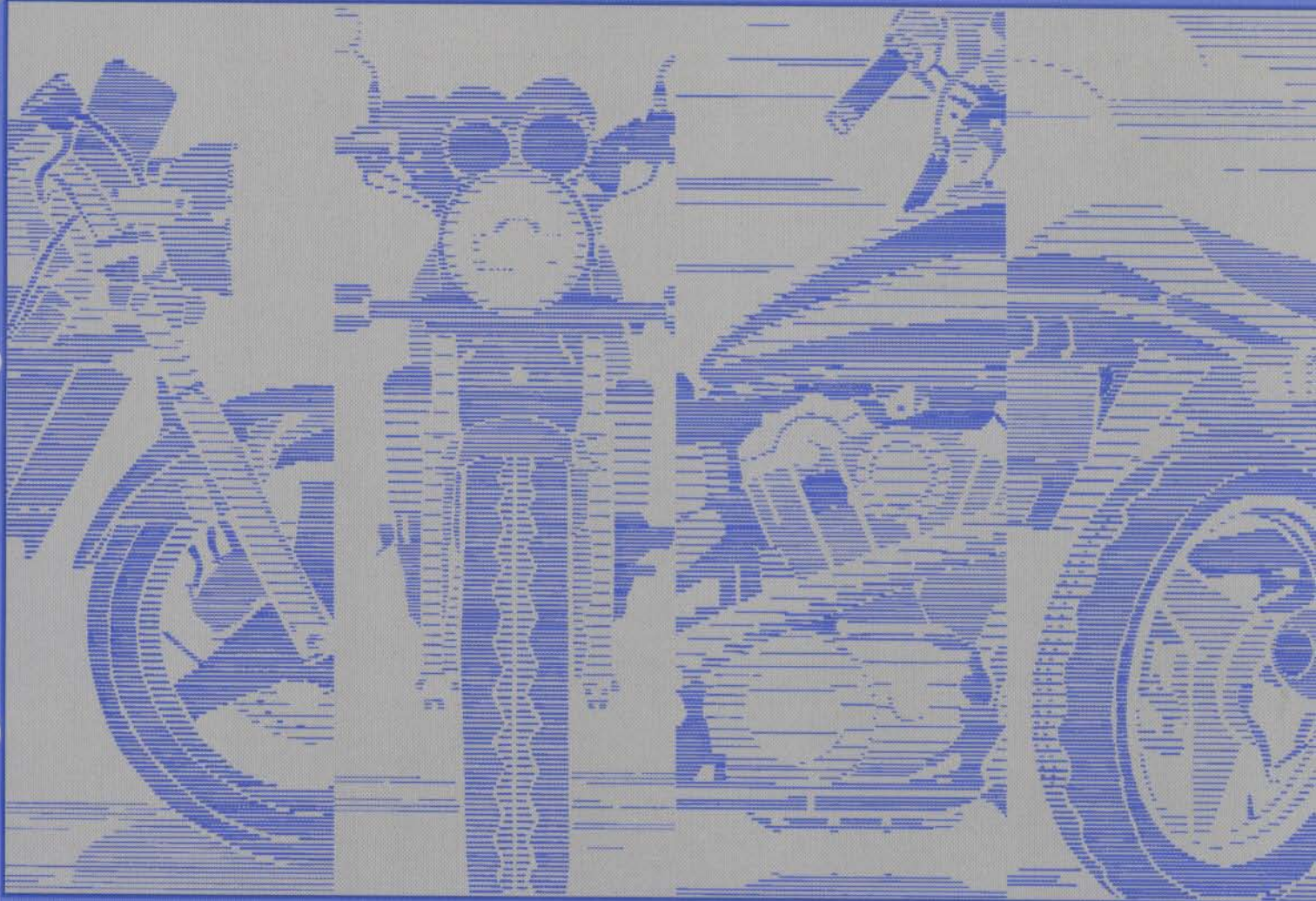


# HONDA

## SERVICE MANUAL



**91-96**

**ST1100**

**92-96**

**ST1100A**

# Introduction

This service manual describes the service procedures for the ST1100/ST1100A.

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.

This manual covers 3 types of ST1100 models:

- Standard (no ABS)
- ABS/TCS ('92-'95)
- LBS-ABS/TCS (After '95)

Be sure to refer to the procedure that pertains to the appropriate version of the ST1100.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standards set by the U.S. Environmental Protection Agency and the California Air Resources Board.

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

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections. Sections 4 through 22 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 Features in section 23.

If you don't know the source of the trouble, go to section 24 Troubleshooting.

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SERVICE PUBLICATION OFFICE

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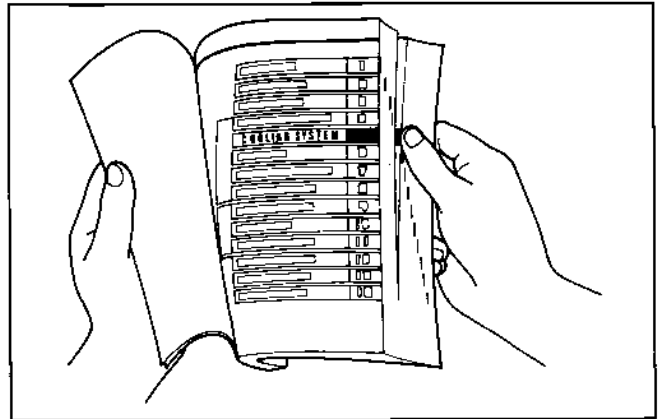
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# How to Use This Manual

## 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 symbols to indicate necessary service procedures and precautions that need to be taken. Refer to the next page for the meaning of each symbol.
- 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**

**System illustration**

**Detailed description of the procedure**

**CYLINDER HEAD/CYLINDER/PISTON**

**CYLINDER HEAD REMOVAL/INSTALLATION**

PROCEDURE	QTY	REMARKS
REMOVAL ORDER		
(1) Cylinder head adjusting nut	12	
(2) Cylinder head mounting bar	2	
(3) Cylinder head assembly	1	
(4) Cover	1	align with the UP mark facing up and rearward
(5) Oil seal	2	
(6) Camshaft oil gear case bolt	2	
(7) Camshaft oil gear case oil seal	2	Installation page 8-5
(8) Sealing caplet	1	
(9) Camshaft oil gear case	1	
(10) Camshaft nut/bolt	4	At installation, align the nut/bolt groove with the angled lip with the UP mark facing upward/rearward side

**REQUISITE SERVICE**

Engine removal/inspection page 7-2

Camshaft removal/inspection page 8-21

**CYLINDER HEAD/CYLINDER/PISTON**

**CAMESHAFT OIL GEAR CASE INSTALLATION**

Insert the camshaft oil gear case dowel pins to align.

**NOTE:**

- Without the dowel pins installed properly, the camshaft oil gear may not be able to be matched onto the caplet shell timing gear.

Insert the camshaft oil gear case onto the cylinder. While pushing the oil gear lightly, turn the gear case so the gear case should be fitted up slightly from the cylinder.

Insert a new sealing washer into mounting slots. Tighten bolts in a gradual, clockwise

**CYLINDER HEAD NUT/BOLT INSTALLATION**

Insert the cylinder head nut/bolt into the slot. Do not tighten them yet.

Insert the cylinder head mounting bar. Tighten the special nuts and mounting bolts in a gradual clockwise pattern.

**TIGHTENING**

Special nut: 30 N·m (3.0 kg-m, 22 ft-lb)  
 Mounting bar: 12 N·m (1.2 kg-m, 9 ft-lb)

**Step sequence (numerals or alphabets)**















**Part name**

**Number of parts**

**Extra notes or precaution related to the service procedure**

# 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.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use special tool</p>
	<p>Use optional tool. Use the same procedure you use to order parts.</p>
 <p>10 (1.0, 7.2)</p>	<p>Torque specification.    10 N·m (1.0 kg-m, 7.2 ft-lb)</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)</p>
	<p>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</p>
	<p>Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent)          Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A.          Honda Moly 60 (U.S.A. only)          Rocol ASP manufactured by Rocol Limited, U.K.          Rocol Paste manufactured by Sumico Lubricant, Japan</p>
	<p>Use silicone grease</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant</p>
	<p>Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>

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# 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

Brake dust may contain asbestos. Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard caused by airborne asbestos fibers.

#### ⚠ WARNING

- **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.**

## General Information

### 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 coolant 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.

### Battery Hydrogen Gas & Electrolyte

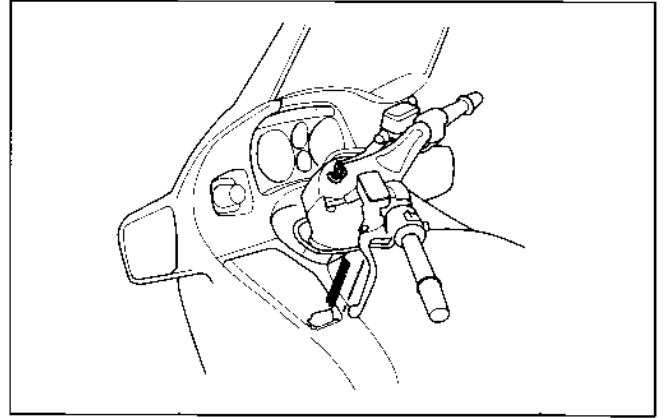
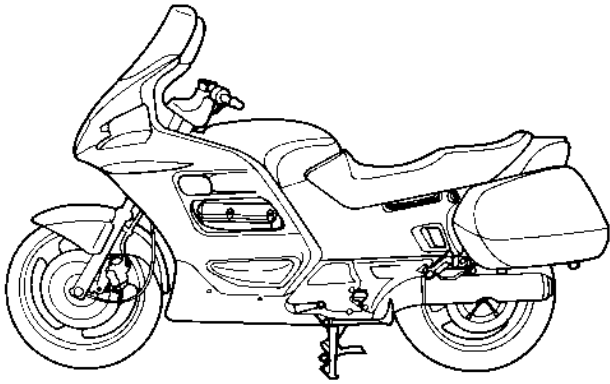
#### ⚠ WARNING

- **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.**



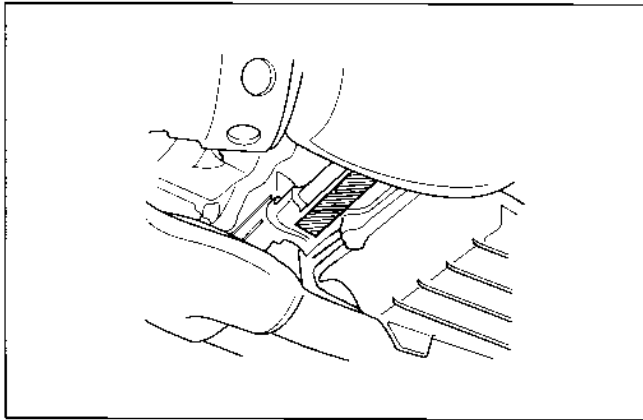
# Model Identification

'91 (Standard model) Shown:



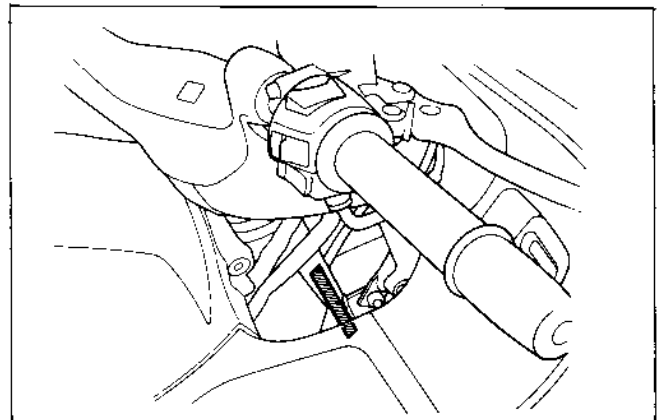
**(1) VEHICLE IDENTIFICATION NUMBER**

The Vehicle Identification Number (VIN) is located on the Safety Certification Label on the left side of the steering head.



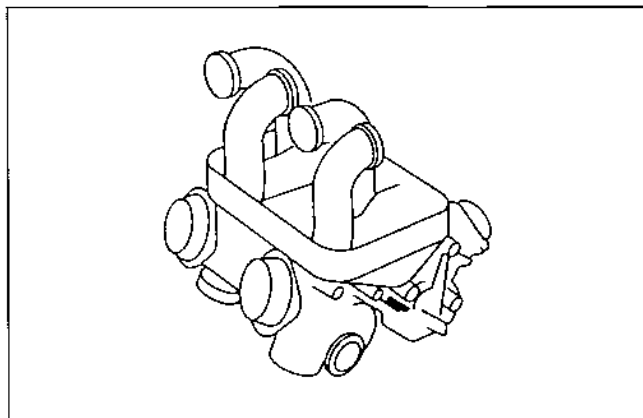
**(2) ENGINE SERIAL NUMBER**

The engine serial number is stamped on the rear of the lower crankcase behind the oil pan.



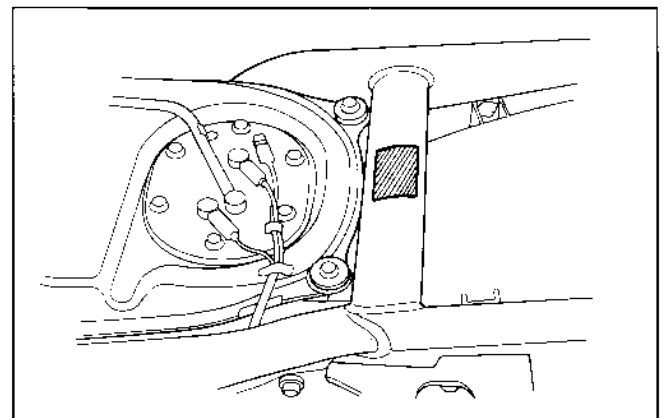
**(3) FRAME SERIAL NUMBER**

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



**(4) CARBURETOR IDENTIFICATION NUMBER**

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



**(5) COLOR LABEL**

The color label is attached to the frame under the seat.

# Specifications

Unit: mm (in)

General		
	Item	Specifications
Dimensions	Overall length	2,285 (90.0)
	Overall width ('91-'93)	835 (32.9) [Saddlebag end]
	(After '93)	935 (36.8) [Rear view mirror end]
	Overall height ('91-'94)	1,395 (54.9)
	(After '94)	1,405 (55.3)
	Wheelbase	1,555 (61.2)
	Seat height	800 (31.5)
	Footpeg height	—
	Ground clearance	145 (5.7)
	Dry weight	
	ABS/TCS or LBS-ABS/TCS model with saddlebag	
	('91-'94) 49 state type	297 kg (655 lb)
	California type	298 kg (657 lb)
	Canada type	293 kg (646 lb)
	(After '94) 49 state type	298 kg (657 lb)
	California type	299 kg (659 lb)
	Canada type	297 kg (655 lb)
	Standard model with saddlebag	
	('91-'94) 49 state type	284 kg (626 lb)
	California type	285 kg (628 lb)
	Canada type	283 kg (624 lb)
	(After '94) 49 state type	288 kg (635 lb)
	California type	289 kg (637 lb)
	Canada type	287 kg (633 lb)
	Curb weight	
	ABS/TCS or LBS-ABS/TCS model with saddlebag	
	('91-'94) 49 state type	326 kg (719 lb)
California type	327 kg (721 lb)	
Canada type	322 kg (710 lb)	
(After '94) 49 state type	327 kg (721 lb)	
California type	328 kg (723 lb)	
Canada type	326 kg (719 lb)	
Standard model with saddlebag		
('91-'94) 49 state type	313 kg (690 lb)	
California type	314 kg (692 lb)	
Canada type	312 kg (688 lb)	
(After '94) 49 state type	317 kg (699 lb)	
California type	318 kg (701 lb)	
Canada type	316 kg (697 lb)	

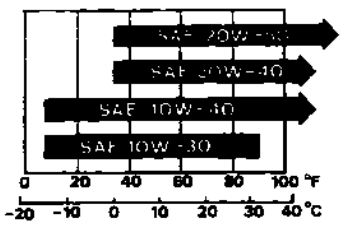
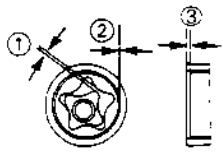
General (cont'd)

Item	Specifications				
<p>Frame</p> <p>Frame type</p> <p>Front suspension</p> <p>Front wheel travel</p> <p>Rear suspension</p> <p>Rear wheel travel</p> <p>Front tire size (Standard model and '92-'95 ABS/TCS model) (After '95 LBS-ABS/TCS model)</p> <p>Rear tire size (Standard model and '92-'95 ABS/TCS model) (After '95 LBS-ABS/TCS model)</p> <p>Tire brand FR/RR (Standard model and '92-'95 ABS/TCS model)  (After '95 LBS-ABS/TCS model)</p> <p>Front brake</p> <p>Rear brake</p> <p>Caster angle</p> <p>Trail length</p> <p>Fuel tank capacity</p> <p>Fuel tank reserve capacity</p>	<p>Double cradle</p> <p>Telescopic fork</p> <p>150 (5.9)</p> <p>Swingram</p> <p>120 (4.7)</p> <p>110/80 V18 (Bridgestone, Dunlop) 110/80 V18-V240 (Metzeler) 120/70 ZR18</p> <p>160/70 V17 (Bridgestone, Dunlop) 160/70 VB17-V240 (Metzeler) 160/70 ZR17</p> <p>G547/G548 (Bridgestone) D103F/D103 (Dunlop) ME33 LASER/ME55A METRONIC (Metzeler) BT-54F/BT-54R (Bridgestone) D202F/D202 (Dunlop)</p> <p>Hydraulic double disc</p> <p>Hydraulic single disc</p> <p>27°30'</p> <p>101 (4.0)</p> <p>28 liters (7.40 US gal, 6.16 Imp gal)</p> <p>—</p>				
<p>Engine</p> <p>Bore and stroke</p> <p>Displacement</p> <p>Compression ratio</p> <p>Valve train</p> <p>Intake valve opens at 1 mm lift</p> <p>Intake valve closes at 1 mm lift</p> <p>Exhaust valve opens at 1 mm lift</p> <p>Exhaust valve closes at 1 mm lift</p> <p>Lubrication system</p> <p>Oil pump type</p> <p>Cooling system</p> <p>Air filtration</p> <p>Crankshaft type</p> <p>Engine dry weight ('91-'93)  ( '94) (After '94)</p> <p>Firing order</p> <p>Cylinder arrangement</p> <p>Cylinder number</p> <p>Left</p> <div style="display: flex; align-items: center; margin-top: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center; width: 40px; height: 20px;">4</table> <table border="1" style="border-collapse: collapse; text-align: center; width: 40px; height: 20px;">2</table> <div style="margin: 0 10px;">⇒</div> <div>Front</div> </div> <div style="display: flex; align-items: center; margin-top: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center; width: 40px; height: 20px;">3</table> <table border="1" style="border-collapse: collapse; text-align: center; width: 40px; height: 20px;">1</table> </div>	<p>73.0 x 64.8 (2.87 x 2.55)</p> <p>1,085 cm<sup>3</sup> (66.2 cu in)</p> <p>10.0 : 1</p> <p>Belt and gear driven DOHC</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">                     '91-'93 : Standard California and U.S.A. ABS/TCS type After '93 : California type                 </td> <td style="width: 50%; padding: 5px;">                     '91-'93 : Standard 49 state and Canada type After '93 : 49 state and Canada type                 </td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 50%; padding: 5px;">                     -5° BTDC (5° ATDC) 35° ABDC 40° BBDC -5° ATDC (5° BTDC)                 </td> <td style="width: 50%; padding: 5px;">                     8° BTDC 37° ABDC 33° BBDC 2° ATDC                 </td> </tr> </table> <p>Forced pressure and wet sump</p> <p>Trochoid</p> <p>Liquid cooled</p> <p>Paper Filter</p> <p>Unit type, 3 main journals</p> <p>93.0 kg (205 lb) : U.S.A. type and ABS/TCS Canada type</p> <p>92.0 kg (203 lb) : Standard Canada type</p> <p>93.0 kg (205 lb) : All types</p> <p>93.0 kg (205 lb) : U.S.A. type</p> <p>92.0 kg (203 lb) : Canada type</p> <p>1-90°-4-270°-3-90°-2-270°-1</p> <p>4 cylinders, 90°V</p>	'91-'93 : Standard California and U.S.A. ABS/TCS type After '93 : California type	'91-'93 : Standard 49 state and Canada type After '93 : 49 state and Canada type	-5° BTDC (5° ATDC) 35° ABDC 40° BBDC -5° ATDC (5° BTDC)	8° BTDC 37° ABDC 33° BBDC 2° ATDC
'91-'93 : Standard California and U.S.A. ABS/TCS type After '93 : California type	'91-'93 : Standard 49 state and Canada type After '93 : 49 state and Canada type				
-5° BTDC (5° ATDC) 35° ABDC 40° BBDC -5° ATDC (5° BTDC)	8° BTDC 37° ABDC 33° BBDC 2° ATDC				

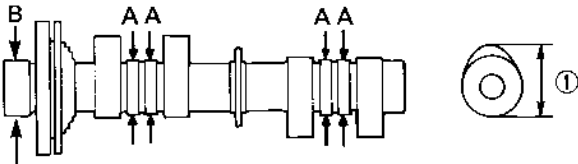
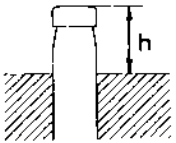
## General Information

Unit: mm (in)

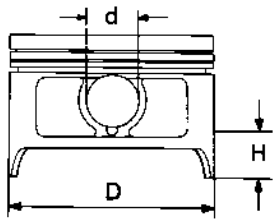
General (cont'd)		
	Item	Specifications
Carburetor	Carburetor type Throttle bore	Constant velocity 4 carburetors 34.5 (1.36)
Drive train	Clutch system Clutch operation system Transmission Primary reduction Secondary reduction Third reduction Final reduction Gear ratio 1st Gear ratio 2nd Gear ratio 3rd Gear ratio 4th Gear ratio 5th Gear ratio 6th Gear ratio reverse Gearshift pattern	Multi-plate, wet Hydraulic operating 5 speeds 1.8292 (75/41) — — 2.8333 (34/12) 2.2666 (34/15) 1.5000 (27/18) 1.1428 (24/21) 0.9166 (22/24) 0.7586 (22/29) — — Left foot operated return system 1-N-2-3-4-5
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 Field control/triple phase full-wave rectification Battery —

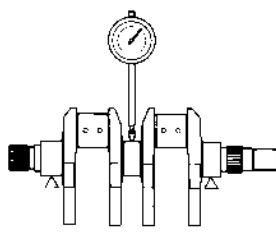
Lubrication	Item	Standard	Service Limit
	Engine oil capacity at draining	3.6 liters (3.80 US qt, 3.17 Imp qt)	—
	at disassembly	4.3 liters (4.54 US qt, 3.78 Imp qt)	—
	at oil filter change	3.7 liters (3.91 US qt, 3.26 Imp qt)	—
	Recommended engine oil	Use Honda GN4 4-stroke oil or equivalent motor oil certified to meet API service classification SF or SG. Viscosity: SAE 10W-40	
	<b>OIL VISCOSITIES</b>		
		Other viscosities 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	392—490 kPa (4.0—5.0 kg/cm <sup>2</sup> , 57—71 psi) at 5,000 rpm (80°C/ 176°F)	—
	Oil pump rotor tip clearance ①	0.15 (0.006)	—
	body clearance ②	0.15—0.22 (0.006—0.009)	—
	end clearance ③	0.02—0.09 (0.0008—0.0035)	—
			

Fuel System	Item	Standard	Service Limit
	Carburetor identification number		
	('91—'93) (Standard 49 state type)	VD BDA	—
	(Standard California and U.S.A. ABS/TCS type)	VD BEA	—
	(Canada type)	VD B1A	—
	(After '93) (Standard 49 state type)	VD BDA	—
	(49 state ABS/TCS or 49 state LBS-ABS/TCS type)	VD BJA	—
	(California type)	VD BEA	—
	(Canada type)	VD B1A	—
	Main jet ('91—'93) (49 state and Canada type)	# 128	—
	(California type)	# 125	—
	(After '93) (Standard 49 state and Canada type)	# 128	—
	(49 state ABS/TCS or 49 state LBS-ABS/TCS and California type)	# 125	—
	Slow jet (All U.S.A. types)	# 38	—
	(Canada type)	# 40	—
	Pilot screw initial opening	See page 5-12	—
	Pilot screw high altitude adjustment	See page 5-16	—
	Pilot screw final opening	See page 5-12	—
	Float level	7.0 (0.28)	—
	Carburetor vacuum difference	Within 40 mmHg (1.6 inHg)	—
	Base carburetor (For carburetor synchronization)	No. 4 carburetor	—
	Idle speed (All U.S.A. types)	1,200±100 rpm	—
	(Canada type)	1,000±100 rpm	—
	Throttle grip free play	2—6 (0.08—0.24)	—
	Pulse secondary air injection (PAIR) control valve vacuum pressure	360 mmHg (14.2 inHg)	—

Cylinder Head	Item	Standard	Service Limit
	Cylinder compression	1,373 ± 196 kPa (14.0 ± 2.0 kg/cm <sup>2</sup> , 199 ± 28 psi)/400 min <sup>-1</sup> (rpm)	—
	Cylinder compression difference	—	—
	Valve clearance IN	0.13—0.19 (0.005—0.007)	—
	EX	0.22—0.28 (0.009—0.011)	—
	Cylinder head warpage	—	0.10 (0.004)
	Cam lobe height ①		
	IN	36.480—36.640 (1.4362—1.4425)	36.450 (1.4350)
	IN (Standard California and U.S.A. ABS/TCS or U.S.A. LBS-ABS/TCS type)	35.680—35.840 (1.4047—1.4110)	35.650 (1.4035)
	EX	35.970—36.130 (1.4161—1.4224)	35.940 (1.4150)
	EX (Standard California and U.S.A. ABS/TCS or U.S.A. LBS-ABS/TCS type)	35.770—35.930 (1.4083—1.4146)	35.740 (1.4071)
	Camshaft runout	—	0.05 (0.002)
	Camshaft oil clearance A	0.020—0.062 (0.0008—0.0024)	0.100 (0.0039)
	B	0.050—0.092 (0.0020—0.0036)	0.130 (0.0051)
			
	Camshaft journal O.D. A	24.959—24.980 (0.9826—0.9835)	24.950 (0.9823)
	B	24.929—24.950 (0.9815—0.9823)	24.920 (0.9811)
	Camshaft holder I.D. A	25.000—25.021 (0.9843—0.9851)	—
	B	25.000—25.021 (0.9843—0.9851)	—
	Valve stem O.D. IN	4.475—4.490 (0.1762—0.1768)	4.465 (0.1758)
	EX	4.465—4.480 (0.1758—0.1764)	4.455 (0.1754)
	Valve guide I.D. IN	4.500—4.512 (0.1772—0.1776)	4.562 (0.1796)
	EX	4.500—4.512 (0.1772—0.1776)	4.612 (0.1816)
	Stem-to guide clearance IN	0.010—0.037 (0.0004—0.0015)	—
	EX	0.020—0.047 (0.0008—0.0019)	—
	Valve guide projection above cylinder head IN (h)	15.3—15.5 (0.60—0.61)	—
	EX (h)	15.3—15.5 (0.60—0.61)	—
	 Before guide installation: 1. Chill the valve guide in the freezer section of a refrigerator for about an hour. 2. Heat the cylinder head to 100—150°C (212—300°F)		
	Valve seat width IN	1.0 (0.04)	1.5 (0.06)
	EX	1.0 (0.04)	1.5 (0.06)
	Valve spring free length IN	41.72 (1.643)	39.6 (15.59)
	EX	41.72 (1.643)	39.6 (15.59)
	Inner IN	—	—
	Inner EX	—	—
	Outer IN	—	—
	Outer EX	—	—
	Rocker arm I.D. IN	—	—
	EX	—	—
	Rocker arm shaft O.D. IN	—	—
	EX	—	—
	Rocker arm-to-rocker arm shaft clearance	—	—
	Valve lifter O.D.	25.978—25.993 (1.0228—1.0233)	25.968 (1.0224)
	Valve lifter bore I.D.	26.010—26.026 (1.0240—1.0246)	26.040 (1.0252)
	Hydraulic tappet adjuster assist spring free length	—	—
	Hydraulic tappet adjuster compression stroke with kerosene	—	—

Unit: mm (in)

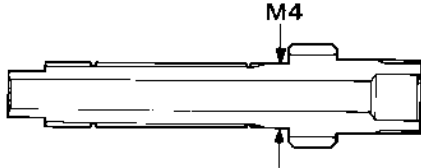
Cylinder/Piston	Item	Standard	Service Limit
	Cylinder I.D.	73.000—73.015 (2.8740—2.8746)	73.10 (2.878)
	Cylinder out of round	—	0.10 (0.004)
	Cylinder taper	—	0.10 (0.004)
	Cylinder warpage	—	0.10 (0.004)
	Piston mark direction	"IN" mark facing toward the intake side	—
	Piston O.D. (D)	72.970—72.990 (2.8728—2.8736)	72.850 (2.8681)
	Piston O.D. measurement point (H)	19 (0.75)	—
	Piston pin hole I.D. (d)	18.002—18.008 (0.7087—0.7090)	18.020 (0.7094)
			
	Cylinder-to-piston clearance	0.010—0.045 (0.0004—0.0018)	—
	Piston pin O.D.	17.994—18.000 (0.7084—0.7087)	17.98 (0.708)
	Piston-to-piston pin clearance	0.002—0.014 (0.0001—0.0006)	—
	Connecting rod-to-piston pin clearance	0.016—0.040 (0.0006—0.0016)	—
	Top ring-to-ring groove clearance	0.025—0.060 (0.0010—0.0024)	0.10 (0.004)
	Second ring-to-ring groove clearance	0.015—0.050 (0.0006—0.0020)	0.10 (0.004)
	Top ring end gap	0.15—0.30 (0.006—0.012)	0.5 (0.02)
	Second ring end gap	0.30—0.45 (0.012—0.018)	0.7 (0.03)
	Oil ring (side rail) end gap	0.20—0.70 (0.008—0.028)	1.0 (0.04)
	Top ring mark	"R" mark facing up	—
	Second ring mark	"RN" mark facing up	—

Crankshaft	Item	Standard	Service Limit
	Connecting rod small end I.D.	18.016—18.034 (0.7093—0.7100)	18.050 (0.7106)
	Connecting rod big end side clearance	0.10—0.30 (0.004—0.012)	0.40 (0.016)
	radial clearance	—	—
	Crankshaft runout	—	0.05 (0.002)
			
	Crankpin oil clearance	0.030—0.052 (0.0012—0.0020)	0.080 (0.0031)
	Crankpin bearing selection	See page 11-6	—
	Main journal oil clearance	0.026—0.048 (0.0010—0.0019)	0.065 (0.0026)
	Main journal bearing selection	See page 11-6	—

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.	—	—

# General Information

Unit: mm (in)

Transmission	Item	Standard	Service Limit
	Transmission gear I.D. M4, M5	31.000—31.025 (1.2204—1.2215)	31.040 (1.2220)
	C2, C3	31.000—31.025 (1.2204—1.2215)	31.040 (1.2220)
	Transmission gear bushing O.D. M4, M5	30.950—30.975 (1.2185—1.2195)	30.930 (1.2177)
	C2, C3	30.950—30.975 (1.2185—1.2195)	30.930 (1.2177)
	Transmission gear bushing I.D. M4	28.000—28.021 (1.1024—1.1032)	28.031 (1.1036)
	Gear-to-bushing clearance at M4, M5 gear	0.025—0.075 (0.0010—0.0030)	—
	at C2, C3 gear	0.025—0.075 (0.0010—0.0030)	—
	Mainshaft O.D. at M4 gear bushing	27.967—27.980 (1.1011—1.1016)	27.960 (1.1008)
			
	Gear bushing-to-shaft clearance at M4 gear	0.020—0.054 (0.0008—0.0021)	—
	Shift fork claw thickness F	5.93—6.00 (0.233—0.236)	5.9 (0.23)
	C	5.93—6.00 (0.233—0.236)	5.9 (0.23)
	R	5.93—6.00 (0.233—0.236)	5.9 (0.23)
	Shift fork I.D. F	14.000—14.021 (0.5512—0.5520)	14.03 (0.552)
	C	14.000—14.021 (0.5512—0.5520)	14.03 (0.552)
	R	14.000—14.021 (0.5512—0.5520)	14.03 (0.552)
	Shift fork shaft O.D. at F shift fork	13.973—13.984 (0.5501—0.5506)	13.965 (0.5498)
	at C shift fork	13.973—13.984 (0.5501—0.5506)	13.965 (0.5498)
	at R shift fork	13.973—13.984 (0.5501—0.5506)	13.965 (0.5498)
<b>Primary Damper Shaft</b>			
	Primary damper spring free length	95.4 (3.76)	93.0 (3.66)



Unit: mm (in)

Clutch System	Item	Standard	Service Limit
	Clutch lever free play	—	—
	Recommended clutch fluid	DOT 4 brake fluid	—
	Clutch master cylinder I.D.	14.000—14.043 (0.5512—0.5529)	14.06 (0.553)
	Clutch master piston O.D.	13.957—13.984 (0.5495—0.5506)	13.94 (0.549)
	Clutch outer I.D.	—	—
	Clutch outer guide O.D.	34.975—34.991 (1.3770—1.3776)	34.965 (1.3766)
	I.D.	27.989—28.006 (1.1019—1.1026)	28.016 (1.1030)
	Primary damper shaft O.D. at clutch outer guide	27.974—27.987 (1.1013—1.1018)	—
	Oil pump drive sprocket I.D.	—	—
	Clutch center B I.D.	—	—
	One way clutch inner O.D.	—	—
	Clutch spring free height	—	—
	Clutch spring free length	43.0 (1.70)	40.0 (1.57)
	Clutch disc/plate thickness (Total of 10 discs and 9 plates)	54.72—55.72 (2.154—2.194)	54.2 (2.13)
	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)	2.5 liters (2.6 US qt, 2.2 Imp qt)	—
	(Reserve tank)	Standard model 0.5 liter (0.5 US qt, 0.4 Imp qt)	—
	ABS/TCS or LBS-ABS/TCS model	0.9 liter (1.0 US qt, 0.8 Imp qt)	—
	Radiator cap relief pressure	108—137 kPa (1.1—1.4 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 (0.32) minimum	—

Drive Train			
	Recommended final drive oil	Hypoid gear oil SAE #80	—
	Final drive gear oil capacity at disassembly	150 cm <sup>3</sup> (5.1 US oz, 5.3 Imp oz)	—
	at draining	130 cm <sup>3</sup> (4.4 US oz, 4.6 Imp oz)	—
	Final drive gear backlash	0.05—0.15 (0.002—0.006)	0.3 (0.01)
	Final drive gear backlash difference between measurements	—	—
	Ring gear-to-stop pin clearance (A)	0.30—0.60 (0.012—0.024)	—
	Stop pin shim	See page 12-10	—
	Ring gear spacer	See page 12-10	—
	Pinion spacer	See page 12-11	—
	Final drive gear assembly preload	2—4 kg-cm (1.7—3.5 in-lb)	—
	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	—	—

## General Information

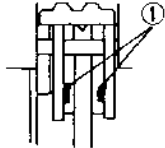
Unit: mm (in)

Wheels/Tires		Standard	Service Limit
Minimum tire tread depth (FR)		—	1.5 (0.06)
	(RR)	—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load (FR)	250 kPa (2.50 kg/cm <sup>2</sup> , 36 psi)	—
	(RR)	290 kPa (2.90 kg/cm <sup>2</sup> , 42 psi)	—
Up to maximum weight capacity	(FR)	250 kPa (2.50 kg/cm <sup>2</sup> , 36 psi)	—
	(RR)	290 kPa (2.90 kg/cm <sup>2</sup> , 42 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		—	—
Drive chain size link	(DID)	—	—
	(RK)	—	—
Wheel sensor air gap	(Front) ABS/TCS model	0.4–1.2 (0.016–0.047)	—
	LBS-ABS/TCS model	0.4–0.5 (0.016–0.020)	—
	(Rear)	0.7–1.2 (0.028–0.047)	—

