

2004



# SERVICE MANUAL

**CBR1000RR**

# HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CBR1000RR-4.

Follow the Maintenance Schedule (Section 4) 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, California Air Resources Board and Transport Canada.

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 and 4 apply to the whole motorcycle. Section 3 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.

Section 5 through 20 describe parts of the motorcycle, grouped according to location.

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

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


If you are not familiar with this motorcycle, read Technical Features in Section 2.

If you don't know the source of the trouble, go to section 22 Troubleshooting.

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

You must use your own good judgement.

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

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

## **DANGER**

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

## **WARNING**

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

## **CAUTION**

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

- Instructions – how to service this vehicle correctly and safely.

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












# CONTENTS

|                        |   |    |
|------------------------|---|----|
|                        | GENERAL INFORMATION                           | 1  |
|                        | TECHNICAL FEATURES                            | 2  |
|                        | FRAME/BODY PANELS/EXHAUST SYSTEM              | 3  |
|                        | MAINTENANCE                                   | 4  |
| ENGINE AND DRIVE TRAIN | LUBRICATION SYSTEM                            | 5  |
|                        | FUEL SYSTEM (Programmed Fuel Injection)       | 6  |
|                        | COOLING SYSTEM                                | 7  |
|                        | ENGINE REMOVAL/INSTALLATION                   | 8  |
|                        | CYLINDER HEAD/VALVES                          | 9  |
|                        | CLUTCH/STARTER CLUTCH                         | 10 |
|                        | ALTERNATOR                                    | 11 |
|                        | TRANSMISSION/GEARSHIFT LINKAGE                | 12 |
|                        | CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER | 13 |
| CHASSIS                | FRONT WHEEL/SUSPENSION/STEERING               | 14 |
|                        | REAR WHEEL/SUSPENSION                         | 15 |
|                        | HYDRAULIC BRAKE                               | 16 |
| ELECTRICAL             | BATTERY/CHARGING SYSTEM                       | 17 |
|                        | IGNITION SYSTEM                               | 18 |
|                        | ELECTRIC STARTER                              | 19 |
|                        | LIGHTS/METERS/SWITCHES                        | 20 |
|                        | WIRING DIAGRAM                                | 21 |
|                        | TROUBLESHOOTING                               | 22 |
|                        | INDEX   | 23 |



## SYMBOLS

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

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

# 1. GENERAL INFORMATION

1

|  |     |  |      |
|--|-----|--|------|
| SERVICE RULES .....  | 1-2 | REAR WHEEL/SUSPENSION<br>SPECIFICATIONS.....             | 1-9  |
| MODEL IDENTIFICATION.....  | 1-2 | HYDRAULIC BRAKE<br>SPECIFICATIONS.....                   | 1-10 |
| GENERAL SPECIFICATIONS.....  | 1-4 | BATTERY/CHARGING SYSTEM<br>SPECIFICATIONS.....           | 1-10 |
| LUBRICATION SYSTEM<br>SPECIFICATIONS.....                              | 1-6 | IGNITION SYSTEM SPECIFICATIONS .....                     | 1-10 |
| FUEL SYSTEM (Programmed Fuel<br>Injection) SPECIFICATIONS.....         | 1-6 | ELECTRIC STARTER SPECIFICATIONS .....                    | 1-10 |
| COOLING SYSTEM SPECIFICATIONS .....                                    | 1-6 | LIGHTS/METERS/SWITCHES<br>SPECIFICATIONS.....            | 1-11 |
| CYLINDER HEAD/VALVES<br>SPECIFICATIONS.....                            | 1-7 | STANDARD TORQUE VALUES .....                             | 1-12 |
| CLUTCH/STARTER CLUTCH<br>SPECIFICATIONS.....                           | 1-7 | ENGINE & FRAME TORQUE VALUES .....                       | 1-12 |
| TRANSMISSION/GEARSHIFT LINKAGE<br>SPECIFICATIONS.....                  | 1-8 | LUBRICATION & SEAL POINTS .....                          | 1-20 |
| CRANKCASE/CRANKSHAFT/BALANCER/<br>PISTON/CYLINDER SPECIFICATIONS ..... | 1-8 | CABLE & HARNESS ROUTING .....                            | 1-24 |
| FRONT WHEEL/SUSPENSION/STEERING<br>SPECIFICATIONS.....                 | 1-9 | EMISSION CONTROL SYSTEMS .....                           | 1-36 |
|  |     | EMISSION CONTROL INFORMATION<br>LABEL (U.S.A. ONLY)..... | 1-39 |



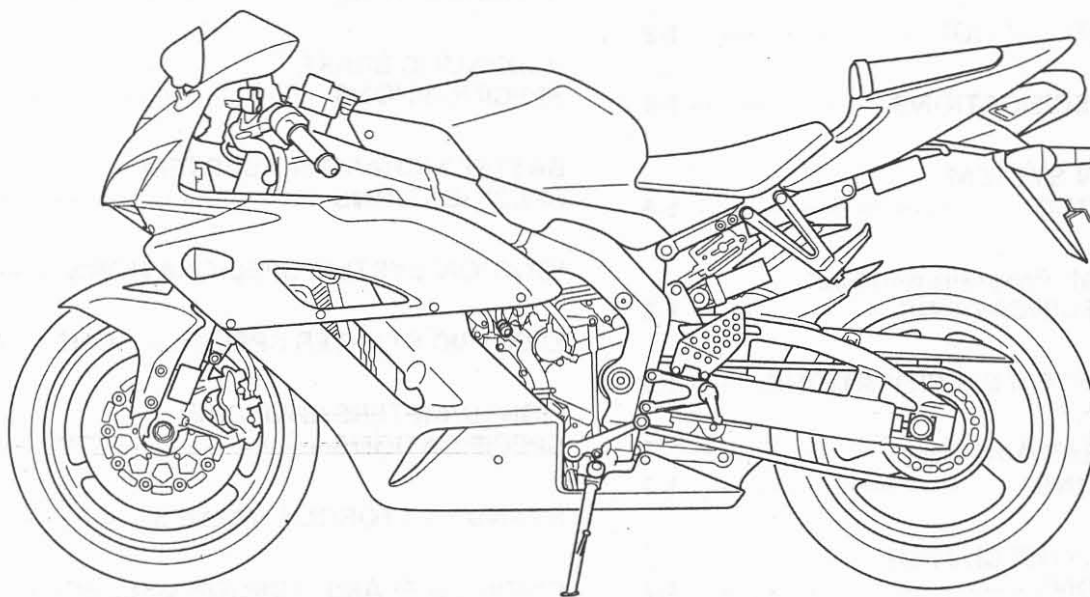
## GENERAL INFORMATION

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### SERVICE RULES

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

### MODEL IDENTIFICATION

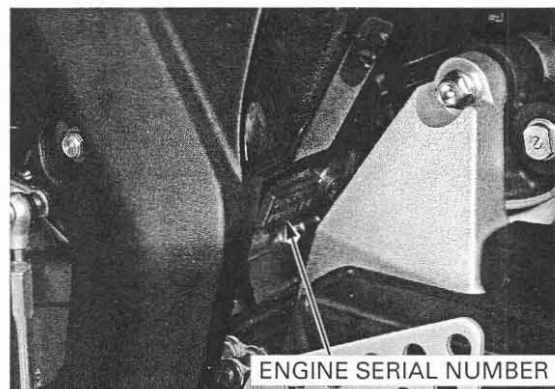


## GENERAL INFORMATION

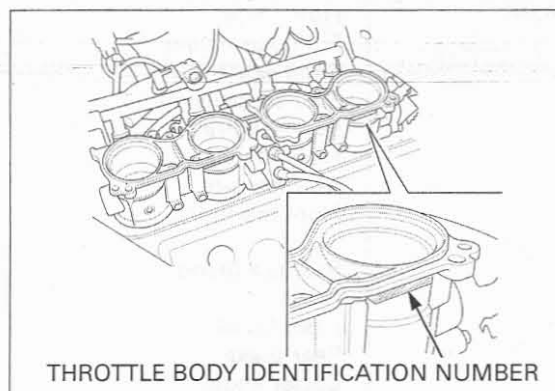
The frame serial number is stamped on the right side of the steering head.



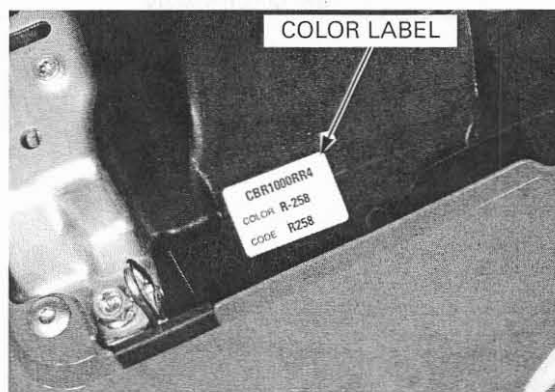
The engine serial number is stamped on the rear side of the lower crankcase.



The throttle body identification number is stamped on the intake side of the throttle body as shown.



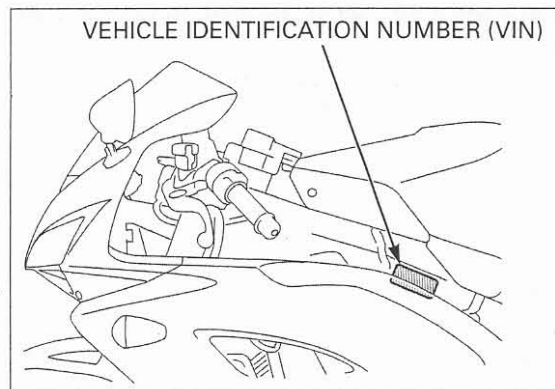
The color label is attached on the rear fender B as shown. When ordering color-coded parts, always specify the designated color code.





## GENERAL INFORMATION

The Vehicle Identification Number (VIN) is located on the left side of the main frame on the Safety Certification Labels.



## GENERAL SPECIFICATIONS

| ITEM       |                         | SPECIFICATIONS  |
|------------|-------------------------|---|
| DIMENSIONS | Overall length          | 2,035 mm (80.1 in)  |
|            | Overall width           | 720 mm (28.3 in)  |
|            | Overall height          | 1,120 mm (44.1 in)  |
|            | Wheelbase               | 1,405 mm (55.3 in)  |
|            | Seat height             | 820 mm (32.3 in)  |
|            | Ground clearance        | 130 mm (5.1 in)   |
|            | Dry weight              | A, CM type: 180 kg (397 lbs)<br>AC type: 181 kg (399 lbs) |
|            | Curb weight             | A, CM type: 210 kg (463 lbs)<br>AC type: 211 kg (465 lbs) |
|            | Maximum weight capacity | A, AC type: 166 kg (366 lbs)<br>CM type: 170 kg (375 lbs) |
|            |                         |   |
| FRAME      | Frame type              | Diamond   |
|            | Front suspension        | Telescopic fork   |
|            | Front axle travel       | 110 mm (4.3 in)   |
|            | Rear suspension         | Swingarm  |
|            | Rear axle travel        | 135 mm (5.3 in)   |
|            | Front tire size         | 120/70 ZR17 M/C (58W)                                     |
|            | Rear tire size          | 190/50 ZR17 M/C (73W)                                     |
|            | Front tire brand        | Bridgestone: BT014F RADIAL G<br>Pirelli: DIABLO CORSA H   |
|            | Rear tire brand         | Bridgestone: BT014R RADIAL G<br>Pirelli: DIABLO CORSA H   |
|            | Front brake             | Hydraulic double disc                                     |
|            | Rear brake              | Hydraulic single disc                                     |
|            | Caster angle            | 23° 45'   |
|            | Trail length            | 102 mm (4.0 in)   |
|            | Fuel tank capacity      | 18.0 liter (4.76 US gal, 3.96 Imp gal)                    |

## GENERAL INFORMATION

| ITEM                 |                         | SPECIFICATIONS   |
|----------------------|-------------------------|--|
| ENGINE               | Cylinder arrangement    | 4 cylinders in-line, inclined 28° from vertical                  |
|                      | Bore and stroke         | 75.0 x 56.5 mm (2.95 x 2.22 in)                                  |
|                      | Displacement            | 998.4 cm <sup>3</sup> (60.92 cu-in)                              |
|                      | Compression ratio       | 11.9: 1  |
|                      | Valve train             | Chain driven, DOHC   |
|                      | Intake valve opens:     | at 1 mm (0.04 in) lift   |
|                      | Intake valve closes:    | at 1 mm (0.04 in) lift   |
|                      | Exhaust valve opens:    | at 1 mm (0.04 in) lift   |
|                      | Exhaust valve closes:   | at 1 mm (0.04 in) lift   |
|                      | Lubrication system      | Forced pressure and wet sump                                     |
|                      | Oil pump type           | Trochoid   |
|                      | Cooling system          | Liquid cooled  |
|                      | Air filtration          | Paper element  |
|                      | Engine dry weight       | 65.8 kg (145.1 lbs)  |
|                      | Firing order            | 1 - 2 - 4 - 3  |
| FUEL DELIVERY SYSTEM | Type                    | PGM-FI (Programmed Fuel Injection)                               |
|                      | Throttle bore           | 44.0 mm (1.73 in)  |
| DRIVE TRAIN          | Clutch system           | Multi-plate, wet   |
|                      | Clutch operation system | Hydraulic operating  |
|                      | Transmission            | Constant mesh, 6-speeds  |
|                      | Primary reduction       | 1.604 (77/48T)   |
|                      | Final reduction         | 2.562 (16/41T)   |
|                      | Gear ratio              | 2.538 (33/13T)   |
|                      |                         | 1.941 (33/17T)   |
|                      |                         | 1.578 (30/19T)   |
|                      |                         | 1.380 (29/21T)   |
|                      |                         | 1.250 (25/20T)   |
|                      |                         | 1.160 (29/25T)   |
|                      | Gearshift pattern       | 1 - N - 2 - 3 - 4 - 5 - 6  |
| ELECTRICAL           | Ignition system         | Computer-controlled digital transistorized with electric advance |
|                      | Starting system         | Electric starter motor   |
|                      | Charging system         | Triple phase output alternator                                   |
|                      | Regulator/rectifier     | SCR shorted/triple phase, full wave rectification                |
|                      | Lighting system         | Battery  |



## GENERAL INFORMATION

### LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

| ITEM   |                         | STANDARD   | SERVICE LIMIT |
|--|-------------------------|--|---------------|
| Engine oil capacity                              | After draining          | 3.0 liter (3.2 US qt, 2.6 Imp qt)  | —             |
|  | After oil filter change | 3.1 liter (3.3 US qt, 2.7 Imp qt)  | —             |
|  | After disassembly       | 3.8 liter (4.0 US qt, 3.3 Imp qt)  | —             |
| Recommended engine oil                           |                         | Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (U.S.A. and Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil<br>API service classification: SG or Higher except oils labeled as energy conserving on the circular API service label<br>JASO T 903 standard: MA<br>Viscosity: SAE 10W-40 | —             |
| Oil pressure at EOP (engine oil pressure) switch |                         | 490 kPa (5.0 kgf/cm <sup>2</sup> , 71 psi) at 6,000 rpm/(80°C/176°F)   | —             |
| Oil pump   | Tip clearance           | 0.15 (0.006)   | 0.20 (0.008)  |
|  | Body clearance          | 0.15 – 0.21 (0.006 – 0.008)  | 0.35 (0.014)  |
|  | Side clearance          | 0.04 – 0.09 (0.002 – 0.004)  | 0.17 (0.007)  |

### FUEL SYSTEM (Programmed Fuel Injection) SPECIFICATIONS

| ITEM   |                    | SPECIFICATIONS   |
|--|--------------------|--|
| Throttle body identification number                          | A, CM type         | GQA0C  |
|  | AC type            | GQA0B  |
| Starter valve vacuum difference                              |                    | 20mm Hg  |
| Base throttle valve for synchronization                      |                    | No. 1  |
| Idle speed   |                    | 1,200 ± 100 rpm  |
| Throttle grip free play                                      |                    | 2 – 4 mm (1/16 – 3/16 in)                                      |
| Intake air temperature sensor resistance (at 20°C/68°F)      |                    | 1 – 4 kΩ   |
| Engine coolant temperature sensor resistance (at 20°C/68°F)  |                    | 2.3 – 2.6 kΩ   |
| Fuel injection resistance (at 20°C/68°F)                     | Primary injector   | 10.5 – 14.5 Ω  |
|  | Secondary injector | 10.5 – 14.5 Ω  |
| PAIR control solenoid valve resistance (at 20°C/68°F)        |                    | 20 – 24 Ω  |
| CMP (Camshaft position) sensor peak voltage (at 20°C/68°F)   |                    | 0.7 V minimum  |
| CKP (Crankshaft position) sensor peak voltage (at 20°C/68°F) |                    | 0.7 V minimum  |
| Manifold absolute pressure at idle                           |                    | 150 – 250 mm Hg  |
| Fuel pressure at idle  |                    | 343 kPa (3.5 kgf/cm <sup>2</sup> , 50 psi)                     |
| Fuel pump flow (at 12V)                                      |                    | 189 cm <sup>3</sup> (6.4 US oz, 6.7 Imp oz) minimum/10 seconds |

### COOLING SYSTEM SPECIFICATIONS

| ITEM                           |                     | SPECIFICATIONS   |
|--------------------------------|---------------------|--|
| Coolant capacity               | Radiator and engine | 3.15 liter (3.33 US qt, 2.77 Imp qt)   |
|                                | Reserve tank        | 0.4 liter (0.42 US qt, 0.35 Imp qt)  |
| Radiator cap relief pressure   |                     | 108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)                        |
| Thermostat                     | Begin to open       | 80 – 84 °C (176 – 183 °F)  |
|                                | Fully open          | 90 °C (194 °F)   |
|                                | Valve lift          | 8 mm (0.3 in) minimum  |
| Recommended antifreeze         |                     | High quality ethylene glycol antifreeze containing corrosion protection inhibitors |
| Standard coolant concentration |                     | 1:1 mixture with distilled water   |

## CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

| ITEM                     |  | STANDARD  | SERVICE LIMIT                   |
|--------------------------|--|---|---------------------------------|
| Cylinder compression     |  | 1,098 kPa (11.2 kgf/cm <sup>2</sup> , 159 psi) at 350 rpm | —                               |
| Valve clearance          | IN   | 0.16 ± 0.03 (0.006 ± 0.001)                               | —                               |
|                          | EX   | 0.30 ± 0.03 (0.012 ± 0.001)                               | —                               |
| Camshaft                 | Cam lobe height                            | IN  | 37.02 – 37.10 (1.457 – 1.461)   |
|                          |  | EX  | 36.66 – 36.74 (1.443 – 1.446)   |
|                          | Runout                                     | —   | 0.05 (0.002)                    |
|                          | Oil clearance                              | 0.020 – 0.062 (0.0008 – 0.0024)                           | 0.10 (0.004)                    |
| Valve lifter             | Valve lifter O.D.                          | 25.978 – 25.993 (1.0228 – 1.0233)                         | 25.97 (1.022)                   |
|                          | Valve lifter bore I.D.                     | 26.010 – 26.026 (1.0240 – 1.0246)                         | 26.04 (1.025)                   |
| Valve, valve guide       | Valve stem O.D.                            | IN  | 3.975 – 3.990 (0.1565 – 0.1571) |
|                          |  | EX  | 3.965 – 3.980 (0.1561 – 0.1567) |
|                          | Valve guide I.D.                           | IN/EX   | 4.000 – 4.012 (0.1575 – 0.1580) |
|                          | Stem-to-guide clearance                    | IN  | 0.010 – 0.037 (0.0004 – 0.0015) |
|                          |  | EX  | 0.020 – 0.047 (0.0008 – 0.0019) |
|                          | Valve guide projection above cylinder head | IN  | 16.1 – 16.4 (0.63 – 0.65)       |
|                          |  | EX  | 15.5 – 15.8 (0.61 – 0.62)       |
|                          | Valve seat width                           | IN  | 0.90 – 1.10 (0.035 – 0.043)     |
|                          |  | EX  | 0.90 – 1.10 (0.035 – 0.043)     |
| Valve spring free length | IN   | 39.5 (1.56)   | 38.7 (1.52)                     |
|                          | EX   | 39.5 (1.56)   | 38.7 (1.52)                     |
| Cylinder head warpage    |  | —   | 0.10 (0.004)                    |

## CLUTCH/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

| ITEM  |                      | STANDARD                          | SERVICE LIMIT   |
|---|----------------------|-----------------------------------|-----------------|
| Specified clutch fluid                          |                      | DOT 4 brake fluid                 | —               |
| Clutch master cylinder                          | Master cylinder I.D. | 12.700 – 12.743 (0.5000 – 0.5017) | 12.755 (0.5022) |
|   | Master piston O.D.   | 12.657 – 12.684 (0.4983 – 0.4994) | 12.645 (0.4978) |
| Clutch  | Spring free length   | 56.8 (2.24)                       | 55.7 (2.19)     |
|   | Disc A thickness     | 3.72 – 3.88 (0.146 – 0.153)       | 3.4 (0.13)      |
|   | Disc B thickness     | 3.22 – 3.38 (0.127 – 0.133)       | 2.9 (0.11)      |
|   | Plate warpage        | —                                 | 0.30 (0.012)    |
| Clutch outer guide A (Without ID mark)          | I.D.                 | 27.993 – 28.003 (1.1021 – 1.1025) | 28.012 (1.1028) |
|   | O.D.                 | 35.004 – 35.012 (1.3781 – 1.3784) | 34.994 (1.3777) |
| Clutch outer guide B (With ID mark)             | I.D.                 | 27.993 – 28.003 (1.1021 – 1.1025) | 28.012 (1.1028) |
|   | O.D.                 | 34.996 – 35.004 (1.3778 – 1.3781) | 34.986 (1.3774) |
| Primary driven gear I.D.                        | A                    | 41.008 – 41.016 (1.6145 – 1.6148) | 41.026 (1.6152) |
|   | B                    | 41.000 – 41.008 (1.6142 – 1.6145) | 41.018 (1.6149) |
| Oil pump drive sprocket guide                   | I.D.                 | 28.000 – 28.021 (1.1024 – 1.1032) | 28.030 (1.1035) |
|   | O.D.                 | 34.975 – 34.991 (1.3770 – 1.3776) | 34.965 (1.3766) |
| Oil pump drive sprocket I.D.                    |                      | 35.025 – 35.145 (1.3789 – 1.3837) | 35.155 (1.3841) |
| Mainshaft O.D. at clutch outer guide            |                      | 27.980 – 27.990 (1.1016 – 1.1020) | 27.96 (1.101)   |
| Mainshaft O.D. at oil pump drive sprocket guide |                      | 27.980 – 27.990 (1.1016 – 1.1020) | 27.96 (1.101)   |
| Starter idle gear                               | Gear I.D.            | 10.013 – 10.035 (0.3942 – 0.3951) | 10.05 (0.396)   |
|   | Shaft O.D.           | 9.991 – 10.000 (0.3933 – 0.3937)  | 9.98 (0.393)    |
| Starter driven gear boss O.D.                   |                      | 45.657 – 45.673 (1.7975 – 1.7981) | 45.642 (1.7969) |



## GENERAL INFORMATION

### TRANSMISSION/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

| ITEM                  |                            |            | STANDARD                          | SERVICE LIMIT   |
|-----------------------|----------------------------|------------|-----------------------------------|-----------------|
| Shift fork            | I.D.                       |            | 12.000 – 12.018 (0.4724 – 0.4731) | 12.03 (0.474)   |
|                       | Claw thickness             |            | 5.93 – 6.00 (0.233 – 0.236)       | 5.9 (0.23)      |
| Shift fork shaft O.D. |                            |            | 11.957 – 11.968 (0.4707 – 0.4712) | 11.95 (0.470)   |
| Transmission          | Gear I.D.                  | M5, M6     | 31.000 – 31.025 (1.2205 – 1.2215) | 31.04 (1.222)   |
|                       |                            | C1         | 28.000 – 28.021 (1.1024 – 1.1032) | 28.04 (1.104)   |
|                       |                            | C2, C3, C4 | 33.000 – 33.025 (1.2992 – 1.3002) | 33.04 (1.301)   |
|                       | Gear busing O.D.           | M5, M6     | 30.955 – 30.980 (1.2187 – 1.2197) | 30.935 (1.2179) |
|                       |                            | C2         | 32.955 – 32.980 (1.2974 – 1.2984) | 32.935 (1.2967) |
|                       |                            | C3, C4     | 32.950 – 32.975 (1.2972 – 1.2982) | 32.930 (1.2964) |
|                       | Gear-to-bushing clearance  | M5, M6     | 0.020 – 0.070 (0.0008 – 0.0028)   | 0.10 (0.004)    |
|                       |                            | C2         | 0.020 – 0.070 (0.0008 – 0.0028)   | 0.10 (0.004)    |
|                       |                            | C3, C4     | 0.025 – 0.075 (0.0010 – 0.0030)   | 0.11 (0.004)    |
|                       | Gear bushing I.D.          | M5         | 27.985 – 28.006 (1.1018 – 1.1026) | 28.016 (1.1030) |
|                       |                            | C2         | 29.985 – 30.006 (1.1018 – 1.1026) | 30.021 (1.1819) |
|                       | Mainshaft O.D.             | at M5      | 27.967 – 27.980 (1.1011 – 1.1016) | 27.957 (1.1007) |
|                       | Countershaft O.D.          | at C2      | 29.967 – 29.980 (1.1798 – 1.1803) | 29.960 (1.1795) |
|                       | Bushing to shaft clearance | M5         | 0.005 – 0.039 (0.0002 – 0.0015)   | 0.06 (0.002)    |
|                       |                            | C2         | 0.005 – 0.039 (0.0002 – 0.0015)   | 0.06 (0.002)    |

### CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER SPECIFICATIONS

Unit: mm (in)

| ITEM                                   |                                       |                 | STANDARD                          | SERVICE LIMIT   |
|--|---------------------------------------|-----------------|-----------------------------------|-----------------|
| Crankshaft                             | Connecting rod side clearance         |                 | 0.05 – 0.20 (0.002 – 0.008)       | 0.25 (0.098)    |
|  | Crankpin bearing oil clearance        |                 | 0.030 – 0.052 (0.0012 – 0.0020)   | 0.06 (0.002)    |
|  | Main journal bearing oil clearance    |                 | 0.019 – 0.037 (0.0007 – 0.0015)   | 0.05 (0.002)    |
|  | Runout                                |                 | —                                 | 0.05 (0.002)    |
| Piston, piston rings                   | Piston O.D. at 4.0 (0.16) from bottom |                 | 74.960 – 74.980 (2.9512 – 2.9520) | 74.895 (2.9486) |
|  | Piston pin bore I.D.                  |                 | 17.002 – 17.008 (0.6694 – 0.6696) | 17.030 (0.6705) |
|  | Piston pin O.D.                       |                 | 16.994 – 17.000 (0.6690 – 0.6693) | 16.980 (0.6685) |
|  | Piston-to-piston pin clearance        |                 | 0.002 – 0.014 (0.0001 – 0.0006)   | 0.04 (0.002)    |
|  | Piston ring end gap                   | Top             | 0.22 – 0.32 (0.009 – 0.013)       | 0.52 (0.020)    |
|  |                                       | Second          | 0.48 – 0.63 (0.019 – 0.025)       | 0.82 (0.032)    |
|  |                                       | Oil (side rail) | 0.2 – 0.7 (0.01 – 0.03)           | 1.0 (0.04)      |
|  | Piston ring-to-ring groove clearance  | Top             | 0.050 – 0.085 (0.0020 – 0.0033)   | 0.125 (0.0049)  |
|  |                                       | Second          | 0.015 – 0.050 (0.0006 – 0.0020)   | 0.075 (0.0030)  |
| Cylinder                               | I.D.                                  |                 | 75.000 – 75.015 (2.9528 – 2.9533) | 75.15 (2.959)   |
|  | Out of round                          |                 | —                                 | 0.10 (0.004)    |
|  | Taper                                 |                 | —                                 | 0.10 (0.004)    |
|  | Warpage                               |                 | —                                 | 0.10 (0.004)    |
| Cylinder-to-piston clearance           |                                       |                 | 0.020 – 0.055 (0.0008 – 0.0022)   | 0.10 (0.004)    |
| Connecting rod small end I.D.          |                                       |                 | 17.030 – 17.042 (0.6705 – 0.6709) | 17.048 (0.6712) |
| Connecting rod-to-piston pin clearance |                                       |                 | 0.030 – 0.046 (0.0012 – 0.0018)   | 0.07 (0.003)    |

## FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

| ITEM                     |                                      | STANDARD  | SERVICE LIMIT     |
|--------------------------|--------------------------------------|---|-------------------|
| Minimum tire tread depth |                                      | —   | 1.5 (0.06)        |
| Cold tire pressure       | Up to 90 kg (200 lbs) load           | 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)                       | —                 |
|                          | Up to maximum weight capacity        | 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)                       | —                 |
| Axle runout              |                                      | —   | 0.2 (0.008)       |
| Wheel rim runout         | Radial                               | —   | 2.0 (0.08)        |
|                          | Axial                                | —   | 2.0 (0.08)        |
| Wheel balance weight     |                                      | —   | 60 g (2.1oz) max. |
| Fork                     | Spring free length                   | 218.2 (8.59)  | 213.8 (8.42)      |
|                          | Fork pipe runout                     | —   | 0.20 (0.008)      |
|                          | Recommended fork fluid               | Pro Honda Suspension Fluid, SS-55 or equivalent                   | —                 |
|                          | Fluid level                          | 90 (3.5)  | —                 |
|                          | Fluid capacity                       | 466 ± 2.5 cm <sup>3</sup> (15.8 ± 0.08 US oz, 16.4 ± 0.09 Imp oz) | —                 |
|                          | Pre-load adjuster initial setting    | 7 turns from minimum  | —                 |
|                          | Rebound adjuster initial setting     | 2 turns out from full hard  | —                 |
|                          | Compression adjuster initial setting | 2 turns out from full hard  | —                 |
|                          | Steering head bearing pre-load       | 12 – 19 N (1.2 – 1.9 kgf)   | —                 |

## REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

| ITEM                     |  |     | STANDARD                                    | SERVICE LIMIT      |
|--------------------------|--|-----|---|--------------------|
| Minimum tire tread depth |  |     | —   | 2.0 (0.08)         |
| Cold tire pressure       | Up to 90 kg (200 lbs) load                   |     | 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi) | —                  |
|                          | Up to maximum weight capacity                |     | 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi) | —                  |
| Axle runout              |  |     | —   | 0.2 (0.01)         |
| Wheel rim runout         | Radial                                       |     | —   | 2.0 (0.08)         |
|                          | Axial  |     | —   | 2.0 (0.08)         |
| Wheel balance weight     |  |     | —   | 60 g (2.1 oz) max. |
| Drive chain              | Size/link                                    | DID | DID50VM2-114YB                              | —                  |
|                          |  | RK  | RK50GFOZ1-114LJFZ                           | —                  |
|                          | Slack  |     | 25 – 35 (1 – 1-3/8)                         | —                  |
| Shock absorber           | Spring pre-load adjuster standard position   |     | Position 4                                  | —                  |
|                          | Rebound damping adjuster initial setting     |     | 2 - 1/2 turns out from full hard            | —                  |
|                          | Compression damping adjuster initial setting |     | 9 clicks out from full hard                 | —                  |

## GENERAL INFORMATION

### HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

| ITEM  |                       |   | STANDARD                          | SERVICE LIMIT   |
|-------|-----------------------|---|-----------------------------------|-----------------|
| Front | Specified brake fluid |   | DOT 4                             | –               |
|       | Brake disc thickness  |   | 5.0 (0.20)                        | 4.0 (0.16)      |
|       | Brake disc runout     |   | –                                 | 0.30 (0.012)    |
|       | Master cylinder I.D.  |   | 17.460 – 17.503 (0.6874 – 0.6891) | 17.515 (0.6896) |
|       | Master piston O.D.    |   | 17.321 – 17.367 (0.6819 – 0.6837) | 17.309 (0.6815) |
|       | Caliper cylinder I.D. | A | 32.080 – 32.130 (1.2630 – 1.2650) | 32.140 (1.2654) |
|       |                       | B | 30.280 – 30.330 (1.1921 – 1.1941) | 30.340 (1.1945) |
|       | Caliper piston O.D.   | A | 31.967 – 32.000 (1.2585 – 1.2598) | 31.957 (1.2581) |
|       |                       | B | 30.167 – 30.200 (1.1877 – 1.1890) | 30.157 (1.1873) |
| Rear  | Specified brake fluid |   | DOT 4                             | –               |
|       | Brake pedal height    |   | 75 (3.0)                          | –               |
|       | Brake disk thickness  |   | 5.0 (0.20)                        | 4.0 (0.16)      |
|       | Brake disc runout     |   | –                                 | 0.30 (0.012)    |
|       | Master cylinder I.D.  |   | 15.870 – 15.913 (0.6248 – 0.6265) | 15.925 (0.6270) |
|       | Master piston O.D.    |   | 15.827 – 15.854 (0.6231 – 0.6242) | 15.815 (0.6226) |
|       | Caliper cylinder I.D. |   | 38.180 – 38.230 (1.5031 – 1.5051) | 38.24 (1.506)   |
|       | Caliper piston O.D.   |   | 38.098 – 38.148 (1.4999 – 1.5019) | 38.09 (1.500)   |

### BATTERY/CHARGING SYSTEM SPECIFICATIONS

| ITEM       |                                      |                | SPECIFICATIONS     |
|------------|--------------------------------------|----------------|--------------------|
| Battery    | Capacity                             |                | 12V – 8.6 Ah       |
|            | Current leakage                      |                | 2.0 mA max.        |
|            | Voltage<br>(20°C/68°F)               | Fully charged  | 13.0 – 13.2 V      |
|            |                                      | Needs charging | Below 12.4 V       |
|            | Charging current                     | Normal         | 0.9 A/5 – 10 h     |
|            |                                      | Quick          | 4.5 A/1 h          |
| Alternator | Capacity                             |                | 0.344 kW/5,000 rpm |
|            | Charging coil resistance (20°C/68°F) |                | 0.1 – 1.0 Ω        |

### IGNITION SYSTEM SPECIFICATIONS

| ITEM                                  |       | SPECIFICATIONS                    |
|---------------------------------------|-------|-----------------------------------|
| Spark plug (Iridium)                  | NGK   | IMR9C-9HES                        |
|                                       | DENSO | VUH27ES                           |
| Spark plug gap                        |       | 0.80 – 0.90 mm (0.031 – 0.035 in) |
| Ignition coil peak voltage            |       | 100 V minimum                     |
| Ignition pulse generator peak voltage |       | 0.7 V minimum                     |
| Ignition timing ("F" mark)            |       | 8° 12' BTDC at idle               |

### ELECTRIC STARTER SPECIFICATIONS

Unit: mm (in)

| ITEM                       | STANDARD                  | SERVICE LIMIT |
|----------------------------|---------------------------|---------------|
| Starter motor brush length | 12.0 – 13.0 (0.47 – 0.51) | 6.5 (0.26)    |



## LIGHTS/METERS/SWITCHES SPECIFICATIONS

| ITEM                    |                                  |    | SPECIFICATIONS             |
|-------------------------|----------------------------------|----|----------------------------|
| Bulbs                   | Headlight                        | Hi | 12V – 55 W                 |
|                         |                                  | Lo | 12V – 55 W                 |
|                         | Position light                   |    | 12V – 5 W                  |
|                         | Brake/tail light                 |    | LED                        |
|                         | Front turn signal/running light  |    | 12V – 23/8 W x 2 (32/3 cp) |
|                         | Rear turn signal light           |    | 12V – 23 W x 2             |
|                         | Instrument light                 |    | LED                        |
|                         | Turn signal indicator            |    | LED                        |
|                         | High beam indicator              |    | LED                        |
|                         | Neutral indicator                |    | LED                        |
|                         | Malfunction indicator lamp (MIL) |    | LED                        |
| Fuse                    | Main fuse                        |    | 30 A                       |
|                         | PGM-FI fuse                      |    | 20 A                       |
|                         | Sub fuse                         |    | 10 A x 4, 20 A x 2         |
| Tachometer peak voltage |                                  |    | 10.5 V minimum             |
| ECT sensor resistance   | 80 °C (176 °F)                   |    | 2.1 – 2.6 kΩ               |
|                         | 120 °C (248 °F)                  |    | 0.65 – 0.73 kΩ             |

## GENERAL INFORMATION

### STANDARD TORQUE VALUES

| FASTENER TYPE          | TORQUE<br>N·m (kgf·m, lbf·ft) | FASTENER TYPE                                 | TORQUE<br>N·m (kgf·m, lbf·ft) |
|------------------------|-------------------------------|---|-------------------------------|
| 5 mm hex bolt and nut  | 4.9 (0.5, 3.6)                | 5 mm screw                                    | 3.9 (0.4, 2.9)                |
| 6 mm hex bolt and nut  | 9.8 (1.0, 7)                  | 6 mm screw                                    | 8.8 (0.9, 6.5)                |
| 8 mm hex bolt and nut  | 22 (2.2, 16)                  | 6 mm flange bolt<br>(8 mm head, small flange) | 9.8 (1.0, 7)                  |
| 10 mm hex bolt and nut | 34 (3.5, 25)                  | 6 mm flange bolt<br>(8 mm head, large flange) | 12 (1.2, 9)                   |
| 12 mm hex bolt and nut | 54 (5.5, 40)                  | 6 mm flange bolt<br>(10 mm head) and nut      | 12 (1.2, 9)                   |
|                        |                               | 8 mm flange bolt and nut                      | 26 (2.7, 20)                  |
|                        |                               | 10 mm flange bolt and nut                     | 39 (4.0, 29)                  |

### ENGINE & FRAME TORQUE VALUES

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

#### NOTE:

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

## ENGINE

### MAINTENANCE:

| ITEM                        | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|-----------------------------|------|---------------------|-------------------------------|---------|
| Spark plug                  | 4    | 10                  | 16 (1.6, 12)                  |         |
| Timing hole cap             | 1    | 45                  | 18 (1.8, 13)                  | NOTE 7  |
| Engine oil filter cartridge | 1    | 20                  | 26 (2.7, 20)                  | NOTE 4  |
| Engine oil drain bolt       | 1    | 12                  | 29 (3.0, 22)                  |         |

### LUBRICATION SYSTEM:

| ITEM                          | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|-------------------------------|------|---------------------|-------------------------------|---------|
| Oil pump assembly flange bolt | 3    | 6                   | 12 (1.2, 9)                   | NOTE 9  |
| Engine oil drain base bolt    | 1    | 6                   | 12 (1.2, 9)                   | NOTE 2  |
| Oil filter boss               | 1    | 20                  | See page 1-15                 |         |

### FUEL SYSTEM (Programmed Fuel Injection):

| ITEM   | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|--|------|---------------------|-------------------------------|---------|
| ECT (Engine Coolant Temperature)/thermo sensor | 1    | 12                  | 23 (2.3, 17)                  |         |
| Throttle body insulator band screw             | 8    | 5                   | See page 1-15                 |         |
| Service check bolt                             | 1    | 6                   | 12 (1.2, 9)                   |         |
| Starter valve lock nut                         | 4    | 10                  | 1.8 (0.18, 1.3)               |         |
| Starter valve synchronization plate screw      | 4    | 3                   | 0.9 (0.09, 0.7)               |         |
| Fuel pipe mounting bolt                        | 3    | 6                   | 9.8 (1.0, 7)                  |         |
| Fast idle wax unit link plate screw            | 1    | 3                   | 0.9 (0.09, 0.7)               |         |
| Fast idle wax unit mounting screw              | 2    | 6                   | 4.9 (0.5, 3.6)                |         |

## GENERAL INFORMATION

### COOLING SYSTEM:

| ITEM                                 | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|--------------------------------------|------|---------------------|-------------------------------|---------|
| Water pump assembly flange bolt      | 2    | 6                   | 12 (1.2, 9)                   | NOTE 9  |
| Thermostat housing cover flange bolt | 2    | 6                   | 12 (1.2, 9)                   | NOTE 9  |

### ENGINE REMOVAL/INSTALLATION:

| ITEM                        | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|-----------------------------|------|---------------------|-------------------------------|---------|
| Drive sprocket special bolt | 1    | 10                  | 54 (5.5, 40)                  |         |

### CYLINDER HEAD/VALVES:

| ITEM                                      | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|---|------|---------------------|-------------------------------|---------|
| Cylinder head mounting bolt/washer        | 10   | 9                   | 51 (5.2, 38)                  | NOTE 8  |
| Camshaft holder flange bolt               | 20   | 6                   | 12 (1.2, 9)                   |         |
| Cylinder head sealing bolt                | 2    | 18                  | 27 (2.8, 20)                  | NOTE 2  |
| Cylinder head cover bolt                  | 4    | 6                   | 9.8 (1.0, 7)                  |         |
| Breather plate flange bolt                | 3    | 6                   | 12 (1.2, 9)                   | NOTE 2  |
| PAIR reed valve cover bolt                | 4    | 6                   | 12 (1.2, 9)                   | NOTE 2  |
| Throttle insulator socket bolt            | 8    | 6                   | 12 (1.2, 9)                   |         |
| Cam sprocket flange bolt                  | 4    | 7                   | 20 (2.0, 14)                  | NOTE 2  |
| CMP (camshaft position) sensor rotor bolt | 2    | 6                   | 12 (1.2, 9)                   | NOTE 2  |
| Cam chain tensioner pivot bolt            | 1    | 6                   | 9.8 (1.0, 7)                  | NOTE 2  |
| Cam chain guide torx bolt                 | 1    | 6                   | 12 (1.2, 9)                   | NOTE 2  |
| Exhaust pipe stud bolt                    | 8    | 8                   | See page 1-15                 |         |

### CLUTCH/STARTER CLUTCH:

| ITEM                          | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS   |
|-------------------------------|------|---------------------|-------------------------------|-----------|
| Clutch center lock nut        | 1    | 25                  | 127 (13.0, 94)                | NOTE 3, 4 |
| Clutch spring bolt/washer     | 5    | 6                   | 12 (1.2, 9)                   |           |
| Oil pump driven sprocket bolt | 1    | 6                   | 15 (1.5, 11)                  | NOTE 2    |
| Starter clutch outer bolt     | 1    | 10                  | 83 (8.5, 61)                  | NOTE 4    |

### ALTERNATOR:

| ITEM                          | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|-------------------------------|------|---------------------|-------------------------------|---------|
| Stator wire clamp flange bolt | 1    | 6                   | 12 (1.2, 9)                   | NOTE 9  |
| Flywheel flange bolt          | 1    | 10                  | 103 (10.5, 76)                | NOTE 4  |
| Stator mounting socket bolt   | 4    | 6                   | 12 (1.2, 9)                   |         |

### TRANSMISSION/GEARSHIFT LINKAGE:

| ITEM                                 | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|--------------------------------------|------|---------------------|-------------------------------|---------|
| Transmission holder flange bolt      | 6    | 8                   | 29 (3.0, 22)                  |         |
| Bearing set plate bolt               | 2    | 6                   | 12 (1.2, 9)                   | NOTE 2  |
| Shift drum center socket bolt        | 1    | 8                   | 23 (2.3, 17)                  | NOTE 2  |
| Shift drum stopper arm pivot bolt    | 1    | 6                   | 12 (1.2, 9)                   |         |
| Gearshift spindle return spring pin  | 1    | 8                   | 23 (2.3, 17)                  |         |
| Shift drum bolt/washer               | 1    | 6                   | 12 (1.2, 9)                   | NOTE 2  |
| Shift drum stopper plate flange bolt | 1    | 6                   | 12 (1.2, 9)                   | NOTE 2  |

## GENERAL INFORMATION

### CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER:

| ITEM                               | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|------------------------------------|------|---------------------|-------------------------------|---------|
| Crankcase 7 mm bolt                | 12   | 7                   | 18 (1.8, 13)                  |         |
| 8 mm bolt                          | 6    | 8                   | 24 (2.4, 17)                  |         |
| 9 mm bolt (main journal bolt)      | 10   | 9                   | See page 13-21                | NOTE 4  |
| Lower crankcase sealing bolt       | 1    | 22                  | 59 (6.0, 43)                  | NOTE 2  |
| Lower crankcase socket bolt        | 1    | 10                  | 12 (1.2, 9)                   | NOTE 2  |
| Lower crankcase sealing bolt       | 1    | 20                  | 29 (3.0, 22)                  | NOTE 2  |
| Lower crankcase socket bolt        | 1    | 8                   | 23 (2.3, 17)                  | NOTE 2  |
| Connecting rod bolt (new bolt)     | 8    | 8                   | See page 13-21                | NOTE 4  |
| Connecting rod bolt (retightening) | 8    | 8                   | See page 13-12                | NOTE 4  |

### ELECTRIC STARTER:

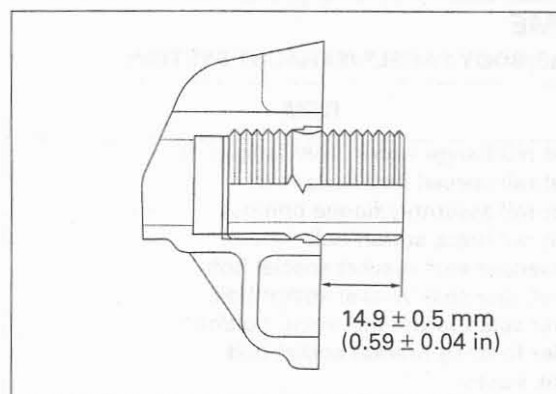
| ITEM                       | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|----------------------------|------|---------------------|-------------------------------|---------|
| Starter motor terminal nut | 1    | 6                   | 12 (1.2, 9)                   |         |

### LIGHTS/METERS/SWITCHES:

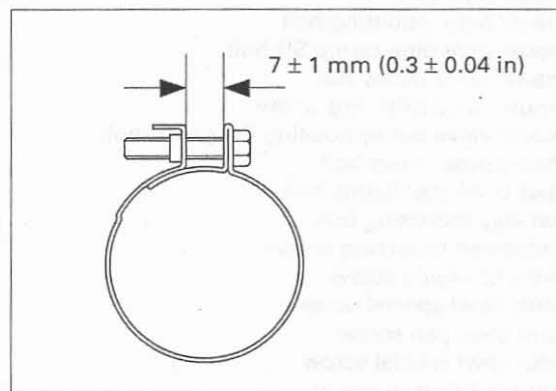
| ITEM                                    | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|---|------|---------------------|-------------------------------|---------|
| Oil pressure switch                     | 1    | PT 1/8              | 12 (1.2, 9)                   | NOTE 1  |
| Oil pressure switch wire terminal screw | 1    | 4                   | 2.0 (0.2, 1.4)                |         |
| Neutral switch                          | 1    | 10                  | 12 (1.2, 9)                   |         |



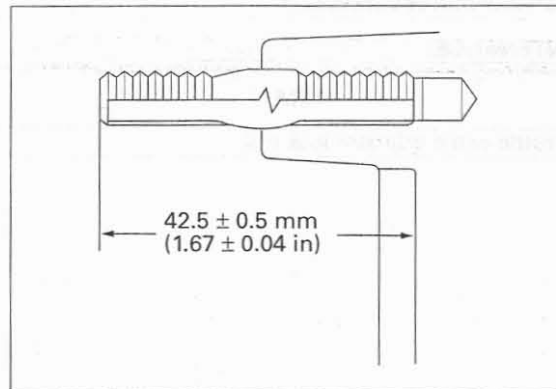
Oil filter boss:



Insulator clamp (Throttle body side):



Exhaust pipe stud bolt:



## GENERAL INFORMATION

### FRAME

#### FRAME/BODY PANELS/EXHAUST SYSTEM:

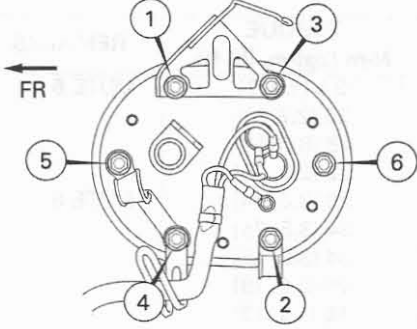
| ITEM  | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|---|------|---------------------|-------------------------------|---------|
| Seat rail flange socket bolt/flange nut     | 2    | 10                  | 59 (6.0, 43)                  |         |
| Seat rail special bolt/flange nut           | 2    | 10                  | 59 (6.0, 43)                  |         |
| Seat rail assembly flange bolt/nut          | 2    | 8                   | 30 (3.1, 22)                  |         |
| Seat rail brace socket bolt                 | 4    | 8                   | 26 (2.7, 20)                  |         |
| Passenger seat bracket special bolt         | 2    | 8                   | 26 (2.7, 20)                  |         |
| Passenger seat bracket socket bolt          | 2    | 8                   | 26 (2.7, 20)                  |         |
| Rider seat bracket mounting bolt/nut        | 4    | 6                   | 9.8 (1.0, 7)                  |         |
| Rider footpeg bracket socket bolt           | 4    | 8                   | 37 (3.8, 27)                  |         |
| Bank sensor                                 | 2    | 6                   | 11 (1.1, 8)                   |         |
| Passenger footpeg bracket socket bolt       | 4    | 8                   | 26 (2.7, 20)                  |         |
| Exhaust pipe joint nut                      | 8    | 7                   | 12 (1.2, 9)                   |         |
| Exhaust pipe mounting bolt                  | 1    | 8                   | 23 (2.3, 17)                  |         |
| Exhaust joint pipe clamp SH bolt            | 1    | 6                   | 9.8 (1.0, 7)                  |         |
| Exhaust valve pulley nut                    | 1    | 6                   | 4.9 (0.5, 3.6)                |         |
| Exhaust valve retaining screw               | 2    | 4                   | 1.5 (0.15, 1.1)               |         |
| Exhaust valve pulley housing flange SH bolt | 2    | 6                   | 9.8 (1.0, 7)                  |         |
| Exhaust pipe clamp bolt                     | 1    | 8                   | 18 (1.8, 13)                  |         |
| Upper cowl stay flange bolt                 | 2    | 8                   | 32 (3.3, 24)                  |         |
| Cowl stay mounting bolt                     | 2    | 6                   | 12 (1.2, 9)                   |         |
| Windscreen mounting screw                   | 6    | 5                   | 0.5 (0.05, 0.4)               |         |
| Middle cowl pan screw                       | 2    | 5                   | 1.5 (0.15, 1.1)               |         |
| Middle cowl special screw                   | 2    | 6                   | 9.8 (1.0, 7)                  |         |
| Under cowl pan screw                        | 6    | 5                   | 1.5 (0.15, 1.1)               |         |
| Under cowl special screw                    | 4    | 6                   | 9.8 (1.0, 7)                  |         |
| Inner cowl special screw                    | 1    | 6                   | 9.8 (1.0, 7)                  |         |
| Front fender pan screw                      | 6    | 6                   | 12 (1.2, 9)                   |         |
| Rearview mirror socket bolt                 | 4    | 6                   | 6.8 (0.7, 5.1)                |         |

#### MAINTENANCE:

| ITEM                             | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|----------------------------------|------|---------------------|-------------------------------|---------|
| Throttle cable adjuster lock nut | 2    | 6                   | 5.4 (0.55, 4.0)               |         |

## GENERAL INFORMATION

### FUEL SYSTEM (Programmed Fuel Injection):

| ITEM  | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N-m (kgf-m, lbf-ft) | REMARKS      |
|---|------|---------------------|-------------------------------|--------------|
| Fuel filler cap socket bolt   | 3    | 4                   | 1.8 (0.18, 1.3)               |              |
| Fuel feed hose banjo bolt (fuel tank side)  | 1    | 12                  | 22 (2.2, 16)                  | Yellow paint |
| Fuel hose sealing nut (throttle body side)  | 1    | 12                  | 22 (2.2, 16)                  |              |
| Fuel pump flange nut  | 6    | 6                   | 12 (1.2, 9)                   |              |
|  |      |                     |                               |              |
| Fuel tank mounting bolt (front)   | 2    | 8                   | 26 (2.7, 20)                  |              |
| Fuel tank mounting bolt (rear)  | 2    | 6                   | 9.8 (1.0, 7)                  |              |
| Fuel rail joint hose bolt   | 2    | 6                   | 9.8 (1.0, 7)                  | Yellow paint |
| Fuel rail joint hose sealing nut  | 1    | 12                  | 22 (2.2, 16)                  | Yellow paint |
| Air cleaner housing/air funnel pan screw  | 6    | 5                   | 4.4 (0.45, 3.3)               |              |
| Top air cleaner housing mounting screw  | 6    | 5                   | 1.2 (0.12, 0.9)               |              |
| Middle air cleaner housing mounting screw   | 8    | 5                   | 1.2 (0.12, 0.9)               |              |
| IAT sensor mounting screw   | 2    | 5                   | 1.2 (0.12, 0.9)               |              |
| Air intake duct joint screw   | 2    | 5                   | 2.5 (0.25, 1.8)               |              |
| Air intake duct cover screw   | 6    | 4                   | 1.2 (0.12, 0.9)               |              |
| Secondary injector base mounting bolts  | 5    | 5                   | 5.4 (0.55, 4.0)               |              |
| Bank angle sensor mounting screw  | 2    | 4                   | 1.5 (0.15, 1.1)               |              |

### COOLING SYSTEM:

| ITEM                            | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N-m (kgf-m, lbf-ft) | REMARKS |
|---------------------------------|------|---------------------|-------------------------------|---------|
| Cooling fan nut                 | 1    | 5                   | 2.9 (0.3, 2.2)                | NOTE 2  |
| Fan motor nut                   | 3    | 5                   | 4.9 (0.5, 3.6)                |         |
| Fan motor bracket mounting bolt | 3    | 6                   | 8.8 (0.9, 6.5)                |         |

### ENGINE REMOVAL/INSTALLATION:

| ITEM                                  | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N-m (kgf-m, lbf-ft) | REMARKS      |
|---------------------------------------|------|---------------------|-------------------------------|--------------|
| Engine hanger adjusting bolt          | 2    | 20                  | 15 (1.5, 11)                  |              |
| Engine hanger adjusting bolt lock nut | 2    | 20                  | 54 (5.5, 40)                  |              |
| Rear upper engine hanger nut          | 1    | 12                  | 64 (6.5, 47)                  | See page 8-9 |
| Rear lower engine hanger nut          | 1    | 12                  | 64 (6.5, 47)                  |              |
| Front engine hanger bolt              | 2    | 12                  | 64 (6.5, 47)                  |              |
| Middle engine hanger bolt             | 2    | 12                  | 64 (6.5, 47)                  |              |

### CLUTCH/STARTER CLUTCH:

| ITEM                                 | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N-m (kgf-m, lbf-ft) | REMARKS |
|--------------------------------------|------|---------------------|-------------------------------|---------|
| Clutch master cylinder oil cup screw | 1    | 4                   | 1.5 (0.15, 1.1)               | NOTE 2  |
| Clutch lever pivot bolt              | 1    | 6                   | 1.0 (0.1, 0.7)                |         |
| Clutch lever pivot nut               | 1    | 6                   | 5.9 (0.6, 4.3)                |         |
| Clutch switch screw                  | 1    | 4                   | 1.0 (0.1, 0.7)                |         |
| Clutch hose oil bolt                 | 2    | 10                  | 34 (3.5, 25)                  |         |
| Clutch master cylinder holder bolt   | 2    | 6                   | 12 (1.2, 9)                   |         |
| Master cylinder bleed valve          | 1    | 8                   | 5.9 (0.6, 4.3)                |         |

## GENERAL INFORMATION

### TRANSMISSION/GEARSHIFT LINKAGE:

| ITEM                            | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|---------------------------------|------|---------------------|-------------------------------|---------|
| Gearshift pedal pivot bolt      | 1    | 8                   | 22 (2.2, 16)                  |         |
| Gearshift pedal link pinch bolt | 1    | 6                   | 9.8 (1.0, 7)                  |         |
| Link arm lock nut               | 2    | 6                   | 9.8 (1.0, 7)                  |         |

### FRONT WHEEL/SUSPENSION/STEERING:

| ITEM                                | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS        |
|-------------------------------------|------|---------------------|-------------------------------|----------------|
| Handlebar weight mounting screw     | 2    | 6                   | 9.8 (1.0, 7)                  | NOTE 6         |
| Handlebar pinch bolt                | 2    | 8                   | 26 (2.7, 20)                  |                |
| Front axle bolt                     | 1    | 18                  | 78 (8.0, 58)                  |                |
| Front axle holder pinch bolt        | 4    | 8                   | 22 (2.2, 16)                  |                |
| Front brake disc bolt               | 12   | 6                   | 20 (2.0, 14)                  | NOTE 6         |
| Fork socket bolt                    | 2    | 10                  | 34 (3.5, 25)                  |                |
| Fork bolt                           | 2    | 46                  | 34 (3.5, 25)                  |                |
| Fork damper lock nut                | 2    | 14                  | 25 (2.6, 19)                  |                |
| Fork compression adjuster plug bolt | 2    | 14                  | 18 (1.8, 13)                  |                |
| Fork top bridge pinch bolt          | 2    | 8                   | 23 (2.3, 17)                  |                |
| Fork bottom bridge pinch bolt       | 4    | 8                   | 23 (2.3, 17)                  |                |
| Steering damper second arm nut      | 1    | 6                   | 12 (1.2, 9)                   | NOTE 5         |
| Steering damper second arm bolt     | 1    | 6                   | 8.8 (0.9, 6.5)                |                |
| Steering damper mounting bolt       | 3    | 6                   | 8.8 (0.9, 6.5)                |                |
| Steering stem adjusting nut         | 1    | 26                  | 20 (2.0, 14)                  |                |
| Steering stem adjusting lock nut    | 1    | 26                  | —                             | See page 14-42 |
| Steering stem nut                   | 1    | 24                  | 103 (10.5, 76)                |                |

### REAR WHEEL/SUSPENSION:

| ITEM                                   | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|--|------|---------------------|-------------------------------|---------|
| Rear axle nut                          | 1    | 22                  | 113 (11.5, 83)                | NOTE 5  |
| Rear brake disc bolt                   | 4    | 8                   | 42 (4.3, 31)                  | NOTE 6  |
| Final driven sprocket nut              | 6    | 10                  | 64 (6.5, 47)                  | NOTE 5  |
| Rear shock absorber upper mounting nut | 1    | 10                  | 44 (4.5, 33)                  | NOTE 5  |
| Rear shock absorber lower mounting nut | 1    | 10                  | 44 (4.5, 33)                  | NOTE 5  |
| Shock link-to-frame pivot nut          | 1    | 10                  | 44 (4.5, 33)                  | NOTE 5  |
| Shock arm-to-shock link nut            | 1    | 10                  | 44 (4.5, 33)                  | NOTE 5  |
| Shock arm-to-swingarm nut              | 1    | 10                  | 44 (4.5, 33)                  | NOTE 5  |
| Drive chain case flange bolt           | 3    | 6                   | 12 (1.2, 9)                   |         |
| Swingarm pivot adjusting bolt          | 1    | 36                  | 15 (1.5, 11)                  |         |
| Swingarm pivot adjusting bolt lock nut | 1    | 36                  | 64 (6.5, 47)                  |         |
| Swingarm pivot nut                     | 1    | 22                  | 113 (11.5, 83)                |         |
| Drive chain slider bolt                | 3    | 6                   | 8.8 (0.9, 6.5)                | NOTE 2  |



## GENERAL INFORMATION

### HYDRAULIC BRAKE:

| ITEM   | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|--|------|---------------------|-------------------------------|---------|
| Brake hose oil bolt                          | 5    | 10                  | 34 (3.5, 25)                  |         |
| Rear brake caliper pad pin                   | 1    | 10                  | 18 (1.8, 13)                  |         |
| Rear caliper bleed valve                     | 1    | 8                   | 5.9 (0.6, 4.3)                |         |
| Rear brake caliper slide pin bolt            | 1    | 12                  | 27 (2.8, 20)                  |         |
| Rear brake caliper mounting bolt             | 1    | 8                   | 23 (2.3, 17)                  |         |
| Rear brake hose clamp bolt                   | 1    | 5                   | 3.9 (0.4, 2.9)                |         |
| Rear master cylinder push rod joint nut      | 1    | 8                   | 18 (1.8, 13)                  |         |
| Rear brake reservoir hose joint screw        | 1    | 4                   | 1.5 (0.15, 1.1)               | NOTE 2  |
| Rear master cylinder reservoir cap screw     | 2    | 4                   | 1.5 (0.15, 1.1)               |         |
| Rear master cylinder reservoir mounting bolt | 1    | 6                   | 12 (1.2, 9)                   |         |
| Rear master cylinder mounting bolt           | 2    | 6                   | 9.8 (1.0, 7)                  |         |
| Brake pedal pivot bolt                       | 1    | 8                   | 18 (1.8, 13)                  |         |
| Front brake caliper mounting bolt            | 4    | 10                  | 45 (4.6, 33)                  | NOTE 6  |
| Front brake caliper assembly bolt            | 8    | 8                   | 23 (2.3, 17)                  | NOTE 2  |
| Front brake caliper pad pin                  | 2    | 10                  | 16 (1.6, 12)                  |         |
| Front caliper bleed valve                    | 2    | 8                   | 7.8 (0.8, 5.8)                |         |
| Front brake hose clamp                       | 1    | 6                   | 8.8 (0.9, 6.5)                |         |
| Front brake hose 3-way joint bolt            | 1    | 6                   | 9.8 (1.0, 7)                  |         |
| Front brake hose clamp (left side)           | 1    | 6                   | 9.8 (1.0, 7)                  |         |
| Front master cylinder reservoir cap screw    | 2    | 4                   | 1.5 (0.15, 1.1)               |         |
| Front master cylinder reservoir stay bolt    | 1    | 6                   | 12 (1.2, 9)                   |         |
| Front brake light switch screw               | 1    | 4                   | 1.0 (0.1, 0.7)                |         |
| Front master cylinder reservoir mounting nut | 1    | 6                   | 5.9 (0.6, 4.3)                | NOTE 5  |
| Front brake lever pivot bolt                 | 1    | 6                   | 1.0 (0.1, 0.7)                |         |
| Front brake lever pivot nut                  | 1    | 6                   | 5.9 (0.6, 4.3)                |         |
| Front master cylinder bleed valve            | 1    | 8                   | 5.9 (0.6, 4.3)                |         |
| Front master cylinder holder bolt            | 2    | 6                   | 12 (1.2, 9)                   |         |

### LIGHTS/METERS/SWITCHES:

| ITEM                                  | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|---------------------------------------|------|---------------------|-------------------------------|---------|
| Ignition switch mounting one-way bolt | 2    | 8                   | 26 (2.7, 20)                  |         |
| Right handlebar switch screw          | 2    | 4                   | 0.9 (0.09, 0.7)               |         |
| Combination meter assembly screw      | 3    | 5                   | 1.0 (0.1, 0.7)                |         |
| Side stand switch special bolt        | 1    | 6                   | 9.8 (1.0, 7)                  | NOTE 6  |

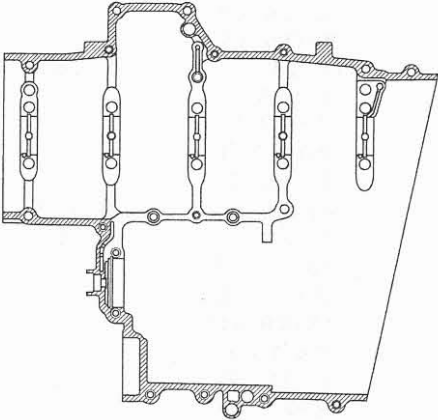
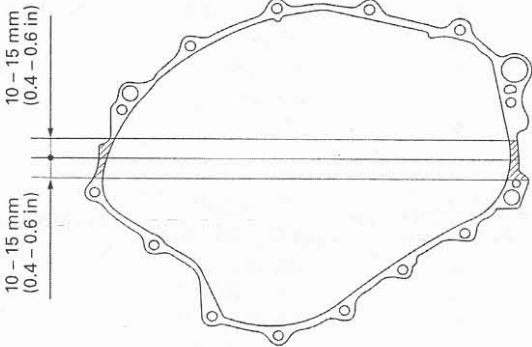
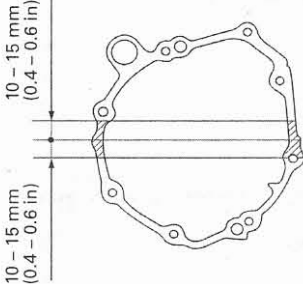
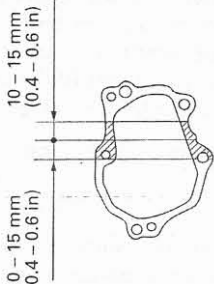
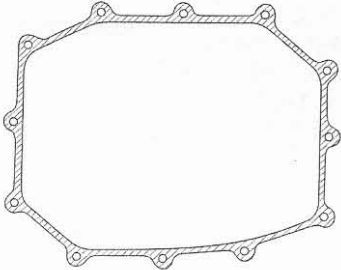
### OTHERS:

| ITEM                   | Q'TY | THREAD<br>DIA. (mm) | TORQUE<br>N·m (kgf·m, lbf·ft) | REMARKS |
|------------------------|------|---------------------|-------------------------------|---------|
| Side stand socket bolt | 2    | 10                  | 54 (5.5, 40)                  |         |
| Side stand pivot bolt  | 1    | 10                  | 9.8 (1.0, 7)                  |         |
| Side stand pivot nut   | 1    | 10                  | 29 (3.0, 22)                  |         |

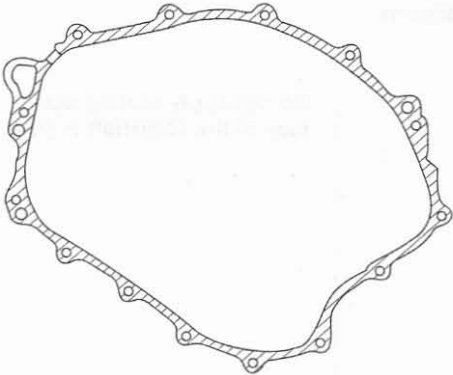
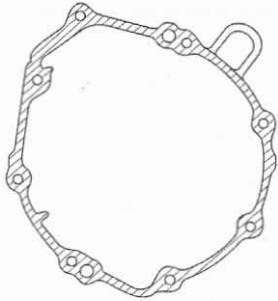
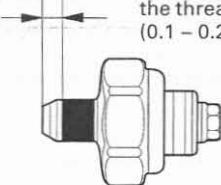
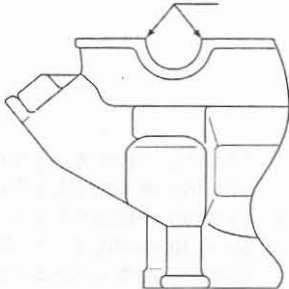
GENERAL INFORMATION

LUBRICATION & SEAL POINTS

ENGINE

| LOCATION  | MATERIAL  | REMARKS  |
|---|---|--|
| <p>Crankcase mating surface</p>  | <p>Liquid sealant<br/>(Three Bond 1207B or equivalent)</p>                          |  |
|                                 |  |  |
| <p>Oil pan mating surface</p>  |   |  |

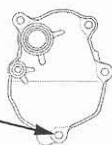
# GENERAL INFORMATION

| LOCATION   | MATERIAL  | REMARKS |
|--|---|---------|
| <p data-bbox="196 212 607 237">Right crankcase cover mating surface</p>  <p data-bbox="196 646 545 672">Alternator cover mating surface</p>  <p data-bbox="196 1031 496 1056">Oil pressure switch threads</p> <p data-bbox="370 1062 613 1129">Do not apply sealant to the thread head 3 – 4 mm (0.1 – 0.2 in)</p>  | <p data-bbox="846 212 1089 289">Liquid sealant<br/>(Three Bond 1207B or equivalent)</p> |         |
| <p data-bbox="196 1289 581 1314">Cylinder head semi-circular cut-out</p>    | <p data-bbox="846 1289 927 1314">Sealant</p>  |         |

## GENERAL INFORMATION

| LOCATION  | MATERIAL  | REMARKS   |
|---|---|---|
| Main journal bearing surface<br>Piston pin sliding surface<br>Connecting rod bearing surface<br>Connecting rod small end inner surface<br>Crankshaft thrust surface<br>Camshaft lobes/journals and thrust surface<br><br>Valve stem (valve guide sliding surface)<br>Valve lifter outer sliding surface<br>Water pump shaft thrust washer sliding surface<br>Clutch outer/primary driven gear sliding surface<br>Clutch outer guide sliding surface<br>Oil pump drive sprocket and collar sliding surface<br>M3/4, C5, C6 shifter gear (shift fork grooves)<br>Starter reduction gear shaft sliding surface<br>Starter idle gear shaft sliding surface<br>Cylinder head special bolt (after removing anti-rust oil additive)  | Molybdenum disulfide oil<br>(a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease) | Do not apply mating surface of the camshaft holder  |
| Clutch joint piece sliding surface<br>Clutch lifter rod outer area<br>Piston and piston ring sliding area<br>Oil strainer packing<br>Clutch disc surface<br>Starter one-way clutch sliding surface<br>Flywheel bolt threads and seating surface<br>Clutch center lock nut threads and seating surface<br>Oil filter cartridge threads and O-ring<br>Camshaft holder bolt threads and seating surface<br>Starter clutch outer bolt threads and seating surface<br>Connecting rod bolt threads and seating surface<br>Each gear teeth and rotating surface<br>Each bearing<br>Each O-ring<br>Other rotating area and sliding surface  | Engine oil  |   |
| Timing hole cap threads<br>Balancer damper rubber fitting area<br>Each oil seal lips  | Multi-purpose grease  |   |
| Lower crankcase 22 mm sealing bolt threads<br>Lower crankcase 20 mm sealing bolt threads<br>Lower crankcase 10 mm sealing bolt threads<br>Lower crankcase 8 mm sealing bolt threads<br>Cam chain guide A bolt threads<br>CMP (Camshaft position) sensor rotor bolt threads<br>Cylinder head sealing bolt threads<br>Cylinder head cover breather joint threads<br>Oil orifice bolt threads<br>Oil pump driven sprocket bolt threads<br>Shift drum bearing set plate bolt threads<br>Oil filter boss stud thread<br>Mainshaft/countershaft bearing set plate bolt threads<br>Cam sprocket bolt threads<br>Cylinder head cover breather plate bolt threads<br>Shift drum center bolt threads<br>Cam chain tensioner pivot bolt threads<br>Spindle plate tightening bolt threads<br>Shift drum stopper plate bolt threads<br>Oil pan drain base bolt threads<br>Gearshift spindle cover bolt threads | Locking agent   | Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm<br>Coating width: $6.5 \pm 1$ mm |

Apply locking agent



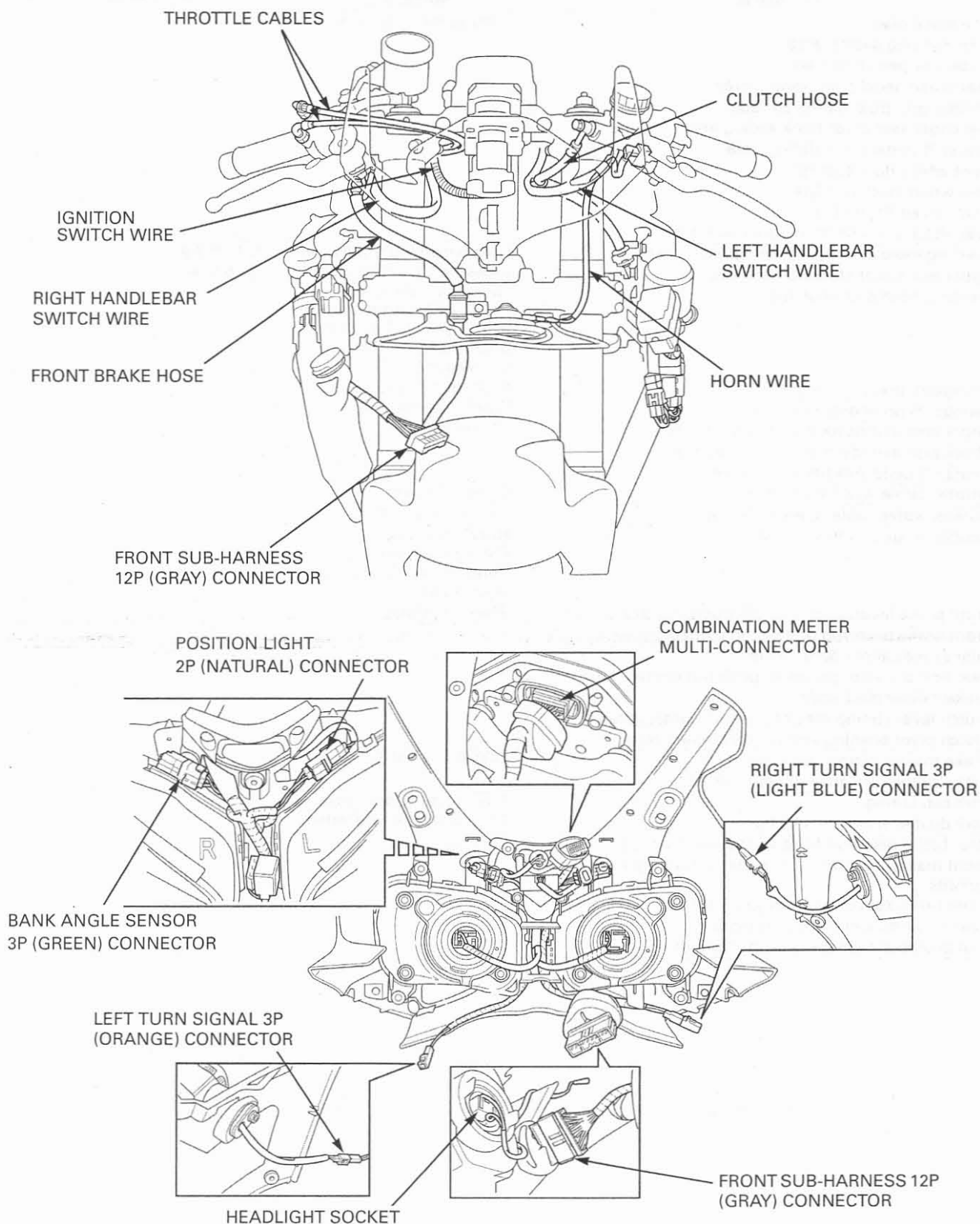
## FRAME

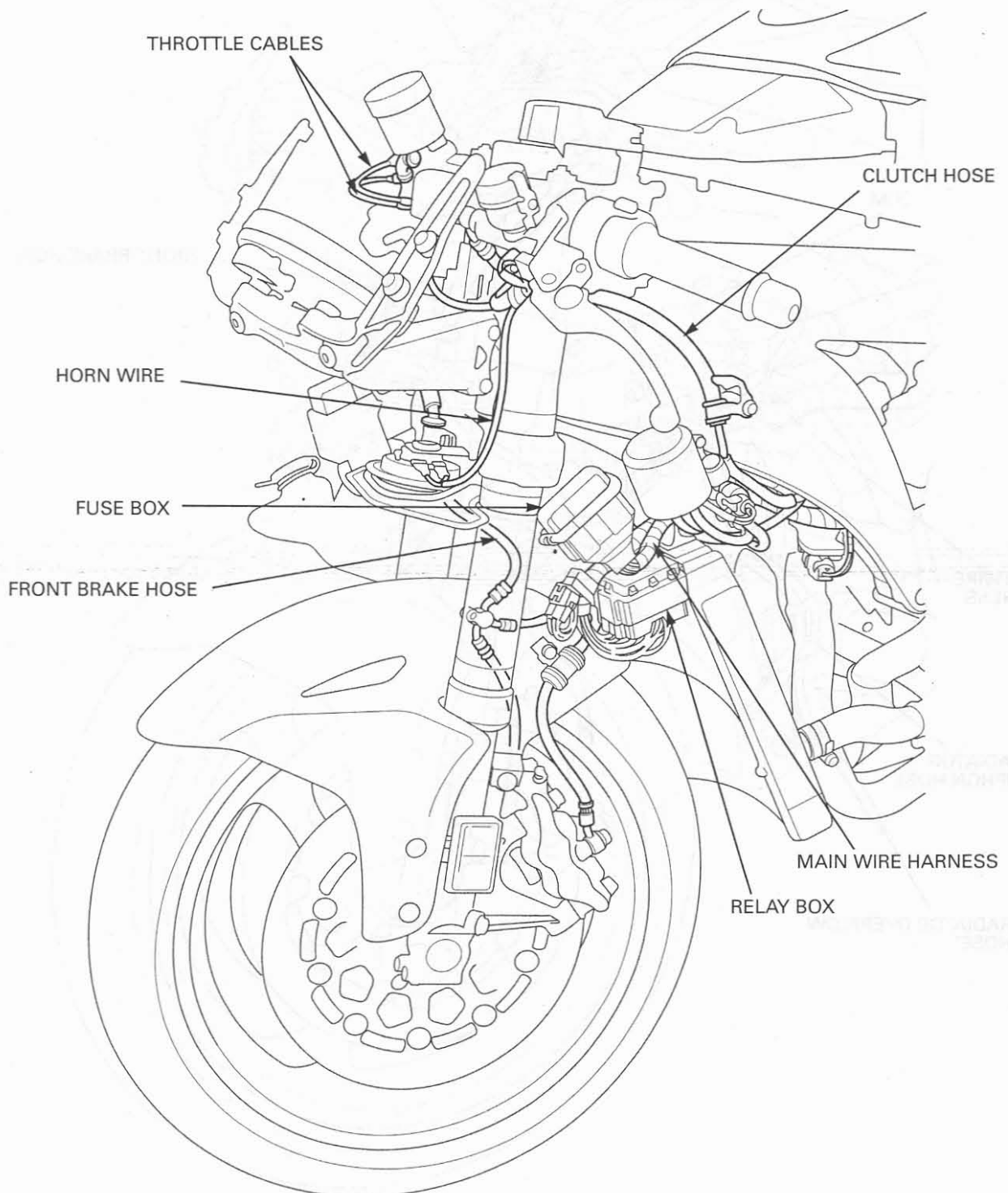
| LOCATION   | MATERIAL  | REMARKS                       |
|--|---|-------------------------------|
| Side stand pivot<br>Rider footpeg sliding area<br>Passenger peg sliding area<br>Rear brake pedal pivot sliding area<br>Throttle grip pipe sliding surface<br>Passenger seat catch hook sliding area<br>Gearshift pedal pivot sliding area<br>Front wheel dust seal lips<br>Rear wheel dust seal lips<br>Final driven flange O-ring<br>Rear shock absorber pivot dust seal lips | Multi-purpose grease  |                               |
| Steering head bearing adjusting nut threads<br>Upper and lower steering head bearing<br>Steering head dust seal lips   | Urea based multi-purpose grease with extreme pressure (example: EXCE-LIGHT EP2 manufactured by KYODO YUSHI, Japan), Shell stamina EP2 or equivalent | 0.1 - 0.3 g<br>3 - 5 g (each) |
| Swingarm pivot bearings<br>Swingarm pivot dust seal lips<br>Shock arm and shock link needle bearings<br>Shock arm and shock link dust seal lips<br>Gearshift pedal link tie-rod ball joints  | Multi-purpose grease (Shell Alvania EP2 or equivalent)  |                               |
| Throttle cable A, B cable inside   | Cable lubricant   |                               |
| Exhaust valve cable A, B cable inside  | Molybdenum oil  |                               |
| Handlebar grip rubber inside   | Honda bond A, Pro Honda Handgrip Cement (U.S.A. only) or equivalent   |                               |
| Front brake lever pivot/adjuster/push rod sliding area<br>Front brake push rod and piston contacting area<br>Rear brake caliper boot inside<br>Rear brake master piston-to-push rod contact area<br>Brake caliper dust seals<br>Clutch lever sliding area and piston contact area<br>Clutch pivot bushing and piston contact area  | Silicone grease   |                               |
| Brake master piston and cups<br>Brake caliper piston and piston seals  | DOT 4 brake fluid   |                               |
| Fork cap O-ring<br>Fork dust seal and oil seal lips  | Pro Honda Suspension Fluid SS-55 or equivalent  |                               |
| Rear brake reservoir hose joint screw threads<br>Front master cylinder oil cup stay mounting bolt threads<br>Front brake caliper assembly bolt threads<br>Rear brake caliper pin bolt threads<br>Clutch oil cup tightening screw threads   | Locking agent   |                               |



## GENERAL INFORMATION

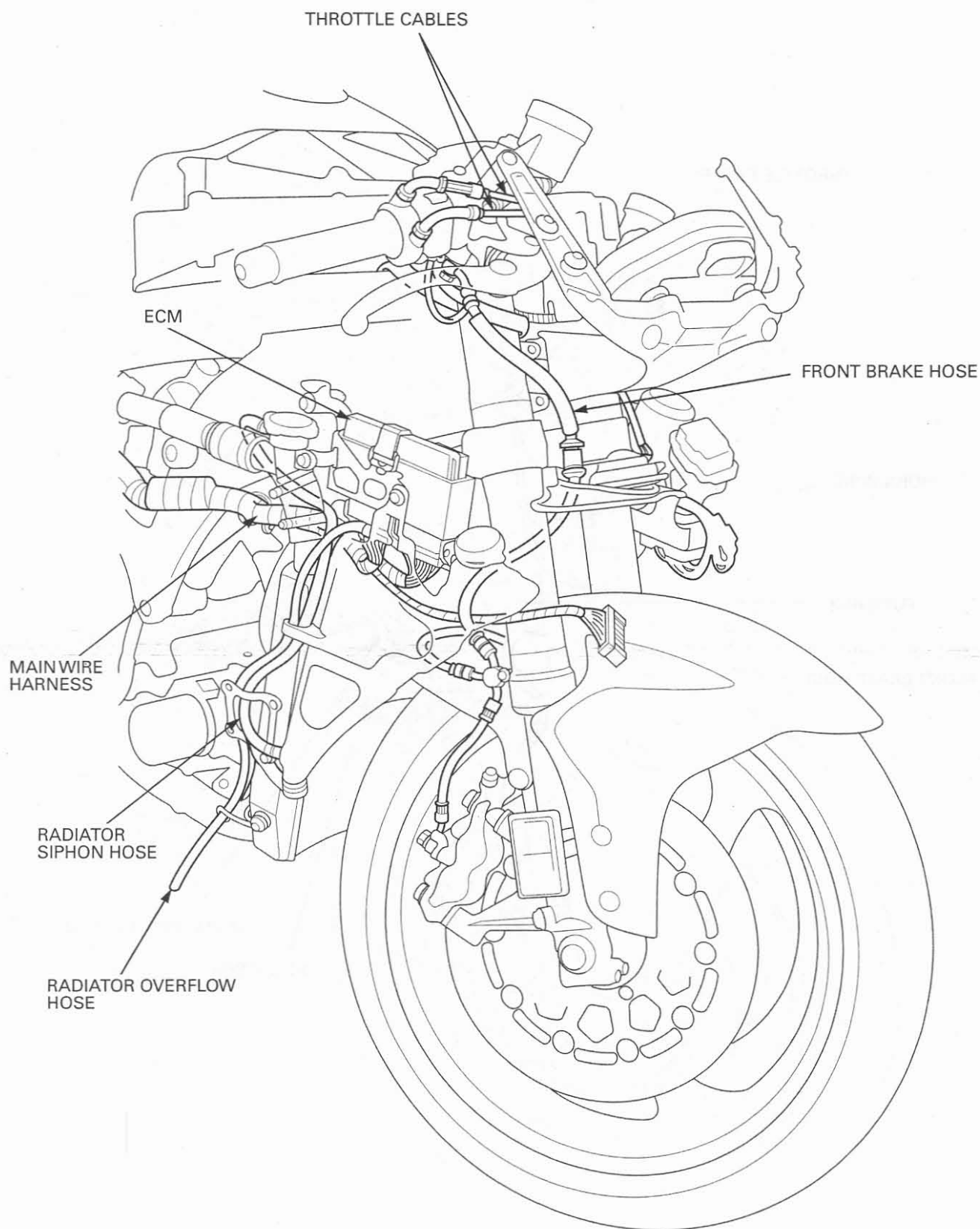
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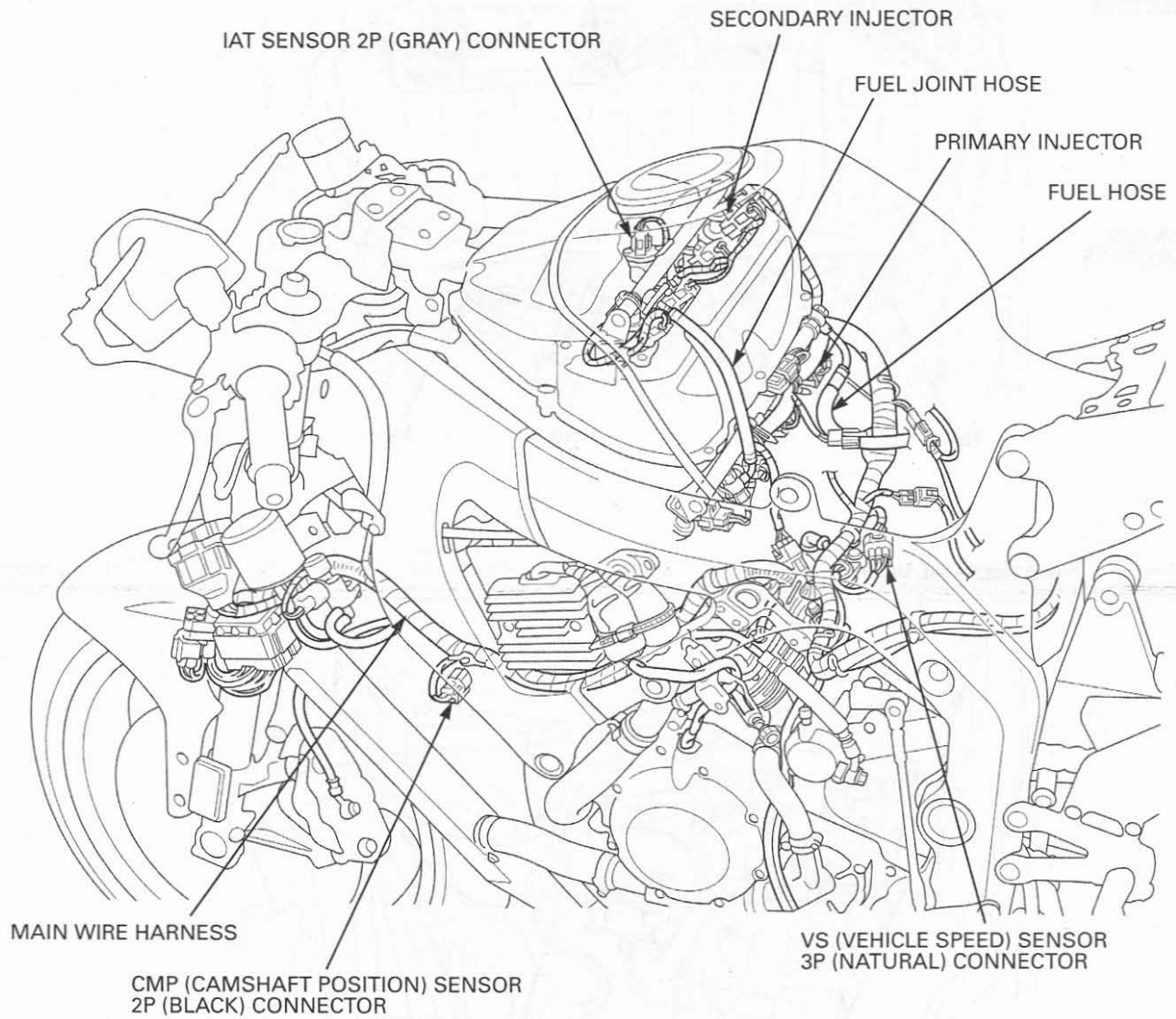




## GENERAL INFORMATION

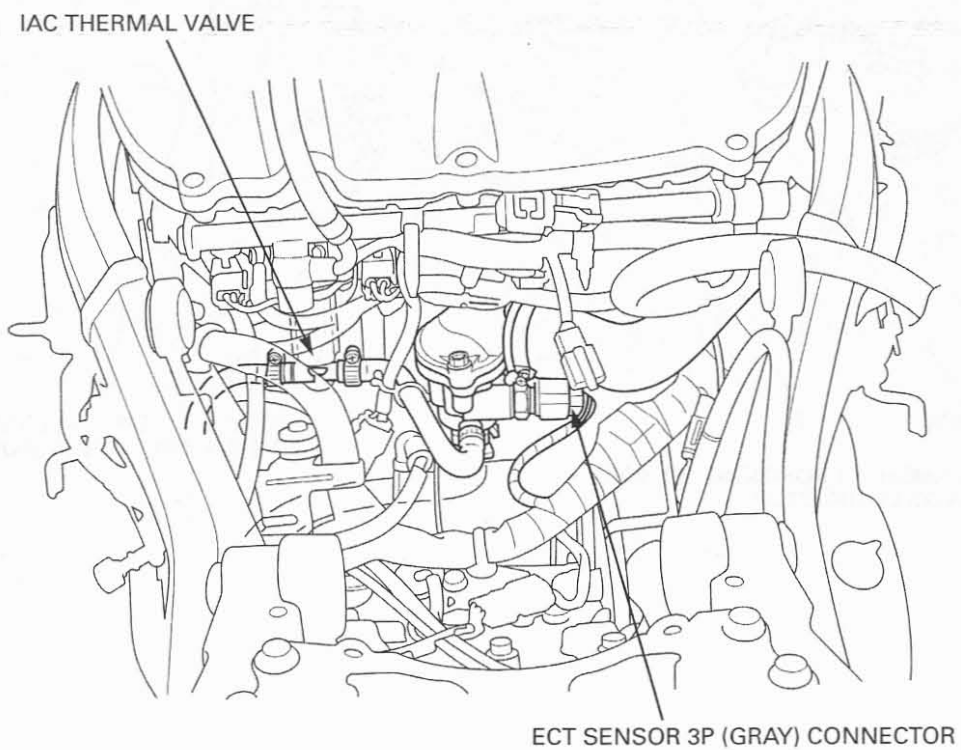
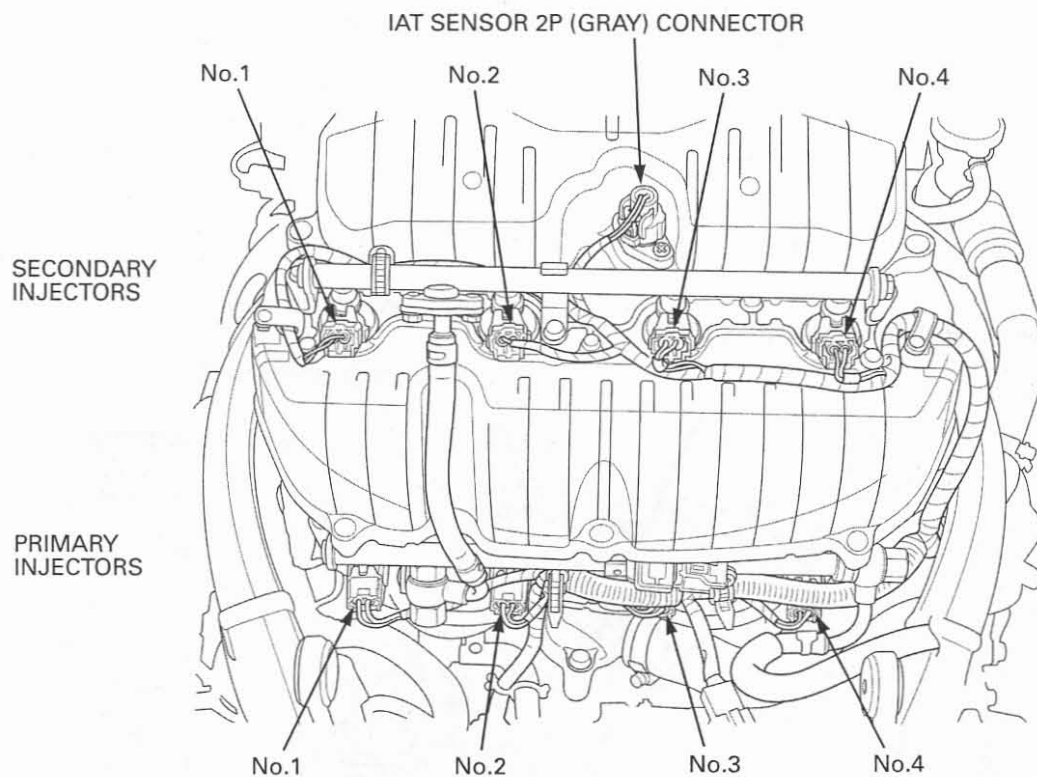
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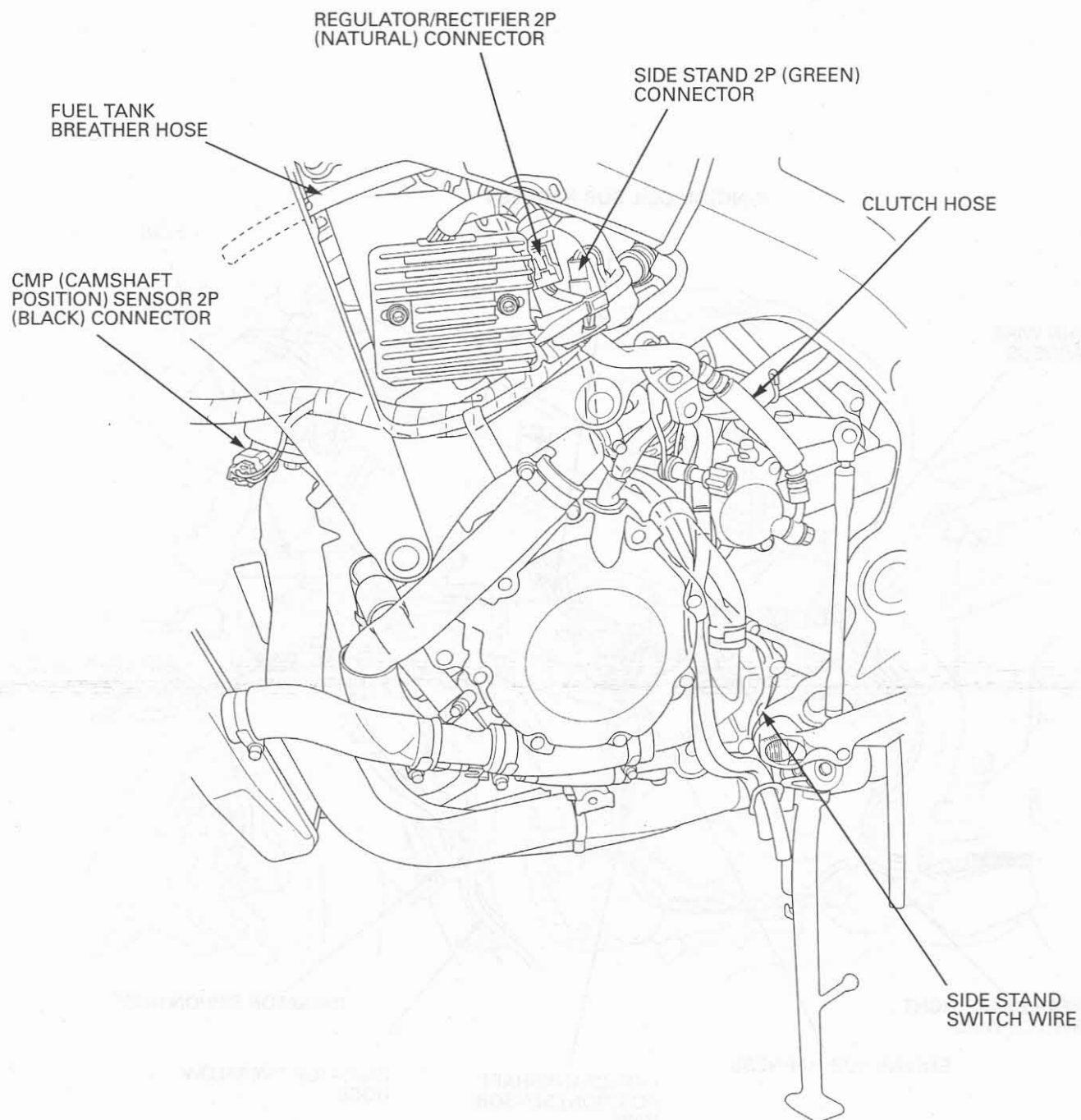


## GENERAL INFORMATION

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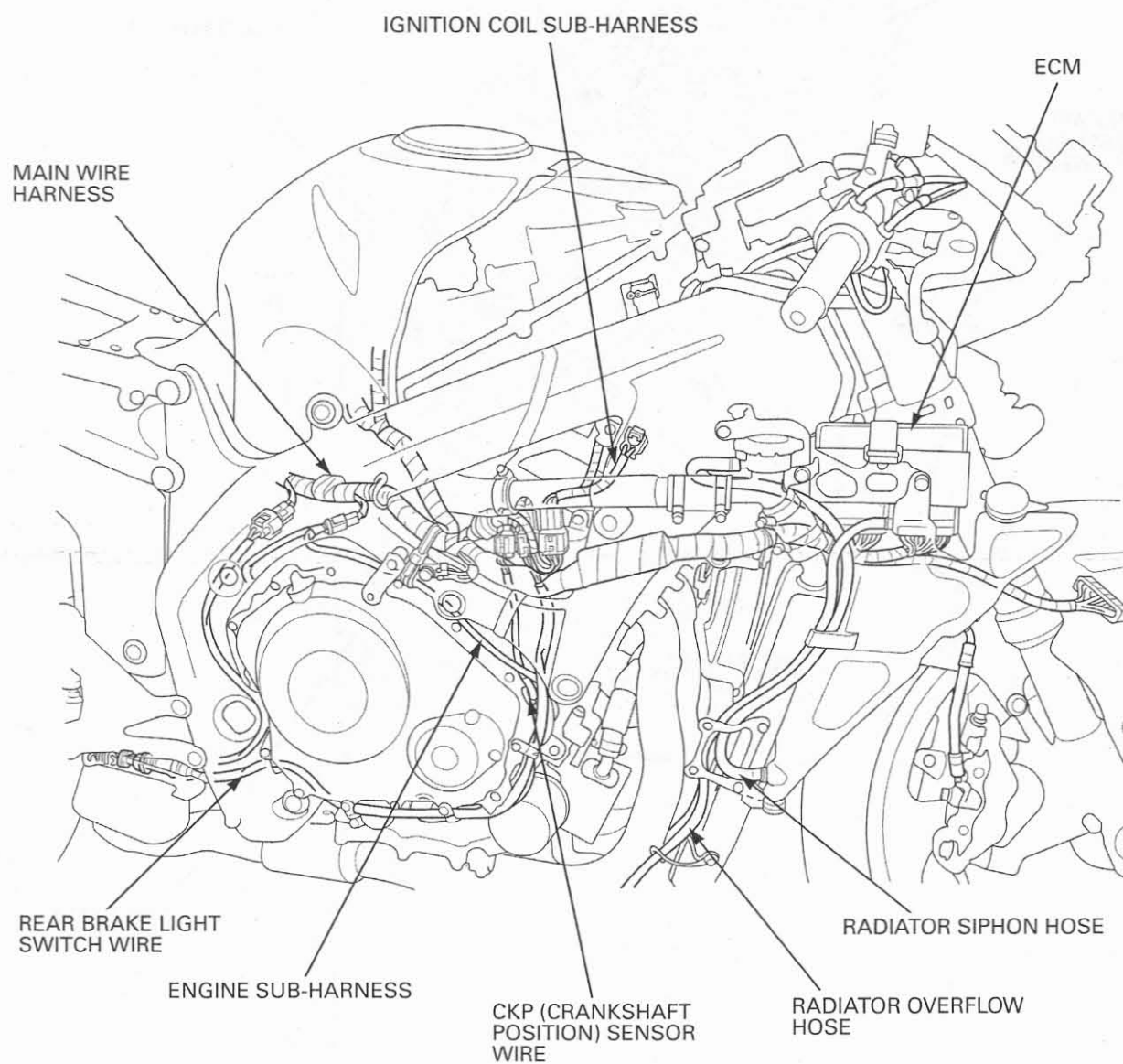


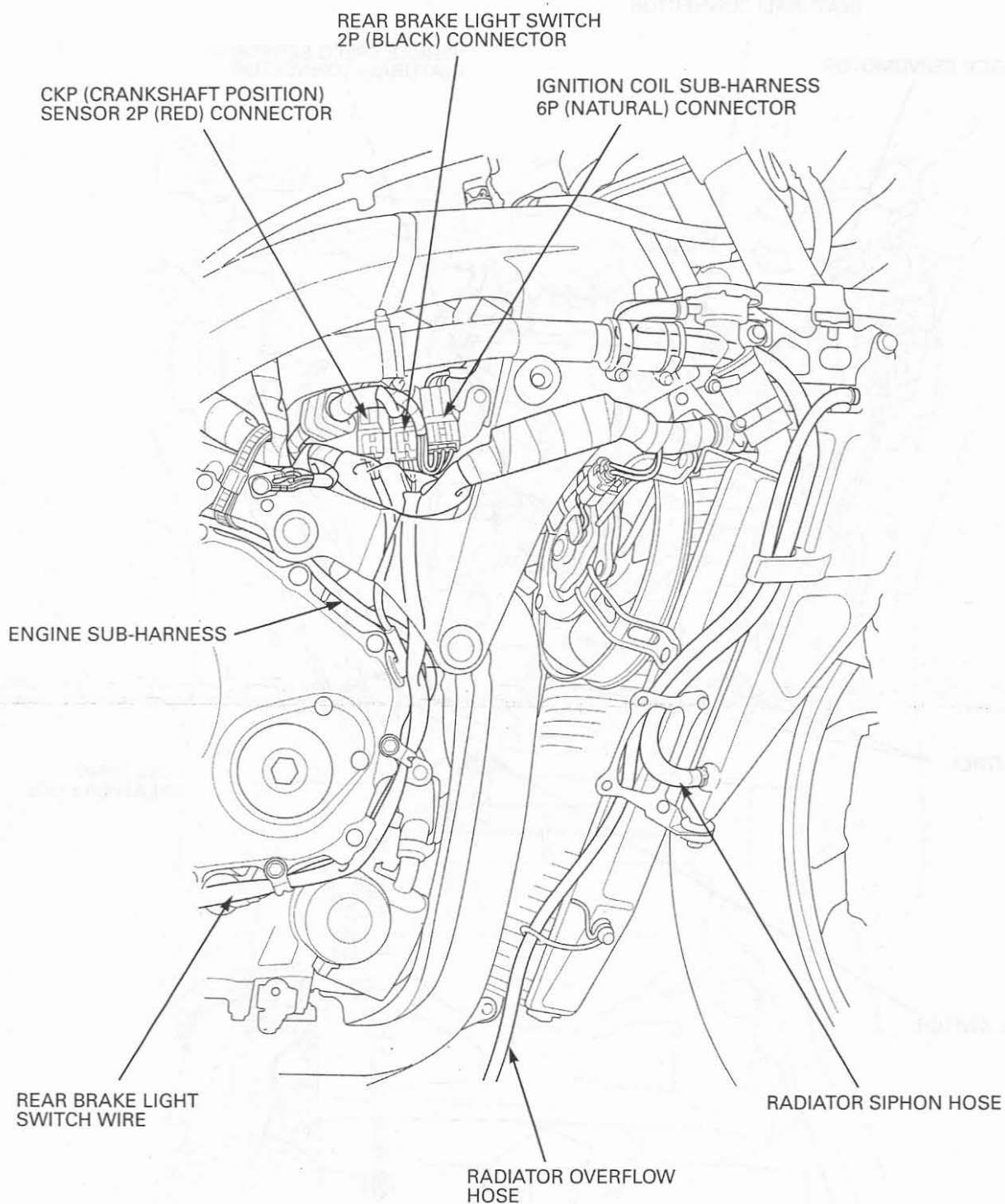




## GENERAL INFORMATION

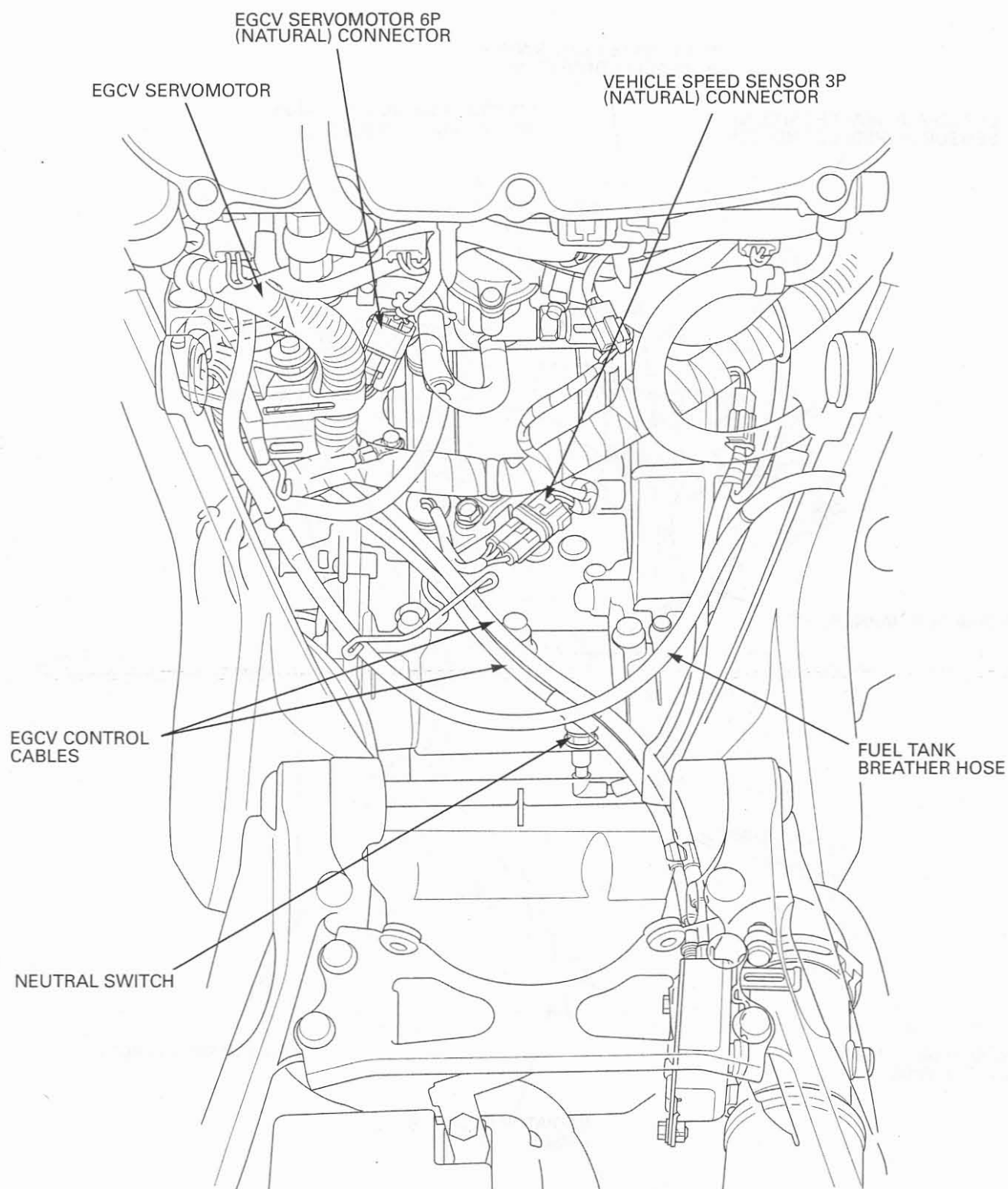
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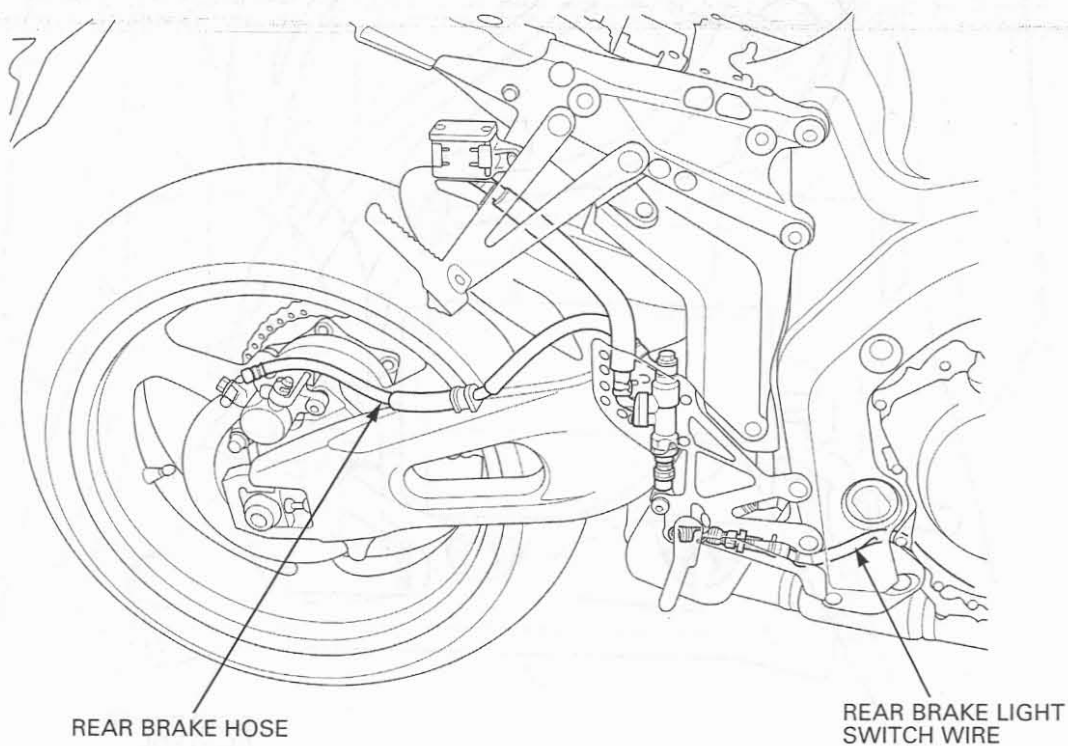
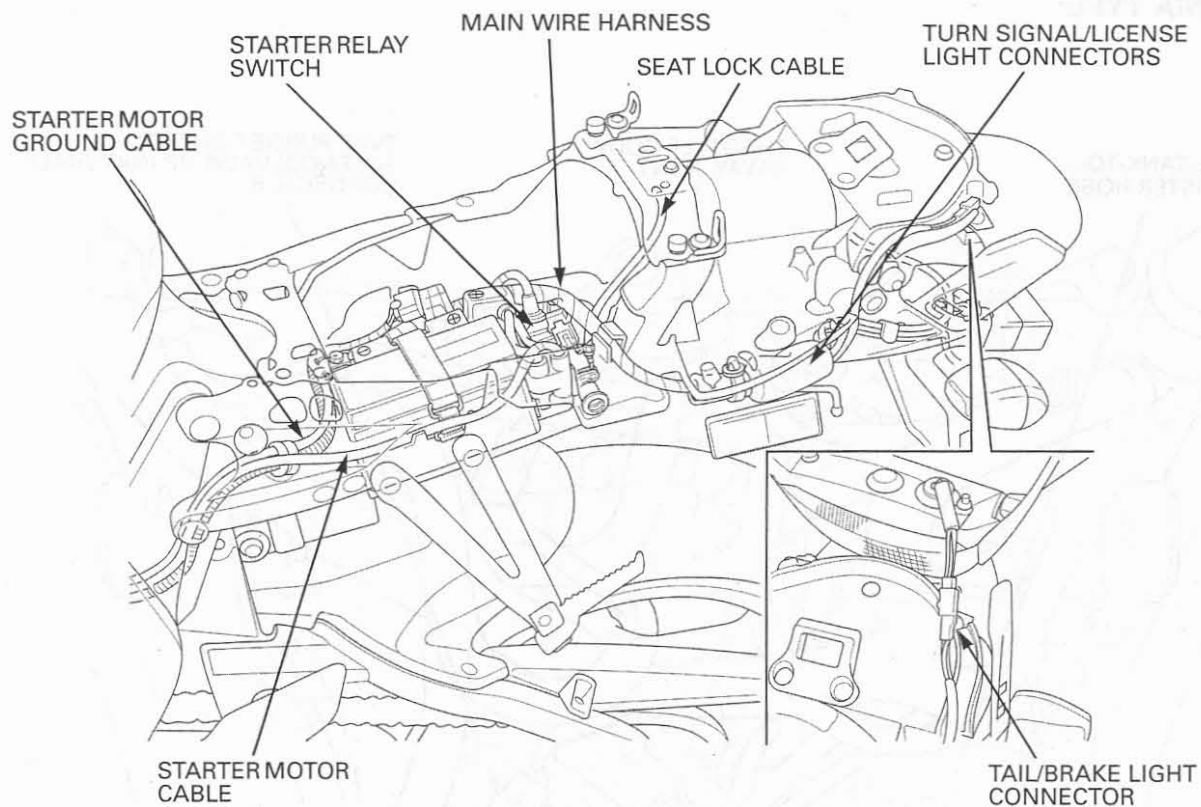




## GENERAL INFORMATION

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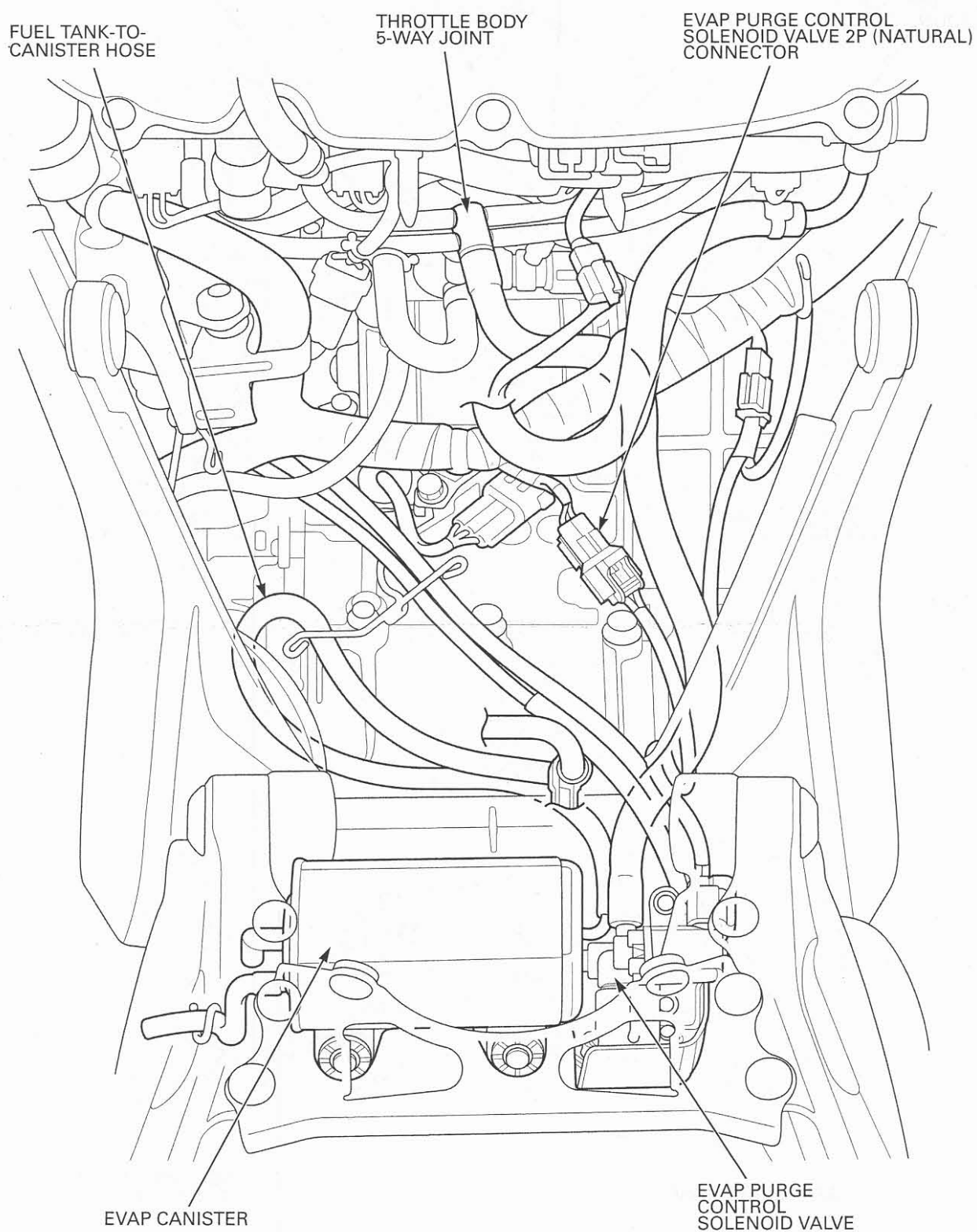




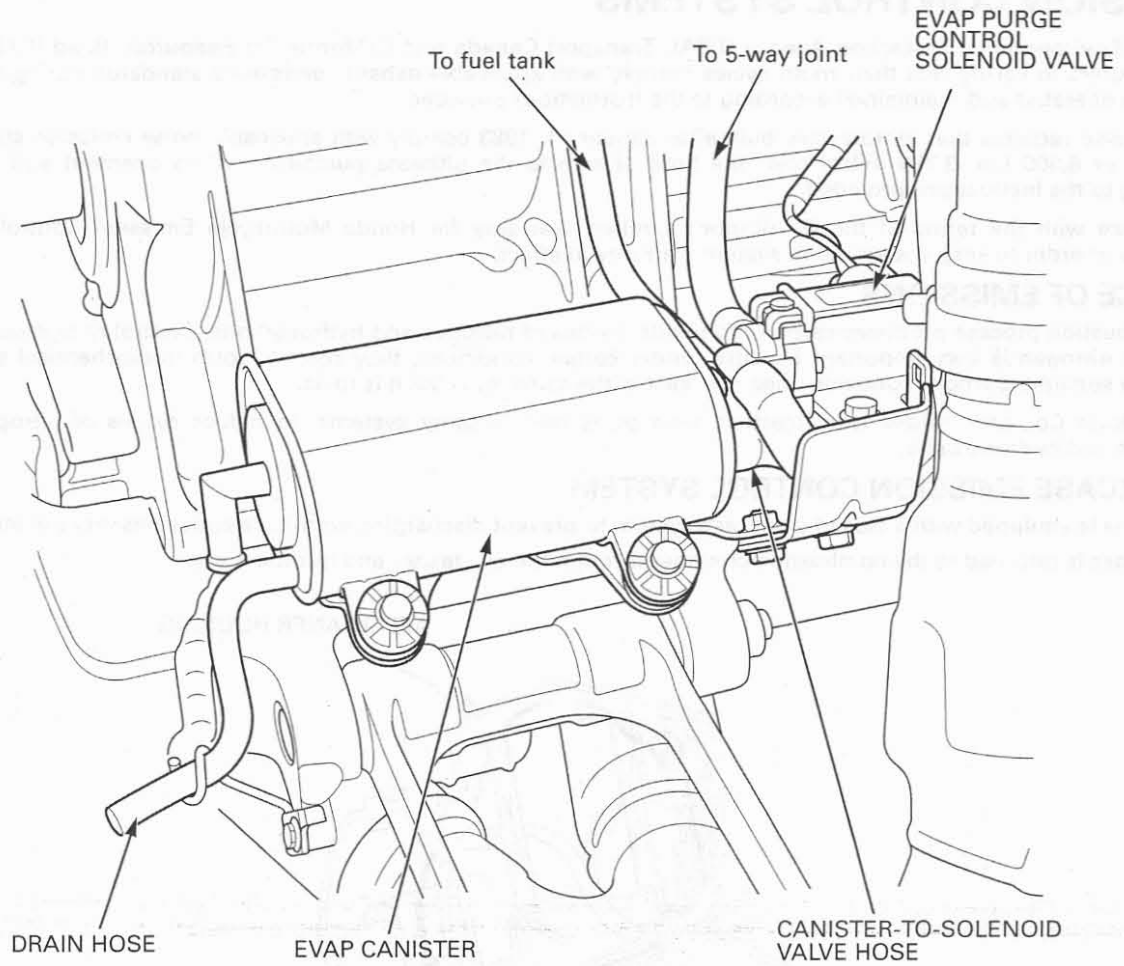


## GENERAL INFORMATION

### CALIFORNIA TYPE:



## GENERAL INFORMATION



## GENERAL INFORMATION

### EMISSION CONTROL SYSTEMS

The U.S. Environmental Protection Agency (EPA), Transport Canada 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.

The EPA also requires 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 emission system warranty in effect.

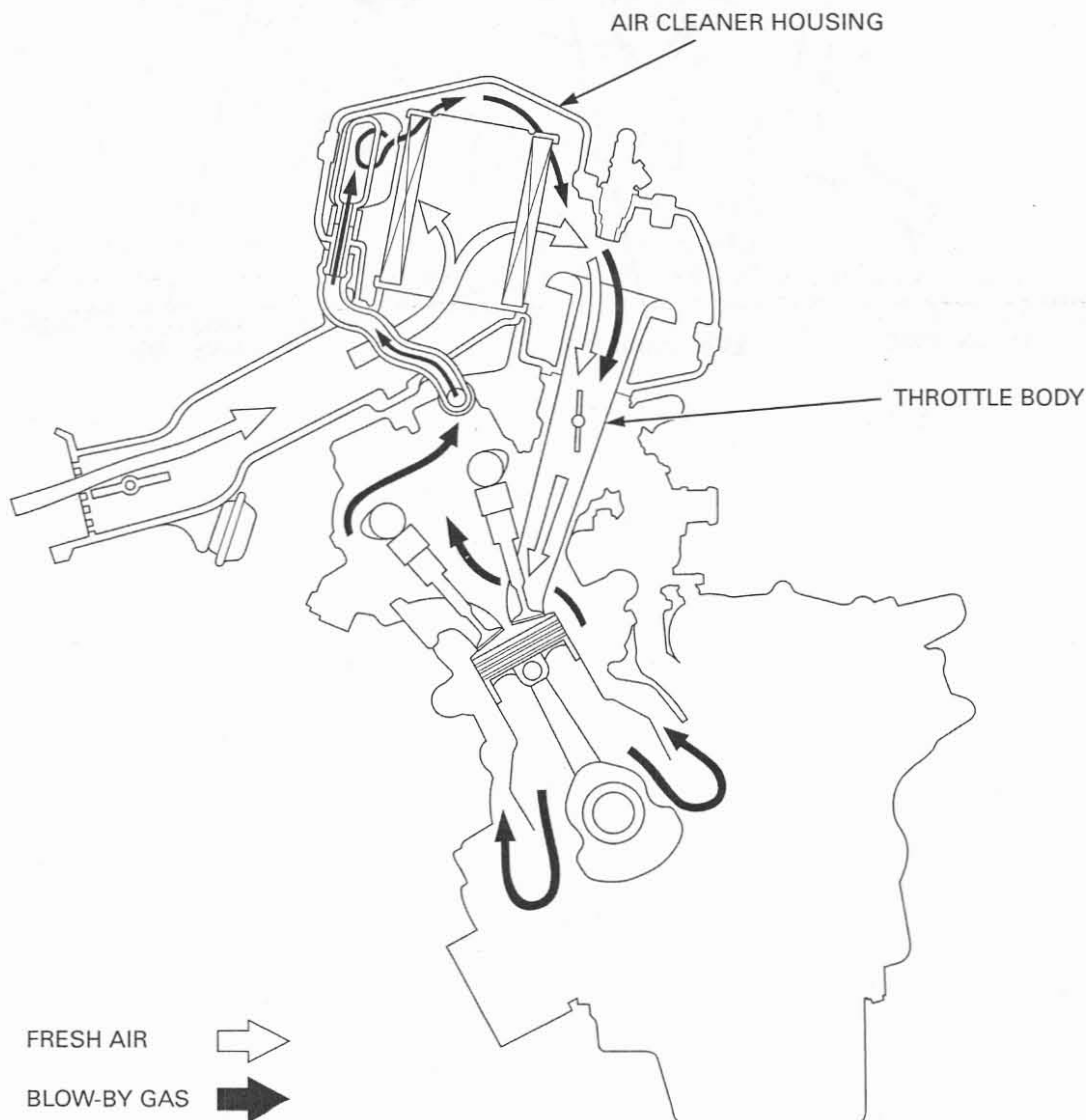
#### SOURCE OF EMISSIONS

The combustion process produces carbon monoxide, oxides of nitrogen and hydrocarbons. Control of hydrocarbons and oxides of nitrogen is very important because, under certain conditions, they react to form photochemical smog when subject to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda Motor Co., Ltd. utilizes lean injection settings as well as other systems, to reduce oxides of nitrogen, carbon monoxide and hydrocarbons.

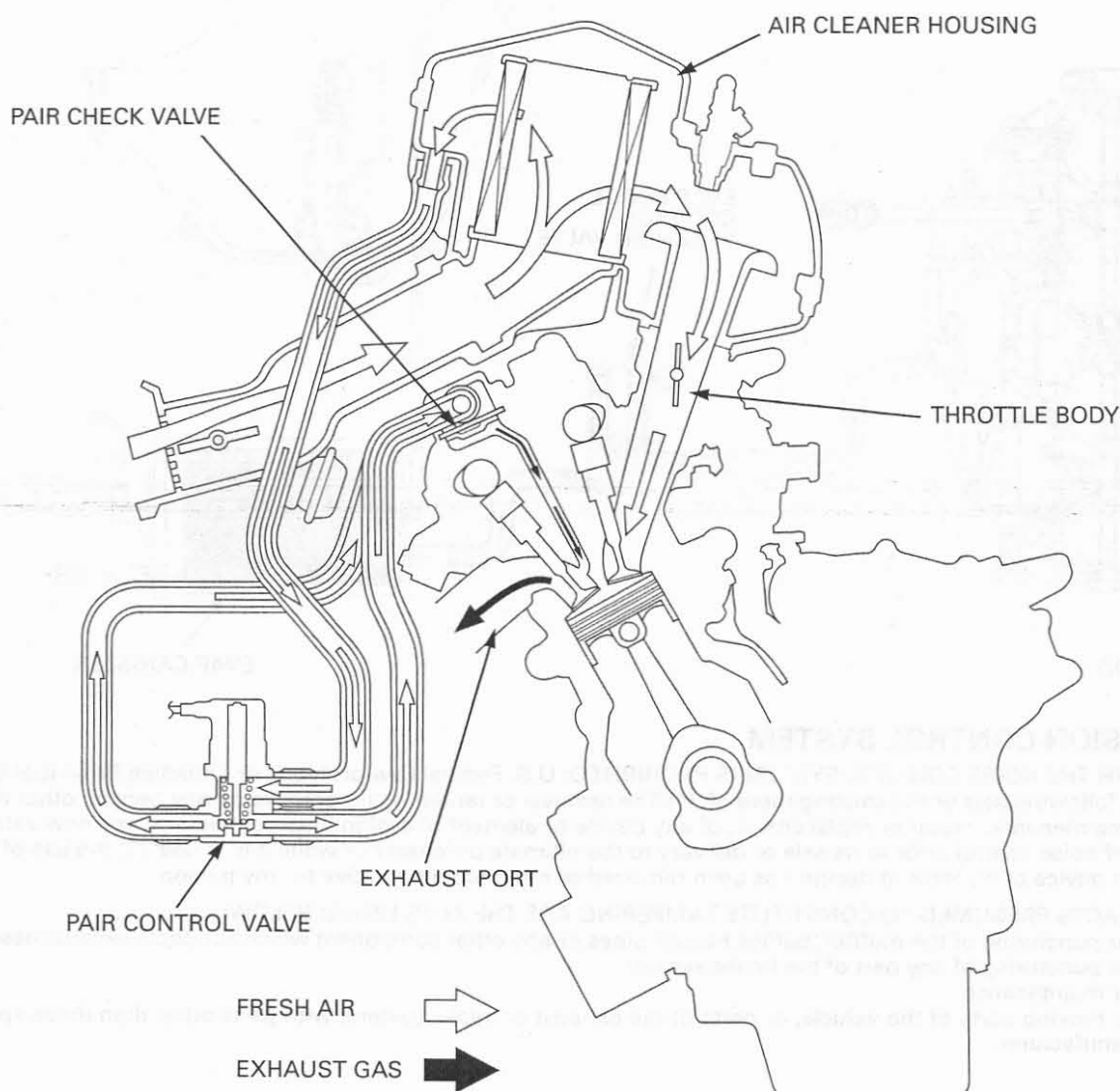
#### CRANKCASE EMISSION CONTROL SYSTEM

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



## SECONDARY AIR SUPPLY SYSTEM

No adjustments to the secondary air supply system should be made, although periodic inspection of the components is recommended.

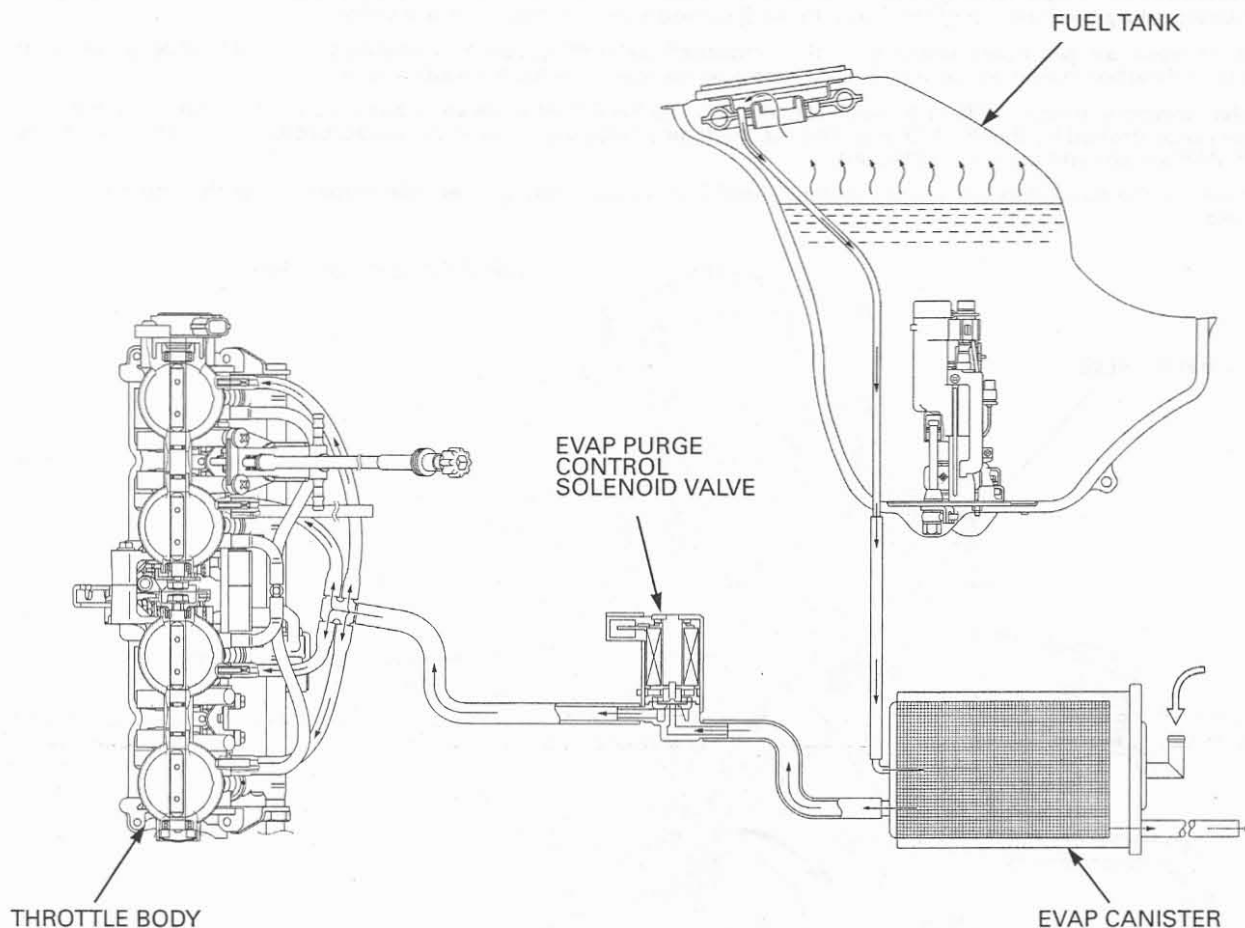


No adjustment to these systems should be made although periodic inspection of the components is recommended.

## GENERAL INFORMATION

### EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)

This model complies with CARB evaporative emission requirements. Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is absorbed and stored while the engine is stopped. When the engine is running and the evaporative emission (EVAP) purge control solenoid valve is open, fuel vapor in the EVAP canister is drawn into the engine through the throttle body.



### NOISE EMISSION CONTROL SYSTEM

**TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED:** U.S. Federal Law prohibits or Canadian Provincial Law may prohibit 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; (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

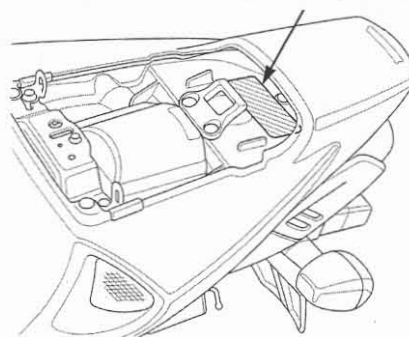
**AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:**

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

## EMISSION CONTROL INFORMATION LABEL (U.S.A. ONLY)

An Emission Control Information Label is located on the storage compartment as shown.

EMISSION CONTROL INFORMATION LABEL





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**MEMO**

## 2. TECHNICAL FEATURES

2

HESD (Honda Electronic Steering Damper) ..... 2-2

RADIAL-MOUNTED FRONT BRAKE CALIPER ..... 2-5

EGCV (Exhaust Gas Control Valve) ..... 2-6

## TECHNICAL FEATURES

### HESD (Honda Electronic Steering Damper)

This motorcycle is equipped with the Honda Electronic Steering Damper (HESD).

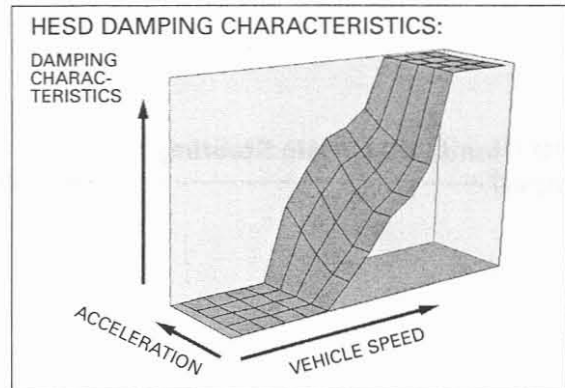
The HESD system consists of the following components.

- Steering damper assembly with linear solenoid
- VS (vehicle speed) sensor
- ECM
- Malfunction indicator lamp (MIL) and HESD indicator

The steering damper assembly is installed on the main frame near the steering head pipe and the linkage arm is installed on the top fork bridge.

The damping characteristics are automatically controlled by the ECM in response to vehicle speed and acceleration and offers optimum handling over a wide range of riding conditions.

HESD employs a hydraulic rotary damper unit. The hydraulic oil is filled into the steering damper and is sealed permanently. The steering damper unit is not serviceable.



Each component of HESD functions as follows.

- **Damper oil chamber/Vane**

The damper oil chamber is divided in two by a moving vane connected internally to the linkage arm. The edge of the vane is covered with an oil seal so that the left and right chambers are sealed from each other. Therefore oil moves between the left and right sides of the chamber via check valve controlled hydraulic passages.

- **Check valve**

Four one-way check valves ensure that oil flows through the main valve in only one direction, whether the vane is moved left or right.

- **Accumulator**

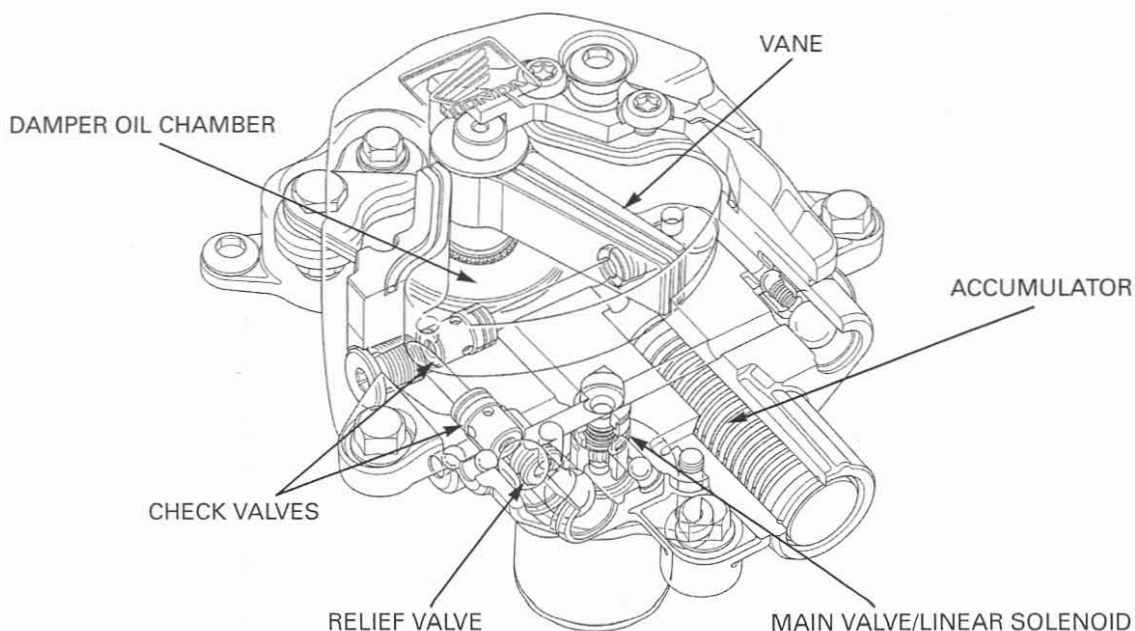
Accumulator compensates for temperature-induced changes in oil volume.

- **Main valve/Linear solenoid**

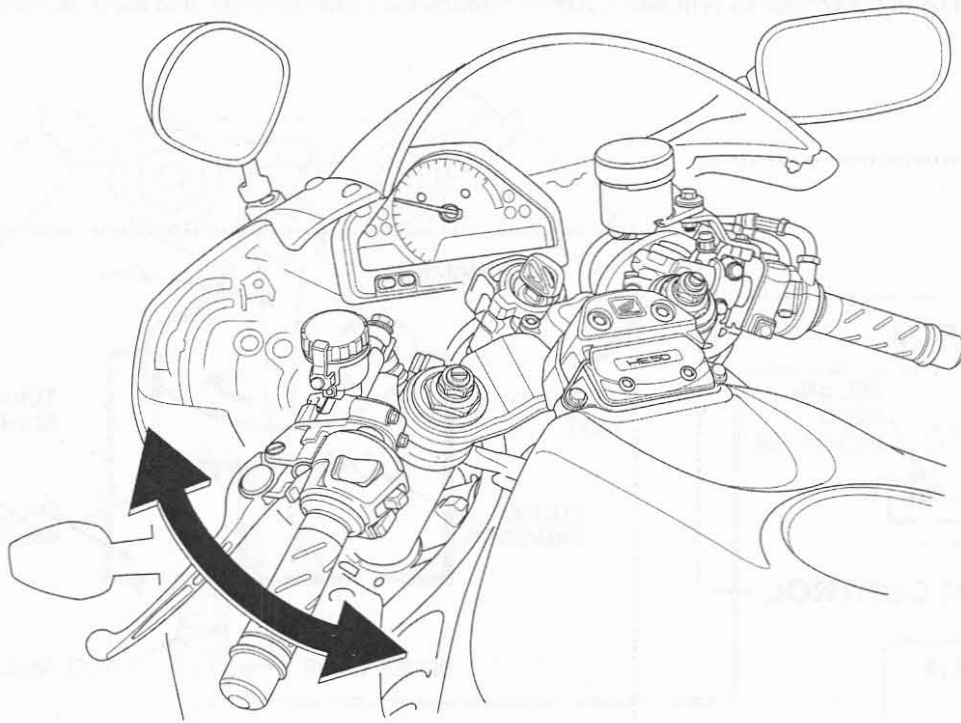
The opening of the main valve is controlled by a linear solenoid that receives its control signals from the ECM. The damping characteristics are varied by the main valve/linear solenoid.

- **Relief valve**

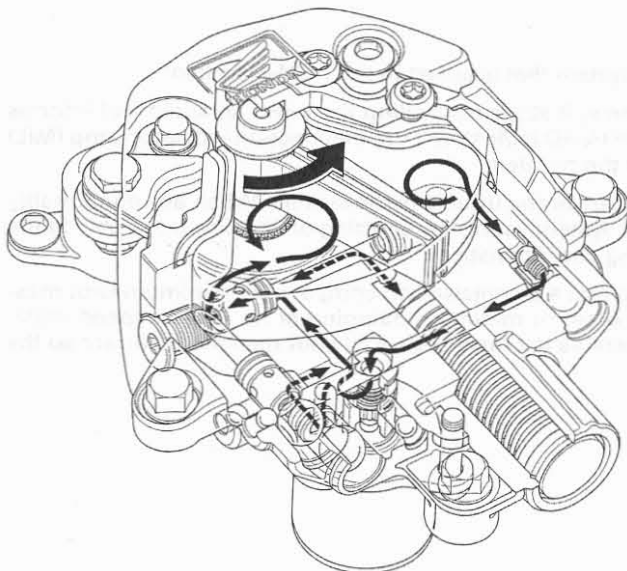
The relief valve controls and sets a limit to the maximum damping force.



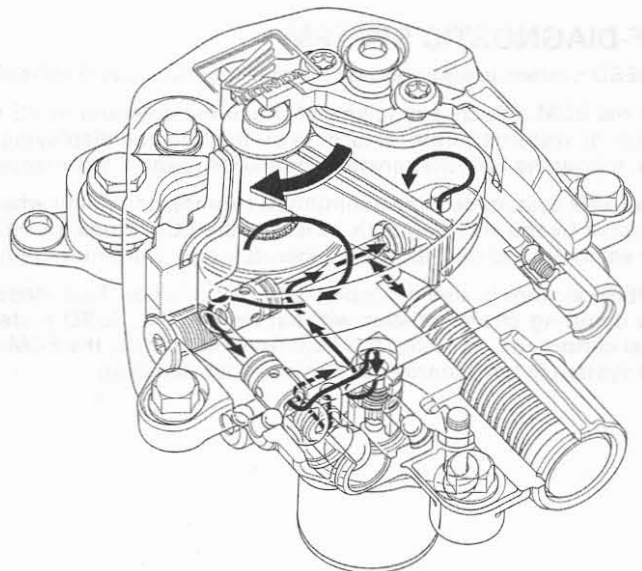
# DAMPER OIL FLOW DIAGRAM



WHEN THE STEERING MOVES TO LEFT:



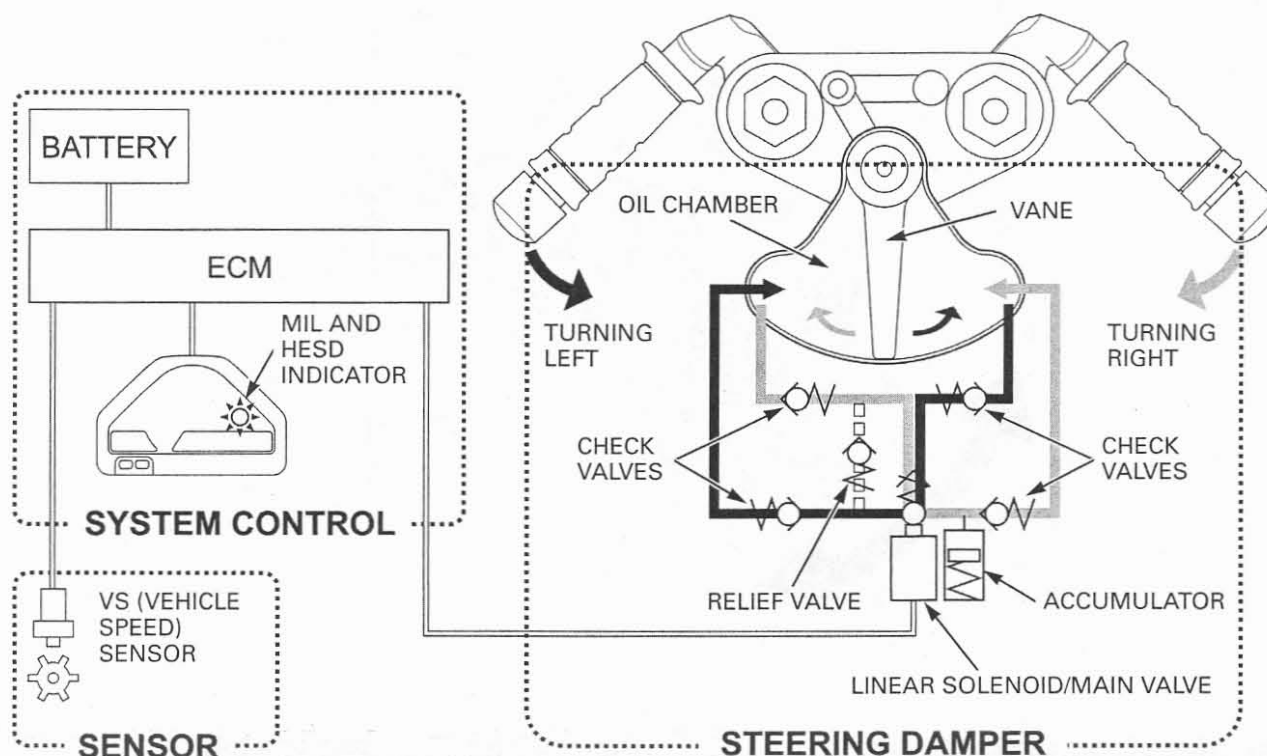
WHEN THE STEERING MOVES TO RIGHT:



## TECHNICAL FEATURES

### CONTROL SYSTEM

Receiving the signal from the VS sensor, the ECM calculates the vehicle speed and rate of acceleration. The ECM outputs the control current to the linear solenoid coil based upon the vehicle speed and acceleration. The linear solenoid depresses the main valve according to the control current which passes through the linear solenoid, and controls the damping characteristics of HESD.



### SELF-DIAGNOSTIC SYSTEM

The HESD system is equipped with a self-diagnostic and fail-safe system that is linked to the PGM-FI system.

When the ECM detects any failure of the linear solenoid or VS sensor, it stops controlling the linear solenoid and informs the rider of system trouble by turning on the MIL and displaying the HESD indicator. If the malfunction indicator lamp (MIL) blinks, follow the Self-Diagnostic Procedures (page 6-9) to remedy the problem.

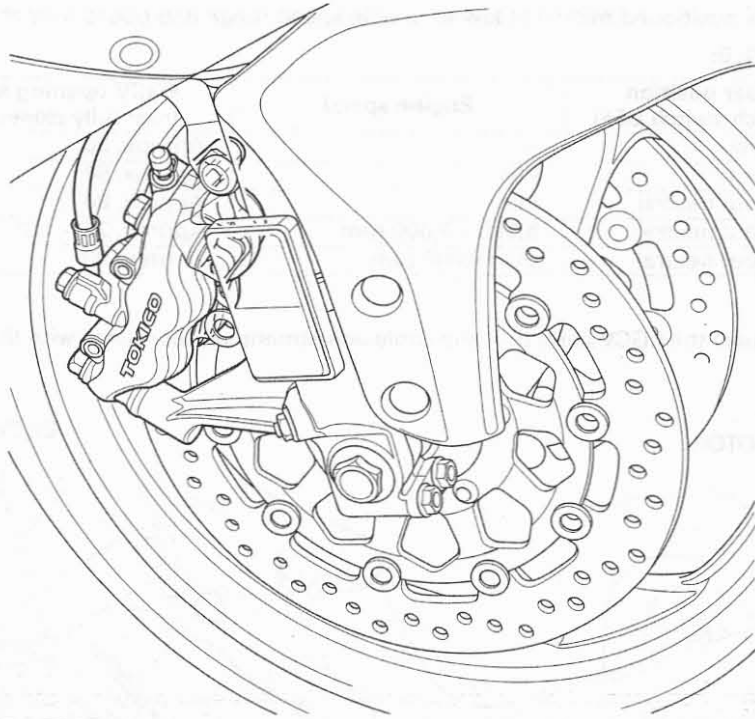
The fail-safe system secures a minimum running capability when there is any trouble in the system. When any abnormality is detected by the self-diagnosis function, the ECM stops the HESD system control by shutting off the current supply to the linear solenoid and the HESD will operate under minimum damping characteristics.

The HESD system is also equipped with the Function Test Mode so that a technician can compare the minimum with maximum damping characteristics without riding. The HESD system is set to minimum damping at no vehicle speed under normal conditions. By using the Function Test Mode, the ECM operates the linear solenoid with maximum current so the HESD system is temporarily set to maximum damping.

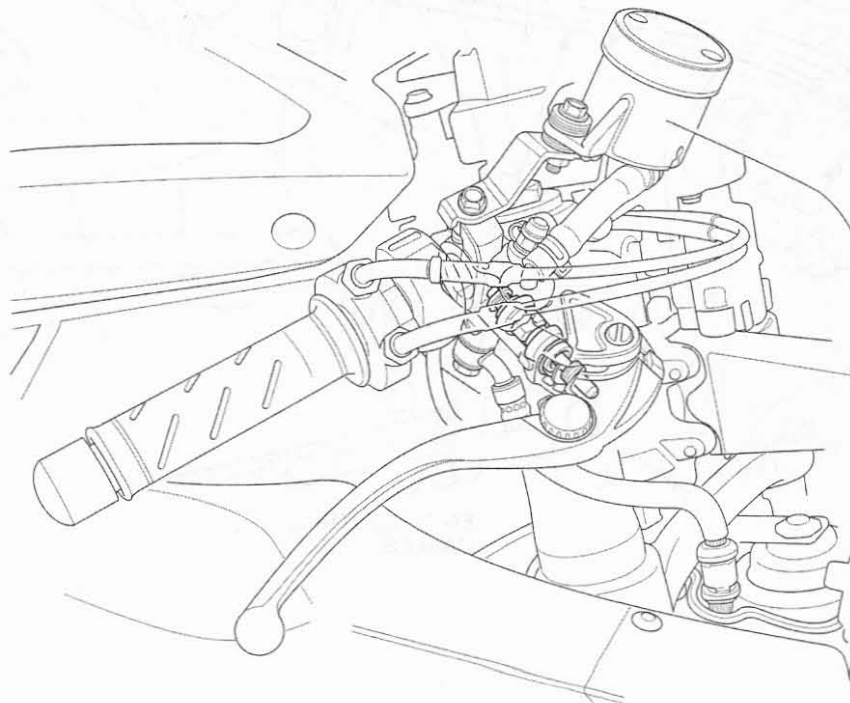
## RADIAL-MOUNTED FRONT BRAKE CALIPER

The CBR1000RR's new front brake system features a set of radial-mounted calipers.

These calipers feature distinctive turret-like mounts that are perpendicular to the front axle, onto which the calipers bolt straight down. The caliper halves are held together by three lateral bolts for a more rigid design that provides both stronger grip and more even pressure distribution across the entire surface area of the pads for highly efficient braking with excellent feel at the lever.



Along with these new radial-mounted front brake calipers, the new front brake system features a newly developed vertical piston layout master cylinder. This system minimizes lost motion and moves the lever pivot farther away from the end of the lever which offers high braking efficiency with excellent feel and controllability.





## TECHNICAL FEATURES

### EGCV (Exhaust Gas Control Valve)

This motorcycle is equipped with the EGCv that provides high performance and driveability especially at low to middle speed range by varying the exhaust gas flow.

This system consists of the variable exhaust control valve located in the muffler and a servomotor located under the fuel tank.

The variable exhaust control valve is operated by cables from the servomotor that is controlled by ECM.

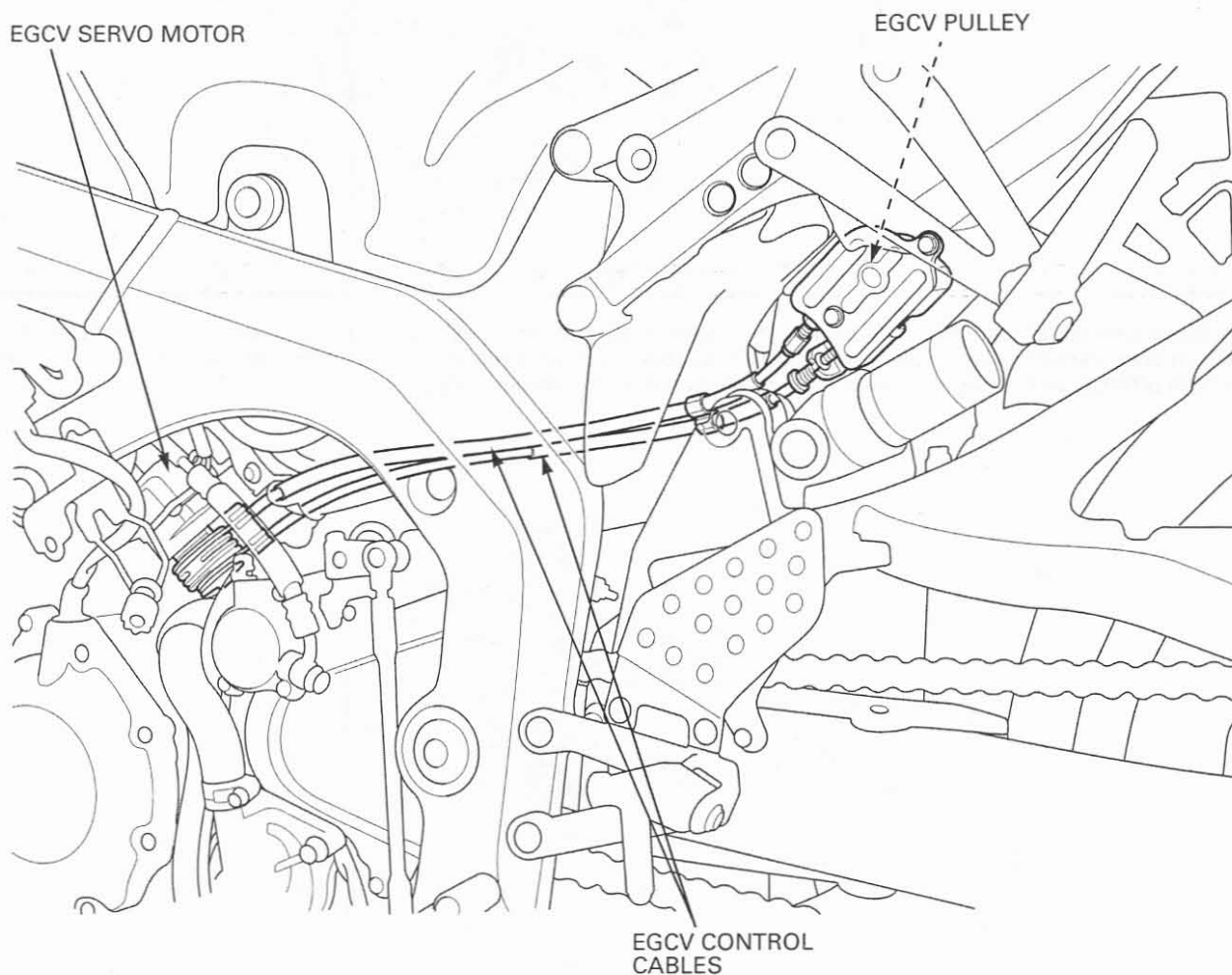
Basically, the EGCv is positioned middle at low to middle speed range and opens fully at high speed range.

#### EGCV OPENING ANGLE:

| Ignition switch | Gear position (Clutch switch OFF) | Engine speed      | EGCV opening angle from fully closed |
|-----------------|-----------------------------------|-------------------|--------------------------------------|
| ON              | Neutral                           | —                 | Approx. 50°                          |
| ON              | Neutral                           | Idle              | Approx. 50°                          |
| ON              | Without neutral                   | Idle              | Approx. 80°                          |
| ON              | Without neutral                   | 5,000 – 6,000 rpm | Approx. 75° – 90°                    |
| ON              | Without neutral                   | over 6,000 rpm    | Approx. 90°                          |

#### NOTE:

It is necessary to inspect the EGCv condition and cable adjustment in accordance with the maintenance schedule (page 4-4).



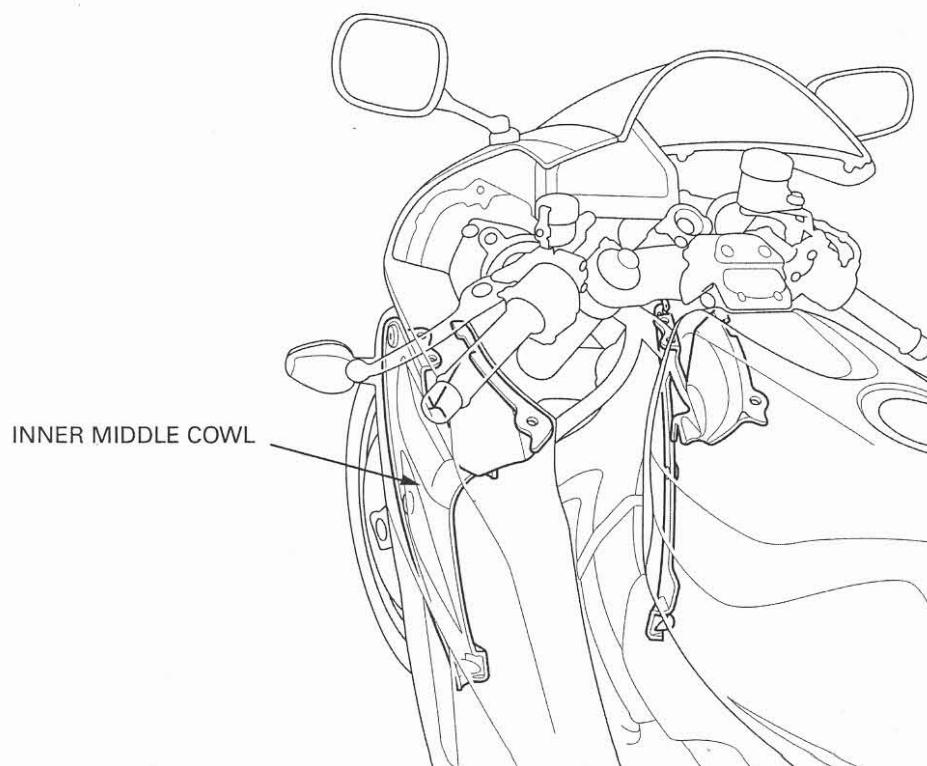
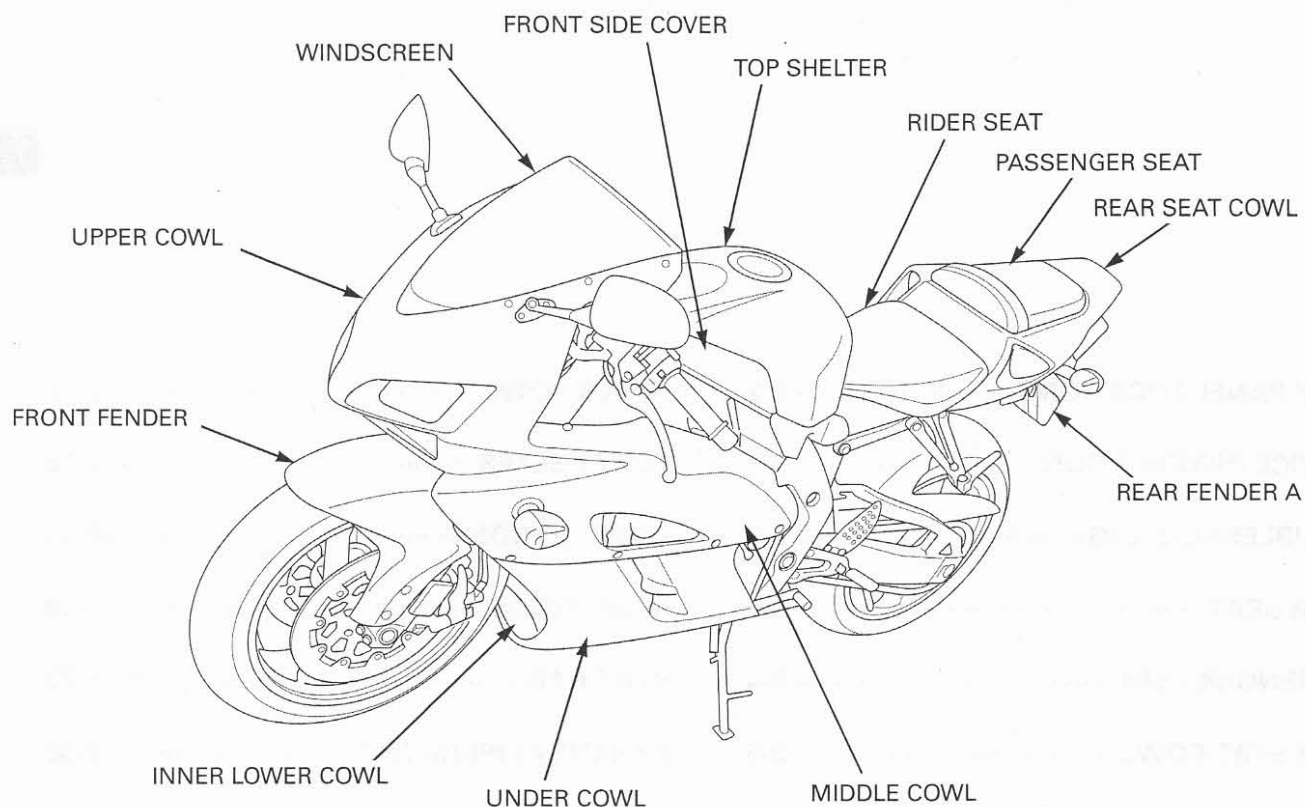
# 3. FRAME/BODY PANELS/EXHAUST SYSTEM

---

3

|                                |     |                            |      |
|--------------------------------|-----|----------------------------|------|
| BODY PANEL LOCATIONS .....     | 3-2 | UPPER COWL .....           | 3-12 |
| SERVICE INFORMATION .....      | 3-3 | TOP SHELTER .....          | 3-16 |
| TROUBLESHOOTING .....          | 3-3 | FRONT FENDER .....         | 3-19 |
| RIDER SEAT .....               | 3-4 | REAR FENDER .....          | 3-19 |
| PASSENGER SEAT .....           | 3-4 | SEAT RAIL .....            | 3-27 |
| REAR SEAT COWL .....           | 3-5 | EXHAUST PIPE/MUFFLER ..... | 3-30 |
| UNDER COWLS/MIDDLE COWLS ..... | 3-7 |                            |      |

## BODY PANEL LOCATIONS



## SERVICE INFORMATION

### GENERAL

- This section covers removal and installation of the body panels, exhaust system and seat rail.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.
- Always replace the exhaust pipe gaskets with a new one after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust pipe clamps first, then tighten the mounting fasteners.
- Always inspect the exhaust system for leaks after installation.

### TORQUE VALUES

|   |                                  |
|---|----------------------------------|
| Seat rail flange socket bolt/flange nut     | 59 N·m (6.0 kgf·m, 43 lbf·ft)    |
| Seat rail special bolt/flange nut           | 59 N·m (6.0 kgf·m, 43 lbf·ft)    |
| Seat rail assembly flange nut               | 30 N·m (3.1 kgf·m, 22 lbf·ft)    |
| Seat rail brace socket bolt                 | 26 N·m (2.7 kgf·m, 20 lbf·ft)    |
| Passenger seat bracket special bolt         | 26 N·m (2.7 kgf·m, 20 lbf·ft)    |
| Passenger seat bracket socket bolt          | 26 N·m (2.7 kgf·m, 20 lbf·ft)    |
| Rider seat bracket mounting bolt/nut        | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |
| Rider footpeg bracket socket bolt           | 37 N·m (3.8 kgf·m, 27 lbf·ft)    |
| Bank sensor                                 | 11 N·m (1.1 kgf·m, 8 lbf·ft)     |
| Passenger footpeg bracket socket bolt       | 26 N·m (2.7 kgf·m, 20 lbf·ft)    |
| Exhaust pipe joint nut                      | 12 N·m (1.2 kgf·m, 9 lbf·ft)     |
| Exhaust pipe mounting bolt                  | 23 N·m (2.3 kgf·m, 17 lbf·ft)    |
| Exhaust joint pipe clamp SH bolt            | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |
| Exhaust valve pulley nut                    | 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)  |
| Exhaust valve retaining screw               | 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft) |
| Exhaust valve pulley housing flange SH bolt | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |
| Muffler pipe clamp bolt                     | 18 N·m (1.8 kgf·m, 13 lbf·ft)    |
| Upper cowl stay flange bolt                 | 32 N·m (3.3 kgf·m, 24 lbf·ft)    |
| Cowl stay mounting bolt                     | 12 N·m (1.2 kgf·m, 9 lbf·ft)     |
| Windscreen mounting screw                   | 0.5 N·m (0.05 kgf·m, 0.4 lbf·ft) |
| Middle cowl pan screw                       | 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft) |
| Middle cowl special screw                   | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |
| Upper cowl pan screw                        | 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft) |
| Upper cowl special screw                    | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |
| Inner cowl special screw                    | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |
| Front fender pan screw                      | 12 N·m (1.2 kgf·m, 9 lbf·ft)     |
| Rearview mirror socket bolt                 | 6.8 N·m (0.7 kgf·m, 5.1 lbf·ft)  |

## TROUBLESHOOTING

### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

### Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

## RIDER SEAT

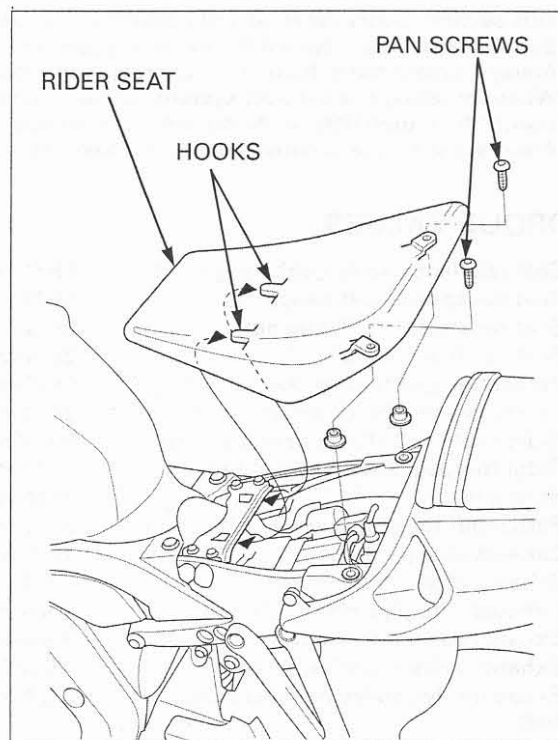
### REMOVAL/INSTALLATION

Remove the two seat mounting pan screws and collars.

Remove the seat by pulling it backward.

Install the seat hooks under the seat bracket on the seat rail.

Install the collars and seat mounting pan screws, tighten the screws.



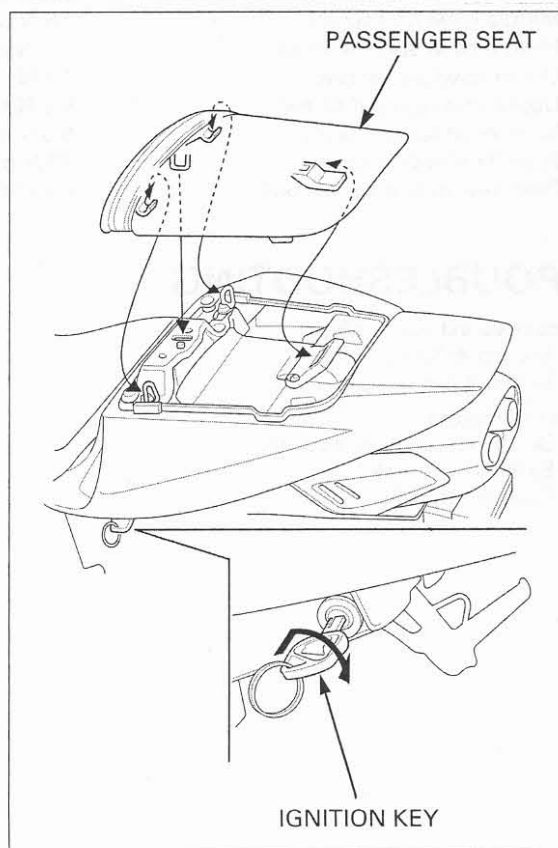
## PASSENGER SEAT

### REMOVAL/INSTALLATION

Unhook the passenger seat lock using the ignition key.

Remove the passenger seat by pulling it forward.

Install the passenger seat in the reverse order of removal.



## REAR SEAT COWL

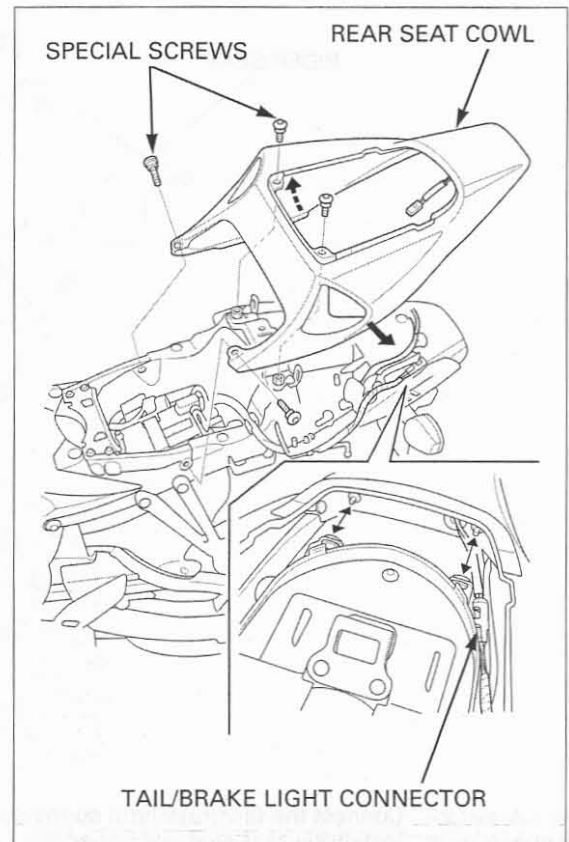
### REMOVAL

Remove the following:

- Rider seat (page 3-4)
- Passenger seat (page 3-4)

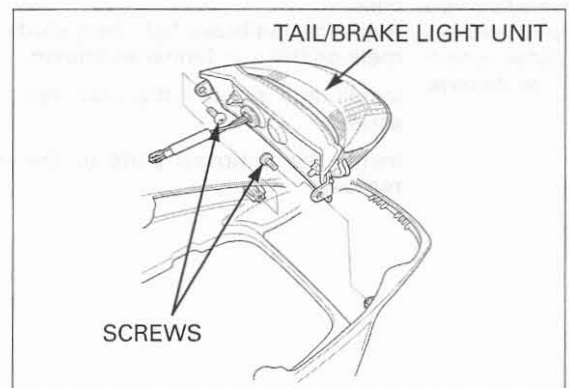
Remove the four special screws.  
Carefully pull out both sides of the rear seat cowl, then remove it upward.

Disconnect the tail/brake light connector.



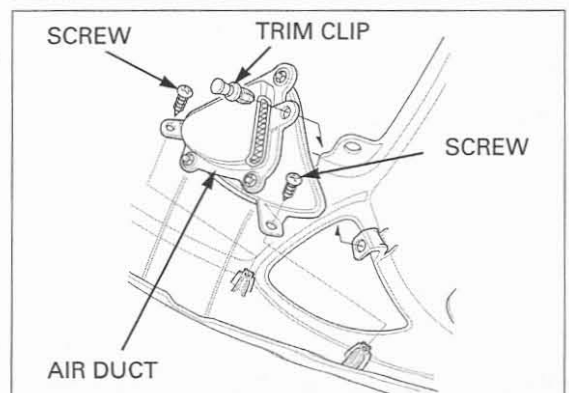
### DISASSEMBLY/ASSEMBLY

Remove the screws and tail/brake light unit.



Remove the two screws, trim clip and air duct.

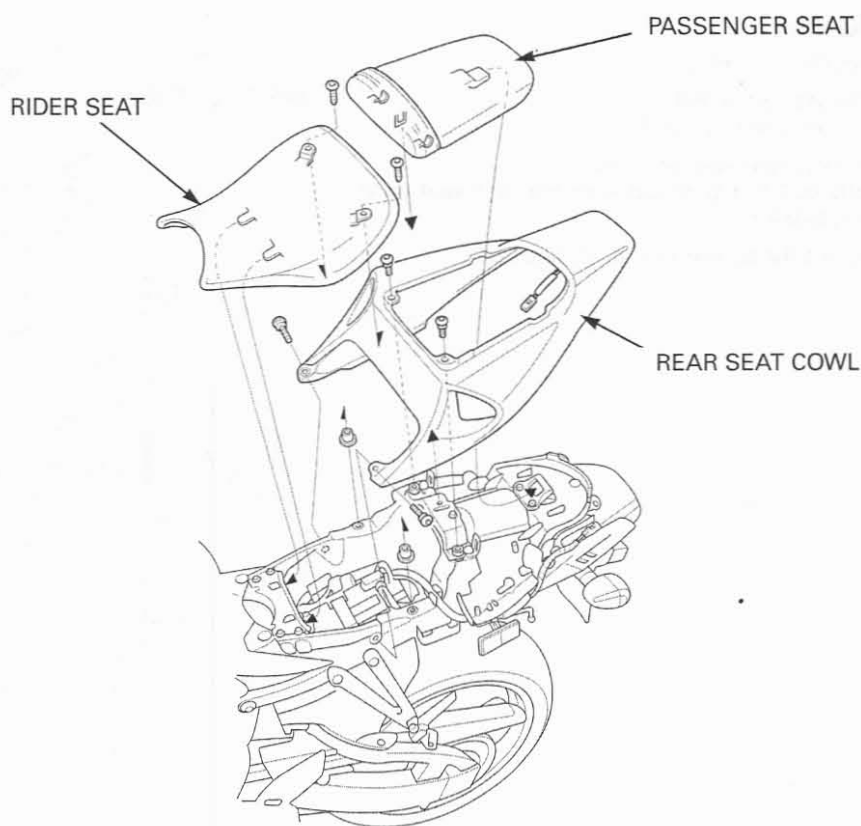
Install the air duct and tail/brake light unit in the reverse order of removal.





## FRAME/BODY PANELS/EXHAUST SYSTEM

### INSTALLATION



*Make sure that the mating surfaces of the cowl bottom are seated onto the rear fender properly before tightening the bolts.*

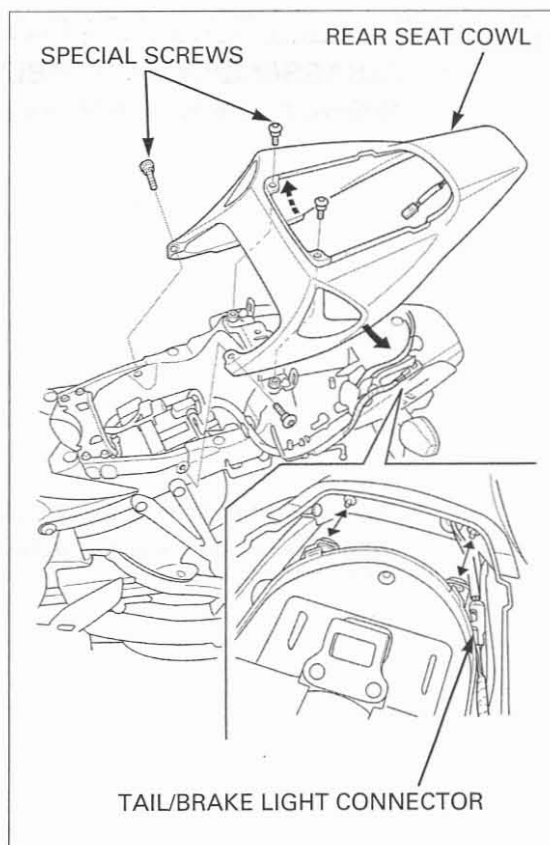
Connect the tail/brake light connector.

Install the rear seat cowl over the seat rail and rear fender being careful not to damage the wire harness.

Align the tail/brake light bolt studs with the grommets on the rear fender as shown.

Install and tighten the rear seat cowl mounting screws.

Install the removed parts in the reverse order of removal.

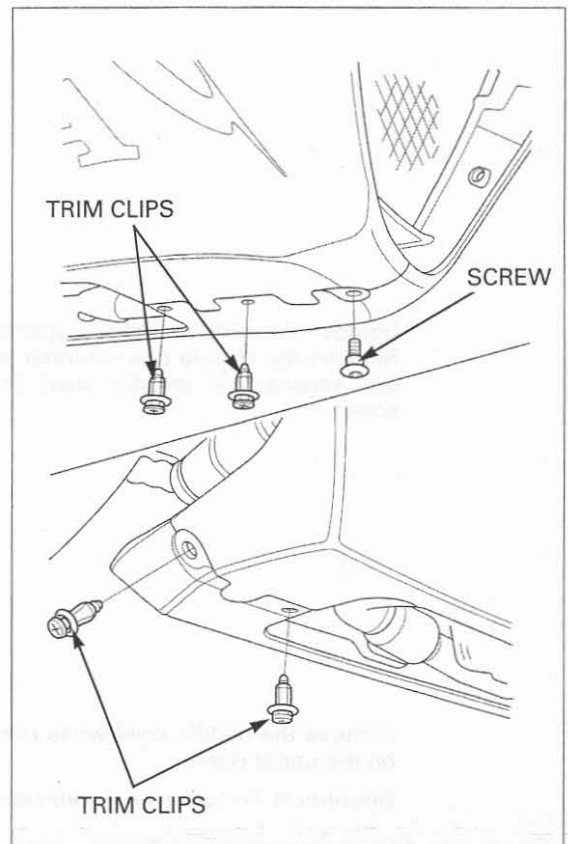


## UNDER COWLS/MIDDLE COWLS

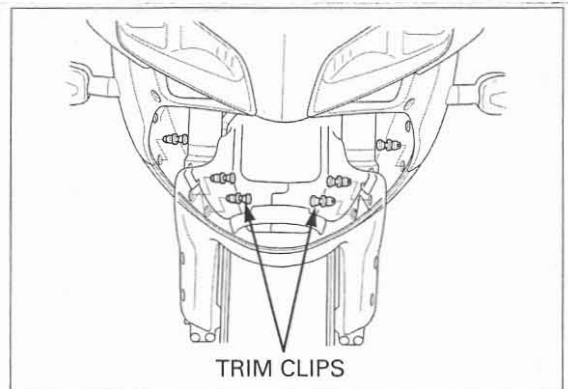
### REMOVAL

*Be careful not to damage the tabs and grooves.*

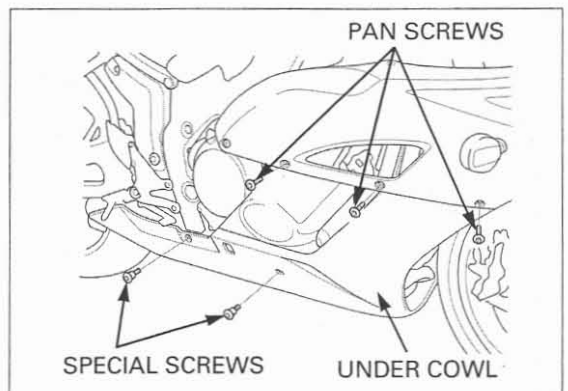
Remove the special screw and four trim clips from the bottom of the under cowls.



Remove the six trim clips from the inner lower cowl and inner middle cowl.

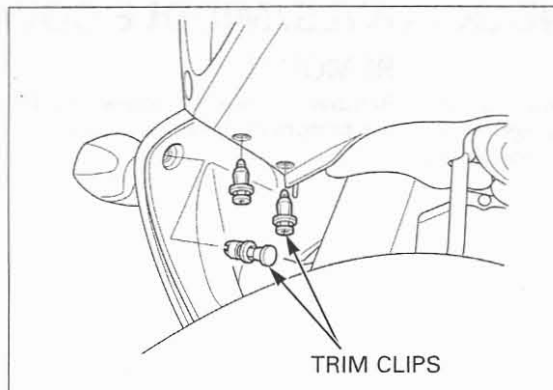


Remove the under cowl-to-middle cowl pan screws. Remove the under cowl mounting special screws and then remove the under cowls and inner lower cowl.

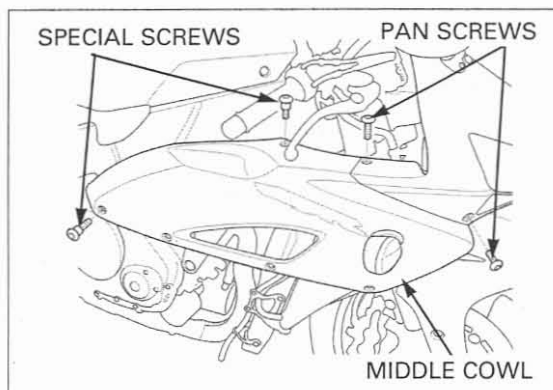


## FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the middle cowl-to-inner middle cowl trim clips.

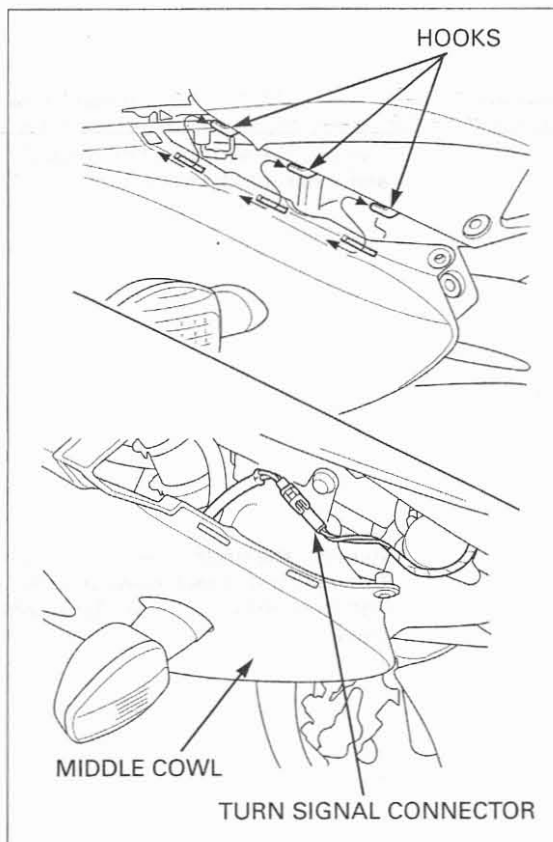


Remove the middle cowl-to-upper cowl pan screws. Remove the middle cowl-to-inner middle cowl special screws and middle cowl mounting special screw.

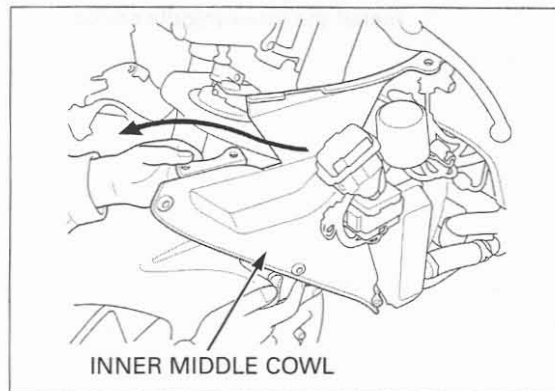


Remove the middle cowl while releasing the hooks on the upper cowl.

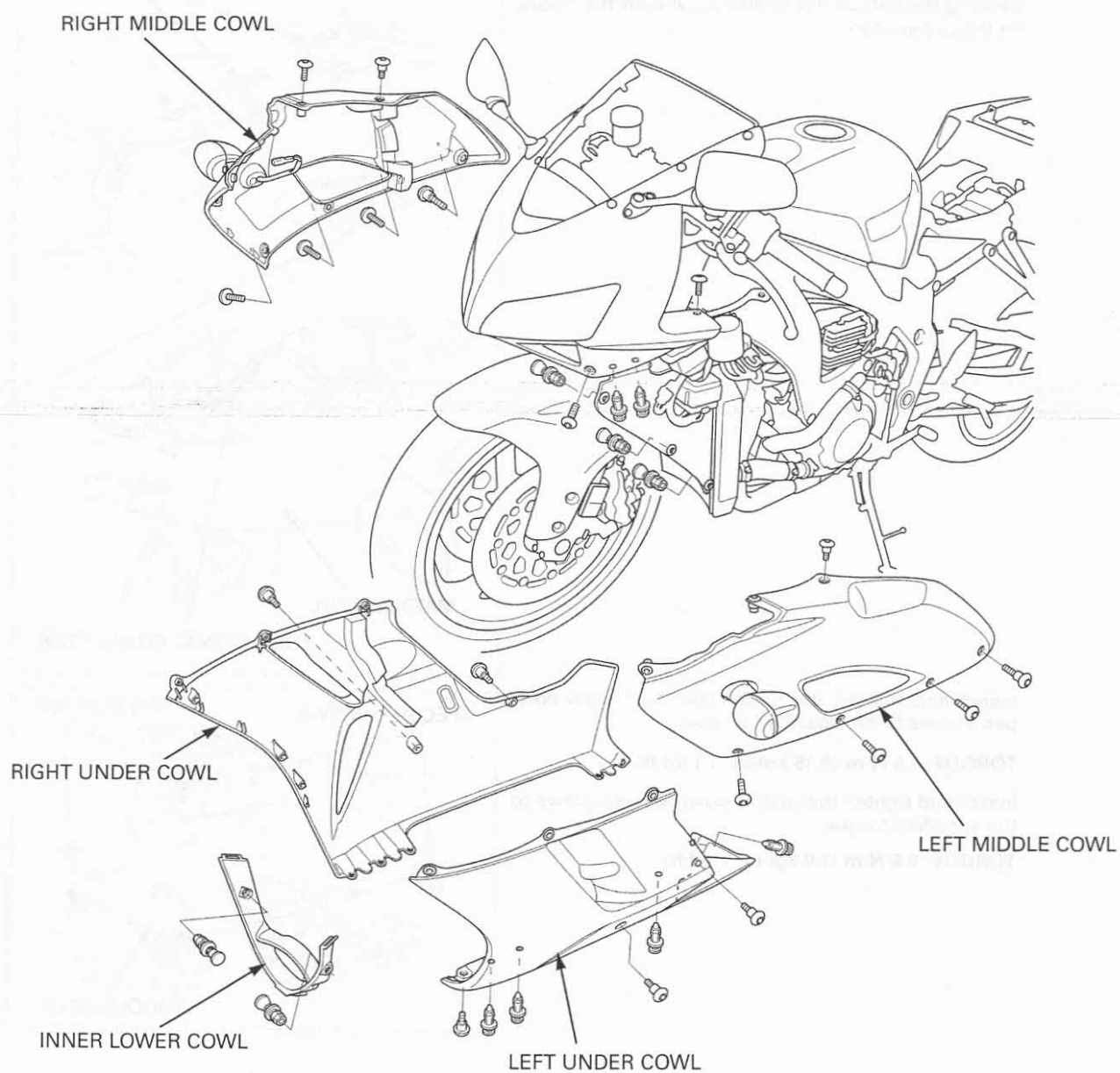
Disconnect the turn signal connector.



Remove the inner middle cowl

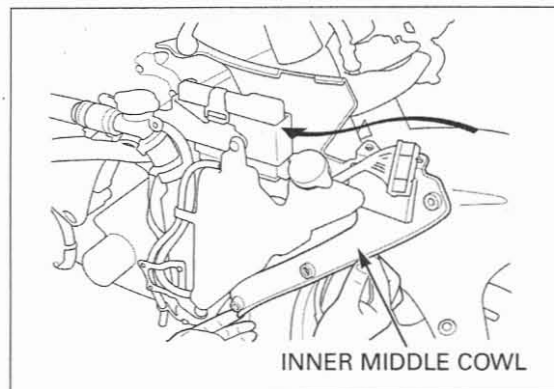


## INSTALLATION



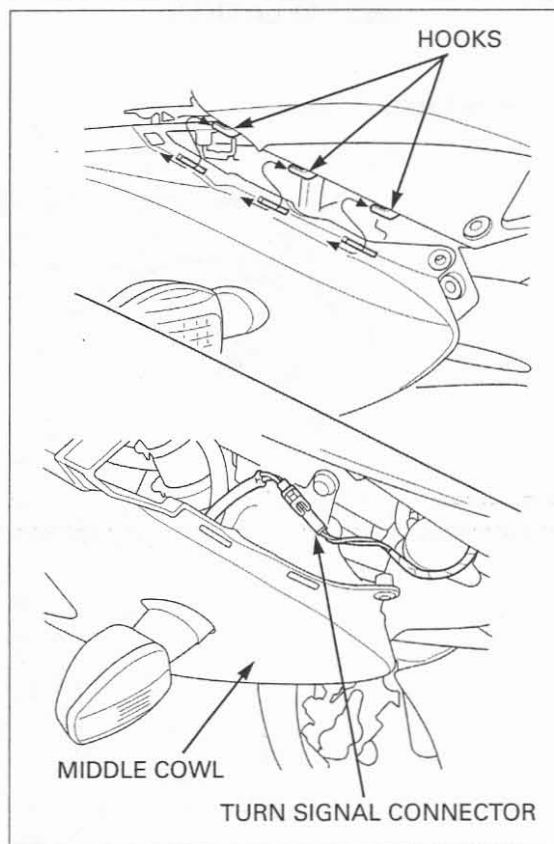
## FRAME/BODY PANELS/EXHAUST SYSTEM

Install the inner middle cowl.



Connect the turn signal connector.

Install the middle cowl onto the upper cowl while aligning the slits in the middle cowl with the hooks on the upper cowl.

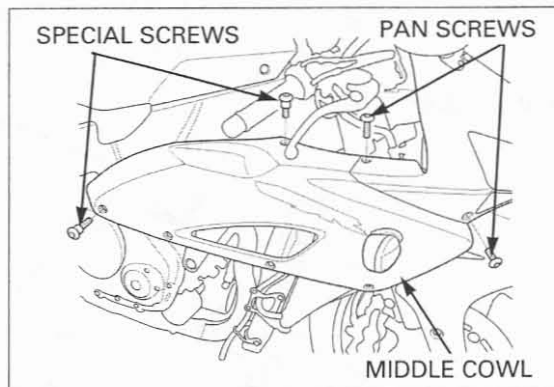


Install and tighten the upper cowl-to-middle cowl pan screws to the specified torque.

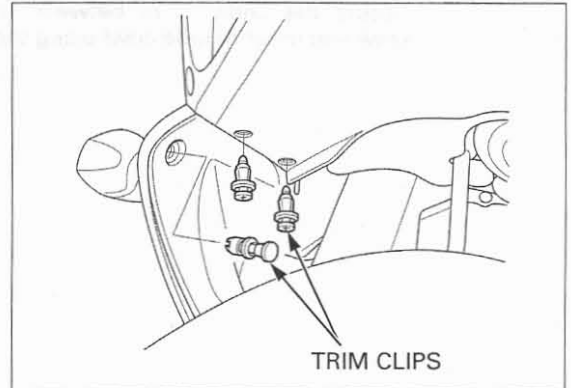
**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**

Install and tighten the middle cowl special screws to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**



Install the trim clips.



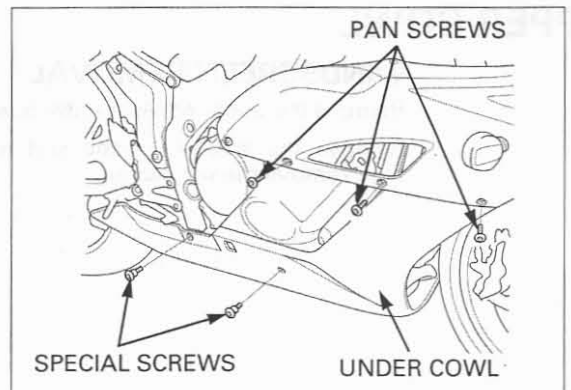
Install the right and left under cowls by aligning the bottom end.

Install and tighten the under cowl-to-middle cowl pan screws to the specified torque.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**

Install and tighten the under cowl mounting special screw to the specified torque.

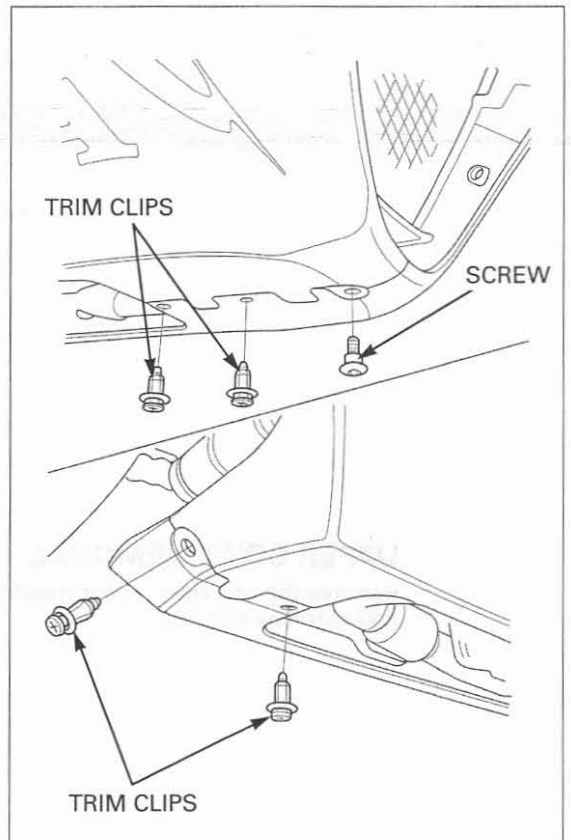
**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**



Secure the bottom of the under cowls using the four trim clips and pan screw.

Tighten the special screw to the specified torque.

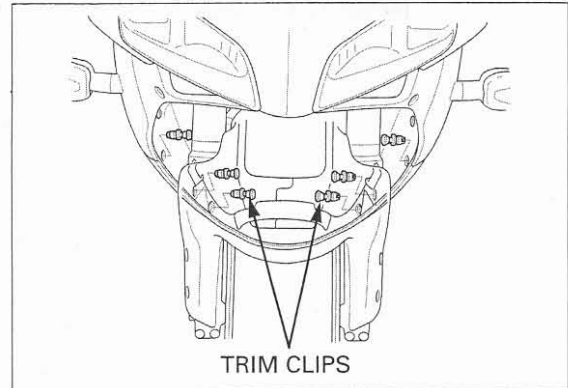
**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**





## FRAME/BODY PANELS/EXHAUST SYSTEM

Secure the under cowl between the inner lower cowl and inner middle cowl using the six trim clips.

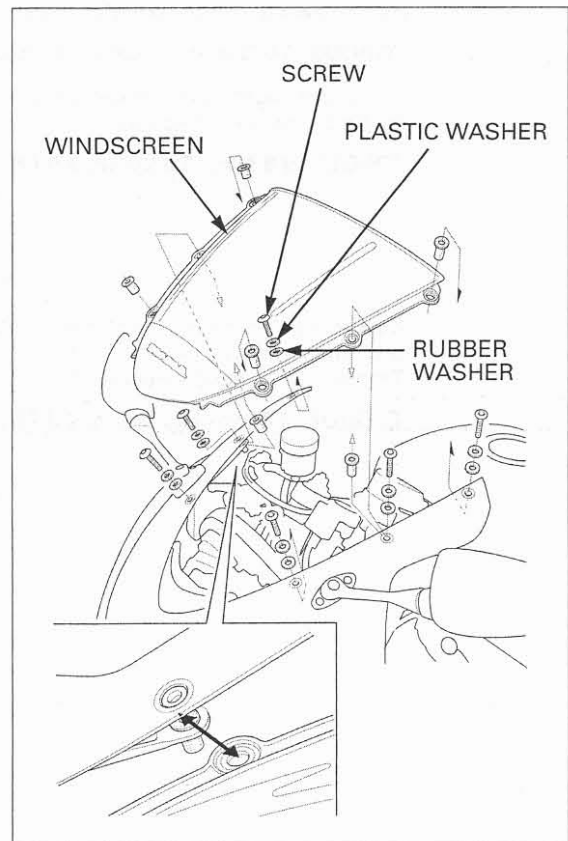


## UPPER COWL

### WINDSCREEN REMOVAL

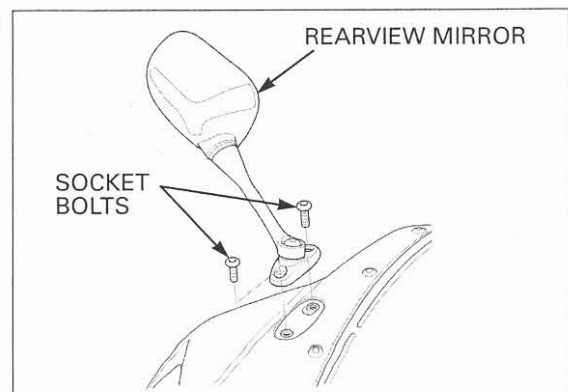
Remove the under cowls/middle cowls (page 3-7).

Remove the screws, plastic and rubber washers, then remove the windscreen.

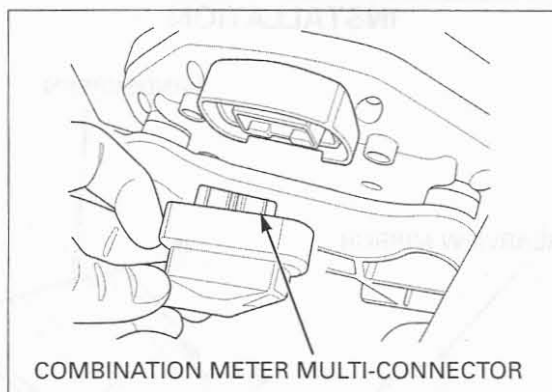


### UPPER COWL REMOVAL

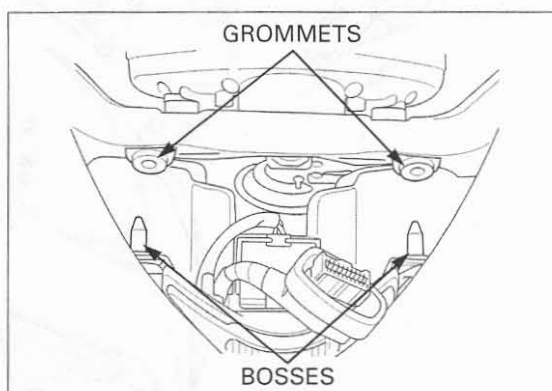
Remove the rearview mirror mounting socket bolts and rearview mirrors.



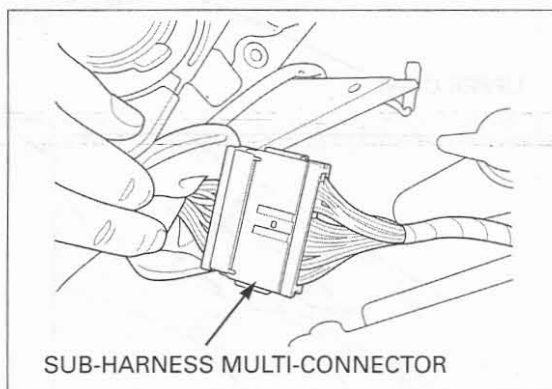
Disconnect the combination meter multi-connector.



Release the upper cowl off the rearview mirror bolt hole studs and bosses of the upper cowl from the meter stay grommets, then remove the upper cowl assembly.

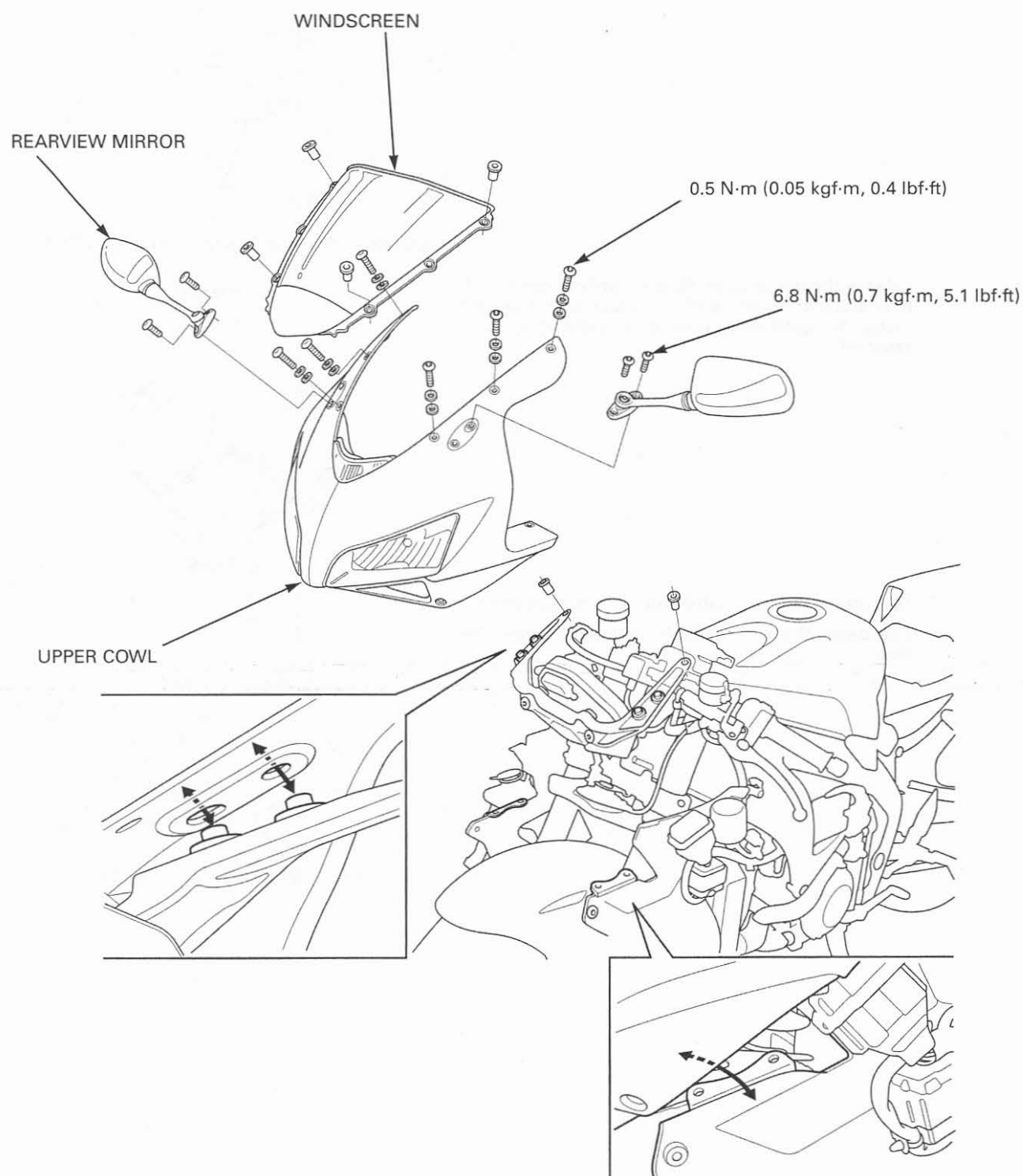


Disconnect the front sub-harness multi-connector.  
See page 20-5 for headlight unit removal/installation.

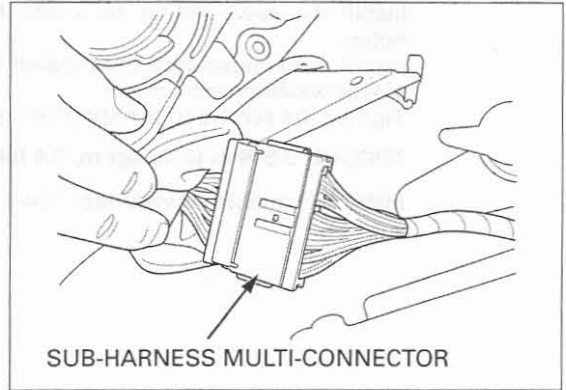


## FRAME/BODY PANELS/EXHAUST SYSTEM

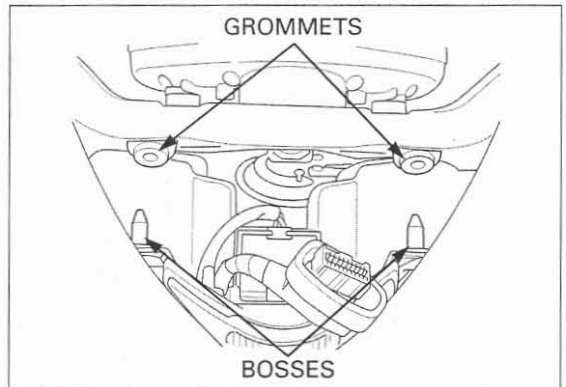
### INSTALLATION



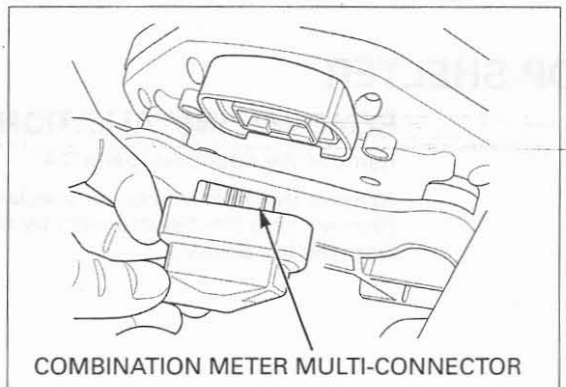
Connect the front sub-harness connectors, combination meter multi-connector.



Install the upper cowl, aligning the bosses with the grommets on the upper cowl stay.



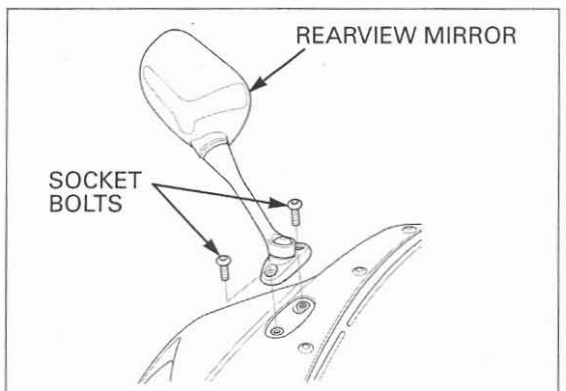
Connect the combination meter multi-connector.



Align the rearview mirror bolt hole studs of upper cowl with the rearview mirror stay.

Install the rearview mirror and tighten the socket bolts to the specified torque.

**TORQUE: 6.8 N·m (0.7 kgf·m, 5.1 lbf·ft)**



## FRAME/BODY PANELS/EXHAUST SYSTEM

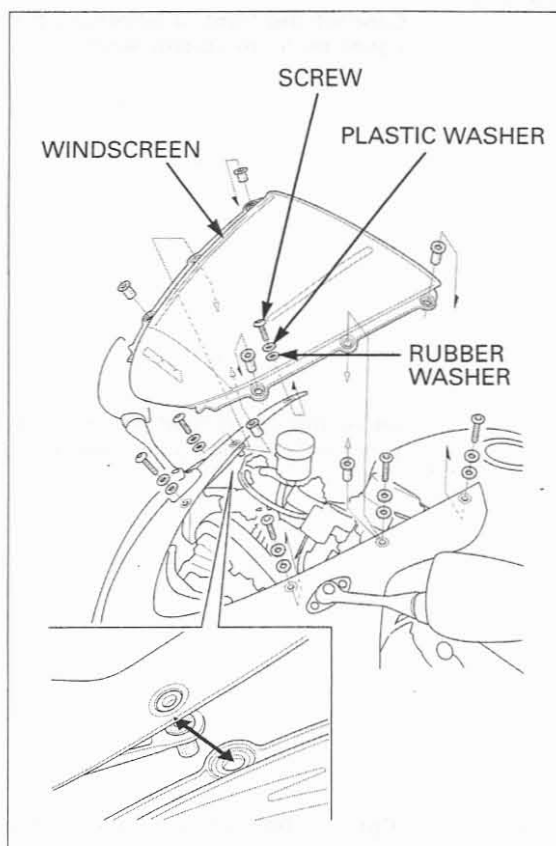
Install the cowl setting nuts into the windscreen holes.

Install the windscreen, then install the rubber and plastic washers and screws.

Tighten the screws to the specified torque.

**TORQUE: 0.5 N·m (0.05 kgf·m, 0.4 lbf·ft)**

Install the middle cowls/under cowls (page 3-7).



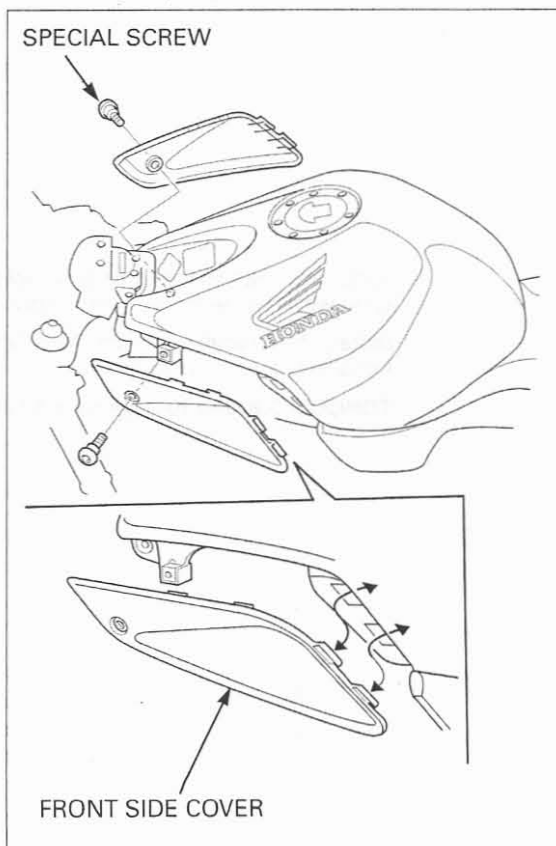
## TOP SHELTER

### REMOVAL/INSTALLATION

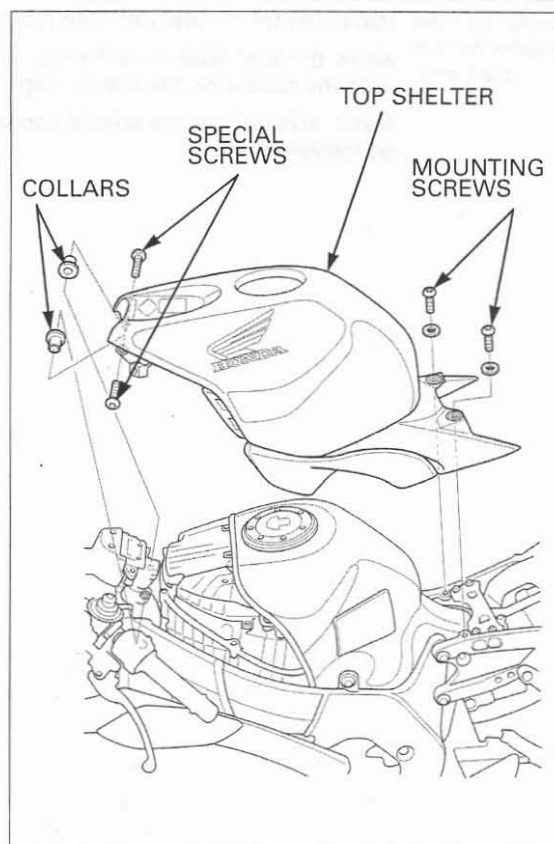
Remove the rider seat (page 3-4).

Remove the front side cover special screws.

Remove both front side covers by releasing the tabs from the top shelter.

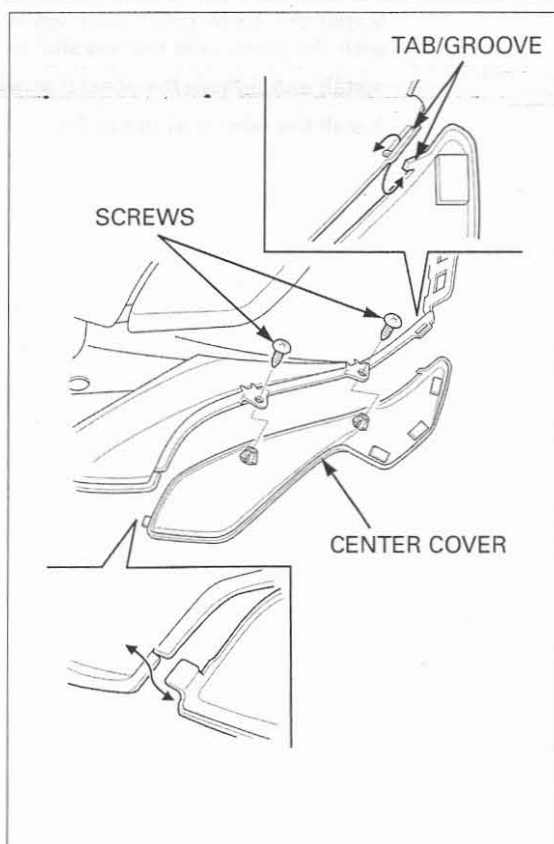


Remove the special screws, mounting screws/washers and top shelter.



Remove the screws and center cover from the top shelter.

Install the center cover, align the tab of the center cover into the groove of the top shelter, then tighten the screws.





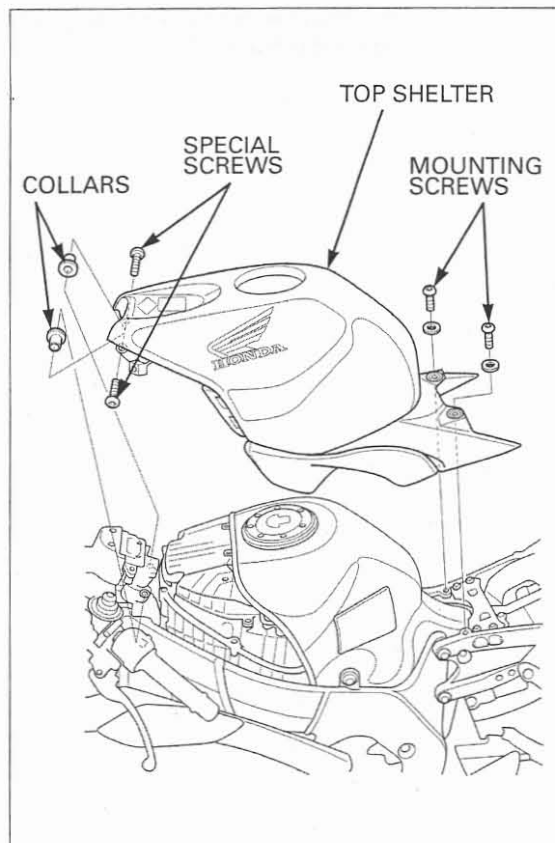
## FRAME/BODY PANELS/EXHAUST SYSTEM

*Be careful not to let the collars fall into the frame.*

Install the top shelter onto the fuel tank.

Align the fuel filler hole flange on the top shelter with the rubber on the fuel fill cap.

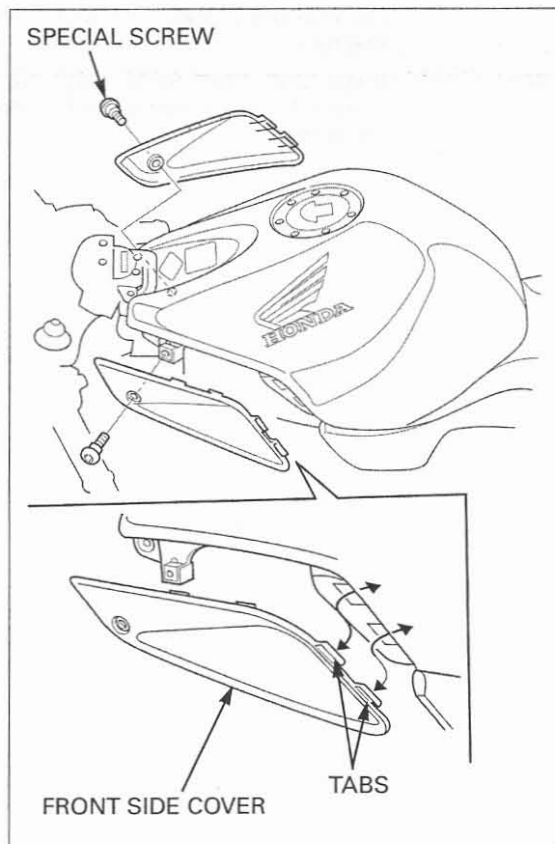
Install and tighten the special screws and mounting screws/washers.



Install the front side cover while aligning its tabs with the grooves in the top shelter.

Install and tighten the special screw on both sides.

Install the rider seat (page 3-4).



## FRONT FENDER

### REMOVAL/INSTALLATION

Remove the front brake hose 3-way joint bolt and hose clamp nut.

Remove the pan screws, front fender, reflectors and grommets from the fork legs.

Install the front fender in the reverse order of removal.

#### TORQUE:

Front fender pan screw:

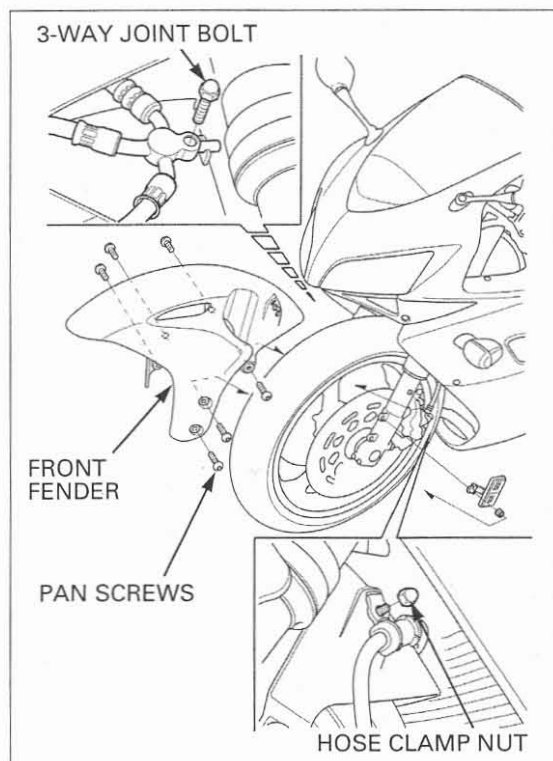
12 N·m (1.2 kgf·m, 9 lbf·ft)

Front brake hose clamp nut:

9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Front brake hose 3-way joint bolt:

9.8 N·m (1.0 kgf·m, 7 lbf·ft)



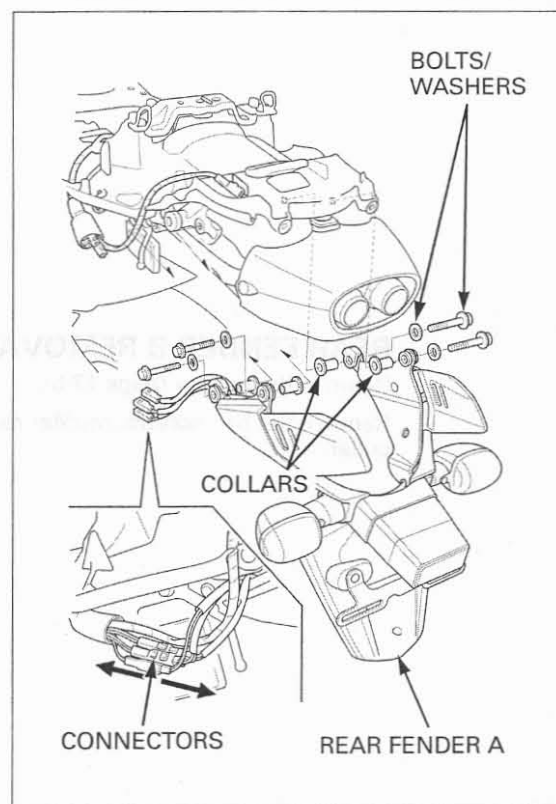
## REAR FENDER

### REAR FENDER A REMOVAL

Remove the rear cowl (page 3-5).

Disconnect the turn signal and license light connectors.

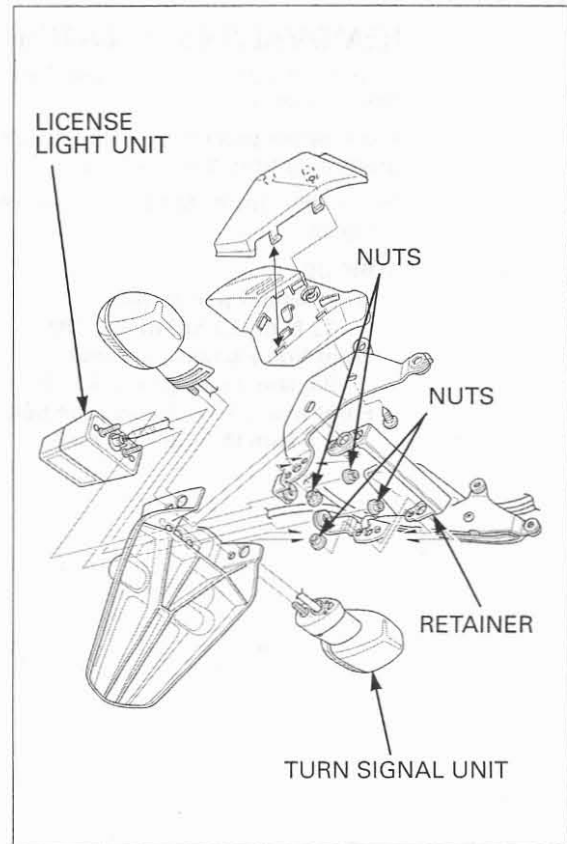
Remove the rear fender A mounting bolts, washers and rear fender A assembly.



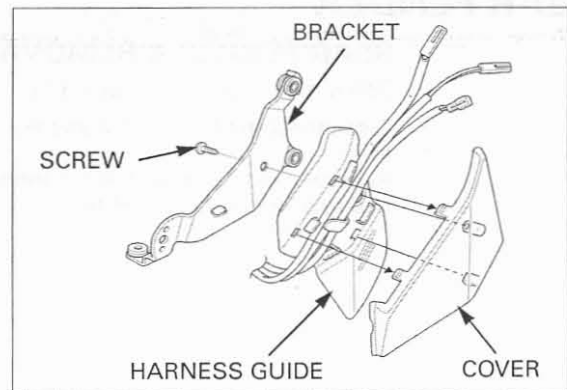
## FRAME/BODY PANELS/EXHAUST SYSTEM

### REAR FENDER A DISASSEMBLY

Remove the nuts and license light unit.  
Remove the nut, retainer and rear turn signal unit.

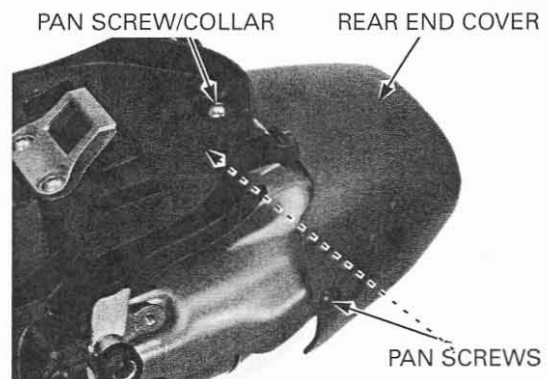


Remove the screw and left rear fender bracket, harness guide and cover.

