

## Introduction

This service manual describes the service procedures for and technical feature of the VFR400R.

This Model Specific Manual includes every service procedure that is of a specific nature to this particular model. Basic service procedures that are common to other Honda Motorcycles/Motor Scooters/ATVs are covered in the Common Service Manual. This Model Specific Service Manual should be used together with the Common Service Manual in order to provide complete service information on all aspects of this motorcycle.

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

Section 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.

While Section 4 through 19 describe parts of the motorcycle, grouped according to locations.

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

Most sections describe the service procedure through system illustration. Refer to the next page for details on how to use this manual.

If you are not familiar with this motorcycle, read Technical Feature in section 20.

If you don't know the source of the trouble, go to section 21 TROUBLESHOOTING.

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SERVICE PUBLICATION OFFICE

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## Important Safety Notice

### **⚠ WARNING**

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

### **CAUTION:**

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

### **NOTE:**

Gives helpful information.

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

## Type Codes

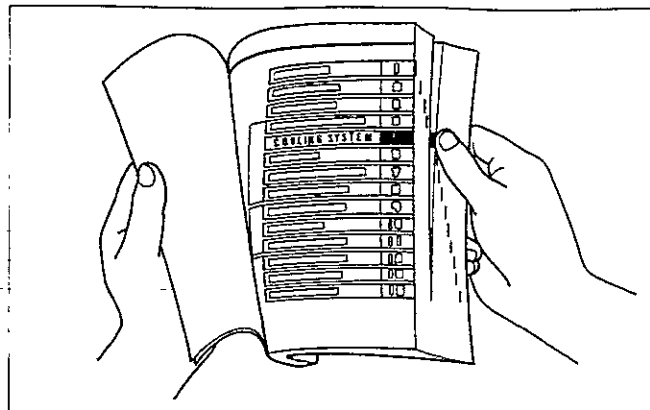
- Throughout this manual, the following abbreviations are used to identify individual model.

Code	Area Type
E	U.K.
AR	Austrie
F (M Model only)	France
G (M Model only)	Germany

# How to Use This Manual

## Finding Information You Need

- This manual is divided into sections which cover each of the major components of the motorcycle. To quickly find the section you are interested in, the first page of each section is marked with a black tab that lines up with one of the thumb index tabs before this page. The first page of each section lists the table of contents within the section. Read the service information and troubleshooting related to the section before you begin working.
- An index of the entire book is provided in the last chapter to directly locate the information you need.



## Note on the Explanation Method of This Manual

- The removal and installation of parts are for the most part illustrated by large and clear illustrations that should provide the reader with visual aid in understanding the major point for servicing.
- The system illustrations are augmented by callouts whose numbers or letters indicate the order in which the parts should be removed or installed.
- The sequence of steps represented numerically are differentiated from the ones represented alphabetically to notify the reader that they must perform these steps separately. For example, if the steps prior and up to camshaft removal are performed with the engine installed, but the subsequent steps like cylinder head removal require engine removal, the callouts are grouped in numerical and alphabetical orders.
- The illustrations may contain symbol marks to indicate necessary service procedures and precautions that need to be taken. Refer to the next page for the meaning of each symbol mark.
- Also in the illustration is a chart that lists information such as the order in which the part is removed/installed, the name of the part, and some extra notes that may be needed.
- Step by step instructions are provided to supplement the illustrations when detailed explanation of the procedure is necessary or illustrations alone would not suffice.
- Service procedures required before or after the procedure described on that particular page, or inspection/adjustment procedures required following the installation of parts, are described under the title Requisite Service.
- Standard workshop procedures and knowledge covered in the Common Service Manual are abbreviated in this manual.

Symbol mark

System illustration

Detailed description of the procedure

Step sequence (numerals or alphabets)

Part number

Number of parts

Extra notes or precaution related to the service procedure

**CYLINDER HEAD/CYLINDER/PISTON**

**CYLINDER HEAD REMOVAL/INSTALLATION**

**REQUISITE SERVICE**

Engine removal/installation (page 7-2)

Camshaft removal/installation (page 8-2)

REMOVAL ORDER	QTY	REMARKS
(1) Cylinder head mounting nut	12	Installation is in the reverse order of removal. Installation (page 8-5)
(2) Cylinder head mounting bolt	2	
(3) Cylinder head assembly	1	
(4) Gasket	1	
(5) Dowel pin	2	
(6) Camshaft side gear case bolt	2	
(7) Camshaft side gear case dowel pin	2	
(8) Sealing washer	1	
(9) Camshaft side gear case	1	
(10) Camshaft insulator	4	

All installation, align the insulator grooves with the engine lug, with the Q UP mark facing upwards (distributor side).

**CAMSHAFT SIDE GEAR CASE INSTALLATION**

Install the camshaft side gear case dowel pin properly.

**NOTE**

Without the dowel pin installed properly, the camshaft side gear may not be able to be installed onto the crankshaft timing gear.

Install the camshaft side gear case onto the cylinder. While moving the side gear timing with the gear case held, the gear case should be fitted up slightly from the cylinder.

Install a new sealing washer and mounting bolt. Tighten bolts in a gradual, as shown.

**CYLINDER HEAD NUT/BOLT INSTALLATION**

Insert the cylinder head mounting nuts as shown. Do not tighten them yet.

Insert the cylinder head mounting bolts. Tighten the special nuts and mounting bolts in a gradual, crosswise pattern.

**TORQUE**















Special nut: 30 ft-lb (4.0 kg-m, 22 N-m)  
Mounting bolt: 12 ft-lb (1.6 kg-m, 9 N-m)

**8-4**

**8-5**

# 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 special tool
	Use optional tool. These tools are obtained as you order parts.
 10 (1.0, 7.2)	Torque specification. 10 N•m (1.0 kg-m, 7.2 ft-lb)
	Use recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease with the ratio 1 : 1).
	Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)
	Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent) Example: Molykote® BR-2 plus manufactured by Dow Corning, U.S.A. Multi-purpose M-2 manufactured by Mitsubishi Oil Japan
	Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent) Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A. Honda Moly 45 (U.S.A. only) Rocol ASP manufactured by Rocol Limited, U.K. Rocol Paste manufactured by Sumico Lubricant, Japan
	Use silicone grease
	Apply a locking agent. Use the agent of the middle strength, unless otherwise specified.
	Apply sealant
	Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.
	Use Fork or Suspension Fluid.



# 1. General Information

1

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## General Safety

### Carbon Monoxide

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

#### ⚠ WARNING

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

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

### Gasoline

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

#### ⚠ WARNING

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

### Hot Components

#### ⚠ WARNING

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

### Used Engine/Transmission Oil

#### ⚠ WARNING

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

### Brake Dust

never use an air hose or dry brush to clean brake assemblies.

#### ⚠ WARNING

- Inhaled asbestos fibers have been found to cause respiratory disease and cancer.

### Brake Fluid

#### CAUTION

- Spilling fluid on painted, plastic or rubber parts will damage them. Place a clean shop towel over these parts whenever the system is serviced. KEEP OUT OF REACH OF CHILDREN.

### Coolant

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

#### ⚠ WARNING

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

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

### Nitrogen Pressure

For shock absorbers with a gas-filled reservoir:

#### ⚠ WARNING

- Use only nitrogen to pressurize the shock absorber. The use of an unstable gas can cause a fire or explosion resulting in serious injury.
- The shock absorber contains nitrogen under high pressure. Allowing fire or heat near the shock absorber could lead to an explosion that could result in serious injury.
- Failure to release the pressure from a shock absorber before disposing of it may lead to a possible explosion and serious injury if it is heated or pierced.

To prevent the possibility of an explosion, release the nitrogen by pressing the valve core. Then remove the valve stem from the shock absorber reservoir.

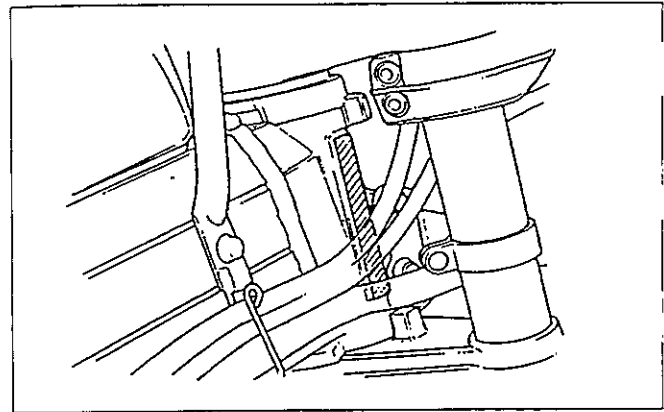
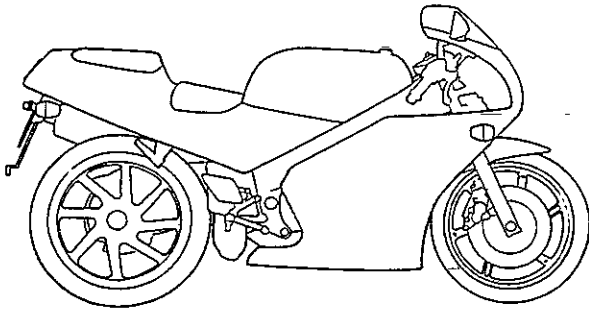
Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve stem from the shock absorber.

### Battery Hydrogen Gas & Electrolyte

#### ⚠ WARNING

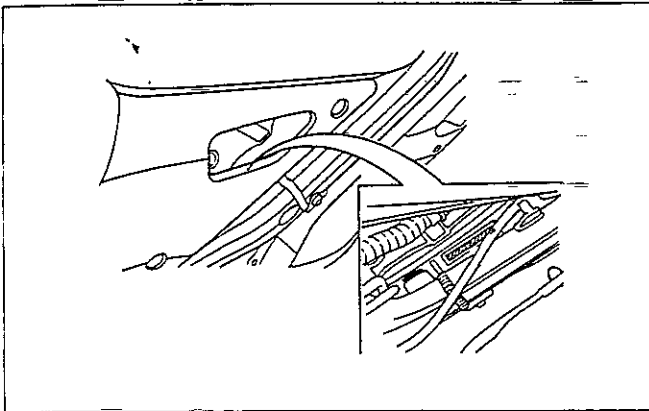
- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician. **KEEP OUT OF REACH OF CHILDREN.**

## Model Identification



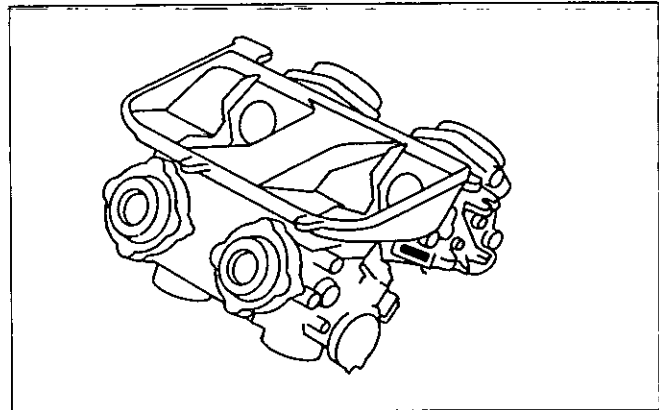
### (1) FRAME SERIAL NUMBER

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



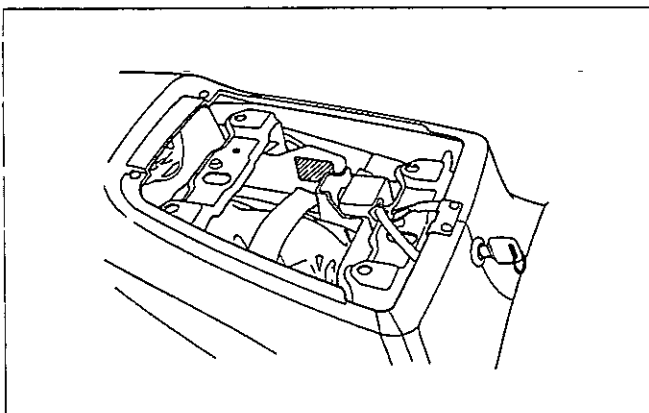
### (2) ENGINE SERIAL NUMBER

The engine serial number is stamped on the top of the crankcase right side.



### (3) CARBURETOR IDENTIFICATION NUMBER

The carburetor identification number is stamped on the carburetor body intake side.

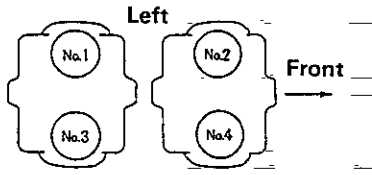


### (4) COLOR CODE LABEL

The color code label is attached to the rear fender below the rear seat. When ordering color-coded part, always specify its designated color.

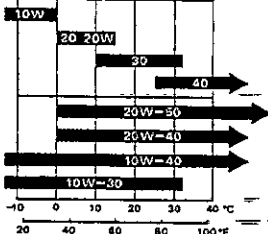
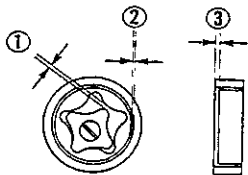
## Specifications

Unit: mm (in)

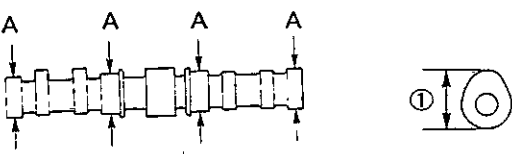

General		
	Item	Specifications
Dimensions	Overall length	1,985 (78.1)
	Overall length (M Model only)	2,035 (80.1), G: 2,070 (81.5)
	Overall width	705 (27.8)
	Overall height	1,075 (42.3)
	Wheelbase	1,345 (53.0)
	Ground clearance	125 (4.9)
	Dry weight	175 kg (385.8 lb)
	Dry weight (M Model only)	176 kg (388.1 lb)
	Curb weight	192 kg (423.3 lb)
	Maximum weight capacity	347 kg (765.0 lb)
	Maximum weight capacity (M Model only)	342 kg (754.0 lb)
Frame	Frame type	Backbone
	Front suspension	Telescopic fork
	Front wheel travel	120 (4.7)
	Rear suspension	Swingarm
	Rear wheel travel	120 (4.7)
	Rear damper	Gas-filled damper with reservoir
	Front tire size	120/60 VR17
	Rear tire size	150/60 VR18
	Tire brand (Bridgestone) FR/RR	—
	Tire brand (Dunlop) FR/RR	K510A RADIAL/K510 RADIAL
	Tire brand (Yokohama) FR/RR	—
	Tire brand (IRC) — EB/RR	—
	Front brake	Hydraulic double disc
	Rear brake	Hydraulic single disc
	Caster angle	25°20'
Engine	Trail length	96 (3.8)
	Fuel tank capacity	15 liters (4.0 US gal, 3.5 Imp gal)
	Fuel tank reserve capacity	2.0 liters (0.5 US gal, 0.4 Imp gal)
	Bore and stroke	55.0 x 42.0 (2.16 x 1.65)
	Displacement	399 cm <sup>3</sup> (24.3 cu in)
	Compression ratio	11.3 : 1
	Valve train	Gear driven DOHC, 4 valves per cylinder
	Intake valve opens at 1 mm lift	15° BTDC
	Intake valve closes at 1 mm lift	35° ABDC
	Exhaust valve opens at 1 mm lift	35° BBDC
	Exhaust valve closes at 1 mm lift	5° ATDC
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trockoid
	Cooling system	Liquid cooled
	Air filtration	Paper filter
	Crankshaft type	Unit-type, 4 main journals
	Firing order	1 — 90° — 4 — 270° — 3 — 90° — 2
	Cylinder arrangement	4 cylinders 90°V
	Cylinder number	
		

Unit: mm (in)

General (Cont'd)		
	Item	Specifications
Carburetor	Carburetor type Throttle bore	Constant velocity, 4 carburetors 32 (1.3)
Drive Train	Clutch system Clutch operation system Transmission Primary reduction Secondary reduction Third reduction Final reduction Gear ratio 1st Gear ratio 2nd Gear ratio 3rd Gear ratio 4th Gear ratio 5th Gear ratio 6th Gear ratio reverse Gearshift pattern	Multi-plate, wet Cable operated 6 speeds 2.117 (34/72) _____ 2.666 (15/40) 2.928 (14/41) 2.166 (18/39) 1.800 (20/36) 1.591 (22/35) 1.435 (23/33) 1.318 (22/29) _____ Left foot operated return system 1—N—2—3—4—5—6
Electrical	Ignition system Starting system Charging system Regulator/rectifier type Lighting system AC regulator type	Digitalized full transistor ignition Electric starter motor Triple phase output alternator SCR Shorted/triple phase full-wave rectification Battery _____

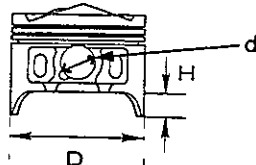
Lubrication		Unit: mm (in)	
Item	Standard	Service Limit	
Engine oil capacity at draining at disassembly at oil filter change Recommended engine oil	2.4 liters (2.54 US qt, 2.11 Imp qt) 3.0 liters (3.17 US qt, 2.64 Imp qt) 2.5 liters (2.64 US qt, 2.20 Imp qt) Use Honda 4-stroke oil or equivalent Viscosity: SAE 10W-40	<div> <div></div> <div></div> <div></div> </div>	
<b>OIL VISCOSITIES</b> 	Other viscosity shown in the chart may be used when the average temperature in your riding area is within the indicated range.		
Oil pressure at oil pressure switch	490—588 kPa (5.0—6.0 kg/cm <sup>2</sup> , 71—85 psi) at 5,000 rpm (80°C/176°F)	<div> <div></div> </div>	
Oil pump rotor tip clearance ① body clearance ② end clearance ③	0.15 (0.006) 0.15—0.22 (0.006—0.009) 0.04—0.09 (0.0016—0.0035)	<div> <div></div> <div></div> <div></div> </div>	
			
Fuel System			
Carburetor identification number	VDE 3A (E), VDE 3C (AR)	<div> <div></div> </div>	
Carburetor identification number (M Model only)	VDE 3F (E, F) VDE 3G (AR) VDE 3H (G)	<div> <div></div> <div></div> <div></div> </div>	
Main jet	—	<div> <div></div> </div>	
(High altitude)	—	<div> <div></div> </div>	
(2, 3)	—	<div> <div></div> </div>	
(1, 4)	—	<div> <div></div> </div>	
(Front)	#122	<div> <div></div> </div>	
(Rear)	#120	<div> <div></div> </div>	
Slow jet	#35	<div> <div></div> </div>	
Jet needle clip position	—	<div> <div></div> </div>	
Pilot screw initial opening	2 turns out	<div> <div></div> </div>	
Pilot screw high altitude adjustment	—	<div> <div></div> </div>	
Pilot screw final opening	1/4 turns out	<div> <div></div> </div>	
Pilot screw final opening (M Model only)	1 turns out (E, F) 1/2 turns out (AR, G)	<div> <div></div> <div></div> </div>	
Air screw initial opening	—	<div> <div></div> </div>	
Air screw high altitude adjustment	—	<div> <div></div> </div>	
Float level	6.8 (0.28)	<div> <div></div> </div>	
Carburetor Vacuum difference	Within 40 mmHg (1.6 inHg)	<div> <div></div> </div>	
Base carburetor (For carburetor synchronization)	No. 2 carburetor	<div> <div></div> </div>	
Idle speed	1,300 ± 100 min <sup>-1</sup> (rpm)	<div> <div></div> </div>	
Throttle grip free play	2—6 (0.08—0.24)	<div> <div></div> </div>	
Accelerator pump clearance	—	<div> <div></div> </div>	

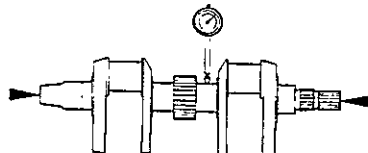
Unit: mm (in)

Cylinder Head Item	Standard	Service Limit
Cylinder compression	1,274 ± 196 kPa (13.0 ± 2.0 kg/cm <sup>2</sup> , 185 ± 28 psi)/400 min <sup>-1</sup> (rpm)	—
Cylinder compression difference	40 mmHg (1.6 inHg)	—
Valve clearance IN	0.12–0.18 (0.005–0.007)	—
EX	0.21–0.27 (0.008–0.011)	—
Cylinder head warpage	—	0.10 (0.004)
Com lobe height ① IN	32.717–32.957 (1.2882–1.2975)	32.67 (1.286)
EX	32.428–32.668 (1.2767–1.2861)	32.38 (1.275)
Camshaft runout	—	0.03 (0.001)
Camshaft oil clearance A	0.040–0.082 (0.0016–0.0032)	0.092 (0.0036)
B	—	—
		
Camshaft journal O.D. A	27.939–27.960 (1.1000–1.1008)	27.93 (1.010)
B	—	—
Camshaft holder I.D. A	28.000–28.021 (1.1024–1.1032)	28.03 (1.104)
B	—	—
Valve stem O.D. IN	4.475–4.490 (0.1762–0.1788)	4.47 (0.176)
EX	4.465–4.480 (0.1758–0.1764)	0.46 (0.1756)
Valve guide I.D. IN	4.500–4.512 (0.1772–0.1776)	4.56 (0.180)
EX	4.500–4.512 (0.1772–0.1776)	4.56 (0.180)
Stem-to-guide clearance IN	0.010–0.037 (0.0004–0.0015)	0.09 (0.004)
EX	0.020–0.047 (0.0008–0.0019)	0.12 (0.005)
Valve guide projection above cylinder head IN (h)	10 (0.4)	—
EX (h)	10 (0.4)	—
 <p>Before guide installation:</p> <ol style="list-style-type: none"> <li>1. Chill the valve guide in the freezer section of a refrigerator for about an hour.</li> <li>2. Heat the cylinder head to 100–150°C (212–300°F)</li> </ol>		
Valve seat width IN	1.70–2.30 (0.067–0.091)	—
EX	1.70–2.30 (0.067–0.091)	—
Valve spring free length IN	—	—
EX	—	—
Inner IN	31.4 (1.24)	30.2 (1.19)
Inner EX	31.4 (1.24)	30.2 (1.19)
Outer IN	34.4 (1.35)	33.2 (1.31)
Outer EX	34.4 (1.35)	33.2 (1.31)
Rocker arm I.D. IN	8.500–8.515 (0.3346–0.3352)	8.53 (0.336)
EX	8.500–8.515 (0.3346–0.3352)	8.53 (0.336)
Rocker arm shaft O.D. IN	8.466–8.484 (0.3333–0.3340)	8.46 (0.333)
EX	8.466–8.484 (0.3333–0.3340)	8.46 (0.333)
Rocker arm-to-rocker arm shaft clearance	—	—
Valve lifter O.D.	—	—
Valve lifter bore I.D.	—	—
Hydraulic tappet adjuster assist spring free length	—	—
Hydraulic tappet adjuster compression stroke with kerosene	—	—

# General information

Unit: mm (in)

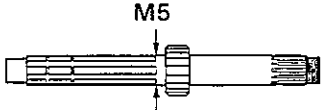
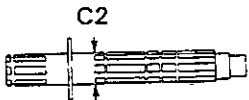
Cylinder/Piston	Item	Standard	Service Limit
	Cylinder I.D.	55.000—55.015 (2.1654—2.1659)	55.07 (2.168)
	Cylinder out of round	—	0.10 (0.004)
	Cylinder taper	—	0.10 (0.004)
	Cylinder warpage	—	0.10 (0.004)
	Piston mark direction	"IN" mark facing toward the intake side	—
	Piston O.D. (D)	54.970—54.990 (2.1642—2.1650)	54.92 (2.168)
	Piston O.D. measurement point (H)	10 (0.4)	—
	Piston pin hole I.D. (d)	14.002—14.008 (0.5513—0.5515)	14.02 (0.552)
	Cylinder-to-piston clearance	0.010—0.045 (0.0004—0.0018)	0.10 (0.004)
	Piston pin O.D.	13.994—14.000 (0.5509—0.5512)	13.98 (0.550)
	Piston-to-piston pin clearance	0.002—0.014 (0.0001—0.0006)	0.04 (0.002)
	Connecting rod-to-piston pin clearance	0.016—0.040 (0.0006—0.0016)	0.06 (0.002)
	Top ring-to-ring groove clearance	0.015—0.050 (0.0006—0.0020)	0.10 (0.004)
	Second ring-to-ring groove clearance	0.015—0.045 (0.0006—0.0018)	0.10 (0.004)
	Top ring end gap	0.18—0.33 (0.007—0.013)	0.65 (0.026)
	Second ring end gap	0.18—0.33 (0.007—0.013)	0.65 (0.026)
	Oil ring (side rail) end gap	0.20—0.80 (0.008—0.031)	0.95 (0.037)
	Top ring mark	"R" mark facing up	—
	Second ring mark	"S" mark facing up	—

Crankshaft	Item	Standard	Service Limit
	Connecting rod small end I.D.	14.016—14.034 (0.5518—0.5525)	14.05 (0.553)
	Connecting rod big end side clearance	0.10—0.30 (0.004—0.012)	0.4 (0.02)
	radial clearance	—	—
	Crankshaft runout	—	0.03 (0.001)
	Crankpin oil clearance	0.028—0.052 (0.0011—0.0020)	0.07 (0.003)
	Crankpin bearing selection	See page 11-10	—
	Main journal oil clearance	0.025—0.049 (0.0010—0.0019)	0.07 (0.003)
	Main journal bearing selection	See page 11-10	—

Kickstarter	Item	Standard	Service Limit
	Kickstarter pinion gear I.D.	—	—
	Kickstarter spindle O.D.	—	—
	Kickstarter idle gear I.D.	—	—
	Countershaft O.D. at kickstarter idle gear	—	—
	Kickstarter idle gear bushing O.D.	—	—
	I.D.	—	—



Unit: mm (in)

Transmission	Item	Standard	Service Limit
	Transmission gear I.D. M5, M6	28.000—28.021 (1.1024—1.1032)	28.04 (1.104)
	C2, C3, C4	28.000—28.021 (1.1024—1.1032)	28.04 (1.104)
	Transmission gear bushing O.D. M5, M6	27.959—27.980 (1.1007—1.1016)	27.94 (1.100)
	C2, C3, C4	27.959—27.980 (1.1007—1.1016)	27.94 (1.100)
	Transmission gear bushing I.D. M5	24.985—25.006 (0.9837—0.9845)	25.03 (0.985)
	C2	24.985—25.006 (0.9837—0.9845)	25.03 (0.985)
	Gear-to-bushing clearance at M5, M6 gear	0.020—0.062 (0.0008—0.0024)	0.10 (0.004)
	at C2, C3, C4 gear	0.020—0.062 (0.0008—0.0024)	0.10 (0.004)
	Mainshaft O.D. at M5 gear bushing	24.967—24.978 (0.9830—0.9834)	24.96 (0.983)
	Countershaft O.D. at C2 gear bushing	24.967—24.978 (0.9830—0.9834)	24.96 (0.983)
	Gear-to-shaft clearance	0.007—0.039 (0.0003—0.0015)	0.06 (0.002)
	Gear bushing-to-shaft clearance at M5 gear	0.007—0.039 (0.0003—0.0015)	0.06 (0.002)
	at C2 gear		
	Shift fork clew thickness L	5.93—6.00 (0.233—0.236)	5.8 (0.23)
	C	5.93—6.00 (0.233—0.236)	5.8 (0.23)
	R	5.93—6.00 (0.233—0.236)	5.8 (0.23)
	Shift fork I.D. L	12.000—12.021 (0.4724—0.4733)	12.04 (0.474)
	C	12.000—12.021 (0.4724—0.4733)	12.04 (0.474)
	R	12.000—12.021 (0.4724—0.4733)	12.04 (0.474)
	Shift fork shaft O.D. L	11.969—11.980 (0.4712—0.4717)	11.95 (0.470)
	C	11.969—11.980 (0.4712—0.4717)	11.95 (0.470)
	R	11.969—11.980 (0.4712—0.4717)	11.95 (0.470)

# General information

Unit: mm (in)

Clutch System		
Item	Standard	Service Limit
Clutch lever free play	10—20 (0.4—0.8)	—
Recommended clutch fluid	—	—
Clutch master cylinder I.D.	—	—
Clutch master piston O.D.	—	—
Clutch outer I.D.	29.000—29.021 (1.1417—1.1426)	29.06 (1.144)
Clutch outer guide O.D.	28.967—28.980 (1.1404—1.1409)	28.93 (1.139)
I.D.	21.995—22.015 (0.8659—0.8667)	22.05 (0.868)
Mainshaft O.D. at clutch outer guide	—	—
Oil pump drive sprocket I.D.	29.025—29.075 (1.1427—1.1447)	29.11 (1.146)
Clutch center B I.D.	63.964—63.990 (2.5183—2.5193)	64.00 (2.520)
One way clutch inner O.D.	47.365—47.378 (1.8648—1.8653)	47.36 (1.8646)
Clutch spring free height (As a set of 3pcs.)	5.3 (0.21)	4.8 (0.19)
Clutch spring free length	—	—
Clutch disc thickness	2.92—3.08 (0.115—0.121)	2.8 (0.110)
Clutch disc thickness A	—	—
B	—	—
Clutch plate warpage	—	0.30 (0.012)
Centrifugal clutch drum I.D.	—	—
bushing O.D.	—	—
Centrifugal clutch center guide I.D.	—	—
O.D.	—	—
Centrifugal clutch center guide collar height	—	—
Centrifugal clutch spring free length	—	—
Clutch lining thickness	—	—
Crankshaft O.D. at clutch center	—	—

Cooling System		
Coolant capacity (Radiator and engine)	2.1 liters (2.22 US qt, 1.85 Imp qt)	—
M Model	2.0 liters (2.11 US qt, 1.76 Imp qt)	—
(Reserve tank)	0.2 liter (0.21 US qt, 0.18 Imp qt)	—
Radiator cap relief pressure	108—137 kPa	—
	(1.10—1.40 kg/cm <sup>2</sup> , 16—20 psi)	—
Thermostat begins to open	80—84°C (176—183°F)	—
Thermostat fully open	95°C (203°F)	—
Thermostat valve lift	8.0 (0.23) min.	—

Drive Train		
Recommended final drive oil	—	—
Final drive gear oil capacity at disassembly	—	—
at draining	—	—
Final drive gear backlash	—	—
Final drive gear backlash difference between measurements	—	—
Ring gear-to-stop pin clearance (A)	—	—
Stop pin shim	—	—
Ring gear spacer	—	—
Pinion spacer	—	—
Final drive gear assembly preload	—	—
Output gear backlash	—	—
Output gear I.D.	—	—
Output gear bushing O.D.	—	—
I.D.	—	—
Output drive shaft O.D.	—	—
Output gear damper spring free length	—	—
Output shaft adjustment shim	—	—
Countershaft drive shaft adjustment shim	—	—

Unit: mm (in)

## Wheels/Tires

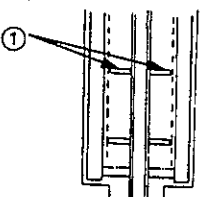
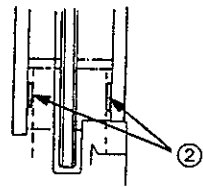
Item	Standard	Service Limit
Minimum tire tread depth (FR)	—	1.5 (0.06)
(RR)	—	2.0 (0.08)
Cold tire pressure Driver only (FR)	225 kPa (2.25 kg/cm <sup>2</sup> , 33 psi)	—
Driver only (RR)	225 kPa (2.25 kg/cm <sup>2</sup> , 33 psi)	—
Driver and passenger (FR)	225 kPa (2.25 kg/cm <sup>2</sup> , 33 psi)	—
Driver and passenger (RR)	250 kPa (2.50 kg/cm <sup>2</sup> , 36 psi)	—
Front and rear axle runout	—	0.2 (0.01)
Front and rear wheel rim runout (Radial)	—	2.0 (0.08)
(Axial)	—	2.0 (0.08)
Front wheel hub-to-rim distance	—	—
Front wheel hub standard surface	—	—
Rear wheel hub-to-rim distance	—	—
Rear wheel hub standard surface	—	—
Wheel balance weight (Front)	—	60 g (2.1 oz) max.
(Rear)	—	60 g (2.1 oz) max.
Drive chain slack	15–25 (5/8–1)	—
Drive chain size link (DID)	—	—
(RK)	RK GB525SM4/104	—

## Front Suspension

Fork spring free length	277.3 (10.92)	271.8 (10.70)
Fork spring free length A	—	—
B	—	—
Fork spring direction	Tightly wound coil end facing down	—
Fork tube runout	—	0.20 (0.008)
Recommended fork oil	Fork fluid	—
Fork oil level	122 mm (4.8 in)	—
Fork oil level (R)	—	—
(L)	—	—
Fork oil capacity	390 cc (13.2 US oz, 13.7 Imp oz)	—
Fork oil capacity (M Model only)	404 cc (13.7 US oz, 14.2 Imp oz)	—
Fork oil capacity (R)	—	—
(L)	—	—
Fork air pressure	—	—
Steering bearing preload	1.0–1.5 kg (2.2–3.3 lb)	—

## Rear Suspension

Shock absorber spring free length	158.7 (6.2 in)	155.5 (6.12)
Shock absorber spring free length (R)	—	—
(L)	—	—
Damper gas pressure	98 kPa (10 kg/cm <sup>2</sup> , 142 psi)	—
Damper compressed gas	Nitrogen	—
Damper rod compressed force at 10 mm compressed	15–20 kg (33–44 lb)	—
Damper drilling point	See page 13–13	—
Shock absorber spring installed length	—	—
(Standard)	147.7 (5.81)	—
(Adjustable range)	—	—
Shock absorber spring adjuster standard position	—	—
Shock absorber spring direction	—	—
Recommended shock absorber oil	—	—
Shock absorber oil capacity	—	—
air pressure	—	—

Brakes		
Item	Standard	Service Limit
Front brake fluid	DOT 4	—
Brake lever free play	—	—
Brake pad wear indicator	—	—
		To the groove 1
brake disc thickness	4 (0.16)	3.5 (0.14)
brake disc runout	—	0.30 (0.012)
master cylinder I.D.	14.000—14.043 (0.5512—0.5529)	14.06 (0.554)
master piston O.D.	13.957—13.984 (0.5495—0.5506)	13.95 (0.549)
caliper cylinder I.D.	—	—
caliper cylinder I.D. (Upper)	30.230—30.280 (1.1902—1.1921)	30.29 (1.193)
(Lower)	25.400—25.450 (1.0000—1.0020)	25.46 (1.0024)
caliper piston O.D.	—	—
caliper piston O.D. (Upper)	30.148—30.198 (1.1869—1.1889)	30.14 (1.1866)
(Lower)	25.318—25.368 (0.9968—0.9987)	25.31 (0.9965)
brake drum I.D.	—	—
brake lining thickness	—	—
Rear brake fluid	DOT 4	—
brake pedal height	—	—
brake pedal free play	—	—
brake pad wear indicator	—	—
		To the groove 2
brake disc thickness	6.0 (0.24)	5.0 (0.20)
brake disc runout	—	0.30 (0.012)
master cylinder I.D.	14.000—14.043 (0.5512—0.5529)	14.06 (0.554)
master piston O.D.	13.957—13.984 (0.5495—0.5506)	13.95 (0.549)
caliper cylinder I.D.	25.400—25.450 (1.0000—1.0020)	25.46 (1.0024)
caliper piston O.D.	25.318—25.368 (0.9968—0.9987)	25.31 (0.996)
brake drum I.D.	—	—
brake lining thickness	—	—

Battery/Charging System		
Alternator charging coil resistance (At 20°C/68°F)	0.1—1.0 Ω	—
Regulator/rectifier regulated voltage/amperage	13.5—15.5 V/0—6 A at 5,000 min <sup>-1</sup> (rpm)	—
Battery capacity	12V — 6AH (Maintenance Free battery: YTX7A—BS)	—
Specified current leakage	—	1 mA max.
Battery specific gravity (Fully charged)	—	—
(Needs charging)	—	—
Battery charging rate (Normal)	0.7 A/5—10 hr.	—
(Quick)	3.0 A/1 hr.	—
Battery voltage (Fully charged at 20°C/68°F)	13.0—13.2 V	—
(Needs charging at 20°C/68°F)	12.3 V	—
Alternator lighting coil resistance (At 20°C/68°F)	—	—
AC regulator regulated voltage (With analogue type)	—	—
(With digital type)	—	—

Unit: mm (in)

Ignition System		
Item	Standard	Service limit
Spark plug (Standard NGK)	ER9EH	—
(Standard ND)	Y27FER	—
(For cold climate/below 5°C/41°F NGK)	ER8EH	—
(For cold climate/below 5°C/41°F ND)	Y24FER	—
(For extended high speed riding NGK)	ER10EH	—
(For extended high speed riding ND)	Y31FER	—
Spark plug gap	0.6—0.7 (0.024—0.028)	—
Ignition timing "F" mark	18° BTDC at 1,200 min <sup>-1</sup> (rpm)	—
Advance starts	1,800 ± 200 min <sup>-1</sup> (rpm)	—
stops	12,000 ± 200 min <sup>-1</sup> (rpm)	—
Fully advance	37 ± 2° BTDC at 12,000 min <sup>-1</sup> (rpm)	—
Alternator exciter coil resistance (At 20°C/68°F)	—	—
Ignition coil resistance (Primary: at 20°C/68°F)	2.5—3.5 Ω	—
(Secondary with plug cap)	14—25 kΩ	—
(Secondary without plug cap)	11—14 kΩ	—
Pulse generator resistance (At 20°C/68°F)	450—550 Ω	—

Lights/Meters/Switches		
Main fuse	30 A	—
Fuse	20A x 1, 10A x 3	—
Headlight (high/low beam)	12 V 60/50 W x 2 (H4)	—
Tail/brake light	12 V 5/21 W x 2	—
License light	12 V 5 W	—
Position light	12 V 5 W (E, AR), 12 V 4 W (F, G)	—
Front turn signal/running light	—	—
Front turn signal light	12 V 21 W	—
Rear turn signal light	12 V 21 W	—
Instrument light	12 V 1.7 W x 5	—
Oil pressure warning indicator	12 V 1.7 W	—
Tail/brake light warning indicator	—	—
Side stand warning indicator	—	—
Low fuel indicator	—	—
Coolant temperature indicator	—	—
Oil temperature indicator	—	—
High beam indicator	12 V 1.7 W	—
Turn signal indicator	12 V 1.7 W	—
Neutral indicator	12 V 1.7 W	—
Reverse indicator	—	—
Overdrive indicator	—	—
Oil temperature sensor resistance	—	—
Fuel unit resistance (At full level)	—	—
(At empty)	—	—
Fuel pump flow capacity (min./minute)	—	—
Thermo sensor resistance (50°C/122°F)	130—180 Ω	—
(80°C/176°F)	45—60 Ω	—
(120°C/248°F)	10—20 Ω	—
Fan motor switch Starts to close (ON)	98—102°C (208—216°F)	—
Stops to open (OFF)	93—97°C (199—207°F)	—

Starting System		
Starter driven gear O.D.	41.975—42.000 (1.6526—1.6535)	41.96 (1.652)
Starter reduction gear shaft O.D.	9.994—10.000 (0.3935—0.3937)	9.90 (0.390)
Starter reduction gear I.D.	10.070—10.110 (0.3965—0.3980)	10.16 (0.400)
Starter motor brush length	12—13 (0.47—0.51)	6.5 (0.26)

## Torque Values

Standard Fasteners Type	Torque	Fasteners Type	Torque
	N·m (kg-m, ft-lb)		N·m (kg-m, ft-lb)
5 mm hex bolt and nut	5 (0.5, 3.5)	5 mm screw	4 (0.4, 3)
6 mm hex bolt and nut	10 (1.0, 7.2)	6 mm screw	9 (0.9, 7)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head)	9 (0.9, 7)
10 mm hex bolt and nut	35 (3.5, 25)	6mm flange bolt (10 mm head) and nut	12 (1.2, 9)
12 mm hex bolt and nut	55 (5.5, 40)	8 mm flange bolt and nut	27 (2.7, 20)
		10 mm flange bolt and nut	40 (4.0, 29)

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

- Notes:
1. Apply locking agent to the threads.
  2. Apply oil to the threads and flange surface.
  3. Apply molybdenum disulfide oil to the threads and flange surface.
  4. Apply sealant to the threads.
  5. Stake.
  6. Apply clean engine oil to the O-ring.
  7. UBS bolt.
  8. Self-locking nut.
  9. Never apply molybdenum disulfide oil.

Engine		Q'ty	Thread dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Item					
<b>Lubrication:</b>					
Oil pump driven sprocket bolt	—	1	6	15 (1.5, 11)	Note 1
Oil pump mounting bolt		3	6	12 (1.2, 9)	
Oil pump cover bolt		3	6	12 (1.2, 9)	
Oil filter		1	20	10 (1.0, 7)	Note 6
Oil drain bolt		1	12	38 (3.8, 27)	
Oil pressure switch	—	1	PT1/8	12 (1.2, 9)	Note 4
<b>Fuel system:</b>					
Carburetor insulator band screw		8	4	1 (0.1, 0.7)	
<b>Cooling system:</b>					
Water pump mounting bolt		2	6	10 (1.0, 7)	
Water pump cover bolt		2	6	10 (1.0, 7)	Note 4
Thermo sensor		1	PT1/8	10 (1.0, 7)	Note 4
<b>Cylinder head/cylinder/piston:</b>					
Cam gear case mounting bolt		8	8	36 (3.6, 26)	Note 2
Cam gear case set bolt		2	6	12 (1.2, 9)	Note 2
Cylinder head cover bolt		8	6	10 (1.0, 7)	
Camshaft holder bolt		32	6	12 (1.2, 9)	
Rocker arm shaft plug		8	PT1/8	8 (0.8, 6)	Note 4
Cylinder head special bolt, 8 mm		16	8	36 (3.6, 26)	Note 2
Cylinder head bolt, 6 mm		6	6	12 (1.2, 9)	
Spark plug		4	8	9 (0.9, 7)	
<b>Clutch/gearshift linkage:</b>					
Right crankcase cover		12	6	10 (1.0, 7)	
Clutch lock nut		1	20	85 (8.5, 61)	Note 5
Gearshift return spring stud pin		1	8	23 (2.3, 17)	Note 1
Shift drum center bolt		1	6	23 (2.3, 17)	Note 1
Shift drum set plate bolt		2	6	12 (1.2, 9)	Note 1
Shift fork shaft set bolt		1	6	12 (1.2, 9)	Note 1
Timing hole cap		1	45	18 (1.8, 13)	Note 3

Engine (Cont'd)		Q'ty	Thread dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
<b>Crankcase/crankshaft/transmission:</b>					
Drive sprocket bolt		1	10	55 (5.5, 40)	Note 2, 9
Neutral switch		1	10	12 (1.2, 9)	
Connecting rod bearing cap nut		8	7	24 (2.4, 17)	
Crankcase bolt 6 mm		12	6	12 (1.2, 9)	
8 mm		11	8	23 (2.3, 17)	
10 mm		1	10	40 (4.0, 29)	
Lower case oil bolt		1	10	23 (2.3, 17)	
<b>Alternator:</b>					
Flywheel bolt		1	10	85 (8.5, 61)	Note 7
<b>Starter clutch:</b>					
Primary drive gear bolt (starter clutch bolt)		1	10	85 (8.5, 61)	Note 7
Starter clutch cover bolt		3	8	28 (2.8, 20)	Note 1

<b>Frame</b>					
<b>Frame/body panels:</b>					
Main step holder bolt		4	8	27 (2.7, 20)	Note 1
Main step bolt		2	10	45 (4.5, 33)	
Pillion step bracket bolt		4	8	27 (2.7, 20)	Note 1
Sub-frame mounting bolt		4	10	27 (2.7, 20)	
Side stand pivot bolt		1	10	38 (3.8, 27)	
Side stand bracket bolt		2	8	35 (3.5, 25)	
<b>Exhaust system:</b>					
Exhaust pipe joint nut		8	6	8 (0.8, 6)	
<b>Cooling system:</b>					
Fan motor switch		1	16	23 (2.3, 17)	Note 4
<b>Fuel system:</b>					
Fuel tank breather check valve		1	18	11 (1.1, 1.8)	Note 1
Fuel valve		1	18	23 (2.3, 17)	
<b>Engine mount:</b>					
Engine mounting bolt		7	10	40 (4.0, 29)	
Engine mounting adjust bolt		2	22	11 (1.1, 8)	Note 2
Engine mounting lock nut		2	22	55 (5.5, 40)	
Engine mounting nut		1	10	40 (4.0, 29)	
Gearshift pedal bolt		1	6	12 (1.2, 9)	
<b>Front suspension:</b>					
Handlebar holder pinch bolt		4	6	12 (1.2, 9)	Note 1
Ignition switch mounting bolt		2	8	25 (2.5, 18)	
Fork socket bolt		2	8	20 (2.0, 14)	Note 1
Fork bolt		2	37	23 (2.3, 17)	
Upper fork pinch bolt		2	7	11 (1.1, 8)	Note 2
Lower fork pinch bolt		2	10	40 (4.0, 29)	
Steering bearing adjustment nut		1	35	50 (5.0, 36)	
Steering stem nut		1	33	140 (14.0, 101)	
Front axle pinch bolt		4	8	22 (2.2, 16)	Note 2
Front axle bolt		1	14	60 (6.0, 43)	

## General Information

Frame (Cont'd)				
Item	Q'ty	Thread dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
<b>Rear suspension:</b>				
Rear wheel nut	1	18	120 (12.0, 87)	Note 5
Rear axle holder lock nut	1	38	165 (16.5, 119)	
Swingarm pivot nut	1	18	95 (9.5, 69)	
Swingarm pivot adjust bolt	1	30	15 (1.5, 11)	
Swingarm pivot lock nut	1	30	80 (8.0, 58)	
Drive chain slider screw	4	5	4 (0.4, 2.9)	Note 8
Driven sprocket nut	6	8	35 (3.5, 25)	
Torque link bolt/nut	2	10	35 (3.5, 25)	
Rear shock absorber mounting bolt	2	10	45 (4.5, 33)	
Rear shock absorber spring adjuster lock nut	1	—	90 (9.0, 65)	
Rear shock absorber reservoir holder band	2	—	4 (0.4, 2.9)	Note 8
Shock linkage bolt/nut	3	10	45 (4.5, 33)	
Rear bearing holder pinch bolt	1	14	55 (5.5, 40)	Note 1
Drive pin bolt	4	12	15 (1.5, 11)	
<b>Brake/clutch system:</b>				
Master cylinder mounting bolt	4	6	12 (1.2, 9)	Note 1
Master cylinder oil bolt	2	10	35 (3.5, 25)	
Front caliper bolt	8	8	33 (3.3, 24)	
Front caliper oil bolt	2	10	35 (3.5, 25)	
Front brake disc bolt	12	6	20 (2.0, 14)	
Caliper mounting bolt	6	8	27 (2.7, 20)	Note 1
Caliper pad pin	3	10	17 (1.7, 12)	
Caliper pad pin plug	3	10	2.5 (0.25, 1.8)	
Caliper bleed valve	3	8	6 (0.6, 4.3)	
Rear brake reservoir mounting bolt	1	6	9 (0.9, 7)	
Rear brake reservoir hose joint screw	1	5	1.5 (0.15, 1.1)	Note 1
Rear caliper pivot pin bolt (5 mm HEX side)	1	8	13 (1.3, 9)	Note 1
Rear caliper pivot pin bolt	1	8	23 (2.3, 17)	Note 1
Rear brake hose joint nut (hose side)	1	10	14 (1.4, 10)	Note 8
Rear brake hose joint (caliper side)	1	10	35 (3.5, 25)	
Rear brake disc nut	4	8	35 (3.5, 25)	



# Tools

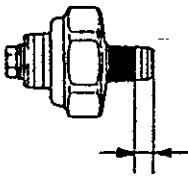
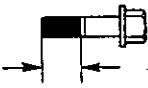
- The newly designed tools are indicated with \* mark in the list.

Description	Tool Number	Application	Section
Compression gauge attachment, 8 mm Oil pressure gauge attachment Oil filter wrench Spark plug wrench, 8 mm	*07KME-MR80100 07510-4220100 07HAA-PJ70100 *07KMA-MR80200	Cylinder compression measurement Engine oil pressure measurement Oil filter replacement Spark plug removal/installation	3
Lock nut wrench	07HMA-MR70200	Engine removal/installation	7
Valve spring compressor attachment Valve guide driver Valve guide reamer, 4.5 mm Valve seat cutter, 24 mm (45° IN) Valve seat cutter, 22 mm (45° EX) Valve flat cutter, 24 mm (32° IN) Valve flat cutter, 21.5 mm (32° EX) Valve interior cutter, 22 mm (60° IN/EX) Cutter holder, 4.5 mm	07959-KM30101 07HMD-ML00100 07HMH-ML00101 07780-0010600 07780-0010701 07780-0012500 07780-0012800 07780-0014202 07781-0010600	Cylinder head disassembly/assembly Valve guide replacement Valve guide reaming Valve seat refacing	8
Lock nut wrench, 26 × 30 mm Extension bar Gear holder	07716-0020203 07716-0020500 07724-0010100	Clutch disassembly/assembly Primary drive gear removal/installation	9
Fork seal driver Fork seal driver attachment Lock nut wrench, 39 × 41 mm Steering stem socket Steering stem driver attachment Inner driver C Driver attachment B (2 pcs. required) Driver assembly shaft Bearing remover B Assembly base	07947-KA50100 07947-KF00100 07GMA-KS40100 07HMA-MR70100 07HMD-MR70100 07746-0030100 07946-KM90200 07946-KM90300 07946-KM90500 07946-KM90600	Fork oil seal installation Steering stem nut removal/installation Steering bearing adjustment nut tightening Steering bearing lower inner race installation Steering bearing outer race removal/installation	12
Driver Attachment, 42 × 47 mm Attachment, 62 × 68 mm Pilot, 40 mm Shock absorber compressor attachment Shock absorber compressor Bushing driver B Pivot adjust wrench Driver shaft Attachment, 37 × 40 mm Pilot, 20 mm Bearing remover set - Remover handle - Bearing remover - Sliding weight Needle bearing remover Driver shaft Pilot, 28 mm	07749-0010000 07746-0010300 07746-0010500 07746-0040900 07959-MB10000 07GME-0010000 07HMF-MM90200 07908-4690001 07946-MJ00100 07746-0010200 07746-0040500 07936-3710001 07936-3710100 07936-3710600 07741-0010201 07HMC-MR70100 07946-MJ00100 07746-0041100	Bearing installation Bearing holder needle bearing replacement Shock absorber disassembly/assembly Shock absorber upper mounting bushing replacement Swingarm pivot bolt removal/installation Right swingarm pivot bearing installation Right swingarm pivot bearing removal Left swingarm pivot bearing replacement	13

**General Information**

Description	Tool Number	Application	Section
Pin driver assembly	07GMD-KT80100	Shock arm needle bearing removal	13
Bearing remover	07936-3710300	Shock link needle bearing removal	
Remover handle	07936-0710100		
Sliding weight	07741-0010201		
Driver	07749-0010000	Shock arm and link needle bearing	
Attachment, 24 x 26 mm	07746-0010700	installation	
Pilot, 17 mm	07746-0040400		
Snap ring pliers	07914-3230001	Brake master cylinder disassembly/ assembly	14
Peak voltage adaptor	07HGJ-0020100	Peak voltage measurement	16
Digital multimeter	07411-0020000		
Universal holder	07725-0030000	Flywheel removal/installation	17
Rotor puller	07733-0020001		

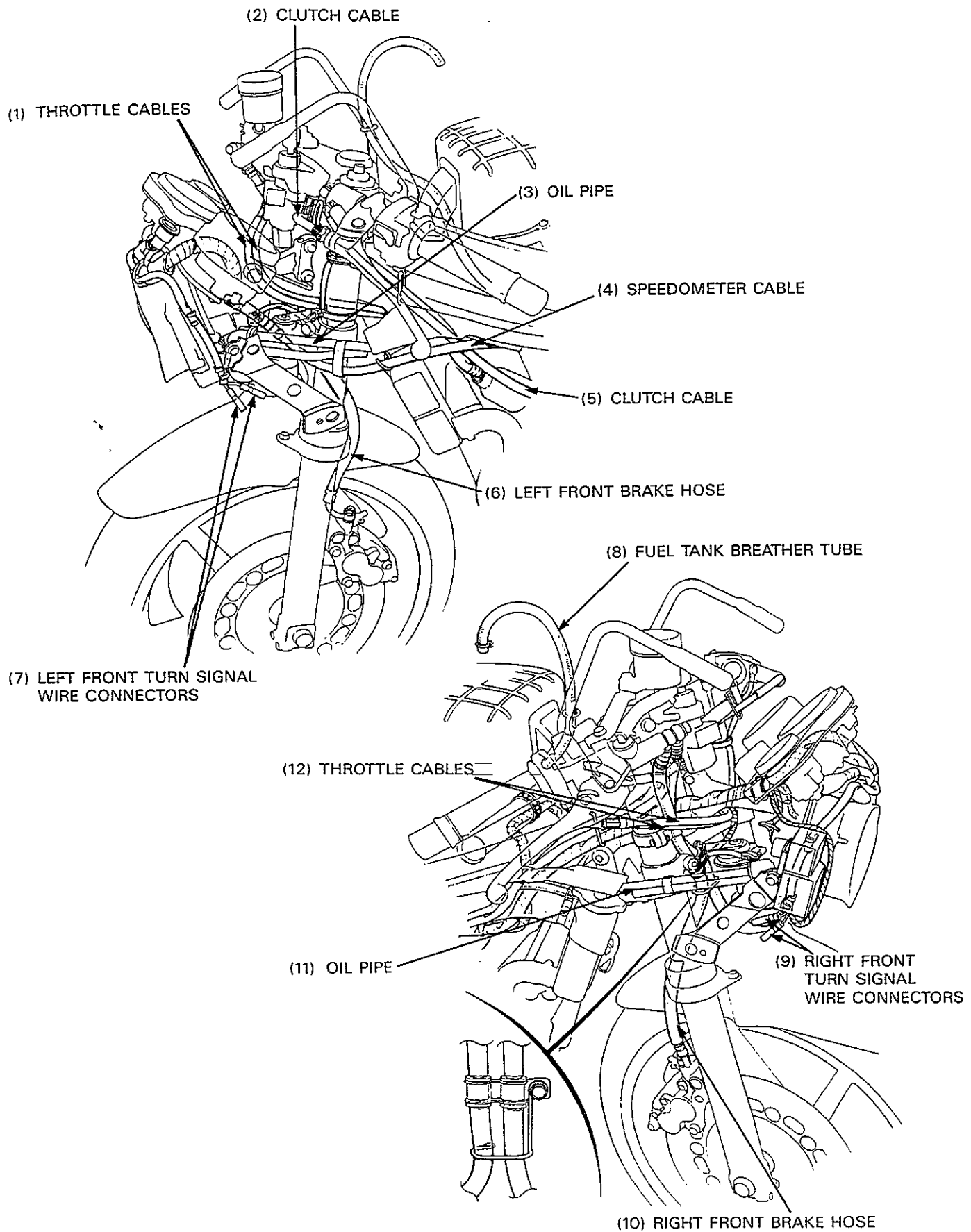
## Lubrication & Seal Points

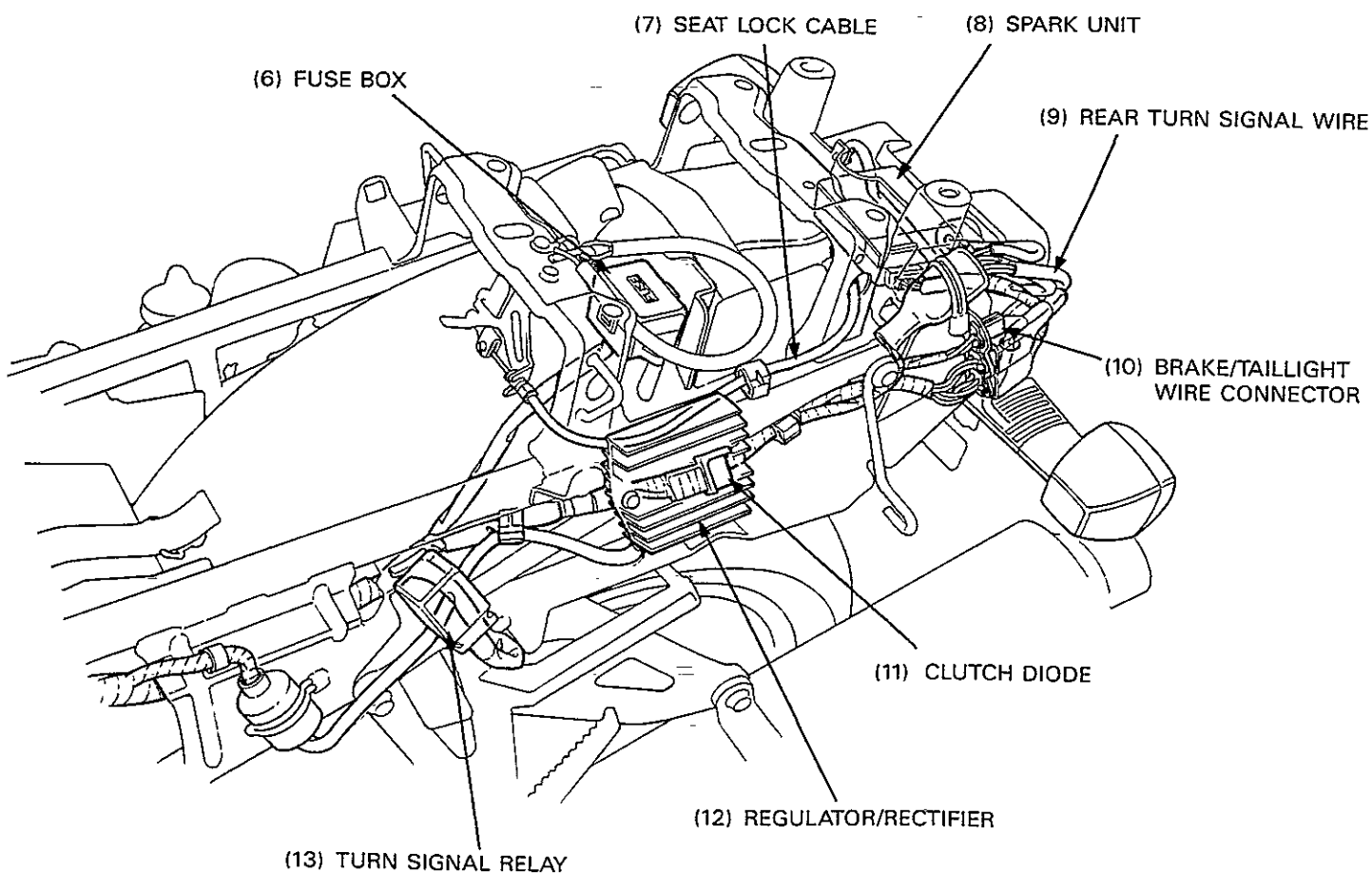
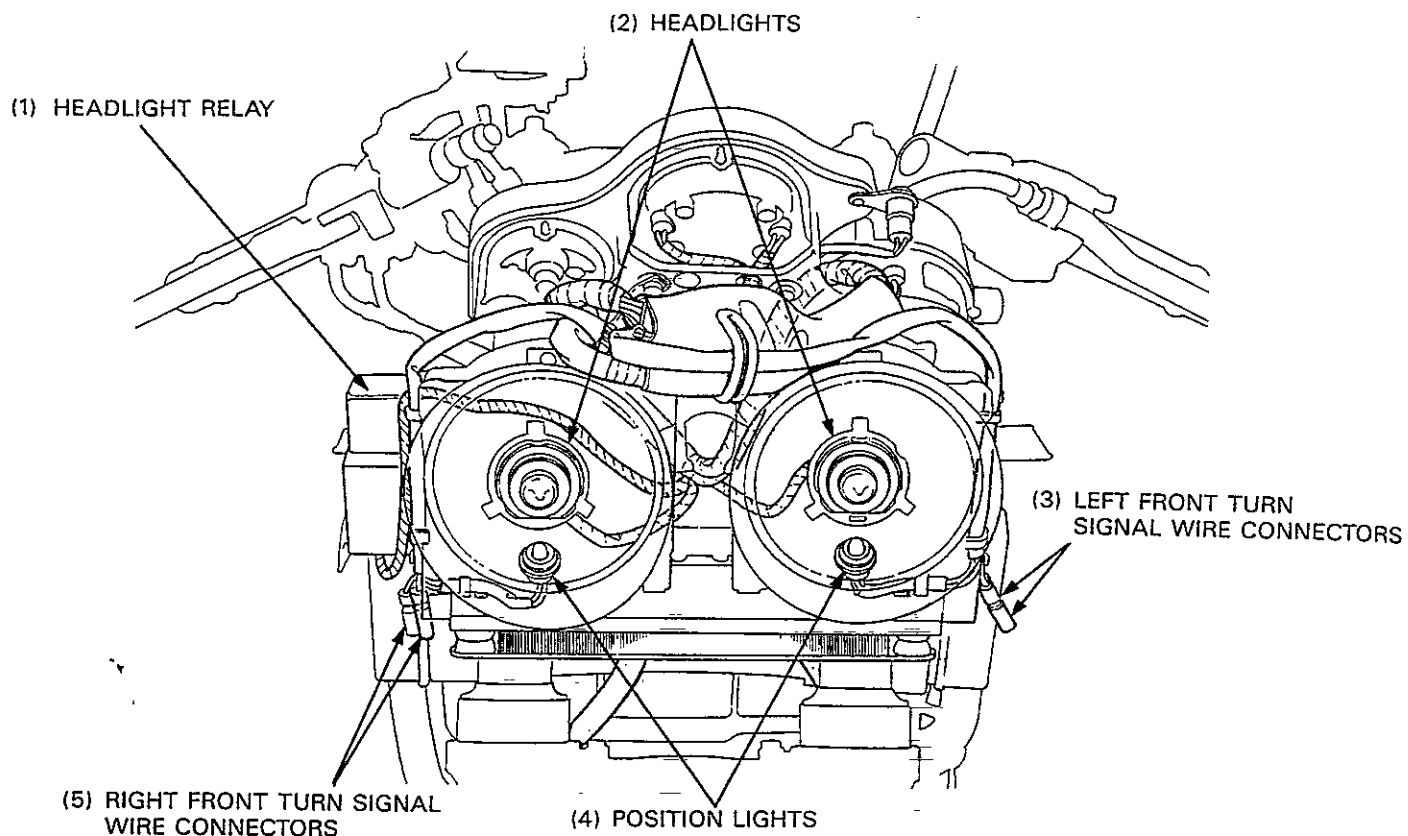
Engine		
Location	Material	Remarks
Valve stem (valve guide sliding surface) Connecting rod small end bearing Transmission gearshift fork groove Timing hole cap threads Connecting rod bearing Crankshaft main bearing	Molybdenum disulfide oil	
Crankcase mating surface	Liquid sealant	Do not apply sealant near the main bearings.
Rocker arm shaft plug Oil pressure switch threads  Thermò sensor threads 3-4 mm (0.12-0.16 in)	Sealant	Do not apply sealant to the switch thread head as shown.
Oil filter O-ring Piston Cylinder head bolt threads Connecting rod bearing cap nut  Rocker arm sliding surface Camshaft journal, cam lobe Other sliding surface	Engine oil	<b>CAUTION</b> Never apply molybdenum disulfide oil.
Clutch lifter rod (lifter cam contacting area)	Multipurpose grease	
Cylinder head sealing bolt threads Shift drum center bolt threads Gearshift return spring stud pin Shift drum set plate bolt threads Shift fork shaft set bolt threads Oil pump driven sprocket bolt threads  5.5-7.5 mm (0.22-0.30 in)	Locking agent	

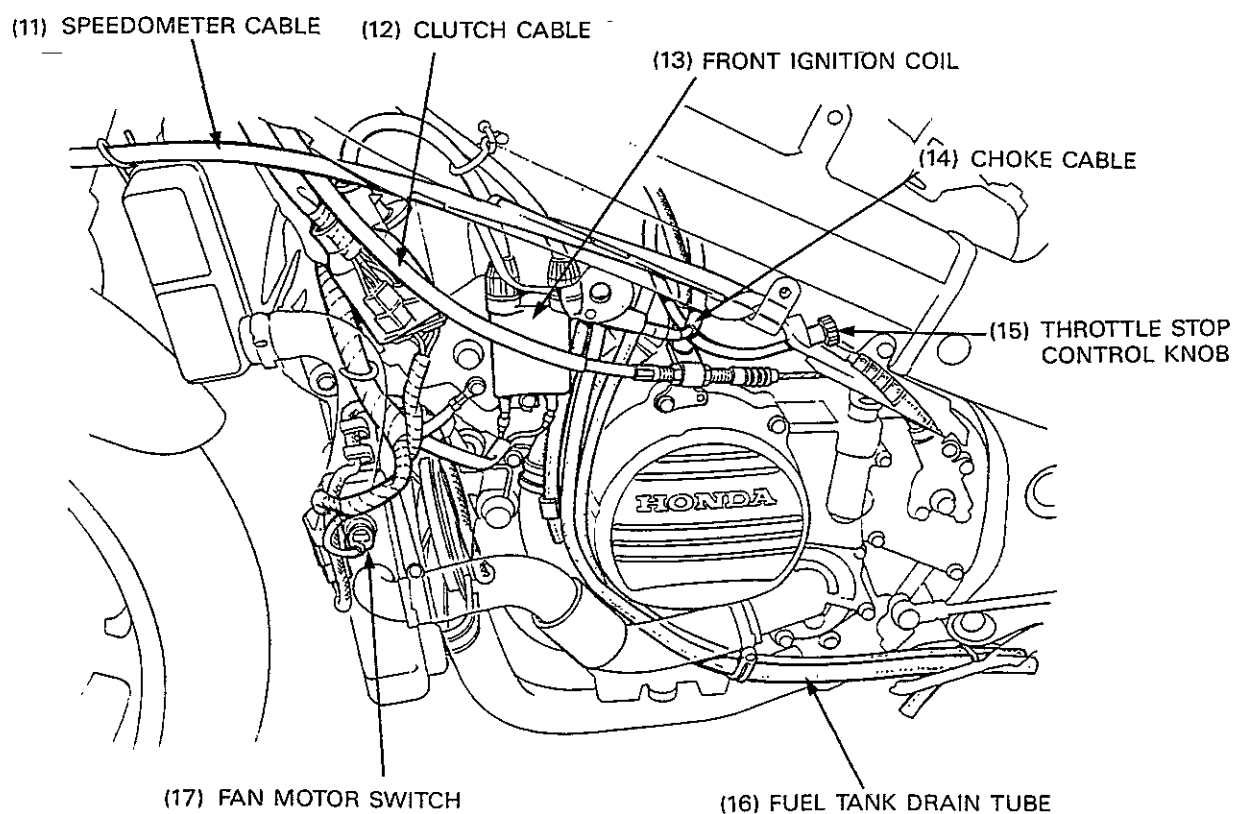
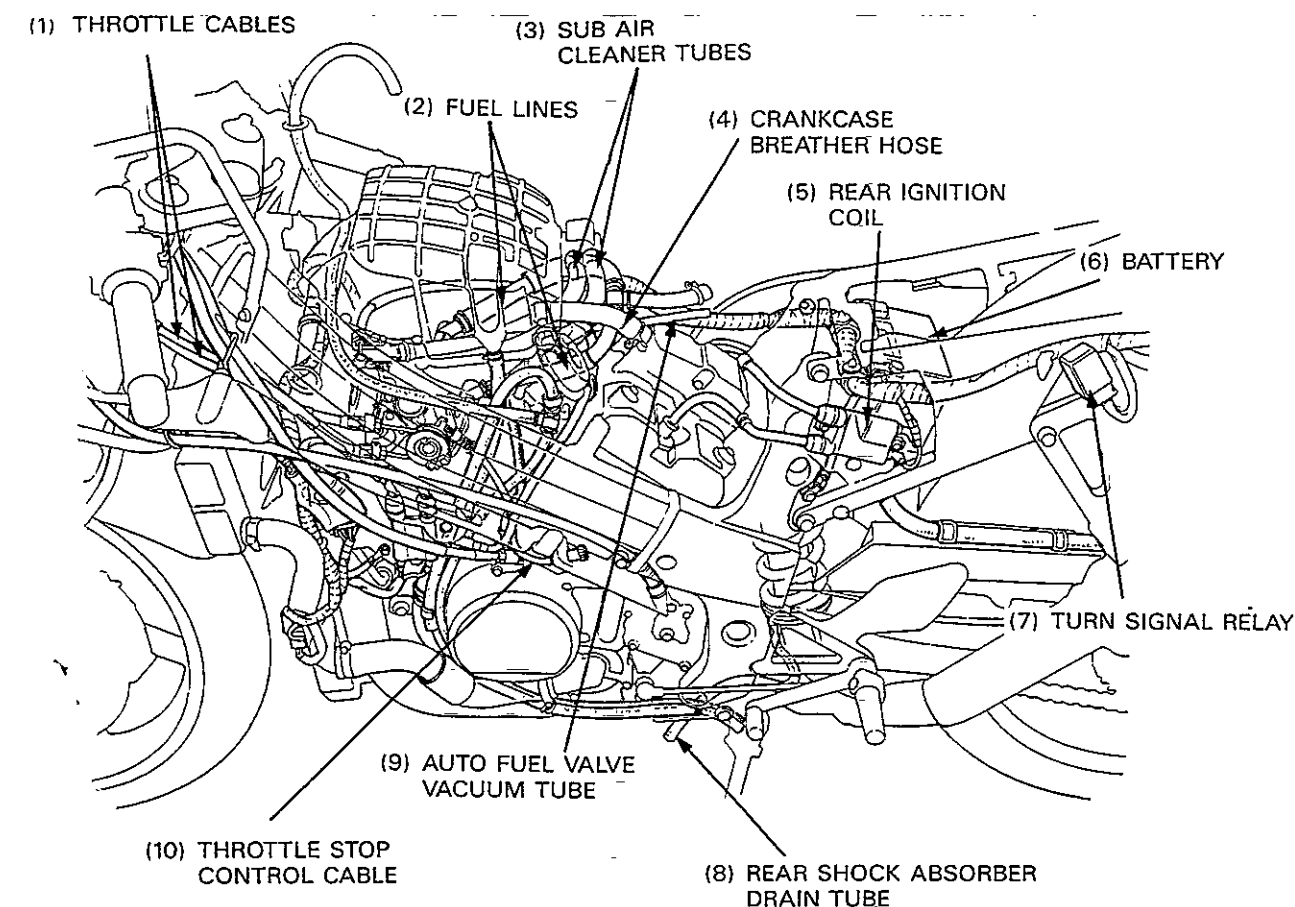
## General Information

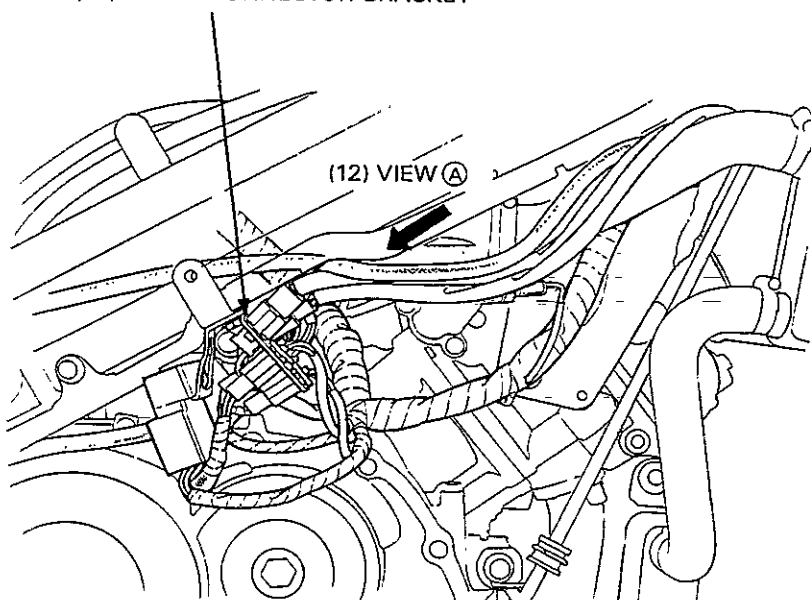
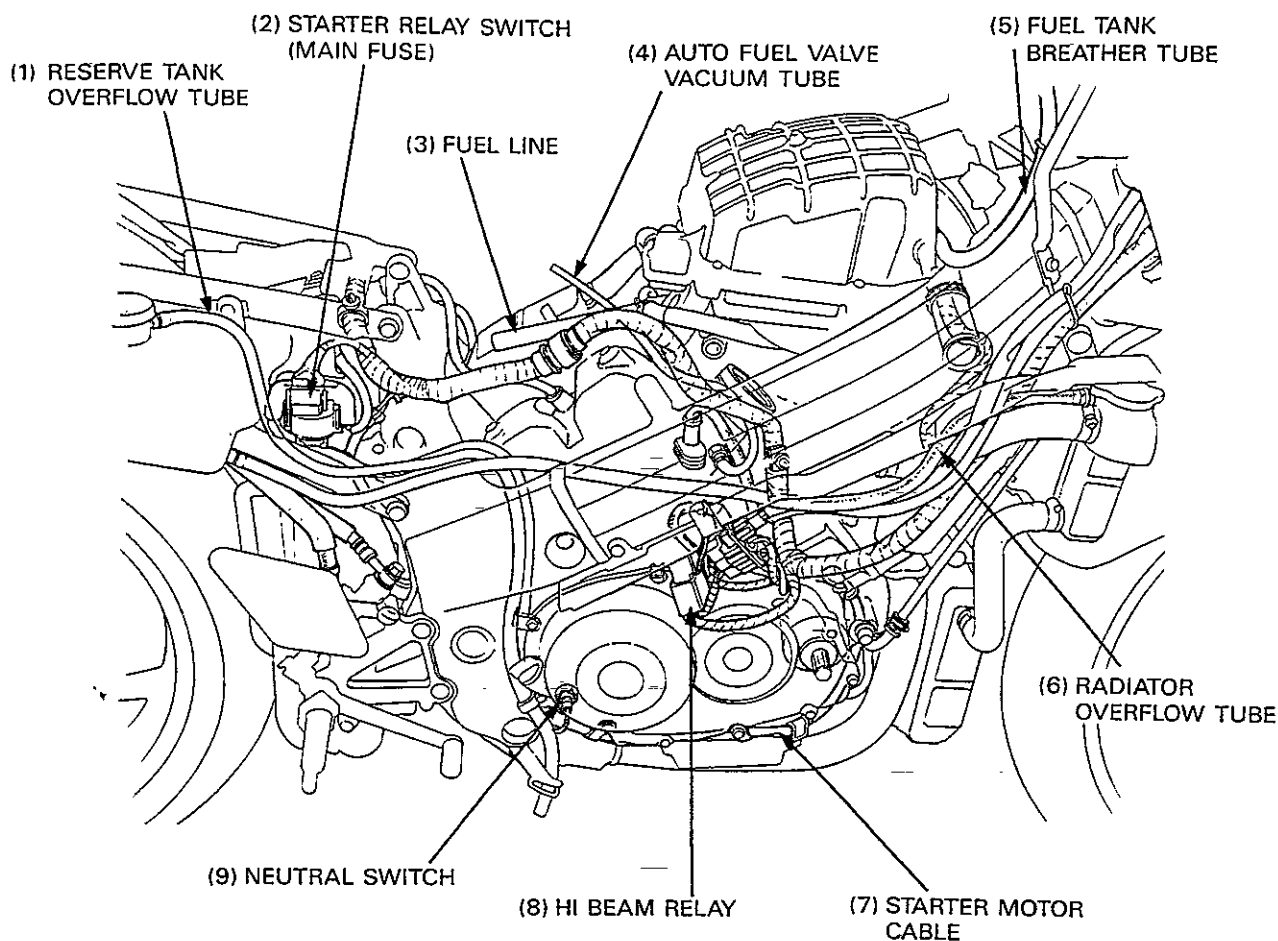
Frame	Location	Material	Remarks
	Drive chain	Gear oil # 80 - 90	
	Axle holder bearing Side stand pivot Shock linkage bearing collar Shock linkage bearing Seat lock hook Gearshift pedal pivot Shock absorber upper mounting collar Swingarm pivot bearing Steering head bearing Step pivot Speedometer gearbox Throttle pipe flange Rear brake pedal pivot Dust seal lip Pad pin threads Pad pin plug threads	Multipurpose grease	
	Caliper piston Caliper piston seal Caliper dust seal Master cylinder piston Master cylinder piston cup	DOT 4 brake fluid	
	Steering bearing adjustment nut threads	Engine oil	
	Fan motor switch threads	Sealant	
	Handlebar grip rubber	Honda Bond A or equivalent	
	Caliper pivot pin Caliper pivot pin boot	Silicone grease	
	Side stand bracket bolt threads Drive chain slider screw threads Drive pin bolt threads Fork socket bolt threads Ignition switch mounting bolt threads Main step holder bolt threads Rear caliper pivot bolt threads Rear brake reservoir hose screw threads	Locking agent	

# Cable & Harness Routing



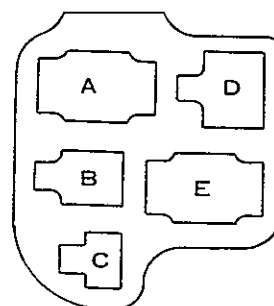






(13)

- A: IGNITION SWITCH WIRE CONNECTOR (3P-BLACK)
- B: PULSE GENERATOR WIRE CONNECTOR (4P-BLACK)
- C: OIL PRESSURE SWITCH/NEUTRAL SWITCH WIRE CONNECTOR (2P-BLACK)
- D: RIGHT HANDLEBAR SWITCH WIRE CONNECTOR (6P-RED)
- E: ALTERNATOR WIRE CONNECTOR (3P-WHITE)



(14) VIEW A



## 2. Frame/Body Panels/Exhaust System

**2**

Service Information	2-1	Fuel Tank Removal/Installation	2-5
Seat Cowling Removal/Installation	2-2	Windshield Removal/Installation	2-6
Upper Fairing Removal/Installation	2-2	Muffler Removal/Installation	2-8
Side Fairing Removal/Installation	2-3	Exhaust Pipe Removal/Installation	2-10
Lower Fairing Removal/Installation	2-4	Sub-Frame Removal/Installation	2-12

### Service Information

#### **⚠ WARNING**

- Gasoline is extremely flammable and explosive under certain conditions.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.

- Work in a well ventilated area. Smoking or allowing flames or sparks in the working area or where gasoline is stored can cause a fire or explosion.
- This section cover removal and installation of the frame body panels, fuel tank and exhaust system.
- Frame body panel installation is in the reverse order of removal, unless noted otherwise.
- When removing the cover, be careful not to damage any tab or groove of the cover.
- Be careful not to bind the wire harnesses when installing the sub-frame.

## Seat Cowling Removal/Installation

Unlock the rear seat by turning the ignition key clockwise. Remove the rear seat.

Remove the six attaching screws.

Raise the rear of the seat cowl and release the two bosses from the grommets.

Disconnect the brake/taillight wire connector and remove the seat cowl rearward.

### NOTE

- Be careful not to damage the front of the cowl.

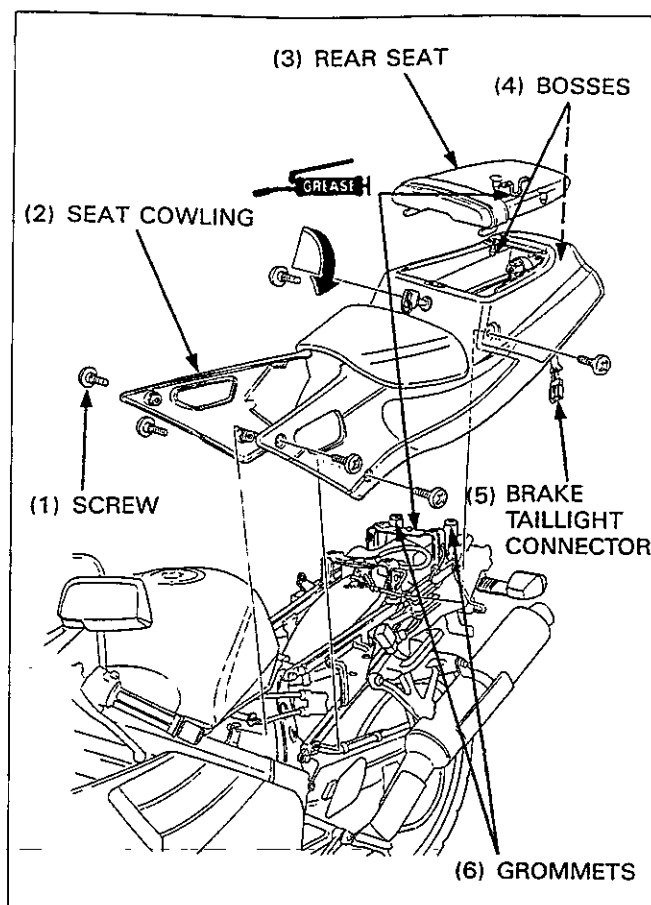
Install the seat cowl, while inserting the hook of the cowl under the frame.

Insert the bosses into the grommet by pushing the rear of the cowl.

Install the rear seat, aligning the hook with the cowl, and push the seat down to lock the seat.

### NOTE

- Grease the seat striker and latch.
- The rear seat is not installed securely if any obstructions are under the seat.
- Be careful not to bind the wire harness etc.



## Upper Fairing Removal/Installation

Disconnect the left and right turn signal wire connectors.

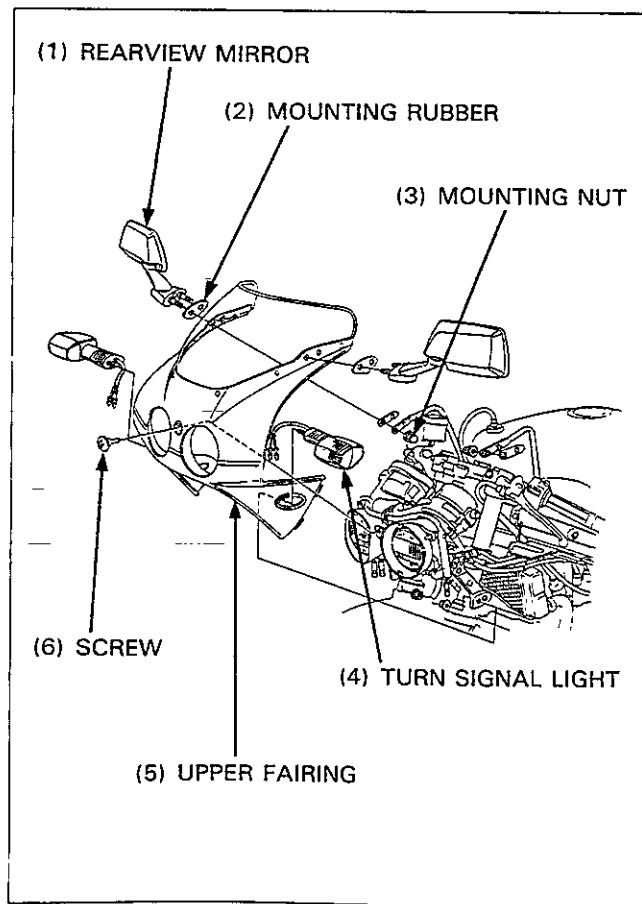
Remove the following:

- both side fairings (page 2-3).
- front panel (page 2-4).
- both rearview mirror mounting nuts.
- both rearview mirror.
- both rearview mirror mounting rubbers.
- both turn signal lights.
- screw.
- upper fairing.