Front Suspension		Standard	Service Limit
Front spring free length	Standard model	415.6 (16.36)	407.3 (16.04)
	ABS/TCS model	474.2 (18.67)	464.7 (18.30)
	LBS-ABS/TCS model	483.1 (19.02)	473.4 (18.64)
Fork spring free length A		—	—
	B	—	—
Fork spring direction		Tightly wound coil end facing down	—
Fork tube runout		—	0.2 (0.008)
Recommended fork oil		Pro Honda Suspension Fluid SS-7	—
Fork oil level		—	—
Fork oil level (R)	Standard model	190 (7.5)	—
	ABS/TCS model	177 (7.0)	—
	LBS-ABS/TCS model	140 (5.5)	—
	(L) Standard model	187 (7.4)	—
	ABS/TCS model	174 (6.9)	—
	LBS-ABS/TCS model	136 (5.4)	—
Fork oil capacity		—	—
Fork oil capacity (R)	Standard model	385 ± 2.5 cm <sup>3</sup> (13.02 ± 0.08 US oz, 13.51 ± 0.09 Imp oz)	—
	ABS/TCS model	372.0 ± 2.5 cm <sup>3</sup> (12.58 ± 0.08 US oz, 13.05 ± 0.09 Imp oz)	—
	LBS-ABS/TCS model	533.0 ± 2.5 cm <sup>3</sup> (18.02 ± 0.08 US oz, 18.71 ± 0.09 Imp oz)	—
	(L) Standard model	435.0 ± 2.5 cm <sup>3</sup> (14.71 ± 0.08 US oz, 15.27 ± 0.09 Imp oz)	—
	ABS/TCS Model	418.0 ± 2.5 cm <sup>3</sup> (14.14 ± 0.08 US oz, 14.67 ± 0.09 Imp oz)	—
	LBS-ABS/TCS model	486.0 ± 2.5 cm <sup>3</sup> (16.43 ± 0.08 US oz, 17.06 ± 0.09 Imp oz)	—
Fork air pressure		—	—
Steering bearing preload		1.5–2.0 kg (3.3–4.4 lb)	—

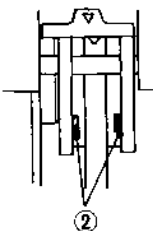
Unit: mm (in)

Rear Suspension		Standard	Service Limit
Item			
Shock absorber spring free length	Standard model	256.5 (10.10)	251.4 (9.90)
	ABS/TCS or LBS-ABS/TCS	258.9 (10.19)	253.7 (9.99)
Shock absorber spring free length (R)		—	—
	(L)	—	—
Damper gas pressure		—	—
Damper compressed gas		—	—
Damper rod compressed force at 10 mm compressed		—	—
Damper drilling point		—	—
Shock absorber spring installed length (Standard)		—	—
	(Adjustable range)	—	—
Shock absorber spring adjuster standard position		—	—
Shock absorber spring direction		—	—
Recommended shock absorber oil		—	—
Shock absorber oil capacity		—	—
air pressure		—	—

Brakes		Standard	Service Limit
Front brake			
Brake fluid		DOT 4	—
Brake lever free play		—	—
Brake pad wear indicator		—	To the groove ①
			
Brake disc thickness		4.8–5.2 (0.19–0.20)	4.0 (0.16)
Brake disc runout		—	0.30 (0.012)
Master cylinder I.D.	Standard and ABS/TCS model	14.000–14.043 (0.5512–0.5529)	14.06 (0.554)
	LBS-ABS/TCS model	12.700–12.743 (0.5000–0.5017)	12.76 (0.502)
Master piston O.D.	Standard and ABS/TCS model	13.957–13.984 (0.5495–0.5506)	13.95 (0.549)
	LBS-ABS/TCS model	12.657–12.684 (0.4983–0.4994)	12.65 (0.498)
Caliper cylinder I.D.	Standard and ABS/TCS model	27.000–27.050 (1.0630–1.0650)	27.06 (1.065)
	LBS-ABS/TCS model R. (Upper)	27.000–27.050 (1.0630–1.0650)	27.06 (1.065)
	(Center)	22.650–22.700 (0.8917–0.8937)	22.71 (0.894)
	(Lower)	25.400–25.450 (1.0000–1.0020)	25.46 (1.002)
	L. (Upper)	25.400–25.450 (1.0000–1.0020)	25.46 (1.002)
	(Center)	25.400–25.450 (1.0000–1.0020)	25.46 (1.002)
	(Lower)	22.650–22.700 (0.8917–0.8937)	22.71 (0.894)
Caliper piston O.D.	Standard and ABS/TCS model	26.918–26.968 (1.0598–1.0617)	26.91 (1.059)
	LBS-ABS/TCS model R. (Upper)	26.935–26.968 (1.0604–1.0617)	26.91 (1.059)
	(Center)	22.585–22.618 (0.8892–0.8905)	22.56 (0.888)
	(Lower)	25.335–25.368 (0.9974–0.9987)	25.31 (0.996)
	L. (Upper)	25.335–25.368 (0.9974–0.9987)	25.31 (0.996)
	(Center)	25.335–25.368 (0.9974–0.9987)	25.31 (0.996)
	(Lower)	22.585–22.618 (0.8892–0.8905)	22.56 (0.888)
Brake drum I.D.		—	—
Brake lining thickness		—	—

# General Information

Unit: mm (in)

Brakes (cont'd)		Standard	Service Limit
Rear brake			
Brake fluid		DOT 4	—
Brake pedal height		—	—
Brake pedal free play		—	—
Brake pad wear indicator		—	To the groove ②
Brake disc thickness	Standard and ABS/TCS model LBS-ABS/TCS model	7.3-7.7 (0.29-0.30) 7.3-7.7 (0.29-0.30)	6.0 (0.24) 6.5 (0.26)
Brake disc runout		—	0.30 (0.012)
Master cylinder I.D.	Standard and ABS/TCS model LBS-ABS/TCS model	12.700-12.743 (0.5000-0.5017) 17.460-17.503 (0.6874-0.6891)	12.76 (0.502) 17.515 (0.6895)
Master piston O.D.	Standard and ABS/TCS model LBS-ABS/TCS model	12.657-12.684 (0.4983-0.4994) 17.417-17.444 (0.6857-0.6868)	12.65 (0.498) 17.405 (0.6852)
Caliper cylinder I.D.	Standard and ABS/TCS model LBS-ABS/TCS model (Front) (Center) (Rear)	27.000-27.050 (1.0630-1.0650) 22.650-22.700 (0.8917-0.8937) 27.000-27.050 (1.0630-1.0650) 22.650-22.700 (0.8917-0.8937)	27.06 (1.065) 22.71 (0.894) 27.06 (1.065) 22.71 (0.894)
Caliper piston O.D.	Standard and ABS/TCS model LBS-ABS/TCS model (Front) (Center) (Rear)	26.918-26.968 (1.0598-1.0617) 22.585-22.618 (0.8892-0.8905) 26.935-26.968 (1.0604-1.0617) 22.585-22.618 (0.8892-0.8905)	26.91 (1.059) 22.56 (0.888) 26.91 (1.059) 22.56 (0.888)
Brake drum I.D.		—	—
Brake lining thickness		—	—
Secondary master cylinder I.D. (LBS-ABS/TCS model)		14.000-14.043 (0.5512-0.5529)	14.06 (0.554)
master piston O.D. (LBS-ABS/TCS model)		13.957-13.984 (0.5495-0.5506)	13.95 (0.549)

Battery/Charging System		
Alternator charging coil resistance (at 20°C/68°F)	0-1.0 Ω ('91-'95) 0.22-0.26 Ω (After '95)	—
Rotor coil (field coil) resistance (at 20°C/68°F)	0-4.0 Ω ('91-'95) 2.6-3.2 Ω (After '95)	—
Regulator/rectifier regulated voltage ('91-'95) (After '95)	12.6-15.0 V at 5,000 rpm 14.2-14.8 V at 5,000 rpm	—
Battery capacity	12 V-12 AH (Maintenance free battery: YTX14-BS)	—
Specified current leakage ('91-'95) (After '95)	— —	3 mA max. 2 mA max.
Battery specific gravity (Fully charged) (Needs charging)	— —	— —
Battery charging rate (Normal) (Quick)	1.4 A x 5 h 6 A x 1 h	— —
Battery voltage (Fully charged at 20°C/68°F) (Needs charging at 20°C/68°F)	13.1 V Below 12.3 V	— —
AC regulator regulated voltage (With analogue type) (With digital type)	— —	— —
Brush length (After '95)	13.7 (0.54)	4.7 (0.19)
Slip ring O.D. (After '95)	14.4 (0.57)	12 (0.5)

Ignition System	Item	Standard	Service Limit
	Spark plug		
	(Standard NGK)	CR8EH 9	—
	(Standard NIPPONDENSO)	U24FER9	—
	(For cold climate/below 5°C/41°F NGK)	—	—
	(For cold climate/below 5°C/41°F NIPPONDENSO)	—	—
	(For extended high speed riding NGK)	CR9EH 9	—
	(For extended high speed riding NIPPONDENSO)	U27FER9	—
	Spark plug gap	0.8—0.9 (0.031—0.035)	—
	Ignition timing "F" mark	12° BTDC at 1,000 rpm	—
	Advance starts	2,000 rpm	—
	stops	5,000 rpm	—
	Full advance	27° BTDC at 5,000 rpm	—
	Alternator exciter coil resistance (At 20°C/68°F)	—	—
	Ignition coil resistance (Primary; at 20°C/68°F)	2.16—3.19 Ω	—
	(Secondary with plug cap)	22.5—27.5 kΩ	—
	(Secondary without plug cap)	13.5—16.5 kΩ	—
	Ignition pulse generator resistance (At 20°C/68°F)	405—495 Ω	—

## General Information

Unit: mm (in)

Lights/Meters/Switches	Item	Standard	Service Limit
	Main fuse	30A	—
	Alternator fuse	55A	—
	Fuse ('91-95)	10A x 6, 20A x 1	—
	(After '95)	Standard model	—
		LBS-ABS/TCS model	—
	ABS fuse (ABS/TCS model)	5A (Accessory), 10A x 6, 20A x 1	—
	(LBS-ABS/TCS model)	5A (Accessory), 10A x 5, 15A x 2	—
	Headlight (high/low beam) Standard and ABS/TCS model	10A x 3, 20A x 1	—
	LBS-ABS/TCS model	10A x 1, 30A x 2	—
	Tail/brake light	12V45/45W x 2	—
	License light	12V 60/55W	—
	Position light	12V32/3cp x 2	—
	Front turn signal/running light	—	—
	Front turn signal light	12V32/3cp x 2	—
	Rear turn signal light	—	—
	Instrument light	12V32cp x 2	—
	Oil pressure indicator	12V1.7W x 4	—
	Standard model	12V3.4W	—
	ABS/TCS or LBS-ABS/TCS model	12V3W	—
	Tail/brake light indicator	—	—
	Side stand indicator	Standard model	—
	ABS/TCS or LBS-ABS/TCS model	12V3.4W	—
	Low fuel indicator	Standard model	—
	ABS/TCS or LBS-ABS/TCS model	12V1.7W	—
	Coolant temperature indicator	Standard model	—
	Oil temperature indicator	ABS/TCS or LBS-ABS/TCS model	—
	High beam indicator	Standard model	—
	ABS/TCS or LBS-ABS/TCS model	12V3.4W	—
	Turn signal indicator	Standard model	—
	ABS/TCS or LBS-ABS/TCS model	12V3W	—
	Neutral indicator	Standard model	—
	ABS/TCS or LBS-ABS/TCS model	12V3.4W	—
	TCS activation light (ABS/TCS or LBS-ABS/TCS model)	12V1.7W	—
	TCS OFF indicator (ABS/TCS or LBS-ABS/TCS model)	12V3W x 2	—
	TCS indicator light (ABS/TCS or LBS-ABS/TCS model)	12V3W	—
	ABS indicator light (ABS/TCS or LBS-ABS/TCS model)	LED x 1	—
	Reverse indicator	LED x 2	—
	Overdrive indicator	—	—
	Oil temperature sensor resistance	—	—
	Fuel unit resistance (At full level)	10 Ω	—
	(At empty)	90 Ω	—
	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)	—
	Fully open (OFF)	93-97°C (199-207°F)	—

Starting System			
	Starter driven gear O.D.	57.749-57.768 (2.2736-2.2743)	—
	Starter clutch outer I.D.	74.414-74.440 (2.9297-2.9307)	—
	Starter motor brush length	12.0-13.0 (0.47-0.51)	—

# Torque Values

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

- 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 sealant to the threads.
  4. Stake.
  5. Apply clean engine oil to the O-ring.

Engine				
Item	Q'ty	Thread dia. (mm)	Torque N•m (kg-m, ft-lb)	Remarks
<b>Lubrication:</b>				
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	Note 1
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	Note 3
Oil filter	1	20	10 (1.0, 7)	Note 5
Oil drain bolt	1	12	38 (3.8, 27)	
Oil cooler bolt ('91-'95)	1	20	65 (6.5, 47)	
Oil filter boss	1	20	18 (1.8, 20)	Note 1
Oil pan bolt	14	6	12 (1.2, 9)	
<b>Timing belt/cylinder head:</b>				
Timing belt tensioner bolt	1	10	46 (4.6, 33)	
Timing belt idle pulley bolt	1	12	46 (4.6, 33)	Note 1
Timing belt driven pulley bolt	2	8	27 (2.7, 20)	
Timing belt drive pulley bolt	1	12	65 (6.5, 47)	
Cylinder head bolt	12	10	58 (5.8, 42)	Note 2
Camshaft holder bolt	24	6	12 (1.2, 9)	
Cylinder head cover bolt	8	6	12 (1.2, 9)	
Spark plug	4	10	11 (1.1, 8)	
Vacuum joint	4	5	4 (0.4, 2.9)	
Reduction bolt	1	12	38 (3.8, 27)	
<b>Clutch/gearshift linkage:</b>				
Clutch lock nut	1	22	110 (11.0, 80)	
Shift drum center bolt	1	8	23 (2.3, 17)	
Shift return spring pin bolt	1	8	23 (2.3, 17)	
Slave cylinder bleed valve	1	8	9 (0.9, 6.5)	
Gearshift arm bolt	1	6	12 (1.2, 9)	
<b>Crankcase/crankshaft/transmission:</b>				
Connecting rod cap nut	8	8	36 (3.6, 26)	Note 2
Crankcase bolt 6 mm	6	6	12 (1.2, 9)	
8 mm	7	8	23 (2.3, 17)	Note 2
10 mm	6	10	52 (5.2, 38)	Note 2
Pulse generator rotor bolt	1	12	100 (10.0, 72)	Note 2
Neutral switch	1	10	12 (1.2, 9)	
32 mm cap	1	32	12 (1.2, 9)	Note 5
<b>Alternator:</b>				
Alternator terminal nut (After '95)	1	6	8 (0.8, 5.8)	
Alternator shaft nut	1	14	58 (5.8, 42)	Note 1
Alternator drive gear bolt	8	6	16 (1.6, 12)	Note 1

## General Information

Frame	Item	Q'ty	Thread dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
<b>Frame/body panels:</b>					
	Center stand pivot bolt	1	8	27 (2.7, 20)	
	Side stand pivot bolt	1	10	10 (1.0, 7)	
	Side stand pivot lock nut	1	10	27 (2.7, 20)	
	Rotary switch attaching bolt	1	6	10 (1.0, 7)	
	Footpeg holder 8 mm	2	8	27 (2.7, 20)	
	10 mm	4	10	35 (3.5, 25)	
	Grab rail	6	8	27 (2.7, 20)	
	Grab rail center plate bolt	4	8	35 (3.5, 25)	
	Saddle bag stay bolt 6 mm	2	6	10 (1.0, 7)	
	8 mm	2	8	35 (3.5, 25)	
	Center stand grip bolt	2	6	10 (1.0, 7)	
	Engine guard mounting bolt	3	8	27 (2.7, 20)	
	Windshield screw	5	5	0.6 (0.06, 0.43)	
	Upper fairing bracket bolt	1	8	27 (2.7, 20)	
<b>Exhaust system:</b>					
	Exhaust pipe joint nut	8	7	17 (1.7, 12)	
	Muffler band bolt	4	8	22 (2.2, 16)	
	Exhaust pipe band bolt	1	8	22 (2.2, 16)	
	Muffler mounting bolt	2	8	27 (2.7, 20)	
	Exhaust pipe protector bolt	12	6	12 (1.2, 9)	
<b>Fuel system:</b>					
	Fuel tank mounting bolt	4	6	12 (1.2, 9)	
	Fuel pump mounting nut	6	6	10 (1.0, 7)	
	Carburetor connecting screw	2	6	8 (0.8, 5.8)	
	Air cleaner housing cover screw	8	5	0.9 (0.09, 0.65)	
	Fuel valve mounting screw	2	5	0.9 (0.09, 0.65)	
<b>Cooling system:</b>					
	Fan motor switch	1	16	12 (1.2, 9)	
	Thermostat case	2	6	10 (1.0, 7)	
	Water hose band screw	10	—	1.2 (0.12, 0.9)	
<b>Engine mount:</b>					
	Engine mounting bolt 10 mm	4	10	55 (5.5, 40)	Note 2
	12 mm	1	12	65 (6.5, 47)	
	Engine mounting bracket bolt 8 mm	8	8	35 (3.5, 25)	
	10 mm	4	10	40 (4.0, 29)	
	Sub frame bolt	5	10	40 (4.0, 29)	
	Engine mounting collar lock nut ('91-'95)	1	18	21 (2.1, 15)	
	(After '95)	2	18	28 (2.8, 20)	
	Engine mounting collar adjusting nut (lower)	1	18	10 (1.0, 7)	
	(After '95)	1	18	10 (1.0, 7)	
	Gearshift pedal pivot bolt	1	8	27 (2.7, 20)	Note 1



Frame		Q'ty	Thread dia. (mm)	Torque N-m (kg-m, ft-lb)	Remarks
<b>Front suspension:</b>					
Handlebar lower cover bolt		4	5	4.3 (0.43, 3.1)	
Handlebar upper holder bolt		4	8	27 (2.7, 20)	
Handlebar weight screw		2	6	9 (0.9, 6.5)	Note 1
Ignition switch mounting bolt		2	8	25 (2.5, 18)	
Throttle housing screw		2	5	4.2 (0.42, 3.0)	
Front fender attaching socket bolt					
Standard and LBS-ABS/TCS model		2	6	12 (1.2, 9)	
ABS/TCS model		2	8	22 (2.2, 16)	
Front fender plate bolt (LBS-ABS/TCS model)		2	8	22 (2.2, 16)	Front side bolts
Steering bearing adjustment nut		1	26	28 (2.8, 20)	Note 2
Steering stem nut		1	24	105 (10.5, 76)	
Upper fork pinch bolt		2	8	23 (2.3, 17)	
Lower fork pinch bolt		4	10	50 (5.0, 36)	
Fork cap	Standard and ABS/TCS model	2	—	20 (2.0, 14)	
	LBS-ABS/TCS model	2	—	23 (2.3, 17)	
Fork socket bolt		2	8	20 (2.0, 14)	Note 1
Fork damper lock nut		1	10	23 (2.3, 17)	
Anti-drive case bolt		4	5	4 (0.4, 2.9)	Note 1
Front axle bolt		1	14	90 (9.0, 65)	
Front axle pinch bolt		4	8	22 (2.2, 16)	
Front pulser ring bolt (ABS/TCS or LBS-ABS/TCS model)		6	5	8 (0.8, 5.8)	
<b>Rear suspension:</b>					
Shock absorber upper mounting bolt		1	10	50 (5.0, 36)	Note 2
Shock absorber lower mounting bolt		1	8	23 (2.3, 17)	
Swingarm right pivot bolt		1	30	105 (10.5, 76)	
Swingarm left pivot bolt					
Standard and ABS/TCS model		1	30	18 (1.8, 13)	
LBS-ABS/TCS model		1	30	22 (2.2, 16)	
Swingarm left pivot bolt lock nut		1	30	105 (10.5, 76)	
Rear axle nut		1	18	110 (11.0, 80)	
Rear axle pinch bolt		1	8	27 (2.7, 20)	
Rear wheel damper plate bolt		5	6	20 (2.0, 14)	
Rear pulser ring bolt (ABS/TCS or LBS-ABS/TCS model)		6	5	8 (0.8, 5.8)	
<b>Brake/clutch system:</b>					
Front wheel speed sensor bracket bolt (LBS-ABS/TCS model)		1	6	12 (1.2, 9)	
Rear caliper stopper pin bolt		1	18	70 (7.0, 51)	
Pad pin plug		3	10	2.5 (0.25, 1.8)	
Pad pin		3	10	18 (1.8, 13)	
Caliper assembly bolt (LBS-ABS/TCS model)		9	8	33 (3.3, 24)	
Front caliper pin bolt (caliper side)		2	8	23 (2.3, 17)	Note 1
(bracket side)		2	8	13 (1.3, 9)	Note 1
Rear caliper pin bolt					
(caliper side) Standard and ABS/TCS model		1	12	28 (2.8, 20)	Note 1
LBS-ABS/TCS model		1	12	28 (2.8, 20)	
(bracket side) Standard and ABS/TCS model		1	8	13 (1.3, 17)	Note 1
LBS-ABS/TCS model		1	8	23 (2.3, 17)	Note 1
Caliper bleed valve					
Standard and ABS/TCS model		3	—	5.5 (0.55, 4.0)	
LBS-ABS/TCS model		6	—	5.5 (0.55, 4.0)	



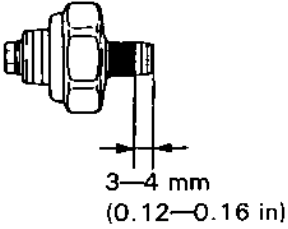
## Tools

Description	Tool Number	Alternate Tool	Tool Number	Ref. Section(s)
Oil filter wrench	07HAA-PJ70100			4
Oil pressure gauge	07506-3000000	Equivalent commercially available in U.S.A.		4
Oil pressure gauge attachment	07501-4220100			4
Float level gauge	07401-0010000			5
Pilot screw wrench	07KMA-MS60101	Pilot screw wrench (U.S.A. only)	07LMA-MT8010A or 07MMA-MT3010A	5
Bearing remover set	07936-3710001	Not available in U.S.A.		8, 10
– Remover handle	07936-3710100			8, 10
– Bearing remover, 17 mm	07936-3710600			8, 10
– Remover weight	07741-0010201		Remover weight	07936-3710200
Driver	07749-0010000			8,9,10,12,13,14
Attachment, 37 x 40 mm	07746-0010200			8, 14
Pilot, 20 mm	07746-0040500			8, 10
Valve guide driver, 4.5 mm	07HMD-ML00100	Valve guide driver, 4.5 mm	07HMD-ML00101	8
Valve spring compressor	07757-0010000			8
Valve spring compressor attachment	07959-KM30101			8
Tappet hole protector	07HMG-MR70001	or Equivalent (see page 8-9)		8
Valve guide reamer, 4.5 mm	07HMH-ML00101	Valve guide reamer, 4.5 mm	07HMH-ML0010A	8
Compression gauge attachment	07JMJ-KY20100	Equivalent commercially available in U.S.A.		8
Valve seat cutter, 24.5 mm (45° EX)	07780-0010100	Equivalent commercially available in U.S.A.		8
Valve seat cutter, 29 mm (45° IN)	07780-0010300			8
Flat cutter, 25 mm (32° EX)	07780-0012000			8
Flat cutter, 28 mm (32° IN)	07780-0012100			8
Interior cutter, 30 mm (60° IN, EX)	07780-0014000			8
Cutter holder, 4.5 mm	07781-0010600			8
Snap ring pliers	07914-3230001			9, 15
Clutch center holder	07JMB-MN50300	Holder plate Clutch center collar "B"	07HGB-001010B 07MPB-764021A	9
Clutch holder collar	07LMB-MT30100			9
Lock nut wrench, 30 x 32 mm	07716-0020400	Equivalent commercially available in U.S.A.		9
Extension bar	07716-0020500			9
Attachment, 28 x 30 mm	07946-1870100			9
Pilot, 12 mm	07746-0040200			9
Ball race & bearing driver attachment	07945-3330300			10
Attachment, 42 x 47 mm	07746-0010300			10,12,13
Pilot, 25 mm	07746-0040600			10
Attachment, 62 x 68 mm	07746-0010500			10, 12
Pilot, 30 mm	07746-0040700			10
Pilot, 28 mm	07746-0041100			10

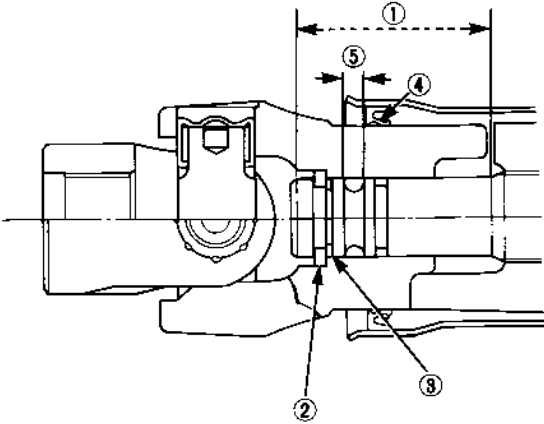
# General Information

Cont'd				
Description	Tool Number	Alternate Tool	Tool Number	Ref. Section(s)
Pinion retainer wrench	07910-MA10100			12
Shaft puller	07931-ME40000	Shaft puller	07931-ME4010A	12
Pinion holder attachment	07924-ME40000			12
attachment	07924-9690102			12
Oil seal remover	07948-4630100			12
Oil seal driver attachment	07948-SB00101			12
Bearing race remover	07946-3710500			12
Oil seal driver	07965-MC70100			12
Attachment, 52 x 55 mm	07746-0010400			12, 13
Pilot, 35 mm	07746-0040800			12
Driver, 40 mm I.D.	07746-0030100			12
Attachment, 25 mm I.D.	07746-0030200			12
Bearing insert attachment	07931-4630300			12
Yoke joint compressor attachment	07LMF-MT30110	Not available in U.S.A.		12
Yoke joint compressor base	07LMF-MT30120			12
Fork seal driver attachment				13
Standard and ABS/TCS model	07947-KF00100			
LBS-ABS/TCS model	07947-KA40200			
Fork seal driver body	07947-KA50100			13
Steering stem socket	07916-3710100			13
Steering stem driver	07946-MB00000	Race remover attachment (U.S.A. only)	07953-MJ1000B	13
Ball race remover set	07953-MJ10000			13
- Driver attachment	07953-MJ10100			13
- Driver handle	07953-MJ10200			13
Bearing race remover	07946-3710100			13
Shock absorber compressor	07GME-0010000			14
Shock absorber compressor attachment	07959-MB10000			14
Pivot bearing outer remover	07936-4150000			14
Lock nut wrench	07908-4690003	Lock nut wrench	KS-HBA-08-469	14
Digital multimeter	KS-AHM-32-003	Equivalent commercially available in U.S.A.		17, 18, 20,
(U.S.A. only)				
Analogue tester (SANWA)	SP-15D			17, 18, 20,
				21
Analogue tester (KOWA)	TH-5H			17, 18, 20,
				21

# Lubrication & Seal Points

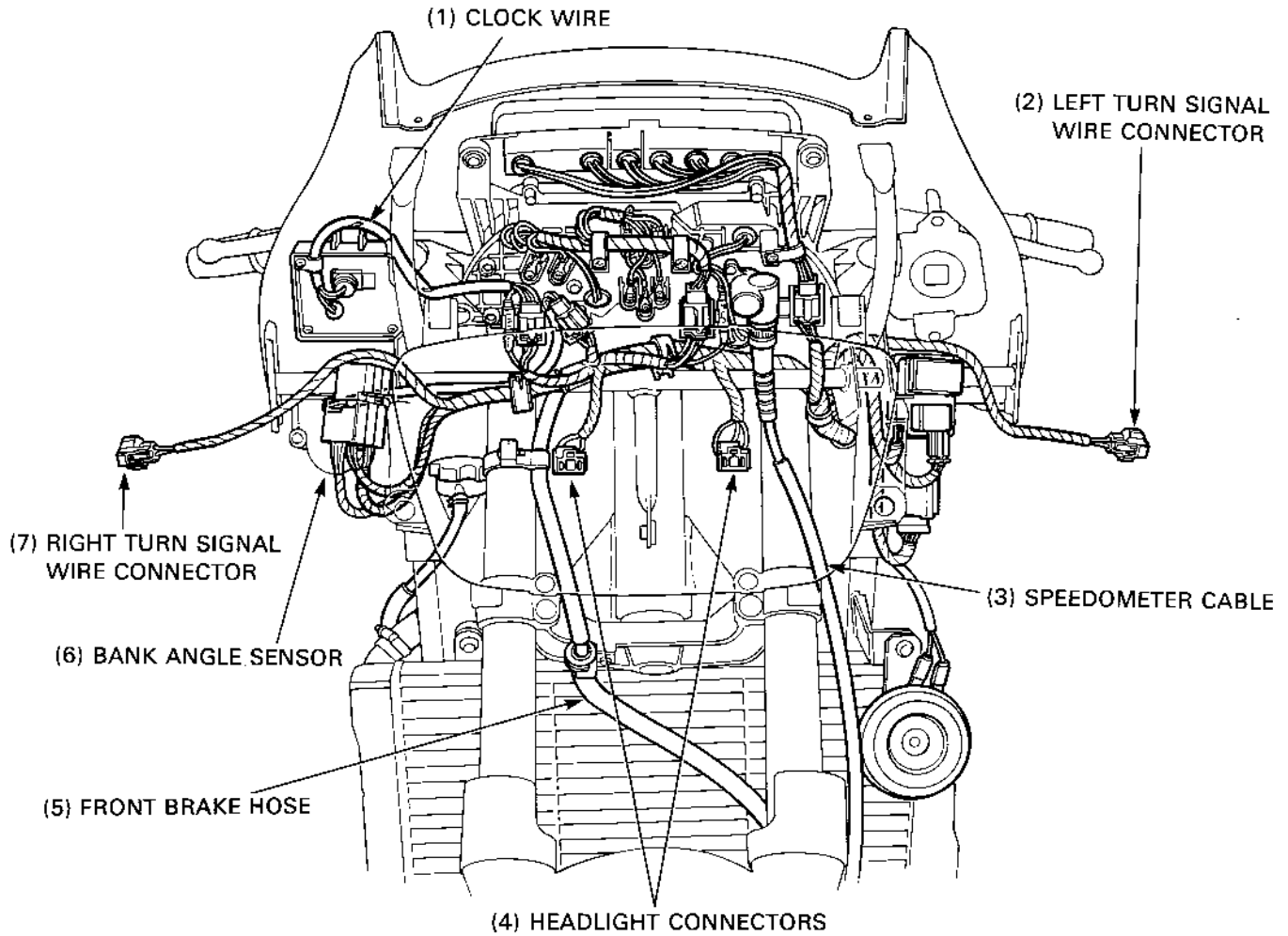
Engine	Location	Material	Remarks
	Upper and lower crankcase mating surface  Oil pressure switch thread  	Liquid sealant	Do not apply sealant near the main journal bearings. Do not apply sealant to the switch thread head as shown.
	Semi-circular portion of the cylinder head		
	Valve stem (valve guide sliding surface) Crankshaft main journal bearings Connecting rod bearings Crankshaft thrust surfaces Crankshaft thrust bearings Camshaft journals, cam lobes and thrust surfaces Camshaft driven gear Cam reduction gear shaft spline Valve lifter Piston pin Primary drive gear Clutch outer guide Transmission gearshift fork grooves Alternator driven gears	Molybdenum disulfide oil (a mixture of engine oil and molybdenum disulfide grease in a 1 : 1 ratio)	
	Connecting rod bearing cap nuts Piston Connecting rod small end bearing Transmission gears Shift forks Oil filter O-ring Oil strainer packing Clutch lifter rod Lifter rod guide Shift fork shaft 10 mm crankcase bolts 8 mm crankcase bolts Pulse generator rotor bolt Cylinder head bolts O-rings Other sliding surfaces	Engine oil	
	Oil seal lips	Multipurpose grease	
	Clutch slave cylinder piston seal	DOT 4 brake fluid	
	Timing belt idle pulley bolt threads Shift drum set plate bolt threads Oil pump driven sprocket bolt threads Primary damper shaft bearing set plate bolt threads Alternator drive gear bolt threads Timing belt tensioner spring hook bolt threads Water pump mounting bolt threads Cam reduction holder bolt threads Clutch cover base bolt threads Alternator shaft nut threads	Locking agent	

# General Information

Frame	Location	Material	Remarks
	Center stand pivot Side stand pivot Rear brake pedal pivot Gearshift pedal pivot Throttle grip pipe flange Steering head bearings Steering head bearing dust seal lips Front caliper pivot collars	Multipurpose grease	
	Driveshaft and driveshaft joint splines  Driveshaft ① Driveshaft yoke joint cotters ② Driveshaft yoke joint thrust washer ③ Driveshaft yoke joint oil seal lip ④ Driveshaft groove ⑤    Rear shock absorber upper mounting collar (inside and outside surfaces) Rear wheel thrust washer Final driven flange splines Final driven flange O-ring	Molybdenum disulfide grease  Molybdenum disulfide paste	Apply to the area as shown.  Pack the groove with the grease
	Handlebar grip rubbers	Honda Bond A or equivalent	
	Steering bearing adjustment nut threads	Engine oil	
	Thermo sensor threads	Sealant	
	Fork Fork oil seal lip	Fork fluid	
	Brake/clutch master cylinder pistons/piston cups Caliper pistons/piston seals Brake/clutch reservoir	DOT 4 brake fluid	
	Insides of the caliper boots Brake pad pin stopper rings (LBS-ABS/TCS model) Front master cylinder push rod ends (LBS-ABS/TCS model) Front master cylinder piston end (Standard and ABS/TCS model) Rear master cylinder push rod upper end and boot groove	Silicone grease	
	Handlebar weight screw threads Front fork socket bolt threads Cooling fan nut threads Caliper pin bolt threads Secondary master cylinder push rod lock nut threads (LBS-ABS/TCS model) Anti-dive case bolt threads	Locking agent	