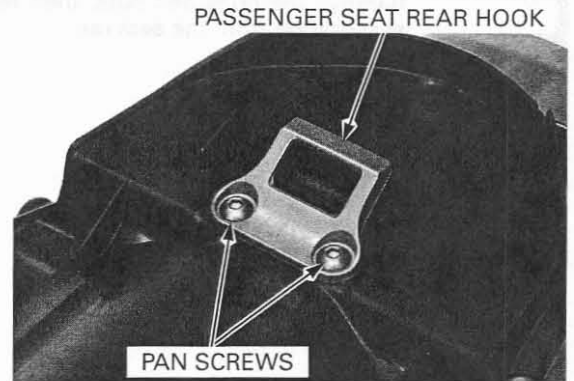


### REAR FENDER B REMOVAL

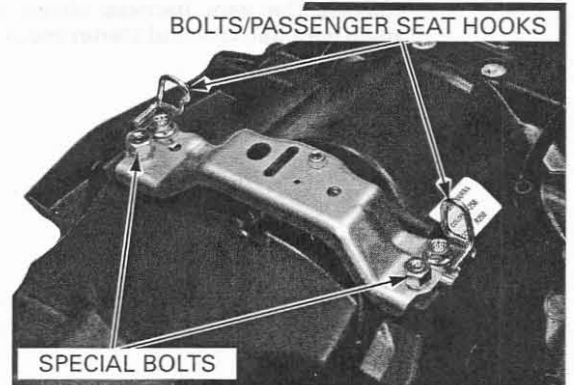
Remove the battery (page 17-5).  
Remove the pan screws, muffler rear end cover and collar.



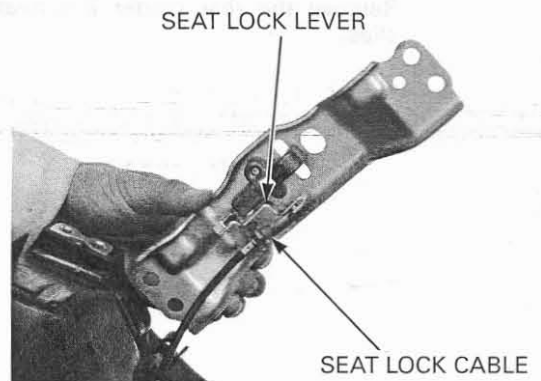
Remove the pan screws and passenger seat rear hook.



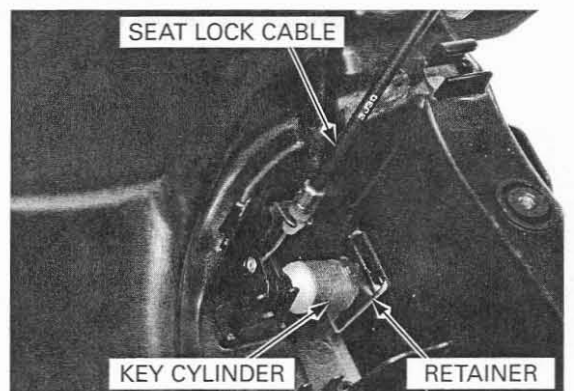
Remove the flange bolts and passenger seat hooks. Remove the passenger seat hook special bolts, then remove the passenger seat bracket.



Unhook the seat lock cable from the seat lock lever, then remove the passenger seat bracket.

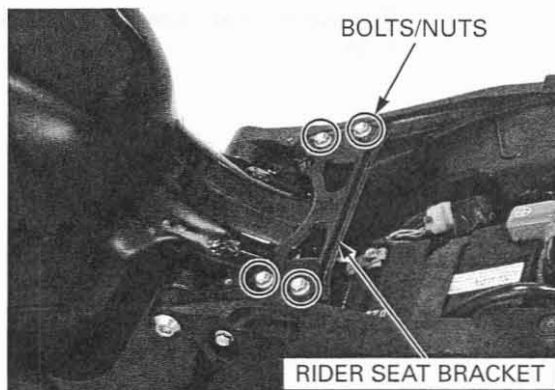


Disconnect the seat lock cable from the seat lock key cylinder. Remove the retainer and remove the seat lock key cylinder from the rear fender B.

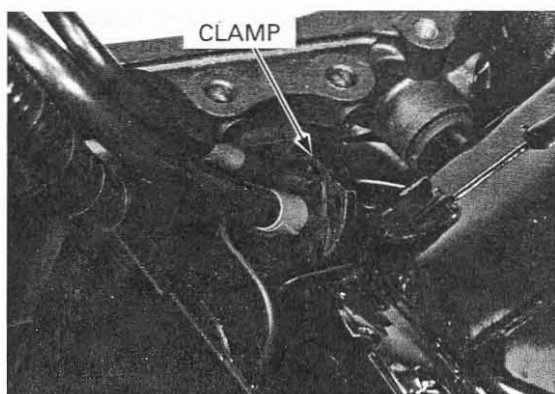


## FRAME/BODY PANELS/EXHAUST SYSTEM

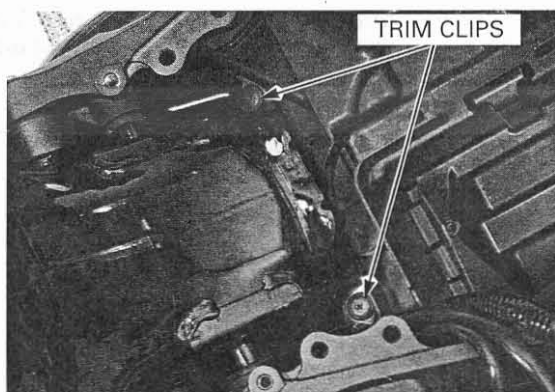
Remove the bolts and nuts, then remove the rider seat bracket from the seat rail.



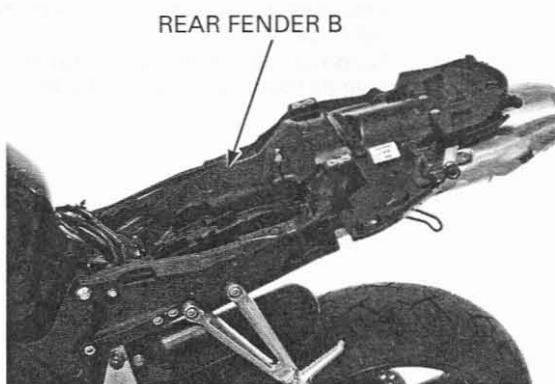
Release the wire harness clamp and release the main wire harness and starter motor cables.



Remove the rear fender B-to-heat protector trim clips.

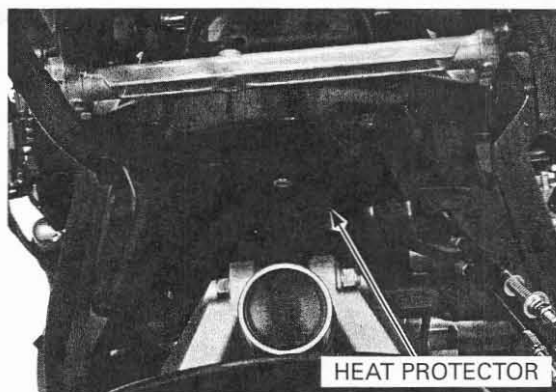


Remove the rear fender B from the seat rail.



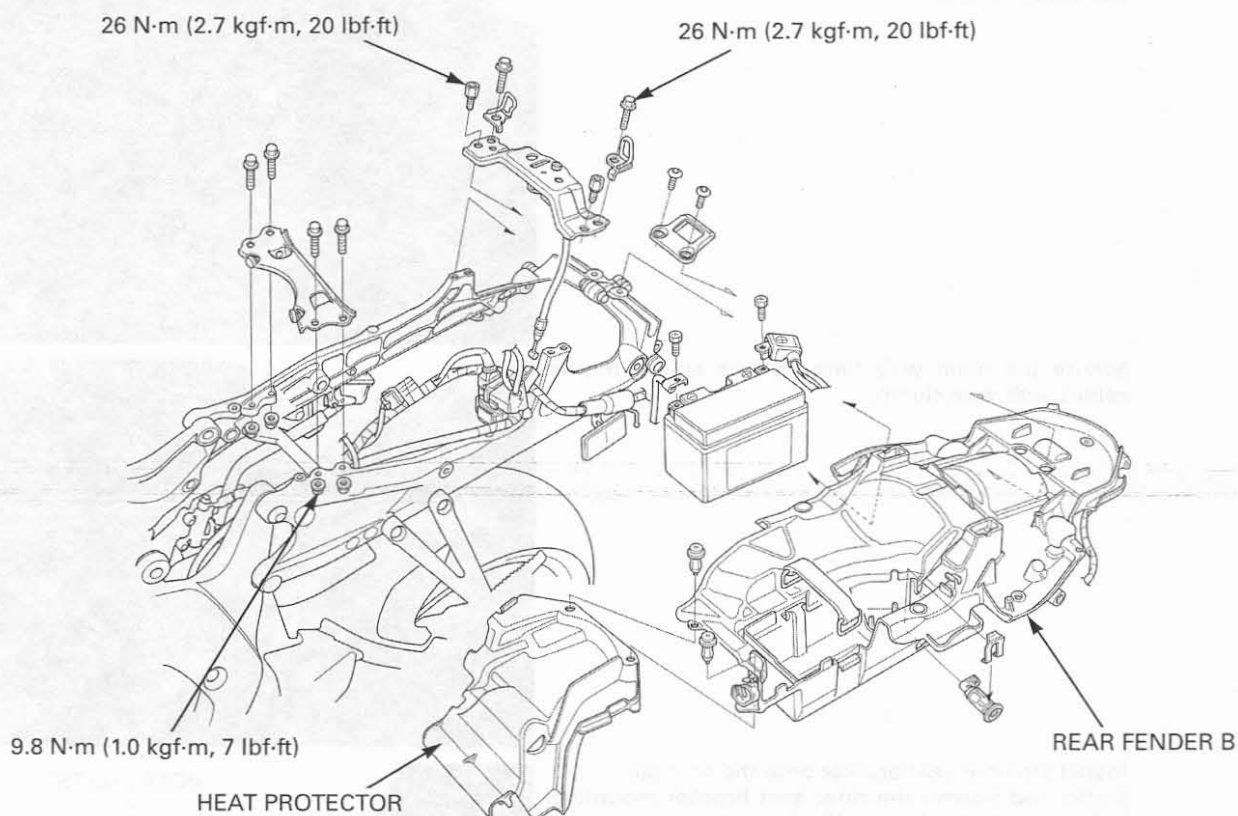
Remove the muffler and muffler heat protector (page 3-30).

Remove the heat protector from the seat rail and frame.



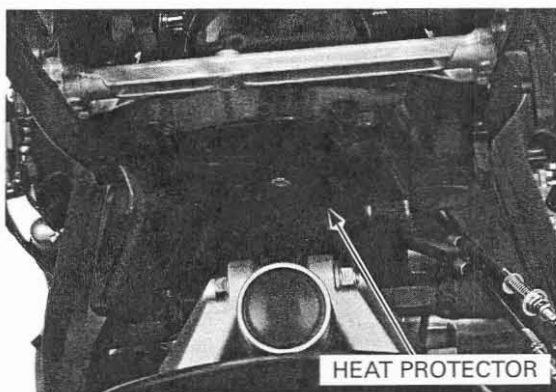
HEAT PROTECTOR

## REAR FENDER B INSTALLATION



Install the heat protector onto the seat rail and frame.

Install the muffler and muffler heat protector (page 3-36).

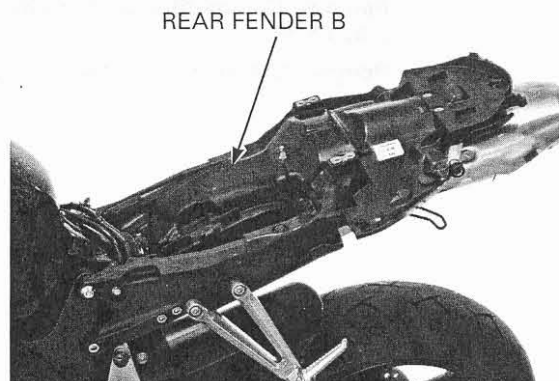


HEAT PROTECTOR

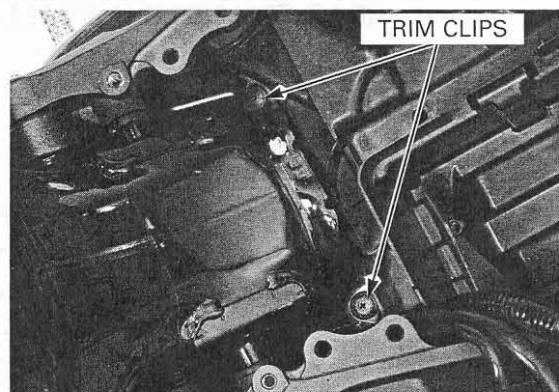


## FRAME/BODY PANELS/EXHAUST SYSTEM

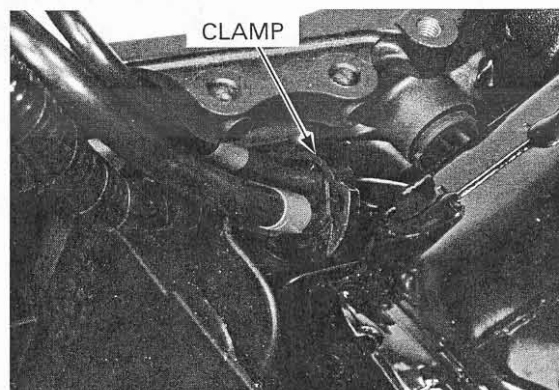
Install the rear fender B into the seat rail.



Install the rear fender B-to-heat protector trim clips and secure them.

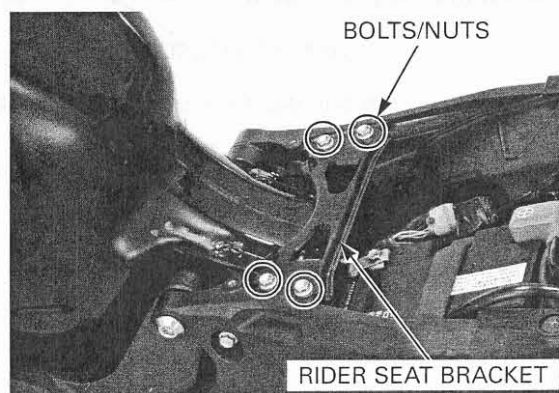


Secure the main wire harness and starter motor cables with wire clamp.



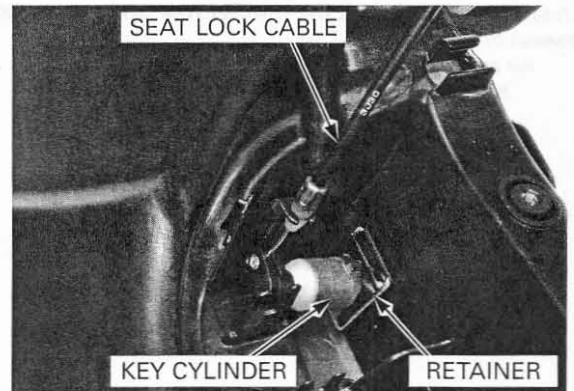
Install the rider seat bracket onto the seat rail. Install and tighten the rider seat bracket mounting bolts and nuts to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

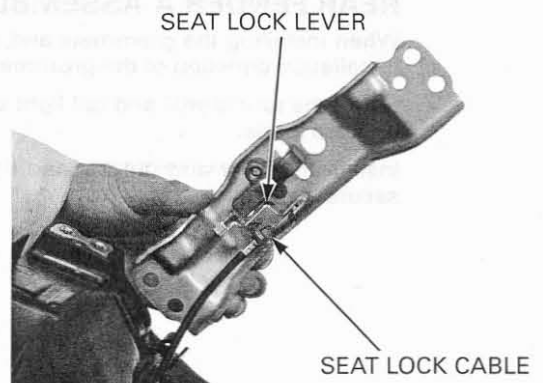




Install the seat lock key cylinder into the rear fender B and secure it with retainer.  
Connect the seat lock cable to the seat lock key cylinder and clamp it with cable clamp.



Hook the seat lock cable to the seat lock lever.

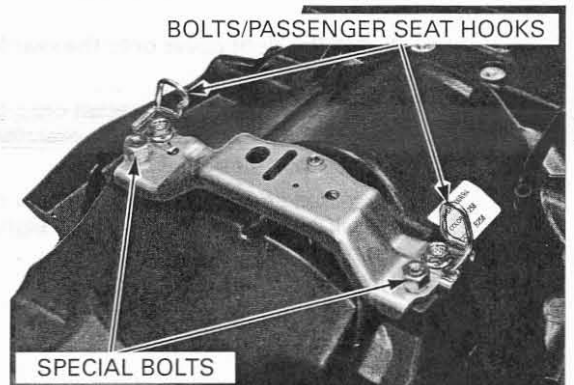


Install the passenger seat bracket.

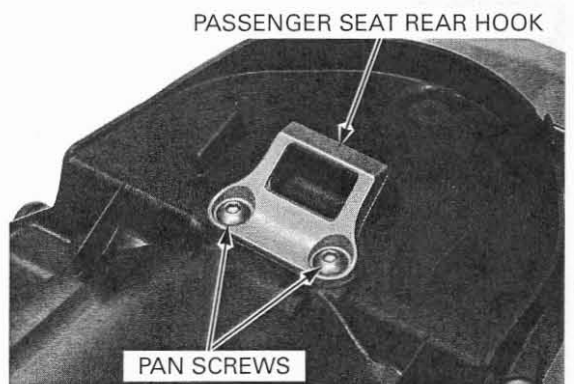
Install the passenger seat bracket special bolts.  
Install the passenger seat hooks and flange bolt.

Tighten the passenger seat bracket special bolts and flange bolts to the specified torque.

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



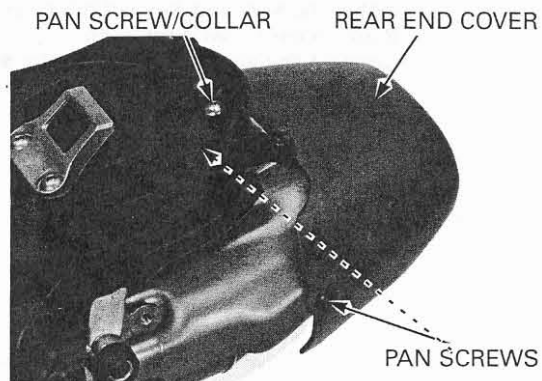
Install the passenger seat rear hook and tighten the pan screw securely.



## FRAME/BODY PANELS/EXHAUST SYSTEM

Install the collar  
between the muffler  
and rear  
fender B.

Install the muffler rear end cover and collar.  
Install and tighten the pan screws.  
Install the battery (page 17-5).

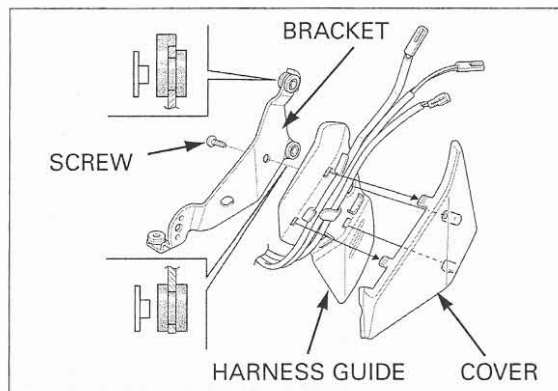


### REAR FENDER A ASSEMBLY

When installing the grommets and collars, note the installation direction of the grommets and collars.

Route the turn signal and tail light wire into the left harness guide.

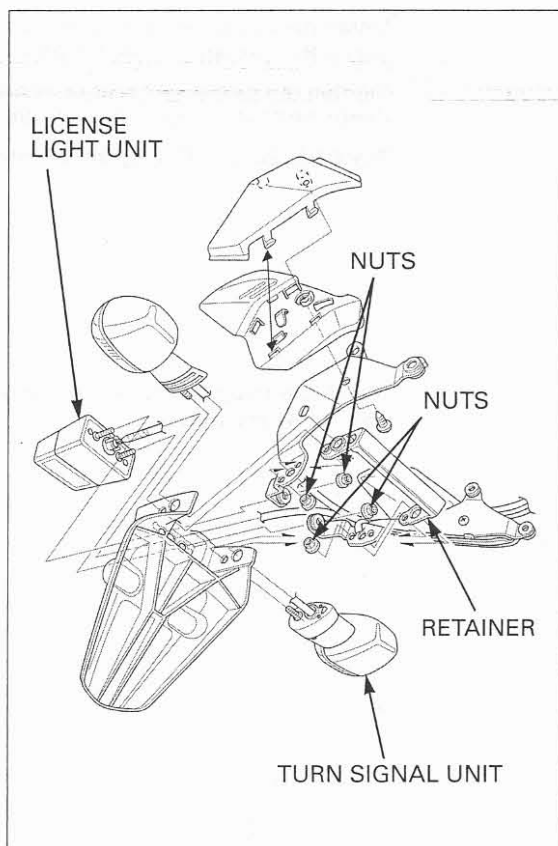
Install the cover and bracket and tighten the screw securely.



Install the right cover onto the rear fender A bracket, tighten the screw.

Install the turn signal bracket onto the rear fender A bracket, then assemble the rear fender A, brackets and license light.

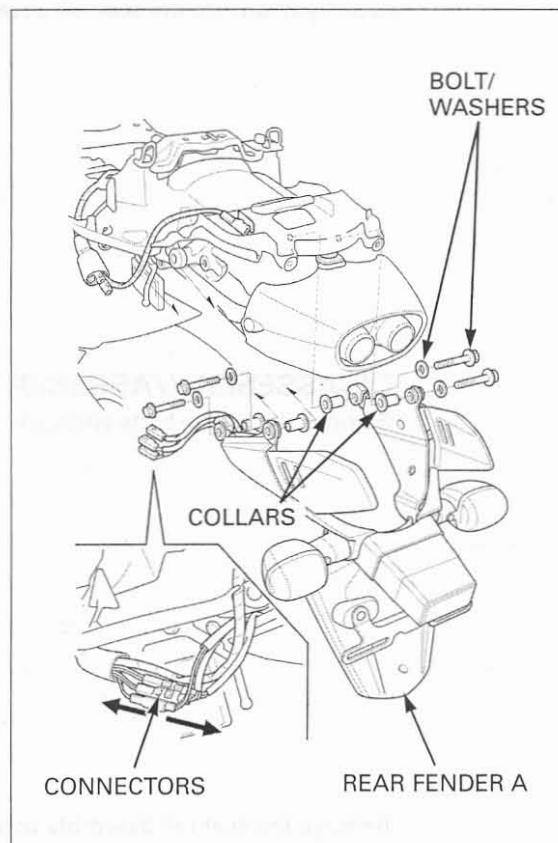
Install and tighten the license light mounting nuts. Install and tighten the rear turn signal unit mounting nuts.



## REAR FENDER A INSTALLATION

Install the rear fender A assembly, washers and bolts, then tighten the bolts securely. Connect the turn signal and license light connectors.

Install the rear cowl (page 3-5).



## SEAT RAIL

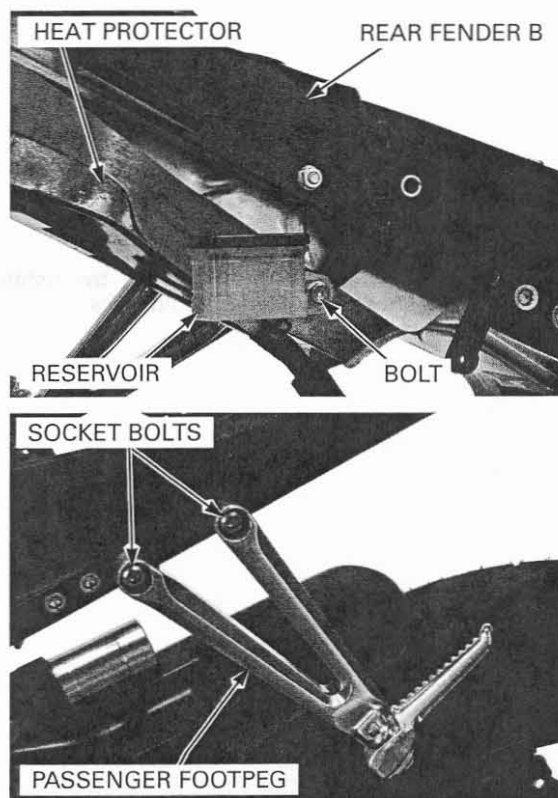
### REMOVAL

Remove the following:

- Muffler (page 3-30)
- Rear fender A and B (page 3-19)
- Fuel tank (page 6-36)

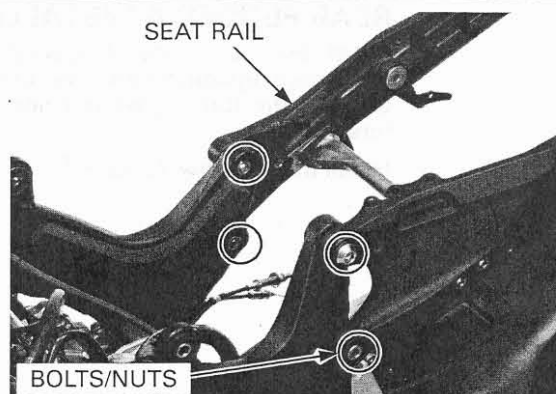
Remove the bolt and rear brake reservoir.

Remove the socket bolts and left passenger footpeg bracket.



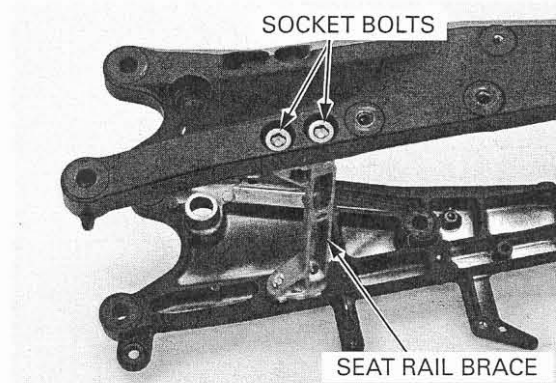
## FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the seat rail mounting special bolts and nuts, then remove the seat rail assembly.

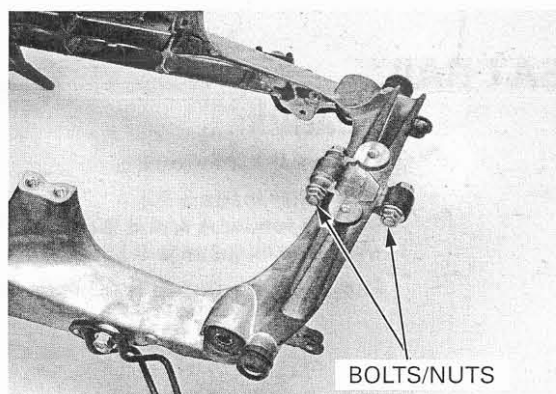


### DISASSEMBLY/ASSEMBLY

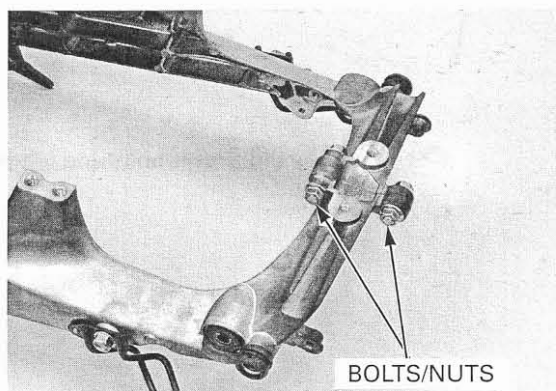
Remove the socket bolts and seat rail brace.



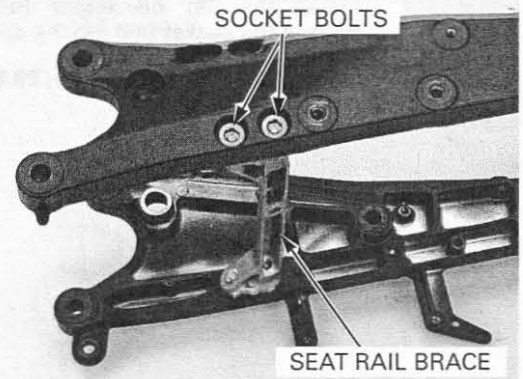
Remove the seat rail assembly bolts/nuts, then separate the right and left seat rail.



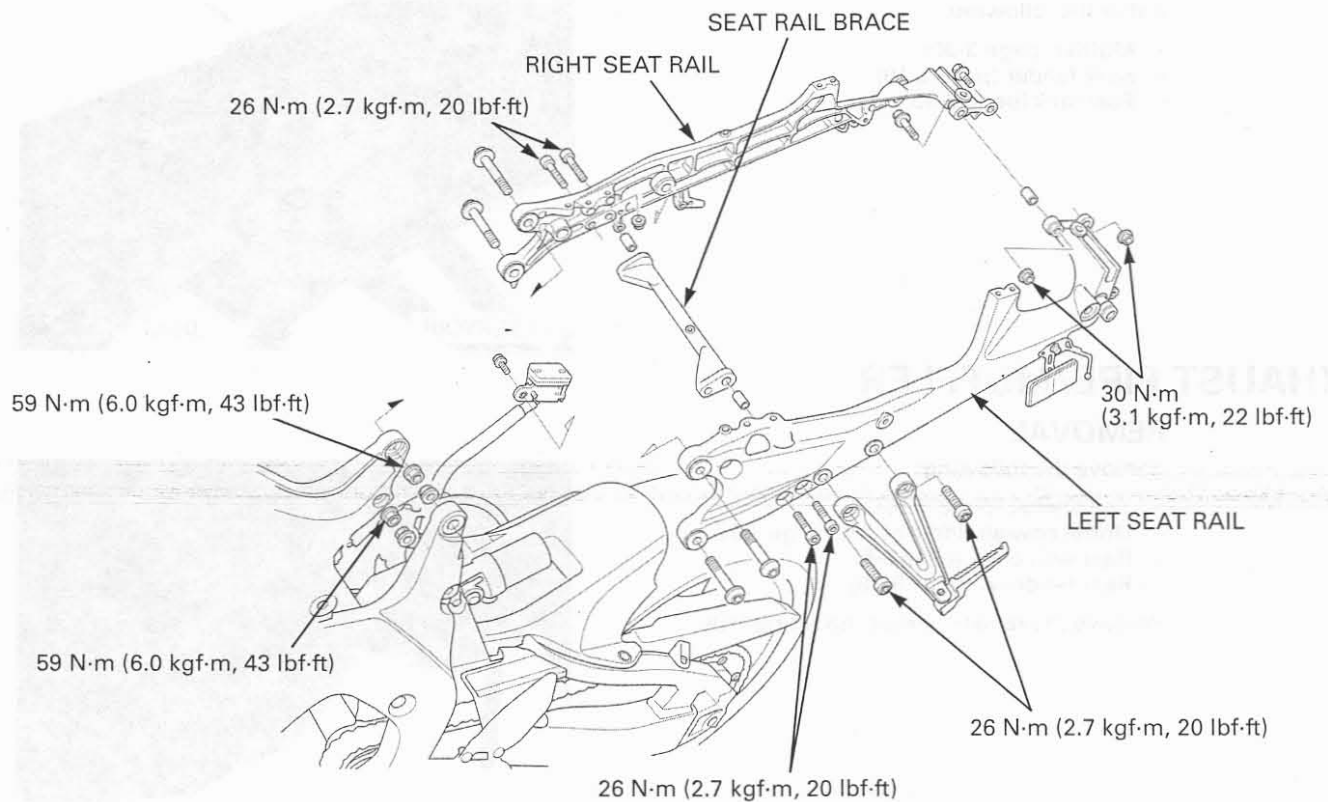
Replace the seat rail as an assembly. Assemble the seat rail by installing the seat rail assembly flange bolts/nuts.



Install the seat rail brace and then install the socket bolts.



## INSTALLATION



Install the seat rail to the frame.

Install the upper mounting bolts/nuts and lower mounting bolts/collars/nuts.  
Tighten the bolts and nuts to the specified torque.

### TORQUE:

Upper mounting flange nut:

59 N·m (6.0 kgf·m, 43 lbf·ft)

Lower mounting flange nut:

59 N·m (6.0 kgf·m, 43 lbf·ft)

Tighten the four seat rail brace socket bolts and seat rail assembly flange nuts to the specified torque.

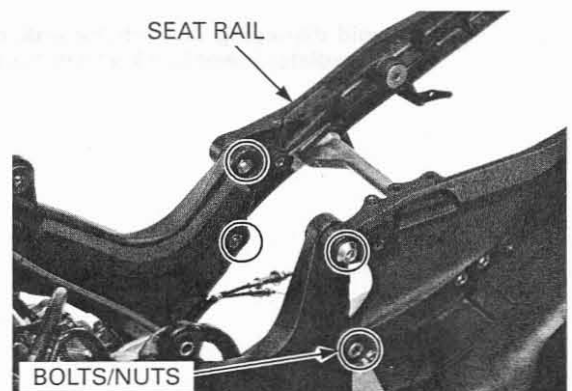
### TORQUE:

Seat rail brace socket bolt:

26 N·m (2.7 kgf·m, 20 lbf·ft)

Seat rail assembly flange nut:

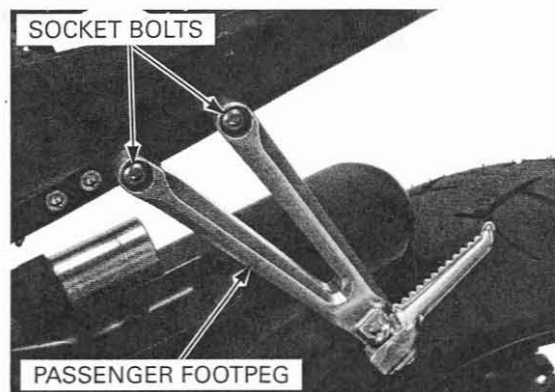
30 N·m (3.1 kgf·m, 22 lbf·ft)



## FRAME/BODY PANELS/EXHAUST SYSTEM

Install the left passenger footpeg bracket and tighten the socket bolts to the specified torque.

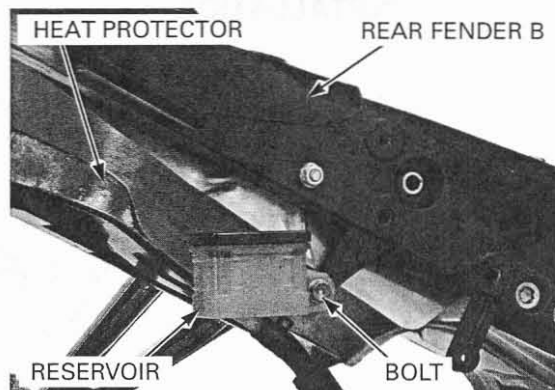
**TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)**



Install the rear brake reservoir and tighten the bolt.

Install the following:

- Muffler (page 3-30)
- Rear fender (page 3-19)
- Fuel tank (page 6-36)



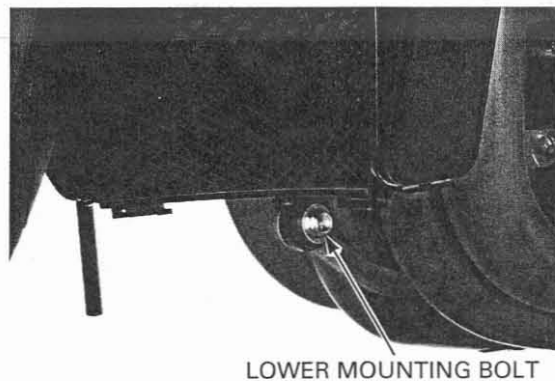
## EXHAUST PIPE/MUFFLER

### REMOVAL

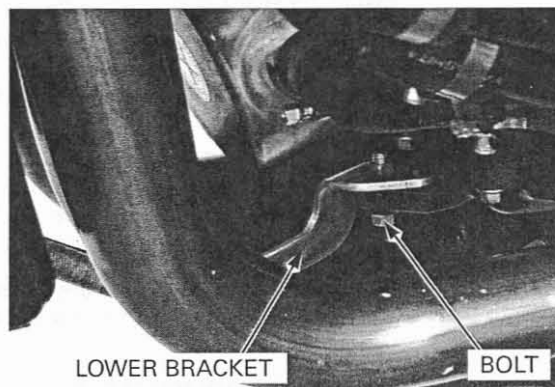
Remove the following:

- Top shelter (page 3-16)
- Under cowls/middle cowls (page 3-7)
- Rear seat cowl (page 3-5)
- Rear fender A (page 3-19)

Remove the radiator lower mounting bolt.

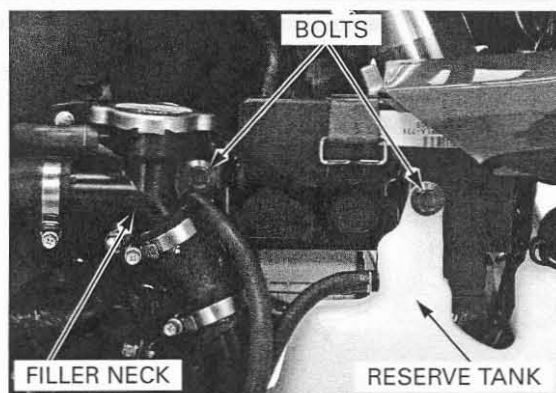


Avoid damaging the radiator fins, remove the bolt and radiator lower bracket from the engine.

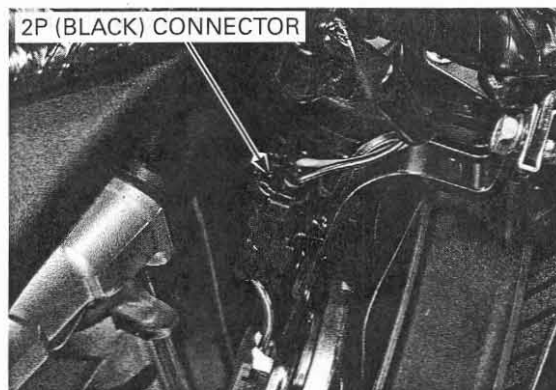




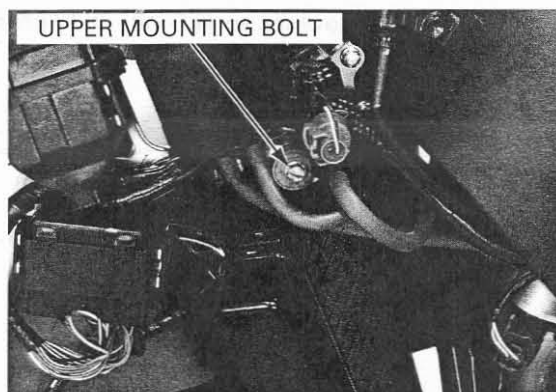
Remove the radiator reserve tank mounting bolt and filler neck mounting bolt.



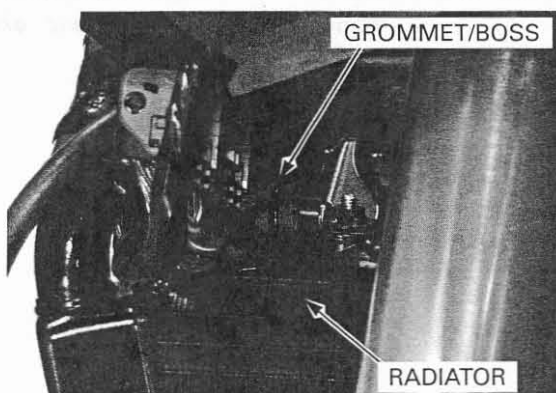
Disconnect the fan motor 2P (Black) connector.



Loosen the radiator upper mounting bolt.



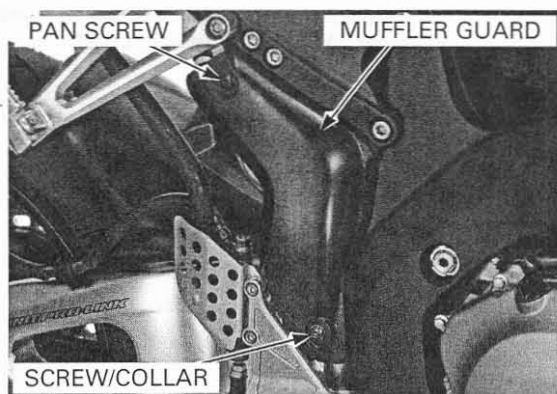
Move the radiator to the right and release the radiator grommet from the bracket boss, then move the radiator downward.



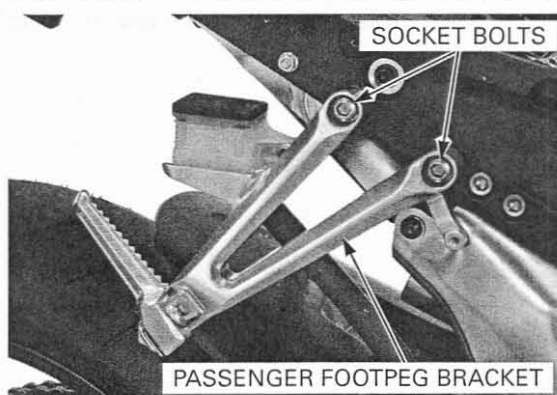


## FRAME/BODY PANELS/EXHAUST SYSTEM

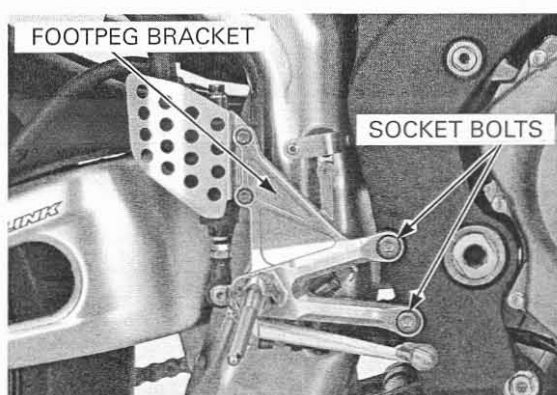
Remove the muffler guard mounting pan screw, collar and screw.  
Remove the muffler guard boss from the seat rail bracket grommet, then remove the muffler guard.



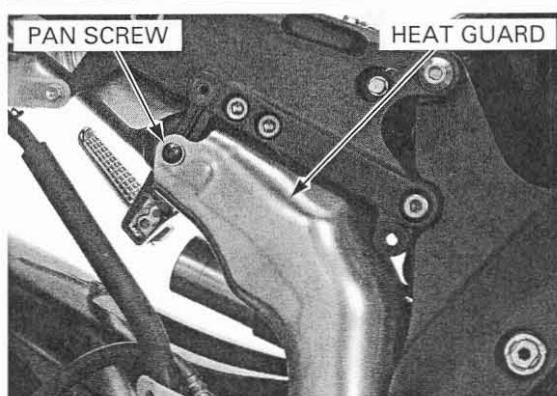
Remove the socket bolts and right passenger footpeg bracket.



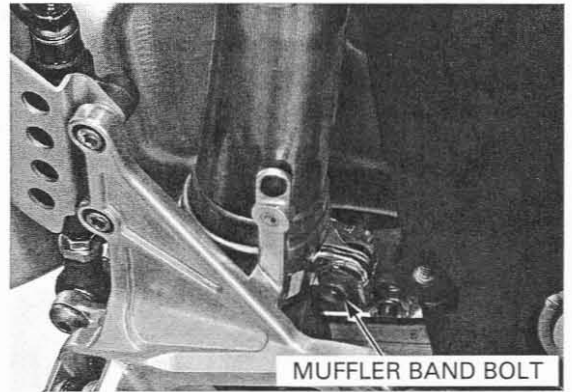
Remove the socket bolts and right footpeg bracket.



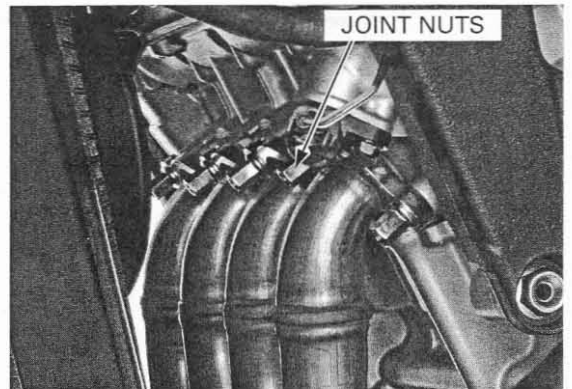
Remove the pan screw and exhaust pipe heat guard.



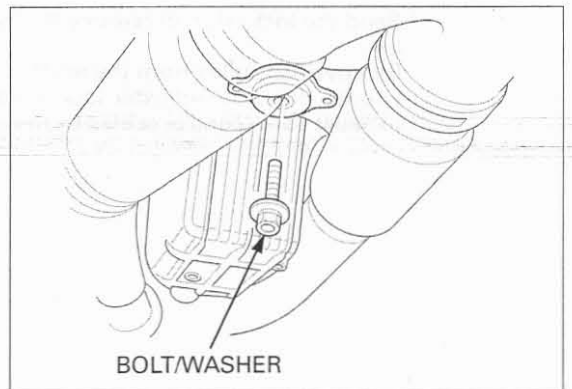
Loosen the muffler band flange bolt.



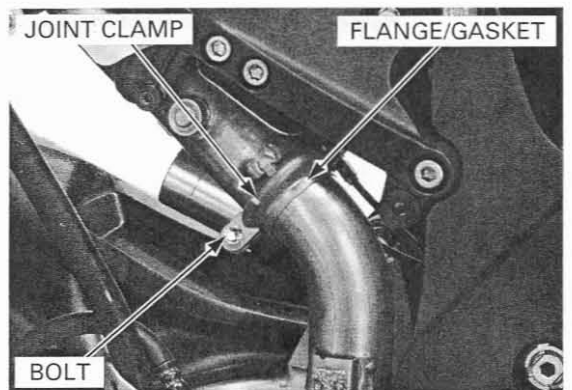
Remove the exhaust pipe joint nuts.



Remove the exhaust pipe mounting bolt/washer, then remove the exhaust pipe.

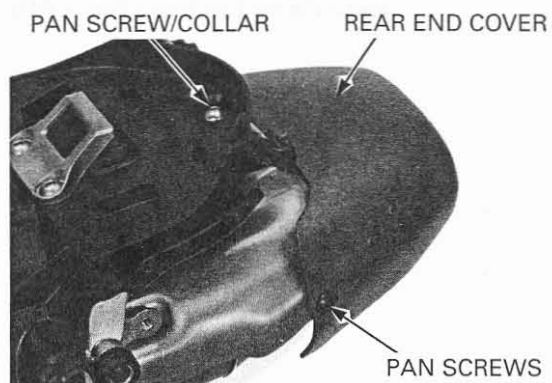


Remove the bolt and exhaust joint pipe clamp.  
Remove the exhaust joint pipe, gasket and flange.

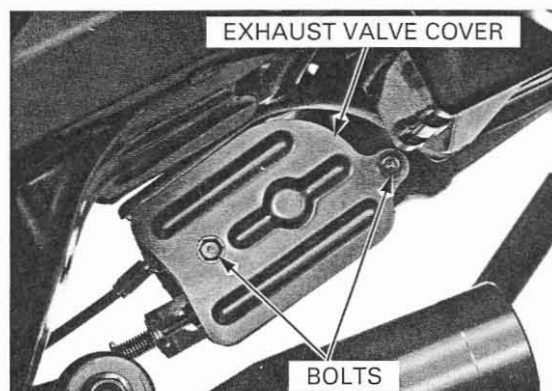


## FRAME/BODY PANELS/EXHAUST SYSTEM

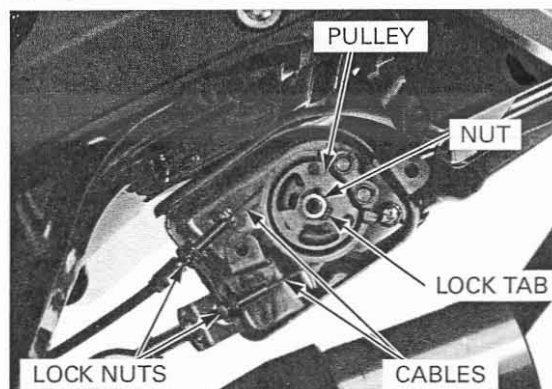
Remove the pan screws, muffler rear end cover and collar.



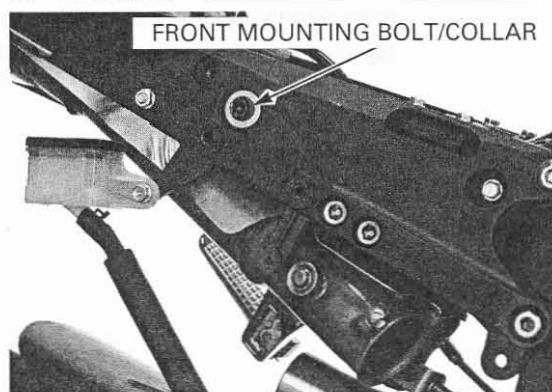
Remove the bolts and exhaust valve cover.



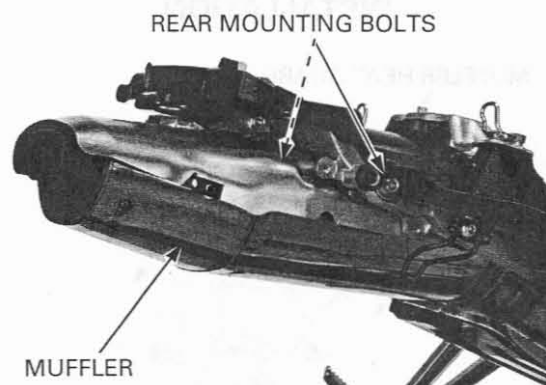
Bend the lock tab and remove the nut from the pulley.  
Remove the pulley from the shaft.  
Loosen the cable adjuster lock nut and remove the exhaust valve control cables from the pulley.



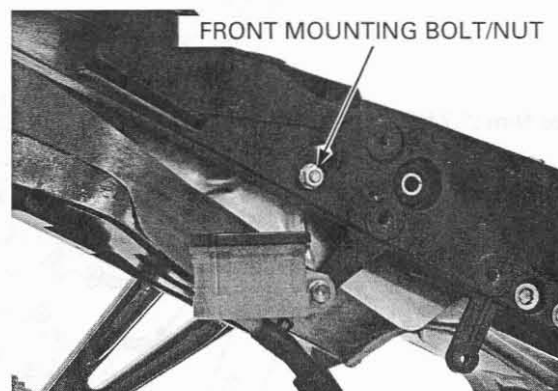
Remove the muffler front mounting bolt and collar.



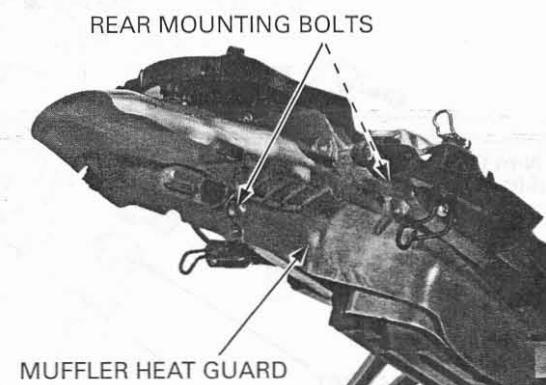
Remove the muffler rear mounting bolts, then remove the muffler assembly.



Remove the muffler heat guard front mounting bolt and nut.

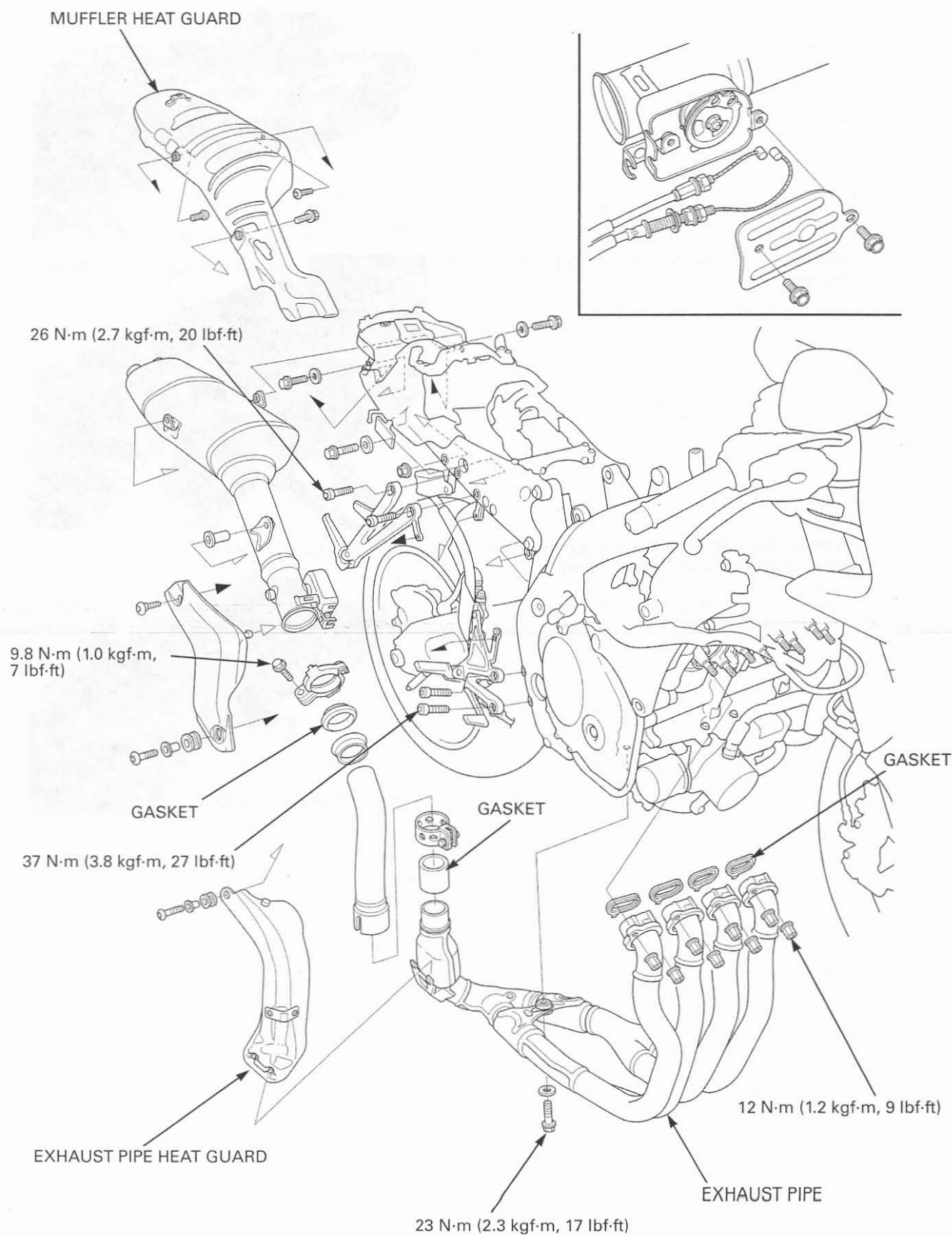


Remove the muffler heat guard rear mounting bolts, then remove the muffler heat guard.



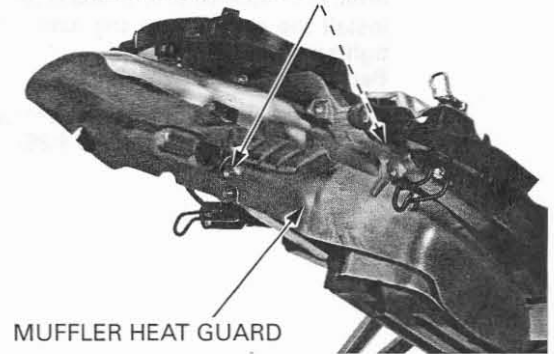
FRAME/BODY PANELS/EXHAUST SYSTEM

INSTALLATION



Install the muffler heat guard into the seat rail, then install the muffler heat guard rear mounting bolts.

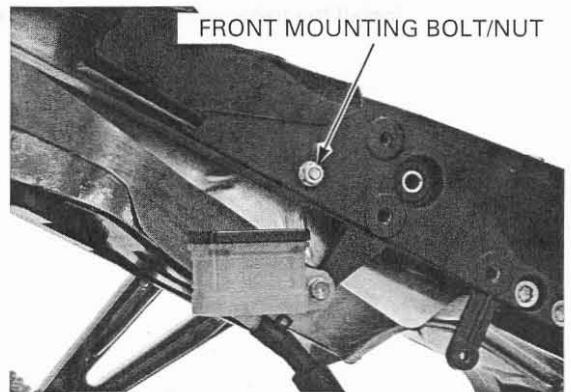
REAR MOUNTING BOLTS



MUFFLER HEAT GUARD

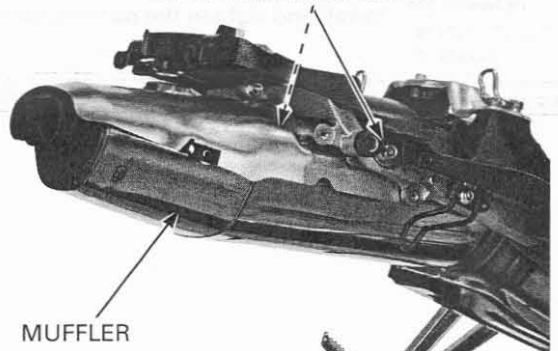
Install the muffler heat guard front mounting bolt and nut. Tighten the nut securely.

FRONT MOUNTING BOLT/NUT



Install the muffler assembly and temporarily install the muffler rear mounting bolts.

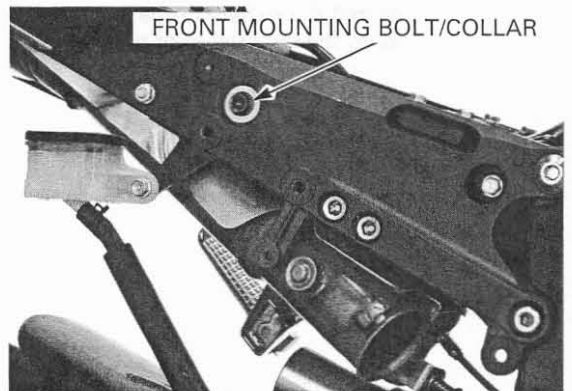
REAR MOUNTING BOLTS



MUFFLER

Install the muffler front mounting collar and bolt. Tighten the muffler front mounting bolt securely. Tighten the muffler rear mounting bolts securely.

FRONT MOUNTING BOLT/COLLAR

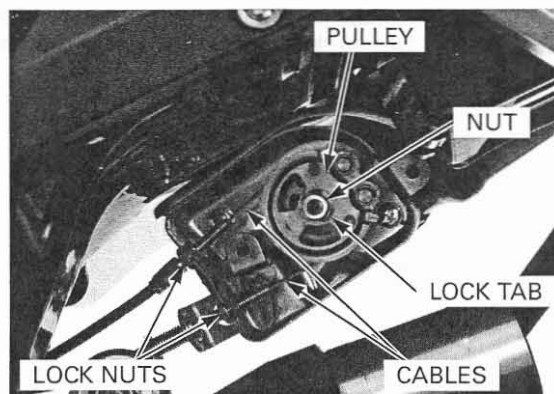




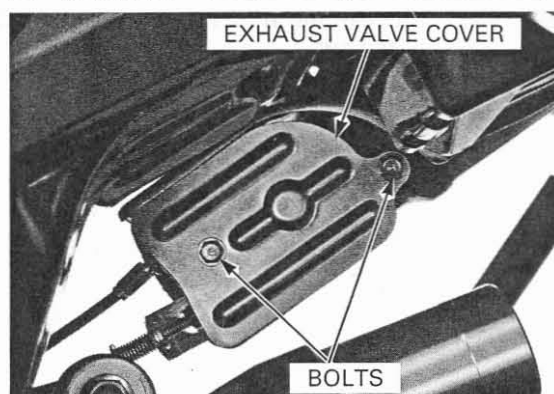
## FRAME/BODY PANELS/EXHAUST SYSTEM

Route the exhaust valve control cable properly, and hook the cable ends with the drive pulley. Install the pulley onto the exhaust valve shaft and tighten the nut. Bend the lock tab over the nut.

Adjust the exhaust valve control cables and tighten the lock nuts securely (page 4-35).

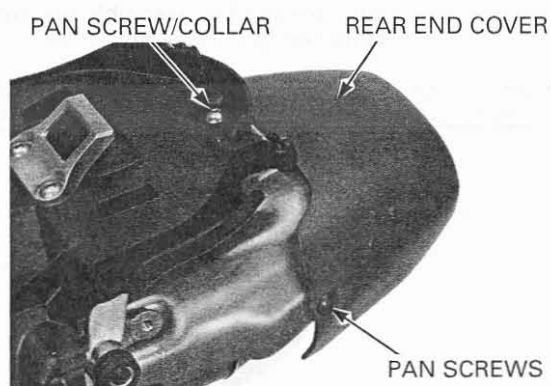


Install the exhaust valve cover and tighten the bolts.

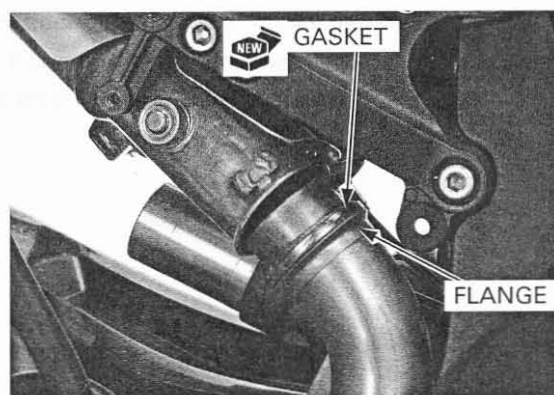


*Install the collar between the muffler and rear fender B.*

Install the muffler rear end cover and collar. Install and tighten the pan screws securely.

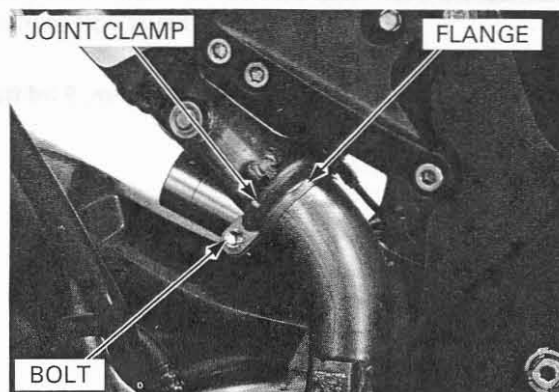


Install the exhaust pipe joint flange and new gasket onto the exhaust joint pipe.





Install the exhaust joint pipe clamp while aligning its boss with the groove on the muffler pipe.  
Install and temporarily tighten the SH bolt.



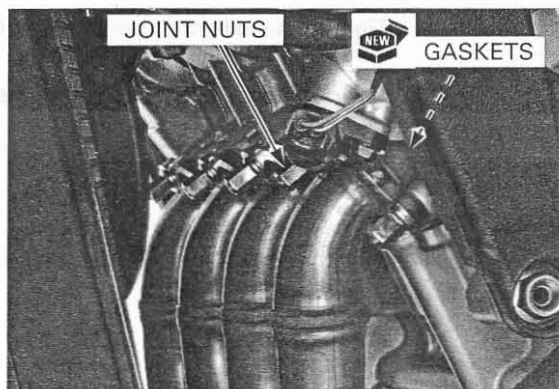
Install new gaskets onto the exhaust ports of the cylinder head.

Install a new gasket onto the exhaust pipe.

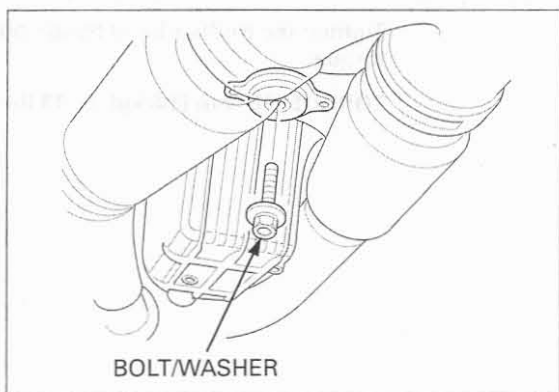
Install the exhaust pipe assembly into the joint pipe and cylinder head.



Install the exhaust pipe joint nuts.



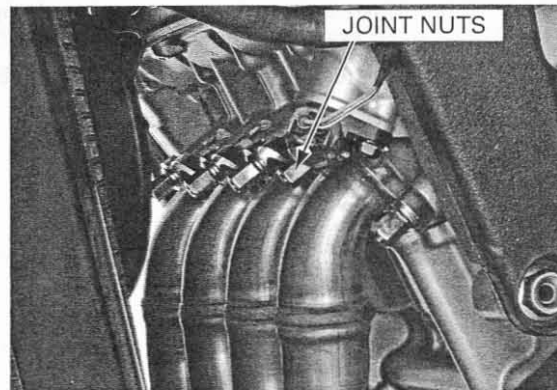
Install the exhaust pipe mounting bolt/washer.



## FRAME/BODY PANELS/EXHAUST SYSTEM

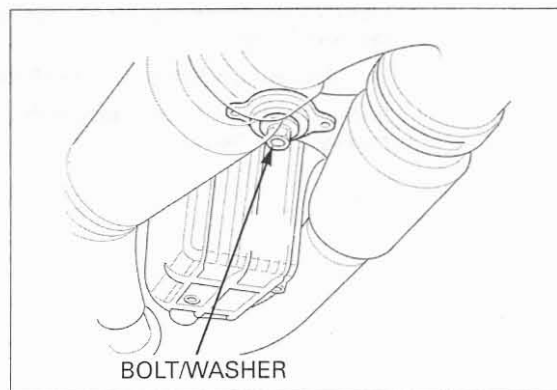
First tighten the exhaust pipe joint nuts to the specified torque.

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



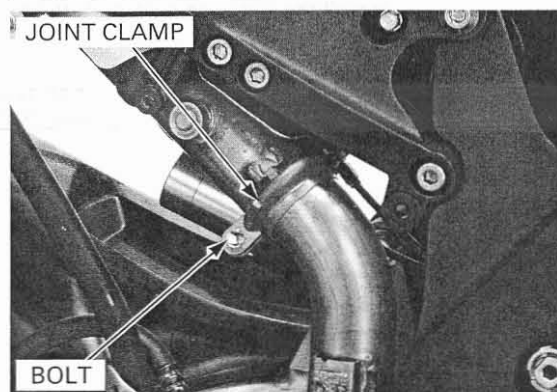
Tighten the exhaust pipe mounting bolt/washer.

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



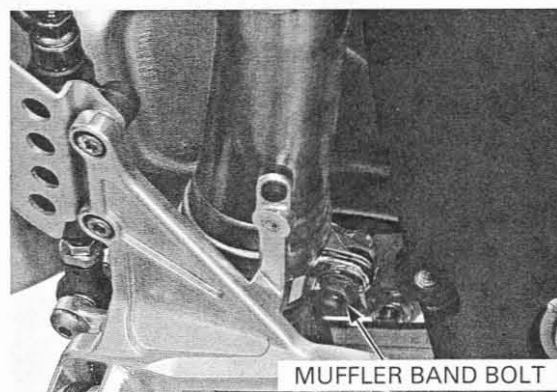
Tighten the exhaust pipe clamp SH bolt to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

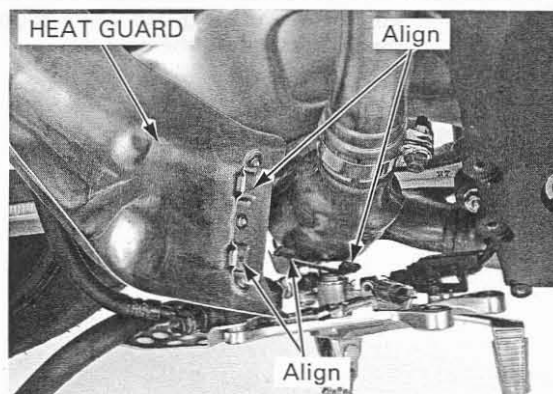


Tighten the muffler band flange bolt to the specified torque.

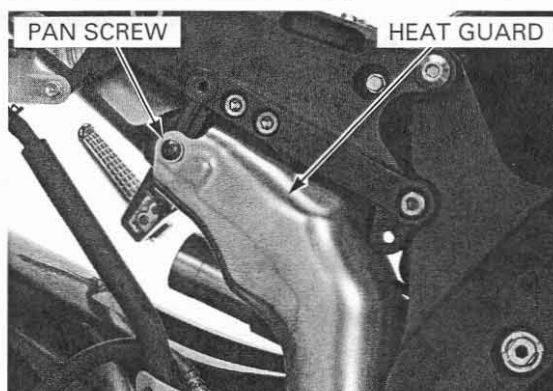
**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**



Install the exhaust pipe heat guard while aligning its tabs with the grooves on the exhaust pipe.

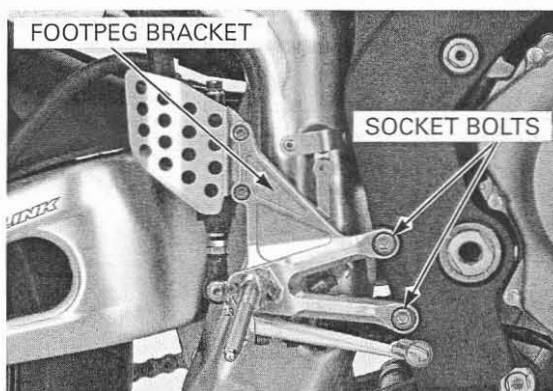


Install and tighten the exhaust pipe heat guard mounting pan screw.



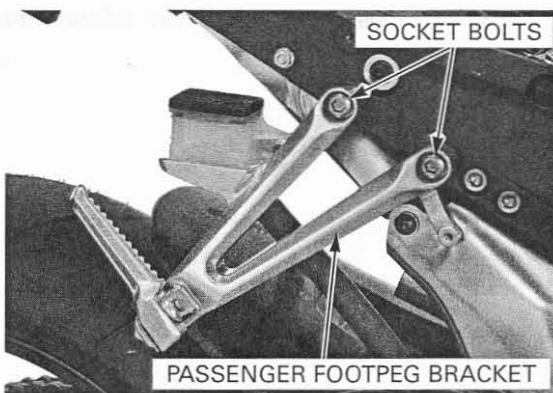
Install the right footpeg bracket onto the frame and tighten the socket bolts to the specified torque.

**TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)**



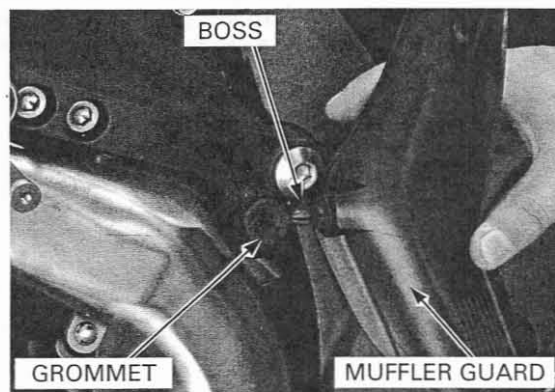
Install the right passenger footpeg bracket onto the seat rail, then tighten the socket bolts to the specified torque.

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

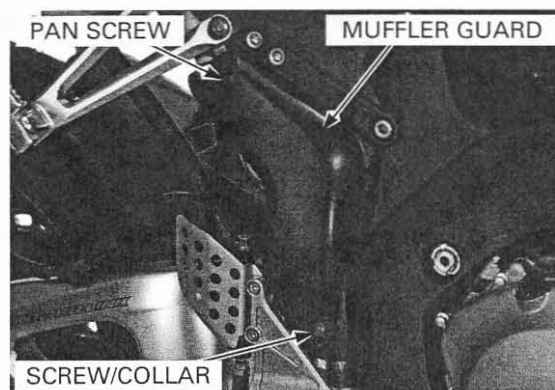


## FRAME/BODY PANELS/EXHAUST SYSTEM

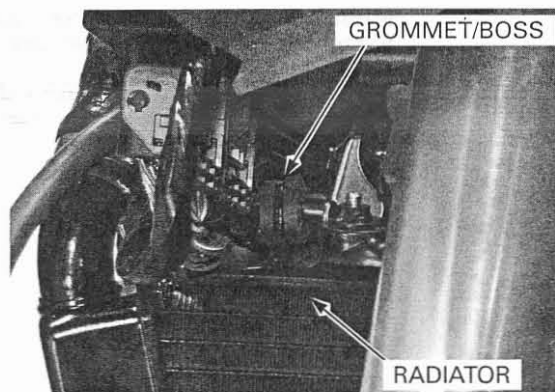
Install the muffler guard while aligning it boss with the grommet onto the seat rail.



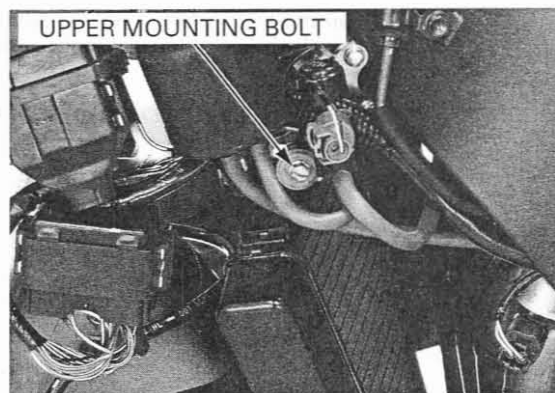
Install the pan screw, collar and screw, then tighten the screws securely.



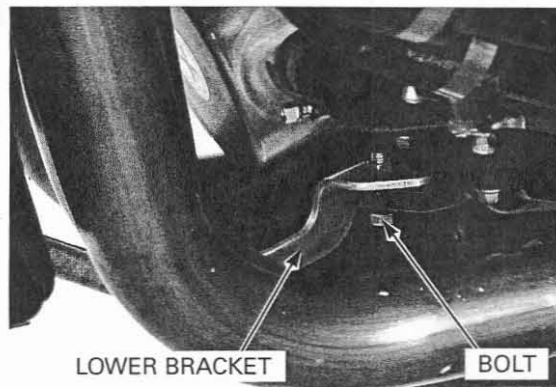
Install the radiator onto the bracket while aligning the grommet and frame boss.



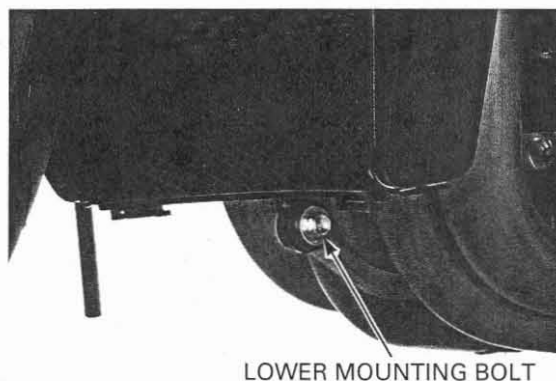
Install and tighten the radiator upper mounting bolt.



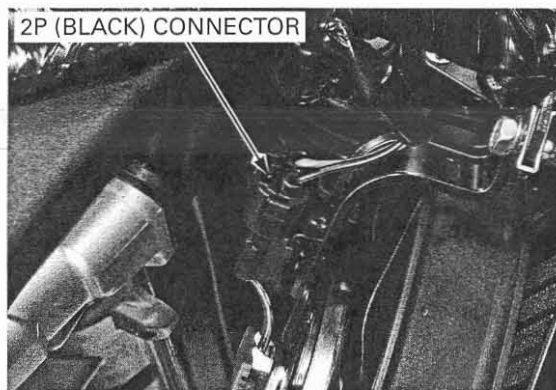
Install the radiator lower bracket to the engine and tighten the bolt.



Install and tighten the radiator lower mounting bolt.



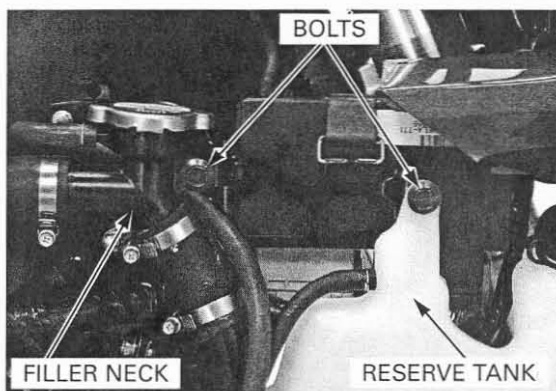
Connect the fan motor 2P (Black) connector.



Install and tighten the radiator reserve tank mounting bolt and filler neck mounting bolt.

Install the following:

- Top shelter (page 3-16)
- Under cowls/middle cowls (page 3-7)
- Rear fender A (page 3-27)
- Rear seat cowl (page 3-5)



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# MEMO



# 4. MAINTENANCE

|   |      |  |      |
|---|------|--|------|
| SERVICE INFORMATION .....   | 4-2  | BRAKE FLUID.....                         | 4-30 |
| MAINTENANCE SCHEDULE .....  | 4-4  | BRAKE PAD WEAR.....                      | 4-31 |
| FUEL LINE .....   | 4-5  | BRAKE SYSTEM .....                       | 4-32 |
| THROTTLE OPERATION.....   | 4-7  | BRAKE LIGHT SWITCH .....                 | 4-33 |
| AIR CLEANER.....  | 4-8  | HEADLIGHT AIM .....                      | 4-33 |
| SPARK PLUG .....  | 4-8  | CLUTCH SYSTEM.....                       | 4-33 |
| VALVE CLEARANCE.....  | 4-16 | CLUTCH FLUID .....                       | 4-34 |
| ENGINE OIL/OIL FILTER .....   | 4-21 | EXHAUST GAS CONTROL VALVE<br>CABLE ..... | 4-34 |
| ENGINE IDLE SPEED .....   | 4-24 | SIDE STAND .....                         | 4-36 |
| RADIATOR COOLANT .....  | 4-24 | SUSPENSION .....                         | 4-37 |
| COOLING SYSTEM.....   | 4-24 | NUTS, BOLTS, FASTENERS.....              | 4-41 |
| SECONDARY AIR SUPPLY SYSTEM.....                                    | 4-25 | WHEELS/TIRES .....                       | 4-41 |
| EVAPORATIVE EMISSION CONTROL<br>SYSTEM (CALIFORNIA TYPE ONLY) ..... | 4-26 | STEERING HEAD BEARINGS .....             | 4-41 |
| DRIVE CHAIN .....   | 4-26 |  |      |



## MAINTENANCE

# SERVICE INFORMATION

## GENERAL

- Place the motorcycle on a level ground before starting any work.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in and enclosed area.

## SPECIFICATIONS

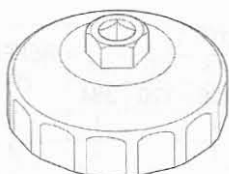
| ITEM                     |                               | SPECIFICATIONS   |   |
|--------------------------|-------------------------------|--|---|
| Throttle grip free play  |                               | 2 – 4 mm (1/16 – 3/16 in)  |   |
| Spark plug               | NGK                           | IMR9C-9HES   |   |
|                          | DENSO                         | VUH27ES  |   |
| Spark plug gap           |                               | 0.80 – 0.90 mm (0.031 – 0.035 in)  |   |
| Valve clearance          | IN                            | 0.16 ± 0.03 mm (0.006 ± 0.001 in)  |   |
|                          | EX                            | 0.30 ± 0.03 mm (0.012 ± 0.001 in)  |   |
| Engine oil capacity      | After draining                | 3.0 liter (3.2 US qt, 2.6 Imp qt)  |   |
|                          | After oil filter change       | 3.1 liter (3.3 US qt, 2.7 Imp qt)  |   |
| Recommended engine oil   |                               | Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (U.S.A. and Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil<br>API service classification: SG or Higher except oils labeled as energy conserving on the circular API service label<br>JASO T 903 standard: MA<br>Viscosity: SAE 10W-40 |   |
| Engine idle speed        |                               | 1,200 ± 100 rpm  |   |
| Drive chain slack        |                               | 25 – 35 mm (1 – 1-3/8 in)  |   |
| Recommended brake fluid  |                               | DOT 4  |   |
| Recommended clutch fluid |                               | DOT 4  |   |
| Tire size                |                               | Front  | 120/70 ZR 17 M/C (58W)                      |
|                          |                               | Rear   | 190/50 ZR 17 M/C (73W)                      |
| Tire brand               | Bridgestone                   | Front  | BT014F RADIAL G                             |
|                          |                               | Rear   | BT014R RADIAL G                             |
|                          | Pirelli                       | Front  | DIABLO CORSA H                              |
|                          |                               | Rear   | DIABLO CORSA H                              |
| Tire air pressure        | Up to 90 kg (200 lbs) load    | Front  | 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi) |
|                          |                               | Rear   | 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi) |
|                          | Up to maximum weight capacity | Front  | 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi) |
|                          |                               | Rear   | 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi) |
| Minimum tire tread depth |                               | Front  | 1.5 mm (0.06 in)                            |
|                          |                               | Rear   | 2.0 mm (0.08 in)                            |

## TORQUE VALUES

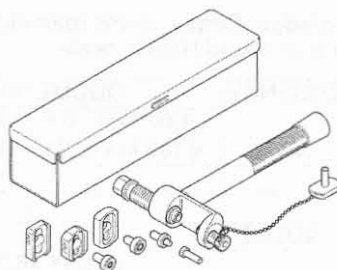
|   |                                 |                                      |
|---|---------------------------------|--------------------------------------|
| Fuel tank front mounting bolt           | 26 N·m (2.7 kgf·m, 20 lbf·ft)   |                                      |
| Spark plug                              | 16 N·m (1.6 kgf·m, 12 lbf·ft)   |                                      |
| Timing hole cap                         | 18 N·m (1.8 kgf·m, 13 lbf·ft)   | Apply grease to the threads          |
| Engine oil filter cartridge             | 26 N·m (2.7 kgf·m, 20 lbf·ft)   | Apply clean engine oil to the O-ring |
| Engine oil drain bolt                   | 29 N·m (3.0 kgf·m, 22 lbf·ft)   |                                      |
| Cylinder head cover bolt                | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)   |                                      |
| Rear axle nut                           | 113 N·m (11.5 kgf·m, 83 lbf·ft) | U-nut                                |
| Drive sprocket special bolt             | 54 N·m (5.5 kgf·m, 40 lbf·ft)   |                                      |
| Final driven sprocket nut               | 64 N·m (6.5 kgf·m, 47 lbf·ft)   | U-nut                                |
| Rear master cylinder push rod joint nut | 18 N·m (1.8 kgf·m, 13 lbf·ft)   |                                      |

TOOLS

Oil filter wrench  
07HAA-PJ70101



Drive chain tool set  
07HMH-MR10103



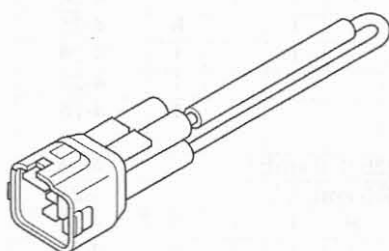
or 07HMH-MR1010C (U.S.A. only)

Cam chain tensioner holder  
07ZMG-MCAA400



or 07NMG-MY90100

SCS service connector  
070PZ-ZY30100



## MAINTENANCE

# MAINTENANCE SCHEDULE

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean. R: Replace. A: Adjust. L: Lubricate.

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

| ITEMS                      | FREQUENCY                             | ODOMETER READING (NOTE 1) |   |         |          |           |           |           |           | REFER TO PAGE |
|----------------------------|---------------------------------------|---------------------------|---|---------|----------|-----------|-----------|-----------|-----------|---------------|
|                            |                                       | x 1,000 mi<br>x 100 km    | 0.6<br>10   | 4<br>64 | 8<br>128 | 12<br>192 | 16<br>256 | 20<br>320 | 24<br>384 |               |
| EMISSION RELATED ITEMS     | * FUEL LINE                           |                           |   |         | I        |           | I         |           | I         | 4-5           |
|                            | * THROTTLE OPERATION                  |                           |   |         | I        |           | I         |           | I         | 4-7           |
|                            | * AIR CLEANER                         | NOTE 2                    |   |         |          | R         |           |           | R         | 4-8           |
|                            | * SPARK PLUG                          |                           | EVERY 16,000 mi (25,600 km): I,<br>EVERY 32,000 mi (51,200 km): R |         |          |           |           |           |           | 4-8           |
|                            | * VALVE CLEARANCE                     |                           |   |         |          |           | I         |           |           | 4-16          |
|                            | ENGINE OIL                            |                           | R   |         | R        |           | R         |           | R         | 4-21          |
|                            | ENGINE OIL FILTER                     |                           | R   |         | R        |           | R         |           | R         | 4-21          |
|                            | * ENGINE IDLE SPEED                   |                           | I   | I       | I        | I         | I         | I         | I         | 4-24          |
|                            | RADIATOR COOLANT                      | NOTE 3                    |   |         | I        |           | I         |           | R         | 4-24          |
|                            | * COOLING SYSTEM                      |                           |   |         | I        |           | I         |           | I         | 4-24          |
|                            | * SECONDARY AIR SUPPLY SYSTEM         |                           |   |         | I        |           | I         |           | I         | 4-25          |
|                            | * EVAPORATIVE EMISSION CONTROL SYSTEM | NOTE 4                    |   |         |          | I         |           |           | I         | 4-26          |
| NON-EMISSION RELATED ITEMS | ** EXHAUST GAS CONTROL VALVE CABLE    |                           | EVERY 16,000 mi (25,600 km): I                                    |         |          |           |           |           |           | 4-34          |
|                            | DRIVE CHAIN                           |                           | EVERY 500 mi (800 km): I, L                                       |         |          |           |           |           |           | 4-26          |
|                            | BRAKE FLUID                           | NOTE 3                    |   | I       | I        | R         | I         | I         | R         | 4-30          |
|                            | BRAKE PAD WEAR                        |                           |   | I       | I        | I         | I         | I         | I         | 4-31          |
|                            | BRAKE SYSTEM                          |                           | I   |         | I        |           | I         |           | I         | 4-32          |
|                            | * BRAKE LIGHT SWITCH                  |                           |   |         | I        |           | I         |           | I         | 4-33          |
|                            | * HEADLIGHT AIM                       |                           |   |         | I        |           | I         |           | I         | 4-33          |
|                            | CLUTCH SYSTEM                         |                           | I   | I       | I        | I         | I         | I         | I         | 4-33          |
|                            | SIDE STAND                            |                           |   |         | I        |           | I         |           | I         | 4-36          |
|                            | * SUSPENSION                          |                           |   |         | I        |           | I         |           | I         | 4-37          |
|                            | * NUTS, BOLTS, FASTENERS              |                           | I   |         | I        |           | I         |           | I         | 4-41          |
|                            | ** WHEELS/TIRES                       |                           |   |         | I        |           | I         |           | I         | 4-41          |
|                            | ** STEERING HEAD BEARINGS             |                           | I   |         | I        |           | I         |           | I         | 4-41          |

\* 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 recommended these items be serviced only by an authorized Honda dealer.

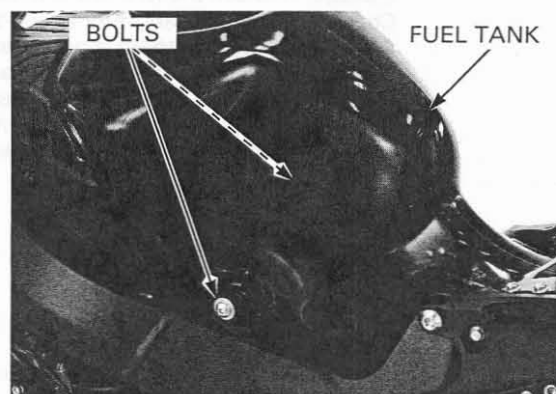
### NOTES:

1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequency if the motorcycle is ridden in unusually wet or dusty areas.
3. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
4. California type only.

# FUEL LINE

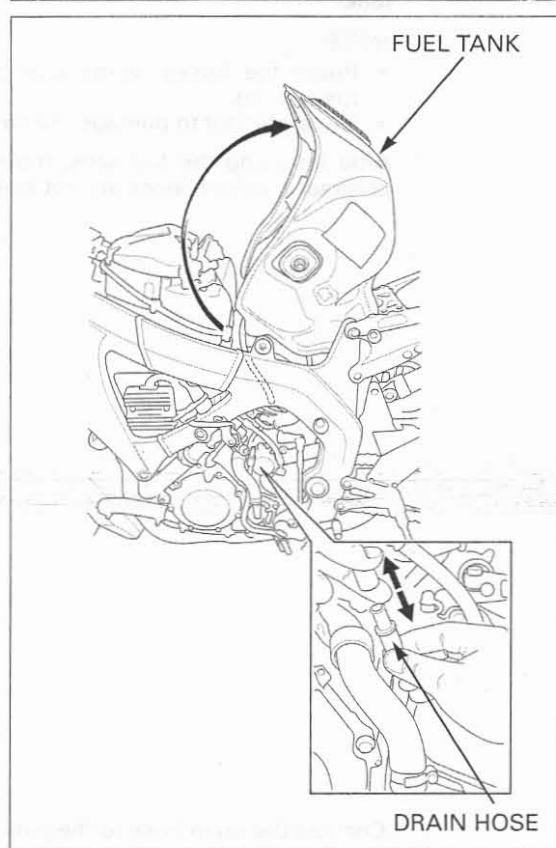
Remove the top shelter (page 3-16).

Remove the fuel tank front mounting bolts.

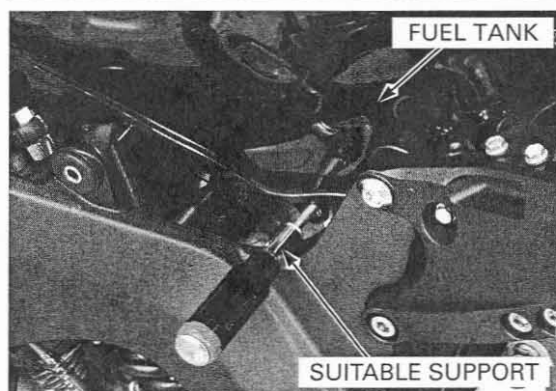


Disconnect the fuel tank drain hose from the hose joint as shown.

Lift the fuel tank as shown.



Support the fuel tank using a suitable support as shown.



## MAINTENANCE

Check the fuel lines for deterioration, damage or leakage. Replace the fuel line if necessary.  
Check the fuel rails and fuel hose joints for damage or leakage. Replace them if necessary.  
Check the fuel pump mounting area for leakage. Replace the fuel pump packing if necessary.  
Check the primary/secondary injectors for damage or leakage. Replace them if necessary.



Remove the suitable support, then lower the fuel tank.

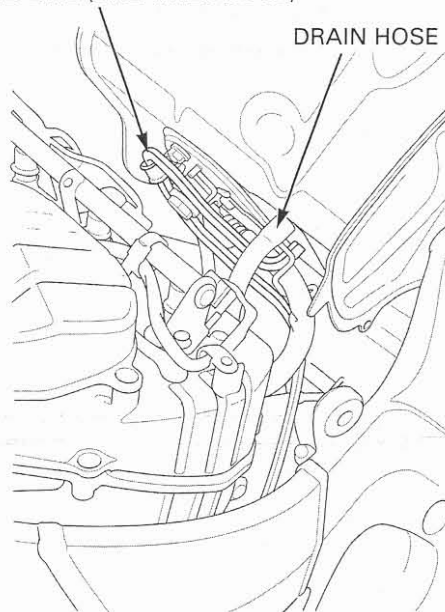
### NOTE:

- Route the hoses, wires and harness properly (page 1-24).
- Be careful not to damage the harness and hoses.

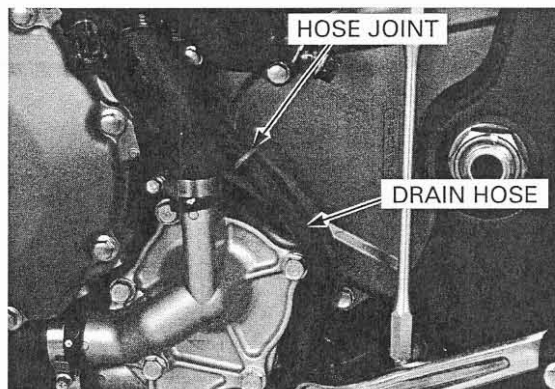
After installing the fuel tank, make sure the drain, breather and fuel hoses are not kinked or bound.

RED LINE (BREATHER HOSE)

DRAIN HOSE



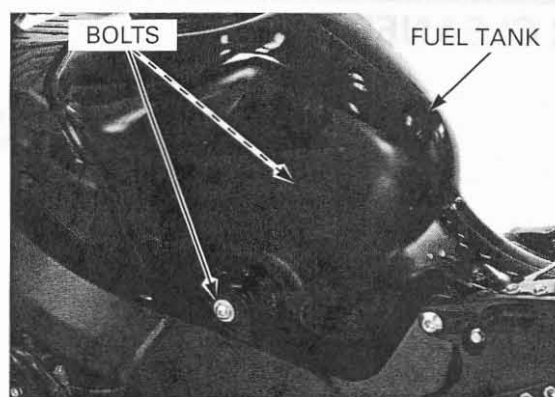
Connect the drain hose to the joint pipe.



Install and tighten the fuel tank front mounting bolts to the specified torque.

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

Install the removed parts in the reverse order of removal.

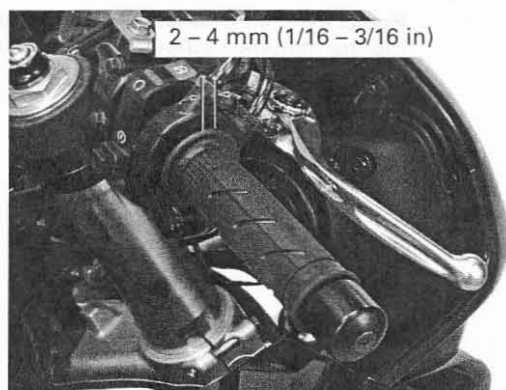


## THROTTLE OPERATION

Check for smooth throttle operation at 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.

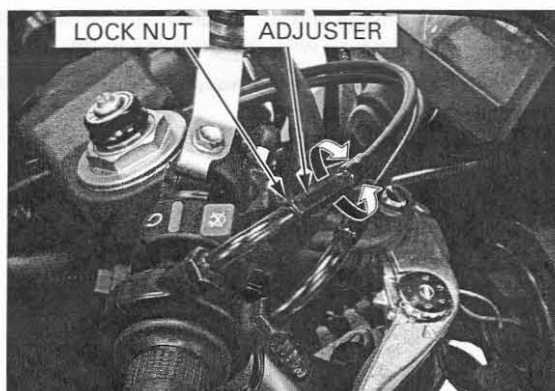
Measure the free play at the throttle grip flange.

**FREE PLAY: 2 – 4 mm (1/16 – 3/16 in)**



Throttle grip free play can be adjusted at either end of the throttle cable.

Minor adjustment is made with the upper adjuster. Adjust the free play by loosening the lock nut and turning the adjuster.



Major adjustment is made with the lower adjuster.

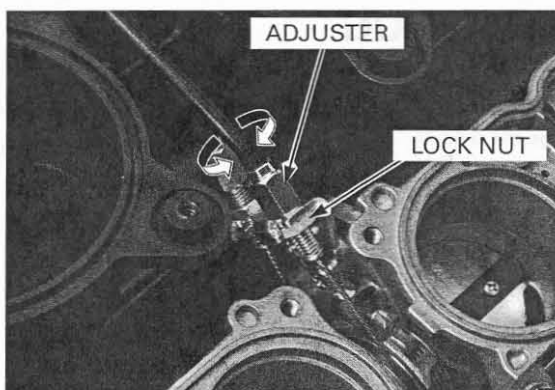
Remove the air cleaner housing (page 6-40).

Adjust the free play by loosening the lock nut and turning the adjuster.

After adjustment, tighten the lock nut securely.

Recheck the throttle operation.

Replace any damaged parts, if necessary.



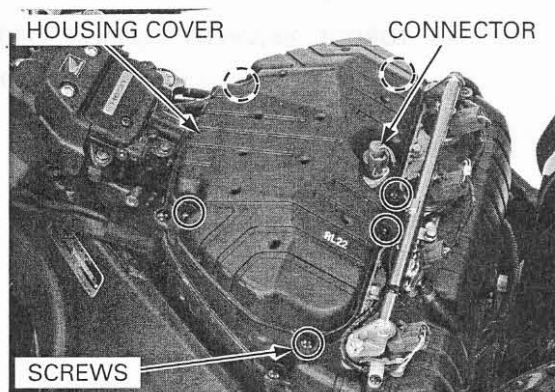


## MAINTENANCE

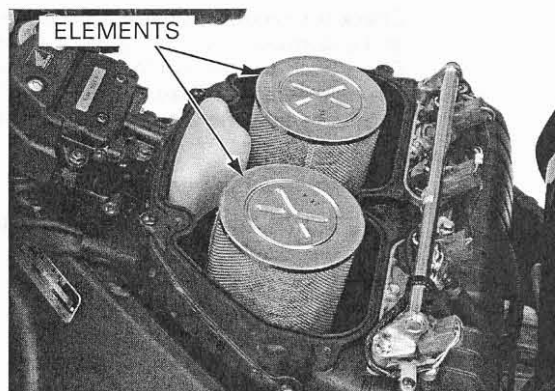
### AIR CLEANER

Remove the top shelter (page 3-16).

Disconnect the IAT sensor 2P (Gray) connector.  
Remove the screws and air cleaner housing cover.

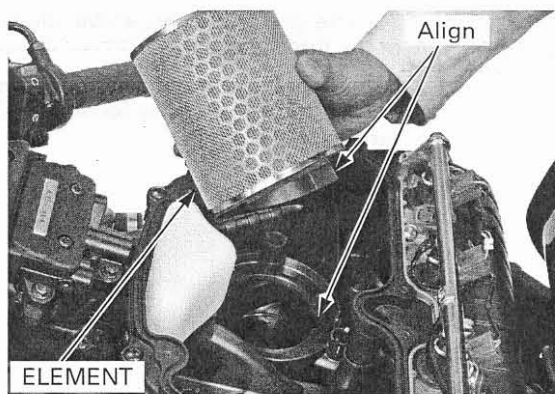


Replace the air cleaner elements in accordance with the maintenance schedule (page 4-4).



Install the air cleaner elements while aligning their bosses with the grooves in the air cleaner housing.

Install the removed parts in the reverse order of removal.



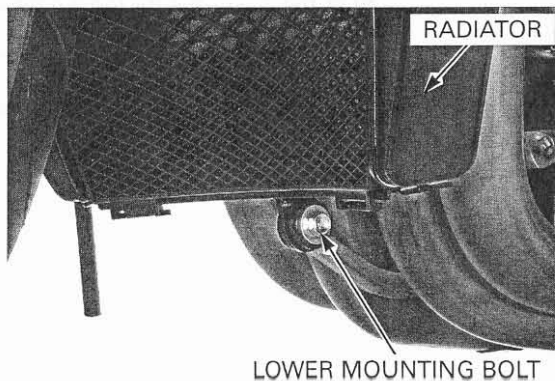
### SPARK PLUG

#### REMOVAL

*Be careful not to damage the radiator fins.*

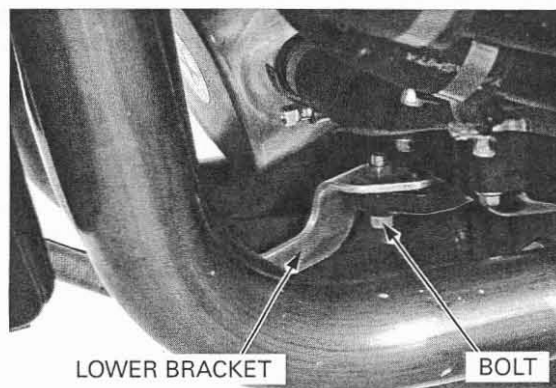
Remove the under cowls/middle cowls (page 3-7).

Remove the radiator lower mounting bolt.

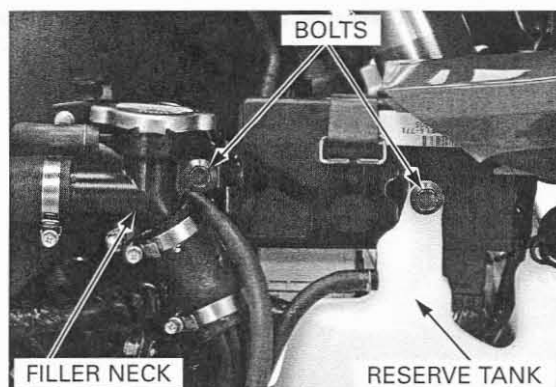




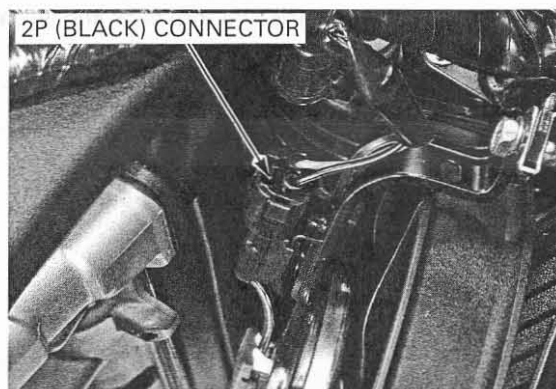
Avoid damaging the radiator fins. Remove the bolt and radiator lower bracket from the engine.



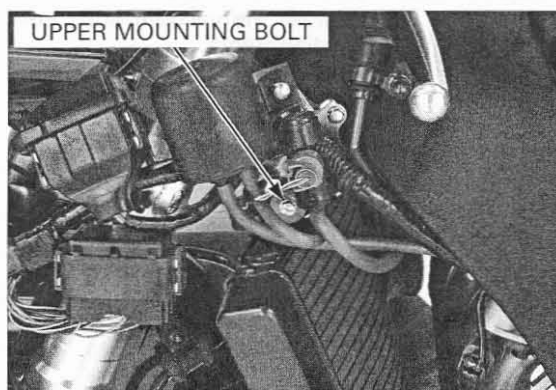
Remove the coolant reserve tank mounting bolt and filler neck mounting bolt.



Disconnect the fan motor 2P (Black) connector.

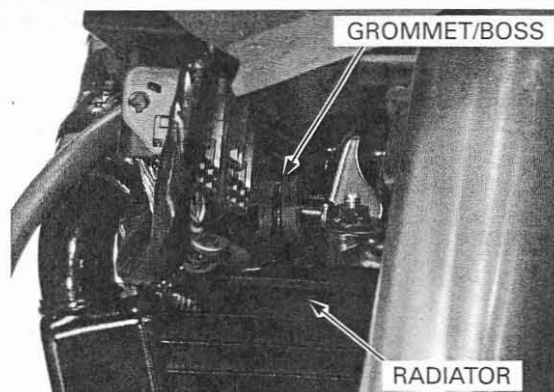


Remove the radiator upper mounting bolt.

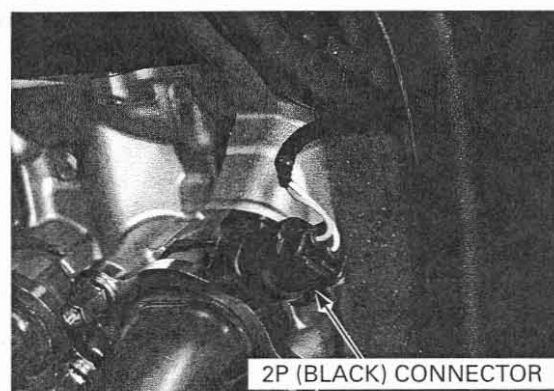


## MAINTENANCE

Move the radiator to the right and release the radiator grommet from the bracket boss, then move the radiator downward.



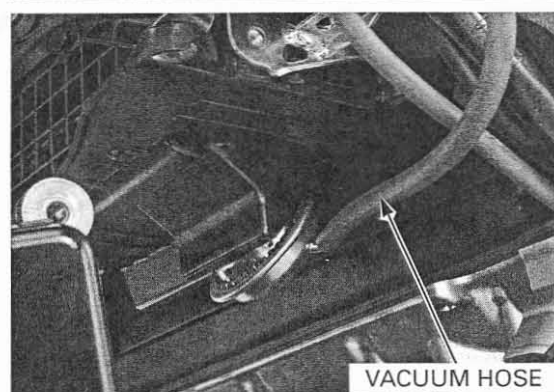
Disconnect the CMP sensor 2P (Black) connector.



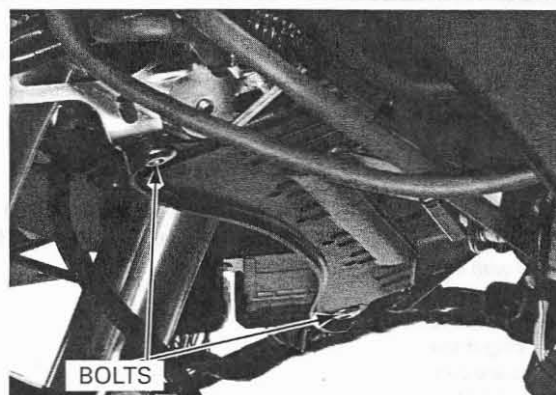
Remove the two trim clips and air intake grill.



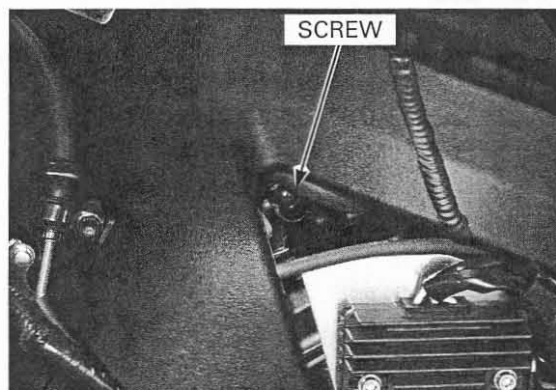
Disconnect the vacuum hose from the variable air intake diaphragm.



Remove the air duct mounting bolts.



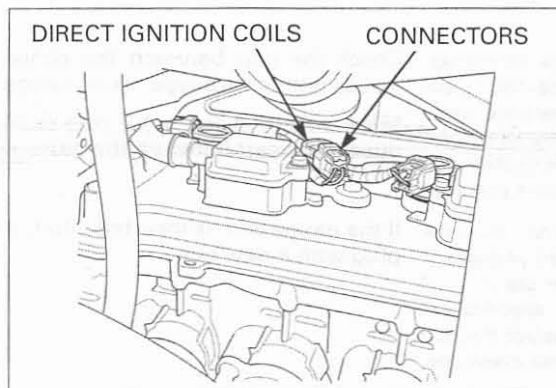
Remove the intake air duct mounting screws. Remove the intake air duct from the air cleaner housing.



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

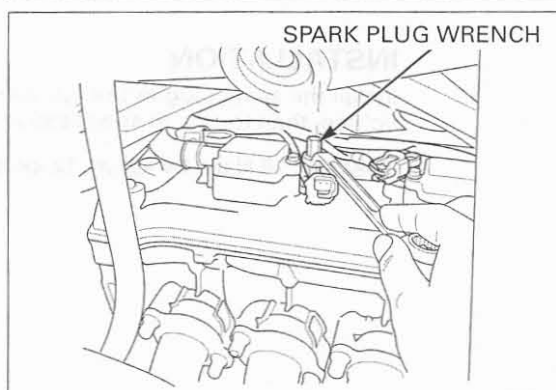
Disconnect the direct ignition coil connectors.

Remove the direct ignition coils from the spark plugs.



Remove the spark plug using the equipped spark plug wrench or an equivalent.

Inspect or replace as described in the maintenance schedule (page 4-4).



## MAINTENANCE

### INSPECTION

Check the following and replace if necessary (recommended spark plug: page 4-2)

- Insulator for damage
- Electrodes for wear
- Burning condition, coloration

*This motorcycle's spark plug is equipped with iridium center electrode. Replace the spark plug if the electrodes are contaminated.*

If the electrodes are contaminated with accumulated objects or dirt, replace the spark plug.

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

*Always use specified spark plugs on this motorcycle.*

#### SPECIFIED SPARK PLUG:

**NGK: IMR9C-9HES**

**DENSO: VUH27ES**

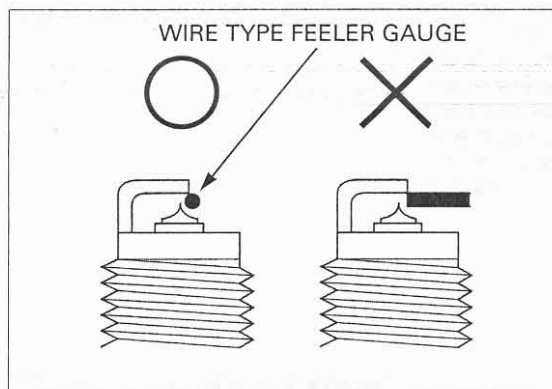
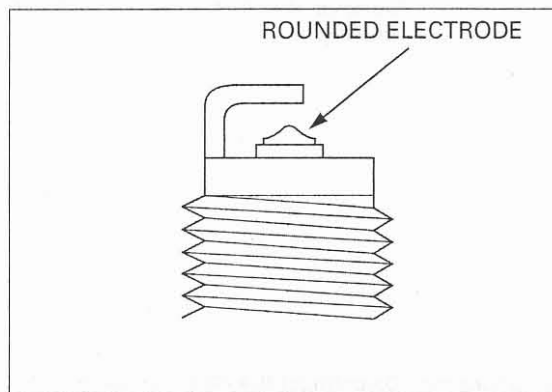
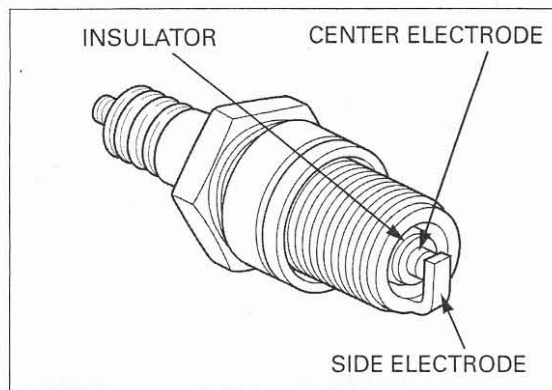
*To prevent damaging the iridium center electrode, use a wire type feeler gauge to check the spark plug gap.*

Check the gap between the center and side electrodes with a wire type feeler gauge.

Make sure that the  $\phi$  1.0 mm (0.04 in) plug gauge does not insert between the gap.

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

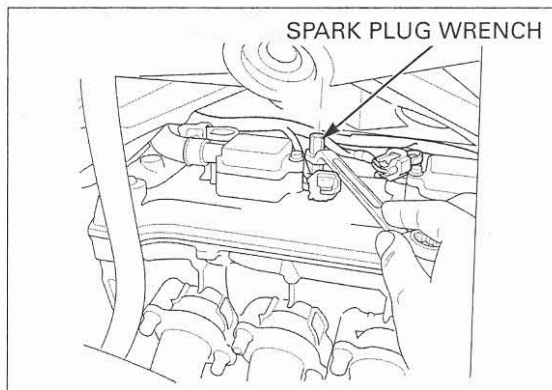
If the gauge can be inserted into the gap, replace the plug with a new one.



### INSTALLATION

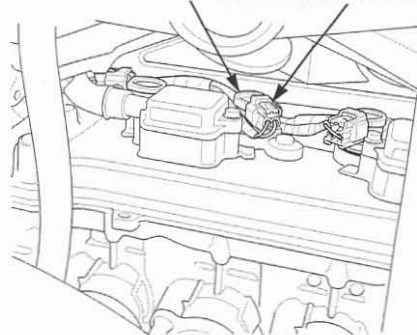
Install the spark plug in the cylinder head and hand tighten, then torque to specification.

**TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)**

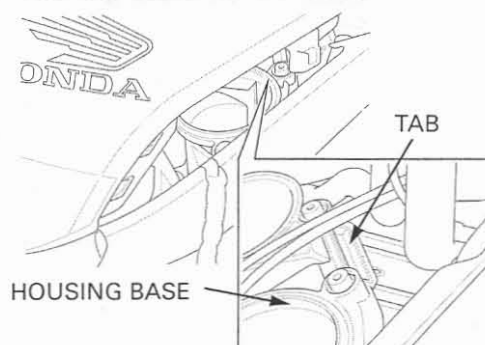


Install the direct ignition coils.  
Connect each connector to each direct ignition coil.

DIRECT IGNITION COILS CONNECTORS

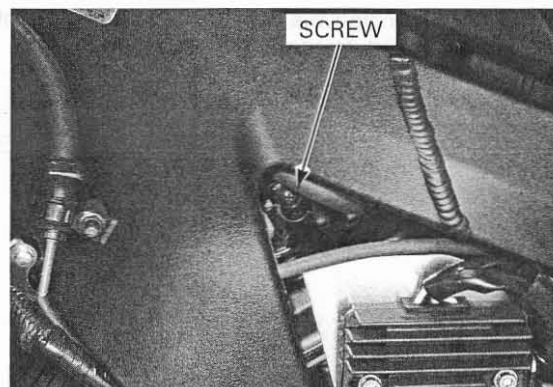


Remove the right front side cover (page 3-16).  
Install the intake air duct assembly, while aligning its tab with the lower air cleaner housing base.  
Make sure that the intake air duct is properly seated on the housing.

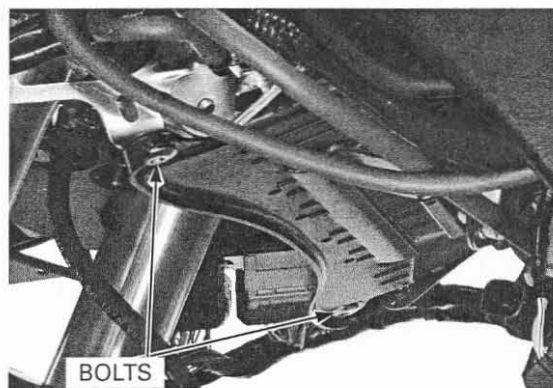


Install and tighten the intake air duct mounting screws.

**TORQUE: 2.5 N·m (0.25 kgf·m, 1.8 lbf·ft)**



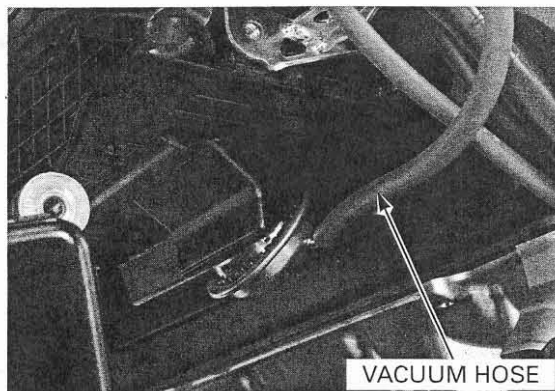
Install and tighten the air duct mounting bolts.





## MAINTENANCE

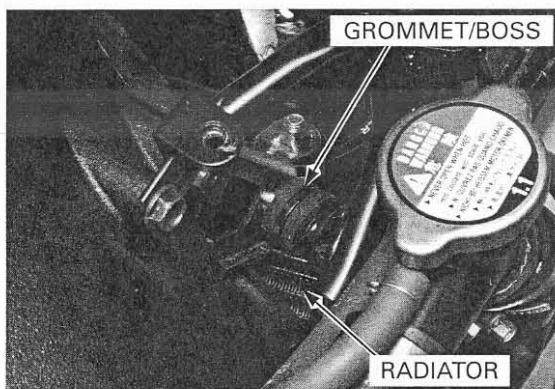
Connect the vacuum hose to the variable air intake diaphragm.



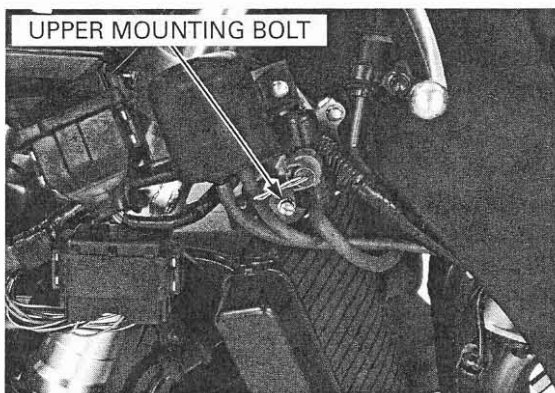
Install the air intake grill and secure it with trim clips.



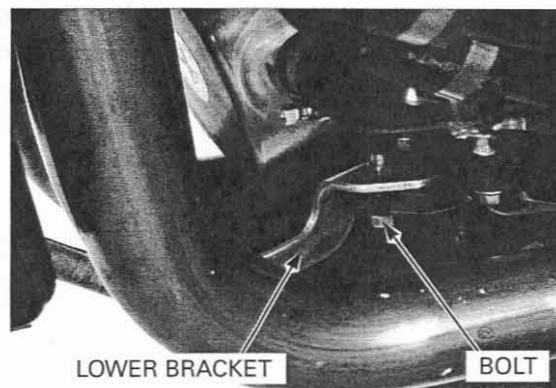
Install the radiator onto the bracket while aligning the grommet and frame boss.



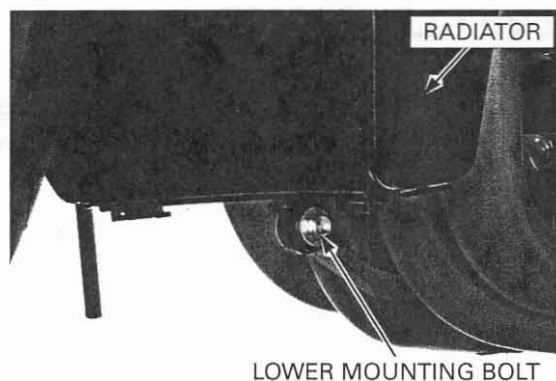
Install and tighten the radiator upper mounting bolt.



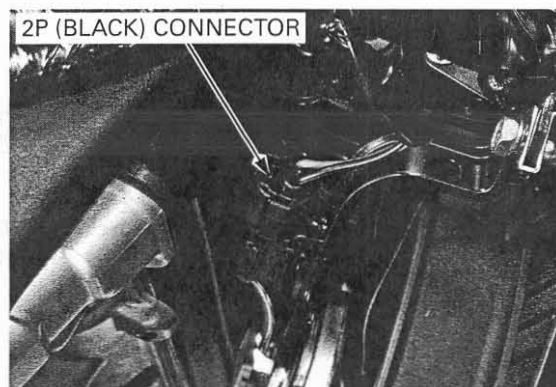
Install the radiator lower bracket to the engine and tighten the bolt.



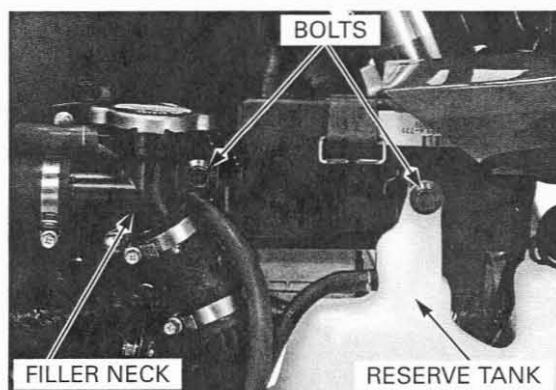
Install and tighten the radiator lower mounting bolt.



Connect the fan motor 2P (Black) connector.



Install and tighten the radiator reserve tank mounting bolt and filler neck mounting bolt.

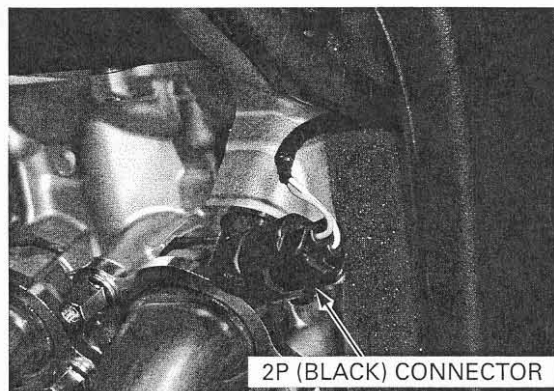




## MAINTENANCE

Connect the CMP sensor 2P (Black) connector.

Remove the under cowls/middle cowls (page 3-7).



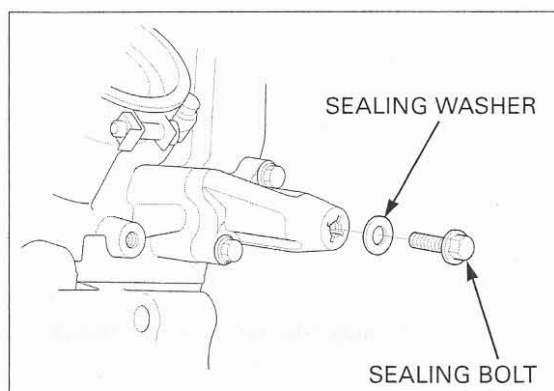
## VALVE CLEARANCE

### INSPECTION

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

Remove the cylinder head cover (page 9-6).

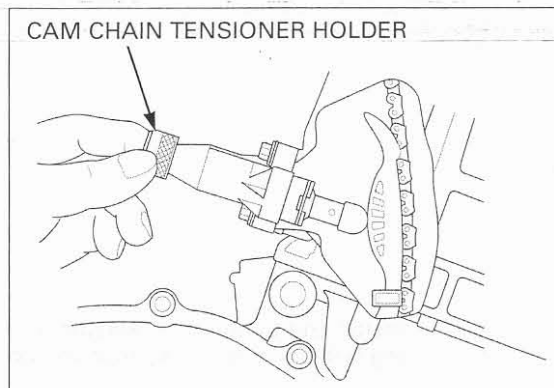
Remove the cam chain tensioner lifter sealing bolt and sealing washer.



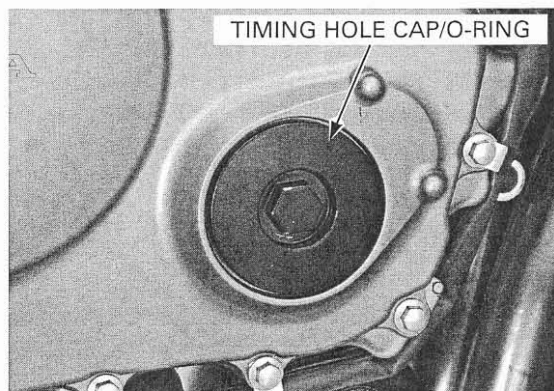
Turn the tensioner lifter shaft fully in (clockwise) and secure it using the special tool to prevent damaging the cam chain.

#### TOOL:

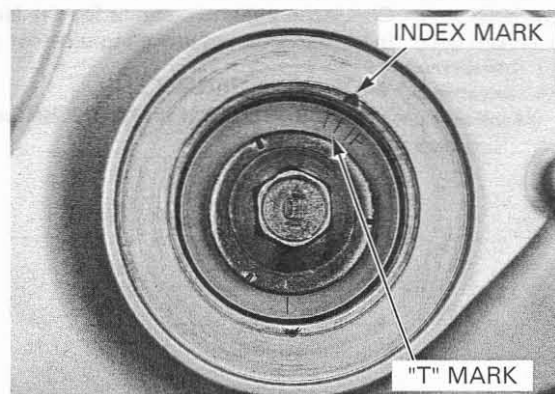
Cam chain tensioner holder 07ZMG-MCAA400 or 07NMG-MY90100



Remove the timing hole cap and O-ring.

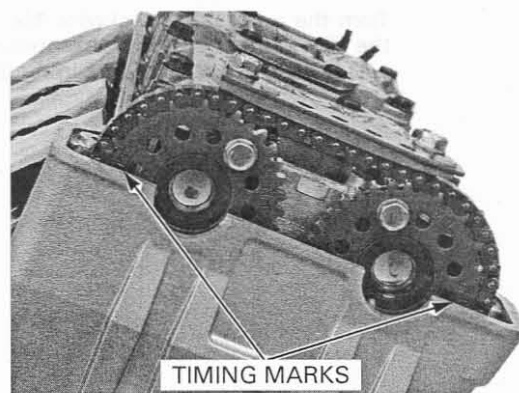


Turn the crankshaft clockwise, align the "T" mark on the crankshaft position sensor rotor with the index mark on the right crankcase cover.



The timing marks ("IN" and "EX") on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks on the cam sprockets are facing inward, turn the crankshaft clockwise one full turn (360°) and realign the timing marks with the cylinder head surface so they are facing outward.



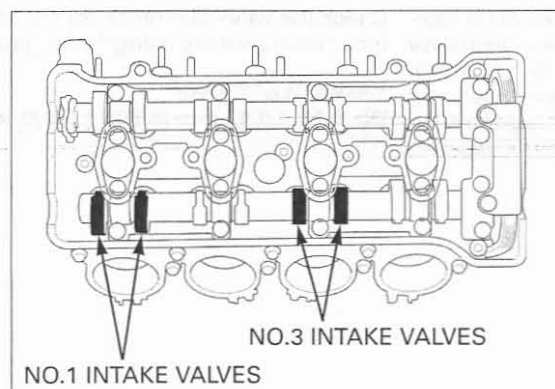
Insert the feeler gauge between the valve lifter and cam lobe.

*Record the clearance for each valve for reference in shim selection if adjustment is required.*

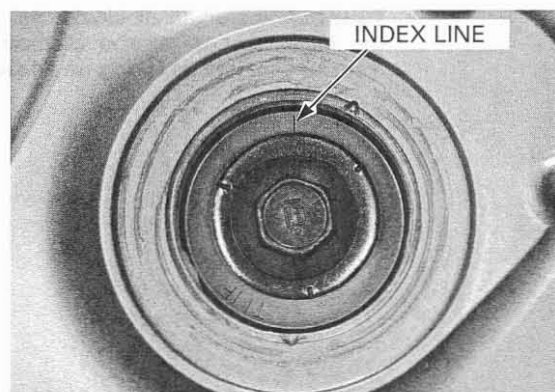
Check the valve clearance for the No.1 and No.3 cylinder intake valves using a feeler gauge.

#### VALVE CLEARANCE:

**IN:**  $0.16 \pm 0.03$  mm ( $0.006 \pm 0.001$  in)



Turn the crankshaft clockwise 1/2 turn (180°), align the index line on the crankshaft position sensor rotor so that it is facing up as shown.



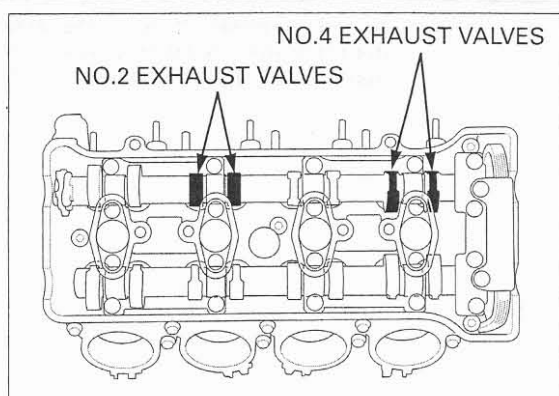
## MAINTENANCE

*Record the clearance for each valve for reference in shim selection if adjustment is required.*

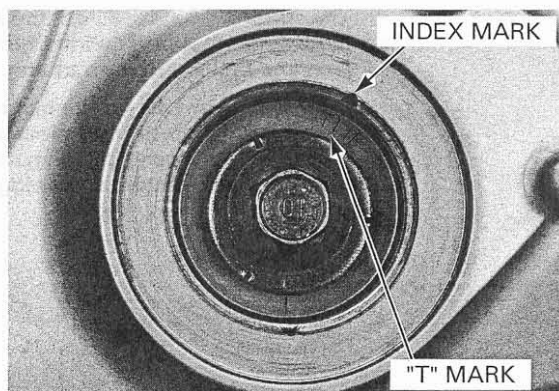
Check the valve clearance for the No.2 and No.4 cylinder exhaust valves using a feeler gauge.

### VALVE CLEARANCE:

**EX:**  $0.30 \pm 0.03$  mm ( $0.012 \pm 0.001$  in)



Turn the crankshaft clockwise 1/2 turn (180°), align the "T" mark on the crankshaft position sensor rotor with the index mark on the right crankcase cover.

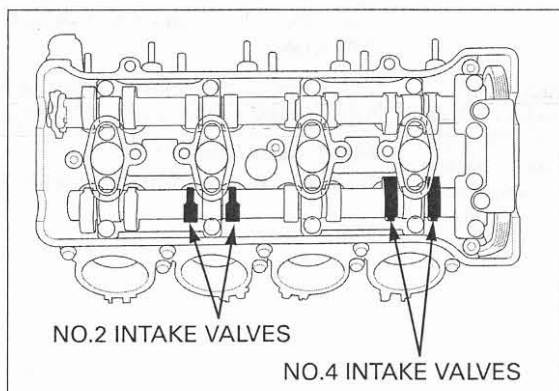


*Record the clearance for each valve for reference in shim selection if adjustment is required.*

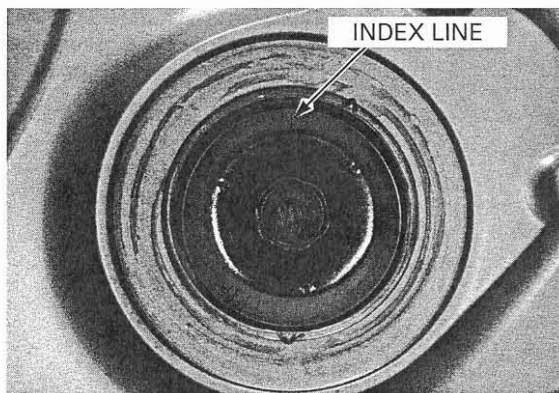
Check the valve clearance for the No.2 and No.4 cylinder intake valves using feeler gauge.

### VALVE CLEARANCE:

**IN:**  $0.16 \pm 0.03$  mm ( $0.006 \pm 0.001$  in)



Turn the crankshaft clockwise 1/2 turn (180°), align the index line on the crankshaft position sensor rotor so that it is facing up as shown.

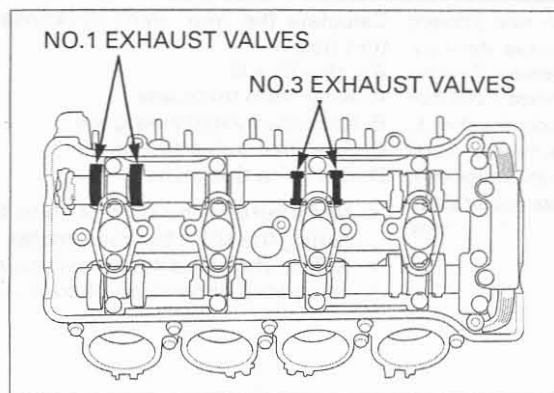


Record the clearance for each valve for reference in shim selection if adjustment is required.

Check the valve clearance for the No.1 and No.3 cylinder exhaust valves using a feeler gauge.

#### VALVE CLEARANCE:

EX:  $0.30 \pm 0.03$  mm ( $0.012 \pm 0.001$  in)



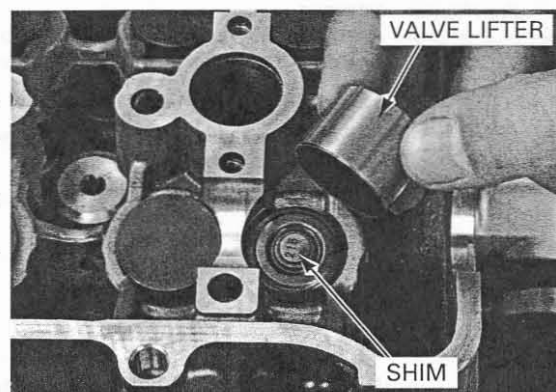
#### ADJUSTMENT

It is not necessary to remove the cam sprocket from the camshaft except when replacing the camshaft and/or cam sprocket.

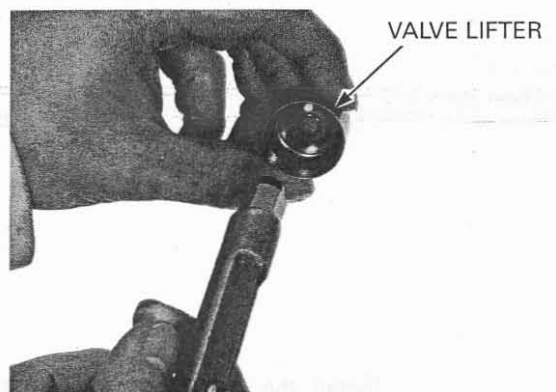
Remove the camshafts (page 9-8).

Remove the valve lifters and shims.

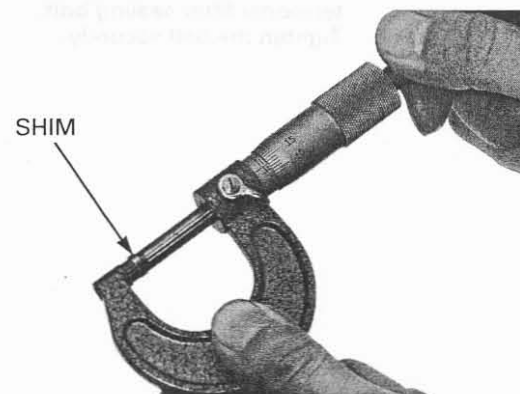
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed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



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



Measure the shim thickness and record it.



## MAINTENANCE

Sixty-nine different thickness shims are available from the thinnest 1.200 mm thickness shim to the thickest 2.900 mm thickness shim in intervals of 0.025 mm.

Calculate the new shim thickness using the equation below.

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

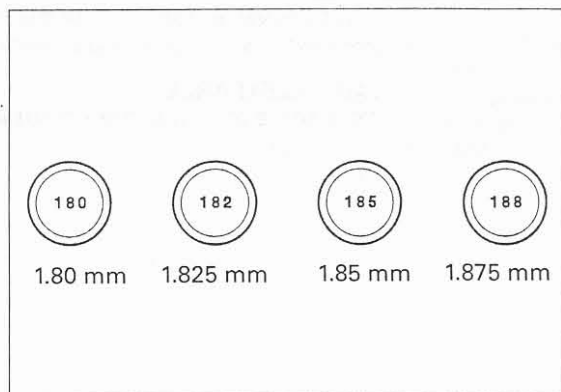
A: New shim thickness

B: Recorded valve clearance

C: Specified valve clearance

D: Old shim thickness

- Make sure of the correct shim thickness by measuring the shim by micrometer.
- Reface the valve seat if carbon deposit result in a calculated dimension of over 2.900 mm.



Install the shims and valve lifters in their original locations

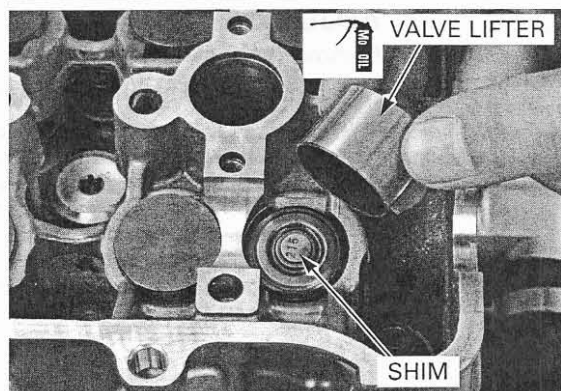
Install the newly selected shim on the valve spring retainer.

Apply molybdenum disulfide oil to the valve lifters. Install the valve lifters into the valve lifter holes.

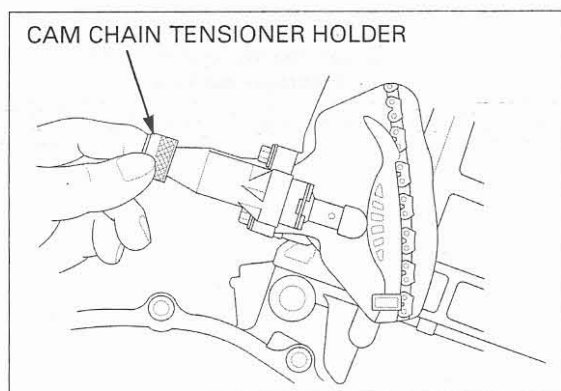
Install the camshafts (page 9-26).

Rotate the camshafts by rotating the crankshaft clockwise several times.

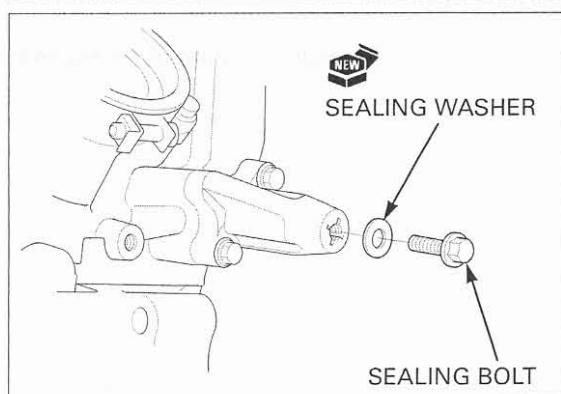
Recheck the valve clearance.



Remove the cam chain tensioner holder tool.



Install the new sealing washer and cam chain tensioner lifter sealing bolt. Tighten the bolt securely.



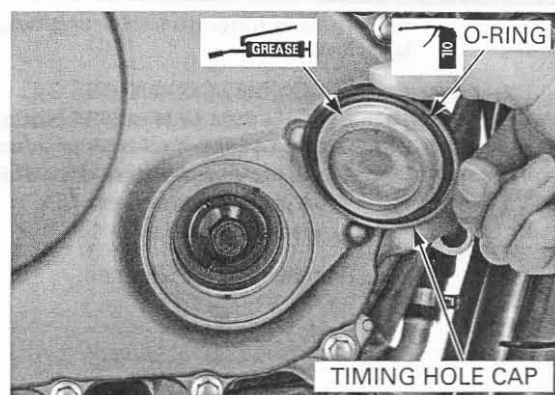


Check that the O-ring is in good condition, replace if necessary.

Apply grease to the timing hole cap threads. Tighten the timing hole cap to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

Install the removed parts in the reverse order of removal.



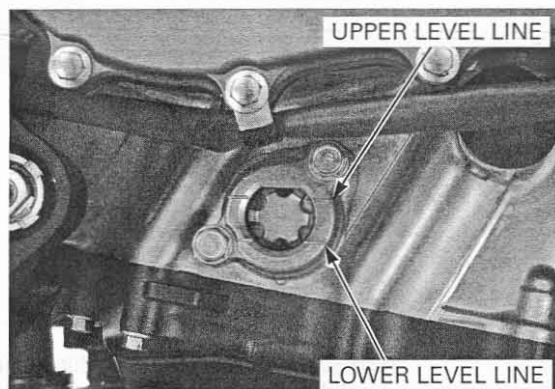
## ENGINE OIL/OIL FILTER

### OIL LEVEL INSPECTION

Start the engine and let it idle for 3 – 5 minutes.  
Stop the engine and wait 2 – 3 minutes.  
Hold the motorcycle in an upright position.  
Check the oil level through the inspection window.



If the level is below the lower level line, remove the oil filler cap and fill the crankcase with the recommended oil up to the upper level line as follows:



Remove the oil filler cap.





## MAINTENANCE

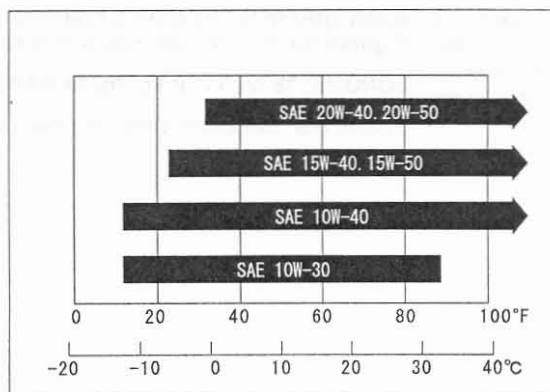
Fill the recommended engine oil up to the upper level line.

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

### RECOMMENDED ENGINE OIL:

**Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil**  
**API service classification: SG or higher**  
**JASO T 903 standard: MA**  
**Viscosity: SAE 10W-40**

Reinstall the oil filler cap.



### ENGINE OIL & FILTER CHANGE

*Change the engine oil with the warm and the motorcycle on level ground to assure complete draining.*

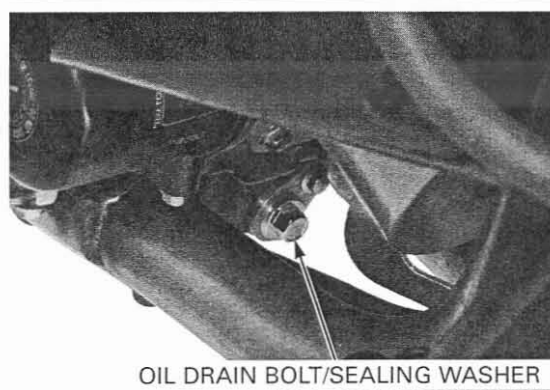
Start the engine and let it idle for 3 – 5 minutes. Stop the engine and wait 2 – 3 minutes. Hold the motorcycle in an upright position.

Remove the under cowl (page 3-7).

Remove the oil filler cap.



Remove the drain bolt and sealing washer, drain the oil completely.

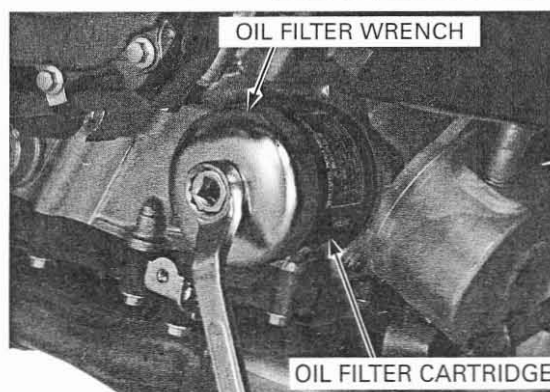


Remove and discard the oil filter cartridge using the special tool.

#### TOOL:

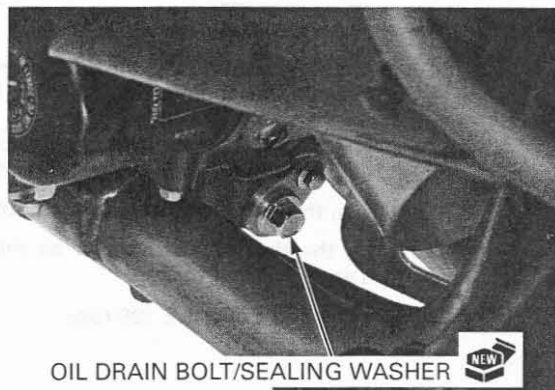
Oil filter wrench

07HAA-PJ70101



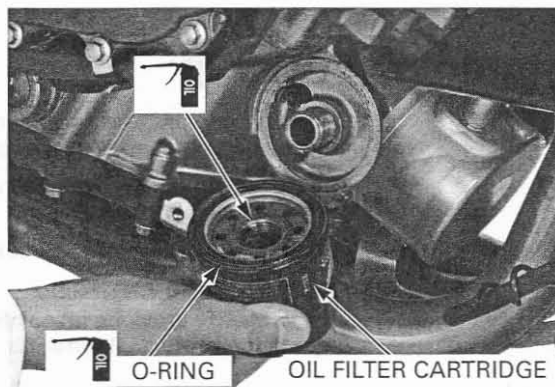
Check that the sealing washer on the drain bolt is in good condition, and replace if necessary. Install and tighten the drain bolt.

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



OIL DRAIN BOLT/SEALING WASHER

Apply clean engine oil to the oil filter cartridge threads and new O-ring.



O-RING

OIL FILTER CARTRIDGE

Install the new oil filter and tighten it to the specified torque.

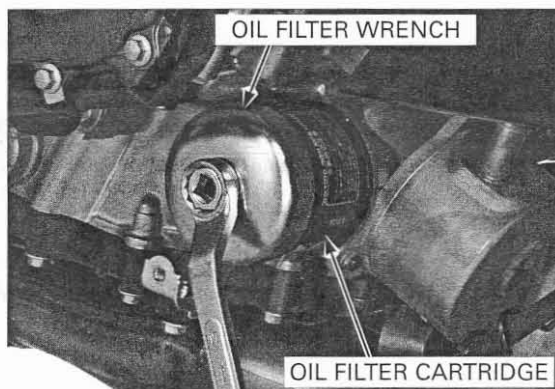
**TOOL:**

Oil filter wrench

07HAA-PJ70101

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

Install the radiator reservoir tank and bolt.



OIL FILTER WRENCH

OIL FILTER CARTRIDGE

Fill the crankcase with recommended engine oil.

**OIL CAPACITY:**

3.0 liter (3.2 US qt, 2.6 Imp qt) after draining

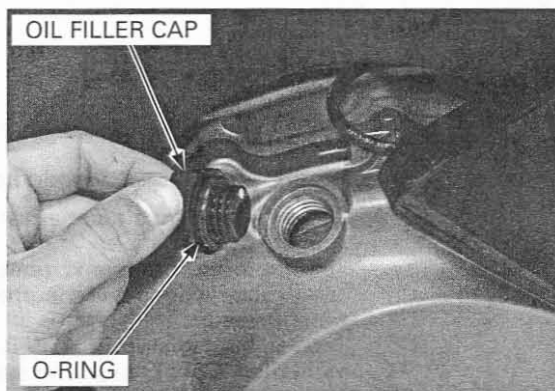
3.1 liter (3.3 US qt, 2.7 Imp qt) after oil filter change

Check that the O-ring on the oil filler cap is in good condition, and replace if necessary. Install the oil filler cap.

Start the engine and let it idle for 3 – 5 minutes. Stop the engine and wait 2 – 3 minutes and recheck the oil level.

Make sure there are no oil leaks.

Install the under cowls (page 3-7).



OIL FILLER CAP

O-RING

## MAINTENANCE

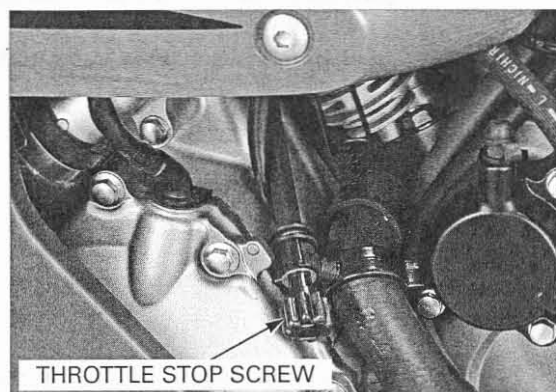
### ENGINE IDLE SPEED

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

Warm the engine for about 10 minutes.

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

**IDLE SPEED:**  $1,200 \pm 100$  rpm



### RADIATOR COOLANT

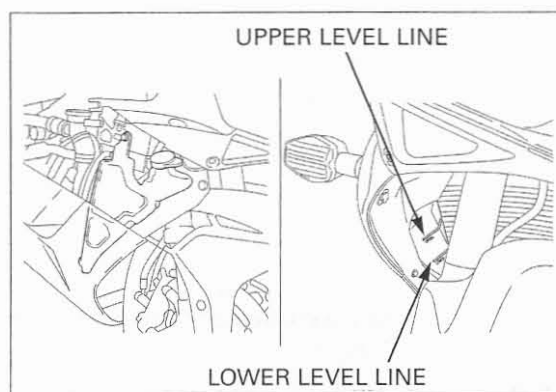
Check the coolant level of the reserve tank with the engine running at normal operating temperature.

The level should be between the "UPPER" and "LOWER" level lines.

If necessary, add recommended coolant.

**RECOMMENDED ANTIFREEZE:**

High quality ethylene glycol antifreeze containing corrosion protection inhibitors.

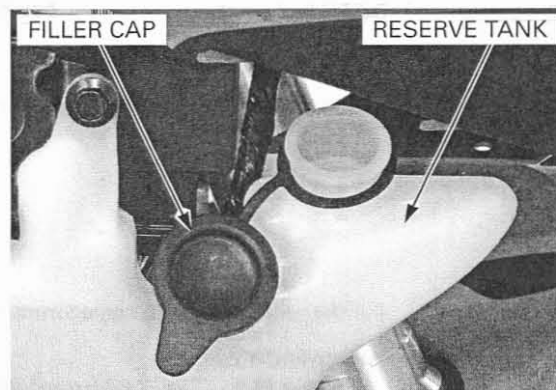


Remove the under cowls/middle cowls (page 3-7).

Remove the reserve tank filler cap and fill to the "UPPER" level line with 1:1 mixture of distilled water and antifreeze.

Reinstall the filler cap.

Install the under cowls/middle cowls (page 3-9).



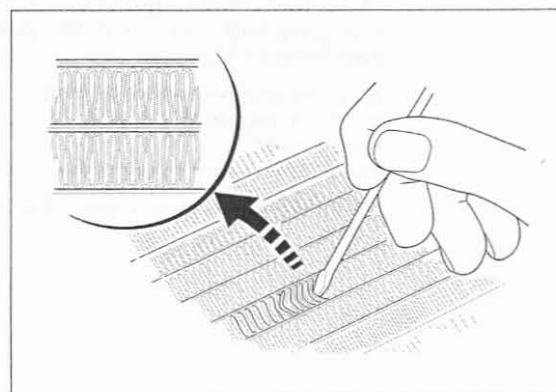
### COOLING SYSTEM

Remove the under cowls/middle cowls (page 3-7).

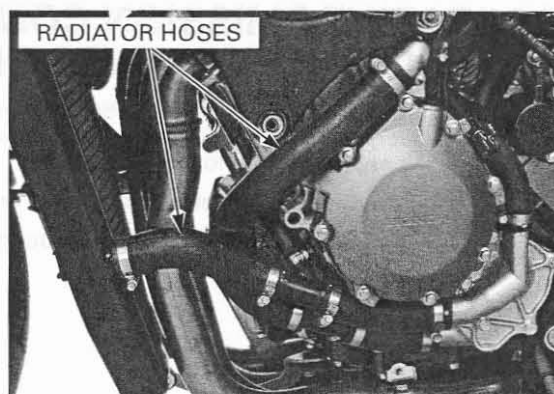
Check the radiator air passages for clogging or damage.

Straighten bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.

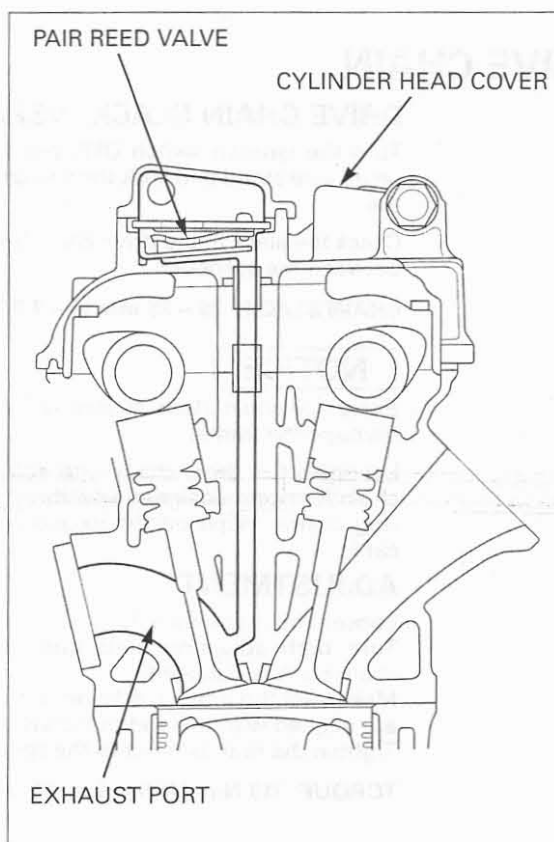


Inspect the radiator hoses for cracks or deterioration, and replace them if necessary. Check the tightness of all hose clamps and fasteners.



## SECONDARY AIR SUPPLY SYSTEM

- This model is equipped built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head cover.
- The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system. This charged secondary air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.



Remove the air cleaner housing (page 6-40).

*If the hoses show any signs of heat damage, inspect the PAIR reed valves in the PAIR check valves for damage.*

Check the PAIR (pulse secondary air injection) hoses between the PAIR control solenoid valve and cylinder head cover for deterioration, damage or loose connections. Make sure that the hoses are not cracked.

Check the air suction hose between the air cleaner housing and PAIR control solenoid valve for deterioration, damage or loose connections. Make sure that the hoses are not kinked, pinched or cracked.

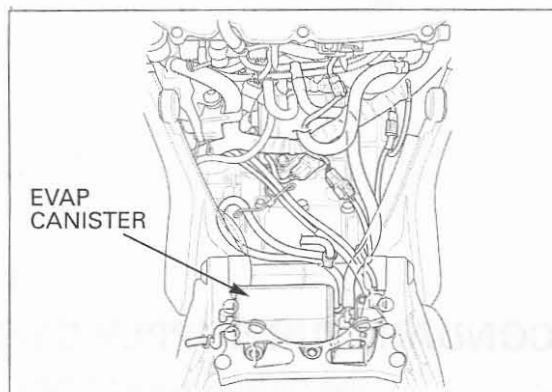


## EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)

Check the hoses between the fuel tank, EVAP canister, EVAP purge control solenoid valve for deterioration, damage or loose connection.

Check the EVAP canister for cracks or other damage.

Refer to the Cable & Harness Routing (page 1-24) for hose connections.



## DRIVE CHAIN

### DRIVE CHAIN SLACK INSPECTION

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

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

**CHAIN SLACK: 25 – 35 mm (1 – 1-3/8 in)**

### NOTICE

*Excessive chain slack, 50 mm (2.0 in) or more, may damage the frame.*

Lubricate the drive chain with #80 – 90 gear oil or chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

### ADJUSTMENT

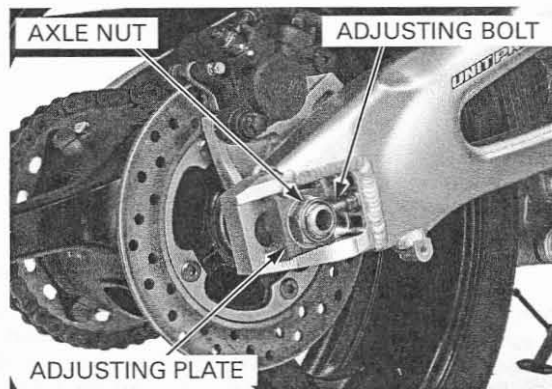
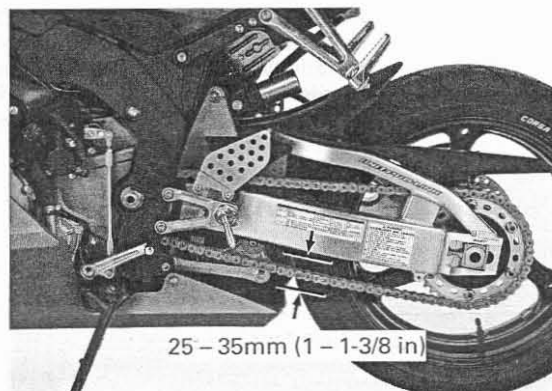
Loosen the rear axle nut.

Turn both adjusting bolts until the correct drive chain slack is obtained.

Make sure the index marks on both adjusting plates are aligned with the end of the swingarm.

Tighten the rear axle nut to the specified torque.

**TORQUE: 113 N·m (11.5 kgf·m, 83 lbf·ft)**



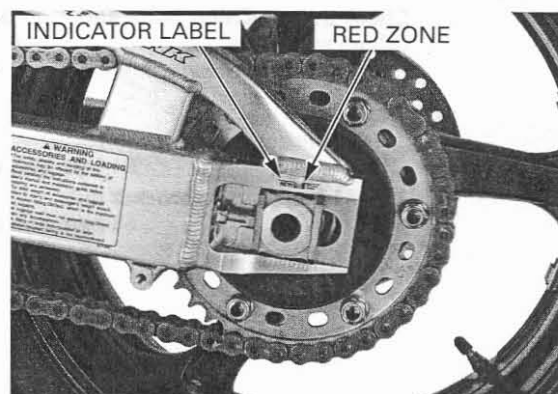


Recheck the drive chain slack and free wheel rotation.

Lubricate the drive chain with #80 – 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

Check the drive chain wear indicator label attached on the left drive chain adjusting plate.

If the swingarm index mark reaches red zone of the indicator label, replace the drive chain with a new one (page 4-28).



## CLEANING AND LUBRICATION

Clean the chain with non-flammable or high flash point solvent and wipe it dry.

Be sure the chain has dried completely before lubricating.

Inspect the drive chain for possible damage or wear. Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.

Inspect and replace sprocket as necessary.

NON-FLAMMABLE OR HIGH  
FLASH POINT SOLVENT

CLEAN

SOFT BRUSH

WIPE AND DRY

LUBRICATE

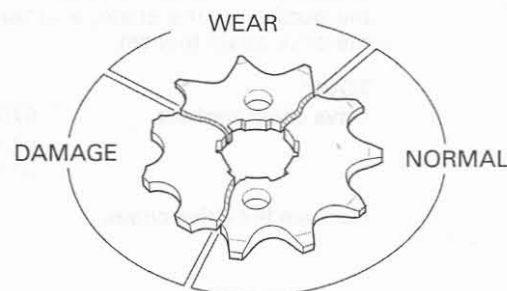
#80 – 90 GEAR OIL OR  
DRIVE CHAIN LUBRICANT

## SPROCKET INSPECTION

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

Never use a new drive chain on worn sprockets.

Both chain and sprockets must be in good condition, or the new replacement chain will wear rapidly.





## MAINTENANCE

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

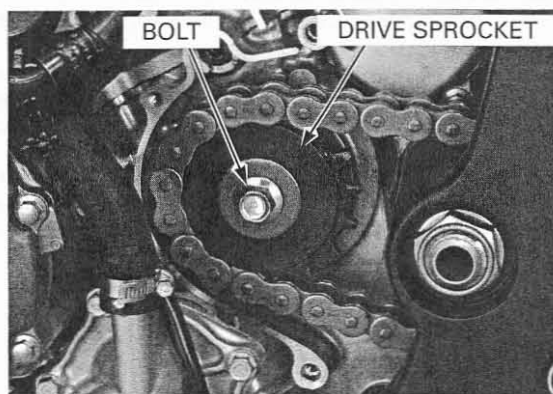
### TORQUE:

Drive sprocket special bolt:

54 N·m (5.5 kg·m, 40 lbf·ft)

Final driven sprocket nut:

64 N·m (6.5 kgf·m, 47 lbf·ft)



## REPLACEMENT

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

Loosen the drive chain (page 4-26).

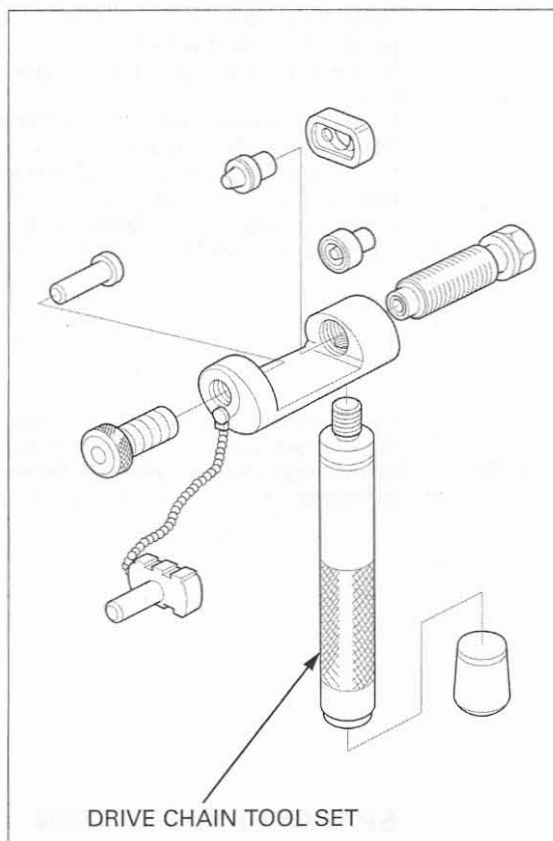
Assemble the special tool as shown.

### TOOL:

Drive chain tool set

07HMH-MR10103 or  
07HMH-MR1010C  
(U.S.A. only)

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



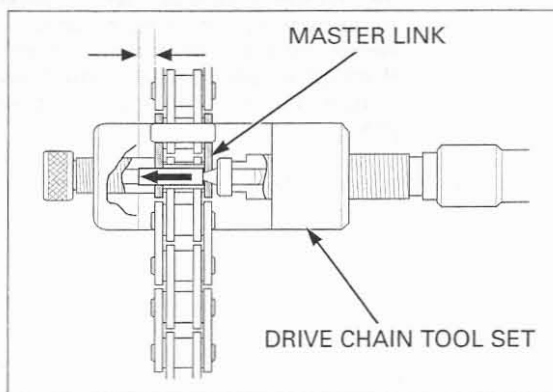
Locate the crimped pin ends of the master link from the outside of the chain, and remove the link with the drive chain tool set.

### TOOL:

Drive chain tool set

07HMH-MR10103 or  
07HMH-MR1010C  
(U.S.A. only)

Remove the drive chain.



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

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

**STANDARD LINKS: 114 LINKS**

## REPLACEMENT CHAIN

**DID: DID50VM2-120ZB**

**RK: RK50GFOZ1-120LJFZ**

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

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

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

Assemble and set the drive chain tool set.

## TOOL:

**Drive chain tool set**

**07HMH-MR10103 or  
07HMH-MR1010C  
(U.S.A. only)**

Make sure that the master link pins are installed properly.

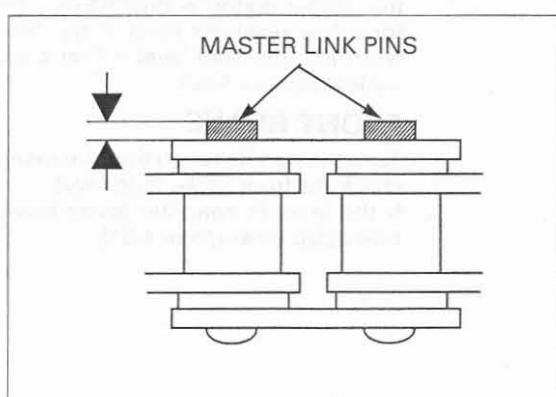
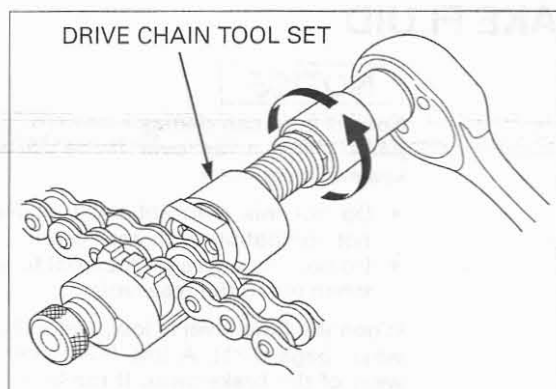
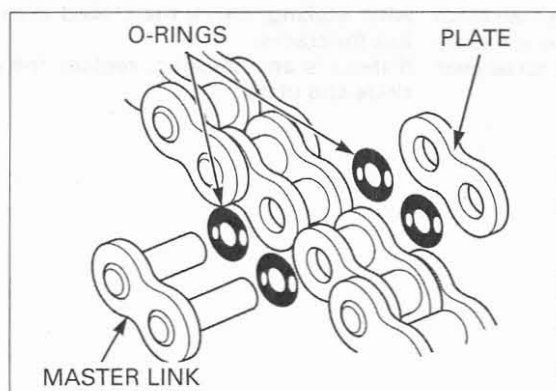
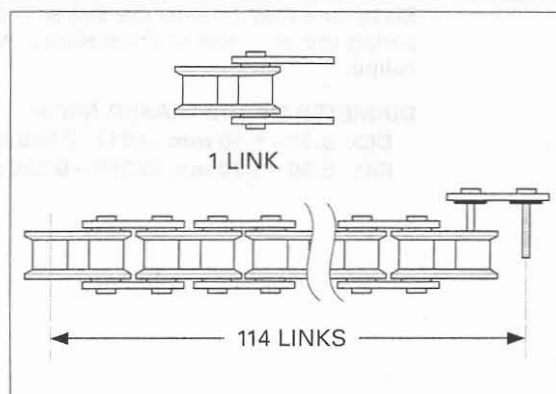
Measure the master link pin length projected from the plate.

## STANDARD LENGTH:

**DID: 1.15 – 1.55 mm (0.045 – 0.061 in)**

**RK: 1.2 – 1.4 mm (0.05 – 0.06 in)**

Stake the master link pins.



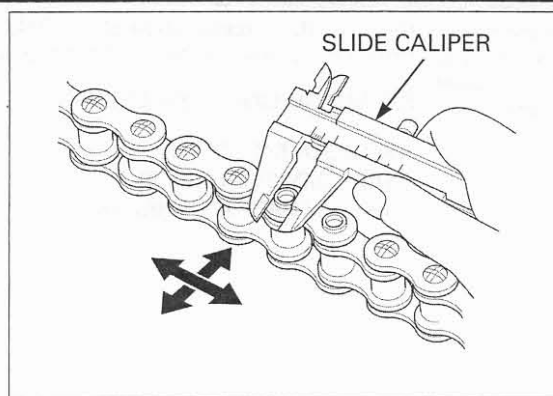
## MAINTENANCE

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

### DIAMETER OF THE STAKED AREA:

DID: 5.50 – 5.80 mm (0.217– 0.228 in)

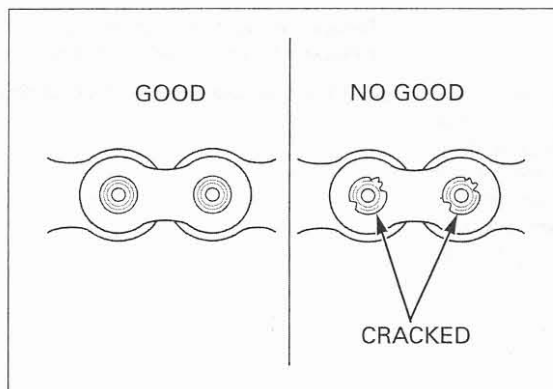
RK: 5.30 – 5.70 mm (0.209 – 0.224 in)



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

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.



## BRAKE FLUID

### NOTICE

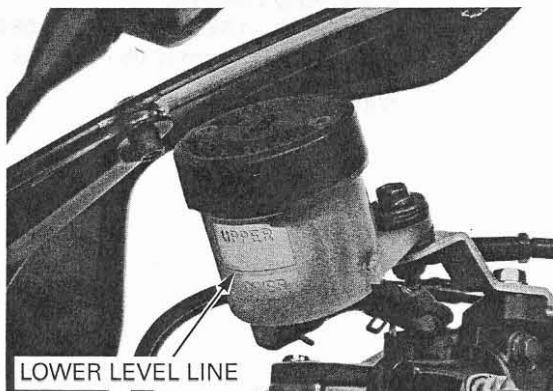
*Spilled fluid can damage painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

- 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.

When the fluid level is low, check the brake pads for wear (page 4-31). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 4-32).

### FRONT BRAKE

Turn the handlebar so that the reservoir is level and check the front brake fluid level. If the level is near the lower level line, check the brake pad wear (page 4-31).

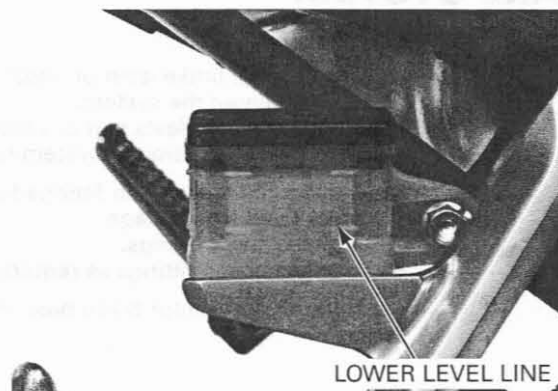


## REAR BRAKE

Place the motorcycle on a level surface, and support it in an upright position.

Check the rear brake fluid level.

If the level is near the lower level line, check the brake pad wear (page 4-31).



LOWER LEVEL LINE

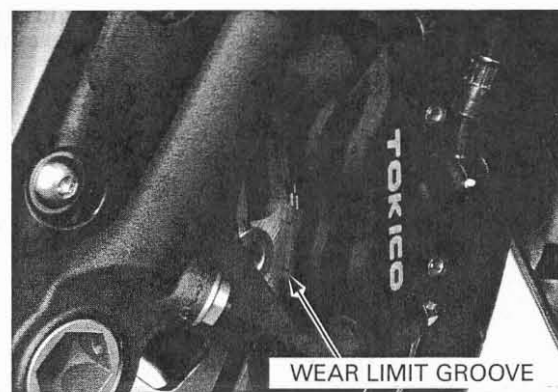
## BRAKE PAD WEAR

### FRONT BRAKE PADS

Check the brake pads for wear.

Replace the brake pads if either pad is worn to the bottom of wear limit groove.

Refer to brake pad replacement (page 16-11).



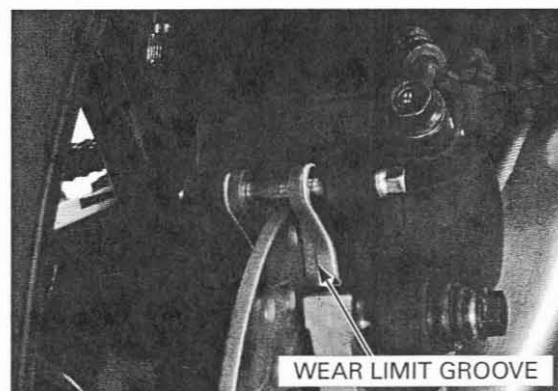
WEAR LIMIT GROOVE

### REAR BRAKE PADS

Check the brake pads for wear.

Replace the brake pads if either pad is worn to the bottom of wear limit groove.

Refer to brake pad replacement (page 16-13).



WEAR LIMIT GROOVE

## MAINTENANCE

### BRAKE SYSTEM

#### INSPECTION

Firmly apply the brake lever or pedal, and check that no air has entered the system.

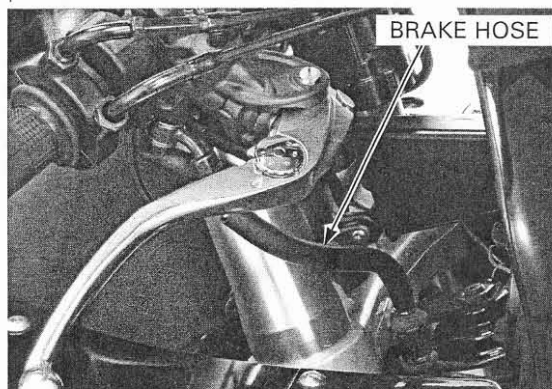
If the lever or pedal feels soft or spongy when operated, bleed the air from the system (page 16-8).

Inspect the brake hose and fittings for deterioration, cracks and signs of leakage.

Tighten any loose fittings.

Replace hoses and fittings as required.

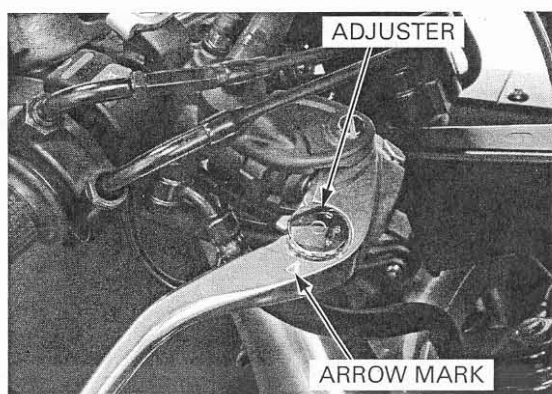
Refer the procedure for brake bleeding (page 16-7).



#### BRAKE LEVER ADJUSTMENT

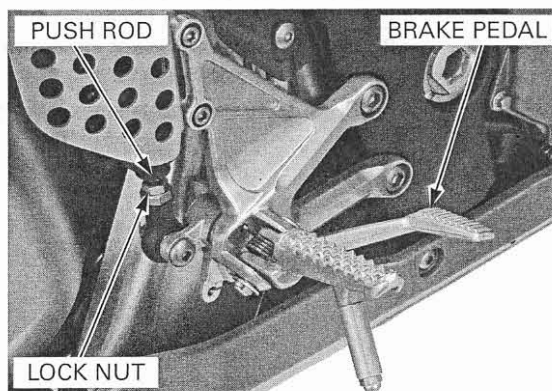
*Align the allow mark on the brake lever with the index number on the adjuster.*

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



#### BRAKE PEDAL HEIGHT ADJUSTMENT

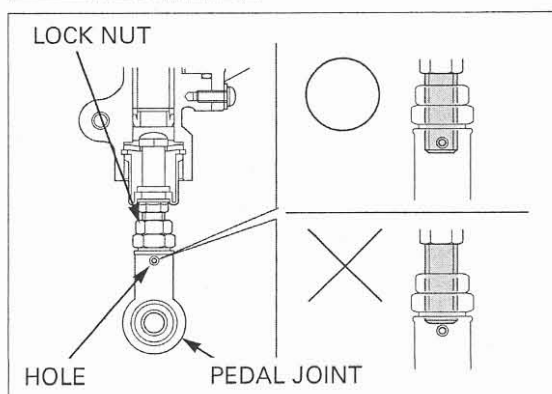
Loosen the lock nut and turn the push rod until the correct pedal height is obtained.



Make sure the push rod threads can be seen through the pedal joint hole.

After adjustment, tighten the lock nut to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

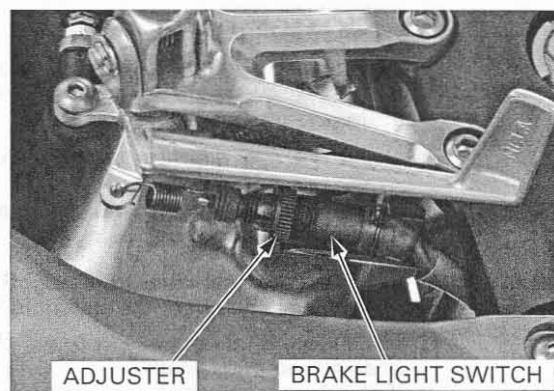


## BRAKE LIGHT SWITCH

The front brake light switch does not require adjustment.

Adjust the brake light switch so that the brake light comes on just prior to the brake actually being engaged.

If the light fails to come on, adjust the switch so that the light comes on at the proper time. Hold the switch body and turn the adjuster. Do not turn the switch body.

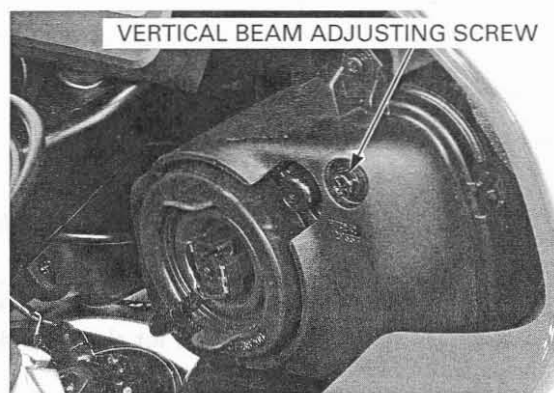


## HEADLIGHT AIM

Place the motorcycle on a level surface.

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

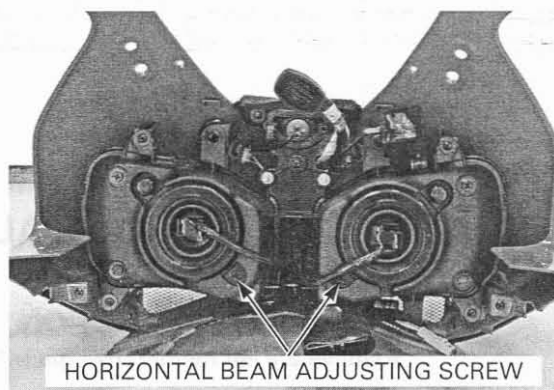
Adjust the headlight aim vertically by turning the vertical beam adjusting screw. A clockwise rotation moves the beam up and counterclockwise rotation moves the beam down.



Adjust the headlight aim horizontally by turning the horizontal beam adjusting screw.

**Left Headlight:** A clockwise rotation moves the beam toward the right and counterclockwise rotation moves the beam toward the left side of the rider.

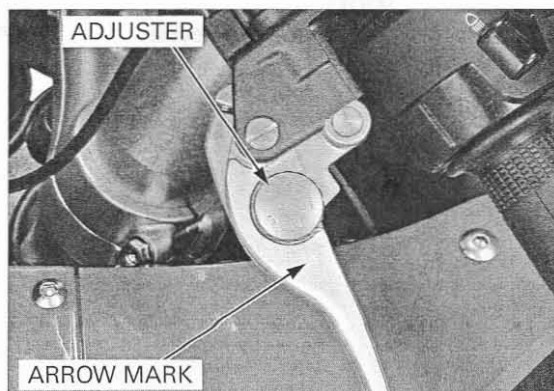
**Right Headlight:** A clockwise rotation moves the beam toward the left and counterclockwise rotation moves the beam toward the right side of the rider.



## CLUTCH SYSTEM

### CLUTCH LEVER ADJUSTMENT

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





## MAINTENANCE

### CLUTCH FLUID

#### NOTICE

*Spilled fluid can damage painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

- 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.

*When the fluid level is low, check entire system for leaks.*

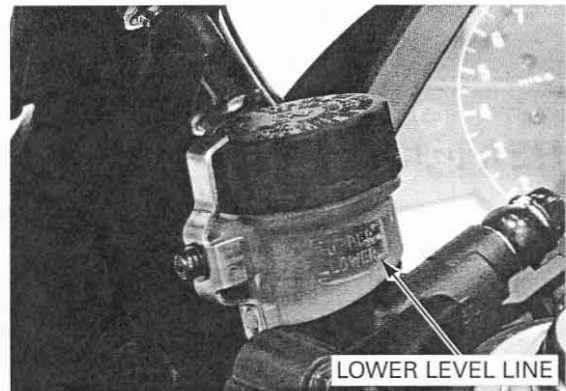
Turn the handlebar to the right so that the reservoir is level and check the clutch fluid level.

Firmly apply the clutch lever, and check that no air has entered the system.

If the lever feels soft or spongy when operated, bleed the air from the system.

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

Refer the procedure for clutch fluid bleeding (page 10-6).



### EXHAUST GAS CONTROL VALVE CABLE

#### OPERATING INSPECTION

Remove the left middle cowl (page 3-7).

Turn the ignition switch to "ON".

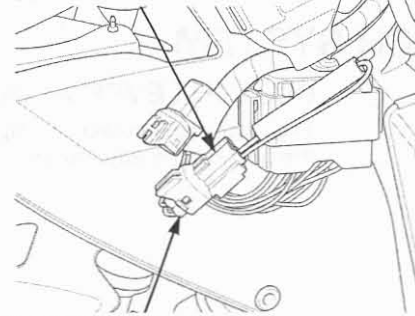
Short the Data Link Connector (DLC) terminals using the special tool.

#### TOOL:

SCS service connector

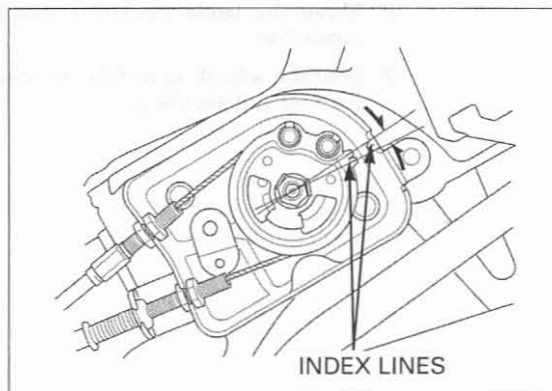
070PZ-ZY30100

#### SCS SERVICE CONNECTOR



Make sure that the EGCV (Exhaust Gas Control Valve) cable guide pulley index line is aligned with the EGCV housing index line as shown. If the pulley index line is not within the tolerance, adjust the EGCV control cables.

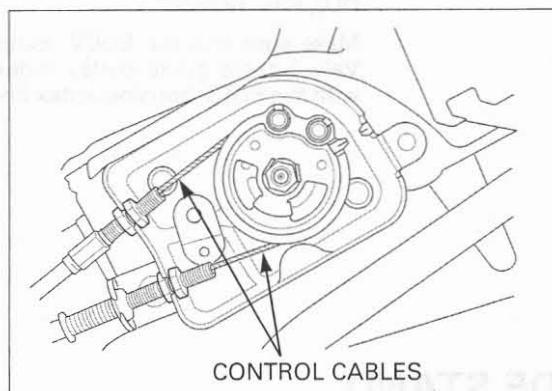
Turn the ignition switch OFF and remove the SCS service connector.



## BEARING INSPECTION

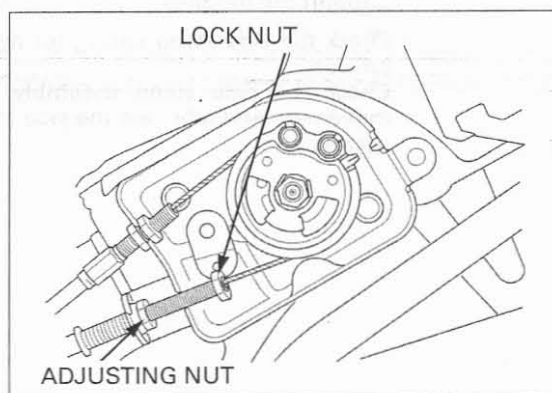
Move the exhaust valve pulley with your hand, check the exhaust valve shaft for excessive play.

If there is excessive play, replace the exhaust valve shaft bearings with new ones.

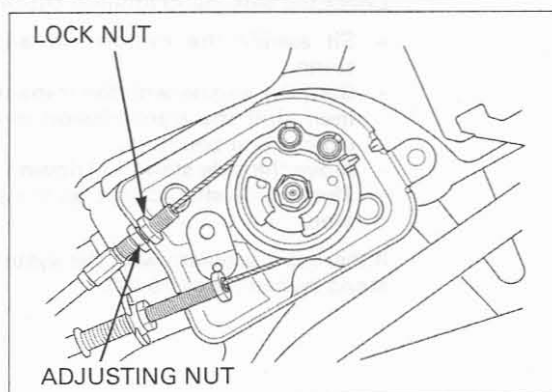


## CABLE ADJUSTMENT

1. Fully loosen the spring equipped side cable lock nut and adjusting nut.
2. Short the Data Link Connector (DLC) terminals using the special tool (page 4-34).

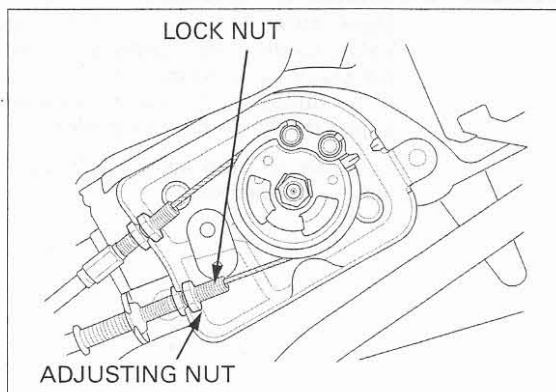


3. Loosen the adjusting cable lock nut and adjusting nut.
4. Adjust the pulley position by turning the adjusting nut.
5. Tighten the lock nut securely.



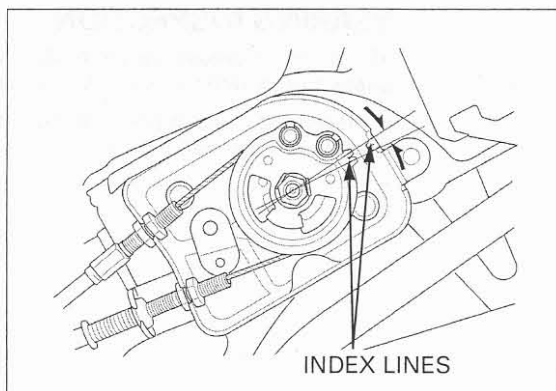
## MAINTENANCE

6. Move the cable several times and recheck the index line.
7. Seat the adjusting nut to the housing and tighten the lock nut securely.



8. Remove the SCS service connector from the DLC, then reinstall it.

Make sure that the EGCV (Exhaust Gas Control Valve) cable guide pulley index line is aligned with the EGCV housing index line.

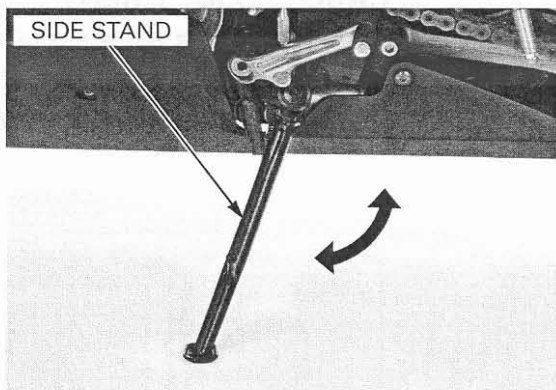


## SIDE STAND

Support the motorcycle on a level surface.

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

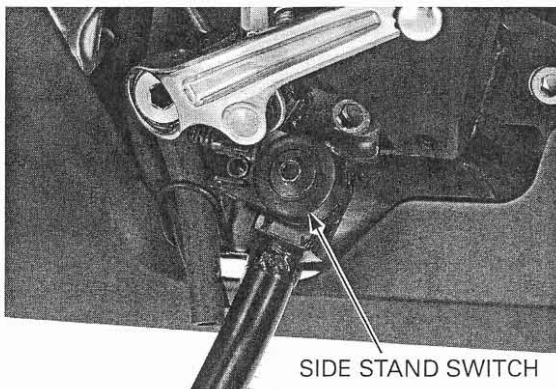
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.



Check the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, 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 (page 20-22).



# SUSPENSION

## FRONT SUSPENSION INSPECTION

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

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

Replace damaged components which cannot be repaired.

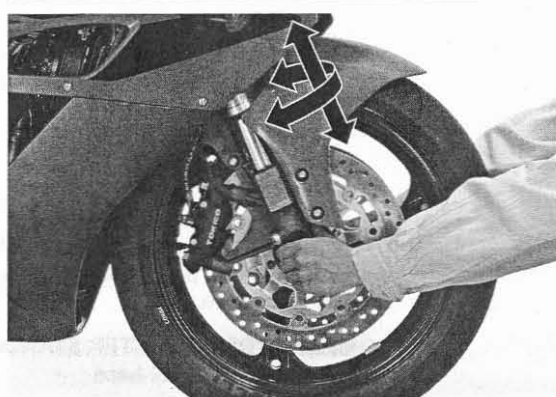
Tighten all nuts and bolts.

Refer to fork service (page 14-21).



Check for worn steering stem bearings by grabbing the front fork legs and attempting to move the front fork front to back.

Replace the bearings if any looseness is noted.



## FRONT SUSPENSION ADJUSTMENT

### SPRING PRE-LOAD ADJUSTER

Spring pre-load can be adjusted by turning the adjuster.

**TURN CLOCKWISE:**

Increase the spring pre-load

**TURN COUNTERCLOCKWISE:**

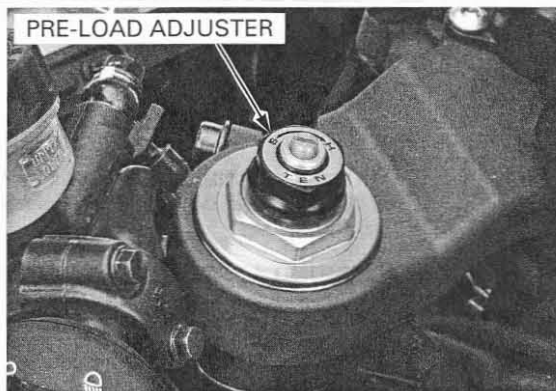
Decrease the spring pre-load

**PRE-LOAD ADJUSTER ADJUSTABLE RANGE:**

15 turns

**PRE-LOAD ADJUSTER STANDARD POSITION:**

7 turns in from minimum



## MAINTENANCE

### COMPRESSION AND REBOUND DAMPING ADJUSTERS

#### NOTICE

*Do not turn the adjusters more than the given positions or the adjusters may be damaged.*

- All damping adjustments are referenced from the full hard position.
- Be sure that the rebound and compression adjusters are firmly located in a detent, and not between positions.

*To adjust both sides equally, set the right and left damping adjusters to the same position.*

The compression and rebound damping can be adjusted by turning the adjusters.

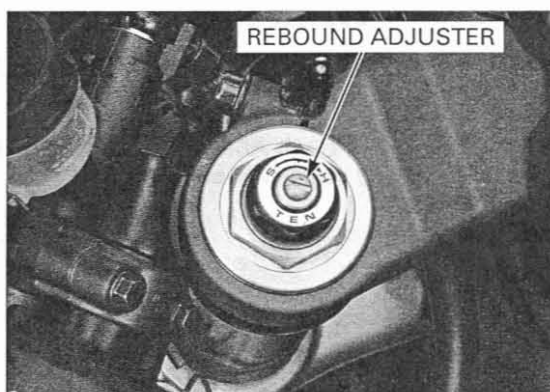
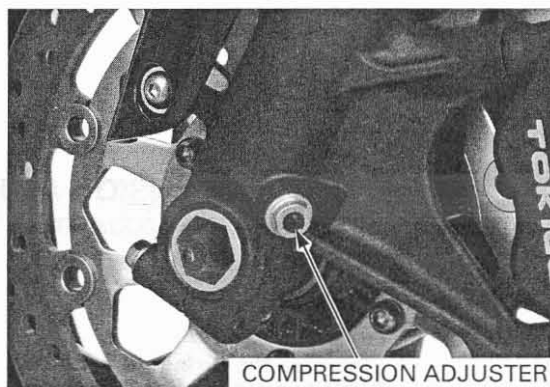
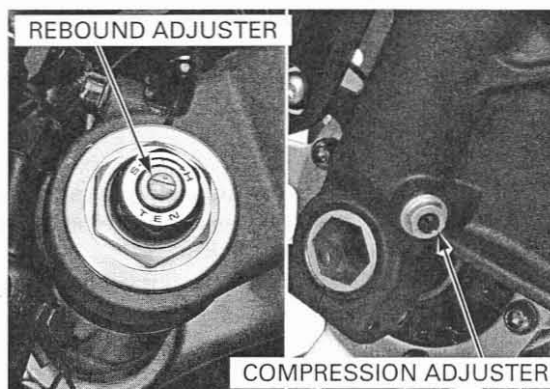
**DIRECTION H:** Increase the damping force  
**DIRECTION S:** Decrease the damping force

Turn the compression adjuster clockwise until it stops (full hard position), then turn the adjuster counterclockwise.

**COMPRESSION ADJUSTER STANDARD POSITION:**  
2 turns out from full hard

Turn the rebound adjuster clockwise until it stops (full hard position), then turn the adjuster counterclockwise.

**REBOUND ADJUSTER STANDARD POSITION:**  
2 turns out from full hard

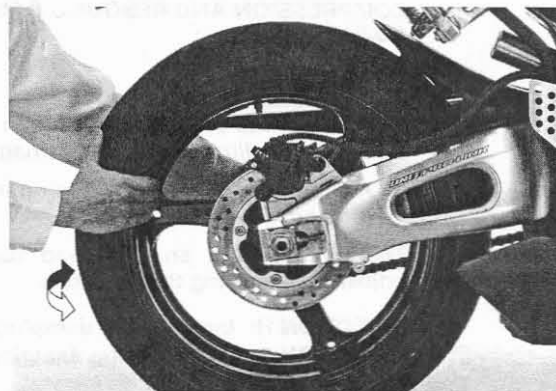




## REAR SUSPENSION INSPECTION

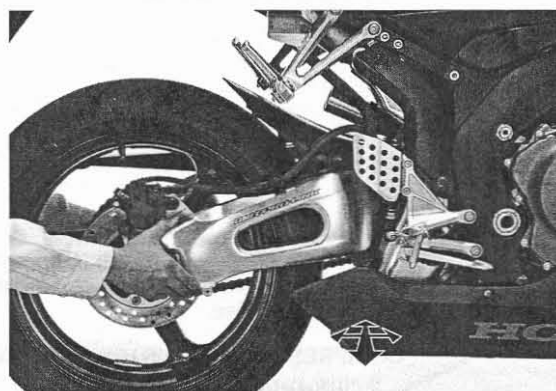
Support the motorcycle securely and raise the rear wheel off the ground.

Hold the swingarm and move the rear wheel side ways with force to see if the axle bearings are worn.



Check for worn swingarm bearings by grabbing the rear end of the swingarm and attempting to move the swingarm side to side.

Replace the bearings if any are looseness is noted.



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

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to the shock absorber service (page 15-14).





### REAR SUSPENSION ADJUSTMENT

#### COMPRESSION AND REBOUND DAMPING ADJUSTERS

##### NOTICE

*Do not turn the adjusters more than the given positions or the adjusters may be damaged.*

- All damping adjustments are referenced from the full hard position.

The compression and rebound damping can be adjusted by turning the adjusters.

**DIRECTION H:** Increase the damping force

**DIRECTION S:** Decrease the damping force

Turn the compression adjuster clockwise until it stops (full hard position), then turn the adjuster counterclockwise.

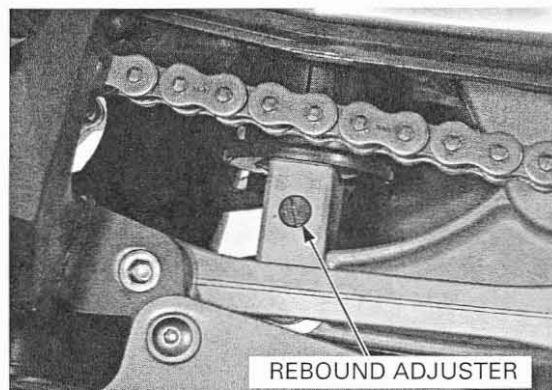
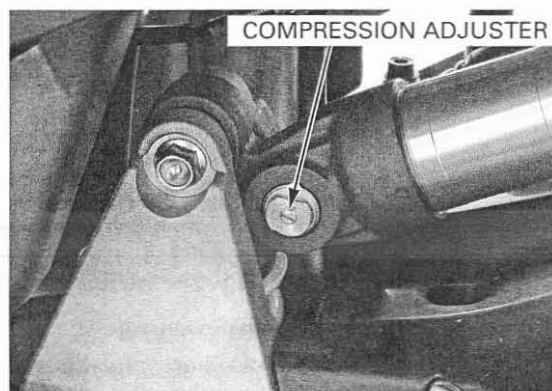
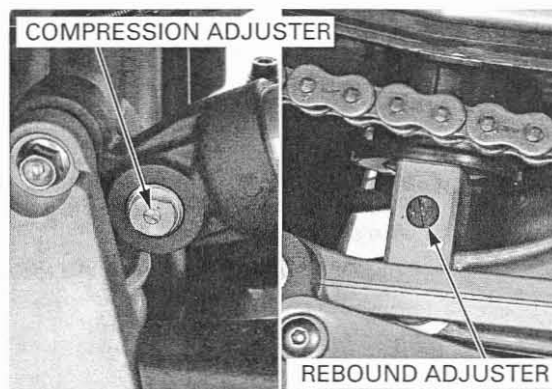
**COMPRESSION ADJUSTER STANDARD POSITION:**

9 clicks out from full hard

Turn the rebound adjuster clockwise until it stops (full hard position), then turn the adjuster counterclockwise.

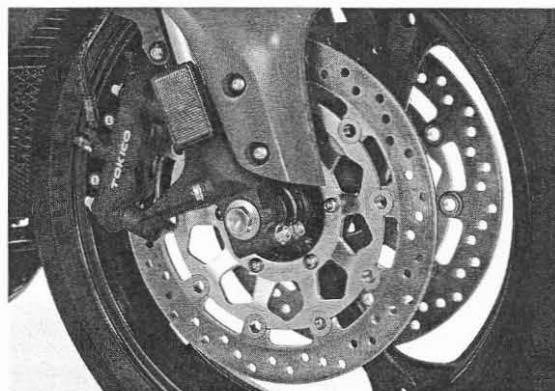
**REBOUND ADJUSTER STANDARD POSITION:**

2 – 1/2 turns out from full hard



## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).  
Check that all safety clips, hose clamps and cable stays are in place and properly secured.

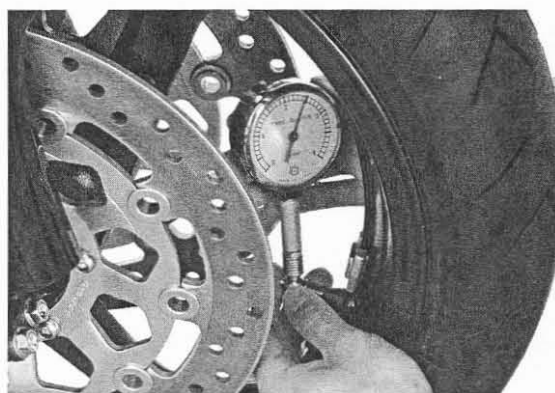


## WHEELS/TIRES

Tire pressure should be checked when the tires are COLD.

### RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

|   |             | FRONT                  | REAR                   |
|---|-------------|------------------------|------------------------|
| Tire pressure kPa (kgf/cm <sup>2</sup> , psi) |             | 250 (2.50, 36)         | 290 (2.90, 42)         |
| Tire size                                     |             | 120/70 ZR 17 M/C (58W) | 190/50 ZR 17 M/C (73W) |
| Tire brand                                    | Bridgestone | BT014F RADIAL G        | BT014R RADIAL G        |
|   | Pirelli     | DIABLO CORSA H         | DIABLO CORSA H         |



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

Check the front wheel (page 14-16) and rear wheel (page 15-7) for trueness.

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

### MINIMUM TREAD DEPTH:

FRONT: 1.5 mm (0.06 in)

REAR: 2.0 mm (0.08 in)

## STEERING HEAD BEARINGS

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

Support the motorcycle securely and raise the front wheel off the ground.

Check that the handlebar moves freely from side to side.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 14-35).



---

MEMO



WHITE, BOLE, LAS ENGRAS

WHITE, BOLE, LAS ENGRAS

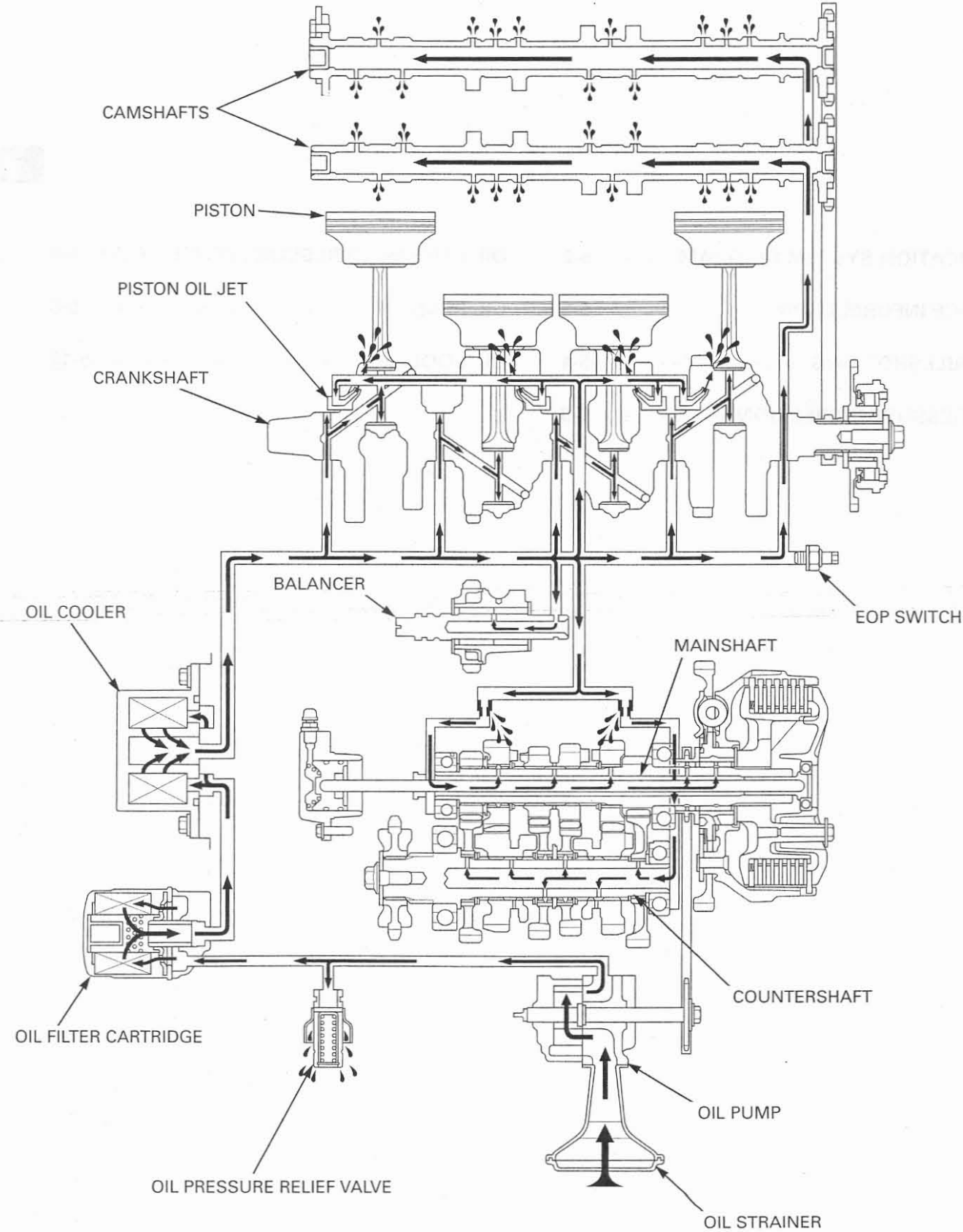
WHITE, BOLE, LAS ENGRAS

# 5. LUBRICATION SYSTEM

5

|                                  |     |                                       |      |
|----------------------------------|-----|---------------------------------------|------|
| LUBRICATION SYSTEM DIAGRAM ..... | 5-2 | OIL STRAINER/PRESSURE RELIEF VALVE .. | 5-6  |
| SERVICE INFORMATION .....        | 5-3 | OIL PUMP .....                        | 5-8  |
| TROUBLESHOOTING .....            | 5-4 | OIL COOLER .....                      | 5-13 |
| OIL PRESSURE INSPECTION .....    | 5-5 |                                       |      |

LUBRICATION SYSTEM DIAGRAM



## SERVICE INFORMATION

### GENERAL

#### ⚠ 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.

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

### SPECIFICATIONS

| ITEM   |                         | STANDARD   | Unit: mm (in)<br>SERVICE LIMIT |
|--|-------------------------|--|--------------------------------|
| Engine oil capacity                              | After draining          | 3.0 liter (3.2 US qt, 2.6 Imp qt)  | —                              |
|  | After oil filter change | 3.1 liter (3.3 US qt, 2.7 Imp qt)  | —                              |
|  | After disassembly       | 3.8 liter (4.0 US qt, 3.3 Imp qt)  | —                              |
| Recommended engine oil                           |                         | Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (U.S.A. and Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil<br>API service classification: SG or Higher except oils labeled as energy conserving on the circular API service label<br>JASO T 903 standard: MA<br>Viscosity: SAE 10W-40 | —                              |
| Oil pressure at EOP (engine oil pressure) switch |                         | 490 kPa (5.0 kgf/cm <sup>2</sup> , 71 psi) at 6,000 rpm/(80°C/176°F)   | —                              |
| Oil pump   | Tip clearance           | 0.15 (0.006)   | 0.20 (0.008)                   |
|  | Body clearance          | 0.15 – 0.21 (0.006 – 0.008)  | 0.35 (0.014)                   |
|  | Side clearance          | 0.04 – 0.09 (0.002 – 0.004)  | 0.17 (0.007)                   |

### TORQUE VALUES

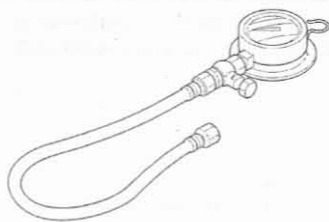
|  |                                 |                                      |
|--|---------------------------------|--------------------------------------|
| Engine oil filter cartridge                          | 26 N·m (2.7 kgf·m, 20 lbf·ft)   | Apply clean engine oil to the O-ring |
| Engine oil drain bolt                                | 29 N·m (3.0 kgf·m, 22 lbf·ft)   |                                      |
| Engine oil drain base bolt                           | 12 N·m (1.2 kgf·m, 9 lbf·ft)    | Apply a locking agent to the threads |
| Oil pump assembly flange bolt                        | 7.8 N·m (0.8 kgf·m, 5.8 lbf·ft) | CT bolt                              |
| Oil filter boss                                      | See page 1-15                   |                                      |
| EOP (engine oil pressure) switch                     | 12 N·m (1.2 kgf·m, 9 lbf·ft)    | Apply sealant to the threads         |
| EOP (engine oil pressure) switch wire terminal screw | 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft) |                                      |
| Oil pump driven sprocket bolt                        | 15 N·m (1.5 kgf·m, 11 lbf·ft)   | Apply a locking agent to the threads |



## LUBRICATION SYSTEM

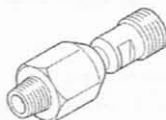
### TOOLS

Oil pressure gauge set  
07506-3000001



or equivalent commercially available in U.S.A. (MT37A)

Oil pressure gauge attachment  
07406-0030000



or equivalent commercially available in U.S.A. (AT77AH)

## TROUBLESHOOTING

### Oil level too low

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

### Low oil pressure

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

### No oil pressure

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

### High oil pressure

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

### Oil contamination

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

### Oil emulsification

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

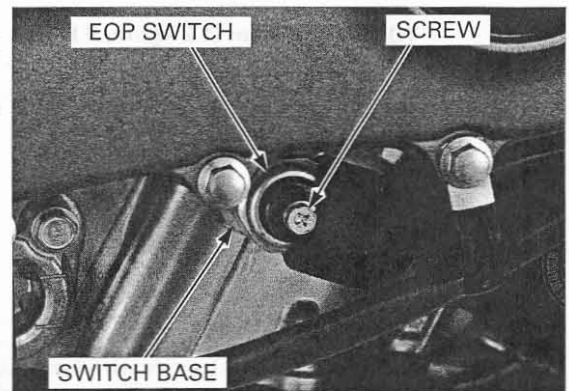
## OIL PRESSURE INSPECTION

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

Remove the under cowls (page 3-7).

Remove the screw and disconnect the EOP switch wire.

Remove the EOP switch while holding the switch base.



Install the oil pressure gauge attachment to the switch base.

Connect the oil pressure gauge to the oil pressure gauge attachment.

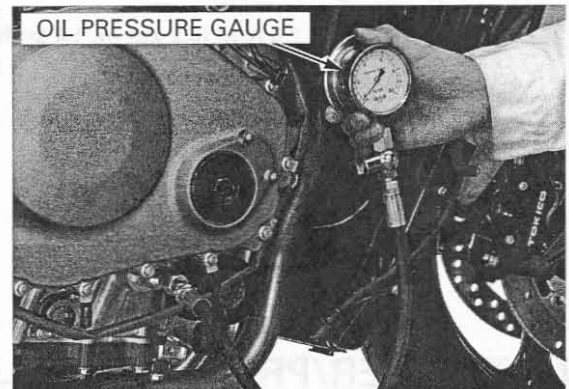
### TOOLS:

Oil pressure gauge set

07506-3000001 or equivalent commercially available in U.S.A. (MT37A)

Oil pressure gauge attachment

07406-0030000 or equivalent commercially available in U.S.A. (AT77AH)



Check the oil level (page 4-21).

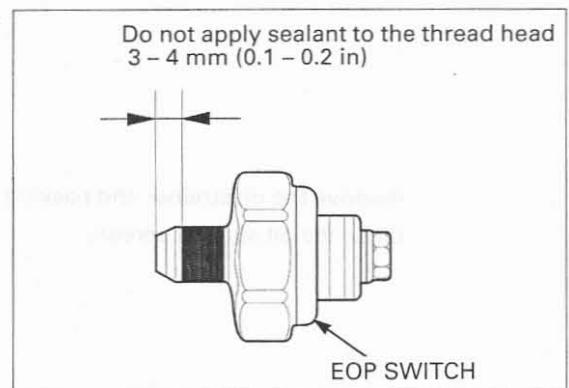
Warm the engine to normal operating temperature (approximately 80°C/176°F) and increase the engine speed to 6,000 rpm and read the oil pressure.

### OIL PRESSURE:

490 kPa (5.0 kgf/cm<sup>2</sup>, 71 psi) at 6,000 rpm/ (80°C/176°F)

Stop the engine and remove the tools.

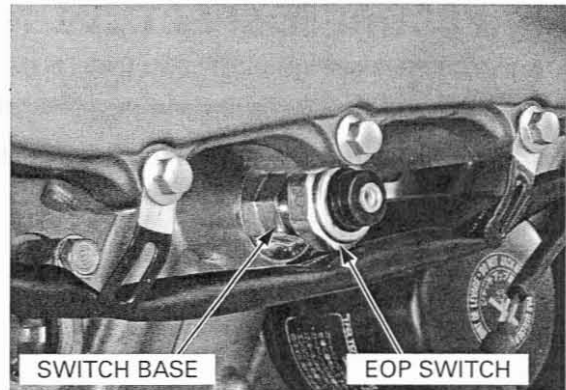
Apply a sealant to the EOP switch threads as shown.



## LUBRICATION SYSTEM

Install and tighten the EOP switch to the specified torque while holding the switch base.

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

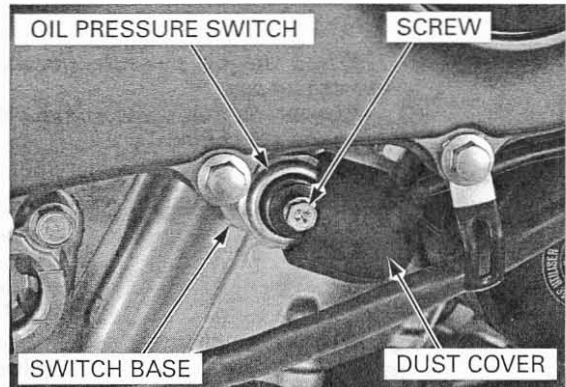


Connect the EOP switch wire terminal to the switch and tighten the screw to the specified torque.

**TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)**

Install the dust cover.

Install the under cowls (page 3-7).



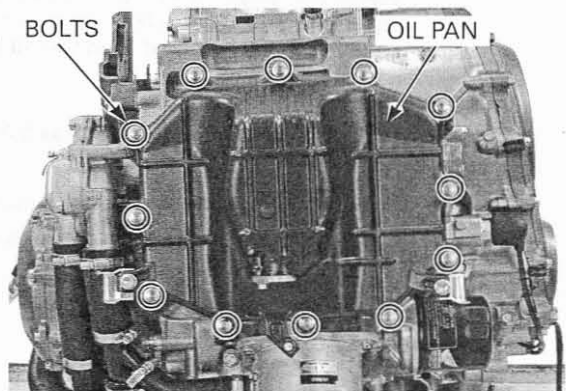
## OIL STRAINER/PRESSURE RELIEF VALVE

### REMOVAL

Drain the engine oil (page 4-22).

Remove the exhaust pipe (page 3-30).

Remove the oil pan SH flange bolts and oil pan.

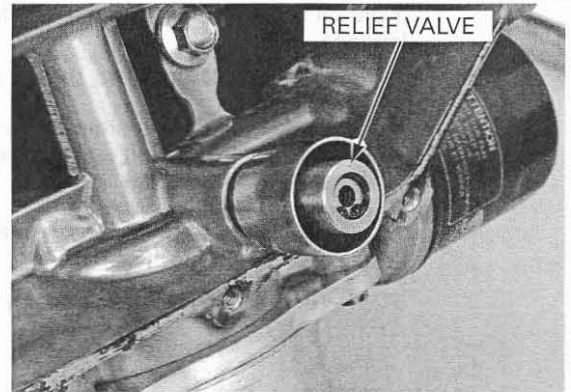


Remove the oil strainer and packing.

Clean the oil strainer screen.



Remove the pressure relief valve and O-ring.

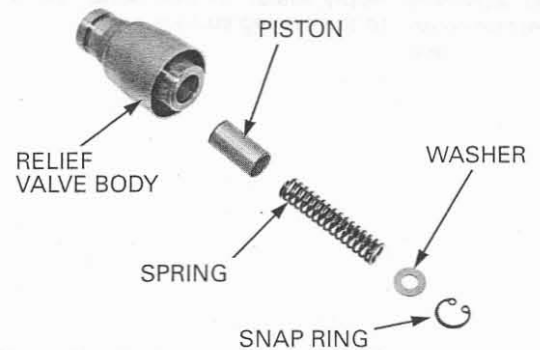


## INSPECTION

Check the operation of the pressure relief valve by pushing on the piston.  
Disassemble the relief valve by removing the snap ring.

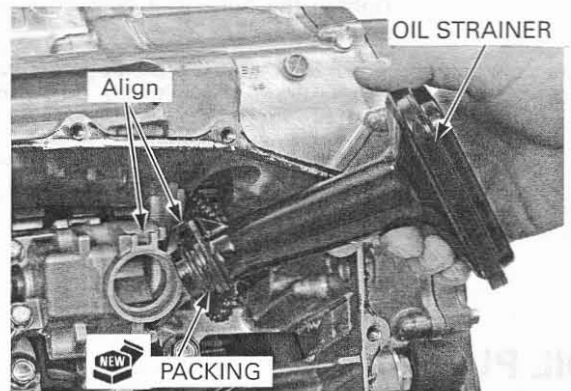
Inspect the piston for wear, unsmooth movement or damage.  
Inspect the spring for fatigue or damage.

Assemble the relief valve in the reverse order of disassembly.

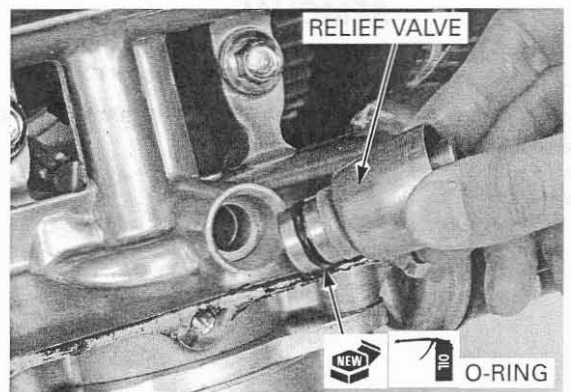


## INSTALLATION

Apply oil to a new packing and install it onto the oil strainer flange.  
Install the oil strainer into the oil pump while aligning the oil strainer boss with the groove of the oil pump.



Apply oil to a new O-ring and install it onto the relief valve.  
Install the relief valve into the crankcase.

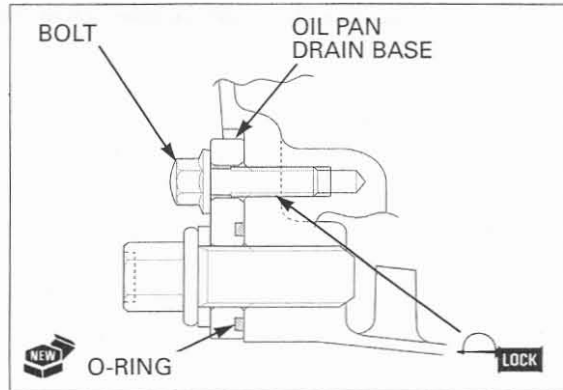


## LUBRICATION SYSTEM

If the oil pan drain base is removed, install the following:

- Install a new O-ring into the oil pan drain base groove.
- Install the oil pan drain base onto the oil pan, and temporarily install and tighten the oil drain bolt.
- Apply a locking agent to the oil pan drain base mounting bolt threads.
- Install and tighten the oil pan drain base mounting bolt to the specified torque.

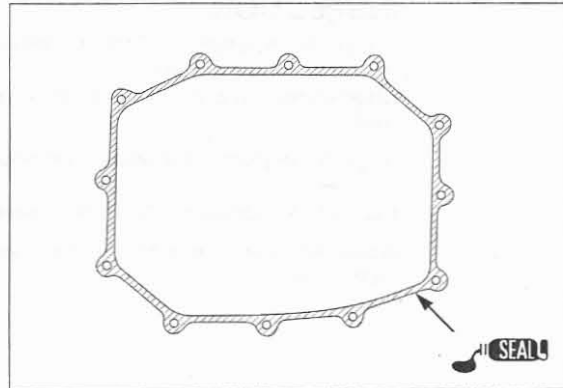
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Clean the oil pan mating surface thoroughly.

*Do not apply more sealant than necessary.*

Apply sealant (Three Bond 1207B or an equivalent) to the mating surface.



Install the oil pan onto the lower crankcase.

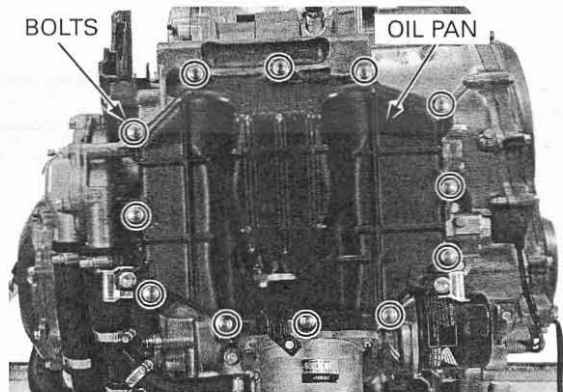
Install the oil pan SH flange bolts.

Tighten the bolts in a crisscross pattern in two or three steps.

Install the exhaust pipe (page 3-36).

Fill the crankcase with the recommended oil (page 4-22).

After installation, check that there are no oil leaks.



## OIL PUMP

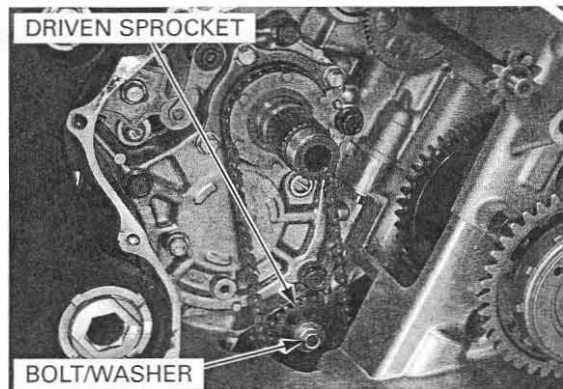
### REMOVAL

Drain the engine oil (page 4-22).

Remove the clutch (page 10-16).

*To gain access to the oil pump driven sprocket bolt, first remove the oil pan.*

Remove the bolt, washer and oil pump driven sprocket.



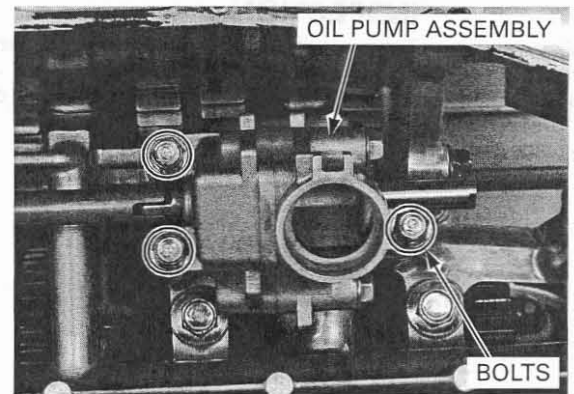
Remove the oil pan (page 5-6).

Remove the following:

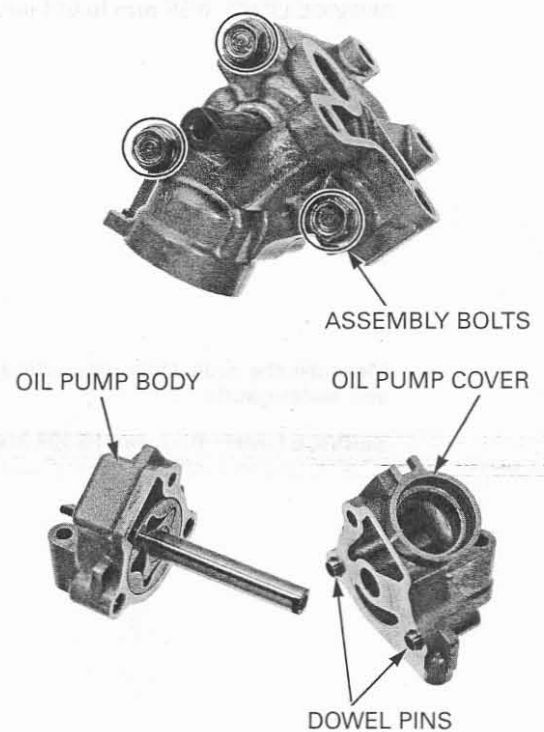
- Oil pump mounting bolts
- Oil pump assembly
- Dowel pins
- Oil pass collar/O-ring

## DISASSEMBLY

Remove the oil pump assembly bolts.

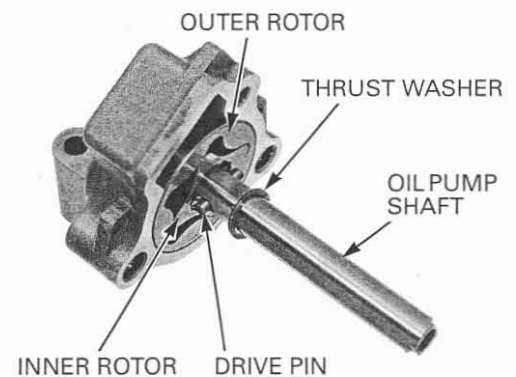


Remove the oil pump cover and dowel pins.



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

Clean all disassembly parts thoroughly.





## LUBRICATION SYSTEM

### INSPECTION

*If any portion of the oil pump is worn beyond the service limit, replace the oil pump as an assembly.*

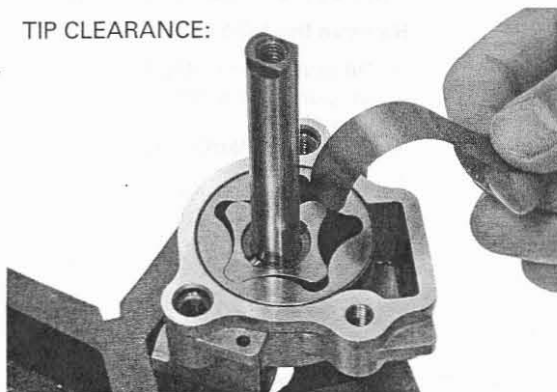
Temporarily install the outer and inner rotors into the oil pump body.

Temporarily install the drive pin and oil pump shaft.

Measure the rotor tip clearance.

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

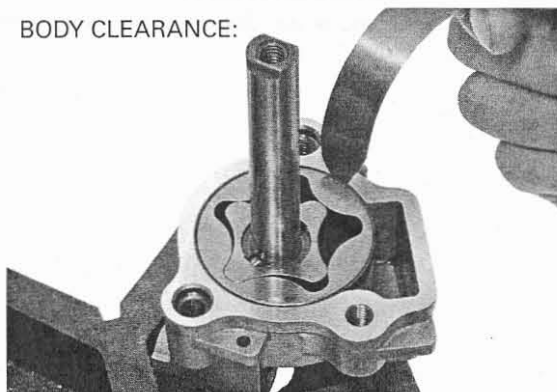
TIP CLEARANCE:



Measure the pump body clearance.