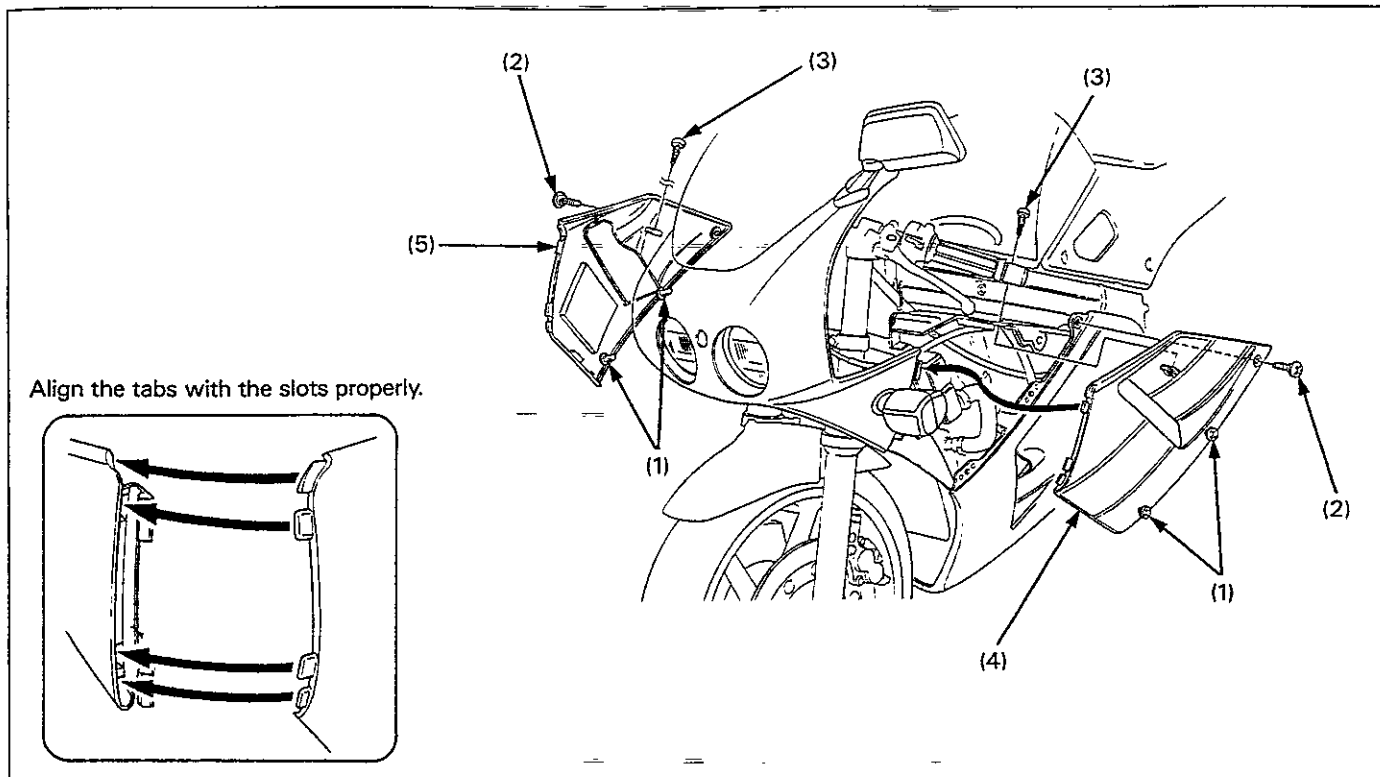
Install the upper fairing in the reverse order of removal.

### CAUTION

- Be careful not to bind the mounting rubber.



## Side Fairing Removal/Installation

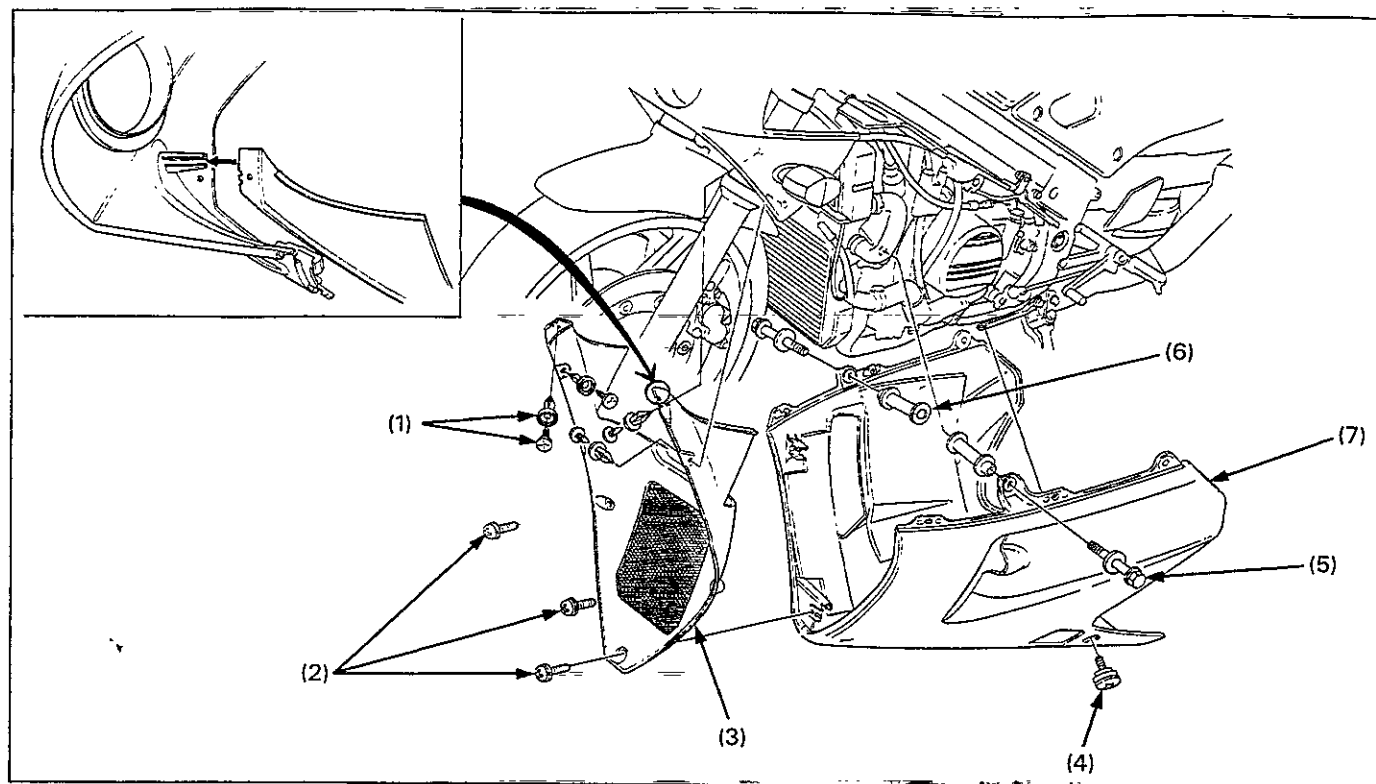


### CAUTION

- Be careful not to damage the tabs.
- Make sure that the clip nut for the tapping screw is installed properly. If it is missing, install it securely with the threaded side facing down.

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Quick screw	4	
(2)	Screw	2	
(3)	Tapping screw	2	
(4)	Left side fairing	1	
(5)	Right side fairing	1	

## Lower Fairing Removal/Installation



### CAUTION

- Make sure that the clip nut for the tapping screw is installed properly. If it is missing, install it securely with the threaded side facing down.

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Trim clip screw/nut	4	
(2)	Front panel screw	3	
(3)	Front panel	1	<b>NOTE</b> At installation, insert the top ends under the tab of the upper fairing properly as shown.
(4)	Mounting screw	2	
(5)	Mounting bolt/washer	2	
(6)	Mounting collar	2	
(7)	Lower fairing assembly	1	

## Fuel Tank Removal/Installation

### ⚠ WARNING

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

Remove the seat cowl (page 2-2).

Turn the fuel valve OFF.

Disconnect the fuel tank breather tube from the tank.

Remove the fuel tank mounting bolt.

Raise the rear of the tank and disconnect the fuel line and vacuum tube from the fuel valve.

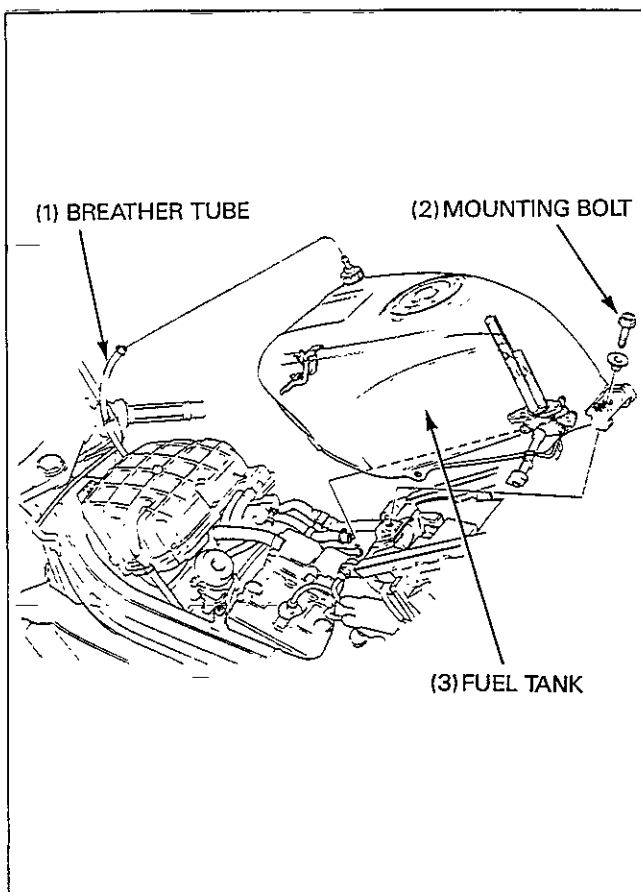
Install the fuel tank in the reverse order of removal.

### NOTE

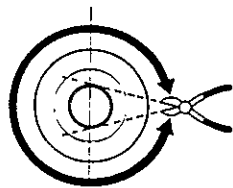
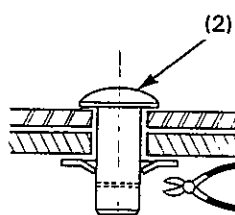
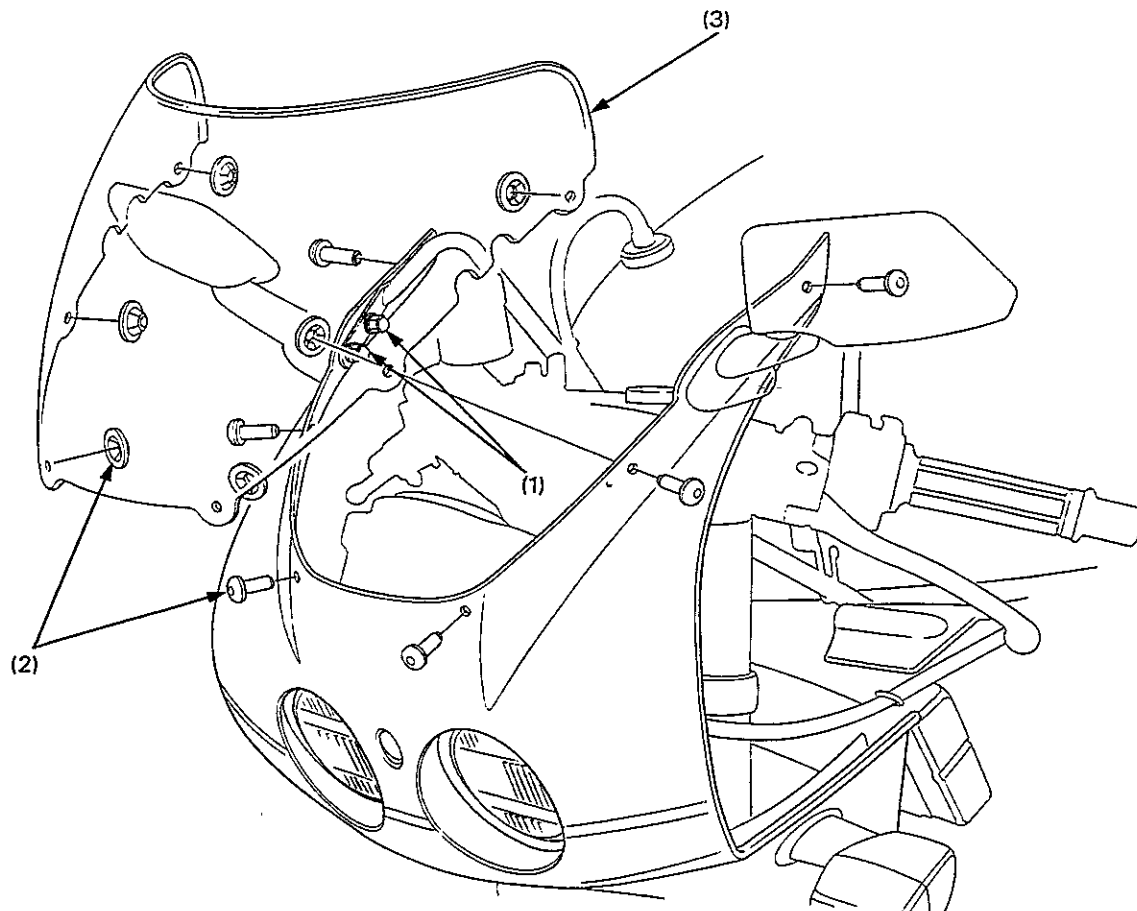
- Make sure that the fuel tank mounting rubber is installed onto the frame properly before installing the tank.

After connecting the fuel line, connect a vacuum pump to the auto fuel valve vacuum joint and apply vacuum.

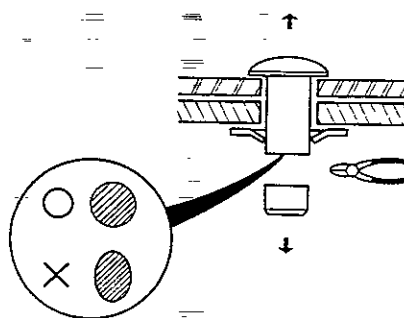
Turn the fuel valve ON and check the fuel line for leakage.



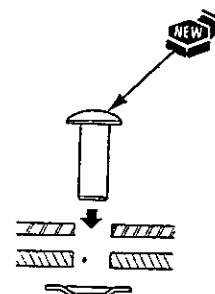
## Windshield Removal/Installation



1. Put the kerf around the circumference of the pin.



2. Cut the pin at the kerf, being careful not to deform the pin. Pull out the remaining pin.



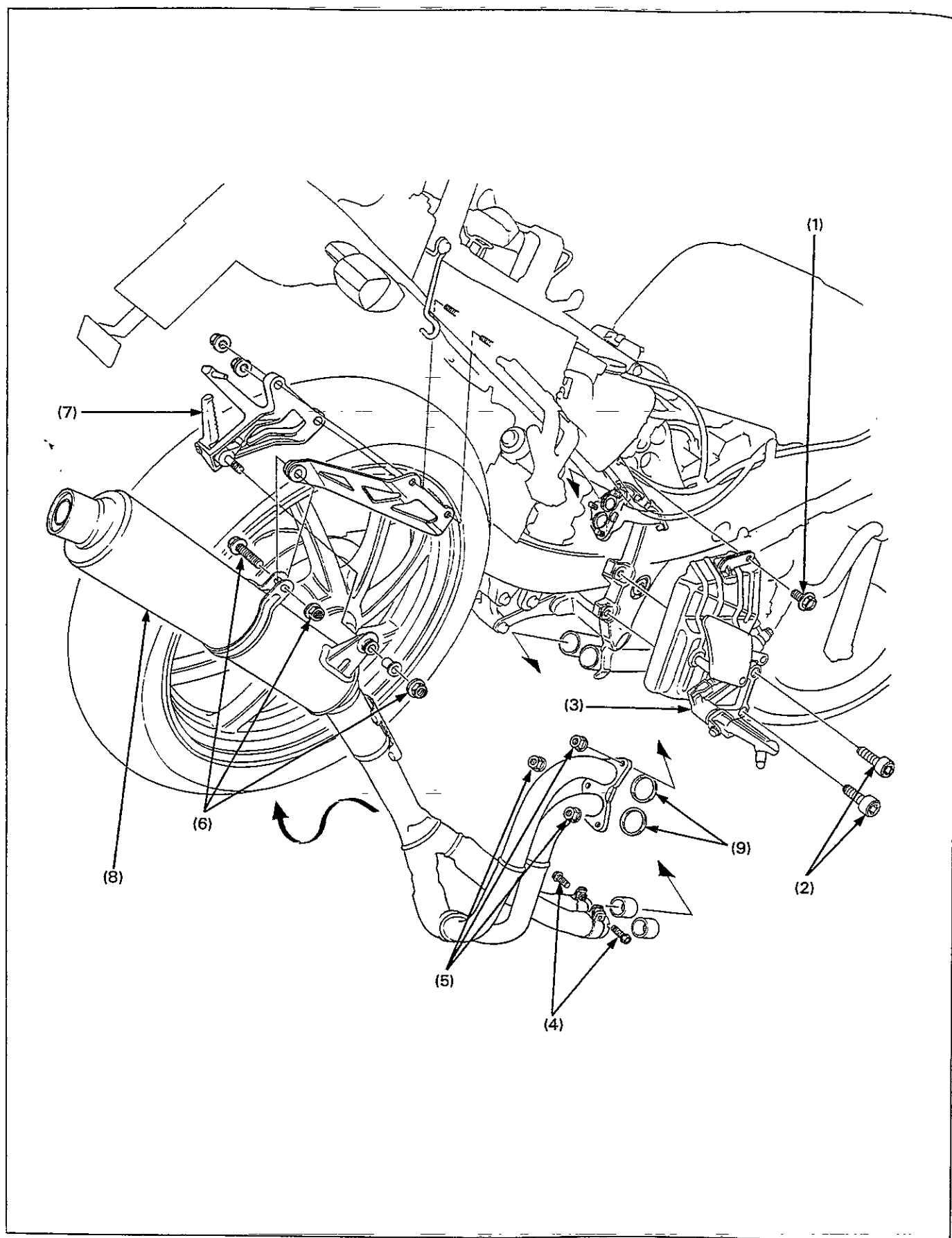
3. Install with using new pins.

## NOTE

- Be careful not to damage the windshield.

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Rearview mirror mounting nut	4	NOTE Loosen until the clearance is made. NOTE Cut the pin to remove.
(2)	Set pin/ring	6	
(3)	Windshield	1	
<b>Installation Order</b>			
(3)	Windshield	1	NOTE Temporarily install the set rings, position the windshield properly and fit the pins.
(2)	Set pin/ring	6	
(1)	Rearview mirror mounting nut	4	

## Muffler Removal/Installation





**⚠ WARNING**

- Do not service the exhaust system while it is hot.

**CAUTION**

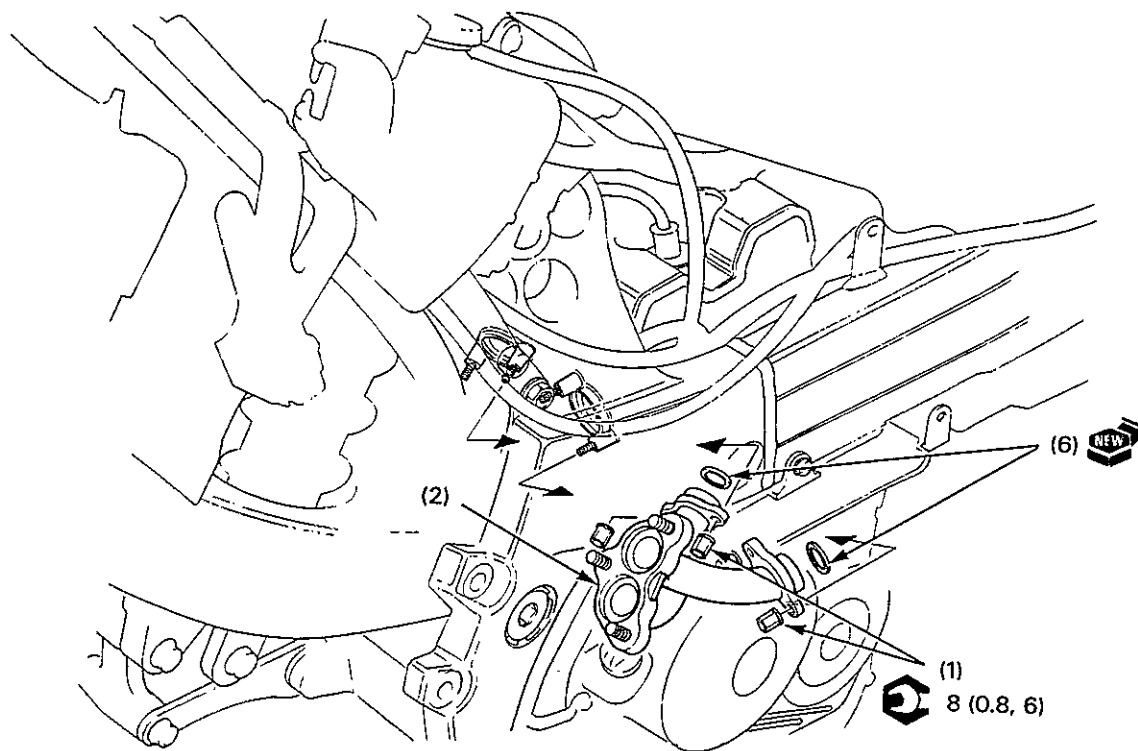
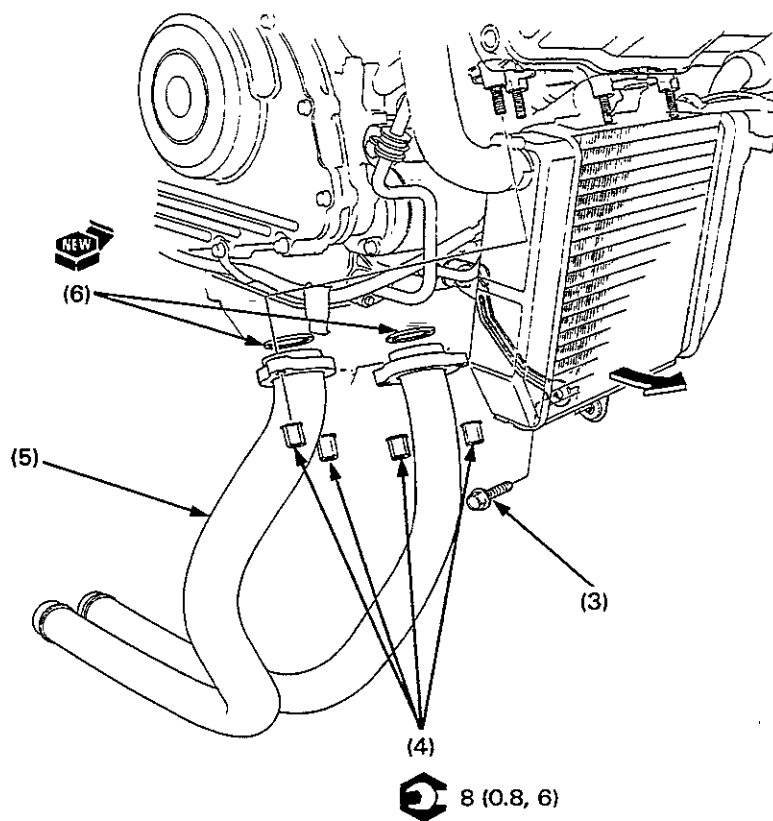
- Do not bend or twist the brake hose. Support the removed right step assembly so that it does not hang from the brake hose.

**Requisite Service**

- Seat cowling removal/installation (page 2-2)
- Lower fairing removal/installation (page 2-4)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Heat guard mounting bold	1	NOTE Remove together with the heat guard. Never hang it from the brake hose.
(2)	Right step bolt	2	
(3)	Right step	1	
(4)	Exhaust pipe band bolt	2	NOTE Loosen the bolts.
(5)	Exhaust pipe nut	3	NOTE At installation, loosely install the bolt and nuts, tighten the exhaust pipe nuts and band bolts first, then tighten them.
(6)	Muffler mounting bolt/nut	1/2	
(7)	Left pillion step	1	
(8)	Muffler assembly	1	
(9)	Gasket	2	

## Exhaust Pipe Removal/Installation



**CAUTION**

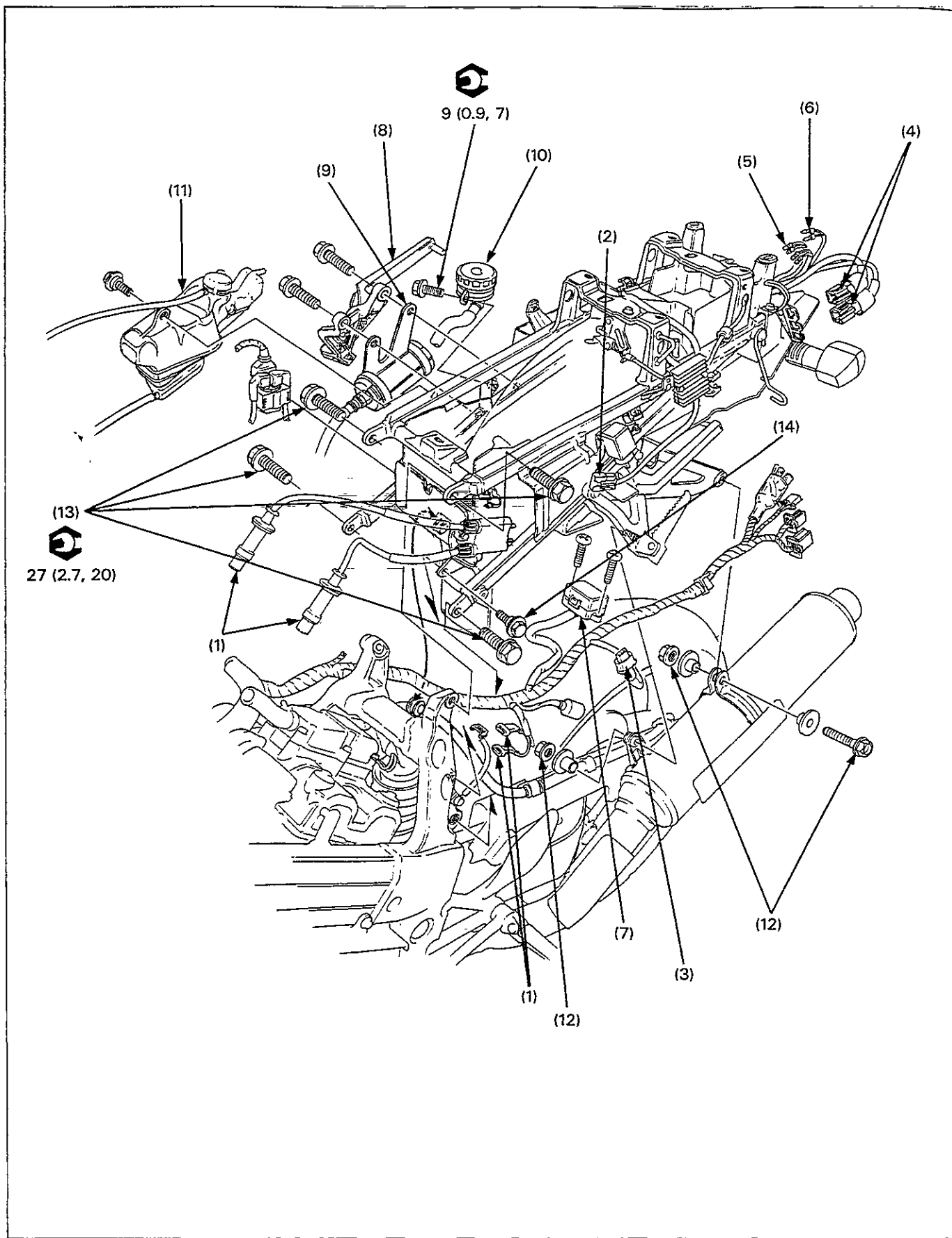
- Cover the radiator fins to prevent them from damaging when servicing the front exhaust pipe.

**Requisite Service**

- Muffler removal/installation (page 2-8)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Rear exhaust pipe joint nut	4	<b>NOTE</b> Remove the bolts, move the radiator forward and hold it with a string.
(2)	Rear exhaust pipe	1	
(3)	Lower radiator mounting bolt	2	
(4)	Front exhaust pipe joint nut	4	
(5)	Front exhaust pipe	1	
(6)	Gasket	4	

## Sub-Frame Removal/Installation



**CAUTION**

- Turn the ignition switch OFF and disconnect the battery negative cable from the battery terminal.
- Be careful not to bind the wire harness when installing the sub-frame.
- Route the wire harness, cable, etc. (page 1-21).

**Requisite Service**

- Seat cowling removal/installation (page 2-2)
- Fuel tank removal/installation (page 2-5)
- Battery removal/installation (page 15-4)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Spark plug cap/primary wire connector	2/2	
(2)	Regulator/rectifier connector	1	
(3)	Turn signal relay connector	1	
(4)	Spark unit wire connector	2	
(5)	Rear turn signal wire connector	4	
(6)	License light wire connector	2	
(7)	Fuse box	1	
(8)	Right grab rail	1	
(9)	Shock absorber reservoir/bracket	1	
(10)	Rear brake reservoir	1	<b>CAUTION</b> Keep the reservoir level to prevent air from entering the system.
(11)	Radiator reserve tank	1	
(12)	Muffler mounting bolt/nut	1/2	
(13)	Sub-frame mounting bolt	4	<b>NOTE</b> Remove the main wire harness from the clamp.
(14)	Rear fender bolt	1	

# 3. Maintenance

Service Information	3-1	Valve Clearance	3-7
Service Access Guide	3-2	Carburetor Synchronization	3-10
Maintenance Schedule	3-4	Drive Chain	3-11
Air Cleaner	3-5	Side Stand	3-12
Spark Plug	3-5		

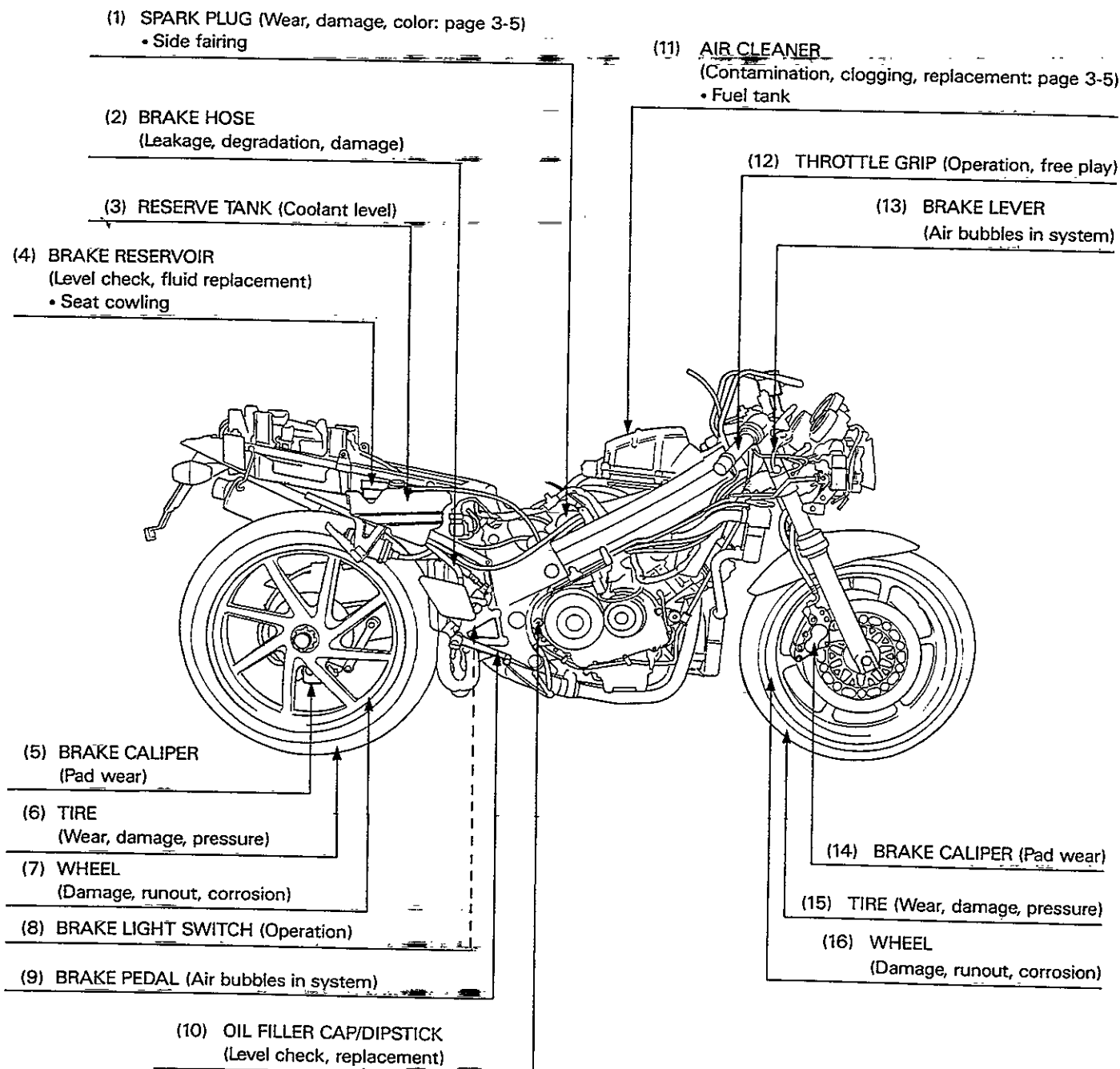
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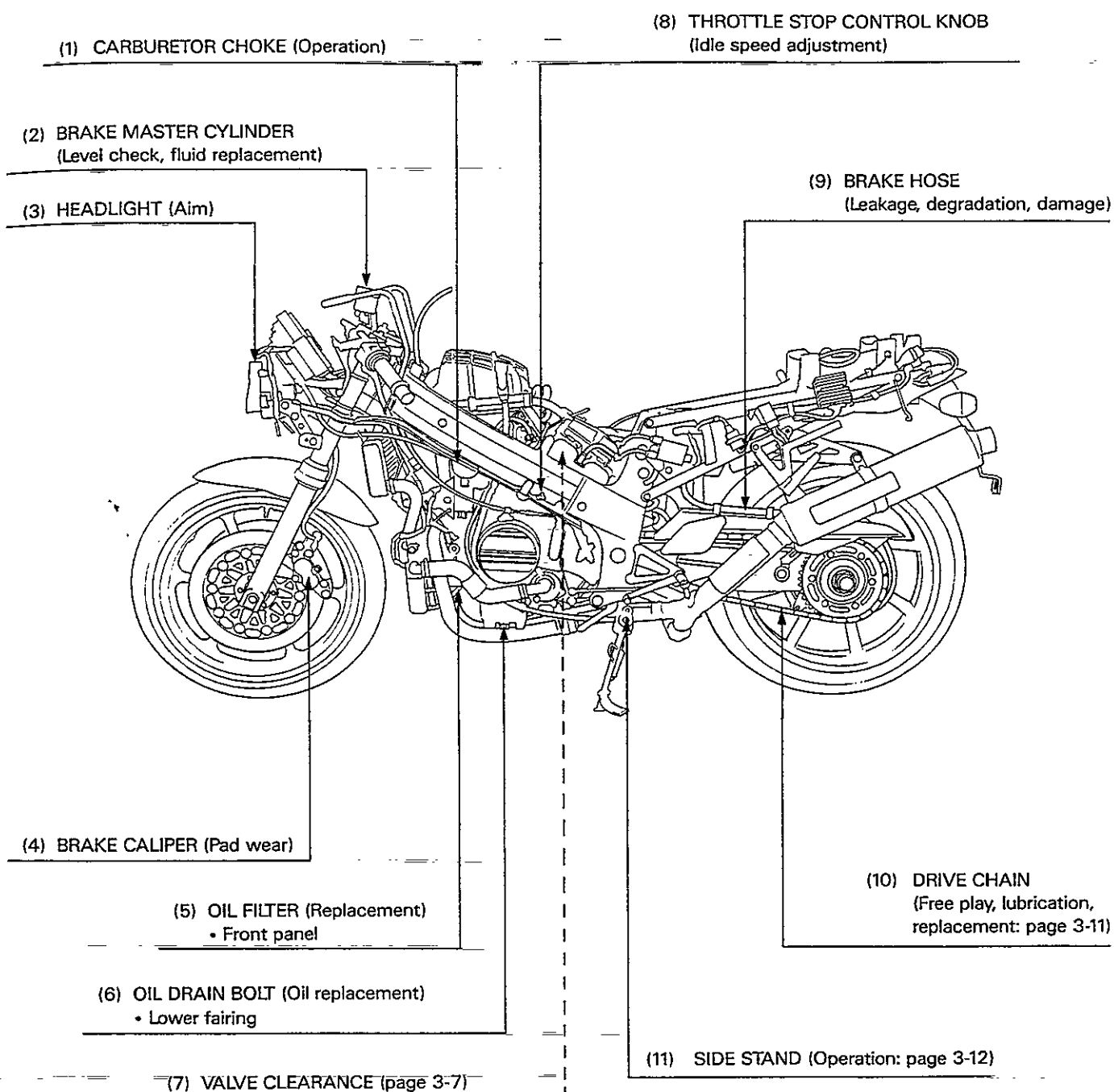
## Service Information

- Refer to Common Service Manual for service procedures on items not included in this manual.
- Refer to the specifications (Section 1) for maintenance service data.

## Service Access Guide

- The following shows the locations of the parts that must be removed for the maintenance items listed below. Refer to the Common Service Manual for items not included in this manual.
- Refer to section 2 (Frame/body panels/exhaust system), for the parts that must be removed for service.  
For example: AIR CLEANER (Contamination, clogging, replacement) — Maintenance part (service items)
  - Fuel tank — The parts that must be removed for service.







# 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.

R: Replace C: Clean L: Lubricate A: Adjust

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

Item	Frequency	Whichever comes first → ↓ Note	Odometer Reading (Note 1)								Refer to page
			× 1,000 km	1	6	12	18	24	30	36	
			× 1,000 mi	0.6	4	8	12	16	20	24	
			Months		6	12	18	24	30	36	
* Fuel Line						I		I		I	Note 4
* Throttle Operation						I		I		I	Note 4
* Carburetor Choke						I		I		I	Note 4
Air Cleaner		Note 2					R			R	3-5
* Valve Clearance				I				I			3-7
Spark Plug					I	R	I	R	I	R	3-5
Engine Oil				R		R		R		R	Note 4
Engine Oil Filter				R		R		R		R	Note 4
* Carburetor Synchronization				I		I		I		I	3-10
* Carburetor Idle Speed				I	I	I	I	I	I	I	Note 4
Radiator Coolant		Note 3				I		I		R	Note 4
* Cooling System						I		I		I	Note 4
Drive Chain			I, L Every 1,000 km (600 mi)								3-11
Brake Fluid		Note 3			I	I	R	I	I	R	Note 4
Brake Pads Wear					I	I	I	I	I	I	Note 4
Brake System				I		I		I		I	Note 4
* Brake Light Switch						I		I		I	Note 4
* Headlight Aim						I		I		I	Note 4
Clutch System				I	I	I	I	I	I	I	Note 4
Side Stand						I		I		I	3-12
* Suspension						I		I		I	Note 4
* Nuts, Bolts, Fasteners				I		I		I		I	Note 4
** Wheels/Tires						I		I		I	Note 4
** Steering Head Bearings				I		I		I		I	Note 4

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

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

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

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

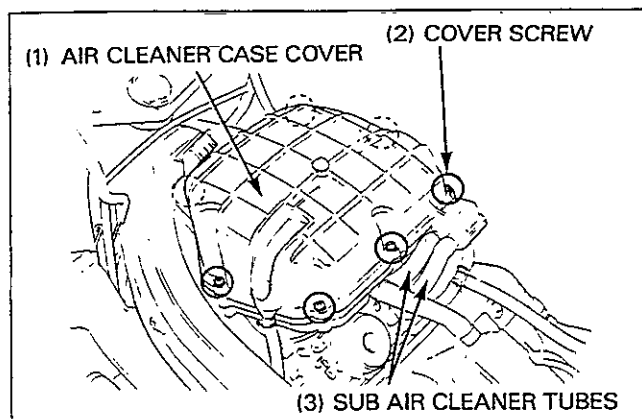
3. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

4. Refer to Common Service Manual.

## Air Cleaner

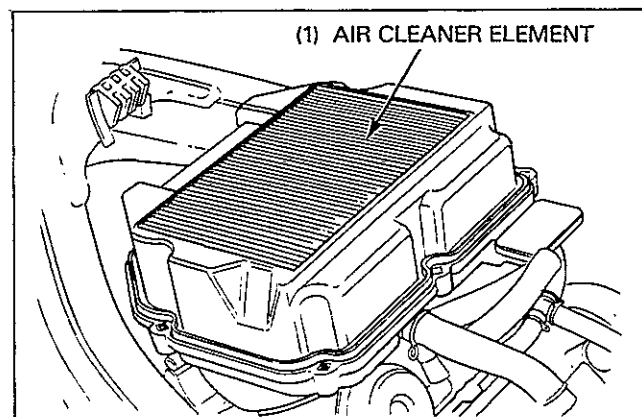
Remove the following:

- seat cowling (page 2-2).
- fuel tank (page 2-5).
- air cleaner case cover screws.
- sub air cleaner tubes.
- air cleaner case cover.



Remove the air cleaner element, and replace it with a new one.

Install the removed parts in the reverse order of removal.



## Spark Plug

### ⚠ WARNING

- Do not touch the exhaust pipe while it is hot.

### Rear Cylinder:

Remove the No. 1 and No. 3 cylinder spark plug caps, and remove the spark plugs with the spark plug wrench.

### Front Cylinder:

Remove the following:

- both side fairings (page 2-3).
- upper radiator lower mounting bolt.

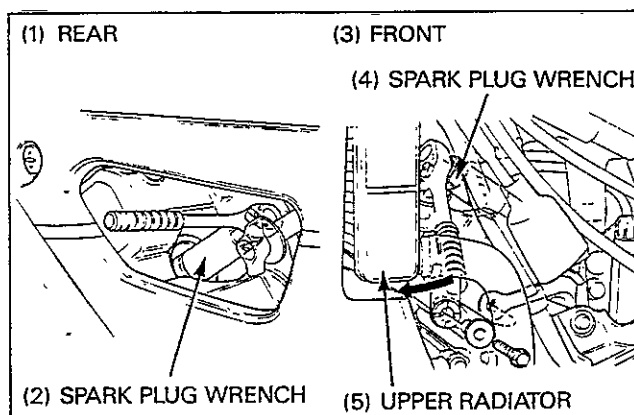
Move the upper radiator forward, remove the No. 2 and No. 4 cylinder spark plug caps and remove the spark plugs with the spark plug wrench.

### CAUTION

- Be careful not to damage the radiator fins while servicing.

### NOTE

- For inspection, refer to section 2 of the Common Service Manual.
- For recommended spark plug and specified spark plug gap, refer to section 1 (Specifications).



Using the spark plug wrench, hand tighten the spark plug until it is seated, then tighten it to the specified torque:

**Torque: 9 N·m (0.9 kg-m, 7 ft-lb)**

**When the spark plug wrench (07KMA—MR80200) is used:**

Hand tighten the spark plug until it is seated, using the spark plug wrench.

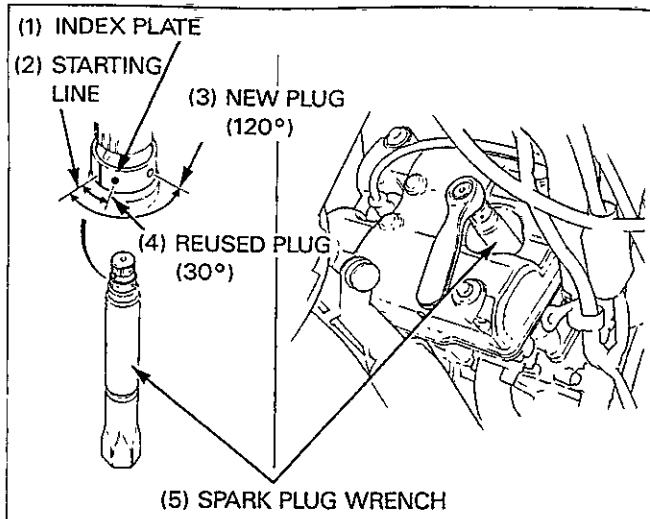
Turn the index plate to align the starting line of the tightening, and install the handle onto the spark plug wrench.

When a new spark plug is used (the sealing washer is not compressed), tighten the plug from the starting line to the "○" mark of the index plate.

When the spark plug is reused (the sealing washer is compressed), tighten the plug from the starting line to the "●" mark of the index plate.

### CAUTION

- Never tighten the plug over the "○" and "●" marks.



## Valve Clearance

### NOTE

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

## Cylinder Head Cover Removal

### Front Cylinder

Remove the lower fairing (page 2-4).

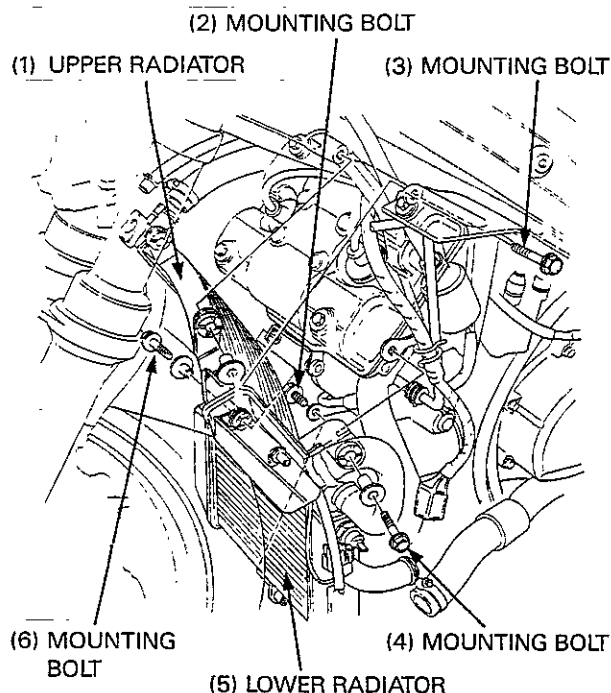
Remove the upper and lower radiator mounting bolts and move the radiators forward.

Remove the following:

- fuel tank (page 2-5).
- air cleaner case (page 6-4).
- air cleaner case base.
- heat protector.
- front spark plug caps.
- front cylinder head cover bolts.
- front cylinder head cover.

### CAUTION

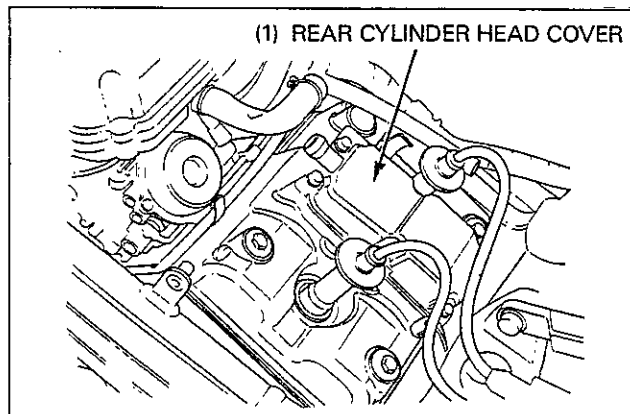
- Cover the radiator fins to prevent them from damaging when servicing.
- Be careful not to damage the front fender.



### Rear Cylinder

Remove the following:

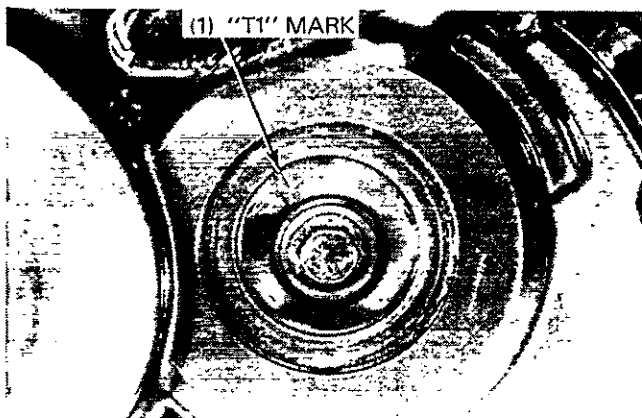
- seat cowl (page 2-2).
- fuel tank (page 2-5).
- rear cylinder head cover bolts.
- rear cylinder head cover.



### Inspection

Remove the timing hole cap.

Turn the crankshaft clockwise and align the "T" mark (front: T2, rear: T1) on the starter clutch cover with the index mark on the right crankcase cover.

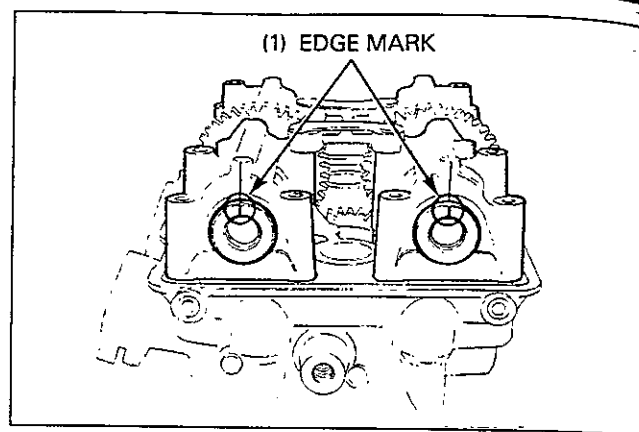


## Maintenance

When the edge marks on the right sides of the cam shafts are facing up, the piston of the following cylinder is at TDC (Top Dead Center) on the compression stroke.

Front (T2): No. 4 cylinder

Rear (T1): No. 1 cylinder



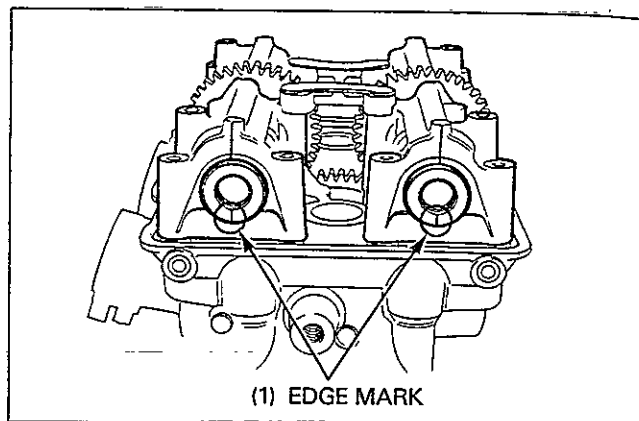
When the edge marks are facing down, the following cylinder is at TDC on the compression stroke.

Front (T2): No. 2 cylinder

Rear (T1): No. 3 cylinder

Relation between the timing mark and edge marks:

Timing mark	Edge marks	Piston at TDC on the compression stroke
T1	Facing up	No. 1 cylinder
	Facing down	No. 3 cylinder
T2	Facing up	No. 4 cylinder
	Facing down	No. 2 cylinder



Make sure that the piston is at TDC on the compression stroke.

Measure the valve clearance by inserting the feeler gauge between the rocker arm and adjustment shim.

Valve clearance:

Intake valve: 0.12—0.18 mm (0.005—0.007 in)

Exhaust valve: 0.21—0.27 mm (0.008—0.011 in)

### Shim Removal

Make sure that the piston is at TDC on the compression stroke.

Place the shop towels in the spark plug hole and cam gear case hole and place the magnet near the shim to prevent the shim from falling.

Move the rocker arm inward by pushing it.

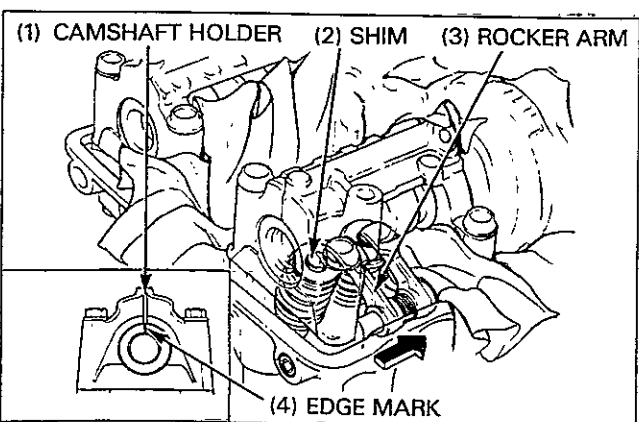
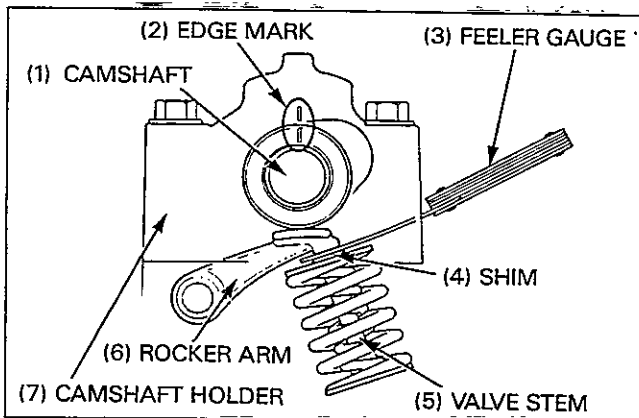
### CAUTION

- If the valve clearance is too small, the shim may jump out when moving the rocker arm.

### NOTE

- To hold the moved rocker arm, it is convenient to use the snap ring pliers (07914—5670100).

Remove the shim with a tweezers.



## Shim Selection

### NOTE

- Sixty-five shims are available in thickness intervals of 0.025 mm. The thinnest is 1.200 mm and the thickest is 2.800 mm.

Clean the shim with a clean shop towel.

Measure the shim thickness with a micrometer and record it.

To select the shim needed to bring the valve clearance within specification, use the following formula:

$$a = b - c + d$$

a: new shim thickness

b: recorded valve clearance

c: specified valve clearance

d: old shim thickness

Example:

Recorded valve clearance = 0.20 mm (b)

Specified valve clearance = 0.15 mm (c)

Old shim thickness = 2.200 mm (d)

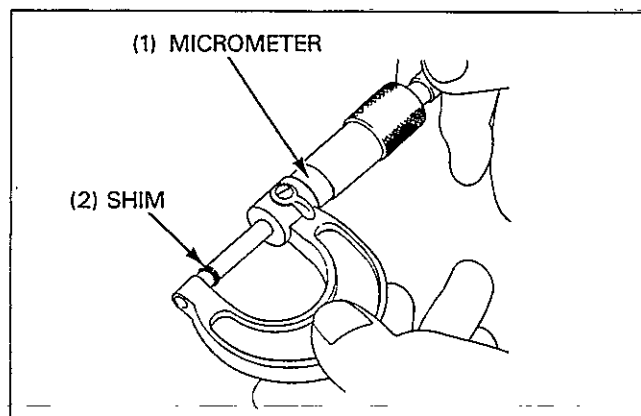
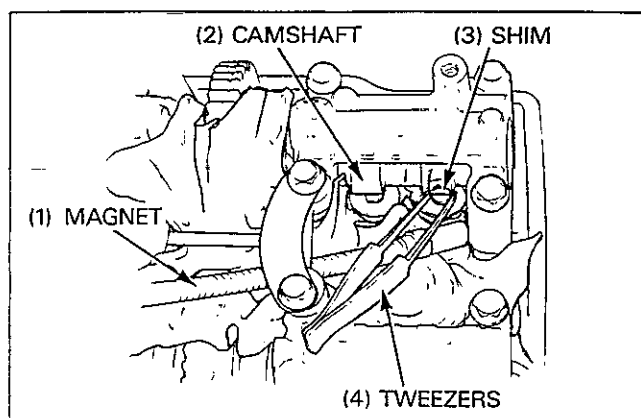
$$a = 0.20 - 0.15 + 2.200$$

$$a = 2.25$$

$$\text{New shim thickness} = 2.250 \text{ mm}$$

### NOTE

- If the required thickness of the new shim is more than 2.800 mm, the valve seat is probable heavily carboned. Reface the seat, recheck valve clearance and reselect the shim.



## Shim Installation

Make sure that the piston is at TDC on the compression stroke.

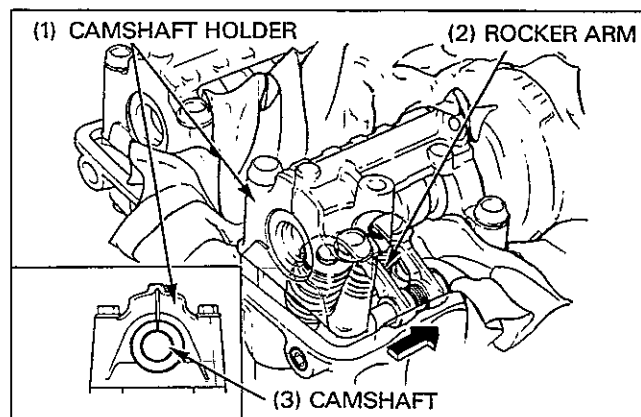
Apply molybdenum disulfide oil to the shim and rocker arm slipper.

Place the shop towels in the spark plug hole and cam gear case hole and place the magnet near the valve to prevent the shim from falling.

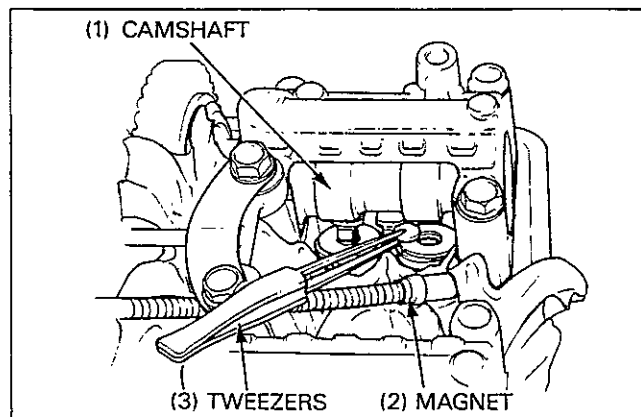
Move the rocker arm inward by pushing it.

### NOTE

- To hold the moved rocker arm, it is convenient to use the snap ring pliers (07914-5670100).



Install the shim with the tweezers.



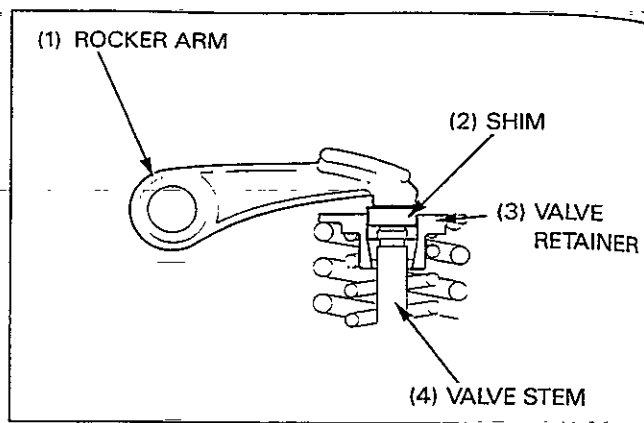
## Maintenance

Carefully slide the rocker arm back to the original position. Make sure that the shim contacting surface of the rocker arm is positioned in the center of the shim and the shim is completely seated.

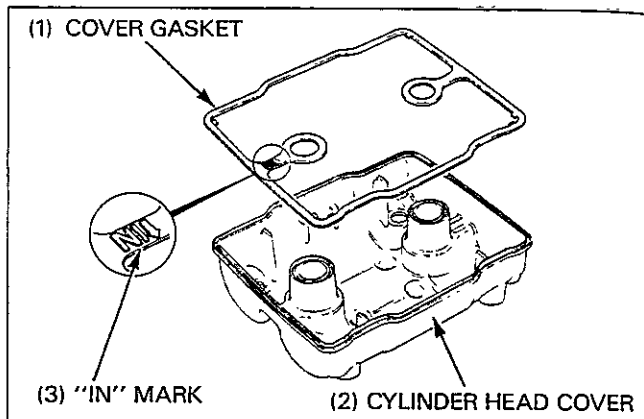
### CAUTION

- Be careful not to bound the shim out when sliding the rocker arm.

Turn the crankshaft clockwise several times. Recheck the valve clearance.



Apply Honda bond A or equivalent to the gasket groove in the cylinder head cover. Install the cover gasket with the "IN" mark facing toward the intake side.

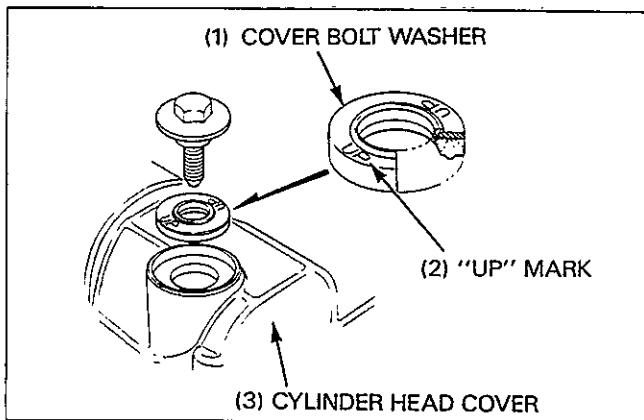


Install the cylinder head cover with the "IN" mark facing toward the intake side.

Install the cover bolt washers with the "UP" mark facing up. Install the cover bolts and tighten them.

**Torque: 10 N·m (1.0 kg-m, 7 ft-lb)**

Install the removed parts in the reverse order of removal.



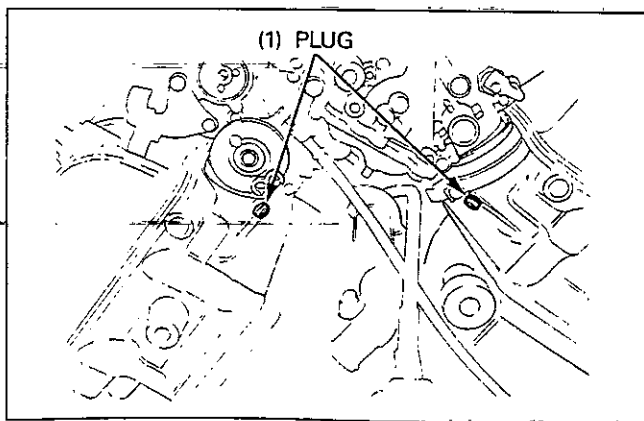
## Carburetor Synchronization

### NOTE

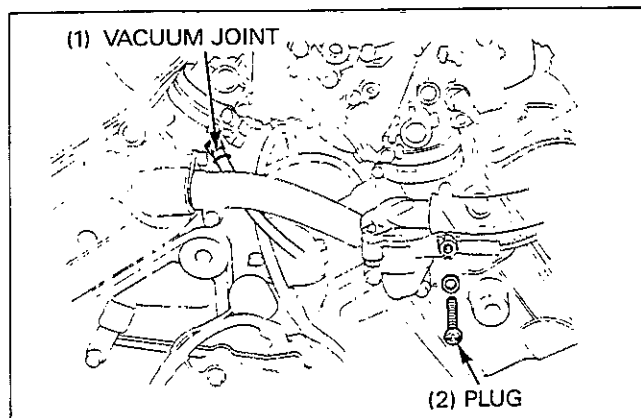
- Refer to section 2 of Common Service Manual for carburetor synchronization procedure.
- Synchronize the carburetor with the engine at normal operating temperature, transmission in neutral and motorcycle supported upright.

Disconnect the vacuum tube from the No. 3 cylinder intake manifold, apply vacuum to the auto fuel valve and pinch the tube with a clip.

Remove the plugs from the No. 1, 2 and 4 cylinder intake manifold and install the vacuum gauge adaptors.



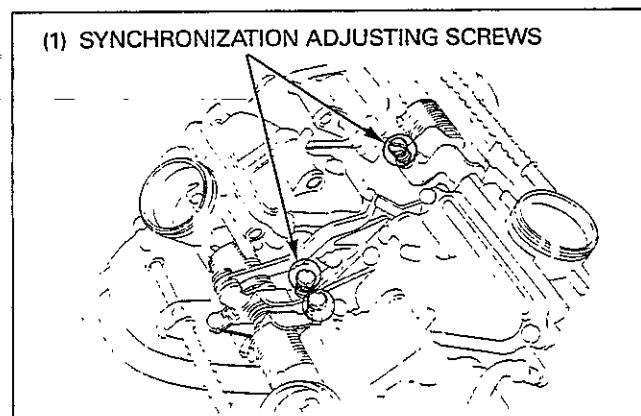
Connect the vacuum gauge adaptor to the auto fuel valve vacuum tube joint of the No. 3 cylinder intake manifold.



## NOTE

- The base carburetor is the No. 2 carburetor.

Adjust the carburetor synchronization by turning the synchronization adjusting screw.



## Drive Chain

### ⚠ WARNING

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

Place the motorcycle on its side stand and shift the transmission into neutral.

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

**Slack: 15–25 mm (5/8–1 in)**

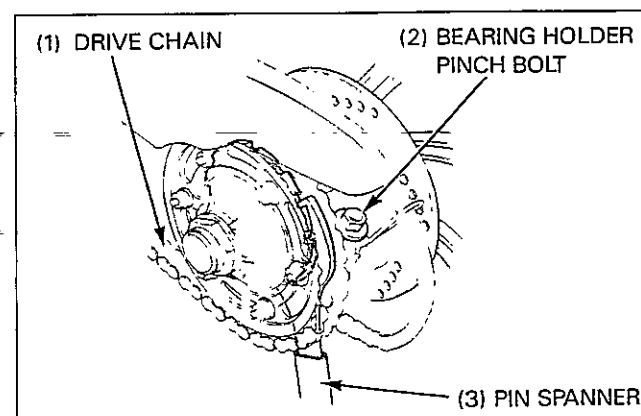
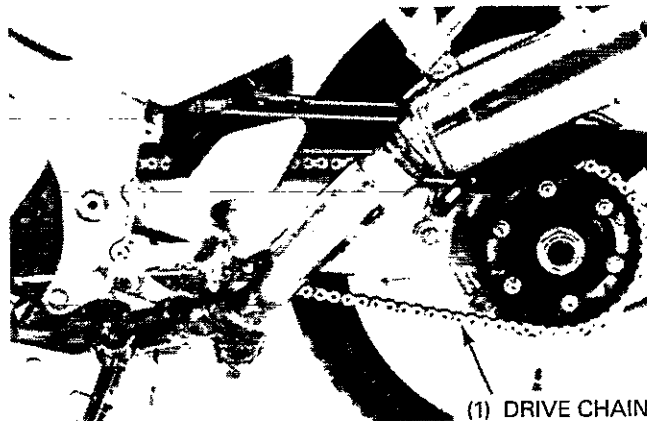
Adjust the chain slack as follows:

Loosen the bearing holder pinch bolt.

Turn the axle bearing holder with the pin spanner provided in the tool kit until the correct drive chain slack is obtained.

## NOTE

- To ease the adjustment, raise the rear wheel with an optional stand and turn the wheel in the same direction as the bearing holder rotation.

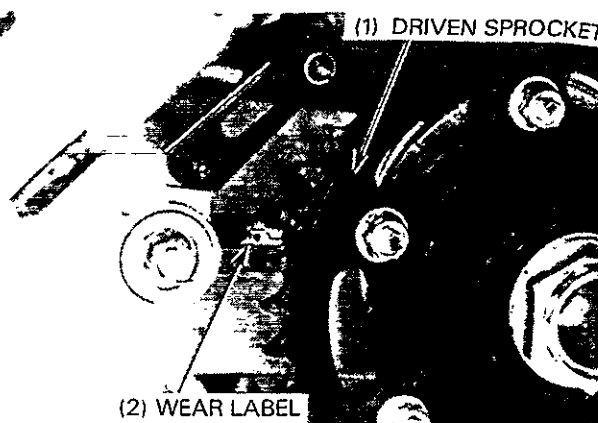




## Maintenance

After adjustment, check the chain wear label. If the red zone on the label reaches the outside diameter of the driven sprocket, replace the drive chain with a new one.

Replacement chain: RK GB525SM4



### NOTE

- Because the endless type drive chain is used, the swingarm must be removed to replace the drive chain.

Tighten the bearing holder pinch bolt.

Torque: 55 N·m (5.5 kg-m, 40 ft-lb)

## Side Stand

Check the side stand rubber for wear.  
Replace the rubber if wear extends to the wear mark.

Check the side stand operation.

The side stand should lower easily to its first stop, then lock after moving farther forward to support the motorcycle as the rubber touches the ground.

When the motorcycle is lifted upright, the stand should automatically move the first position, and retract when kicked up.

If the side stand does not move freely, disassemble it:

Remove the return spring at the retracted position.

Remove the pivot bolt and remove the side stand assembly from the frame.

Check the following parts for wear or damage:

- inside of the pivot and pivot collar.
- pivot dust seals.

Lubricate the pivot area with clean grease and reassemble the side stand.

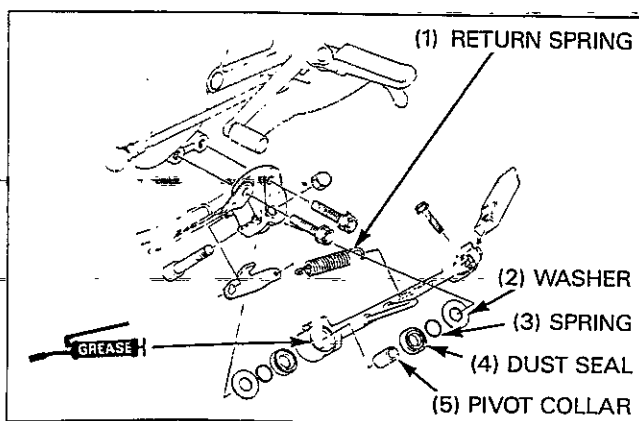
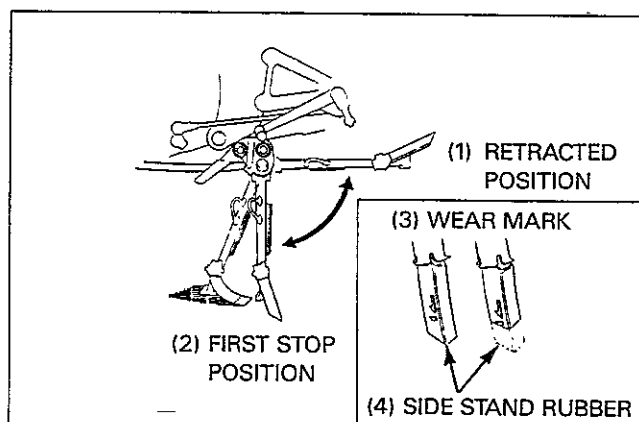
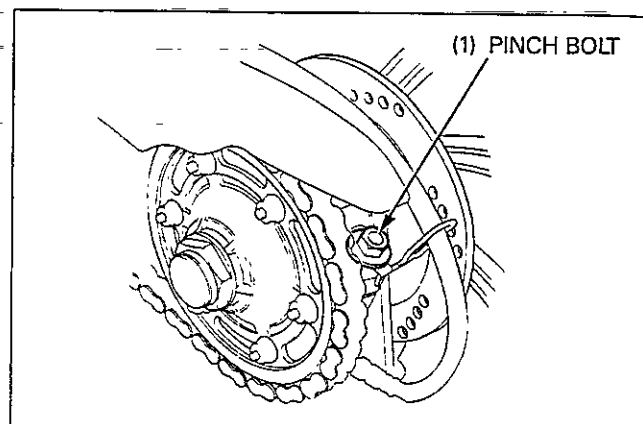
### CAUTION

- Install the dust seal with the spring side facing out.
- Make sure that the dust seal spring is not removed, then install the side stand.

### Torque:

Side stand bracket bolt: 35 N·m (3.5 kg-m, 25 ft-lb)

Recheck the side stand operation.



## 4. Lubrication System

Service Information	4-1	Oil Cooler Removal/Installation	4-3
Troubleshooting	4-1	Oil Pump Removal/Installation	4-4
Lubrication System Diagram	4-2	Oil Pump Disassembly/Assembly	4-6

### 4

## Service Information

- The service procedures in this section can be performed with the engine oil drain.
- 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.

## Troubleshooting

### Oil Level Low

- Oil consumption.
- External oil leak.
- Worn piston ring or incorrect piston ring installation.
- Worn valve guide or seal.

### Oil Contamination

- From coolant mixing with oil.
  - Faulty water pump mechanical seal.
  - Faulty head gasket.
  - Water leak in crankcase.

### No Oil Pressure

- Oil level too low.
- Oil pump drive chain or drive sprocket broken.
- Oil pump damaged (pump shaft).
- Internal oil leaks.

### Low Oil Pressure

- Pressure relief valve stuck open.
- Clogged oil filter screen.
- Oil pump worn or damaged.
- Internal oil leak.
- Incorrect oil being used.
- Low oil level.

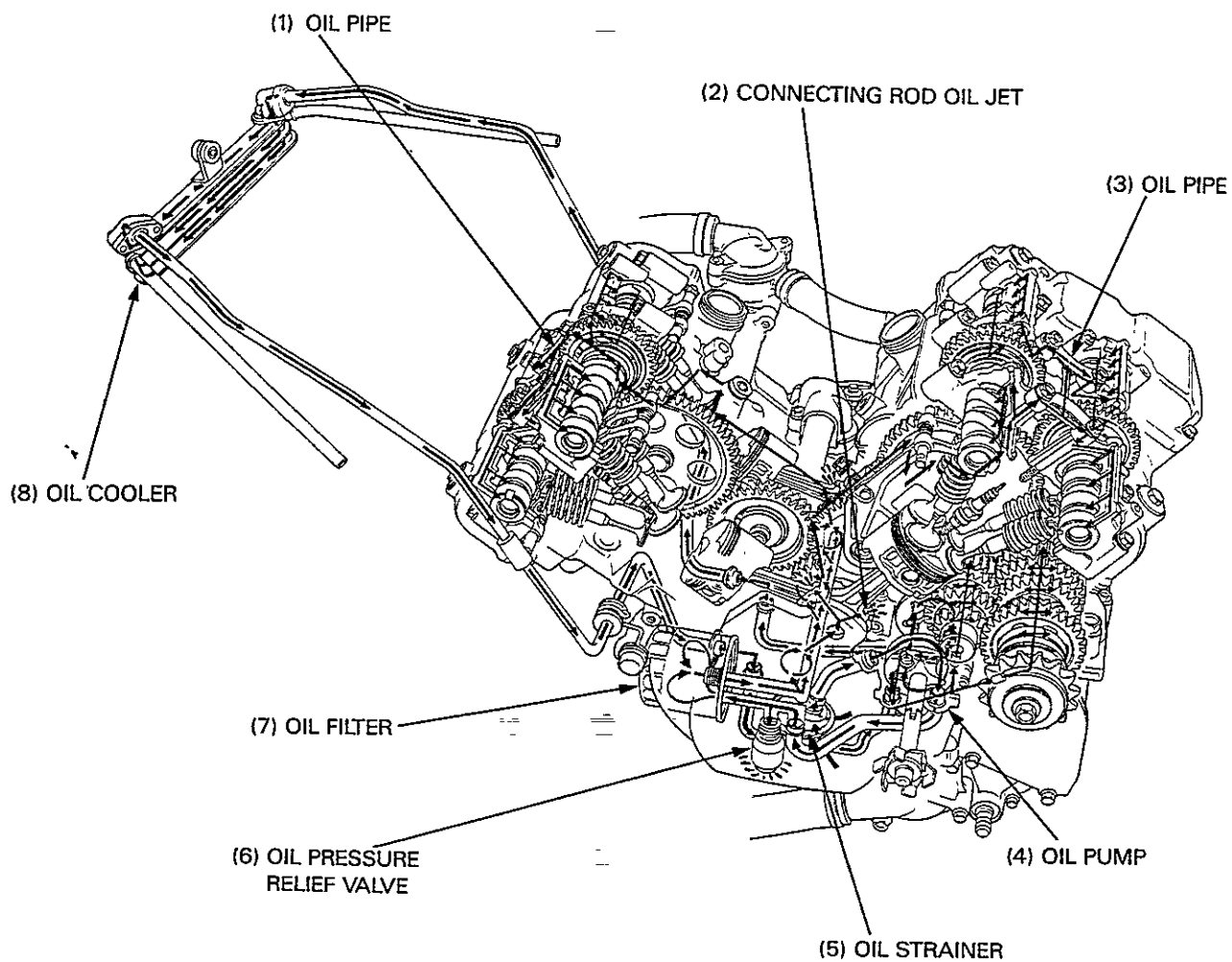
### High Oil Pressure

- Pressure relief valve stuck closed.
- Plugged oil filter, gallery, or metering orifice.
- Incorrect oil being used.

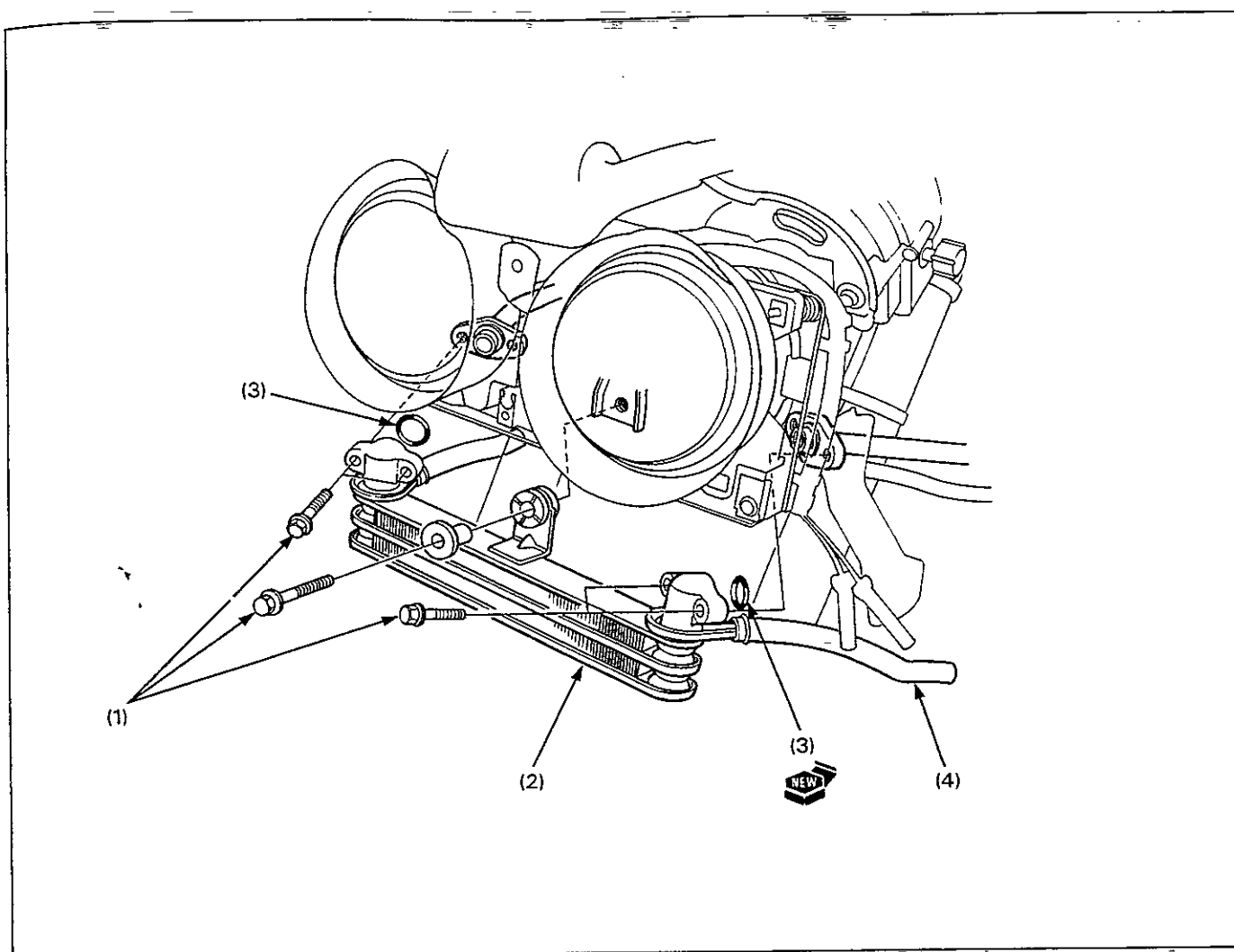
### Seized Engine

- No or low oil pressure.
- Clogged oil orifice/passage.
- Oil leakage inside the engine.
- Use of oil not recommended.

## Lubrication System Diagram



# Oil Cooler Removal/Installation

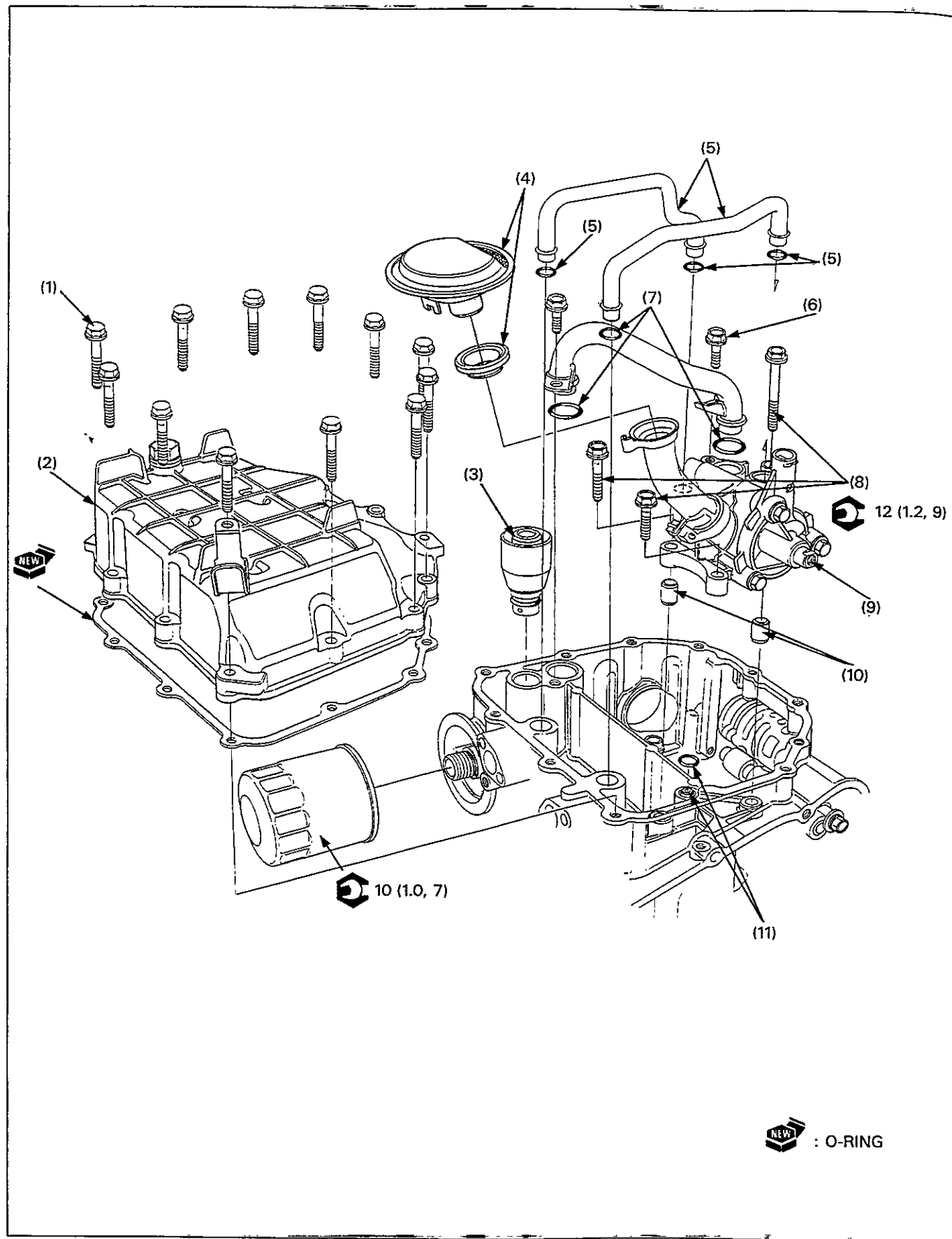


## Requisite Service

- Lower fairing removal/installation (page 2-4).
- Engine oil draining (location: page 3-3, step: section 2 of the Common Service Manual).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Oil cooler bolt	5	
(2)	Oil cooler	1	
(3)	O-ring	2	
(4)	Tube	2	

# Oil Pump Removal/Installation



# NOTE

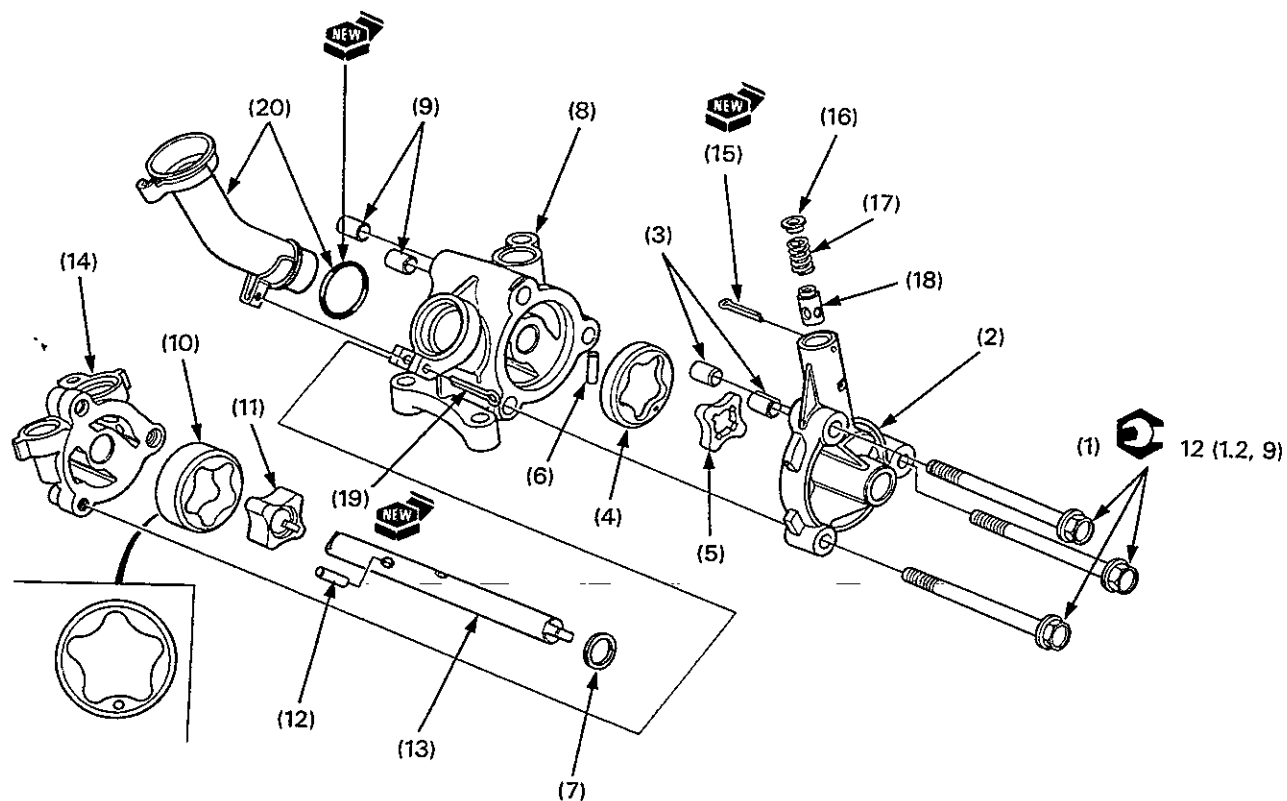
- Remove the drive sprocket bolt before removing the oil pump mounting bolts.
- Remove the oil pump drive sprocket bolt with care as it is coated with thread locking agent.