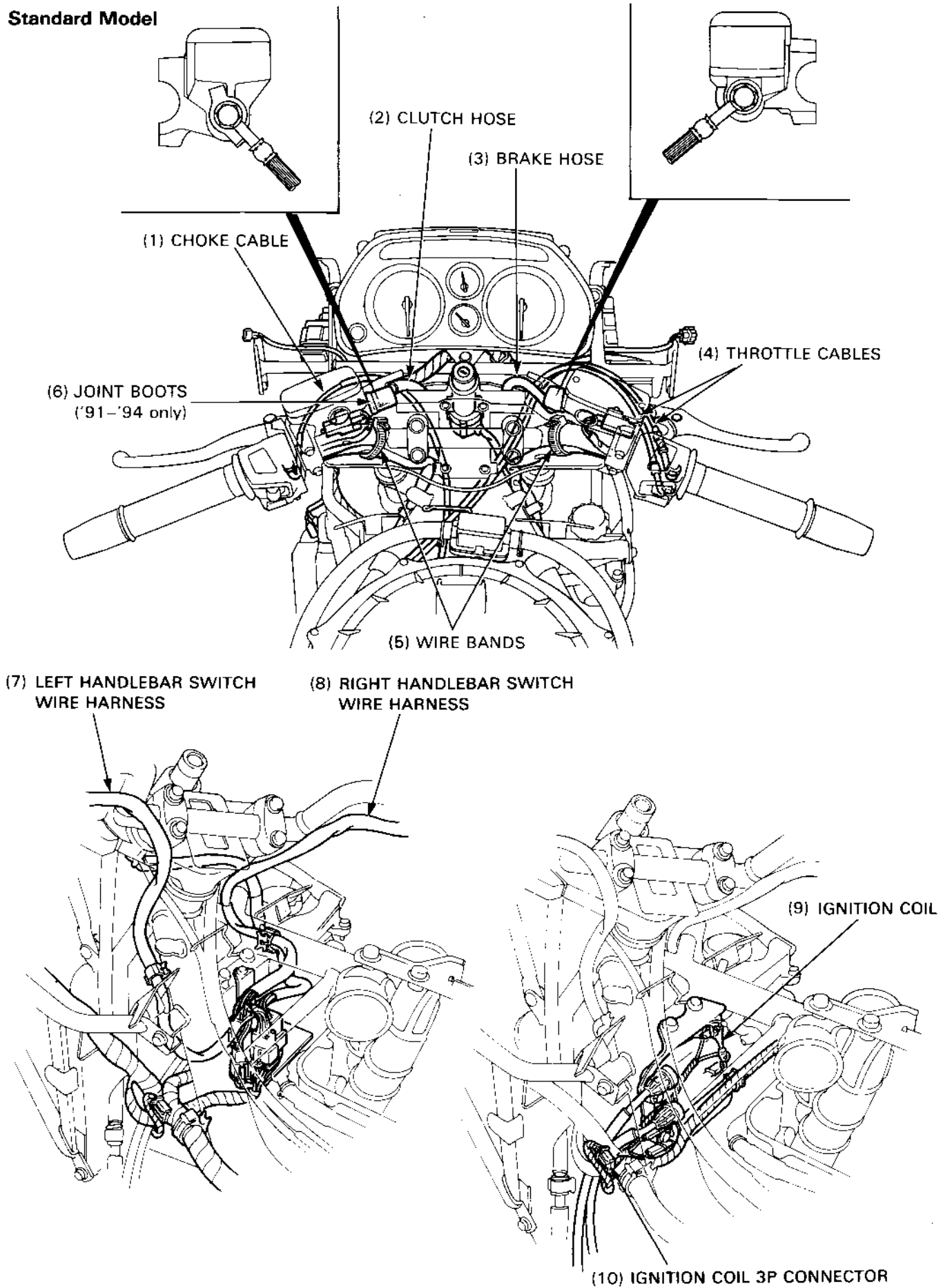
# Cable & Harness Routing

Standard Model



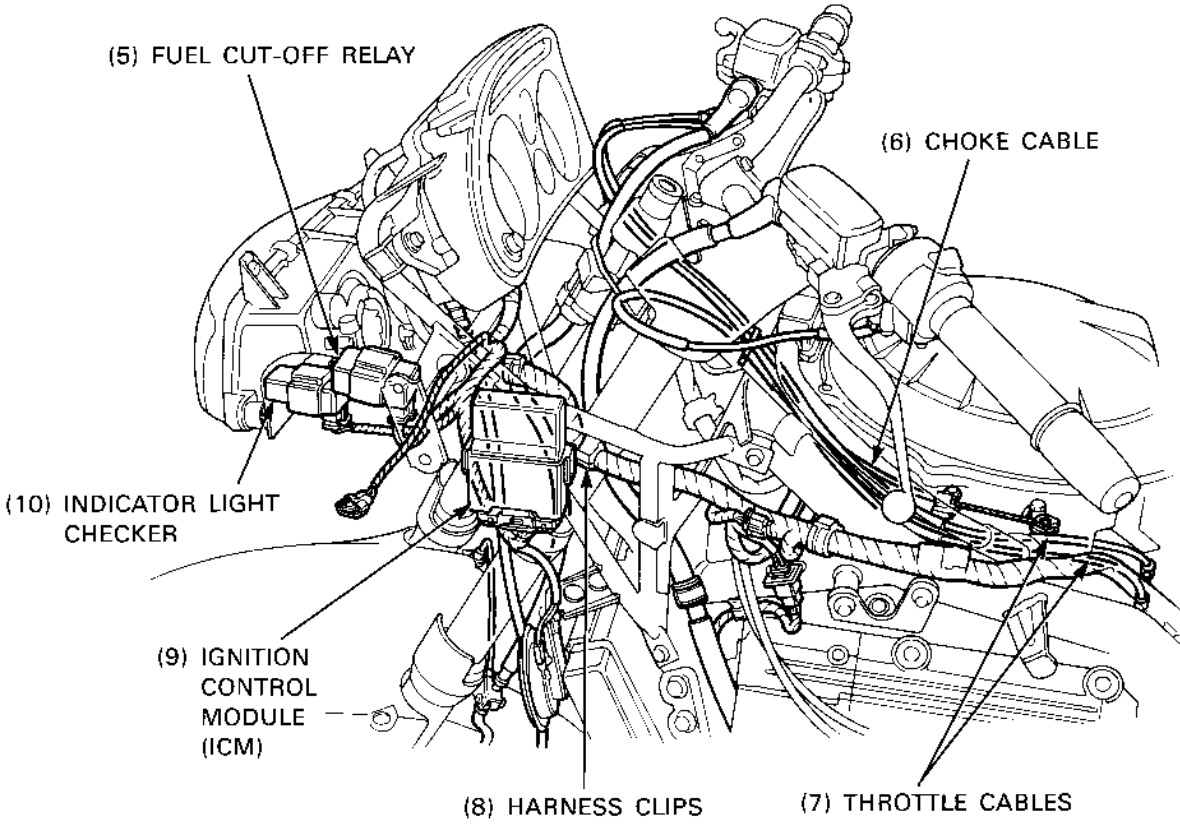
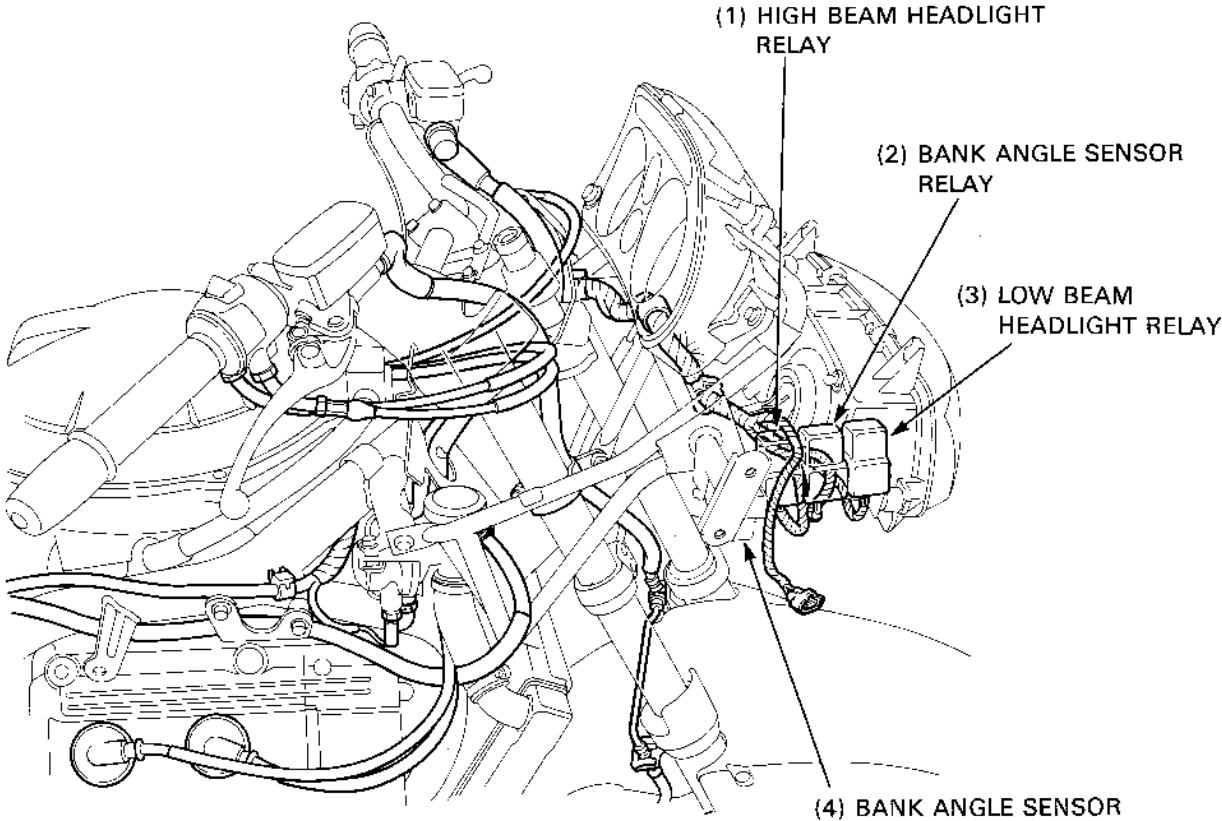
# General Information

## Standard Model





Standard Model



Standard Model

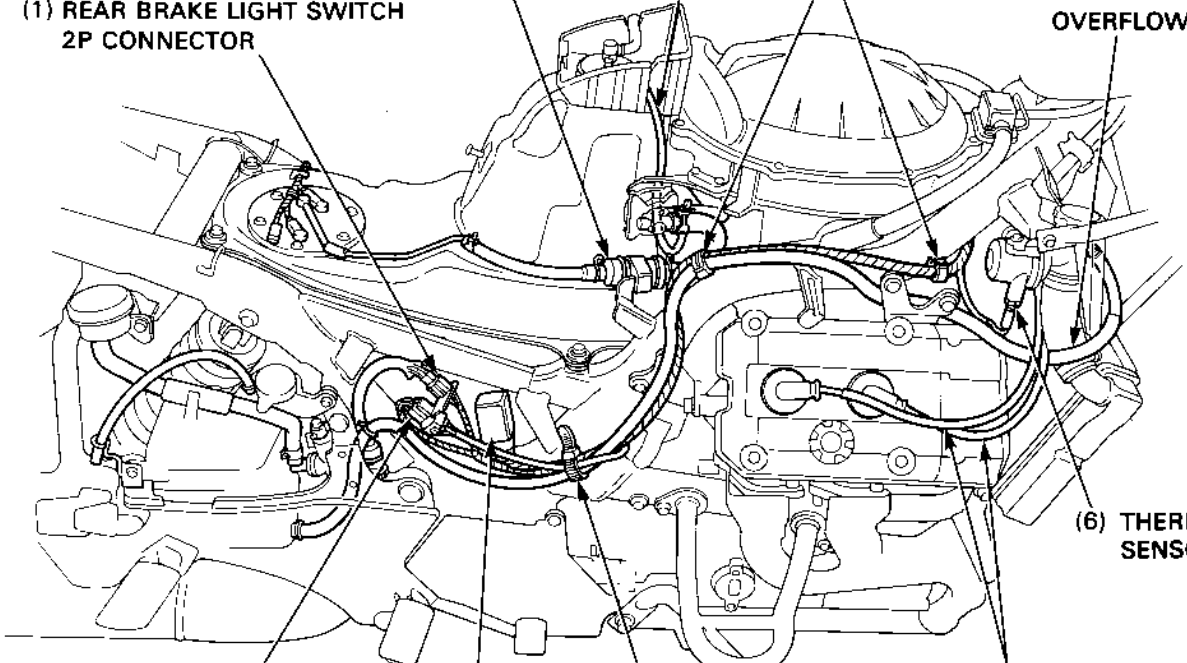
(3) THROTTLE STOP SCREW CABLE

(2) FUEL FILTER

(4) HARNESS CLIPS

(1) REAR BRAKE LIGHT SWITCH  
2P CONNECTOR

(5) RADIATOR  
OVERFLOW TUBE



(10) IGNITION PULSE GENERATOR  
WIRE 4P CONNECTOR

(9) TURN SIGNAL RELAY

(8) WIRE BAND

(7) SPARK PLUG WIRES

'91-'95:

(12) FUEL TANK TRAY  
DRAIN TUBE

(13) FUEL FILL CAP  
BREATHER TUBE

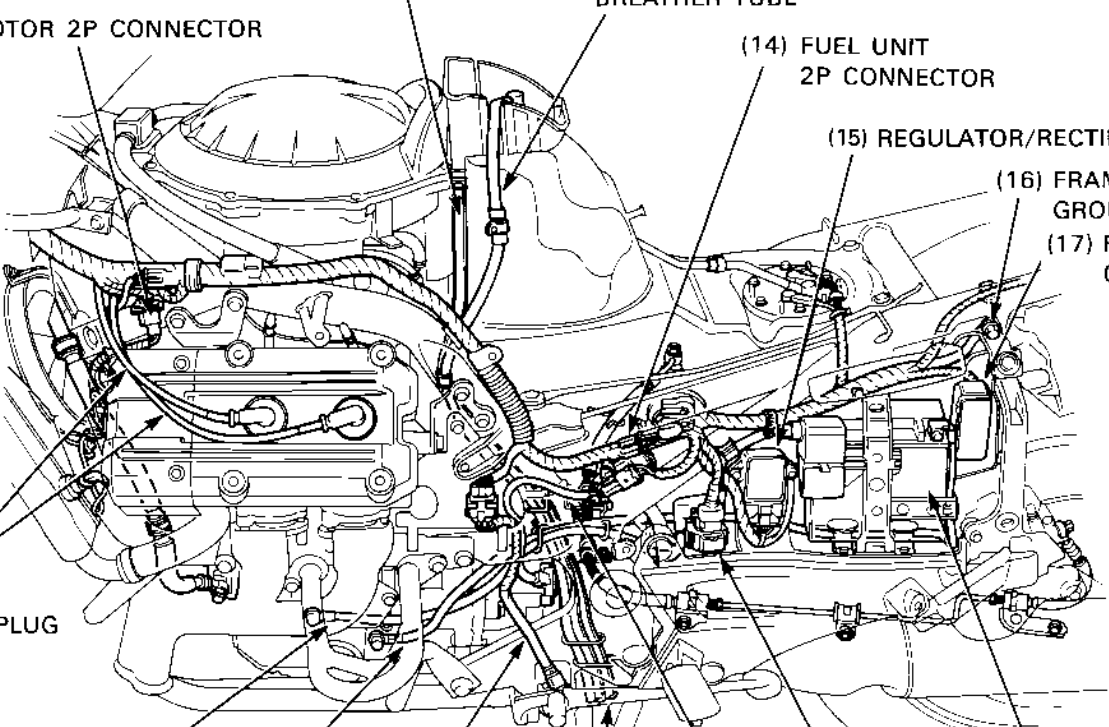
(11) FAN MOTOR 2P CONNECTOR

(14) FUEL UNIT  
2P CONNECTOR

(15) REGULATOR/RECTIFIER

(16) FRAME  
GROUND

(17) FUSE  
CASE



(25) SPARK PLUG  
WIRES

(24) STARTER MOTOR  
CABLE

(23) ENGINE GROUND  
CABLE

(22) SIDE STAND  
SWITCH WIRE

(21) CARBURETOR  
DRAIN TUBE

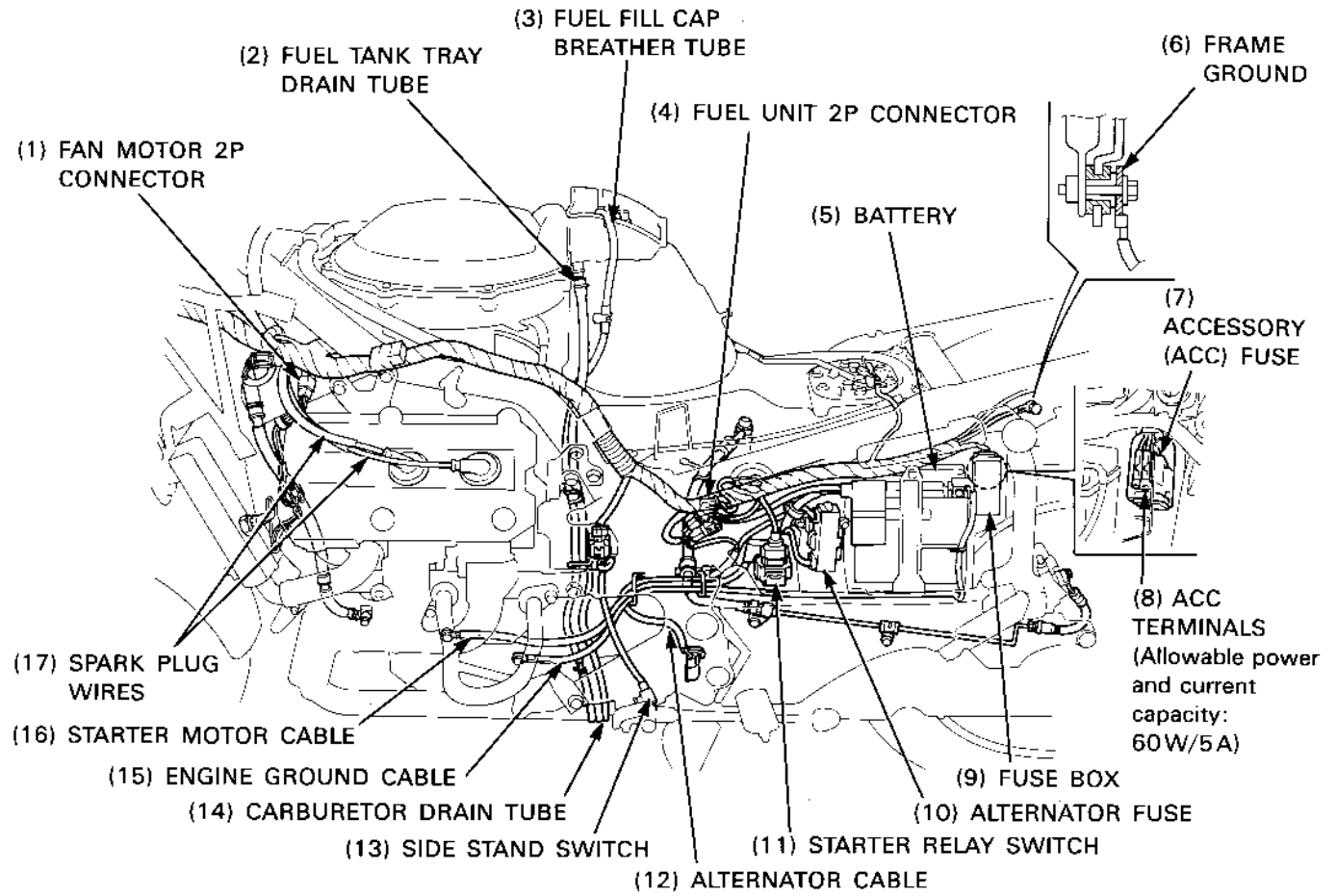
(20) ALTERNATOR  
WIRE

(19) STARTER RELAY  
SWITCH

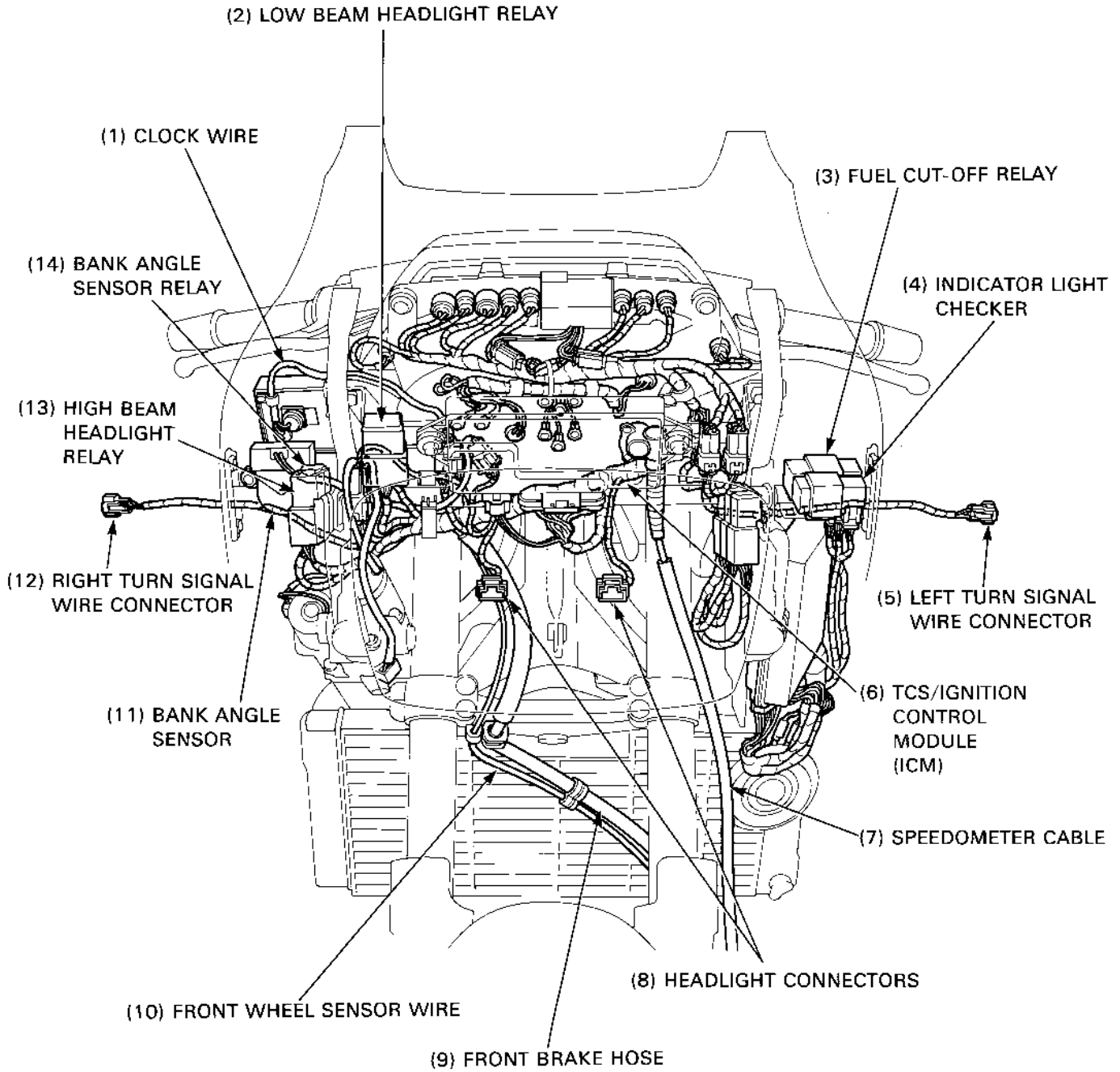
(18) BATTERY

Standard Model

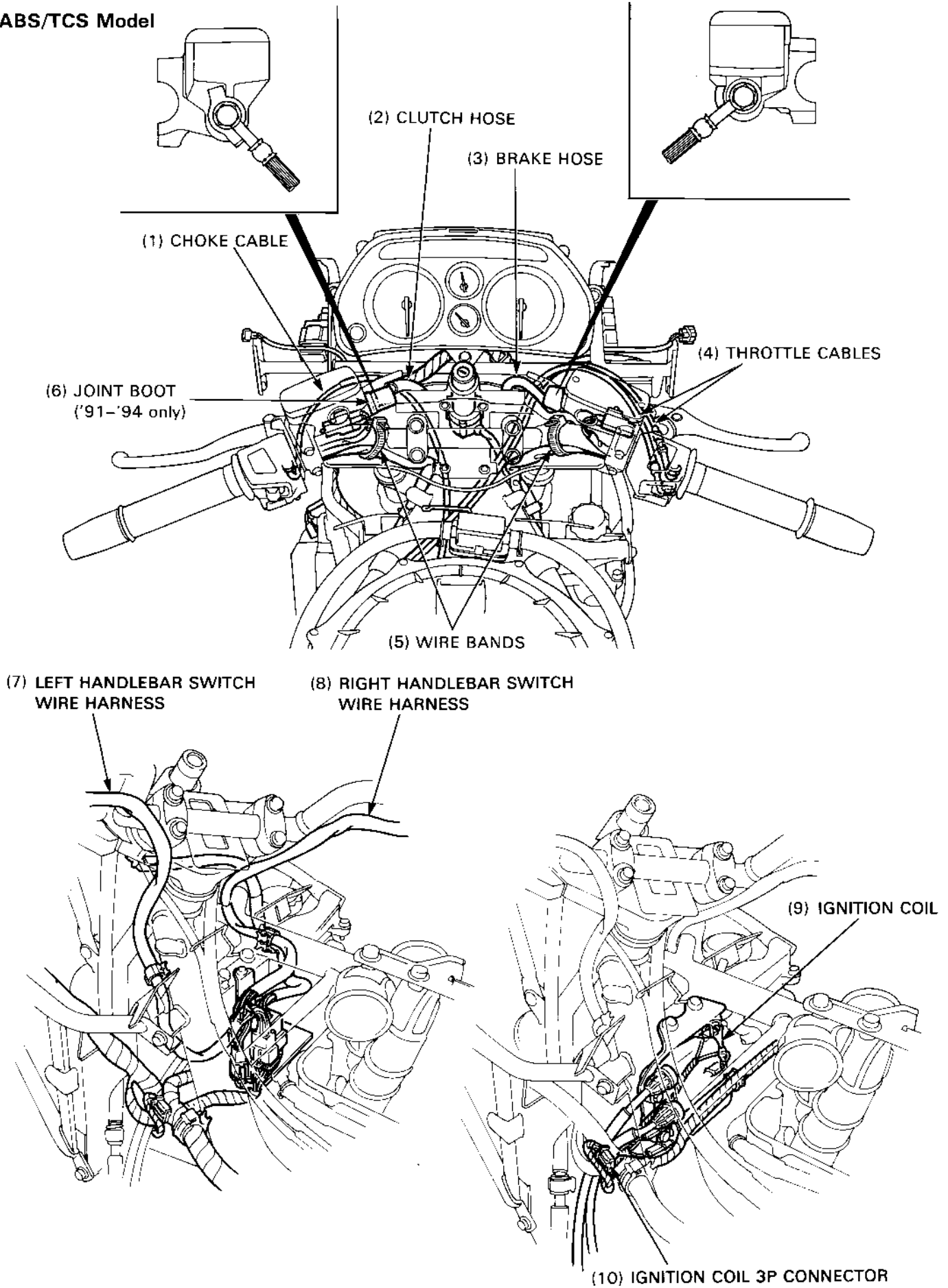
After '95:



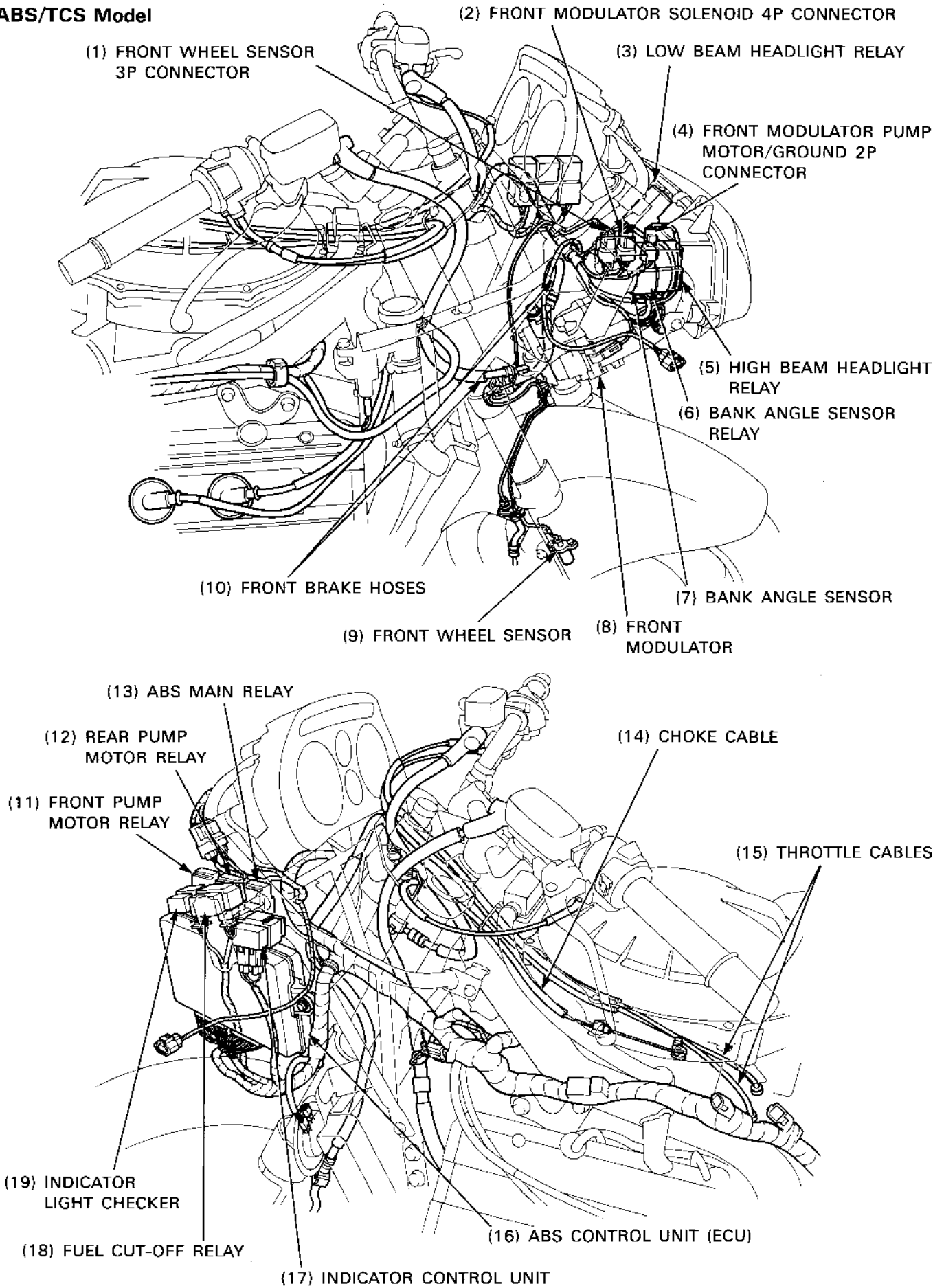
ABS/TCS Model



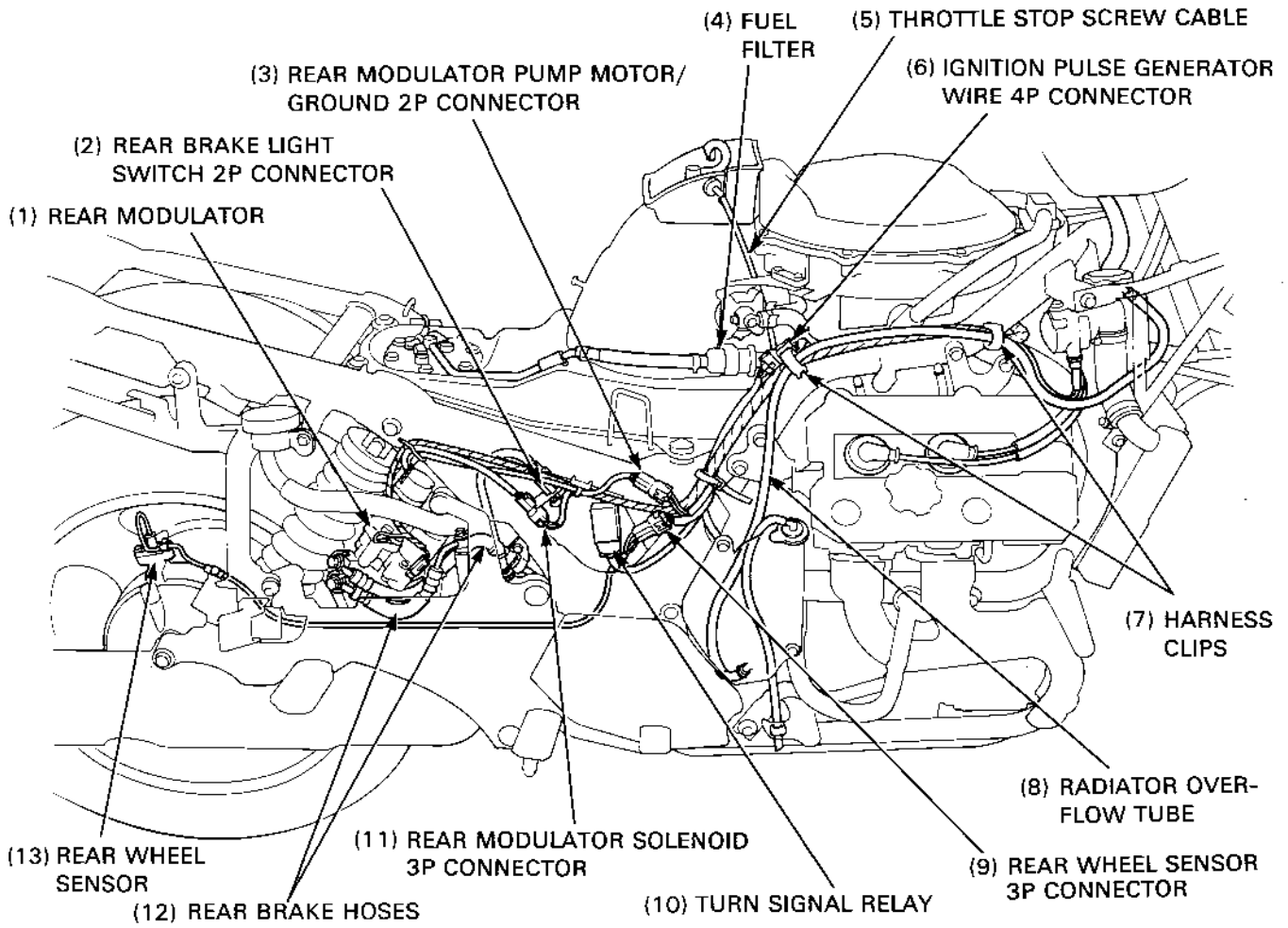
ABS/TCS Model



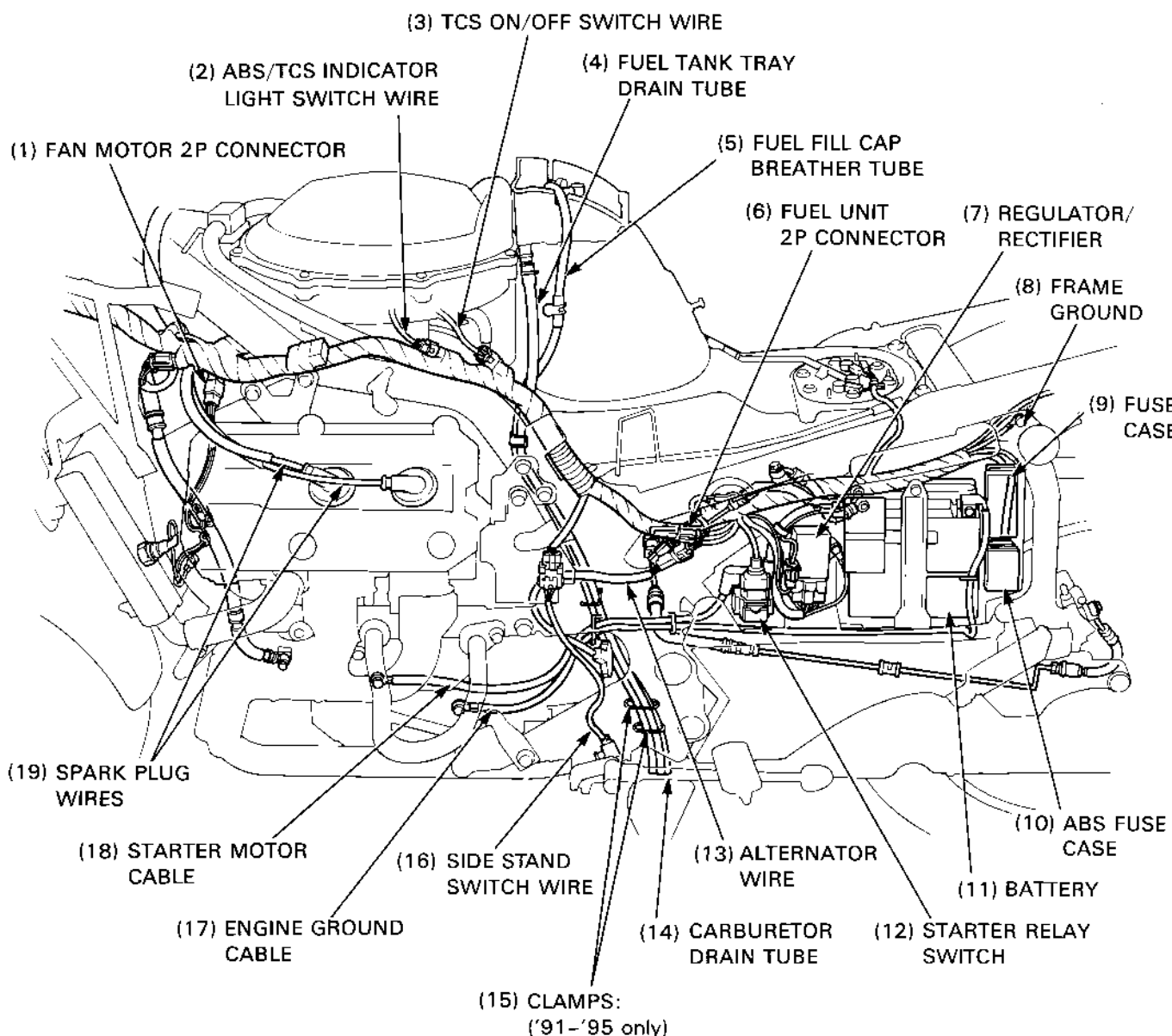
ABS/TCS Model



ABS/TCS Model

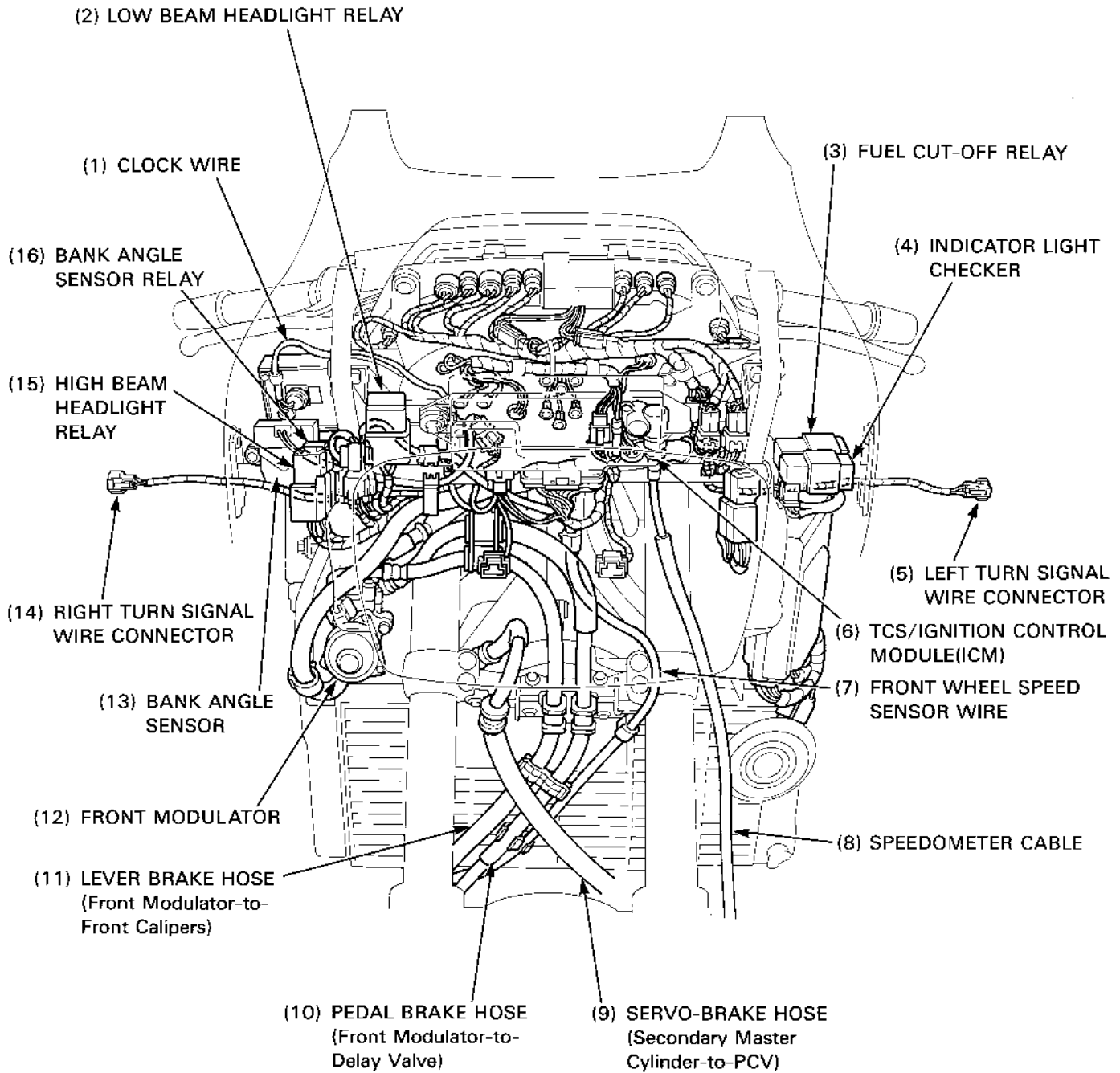


ABS/TCS Model

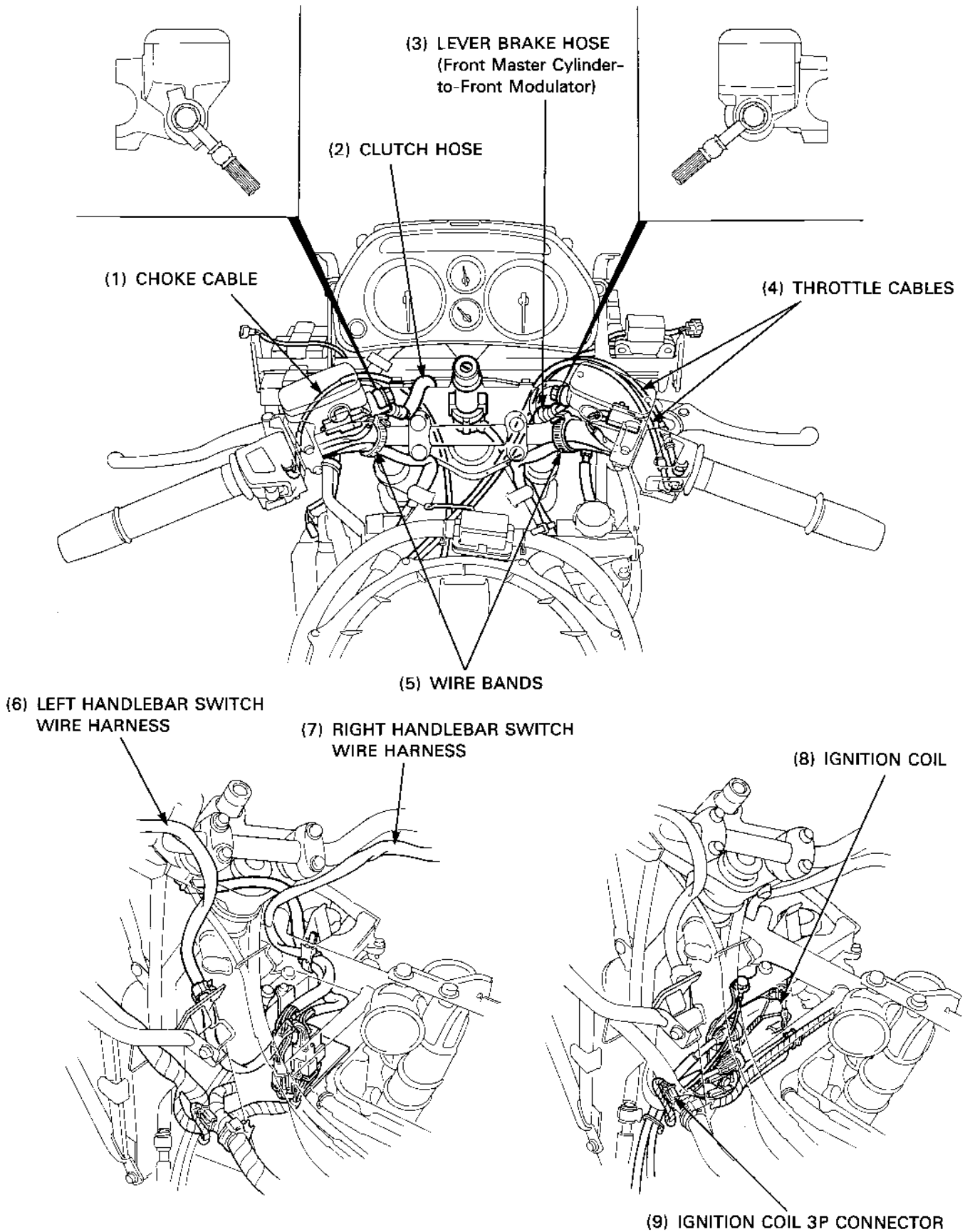




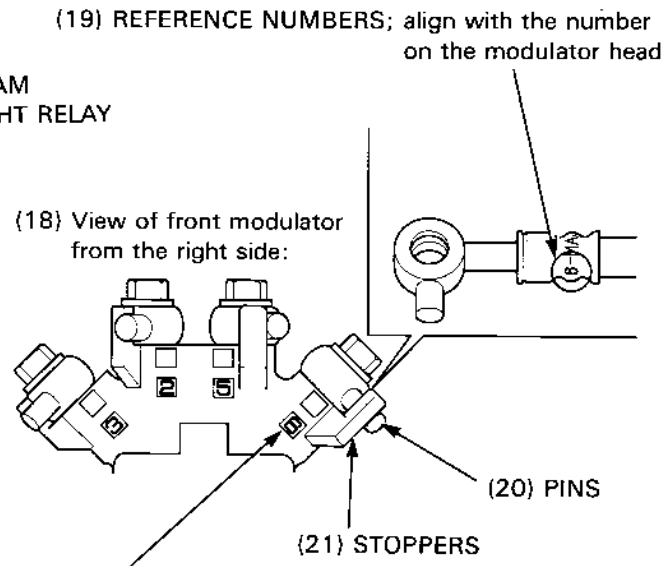
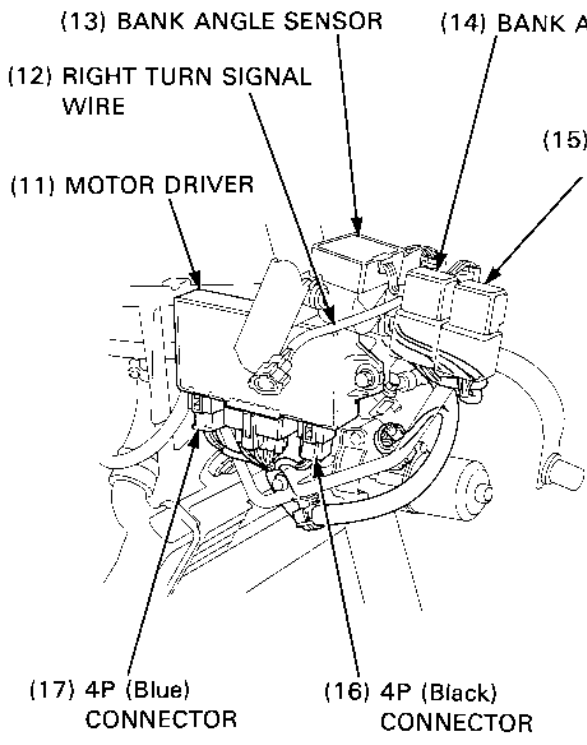
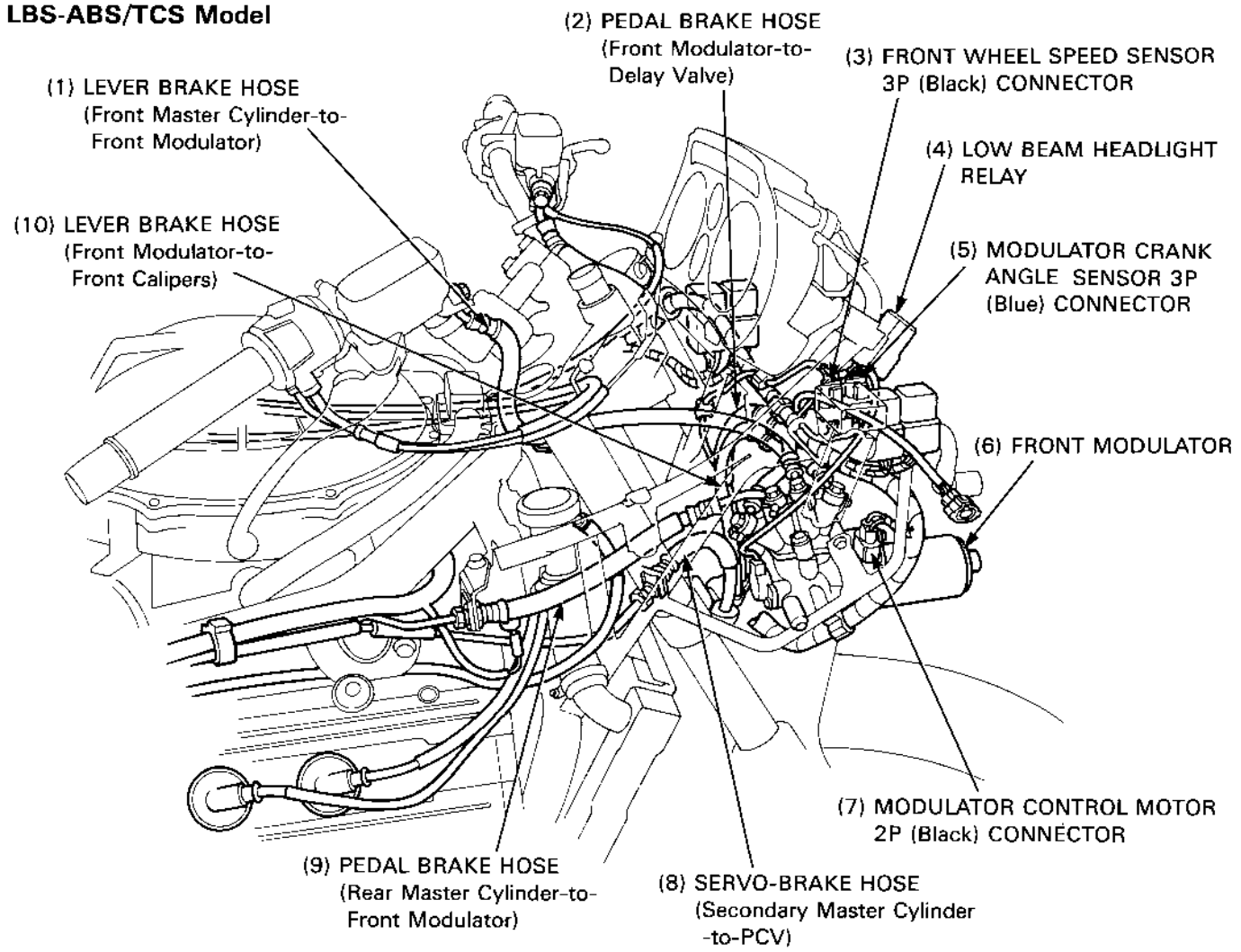
LBS-ABS/TCS Model



LBS-ABS/TCS Model

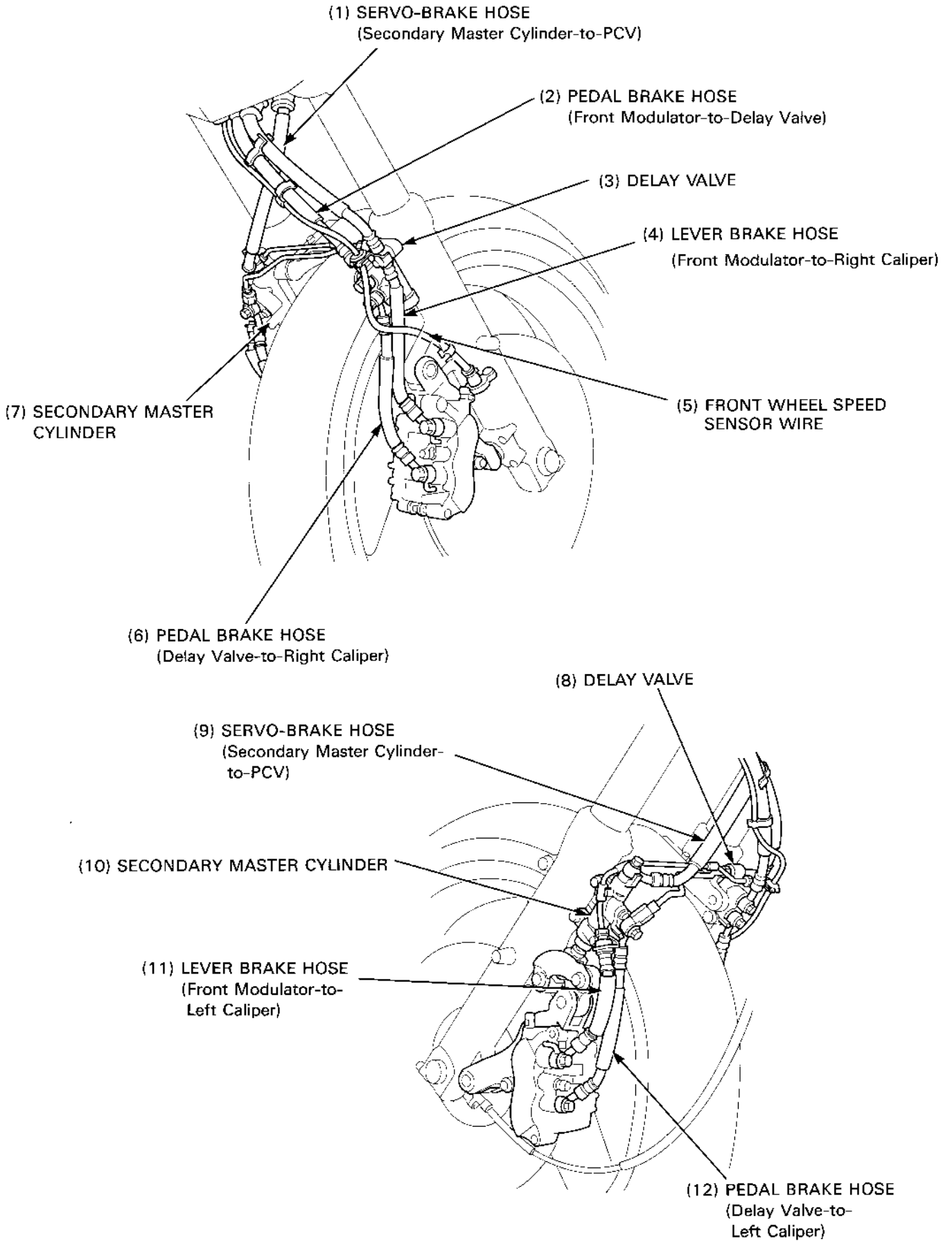


LBS-ABS/TCS Model

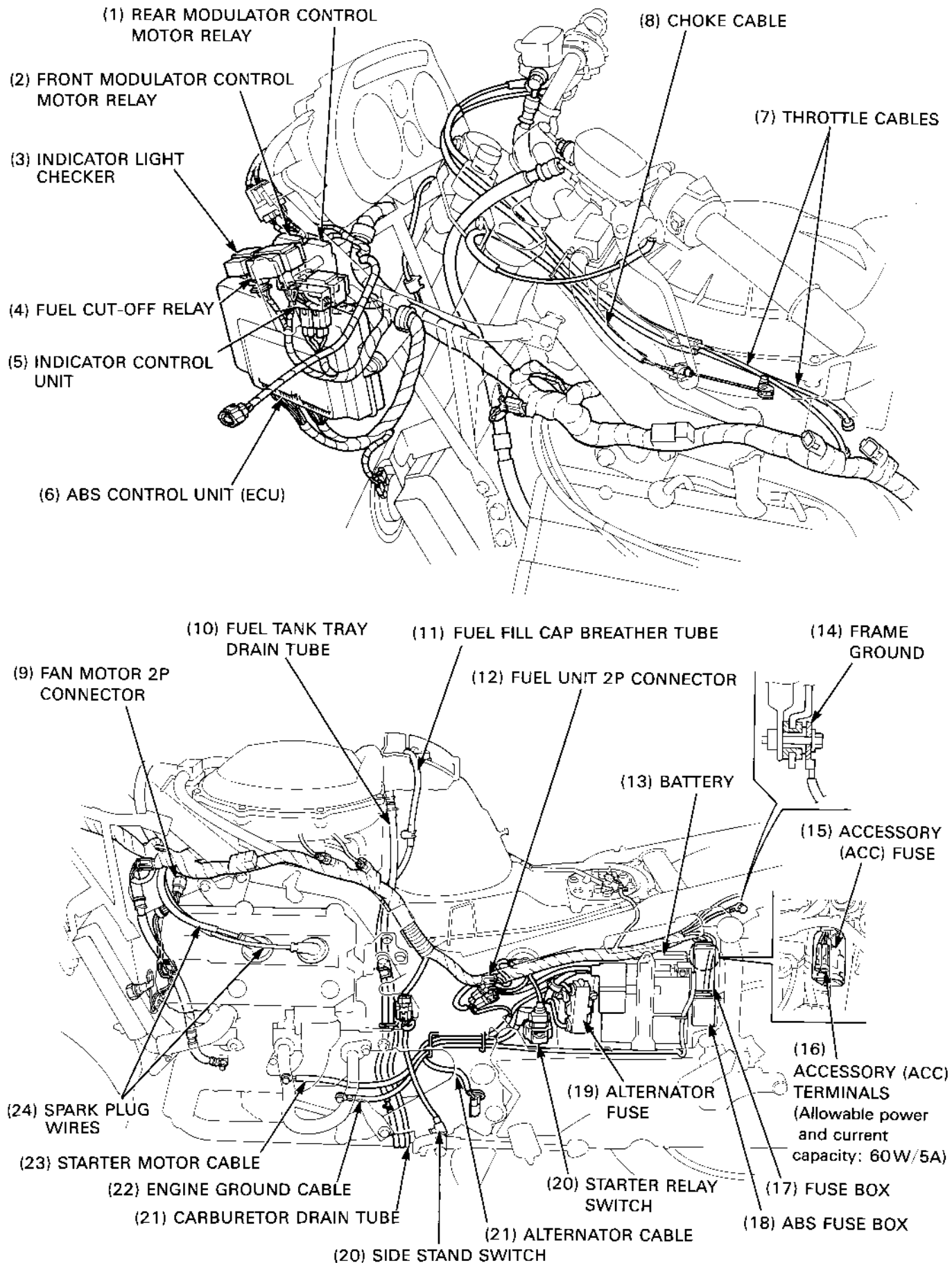


(22) REFERENCE NUMBERS; Two kinds of numbers are stamped on each hose joint—refer to the second line from the top for the front modulator.

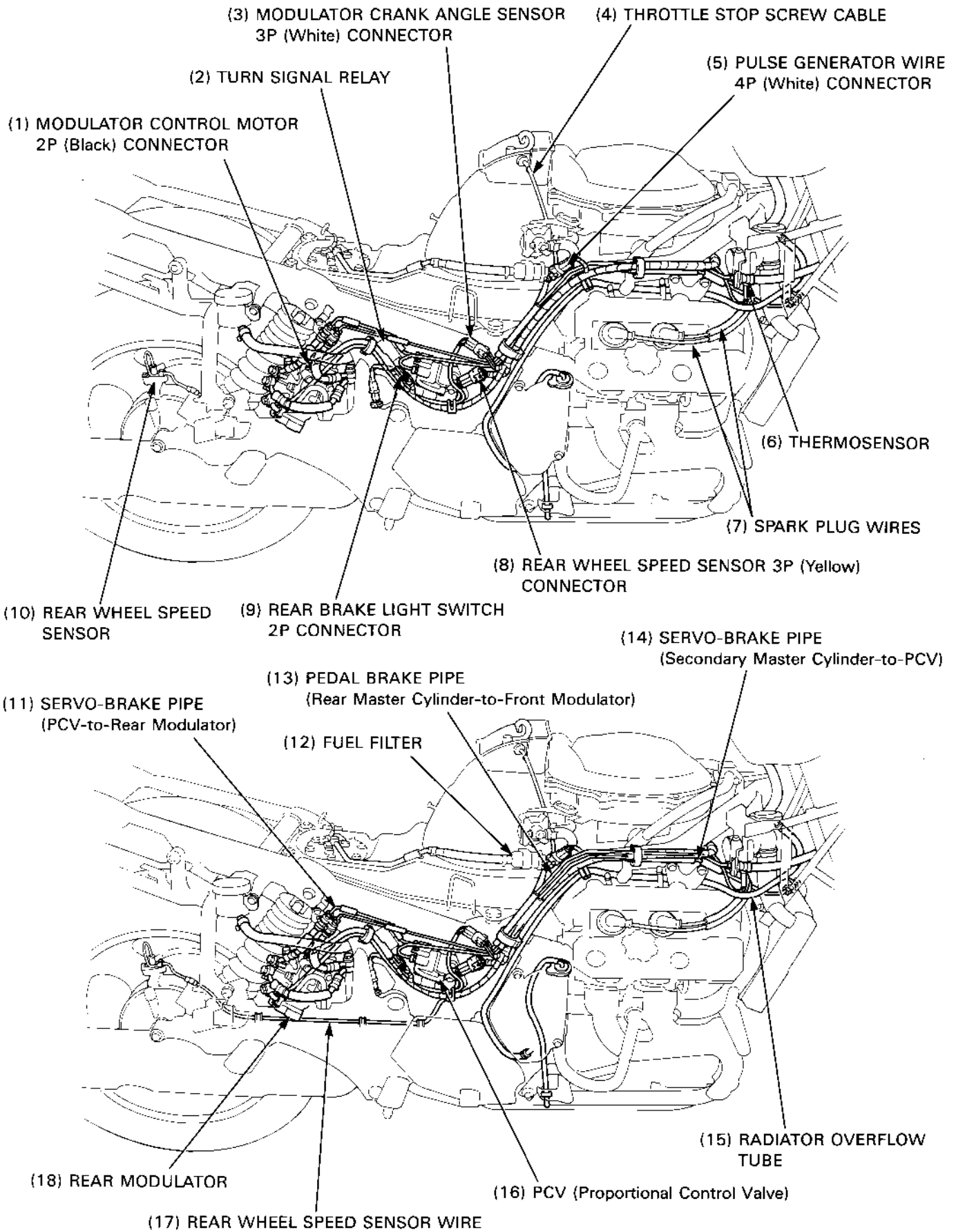
**LBS-ABS/TCS Model**



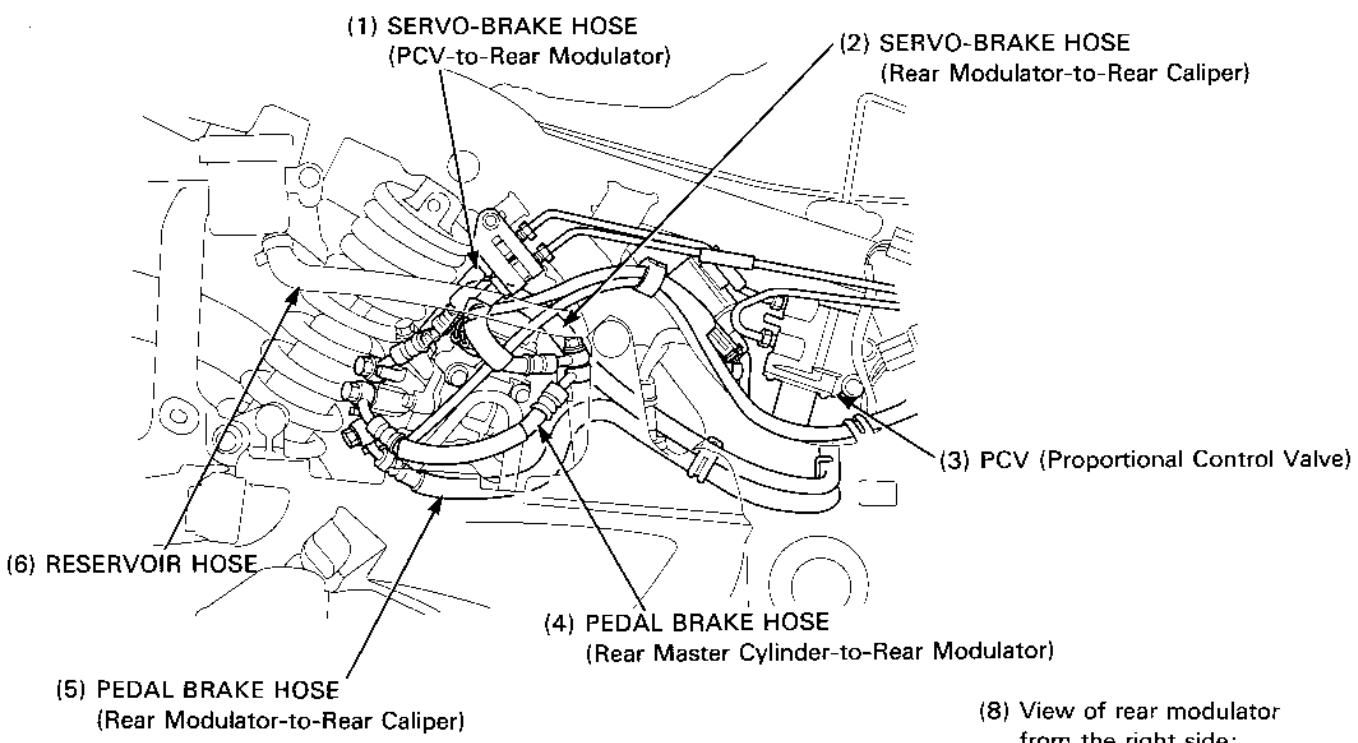
**LBS-ABS/TCS Model**



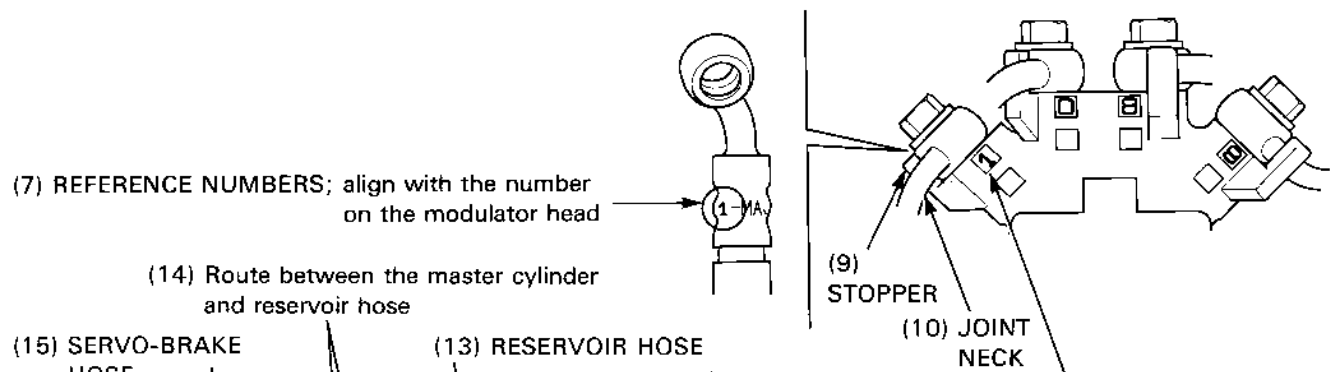
LBS-ABS/TCS Model



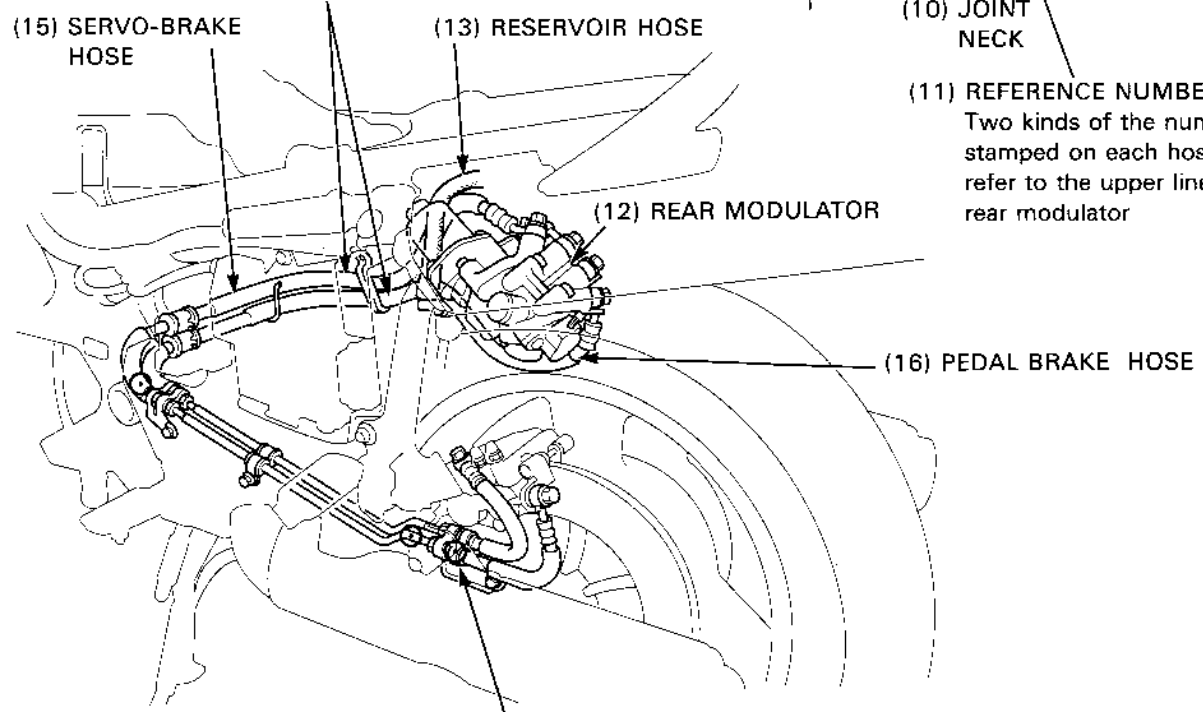
LBS-ABS/TCS Model



(8) View of rear modulator from the right side:

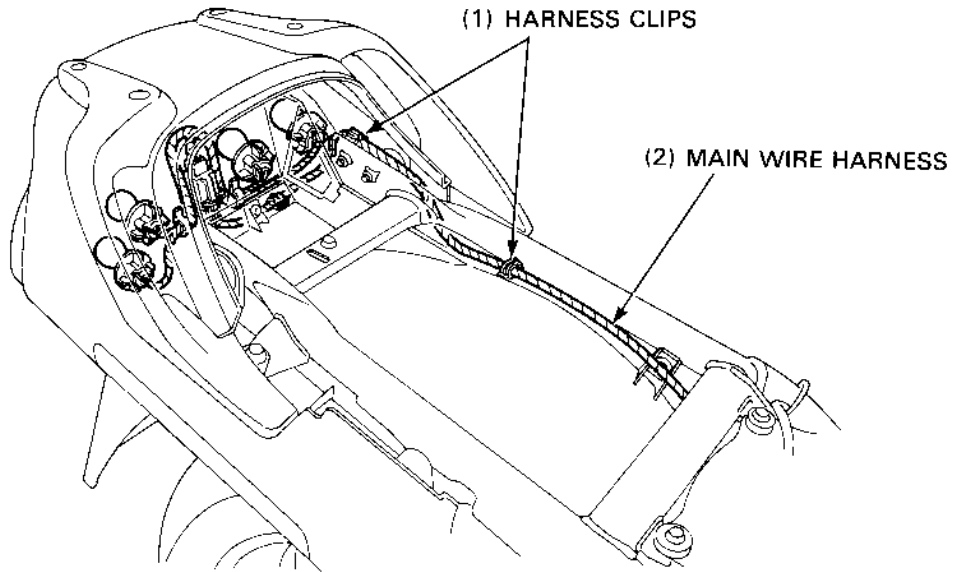


(11) REFERENCE NUMBERS; Two kinds of the numbers are stamped on each hose joint — refer to the upper line for the rear modulator



(16) WHITE PAINT (3 places): Servo-brake line only

**All Models**





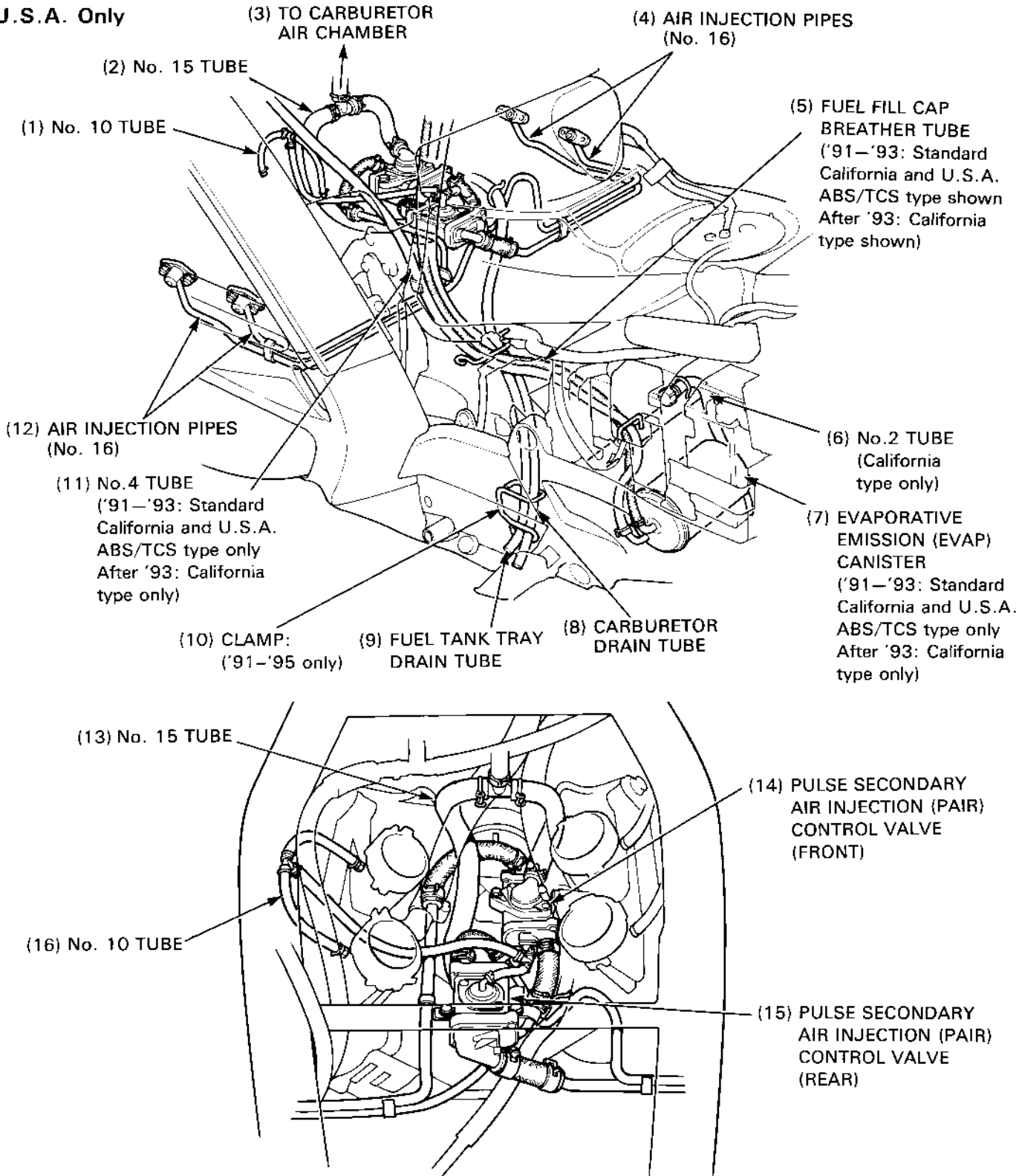
Emission Control Systems:

49 state	PAIR control valves
California	PAIR control valves EVAP purge control valve EVAP CAV control valve EVAP canister
Canada	

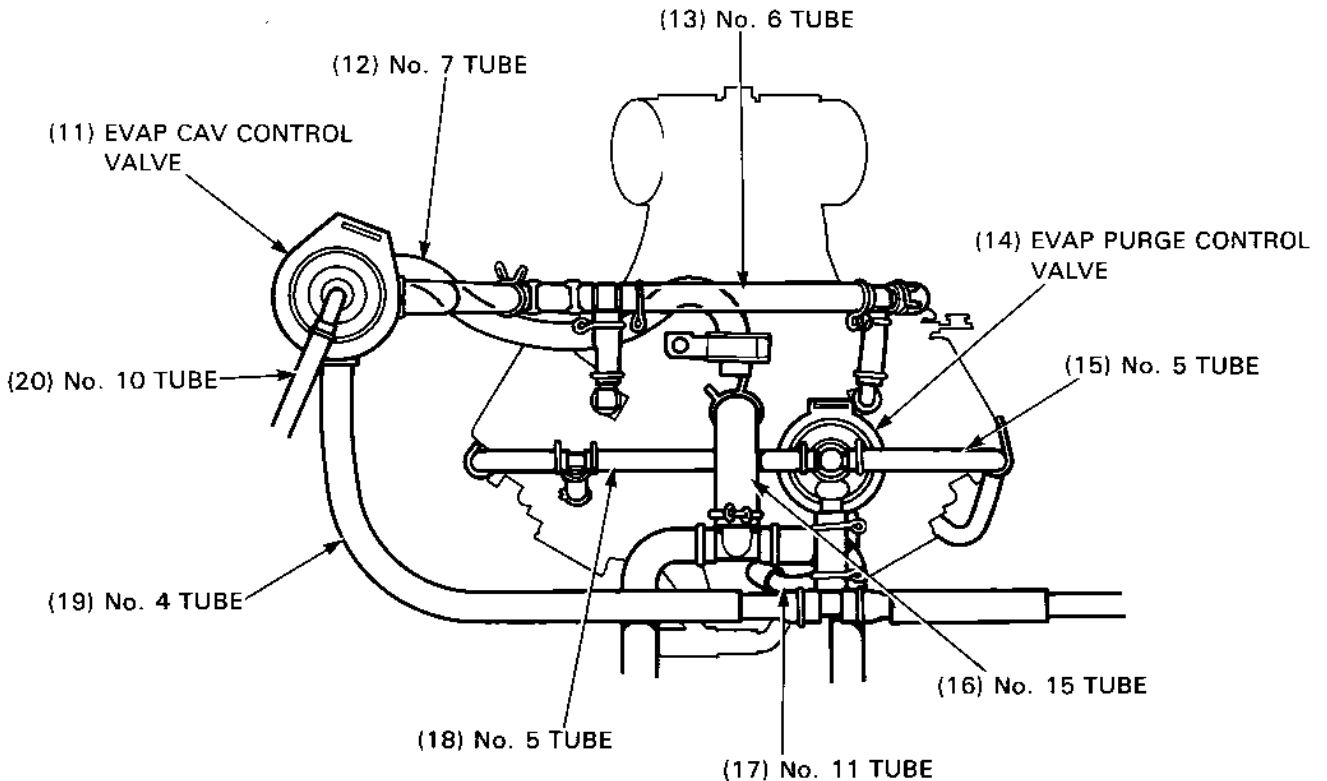
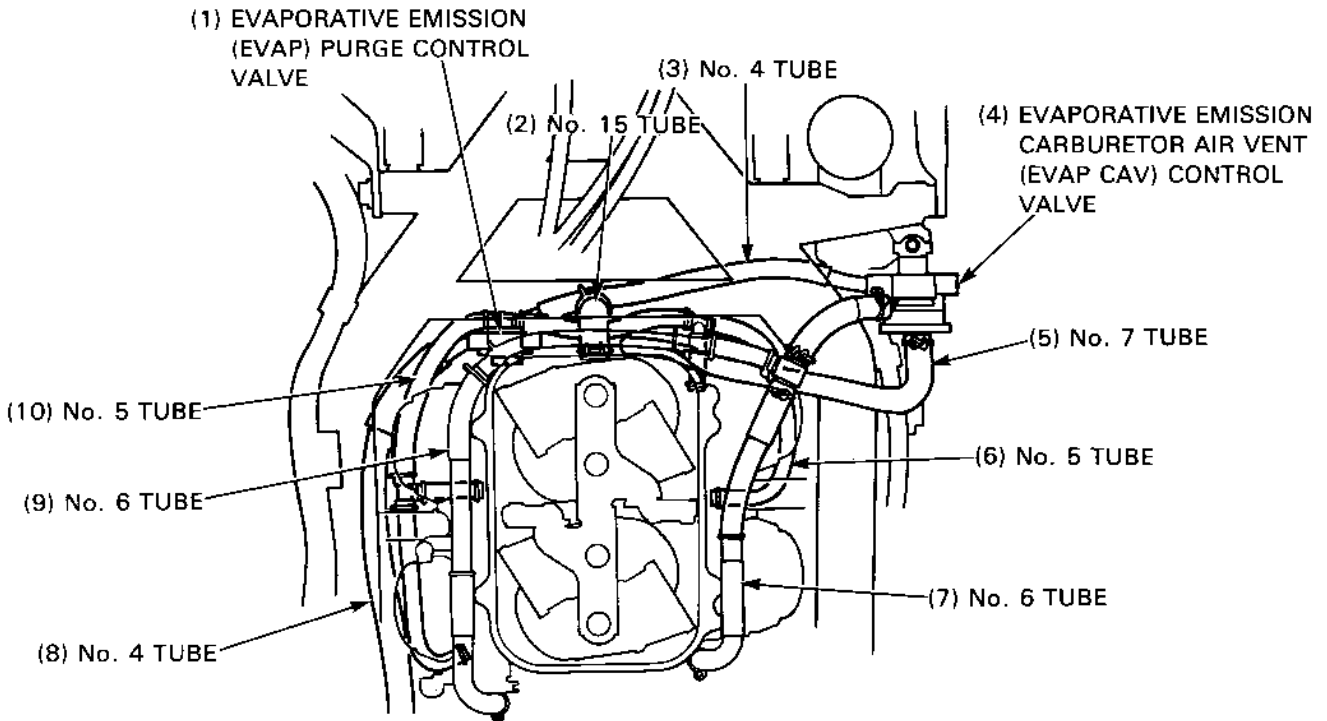
Model:

	Standard	ABS/TCS	LBS-ABS/TCS
49 state		'94~'95	
California	'91~	'92~'95	'96~
Canada			

U.S.A. Only



'91-'93:  
Standard California Type and U.S.A. ABS/TCS Type  
After '93:  
California Type



## Emission Control Systems

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

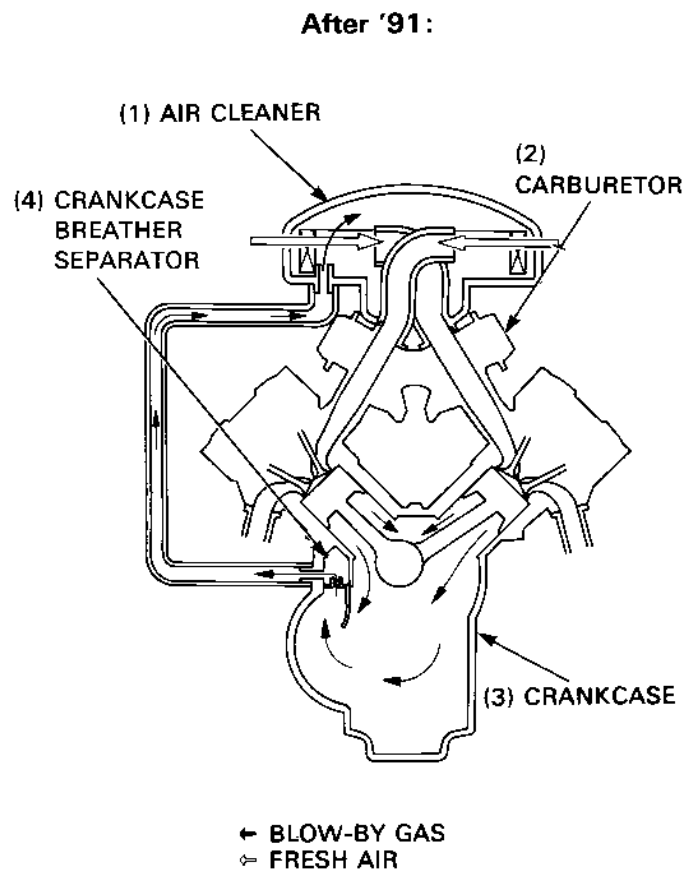
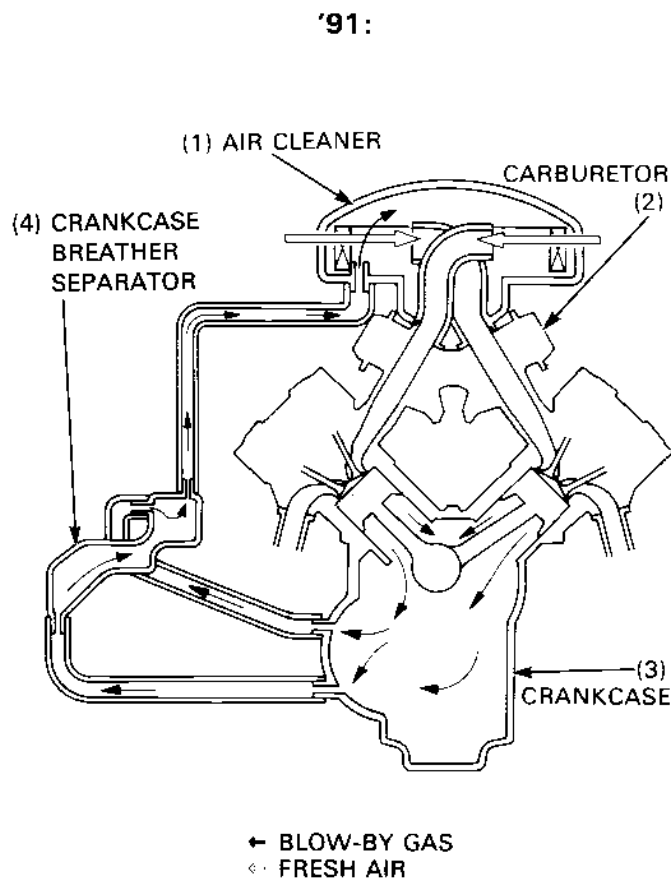
### Source of Emissions

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

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

### Crankcase Emission Control System

The crankcase emission control system routes crankcase emissions through the air cleaner and into the combustion chamber.



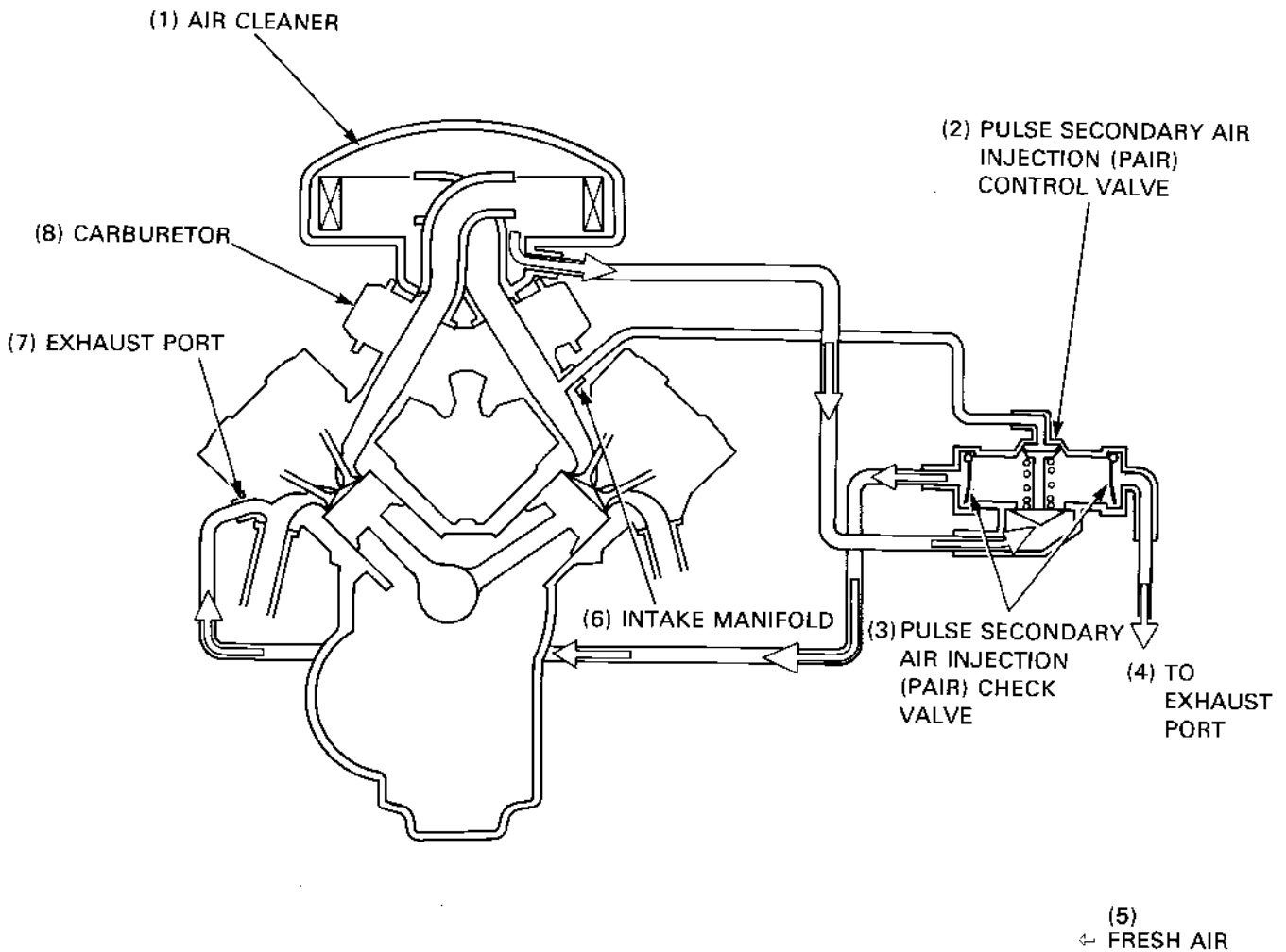
## General Information

### Exhaust Emission Control System (Secondary Air Supply System) [U.S.A. only]

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port whenever there is a negative pressure pulse in the exhaust system. This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

The pulse secondary air injection check valves prevents reverse air flow through the system. The pulse secondary air injection control valve reacts to high intake manifold vacuum and will cut off the supply of fresh air during engine deceleration, thereby preventing afterburn in the exhaust system.

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



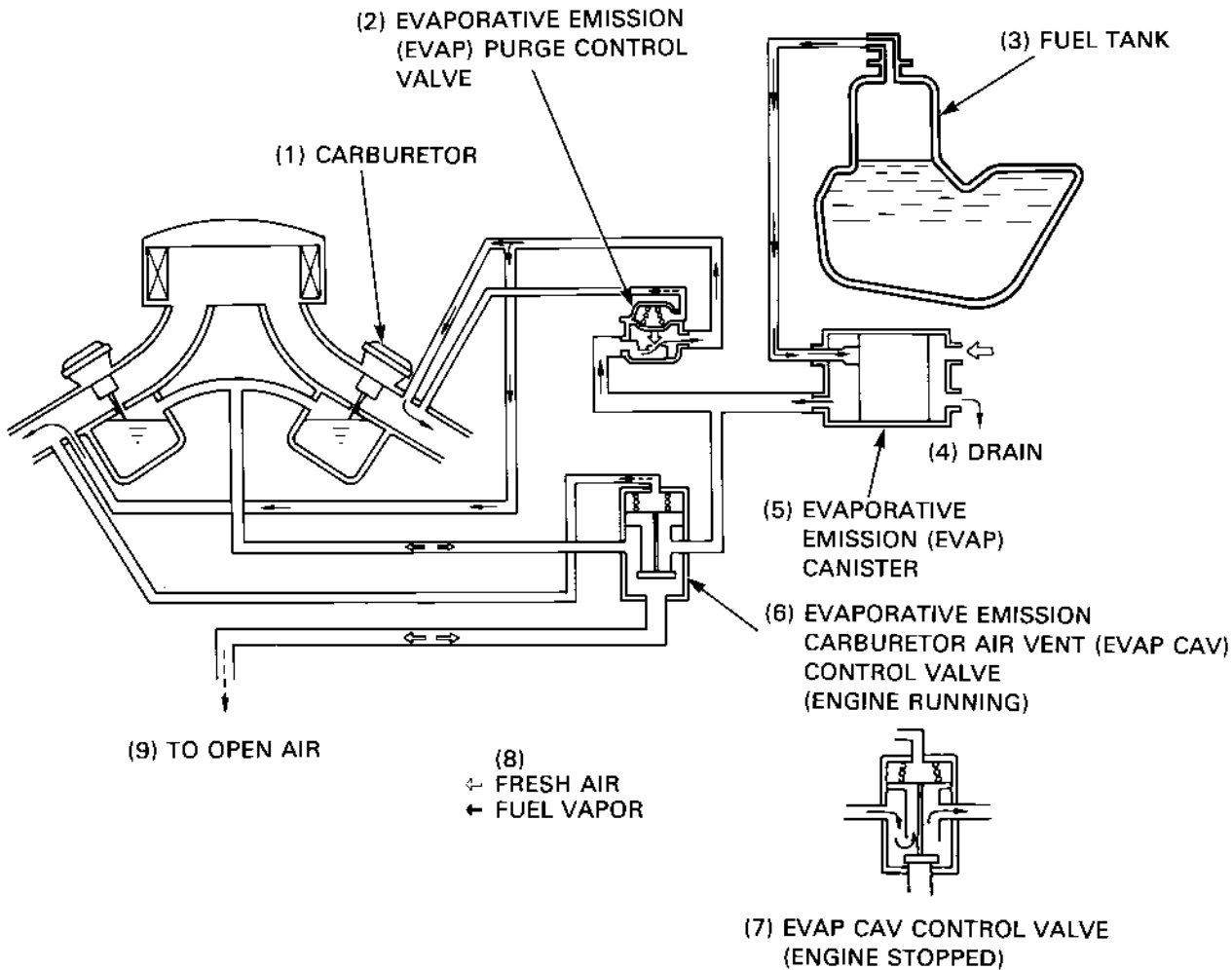
**Evaporative Emission Control System**

('91-'93: Standard California Type and U.S.A. ABS/TCS Type)

(After '93: California Type)

This vehicle complies with the California Air Resources Board requirements for evaporative emission regulations.

Fuel vapor from the fuel tank and carburetors is routed into the evaporative emission canister where it is absorbed and stored while the engine is stopped. When the engine is running and the evaporative emission purge control diaphragm valve is open, fuel vapor in the evaporative emission canister is drawn into the engine through the carburetor. At the same time, the evaporative emission carburetor air vent control valve is open and air is drawn into the carburetor through the valve.

**Noise Emission Control System**

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

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

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

# Emission Control Information Labels (U.S.A. Only)

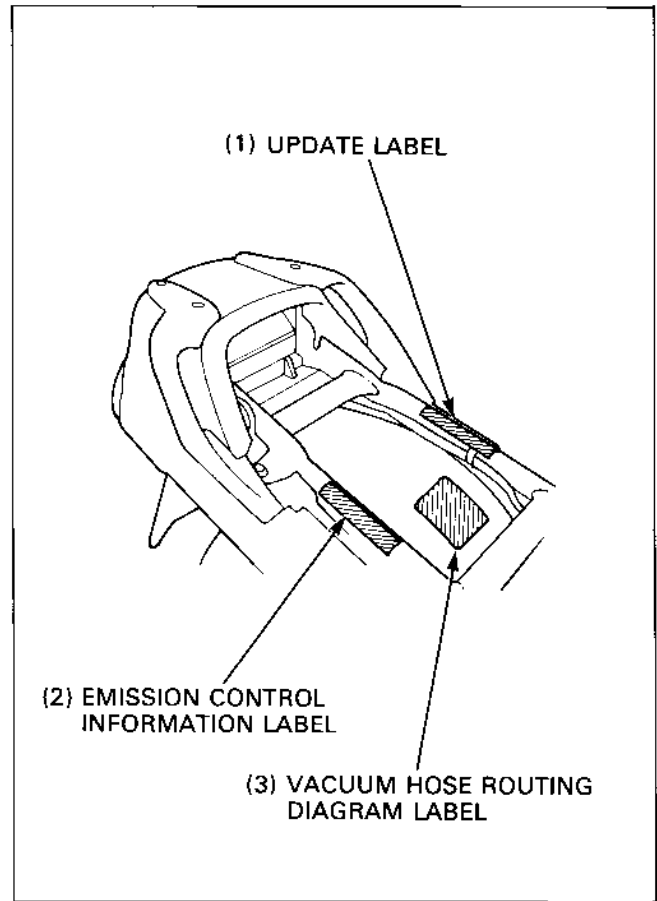
An Emission Control Information Label is located on the right side of the frame as shown. The seat must be removed to read it. It gives basic tune-up specifications.

## Vehicle Emission Control Information Update Label

After making a high altitude carburetor adjustment, attach an update label on the left side of the frame as shown.

Instructions for obtaining the update label are given in Service Letter No. 132.

When readjusting the carburetors back to the low altitude specifications, be sure to remove this update label.

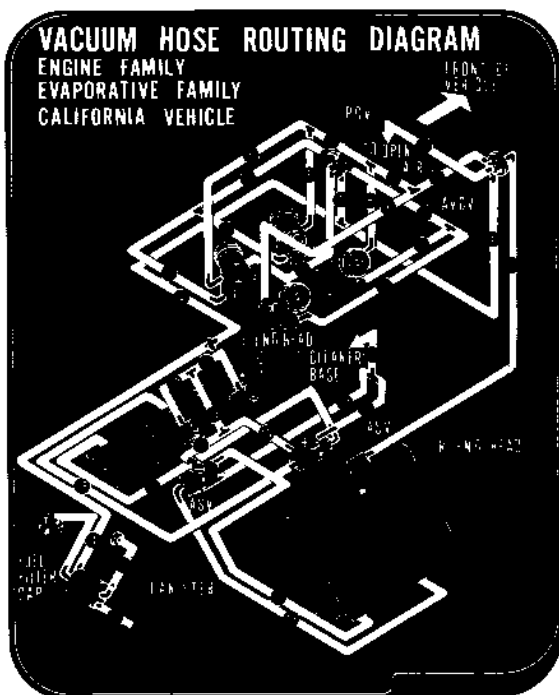


## Vacuum Hose Routing Diagram Label

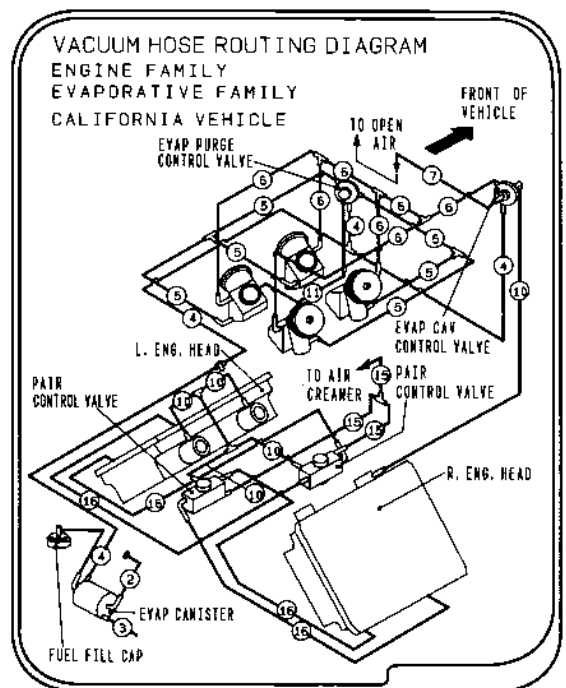
('91-'93: Standard California type and U.S.A. ABS/TCS type)  
(After '93: California type)

The Vacuum Hose Routing Diagram Label is on the rear fender as shown. The seat must be removed to read it.

'91-'93:

















After '93:



# 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.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use special tool</p>
	<p>Use optional tool. Use the same procedure you use to order parts.</p>
 <p>10 (1.0, 7.2)</p>	<p>Torque specification.    10 N·m (1.0 kg-m, 7.2 ft-lb)</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)</p>
	<p>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</p>
	<p>Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent)          Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A.          Honda Moly 60 (U.S.A. only)          Rocol ASP manufactured by Rocol Limited, U.K.          Rocol Paste manufactured by Sumico Lubricant, Japan</p>
	<p>Use silicone grease</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant</p>
	<p>Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>

# 2. Frame/Body Panels/Exhaust System

2

Service Information	2-1	Fairing Pocket	2-6
Seat	2-2	Windshield	2-6
Side Cover	2-2	Instrument Panel	2-7
Saddlebag	2-2	Middle Fairing Inner Cover	2-7
Seat cowling	2-3	Middle Fairing	2-8
Saddle Bag Stay	2-3	Rearview Mirror	2-8
Rear Fender	2-4	Upper Fairing	2-9
Lower fairing	2-4	Front Fender (LBS-ABS/TCS model)	2-11
Pivot Cover	2-5	Fuel Tank	2-12
Maintenance Cover	2-5	Muffler	2-13
Top Shelter	2-5	Exhaust Pipe	2-18

## 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.

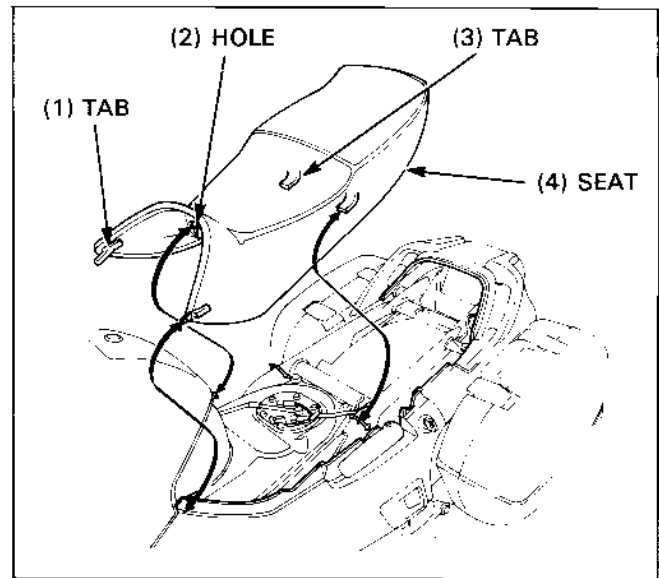
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- This section covers removal and installation of the frame body panels, fuel tank and exhaust system.
- Frame body panel installation is in the reverse order of removal, unless noted otherwise.
- When removing the covers be careful not to damage any tabs or grooves on the covers.



## Seat

Unlock the seat with the ignition key.  
Push the front of the seat and remove the seat by pulling it rearward.

Install the seat by aligning the four tabs and one hole as shown, and lock it by pushing it down securely.



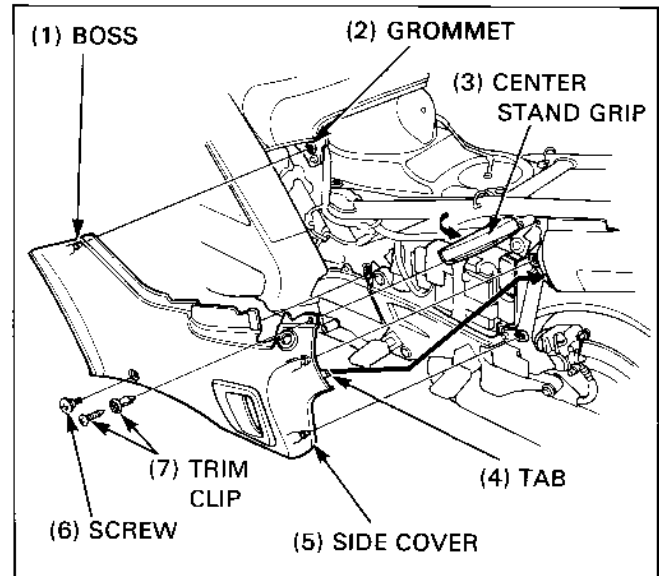
## Side Cover

Remove the seat.

Remove the attaching screw and trim clip, and release the three bosses from the grommets, being careful not to damage the tab. Remove the side cover.

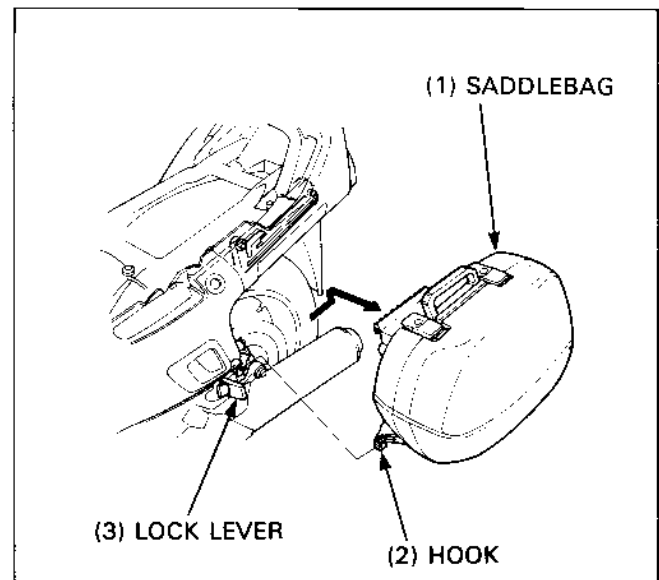
### NOTE

- On the left side cover, pull the center stand grip outward when removing the cover.



## Saddlebag

Unlock the saddlebag lock lever with the ignition key.  
Release the saddlebag hook by pulling the lock lever.  
Slide the saddle bag rearward and raise it slightly to remove it.



## Seat Cowling

Remove the left and right side covers and saddle bags.

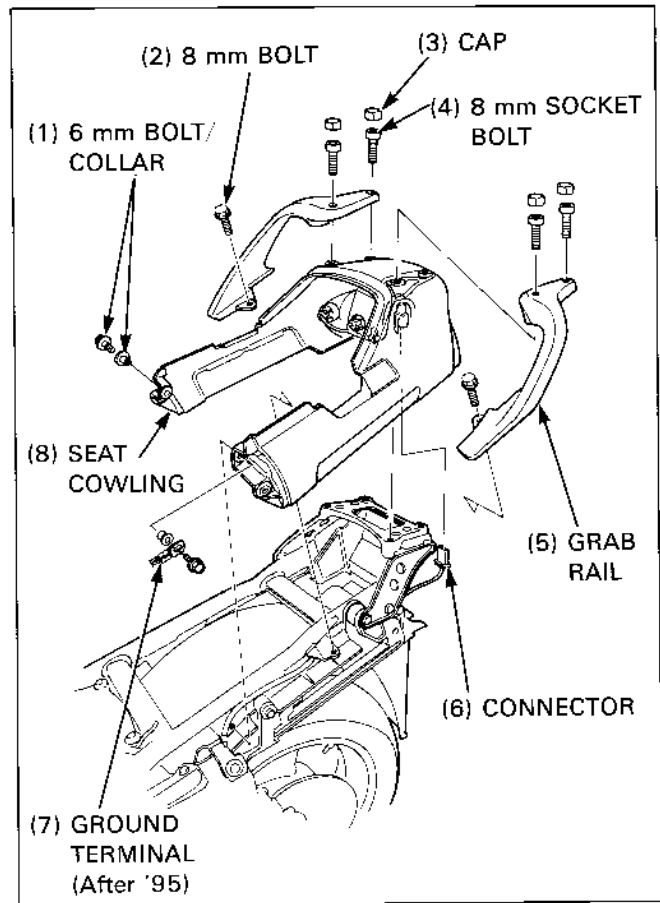
Remove the four socket head caps.

Remove the four socket bolts, two 8 mm bolts and the left and right grab rails.

Remove the two 6 mm bolts, ground terminal (After '95) and collars, disconnect the tail/brake light connector, and remove the seat cowling.

### Torque:

Grab rail bolts: 27 N·m ( 2.7 kg-m, 20 ft-lb)



## Saddlebag Stay

Remove the seat cowling.

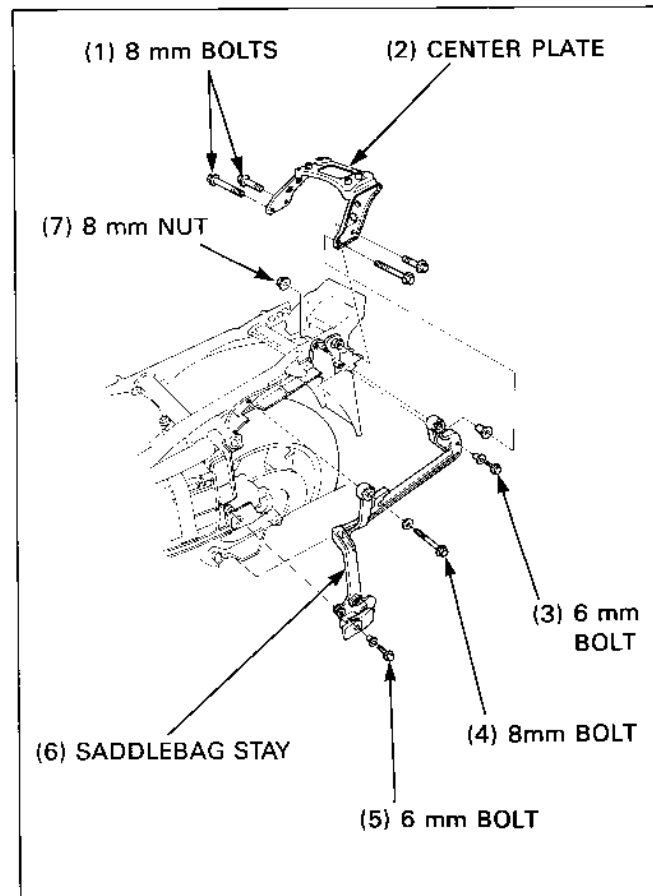
Remove the four 8 mm bolts and the grab rail center plate. Remove the two 6 mm bolts, one 8 mm bolt and the saddlebag stay.

### Torque:

Center plate 8 mm bolt: 35 N·m (3.5 kg-m, 25 ft-lb)

Saddlebag stay 6 mm bolt: 10 N·m (1.0 kg-m, 7 ft-lb)

8 mm bolt: 35 N·m (3.5 kg-m, 25 ft-lb)



## Rear Fender

Remove the battery (page 17-7).

Remove the left and right saddlebag stays (page 2-3).

Remove the four socket bolts, rear fender B and the saddlebag stay stopper.

Remove the starter motor cable from the starter relay switch, and remove the starter relay switch from the rear fender A.

Remove the three bolts and the battery holder.