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

BODY CLEARANCE:



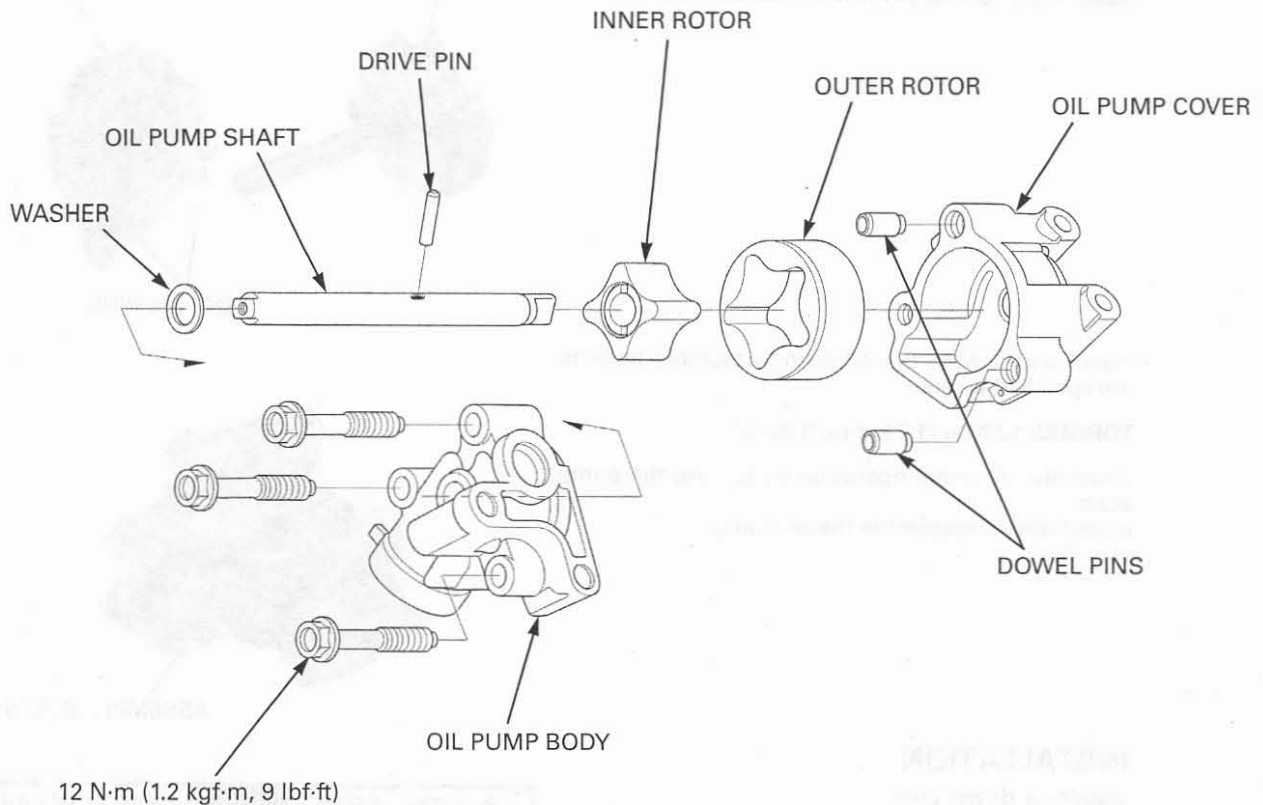
Measure the side clearance using a straight edge and feeler gauge.

**SERVICE LIMIT: 0.17 mm (0.007 in)**

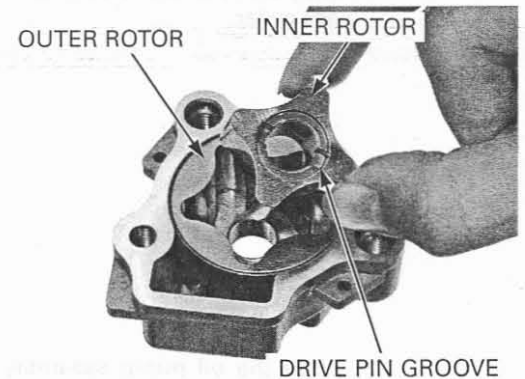
SIDE CLEARANCE:



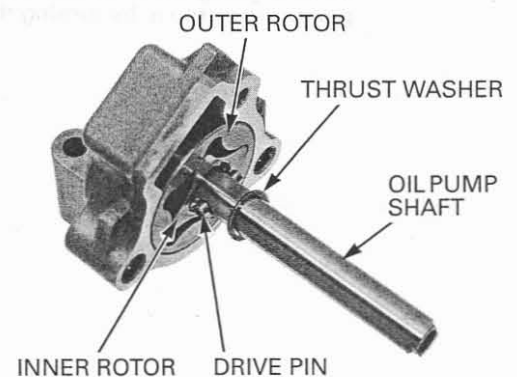
ASSEMBLY



Dip all parts in clean engine oil.  
Install the outer rotor into the oil pump body.  
Install the inner rotor into the outer rotor with its drive pin groove facing the oil pump cover.



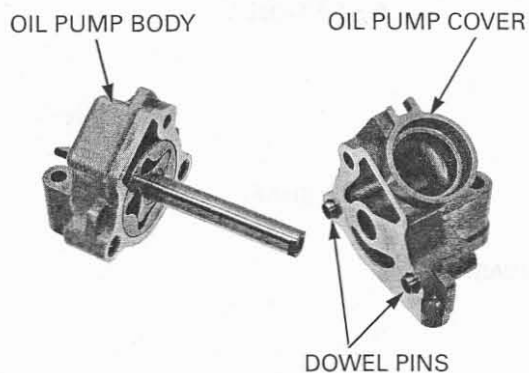
Install the oil pump shaft through the inner rotor and oil pump body.  
Install the drive pin into the hole in the oil pump shaft and align the drive pin with the groove in the inner rotor.  
Install the thrust washer.



## LUBRICATION SYSTEM

Install the dowel pins into the oil pump cover.

Install the oil pump cover to the oil pump body.

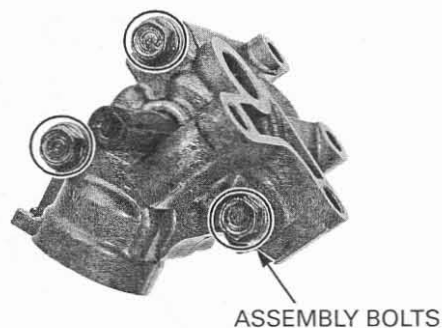


Install and tighten the oil pump assembly bolts to the specified torque.

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

Check the oil pump operation by turning the pump shaft.

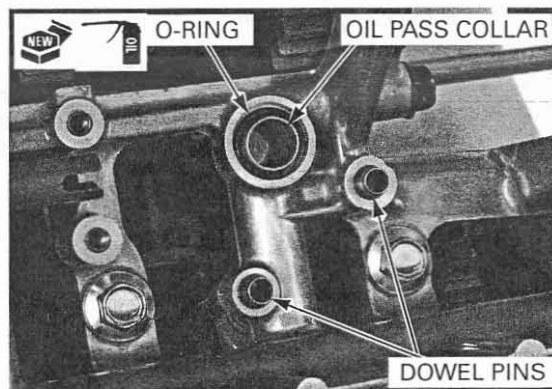
If necessary, reassemble the oil pump.



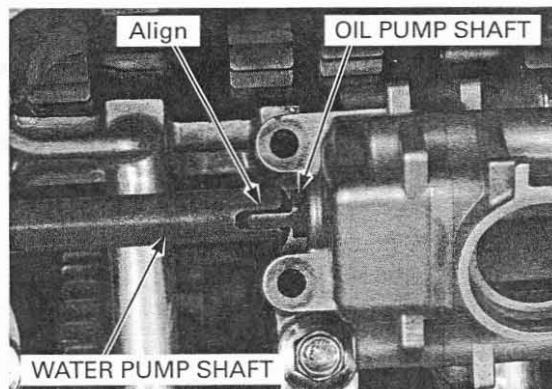
## INSTALLATION

Install the dowel pins.

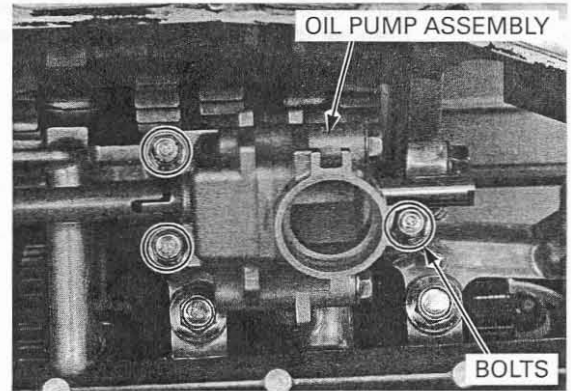
Apply oil to a new O-ring and install it with the oil pass collar.



Install the oil pump assembly onto the crankcase while aligning the oil pump shaft lug with the water pump shaft groove by turning the oil pump shaft.

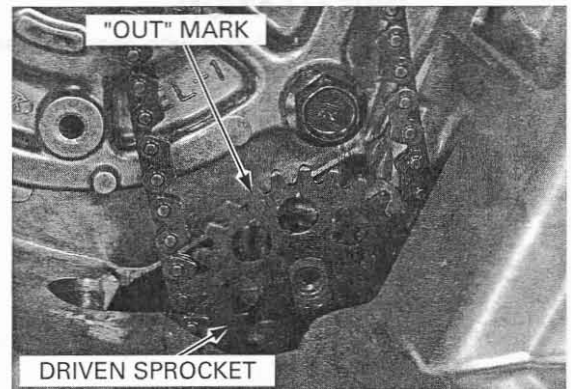


Install and tighten the three flange bolts securely.



Apply oil to the oil pump driven sprocket and drive chain

Install the driven sprocket with its "OUT" mark facing out.



Apply a locking agent to the oil pump driven sprocket bolt threads.

Install and tighten the driven sprocket bolt/washer to the specified torque.

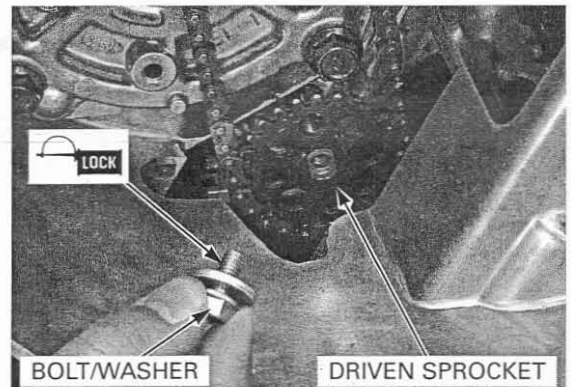
**TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)**

Install the oil pan (page 5-7).

Install the right crankcase cover (page 10-34).

After installation, fill the crankcase with the recommended oil (page 4-22) and check that there is no oil leaks.

Check the oil pressure (page 5-5).



## OIL COOLER

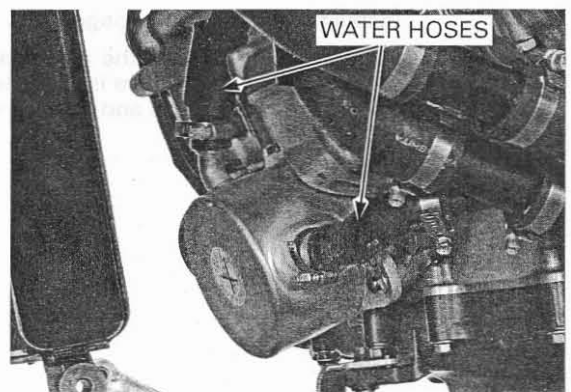
### REMOVAL

Drain the engine oil (page 4-22).

Drain the coolant from the system (page 7-6).

Remove the exhaust pipe (page 3-30).

Loosen the hose clamp screws and disconnect the oil cooler water hoses from the oil cooler.

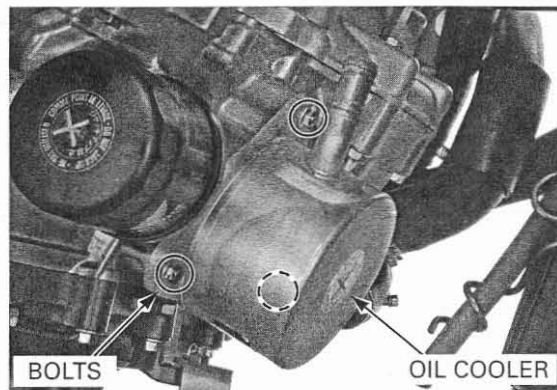


## LUBRICATION SYSTEM

Remove the three bolts and oil cooler.  
Remove the O-ring from the oil cooler.

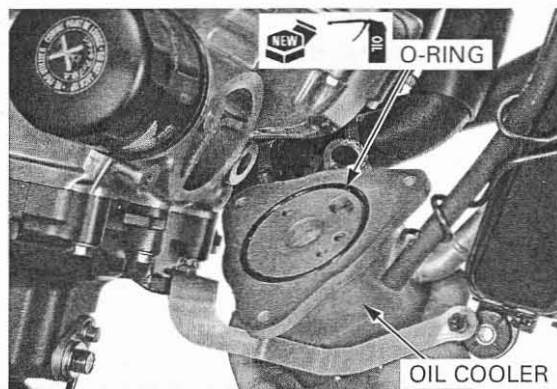
### INSPECTION

Check the oil cooler for damage.



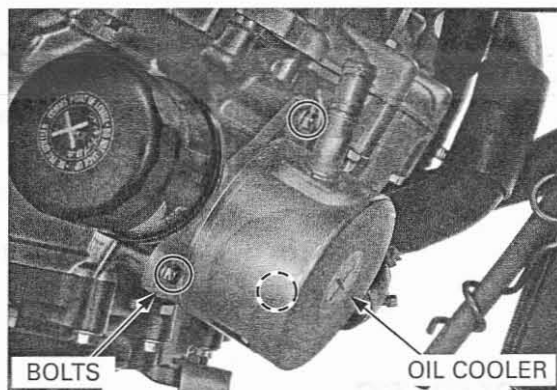
### INSTALLATION

Coat a new O-ring with engine oil and install it into the oil cooler groove.



Install the oil cooler on the crankcase.

Install and tighten the three bolts.

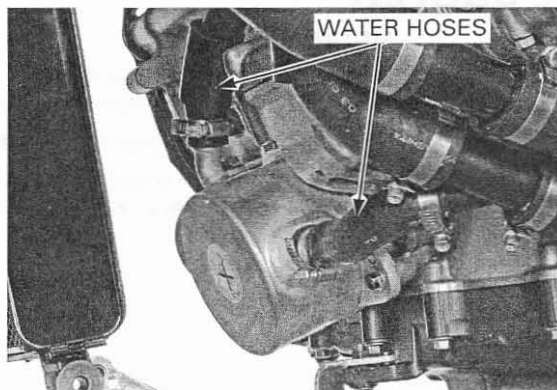


Connect the oil cooler water hoses into the oil cooler and tighten the hose clamp screws securely.

Install the exhaust pipe (page 3-36).

Fill the crankcase with the recommended oil (page 4-22) and check that there is no oil leaks.

Fill the cooling system and bleed any air (page 7-6).



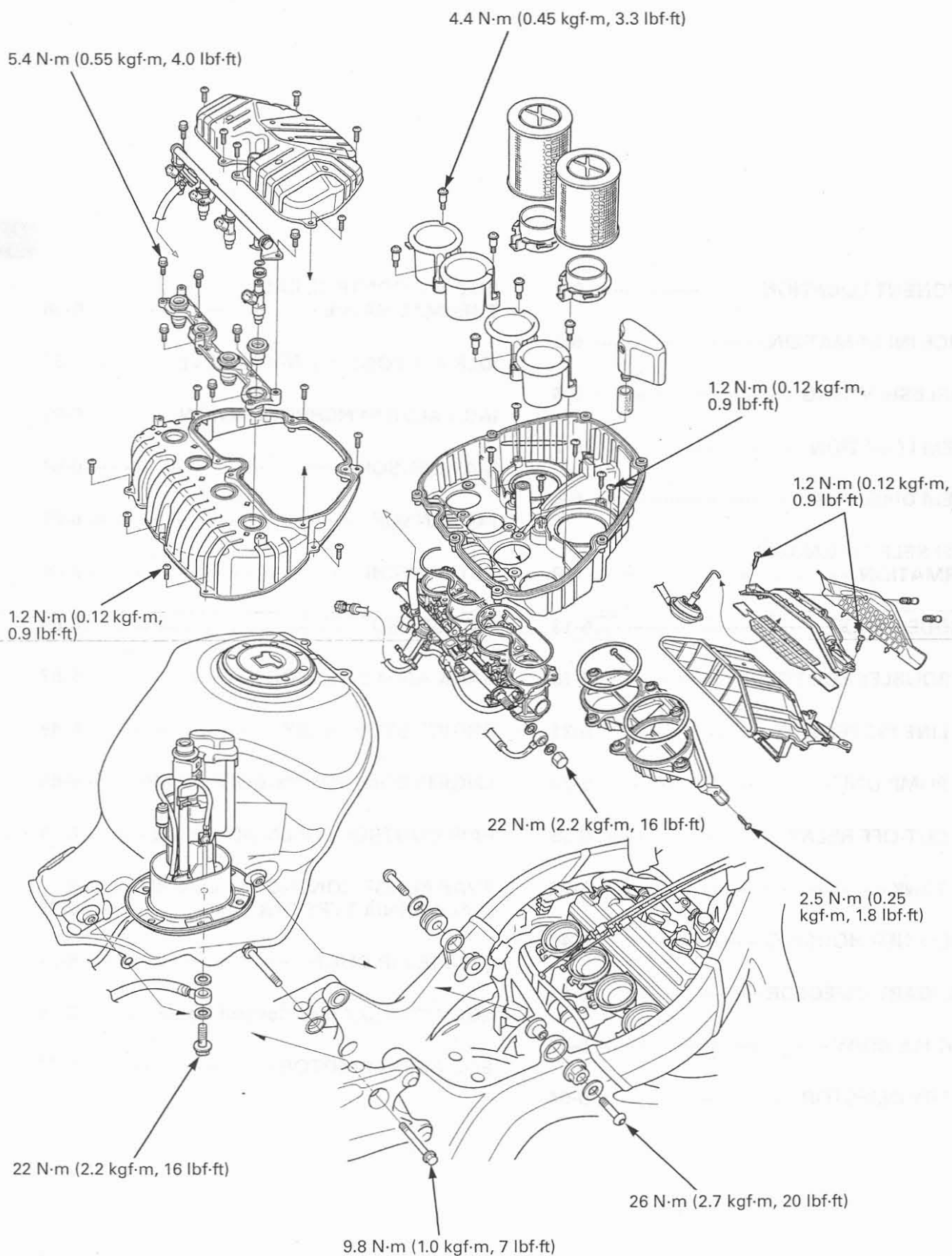
## 6. FUEL SYSTEM (Programmed Fuel Injection)

|  |      |   |      |
|--|------|---|------|
| COMPONENT LOCATION .....                   | 6-2  | IDLE AIR CONTROL (IAC)<br>THERMAL VALVE .....                     | 6-56 |
| SERVICE INFORMATION .....                  | 6-3  | IDLE AIR CONTROL (IAC) VALVE .....                                | 6-57 |
| TROUBLESHOOTING .....                      | 6-6  | IAC VALVE SYNCHRONIZATION .....                                   | 6-61 |
| SYSTEM LOCATION .....                      | 6-7  | MAP SENSOR .....  | 6-64 |
| SYSTEM DIAGRAM .....                       | 6-8  | IAT SENSOR .....  | 6-65 |
| PGM-FI SELF-DIAGNOSIS<br>INFORMATION ..... | 6-9  | ECT SENSOR .....  | 6-65 |
| MIL CODE INDEX .....                       | 6-13 | CMP SENSOR .....  | 6-66 |
| MIL TROUBLESHOOTING .....                  | 6-15 | BANK ANGLE SENSOR .....   | 6-67 |
| FUEL LINE INSPECTION .....                 | 6-31 | ENGINE STOP RELAY .....   | 6-68 |
| FUEL PUMP UNIT .....                       | 6-33 | ENGINE CONTROL MODULE (ECM) .....                                 | 6-69 |
| FUEL CUT-OFF RELAY .....                   | 6-35 | PAIR CONTROL SOLENOID VALVE .....                                 | 6-71 |
| FUEL TANK .....                            | 6-36 | EVAP PURGE CONTROL SOLENOID VALVE<br>(CALIFORNIA TYPE ONLY) ..... | 6-72 |
| AIR CLEANER HOUSING .....                  | 6-40 | INTAKE AIR DUCT .....   | 6-73 |
| SECONDARY INJECTOR .....                   | 6-43 | EGCV (Exhaust Gas Control Valve) .....                            | 6-76 |
| THROTTLE BODY .....                        | 6-47 | EGCV SERVOMOTOR .....   | 6-78 |
| PRIMARY INJECTOR .....                     | 6-54 |   |      |



## FUEL SYSTEM (Programmed Fuel Injection)

### COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- Be sure to relieve the fuel pressure while the engine is OFF.
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel pipe on the throttle body while removing or installing the throttle body.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- Prevent dirt and debris from entering the throttle bore, fuel hose and return hose, clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not push the fuel pump base under the fuel tank when the fuel tank is stored.
- Always replace the packing when the fuel pump is removed.
- The programmed fuel injection (PGM-FI) system is equipped with a Self-Diagnostic System, described page 6-9. If the malfunction indicator lamp (MIL) blinks, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI, always follow the steps in the troubleshooting flow chart (page 6-15).
- The PGM-FI system is provided with fail-safe function to secure a minimum running capability when there is any trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is secured by using numerical values preset in advance in the program map. It must be remembered, however, that when any abnormality is detected in 8 injectors and/or the CKP (Crankshaft Position) sensor and CMP (Camshaft Position) sensor, the fail safe function stops the engine to protect it from damage.
- Refer to PGM-FI system location (page 6-7).
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- Refer to procedures for fuel reserve sensor inspection (page 20-17).
- The vehicle speed sensor sends a digital pulse signal to the ECM (PGM-FI unit) for computation. Refer to procedures for vehicle speed sensor inspection (page 20-12).
- When disassembling the programmed fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Before disconnecting the fuel hose, release the fuel pressure by loosening the fuel hose banjo bolt at the fuel tank.
- Always replace the sealing washers when the fuel hose banjo bolt is removed or loosened.
- Use a digital test meter for PGM-FI system inspection.

### SPECIFICATIONS

| ITEM   |                    | SPECIFICATIONS   |
|--|--------------------|--|
| Throttle body identification number                          | A, CM type         | GQA0C  |
|  | AC type            | GQA0B  |
| Idle air control (IAC) valve vacuum difference               |                    | 20 mmHg  |
| Base throttle valve for synchronization                      |                    | No. 1  |
| Idle speed   |                    | 1,200 ± 100 rpm  |
| Throttle grip free play                                      |                    | 2 – 4 mm (1/16 – 3/16 in)                                      |
| Intake air temperature sensor resistance (at 20°C/68°F)      |                    | 1 – 4 kΩ   |
| Engine coolant temperature sensor resistance (at 20°C/68°F)  |                    | 2.3 – 2.6 kΩ   |
| Fuel injection resistance (at 20°C /68°F)                    | Primary injector   | 10.5 – 14.5 Ω  |
|  | Secondary injector | 10.5 – 14.5 Ω  |
| PAIR control solenoid valve resistance (at 20°C/68°F)        |                    | 20 – 24 Ω  |
| CMP (Camshaft position) sensor peak voltage (at 20°C/68°F)   |                    | 0.7 V minimum  |
| CKP (Crankshaft position) sensor peak voltage (at 20°C/68°F) |                    | 0.7 V minimum  |
| Manifold absolute pressure at idle                           |                    | 150 – 250 mmHg   |
| Fuel pressure at idle  |                    | 343 kPa (3.5 kgf/cm <sup>2</sup> , 50 psi)                     |
| Fuel pump flow (at 12V)                                      |                    | 189 cm <sup>3</sup> (6.4 US oz, 6.7 Imp oz) minimum/10 seconds |

## FUEL SYSTEM (Programmed Fuel Injection)

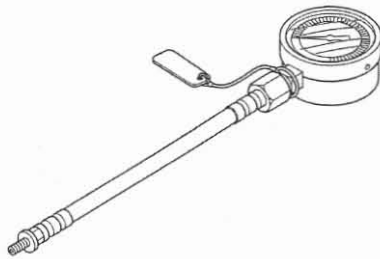
### TORQUE VALUES

|  |                                  |                                       |
|--|----------------------------------|---------------------------------------|
| ECT (Engine Coolant Temperature)/thermo sensor | 23 N·m (2.3 kgf·m, 17 lbf·ft)    |                                       |
| Throttle body insulator band screw             | See page 1-15                    |                                       |
| Service check bolt                             | 12 N·m (1.2 kgf·m, 9 lbf·ft)     |                                       |
| IAC valve lock nut                             | 1.8 N·m (0.18 kgf·m, 1.3 lbf·ft) |                                       |
| IAC valve synchronization plate screw          | 0.9 N·m (0.09 kgf·m, 0.7 lbf·ft) |                                       |
| Fuel pipe mounting bolt                        | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |                                       |
| IAC thermal valve link plate screw             | 0.9 N·m (0.09 kgf·m, 0.7 lbf·ft) |                                       |
| IAC thermal valve mounting screw               | 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)  |                                       |
| Fuel filler cap socket bolt                    | 1.8 N·m (0.18 kgf·m, 1.3 lbf·ft) |                                       |
| Fuel feed hose banjo bolt (fuel tank side)     | 22 N·m (2.2 kgf·m, 16 lbf·ft)    | Yellow paint                          |
| Fuel hose sealing nut (throttle body side)     | 22 N·m (2.2 kgf·m, 16 lbf·ft)    |                                       |
| Fuel pump flange nut                           | 12 N·m (1.2 kgf·m, 9 lbf·ft)     | See page 1-17 for tightening sequence |
| Fuel tank mounting bolt (front)                | 26 N·m (2.7 kgf·m, 20 lbf·ft)    |                                       |
| Fuel tank mounting bolt (rear)                 | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |                                       |
| Fuel rail joint hose SH bolt                   | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    | Yellow paint                          |
| Fuel rail joint hose sealing nut               | 22 N·m (2.2 kgf·m, 16 lbf·ft)    | Yellow paint                          |
| Air cleaner housing/air funnel pan screw       | 4.4 N·m (0.45 kgf·m, 3.3 lbf·ft) |                                       |
| Top air cleaner housing mounting screw         | 1.2 N·m (0.12 kgf·m, 0.9 lbf·ft) |                                       |
| Middle air cleaner housing mounting screw      | 1.2 N·m (0.12 kgf·m, 0.9 lbf·ft) |                                       |
| IAT sensor mounting screw                      | 1.2 N·m (0.12 kgf·m, 0.9 lbf·ft) |                                       |
| Air intake duct joint screw                    | 2.5 N·m (0.25 kgf·m, 1.8 lbf·ft) |                                       |
| Air intake duct flap screw                     | 1.2 N·m (0.12 kgf·m, 0.9 lbf·ft) |                                       |
| Secondary injector base mounting bolt          | 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft) |                                       |
| Bank angle sensor mounting screw               | 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft) |                                       |

## FUEL SYSTEM (Programmed Fuel Injection)

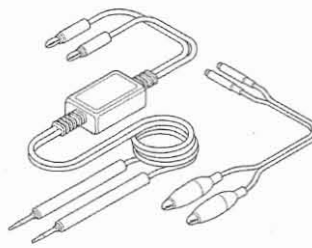
### TOOLS

Fuel pressure gauge  
07406-0040003



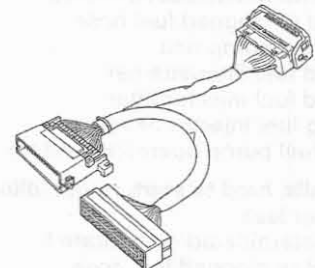
or 07406-004000B  
or 07406-004000A  
(U.S.A. only)

Peak voltage adaptor  
07HGJ-0020100



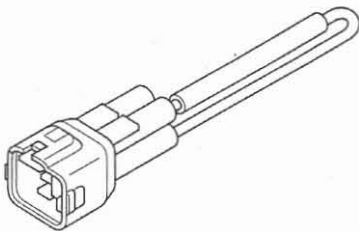
(not available in U.S.A.)  
with commercially available digital  
multimeter (impedance 10 M $\Omega$ /DCV  
minimum)

ECM test harness, 32P  
070MZ-0010201

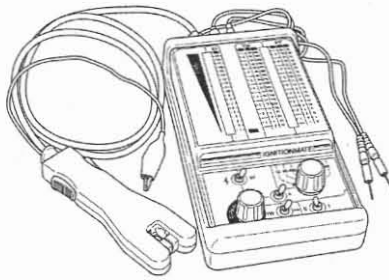


(two required)

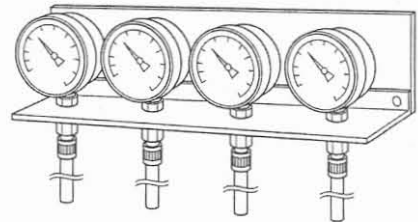
SCS service connector  
070PZ-ZY30100



IgnitionMate peak voltage tester  
MTP07-0286 (U.S.A. only)

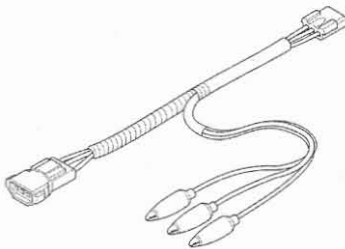


Vacuum gauge set  
07LMJ-001000B



or 07LMJ-001000A

Inspection adaptor  
07GMJ-ML80100



### **TROUBLESHOOTING**

#### **Engine won't start**

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Faulty fuel pump unit
- Clogged fuel filter/strainer
- Clogged fuel injector filter
- Sticking fuel injector needle
- Faulty fuel pump operating system

#### **Engine stalls, hard to start, rough idling**

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed misadjusted
- IAC valve synchronization misadjusted

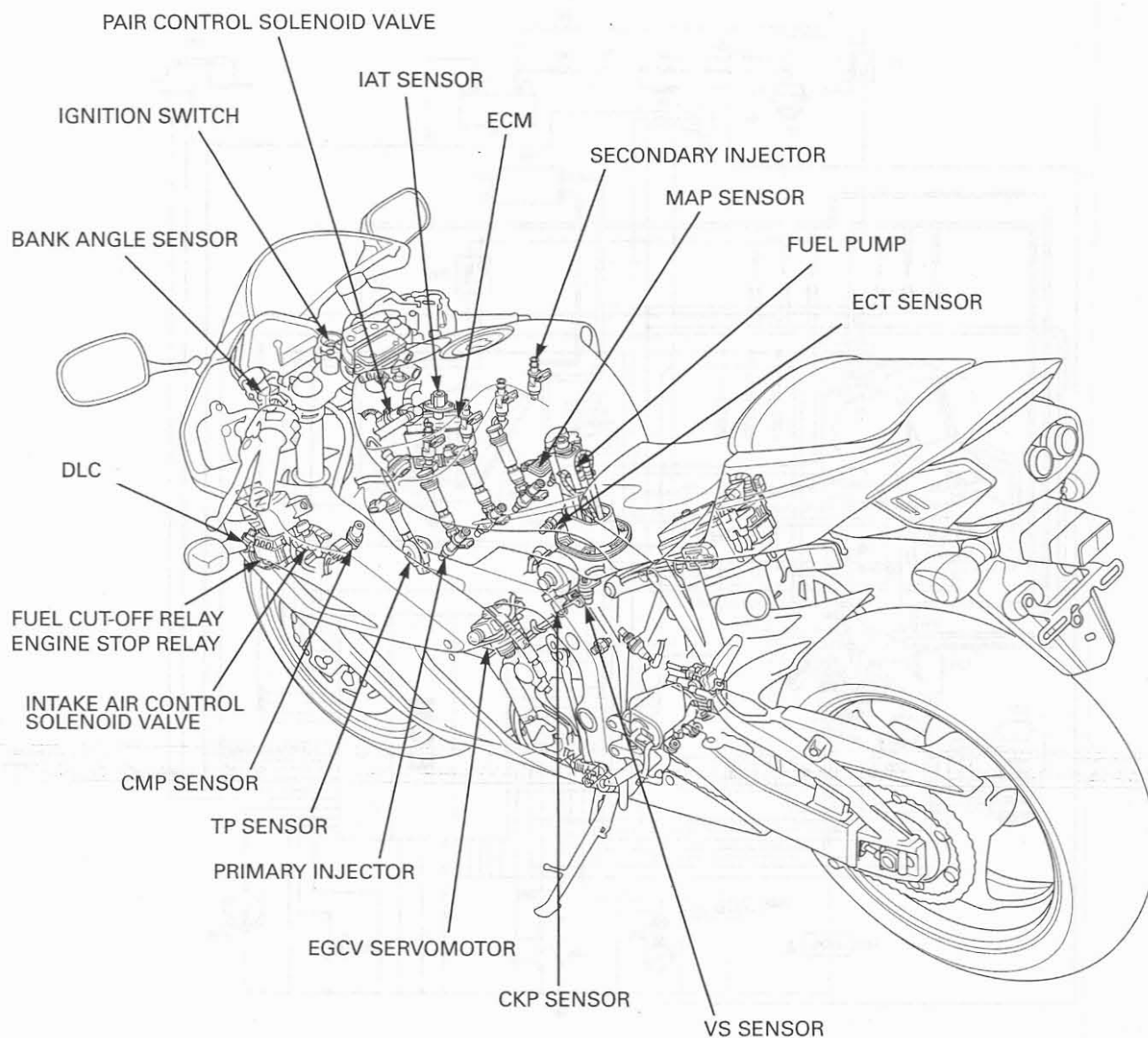
#### **Backfiring or misfiring during acceleration**

- Ignition system malfunction

#### **Poor performance (drive ability) and poor fuel economy**

- Pinched or clogged fuel hose
- Faulty pressure regulator

# SYSTEM LOCATION

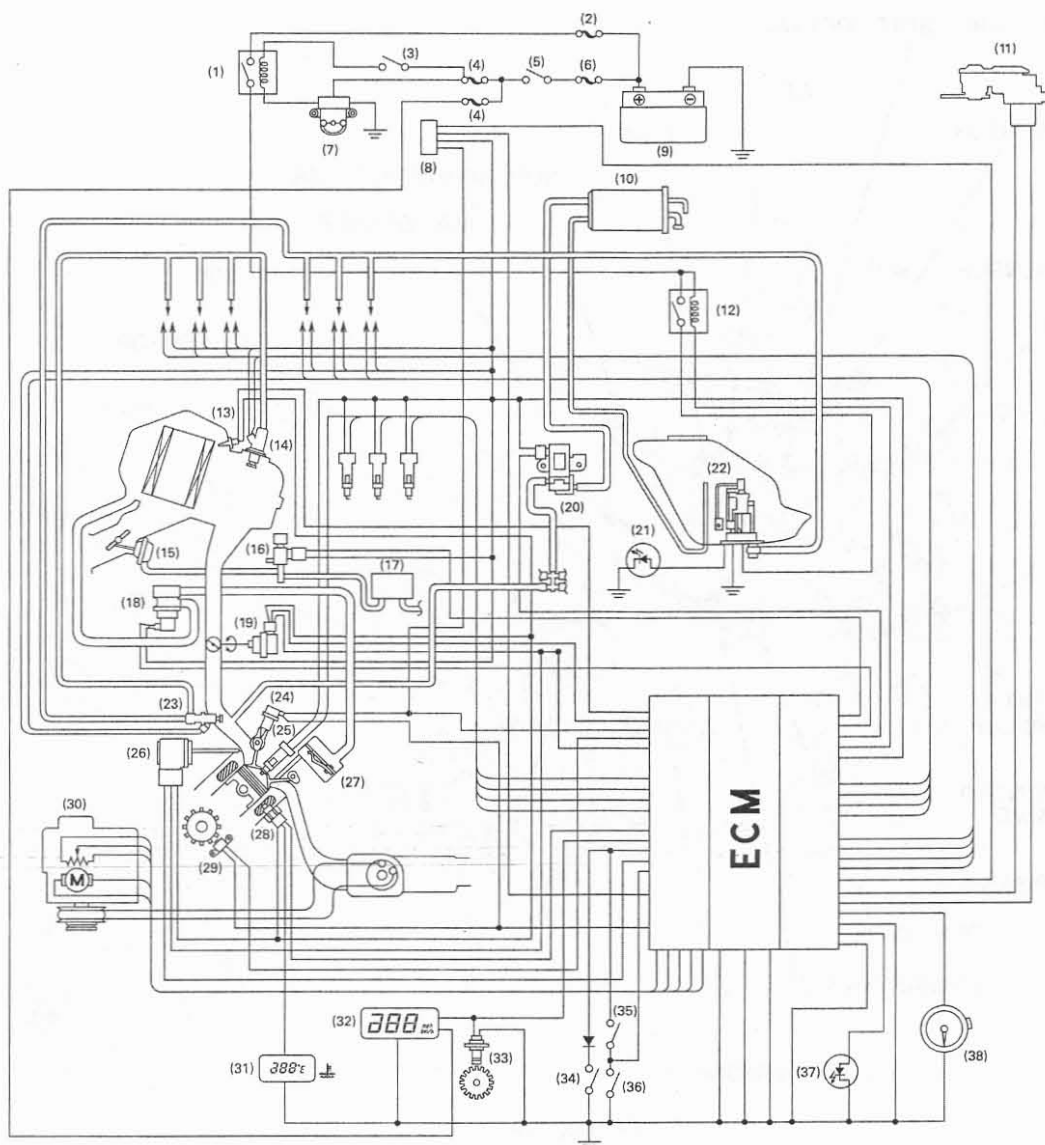


| FULL NAME                         | ABBREVIATIONS |
|-----------------------------------|---------------|
| Manifold absolute pressure sensor | MAP sensor    |
| Throttle position sensor          | TP sensor     |
| Intake air temperature sensor     | IAT sensor    |
| Engine coolant temperature sensor | ECT sensor    |
| Camshaft position sensor          | CMP sensor    |
| Crankshaft position sensor        | CKP sensor    |
| Vehicle speed sensor              | VS sensor     |
| Engine control module             | ECM           |



## FUEL SYSTEM (Programmed Fuel Injection)

### SYSTEM DIAGRAM



- |  |  |
|--|--|
| (1) Engine stop relay                        | (20) EVAP purge control solenoid valve |
| (2) PGM-FI fuse (20A)                        | (21) Fuel indicator                    |
| (3) Engine stop switch                       | (22) Fuel pump unit                    |
| (4) Sub-fuse (10A)                           | (23) Primary injector                  |
| (5) Ignition switch                          | (24) CMP (camshaft position) sensor    |
| (6) Main fuse A (30A)                        | (25) Direct ignition coil/spark plug   |
| (7) Bank angle sensor                        | (26) MAP sensor                        |
| (8) DLC (data link connector)                | (27) PAIR check valve                  |
| (9) Battery                                  | (28) ECT sensor                        |
| (10) EVAP canister                           | (29) CKP (crankshaft position) sensor  |
| (11) HESD (Honda Electronic Steering Damper) | (30) EGCV servomotor                   |
| (12) Fuel cut-off relay                      | (31) Water temperature LCD             |
| (13) IAT sensor                              | (32) Speedometer                       |
| (14) Secondary injector                      | (33) VS (vehicle speed) sensor         |
| (15) Intake duct diaphragm                   | (34) Neutral switch                    |
| (16) Intake air control solenoid valve       | (35) Clutch switch                     |
| (17) Vacuum chamber                          | (36) Side stand switch                 |
| (18) PAIR control solenoid valve             | (37) Malfunction indicator lamp (MIL)  |
| (19) TP sensor                               | (38) Tachometer                        |

# PGM-FI SELF-DIAGNOSIS INFORMATION

## SELF-DIAGNOSTIC PROCEDURE

Place the motorcycle on its side stand.

Start the engine and let it idle.

### NOTE:

If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blinks.

If the malfunction indicator lamp (MIL) does not light or blink, the system has no memory of problem data.

If the malfunction indicator blinks, note how many times the MIL blinks and determine the cause of the problem (page 6-13).

If you wish to read the PGM-FI memory for trouble data, perform the following:

*The MIL will blink only with the side stand down and with the engine off (engine stop switch is RUN) or engine revs are below 5,000 rpm. In any other condition, the MIL will illuminate and stay on.*

Turn the ignition switch OFF.

Remove the left middle cowl (page 3-7).

Disconnect the Data Link Connector (DLC).

Turn the ignition switch OFF.

Remove the left middle cowl (page 3-7).

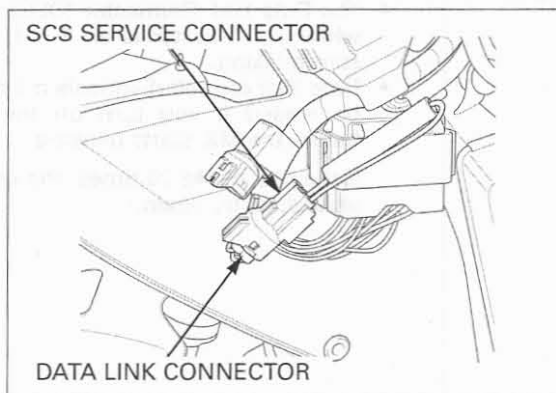
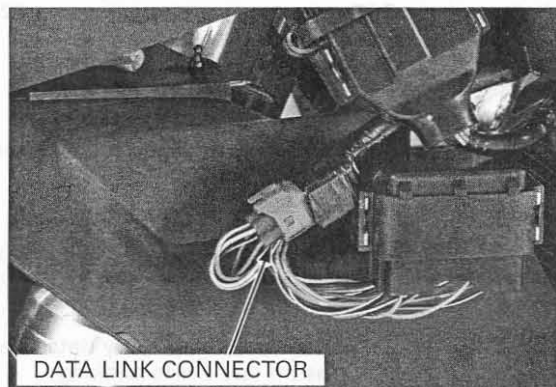
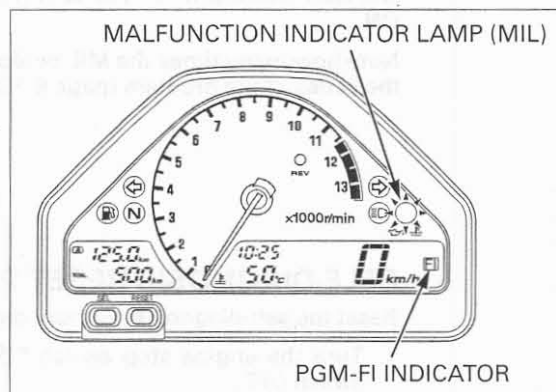
Short the Data Link Connector (DLC) terminals using the special tool.

### TOOL:

**SCS service connector** 070PZ-ZY30100

**Connection: Brown – Green**

Turn the ignition switch ON and engine stop switch "Q".



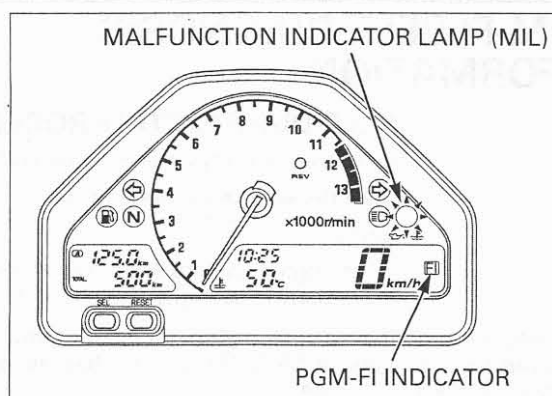
## FUEL SYSTEM (Programmed Fuel Injection)

*Even if the PGM-FI has memory data, the MIL does not blink when the engine is running.*

If the ECM has no self diagnosis memory data, the MIL will illuminate, when you turn the ignition switch ON.

If the ECM has self diagnosis memory data, the MIL will start blinking when you turn the ignition switch ON.

Note how many times the MIL blinks, and determine the cause of the problem (page 6-13).



### SELF-DIAGNOSIS RESET PROCEDURE

Reset the self-diagnosis memory data as follows;

1. Turn the engine stop switch "⊗" and ignition switch OFF.
2. Short the Data Link Connector (DLC) terminals using a special tool.

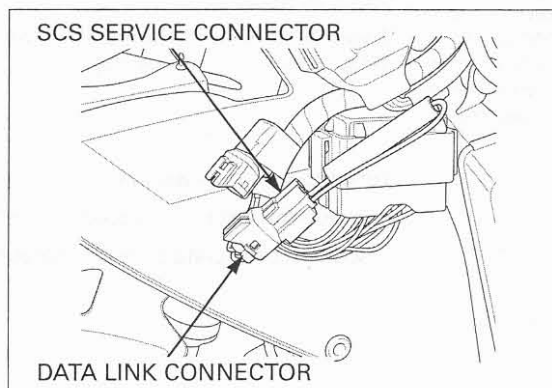
#### TOOL:

SCS service connector

070PZ-ZY30100

Connection: Brown – Green

3. Turn the ignition switch ON.
4. Remove the special tool from the Data Link Connector (DLC).

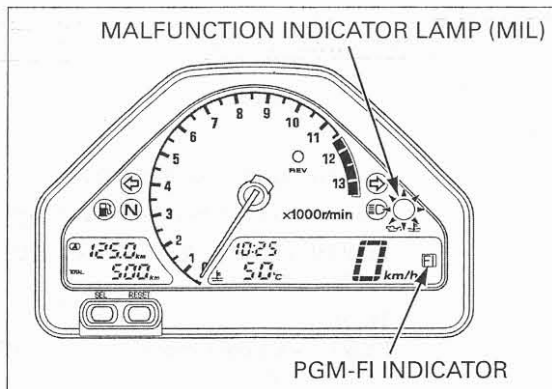


5. The MIL lights about 5 seconds. While the indicator lights, short the Data Link Connector (DLC) again with the special tool.

Self-diagnosis memory data is erased, if the MIL turns off and starts blinking.

- The Data Link Connector (DLC) must be jumped while the indicator is lit. If not, the MIL will not start blinking.
- Note that the self diagnosis memory data cannot be erased if you turn off the ignition switch before the MIL starts blinking.

If the MIL blinks 20 times, the data has not been erased, so try again.

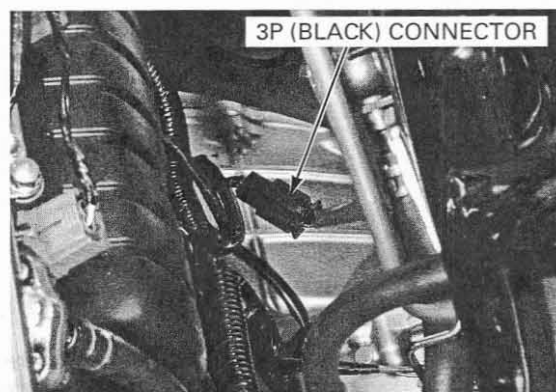


## PEAK VOLTAGE INSPECTION PROCEDURE

- Use this procedure for the crankshaft position sensor and camshaft position sensor inspection.
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that all spark plugs are installed correctly.
- Use the recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M $\Omega$ /DCV minimum.
- If the IgnitionMate peak voltage tester is used, follow the manufacturer's instruction.
- The display value differs depending upon the internal impedance of the multimeter.
- Disconnect the fuel pump connector before checking the peak voltage.

Lift and support the fuel tank (page 4-5).

Disconnect the fuel pump unit 3P (Black) connector.



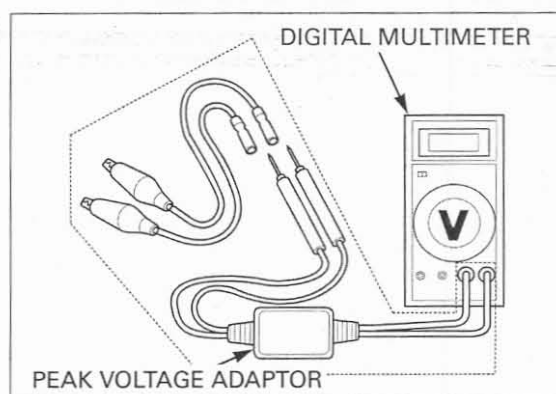
Connect the peak voltage adaptor to the digital multimeter.

### TOOLS:

IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) or 07HGJ-0020100 (not available in U.S.A.)

Peak voltage adaptor

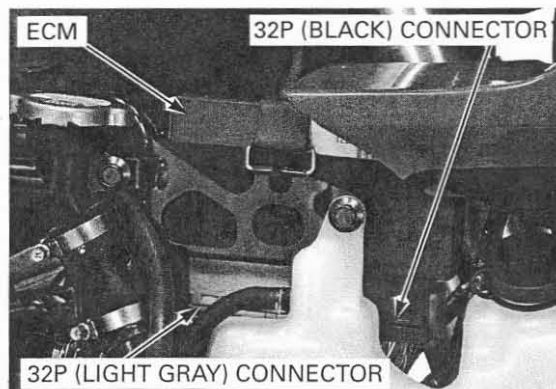
with commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)



## TEST HARNESS CONNECTION

Remove the under cowl/middle cowl (page 3-7).

Disconnect the ECM 32P (Black) and 32P (Light gray) connectors from the ECM (page 6-69).



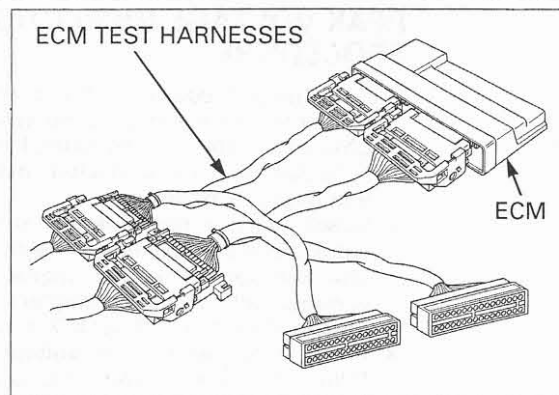
## FUEL SYSTEM (Programmed Fuel Injection)

Connect the ECM test harnesses between the main wire harness and the ECM.

**TOOLS:**

ECM test harness, 32P

070MZ-0010201  
(two required)

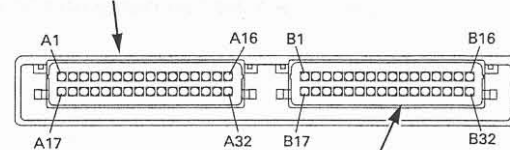


## TEST HARNESS TERMINAL LAYOUT

The ECM connector terminals are numbered as shown.

**VIEW FROM WIRE HARNESS SIDE:**

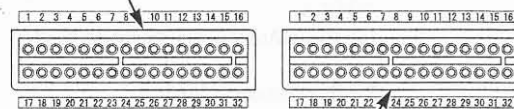
A: 32P (BLACK) CONNECTOR



B: 32P (LIGHT GRAY) CONNECTOR

The ECM test harness terminals are the same layout as for the ECM connector terminals as shown.

FOR 32P (BLACK) CONNECTOR



FOR 32P (LIGHT GRAY) CONNECTOR

## MIL CODE INDEX

- The PGM-FI MIL denotes the failure codes (the number of blinks from 0 to 49). When the indicator lights for 1.3 seconds, it is equivalent to ten blinks. For example, a 1.3 second illumination and two blinks (0.5 second x 2) of the indicator equals 12 blinks. Follow code 12 troubleshooting (page 6-24).
- When more than one failure occurs, the MIL shows the blinks in the order of lowest number to highest number. For example if the indicator blinks once, then two times, two failures have occurred. Follow codes 1 (page 6-15) and 2 (page 6-16) troubleshooting.

| MIL       | Function Failure                              | Causes   | Symptoms  | Refer to |
|-----------|---|--|---|----------|
| No blinks | ECM malfunction                               | <ul style="list-style-type: none"> <li>• Faulty ECM</li> </ul>   | <ul style="list-style-type: none"> <li>• Engine does not start</li> </ul>   | 6-69     |
| No blinks | ECM power/ground circuits malfunction         | <ul style="list-style-type: none"> <li>• Open circuit at the power input wire of the ECM</li> <li>• Faulty bank angle sensor</li> <li>• Open circuit in bank angle sensor related circuit</li> <li>• Faulty engine stop relay</li> <li>• Open circuit in engine stop relay related wires</li> <li>• Faulty engine stop switch</li> <li>• Open circuit in engine stop switch related wires</li> <li>• Faulty ignition switch</li> <li>• Blown PGM-FI fuse (20 A)</li> <li>• Blown sub-fuse (10 A) (Starter, Bank angle sensor)</li> </ul> | <ul style="list-style-type: none"> <li>• Engine does not start</li> </ul>   | 6-69     |
| No blinks | ECM output line malfunction                   | <ul style="list-style-type: none"> <li>• ECM output voltage line (Yellow/Red wire) short circuit</li> </ul>  | <ul style="list-style-type: none"> <li>• Engine does not start</li> </ul>   | —        |
| No blinks | MIL circuit malfunction                       | <ul style="list-style-type: none"> <li>• Faulty ECM</li> <li>• Open or short circuit in MIL wire</li> </ul>  | <ul style="list-style-type: none"> <li>• Engine operates normally</li> </ul>  | 6-9      |
| Stays lit | Data link circuit malfunction                 | <ul style="list-style-type: none"> <li>• Short circuit in data link connector</li> <li>• Faulty ECM</li> <li>• Short circuit in data link connector wire</li> </ul>  | <ul style="list-style-type: none"> <li>• Engine operates normally</li> </ul>  | —        |
| 1 Blink   | MAP sensor circuit malfunction                | <ul style="list-style-type: none"> <li>• Loose or poor contact on MAP sensor connector</li> <li>• Open or short circuit in MAP sensor wire</li> <li>• Faulty MAP sensor</li> </ul>   | <ul style="list-style-type: none"> <li>• Engine operates normally</li> </ul>  | 6-15     |
| 2 Blinks  | MAP sensor performance problem                | <ul style="list-style-type: none"> <li>• Loose or poor connection of the MAP sensor vacuum hose</li> <li>• Faulty MAP sensor</li> </ul>  | <ul style="list-style-type: none"> <li>• Engine operates normally</li> </ul>  | 6-16     |
| 7 Blinks  | ECT sensor circuit malfunction                | <ul style="list-style-type: none"> <li>• Loose or poor contact on ECT sensor</li> <li>• Open or short circuit in ECT sensor wire</li> <li>• Faulty ECT sensor</li> </ul>   | <ul style="list-style-type: none"> <li>• Hard start at a low temperature (Simulate using numerical values; 90 °C/ 194 °F)</li> </ul>  | 6-17     |
| 8 Blinks  | TP sensor circuit malfunction                 | <ul style="list-style-type: none"> <li>• Loose or poor contact on TP sensor connector</li> <li>• Open or short circuit in TP sensor wire</li> <li>• Faulty TP sensor</li> </ul>  | <ul style="list-style-type: none"> <li>• Poor engine performance response and when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°)</li> </ul> | 6-19     |
| 9 Blinks  | IAT sensor circuit malfunction                | <ul style="list-style-type: none"> <li>• Loose or poor contact on IAT sensor</li> <li>• Open or short circuit in IAT sensor wire</li> <li>• Faulty IAT sensor</li> </ul>   | <ul style="list-style-type: none"> <li>• Engine operates normally (Simulate using numerical values; 25 °C/ 77 °F)</li> </ul>  | 6-21     |
| 11 Blinks | VS (Vehicle speed) sensor circuit malfunction | <ul style="list-style-type: none"> <li>• Loose or poor contact on VS sensor connector</li> <li>• Open or short circuit in VS sensor wire</li> <li>• Faulty VS sensor</li> </ul>  | <ul style="list-style-type: none"> <li>• Engine operates normally</li> <li>• HESD does not function</li> </ul>  | 6-22     |



## FUEL SYSTEM (Programmed Fuel Injection)

| MIL       | Function Failure                            | Causes  | Symptoms   | Refer to |
|-----------|---|---|--|----------|
| 12 Blinks | No.1 primary injector circuit malfunction   | <ul style="list-style-type: none"> <li>Loose or poor contact on No.1 primary injector connector</li> <li>Open or short circuit in No.1 primary injector wire</li> <li>Faulty No.1 primary injector</li> </ul>       | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-24     |
| 13 Blinks | No.2 primary injector circuit malfunction   | <ul style="list-style-type: none"> <li>Loose or poor contact on No.2 primary injector connector</li> <li>Open or short circuit in No.2 primary injector wire</li> <li>Faulty No.2 primary injector</li> </ul>       | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-25     |
| 14 Blinks | No.3 primary injector circuit malfunction   | <ul style="list-style-type: none"> <li>Loose or poor contact on No.3 primary injector connector</li> <li>Open or short circuit in No.3 primary injector wire</li> <li>Faulty No.3 primary injector</li> </ul>       | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-25     |
| 15 Blinks | No.4 primary injector circuit malfunction   | <ul style="list-style-type: none"> <li>Loose or poor contact on No.4 primary injector connector</li> <li>Open or short circuit in No.4 primary injector wire</li> <li>Faulty No.4 primary injector</li> </ul>       | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-25     |
| 16 Blinks | No.1 secondary injector circuit malfunction | <ul style="list-style-type: none"> <li>Loose or poor contact on No.1 secondary injector connector</li> <li>Open or short circuit in No.1 secondary injector wire</li> <li>Faulty No.1 secondary injector</li> </ul> | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-25     |
| 17 Blinks | No.2 secondary injector circuit malfunction | <ul style="list-style-type: none"> <li>Loose or poor contact on No.2 secondary injector connector</li> <li>Open or short circuit in No.2 secondary injector wire</li> <li>Faulty No.2 secondary injector</li> </ul> | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-25     |
| 18 Blinks | CMP (Camshaft position) sensor, no signal   | <ul style="list-style-type: none"> <li>Loose or poor contact on CMP sensor</li> <li>Open or short circuit in CMP sensor</li> <li>Faulty camshaft position sensor</li> </ul>   | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-26     |
| 19 Blinks | CKP (Crankshaft position) sensor, no signal | <ul style="list-style-type: none"> <li>Loose or poor contact on CKP sensor</li> <li>Open or short circuit in CKP sensor</li> <li>Faulty crankshaft position sensor</li> </ul>                                       | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-27     |
| 33 Blinks | EEPROM in ECM malfunction                   | <ul style="list-style-type: none"> <li>Faulty ECM</li> </ul>  | <ul style="list-style-type: none"> <li>Engine operates normally</li> </ul>                                 | 6-28     |
| 34 Blinks | EGCV POT (potentiometer) malfunction        | <ul style="list-style-type: none"> <li>Faulty EGCV servomotor POT</li> </ul>  | <ul style="list-style-type: none"> <li>Engine operates normally</li> </ul>                                 | 6-28     |
| 35 Blinks | EGCV servomotor malfunction                 | <ul style="list-style-type: none"> <li>EGCV servomotor lock</li> </ul>  | <ul style="list-style-type: none"> <li>Engine operates normally</li> </ul>                                 | 6-30     |
| 48 Blinks | No.3 secondary injector circuit malfunction | <ul style="list-style-type: none"> <li>Loose or poor contact on No.3 secondary injector connector</li> <li>Open or short circuit in No.3 secondary injector wire</li> <li>Faulty No.3 secondary injector</li> </ul> | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-25     |
| 49 Blinks | No.4 secondary injector circuit malfunction | <ul style="list-style-type: none"> <li>Loose or poor contact on No.4 secondary injector connector</li> <li>Open or short circuit in No.4 secondary injector wire</li> <li>Faulty No.4 secondary injector</li> </ul> | <ul style="list-style-type: none"> <li>Engine does not start</li> </ul>                                    | 6-25     |
| 51 Blinks | HESD linear solenoid malfunction            | <ul style="list-style-type: none"> <li>Loose or poor contact on HESD solenoid connector</li> <li>Open or short circuit in HESD solenoid wire</li> <li>Faulty HESD solenoid</li> </ul>                               | <ul style="list-style-type: none"> <li>Engine operates normally</li> <li>HESD does not function</li> </ul> | 14-7     |

# MIL TROUBLESHOOTING

## MIL 1 BLINK (MAP SENSOR)

- Before starting the inspection, check for loose or poor contact on the MAP sensor 3P (Black) connector and recheck the MIL blinking.

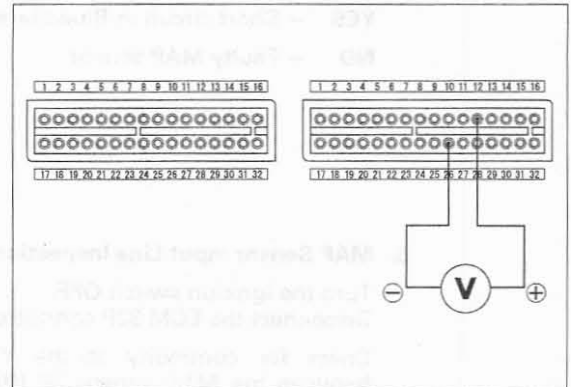
### 1. MAP Sensor Output Voltage Inspection

Turn the ignition switch OFF.  
Connect the ECM test harness to ECM connectors (page 6-11).  
Turn the ignition switch ON and engine stop switch "Q".  
Measure the voltage at the test harness terminals.

Connection: B12 (+) – B26 (–)

Is the voltage within 2.7 – 3.1V?

- YES –
- Intermittent failure
  - Loose or poor contact on the ECM connectors
- NO –
- About 5 V  
GO TO STEP 2.
  - About 0 V  
GO TO STEP 3.



### 2. MAP Sensor Output Line Inspection

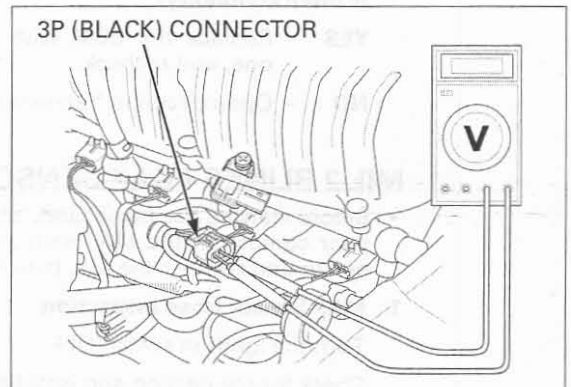
Turn the ignition switch OFF.  
Disconnect the MAP sensor 3P (Black) connector.

Turn the ignition switch ON and engine stop switch "Q".  
Measure the voltage at the wire harness side.

Connection: Blue/black (+) – Gray/black (–)

Is the voltage within 4.75 – 5.25V?

- YES – Faulty MAP sensor
- NO –
- Open circuit in Blue/black wire
  - Open circuit in Gray/black wire



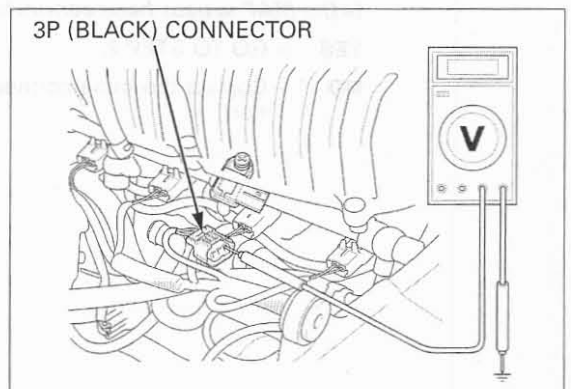
### 3. MAP Sensor Input Voltage Inspection

Measure the voltage at the wire harness side.

Connection: Yellow/red (+) – Ground (–)

Is the voltage within 4.75 – 5.25V?

- YES – GO TO STEP 4.
- NO – GO TO STEP 5.



## FUEL SYSTEM (Programmed Fuel Injection)

### 4. MAP Sensor Output Line Short Circuit Inspection

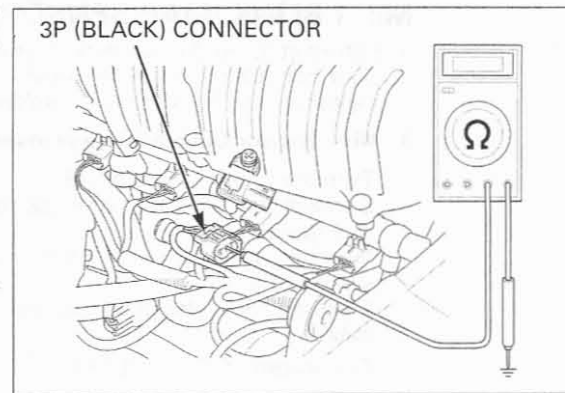
Check for continuity between the MAP sensor 3P (Black) connector terminal of the wire harness side and ground.

**Connection: Blue/black – ground**

*Is there continuity?*

**YES** – Short circuit in Blue/black wire

**NO** – Faulty MAP sensor



### 5. MAP Sensor Input Line Inspection

Turn the ignition switch OFF.  
Disconnect the ECM 32P connectors.

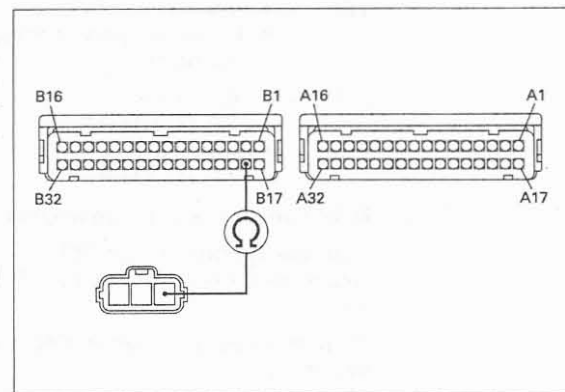
Check for continuity at the Yellow/red wire between the MAP sensor 3P (Black) connector terminal and the ECM 32P (Light gray) connector.

**Connection: B18 – Yellow/red**

*Is there continuity?*

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Open circuit in Yellow/red wire



## MIL 2 BLINKS (MAP SENSOR)

- Before starting the inspection, check for loose or poor contact on the MAP sensor 3P (Black) connector and recheck the MIL blinking.

### 1. MAP Sensor Hose Inspection

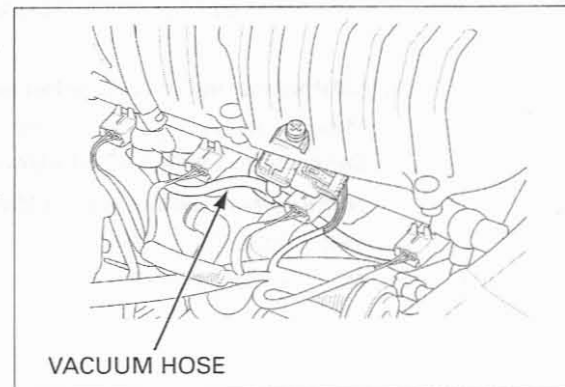
Turn the ignition switch OFF

Check for connection and installation of the MAP sensor vacuum hose.

*Is the MAP sensor hose connection correct?*

**YES** – GO TO STEP 2.

**NO** – Correct the hose connection or installation



## 2. MAP Sensor Output Voltage Inspection

Connect the ECM test harness to ECM connectors (page 6-11).

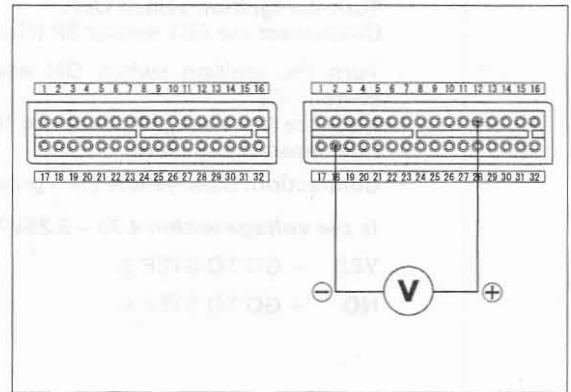
Turn the ignition switch ON and engine stop switch "Q".  
Measure the voltage at the test harness terminals.

**Connection:** B12 (+) –B18 (–)

**Is the voltage within 2.7 – 3.1 V?**

**YES** – GO TO STEP 3.

**No** – Faulty MAP sensor



## 3. MAP Sensor Output Voltage Inspection At Idle

Start the engine.

Measure the voltage at the test harness terminals.

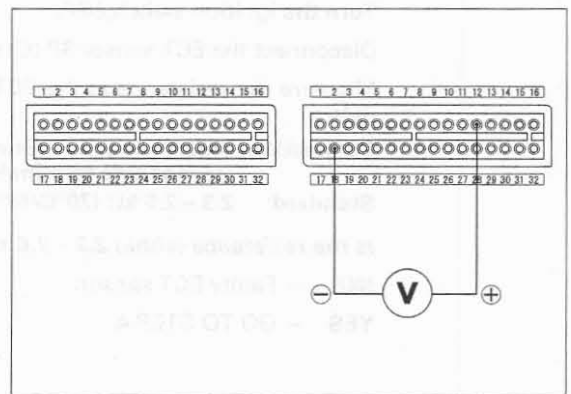
**Connection:** B12 (+) –B18 (–)

**Standard:** 2.7 V maximum

**Is the voltage less than 2.7 V?**

**YES** – Replace the ECM with a known good one, and recheck

**NO** – Faulty MAP sensor



## MIL 7 BLINKS (ECT SENSOR)

- Before starting the inspection, check for loose or poor contact on the ECT sensor 3P (Gray) connector and recheck the MIL blinking.

## 1. ECT Sensor Output Voltage Inspection

Turn the ignition switch OFF.

Connect ECM the test harness to ECM connectors (page 6-11).

Turn the ignition switch ON and engine stop switch "Q".  
Measure the voltage at the ECM test harness terminals.

**Connection:** B27 (+) –B26 (–)

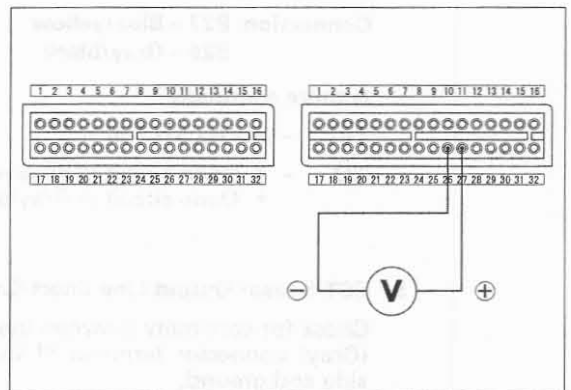
**Standard:** 2.7 – 3.1 V (20°C/68°F)

**Is the voltage within 2.7 – 3.1 V?**

**YES** – • Intermittent failure

- Loose or poor contact on the ECM connectors

**No** – GO TO STEP 2.



## FUEL SYSTEM (Programmed Fuel Injection)

### 2. ECT Sensor Input Voltage Inspection

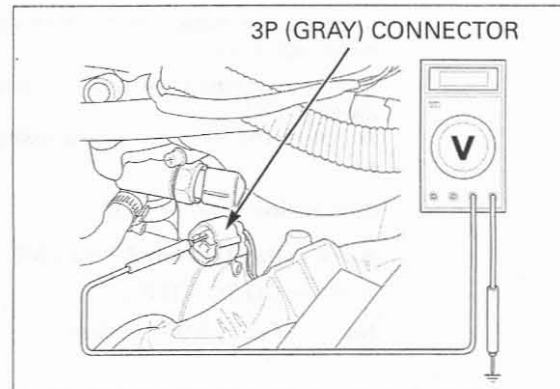
Turn the ignition switch OFF.  
Disconnect the ECT sensor 3P (Gray) connector.  
Turn the ignition switch ON and engine stop switch "O".  
Measure the voltage at the wire harness side of ECT sensor connector.

**Connection: Blue/yellow (+) – ground (-)**

**Is the voltage within 4.75 – 5.25V?**

**YES** – GO TO STEP 3.

**NO** – GO TO STEP 4.



### 3. ECT Sensor Resistance Inspection

Turn the ignition switch OFF.  
Disconnect the ECT sensor 3P (Gray) connector.  
Measure the resistance at the ECT sensor terminals.

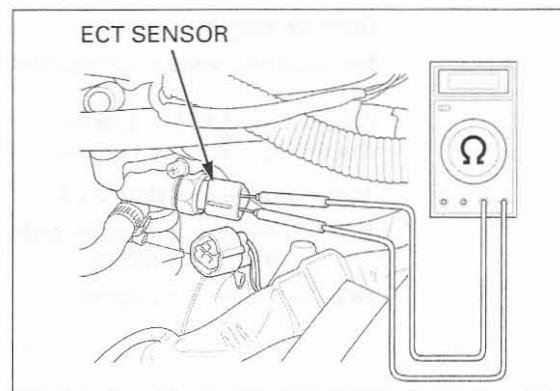
**Connection: Blue/yellow (+) – Gray/black (-)**  
(sensor side terminals)

**Standard: 2.3 – 2.6 k $\Omega$  (20°C/68°F)**

**Is the resistance within 2.3 – 2.6 k $\Omega$  (20°C/68°F)?**

**NO** – Faulty ECT sensor.

**YES** – GO TO STEP 4.



### 4. ECT Sensor Open Circuit Inspection

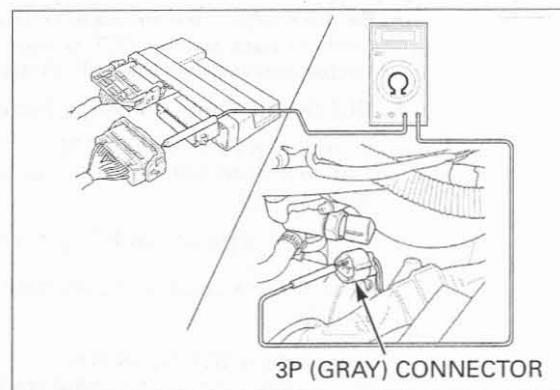
Turn the ignition switch OFF.  
Check for continuity at the Pink and Green/orange wires between the ECT sensor 3P (Gray) connector terminal and the ECM 32P (Light gray) connector terminal.

**Connection: B27 – Blue/yellow**  
**B26 – Gray/black**

**Is there continuity?**

**YES** – GO TO STEP 5.

**NO** –  
• Open circuit in Blue/yellow  
• Open circuit in Gray/black wire



### 5. ECT Sensor Output Line Short Circuit Inspection

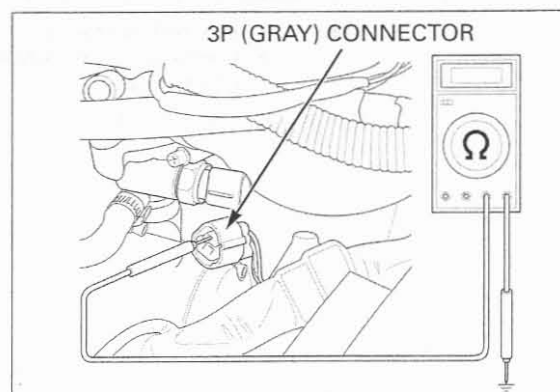
Check for continuity between the ECT sensor 3P (Gray) connector terminal of the wire harness side and ground.

**Connection: Blue/yellow – ground**

**Is there continuity?**

**YES** – Short circuit in Blue/yellow wire

**NO** – Replace the ECM with a known good one, and recheck



## MIL 8 BLINKS (TP SENSOR)

- Before starting the inspection, check for loose or poor contact on the TP sensor 3P (Black) connector and recheck the MIL blinking.

### 1. TP Sensor Output Voltage

Turn the ignition switch OFF.

Connect the ECM test harness to ECM connectors (page 6-11).

Turn the ignition switch ON and engine stop switch "Q".

Measure the TP sensor output voltage at the test harness terminals.

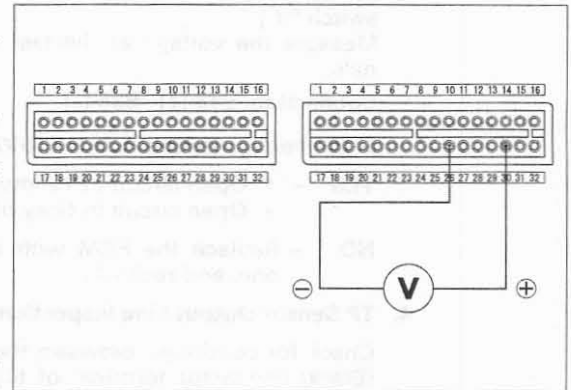
**Connection:** B30 (+) – B26 (–)

**Standard:** \*0.4 – 0.6 V (throttle fully closed)

\*4.2 – 4.8 V (throttle fully opened)

#### NOTE:

- A voltage marked \* refers to the value of the ECM output voltage (STEP 3) when the voltage reading shows 5 V.  
When the ECM output voltage reading shows other than 5 V, derive the TP sensor output voltage at the test harness as follows:  
In the case of the ECM output voltage is 4.75 V:  
 $0.4 \times 4.75/5.0 = 0.38 \text{ V}$   
 $0.6 \times 4.75/5.0 = 0.57 \text{ V}$   
Thus, the solution is "0.38 – 0.57 V" with the throttle fully closed.  
Replace 0.4 and 0.6 with 4.2 and 4.8 respectively, in the above equations to determine the throttle fully opened range.



#### Is there standard voltage?

- YES** –
- Intermittent failure
  - Loose or poor contact on the ECM connectors

**NO** – GO TO STEP 2.

### 2. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the TP sensor 3P (Black) connector.

Turn the ignition switch ON and engine stop switch "Q".

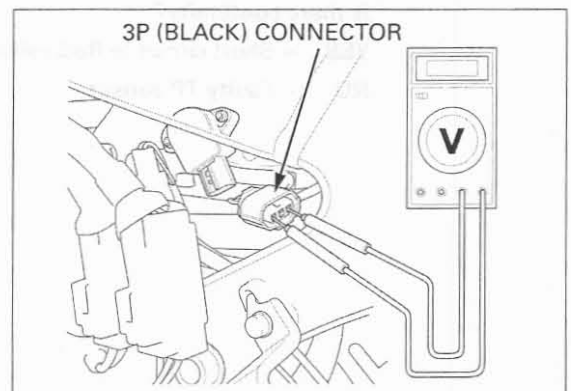
Measure the voltage at the wire harness side.

**Connection:** Yellow/red (+) – Gray/black (–)

#### Is the voltage within 4.75 – 5.25 V?

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.





## FUEL SYSTEM (Programmed Fuel Injection)

### 3. ECM Output Voltage Inspection

Turn the ignition switch OFF.  
Connect the ECM test harness to ECM connectors (page 6-11).

Turn the ignition switch ON and engine stop switch "Q".

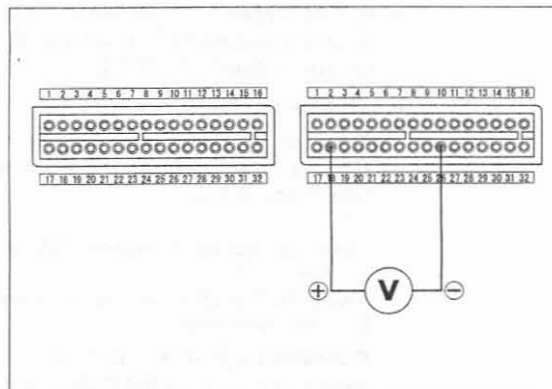
Measure the voltage at the test harness terminals.

**Connection: B18 (+) – B26 (–)**

**Is the voltage within 4.75 – 5.25V?**

**YES** – • Open circuit in Yellow/red wire  
• Open circuit in Gray/black wire

**NO** – Replace the ECM with a known good one, and recheck.



### 4. TP Sensor Output Line Inspection

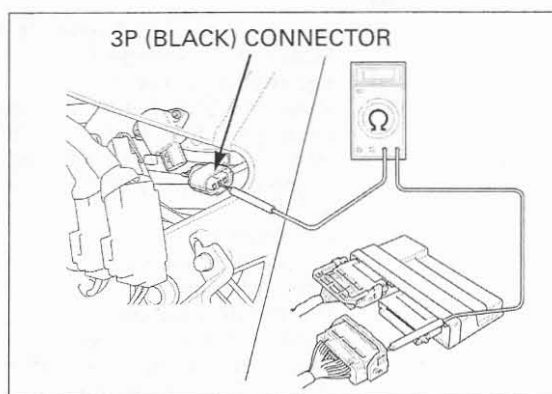
Check for continuity between the TP sensor 3P (Black) connector terminal of the wire harness side and ECM 32P (Light gray) connector.

**Connection: Red/yellow – B30**

**Is there continuity?**

**YES** – GO TO STEP 5.

**NO** – Open circuit in Red/yellow wire



### 5. TP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

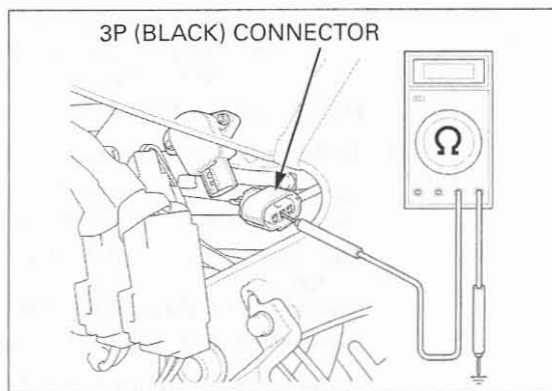
Check for continuity between the TP sensor 3P (Black) connector terminal of the wire harness side and ground.

**Connection: Red/yellow (+) – ground (–)**

**Is there continuity?**

**YES** – Short circuit in Red/yellow wire

**NO** – Faulty TP sensor



## MIL 9 BLINKS (IAT SENSOR)

- Before starting the inspection, check for loose or poor contact on the IAT sensor 2P (Gray) connector and recheck the MIL blinking.

### 1. IAT Sensor Output Voltage Inspection

Turn the ignition switch OFF.  
Connect the ECM test harness to ECM connectors (page 6-11).

Turn the ignition switch ON and engine stop switch "Q".  
Measure the voltage at the test harness terminals.

**Connection:** B8 (+) -B26 (-)

**Standard:** 2.7 – 3.1 V (20°C/68°F)

**Is the voltage within 2.7 – 3.1 V?**

- YES** –
- Intermittent failure
  - Loose or poor contact on the ECM connectors

**NO** – GO TO STEP 2.

### 2. IAT Sensor Input Voltage Inspection

Turn the ignition switch OFF.  
Disconnect the IAT sensor 2P (Gray) connector.

Turn the ignition switch ON and engine stop switch "Q".  
Measure the voltage at the wire harness side of IAT sensor connector.

**Connection:** Gray/blue – Gray/black

**Is the voltage within 4.75 – 5.25V?**

**YES** – GO TO STEP 3.

**NO** – GO TO STEP 4.

### 3. IAT Sensor Resistance Inspection

Turn the ignition switch OFF.  
Disconnect the IAT sensor 2P (Gray) connector.

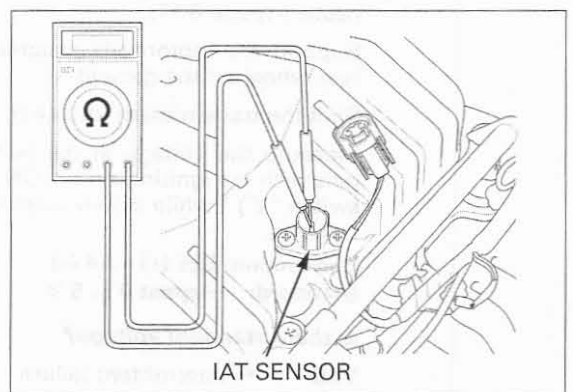
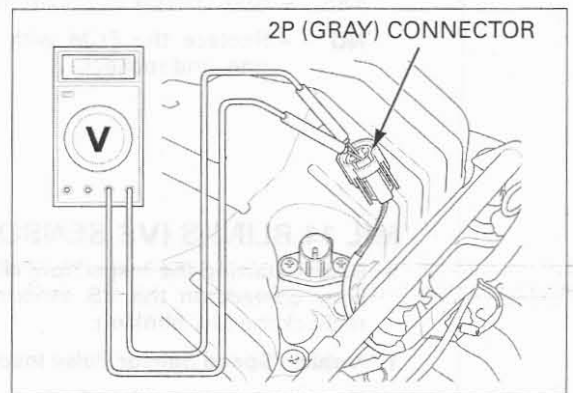
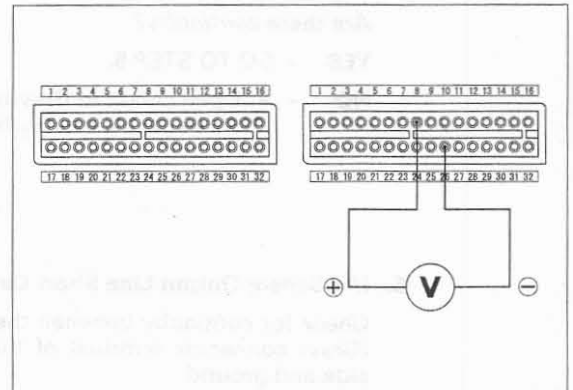
Measure the resistance at the IAT sensor terminals (at 20 – 30°C/68 – 86°F).

**Standard:** 1 – 4 kΩ (20 – 30°C/68 – 86°F)

**Is the resistance within 1 – 4 kΩ?**

**NO** – Faulty IAT sensor.

**YES** – GO TO STEP 4.



## FUEL SYSTEM (Programmed Fuel Injection)

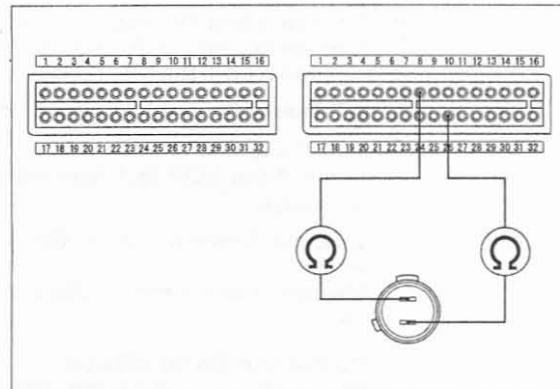
### 4. IAT Sensor Open Circuit Inspection

Turn the ignition switch OFF.  
Check for continuity at the Gray/blue and Gray/black wires between the IAT sensor 2P (Gray) connector terminal and the ECM 32P (Light gray) connector.

**Are there continuity?**

**YES** – GO TO STEP 5.

**NO** –  
• Open circuit in Gray/blue wire  
• Open circuit in Gray/black wire



### 5. IAT Sensor Output Line Short Circuit Inspection

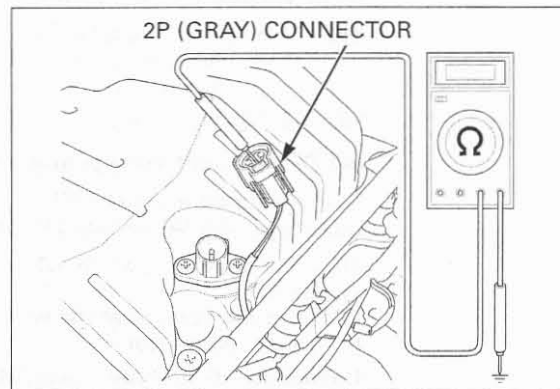
Check for continuity between the IAT sensor 2P (Gray) connector terminal of the wire harness side and ground.

**Connection: Gray/blue – ground**

**Is there continuity?**

**YES** – Short circuit in Gray/blue wire

**NO** – Replace the ECM with a known good one, and recheck.



## MIL 11 BLINKS (VS SENSOR)

- Before starting the inspection, check for loose or poor contact on the VS sensor connector and recheck the MIL blinking.

### 1. Vehicle Speed Sensor Pulse Inspection

Turn the ignition switch OFF.  
Connect the ECM test harness to the ECM connectors (page 6-11).

Support the motorcycle securely and place the rear wheel off the ground.

Shift the transmission into gear.

Measure the voltage at the test harness terminals with the ignition switch ON and engine stop switch "  $\odot$  " while slowly turning the rear wheel by hand.

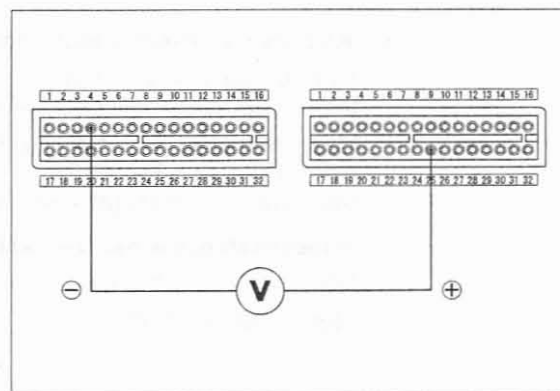
**Connection: B25 (+) – A4 (–)**

**Standard: Repeat 0 to 5 V**

**Is there standard voltage?**

**YES** –  
• Intermittent failure  
• Loose or poor contact on the ECM connectors

**NO** – GO TO STEP 2.



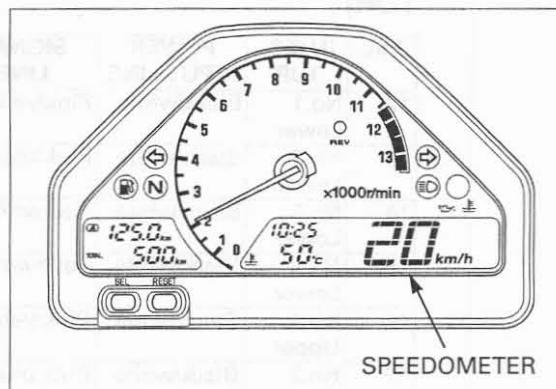
## 2. Combination Meter Inspection

Check for operation of speedometer.

**Does the speedometer operate normally?**

**YES** – Open or short circuit in the Brown/white wire

**NO** – GO TO STEP 3.



## 3. VS Sensor Input Voltage Inspection

Turn the ignition switch OFF.  
Disconnect the VS sensor 3P (Natural) connector.

Turn the ignition switch ON and engine stop switch "Q".

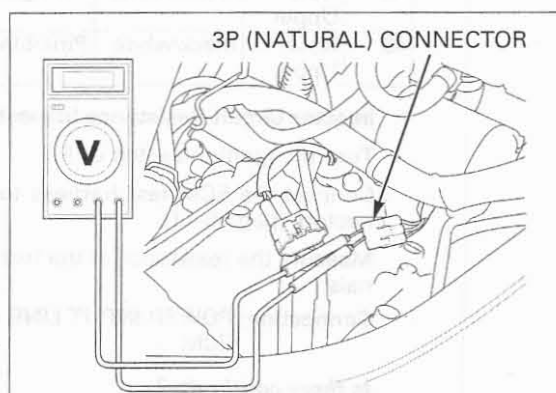
Measure the voltage at the wire harness side.

**Connection: Pink (+) – Green/black (-)**

**Is there battery voltage?**

**YES** – GO TO STEP 4.

**NO** – • Open circuit in the Pink wire  
• Open circuit in the Green or Green/black wire



## 4. VS Sensor Signal Line Short Circuit Inspection

Turn the ignition switch OFF.

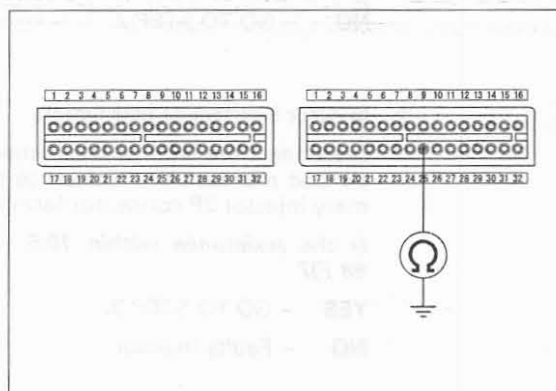
Check for continuity between the test harness and the ground.

**Connection: B25 – ground**

**Is there continuity?**

**YES** – Short circuit in the Pink wire

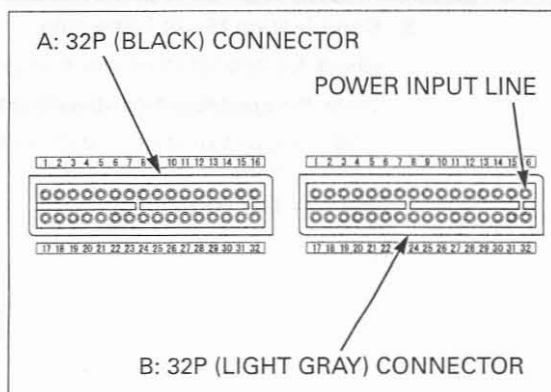
**NO** – Inspect the VS sensor (page 20-11)



## FUEL SYSTEM (Programmed Fuel Injection)

### MIL 12 BLINKS (No.1 PRIMARY INJECTOR)

| MIL | INJECTOR   | POWER INPUT LINE | SIGNAL LINE | SIGNAL AT ECM |
|-----|------------|------------------|-------------|---------------|
| 12  | No.1 Lower | Black/white      | Pink/yellow | A11           |
| 13  | No.2 Lower | Black/white      | Pink/blue   | A12           |
| 14  | No.3 Lower | Black/white      | Red/white   | A13           |
| 15  | No.4 Lower | Black/white      | Yellow/red  | A14           |
| 16  | No.1 Upper | Black/white      | Pink/yellow | A9            |
| 17  | No.2 Upper | Black/white      | Pink/blue   | A10           |
| 48  | No.3 Upper | Black/white      | Pink/green  | A15           |
| 49  | No.4 Upper | Black/white      | Pink/black  | A16           |



#### 1. Injector Circuit Resistance Inspection

Turn the ignition switch OFF.

Connect the ECM test harness to the ECM connectors (page 6-11).

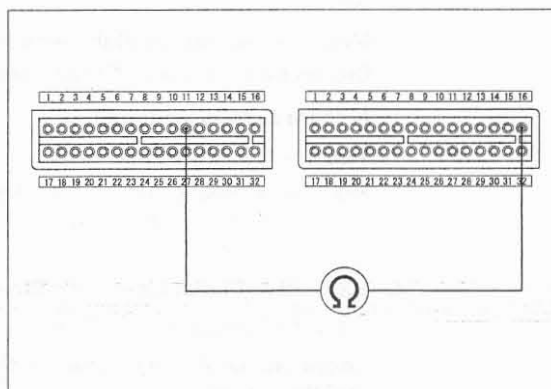
Measure the resistance at the test harness terminals.

**Connection: POWER INPUT LINE – SIGNAL AT ECM**

*Is there continuity?*

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 2.



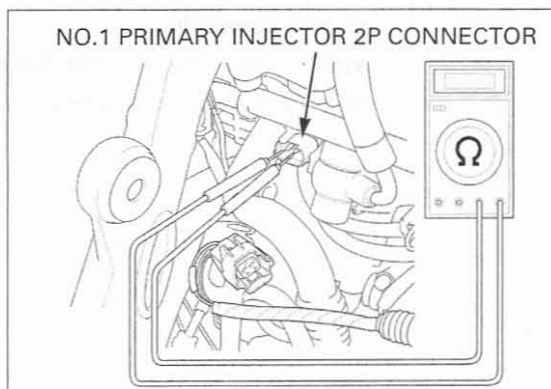
#### 2. Injector Resistance Inspection

Disconnect the No.1 primary injector 2P connector and measure the resistance of the No.1 primary injector 2P connector terminals.

*Is the resistance within 10.5 – 14.5  $\Omega$  (20°C/ 68°F)?*

**YES** – GO TO STEP 3.

**NO** – Faulty injector



## 3. Injector Input Voltage Inspection

Turn the ignition switch ON and engine stop switch "Q".

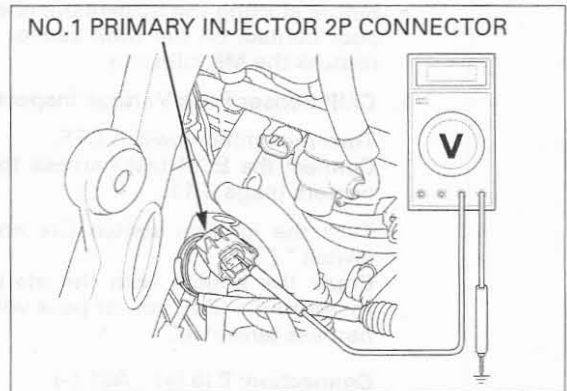
Measure the voltage between the No. 1 primary injector connector of the wire harness side and ground.

**Connection: POWER INPUT LINE (+) – ground (–)**

*Is there battery voltage?*

**YES** – Open circuit in SIGNAL LINE wire

**NO** – Open circuit in POWER INPUT LINE wire



## 4. Injector Signal Line Short Circuit Inspection

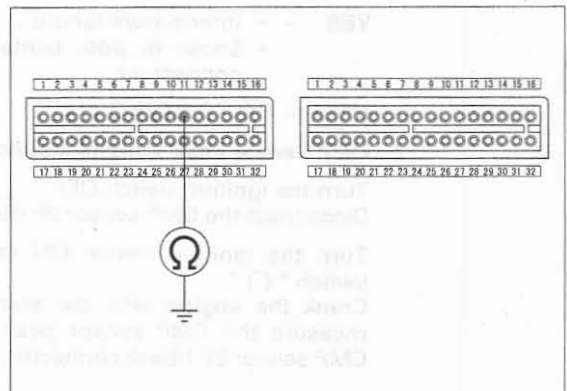
Check for continuity between the test harness terminals and ground.

**Connection: SIGNAL AT ECM – ground**

*Is there continuity?*

**YES** – • Short circuit in the SIGNAL LINE wire  
• Faulty injector

**NO** – Replace the ECM with a known good one, and recheck



## MIL 13 BLINKS (No.2 PRIMARY INJECTOR)

(page 6-24)

## MIL 14 BLINKS (No.3 PRIMARY INJECTOR)

(page 6-24)

## MIL 15 BLINKS (No.4 PRIMARY INJECTOR)

(page 6-24)

## MIL 16 BLINKS (No.1 SECONDARY INJECTOR)

(page 6-24)

## MIL 17 BLINKS (No.2 SECONDARY INJECTOR)

(page 6-24)

## MIL 48 BLINKS (No.3 SECONDARY INJECTOR)

(page 6-24)

## MIL 49 BLINKS (No.4 SECONDARY INJECTOR)

(page 6-24)



## FUEL SYSTEM (Programmed Fuel Injection)

### MIL 18 BLINKS (CMP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CMP sensor connector and recheck the MIL blinking.

#### 1. CMP Sensor Peak Voltage Inspection at ECM

Turn the ignition switch OFF.

Connect the ECM test harness to the ECM connectors (page 6-11).

Turn the ignition switch ON and engine stop switch "Q".

Crank the engine with the starter motor, and measure the CMP sensor peak voltage at the test harness terminals.

**Connection: B10 (+) – A31 (–)**

**Is the voltage more than 0.7 V (20 °C/68 °F)?**

- YES** –
- Intermittent failure
  - Loose or poor contact on the ECM connectors

**NO** – GO TO STEP 2.

#### 2. CMP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.

Disconnect the CMP sensor 2P (Black) connector.

Turn the ignition switch ON and engine stop switch "Q".

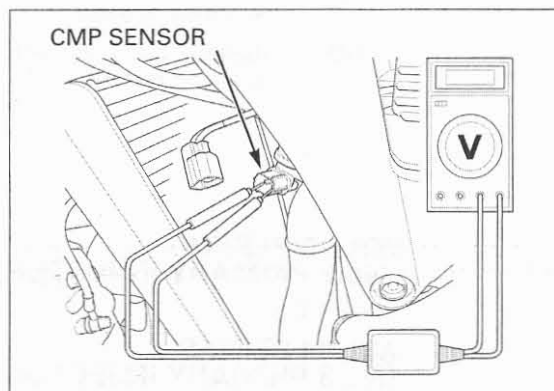
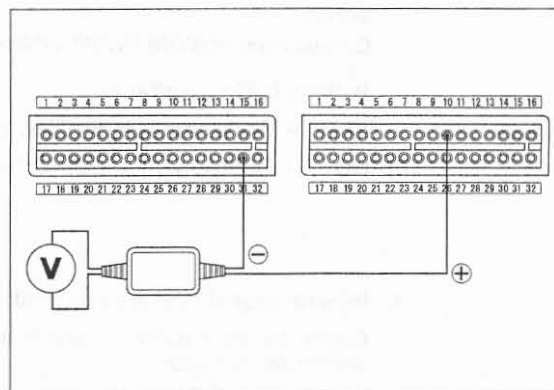
Crank the engine with the starter motor, and measure the CMP sensor peak voltage at the CMP sensor 2P (Black) connector.

**Connection: Gray (+) – White/black (–)**

**Is the voltage more than 0.7 V (20 °C/68 °F)?**

- YES** –
- Open or short circuit in the White/black wire or Gray wire

**NO** – Faulty CMP sensor



## MIL 19 BLINKS (CKP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CKP sensor connector and recheck the MIL blinking.

### 1. CKP Sensor Peak Voltage Inspection at ECM

Turn the ignition switch OFF.

Connect the ECM test harness to the ECM connectors (page 6-11).

Turn the ignition switch ON and engine stop switch "Q".

Crank the engine with the starter motor, and measure the CKP sensor peak voltage at the test harness terminals.

**Connection: B11 (+) – A31 (–)**

**Is the voltage more than 0.7 V (20 °C/68 °F)?**

- YES** –
- Intermittent failure
  - Loose or poor contact on the ECM connectors

**NO** – GO TO STEP 2.

### 2. CKP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.

Disconnect the CKP sensor 2P (Red) connector.

Turn the ignition switch ON and engine stop switch "Q".

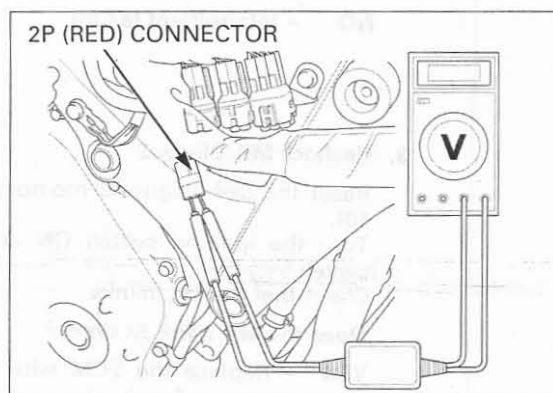
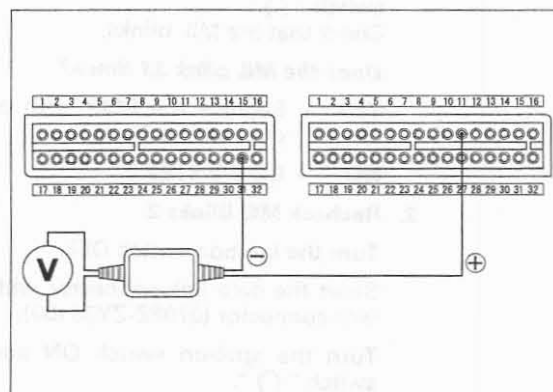
Crank the engine with the starter motor, and measure the CKP sensor peak voltage at the CKP sensor 2P (Red) connector.

**Connection: Yellow (+) – White/black (–)**

**Is the voltage more than 0.7 V (20 °C/68 °F)?**

- YES** –
- Open or short circuit in the Yellow, White/black wire

**NO** – Faulty CKP sensor



## FUEL SYSTEM (Programmed Fuel Injection)

### MIL 33 BLINKS (EEPROM)

#### 1. Recheck MIL Blinks 1

Reset the self-diagnosis memory data (page 6-10).

Turn the ignition switch ON and engine stop switch "Q".

Check that the MIL blinks.

**Does the MIL blink 33 times?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – GO TO STEP 2.

#### 2. Recheck MIL Blinks 2

Turn the ignition switch OFF.

Short the data link connector with the SCS service connector (070PZ-ZY30100).

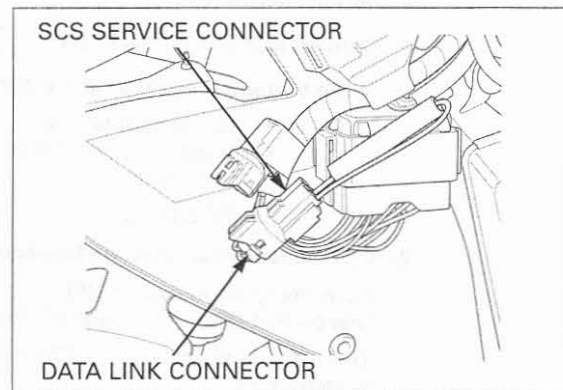
Turn the ignition switch ON and engine stop switch "Q".

Check that the MIL blinks.

**Does the MIL blink 33 times?**

**YES** – GO TO STEP 3.

**NO** – Intermittent failure



#### 3. Recheck MIL Blinks 3

Reset the self-diagnosis memory data (page 6-10).

Turn the ignition switch ON and engine stop switch "Q".

Check that the MIL blinks.

**Does the MIL blink 33 times?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Intermittent failure

### MIL 34 BLINKS (EGCV POT)

- Before starting the inspection, check for loose or poor contact on the EGCV servomotor connector and recheck the MIL blinking.

#### 1. EGCV POT Output Voltage

Turn the ignition switch OFF.

Connect the ECM test harness to ECM connectors (page 6-11).

Turn the ignition switch ON and engine stop switch "Q".

Measure the EGCV POT output voltage at the test harness terminals.

**Connection: B24 (+) – B26 (–)**

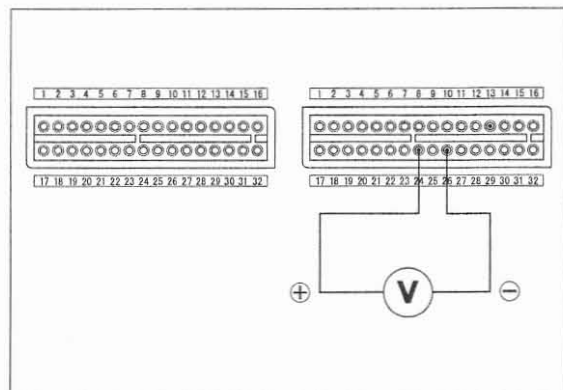
**Standard: 2.0 – 2.1 V**

**Is there standard voltage?**

**YES** –

- Intermittent failure
- Loose or poor contact on the ECM connectors

**NO** – GO TO STEP 2.



## 2. EGCV POT Input Voltage Inspection

Turn the ignition switch OFF.  
Disconnect the EGCV servomotor 6P (Natural) connector.

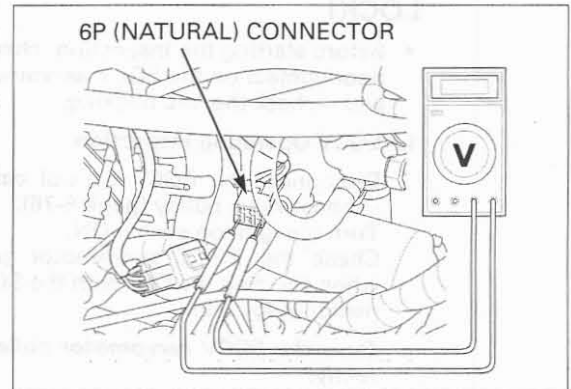
Turn the ignition switch ON and engine stop switch "○".  
Measure the voltage at the wire harness side.

**Connection: Yellow/red (+) – Brown/black (–)**

*Is the voltage within 4.75 – 5.25 V?*

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.



## 3. ECM Output Voltage Inspection

Turn the ignition switch OFF.  
Connect the EGCV servomotor 6P (Natural) connector.

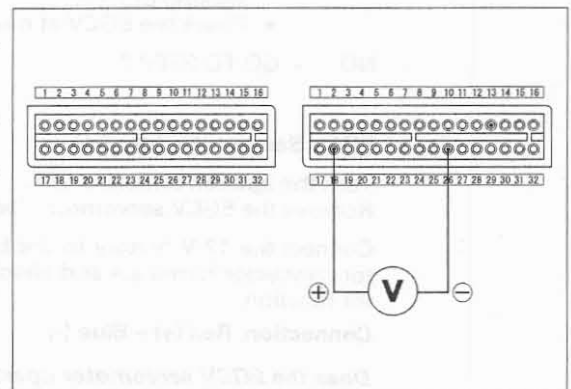
Turn the ignition switch ON and engine stop switch "○".  
Measure the voltage at the test harness terminals.

**Connection: B18 (+) – B26 (–)**

*Is the voltage within 4.75 – 5.25V?*

**YES** – • Open circuit in Yellow/red wire  
• Open circuit in Green/orange wire

**NO** – Replace the ECM with a known good one, and recheck.



## 4. EGCV POT Output Line Inspection

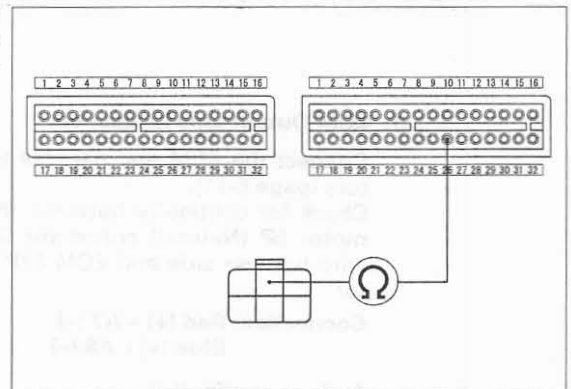
Check for continuity between the EGCV servomotor 6P (Natural) connector terminal of the wire harness side and ECM 32P (Light gray) connector.

**Connection: Light green/black – B24**

*Is there continuity?*

**YES** – GO TO STEP 5.

**NO** – Open circuit in Light green/black wire



## 5. EGCV POT Output Line Short Circuit Inspection

Turn the ignition switch OFF.

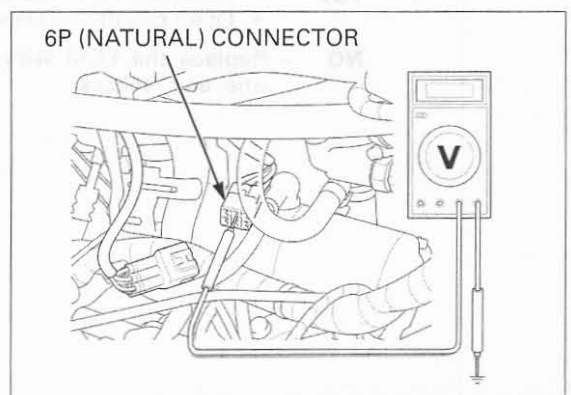
Check for continuity between the EGCV servomotor 6P (Natural) connector terminal of the wire harness side and ground.

**Connection: Light green/black (+) – ground (–)**

*Is there continuity?*

**YES** – Short circuit in Light green/black wire

**NO** – Faulty EGCV servomotor



## FUEL SYSTEM (Programmed Fuel Injection)

### MIL 35 BLINKS (EGCV SERVOMOTOR LOCK)

- Before starting the inspection, check for loose or poor contact on the EGCV servomotor connector and recheck the MIL blinking.

#### 1. EGCV Operating Inspection

Disconnect the EGCV control cables from the exhaust valve pulley (page 6-76).

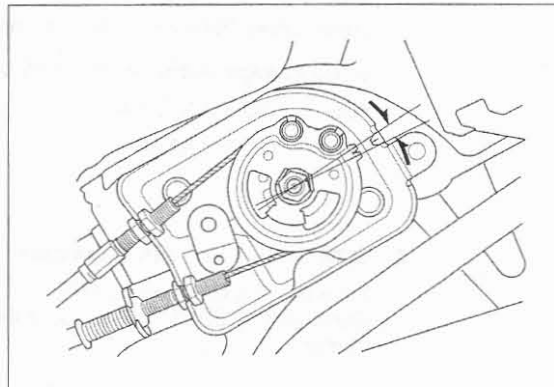
Turn the ignition switch ON.

Check the EGCV servomotor pulley rotation when shorting the DLC with the SCS service connector (page 6-9).

**Does the EGCV servomotor pulley operate correctly?**

- YES** –
- Check the EGCV cables binding, sticking or lock.
  - Check the EGCV at muffler side.

**NO** – GO TO STEP 2.



#### 2. EGCV Servomotor Inspection

Turn the ignition switch to OFF.

Remove the EGCV servomotor (page 6-78).

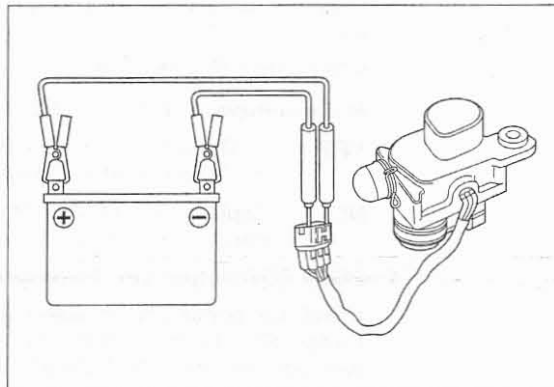
Connect the 12 V battery to the EGCV servomotor connector terminals and check the servomotor function.

**Connection: Red (+) – Blue (-)**

**Does the EGCV servomotor operate normally?**

**YES** – GO TO STEP 3.

**NO** – Faulty EGCV servomotor



#### 3. ECM Output Line Inspection

Connect the ECM test harness to ECM connectors (page 6-11).

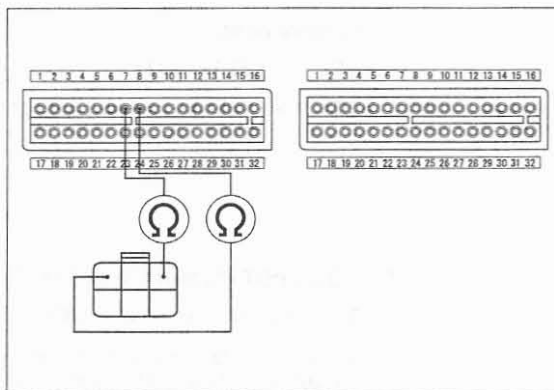
Check for continuity between the EGCV servomotor 6P (Natural) connector terminals of the wire harness side and ECM 32P (Black) connector.

**Connection: Red (+) – A7 (-)**  
**Blue (+) – A8 (-)**

**Is there continuity?**

- YES** –
- Open circuit in Red wire
  - Open circuit in Blue wire

**NO** – Replace the ECM with a known good one, and recheck.



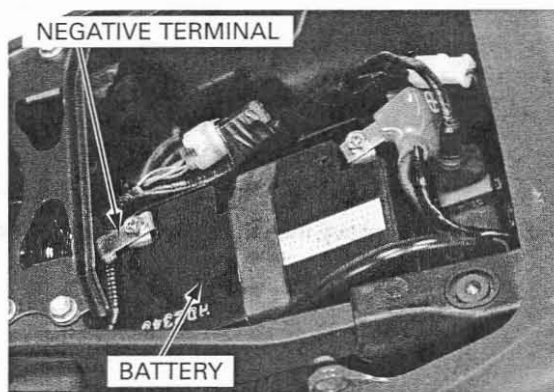
## FUEL LINE INSPECTION

### FUEL PRESSURE INSPECTION

- Before disconnecting fuel hoses, release the fuel pressure by loosening the fuel feed hose banjo bolt at the fuel tank.
- Failure to release the fuel pressure could result in fuel spilling onto painted or plastic parts, which will be damaged.
- Always replace the sealing washers when the fuel feed hose banjo bolt is removed or loosened.

Remove the seat (page 3-4).

Disconnect the battery negative cable from the battery terminal.



Lift and support the fuel tank (page 4-5).

Cover the service check bolt on the secondary injector fuel rail with a rag or shop towel.

Slowly loosen the service check bolt and catch the remaining fuel using an approved gasoline container.

Remove the service check bolt and sealing washer.



Attach the fuel pressure gauge to the fuel rail.

#### TOOL:

Fuel pressure gauge      07406-0040003 or  
    07406-004000B or  
    07406-004000A  
    (U.S.A. only)

Connect the battery negative cable.

Start the engine.

Measure the fuel pressure at idle speed.

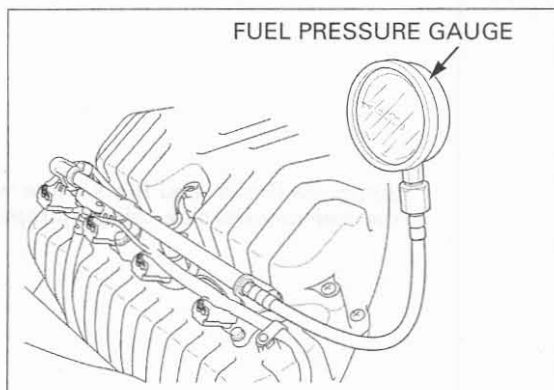
**IDLE SPEED:** 1,200 ± 100 rpm

**STANDARD:** 343 kPa (3.5 kgf/cm<sup>2</sup>, 50 psi)

If the fuel pressure is higher than specified, replace the fuel pump unit (page 6-34).

If the fuel pressure is lower than specified, inspect the following:

- Fuel line leaking
- Fuel strainer (page 6-34)





## FUEL SYSTEM (Programmed Fuel Injection)

*Always replace the sealing washer when the service check bolt is removed or loosened.*

After inspection, remove the pressure gauge and reinstall and tighten the service check bolt using a new sealing washer.

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

Remove the suitable support and close the fuel tank (page 4-5).

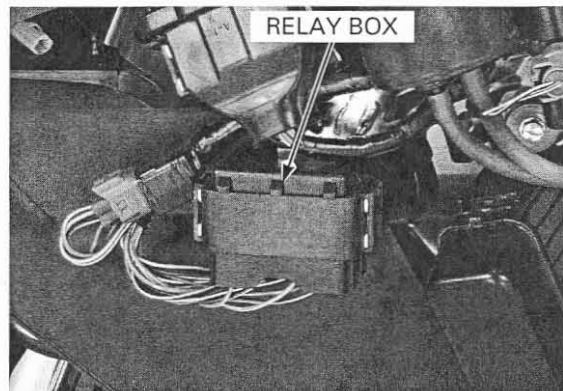
Install the removed parts in the reverse order of removal.



### FUEL FLOW INSPECTION

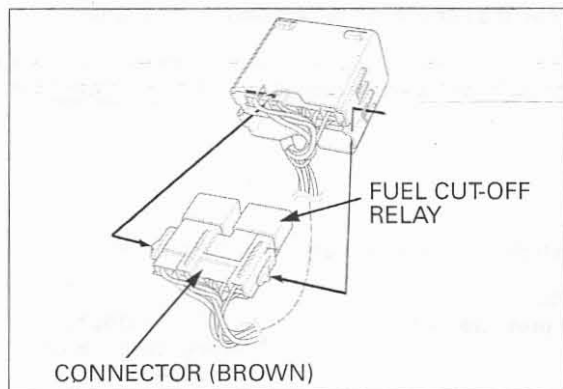
Remove the left middle cowl (page 3-7)

Remove the relay box from the bracket.

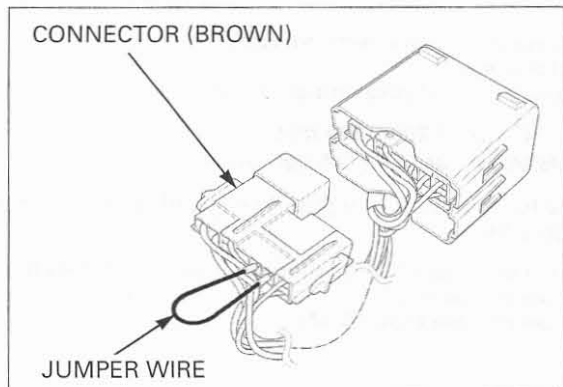


Release the retainers (brown) and remove the relay connector base.

Remove the fuel cut-off relay from the connector.



Jump the Brown and Black/white wire terminals of the wire harness side using a jumper wire.

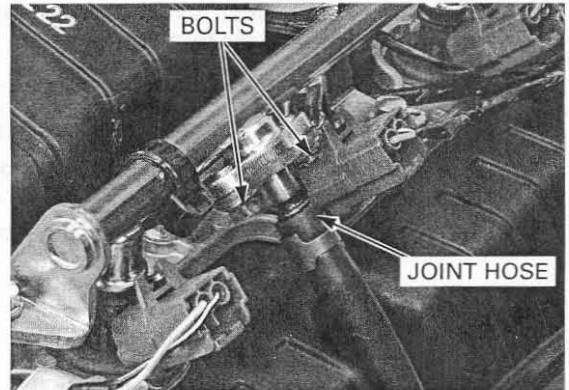


## FUEL SYSTEM (Programmed Fuel Injection)

*Do not apply excessive force or the fuel rail may be damaged.*

Remove the fuel pipe joint mounting bolts, then disconnect the fuel joint hose from the secondary injector fuel rail.

- Place an approved gasoline container and drain the gasoline.
- Wipe off spilled gasoline.



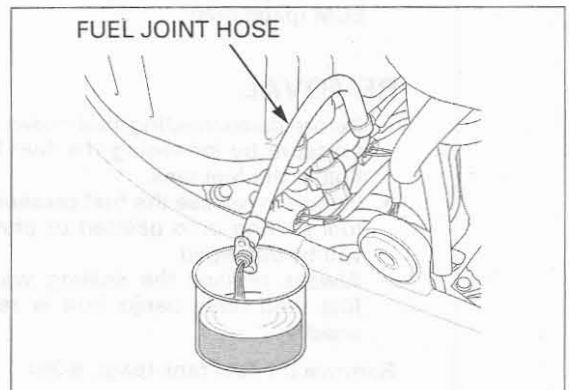
Turn the ignition switch ON for 10 seconds. Measure the amount of fuel flow.

**Amount of fuel flow:**

**189 cm<sup>3</sup> (6.4 US oz, 6.7 Imp oz) minimum /10 seconds at 12 V**

If the fuel flow is less than specified, inspect the following:

- Pinched or clogged fuel hose
- Fuel pump unit (page 6-33)



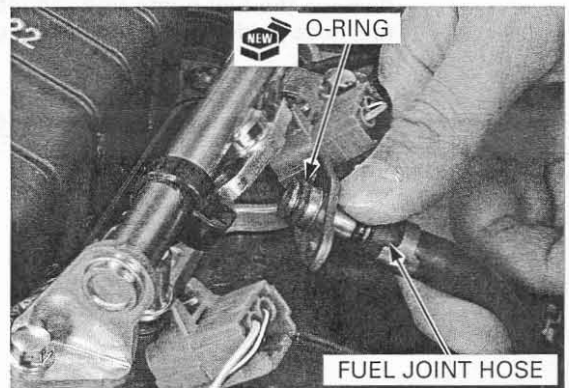
After inspection, install a new O-ring into the groove of the fuel joint hose.

*Be careful not to damage the O-ring while installing the fuel joint hose to the fuel rail.*

Install the fuel joint hose to the secondary injector fuel rail, tighten the two bolts to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

Start the engine and check for fuel leaks.



## FUEL PUMP UNIT

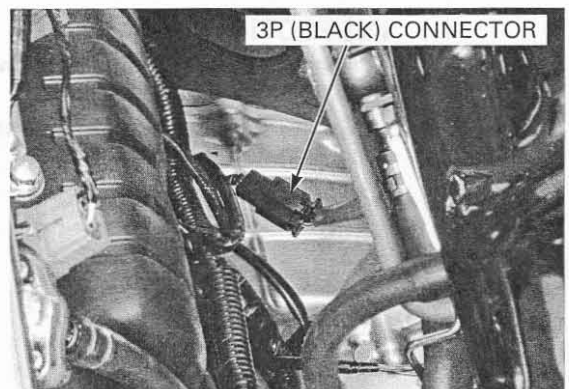
### INSPECTION

Turn the ignition switch ON and confirm that the fuel pump operates for a few seconds.

If the fuel pump does not operate, inspect as follows:

Lift and support the fuel tank (page 4-5).

Disconnect the fuel pump unit 3P (Black) connector.



## FUEL SYSTEM (Programmed Fuel Injection)

Turn the ignition switch ON and measure the voltage between the terminals.

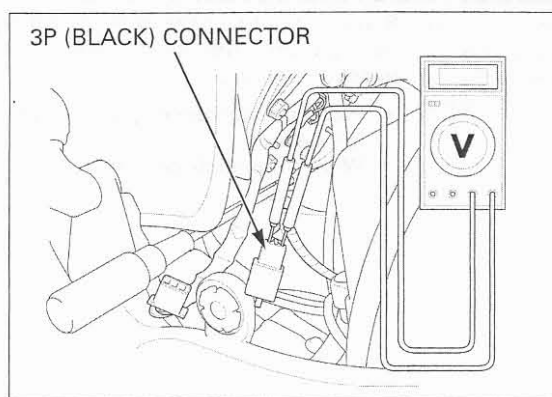
**Connection: Brown (+) – Green (–)**

There should be battery voltage for a few seconds.

If there is battery voltage a few seconds, replace the fuel pump unit.

If there is no battery voltage, inspect the following:

- Main fuse 30A
- Sub fuse 10A
- Engine stop switch (page 20-19)
- Fuel cut-off relay (page 6-35)
- Engine stop relay (page 6-68)
- Bank angle sensor (page 6-67)
- ECM (page 6-70)

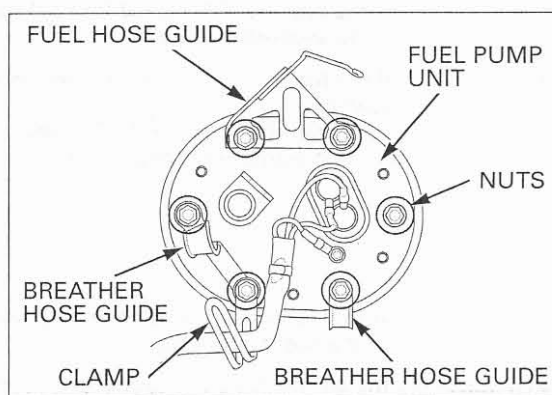


### REMOVAL

- Before disconnecting fuel hoses, release the fuel pressure by loosening the fuel feed hose banjo bolt at the fuel tank.
- Failure to release the fuel pressure could result in fuel spilling onto painted or plastic parts, which will be damaged.
- Always replace the sealing washers when the fuel feed hose banjo bolt is removed or loosened.

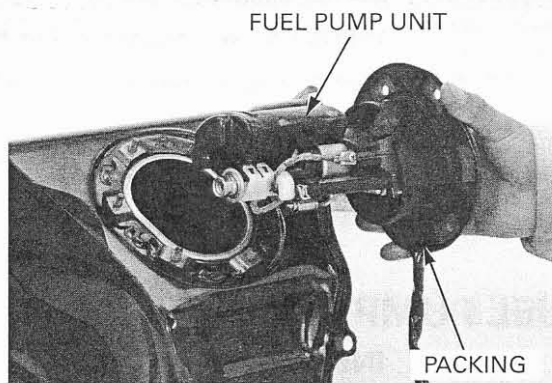
Remove the fuel tank (page 6-36).

Remove the fuel pump unit mounting nuts, clamp, fuel hose guide and breather hose guide.



*Be careful not to damage the pump wire and fuel level gauge.*

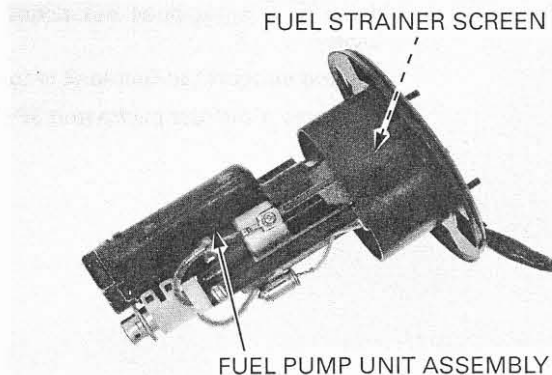
Remove the fuel pump unit and packing.



### INSPECTION

Check the fuel pump unit for wear or damage, replace it if necessary.

Clean the fuel strainer screen with non-flammable or high flash point solvent.



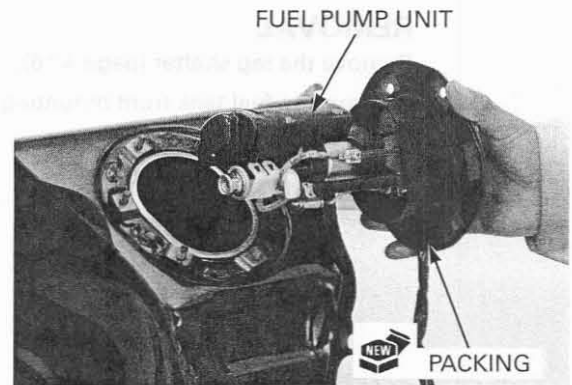
## INSTALLATION

Always replace the packing with a new one.

Be careful not to damage the pump wire and fuel level gauge.

Place a new packing onto the fuel pump unit.

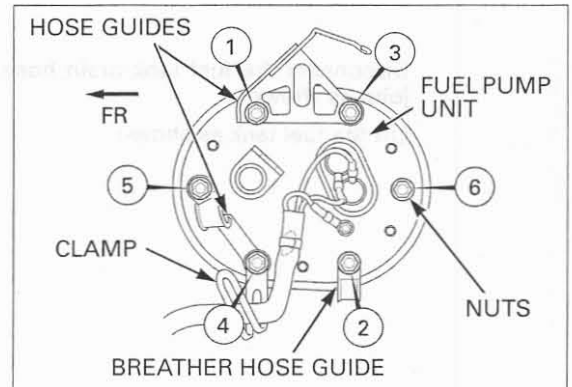
Install the fuel pump unit into the fuel tank.



Install the hose guides and clamp and tighten the fuel pump unit mounting nuts in the specified sequence as shown.

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

Install the fuel tank (page 6-38).



## FUEL CUT-OFF RELAY

### INSPECTION

Remove the fuel cut-off relay from the relay box (page 6-32).

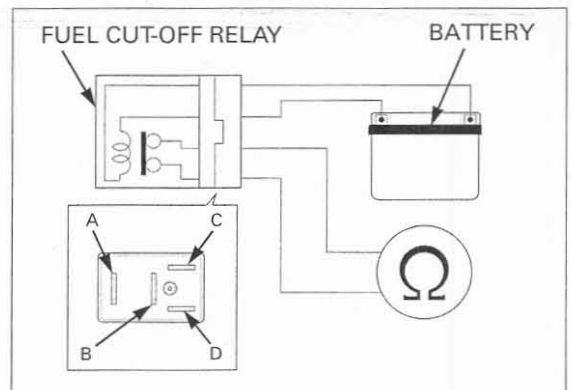
Connect the ohmmeter to the fuel cut-off relay connector terminals.

**Connection: A – B**

Connect the 12 V battery to the following fuel cut-off relay connector terminals.

**Connection: C (+) – D (–)**

There should be continuity only when the 12 V battery is connected. If there is no continuity when the 12 V battery is connected, replace the fuel cut-off relay.

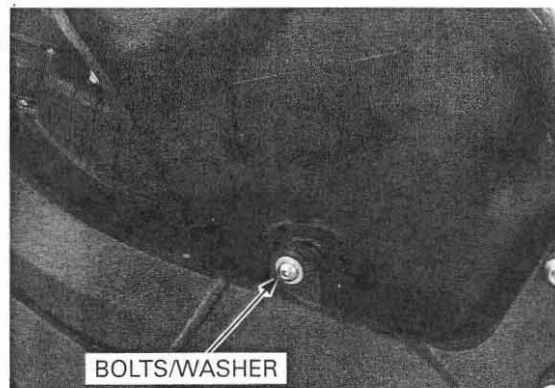


### FUEL TANK

#### REMOVAL

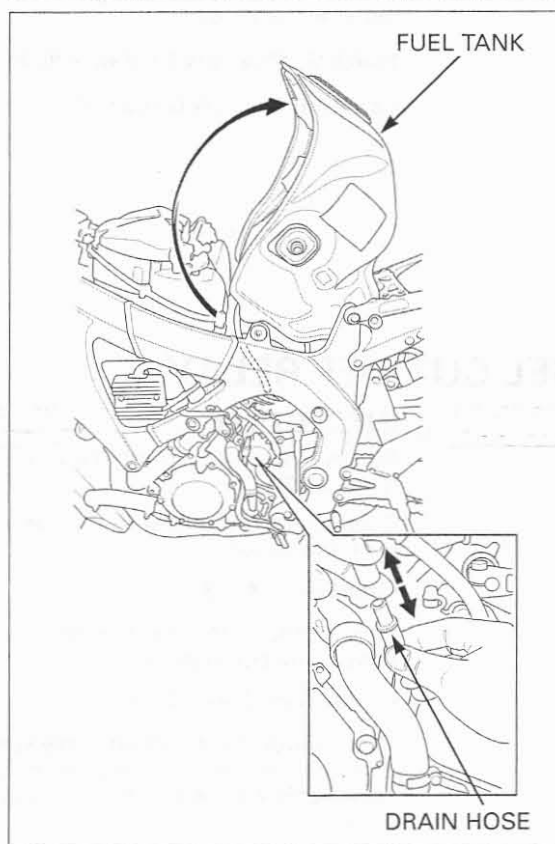
Remove the top shelter (page 3-16).

Remove the fuel tank front mounting bolts.

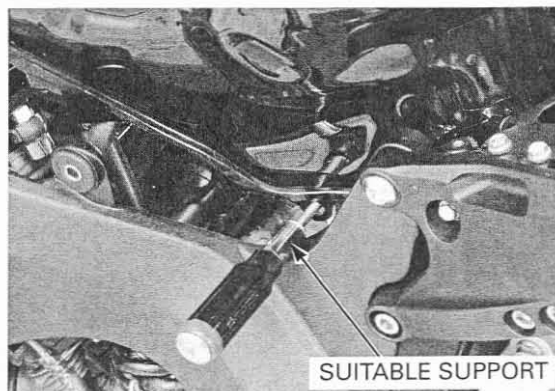


Disconnect the fuel tank drain hose from the hose joint as shown.

Lift the fuel tank as shown.



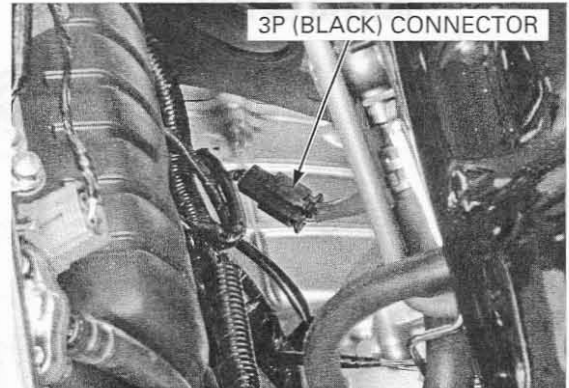
Support the fuel tank using a suitable support.



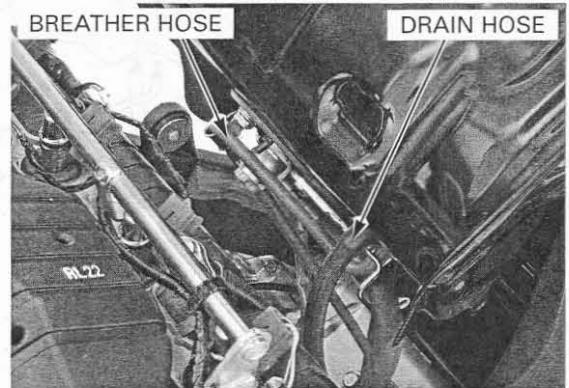


## FUEL SYSTEM (Programmed Fuel Injection)

Disconnect the fuel pump unit 3P (Black) connector.



Disconnect the fuel tank drain hose and breather hose.



Cover the fuel hose banjo bolt with a rag or shop towel.

Slowly loosen the banjo bolt and catch the remaining fuel using a approved gasoline container.

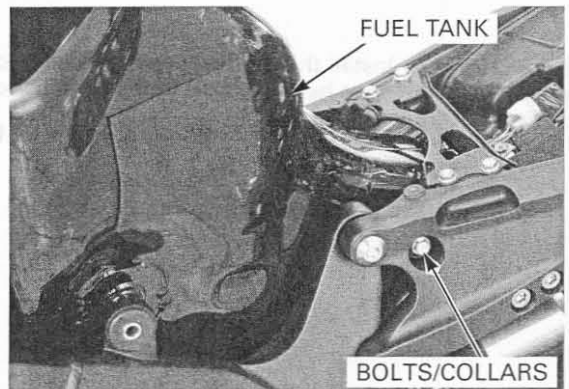
Remove the fuel hose banjo bolt and sealing washers, then disconnect the fuel hose.

- Before disconnecting fuel hoses, release the fuel pressure by loosening the fuel feed hose banjo bolt at the fuel tank.
- Failure to release the fuel pressure could result in fuel spilling onto painted or plastic parts, which will be damaged.
- Always replace the sealing washers when the fuel feed hose banjo bolt is removed or loosened.



Remove the suitable support and close the fuel tank. Remove the fuel tank pivot bolts, collars and fuel tank.

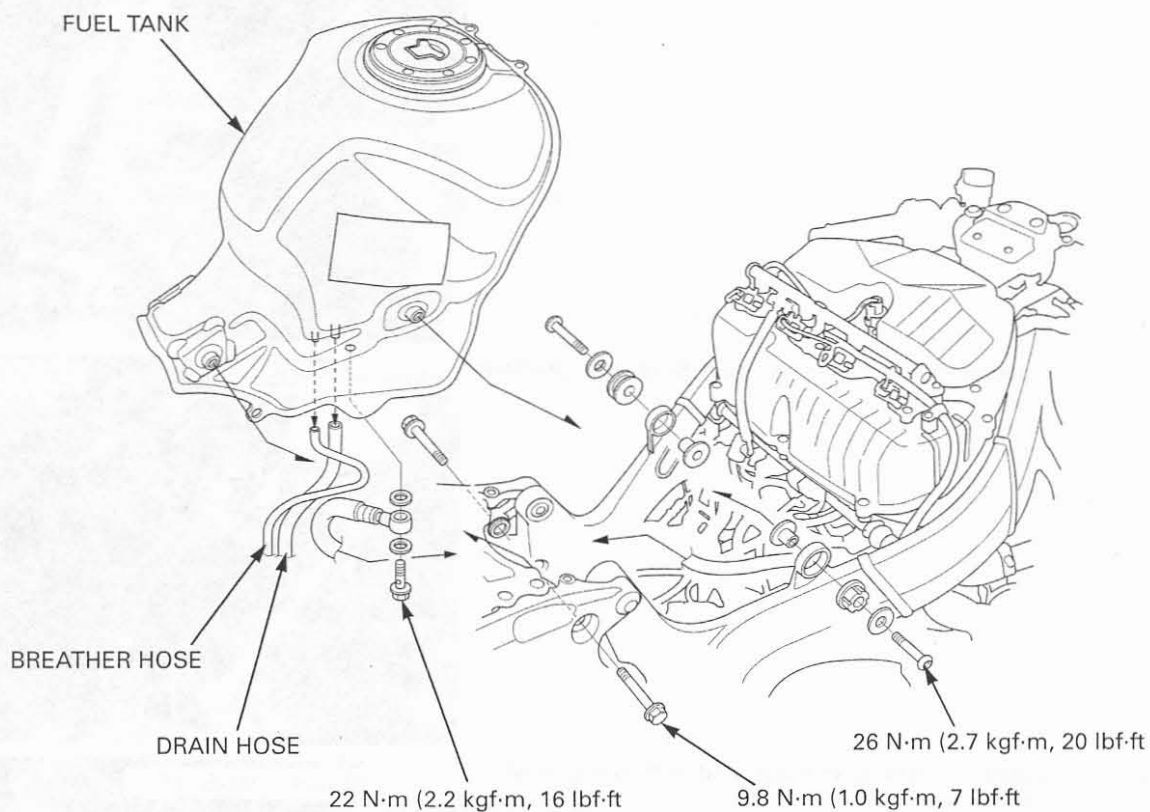
Refer to procedures for fuel pump unit removal (page 6-34).





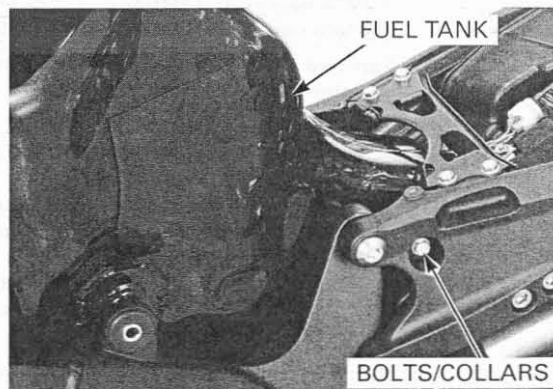
## FUEL SYSTEM (Programmed Fuel Injection)

### INSTALLATION



Install the fuel tank, collars and pivot bolts into the frame and tighten the bolts securely.

Open and support the fuel tank (page 4-5).



*Align the fuel hose eyelet joint with the stopper on the fuel pump mounting stay.*

Install the new sealing washers and tighten the fuel hose banjo bolt to the specified torque.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



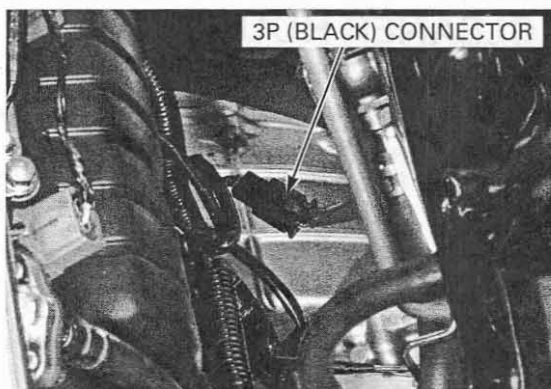
## FUEL SYSTEM (Programmed Fuel Injection)

Route the hoses properly (page 1-24).

Connect the fuel tank drain hose and breather hose.



Connect the fuel pump unit 3P (Black) connector.



Remove the suitable support and close the fuel tank on the frame.

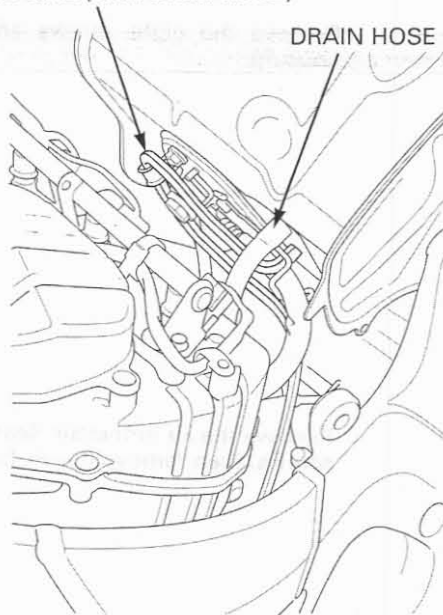
### NOTE:

- Route the hoses, wires and harness properly (page 1-24).
- Be careful not to damage the harness and hoses.
- Do not twist the breather hose or proper fuel supply would be obstructed. Check the red line on the breather hose.

After installing the fuel tank, make sure the drain, breather and fuel hoses are not kinked or bound.

RED LINE (BREATHER HOSE)

DRAIN HOSE



## FUEL SYSTEM (Programmed Fuel Injection)

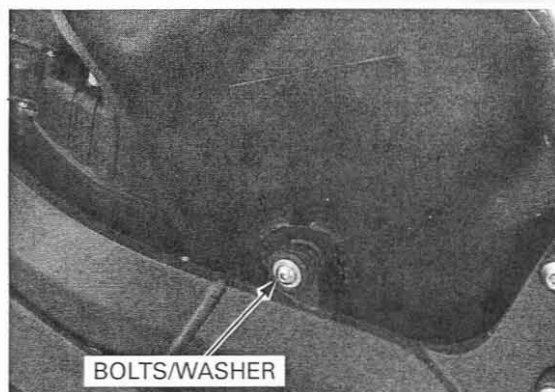
Install and tighten the fuel tank front mounting bolts to the specified torque.

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

Tighten the fuel tank rear mounting bolts to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the top shelter (page 3-16).

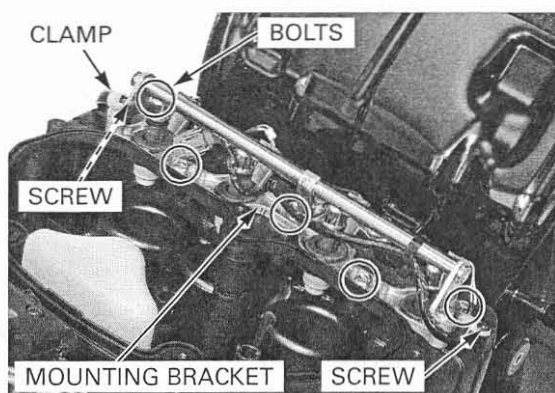


## AIR CLEANER HOUSING

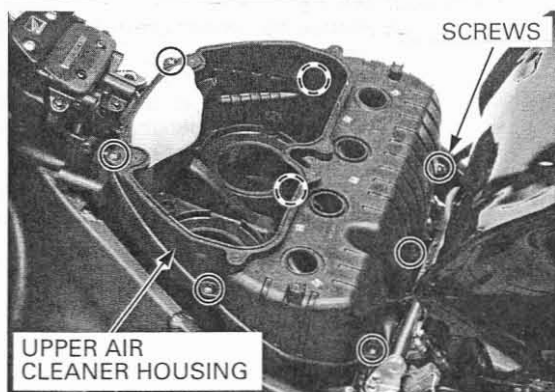
### REMOVAL

Remove the air cleaner elements (page 4-8).

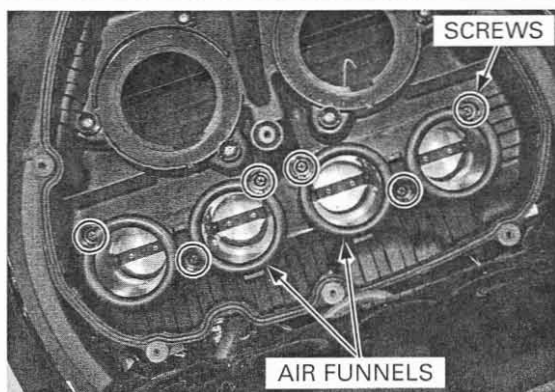
Remove the screws and sub harness clamps. Remove the five bolts and secondary injector mounting bracket from the air cleaner housing.



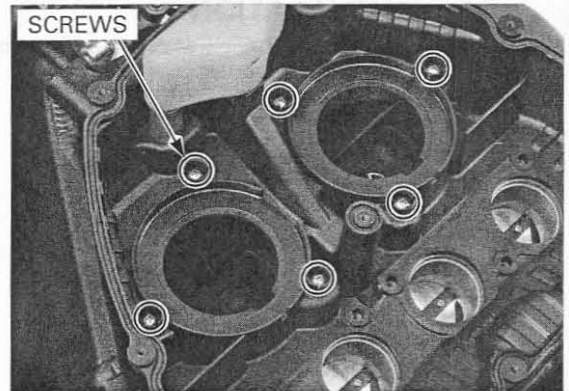
Remove the eight screws and upper air cleaner housing.



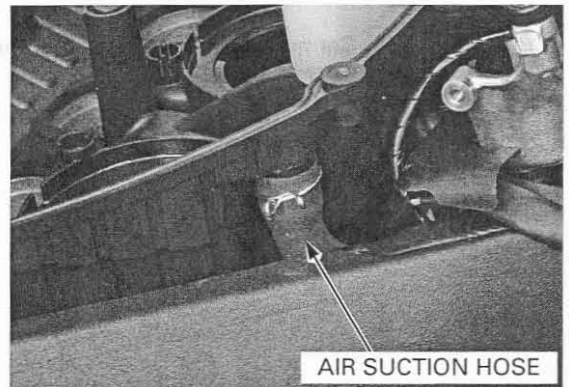
Remove the air funnel/air cleaner housing mounting screws, then remove the air funnels.



Remove the air cleaner housing mounting screws.



Disconnect the PAIR air suction hose from the air cleaner housing.

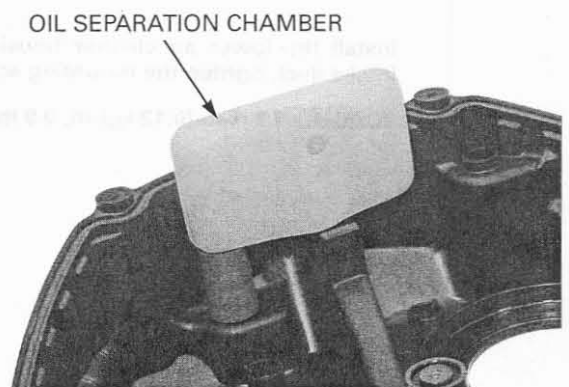


Disconnect the crankcase breather hose from the air cleaner housing.

Remove the air cleaner housing.



Remove the oil separation chamber from the lower air cleaner housing.

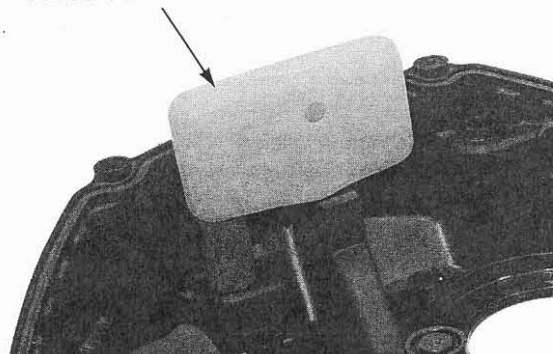


## FUEL SYSTEM (Programmed Fuel Injection)

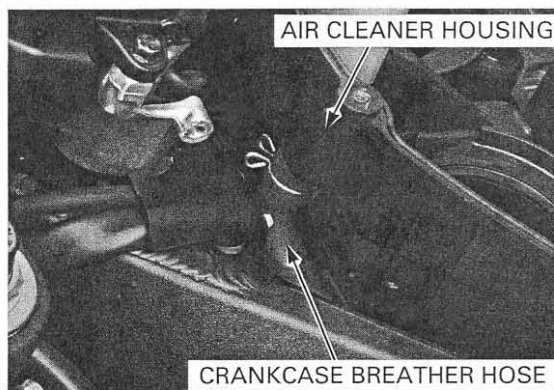
### INSTALLATION

Install the oil separation chamber to the lower air cleaner housing.

OIL SEPARATION CHAMBER

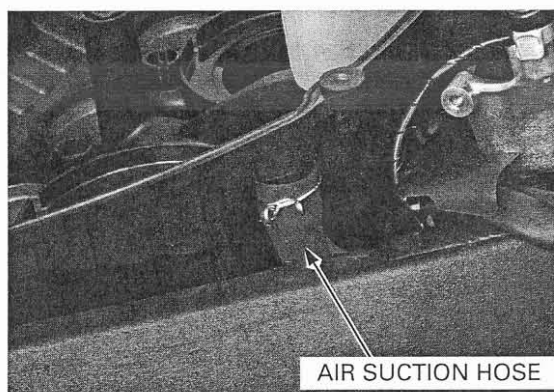


Connect the crankcase breather hose to the air cleaner housing.



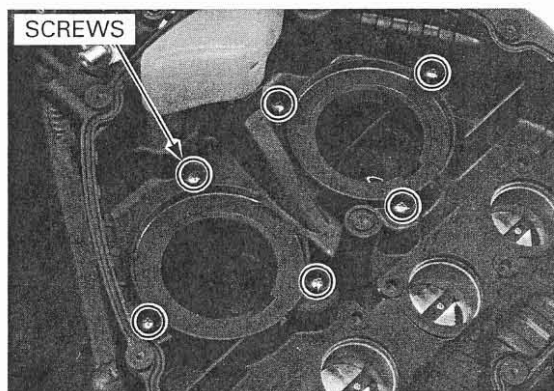
Connect the PAIR air suction hose to the air cleaner housing.

Install the air cleaner housing onto the throttle body and air intake duct.



Install the lower air cleaner housing onto the air intake duct, tighten the mounting screws.

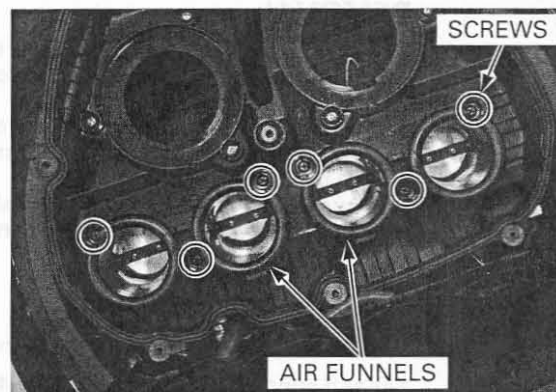
**TORQUE: 1.2 N·m (0.12 kgf·m, 0.9 lbf·ft)**





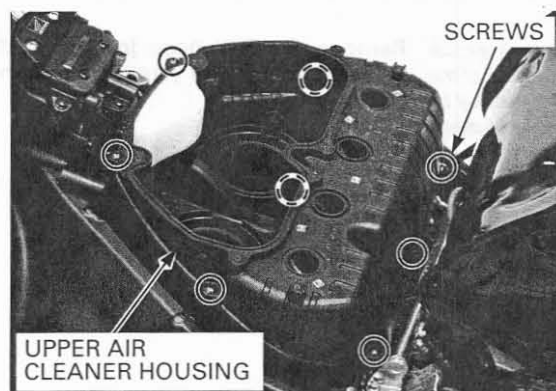
Install the air funnels in their proper locations.  
Install and tighten the air funnel/air cleaner housing mounting screws.

**TORQUE: 4.4 N·m (0.45 kgf·m, 3.3 lbf·ft)**



Install the upper air cleaner housing and eight screws.  
Tighten the screws.

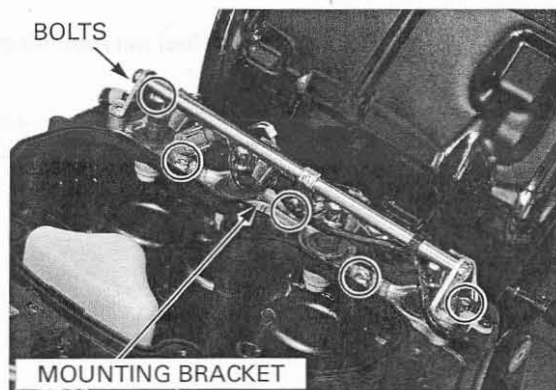
**TORQUE: 1.2 N·m (0.12 kgf·m, 0.9 lbf·ft)**



Install the secondary injector mounting bracket onto the air cleaner housing.  
Tighten the bolts to the specified torque.

**TORQUE: 5.4 N·m (0.55 kgf·m, 4 lbf·ft)**

Install the air cleaner element (page 4-8).



## SECONDARY INJECTOR

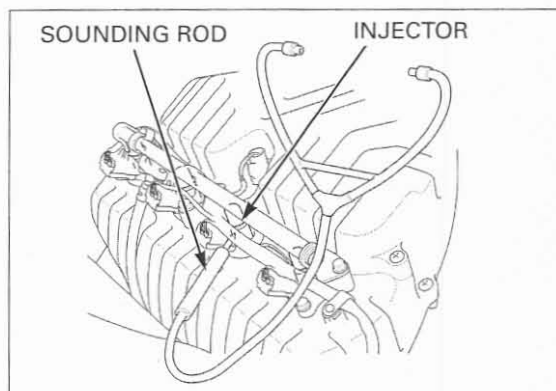
### INSPECTION

Start the engine and let it idle.  
Confirm the injector operating sounds with a sounding rod or stethoscope.

#### NOTE:

The secondary injectors operate with following conditions.

- Engine speed is over 5,500 rpm
- Throttle opening is over 20°(1/4)





## FUEL SYSTEM (Programmed Fuel Injection)

### REMOVAL

- Before disconnecting fuel hoses, release the fuel pressure by loosening the fuel feed hose banjo bolt at the fuel tank.
- Failure to release the fuel pressure could result in fuel spilling onto painted or plastic parts, which will be damaged.
- Always replace the sealing washers when the fuel feed hose banjo bolt is removed or loosened.

Remove the wire band.

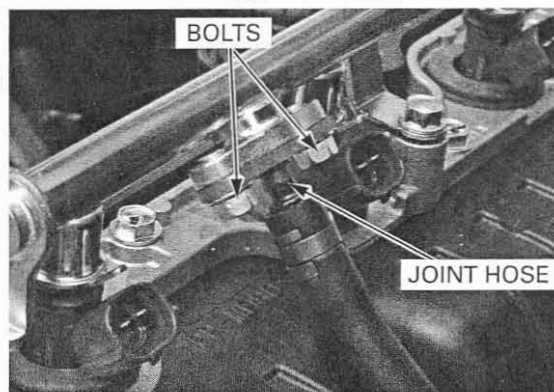
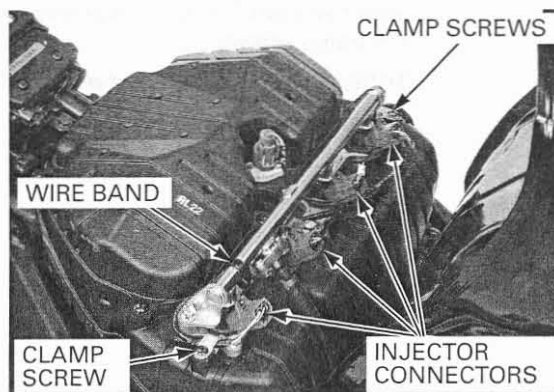
Remove the harness clamp screws.

Disconnect the secondary injector connectors.

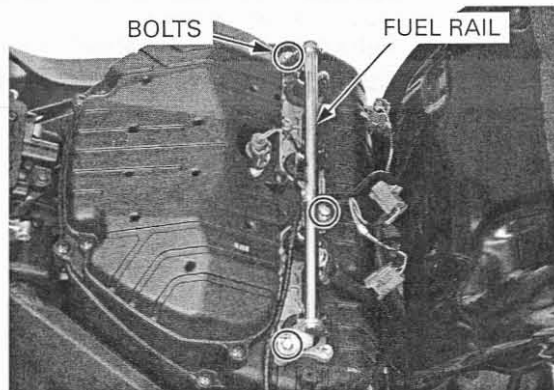
Lift and support the fuel tank (page 4-5).

*Do not apply excessive force or the fuel rail may be damaged.*

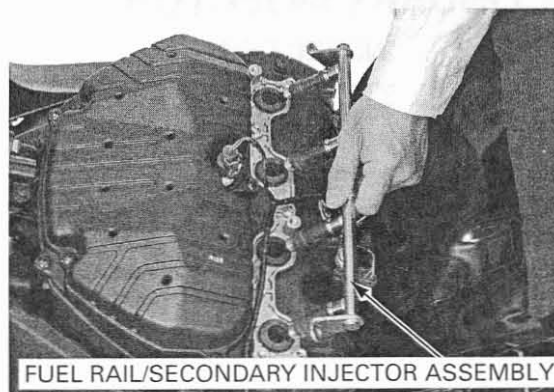
Remove the fuel hose joint mounting bolts, then disconnect the fuel joint hose from the secondary injector fuel rail.



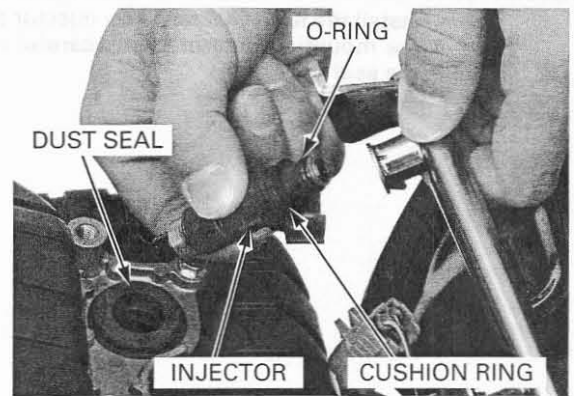
Remove the three fuel rail mounting bolts.



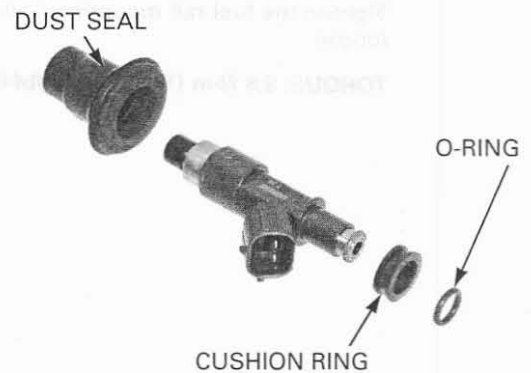
Remove the fuel rail/secondary injector assembly from the mounting bracket.



Remove the injectors from the fuel rail.  
Remove the dust seals.



Remove the O-ring and cushion ring.



### INSTALLATION

Apply oil to a new O-ring.

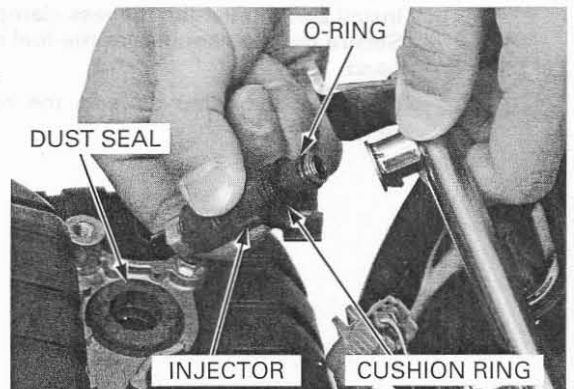
*Replace the seal ring, cushion ring and O-ring with new ones as a set.*

Install the new cushion ring, and O-ring, being careful not to damage the O-ring.



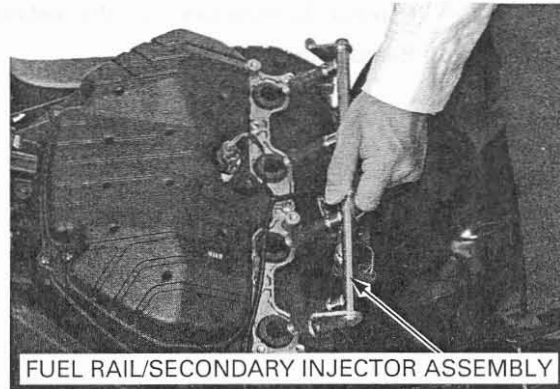
Install the fuel injectors into the fuel rail, being careful not to damage the O-ring and cushion ring.

Check the dust seal for wear or damage, replace it if necessary.



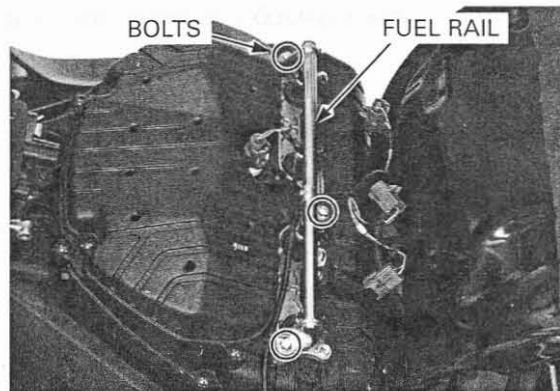
## FUEL SYSTEM (Programmed Fuel Injection)

Install the fuel rail/secondary injector assembly onto the mounting bracket, being careful not to damage the seal ring.



Tighten the fuel rail mounting bolts to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**



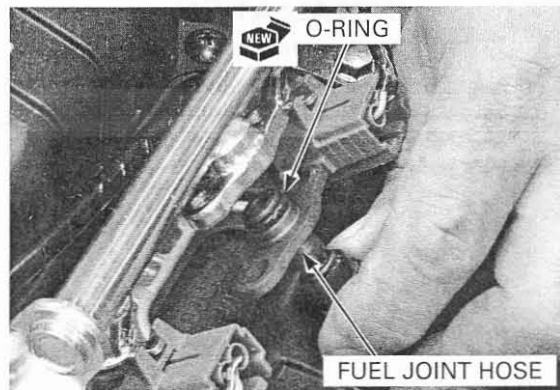
After inspection, install a new O-ring into the groove of the fuel joint hose.

*Be careful not to damage the O-ring while installing the fuel joint hose to the fuel rail.*

Install the fuel joint hose to the secondary injector fuel rail, tighten the two bolt to the specified torque.

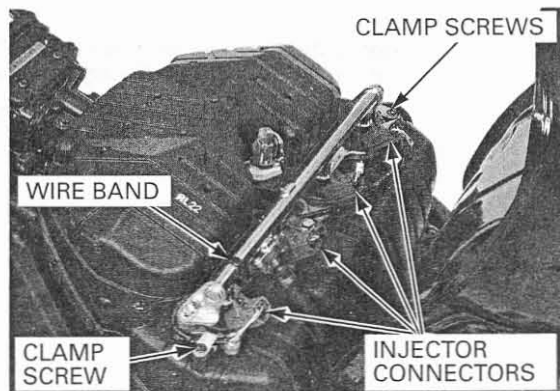
**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

Start the engine and check for leaks.



Connect the secondary injector connectors. Install and tighten the harness clamp screws. Secure the wire harness to the fuel rail using a wire band.

Install the removed parts in the reverse order of removal.



## THROTTLE BODY

### REMOVAL

- Before disconnecting fuel hoses, release the fuel pressure by loosening the service check bolt at the secondary injector fuel rail.
- Failure to release the fuel pressure could result in fuel spilling onto painted or plastic parts, which will be damaged.
- Always replace the sealing washers when the service check bolt is removed or loosened.

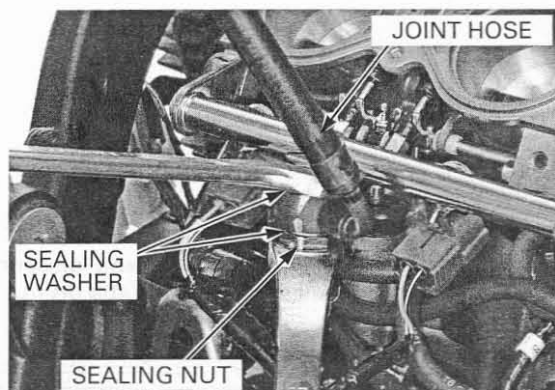
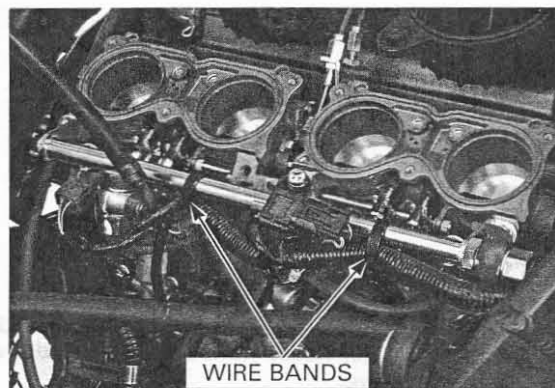
Drain the coolant from the cooling system (page 7-6).

Remove the following:

- Under cowls/middle cowls (page 3-7)
- Fuel tank (page 6-36)
- Air cleaner housing (page 6-40)

Unfasten the wire bands and release the wire harness from the fuel rail.

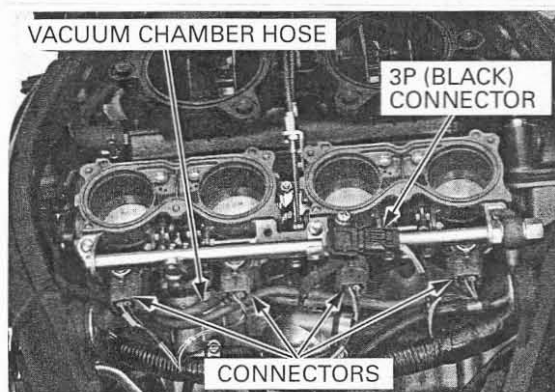
Remove the sealing nut, sealing washers and fuel joint hose from the primary injector fuel rail.



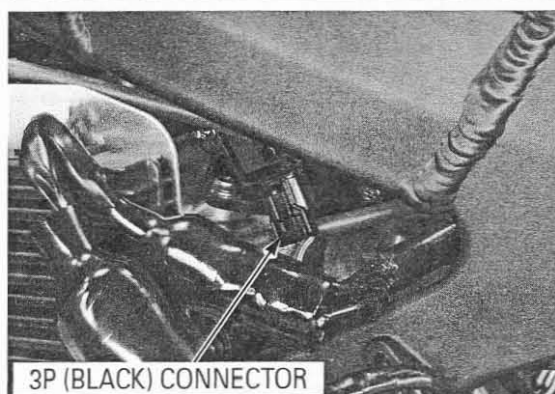
Disconnect the MAP sensor 3P (Black) connector. Disconnect the primary fuel injector connectors from the injectors.

Disconnect the EVAP vacuum hose from the vacuum junction (AC type only).

Disconnect the vacuum chamber hose from the throttle body.



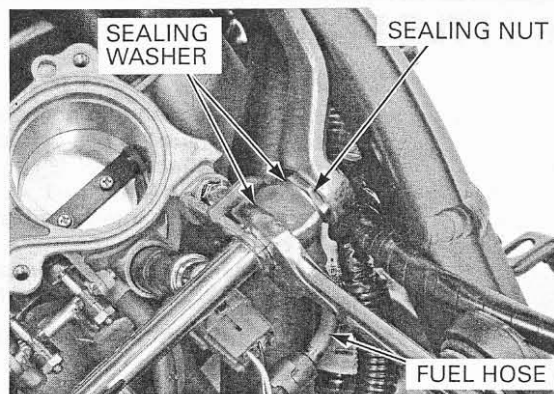
Disconnect the TP sensor 3P (Black) connector.



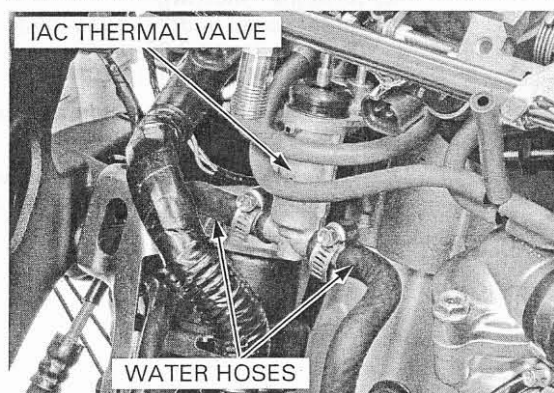


## FUEL SYSTEM (Programmed Fuel Injection)

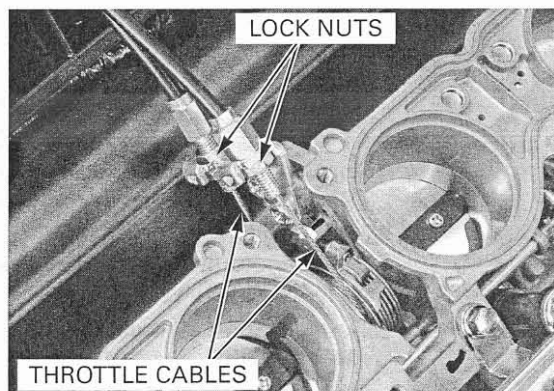
Remove the fuel feed hose sealing nut while holding the fuel rail.



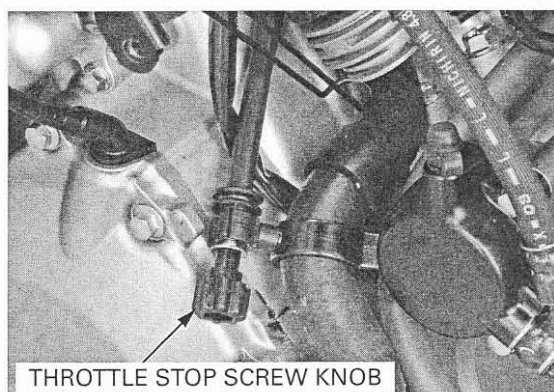
Loosen the hose clamp screws and disconnect the water hoses from the idle air control (IAC) thermal valve.



Loosen the lock nuts and disconnect the throttle cable ends from the throttle drum.



Remove the throttle stop screw knob from the clamp on the bypass hose.

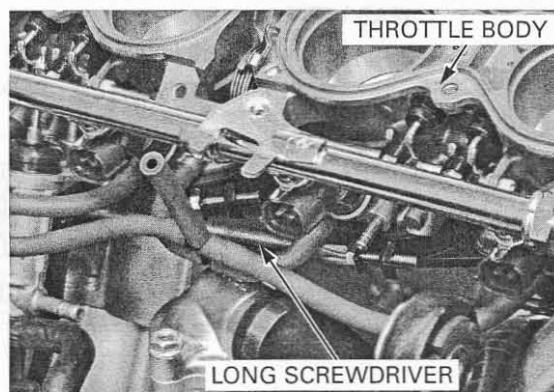


Loosen the engine side insulator band screws using a long phillips screwdriver.

*Do not hold the fuel rail on the throttle body to remove the throttle body, or it may be damaged.*

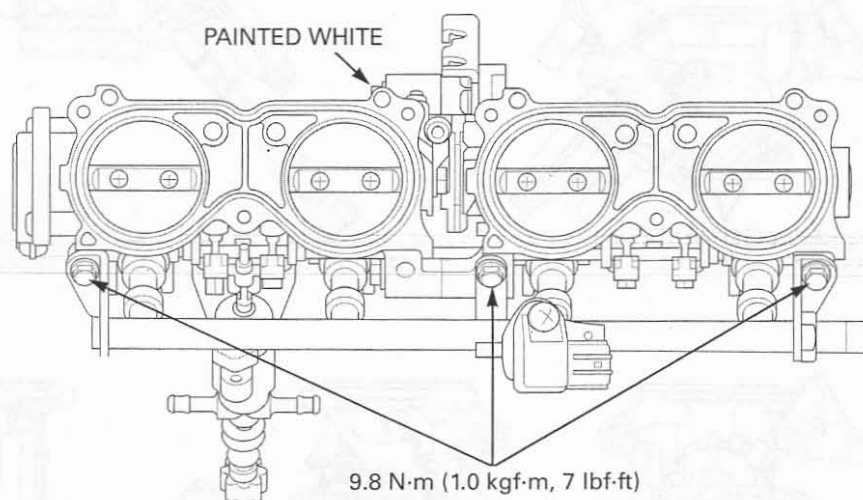
Remove the throttle body from the cylinder head.

- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed. If debris is allowed to enter the ports the engine may be damaged.
- Do not snap the throttle valve from fully open to fully closed after the throttle cable has been removed. It may cause incorrect idle operation.



- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- *The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.*
- *Do not loosen or tighten the painted white bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.*

TOP VIEW:



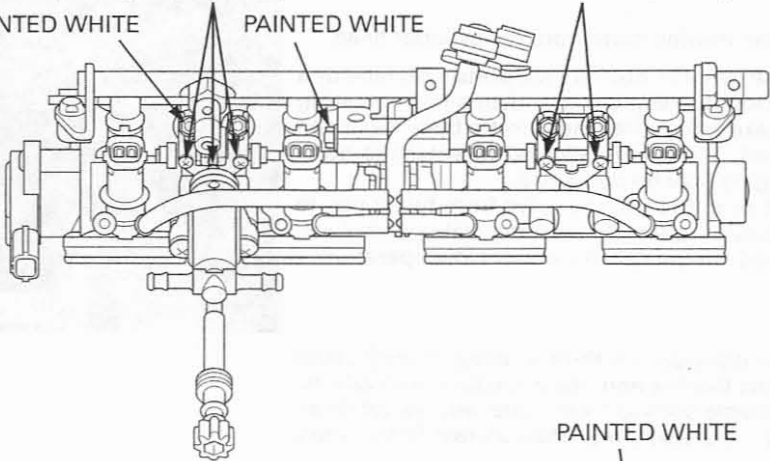


FUEL SYSTEM (Programmed Fuel Injection)

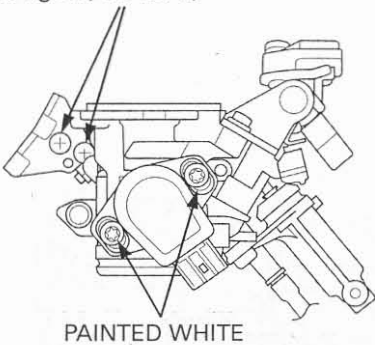
REAR VIEW:

0.9 N·m (0.09 kgf·m, 0.7 lbf·ft)      0.9 N·m (0.09 kgf·m, 0.7 lbf·ft)

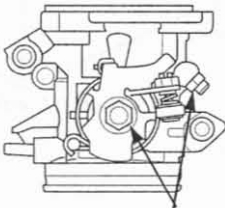
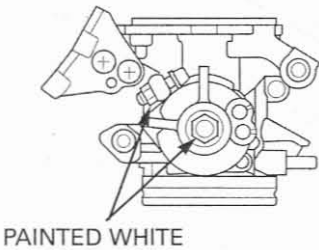
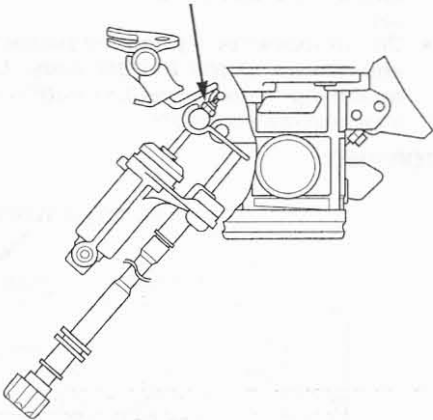
PAINTED WHITE      PAINTED WHITE



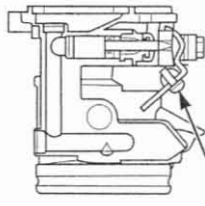
3 N·m (0.35 kgf·m, 2.5 lbf·ft)



PAINTED WHITE



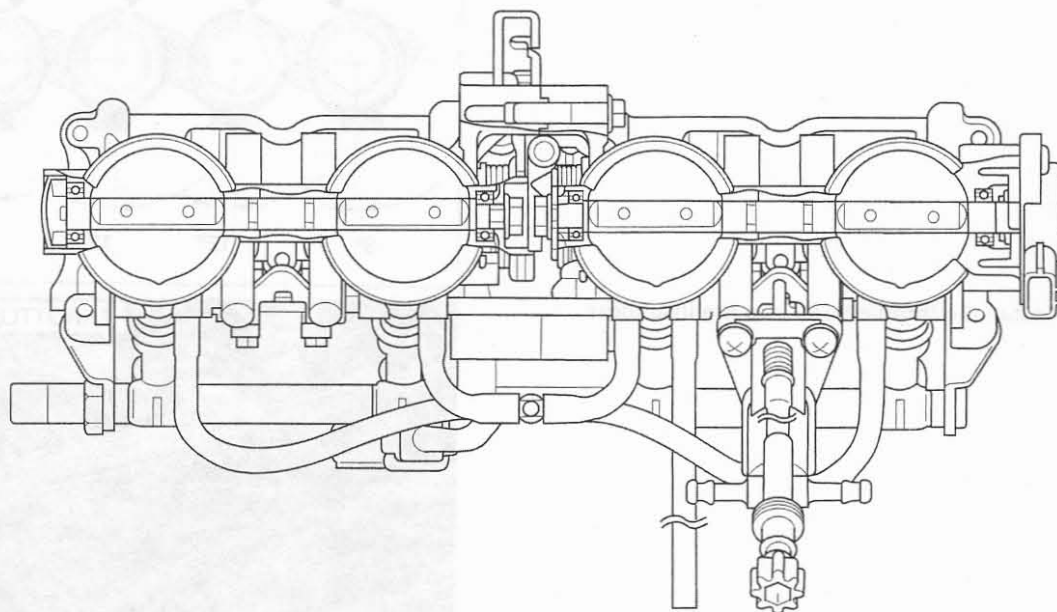
PAINTED WHITE



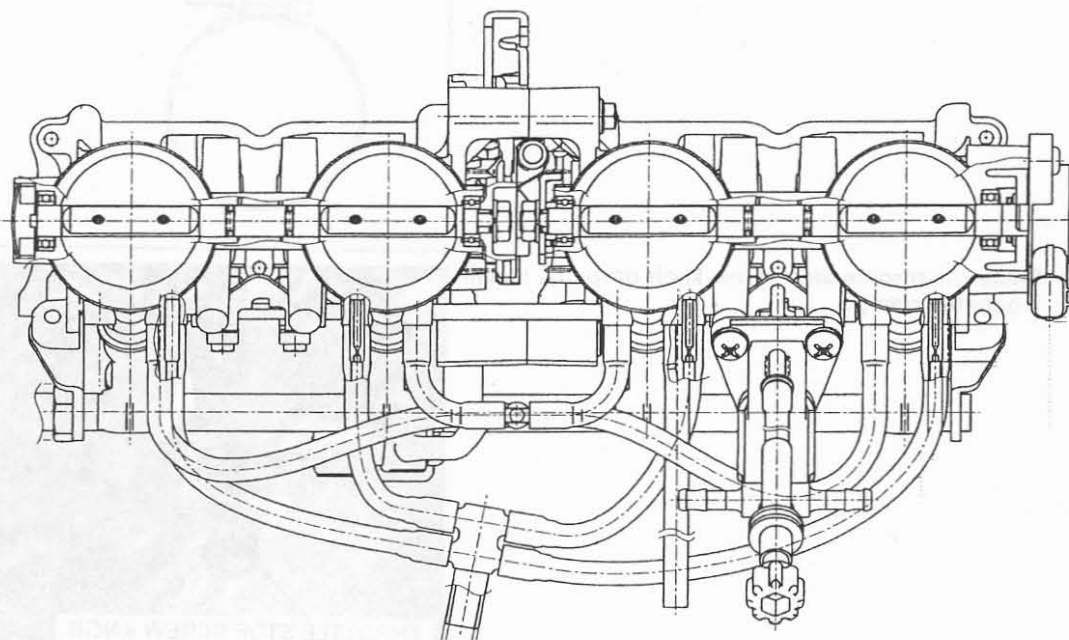
0.9 N·m (0.09 kgf·m, 0.7 lbf·ft)

**THROTTLE BODY VACUUM HOSE  
ROUTING**

EXCEPT CALIFORNIA TYPE:



CALIFORNIA TYPE:



## FUEL SYSTEM (Programmed Fuel Injection)

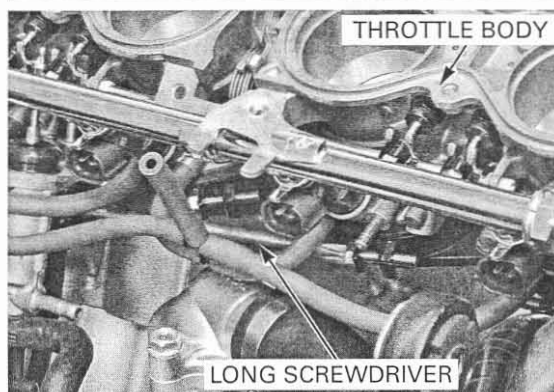
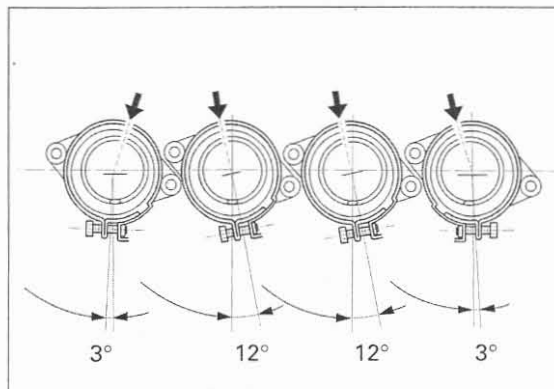
### INSTALLATION

Adjust the insulator band angle as shown.

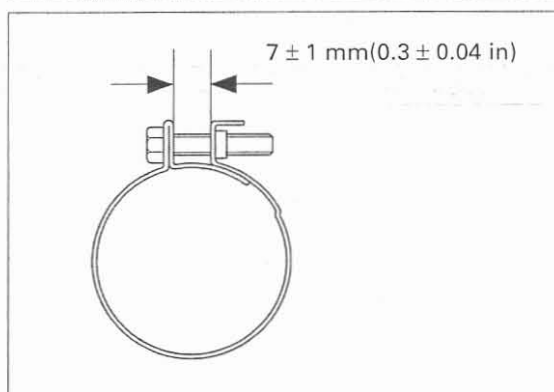
Apply oil to the insulator inside surfaces for ease of throttle body installation.

*Do not hold the fuel rail on the throttle body to install the throttle body.*

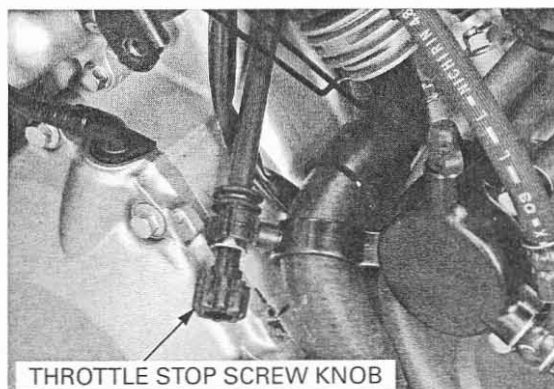
Install the throttle body into the insulators.



Tighten the throttle body side insulator band screw so that the insulator band distance is  $7 \pm 1$  mm ( $0.3 \pm 0.04$  in).

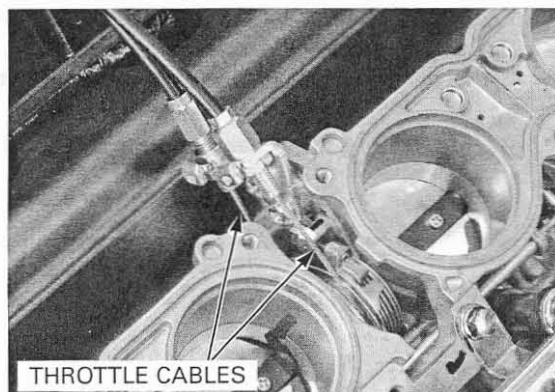


Route the throttle stop screw knob properly, install it onto the clamp.

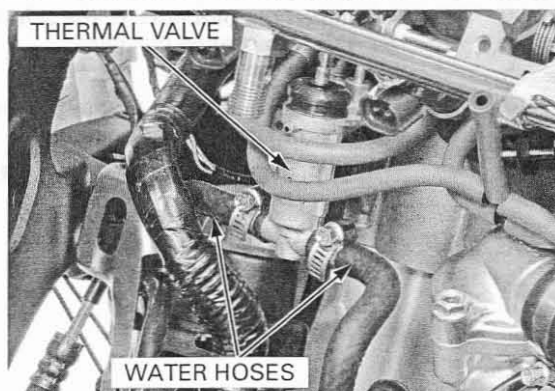


## FUEL SYSTEM (Programmed Fuel Injection)

Route the throttle cables properly (page 1-24). Connect the throttle cable ends to the throttle drum.



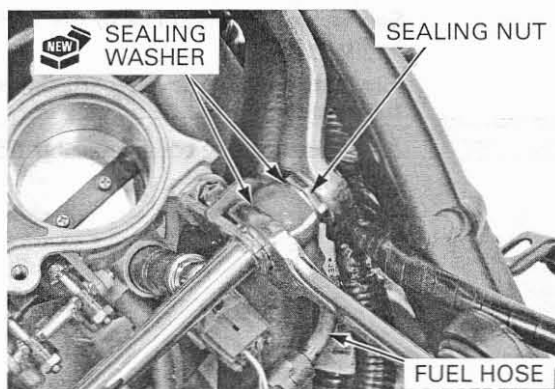
Connect the water hoses to the IAC thermal valve and tighten the hose clamp screws.



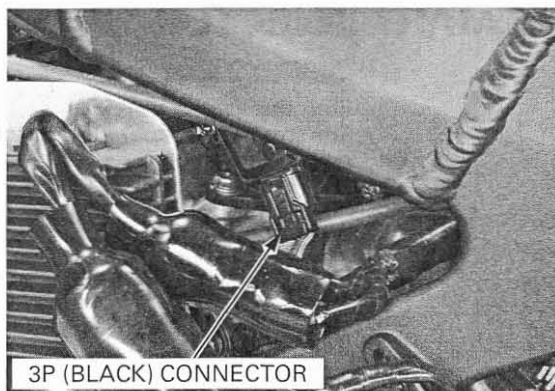
Install the fuel feed hose to the fuel rail with new sealing washers.

Install and tighten the sealing nut to the specified torque while holding the fuel rail.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Connect the TP sensor 3P (Black) connector.



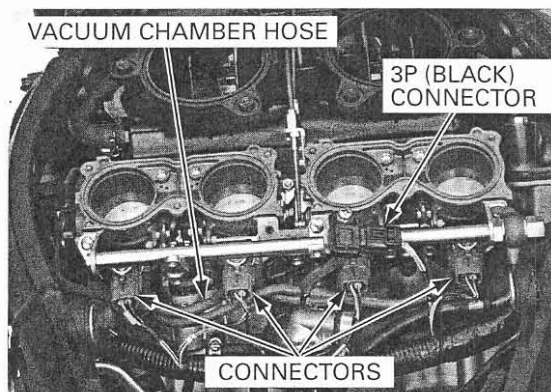
## FUEL SYSTEM (Programmed Fuel Injection)

Connect the primary fuel injector connectors to the injectors.

Connect the EVAP vacuum hose to the vacuum junction (AC type only).

Connect the vacuum chamber hose to the throttle body.

Connect the MAP sensor connector.

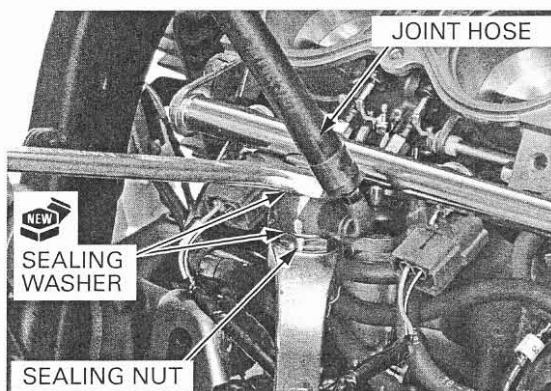


Install the fuel joint hose to the primary injector fuel rail with new sealing washers.

Install the sealing nut.

Tighten the sealing nut to the specified torque while holding the fuel rail securely.

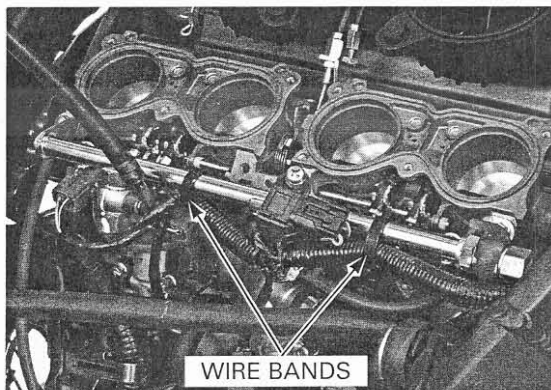
**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Secure the wire harness to the fuel rail using wire bands.

Install the removed parts in the reverse order of removal.

After installation, adjust the throttle grip free play (page 4-7).

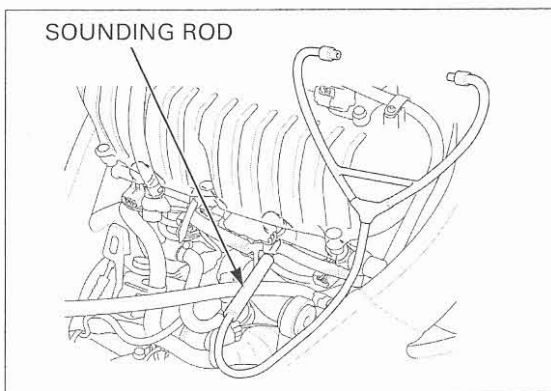


## PRIMARY INJECTOR

### INSPECTION

Start the engine and let it idle.

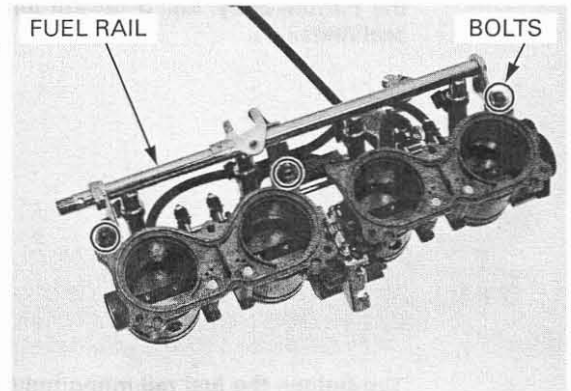
Confirm the injector operating sounds with a sounding rod or stethoscope.



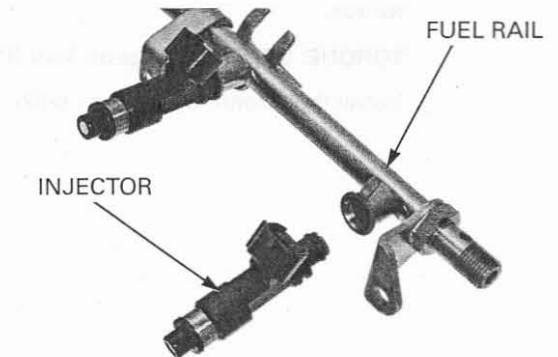
### REMOVAL

Remove the throttle body (page 6-47).

Remove the bolts and fuel rail/primary injector assembly.



Remove the injectors from the fuel rail.



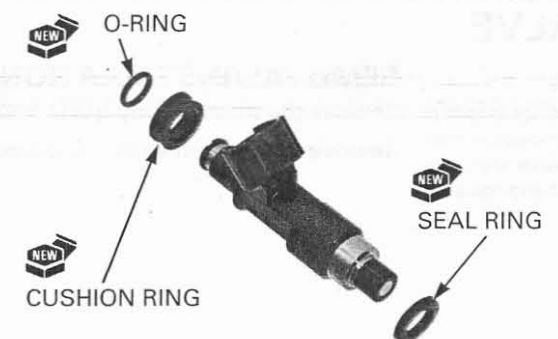
Remove the seal ring, O-ring and cushion ring.

### INSTALLATION

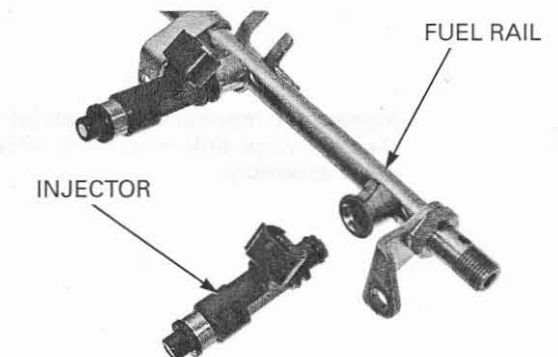
Apply oil to the new O-ring.

*Replace the seal ring, cushion ring and O-ring with new ones as a set.*

Install the new seal ring, cushion ring and O-ring, being careful not to damage the O-ring.



Install the fuel injectors into the fuel rail, being careful not to damage the O-ring and cushion ring.





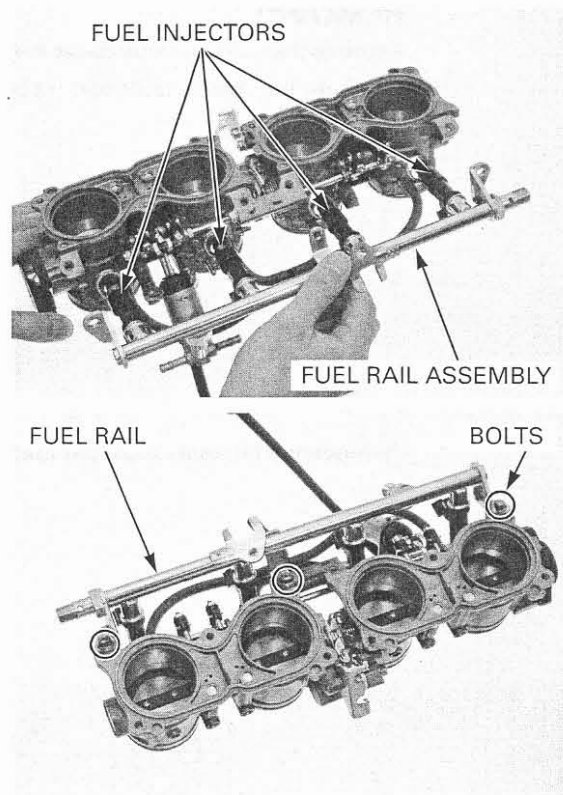
## FUEL SYSTEM (Programmed Fuel Injection)

Install the fuel rail/primary injector assembly onto the throttle body, being careful not to damage the seal rings.

Tighten the fuel rail mounting bolts to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the throttle body (page 6-52).



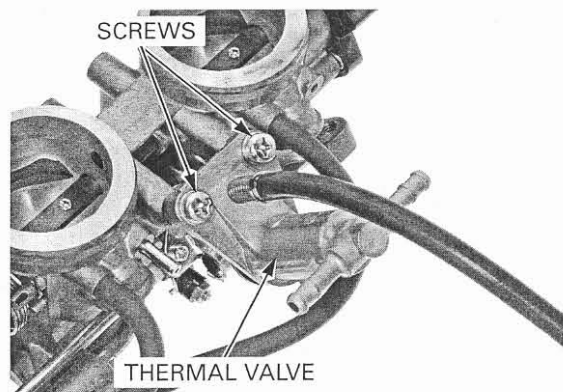
## IDLE AIR CONTROL (IAC) THERMAL VALVE

### REMOVAL/INSTALLATION

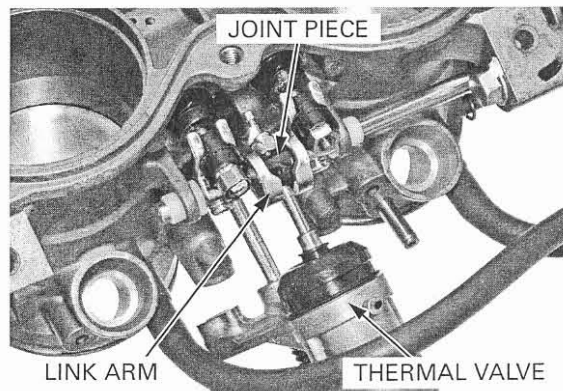
*Do not loosen or remove the thermal valve shaft lock nut and adjusting nut.*

Remove the throttle body (page 6-47).

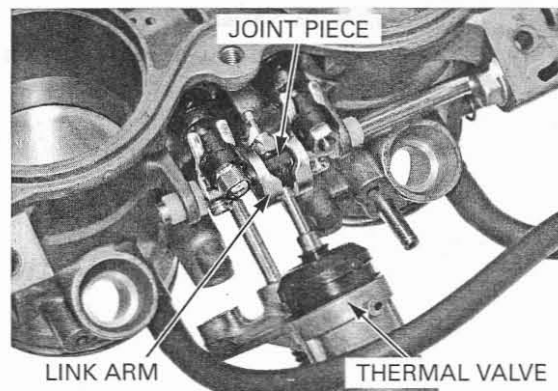
Remove the thermal valve mounting screws.



Release the thermal valve shaft joint piece from the thermal valve link arm, then remove the thermal valve assembly.

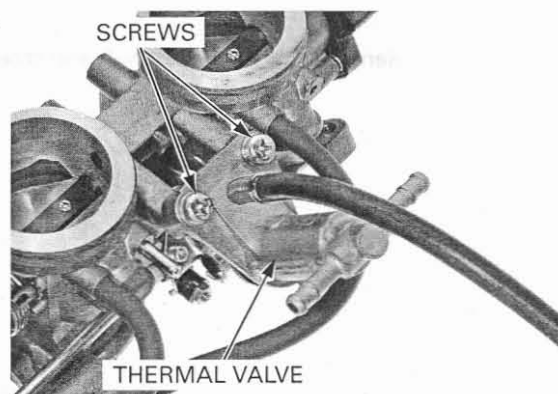


Install the thermal valve shaft joint piece to the thermal valve link arm.



Tighten the thermal valve mounting screws to the specified torque.

**TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)**



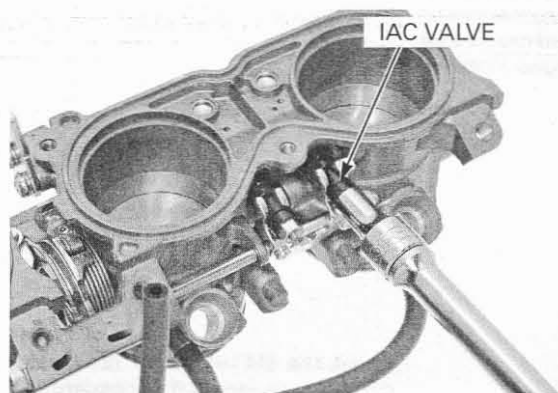
## IDLE AIR CONTROL (IAC) VALVE

### DISASSEMBLY

Remove the throttle body (page 6-47).

Remove the fuel rail and primary injectors (page 6-55).

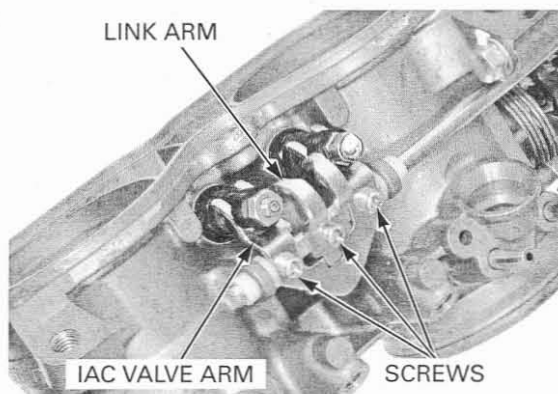
Turn each IAC valve adjusting screw in, recording the number of turns until it seats lightly.



### No.1/2 IAC valve:

Remove the IAC valve arm screws and IAC valve arm.

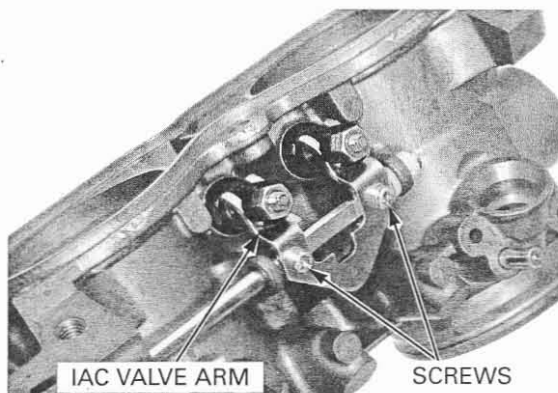
Remove the screw and IAC valve arm.



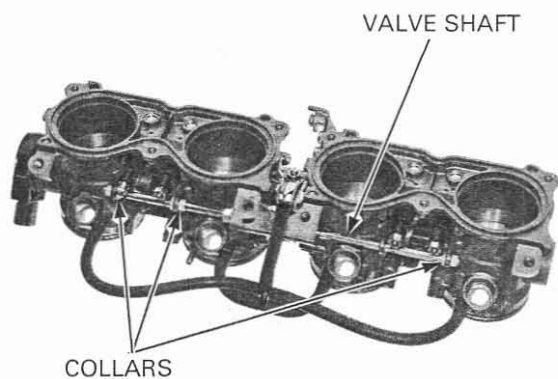
## FUEL SYSTEM (Programmed Fuel Injection)

### No.3/4 IAC valve:

Remove the IAC valve arm screws and IAC valve arm.

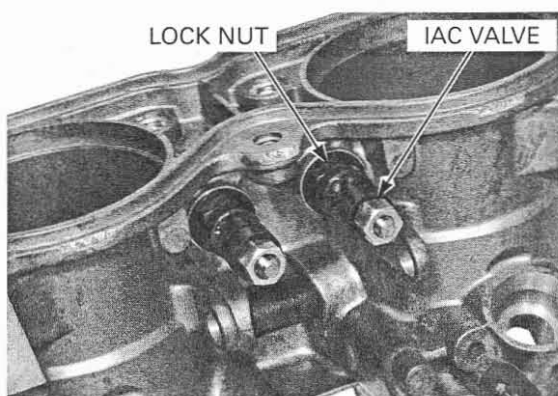


Remove the IAC valve shaft and three collars.

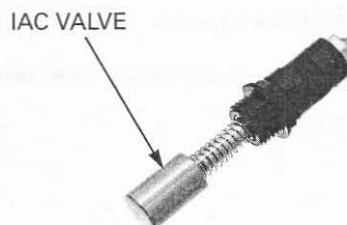


*Mark the IAC valves during disassembly so they can be placed back in their original locations.*

Loosen the lock nut and remove the IAC valves.



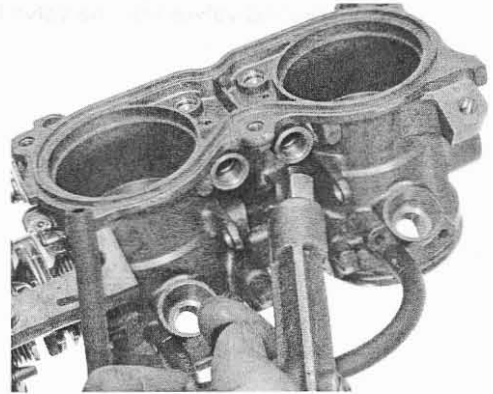
Check the IAC valve for scratches, scoring or other damage, replace it if necessary.



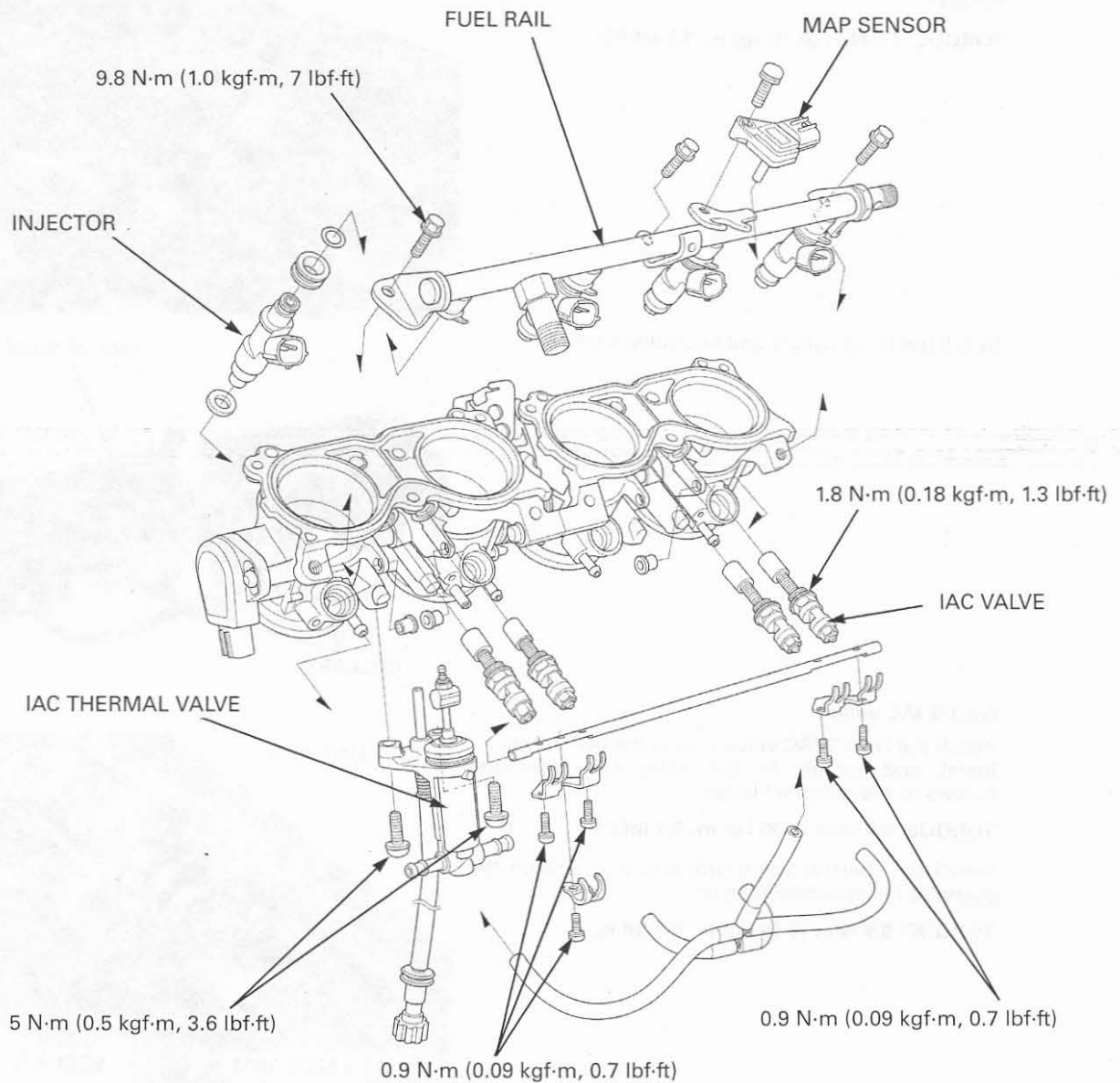
## FUEL SYSTEM (Programmed Fuel Injection)

*Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.*

Clean the IAC valve bypasses using compressed air.

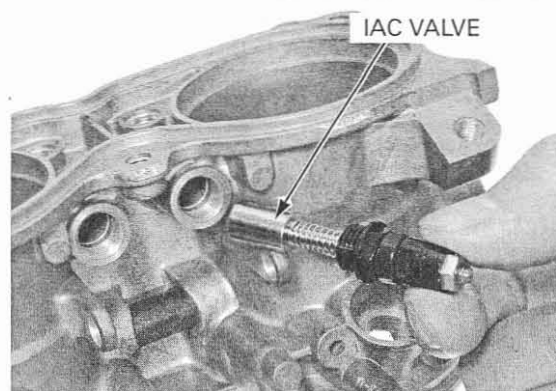


### ASSEMBLY



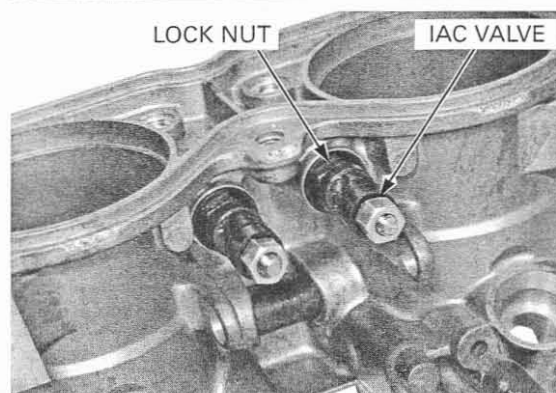
## FUEL SYSTEM (Programmed Fuel Injection)

Install the IAC valves into the valve holes.

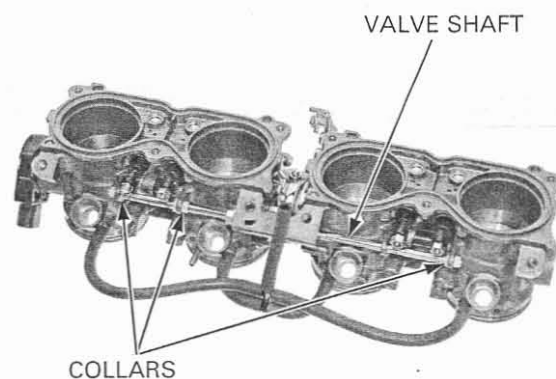


Tighten the IAC valve lock nut to the specified torque.

**TORQUE: 1.8 N·m (0.18 kgf·m, 1.3 lbf·ft)**



Install the three collars and IAC valve shaft.



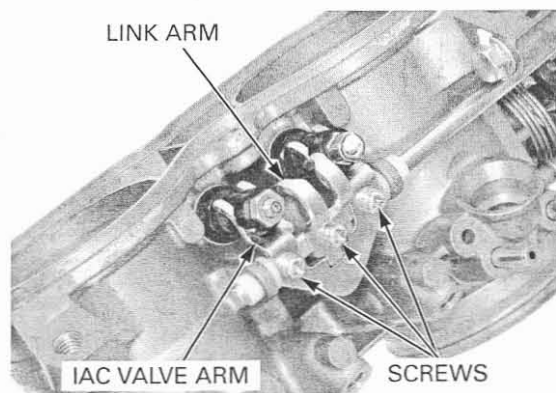
### No.1/2 IAC valve:

Install the No.1/2 IAC valve arm to the IAC valves. Install and tighten the IAC valve arm mounting screws to the specified torque.

**TORQUE: 0.9 N·m (0.09 kgf·m, 0.7 lbf·ft)**

Install the thermal valve link arm and tighten the screw to the specified torque.

**TORQUE: 0.9 N·m (0.09 kgf·m, 0.7 lbf·ft)**

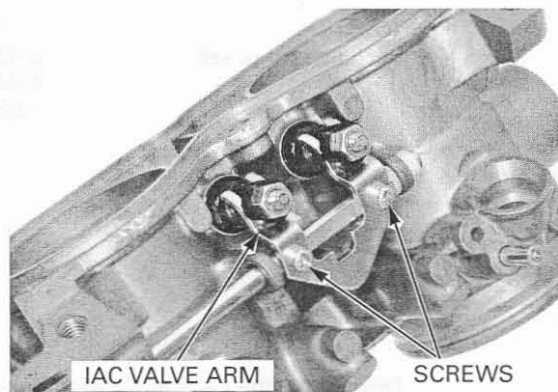


### No.3/4 IAC valve:

Install the No.3/4 IAC valve arm onto the IAC valves. Install and tighten the IAC valve arm mounting screws to the specified torque.

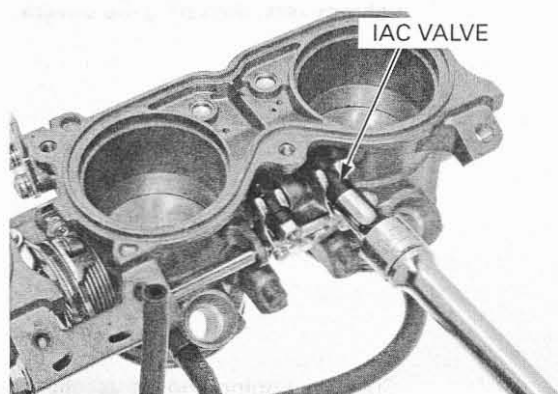
**TORQUE: 0.9 N·m (0.09 kgf·m, 0.7 lbf·ft)**

Install the IAC thermal valve (page 6-56).



Turn the IAC valve screw until it seats lightly, then back it out as noted during removal.

Install the throttle body (page 6-52).



## IAC VALVE SYNCHRONIZATION

- Synchronize the IAC valves with the engine at normal operating temperature and with the transmission in neutral.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

Lift and support the fuel tank (page 4-5).

Disconnect the each vacuum hose from the 5-way joint.





## FUEL SYSTEM (Programmed Fuel Injection)

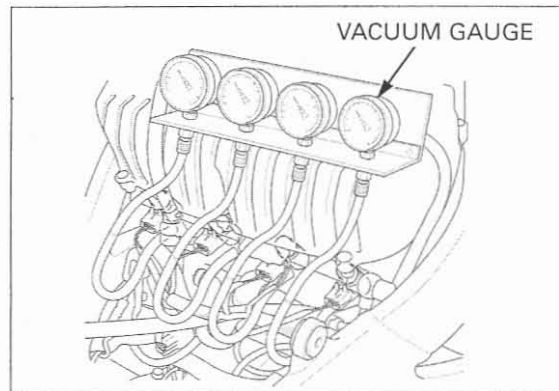
Connect the vacuum hoses to the vacuum gauge.

**TOOL:**

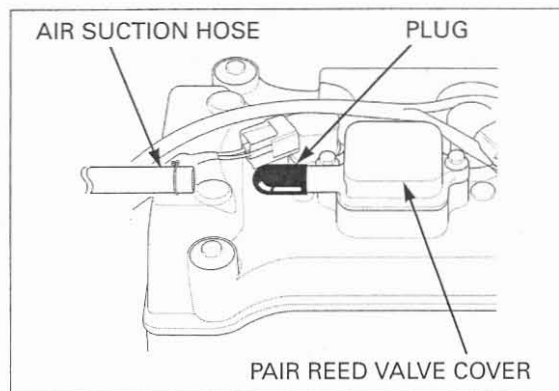
Vacuum gauge set

07LMJ-001010B or  
07LMJ-001000A  
(U.S.A. only)

Connect a tachometer.



Disconnect the PAIR air suction hoses from the reed valve covers, then plug the covers.



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

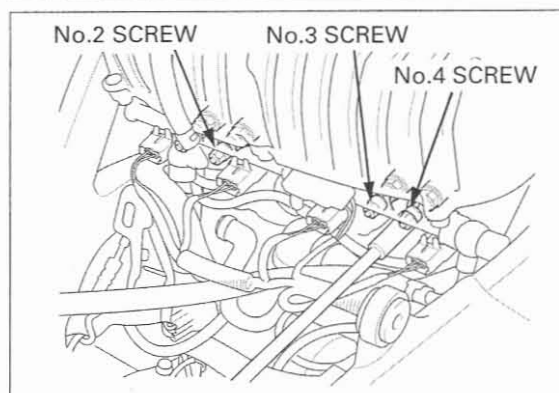
**IDLE SPEED:  $1,200 \pm 100$  rpm**



*The No.1 IAC valve cannot be adjusted, it is the base IAC valve.*

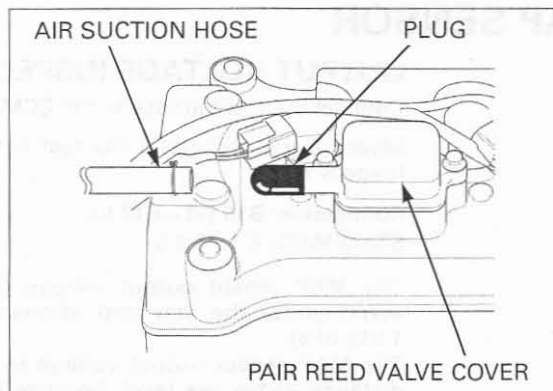
Match each intake vacuum pressure with the No.1 IAC valve.

**IAC VALVE VACUUM DIFFERENCE: 20 mmHg**



## FUEL SYSTEM (Programmed Fuel Injection)

Remove the plugs and connect the PAIR air suction hoses to the reed valve covers.



Adjust the idle speed if the idle speed differs from the specified speed.

**IDLE SPEED:  $1,200 \pm 100$  rpm**



Remove the vacuum gauge from the vacuum hoses. Connect the each vacuum hoses to the 5-way joint.

Reset the ECM failure code (page 6-10).



### MAP SENSOR

#### OUTPUT VOLTAGE INSPECTION

Connect the test harness to the ECM (page 6-11).

Measure the voltage at the test harness terminals (page 6-12).

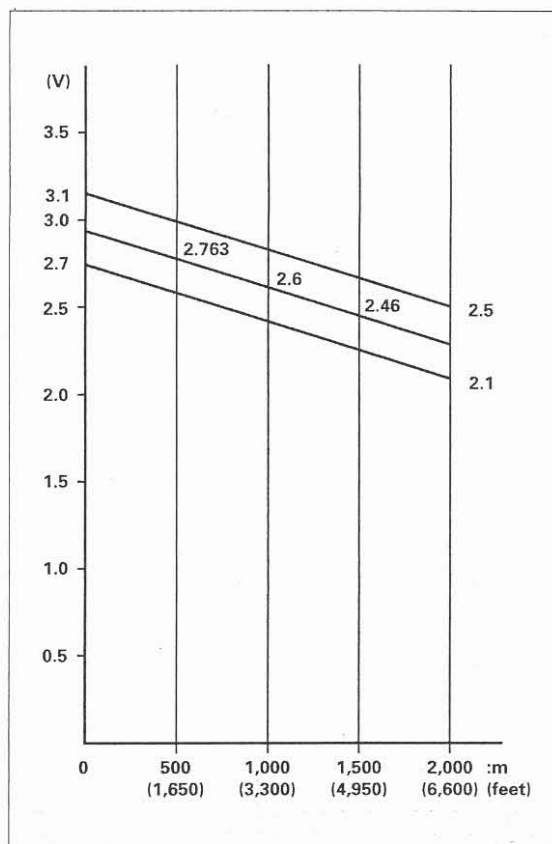
**Connection:** B15 (+) – B17 (–)

**STANDARD:** 2.7 – 3.1 V

The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,013 hPa).

The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmosphere.

Check the sea level measurement and be sure that the measured voltage falls within the specified value.



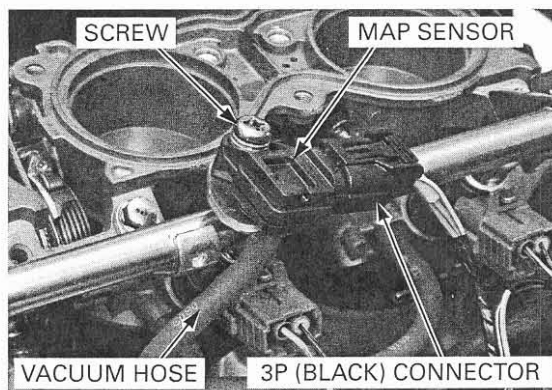
#### REMOVAL/INSTALLATION

Lift and support the fuel tank (page 4-5).

Disconnect the MAP sensor 3P (Black) connector.  
Disconnect the vacuum hose from the MAP sensor.

Remove the screw and MAP sensor from the primary injector fuel rail.

Installation is in the reverse order of removal.



## IAT SENSOR

### REMOVAL/INSTALLATION

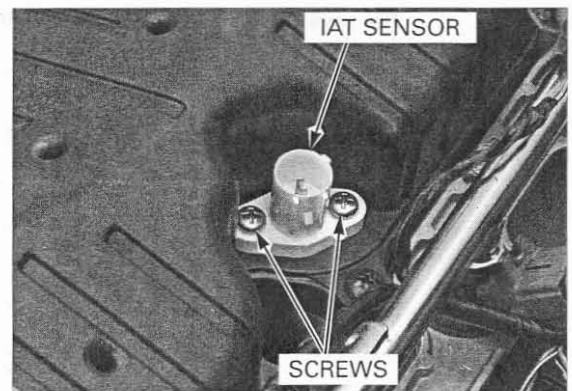
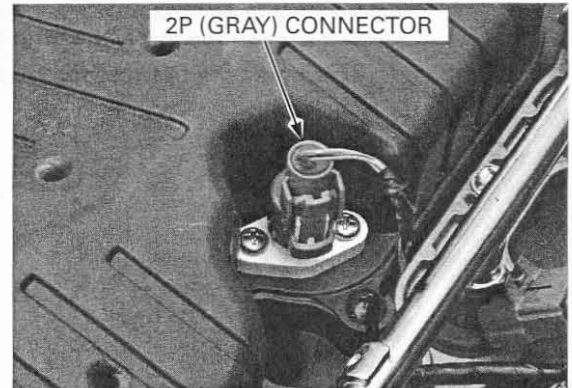
Lift and support the fuel tank (page 4-5).

Disconnect the IAT sensor 2P (Gray) connector.

Remove the screws and IAT sensor from the air cleaner housing.

Installation is in the reverse order of removal.

**TORQUE: 1.2 N·m (0.12 kgf·m, 0.9 lbf·ft)**



## ECT SENSOR

*Replace the ECT sensor while the engine is cold.*

### REMOVAL/INSTALLATION

Drain the coolant from the system (page 7-6).

Lift and support the fuel tank (page 4-5).

Disconnect the 3P (Gray) connector from the ECT sensor.

Remove the ECT sensor and sealing washer.

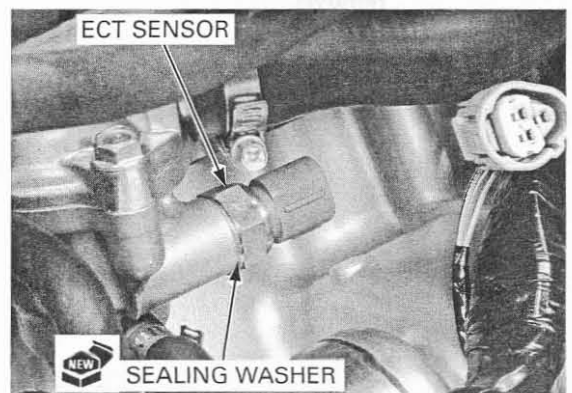
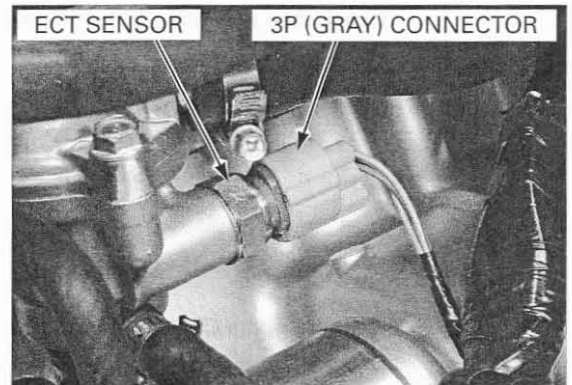
*Always replace a sealing washer with a new one.*

Install a new sealing washer and ECT sensor. Tighten the ECT sensor to the specified torque.