## Requisite Service

- Engine oil draining (location: page 3-3, step: section 2 of the Common Service Manual).
- Lower fairing removal/installation (page 2-4).
- Oil pump driven sprocket removal/installation (pages 9-4 and 9-6).
- Front exhaust system (page 2-10).
- Right crankcase cover removal/installation (page 9-2).

Procedure		Q'ty	Remarks
<b>Removal order</b>			Installation is in the reverse order of removal.
(1)	Oil pan bolt	12	<p><b>NOTE</b> Loosely tighten the bolts first to set the oil pan in correct position.</p> <p><b>NOTE</b> Align the cutout in the stopper with the pipe.</p> <p><b>NOTE</b> Install the oil strainer aligning the boss in the strainer with the slit on the oil strainer.</p> <p><b>NOTE</b> Remove the drive sprocket bolt before removing the oil pump mounting bolts.</p> <p><b>NOTE</b> When installing the oil pump assembly, align the projection on the pump shaft with the cutout in the water pump shaft by rotating the pump shaft. Disassembly: see page 4-6.</p> <p><b>NOTE</b> If the orifice is removed, check it for clogging before reinstallation.</p>
(2)	Oil pan	1	
(3)	Pressure relief valve	1	
(4)	Oil strainer/O-ring	1/1	
(5)	Oil pipe/O-ring	2/4	
(6)	Oil pipe bolt	2	
(7)	Oil pipe/O-ring	1/1	
(8)	Oil pump bolt	3	
(9)	Oil pump assembly	1	
(10)	Dowel pin	2	
(11)	Oil orifice/O-ring	1/1	

# Oil Pump Disassembly/Assembly



## NOTE

- Clean each part with cleaning solvent and coat with clean engine oil before assembly.

## Requisite Service

- Oil pump removal/installation (page 4-4).

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Oil pump body bolt	3	
(2)	Cooler pump cover	1	
(3)	Dowel pin	2	
(4)	Cooler outer rotor	1	NOTE
			• Install the outer rotor with its punch mark facing cooler pump cover.
(5)	Cooler inner rotor	1	
(6)	Drive pin	1	
(7)	Thrust washer	1	
(8)	Oil pump body	1	
(9)	Dowel pin	2	
(10)	Feed pump outer rotor	1	NOTE
			• Install the outer rotor with its punch mark facing feed pump cover.
(11)	Feed pump inner rotor	1	
(12)	Drive pin	1	
(13)	Oil pump shaft	1	NOTE
			• Install with the tab side facing the cover (water pump side).
(14)	Feed pump cover	1	
(15)	Cotter pin	1	
(16)	Spring retainer	1	
(17)	Spring	1	
(18)	Piston	1	
(19)	Cotter pin	1	
(20)	Oil strainer pipe/O-ring	1/1	



# 5. Cooling System

Service Information	5-1	Water Pump Disassembly/Assembly	5-5
Troubleshooting	5-1	Radiator Removal/Installation	5-6
System Flow Pattern	5-2	Radiator Disassembly/Assembly	5-8
Coolant Draining	5-3		
Thermostat Removal/Installation	5-4		

5

## Service Information

### ⚠ WARNING

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

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system service can be made with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to section 18 for fan motor switch and thermo sensor inspections.

## Troubleshooting

### Engine Temperature Too High

- Faulty radiator cap.
- Insufficient coolant.
- Passages blocked in radiator, hoses, or water jacket.
- Air in system.
- Faulty water pump.
- Thermostat stuck closed.
- Faulty temperature gauge or thermo sensor.
- Faulty cooling fan motor.
- Faulty fan motor switch.
- Fan shroud installed improperly.

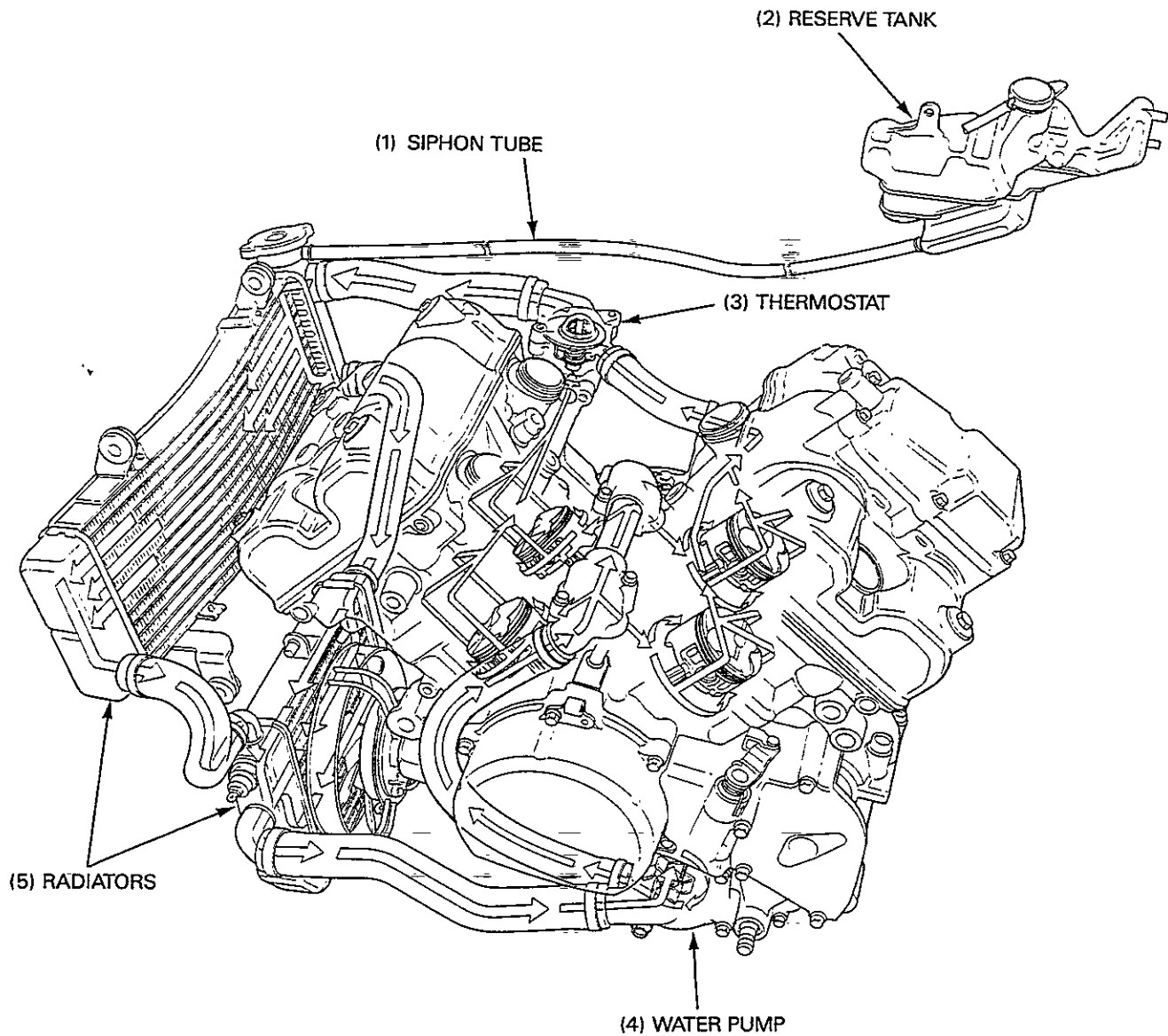
### Engine Temperature Too Low

- Faulty temperature gauge or gauge sensor.
- Thermostat stuck open.
- Faulty cooling fan motor switch (see section 18).

### Coolant Leaks

- Faulty pump mechanical seal.
- Deteriorated O-rings.
- Faulty radiator cap.
- Damaged or deteriorated gasket.
- Loose hose connection or clamp.
- Damaged or deteriorated hoses.

## System Flow Pattern

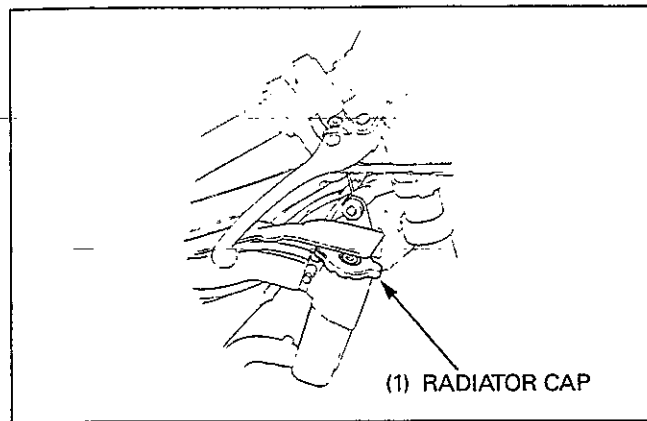


# Coolant Draining

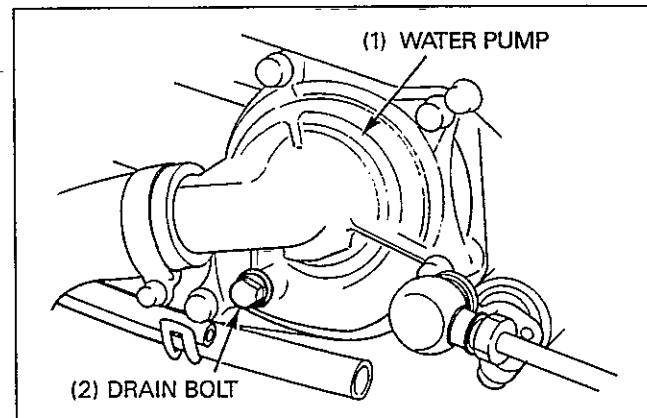
## ⚠ WARNING

- The radiator cap is under high pressure and radiator coolant could spurt out, resulting in scalds on your hands etc. If the cap is removed while the radiator is hot. Wait until the radiator cools down and remove the cap.

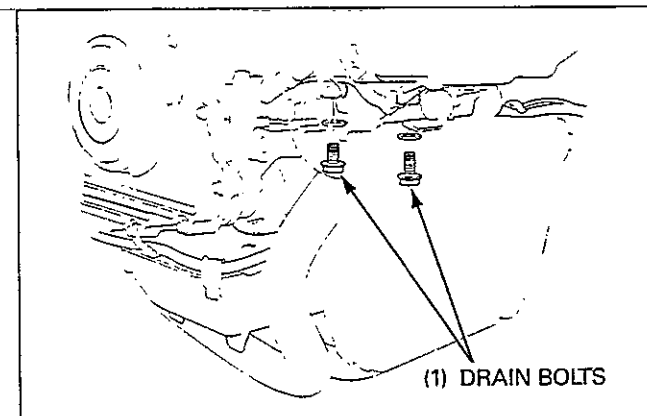
Remove the side fairing and the lower fairing (pages 2-3 and 2-4).  
Remove the radiator cap.



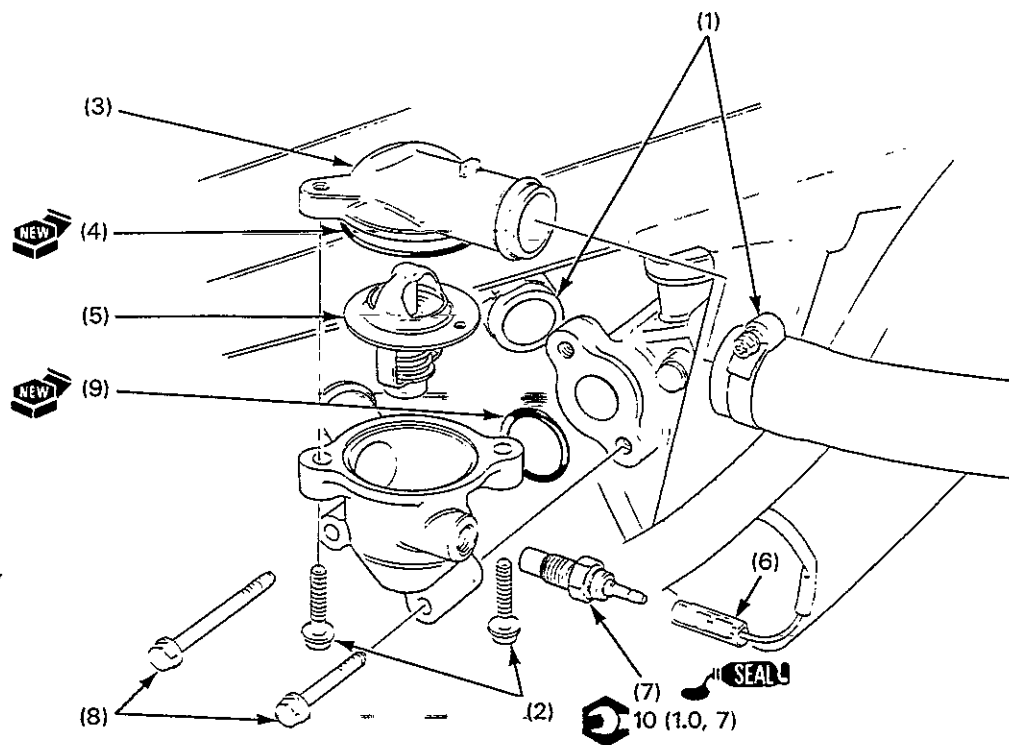
Remove the drain bolt (on which a copper washer attached) from the water pump and drain the coolant.



Remove the two drain bolts from the cylinder and drain the coolant.



# Thermostat Removal/Installation

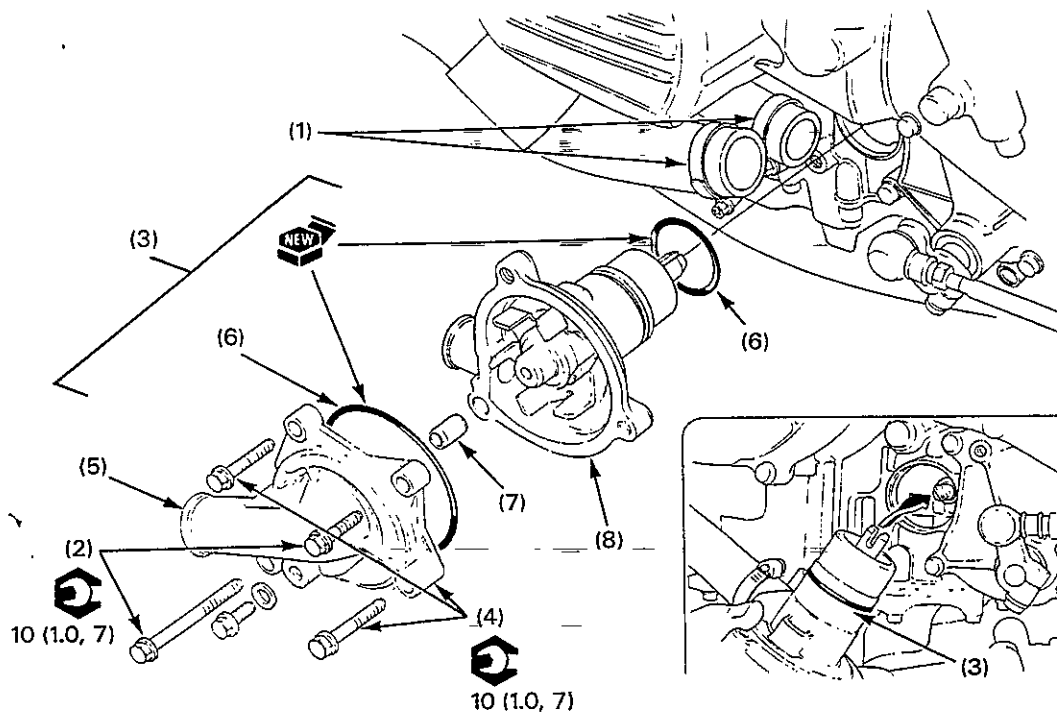


## Requisite Service

- Fuel tank removal/installation (page 2-5).
- Lower fairing removal/installation (page 2-4).
- Coolant draining (page 5-3).
- Coolant refill (section 5 of the Common Service Manual).

Procedure		Q'ty	Remarks
(1)	<b>Removal Order</b> Band/water hose	2/2	Installation is in the reverse order of removal. NOTE • Loosen the hose band.
(2)	Thermostat cover bolt	2	
(3)	Thermostat cover	1	
(4)	O-ring	1	
(5)	Thermostat	1	
(6)	Thermo sensor connector	1	
(7)	Thermo sensor	1	NOTE • At reassembly, apply a sealing agent to the threads.
(8)	Thermostat housing bolt	2	
(9)	O-ring	1	

# Water Pump Disassembly/Assembly



## NOTE

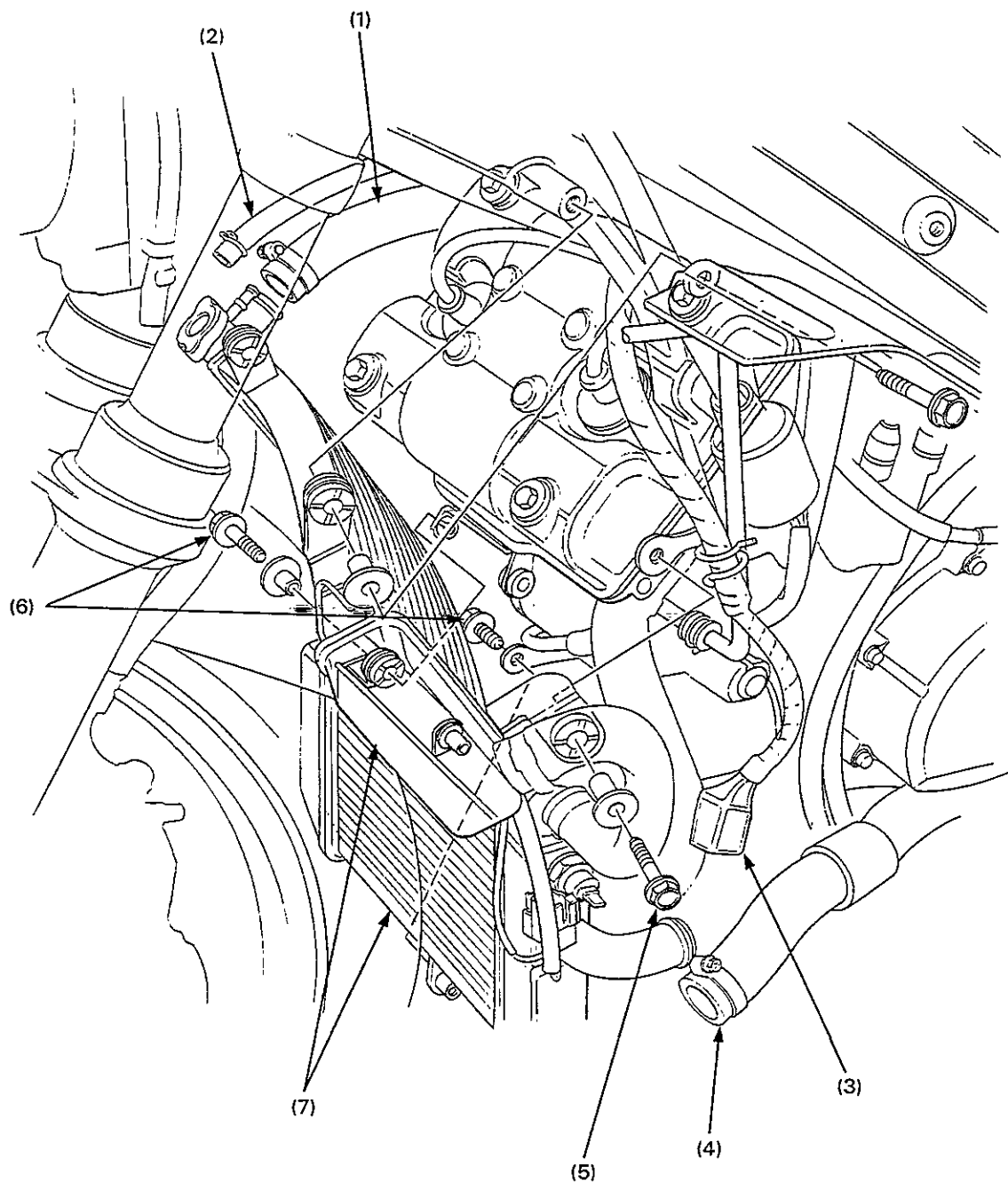
- Before removing the water pump, place an oil pan under the engine to catch the leaked engine.

## Requisite Service

- Lower fairing removal/installation (page 2-4).
- Coolant draining (page 5-3).
- Coolant refill (section 5 of the Common Service Manual).

Procedure		Q'ty	Remarks
(1)	<b>Removal Order</b> Hose band/water hose	2/2	Installation is in the reverse order of removal. NOTE • Loosen the band and pull out the water hose.
(2)	Bolt	2	NOTE • Before removing bolts, loosen the pump cover bolts.
(3)	Water pump assembly	1	NOTE • At installation, align the pump shaft slot with the oil pump shaft.
(4)	Housing cover bolt	2	
(5)	Cover	1	
(6)	O-ring	2	
(7)	Dowel pin	1	
(8)	Water pump	1	<b>CAUTION</b> • Avoid further disassembly.

## Radiator Removal/Installation



**CAUTION**

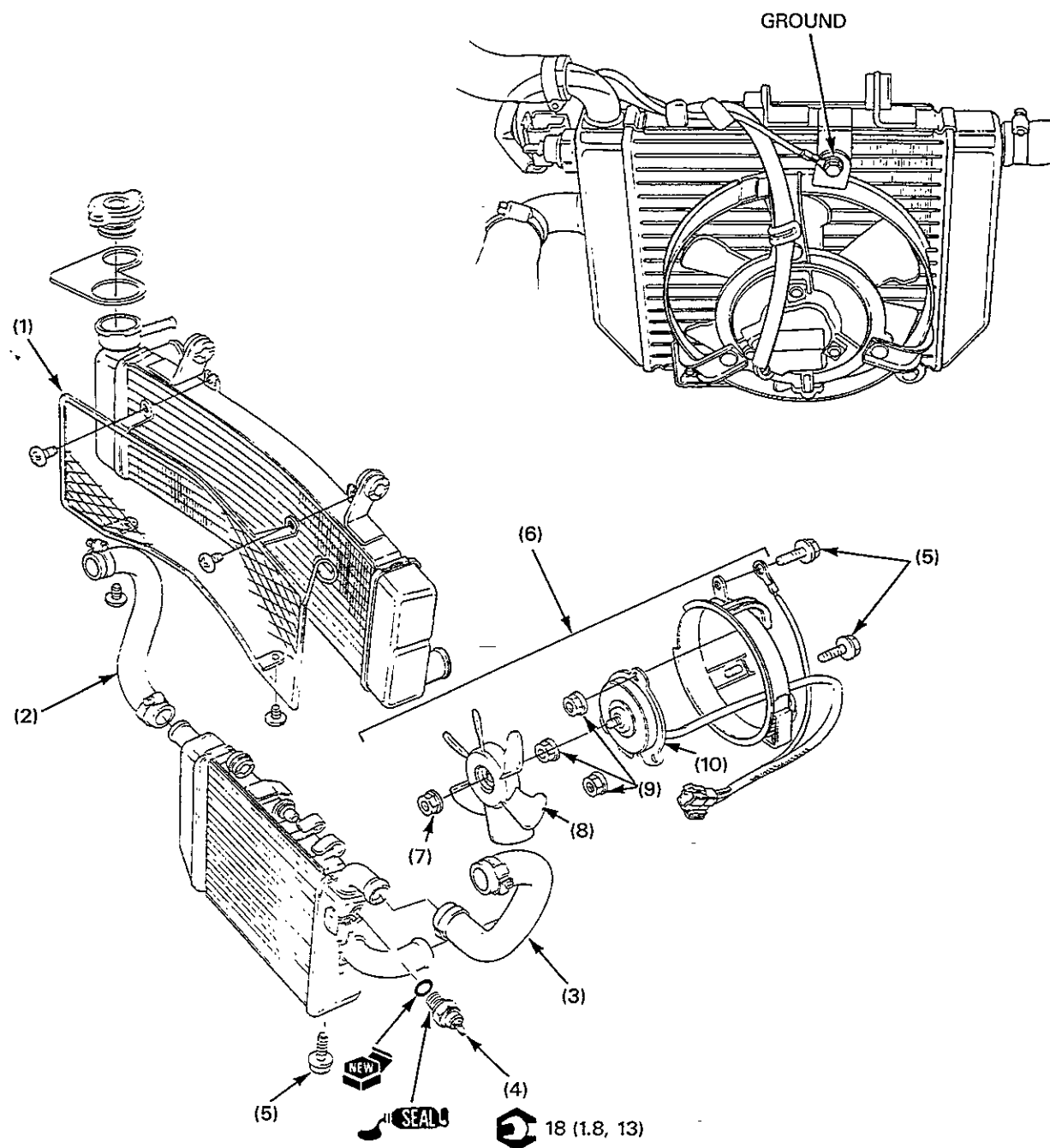
- Protect the radiator fins by attaching a piece of adhesive tape or equivalent and remove/install the radiator with care not to break the fins.
- Take care not to damage the front fender.

**Requisite Service**

- Lower fairing removal/installation (page 2-4).
- Coolant draining (page 5-3).
- Coolant refill (section 5 of the Common Service Manual).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Upper radiator hose	1	
(2)	Radiator breather tube	1	
(3)	Fan motor connector/fan motor switch connector	1/1	
(4)	Lower radiator hose	1	
(5)	Upper radiator bolt	2	NOTE <ul style="list-style-type: none"> <li>• Remove the two bolts, pull the upper radiator to the flywheel side, and disconnect at the upper connection of the radiator mount.</li> </ul>
(6)	Lower radiator bolt	2	NOTE <ul style="list-style-type: none"> <li>• Remove the two bolts, pull the lower radiator to the clutch side, and disconnect at the upper connection of the radiator mount.</li> </ul>
(7)	Upper/lower radiator	1/1	NOTE <ul style="list-style-type: none"> <li>• Remove as an assembly.</li> </ul>

## Radiator Disassembly/Assembly





**CAUTION**

- Protect the radiator fins by attaching a piece of adhesive tape or equivalent and remove/install the radiator with care not to break the fins.

**NOTE**

- Set the fan motor wire in the fan shroud clamp properly to avoid interference between the fan and the cord.

**Requisite Service**

- Radiator removal/installation (page 5-6).

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Radiator grille	1	
(2)	Right radiator hose	1	
(3)	Left radiator	1	
(4)	Fan motor switch	1	NOTE • At installation, apply sealant to the threads.
			<b>CAUTION</b> • Do not over-tighten the fan motor switch, or the radiator may be damaged.
(5)	Fan motor bolt	3	NOTE • On reassembly, tighten the ground wire together with the upper bolt.
(6)	Fan motor assembly	1	NOTE • Disconnect the connector and the wire from the clamp of the lower radiator.
(7)	Nut	1	
(8)	Cooling fan	1	NOTE • When reassembling, align the fan motor shaft and the cutout in the fan blade.
(9)	Fan motor nut	3	
(10)	Fan motor	1	NOTE • Install the fan motor on the fan shroud with the water drain hole facing down.

## 6. Fuel System

Service Information	6-1	Carburetor Removal/Installation	6-8
Troubleshooting	6-2	Carburetor Separation	6-10
Fuel Tank Disassembly/Assembly	6-3	Carburetor Combination	6-12
Fuel Valve Disassembly/Assembly	6-4	Carburetor Disassembly/Assembly	6-14
Air Cleaner Removal/Installation	6-6		

### Service Information

6

#### ⚠ WARNING

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

#### CAUTION

- 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.
- Be sure to remove the diaphragms before cleaning air and fuel passages with compressed air. The diaphragms might be damaged.

#### NOTE

- If the vehicle is to be stored for more than one month, drain the float bowls. Fuel left in the float bowls may cause clogged jets resulting in hard starting or poor driveability.

- Carburetor disassembly is not required for servicing the vacuum piston and the float chamber.
- Refer to section 2 for fuel tank removal and installation.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- Before disassembling the carburetor, place the suitable container under the carburetor drain bolt, then loosen the bolt and drain the carburetor.
- After removing the carburetor, wrap the intake port of the engine with a shop towel or cover it with piece of tape to prevent any foreign material from dropping into the engine.
- Carburetor number is set so that it corresponds to the cylinder number.

## **Troubleshooting**

### **Engine Won't Start**

- No fuel to carburetors
  - fuel strainer clogged
  - fuel tube clogged
  - faulty fuel valve
  - float level misadjusted
  - fuel tank cap breather hole clogged
- Too much fuel getting to the engine
  - air cleaner clogged
  - flooded carburetors
- Intake air leak
- Fuel contaminated/deteriorated
- Slow circuit or bystarter circuit clogged
- Ignition malfunction

### **Engine Stalls, Hard to Start, Rough Idling**

- Fuel line restricted
- Ignition malfunction
- Fuel mixture too lean/rich
- Fuel contaminated/deteriorated
- Intake air leak
- Idle speed misadjusted
- Pilot screw misadjusted
- Slow circuit or bystarter circuit clogged
- Float level misadjusted
- Fuel tank breather tube clogged

### **Afterburn on Deceleration**

- Lean mixture in slow circuit

### **Backfiring or Misfiring During Acceleration**

- Ignition system faulty
- Fuel mixture too lean

### **Poor Performance (driveability) and Poor Fuel Economy**

- Fuel system clogged
- Ignition malfunction

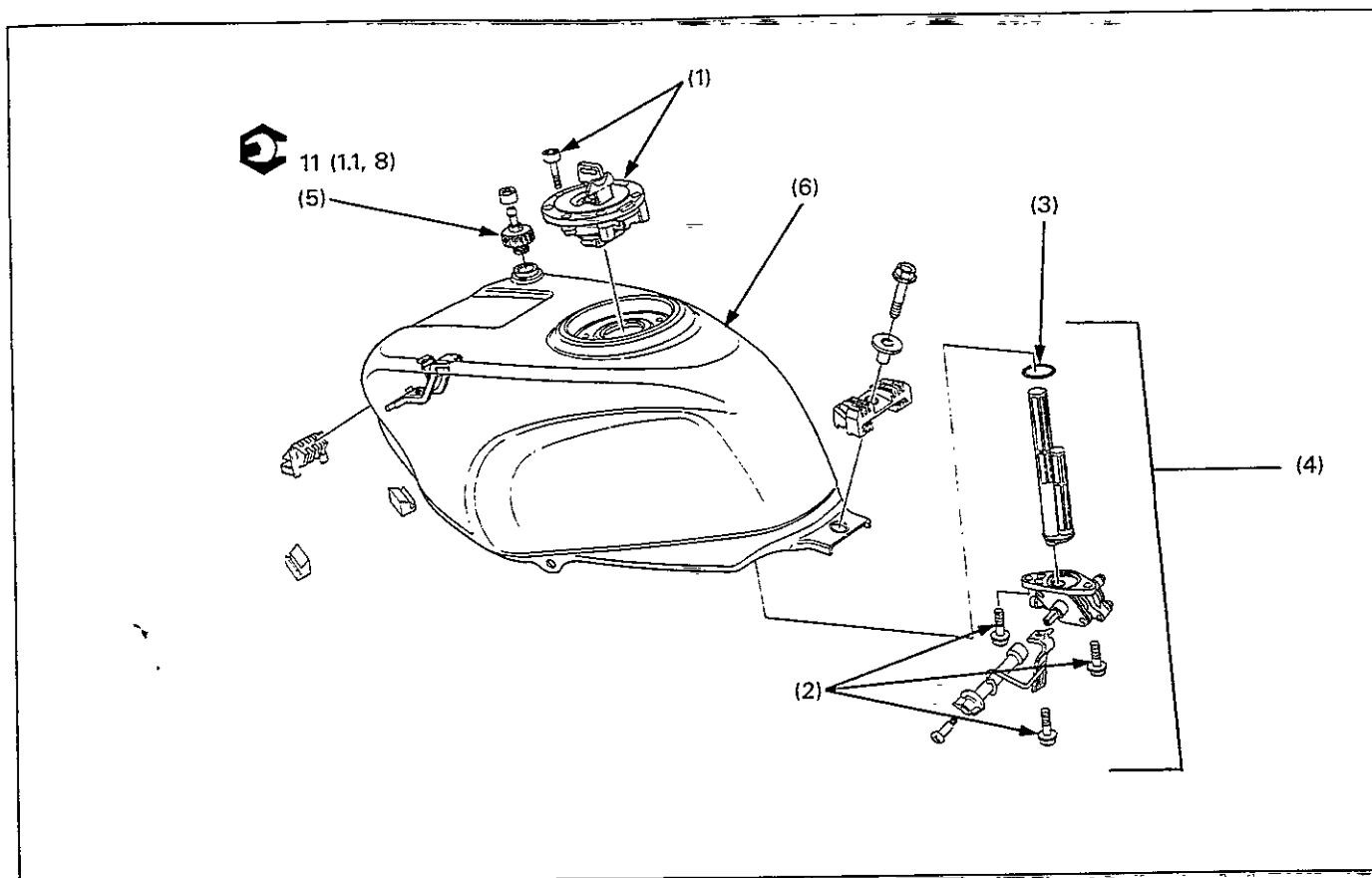
### **Lean Mixture**

- Fuel jets clogged
- Float valve faulty
- Float level too low
- Fuel line restricted
- Carburetor air vent hole (or tube) clogged
- Intake air leak
- Vacuum piston faulty
- Throttle valve faulty

### **Rich Mixture**

- Bystarter valve in ON position
- Float valve faulty
- Float level too high
- Air jets clogged
- Air cleaner element contaminated
- Flooded carburetors

# Fuel Tank Disassembly/Assembly



## ⚠ WARNING

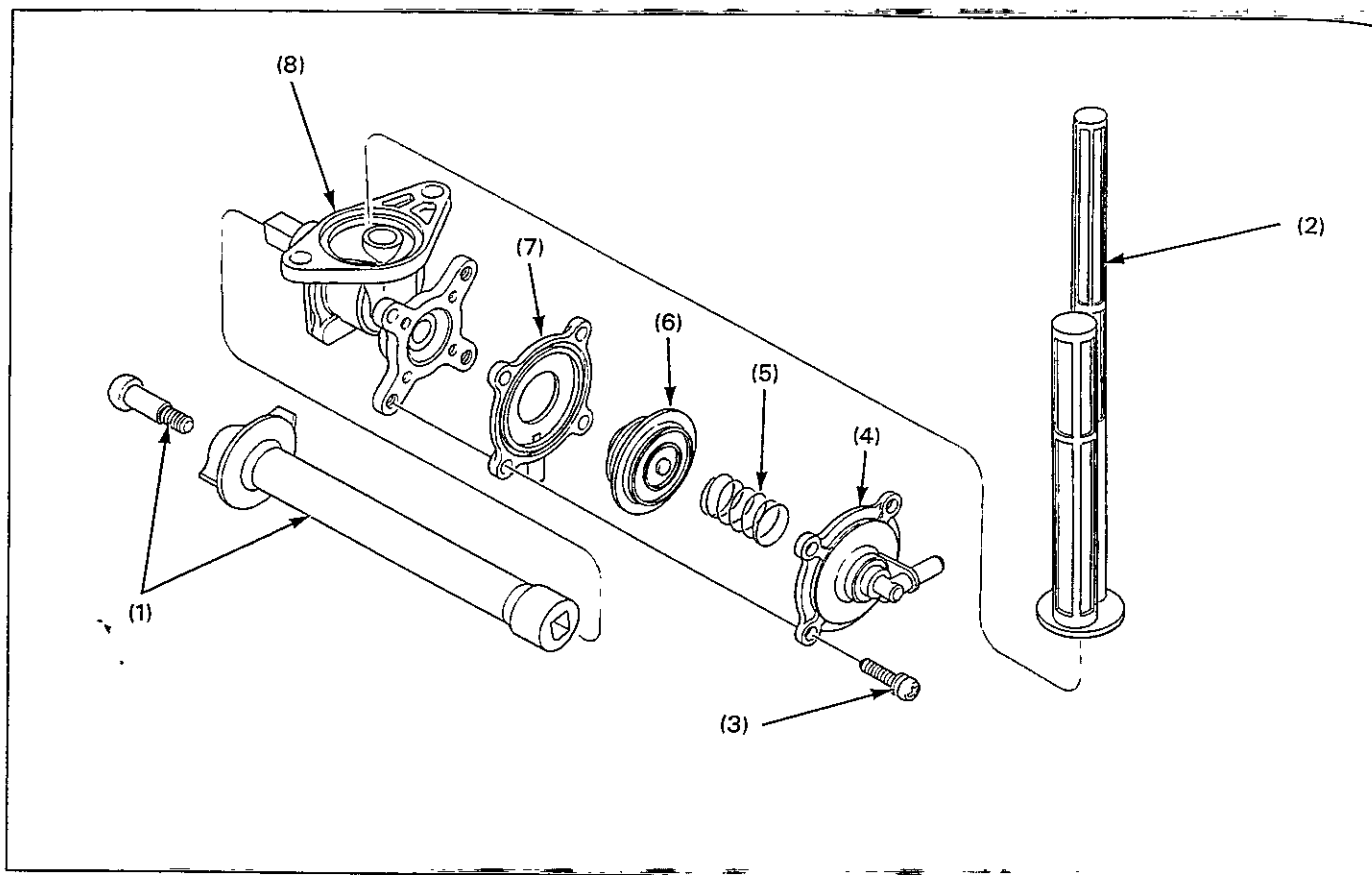
- Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.

## Requisite Service

- Fuel tank removal/installation (page 2-5).

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Bolt/tank cap	7/1	<b>NOTE</b> <ul style="list-style-type: none"> <li>When assembling the fuel tank, take care not to get the O-ring caught or pinched in the parts.</li> </ul>
(2)	Fuel valve bolt	3	
(3)	O-ring	1	
(4)	Fuel valve assembly	1	
(5)	Breather tube joint	1	
(6)	Fuel tank	1	

## Fuel Valve Disassembly/Assembly

**⚠ WARNING**

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

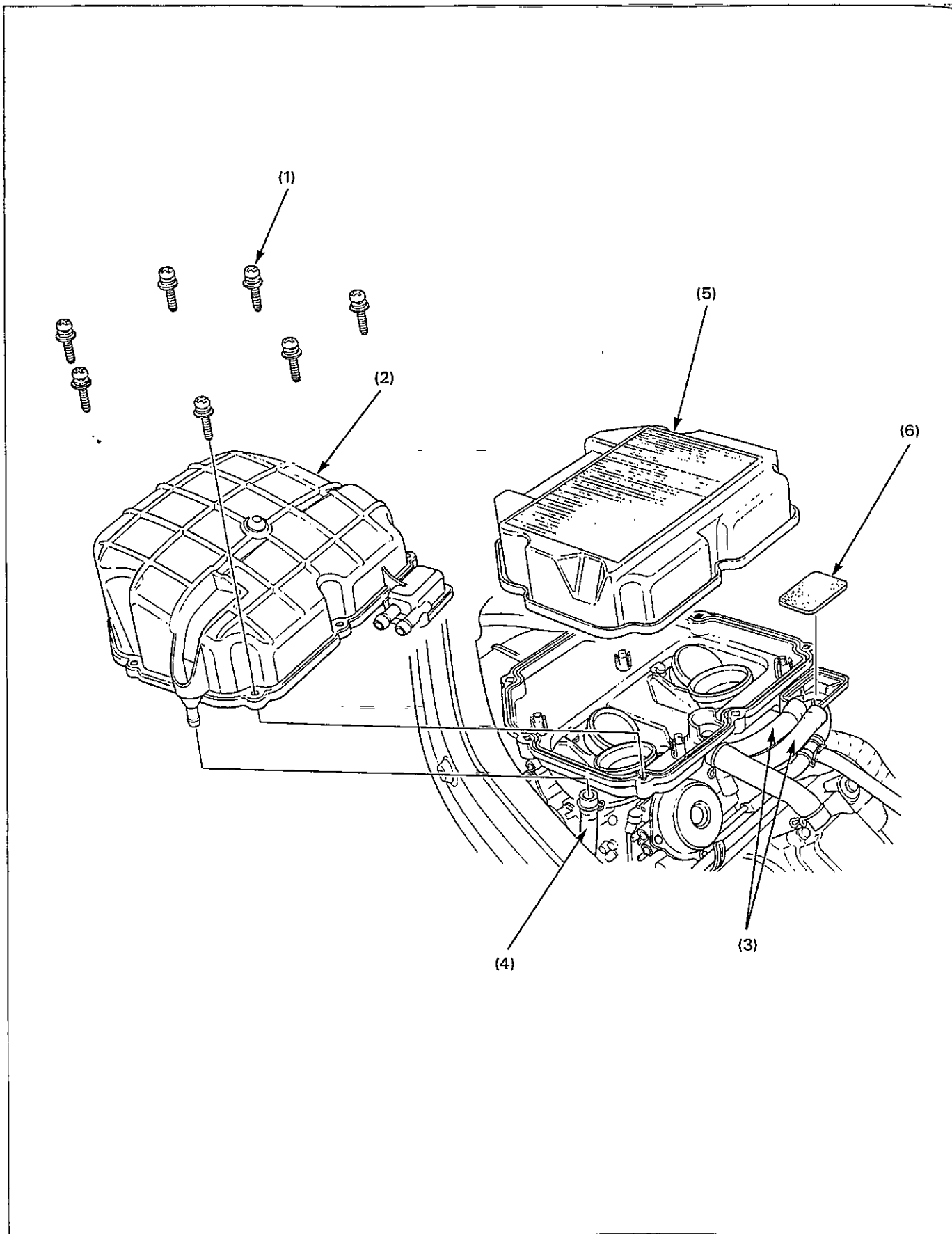
**Requisite Service**

- Fuel tank disassembly/assembly (page 6-3).

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.  <b>NOTE</b> • On assembly, tighten the screws equally.
(1)	Fuel valve lever	1	
(2)	Fuel filter	1	
(3)	Diaphragm cover screw	4	
(4)	Diaphragm cover	1	
(5)	Spring	1	
(6)	Diaphragm	1	
(7)	Set plate	1	
(8)	Fuel valve body	1	

MEMO

## Air Cleaner Removal/Installation



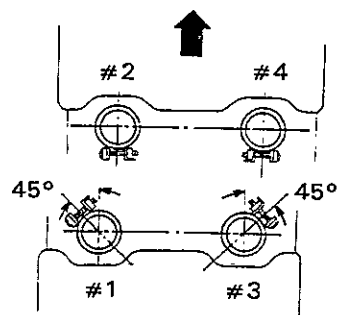
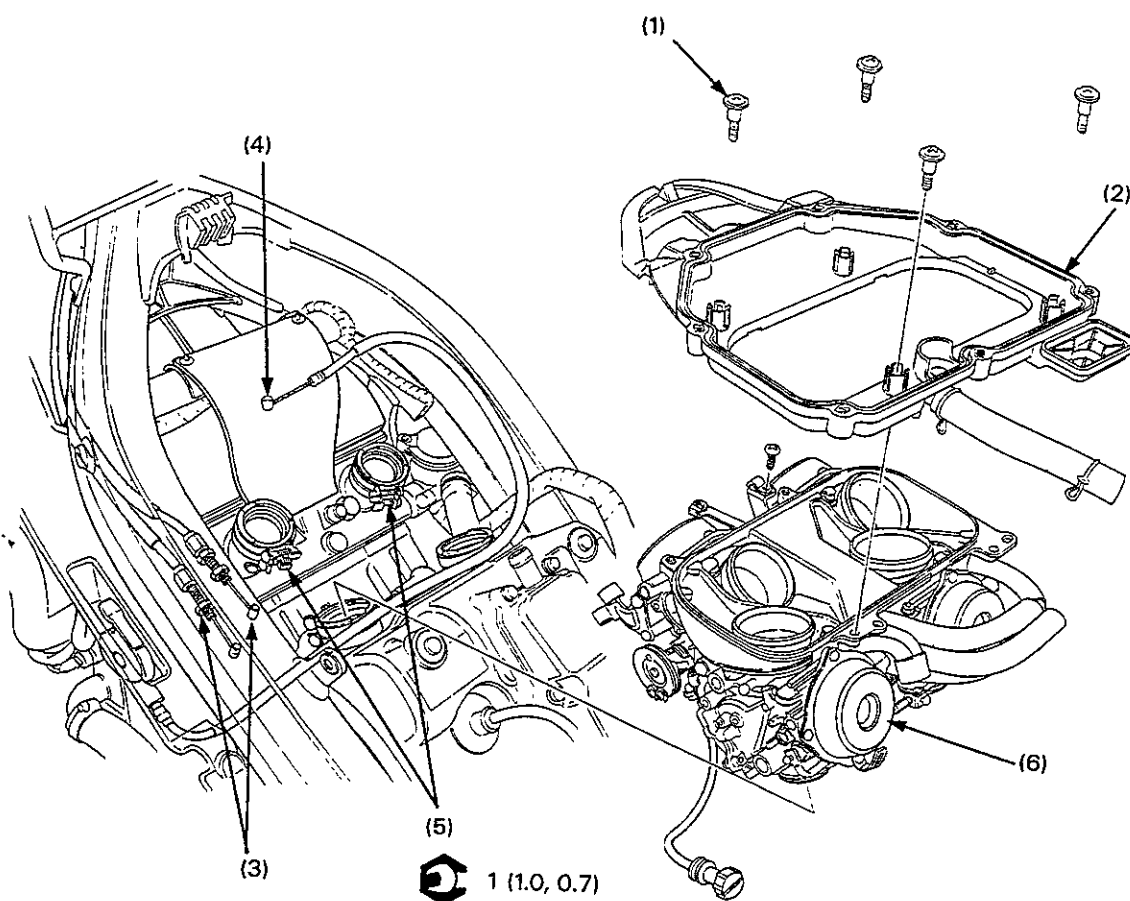
**Requisite Service**

- Fuel tank removal/installation (page 2-5).

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Air cleaner case cover screw	7	
(2)	Air cleaner case cover	1	
(3)	Sub air cleaner tube	2	
(4)	Fuel tank drain tube	1	
(5)	Air cleaner element	1	
(6)	Sub air cleaner element	1	



# Carburetor Removal/Installation



**⚠ WARNING**

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

**NOTE**

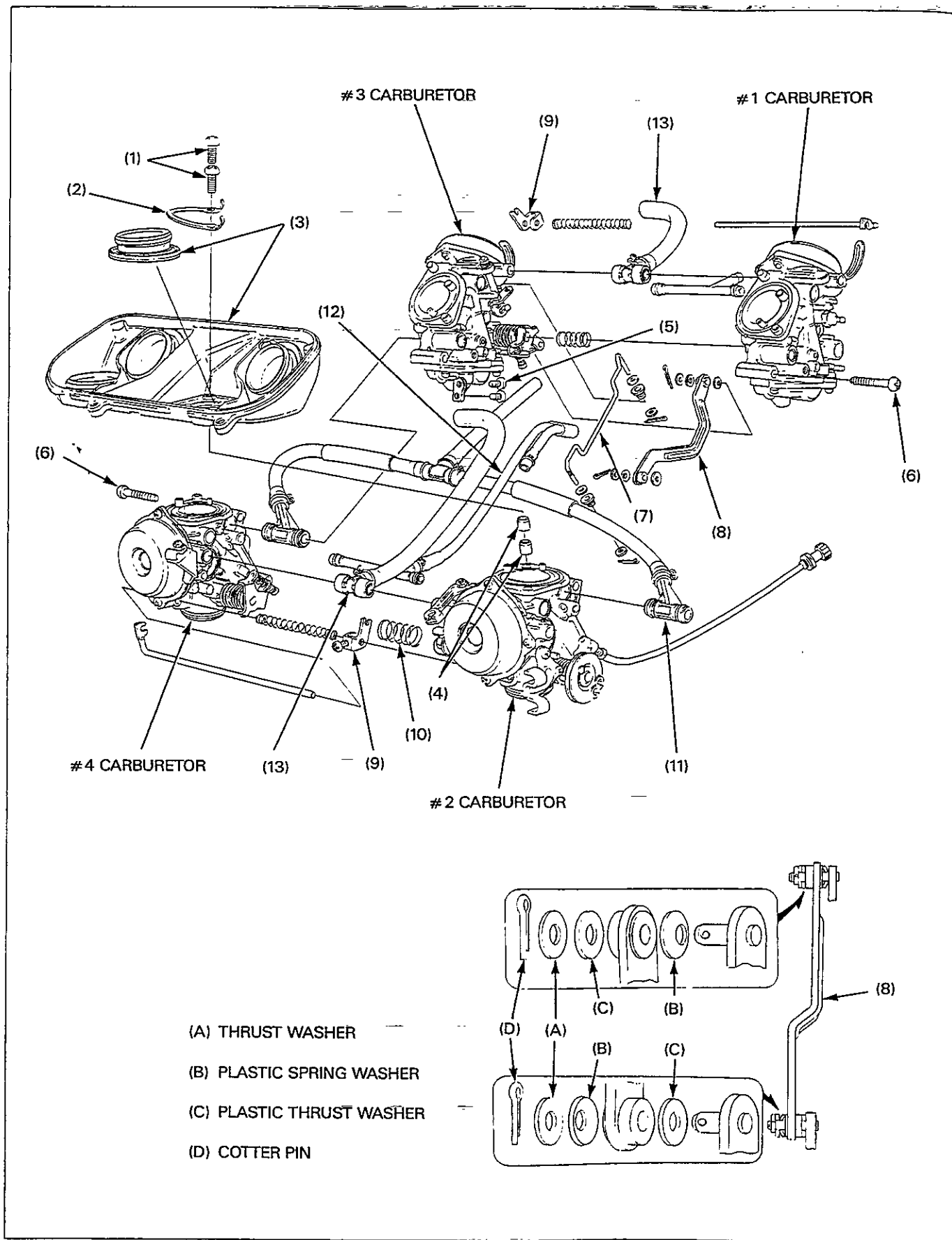
- After removing the carburetor, cover the engine intake port with a shop towel or tape to prevent foreign materials from entering the engine through the port.

**Requisite Service**

- Air cleaner removal/installation (page 6-6).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Air cleaner case base screw	4	
(2)	Air cleaner case base	1	
(3)	Throttle cable	2	NOTE
			• Loosen the adjuster.
(4)	Choke cable	1	
(5)	Insulator band	4	NOTE
			• Loosen the screws on the carburetor side.
			Install the insulator bands as shown in the drawing.
(6)	Carburetor assembly	1	

# Carburetor Separation



**⚠ WARNING**

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

**Requisite Service**

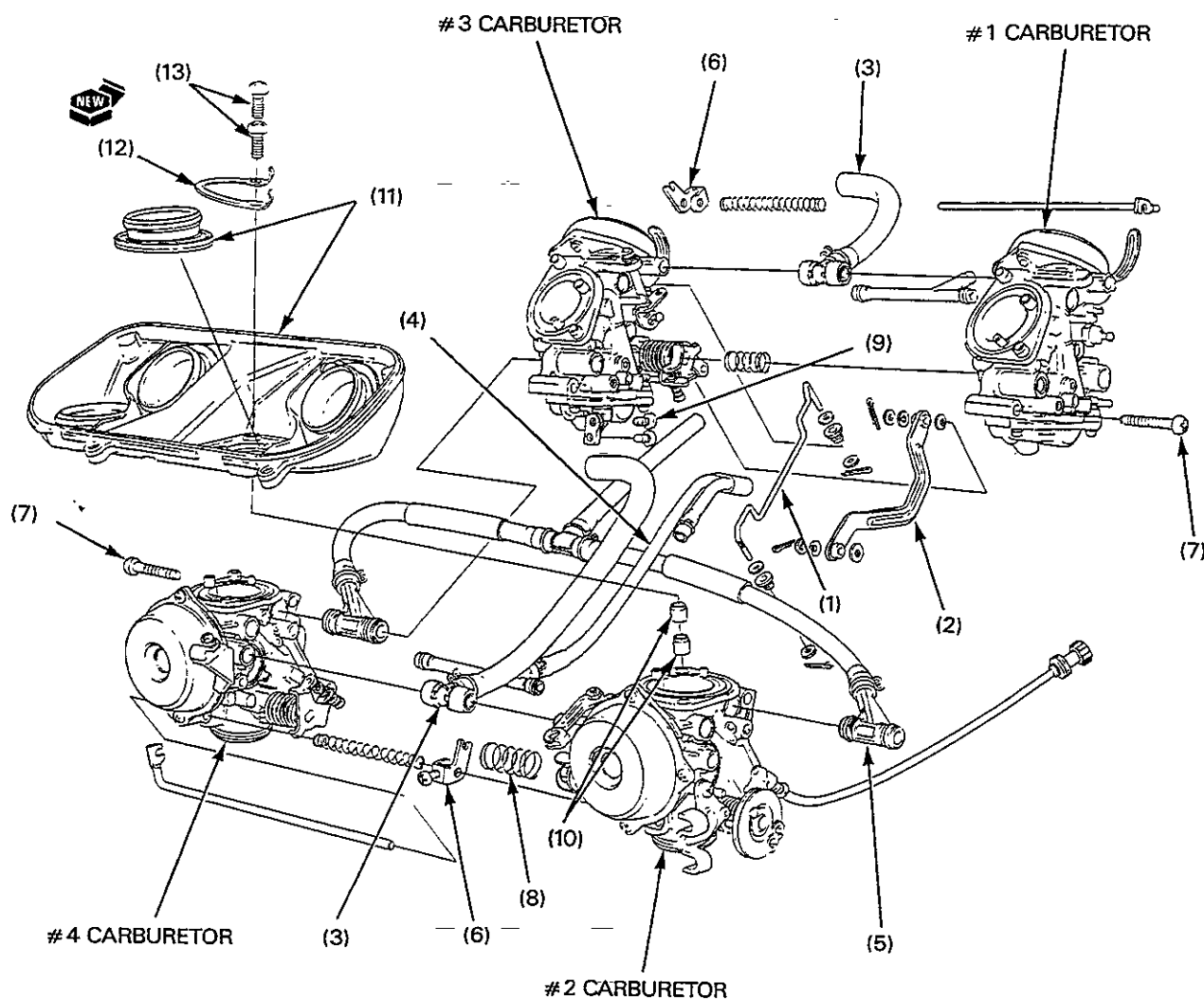
- Carburetor removal (page 6-8).

Procedure		Q'ty	Remarks
<b>Separation order</b>			
(1)	Air chamber screw	8	
(2)	Lock plate	4	
(3)	Air chamber/air cleaner duct	1/4	
(4)	Dowel pin	8	
(5)	Bracket screw	2	
(6)	Carburetor set screw	2	NOTE
			• Separate the carburetors.
(7)	By-starter link	1	NOTE
			• Remove from the No. 2 and No. 3 carburetors.
(8)	Throttle link	1	NOTE
			• Disconnect from the No. 2 and No. 3 carburetors.
(9)	By-starter arm	2	NOTE
			• Loosen the screws.
(10)	# 1-3, # 2-4 thrust spring	2	NOTE
			• Loosen the synchronizing screws.
(11)	Fuel tube	1	NOTE
(12)	Air bent tube	1	
(13)	Sub air cleaner tube	2	
			• Note and record the joint pipe installation direction.

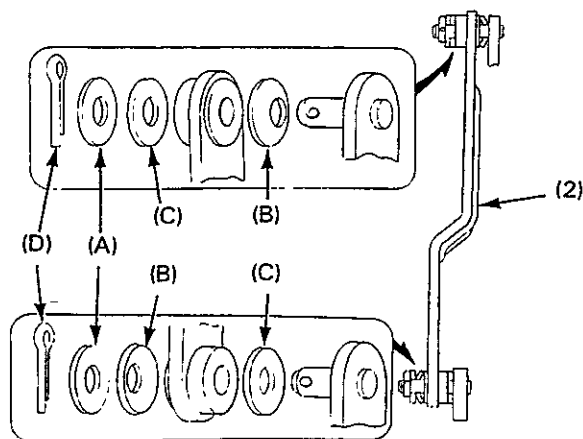
# Carburetor Combination



: O-RING, COTTER PIN



- (A) THRUST WASHER
- (B) PLASTIC SPRING WASHER
- (C) PLASTIC THRUST WASHER
- (D) COTTER PIN



**Requisite Service**

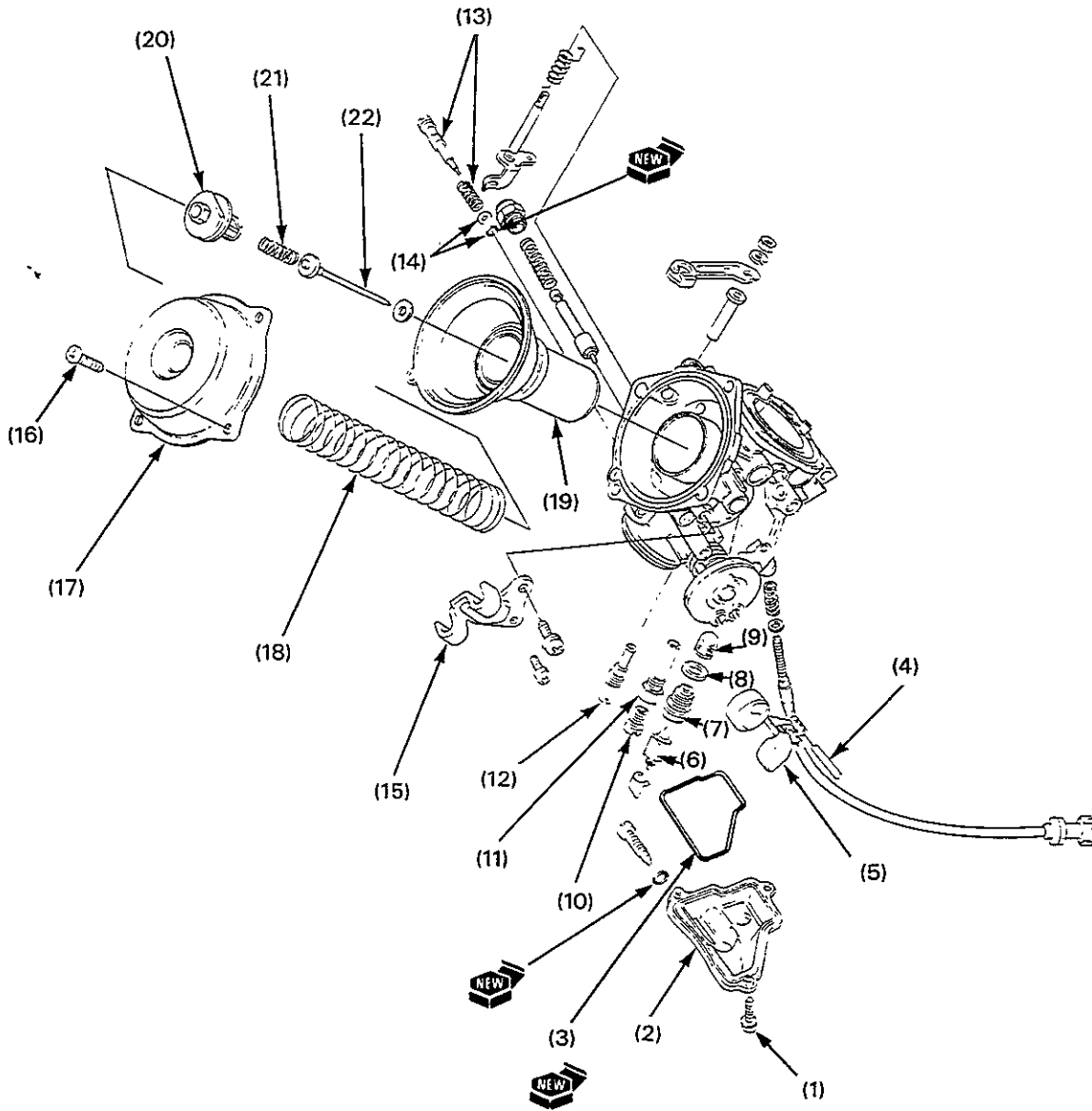
- Carburetor installation (page 6-8).

**CAUTION**

- After assembling the carburetor, check the throttle link and the bystarter link for smooth operation.
- After assembling the carburetor, move the bystarter link lever to "CLOSED" position and be sure that the bystarter valve is not pulled by the bystarter rod claw.

Procedure		Q'ty	Remarks
(1)	<b>Combination Order</b> By-starter link	1	NOTE • Refer to the drawing for the combination of the washer.
(2)	Throttle link	1	
(3)	Sub air cleaner tube	2	
(4)	Air bent tube	1	
(5)	Fuel tube	1	
(6)	By-starter arm	2	
(7)	Carburetor set screw	2	NOTE • Set the claw of the by-starter rod and arm on the by-starter valve securely.  <b>CAUTION</b> • Take care not to damage the fuel joint pipe O-rings.
(8)	#1-3; #2-4 thrust spring	2	
(9)	Bracket screw	2	
(10)	Dowel pin	8	
(11)	Air chamber	1	
(12)	Lock plate	4	
(13)	Air chamber screw	8	

# Carburetor Disassembly/Assembly



**WARNING**

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

**NOTE**

- The service procedure is for the No. 2 carburetor on this page.
- The procedures of the No. 1, 3, and 4 are the same as the No. 2.
- The vacuum chamber and float chamber can be serviced with the carburetor assembly.
- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled. Turn each pilot screw in and carefully count the number of turns before it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screws. If new pilot screws are installed, turn pilot screws out to the initial opening (page 1-6).

**Requisite Service**

- Carburetor removal/installation (page 6-8).

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
	Float Chamber		
(1)	Screw	3	
(2)	Float chamber cover	1	
(3)	O-ring \	1	
(4)	Float pin	1	
(5)	Float	1	
(6)	Float valve	1	
(7)	Valve seat	1	
(8)	Washer	1	
(9)	Filter	1	
(10)	Main jet	1	
(11)	Needle jet holder	1	
(12)	Slow jet	1	
(13)	Pilot screw/spring	1/1	
(14)	Washer/O-ring	1/1	
(15)	Throttle cable holder	1	
<b>Vacuum Piston</b>			
(16)	Vacuum chamber cover screw	4	NOTE
			• Install with care not to pinch the diaphragm.
(17)	Vacuum chamber cover	1	
(18)	Spring	1	
(19)	Vacuum piston	1	
(20)	Jet needle holder	1	NOTE
			• Turn counterclockwise while pushing the holder lightly.
(21)	Spring	1	
(22)	Jet needle	1	



# 7. Engine Removal/Installation

Service Information

7-1

Engine Installation

7-4

Engine Removal

7-2

## Service Information

- A floor jack or other adjustable support is required to support and maneuver the engine.

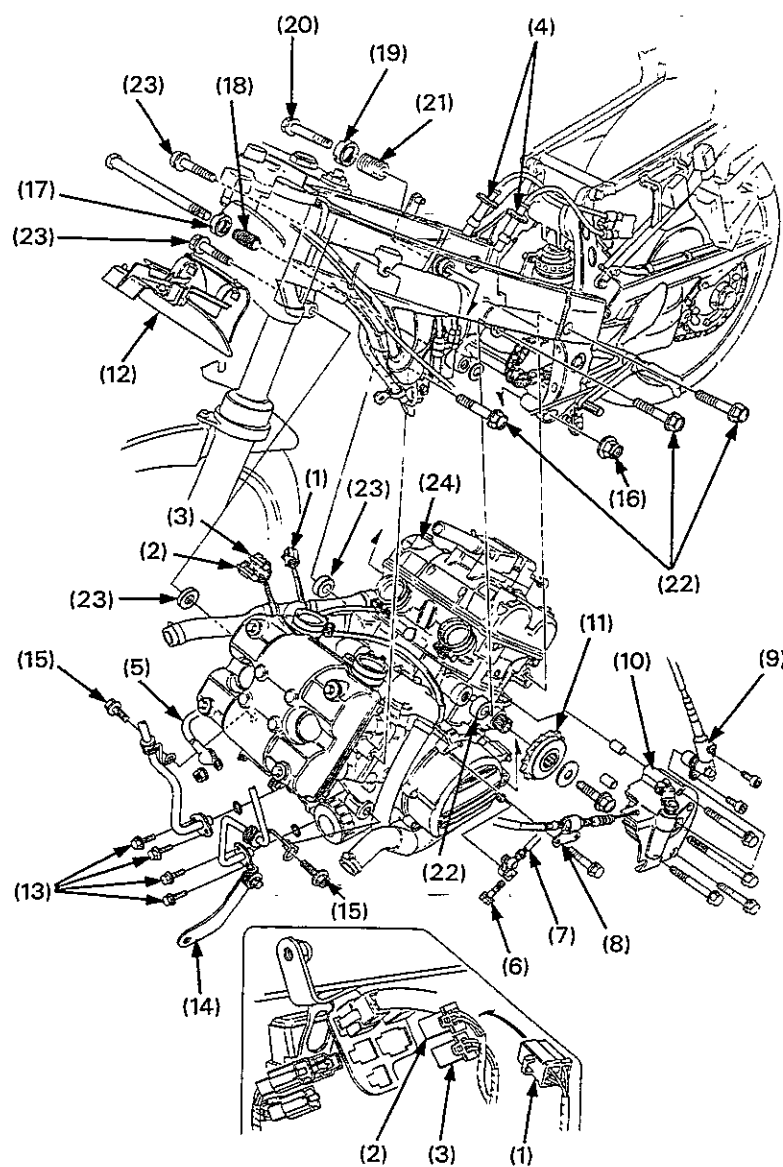
### CAUTION

- Do not jack up the motorcycle using the oil filter.

7

- To protect the engine, place a rubber board or equivalent on the floor before removing/installing the engine.
- Place a jack under the engine and support the motorcycle securely. Remove and install the engine with care not to damage the frame, engine, cables, and the harnesses.
- When removing/installing the engine, tape the frame to protect it.
- The following components can be serviced with the engine installed in the frame:
  - alternator (Section 14)
  - cylinder head (Section)
  - clutch (Section 9)
  - gearshift linkage (Section 9)
  - oil pump (Section 4)
  - starter motor (Section 16)
  - water pump (Section 5)
- The following components require engine removal for service:
  - connecting rod (Section 10)
  - crankshaft (Section 10)
  - piston (Section 8)
  - transmission (Section 10)

## Engine Removal



**CAUTION**

- Place a jack under the engine and support the motorcycle securely.
- Turn the ignition switch OFF before disconnecting the cable from the battery negative (–) terminal.
- When placing the jack under the engine, take care not to set the jack against the oil filter.
- Take care not to pinch the wire harnesses.

**NOTE**

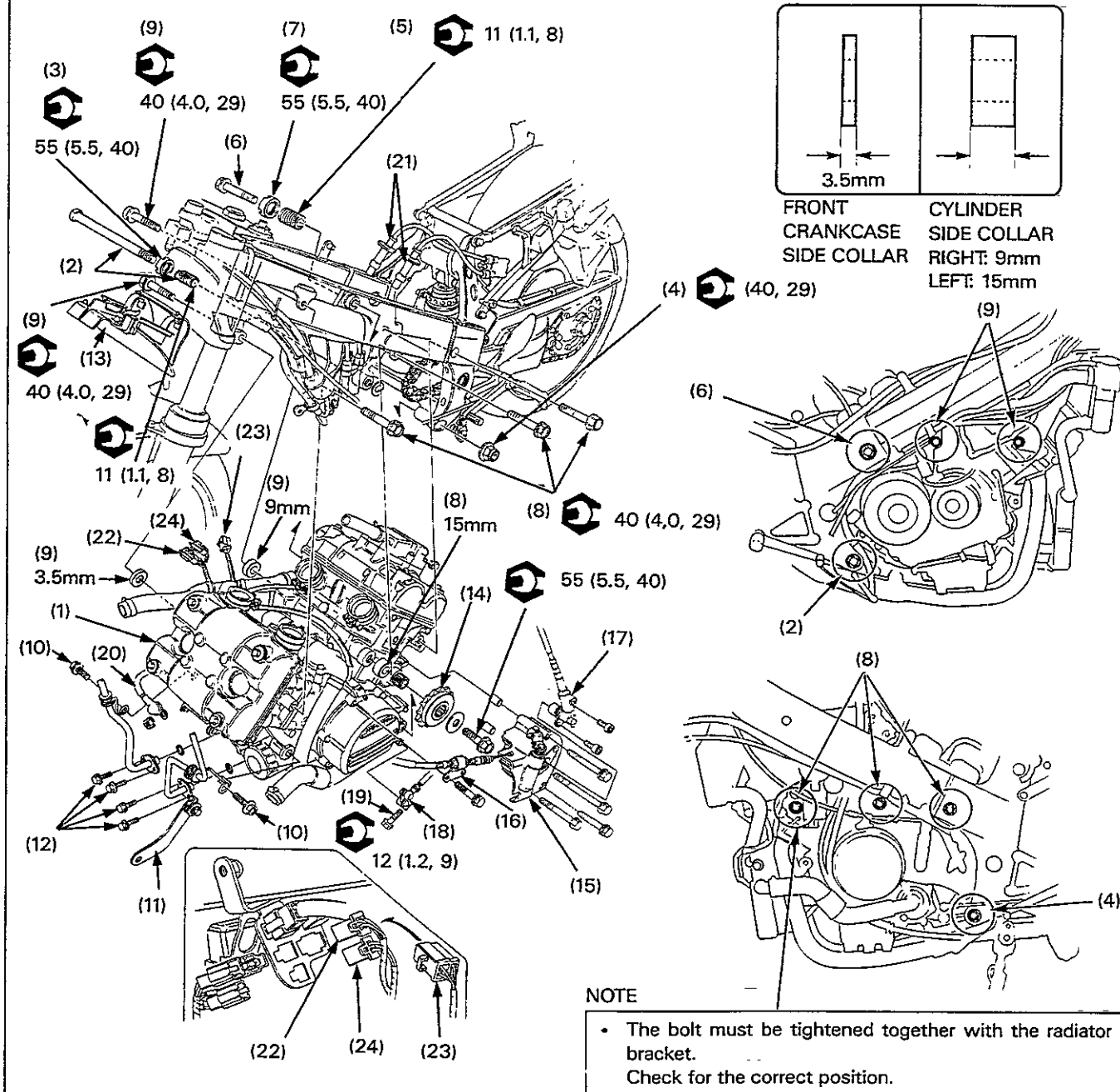
- When the clutch lock nut, primary drive gear bolt, and the flywheel bolt are removed after removing the engine, loosen them in advance to ease removal.

**Requisite Service**

- Engine oil draining (location: page 3-3, step: section 2 of the Common Service Manual).
- Exhaust pipe removal (page 2-10).
- Fuel tank removal (page 2-5).
- Carburetor removal (page 6-8).
- Coolant draining (page 5-3).
- Radiator removal (page 5-6).
- Loosen the drive chain (page 3-11).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Alternator wire connector	1	
(2)	Pulse generator wire connector	1	
(3)	Neutral switch wire connector	1	NOTE • Disconnect the which is integrated with the oil pressure switch.
(4)	Spark plug cap	4	
(5)	Starter motor cable	1	
(6)	Gearshift spindle joint bolt	1	
(7)	Gearshift spindle joint	1	
(8)	Clutch cable	1	NOTE • Loosen the lower adjuster lock nut and remove.
(9)	Speedometer gear box	1	NOTE • Remove the mounting bolt.
(10)	Drive sprocket cover	1	
(11)	Drive sprocket	1	NOTE • Remove the sprocket and remove the drive chain.
(12)	Heat protector	1	
(13)	Oil pipe joint bolt	4	
(14)	Lower radiator stay	1	
(15)	Oil pipe bolt	2	
(16)	Rear lower engine mounting nut	1	
(17)	— adjusting bolt lock nut	1	
(18)	— mounting adjusting bolt	1	NOTE • Turn counterclockwise together with the mounting bolt and remove.
(19)	Rear upper bolt lock nut	1	
(20)	— mounting bolt	1	
(21)	— adjusting bolt	1	NOTE • Loosen until the bolt end is not extruding inside the frame.
(22)	Left mounting bolt/collar	3/1	NOTE • Front bolt must be tightened together with the radiator bracket.
(23)	Right mounting bolt/collar	2/2	
(24)	Engine assembly	1	NOTE • Lower the engine straight, then raise the frame.

# Engine Installation



**CAUTION**

- Place a jack under the engine and support the motorcycle securely. Take care not to damage the frame, engine, etc.
- Take care not to pinch the cable and wires.
- When placing the jack under the engine, take care not to set the jack against the oil filter.
- Loosely tighten the all mounting bolts and check to see that the engine is placed in correct position. Tighten the mounting bolts first that are tightened together with the adjusting bolts (page 7-6).

**Requisite Service**

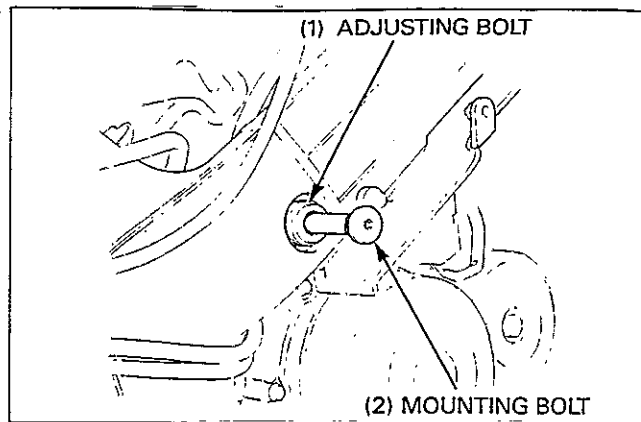
- Exhaust pipe installation (page 2-10).
- Carburetor installation (page 6-8).
- Coolant refill (section 5 of the Common Service Manual).
- Radiator installation (page 5-6).
- Fuel tank installation (page 2-5).

Procedure		Q'ty	Remarks
<b>Installation Order</b>			
(1)	Engine assembly	1	
(2)	Rear lower engine mounting bolt/adjusting bolt	1/1	NOTE <ul style="list-style-type: none"> <li>• Insert the mounting bolt into the adjusting bolt, engage them, and tighten them together.</li> </ul>
(3)	— adjust bolt lock nut	1	
(4)	— mounting nut	1	
(5)	Rear upper adjusting bolt	1	NOTE <ul style="list-style-type: none"> <li>• Loosely tighten.</li> </ul>
(6)	— mounting bolt	1	NOTE <ul style="list-style-type: none"> <li>• Loosely tighten the bolt first, tighten the adjusting bolt as much as it goes, and install the lock nut.</li> </ul>
(7)	— lock nut	1	
(8)	Left mounting bolt/collar	3/1	NOTE <ul style="list-style-type: none"> <li>• The rearward bolt has a collar (15mm of with). The forward bolt must be tightened together with the radiator bracket. Loosely tighten to check the correct installation position.</li> </ul>
(9)	Right mounting bolt/collar	2/2	NOTE <ul style="list-style-type: none"> <li>• Install the collars in proper positions.</li> </ul>
(10)	Oil pipe bolt	4	
(11)	Lower radiator stay	1	NOTE <ul style="list-style-type: none"> <li>• Install the drive chain on the drive sprocket.</li> </ul>
(12)	Oil pipe joint bolt	2	NOTE <ul style="list-style-type: none"> <li>• Interlock the lifter arm with the lifter rod.</li> </ul>
(13)	Heat protector	1	
(14)	Drive sprocket	1	
(15)	Drive sprocket cover	1	
(16)	Clutch cable	1	
(17)	Speedometer gear box	1	NOTE <ul style="list-style-type: none"> <li>• Engage with the drive sprocket bolt (page 10-2).</li> </ul>
(18)	Gearshift spindle joint	1	
(19)	Gearshift spindle joint bolt	1	NOTE <ul style="list-style-type: none"> <li>• Install the punch mark on the arm aligned with the mark on the spindle (page 10-2).</li> </ul>
(20)	Starter motor cable	1	
(21)	Spark plug cap	1	
(22)	Pulse generator wire connector	1	
(23)	Alternator wire connector	1	
(24)	Neutral switch wire connector	1	

### Engine Mounting Bolt Installation

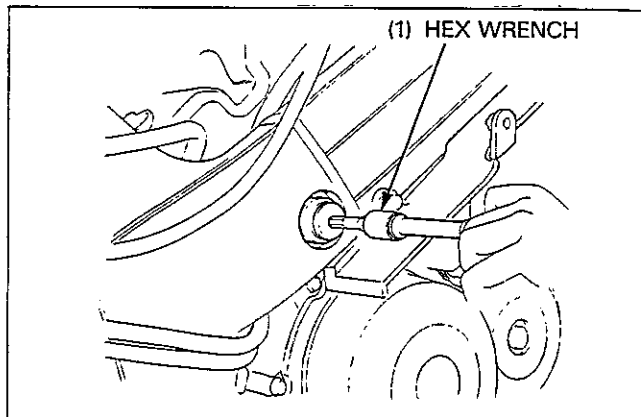
#### [Rear Upper Mounting Bolt]

Set the adjusting bolt over the mounting bolt and engage them. Push the mounting bolt into the place shown in the drawing as full as it goes.



Tighten the mounting bolt and the adjusting bolt by using a hex wrench.

**TORQUE:** 11 N·m (1.1 kg-m, 8 ft-lb)



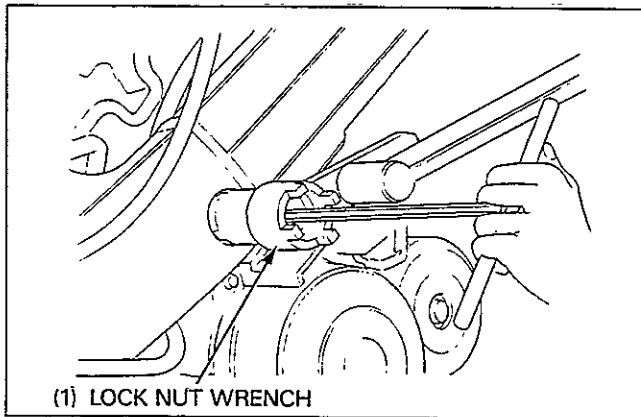
Install the lock nut. Hold the adjusting bolt and tighten the lock nut by using the lock nut wrench.

**TORQUE:** 55 N·m (5.5 kg-m, 40 ft-lb)

**STOOL**

**LOCK NUT WRENCH**

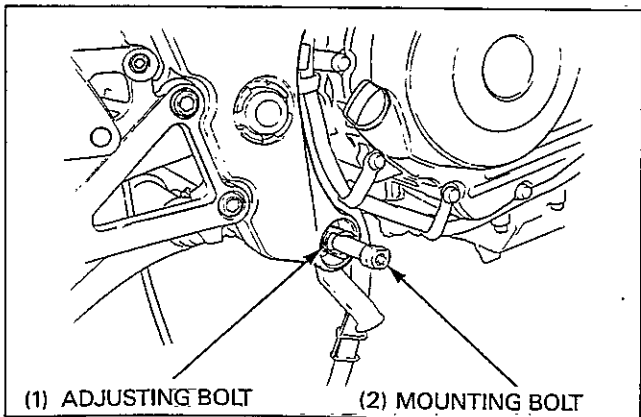
**07HMA-MR70200**



#### [Rear Lower Mounting Bolt]

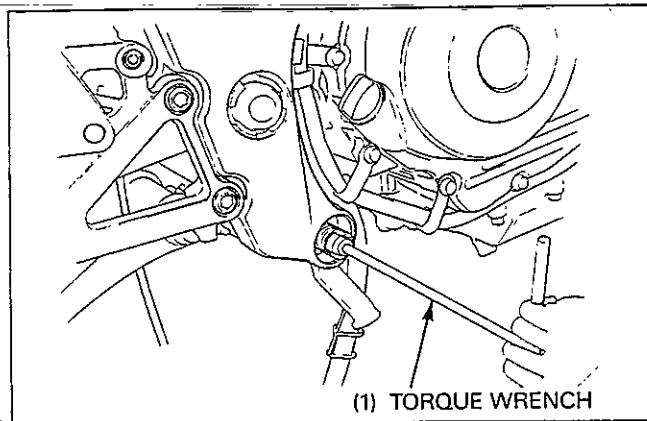
Apply a thin coat of grease to the mounting bolt.

Set the adjusting bolt over the mounting bolt and engage them. Push the mounting bolt into the place shown in the drawing as full as it goes.



Tighten the mounting bolt and the adjusting bolt by using a hex wrench.

**TORQUE:** 11 N·m (1.1 kg-m, 8 ft-lb)



Install the lock nut. Hold the mounting bolt and tighten the lock nut by using the lock nut wrench.

**TORQUE:** 55 N·m (5.5 kg-m, 40 ft-lb)

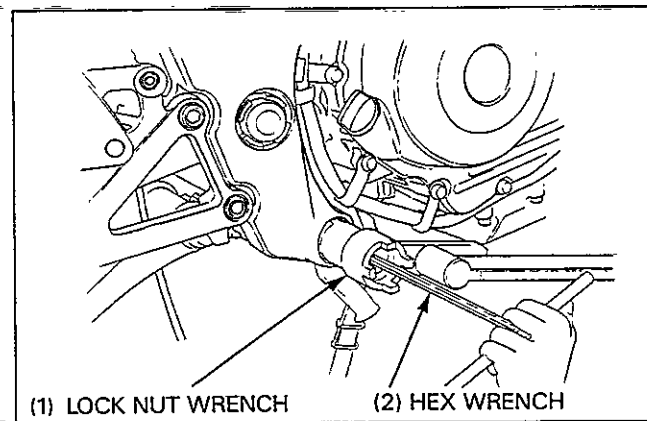
**5 TOOL**

**LOCK NUT WRENCH**

**07HMA-MR70200**

Tighten the mounting nut on the other side.