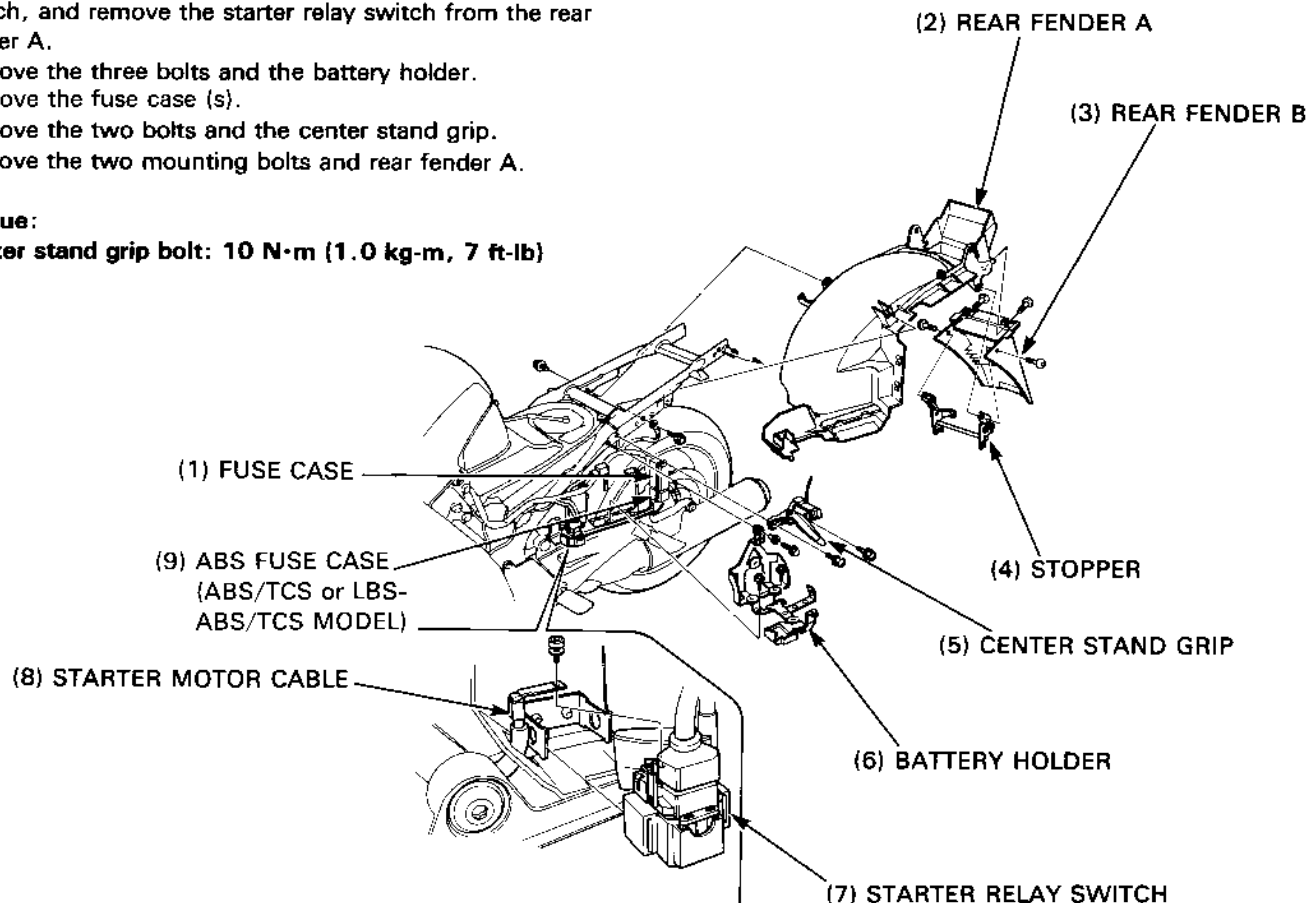
Remove the fuse case (s).

Remove the two bolts and the center stand grip.

Remove the two mounting bolts and rear fender A.

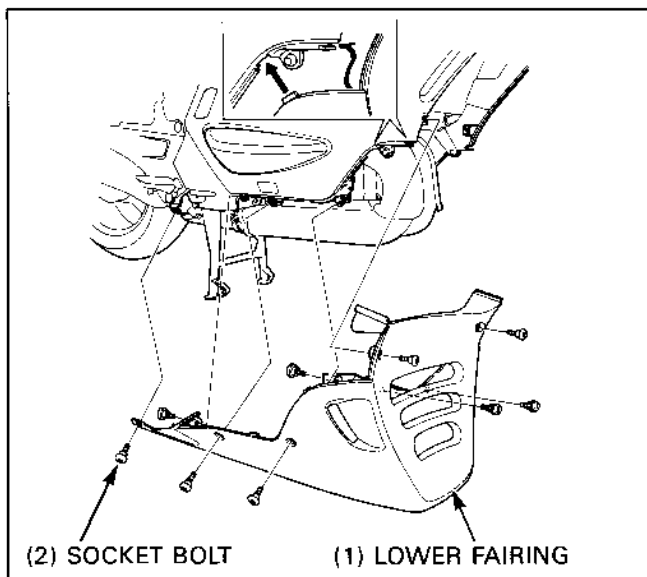
### Torque:

Center stand grip bolt: 10 N·m (1.0 kg-m, 7 ft-lb)



## Lower Fairing

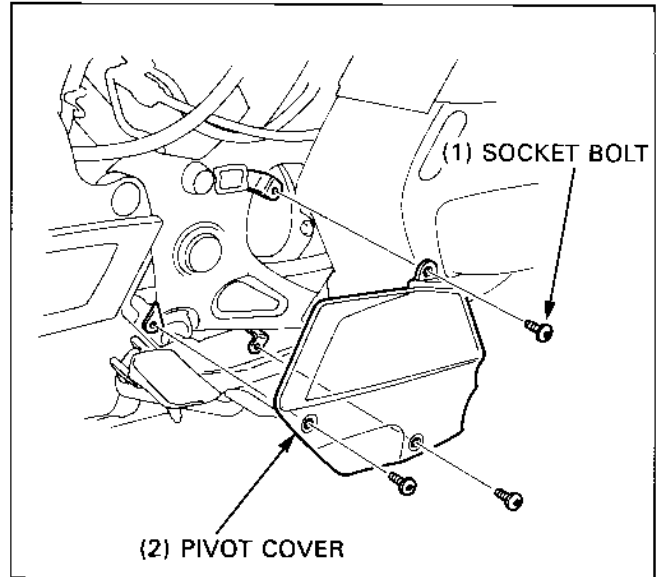
Remove the nine socket bolts and the lower fairing.



## Pivot Cover

Remove the side cover (page 2-2).

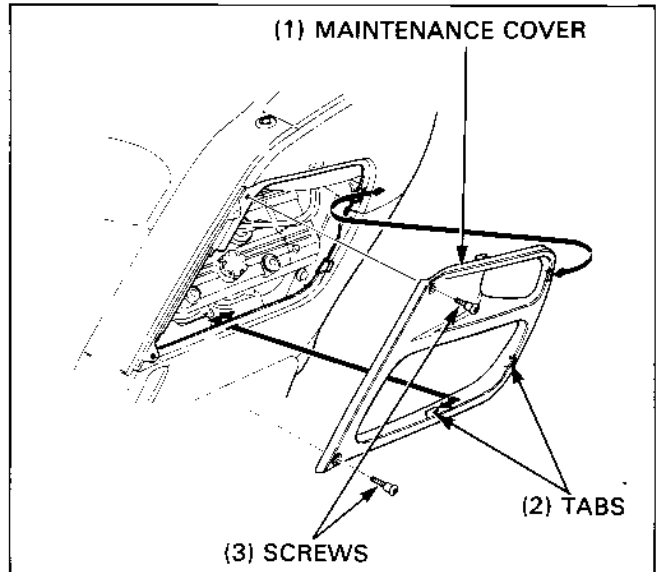
Remove the three socket bolts and the pivot cover.



## Maintenance Cover

Remove the two screws.

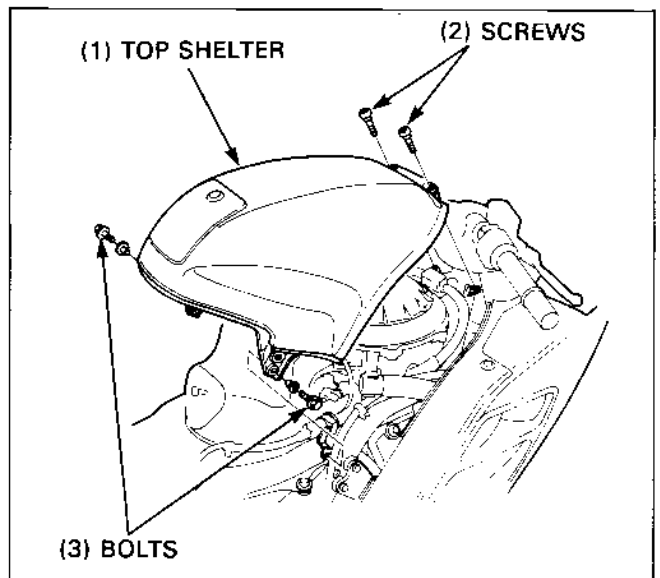
Release the four tabs by sliding the maintenance cover rearward and remove the cover.



## Top Shelter

Remove the left and right side covers (page 2-2).

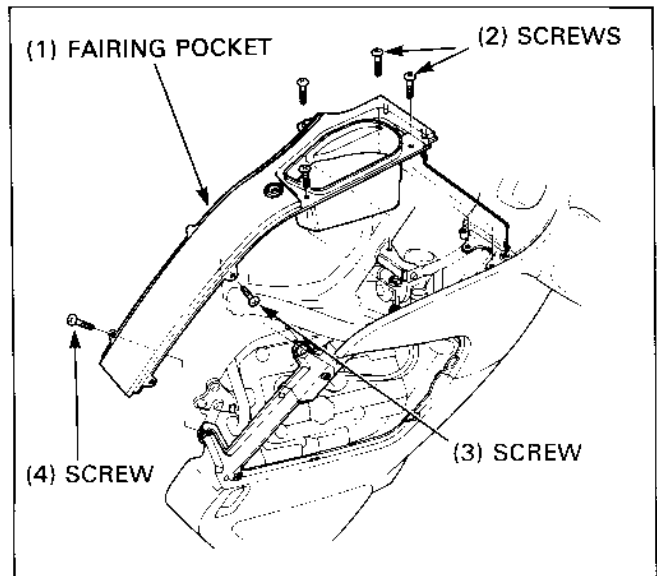
Remove the two screws, two bolts and the top shelter.



## Fairing Pocket

Remove the maintenance cover (page 2-5).  
Remove the top shelter (page 2-5).

Remove the six screws and the fairing pocket.



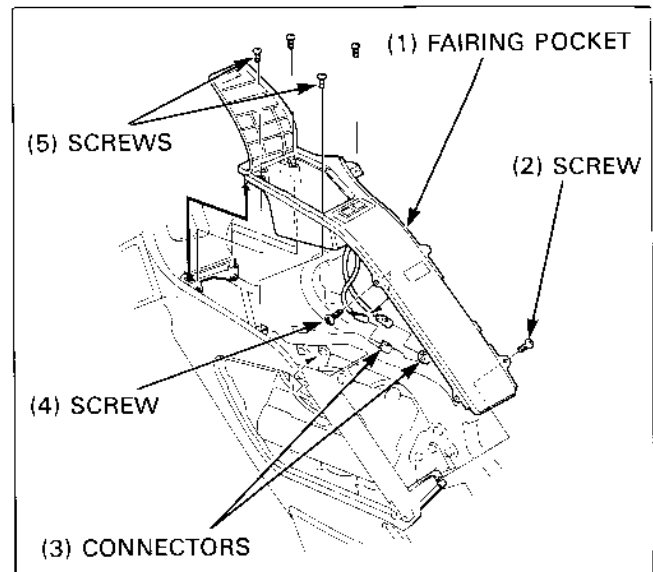
### ABS/TCS or LBS-ABS/TCS model:

Remove the maintenance cover (page 2-5).  
Remove the top shelter (page 2-5).

Remove the six screws.  
Disconnect the two connectors and left fairing pocket.

#### NOTE

- The TCS OFF indicator turns on when the TCS switch connector is disconnected and then reconnected with the ignition switch ON. The TCS can be reactivated by pushing the TCS switch.



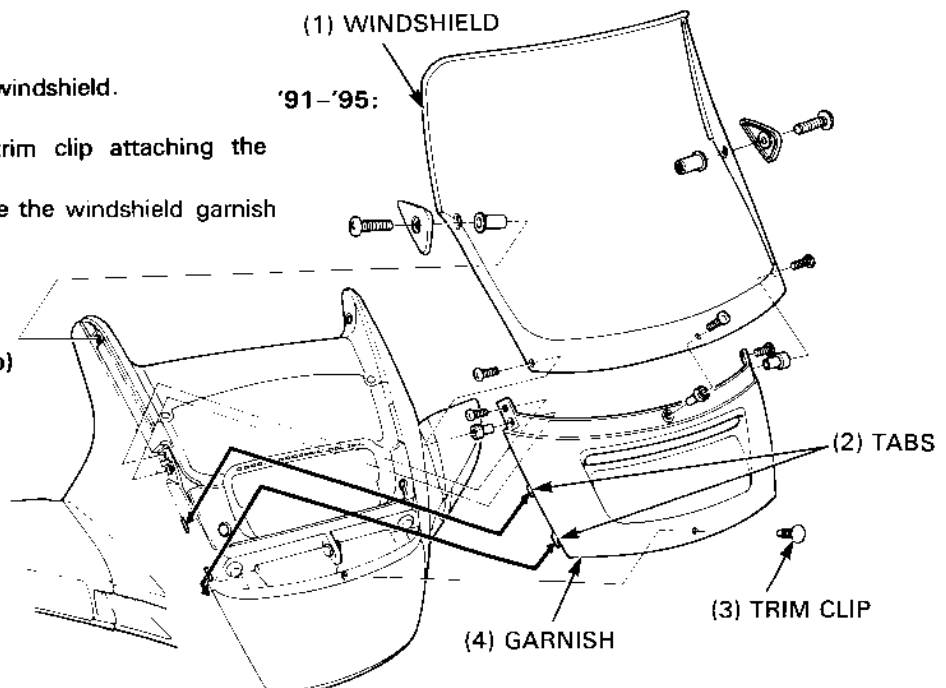
## Windshield

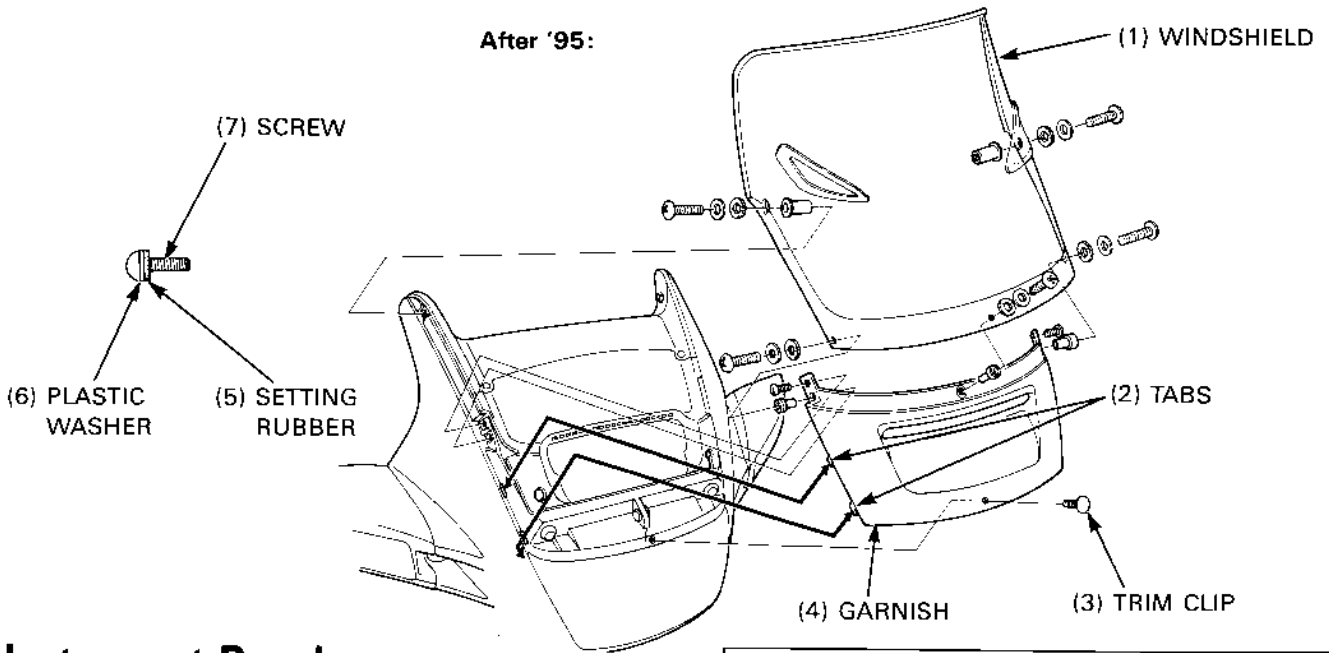
Remove the five screws and the windshield.

Remove the two screws and trim clip attaching the windshield garnish.  
Release the four tabs and remove the windshield garnish from the upper fairing.

#### Torque:

Windshield screw  
0.6 N·m (0.06 kg-m, 0.43 ft-lb)

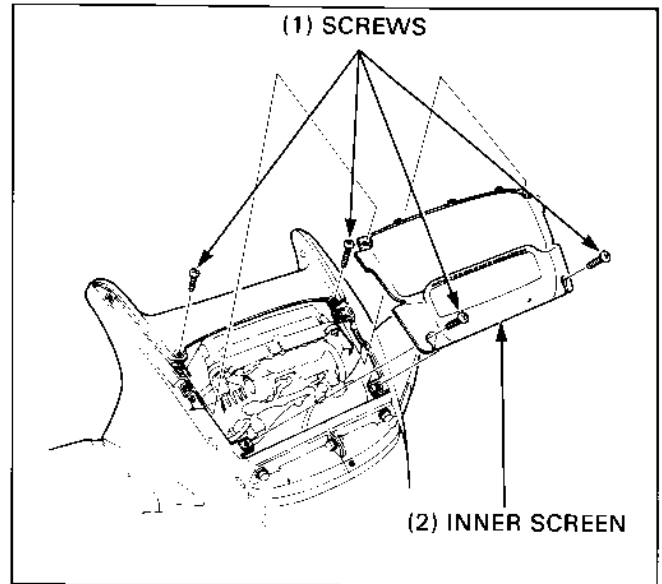




## Instrument Panel

Remove the windshield and garnish (page 2-6).

Remove the four screws and the inner screen.



Remove the left and right fairing pockets (page 2-6).

Disconnect the clock connectors under the instruments.

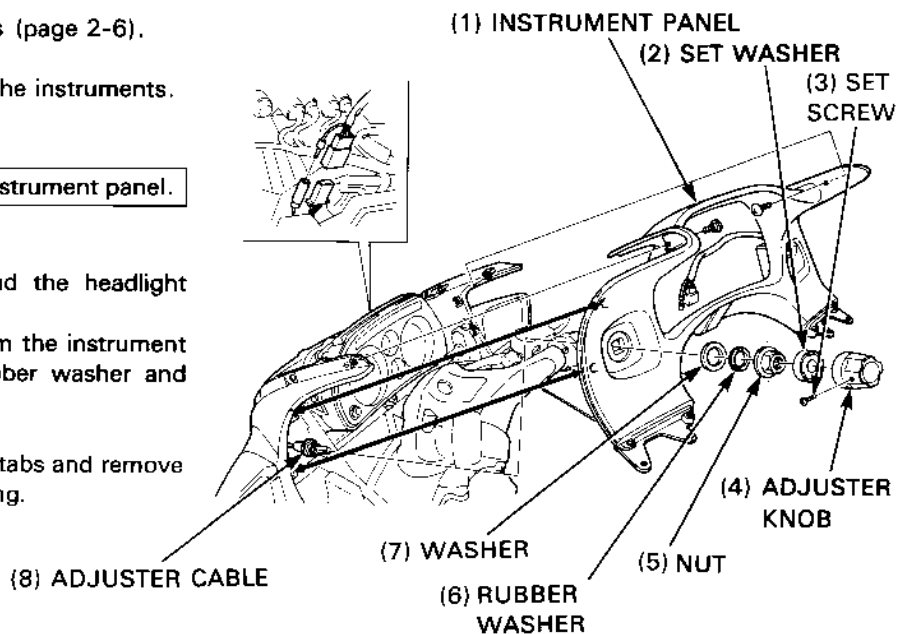
### NOTE

- Adjust the clock after installing the instrument panel.

Remove the set screw, set washer and the headlight adjuster knob.

Remove the headlight adjuster cable from the instrument panel by removing the plastic nut, rubber washer and washer.

Remove the two screws, release the four tabs and remove the instrument panel from the upper fairing.

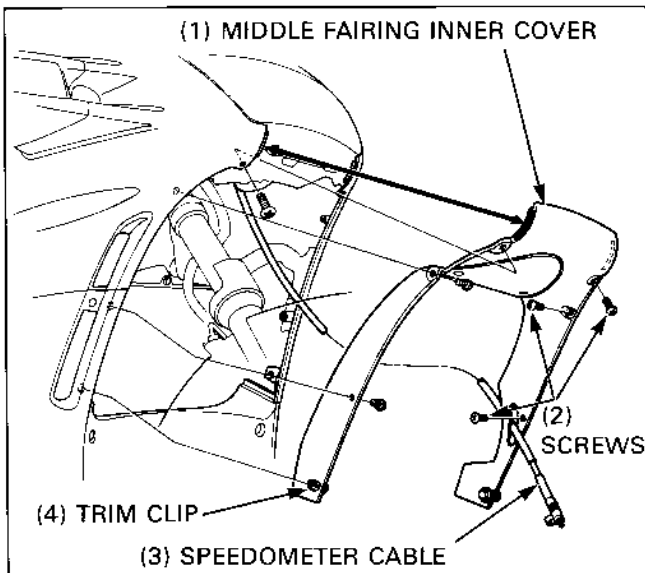


## Middle Fairing Inner Cover

Disconnect the speedometer cable from the front wheel by removing the cable set screw.

Remove the two trim clips from the middle fairing by pulling them out.

Remove the six screws and the middle fairing inner cover.



## Middle Fairing

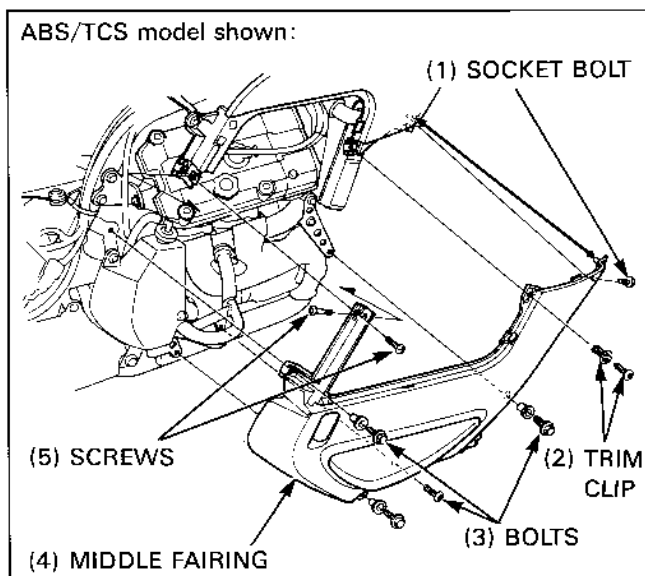
Remove the following:

- middle fairing inner cover (page 2-7)
- left and right fairing pockets (page 2-6)
- lower fairing (page 2-4).

Remove the socket bolt, three screws, trim clip, three bolts and the middle fairing.

### NOTE

- At installation, align the boss of the middle fairing with the hole of the upper fairing properly.

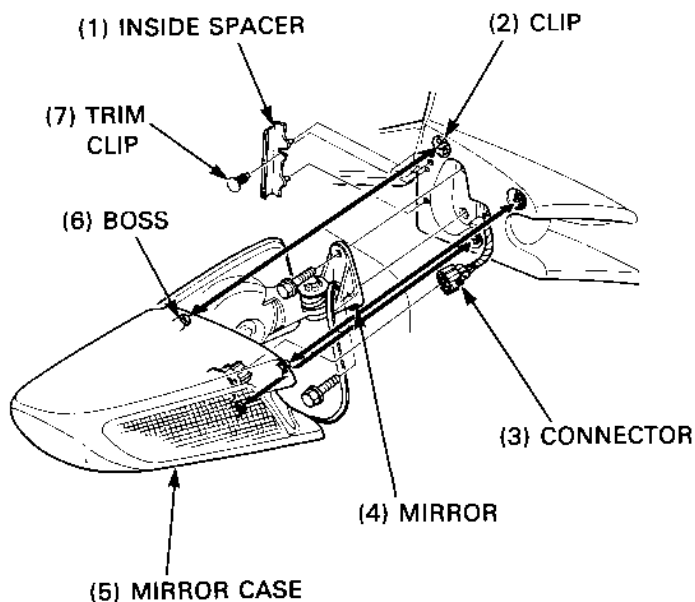


## Rearview Mirror

Remove the rearview mirror case by carefully releasing the three bosses from the clips of the upper fairing. Disconnect the front turn signal connector.

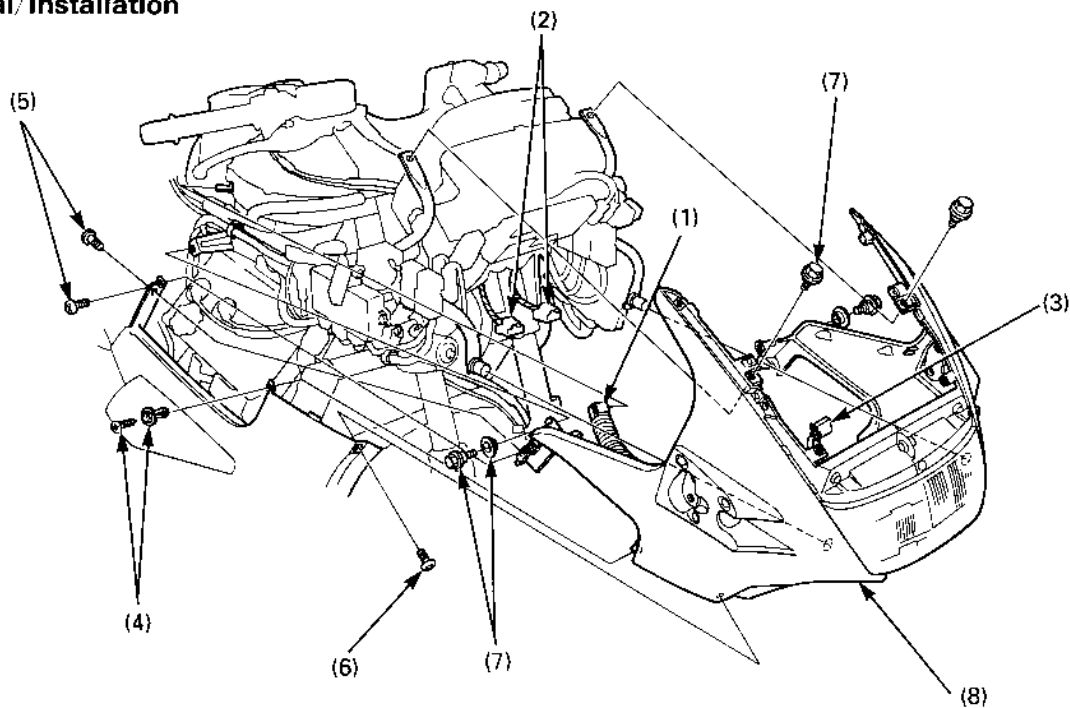
Remove the trim clip and the mirror cover inside spacer.

Remove the two bolts and the rearview mirror.



# Upper Fairing

## Removal/Installation



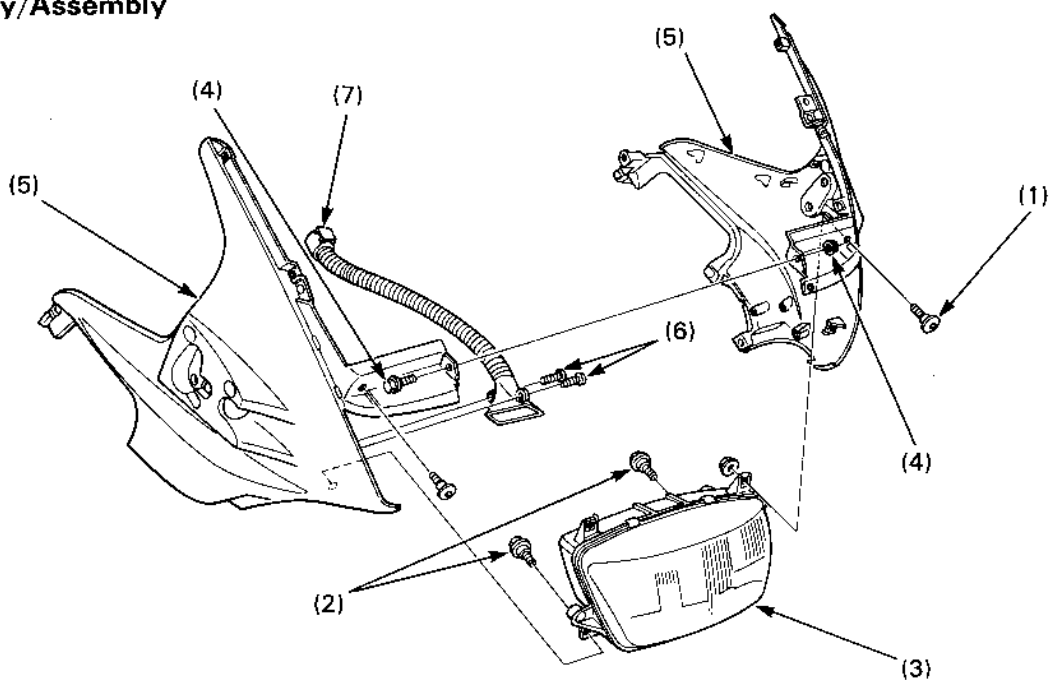
## Requisite Service

- Left and right rear view mirrors (page 2-8).
- Instrument panel (page 2-7).
- Middle fairing inner cover (page 2-7).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Air duct	1	
(2)	Headlight connector	2	
(3)	Position light connector	1	
(4)	Trim clip	2	
(5)	Screw	4	
(6)	Socket bolt	2	
(7)	Bolt/collar	4/2	
(8)	Upper fairing	1	At installation, align the holes in the headlight with the mounting bosses of the fairing stay.



**Disassembly/Assembly**

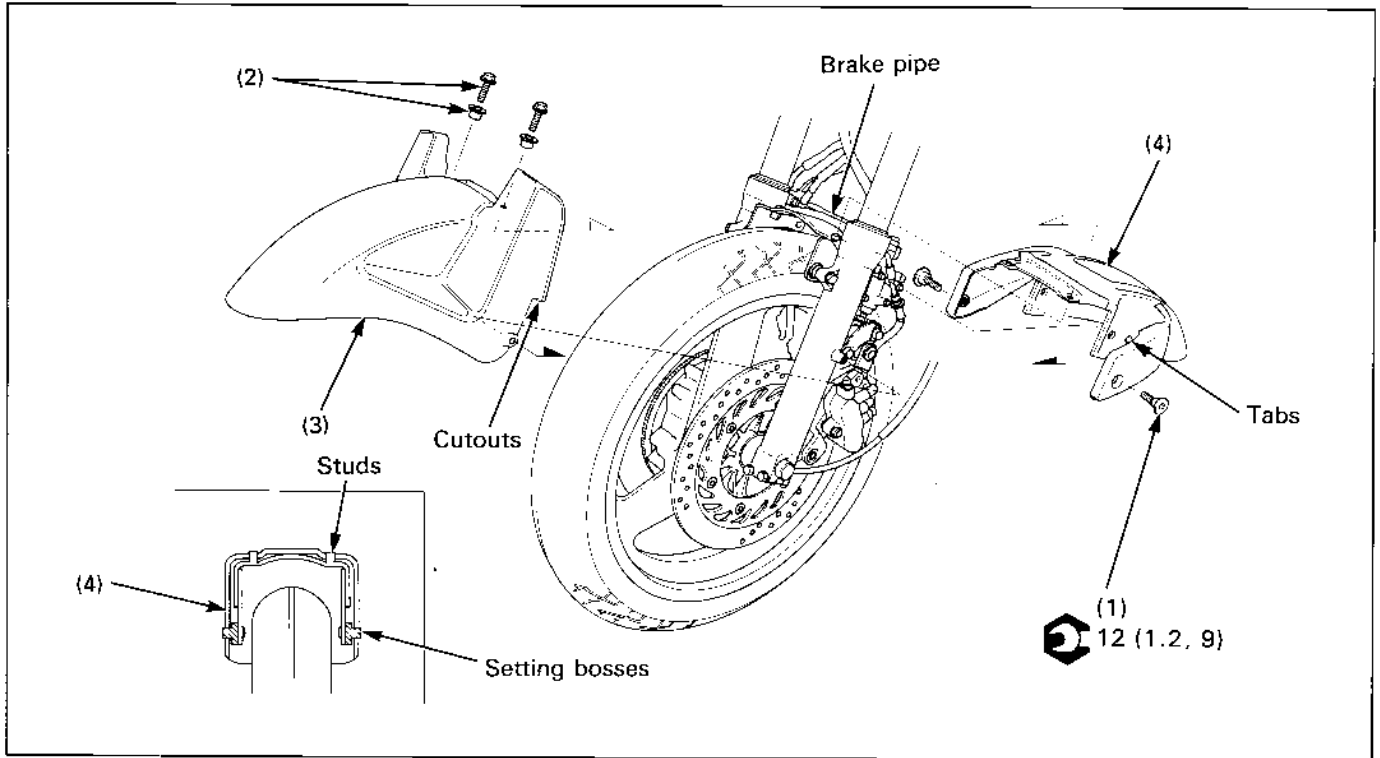


**Requisite Service**

- Upper fairing removal/installation (page 2-9).

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Socket bolt/nut	2/2	
(2)	Bolt	2	
(3)	Headlight	1	
(4)	Bolt/nut	1/1	
(5)	Upper fairing	2	
(6)	Screw	2	
(7)	Air duct	1	

# Front Fender (LBS-ABS/TCS model)

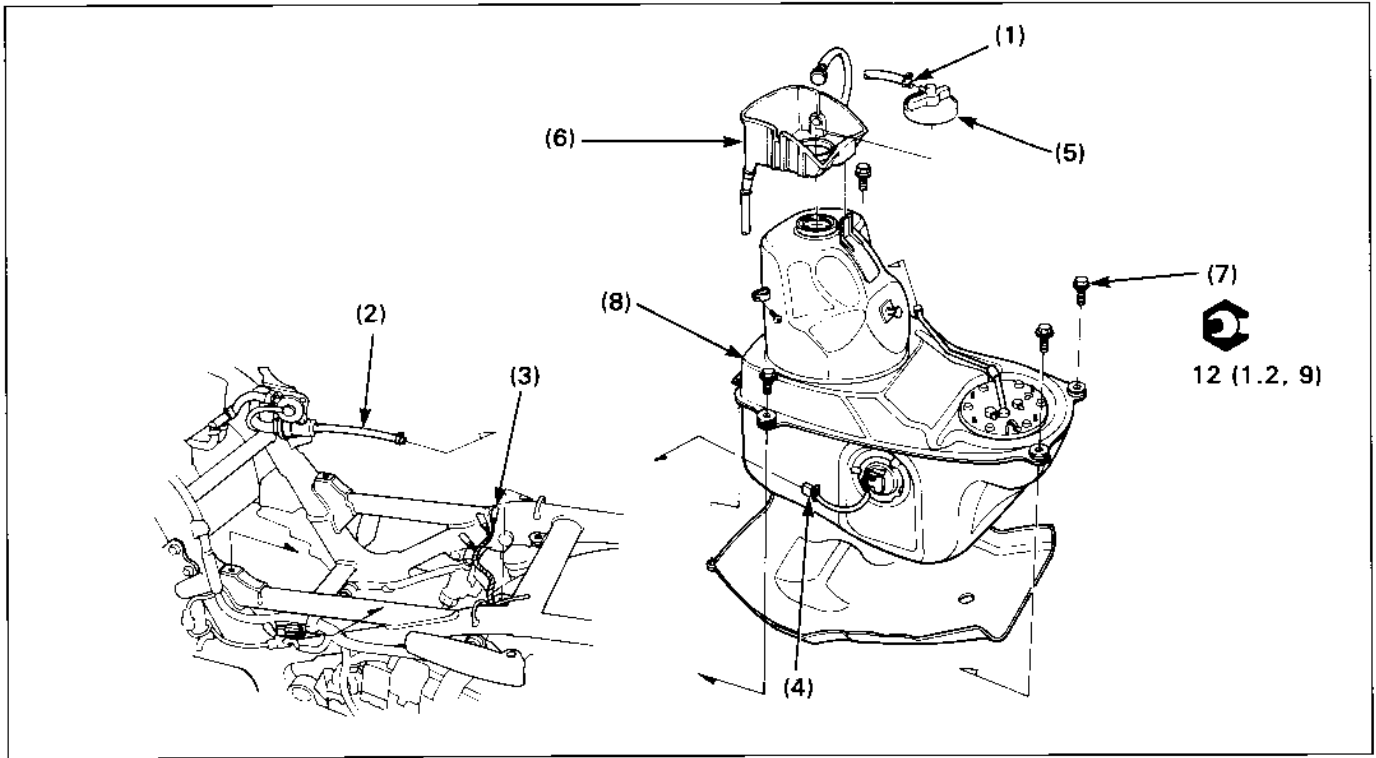


**NOTE**

• On the standard and ABS/TCS model, refer to page 13-6 "Front wheel removal/installation".