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

Connect the ECT sensor 3P (Gray) connector.

Fill the cooling system with recommended coolant (page 7-6).

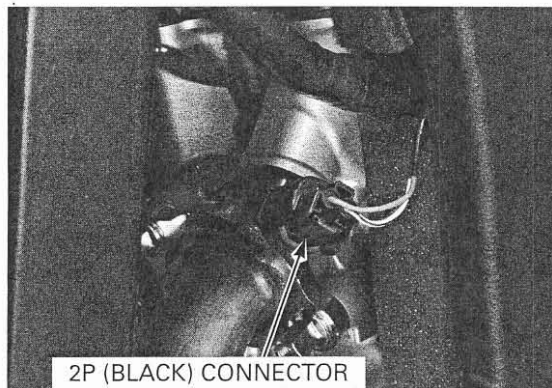


### CMP SENSOR

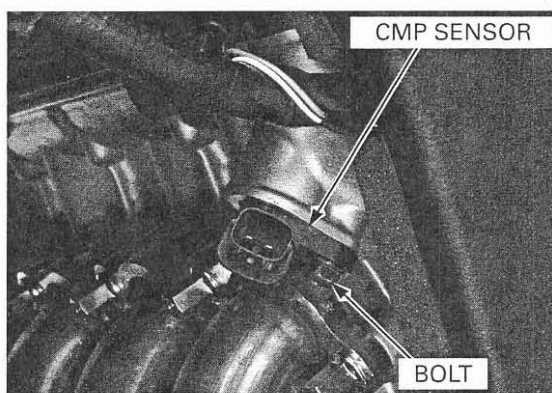
#### REMOVAL/INSTALLATION

Remove the under cowls/middle cowls (page 3-7).  
Lift and support the fuel tank (page 4-5).

Disconnect the CMP sensor 2P (Black) connector.

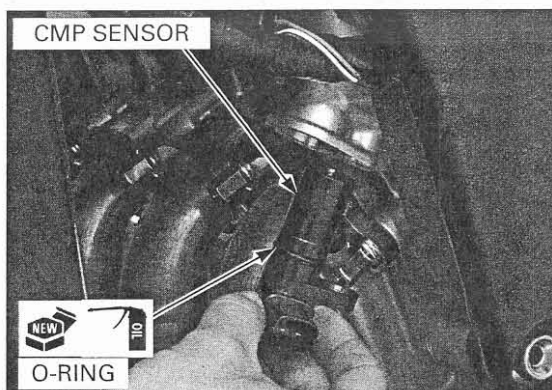


Remove the bolt and CMP sensor from the cylinder head.



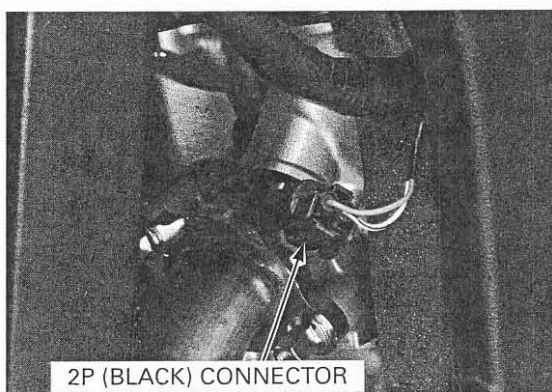
Apply oil to a new O-ring and install it onto the camshaft position sensor groove.  
Install the CMP sensor into the cylinder head.

Tighten the mounting bolt securely.



Connect the CMP sensor 2P (Black) connector.

Install the removed parts in the reverse order of removal.



## BANK ANGLE SENSOR

### INSPECTION

Remove the headlight unit (page 20-5).

Disconnect the bank angle sensor 3P (Green) connector and connect the special tool between the connectors.

#### TOOL:

Inspection adaptor

07GMJ-ML80100

Reinstall the headlight unit and bank angle sensor onto the upper cowl (page 3-12).

Connect the front sub-harness multi-connector.

Turn the ignition switch ON and engine stop switch "O".

Measure the voltage between the following terminals of the test harness.

| TERMINAL                    | STANDARD        |
|-----------------------------|-----------------|
| White/black (+) - Green (-) | Battery voltage |
| Red/white (+) - Green (-)   | 0 - 1 V         |

*Do not disconnect the bank angle sensor connector during inspection.*

Turn the ignition switch OFF.

Remove the upper cowl (page 3-12).

Remove the flange nuts and bank angle sensor.

Reinstall the upper cowl and connect the front sub-harness multi-connector.

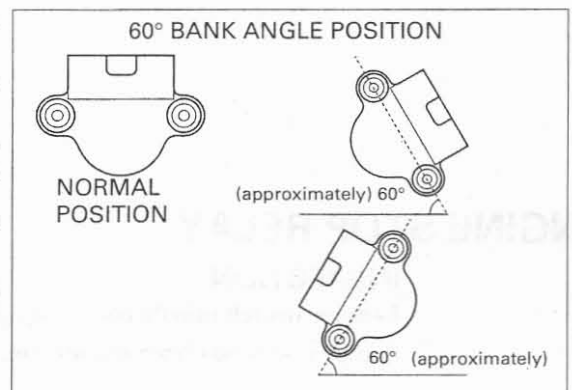
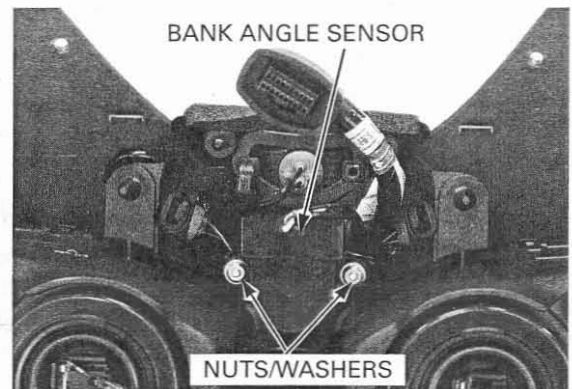
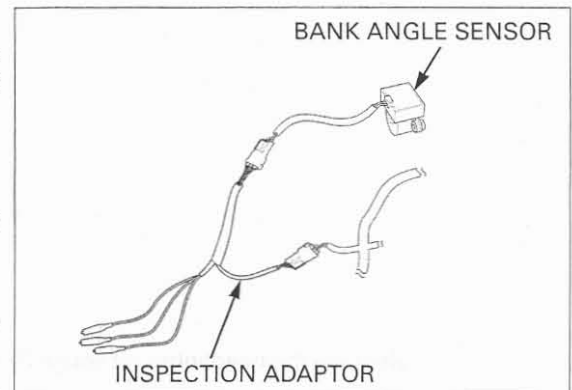
Place the bank angle sensor horizontal as shown, and turn the ignition switch ON.

The bank angle sensor is normal if the engine stop relay clicks and power supply is closed.

Incline the bank angle sensor approximately 60 degrees to the left or right with the ignition switch ON.

The bank angle sensor is normal if the engine stop relay clicks and power supply is open.

If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON.

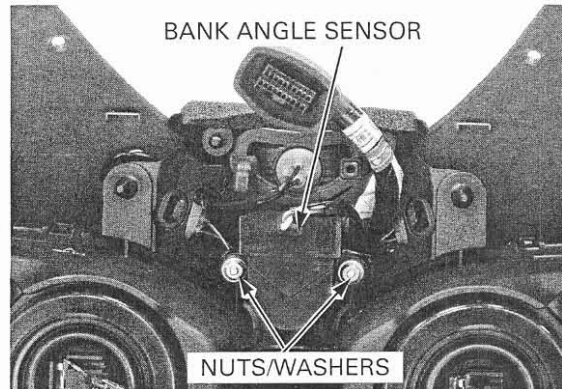




## FUEL SYSTEM (Programmed Fuel Injection)

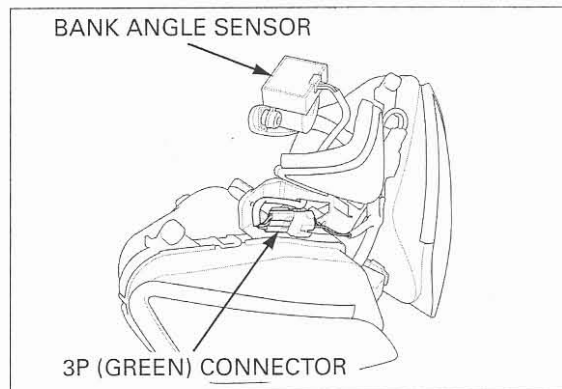
### REMOVAL/INSTALLATION

Remove the bank angle sensor mounting nut and sensor from the headlight unit.



Remove the headlight unit (page 20-5).

Disconnect the bank angle sensor 3P (Green) connector.

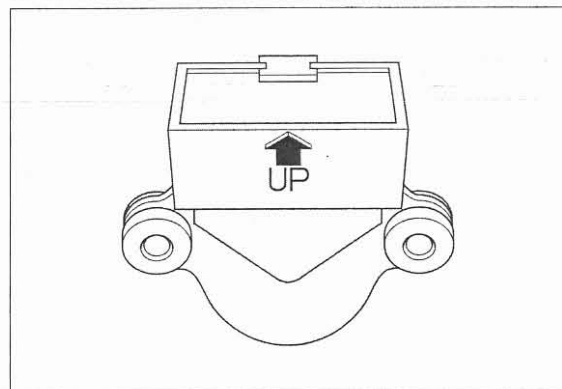


*Install the bank angle sensor with its "UP" mark facing up.*

Installation is in the reverse order of removal.

Tighten the mounting screws to the specified torque.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**

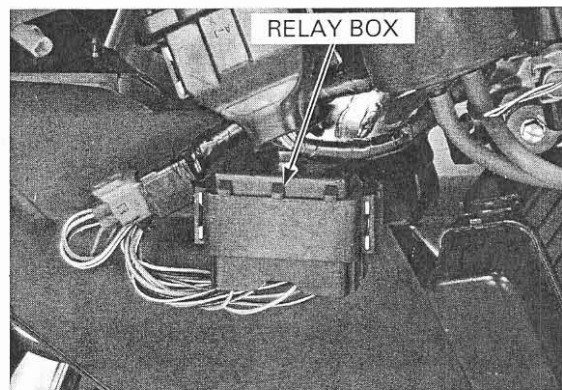


## ENGINE STOP RELAY

### INSPECTION

Remove the left middle cowl (page 3-7)

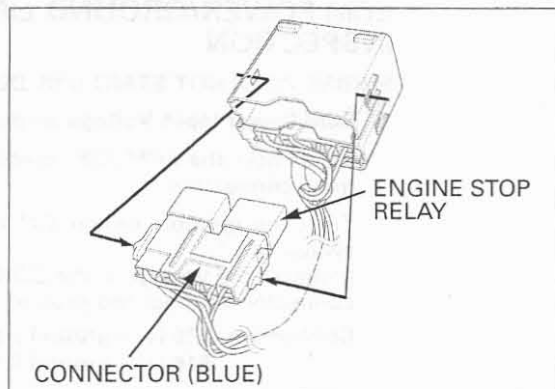
Remove relay box from the bracket.



## FUEL SYSTEM (Programmed Fuel Injection)

Release the retainers (Blue) and remove the relay connector base.

Remove the engine stop relay from the connector.



Connect the ohmmeter to the engine stop relay connector terminals.

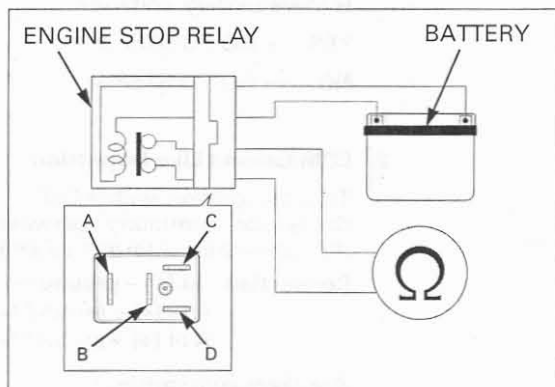
**Connection: A – B**

Connect a 12 V battery to the following engine stop relay connector terminals.

**Connection: C (+) – D (–)**

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the engine stop relay.



## ENGINE CONTROL MODULE (ECM)

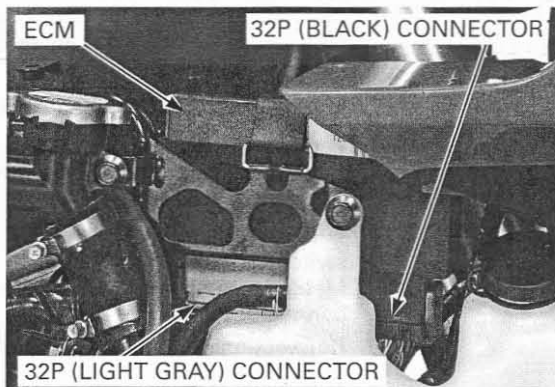
### REMOVAL/INSTALLATION

Remove the under cowls/middle cowls (page 3-7).

Disconnect the ECM 32P (Black) and 32P (Light gray) connectors.

Remove the holder band and ECM.

Installation is in the reverse order of removal.



## FUEL SYSTEM (Programmed Fuel Injection)

### ECM POWER/GROUND LINE INSPECTION

#### ENGINE DOES NOT START (MIL DOES NOT BLINK)

##### 1. ECM Power Input Voltage Inspection

Disconnect the ECM 32P (Black) and 32P (Light gray) connectors.

Turn the ignition switch ON and engine stop switch "O".

Measure the voltage at the ECM 32P (Light gray) connector terminal and ground.

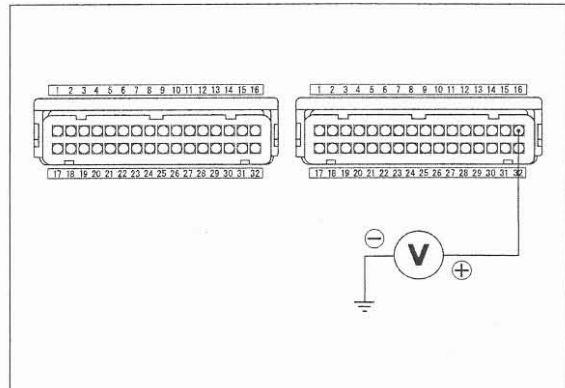
**Connection:** B15 (+) – ground (-)

B16 (+) – ground (-)

*Is there battery voltage?*

**YES** – GO TO STEP 2.

**NO** – GO TO STEP 3.



##### 2. ECM Ground Line Inspection

Turn the ignition switch OFF.

Check for continuity between the ECM 32P (Black) connector terminals and ground.

**Connection:** A4 (+) – ground (-)

A18 (+) – ground (-)

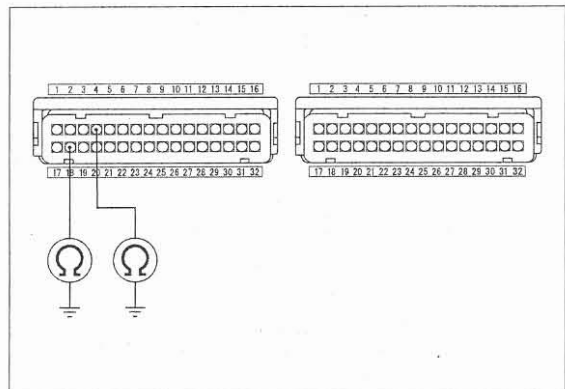
A19 (+) – ground (-)

*Are there continuities?*

**YES** – Replace the ECM with a know good one, and recheck.

**NO** –

- Open circuit in the Green/pink (A18) wire
- Open circuit in the Green /pink (A4) wire



##### 3. Engine Stop Relay Inspection 1

Turn the ignition switch OFF.

Remove the engine stop relay from the relay connector base.

Turn the ignition switch ON and engine stop switch "O".

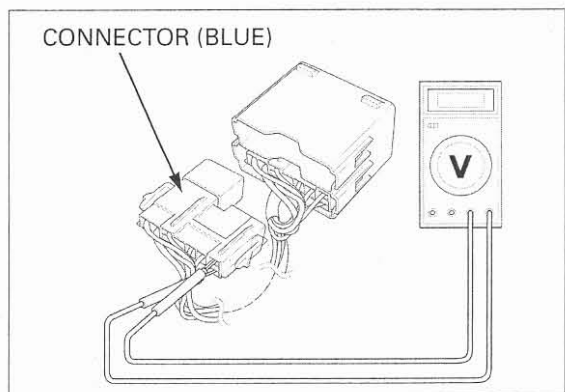
Measure the voltage at the engine stop relay connector terminals.

**Connection:** Black (+) – Red/blue (-)

*Is there battery voltage?*

**YES** – GO TO STEP 4.

**NO** – Inspect the bank angle sensor (page 6-67)



## 4. Engine Stop Relay Inspection 2

Turn the ignition switch OFF.  
Jump the engine stop relay connector terminals.

**Connection: Red/white – Black/white**

Turn the ignition switch ON.  
Measure the voltage at the ECM connector terminal and ground.

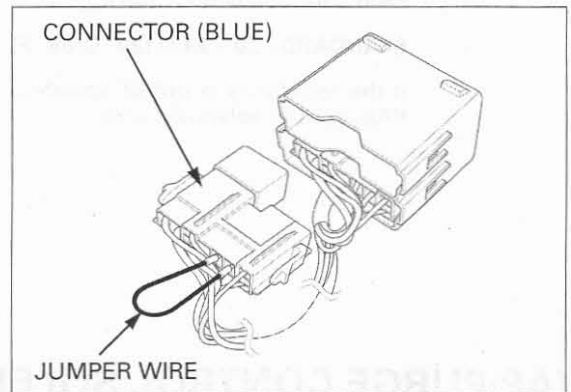
**Connection: B15 (+) – ground (-)**

**B16 (+) – ground (-)**

**Is there battery voltage?**

**YES** – Inspect the engine stop relay (page 6-68)

**NO** – Open circuit in power input line (Black/white or Red/white) between the battery and the ECM



## PAIR CONTROL SOLENOID VALVE

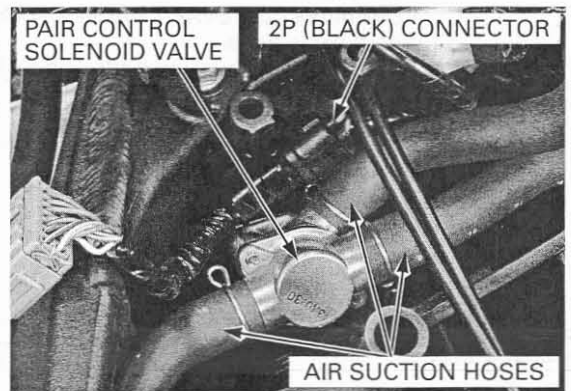
### REMOVAL/INSTALLATION

Remove the air cleaner housing (page 6-40).

Disconnect the PAIR control solenoid valve 2P (Black) connector.

Disconnect the PAIR air suction hoses and remove the PAIR control solenoid valve.

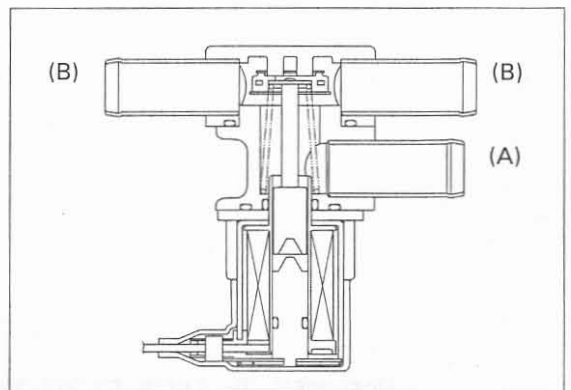
Installation is in the reverse order of removal.



### INSPECTION

Remove the PAIR control solenoid valve.

Check that air flows (A) to (B) when the 12 V battery is connected to the PAIR control solenoid valve terminals. Air should not flow (A) to (B) when there is no voltage applied to the PAIR valve terminals.

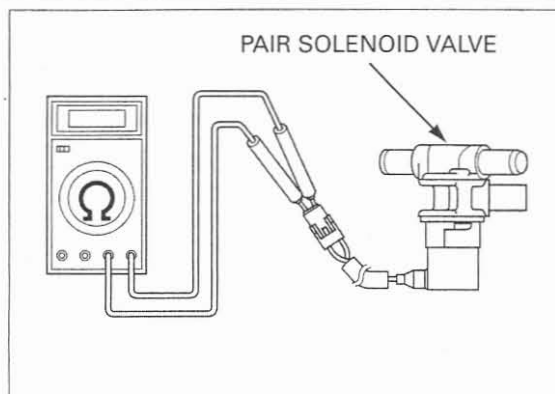


## FUEL SYSTEM (Programmed Fuel Injection)

Check the resistance between the terminals of the PAIR control solenoid valve.

**STANDARD: 20 – 24  $\Omega$  (20 °C/68 °F)**

If the resistance is out of specification, replace the PAIR control solenoid valve.



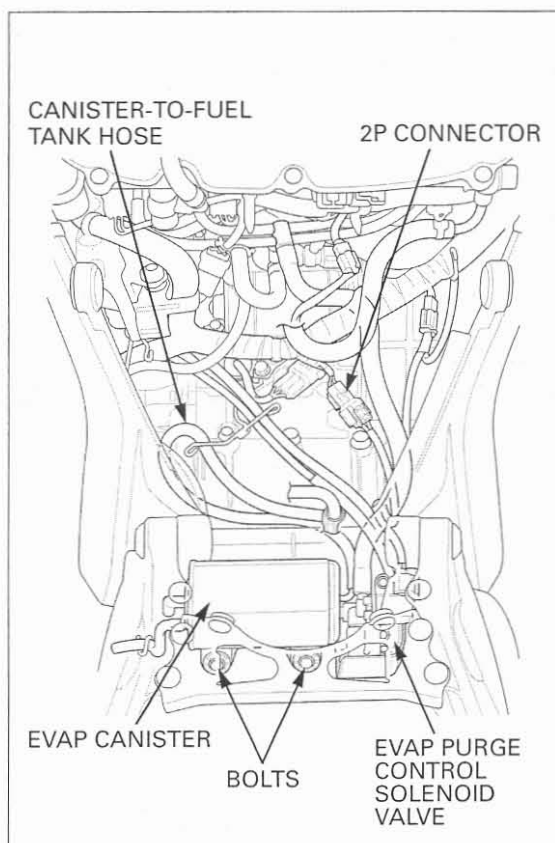
## EVAP PURGE CONTROL SOLENOID VALVE (CALIFORNIA TYPE ONLY)

### REMOVAL/INSTALLATION

Disconnect the EVAP canister-to-fuel tank hose from the canister.

Disconnect the EVAP canister-to-purge control solenoid valve hose.

Remove the mounting bolts and EVAP canister from the bracket.

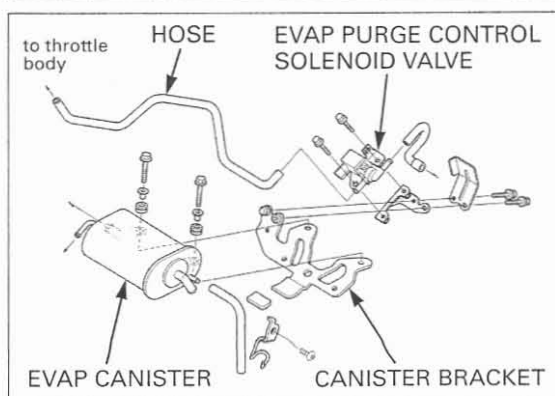


Disconnect the purge control solenoid valve-to-throttle body hose from the solenoid valve.

Remove the bolts and canister bracket/solenoid valve as an assembly from the frame.

Remove the bolts and EVAP purge control solenoid valve from the bracket.

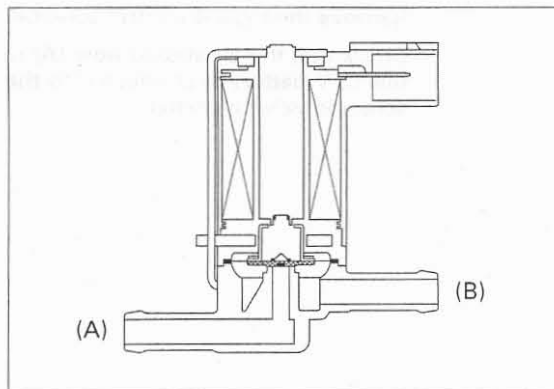
Installation is in the reverse order of removal.



## INSPECTION

Remove the EVAP purge control solenoid valve.

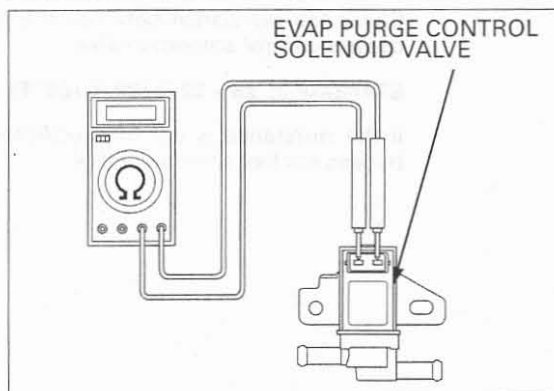
Check that air should not flow (A) to (B), only when the 12 V battery is connected to the EVAP purge control solenoid valve terminal.



Check the resistance between the terminals of the EVAP purge control solenoid valve.

**STANDARD: 30 – 34  $\Omega$  (20 °C/68 °F)**

If the resistance is out of specification, replace the EVAP purge control solenoid valve.



## INTAKE AIR DUCT

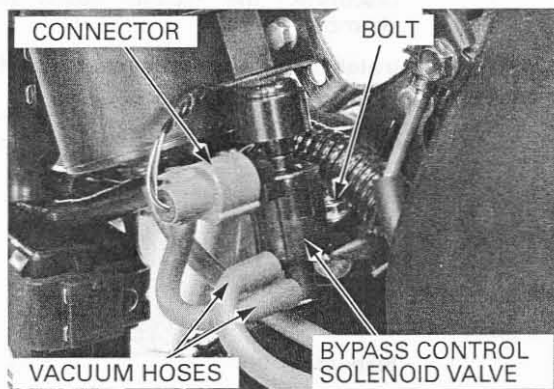
### INTAKE AIR DUCT CONTROL SOLENOID VALVE

#### Removal/Installation

Remove the left middle cowl (page 3-7).

Disconnect the vacuum hoses and connector from the bypass control solenoid valve.

Remove the bolt and bypass control solenoid valve.



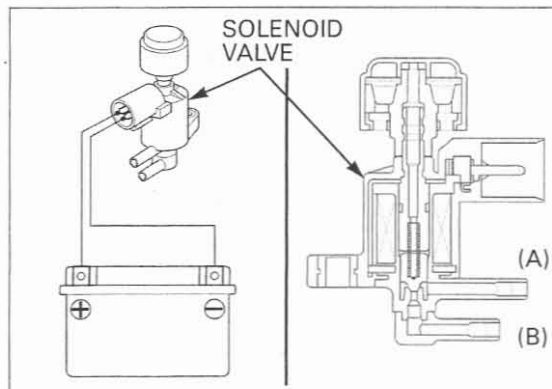


## FUEL SYSTEM (Programmed Fuel Injection)

### Inspection

Remove the bypass control solenoid valve.

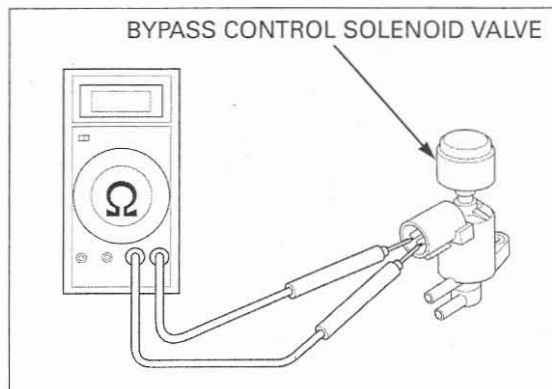
Check that the air should flow (A) to (B), only when the 12 V battery is connected to the bypass control solenoid valve terminal.



Check the resistance between the terminals of the bypass control solenoid valve.

**STANDARD:** 28 – 32  $\Omega$  (20 °C/68 °F)

If the resistance is out of specification, replace the bypass control solenoid valve.



### VACUUM CHAMBER/ONE-WAY VALVE

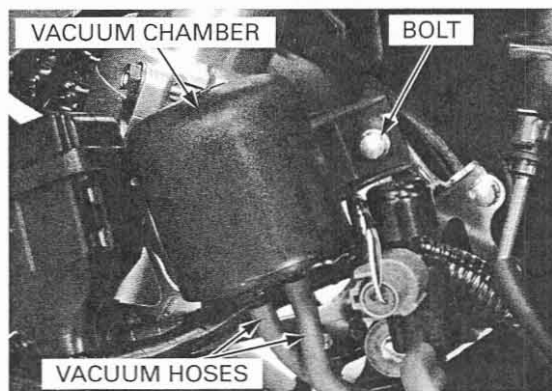
#### Removal/Installation

Remove the left middle cowl (page 3-7).

Disconnect the vacuum hoses and the vacuum chamber.

Installation is in the reverse order of removal.

*Route the vacuum hoses correctly.*



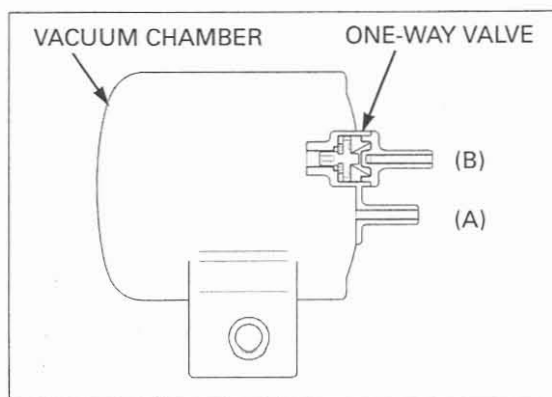
### Inspection

Check the vacuum chamber for damage and scratches, replace if necessary.

Check the one-way valve operation in the vacuum chamber as follows:

- Air should flow (A) to (B)
- Air should not flow (B) to (A)

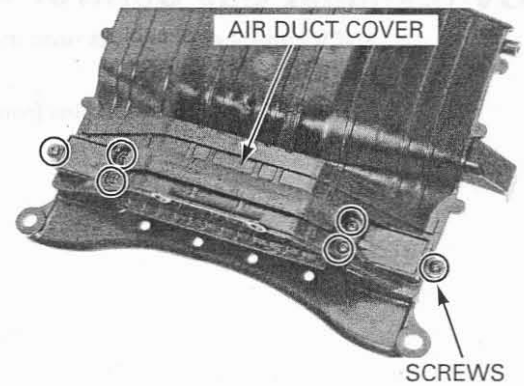
If the operation is incorrect, replace the vacuum chamber/one-way valve assembly.



### INTAKE AIR DUCT DIAPHRAGM/FLAP

Remove the intake air duct from the air cleaner housing (page 4-8).

Remove the screws and air duct cover.

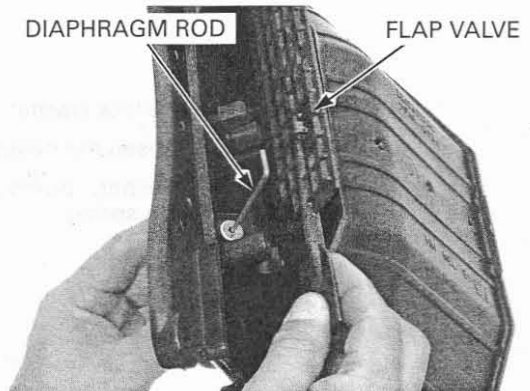


Unhook the diaphragm rod from the flap valve, then remove the flap valve.

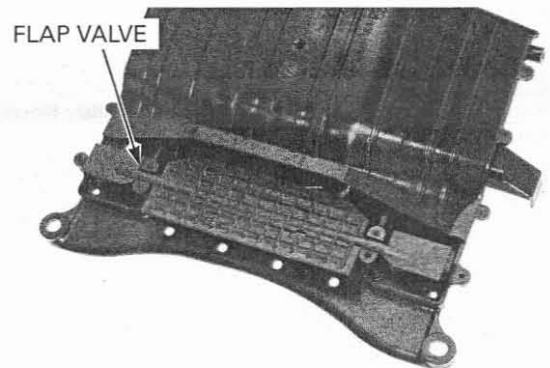
Remove the diaphragm from the intake air duct.

Install the diaphragm into the intake air duct.

Hook the diaphragm rod with the flap valve hole as shown.



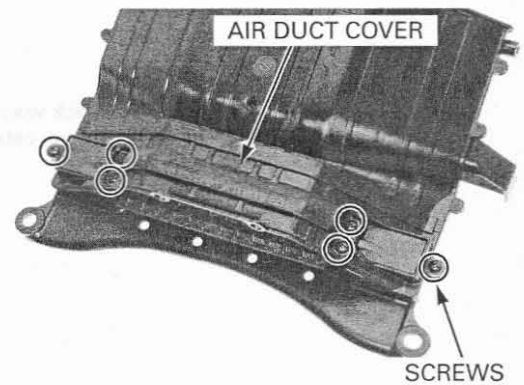
Place the flap valve onto the intake air duct.



Install the air duct cover and tighten the screws to the specified torque.

**TORQUE: 1.2 N·m (0.12 kgf·m, 0.9 lbf·ft)**

Install the intake air duct to the air cleaner housing (page 4-8).

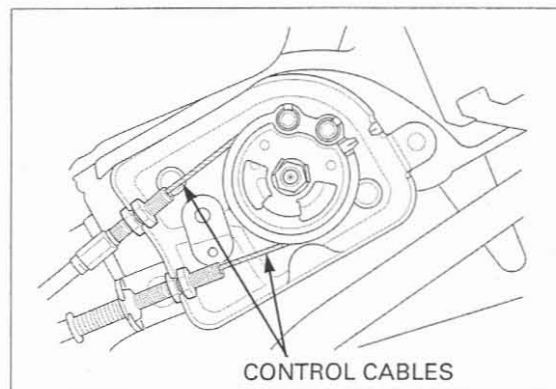


## EGCV (Exhaust Gas Control Valve)

EGCV control cable adjustment (page 4-35).

### DISASSEMBLY

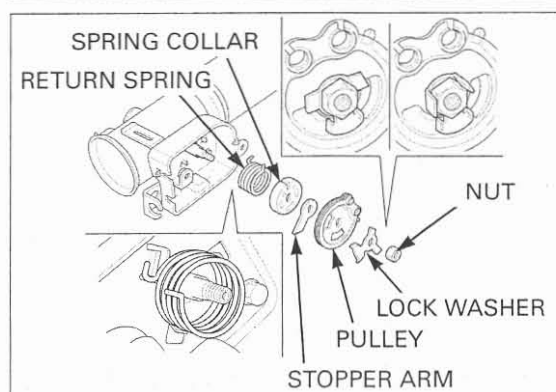
Disconnect the control cables from the pulley.



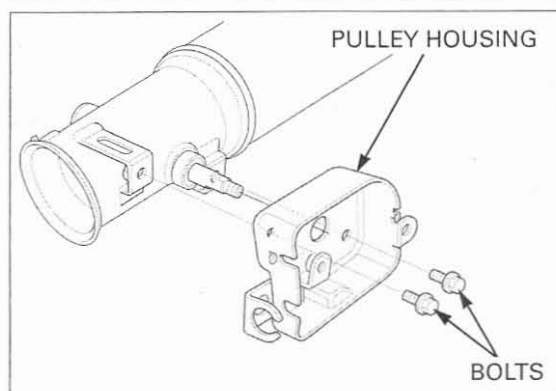
Bend up the tabs of the lock washer.

Hold the pulley and loosen the pulley nut.

Remove the lock washer, pulley, stopper arm, spring collar and return spring.

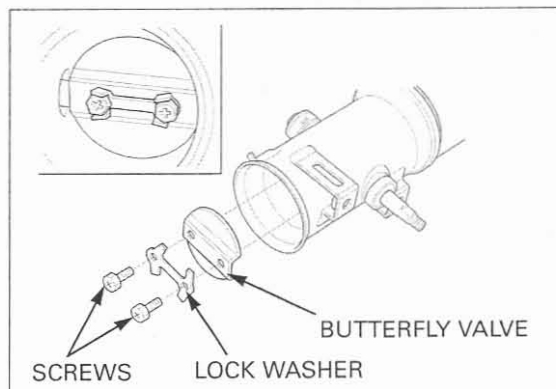


Remove the bolts and pulley housing.

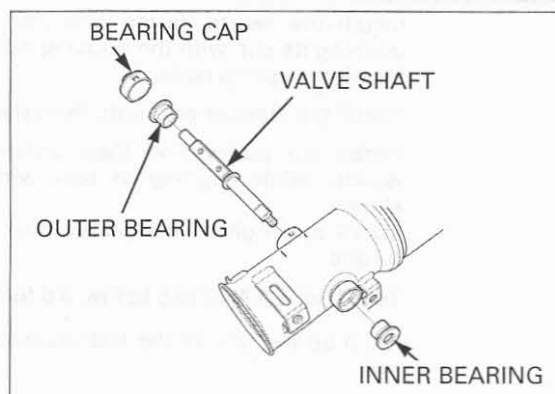


Bend up the tabs of the lock washer.

Remove the butterfly valve retaining screws, lock washer and butterfly valve.



Remove the bearing cap.  
Push the exhaust valve shaft and remove the outer bearing.  
Remove the inner bearing.

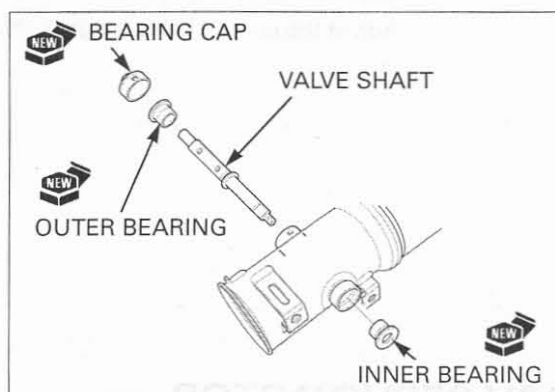


## ASSEMBLY

Press the new inner bearing into the exhaust shaft pivot.

Install the exhaust valve shaft, then press the new outer bearing into the exhaust valve shaft pivot.

Install the new bearing cap securely.



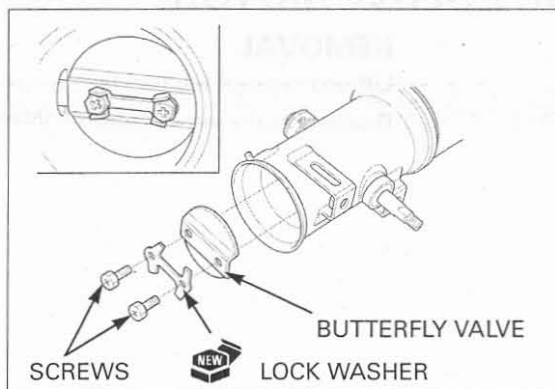
*Note the direction of the butterfly valve.*

Install the butterfly valve into the muffler pipe.

Place the new lock washer onto the butterfly valve and then install and tighten the retaining screws to the specified torque.

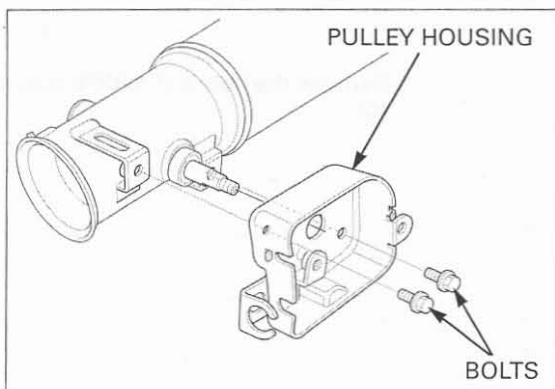
**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**

Bend up the tabs of the lock washer and secure the screw head.



Install the pulley housing onto the muffler pipe, tighten install and tighten the housing bolts to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**



## FUEL SYSTEM (Programmed Fuel Injection)

Install the return spring onto the housing while aligning its end with the housing boss.  
Install the spring collar.

Install the stopper arm onto the valve shaft.

Install the pulley and then install the new lock washer while aligning its tabs with the pulley as shown.

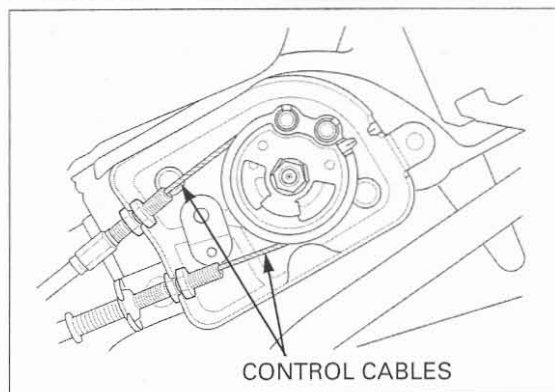
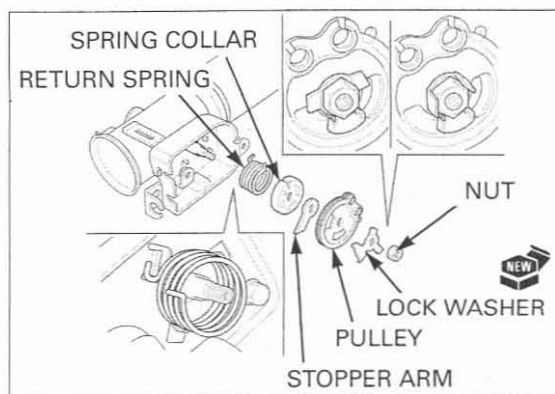
Install and tighten the pulley nut to the specified torque.

**TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)**

Bend up the tabs of the lock washer and secure the nut.

Connect the control cables to the pulley.

Adjust the control cable (page 4-35).

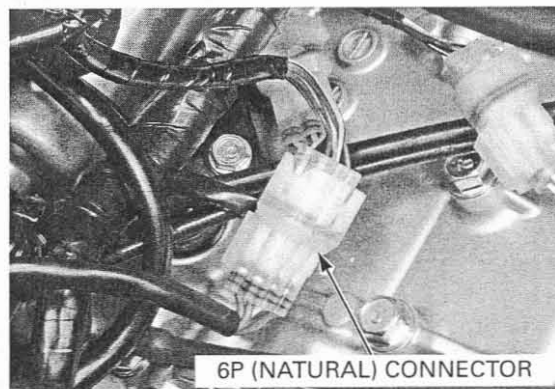


## EGCV SERVOMOTOR

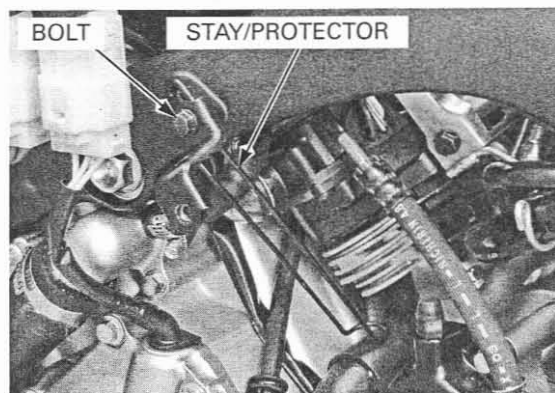
### REMOVAL

Lift and support the fuel tank (page 4-5).

Disconnect the servomotor 6P (Natural) connector.

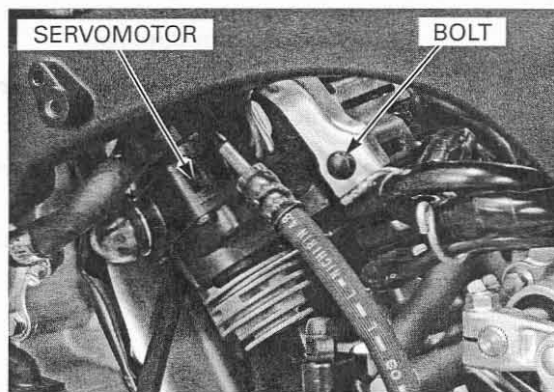


Remove the bolt and middle cowl stay/cable protector.

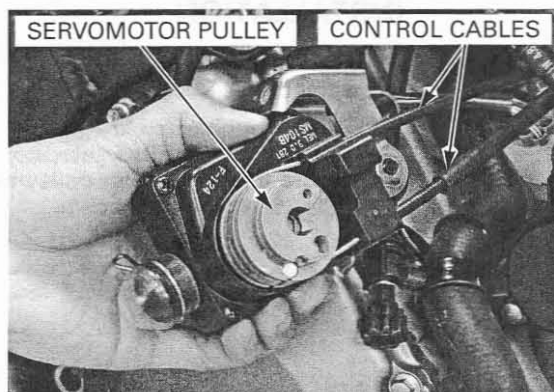


## FUEL SYSTEM (Programmed Fuel Injection)

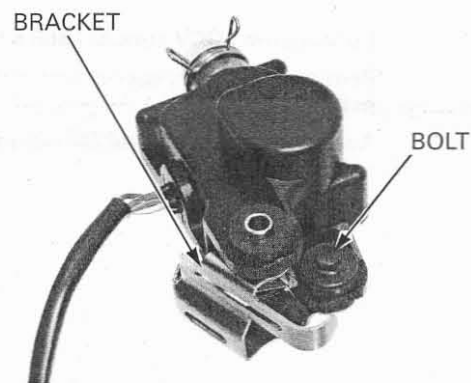
Remove the servomotor mounting bolt and pull out the servomotor from the bracket.



Disconnect the EGCV control cables from the servomotor pulley, then remove the servomotor.



Remove the bolt and servomotor bracket.

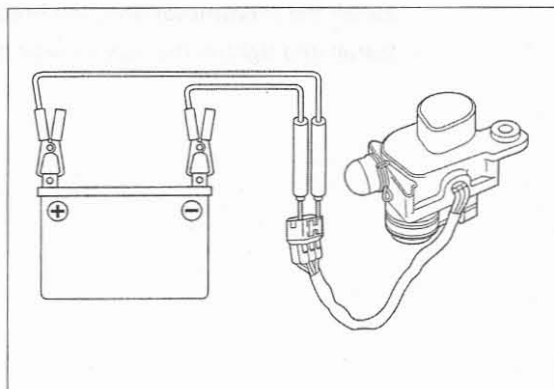


### INSPECTION

Connect the 12 V battery to the servomotor 6P (Natural) connector terminals and check that the motor operation.

**Connection: Red (+) – Blue (–)**

If the servomotor does not turn, replace the servomotor with a new one.





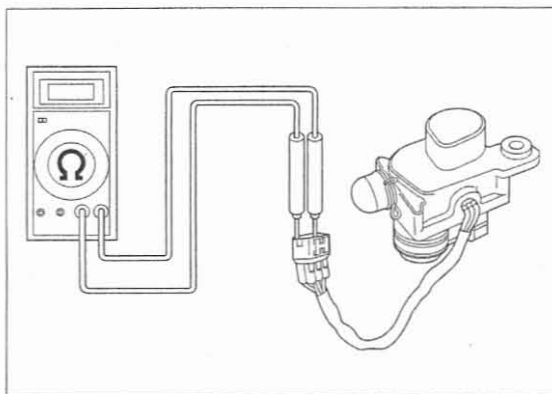
## FUEL SYSTEM (Programmed Fuel Injection)

Measure the resistance between the servomotor 6P (Natural) connector terminals.

**Connection: Yellow/red – Green/orange**  
**Standard: 5 k $\Omega$**

**Connection: Light green/pink – Green/orange**  
**Standard: 0 – 5 k $\Omega$**

If the resistance is out of range, replace the servomotor.



### INSTALLATION

Connect the servomotor 6P (Natural) connector.

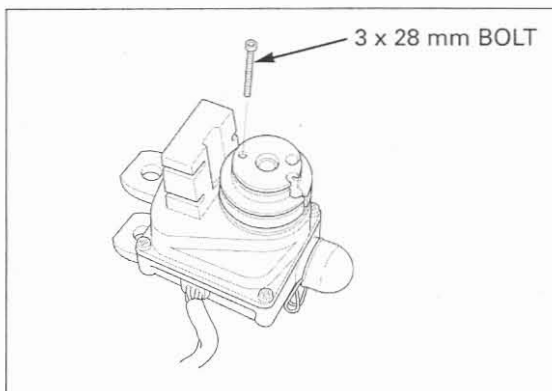
Short the DLC (page 6-9).

Turn the ignition switch to "ON".

The servomotor turns, then stops.

Secure the servomotor pulley at this position using a 3 x 28 mm bolt as shown.

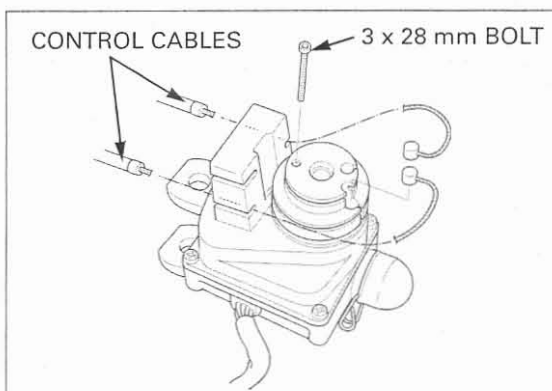
*If you use a new servomotor, it is not necessary to do this procedure.*



Connect the EGCv control cables to each position.

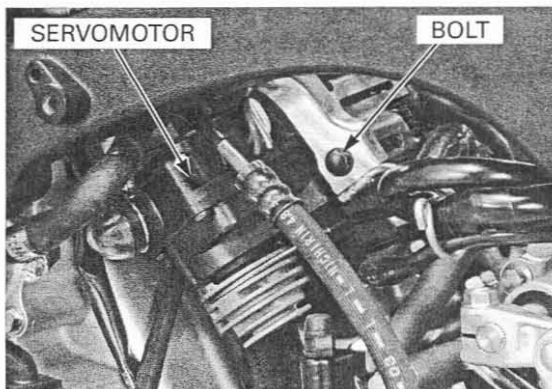
Remove the 3 mm socket bolt from the servomotor pulley.

Adjust the EGCv control cables (page 4-35).



Install the servomotor onto the bracket.

Install and tighten the servomotor mounting bolt.

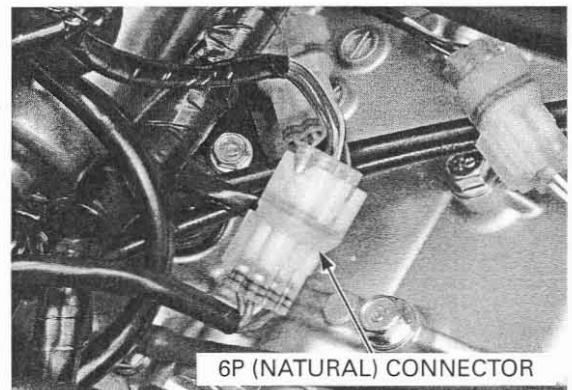


## FUEL SYSTEM (Programmed Fuel Injection)

Install the middle cowl stay/cable protector and tighten the bolt securely.



Connect the servomotor 6P (Natural) connector.  
Install the removed parts in the reverse order of removal.



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## MEMO

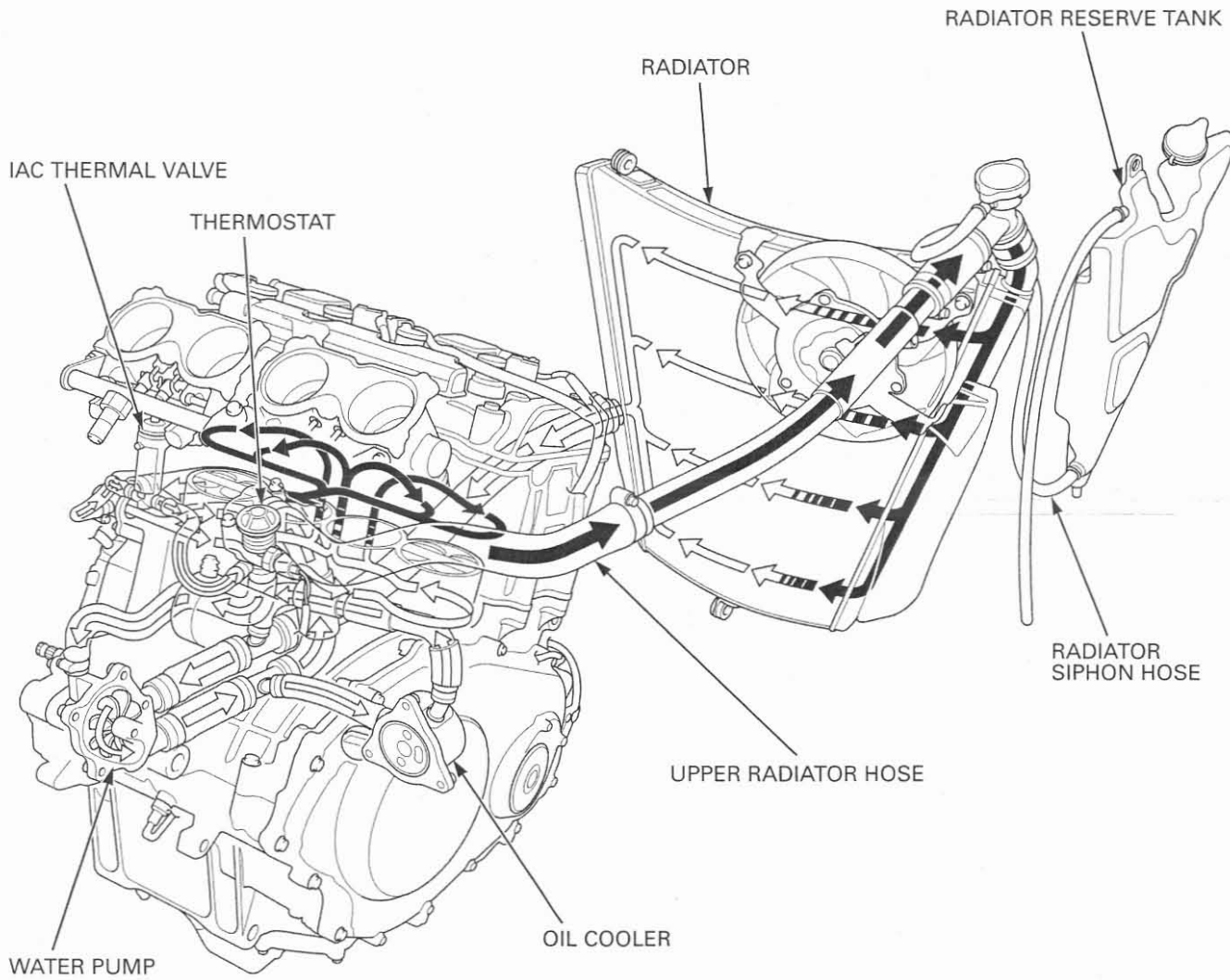
# 7. COOLING SYSTEM

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|                           |     |                             |      |
|---------------------------|-----|-----------------------------|------|
| SYSTEM FLOW PATTERN ..... | 7-2 | THERMOSTAT .....            | 7-8  |
| SERVICE INFORMATION ..... | 7-3 | RADIATOR .....              | 7-10 |
| TROUBLESHOOTING .....     | 7-4 | WATER PUMP .....            | 7-17 |
| SYSTEM TESTING.....       | 7-5 | RADIATOR RESERVE TANK ..... | 7-20 |
| COOLANT REPLACEMENT ..... | 7-6 | FAN CONTROL RELAY.....      | 7-21 |

## COOLING SYSTEM

### SYSTEM FLOW PATTERN



## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

#### NOTICE

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

- Add cooling system at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine installed in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to the ECT sensor inspection (page 20-14).

### SPECIFICATIONS

| ITEM                           |                     | SPECIFICATIONS   |
|--------------------------------|---------------------|--|
| Coolant capacity               | Radiator and engine | 3.15 liter (3.33 US qt, 2.77 Imp qt)   |
|                                | Reserve tank        | 0.4 liter (0.42 US qt, 0.35 Imp qt)  |
| Radiator cap relief pressure   |                     | 108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)                        |
| Thermostat                     | Begin to open       | 80 – 84 °C (176 – 183 °F)  |
|                                | Fully open          | 90 °C (194 °F)   |
|                                | Valve lift          | 8 mm (0.3 in) minimum  |
| Recommended antifreeze         |                     | High quality ethylene glycol antifreeze containing corrosion protection inhibitors |
| Standard coolant concentration |                     | 1:1 mixture with distilled water   |

### TORQUE VALUES

|  |                                 |                                      |
|--|---------------------------------|--------------------------------------|
| Water pump assembly flange bolt                | 12 N·m (1.2 kgf·m, 9 lbf·ft)    | CT bolt                              |
| Thermostat housing cover flange bolt           | 13 N·m (1.3 kgf·m, 10 lbf·ft)   | CT bolt                              |
| ECT (Engine Coolant Temperature)/thermo sensor | 23 N·m (2.3 kgf·m, 17 lbf·ft)   |                                      |
| Cooling fan nut                                | 2.9 N·m (0.3 kgf·m, 2.2 lbf·ft) | Apply a locking agent to the threads |
| Fan motor nut                                  | 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft) |                                      |
| Fan motor bracket mounting bolt                | 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft) |                                      |



## COOLING SYSTEM

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### TROUBLESHOOTING

#### Engine temperature too high

- Faulty temperature gauge or ECT sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passage blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan control relay
- Faulty water pump

#### Engine temperature too low

- Faulty temperature gauge or ECT sensor
- Thermostat stuck open
- Faulty cooling fan control relay

#### Coolant leak

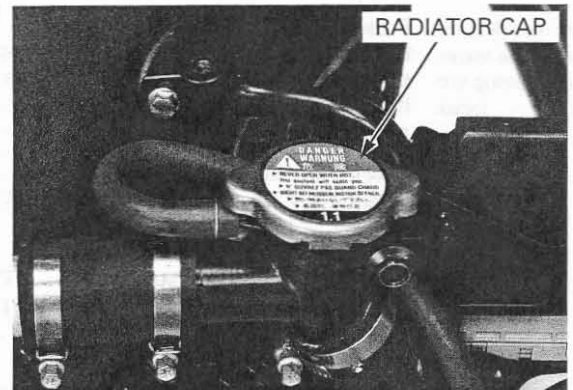
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose

## SYSTEM TESTING

### COOLANT (HYDROMETER TEST)

Remove the right side under cowl/middle cowl (page 3-7).

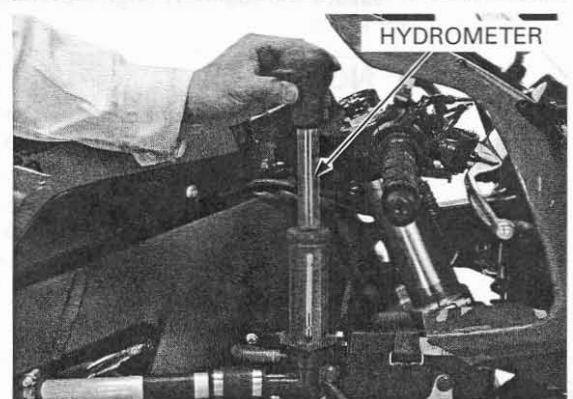
Remove the radiator cap.



Test the coolant gravity using a hydrometer (see below for "Coolant gravity chart").

For maximum corrosion protection, a 1:1 solution of ethylene glycol and distilled water is recommended (page 7-3).

Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

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

## COOLING SYSTEM

### RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap (page 7-5).

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

Pressure test the radiator cap.

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

#### RADIATOR CAP RELIEF PRESSURE:

108 – 137 kPa (1.1 – 1.4 kgf/cm<sup>2</sup>, 16 – 20 psi)

#### TOOLS (Commercially available):

Cooling System Pressure Pump STV26232

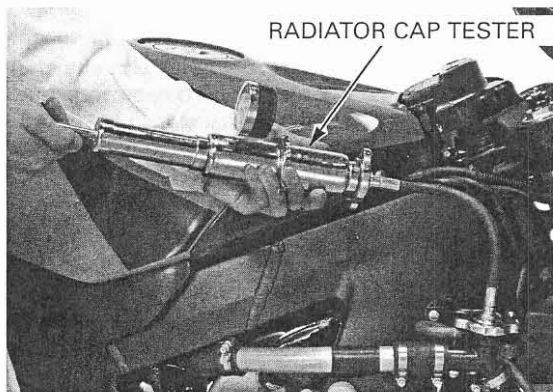
Cooling System Adapter OTCJ33984A

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

#### NOTICE

*Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm<sup>2</sup>, 20 psi).*

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



## COOLANT REPLACEMENT

### PREPARATION

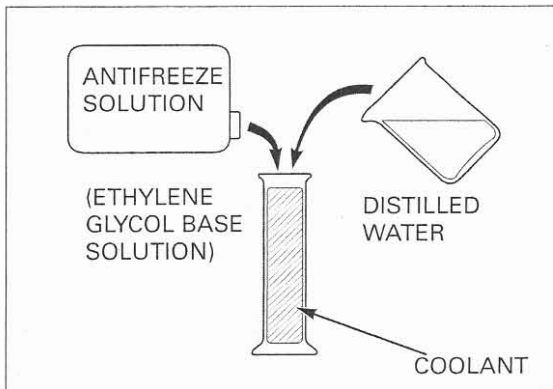
- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled water with the antifreeze.

#### RECOMMENDED ANTIFREEZE:

High quality ethylene glycol antifreeze containing corrosion protection inhibitors

#### RECOMMENDED MIXTURE:

1:1 (Distilled water and antifreeze)

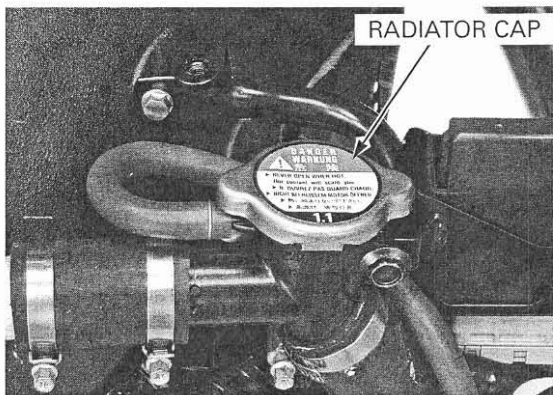


### REPLACEMENT/AIR BLEEDING

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

Remove the under cowls/middle cowls (page 3-7).

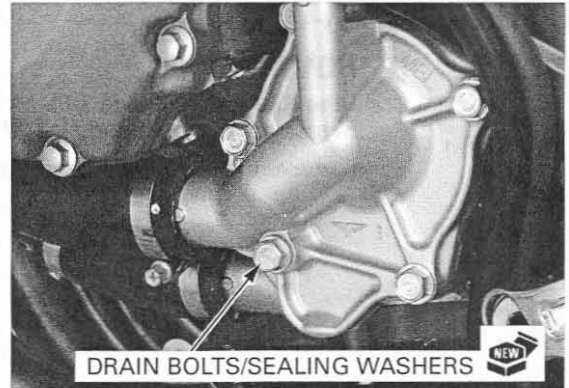
Remove the radiator cap.



Remove the drain bolt on the water pump cover and drain the system coolant.

Reinstall the drain bolts with new sealing washers. Tighten the water pump drain bolt to the specified torque.

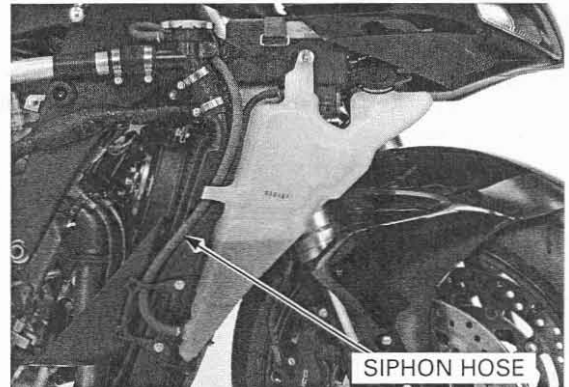
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



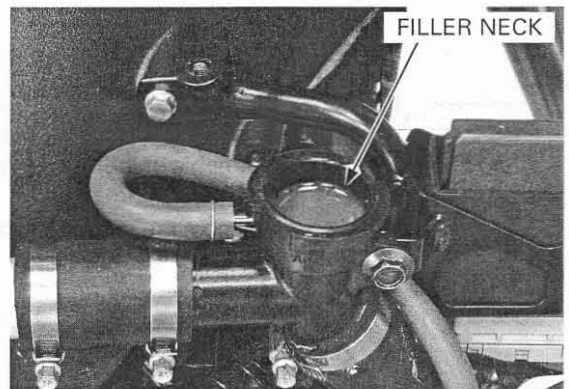
Disconnect the siphon hose from the radiator.

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

Connect the radiator siphon hose.



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



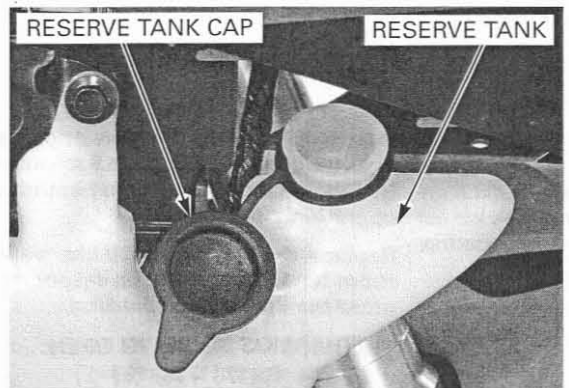
Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.

Bleed air from the system as follows:

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

Install the radiator reserve tank cap.

Install the under cowls/middle cowls (page 3-7).



## COOLING SYSTEM

### THERMOSTAT

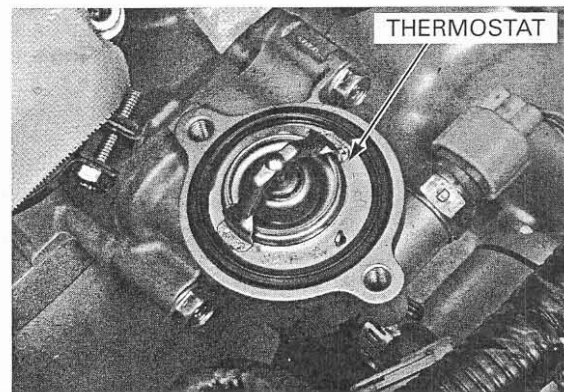
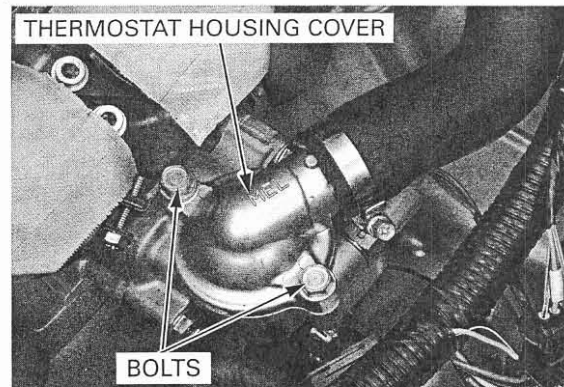
#### REMOVAL

Drain the coolant (page 7-6).

Remove the throttle body (page 6-47).

Remove the bolts and thermostat housing cover.

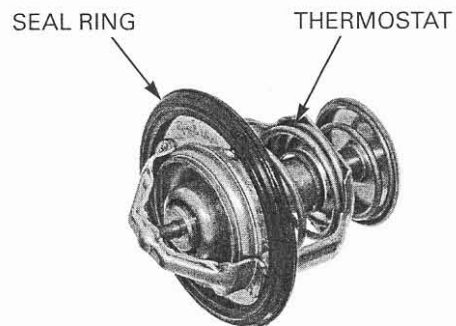
Remove the thermostat from the housing.



#### INSPECTION

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

Visually inspect the thermostat for damage. Check for damage of the seal ring.



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

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

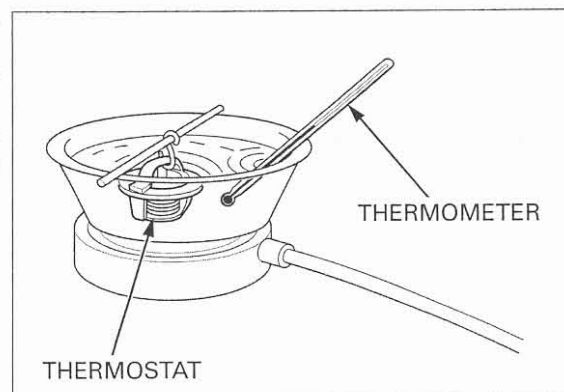
Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

#### THERMOSTAT BEGIN TO OPEN:

80 – 84 °C (176 – 183 °F)

#### VALVE LIFT:

8 mm (0.3 in) minimum at 95 °C (203 °F)





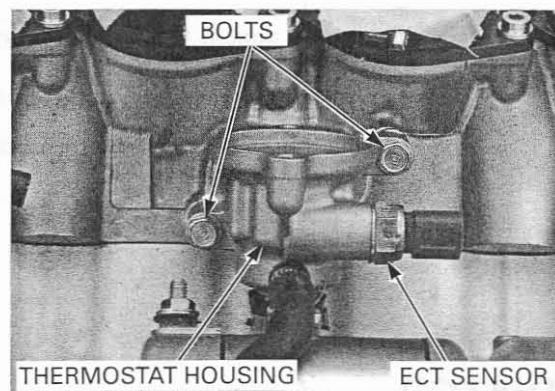
### THERMOSTAT HOUSING REMOVAL

Disconnect the ECT sensor connector.  
If necessary, remove the ECT sensor from the thermostat housing (page 20-14).

If necessary, disconnect the fast idle wax unit water hose and bypass hose from the thermostat housing.

Remove the bolts and thermostat housing from the cylinder head.

Remove the O-ring from the housing.



### THERMOSTAT HOUSING INSTALLATION

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

Install the thermostat housing onto the cylinder head.

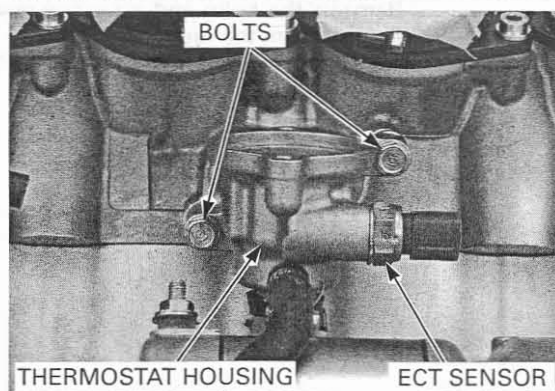


Install and tighten the thermostat housing mounting bolts securely.

Connect the fast idle wax unit water hose and bypass hose if it has been removed.

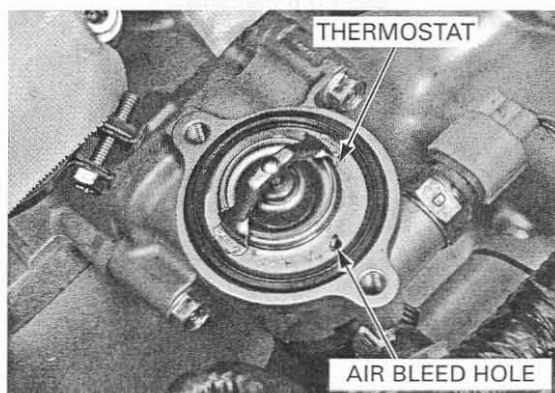
Install the ECT sensor if it has been removed (page 20-14).

Connect the ECT sensor connector.



### THERMOSTAT INSTALLATION

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



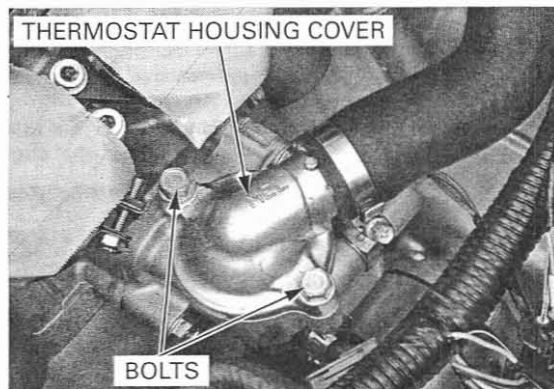


## COOLING SYSTEM

Install the thermostat housing cover onto the housing.  
Install and tighten the housing cover bolts to the specified torque.

**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**

Fill the system with the recommended coolant and bleed any air (page 7-6).



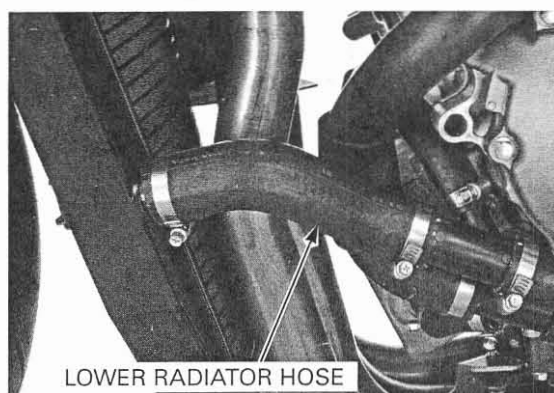
## RADIATOR

### REMOVAL

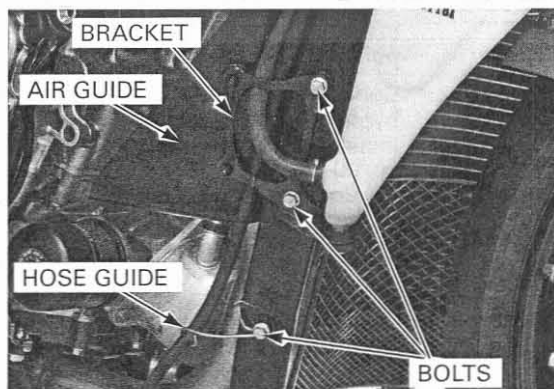
Remove the under cowls/middle cowls (page 3-7).

Drain the coolant (page 7-6).

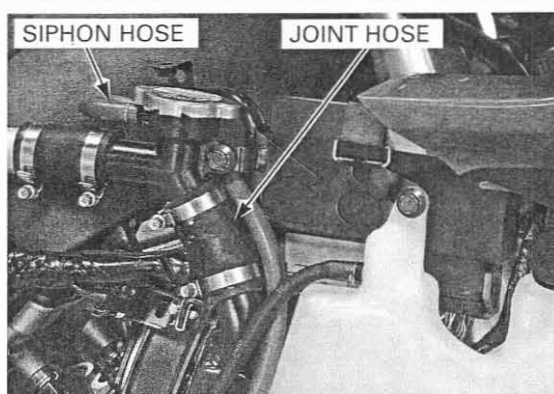
Loosen the hose clamp screw and disconnect the lower radiator hose.



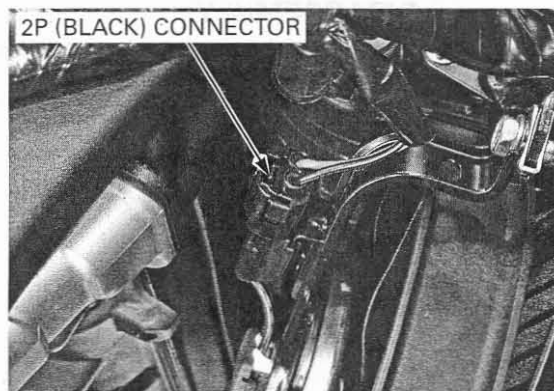
Remove the bolts and air guide/reserve tank lower bracket from the radiator.  
Remove the bolt and radiator overflow hose guide.



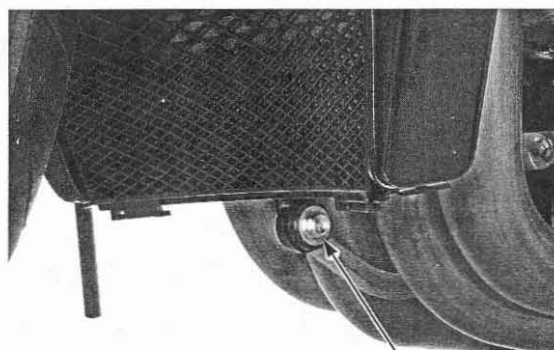
Disconnect the siphon hose and filler neck joint hose from the radiator.



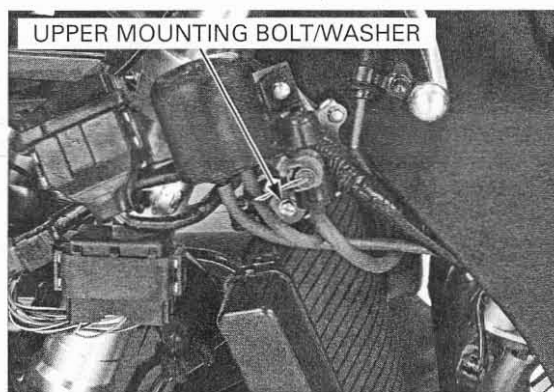
Disconnect the fan motor 2P (Black) connector.



Remove the radiator lower mounting bolt.



Remove the radiator upper mounting bolt and washer.



*Be careful not to damage the radiator fins.*

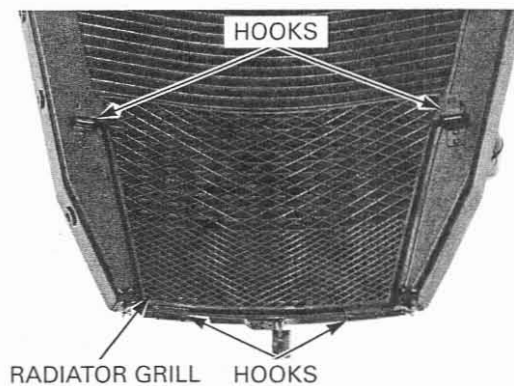
Move the radiator assembly to the right and release the radiator upper grommet from the bracket boss, then remove the radiator assembly.



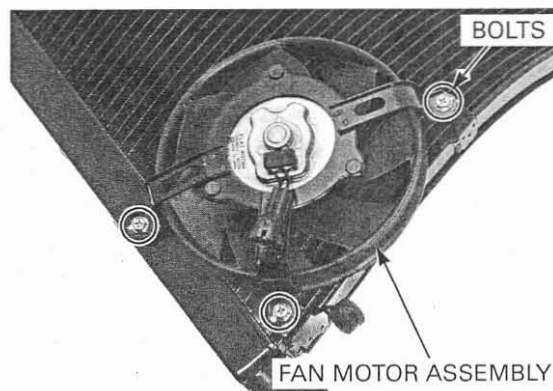
## COOLING SYSTEM

### DISASSEMBLY

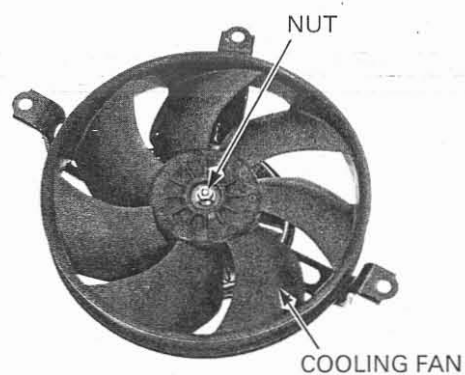
Unhook the hooks from the radiator bosses, then remove the radiator grill.



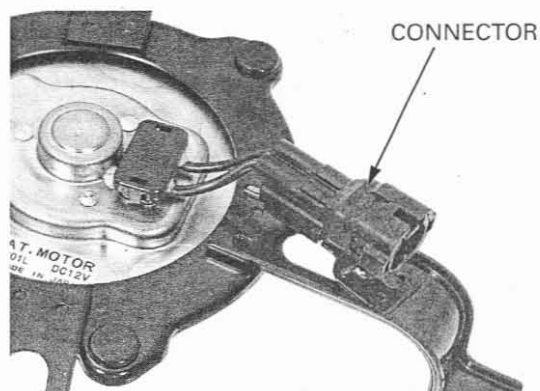
Remove the three bolts and cooling fan motor assembly from the radiator.



Remove the nut and cooling fan.

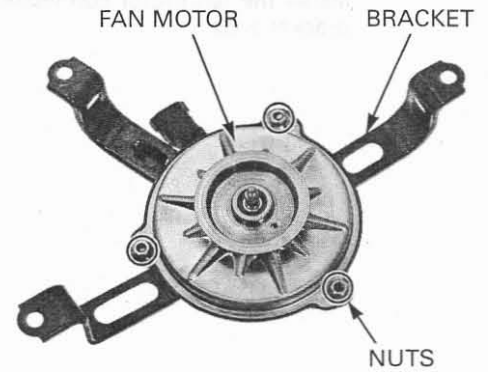


Release the fan motor connector from the fan motor bracket.

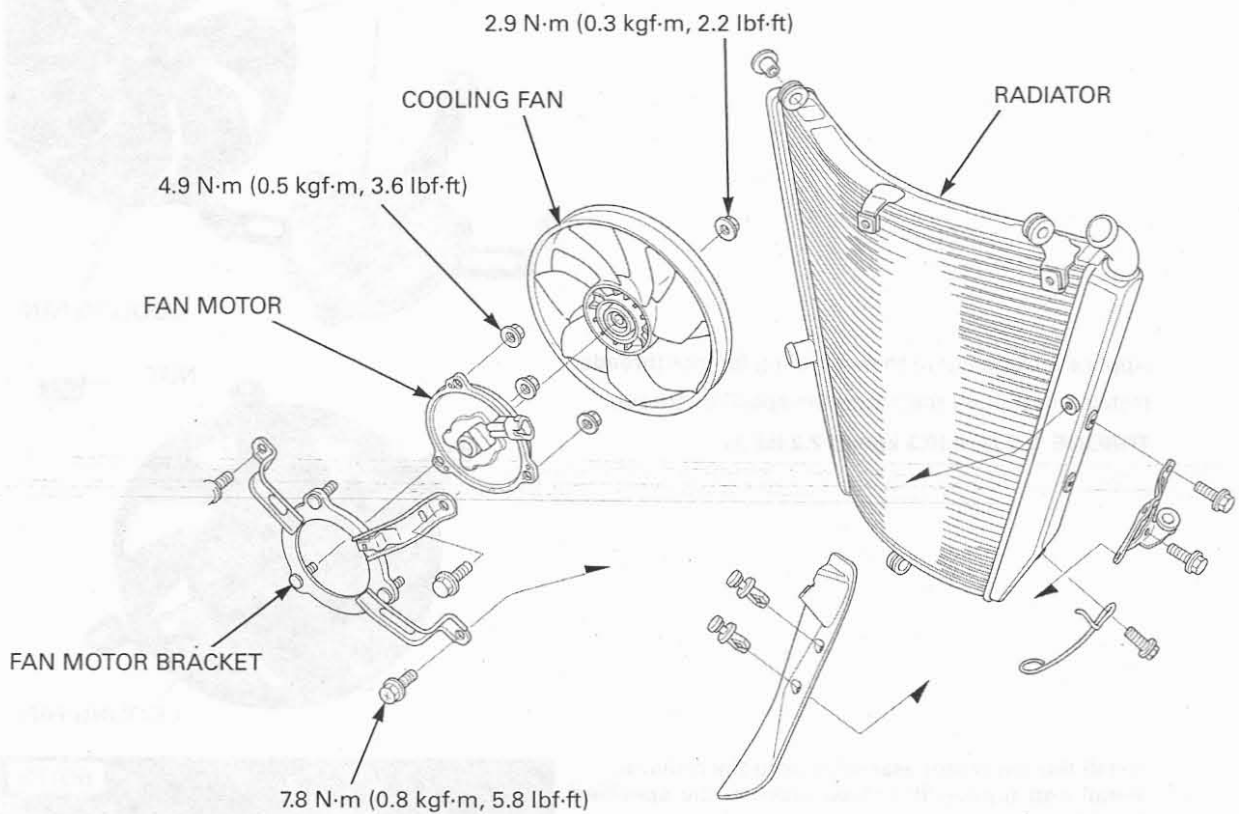


Remove the nuts and fan motor from the fan motor bracket.

Refer to the fan control relay information (page 7-21).

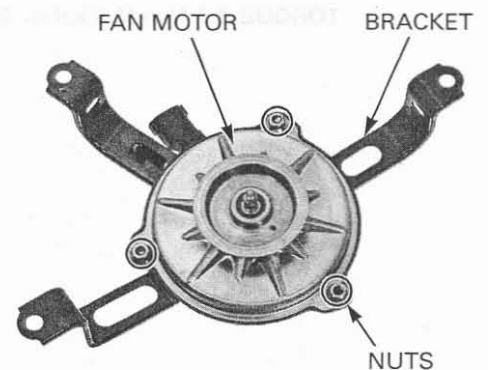


## ASSEMBLY



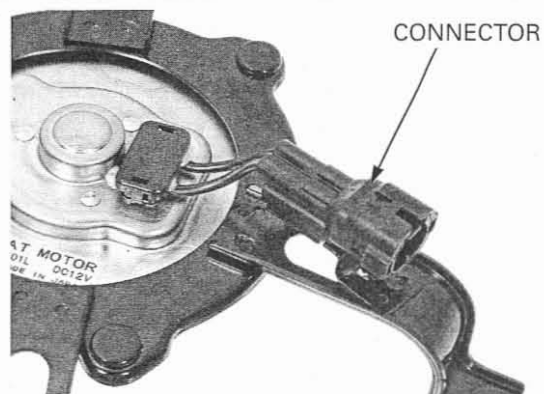
Install the fan motor onto the fan motor bracket and tighten the nuts to the specified torque.

**TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)**

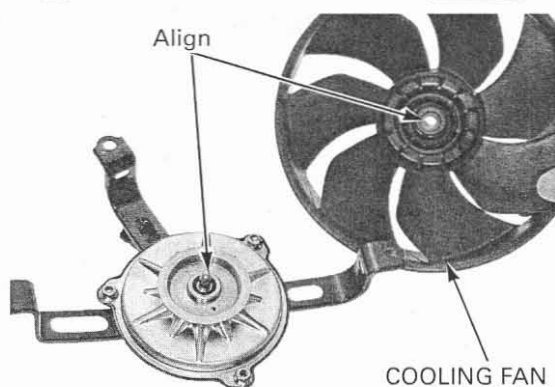


## COOLING SYSTEM

Install the fan motor connector onto the fan motor bracket boss.

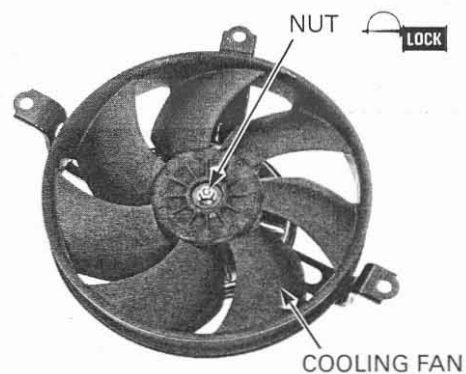


Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



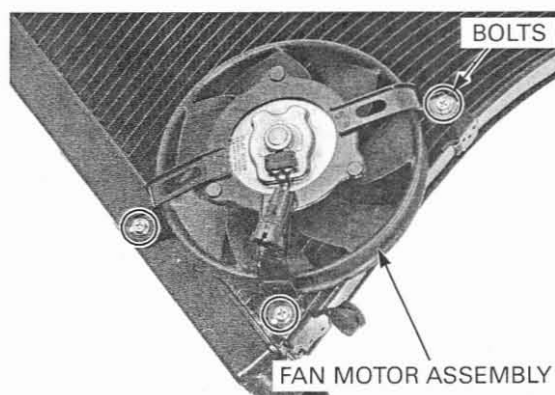
Apply a locking agent to the cooling fan nut threads. Install and tighten the nut to the specified torque.

**TORQUE: 2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)**

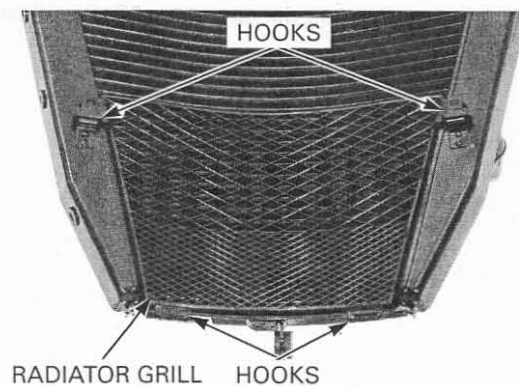


Install the fan motor assembly onto the radiator. Install and tighten the three bolts to the specified torque.

**TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)**



Install the radiator grill onto the radiator, and install the hooks securely.



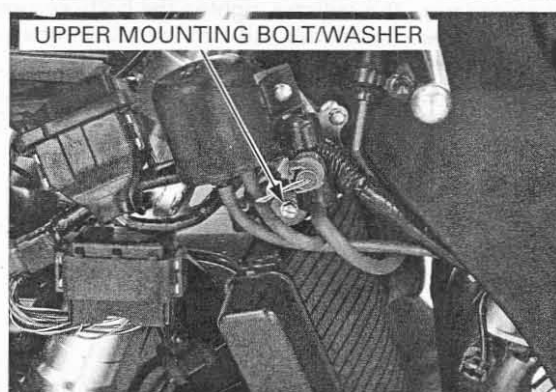
## INSTALLATION

*Be careful not to damage the radiator fins.*

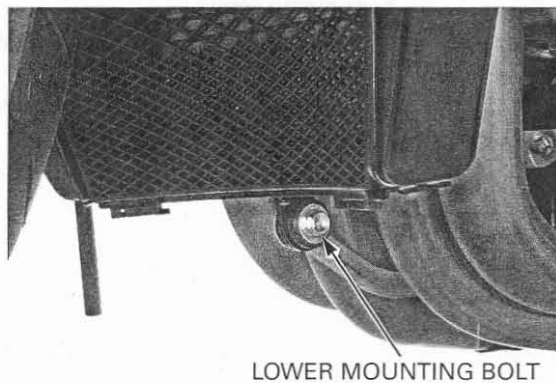
Install the radiator assembly, aligning its upper grommet with the frame bracket boss.



Install the radiator upper mounting bolt and washer, tighten the bolt securely.



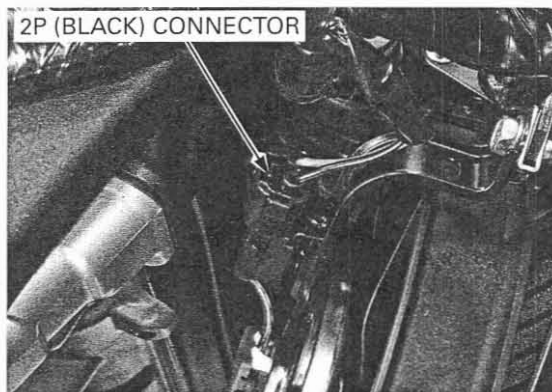
Install and tighten the radiator lower mounting bolt.





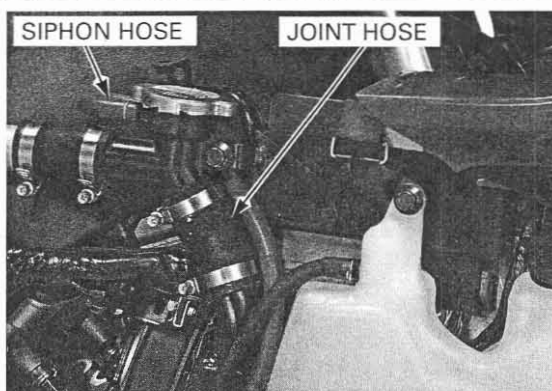
## COOLING SYSTEM

Connect the fan motor 2P (Black) connector.



Connect the filler neck joint hose and tighten the hose clamp screw.

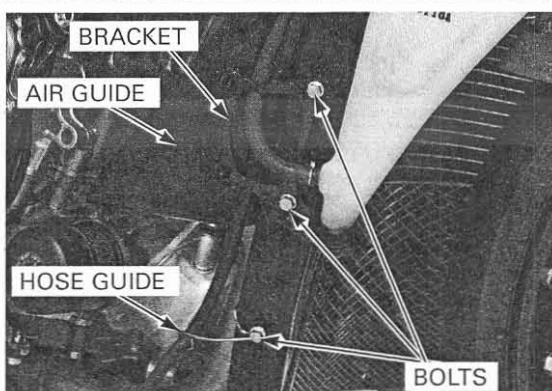
Connect the siphon hose to the filler neck and secure it with clip.



*Route the radiator drain hose and overflow hose into the bracket.*

Install the air guide/reserve tank lower bracket onto the radiator, tighten the bolts securely.

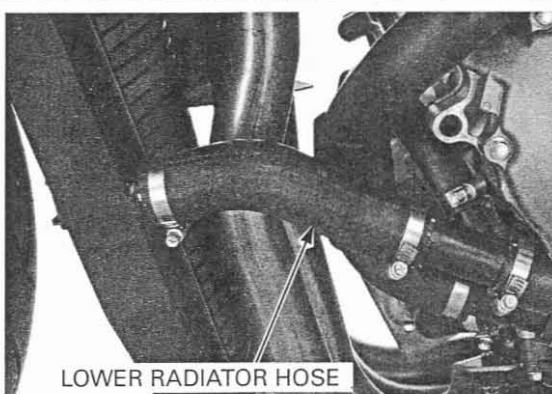
Install the radiator overflow hose guide onto the radiator, tighten the bolt.



Connect the lower radiator hose and tighten the hose clamp screw.

Fill the system with the recommended coolant (page 7-6).

Install the under cowls/middle cowls (page 3-7).



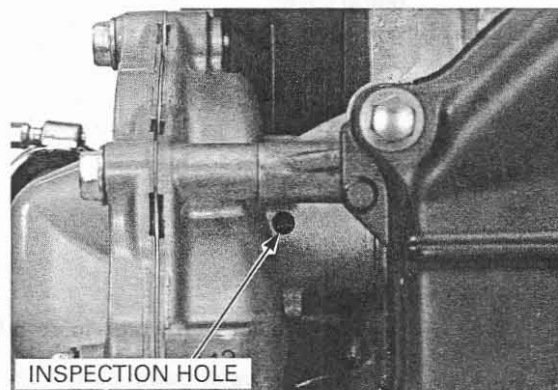
## WATER PUMP

### MECHANICAL SEAL INSPECTION

Remove the under cowls (page 3-7).

Inspect the inspection hole for signs of coolant leakage.

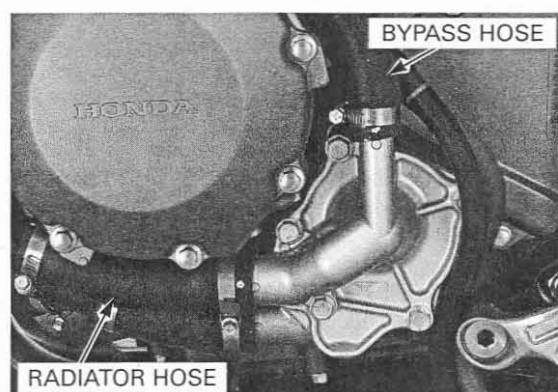
If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.



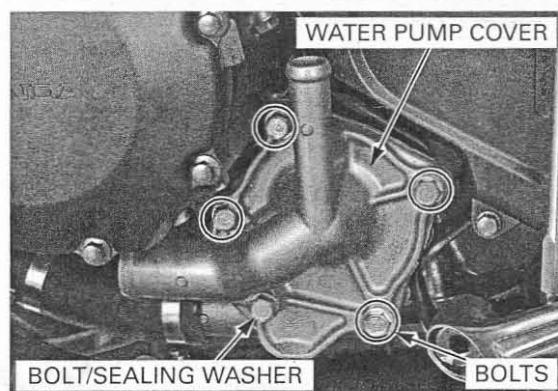
### REMOVAL

Drain the coolant (page 7-6).

Disconnect the lower radiator hose and bypass hose from the water pump cover.

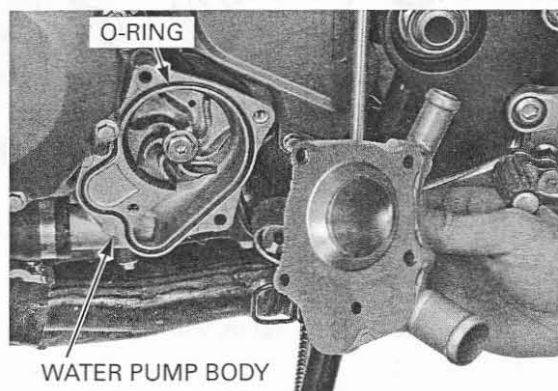


Remove the flange bolts, sealing washer.



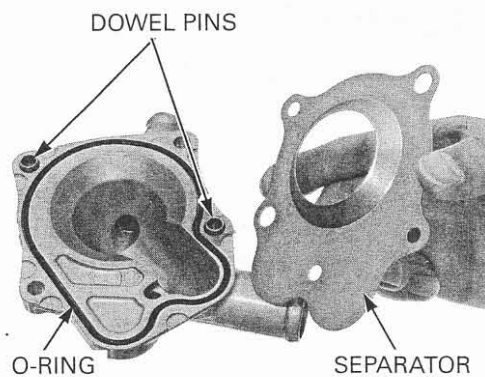
Remove the water pump cover assembly

Remove the O-ring from the water pump body.

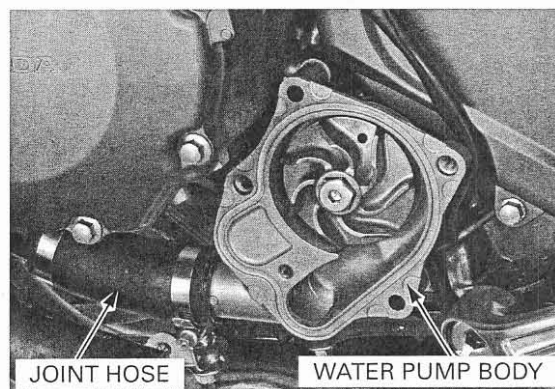


## COOLING SYSTEM

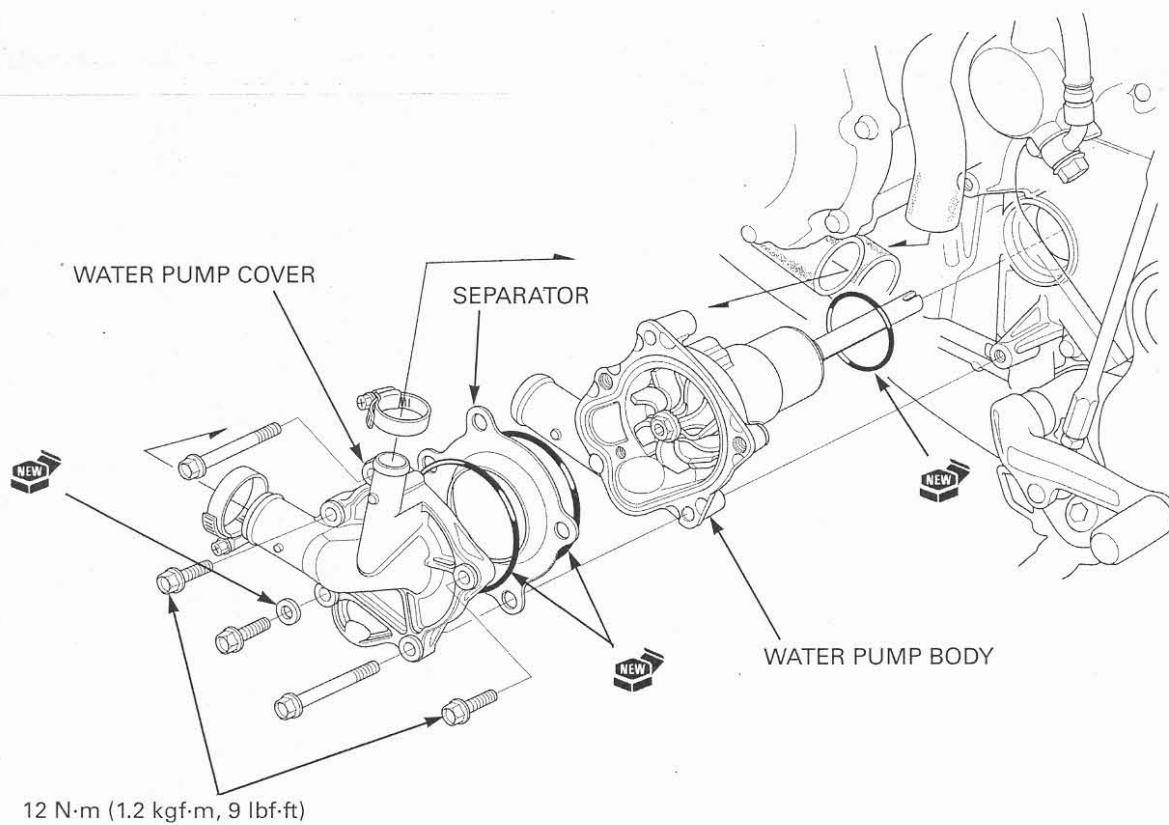
Remove the separator plate from the water pump cover.  
Remove the dowel pins and O-ring from the water pump cover.



Disconnect the water joint hose from the water pump body.  
Remove the water pump body from the crankcase.

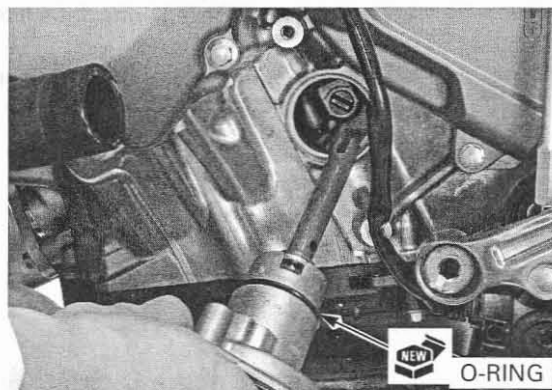


## INSTALLATION

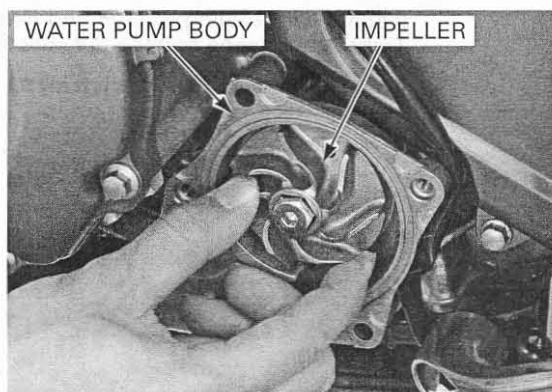


Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump body.

Install the water pump body into the crankcase while aligning the water pump shaft groove with the oil pump shaft end.

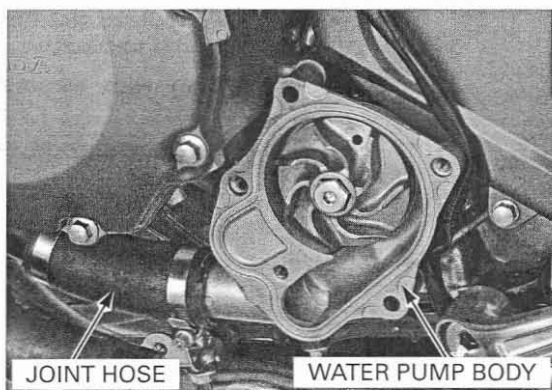


Align the water pump shaft groove with the oil pump shaft end by turning the water pump impeller.



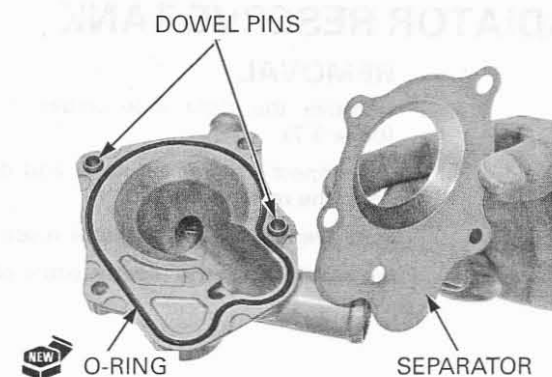
Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.

Connect the joint hose to the water pump body, tighten the clamp screw.



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

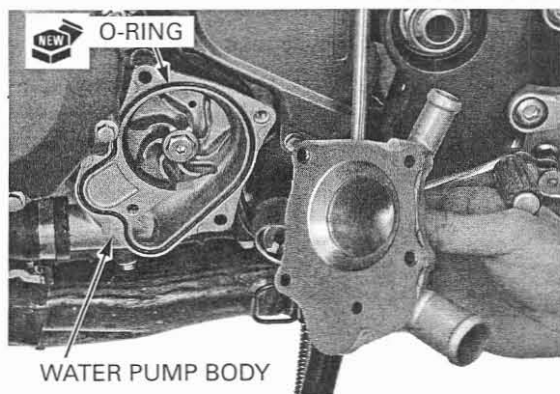
Install the separator onto the water pump cover.



## COOLING SYSTEM

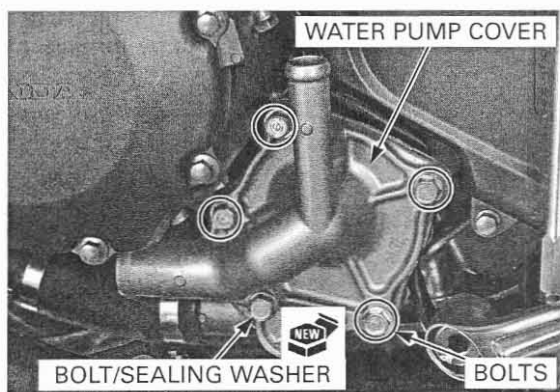
Install the new O-ring into the water pump body groove.

Install the water pump cover assembly onto the water pump body.



Install a new sealing washer and flange bolts. Tighten the flange bolts to the specified torque.

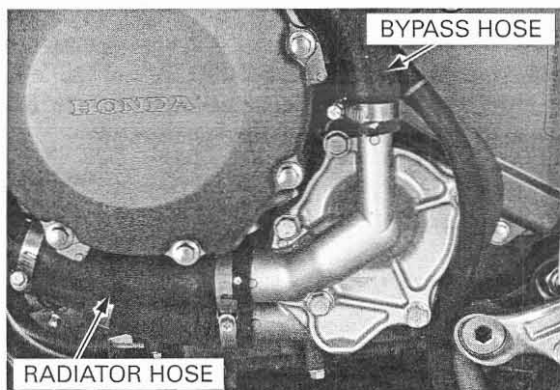
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Connect the lower radiator hose and bypass hose, then tighten the clamp screws.

Fill the system with the recommended coolant (page 7-6).

Install the under cowl (page 3-7).



## RADIATOR RESERVE TANK

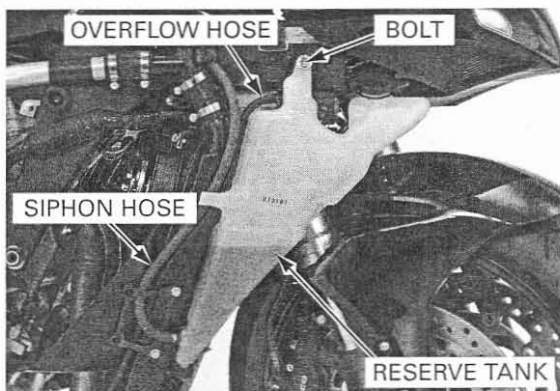
### REMOVAL

Remove the right side under cowl/middle cowl (page 3-7).

Disconnect the siphon hose and drain the coolant from the reserve tank.

Remove the bolt and radiator reserve tank.

Installation is in the reverse order of removal.

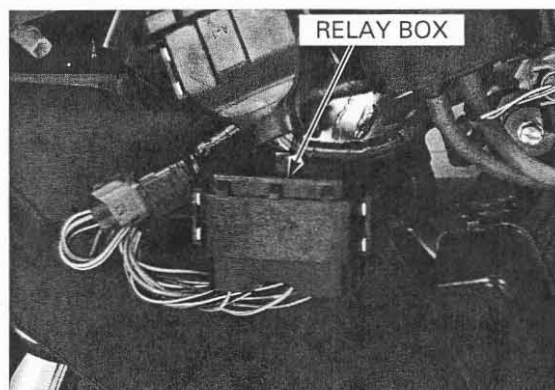


## FAN CONTROL RELAY

### INSPECTION

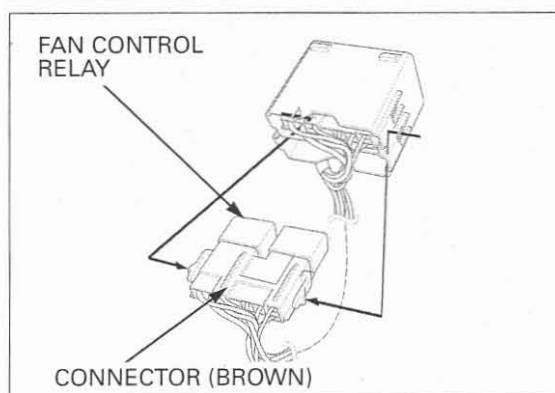
Remove the under cowls/middle cowls (page 3-7).

Remove the relay box from the bracket.



Release the retainers (brown) and remove the relay connector base.

Remove the fan control relay from the connector base.



Connect the ohmmeter to the fan control relay connector terminals.

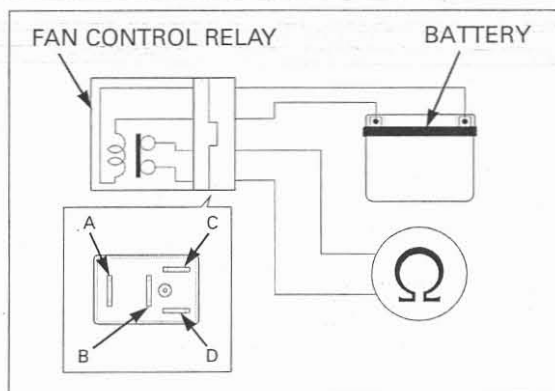
#### Connection: A – B

Connect a 12 V battery to the following engine stop relay connector terminals.

#### Connection: C (+) – D (–)

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the fan control relay.





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# MEMO

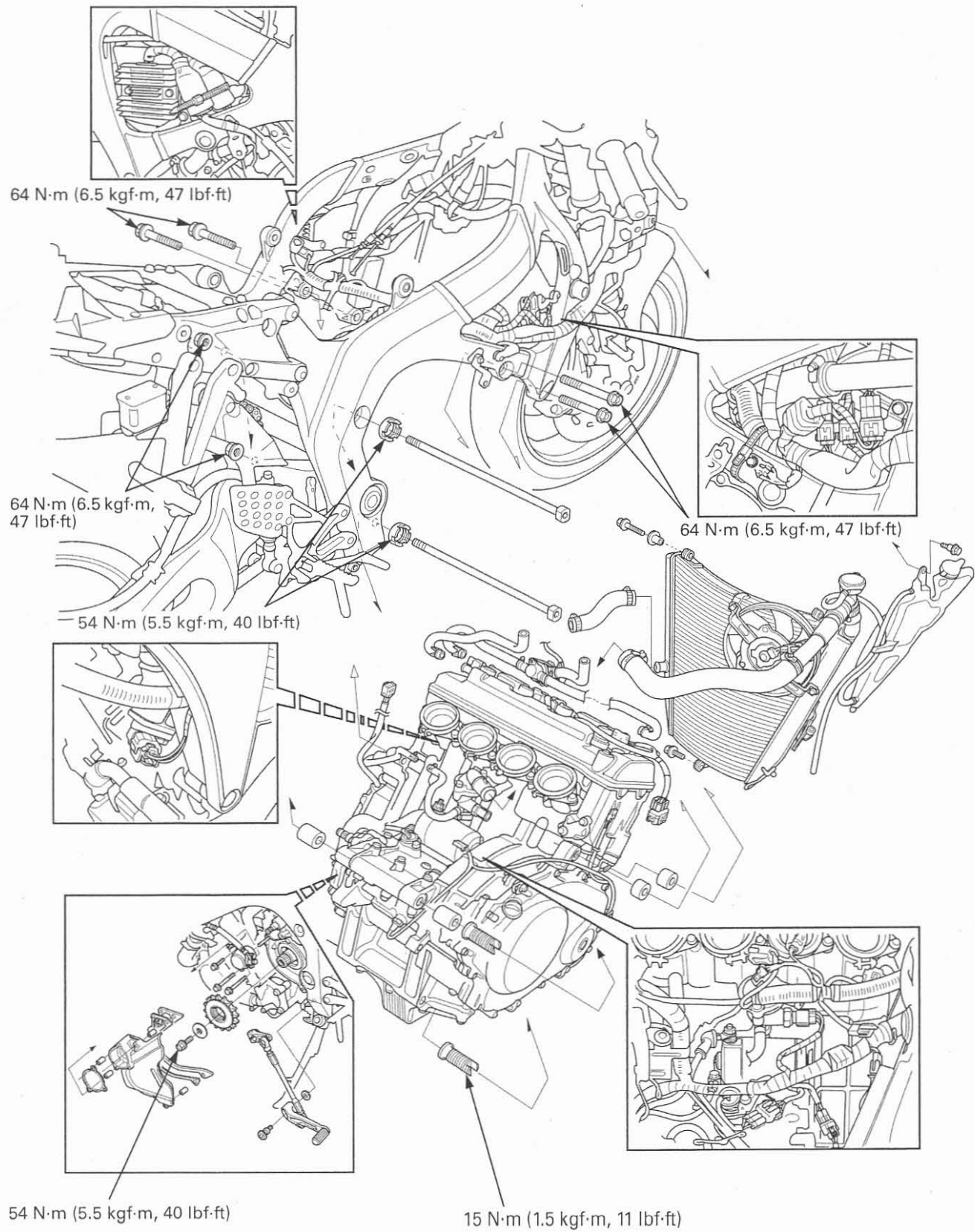
# 8. ENGINE REMOVAL/INSTALLATION

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|                           |     |                           |     |
|---------------------------|-----|---------------------------|-----|
| COMPONENT LOCATION .....  | 8-2 | ENGINE REMOVAL .....      | 8-4 |
| SERVICE INFORMATION ..... | 8-3 | ENGINE INSTALLATION ..... | 8-9 |

ENGINE REMOVAL/INSTALLATION

COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- Do not use the oil filter and oil cooler as a jacking point.
- When using the lock nut wrench for the adjusting bolt lock nut, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not overtighten the lock nut. The specification later in the text gives both actual and indicated.
- The following components can be serviced with the engine installed in the frame.
  - Alternator (page 11-4)
  - Clutch (page 10-16)
  - Camshaft (page 9-8)
  - Gearshift linkage (page 12-11)
  - Oil cooler (page 5-13)
  - Oil pump (page 5-8)
  - Transmission/gearshift linkage (page 12-11)
  - Water pump (page 7-17)
- The following components require engine removal for service.
  - Cylinder head (page 9-13)
  - Crankshaft (page 13-7)
  - Piston/cylinder (page 13-15)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.

### SERVICE DATA

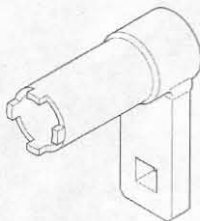
| ITEM                |                     | SPECIFICATIONS                       |
|---------------------|---------------------|--------------------------------------|
| Engine dry weight   |                     | 65.8 kg (145.1 lbs)                  |
| Engine oil capacity | After disassembly   | 3.8 liter (4.0 US qt, 3.3 Imp qt)    |
| Coolant capacity    | Radiator and engine | 3.55 liter (3.75 US qt, 3.12 Imp qt) |

### TORQUE VALUES

|                                       |                               |
|---------------------------------------|-------------------------------|
| Engine hanger adjusting bolt          | 15 N·m (1.5 kgf·m, 11 lbf·ft) |
| Engine hanger adjusting bolt lock nut | 54 N·m (5.5 kgf·m, 40 lbf·ft) |
| Rear upper engine hanger nut          | 64 N·m (6.5 kgf·m, 47 lbf·ft) |
| Rear lower engine hanger nut          | 64 N·m (6.5 kgf·m, 47 lbf·ft) |
| Front engine hanger bolt              | 64 N·m (6.5 kgf·m, 47 lbf·ft) |
| Middle engine hanger bolt             | 64 N·m (6.5 kgf·m, 47 lbf·ft) |
| Drive sprocket special bolt           | 54 N·m (5.5 kgf·m, 40 lbf·ft) |
| Starter motor terminal nut            | 9.8 N·m (1.0 kgf·m, 7 lbf·ft) |

### TOOLS

Lock nut wrench, 20 mm  
07VMA-MBB0100



or 07VMA-MBB0101

## ENGINE REMOVAL/INSTALLATION

### ENGINE REMOVAL

Remove the following:

- Under cowls/middle cowl (page 3-7)
- Exhaust pipe (page 3-30)
- Fuel tank (page 6-36)
- Radiator reserve tank (page 7-20)
- Air cleaner housing (page 6-40)
- Throttle body (page 6-47)

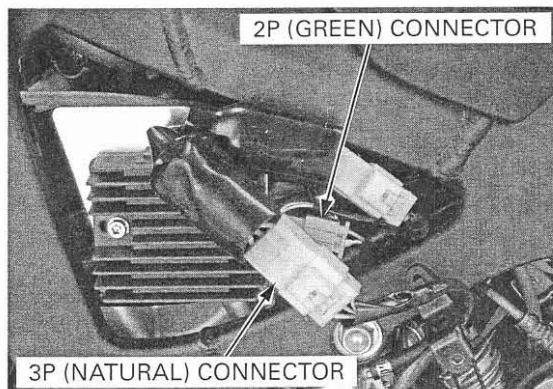
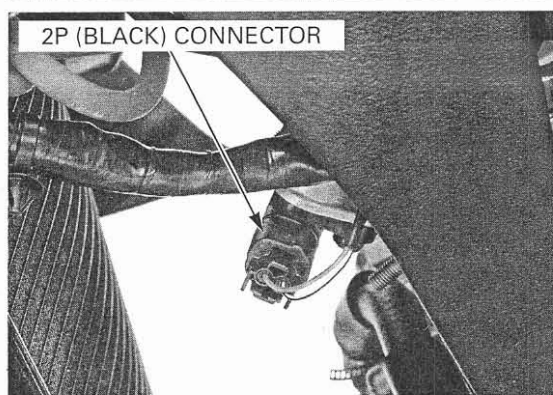
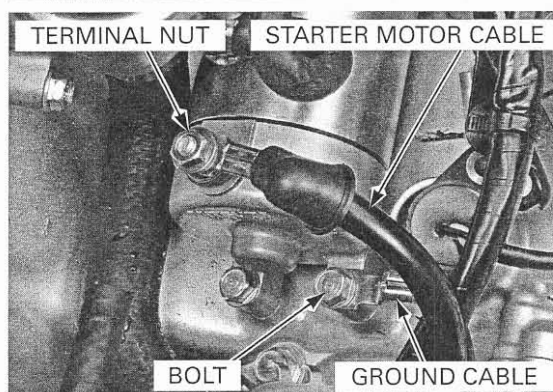
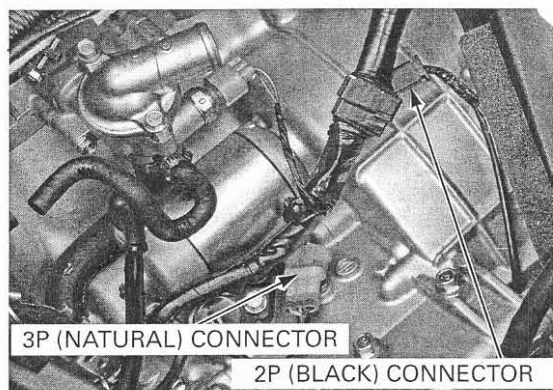
Disconnect the following connectors:

- Vehicle speed sensor 3P (Natural) connector
- Engine sub-harness 2P (Black) connector

Remove the terminal nut and disconnect the starter motor cable from the starter motor.  
Remove the starter motor mounting bolt and starter motor ground cable.

Disconnect the camshaft position sensor 2P (Black) connector.

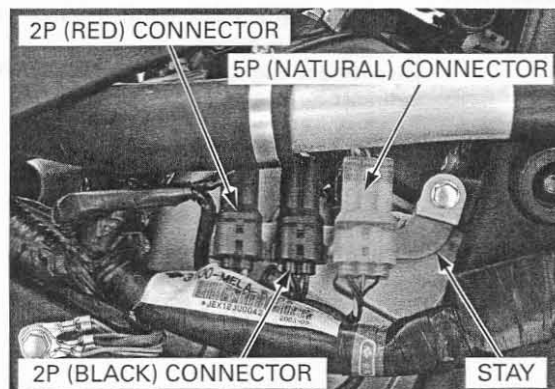
Disconnect the alternator 3P (Natural) connector and side stand switch 2P (Green) connector.



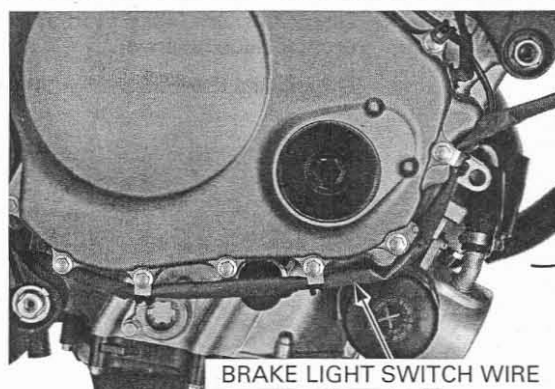
Disconnect the following connectors:

- Crankshaft position sensor 2P (Red) connector
- Rear brake light switch 2P (Black) connector
- Ignition coil sub-harness 5P (Natural) connector

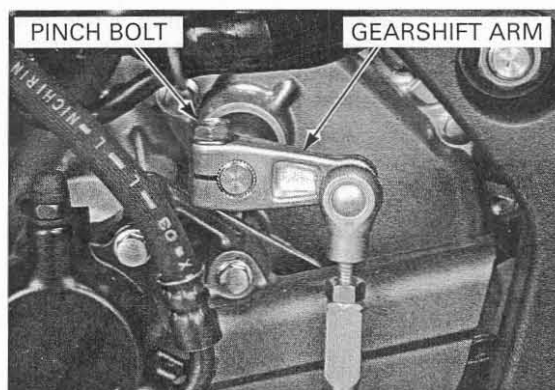
Remove the ignition coil sub-harness 5P (Natural) connector from the stay.



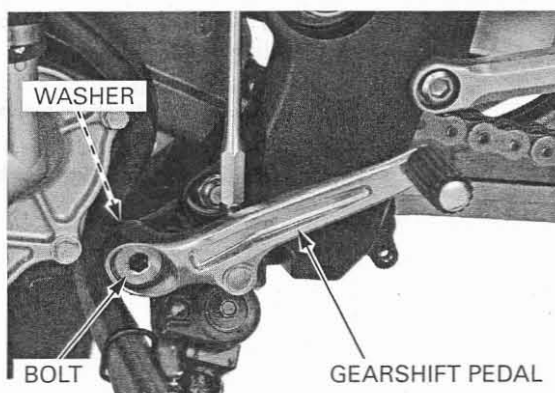
Remove the rear brake light switch wire from the clamps on the right crankcase cover.



Remove the pinch bolt and disconnect the gear shift arm from the gearshift spindle.



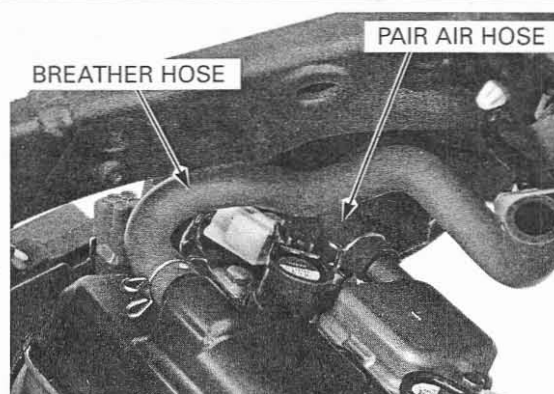
Remove the bolt, washer, wave washer and gear shift pedal assembly.





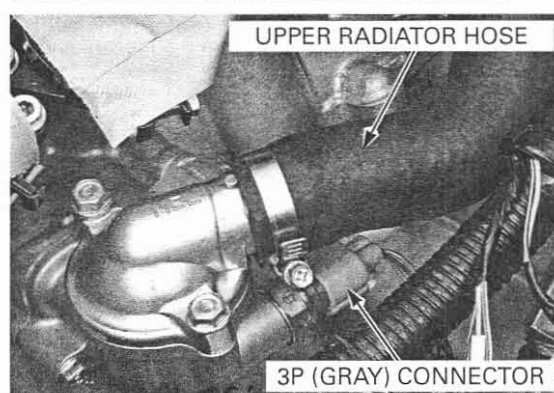
## ENGINE REMOVAL/INSTALLATION

Disconnect the PAIR control valve air hoses from the reed valve cover.  
Disconnect the crankcase breather hose from the cylinder head cover.



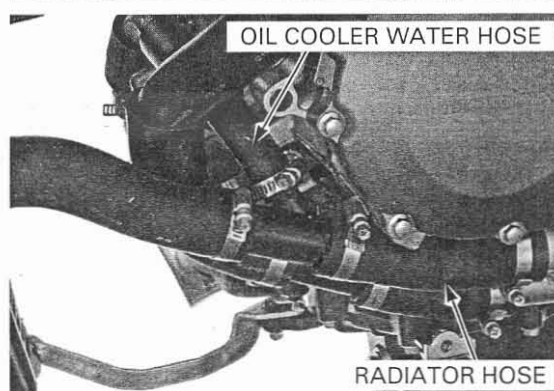
Disconnect the upper radiator hose from the thermostat housing cover.

Disconnect the ECT sensor 3P (Gray) connector.



Loosen the hose clamp screw and disconnect the radiator hose from the water pump.  
Loosen the hose clamp screws and disconnect the water hoses from the oil cooler.

Remove the radiator assembly.

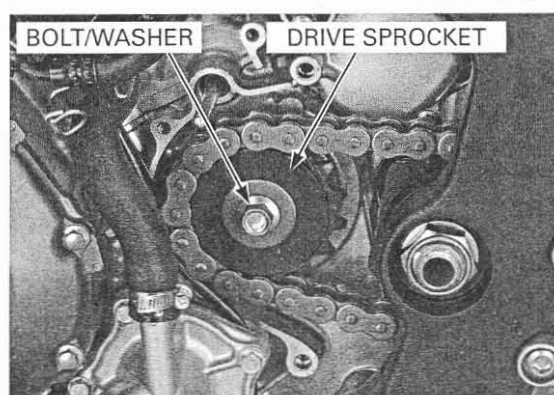


Remove the two bolts, drive sprocket cover and guide plate (page 12-7).

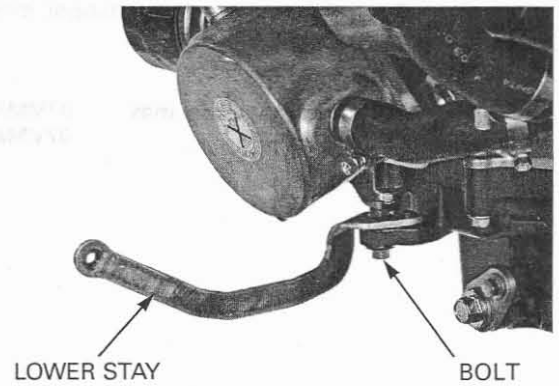
Loosen the rear axle nut.

Turn the drive chain adjusting bolts make the drive chain slack fully.

Remove the drive sprocket special bolt, washer and drive sprocket.

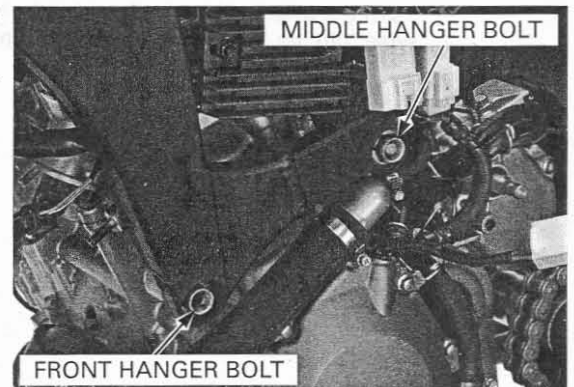


Remove the bolt and radiator lower stay from the oil pan.

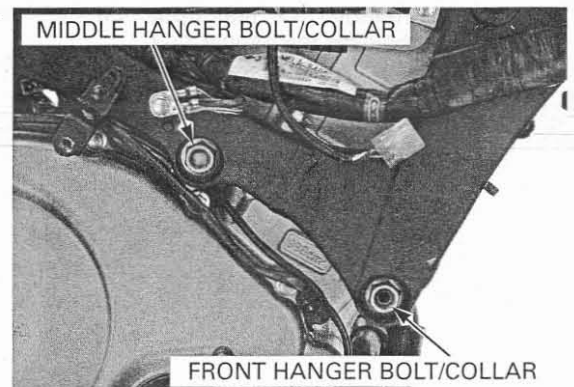


Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

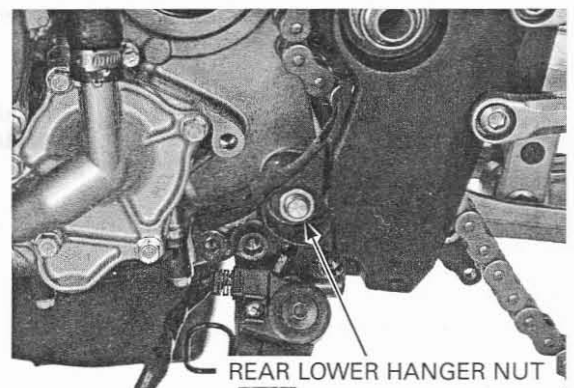
Remove the left front engine hanger bolt and middle engine hanger bolt.



Remove the right front engine hanger bolt and middle engine hanger bolt and distance collars.



Remove the rear lower engine hanger nut while holding the hanger bolt.



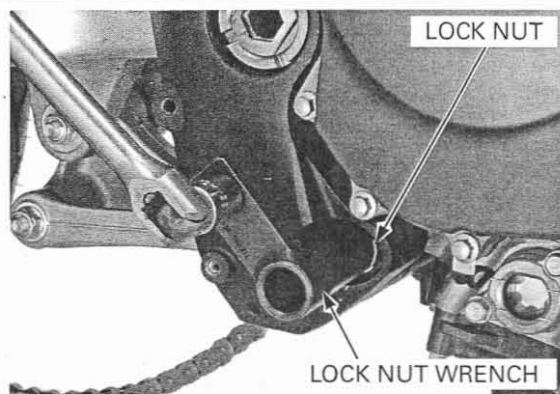
## ENGINE REMOVAL/INSTALLATION

Remove the rear engine hanger lock nut using the special tool.

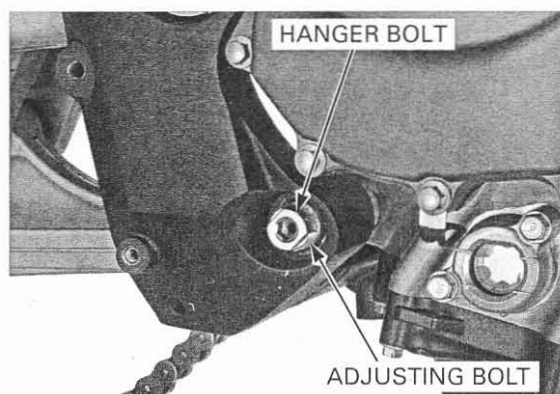
**TOOL:**

Lock nut wrench, 20 mm

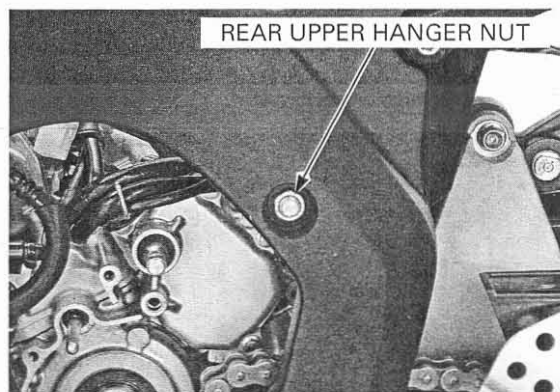
07VMA-MBB0100 or  
07VMA-MBB0101



Turn the engine hanger adjusting bolt counterclockwise fully by loosening the rear engine hanger bolt.



Remove the rear upper engine hanger nut while holding the hanger bolt.

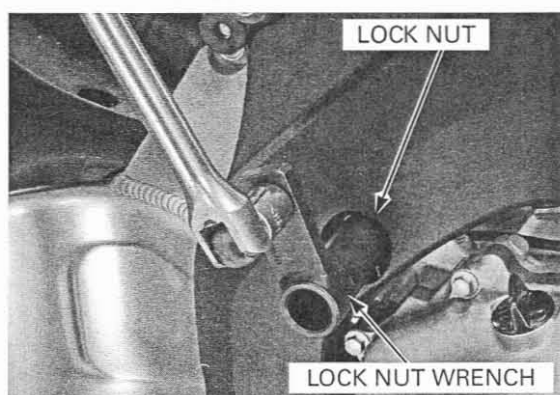


Loosen the rear upper engine hanger adjusting bolt lock nut using the special tool.

**TOOL:**

Lock nut wrench, 20 mm

07VMA-MBB0100 or  
07VMA-MBB0101



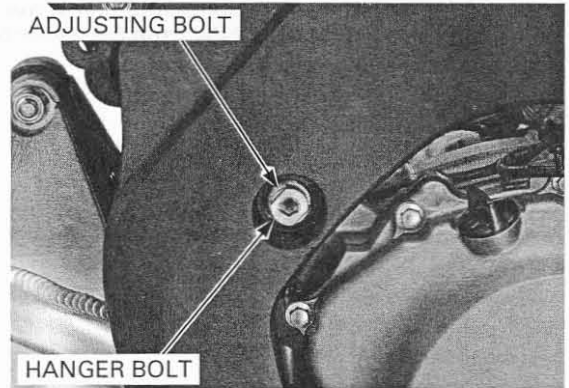
Turn the engine hanger adjusting bolt counterclockwise fully by loosening the rear engine hanger bolt.

Support the engine using a jack or other adjustable support to ease engine hanger bolts removal.

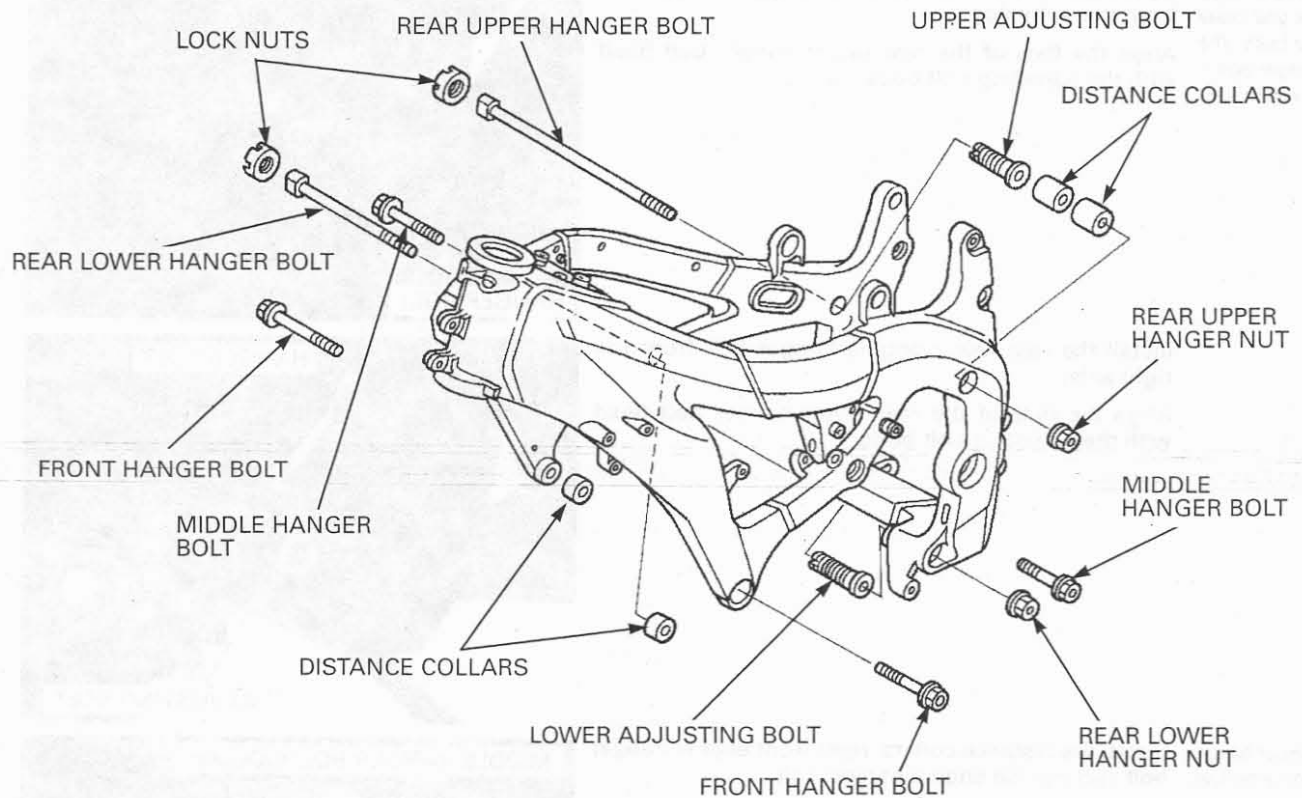
Remove the following:

- Rear lower engine hanger bolt
- Rear upper engine hanger bolt and collars

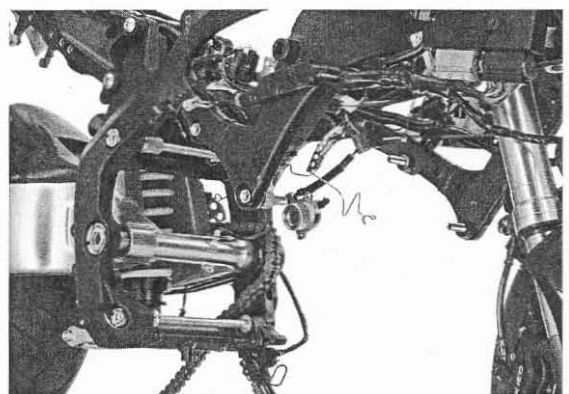
Carefully lower the adjustable support, then remove the engine from the frame.



## ENGINE INSTALLATION

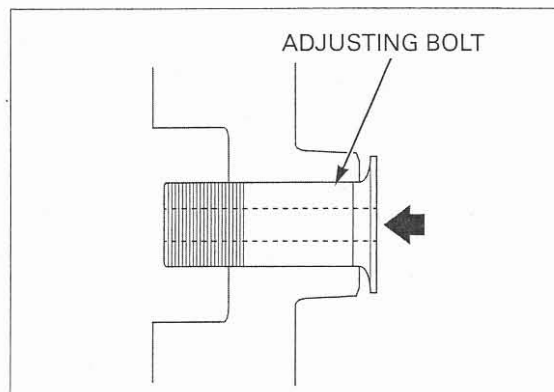


- Note the direction of the hanger bolts/collars.
- When tightening the lock nut with the lock nut wrench, refer to the torque wrench reading information in "SERVICE INFORMATION" (page 8-3).
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- Route the wire and cables properly (page 1-24).
- Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence described on the following page. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the specified sequence.



## ENGINE REMOVAL/INSTALLATION

Install the rear upper and rear lower engine hanger adjusting bolts fully from the inside of the frame.

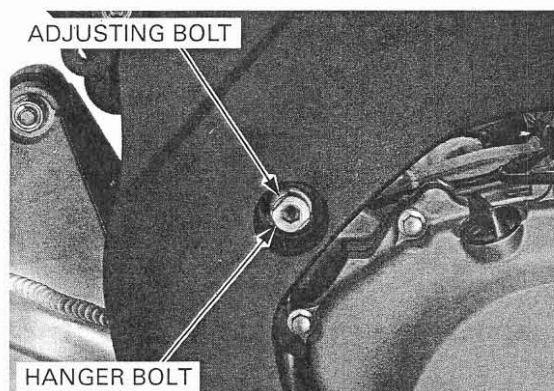


Carefully install the engine into the frame.

*Do not interchange the upper and lower hanger bolts. The upper hanger bolt is not hollow.*

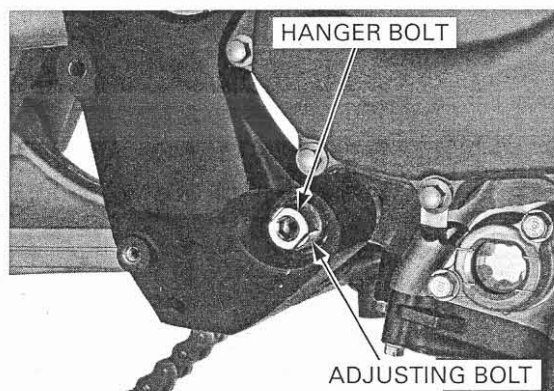
Install the collars and rear upper engine hanger bolt from the right side.

Align the flats of the rear upper hanger bolt head with the adjusting bolt boss.



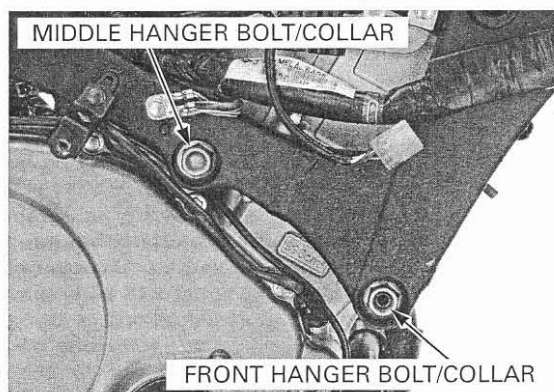
Install the rear lower engine hanger bolt from the right side.

Align the flats of the rear lower hanger bolt head with the adjusting bolt boss.



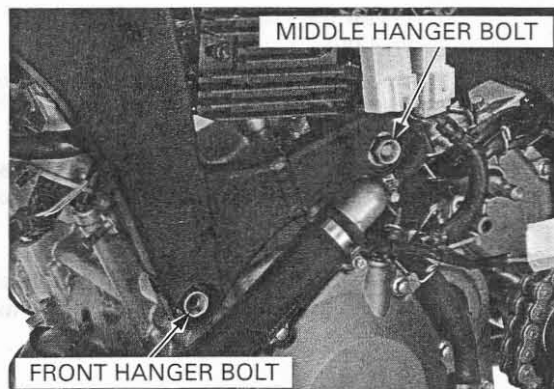
*The front hanger bolt is hollow.*

Install the distance collars, right front engine hanger bolt and middle engine hanger bolt.





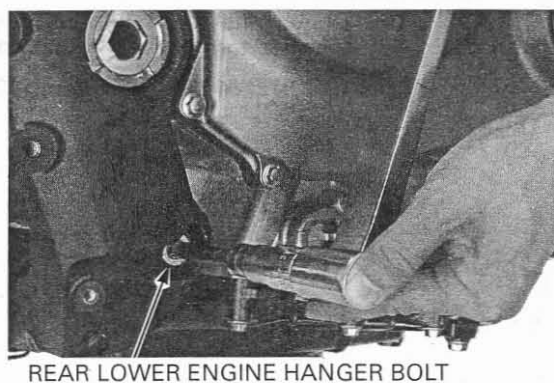
Install the left front engine hanger bolt and middle engine hanger bolt.



Turn the upper and lower engine hanger adjusting bolt by turning the hanger bolt until the adjusting bolt is seated on the engine.

Tighten the rear lower engine hanger adjusting bolt to the specified torque by turning the hanger bolt.

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



Install the rear lower engine hanger adjusting bolt lock nut.

Hold the adjusting bolt by holding the hanger bolt and tighten the lock nut to the specified torque.

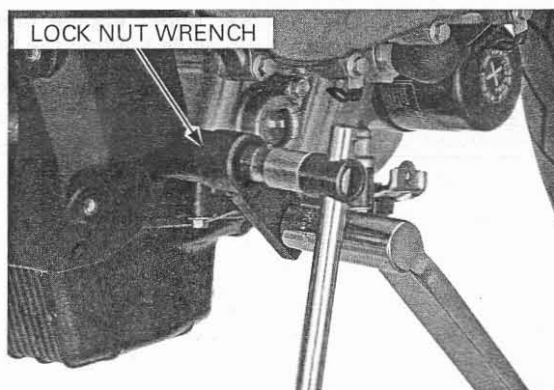
## TOOL:

Lock nut wrench, 20 mm      07VMA-MBB0100 or 07VMA-MBB0101

## TORQUE:

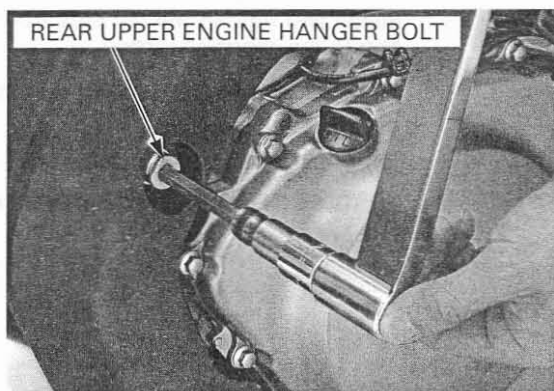
Actual: 54 N·m (5.5 kgf·m, 40 lbf·ft)

Indicated: 49 N·m (5.0 kgf·m, 39 lbf·ft)



Tighten the rear upper engine hanger adjusting bolt to the specified torque by turning the hanger bolt.

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





## ENGINE REMOVAL/INSTALLATION

Install the rear lower engine hanger adjusting bolt lock nut.

Hold the adjusting bolt by holding the hanger bolt and tighten the lock nut to the specified torque.

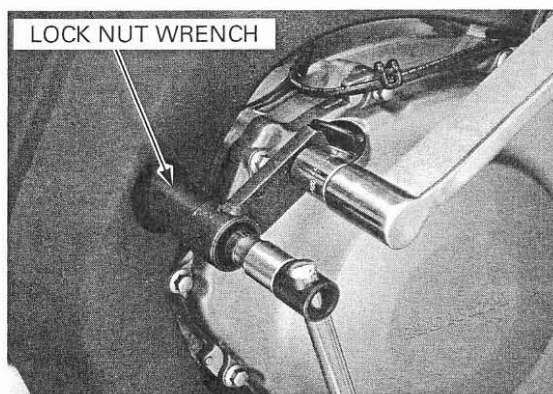
### TOOL:

Lock nut wrench, 20 mm      07VMA-MBB0100 or  
07VMA-MBB0101

### TORQUE:

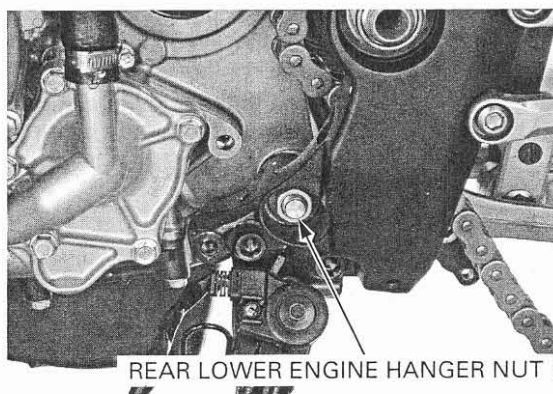
Actual: 54 N·m (5.5 kgf·m, 40 lbf·ft)

Indicated: 49 N·m (5.0 kgf·m, 39 lbf·ft)



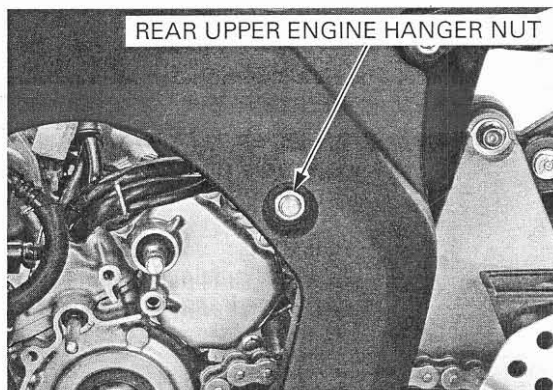
Tighten the rear lower engine hanger nut to the specified torque while holding the hanger bolt.

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



Tighten the rear upper engine hanger nut to the specified torque while holding the hanger bolt.

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

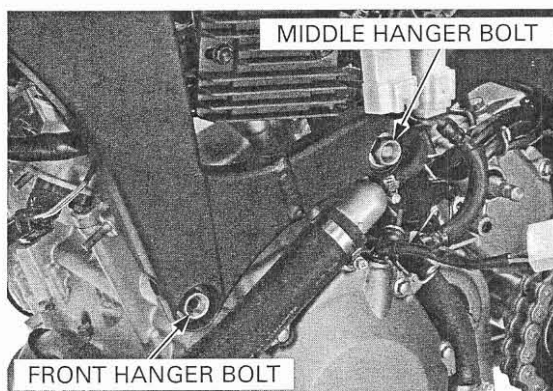


Install and tighten the left side front engine hanger bolt to the specified torque.

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

Install and tighten the left side middle engine hanger bolt to the specified torque.

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

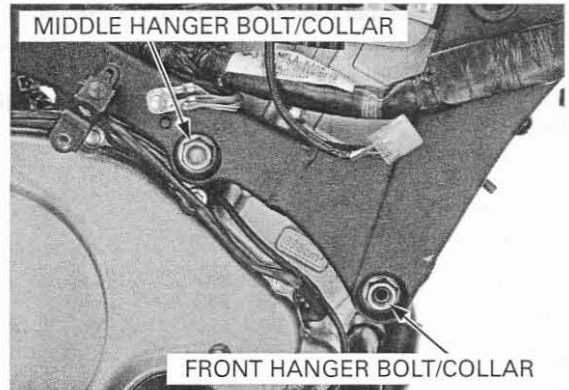


Install and tighten the right side front engine hanger bolt to the specified torque.

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

Install and tighten the right side middle engine hanger bolt to the specified torque.

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

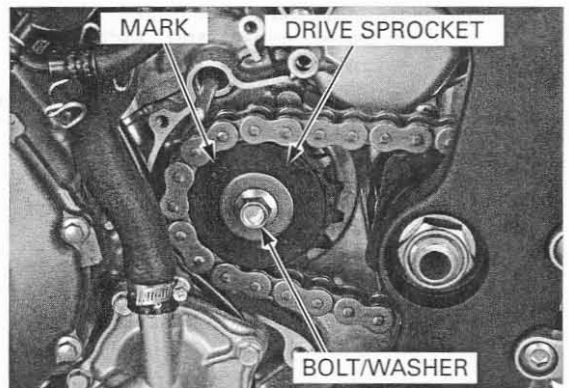


Install the drive sprocket with the marks facing out.

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

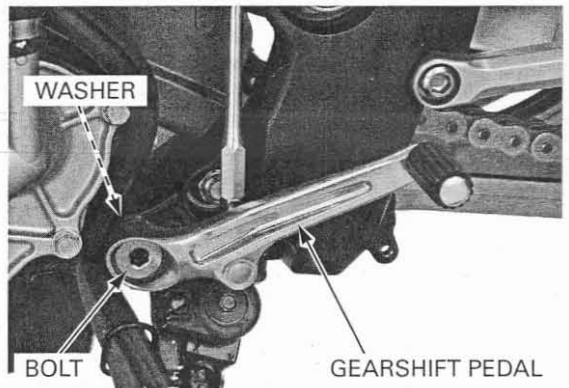
**TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)**

Install the drive sprocket cover and clutch slave cylinder (page 12-11).



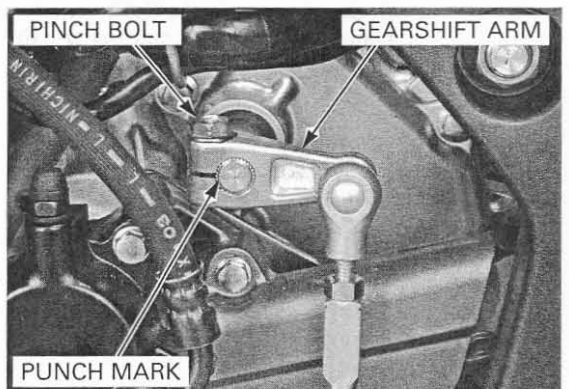
Install the gearshift pedal assembly onto the frame, then install the washer and pivot bolt. Tighten the pivot bolt to the specified torque.

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



Install the gearshift pedal link to the gearshift spindle while aligning its slit with the punch mark on the gearshift spindle. Install and tighten the pinch bolt to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

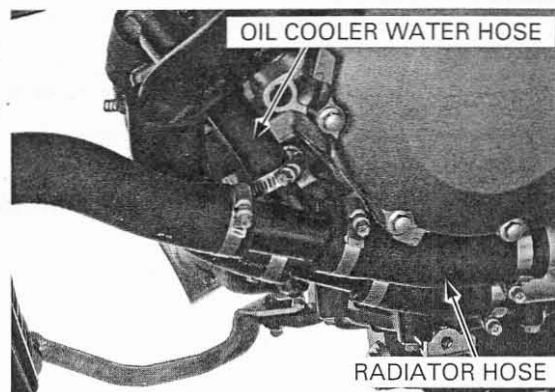


## ENGINE REMOVAL/INSTALLATION

Install the radiator onto the frame.

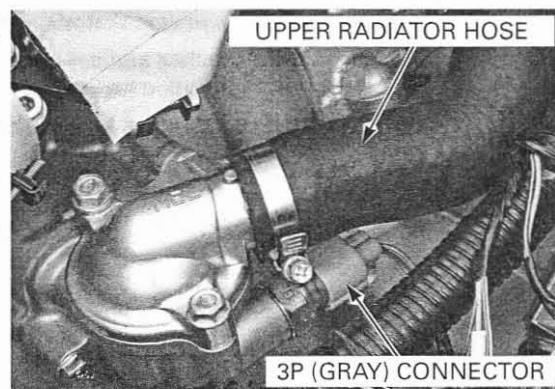
Connect the radiator hose and tighten the clamp screw securely.

Connect the oil cooler hose and tighten the clamp screw securely.



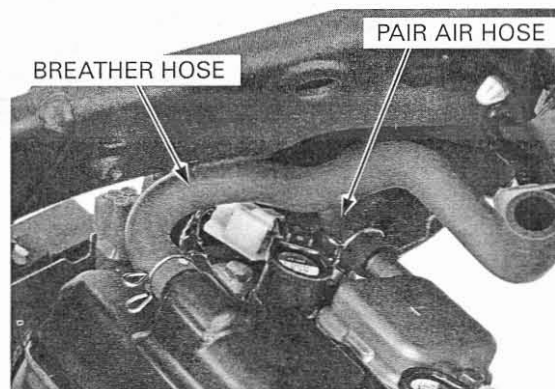
Connect the upper radiator hose to the thermostat housing cover and tighten the clamp screw securely.

Connect the ECT sensor 3P (Gray) connector.

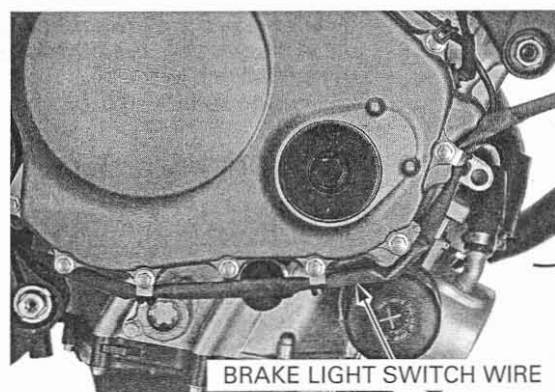


Connect the PAIR control valve air hoses to the reed valve cover.

Connect the crankcase breather hose to the cylinder head cover.

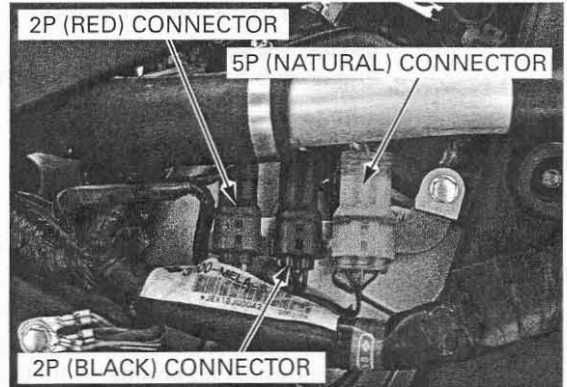


Route the rear brake light switch wire properly and clamp it with wire clamps on the right crankcase cover.

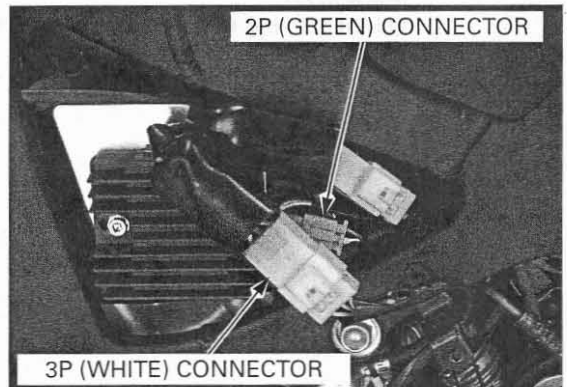


Connect the following connectors:

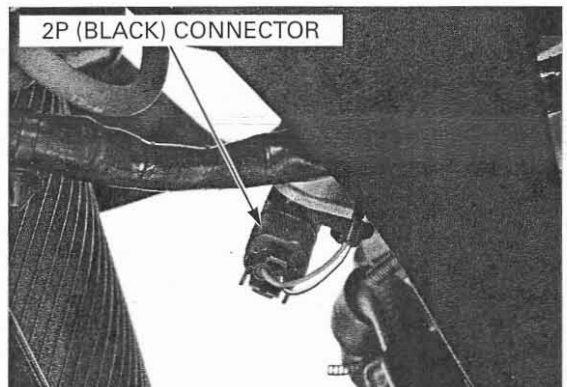
- Crankshaft position sensor 2P (Red) connector
- Rear brake light switch 2P (Black) connector
- Ignition coil sub-harness 5P (Natural) connector



Connect the alternator 3P (Natural) connector and side stand switch 2P (Green) connector.

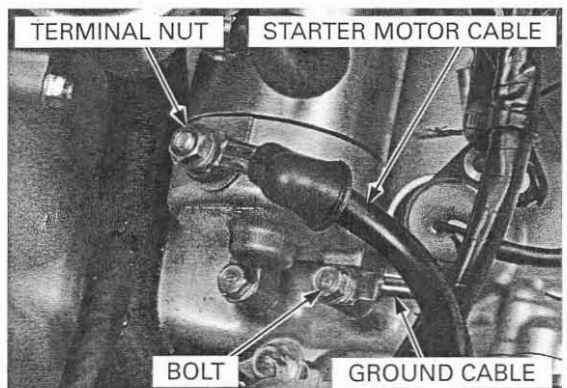


Connect the camshaft position sensor 2P (Black) connector.



Route the starter motor cable and ground cable properly.  
Connect the ground cable with the starter motor mounting bolt, tighten the mounting bolt.  
Connect the starter motor cable to the starter motor terminal, tighten the terminal nut to the specified torque.

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



## ENGINE REMOVAL/INSTALLATION

Connect the following connectors:

- Vehicle speed sensor 3P (Natural) connector
- Engine sub-harness 2P (Black) connector

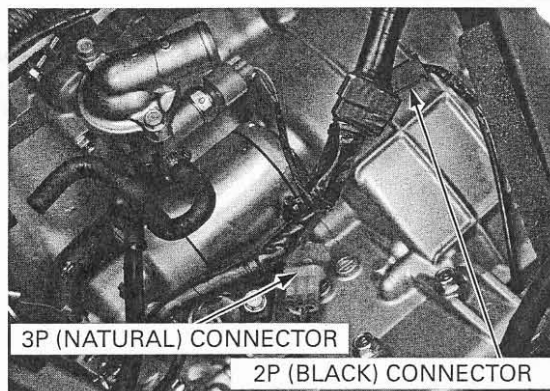
Install the following:

- Throttle body (page 6-47)
- Air cleaner housing (page 6-40)
- Radiator reserve tank (page 7-20)
- Radiator (page 7-10)
- Fuel tank (page 6-36)
- Exhaust pipe (page 3-30)
- Under cowls/middle cowl (page 3-7)

Adjust the drive chain slack (page 4-26).

Pour recommended engine oil up to the proper level (page 4-22).

Fill the cooling system with the recommended coolant and bleed any air (page 7-6).





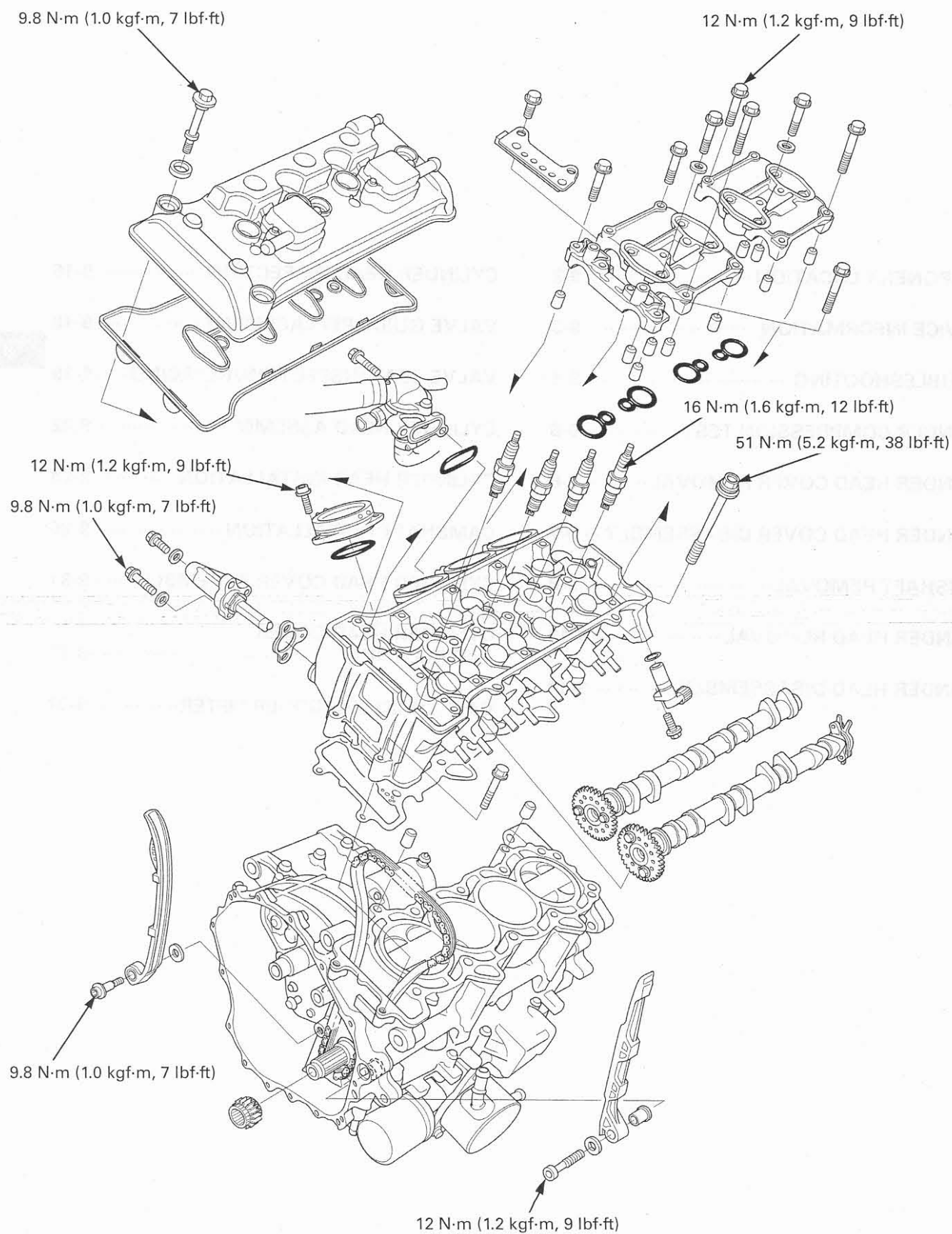
## 9. CYLINDER HEAD/VALVES

---

|                                     |      |   |      |
|-------------------------------------|------|---|------|
| COMPONENT LOCATION .....            | 9-2  | CYLINDER HEAD INSPECTION .....            | 9-16 |
| SERVICE INFORMATION .....           | 9-3  | VALVE GUIDE REPLACEMENT .....             | 9-18 |
| TROUBLESHOOTING .....               | 9-5  | VALVE SEAT INSPECTION/REFACING .....      | 9-19 |
| CYLINDER COMPRESSION TEST .....     | 9-6  | CYLINDER HEAD ASSEMBLY .....              | 9-22 |
| CYLINDER HEAD COVER REMOVAL .....   | 9-6  | CYLINDER HEAD INSTALLATION .....          | 9-24 |
| CYLINDER HEAD COVER DISASSEMBLY ... | 9-7  | CAMSHAFT INSTALLATION .....               | 9-26 |
| CAMSHAFT REMOVAL .....              | 9-8  | CYLINDER HEAD COVER ASSEMBLY .....        | 9-31 |
| CYLINDER HEAD REMOVAL .....         | 9-13 | CYLINDER HEAD COVER<br>INSTALLATION ..... | 9-32 |
| CYLINDER HEAD DISASSEMBLY .....     | 9-14 | CAM CHAIN TENSIONER LIFTER .....          | 9-34 |



## COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers service of the cylinder head, valves and camshaft.
- The camshaft services can be done with the engine installed in the frame. The cylinder head service requires engine removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

### SPECIFICATIONS

| ITEM                        |   | STANDARD   | SERVICE LIMIT                   |
|-----------------------------|---|--|---------------------------------|
| Cylinder compression        |   | 1,098 kPa (11.2 kgf/cm <sup>2</sup> , 159 psi)<br>at 350 rpm | —                               |
| Valve clearance             | IN  | 0.16 ± 0.03 (0.006 ± 0.001)                                  | —                               |
|                             | EX  | 0.30 ± 0.03 (0.012 ± 0.001)                                  | —                               |
| Camshaft                    | Cam lobe height                               | IN   | 37.02 – 37.10 (1.457 – 1.461)   |
|                             |   | EX   | 36.66 – 36.74 (1.443 – 1.446)   |
|                             | Runout  | —  | 0.05 (0.002)                    |
|                             | Oil clearance                                 | 0.020 – 0.062 (0.0008 – 0.0024)                              | 0.10 (0.004)                    |
| Valve lifter                | Valve lifter O.D.                             | 25.978 – 25.993 (1.0228 – 1.0233)                            | 25.97 (1.022)                   |
|                             | Valve lifter bore I.D.                        | 26.010 – 26.026 (1.0240 – 1.0246)                            | 26.04 (1.025)                   |
| Valve,<br>valve guide       | Valve stem O.D.                               | IN   | 3.975 – 3.990 (0.1565 – 0.1571) |
|                             |   | EX   | 3.965 – 3.980 (0.1561 – 0.1567) |
|                             | Valve guide I.D.                              | IN/EX  | 4.000 – 4.012 (0.1575 – 0.1580) |
|                             | Stem-to-guide clearance                       | IN   | 0.010 – 0.037 (0.0004 – 0.0015) |
|                             |   | EX   | 0.020 – 0.047 (0.0008 – 0.0019) |
|                             | Valve guide projection<br>above cylinder head | IN   | 16.1 – 16.4 (0.63 – 0.65)       |
|                             |   | EX   | 15.5 – 15.8 (0.61 – 0.62)       |
|                             | Valve seat width                              | IN   | 0.90 – 1.10 (0.035 – 0.043)     |
|                             |   | EX   | 0.90 – 1.10 (0.035 – 0.043)     |
| Valve spring<br>free length | IN  | 39.5 (1.56)  | 38.7 (1.52)                     |
|                             | EX  | 39.5 (1.56)  | 38.7 (1.52)                     |
| Cylinder head warpage       |   | —  | 0.10 (0.004)                    |

### TORQUE VALUES

|   |                               |   |
|---|-------------------------------|---|
| Cylinder head mounting bolt/washer              | 51 N·m (5.2 kgf·m, 38 lbf·ft) | Apply molybdenum disulfide oil to the threads and seating surface |
| Camshaft holder flange bolt                     | 12 N·m (1.2 kgf·m, 9 lbf·ft)  | Apply oil to the threads  |
| Cylinder head sealing bolt                      | 27 N·m (2.8 kgf·m, 20 lbf·ft) |   |
| Cylinder head cover bolt                        | 9.8 N·m (1.0 kgf·m, 7 lbf·ft) |   |
| Breather plate flange bolt                      | 12 N·m (1.2 kgf·m, 9 lbf·ft)  | Apply a locking agent to the threads                              |
| PAIR reed valve cover bolt                      | 12 N·m (1.2 kgf·m, 9 lbf·ft)  | CT bolt   |
| Throttle body insulator socket bolt             | 12 N·m (1.2 kgf·m, 9 lbf·ft)  | Apply a locking agent to the threads                              |
| Cam sprocket flange bolt                        | 20 N·m (2.0 kgf·m, 14 lbf·ft) |   |
| Cam chain tensioner pivot bolt                  | 9.8 N·m (1.0 kgf·m, 7 lbf·ft) | Apply a locking agent to the threads                              |
| Camshaft position sensor rotor bolt             | 12 N·m (1.2 kgf·m, 9 lbf·ft)  | Apply a locking agent to the threads                              |
| Cam chain tensioner lifter mounting socket bolt | 9.8 N·m (1.0 kgf·m, 7 lbf·ft) |   |
| Cam chain guide torx bolt                       | 12 N·m (1.2 kgf·m, 9 lbf·ft)  |   |
| Exhaust pipe stud bolt                          | See page 1-15                 |   |
| Spark plug                                      | 16 N·m (1.6 kgf·m, 12 lbf·ft) |   |

## CYLINDER HEAD/VALVES

### TOOLS

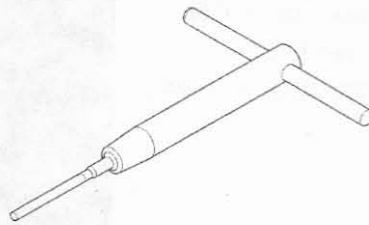
|  |  |  |
|--|--|--|
| <p>Compression gauge attachment<br/>07RMJ-MY50100</p>  <p>or equivalent commercially available in U.S.A.</p>          | <p>Cam chain tensioner holder<br/>07ZMG-MCAA400</p>  <p>or 07NMG-MY90100</p>                                  | <p>Valve spring compressor<br/>07757-0010000</p>    |
| <p>Valve spring compressor attachment<br/>07959-KM30101</p>   | <p>Tappet hole protector<br/>07HMG-MR70002</p>  <p>U.S.A. only;<br/>Make your own tool (page 9-15)</p>        | <p>Valve guide driver<br/>07GMD-KT70100</p>   |
| <p>Valve guide driver<br/>07743-0020000</p>  <p>Not available in U.S.A.</p>   | <p>Valve guide reamer, 4.00 mm<br/>07MMH-MV90100</p>  <p>07MMH-MV9010A (U.S.A. only)</p>                    | <p>Valve seat cutter, 29 mm (45° IN)<br/>07780-0010300</p>  <p>or equivalent commercially available in U.S.A.</p> |
| <p>Valve seat cutter, 27.5 mm (45° EX)<br/>07780-0010200</p>  <p>or equivalent commercially available in U.S.A.</p> | <p>Flat cutter, 30 mm (32° IN)<br/>07780-0012200</p>  <p>or equivalent commercially available in U.S.A.</p> | <p>Flat cutter, 27 mm (32° EX)<br/>07780-0013300</p>  <p>or equivalent commercially available in U.S.A.</p>       |

Interior cutter, 30 mm (60° IN)  
07780-0014000



or equivalent commercially available in U.S.A.

Cutter holder  
07JMH-KY20200



or equivalent commercially available in U.S.A.

## TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for a seized piston ring (page 13-16).

### Compression too low, hard starting or poor performance at low speed

- Valves:
  - Incorrect valve adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head:
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head
- Worn cylinder, piston or piston rings (page 13-16)

### Compression too high, overheating or knocking

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

### Excessive smoke

- Cylinder head:
  - Worn valve stem or valve guide
  - Damaged stem seal
- Worn cylinder, piston or piston rings (page 13-16)

### Excessive noise

- Cylinder head:
  - Incorrect valve adjustment
  - Sticking valve or broken valve spring
  - Damaged or worn camshaft
  - Loose or worn cam chain
  - Worn or damaged cam chain
  - Worn or damaged cam chain tensioner
  - Worn cam sprocket teeth
- Worn cylinder, piston or piston rings (page 13-16)

### Rough idle

- Low cylinder compression

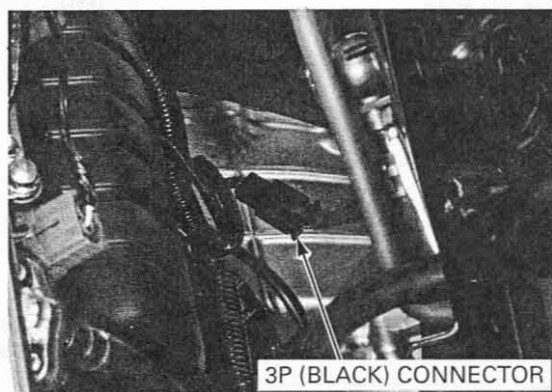
## CYLINDER HEAD/VALVES

### CYLINDER COMPRESSION TEST

Warm the engine to normal operating temperature. Stop the engine and remove the all direct ignition coil/spark plug caps and spark plugs (page 4-8).

Lift and support the fuel tank (page 4-5).

Disconnect the fuel pump unit 3P (Black) connector.



Install a compression gauge into the spark plug hole.

#### TOOL:

Compression gauge attachment

07RMJ-MY50100 or equivalent commercially available in U.S.A.

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.

The maximum reading is usually reached within 4 – 7 seconds.

#### Compression pressure:

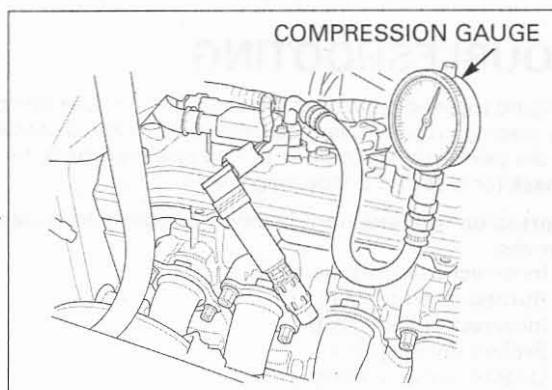
1,098 kPa (11.2 kgf/cm<sup>2</sup>, 159 psi) at 350 rpm

Low compression can be caused by:

- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head

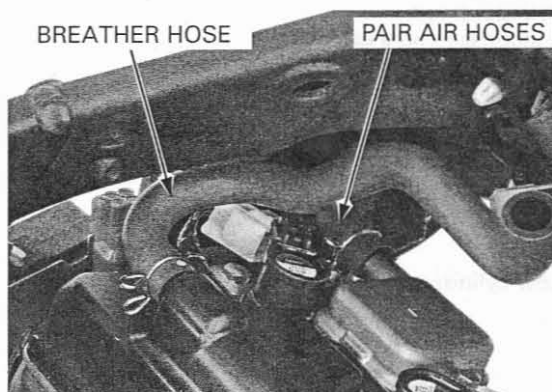


### CYLINDER HEAD COVER REMOVAL

Remove the throttle body (page 6-47).

Remove the crankcase breather hose.

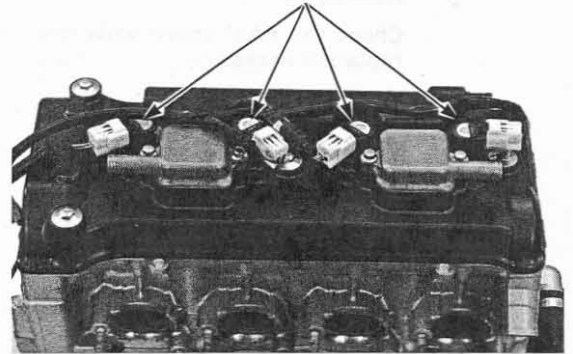
Disconnect the PAIR air hoses from the cylinder head and remove the PAIR control solenoid valve (page 6-71).



## CYLINDER HEAD/VALVES

Disconnect the ignition coil connectors and remove the direct ignition coils.

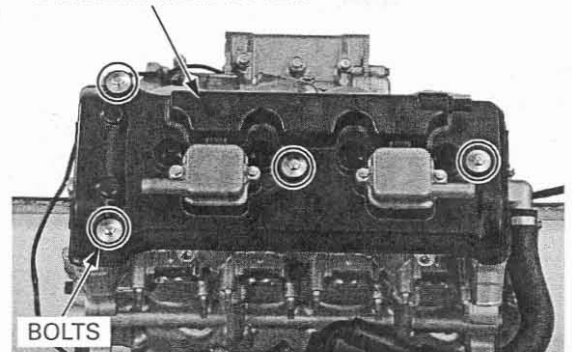
DIRECT IGNITION COILS



Remove the cylinder head cover bolts.

Remove the cylinder head cover from the cylinder head.

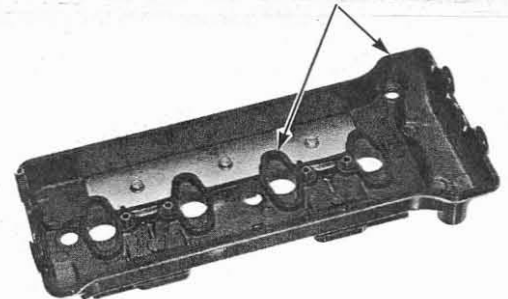
CYLINDER HEAD COVER



## CYLINDER HEAD COVER DISASSEMBLY

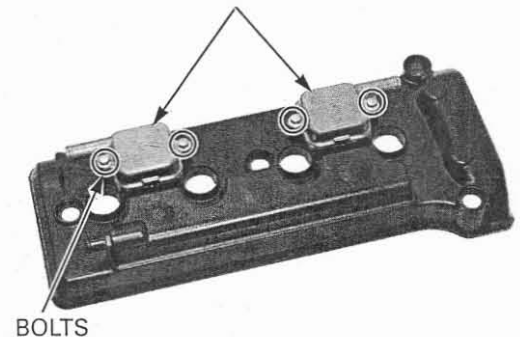
Remove the cylinder head cover packing.

PACKING



Remove the bolts and PAIR check valve cover.

PAIR CHECK VALVE COVERS

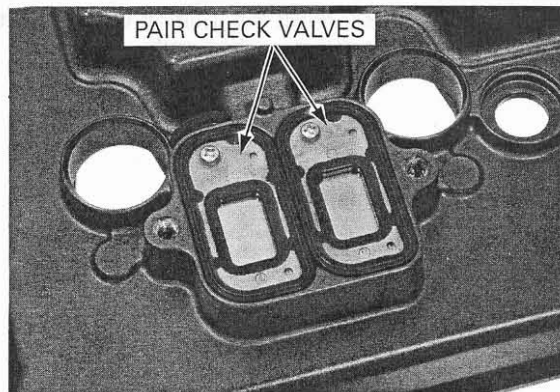




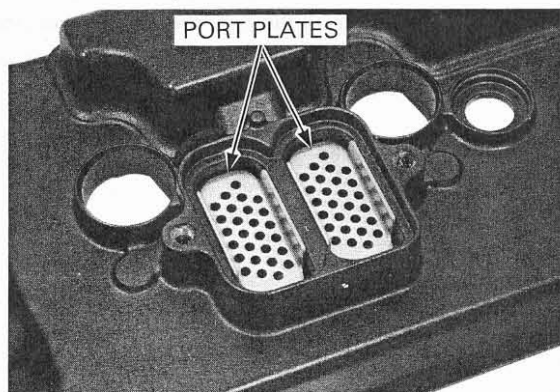
## CYLINDER HEAD/VALVES

Remove the PAIR check valves from the cylinder head cover.

Check the PAIR check valve for wear or damage, replace if necessary.



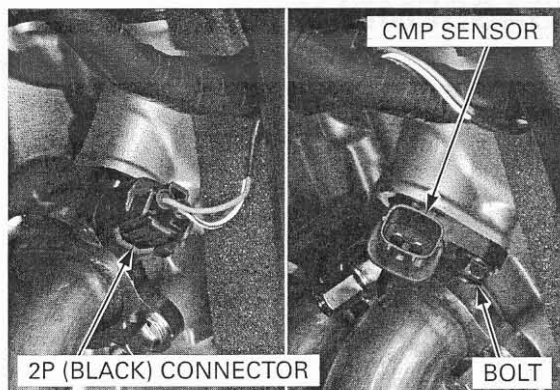
Remove the port plates from the cylinder head cover.



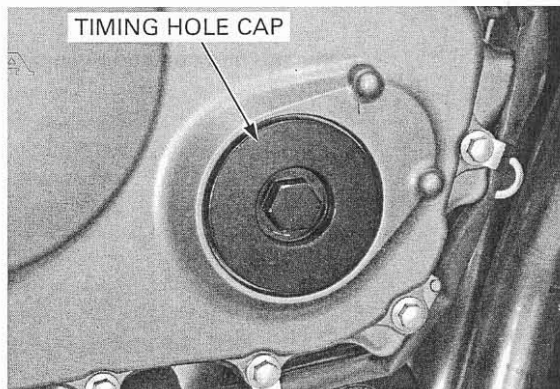
## CAMSHAFT REMOVAL

Remove the cylinder head cover (page 9-6).

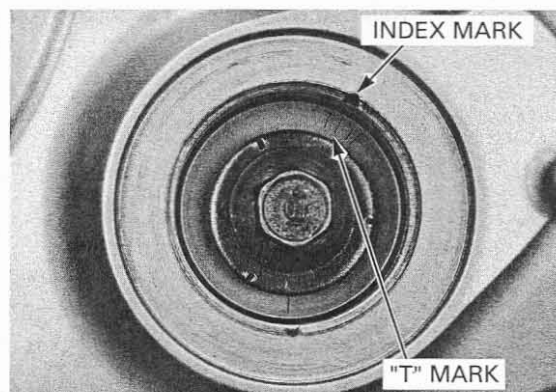
Avoid damaging the CMP (camshaft position) sensor while removing the camshafts, remove the bolt and CMP sensor from the cylinder head.



Remove the timing hole cap and O-ring.

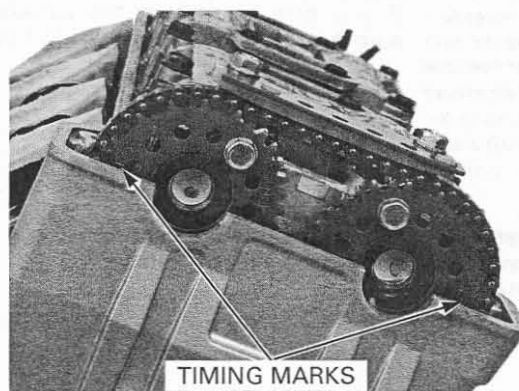


Turn the crankshaft clockwise, align the "T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.

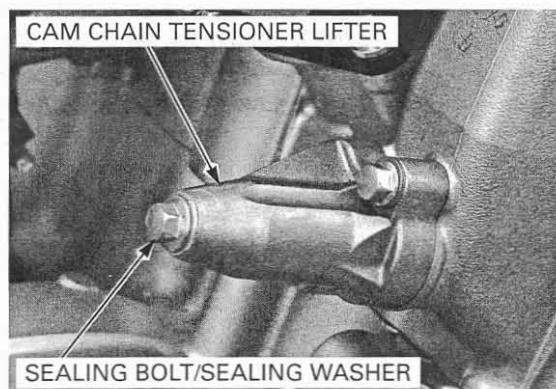


The timing marks ("IN" and "EX") on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks on the cam sprocket are facing inward, turn the crankshaft clockwise one full turn (360°) and realign the timing marks with the cylinder head surface so they are facing outward.



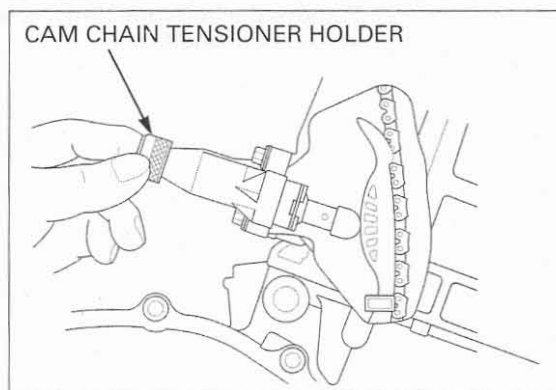
Remove the cam chain tensioner lifter sealing bolt and sealing washer.



Turn the tensioner lifter shaft fully in (clockwise) and secure it using the special tool to prevent damaging the cam chain.

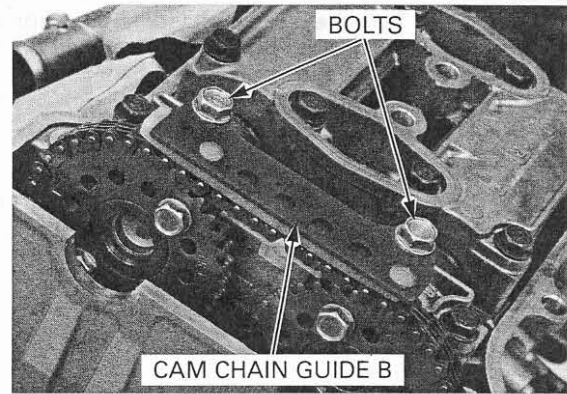
**TOOL:**

**Cam chain tensioner holder** 07ZMG-MCAA400 or 07NMG-MY90100



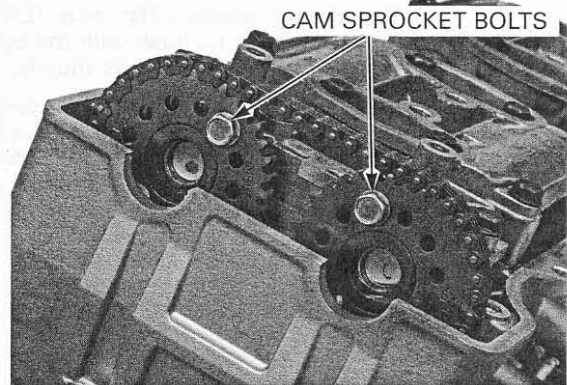
## CYLINDER HEAD/VALVES

Remove the bolts and cam chain guide B.



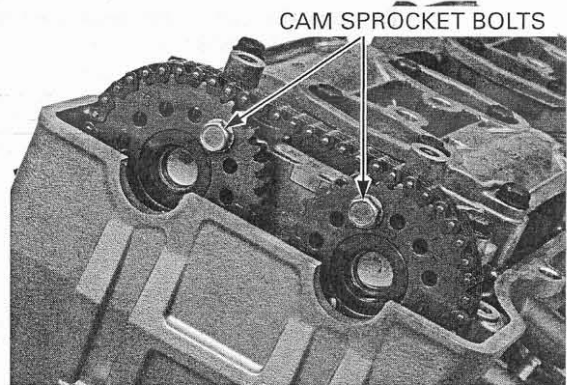
*It is not necessary to remove the cam sprocket from the camshaft except when replacing the camshaft and/or cam sprocket.*

If you plan to replace the camshaft and/or cam sprocket, loosen the cam sprocket bolts as follows:

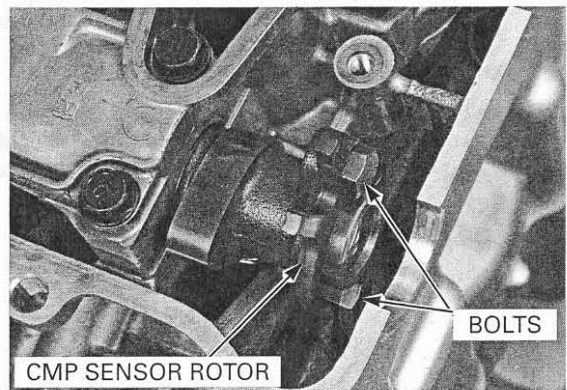


*Be careful not to drop the cam sprocket bolts and cam sprocket into the crankcase.*

- Remove the cam sprocket bolts from the intake and exhaust camshafts.
- Turn the crankshaft clockwise one full turn (360°), remove the other cam sprocket bolts from the camshafts.
- Remove the cam sprockets from the camshafts.



- Remove the bolts and CMP sensor rotor from the exhaust camshaft.



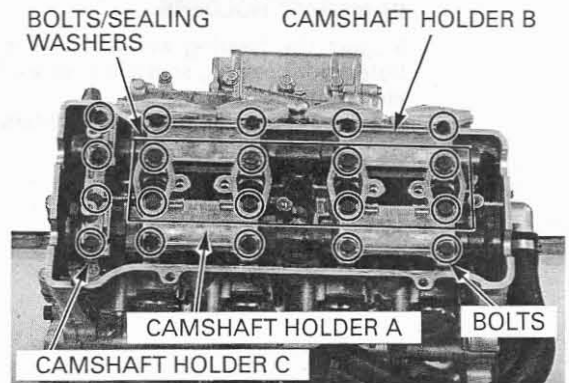
*Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.*

Loosen and remove the camshaft holder bolts/washers, then remove the camshaft holders and camshafts.

**NOTE:**

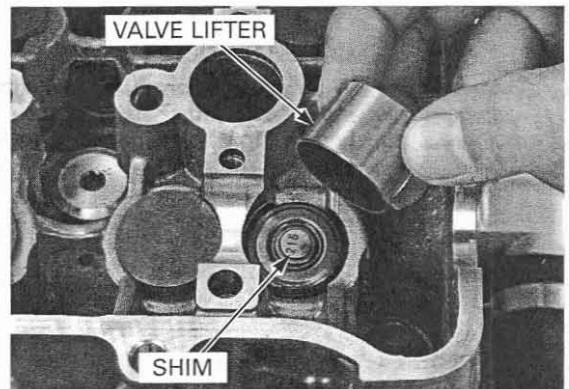
From outside to inside, loosen the bolts in a criss-cross pattern in several steps or the camshaft holder might break.

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



Remove the valve lifters and shims.

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



## INSPECTION

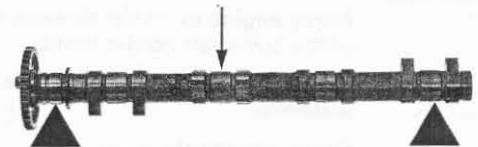
### CAMSHAFT

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

Check the oil holes in the camshaft for clogging.

Support both sides of the camshaft (at journals) with V-blocks and check the camshaft run out with a dial gauge.

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

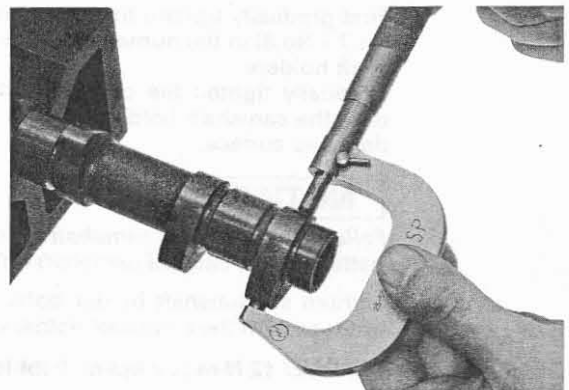


Using a micrometer, measure each cam lobe height.

**SERVICE LIMITS:**

**IN:** 37.00 mm (1.457 in)

**EX:** 36.64 mm (1.443 in)



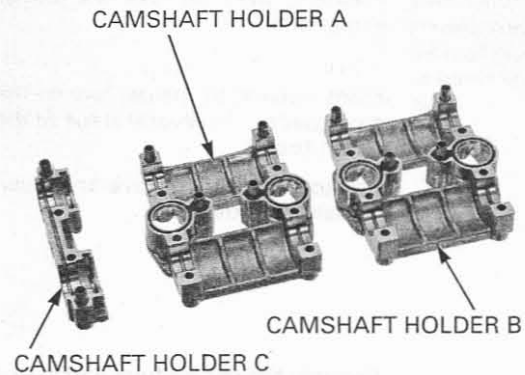


## CYLINDER HEAD/VALVES

### CAMSHAFT HOLDERS

Inspect the bearing surface of the each camshaft holder for scoring, scratches, or evidence of insufficient lubrication.

Inspect the oil orifices of the holders for clogging.

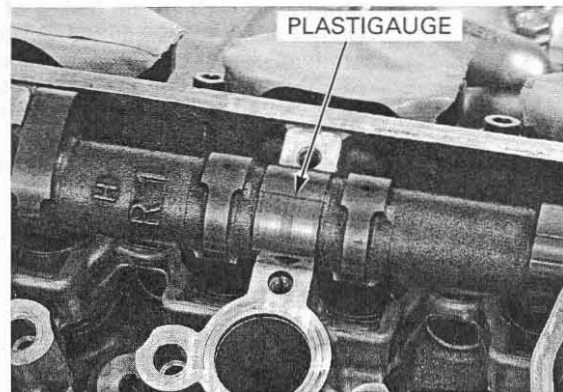


### CAMSHAFT OIL CLEARANCE

*Do not rotate the camshaft when using plastigauge.*

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

Lay a strip of plastigauge lengthwise on top of each camshaft journal.



*Be sure the dowel pins in the camshaft holder align the holes in the cylinder head.*

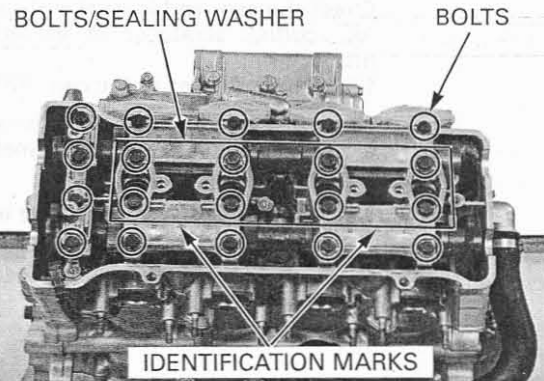
Install the each camshaft holder to the correct locations with the identification marks.

- "R" mark: center camshaft holder (Holder A)
- "L" mark: left camshaft holder (Holder B)

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

Install the twenty holder bolts with the eight sealing washers.

Finger tighten the bolts.



First gradually tighten the four bolts (No.5 – No.6 – No.7 – No.8) in the numerical order cast on the camshaft holders.

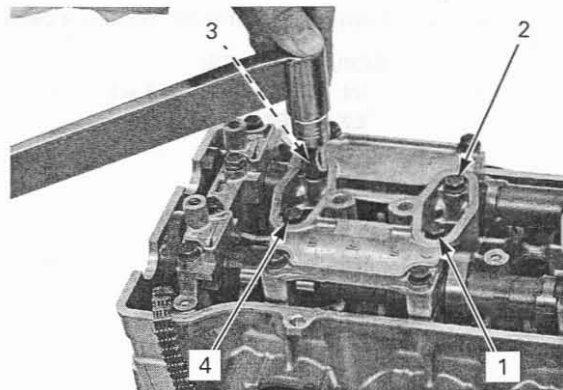
Gradually tighten the other camshaft holder bolts until the camshaft holders lightly contact the cylinder head surface.

### NOTICE

*Failure to tighten the camshaft holder in a crisscross pattern might cause a camshaft holder to break.*

Tighten all camshaft holder bolts in the numerical order cast on the camshaft holders.

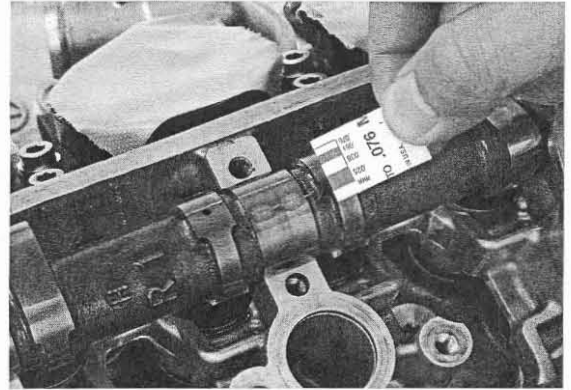
**TORQUE:** 12 N·m (1.2 kgf·m, 9 lbf·ft)



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

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

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

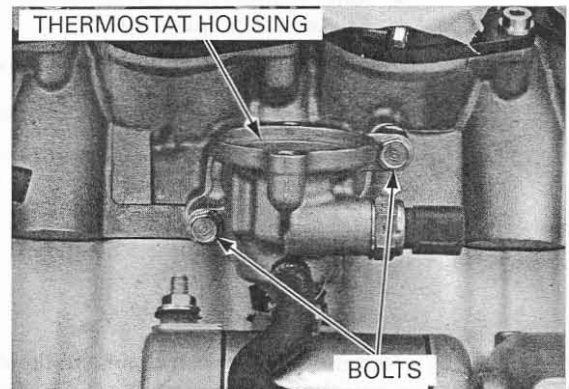


## CYLINDER HEAD REMOVAL

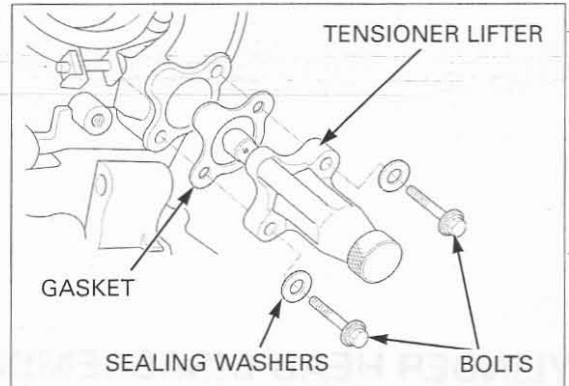
Remove the engine from the frame (page 8-4).  
Remove the camshafts (page 9-8).

Remove the bolts, thermostat housing and O-ring.

Tilt the engine and drain the coolant from the cylinder head and cylinder.

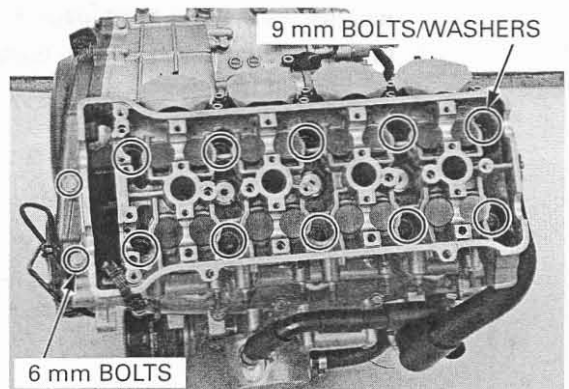


Remove the bolts, sealing washers, cam chain tensioner lifter and gasket.



Remove the two 6 mm bolts.  
Remove the ten 9 mm bolts/washers.  
Remove the cylinder head.

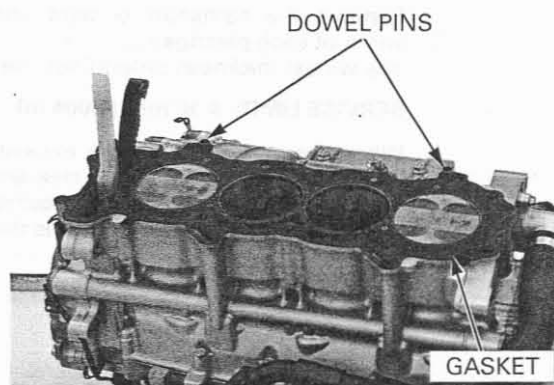
*Loosen the 9 mm bolts in a criss-cross pattern in two or three steps.*





## CYLINDER HEAD/VALVES

Remove the gasket and dowel pins.

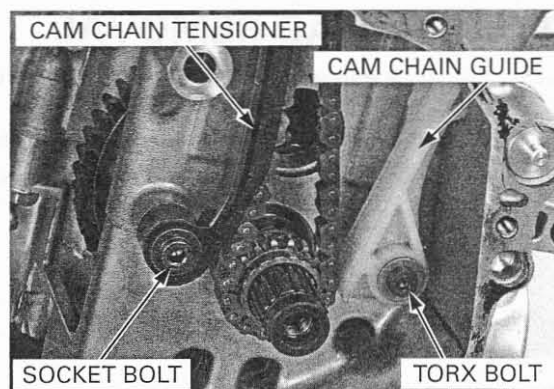


Remove the following:

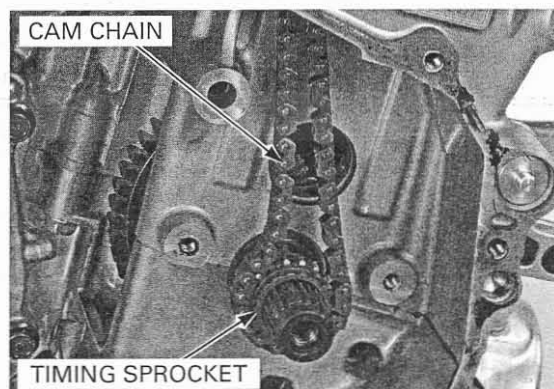
- Right crankcase cover (page 10-15)
- Starter clutch (page 10-28)

Remove the torx bolt, washer, cam chain guide and pivot collar.

Remove the socket bolt, cam chain tensioner and washer.



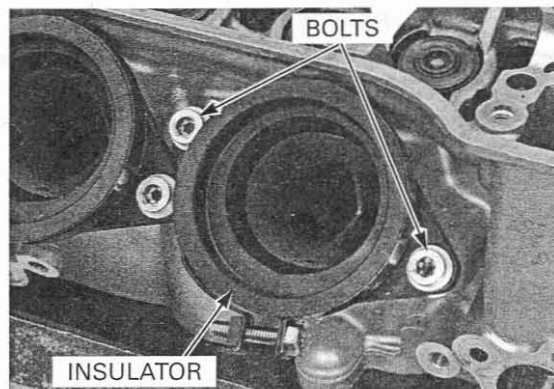
Remove the cam chain and timing sprocket from the crankshaft.



## CYLINDER HEAD DISASSEMBLY

Remove the cylinder head (page 9-13).

Remove the bolts and throttle body insulators from the cylinder head.

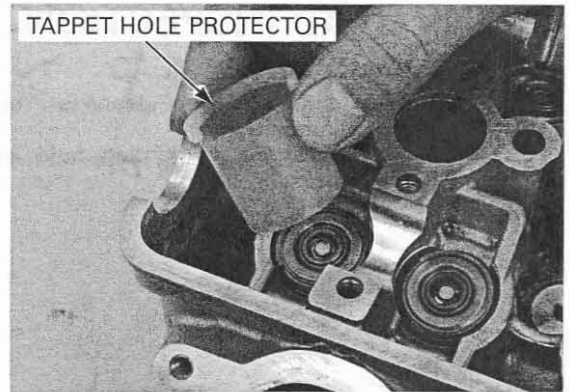


Remove the spark plugs from the cylinder head.  
Install the tappet hole protector into the valve lifter bore.

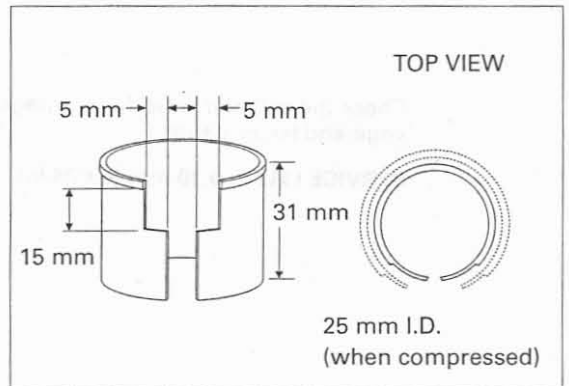
**TOOL:**

Tappet hole protector

07HMG-MR70002  
(not available in  
U.S.A.)



An equivalent tool can easily be made from a plastic 35 mm film container as shown.



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

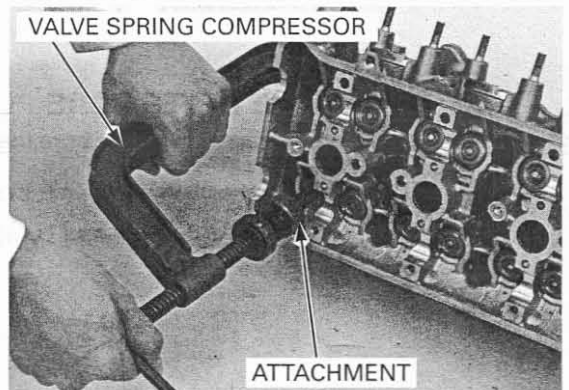
Remove the valve spring cotters using the special tools as shown.

**TOOLS:**

Valve spring compressor  
Valve spring compressor attachment

07757-0010000

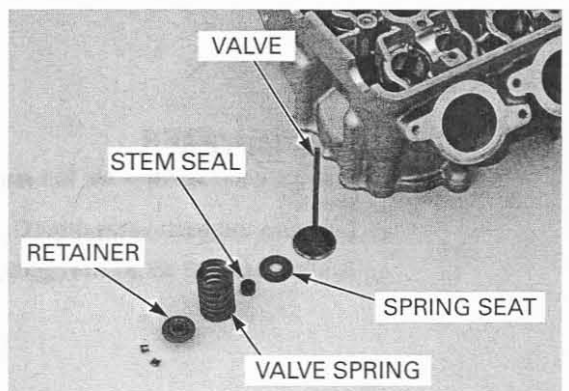
07959-KM30101



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

Remove the following:

- Spring retainer
- Valve springs
- Valve
- Stem seal
- Valve spring seat



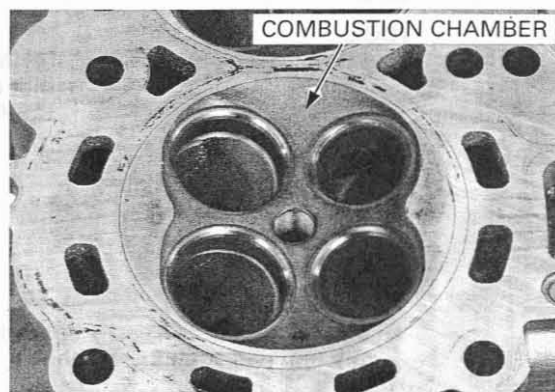
## CYLINDER HEAD/VALVES

### CYLINDER HEAD INSPECTION

#### CYLINDER HEAD

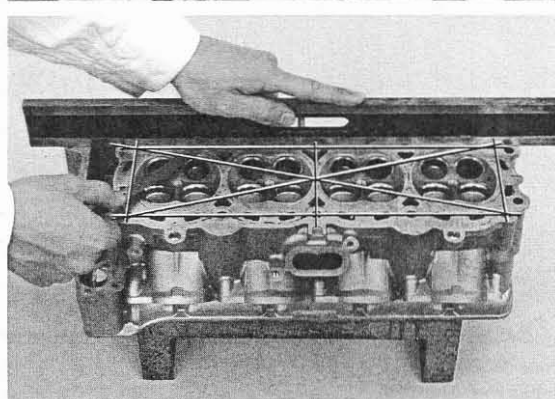
*Avoid damaging the gasket surface.*

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



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

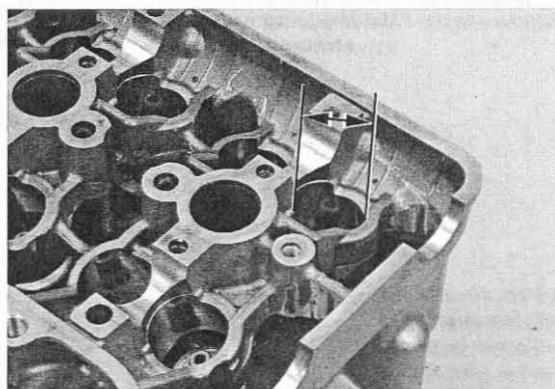
**SERVICE LIMIT:** 0.10 mm (0.004 in)



#### VALVE LIFTER BORE

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

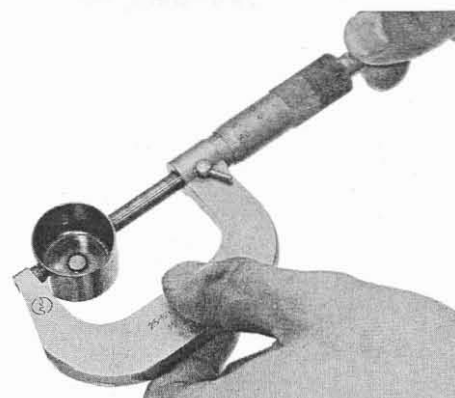
**SERVICE LIMIT:** 26.04 mm (1.025 in)



#### VALVE LIFTER

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

**SERVICE LIMIT:** 25.97 mm (1.022 in)



**VALVE SPRING**

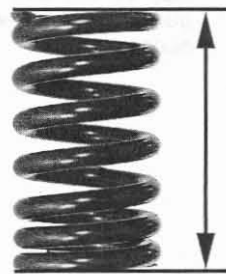
Measure the free length of the valve springs.

**SERVICE LIMITS:**

IN: 38.7 mm (1.52 in)

EX: 38.7 mm (1.52 in)

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

**VALVE/VALVE GUIDE**

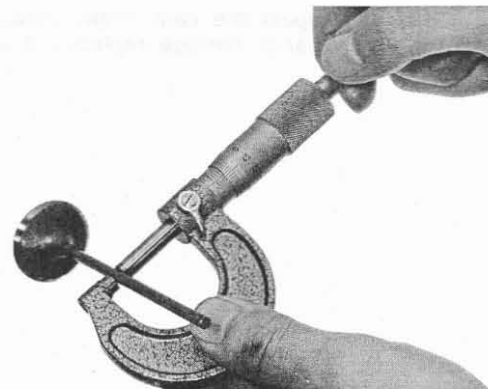
Check that the valve moves smoothly in the guide. Inspect each valve for bending, burning or abnormal stem wear.

Measure and record each valve stem O.D.

**SERVICE LIMITS:**

IN: 3.965 mm (0.1561 in)

EX: 3.955 mm (0.1557 in)



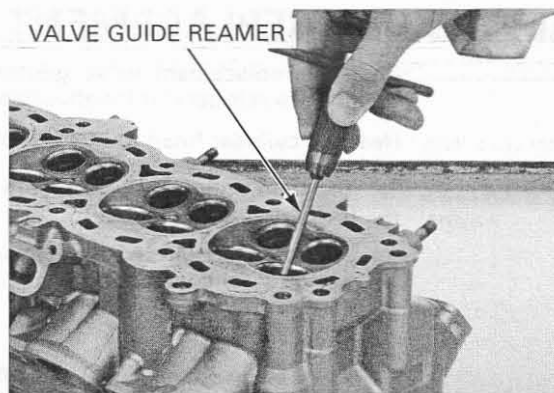
Ream the guides to remove any carbon deposits before checking clearances.

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

**TOOL:**

Valve guide reamer, 4.00 mm 07MMH-MV90100

VALVE GUIDE REAMER



Measure and record each valve guide I.D.

**SERVICE LIMIT: IN/EX: 4.04 mm (0.159 in)**

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

**SERVICE LIMIT:**

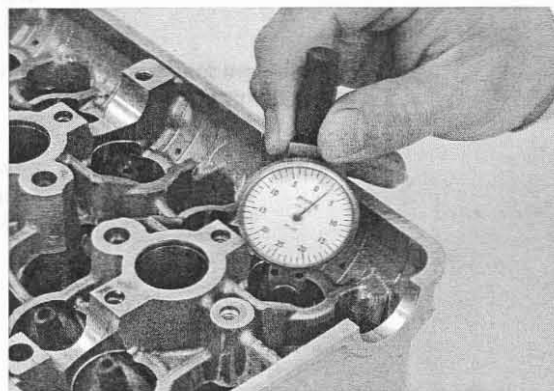
IN: 0.075 mm (0.0030 in)

EX: 0.085 mm (0.0033 in)

*Reface the valve seats whenever the valve guides are replaced (page 9-20).*

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

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

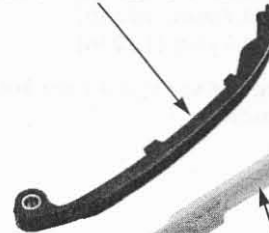


## CYLINDER HEAD/VALVES

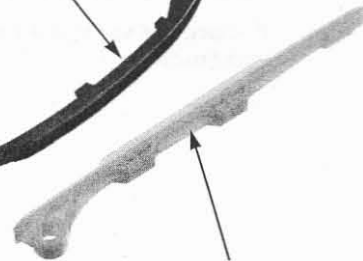
### CAM CHAIN TENSIONER/CAM CHAIN GUIDE

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

CAM CHAIN TENSIONER

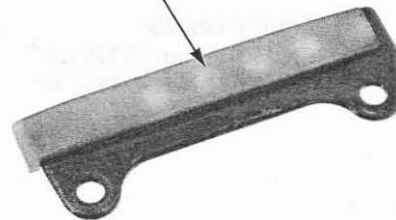


CAM CHAIN GUIDE



Inspect the cam chain tensioner B for excessive wear or damage, replace it if necessary.

CAM CHAIN TENSIONER B



## VALVE GUIDE REPLACEMENT

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

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

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

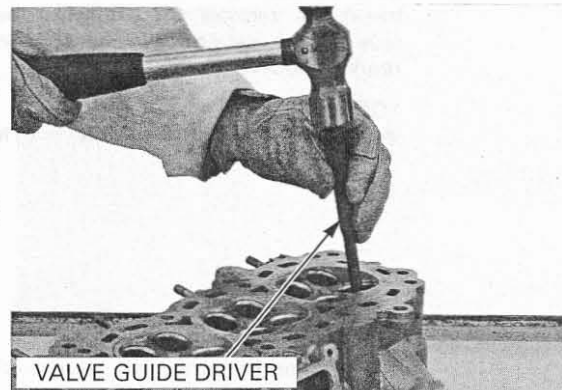
To avoid burns, wear heavy gloves when handling the heated cylinder head.

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

#### TOOL:

Valve guide driver

07JMD-KY20100  
(not available in U.S.A.)

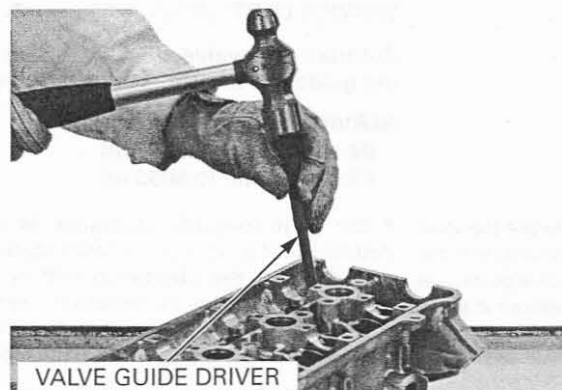


Drive in the guides to the specified depth from the top of the cylinder head.

#### TOOL:

Valve guide driver

07743-0020000  
(not available in U.S.A.)





**SPECIFIED DEPTH:**

IN: 16.1 – 16.4 mm (0.63 – 0.65 in)

EX: 15.5 – 15.8 mm (0.61 – 0.62 in)

Let the cylinder head cool to room temperature.

*Use cutting oil on the reamer during this operation.*

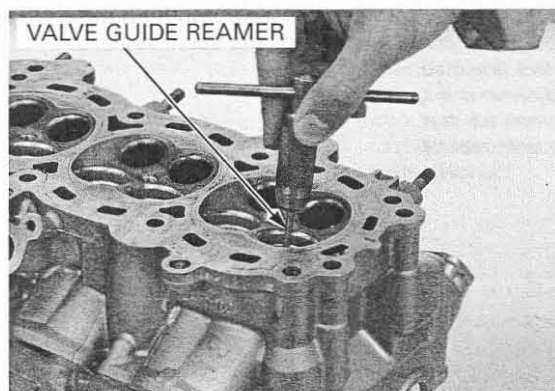
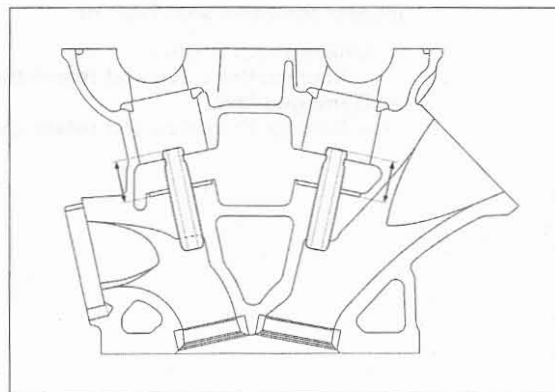
Ream the new valve guides after installation. Insert the reamer from the combustion chamber side of the head and also always rotate the reamer clockwise.

**TOOL:**

Valve guide reamer, 4.00 mm 07MMH-MV90100

Clean the cylinder head thoroughly to remove any metal particles.

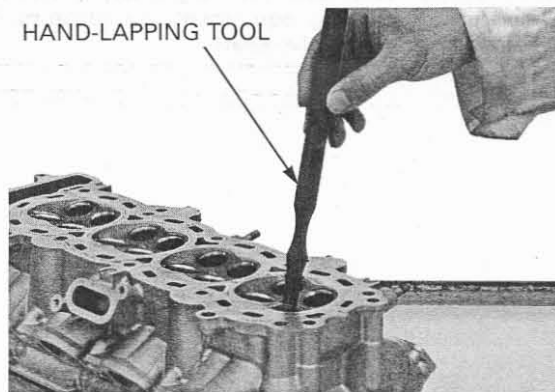
Reface the valve seat (page 9-20).

**VALVE SEAT INSPECTION/REFACING**

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

Apply a light coating of Prussian Blue to the valve seats.

Tap the valves and seats using a rubber hose or other hand-lapping tool.

**HAND-LAPPING TOOL**

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

**STANDARD:**

IN: 0.90 – 1.10 mm (0.035 – 0.043 in)

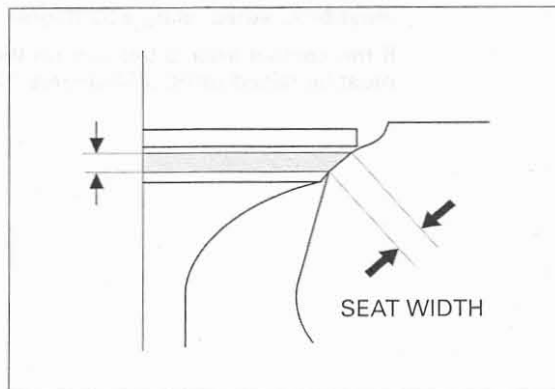
EX: 0.90 – 1.10 mm (0.035 – 0.043 in)

**SERVICE LIMIT:**

IN: 1.5 mm (0.06 in)

EX: 1.5 mm (0.06 in)

If the seat width is not within specification, reface the valve seat (page 9-20).





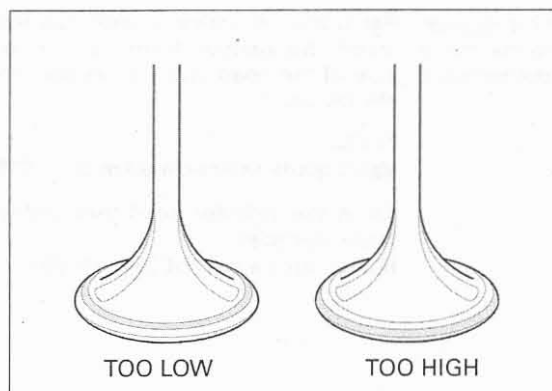
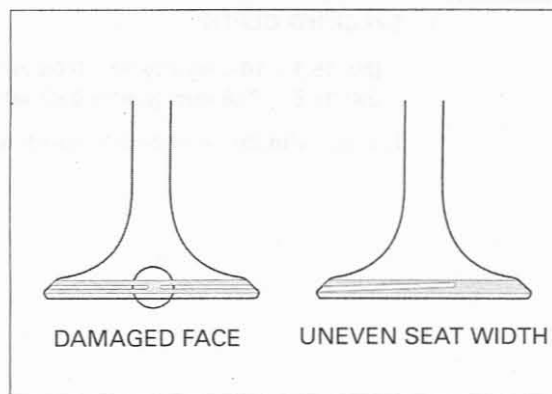
## CYLINDER HEAD/VALVES

Inspect the valve seat face for:

- Uneven seat width:
  - Replace the valve and reface the valve seat.
- Damaged face:
  - Replace the valve and reface the valve seat.

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

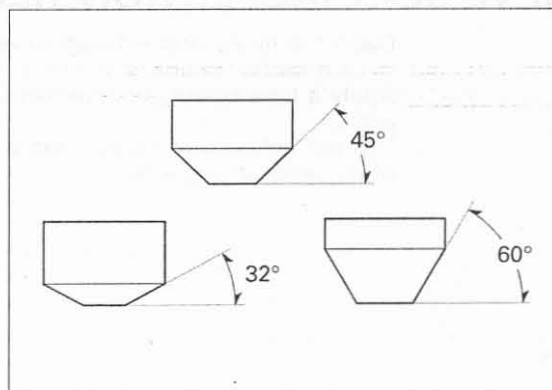
- Contact area (too high or too low)
  - Reface the valve seat.



### VALVE SEAT REFACING

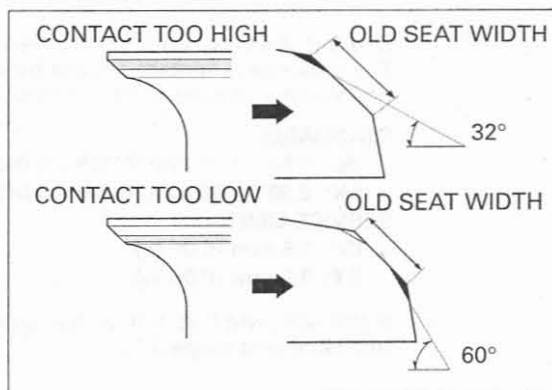
*Follow the refacing manufacturer's operating instructions.*

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



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 interior cutter.



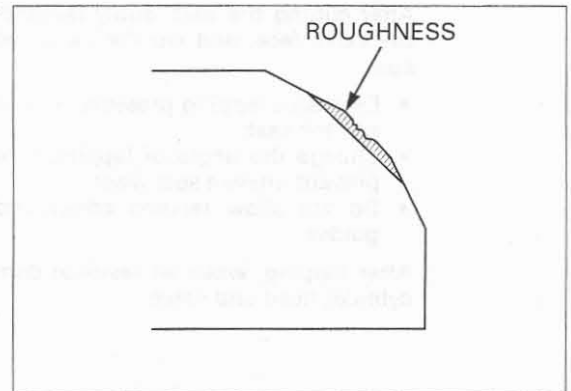
Reface the seat with a 45-degree cutter whenever a valve guide is replaced.

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

**TOOLS:**

Seat cutter, 29 mm (IN)  
Seat cutter, 27.5 mm (EX)  
Cutter holder

07780-0010300  
07780-0010200  
07JMH-KY20200 or  
equivalent commercially  
available in  
U.S.A.