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

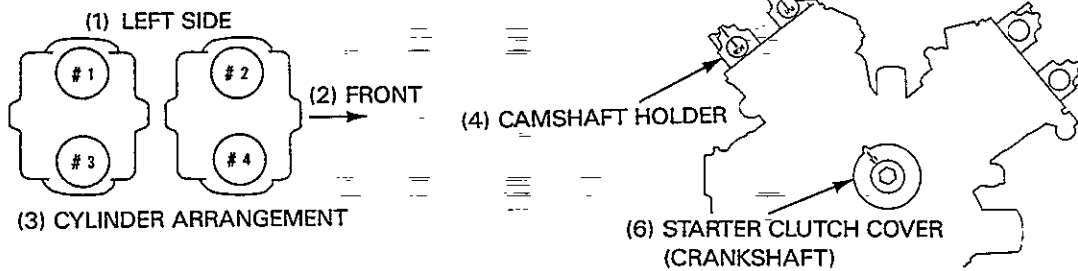


# 8. Cylinder Head/Valves

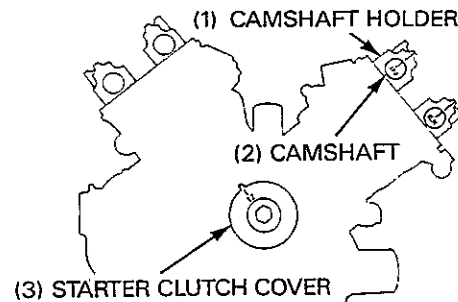
Service Information	8-1	Cylinder Head Disassembly/Assembly	8-6
Troubleshooting	8-1	Camshaft, Cam Gear Case Installation	8-8
Camshaft/Cam Gear Case Removal	8-2	Cam Gear Case Installation	8-10
Cylinder Head Removal/Installation	8-3	Camshaft Installation	8-11

## Service Information

- The cylinder head, camshaft, and the cam gear case can be serviced with the engine mounted on the frame.
- If the front or rear camshaft is removed, be sure to check the valve timing on the other cylinder from which the shaft is not removed, then reinstall the removed shaft.
- When servicing the cylinder head, note and record the shim numbers and locations so that they can be set in their original position.
- When assembling the cylinder head, apply molybdenum disulfide grease to the sliding surfaces of the valve stem, rocker arm, rocker arm shaft, and the camshaft.
- Be sure that the No. 1 cylinder is at the top dead center of the compression stroke when the T1 mark is aligned with the alignment mark on the clutch cover (cutout) and the camshaft edge mark is toward up (i.e. aligned with the scribe line on the camshaft holder). Each mark should be positioned as shown in the drawing.
- The crankshaft should rotate clockwise and the camshaft counterclockwise viewed from the clutch cover side.
- The cylinders should be arranged as shown in the drawing.



- Be sure that the No. 4 cylinder is at the top dead center of the compression stroke when the T2 mark is aligned with the alignment mark on the clutch cover (cutout) and the camshaft edge mark is toward up (i.e. aligned with the scribe line on the camshaft holder). Each mark should be positioned as shown in the drawing.



## Troubleshooting

The cylinder head troubles can be detected by the cylinder compression and the abnormal engine noise.

### Cylinder Compression Too Low

- Valve
  - Misadjusted valve clearance
  - Seized or bent valve
  - Damaged valve spring
  - Improper valve timing
  - Improperly seated valve seat
- Cylinder head
  - Leads from the cylinder head
  - Distorted or cracked cylinder head

### Cylinder Compression Too High

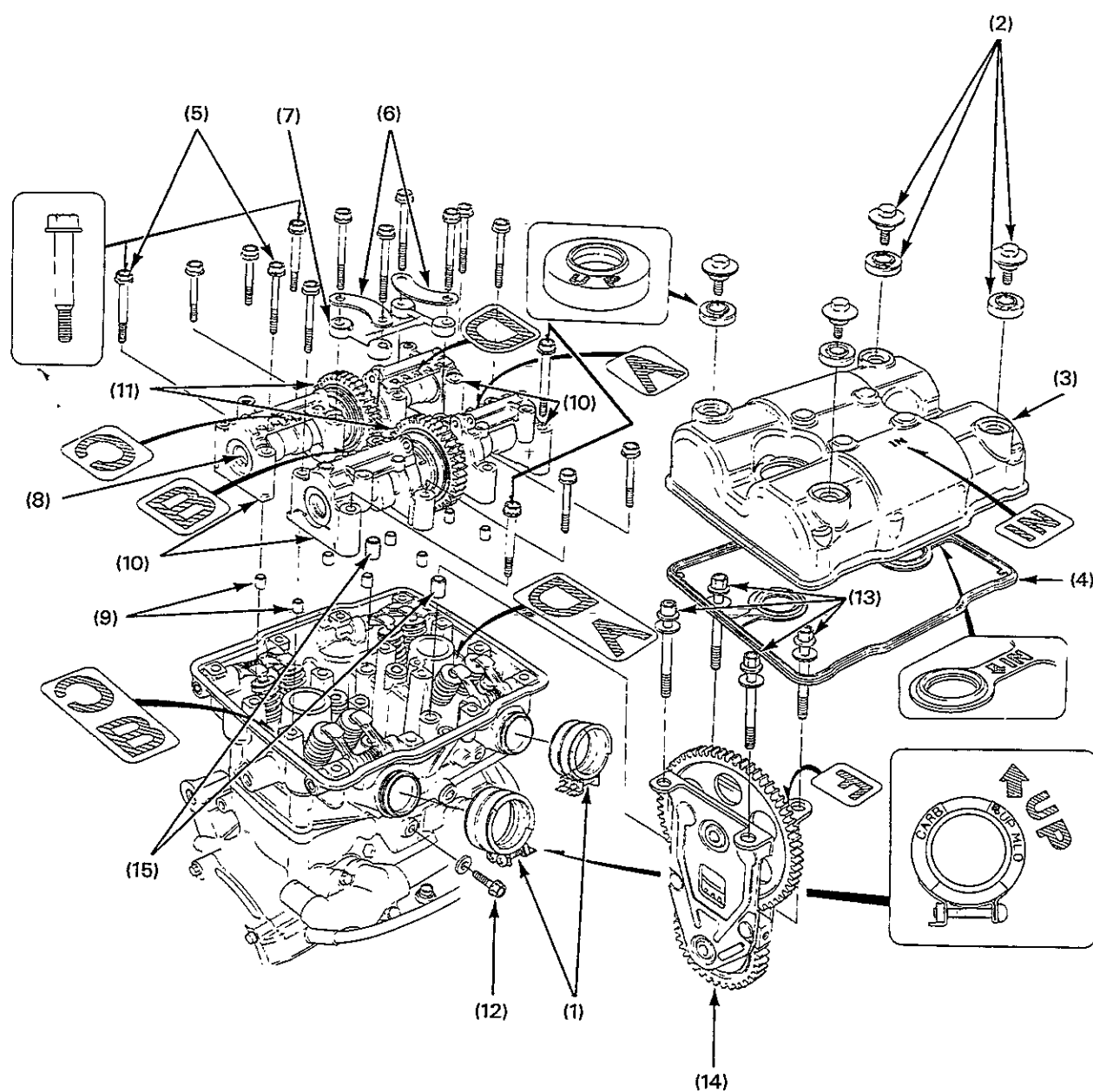
- Carbon deposits on the piston and in the combustion chamber

### Abnormal Noise

- Misadjusted valve clearance
- Seized valve or damaged valve spring
- Damaged or worn camshaft holder and camshaft
- Damaged or worn rocker arm
- Damaged or worn cam gear



## Camshaft/Cam Gear Case Removal



## NOTE

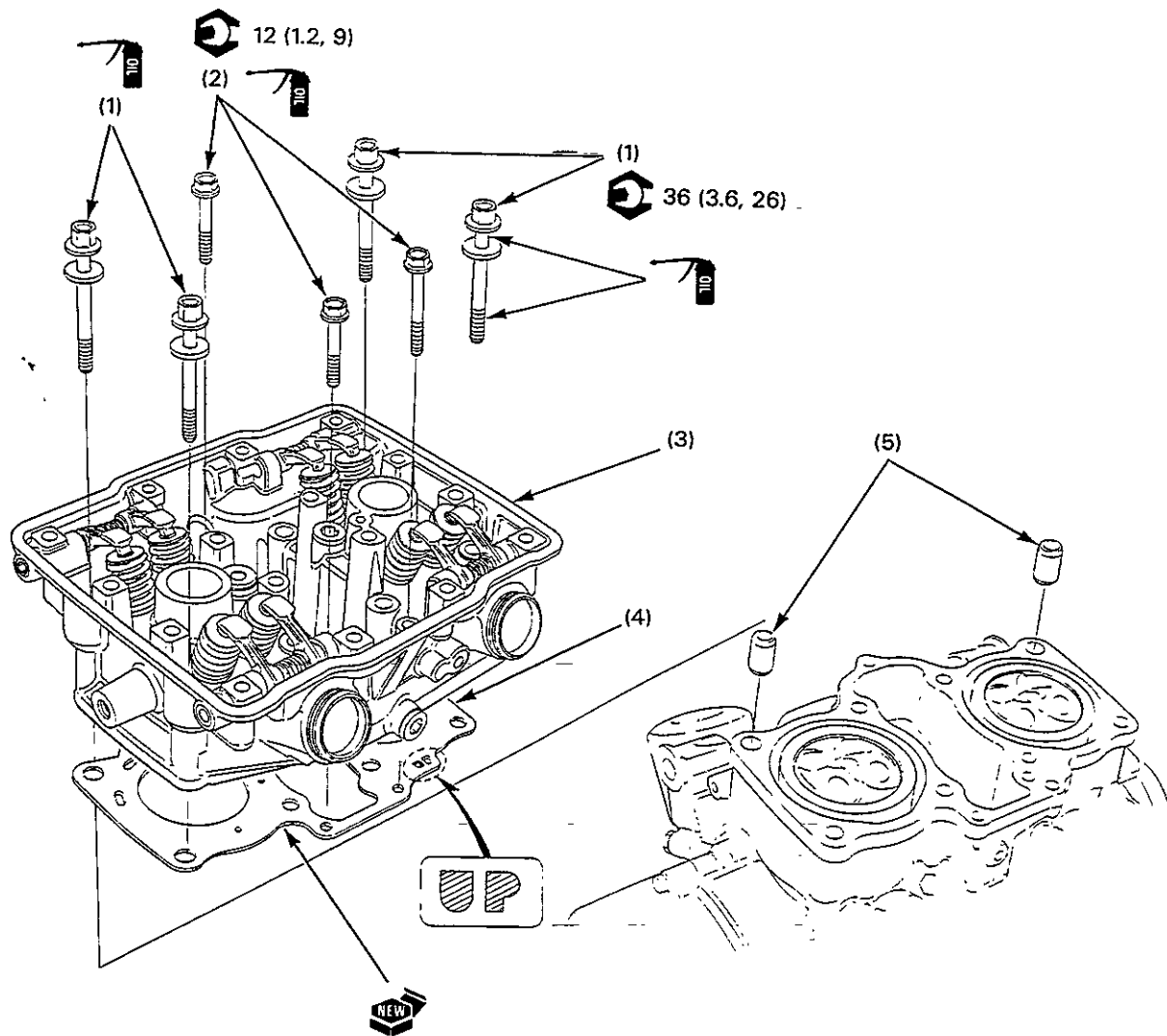
- Service on the front side is described on this page. Perform the rear side service in the same manner.
- Take care not to drop any part into the hole in the cam gear case.
- The cam gear case is stamped with the front and rear I.D. marks. Do not confuse the front and rear gear cases when the both are removed.
- When removing the camshaft holders, be sure that the camshaft of one cylinder is at the top dead center of the compression stroke. Loosen the holder bolts on the side of the other cylinder (which camshaft is at the top dead center of the exhaust stroke) equally in 2 or 3 steps, then loosen the remaining holder bolts in the same manner. Remove the holders as straight as possible.
- Each camshaft is stamped with the I.D. mark; F for the front cylinder and R for the rear cylinder. Also each camshaft is marked with IN or EX respectively.

## Requisite Service

- Radiator removal (page 5-6).
- Water pipe.
- Carburetor removal (page 6-8).
- Spark plug removal.

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Carburetor insulator	2	NOTE • Check that the camshaft of one cylinder is at the top dead center of the compression stroke. • Loosen the holder bolts on the side of the other cylinder which camshaft is at the top dead center of the exhaust stroke in 2 or 3 steps equally, then loosen the remaining holder bolts.
(2)	Cylinder head cover bolt/washer	4/4	
(3)	Cylinder head cover	1	
(4)	Gasket	1	
(5)	Camshaft holder bolt	16	
(6)	Oil pipe stopper plate	2	NOTE • Check for the cam gear and drive gear engagement.
(7)	Oil pipe	1	
(8)	Camshaft assembly	2	NOTE • The cam holder dowel pins must not necessarily removed.
(9)	Cam holder dowel pin	8	NOTE • Check the mark on the camshaft holder and erase either front (F) or rear (R) mark.
(10)	Camshaft holder	4	NOTE • Remove by aligning the cam lobe with the long hole in the cam holder.
(11)	Camshaft	2	NOTE • With copper washer.
(12)	Cam gear case set bolt	1	NOTE • With conical washer. Loosen in 2 or 3 steps equally.
(13)	Cam gear case mounting bolt	4	NOTE • Do not confuse the front and rear when both are removed.
(14)	Cam gear case	1	
(15)	Dowel pin (8mm)	2	

## Cylinder Head Removal/Installation



## NOTE

- Service on the front side is described on this page. Perform the rear side service in the same manner.
- When removing/installing the front engine mounting bolt, be sure to protect the oil pan by attaching it with 2 suitable wood board and support the engine with a jack to prevent load on the bolt.

## CAUTION

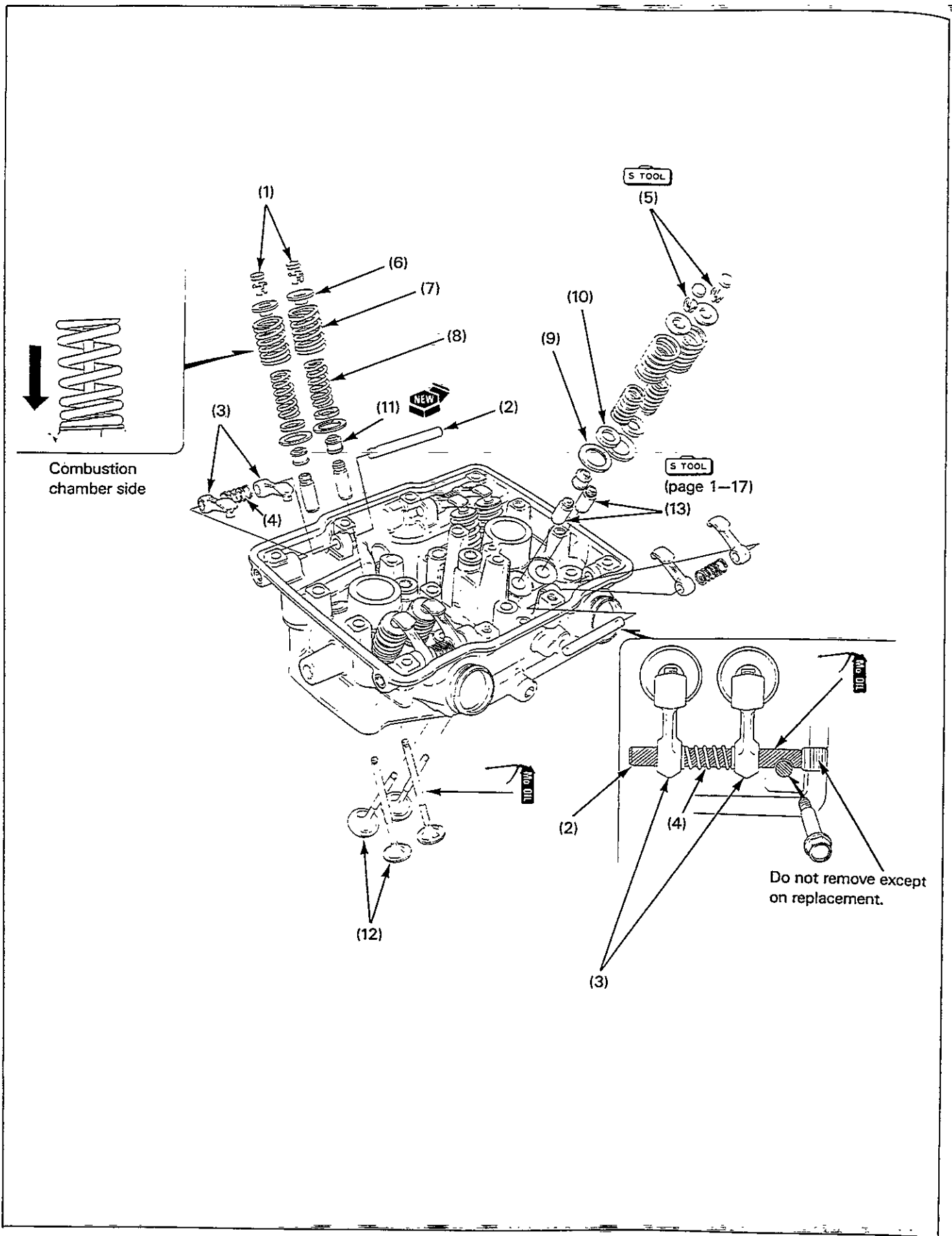
- Apply engine oil to the threads and the seating face of the cylinder head bolt.

## Requisite Service

- Operations related to the front cylinder:
  - Radiator removal/installation (page 5-6).
  - Operations related to the both cylinder:
    - Camshaft holder/cam gear case removal (page 8-2).
    - Exhaust pipe removal/installation (page 2-10).
    - Carburetor removal/installation (page 6-8).
  - Thermostat removal/installation (page 5-4).
  - Coolant draining (page 5-3).
  - Engine mounting bolt removal.

Procedure		Q'ty	Remarks
(1)	<b>Removal Order</b> Cylinder head bolt 8 × 84mm	4	Installation is in the reverse order of removal. NOTE • Loosen/tighten the conical washer attached special bolts together with the 6mm bolts in 2 or 3 steps equally.
(2)	Cylinder head bolt 6 × 62mm	3	
(3)	Cylinder head assembly	1	
(4)	Gasket	1	NOTE • Install with the "UP" mark facing up.
(5)	Dowel pin	2	

## Cylinder Head Disassembly/Assembly



**CAUTION**

- Before servicing the cylinder head, note and record the shim thickness and combination with the valve to installed the shims in their original position.
- Do not compress the valve springs more than necessary.
- Note the location of each part and reinstall them in their original position.
- When installing the valve springs, install with the narrower coil pitch side toward the combustion chamber.
- Do not remove the rocker arm shaft plug except when it is replaced as it has the tapered threads. When the rocker arm shaft plug is replaced, apply sealing agent to the threads and install.

**NOTE**

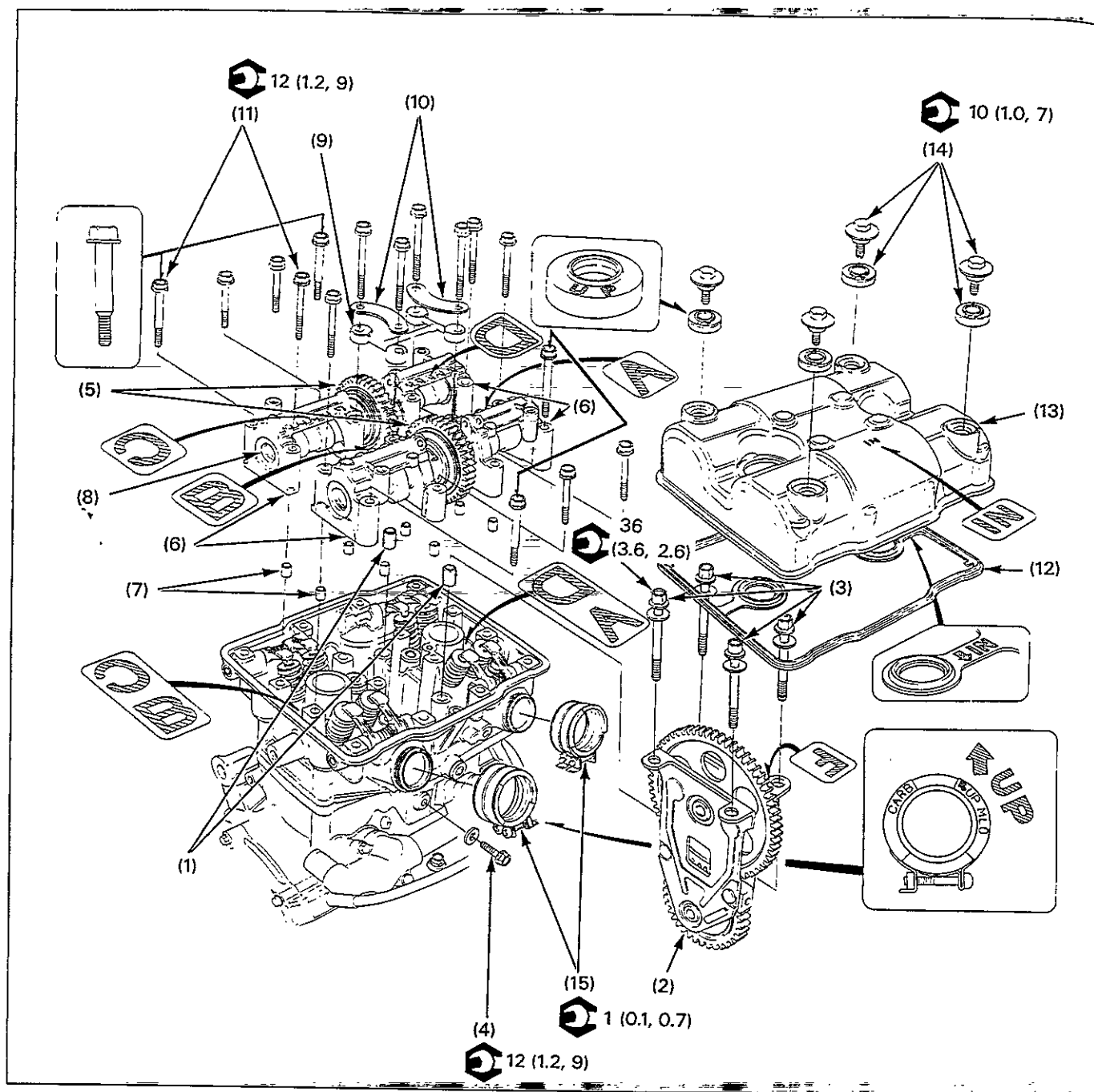
- Servicing on the front bank is described on this page. Perform the rear bank service in the same manner.

**Requisite Service**

- Cylinder head removal/installation (page 8-4).

Procedure		Q'ty	Remarks
(1)	Disassembly Order Shim	8	Assembly is in the reverse order of disassembly. NOTE
(2)	Rocker arm shaft	4	NOTE
			• The rocker arm shaft can be easily removed by pressing the spring with the two rocker arms and moving the shaft inward. When installing the rocker arm shaft, align the groove in the rocker arm shafts with the recess groove of the camshaft holder bolts.
(3)	Rocker arm	8	NOTE
			• Check for missing spring.
(4)	Thrust spring	4	
(5)	Valve cotter	16	
(6)	Valve retainer	8	
(7)	Outer spring	8	NOTE
			• Install them with the narrow pitch end facing down.
(8)	Inner spring	8	
(9)	Outer spring seat	8	NOTE
(10)	Inner spring seat	8	• Install flush. There should be no step between the spring seats.
(11)	Stem seal	8	
(12)	Valve IN/EX	8	
(13)	Valve guide	8	

# Camshaft, Cam Gear Case Installation



## NOTE

- The front cylinder service is described on this page. Perform the rear cylinder service in the same manner.
- Check that the shim is installed on each valve retainer securely. Take care not to drop any part into the hole in the cam gear case.
- When installing the cam shaft holders, check that the camshaft of one cylinder is at the top dead center of the compression stroke. Loosely tighten the holder bolts on the side of the other cylinder which camshaft is at the top dead center of the exhaust stroke in 2 or 3 steps equally, then tighten the remaining holder bolts (page 8-11).
- The camshaft are marked with F for front cylinder and R for rear cylinder. Each camshaft is also marked with IN or EX respectively (page 8-11).

## Requisite Service

- Radiator installation (page 5-6).
- Water pipe installation.
- Carburetor Installation (page 6-8).
- Spark plug installation.

Procedure		Q'ty	Remarks
<b>Installation Order</b>			
(1)	Dowel pin (8mm)	2	NOTE • Push the dowel pins fully and install.
(2)	Cam gear case	1	NOTE • Check the flange for F (for front) or R (for rear) mark and install accordingly with the set bolt installation hole toward the carburetor (page 8-10).
(3)	Cam gear case mounting bolt	4	NOTE • Loosely tighten, check for proper engagement of the second gear and the crankshaft timing gear, and push the cam gear case as much as it goes.
(4)	Cam gear case set bolt	1	NOTE • With copper washer. Loosely tighten. Tighten the cam gear mounting bolts of the dowel pin side first, then the remaining mounting bolts diagonally. Tighten the set bolt (page 8-10).
(5)	Camshaft	2	NOTE • Install by aligning the cam lobe with the long hole in the cam holder.
(6)	Camshaft holder	4	NOTE • Check the mark on the camshaft holder and assemble with the camshaft accordingly.
(7)	Camshaft holder dowel pin	8	NOTE • Check the timing mark on the starter clutch. Check the engagement of the cam gear and the drive gear and install by aligning the edge mark with the scribe line on the holder.
(8)	Camshaft assembly	2	
(9)	Oil pipe	1	NOTE • Check that the camshaft of one cylinder is at the top dead center of the compression strokes. Loosely tighten the holder bolts on the side of the other cylinder which camshaft is at the top dead center of the exhaust stroke in 2 or 3 steps equally, then tighten the remaining holder bolts. The outer rows of the camshaft holder bolts tightened on the cylinder head are the stepped bolts.
(10)	Oil pipe stopper plate	2	
(11)	Camshaft holder bolt	16	
(12)	Gasket	1	NOTE • Align the in mark with the mark on the cover and attach by using the recommended adhesive agent (page 3-10).
(13)	Cylinder head cover	1	NOTE • Install with the IN mark toward the carburetor
(14)	Cylinder head cover washer/bolt	4	NOTE • Install the washer with the "UP" mark toward out.
(15)	Carburetor insulator	2	NOTE • Install with the "CARB" mark toward the carburetor and the "UP" mark toward up.



## Cam Gear Case Installation

### NOTE

- The cam gear case is marked with F or R on the flange. Install the gear case marked F on the front cylinder and the case marked R on the rear cylinder.
- When the identification mark is not clear, the gear case can be identified by the sub gear of the second gear. With the sub gear toward you:
  - for front cylinder: the sub gear is off to the left side from the main gear.
  - for rear cylinder: the sub gear is off to the right side from the main gear.

Push the gear case dowel pins fully into the cylinder head.

### NOTE

- The second gear and the crankshaft timing gear do not engage properly when the dowel pins are not pushed into the full.

Check the I.D. mark on the gear case and install the case on the designate cylinder head.

Check for the proper engagement of the timing gear and the seconds gear in the following procedures.

Lightly move the third gear back and forth with the gear case lightly pushed down. The engagement is correct if the flange of the gear case is pushed by the timing gear and raised off the cylinder head slightly.

Remove the gear case and reinstall it if necessary.

Tighten the four gear case mounting bolts fully with your fingers.

Install and loosely tighten the gear case set bolt and the copper washer.

### NOTE

- When tightening the set bolt, take care not to damage the gear case threads and the bolt threads.

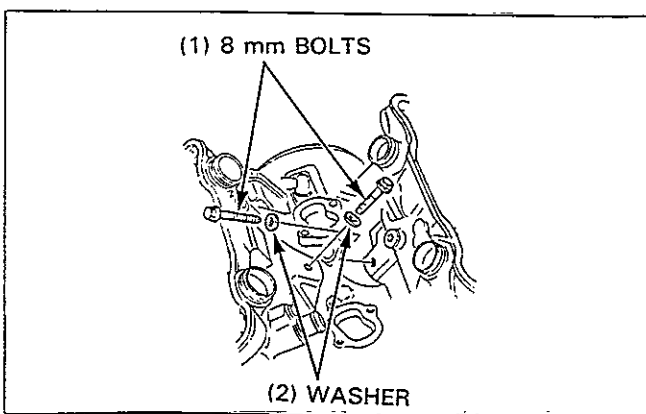
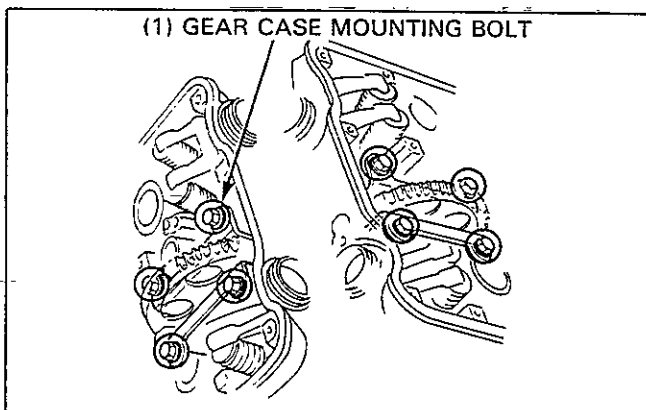
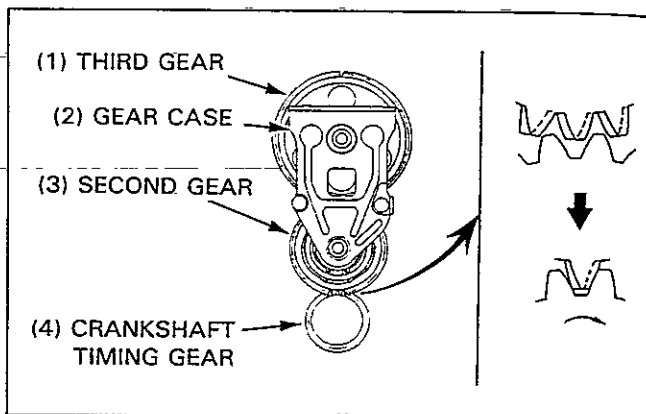
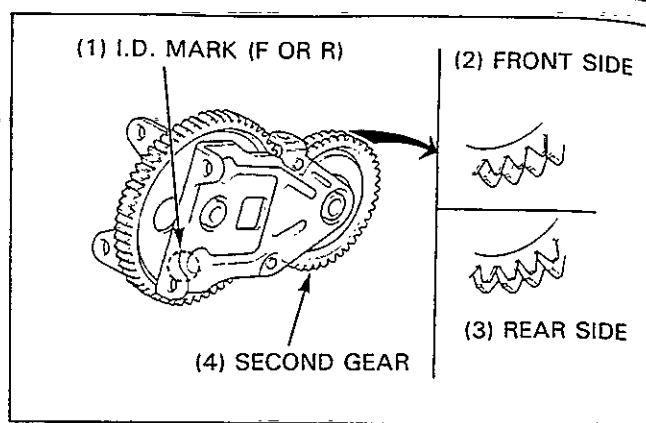
Tighten the gear case mounting bolts of the dowel pin side to the specified torque.

**TORQUE: 36 N·m (3.6 kg-m, 26 ft-lb)**

Then tighten the remaining mounting bolts.

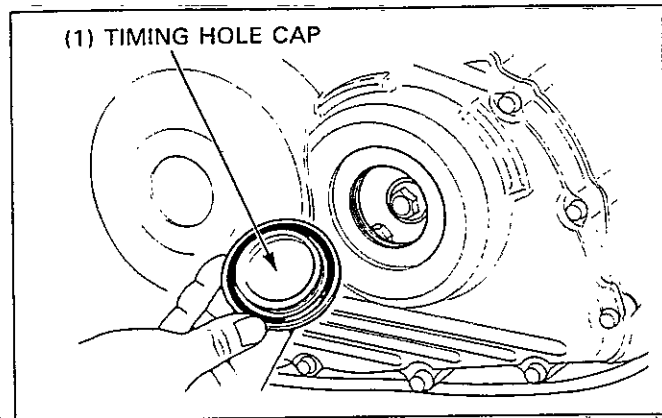
Tighten the gear case set bolt.

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



## Camshaft Installation

Remove the lower fairing (page 2-4).  
Remove the timing hole cap.

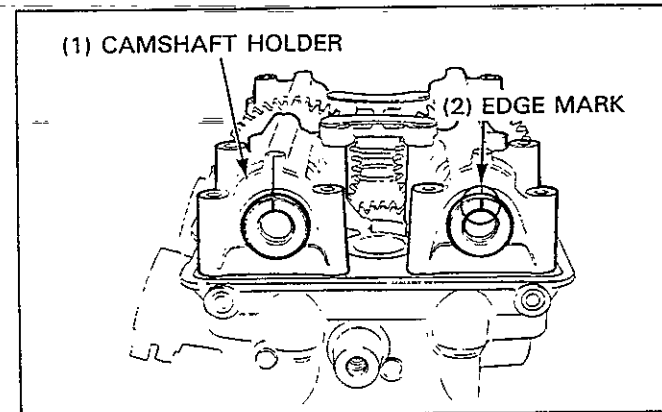


When both front and rear cylinders are disassembled:

### CAUTION

- Install all the camshafts with the edge mark toward the right crankcase cover.

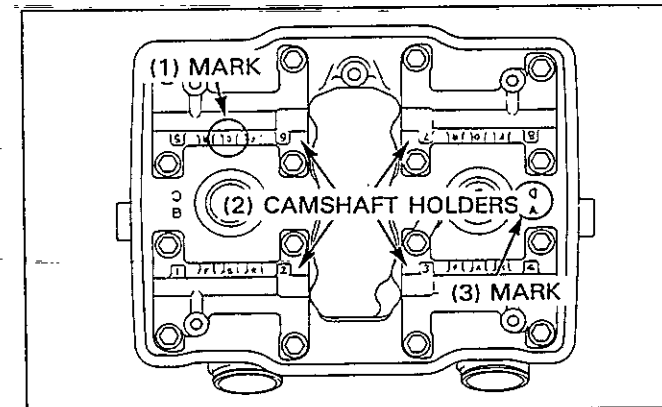
Apply molybdenum disulfide solvent to the sliding surface of the camshaft, camshaft holder, and the rocker arm.



Refer to the marks on the camshaft holders and the cylinder head and note each camshaft holder installation position.

### CAUTION

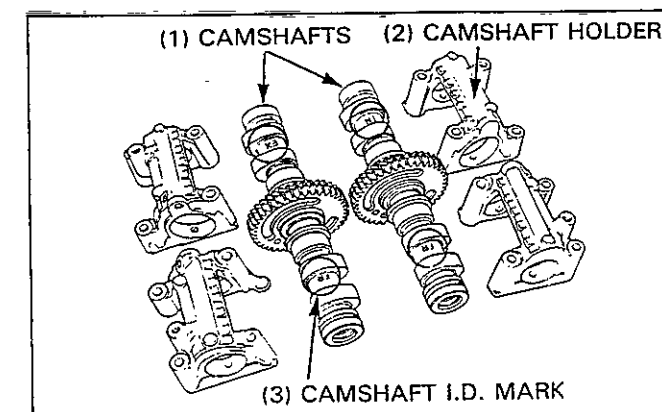
- The camshaft holders make up the oil passage. Be sure to install them in the correct positions as instructed with the marks.



Check the I.D. marks of each bank's camshaft and assemble the camshafts with the respective camshaft holders.

### I.D. MARKS:

RR: Rear bank  
FR: Front bank  
IN: Intake  
EX: Exhaust

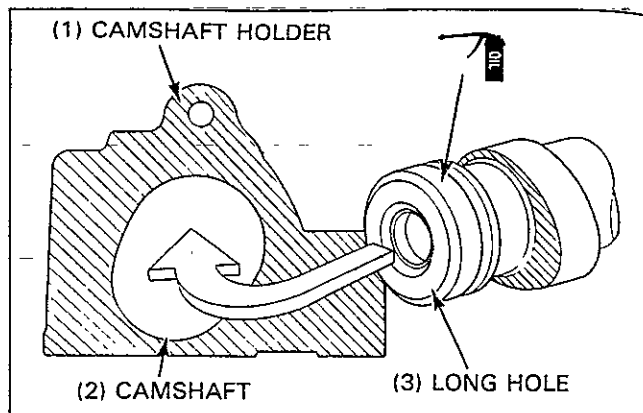


## Cylinder Head/Valves

Align the cam lobe with the long hole in the camshaft holder and insert the camshaft into the camshaft holder.

### CAUTION

- Apply molybdeum disulfide solution to the cam lobe, camshaft, and the camshaft holder journal and insert the camshaft with care not to damage them.

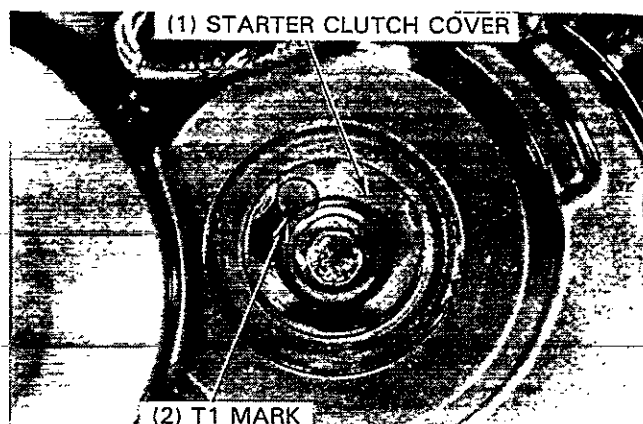


[Rear bank side installation]

Rotate the crankshaft clockwise and align the starter clutch T1 mark (scribe line) with the cutout (alignment mark) in the right crankcase cover. (The No.1 cylinder should be at the top dead center of the compression stroke.)

### CAUTION

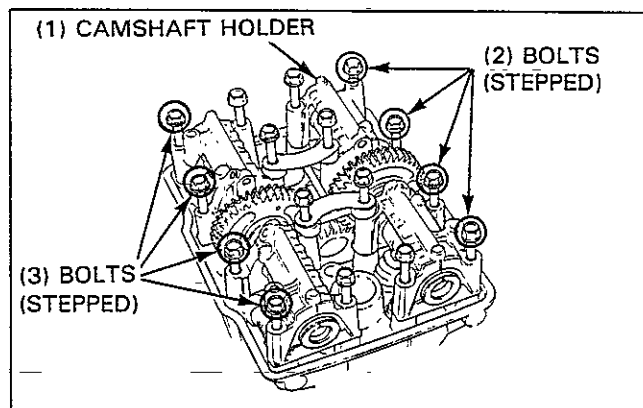
- Be sure to install the camshaft holder of the No.3 cylinder first, as it is at the top dead center of the exhaust stroke.



Install the assembled intake side and exhaust side camshaft holders on the cylinder head with the camshaft edge marks facing up and aligned with the scribe line on the holders.

### CAUTION

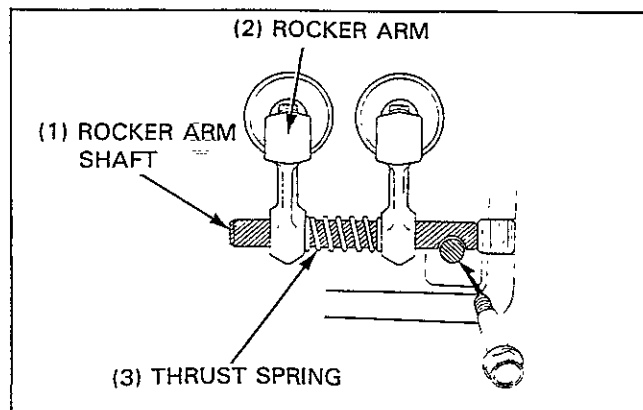
- Be sure each shim is installed properly.
- Check for proper engagement of the cam gear and the camshaft side driven gear, and install with care not to let the edge marks out of the alignment with the scribe lines.
- Do not strike to install the camshaft holder.



Set the oil pipe and the pipe plate between the camshaft holders and loosely tighten all the camshaft holder bolts.

### CAUTION

- Before loosely tightening the camshaft holder bolts, be sure that the bolt holes at the cylinder head corners align with the recess holes for fixing the rocker arm shafts.
- After confirming the alignment of the recess holes and the bolt holes, insert a 6 mm pin into the holes to ease the rear bank side installation.
- Do not remove the sealing plug.



Tighten the eight No.3 side camshaft holder bolts (IN and EX sides) until the camshaft holders closely set on the cylinder head.

### CAUTION

- The camshafts on the No.3 cylinder are so close that they get "overlapped". Tighten the eight holder bolts (No.3 side only) in 2 or 3 steps equally.
- Tighten the stepped bolts at the corners of the cylinder head.

Recheck that the both camshaft edge marks align with the scribe lines on the camshaft holders.

Tighten all the camshaft holder bolts in 2 or 3 steps diagonally.  
TORQUE: 12 N.m (1.2 kg-m, 9 ft-lb)

### CAUTION

- The No.1 cylinder is at the top dead center of the compression stroke. Tighten the No.3 cylinder's camshaft holder bolts first until the No.3 camshaft holders closely set on the cylinder head, then tighten the remaining bolts in 2 or 3 steps equally.

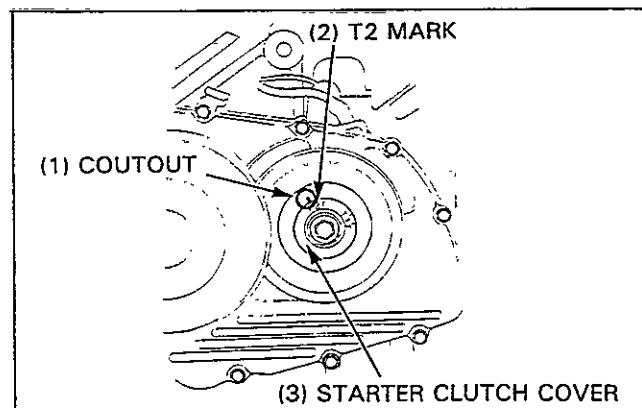
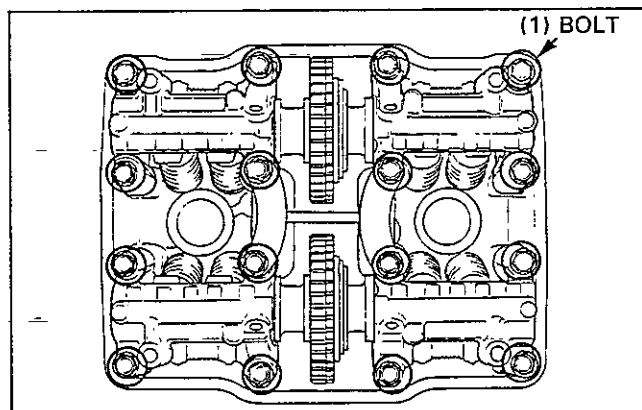
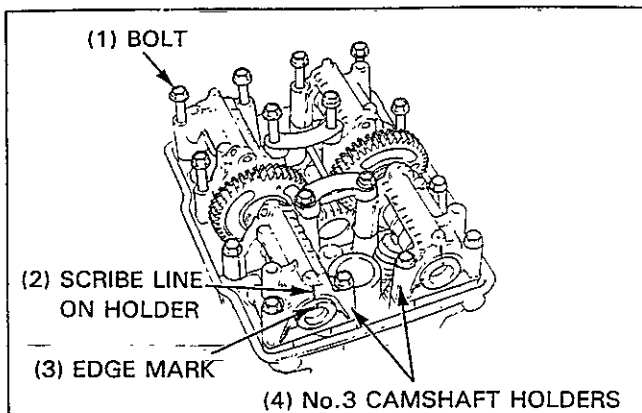
After the installation, slowly turn the crankshaft 2 or 3 revolutions clockwise and adjust the shims to fit.

Valve clearance adjustment: see page 3-7.

[Front bank side installation]

Turn the crankshaft clockwise and align the starter clutch T1 mark (scribe line) with the cutout (alignment mark) in the right crankcase cover. Be sure that the camshaft edge mark facing up and aligning with the scribe line on the camshaft holder. If it not, align by turning the crankshaft on emore clockwise revolution. (The No.1 cylinder should be at the top dead center of the compression stroke.)

Turn the crankshaft further 90 degress clockwise and align the starter clutch T2 mark (scribe line) with the cutout (alignment mark) in the right crankcase cover.

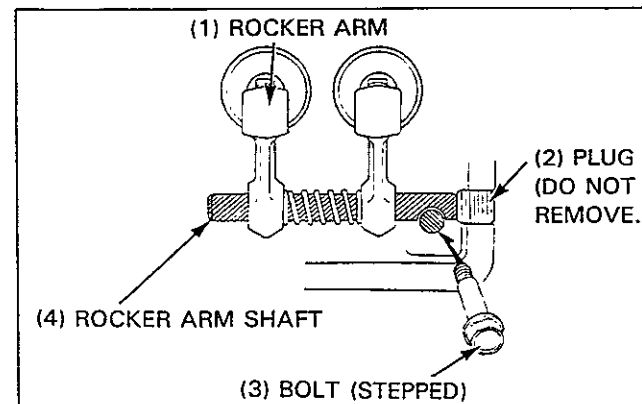


Be sure that the camshaft edge mark is facing up and aligning with the scribe line on the camshaft holder. (The No.4 cylinder should be at the top dead center of the compression stroke.) Now install the camshaft in the follwoing procedures.

Set the oil pipe and the pipe plate between the camshaft holders and tighten all the camshaft holder bolts.

### CAUTION

- Before loosely tightening the camshaft holder bolts, be sure that the bolt holes at the cylinder head corners align with the recess holes for fixing the rocker arm shafts, before loosely tightening the camshaft holder bolts. Do not remove the sealing plug.

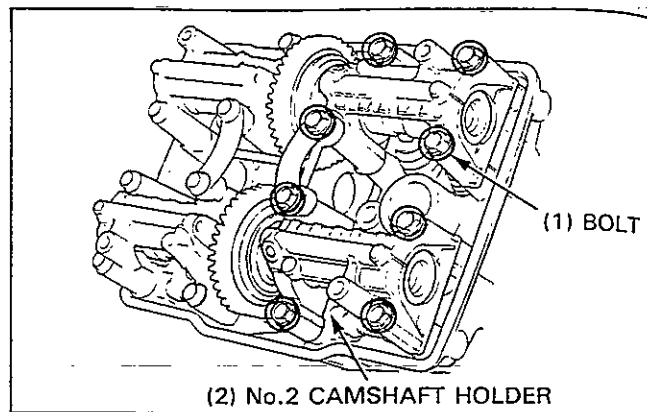


## Cylinder Head/Valves

Tighten the eight camshaft holder bolts of both No.2 cylinder camshafts (IN and EX sides) until the camshaft holders closely set on the cylinder head, as did on the rear bank side.

### CAUTION

- Be sure each shim is installed properly.
- Check for proper engagement of the cam gear and the camshaft side driven gear, and install with care not to let the edge marks out of the alignment with the scribe lines.
- Do not strike to install the camshaft holder.

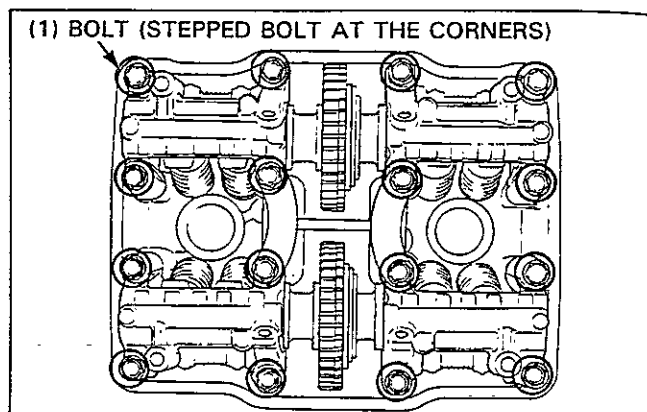


Tighten the all bolts including the camshaft holder bolts of the No.4 cylinder side in 2 or 3 steps.

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

### CAUTION

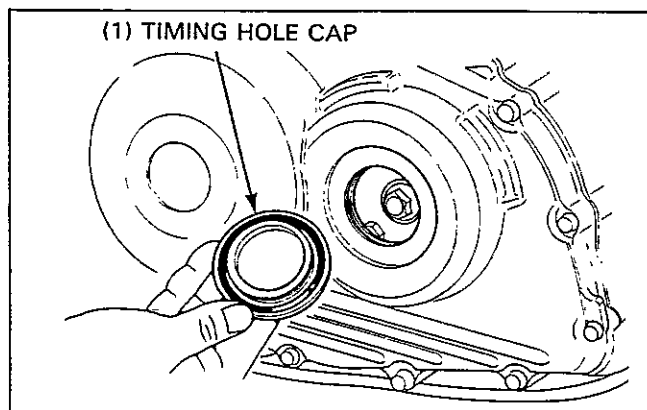
- No.4 cylinder is at the top dead center of the compression stroke. Be sure to tighten the No.2 cylinder's camshaft holder bolts first until the camshaft holders closely set on the cylinder head, then tighten the remaining bolts in 2 or 3 steps equally.



Valve clearance adjustment: see page 3-7.

Head cover installation: see page 3-10.

Apply the molybdenum disulfide solution to the timing hole cap O-ring and install the cap.

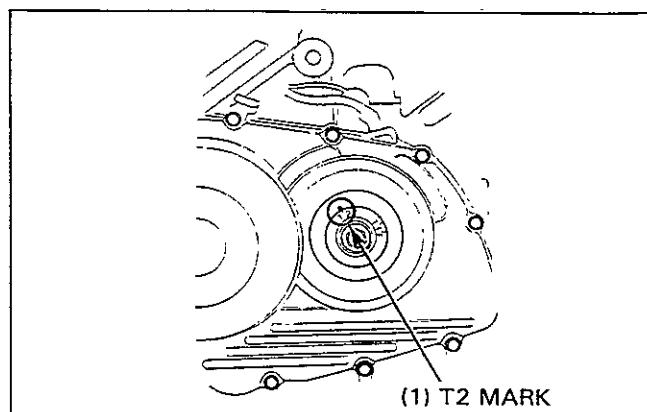


[When the front side is disassembled]

Remove the rear cylinder head cover and check that the No. 1 cylinder is at the top dead center of the compression stroke (page 3-7).

Turn the crankshaft 90 degrees clockwise from the timing mark T1 position and align the starter clutch T2 mark (scribe line) with the cutout (alignment mark) in the right crankcase cover. (The No.4 cylinder should be at the top dead center of the compression stroke.)

Now install the front camshaft.



[When the rear side is disassembled]

Remove the front cylinder head cover and be sure that the No.4 cylinder is at the top dead center of the compression stroke. (The camshaft edge mark should face up at the T2 position.) (Page 3-7)

Turn the crankshaft clockwise 630 degrees (one revolution and 270 degrees) from the timing mark T2 position and align the starter clutch T1 mark (scribe line) with the coutout (alignment mark) on the right crankcase cover. (The No.1 cylinder should be at the top dead center of the compression stroke.)

Now install the rear camshaft.

(1) Relationship between the top dead center marks and cylinders

Timing mark (starter clutch)	Camshaft edge mark	Cylinder at top dead center
T1	Toward up	# 1
	Toward down	# 3
T2	Toward up	# 4
	Toward down	# 2

# 9. Clutch

Service Information	9-1	Clutch Removal	9-4
Troubleshooting	9-1	Clutch Installation	9-6
Right Crankcase Cover Removal/Installation	9-2		

## Service Information

- Clutch maintenance can be done with the engine in the frame.
- Clean any gasket off the crankcase cover-crankcase mating surface.
- Do not damage the cover-case mating surface.
- Never allow foreign materials to get into the engine.
- If the transmission require servicing, remove the engine and separate the crankcase (Section 10).

## Troubleshooting

Most of the clutch malfunction result from the improper clutch free play. Check the clutch free play and adjust, if necessary, before disassembling the clutch.

### Clutch is Slippery When Accelerating.

- Too small clutch lever free play
- Worn clutch disc
- Deteriorated diaphragm spring
- Excessive engine oil

### Clutch Operation is not Stabilized.

- Worn clutch outer groove

### Gear is Hard to Engage.

- Clutch misadjusted

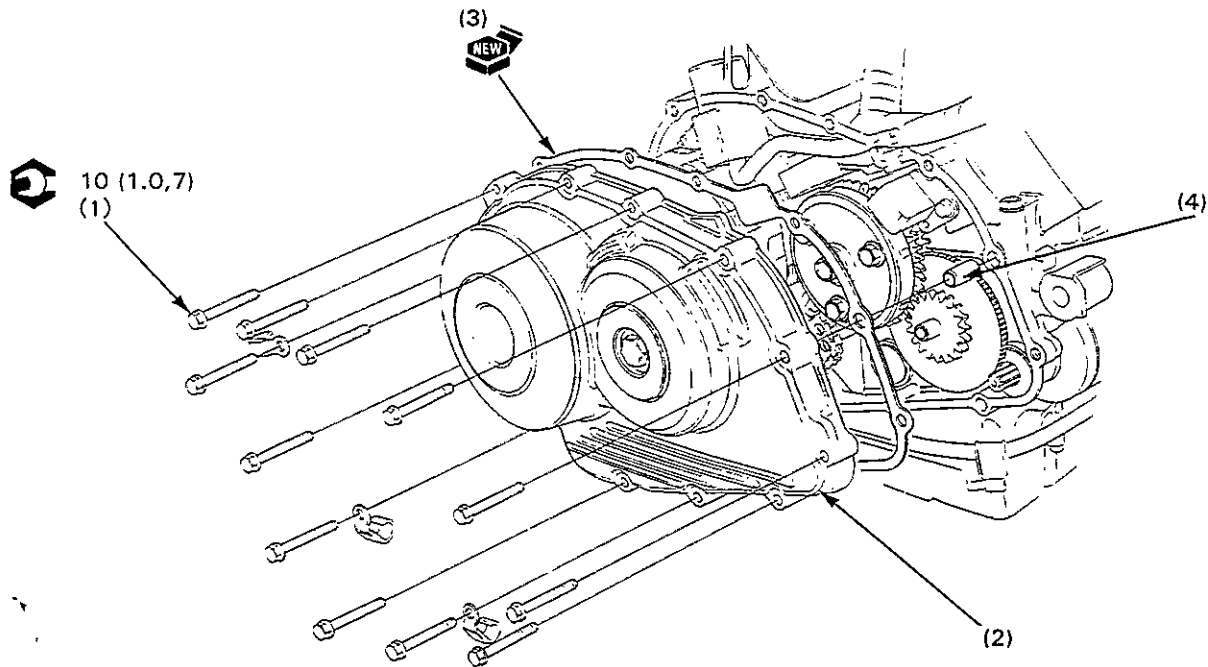
### Clutch Lever is Heavy.

- Poor clutch cable operation due to damage or rust
- Damaged clutch lifter mechanism
- Damaged clutch lifter plate bearing
- Clutch cable not routed properly
- Bent clutch lifter arm

### Clutch is Hard to Disengage or the Motorcycle Moves with the Clutch Disengaged.

- Excessive clutch lever free play
- Bent clutch plate
- Loose clutch lock nut
- Excessive engine oil or excessive oil viscosity
- Clutch cable not routed properly

## Right Crankcase Cover Removal/Installation



### Requisite Service

- Engine oil draining (drain bolt location: page 3-3, step: section 2 of the Common Service Manual).
- Lower fairing removal/Installation (page 2-4).

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Right crankcase cover bolt	12	
(2) Right crankcase cover	1	
(3) Gasket	1	
(4) Dowel pin	2	



**Clutch lock Nut Removal**

Straighten the locking tabs of the lock nut with care not to damage the main shaft.

**NOTE**

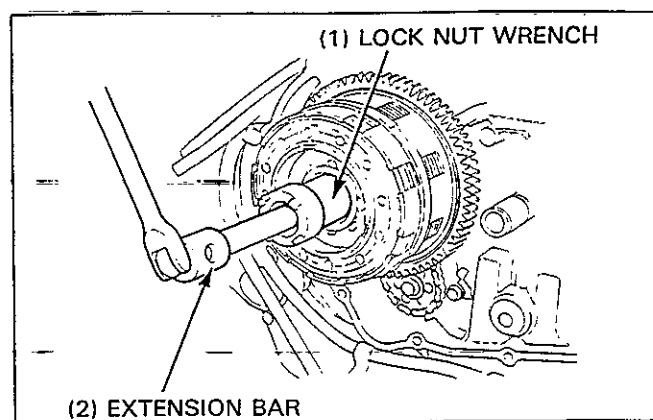
- With engine mounted: move the shift lever to the 6th speed, operate the rear brake, and loosen the lock nut.  
With engine dismounted: move the shift lever to the 6th speed, hold the drive sprocket with a universal holder, and loosen the lock nut.

Loosen the lock nut by using the lock nut wrench.

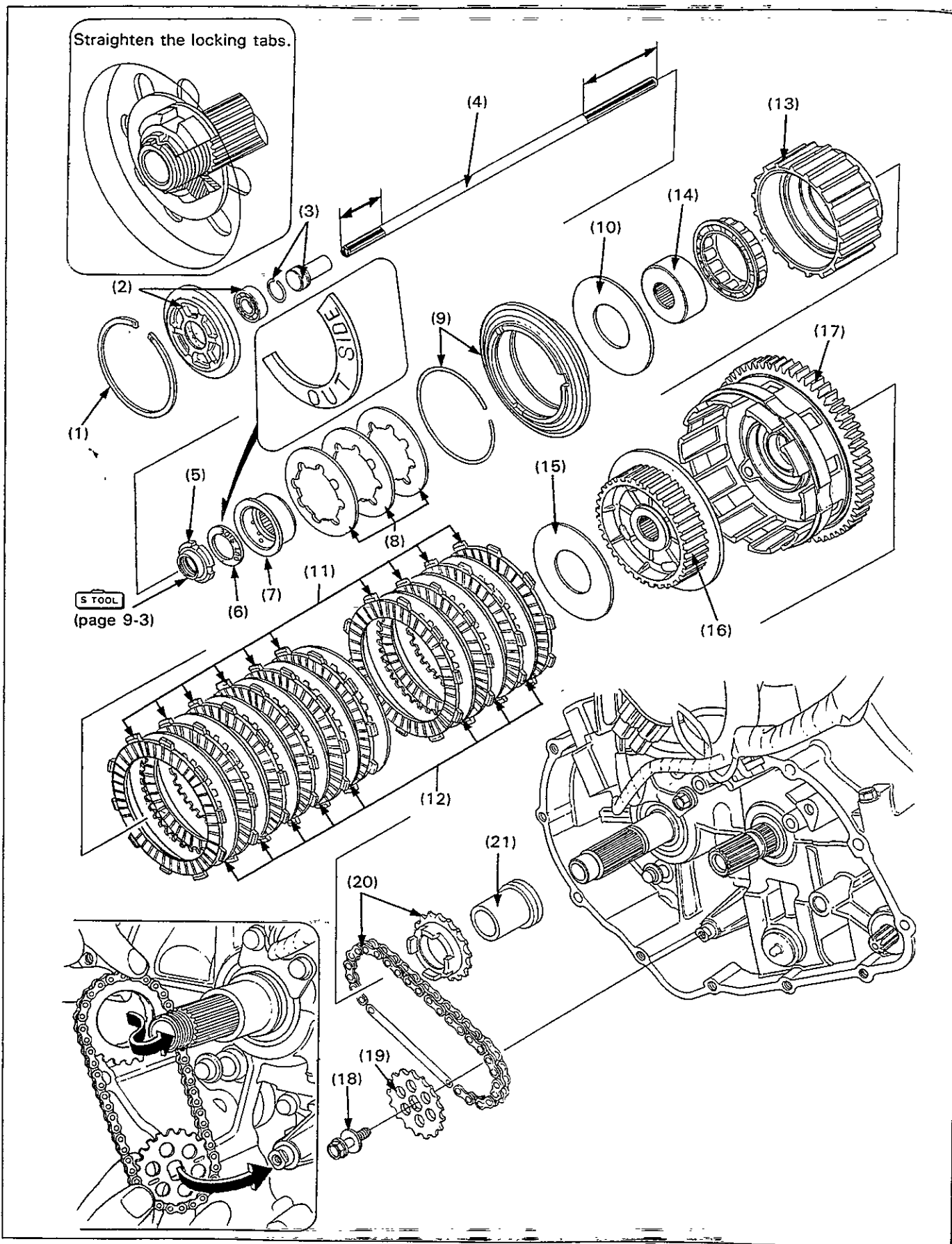
**S TOOL**

**LOCK NUT WRENCH, 26 x 30 mm** 07716-0020203

**EXTENSION BAR** 07716-0020500



## Clutch Removal



## NOTE

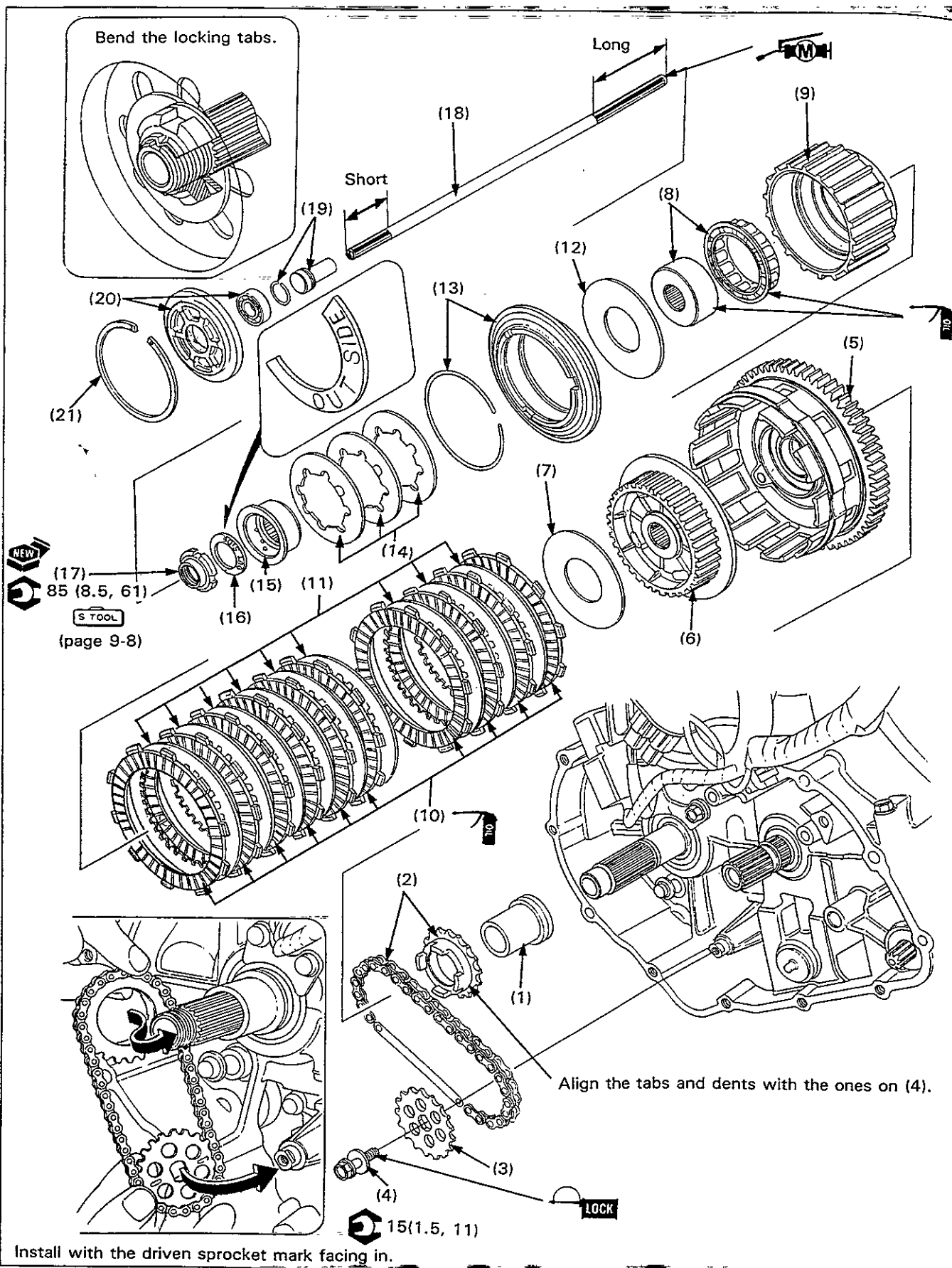
- To loosen the clutch center lock nut, straighten the locking tabs with care not to damage them, then; Move the shift lever to the 6th speed and operate the rear brake. When the engine is dismounted from the frame, move the shift lever to the 6th speed and hold the drive sprocket with a universal holder or equivalent.
- Loosen the oil pump driven sprocket bolt with the clutch assembly installed before removing the bolt. Note that the bolt threads are coated with the thread locking agent.
- Note the connection and installation direction of the lifter rod once it is removed. Special alignment is required at the left lifter cam connecting section (page 10-2).

## Requisite Service

- Right crankcase cover removal/installation (page 9-2).
- Starter clutch removal (page 17-2).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Snap ring	1	NOTE • When removing the oil pump driven sprocket bolt, loosen it first with the clutch outer installed.
(2)	Clutch lifter plate	1	NOTE • Remove the bearing only on replacement.
(3)	Lifter guide	1	NOTE • Remove the stopper ring only on replacement.
(4)	Lifter rod	1	NOTE • Do not depress the clutch lever with the rod removed.
(5)	Clutch center lock nut	1	NOTE • Straighten the locking tabs first (page 9-3)
(6)	Lock washer	1	
(7)	Clutch spring set plate	1	
(8)	Diaphragm spring	3	NOTE • Replace the three springs as a set.
(9)	Pressure plate	1	NOTE • Remove the stopper ring only on replacement.
(10)	Thrust washer	1	
(11)	Clutch disc	10	NOTE • Disc contact surface of the two end plates is black.
(12)	Clutch plate	9	
(13)	Clutch center B	1	
(14)	One-way clutch assembly	1	NOTE • Do not disassemble unnecessarily.
(15)	Thrust washer	1	
(16)	Clutch center A	1	
(17)	Clutch outer	1	
(18)	Oil pump driven sprocket bolt	1	
(19)	Oil pump driven sprocket	1	
(20)	Oil pump drive chain/sprocket	1/1	NOTE • Remove the oil pump drive chain and sprocket together.
(21)	Clutch outer guide	1	

## Clutch Installation



## NOTE

- Tighten the clutch center lock nut as follows.  
Move the shift lever to the 6th speed, operate the rear brake, and tighten the clutch center lock nut.  
When the engine is dismounted from the frame, move the shift lever to the 6th speed and hold the drive sprocket with a universal holder or equivalent.
- Tighten the oil pump driven sprocket bolt with the clutch assembly installed. Apply the thread locking agent to the bolt 5.5 to 7.5 mm from the tip.
- The disc contact surface of the two clutch end discs are different in material (black). Do not interchange them.
- Install the lifter rod with the long iron ends toward left.

## Requisite Service

- Right crankcase installation (page 9-2).
- Starter clutch installation (page 17-4).

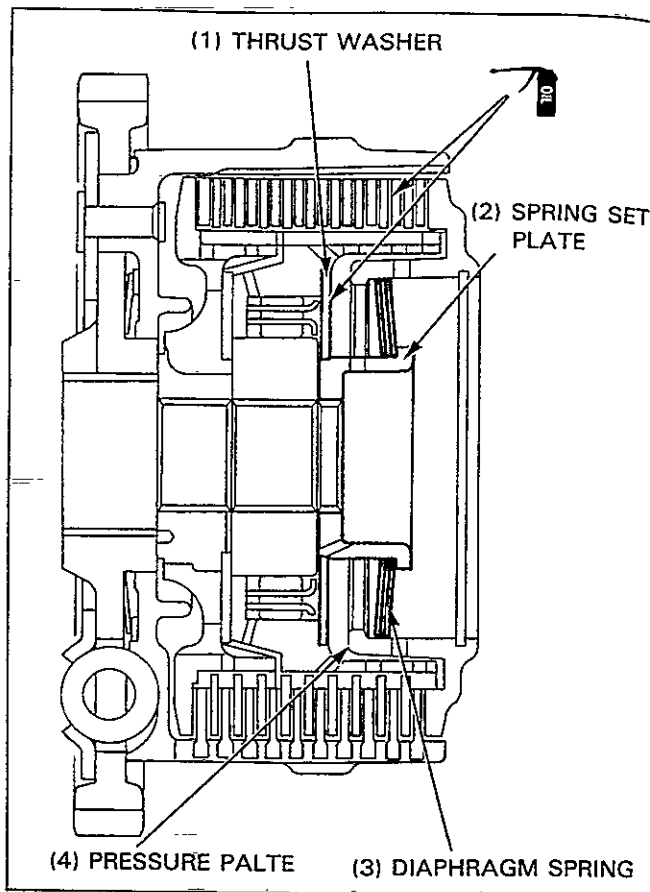
Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Clutch outer guide	1	
(2)	Oil pump drive chain/sprocket	1/1	
(3)	Oil pump driven sprocket	1	NOTE • Install with a scribe line on the gear toward in and tighten with a bolt.
(4)	Oil pump driven sprocket bolt	1	
(5)	Clutch outer	1	NOTE • Engage with the drive sprocket and install.
(6)	Clutch center A	1	NOTE • Take care not to damage the main shaft spline.
(7)	Thrust washer	1	
(8)	One-way clutch assembly	1	NOTE • Coat the sprag roller and inner with clean engine oil and assemble with the clutch center B with the roller flange toward the case cover.
(9)	Clutch center B	1	
(10)	Clutch disc	10	NOTE • Contact surface of the both end plates is black. Coat the discs with clean engine oil and assemble with the clutch plates alternately.
(11)	Clutch plate	9	
(12)	Thrust washer	1	
(13)	Pressure plate	1	
(14)	Diaphragm spring	3	NOTE • Install with the projected side toward out.
(15)	Clutch spring set plate	1	NOTE • Set the thrust washer on the stepped portion at the bottom of the set plate (page 9-8).
(16)	Lock washer	1	NOTE • Install with the OUTSIDE mark facing out.
(17)	Lock nut	1	CAUTION • Check that the drive sprocket and the clutch outer are properly engaged, then bend the locking tabs with care not to damage the threads.
(18)	Lifter rod	1	NOTE • Install with the long iron ends toward left. Apply molybdenum disulfide grease to the left end. Alignment with the lifter cam: see page 10-2.
(19)	Lifter guide	1	NOTE • Assemble with the lifter plate bearing.
(20)	Lifter plate/bearing	1	
(21)	Snap ring	1	

### Clutch Diaphragm Spring Installation

When installing the clutch, install the three diaphragm springs on the pressure plate with the projected side toward the lock nut, then assemble with the spring set plate. Be sure that the thrust washer is securely set on the stepped section at the bottom of the set plate.

#### CAUTION

- Replace the three diaphragm springs as a set.
- Note that the thrust washer is set in the correct position of the set plate. Otherwise, the diaphragm spring and the lock nut cannot be set properly.
- Coat the thrust washer with clean engine oil to ease installation.



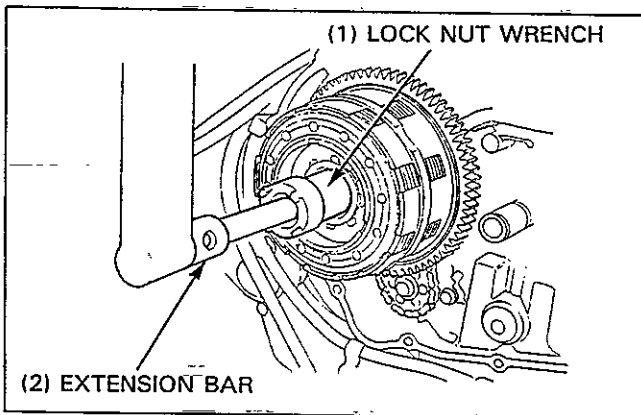
### Clutch Lock Nut Installation

Assemble the clutch (page 9-6).

#### NOTE

- With engine mounted: move the shift lever to the 6th speed, operate the rear brake, and tighten the clutch lock nut.
- With engine dismounted: Move the shift lever to the 6th speed, hold the drive sprocket with a universal holder or equivalent, and tighten the clutch lock nut.

Tighten the lock nut by using the lock nut wrench.



LOCK NUT WRENCH, 26 x 30 mm 07716-0020203  
EXTENSION BAR 07716-0020500

Bent the locking tabs of the lock nut.

#### NOTE

- Take care not to damage the main shaft.

# 10. Gearshift Linkage

Service Information	10-1	Gearshift Linkage, Shift Drum Removal	10-4
Troubleshooting	10-1	Gearshift Linkage, Shift Drum Installation	10-6
Drive Sprocket Cover Removal/Installation	10-2		

## Service Information

- The gear shift linkage (including the shift drum, shift fork, and the shift fork shaft) can be serviced with the engine mounted on the frame.
- Take care not to let dust, dirt, and any other foreign materials enter the engine.
- Separate the crankcase when the transmission service is required.

## Troubleshooting

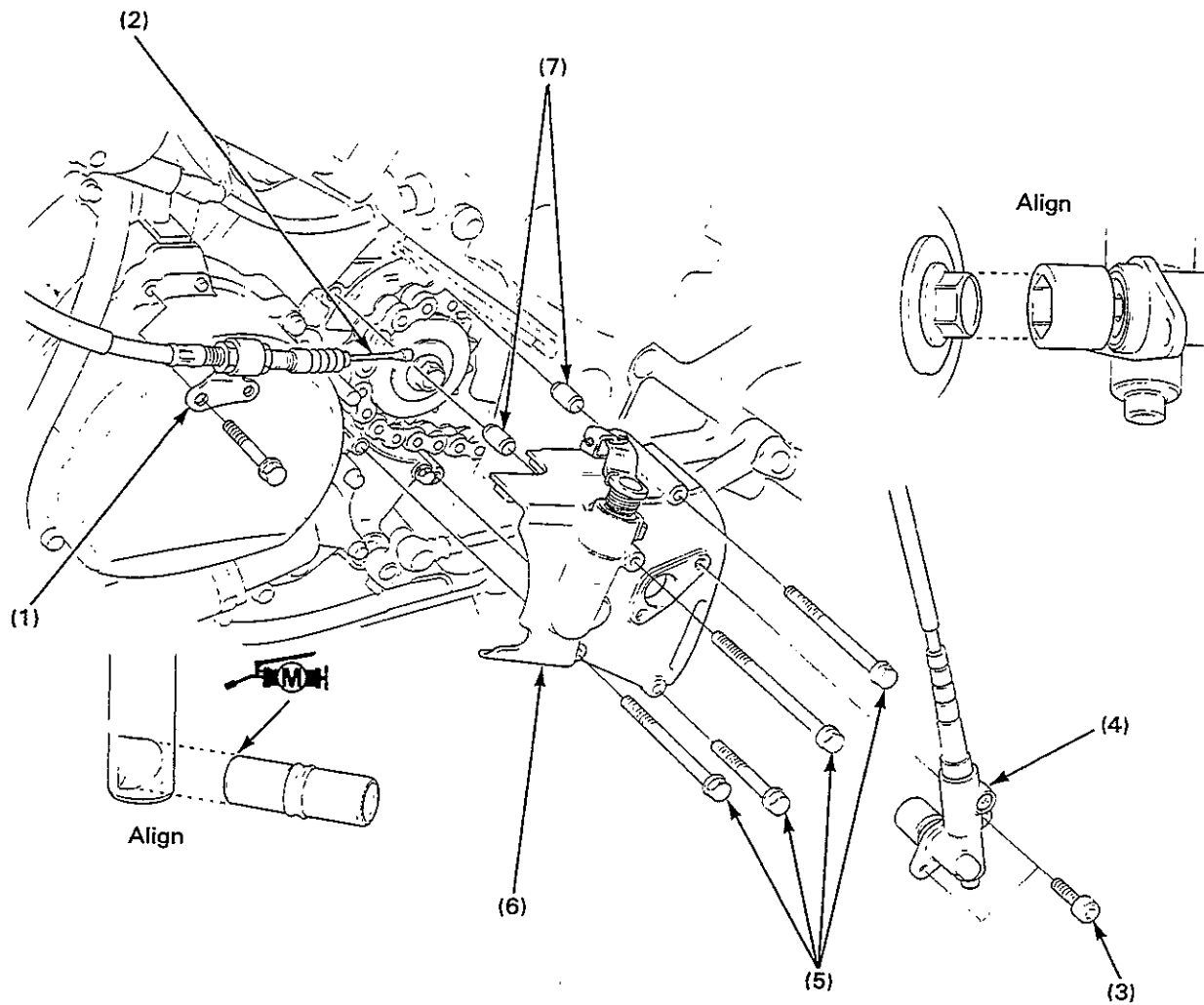
### Gear Slips Out of Engagement.

- Worn gear dog
- Bent shift shaft
- Damaged stopper arm
- Bent or damaged shift fork
- worn shift drum groove

### Gear is Hard to Engage.

- Bent shift fork
- Damaged shift drum cam groove
- Bent gear shift spindle claw

## Drive Sprocket Cover Removal/Installation



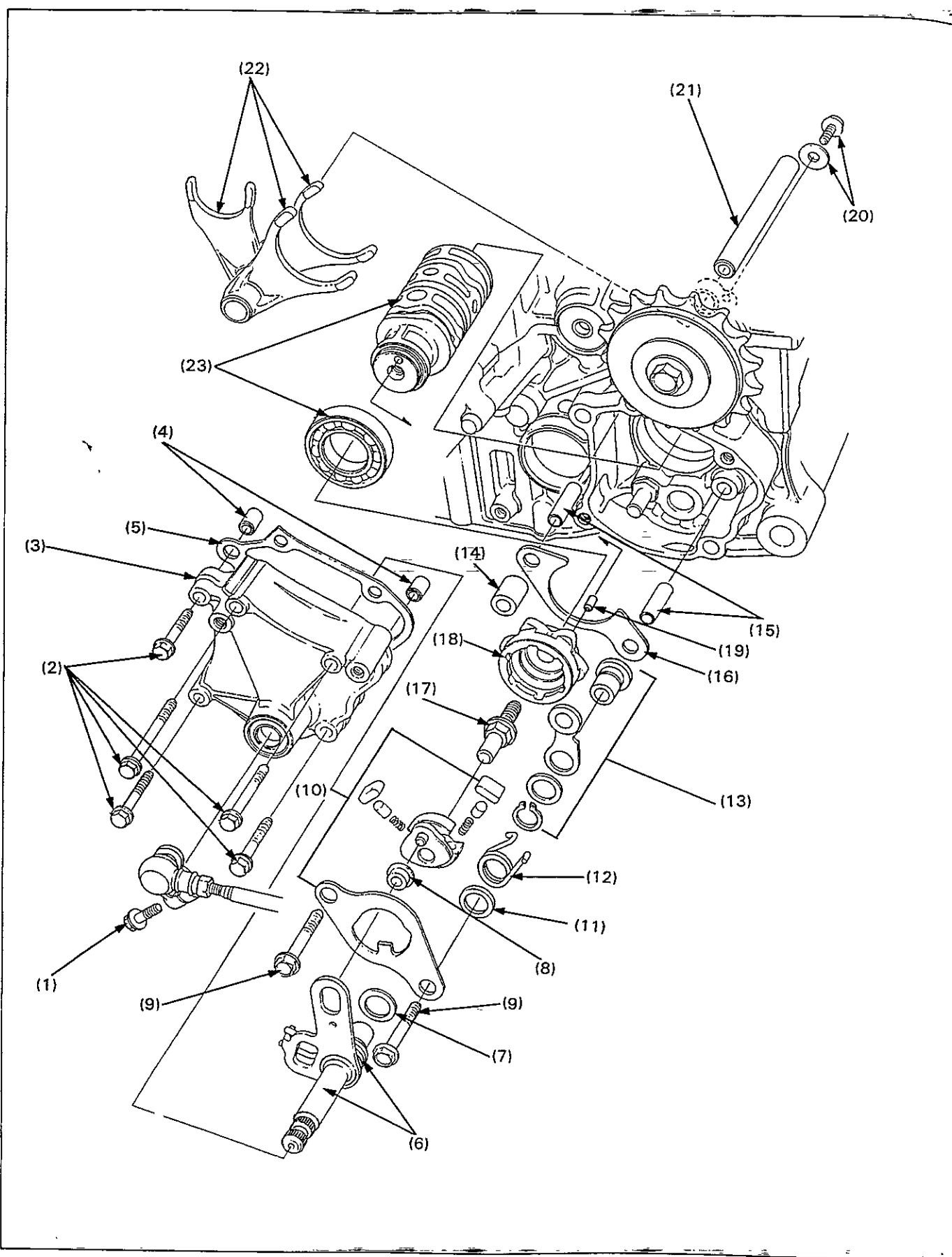


## Requisite Service

- Lower fairing removal/installation (page 2-4).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Clutch cable holder	1	NOTE • Disconnect from the lifter arm.
(2)	Clutch cable	1	
(3)	Speedometer gear box bolt	2	NOTE • Remove the gear box.
(4)	Speedometer gear box	1	
(5)	Drive sprocket cover bolt	4	
(6)	Drive sprocket cover	1	
(7)	Dowel pin	2	
<b>Installation Order</b>			
(7)	Dowel pin	2	NOTE • Turn the lifter arm counterclockwise and connect the cam and lifter rod by engaging their projections and dents. Apply molybdenum disulfide grease to the lifter rod end.
(6)	Drive sprocket cover	1	
(5)	Drive sprocket cover bolt	4	NOTE • Connect the gear box side joint to the sprocket bolt.
(4)	Speedometer gear box	1	
(3)	Speedometer gear box bolt	2	NOTE • Install with care not to disconnect the joint.
(2)	Clutch cable	1	NOTE • Connect to the lifter arm.
(1)	Clutch cable holder	1	NOTE • Install by aligning the hole with the stopper pin.

## Gearshift Linkage, Shift Drum Removal



## NOTE

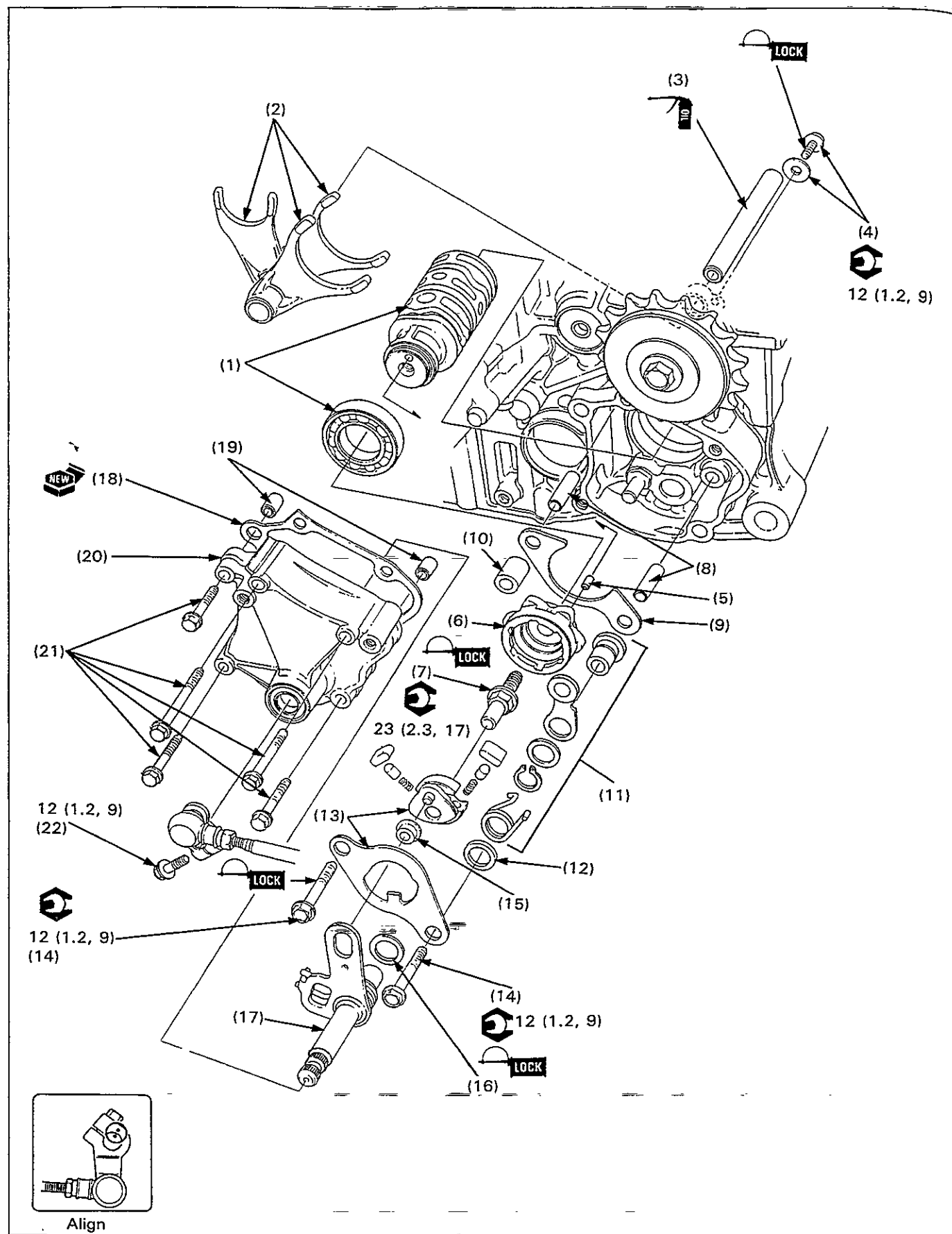
- The shift fork, shift fork shaft, and the shift drum can be removed, installed, and/or disassembled with the engine mounted on the frame.
- The water pump mounting bolts must be removed to service the gearshift linkage. However, it can be serviced without disconnecting the cooling system hose(s).
- Remove/install the clutch assembly and the oil pan to remove/install the shift fork, fork shaft, and shift drum.