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Socket bolt	2	
(2) Flange bolt/washer	2/2	
(3) Upper fender	1	When installing, align the cutouts with the tabs on the fender side covers.
(4) Lower fender	1	When installing, insert the fender end between the brake pipe and fender plate, and align the holes in the lower fender with the bolt hole studs and setting bosses on the fender plate.

# Fuel Tank



**▲ WARNING**

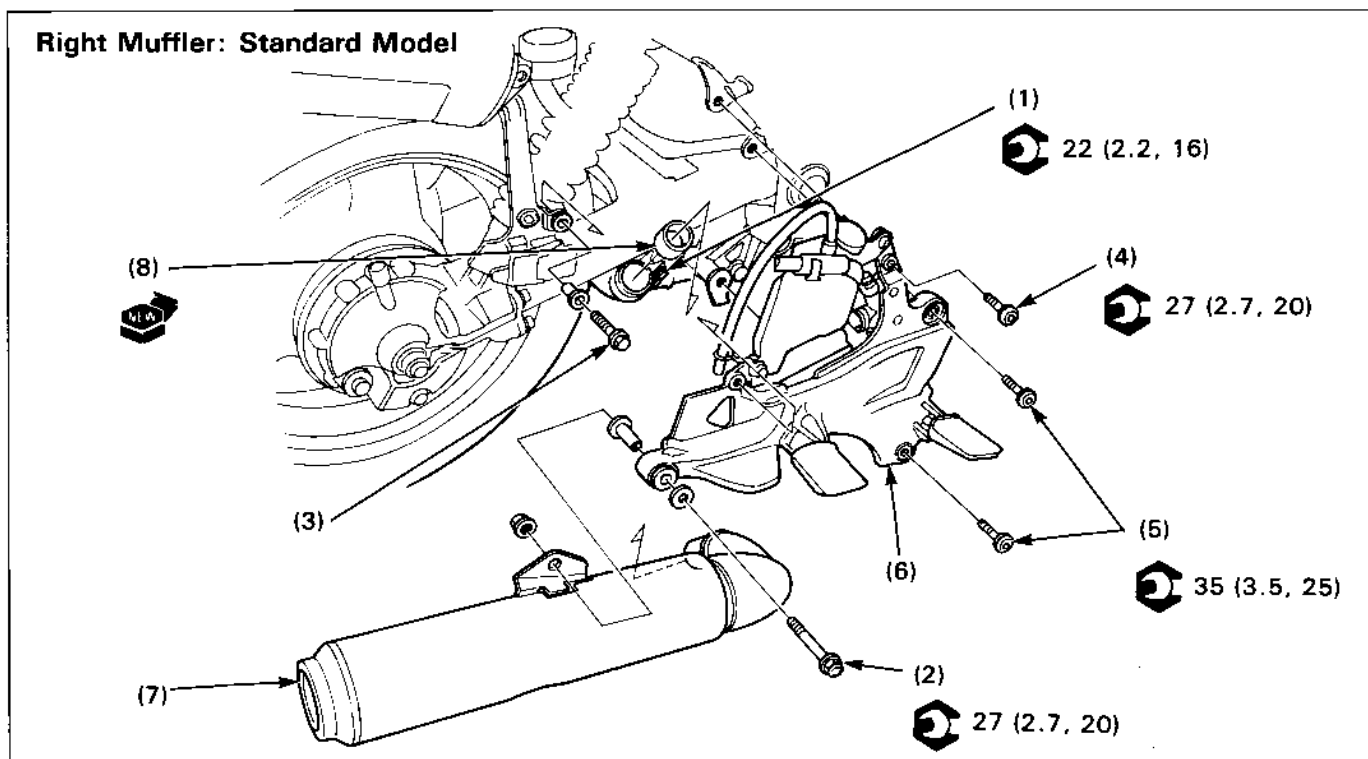
• Gasoline is extremely flammable and is explosive under certain conditions.

## Requisite Service

- Air cleaner housing removal/installation (page 5-10)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Fuel tank breather tube	1	Remove from the fuel fill cap and clamp.
(2) Fuel line	1	
(3) Fuel pump connector	3	
(4) Fuel level sensor connector	1	
(5) Fuel fill cap	1	
(6) Fuel tank tray	1	
(7) Fuel tank mounting bolt	4	
(8) Fuel tank	1	
(9) Fuel tank heat protector	1	

# Muffler



**⚠ WARNING**

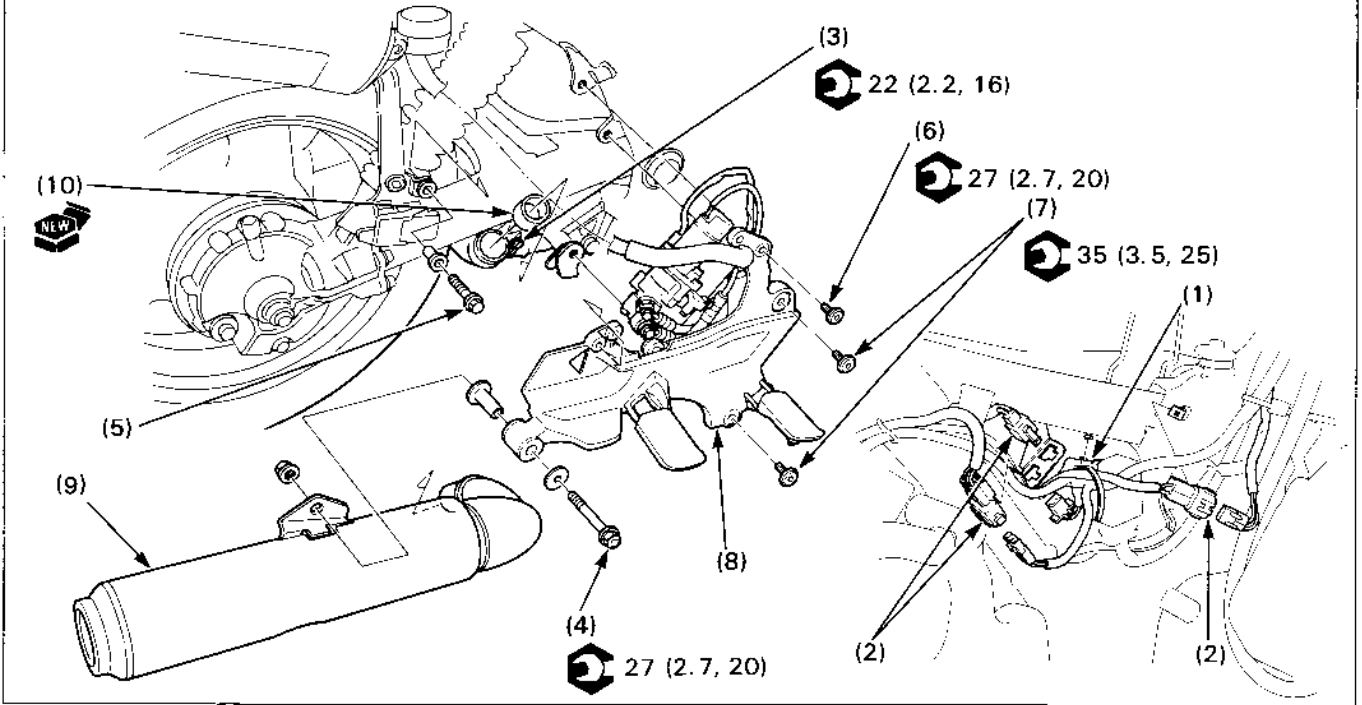
- Do not service the exhaust system while it is hot.

## Requisite Service

- Right pivot cover removal/installation (page 2-5)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Muffler band	2	Loosen the band bolts.
(2)	Muffler mounting bolt	1	
(3)	Right footpeg holder bolt 6 mm	1	
(4)	8 mm	1	
(5)	10 mm	2	
(6)	Right footpeg holder	1	<ul style="list-style-type: none"> <li>• Remove with the master cylinder and rear brake light switch installed.</li> <li>• Support with a piece of string.</li> </ul>
(7)	Right muffler	1	
(8)	Gasket	1	

**Right Muffler: ABS/TCS Model**



**⚠ WARNING**

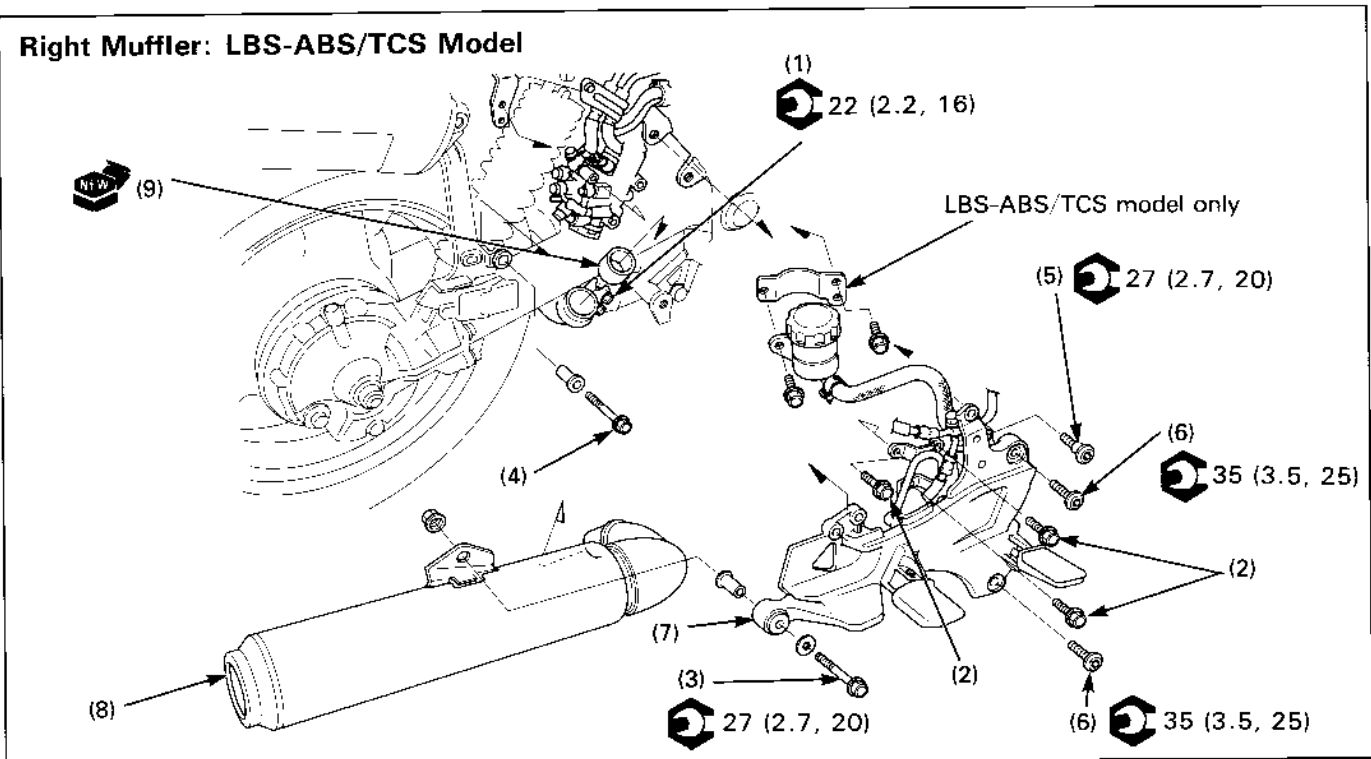
- Do not service the exhaust system while it is hot.

**Requisite Service**

- Right pivot cover removal/installation (page 2-5)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Harness band	1	Loosen the band.
(2) Connector	3	
(3) Muffler band	2	Loosen the band bolts.
(4) Muffler mounting bolt	1	
(5) Right footpeg holder bolt 6 mm	1	
(6) 8 mm	1	
(7) 10 mm	2	
(8) Right footpeg holder	1	<ul style="list-style-type: none"> <li>• Remove with the master cylinder and rear brake light switch installed.</li> <li>• Support with a piece of string.</li> </ul>
(9) Right muffler	1	
(10) Gasket	1	

**Right Muffler: LBS-ABS/TCS Model**



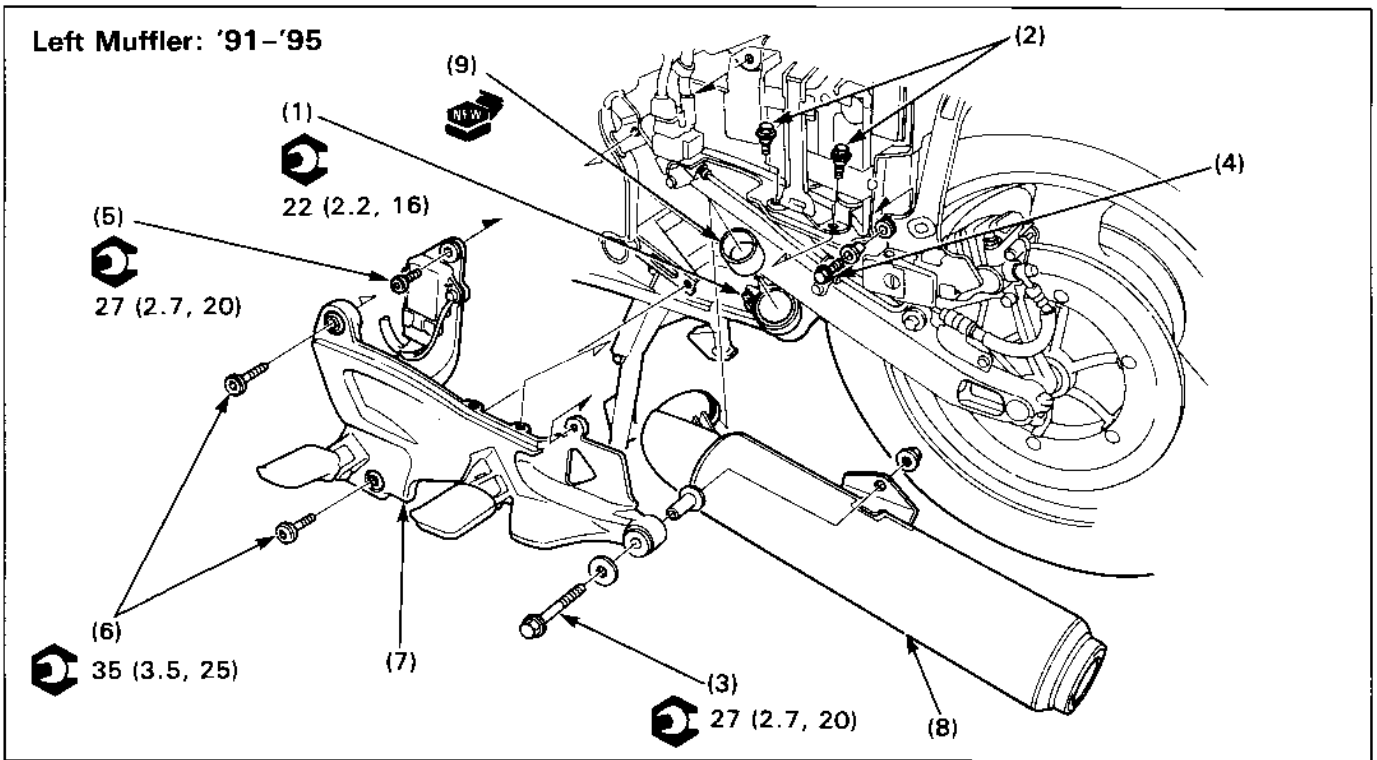
**WARNING**

- Do not service exhaust system while it is hot.

**Requisite Service**

- Right pivot cover removal/installation (page 2-5).

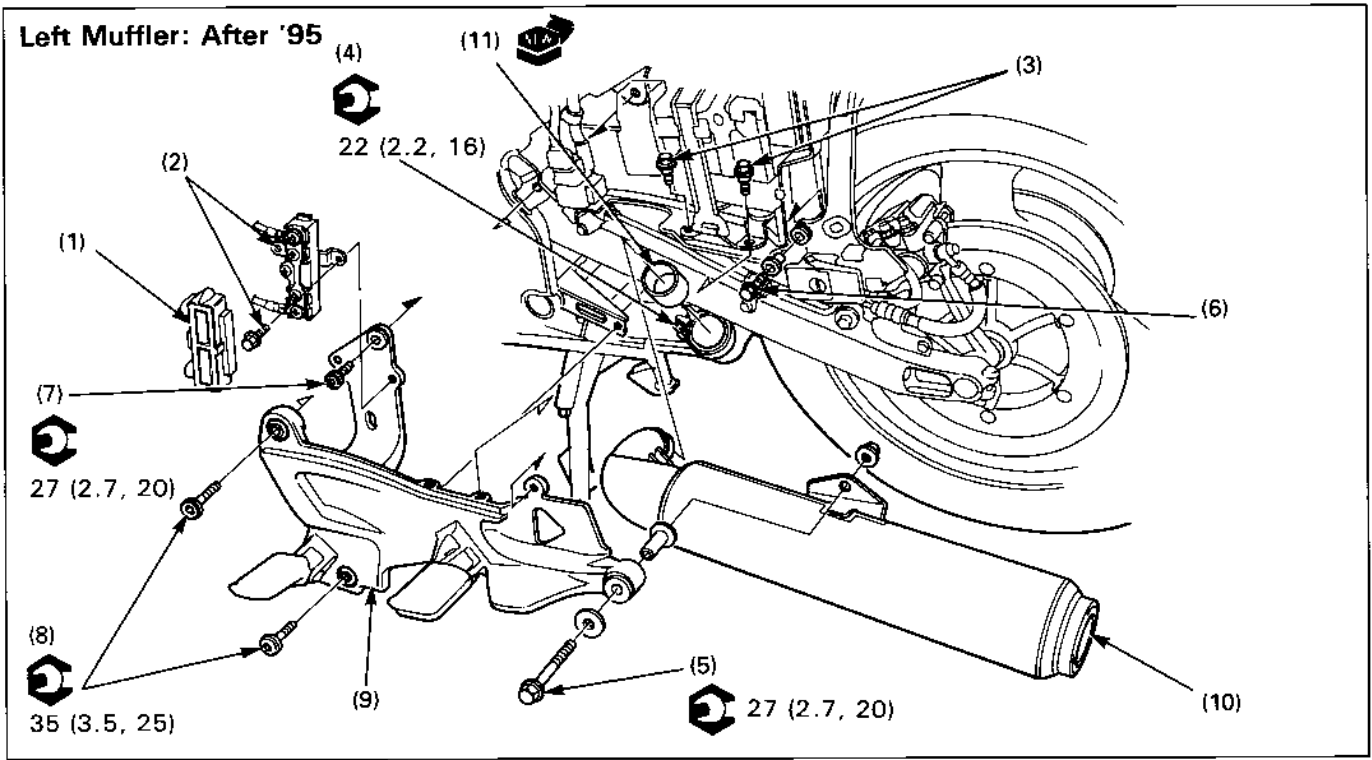
Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Muffler band	2	Loosen the band bolts.
(2) Modulator mounting bolt	3	
(3) Muffler mounting bolt	1	
(4) Right step holder bolt 6 mm	1	
(5) 8 mm	1	
(6) 10 mm	2	
(7) Right step holder	1	<ul style="list-style-type: none"> <li>• Remove with the master cylinder and rear brake light switch installed.</li> <li>• Support with a piece of string.</li> </ul>
(8) Right muffler	1	
(9) Gasket	1	



**Requisite Service**

- Left pivot cover removal/installation (page 2-5)
- Battery removal/installation (page 17-12)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Muffler band	2	Loosen the band bolts.
(2) Battery holder bolt	2	
(3) Muffler mounting bolt	1	
(4) Left footpeg holder bolt 6 mm	1	
(5) 8 mm	1	
(6) 10 mm	2	
(7) Left footpeg holder	1	Support with a piece of string.
(8) Left muffler	1	
(9) Gasket	1	



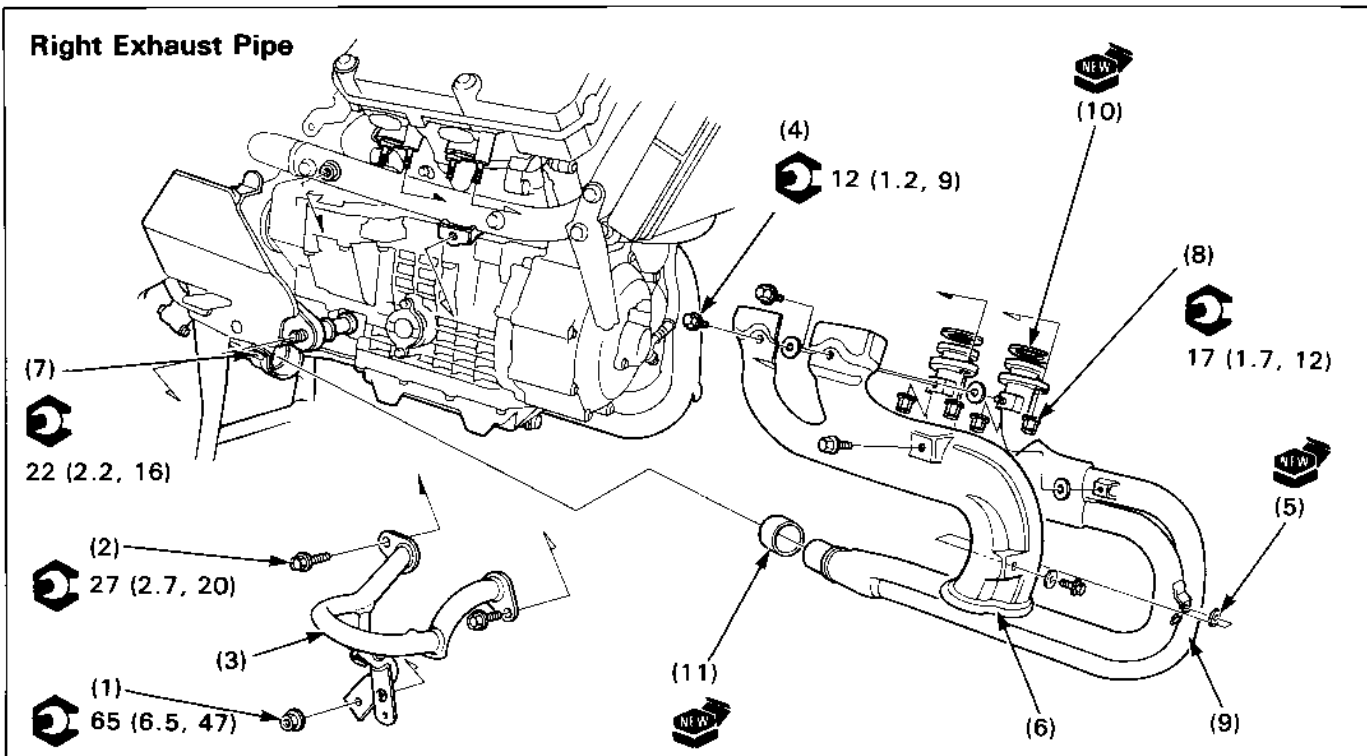
**Requisite Service**

- Left pivot cover removal/installation (page 2-5).
- Battery removal/installation (page 17-12).

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Alternator fuse cover	1	
(2) Bolt/fuse base plate	2/1	
(3) Battery holder bolt	2	
(4) Muffler band	2	Loosen the band bolts.
(5) Muffler mounting bolt	1	
(6) Left step holder bolt 6 mm	1	
(7) 8 mm	1	
(8) 10 mm	2	
(9) Left step holder	1	
(10) Left muffler	1	
(11) Gasket	1	



# Exhaust Pipe



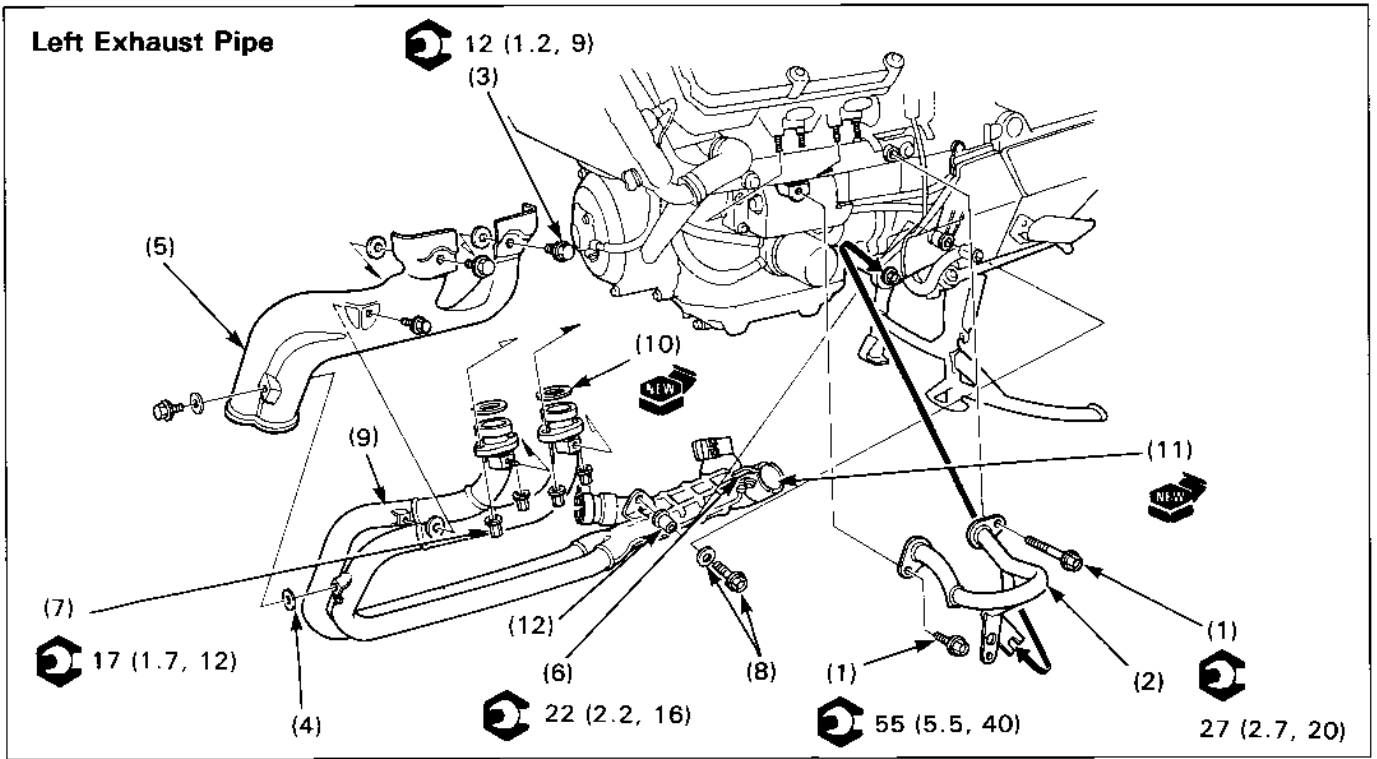
**WARNING**

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

### Requisite Service

- Right middle fairing removal/installation (page 2-8)
- ABS/TCS or LBS-ABS/TCS Model:  
Radiator reserve tank removal/installation (page 6-9)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Lower engine mounting nut	1	
(2) Bolt	2	
(3) Right engine guard	1	
(4) Bolt	4	
(5) Protector gasket	5	
(6) Right exhaust pipe protector	1	
(7) Exhaust pipe band	1	Loosen the band bolt.
(8) Exhaust pipe joint nut	4	
(9) Right exhaust pipe	1	
(10) Exhaust pipe gasket	2	
(11) Exhaust chamber gasket	1	



**Requisite Service**

- Left middle fairing removal/installation (page 2-8)
- Right exhaust muffler removal/installation (page 2-14)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Bolt	2	
(2)	Left engine guard	1	
(3)	Bolt	4	
(4)	Protector gasket	5	
(5)	Left exhaust pipe protector	1	
(6)	Muffler band	4	Loosen the band bolts.
(7)	Exhaust pipe joint nut	4	Installation (page 2-20)
(8)	8 mm mounting bolt/washer	1/1	
(9)	Left exhaust pipe/chamber	1	
(10)	Exhaust pipe gasket	2	
(11)	Muffler gasket	2	
(12)	Mounting collar	1	

## Exhaust Pipe Installation

1. Make sure that the mounting collar is installed in position. Loosely install the left exhaust pipe/chamber to the frame with the 8 mm mounting bolt and washer.
2. Make sure that the exhaust pipe gaskets are installed in position, insert the left exhaust pipe flanges into the cylinder head and loosely install the joint nuts.
3. Insert the right exhaust pipe into the left exhaust pipe/chamber.
4. Make sure that the exhaust pipe gaskets are installed in position. Insert the right exhaust pipe flanges into the cylinder head and loosely install the joint nuts.
5. Tighten each pair of the joint nuts in 3 steps as follows:
  - A. Temporarily tighten either nut to 10 N·m (1.0 kg-m, 9 ft-lb).
  - B. Tighten the other nut to the specified torque.

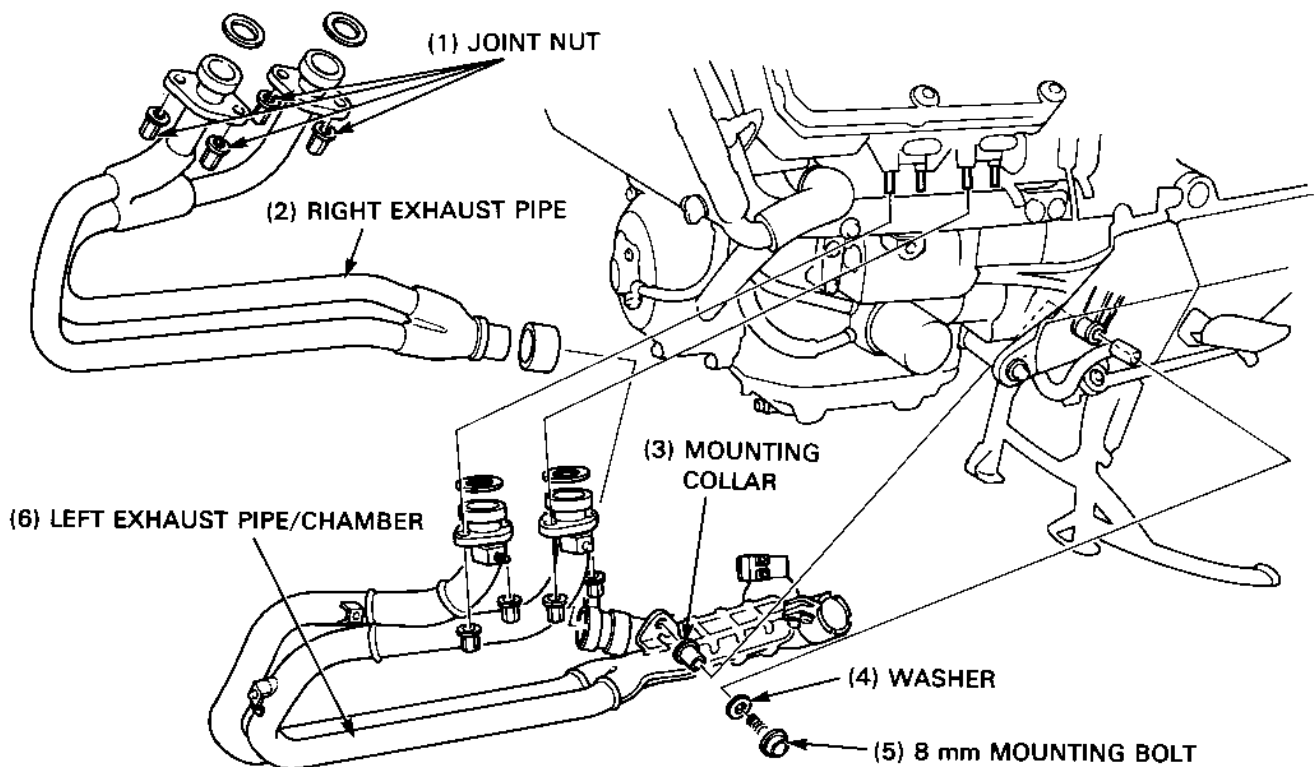
**Torque: 17 N·m (1.7 kg-m, 12 ft-lb)**

- C. Tighten the nut temporarily tightened in step A to the specified torque.

6. Tighten the exhaust pipe band.















**Torque: 22 N·m (2.2 kg-m, 16 ft-lb)**

7. Tighten the 8 mm mounting bolt.



# 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.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use special tool</p>
	<p>Use optional tool. Use the same procedure you use to order parts.</p>
 <p>10 (1.0, 7.2)</p>	<p>Torque specification.    10 N·m (1.0 kg-m, 7.2 ft-lb)</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)</p>
	<p>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</p>
	<p>Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent)          Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A.          Honda Moly 60 (U.S.A. only)          Rocol ASP manufactured by Rocol Limited, U.K.          Rocol Paste manufactured by Sumico Lubricant, Japan</p>
	<p>Use silicone grease</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant</p>
	<p>Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>

# 3. Maintenance

<b>Service Information</b>	<b>3-1</b>	<b>Carburetor Synchronization</b>	<b>3-9</b>
<b>Service Access Guide</b>	<b>3-2</b>	<b>Engine Idle Speed</b>	<b>3-11</b>
<b>Maintenance Schedule</b>	<b>3-4</b>	<b>Radiator Coolant</b>	<b>3-11</b>
<b>Air Cleaner</b>	<b>3-6</b>	<b>Timing Belt</b>	<b>3-12</b>
<b>Spark Plugs</b>	<b>3-6</b>	<b>Brake Fluid</b>	<b>3-12</b>
<b>Valve Clearance</b>	<b>3-6</b>	<b>Brake System (LBS-ABS/TCS model)</b>	<b>3-13</b>
<b>Engine Oil</b>	<b>3-8</b>	<b>Headlight Aim</b>	<b>3-14</b>

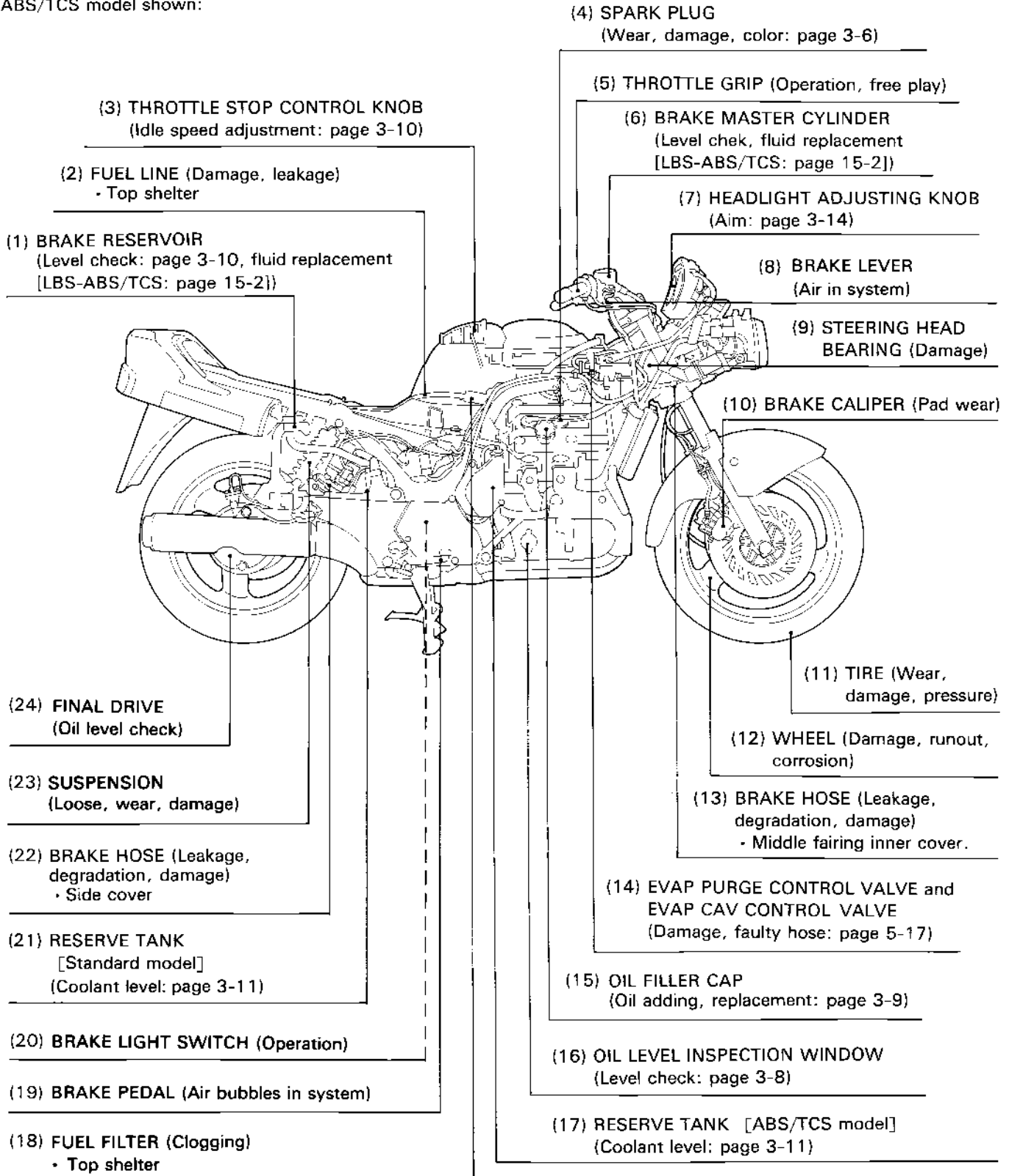
## Service Information

- Refer to Common Service Manual for service procedures on items not included in this manual.
- Refer to 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)
  - Top shelter — The parts that must be removed for service.