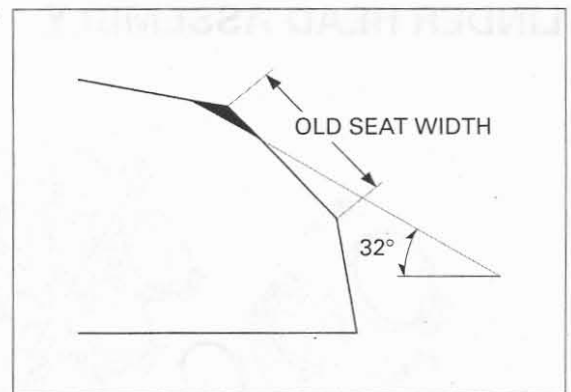


Use a 32-degree cutter to remove the top 1/4 of the existing valve seat material.

**TOOLS:**

Flat cutter, 30 mm (IN)  
Flat cutter, 27 mm (EX)  
Cutter holder

07780-0012200  
07780-0013300  
07JMH-KY20200 or  
equivalent commercially  
available in  
U.S.A.

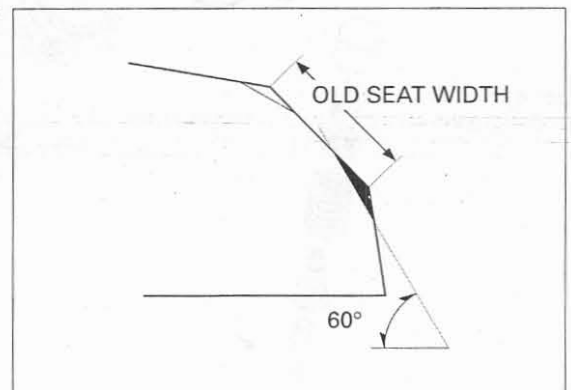


Use a 60-degree cutter to remove the bottom 1/4 of the old seat.

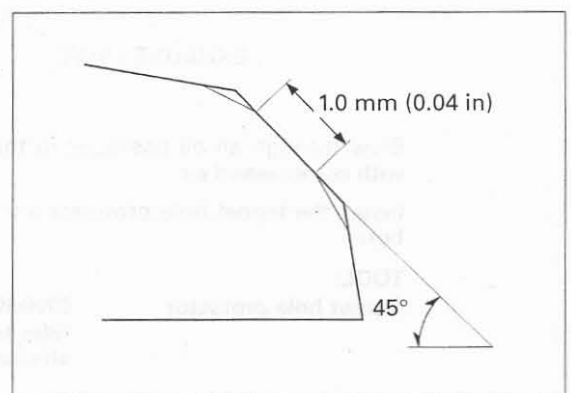
**TOOLS:**

Interior cutter, 30 mm (IN)  
Interior cutter, 30 mm (EX)  
Cutter holder

07780-0014000  
07780-0014000  
07JMH-KY20200 or  
equivalent commercially  
available in  
U.S.A.



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

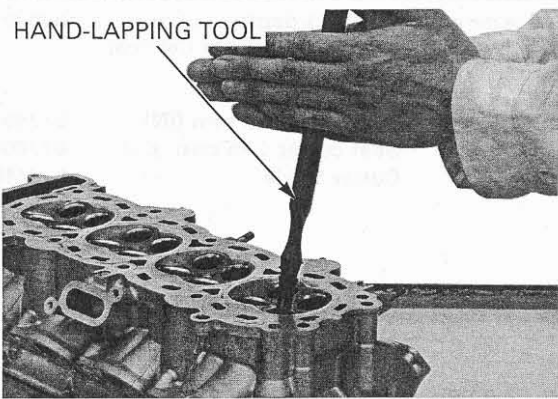


## CYLINDER HEAD/VALVES

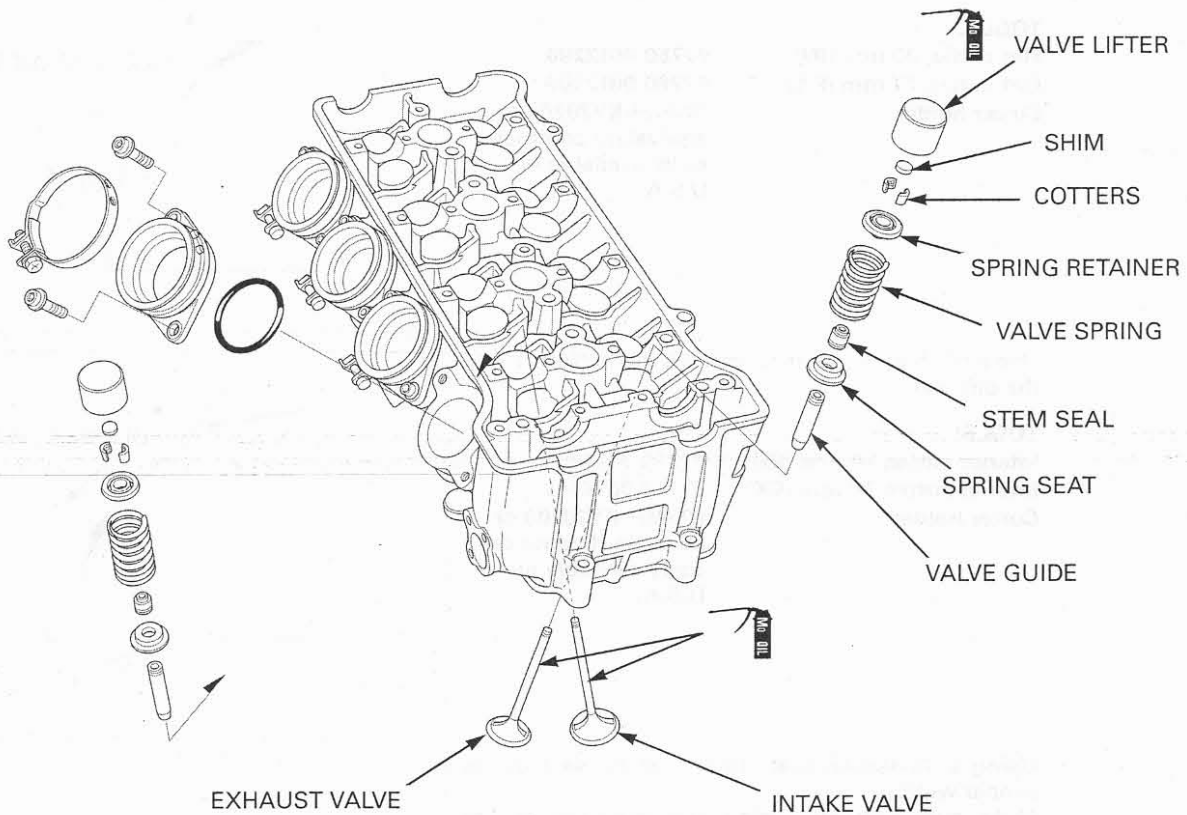
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

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

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



## CYLINDER HEAD ASSEMBLY



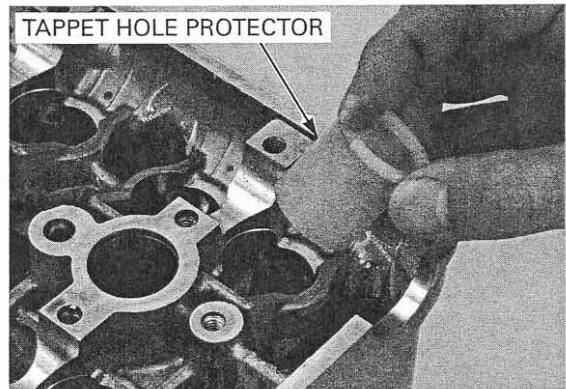
Blow through all oil passages in the cylinder head with compressed air.

Install the tappet hole protector into the valve lifter bore.

**TOOL:**

Tappet hole protector

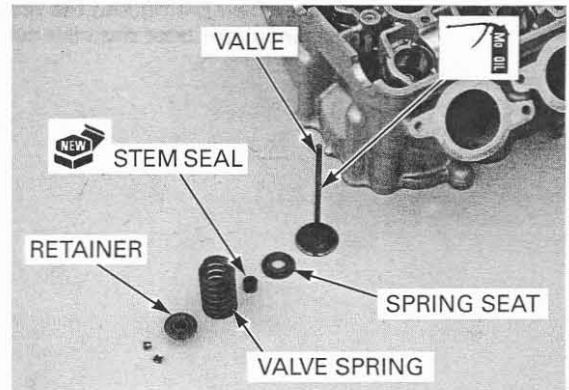
07HMG-MR70002 or  
refer to page 9-15 for  
alternative tool



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

Lubricate the valve stems with molybdenum oil solution.

Insert the valve into the valve guide while turning it slowly to avoid damage to the stem seal.



*The exhaust valve springs have orange paint marks and the intake valve springs have gray paint marks.*

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

Install the valve spring retainer.



*Grease the cotters to ease installation.*

Install the valve cotters using the special tool as shown.

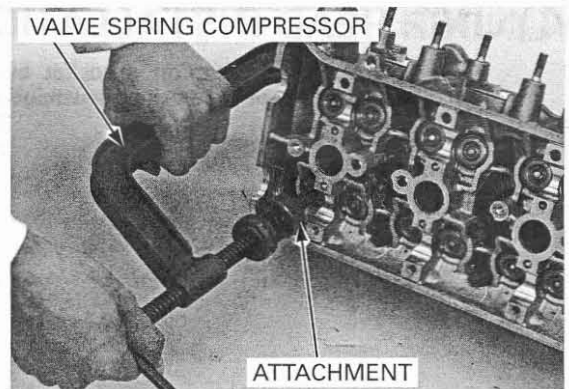
**NOTE:**

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

**TOOLS:**

Valve spring compressor 07757-0010000

Valve spring compressor attachment 07959-KM30101

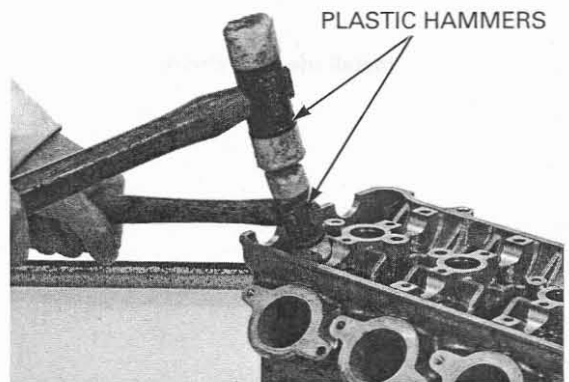


*Support the cylinder head above the work bench surface to prevent possible valve damage.*

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

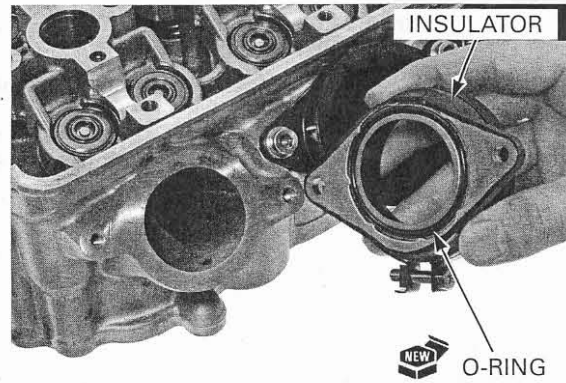
Install and tighten the spark plugs.

**TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)**



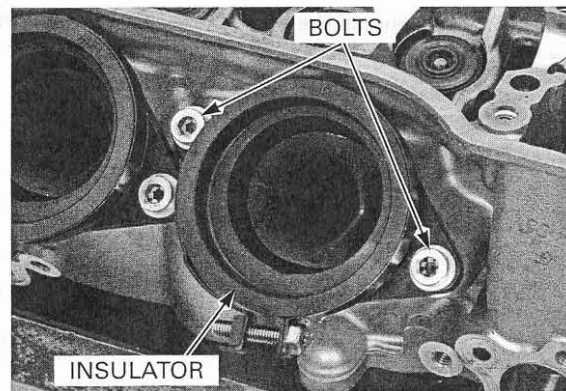
## CYLINDER HEAD/VALVES

Install a new O-ring into the groove of the insulator.  
Install the insulator onto the cylinder head.



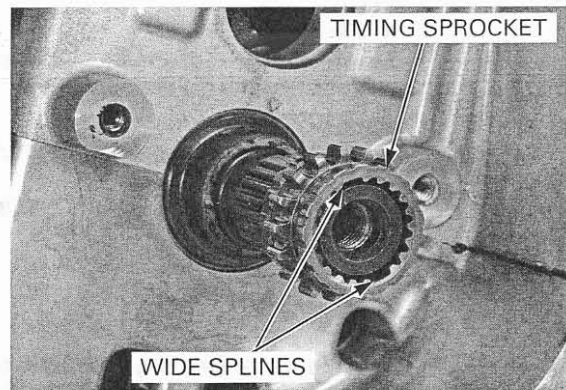
Install and tighten the insulator mounting socket bolts to the specified torque.

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

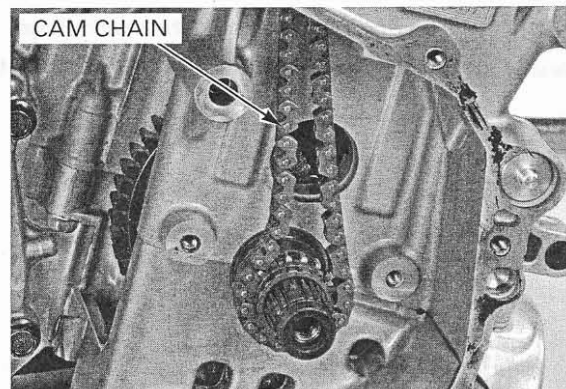


## CYLINDER HEAD INSTALLATION

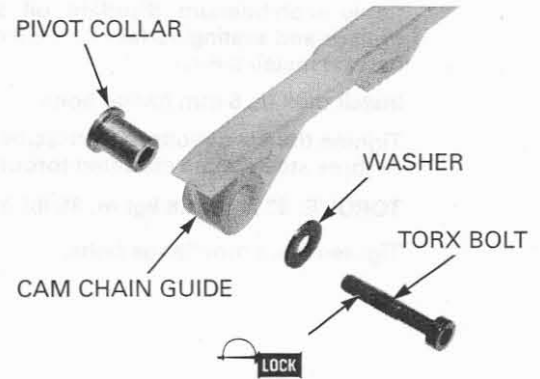
Install the timing sprocket by aligning the wide splines between the crankshaft and sprocket.



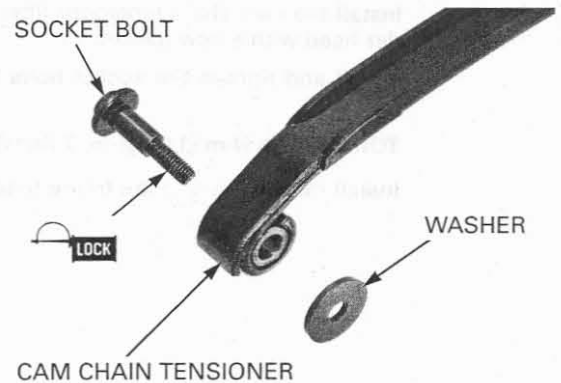
Install the cam chain.



Apply a locking agent to the cam chain guide torx bolt threads.  
Install the pivot collar, cam chain guide, washer and torx bolt.



Apply a locking agent to the cam chain tensioner socket bolt threads.  
Install the washer, cam chain tensioner and socket bolt.



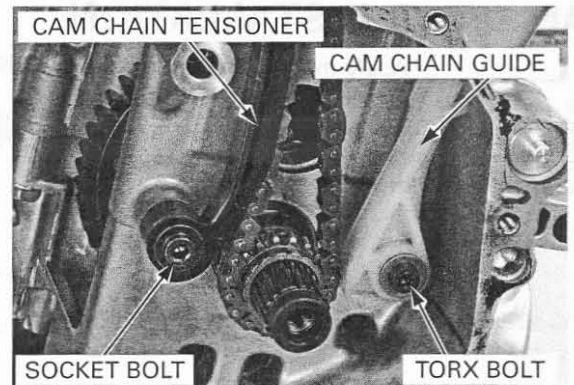
Tighten the cam chain guide torx bolt to the specified torque.

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

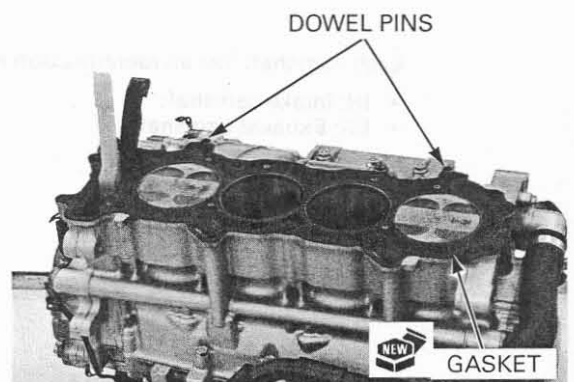
Tighten the cam chain tensioner socket bolt to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the starter clutch (page 10-32) and right crankcase cover (page 10-34).



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





## CYLINDER HEAD/VALVES

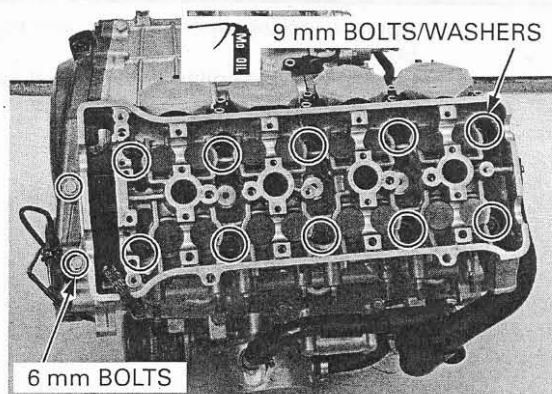
Apply molybdenum disulfide oil solution to the threads and seating surface of the 9 mm bolts/washers and install them.

Install the two 6 mm flange bolts.

Tighten the 9 mm bolts in a crisscross pattern in two or three steps to the specified torque.

**TORQUE: 47 N·m (4.8 kgf·m, 35 lbf·ft)**

Tighten the 6 mm flange bolts.

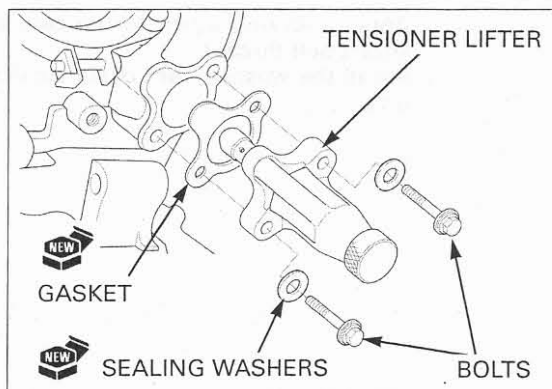


Install the cam chain tensioner lifter onto the cylinder head with a new gasket.

Install and tighten the socket bolts to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the engine into the frame (page 8-9).

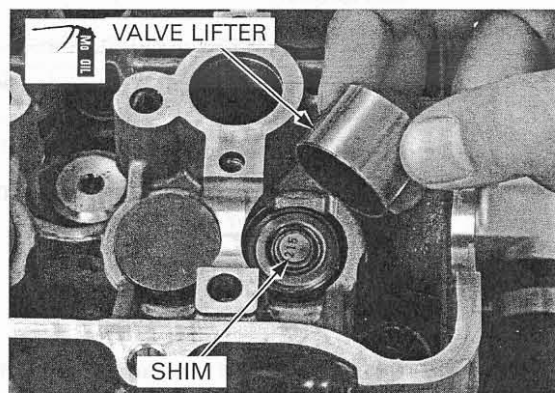


## CAMSHAFT INSTALLATION

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

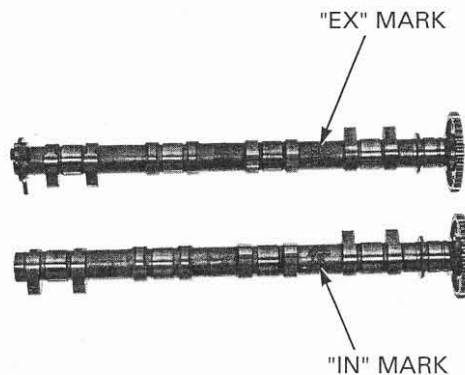
*Install the shims and valve lifters in their original locations.*

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



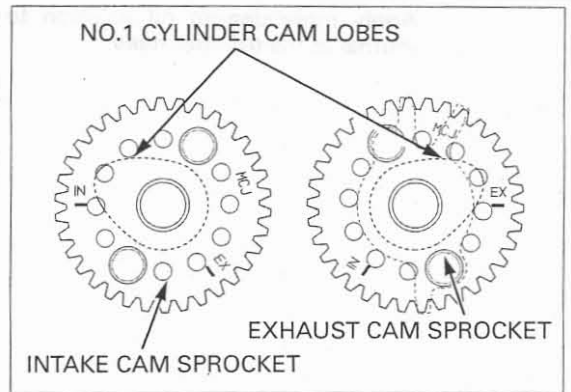
Each camshaft has an identification mark.

- IN: Intake camshaft
- EX: Exhaust camshaft



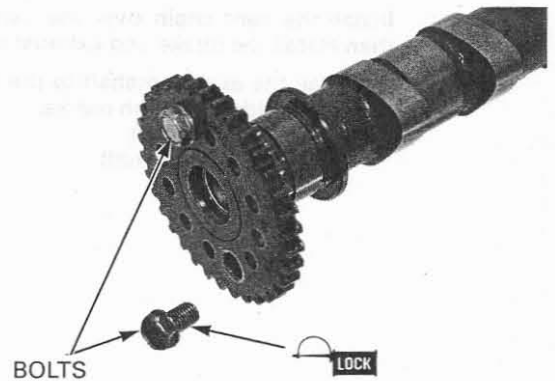
If the cam sprockets are removed, install the cam sprockets onto the camshafts.

- Install the intake cam sprocket with the timing mark (IN) facing outward and the No.1 cam lobes facing up and out as shown.
- Install the exhaust cam sprocket with the timing mark (EX) facing outward and the No.1 cam lobes facing up and out as shown.



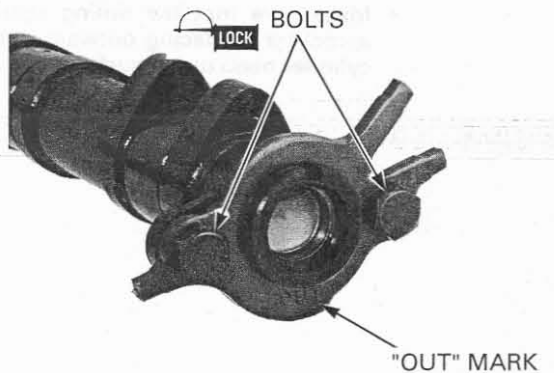
Clean and apply a locking agent to the cam sprocket bolt threads.

Install the cam sprockets and bolts.

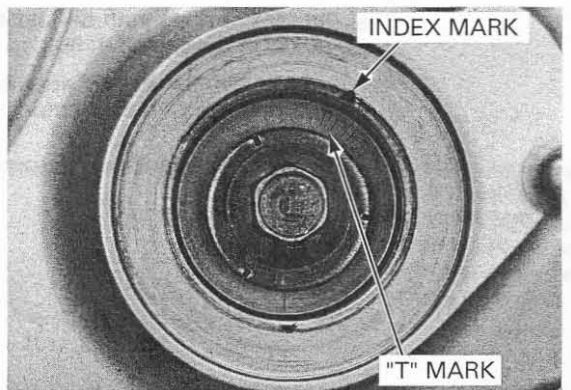


*Exhaust camshaft only:* Clean and apply a locking agent to the CMP sensor rotor bolt threads.

*Install the CMP sensor rotor with the No.1 cylinder cam lobes facing up and rotor "OUT" mark facing out as shown.*

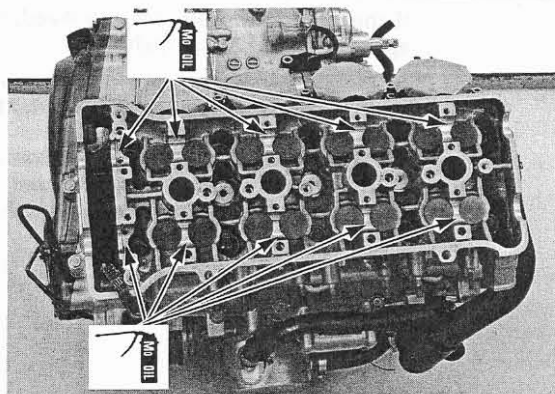


Turn the crankshaft clockwise and align the "T" mark on the crankshaft position sensor rotor with the index mark on the right crankcase cover.



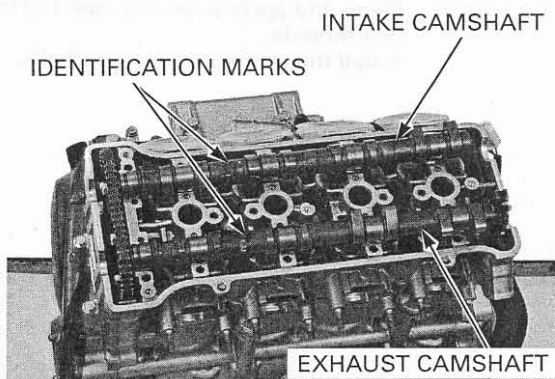
## CYLINDER HEAD/VALVES

Apply molybdenum oil solution to the camshaft journal of the cylinder head.

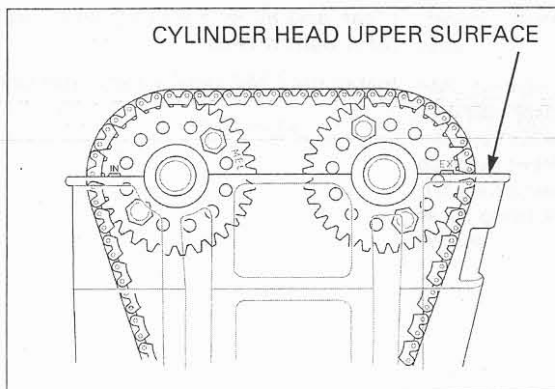


Install the cam chain over the cam sprockets and then install the intake and exhaust camshafts.

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



- Make sure that the timing marks on the cam sprockets are facing outward and flush with the cylinder head upper surface as shown.

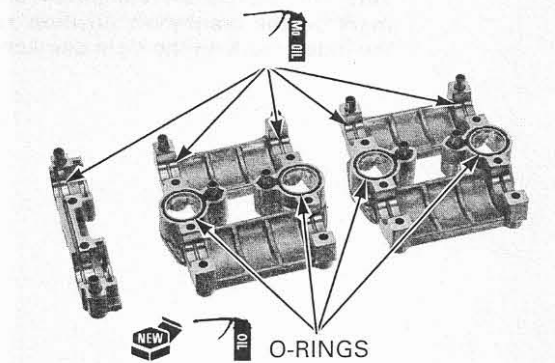


Coat new O-rings with oil and install them into the grooves in the camshaft holders.

Apply molybdenum oil solution to the camshaft journals of the camshaft holders.

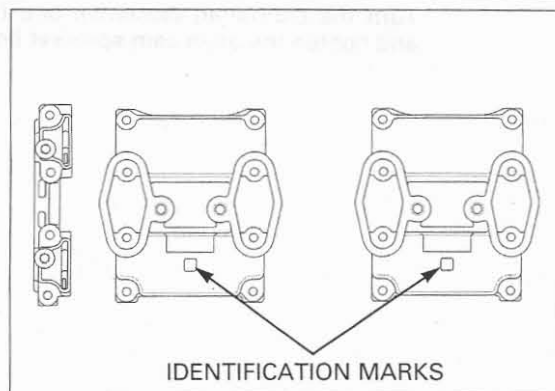
*Be sure the dowel pins in the camshaft holder align properly with the holes in the cylinder head properly.*

Install the each camshaft holder onto the camshafts.



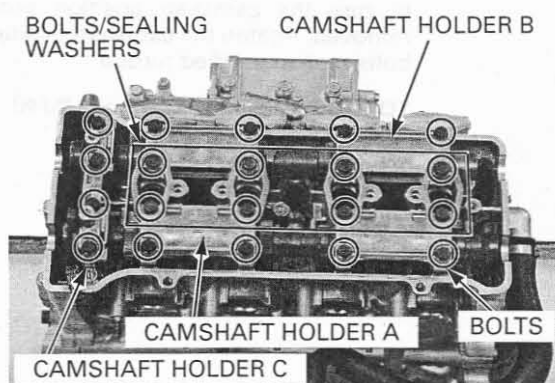
Note the correct locations with the identification marks as shown.

- No mark: right camshaft holder
- "R" mark: center camshaft holder
- "L" mark: left camshaft holder



Apply engine oil to the threads and seating surfaces of the camshaft holder bolts. Install the twenty holder bolts with new eight sealing washers as shown.

Finger tighten the bolts.



First gradually tighten the four bolts (No.5 – No.6 – No.7 – No.8) in the numerical order cast on the camshaft holders.

Gradually tighten the other camshaft holder bolts until the camshaft holders lightly contact the cylinder head surface.

### NOTICE

*Failure to tighten the camshaft holder in a crisscross pattern might cause a camshaft holder to break.*

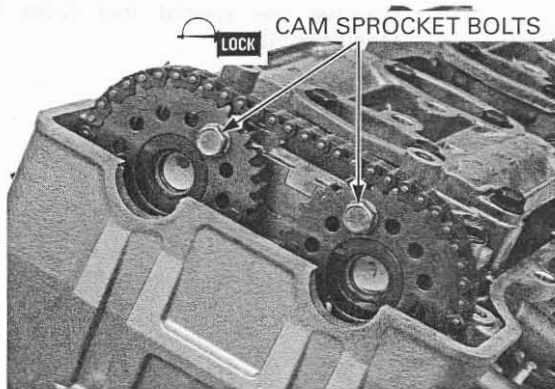
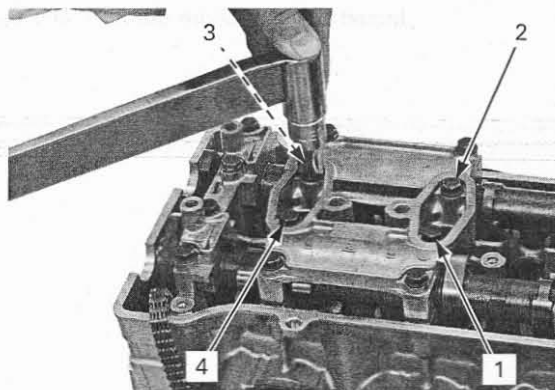
Tighten all camshaft holder bolts in the numerical order cast on the camshaft holders.

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

In case the cam sprockets were removed, apply a locking agent to the cam sprocket bolt threads.

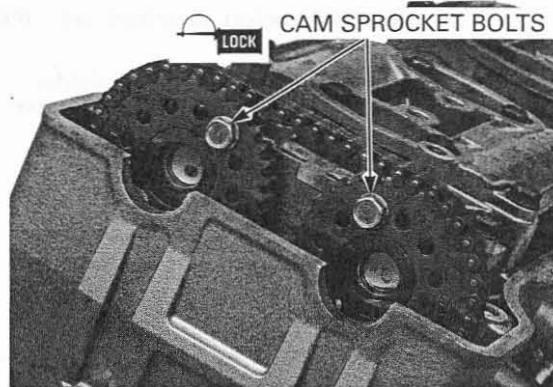
Tighten the cam sprocket bolts to the specified torque.

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



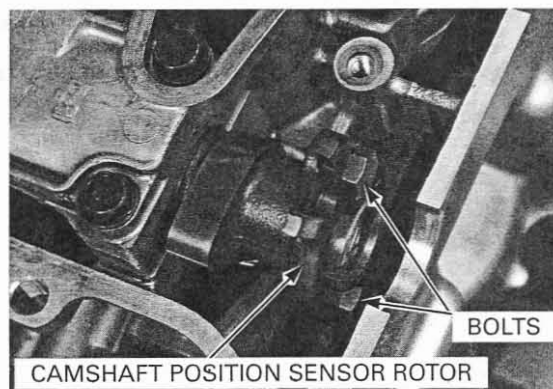
## CYLINDER HEAD/VALVES

Turn the crankshaft clockwise one full turn (360°) and tighten the other cam sprocket bolts.

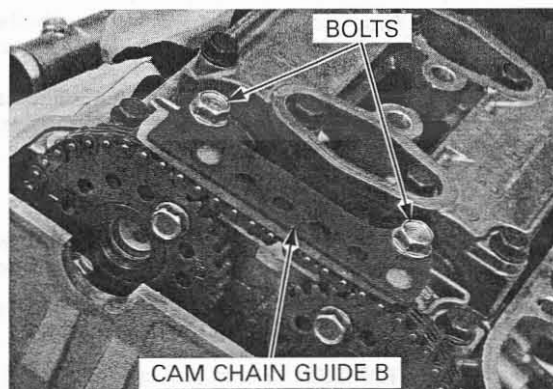


In case the camshaft position sensor rotor was removed, tighten the camshaft position sensor rotor bolts to the specified torque.

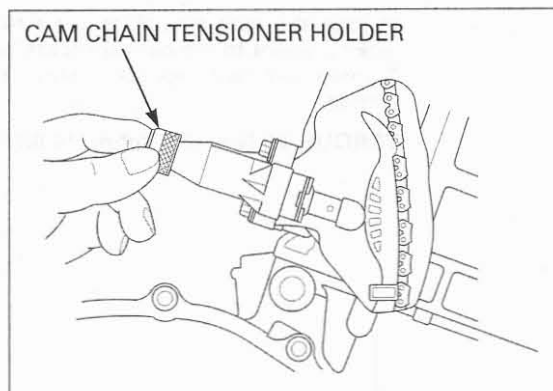
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Install the cam chain guide B, and tighten the bolts.



Remove the special tool from the cam chain tensioner lifter.

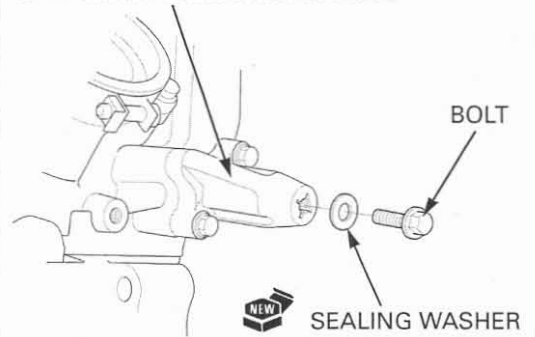




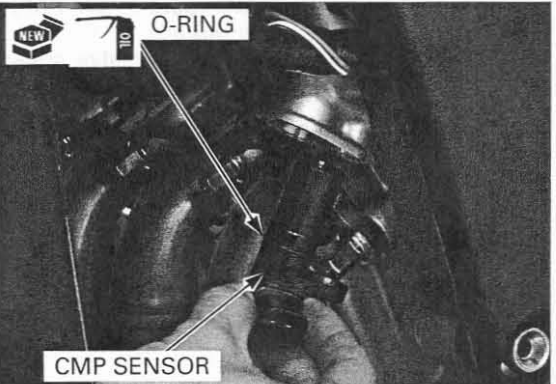
Install a new sealing washer and tighten the sealing bolt.

Recheck the valve timing.

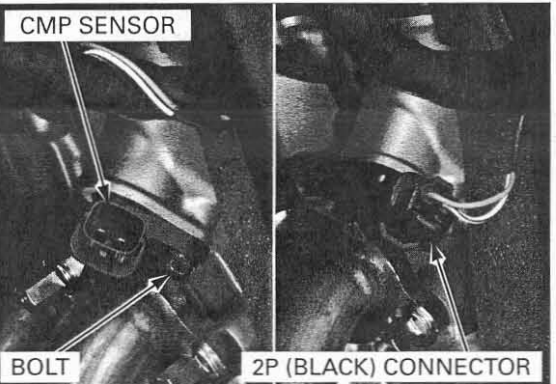
CAM CHAIN TENSIONER LIFTER



Apply oil to a new O-ring, and install it onto the CMP sensor.  
Install the CMP sensor into the cylinder head.

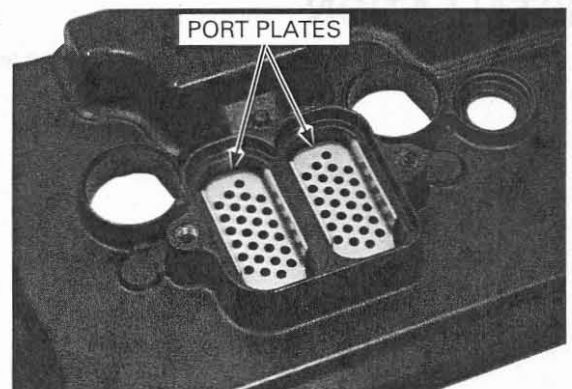


Install and tighten the mounting bolt securely.  
Connect the CMP sensor 2P (Black) connector.  
Install the cylinder head cover (page 9-32).



## CYLINDER HEAD COVER ASSEMBLY

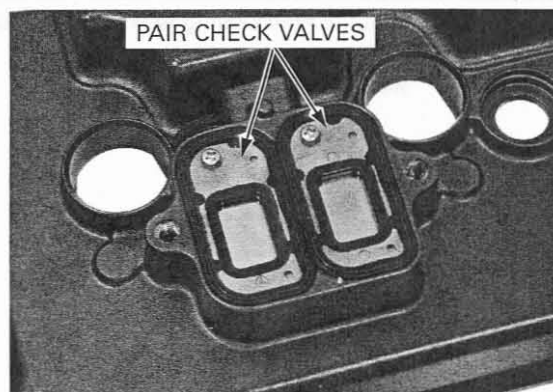
Install the PAIR check valve port plates into the cylinder head cover.





## CYLINDER HEAD/VALVES

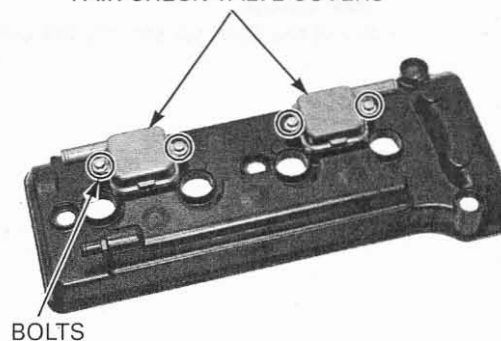
Install the PAIR check valves into the cylinder head cover.



Apply a locking agent to the PAIR check valve cover mounting bolt threads. Install the PAIR check valve cover and tighten the bolts to the specified torque.

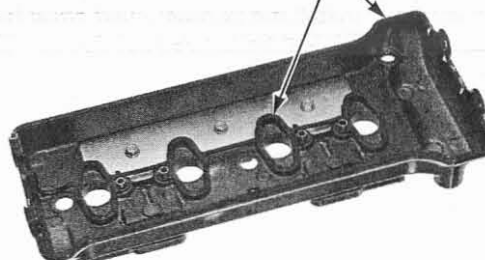
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

PAIR CHECK VALVE COVERS



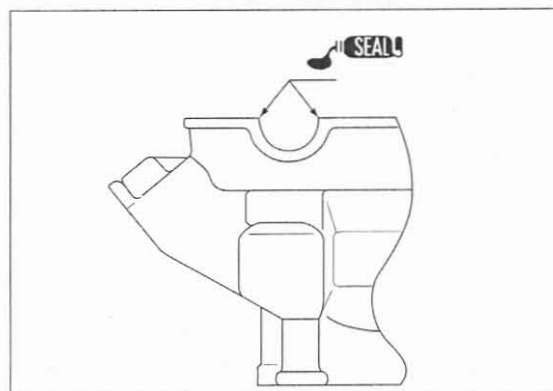
Install the new cylinder head cover packing into the cylinder head cover grooves.

NEW PACKING



## CYLINDER HEAD COVER INSTALLATION

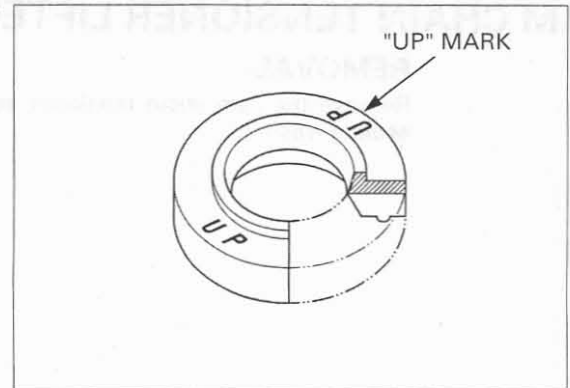
Apply sealant to the cylinder head semi-circular cut-outs as shown.



## CYLINDER HEAD/VALVES

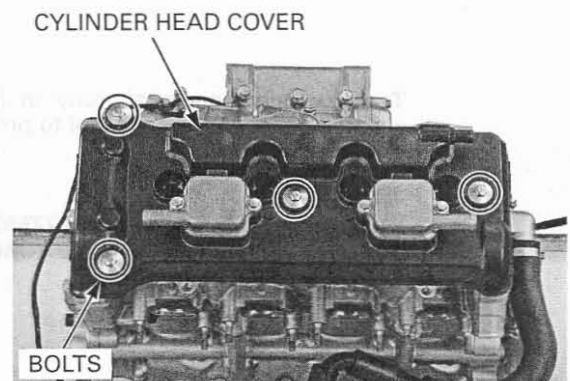
Install the cylinder head cover onto the cylinder head.

Install the washers to the cylinder head cover with their "UP" mark facing up.

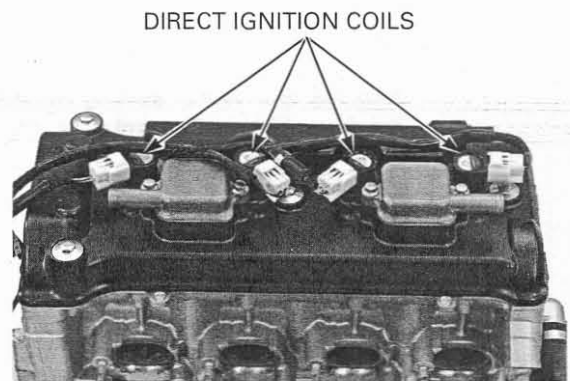


Install and tighten the cylinder head cover bolts to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**



Install the direct ignition coils and connect the ignition coil connectors.

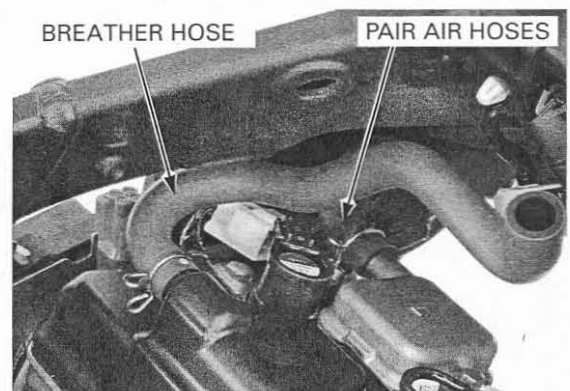


Connect the PAIR air hoses onto the reed valve covers.

Connect the PAIR control solenoid valve 2P (Black) connector (page 6-71).

Install the crankcase breather hose to the cylinder head cover.

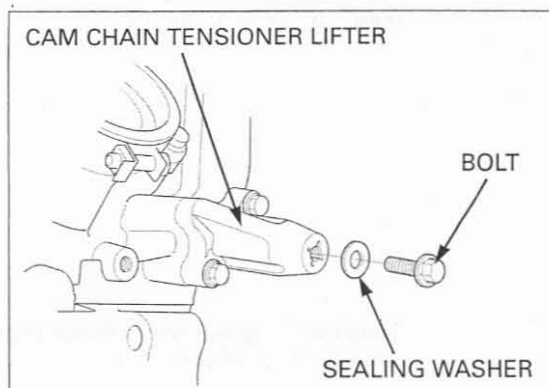
Install the throttle body (page 6-47).



## CAM CHAIN TENSIONER LIFTER

### REMOVAL

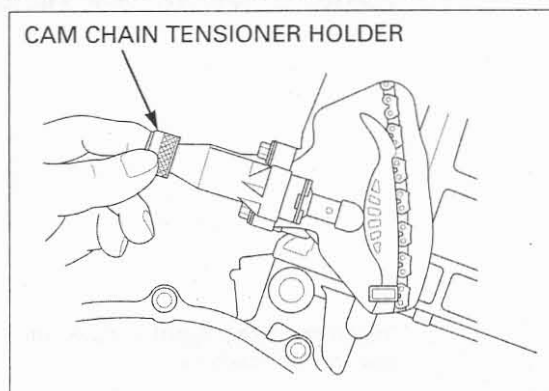
Remove the cam chain tensioner sealing bolt and sealing washer.



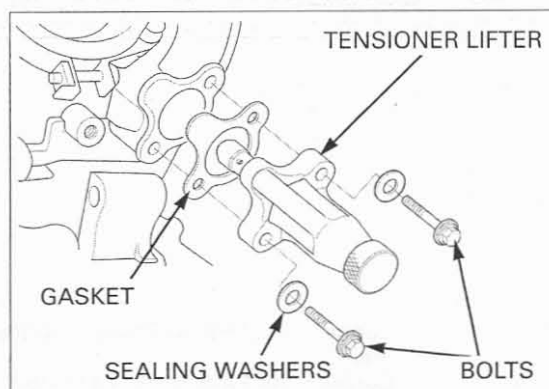
Turn the tensioner shaft fully in (clockwise) and secure it using the special tool to prevent damaging the cam chain.

### TOOL:

Cam chain tensioner holder 07ZMG-MCAA400 or 07NMG-MY90100



Remove the bolts, sealing washers, cam chain tensioner lifter and gasket.



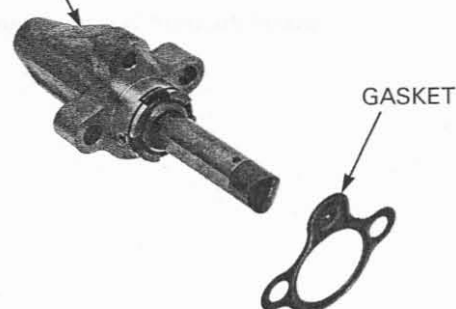
### INSTALLATION

*Note the installation direction of the gasket.*

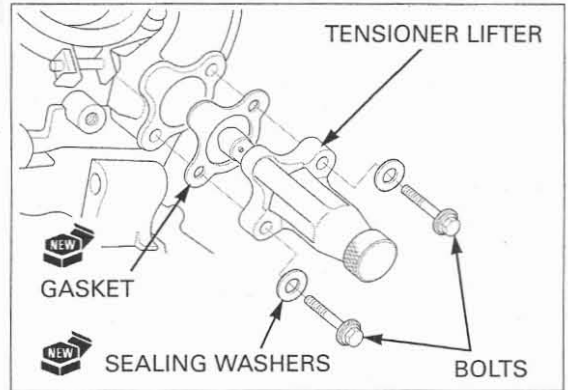
Install a new gasket onto the cam chain tensioner lifter.

Install the cam chain tensioner lifter into the cylinder head.

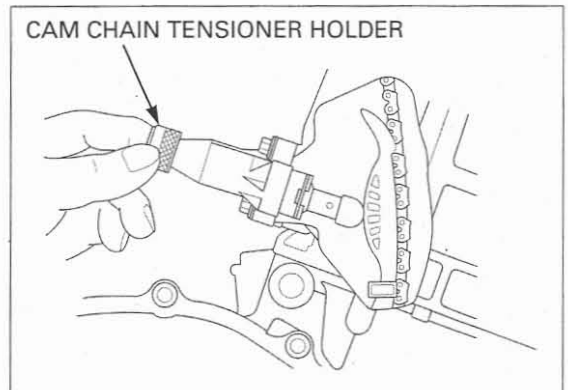
### TENSIONER LIFTER



Install the sealing washers and bolts, tighten the socket bolts.

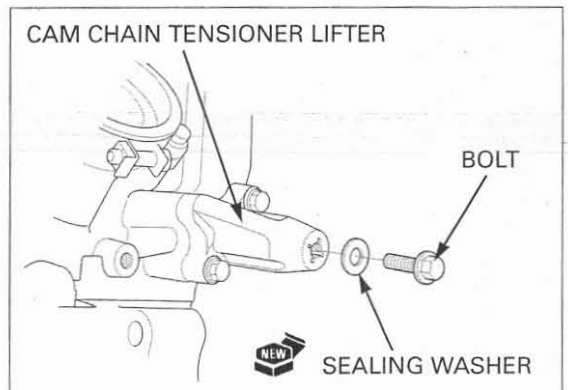


Remove the special tool.



Install a new sealing washer and tighten the sealing bolt securely.

Install the throttle body (page 6-52).



MEMO

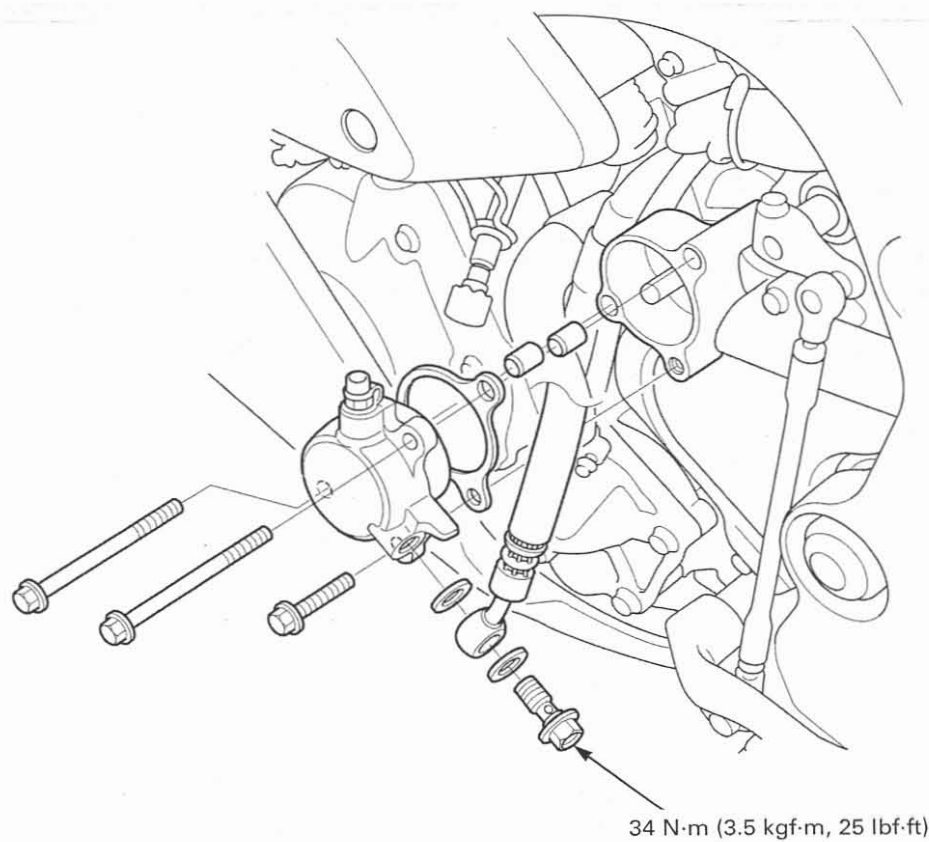
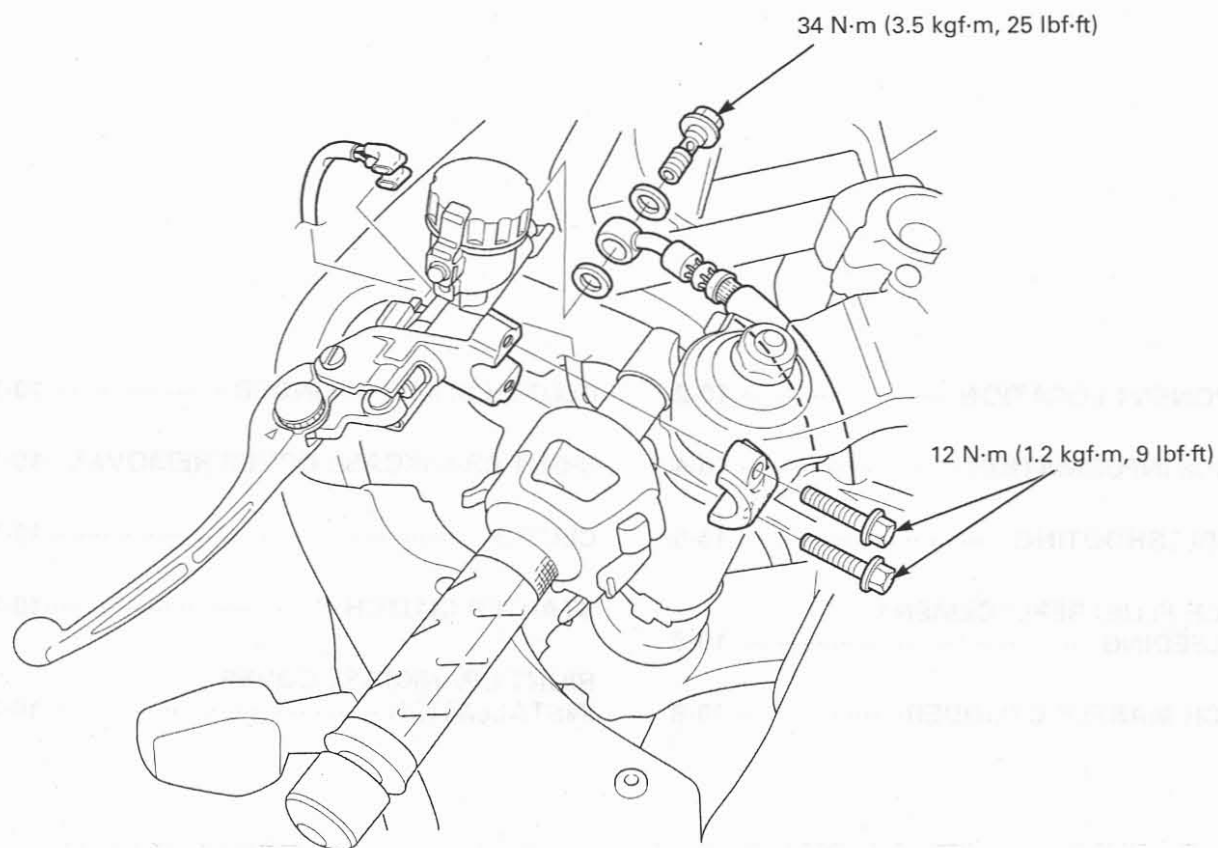
# 10. CLUTCH/STARTER CLUTCH

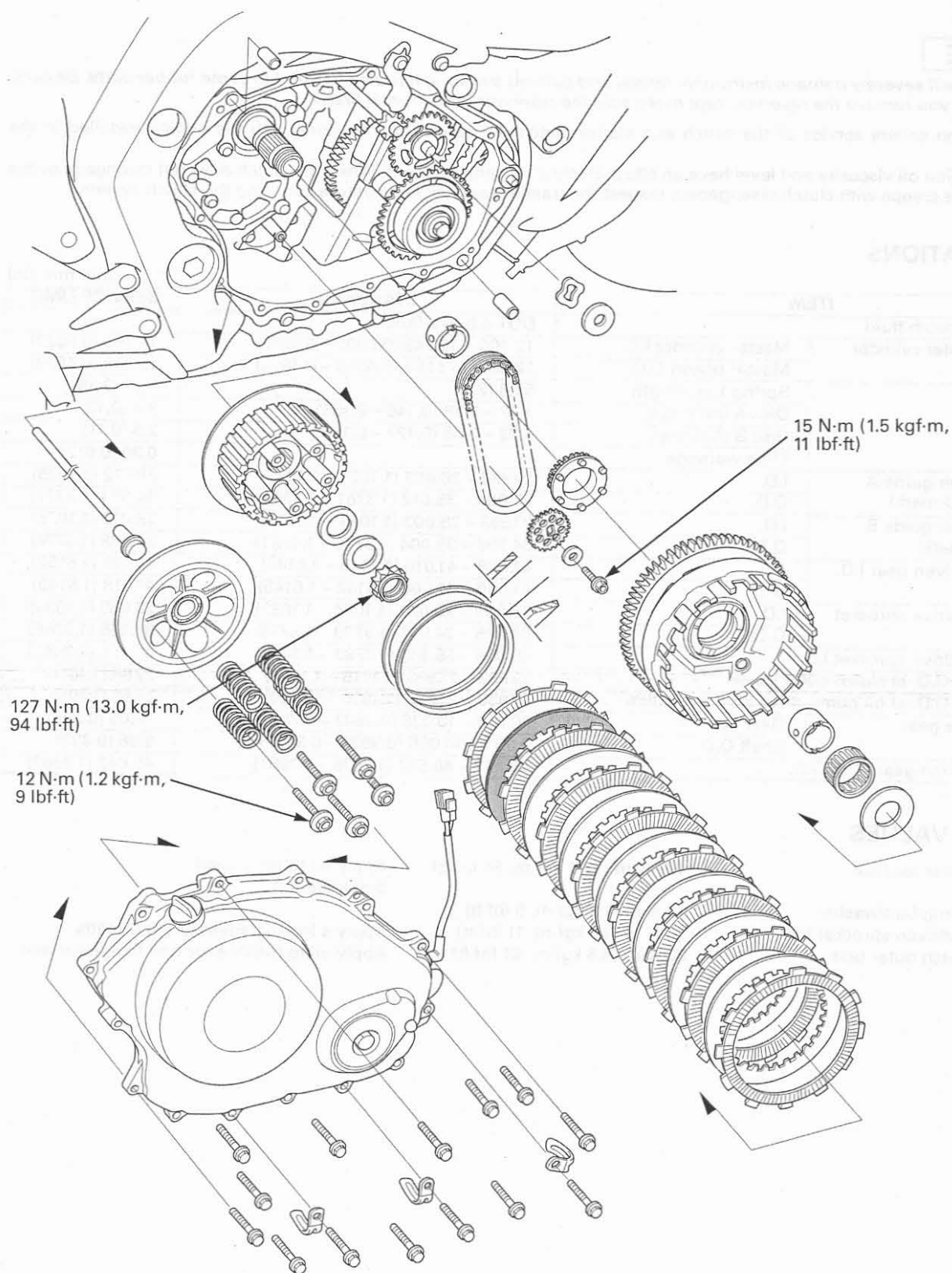
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|   |      |  |       |
|---|------|--|-------|
| COMPONENT LOCATION .....                        | 10-2 | CLUTCH SLAVE CYLINDER .....                | 10-13 |
| SERVICE INFORMATION .....                       | 10-4 | RIGHT CRANKCASE COVER REMOVAL ..           | 10-15 |
| TROUBLESHOOTING .....                           | 10-5 | CLUTCH.....                                | 10-16 |
| CLUTCH FLUID REPLACEMENT/<br>AIR BLEEDING ..... | 10-6 | STARTER CLUTCH .....                       | 10-28 |
| CLUTCH MASTER CYLINDER.....                     | 10-8 | RIGHT CRANKCASE COVER<br>INSTALLATION..... | 10-34 |



## COMPONENT LOCATION





## CLUTCH/STARTER CLUTCH

# SERVICE INFORMATION

## GENERAL

### NOTICE

Spilled fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.

- This section covers service of the clutch and starter clutch. All service can be done with the engine installed in the frame.
- Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

## SPECIFICATIONS


Unit: mm (in)

| ITEM  |                      | STANDARD                          | SERVICE LIMIT   |
|---|----------------------|-----------------------------------|-----------------|
| Specified clutch fluid                          |                      | DOT 4 brake fluid                 | —               |
| Clutch master cylinder                          | Master cylinder I.D. | 12.700 – 12.743 (0.5000 – 0.5017) | 12.755 (0.5022) |
|   | Master piston O.D.   | 12.657 – 12.684 (0.4983 – 0.4994) | 12.645 (0.4978) |
| Clutch  | Spring free length   | 56.8 (2.24)                       | 55.7 (2.19)     |
|   | Disc A thickness     | 3.72 – 3.88 (0.146 – 0.153)       | 3.4 (0.13)      |
|   | Disc B thickness     | 3.22 – 3.38 (0.127 – 0.133)       | 2.9 (0.11)      |
|   | Plate warpage        | —                                 | 0.30 (0.012)    |
|   |                      |                                   |                 |
| Clutch outer guide A<br>(Without ID mark)       | I.D.                 | 27.993 – 28.003 (1.1021 – 1.1025) | 28.012 (1.1028) |
|   | O.D.                 | 35.004 – 35.012 (1.3781 – 1.3784) | 34.994 (1.3777) |
| Clutch outer guide B<br>(With ID mark)          | I.D.                 | 27.993 – 28.003 (1.1021 – 1.1025) | 28.012 (1.1028) |
|   | O.D.                 | 34.996 – 35.004 (1.3778 – 1.3781) | 34.986 (1.3774) |
| Primary driven gear I.D.                        | A                    | 41.008 – 41.016 (1.6145 – 1.6148) | 41.026 (1.6152) |
|   | B                    | 41.000 – 41.008 (1.6142 – 1.6145) | 41.018 (1.6149) |
| Oil pump drive sprocket<br>guide                | I.D.                 | 28.000 – 28.021 (1.1024 – 1.1032) | 28.030 (1.1035) |
|   | O.D.                 | 34.975 – 34.991 (1.3770 – 1.3776) | 34.965 (1.3766) |
| Oil pump drive sprocket I.D.                    |                      | 35.025 – 35.145 (1.3789 – 1.3837) | 35.155 (1.3841) |
| Mainshaft O.D. at clutch outer guide            |                      | 27.980 – 27.990 (1.1016 – 1.1020) | 27.96 (1.101)   |
| Mainshaft O.D. at oil pump drive sprocket guide |                      | 27.980 – 27.990 (1.1016 – 1.1020) | 27.96 (1.101)   |
| Starter idle gear                               | Gear I.D.            | 10.013 – 10.035 (0.3942 – 0.3951) | 10.05 (0.396)   |
|   | Shaft O.D.           | 9.991 – 10.000 (0.3933 – 0.3937)  | 9.98 (0.393)    |
| Starter driven gear boss O.D.                   |                      | 45.657 – 45.673 (1.7975 – 1.7981) | 45.642 (1.7969) |

## TORQUE VALUES

|                               |                                 |   |
|-------------------------------|---------------------------------|---|
| Clutch center lock nut        | 127 N·m (13.0 kgf·m, 94 lbf·ft) | Apply oil to the thread<br>Stake the nut    |
| Clutch spring bolt/washer     | 12 N·m (1.2 kgf·m, 9 lbf·ft)    |   |
| Oil pump driven sprocket bolt | 15 N·m (1.5 kgf·m, 11 lbf·ft)   | Apply a locking agent to the threads        |
| Starter clutch outer bolt     | 83 N·m (8.5 kgf·m, 61 lbf·ft)   | Apply oil to the threads and flange surface |

## TOOLS

|   |  |  |
|---|--|--|
| <p>Snap ring pliers<br/>07914-SA50001</p>  | <p>Clutch center holder<br/>07724-0050002</p>  <p>or equivalent commercially available in U.S.A.</p> | <p>Gear holder, M2.5<br/>07724-0010100</p>  <p>or 07724-001A100 (U.S.A. only)</p> |
|---|--|--|

## TROUBLESHOOTING

**Clutch lever soft or spongy**

- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking

**Clutch lever too hard to pull in**

- Sticking master cylinder piston
- Sticking slave cylinder
- Clogged hydraulic system
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

**Clutch slips when accelerating**

- Hydraulic system sticking
- Worn clutch disc
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additive

**Clutch will not disengage or motorcycle creeps with clutch disengaged**

- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking or clogged
- Clutch plate warped
- Loose clutch lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

**Hard to shift**

- Improper clutch operation
- Improper oil viscosity

## CLUTCH/STARTER CLUTCH

# CLUTCH FLUID REPLACEMENT/AIR BLEEDING

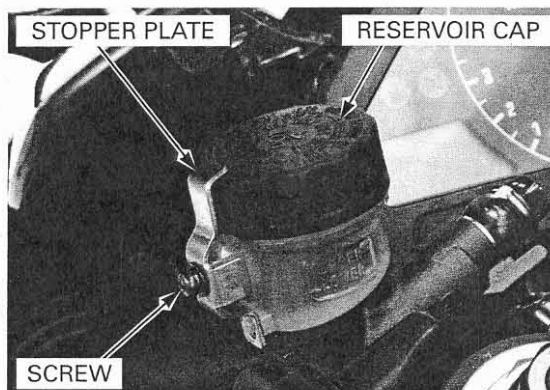
### CLUTCH FLUID DRAINING

Support the motorcycle on its side stand.

Turn the handlebar to the right until the reservoir is parallel to the ground, before removing the reservoir cap.

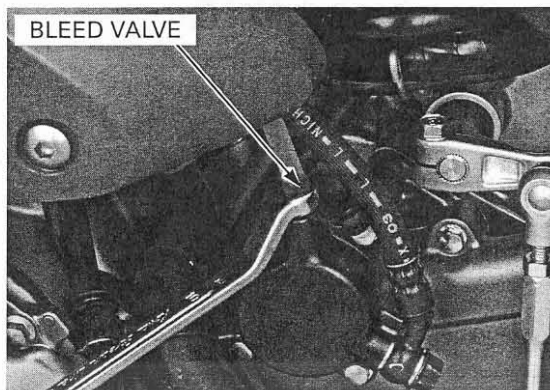
Remove the screw and stopper plate.

Remove the reservoir cap, set plate and diaphragm.



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

Loosen the bleed valve and pump the clutch lever until fluid stops flowing out of the bleed valve.



### CLUTCH FLUID FILLING/AIR BLEEDING

*Use only DOT 4 brake fluid from a sealed container.*

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

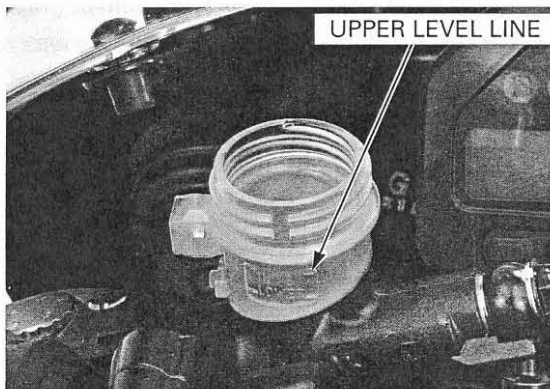
Connect a commercially available brake bleeder to the bleed valve.

*Do not mix different types of fluid. They are not compatible.*

Pump the brake bleeder and loosen the bleed valve.

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

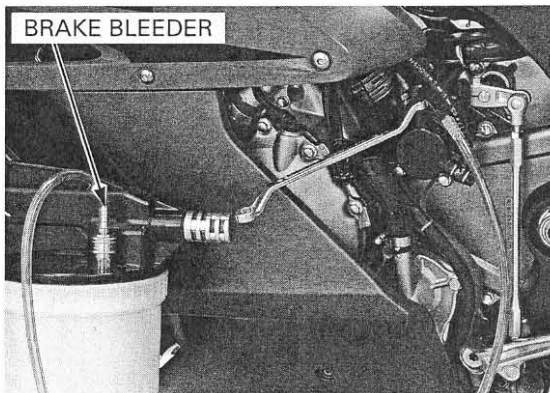
- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instruction.



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

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

Close the bleed valve and operate the clutch lever. If it is still spongy, bleed the system again.





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

Pump the clutch lever until lever resistance is felt.

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

1. Squeeze the clutch lever, open the bleed valve 1/4 of a turn and then close it. Do not release the clutch lever until the bleed valve has been closed.
2. Release the clutch lever slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until air bubbles do not appear in the bleed hose.

Tighten the bleed valve to the specified torque.

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

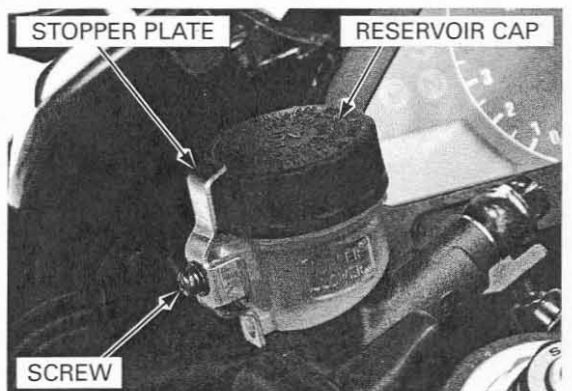
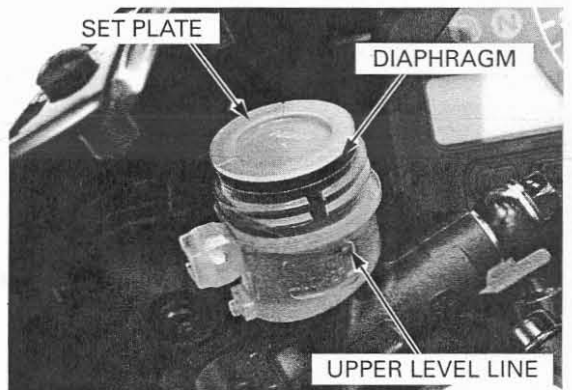
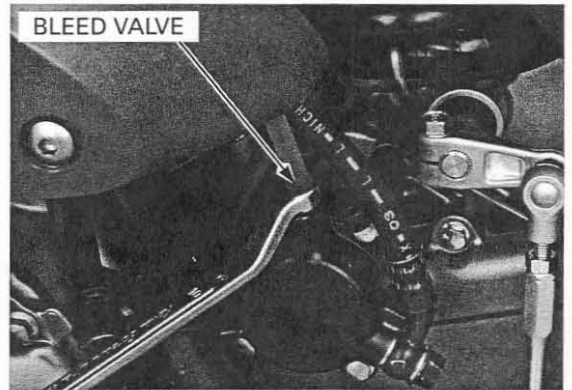
Fill the reservoir to the upper level line with DOT 4 brake fluid from a sealed container.

Install the diaphragm and set plate.

Install and tighten the reservoir cap.

Install the stopper plate and tighten the screw.

Check the clutch operation (page 4-33).





## CLUTCH MASTER CYLINDER

### REMOVAL

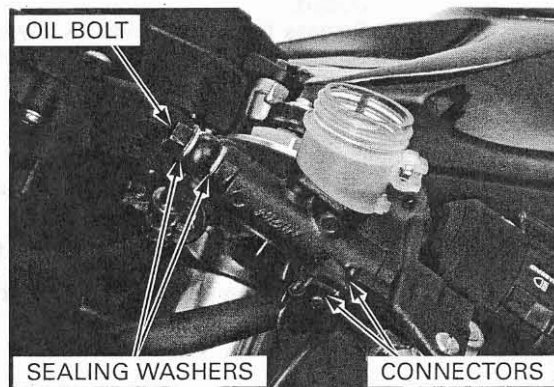
#### NOTICE

*Spilled fluid can damage painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.*

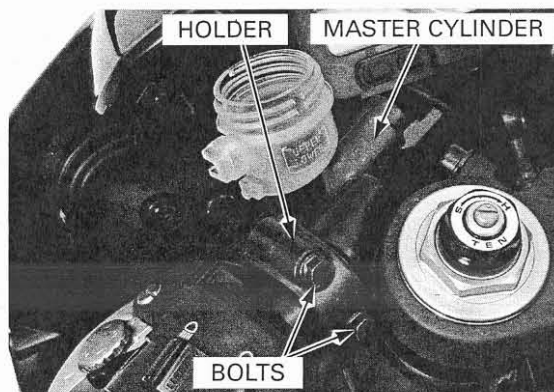
Drain the clutch hydraulic system (page 10-6).

Disconnect the clutch switch wire connectors.

Remove the clutch hose oil bolt, sealing washers and clutch hose eyelet.

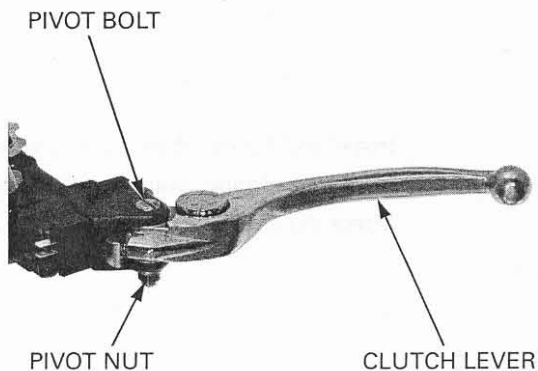


Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



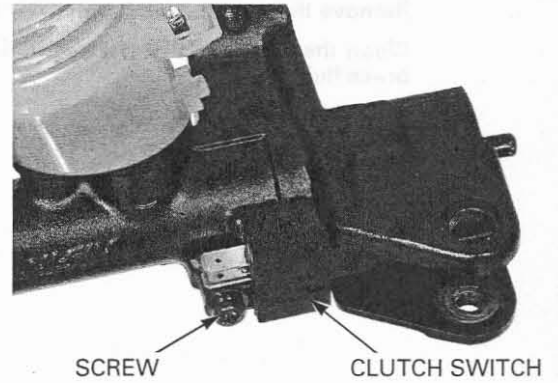
### DISASSEMBLY

Remove the pivot bolt/nut and clutch lever assembly.

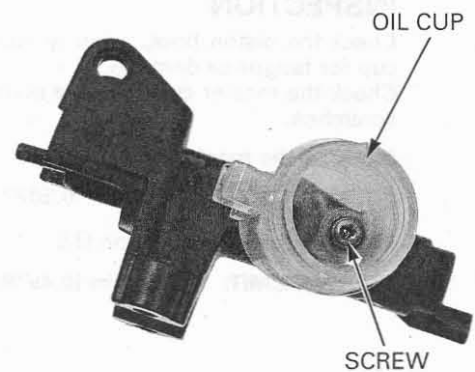


## CLUTCH/STARTER CLUTCH

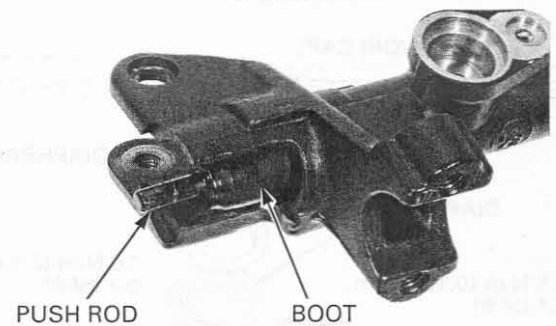
Remove the screw and clutch switch.



Remove the screw and oil cup and O-rings from the master cylinder body.



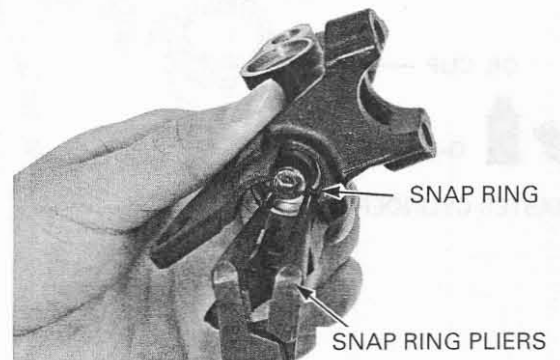
Remove the boot and push rod.



Remove the snap ring from the master cylinder body using the special tool as shown.

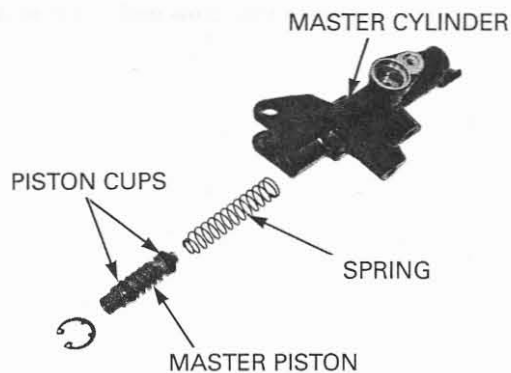
**TOOL:**  
Snap ring pliers

07914-SA50001



## CLUTCH/STARTER CLUTCH

Remove the master piston assembly and spring.  
Clean the inside of the cylinder and reservoir with brake fluid.



### INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.  
Check the master cylinder and piston for abnormal scratches.

Measure the master cylinder I.D.

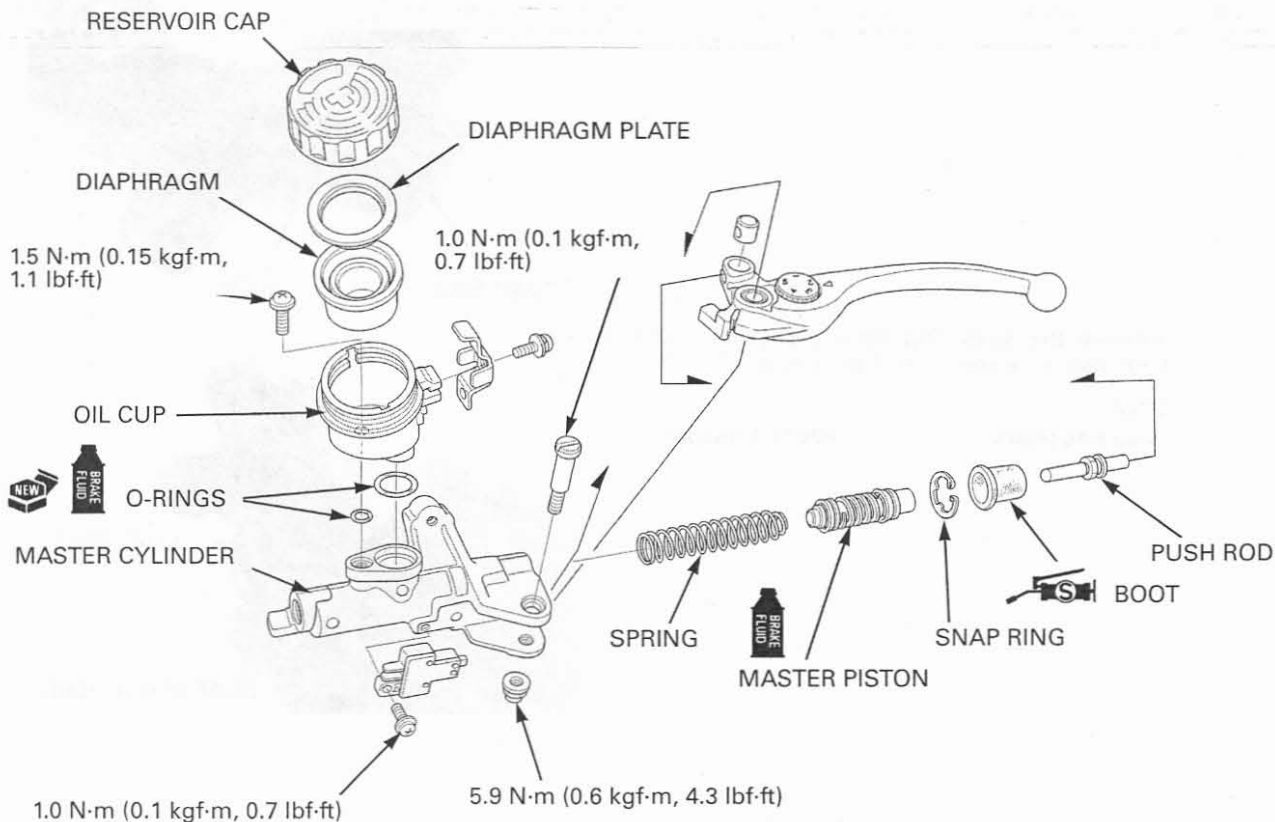
**SERVICE LIMIT: 12.755 mm (0.5022 in)**

Measure the master piston O.D.

**SERVICE LIMIT: 12.645 mm (0.4978 in)**



### ASSEMBLY

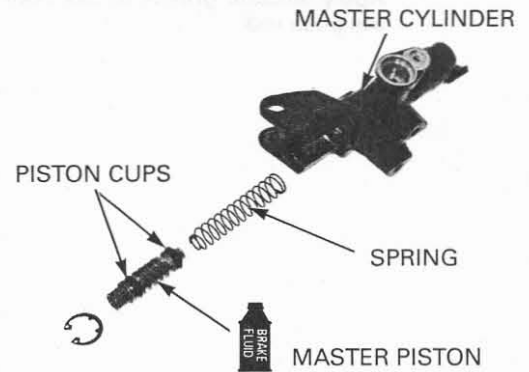


## CLUTCH/STARTER CLUTCH

Coat all parts with clean brake fluid before assembly.  
Dip the piston in brake fluid.  
Install the primary and secondary cups onto the master piston.

*When installing the cups, do not allow the lips to turn inside out.*

Install the spring and master piston assembly into the master cylinder.



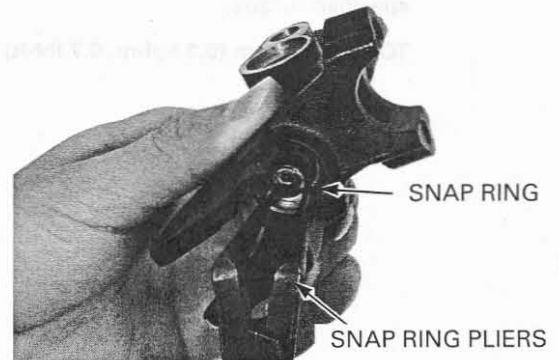
*Be certain the snap ring is firmly seated in the groove.*

Install the snap ring using the special tool.

### TOOL:

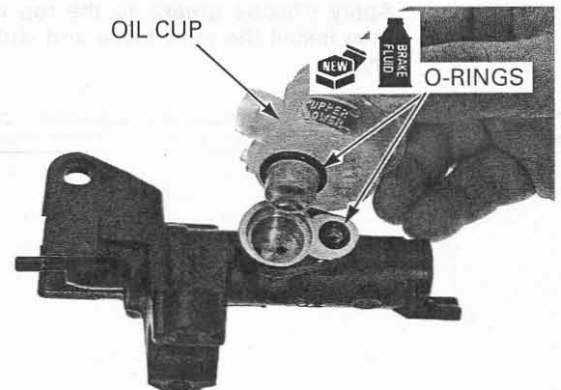
Snap ring pliers

07914-SA50001



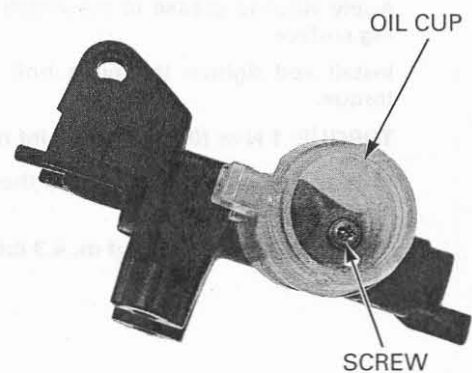
Apply clean brake fluid to the O-rings and install them oil cup and master cylinder body grooves.

Install the oil cup onto the master cylinder body.



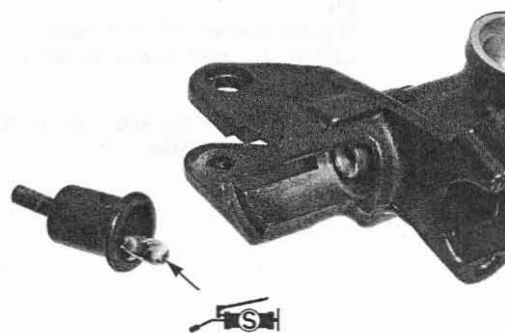
Install and tighten the oil cup mounting screw to the specified torque.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**



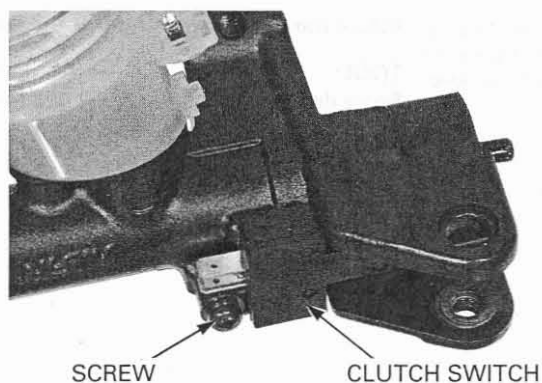
## CLUTCH/STARTER CLUTCH

Apply silicone grease to the boot inside and tip of the push rod.

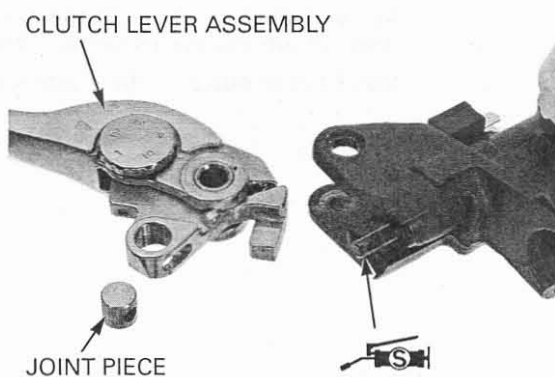


Install the clutch switch and tighten the screw to the specified torque.

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



Apply silicone grease to the top of the push rod, then install the joint piece and clutch lever assembly.



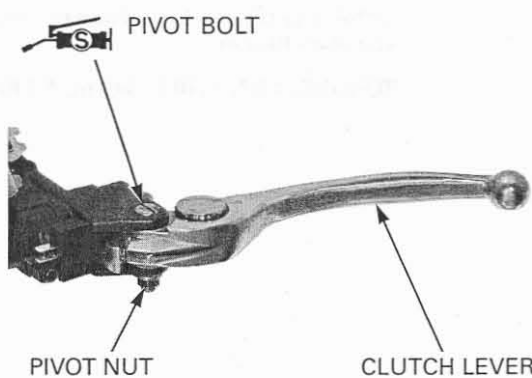
Apply silicone grease to the clutch lever pivot sliding surface.

Install and tighten the pivot bolt to the specified torque.

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

Hold the pivot bolt and tighten the pivot nut to the specified torque.

**TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)**

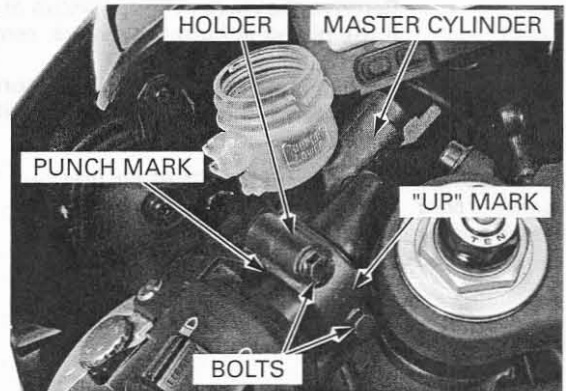


**INSTALLATION**

Place the master cylinder assembly onto the handlebar.  
Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.  
Tighten the upper bolt first, then the lower bolt.

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

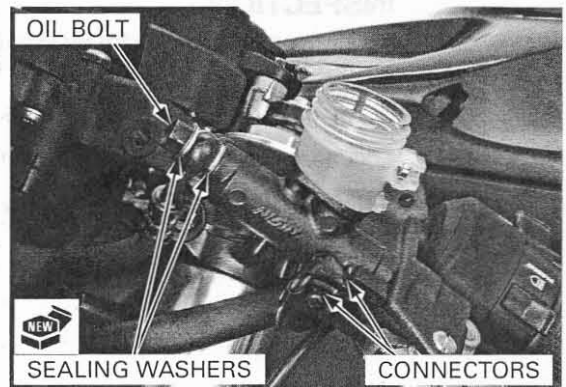


Install the clutch hose eyelet the oil bolt and new sealing washers.  
While pushing the clutch hose against the stopper and tighten the oil bolt to the specified torque.

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

Connect the clutch switch connectors.

Fill the reservoir to the upper level and bleed the hydraulic system (page 10-6).

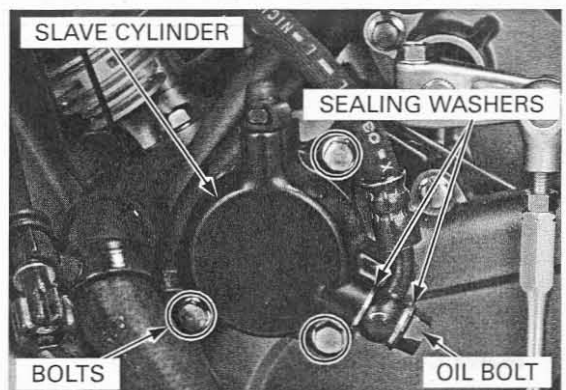
**CLUTCH SLAVE CYLINDER****REMOVAL**

Drain the clutch hydraulic system (page 10-6).

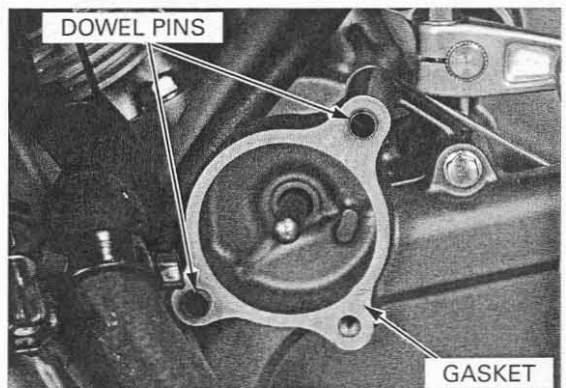
*Avoid spilling fluid on painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.*

Remove the clutch hose oil bolt, sealing washers and brake hose eyelet.

Remove the bolts and clutch slave cylinder assembly.



Remove the gasket and dowel pins.





## CLUTCH/STARTER CLUTCH

### DISASSEMBLY

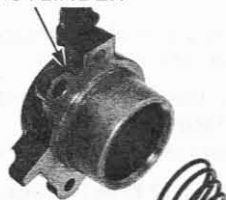
Remove the slave cylinder piston and spring. If the piston is hard to remove, remove the following:

Place a shop towel over the piston to cushion the piston when it is expelled, and position the cylinder with the piston down.

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

Apply small squirts of air pressure to the fluid inlet to remove the piston.

SLAVE CYLINDER



SPRING

PISTON



### INSPECTION

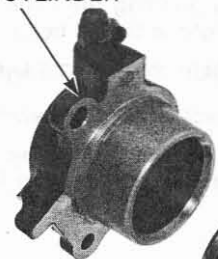
Check the piston spring for weakness or damage. Inspect the oil seal and O-rings for damage or deterioration, replace if necessary.

Clean the O-ring grooves with clean brake fluid.

Check the slave cylinder for scoring or other damage.

Check the slave cylinder piston for scratches, scoring or other damage.

SLAVE CYLINDER

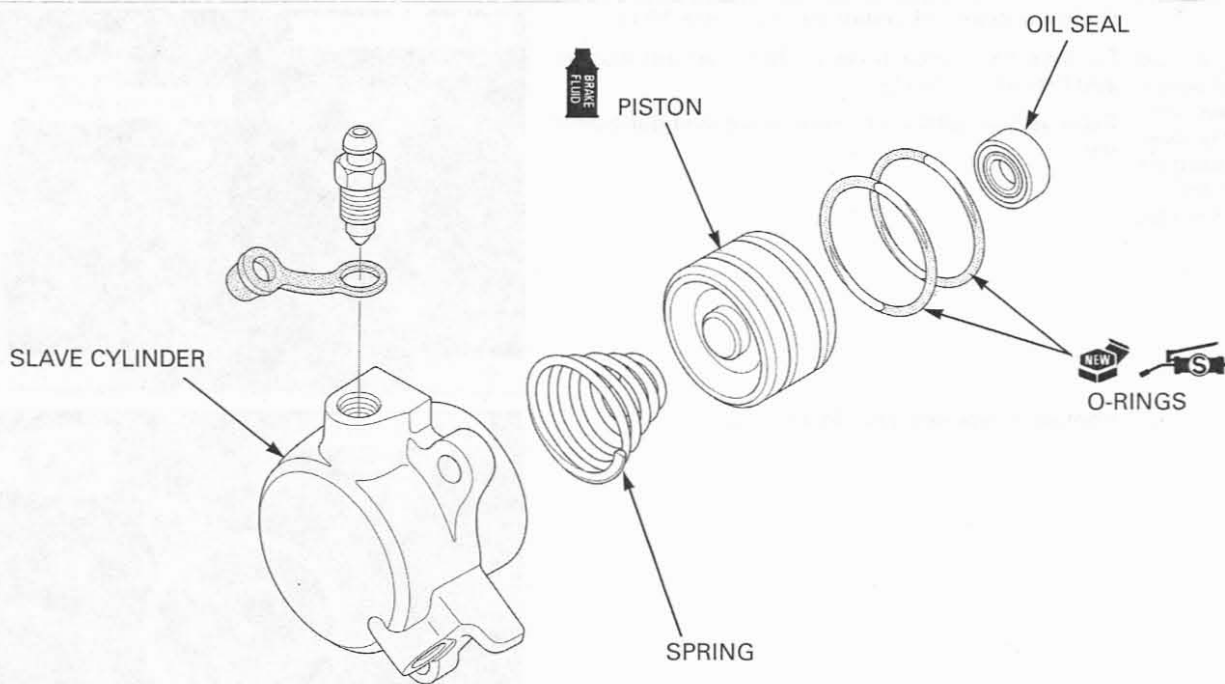


PISTON

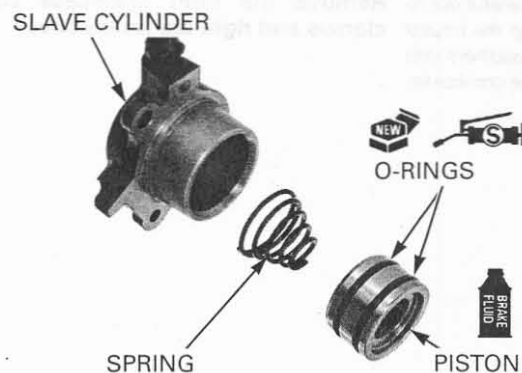
O-RINGS

OIL SEAL

### ASSEMBLY

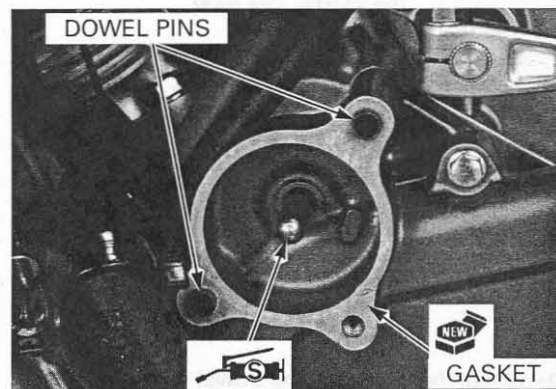


Lubricate the piston with brake fluid.  
 Apply silicone grease to the new O-rings and install them to the slave cylinder piston grooves.  
 Install the spring into the boss of the piston.  
 Install the spring and piston into the slave cylinder.



## INSTALLATION

Install the dowel pins and new gasket.  
 Apply silicone grease to the top of the push rod.  
 Install the slave cylinder onto the left crankcase rear cover.



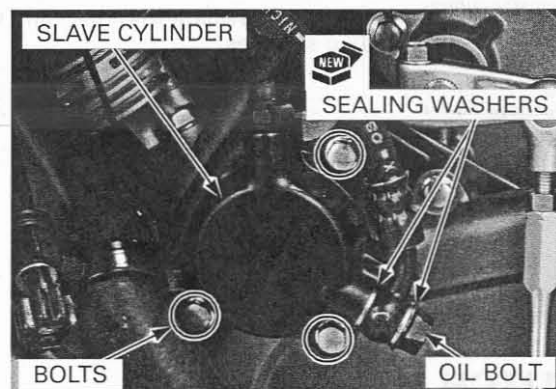
Install and tighten the SH bolts.

Install the clutch hose eyelet with the oil bolt and new sealing washers.

While pushing the clutch hose against the stopper, tighten the oil bolt to the specified torque.

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

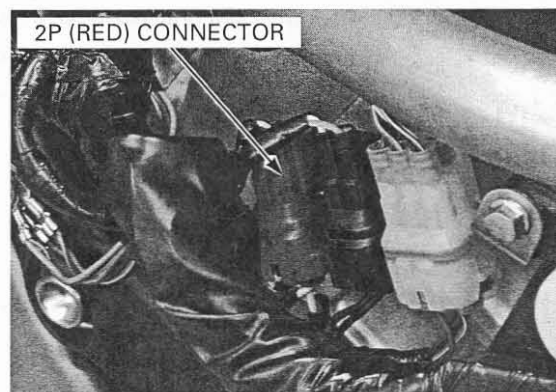
Fill the reservoir to the upper level and bleed the hydraulic system (page 10-6).



## RIGHT CRANKCASE COVER REMOVAL

Remove the under cowls/middle cowls (page 3-7)  
 Drain the engine oil (page 4-22).

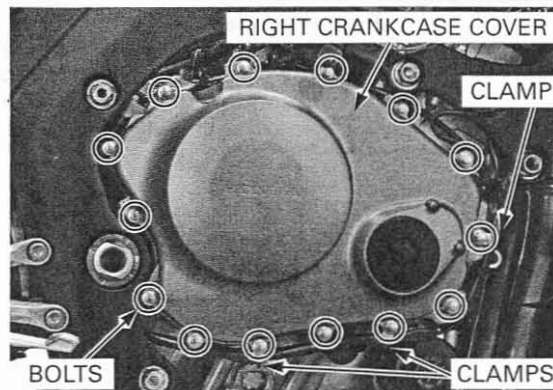
Disconnect the crankshaft position sensor 2P (Red) connector.



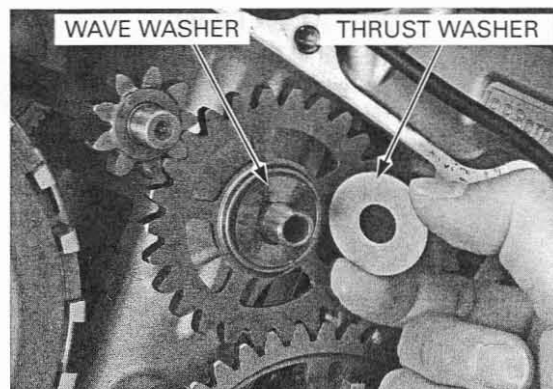
## CLUTCH/STARTER CLUTCH

*Be careful not to drop the thrust/wave washers into the crankcase.*

Remove the right crankcase cover bolts, wire clamps and right crankcase cover.



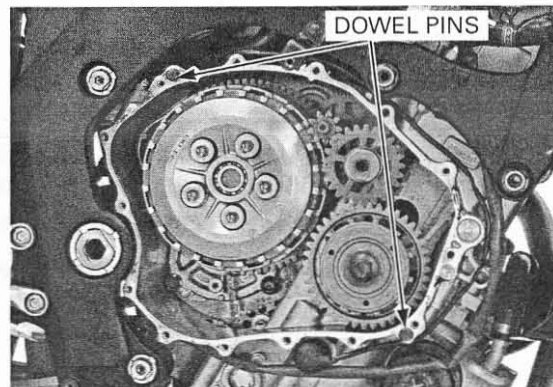
Remove the thrust washer and wave washer from the starter idle gear.



*Do not turn the crankshaft counter-clockwise after removing the right crankcase cover to prevent the starter reduction gear from damage.*

Remove the dowel pins.

Clean off any sealant from the right crankcase cover mating surfaces.

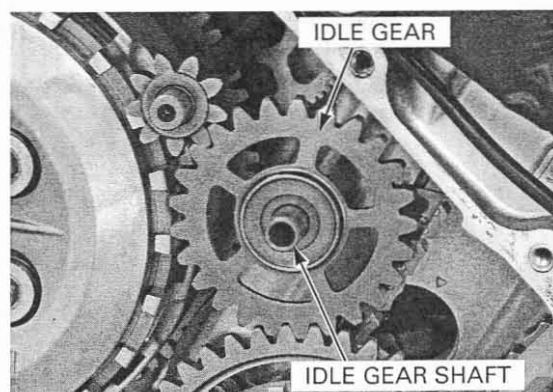


## CLUTCH

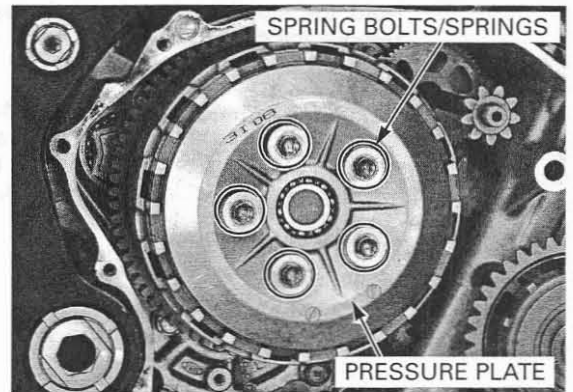
### REMOVAL

Remove the right crankcase cover (page 10-15).

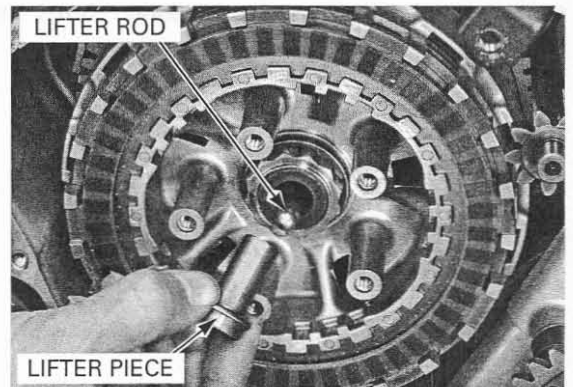
Prevent damaging the starter reduction gear shaft, remove the starter idle gear and shaft from the crankcase.



Remove the clutch spring bolts, springs in a criss-cross pattern in two to three steps, then remove the pressure plate.

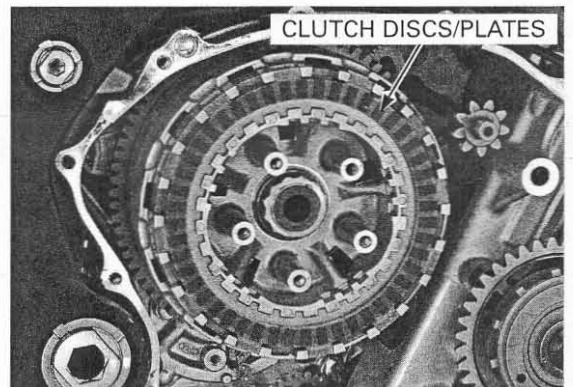


Remove the clutch lifter piece and lifter rod.

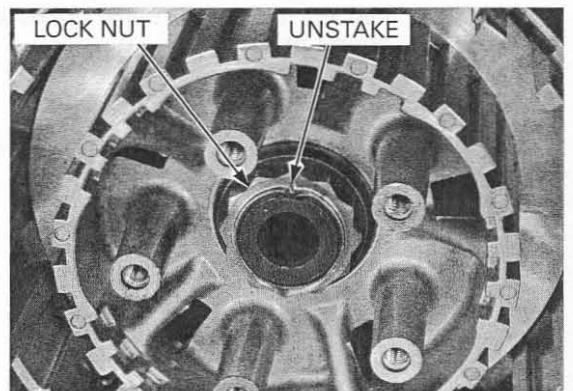


Remove the following:

- Two clutch disc A
- Six clutch disc B
- Seven clutch plates
- Friction spring
- Spring seat



Unstake the clutch center lock nut.





## CLUTCH/STARTER CLUTCH

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

**TOOL:**

**Clutch center holder**

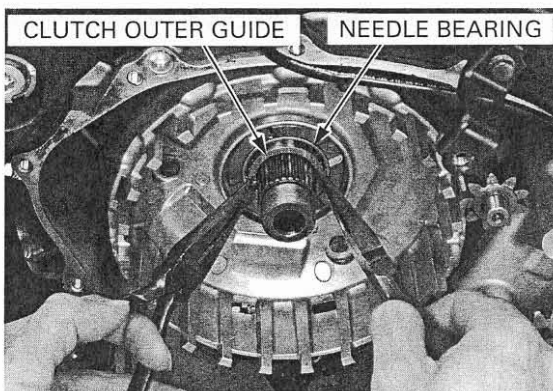
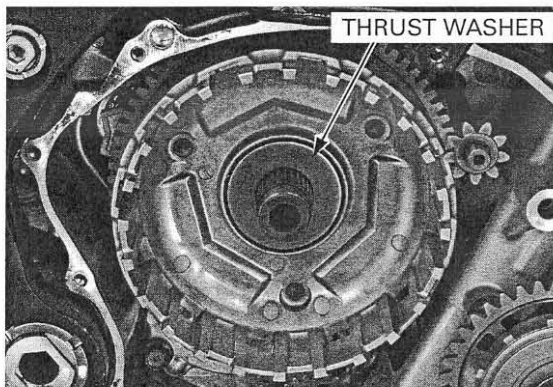
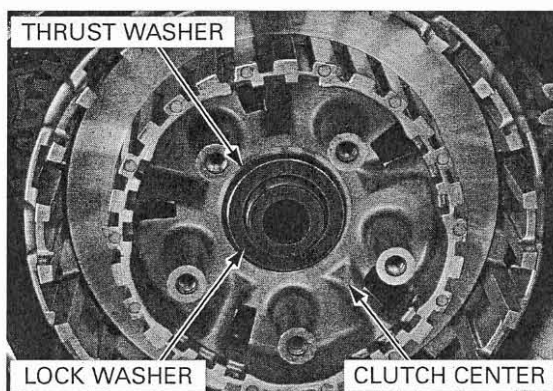
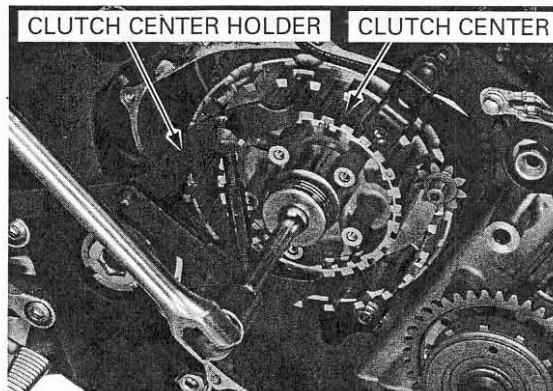
**07724-0050002 or  
equivalent commercially available in  
U.S.A.**

Discard the lock nut.

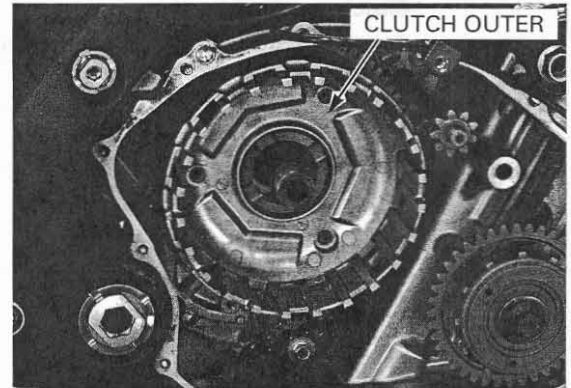
Remove the lock washer, thrust washer and clutch center.

Remove the thrust washer.

Pull out the clutch outer guide, then remove the needle bearing.



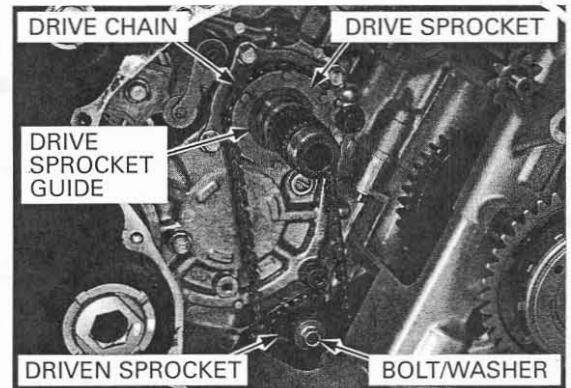
Remove the clutch outer.



Remove the oil pump driven sprocket bolt/washer.

*To gain access to the oil pump driven sprocket, first remove the oil pan.*

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



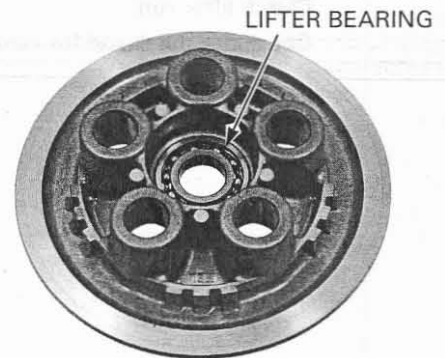
## INSPECTION

### Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger.

The bearing should turn smoothly and freely without excessive play.

If necessary, replace the bearing.

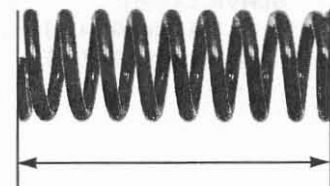


### Clutch spring

*Replace the clutch springs as a set.*

Measure the clutch spring free length.

**SERVICE LIMIT: 55.7 mm (2.19 in)**



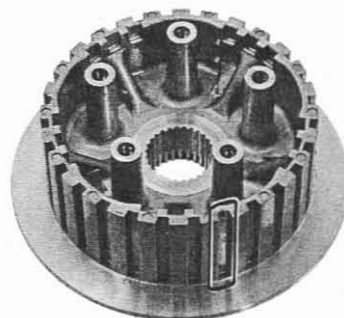


## CLUTCH/STARTER CLUTCH

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### Clutch center

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



### Clutch lifter piece

Check the clutch lifter piece for damage or abnormal wear.



### Clutch lifter rod

Check the clutch rod for bend or other damage.



### Clutch disc

*Replace the clutch discs and plates as a set.*

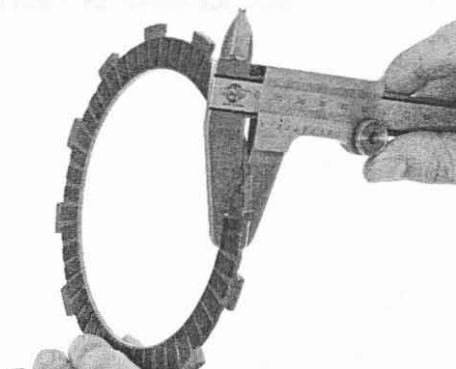
Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of each disc.

#### SERVICE LIMIT:

A: 3.4 mm (0.13 in)

B: 2.9 mm (0.11 in)

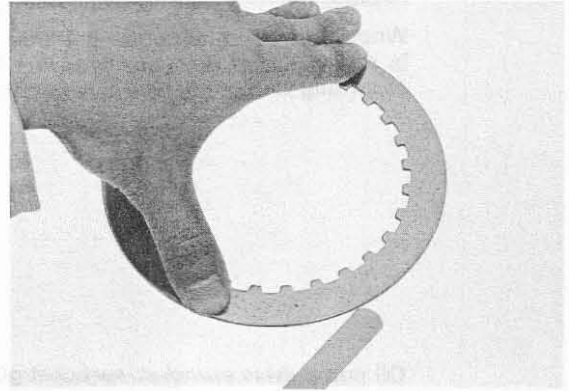


## Clutch plate

Replace the clutch discs and plates as a set.

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

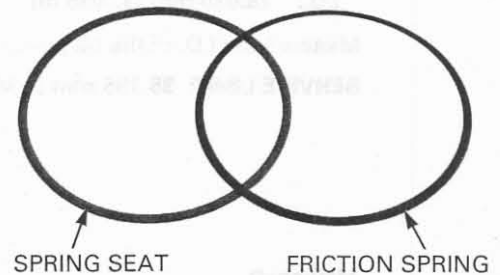
**SERVICE LIMIT:** 0.30 mm (0.012 in)



## Friction spring/spring seat

Check the friction spring and spring seat for deformation, warpage or damage; replace as necessary.

- A damaged or warped spring seat will cause the friction spring to be pressed unevenly.
- A damaged friction spring also causes the weak contact between the discs and plates or uneven disc/plate contact.



## Clutch outer/primary driven gear

Check the slots of the clutch outer for damage or wear caused by the clutch discs.

Check the primary driven gear for abnormal wear or damage.

Measure the I.D. of the primary driven gear.

### SERVICE LIMITS:

**A:** 41.026 mm (1.6152 in)

**B:** 41.018 mm (1.6149 in)

Replace the clutch outer assembly if necessary.

When the clutch outer assembly is replaced, be sure to select the needle bearing according to the selective fit table (page 10-22).

## Clutch outer guide/needle bearing

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

### SERVICE LIMITS:

**A (without ID mark):**

**O.D.:** 34.994 mm (1.3777 in)

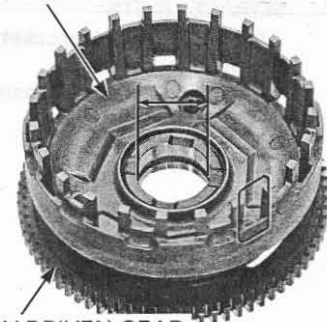
**I.D.:** 28.012 mm (1.1028 in)

**B (with ID mark):**

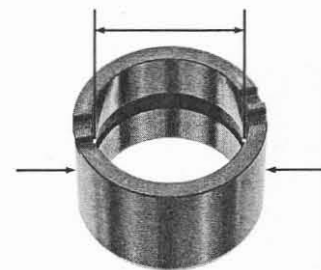
**O.D.:** 34.986 mm (1.3774 in)

**I.D.:** 28.012 mm (1.1028 in)

CLUTCH OUTER



PRIMARY DRIVEN GEAR



## CLUTCH/STARTER CLUTCH

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

When the clutch outer guide and/or needle bearing is replaced, be sure to select the needle bearing according to the selective fit table (page 10-22).



### Oil pump drive sprocket/sprocket guide

Measure the O.D. and I.D. of the oil pump drive sprocket guide.

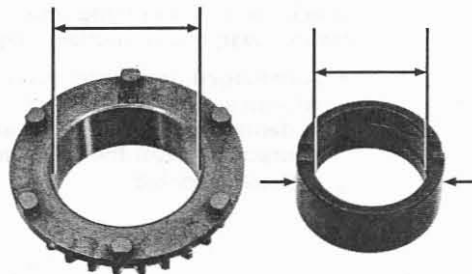
#### SERVICE LIMITS:

O.D.: 34.965 mm (1.3766 in)

I.D.: 28.030 mm (1.1035 in)

Measure the I.D. of the oil pump drive sprocket.

SERVICE LIMIT: 35.155 mm (1.3841 in)



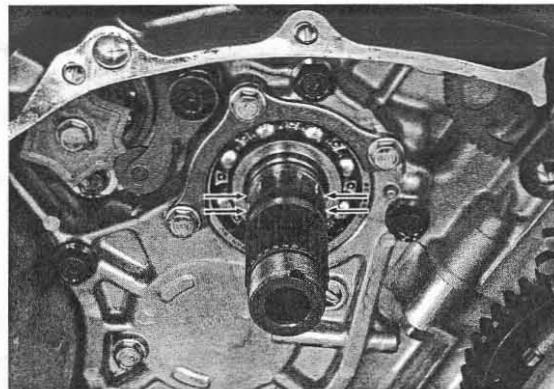
### Mainshaft

Measure the mainshaft O.D. at clutch outer guide and oil pump drive sprocket guide sliding surfaces.

#### SERVICE LIMITS:

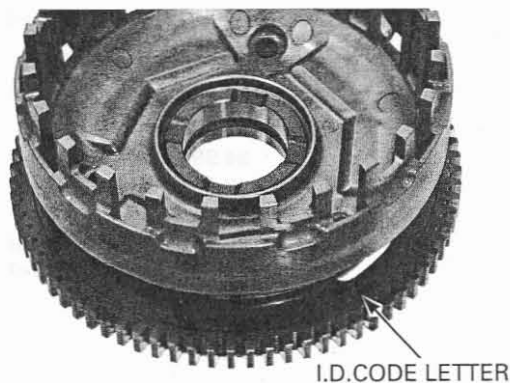
Oil pump drive sprocket  
guide position: 27.96 mm (1.101 in)

Clutch outer guide position: 27.96 mm (1.101 in)



## NEEDLE BEARING SELECTION

The primary driven gear has I.D. code letter as shown.



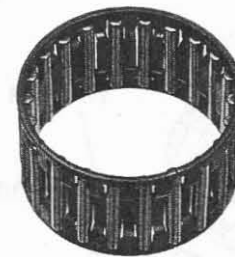
## CLUTCH/STARTER CLUTCH

The clutch outer guide has O.D. code letter as shown.

O.D.CODE LETTER



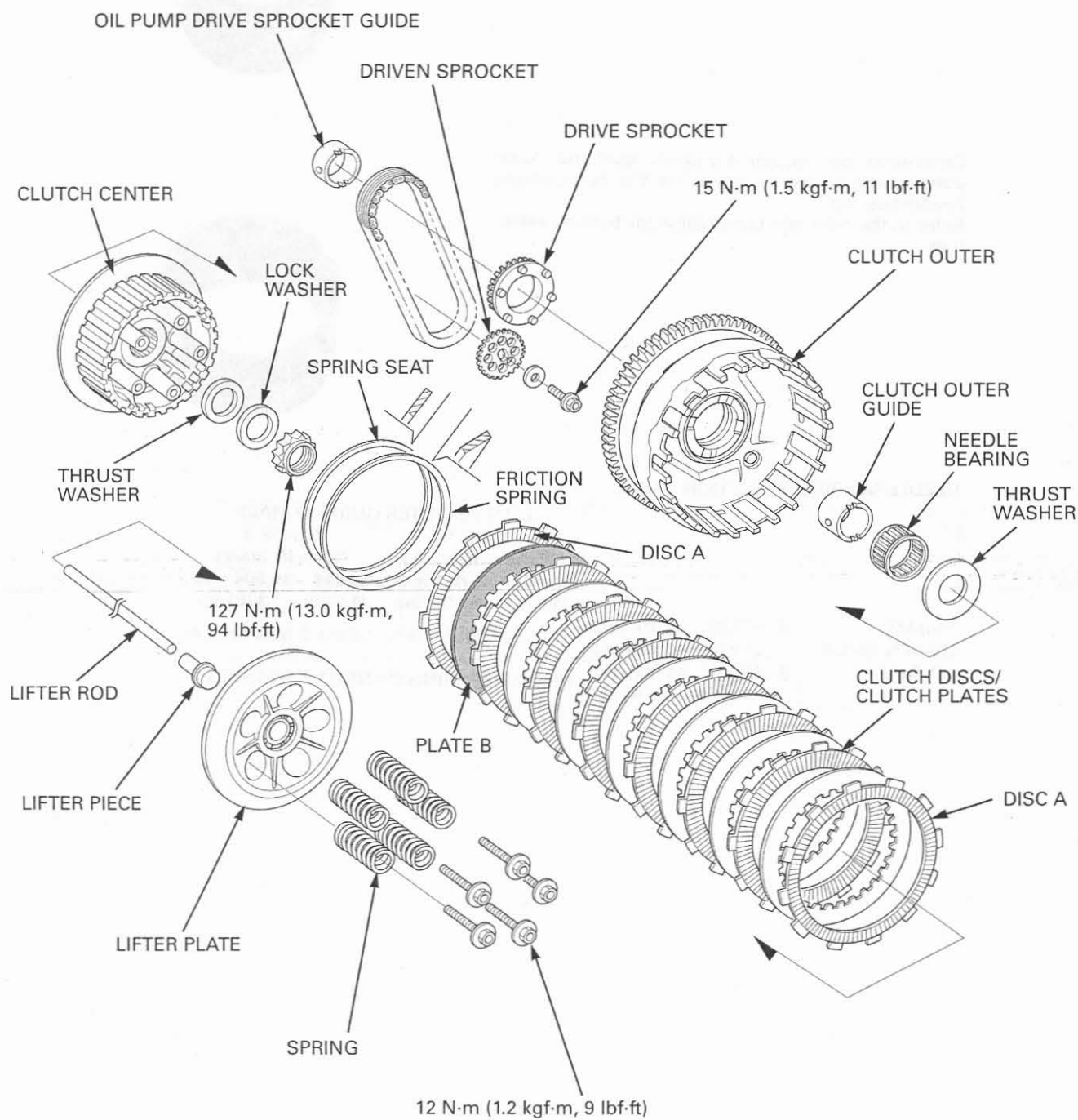
Cross-reference the primary driven gear and clutch outer guide codes to determine the replacement needle bearing.  
Refer to the selection table below for bearing selection.



NEEDLE BEARING SELECTION TABLE:

|                                     |   |  | CLUTCH OUTER GUIDE ID MARK                 |  |
|-------------------------------------|---|--|--|--|
|                                     |   |  | GUIDE A<br>(Without ID mark)               | GUIDE B<br>(With ID mark)                  |
|                                     |   |  | 35.004 – 35.012 mm<br>(1.3781 – 1.3784 in) | 34.996 – 35.004 mm<br>(1.3778 – 1.3781 in) |
| PRIMARY<br>DRIVEN GEAR<br>I.D. MARK | A | 41.008 – 41.016 mm<br>(1.6145 – 1.6148 in) | NEEDLE BEARING B                           | NEEDLE BEARING A                           |
|                                     | B | 41.000 – 41.008 mm<br>(1.6142 – 1.6145 in) | NEEDLE BEARING C                           | NEEDLE BEARING B                           |

## CLUTCH/STARTER CLUTCH INSTALLATION



Install the oil pump drive sprocket guide.

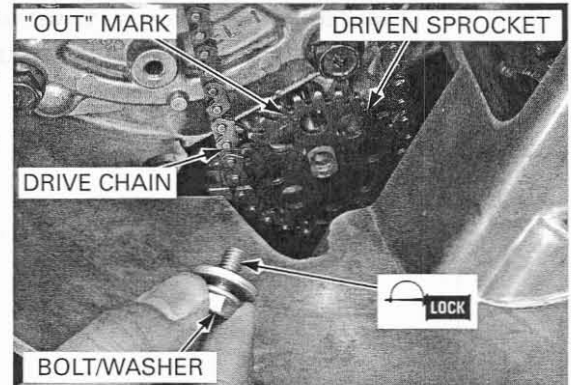
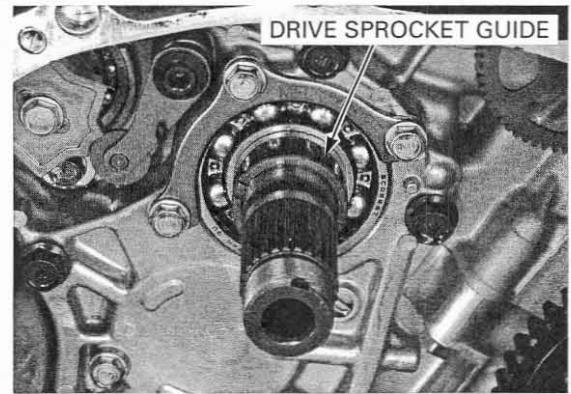
*Install the oil pump driven sprocket with its "OUT" mark facing out.*

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

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

Install the oil pump driven sprocket bolt, washer and tighten the bolt to the specified torque.

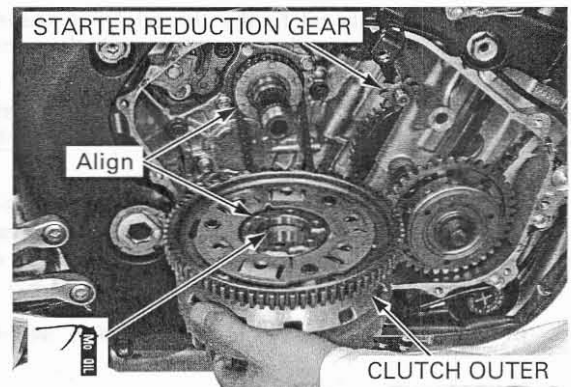
**TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)**



*Make sure the starter reduction gear is installed before installing the clutch.*

Apply molybdenum oil solution to the clutch outer sliding surface.

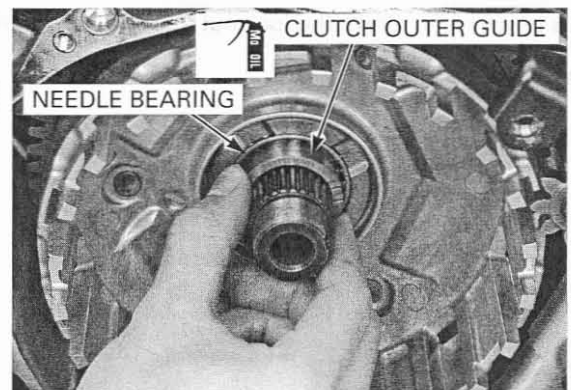
Install the clutch outer while aligning the bosses on the oil pump drive sprocket with holes in the clutch outer.



*Install the clutch outer guide with its grooves facing out.*

Apply molybdenum oil solution to the clutch outer guide sliding surface.

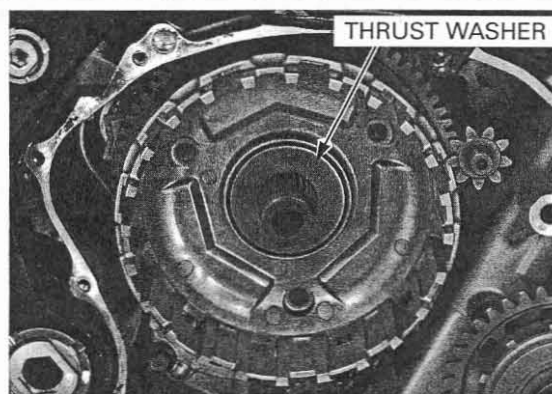
Install the clutch outer guide and needle bearing onto the mainshaft (Refer to the needle bearing selection: page 10-23).





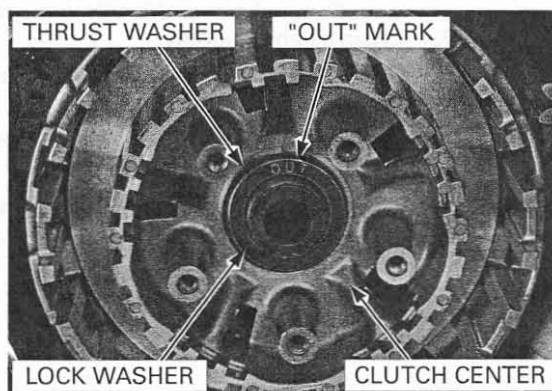
## CLUTCH/STARTER CLUTCH

Install the thrust washer.



Install the clutch center and thrust washer.

Install the lock washer with its "OUT" mark facing out.



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

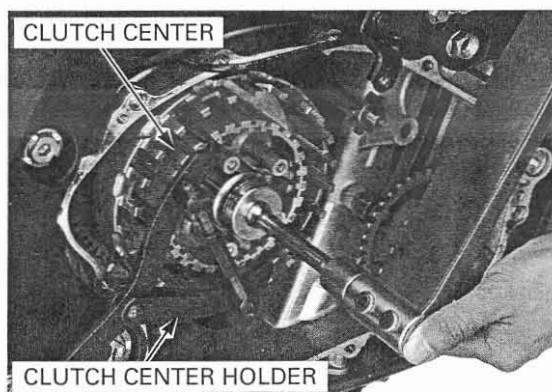
Hold the clutch center with the special tool and tighten the lock nut to the specified torque.

### TOOL:

Clutch center holder

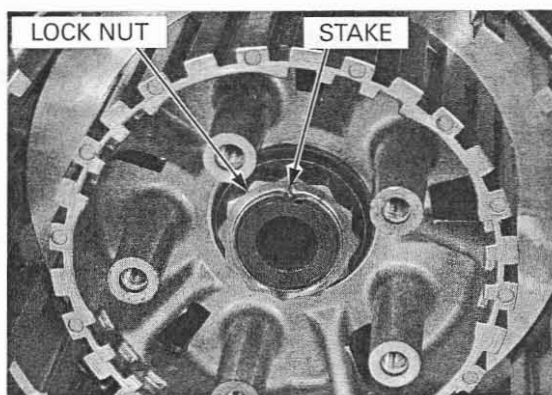
07724-0050002 or  
equivalent commercially available in  
U.S.A.

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



*Be careful not to  
damage the  
mainshaft threads.*

Stake the lock nut into the mainshaft groove with a punch.



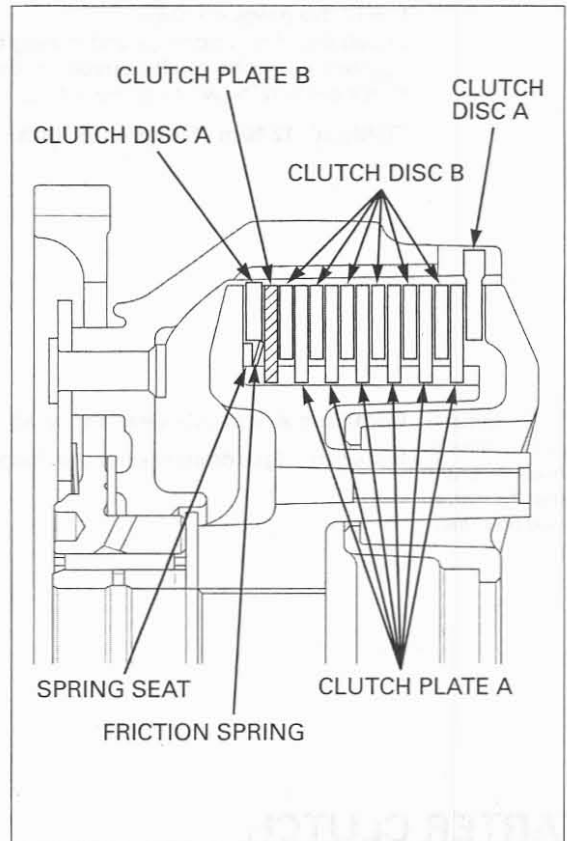
## CLUTCH/STARTER CLUTCH

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

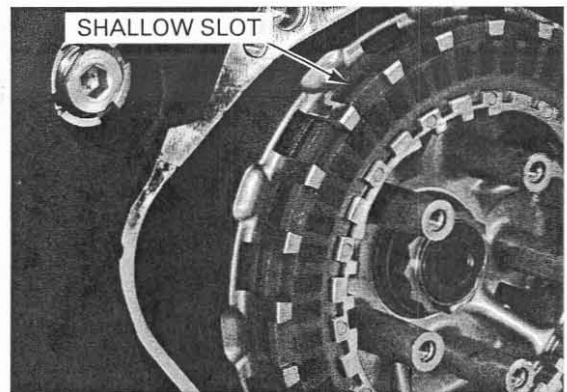
Coat the clutch discs and plates with clean engine oil.

*Surface treatment of clutch plate B is different from that of plate A.*

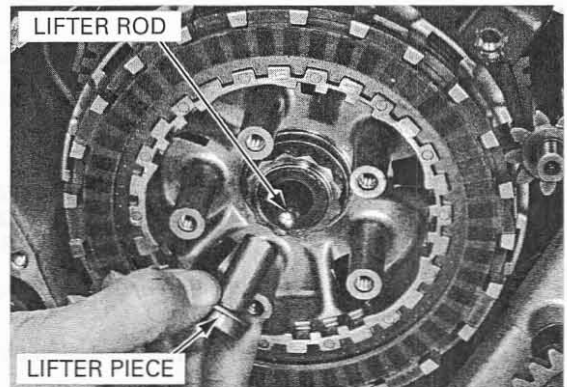
First install the clutch disc A (larger I.D. disc) into the clutch outer, and then install the clutch plate B. Stack the six clutch discs (B) and plates (A) alternately.



Install the clutch disc A (larger I.D. disc) and set the tabs of it in the shallow slots of the clutch outer.



Install the push rod and clutch lifter piece into the mainshaft.



## CLUTCH/STARTER CLUTCH

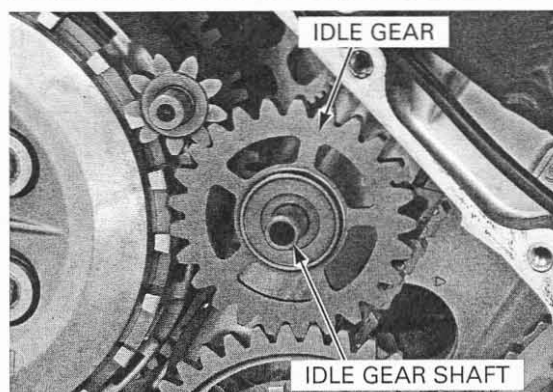
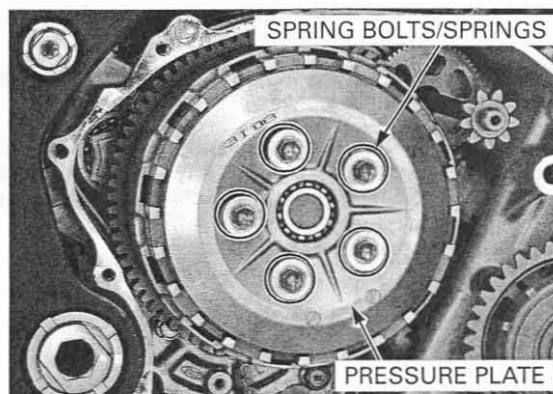
Install the pressure plate.  
Install the clutch springs and spring bolts.  
Tighten the bolts to the specified torque in a criss-cross pattern in two to three steps.

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

*Make sure the starter motor is installed before installing the starter idle gear and shaft.*

Install the starter idle gear and shaft.

Install the right crankcase cover (page 10-34).

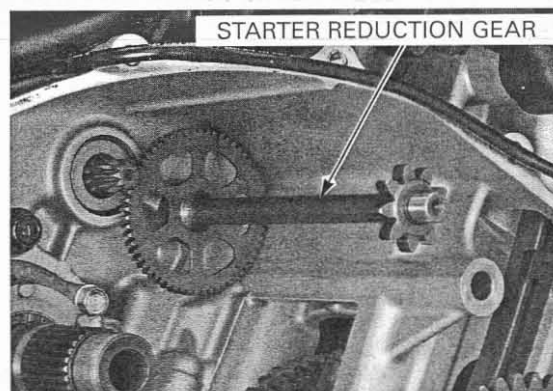


## STARTER CLUTCH

### REMOVAL

Remove the clutch (page 10-16).

Remove the starter reduction gear from the crankcase.



Temporarily install the primary driven gear.

Insert the gear holder between the primary drive and driven gear as shown.

#### TOOL:

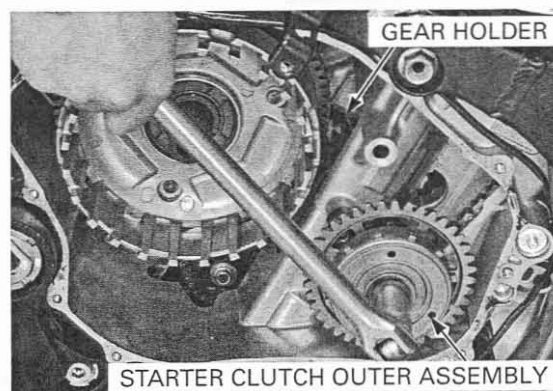
Gear holder, M2.5

07724-0010100 or  
07724-001A100  
(U.S.A. only)

Remove the starter clutch outer special bolt and washer.

Remove the temporarily installed parts.

Remove the starter clutch outer assembly.



Remove the thrust washer.



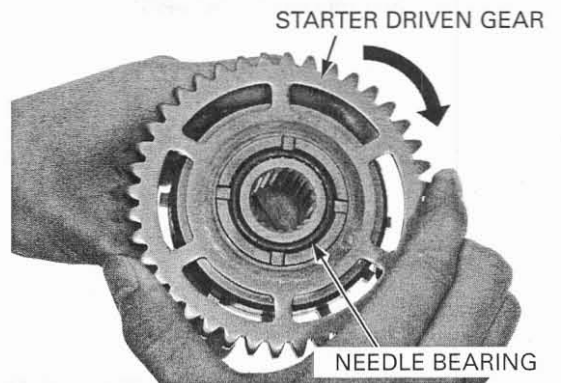
### INSPECTION

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

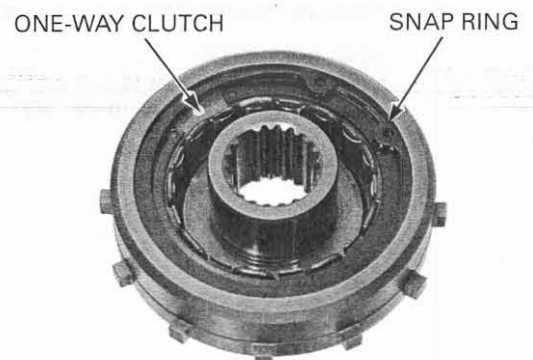
### DISASSEMBLY

Remove the starter driven gear by turning it counterclockwise.

Remove the needle bearing.



Remove the snap ring and one-way clutch.



Check the starter clutch outer inner surface and one-way clutch for abnormal wear or damage and replace them if necessary.



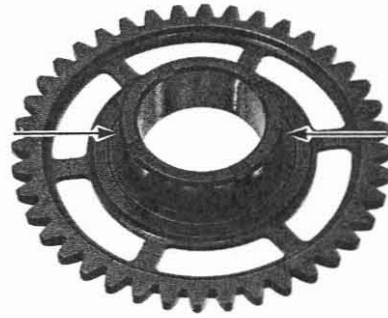
## CLUTCH/STARTER CLUTCH

---

Check the starter driven gear for abnormal wear or damage.

Measure the starter driven gear boss O.D.

**SERVICE LIMIT: 45.642 mm (1.7969 in)**



Check the starter reduction gear for wear or damage and replace it if necessary.

STARTER REDUCTION GEAR

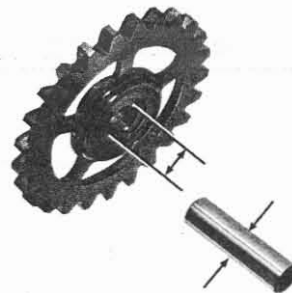


Check the starter idle gear and shaft for wear or damage, replace them if necessary.

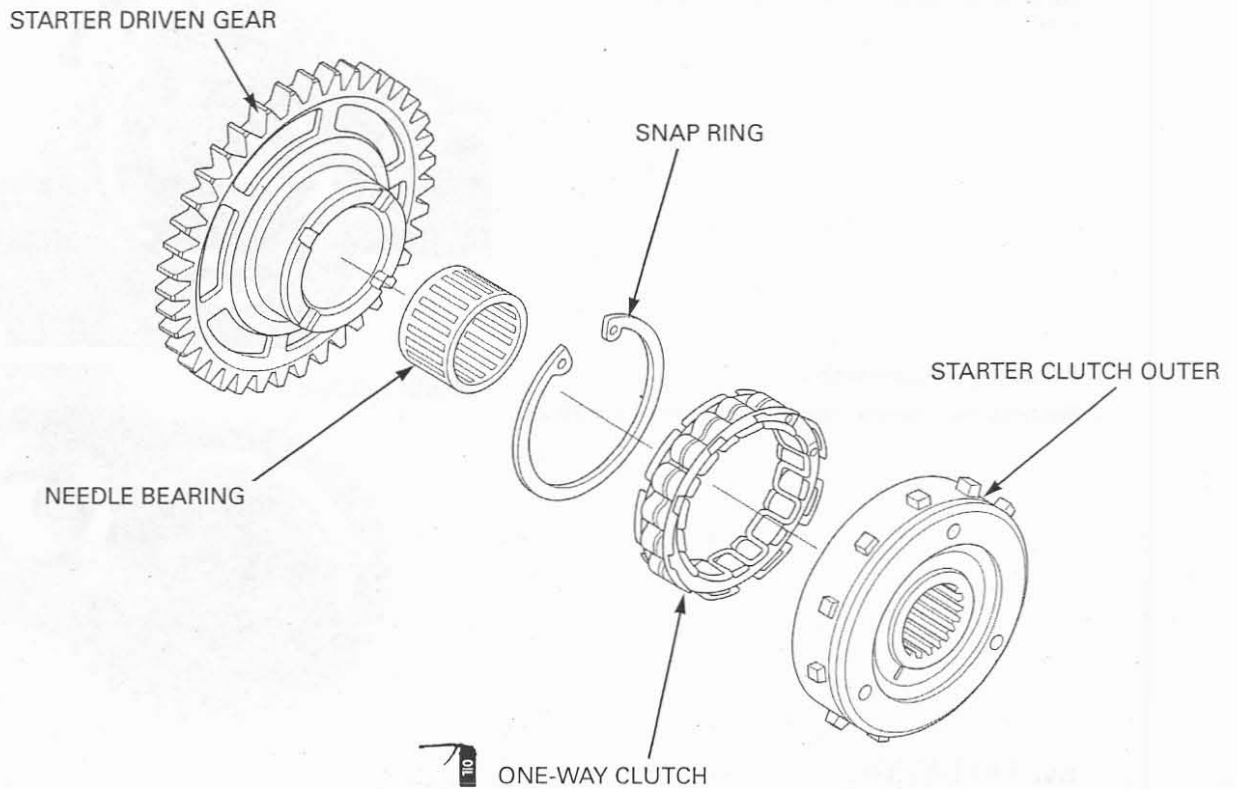
**SERVICE LIMITS:**

Shaft O.D.: 9.98 mm (0.393 in)

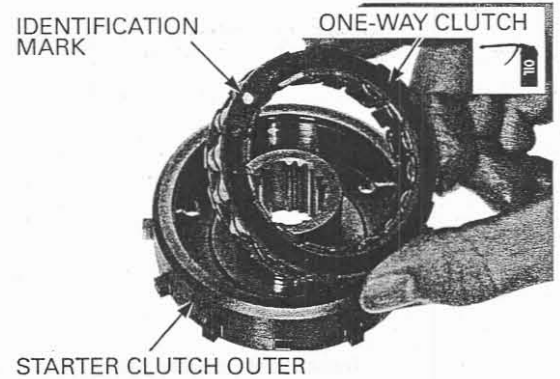
Gear I.D.: 10.05 mm (0.396 in)



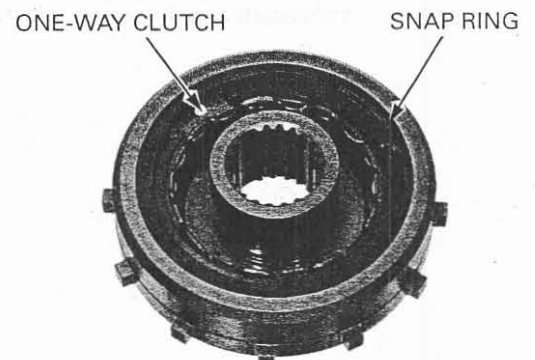
## ASSEMBLY



Apply oil to the one-way clutch. Install the one-way clutch into the starter clutch outer with its identification mark (white paint) facing out.



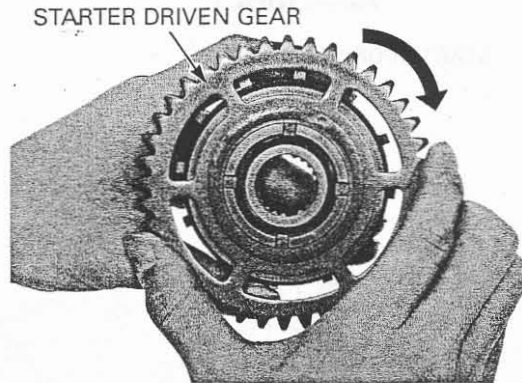
Install the snap ring into the starter clutch outer groove securely.





## CLUTCH/STARTER CLUTCH

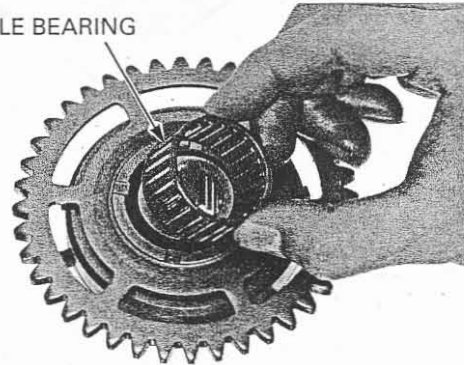
Install the starter driven gear into the starter clutch outer while turning the starter driven gear clockwise.



Install the needle bearing.

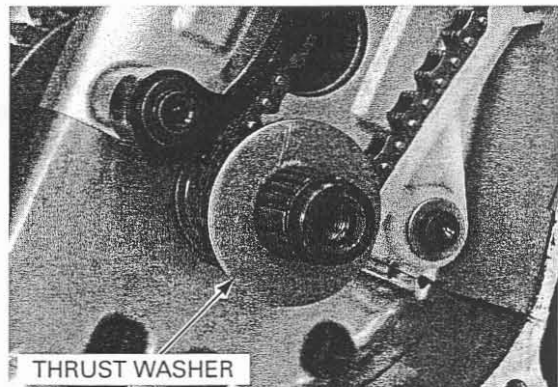
Recheck the one-way clutch operation (page 10-29).

NEEDLE BEARING

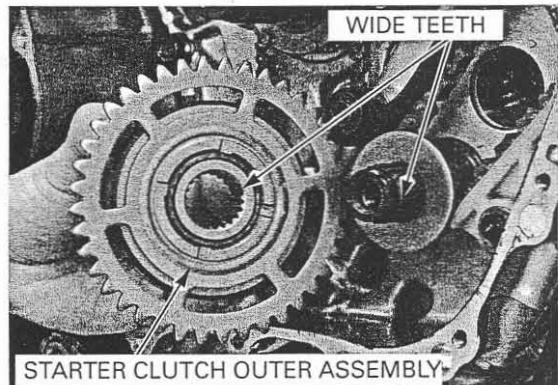


## INSTALLATION

Install the thrust washer into the crankshaft.

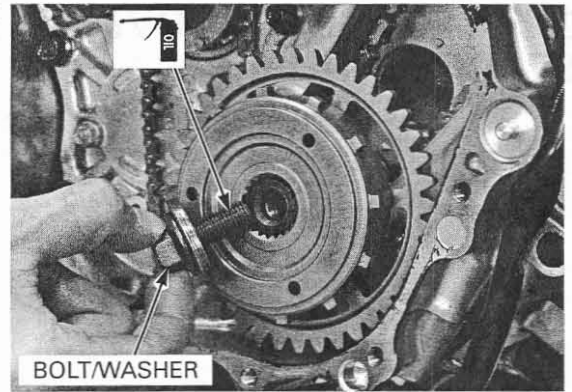


Install the starter clutch outer assembly into the crankshaft while aligning the wide teeth of the crankshaft and the starter clutch assembly.



Apply oil to the starter clutch outer special bolt threads and seating surface.

Install the washer and starter clutch outer special bolt.



Temporarily install the following:

- Oil pump drive gear guide
- Oil pump drive gear
- Clutch outer
- Clutch outer guide
- Clutch outer needle bearing

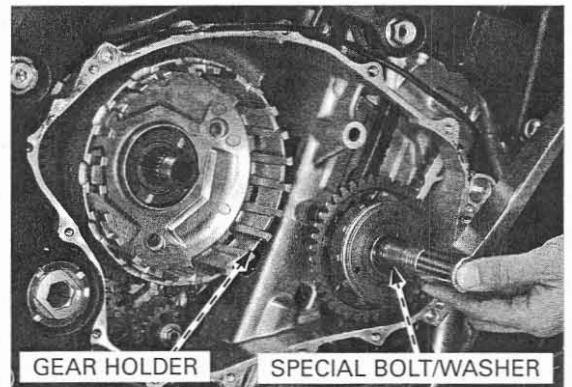
*Be careful not to drop the gear holder into the crankcase.*

Attach the gear holder between the primary drive gear and driven gear.

**TOOL:**

**Gear holder, M2.5**

**07724-0010100 or  
07724-001A100  
(U.S.A. only)**



Tighten the starter clutch special bolt to the specified torque.

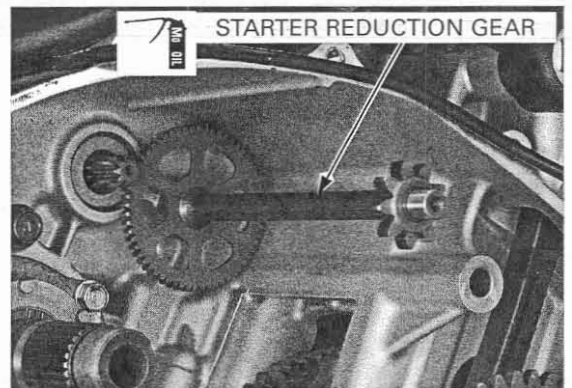
**TORQUE: 83 N·m (8.5 kgf·m, 61 lbf·ft)**

Remove the temporarily installed parts.

Apply molybdenum oil solution to the starter reduction gear sliding surface.

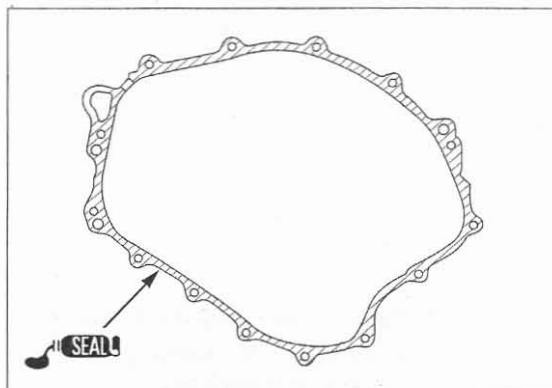
Install the starter reduction gear into the crankcase.

Install the clutch (page 10-24).

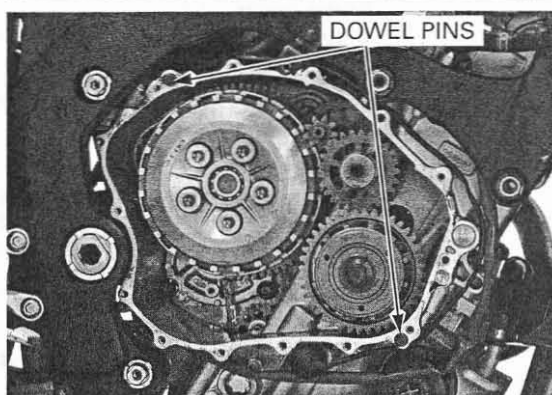


## RIGHT CRANKCASE COVER INSTALLATION

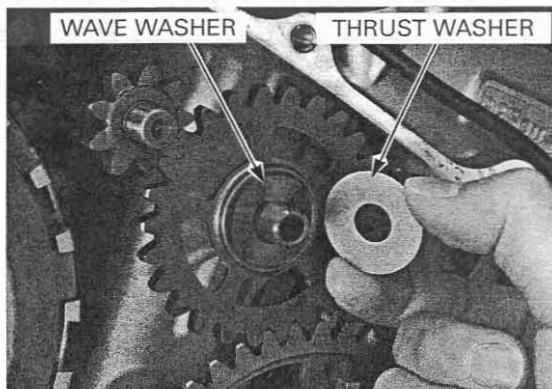
Apply sealant to the mating surface of the right crankcase cover.



Install the two dowel pins.



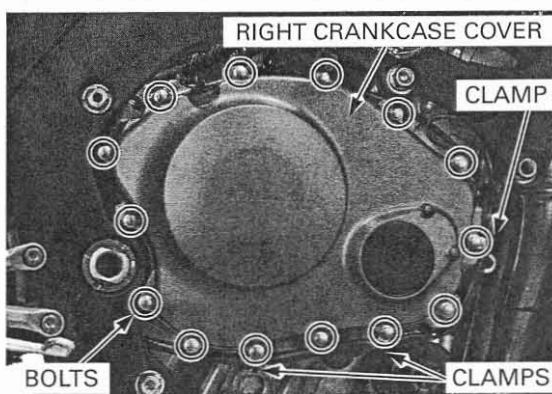
Install the wave washer and thrust washer onto the starter idle gear.



Install the right crankcase cover while aligning the starter idle gear shaft and reduction gear shaft with the holes in the right crankcase cover, then align the dowel pins with the cover holes.

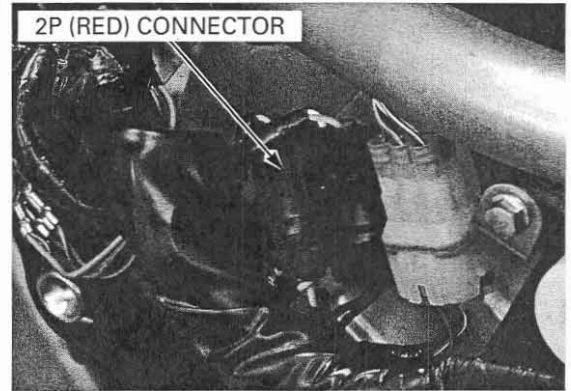
Install the wire clamps and right crankcase cover bolts.

Tighten the right crankcase cover bolts crisscross pattern in two or three steps.



Connect the crankshaft position sensor 2P (Red) connector.

Add the recommended engine oil (page 4-22).  
Install the middle cowls/under cowls (page 3-7).



## MEMO



# 11. ALTERNATOR

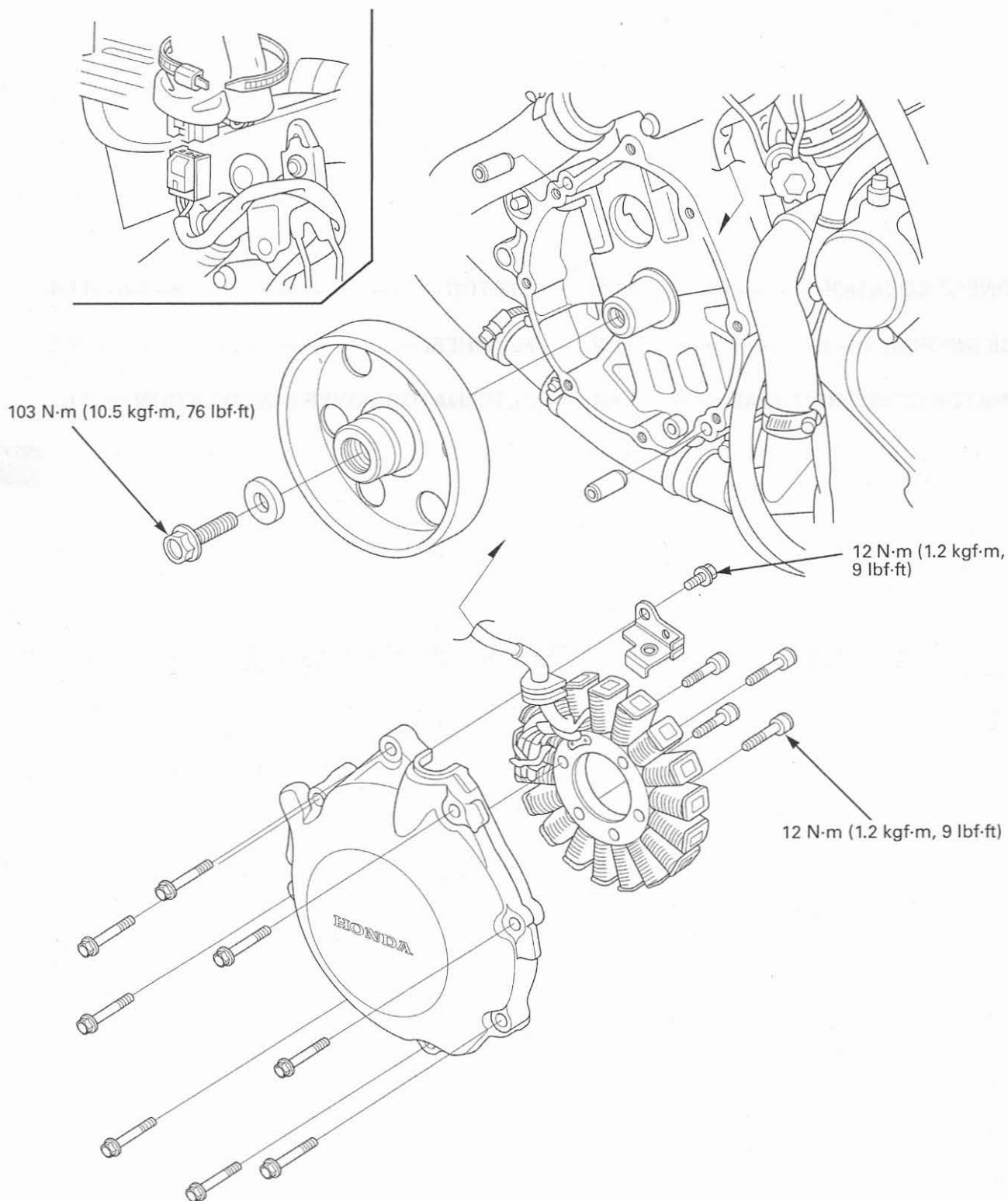
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|                                |      |                                     |      |
|--------------------------------|------|-------------------------------------|------|
| COMPONENT LOCATION .....       | 11-2 | STATOR .....                        | 11-4 |
| SERVICE INFORMATION .....      | 11-3 | FLYWHEEL .....                      | 11-5 |
| ALTERNATOR COVER REMOVAL ..... | 11-4 | ALTERNATOR COVER INSTALLATION ..... | 11-7 |



## ALTERNATOR

### COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

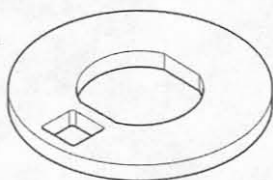
- This section covers service of the alternator stator and flywheel. All service can be done with the engine installed in the frame.
- Refer to procedures for alternator stator inspection (page 17-8).
- Refer to procedures for starter motor servicing (page 19-6).

### TORQUE VALUES

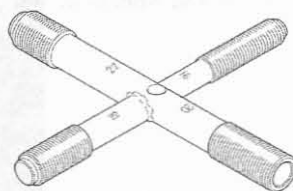
|                               |                                 |                          |
|-------------------------------|---------------------------------|--------------------------|
| Stator wire clamp flange bolt | 12 N·m (1.2 kgf·m, 9 lbf·ft)    | Apply oil to the threads |
| Flywheel flange bolt          | 103 N·m (10.5 kgf·m, 76 lbf·ft) |                          |
| Stator mounting socket bolt   | 12 N·m (1.2 kgf·m, 9 lbf·ft)    |                          |

### TOOLS

Flywheel holder  
070MB-MELC100



Rotor puller  
07733-0020001



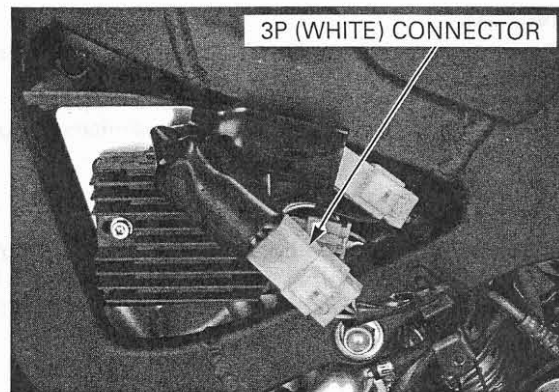
or 07933-3950000 (U.S.A. only)

## ALTERNATOR

### ALTERNATOR COVER REMOVAL

Remove the under cowls/middle cowls (page 3-7).

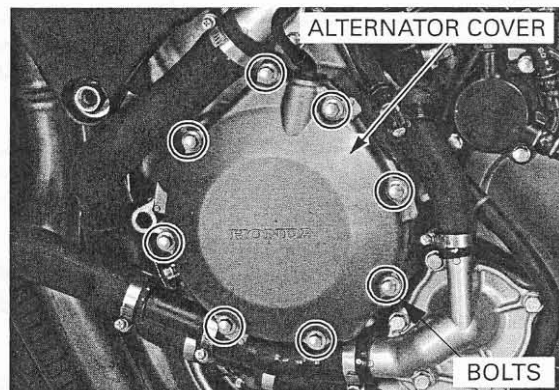
Disconnect the alternator 3P (White) connector.



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

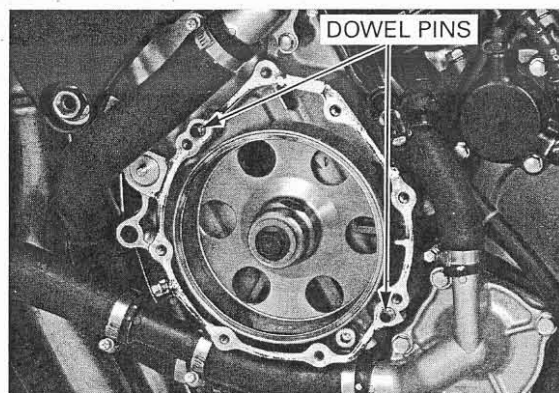
Remove the alternator cover SH bolts and alternator cover.

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



Remove the dowel pins.

Clean off any sealant from the right crankcase cover mating surfaces.



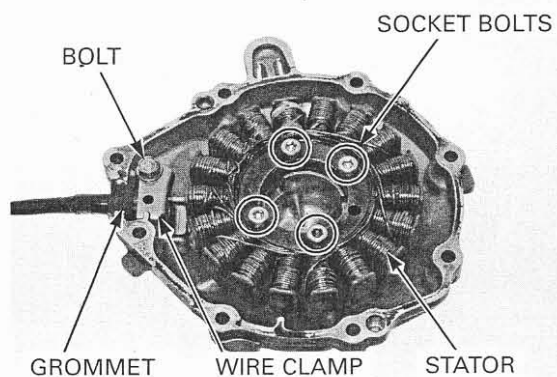
## STATOR

### REMOVAL

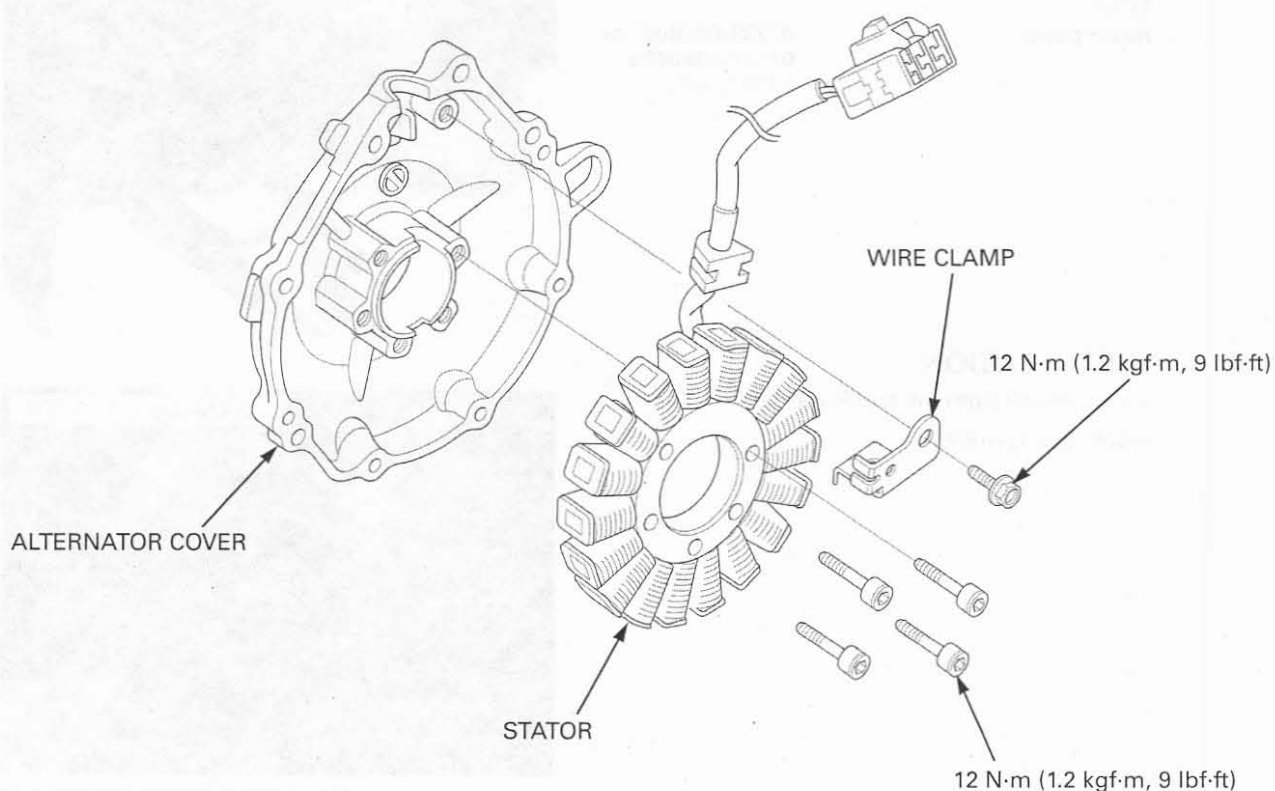
Remove the bolt and stator wire clamp.

Remove the alternator wire grommet from the alternator cover.

Remove the socket bolts and stator.



## INSTALLATION



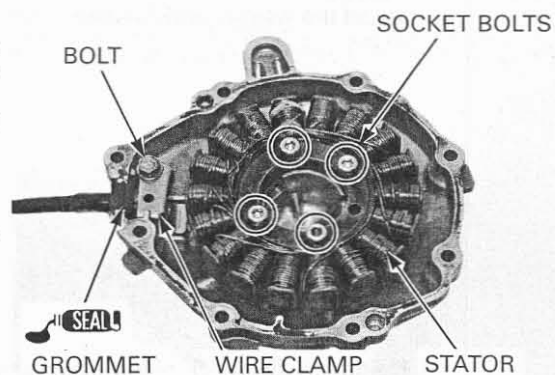
Install the stator into the alternator cover.

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

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

Install the wire clamp and tighten the flange bolt to the specified torque.

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



## FLYWHEEL

## REMOVAL

Remove the alternator cover (page 11-4).

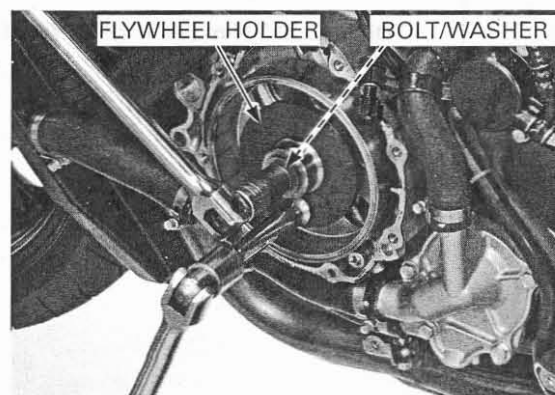
Hold the flywheel using the special tool, then remove the flywheel bolt.

## TOOL:

Flywheel holder

070MB-MELC100

Remove the washer.



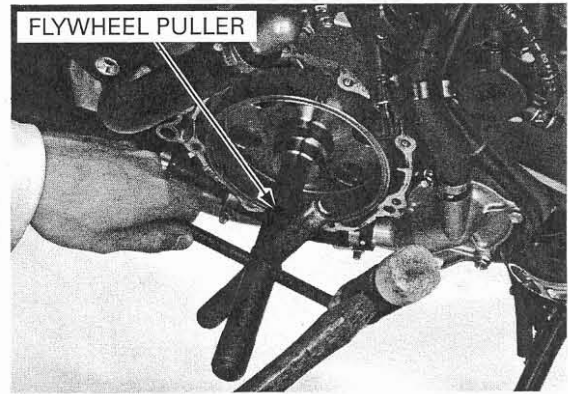
## ALTERNATOR

Remove the flywheel using the special tool.

**TOOL:**

Rotor puller

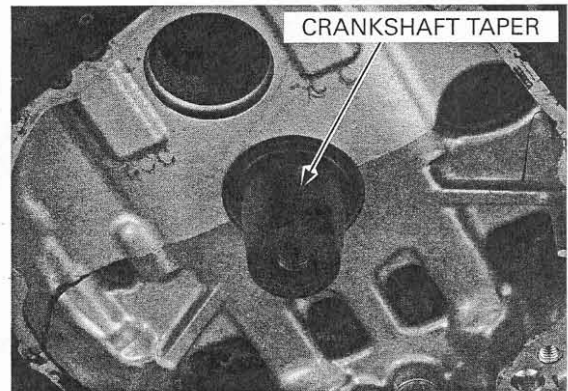
07733-0020001 or  
07933-3950000  
(U.S.A. only)



## INSTALLATION

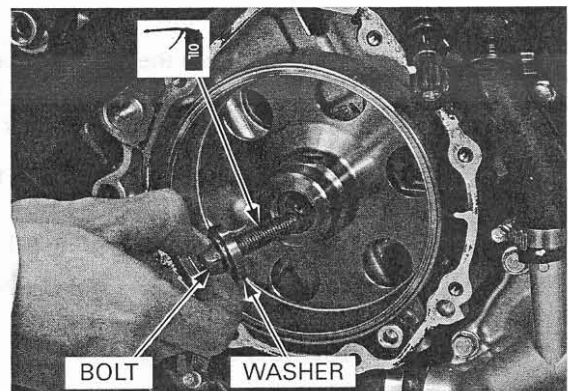
Clean any oil from the crankshaft taper.

Install the flywheel.



Apply oil to the flywheel bolt threads and seating surface.

Install the washer and flywheel bolt.



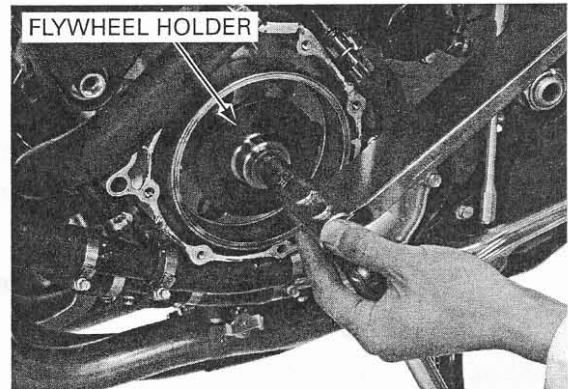
Hold the flywheel using the special tool, then tighten the bolt to the specified torque.

**TOOL:**

Flywheel holder

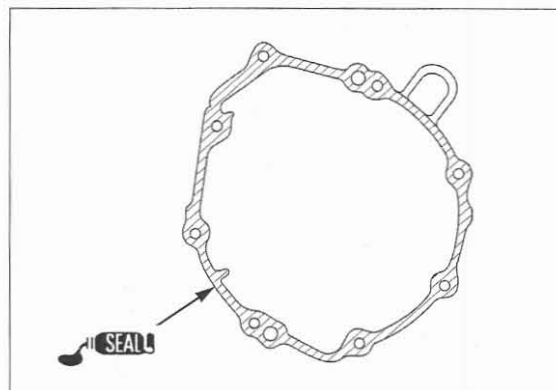
070MB-MELC100

**TORQUE:** 103 N·m (10.5 kgf·m, 76 lbf·ft)

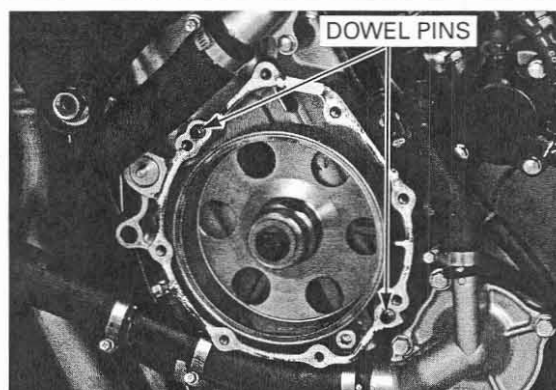


## ALTERNATOR COVER INSTALLATION

Apply a sealant to the mating surface of the alternator cover.



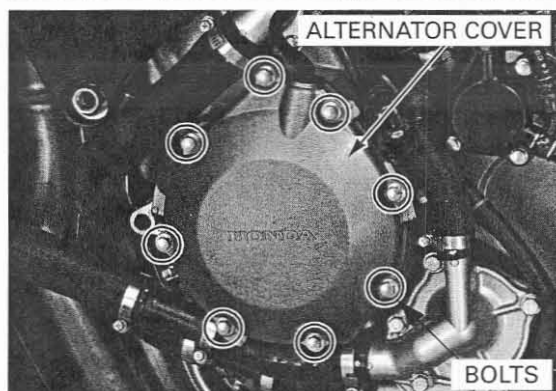
Install the dowel pins.



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

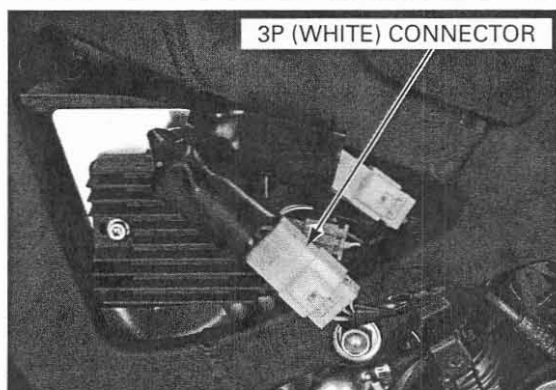
Install the alternator cover.

Install and tighten the SH bolts securely.



Connect the alternator 3P (White) connector.

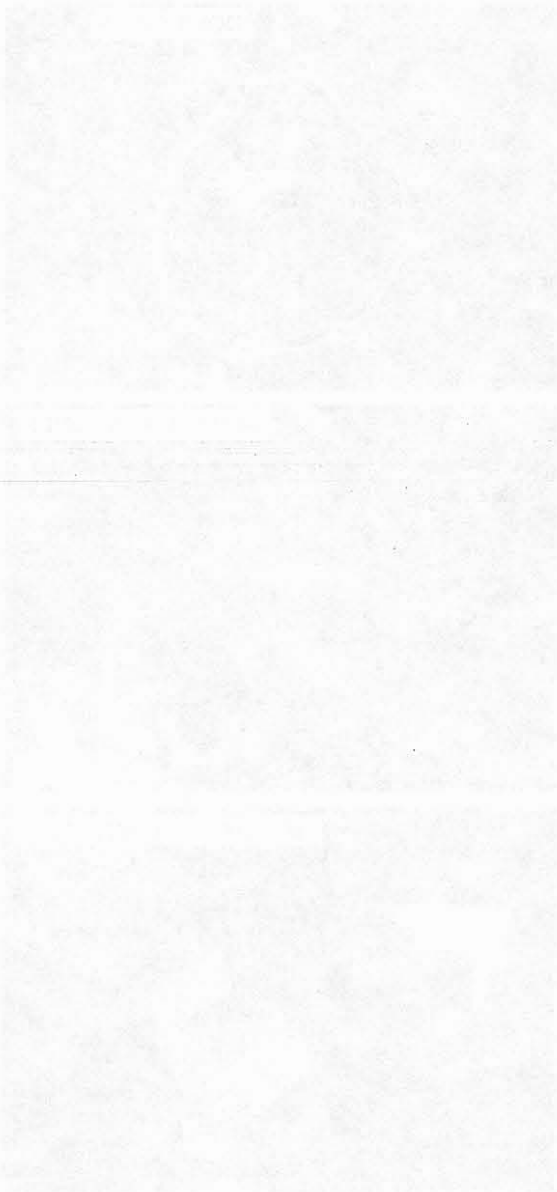
Install the under cowls/middle cowls (page 3-7).





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MEMO

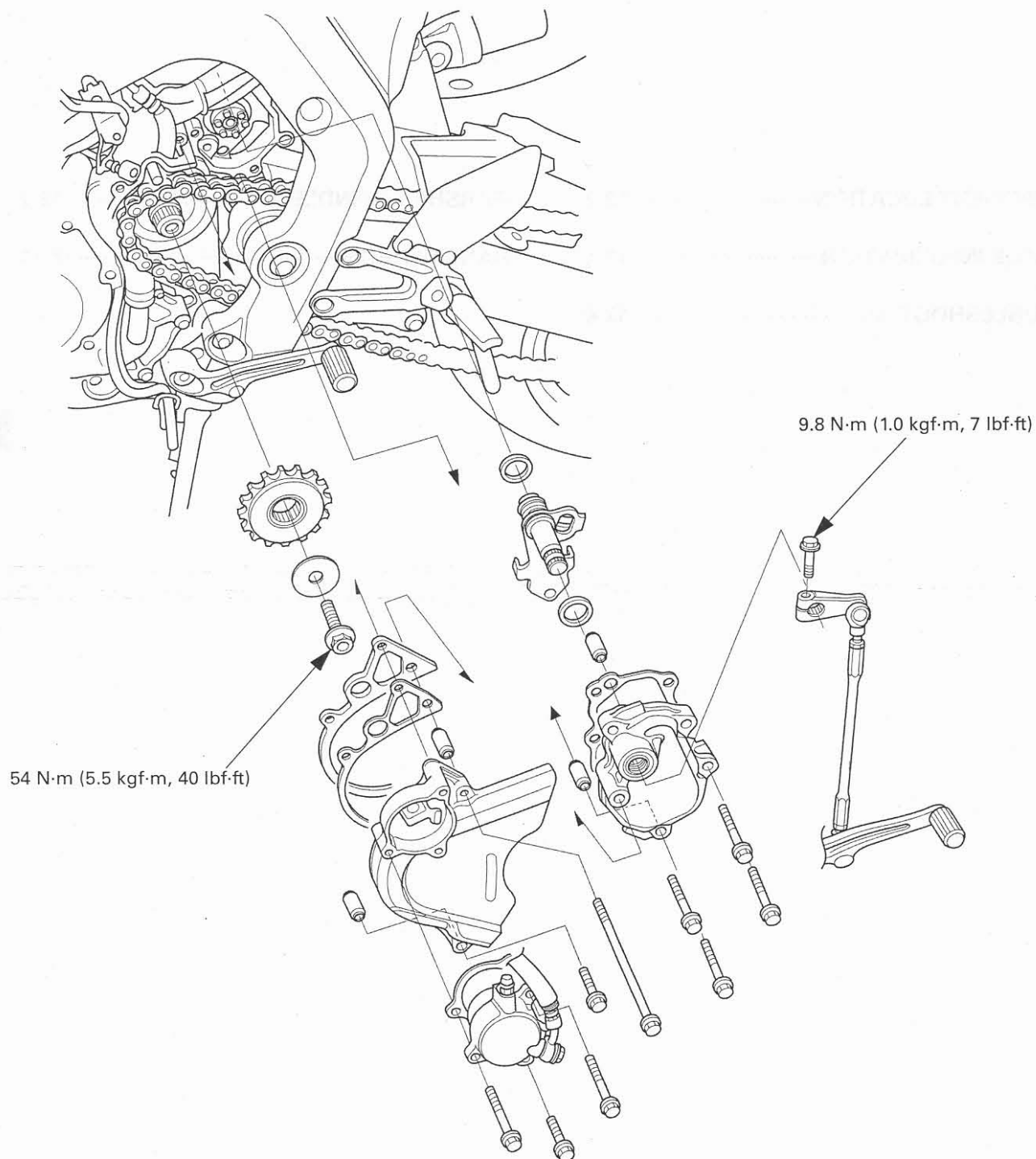


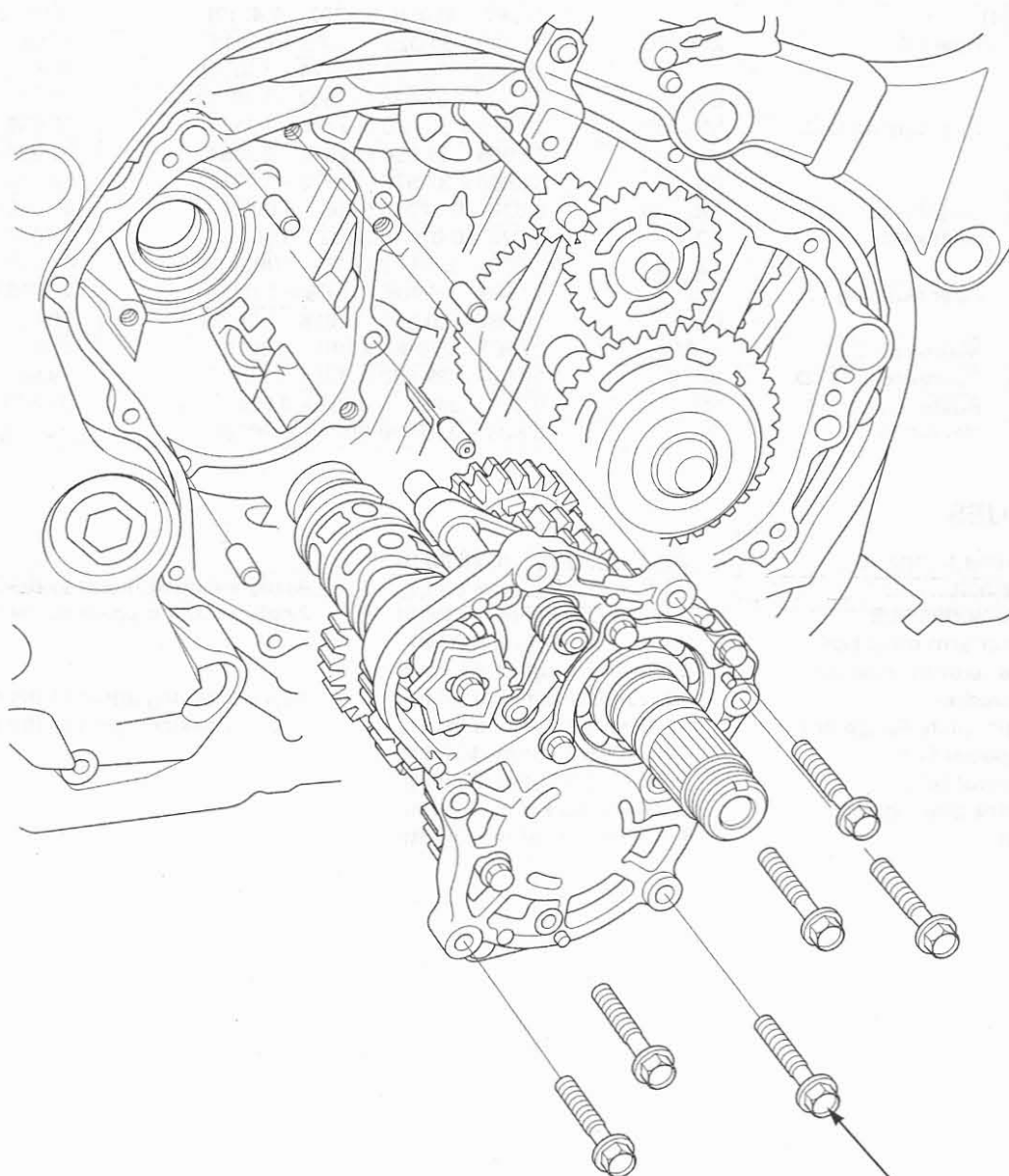
## 12. TRANSMISSION/GEARSHIFT LINKAGE

---

|                           |      |                        |       |
|---------------------------|------|------------------------|-------|
| COMPONENT LOCATION .....  | 12-2 | GEARSHIFT SPINDLE..... | 12-7  |
| SERVICE INFORMATION ..... | 12-4 | TRANSMISSION.....      | 12-11 |
| TROUBLESHOOTING .....     | 12-6 |                        |       |

## COMPONENT LOCATION





29 N·m (3.0 kgf·m, 22 lbf·ft)

## TRANSMISSION/GEARSHIFT LINKAGE

### SERVICE INFORMATION

#### GENERAL

- This section covers the transmission and gearshift linkage service. These service can be done engine installed in the frame.

#### SPECIFICATIONS

Unit: mm (in)

| ITEM                  |                            |            | STANDARD                          | SERVICE LIMIT   |
|-----------------------|----------------------------|------------|-----------------------------------|-----------------|
| Shift fork            | I.D.                       |            | 12.000 – 12.018 (0.4724 – 0.4731) | 12.03 (0.474)   |
|                       | Claw thickness             |            | 5.93 – 6.00 (0.233 – 0.236)       | 5.9 (0.23)      |
| Shift fork shaft O.D. |                            |            | 11.957 – 11.968 (0.4707 – 0.4712) | 11.95 (0.470)   |
| Transmission          | Gear I.D.                  | M5, M6     | 31.000 – 31.025 (1.2205 – 1.2215) | 31.04 (1.222)   |
|                       |                            | C1         | 28.000 – 28.021 (1.1024 – 1.1032) | 28.04 (1.104)   |
|                       |                            | C2, C3, C4 | 33.000 – 33.025 (1.2992 – 1.3002) | 33.04 (1.301)   |
|                       | Gear busing O.D.           | M5, M6     | 30.955 – 30.980 (1.2187 – 1.2197) | 30.935 (1.2179) |
|                       |                            | C2         | 32.955 – 32.980 (1.2974 – 1.2984) | 32.935 (1.2967) |
|                       |                            | C3, C4     | 32.950 – 32.975 (1.2972 – 1.2982) | 32.930 (1.2964) |
|                       | Gear-to-bushing clearance  | M5, M6     | 0.020 – 0.070 (0.0008 – 0.0028)   | 0.10 (0.004)    |
|                       |                            | C2         | 0.020 – 0.070 (0.0008 – 0.0028)   | 0.10 (0.004)    |
|                       |                            | C3, C4     | 0.025 – 0.075 (0.0010 – 0.0030)   | 0.11 (0.004)    |
|                       | Gear bushing I.D.          | M5         | 27.985 – 28.006 (1.1018 – 1.1026) | 28.016 (1.1030) |
|                       |                            | C2         | 29.985 – 30.006 (1.1018 – 1.1026) | 30.021 (1.1819) |
|                       | Mainshaft O.D.             | at M5      | 27.967 – 27.980 (1.1011 – 1.1016) | 27.957 (1.1007) |
|                       | Countershaft O.D.          | at C2      | 29.967 – 29.980 (1.1798 – 1.1803) | 29.960 (1.1795) |
|                       | Bushing to shaft clearance | M5         | 0.005 – 0.039 (0.0002 – 0.0015)   | 0.06 (0.002)    |
|                       |                            | C2         | 0.005 – 0.039 (0.0002 – 0.0015)   | 0.06 (0.002)    |

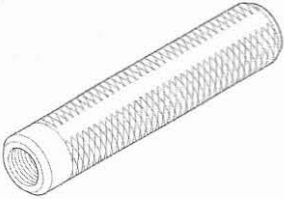
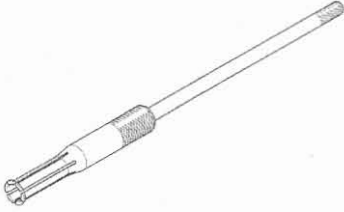
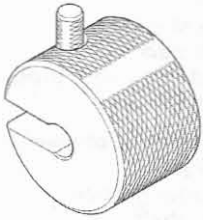
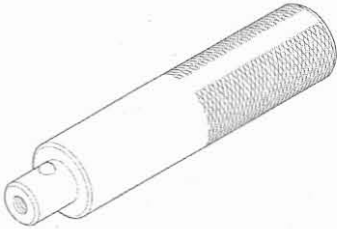
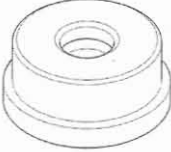
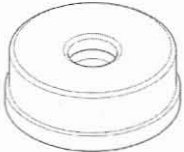
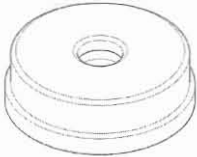
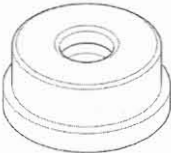



#### TORQUE VALUES

|                                      |                               |
|--------------------------------------|-------------------------------|
| Transmission holder flange bolt      | 29 N·m (3.0 kgf·m, 22 lbf·ft) |
| Bearing set plate bolt               | 12 N·m (1.2 kgf·m, 9 lbf·ft)  |
| Shift drum center socket bolt        | 23 N·m (2.3 kgf·m, 17 lbf·ft) |
| Shift drum stopper arm pivot bolt    | 12 N·m (1.2 kgf·m, 9 lbf·ft)  |
| Gearshift spindle return spring pin  | 23 N·m (2.3 kgf·m, 17 lbf·ft) |
| Shift drum bolt/washer               | 12 N·m (1.2 kgf·m, 9 lbf·ft)  |
| Shift drum stopper plate flange bolt | 12 N·m (1.2 kgf·m, 9 lbf·ft)  |
| Drive sprocket special bolt          | 54 N·m (5.5 kgf·m, 40 lbf·ft) |
| Gearshift pedal pivot bolt           | 26 N·m (2.7 kgf·m, 20 lbf·ft) |
| Gearshift pedal link pinch bolt      | 9.8 N·m (1.0 kgf·m, 7 lbf·ft) |
| Link arm lock nut                    | 9.8 N·m (1.0 kgf·m, 7 lbf·ft) |

Apply a locking agent to the threads  
Apply a locking agent to the threads

Apply a locking agent to the threads  
Apply a locking agent to the threads

## TOOLS

|   |  |   |
|---|--|---|
| <p>Bearing remover handle<br/>07936-3710100</p>    | <p>Bearing remover set, 20 mm<br/>07936-3710600</p>  | <p>Remover weight<br/>07741-0010201</p>  <p>or 07936-371020A (U.S.A. only)</p> |
| <p>Driver<br/>07749-0010000</p>                    | <p>Attachment, 42 x 47 mm<br/>07746-0010300</p>       | <p>Attachment, 52 x 55 mm<br/>07746-0010400</p>                                |
| <p>Attachment, 62 x 68 mm<br/>07746-0010500</p>  | <p>Attachment, 42 x 47 mm<br/>07746-0010300</p>     | <p>Pilot, 20 mm<br/>07746-0040500</p>                                        |
| <p>Pilot, 25 mm<br/>07746-0040600</p>            | <p>Pilot, 28 mm<br/>07746-0041100</p>               |   |



### TROUBLESHOOTING

#### Hard to shift

- Improper clutch operation
- Incorrect engine oil weight
- Bent shift fork
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam groove
- Bent gearshift spindle

#### Transmission jumps out of gear

- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Broken shift drum stopper arm spring
- Worn or bent shift forks
- Broken gearshift spindle return spring

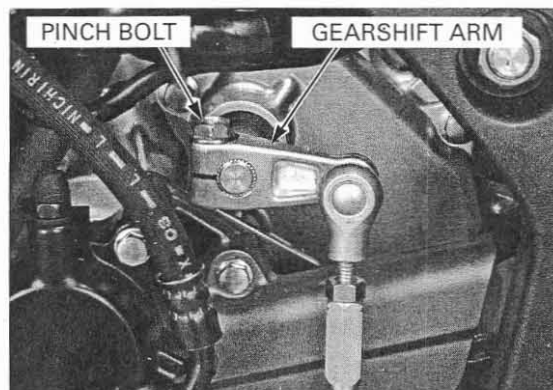
#### Excessive engine noise

- Worn or damaged transmission gear
- Worn or damaged transmission bearings

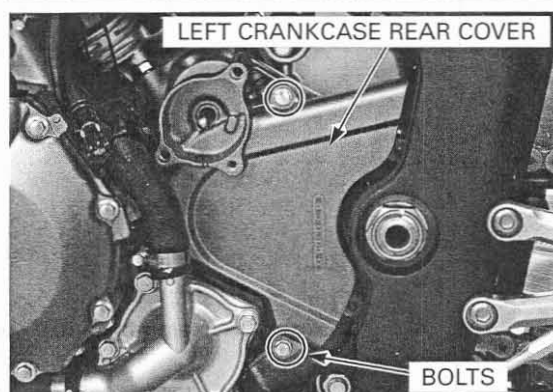
## GEARSHIFT SPINDLE

### REMOVAL

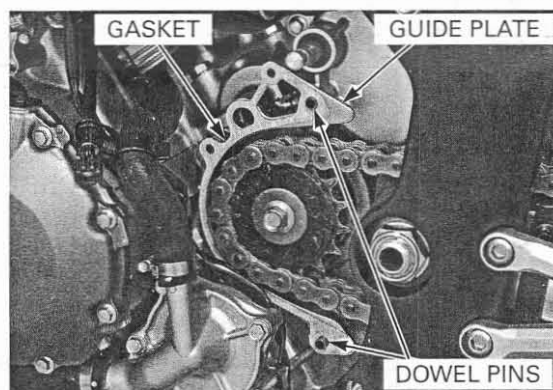
Remove the pinch bolt and disconnect the gear shift arm from the gear shift spindle.



Remove the clutch slave cylinder (page 10-13).  
Remove the bolts and left crankcase rear cover.

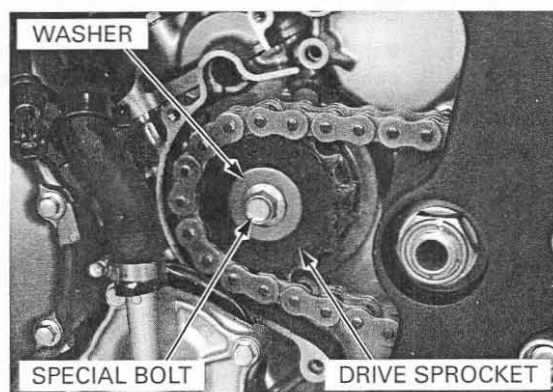


Remove the gasket, guide plate and dowel pins.



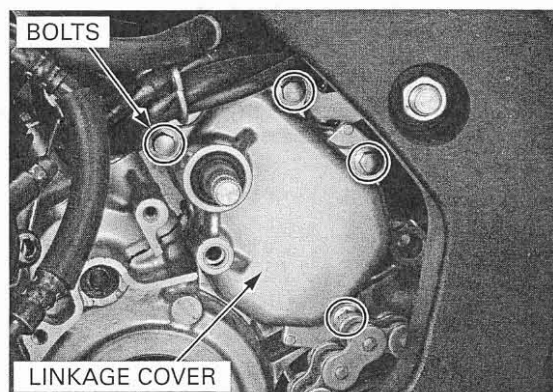
Loosen the rear axle nut.  
Turn the drive chain adjusting bolts make the drive chain slack fully.

Remove the drive sprocket special bolt, washer and drive sprocket.

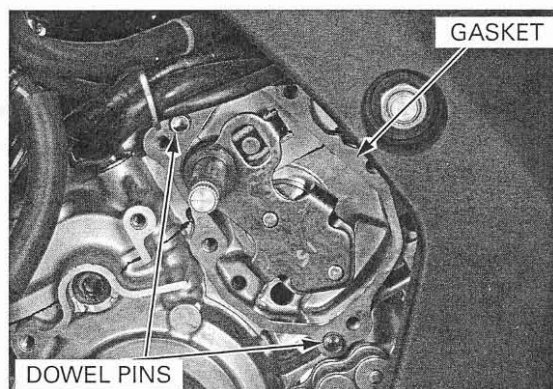


## TRANSMISSION/GEARSHIFT LINKAGE

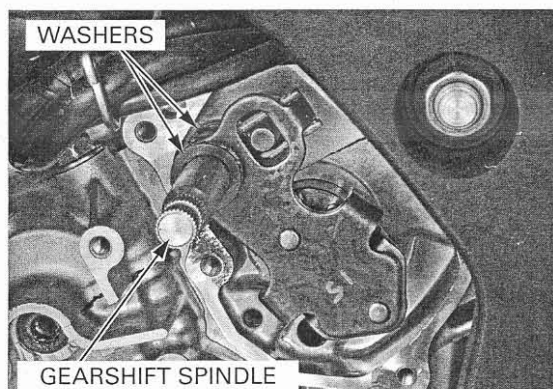
Remove the bolts and gearshift linkage cover.



Remove the gasket and dowel pins.



Remove the gearshift spindle and washers.

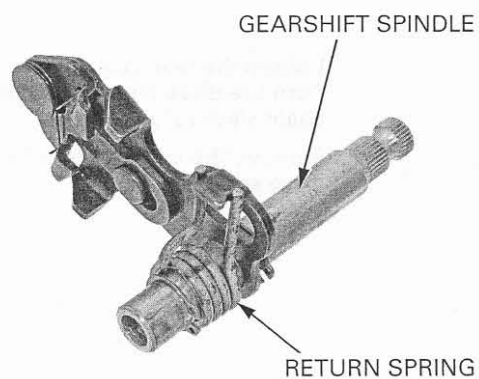


### INSPECTION

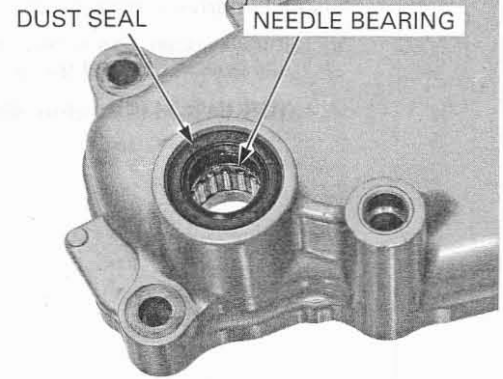
Check the gearshift spindle for wear, damage or bends.

Check the return spring for fatigue or damage.

If the snap rings are removed, install them with their chamfered side facing the thrust washers.

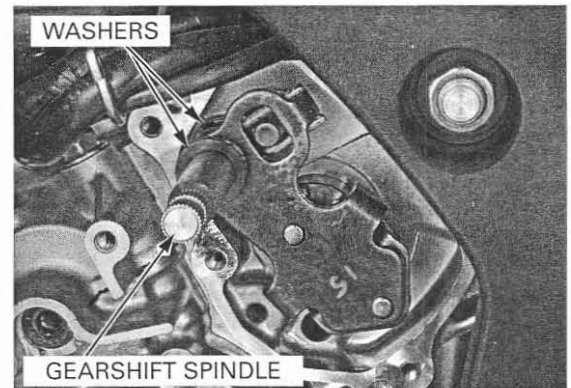


Check the dust seal for wear or damage.  
Check the needle bearing for wear or damage.

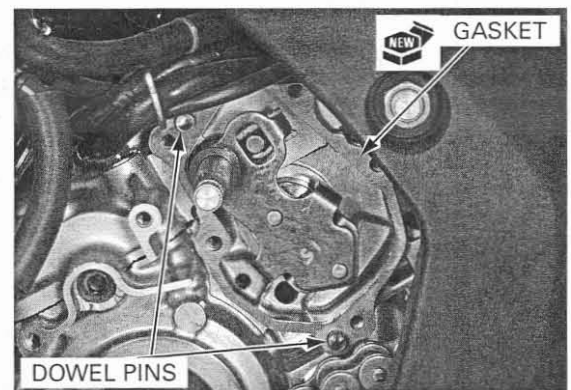


## INSTALLATION

Install the gearshift spindle and washers.



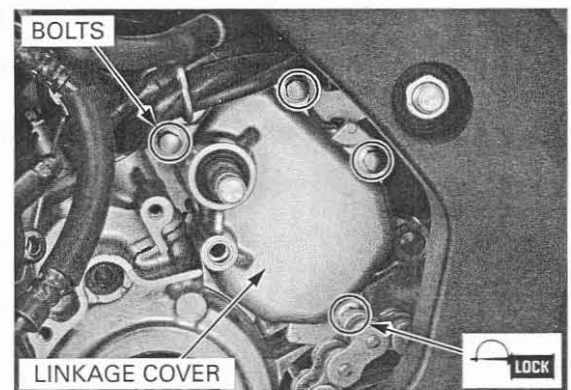
Install a dowel pins and new gasket.



Install the gearshift linkage cover being careful not to damage the oil seal lips.

*Apply a locking agent to the threads of the bolt indicated.*

Install and tighten the linkage cover bolts.

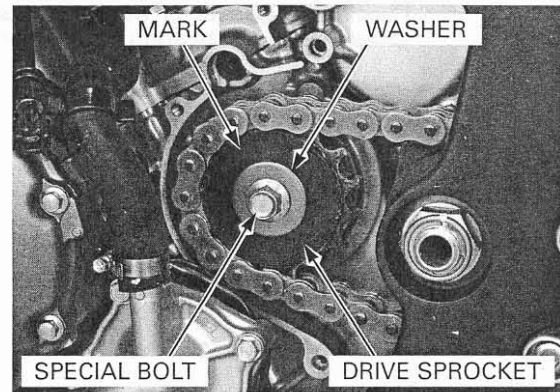


## TRANSMISSION/GEARSHIFT LINKAGE

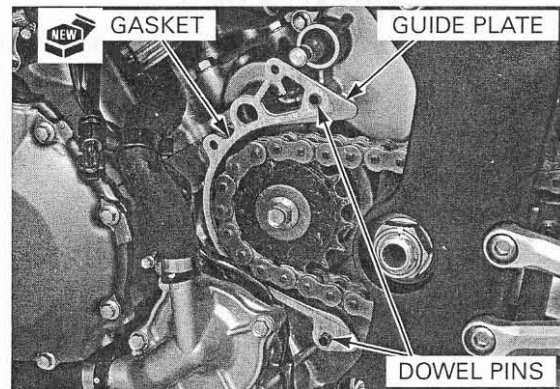
Install the drive sprocket with its mark facing out.

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

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

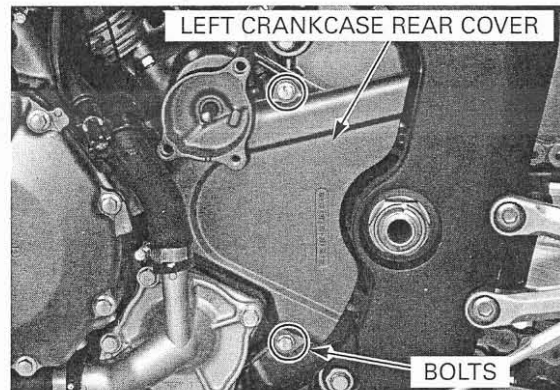


Install the dowel pins, guide plate and new gasket.



Install the left crankcase rear cover and tighten the mounting bolts.

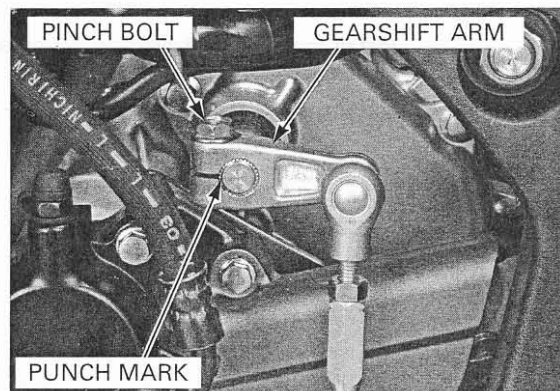
Install the clutch slave cylinder (page 10-13).



Install the gearshift arm to the gearshift spindle, while aligning its slit with the punch mark onto the spindle.

Install the gearshift arm to the gearshift spindle, tighten the pinch bolt.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

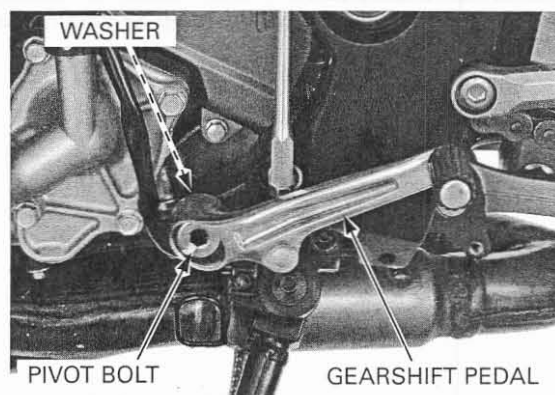




If the gearshift pedal has been removed, install the washer, gearshift pedal and pivot bolt onto the frame.

Tighten the pivot bolt to the specified torque.

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



## TRANSMISSION

### REMOVAL

Remove the following:

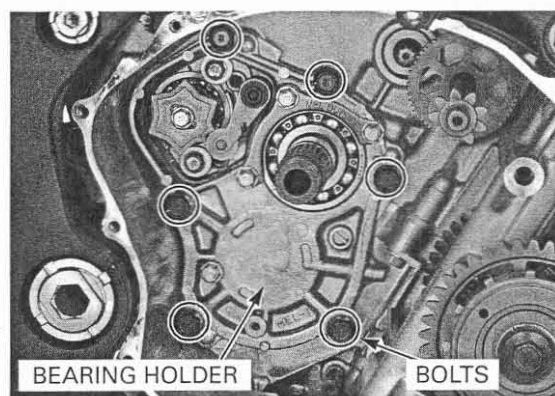
- Right crankcase cover (page 10-15)
- Clutch (page 10-16)
- Oil pump drive sprocket/chain/driven sprocket (page 10-19)
- Drive sprocket (page 12-7)

*Replace the transmission bearing holder and crankcase as a set.*

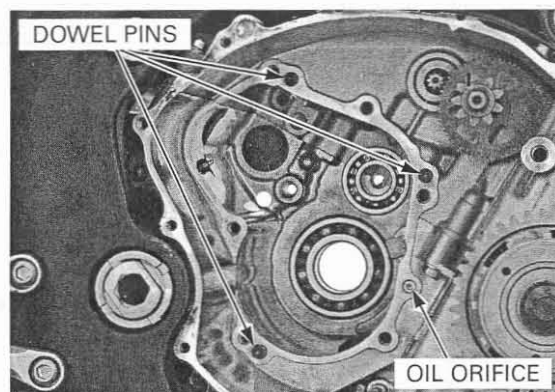
Remove the transmission bearing holder mounting bolts.

*Be careful not to fall the oil orifice into the crankcase.*

Pull out the bearing holder/transmission assembly from the crankcase.

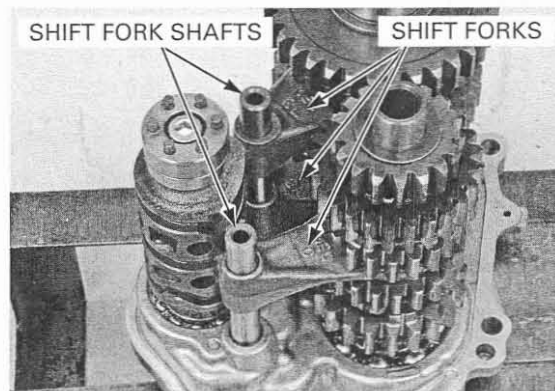


Remove the dowel pins and oil orifice.



### DISASSEMBLY

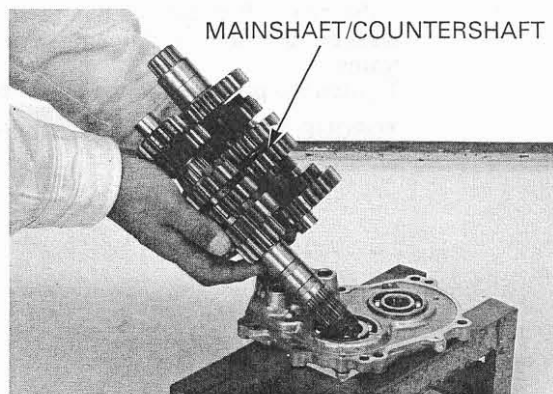
Remove the shift fork shafts and shift forks.



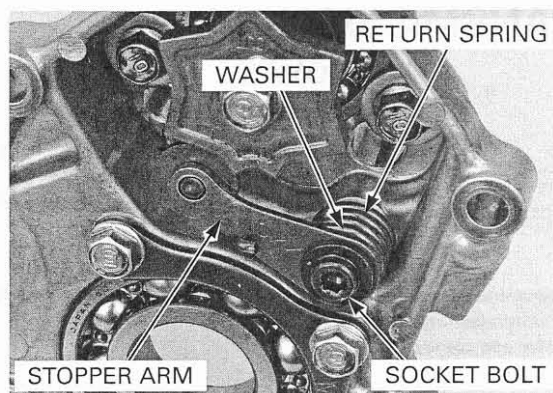


## TRANSMISSION/GEARSHIFT LINKAGE

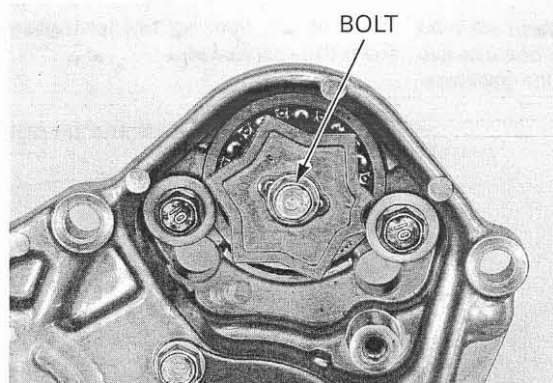
Remove the mainshaft and countershaft assembly.



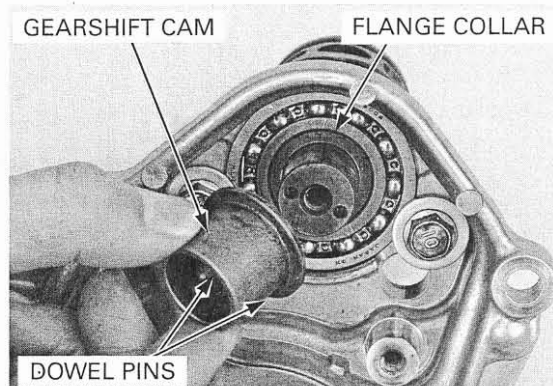
Remove the socket bolt, stopper arm, return spring and washer.



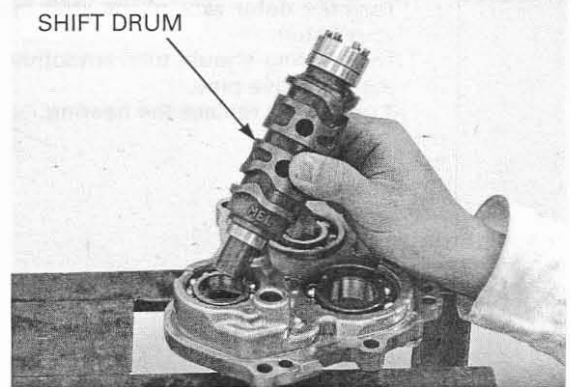
Remove the gearshift cam bolt.



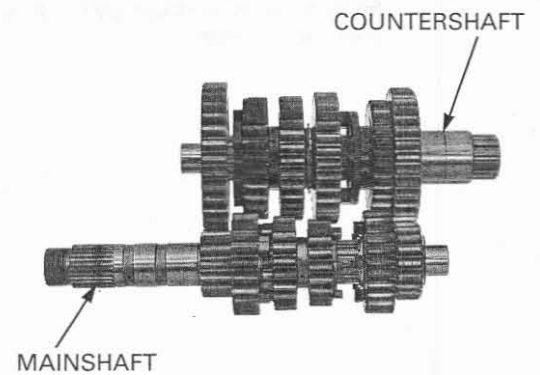
Remove the gearshift cam and dowel pins.  
Remove the flange collar.



Remove the shift drum from the bearing holder.



Disassemble the mainshaft and countershaft assembly.



### INSPECTION

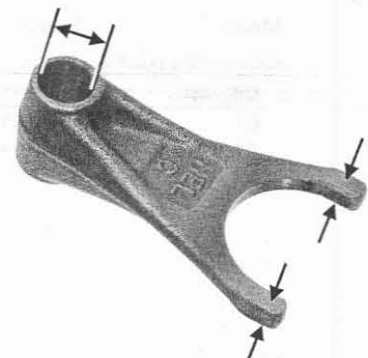
Check the shift fork guide pin for abnormal wear or damage

Measure the shift fork I.D.

**SERVICE LIMIT: 12.03 mm (0.474 in)**

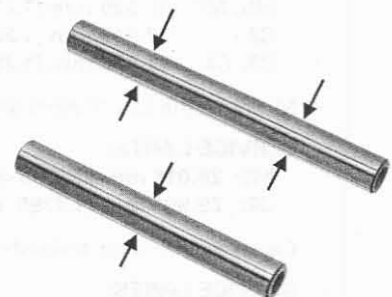
Measure the shift fork claw thickness.

**SERVICE LIMIT: 5.9 mm (0.23 in)**



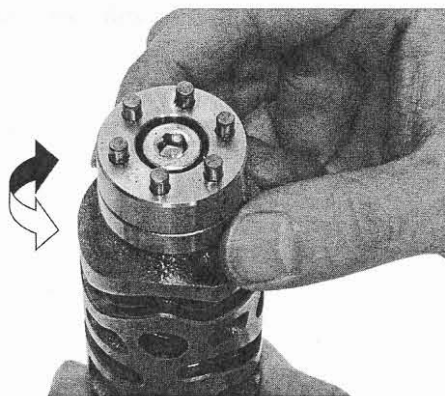
Measure the shift fork shaft O.D.

**SERVICE LIMIT: 11.95 mm (0.470 in)**

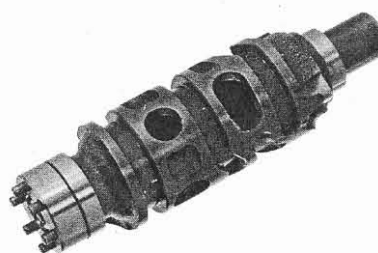


## TRANSMISSION/GEARSHIFT LINKAGE

Turn the outer race of the shift drum bearing with your finger.  
The bearing should turn smoothly and freely without excessive play.  
If necessary replace the bearing.



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

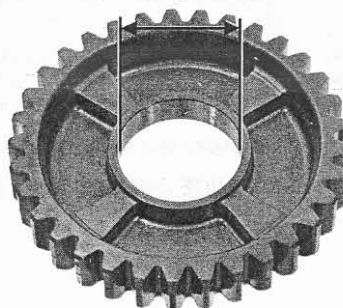


Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.

Measure the I.D. of each gear.

### SERVICE LIMITS:

M5, M6: 31.04 mm (1.222 in)  
C1: 28.04 mm (1.104 in)  
C2, C3, C4: 33.04 mm (1.301 in)



Measure the O.D. of each gear bushing.

### SERVICE LIMITS:

M5, M6: 30.935 mm (1.2179 in)  
C2: 32.935 mm (1.2967 in)  
C3, C4: 32.930 mm (1.2964 in)

Measure the I.D. of each gear bushing.

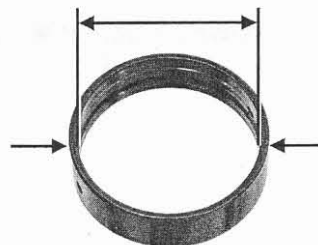
### SERVICE LIMITS:

M5: 28.016 mm (1.1030 in)  
C2: 29.960 mm (1.1795 in)

Calculate the gear-to-bushing clearance.

### SERVICE LIMITS:

M5, M6: 0.10 mm (0.004 in)  
C2: 0.10 mm (0.004 in)  
C3, C4: 0.11 mm (0.004 in)



Check the gear shifter groove for abnormal wear or damage.



Check the mainshaft and countershaft for abnormal wear or damage.

Measure the mainshaft O.D. at the M5 gear.

**SERVICE LIMIT: 27.957 mm (1.1007 in)**

Measure the countershaft O.D. at the C2 gear.

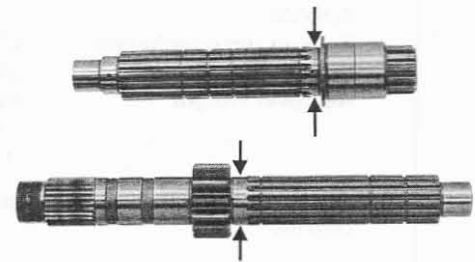
**SERVICE LIMIT: 29.960 mm (1.1795 in)**

Calculate the gear bushing-to-shaft clearance.

**SERVICE LIMITS:**

**M5: 0.06 mm (0.002 in)**

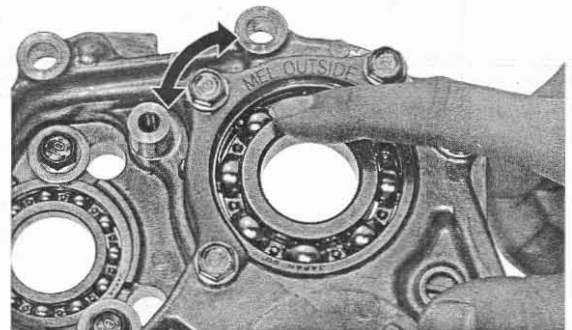
**C2: 0.06 mm (0.002 in)**



Turn the outer race of each transmission bearing with your finger.

The bearing should turn smoothly and freely without excessive play.

If necessary replace the bearing.

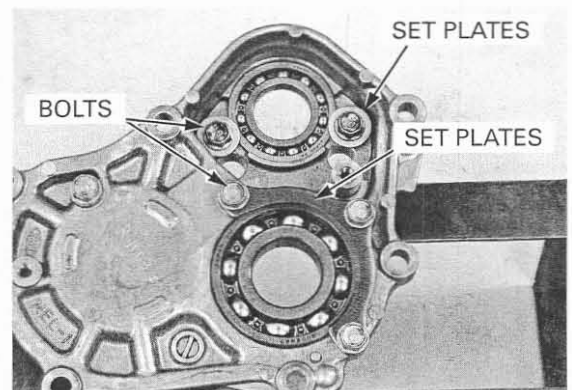


### TRANSMISSION BEARING REPLACEMENT

*Replace the transmission bearing holder and crankcase as a set.*

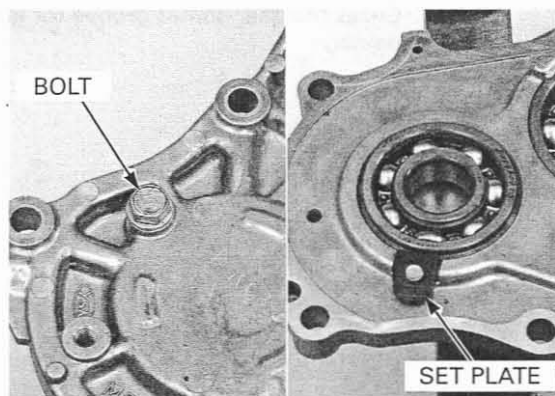
Remove the bolts and shift drum bearing set plates.

Remove the bolts and mainshaft bearing set plate.



## TRANSMISSION/GEARSHIFT LINKAGE

Remove the bolt and countershaft bearing set plate.

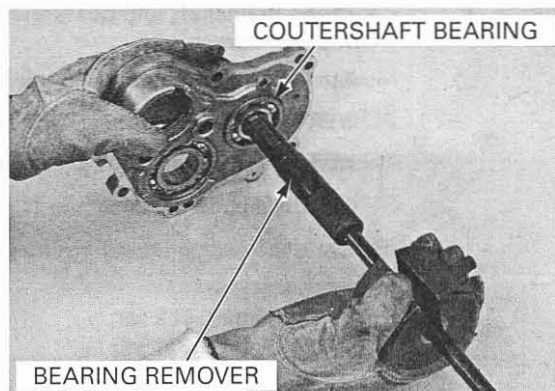


Remove the countershaft bearing using the special tools.

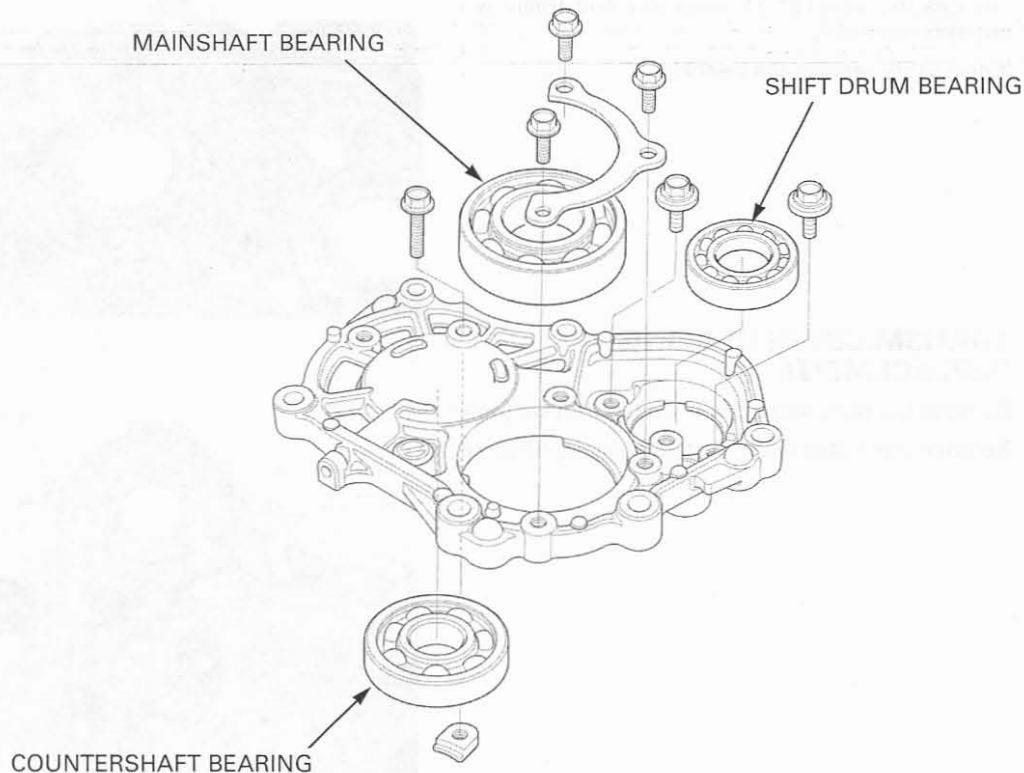
### TOOLS:

|                        |  |
|------------------------|--|
| Bearing remover handle | 07936-3710100                                      |
| Bearing remover set    | 07936-3710600                                      |
| Remover weight         | 07741-0010201 or<br>07936-371020A<br>(U.S.A. only) |

Drive out the countershaft bearing and shift drum bearing.



### Bearing Locations



Drive each bearing into the bearing holder using the special tools.

## TOOLS:

### Mainshaft bearing:

|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 62 x 68 mm | 07746-0010500 |
| Pilot, 28 mm           | 07746-0041100 |

### Countershaft bearing:

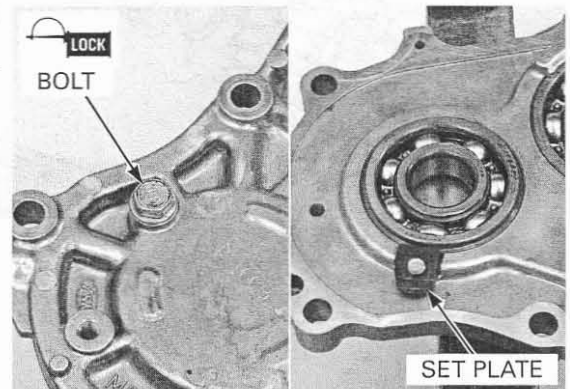
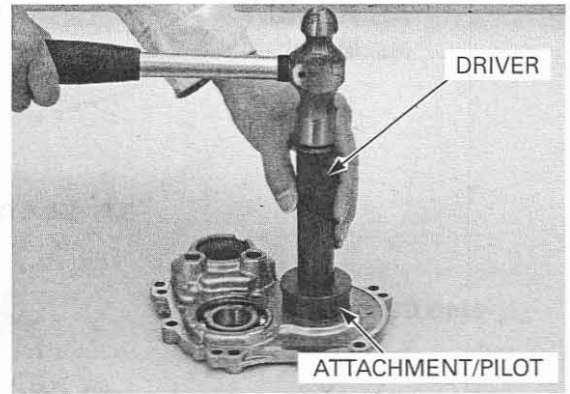
|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 52 x 55 mm | 07746-0010400 |
| Pilot, 20 mm           | 07746-0040500 |

### Shift drum bearing:

|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 42 x 47 mm | 07746-0010300 |
| Pilot, 25 mm           | 07746-0040600 |

Apply a locking agent to the countershaft bearing set plate bolt threads.  
Install the set plate and tighten the bolt to the specified torque.

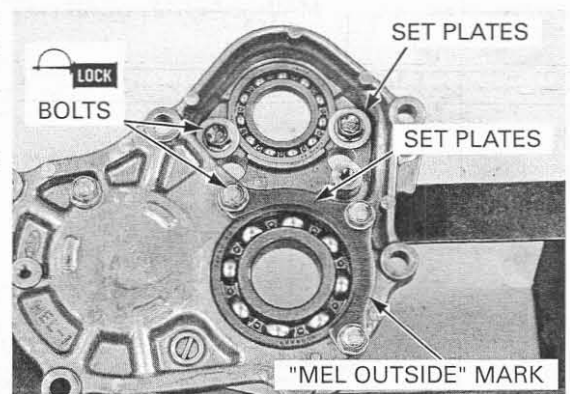
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Apply a locking agent to the mainshaft bearing set plate bolt threads and shift drum bearing set plate bolt threads.

Install the mainshaft bearing set plate with its "MEL OUTSIDE" mark facing out.  
Install and tighten the bearing set plate bolts to the specified torque.