## Requisite service

- Lower fairing removal (page 2-4).
- Drive sprocket cover removal (page 10-2).
- Clutch removal (page 9-4).
- Water pump removal (page 5-5).
- Oil pan removal (page 4-4).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
<b>Gearshift Linkage</b>			
(1)	Gearshift spindle joint bolt/gearshift spindle joint	1/1	NOTE • Pull out straight with care not to damage the dust seal.
(2)	Gearshift linkage cover bolt	5	
(3)	Gearshift linkage cover	1	
(4)	Dowel pin	2	NOTE • Do not remove the spring except on replacement.
(5)	Gasket	1	
(6)	Gear shift spindle/spring	1/1	
(7)	Thrust washer	1	NOTE • Remove slowly with care not to let the plunger and spring scatter around from the shifter body.
(8)	Shifter collar	1	
(9)	Bolt	2	
(10)	Guide plate/drum shifter assembly	1	NOTE • Snap ring, washer, arm, and collar: Do not disassemble unnecessarily.
(11)	Thrust washer	1	
(12)	Stopper arm spring	1	
(13)	Stopper arm assembly	1	NOTE • The threads are coated with the thread locking agent.
(14)	Spacer collar	1	
(15)	Dowel pin	2	
(16)	Shift drum set plate	1	NOTE • The threads are coated with the thread locking agent.
(17)	Shift drum center bolt	1	
(18)	Shift drum center	1	
(19)	Shift drum pin	1	
<b>Shift Drum</b>			
(20)	Bolt/stopper washer	1	NOTE • The bolt threads are coated with the thread locking agent.
(21)	Shift fork shaft	1	NOTE • Push out to the right side.
(22)	Shift fork	3	NOTE • Pull out to the left side.
(23)	Bearing/Shift drum	1/1	

# Gearshift Linkage, Shift Drum Installation



## NOTE

- When installing the water pump, check the water pump shaft and oil pump shaft connection.

## Requisite Service

- Oil pan installation (page 4-4).
- Drive sprocket cover installation (page 10-2).
- Water pump installation (page 5-5).
- Clutch installation (page 9-6).
- Lower fairing installation (page 2-4).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Shift drum	1/1	NOTE • Install the left shift fork on the C6 gear, center shift fork on the M3/M4 gear, and the right shift fork on the C5 gear respectively with the marks facing right (page 11-4).  NOTE • Apply engine oil and push in from the right side.
(2)	Shift drum/bearing	3	
(2)	Shift fork		
(3)	Shift fork shaft	1	
(4)	Stopper washer/bolt	1/1	
(5)	Gearshift Linkage Shift drum pin	1	NOTE • Install the shift drum pin on the shift drum.  <b>CAUTION</b> • Install by aligning the shift drum pin with the longhole in the drum center.          NOTE • Loosely tighten the two set bolts and install the roller on the drum center with the spring hook set on the arm and the reverse side set on the crankcase. Remove the set bolts.    NOTE • Assemble the shifter body, plunger, spring, and reatched pawl with the shifter plate. Pushing the pawl with your fingers, install the assembled plate on the shift drum center.          NOTE • Install by aligning the long hole with the shifter collar and the two return springs with the stud pins on the case.
(6)	Shift drum center	1	
(7)	Shift drum center bolt	1	
(8)	Doel pin	2	
(9)	Shift drum set plate	1	
(10)	Spacer collar	1	
(11)	Stopper arm assembly/spring	1/1	
(12)	Thrust washer	1	
(13)	Guide plate/drum shifter assembly	1/1	
(14)	Bolt	2	
(15)	Shift collar	1	
(16)	Thrust washer	1	
(17)	Gearshift spindle/spring	1/1	NOTE • Install with care not to damage the dust seal.
(18)	Gasket	1	
(19)	Dowel pin	1	
(20)	Gearshift linkage cover	1	
(21)	Gearshift linkage cover bolt	5	
(22)	Gearshift spindle joint/gearshift spindle joint bolt	1	NOTE • Align the punch mark with the one on the shift arm and install on the spindle.

# 11. Crankshaft/Piston/Transmission

Service Information	11-1	Countershaft Disassembly/Assembly	11-6
Trouble shooting	11-1	Piston Disassembly/Assembly	11-8
Crankcase Separation	11-2	Bearing Selection	11-10
Shift Fork Installation	11-4	Crankcase Assembly	11-12
Mainshaft Disassembly/Assembly	11-5		

## Service Information

- Identify the connecting rods and the connecting rod bearing caps and store them neatly whenever they are removed. Do not confuse them as improperly installed connecting rods and bearing caps result in lack of oil clearance and eventually crankshaft seizure.
- The piston, connecting rod, crankshaft, cylinder, and/or the transmission services must be made by separating the crankcase after the engine is removed (see section 7).
- When the crankcase is separated, take care not to drop any foreign materials in the oil orifice.
- Do not damage the cylinder wall and the outer surface of the piston.
- Store the piston, piston ring, piston pin, piston pin clip, and the connecting rods for each cylinder so that they can be reinstalled in their original position.
- Select the bearings by the color code numbers. Use the code table to select the replacement bearings.
- After replacing the bearings, check the oil clearance by using the plastigauge.
- Apply molybdenum disulfide oil to the main journal bearing and the crank pin bearing on reassembly (page 1-16).
- Remove the carbon deposits and sludge from the cylinder top before removing the piston and the connecting rod.
- Check the crankcase breather pipe for smoke when the engine is hard to start or poor operation at low speed.
- When there is smoke from the crankcase breather pipe, it might indicate broken or seized piston ring.

11

## Troubleshooting

### Cylinder Compression is Too Low, or Engine is Hard to Start.

- Blown out cylinder head gasket
- Worn, stuck, or broken piston ring
- Worn or damaged cylinder or piston
- Bent valve, or bent and deteriorated valve seat

### Cylinder Compression is Too High, or Engine Overheats or Knocks.

- Carbon deposits on the cylinder head and/or piston

### Piston Sounds.

- Worn cylinder, piston, and/or piston ring
- Worn piston pin hole and piston pin
- Worn connecting rod small end

### Smokes from Muffler

- Worn, stuck, or broken piston ring
- Weak valve stem seal

### Gear is Hard to Engage.

- Clutch is misadjusted (excessive free play).
- Bent shift fork
- Bent shift fork shaft
- Damaged gear shift spindle
- Damaged shift drum guide groove
- Damaged shift drum guide pin

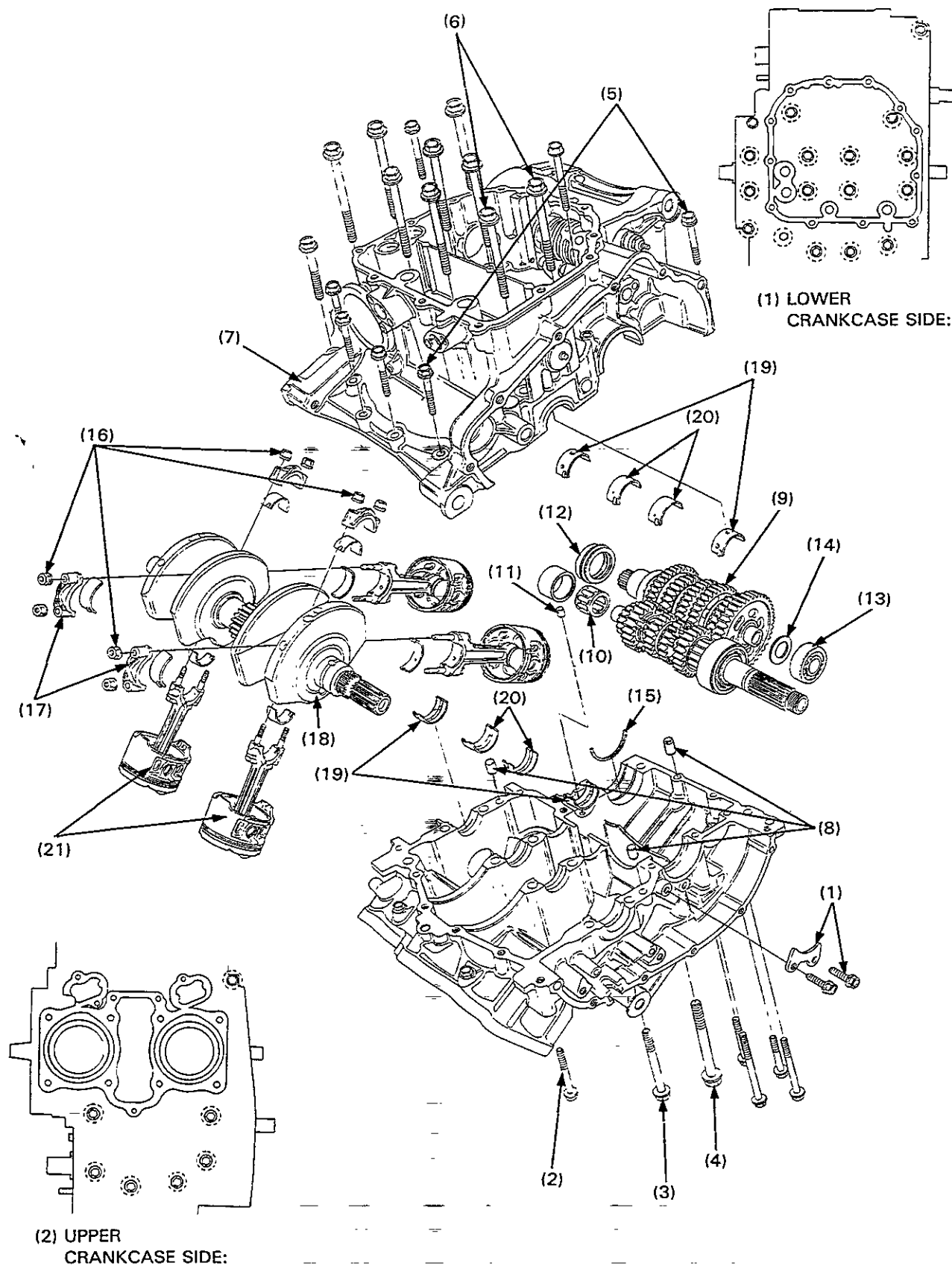
### Gear Slips Out of Engagement.

- Worn gear dowel
- Bent shift fork shaft
- Damaged shift drum stopper
- Worn shift drum guide
- Worn shift fork groove of gear

### Abnormal Engine Noise

- Worn connecting rod large end bearing
- Bent connecting rod
- Worn crankshaft main bearing
- Worn transmission gear

# Crankcase Separation



**CAUTION**

- Select and replace the main bearing by using the selection table to make it a good match with the crankshaft main journal (page 11-10).
- Select and replace the connecting rod bearing by using the selection table to make it a good match with the crankshaft (page 11-10).
- Note the location of each part to reinstall them in their original position.
- The gear shift linkage such as the shift fork and fork shaft can be removed after separating the crankshaft.
- If the crankcase cannot be separated by lightly tapping on the upper case, check whether the crankcase halves are still tightened with a bolt.

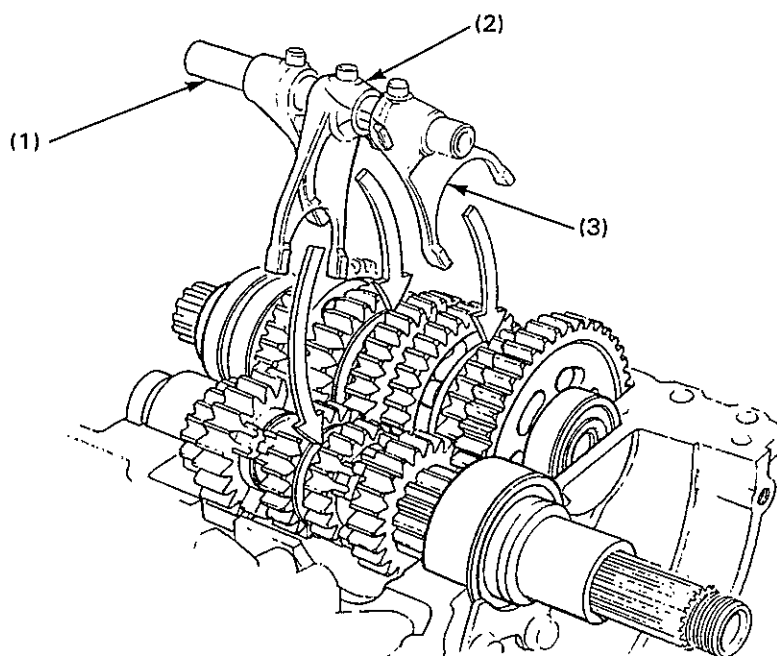
**Requisite Service**


- Engine removal (page 7-2).
- Primary drive gear removal (page 17-4).
- Water pump removal (page 5-5).
- Starter motor removal (page 17-7).
- Oil filter removal.
- Cylinder head removal (page 8-4).
- Gearshift linkage removal (page 10-4).
- Oil pump removal (page 4-4).
- Alternator removal (page 15-8).

Procedure		Q'ty	Remarks
<b>Removal Order</b> Upper Case Side			
(1)	Mainshaft bearing set plate	1	NOTE • Loosen the bolt in a crisscross pattern 2 or 3 steps.
(2)	6 mm bolt	5	
(3)	8 mm bolt	1	
(4)	10 mm bolt	1	
Lower Case Side			
(5)	6 mm bolt	7	NOTE • Loosen the bolt in a crisscross pattern 2 or 3 steps. NOTE • Set the crankcase with the upper case toward down. Lift the lower case to separate the upper and lower halves.
(6)	8 mm bolt	10	
(7)	Lower crankcase	1	
(8)	Dowel pin	3	
(9)	Transmission assembly	1	NOTE • Do not remove the connecting rod caps with force but pull them out straight. Remove the bearing. NOTE • Remove with care not to damage the crankshaft journal. NOTE • Remove from the upper and lower cases and record the installation location. NOTE • Remove to the cylinder head side. Piston removal/installation: page 11-8
(10)	Mainshaft bearing	1	
(11)	Bearing cap stop pin	1	
(12)	Countershaft oil seal	1	
(13)	Countershaft bearing	1	
(14)	Thrust washer	1	
(15)	Bearing stopper ring	1	
(16)	Connecting rod bearing cap nut	8	
(17)	Bearing cap	4	
(18)	Crankshaft	1	
(19)	Side main bearing	4	
(20)	Center main bearing	4	
(21)	Connecting rod/piston	1/1	



## Shift Fork Installation



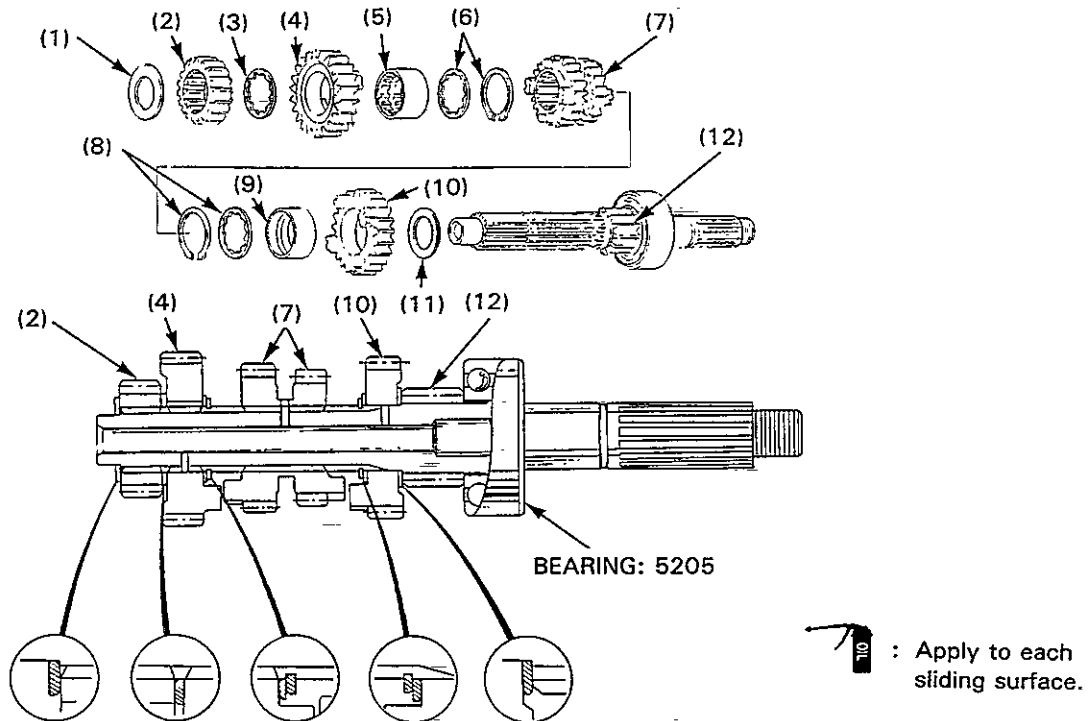
 : Apply to each sliding surface.

### Requisite Service

- Crankcase separation (page 11-2).

Procedure		Q'ty	Remarks
<b>Installation Order</b>			
(1)	Left shift fork	1	<b>NOTE</b> <ul style="list-style-type: none"> <li>• Install on the shift fork shaft with each mark (R,C, and L) toward the clutch.</li> </ul>
(2)	Center shift fork	1	
(3)	Right shift fork	1	

## Mainshaft Disassembly/Assembly

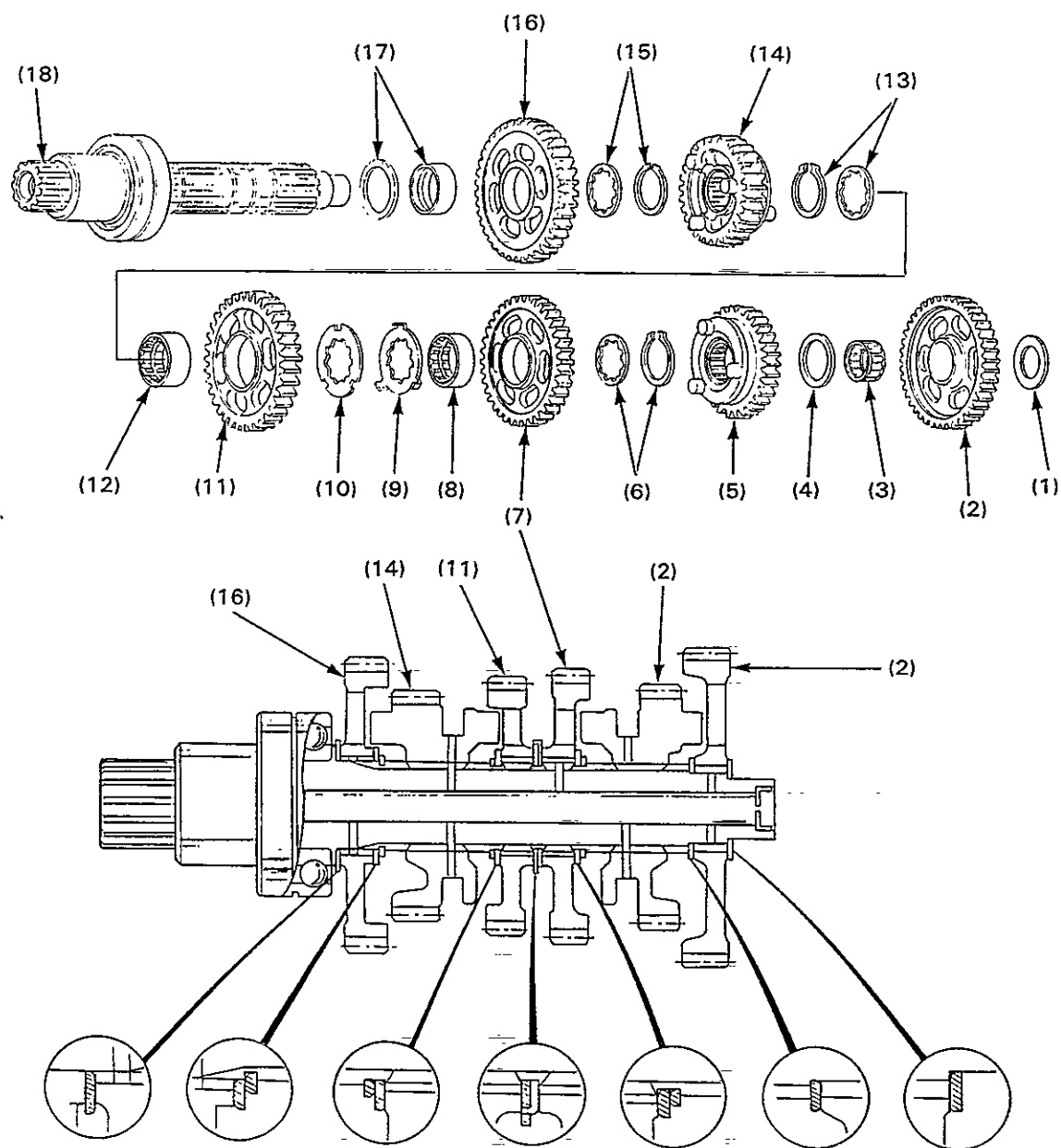


## Requisite Service

- Crankcase separation (page 11-2).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Assembly is in the reverse order of disassembly.
(1)	Thrust washer	1	
(2)	M2 gear (18T)	1	
(3)	Thrust washer	1	
(4)	M6 gear (22T)	1	
(5)	Spline bushing	1	
(6)	Thrust washer/snap ring	1/1	
(7)	M4/M3 gear (22T/20T)	1	
(8)	Snap ring/thrust washer	1/1	
(9)	M5 bushing	1	
(10)	M5 gear (23T)	1	
(11)	Thrust washer	1	
(12)	Mainshaft M1 gear (14T)	1	

## Countershaft Disassembly/Assembly

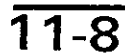


 : Apply to each sliding surface.

## Requisite Service

- Crankcase separation (page 11-2).

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Thrust washer	1	NOTE • When assembly, insert the tang of the washer into the lock washer groove securely.
(2)	C1 gear (41T)	1	
(3)	Needle bearing	1	
(4)	Thrust washer	1	
(5)	C5 gear (33T)	1	
(6)	snap ring/thrust washer	1/1	
(7)	C3 gear (36T)	1	
(8)	Spline bushing	1	
(9)	Lock washer	1	
(10)	Spline washer	1	
(11)	C4 gear (35T)	1	
(12)	Spline bushing	1	
(13)	Thrust washer/snap ring	1/1	
(14)	C6 gear (29T)	1	
(15)	Snap ring/thrust washer	1/1	
(16)	C2 gear (39T)	1	
(17)	C2 gear bushing/thrust washer	1/1	
(18)	Countershaft	1	



**CAUTION**

- Take care not to damage the pistons.
- Classify and store the parts for each cylinder.
- Number of Q'ty listed in the table indicates the numbers that are shown in the drawing.
- Before assembling the piston pin with the connecting rod, apply molybdenum disulfide oil to the sliding surfaces.
- Select the appropriate connecting rod and/or bearings by using the selection table to make a good match. Also select the connecting rods of the most appropriate weight by using the table (page 11-10).

**Requisite Service**

- Crankcase separation (page 11-2).

Procedure		Q'ty	Remarks
(1)	<b>Disassembly Order</b> Front connecting rod bearing	1	Assembly is in the reverse order of disassembly. NOTE • Note the color codes of the connecting rod bearing and the connecting rod cap and store.
(2)	Rear connecting rod bearing	1	NOTE • Note the color codes of the connecting rod bearing and the connecting rod cap and store.
(3)	Piston pin clip	4	NOTE • Do not lose.
(4)	Piston pin	1	NOTE • Do not remove the piston ring except on replacement.
(5)	Front piston assembly	1	
(6)	Rear piston assembly	1	
(6)	<b>Assembly Order</b> Rear piston assembly	1	NOTE • Check the connecting rod I.D. mark. Install with the IN mark toward the carburetor and the connecting rod oil jet port toward the other side.
(5)	Front piston assembly	1	NOTE • Check the connecting rod I.D. mark. Install with the IN mark and the connecting rod oil jet port toward the carburetor.
(4)	Piston pin	4	NOTE • Install with the oil passage hole aligned with the connecting rod hole.
(3)	Piston pin clip	1	
(2)	Rear connecting rod bearing	1	NOTE • Connecting rod bearing selection: see page 11-10.
(1)	Front connecting rod bearing	1	

## Bearing Selection

### Main Bearing

Record the crankcase I.D. code.

#### NOTE

- A or B stamped on the No.4 journal of the upper crankcase is the I.D. code of the journal. The code letters, from left to right, indicate each journal I.D. respectively. (Refer to the drawing to the right.)

Record the crankshaft main journal O.D. code (or measure the main journal O.D.).

#### NOTE

- 1 or 2 stamped on the crank weight is the main journal O.D. code. (Refer to the drawing to the right.)

Determine the bearing I.D. code by referring to the case I.D. code and the main journal code.

		Main journal O.D. code	
		1	2
		29.994–30.002mm (1.1809–1.1812in)	30.002–30.010mm (1.1812–1.1815in)
Case I.D. code	A	33.000–33.008mm (1.2992–1.2995in)	C (Yellow)
	B	33.008–33.016mm (1.2995–1.2998in)	B (Green)
			A (Brown)

A (Brown): 1.498–1.502 mm (0.0590–0.0591 in)

B (Green): 1.494–1.498 mm (0.0588–0.0590 in)

C (Yellow): 1.490–1.494 mm (0.0587–0.0588 in)

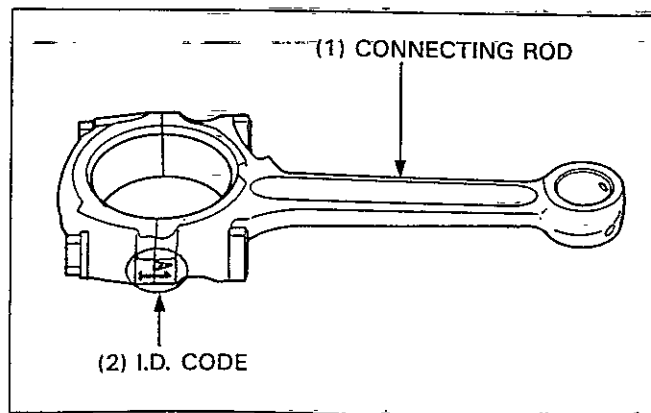
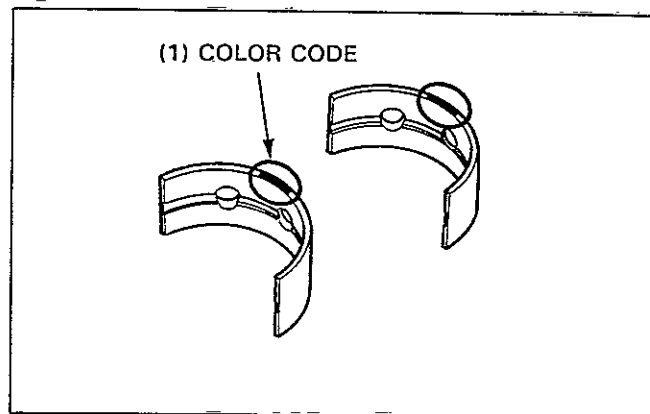
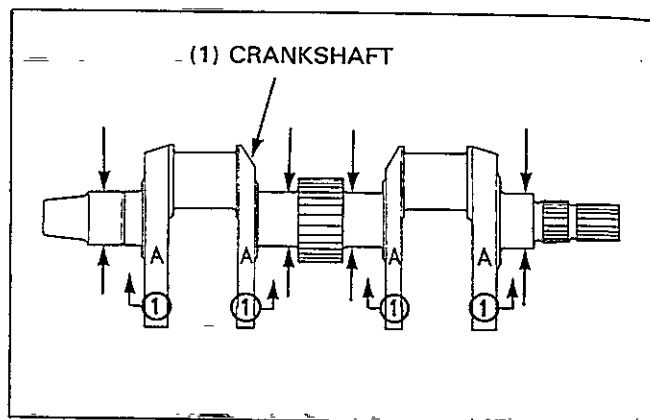
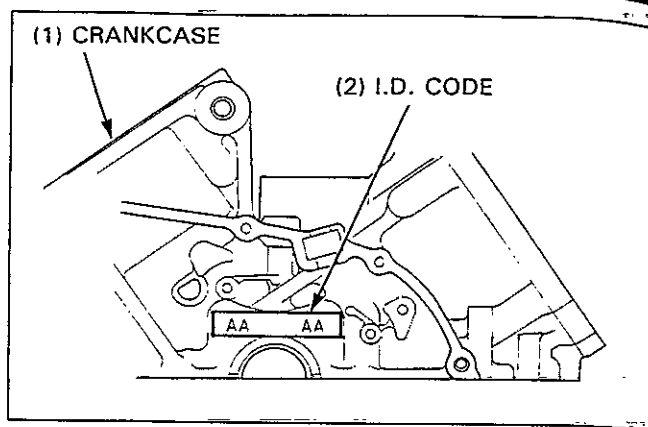
Thickness of the bearing metal can be identified by the color code.

### Connecting Rod Bearing

Record the connecting rod I.D. code number.

#### NOTE

- 1 or 2 stamped on the connecting rod is the connecting rod I.D. code number. (Refer to the drawing to the right.)



Record the crank pin O.D. code number (or measure the crank pin O.D.).

## NOTE

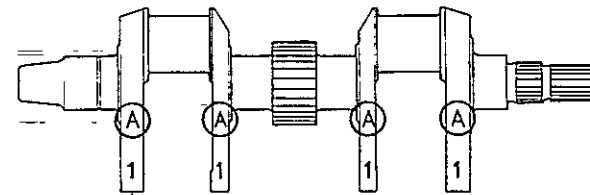
A or B stamped on the crank weight is the crank pin O.D. code. (Refer to the drawing to the right.)

Select the appropriate bearing metal by referring to the crank pin O.D. code letter and the connecting rod I.D. code number.

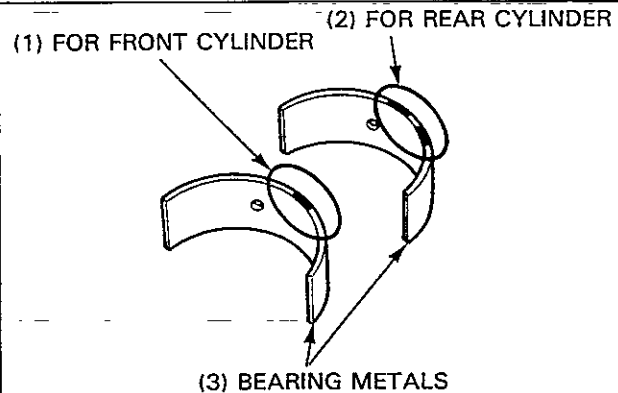
## NOTE

- There are two types of the connecting rod bearings: one for the front cylinder (marked with the one I.D. paint) and the other for the rear cylinder (marked with the two I.D. paints). Do not confuse.

		Connecting rod I.D. code			
		1		2	
		33.000–33.008mm (1.2992–1.2995in)		33.008–33.016mm (1.2995–1.2998in)	
Crank pin O.D. code		Front	Rear	Front	Rear
A	29.992–30.000mm (1.1303–1.1811in)	C (Yellow)	C (Yellow, Yellow)	B (Green)	B (Green, Green)
	29.984–29.992mm (1.1805–1.1808in)	B (Green)	B (Green, Green)	A (Brown)	A (Brown, Brown)



(T) CRANK WEIGHT



## Selective bearing metals:

A (Brown) (Brown, Brown): 1.494 - 1.498 mm (0.0588 - 0.0590 in)

B (Green) (Green, Green): 1.490 - 1.494 mm (0.0587 - 0.0588 in)

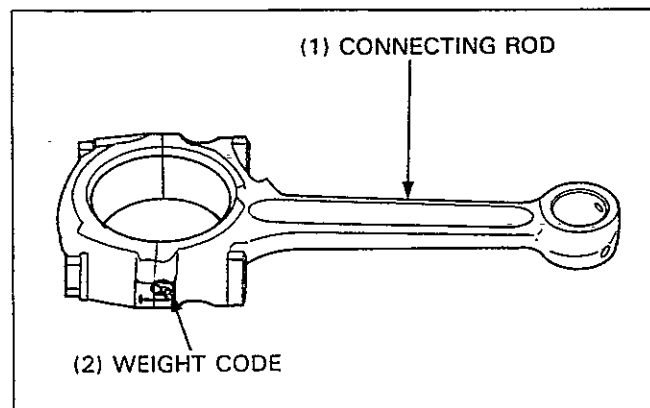
C (Yellow) (Yellow, Yellow): 1.486 - 1.490 mm (0.0585 - 0.0587 in)

## Connecting Rod Weight Selection

The connecting rods are stamped with the mark A, B, or C which indicates the weight of the rod.

When replacing the connecting rod, refer to the selection table and select the connecting rod of the appropriate weight.

Weight code of the connecting rod which is to be replaced	Weight code of the remaining connecting rod on the same crank pin	Weight code of the new connecting rod
A	B	A, B or C
	C	A or B
B	A	B or C
	B	A, B, or C
	C	A or B
C	A	B or C
	B	A, B, or C

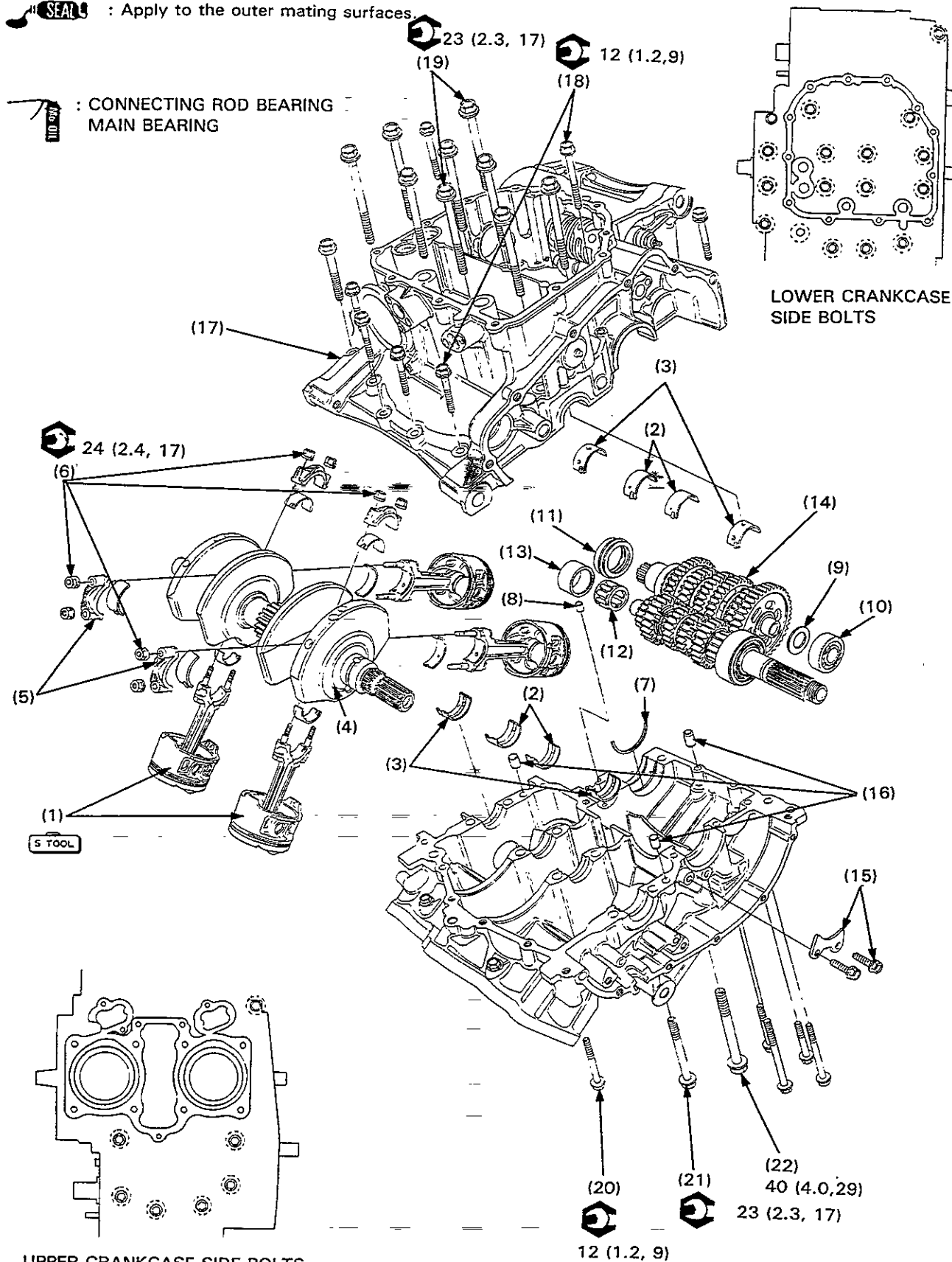




## Crankcase Assembly

 **SEALS** : Apply to the outer mating surfaces

 : CONNECTING ROD BEARING  
MAIN BEARING



**CAUTION**

- Select and replace the main bearing by using the selection table to make it a good match with the crankshaft main journal (page 11-10).
- Select and replace the connecting rod bearing by using the selection table to make it a good match with the crankshaft (page 11-10).
- Clean the crankcase mating surfaces and apply the sealant to the outer mating surface of the crankcase halves with care not to get the sealant on and around the main bearing. Assemble the crankcase halves.
- Assemble the crankcase halves with the upper case toward down. If the upper and lower cases are not assembled properly, check the transmission assembly for proper installation.

**Requisite Service**

- Alternator installation (page 15-8).
- Oil pump installation (page 4-4).
- Primary drive gear installation (page 17-4).
- Clutch installation (page 9-6).
- Water pump installation (page 5-5).
- Oil filter installation,
- Coolant filling.
- Starter motor installation (page 17-7).
- Gearshift linkage installation (page 10-6).
- Starter clutch installation (page 17-4).
- Cylinder head installation (page 8-4).
- Engine installation (page 7-4).
- Engine oil filling.

Procedure		Q'ty	Remarks
<b>Assembly Order</b>			
<b>Lower Case Side</b>			
(1)	Connecting rod/piston	4/4	NOTE • Install from the cylinder head side.
(2)	Center main bearing	4	
(3)	Side main bearing	4	
(4)	Crankshaft	1	NOTE • Take care not to damage the journal.
(5)	Bearing cap	4	
(6)	Cap nut	8	
(7)	Bearing stopper ring	1	
(8)	Bearing cap stop pin	1	
(9)	Thrust washer	1	
(10)	Countershaft bearing	1	
(11)	Countershaft oil seal	1	
(12)	Mainshaft bearing	1	
(13)	Needle bearing cap	1	
(14)	Transmission assembly	1	NOTE • Align the countershaft bearing groove with the stopper ring, and the hole in the mainshaft bearing cap with the stop pin.
(15)	Mainshaft bearing set plate	1	
(16)	Dowel pin	1	
(17)	Lower crankcase	1	NOTE • Apply sealant to the mating surfaces with care not to get it on and around the main bearing.
(18)	6 mm bolt	7	NOTE • Tighten the bolt in a crisscross pattern 2 or 3 steps. • Tighten at the lower side first, then raise the engine to tighten at the upper side.
(19)	8 mm bolt	10	
<b>Upper Case Side</b>			
(20)	6 mm bolt	5	NOTE • Tighten the bolt in a crisscross pattern 2 or 3 steps.
(21)	8 mm bolt	1	
(22)	10 mm bolt	1	

# 12. Front Wheel/Suspension/Steering

Service Information	12-1	Fork Removal/Installation	12-10
Troubleshooting	12-1	Fork Disassembly	12-12
Left Handlebar Disassembly/Assembly	12-2	Fork Assembly	12-13
Right Handlebar Disassembly/Assembly	12-4	Steering Stem Removal	12-14
Front Wheel Removal/Installation	12-6	Steering Stem Installation	12-16
Front Wheel Disassembly/Assembly	12-8		

## Service Information

### ⚠ WARNING

- Riding on damaged rims impairs safe operation of the vehicle.

- When servicing the front wheel, support the motorcycle securely with a jack or other support under the engine.
- When installing the front wheel, note the normal rotating direction.
- Tubeless tire removal, repair, and remounting procedures are covered in the section 16 of the Common Service Manual. When remounting the tire, note the normal rotating direction.
- Refer to the section 14 for brake system information.
- Refer to the section 18 for light, meter and switch information.

## Troubleshooting

### Hard Steering

- Steering head bearing adjustment nut too tight
- Faulty steering head bearings
- Damaged steering stem races
- Insufficient tire pressure
- Faulty tire

### Steers to One Side or Does Not Track Straight

- Bent fork
- Bent front axle: wheel installed incorrectly
- Faulty steering head bearings
- Bent frame
- Worn wheel bearing
- Worn swingarm pivot

### Front Wheel Wobbling

- Bent rim
- Worn front wheel bearings
- Faulty tire
- Unbalanced tire and wheel

### Wheel Turns Hard

- Faulty wheel bearing
- Brake drag (page 14-1)
- Bent front axle

### Soft Suspension

- Weak fork spring
- Insufficient fluid in fork
- Low fluid level in fork
- Low tire pressure

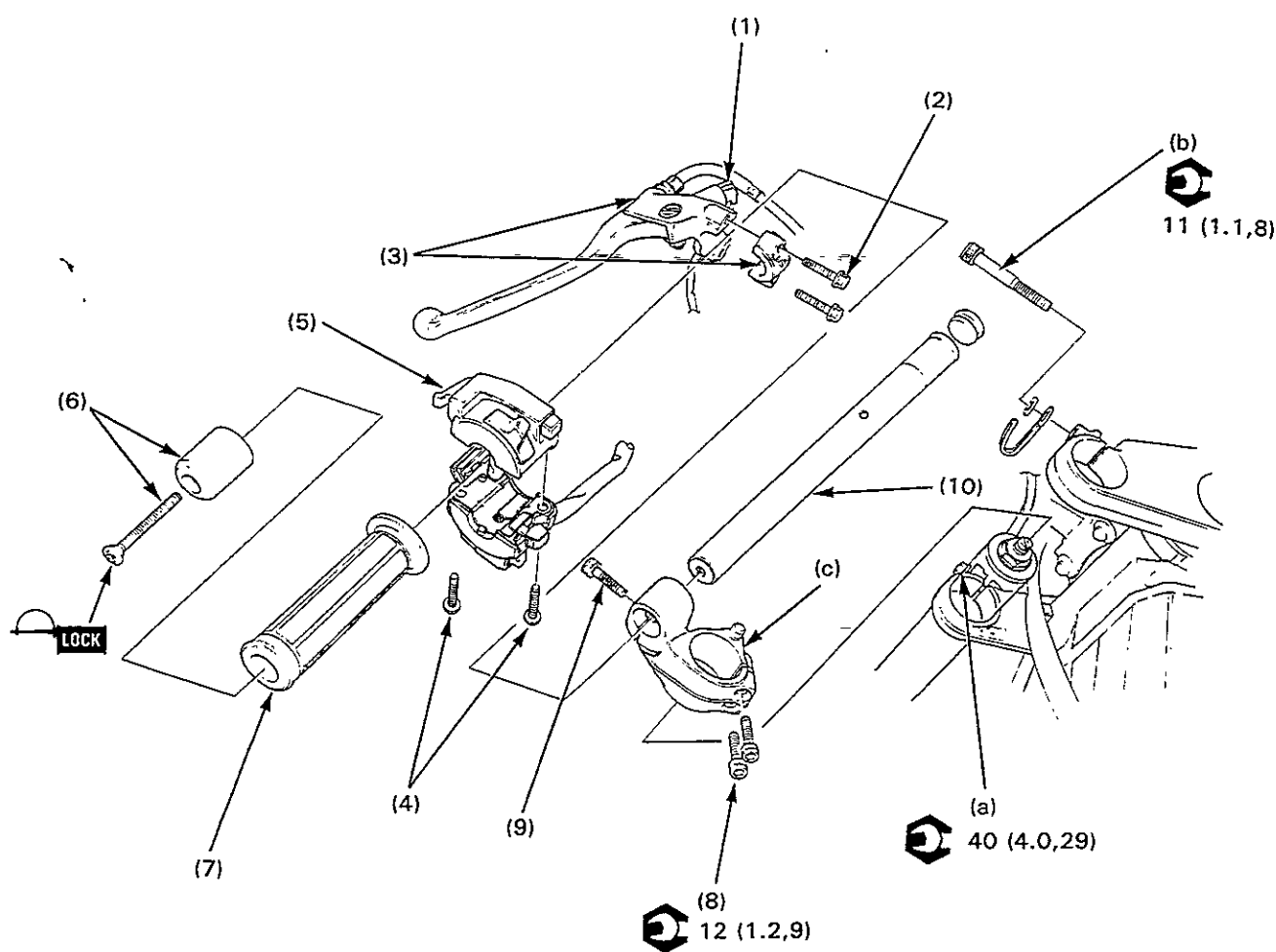
### Hard Suspension

- Incorrect fluid weight
- Bent fork tubes
- Clogged fork fluid passage
- High tire pressure

### Front Suspension Noisy

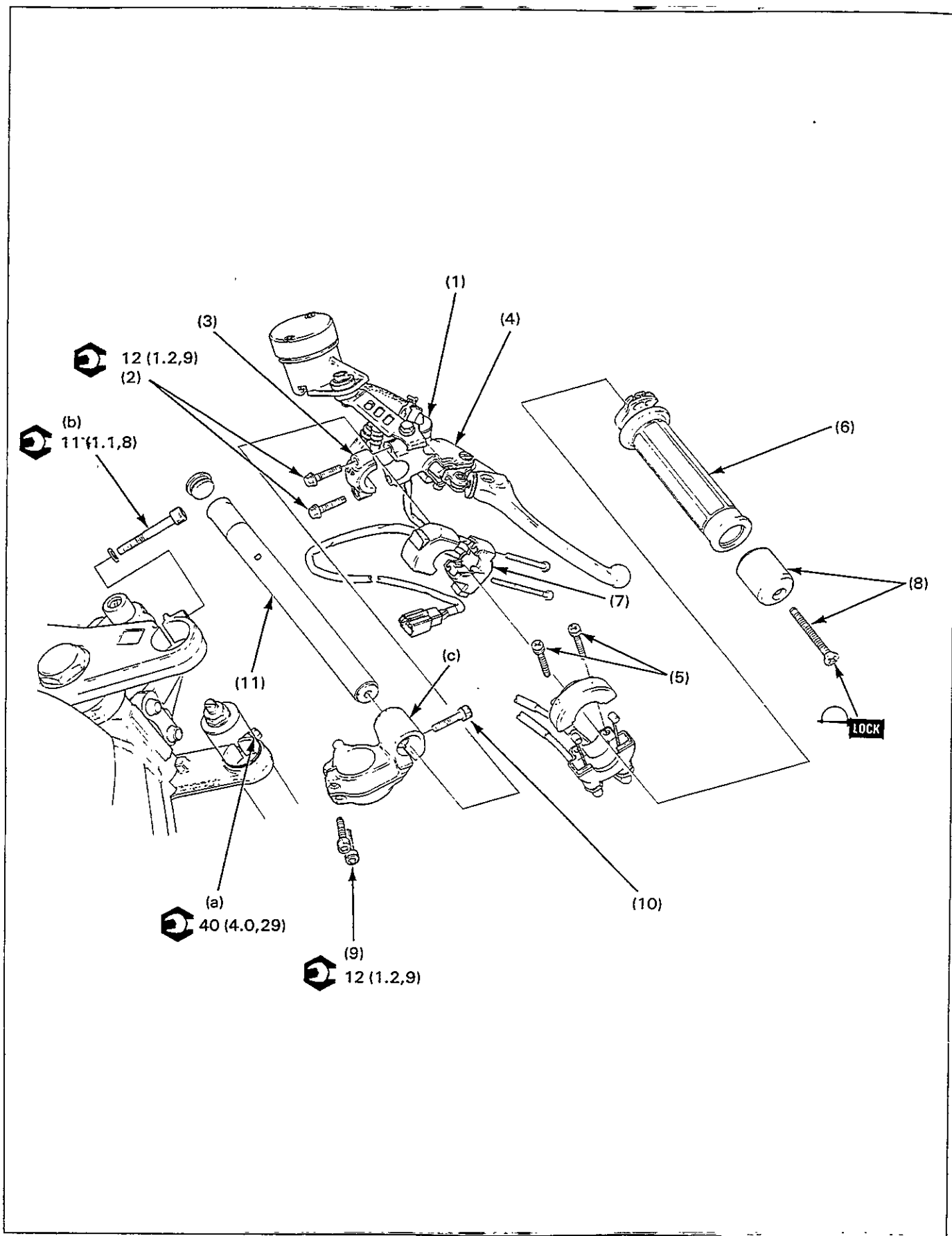
- Insufficient fluid in fork
- Loose fork fasteners

# Left Handlebar Disassembly/Assembly



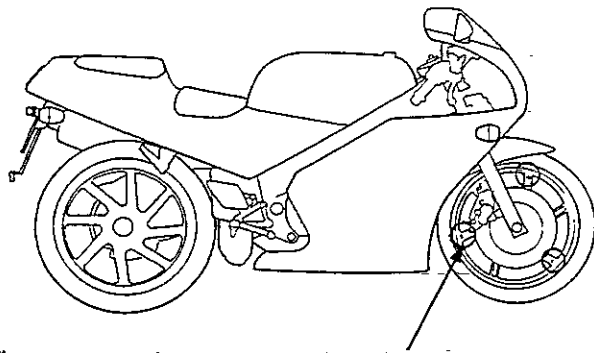
Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			
(1)	Clutch switch wire	2	Disconnect from the switch terminals.
(2)	Clutch lever holder bolt	2	
(3)	Clutch lever holder/bracket	1/1	
(4)	Attaching screw	2	
(5)	Left handlebar switch	1	
(6)	Left handlebar weight/attaching screw	1/1	
(7)	Left handlebar grip	1	
(8)	Handlebar holder pinch bolt	2	Loosen the bolts.
(9)	Left handlebar pinch bolt	1	
(10)	Left handlebar	1	NOTE • Spread the slit slightly and push the handlebar out.
<b>Handlebar holder removal order</b>			
(a)	Lower fork pinch bolt	1	Installation is in the reverse order of removal. Loosen the bolt.
(b)	Upper fork pinch bolt	1	Loosen the bolt. Remove the wire bands.
(c)	Left handlebar holder	1	NOTE • Remove the front wheel (page 12-6) and lower the fork.
<b>Assembly Order</b>			
(10)	Left handlebar	1	NOTE • Align the locating pin on the holder with the groove in the fork top bridge, and tighten the upper bolt first.
(9)	Left handlebar pinch bolt	1	
(8)	Handlebar holder pinch bolt	2	
(7)	Left handlebar grip	1	NOTE • Apply locking agent to the screw thread.
(6)	Left handlebar weight/attaching screw	1/1	
(5)	Left handlebar switch	1	NOTE • Align the locating pin with the hole in the handlebar.
(4)	Attaching screw	2	NOTE • Tighten the front screw first.
(3)	Clutch lever holder/bracket	1/1	NOTE • Install the holder with the "UP" mark facing up.
(2)	Clutch lever holder bolt	2	NOTE • Tighten the upper bolt first.
(1)	Clutch switch wire	2	Connect to the switch terminals.

# Right Handlebar Disassembly/Assembly

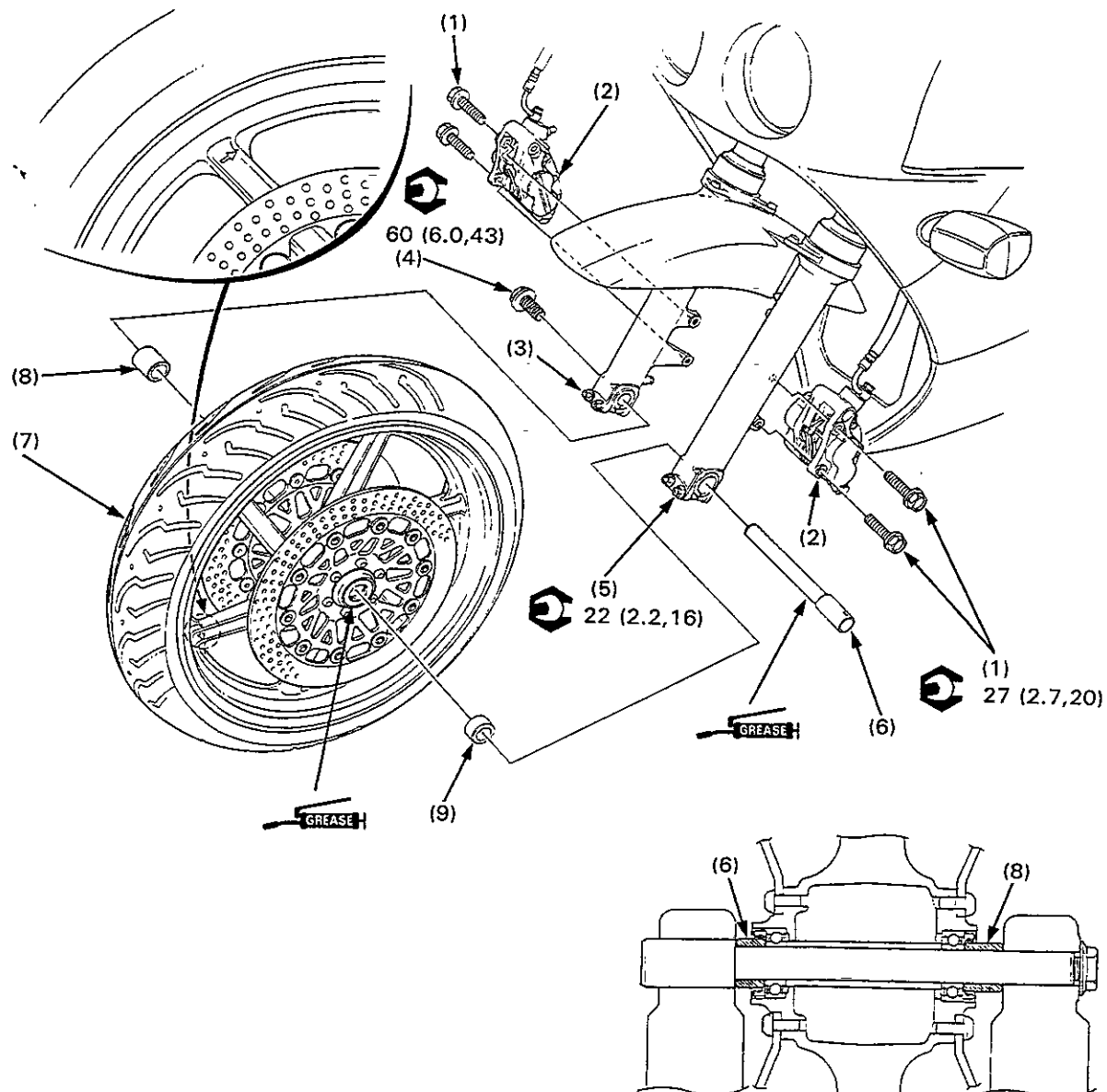


Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			
(1)	Front brake switch wire	2	Disconnect from the switch terminals
(2)	Master cylinder holder bolt	2	
(3)	Master cylinder holder	1	
(4)	Brake master cylinder assembly	1	
(5)	Throttle housing screw	2	<b>CAUTION</b> • Keep the master cylinder upright.
(6)	Throttle grip	1	
(7)	Engine stop switch	1	Disconnect the throttle cable. Remove the screws.
(8)	Right handlebar weight/attaching screw	1/1	Loosen the bolts.
(9)	Handlebar holder pinch bolt	2	
(10)	Right handlebar pinch bolt	1	<b>NOTE</b> • Spread the slit slightly and push the handlebar out.
(11)	Right handlebar	1	
<b>Handlebar holder removal order</b>			Installation is in the reverse order of removal.
(a)	Lower fork pinch bolt	1	Loosen the bolt.
(b)	Upper fork pinch bolt	1	Loosen the bolt. Remove the brake hose band.
(c)	Left handlebar holder	1	<b>NOTE</b> • Remove the front wheel (page 12-6) and lower the fork.
<b>Assembly Order</b>			
(11)	Right handlebar	1	<b>NOTE</b> • Align the locating pin on the holder with the groove in the fork top bridge, and tighten the upper bolt first.
(10)	Right handlebar pinch bolt	1	
(9)	Handlebar holder pinch bolt	2	
(6)	Throttle grip	1	Connect the throttle cables.
(5)	Throttle housing screw	2	<b>NOTE</b> • Align the mating surface with the punch mark on the handlebar and tighten the front screw first.
(7)	Engine stop switch	1	<b>NOTE</b> • Tighten the front attaching screw first.
(4)	Brake master cylinder assembly	1	<b>NOTE</b> • Install with the "UP" mark facing up.
(3)	Master cylinder holder	1	
(2)	Master cylinder bolt	2	<b>NOTE</b> • Align the end of the holder with the punch mark on the handlebar and tighten the upper bolt first.
(1)	Front brake switch wire	2	Connect to the switch terminals.

# Front Wheel Removal/Installation



The arrow marks are stamped on the right side only.





**⚠ WARNING**

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.

**NOTE**

- Install the front wheel with the arrow mark (stamped on the right side) facing to the normal rotating direction.
- Do not depress the brake lever when the caliper is removed, or it will be difficult to refit the disc between the brake pads.

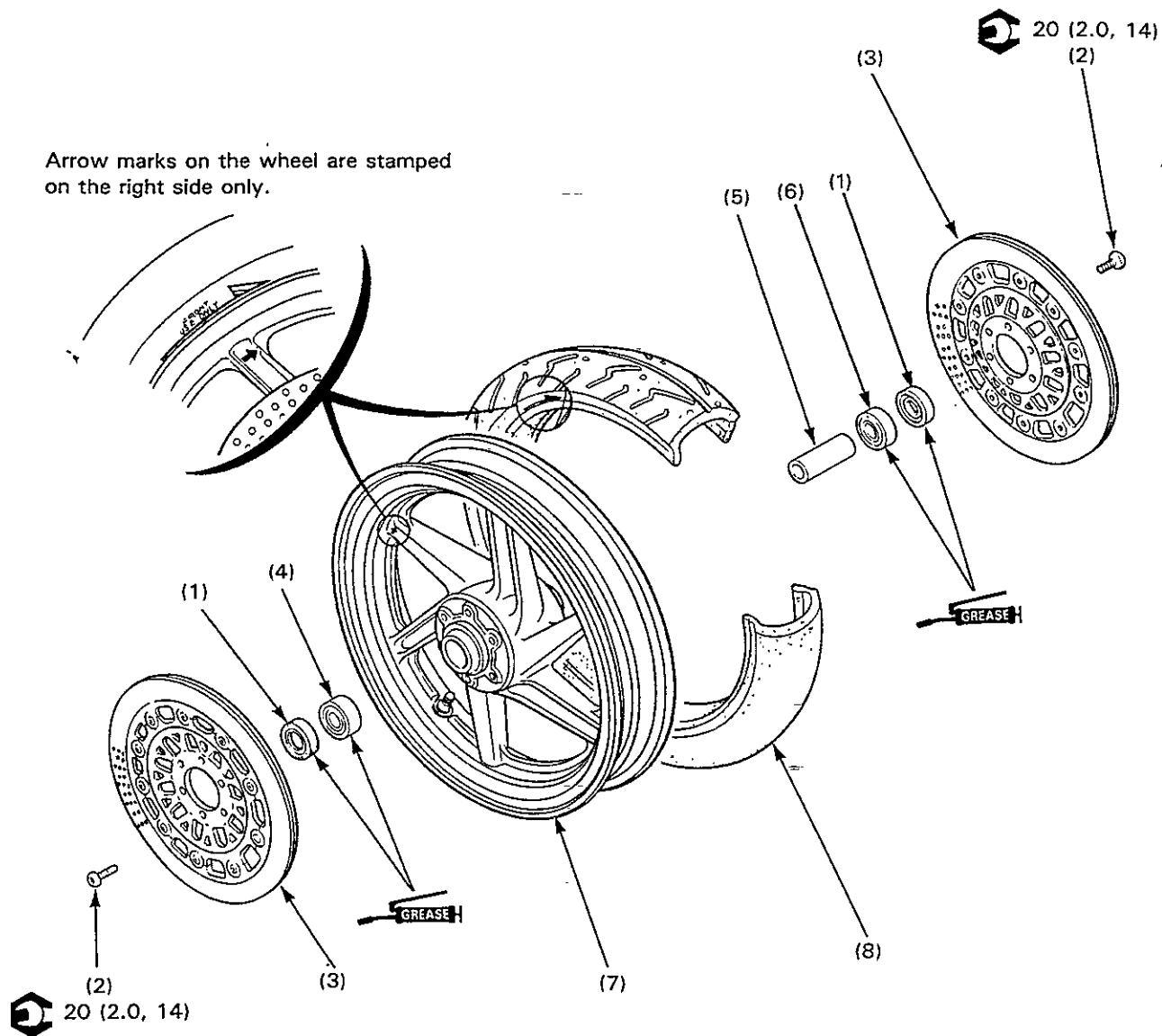
**Requisite Service**

- Raise the wheel off the ground by placing a jack or other support under the engine.

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Caliper mounting bolt	4	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• Do not hang the caliper by the brake hose.</li> </ul> Loosen the bolts.
(2)	Front caliper assembly	2	
(3)	Right axle pinch bolt	2	
(4)	Axle bolt	1	
(5)	Left axle pinch bolt	2	
(6)	Axle shaft	1	
(7)	Front wheel assembly	1	
(8)	Side collar	2	
<b>Installation Order</b>			
(8)	Side collar	2	<b>NOTE</b> <ul style="list-style-type: none"> <li>• Right side collar is longer than the left side collar.</li> <li>• Apply grease to the dust seal lips before installing.</li> </ul>
(7)	Front wheel assembly	1	
(6)	Axle shaft	1	<b>NOTE</b> <ul style="list-style-type: none"> <li>• Apply thin coat of grease.</li> </ul>
(4)	Axle bolt	1	
(5)	Left axle pinch bolt	2	<b>NOTE</b> <ul style="list-style-type: none"> <li>• Tighten after tightening the axle bolt.</li> </ul>
(3)	Right axle pinch bolt	2	
(2)	Front caliper assembly	2	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• Be careful not to damage the pads.</li> </ul>
(1)	Caliper mounting bolt	4	

# Front Wheel Disassembly/Assembly

Arrow marks on the wheel are stamped on the right side only.



**⚠ WARNING**

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

**NOTE**

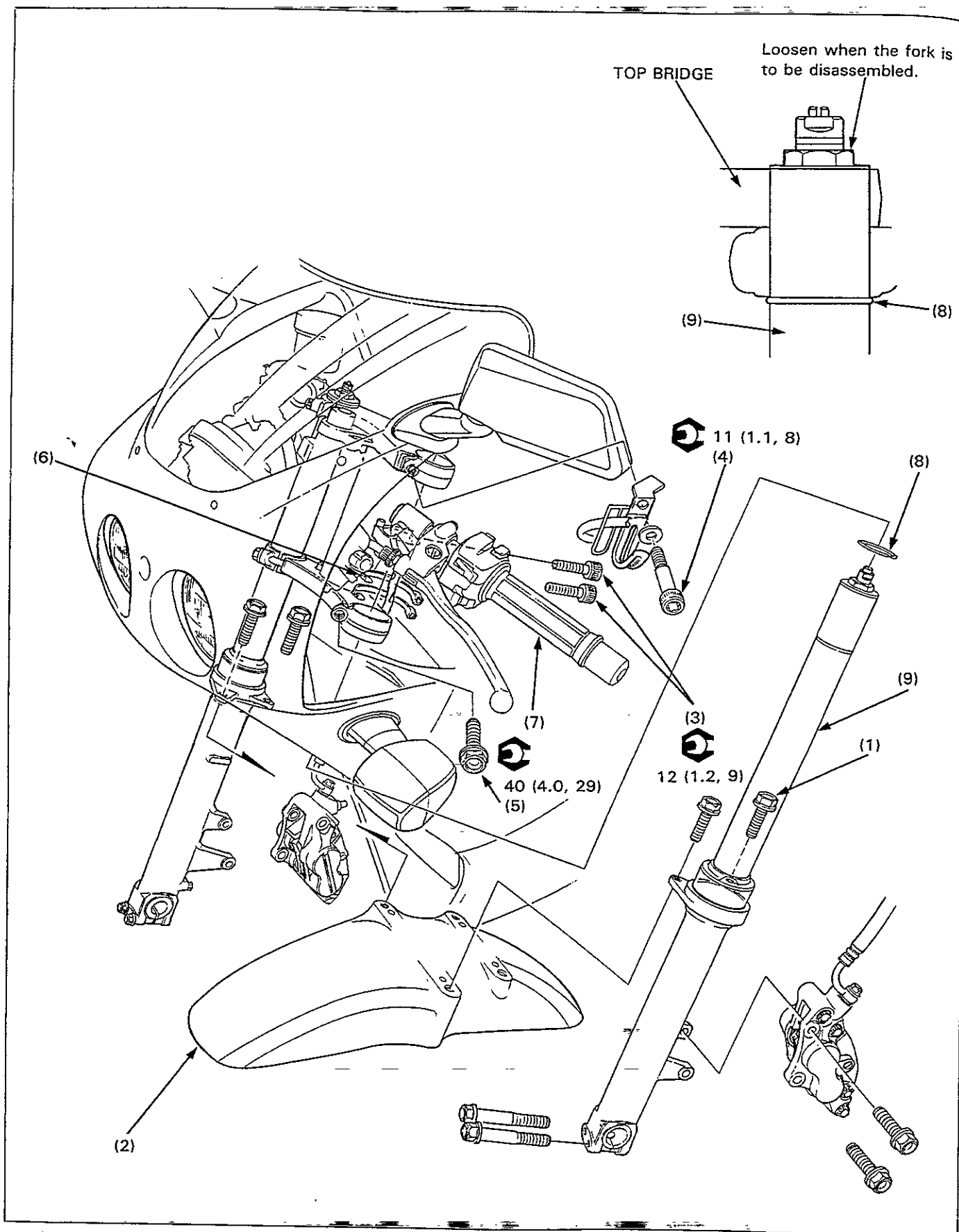
- The left and right brake discs should be installed on the original side unless they are replaced.
- When remounting the tire onto the wheel, face the arrow marks on the wheel and tire to the same direction.
- Do not add more than 60 g (2.1 oz) of the wheel balance weight.
- Always replace wheel bearings as a set.

**Requisite Service**

- Front wheel removal/installation

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Dust seal	2	
(2)	Brake disc bolt	12	
(3)	Brake disc	2	
(4)	Right wheel bearing (6004UU)	1	
(5)	Distance collar	1	
(6)	Left wheel bearing (6004UU)	1	At installation, drive a new left bearing into the hub first, then drive a new right bearing.
(7)	Front tire	1	NOTE • At installation, face the arrow mark to the same direction as the arrow mark on the wheel.

# Fork Removal/Installation



## NOTE

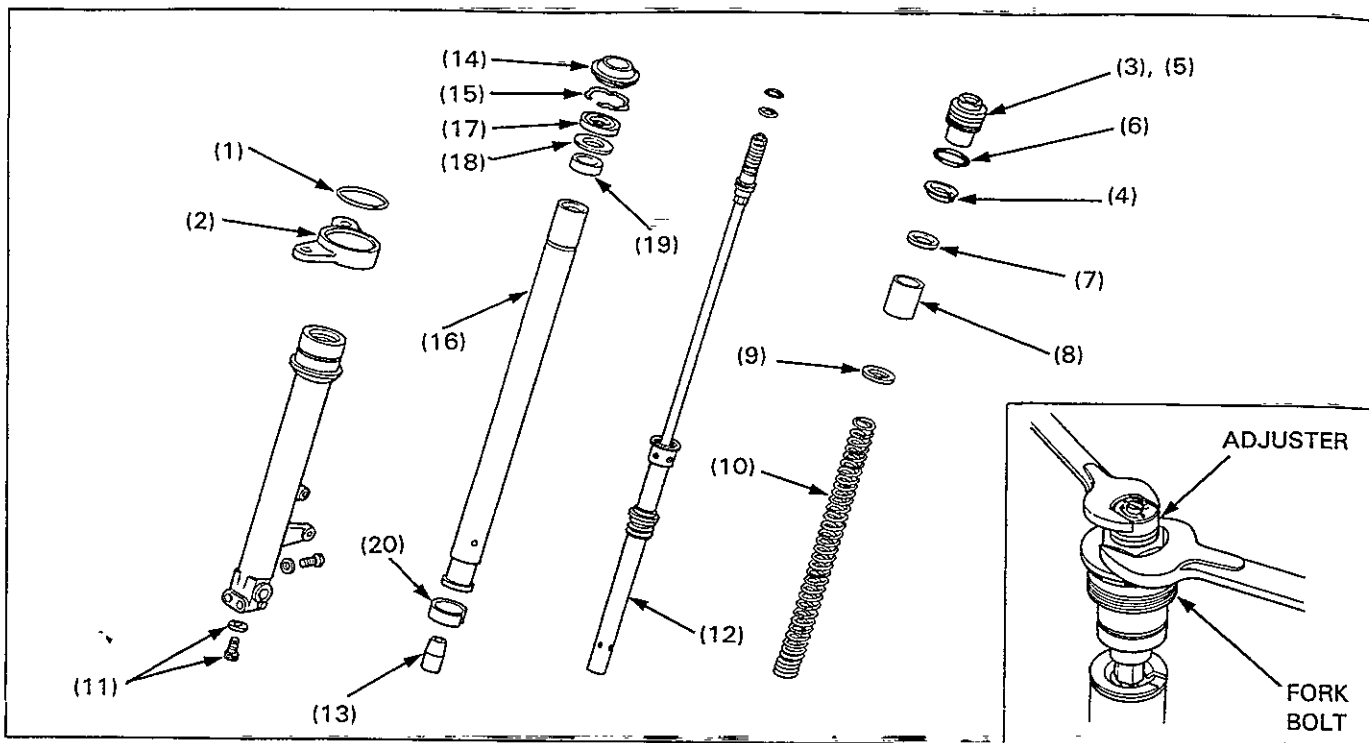
- When the fork is to be disassembled, set the pre-load adjuster to the "softest" position, loosen the upper fork pinch bolt and loosen the fork bolt but do not remove it yet.
- After assembling the fork, tighten the fork bolt which is temporarily tightened before tightening the upper fork pinch bolt.

## Requisite Service

- Front wheel removal/installation (page 12-6)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Front fender mounting bolt	4	
(2)	Front fender	1	
(3)	Handlebar holder pinch bolt	2	Loosen the bolts.
(4)	Upper fork pinch bolt	1	Loosen the bolt.
(5)	Lower fork pinch bolt	1	Loosen the bolt.
(6)	Wire band	2	NOTE
(7)	Handlebar assembly	1	<ul style="list-style-type: none"> <li>• On the right fork, remove the brake hose band.</li> </ul> Lower the fork part way and remove from the fork. <b>CAUTION</b> <ul style="list-style-type: none"> <li>• On the right side, keep the master cylinder upright.</li> </ul>
(8)	Stopper ring	1	
(9)	Fork assembly	1	Disassembly (page 12-12)
<b>Installation Order</b>			
(9)	Fork assembly	1	
(8)	Stopper ring	1	Support the fork and install into the groove securely.
(7)	Handlebar assembly	1	NOTE
			<ul style="list-style-type: none"> <li>• Install onto the fork and raise the fork through the top bridge, aligning the locating pin of the handlebar holder with the top bridge groove.</li> </ul>
(5)	Lower fork pinch bolt	1	
(4)	Upper fork pinch bolt	1	
(3)	Handlebar holder pinch bolt	2	
(6)	Wire band	2	
(2)	Front fender	1	
(1)	Front fender mounting bolt	4	

## Fork Disassembly



## NOTE

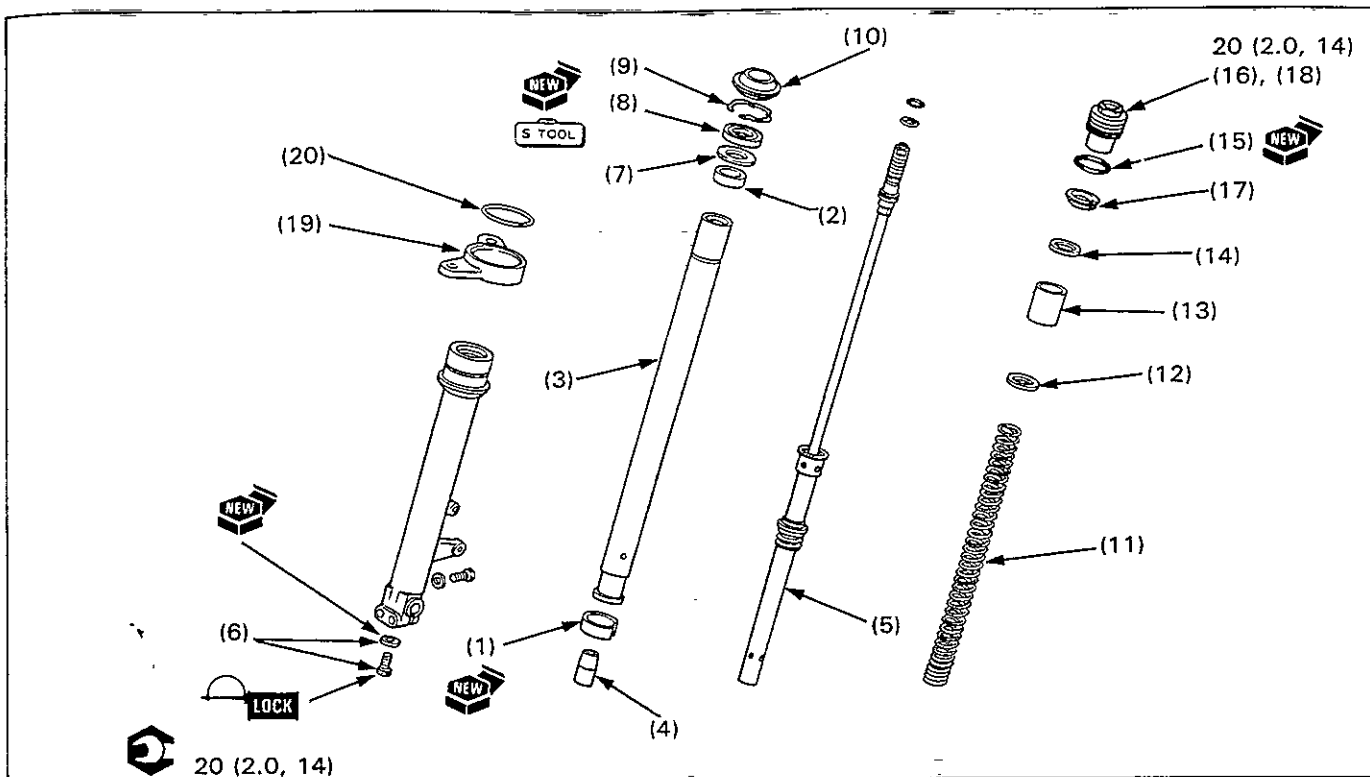
- Set the pre-load adjuster to the "softest" position before loosening the fork bolt.

## Requisite Service

- Fork removal/Installation (page 12-10).

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		
(1) Stopper ring	1	
(2) Fender bracket	1	
(3) Fork bolt	1	Remove from the fork tube.
(4) Stopper seat	1	NOTE
		• Drain the fork oil from the fork tube and piston rod after removing.
(5) Fork bolt	1	Hold the pre-load adjuster and remove the fork bolt as shown.
(6) O-ring	1	
(7) Spring seat	1	
(8) Spacer	1	
(9) Spring seat	1	
(10) Fork spring	1	
(11) Socket bolt/washer	1/1	
(12) Fork piston assembly	1	CAUTION
		• Do not remove the adjuster from the fork piston.
(13) Oil lock piece	1	
(14) Dust seal	1	
(15) Stopper ring	1	
(16) Fork tube	1	
(17) Oil seal	1	
(18) Back-up ring	1	
(19) Slider bushing	1	
(20) Fork tube bushing	1	CAUTION
		• Do not remove the bushing unless it is replaced.

## Fork Assembly



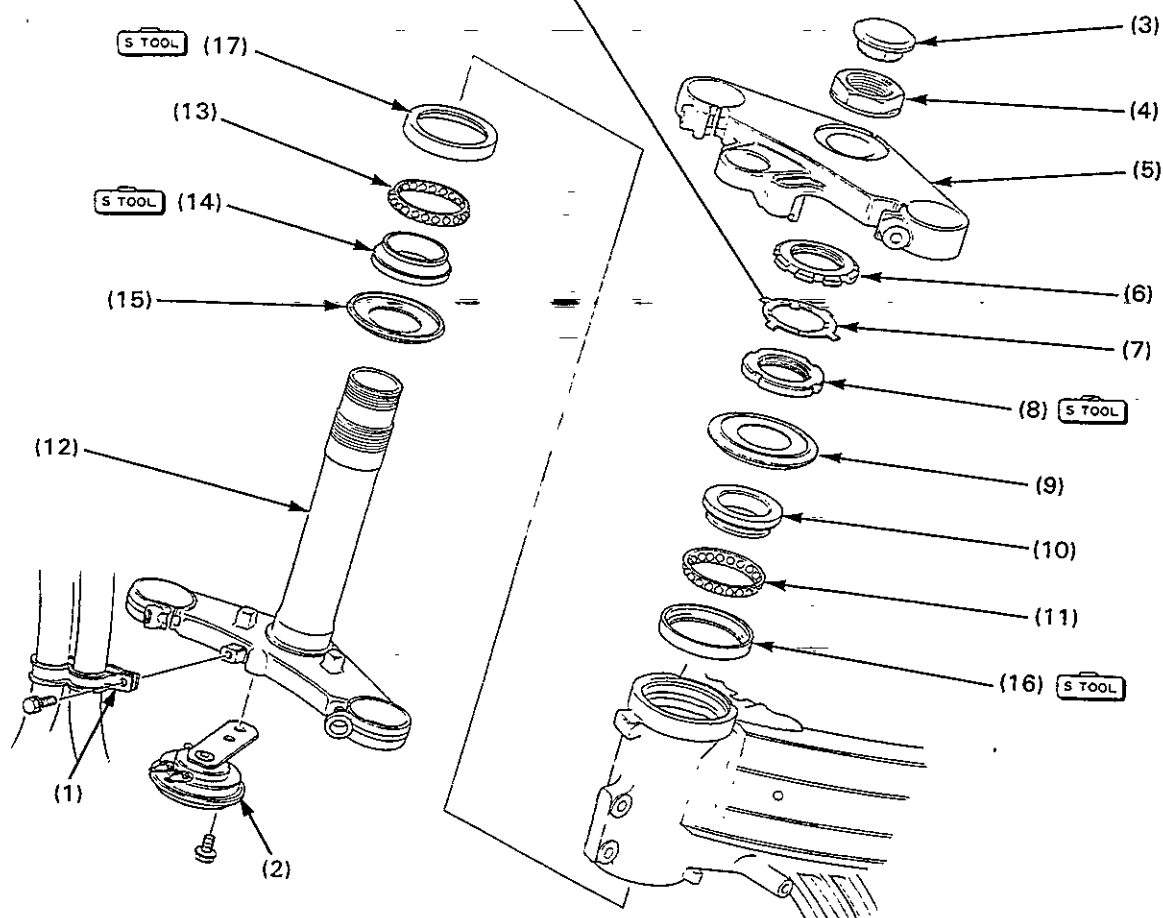
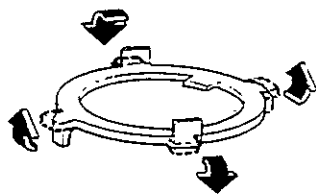
## NOTE

- Set the pre-load adjuster to the "softest" position before tightening the fork bolt.

Procedure	Q'ty	Remarks
<b>Assembly Order</b>		
(1) Fork tube bushing	1	
(2) Slider bushing	1	Install onto the fork tube.
(3) Fork tube	1	
(4) Oil lock piece	1	Install onto the end of the fork piston.
(5) Fork piston	1	
(6) Sealing washer/socket bolt	1/1	NOTE • Apply locking agent to the bolt threads.
(7) Back-up ring	1	
(8) Oil seal	1	Use the fork seal driver (07947-KA50100) and attachment (0797-KF00100).
(9) Stopper ring	1	
(10) Dust seal	1	NOTE • Pour fork oil to the specified level before installing the spring (page 1-11).
(11) Fork spring	1	NOTE • Install with the tapered end facing down.
(12) Spring seat	1	
(13) Spacer	1	
(14) Spring seat	1	
(15) O-ring	1	
(16) Fork bolt	1	Install onto the adjuster.
(17) Stopper seat	1	
(18) Fork bolt	1	Screw into the fork tube, but do not tighten yet. <b>CAUTION</b> • Be careful not to cross-thread.
(19) Fender bracket	1	
(20) Stopper ring	1	

# Steering Stem Removal

Straighten the lock washer tabs.





## NOTE

- Replace the steering bearing and races as a set.
- Do not reuse the lock washer.