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

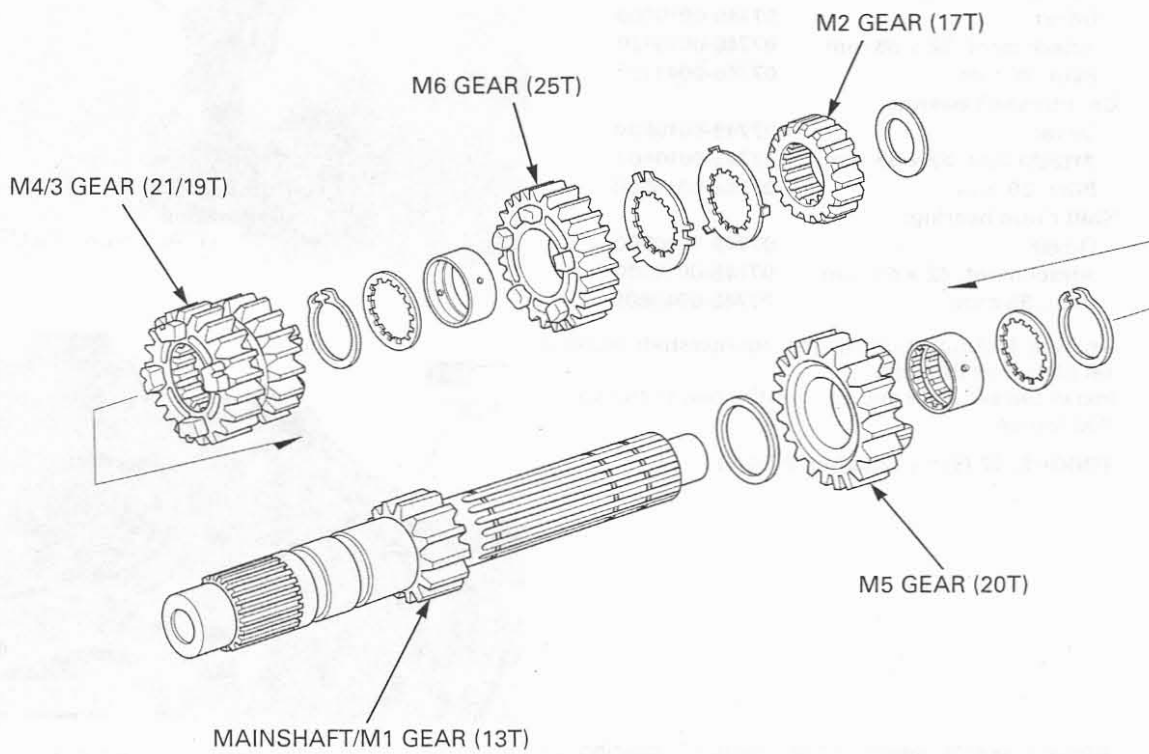




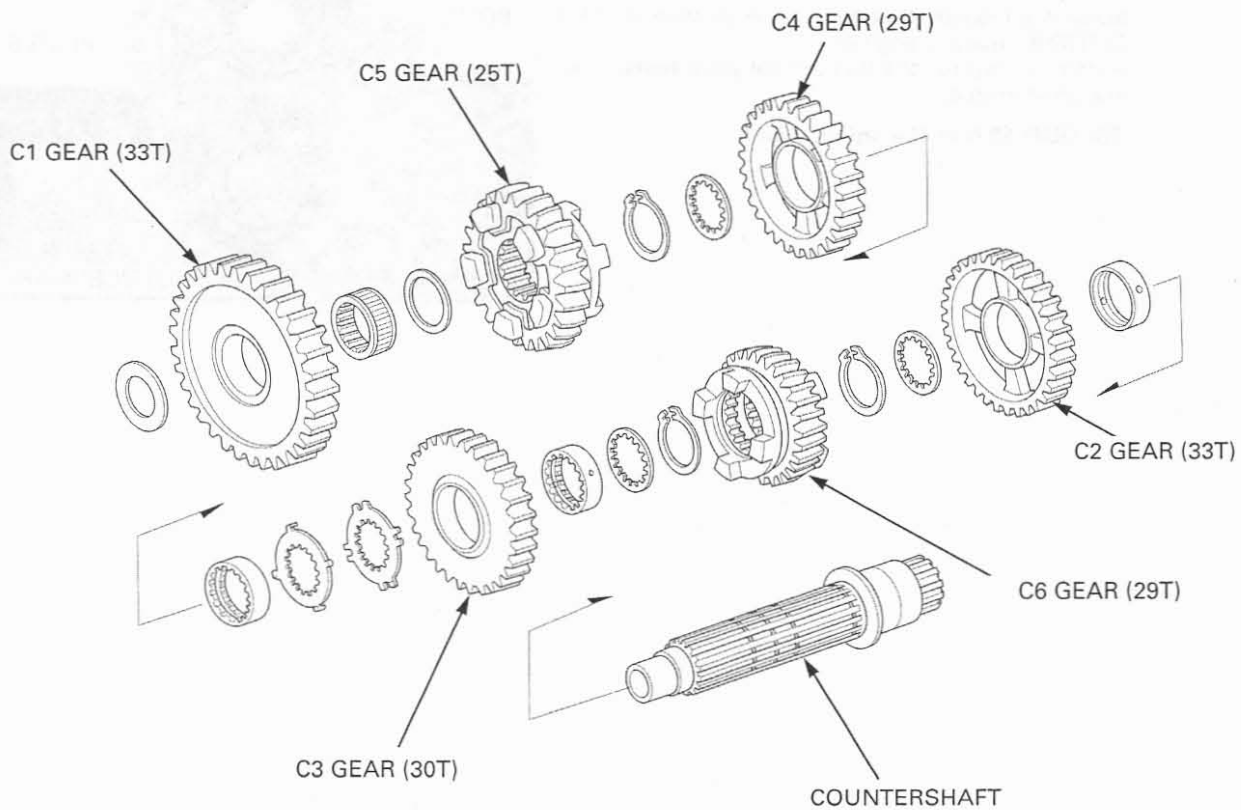
## TRANSMISSION/GEARSHIFT LINKAGE

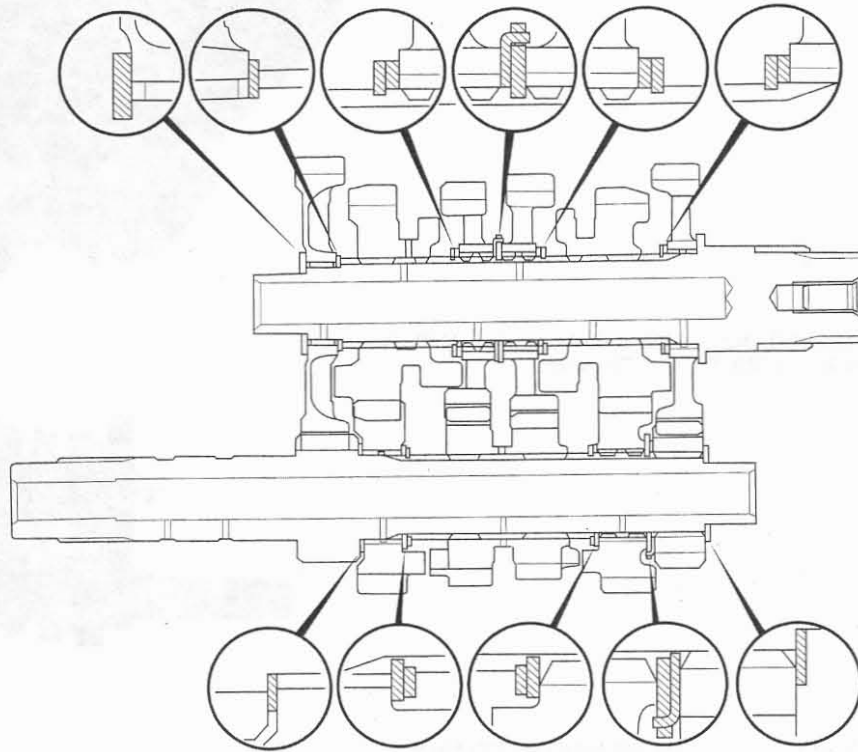
### ASSEMBLY

Mainshaft:



Countershaft:

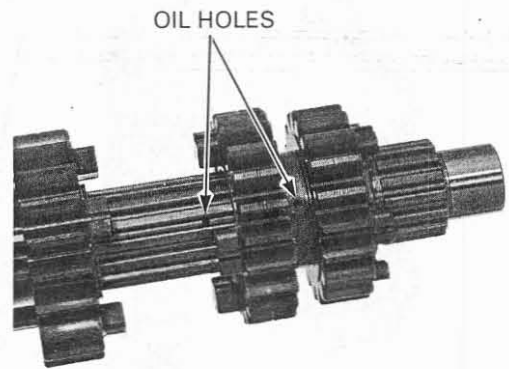




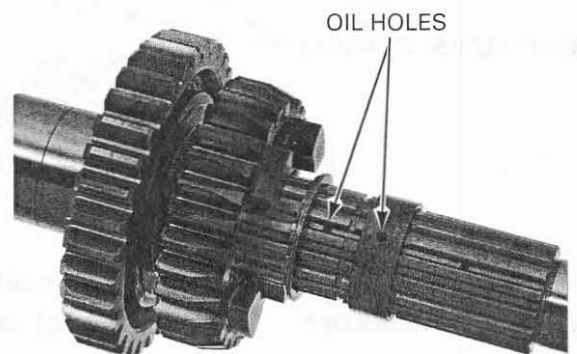
Coat each gear with clean engine oil and check for smooth movement.

Assemble the transmission gear and shafts.

- Always install the thrust washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap ring so that its end gap aligns with the groove in the splines.
- Make sure that the snap ring is fully seated in the shaft groove after installing it.

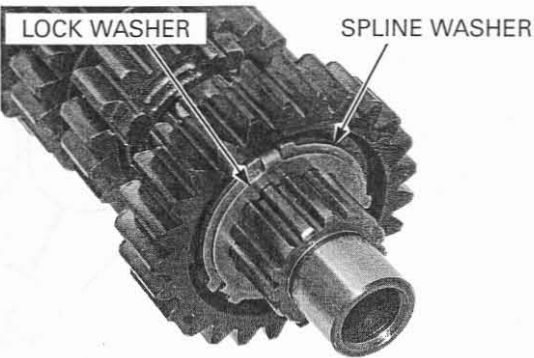


Align the oil holes between the shaft, gear and collar.

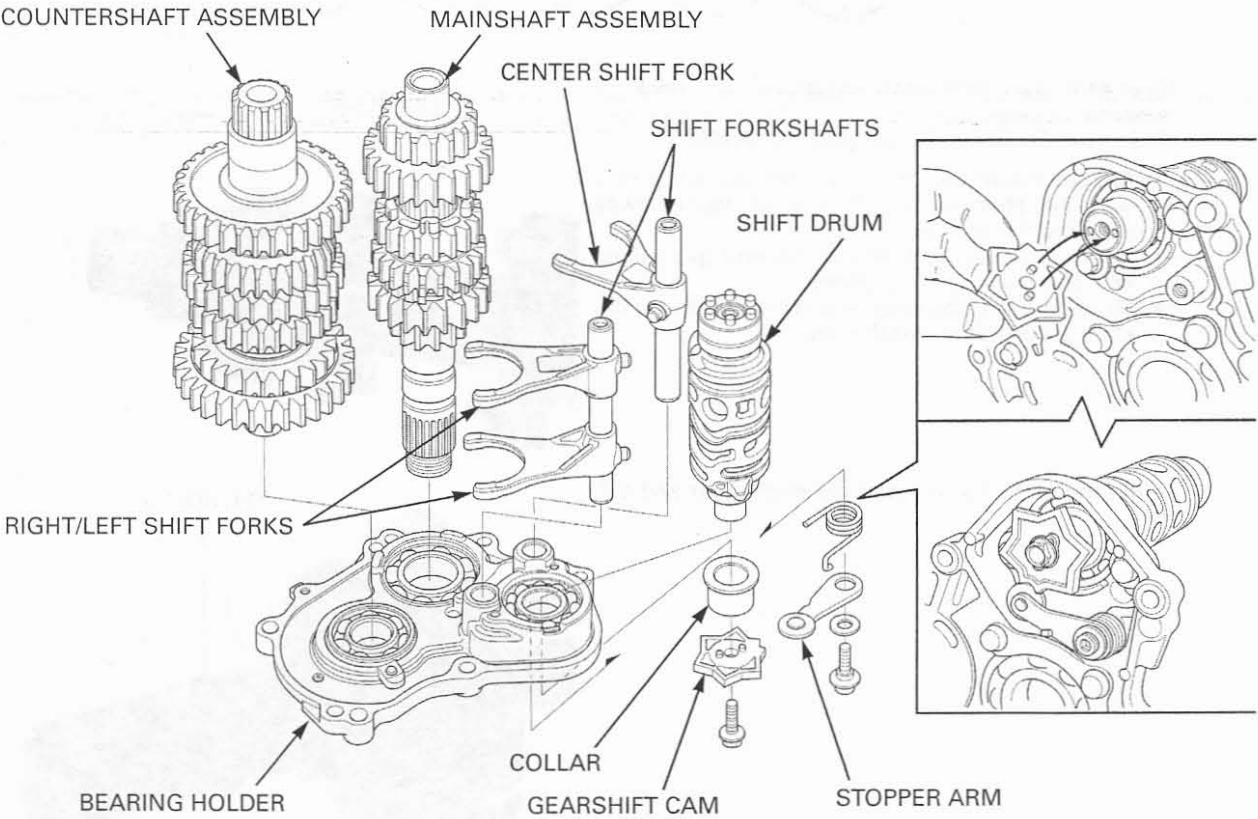
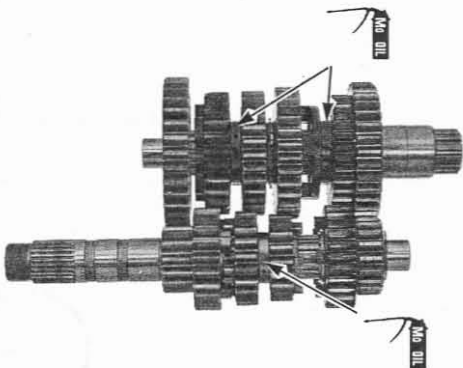


TRANSMISSION/GEARSHIFT LINKAGE

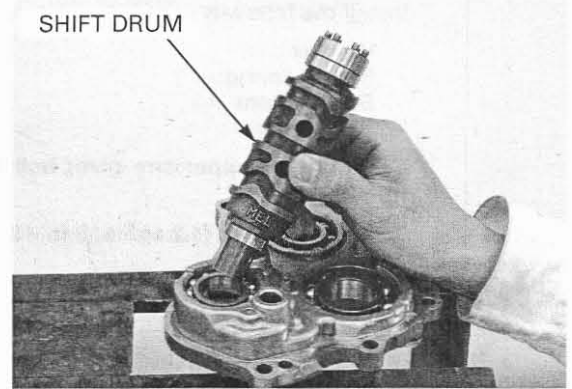
Align the lock washer tabs with the spline washer grooves.



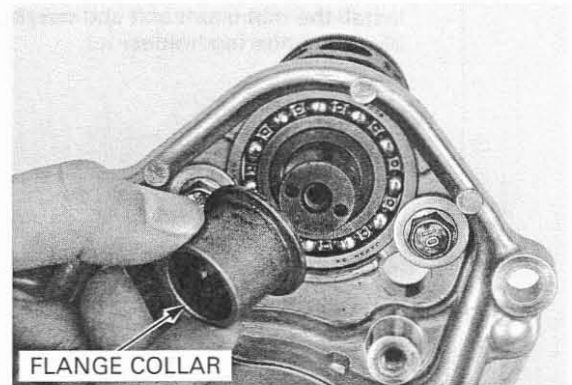
Apply molybdenum oil solution to the shift fork grooves in the M3, C4 and C5 gear.



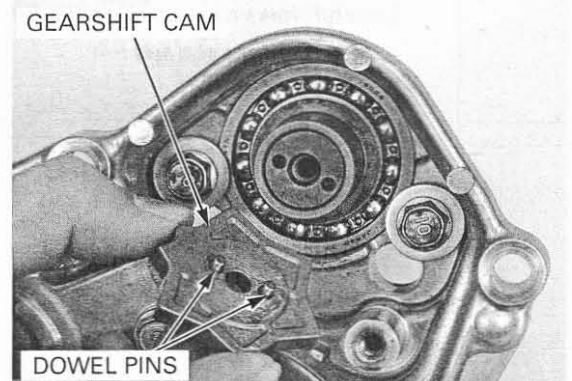
Install the shift drum into the bearing holder.



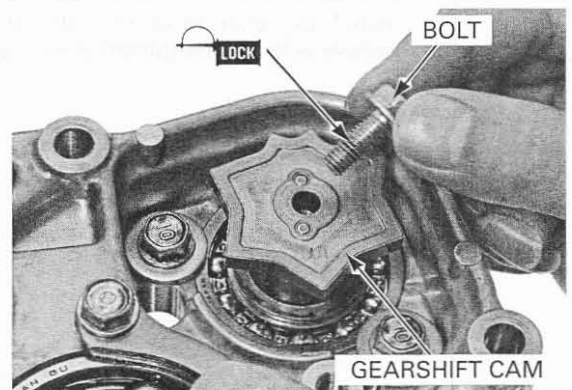
Install the flange collar with it flange facing in.



Install the dowel pins onto the gearshift cam.  
Install the gearshift cam onto the gearshift drum.



Apply a locking agent to the shift drum cam flange bolt threads.  
Tighten the bolt securely.



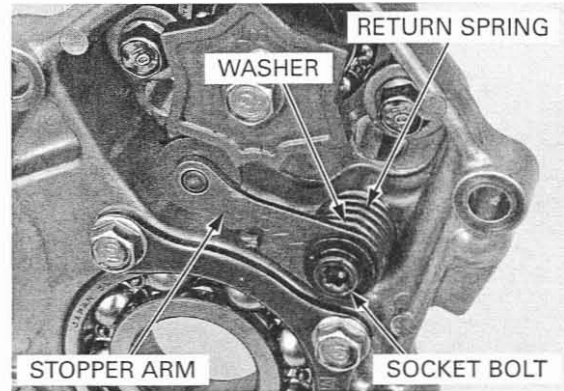
## TRANSMISSION/GEARSHIFT LINKAGE

Install the following:

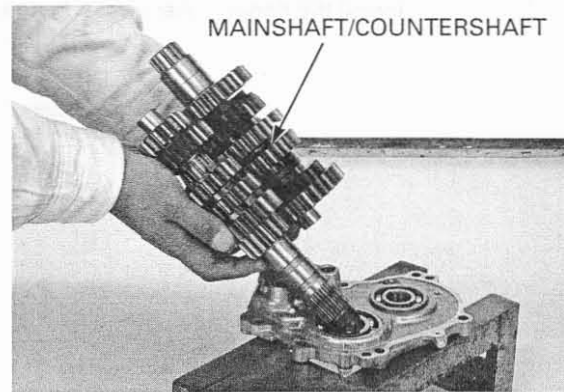
- Washer
- Return spring
- Stopper arm
- Pivot bolt

Tighten the stopper arm pivot bolt to the specified torque.

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

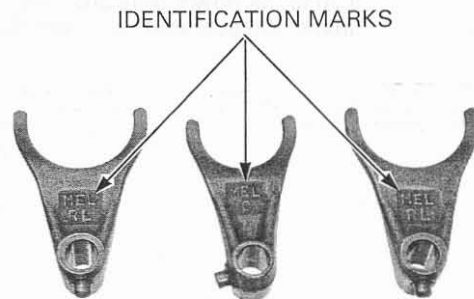


Install the mainshaft and countershaft as an assembly to the bearing holder.

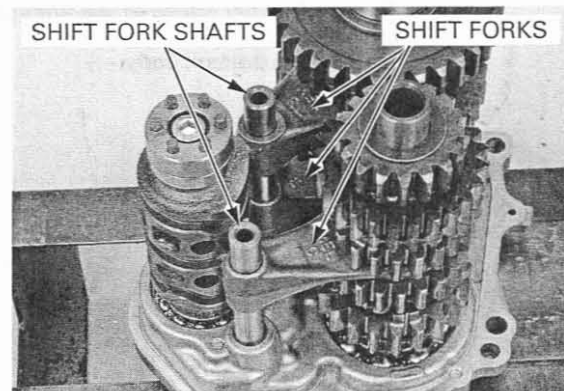


The shift forks have location marks:

- "RL" for right and left
- "C" for center



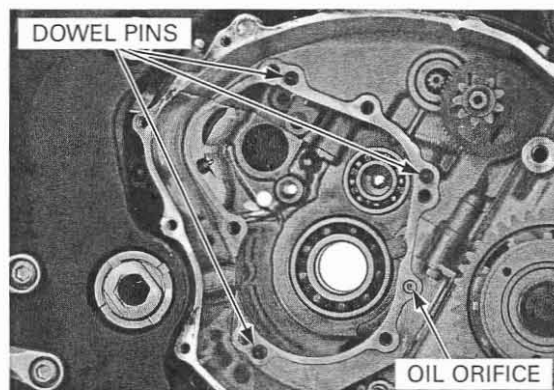
Install the shift forks into the shift drum guide groove with the identification marks facing up.



**INSTALLATION**

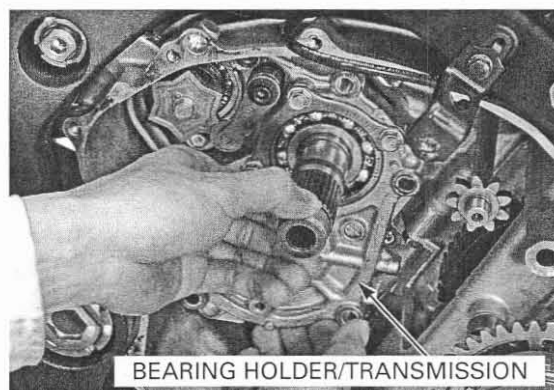
Install the oil orifice with its small I.D. side facing in.

Install the dowel pins.



Turn the shift drum while turning the mainshaft, position the transmission into neutral.

Install the bearing holder/transmission assembly into the crankcase.

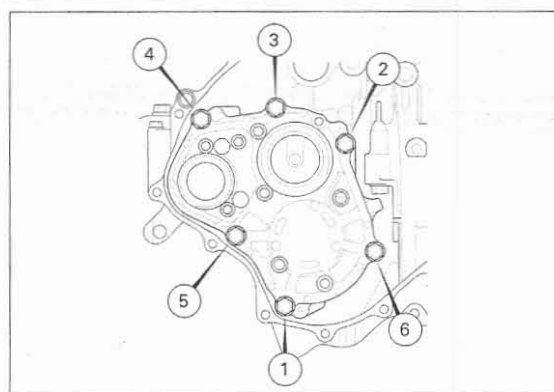


Install and tighten the bearing holder mounting bolts to the specified torque.

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

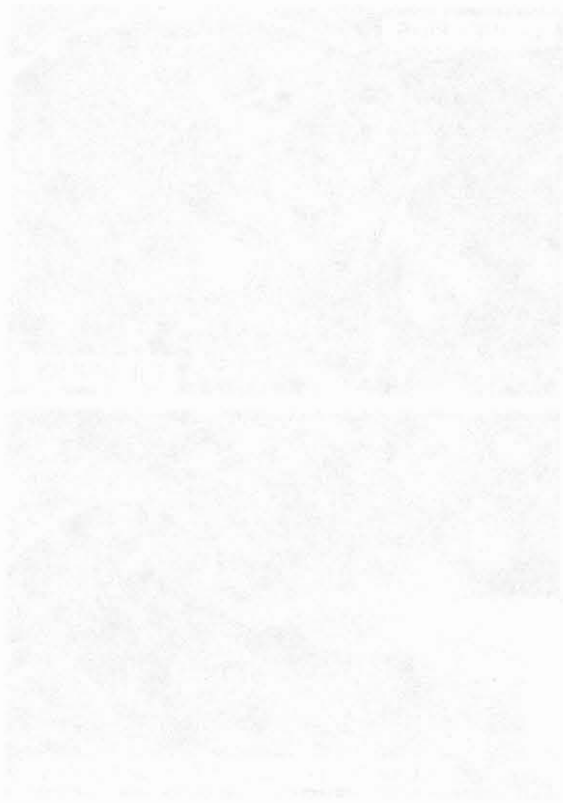
Install the following:

- Drive sprocket (page 12-9)
- Clutch (page 10-16)
- Right crankcase cover (page 10-34)





MEMO

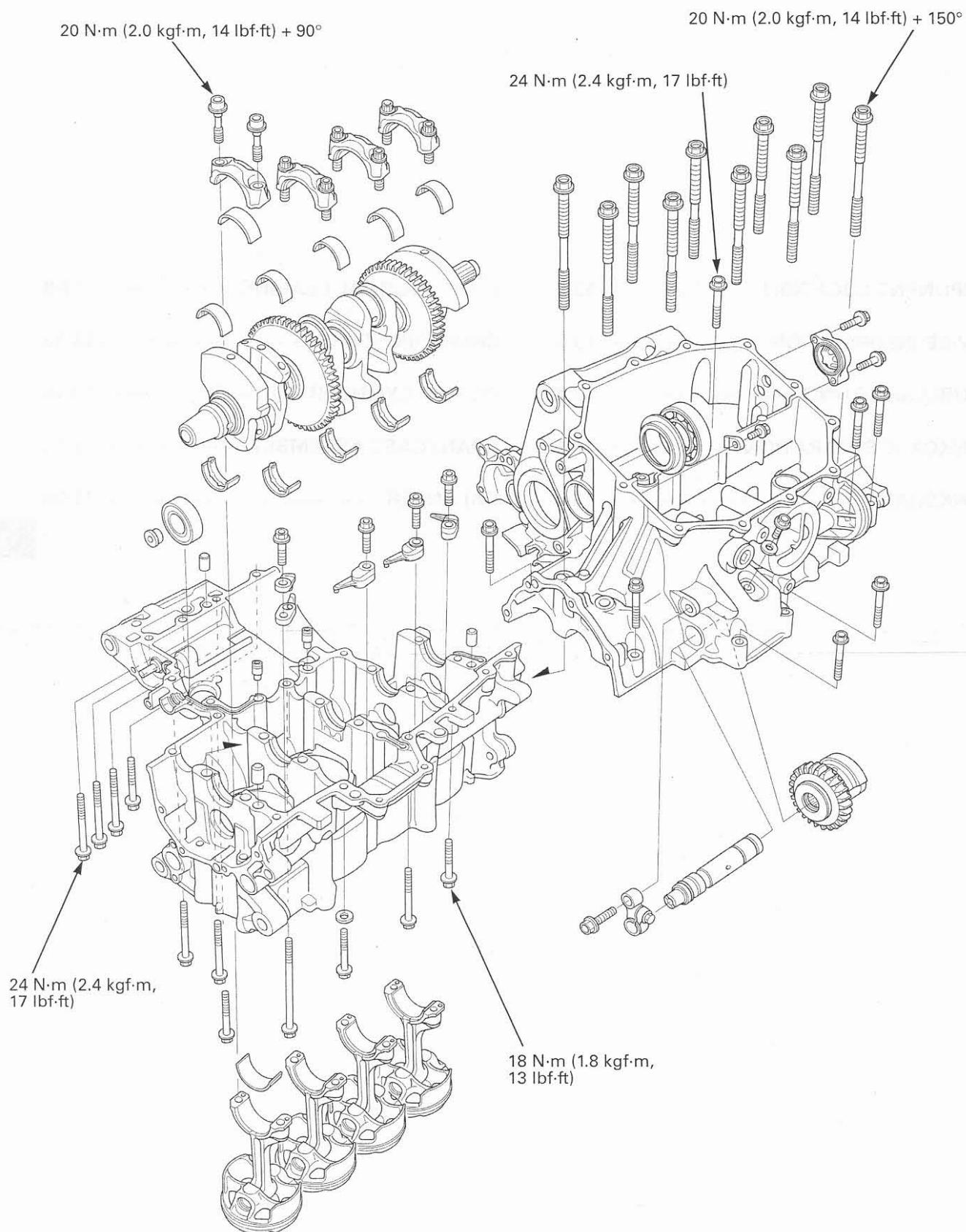


## 13. CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

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|                           |      |                           |       |
|---------------------------|------|---------------------------|-------|
| COMPONENT LOCATION .....  | 13-2 | MAIN JOURNAL BEARING..... | 13-9  |
| SERVICE INFORMATION ..... | 13-3 | CRANKPIN BEARING .....    | 13-12 |
| TROUBLESHOOTING .....     | 13-4 | PISTON/CYLINDER .....     | 13-15 |
| CRANKCASE SEPARATION..... | 13-5 | CRANKCASE ASSEMBLY .....  | 13-21 |
| CRANKSHAFT .....          | 13-7 | BALANCER.....             | 13-28 |

## COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- The crankcase must be separated to service the following:
  - Crankshaft (page 13-7)
  - Piston/connecting rod/cylinder (page 13-15)
- The following components must be removed before separating the crankcase:
  - Engine (page 8-4)
  - Clutch (page 10-16)
  - Cylinder head (page 9-13)
  - Flywheel (page 11-5)
  - Gearshift linkage/transmission (page 12-11)
  - Oil pan (page 5-6), oil pump (page 5-8) and oil cooler (page 5-13)
  - Starter clutch (page 10-28)
  - Starter motor (page 19-6)
  - Water pump (page 7-17)
- Replace the crankcase and transmission bearing holder as an assembly.
- Be careful not to damage the crankcase mating surfaces when servicing.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.
- The crankcase must be separated to service the crankshaft, cylinder and piston/connecting rod. Refer to procedures for crankcase separation (page 13-5) and assembly (page 13-21).
- Mark and store the connecting rods, bearing caps and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with a plastigauge. Incorrect oil clearance can cause major engine damage.
- Clean the oil jets in the upper crankcase with compressed air before installing the pistons

### SPECIFICATIONS

Unit: mm (in)

| ITEM                                   |                                       | STANDARD                          | SERVICE LIMIT                   |
|--|---------------------------------------|-----------------------------------|---------------------------------|
| Crankshaft                             | Connecting rod side clearance         | 0.05 – 0.20 (0.002 – 0.008)       | 0.25 (0.098)                    |
|  | Crankpin bearing oil clearance        | 0.030 – 0.052 (0.0012 – 0.0020)   | 0.06 (0.002)                    |
|  | Main journal bearing oil clearance    | 0.019 – 0.037 (0.0007 – 0.0015)   | 0.05 (0.002)                    |
|  | Runout                                | –                                 | 0.05 (0.002)                    |
| Piston, piston rings                   | Piston O.D. at 4.0 (0.16) from bottom | 74.960 – 74.980 (2.9512 – 2.9520) | 74.895 (2.9486)                 |
|  | Piston pin bore I.D.                  | 17.002 – 17.008 (0.6694 – 0.6696) | 17.030 (0.6705)                 |
|  | Piston pin O.D.                       | 16.994 – 17.000 (0.6690 – 0.6693) | 16.980 (0.6685)                 |
|  | Piston-to-piston pin clearance        | 0.002 – 0.014 (0.0001 – 0.0006)   | 0.04 (0.002)                    |
|  | Piston ring end gap                   | Top                               | 0.22 – 0.32 (0.009 – 0.013)     |
|  |                                       | Second                            | 0.48 – 0.63 (0.019 – 0.025)     |
|  |                                       | Oil (side rail)                   | 0.2 – 0.7 (0.01 – 0.03)         |
|  | Piston ring-to-ring groove clearance  | Top                               | 0.050 – 0.085 (0.0020 – 0.0033) |
|  |                                       | Second                            | 0.015 – 0.050 (0.0006 – 0.0020) |
| Cylinder                               | I.D.                                  | 75.000 – 75.015 (2.9528 – 2.9533) | 75.15 (2.959)                   |
|  | Out of round                          | –                                 | 0.10 (0.004)                    |
|  | Taper                                 | –                                 | 0.10 (0.004)                    |
|  | Warpage                               | –                                 | 0.10 (0.004)                    |
| Cylinder-to-piston clearance           |                                       | 0.020 – 0.055 (0.0008 – 0.0022)   | 0.10 (0.004)                    |
| Connecting rod small end I.D.          |                                       | 17.030 – 17.042 (0.6705 – 0.6709) | 17.048 (0.6712)                 |
| Connecting rod-to-piston pin clearance |                                       | 0.030 – 0.046 (0.0012 – 0.0018)   | 0.07 (0.003)                    |

## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

### TORQUE VALUES

|                                    |                               |  |
|------------------------------------|-------------------------------|--|
| Crankcase 7 mm bolt                | 18 N·m (1.8 kgf·m, 13 lbf·ft) |  |
| 8 mm bolt                          | 24 N·m (2.4 kgf·m, 17 lbf·ft) |  |
| 9 mm bolt (main journal bolt)      | See page 13-21                | Apply oil to the threads and seating surface |
| Lower crankcase sealing bolt       | 59 N·m (6.0 kgf·m, 43 lbf·ft) | Apply a locking agent to the threads         |
| Lower crankcase socket bolt        | 12 N·m (1.2 kgf·m, 9 lbf·ft)  | Apply a locking agent to the threads         |
| Lower crankcase sealing bolt       | 29 N·m (3.0 kgf·m, 22 lbf·ft) | Apply a locking agent to the threads         |
| Lower crankcase socket bolt        | 23 N·m (2.3 kgf·m, 17 lbf·ft) | Apply a locking agent to the threads         |
| Connecting rod bolt (new bolt)     | See page 13-8                 | Apply oil to the threads and seating surface |
| Connecting rod bolt (retightening) | See page 13-12                | Apply oil to the threads and seating surface |

### TROUBLESHOOTING

#### Cylinder compression is too low, hard to starting or poor performance at low speed

- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

#### Cylinder compression too high, overheating or knocking

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

#### Excessive smoke

- Worn cylinder, piston or piston ring
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

#### Abnormal noise

- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings
- Worn main journal bearings
- Worn crankpin bearings

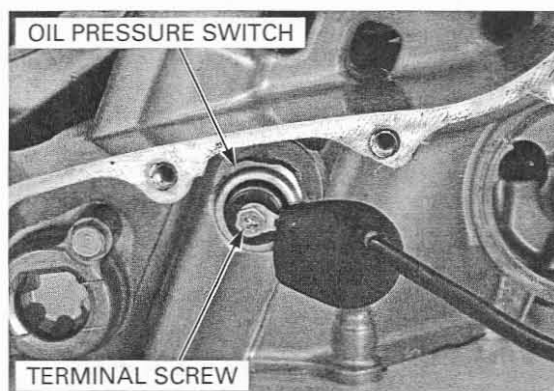
#### Engine vibration

- Excessive crankshaft runout
- Incorrect balancer timing

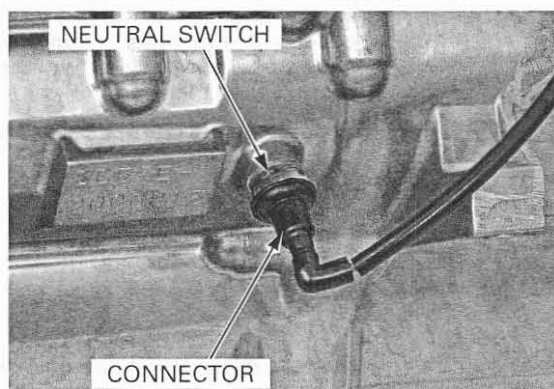
## CRANKCASE SEPARATION

Refer to Service Information See page 13-3 for removal of necessary parts before separating the crankcase.

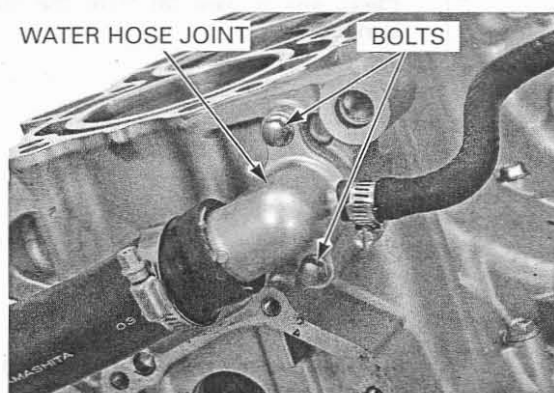
Remove the terminal screw and terminal eyelet from the oil pressure switch.



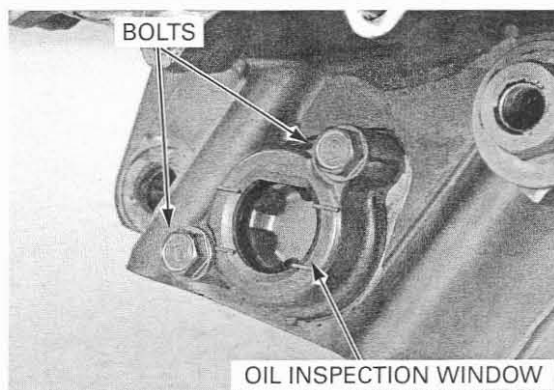
Disconnect the neutral switch connector, then remove the engine sub-harness.



Remove the bolts, water hose joint and O-ring.



Remove the bolts, oil inspection window and O-ring from the crankcase.



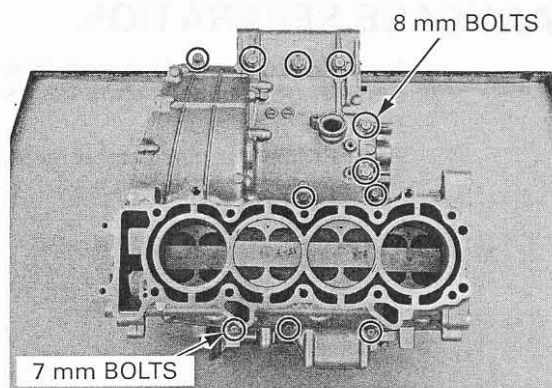


## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

Loosen the 7 mm bolts (six) and sealing washer in two to three steps.

Loosen the 8 mm bolts (five) in two to three steps.

Remove the 8 mm bolts, 7 mm bolts and sealing washer.

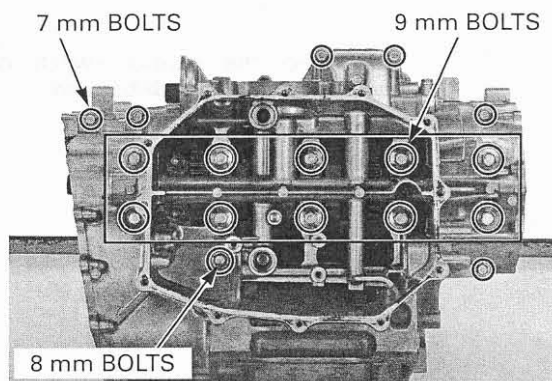


Place the engine upside down.

Loosen the 8 mm bolt and 7 mm bolts (six) in a crisscross pattern in two to three steps.

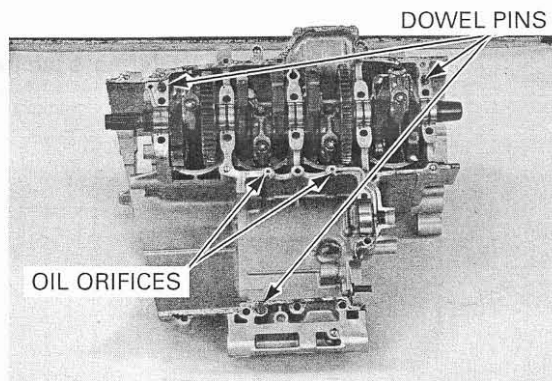
Loosen the 9 mm bolts (main journal bolts) in a criss-cross pattern in two to three steps, then remove the bolts.

Separate the lower crankcase from the upper crankcase.

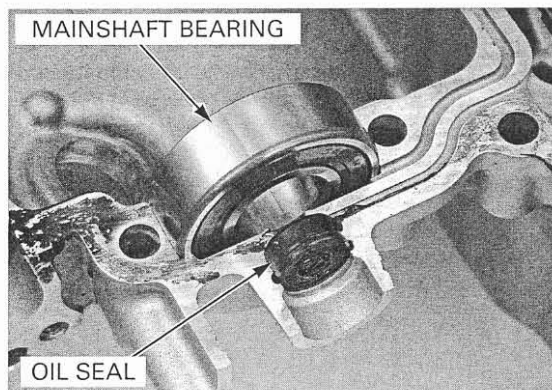


Remove the three dowel pins and two oil orifices.

Clean any sealant off from the crankcase mating surface.



Remove the mainshaft bearing and clutch lifter rod oil seal from the upper crankcase.



## CRANKSHAFT

### SIDE CLEARANCE INSPECTION

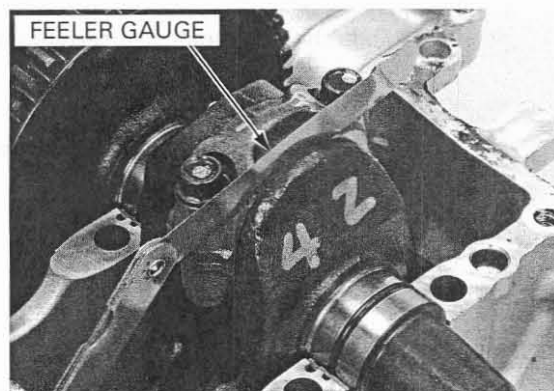
Separate the crankcase halves (page 13-5).

Measure the connecting rod side clearance.

**SERVICE LIMIT: 0.25 mm (0.098 in)**

If the clearance exceeds the service limit, replace the connecting rod.

Recheck and if still out of limit, replace the crankshaft.



### REMOVAL

#### NOTICE

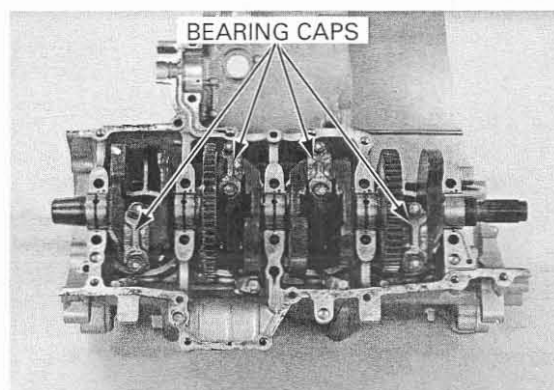
*Before removal, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod.*

Mark the bearing caps and bearings as you remove them to indicate the correct cylinder for reassembly.

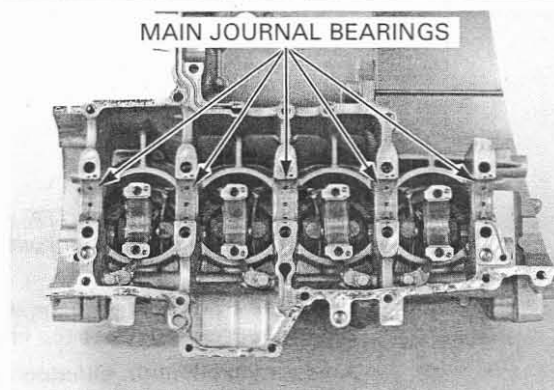
Remove the connecting rod bearing cap bolts and bearing caps.

Tap the side of the cap lightly if the bearing cap is hard to remove.

Position all the pistons at TDC (Top Dead Center), then remove the crankshaft.



Remove the main journal bearings from both the crankcase halves.

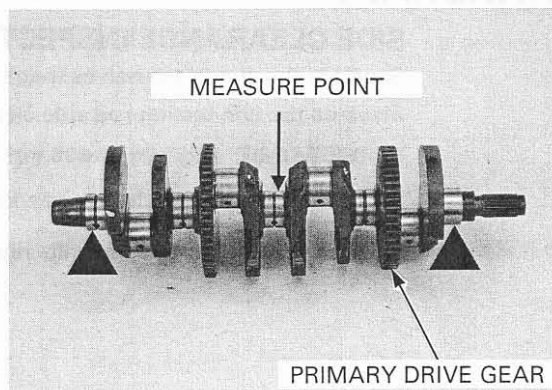


### INSPECTION

Support the crankshaft on both end journals.  
Set a dial gauge on the center main journal of the crankshaft.  
Rotate the crankshaft two revolutions and read the runout.

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

Check the primary drive gear teeth for abnormal wear or damage.

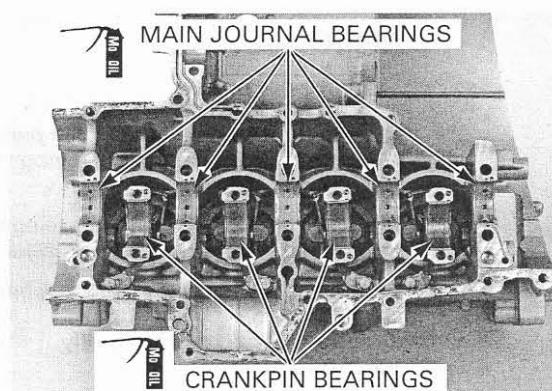


### INSTALLATION

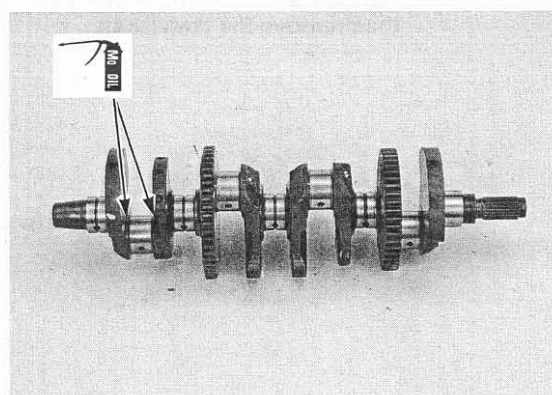
Apply molybdenum oil solution to the main journal bearing sliding surfaces on the upper crankcase and the crankpin bearing sliding surfaces on the connecting rods.

*The bearing tabs should be aligned with the grooves in the crankcase.*

Install the main journal bearings into the upper crankcase.



Apply molybdenum oil solution to the thrust surfaces of the crankshaft as shown.



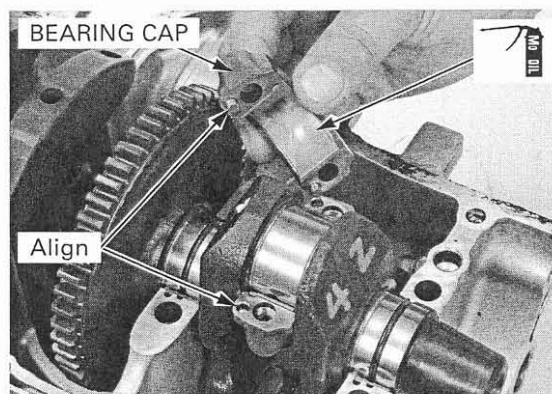
### NOTICE

*Position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod.*

Install the crankshaft onto the upper crankcase.  
Set the connecting rods onto the crankpins.

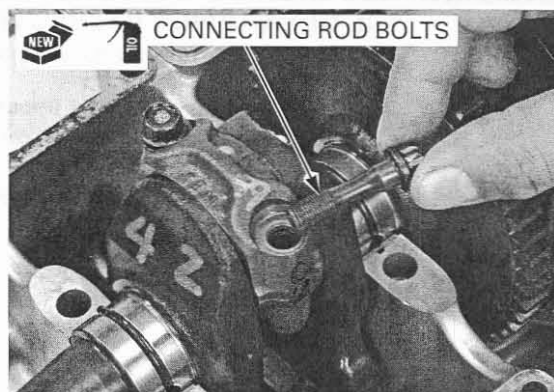
Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the connecting rod bearing caps.

Install the connecting rod bearing caps, aligning the dowel pins with the holes in the connecting rods.  
Be sure each part is installed in its original position, as noted during removal.



*The connecting rod bolts cannot be reused. Once the connecting rod bolts have been loosened replace them with new ones.*

Apply oil to new connecting rod bearing cap bolt threads and seating surfaces, and install the bolts.

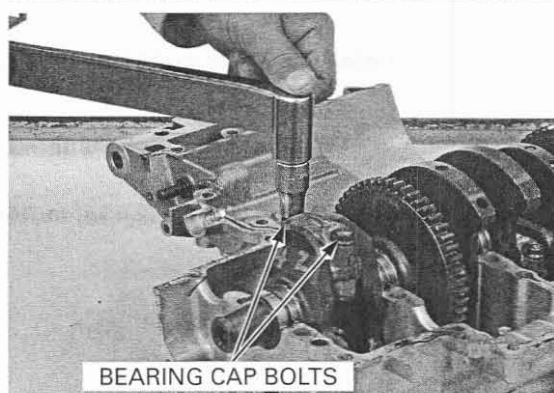


Tighten the bolts in two or three steps alternately, then tighten the bolts to the specified torque.

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

Further tighten the connecting rod bearing cap bolts 90 degrees.

Assemble the upper and lower crankcase (page 13-21).



## MAIN JOURNAL BEARING

### NOTICE

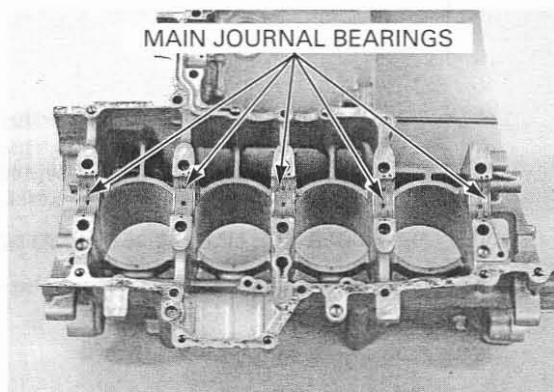
*Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.*

Remove the crankshaft (page 13-7).

### BEARING INSPECTION

Inspect the main journal bearing inserts on the upper and lower crankcase halves for unusual wear or peeling.

Check the bearing tabs for damage.





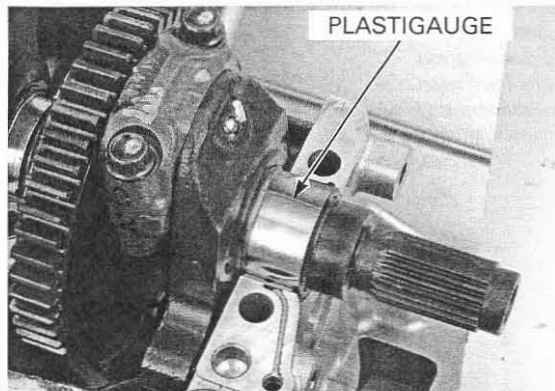
## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

### OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and main journals.

Install the crankshaft onto the upper crankcase. Put a strip of plastigauge lengthwise on each main journal avoiding the oil hole.

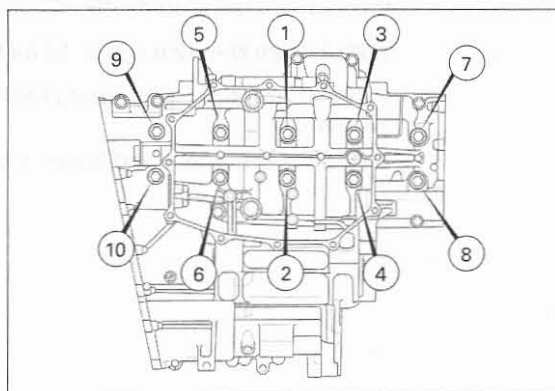
- Do not rotate the crankshaft during inspection.



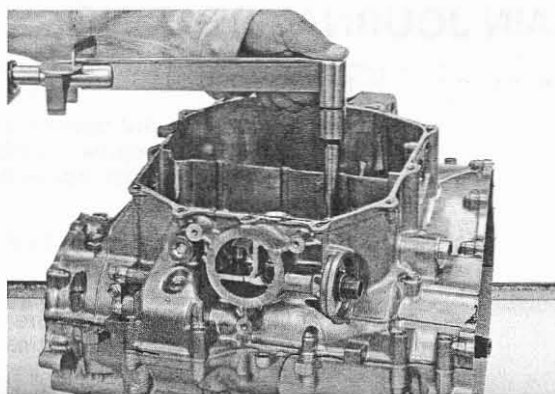
Install the lower crankcase onto the upper crankcase, then install the crankcase 9 mm bolts (main journal bolts).

Tighten the 9 mm bolts in numerical order to the specified torque.

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



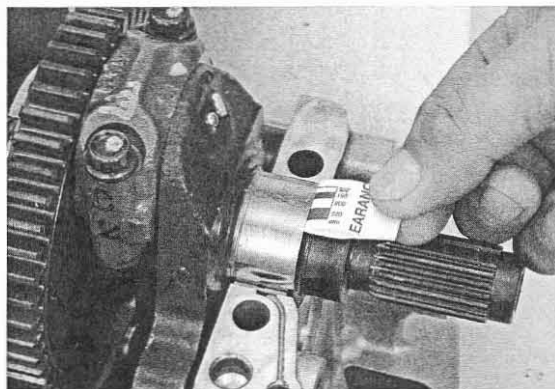
Further tighten the 9 mm bolts 150 degrees.



Remove the crankcase 9 mm bolts (main journal bolts) and lower crankcase, measure the compressed plastigauge at its widest point on each main journal to determine the oil clearance.

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

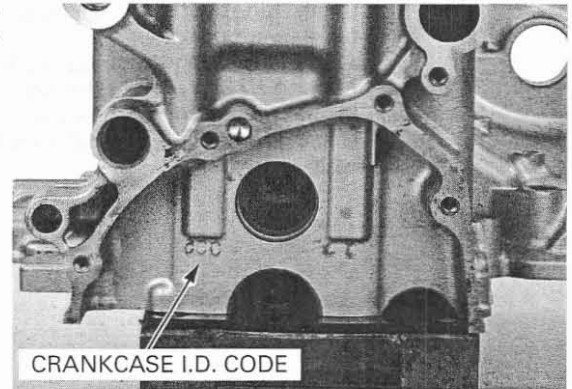
If the oil clearance exceeds the service limit, select a replacement bearing.



Letters (A, B or C) on the left side of upper crankcase are the codes for the bearing support I.D.s from left to right.

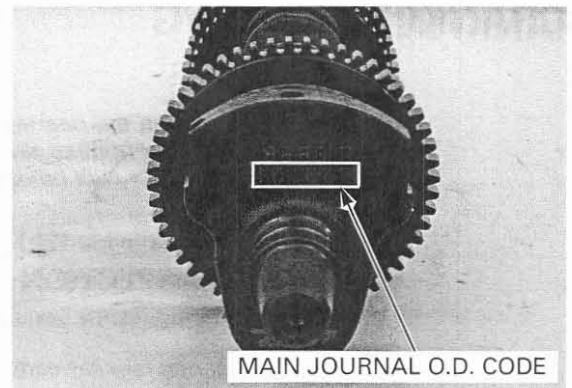
## BEARING SELECTION

Record the crankcase bearing support I.D. code letters from the pad on the left side of the upper crankcase as shown.



Numbers (1, 2 or 3) on the crank weight are the codes for the main journal O.D.s from left to right.

Record the corresponding main journal O.D. code numbers from the crank weight.



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

### MAIN JOURNAL BEARING SELECTION TABLE:

|                        |   |  | BEARING SUPPORT I.D. CODE                  |  |  |
|------------------------|---|--|--|--|--|
|                        |   |  | A  | B  | C  |
|                        |   |  | 37.000 – 37.006 mm<br>(1.4567 – 1.4569 in) | 37.006 – 37.012 mm<br>(1.4569 – 1.4572 in) | 37.012 – 37.018 mm<br>(1.4572 – 1.4574 in) |
| MAIN JOURNAL O.D. CODE | 1 | 34.000 – 34.006 mm<br>(1.3386 – 1.3388 in) | Red  | Pink                                       | Yellow                                     |
|                        | 2 | 33.994 – 34.000 mm<br>(1.3383 – 1.3386 in) | Pink                                       | Yellow                                     | Green                                      |
|                        | 3 | 33.988 – 33.994 mm<br>(1.3381 – 1.3383 in) | Yellow                                     | Green                                      | Brown                                      |

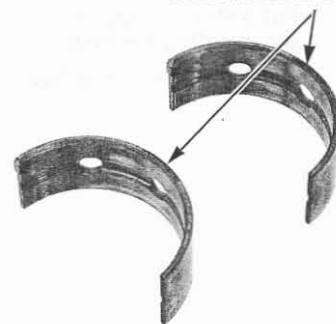
### BEARING THICKNESS:

Brown: Thickest  
Green:  
Yellow: ↓  
Pink:  
Red: Thinnest

### NOTICE

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

### IDENTIFICATION COLOR



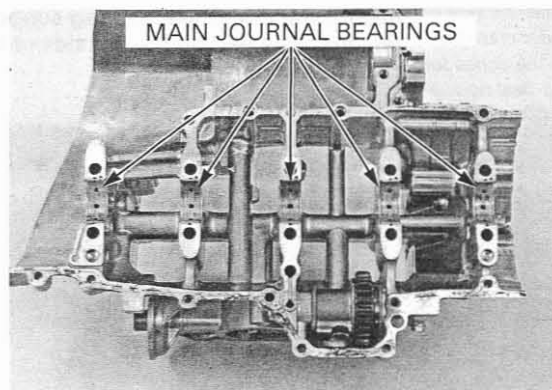


### BEARING INSTALLATION

Clean the bearing outer surfaces and crankcase bearing supports.

Apply molybdenum oil solution to the main journal bearing sliding surfaces on the upper crankcase.

Install the main journal bearing inserts onto the crankcase bearing supports, aligning each tabs with each grooves.



## CRANKPIN BEARING

### NOTICE

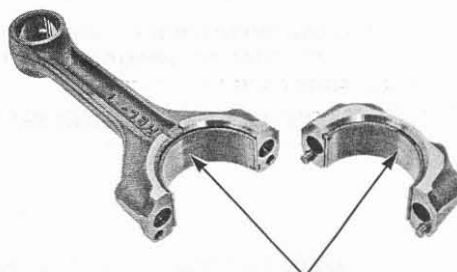
*Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.*

Remove the crankshaft (page 13-7).

### BEARING INSPECTION

Check the bearing inserts for unusual wear or peeling.

Check the bearing tabs for damage.



CRANKPIN BEARING INSERTS

### OIL CLEARANCE INSPECTION

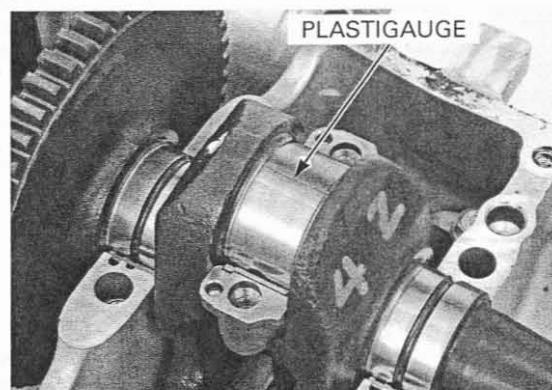
Clean off any oil from the bearing inserts and crankpins.

Carefully install the crankshaft onto the upper crankcase.

Set the connecting rods onto the crankpins.

Put a strip of plastigauge lengthwise on each crankpin avoiding the oil hole.

- Do not rotate the crankshaft during inspection.



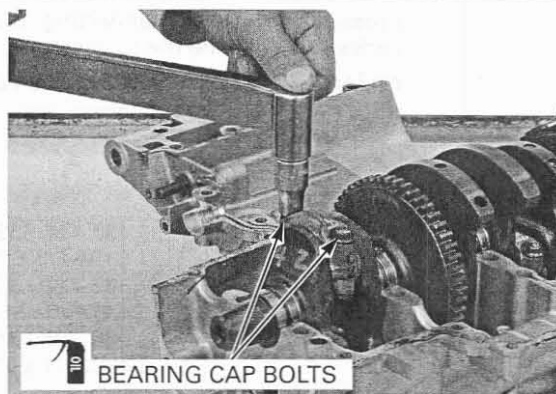
Carefully install the connecting rod bearing caps, aligning the dowel pins with the holes in the connecting rods.

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

Apply oil to the connecting rod bearing cap bolt threads and seating surfaces and install the bolts. Tighten the bolts in two or three steps alternately, then tighten the bolts to the specified torque.

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

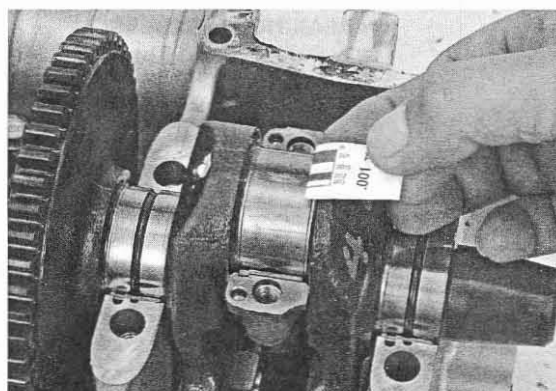
Further tighten the connecting rod bearing cap bolts 90 degrees.



Remove the bearing caps and measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

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

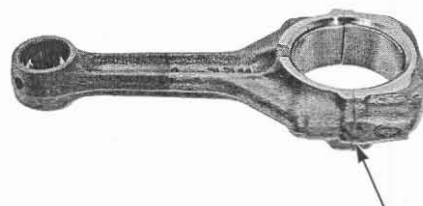
If the oil clearance exceeds the service limit, select the correct replacement bearings.



## BEARING SELECTION

*Numbers (1 or 2) on the connecting rods are the codes for the connecting rod I.D.*

Record the connecting rod I.D. code number (1 or 2) or measure the I.D. with the connecting rod bearing cap installed without bearing inserts.

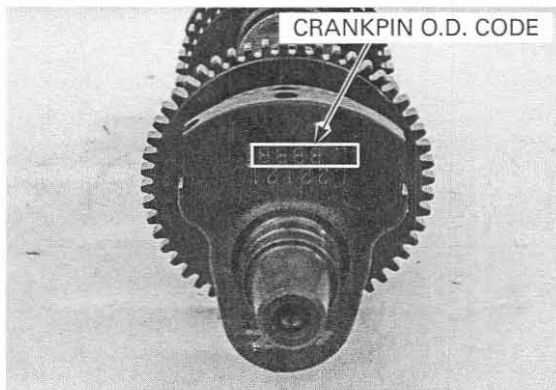


CONNECTING ROD I.D. CODE

*Letters (A or B) on the crankweight are the codes for the crankpin O.D.s from left to right.*

If you are replacing the crankshaft, record the corresponding crankpin O.D. code letter (A or B).

If you are reusing the crankshaft, measure the crankpin O.D. with a micrometer.



CRANKPIN O.D. CODE

## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

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

**CRANKPIN BEARING SELECTION TABLE:**

|                       |   |  | CONNECTING ROD I.D.CODE                    |  |  |
|-----------------------|---|--|--|--|--|
|                       |   |  | 1  | 2  | 3  |
|                       |   |  | 39.500 – 39.506 mm<br>(1.5551 – 1.5554 in) | 39.506 – 39.512 mm<br>(1.5554 – 1.5556 in) | 39.512 – 39.518 mm<br>(1.5556 – 1.5558 in) |
| CRANK PIN<br>O.D.CODE | A | 36.497 – 36.503 mm<br>(1.4369 – 1.4371 in) | Yellow                                     | Green                                      | Brown                                      |
|                       | B | 36.491 – 36.497 mm<br>(1.4367 – 1.4369 in) | Green                                      | Brown                                      | Black                                      |
|                       | C | 36.485 – 36.491 mm<br>(1.4364 – 1.4367 in) | Brown                                      | Black                                      | Blue                                       |

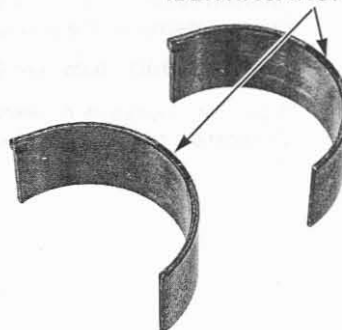
### BEARING THICKNESS:

Blue:           Thickest  
Black:  
Brown:         ↓  
Green:  
Yellow:        Thinnest

### NOTICE

*After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.*

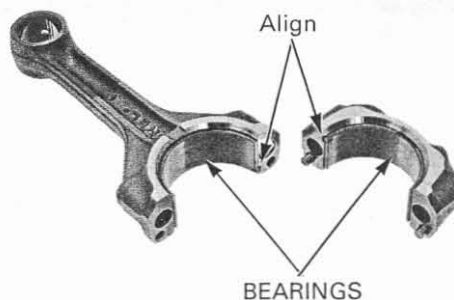
### IDENTIFICATION COLOR



### BEARING INSTALLATION

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

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



## PISTON/CYLINDER

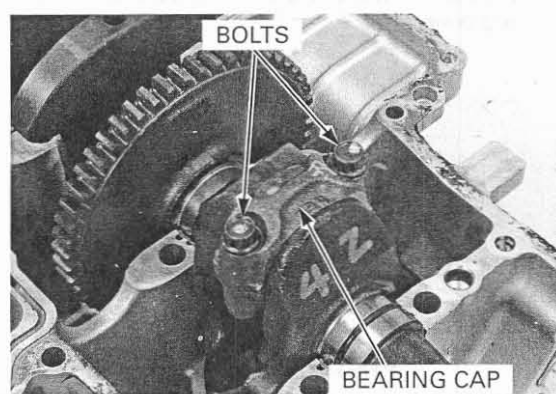
### PISTON/CONNECTING ROD REMOVAL

#### NOTICE

- This motorcycle is equipped with aluminum cylinder sleeves. Before piston removal, place a clean shop towel around the connecting rod to prevent damaging the cylinder sleeve.
- Do not try to remove the piston/connecting rod assembly from bottom of the cylinder; the assembly will get stuck in the gap between the cylinder liner and the upper crankcase.
- Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

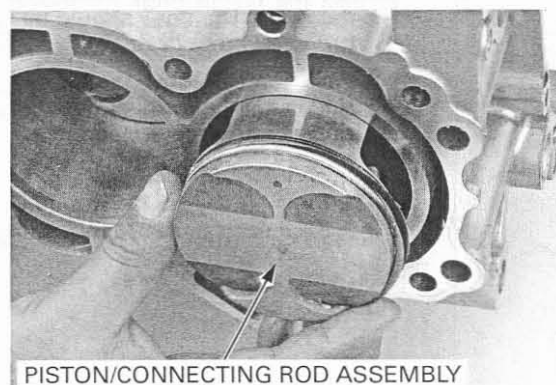
Mark all parts as you remove them to indicate the correct cylinder for reassembly.

Remove the bolts and connecting rod bearing caps.



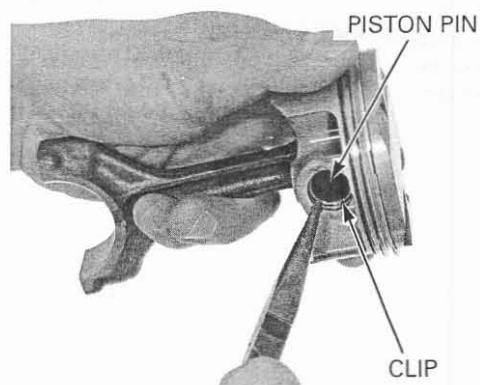
Do not try to remove the connecting rod/piston assembly from the bottom of the cylinder; the assembly will be locked so that the oil ring expands in the gap between the cylinder liner and the upper crankcase.

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



### PISTON REMOVAL

Remove the piston pin clip with pliers. Push the piston pin out of the piston and connecting rod, and remove the piston.

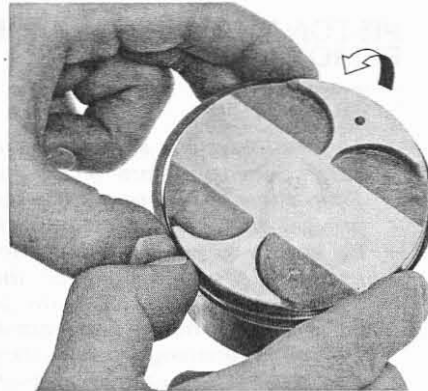


## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

### PISTON DISASSEMBLY

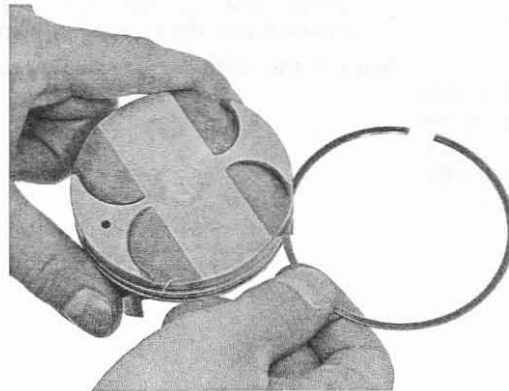
*Be careful not to damage the piston ring by spreading the ends too far.*

Spread each piston ring end and remove them by lifting up at a point opposite the gap.



*Never use a wire brush; it will scratch the groove.*

Clean carbon deposits from the piston ring grooves with a ring that will be discarded.



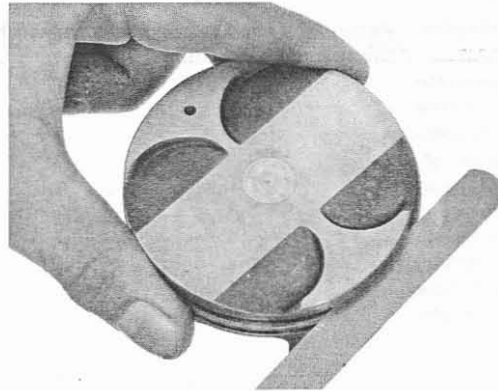
### PISTON INSPECTION

Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

#### SERVICE LIMITS:

Top: 0.125 mm (0.0049 in)  
Second: 0.075 mm (0.0030 in)

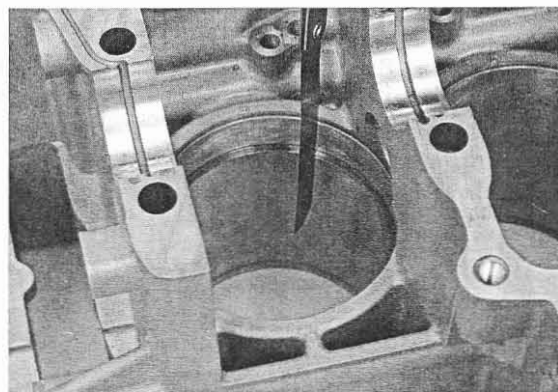


*Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.*

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

#### SERVICE LIMITS:

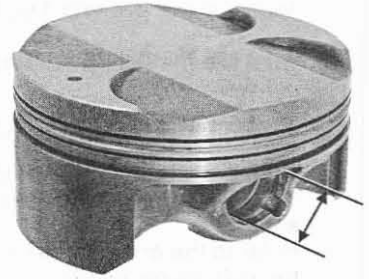
Top: 0.52 mm (0.020 in)  
Second: 0.82 mm (0.032 in)  
Oil (side rail): 1.0 mm (0.04 in)



## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

Measure the piston pin bore.

**SERVICE LIMIT: 17.030 mm (0.6705 in)**

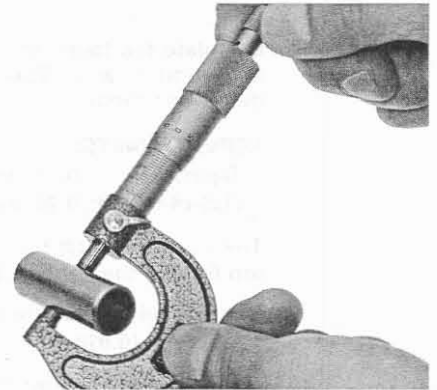


Measure the O.D. of the piston pin.

**SERVICE LIMIT: 16.980 mm (0.6685 in)**

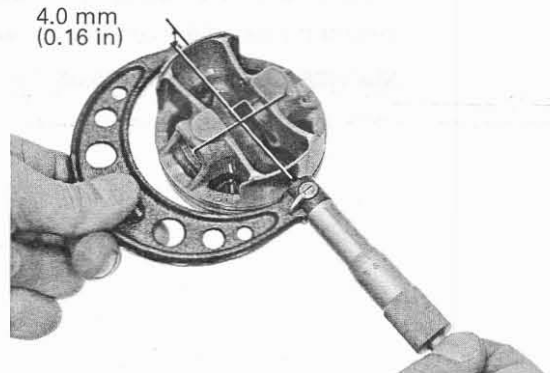
Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT: 0.04 mm (0.002 in)**



Measure the diameter of the piston at 4.0 mm (0.16 in) from the bottom and 90 degrees to the piston pin hole.

**SERVICE LIMIT: 74.895 mm (2.9486 in)**



### CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

**SERVICE LIMIT: 17.048 mm (0.6712 in)**

Calculate the connecting rod-to-piston pin clearance.

**SERVICE LIMIT: 0.07 mm (0.003 in)**





### CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage.  
Measure the cylinder I.D. in X and Y axis at three levels.  
Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT: 75.15 mm (2.959 in)**

Calculate the piston-to-cylinder clearance.  
Take a maximum reading to determine the clearance.  
Refer to the procedures for measurement of the piston O.D. (page 13-17).

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

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

#### SERVICE LIMITS:

**Taper: 0.10 mm (0.004 in)**

**Out-of-round: 0.10 mm (0.004 in)**

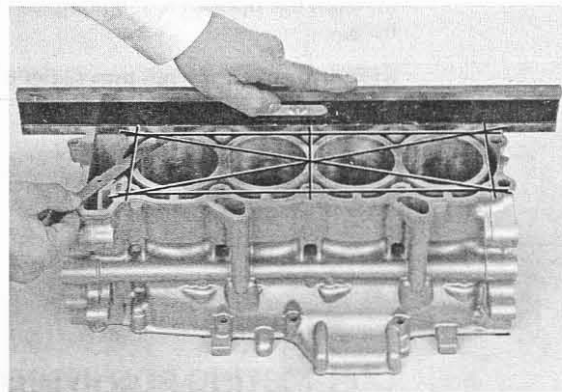
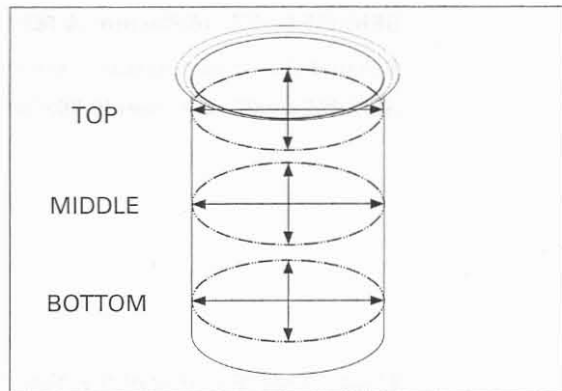
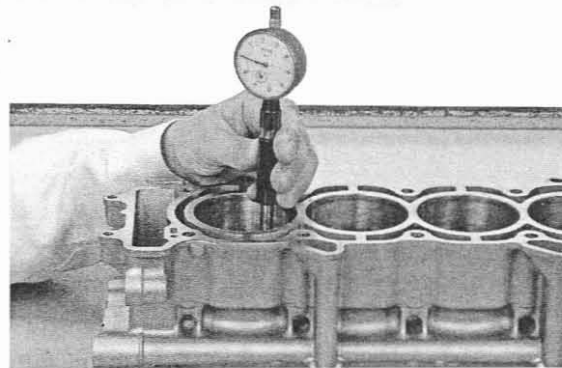
The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

**The following oversize piston is available:**  
**0.25 mm (0.010 in)**

The piston to cylinder clearance for the oversize piston must be: 0.015 – 0.050 mm (0.0006 – 0.0020 in).

Inspect the top of the cylinder for warpage.

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

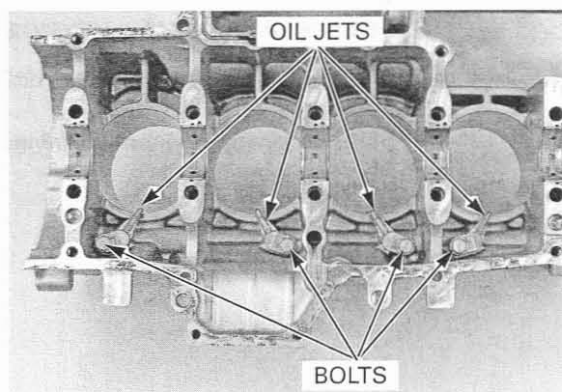


### PISTON OIL JET REPLACEMENT

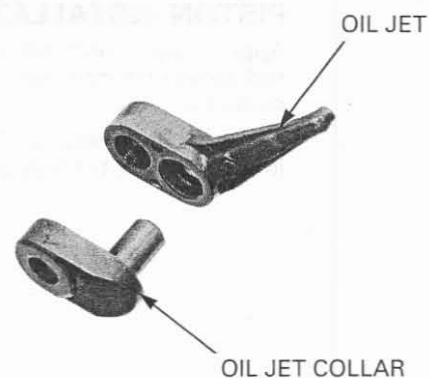
*Always replace the O-ring when the oil jets are removed.*

Remove the bolts and piston oil jets from the upper crankcase.

Inspect the oil jets for clogs, and replace it if necessary.



Install the oil jet collar onto the oil jet.

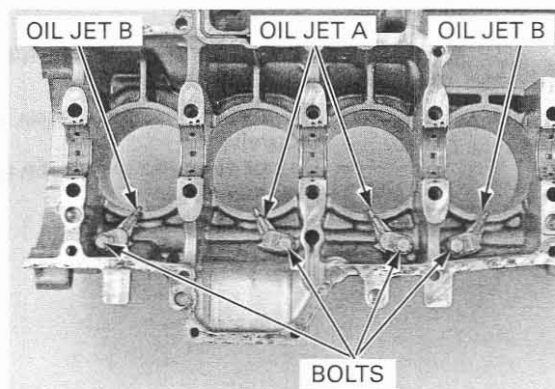


The piston oil jet has identification marks (A or B) on the body.

Install the oil jet A into the No.2 and 3 cylinder, and the oil jet B into the No.1 and 4 cylinder as shown.

Apply a locking agent to the piston oil jet mounting bolt threads.

Install and tighten the piston oil jet mounting bolts.



## PISTON ASSEMBLY

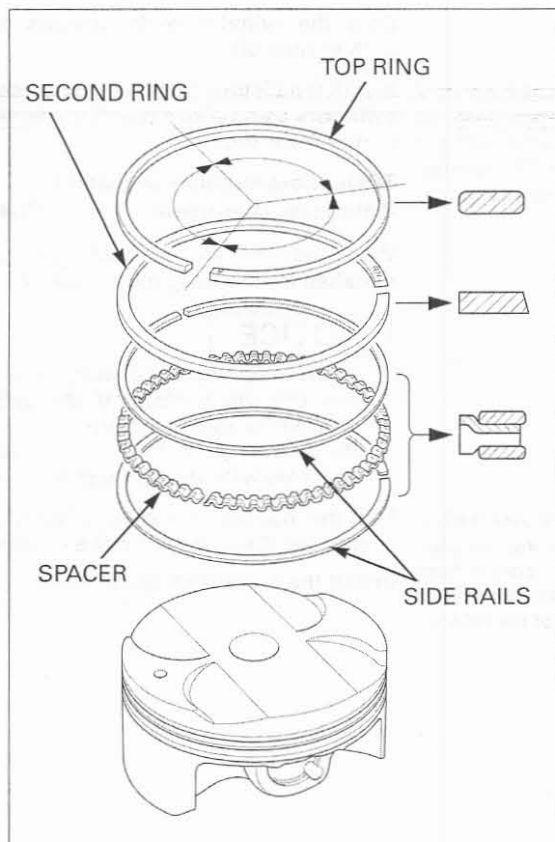
Clean the piston ring grooves thoroughly and install the piston rings.

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking (R: top ring, RN: second ring) facing up.
- Do not mix the top and second rings; top ring is narrower than the second ring in width.
- To install the oil ring, install the spacer first, then install the side rails.

Stagger the piston ring end gaps 120° apart from each other.

Stagger the side rail end gaps as shown.

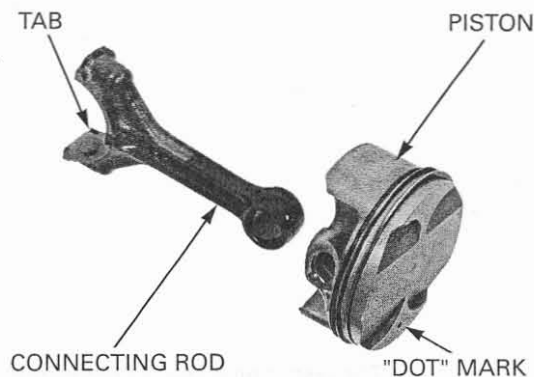
After installation, the rings should rotate freely in the ring groove.



### PISTON INSTALLATION

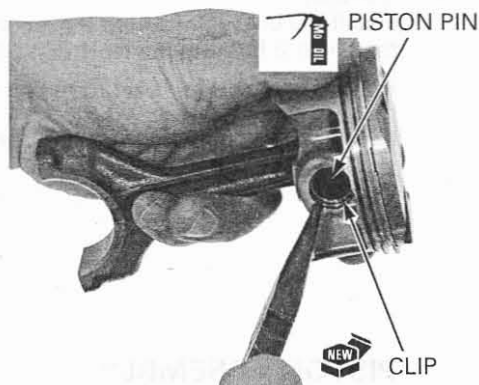
Apply molybdenum oil solution to the connecting rod small end inner surfaces and piston pin outer surfaces.

Assemble the piston and connecting rod with the journal bearing tab facing to the piston "dot" mark.



Install the piston pin and secure it using new piston pin clips.

- Make sure that the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cut-out.



Coat the cylinder walls, pistons and piston rings with engine oil.

*Install the piston/connecting rod assembly with the piston "IN" mark facing the intake side.*

Install the piston/connecting rod assemblies into the cylinders using a commercially available piston ring compressor tool.

#### TOOL (Commercially available):

Piston ring compressor RC40C

When reusing the connecting rods, they must be installed in their original locations.

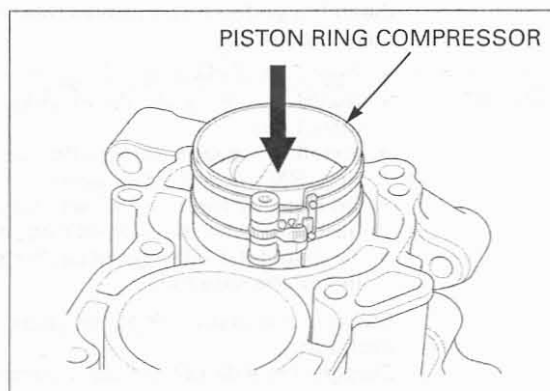
#### NOTICE

- While installing the piston, be careful not to damage the top surface of the cylinder, especially around the cylinder bore.
- Be careful not to damage the cylinder sleeve and crankpin with the connecting rod.

*Make sure the piston ring compressor tool sits flush on the top surface of the cylinder.*

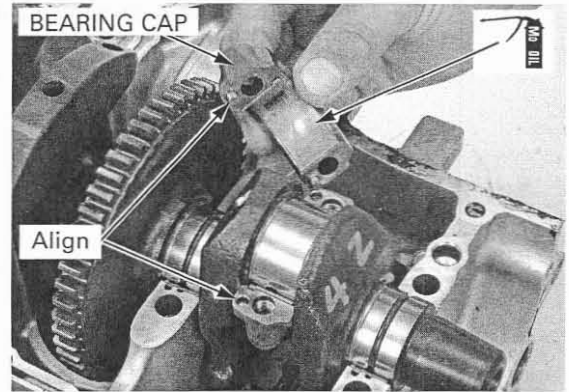
Use the handle of a plastic hammer or equivalent tool to tap the piston into the cylinder.

Install the crankshaft (page 13-8).



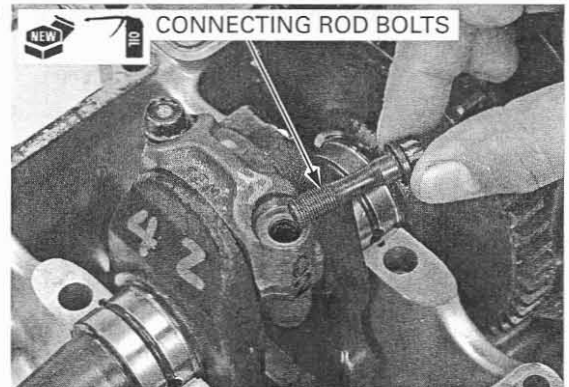
Apply molybdenum oil solution to the crankpin bearing sliding surface on the bearing caps.

Install the connecting rod bearing caps, aligning the dowel pins with the holes in the connecting rods.



*The connecting rod bolts cannot be reused. Once the connecting rod bolts have been loosened replace them with new ones.*

Apply oil to new connecting rod bearing cap bolt threads and seating surfaces, and install the bolts.

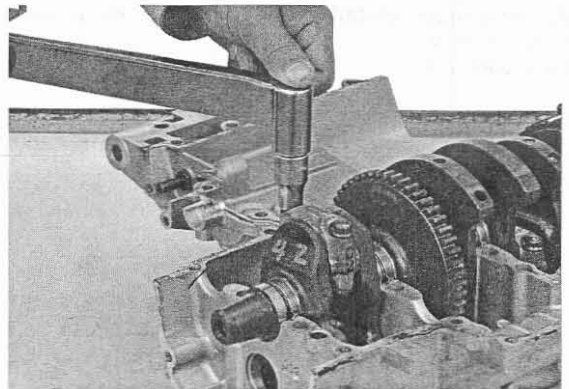


Tighten the bolts in two or three steps alternately.

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

Further tighten the connecting rod bearing cap bolts 90 degrees.

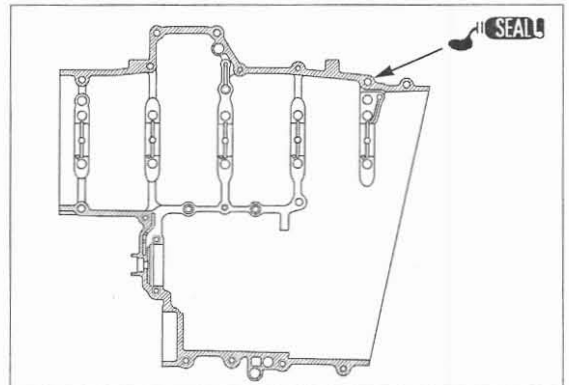
Assemble the crankcase halves (page 13-21).



## CRANKCASE ASSEMBLY

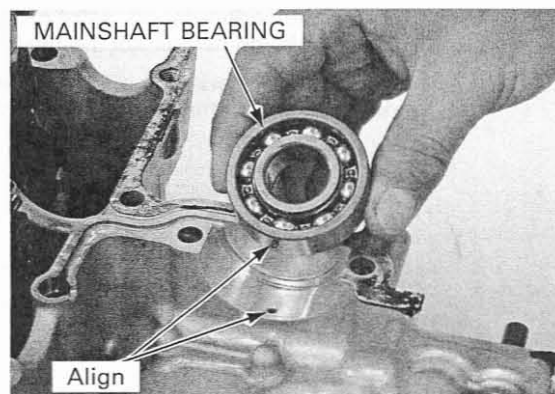
*Replace the transmission bearing holder and crankcase as a set.*

Apply a light, but thorough, coating of liquid sealant to the crankcase mating surface. Do not apply sealant to the crankcase 8 mm bolt (main journal bolt) area and the oil passage area as shown.

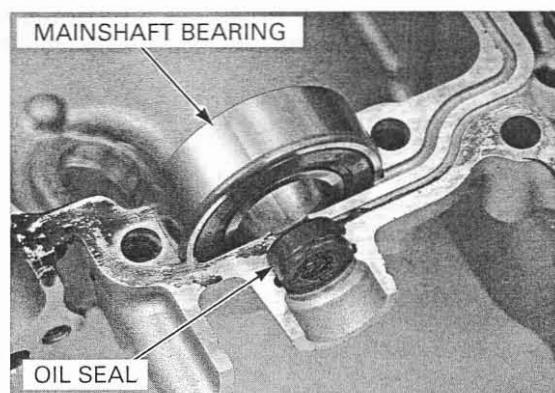


## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

Install the mainshaft bearing while aligning it locating pin with the crankcase hole.

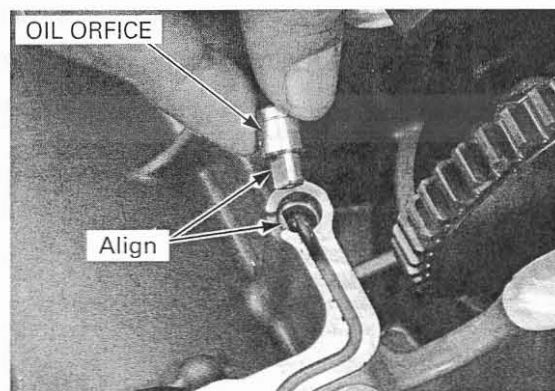


Install the clutch lifter rod oil seal.

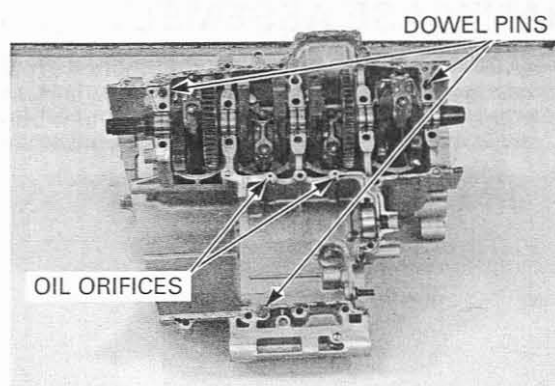


*Align the cut-outs between the oil orifice and crankcase.*

Install the oil orifices in the upper crankcase.

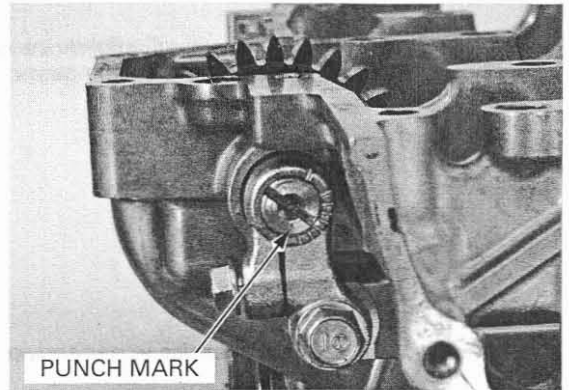


Install the three dowel pins.

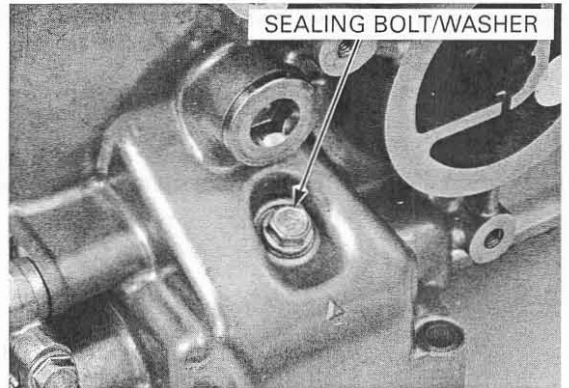


## BALANCER TIMING ALIGNMENT/LOWER CRANKCASE INSTALLATION

1. Avoid damaging the balancer drive and driven gear, turn the balancer shaft and place the punch mark facing down, to set the balancer backlash at maximum.



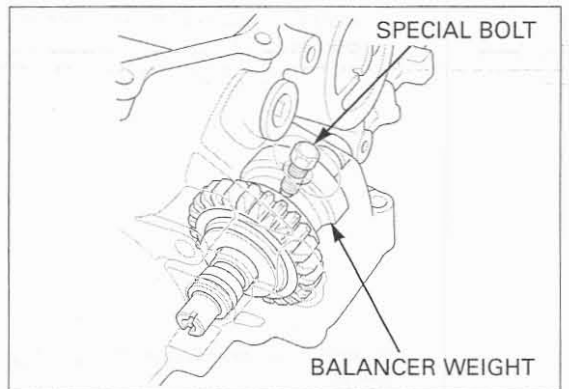
2. Remove the sealing bolt and sealing washer from the lower crankcase.



3. Temporarily install the special bolt or equivalent into the sealing bolt hole, hold the balancer weight securely.

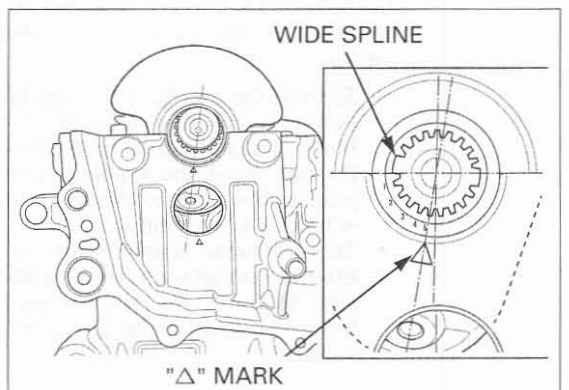
Make sure the special bolt tip into the balancer weight hole.

**Special bolt, 6 x 18 mm: 90004-MM5-000**



4. Place the crankshaft onto the upper crankcase so that the No.1 piston at TDC (Top Dead Center).

Slightly turn the crankshaft clockwise and align the crankshaft 5th spline center (from the wide spline) with the "△" mark on the upper crankcase as shown.





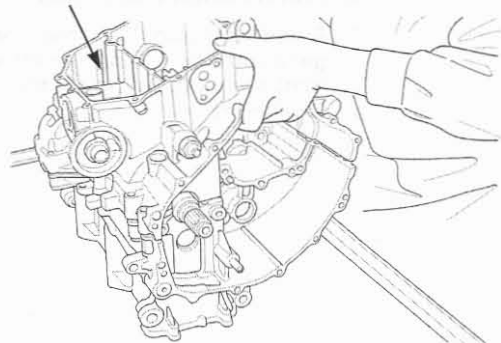
## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

5. Carefully place the lower crankcase onto the upper crankcase.

**NOTE:**

The crankshaft will slightly move counterclockwise when engaging the balancer gears.

LOWER CRANKCASE



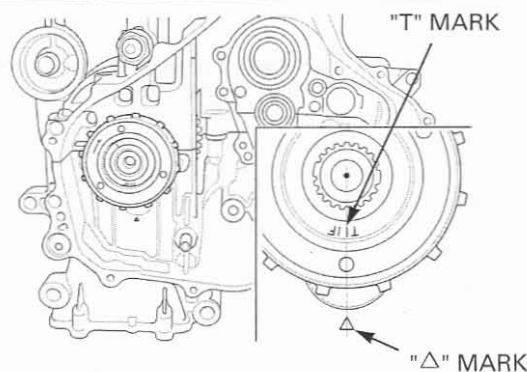
6. Check that the upper and lower crankcase seats properly.

*Temporarily install the starter clutch assembly to check the TDC.*

Check that the crankshaft 5th spline center aligns with the next "△" mark on the upper crankcase as shown.

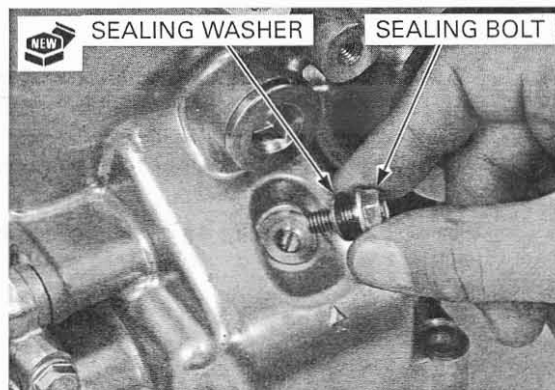
Make sure the No.1 piston at TDC (Top Dead Center).

If the crankshaft is not in the proper position, reassemble the crankcase halves from the beginning.



7. Remove the temporarily installed special bolt from the balancer weight.

Install a new sealing washer and bolt, tighten the bolt securely.

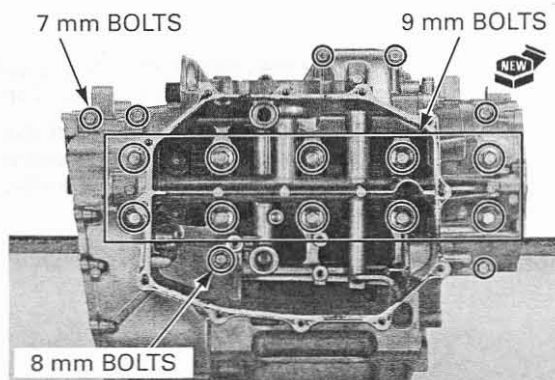


Install new crankcase 9 mm bolts (main journal bolts).

Loosely install all the lower crankcase bolts.

Make sure the upper and lower crankcase are seated securely.

- Tighten the crankcase 9 mm bolts (main journal bolts) using the Plastic Region Tightening Method described on next procedure.
- Do not reuse the crankcase 9 mm bolts (main journal bolts), because the correct axial tension will not be obtained.
- The crankcase 9 mm bolts (main journal bolts) are pre-coated with an oil additive for axial tension stability. Do not remove the oil additive from the new 9 mm bolts (main journal bolts) surface.

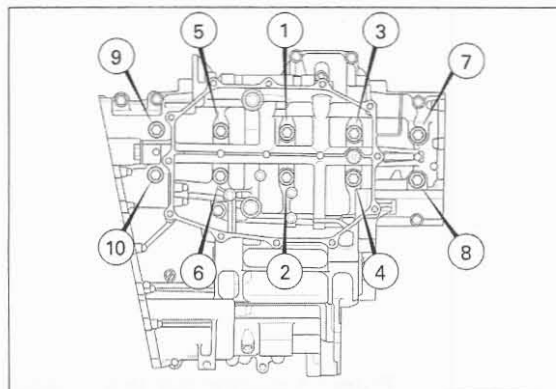


## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

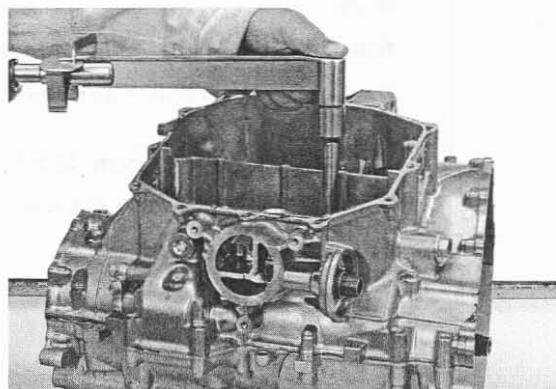
### PLASTIC REGION TIGHTENING METHOD:

Tighten the crankcase 9 mm bolts (main journal bolts) in numerical order in the illustration in two to three steps to the specified torque.

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



Further tighten the crankcase 9 mm bolts (main journal bolts) 150 degrees.

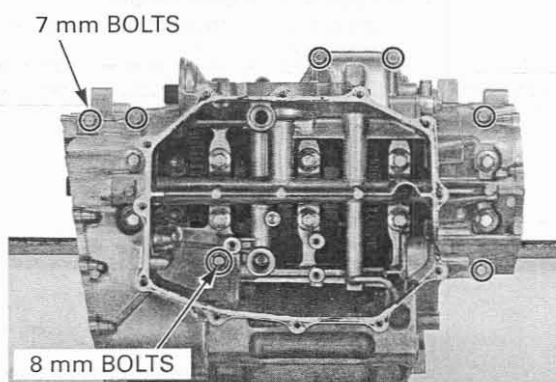


Tighten the 8 mm bolt to the specified torque.

**TORQUE: 24 N·m (2.4 kgf·m, 17 lbf·ft)**

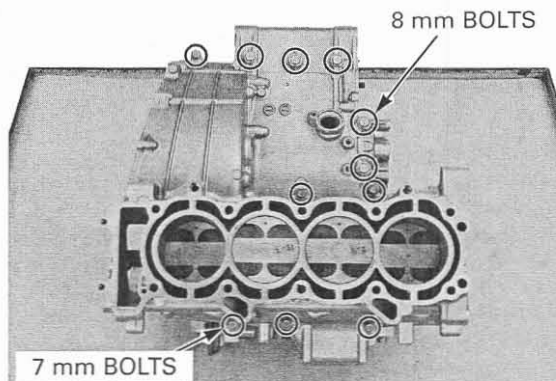
From the inside to outside, tighten the 7 mm bolts to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**



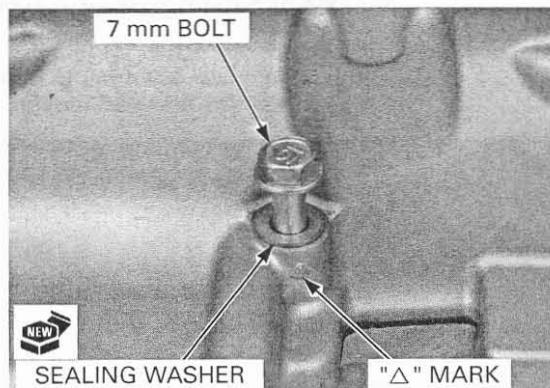
Place the engine with the lower side down.

Install the upper crankcase 8 mm bolts, sealing washer and 7 mm bolts.



## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

The sealing washer locations are indicated on the upper crankcase using the "△" mark.



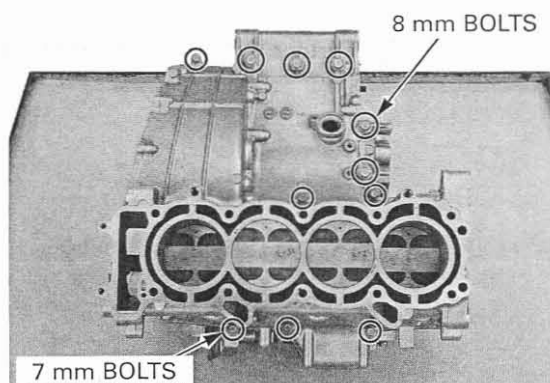
Tighten the 8 mm bolt in a crisscross pattern in 2 - 3 steps.

**TORQUE: 24 N·m (2.4 kgf·m, 17 lbf·ft)**

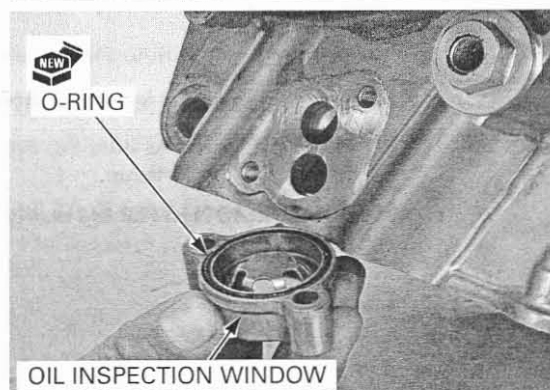
Tighten the 7 mm bolt in a crisscross pattern in 2 - 3 steps.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

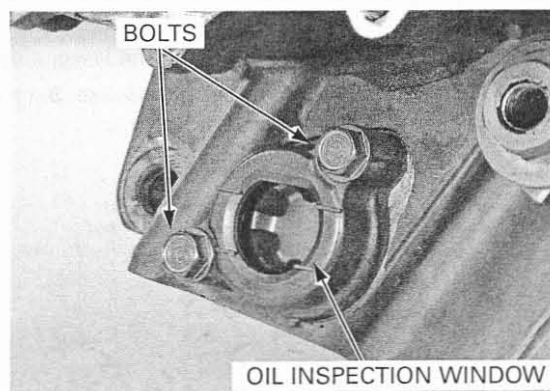
Set the initial balancer backlash adjustment (page 13-33).



Apply oil to a new O-ring and install it into the oil inspection window groove. Install the oil inspection window onto the lower crankcase.

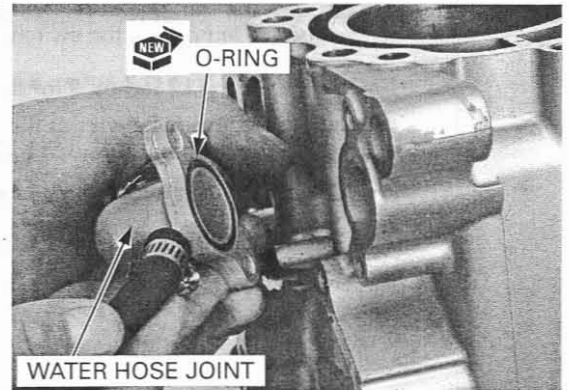


Install and tighten the bolts securely.

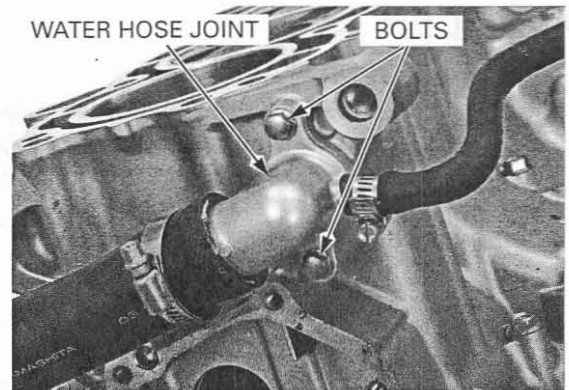


## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

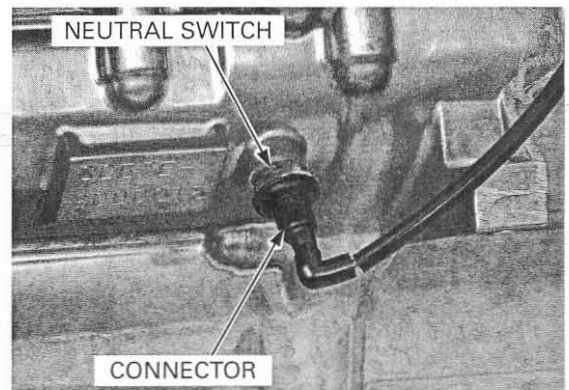
Install a new O-ring into the water hose joint groove.



Install the water hose joint to the crankcase, tighten the two bolts securely.



Route the engine sub-harness properly, connect the neutral switch connector.



Apply a sealant to the oil pressure switch threads as shown.



## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

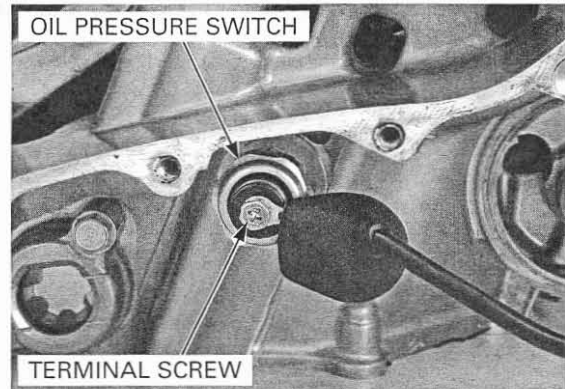
Tighten the oil pressure switch to the specified torque while holding the switch base.

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

Install the terminal eyelet to the oil pressure switch, tighten the terminal screw to the specified torque.

**TORQUE: 20 N·m (0.2 kgf·m, 1.4 lbf·ft)**

Install the removed parts in the reverse order of removal.



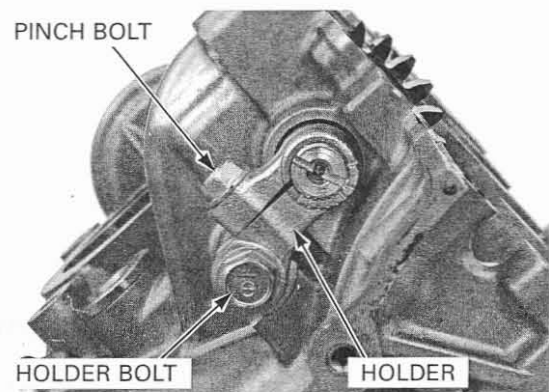
## BALANCER

### REMOVAL

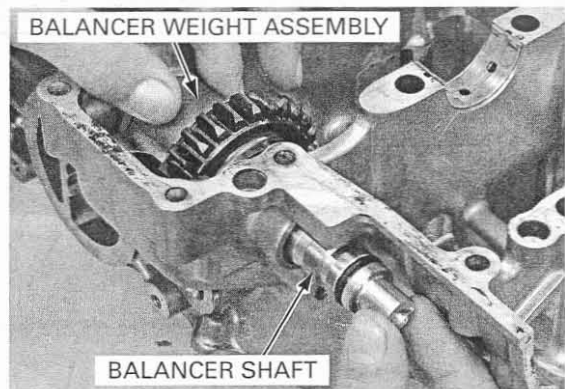
Separate the crankcase halves (page 13-5).

Loosen the balancer shaft pinch bolt.

Remove the balancer shaft holder bolt and balancer holder.

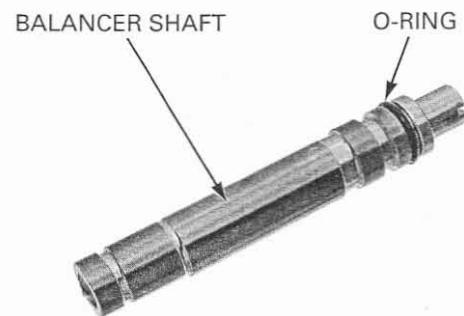


Pull the balancer shaft out and remove the balancer weight assembly from the lower crankcase.

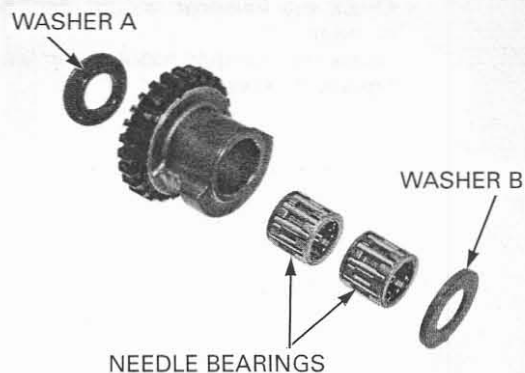


### DISASSEMBLY

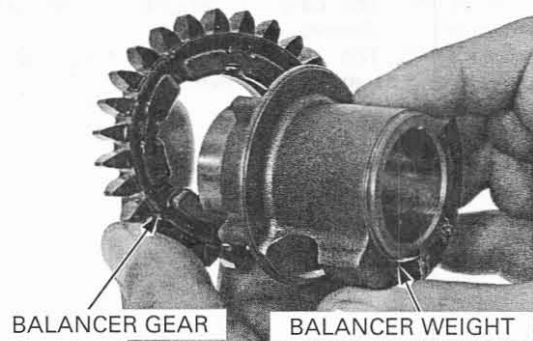
Remove the O-ring from the balancer shaft.



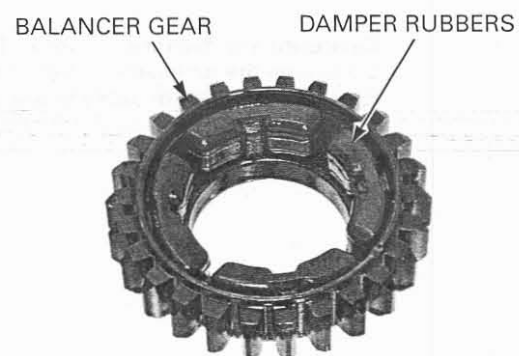
Remove the washers and needle bearings from the balancer weight assembly.



Remove the balancer gear assembly from the balancer weight.



Remove the damper rubbers from the balancer gear.



## INSPECTION

*Replace the balancer weight, balancer shaft, needle bearing as a set*

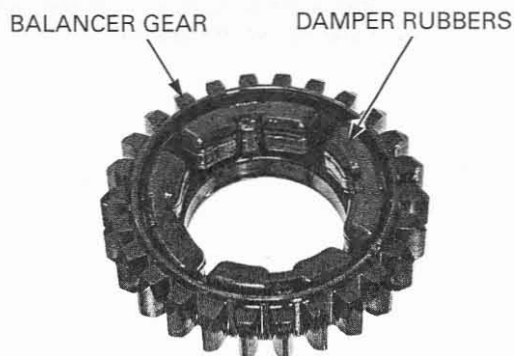
Check the needle bearing for wear or damage, replace if necessary.





## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

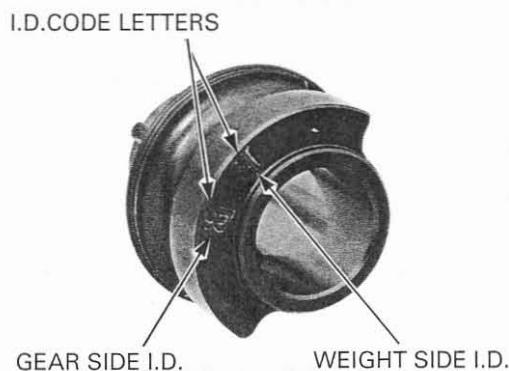
Check the balancer weight and gear for wear or damage.  
Check the damper rubbers for fatigue or damage, replace if necessary.



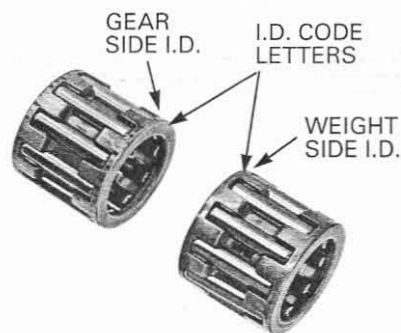
### BALANCER BEARING SELECTION

*The balancer weight and needle bearings are select fitted.*

The balancer weight has two I.D. code letters as shown. The marking identify each I.D. of the balancer weight as shown.



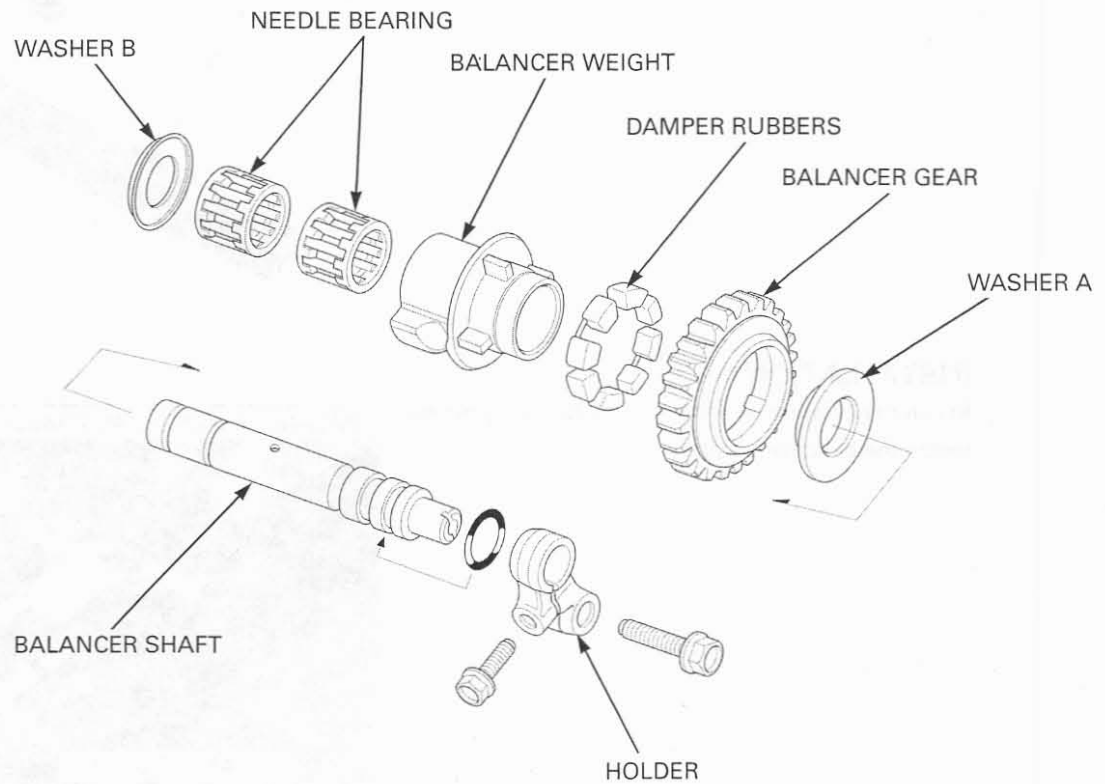
Reference the balancer weight I.D. code letters to determine the replacement bearing color. Refer to the selection table below for bearing selection.



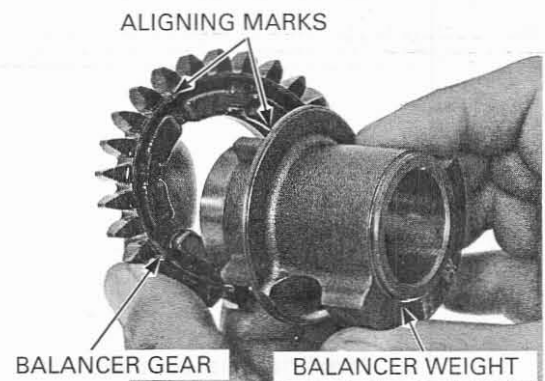
**BALANCER BEARING SELECTION TABLE:**

|                   |  | BALANCER WEIGHT I.D. CODE                  |  |  |
|-------------------|--|--|--|--|
|                   |  | A  | B  | C  |
|                   |  | 27.000 – 27.004 mm<br>(1.0630 – 1.0631 in) | 26.991 – 26.996 mm<br>(1.0626 – 1.0628 in) | 26.987 – 26.991 mm<br>(1.0624 – 1.0626 in) |
| BALANCER<br>SHAFT | 17.990 – 17.996 mm<br>(0.7083 – 0.7085 in) | Blue                                       | White                                      | Green                                      |

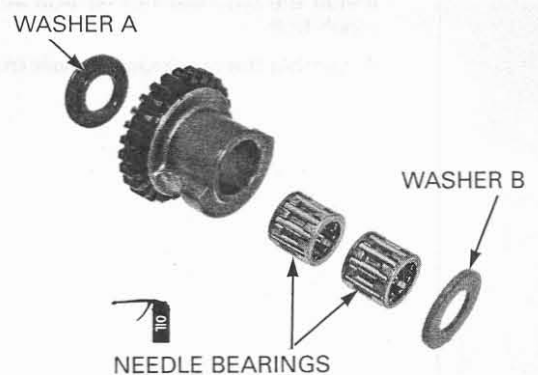
DISASSEMBLY



Install the damper rubbers into the balancer gear.  
Assemble the balancer gear and weight while aligning the aligning marks.

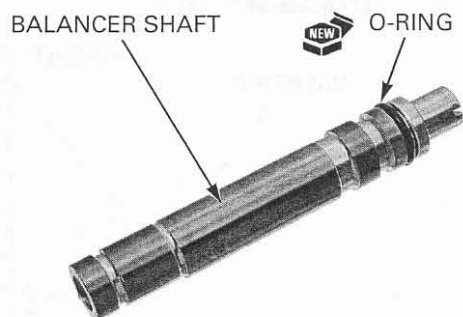


Apply oil to the needle bearing, install them into the balancer weight.  
Install the washer A and B.



## CRANKCASE/CRANKSHAFT/BALANCER/PISTON/CYLINDER

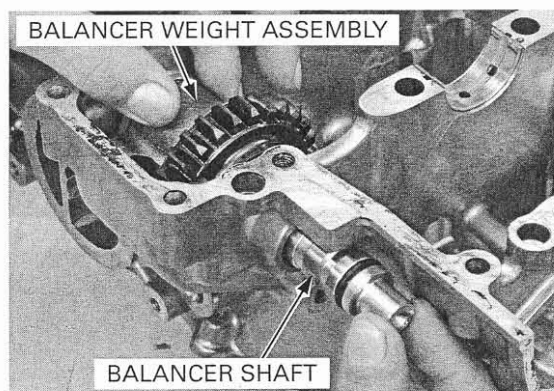
Install a new O-ring to the balancer shaft.



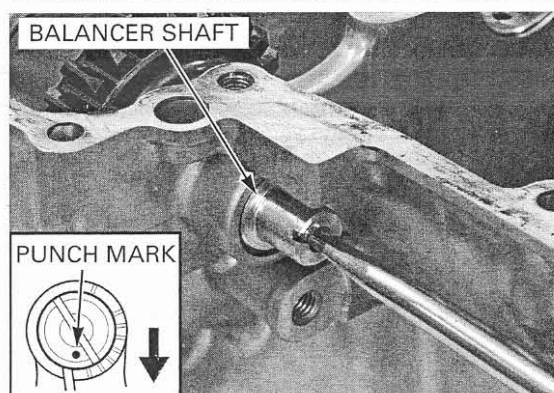
### INSTALLATION

Install the balancer weight into the lower crankcase.

Install the balancer shaft.



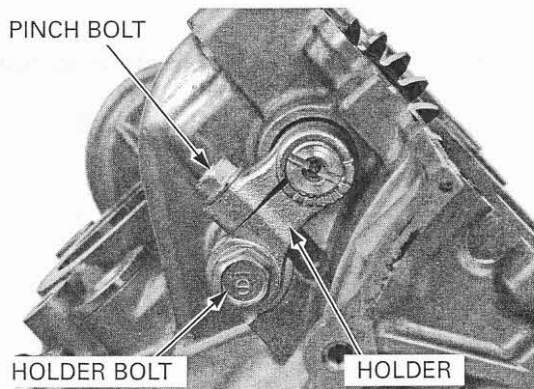
Turn the balancer shaft and place the punch mark on the shaft facing down.



Install the balancer shaft holder.

Install the balancer holder bolt and balancer holder pinch bolt.

Assemble the crankcase halves (page 13-21).

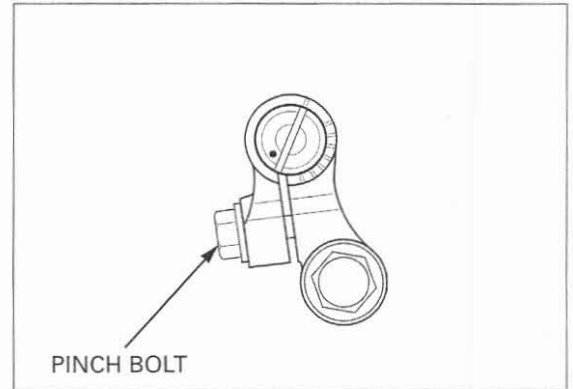


## INITIAL BACKLASH ADJUSTMENT

Install the engine into the frame (page 8-9).

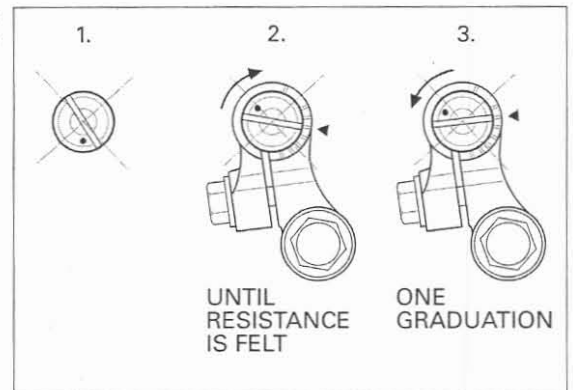
*Adjust the backlash while the engine is cold (below 35°C/ 95°F) and the engine is not running.*

Loosen the balancer shaft holder pinch bolt.



*Excessive force can cause balancer gear, bearing and shaft damage. Do not turn the shaft more than necessary.*

Turn the balancer shaft clockwise until resistance is felt, then back it off one graduation using the slot as a measure.



## FINAL BACKLASH ADJUSTMENT

Warm up the engine and let it idle.

If the balancer gear noises are excessive, adjust the balancer backlash as follows:

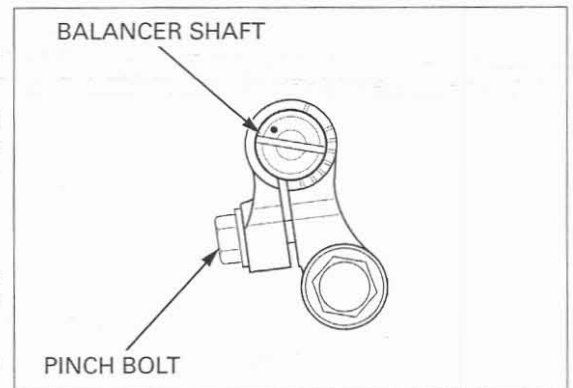
Turn the balancer gear shaft counterclockwise until the gears begin to make a "whining" noise. Then turn the gear shaft clockwise until the gear "whining" noise disappears.

Tighten the balancer shaft pinch bolt.

After all gear backlash adjustments are done, snap the throttle and make sure the gear noises are not excessive.

If the gear "whine" noise is excessive, the backlash is too small.

If the gear "rattling" noise is excessive, the backlash is excessive.



---

# MEMO

MEMORANDUM FOR THE RECORD

SUBJECT: [Illegible]

DATE: [Illegible]

BY: [Illegible]

FOR: [Illegible]

RE: [Illegible]

[Illegible]

[Illegible]

[Illegible]

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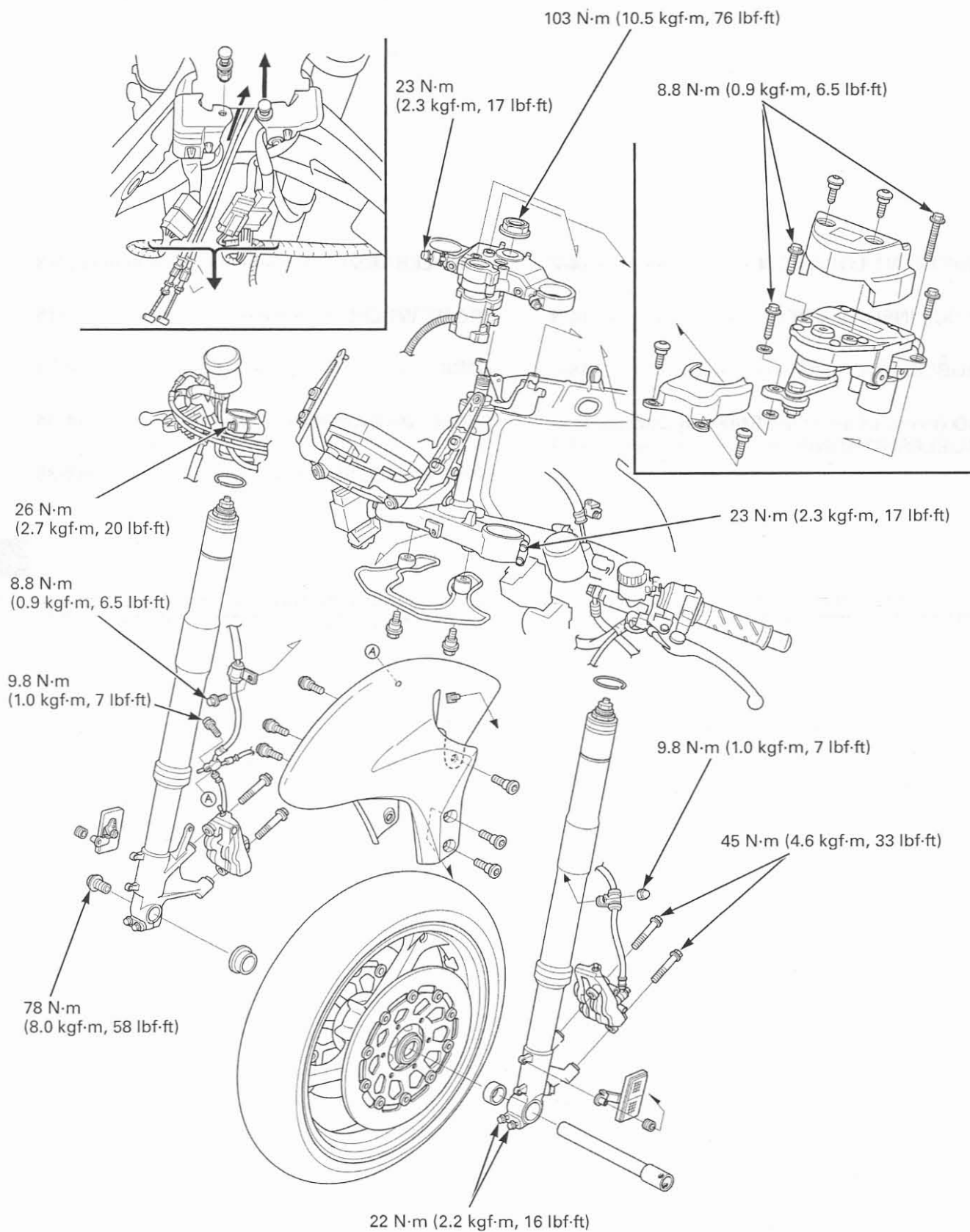
[Illegible]

# 14. FRONT WHEEL/SUSPENSION/STEERING

|  |      |                       |       |
|--|------|-----------------------|-------|
| COMPONENT LOCATION .....   | 14-2 | HANDLEBARS .....      | 14-9  |
| SERVICE INFORMATION .....  | 14-3 | FRONT WHEEL .....     | 14-16 |
| TROUBLESHOOTING .....  | 14-6 | FORK .....            | 14-21 |
| HESD (Honda Electronic Steering Damper)<br>TROUBLESHOOTING ..... | 14-7 | STEERING DAMPER ..... | 14-34 |
|  |      | STEERING STEM .....   | 14-35 |



# COMPONENT LOCATION



# SERVICE INFORMATION

## GENERAL

- When servicing the front wheel, fork or steering stem, support the motorcycle securely using a hoist or equivalent.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the front wheel installation, check the brake operation by applying the brake lever.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- Refer to the brake system information (page 16-4).

## SPECIFICATIONS

Unit: mm (in)


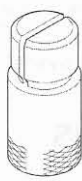
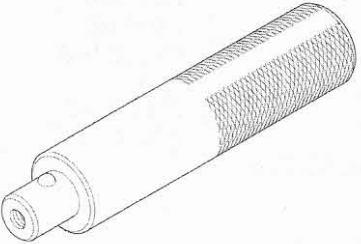
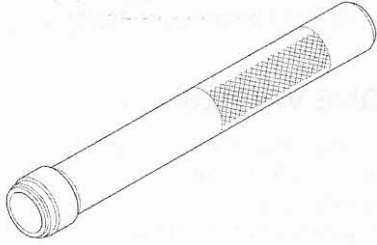
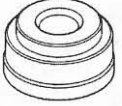
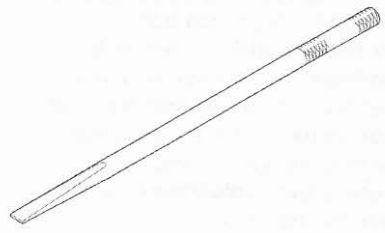
| ITEM                           |                                      | STANDARD  | SERVICE LIMIT     |
|--------------------------------|--------------------------------------|---|-------------------|
| Minimum tire tread depth       |                                      | —   | 1.5 (0.06)        |
| Cold tire pressure             | Up to 90 kg (200 lbs) load           | 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)                       | —                 |
|                                | Up to maximum weight capacity        | 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)                       | —                 |
| Axle runout                    |                                      | —   | 0.2 (0.008)       |
| Wheel rim runout               | Radial                               | —   | 2.0 (0.08)        |
|                                | Axial                                | —   | 2.0 (0.08)        |
| Wheel balance weight           |                                      | —   | 60 g (2.1oz) max. |
| Fork                           | Spring free length                   | 218.2 (8.59)  | 213.8 (8.42)      |
|                                | Tube runout                          | —   | 0.20 (0.008)      |
|                                | Recommended fork fluid               | Pro Honda Suspension Fluid, SS-55 or equivalent                   | —                 |
|                                | Fluid level                          | 90 (3.5)  | —                 |
|                                | Fluid capacity                       | 466 ± 2.5 cm <sup>3</sup> (15.8 ± 0.08 US oz, 16.4 ± 0.09 Imp oz) | —                 |
|                                | Pre-load adjuster initial setting    | 7 turns from minimum  | —                 |
|                                | Rebound adjuster initial setting     | 2 turns out from full hard  | —                 |
|                                | Compression adjuster initial setting | 2 turns out from full hard  | —                 |
| Steering head bearing pre-load |                                      | 12 – 19 N (1.2 – 1.9 kgf)   | —                 |

## TORQUE VALUES

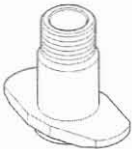
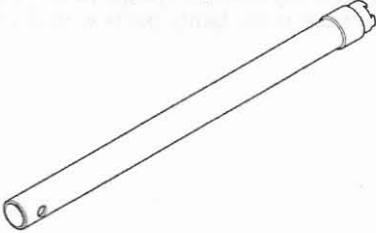
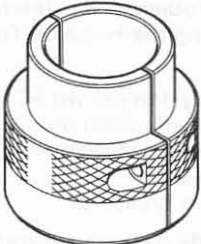
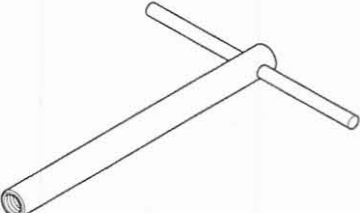
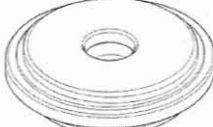

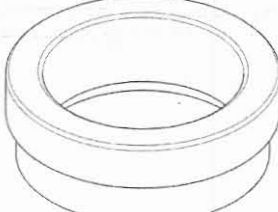
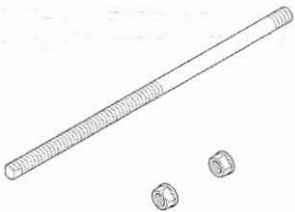


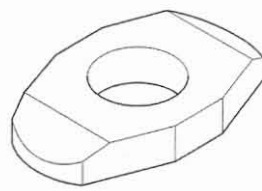
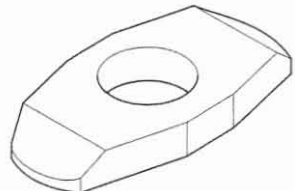
|                                     |                                 |                                    |
|-------------------------------------|---------------------------------|------------------------------------|
| Handlebar weight mounting screw     | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)   | ALOC screw; replace with a new one |
| Handlebar pinch bolt                | 26 N·m (2.7 kgf·m, 20 lbf·ft)   |                                    |
| Front axle bolt                     | 78 N·m (8.0 kgf·m, 58 lbf·ft)   |                                    |
| Front axle holder pinch bolt        | 22 N·m (2.2 kgf·m, 16 lbf·ft)   |                                    |
| Front brake disc bolt               | 20 N·m (2.0 kgf·m, 14 lbf·ft)   | ALOC bolt; replace with a new one  |
| Fork socket bolt                    | 34 N·m (3.5 kgf·m, 25 lbf·ft)   |                                    |
| Fork bolt                           | 34 N·m (3.5 kgf·m, 25 lbf·ft)   |                                    |
| Fork damper lock nut                | 25 N·m (2.6 kgf·m, 19 lbf·ft)   |                                    |
| Fork compression adjuster plug bolt | 18 N·m (1.8 kgf·m, 13 lbf·ft)   |                                    |
| Fork top bridge pinch bolt          | 23 N·m (2.3 kgf·m, 17 lbf·ft)   |                                    |
| Fork bottom bridge pinch bolt       | 23 N·m (2.3 kgf·m, 17 lbf·ft)   |                                    |
| Steering damper second arm nut      | 12 N·m (1.2 kgf·m, 9 lbf·ft)    | U-nut                              |
| Steering damper second arm bolt     | 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft) |                                    |
| Steering damper mounting bolt       | 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft) |                                    |
| Steering stem adjusting nut         | 20 N·m (2.0 kgf·m, 14 lbf·ft)   |                                    |
| Steering stem adjusting lock nut    | —                               | See page 14-42                     |
| Steering stem nut                   | 103 N·m (10.5 kgf·m, 76 lbf·ft) |                                    |

## FRONT WHEEL/SUSPENSION/STEERING

### TOOLS

|  |  |  |
|--|--|--|
| <p>Attachment, 42 x 47 mm<br/>07746-0010300</p>       | <p>Pilot, 25 mm<br/>07746-0040600</p>   | <p>Bearing remover head, 25 mm<br/>07746-0050800</p>  |
| <p>Driver<br/>07749-0010000</p>                       | <p>Steering stem socket<br/>07916-3710101</p>  <p>07916-3710100 (U.S.A. only)</p> | <p>Driver shaft assembly<br/>07946-KM90301</p>        |
| <p>Bearing remover, A<br/>07946-KM90401</p>         | <p>Assembly base<br/>07946-KM90600</p>    | <p>Steering stem driver<br/>07946-MB00000</p>       |
| <p>Driver attachment (upper)<br/>070MF-MCJ0100</p>  | <p>Driver attachment (lower)<br/>070MF-MCJ0200</p>                              | <p>Bearing remover shaft<br/>07GGD-0010100</p>      |

# FRONT WHEEL/SUSPENSION/STEERING

|  |  |   |
|--|--|---|
| <p>Bearing remover, B<br/>07NMF-MT70110</p>                         | <p>Fork damper holder<br/>07YMB-MCF0101</p>  <p>or 07YMB-MCFA100 (U.S.A. only)</p> | <p>Fork seal driver<br/>07YMD-MCF0100</p>  <p>or 07NMD-KZ3010A (U.S.A. only)</p> |
| <p>Damper rod holder<br/>070MB-MEL0200</p>  <p>or 070MB-MELC200</p> | <p>Main bearing driver attachment<br/>07946-ME90200</p>                             | <p>Fork seal driver weight<br/>07947-KA50100</p>                                 |
| <p>Oil seal driver<br/>07965-MA60000</p>                          | <p>Installer shaft<br/>07VMF-KZ30200</p>    | <p>Installer attachment A<br/>07VMF-MAT0100 (U.S.A. only)</p>                  |
| <p>Installer attachment B<br/>07VMF-MAT0200 (U.S.A. only)</p>     | <p>Remover attachment E<br/>07AMF-MELA100 (U.S.A. only)</p>                       | <p>Remover attachment F<br/>07AMF-MELA200 (U.S.A. only)</p>                    |

### TROUBLESHOOTING

#### NOTE:

If there is any problem with steering, remove the steering damper (page 14-34) and inspect the steering condition. Check the HESD by using the Function Test (page 14-7) in case of no faulty parts with the steering.

#### Hard steering

- Faulty steering damper (HESD)
- Steering stem adjusting nut too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure

#### Steers to one side or does not track straight

- Faulty steering damper (HESD)
- Unevenly adjusted right and left forks
- Damaged or loose steering head bearings
- Bent fork legs
- Bent axle
- Wheel installed incorrectly
- Bent frame
- Worn or damaged wheel bearings
- Worn or damaged swingarm pivot bearings

#### Front wheel wobbling

- Bent rim
- Worn or damaged front wheel bearings
- Faulty tire
- Unbalanced front tire and wheel

#### Front wheel hard to turn

- Faulty front wheel bearings
- Bent front axle
- Front brake drag

#### Soft suspension

- Insufficient fluid in fork
- Incorrect fork fluid weight
- Weak fork springs
- Insufficient tire pressure

#### Stiff suspension

- Bent fork legs
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

#### Front suspension noise

- Insufficient fluid in fork
- Loose fork fasteners
- Incorrect fork fluid weight

## HESD (Honda Electronic Steering Damper) TROUBLESHOOTING

- The HESD (Honda Electronic Steering Damper) system is equipped with a Self-Diagnostic System that is linked to the PGM-FI system. If the malfunction indicator lamp (MIL) blinks (page 6-9), follow the Self-Diagnostic Procedures to remedy the problem (Refer to MIL troubleshooting; page 14-8). The HESD system is also equipped with a Function Test Mode that makes it possible to check the HESD under maximum damping characteristics. If there is any abnormal condition in the HESD system without MIL blinking, follow the HESD function test and check the HESD function.
- The HESD system includes a fail-safe function to secure a minimum running capability when there is any trouble in the system. When any abnormality is detected by the self-diagnosis function, the ECM stops the HESD system control by shutting off the current supply to the linear solenoid and the HESD will operate under minimum damping characteristics accordingly.
- Refer to system diagram in the PGM-FI system (page 6-8).
- Refer to PGM-FI self-diagnosis information for self-diagnosis procedure and reset procedure in the PGM-FI system (page 6-9).
- Refer to test harness connection (page 6-11) and terminal location (page 6-12).
- Refer to MIL code information (page 14-8) before starting troubleshooting.
- A faulty HESD system is often related to poorly connected or corroded connectors. Check those connections before proceeding.

If the following symptoms occur to the HESD, check the MIL blinking and perform the troubleshooting in accordance with MIL blinks.

- MIL blink 11 times (page 6-22)
- MIL blink 51 times (page 14-8)
- MIL does not blink, although HESD does not work.
  - When the vehicle speed rises, the damping force does not increase.
  - Although vehicle is not running, the damping force is strong (hard steering).

### HESD FUNCTION TEST

#### NOTE:

- The HESD system is also equipped with a Function Test Mode so that a technician can compare the minimum with maximum damping characteristics without riding. The HESD system is set to minimum damping at no vehicle speed under normal conditions. By using the Function Test Mode, the ECM operates the linear solenoid with maximum current so the HESD system is temporarily set to maximum damping.
- It is not possible to use the HESD Function Test Mode when any problems occur (MIL blinking).
- Before performing the HESD function test, remove the HESD unit from the vehicle (page 14-34) and check the following.
  - Steering stem pre-load (page 14-44)
  - Wear or damage of steering head bearing (page 14-35)
  - HESD-to-steering linkage (page 14-34)

### HESD FUNCTION TEST PROCEDURE

- Support the motorcycle securely using a hoist or equivalent and raise the front wheel off the ground.
- Before function the test, check the feel for minimum damping characteristics by moving the steering right and left quickly several times. Operate the steering quickly and at a uniform force during the test.

Perform the HESD function test as follows:

1. Lower the side stand (side stand switch OFF).
2. Shift the transmission into any gear other than neutral.
3. Open the throttle grip fully.
4. Turn the ignition switch ON with keeping the state of 1 – 3.

The HESD indicator starts blinking and the HESD system enters the Function Test Mode for 10 seconds.

Make sure that the damping characteristics (force) changes, by means of comparing the minimum damping characteristics before Function Test with the maximum damping characteristics under the Function Test.

If the HESD damping characteristics (force) in Function Test Mode does not change at all, replace the HESD unit with a new one (page 14-34).



## MIL TROUBLESHOOTING

| MIL Blinks | Causes  | Symptoms  | Refer to |
|------------|---|---|----------|
| 11         | <ul style="list-style-type: none"> <li>Loose or poor contact on speed sensor connector</li> <li>Open or short circuit in speed sensor wire</li> <li>Faulty speed sensor</li> </ul>          | <ul style="list-style-type: none"> <li>Engine operates normally</li> <li>HESD does not function               <ul style="list-style-type: none"> <li>ECM does not control the linear solenoid</li> <li>Minimum damping characteristics</li> </ul> </li> </ul> | 6-22     |
| 51         | <ul style="list-style-type: none"> <li>Loose or poor contact on linear solenoid connector</li> <li>Open or short circuit in linear solenoid wire</li> <li>Faulty linear solenoid</li> </ul> | <ul style="list-style-type: none"> <li>Engine operates normally</li> <li>HESD does not function               <ul style="list-style-type: none"> <li>ECM does not control the linear solenoid</li> <li>Minimum damping characteristics</li> </ul> </li> </ul> | 14-8     |

## MIL 51 BLINKS (LINEAR SOLENOID)

- Before starting the inspection, check for loose or poor contact on the linear solenoid connector and recheck the MIL blinking.

## 1. Linear Solenoid Circuit Inspection

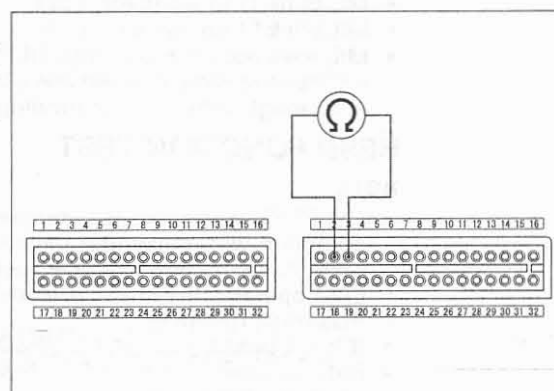
Turn the ignition switch OFF.  
Disconnect the ECM connectors and connect the ECM test harness to the ECM connectors at the wire harness side (page 6-11).  
Measure the resistance at the test harness terminals.

Connection: B2 – B3

*Is the resistance within 6.0 – 8.0  $\Omega$  (20°C/68°F)?*

**Yes** – GO TO STEP 3

**No** – GO TO STEP 2



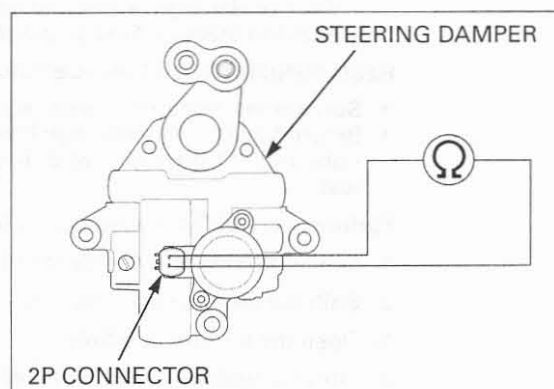
## 2. Linear Solenoid Resistance Inspection

Remove the steering damper (page 14-34) and disconnect the linear solenoid 2P connector.  
Measure the resistance at the linear solenoid terminals.

*Is the resistance within 6.0 – 8.0  $\Omega$  (20°C/68°F)?*

**Yes** – Open circuit in White/green or White/blue wire

**No** – Faulty linear solenoid



### 3. Linear Solenoid Short Circuit Inspection

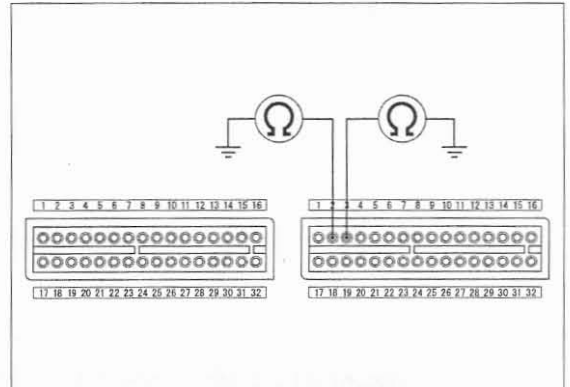
Check for continuity between the test harness and body ground.

**Connections:** B2 (+) – body ground (–)  
B3 (+) – body ground (–)

*Is there continuity?*

**Yes** – Short circuit in White/green or White/blue wire

**No** – Replace the ECM with a known good one, and recheck

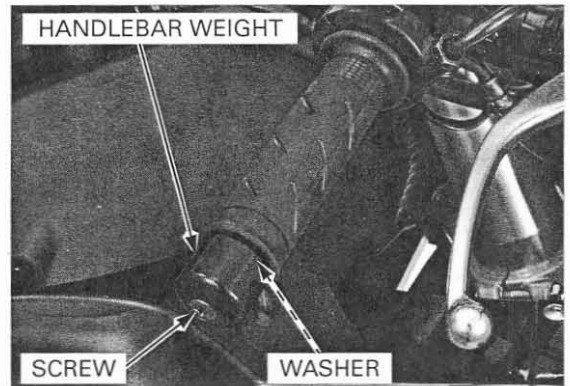


## HANDLEBARS

### REMOVAL

Support the motorcycle securely using a hoist or equivalent and raise the front wheel of the ground.

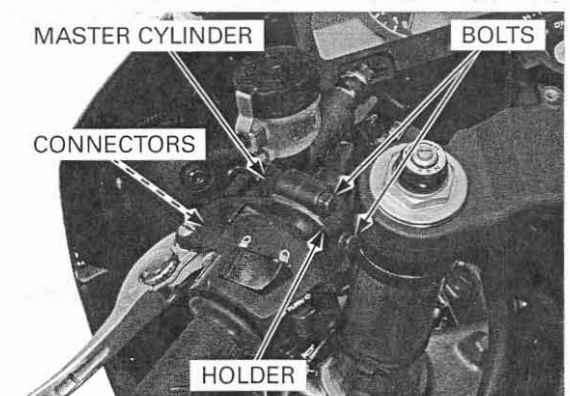
Hold the handlebar weight and remove the mounting screw, then remove both handlebar weights/washers.



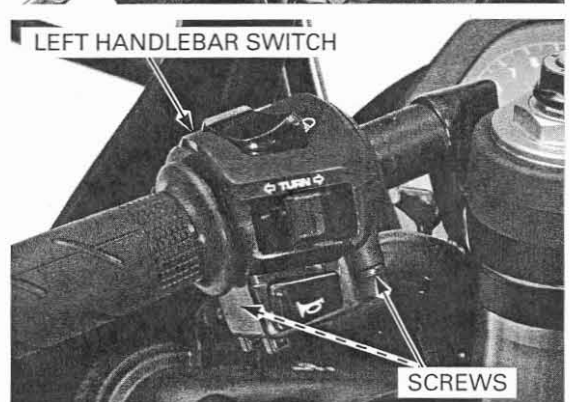
Disconnect the clutch switch connectors from the switch.

*Keep the clutch master cylinder upright to prevent air from entering the hydraulic system.*

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

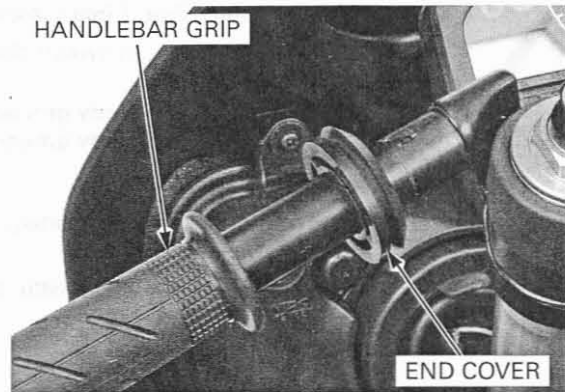


Remove the screws and left handlebar switch.

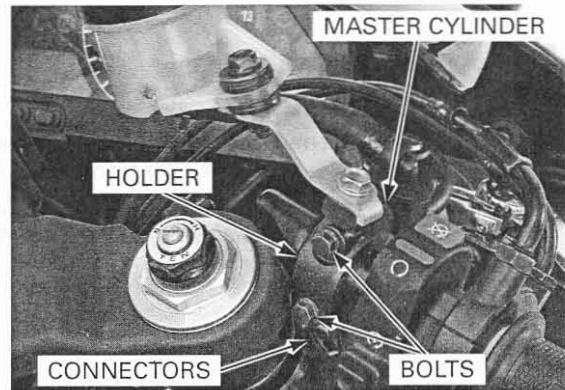


## FRONT WHEEL/SUSPENSION/STEERING

Remove the left handlebar grip and switch end cover.



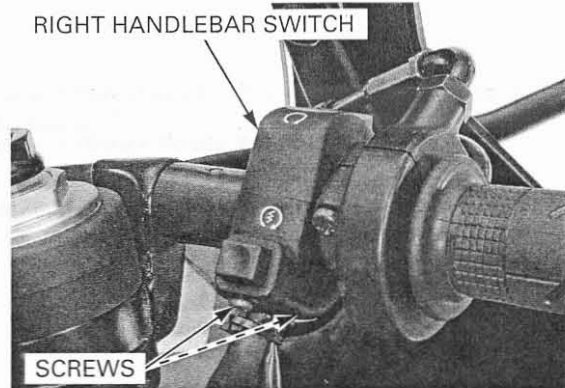
Disconnect the front brake light switch connectors from the switch.



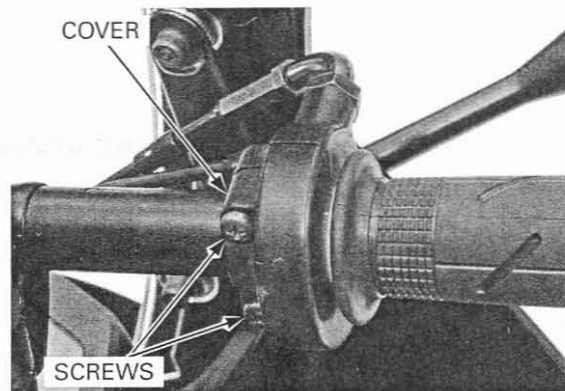
*Keep the brake master cylinder upright to prevent air from entering the hydraulic system.*

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

Remove the screws and right handlebar switch.

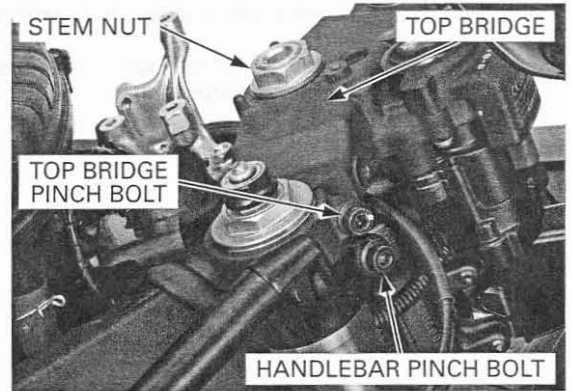


Remove the screws and throttle cable housing cover.

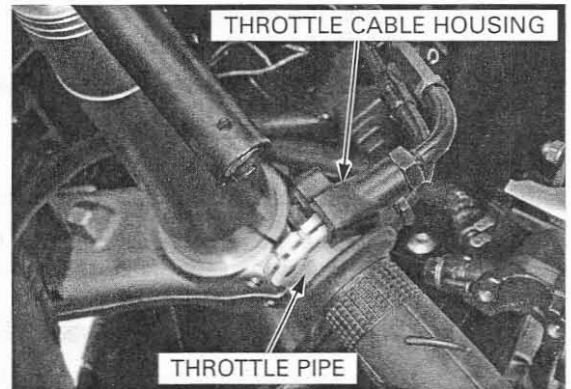


Remove the HESD unit (page 14-34).

Loosen the top bridge pinch bolts and handlebar pinch bolts.  
Remove the steering stem nut and top bridge.  
Remove the handlebars from the fork sliders.



Remove the throttle cable housing/throttle pipe from the right handlebar.

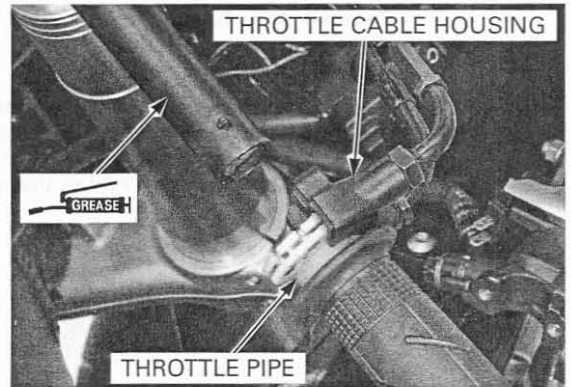


## INSTALLATION

Make sure that the handlebar stopper ring is installed in the fork slider groove properly.

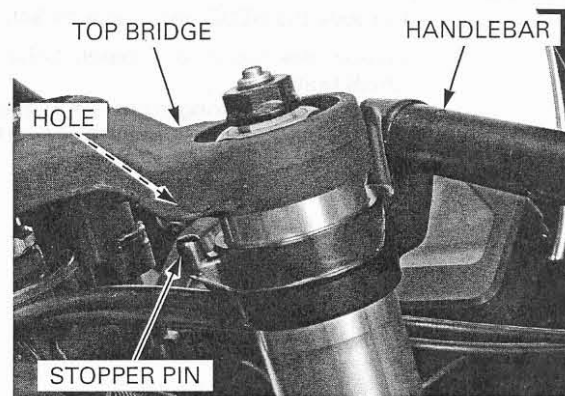


Apply grease to the sliding surface of the throttle pipe.  
Install the throttle cable housing/throttle pipe to the right handlebar.



## FRONT WHEEL/SUSPENSION/STEERING

Install the right and left handlebars onto the fork sliders.  
Install the top bridge while aligning its holes with the handlebar stopper pins.



Install the steering stem nut and tighten it to the specified torque.

**TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)**

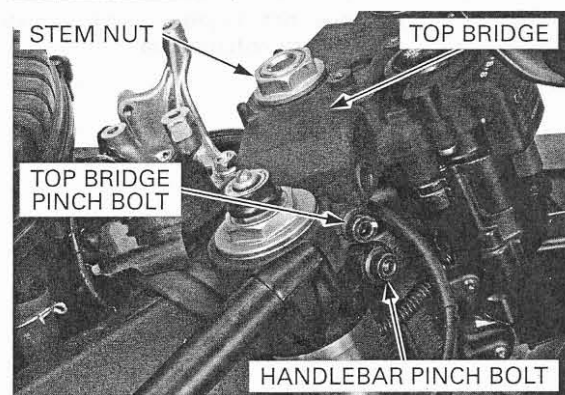
Tighten the top bridge pinch bolts to the specified torque.

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

Seat the handlebar upper surface with the top bridge lower surface, then tighten the handlebar pinch bolts to the specified torque.

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

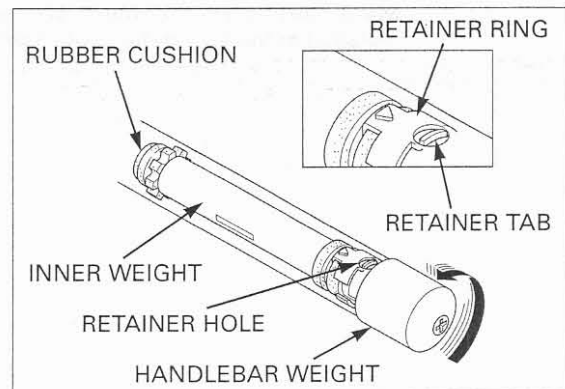
Install the steering damper (page 14-34).



### HANDLEBAR WEIGHT REPLACEMENT

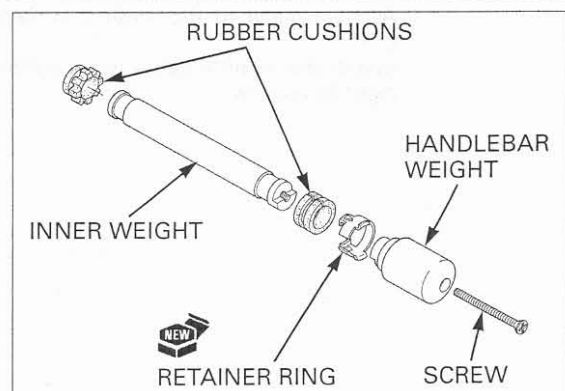
Straighten the weight retainer tab by the screwdriver or punch.

*Apply lubricant spray through the tab locking hole to the rubber for easy removal.* Temporarily install the handlebar weight and screw, then remove the inner weight by turning the handlebar weight.



Remove the handlebar weight from the inner weight.  
Discard the retainer ring.

Install the new retainer ring onto the inner weight.  
Install the handlebar weight onto the inner weight while aligning the bosses and grooves each other.  
Install and temporarily tighten the mounting screw.

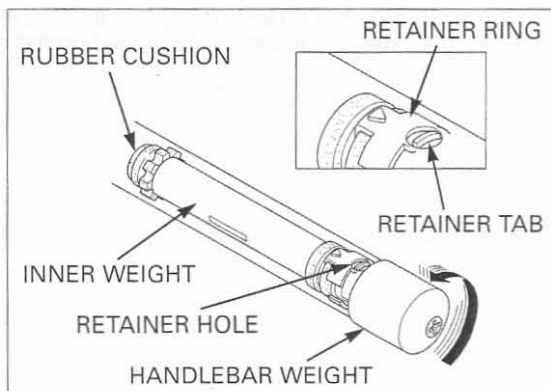




Insert the handlebar weight assembly into the handlebar.

Turn the handlebar weight and hook the retainer ring tab with the hole in the handlebar.

Remove the mounting screw and handlebar weight.



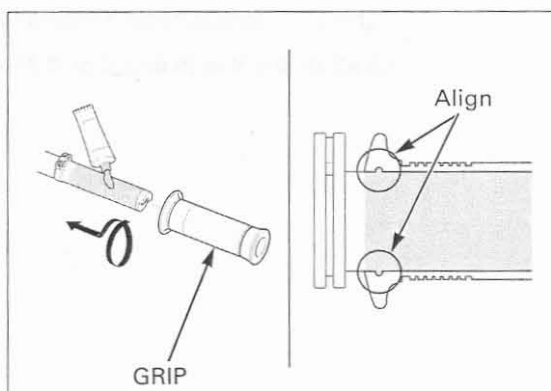
If you remove the right handlebar grip from the throttle pipe, install it in accordance with following procedure.

Apply Pro Honda Handgrip Cement or equivalent adhesive to the inside of the handlebar grip and to the clean surfaces of the throttle pipe.

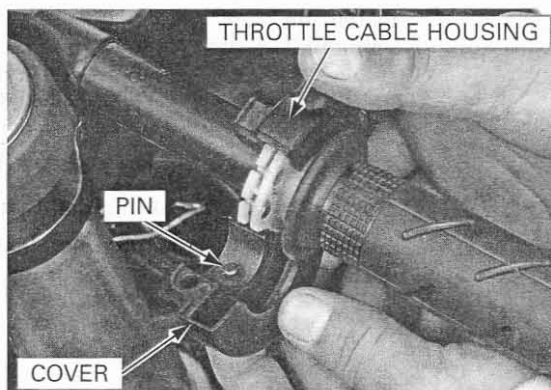
Wait 3 – 5 minutes and install the grip.

*Allow the adhesive to dry for an hour before using.*

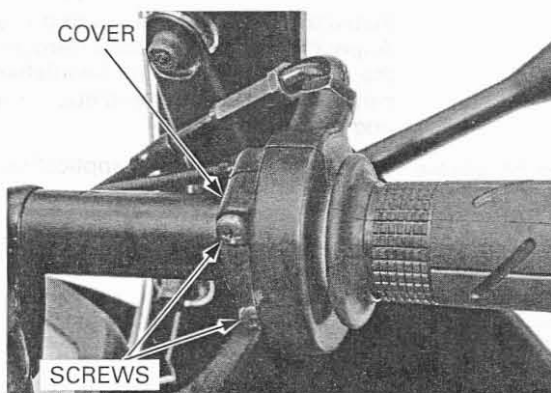
Rotate the grip for even application of the adhesive, and align the inner groove of the grip with the index line of throttle pipe.



Install the throttle cable housing cover to the throttle pipe flange, aligning its locating pin with the hole in the handlebar.



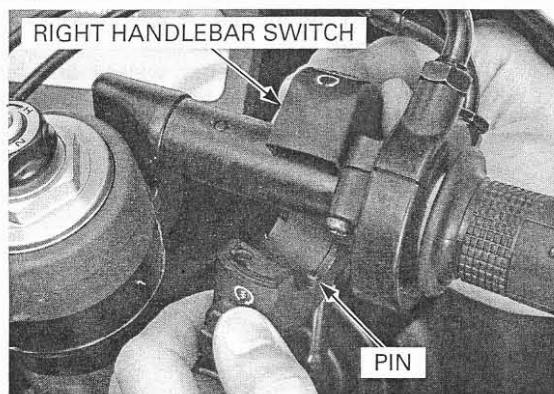
Install and tighten the housing cover screws securely.





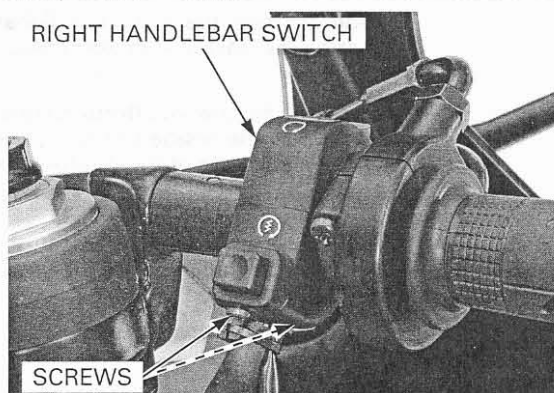
## FRONT WHEEL/SUSPENSION/STEERING

Install the right handlebar switch, aligning its locating pin with the hole in the handlebar.



Tighten the screws to the specified torque.

**TORQUE: 0.9 N·m (0.09 kgf·m, 0.7 lbf·ft)**



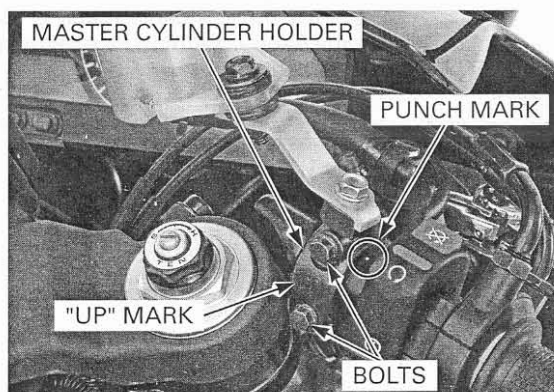
Install the front brake master cylinder and holder with the "UP" mark facing up.

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

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

Connect the front brake light switch connectors.

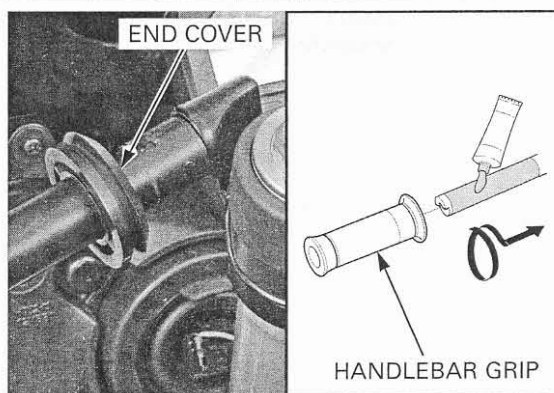
Check the throttle grip operation and free play (page 4-7).



Install the switch end cover to the left handlebar. Apply Pro Honda Handgrip Cement or equivalent to the inside surface of the handlebar grip and to the clean surface of the handlebar. Wait 3 – 5 minutes and install the grip.

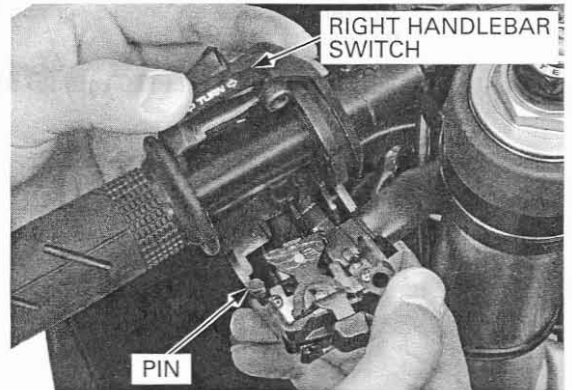
*Allow the adhesive to dry for an hour before using.*

Rotate the grip for even application of the adhesive.

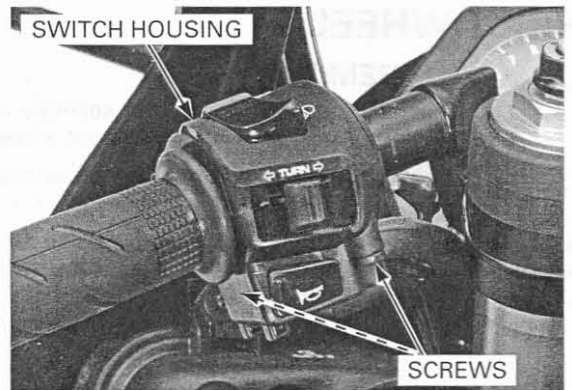


Make sure that the switch end plate is installed into the handlebar switch groove.

Install the left handlebar switch, aligning its locating pin with the hole in the handlebar.



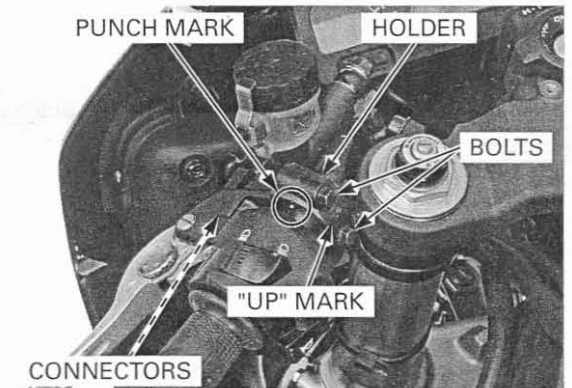
Tighten the forward screw first, then the rear screw.



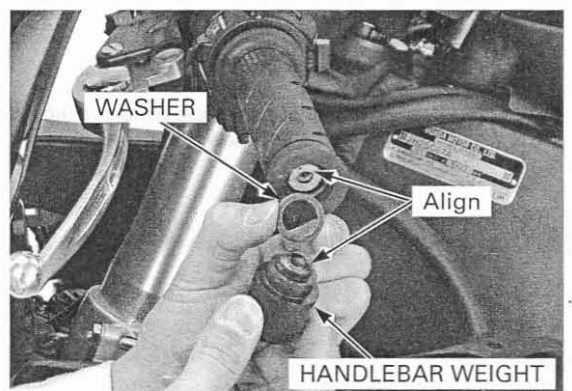
Install the clutch master cylinder and holder with the "UP" mark facing up. Align the end of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then lower bolt.

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

Connect the clutch switch connectors.



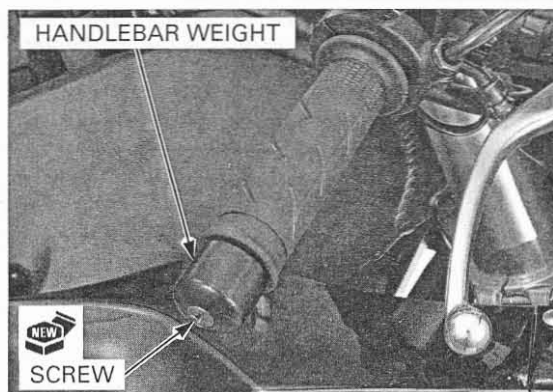
Install the washer and handlebar weight on both handlebars, aligning with each handlebar and handlebar weight cutout.



## FRONT WHEEL/SUSPENSION/STEERING

Tighten the new mounting screws to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**



## FRONT WHEEL

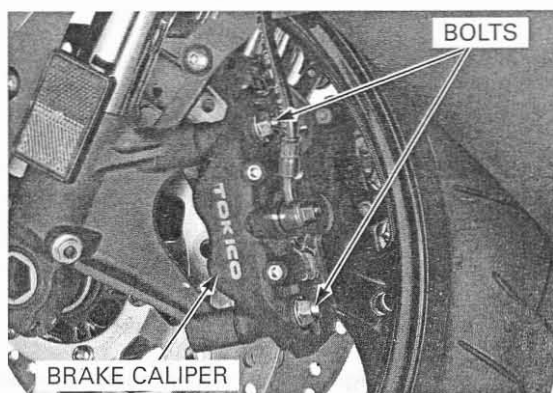
### REMOVAL

Support the motorcycle securely using a hoist or equivalent, and raise the front wheel off the ground.

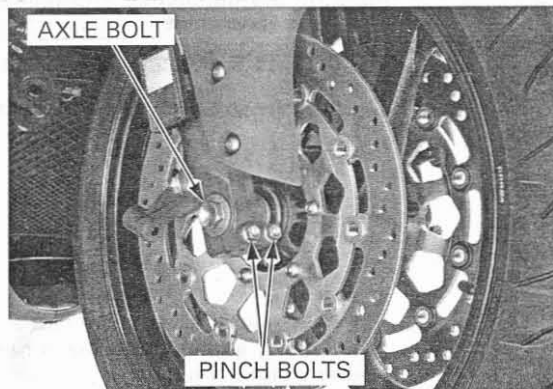
Remove the brake caliper mounting bolts and both brake calipers.

*Do not operate the brake lever after the brake caliper is removed.*

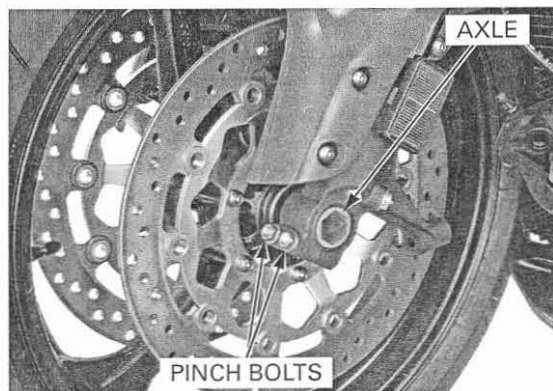
Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.



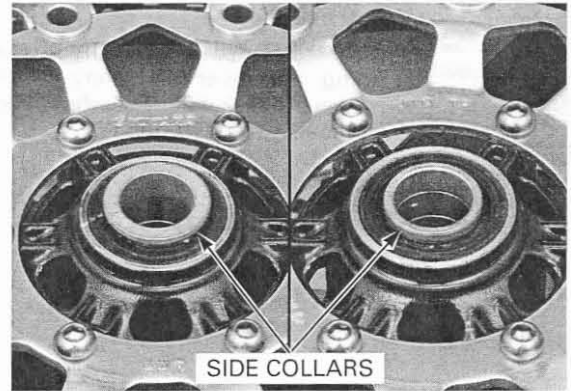
Loosen the right axle holder pinch bolts. Remove the axle bolt.



Loosen the left axle holder pinch bolts. Remove the axle and front wheel.



Remove the right and left side collars.

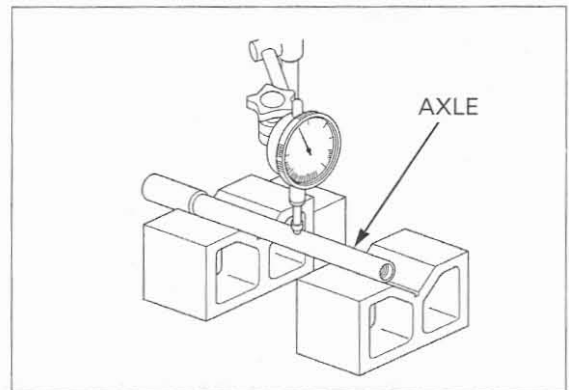


## INSPECTION

### Axle

Set the axle on V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT: 0.2 mm (0.008 in)**



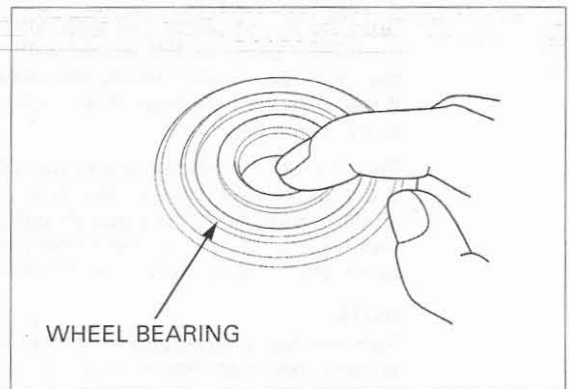
### Wheel bearing

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Replace the wheel bearings, if necessary (page 14-18).

Replace the bearings in pairs.



### Wheel rim runout

Check the rim runout by placing the wheel in a turning stand.

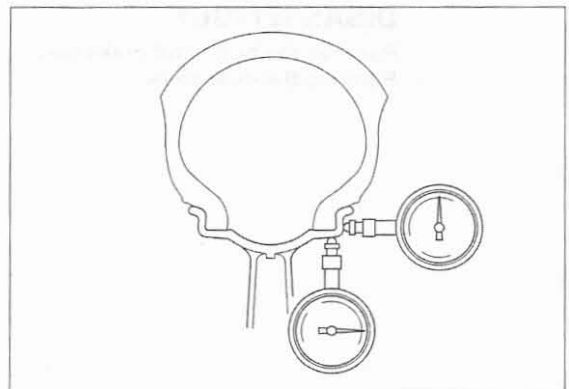
Spin the wheel by hand, and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

### SERVICE LIMITS:

**Radial: 2.0 mm (0.08 in)**

**Axial: 2.0 mm (0.08 in)**

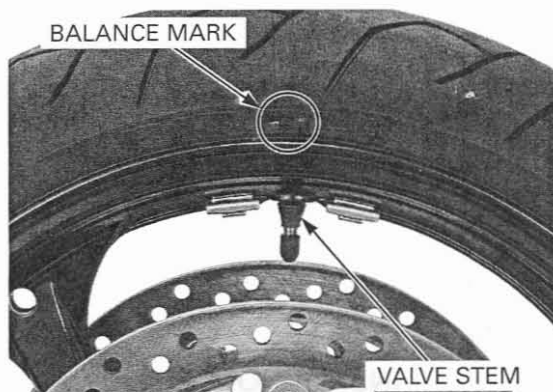


## FRONT WHEEL/SUSPENSION/STEERING

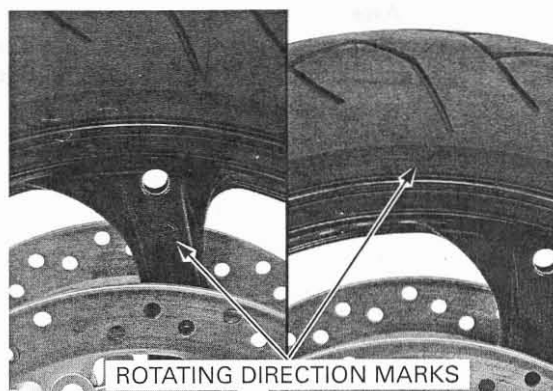
For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

### Wheel balance

- Wheel balance directly affects the stability, handling and over all safety of the motorcycle. Always check balance when the tire has been removed from the rim.



Note the rotating direction marks on the wheel and tire.



Remove the dust seals from the wheel. Mount the wheel, tire and brake discs assembly in an inspection stand. Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk. Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.

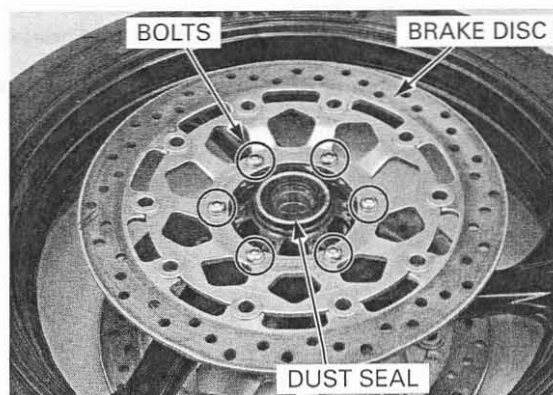
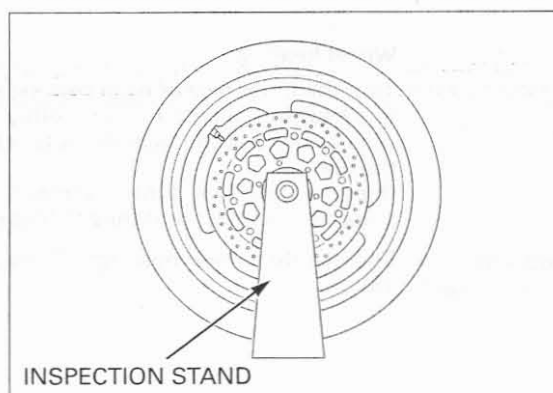
To balance the wheel, install the wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.

### NOTE:

This model is equipped with the new shape wheel weight made of zinc spelter. This wheel weight is incompatible with the conventional one in case of installation to the wheel.

### DISASSEMBLY

Remove the bolts and brake discs.  
Remove the dust seals.

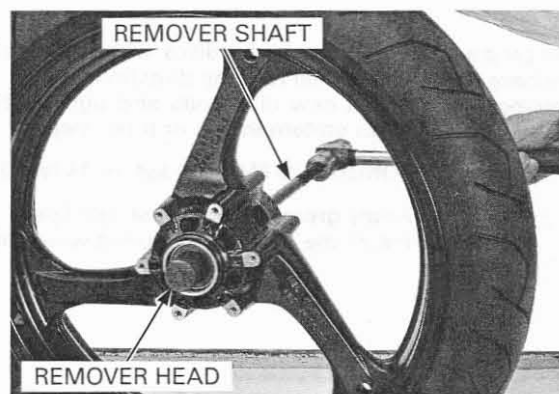




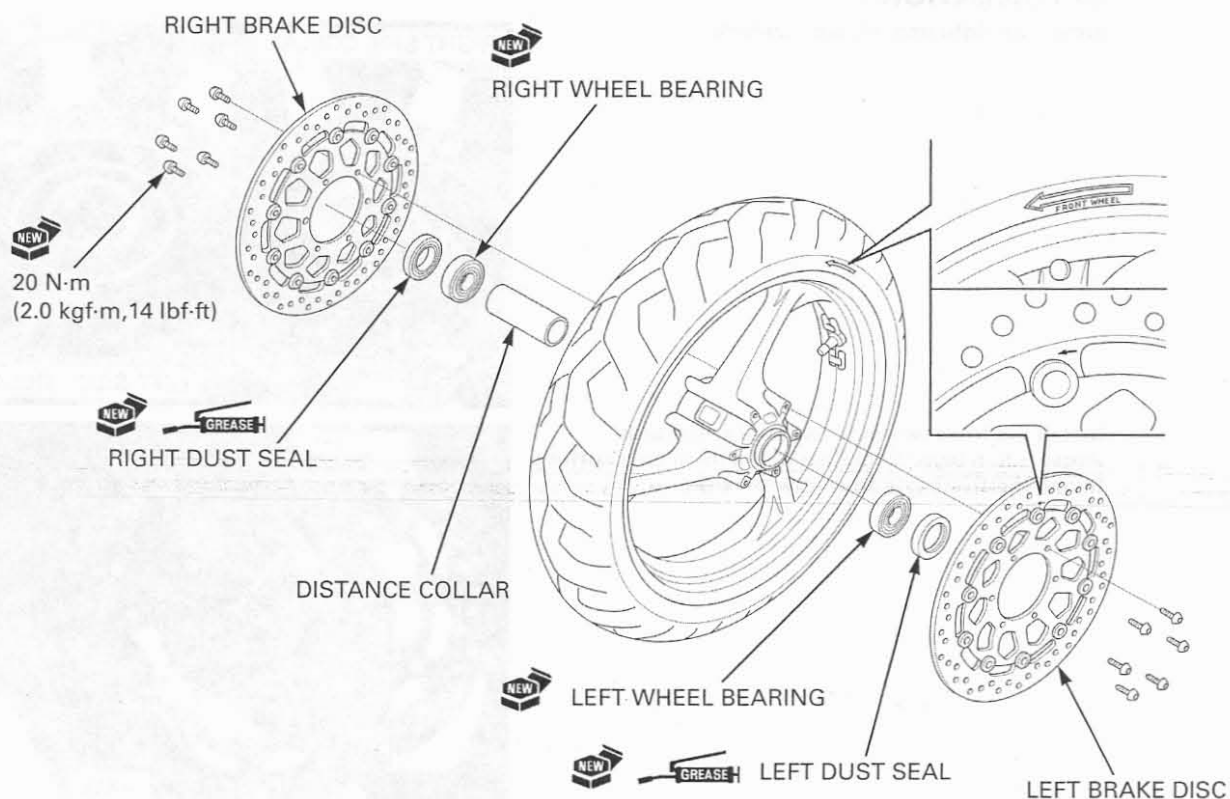
Install the bearing remover head into the bearing. From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

## TOOLS:

Bearing remover head, 25 mm 07746-0050800  
Bearing remover shaft 07GGD-0010100



## ASSEMBLY

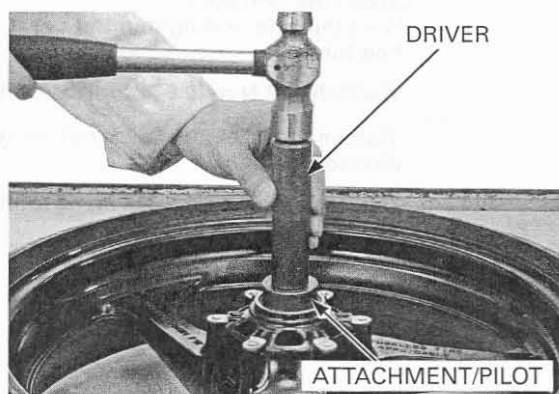


*Never install the old bearings. Once the bearings have been removed, the bearings must be replaced with new ones.*

Drive in a new right wheel bearing squarely until it is fully seated using the special tools. Install the distance collar, then drive in new left wheel bearing using the same tools.

## TOOLS:

Driver 07749-0010000  
Attachment, 42 x 47 mm 07746-0010300  
Pilot, 25 mm 07746-0040600





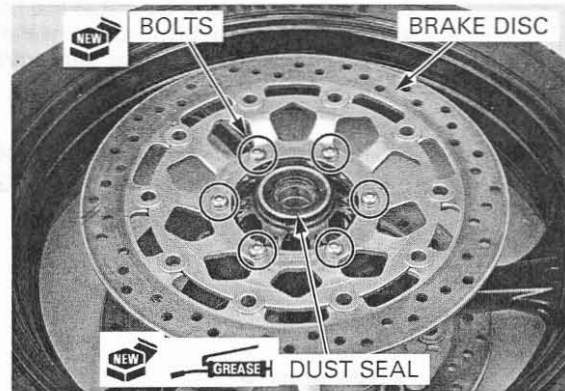
## FRONT WHEEL/SUSPENSION/STEERING

*Do not get grease on the brake discs or stopping power will be reduced.*

Install the brake discs with the arrow mark facing the normal rotating direction.  
Install new disc bolts and tighten them in a criss-cross pattern in two or three steps.

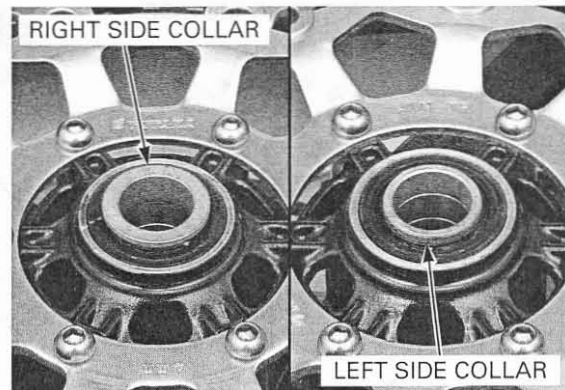
**TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)**

Apply grease to new dust seal lips.  
Install the dust seals into the wheel hub.

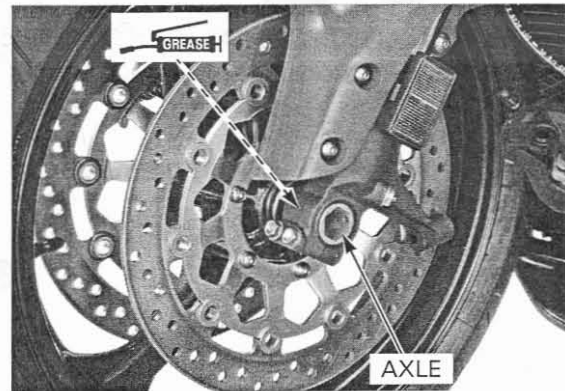


### INSTALLATION

Install the right and left side collars.



Install the front wheel between the fork legs.  
Apply a thin layer of grease to the front axle surface.  
Install the front axle from the left side.

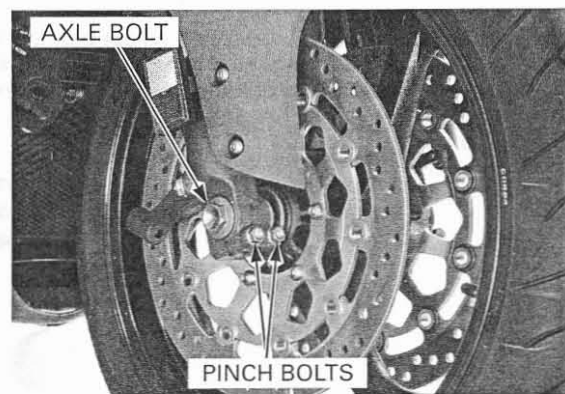


Install the axle bolt.  
Hold the axle and tighten the axle bolt to the specified torque.

**TORQUE: 78 N·m (8.0 kgf·m, 58 lbf·ft)**

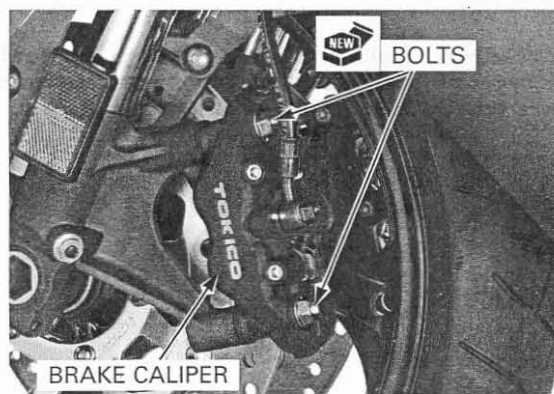
Tighten the right axle holder pinch bolts to the specified torque.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Install the both brake calipers and tighten the new mounting bolts to the specified torque.

**TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)**



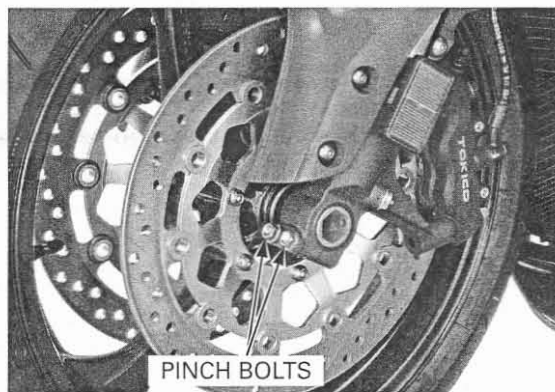
With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.



Tighten the left axle holder pinch bolts to the specified torque.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

Recheck the front brake operation.



## FORK

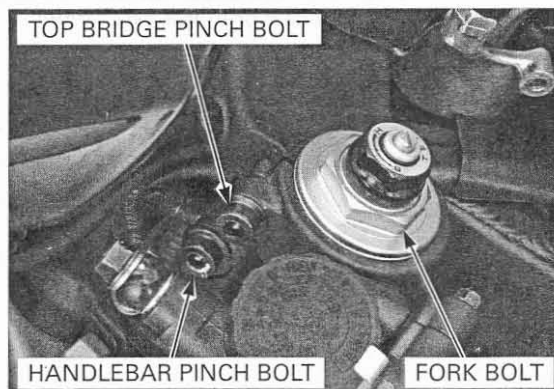
### REMOVAL

Remove the following:

- Front wheel (page 14-16)
- Front fender (page 3-19)

Loosen the handlebar pinch bolt and fork top bridge pinch bolt.

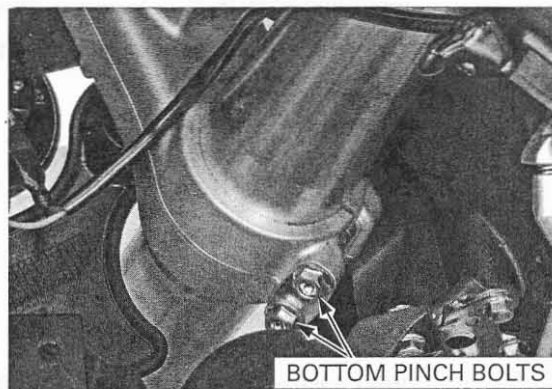
When the fork leg will be disassembled, loosen the fork bolt, but do not remove it yet.



## FRONT WHEEL/SUSPENSION/STEERING

*Keep the front  
brake and clutch  
master cylinder  
upright.*

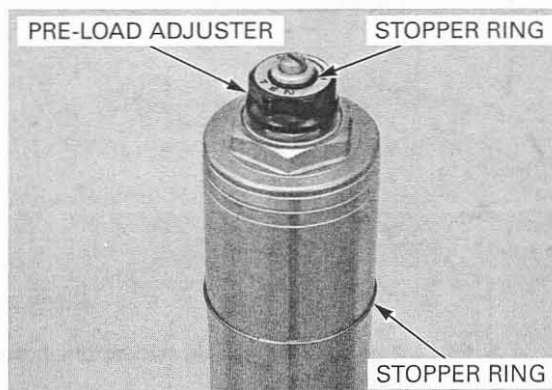
While holding the fork leg, loosen the fork bottom bridge pinch bolts and remove the fork slider from the handlebar and fork bridges.



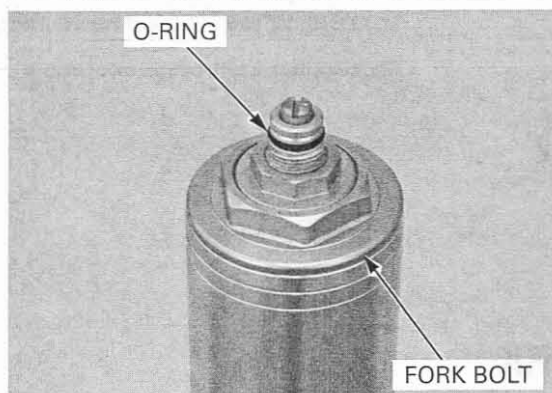
### DISASSEMBLY

*Be careful not to  
scratch the fork  
slider.*

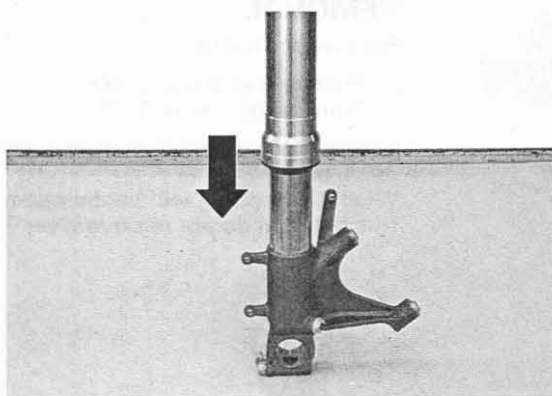
Remove the handlebar stopper ring.  
Remove the stopper ring and pre-load adjuster.



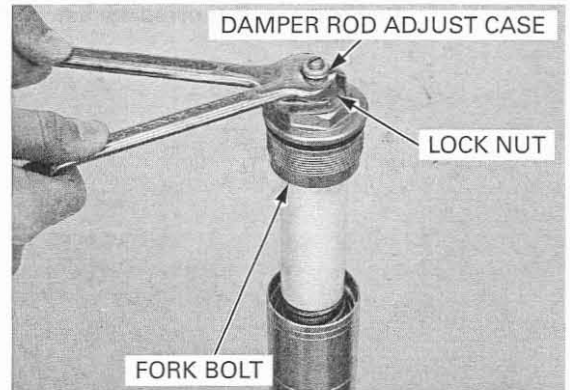
Remove the O-ring from the damper rod adjust case.  
Remove the fork bolt from the fork slider.



Push the fork slider slowly down, and gently seat the dust seal onto the axle holder.

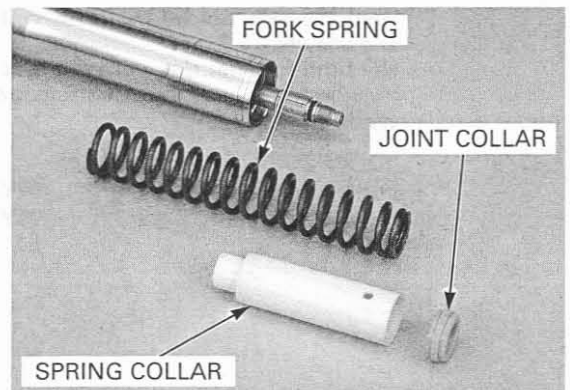


Hold the damper rod adjust case, then loosen the lock nut.  
Remove the lock nut and fork bolt.



Remove the following:

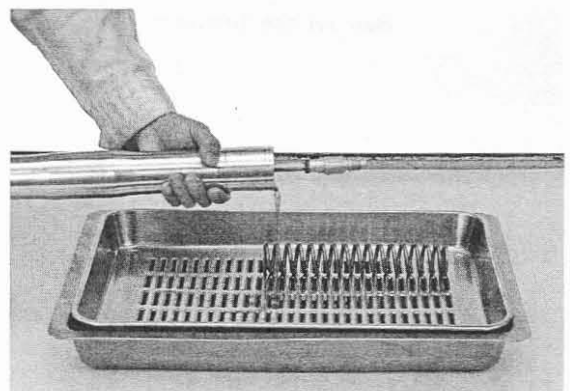
- Joint collar
- Spring collar
- Fork spring



Remove the O-ring from the damper rod adjust case.

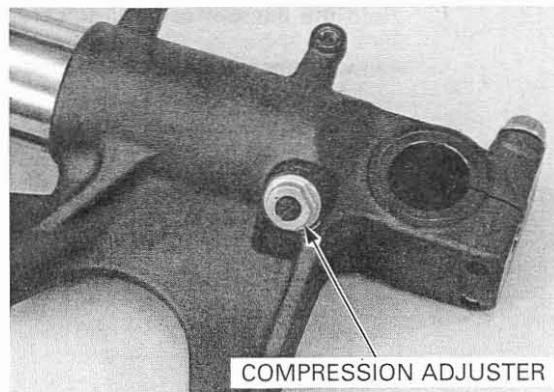


Pour out the fork fluid by pumping the fork tube several times.  
Pour out the fork fluid from the fork damper by pumping the damper rod several times.



## FRONT WHEEL/SUSPENSION/STEERING

Remove the compression adjuster from the axle holder.

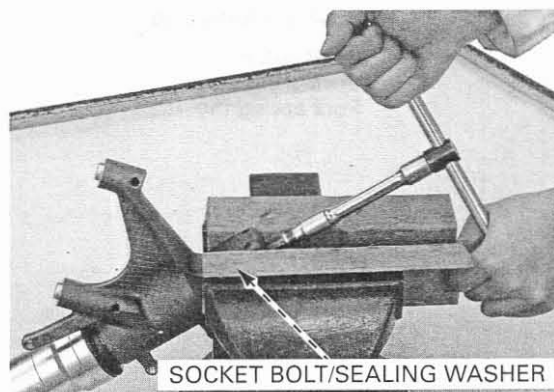


Hold the axle holder in a vise with soft jaws or a shop towel. Hold the fork damper with the fork damper holder, then remove the fork socket bolt and sealing washer.

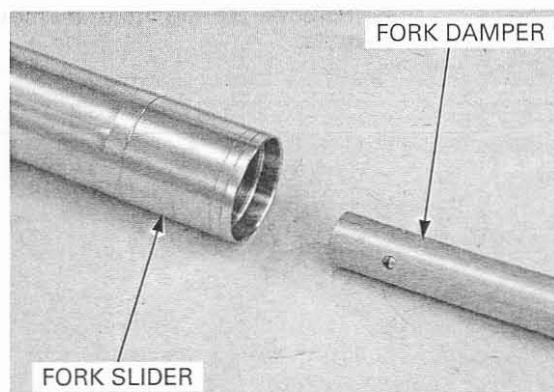
**TOOL:**

Fork damper holder

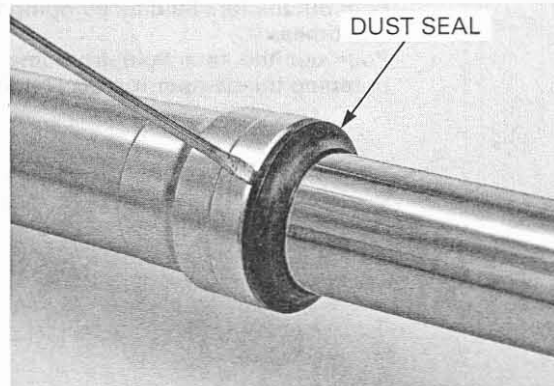
07YMB-MCF0101 or  
07YMB-MCFA100  
(U.S.A. only)



Remove the fork damper assembly from the fork slider.



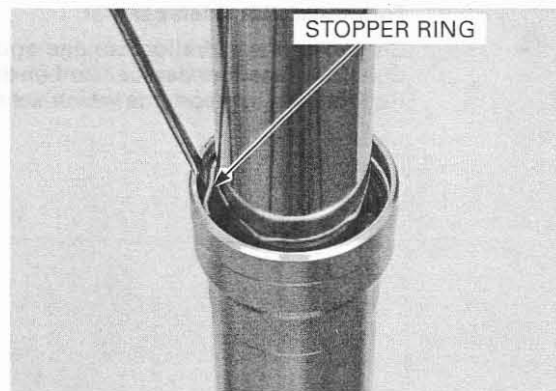
Remove the dust seal.



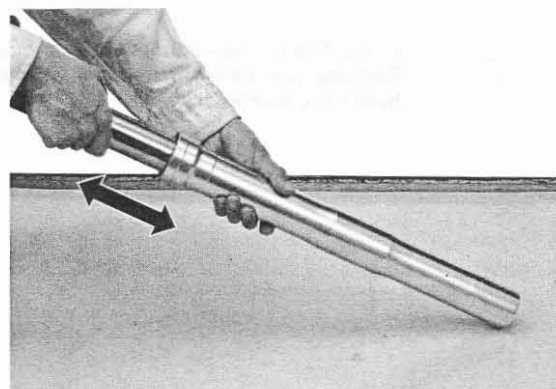


*Do not scratch the fork tube sliding surface.*

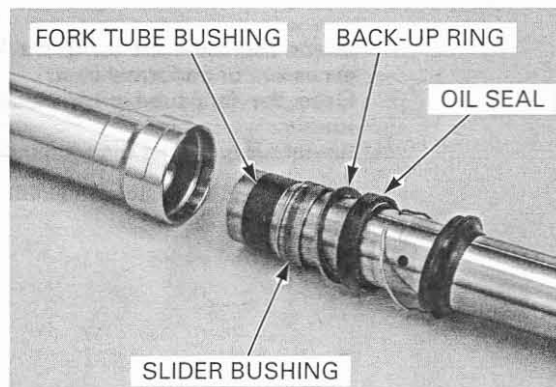
Remove the oil seal stopper ring.



Pull the fork tube out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork tube separates from the fork slider. The slider bushing will be forced out by the fork tube bushing.



Remove the fork tube bushing, slider bushing, back-up ring, oil seal, stopper ring and dust seal from the fork tube.

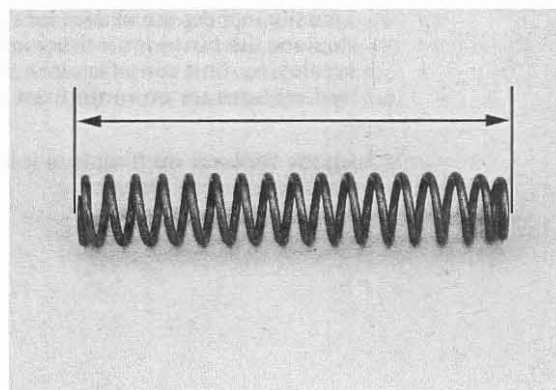


## INSPECTION

### Fork spring

Measure the fork spring free length.

**SERVICE LIMIT:** 213.8 mm (8.42 in)

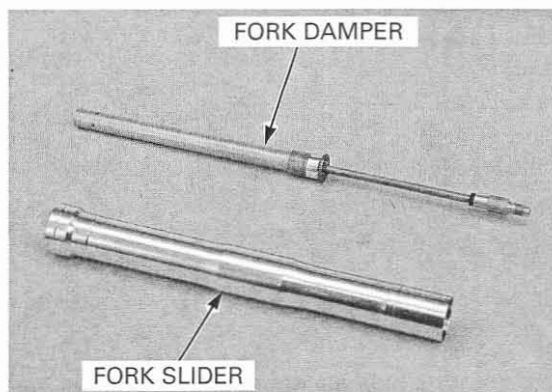




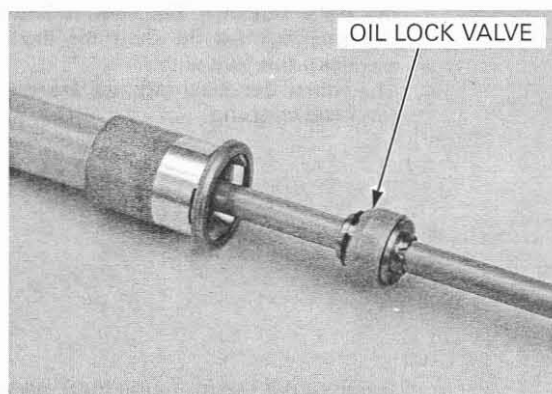
## FRONT WHEEL/SUSPENSION/STEERING

### Fork tube/slider/damper

Check the fork slider for damage or deformation.  
Check the fork damper for bend or damage.  
Replace any components which are damaged.

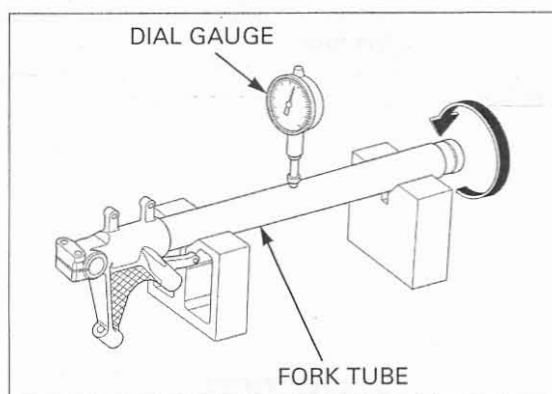


Check the oil lock valve for wear or damage.  
Replace the fork damper assembly, if any components are damaged.



Check the fork tube for score marks, scratches, or excessive or abnormal wear.  
Place the fork tube on V-blocks and measure the runout.  
Actual runout is 1/2 the total indicator reading.

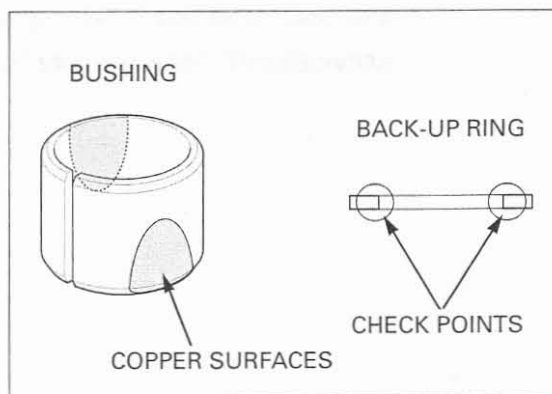
**SERVICE LIMIT: 0.20 mm (0.008 in)**



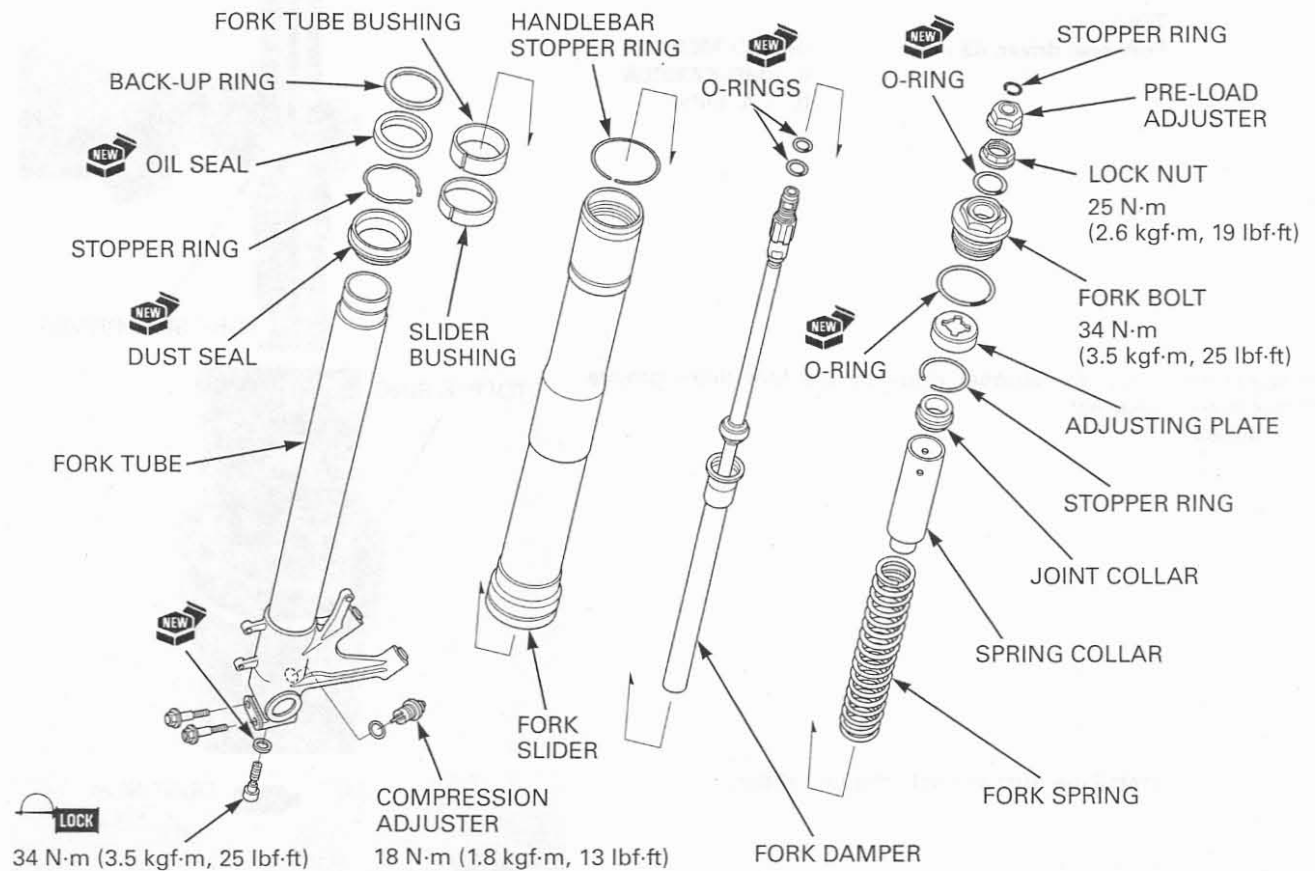
### Fork tube bushing

Visually inspect the slider and fork tube bushings.  
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

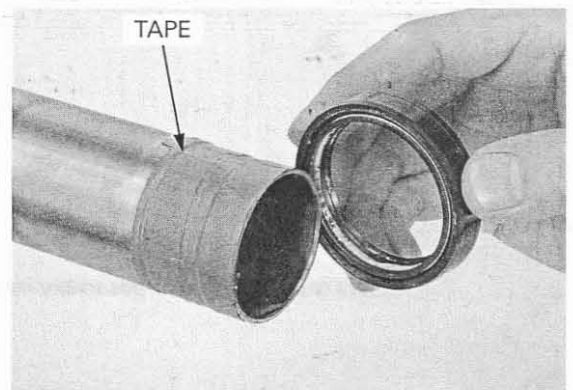
Check the back-up ring; replace it if there is any distortion at the points shown.



# ASSEMBLY



- Before assembly, wash all parts with a high flash or non-flammable solvent and wipe them dry.
- When installing the fork dust seal and oil seal, wrap the edge and groove of the fork tube with tape.



Apply fork fluid to new dust seal and oil seal lips.

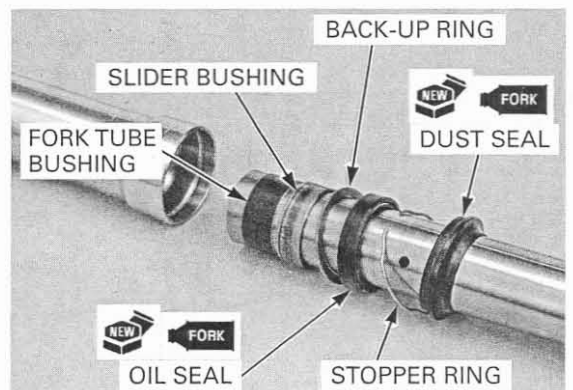
Install the oil seal with its marked side facing toward the axle holder.

Install the dust seal, stopper ring and oil seal.

Remove the burrs from the slider bushing mating surface, being careful not to peel off the coating.

Install the back-up ring, slider bushing and fork tube bushing.

Install the fork tube into the fork slider.



## FRONT WHEEL/SUSPENSION/STEERING

Drive the oil seal in using the special tool.

**TOOL:**

Fork seal driver, 43 mm

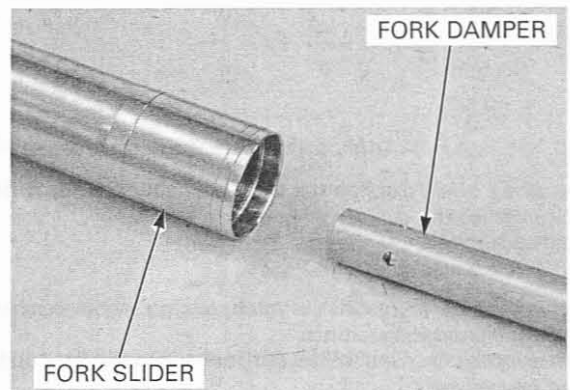
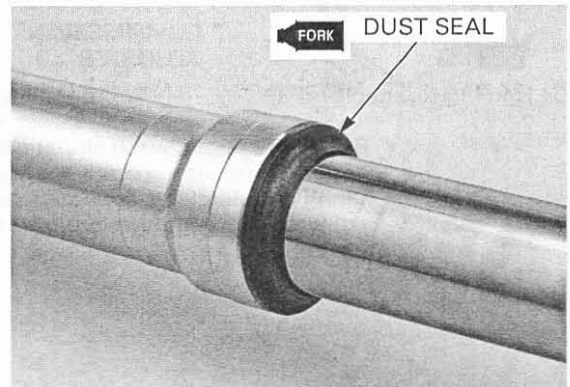
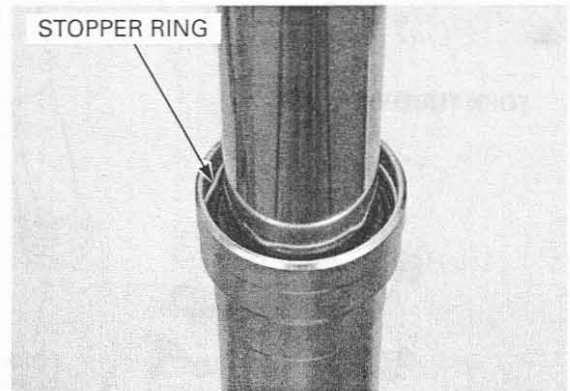
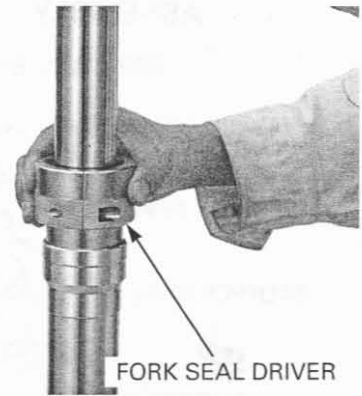
07YMD-MCF0100 or  
07NMD-KZ3010A  
(U.S.A. only)

*Do not scratch the  
fork tube sliding  
surface.*

Install the stopper ring into the fork slider groove  
securely.

Install the dust seal into the fork slider.

Install the fork damper assembly into the fork slider.



Apply a locking agent to the fork socket bolt threads.  
Install the socket bolt with a new sealing washer.



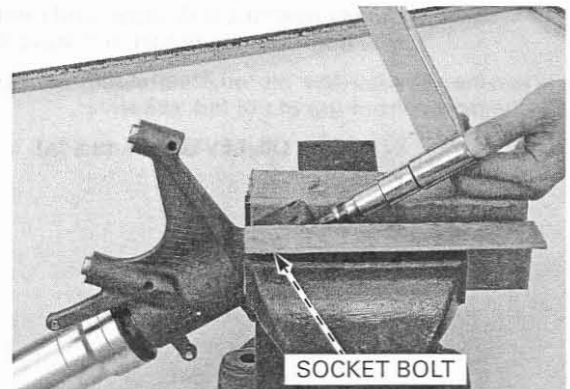
Hold the axle holder in a vise with soft jaws or a shop towel.  
Hold the fork damper with the fork damper holder, then tighten the fork socket bolt to the specified torque.

## TOOL:

Fork damper holder

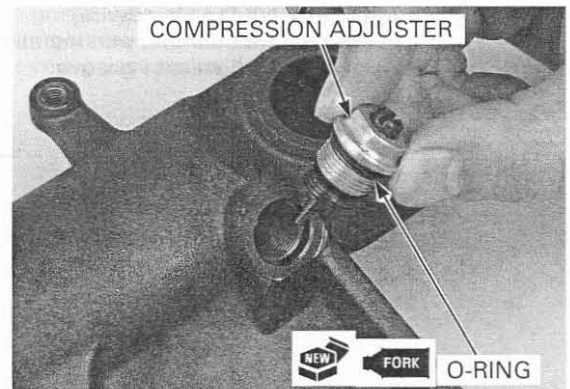
07YMB-MCF0101 or  
07YMB-MCFA100  
(U.S.A. only)

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



Apply fork fluid to new O-ring and install it to the compression adjuster.  
Install the compression adjuster to the axle holder.

**TORQUE:** 18 N·m (1.8 kgf·m, 13 lbf·ft)



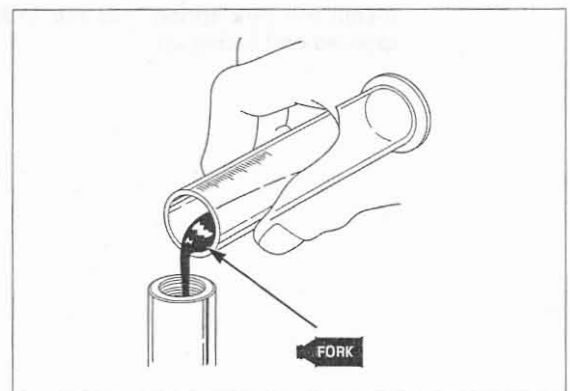
Pour the specified amount of recommended fork fluid into the fork leg.

## RECOMMENDED FORK FLUID:

Pro Honda Suspension Fluid, SS-55 or equivalent

## FORK FLUID CAPACITY:

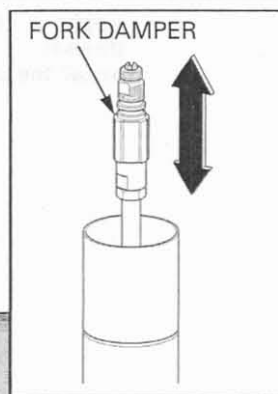
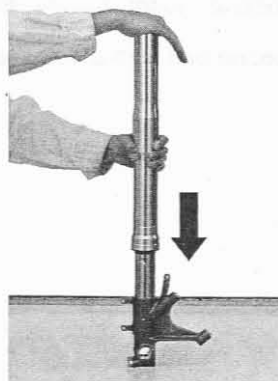
$466 \pm 2.5 \text{ cm}^3$  ( $15.8 \pm 0.08 \text{ US oz}$ ,  $16.4 \pm 0.09 \text{ Imp oz}$ )



## FRONT WHEEL/SUSPENSION/STEERING

Bleed the air from the fork leg as follows:

1. Extend the fork, cover the top of the fork slider with your hand and compress the fork leg slowly.
2. Remove your hand and extend the fork slowly. Repeat above procedure 2 or 3 times.
3. Pump the fork damper rod slowly 8 – 10 times.

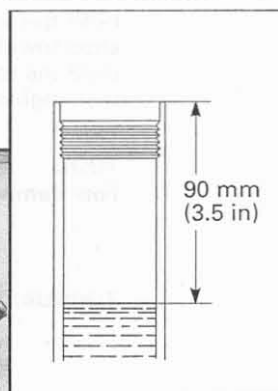
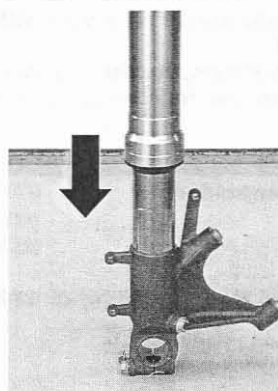


Slowly push the fork slider, and gently seat the dust seal onto the axle holder and leave it for 5 minutes.

*Be sure the oil level is the same in the both forks.*

After the oil level stabilizes, measure the oil level from top of the fork slider.

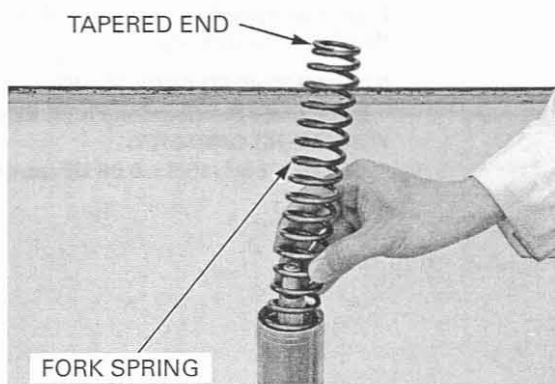
**FORK OIL LEVEL: 90 mm (3.5 in)**



Apply fork fluid to new O-ring. Extend the fork damper and install the O-ring to the damper rod adjust case groove.



Install the fork spring into the fork slider with the tapered end facing up.



Attach the handle to the damper rod holder after installing the spring collar and joint collar.

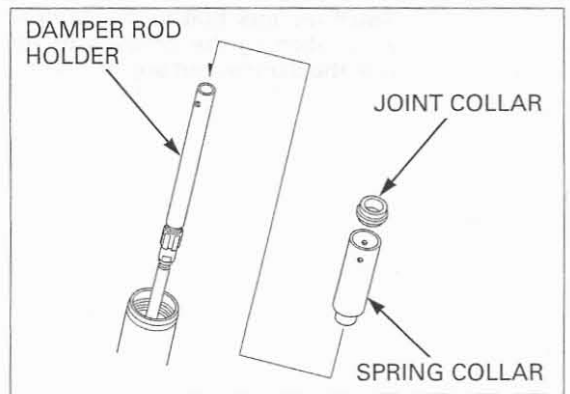
Extend the fork damper fully and install the damper rod holder onto the damper rod adjust case.

**TOOL:**

**Damper rod holder**

**070MB-MEL0200 or  
070MB-MELC200**

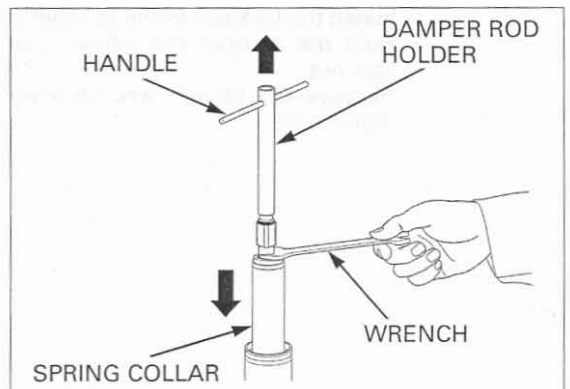
Install the spring collar and joint collar.



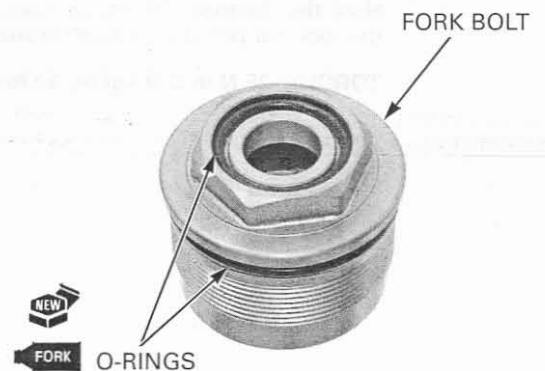
Attach the handle to the damper rod holder, then lower the spring collar while pulling up the damper rod holder.

Attach the 14 mm wrench to the damper rod adjust case as shown.

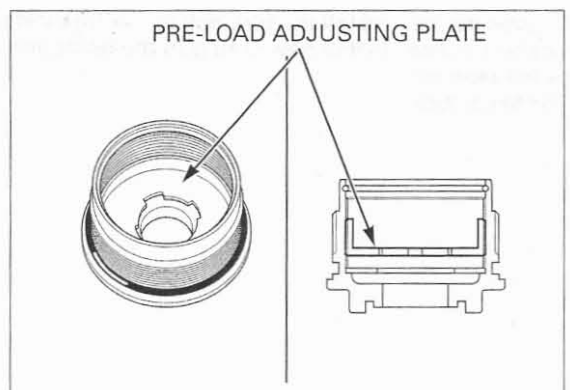
Make sure that the damper rod adjust case is firmly fixed, then remove the damper rod holder.



Apply fork fluid to new O-rings and install them to the fork bolt.



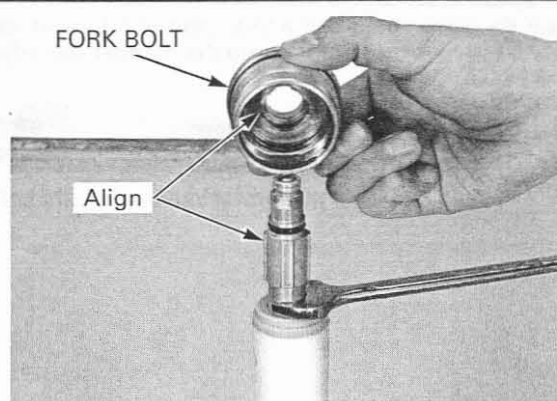
Turn the pre-load adjusting plate clockwise until it seats lightly.



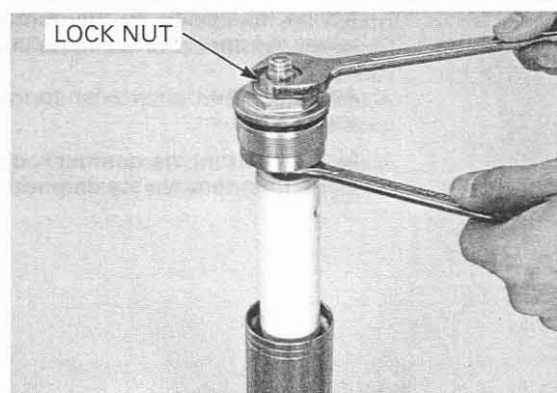


## FRONT WHEEL/SUSPENSION/STEERING

Install the fork bolt to the damper rod adjust case while aligning the grooves of the adjusting plate with the damper rod adjust case.

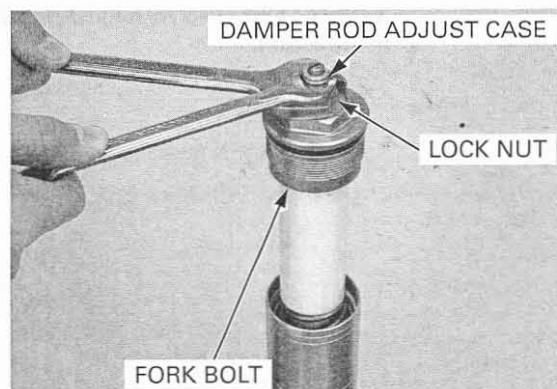


Install the lock nut to the damper rod adjust case. Hold the damper rod adjust case and tighten the lock nut. Remove the 14 mm wrench from the damper rod adjust case.



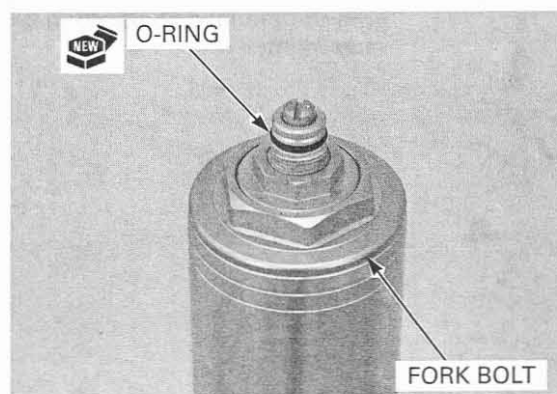
Hold the damper rod adjust case, and then tighten the lock nut to the specified torque.

**TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)**

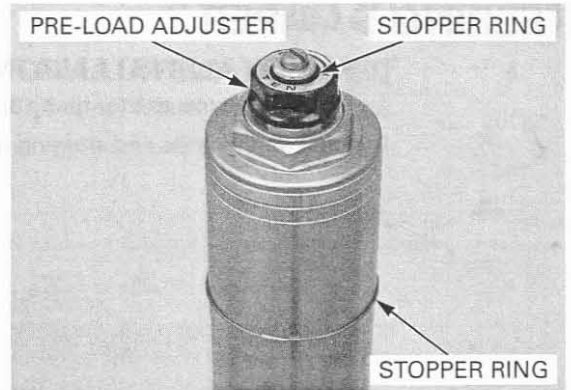


*Tighten the fork bolt after installing the fork slider into the fork bridges.*

Install the fork bolt to the fork slider. Install new O-ring to the damper rod adjust case.



Install the handlebar stopper ring.  
Install the pre-load adjuster and stopper ring.



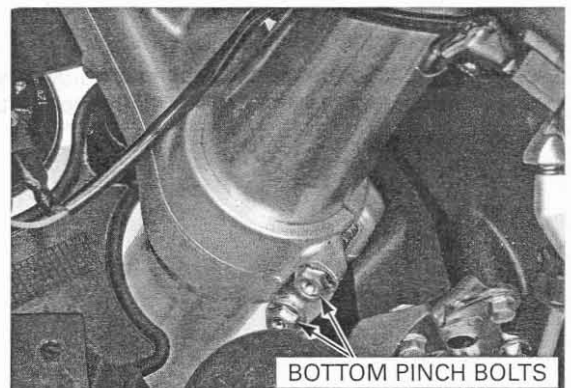
## INSTALLATION

Install the fork leg through the bottom bridge, handlebar and top bridge (page 14-44).  
Position the top end of the fork slider flush with the upper surface of the top bridge as shown.



Tighten the bottom bridge pinch bolts to the specified torque.

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



If the fork bolt was loosened, tighten it to the specified torque.

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

Tighten the top bridge pinch bolt to the specified torque.

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

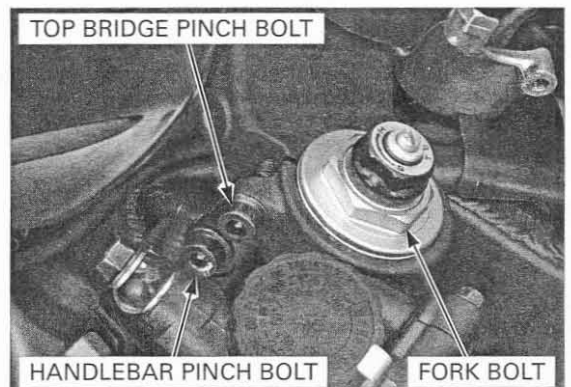
Tighten the handlebar pinch bolt to the specified torque.

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

Install the following:

- Front wheel (page 14-20)
- Front fender (page 3-19)

Adjust the pre-load and compression/rebound damping adjusters (page 4-37).

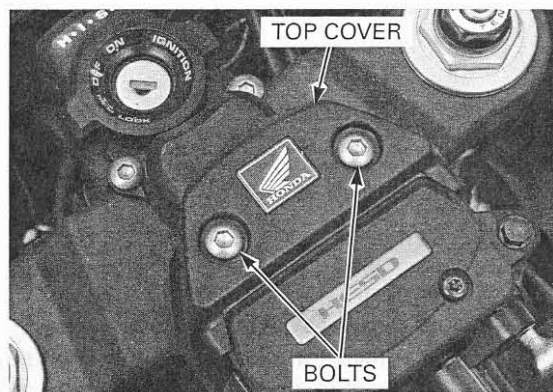


## STEERING DAMPER

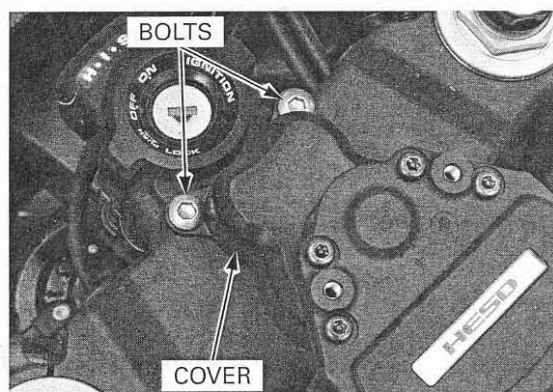
### REMOVAL/INSTALLATION

Remove the top shelter (page 3-16).

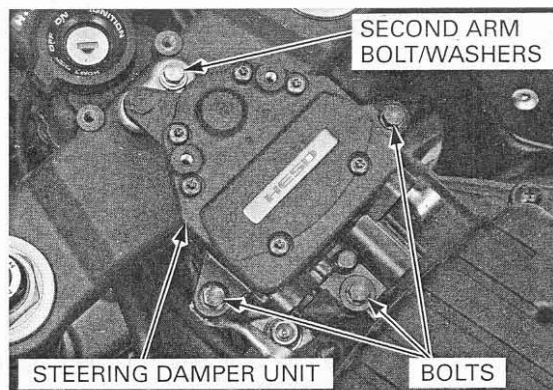
Remove the bolts and steering damper top cover.



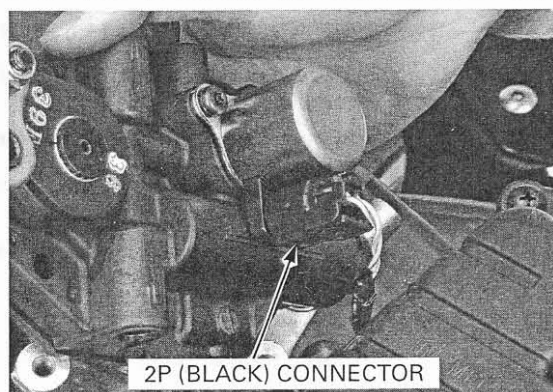
Remove the bolts and steering linkage cover.



Remove the second arm bolt/washers, three mounting bolts and steering damper unit.



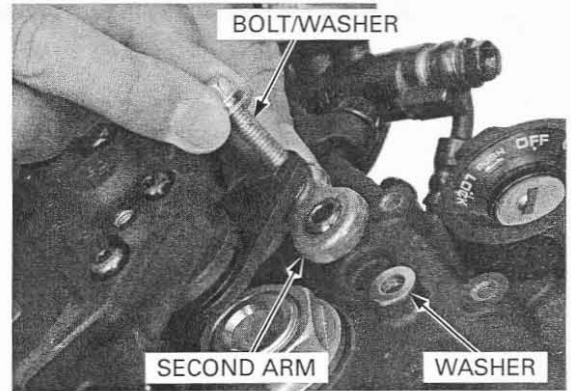
Disconnect the 2P (Black) connector from the steering damper unit.



Connect the 2P (Black) connector.

*Install a washer between the steering damper second arm and top bridge.*

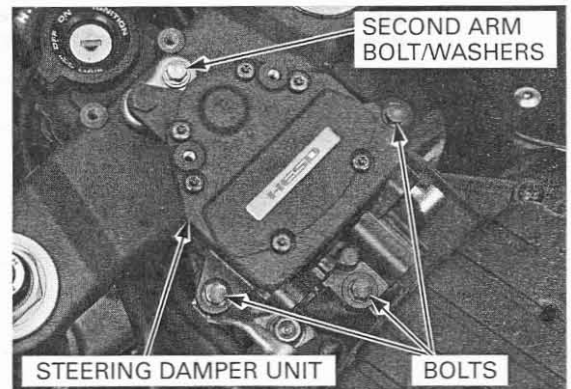
Install the steering damper onto the top bridge, then install the washers and steering damper second arm bolt.



Install the steering damper mounting bolts, and tighten the second arm bolt and mounting bolts to the specified torque.

**TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)**

Install the removed parts in the reverse order of removal.



## STEERING STEM

### REMOVAL

Remove the following:

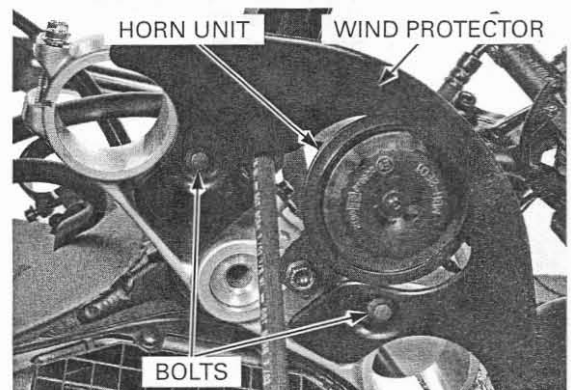
- Front wheel (page 14-16)
- Front fender (page 3-19)
- Upper cowl (page 3-12)
- Top shelter (page 3-16)
- Steering damper (page 14-34)

Remove the steering stem nut.

Remove the fork legs (page 14-21).



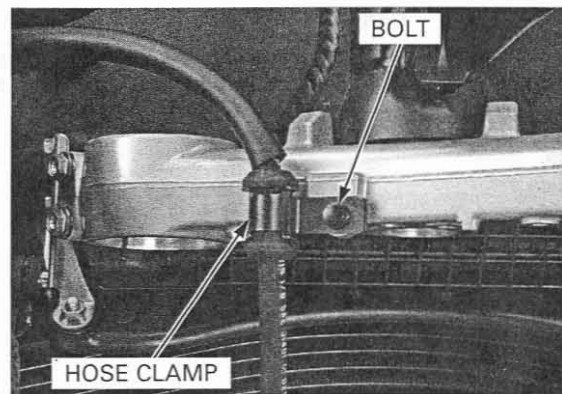
Remove the bolts and wind protector.  
Remove the bolt and horn unit.



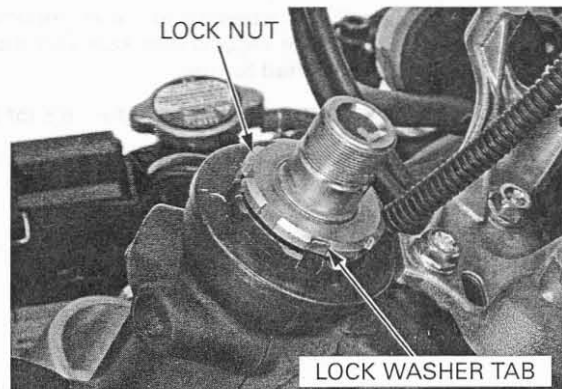


## FRONT WHEEL/SUSPENSION/STEERING

Remove the bolt and front brake hose clamp.



Straighten the tabs of the lock washer.  
Remove the lock nut and lock washer.

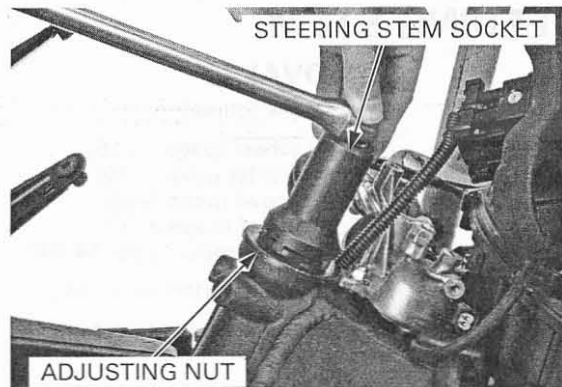


Remove the steering stem adjusting nut using the special tool.

### TOOL:

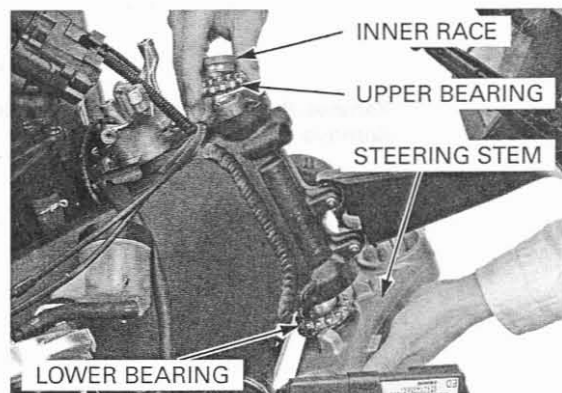
Steering stem socket

07916-3710101 or  
07916-3710100



Remove the following:

- Dust seal
- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing



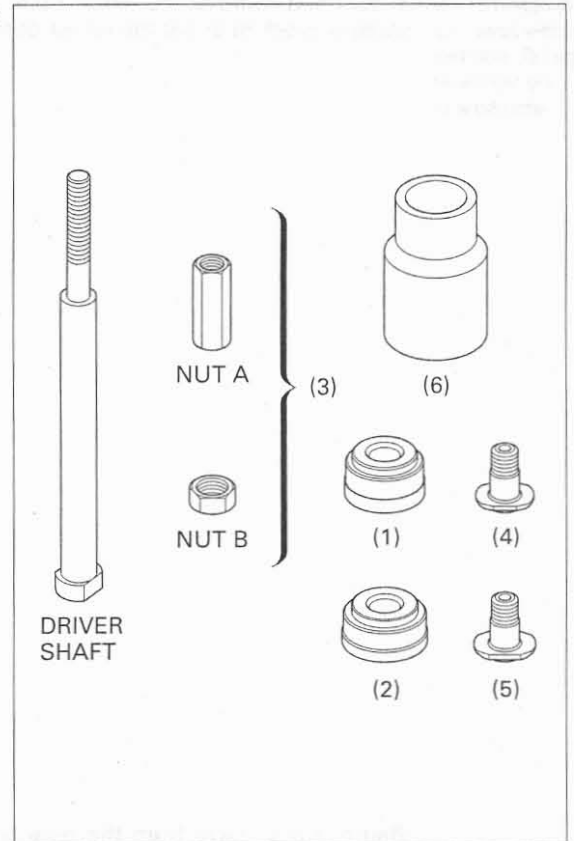
## OUTER RACE REPLACEMENT

Always replace the bearings and races as a set.

Replace the races using the special tools as described in the following procedure.

### TOOLS: (Not available in U.S.A.)

- |                               |               |
|-------------------------------|---------------|
| (1) Driver attachment (upper) | 070MF-MCJ0100 |
| (2) Driver attachment (lower) | 070MF-MCJ0200 |
| (3) Driver shaft assembly     | 07946-KM90301 |
| (4) Bearing remover, A        | 07946-KM90401 |
| (5) Bearing remover, B        | 07NMF-MT70110 |
| (6) Assembly base             | 07946-KM90600 |



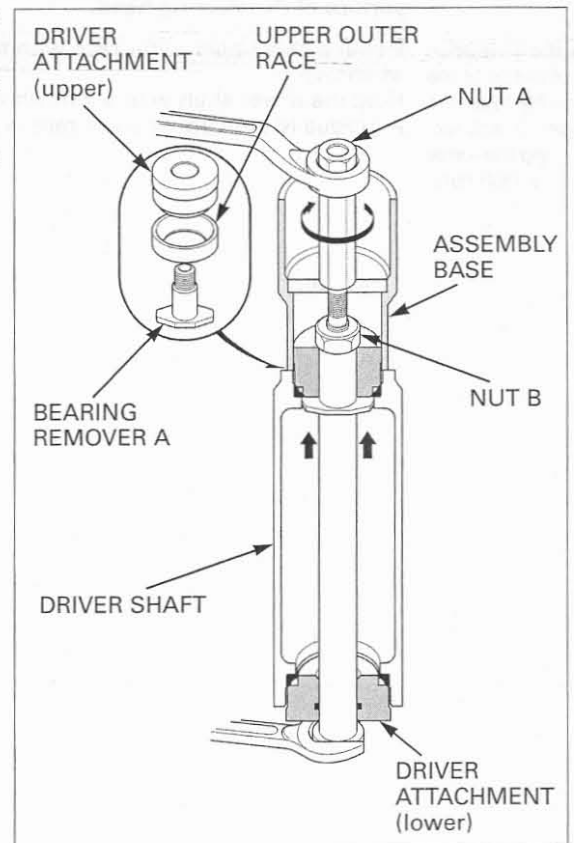
Note the installation direction of the assembly base; the small I.D. side facing the upper attachment.

Install the special tools into the steering head as shown.

Align the bearing remover A with the grooves in the steering head.

Lightly tighten the nut B with a wrench.

Holding the driver shaft with a wrench, turn the nut A gradually to remove the upper outer race.

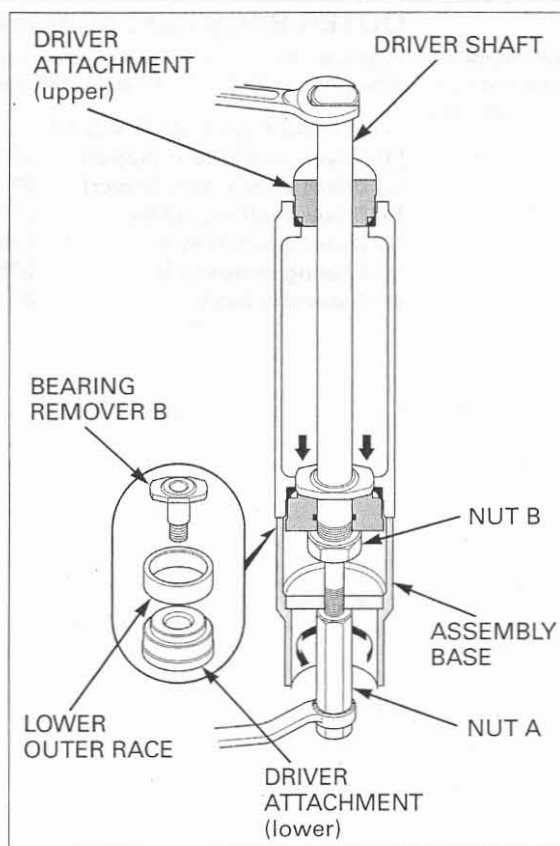




## FRONT WHEEL/SUSPENSION/STEERING

Note the installation direction of the assembly base; the large I.D. side facing the lower attachment.

Install the special tools into the steering head as shown and remove the lower outer race using the same procedure as for the upper outer race.

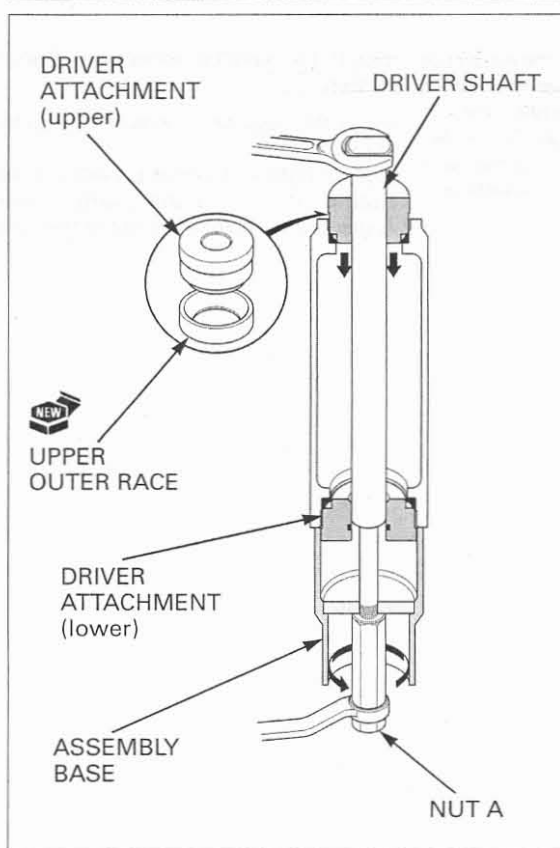


Remove any burrs from the outer race installation surface of the steering head.

Note the installation direction of the assembly base; the large I.D. side facing the lower attachment.

Install a new upper outer race with the special tools as shown.

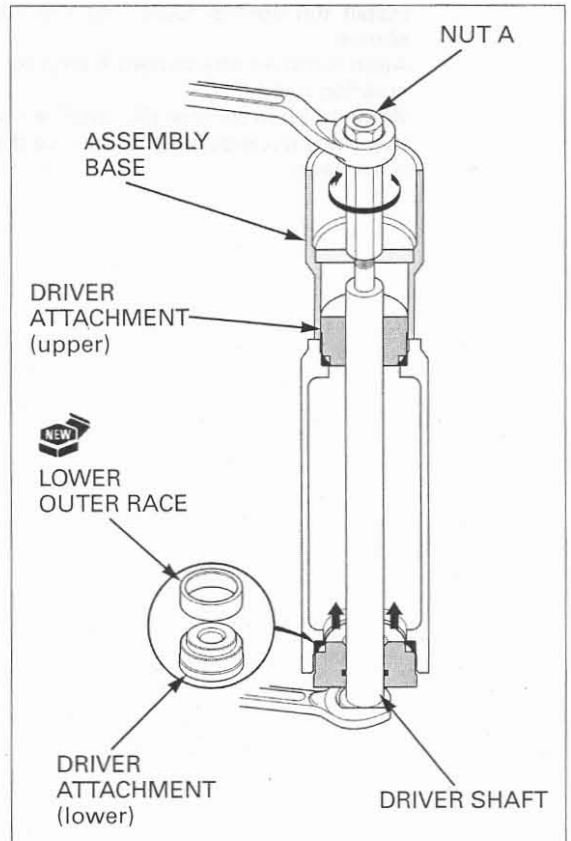
Hold the driver shaft with a wrench and turn the nut A gradually until upper outer race is fully seated.



Remove any burrs from the outer race installation surface of the steering head.

*Note the installation direction of the assembly base; the small I.D. side facing the upper attachment.*

Install a new lower outer race with the special tools as shown.  
Hold the driver shaft with a wrench and turn the nut A gradually until lower outer race is fully seated.



## OUTER RACE REPLACEMENT (U.S.A. only)

Replace the steering head bearing outer races using the special tools listed below.

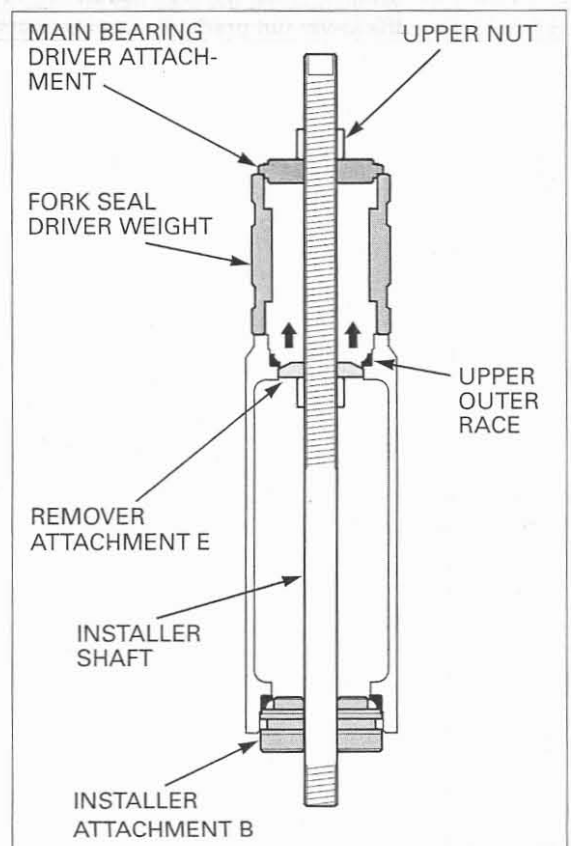
### TOOLS:

|                                |               |
|--------------------------------|---------------|
| Main bearing driver attachment | 07946-ME90200 |
| Fork seal driver weight        | 07947-KA50100 |
| Oil seal driver                | 07965-MA60000 |
| Installer shaft                | 07VMF-KZ30200 |
| Installer attachment A         | 07VMF-MAT0100 |
| Installer attachment B         | 07VMF-MAT0200 |
| Remover attachment E           | 07AMF-MELA100 |
| Remover attachment F           | 07AMF-MELA200 |

Install the special tools into the steering head as shown.

Align remover attachment E with the grooves in the steering head.

While holding the installer shaft with a wrench, turn the upper nut gradually to remove the upper bearing outer race.

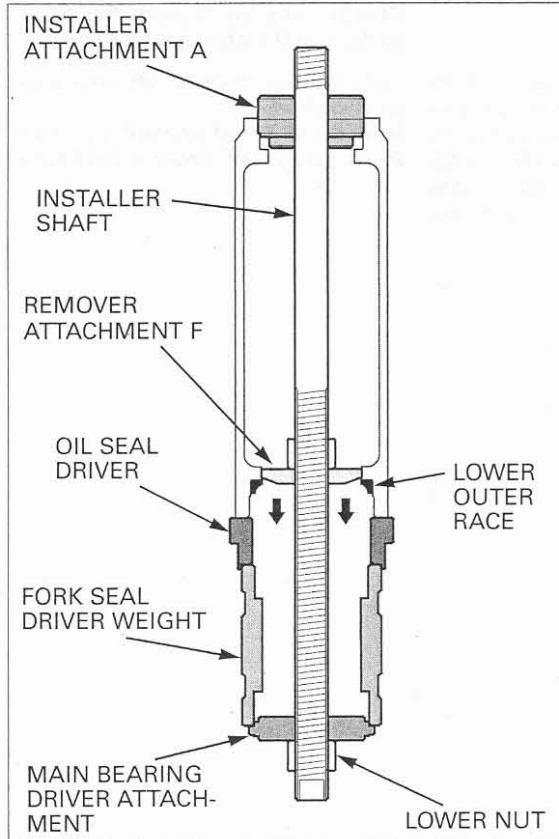


## FRONT WHEEL/SUSPENSION/STEERING

Install the special tools into the steering head as shown.

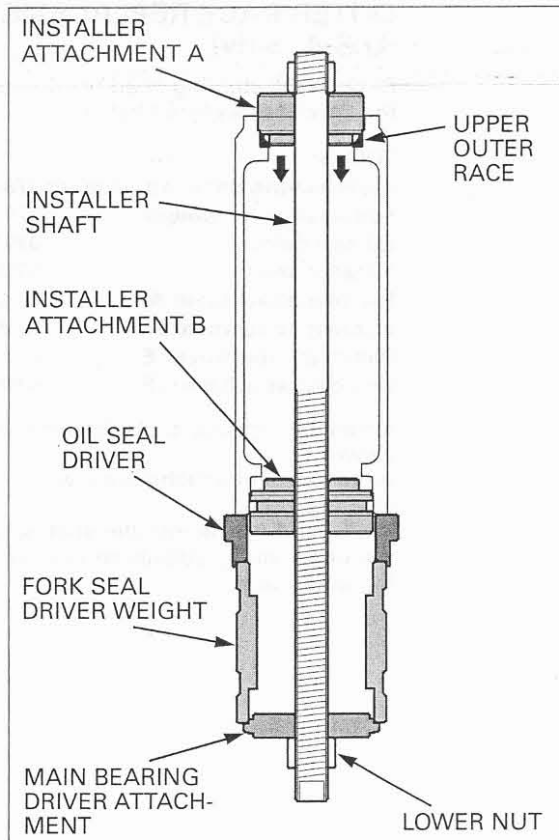
Align remover attachment F with the grooves in the steering head.

While holding the installer shaft with a wrench, turn the lower nut gradually to remove the lower bearing outer race.

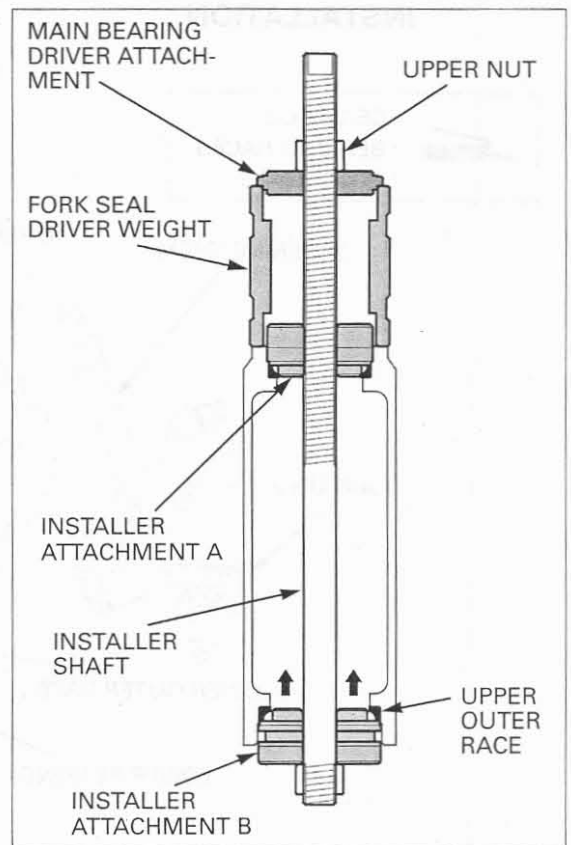


Install a new upper bearing outer race with the special tools as shown.

While holding the installer shaft with a wrench, turn the lower nut gradually until the race is fully seated.



Install a new lower bearing outer race with the special tools as shown.  
While holding the installer shaft with a wrench, turn the upper nut gradually until the race is fully seated.



## LOWER INNER RACE REPLACEMENT

Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.

Remove the dust seal.

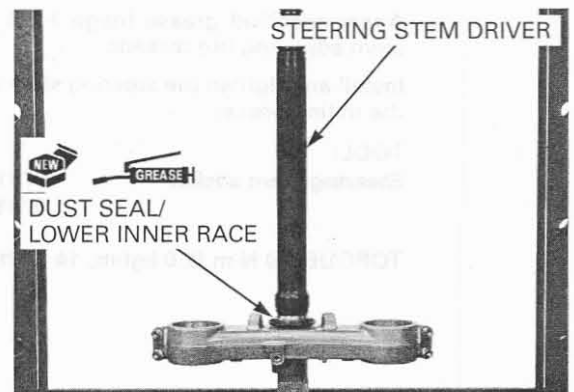


Apply specified grease (page 1-23) to new dust seal lips and install it over the steering stem.  
Install new lower bearing inner race using a special tool and a hydraulic press.

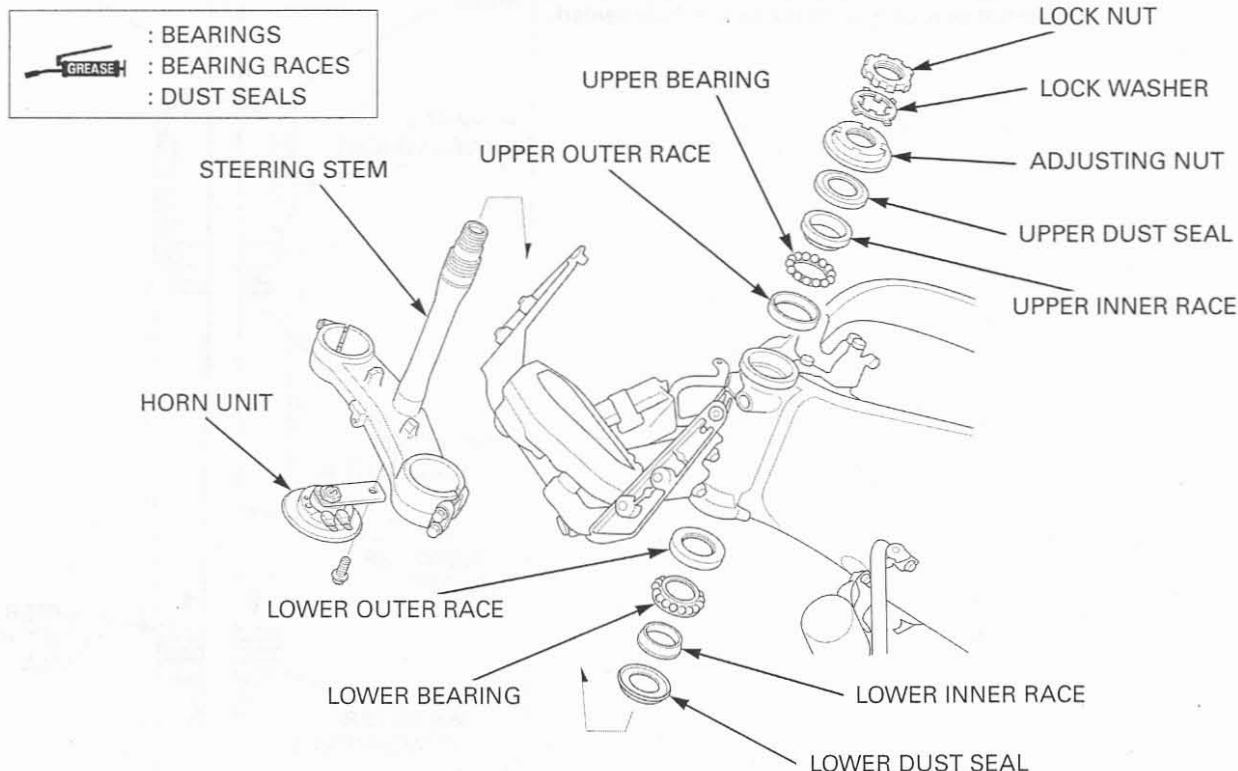
### TOOL:

Steering stem driver

07946-MB00000

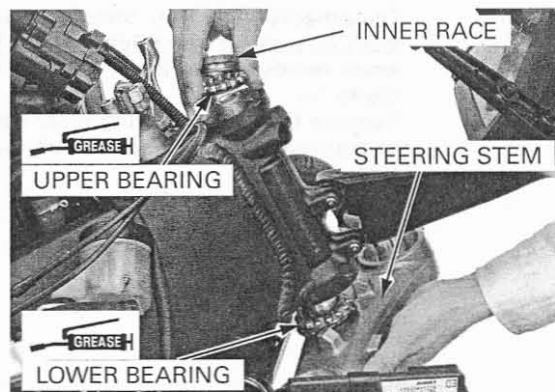


## INSTALLATION



Apply specified grease (page 1-23) to the upper and lower bearings, bearing races and upper dust seal lips.

Install the lower bearing onto the steering stem. Insert the steering stem into the steering head pipe. Install the upper bearing, inner race and upper dust seal.



Apply specified grease (page 1-23) to the steering stem adjusting nut threads.

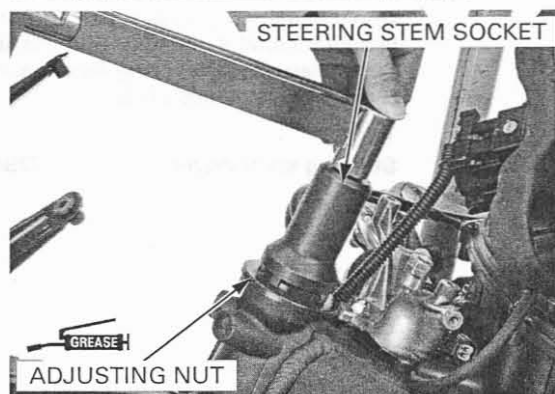
Install and tighten the steering stem adjusting nut to the initial torque.

### TOOL:

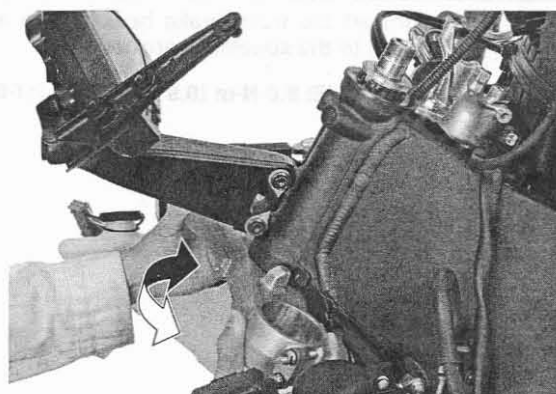
Steering stem socket

07916-3710101 or  
07916-3710100

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



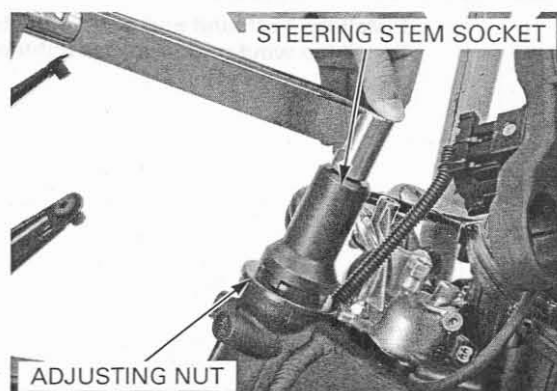
Move the steering stem right and left, lock-to-lock, several times to seat the bearings. Make sure that the steering stem moves smoothly without play or binding, then loosen the adjusting nut.



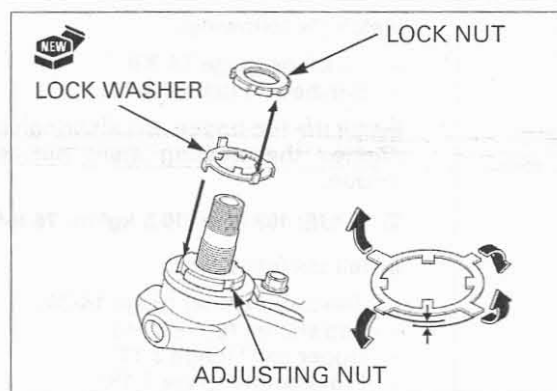
Retighten the steering stem adjusting nut to the specified torque.

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

Recheck that the steering stem moves smoothly without play or binding.

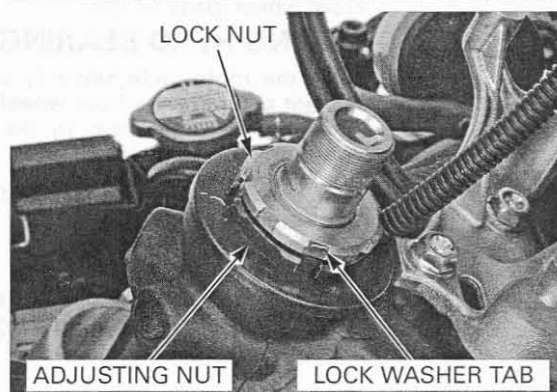


Install a new lock washer onto the steering stem. Align the tabs of the lock washer with the grooves in the adjusting nut and bend two opposite tabs (shorter) down into the adjusting nut groove.



*Do not overtighten the lock nut until the lock washer being flat.*

Install and finger tighten the lock nut. Hold the adjusting nut and further tighten the lock nut no more than 1/4 turn (90°), enough to align its grooves with the lock washer tabs. Bend the lock washer tabs up into the lock nut grooves.

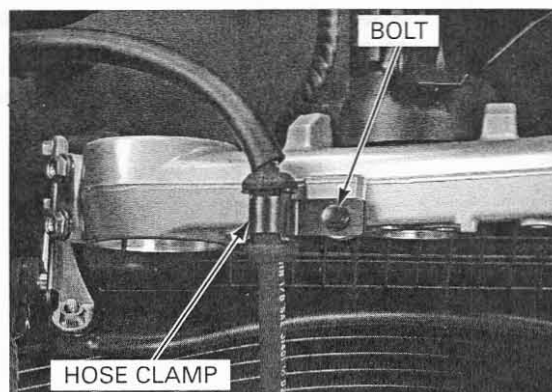




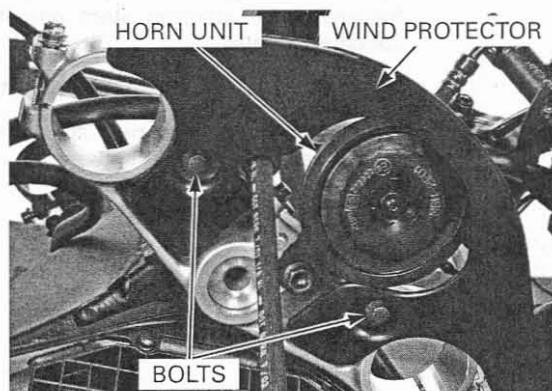
## FRONT WHEEL/SUSPENSION/STEERING

Install the front brake hose clamp and tighten the bolt to the specified torque.

**TORQUE: 8.8 N·m (0.9 kgf-m, 6.5 lbf-ft)**



Install the horn unit and tighten the bolt securely. Install the wind protector and tighten the bolts.



Install the following:

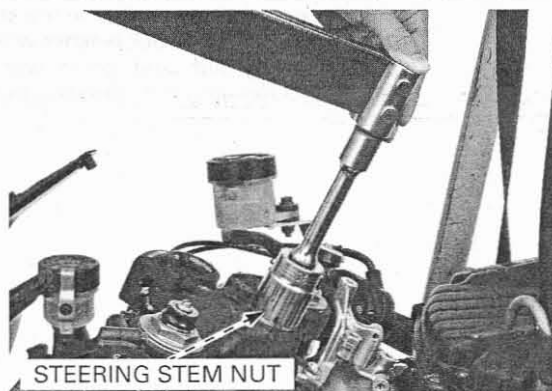
- Fork legs (page 14-33)
- Handlebars (page 14-11)

Install the top bridge and steering stem nut. Tighten the steering stem nut to the specified torque.

**TORQUE: 103 N·m (10.5 kgf-m, 76 lbf-ft)**

Install the following:

- Steering damper (page 14-34)
- Top shelter (page 3-16)
- Upper cowl (page 3-12)
- Front fender (page 3-19)
- Front wheel (page 14-20)



### STEERING HEAD BEARING PRE-LOAD

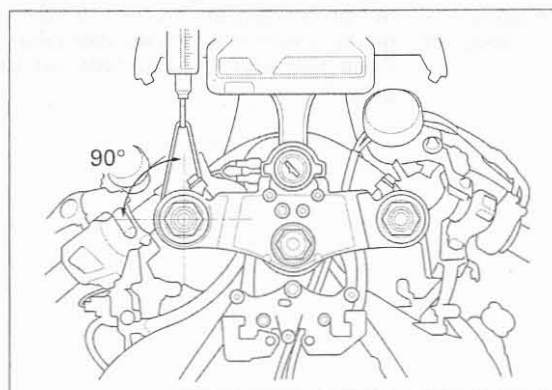
Support the motorcycle securely using a hoist or equivalent and raise the front wheel off the ground. Position the steering stem to the straight ahead position.

*Make sure that there is no cable or wire harness interference.*

Hook a spring scale to the fork slider and measure the steering head bearing pre-load.

The pre-load should be within 12 – 19 N (1.2 – 1.9 kgf).

If the readings do not fall within the limits, readjust the steering stem adjusting nut (page 14-42).

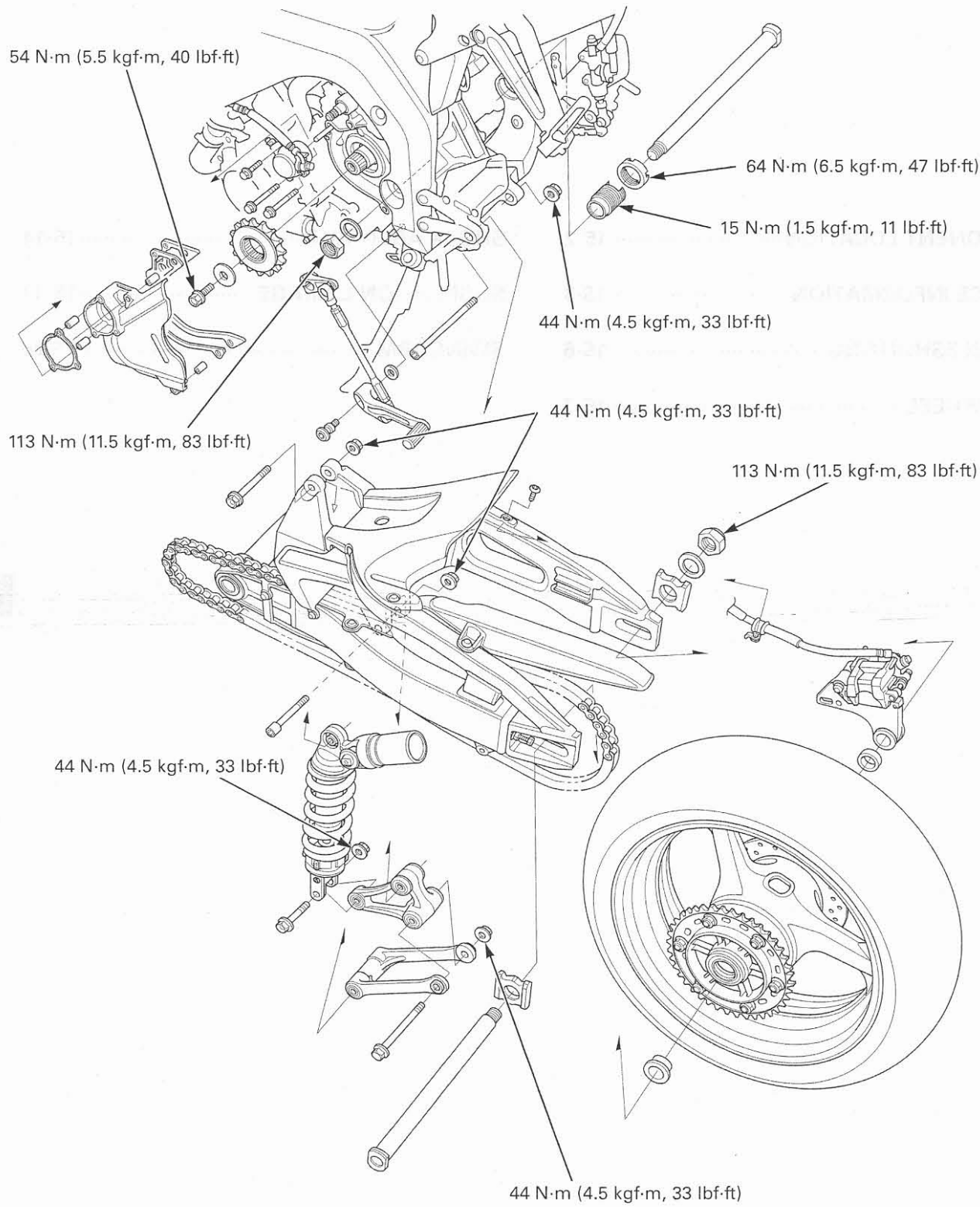


# 15. REAR WHEEL/SUSPENSION

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|                           |      |                          |       |
|---------------------------|------|--------------------------|-------|
| COMPONENT LOCATION .....  | 15-2 | SHOCK ABSORBER .....     | 15-14 |
| SERVICE INFORMATION ..... | 15-3 | SUSPENSION LINKAGE ..... | 15-17 |
| TROUBLESHOOTING .....     | 15-6 | SWINGARM .....           | 15-20 |
| REAR WHEEL .....          | 15-7 |                          |       |

COMPONENT LOCATION



# SERVICE INFORMATION

## GENERAL

- A contaminated brake disc or pad reduces stopping power: Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the rear wheel installation, check the brake operation by applying the brake pedal.
- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- Before disposal of the shock absorber, release the nitrogen (page 15-16).
- When servicing the rear wheel and suspension, support the motorcycle using a safety stand or hoist.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting point.
- When installing the swingarm, be sure to tighten the swingarm pivot fasteners to the specified torque in the specified sequence. If you mistake the tightening torque or sequence, loosen all pivot fasteners, then tighten them again to the specified torque in the correct sequence.
- When using the lock nut wrench for the swingarm pivot, use a 20-inch long deflecting beam type torque wrench. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given on this page is actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives the actual and indicated torque.
- Refer to the brake system information (page 16-4).

## SPECIFICATIONS

Unit: mm (in)

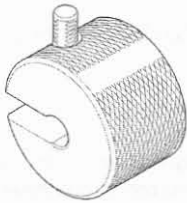

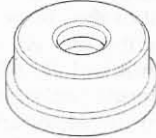
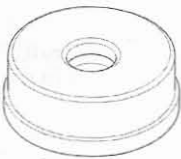


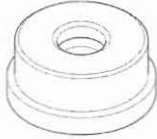



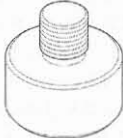

| ITEM                     |  |     | STANDARD                                    | SERVICE LIMIT         |
|--------------------------|--|-----|---|-----------------------|
| Minimum tire tread depth |  |     | —   | 2.0 (0.08)            |
| Cold tire pressure       | Up to 90 kg (200 lbs) load                   |     | 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi) | —                     |
|                          | Up to maximum weight capacity                |     | 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi) | —                     |
| Axle runout              |  |     | —   | 0.2 (0.01)            |
| Wheel rim runout         | Radial                                       |     | —   | 2.0 (0.08)            |
|                          | Axial  |     | —   | 2.0 (0.08)            |
| Wheel balance weight     |  |     | —   | 60 g<br>(2.1 oz) max. |
| Drive chain              | Size/link                                    | DID | DID50VM2-114YB                              | —                     |
|                          |  | RK  | RK50GFOZ1-114LJFZ                           | —                     |
|                          | Slack  |     | 25 – 35 (1 – 1-3/8)                         | —                     |
| Shock absorber           | Spring pre-load adjuster standard position   |     | Position 4                                  | —                     |
|                          | Rebound damping adjuster initial setting     |     | 2-1/2 turns out from full hard              | —                     |
|                          | Compression damping adjuster initial setting |     | 9 clicks out from full hard                 | —                     |

## TORQUE VALUES

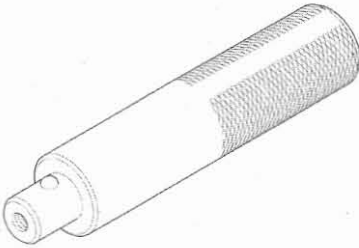
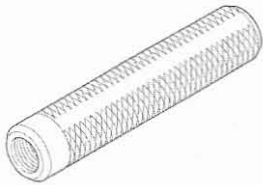


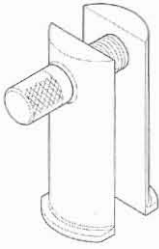
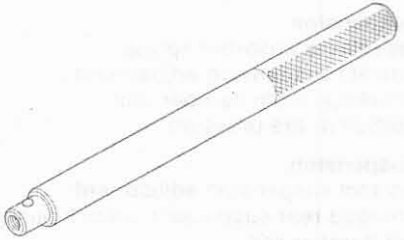
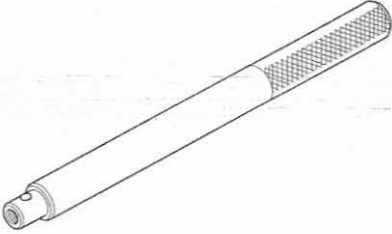
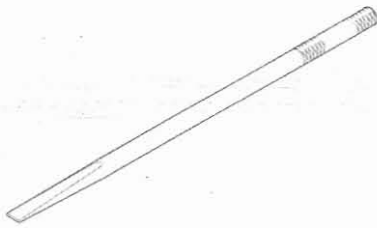
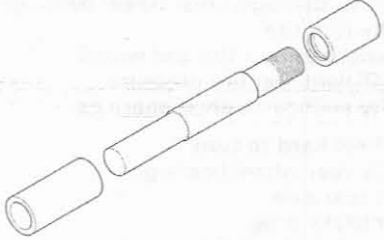


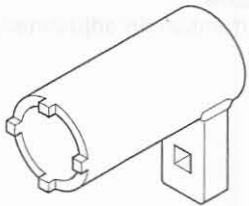
|  |                                 |                                      |
|--|---------------------------------|--------------------------------------|
| Rear axle nut                          | 113 N·m (11.5 kgf·m, 83 lbf·ft) | U-nut                                |
| Rear brake disc bolt                   | 42 N·m (4.3 kgf·m, 31 lbf·ft)   | ALOC bolt; replace with a new one    |
| Final driven sprocket nut              | 64 N·m (6.5 kgf·m, 47 lbf·ft)   | U-nut                                |
| Rear shock absorber upper mounting nut | 44 N·m (4.5 kgf·m, 33 lbf·ft)   | U-nut                                |
| Rear shock absorber lower mounting nut | 44 N·m (4.5 kgf·m, 33 lbf·ft)   | U-nut                                |
| Shock link-to-frame pivot nut          | 44 N·m (4.5 kgf·m, 33 lbf·ft)   | U-nut                                |
| Shock arm-to-shock link nut            | 44 N·m (4.5 kgf·m, 33 lbf·ft)   | U-nut                                |
| Shock arm-to-swingarm nut              | 44 N·m (4.5 kgf·m, 33 lbf·ft)   | U-nut                                |
| Drive chain case flange bolt           | 12 N·m (1.2 kgf·m, 9 lbf·ft)    |                                      |
| Swingarm pivot adjusting bolt          | 15 N·m (1.5 kgf·m, 11 lbf·ft)   |                                      |
| Swingarm pivot adjusting bolt lock nut | 64 N·m (6.5 kgf·m, 47 lbf·ft)   | See page 15-29                       |
| Swingarm pivot nut                     | 113 N·m (11.5 kgf·m, 83 lbf·ft) |                                      |
| Drive chain slider bolt                | 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft) | Apply a locking agent to the threads |

## REAR WHEEL/SUSPENSION

### TOOLS

|   |   |   |
|---|---|---|
| <p>Remover weight<br/>07741-0010201</p>  <p>07936-371020A (U.S.A. only) or<br/>07936-3710200 (U.S.A. only)</p> | <p>Attachment, 32 x 35 mm<br/>07746-0010100</p>  | <p>Attachment, 42 x 47 mm<br/>07746-0010300</p>                                        |
| <p>Attachment, 52 x 55 mm<br/>07746-0010400</p>    | <p>Attachment, 24 x 26 mm<br/>07746-0010700</p>  | <p>Attachment, 22 x 24 mm<br/>07746-0010800</p>  <p>or 07746-001A800 (U.S.A. only)</p> |
| <p>Attachment, 40 x 42 mm<br/>07746-0010900</p>    | <p>Pilot, 17 mm<br/>07746-0040400</p>          | <p>Pilot, 25 mm<br/>07746-0040600</p>    |
| <p>Pilot, 28 mm<br/>07746-0041100</p>    | <p>Pilot, 19 mm<br/>07746-0041400</p>          | <p>Bearing remover head, 25 mm<br/>07746-0050800</p>                                 |

## REAR WHEEL/SUSPENSION

|   |   |  |
|---|---|--|
| <p>Driver<br/>07749-0010000</p>    | <p>Remover handle<br/>07936-3710100</p>            | <p>Bearing remover, 17 mm<br/>07936-3710300</p>   |
| <p>Attachment, 28 x 30 mm<br/>07946-1870100</p>                          | <p>Ball race remover<br/>07948-4630100</p>         | <p>Driver<br/>07949-3710001</p>   |
| <p>Driver<br/>070GD-0010100</p>  <p>or 070GD-001A100 (U.S.A. only)</p> | <p>Bearing remover shaft<br/>07GGD-0010100</p>  | <p>Bearing driver<br/>07GMD-KT80100</p>   |
| <p>Pilot, 32 mm<br/>07MAD-PR90200</p>                                  | <p>Attachment, 42 mm<br/>07QAD-P0A0100</p>       | <p>Swingarm lock nut wrench,<br/>5.8 x 47 mm<br/>07YMA-MCF0100</p>  <p>or 07YMA-MCFA100 (U.S.A. only)</p> |



## REAR WHEEL/SUSPENSION

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Attachment, 34 mm  
07ZMD-MBW0100



or 07ZMD-MBWA100 (U.S.A. only)

## TROUBLESHOOTING

### Soft suspension

- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Insufficient tire pressure

### Stiff suspension

- Incorrect suspension adjustment
- Damaged rear suspension pivot bearings
- Bent damper rod
- Bent swingarm pivot
- Tire pressure too high

### Rear wheel wobbling

- Bent rim
- Worn or damaged rear wheel bearings
- Faulty rear tire
- Unbalanced rear tire and wheel
- Insufficient rear tire pressure
- Faulty swingarm pivot bearings

### Rear wheel hard to turn

- Faulty rear wheel bearings
- Bent rear axle
- Rear brake drag
- Drive chain too tight

### Rear suspension noise

- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

### Steers to one side or does not track straight

- Bent rear axle
- Axle alignment/chain adjustment not equal on both sides

## REAR WHEEL

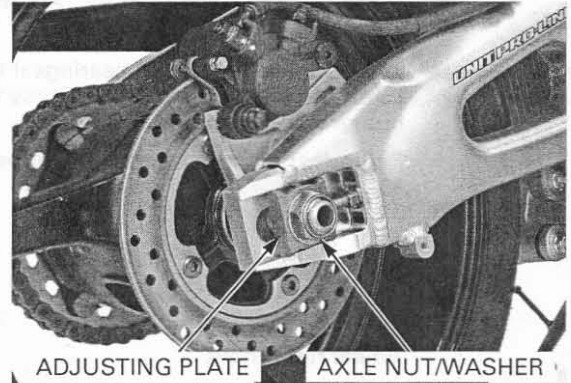
### REMOVAL

Loosen the lock nuts and drive chain adjusting bolts. (page 4-26)

Loosen the rear axle nut.

Support the motorcycle using a safety stand or hoist and raise the rear wheel off the ground.

Remove the axle nut, washer and drive chain adjusting plate.



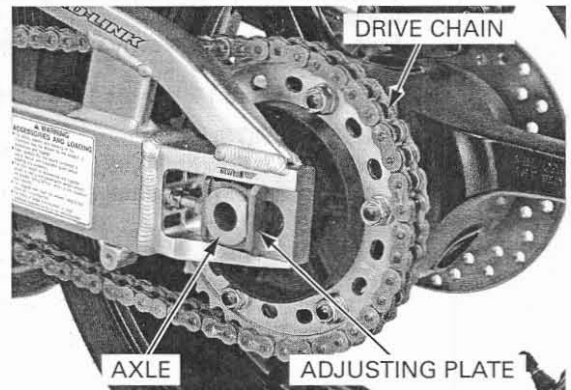
ADJUSTING PLATE

AXLE NUT/WASHER

Push the rear wheel forward and derail the drive chain from the driven sprocket.

*Do not operate the brake pedal after removing the rear wheel.*

Remove the rear axle and drive chain adjusting plate from the left side, then remove the rear wheel.

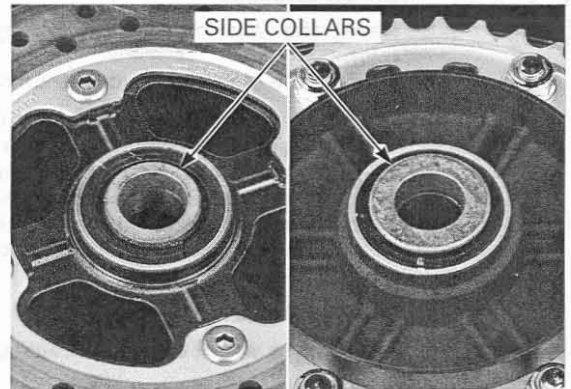


DRIVE CHAIN

AXLE

ADJUSTING PLATE

Remove the side collars.



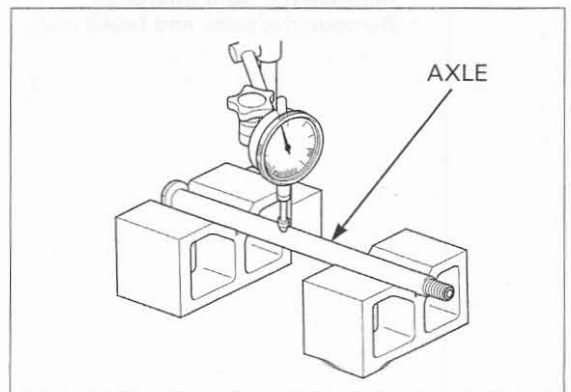
SIDE COLLARS

### INSPECTION

#### Axle

Place the axle on V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT: 0.2 mm (0.01 in)**



AXLE

## REAR WHEEL/SUSPENSION

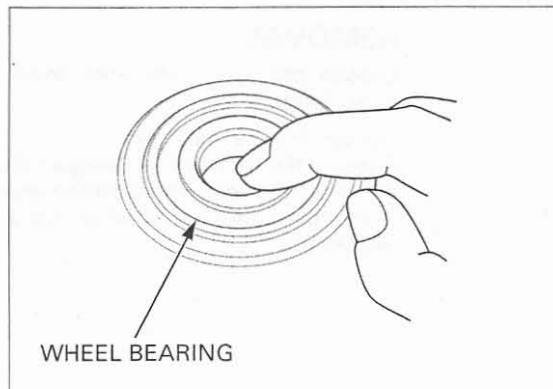
### Wheel bearing

Turn the inner race of each bearing with your finger. Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub or driven flange.

*Replace the wheel bearings in pairs.*

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub or driven flange.

Remove the wheel bearings, if necessary (page 15-10).



### Wheel rim runout

Check the rim runout by placing the wheel in a truing stand.

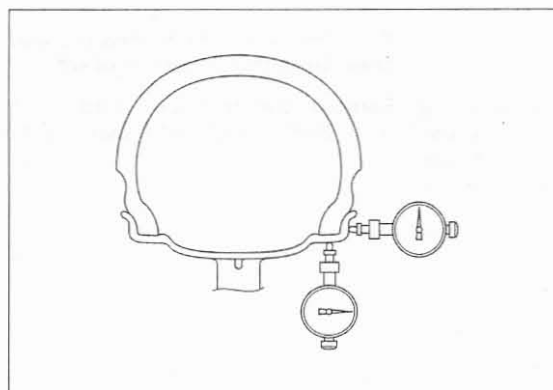
Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

#### SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

Axial: 2.0 mm (0.08 in)

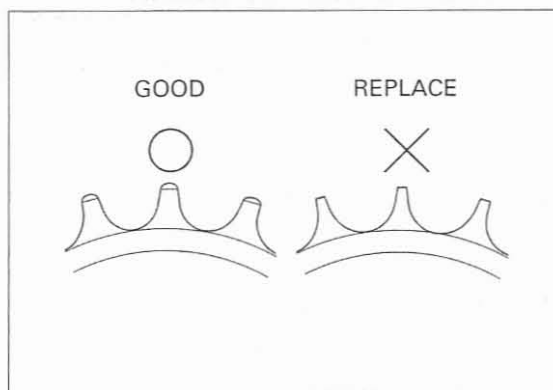


### Driven sprocket

Check the condition of the final driven sprocket teeth.

Replace the sprocket if worn or damaged.

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



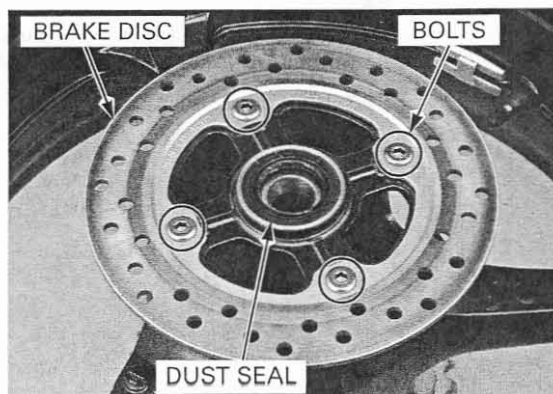
### Wheel balance

Refer to the wheel balance servicing (page 14-18).

## DISASSEMBLY

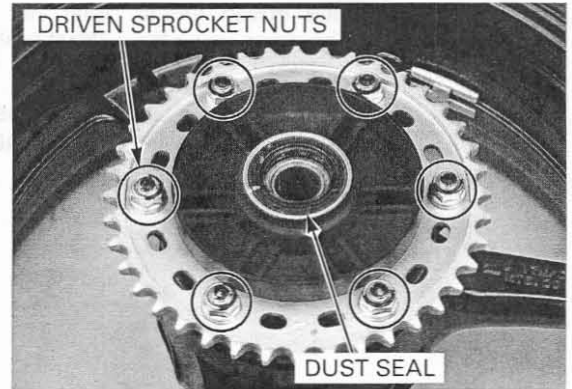
Remove the right dust seal.

Remove the bolts and brake disc.

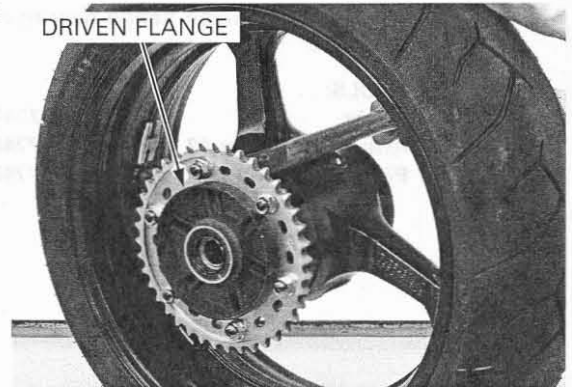


If you will disassemble the driven flange, loosen the driven sprocket nuts and bolts before removing the driven flange from the wheel hub.

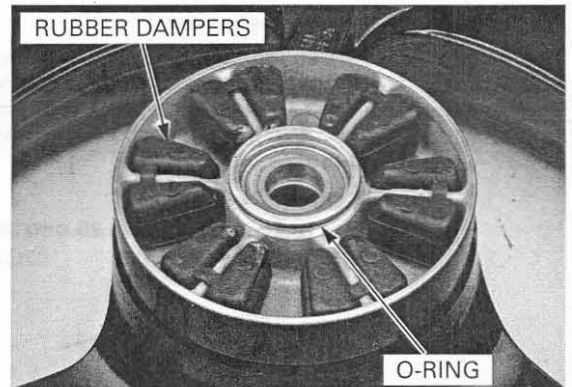
Remove the left dust seal.



Remove the driven flange assembly from the left wheel hub.

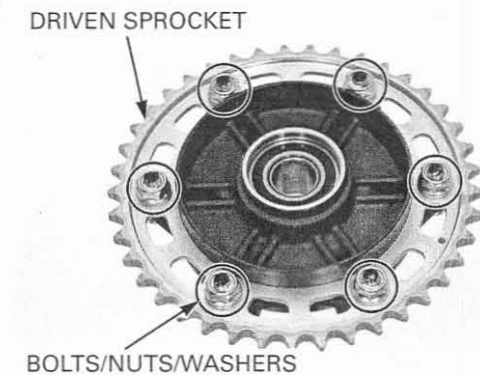


Remove the wheel rubber dampers and O-ring.



## Driven flange bearing removal

Remove the nuts, washer, bolts and driven sprocket from the driven flange.



## REAR WHEEL/SUSPENSION

Drive the driven flange collar out of the driven flange bearings using the special tools.

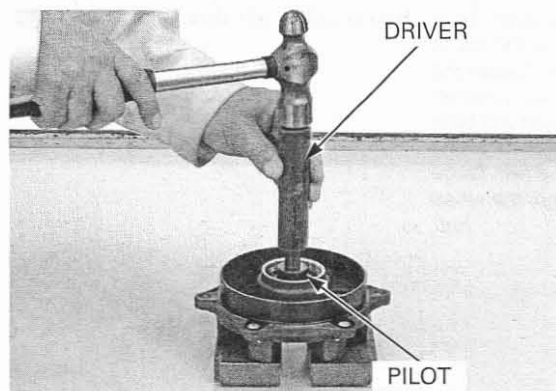
### TOOLS:

Driver

07749-0010000

Pilot, 28 mm

07746-0041100



Drive out the driven flange bearings using the special tools.

### TOOLS:

Driver

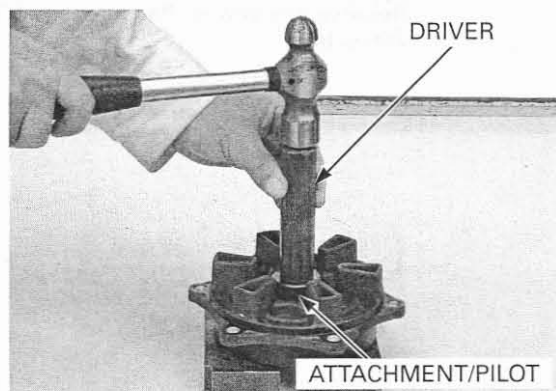
07749-0010000

Attachment, 40 x 42 mm

07746-0010900

Pilot, 28 mm

07746-0041100



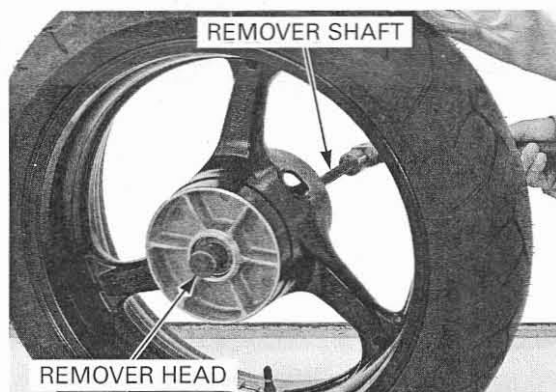
### Wheel bearing removal

Install the bearing remover head into the bearing. From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

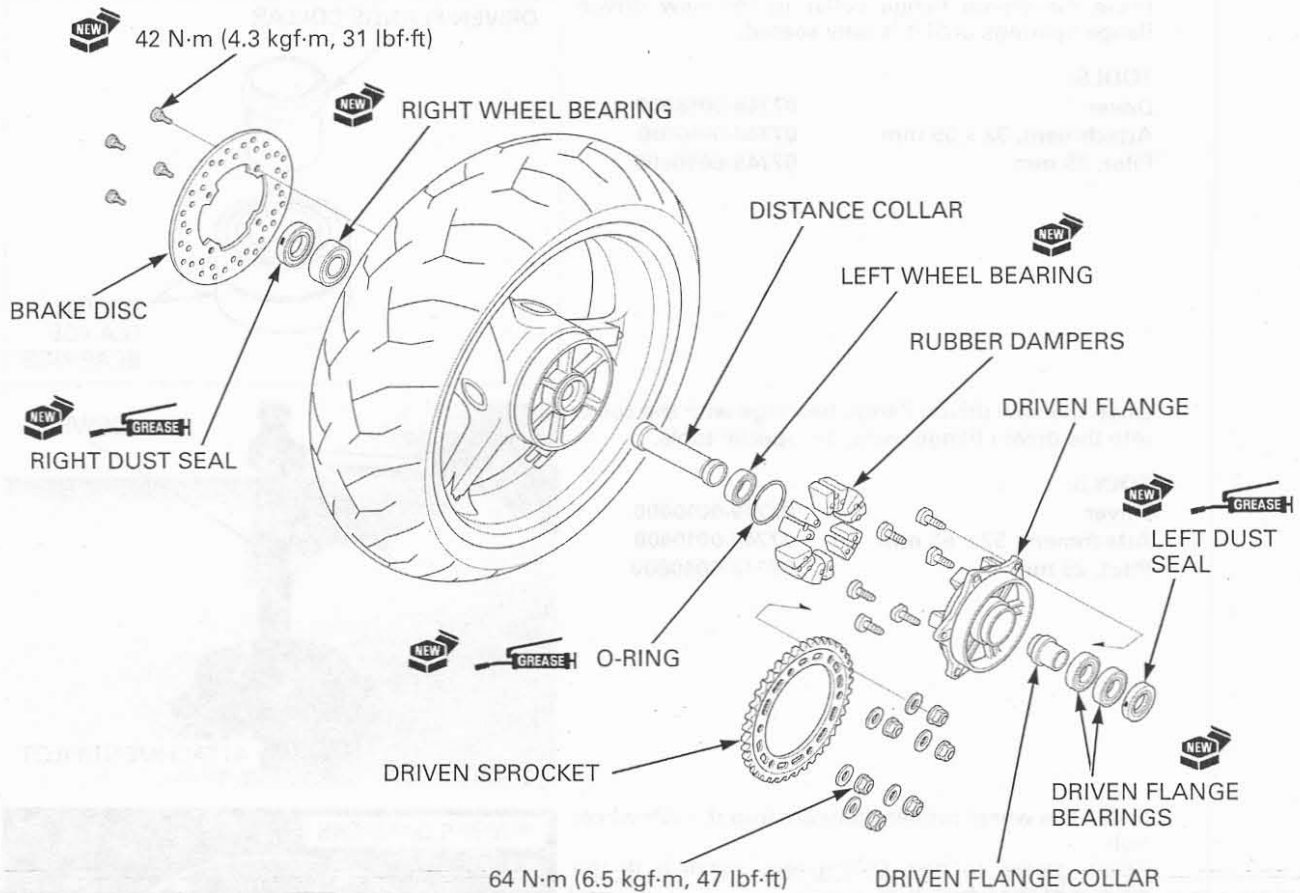
### TOOLS:

Bearing remover head, 25 mm 07746-0050800

Bearing remover shaft 07GGD-0010100



# ASSEMBLY



Never install the old bearings, once the bearings has been removed, the bearings must be replaced with new ones.

## Wheel bearing installation

- Install the right wheel bearing previously.
- Drive in a new right bearing squarely, until it is fully seated.

### TOOLS:

Driver

Attachment, 52 x 55 mm

Pilot, 25 mm

07749-0010000

07746-0010400

07746-0040600

Install the distance collar

Drive in a new left bearing squarely.

### TOOLS:

Driver

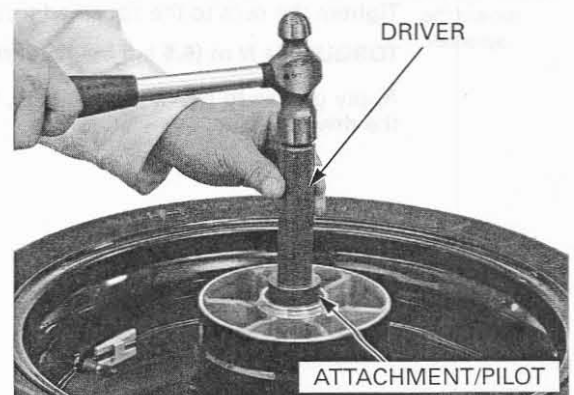
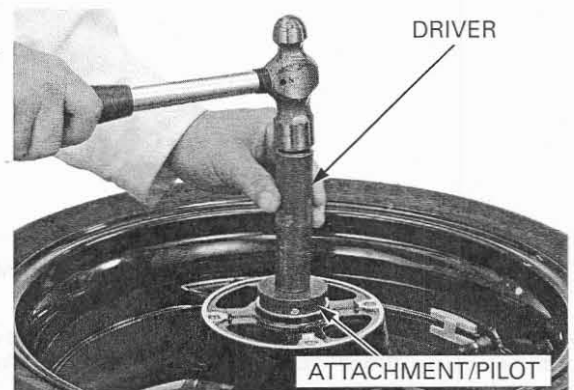
Attachment, 42 x 47 mm

Pilot, 25 mm

07749-0010000

07746-0010300

07746-0040600





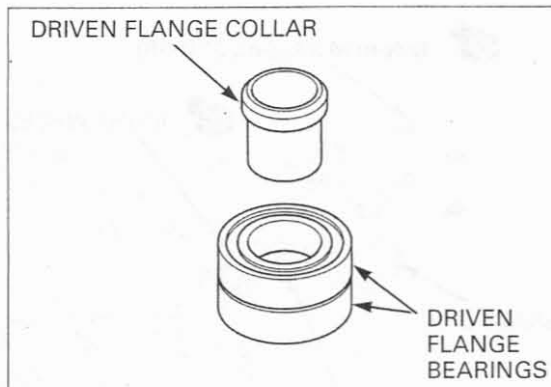
## REAR WHEEL/SUSPENSION

### Driven flange bearing installation

Press the driven flange collar in the new driven flange bearings until it is fully seated.

#### TOOLS:

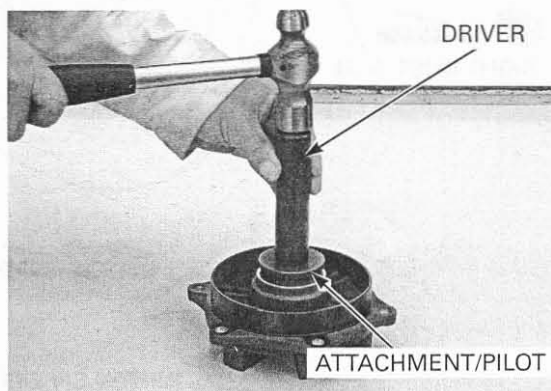
|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 32 x 35 mm | 07746-0010100 |
| Pilot, 25 mm           | 07746-0040600 |



Drive the new driven flange bearings with the collar into the driven flange using the special tools.

#### TOOLS:

|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 52 x 55 mm | 07746-0010400 |
| Pilot, 25 mm           | 07746-0040600 |



Install the wheel rubber dampers into the left wheel hub.

Apply grease to new O-ring and install it to the groove of the wheel hub.



Install the driven flange assembly into the left wheel hub.

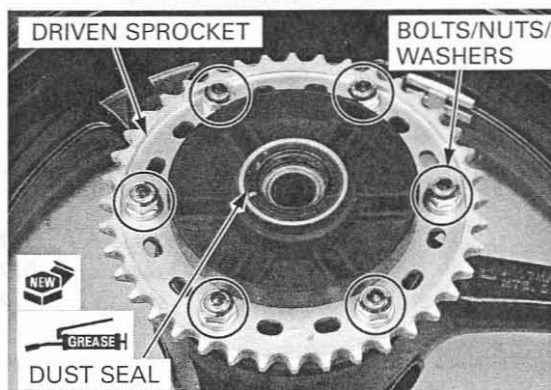
*Install the washers with their chamfered side facing toward the sprocket.*

If the driven sprocket was removed, install the driven sprocket bolts, driven sprocket, washers and nuts.

Tighten the nuts to the specified torque.

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

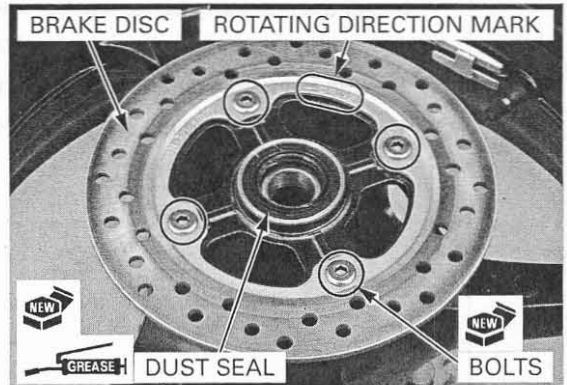
Apply grease to new dust seal lips, then install it to the driven flange.



Install the brake disc with its rotating direction mark facing out.  
Tighten the new brake disc bolts to the specified torque.

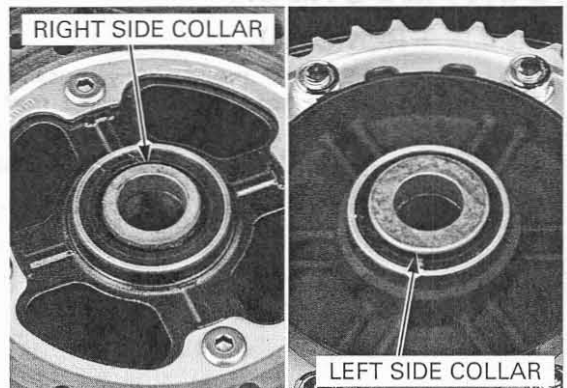
**TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)**

Apply grease to new dust seal lips, then install it to the right wheel hub.

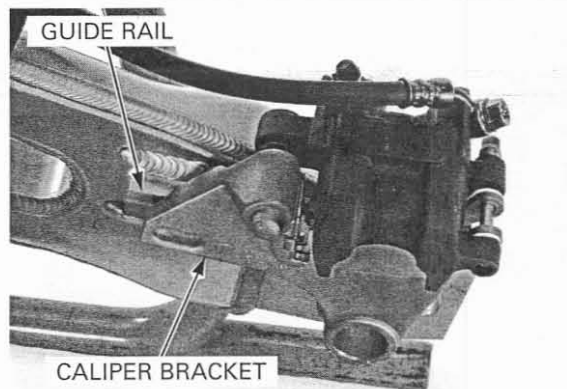


## INSTALLATION

Install the side collars.

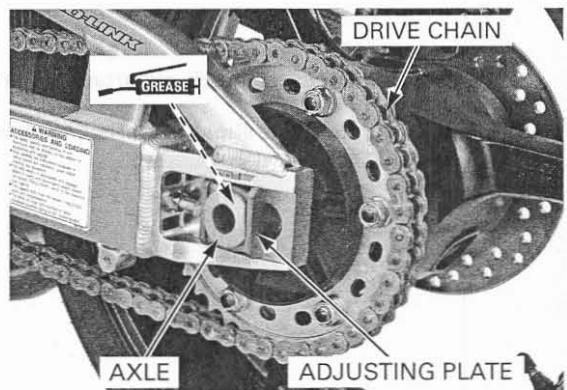


Make sure that the rear brake caliper bracket is positioned in the guide of the swingarm.



*Be careful not to damage the brake pads.*

Place the rear wheel in the swingarm.  
Install the drive chain over the driven sprocket.  
Apply a thin coat of grease to the rear axle.  
Install the drive chain adjusting plate and rear axle from the left side.



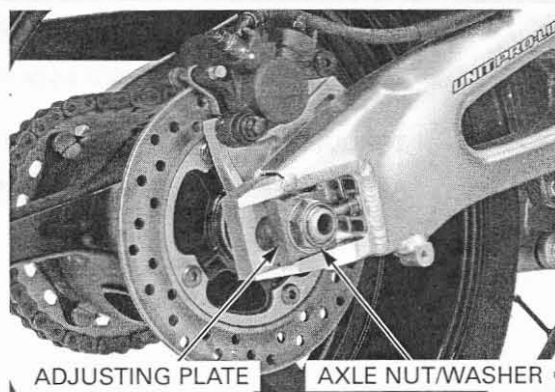
## REAR WHEEL/SUSPENSION

Install the adjusting plate, washer and axle nut.

Adjust the drive chain slack (page 4-26).

Tighten the axle nut to the specified torque.

**TORQUE: 113 N·m (11.5 kgf·m, 83 lbf·ft)**

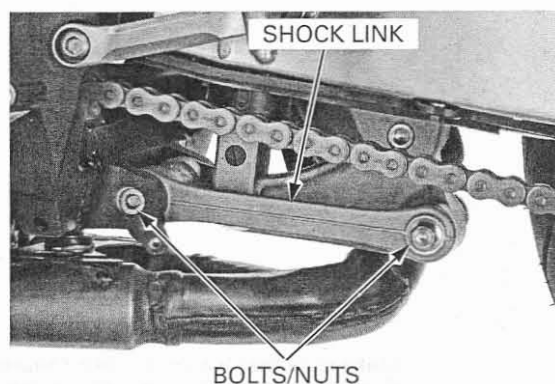


## SHOCK ABSORBER

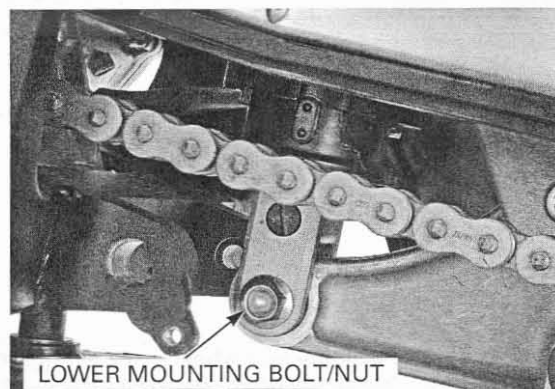
### REMOVAL

Support the motorcycle securely using a safety stand or hoist and raise the rear wheel off the ground.

Remove the bolts/nuts and shock link.

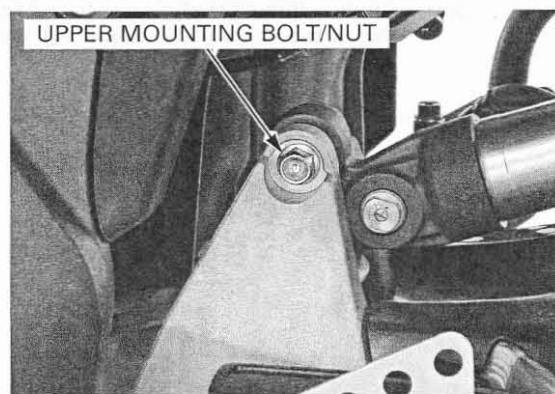


Remove the shock absorber lower mounting bolt/nut.



Remove the shock absorber upper mounting bolt/nut.

Remove the shock absorber to downward through the swingarm.

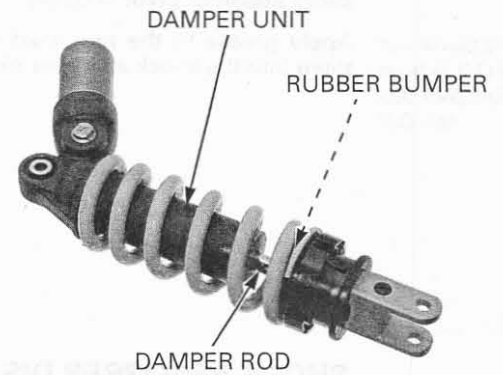


## INSPECTION

Visually inspect the shock absorber for damage.  
Check the following:

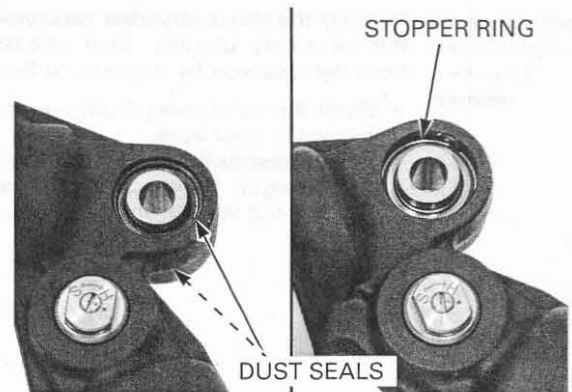
- Damper rod for bends or damage
- Damper unit for deformation or oil leaks
- Rubber bumper for wear or damage

Inspect all the other parts for wear or damage.  
If necessary, replace the shock absorber as an assembly.



## SPHERICAL BEARING REPLACEMENT

Remove the dust seals.  
Remove the stopper ring from the left side pivot.

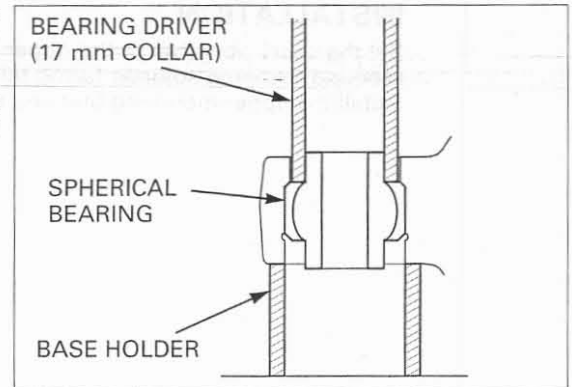


Prepare the metal pipe (as a base holder; I.D. 27 mm or other suitable collar) for the spherical bearing removal.

Press the spherical bearing out of the shock absorber pivot from the left side using the metal pipe and special tool.

**TOOLS:**  
Bearing driver  
(Use only 17 mm collar)

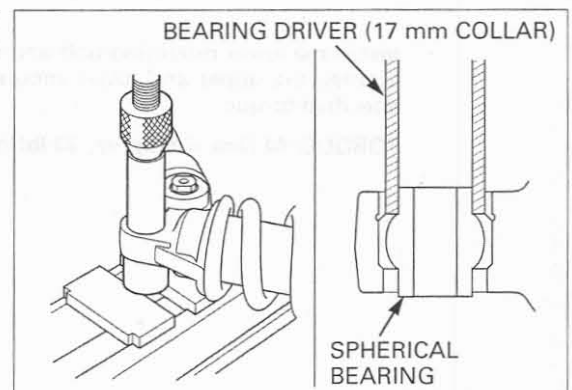
**07GMD-KT80100**



Press new spherical bearing into the shock absorber pivot from the left side until it is fully seated, using the special tool and hydraulic press.

**TOOLS:**  
Bearing driver  
(Use only 17 mm collar)

**07GMD-KT80100**

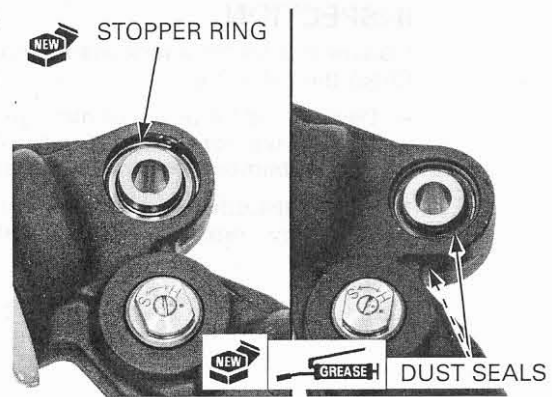


## REAR WHEEL/SUSPENSION

Install a new stopper ring into the groove of the shock absorber pivot securely.

*The left pivot dust seal O.D. is larger than right pivot dust seal O.D.*

Apply grease to the new dust seal lips and install them into the shock absorber pivot.

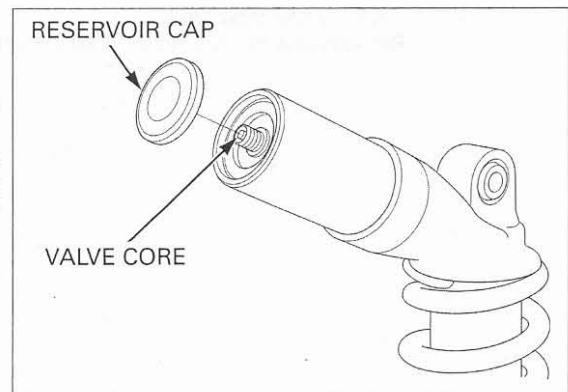


### SHOCK ABSORBER DISPOSAL PROCEDURE

*Do not remove the valve core until pressure is released.*

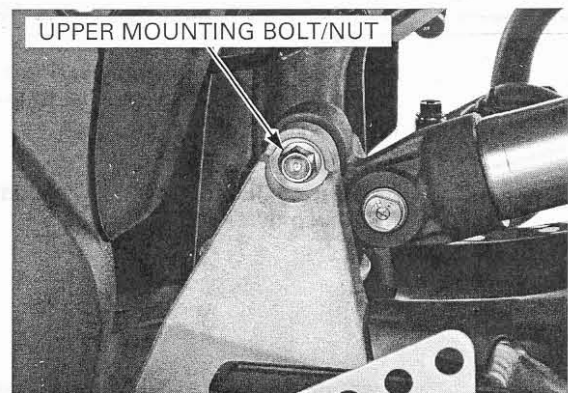
Remove the shock absorber reservoir cap. Put on safety glasses, then release the nitrogen from the reservoir by depressing the valve core.

- Point the valve away from you to prevent debris getting in your eyes.
- Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve from the shock absorber reservoir.



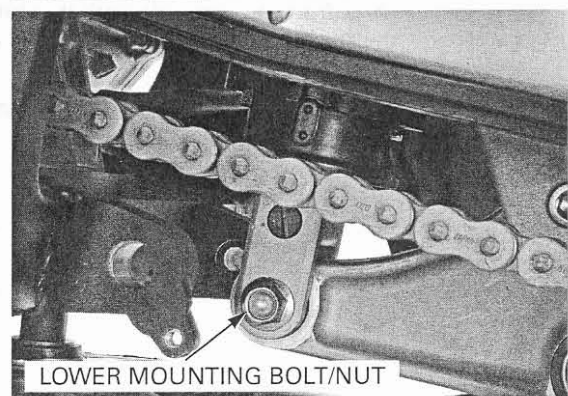
### INSTALLATION

Set the shock absorber to the upper mount with the rebound damping adjuster facing left. Install the upper mounting bolt and nut.



Install the lower mounting bolt and nut. Tighten the upper and lower mounting nuts to the specified torque.

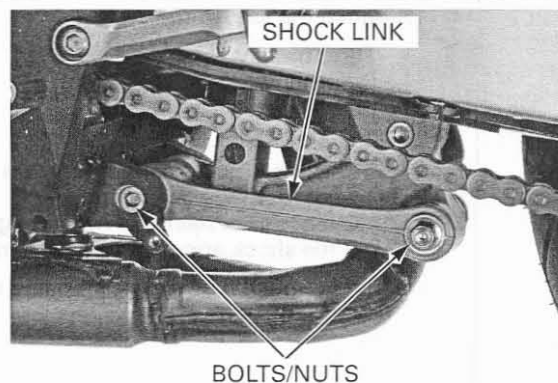
**TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)**





Install the shock link to the frame and shock arm.  
Install the shock link bolts and nuts.  
Tighten the nuts to the specified torque.

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

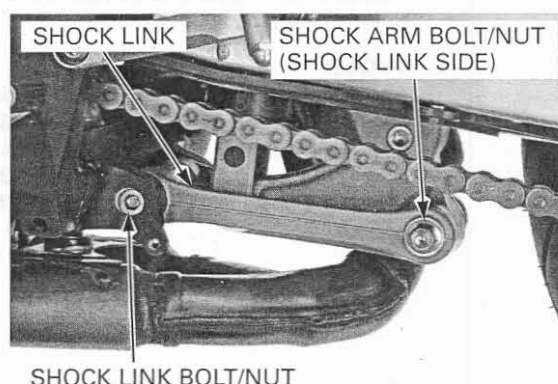


## SUSPENSION LINKAGE

### REMOVAL

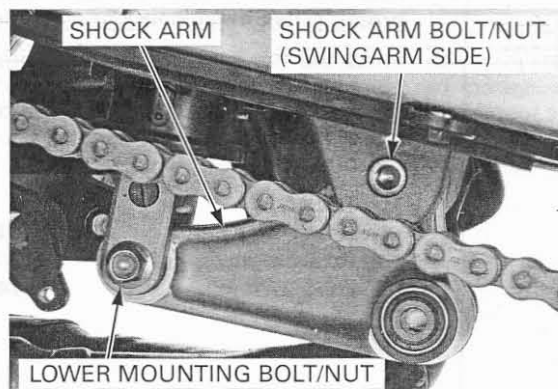
Support the motorcycle securely using a safety stand or hoist and raise the rear wheel off the ground.

Remove the bolts, nuts and shock link.



Remove the following:

- Shock arm bolt/nut (swingarm side)
- Shock absorber lower mounting bolt/nut
- Shock arm



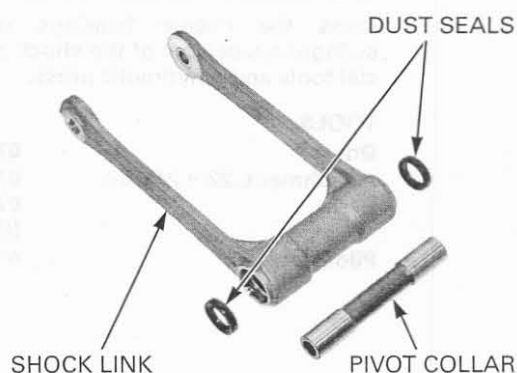
Remove the pivot collar and dust seals from the shock link.

Check the dust seals and pivot collar for wear, damage or fatigue.

Check the needle bearings for damage or loose fit.

Check the shock link for cracks or damage.

If the needle bearings are damaged, replace them.





## REAR WHEEL/SUSPENSION

Remove the following:

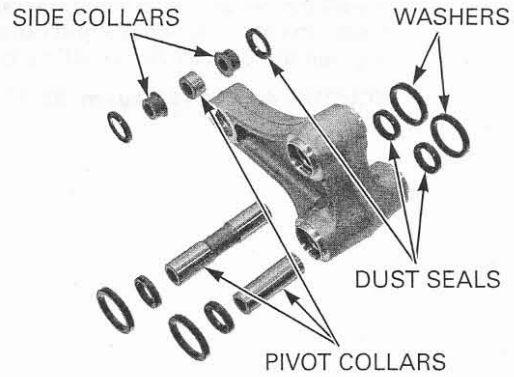
- Thrust washers
- Dust seals
- Side collars
- Pivot collars

Check the dust seals, thrust washers and collars for wear, damage or fatigue.

Check the needle bearings for damage or loose fit.

Check the shock arm for cracks or damage.

If the needle bearings are damaged, replace them.



### BEARING REPLACEMENT

#### SHOCK LINK NEEDLE BEARING

Remove the needle bearings from the shock link using the special tools.

##### TOOLS:

Remover handle

Bearing remover, 17 mm

Remover weight

07936-3710100

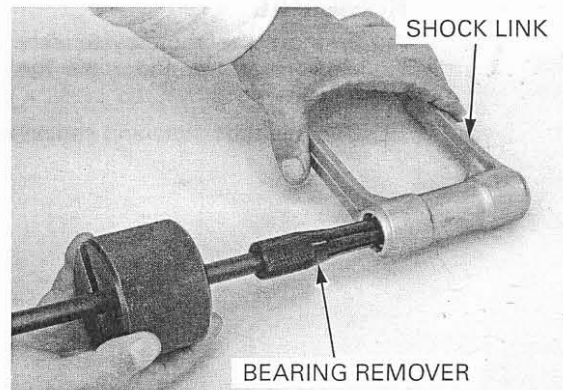
07936-3710300

07741-0010201 or

07936-371020A,

07936-3710200

(U.S.A. only)



Pack the new needle bearings with multi-purpose grease (Shell Alvania EP2 or equivalent).

*Press the needle bearings into the shock link with the marked side facing out.*

Press the new needle bearings into the shock link pivot so that the needle bearing surface is 4.8 – 5.2 mm (0.19 – 0.20 in) below the end of the shock link surface, using the special tools and a hydraulic press.

##### TOOLS:

Driver

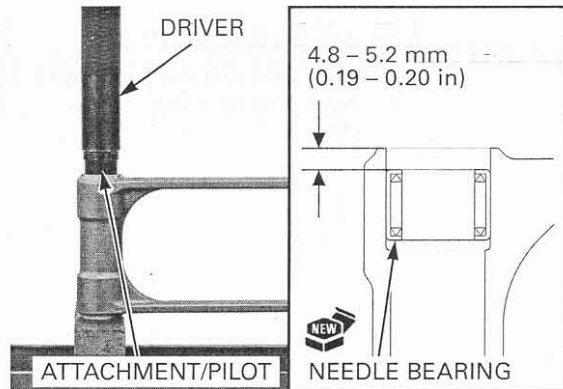
Attachment, 24 x 26 mm

Pilot, 17 mm

07749-0010000

07746-0010700

07746-0040400



#### SHOCK ARM NEEDLE BEARING

Press the needle bearings (shock link side, swingarm side) out of the shock arm using the special tools and a hydraulic press.

##### TOOLS:

Driver

Attachment, 22 x 24 mm

Pilot, 17 mm

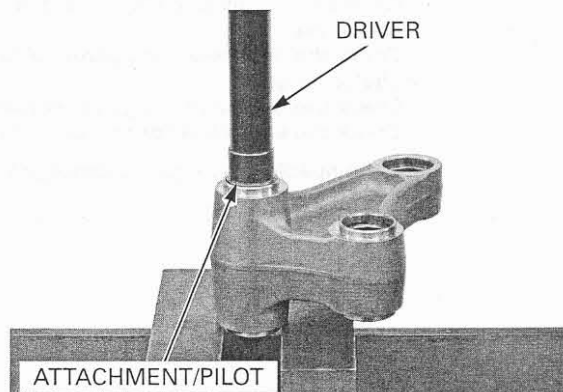
07949-3710001

07746-0010800 or

07746-001A800

(U.S.A. only)

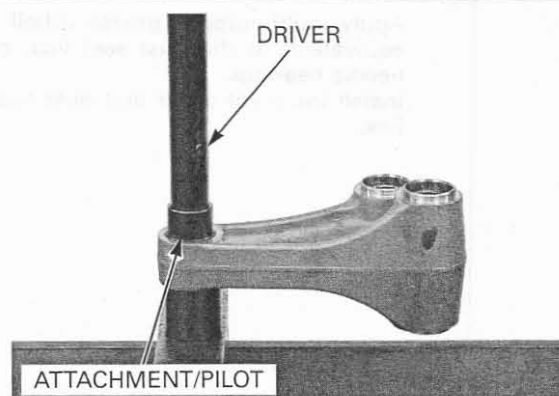
07746-0040400



Press the needle bearing (shock absorber side) out of the shock arm using the special tools and a hydraulic press.

## TOOLS:

|                        |               |
|------------------------|---------------|
| Driver                 | 07949-3710001 |
| Attachment, 24 x 26 mm | 07746-0010700 |
| Pilot, 19 mm           | 07746-0041400 |



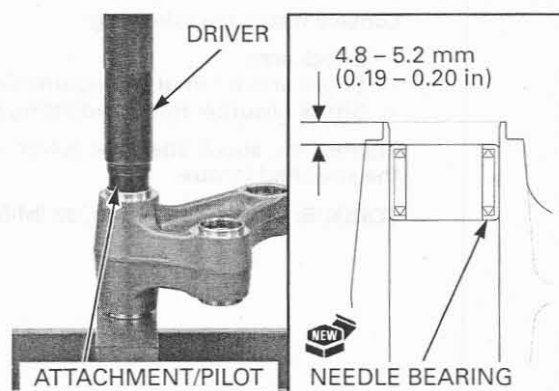
*Press the needle bearings into the shock arm with the marked side facing out.*

Pack the new needle bearings with multi-purpose grease (Shell Alvania EP2 or equivalent).

Press the new needle bearings into the pivot (shock link side and swingarm side) so that the needle bearing surface is 4.8 – 5.2 mm (0.19 – 0.20 in) below the end of the shock arm surface, using the special tools and a hydraulic press.

## TOOLS:

|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 24 x 26 mm | 07746-0010700 |
| Pilot, 17 mm           | 07746-0040400 |

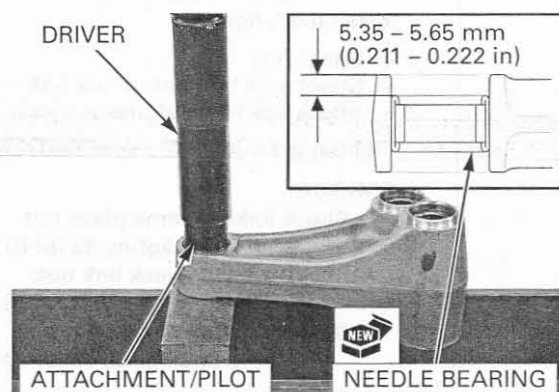


Pack the new needle bearing with multi-purpose grease (Shell Alvania EP2 or equivalent).

Press the new needle bearing into the shock absorber side pivot so that the needle bearing surface is 5.35 – 5.65 mm (0.211 – 0.222 in) below the end of the shock arm surface, using the special tools and a hydraulic press.

## TOOLS:

|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 24 x 26 mm | 07746-0010700 |
| Pilot, 19 mm           | 07746-0041400 |

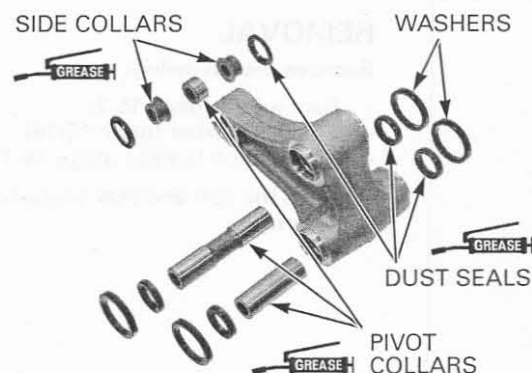


## INSTALLATION

Apply multi-purpose grease (Shell Alvania EP2 or equivalent) to the dust seal lips, collars and needle bearings.

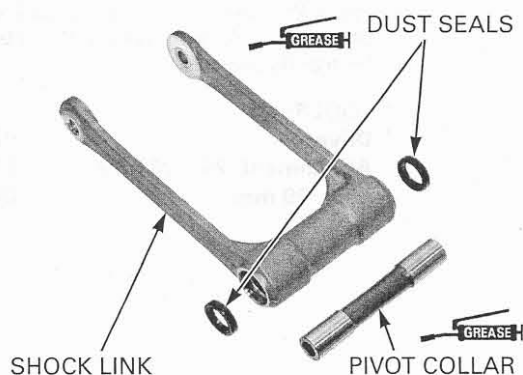
- Make sure the needle bearing rollers of the shock absorber side are in position before installing.
  - Number of needle rollers: 27

Install the pivot collars, side collars, dust seals and thrust washers to the shock arm.



## REAR WHEEL/SUSPENSION

Apply multi-purpose grease (Shell Alvania EP2 or equivalent) to the dust seal lips, pivot collar and needle bearings.  
Install the pivot collar and dust seals to the shock link.

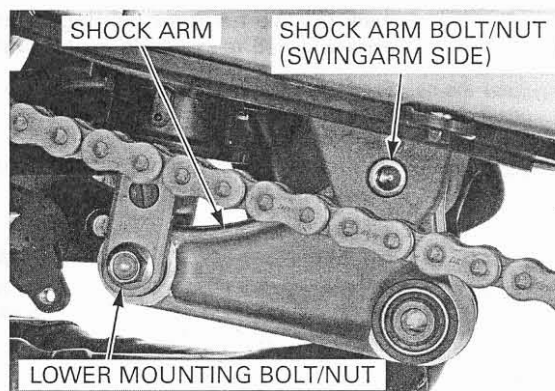


Loosely install the following:

- Shock arm
- Shock arm bolt/nut (swingarm side)
- Shock absorber lower mounting bolt/nut

Tighten the shock absorber lower mounting nut to the specified torque.

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



Install the following:

- Shock link
- Shock arm bolt/nut (shock link side)
- Shock link bolt/nut (frame side)

Tighten the nuts to the specified torque.

**TORQUE:**

**Shock link-to-frame pivot nut:**

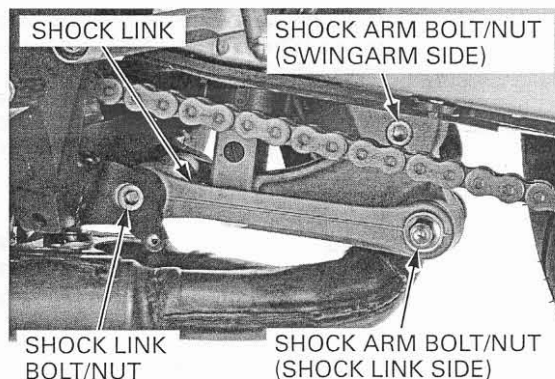
**44 N·m (4.5 kgf·m, 33 lbf·ft)**

**Shock arm-to-shock link nut:**

**44 N·m (4.5 kgf·m, 33 lbf·ft)**

**Shock arm-to-swingarm nut:**

**44 N·m (4.5 kgf·m, 33 lbf·ft)**



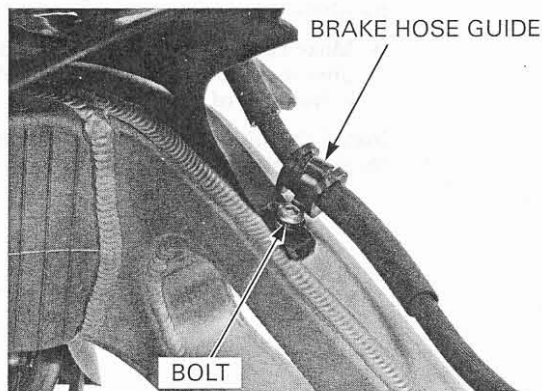
## SWINGARM

### REMOVAL

Remove the following:

- Rear wheel (page 15-7)
- Shock absorber (page 15-14)
- Suspension linkage (page 15-17)

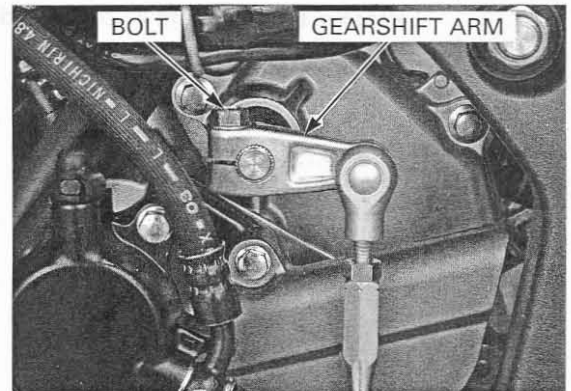
Remove the bolt and rear brake hose guide from the swingarm.



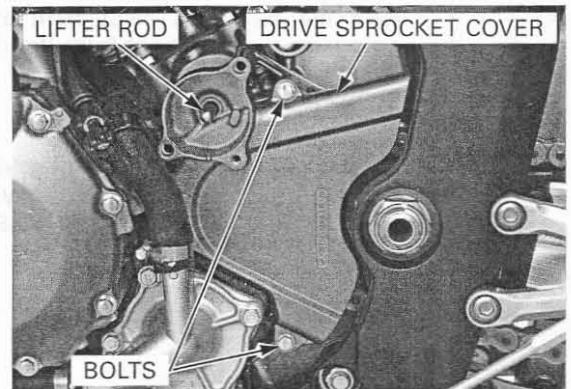
Remove the bolt and gearshift arm from the gearshift spindle.

*It is not necessary to drain the clutch hydraulic system in order to remove the swingarm.*

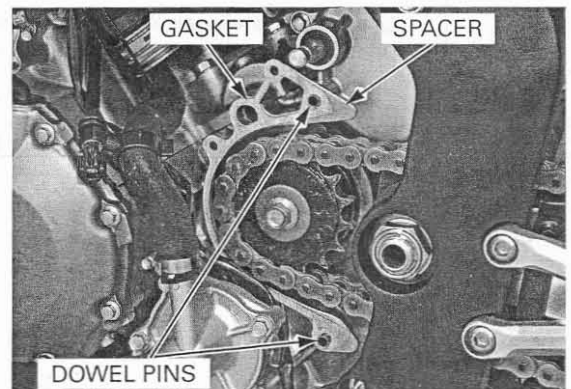
Remove the clutch slave cylinder (page 10-13).



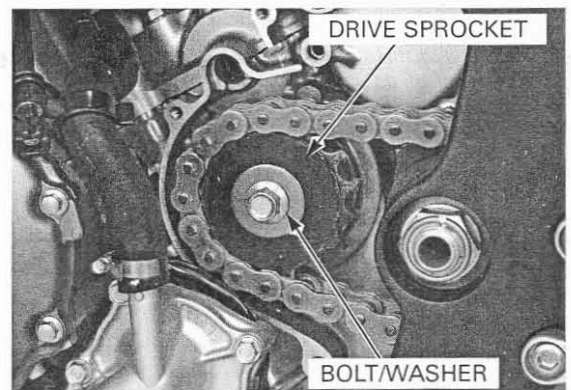
Remove the clutch lifter rod.  
Remove the bolts and drive sprocket cover.



Remove the gasket, spacer and dowel pin.

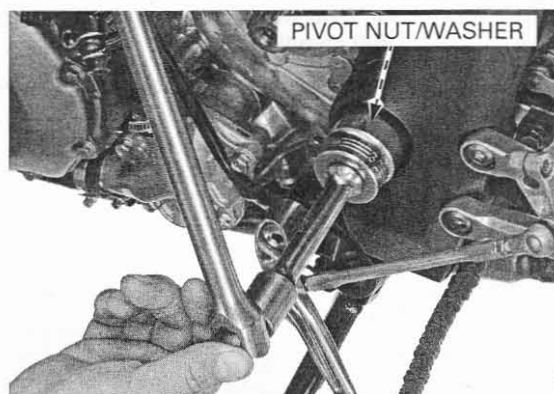


Remove the bolt, washer and drive sprocket.



## REAR WHEEL/SUSPENSION

Remove the swingarm pivot nut and washer.

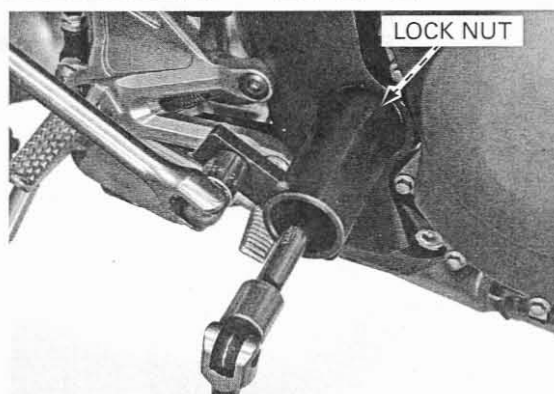


Hold the swingarm pivot shaft and remove the swingarm pivot lock nut from the right pivot using the special tool.

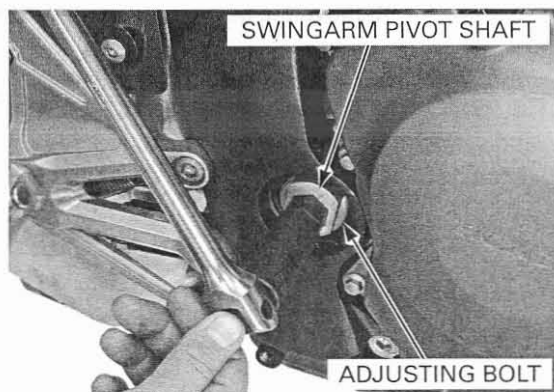
**TOOL:**

Swingarm lock nut wrench,  
5.8 x 47 mm

07YMA-MCF0100 or  
07YMA-MCFA100  
(U.S.A. only)

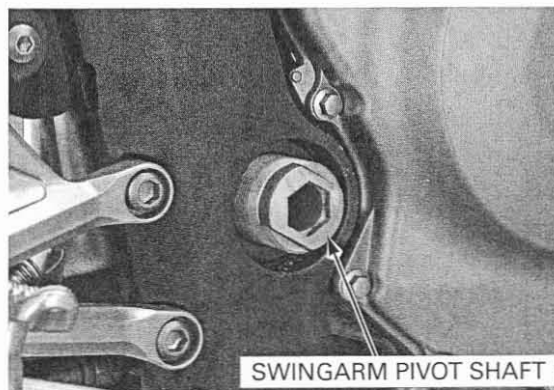


Loosen the swingarm pivot adjusting bolt with the pivot shaft.



*Be careful so that  
the pivot collars do  
not damage the  
main frame.*

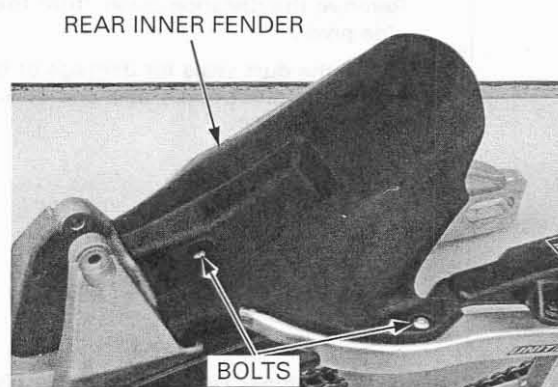
Remove the swingarm pivot shaft and the swingarm.



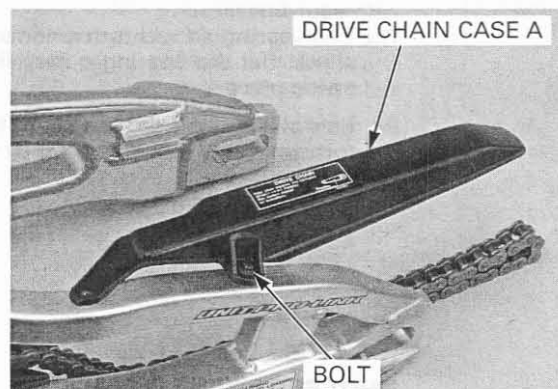


## DISASSEMBLY/INSPECTION

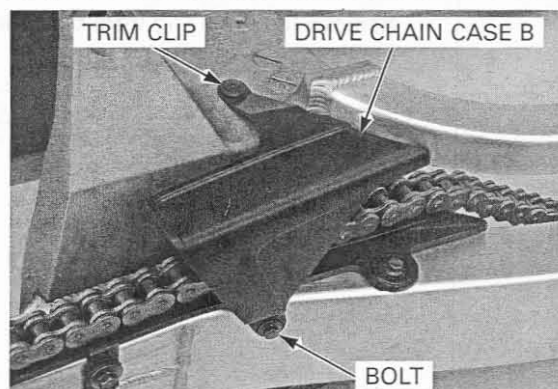
Remove the bolts and rear inner fender.



Remove the two bolt and drive chain case A.

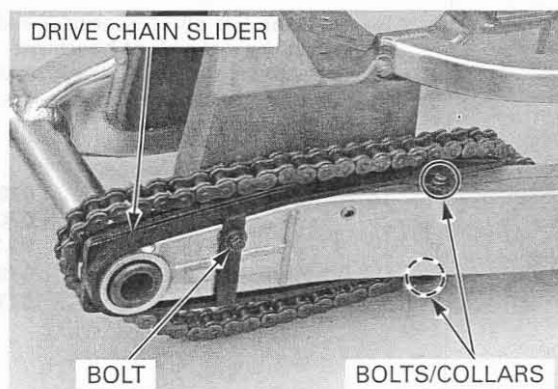


Remove the bolt, trim clip and drive chain case B.



Remove the three bolts, collars and drive chain slider.

Check the drive chain slider for wear or damage.

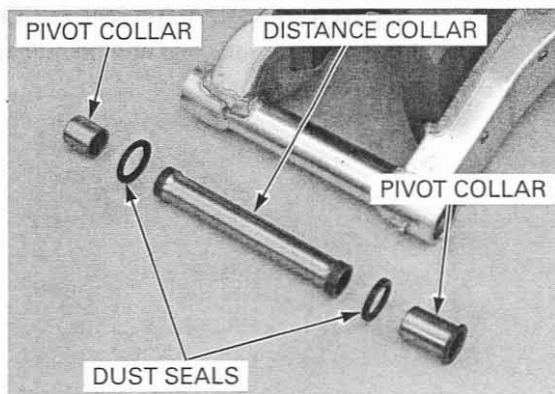




## REAR WHEEL/SUSPENSION

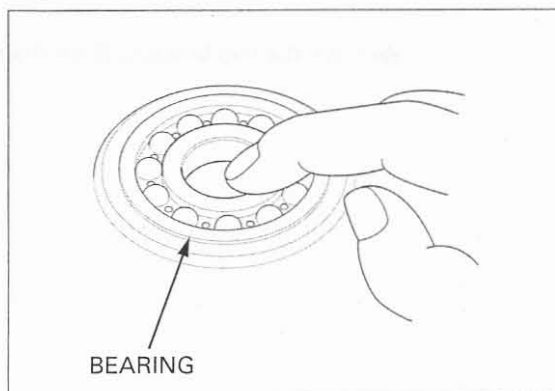
Remove the pivot collars and dust seals.  
Remove the distance collar from the swingarm left side pivot.

Check the dust seals for damage or fatigue.  
Check the pivot collar and distance collar for wear or damage.



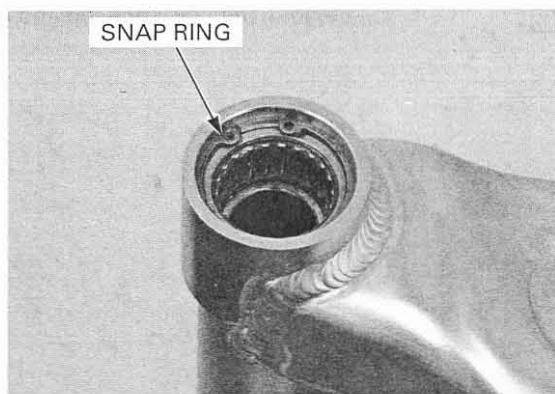
Turn the inner race of right side pivot ball bearing with your finger.  
The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the swingarm pivot.

Remove and discard the bearing if the races do not turn smoothly and quietly, or if they fit loosely in the swingarm pivot.



### PIVOT BEARING REPLACEMENT

Remove the snap ring from the swingarm right side pivot.

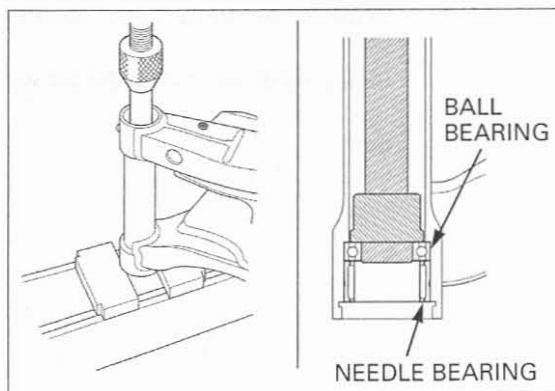


Remove the left pivot bearing needle rollers before removing the right pivot bearings.  
Press the right pivot needle and ball bearings out of the swingarm pivot using the special tools and a hydraulic press.

**TOOLS:**  
Driver

070GD-0010100 or  
070GD-001A100  
(U.S.A. only)  
07946-1870100  
07746-0040600

Attachment, 28 x 30 mm  
Pilot, 25 mm



Attach the special tools into the left pivot needle bearing cage as shown.  
Press the left pivot needle bearing cage out of the swingarm pivot, using the special tools and a hydraulic press.

## TOOLS:

Driver

070GD-0010100 or  
070GD-001A100  
(U.S.A. only)  
07ZMD-MBW0100  
or  
07ZMD-MBWA100  
(U.S.A. only)  
07948-4630100

Attachment, 34 mm

Ball race remover

Pack the new ball bearing cavities with grease (Shell Alvania EP2 or equivalent).  
Press the ball bearing into the swingarm right pivot until it is fully seated, using the special tools and a hydraulic press.

## TOOLS:

Driver

Attachment, 40 x 42 mm

Pilot, 25 mm

07749-0010000  
07746-0010900  
07746-0040600

Pack the new needle bearing with grease (Shell Alvania EP2 or equivalent).  
Press the needle bearing into the swingarm right pivot until it is fully seated onto the ball bearing, using the special tools, removed right pivot collar and a hydraulic press.

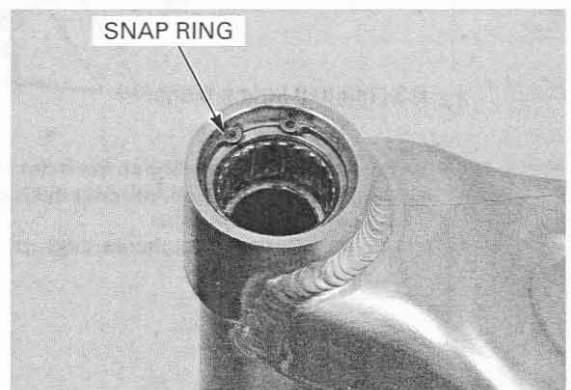
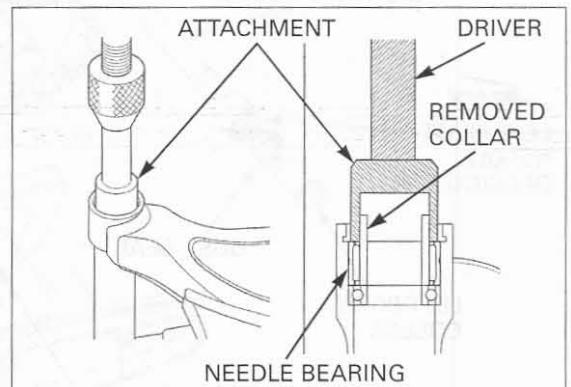
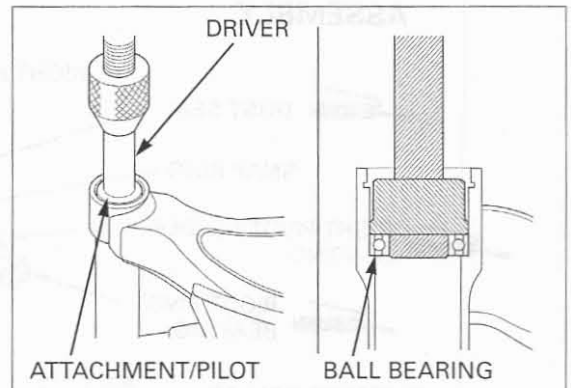
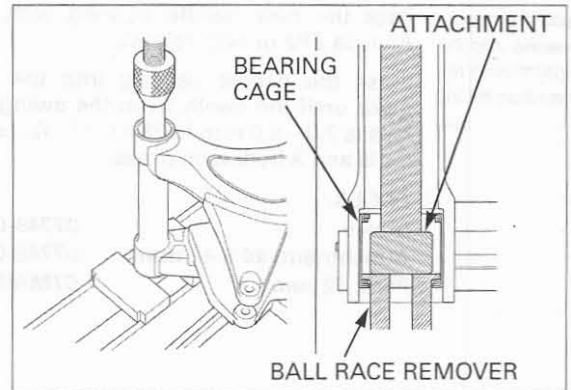
## TOOLS:

Driver

Attachment, 42 mm

07749-0010000  
07QAD-P0A0100

Install the snap ring into the right swingarm pivot groove securely.



## REAR WHEEL/SUSPENSION

Press the needle bearing into the swingarm with the marked side facing out.

Pack the new needle bearing with grease (Shell Alvania EP2 or equivalent).

Press the needle bearing into the left swingarm pivot until the depth from the swingarm pivot surface is 7.0 – 8.0 mm (0.28 – 0.31 in), using the special tools and a hydraulic press.

### TOOLS:

Driver

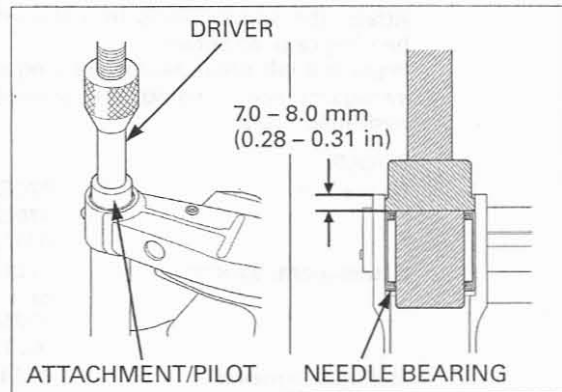
Attachment, 40 x 42 mm

Pilot, 32 mm

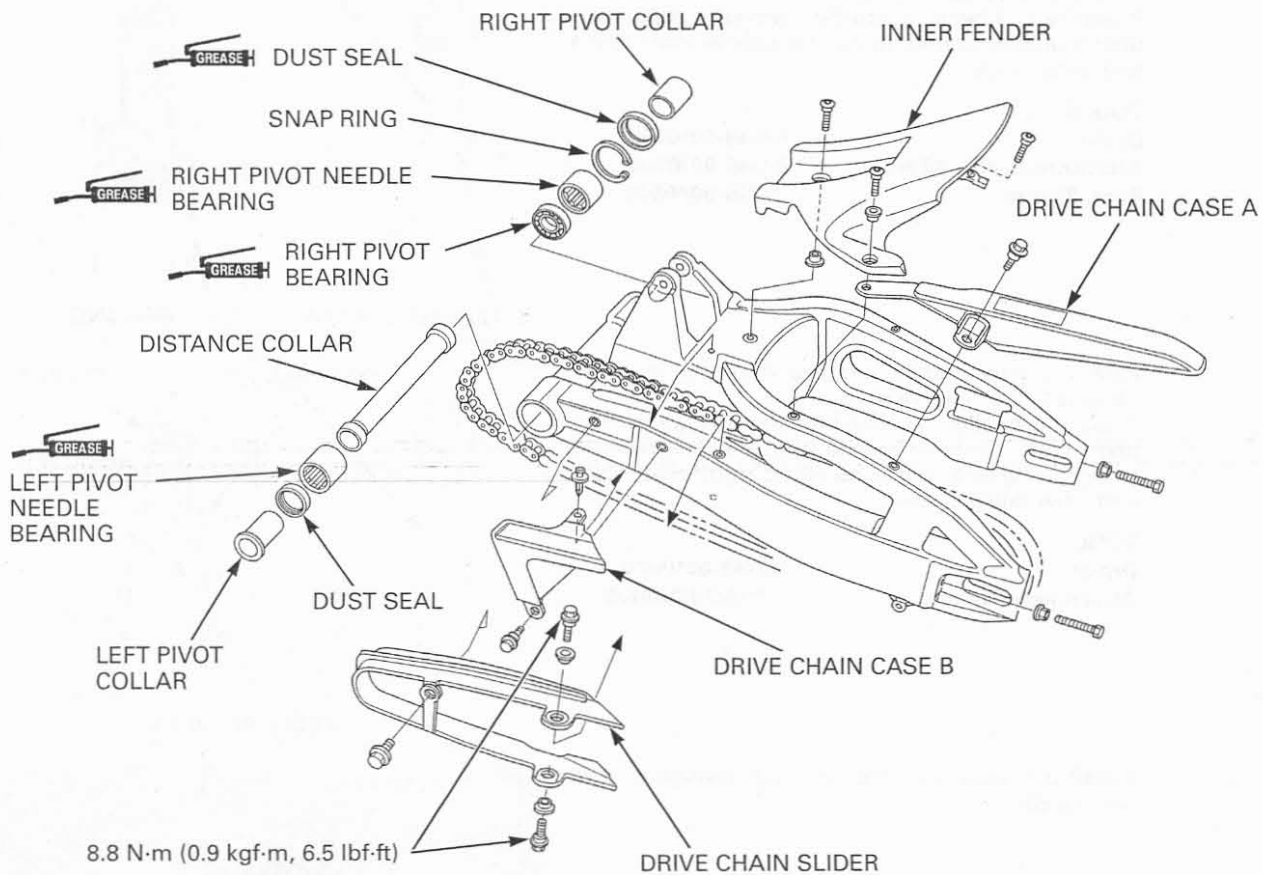
07749-0010000

07746-0010900

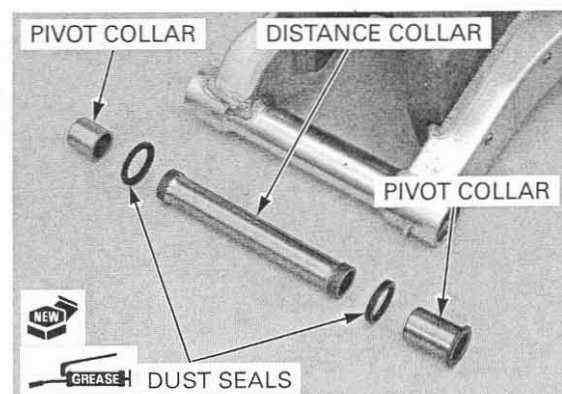
07MAD-PR90200



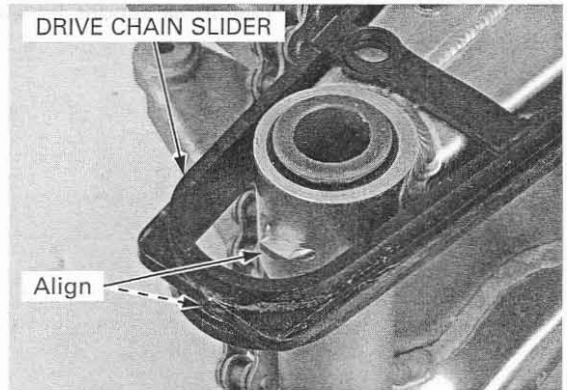
## ASSEMBLY



Install the distance collar from the left side pivot. Apply grease (Shell Alvania EP2 or equivalent) to new dust seal lips. Install the dust seals and pivot collars into the swingarm pivot.



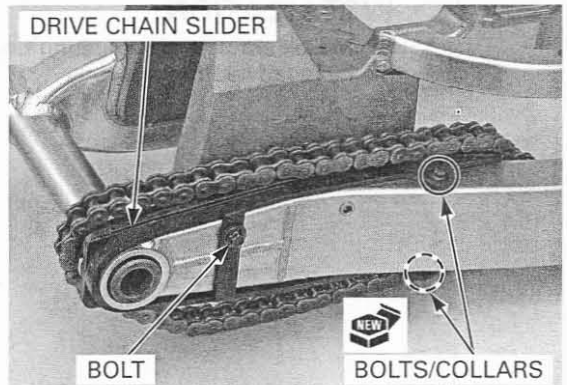
Install the drive chain slider aligning its slit with the boss on the swingarm.



Install the drive chain slider mounting bolt (front).  
Install the collars and new drive chain slider mounting bolts (rear).

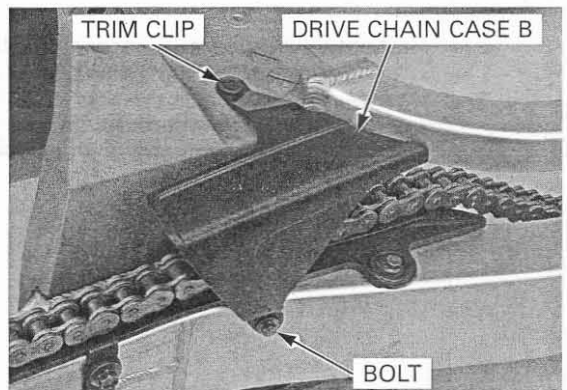
Tighten the bolts to the specified torque.

**TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)**

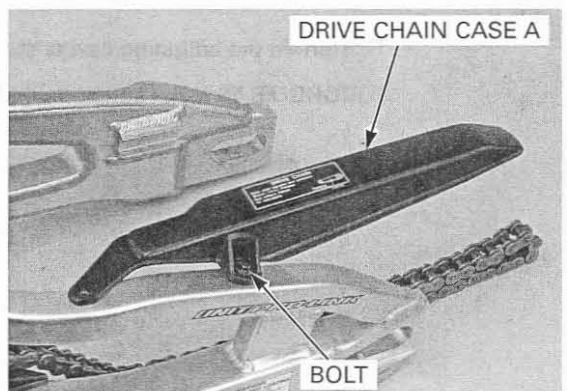


Install the drive chain case B and tighten the bolt securely.

Install the trim clip.



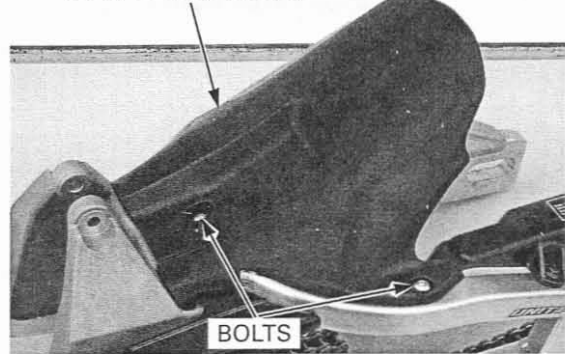
Install the drive chain case A and tighten the bolts securely.



## REAR WHEEL/SUSPENSION

Install the rear inner fender and tighten the bolts securely.

REAR INNER FENDER

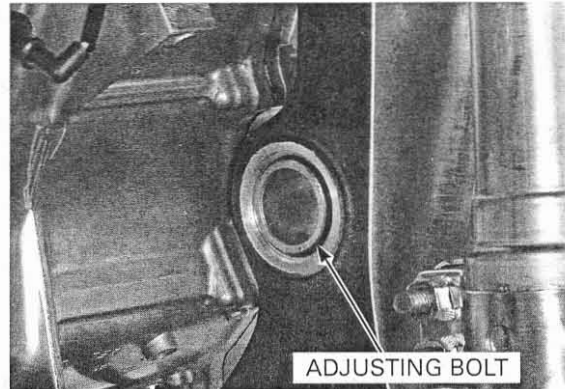


### INSTALLATION

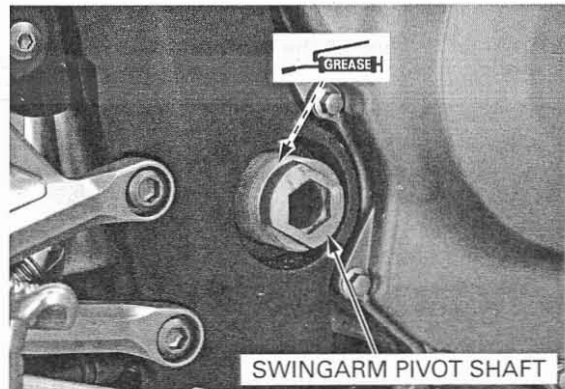
Make sure that the adjusting bolt does not protrude inside of the frame pivot.

Apply a thin coat of grease (Shell Alvania EP2 or equivalent) to the swingarm pivot shaft sliding surface.  
Install the swingarm to the frame.  
Install the swingarm pivot shaft from the right side.

ADJUSTING BOLT



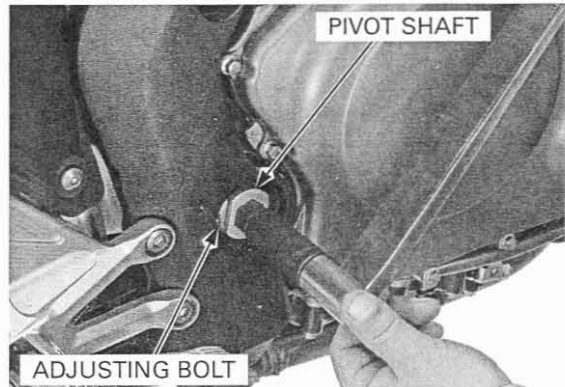
SWINGARM PIVOT SHAFT



Tighten the adjusting bolt with the pivot shaft.

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

PIVOT SHAFT





Install the washer and swingarm pivot nut, and tighten the nut to the specified torque.

**TORQUE:** 113 N·m (11.5 kgf·m, 83 lbf·ft)



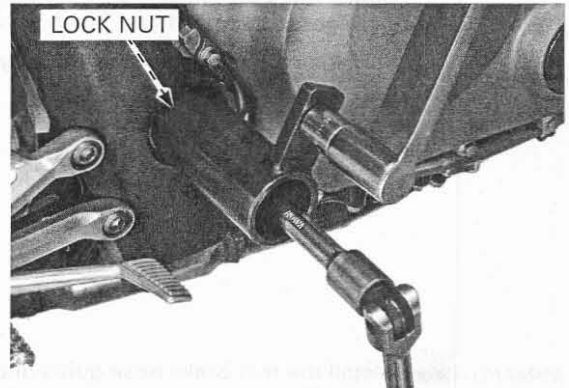
Refer to torque wrench reading information on page 15-3 "Service Information".

Hold the swingarm pivot shaft, tighten the pivot adjusting bolt lock nut to the specified torque.

**TOOL:**  
Swingarm lock nut wrench,  
5.8 x 47 mm

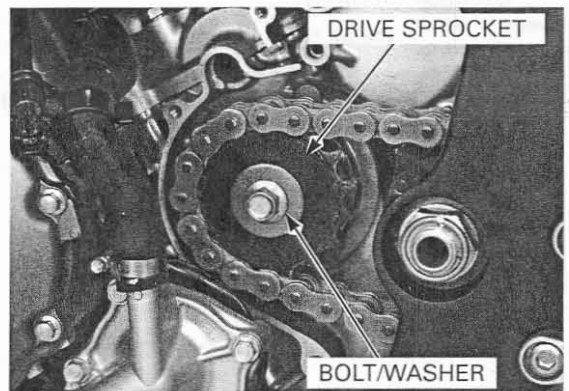
07YMA-MCF0100 or  
07YMA-MCFA100  
(U.S.A. only)

**TORQUE:**  
Actual: 64 N·m (6.5 kgf·m, 47 lbf·ft)  
Indicated: 58 N·m (5.9 kgf·m, 43 lbf·ft)

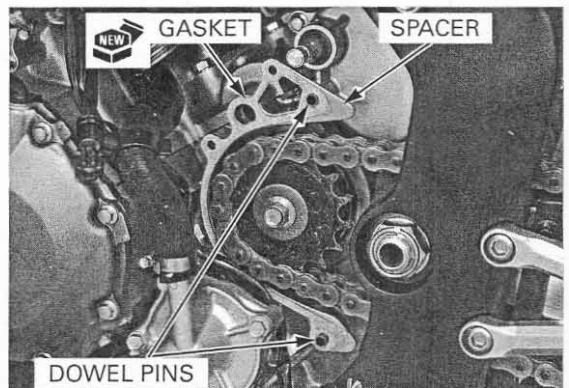


Install the drive sprocket with its marks facing out. Install the washer and sprocket bolt, then tighten the bolt to the specified torque.

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



Install the dowel pins, spacer and new drive sprocket cover gasket.

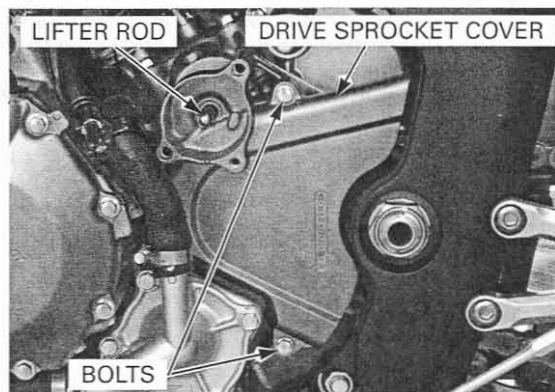




## REAR WHEEL/SUSPENSION

Install the drive sprocket cover and tighten the bolts securely.

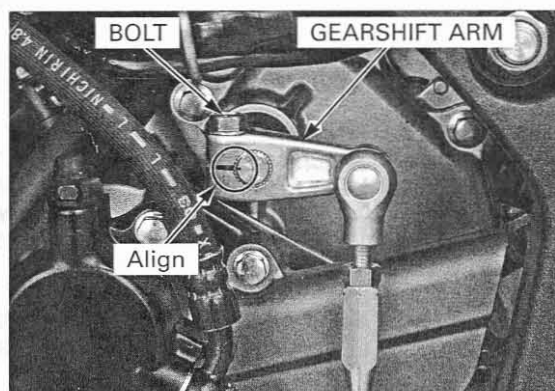
Install the clutch lifter rod.



Install the gearshift arm aligning its slit with the punch mark on the gearshift spindle.

Tighten the gearshift arm pinch bolt securely.

Install the clutch slave cylinder (page 10-15).

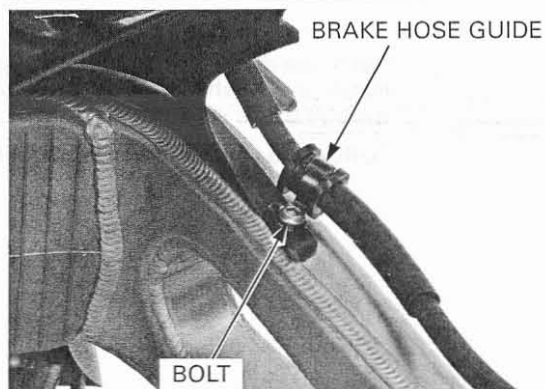


*Install the brake hose guide between the inner fender and swing-arm.*

Install the rear brake hose guide and tighten the bolt securely.

Install the following:

- Shock absorber (page 15-16)
- Suspension linkage (page 15-19)
- Rear wheel (page 15-13)



# 16. HYDRAULIC BRAKE

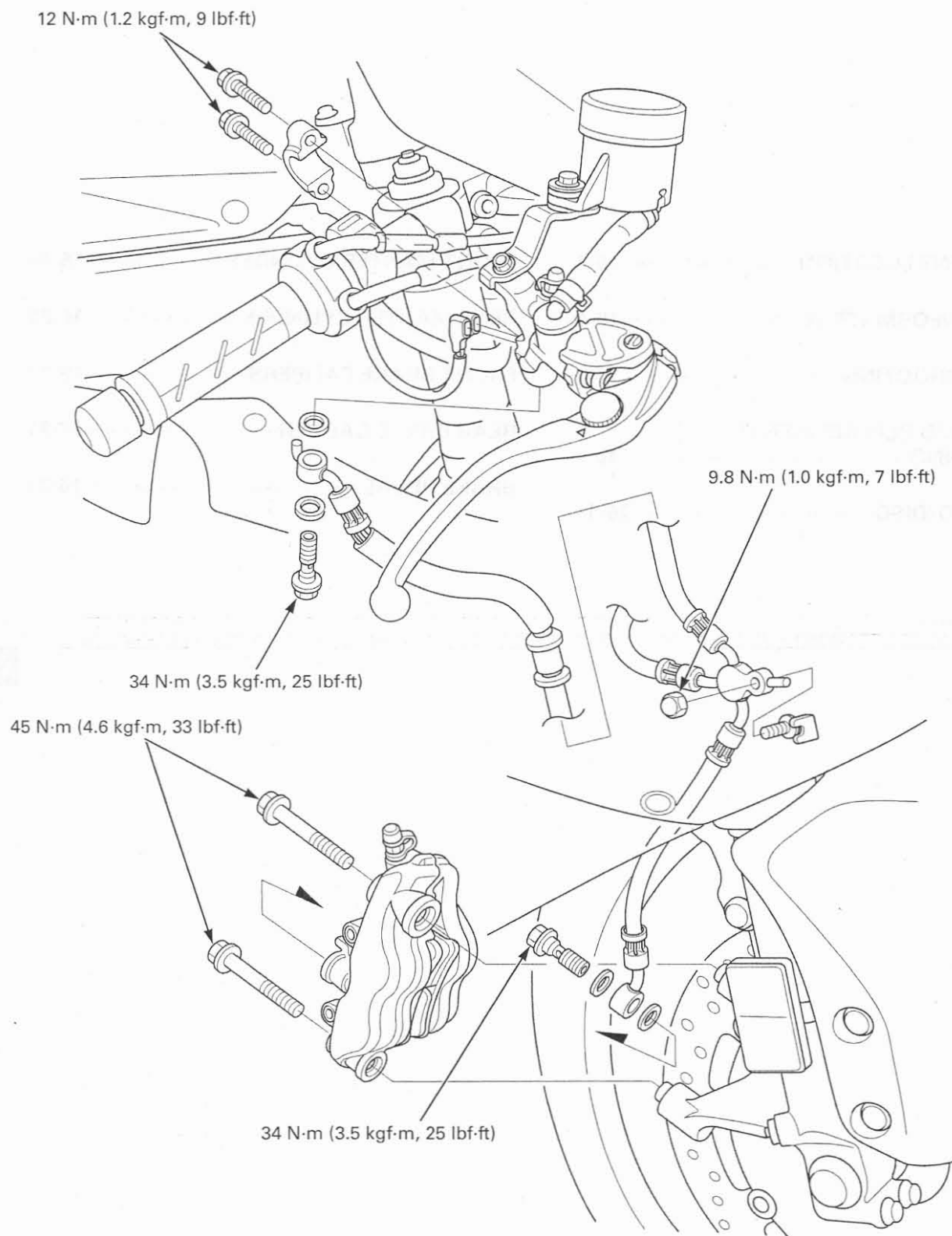
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|  |       |                             |       |
|--|-------|-----------------------------|-------|
| COMPONENT LOCATION .....                       | 16-2  | FRONT MASTER CYLINDER ..... | 16-15 |
| SERVICE INFORMATION .....                      | 16-4  | REAR MASTER CYLINDER .....  | 16-21 |
| TROUBLESHOOTING .....                          | 16-6  | FRONT BRAKE CALIPERS .....  | 16-27 |
| BRAKE FLUID REPLACEMENT/<br>AIR BLEEDING ..... | 16-7  | REAR BRAKE CALIPER .....    | 16-31 |
| BRAKE PAD/DISC .....                           | 16-11 | BRAKE PEDAL .....           | 16-34 |

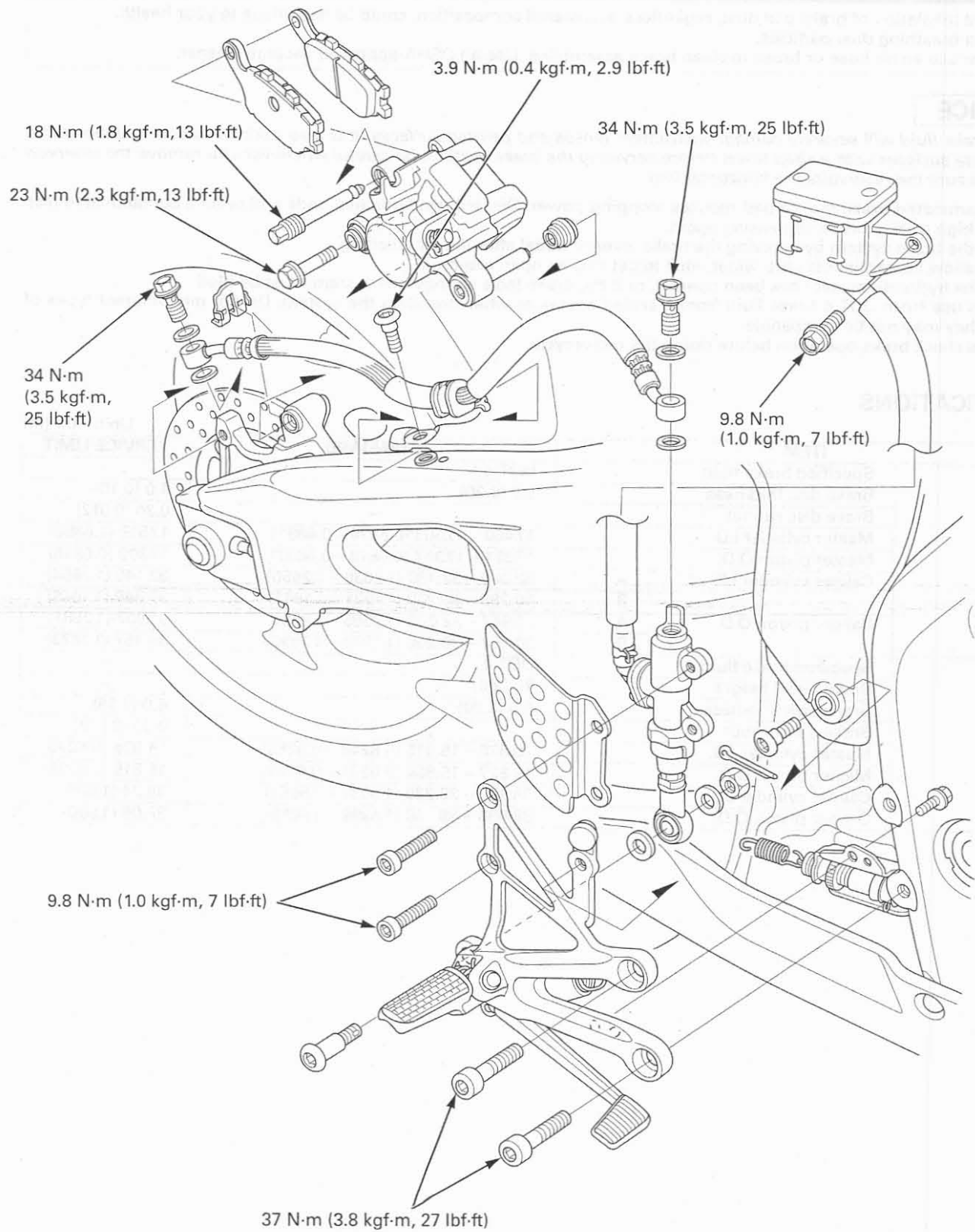
## HYDRAULIC BRAKE

### COMPONENT LOCATION

FRONT:



REAR:



## HYDRAULIC BRAKE

# SERVICE INFORMATION

## GENERAL

### ⚠ CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

### NOTICE

*Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Cover these surfaces with a shop towel before servicing the brake system. Be careful whenever you remove the reservoir cap; make sure the reservoirs are horizontal first.*

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Check the brake system by applying the brake lever or pedal after the air bleeding.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid; they may not be compatible.
- Always check brake operation before riding the motorcycle.

## SPECIFICATIONS

Unit: mm (in)

| ITEM  |                       | STANDARD                          | SERVICE LIMIT                     |
|-------|-----------------------|-----------------------------------|-----------------------------------|
| Front | Specified brake fluid | DOT 4                             | —                                 |
|       | Brake disc thickness  | 5.0 (0.20)                        | 4.0 (0.16)                        |
|       | Brake disc runout     | —                                 | 0.30 (0.012)                      |
|       | Master cylinder I.D.  | 17.460 – 17.503 (0.6874 – 0.6891) | 17.515 (0.6896)                   |
|       | Master piston O.D.    | 17.321 – 17.367 (0.6819 – 0.6837) | 17.309 (0.6815)                   |
|       | Caliper cylinder I.D. | A                                 | 32.080 – 32.130 (1.2630 – 1.2650) |
|       |                       | B                                 | 30.280 – 30.330 (1.1921 – 1.1941) |
|       | Caliper piston O.D.   | A                                 | 31.967 – 32.000 (1.2585 – 1.2598) |
|       |                       | B                                 | 30.167 – 30.200 (1.1877 – 1.1890) |
| Rear  | Specified brake fluid | DOT 4                             | —                                 |
|       | Brake pedal height    | 75 (3.0)                          | —                                 |
|       | Brake disk thickness  | 5.0 (0.20)                        | 4.0 (0.16)                        |
|       | Brake disc runout     | —                                 | 0.30 (0.012)                      |
|       | Master cylinder I.D.  | 15.870 – 15.913 (0.6248 – 0.6265) | 15.925 (0.6270)                   |
|       | Master piston O.D.    | 15.827 – 15.854 (0.6231 – 0.6242) | 15.815 (0.6226)                   |
|       | Caliper cylinder I.D. | 38.180 – 38.230 (1.5031 – 1.5051) | 38.24 (1.506)                     |
|       | Caliper piston O.D.   | 38.098 – 38.148 (1.4999 – 1.5019) | 38.09 (1.500)                     |

## TORQUE VALUES

|  |                                  |
|--|----------------------------------|
| Brake hose oil bolt                          | 34 N·m (3.5 kgf·m, 25 lbf·ft)    |
| Rear brake caliper pad pin                   | 18 N·m (1.8 kgf·m, 13 lbf·ft)    |
| Rear caliper bleed valve                     | 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)  |
| Rear brake caliper slide pin bolt            | 27 N·m (2.8 kgf·m, 20 lbf·ft)    |
| Rear brake caliper mounting bolt             | 23 N·m (2.3 kgf·m, 17 lbf·ft)    |
| Rear brake hose clamp bolt                   | 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)  |
| Rear master cylinder push rod joint nut      | 18 N·m (1.8 kgf·m, 13 lbf·ft)    |
| Rear brake reservoir hose joint screw        | 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft) |
| Rear master cylinder reservoir cap screw     | 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft) |
| Rear master cylinder reservoir mounting bolt | 12 N·m (1.2 kgf·m, 9 lbf·ft)     |
| Rear master cylinder mounting bolt           | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |
| Brake pedal pivot bolt                       | 18 N·m (1.8 kgf·m, 13 lbf·ft)    |
| Front brake caliper mounting bolt            | 45 N·m (4.6 kgf·m, 33 lbf·ft)    |
| Front brake caliper assembly bolt            | 23 N·m (2.3 kgf·m, 17 lbf·ft)    |
| Front brake caliper pad pin                  | 16 N·m (1.6 kgf·m, 12 lbf·ft)    |
| Front caliper bleed valve                    | 7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)  |
| Front brake hose clamp                       | 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)  |
| Front brake hose 3-way joint bolt            | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |
| Front brake hose clamp (left side)           | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    |
| Front master cylinder reservoir cap screw    | 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft) |
| Front master cylinder reservoir stay bolt    | 12 N·m (1.2 kgf·m, 9 lbf·ft)     |
| Front brake light switch screw               | 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)  |
| Front master cylinder reservoir mounting nut | 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)  |
| Front brake lever pivot bolt                 | 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)  |
| Front brake lever pivot nut                  | 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)  |
| Front master cylinder bleed valve            | 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)  |
| Front master cylinder holder bolt            | 12 N·m (1.2 kgf·m, 9 lbf·ft)     |

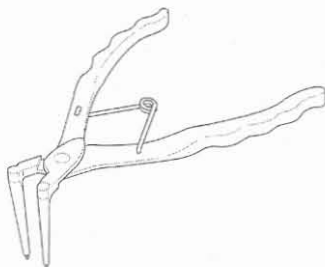
Apply a locking agent to the threads

ALOC bolt: replace with a new one  
Apply a locking agent to the threads

U-nut

## TOOLS

Snap ring pliers  
07914-SA50001





## HYDRAULIC BRAKE

### TROUBLESHOOTING

#### Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly (rear)
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

#### Brake lever/pedal hard

- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Caliper not sliding properly (rear)
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

#### Brake drags

- Contaminated brake pad/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly (rear)
- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port
- Sticking master cylinder piston

## BRAKE FLUID REPLACEMENT/ AIR BLEEDING

### NOTICE

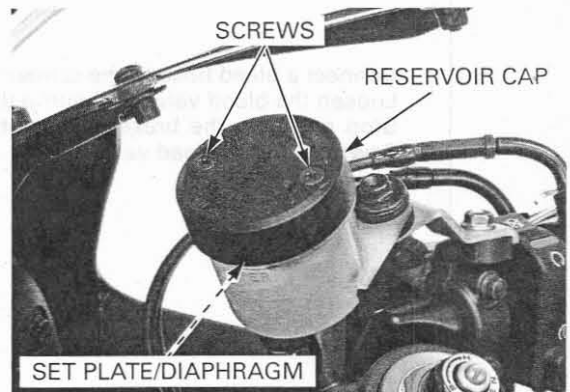
*Spilled fluid can damage painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.*

- Do not allow foreign material to enter the system when filling the reservoir.

### BRAKE FLUID DRAINING

#### FRONT:

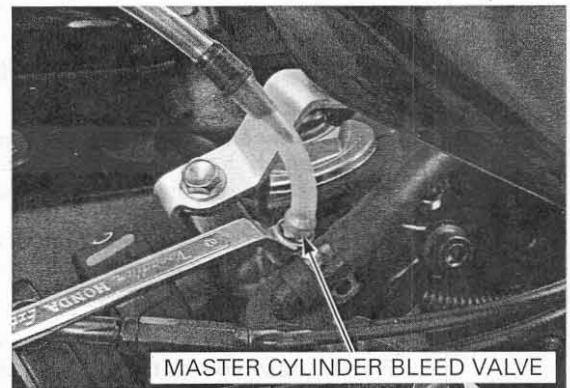
Before removing the reservoir cap, turn the handlebar until the reservoir is parallel to the ground. Remove the screws, reservoir cap, set plate and diaphragm.



Connect the bleed hose to the master cylinder bleed valve.

Loosen the master cylinder bleed valve, and pump the brake lever.

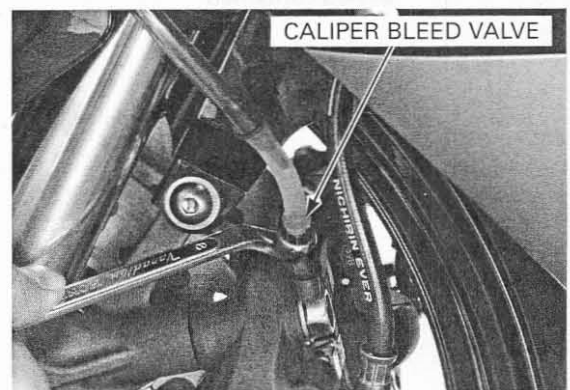
Stop pumping the brake lever until no more fluid flows out of the bleed valve.



Connect the bleed hose to the caliper bleed valve. Loosen the caliper bleed valve, and pump the brake lever.

Stop pumping the brake lever until no more fluid flows out of the bleed valve.

Perform this operation for the other side brake caliper.

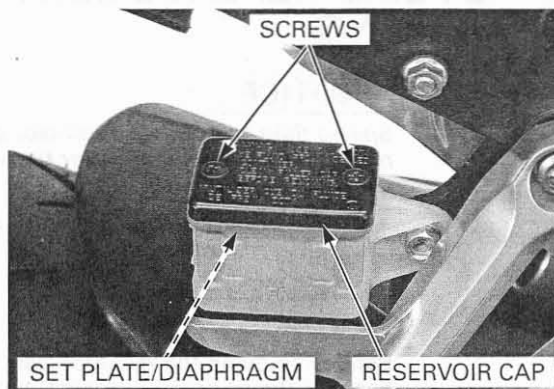


## HYDRAULIC BRAKE

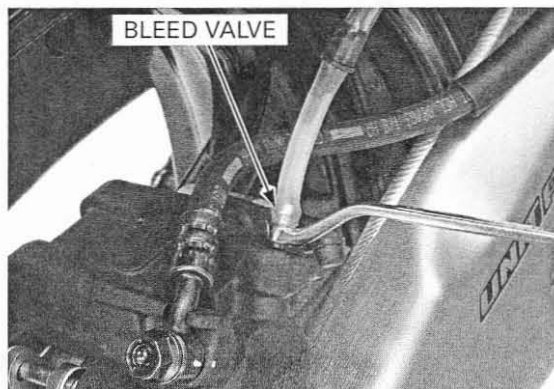
### REAR:

Remove the rear seat cowl (page 3-5).

Remove the screws, reservoir cap, set plate and diaphragm.



Connect a bleed hose to the caliper bleed valve. Loosen the bleed valve and pump the brake pedal. Stop pumping the brake pedal until no more fluid flows out of the bleed valve.



### BRAKE FLUID FILLING/AIR BLEEDING

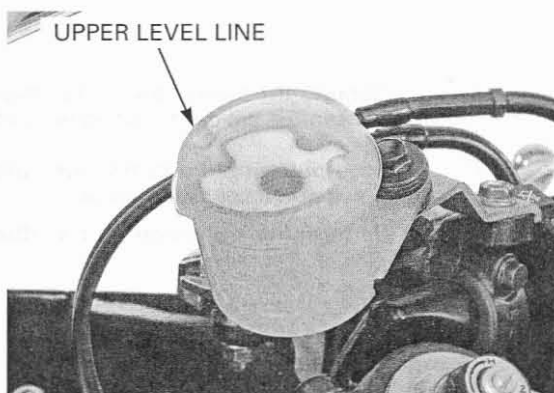
#### NOTE:

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. They are not compatible.
- Do not allow foreign material to enter the system when filling the reservoir.

#### FRONT:

Close the bleed valves.

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



*If not using an automatic refill system, add brake fluid when the fluid level in the reservoir is low.*

1. Connect a commercially available brake bleeder to the master cylinder bleed valve.

Operate the brake bleeder and loosen the bleed valve.

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Repeat above procedure until air bubbles do not appear in the bleed hose.

Close the master cylinder bleed valve.

**TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)**

2. Connect a brake bleeder to the caliper bleed valve.

Operate the brake bleeder and loosen the bleed valve.

Repeat above procedure until air bubbles do not appear in the bleed hose.

Close the bleed valve and perform air bleeding for the other side caliper bleed valve.

Close the caliper bleed valves.

**TORQUE: 7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)**

3. Perform the bleeding procedure at the master cylinder bleed valve again until the system is completely flushed/bled.

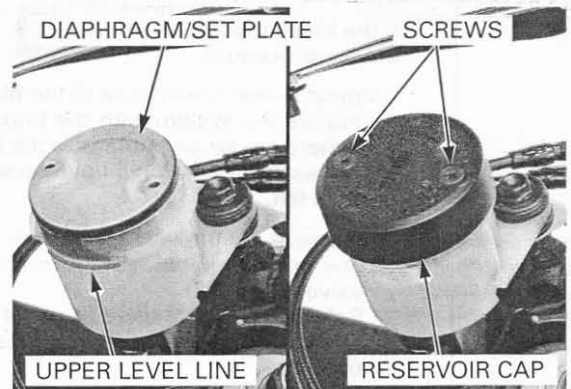
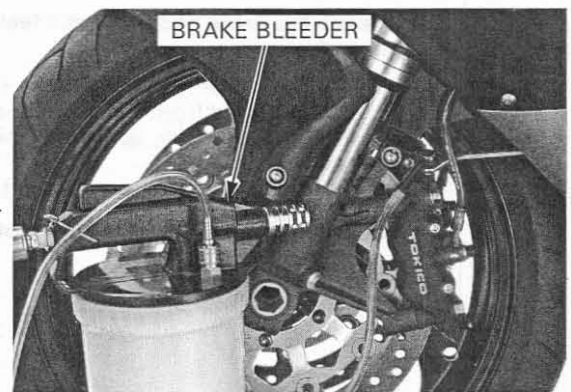
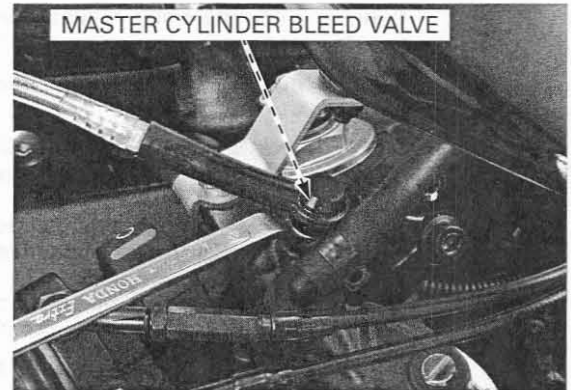
Operate the brake lever. If it still feels spongy, bleed the system again.

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

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

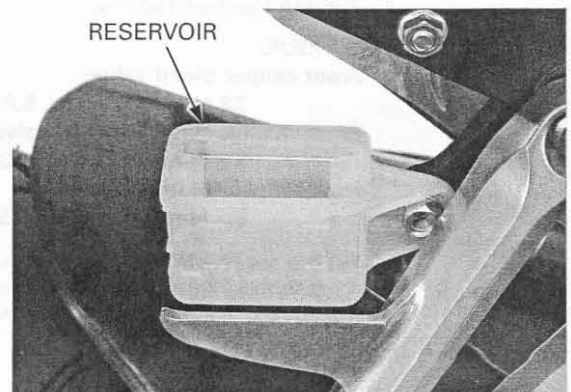
Tighten the screws to the specified torque.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**



## REAR:

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



## HYDRAULIC BRAKE

*If not using an automatic refill system, add brake fluid when the fluid level in the reservoir is low.*

Connect a commercially available brake bleeder to the bleed valve.

Operate the brake bleeder and loosen the bleed valve.

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Repeat above procedure until air bubbles do not appear in the bleed hose.  
Close the bleed valve.

**TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)**

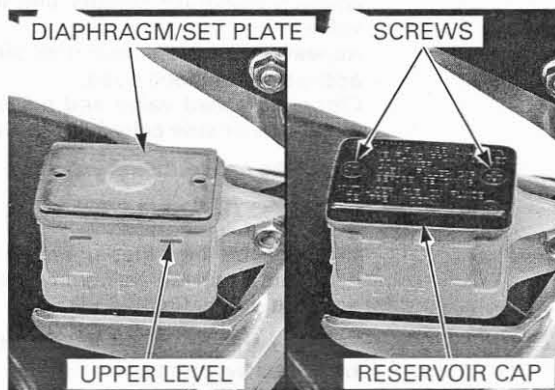
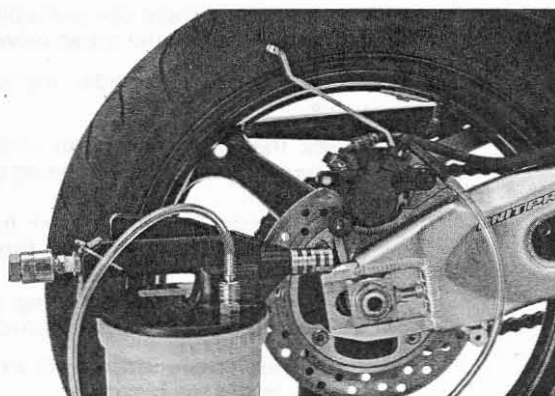
Operate the brake pedal. If it still feels spongy, bleed the system again.

Fill the rear brake reservoir to the upper level with DOT 4 brake fluid from a sealed container. Install the diaphragm, set plate, reservoir cap and screws.

Tighten the screws to the specified torque.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**

Install the rear seat cowl (page 3-6).



If the brake bleeder is not available, perform the following procedures:

Connect a clear bleed hose to the bleed valve.

Pressurize the system with the brake lever or pedal until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever or pedal resistance is felt.

1. Squeeze the brake lever or push the brake pedal, open the bleed valve 1/2 turn and then close the valve.
2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.
3. Repeat steps 1 and 2 until bubbles cease to appear in the fluid coming out of the bleed valve.
4. Tighten the bleed valves.

**TORQUE:**

**Front caliper bleed valve:**

**7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)**

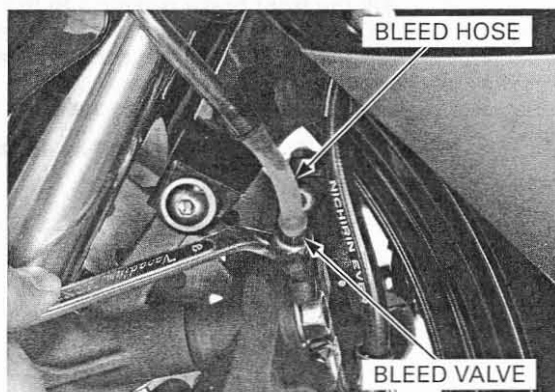
**Front master cylinder bleed valve:**

**5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)**

**Rear caliper bleed valve:**

**5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)**

5. Fill the reservoir to the upper level line with DOT 4 brake fluid from a sealed container. Install the diaphragm, set plate and reservoir cap.



*Do not release the brake lever or pedal until the bleed valve has been closed.*



## BRAKE PAD/DISC

*Always replace the brake pads in pairs to assure even disc pressure.*

### FRONT BRAKE PAD REPLACEMENT

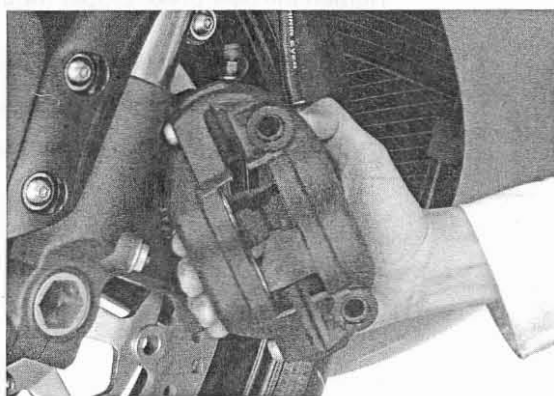
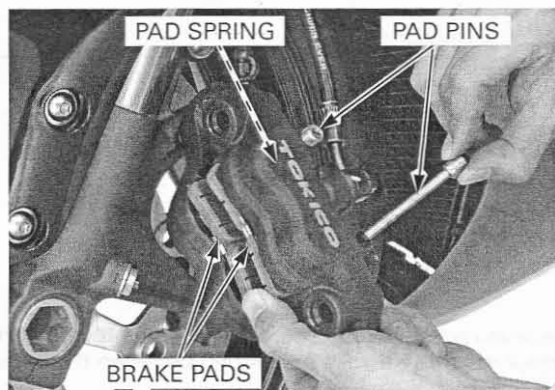
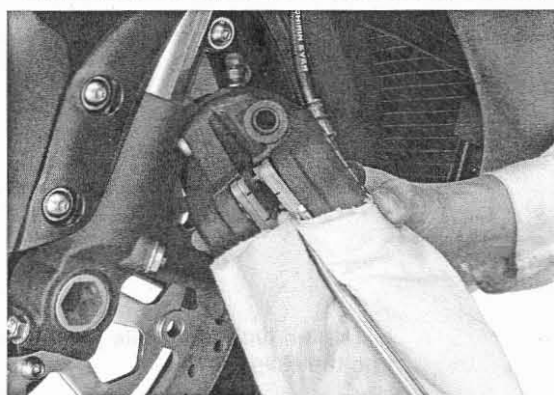
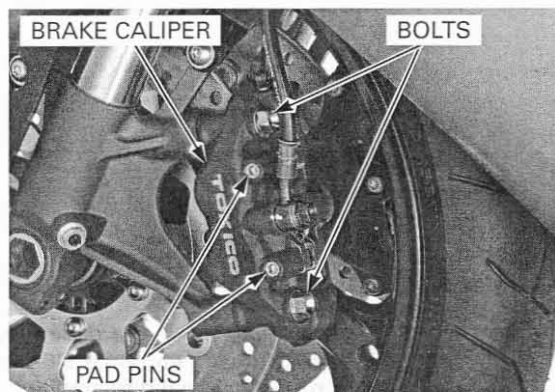
Loosen the pad pins.  
Remove the caliper mounting bolts and brake caliper.  
Discard the brake caliper mounting bolts.

*Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.*

Push the caliper pistons all the way in to allow installation of new brake pads.

Remove the pad pins, brake pads and pad spring.

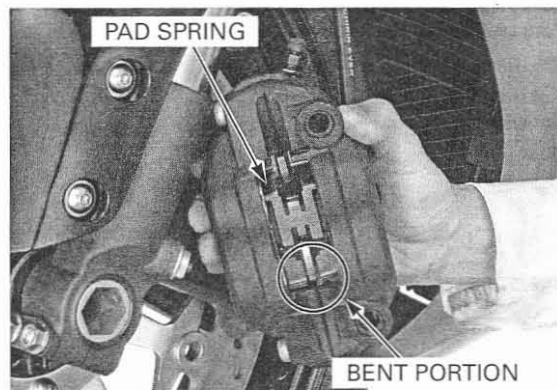
Clean the inside of the caliper especially around the caliper pistons.



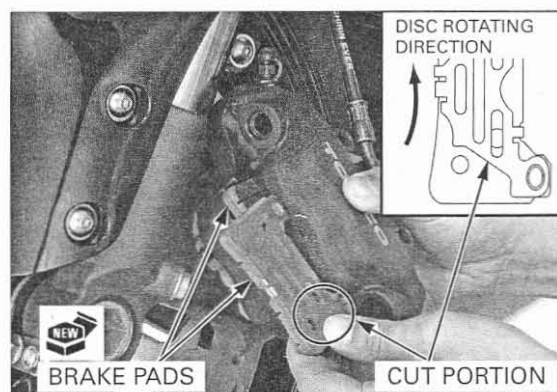


## HYDRAULIC BRAKE

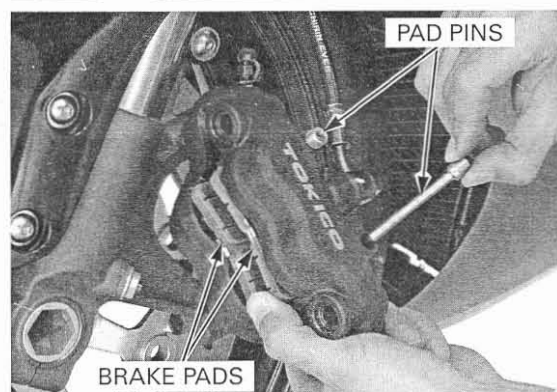
Install the pad spring with its bent side downward.



Install the new brake pads with the cut portion of the shims toward entrance side of the brake disc which rotates normal direction.



Install the pad pins while pushing the brake pad up into the caliper.



*Be careful not to damage the pads.*

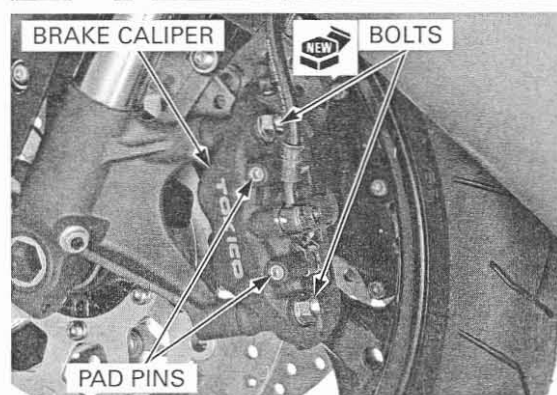
Install the brake caliper to the fork leg so that the disc is positioned between the pads (page 16-30).

Tighten the new brake caliper mounting bolts to the specified torque.

**TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)**

Tighten the pad pins to the specified torque.

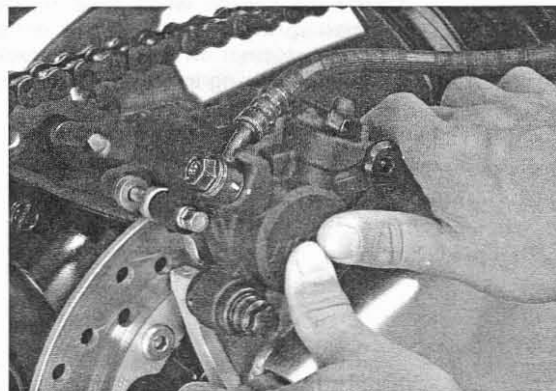
**TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)**



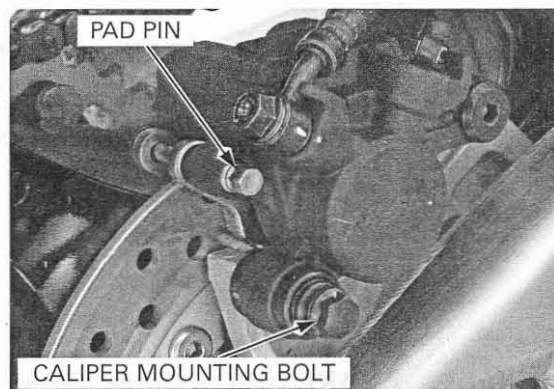
**REAR BRAKE PAD REPLACEMENT**

*Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.*

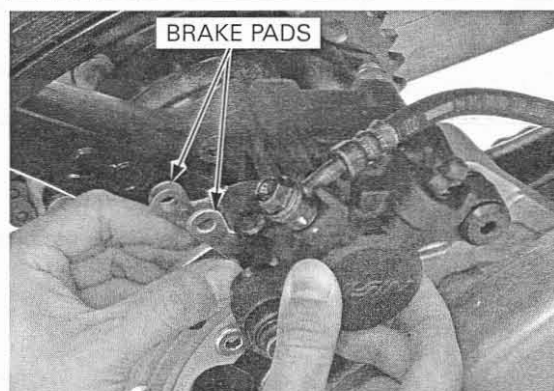
Push the caliper piston all the way in by pushing the caliper body inward to allow installation of new brake pads.



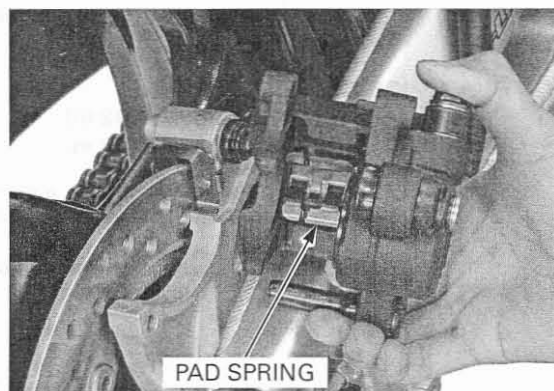
Remove the pad pin.  
Remove the caliper mounting bolt.



Pivot the caliper up, and remove the brake pads.

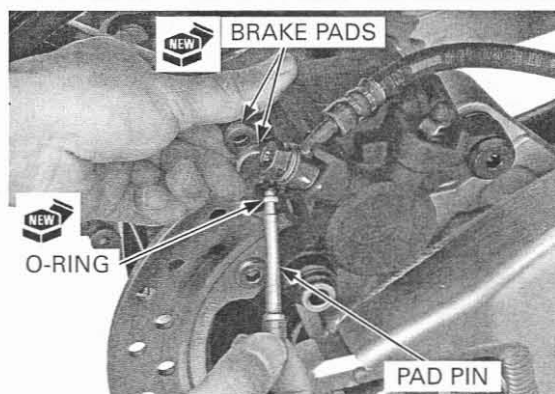


Clean the inside of the caliper especially around the caliper piston.  
Make sure the pad spring is in place.



## HYDRAULIC BRAKE

Install the new brake pads.  
Lower the caliper while pushing the pads against the pad spring so that the pad ends are positioned onto the retainer on the caliper bracket.  
Install new O-ring to the pad pin groove.  
Install the pad pin.

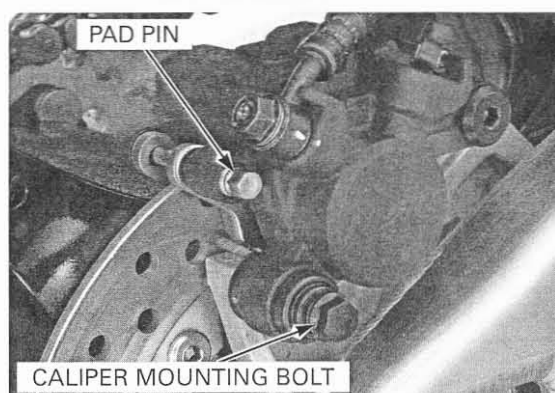


Tighten the caliper mounting bolt to the specified torque.

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

Tighten the pad pin to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**



### BRAKE DISC INSPECTION

Visually inspect the brake discs for damage or cracks.

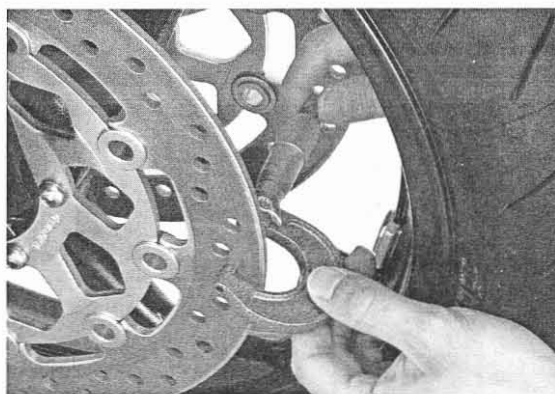
Measure the brake disc thickness with a micrometer.

#### SERVICE LIMITS:

**FRONT: 4.0 mm (0.16 in)**

**REAR: 4.0 mm (0.16 in)**

Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake disc warpage with a dial indicator.

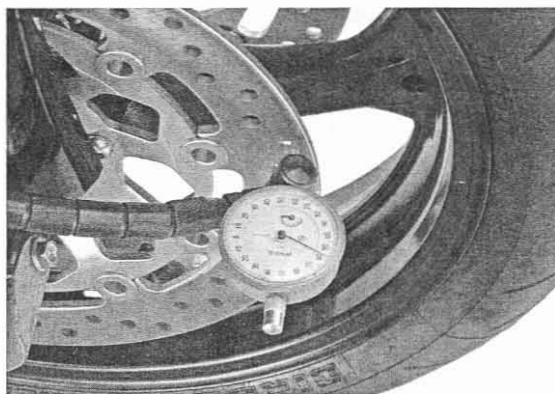
#### SERVICE LIMITS:

**FRONT: 0.30 mm (0.0012 in)**

**REAR: 0.30 mm (0.0012 in)**

Check the wheel bearings for excessive play (page 14-17 and 15-8), if the warpage exceeds the service limit.

Replace the brake disc if the wheel bearings are normal.



## FRONT MASTER CYLINDER

### NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.

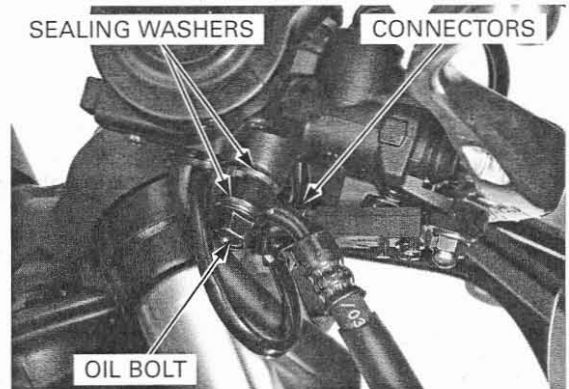
### REMOVAL

Drain the front hydraulic system (page 16-7).

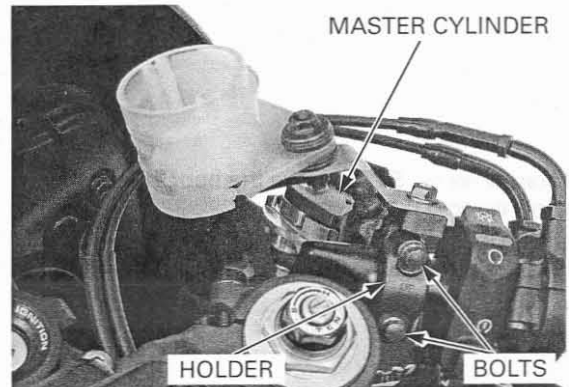
Disconnect the brake light switch connectors.

*Avoid spilling fluid on painted, plastic, or rubber parts.*

Remove the brake hose oil bolt, sealing washers and brake hose eyelet joint.



Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



### DISASSEMBLY

Remove the dust cover and snap ring.

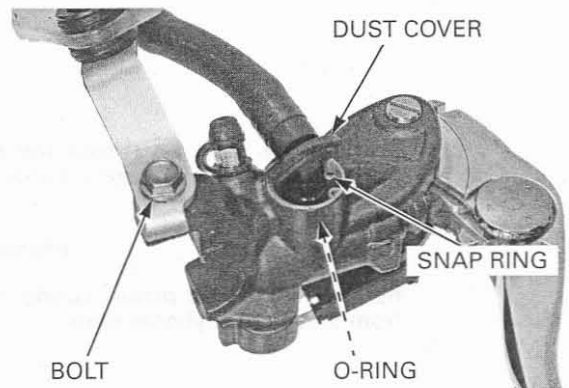
#### TOOL:

Snap ring pliers

07914-SA50001

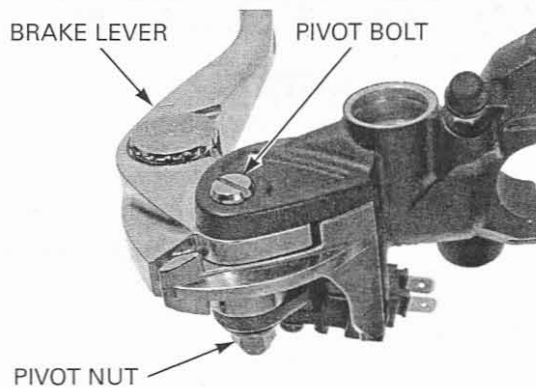
Remove the bolt and brake reservoir from the master cylinder.

Remove the O-ring from the reservoir joint.

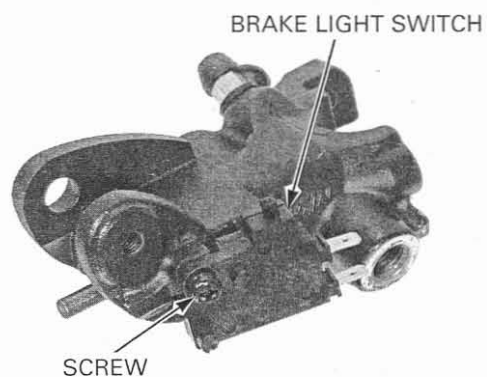


## HYDRAULIC BRAKE

Remove the pivot bolt/nut and brake lever assembly.

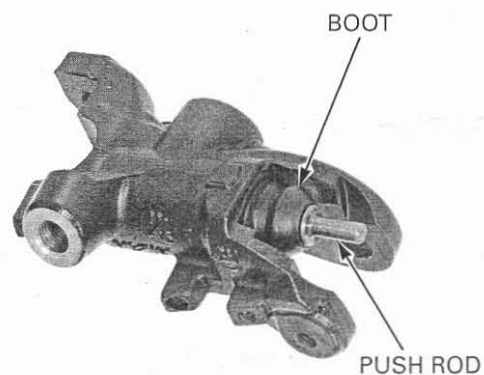


Remove the screw and brake light switch.



*Be careful not to damage the boot.*

Remove the boot and push rod.



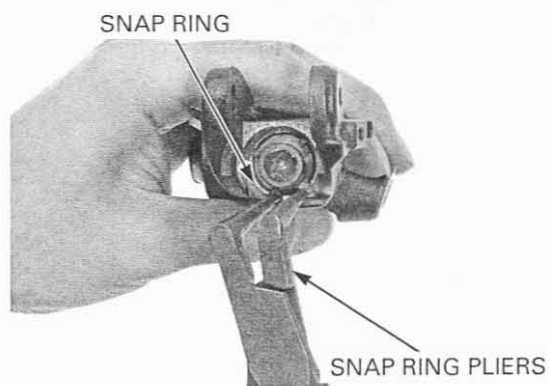
Remove the snap ring from the master cylinder body using the special tool as shown.

### TOOL:

**Snap ring pliers**

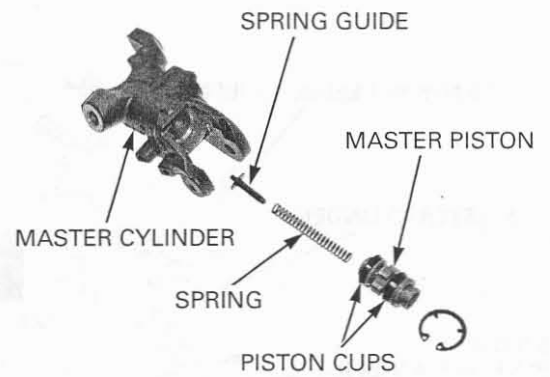
**07914-SA50001**

Remove the master piston, spring and spring guide from the master cylinder body.



## INSPECTION

Clean the inside of the cylinder and reservoir with clean brake fluid.  
 Check the piston boot, piston cups for damage or deterioration.  
 Check the master cylinder and piston for abnormal scratches.  
 Check the spring for fatigue or damage.



Measure the master cylinder I.D.

**SERVICE LIMIT: 17.515 mm (0.6896 in)**



Measure the master cylinder piston O.D.

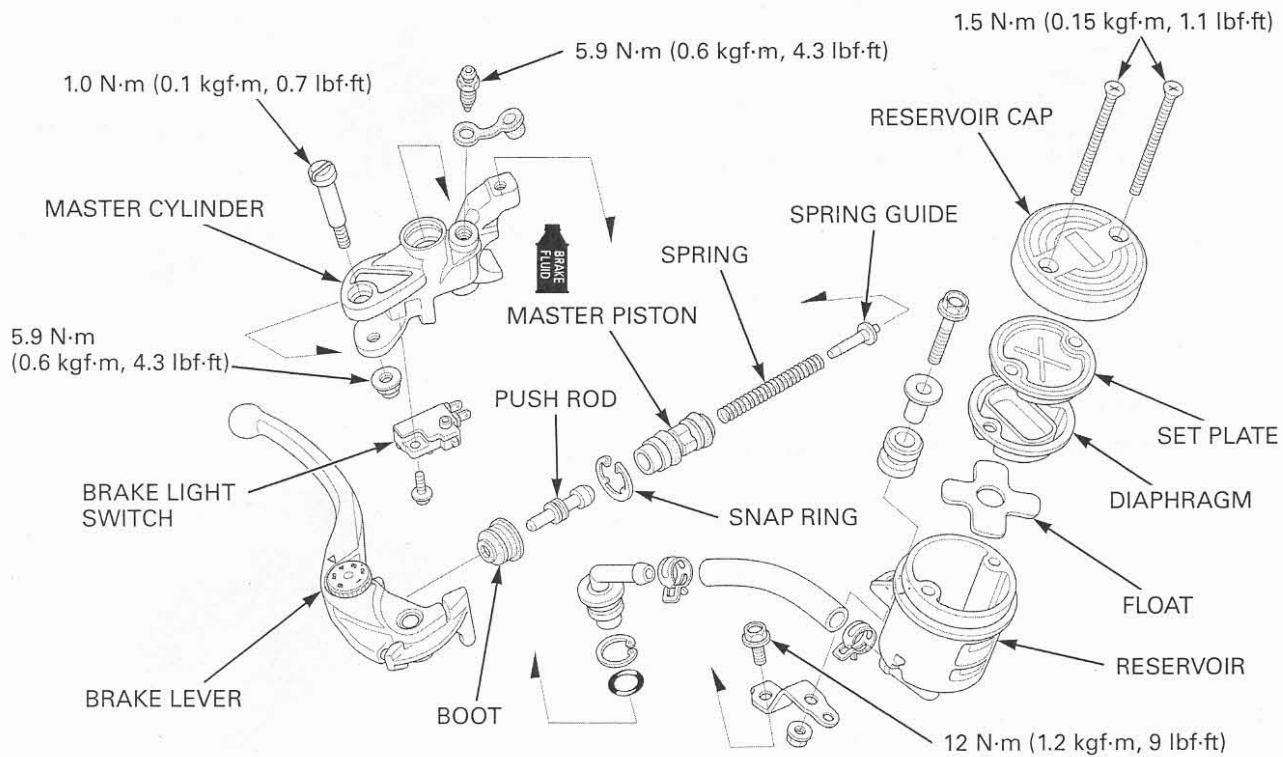
**SERVICE LIMIT: 17.309 mm (0.6815 in)**





# HYDRAULIC BRAKE

## ASSEMBLY



- Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

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

Install the spring guide into the spring.

*When installing the cups, do not allow the lips to turn inside out.*

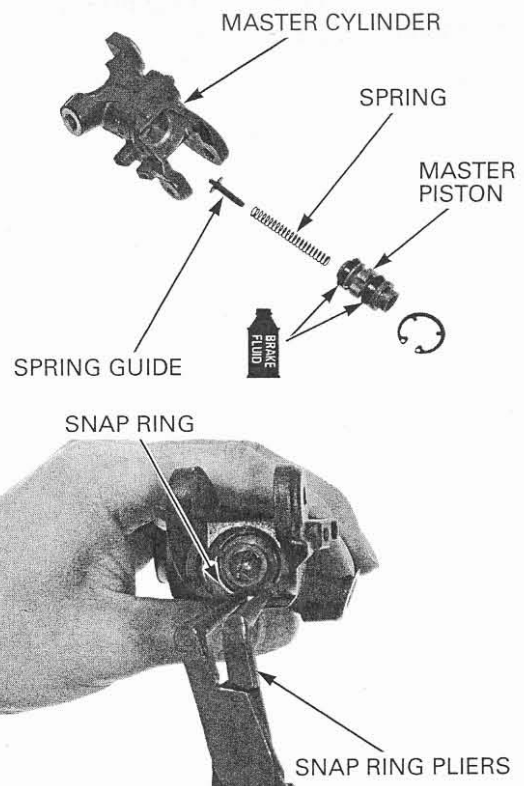
Install the spring guide/spring and master piston into the master cylinder.

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

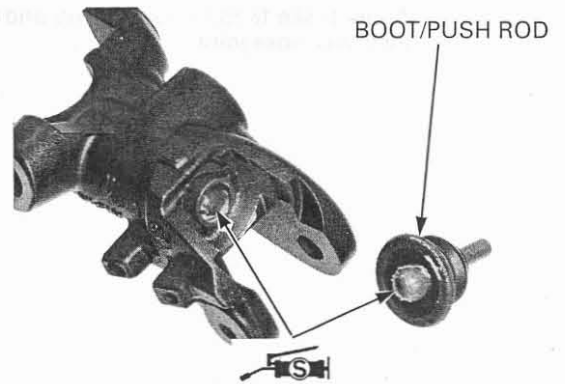
Install the snap ring with the special tool.

**TOOL:**  
Snap ring pliers

07914-SA50001

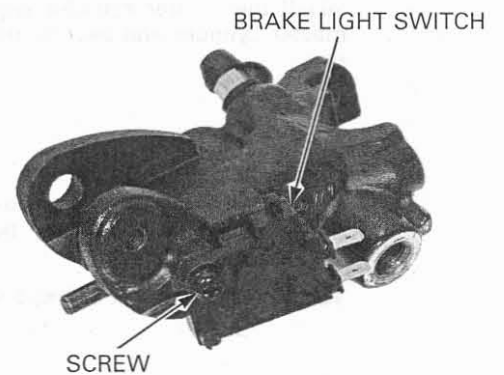


Apply silicone grease to contact surfaces of the push rod and master piston.  
Install the boot with the push rod.

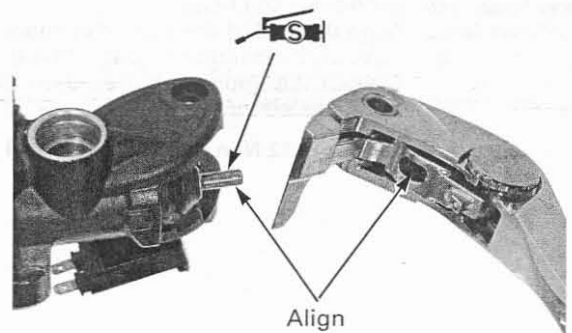


Install the brake light switch and tighten the screw to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**



Apply silicone grease to push rod tip.  
Install the brake lever by aligning the hole of brake lever with the push rod.

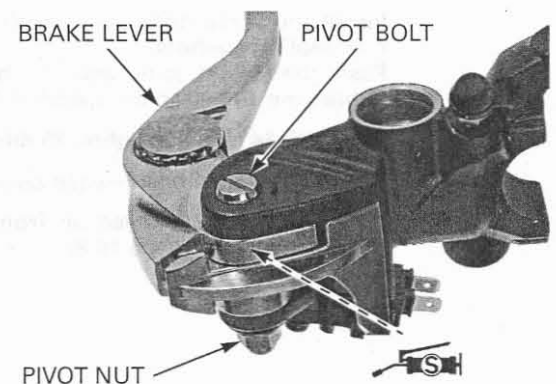


Apply silicone grease to the brake lever pivot bolt sliding surface.  
Install the brake lever pivot bolt and nut.  
Tighten the pivot bolt to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

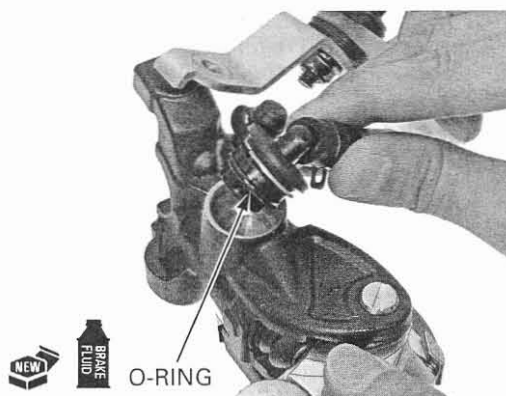
Hold the pivot bolt and tighten the pivot nut to the specified torque.

**TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)**



## HYDRAULIC BRAKE

Apply brake fluid to new O-ring and install it to the reservoir hose joint.



Install the master cylinder reservoir joint into the master cylinder and secure the joint with the snap ring.

### TOOL:

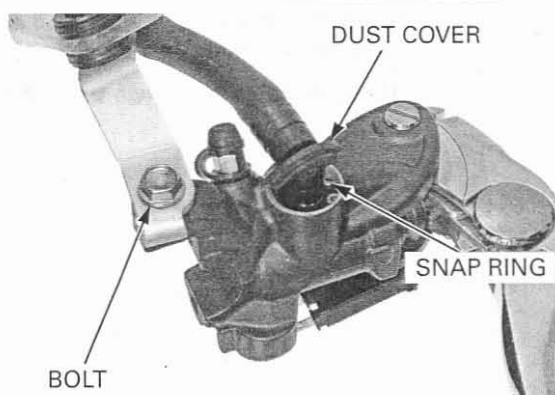
Snap ring pliers

07914-SA50001

Install the dust cover.

Install the reservoir stay onto the master cylinder and tighten the mounting bolt to the specified torque.

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



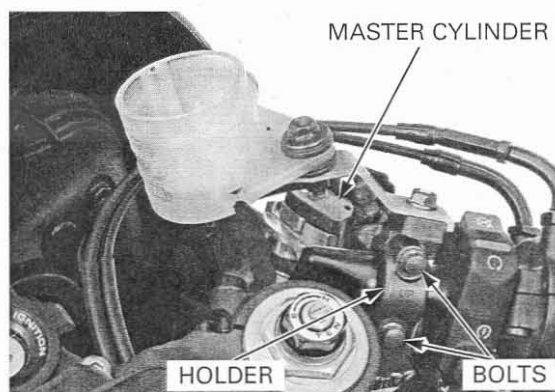
*Install the master cylinder holder with its "UP" mark facing up.*

Install the master cylinder assembly, master cylinder holder and bolts.

Align the end of the master cylinder with the punch mark on the handlebar (page 14-14).

Tighten the upper bolt first, then the lower bolt to the specified torque.

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



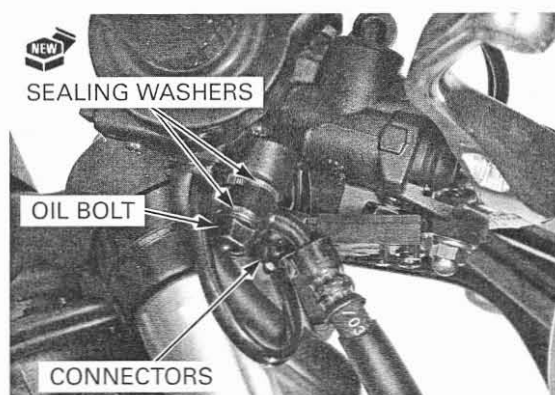
Install the brake hose eyelet with the oil bolt and new sealing washers.

Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

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

Connect the brake light switch connectors.

Fill brake fluid and bleed air from the front brake hydraulic system (page 16-8).



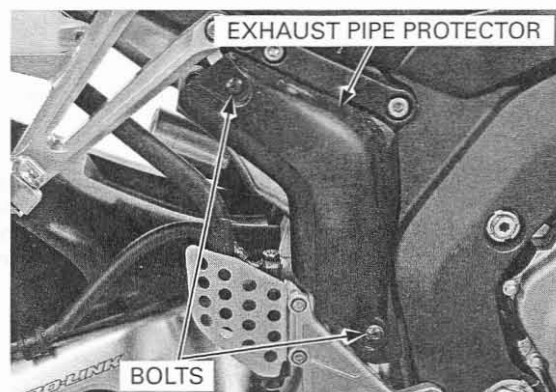
## REAR MASTER CYLINDER

### NOTICE

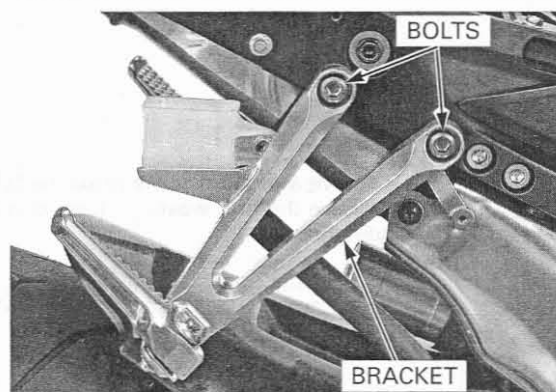
*Spilled fluid can damage painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.*

### REMOVAL

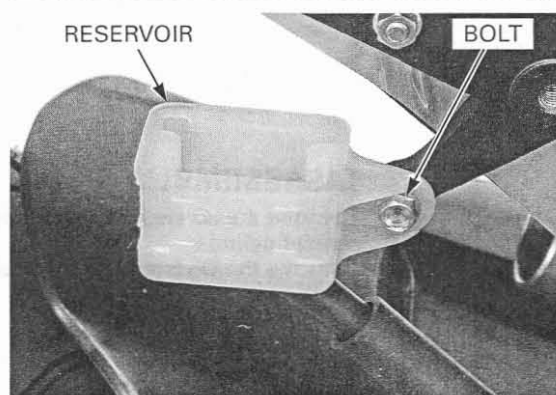
Remove the bolts and exhaust pipe protector.



Drain the rear hydraulic system (page 16-7).  
Remove the bolts and passenger peg bracket.



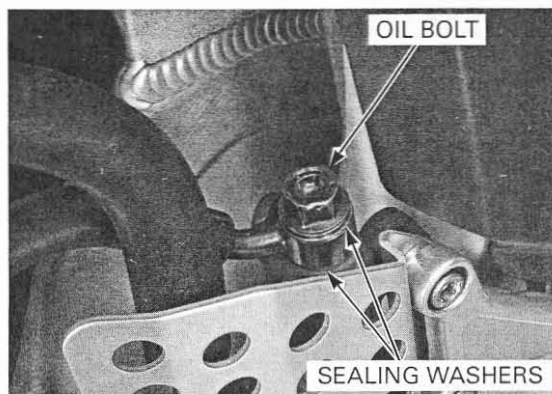
Remove the bolt and rear master cylinder reservoir.



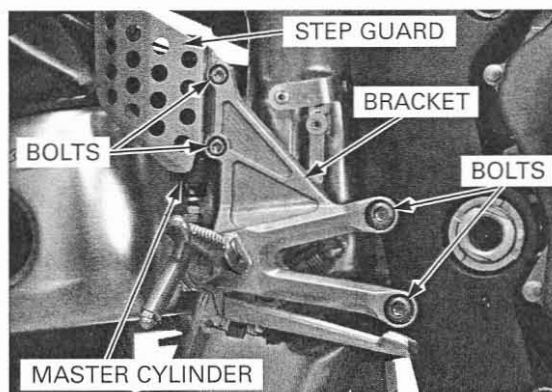
## HYDRAULIC BRAKE

*Avoid spilling fluid on painted, plastic, or rubber parts.*

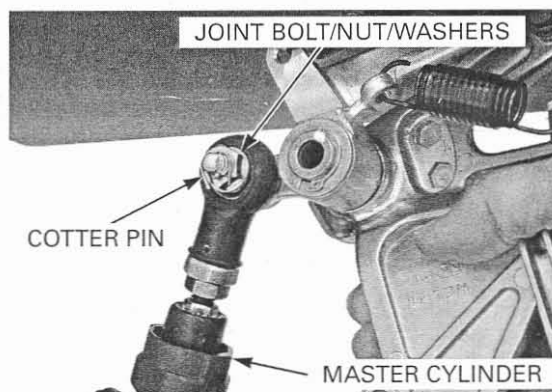
Remove the brake hose oil bolt, sealing washers and brake hose eyelet joint.



Loosen the rear master cylinder mounting bolts. Remove the bolts and right footpeg bracket, then remove the master cylinder mounting bolts, step guard and rear master cylinder from the right footpeg bracket.

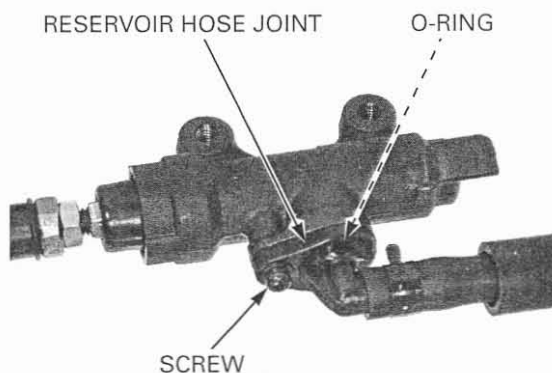


Remove and discard the brake pedal joint cotter pin. Remove the nut, washers, joint bolt and rear master cylinder.



### DISASSEMBLY

Remove the screw and reservoir hose joint from the master cylinder.  
Remove the O-ring from the reservoir joint.



*Be careful not to damage the boot.*

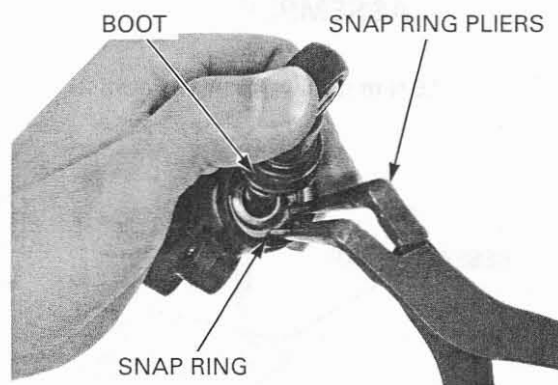
Remove the boot from the master cylinder body.  
Remove the snap ring using the special tool.

## TOOL:

Snap ring pliers

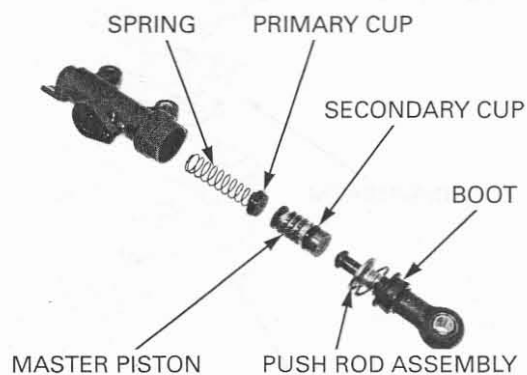
07914-SA50001

Remove the push rod, master piston, primary cup and spring.



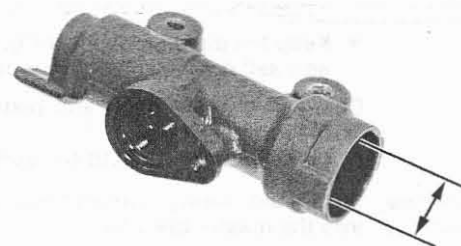
## INSPECTION

Clean the master piston, spring and inside of the cylinder with clean brake fluid.  
Check the push rod boot, primary cup and secondary cup for damage or deterioration.  
Check the master cylinder and piston for abnormal scratches.  
Check the spring for fatigue or damage.



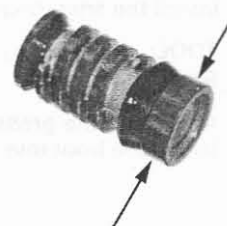
Measure the master cylinder I.D.

**SERVICE LIMIT: 15.925 mm (0.6270 in)**



Measure the master cylinder piston O.D.

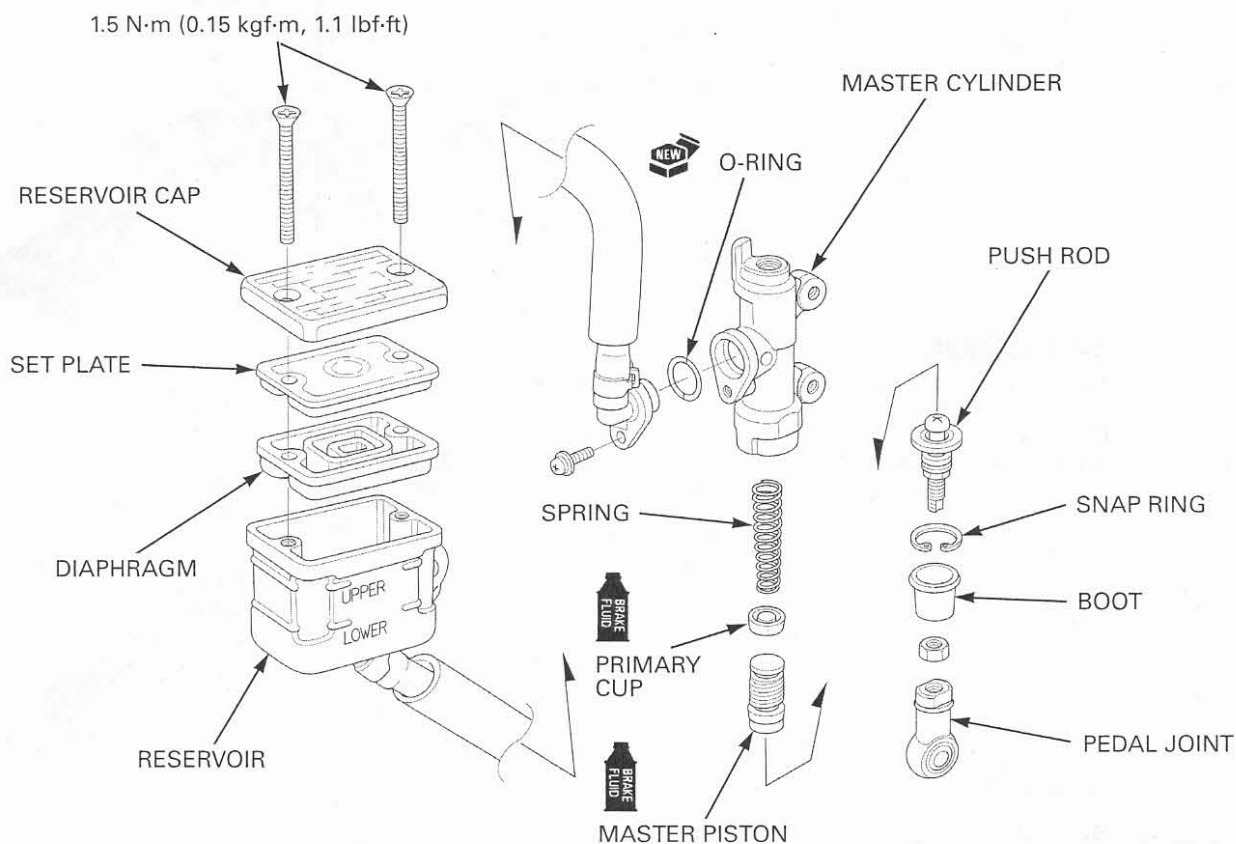
**SERVICE LIMIT: 15.815 mm (0.6226 in)**





# HYDRAULIC BRAKE

## ASSEMBLY



- Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

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

Install the primary cup to the spring.

*When installing the cups, do not allow the lips to turn inside out.*

Install the spring/primary cup and master piston into the master cylinder.

Apply silicone grease to the piston contact area of the push rod.

Install the push rod assembly into the master cylinder.

Install the snap ring using the special tool.

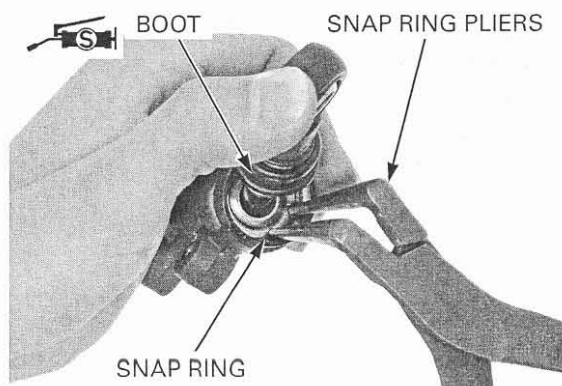
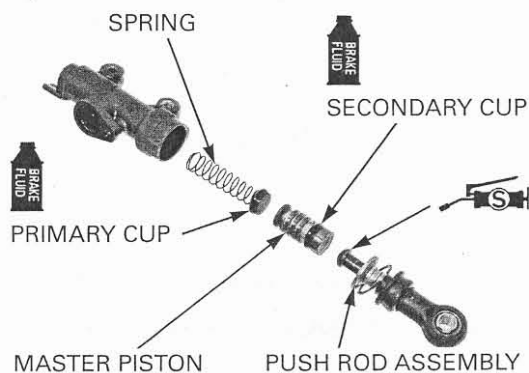
*Be certain the snap ring is firmly seated in the groove.*

**TOOL:**

**Snap ring pliers**

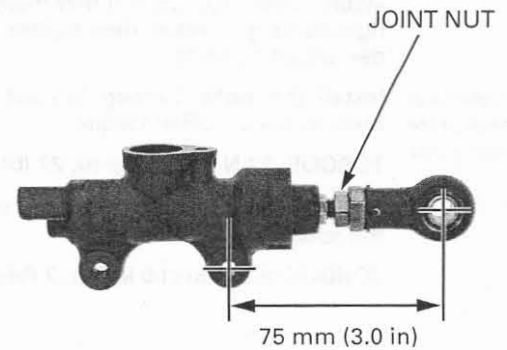
**07914-SA50001**

Apply silicone grease to the push rod boot inside.  
Install the boot into the master cylinder.

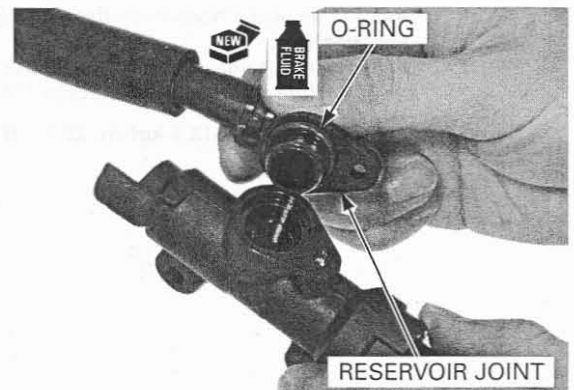


If the push rod joint is disassembled, adjust the push rod length so that the distance between the centers of the master cylinder lower mounting bolt hole and joint pin hole is 75 mm (3.0 in). After adjustment, tighten the joint nut to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

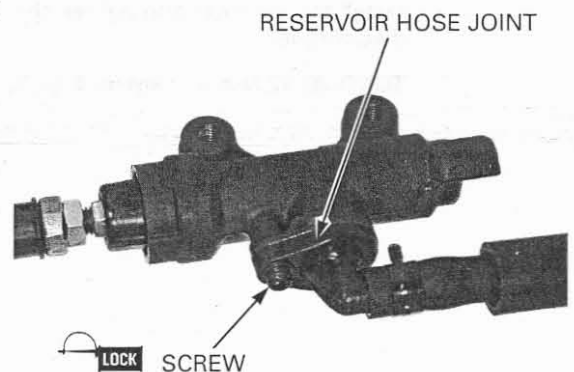


Apply brake fluid to new O-ring and install it onto the reservoir joint.  
Install the reservoir joint to the master cylinder.



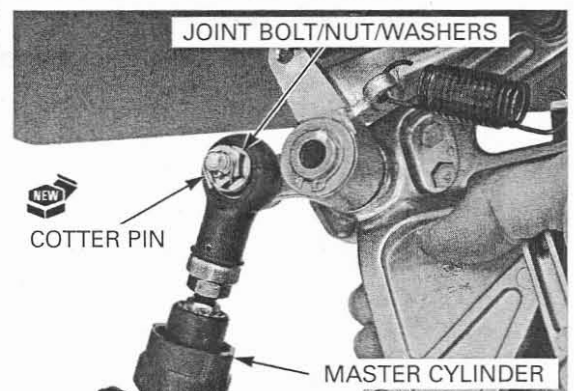
Apply a locking agent to the reservoir joint screw threads.  
Tighten the screw to the specified torque.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**



## INSTALLATION

Connect the push rod lower joint to the brake pedal and install the joint bolt and nut with washers.  
Tighten the nut and secure it with new cotter pin.



## HYDRAULIC BRAKE

Install the step guard and rear master cylinder to the right footpeg bracket, then tighten the master cylinder mounting bolts.

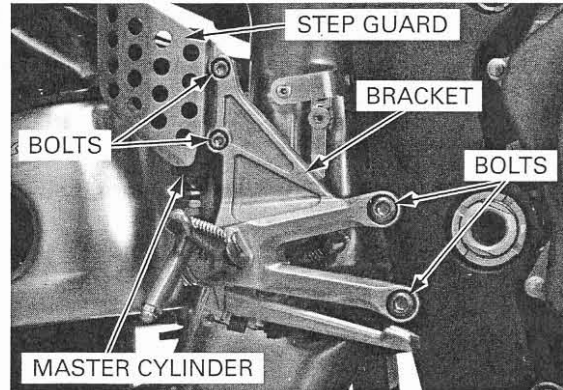
*Put the bracket in at the hook of the heat guard.*

Install the right footpeg bracket and tighten the bolts to the specified torque.

**TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)**

Tighten the rear master cylinder mounting bolts to the specified torque.

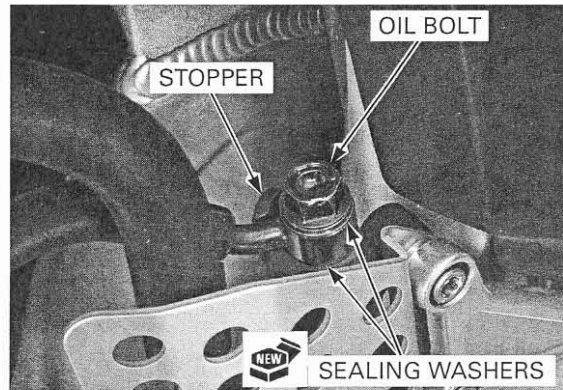
**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**



Install the brake hose with the oil bolt and new sealing washers.

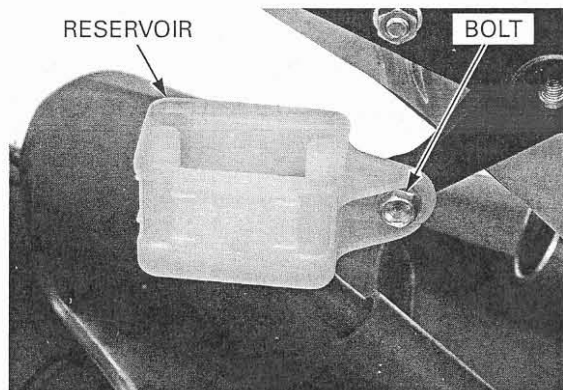
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

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



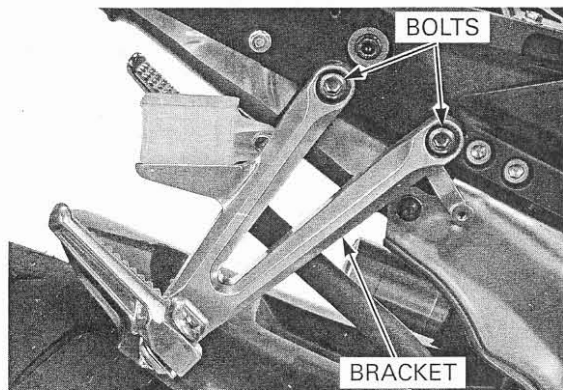
Install the reservoir and tighten the bolt to the specified torque.