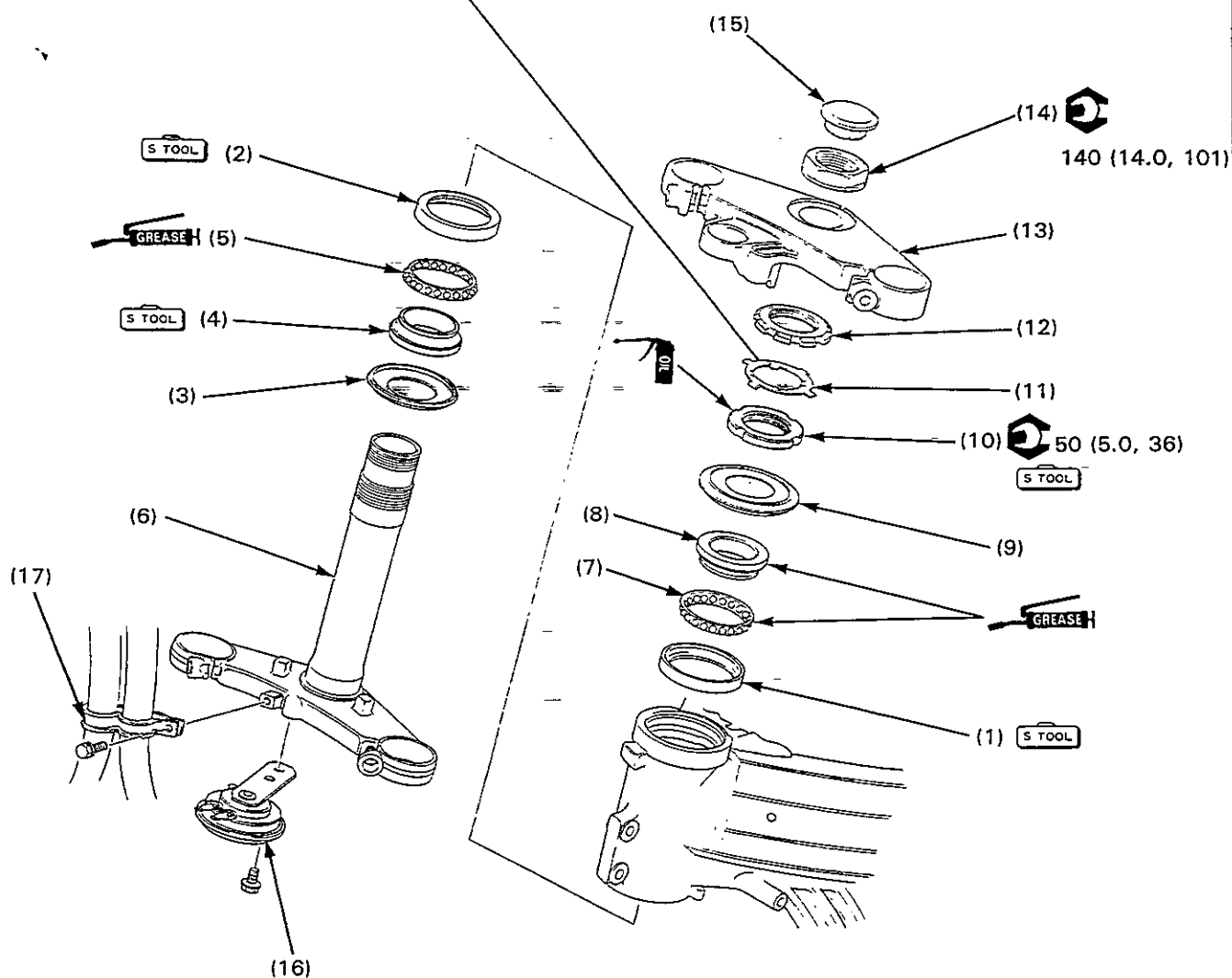
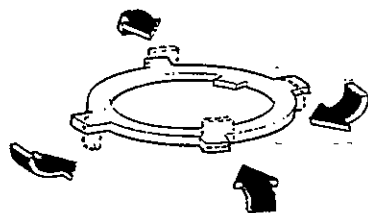
## Requisite Service

- Front wheel removal (page 12-6)
- Fork removal (page 12-10)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Brake hose clamp	1	
(2)	Horn	1	Disconnect the horn wires.
(3)	Steering stem nut cap	1	
(4)	Steering stem nut	1	
(5)	Top bridge	1	
(6)	Lock nut	1	Straighten the lock washer tabs.
(7)	Lock washer	1	
(8)	Steering bearing adjustment nut	1	Use the steering stem socket (07HMA—MR70100).
(9)	Upper dust seal	1	
(10)	Upper bearing inner race	1	
(11)	Upper bearing	1	
(12)	Steering stem	1	
(13)	Lower bearing	1	Remove from the steering stem.
(14)	Lower bearing inner race	1	
(15)	Lower dust seal	1	
(16)	Upper bearing outer race	1	Use the driver attachment B (07946—KM90200), driver assembly shaft (07946—KM90300), bearing remover B (07946—KM90500) and base (07946—KM90600).
(17)	Lower bearing outer race	1	

## Steering Stem Installation

Bend down the two tabs into the adjustment nut grooves and bend up two tabs into the lock nut grooves.



## NOTE

- Check the steering bearing preload after installing.

## Requisite Service

- Fork installation (page 12-10)
- Front wheel installation (page 12-6)

Procedure		Q'ty	Remarks
<b>Installation Order</b>			
(1)	Upper bearing outer race	1	Use the driver attachment B (07946—KM90200), driver assembly shaft (07946—KM90300), bearing remover B (07946—KM90500) and base (07946—KM90600).
(2)	Lower bearing outer race	1	
(3)	Lower dust seal	1	Use the stem driver attachment (07HMD—MR70100) and inner driver C (07746—0030100).
(4)	Lower bearing inner race	1	
(5)	Lower bearing	1	
(6)	Steering stem	1	
(7)	Upper bearing	1	
(8)	Upper bearing inner race	1	Use the steering stem socket (07HMD—MR70100). Bend down the two tabs into the adjustment nut grooves. Hand tighten, align the grooves with the lock washer tabs and bend up the tabs into the grooves.
(9)	Upper dust seal	1	
(10)	Steering bearing adjustment nut	1	
(11)	Lock washer	1	
(12)	Lock nut	1	NOTE Temporarily install the front forks and tighten the nut.
(13)	Top bridge	1	
(14)	Steering stem nut	1	Connect the horn wires.
(15)	Steering stem nut cap	1	
(16)	Horn	1	
(17)	Brake hose clamp	1	

# 13. Rear Wheel/Suspension

Service Information	13-1	Shock Absorber, Linkage Removal/Installation	13-8
Troubleshooting	13-1	Shock Absorber Disassembly/Assembly	13-12
Rear Wheel, Driven Sprocket Removal/Installation	13-2	Shock Linkage Disassembly/Assembly	13-14
Bearing Holder Removal/Installation	13-4	Swingarm Removal/Installation	13-16
Bearing Holder, Axle Disassembly/Assembly	13-6	Swingarm Disassembly/Assembly	13-18

## Service Information

### ⚠ WARNING

- 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 (Step: section 19 of the Common Service Manual; Drilling point: page 1-11).
- Riding on damaged rims impairs safe operation of the vehicle.

- Tubeless tire removal, repair, and remounting procedures are covered in the section 16 of the Common Service Manual. When remounting the tire, note the normal rotating direction.
- Refer to the section 14 for brake system information.
- Use only genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.

## Troubleshooting

13

### Rear Wheel Wobbling

- Loose wheel nut
- Bent rim
- Loose bearing holder
- Damaged axle bearing(s)
- Faulty swingarm pivot bearing(s)
- Loose shock linkage/swingarm fastener(s)
- Faulty tire
- Unbalanced tire and wheel

### Soft Suspension

- Weak spring
- Incorrect suspension adjustment
- Faulty damper unit
- Oil leakage from damper unit

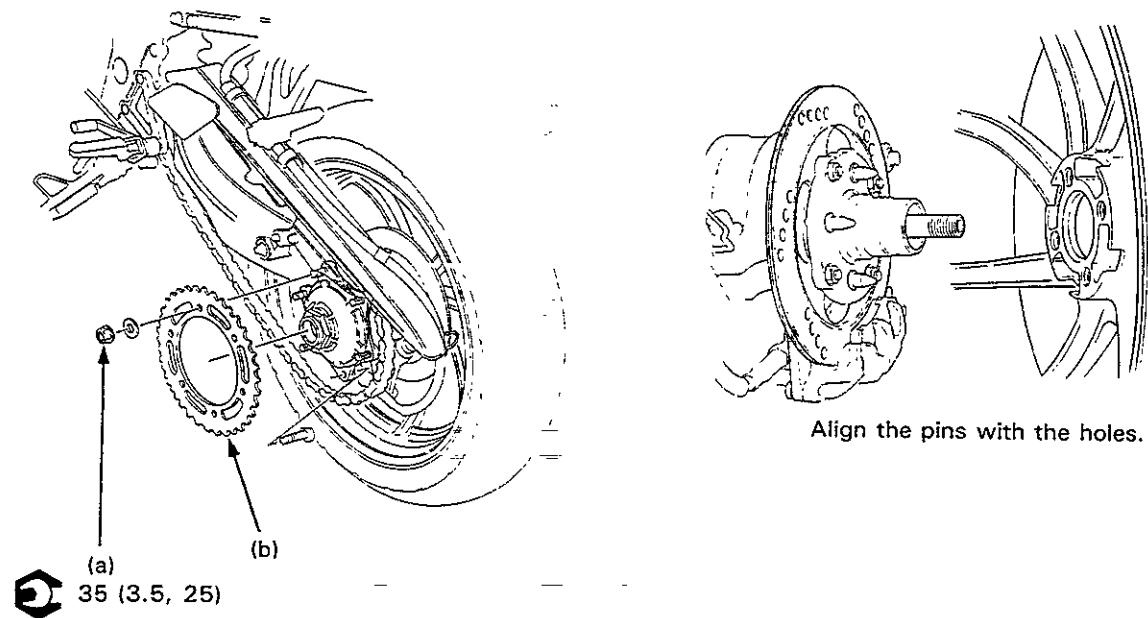
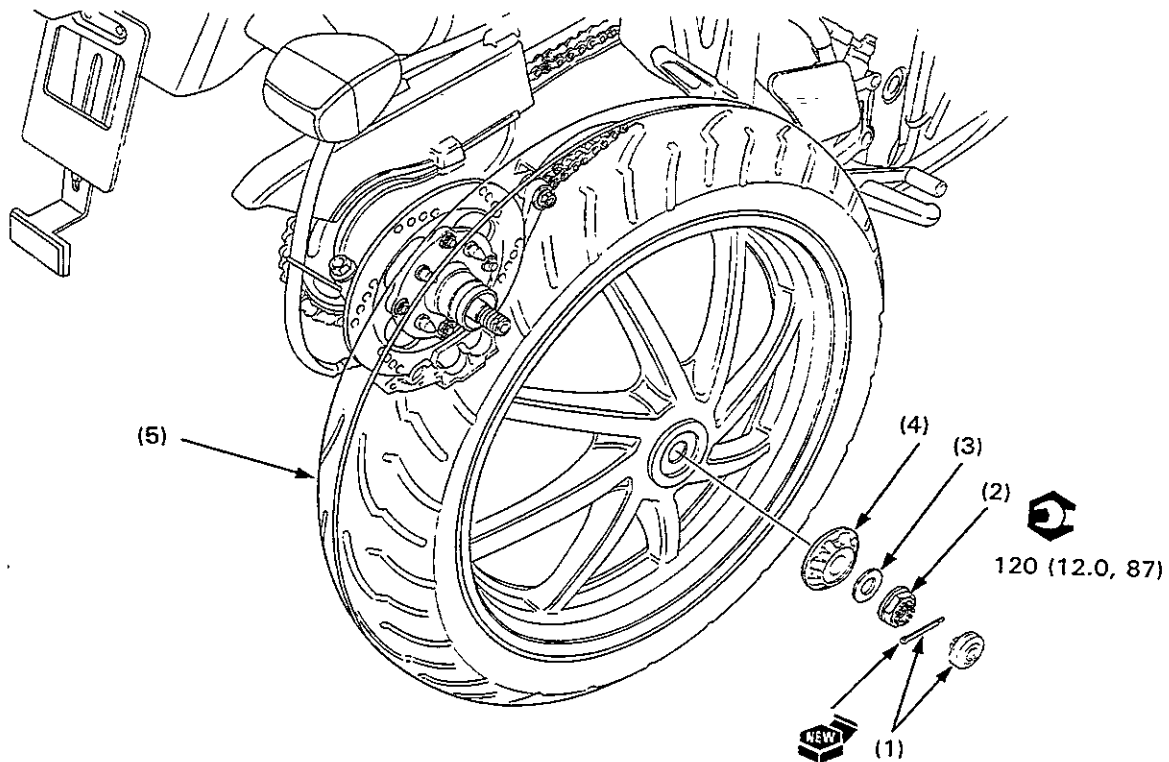
### Hard Suspension

- Bent damper rod
- Damaged swingarm pivot bearings
- Damaged shock absorber bushing
- Incorrect suspension adjustment
- Faulty shock linkage bearings
- Insufficient lubrication of suspension pivots
- Damaged mount bushing

### Rear Suspension Noise

- Loose fasteners

## Rear Wheel, Driven Sprocket Removal/Installation

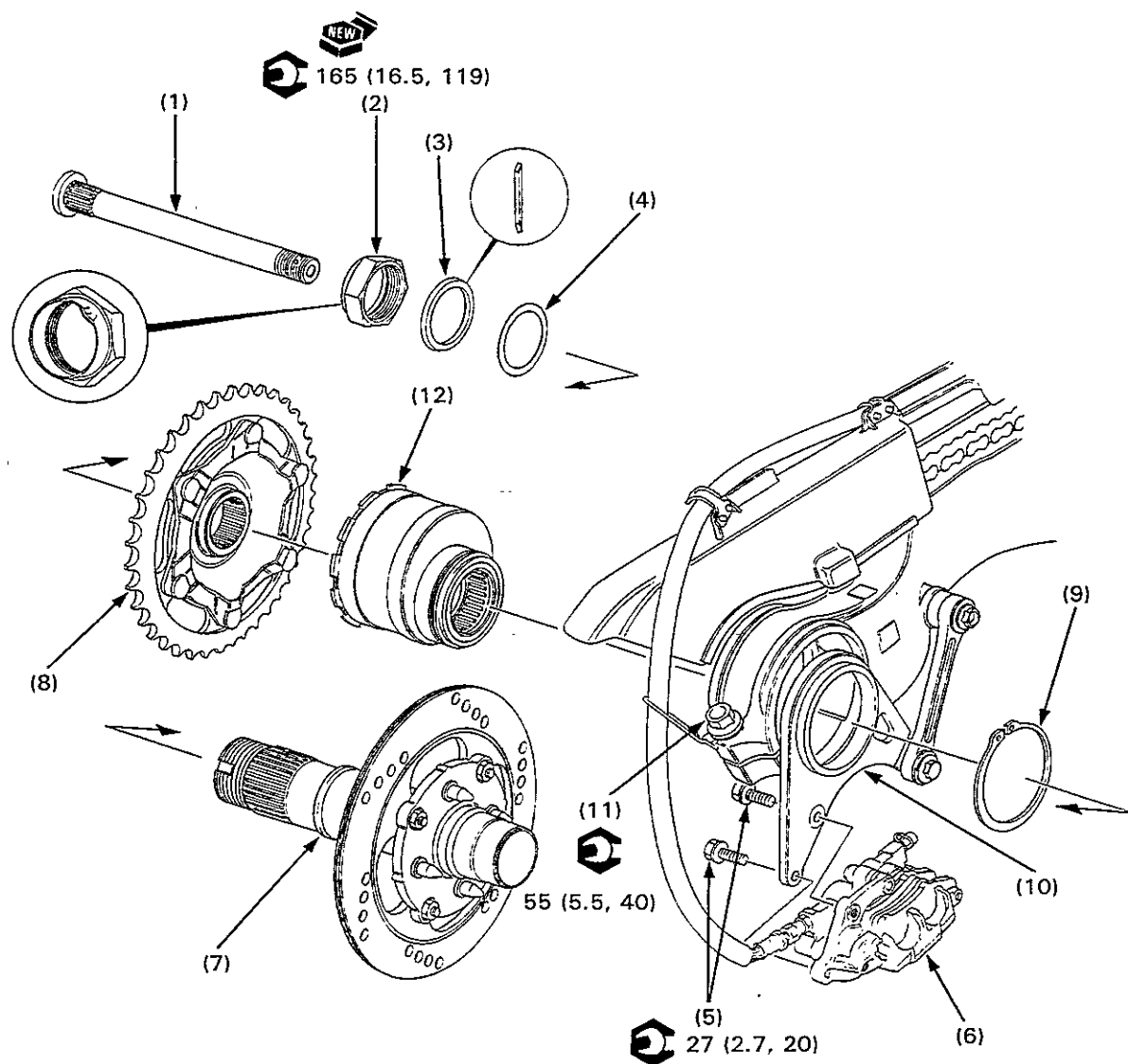


**Requisite Service**

- Raise the rear wheel off the ground and support the motorcycle.

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Center cap/cotter pin	1/1	
(2)	Wheel nut	1	
(3)	Shim	1	
(4)	Center lock spacer	1	
(5)	Rear wheel	1	
<b>Driven Sprocket Removal Order</b>			Installation is in the reverse order of removal.
(a)	Driven sprocket nut	6	
(b)	Driven sprocket	1	NOTE
			• Loosen the drive chain before removing (page 3-11).
<b>Installation Order</b>			
(5)	Rear wheel	1	NOTE
			• Align the holes with the drive pins of the axle.
(4)	Center lock spacer	1	
(3)	Shim	1	
(2)	Wheel nut	1	
(1)	Cotter pin/center cap	1/1	

# Bearing Holder Removal/Installation



**⚠ WARNING**

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.

**NOTE**

- Do not depress the brake pedal when the caliper is removed, or it will be difficult to refit the disc between the brake pads.
- Support the removed caliper with a piece of wire so that it does not hang by the brake hose. Do not twist the brake hose.

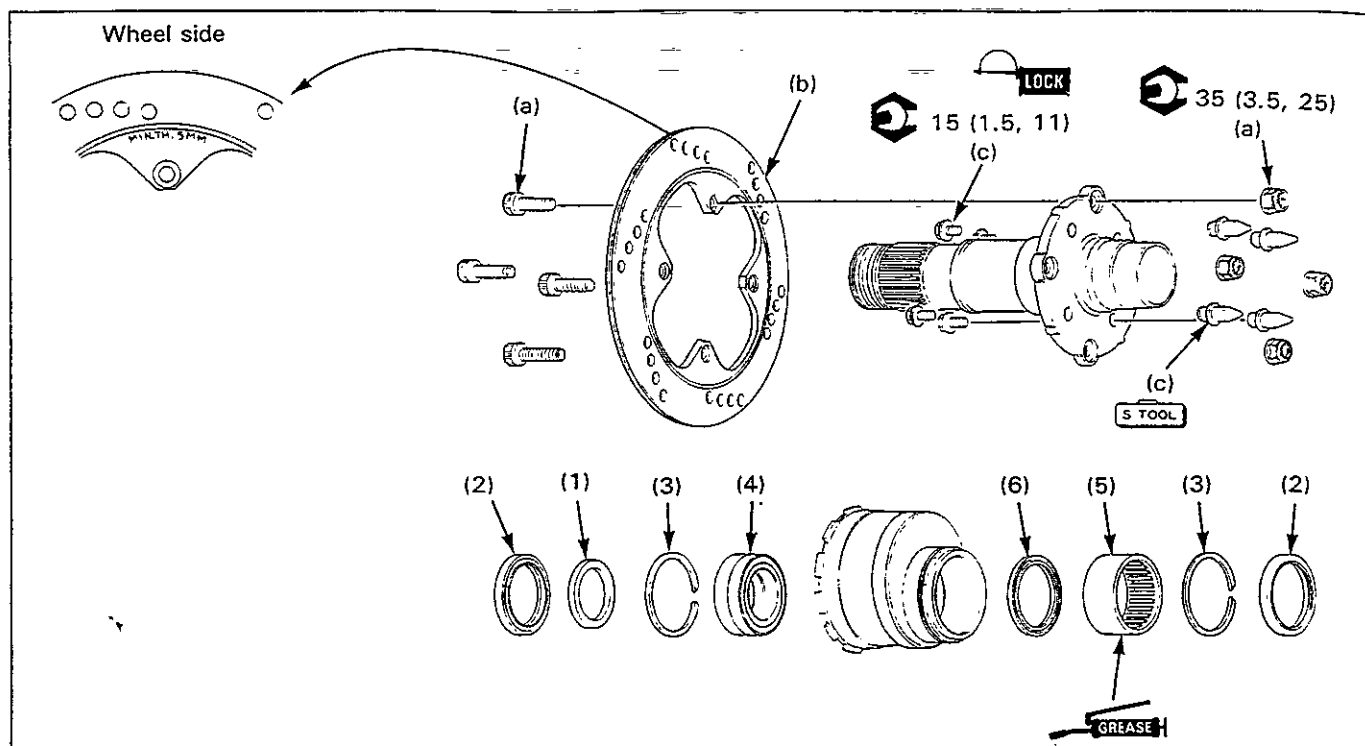
**Requisite Service**

- Rear wheel removal/installation (page 13-2)
- Loosen the drive chain (page 3-11).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Axle bolt	1	<b>NOTE</b> <ul style="list-style-type: none"> <li>• Tap out the bolt to the left side with a plastic hammer when it is to be replaced.</li> </ul> Loosen after unstaked.
(2)	Lock nut	1	
(3)	Spring washer 1	1	
(4)	Thrust washer	1	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• Do not hang by the brake hose.</li> </ul> Pull out to the right side while holding the driven flange. Disassembly (page 13-6)
(5)	Brake caliper mounting bolt	2	
(6)	Brake caliper	1	
(7)	Axle/brake disc assembly	1	Remove from the drive chain.
(8)	Driven flange	1	
(9)	Snap ring	1	
(10)	Caliper bracket	1	Fully loosen.
(11)	Bearing holder pinch bolt	1	
(12)	Bearing holder	1	
<b>Installation Order</b>			
(12)	Bearing holder	1	Loosely install.
(11)	Bearing holder pinch bolt	1	
(10)	Caliper bracket	1	
(9)	Snap ring	1	Install from the right side while holding the driven flange. Install the drive chain, then install aligning the splines.
(7)	Axle/brake disc assembly	1	
(8)	Driven flange	1	
(6)	Brake caliper	1	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• Be careful not to damage the brake pads.</li> </ul>
(5)	Brake caliper mounting bolt	2	
(4)	Thrust washer	1	
(3)	Spring washer	1	<b>NOTE</b> <ul style="list-style-type: none"> <li>• Install with the dished side facing in.</li> </ul> Use a new nut and stake it after tightening.
(2)	Lock nut	1	
(1)	Axle bolt	1	
			<b>NOTE</b> <ul style="list-style-type: none"> <li>• Adjust the drive chain slack after installing the rear wheel (page 3-11).</li> </ul>



# Bearing Holder, Axle Disassembly/Assembly



## NOTE

- Replace the axle bearings as a set.

## Requisite Service

- Bearing holder removal/installation (page 13-4)

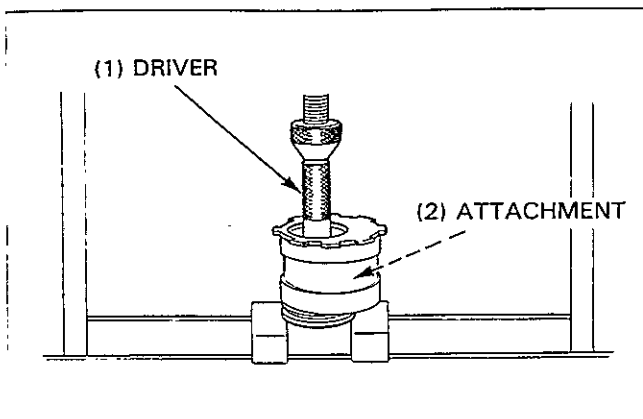
Procedure		Q'ty	Remarks
<b>Bearing Holder Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Collar	1	
(2)	Outer dust seal	2	
(3)	Bearing set ring	2	
(4)	Left bearing (6908LU)	1	
(5)	Right needle bearing	1	Replacement (page 13-7)
(6)	Inner dust seal	1	
<b>Axle Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(a)	Brake disc bolt/nut	4/4	
(b)	Brake disc	1	NOTE
			• At assembly, install with the "MIN. TH. 5 mm" mark facing toward the wheel.
(c)	Drive pin/pin bolt	4/4	NOTE
			• Carefully remove as the thread locking agent is used.

## Axle Needle Bearing Replacement

Press the needle bearing out of the bearing holder.

### S TOOL

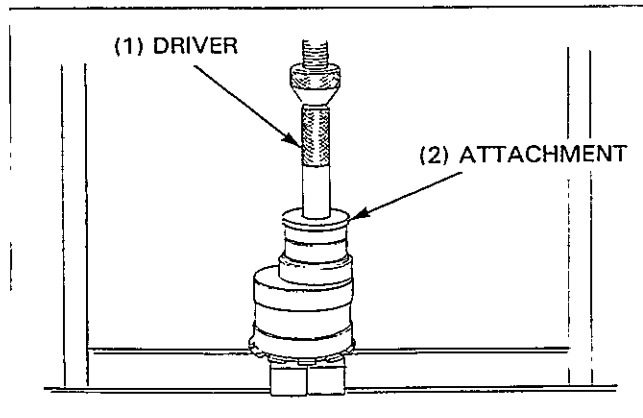
<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 42 x 47 mm</b>	<b>07746-0010300</b>
<b>Pilot, 40 mm</b>	<b>07746-0040900</b>



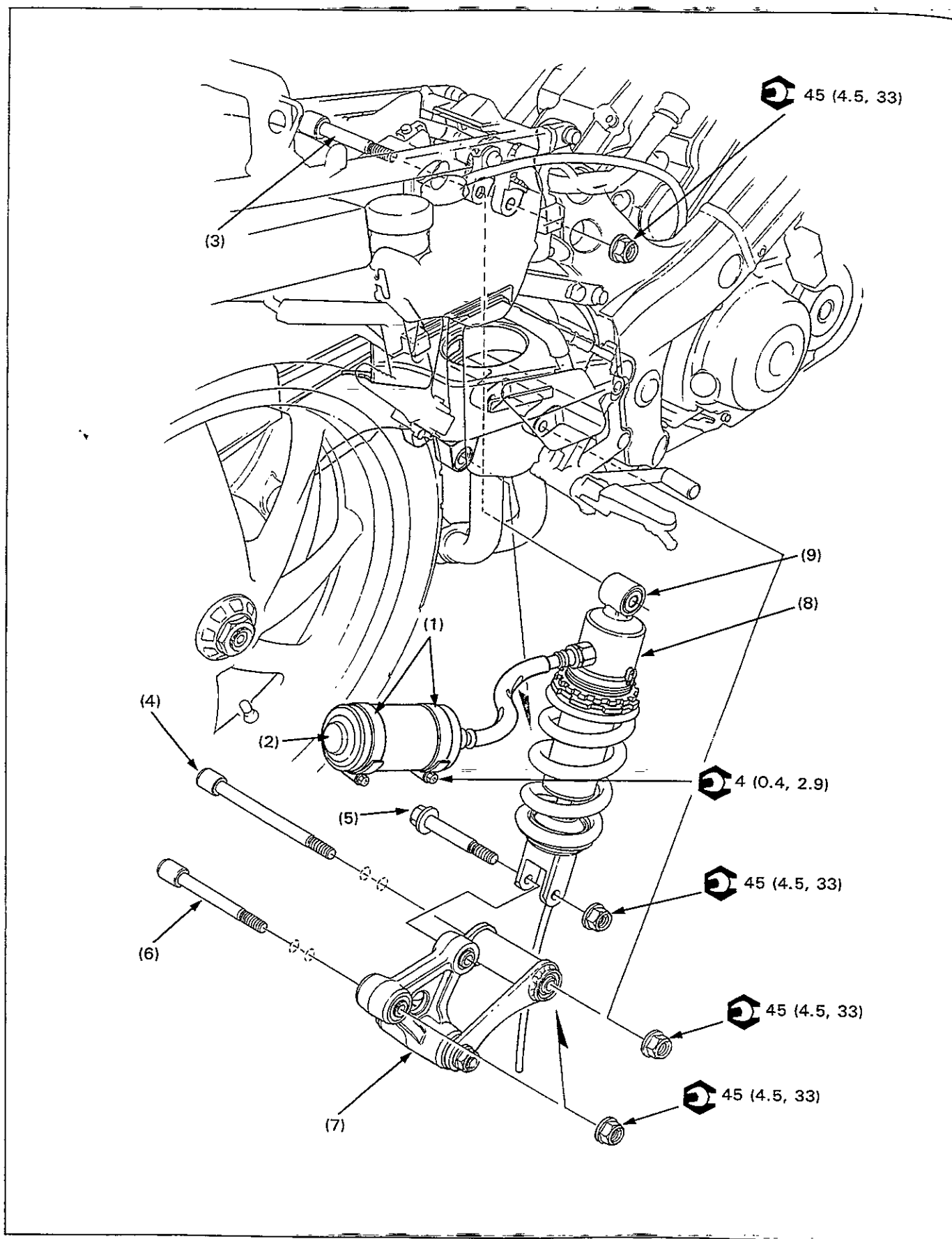
Grease the new needle bearing and press it into the bearing holder until it bottoms.

### S TOOL

<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 62 x 68 mm</b>	<b>07746-0010500</b>



## Shock Absorber, Linkage Removal/Installation



**⚠ WARNING**

- Do not service the shock absorber and linkage while the exhaust system is hot.

**Requisite Service**

- Seat cowling removal/installation (page 2-2)

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Holder band	2	Loosen the band screws.
(2)	Shock absorber reservoir	1	Remove from the bracket.
(3)	Shock absorber upper mounting bolt	1	Removal (page 13-10)
(4)	Shock link-to-frame bolt	1	
(5)	Shock absorber lower mounting bolt	1	
(6)	Shock arm-to-swingarm bolt	1	
(7)	Shock linkage assembly	1	Remove through the space between the exhaust pipes. Disassembly (page 13-14)
(8)	Shock absorber assembly	1	Disassembly (page 13-12)
(9)	Upper mounting collar	1	

### Rear Suspension Bolt Removal

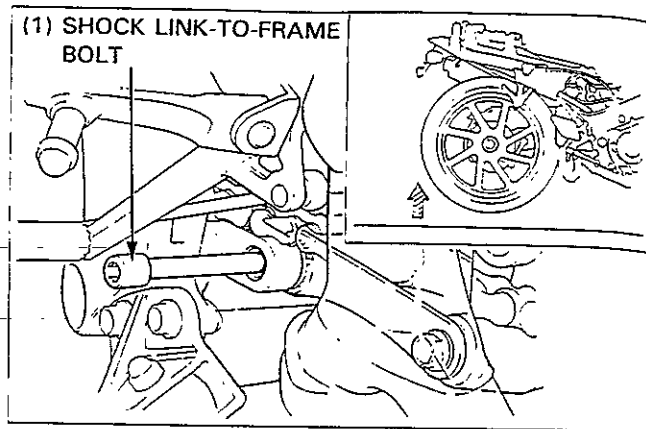
Raise the rear wheel off the ground and support the motorcycle securely.

Remove the seat cowl.

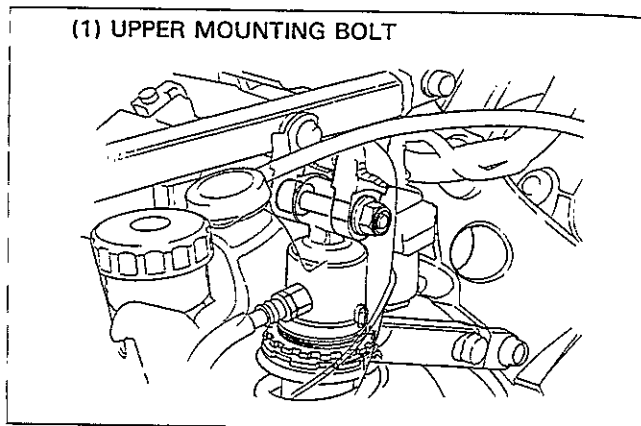
Remove the shock link-to frame bolt.

#### NOTE

- Loosen the nut first then remove the bolt for easy removal.



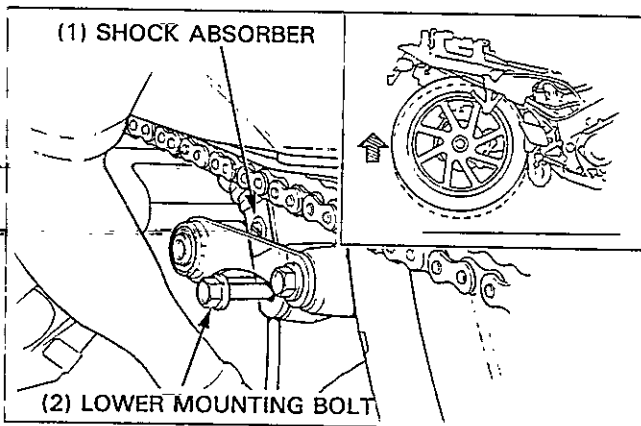
Remove the shock absorber upper mounting bolt while supporting the rear wheel by hand.



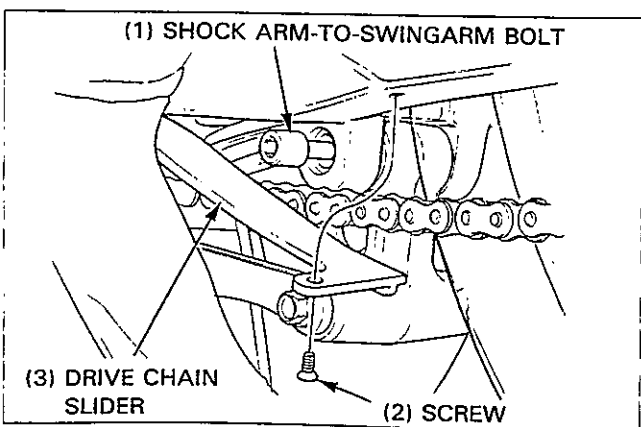
Loosen the shock absorber lower mounting nut. Raise the wheel further by hand and remove the shock absorber lower mounting bolt.

#### NOTE

- Be careful not to damage the exhaust pipe while servicing.

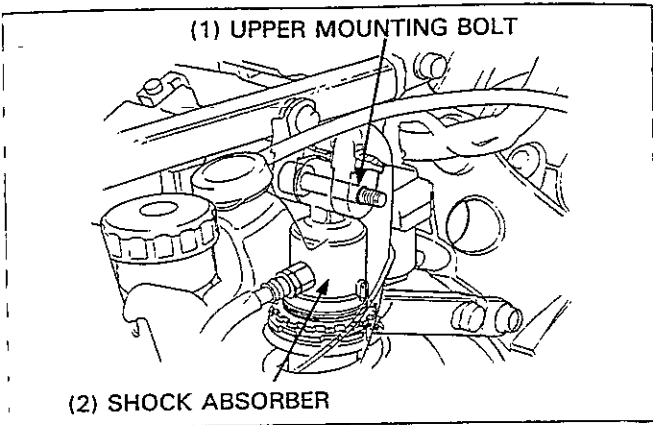


Remove the screw and the lower portion of the drive chain slider from the swingarm. Remove the shock arm-to-swingarm bolt.



## Rear Suspension Bolt Installation

Install the shock absorber with the drain tube forward and temporarily install the upper mounting bolt.

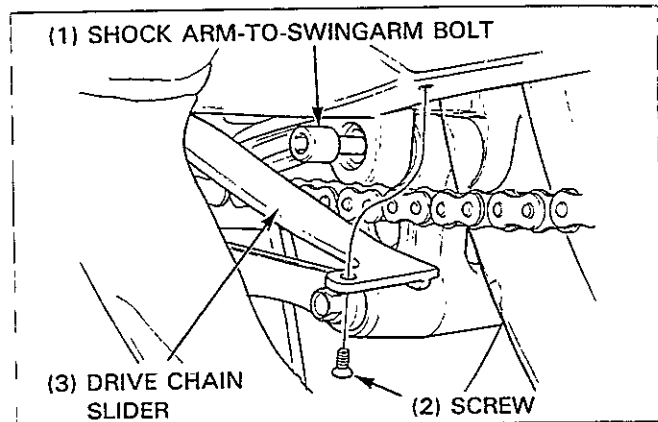


Install the shock linkage assembly, and install and tighten the shock arm-to-swingarm bolt.

**Torque: 45 N·m (4.5 kg-m, 33 ft-lb)**

Install the drive chain slider and screw.

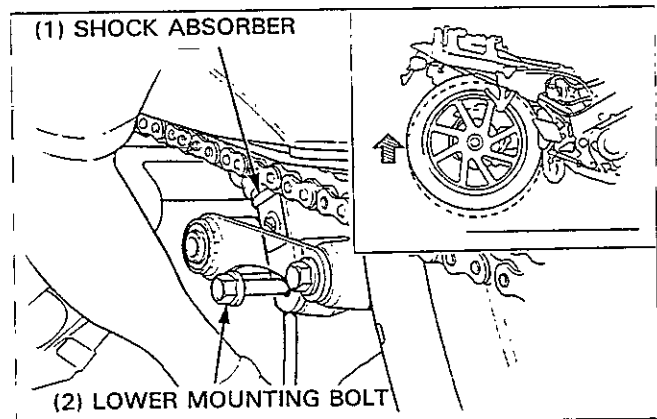
**Torque: 4 N·m (0.4 kg-m, 2.9 ft-lb)**



While holding the shock absorber, remove the upper mounting bolt.

Raise the rear wheel and install the shock absorber lower mounting bolt.

**Torque: 45 N·m (4.5 kg-m, 33 ft-lb)**

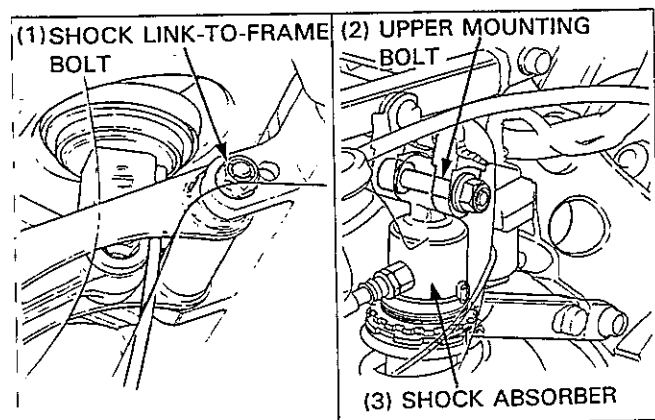


Install the shock link-to-frame bolt.

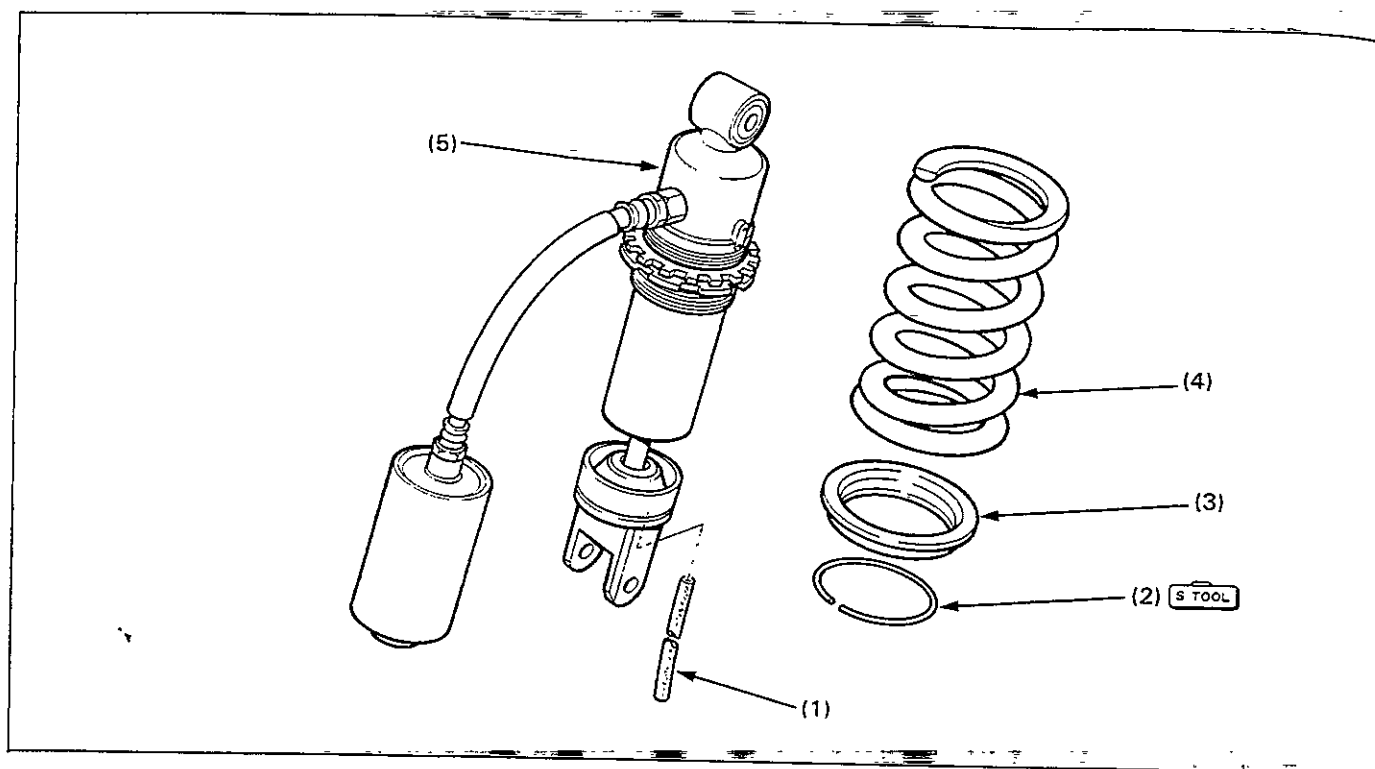
**Torque: 45 N·m (4.5 kg-m, 33 ft-lb)**

While supporting the rear wheel, install the shock absorber upper mounting bolt and tighten it.

**Torque: 45 N·m (4.5 kg-m, 33 ft-lb)**



## Shock Absorber Disassembly/Assembly

**⚠ WARNING**

- 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 (Step: section 19 of the Common Service Manual; Drilling point: page 1-11).

**NOTE**

- Loosen the spring pre-load adjuster lock nut and adjuster nut fully for easy disassembly. When the adjuster nut is loosened, adjust the spring installed length and tighten the lock nut.

**Requisite Service**

- Shock absorber, linkage removal/installation (13-8)

Procedure		Q'ty	Remarks
(1)	Disassembly Order		Assembly is in the reverse order of disassembly.
(1)	Drain tube	1	
(2)	Stopper ring	1	Removal/installation (page 13-13)
(3)	Lower spring seat	1	
(4)	Spring	1	
(5)	Damper unit	1	

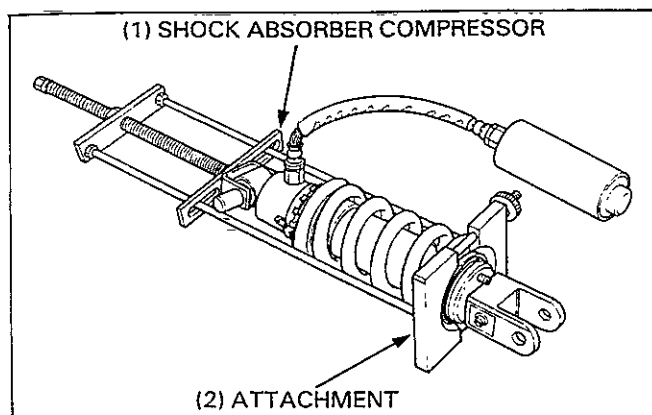
## Stopper Ring Removal/Installation

Install the shock absorber compressor and attachment on the shock absorber as shown.

**5 TOOL**

Shock absorber compressor  
Attachment

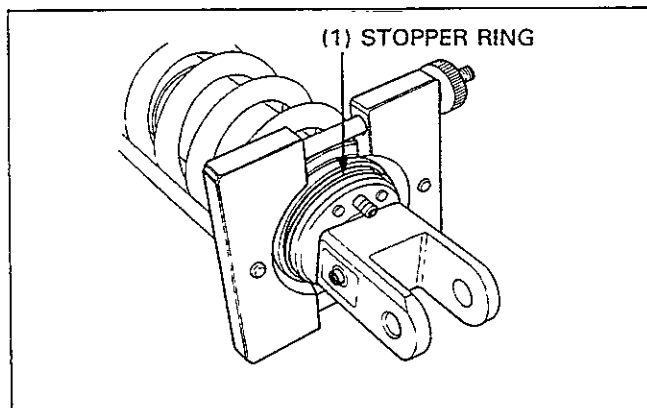
07GME-0010000  
07959-MB10000



Turn the compressor handle and slowly compress the spring until the stopper ring can be removed.

Remove the stopper ring.

Install the stopper ring in the reverse order of removal.



## Shock Absorber Disposal Procedure

Center punch the center of the pressure tank cap to mark the drilling point.

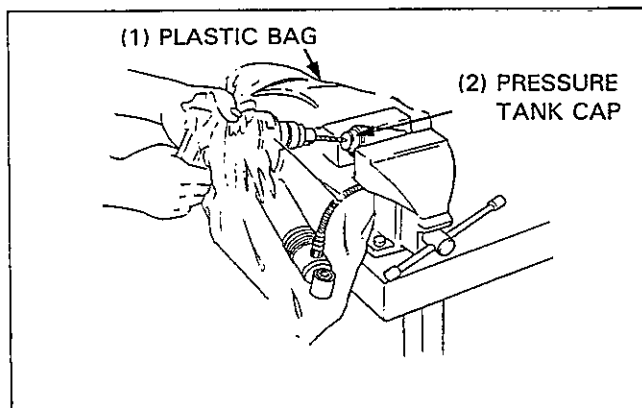
Wrap the pressure tank inside a plastic bag.

Support the pressure tank in a vise as shown.

Through the open end of the bag, insert a drill motor with a sharp 2–3 mm (5/64–1/8 in) drill bit.

### ⚠ WARNING

- Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.
- The shock absorber contains nitrogen gas and oil under high pressure. Do not drill the damper case pressure tank body, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.
- Always wear eye protection to avoid getting metal shavings in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.

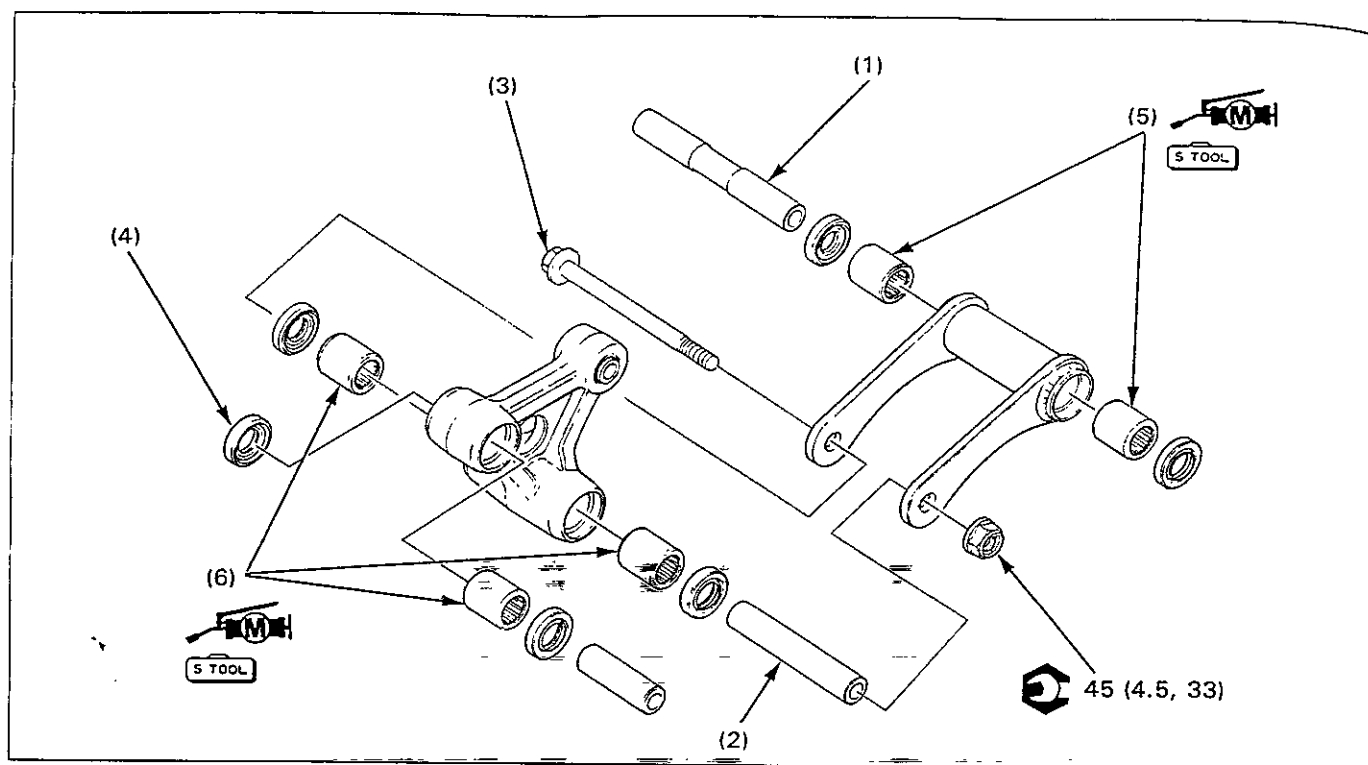


Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.

Remove the joint hose from the damper.



## Shock Linkage Disassembly/Assembly



## Requisite Service

- Shock absorber, linkage removal/installation (13-8)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Shock link collar	1	NOTE • At assembly, note the installation direction of the shock arm, shock link and bolt.
(2)	Shock arm collar	1	
(3)	Shock arm-to-shock link bolt	1	
(4)	Dust seal	6	
(5)	Shock link needle bearing	2	
(6)	Shock arm needle bearing	3	

## Shock Linkage Bearing Replacement

## Removal

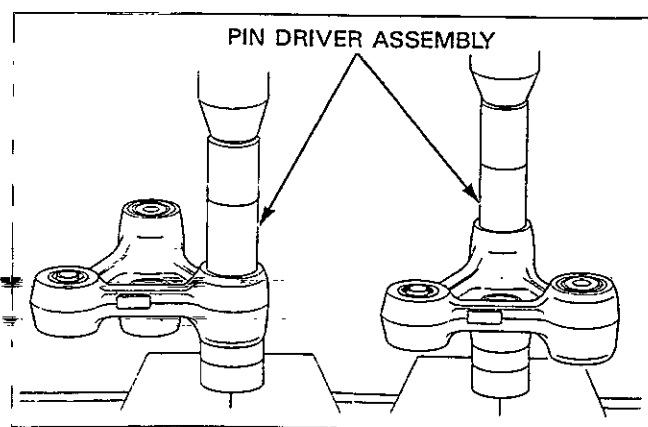
Press the needle bearings out of the shock arm.

**S TOOL**

Pin driver assembly 07GMD-KT80100

## NOTE

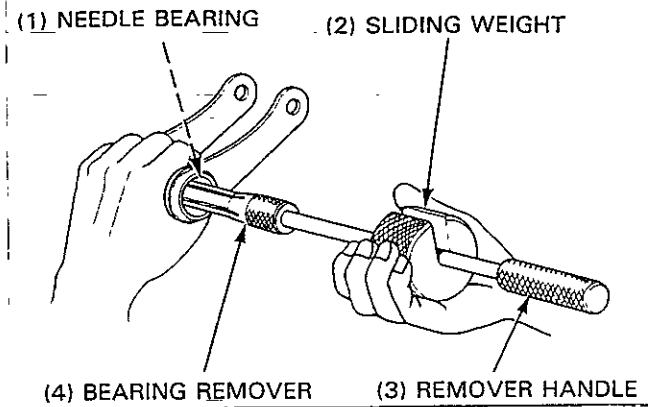
- Do not remove the shock absorber lower mount bushing.



Remove the needle bearings from the shock link with the following tools.



Bearing remove	07936-3710300
Remover handle	07936-3710100
Sliding weight	07741-0010201

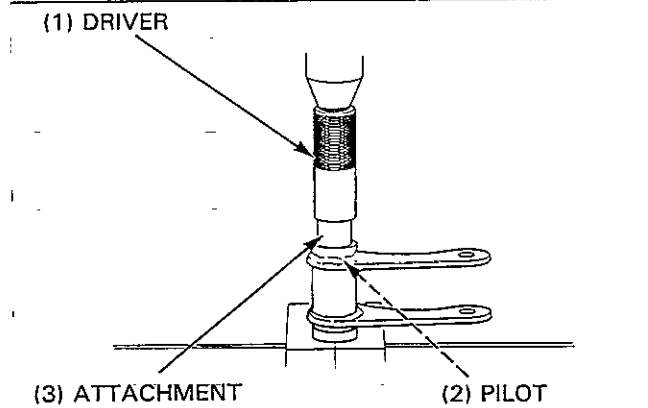


#### Installation

Apply molybdenum disulfide grease to a new needle bearing and press the bearing into the shock link until it bottoms.



Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400

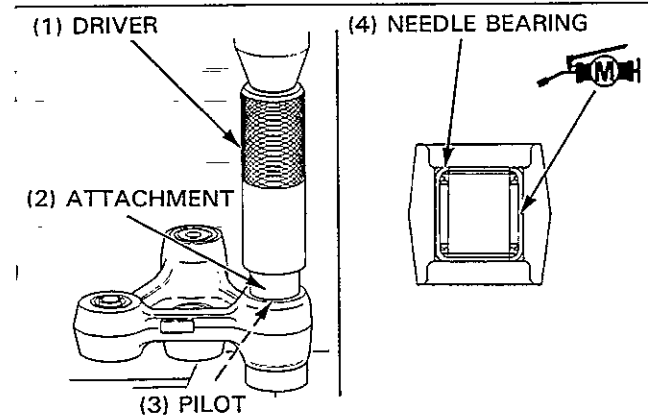


#### Shock link pivot:

Apply molybdenum disulfide grease to a new needle bearing and press the bearing into the shock arm until the attachment bottoms.



Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400

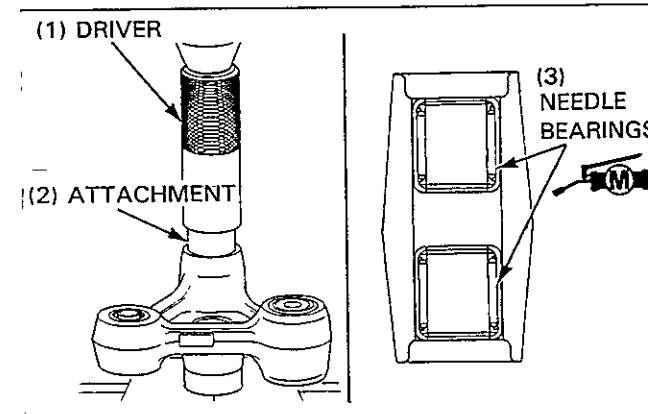


#### Swingarm pivot:

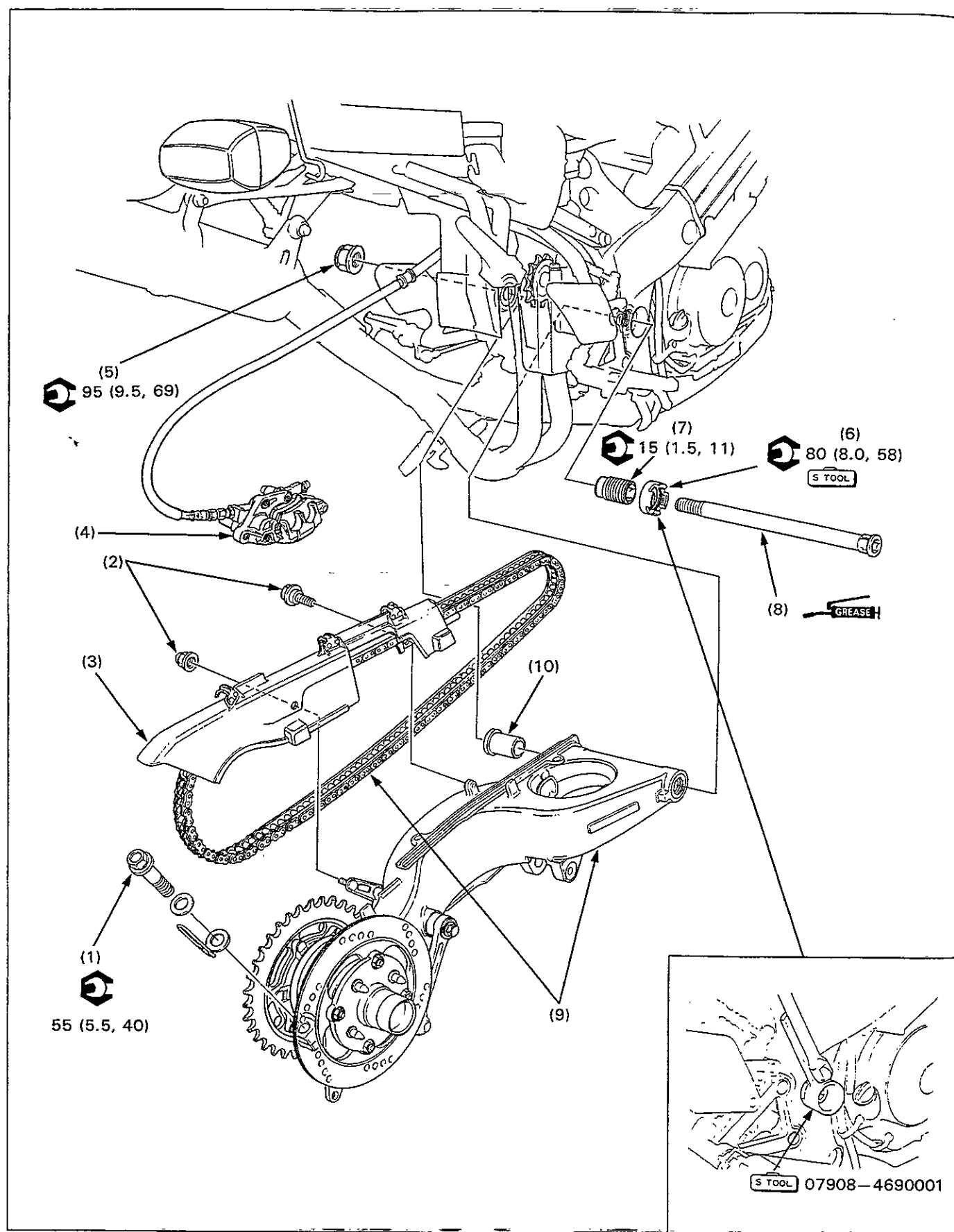
Apply molybdenum disulfide grease to a new needle bearing and press the bearing into the shock arm until the attachment bottoms.



Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400



# Swingarm Removal/Installation



**CAUTION**

- Support the removed caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.

**NOTE**

- Do not depress the pedal when the caliper is removed, or it will be difficult to refit the disc between the brake pads.

**Requisite Service**

- Rear wheel, driven sprocket removal/installation (page 13-2)
- Shock absorber, linkage removal/installation (page 13-8)

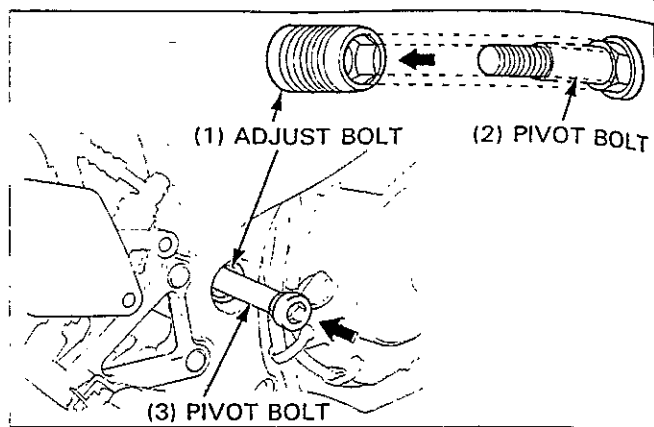
Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Bearing holder pinch bolt/hose clamp	1/1	Remove the brake hose from the clamps.
(2)	Drive chain cover bolt/nut	1/1	
(3)	Drive chain cover	1	
(4)	Rear brake caliper	1	
(5)	Pivot nut	1	
(6)	Adjust bolt lock nut	1	
(7)	Adjust bolt	1	
(8)	Pivot bolt	1	Loosen by turning the pivot bolt counterclockwise with the hex. wrench.
(9)	Swingarm/drive chain	1/1	Disassembly/assembly (page 13-19)
(10)	Left pivot collar	1	
<b>Installation Order</b>			
(10)	Left pivot collar	1	Install into the swingarm.
(9)	Swingarm/drive chain	1/1	
(7)	Adjust bolt	1	Installation (page 13-18)
(8)	Pivot bolt	1	
(5)	Pivot nut	1	
(6)	Adjust bolt lock nut	1	
(4)	Rear brake caliper	1	Clamp the brake hose.
(3)	Drive chain cover	1	
(2)	Drive chain cover bolt/nut	1/1	
(1)	Bearing holder pinch bolt/hose clamp	1/1	NOTE • After installing, adjust the drive chain slack (page 3-11).

### Pivot Bolt Installation

Screw the adjust bolt in the left pivot by hand.

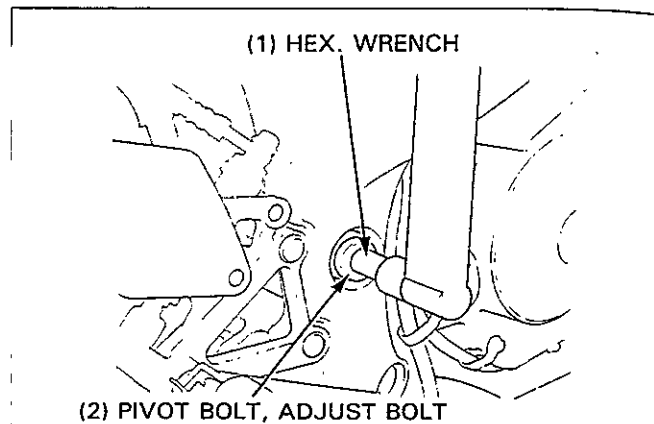
Apply thin coat of grease to the pivot bolt and insert the bolt in the pivot.

Align the hex. head of the pivot bolt with the hex hole in the adjust bolt and push the pivot bolt in fully.



Tighten the adjust bolt by turning the pivot bolt with the hex. wrench.

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



Loosely install the pivot nut.

Install the adjust bolt lock nut and tighten it while holding the pivot bolt to prevent the adjust bolt from turning.

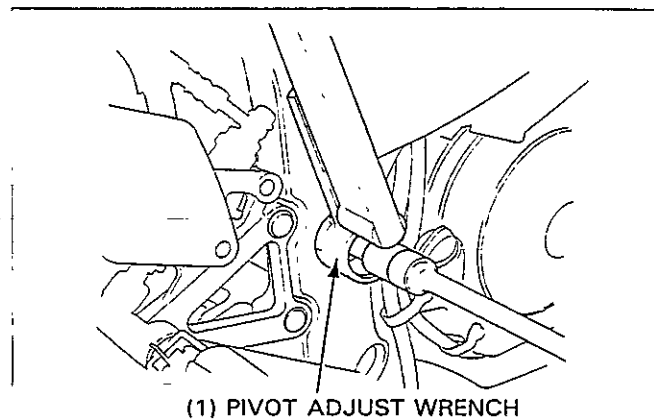
**Torque: 80 N·m (8.0 kg-m, 58 ft-lb)**

**5 TOOL**

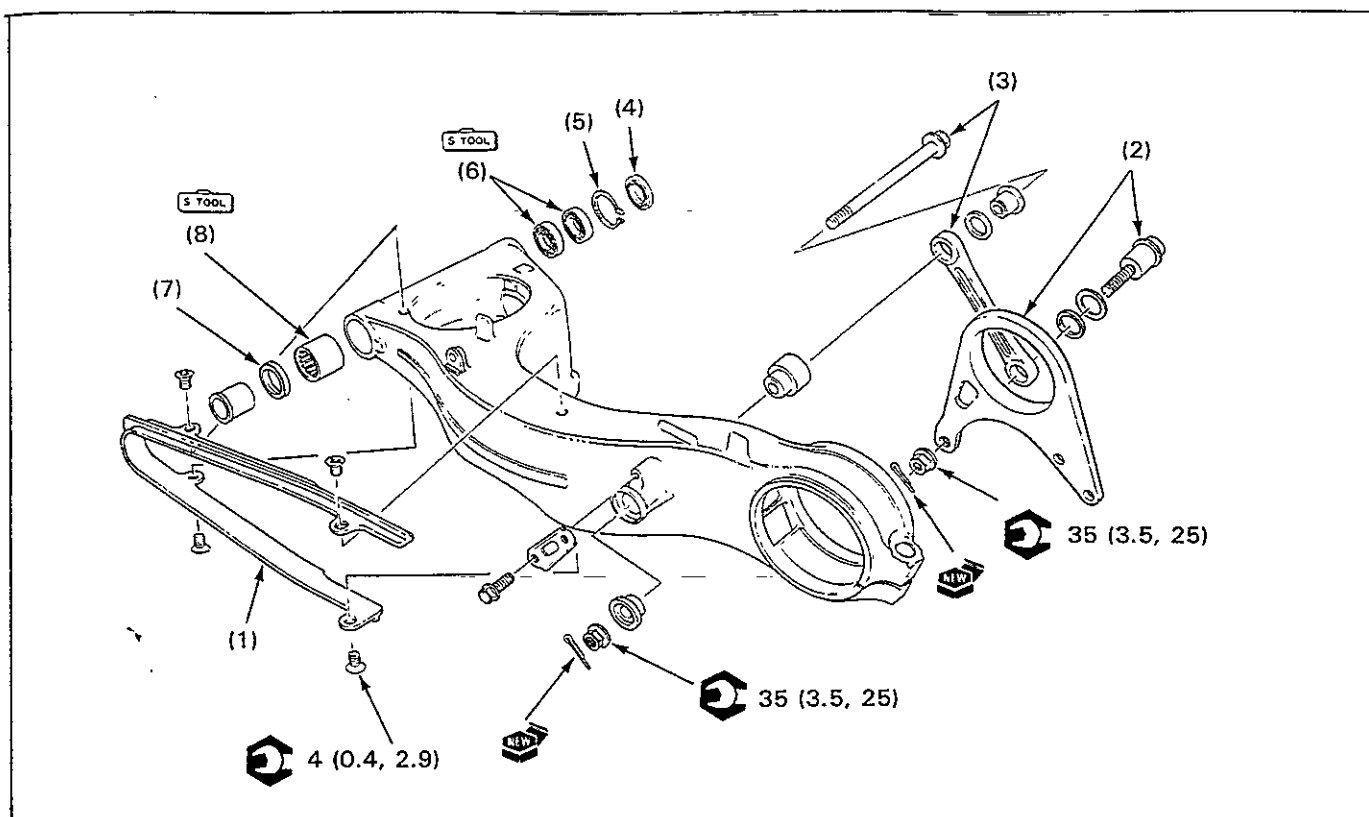
**Pivot adjust wrench 07908-4690001**

Tighten the pivot nut.

**Torque: 95 N·m (9.5 kg-m, 69 ft-lb)**



## Swingarm Disassembly/Assembly



### Requisite Service

- Swingarm Removal/Installation (page 13-16)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Drive chain slider	1	
(2)	Caliper bracket/bolt	1/1	
(3)	Torque link/bolt	1/1	
(4)	Right dust seal	1	
(5)	Snap ring	1	
(6)	Right pivot ball bearing	2	Replacement (page 13-20)
(7)	Left dust seal	1	
(8)	Left pivot needle bearing	1	Replacement (page 13-20)

## Pivot Bearing Replacement

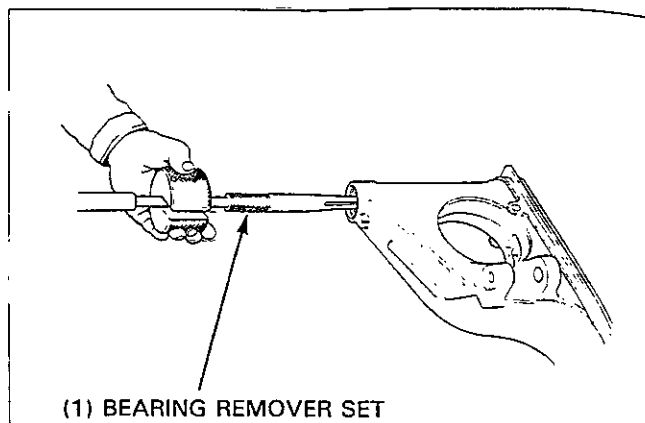
### Removal

Remove the snap ring.

Remove the ball bearing from the right swingarm pivot.

#### S TOOL

Bearing remover set 07936-3710001

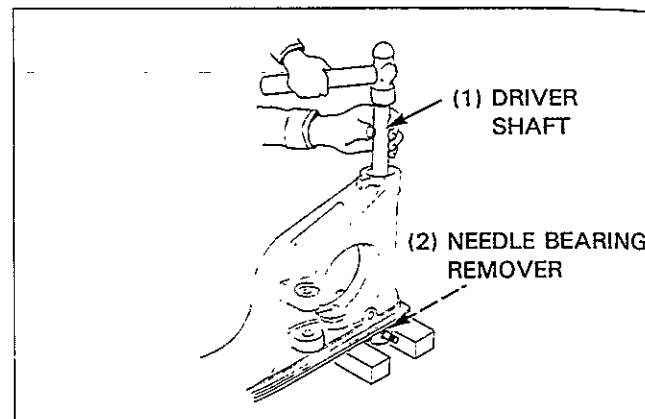


Drive the needle bearing out of the left swingarm pivot.

#### S TOOL

Needle bearing remover 07HMC-MR70100

Driver shaft 07946-MJ00100



### Installation

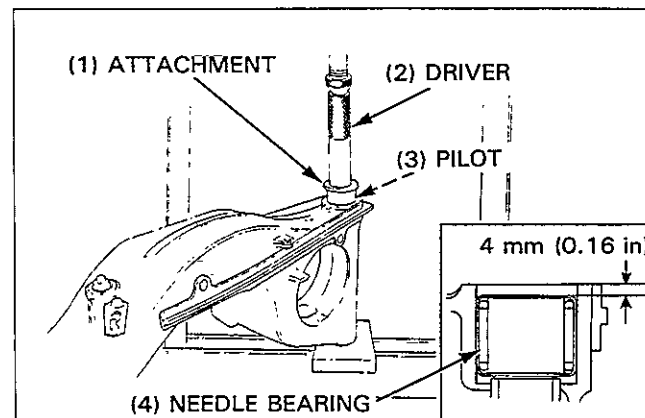
Apply molybdenum disulfide grease to a new needle bearing. Carefully press the needle bearing into the left swingarm pivot 4 mm (0.16 in) from the edge of the swingarm, measuring with the vernier caliper.

#### S TOOL

Driver 07749-0010000

Attachment, 37 x 40 mm 07746-0010200

Pilot, 28 mm 07746-0041100



Drive ball bearings into the right swingarm pivot one by one with the marked side facing out until they bottom.

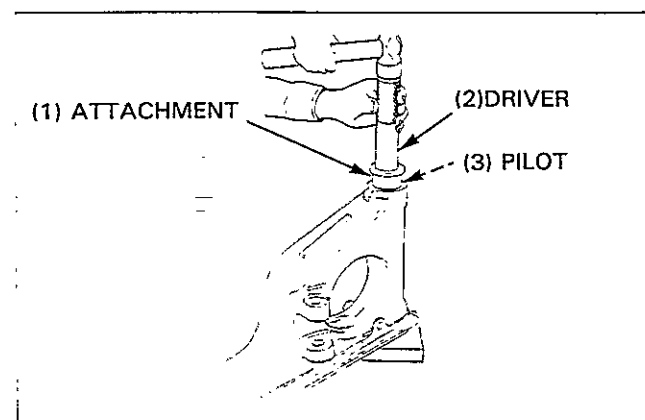
#### S TOOL

Driver 07749-0010000

Attachment, 37 x 40 mm 07746-0010200

Pilot, 20 mm 07746-0040500

Install the snap ring



# 14. Brake System

Service Information	14-1	Front Brake Caliper Disassembly/Assembly	14-6
Troubleshooting	14-1		
Front Brake Pad Replacement	14-2	Rear Master Cylinder Disassembly/Assembly	14-8
Rear Brake Pad Replacement	14-3	Rear Brake Caliper Disassembly/Assembly	14-10
Front Master Cylinder Disassembly/Assembly	14-4	Rear Brake Pedal Removal/Installation	14-12

## Service Information

### ⚠ WARNING

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.

- Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be very careful whenever you remove the reservoir cap: make sure the front reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brakes feel 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 as they may not be compatible.
- Always check brake operation before riding the motorcycle.

## Troubleshooting

### Brake Lever/Pedal Soft or Spongy

- Air bubbles in the hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

### Brake Lever/Pedal Hard

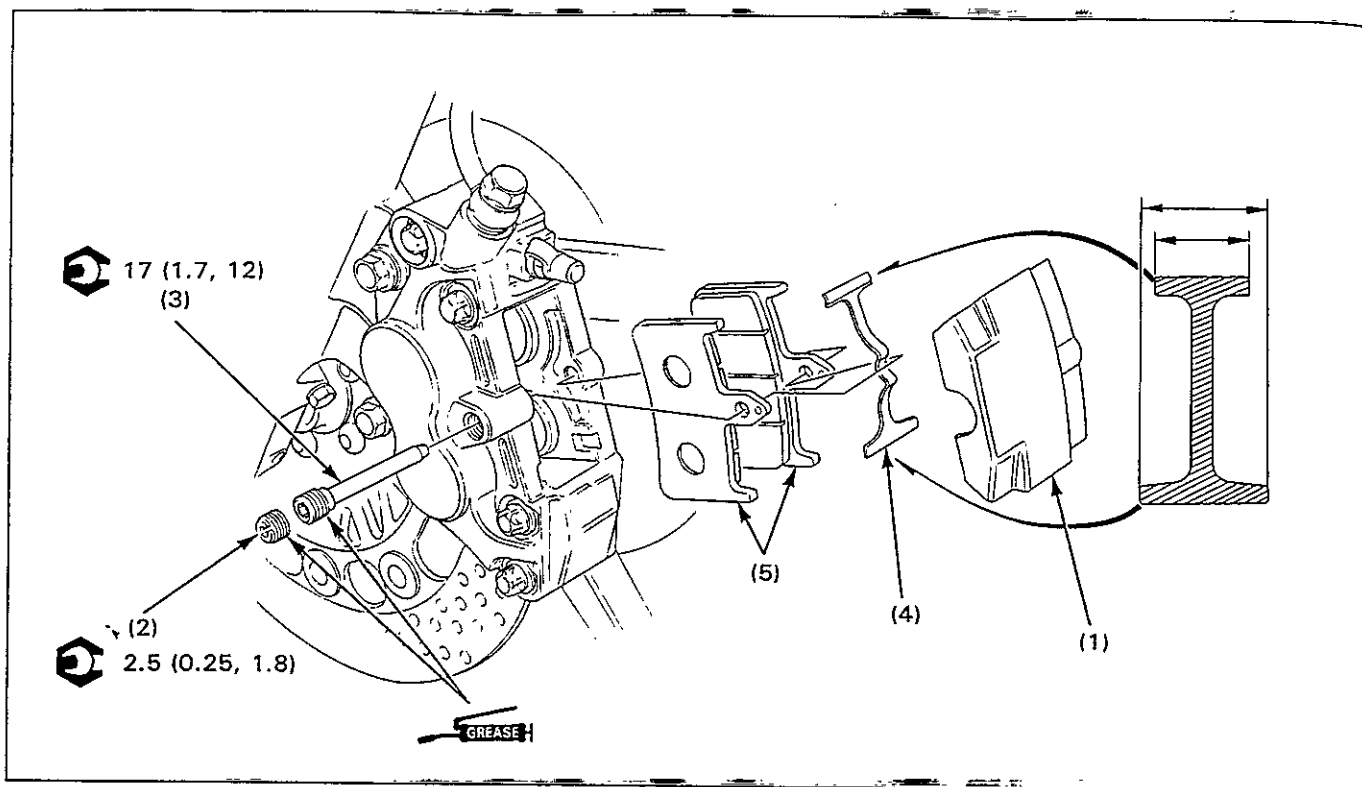
- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

### Brake Drag

- Contaminated brake pad/discs
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking/worn caliper piston



# Front Brake Pad Replacement



## WARNING

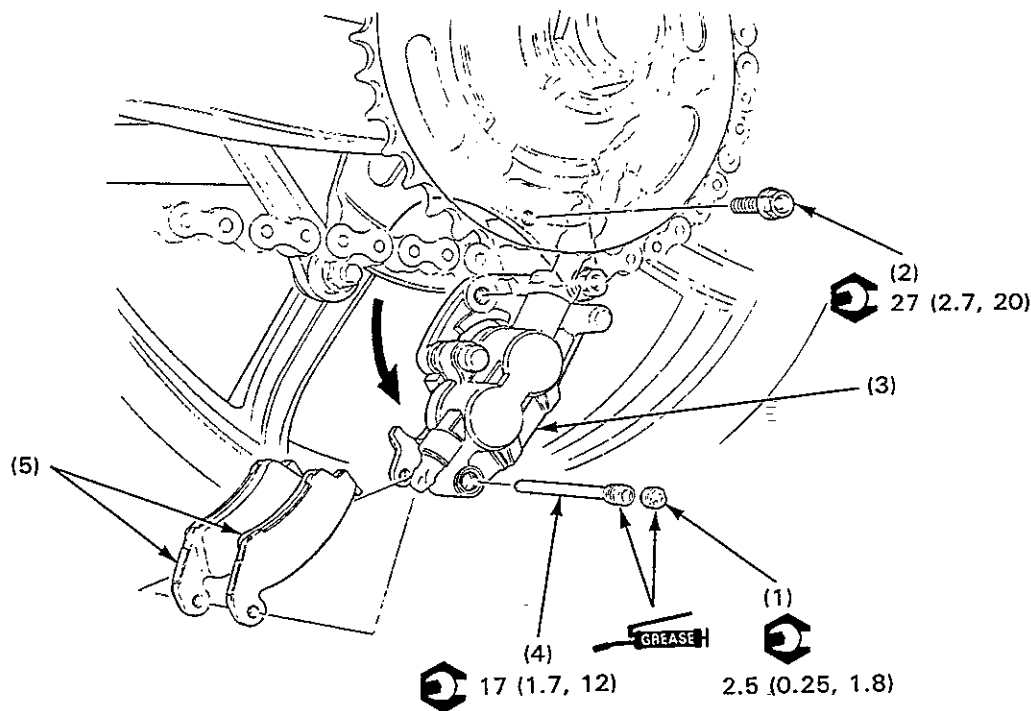
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.
- After replacement, operate the brake lever to seat the caliper pistons against the pads.

## NOTE

- The brake pads can be replaced without disconnecting the hydraulic system.
- Replace the brake pads as a set.
- Apply a thin coat of grease onto the pad pin and pad plug threads so as not to rust it.

Procedure		Q'ty	Remarks
(1) (2) (3) (4)	<b>Removal Order</b>		Installation is in the reverse order of removal.
	Dust cover	1	
	Pad pin plug	1	
	Pad pin	1	
(4)	Pad spring	1	<b>NOTE</b> <ul style="list-style-type: none"> <li>• At installation, align the tabs with the caliper grooves as shown.</li> </ul>
(5)	Pad	2	
			<b>NOTE</b> <ul style="list-style-type: none"> <li>• Push the piston all the way into provide clearance for new pads.</li> </ul>

## Rear Brake Pad Replacement

**WARNING**

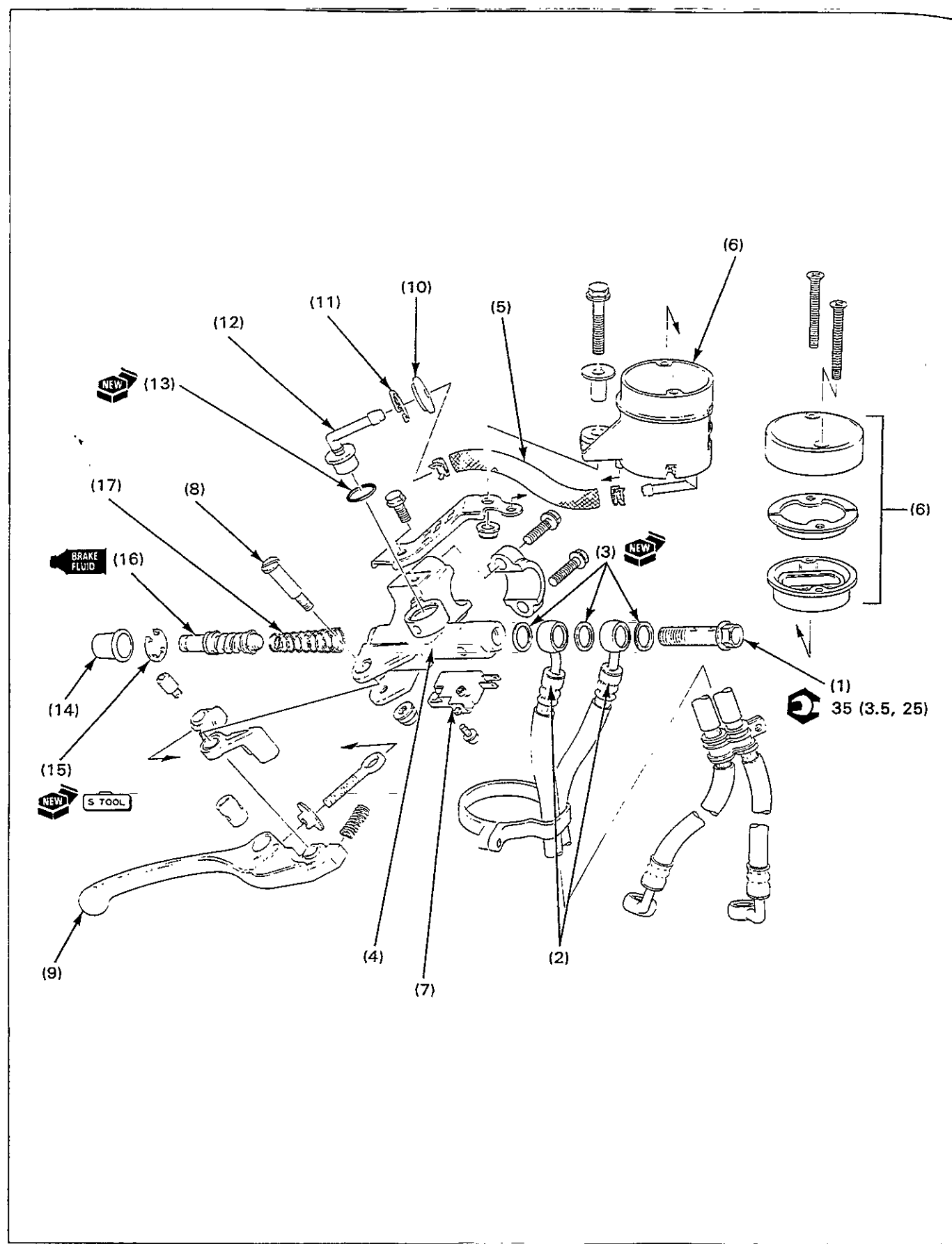
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.
- After replacement, operate the brake lever to seat the caliper pistons against the pads.

**NOTE**

- The brake pads can be replaced without disconnecting the hydraulic system.
- Replace the brake pads as a set.
- Apply a thin coat of grease onto the pad pin and pad plug threads so as not to rust it.

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Pad pin plug	1	Loosen the pad pin after removing the plug.
(2)	Caliper mounting bolt	1	Remove the front bolt.
(3)	Caliper assembly	1	Pivot downward out of the disc.
(4)	Pad pin	1	Pull out while pushing the pads in slightly.
(5)	Pad/shim	2	NOTE
			• Push the pistons all the way in to provide clearance for new pads.
<b>Removal Order</b>			
(5)	Pad/shim	2	Do not forget to install the shim.
(4)	Pad pin	1	Loosely install while pushing the pads in slightly.
(3)	Caliper assembly	1	<b>CAUTION</b>
			• Be careful not to damage the pads.
(2)	Caliper mounting bolt	1	
(1)	Pad pin plug	1	Tighten the pad pin before installing the plug.

# Front Master Cylinder Disassembly/Assembly



**WARNING**

- Check the brake system by applying the brake after the air bleeding.

**CAUTION**

- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.
- When removing the oil bolt, cover the end of the brake hose to prevent contamination. Do not allow the foreign material to enter the system.
- Do not allow the lips of the cups to turn inside and be certain the snap ring is firmly seated in the groove.

**NOTE**

- Use only DOT 4 brake fluid from a sealed container.

**Requisite Service**

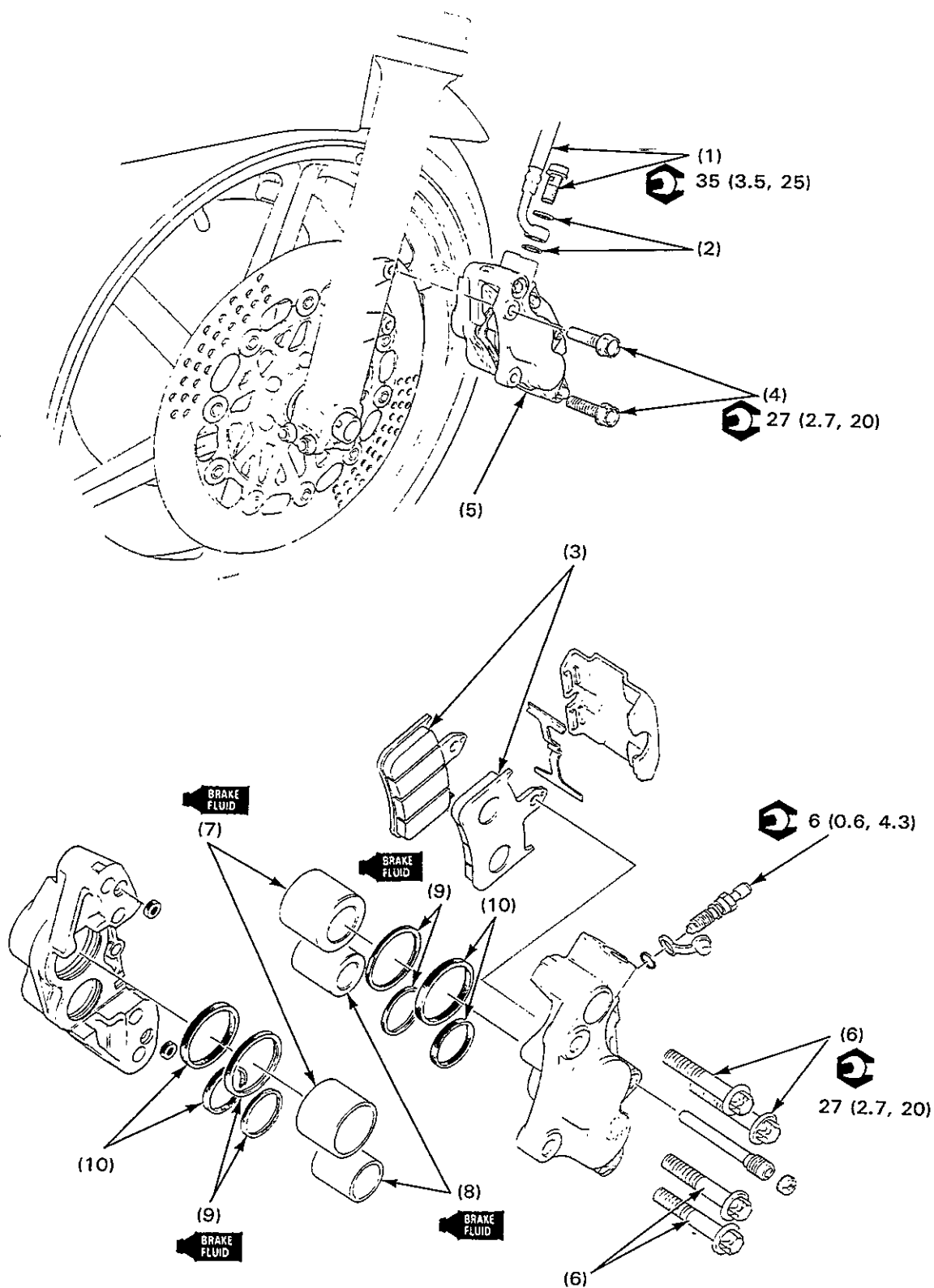
- Front brake fluid draining/air bleeding

Procedure		Q'ty	Remarks
	<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1)	Brake oil bolt	1	
(2)	Brake hose	2	<b>NOTE</b> • Do not twist the hoses.
(3)	Sealing washer	3	
(4)	Master cylinder assembly	1	Disconnect the brake switch wires and remove the holder.
(5)	Reservoir hose	1	
(6)	Reservoir assembly	1	
(7)	Brake switch	1	
(8)	Brake lever pivot bolt	1	
(9)	Brake lever assembly	1	
(10)	Rubber cap	1	
(11)	Snap ring	1	
(12)	Reservoir hose joint	1	
(13)	O-ring	1	
(14)	Piston boot	1	
(15)	Snap ring	1	Use the snap ring pliers (07914—3230001). <b>CAUTION</b> • At installation, be certain the snap ring is firmly seated in the groove in the master cylinder body.
(16)	Master piston assembly	1	<b>NOTE</b> • Do not remove the piston cups from the piston.
(17)	Spring	1	<b>NOTE</b> • At installation, install with the small coil end facing toward the primary cup.

# Front Brake Caliper Disassembly/Assembly



: O-ring, seal and sealing washer



**⚠ WARNING**

- Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Check the brake system by applying the brake after the air bleeding.

**CAUTION**

- Spilled brake fluid will damage painted, plastic, or rubber parts.

**NOTE**

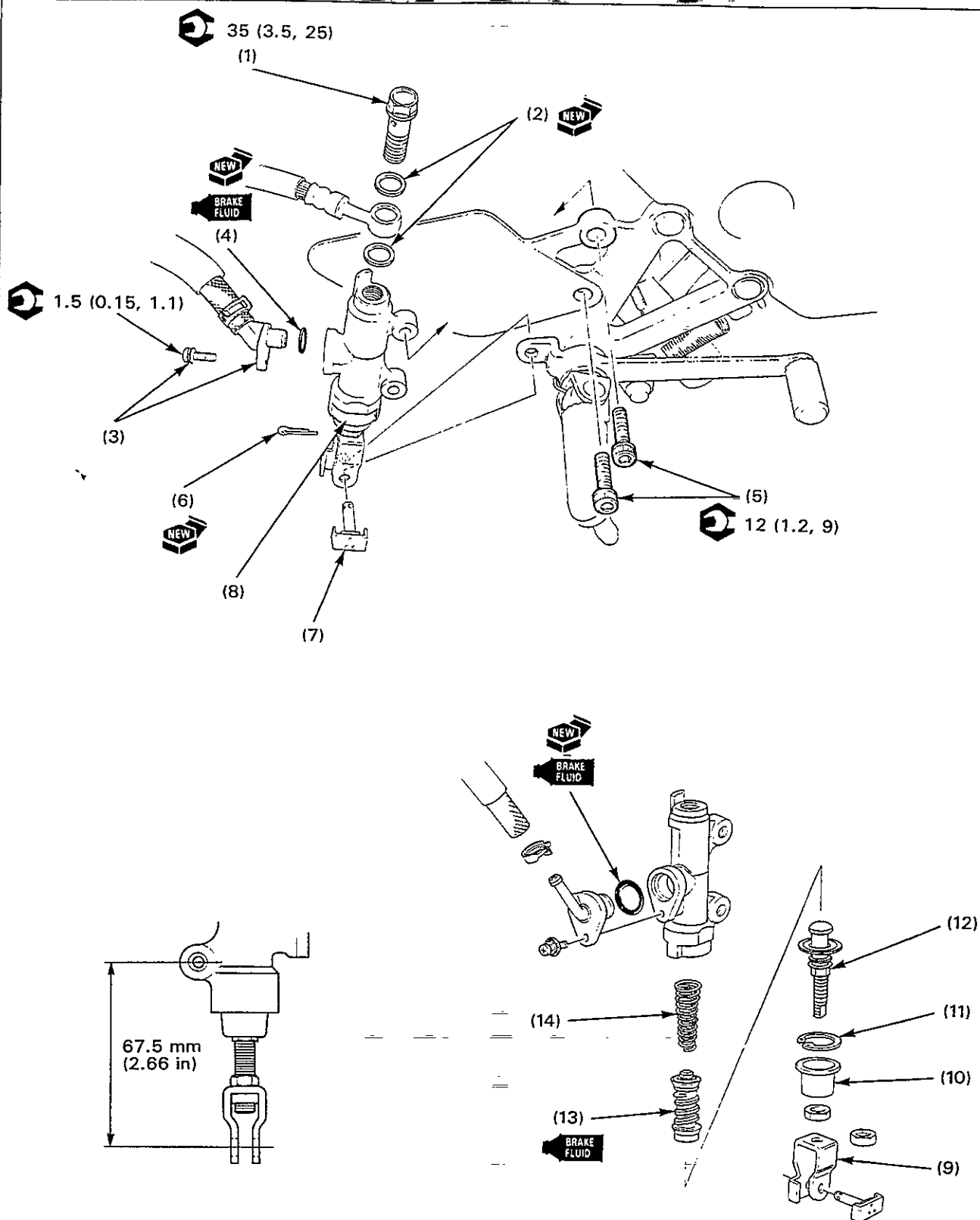
- Do not remove the bleed valve unless it is replaced.

**Requisite Service**

- Front brake fluid draining/air bleeding

Procedure		Q'ty	Remarks
(1)	<b>Disassembly Order</b> Brake oil bolt/hose	1/1	Assembly is in the reverse order of disassembly. <b>NOTE</b> <ul style="list-style-type: none"> <li>• Do not twist the hose.</li> <li>• At installation, install the hose with the joint pipe facing toward the fork.</li> </ul>
(2)	Sealing washer	2	Removal/Installation (page 14-2) <b>NOTE</b> <ul style="list-style-type: none"> <li>• Loosen the torx bolts before removing the mounting bolts.</li> </ul>
(3)	Pad	2	
(4)	Caliper mounting bolt	2	
(5)	Brake caliper assembly	1	<b>NOTE</b> <ul style="list-style-type: none"> <li>• At installation, tighten after installing the caliper mounting bolts.</li> </ul>
(6)	Torx bolt	4	
(7)	Caliper piston (large diameter)	2	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• Mark the piston to ensure that they are reinstalled in their original positions.</li> </ul>
(8)	Caliper piston (small diameter)	2	
(9)	Dust seal	4	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• Be careful not to damage the caliper cylinders.</li> </ul>
(10)	Piston seal	4	

# Rear Master Cylinder Disassembly/Assembly



**⚠ WARNING**

- Check the brake system by applying the brake after the air bleeding.

**CAUTION**

- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.
- When removing the oil bolt, cover the end of the brake hose to prevent contamination. Do not allow the foreign material to enter the system.
- Do not allow the lips of the cups to turn inside and be certain the snap ring is firmly seated in the groove.

**NOTE**

- Use only DOT 4 brake fluid from a sealed container.

**Requisite Service**

- Front brake fluid draining/air bleeding

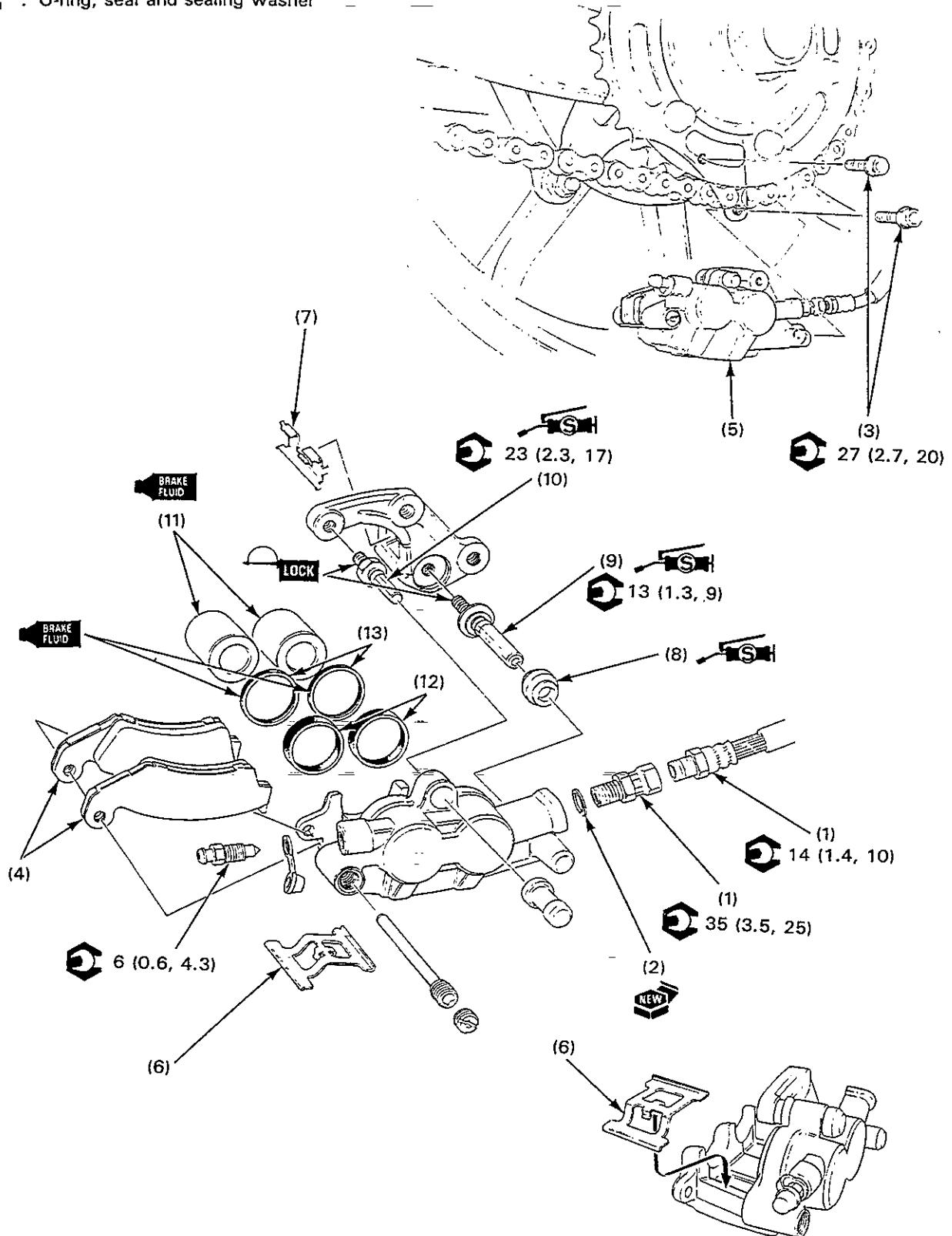
Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			
(1)	Brake oil bolt/hose	1	Loosen the bolts.
(2)	Sealing washer	2	
(3)	Reservoir hose joint/screw	1/1	
(4)	O-ring	1	
(5)	Master cylinder mounting bolt	2	
(6)	Cotter pin	1	Remove from the right step bracket. Remove by loosening the lock nut.
(7)	Joint pin	1	
(8)	Master cylinder assembly	1	
(9)	Pedal joint	1	Use the snap ring pliers (07914-3230001).
(10)	Rubber boot	1	
(11)	Snap ring	1	
(12)	Push rod	1	NOTE • Do not remove the piston cups from the piston.
(13)	Master piston assembly	1	
(14)	Spring	1	
<b>Assembly Order</b>			
(14)	Spring	1	NOTE • Install with the small coil end facing toward the piston.
(13)	Master piston assembly	1	
(12)	Push rod	1	
(11)	Snap ring	1	CAUTION • Be certain the snap ring is firmly seated in the groove in the master cylinder body.
(10)	Rubber boot	1	
(9)	Pedal joint	1	
(8)	Master cylinder assembly	1	NOTE • Adjust joint installed length as shown.
(5)	Master cylinder mounting bolt	2	
(7)	Joint pin	1	
(6)	Cotter pin	1	Tighten the master cylinder mounting bolts after installing.
(4)	O-ring	1	
(3)	Reservoir hose joint/screw	1/1	
(2)	Sealing washer	2	Rest the joint against the master cylinder boss.
(1)	Brake oil bolt/hose	1/1	



# Rear Brake Caliper Disassembly/Assembly



: O-ring, seal and sealing washer



**⚠ WARNING**

- Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Check the brake system by applying the brake after the air bleeding.

**CAUTION**

- Spilled brake fluid will damage painted, plastic, or rubber parts.

**NOTE**

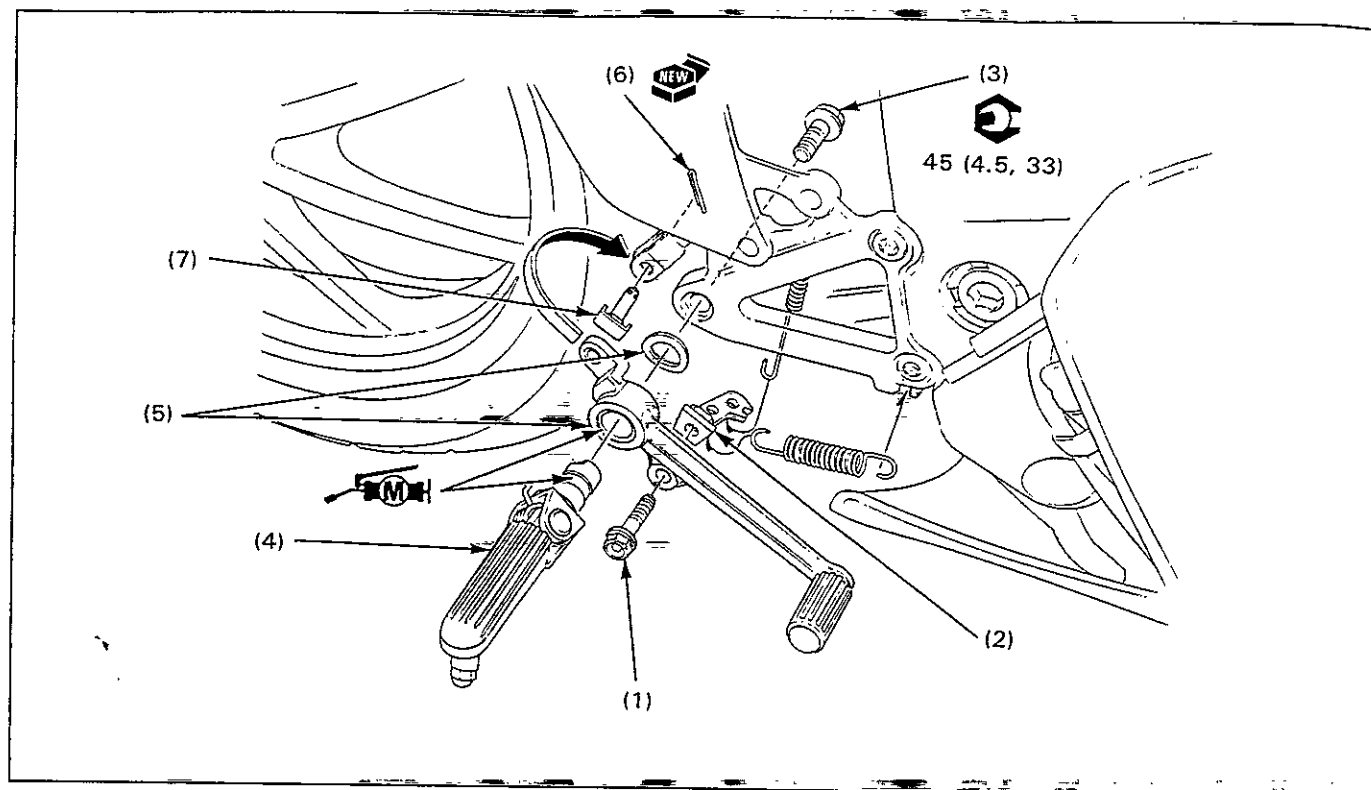
- Do not remove the bleed valve unless it is replaced.

**Requisite Service**

- Rear brake fluid draining/air bleeding

Procedure		Q'ty	Remarks
(1)	<b>Disassembly Order</b> Brake oil bolt/hose	1/1	Assembly is in the reverse order of disassembly. <b>CAUTION</b> • Do not twist the hose. <b>NOTE</b> • Remove the hose by loosening the joint nut while holding the hose nut.
(2)	Sealing washer	1	
(3)	Caliper mounting bolt	2	<b>NOTE</b> • Loosen the pad pin before removing.
(4)	Pad	2	Removal/installation (page 14-3)
(5)	Caliper assembly	1	Separate the bracket from the caliper.
(6)	Pad retainer	1	<b>NOTE</b> • At installation, note the installation direction.
(7)	Pad retainer	1	
(8)	Pivot boot	1	
(9)	Pivot pin bolt	1	<b>NOTE</b>
(10)	Pivot pin bolt	1	• Do not remove the pivot pin bolt unless it is replaced.
(11)	Caliper piston	2	<b>CAUTION</b> • Mark the piston to ensure that they are reinstalled in their original positions.
(12)	Dust seal	2	<b>CAUTION</b>
(13)	Piston seal	2	• Be careful not to damage the caliper cylinders.

## Rear Brake Pedal Removal/Installation



## NOTE

- The pedal height can be adjusted by turning the pedal joint on the master cylinder push rod.

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Spring hook plate bolt	1	
(2)	Spring hook plate	1	
(3)	Step bolt	1	<b>NOTE</b> <ul style="list-style-type: none"> <li>At installation, align the flats of the step and step holder.</li> </ul>
(5)	Brake pedal/thrust washer	1/1	
(6)	Cotter pin	1	
(7)	Joint pin	1	

# 15. Charging System/Alternator

Service Information	15-1	Charging System Inspection	15-5
System Location	15-2	Regulator/Rectifier Inspection	15-6
Troubleshooting	15-3	Alternator Inspection	15-7
Battery Removal/Installation	15-4	Alternator Removal/Installation	15-8

## Service Information

### ⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames, and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous. If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.
- **KEEP OUT OF REACH OF CHILDREN.**

- Always turn off the ignition switch before disconnecting any electrical component.

### CAUTION

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.

### NOTE

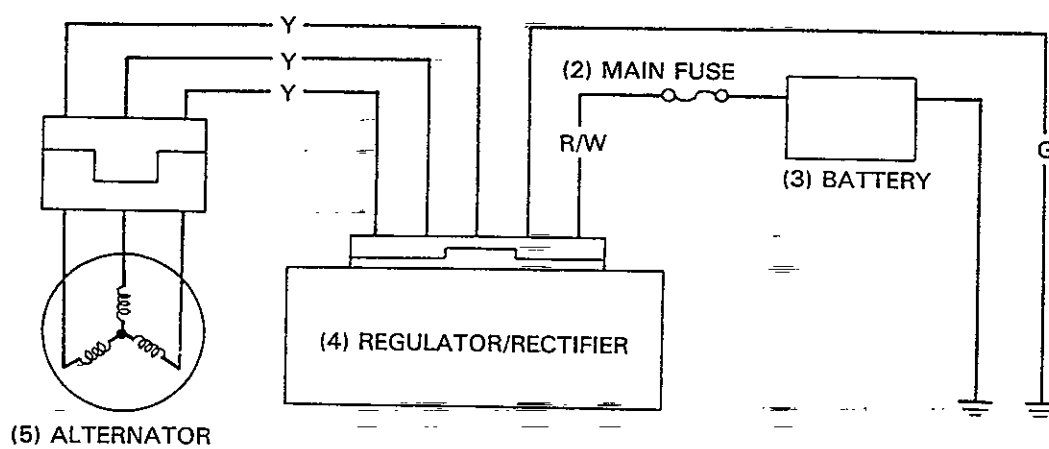
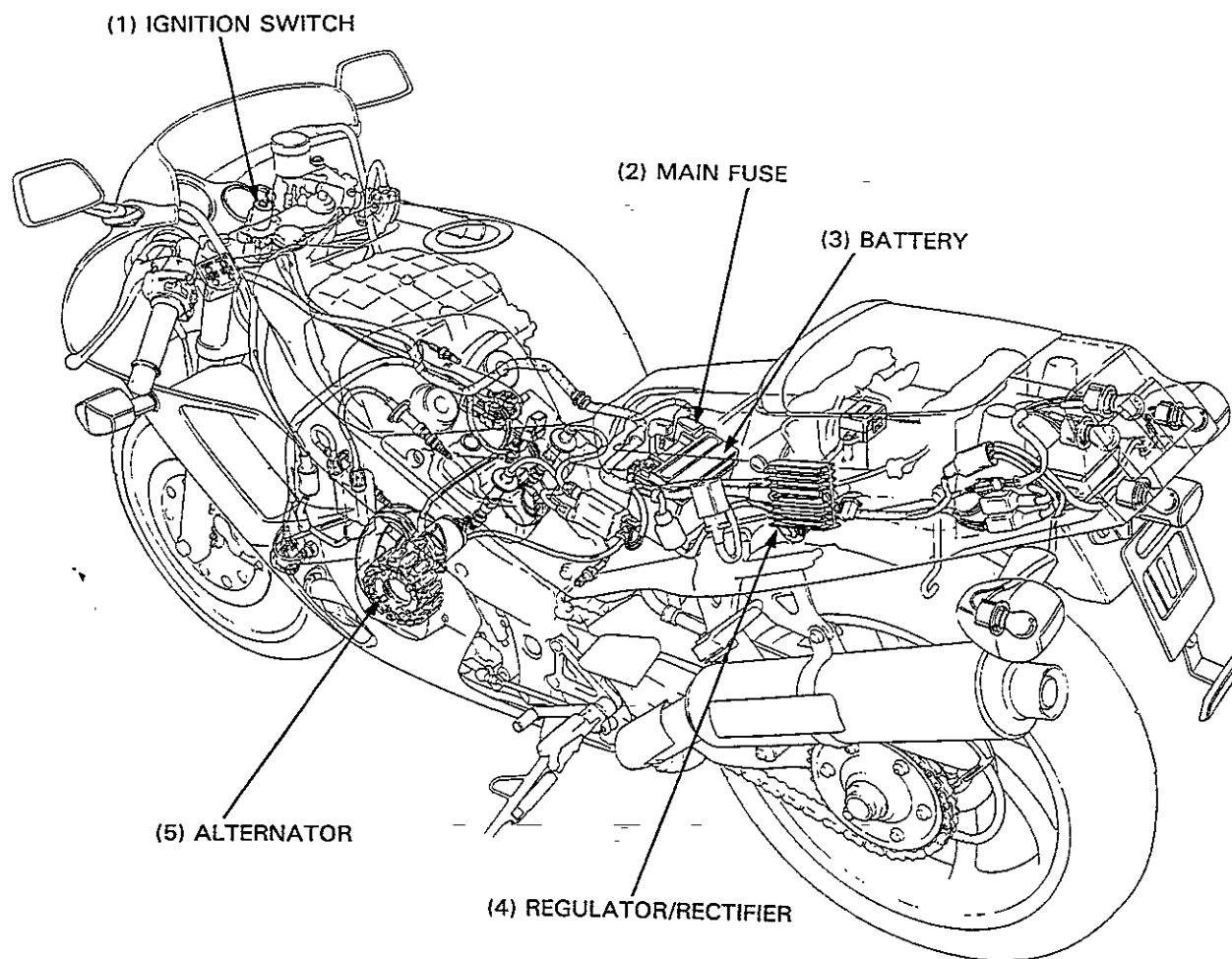
- The maintenance free battery must be replaced when it reaches the end of its service life.

### CAUTION

- The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.

- Battery can be damaged if overcharged or undercharged, or if left to discharge for long periods. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of 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 to be the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharge 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 forming.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when its is initial-charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 15-3).
- For battery testing/charging, refer to section 22 of the Common Service Manual.
- For charging system location, see page 15-2.

# System Location



# Troubleshooting

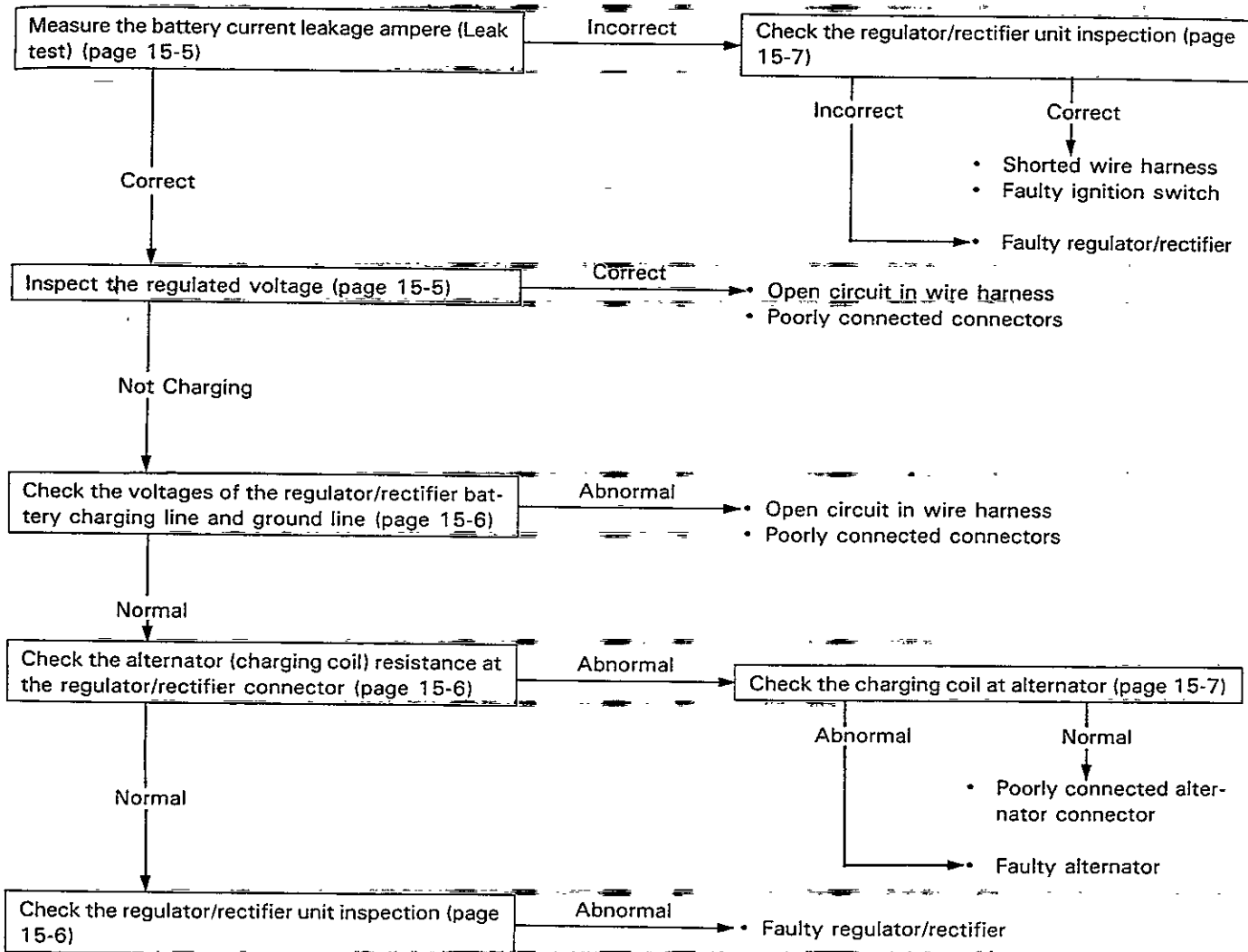
## Battery Overcharging

- Faulty regulator/rectifier

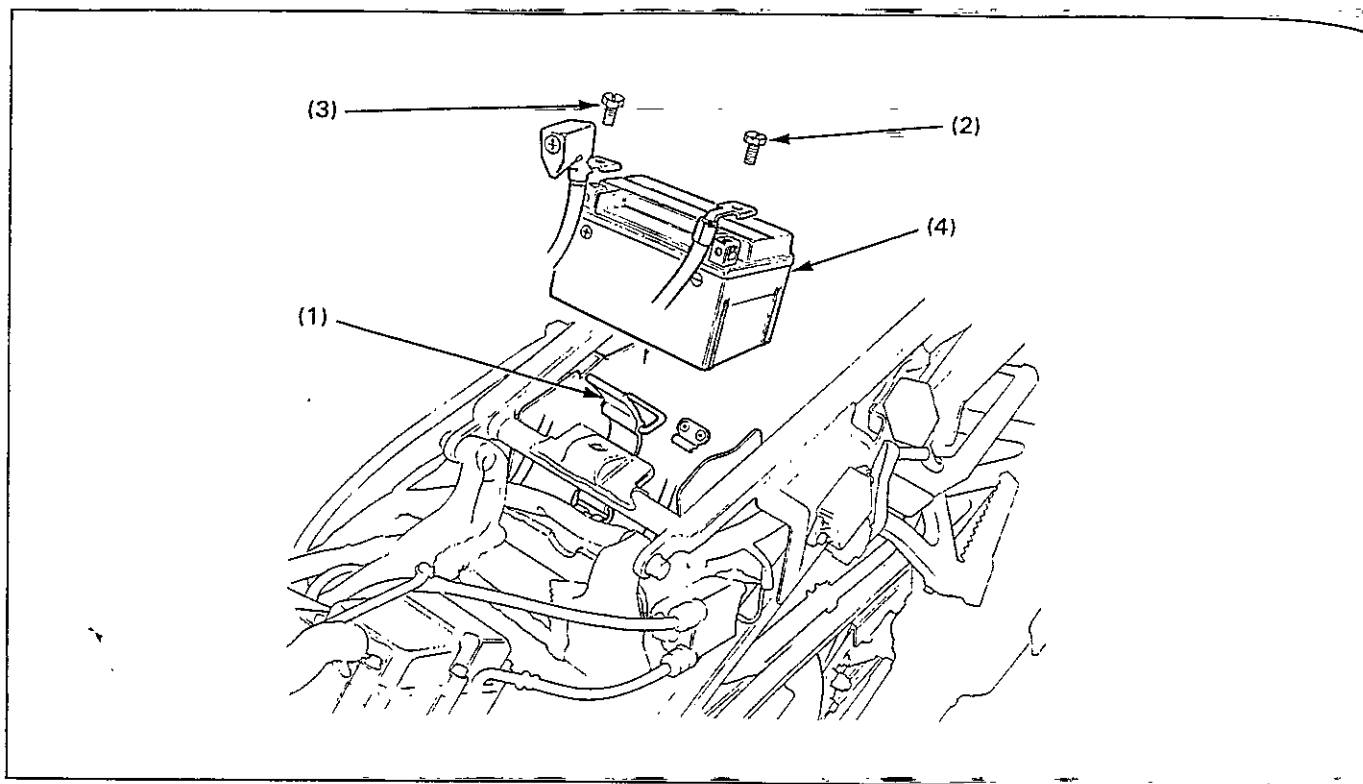
## Battery Undercharging

### NOTE

- In order to obtain accurate test readings when charging system, the battery must be fully charged and in good condition. See Common Service Manual section 22 for check the battery condition.



## Battery Removal/Installation



### CAUTION

- Turn the ignition switch off.

### Requisite Service

- Seat cowling removal/installation (page 2-2)

Procedure		Q'ty	Remarks
(1)	<b>Removal Order</b>		Installation is in the reverse order of removal.
(2)	Battery holder band	1	
(3)	Negative (-) cable	1	
(4)	Positive (+) cable	1	Remove the bolt and disconnect the cable. <b>NOTE</b> • At installation, connect the positive (+) cable first, apply grease and cover the terminal.
(4)	Battery	1	

## Charging System Inspection

### Leak Test

Remove the seat cowling (page 2-2).

Turn the ignition switch off, and disconnect the negative (–) cable from the battery.

Connect the ammeter (+) probe to the negative (–) cable and the ammeter (–) probe to the battery negative (–) terminal.

With the ignition switch off, check for current leakage.

#### NOTE

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow larger than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

**Specified current leakage: 1 mA**

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.

### Regulated Voltage/Ampere Inspection

#### NOTE

- Before performing this test, be sure that the battery is fully charged and that the voltage between its terminals is greater than 12.8 V.

Start the engine and warm it up to operating temperature, then turn the ignition switch OFF.

Remove the seat cowling (page 2-2).

Connect the multimeter between the battery terminals.

#### 5 TOOL

Digital multimeter

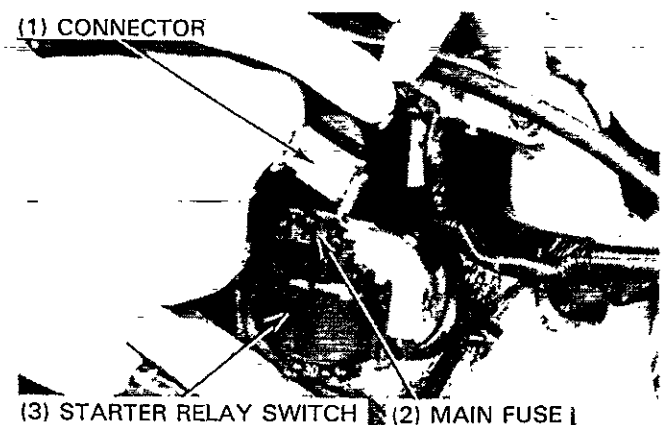
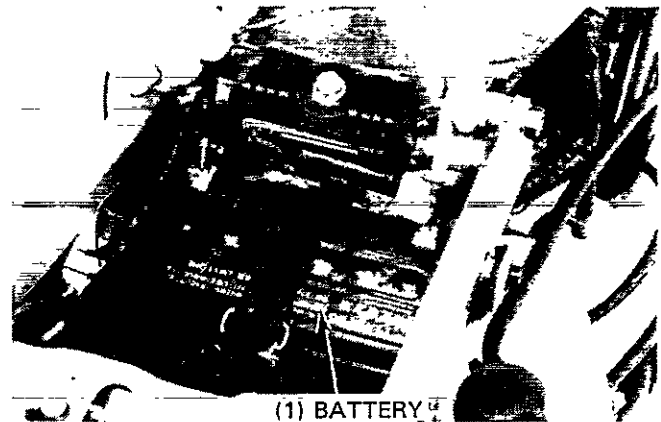
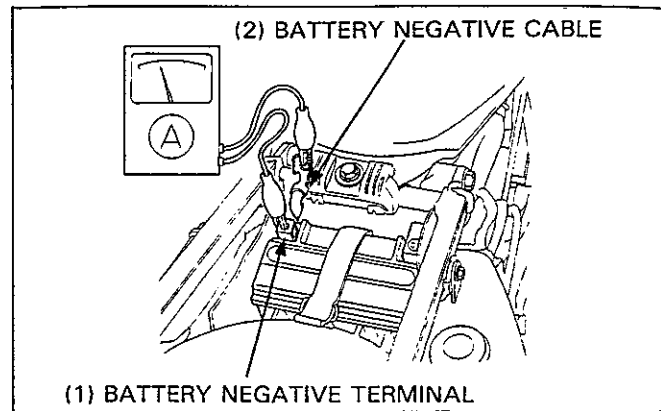
07411–0020000

#### ⚠ WARNING

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

Disconnect the starter relay switch connector and remove the main fuse.

Reconnect the connector securely.





## Charging System/Alternator

Connect the ammeter between the main fuse terminals.

### CAUTION

- Be careful not to short any tester probes.
- Although the current could be measured when the ammeter is connected between the battery positive terminal and positive cable, a sudden surge of current to the starter motor could damage the ammeter.
- Always turn the ignition switch off when connecting and disconnecting the ammeter. Disconnecting the ammeter or wires when current is flowing may damage the ammeter.

Start the engine and increase the engine speed gradually.

Regulated voltage: 13.5—15.5 V/5,000 min<sup>-1</sup> (rpm)

Regulated current: 0—9 A/5,000 min<sup>-1</sup> (rpm)

## Regulator/Rectifier Inspection

### Wire Harness Inspection

Remove the seat cowling (page 2-2).

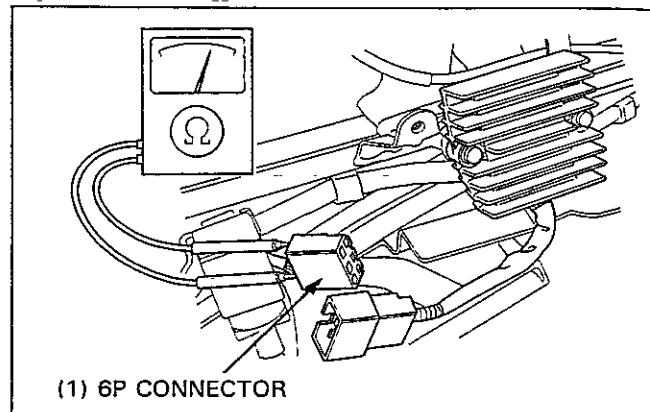
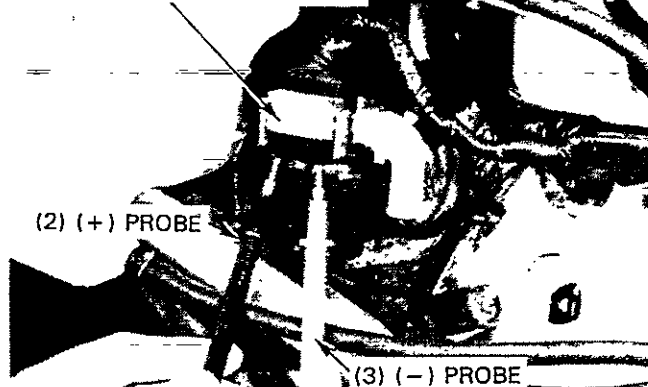
Disconnect the 6P (white) connector from the regulator/rectifier and check it for loose or corroded terminals.

Measure the following between connector terminals of the wire harness side.

Item	Terminals	Specification
Battery charging line	Red/white (+) and ground (-)	Battery voltage should register.
Ground line	Green and ground	Continuity exist.
Charging coil line	Yellow and yellow	0.1—1.0 Ω (20°C/68°F)

If the charging coil line reading is out of specification, check the alternator (page 15-7).

(1) STARTER RELAY SWITCH



## Unit Inspection

The circuits on the wire harness side are normal and there are no loose connections at the connector, inspect the regulator/rectifier unit by measuring the resistance between the terminals.

### NOTE

- You'll get false readings if the probes touch your fingers.
- Use the specified multimeters. Using other equipment may not allow you to obtain the correct results. This is due to the characteristic of semiconductors, which have different resistance values depending on the applied voltage.

#### Specified multimeter

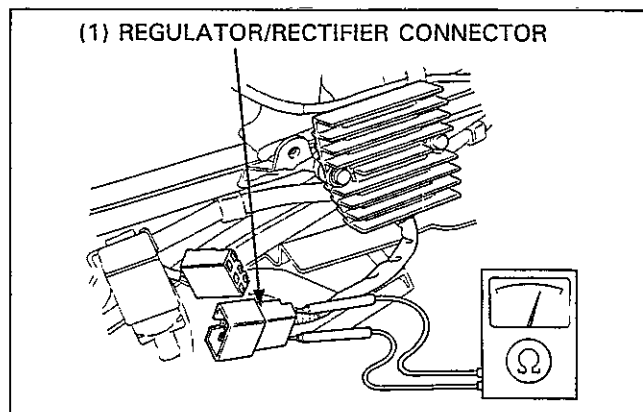
- 07411—0020000 (KOWA Digital type)
- 07308—0020001 (SANWA Analogue type)
- TH—5H (KOWA Analogue type)

- Select the following range:  
SANWA: k $\Omega$   
KOWA:  $\times 100\Omega$
- An old battery stored in the multimeter could cause inaccurate readings. Check the battery if the multimeter registers incorrectly.
- When using the KOWA multimeter, remember that all readings should be multiplied by 100.

Replace the regulator/rectifier unit if the resistance value between the terminals is abnormal.

$\Omega$

$\oplus$ probe $\ominus$ probe	Red/ white	Yellow	Yellow	Yellow	Green
Red/white		$\infty$	$\infty$	$\infty$	$\infty$
Yellow	0.5—10K		30K—500K	30K—500K	10K—200K
Yellow	0.5—10K	30K—500K		30K—500K	10K—200K
Yellow	0.5—10K	30K—500K	30K—500K		10K—200K
Green	1K—20K	0.5—10K	0.5—10K	0.5—10K	



## Alternator Inspection

### NOTE

- It is not necessary to remove the stator coil to make this test.

Remove the seat cowling (page 2-2).

Disconnect the alternator 3P (white) connector.

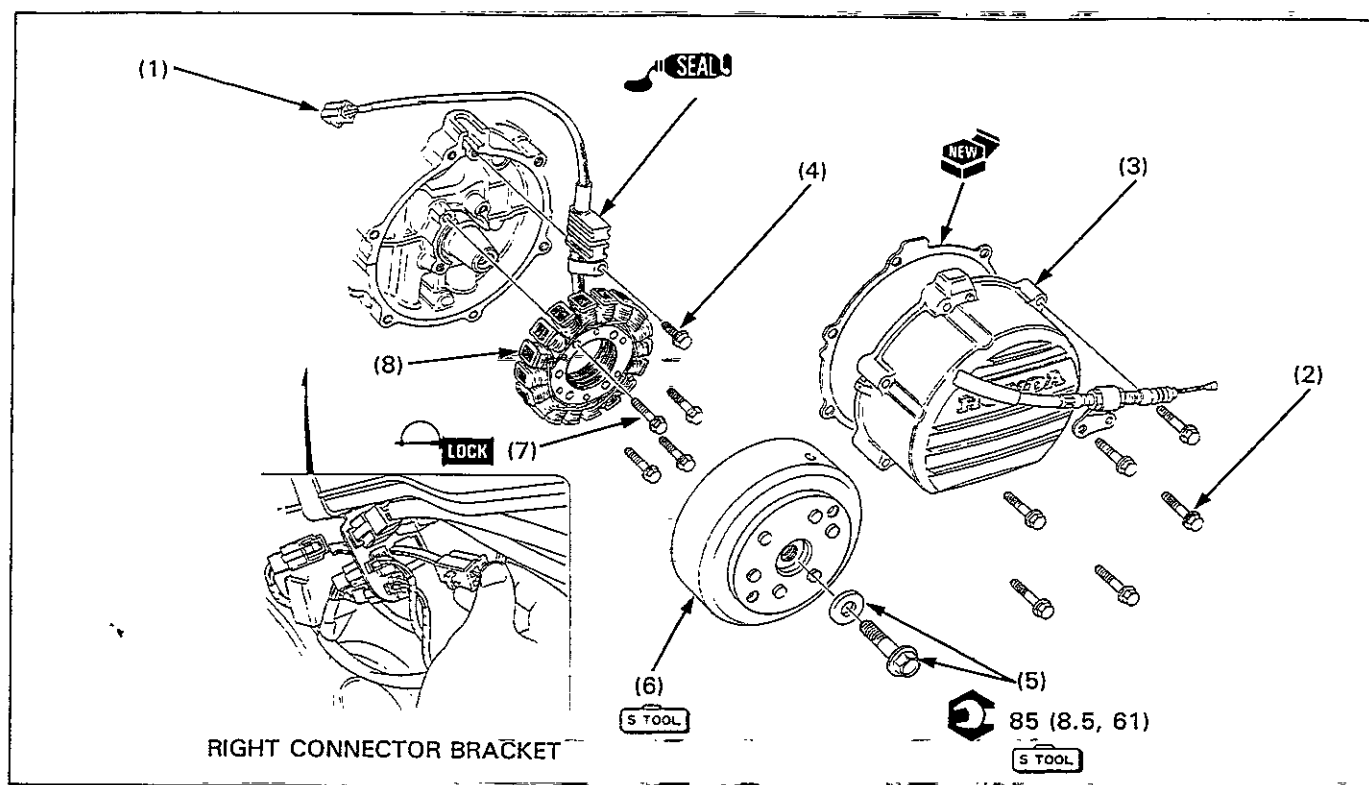
Measure the resistance between the yellow wire terminals and check for no continuity between each terminal and ground.

**Standard: 0.1—1.0  $\Omega$  (20°C/68°F)**

Replace the stator if the resistance is out of specification or if there is continuity between any yellow wire terminal and ground.



## Alternator Removal/Installation



### NOTE

- The engine oil will spill out when the left crankcase cover is removed. Place a clean oil pan under the engine to catch the oil and add the recommended oil to the specified level after installing the cover.

### Requisite Service

- Lower fairing removal/installation (page 2-4)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Alternator wire connector	1	Installation is in the reverse order of removal. Disconnect the connector.
(2)	Left crankcase cover bolt	6	
(3)	Left crankcase cover	1	Hold the flywheel with the universal holder (07725-0030000) and remove the bolt. Use the rotor puller (07733-0020001).
(4)	Wire clamp/bolt	1/1	
(5)	Flywheel bolt/washer	1/1	
(6)	Flywheel	1	
(7)	Stator mounting bolt	4	
(8)	Stator	1	

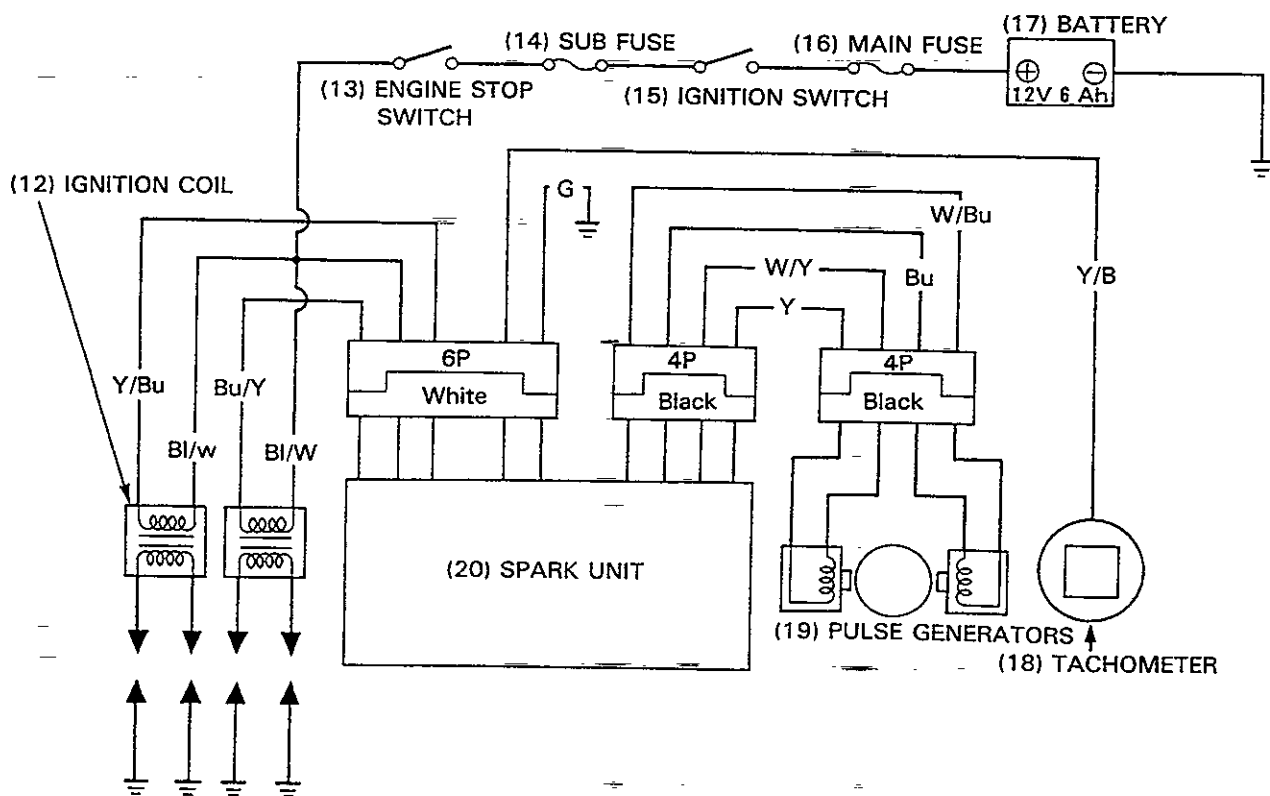
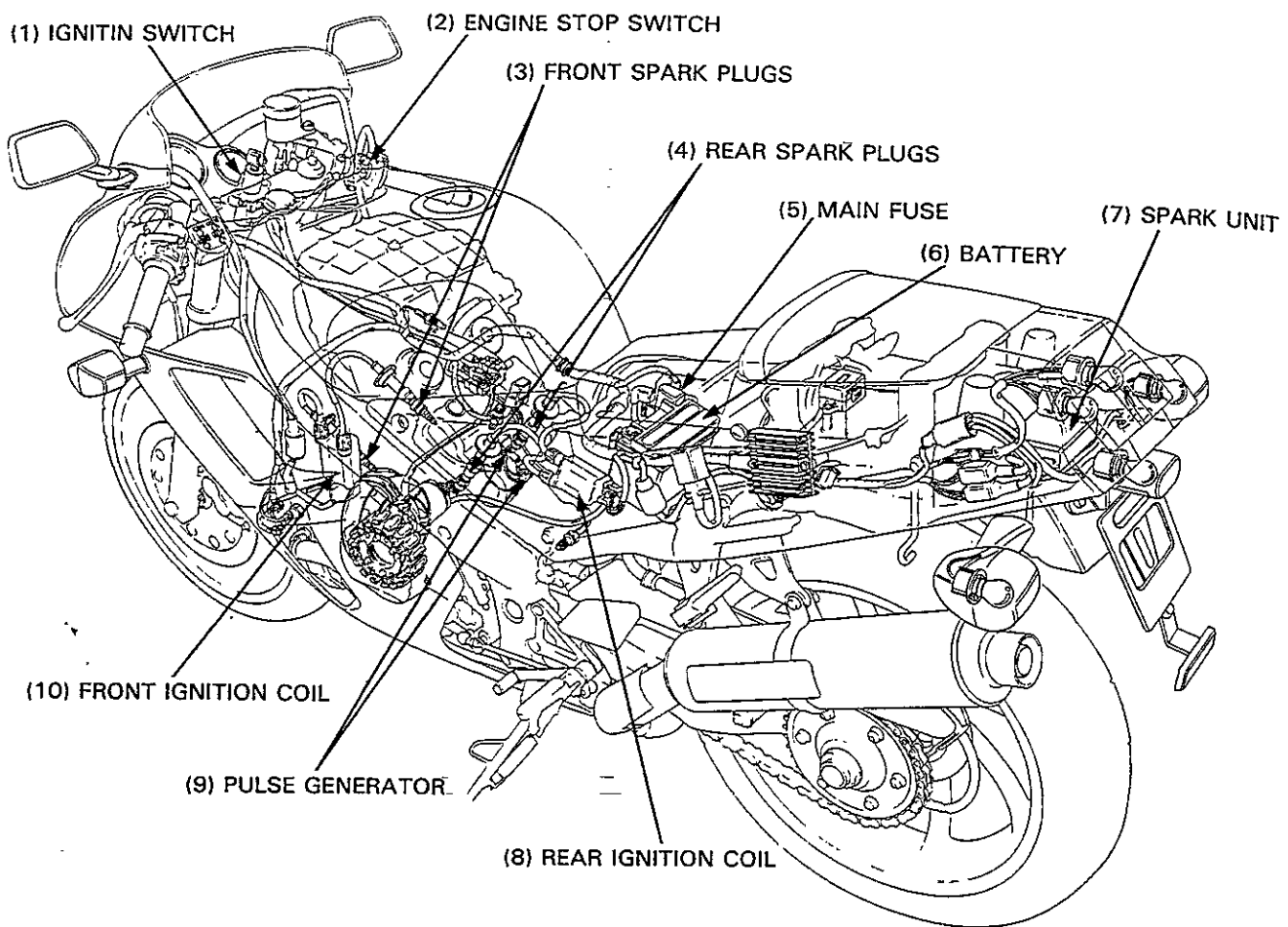
# 16. Ignition System

Service Information	16-1	Pulse Generator Inspection	16-6
System Location	16-2	Ignition Timing	16-7
Troubleshooting	16-3	Pulse Generator Removal/Installation	16-8
Ignition System Inspection	16-4		
Ignition Coil Inspection	16-6		

## Service Information

- The digital transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- A rough diagnosis can be made by identifying the cylinder whose spark timing is incorrect.
- The spark unit may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the unit. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poorly connected connectors. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plugs.
- Use spark plugs of the correct heat range. Using spark plugs with an incorrect heat range can damage the engine. Refer to section 2 of the Common Service Manual.
- For the ignition switch and engine stop switch inspection, check for continuity on the continuity chart of the Wiring Diagram, page 19-1. Disconnect the ignition and engine stop switch connectors on the right connector bracket (page 1-24) and check them.

# System Location



## Troubleshooting

- Before troubleshooting, check that no spark jumps at the spark plug using a known good spark plug (to ensure that the plug does not cause the problem).  
Moreover, check for proper spark plug gap and loose spark plug wire as well as for leakage of the ignition coil secondary current caused by moisture.
- If no spark jumps at one part of the ignition system, exchange the ignition coil with the other good one and perform the spark test. If good sparks jump, the exchanged ignition coil is faulty.
- As for peak voltage inspection, first measure the primary coil voltage of the ignition coil. If the voltage is abnormal, check each item in numerical order in the "Probable Cause" column described on the Troubleshooting chart.
- "Initial voltage" of the ignition primary coil is the voltage measured with the ignition switch ON and engine stop switch at RUN (when the engine is not cranking with 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 switch ON and engine stop switch at RUN. (Other electrical components are normal.)	<ol style="list-style-type: none"> <li>1. Faulty engine stop switch.</li> <li>2. Open circuit in BI/W wire between the ignition coil and engine stop switch.</li> <li>3. Loose or poor connection of the ignition coil primary wire terminal or open circuit in primary coil.</li> <li>4. Faulty spark unit, when the initial voltage is normal with the spark unit connectors disconnected.</li> </ol>
	Initial voltage is normal, but it drops by 2—4 volts while cranking the engine.	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections.</li> <li>2. Battery is undercharged. (Voltage drops largely when the engine is started.)</li> <li>3. No voltage at BI/W wire of the spark unit 6P white connector, or loose or poorly connected spark unit connector.</li> <li>4. Poor connection or open circuit in G wire of the spark unit 6P white connector.</li> <li>5. Loose or poor connection, or open circuit in Y/Bu or Bu/Y wire between the ignition coil and spark unit.</li> <li>6. Short circuit in the ignition primary coil.</li> <li>7. Faulty pulse generator. (Measure the peak voltage.)</li> <li>8. Faulty spark unit (when above No. 1—7 are normal).</li> </ol>
	Initial voltage is normal, but no peak voltage exists while cranking the engine.	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections.</li> <li>2. Faulty peak voltage adaptor.</li> <li>3. Faulty spark unit (when above No. 1 and 2 are normal).</li> </ol>
	Initial voltage is normal, but peak voltage is lower than the standard value.	<ol style="list-style-type: none"> <li>1. The multitester impedance is too low.</li> <li>2. Cranking speed is too slow. (Battery is undercharged.)</li> <li>3. The sample timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.)</li> <li>4. Faulty spark unit (when above No. 1—3 are normal).</li> </ol>
	Initial voltage and peak voltage are normal, but no spark jumps at plug.	<ol style="list-style-type: none"> <li>1. Faulty spark plug or leaking ignition coil secondary current ampere.</li> <li>2. Faulty ignition coil.</li> </ol>
Pulse generator	Peak voltage is lower than the standard value.	<ol style="list-style-type: none"> <li>1. The multitester impedance is too low.</li> <li>2. Cranking speed is too slow. (Battery is undercharged.)</li> <li>3. The sample timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.)</li> <li>4. Faulty pulse generator (when above No. 1—3 are normal).</li> </ol>
	No peak voltage.	<ol style="list-style-type: none"> <li>1. Faulty peak voltage adaptor.</li> <li>2. Faulty pulse generator.</li> </ol>

## Ignition System Inspection

### NOTE

- If no spark jumps at all plugs, check all connections for loose or poor contact before measuring each peak voltage.
- The reading differs depending on the multimeter input impedance. Use only genuine digital multimeter or commercially available multimeter with the input impedance higher than 10 M $\Omega$ /DCV.

Connect the peak voltage adaptor to the digital multimeter.

### 5 TOOL

Peak voltage adaptor 07HGJ-0020100  
Digital multimeter 07411-0020000

### Ignition Coil Primary Voltage Inspection

## Ignition Coil Primary Voltage Inspection

### NOTE

- Check all system connections before this inspection. Poor connected connectors can cause incorrect readings.
- Make sure that all cylinder compressions are normal and check that the spark plugs are installed correctly in all cylinders.

Place the motorcycle on its side stand and shift the transmission into neutral.

Remove the seat cowling (page 2-2) and the lower fairing (page 2-4).

Disconnect all spark plug caps from the spark plugs. Leave the spark plugs installed in all cylinder heads, install good known spark plugs into the spark plug caps and ground them to the engine.

### NOTE

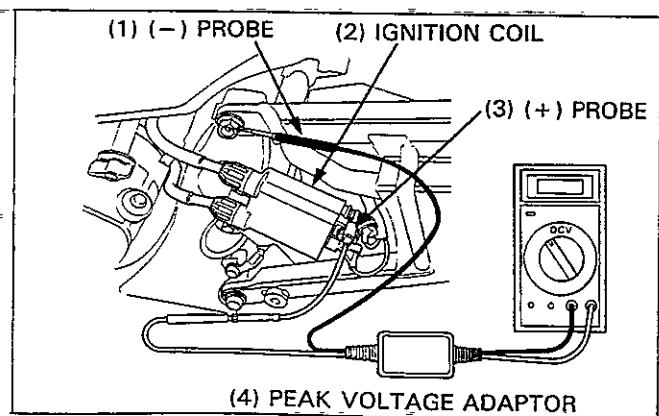
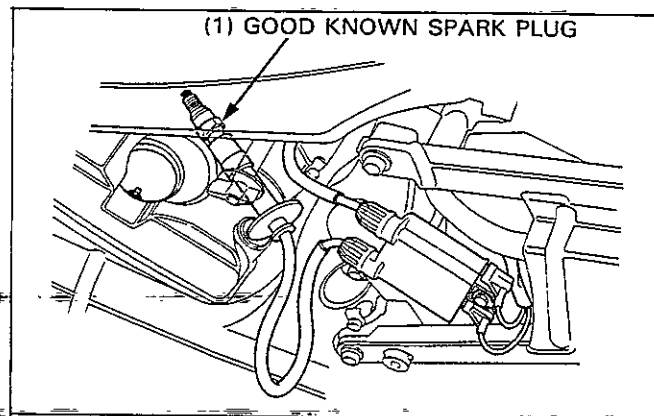
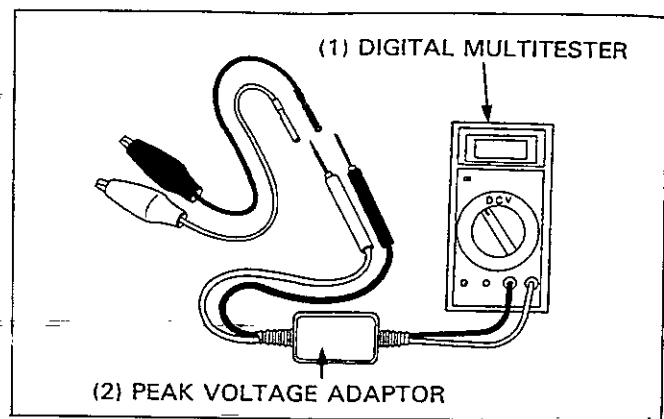
- The peak voltage must be measured under the normal cylinder compressions and with the ignition secondary circuits closed.

Connect the peak voltage adaptor probes between the primary ignition coil terminal and ground with the connector connected.

### Connection:

Front ignition coil: Bu/Y terminal (+) and ground (-)  
Rear ignition coil: Y/Bu terminal (+) and ground (-)

Turn the ignition switch ON and engine stop switch to RUN position, and measure the initial voltage. The battery voltage should be registered.



Measure the ignition coil primary peak voltage while cranking the engine with the starter motor.

**Connection:**

- Front ignition coil: Bu/Y terminal (+) and ground (-)
- Rear ignition coil: Y/Bu terminal (+) and ground (-)

Peak voltage: 140 V minimum

**⚠ WARNING**

- To avoid possible electrical shock during voltage measurements, do not touch the tester probe metal parts.

**NOTE**

- As long as the measured voltage exceed the specified value, the system is normal.

### Pulse Generator Peak Voltage Inspection

**NOTE**

- The peak voltage must be measured with all spark plugs installed in the cylinder heads and under normal cylinder compression.

Remove the seal cowl (page 2-2).

Disconnect the spark unit 4P black connector.  
Connect the peak voltage adaptor probes to the pulse generator wire terminals of the wire harness side connector.

**Connection:**

- Pulse generator 1: W/Y terminal (+) and Y terminal (-)
- Pulse generator 2: W/Bu terminal (+) and Bu terminal (-)

Measure the pulse generator peak voltage while cranking the engine with the starter motor.

Peak voltage: 1.8V minimum

**⚠ WARNING**

- To avoid possible electrical shock during voltage measurements, do not touch the tester probe metal parts.

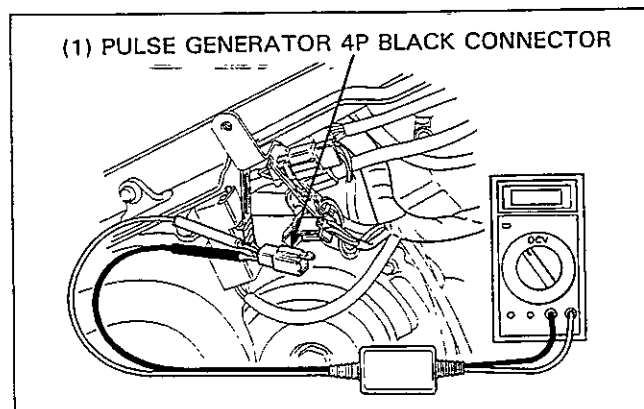
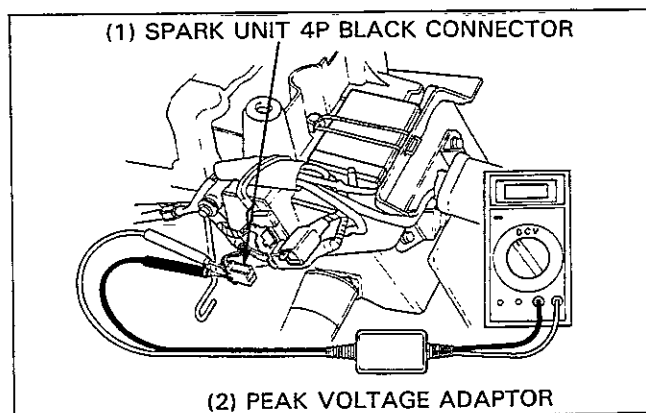
If the peak voltage is abnormal, disconnect the pulse generator 4P black connector on the right connector bracket (page 1-24).

Connect the peak voltage adaptor probes to the pulse generator wire terminals.

**Connection:**

- Pulse generator 1: W/Y terminal (+) and Y terminal (-)
- Pulse generator 2: W/Bu terminal (+) and Bu terminal (-)

Measure the pulse generator peak voltage while cranking the engine with the starter motor.





## Ignition System

If the peak voltage measured at the spark unit is abnormal and the one measured at the pulse generator wire connector is normal, the wire harness has an open circuit or loose connection.

### NOTE

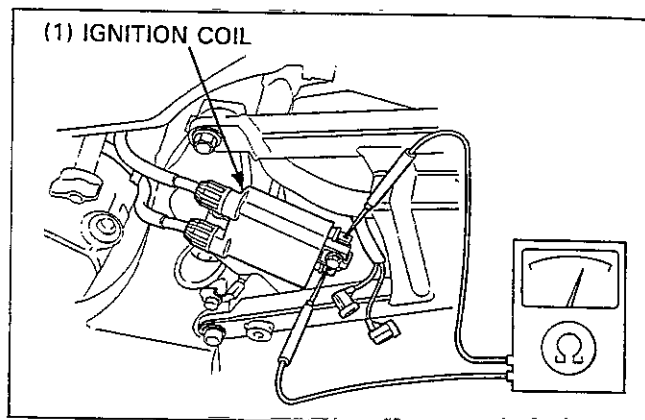
- As long as the measured voltage exceeds the specified value, the system is normal.

## Ignition Coil Inspection

Remove the seat cowling (page 2-2) and the lower fairing (page 2-4).

Disconnect the primary wire connectors and measure the primary coil resistance between the terminals.

Standard: 2.5 — 3.5  $\Omega$  (20°C/68°F)

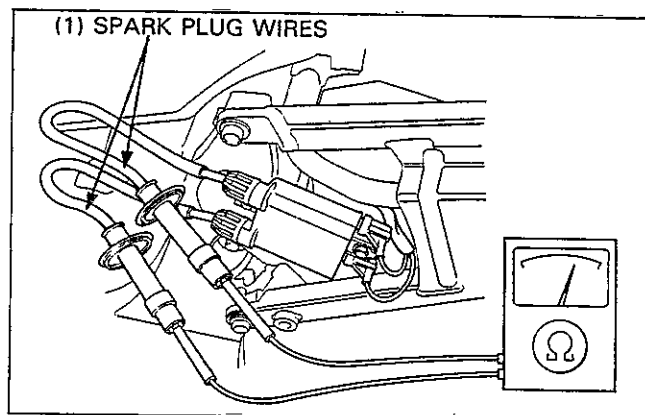


Remove the spark plug caps from the plugs and measure the secondary coil resistance between the spark plug caps.

Standard: 14 — 25 k $\Omega$  (20°C/68°F)

If the resistance is out of range, remove the ignition coil, remove the spark plug wires from the ignition coil and measure the secondary coil resistance.

Standard: 11 — 14 k $\Omega$  (20°C/68°F)



## Pulse Generator Inspection

### NOTE

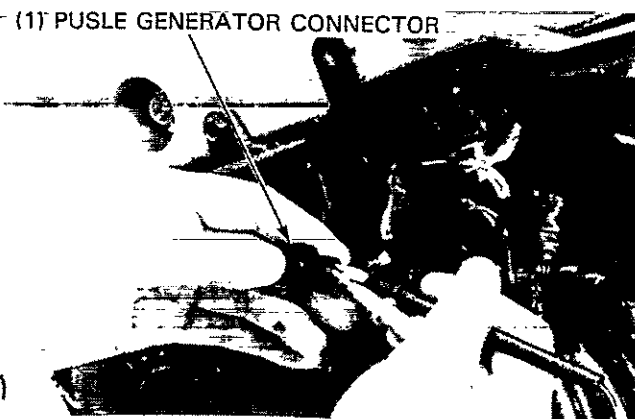
- It is not necessary to remove the pulse generator to make this inspection.

Remove the lower fairing (page 2-4).

Disconnect the pulse generator wire connector on the right connector bracket (page 1-24).

Measure the pulse generator coil resistance between the W/Y and Y wire terminals and between the W/Bu and Bu wire terminals.

Standard: 450 — 550  $\Omega$  (20°C/68°F)



## Ignition Timing

### NOTE

- The spark unit system is factory pre-set and cannot be adjusted. Ignition timing inspection procedures are given to inspect the function of the spark unit components.
- Connect the timing light to the other spark plug wire it you see that the ignition timing is incorrect, and you might be able to see the timing is correct.

Warm up the engine to operating temperature.

### ⚠ WARNING

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

Remove the lower fairing (page 2-2).

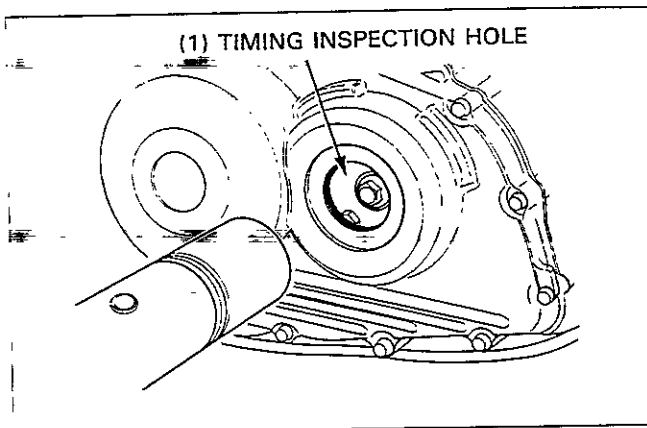
Remove the timing hole cap from the right crankcase cover. Connect the timing light to the No. 1 cylinder spark plug wire. The timing is correct if the "F" mark of the "T1" mark side aligns with the index mark at idle.

Idle speed: 1,300  $\text{min}^{-1}(\text{rpm})$

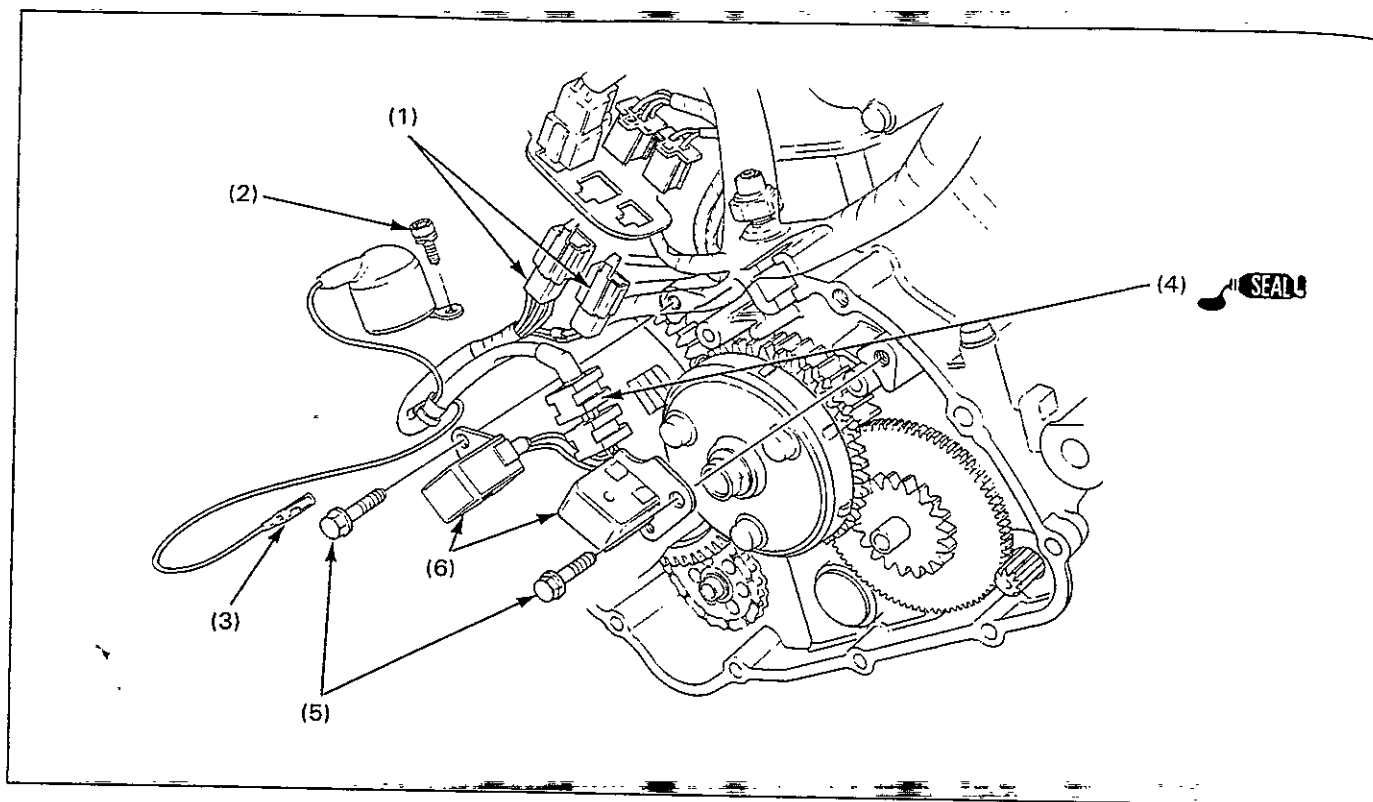
Increase the engine speed and check the "F" mark begins to move to the left side.

Apply molybdenum disulfide oil to the O-ring and timing hole cap threads, and install the timing hole cap.

Torque: 18 N·m (1.8 kg-m, 13 ft-lb)



# Pulse Generator Removal/Installation



## NOTE

- Route the pulse generator wires above the wire guide.

## Requisite Service

- Right crankcase cover removal/installation (page 9-2)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Wire connectoe	2	Installation is in the reverse order of removal. Disconnect the connectors.
(2)	Oil pressue switch terminal screw	1	
(3)	Neutral switch wire connector	1	Disconnect the connector.
(4)	Wire grommet	1	
(5)	Pulse generator mounting bolt	2	
(6)	Pluse generator	2	

# 17. Electric Starter/Starter Clutch

Service Information	17-1	Starter Clutch Disassembly/Assembly	17-6
System Location	17-2	Starter Motor Removal/Installation	17-7
Troubleshooting	17-3	Starter Motor Disassembly/Assembly	17-8
Starter Clutch, Primary Drive Gear Removal/Installation	17-4		

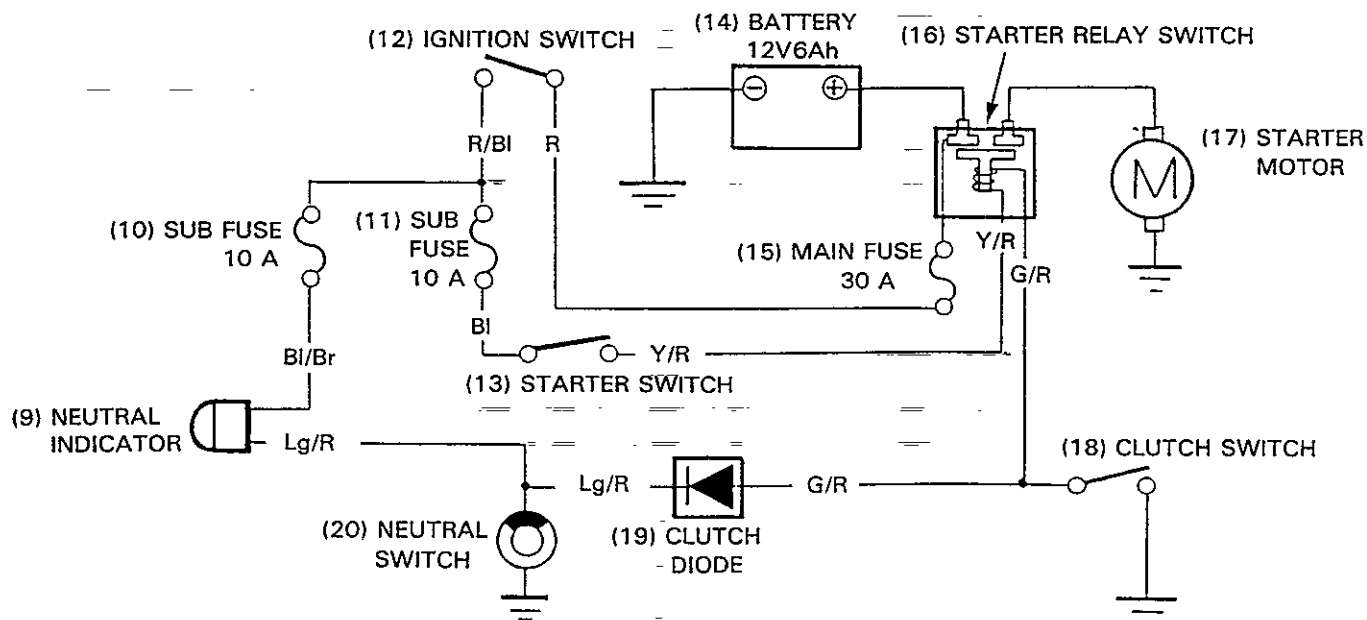
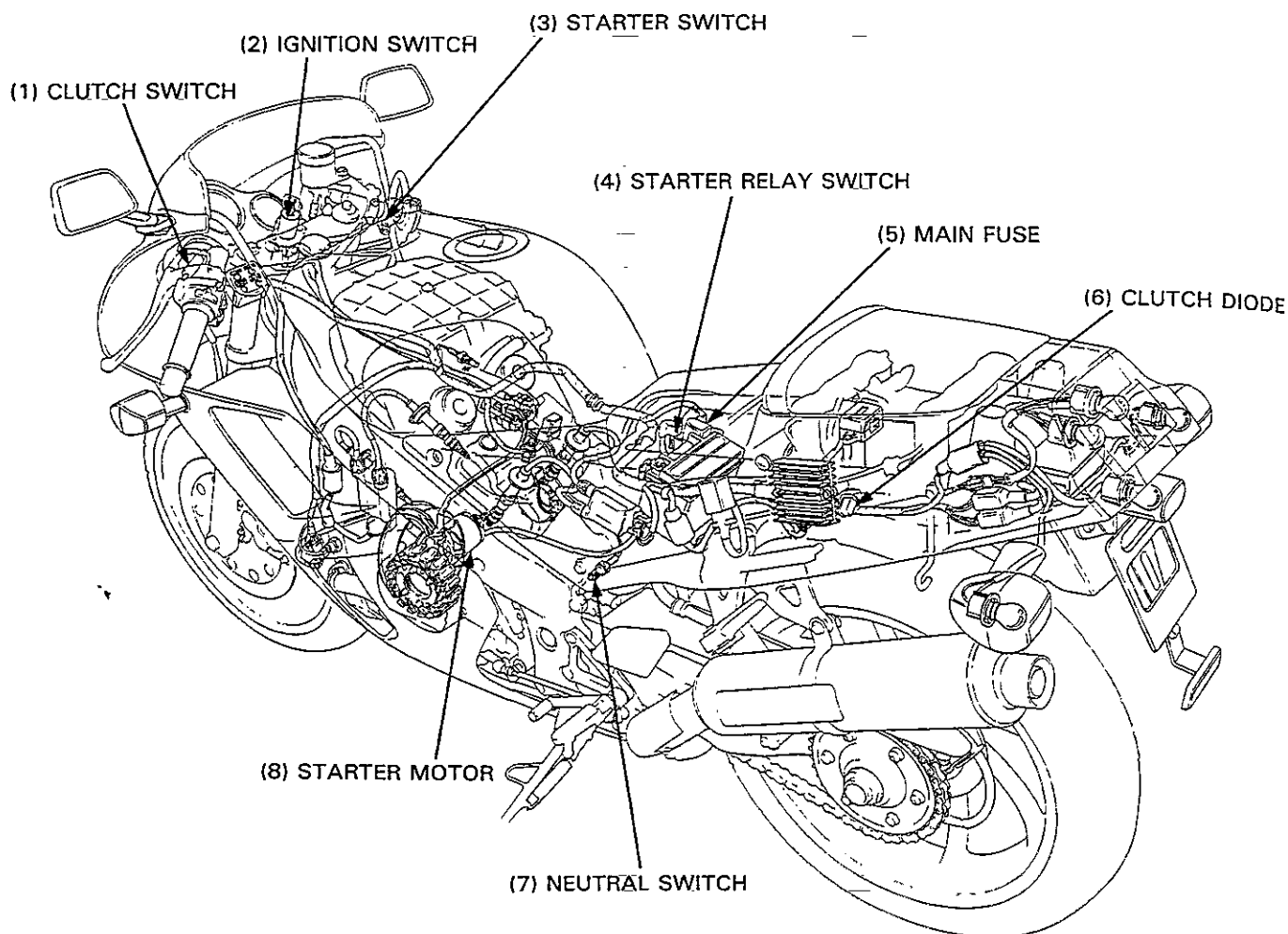
## Service Information

### ⚠ WARNING

- Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is allowed to flow to the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- For the following component in sections, refer to the following pages; for the parts locations, see page 17-2 of this manual (System Location).

Clutch switch diode	Section 24 of the Common Service Manual.
Starter motor	Section 24 of the Common Service Manual.
Clutch switch	Section 25 of the Common Service Manual.
Neutral switch	Section 25 of the Common Service Manual.
Ignition switch	Check for continuity on the continuity chart of the Wiring Diagram, page 19-1. Disconnect the switch connector on the right connector bracket (page 1-24) and check it.

## System Location

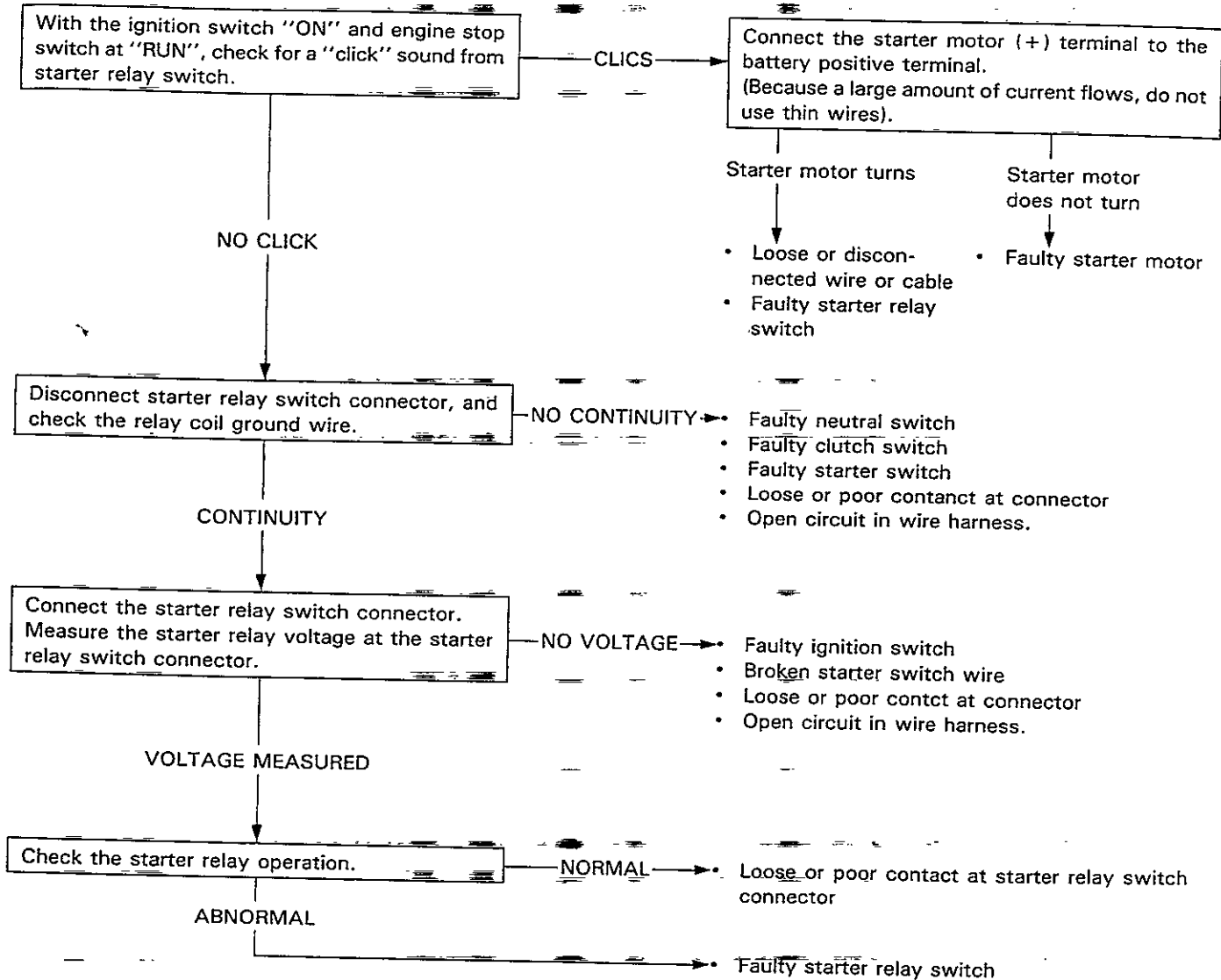


# Troubleshooting

## NOTE

- Check for a blown main or sub fuse before servicing.
- Make sure the battery is fully charged and in good condition.