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



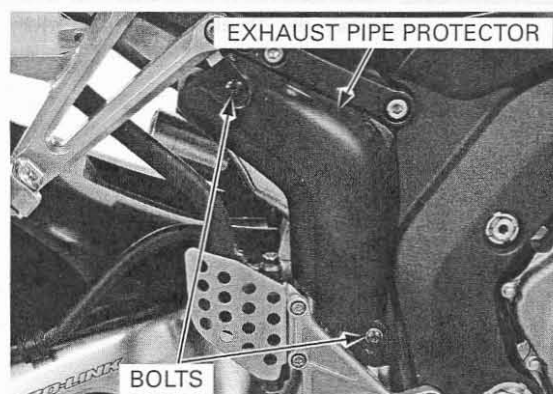
Install the passenger peg bracket and tighten the bolts to the specified torque.

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



Install the exhaust pipe protector and tighten the bolts securely.

Fill brake fluid and bleed air the rear brake hydraulic system (page 16-8).



## FRONT BRAKE CALIPERS

### NOTICE

*Spilled fluid can damage painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.*

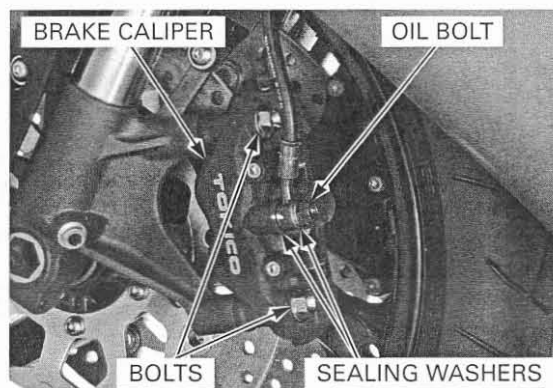
### REMOVAL

Drain the front brake hydraulic system (page 16-7).

*Avoid spilling fluid on painted, plastic, or rubber parts.*

Remove the brake hose oil bolt, sealing washers and brake hose eyelet joint. Remove the caliper mounting bolts and brake caliper.

Remove the brake pads (page 16-11).

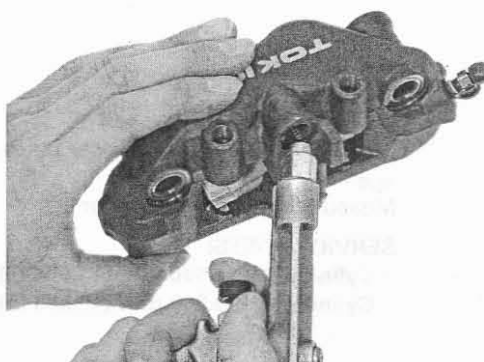


### DISASSEMBLY

Install a corrugated cardboard or soft wood sheet between the caliper pistons.

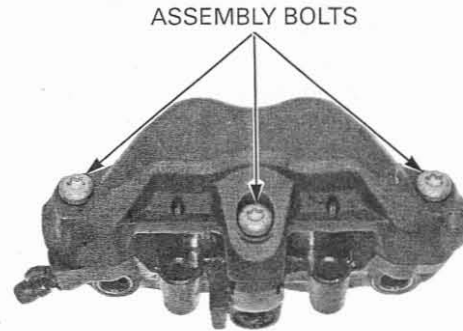
*Do not use high pressure air or bring the nozzle too close to the inlet.*

Apply small squirts of air pressure to the fluid inlet to remove the pistons.



## HYDRAULIC BRAKE

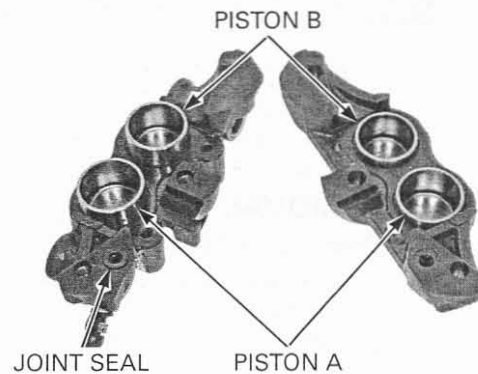
Remove the three caliper assembly torx bolts and separate the caliper halves.



Mark the pistons to ensure correct reassembly.

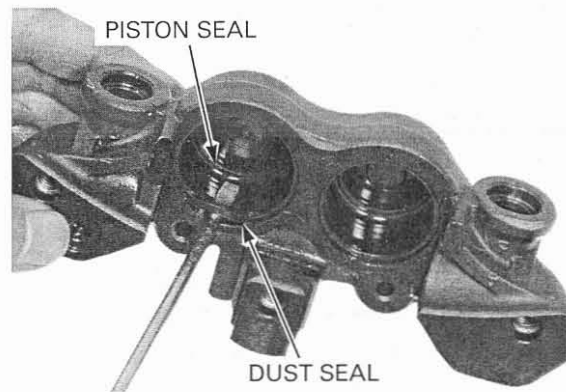
Remove the following:

- Joint seal
- Caliper piston A
- Caliper piston B



Be careful not to damage the piston sliding surface.

Push the dust seals and piston seals in and lift them out. Clean the seal grooves with clean brake fluid.

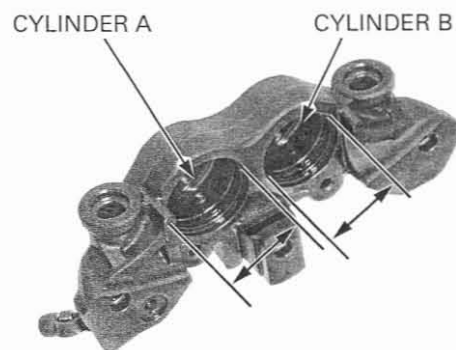


### INSPECTION

Check the caliper cylinder for scoring or other damage. Measure the caliper cylinder I.D.

#### SERVICE LIMITS:

- Cylinder A: 32.140 mm (1.2654 in)
- Cylinder B: 30.340 mm (1.1945 in)

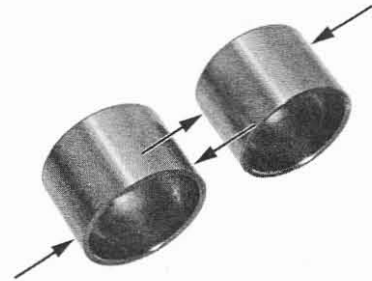


Check the caliper pistons for scratches, scoring or other damage.  
Measure the caliper piston O.D.

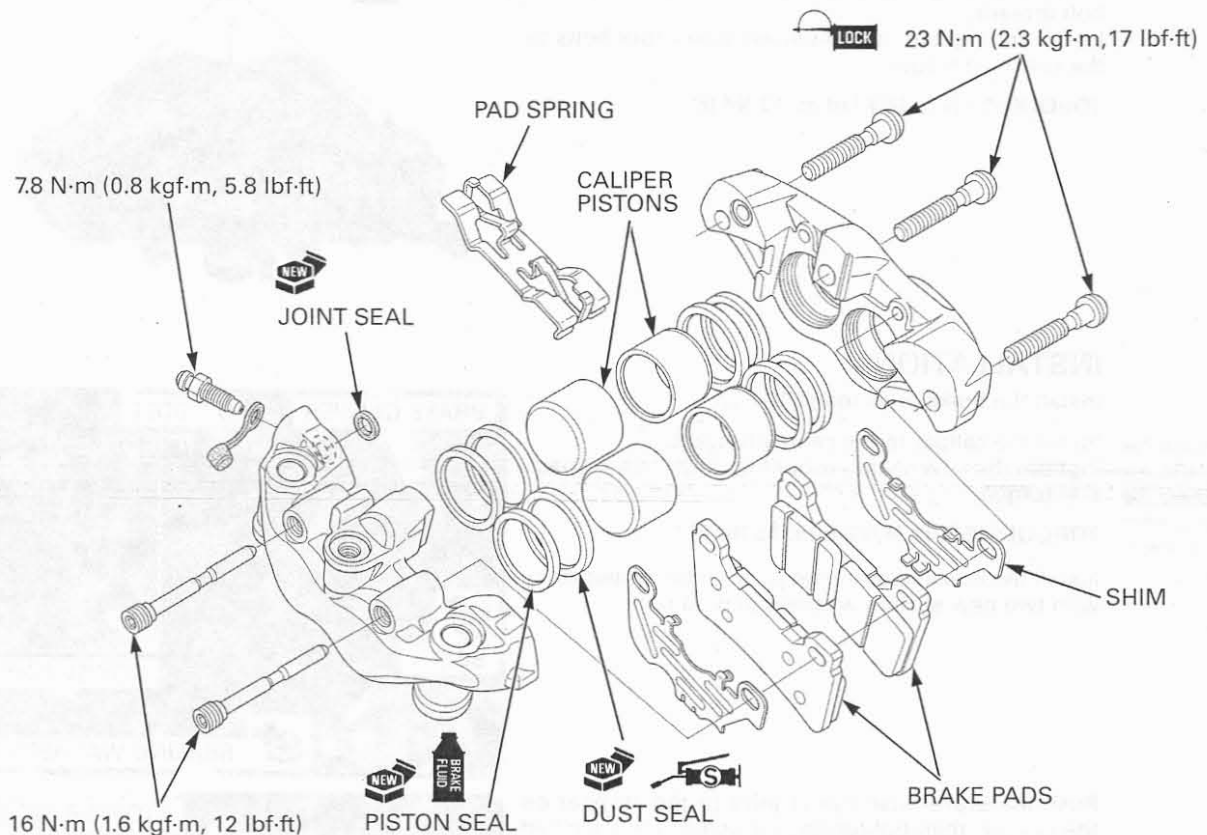
## SERVICE LIMITS:

Piston A: 31.957 mm (1.2581 in)

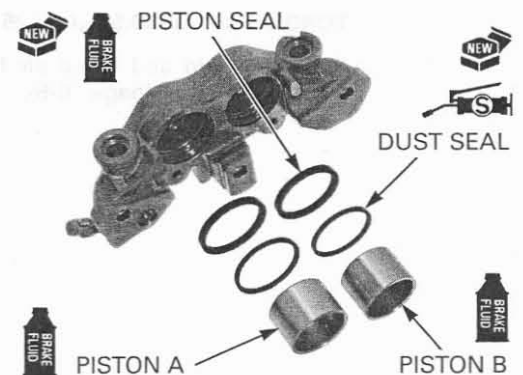
Piston B: 30.157 mm (1.1873 in)



## ASSEMBLY



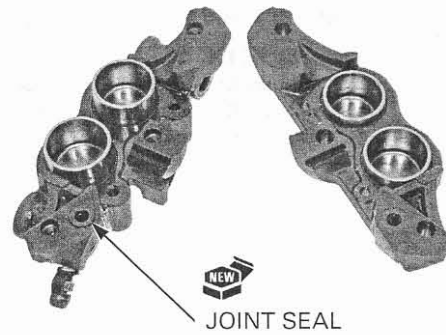
Coat new piston seals with clean brake fluid.  
Coat new dust seals with silicone grease.  
Install the piston and dust seals into the grooves of the caliper body.  
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.





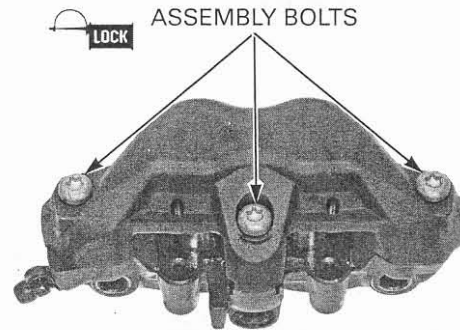
## HYDRAULIC BRAKE

Install the new joint seal into the fluid passage on the caliper.



Assemble the caliper halves.  
Apply a locking agent to the caliper assembly torx bolt threads.  
Install and tighten the caliper assembly torx bolts to the specified torque.

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



## INSTALLATION

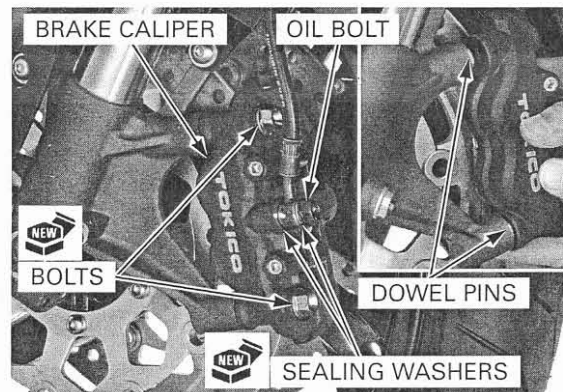
Install the brake pads (page 16-11).

*Make sure that the dowel pins are installed into the caliper bracket properly.*

Install the caliper to the caliper bracket.  
Tighten the new caliper mounting bolts to the specified torque.

**TORQUE: 45 N·m (4.5 kgf·m, 33 lbf·ft)**

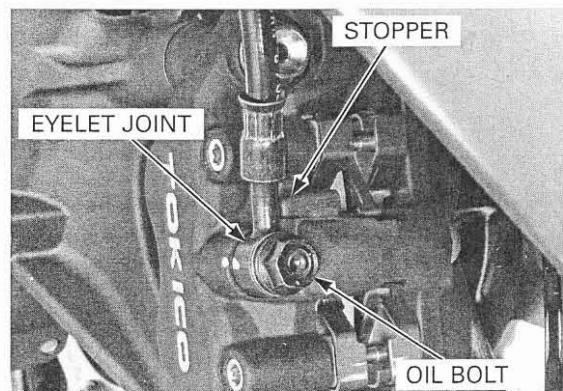
Install the brake hose eyelet joint to the caliper body with two new sealing washers and oil bolt.



Push the brake hose eyelet joint to the stopper on the caliper, then tighten the oil bolt to the specified torque.

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

Fill brake fluid and bleed air from the front brake hydraulic system (page 16-8).



## REAR BRAKE CALIPER

### NOTICE

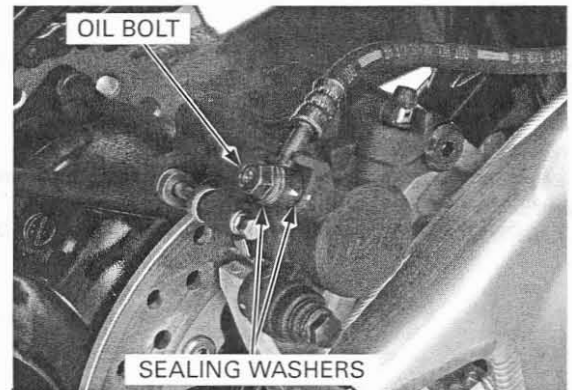
Spilled fluid can damage painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.

### REMOVAL

Drain the rear brake hydraulic system (page 16-7).

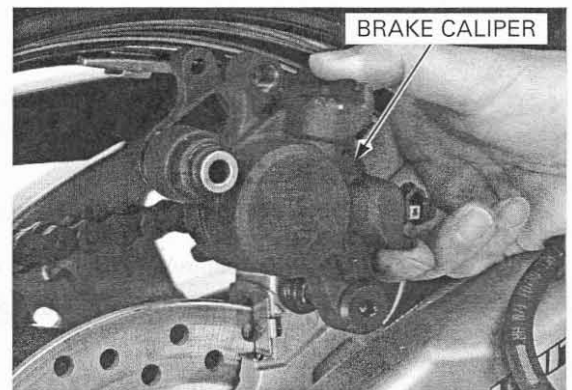
Avoid spilling fluid on painted, plastic, or rubber parts.

Remove the oil bolt, sealing washers and brake hose eyelet joint.



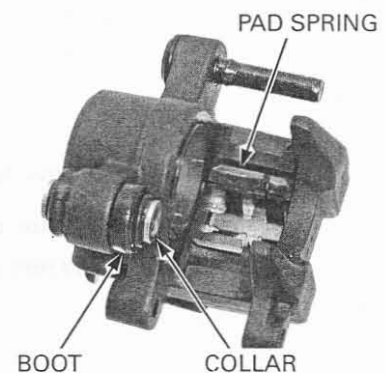
Remove the caliper mounting bolt and the brake pads (page 16-13).

Pivot the caliper up and remove it from the caliper bracket.



### DISASSEMBLY

Remove the pad spring, collar and boot from the caliper body.

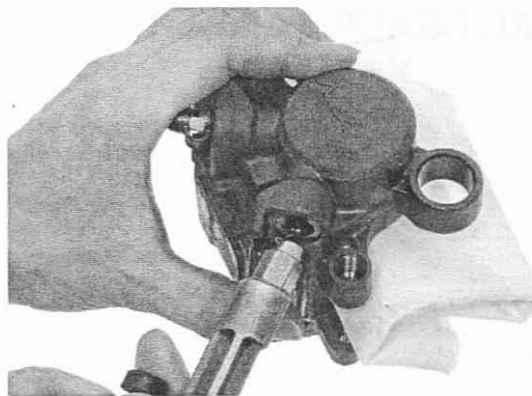


## HYDRAULIC BRAKE

Place a shop towel over the piston.

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

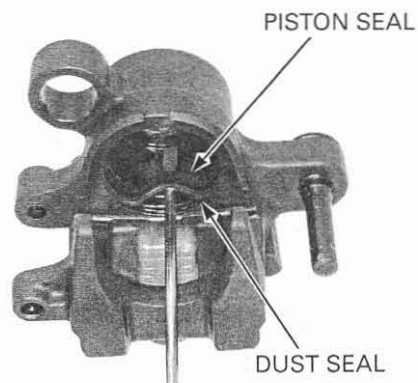
Position the caliper body with the piston down and apply small squirts of air pressure to the fluid inlet to remove the piston.



*Be careful not to damage the piston sliding surface.*

Push the dust seal and piston seal in and lift them out.

Clean the seal grooves with clean brake fluid.

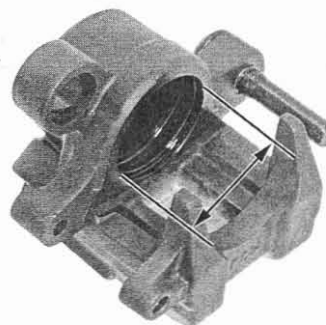


### INSPECTION

Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

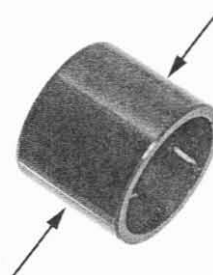
**SERVICE LIMIT: 38.24 mm (1.506 in)**



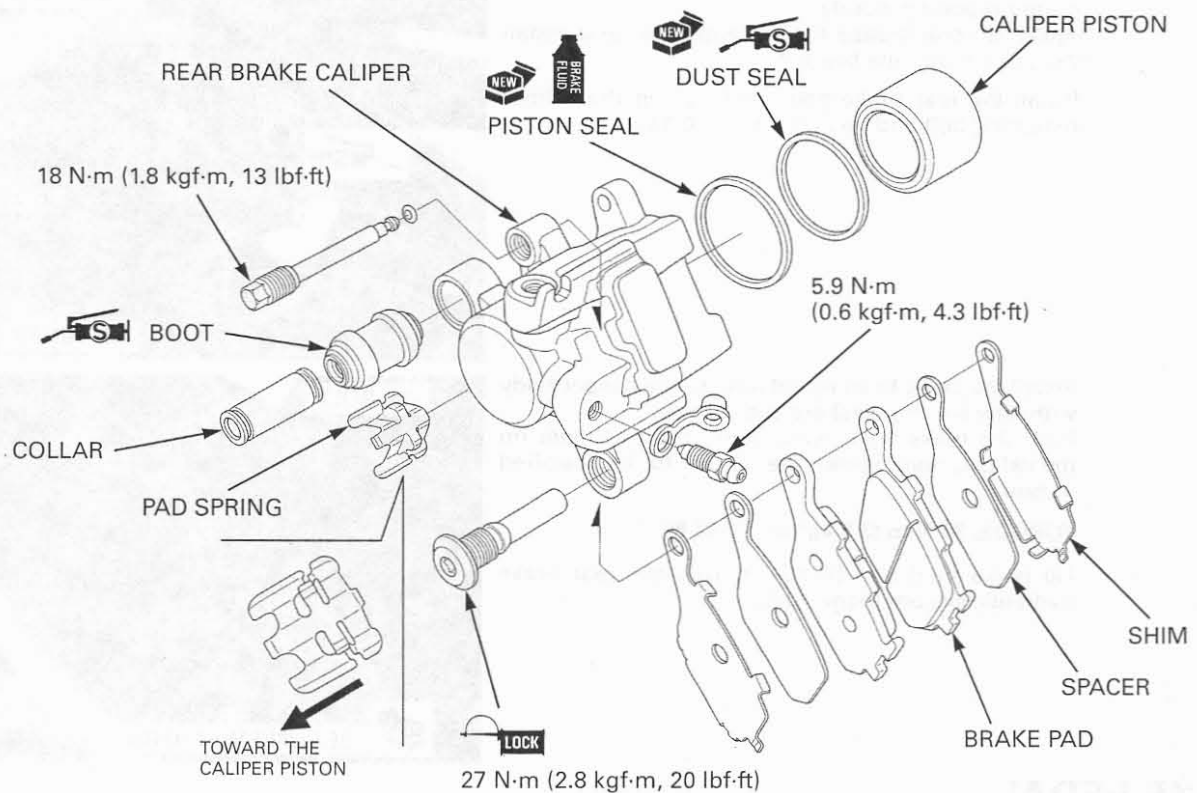
Check the caliper piston for scratches, scoring or other damage.

Measure the caliper piston O.D.

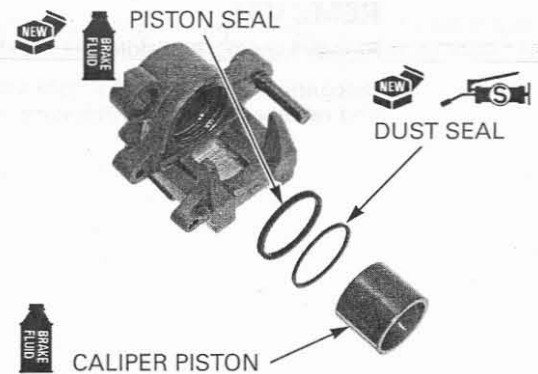
**SERVICE LIMIT: 38.09 mm (1.500 in)**



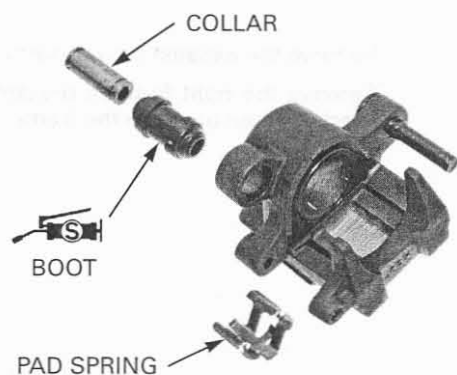
## ASSEMBLY



Coat a new piston seal with clean brake fluid.  
 Coat a new dust seal with silicone grease.  
 Install the piston seal and dust seal into the groove of the caliper body.  
 Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with its open end toward the pad.



Install the pad spring into the caliper body.  
 Apply silicone grease to the inside of the boot and install the boot and collar into the caliper.  
 If the boot is hard or deteriorated, replace it with a new one.



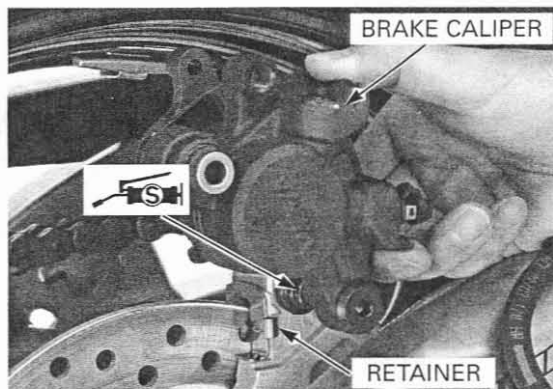
## HYDRAULIC BRAKE

### INSTALLATION

Make sure that the pad retainer is installed on the caliper bracket properly.

Apply silicone grease to the caliper pin and install the caliper onto the bracket.

Install the rear brake pads and tighten the caliper mounting bolt and pad pin (page 16-13).

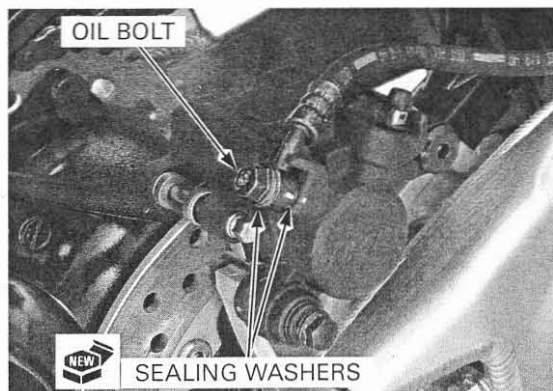


Install the brake hose eyelet joint to the caliper body with new sealing washers and oil bolt.

Push the brake hose eyelet joint to the stopper on the caliper, then tighten the oil bolt to the specified torque.

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

Fill brake fluid and bleed air from the rear brake hydraulic system (page 16-8).

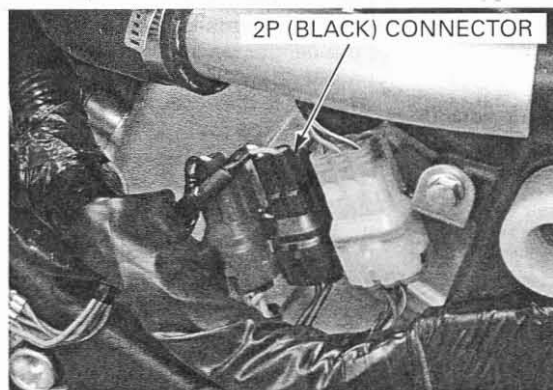


## BRAKE PEDAL

### REMOVAL

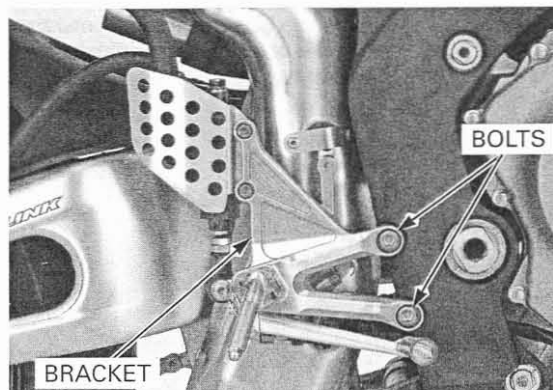
Remove the right middle cowl (page 3-7).

Disconnect the rear brake light switch 2P connector and release the light switch wire from the clamps.

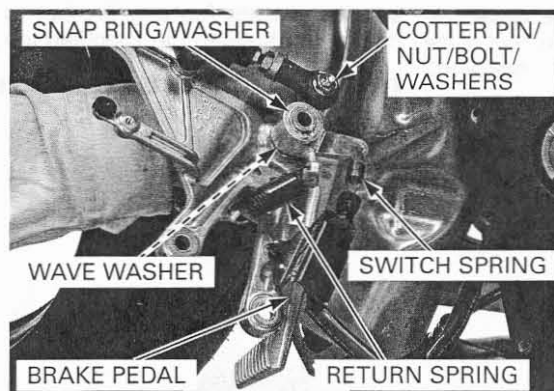


Remove the exhaust pipe protector (page 16-21).

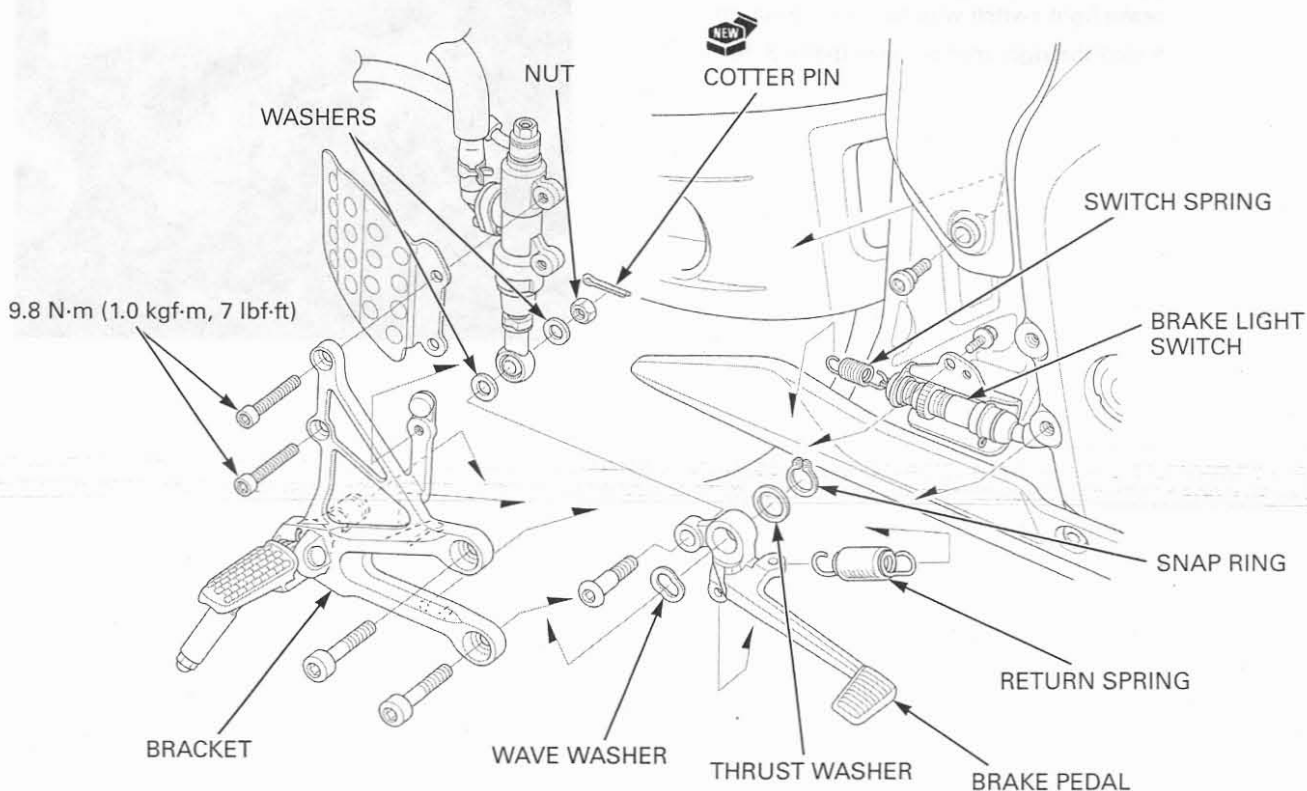
Remove the right footpeg bracket socket bolts and bracket assembly from the frame.



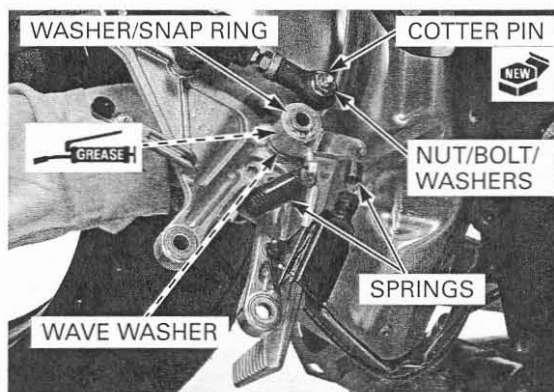
Remove and discard the brake pedal joint cotter pin. Remove the nut, washers and joint bolt, and disconnect the push rod lower joint from the brake pedal. Unhook the brake light switch spring and brake pedal return spring from the brake pedal. Remove the snap ring and thrust washer, then remove the brake pedal and wave washer.



## INSTALLATION



Apply grease to the sliding surface of the brake pedal and pivot shaft. Install the wave washer, brake pedal, thrust washer and snap ring onto the brake pedal pivot. Connect the push rod lower joint to the brake pedal and install the joint bolt and nut with washers. Tighten the nut and secure it with new cotter pin. Install the brake pedal return spring and brake light switch spring.



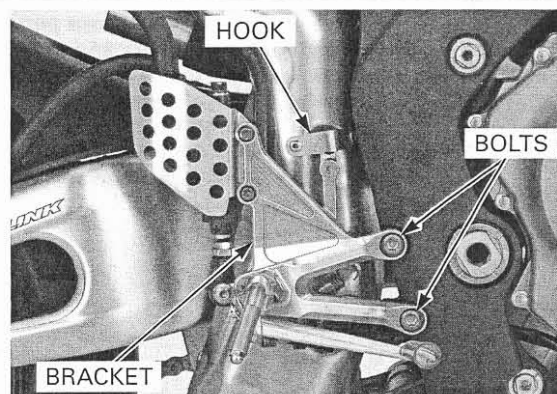


## HYDRAULIC BRAKE

*Put the bracket in at the hook of the heat guard.*

Install the right footpeg bracket to the frame and tighten the bolts to the specified torque.

**TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)**



Route the rear brake light switch wire properly. Connect the 2P (Black) connector and secure the brake light switch wire to the wire clamp.

Install the right middle cowl (page 3-9).

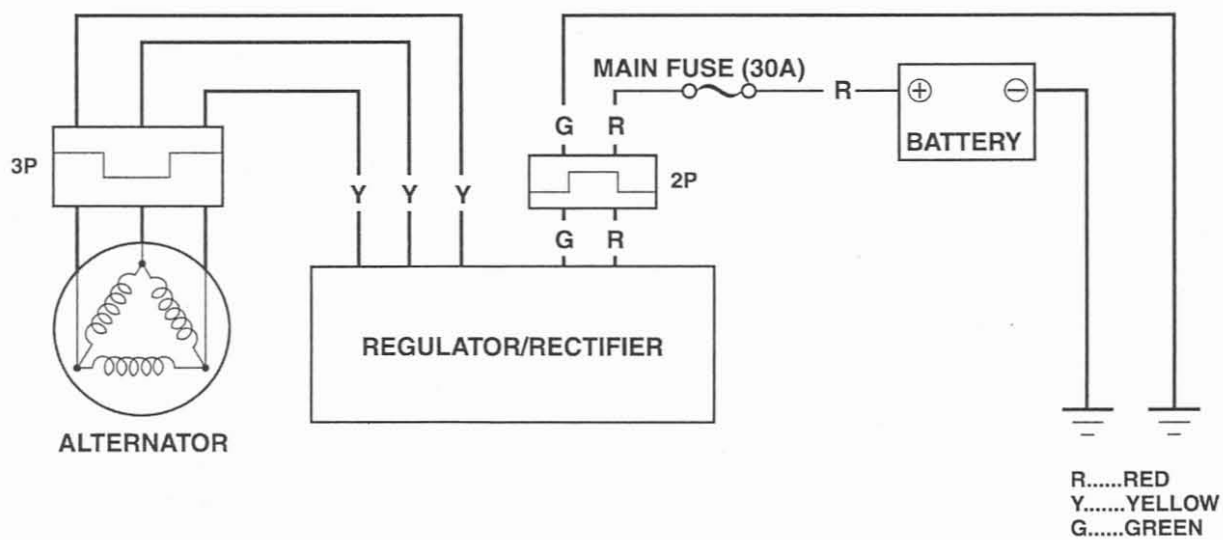
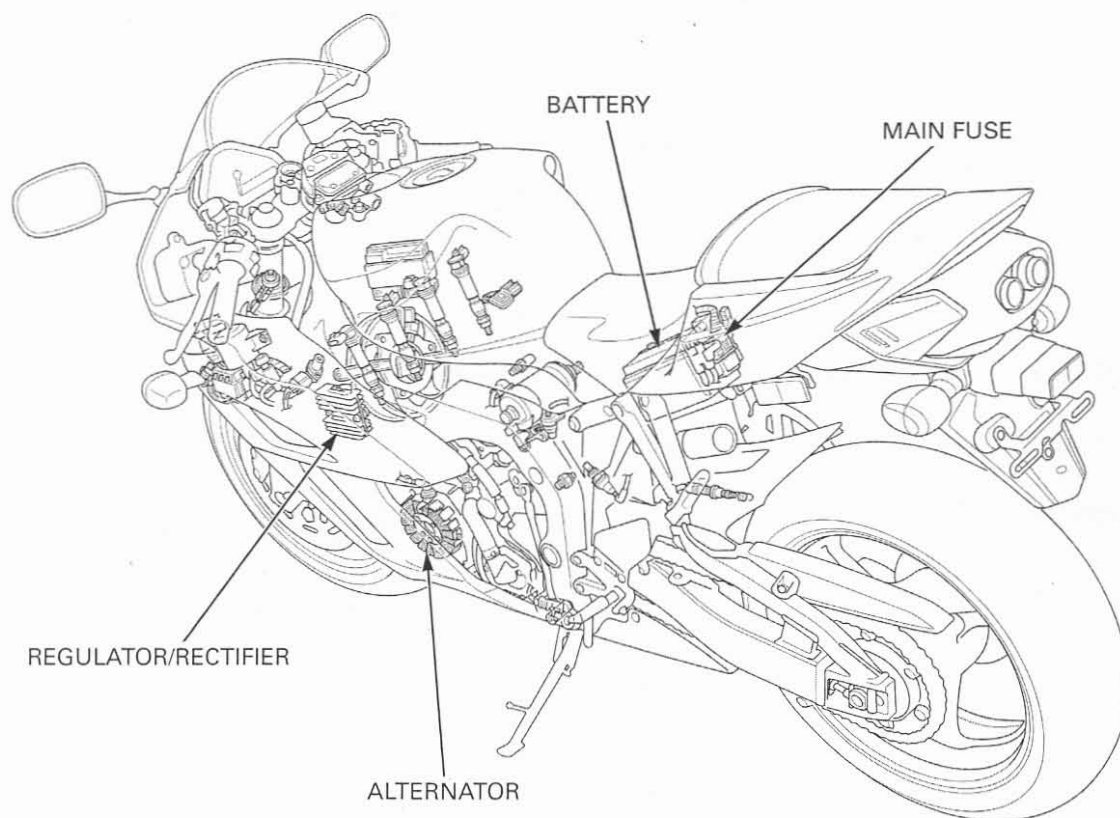


# 17. BATTERY/CHARGING SYSTEM

|                           |      |                                 |      |
|---------------------------|------|---------------------------------|------|
| SYSTEM DIAGRAM.....       | 17-2 | CHARGING SYSTEM INSPECTION..... | 17-7 |
| SERVICE INFORMATION ..... | 17-3 | ALTERNATOR CHARGING COIL .....  | 17-8 |
| TROUBLESHOOTING .....     | 17-4 | REGULATOR/RECTIFIER .....       | 17-8 |
| BATTERY.....              | 17-5 |                                 |      |



# SYSTEM DIAGRAM



## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

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

#### NOTICE

- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for a long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2 – 3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 17-4).
- For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or charging time may damage the battery.
- Refer to (page 11-4) for alternator removal and disassembly.

#### BATTERY TESTING

Refer to the instruction of the Operation Manual for the recommended battery tester. The recommended battery tester puts a "load" on the battery so that the actual battery condition of the load can be measured.

Recommended battery tester: BM-210 or BATTERY MATE or equivalent

#### SPECIFICATIONS

| ITEM       |                                      |                | SPECIFICATIONS     |
|------------|--------------------------------------|----------------|--------------------|
| Battery    | Capacity                             |                | 12 V – 8.6 Ah      |
|            | Current leakage                      |                | 2.0 mA max.        |
|            | Voltage<br>(20°C/68°F)               | Fully charged  | 13.0 – 13.2 V      |
|            |                                      | Needs charging | Below 12.4 V       |
|            | Charging current                     | Normal         | 0.9 A/5 – 10 h     |
|            |                                      | Quick          | 4.5 A/1 h          |
| Alternator | Capacity                             |                | 0.344 kW/5,000 rpm |
|            | Charging coil resistance (20°C/68°F) |                | 0.1 – 1.0 Ω        |

# TROUBLESHOOTING

### BATTERY IS DAMAGED OR WEAK

#### 1. BATTERY TEST

Remove the battery (page 17-5).

Check the battery condition using the recommended battery tester.

#### RECOMMENDED BATTERY TESTER:

BM210 or BATTERY MATE or equivalent

*Is the battery in good condition?*

NO – Faulty battery

YES – GO TO STEP 2.

#### 2. CURRENT LEAKAGE TEST

Install the battery (page 17-5).

Check the battery current leakage (Leakage test; See page 17-7).

*Is the current leakage below 2.0 mA?*

YES – GO TO STEP 4.

NO – GO TO STEP 3.

#### 3. CURRENT LEAKAGE TEST WITHOUT REGULATOR/RECTIFIER CONNECTED

Disconnect the regulator/rectifier 2P connector and recheck the battery current leakage.

*Is the current leakage below 2.0 mA?*

YES – Faulty regulator/rectifier

NO – 

- Shorted wire harness
- Faulty ignition switch

#### 4. ALTERNATOR CHARGING COIL INSPECTION

Check the alternator charging coil (page 17-8).

*Is the alternator charging coil resistance within 0.1 – 1.0  $\Omega$  (20°C/68°F)?*

NO – Faulty charging coil

YES – GO TO STEP 5.

#### 5. CHARGING VOLTAGE INSPECTION

Measure and record the battery voltage using a digital multimeter (page 17-5).

Start the engine and measure the charging voltage (page 17-7).

Compare the measurement to result of the following calculation.

#### STANDARD:

Measured battery Voltage < Measured charging voltage < 15.5 V

*Is the measured charging voltage within the standard voltage?*

YES – Faulty battery

NO – GO TO STEP 6.

#### 6. REGULATOR/RECTIFIER SYSTEM INSPECTION

Check the voltage at the regulator/rectifier connector (page 17-8).

*Are the results of checked voltage correct?*

YES – Faulty regulator/rectifier

NO – 

- Open circuit in related wire
- Loose or poor contacts of related terminal
- Shorted wire harness

## BATTERY

*Always turn the ignition switch OFF before removing the battery.*

*Connect the positive cable first and then the negative cable.*

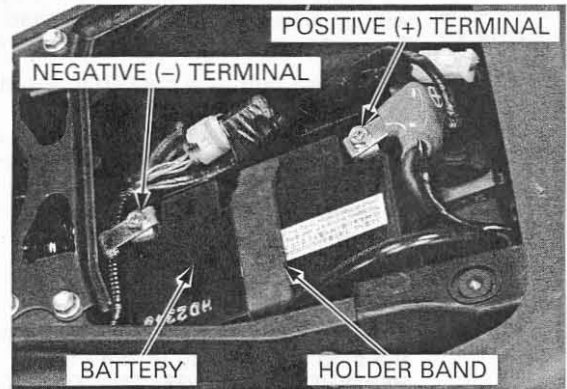
### REMOVAL/INSTALLATION

Remove the rider seat (page 3-4).

Remove the battery holder band. Disconnect the negative cable first, then the positive cable.

Remove the battery from the battery tray.

Install the battery in the reverse order of removal. After installing the battery, coat the terminals with clean grease.



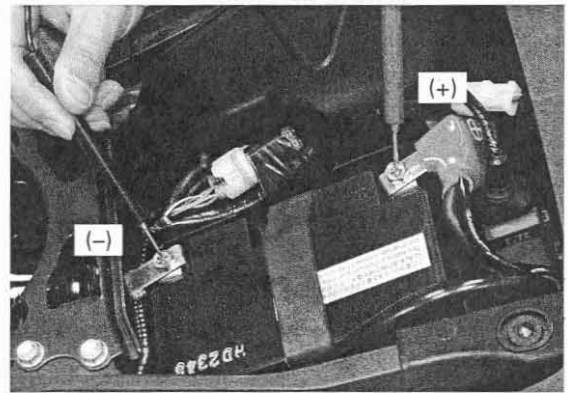
### VOLTAGE INSPECTION

Measure the battery voltage using a commercially available digital multimeter.

#### VOLTAGE:

Fully charged: 13.0 – 13.2 V

Under charged: Below 12.3 V



### BATTERY TESTING

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 17-5).

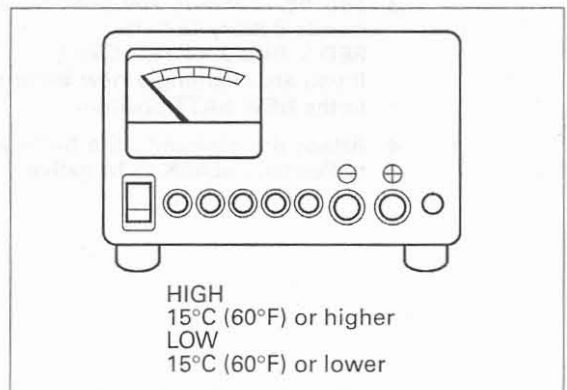
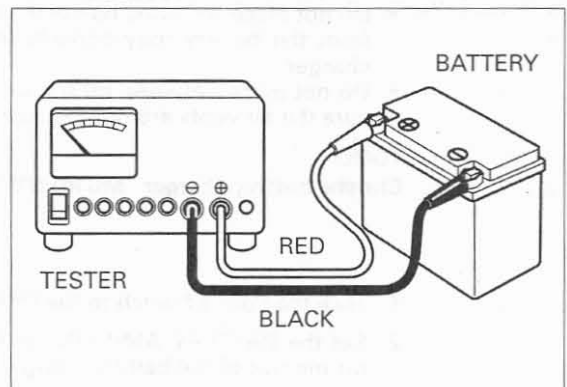
Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

#### TOOL:

Battery tester BM-210-AH (U.S.A. only) or BM-210

*For accurate test results, 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.





## BATTERY/CHARGING SYSTEM

*For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.*

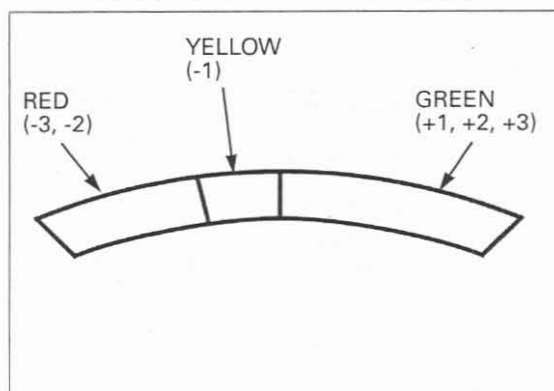
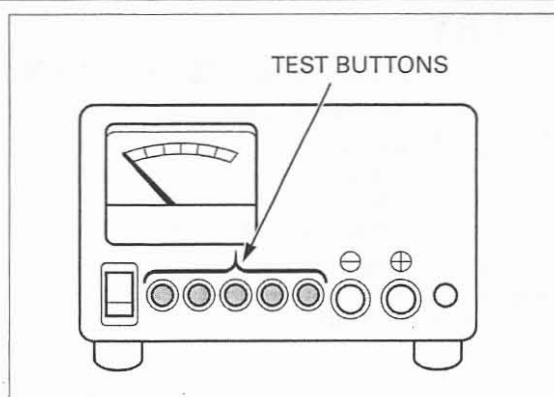
Push in the appropriate test button for 3 seconds and read the condition of the battery on the meter.

To avoid damaging the tester, only test batteries with an amperage rating of less than 20 Ah.

Tester damage can result from overheating when:

- The test button is pushed in for more than 3 seconds.
- The tester is used without being allowed to cool for at least 1 minute when testing more than one battery.
- More than 10 consecutive tests are performed without allowing at least a 30-minute cool-down period.

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.



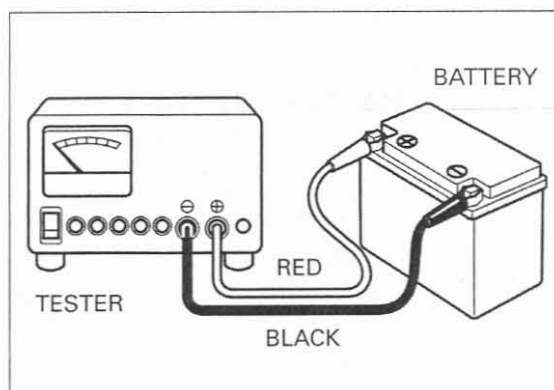
### BATTERY CHARGING

Remove the battery (page 17-5).

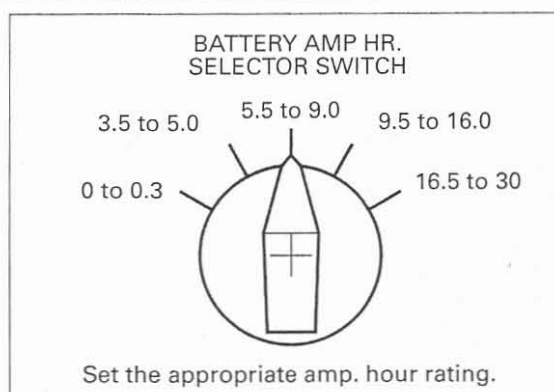
- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place batteries below the charger - gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents are not blocked.

#### TOOL:

Christie battery charger MC1012/2 (U.S.A. only)

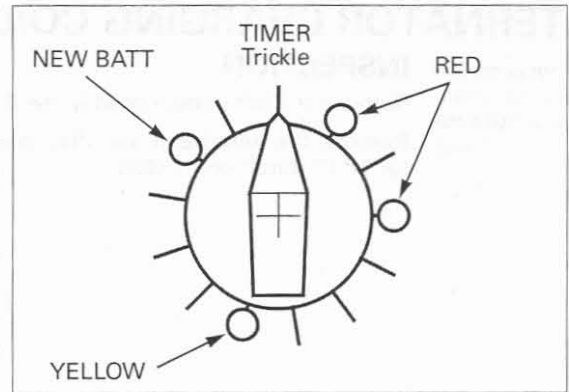


1. Turn the Power Switch to the OFF position.
2. Set the BATTERY AMP HR. SELECTOR SWITCH for the size of the battery being charged.
3. Set the TIMER to the position indicated by the Honda Battery Tester; RED-3, RED-2, or YELLOW-1. If you are charging a new battery, set the switch to the NEW BATT position.
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.

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. The charger will automatically switch to the "Trickle" mode after the set charging time has elapsed.
7. Let the battery cool for at least 10 minutes or until gassing subsides after charging.
8. Re-test the battery using the Honda Battery Tester and recharge if necessary using the above steps.



## CHARGING SYSTEM INSPECTION

*Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.*

### CURRENT LEAKAGE INSPECTION

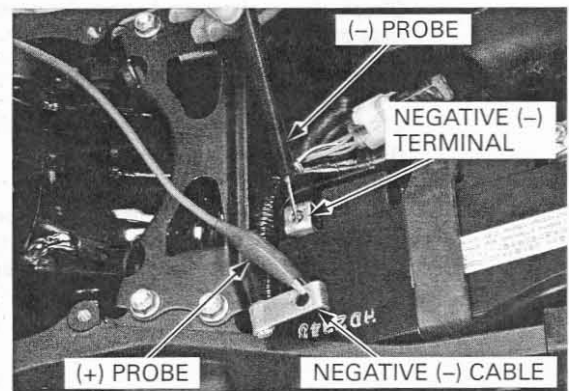
Remove the driver seat (page 3-4).

Turn the ignition switch OFF and disconnect the battery negative cable from the battery.

Connect the ammeter (+) probe to the negative cable and the ammeter (-) probe to the battery (-) terminal.

With the ignition switch OFF, check for current leakage.

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition switch on. A sudden surge of current may blow out the fuse in the tester.



**SPECIFIED CURRENT LEAKAGE: 2.0 mA max.**

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

### CHARGING VOLTAGE INSPECTION

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 multimeter between the positive and negative terminals of the battery.

- To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

Restart the engine.

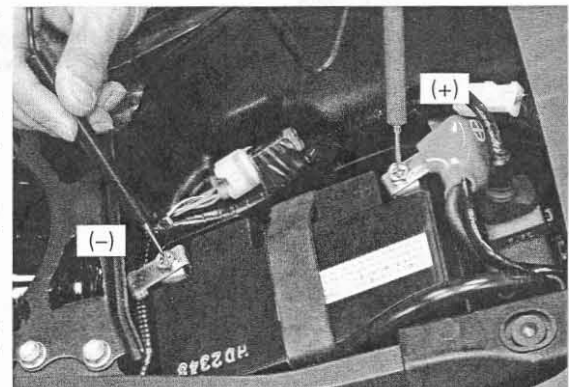
With the headlight on Hi beam, measure the voltage on the multimeter when the engine runs at 5,000 rpm.

**Standard:**

**Measured BV < Measured CV < 15.5 V at 5,000 rpm**

**BV = Battery Voltage (page 17-5)**

**CV = Charging Voltage**



## BATTERY/CHARGING SYSTEM

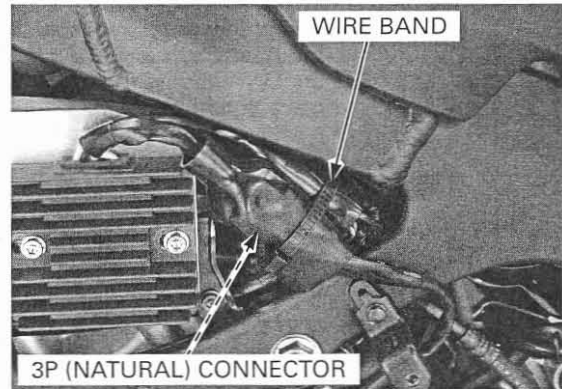
### ALTERNATOR CHARGING COIL

*It is not necessary to remove the stator coil to make this test.*

#### INSPECTION

Remove the left middle cowl (page 3-7).

Remove the wire band and disconnect the alternator 3P (Natural) connector.

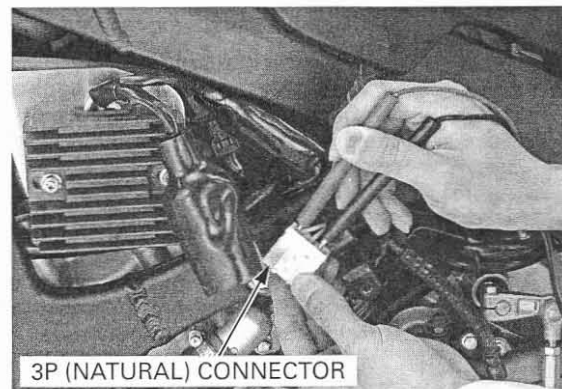


Check the resistance between three Yellow terminals of the alternator side connector.

**STANDARD:** 0.1 – 1.0  $\Omega$  (at 20°C/68°F)

Check for continuity between each terminal and ground. There should be no continuity.

If resistance is out of specification, or if any wire has continuity to ground, replace the alternator stator. Refer to page 11-4 for stator removal.



### REGULATOR/RECTIFIER

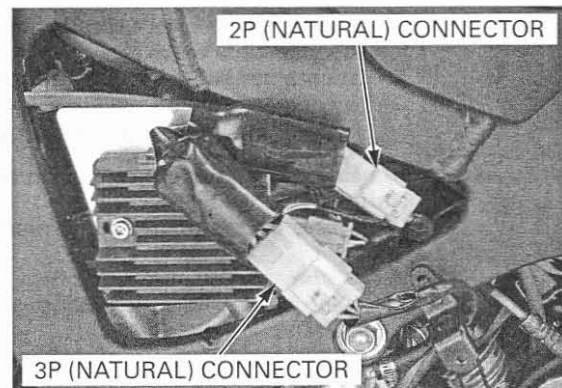
#### WIRE HARNESS INSPECTION

Remove the left middle cowl (page 3-7).

Remove the wire band and disconnect the regulator/rectifier 2P (Natural) connector and alternator 3P (Natural) connector.

Check the connectors for loose contacts or corroded terminals.

If the regulated voltage reading (page 17-7) is out of the specification, check the following at the wire harness side connector.



### BATTERY LINE

Measure the voltage between the red wire terminal and green wire terminal.

There should be battery voltage at all time.



### GROUND LINE

Check the continuity between the green wire terminal and ground.

There should be continuity at all time.

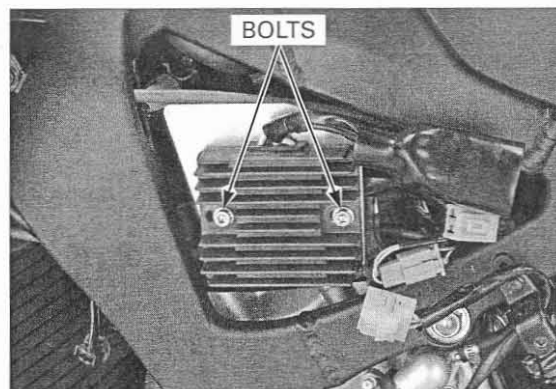
If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit (page 17-9).



### REMOVAL/INSTALLATION

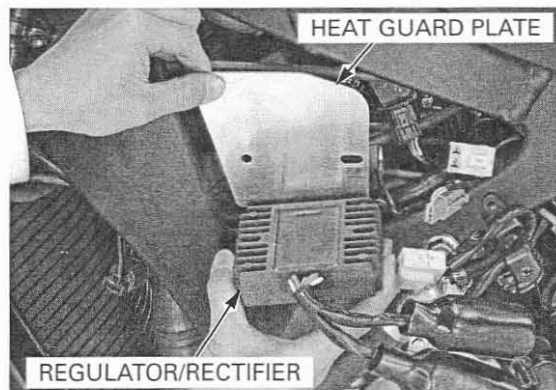
Disconnect the alternator 3P (Natural) connector and regulator/rectifier 2P (Natural) connector (page 17-8).

Remove the regulator/rectifier mounting bolts.



Remove the regulator/rectifier unit and heat guard plate.

Install the regulator/rectifier unit in the reverse order of removal.



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## MEMO

# 18. IGNITION SYSTEM

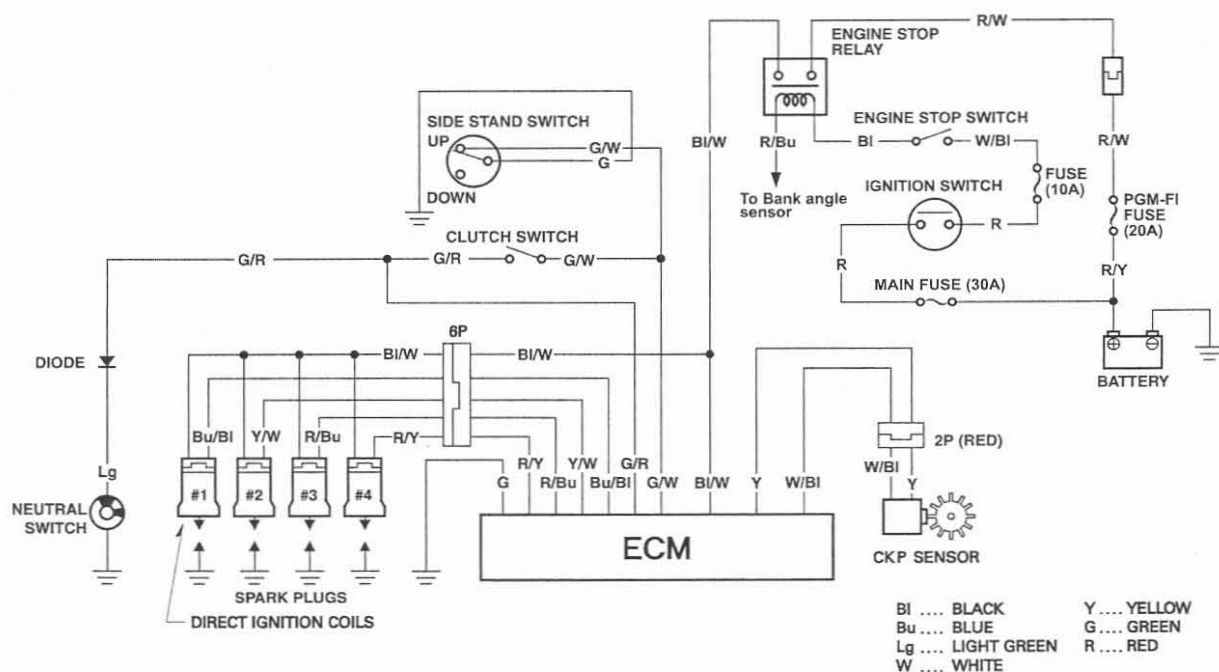
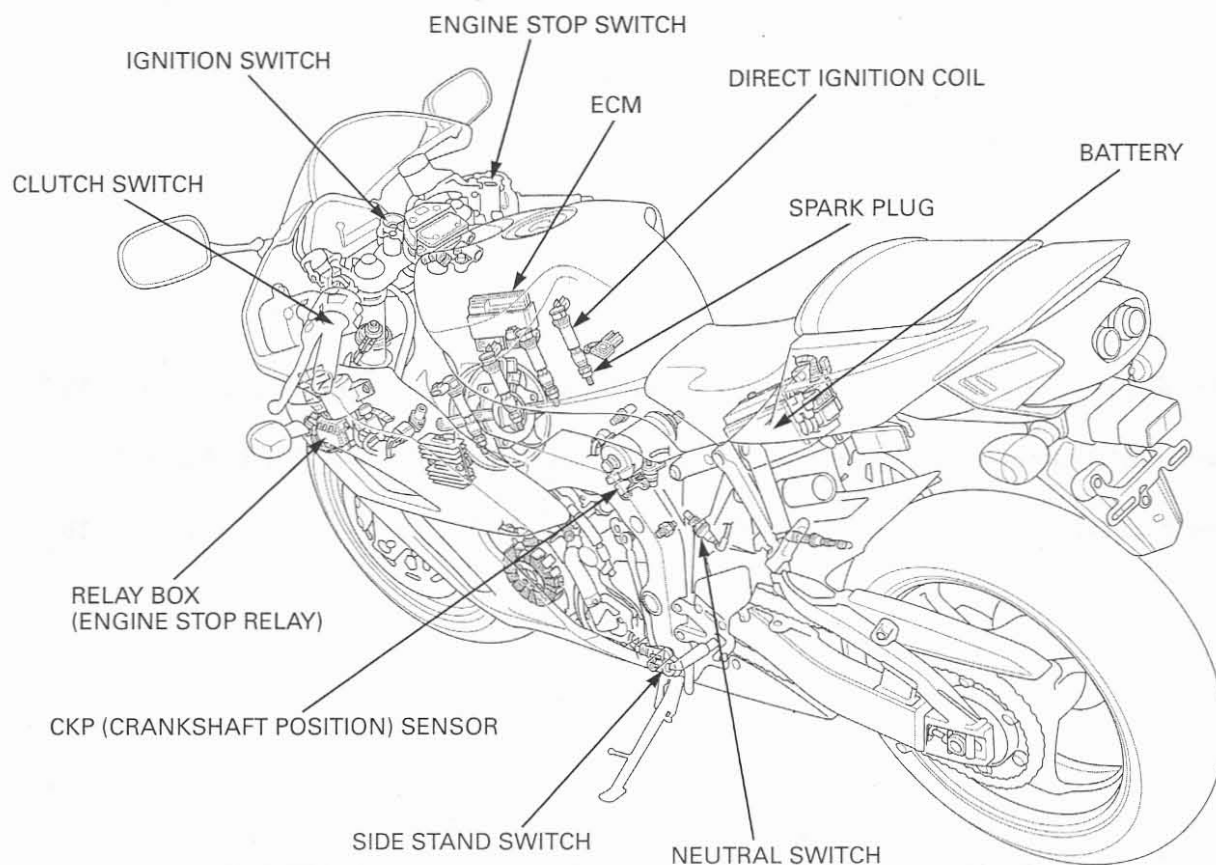
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|                           |      |                                     |      |
|---------------------------|------|-------------------------------------|------|
| SYSTEM DIAGRAM.....       | 18-2 | IGNITION SYSTEM INSPECTION.....     | 18-5 |
| SERVICE INFORMATION ..... | 18-3 | CKP (CRANKSHAFT POSITION) SENSOR .. | 18-7 |
| TROUBLESHOOTING .....     | 18-4 | IGNITION TIMING .....               | 18-7 |



# IGNITION SYSTEM

## SYSTEM DIAGRAM



# SERVICE INFORMATION

## GENERAL

### NOTICE

- The ECM may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence (page 18-4).
- This motorcycle's Ignition Control Module (ICM) is built into the Engine Control Module (ECM).
- The ignition timing does not normally need to be adjusted since the ECM is factory preset.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- This motorcycle features direct ignition coils, where the ignition coil and spark plug cap are integrated. There are four direct ignition coils.
- This motorcycle's spark plug is equipped with iridium type electrode. Do not use spark plugs other than specified.
- Refer to the CMP (camshaft position) sensor inspection (page 6-66) and ECM inspection (page 6-69).

## SPECIFICATIONS

| ITEM  |       | SPECIFICATIONS                    |
|---|-------|-----------------------------------|
| Spark plug (Iridium)                          | NGK   | IMR9C-9HES                        |
|   | DENSO | VUH27ES                           |
| Spark plug gap                                |       | 0.80 – 0.90 mm (0.031 – 0.035 in) |
| Ignition coil peak voltage                    |       | 100 V minimum                     |
| CKP (crankshaft position) sensor peak voltage |       | 0.7 V minimum                     |
| Ignition timing ("F" mark)                    |       | 8°12' BTDC at idle                |

## TORQUE VALUES

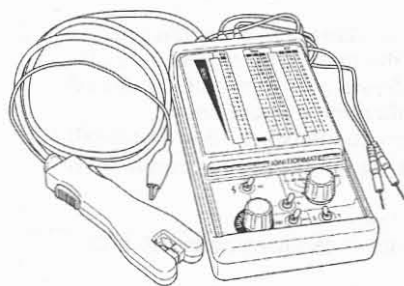
Timing hole cap

18 N·m (1.8 kgf·m, 13 lbf·ft)

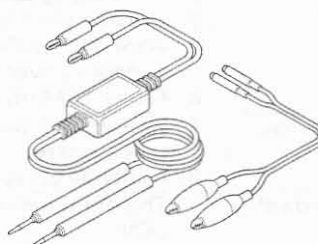
Apply grease to the threads

## TOOLS

IgnitionMate peak voltage tester  
MTP07-0286 (U.S.A. only)

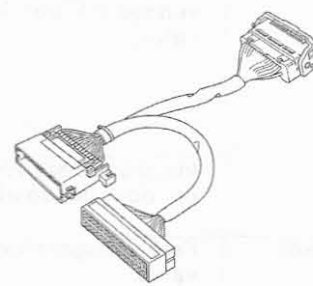


Peak voltage adaptor  
07HGJ-0020100  
(not available in U.S.A.)



with commercially available digital  
multimeter (impedance 10 MΩ/DCV  
minimum)

ECM test harness, 32P  
070MZ-0010201



(two required)

## IGNITION SYSTEM

### TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose direct ignition coil and spark plug connection
  - Loose direct ignition coil connectors
  - Water got into the direct ignition coil (shorting the ignition coil secondary voltage)
- If there is no spark at any cylinder, temporarily exchange the direct ignition coil with the other good one and perform the spark test. If there is spark, the exchanged direct ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned ON and engine stop switch turned "  $\bigcirc$  " (The engine is not cranked by the starter motor).

#### No spark at all plugs

|                               | Unusual condition   | Probable cause (Check in numerical order)  |
|-------------------------------|---|--|
| Ignition coil primary voltage | No initial voltage with the ignition ON and engine stop switch turned " $\bigcirc$ " (other electrical components are normal) | 1. Faulty engine stop relay.<br>2. An open circuit in Black/white wire between the direct ignition coil and engine stop relay.<br>3. Loose or poor connect of the direct ignition coil connectors, or an open circuit in primary coil (Check at the ECM connector).<br>4. Faulty ECM (in case when the initial voltage is normal while disconnecting ECM connectors)   |
|                               | Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine.  | 1. Incorrect peak voltage adaptor connections.<br>2. Undercharged battery.<br>3. No voltage between the Black/white (+) and body ground (–) at the ECM multi-connector or loosen ECM connection.<br>4. An open circuit or loose connection in Green wire.<br>5. An open circuit or loose connection in Blue/black, Yellow/white, Red/blue and Red/yellow wires between the direct ignition coils and ECM.<br>6. Faulty side stand switch or neutral switch.<br>7. An open circuit or loose connection in No. 6 related circuit wires.<br>– Side stand switch line: Green/white wire<br>– Neutral switch line: Light green wire<br>8. Faulty CKP sensor (Measure the peak voltage).<br>9. Faulty ECM (in case when above No. 1 – 8 are normal). |
|                               | Initial voltage is normal, but no peak voltage while cranking the engine.   | 1. Faulty peak voltage adaptor connections.<br>2. Faulty peak voltage adaptor.<br>3. Faulty ECM (in case when above No. 1 and 2 are normal).   |
|                               | Initial voltage is normal, but peak voltage is lower than standard value.   | 1. The multimeter impedance is too low; below 10 M $\Omega$ /DCV.<br>2. Cranking speed is too low (Battery is undercharged).<br>3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the specification at least once).<br>4. Faulty ECM (in case when above No. 1 – 3 are normal).  |
|                               | Initial and peak voltage are normal, but does not spark.  | 1. Faulty spark plug or leaking ignition coil secondary current ampere.<br>2. Faulty direct ignition coil (s).   |
| CKP sensor                    | Peak voltage is lower than standard value.  | 1. The multimeter impedance is too low; below 10 M $\Omega$ /DCV.<br>2. Cranking speed is too low (Battery is undercharged).<br>3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the specification at least once).<br>4. Faulty ECM (in case when above No. 1 – 3 are normal).  |
|                               | No peak voltage.  | 1. Faulty peak voltage adaptor.<br>2. Faulty CKP sensor.   |

## IGNITION SYSTEM INSPECTION

- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M $\Omega$ /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If the Imrie diagnostic tester (model 625) is used, follow the manufacturer's instruction.

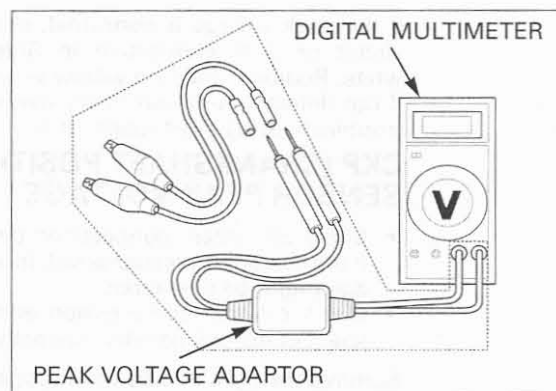
Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

### TOOLS:

**IgnitionMate peak voltage tester MTP07-0286**  
(U.S.A. only) or  
**07HGJ-0020100**  
(not available in  
U.S.A.)

**Peak voltage adaptor**

**with commercially available digital multimeter**  
(impedance 10 M $\Omega$ /DCV minimum)



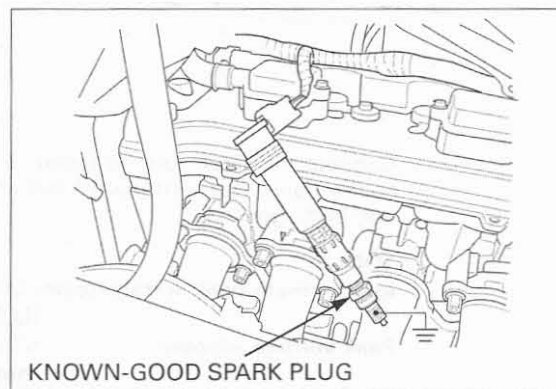
## IGNITION COIL PRIMARY PEAK VOLTAGE

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Remove the direct ignition coils from the spark plugs (page 4-8).

Connect the direct ignition coil 2P connectors to the direct ignition coil.

Connect known-good spark plugs to the direct ignition coil and ground the spark plug to the cylinder head as done in a spark test.



Connect the ECM test harness to the ECM connectors (page 6-11).

Connect the peak voltage tester or adaptor probes to the test harness terminals.

### CONNECTIONS:

**No.1 ignition coil:**

B16 (+) – A17 (–)

**No.2 ignition coil:**

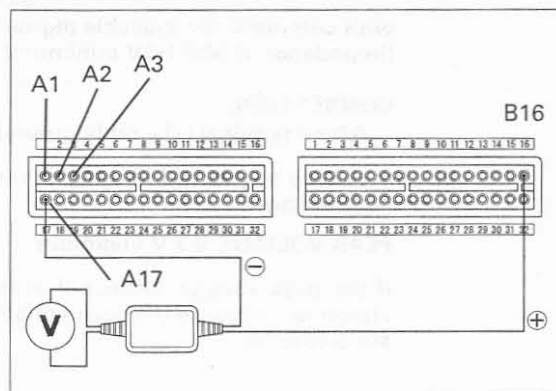
B16 (+) – A1 (–)

**No.3 ignition coil:**

B16 (+) – A2 (–)

**No.4 ignition coil:**

B16 (+) – A3 (–)



## IGNITION SYSTEM

Avoid touching the spark plugs and tester probes to prevent electric shock.

Turn the ignition switch ON and engine stop switch "○".

Check for initial voltage at this time.

Battery voltage should be present.

If the initial voltage cannot be measured, check the power supply circuit (refer to the troubleshooting, page 18-4).

Shift the transmission into neutral.

Crank the engine with the starter motor and read the ignition coil primary peak voltage.

### PEAK VOLTAGE: 100 V minimum

If the peak voltage is abnormal, check for an open circuit or poor connection in Blue/black, Yellow/white, Red/blue and Red/yellow wires.

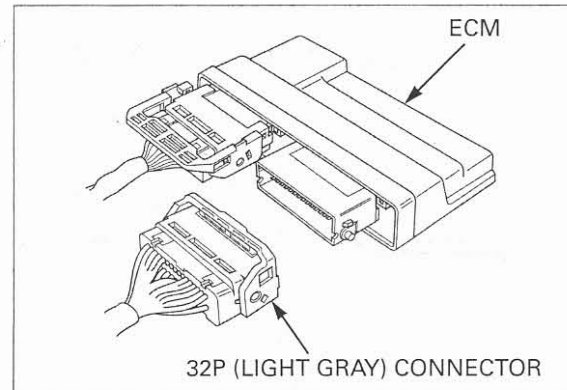
If not defects are found in the harness, refer to the troubleshooting chart (page 18-4).

### CKP (CRANKSHAFT POSITION) SENSOR PEAK VOLTAGE

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Remove the right middle cowl (page 3-7).

Disconnect the ECM 32P (Light gray) connector from the ECM.



Connect the peak voltage tester or adaptor probes to the connector terminal of the wire harness side and body ground.

#### TOOLS:

IgnitionMate peak voltage tester MTP07-0286

(U.S.A. only) or

Peak voltage adaptor

07HGJ-0020100

(not available in U.S.A.)

with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

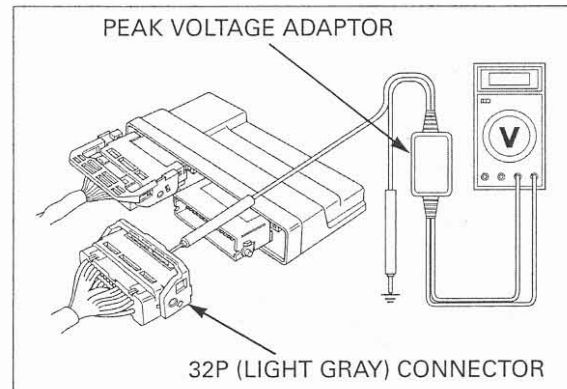
#### CONNECTION:

Yellow terminal (+) – body ground (–)

Crank the engine with the starter motor and read the peak voltage.

### PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at ECM connector is abnormal, measure the peak voltage at the CKP sensor connector.



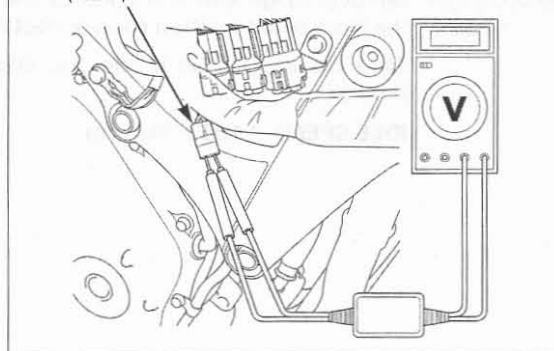
Remove the right middle cowl (page 3-7)

Disconnect the CKP sensor 2P (Red) connector and connect the tester probes to the terminal (Yellow and Yellow/white).

In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the CKP sensor is normal, check the 2P (Red) connector for loose connection and the wire harness for an open circuit or loose connection.
- If both peak voltage measured are abnormal, check each item in the troubleshooting chart (page 18-4). If all items are normal, the CKP sensor is faulty. See following steps for CKP (crankshaft position) sensor replacement.

2P (RED) CONNECTOR



## CKP (CRANKSHAFT POSITION) SENSOR

### REPLACEMENT

Remove the right crankcase cover (page 10-15).

Remove the wire grommet from the cover.

Remove the bolts and CKP sensor.

Apply sealant to the grommet seating surface.

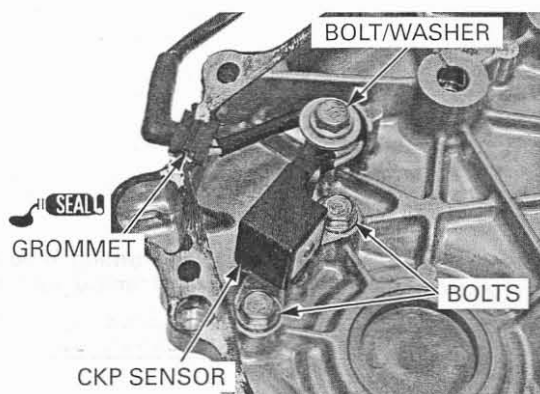
Install a new CKP sensor and the grommet into the cover groove properly.

Tighten the mounting bolts securely.

Route the CKP sensor wire into the groove of the right crankcase cover.

Install the washer and bolt, then tighten the bolt securely.

Install the right crankcase cover (page 10-34).

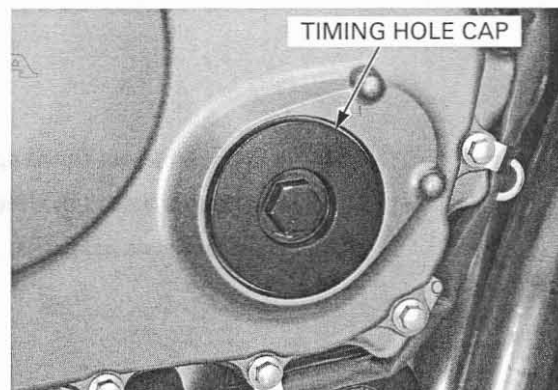


## IGNITION TIMING

Remove the under cowls (page 3-7).

Warm up the engine.

Stop the engine and remove the timing hole cap.





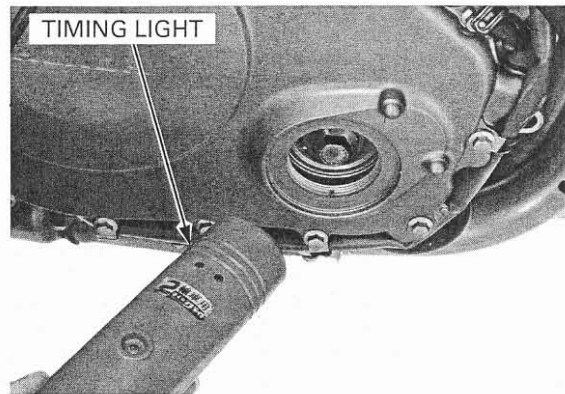
## IGNITION SYSTEM

*Read the instructions for timing light operation.*

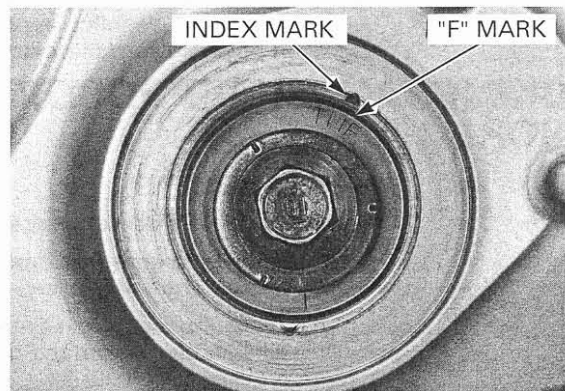
Remove the intake air duct (refer to the spark plug removal; page 4-8) and connect the timing light to the No.1 direct ignition coil connector wire.

Start the engine, let it idle and check the ignition timing.

**IDLE SPEED:  $1,200 \pm 100$  rpm**



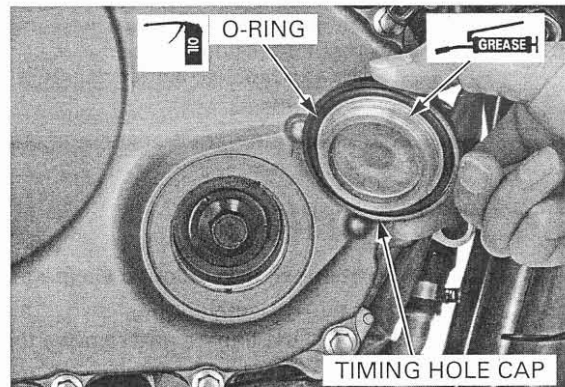
The ignition timing is correct if the "F" mark on the CKP sensor rotor aligns with the index mark on the right crankcase cover at idle. Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move counterclockwise.



Apply oil to the O-ring.

*Check that the O-ring is in good condition, replace it if necessary.*

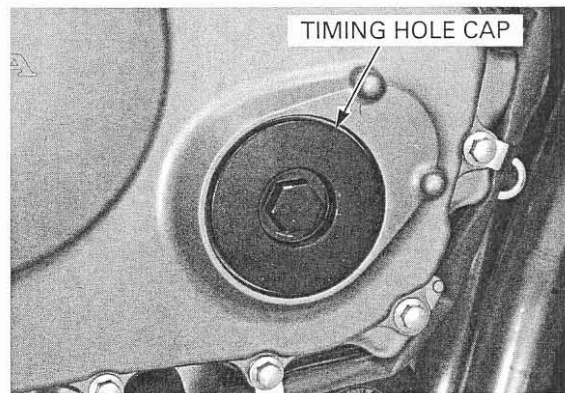
Apply grease to the timing hole cap threads and install the O-ring and timing hole cap.



Tighten the timing hole cap to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

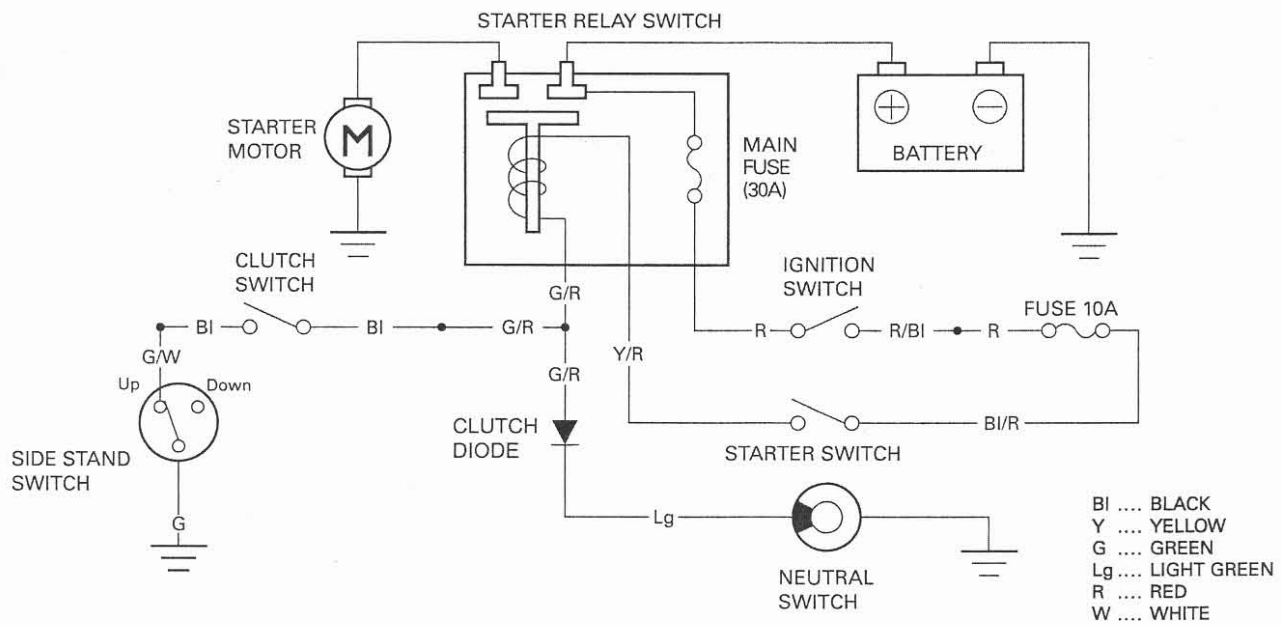
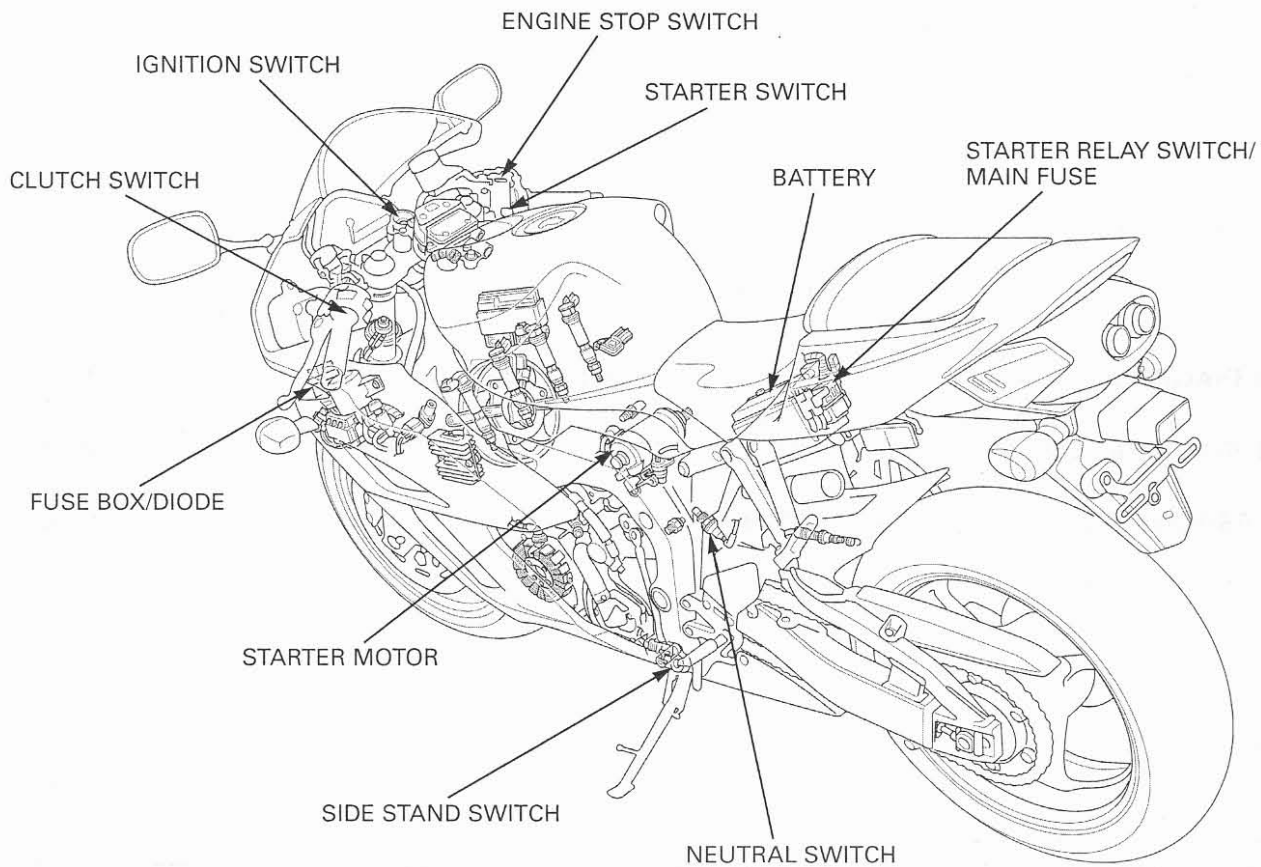
Remove the under cowls (page 3-7).



# 19. ELECTRIC STARTER

|                           |      |                           |       |
|---------------------------|------|---------------------------|-------|
| SYSTEM DIAGRAM.....       | 19-2 | STARTER MOTOR.....        | 19-6  |
| SERVICE INFORMATION ..... | 19-3 | STARTER RELAY SWITCH..... | 19-13 |
| TROUBLESHOOTING .....     | 19-4 | DIODE.....                | 19-14 |

# ELECTRIC STARTER SYSTEM DIAGRAM



## SERVICE INFORMATION

### GENERAL

#### NOTICE

If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.

- Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-4).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- Refer to the starter clutch servicing (page 10-28).
- Refer to the following components informations.
  - Ignition switch (page 20-18)
  - Starter switch (page 20-19)
  - Neutral switch (page 20-21)
  - Side stand switch (page 20-22)
  - Clutch switch (page 20-21)

### SPECIFICATIONS

Unit: mm (in)

| ITEM                       | STANDARD                  | SERVICE LIMIT |
|----------------------------|---------------------------|---------------|
| Starter motor brush length | 12.0 – 13.0 (0.47 – 0.51) | 6.5 (0.26)    |

### TORQUE VALUES

Starter motor terminal nut

12 N·m (1.2 kgf·m, 9 lbf·ft)

# TROUBLESHOOTING

### Starter motor does not turn

#### 1. Fuse Inspection

Check for blown main fuse or sub fuse.

*Is the fuse blown?*

**YES** – Replace the fuse

**NO** – GO TO STEP 2.

#### 2. Battery Inspection

Make sure the battery is fully charged and in good condition.

*Is the battery in good condition?*

**YES** – GO TO STEP 3.

**NO** – Replace the battery

#### 3. Starter Relay Switch Operation

Check the starter relay switch operation.

You should hear the relay "CLICK" when the engine starter switch button is depressed.

*Is there a "CLICK"?*

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 5.

#### 4. Starter Motor Inspection

Apply battery voltage to the starter motor directly and check the operation.

*Does the starter motor turn?*

**YES** – 

- Poorly connected starter motor cable
- Faulty starter relay switch (page 19-13)

**NO** – Faulty starter motor (page 19-6)

#### 5. Relay Coil Ground Wire Lines Inspection

Disconnect the starter relay switch connector, and check the relay coil ground wire lines as below for continuity:

1. Green/Red terminal – clutch diode – neutral switch line (with the transmission in neutral and clutch lever released).
2. Green/Red terminal – clutch switch – side stand switch line (in any gear except neutral, and with the clutch lever pulled in and the side stand up).

*Is there continuity?*

**NO** – 

- Faulty neutral switch (page 20-21)
- Faulty clutch diode (page 19-14)
- Faulty clutch switch (page 20-21)
- Faulty side stand switch (page 20-22)
- Loose or poor contact connector
- Open circuit in wire harness

**YES** – GO TO STEP 6.

#### 6. Starter Relay Voltage Inspection

Connect the starter relay switch connector.

With the ignition switch ON and the starter switch pushed, measure the voltage at the starter relay switch connector (between Yellow/Red (+) and body ground (-)).

*Is the starter relay switch operation correct?*

**NO** – 

- Faulty ignition switch (page 20-18)
- Faulty starter switch (page 20-19)
- Loose or poor contact connector
- Open circuit in wire harness

**YES** – GO TO STEP 7.

**7. Starter Relay Switch Continuity Inspection**

Disconnect the starter relay switch 4P connector and cables.

Connect a fully charged 12 V battery positive wire to the relay switch Yellow/red wire terminal and negative wire to the Green/red wire terminal.

Check the continuity between the starter relay switch large terminals while the battery connected.

**Is there continuity?**

**NO** – Faulty starter relay switch

**YES** – Loose or poor contact of the starter relay switch 4P connector

**The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.**

**1. Clutch Switch Inspection**

Check the clutch switch operation.

**Is the clutch switch operation normal?**

**NO** – Faulty clutch switch

**YES** – GO TO STEP 2.

**2. Side Stand Switch Inspection**

Check the side stand switch operation.

**Is the side stand switch operation normal?**

**NO** – Faulty side stand switch (page 20-22)

**YES** – • Open circuit in wire harness  
• Loose or poor contact connector

**Starter motor turns engine slowly**

- Low battery voltage
- Poorly connected battery terminal cables
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

**Starter motor turns, but engine does not turn**

- Starter motor is running backwards
  - Starter motor assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter driven gear, idle gear and/or reduction gear

**Starter relay switch "Clicks", but engine does not turn over**

- Crankshaft does not turn due to engine problems



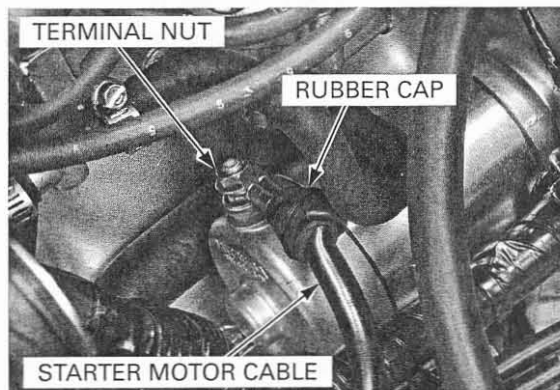
## STARTER MOTOR

### REMOVAL

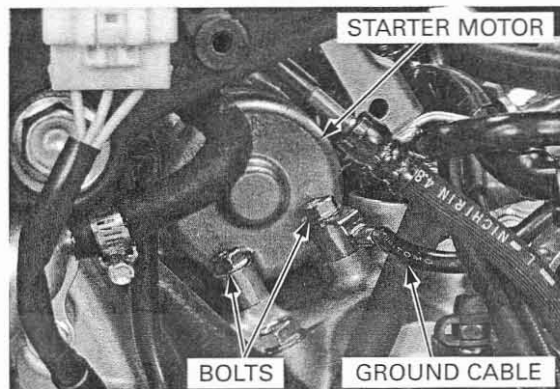
- With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the EGCV servo motor (page 6-78).

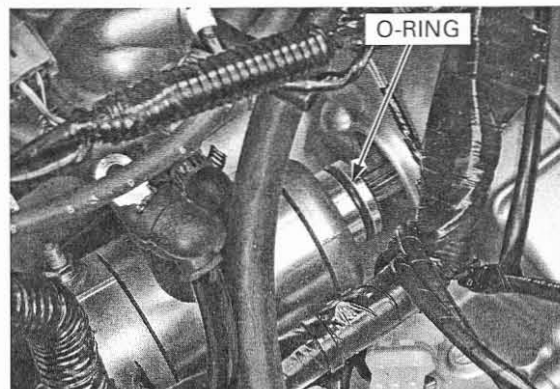
Remove the rubber cap, terminal nut and starter motor cable.



Remove the two mounting bolts and ground cable.



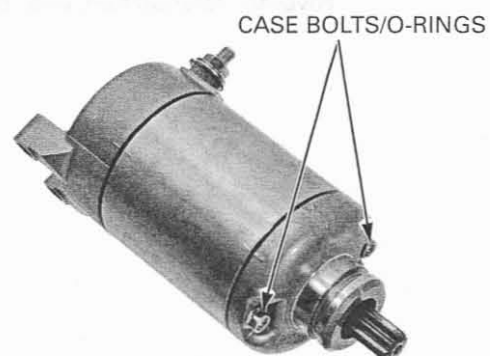
Remove the starter motor from the crankcase.  
Remove the O-ring from the starter motor.



**DISASSEMBLY**

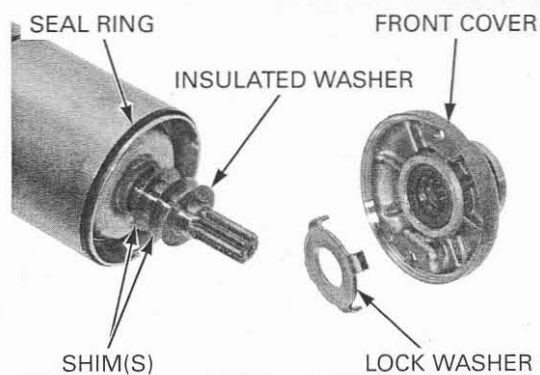
Remove the following:

- Starter motor case bolts/O-rings



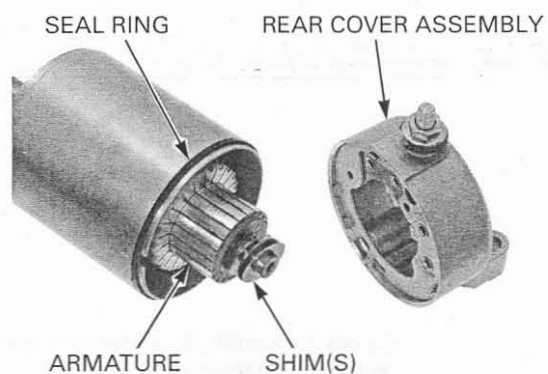
*Record the location  
and number of  
shims.*

- Front cover
- Seal ring
- Lock washer
- Insulated washer
- Shim(s)

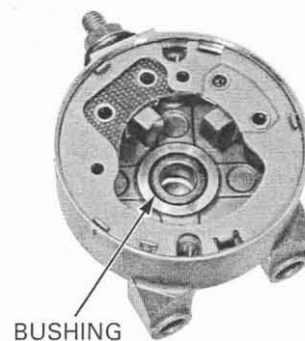


*Record the location  
and number of  
shims.*

- Rear cover assembly
- Seal ring
- Shim(s)
- Armature

**INSPECTION**

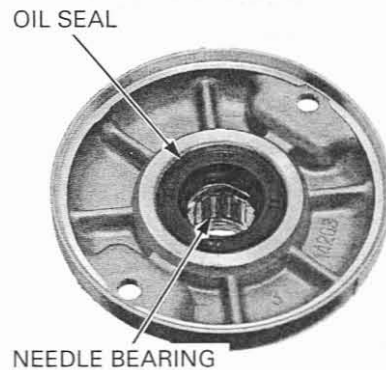
Check the bushing in the rear cover for wear or damage.



## ELECTRIC STARTER

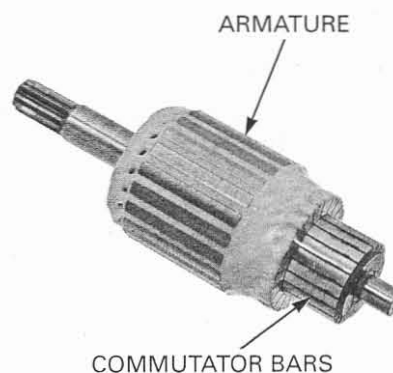
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Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.

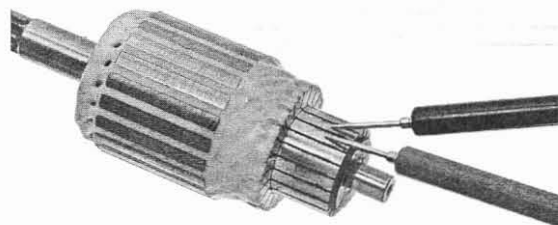


*Do not use emery or sand paper on the commutator.*

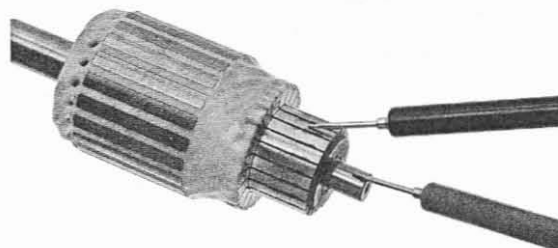
Check the commutator bars of the armature for discoloration.



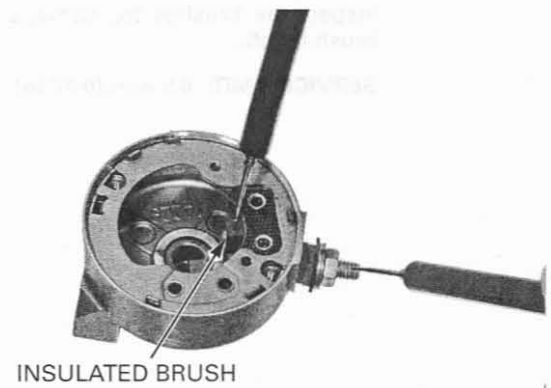
Check for continuity between pairs of commutator bars. There should be continuity.



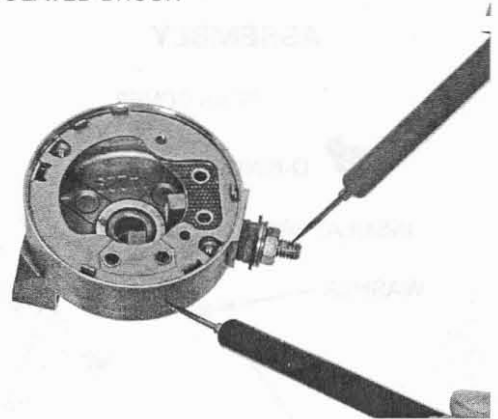
Check for continuity between each commutator bar and the armature shaft. There should be no continuity.



Check for continuity between the insulated brush and cable terminal.  
There should be continuity.



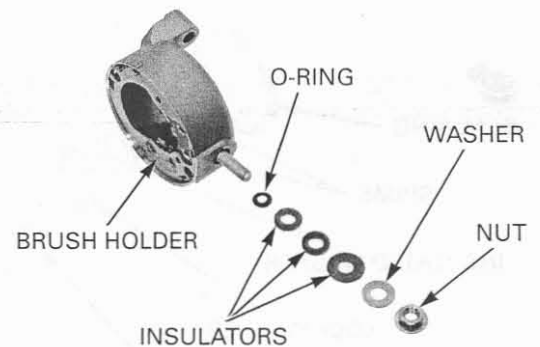
Check for continuity between the cable terminal and the rear cover.  
There should be no continuity.



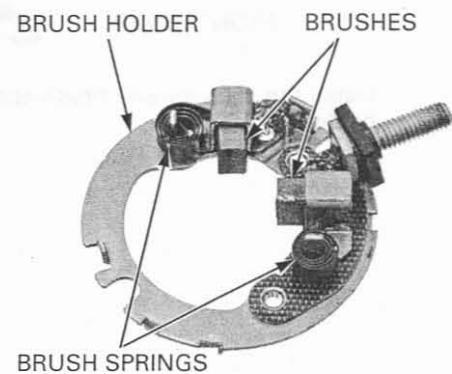
*Record the location and number of insulators.*

Remove the following:

- Nut
- Washer
- Insulators
- O-ring
- Brush holder assembly



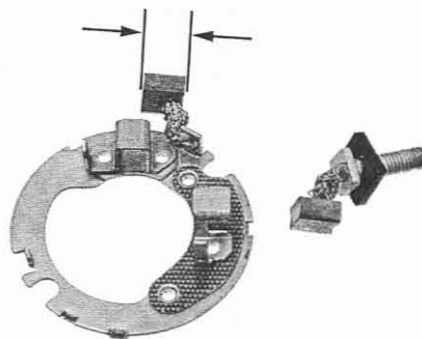
Remove the brush springs and brushes from the brush holder.



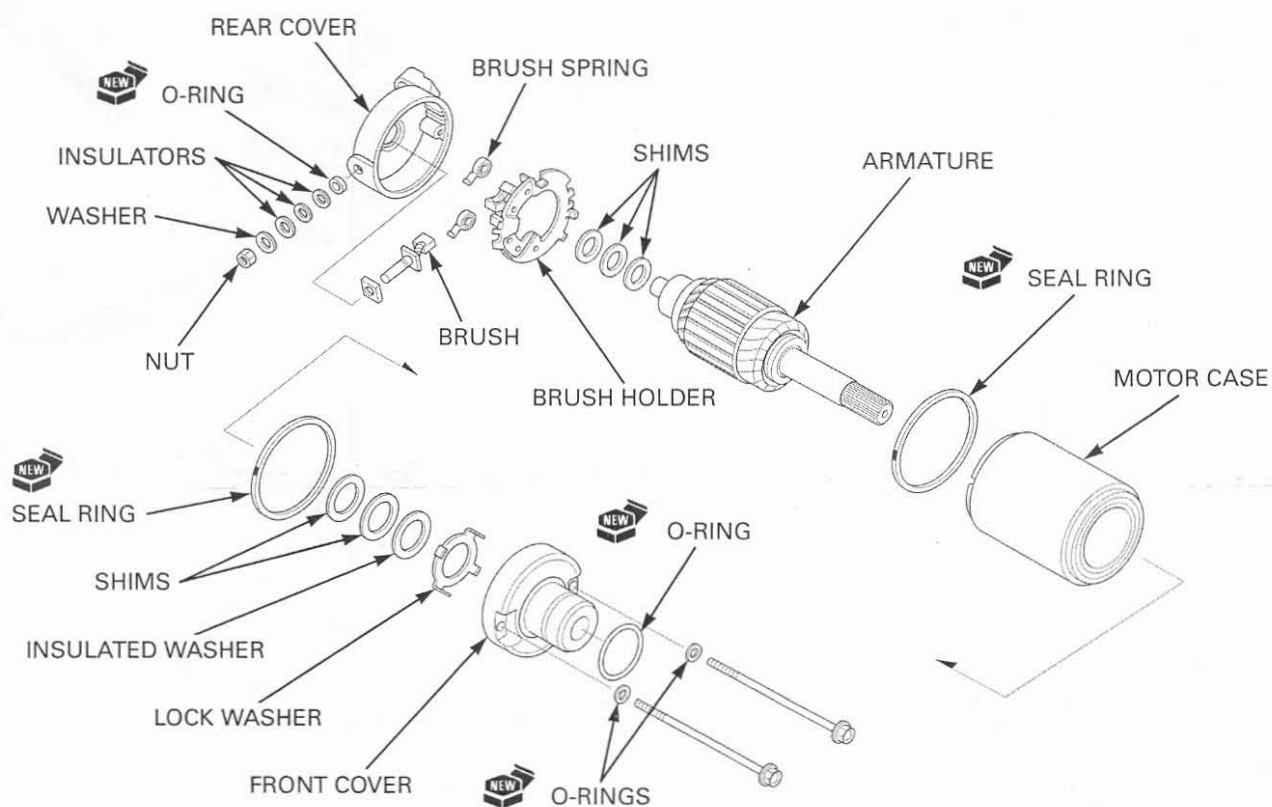
## ELECTRIC STARTER

Inspect the brushes for damage and measure the brush length.

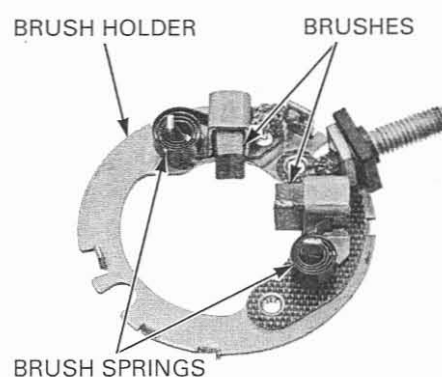
**SERVICE LIMIT:** 6.5 mm (0.26 in)



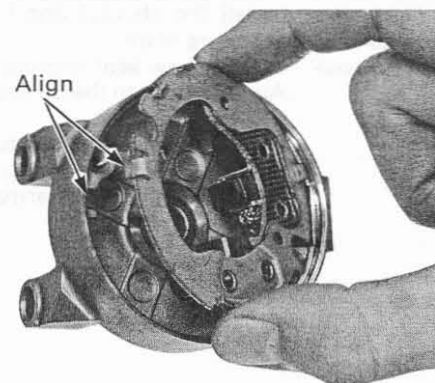
### ASSEMBLY



Install the brushes and brush springs to the brush holder.



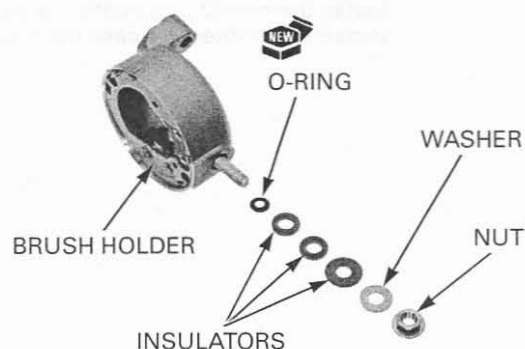
Install the cable terminal and brush holder into the rear cover, aligning the holder tab with the rear cover groove.



Install the insulators properly as noted during removal.

Install the following:

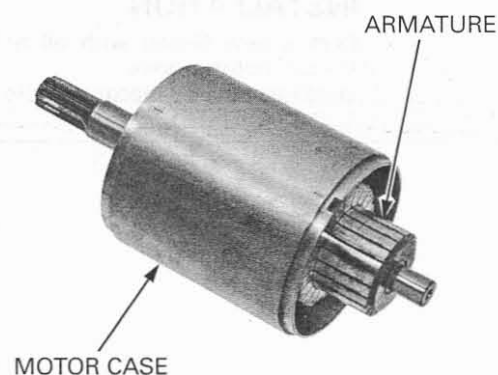
- New O-ring
- Insulators
- Washer
- Nut



Install the armature in the motor case. When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

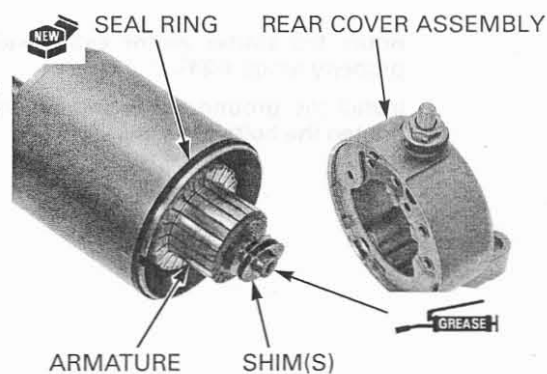
### NOTICE

*The coil may be damaged if the magnet pulls the armature against the case.*



Install the shims properly as noted during removal.

Install a new seal ring onto the motor case. Install the shim(s) onto the armature shaft. Apply thin coat of grease to the armature shaft end. Install the rear cover assembly, while pushing in the brushes into the brush holder and aligning the brush holder tab with the motor case groove.

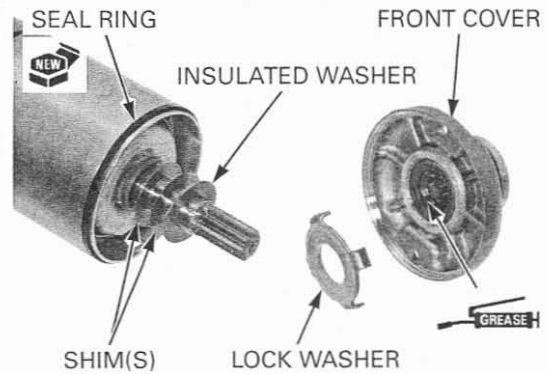




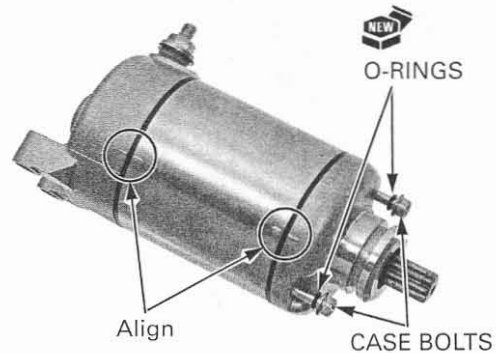
## ELECTRIC STARTER

*Install the shims properly as noted during removal.*

Install the shim(s) and insulated washer onto the armature shaft.  
Install a new seal ring onto the motor case.  
Apply grease to the oil seal lip and needle bearing in the front cover.  
Install the lock washer to the front cover with the lock washer tabs facing to the front cover, and install them onto the armature shaft.

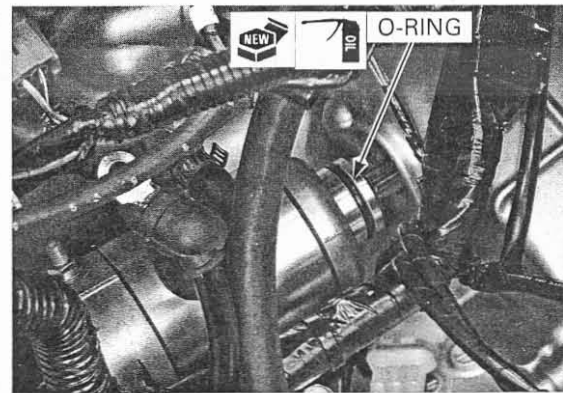


Make sure the index lines are aligned.  
Install the new O-rings onto the motor case bolts.  
Install and tighten the case bolts securely.



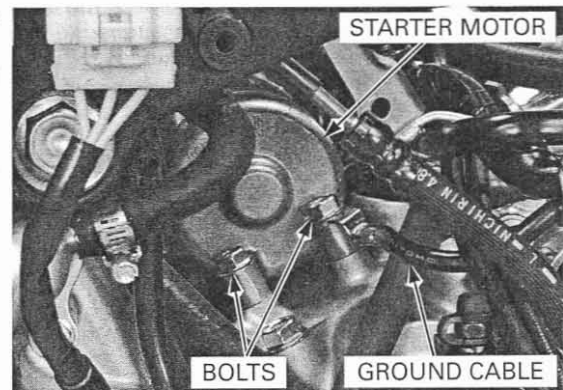
### INSTALLATION

Coat a new O-ring with oil and install it into the starter motor groove.  
Install the starter motor into the crankcase.



Route the starter motor cable and ground cable properly (page 1-24).

Install the ground cable and mounting bolts, and tighten the bolts securely.

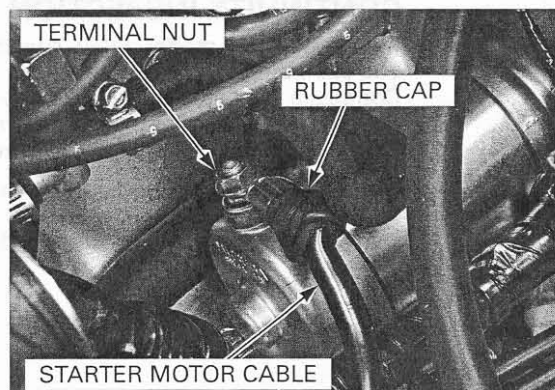


Install the starter motor cable to the terminal, then tighten the terminal nut to the specified torque.

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

Install the rubber cap securely.

Install the EGCV servo motor (page 6-80).



## STARTER RELAY SWITCH

### OPERATION INSPECTION

Remove the driver seat (page 3-4).

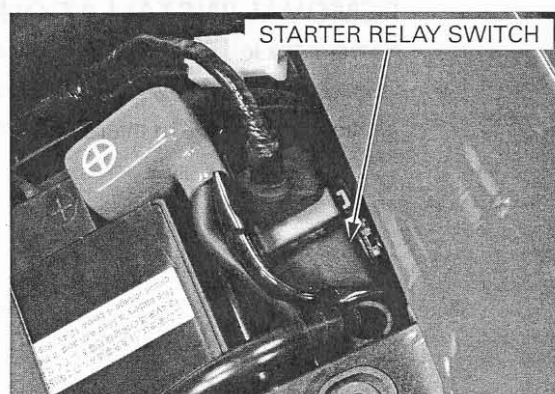
Shift the transmission into neutral.

Turn the ignition switch ON and engine stop switch "Q".

Press the starter switch button.

The coil is normal if the starter relay switch clicks.

If you don't hear the switch "click", inspect the relay switch using the procedure below.

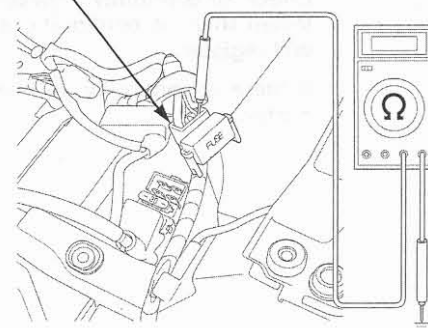


### GROUND LINE INSPECTION

Disconnect the starter relay switch 4P connector. Check for continuity between the Green/red wire (ground line) and body ground.

If there is continuity when the transmission is in neutral and clutch lever released or when the clutch lever pulled and the side stand up, the ground circuit is normal (In neutral, there is a slight resistance due to the diode).

RELAY SWITCH 4P CONNECTOR



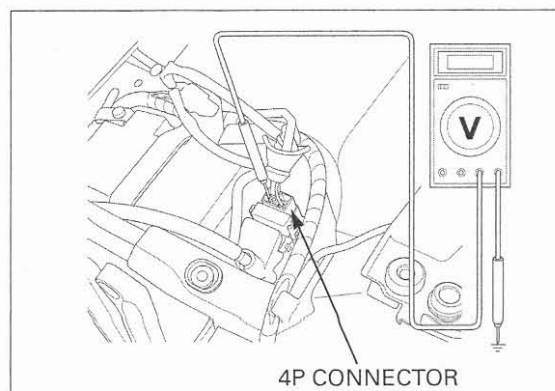
### STARTER RELAY VOLTAGE INSPECTION

Connect the starter relay switch 4P connector.

Shift the transmission into neutral.

Measure the voltage between the Yellow/red wire terminal (+) and ground (-).

If the battery voltage appears only when the starter switch is pushed with the ignition switch ON and engine stop switch "Q", it is normal.



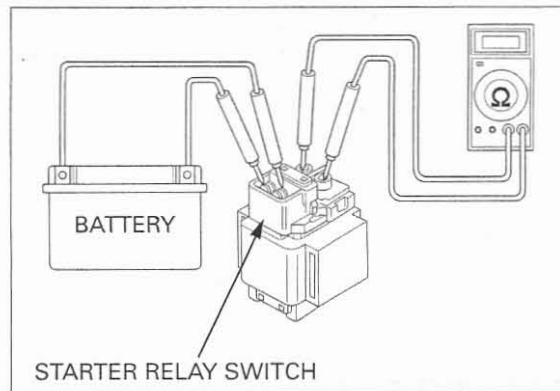
## ELECTRIC STARTER

### CONTINUITY INSPECTION

Disconnect the starter relay switch 4P connector and cables.

Connect a fully charged 12 V battery positive wire to the relay switch Yellow/red wire terminal and negative wire to the Green/red wire terminal.

There should be continuity between the large terminals while the battery is connected, and no continuity when the battery is disconnected.



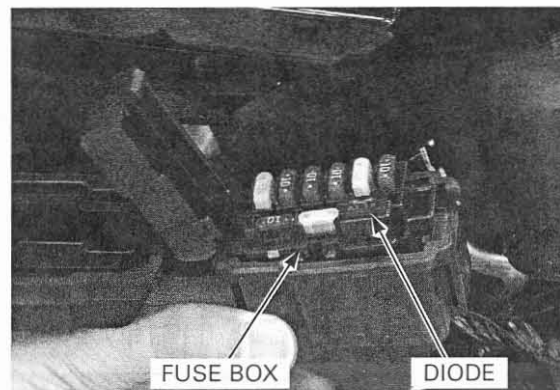
## DIODE

### REMOVAL/INSTALLATION

Remove the left middle cowl (page 3-7)

Open the fuse box and remove the diode.

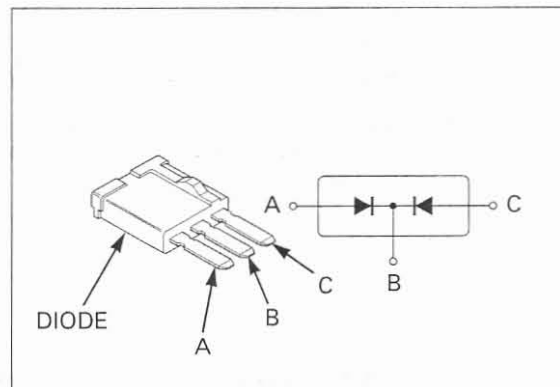
Install the diode in the reverse order of removal.



### INSPECTION

Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity, in one direction, the diode is normal.



## 20. LIGHTS/METERS/SWITCHES

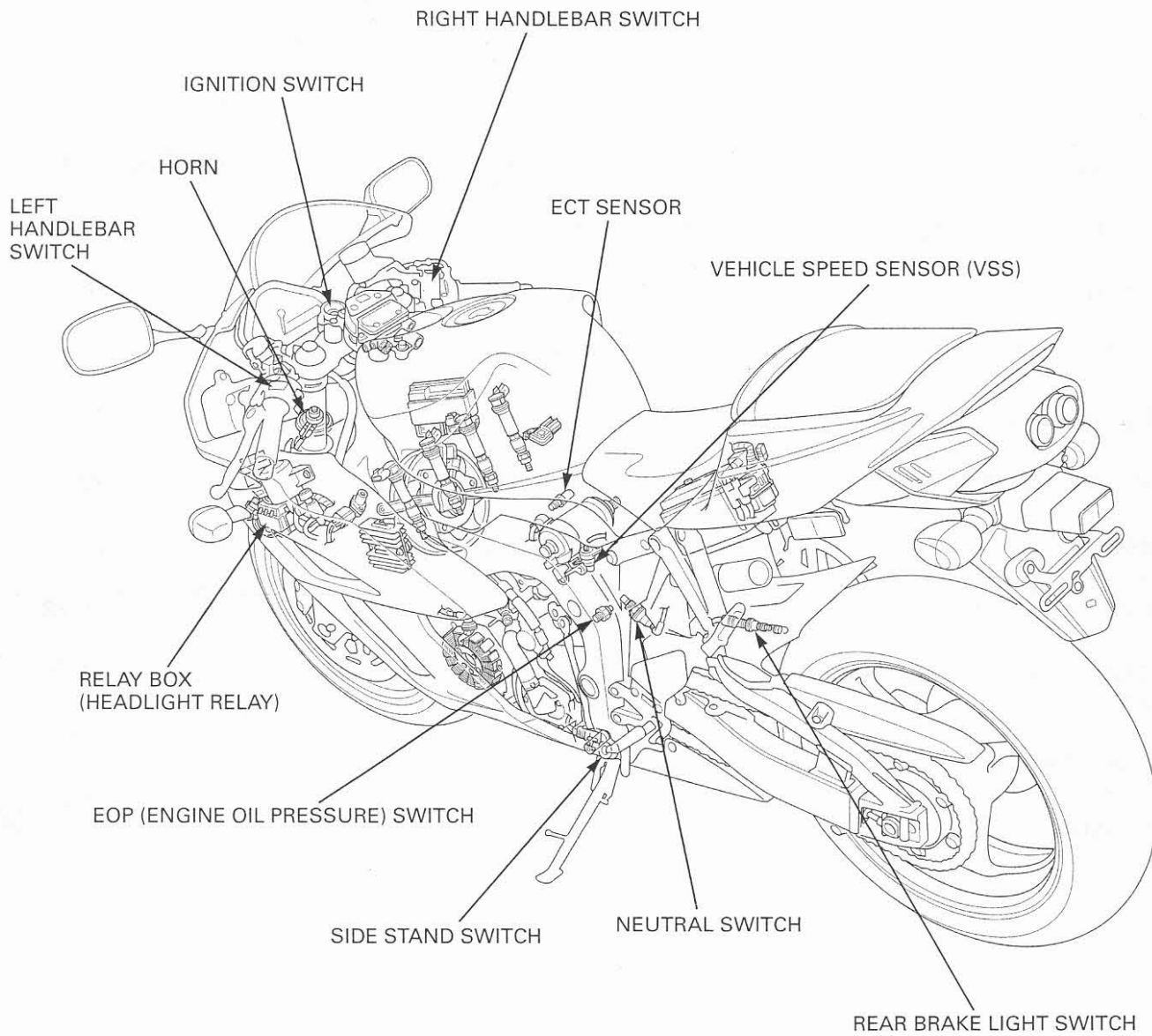
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|   |       |                                     |       |
|---|-------|-------------------------------------|-------|
| SYSTEM LOCATION.....                      | 20-2  | EOP (ENGINE OIL PRESSURE) SWITCH... | 20-15 |
| SERVICE INFORMATION .....                 | 20-3  | FUEL RESERVE SENSOR.....            | 20-17 |
| HEADLIGHT.....                            | 20-5  | IGNITION SWITCH .....               | 20-18 |
| POSITION LIGHT .....                      | 20-6  | HANDLEBAR SWITCHES .....            | 20-19 |
| TURN SIGNAL .....                         | 20-7  | BRAKE LIGHT SWITCH .....            | 20-20 |
| TAIL/BRAKE LIGHT .....                    | 20-8  | CLUTCH SWITCH .....                 | 20-21 |
| LICENSE LIGHT.....                        | 20-9  | NEUTRAL SWITCH.....                 | 20-21 |
| COMBINATION METER.....                    | 20-10 | SIDE STAND SWITCH .....             | 20-22 |
| SPEEDOMETER/VEHICLE SPEED<br>SENSOR ..... | 20-11 | HORN .....                          | 20-24 |
| TACHOMETER .....                          | 20-13 | TURN SIGNAL RELAY.....              | 20-24 |
| ECT SENSOR .....                          | 20-14 | HEADLIGHT RELAY.....                | 20-25 |

## LIGHTS/METERS/SWITCHES

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### SYSTEM LOCATION



## SERVICE INFORMATION

### GENERAL

#### NOTICE

- A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.
- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Use an electric heating element to heat the water/coolant mixture for the ECT sensor inspection. Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes are used throughout this section.

|            |                 |                  |            |
|------------|-----------------|------------------|------------|
| Bu = Blue  | G = Green       | Lg = Light Green | R = Red    |
| Bl = Black | Gr = Gray       | O = Orange       | W = White  |
| Br = Brown | Lb = Light Blue | P = Pink         | Y = Yellow |

### SPECIFICATIONS

| ITEM                    |                                  |               | SPECIFICATIONS              |
|-------------------------|----------------------------------|---------------|-----------------------------|
| Bulbs                   | Headlight                        | Hi            | 12 V – 55 W                 |
|                         |                                  | Lo            | 12 V – 55 W                 |
|                         | Position light                   |               | 12 V – 5 W                  |
|                         | Tail/brake light                 |               | LED                         |
|                         | Front turn signal light          |               | 12 V – 23/8 W (32/3 cp) x 2 |
|                         | Rear turn signal light           |               | 12 V – 23 W x 2             |
|                         | Instrument light                 |               | LED                         |
|                         | Turn signal indicator            |               | LED                         |
|                         | High beam indicator              |               | LED                         |
|                         | Neutral indicator                |               | LED                         |
|                         | Malfunction indicator lamp (MIL) |               | LED                         |
| Fuse                    | Main fuse                        |               | 30 A                        |
|                         | PGM-FI fuse                      |               | 20 A                        |
|                         | Sub fuse                         |               | 10 A x 4, 20 A x 2          |
| Tachometer peak voltage |                                  |               | 10.5 V minimum              |
| ECT sensor resistance   |                                  | 80°C (176°F)  | 2.1 – 2.6 kΩ                |
|                         |                                  | 120°C (248°F) | 0.65 – 0.73 kΩ              |

### TORQUE VALUES

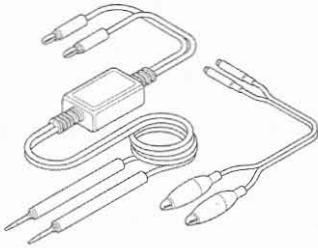
|                                       |                                  |                                   |
|---------------------------------------|----------------------------------|-----------------------------------|
| EOP (Engine Oil Pressure) switch      | 12 N·m (1.2 kgf·m, 9 lbf·ft)     | Apply sealant to the threads      |
| EOP switch wire terminal screw        | 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)  |                                   |
| Neutral switch                        | 12 N·m (1.2 kgf·m, 9 lbf·ft)     |                                   |
| Ignition switch mounting one-way bolt | 26 N·m (2.7 kgf·m, 20 lbf·ft)    |                                   |
| Right handlebar switch screw          | 0.9 N·m (0.09 kgf·m, 0.7 lbf·ft) |                                   |
| Combination meter assembly screw      | 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)  |                                   |
| Side stand switch special bolt        | 9.8 N·m (1.0 kgf·m, 7 lbf·ft)    | ALOC bolt; replace with a new one |



## LIGHTS/METERS/SWITCHES

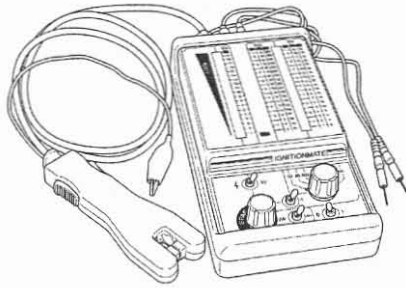
### TOOLS

Peak voltage adaptor  
07HGJ-0020100  
(not available in U.S.A.)

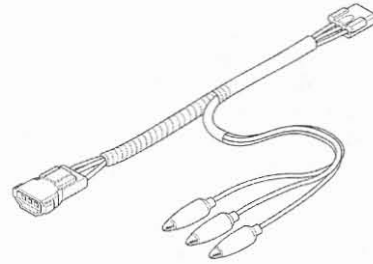


with commercially available digital  
multimeter (impedance 10 M $\Omega$ /DCV  
minimum)

IgnitionMate peak voltage tester  
MTP07-0286 (U.S.A. only)



Inspection adaptor  
07GMJ-ML80100



## HEADLIGHT

### BULB REPLACEMENT

Disconnect the headlight bulb connector.  
Remove the dust cover.

Unhook the bulb retainer and remove the headlight bulb/socket.

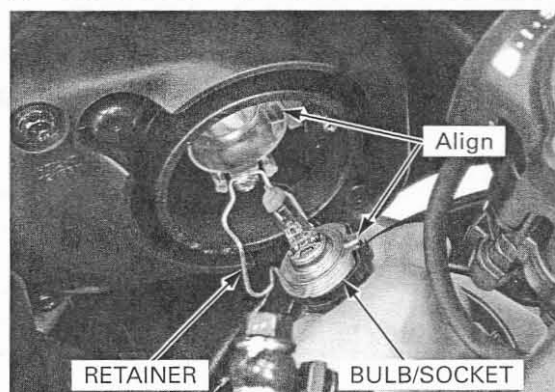
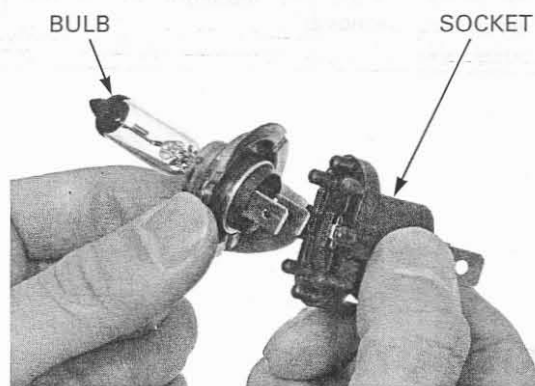
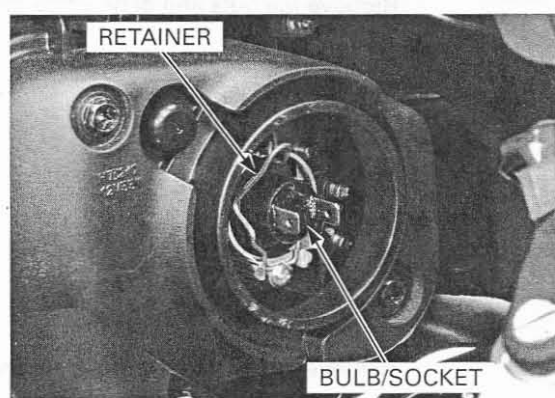
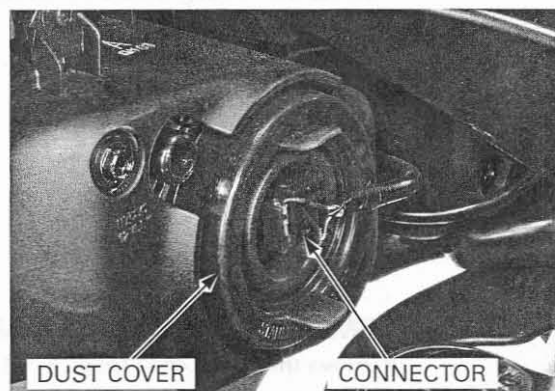
Remove the headlight bulb from the socket.  
Install new bulb into the socket.

#### NOTICE

*Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.*

If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent early bulb failure.

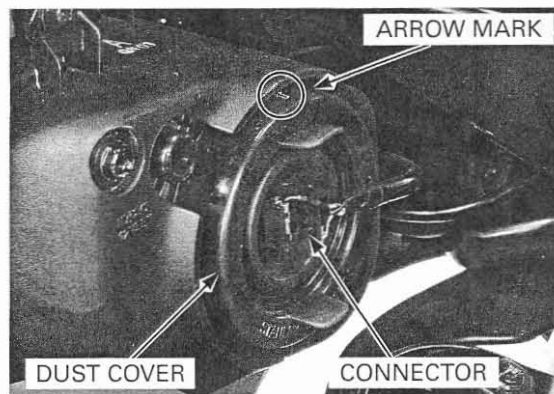
Install the new headlight bulb/socket aligning its tab with the groove in the headlight unit, and hook the bulb retainer properly.



## LIGHTS/METERS/SWITCHES

Install the dust cover tightly against the headlight unit with its arrow mark facing up.

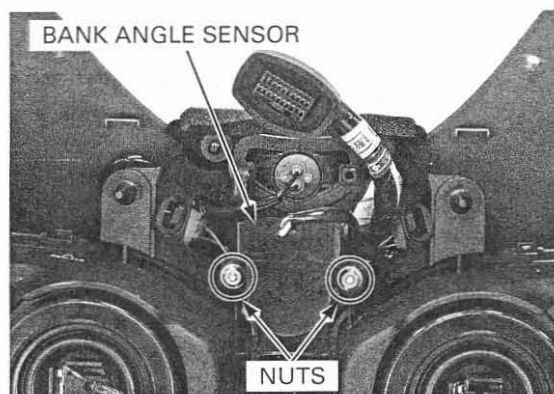
Connect the headlight bulb connector.



### REMOVAL/INSTALLATION

Remove the upper cowl (page 3-12).

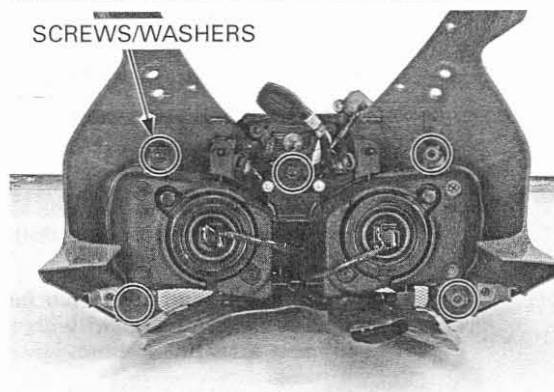
Remove the nuts and bank angle sensor.



Remove the five screws/washers and headlight unit.

*Route the wire harness properly (page 1-24).*

Install the headlight unit in the reverse order of removal.

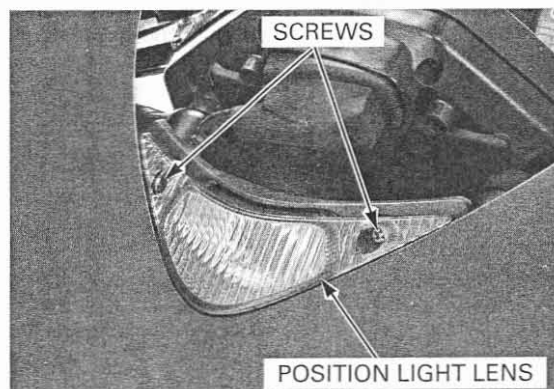


## POSITION LIGHT

### BULB REPLACEMENT

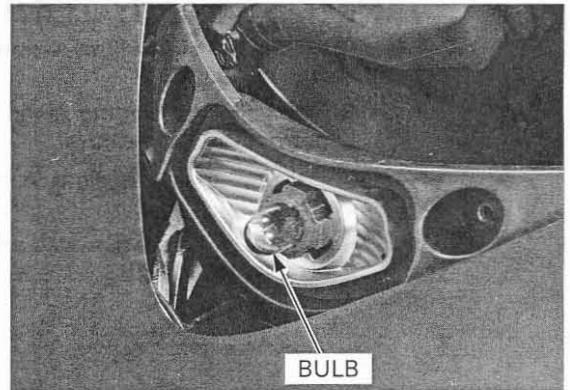
Remove the windscreen (page 3-12).

Remove the screws and position light lens.



Remove the bulb from the socket, and replace it with new one.

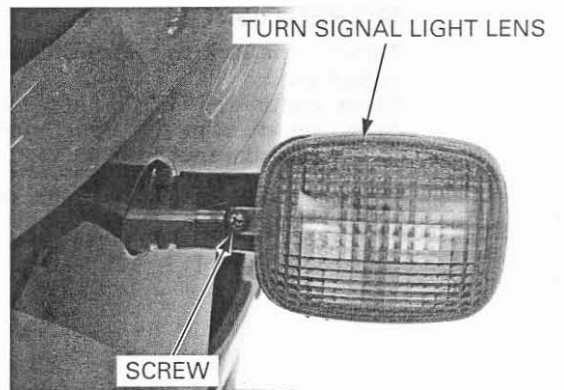
Install the removed parts in the reverse order of removal.



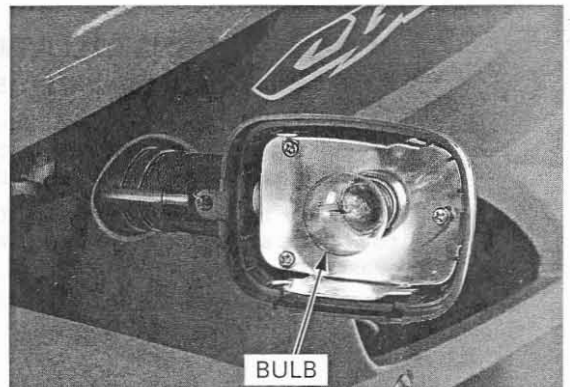
## TURN SIGNAL

### BULB REPLACEMENT

Remove the screw, turn signal light lens and seal rubber.

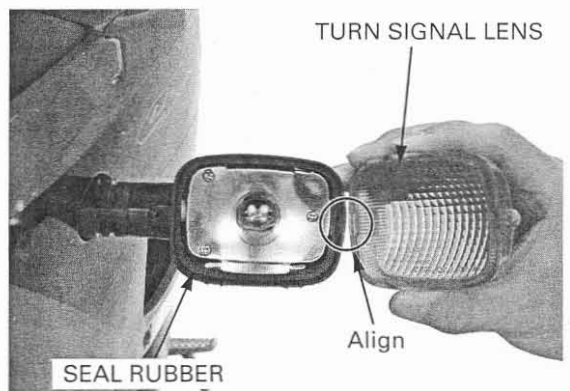


While pushing in, turn the bulb counterclockwise to remove it and replace with new one.



Install the seal rubber onto the turn signal light case.

Install the lens by aligning the lens tab with the turn signal light case groove, and tighten the screw securely.



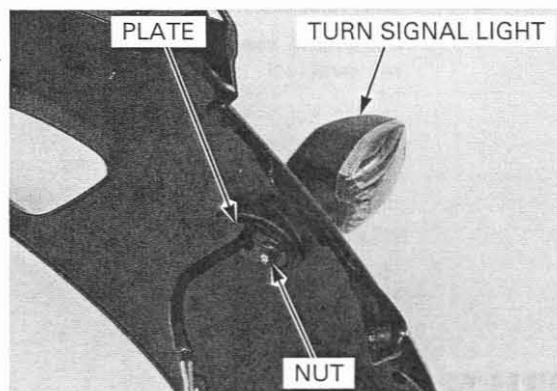
### REMOVAL/INSTALLATION

For front turn signal light removal, remove the middle cowls (page 3-7).

Remove the nut, setting plate and the turn signal light from the middle cowl.

Install the turn signal light in the reverse order of removal.

For rear turn signal removal, see rear fender A disassembly (page 3-20).



## TAIL/BRAKE LIGHT

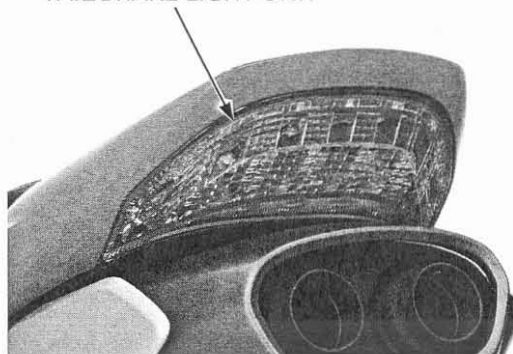
### INSPECTION

Turn the ignition switch ON, and check the taillight operation.

Check that all LED in the tail/brake light unit light illuminate with the front brake lever and/or rear brake pedal applied.

If any LED does not turn on, replace the tail/brake light assembly.

TAIL/BRAKE LIGHT UNIT



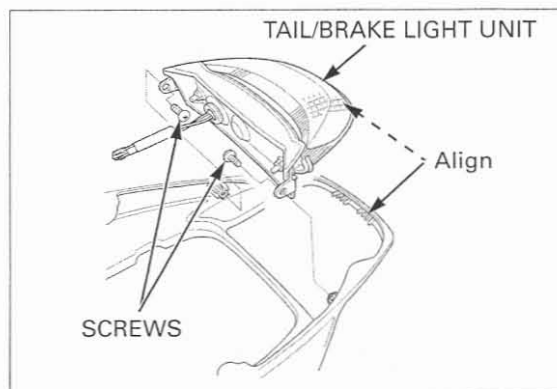
### REMOVAL/INSTALLATION

Remove the rear seat cowl (page 3-5).

Remove the tail/brake light unit mounting screws. Pull out the tabs from the grooves of rear seat cowl, then remove the tail/brake light unit.

Install the tail/brake light unit onto the rear seat cowl while aligning the tabs with groove of the rear seat cowl.

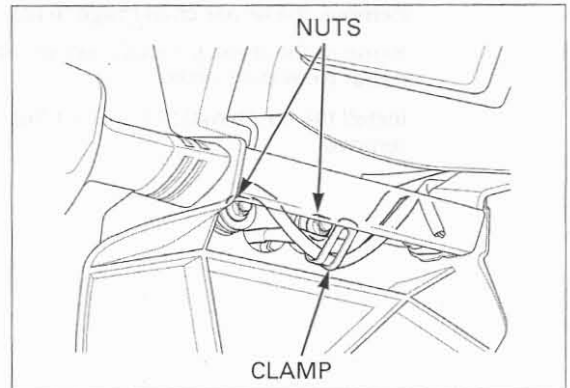
Installation is in the reverse order of removal.



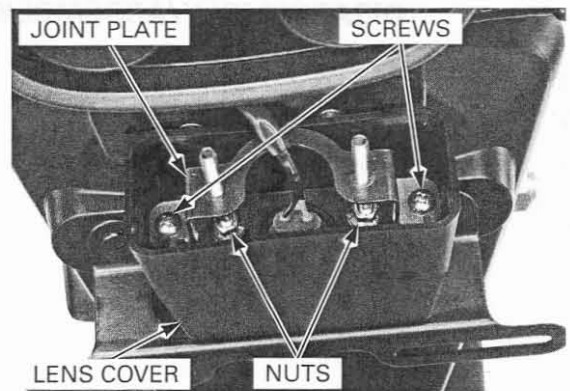
## LICENSE LIGHT

### BULB REPLACEMENT

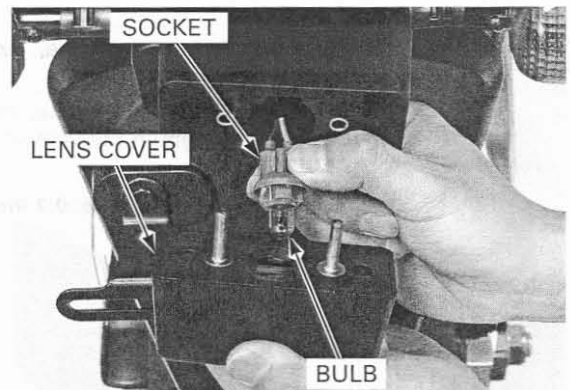
Remove the two nuts and wire clamp.



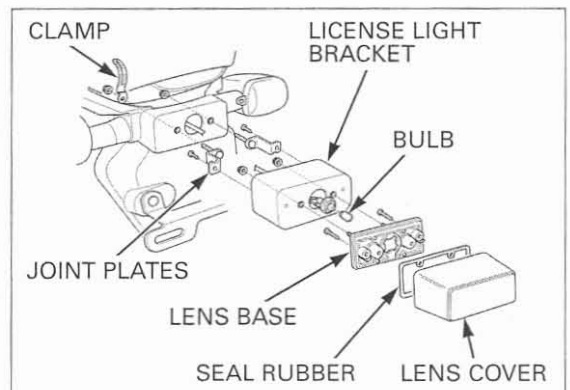
Remove the two screws and joint plate.  
Remove the two nuts and lens cover.



Turn the license light bulb socket counterclockwise and remove it from the lens cover.  
Remove the bulb from the socket, replace it with new one.



Install the license light bulb socket and lens cover in the reverse order of removal.





## COMBINATION METER

### REMOVAL/INSTALLATION

Remove the upper cowl (page 3-12).

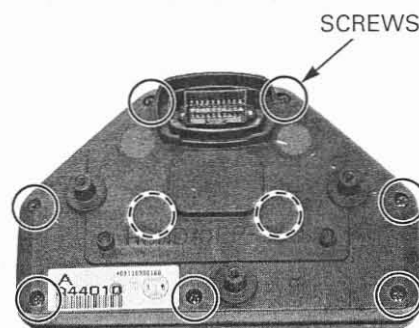
Remove the three screws/washers and combination meter from the bracket.

Install the combination meter in the reverse order of removal.



### DISASSEMBLY/ASSEMBLY

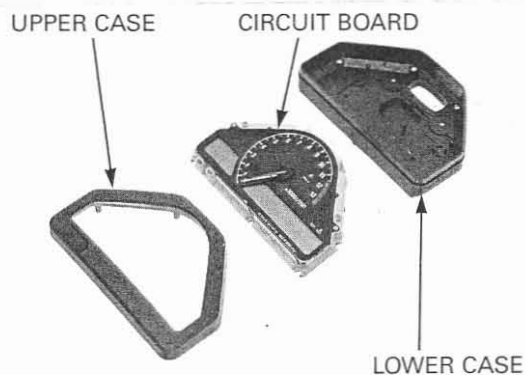
Remove the screws.



Remove the meter upper case, circuit board and lower case.

Assemble the meter upper case, circuit board and lower case, then tighten the screws to the specified torque.

**TORQUE:** 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)



**POWER/GROUND LINES INSPECTION**

Check the following at the wire harness side connector terminals of the combination meter.

**Power input line**

Measure the voltage between the Brown/white wire terminal (+) and body ground (-).

There should be battery voltage with the ignition switch ON.

If there is no voltage, check the sub-fuse (10 A) and an open circuit in Brown/white wire.

**Back-up voltage line**

Measure the voltage between the Red/green wire terminal (+) and body ground (-).

There should be battery voltage at all times.

If there is no voltage, check the sub-fuse (10 A) and an open circuit in Red/green wire.

**Ground line**

Measure the continuity between the Green wire terminal (+) and body ground (-).

There should be continuity at all times.

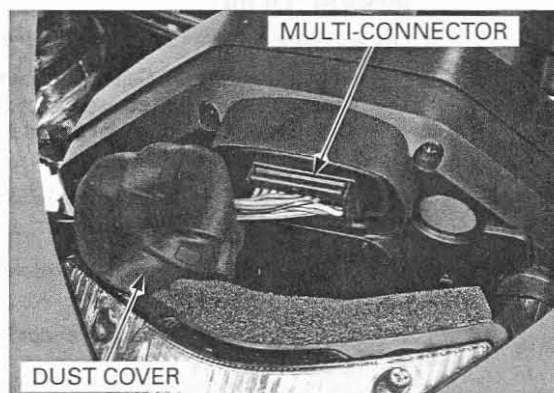
If there is no continuity, check for open circuit in Green wire.

**Sensor ground line**

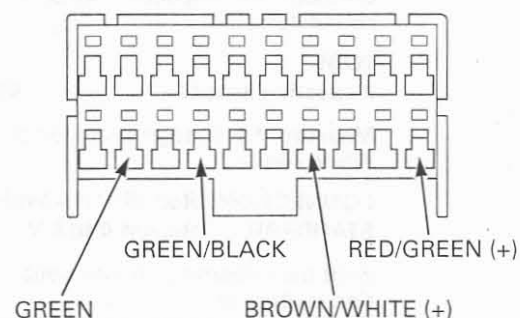
Measure the continuity between the Green/black wire terminal (+) and body ground (-).

There should be continuity at all times.

If there is no continuity, check for open circuit in Green/black wire.



VIEWED FROM TERMINAL SIDE:

**SPEEDOMETER/VEHICLE SPEED SENSOR****SYSTEM INSPECTION**

Check that the tachometer and coolant temperature meter function properly.

- If they do not function, perform the power and ground line inspection of the combination meter (page 20-11).

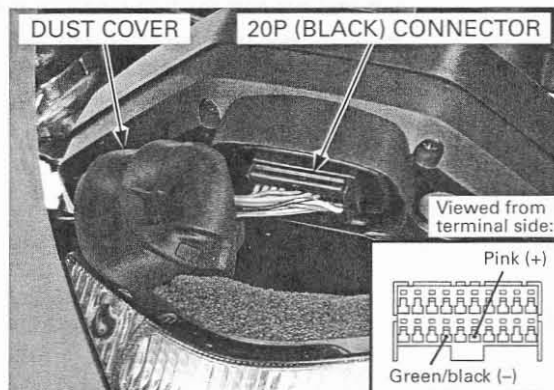
- If they function, remove the dust cover and disconnect the combination meter 20P (Black) connector. Shift the transmission into neutral and turn the ignition switch ON.

Measure the voltage between the Pink (+) and Green/black (-) wire terminals of the wire harness side connector.

Slowly turn the rear wheel by hand.

There should be 0 to 5 V pulse voltage.

- If pulse voltage appears, replace the combination meter printed circuit board (page 20-10).
- If pulse voltage does not appear, check for open or short circuit in the Pink wire. If the Pink wire is OK, check the vehicle speed sensor (page 20-12).



### VEHICLE SPEED SENSOR (VSS) INSPECTION

Lift and support the fuel tank (page 4-5).

Disconnect the VSS 3P (Natural) connector.  
Measure the voltage between the Brown/white (+) and Green/black (-) wire terminals at the harness side 3P connector.

**CONNECTION:** Brown/white (+) – Green/black (-)  
**STANDARD:** Battery voltage

There should be battery voltage with the ignition switch ON.

If there is no voltage, check for open circuit in related wires.

If there is voltage, check the VSS as follows.

Support the motorcycle securely using a safety stand or hoist, and raise the rear wheel off the ground.

Connect the inspection adaptor to the sensor 3P connectors.

**TOOL:**  
**Inspection adaptor** 07GMJ-ML80100

Measure the voltage between the Red clip (+) and White clip (-).

**CONNECTION:** Red clip (+) – White clip (-)  
**STANDARD:** Repeat 0 to 5 V

Shift the transmission into neutral and turn the ignition switch ON.

Slowly turn the rear wheel by hand.

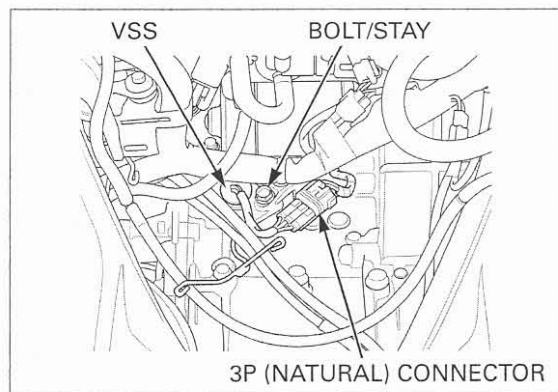
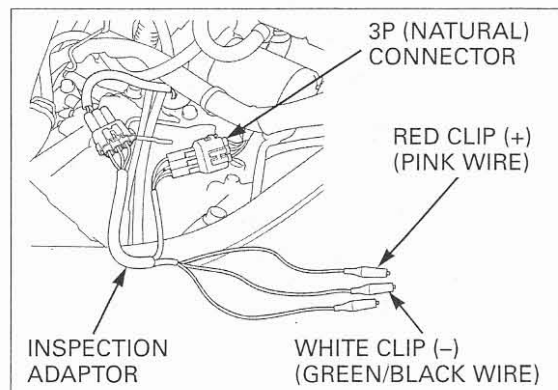
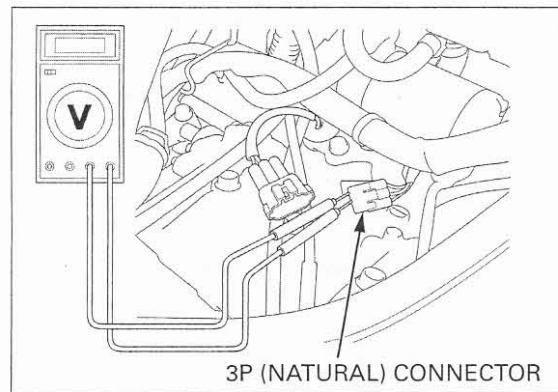
There should be 0 to 5 V pulse voltage.

If the pulse voltage does not appear, replace the VSS (page 20-12).

### REMOVAL/INSTALLATION

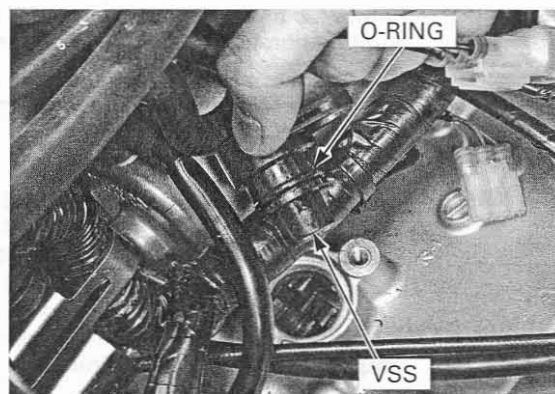
Lift and support the fuel tank (page 4-5).

Remove the VSS 3P (Natural) connector from the stay and disconnect the connector.  
Remove the bolt, stay and VSS.



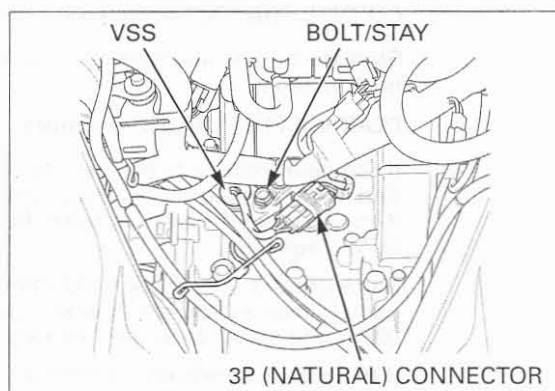
Check the condition of the O-ring, replace it if necessary.

Install the VSS into the upper crankcase.



Install the stay and tighten the bolt securely.

Route the EGCV servo motor cable and fuel tank breather tube properly (page 1-24). Connect the VSS 3P (Natural) connector and install it to the stay.



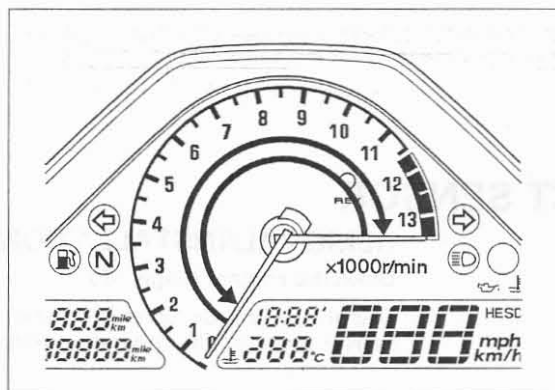
## TACHOMETER

### SYSTEM INSPECTION

- Check for loose or poor contact terminals at the combination meter 20P (Black) connector and front sub-harness 22P connector.

Turn the ignition switch ON, check that the tachometer needle moves to full scale and then returns to zero.

If the needle does not show initial function, check the combination meter power input line (page 20-11).



## LIGHTS/METERS/SWITCHES

Remove the windscreen (page 3-12) and expose the combination meter 20P (Black) connector.

Connect the peak voltage tester or adaptor probes to the tachometer Yellow/green terminal and body ground.

### TOOLS:

IgnitionMate peak voltage tester MTP-0286

Peak voltage adaptor (U.S.A. only) or 07HGJ-0020100 (not available in U.S.A.)

with commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)

**CONNECTION:** Yellow/green (+) – body ground (–)

Start the engine and measure the tachometer input peak voltage.

**PEAK VOLTAGE:** 10.5 V minimum

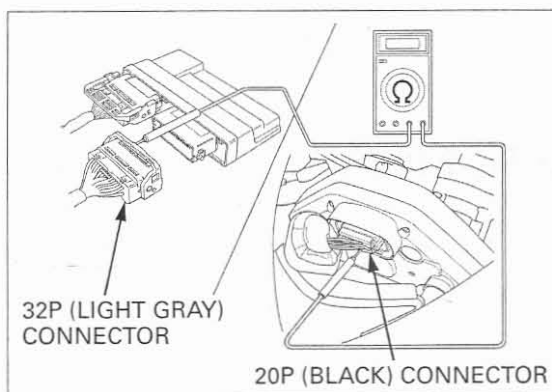
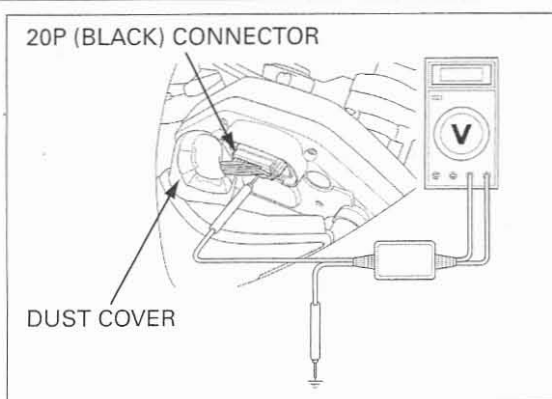
If the peak voltage is normal, replace the combination meter printed circuit board (page 20-10).

If the measured value is below 10.5 V, replace the ECM (page 6-69).

If the value is 0 V, check for continuity between the combination meter 20P (Black) connector and ECM 32P (Light gray) connector Yellow/green terminals.

If there is no continuity, check the wire harness and front sub-harness for an open circuit.

If there is continuity, replace the ECM (page 6-69).

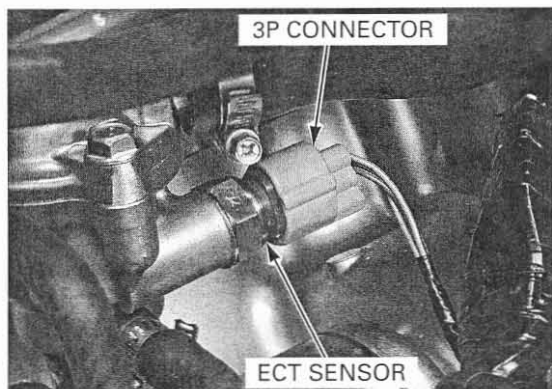


## ECT SENSOR

### REMOVAL/INSTALLATION

Drain the coolant (page 7-6).

Disconnect the 3P connector and remove the ECT sensor from the thermostat housing.



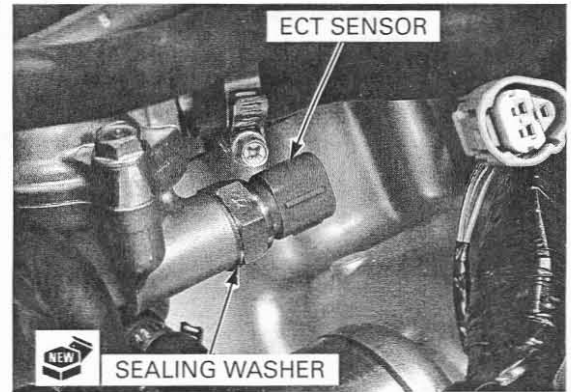
Always replace the sealing washer with a new one.

Install the ECT sensor with new sealing washer and tighten it to the specified torque.

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

Connect the ECT sensor 3P connector.

Fill the system with recommended coolant and bleed the air (page 7-6).



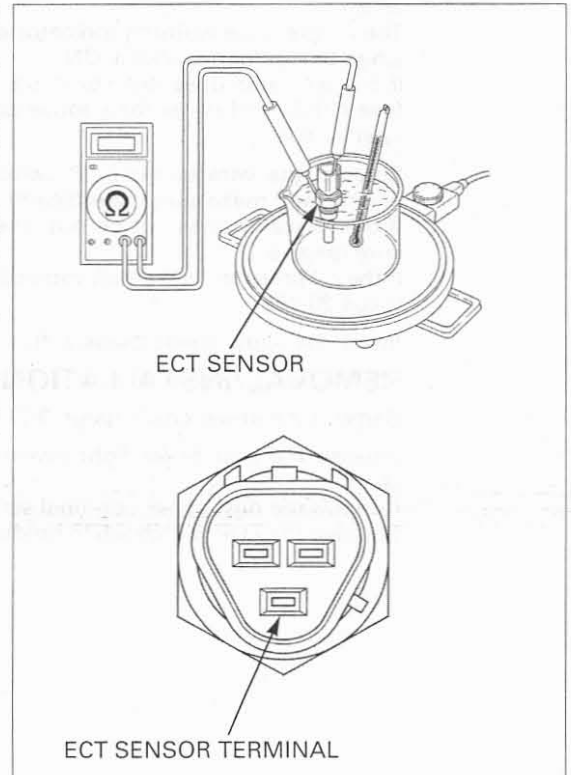
## INSPECTION

Suspend the ECT sensor in a pan of coolant (50 – 50 mixture) on an electric heating element and measure the resistance through the sensor as the coolant heats up.

- Soak the ECT sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT sensor touch the pan.

Replace the sensor if it is out of specification by more than 10% at any temperature listed.

|             |              |                |
|-------------|--------------|----------------|
| Temperature | 80°C (68°F)  | 120°C (248°F)  |
| Resistance  | 2.1 – 2.6 kΩ | 0.65 – 0.73 kΩ |

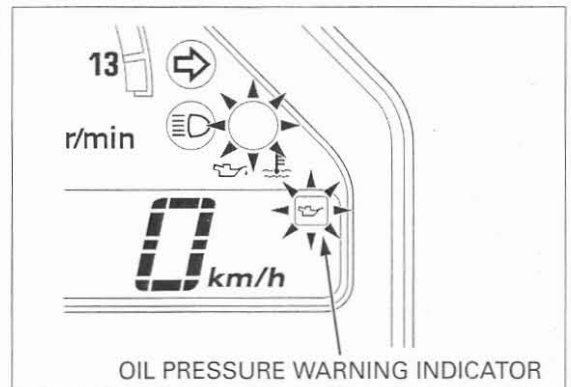


## EOP (ENGINE OIL PRESSURE) SWITCH

### INSPECTION

If the oil pressure warning indicator stays on while the engine is running, check the engine oil level before this inspection (page 4-21).

Make sure that the oil pressure warning indicator comes on with the ignition switch ON.





## LIGHTS/METERS/SWITCHES

If the indicator does not come on, inspect as follows:

Remove the under cowls (page 3-7).

Remove the dust cover.

Remove the terminal screw and EOP switch wire.

Short the EOP switch wire to ground using a jumper wire.

The oil pressure warning indicator should come on when the ignition switch is ON.

If the indicator does not come on, check the sub-fuse (10 A) and wires for a loose connection or an open circuit.

Connect the wire to the EOP switch and start the engine, and make sure the indicator goes out.

If the indicator does not go out, check the oil pressure (page 5-5).

If the oil pressure is normal, replace the EOP switch (page 20-16).

Install the under cowls (page 3-7).

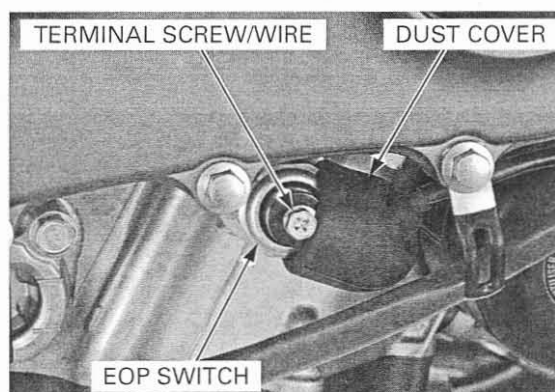
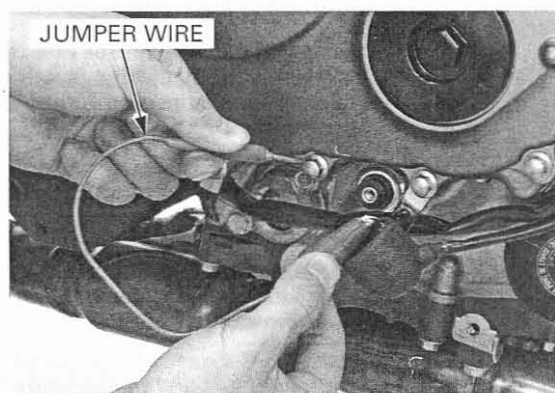
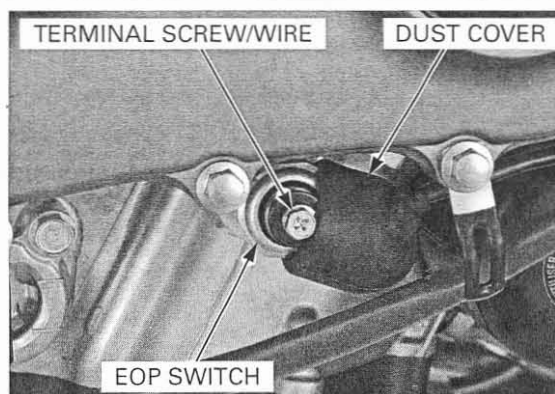
### REMOVAL/INSTALLATION

Remove the under cowls (page 3-7).

Release the rear brake light switch wire from the clamp.

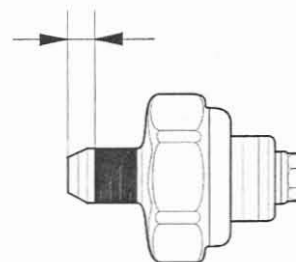
Remove the dust cover, terminal screw and wire.

Remove the EOP switch while holding switch base.



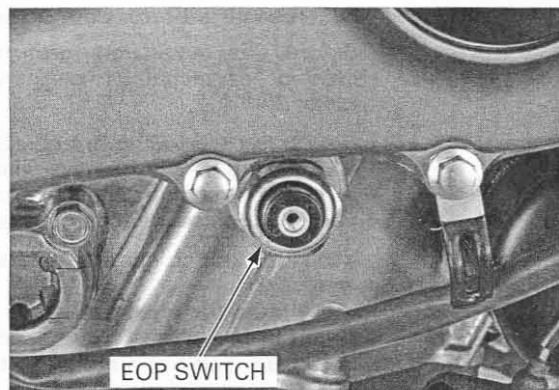
Apply sealant to the EOP switch threads as shown.

Do not apply sealant to the thread head 3 – 4 mm (0.1 – 0.2 in).



Install the EOP switch onto the switch base, tighten the EOP switch to the specified torque while holding the switch base.

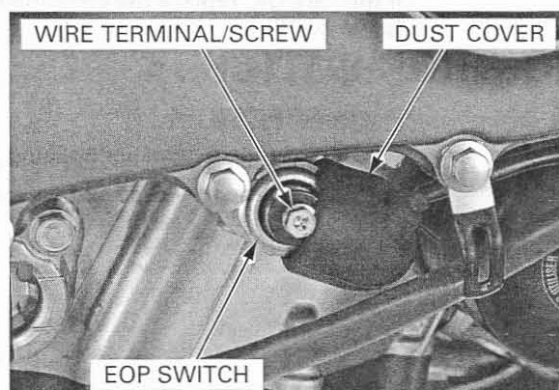
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



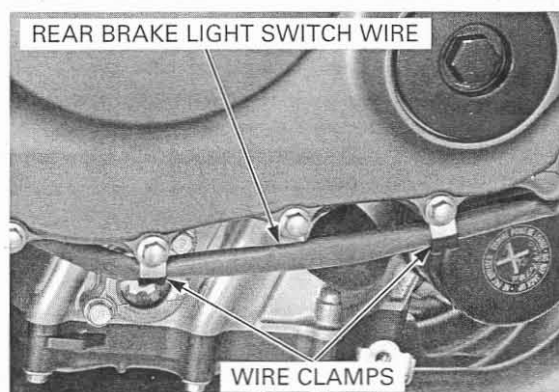
Connect the EOP switch wire to the switch and tighten the screw to the specified torque.

**TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)**

Install the dust cover.



Clamp the rear brake light switch wire properly.  
Install the under cowls (page 3-9).



## FUEL RESERVE SENSOR

### FUEL RESERVE SENSOR INSPECTION

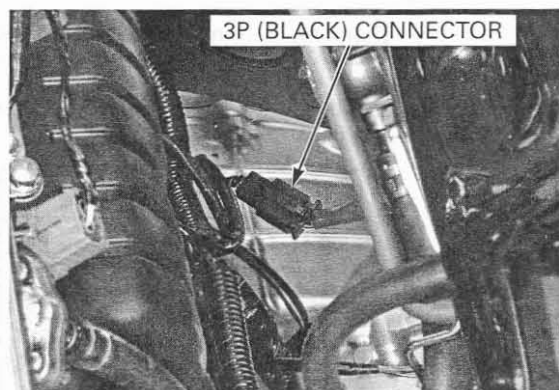
**Fuel reserve indicator does not go off**

Lift and support the fuel tank (page 4-5).

Disconnect the fuel pump unit 3P (Black) connector. Turn the ignition switch ON and check the fuel reserve indicator.

If the indicator goes off, replace the fuel pump unit (page 6-34).

If the indicator is still on, check for short circuit in Brown/black wire between the fuel pump unit connector and combination meter.



## LIGHTS/METERS/SWITCHES

### Fuel reserve indicator does not come on

Before this inspection, perform the power and ground line inspection of the combination meter (page 20-11).

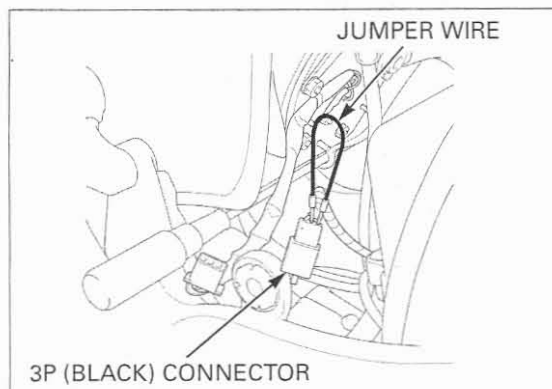
Disconnect the fuel pump unit 3P (Black) connector and short the wire harness side connector Brown/black and Green terminals with a jumper wire.

Turn the ignition switch ON and check the indicator.

If the indicator comes on, replace the fuel pump unit (page 6-34).

If the indicator does not come on, check for open circuit in Brown/black wire between the fuel pump unit connector and combination meter.

If they are OK, replace the combination meter (page 20-10).

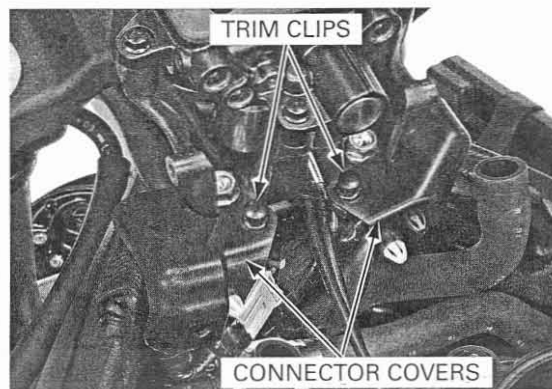


## IGNITION SWITCH

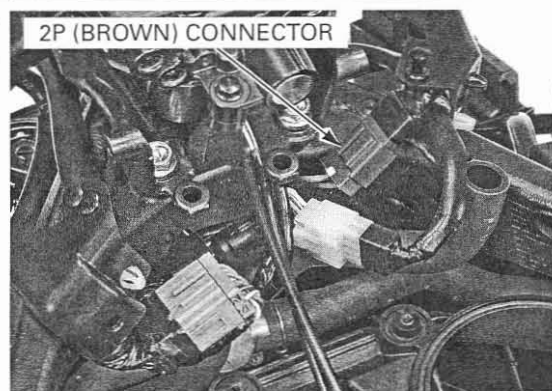
### INSPECTION

Remove the air cleaner housing (page 6-40).

Remove the trim clips and connector covers.



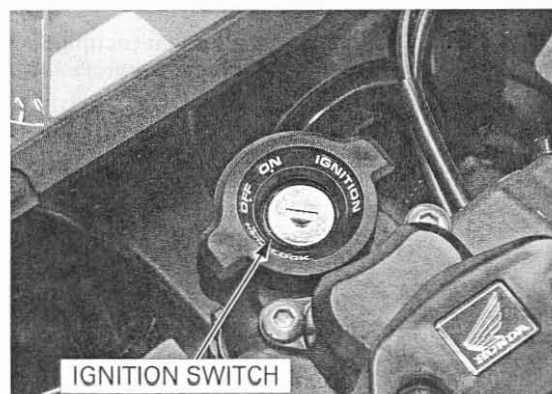
Disconnect the ignition switch wire 2P (Brown) connector.



Check for continuity between the wire terminals of the ignition switch connector in each switch position.

Continuity should exist between the color coded wires as follow:

|       | IG   | BAT1 | KEY                 |
|-------|------|------|---------------------|
| ON    | ○—○  |      | KEY ON              |
| OFF   |      |      | KEY OFF             |
| LOCK  |      |      | KEY OFF<br>LOCK PIN |
| COLOR | R/BI | R    | —                   |



**REMOVAL/INSTALLATION**

Remove the air cleaner housing (page 6-40) and connector covers (page 20-18).

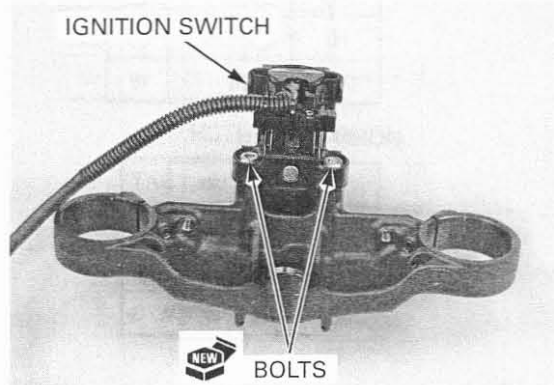
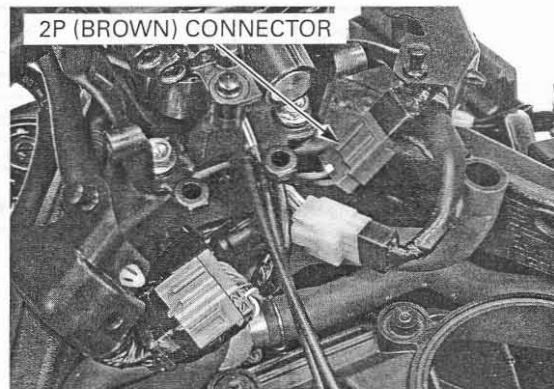
Disconnect the ignition switch wire 2P (Brown) connector.

Remove the top bridge (page 14-11).

Remove the mounting bolts and ignition switch. Install the ignition switch to the top bridge. Tighten the new ignition switch mounting bolts to the specified torque.

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

Install the removed parts in the reverse order of removal.

**HANDLEBAR SWITCHES**

Remove the air cleaner housing (page 6-40).

Disconnect the handlebar switch connectors.

- Right handlebar switch: 8P (Natural) connector
- Left handlebar switch: 12P (Gray) connector

Check for continuity between the wire terminals of the handlebar switch connector.

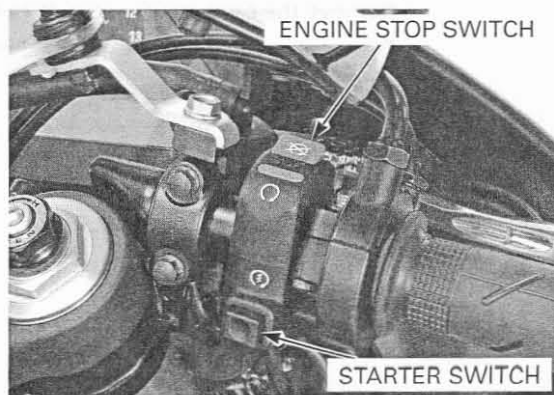
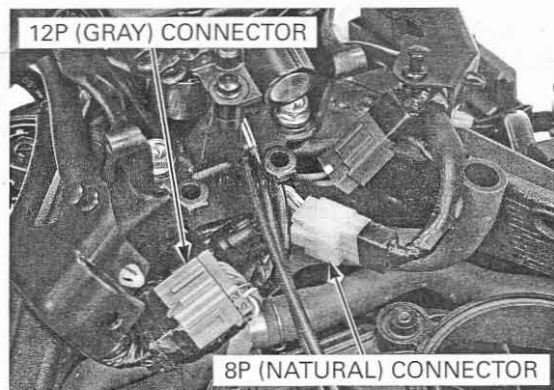
Continuity should exist between the color coded wire terminals as follows:

**ENGINE STOP SWITCH:**

|       | IG  | BAT  |
|-------|-----|------|
| OFF   |     |      |
| RUN   | ○—○ |      |
| COLOR | BI  | W/BI |

**STARTER SWITCH:**

|       | BAT  | ST  | H/L  |
|-------|------|-----|------|
| FREE  | ○—○  |     |      |
| PUSH  | ○—○  |     |      |
| COLOR | BI/R | Y/R | Bu/W |



## LIGHTS/METERS/SWITCHES

### TURN SIGNAL SWITCH:

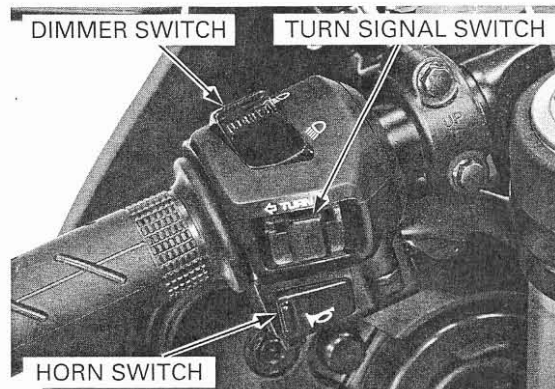
|       | W  | R  | L | P    | PR   | PL  |
|-------|----|----|---|------|------|-----|
| R     |    |    |   |      |      |     |
| N     |    |    |   |      |      |     |
| L     |    |    |   |      |      |     |
| COLOR | Gr | Lb | O | Br/W | Lb/W | O/W |

### DIMMER SWITCH:

|       | HL   | Lo | Hi |
|-------|------|----|----|
| Lo    |      |    |    |
| (N)   |      |    |    |
| Hi    |      |    |    |
| COLOR | Bu/W |    | W  |

### HORN SWITCH:

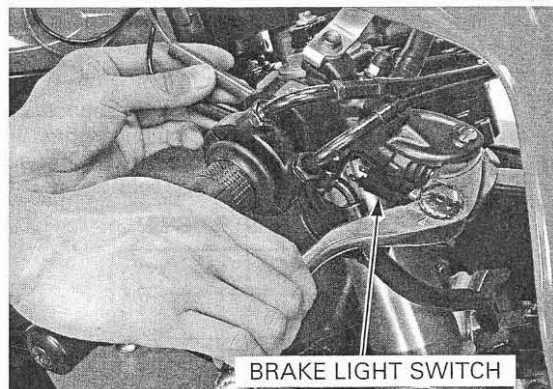
|       | Ho | BAT |
|-------|----|-----|
| FREE  |    |     |
| PUSH  |    |     |
| COLOR | B  | W/G |



## BRAKE LIGHT SWITCH

### FRONT

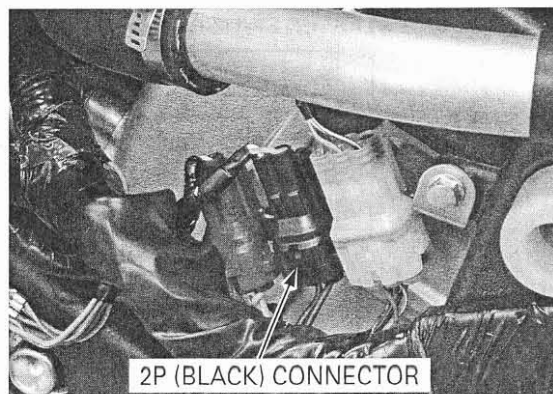
Disconnect the front brake light switch connectors and check for continuity between the terminals. There should be continuity with the brake lever applied, and there should be no continuity when the brake lever is released.



### REAR

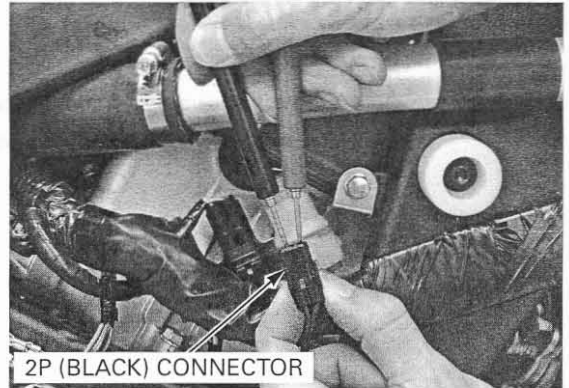
Remove the right middle cowl (page 3-7).

Disconnect the rear brake light switch 2P (Black) connector.



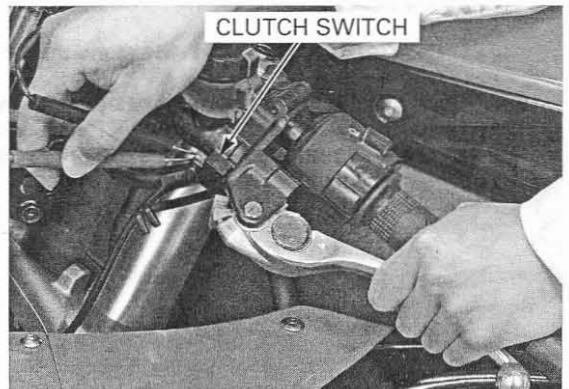


Check for continuity between the terminals. There should be continuity with the brake pedal applied, and there should be no continuity when the brake pedal is released.



## CLUTCH SWITCH

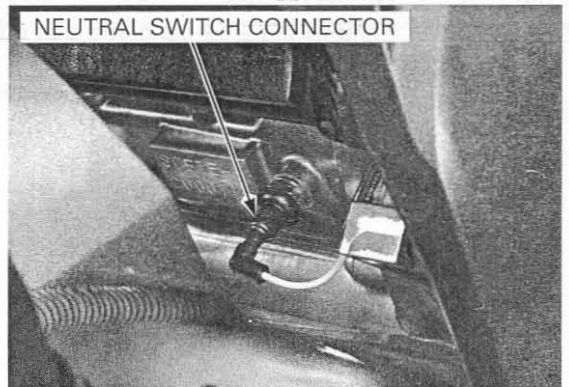
Disconnect the clutch switch connectors. There should be continuity with the clutch lever applied, and there should be no continuity when the clutch lever is released.



## NEUTRAL SWITCH

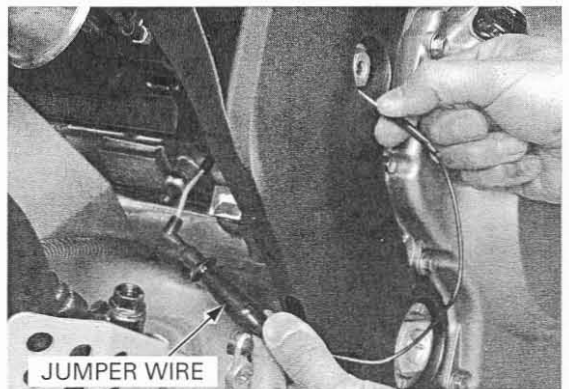
Remove the exhaust pipe (page 3-30).

Disconnect the neutral switch connector from the switch.



Shift the transmission into neutral and check for continuity between the Light green wire and body ground.

There should be continuity with the transmission in neutral, and no continuity when the transmission is in gear.





## SIDE STAND SWITCH

### INSPECTION

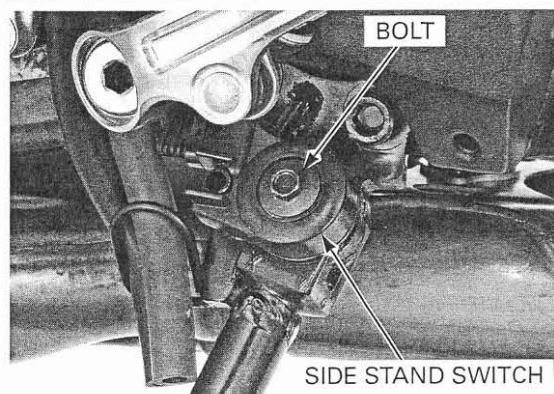
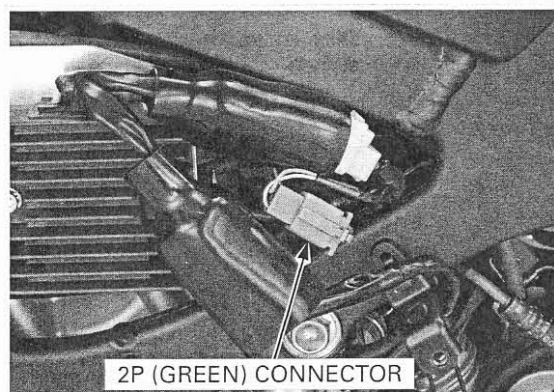
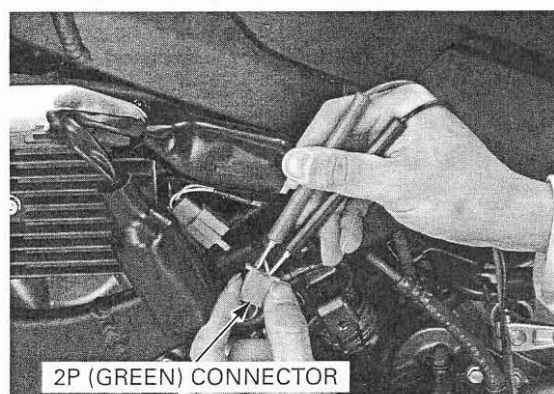
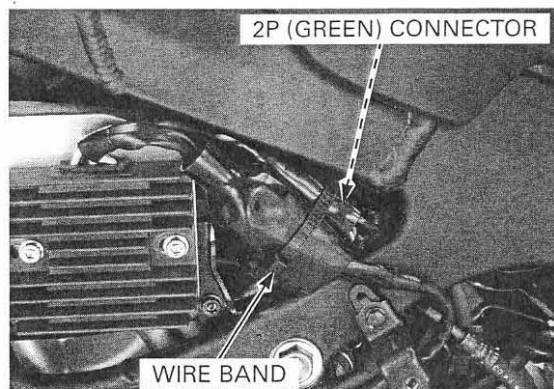
Remove the left under and middle cowls (page 3-7).  
Remove the wire band and pull out the 2P (Green) connector from the connector boot.

Disconnect the side stand switch 2P (Green) connector.  
Check for continuity between the wire terminals of the side stand switch 2P (Green) connector. Continuity should exist only when the side stand is up.

### REMOVAL

Remove the wire band and pull out the 2P (Green) connector from the connector boot (page 20-22).  
Disconnect the side stand switch 2P (Green) connector.

Remove the bolt and side stand switch.



**INSTALLATION**

Route the side stand switch wire properly (page 1-24).

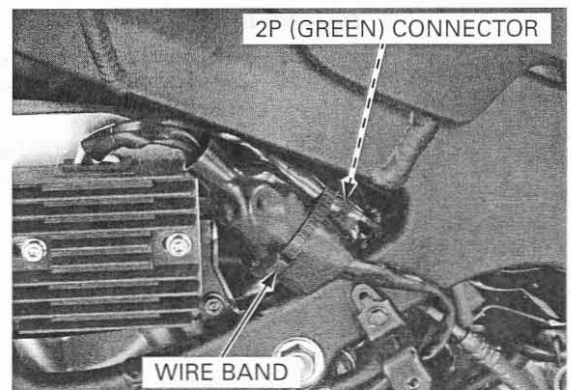
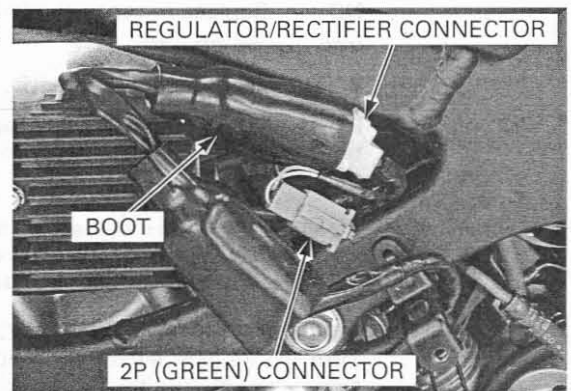
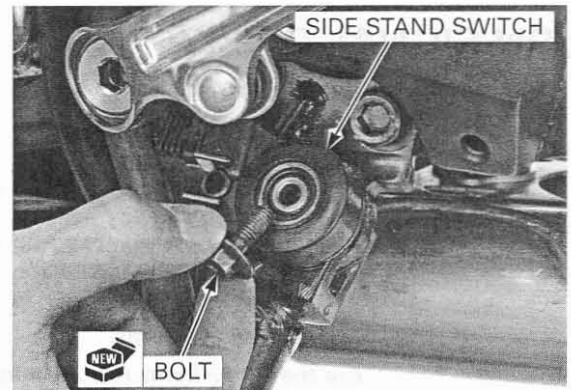
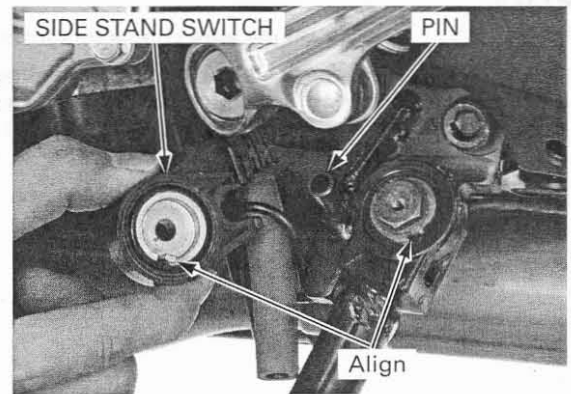
Install the side stand switch by aligning the switch pin with the side stand hole and switch groove with the return spring holding pin.

Secure the side stand switch with a new bolt.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**

Connect the side stand switch 2P (Green) connector. Install the 2P (Green) connector into the connector boot with regulator/rectifier 2P connector.

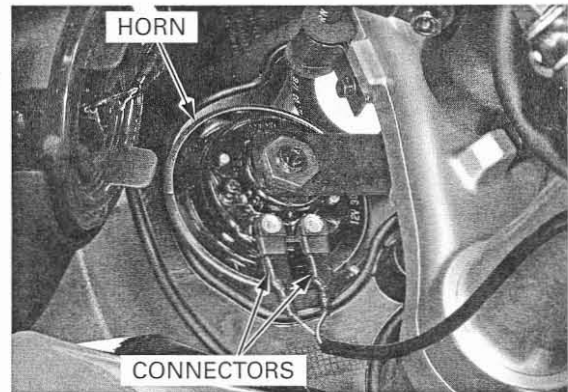
Bundle the connector boots in the wire band. Install the middle and under cowls (page 3-9).



## HORN

Disconnect the wire connectors from the horn.

Connect a 12 V battery to the horn terminal directly. The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



## TURN SIGNAL RELAY

### INSPECTION

#### 1. Related Circuit Inspection

Check the following

- Burned bulb or non-specified wattage
- Blown fuse
- Ignition switch (page 20-18) and turn signal switch function (page 20-20)
- Loose connector

Check the above items.

*Are the above items in good condition?*

**NO** - Replace or repair the failed part(s)

**YES** - GO TO STEP 2.

#### 2. Turn Signal Circuit Inspection

Remove the upper cowl (page 3-12), then remove the head light unit from the upper cowl (page 20-6).

Disconnect the turn signal 2P (Black) connector and short the Gray and White/green terminals of the wire harness side connector with a jumper wire.

Connect the front sub-harness 22P connector.

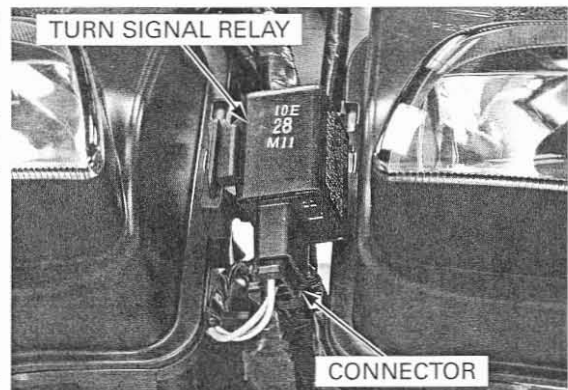
Turn the ignition switch ON and check the turn signal light by turning the turn signal switch on.

*Does the light come on?*

**YES** - 

- Faulty turn signal relay
- Loose or poor contact of the connector terminals

**NO** - Open circuit in related wires

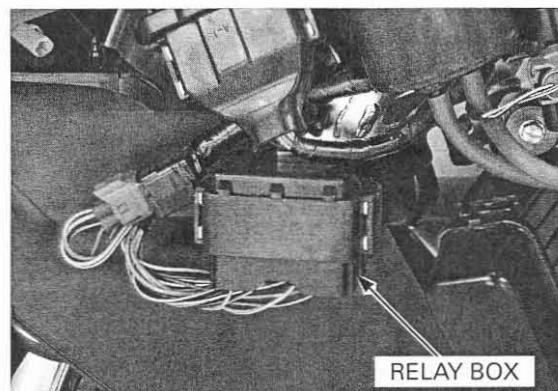


## HEADLIGHT RELAY

### INSPECTION

Remove the left middle cowl (page 3-7).

Remove the relay box from the bracket.



Remove the relay box (Blue) connector from the relay box, and then remove the headlight relay.

HEADLIGHT RELAY

RELAY BOX (BLUE) CONNECTOR

Connect an ohmmeter to the following headlight relay terminals.

**CONNECTION: Black/red – Blue**

Connect a 12 V battery to the following headlight relay terminals.

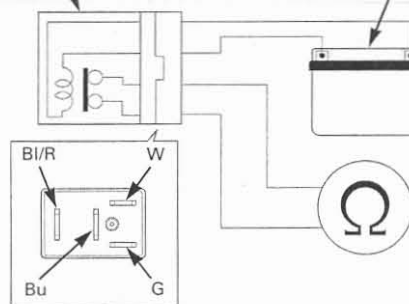
**CONNECTION: White – Green**

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the headlight relay.

HEAD LIGHT RELAY

BATTERY



---

# MEMO

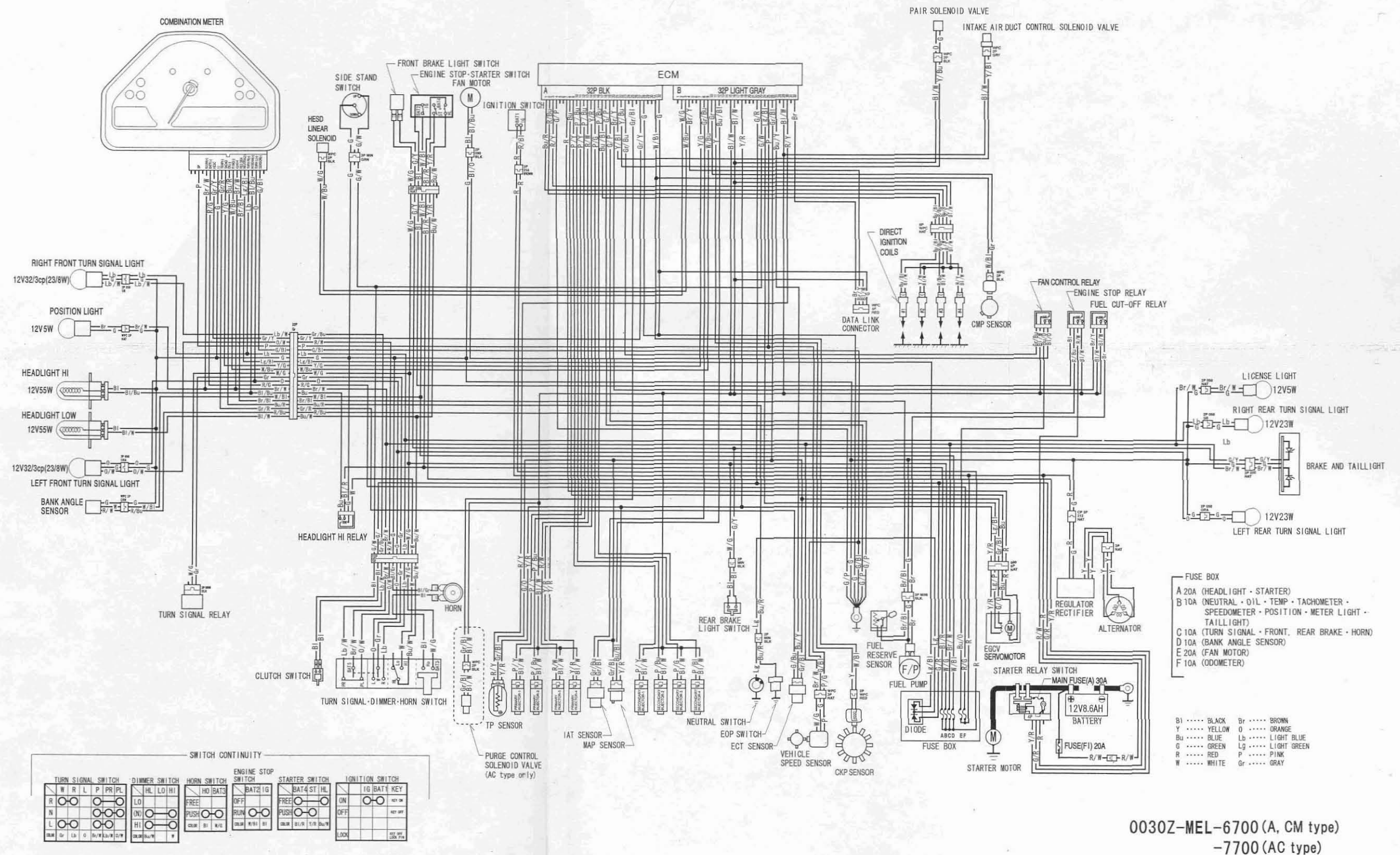
# 21. WIRING DIAGRAM

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A, AC, CM type ..... 21-3



A, AC, CM type:



0030Z-MEL-6700 (A, CM type)  
-7700 (AC type)



## 22. TROUBLESHOOTING

---

|  |      |  |      |
|--|------|--|------|
| ENGINE DOES NOT START OR IS HARD<br>TO START ..... | 22-2 | POOR PERFORMANCE AT LOW AND<br>IDLE SPEED..... | 22-5 |
| ENGINE LACKS POWER .....                           | 22-3 | POOR PERFORMANCE AT HIGH SPEED .....           | 22-6 |
|  |      | POOR HANDLING.....                             | 22-6 |

# ENGINE DOES NOT START OR IS HARD TO START

### 1. Spark Plug Inspection

Remove and inspect spark plug.

*Are the spark plugs in good condition?*

- NO** – • Incorrect spark plug heat range  
• Incorrect spark plug gap  
• Dirty air cleaner

**YES** – GO TO STEP 2.

### 2. Spark Test

Perform spark test.

*Are there good sparks?*

- NO** – • Loose or disconnected ignition system wire  
• Faulty ignition coil  
• Broken or shorted direct ignition coil connector wire  
• Faulty ignition pulse generator  
• Faulty engine stop switch  
• Faulty engine control module (ECM)

**YES** – GO TO STEP 3.

### 3. Fuel Pump Inspection

Check for operation of the fuel pump and inspect the fuel flow.

*Is the fuel pump unit normal?*

- NO** – Faulty fuel pump unit (page 6-33).

**YES** – GO TO STEP 4.

### 4. Programmed Fuel Injection System Inspection

Check the fuel injection system.

*Is the fuel injection system normal?*

- NO** – Faulty fuel injection system (page 6-54, 6-43).

**YES** – GO TO STEP 5.

### 5. Cylinder compression Inspection

Test the cylinder compression.

*Is the compression specified?*

- NO** – • Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Seized valves  
• Improper valve timing

**YES** – GO TO STEP 6.

### 6. Engine Start Condition

Start by following normal procedure.

*Did the engine start but stops?*

- YES** – • Leaking intake manifold  
• Leaking intake pipes  
• Faulty starter valves  
• Improper ignition timing (Faulty ECM or ignition pulse generator)  
• Contaminated fuel

## ENGINE LACKS POWER

### 1. Drive Train Inspection

Raise wheel off the ground and spin by hand.

*Did the wheel spin freely?*

- NO – • Brake dragging  
• Worn or damaged wheel bearings

YES – GO TO STEP 2.

### 2. Tire Pressure Inspection

Check the tire pressure.

*Is the tire pressure correct?*

- NO – • Faulty tire valve  
• Punctured tire

YES – GO TO STEP 3.

### 3. Clutch Inspection

Accelerate rapidly, shift from first to second.

*Did the engine speed change accordingly when clutch is released?*

- NO – • Clutch slipping  
• Worn clutch discs/plates  
• Warped clutch discs/plates  
• Weak clutch spring  
• Additive in engine oil

YES – GO TO STEP 4.

### 4. Engine Performance Inspection

Accelerate lightly.

*Did the Engine speed increase?*

- NO – • Dirty air cleaner  
• Restricted fuel flow  
• Clogged muffler

YES – GO TO STEP 5.

### 5. Spark Plug Inspection

Remove and inspect spark plugs.

*Are the spark plugs in good condition?*

- NO – • Plugs not serviced frequently enough  
• Incorrect spark plug heat range  
• Incorrect spark plug gap

YES – GO TO STEP 6.

### 6. Engine Oil Inspection

Check the oil level and condition.

*Is the engine oil in good condition?*

- NO – • Oil level too high  
• Oil level too low  
• Contaminated oil

YES – GO TO STEP 7.

### 7. Ignition Timing Inspection

Check the ignition timing.

*Is the ignition timing as specified?*

- NO – • Faulty engine control module (ECM)  
• Faulty ignition pulse generator  
• Improper valve timing

YES – GO TO STEP 8.

## TROUBLESHOOTING

---

### 8. Cylinder compression Inspection

Test the cylinder compression.

*Is the compression as specified?*

- NO** – • Valve clearance too small  
• Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Improper valve timing

**YES** – GO TO STEP 9.

### 9. Fuel Pump Inspection

Inspect the fuel flow.

*Is the fuel pump unit normal?*

**NO** – Faulty fuel pump unit (page 6-33).

**YES** – GO TO STEP 10.

### 10. Programmed Fuel Injection System Inspection

Check the fuel injection system.

*Is the fuel injection system normal?*

**NO** – Faulty fuel injection system (page 6-54, 6-43).

**YES** – GO TO STEP 11.

### 11. Lubrication Inspection

Remove cylinder head cover and inspect lubrication.

*Is the valve train lubricated properly?*

- NO** – • Faulty oil pump  
• Faulty pressure regulator valve  
• Clogged oil strainer  
• Clogged oil passage

**YES** – GO TO STEP 12.

### 12. Over Heating Inspection

Check for engine over heating.

*Is the engine over heating?*

- YES** – • Coolant level too low  
• Fan motor not working  
• Thermostat stuck closed  
• Excessive carbon build-up in combustion chamber  
• Use of poor quality fuel  
• Wrong type of fuel  
• Clutch slipping

**NO** – GO TO STEP 13.

### 13. Engine Knocking Inspection

Accelerate or run at high speed.

*Is the engine knocking?*

- YES** – • Worn piston and cylinder  
• Wrong type of fuel  
• Excessive carbon build-up in combustion chamber  
• Ignition timing too advance (Faulty ECM)  
• Faulty ignition pulse generator  
• Faulty cam pulse generator

**NO** – • Engine does not knock



## POOR PERFORMANCE AT LOW AND IDLE SPEED

### 1. Spark Plug Inspection

Remove and inspect spark plugs.

*Are the spark plugs in good condition?*

- NO** – • Plugs not serviced frequently enough  
• Incorrect spark plug heat range  
• Incorrect spark plug gap

**YES** – GO TO STEP 2.

### 2. Ignition Timing Inspection

Check the ignition timing.

*Is the ignition timing as specified?*

- NO** – • Faulty engine control module (ECM)  
• Faulty ignition pulse generator  
• Faulty cam pulse generator  
• Faulty vehicle speed sensor  
• Improper valve timing

**YES** – GO TO STEP 3.

### 3. Fuel Pump Inspection

Inspect the fuel flow.

*Is the fuel pump unit normal?*

- NO** – Faulty fuel pump unit (page 6-33).

**YES** – GO TO STEP 4.

### 4. Programmed Fuel Injection System Inspection

Check the fuel injection system.

*Is the fuel injection system normal?*

- NO** – Faulty fuel injection system (page 6-54, 6-43).

**YES** – GO TO STEP 5.

### 5. Starter Valve Synchronization Inspection

Check the starter valve synchronization.

*Is the starter valve synchronization as specified?*

- NO** – Adjust the starter valve synchronization (page 6-61).

**YES** – GO TO STEP 6.

### 6. Intake Pipes Leaking Inspection

Check for leaks at the intake manifold pipes.

*Are there leaks?*

- YES** – • Loose insulator  
• Damaged insulator

### POOR PERFORMANCE AT HIGH SPEED

#### 1. Ignition Timing Inspection

Check the ignition timing.

*Is the ignition timing as specified?*

- NO** –
- Faulty engine control module (ECM)
  - Faulty ignition pulse generator
  - Faulty cam pulse generator
  - Faulty vehicle speed sensor
  - Improper valve timing

**YES** – GO TO STEP 2.

#### 2. Fuel Pump Inspection

Inspect the fuel flow.

*Is the fuel pump unit operation normal?*

- NO** – Faulty fuel pump unit (page 6-33).

**YES** – GO TO STEP 3.

#### 3. Programmed Fuel Injection System Inspection

Check the fuel injection system.

*Is the fuel injection system normally?*

- NO** – Faulty fuel injection system (page 6-54, 6-43).

**YES** – GO TO STEP 4.

#### 4. Valve Timing Inspection

Check the valve timing.

*Is the valve timing correct?*

- NO** – Camshafts not installed properly

**YES** – GO TO STEP 5.

#### 5. Valve Spring Inspection

Check for the valve springs.

*Is the valve spring free length as specified?*

- NO** – Faulty valve springs

**YES** – Not weak

### POOR HANDLING

#### Steering is heavy

- Faulty steering damper (HESD)
- Steering stem adjusting nut too tight
- Damaged steering head bearings
- Insufficient tire pressure

#### Either wheel is wobbling

- Excessive wheel bearing play
- Bent rim
- Swingarm pivot bearing excessively worn
- Bent frame

#### The motorcycle pulls to one side

- Front and rear wheel not aligned
- Faulty shock absorber
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

|   |       |   |       |
|---|-------|---|-------|
| AIR CLEANER .....                             | 4-8   | DIODE .....                                   | 19-14 |
| AIR CLEANER HOUSING .....                     | 6-40  | DRIVE CHAIN .....                             | 4-26  |
| ALTERNATOR CHARGING COIL .....                | 17-8  | ECT SENSOR .....                              |       |
| ALTERNATOR COVER INSTALLATION .....           | 11-7  | FUEL SYSTEM (Programmed Fuel Injection) ..... | 6-65  |
| ALTERNATOR COVER REMOVAL .....                | 11-4  | LIGHTS/METERS/SWITCHES .....                  | 20-14 |
| BALANCER .....                                | 13-28 | EGCV (Exhaust Gas Control Valve) .....        |       |
| BANK ANGLE SENSOR .....                       | 6-67  | FUEL SYSTEM (Programmed Fuel Injection) ..... | 6-76  |
| BATTERY .....                                 | 17-5  | TECHNICAL FEATURES .....                      | 2-6   |
| BATTERY/CHARGING SYSTEM SPECIFICATIONS .....  | 1-10  | EGCV SERVOMOTOR .....                         | 6-78  |
| BODY PANEL LOCATIONS .....                    | 3-2   | ELECTRIC STARTER SPECIFICATIONS .....         | 1-10  |
| BRAKE FLUID .....                             | 4-30  | EMISSION CONTROL INFORMATION LABEL .....      |       |
| BRAKE FLUID REPLACEMENT/AIR BLEEDING .....    | 16-7  | (U.S.A. ONLY) .....                           | 1-39  |
| BRAKE LIGHT SWITCH .....                      |       | EMISSION CONTROL SYSTEMS .....                | 1-36  |
| LIGHTS/METERS/SWITCHES .....                  | 20-20 | ENGINE & FRAME TORQUE VALUES .....            | 1-12  |
| MAINTENANCE .....                             | 4-33  | ENGINE CONTROL MODULE (ECM) .....             | 6-69  |
| BRAKE PAD WEAR .....                          | 4-31  | ENGINE IDLE SPEED .....                       | 4-24  |
| BRAKE PAD/DISC .....                          | 16-11 | ENGINE INSTALLATION .....                     | 8-9   |
| BRAKE PEDAL .....                             | 16-34 | ENGINE OIL/OIL FILTER .....                   | 4-21  |
| BRAKE SYSTEM .....                            | 4-32  | ENGINE REMOVAL .....                          | 8-4   |
| CABLE & HARNESS ROUTING .....                 | 1-24  | ENGINE STOP RELAY .....                       | 6-68  |
| CAM CHAIN TENSIONER LIFTER .....              | 9-34  | EOP (ENGINE OIL PRESSURE) SWITCH .....        | 20-15 |
| CAMSHAFT INSTALLATION .....                   | 9-26  | EVAP PURGE CONTROL SOLENOID VALVE .....       |       |
| CAMSHAFT REMOVAL .....                        | 9-8   | (CALIFORNIA TYPE ONLY) .....                  | 6-72  |
| CHARGING SYSTEM INSPECTION .....              | 17-7  | EVAPORATIVE EMISSION CONTROL SYSTEM .....     |       |
| CKP (CRANKSHAFT POSITION) SENSOR .....        | 18-7  | (CALIFORNIA TYPE ONLY) .....                  | 4-26  |
| CLUTCH .....                                  | 10-16 | EXHAUST GAS CONTROL VALVE CABLE .....         | 4-34  |
| CLUTCH FLUID .....                            | 4-34  | EXHAUST PIPE/MUFFLER .....                    | 3-30  |
| CLUTCH FLUID DRAINING .....                   | 10-6  | FAN CONTROL RELAY .....                       | 7-21  |
| CLUTCH FLUID REPLACEMENT/AIR BLEEDING .....   | 10-6  | FLYWHEEL .....                                | 11-5  |
| CLUTCH MASTER CYLINDER .....                  | 10-8  | FORK .....                                    | 14-21 |
| CLUTCH SLAVE CYLINDER .....                   | 10-13 | FRONT BRAKE CALIPERS .....                    | 16-27 |
| CLUTCH SWITCH .....                           | 20-21 | FRONT FENDER .....                            | 3-19  |
| CLUTCH SYSTEM .....                           | 4-33  | FRONT MASTER CYLINDER .....                   | 16-15 |
| CLUTCH/STARTER CLUTCH SPECIFICATIONS .....    | 1-7   | FRONT WHEEL .....                             | 14-16 |
| CMP SENSOR .....                              | 6-66  | FRONT WHEEL/SUSPENSION/STEERING .....         |       |
| COMBINATION METER .....                       | 20-10 | SPECIFICATIONS .....                          | 1-9   |
| COMPONENT LOCATION .....                      |       | FUEL CUT-OFF RELAY .....                      | 6-35  |
| ALTERNATOR .....                              | 11-2  | FUEL LINE .....                               | 4-5   |
| CLUTCH/STARTER CLUTCH/GEARSHIFT .....         |       | FUEL LINE INSPECTION .....                    | 6-31  |
| LINKAGE .....                                 | 10-2  | FUEL PUMP UNIT .....                          | 6-33  |
| CRANKCASE/CRANKSHAFT/BALANCER/ .....          |       | FUEL RESERVE SENSOR .....                     | 20-17 |
| PISTON/CYLINDER .....                         | 13-2  | FUEL SYSTEM (Programmed Fuel Injection) ..... |       |
| CYLINDER HEAD/VALVES .....                    | 9-2   | SPECIFICATIONS .....                          | 1-6   |
| ENGINE REMOVAL/INSTALLATION .....             | 8-2   | FUEL TANK .....                               | 6-36  |
| FRONT WHEEL/SUSPENSION/STEERING .....         | 14-2  | GEARSHIFT SPINDLE .....                       | 12-7  |
| FUEL SYSTEM (Programmed Fuel Injection) ..... | 6-2   | GENERAL SPECIFICATIONS .....                  | 1-4   |
| HYDRAULIC BRAKE .....                         | 16-2  | HANDLEBAR SWITCHES .....                      | 20-19 |
| REAR WHEEL SUSPENSION .....                   | 15-2  | HANDLEBARS .....                              | 14-9  |
| TRANSMISSION/GEARSHIFT LINKAGE .....          | 12-2  | HEADLIGHT .....                               | 20-5  |
| COOLANT REPLACEMENT .....                     | 7-6   | HEADLIGHT AIM .....                           | 4-33  |
| COOLING SYSTEM .....                          | 4-24  | HEADLIGHT RELAY .....                         | 20-25 |
| COOLING SYSTEM SPECIFICATIONS .....           | 1-6   | HESD (Honda Electronic Steering Damper) ..... | 2-2   |
| CRANKCASE ASSEMBLY .....                      | 13-21 | HESD (Honda Electronic Steering Damper) ..... |       |
| CRANKCASE SEPARATION .....                    | 13-5  | TROUBLESHOOTING .....                         | 14-7  |
| CRANKCASE/CRANKSHAFT/BALANCER/ .....          |       | HORN .....                                    | 20-24 |
| PISTON/CYLINDER SPECIFICATIONS .....          | 1-8   | HYDRAULIC BRAKE SPECIFICATIONS .....          | 1-10  |
| CRANKPIN BEARING .....                        | 13-12 | IAC VALVE SYNCHRONIZATION .....               | 6-61  |
| CRANKSHAFT .....                              | 13-7  | IAT SENSOR .....                              | 6-65  |
| CYLINDER COMPRESSION TEST .....               | 9-6   | IDLE AIR CONTROL (IAC) THERMAL VALVE .....    | 6-56  |
| CYLINDER HEAD ASSEMBLY .....                  | 9-22  | IDLE AIR CONTROL (IAC) VALVE .....            | 6-57  |
| CYLINDER HEAD COVER ASSEMBLY .....            | 9-31  | IGNITION SWITCH .....                         | 20-18 |
| CYLINDER HEAD COVER DISASSEMBLY .....         | 9-7   | IGNITION SYSTEM INSPECTION .....              | 18-5  |
| CYLINDER HEAD COVER INSTALLATION .....        | 9-32  | IGNITION SYSTEM SPECIFICATIONS .....          | 1-10  |
| CYLINDER HEAD COVER REMOVAL .....             | 9-6   | IGNITION TIMING .....                         | 18-7  |
| CYLINDER HEAD DISASSEMBLY .....               | 9-14  | INTAKE AIR DUCT .....                         | 6-73  |
| CYLINDER HEAD INSPECTION .....                | 9-16  | LICENSE LIGHT .....                           | 20-9  |
| CYLINDER HEAD INSTALLATION .....              | 9-24  | LIGHTS/METERS/SWITCHES SPECIFICATIONS .....   | 1-11  |
| CYLINDER HEAD REMOVAL .....                   | 9-13  | LUBRICATION & SEAL POINTS .....               | 1-20  |
| CYLINDER HEAD/VALVES SPECIFICATIONS .....     | 1-7   | LUBRICATION SYSTEM DIAGRAM .....              | 5-2   |

## INDEX

|   |       |   |       |
|---|-------|---|-------|
| LUBRICATION SYSTEM SPECIFICATIONS .....       | 1-6   | STANDARD TORQUE VALUES .....                  | 1-12  |
| MAIN JOURNAL BEARING .....                    | 13-9  | STARTER CLUTCH .....                          | 10-28 |
| MAINTENANCE SCHEDULE .....                    | 4-4   | STARTER MOTOR .....                           | 19-6  |
| MAP SENSOR .....                              | 6-64  | STARTER RELAY SWITCH .....                    | 19-13 |
| MIL CODE INDEX .....                          | 6-13  | STATOR .....                                  | 11-4  |
| MIL TROUBLESHOOTING .....                     | 6-15  | STEERING DAMPER .....                         | 14-34 |
| MODEL IDENTIFICATION .....                    | 1-2   | STEERING HEAD BEARINGS .....                  | 4-41  |
| NEUTRAL SWITCH .....                          | 20-21 | STEERING STEM .....                           | 14-35 |
| NUTS, BOLTS, FASTENERS .....                  | 4-41  | SUSPENSION .....                              | 4-37  |
| OIL COOLER .....                              | 5-13  | SUSPENSION LINKAGE .....                      | 15-17 |
| OIL PRESSURE INSPECTION .....                 | 5-5   | SWINGARM .....                                | 15-20 |
| OIL PUMP .....                                | 5-8   | SYSTEM DIAGRAM                                |       |
| OIL STRAINER/PRESSURE RELIEF VALVE .....      | 5-6   | BATTERY/CHARGING SYSTEM .....                 | 17-2  |
| PAIR CONTROL SOLENOID VALVE .....             | 6-71  | ELECTRIC STARTER .....                        | 19-2  |
| PASSENGER SEAT .....                          | 3-4   | FUEL SYSTEM (Programmed Fuel Injection) ..... | 6-8   |
| PGM-FI SELF-DIAGNOSIS INFORMATION .....       | 6-9   | IGNITION SYSTEM .....                         | 18-2  |
| PISTON/CYLINDER .....                         | 13-15 | SYSTEM FLOW PATTERN .....                     | 7-2   |
| POSITION LIGHT .....                          | 20-6  | SYSTEM LOCATION                               |       |
| PRIMARY INJECTOR .....                        | 6-54  | FUEL SYSTEM (Programmed Fuel Injection) ..... | 6-7   |
| RADIAL-MOUNTED FRONT BRAKE CALIPER .....      | 2-5   | LIGHTS/METERS/SWITCHES .....                  | 20-2  |
| RADIATOR .....                                | 7-10  | SYSTEM TESTING .....                          | 7-5   |
| RADIATOR COOLANT .....                        | 4-24  | TACHOMETER .....                              | 20-13 |
| RADIATOR RESERVE TANK .....                   | 7-20  | TAIL/BRAKE LIGHT .....                        | 20-8  |
| REAR BRAKE CALIPER .....                      | 16-31 | THERMOSTAT .....                              | 7-8   |
| REAR FENDER .....                             | 3-19  | THROTTLE BODY .....                           | 6-47  |
| REAR MASTER CYLINDER .....                    | 16-21 | THROTTLE OPERATION .....                      | 4-7   |
| REAR SEAT COWL .....                          | 3-5   | TOP SHELTER .....                             | 3-16  |
| REAR WHEEL .....                              | 15-7  | TRANSMISSION .....                            | 12-11 |
| REAR WHEEL/SUSPENSION SPECIFICATIONS .....    | 1-9   | TRANSMISSION/GEARSHIFT LINKAGE                |       |
| REGULATOR/RECTIFIER .....                     | 17-8  | SPECIFICATIONS .....                          | 1-8   |
| RIDER SEAT .....                              | 3-4   | TROUBLESHOOTING .....                         | 5-4   |
| RIGHT CRANKCASE COVER INSTALLATION .....      | 10-34 | BATTERY/CHARGING SYSTEM .....                 | 17-4  |
| RIGHT CRANKCASE COVER REMOVAL .....           | 10-15 | CLUTCH/GEARSHIFT LINKAGE .....                | 10-5  |
| SEAT RAIL .....                               | 3-27  | COOLING SYSTEM .....                          | 7-4   |
| SECONDARY AIR SUPPLY SYSTEM .....             | 4-25  | CRANKCASE/CRANKSHAFT/BALANCER/                |       |
| SECONDARY INJECTOR .....                      | 6-43  | PISTON/CYLINDER .....                         | 13-4  |
| SERVICE INFORMATION                           |       | CRANKCASE/TRANSMISSION .....                  | 12-6  |
| ALTERNATOR .....                              | 11-3  | CYLINDER HEAD/VALVES .....                    | 9-5   |
| BATTERY/CHARGING SYSTEM .....                 | 17-3  | ELECTRIC STARTER .....                        | 19-4  |
| CLUTCH/STARTER CLUTCH/GEARSHIFT               |       | ENGINE DOES NOT START OR IS HARD              |       |
| LINKAGE .....                                 | 10-4  | TO START .....                                | 22-2  |
| COOLING SYSTEM .....                          | 7-3   | ENGINE LACKS POWER .....                      | 22-3  |
| CRANKCASE/CRANKSHAFT/BALANCER/                |       | FRAME/BODY PANELS/EXHAUST SYSTEM .....        | 3-3   |
| PISTON/CYLINDER .....                         | 13-3  | FRONT WHEEL/SUSPENSION/STEERING .....         | 14-6  |
| CRANKCASE/TRANSMISSION .....                  | 12-4  | FUEL SYSTEM (Programmed Fuel Injection) ..... | 6-6   |
| CYLINDER HEAD/VALVES .....                    | 9-3   | HYDRAULIC BRAKE .....                         | 16-6  |
| ELECTRIC STARTER .....                        | 19-3  | IGNITION SYSTEM .....                         | 18-4  |
| ENGINE REMOVAL/INSTALLATION .....             | 8-3   | POOR HANDLING .....                           | 22-6  |
| FRAME/BODY PANELS/EXHAUST SYSTEM .....        | 3-3   | POOR PERFORMANCE AT HIGH SPEED .....          | 22-6  |
| FRONT WHEEL/SUSPENSION/STEERING .....         | 14-3  | POOR PERFORMANCE AT LOW AND                   |       |
| FUEL SYSTEM (Programmed Fuel Injection) ..... | 6-3   | IDLE SPEED .....                              | 22-5  |
| HYDRAULIC BRAKE .....                         | 16-4  | REAR WHEEL SUSPENSION .....                   | 15-6  |
| IGNITION SYSTEM .....                         | 18-3  | TURN SIGNAL .....                             | 20-7  |
| LIGHTS/METERS/SWITCHES .....                  | 20-3  | TURN SIGNAL RELAY .....                       | 20-24 |
| LUBRICATION SYSTEM .....                      | 5-3   | UNDER COWLS/MIDDLE COWLS .....                | 3-7   |
| MAINTENANCE .....                             | 4-2   | UPPER COWL .....                              | 3-12  |
| REAR WHEEL SUSPENSION .....                   | 15-3  | VALVE CLEARANCE .....                         | 4-16  |
| SERVICE RULES .....                           | 1-2   | VALVE GUIDE REPLACEMENT .....                 | 9-18  |
| SHOCK ABSORBER .....                          | 15-14 | VALVE SEAT INSPECTION/REFACING .....          | 9-19  |
| SIDE STAND .....                              | 4-36  | WATER PUMP .....                              | 7-17  |
| SIDE STAND SWITCH .....                       | 20-22 | WHEELS/TIRES .....                            | 4-41  |
| SPARK PLUG .....                              | 4-8   | WIRING DIAGRAM                                |       |
| SPEEDOMETER/VEHICLE SPEED SENSOR .....        | 20-11 | A, AC, CM type .....                          | 21-3  |