### Starter Motor Will Not Turn.



### Starter Motor Turns Slowly

- Low specific gravity in battery (or Dead battery)
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

### Starter Motor Relay "clicks", but Engine Does Not Turn Over

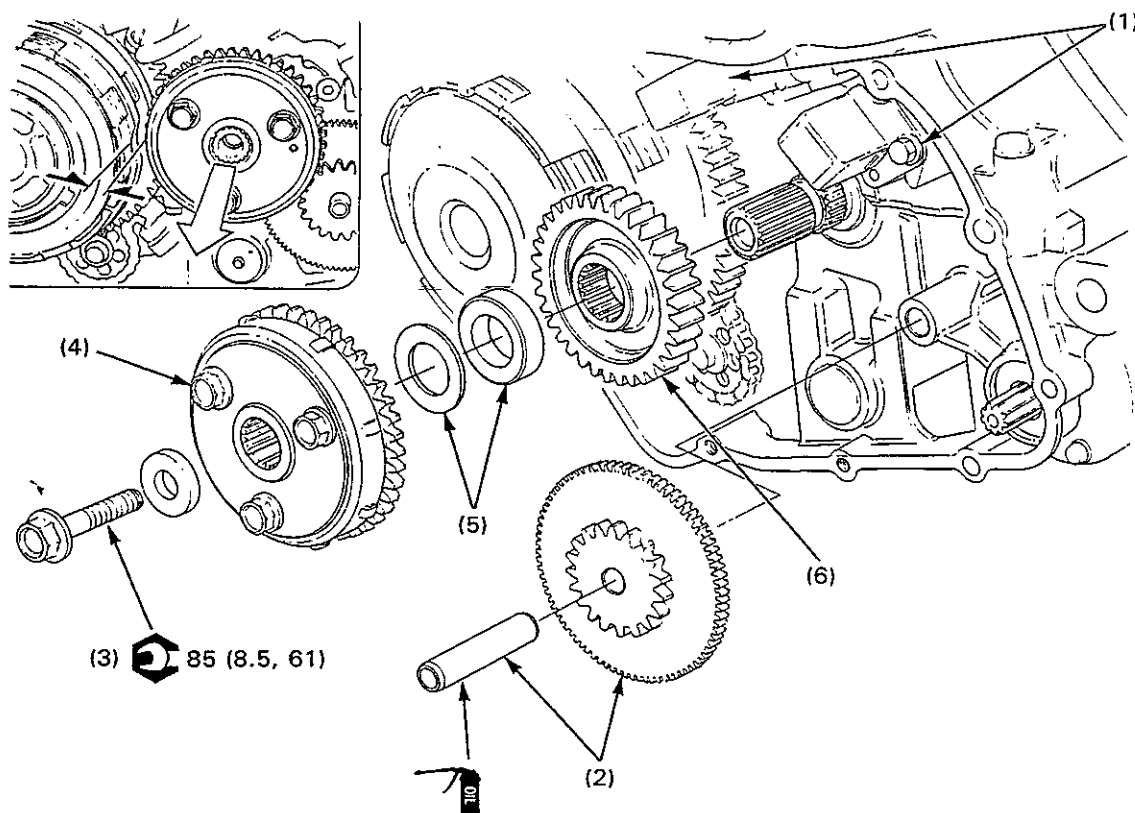
- Crankshaft does not turn due to engine problems
- Excessive reduction gear friction

### Starter Motor Turns, but Engine Does Not Turn

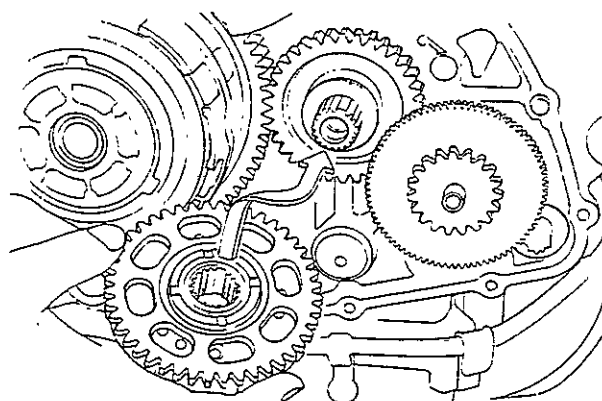
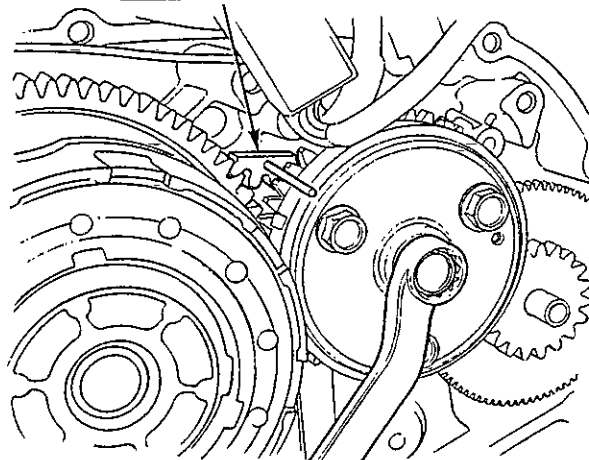
- Starter motor is running backwards
  - Brushes assembled improperly
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged idler gear or reduction gear

# Starter Clutch/Primary Drive Gear Removal/Installation

Remove through the recessed portion of the clutch outer.



S TOOL GEAR HOLDER



At installaiton, align the wide groove with the wide tooth.

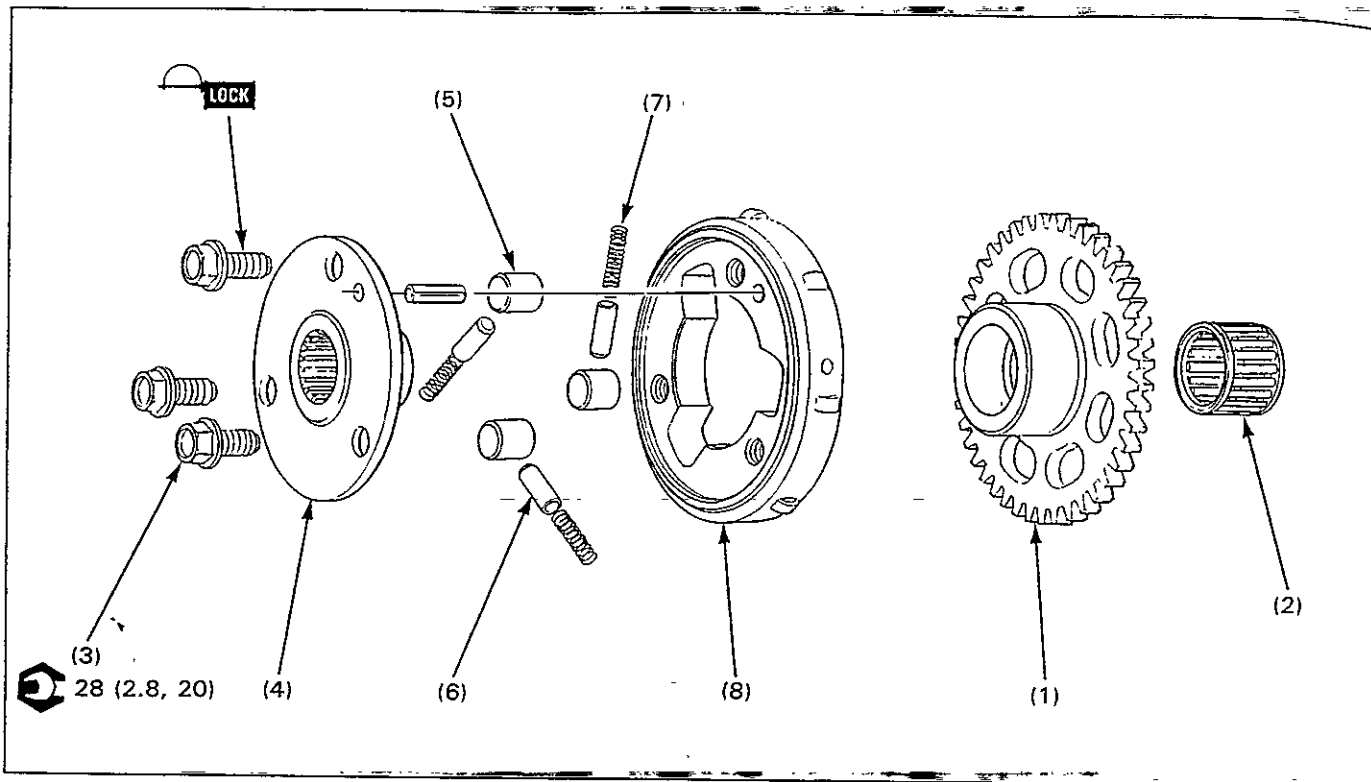
## Requisite Service

- Right crankcase cover removal/installation (page 9-2)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is the reverse order of removal.
(1)	Pulse generator mounting bolt	2	Remove the pulse generators.
(2)	Starter idle gear/shaft	1/1	
(3)	Primary drive gear bolt	1	Use the gear holder (00724-001010) as shown.
(4)	Starter clutch	1	Disassembly/assembly (page 17-6)
			NOTE
			<ul style="list-style-type: none"> <li>• Remove the clutch through the recessed portion of the clutch outer.</li> <li>• At installation, align the wide groove with the wide tooth of the crankshaft.</li> </ul>
(5)	Spacer	2	
(6)	Primary drive gear	1	



## Starter Clutch Disassembly/Assembly

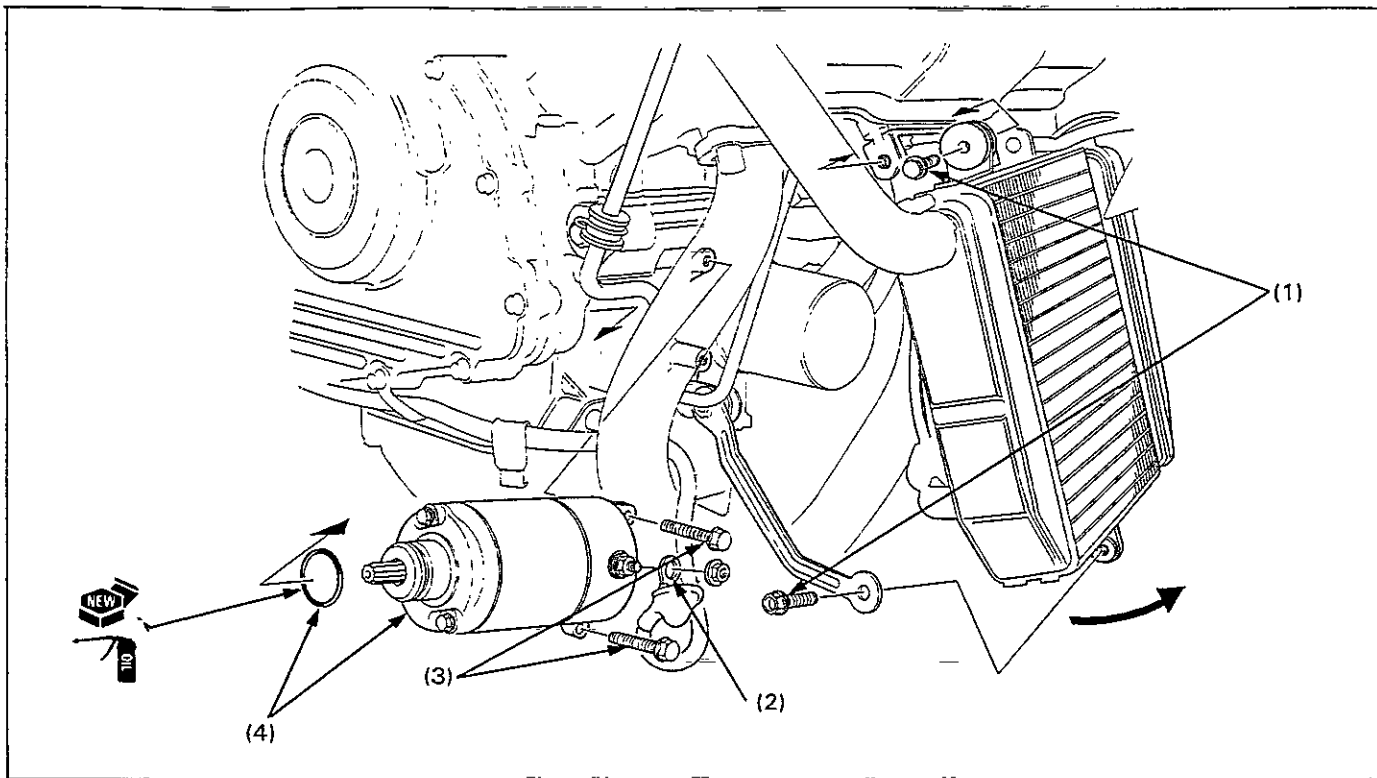


## Requisite Service

- Starter clutch removal/installation (page 17-4)

Procedure		Q'ty	Remarks
(1)	<b>Removal Order</b> Starter driven gear	1	Assembly is in the reverse order of disassembly. <b>NOTE</b> <ul style="list-style-type: none"> <li>• At installation, install the gear into the clutch while turning it clockwise.</li> </ul>
(2)	Needle bearing	1	
(3)	Clutch cover bolt	3	
(4)	Clutch cover	1	
(5)	Roller	3	<b>NOTE</b> <ul style="list-style-type: none"> <li>• At installation, align the hole with the locating pin.</li> </ul>
(6)	Plunger	3	
(7)	Spring	3	
(8)	Starter clutch body	1	

## Starter Motor Removal/Installation



### ⚠ WARNING

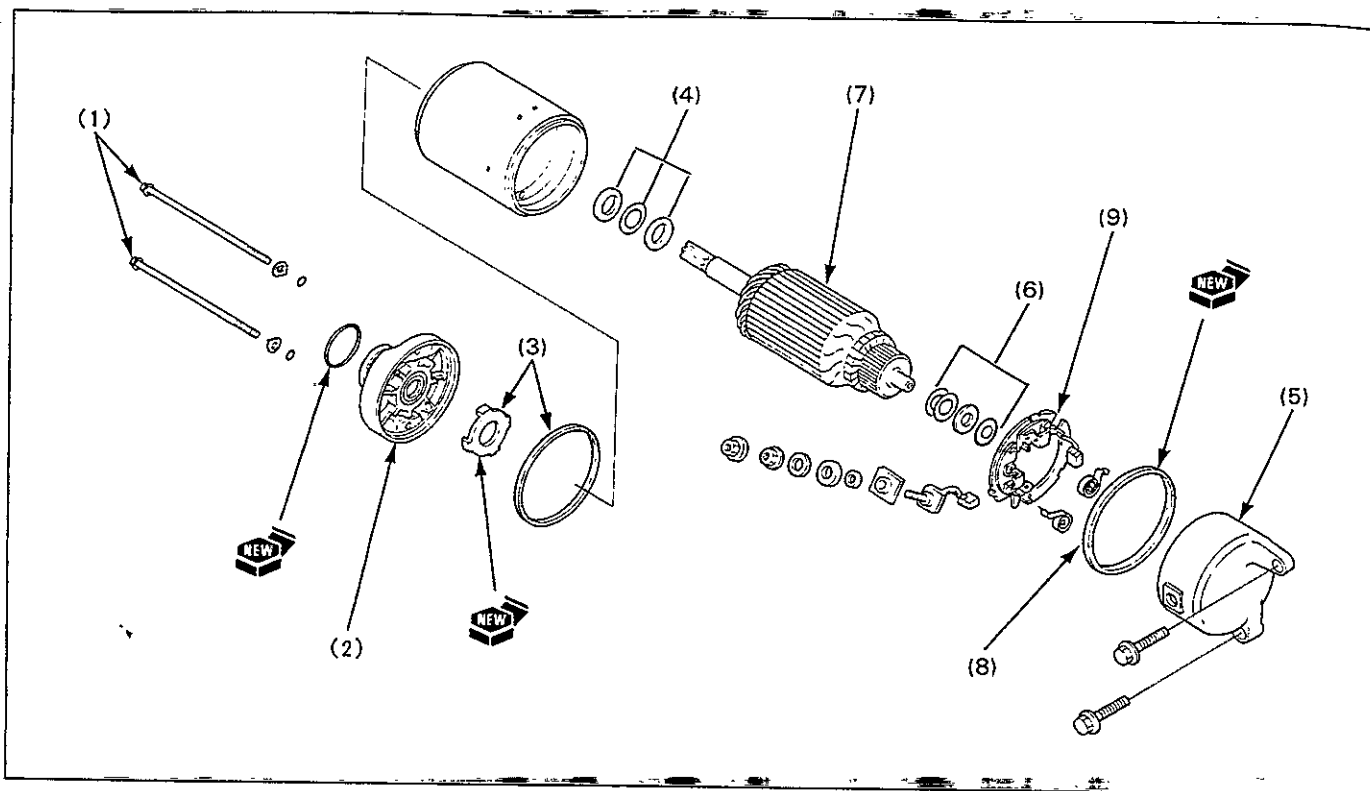
- With the ignition switch OFF, remove the negative cable from the battery before servicing the starter motor.

### Requisite Service

- Lower fairing removal/installation (page 2-4)

Procedure		Q'ty	Remarks
(1)	<b>Removal Order</b> Lower radiator mounting bolt	2	Installation is in the reverse order of removal. <b>NOTE</b> • Remove the bolts and move the lower radiator forward. <b>CAUTION</b> • Cover the radiator fins to prevent them from damage when servicing.
(2)	Starter motor cable	1	Disconnect the cable. <b>NOTE</b> • Install the rubber cap securely after installing.
(3)	Starter motor mounting bolt	2	
(4)	Starter motor/O-ring	1/1	Disassembly/assembly (page 17-8)

# Starter Motor Disassembly/Assembly



## NOTE

- Note the location and number of the shims when disassembly.

## Requisite Service

- Starter motor removal/installation (page 17-7)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Assembly is in the reverse order of disassembly.
(1)	Case bolt	2	
(2)	Front cover	1	
(3)	Dust seal/Thrust plate	1/1	
(4)	Shim	—	
(5)	Rear cover	1	
(6)	Shim	—	
(7)	Armature	1	
(8)	O-ring	1	
(9)	Brush holder assembly	1	

# 18. Lights/Meters/Switches

Service Information	18-1	Turn Signal Light Bulb Replacement	18-5
System Location	18-2	Headlight Bulb Replacement	18-6
Oil Pressure Switch Inspection	18-3	Ignition Switch Removal/Installation	18-7
Fan Motor Switch Inspection	18-3	Instruments, Headlight Unit Removal/Installation	18-8
Coolant Temperature Gauge Inspection	18-4		
Headlight Relay Inspection	18-5		

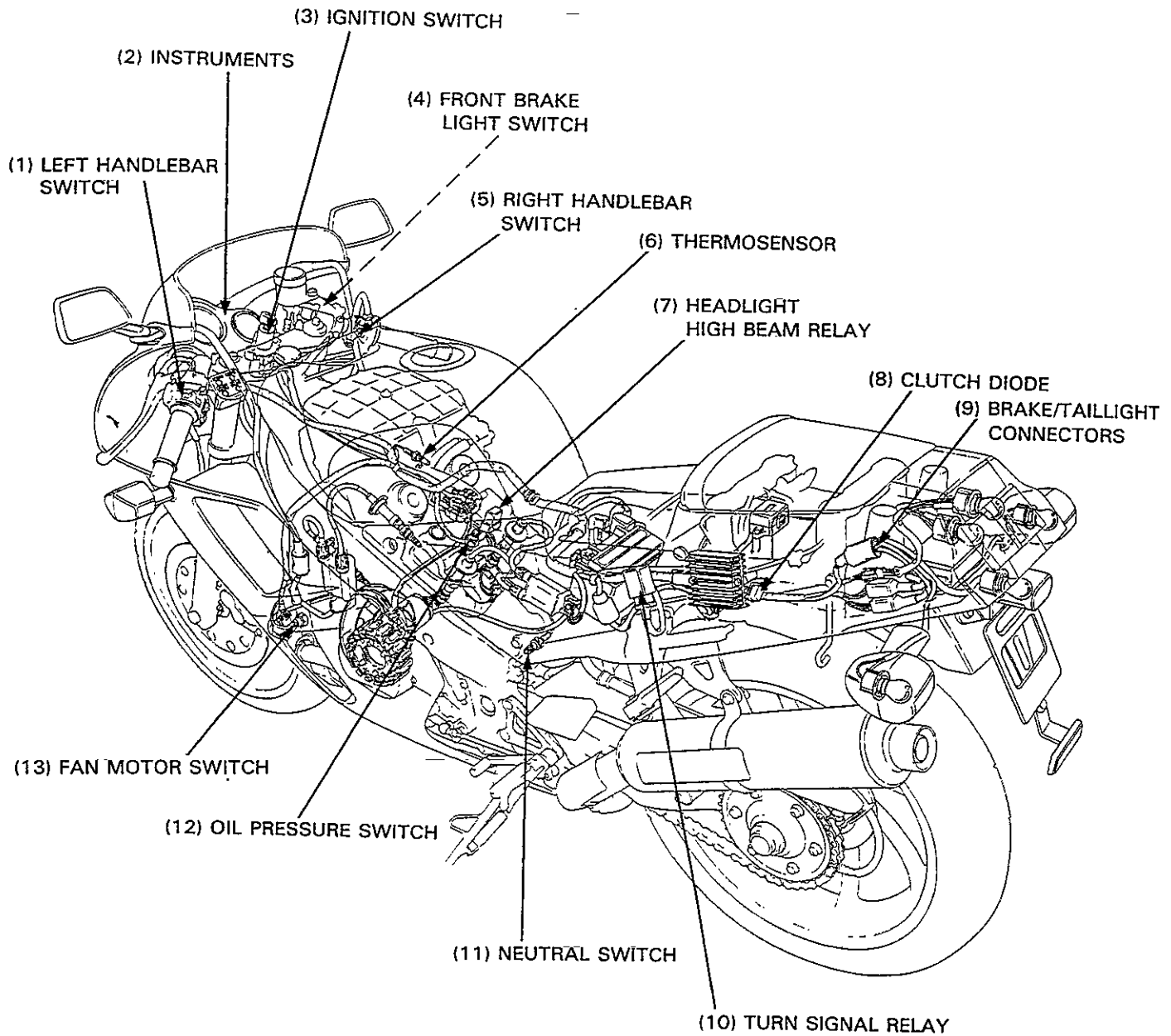
## Service Information

### ⚠ WARNING

- A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.
- Use a heat element to heat water/coolant mixture for thermosensor inspection. Keep all flammable materials away from the burner. Wear protective clothing, gloves and eye protection.

- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to break.
  - If you touch the bulb with your bare hands, clean it with a cloth mistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.

## System Location

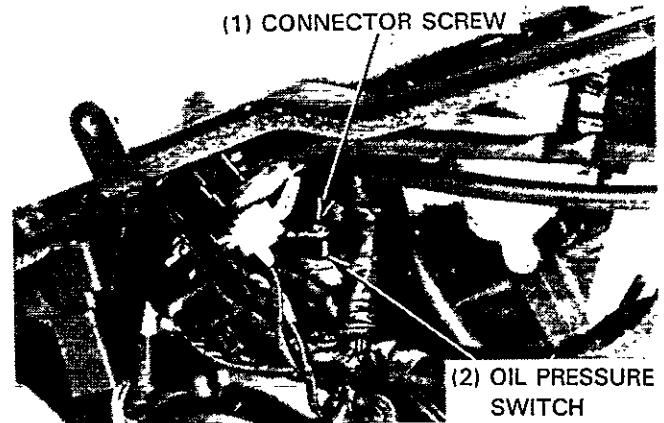
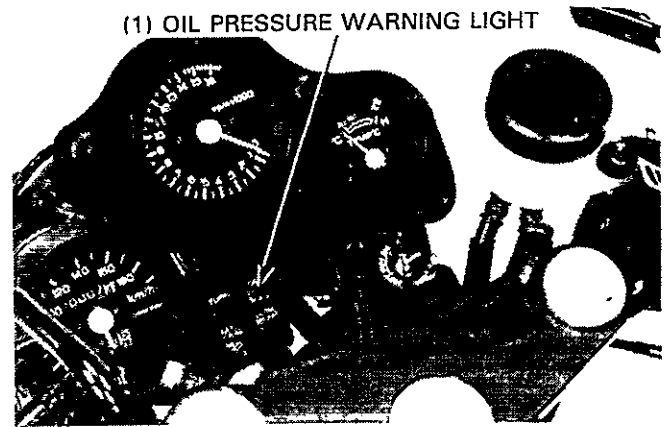


# Oil Pressure Switch Inspection

Remove the lower fairing (page 2-4).

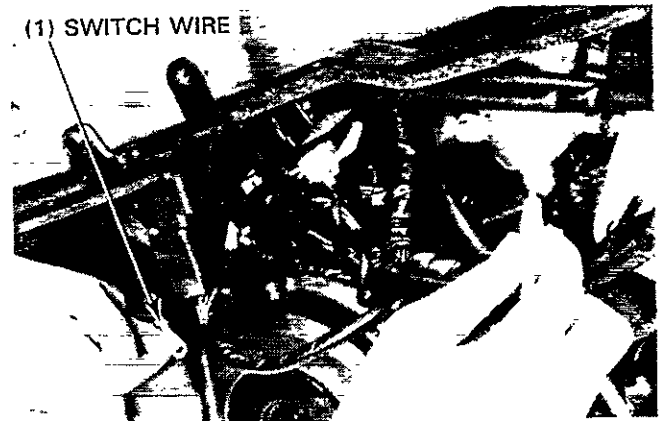
If the oil pressure warning light does not come on with the ignition switch turned ON:

1. Disconnect the oil pressure switch wire from the switch and ground it.
2. Turn the ignition switch ON and check that the oil pressure warning light comes on.
  - If the light comes on, the oil pressure switch is faulty. Replace the switch.
  - If the light does not come on, the bulb is blown or wire harness has an open circuit. Check them.



If the oil pressure warning light stays on while the engine is running.

1. Check the engine oil level and add the recommended oil if the level is low.
2. Disconnect the oil pressure switch wire from the switch and check that the oil pressure warning light does not come on with the ignition switch turned ON.
  - If the light comes on, the wire harness between the light and switch is shorted to the ground.
  - If the light does not come on, measure the oil pressure. If the pressure is normal, replace the oil pressure switch.



## Fan Motor Switch Inspection

### NOTE

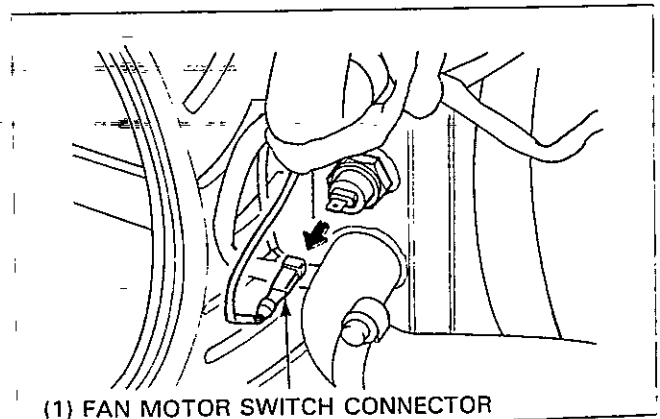
- Perform this inspection while the engine is cold.

Turn the ignition switch OFF.

Remove the lower fairing (page 2-4).

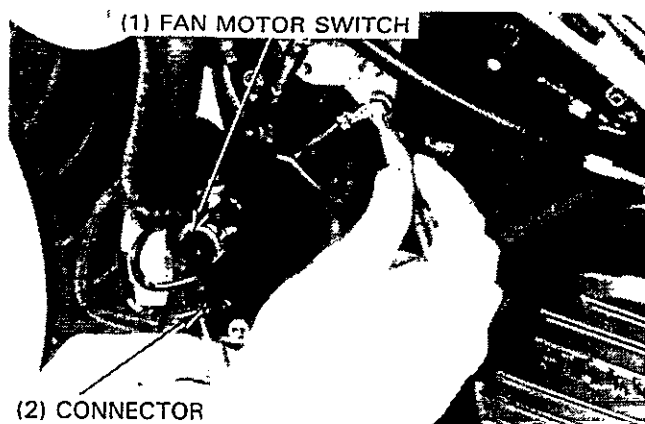
If the fan motor does not stop:

1. Disconnect the fan motor switch connector from the switch and turn the ignition switch ON.
  - If the starter motor does not start, the fan motor switch is faulty. Replace the switch.
  - If the fan motor starts, the wire between the motor and switch is shorted to the ground.



### If the fan motor does not start:

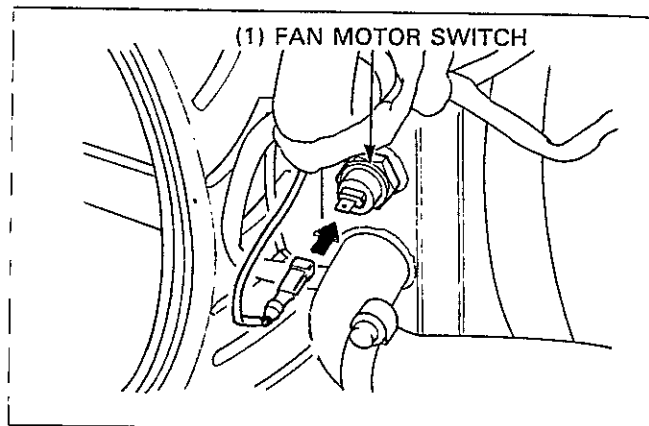
1. Disconnect the fan motor switch connector from the switch and ground it with a jumper wire.
2. Turn the ignition switch ON, and check the fan motor.
  - If the motor turns, the fan motor switch is faulty or switch connector is loose or poorly connected.
  - If the motor does not turn, check for voltage between the connector and ground.
    - If the battery voltage exists, the fan motor is faulty.
    - If no voltage, the wire harness has an open circuit.



When installing a new fan motor switch, apply sealant to the threads and tighten it to the specified torque.

**Torque: 18 N·m (1.8 kg-m, 13 ft-lb)**

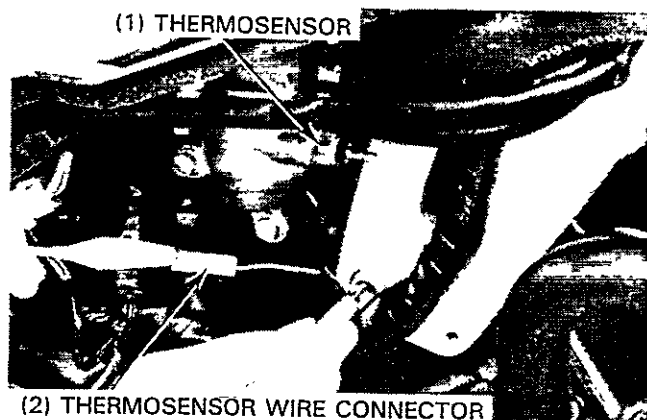
Connect the fanmotor switch connector.  
Install the lower fairing (page 2-4).



## Coolant Temperature Gauge Inspection

Remove the lower fairing (page 2-4) and the fuel tank (page 2-5).

Disconnect the thermosensor wire connector from the sensor and ground it with a jumper wire.



Turn the ignition switch ON and check the coolant temperature gauge. Disconnect the thermosensor wire from the ground immediately when the gauge needle moves fully to H.

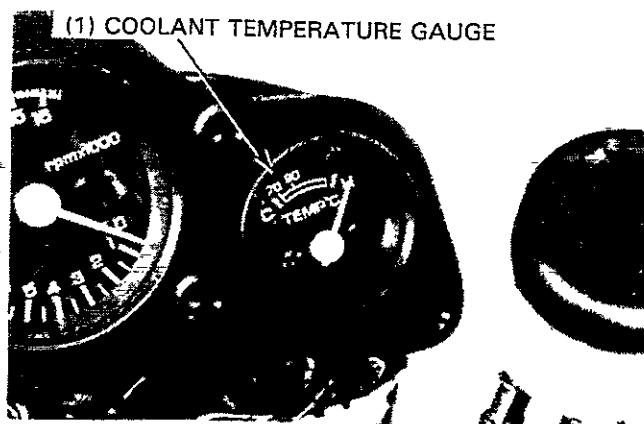
### CAUTION

- Do not ground the thermosensor wire longer than 5 seconds to prevent damage to the gauge.

If the needle does not move to H, check the wire harness between the switch and gauge.

If the wire harness is normal, replace the coolant temperature gauge.

Install the removed parts in the reverse order of removal.



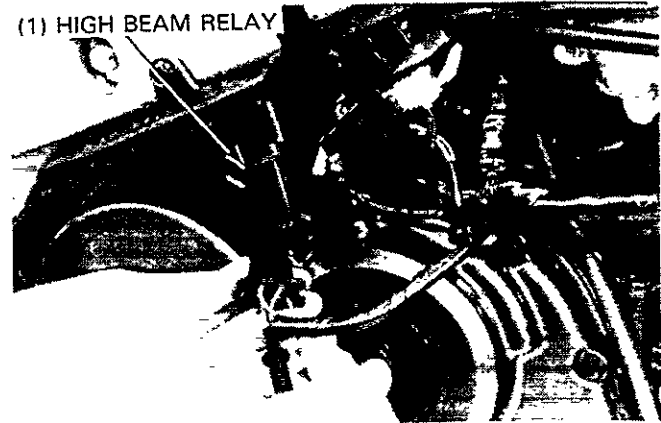
## Headlight Relay Inspection

### High Beam Relay

Remove the lower fairing (page 2-4).

Turn the ignition switch ON and the headlight switch to "H". Turn the dimmer switch to "HI" and check for a "click" sound from the high beam relay.

- If the relay click, measure the voltage between the Bl/R wire (+) and ground with the ignition switch ON.
  - If the battery voltage exists, replace the relay.
  - If no voltage, check the wire harness.
- If the relay does not click, measure the voltage between the Bu/W (+) and G (–) wire terminals at the relay connector. The battery voltage should be registered when the headlight switch is turned to "H" and the dimmer switch is turned to "HI".
  - If the battery voltage exists, replace the relay.
  - If no voltage, check the wire harness, lighting switch and dimmer switch.



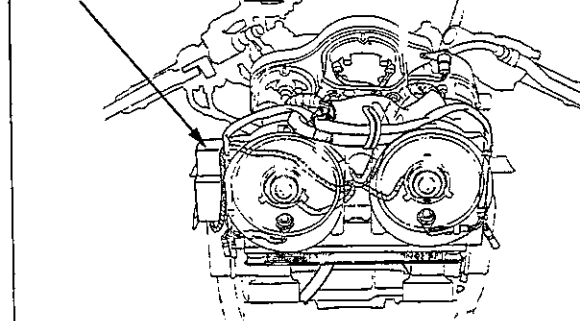
### Low Beam Relay

Remove the upper fairing (page 2-2).

Turn the ignition switch ON and the headlight switch to "H". Turn the dimmer switch to "LO" and check for a "click" sound from the high beam relay.

- If the relay clicks, measure the voltage between the Bl/R wire (+) and ground with the ignition switch ON.
  - If the battery voltage exists, replace the relay.
  - If no voltage, check the wire harness
- If the relay does not click, measure the voltage between the W/Bu (+) and G (–) wire terminals at the relay connector. The battery voltage should be registered when the headlight switch is turned to "H" and the dimmer switch is turned to "LO".
  - If the battery voltage exists, replace the relay.
  - If no voltage, check the wire harness, lighting switch and dimmer switch.

(1) LOW BEAM RELAY



## Turn Signal Light Bulb Replacement

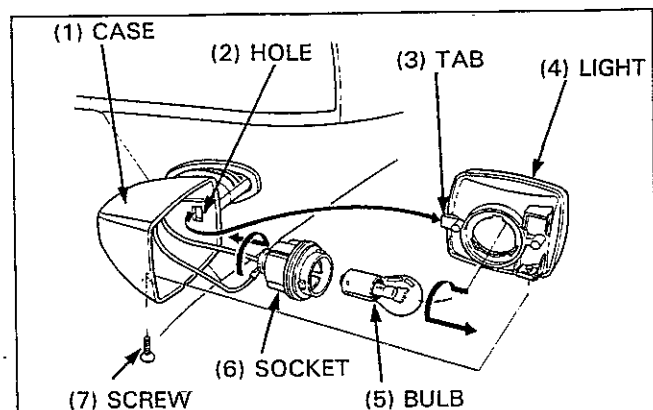
Remove the screw and the turn signal light from the case. Remove the bulb socket from the light by turning it counterclockwise.

Remove the bulb from the socket by pushing it in and turning it counterclockwise.

Install the new bulb in the reverse order of removal.

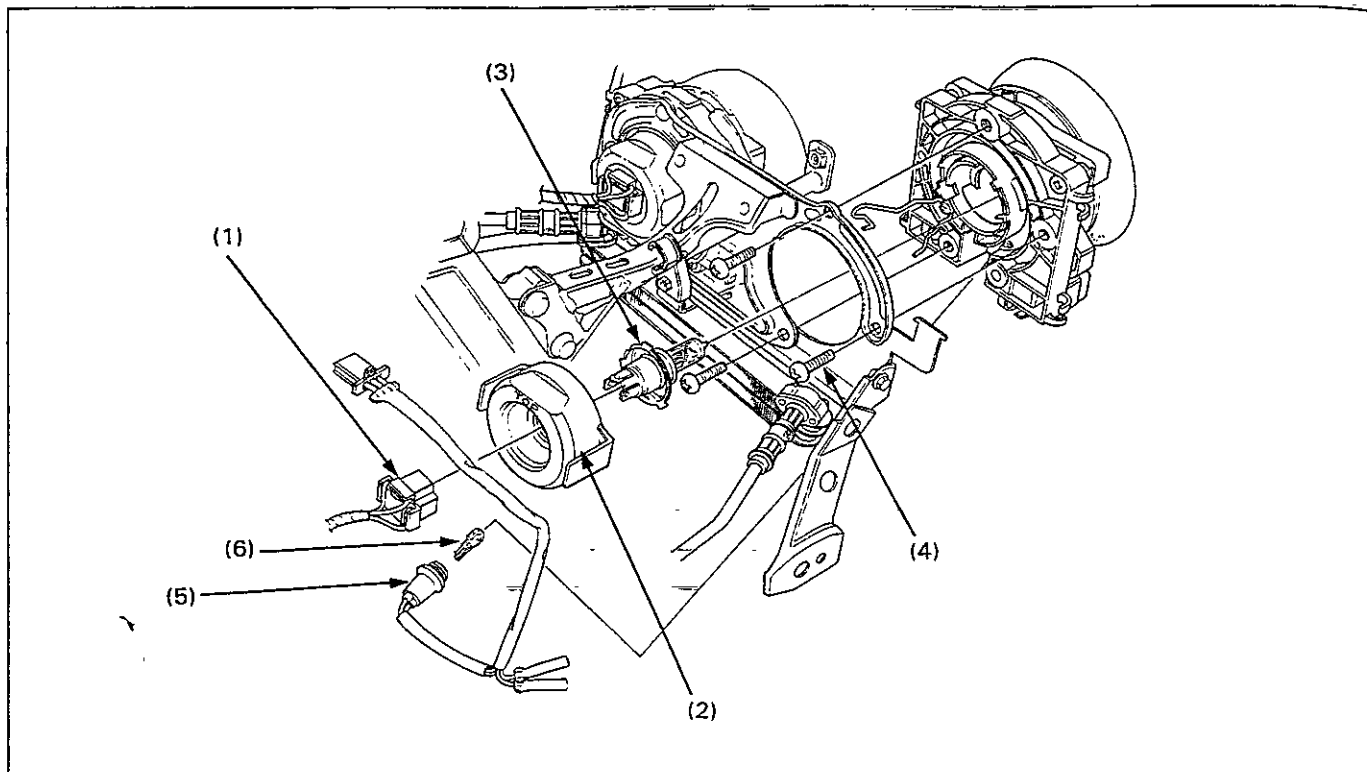
### NOTE

- Align the tab of the turn signal light with the hole in the case properly.





# Headlight Bulb Replacement



## WARNING

- A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.

## CAUTION

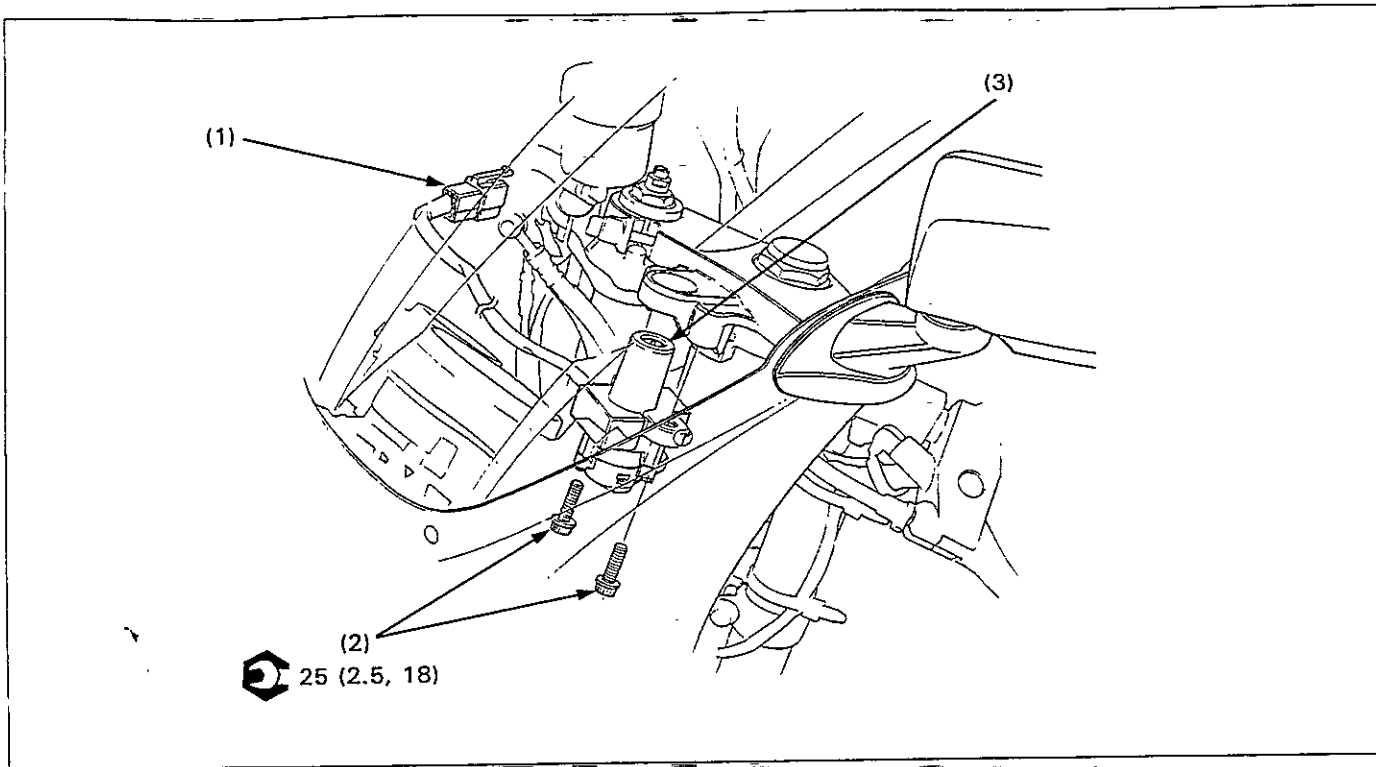
- If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent early failure.

## Requisite Service

- Upper fairing removal/installation (page 2-2)
- Instruments removal/installation (page 18-8)

Procedure		Q'ty	Remarks
(1) Headlight connector (2) Rubber cap (3) Headlight bulb (4) Headlight unit mounting screw (5) Position light socket (6) Position light bulb	Removal Order		Installation is in the reverse order of removal.
		1	NOTE Install the cap securely with the "TOP" mark facing up.
		1	
		1	
		3	
		1	

# Ignition Switch Removal/Installation

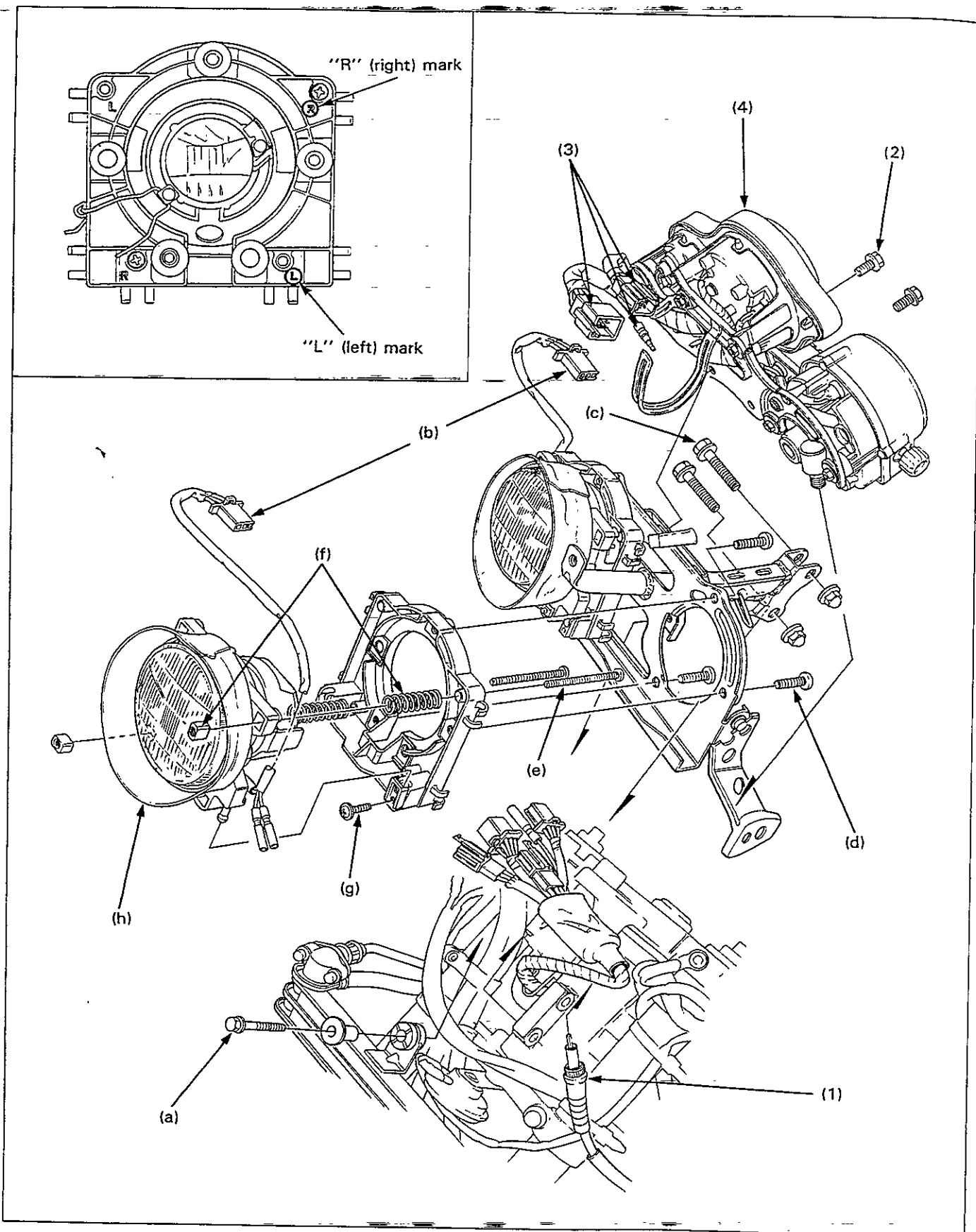


## NOTE

- Route the ignition switch wire harness properly (see page 1-21).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal. Disconnect at right connector bracket (page 1-24).
(1)	Ignition switch wire connector	1	
(2)	Ignition switch mounting bolt	2	
(3)	Ignition switch	1	

# Instruments, Headlight Unit Removal/Installation



## NOTE

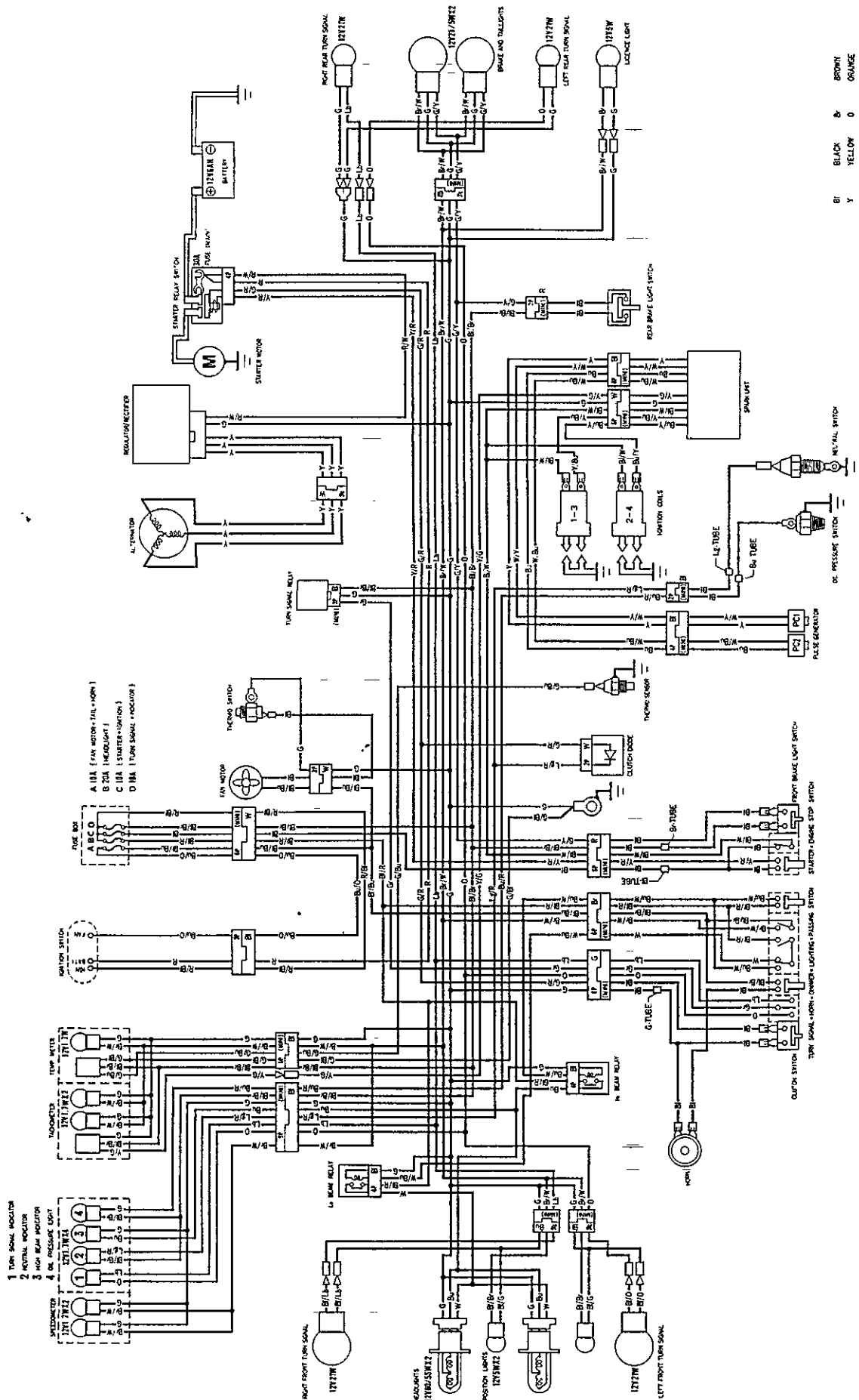
- Instruments can be removed with the upper fairing installed.
- the right and left mounting brackets are different. When replacing the bracket, install the headlight aim adjusting screws in the marked locations as shown.

## Requisite Service

- Upper fairing removal/installation (page 2-2)

Procedure		Q'ty	Remarks
<b>Instrument Removal Order</b>			Installation is in the reverse order of removal.
(1)	Speedometer cable	1	Disconnect the connectors.
(2)	Instrument mounting bolt	2	
(3)	Instrument wire connector	3	
(4)	Instrument unit	1	
<b>Headlight Removal Order</b>			Installation is in the reverse order of removal.
(a)	Oil cooler mounting bolt	1	Disconnect the connectors.
(b)	Headlight wire connector	2	
(c)	Headlight stay mounting bolt	2	
(d)	Headlight mounting screw	3	
<b>Headlight Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(e)	Headlight aim adjusting screw	2	Remove the screw and open the holder cover.
(f)	Headlight aim adjusting spring/nut	2/2	
(g)	Headlight pivot holder screw	1	
(h)	Headlight	1	

# 19. Wiring Diagram



WIRING DIAGRAM

TURN SIGNAL SWITCH	W	B	L
W	W	B	L
B	B	L	W
L	L	W	B
W	W	B	L
B	B	L	W
L	L	W	B
W	W	B	L

LOCKING SWITCH	B	L	W	B	L	W
B	B	L	W	B	L	W
L	L	W	B	L	W	B
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B
W	W	B	L	W	B	L

DOOR SWITCH	H	L	W	B	L	W
H	H	L	W	H	L	W
L	L	W	H	L	W	H
W	W	H	L	W	H	L
H	H	L	W	H	L	W
L	L	W	H	L	W	H
W	W	H	L	W	H	L

HORN SWITCH	W	B	L	W	B	L
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B

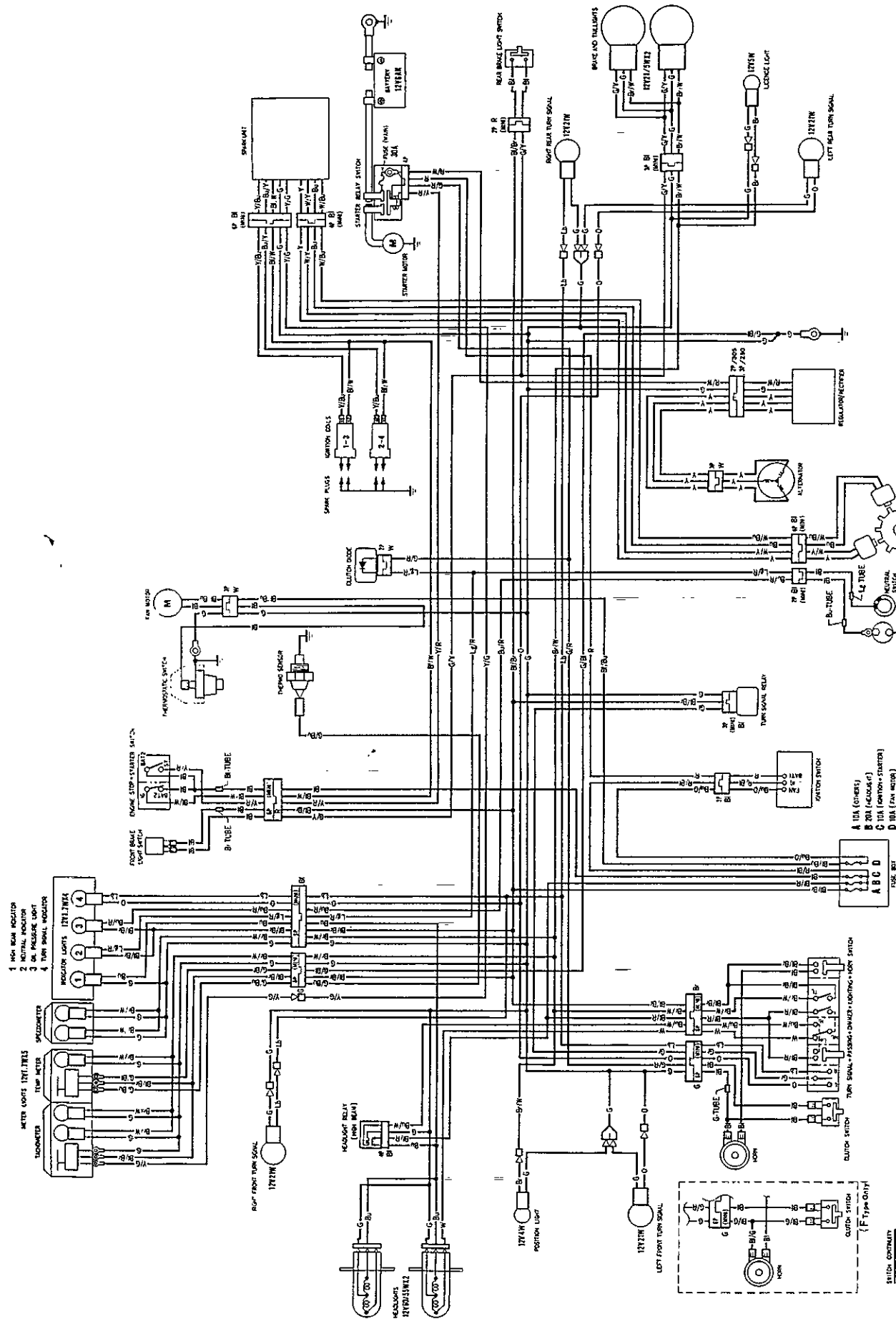
FLASHING SWITCH	W	B	L	W	B	L
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B

DOOR STOP SWITCH	W	B	L	W	B	L
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B

STARTER SWITCH	W	B	L	W	B	L
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B

IGNITION SWITCH	W	B	L	W	B	L
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B
W	W	B	L	W	B	L
B	B	L	W	B	L	W
L	L	W	B	L	W	B

0030Z-MR8-6000





B	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
B <sub>u</sub>	BLUE	L <sub>3</sub>	LIGHT BLUE
G	GREEN	L <sub>2</sub>	LIGHT GREEN
R	RED	P	PINK
W	WHITE	G	GRAY

0030Z-MR8-6100

	FAN	IG	BATT
ON	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
OFF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LOCK	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PULLING SWITCH	BATA	H <sub>1</sub>	
	FREE		

NON SWITCH	HO	BAT3	
	FREE		

	ML	Lo	Hi
Diagonal	Lo	Hi	Lo
Horizontal	Lo	Hi	Lo
Vertical	Lo	Hi	Lo

[illegible]

L				O
BAT3				
P	H			

	L	M	R
L			
M			
R			

### Session Continuity

## 20. Technical Feature

Cylinder Head

20-1

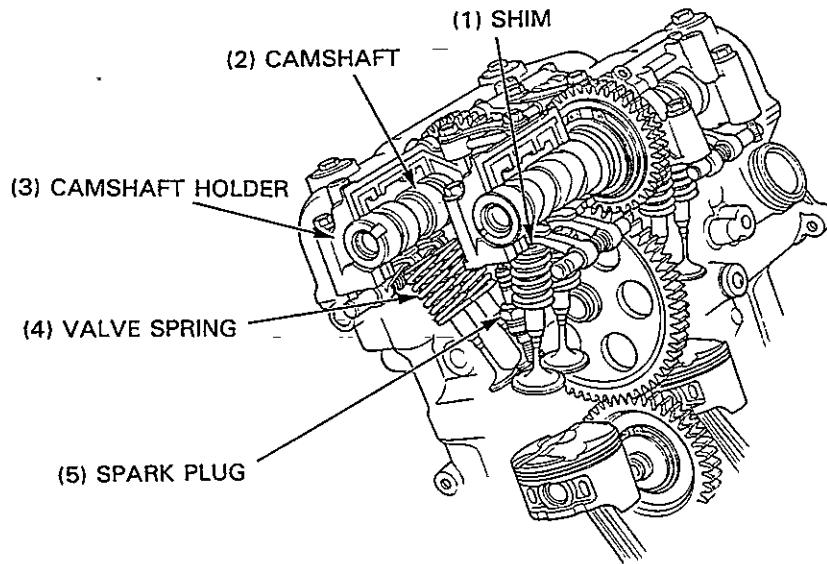
Newly Designed Spark Plug

20-2

Shim Direct Push Mechanism With  
Rocker Arm

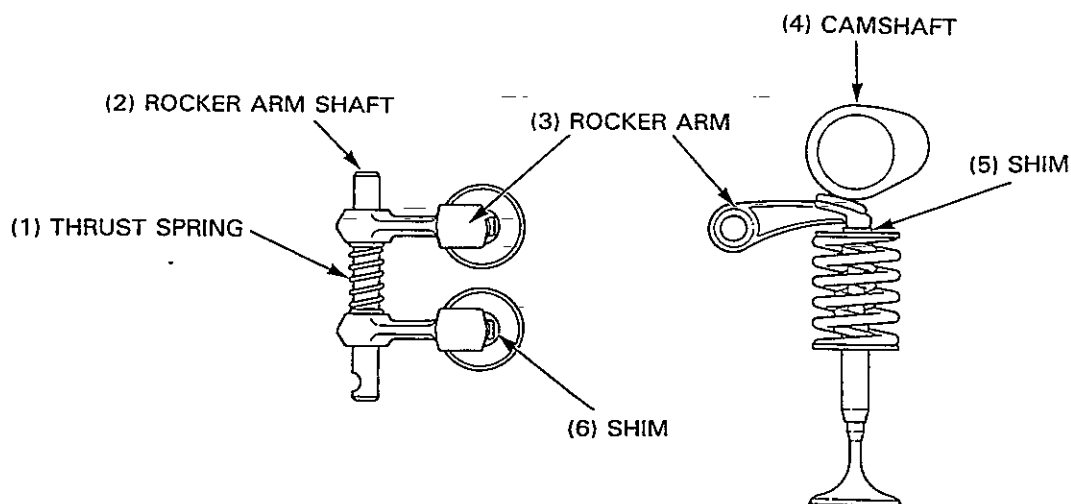
20-2

### Cylinder Head



The new design does not require the rocker arm which is positioned thru the rocker arm shaft and the thrust spring, the camshaft which is located on the same shaft as the valve stem, and the valve lifter. This achieves a larger valve diameter and higher valve lift amount for the newly designed cylinder head. The part supporting the valve lifter is not required, because a mechanism directly pushes the shim and the newly designed special spark plug (details are described on the next page) is used. The resulting compact cylinder head yields a higher performance. Compared with conventional models, the installation position of the new engine can be shifted further toward the front. Thus, the new design contributes to an improved rotation performance, driving safety and load balance of the front and rear wheels by shifting load to the front wheels, and simultaneously decreasing the required wheel base.

## Shim Direct Push Mechanism With Rocker Arm



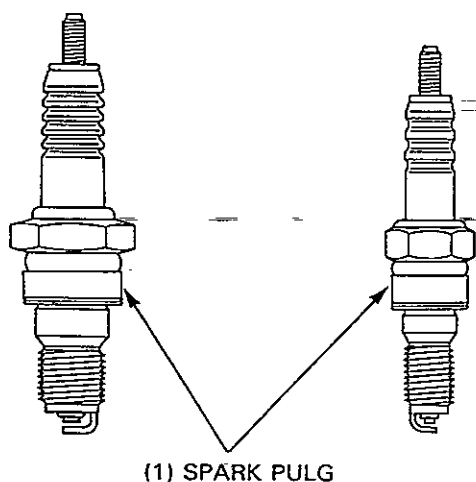
The new design is a compact cylinder head, using a shim direct push mechanism with rocker arm for easier maintenance, without any valve lifter.

In conventional designs, the direct push type shim is located inside the valvelifter. Therefore, the valve lifter including the camshaft must be removed/installed when the shim is replaced. The new direct shim push mechanism used in the VFR4004R facilitates easier maintenance than with the valve adjuster method, however, without requiring any valve adjuster. The decreased operating mass Thanks to the reduced weight of the rocker arm, the decreased operating mass results in better valve performance during high speed, as well as in enhanced durability and reliability.

## Newly Designed Spark Plug

[Conventional Type]

[Screw Diameter: 8 mm]



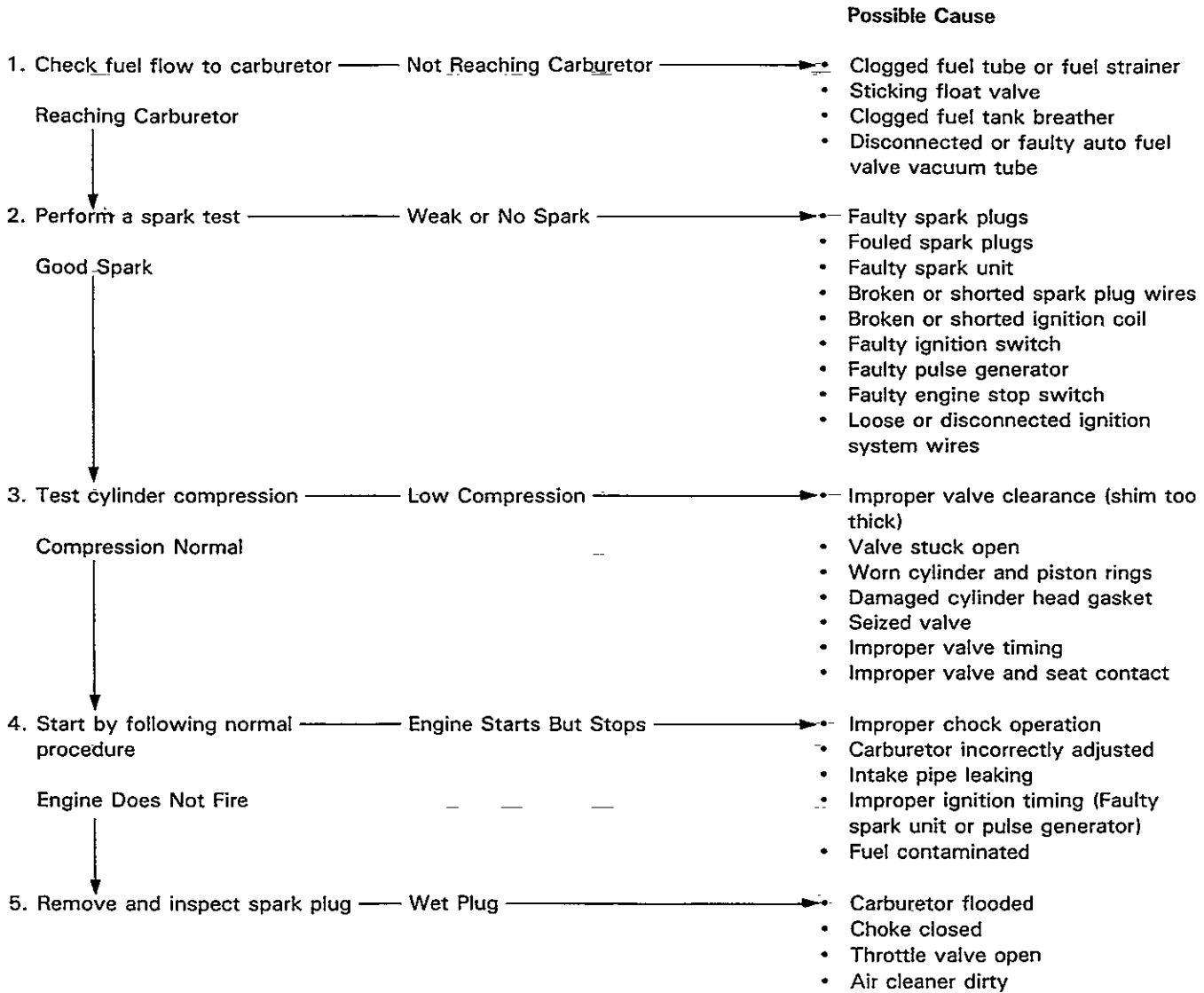
The newly designed dedicated spark plugs (diameter: 8 mm) maintain a balanced combustion and use a valve with larger diameter. Greater charging efficiency and higher gas speed are attained, resulting in a better acceleration response.



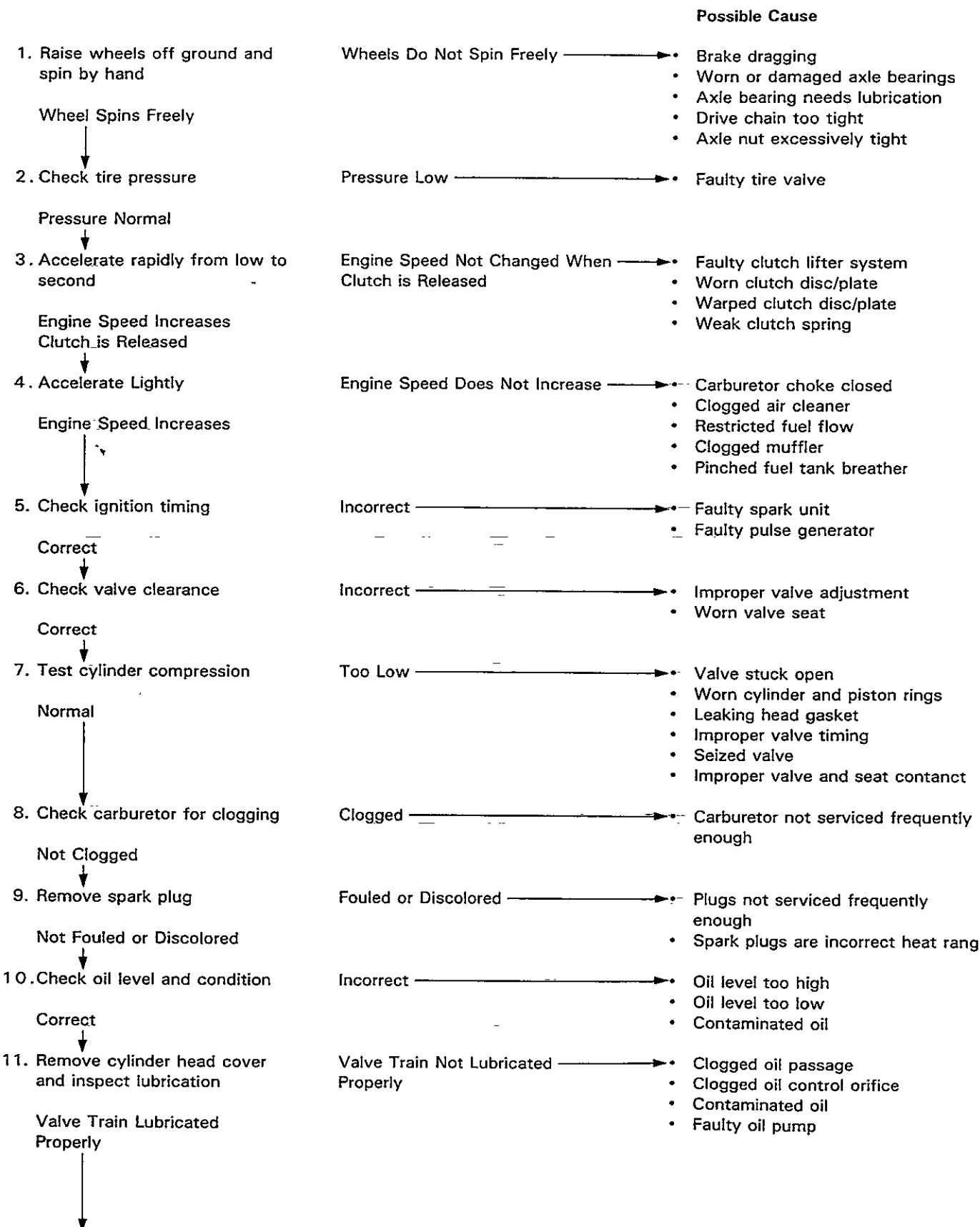
# 21. Troubleshooting

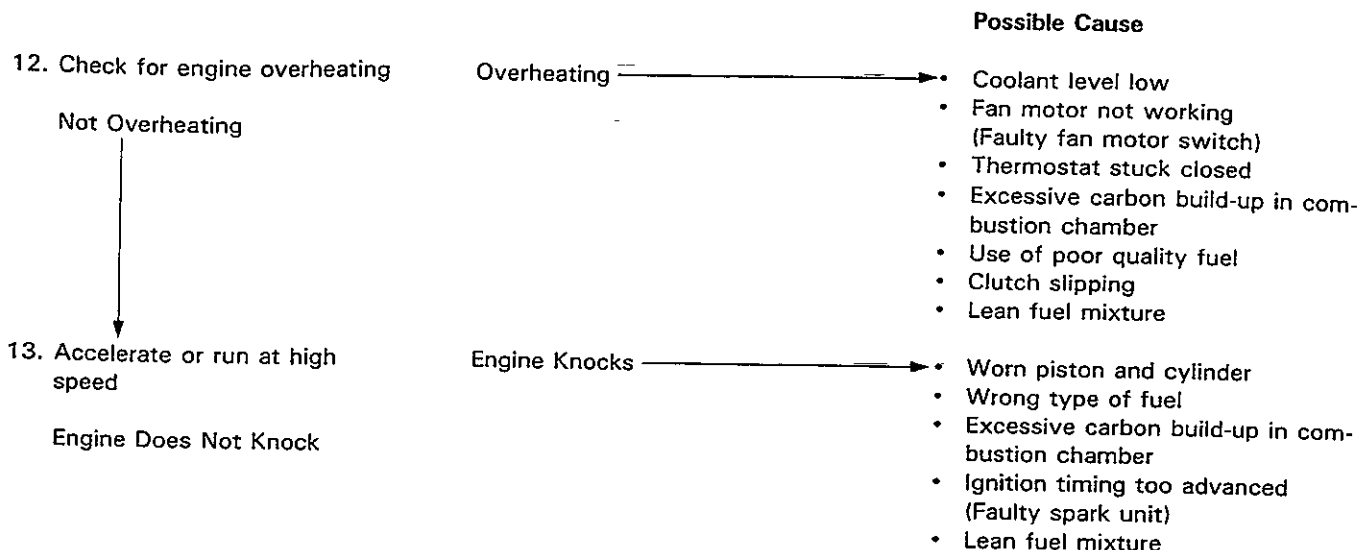
Engine Does Not Start or is Hard to Start	21-1	Poor Performance at High Speed	21-3
Engine Lacks Power	21-2	Poor Handling	21-4
Poor Performance at Low and Idle Speeds	21-3		

## Engine Does Not Start or is Hard to Start

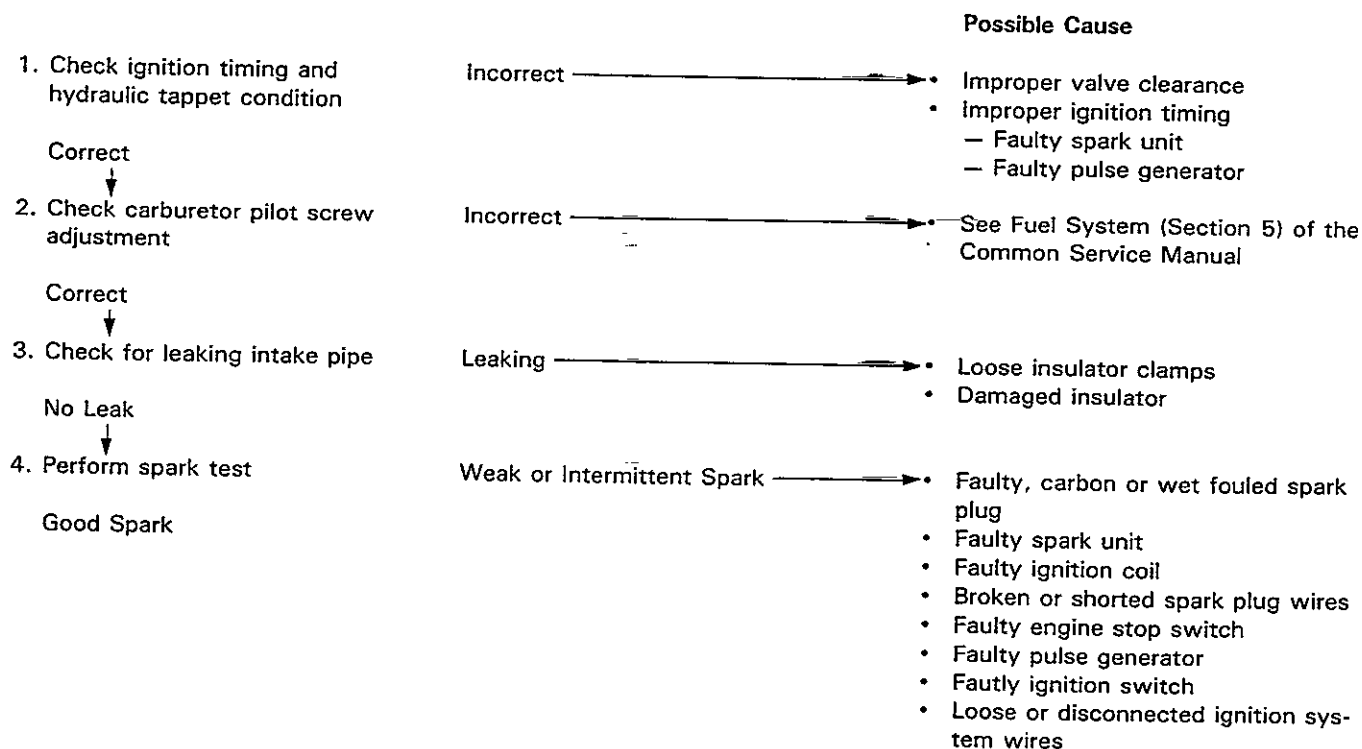


# Engine Lacks Power

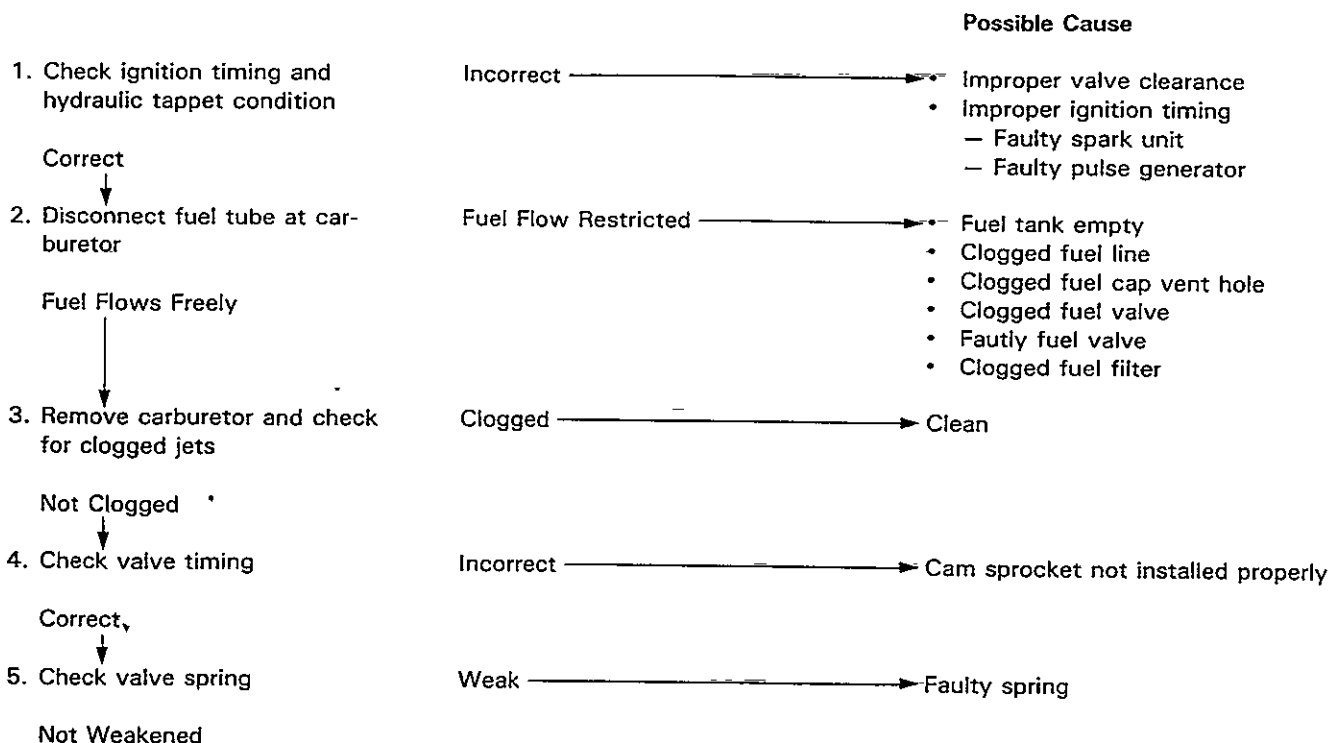




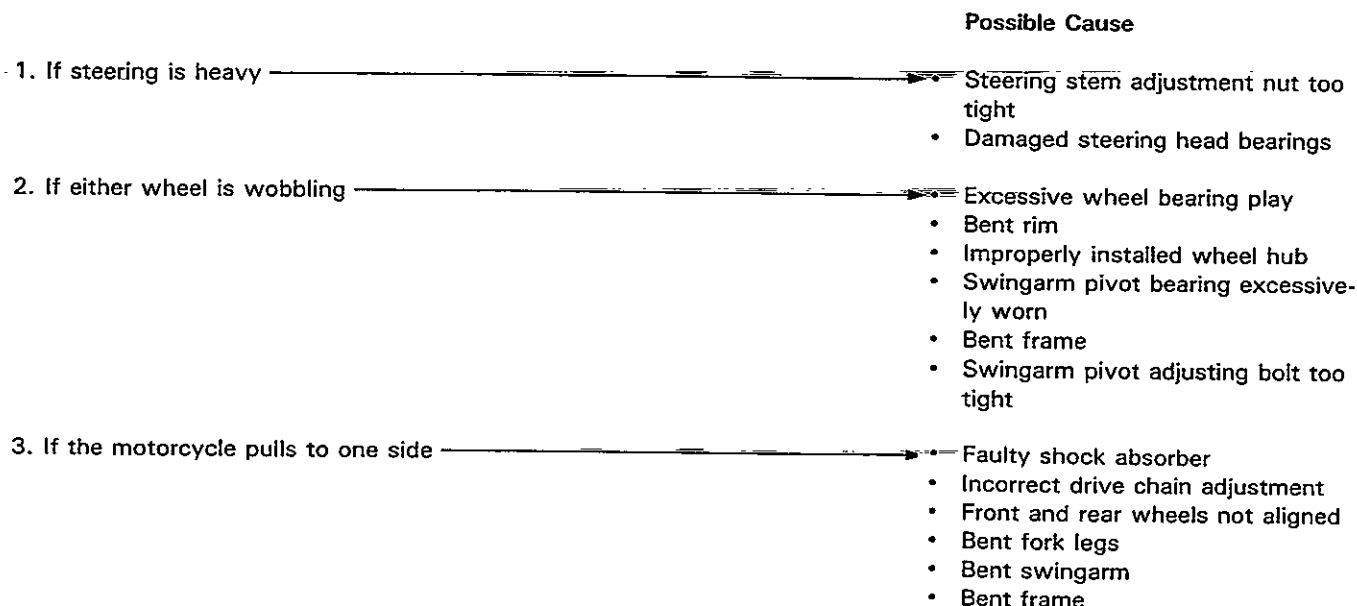
## Poor Performance at Low and Idle Speeds



## Poor Performance at High Speed



## Poor Handling → Check tire pressure



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