ABS/TCS model shown:



ABS/TCS model shown:

(6) PAIR CONTROL VALVE  
(Damage, faulty hose: page 5-17)

(5) CARBURETOR CHOKE (Operation)

(4) CLUTCH MASTER CYLINDER  
(Level check, fluid replacement)

(3) CLUTCH LEVER  
(Air in system)

(2) HEADLIGHT  
ADJUSTING SCREW  
(Aim: page 3-14)

(1) SUSPENSION  
(Loose, wear, damage)

(7) AIR CLEANER  
(Contamination, clogging, replacement: page 3-6)

(8) SYNCHRONIZATION ADJUSTING SCREW  
(Synchronization: page 3-9)

(9) BRAKE HOSE  
(Leakage, degradation,  
damage)

(10) BRAKE CALIPER  
(Pad wear)  
• Left saddle bag

(19) TIMING HOLE COVER (Ignition timing)  
• Lower fairing

(18) TIMING BELT (Cracks, damage,  
contamination: page 3-12)

(17) RADIATOR HOSE  
(Leakage, degradation, damage)

(16) OIL DRAIN BOLT  
(Oil replacement: page 3-8)

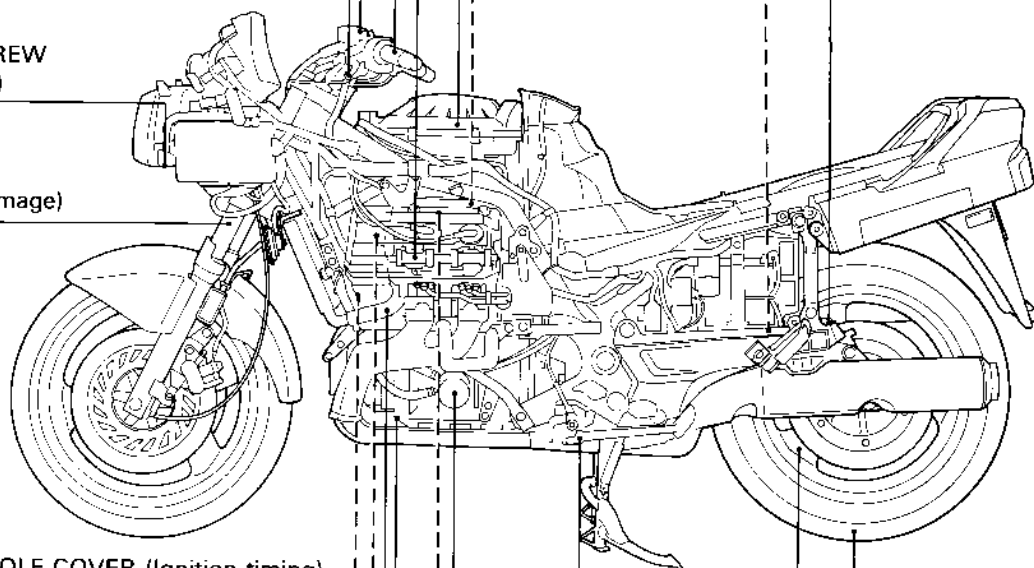
(15) VALVE CLEARANCE (page 3-6)

(14) OIL FILTER  
(Replacement: page 3-8)

(11) TIRE (Wear,  
damage, pressure)

(12) WHEEL (Damage,  
runout, corrosion)

(13) SIDE STAND (Operation)



# Maintenance Schedule

'91-'94

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 an authorized Honda dealer.

Item	Frequency	Whichever comes first Note	Odometer Reading (Note 1)								Refer to page	
			x 1,000 mi	0.6	4	8	12	16	20	24		
			x 100 km	10	64	128	192	256	320	384		
Months		6	12	18	24	30	36					
Emission Related Items	* Fuel Line				I			I			I	Note 5
	* Throttle Operation					I		I			I	Note 5
	* Carburetor Choke					I		I			I	Note 5
	Air Cleaner		Note 2					R			R	3-6
	Spark Plugs				I	R	I	R	I		R	3-6
	* Valve Clearance				I			I				3-6
	Engine Oil					R		R			R	3-8
	Engine Oil Filter					R		R			R	3-8
	* Carburetor Synchronization				I			I			I	3-9
	* Engine Idle Speed				I	I	I	I	I	I	I	3-11
	Radiator Coolant		Note 3					I			R	3-11
	* Cooling System							I			I	Note 5
	* Secondary Air Supply System		Note 6					I			I	Note 5
	* Evaporative Emission Control System		Note 4					I			I	Note 5
* Timing Belt							I Every 60,000 mi (96,000 km) R Every 90,000 mi (144,000 km)				3-12	
Non-emission Related Items	Final Drive Oil										R	Note 5
	Brake Fluid		Note 3			I	I	R	I	I	R	Note 5,3-12
	Brake Pads Wear					I	I	I	I	I	I	Note 5
	Brake System					I		I			I	Note 5,3-13
	* Brake Light Switch							I			I	Note 5
	* Headlight Aim							I			I	3-14
	Clutch System							I			I	Note 5
	Clutch Fluid		Note 3					I	I	R	I	Note 5
	Side Stand							I			I	Note 5
	* Suspension							I			I	Note 5
	* Nuts, Bolts, Fasteners							I			I	Note 5
	** Wheels/Tires								I		I	Note 5
** Steering Head Bearings								I		I	Note 5	

\* Should be serviced by your 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 your authorized Honda dealer.

- Notes:
- At higher odometer readings, repeat at the frequency interval established here.
  - Service more frequently when riding in unusually wet or dusty areas.
  - Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
  - '91-'93: Standard California type and U.S.A. ABS/TCS type.  
'94: California type.
  - Refer to Common Service Manual.
  - All U.S.A. types.



## After '94

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 an authorized Honda dealer.

Item	Frequency	Whichever comes first Note	Odometer Reading (Note 1)						Refer to page		
			x 1,000 mi	0.6	4	8	12	16		20	24
			x 100 km	10	64	128	192	256		320	384
			Months	6	12	18	24	30	36		
* Fuel Line					I		I		I	Note 5	
* Throttle Operation					I		I		I	Note 5	
* Carburetor Choke					I		I		I	Note 5	
Air Cleaner		Note 2					R		R	3-6	
Spark Plugs				I	R	I	R	I	R	3-6	
* Valve Clearance							I			3-6	
Engine Oil			R		R		R		R	3-8	
Engine Oil Filter			R		R		R		R	3-8	
* Carburetor Synchronization			I		I		I		I	3-9	
* Engine Idle Speed			I	I	I	I	I	I	I	3-11	
Radiator Coolant		Note 3			I		I		R	3-11	
* Cooling System					I		I		I	Note 5	
* Secondary Air Supply System		Note 6			I		I		I	Note 5	
* Evaporative Emission Control System		Note 4					I		I	Note 5	
* Timing Belt			I Every 60,000 mi (96,000 km) R Every 90,000 mi (144,000 km)						3-12		
Final Drive Oil					I		I		R	Note 5	
Brake Fluid		Note 3			I	I	R	I	I	Note 5,3-12	
Brake Pads Wear					I	I	I	I	I	Note 5	
Brake System			I		I		I		I	Note 5,3-13	
* Brake Light Switch					I		I		I	Note 5	
* Headlight Aim					I		I		I	3-14	
Clutch System					I		I		I	Note 5	
Clutch Fluid		Note 3			I	I	R	I	I	Note 5	
Side Stand					I		I		I	Note 5	
* Suspension					I		I		I	Note 5	
* Nuts, Bolts, Fasteners			I		I		I		I	Note 5	
** Wheels/Tires					I		I		I	Note 5	
** Steering Head Bearings			I		I		I		I	Note 5	

\* Should be serviced by your 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 your 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. California type.

5. Refer to Common Service Manual.

6. All U.S.A. types.

## Air Cleaner

Remove the top shelter (page 2-5).

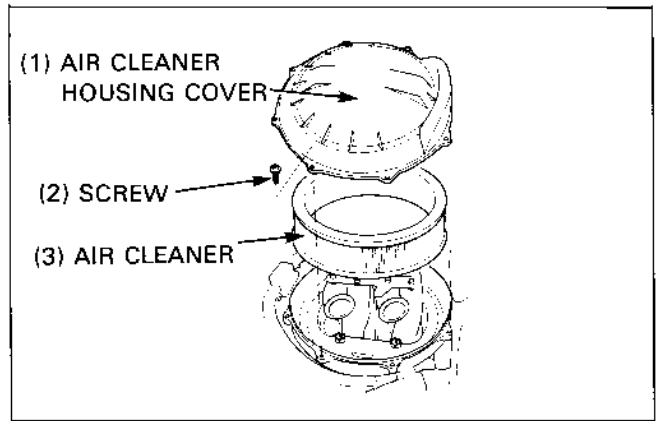
Remove the eight screws and the air cleaner housing cover.

Remove the air cleaner and discard it.

Install a new air cleaner and the removed parts in the reverse order of removal.

**Torque: Housing cover screw:**

**0.9 N·m (0.09 kg-m, 0.65 ft-lb)**



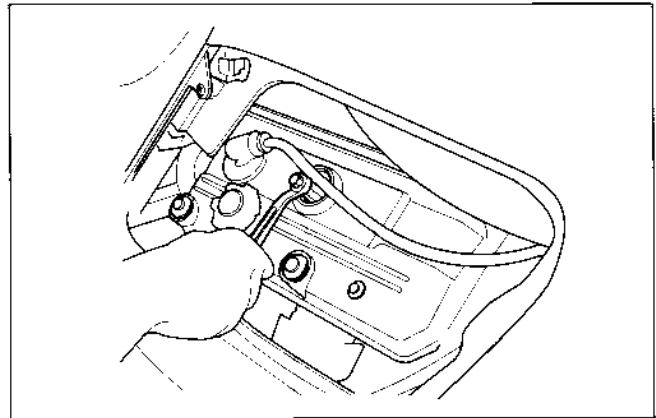
## Spark Plugs

Remove the maintenance cover (page 2-5).

Disconnect the spark plug caps and clean any dirt from around the spark plug bases.

Remove the spark plugs.

Visually inspect the spark plug electrodes for wear. The center electrode should have square edges and the side electrode should have a constant thickness. Discard the spark plug if there is apparent wear or if the insulator is cracked or chipped.



For recommended spark plug, see page 1-15.

Measure the spark plug gaps using a wire-type feeler gauge.

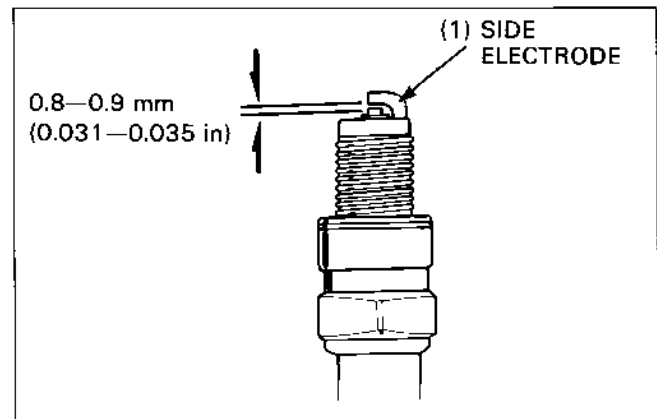
**Spark plug gap: 0.8—0.9 mm (0.031—0.035 in)**

If necessary, adjust the gap by carefully bending the side electrode.

Install the spark plugs.

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

Connect the spark plug caps and install the maintenance cover (page 2-5).



## Valve Clearance

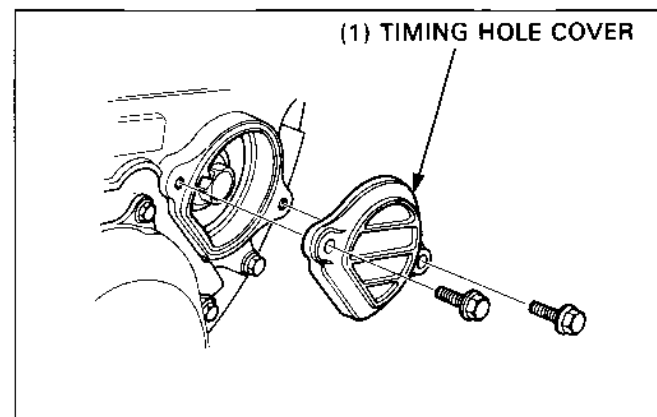
### Inspection

#### NOTE

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

Remove the cylinder head covers (page 8-2).

Remove the timing hole cover.



Turn the crankshaft clockwise and align the T1 mark on the timing belt drive pulley guide plate with the timing belt cover Index mark.

Make sure the No. 1 piston is at Top Dead Center (TDC) on the compression stroke and the RIGHT camshaft index lines align with the top of the cylinder head and face OUT as shown.

If the No. 1 piston is not at TDC on the compression stroke, turn the crankshaft clockwise one full turn and realign the T1 mark with the index mark.

Measure the No. 1 cylinder valve clearances for the intake and exhaust valves by inserting a feeler gauge between the cam lobes and the valve lifters.

#### Valve clearance:

**IN:** 0.13–0.19 mm (0.005–0.007 in)

**EX:** 0.22–0.28 mm (0.009–0.11 in)

Record the clearance for each valve for reference, if shim selection is needed.

Turn the crankshaft clockwise 1/4 turn to align the T4 mark with the index mark. The LEFT camshaft index lines should align with the top of the cylinder head and face IN.

Measure and record the No. 4 cylinder valve clearances.

Turn the crankshaft clockwise 3/4 turn to align the T1 mark. The RIGHT camshaft index lines should align with the top of the cylinder head and face IN.

Measure and record the No. 3 cylinder valve clearances.

Turn the crankshaft clockwise 1/4 turn to align the T4 mark. The LEFT camshaft index lines should align with the top of the cylinder head and face OUT.

Measure and record the No. 2 cylinder valve clearances.

### Shim Selection

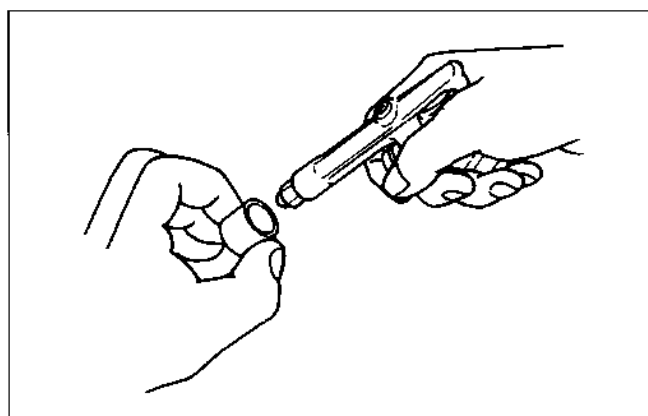
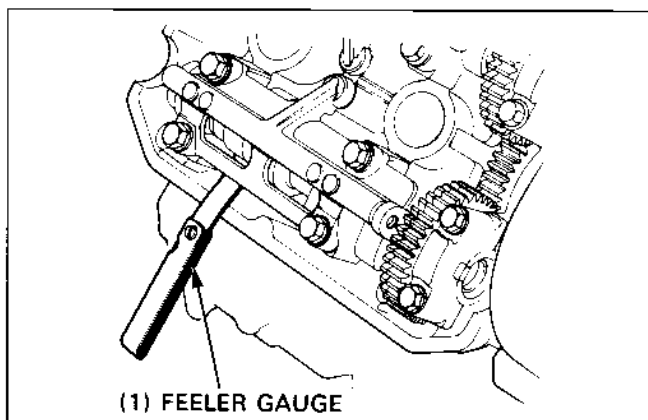
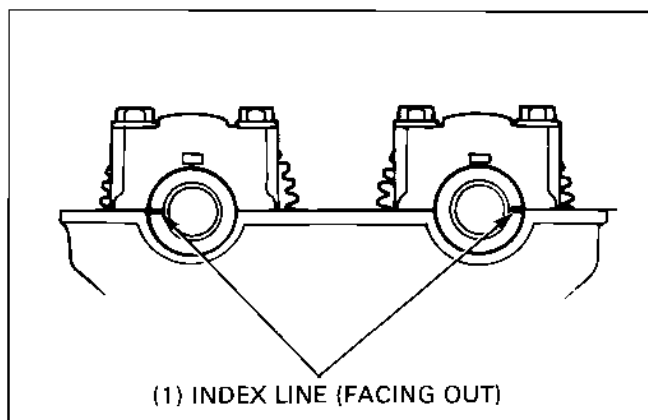
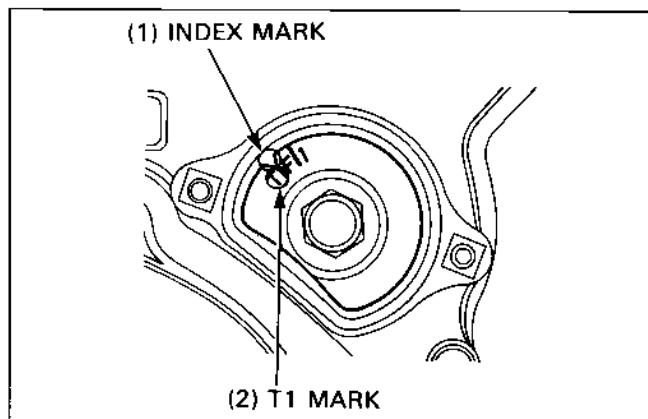
If the valve clearance is not correct:

Remove the camshaft (page 8-4), valve lifter and shim (page 8-8).

#### NOTE

- Be careful not to allow the shims to fall into the crankcase. The shim may occasionally stick to the valve lifter.
- Mark the positions of all valve lifters and shims to ensure correct reassembly.
- Remove the shim with tweezers or a magnet.

Clean the valve lifter with compressed air.



## Maintenance

Clean the shim with a clean shop towel.  
Measure the shim thickness with a micrometer and record it.

### NOTE

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

To select the shim needed to bring the valve clearance within the 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

b: recorded valve clearance = 0.18 mm

c: specified valve clearance = 0.16 mm

d: old shim thickness = 1.850 mm

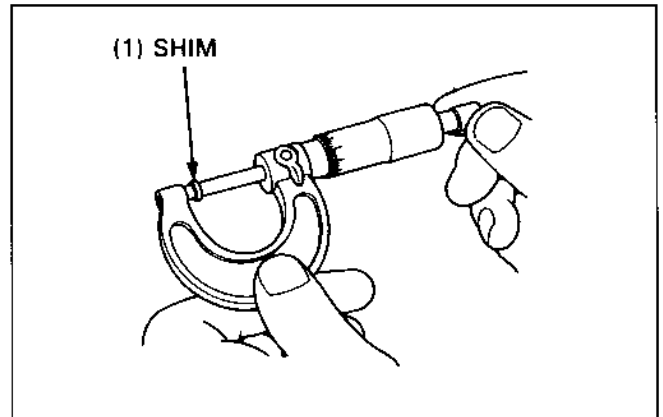
$$a = 0.18 - 0.16 + 1.850$$

$$a = 1.870$$

New shim thickness = 1.875 mm

### NOTE

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



## Engine Oil

### Engine Oil and Filter Change

#### CAUTION

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

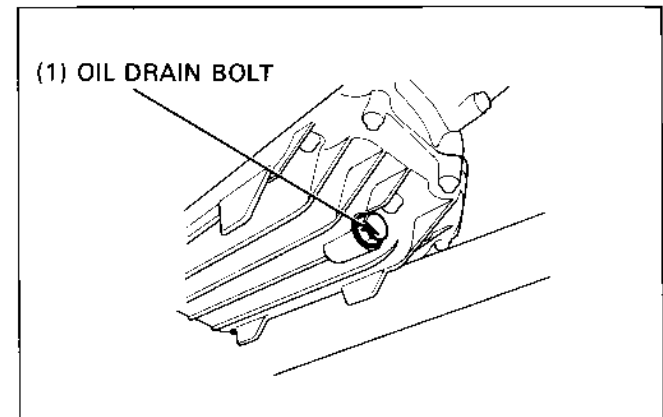
#### NOTE

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

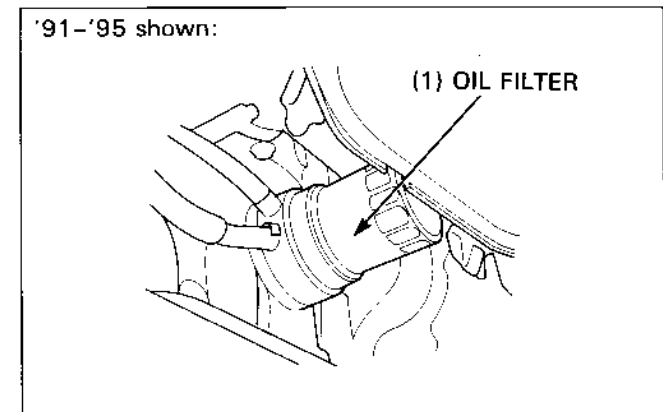
Remove the lower fairing (page 2-4).

Remove the oil filler cap and oil drain bolt, and drain the engine oil.

Remove the oil filter with the special tool and let the remaining oil drain out. Discard the oil filter.



'91-'95 shown:



S TOOL

Oil filter wrench

07HAA-PJ70100

Apply a thin coat of engine oil to the O-ring on the new oil filter.

Install the oil filter and tighten it with an oil filter wrench.

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

Check that the sealing washer on the drain bolt is in good condition. Install the drain bolt and tighten it.

**Torque: 38 N·m (3.8 kg-m, 27 ft-lb)**

Fill the crankcase with the recommended engine oil (page 1-7).

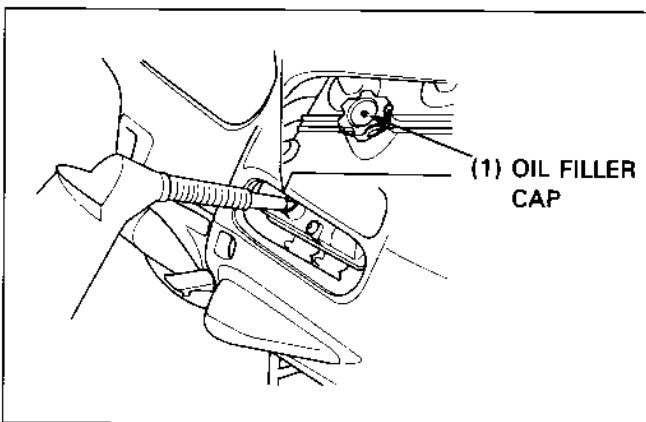
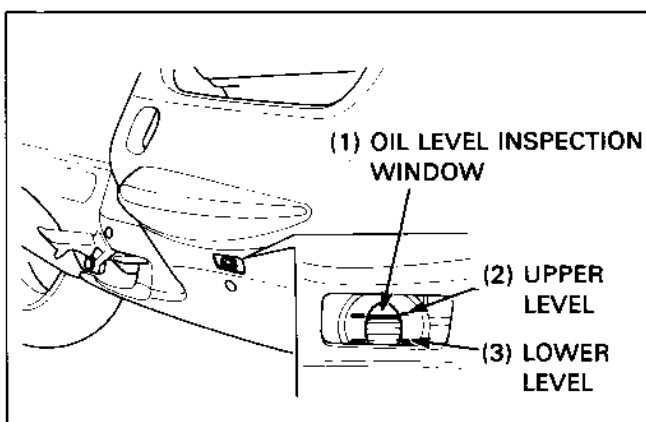
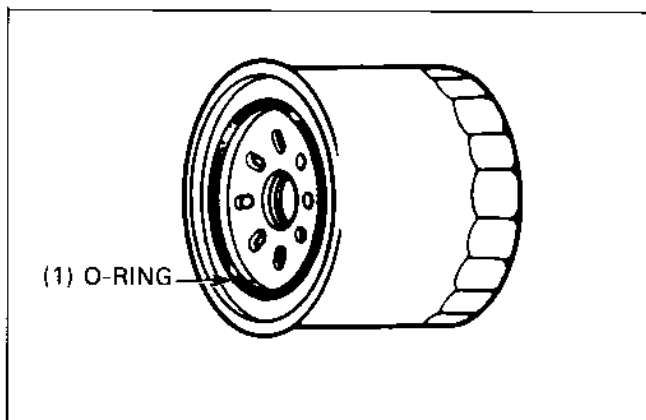
Install the oil filler cap.

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

Stop the engine. After a few minutes, check the oil level inspection window.

The oil level should be between the upper and lower level marks.

If required, remove the filler cap, and add the specified oil up to the upper level mark. Do not overfill.



## Carburetor Synchronization

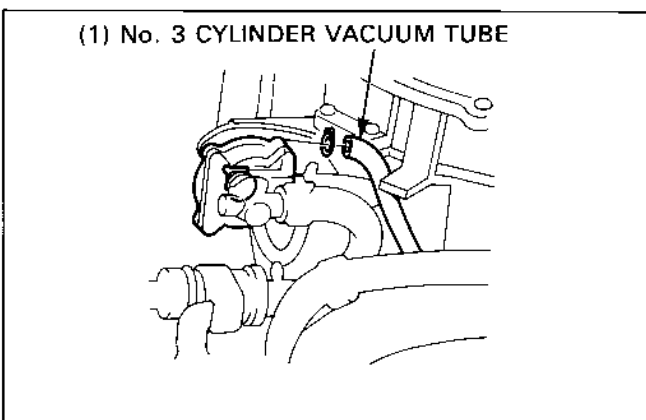
### NOTE

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

Remove the left and right fairing pockets (page 2-6).

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

Connect the vacuum gauge adaptor to the No. 3 cylinder vacuum tube.



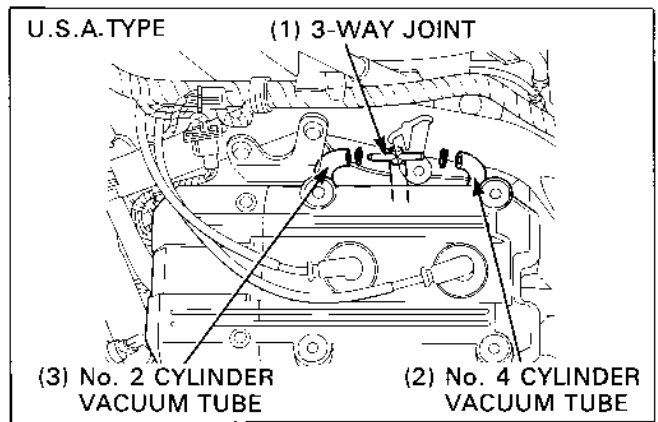
## Maintenance

(All U.S.A. types)

Disconnect the No. 2 and 4 cylinder vacuum tubes at the 3-way joint, and connect the vacuum gauge adaptors.

(Canada type)

Remove the vacuum tube caps from the No. 2 and 4 cylinder vacuum tubes and install the vacuum gauge adaptor tubes.



'91-'93:

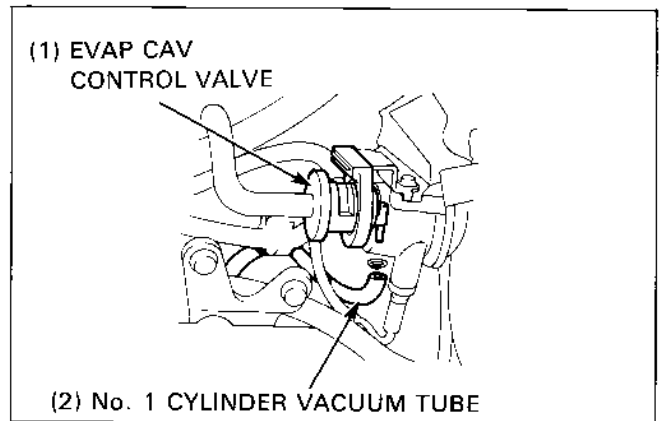
(Standard California type and U.S.A. ABS/TCS type)

After '93:

(California type)

Disconnect the No. 1 cylinder vacuum tube from the EVAP CAV control valve apply vacuum to the EVAP CAV control valve and pinch the tube with a clamp.

Connect the vacuum gauge adaptor to the No. 1 cylinder vacuum tube.



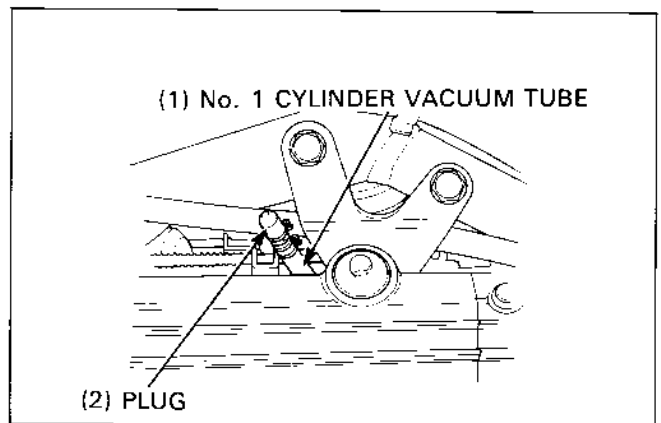
'91-'93:

(Standard 49 state and Canada type)

After '93:

(49 state and Canada type)

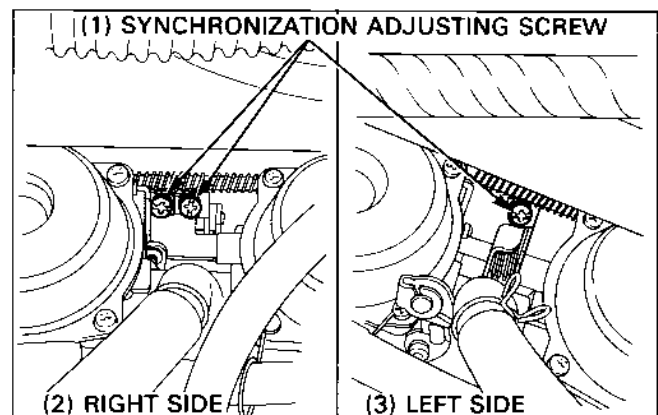
Remove the vacuum joint tube cap from the No. 1 cylinder vacuum tube and install the vacuum gauge adaptor tube.



### NOTE

- The base carburetor is the No. 4 carburetor.

Adjust the carburetor synchronization by turning the synchronization adjusting screw.



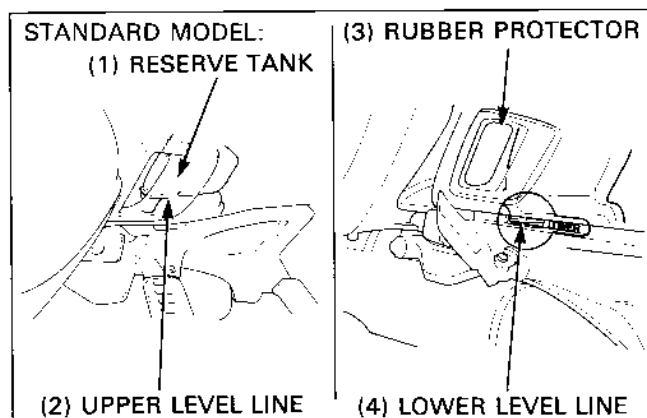
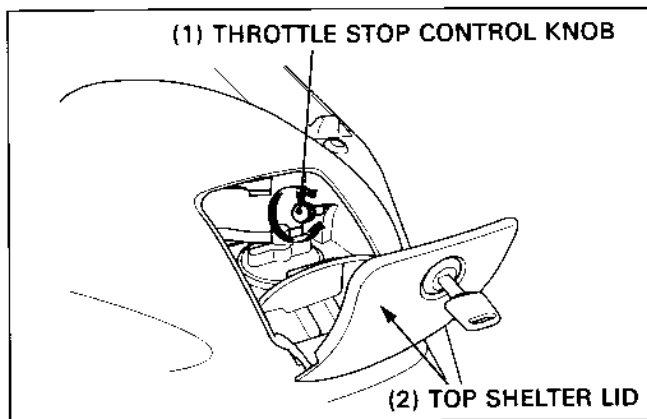
## Engine Idle Speed

### NOTE

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

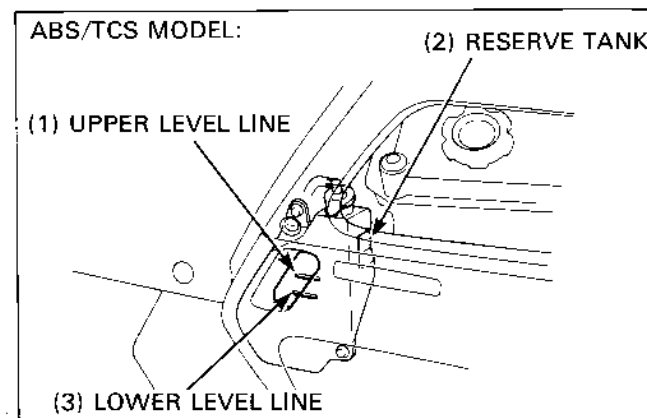
Warm up the engine, shift the transmission into neutral and place the motorcycle on its center stand. Open the top shelter lid with the ignition key. Adjust the idle speed by turning the throttle stop control knob.

Idle speed:  $1,200 \pm 100$  rpm  
 $1,000 \pm 100$  rpm (Canada type)



## Radiator Coolant

Check the coolant level in the reserve tank while the engine is at normal operating temperature. The level should be between the UPPER and LOWER level lines.



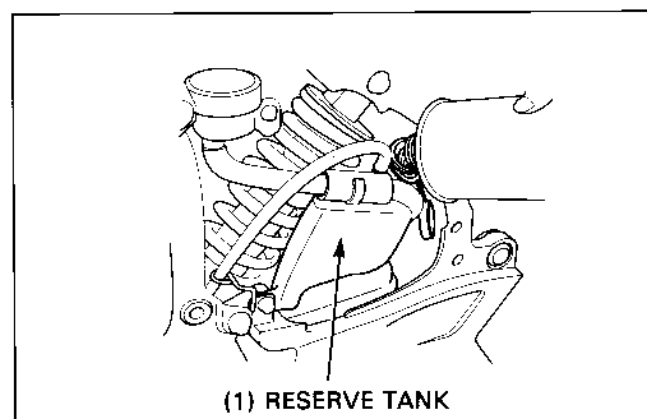
(Standard Model)

If the level is low, remove the right side cover (page 2-2), remove the filler cap and add the recommended coolant to the UPPER level line.

### NOTE

- Do not remove the rubber protector.

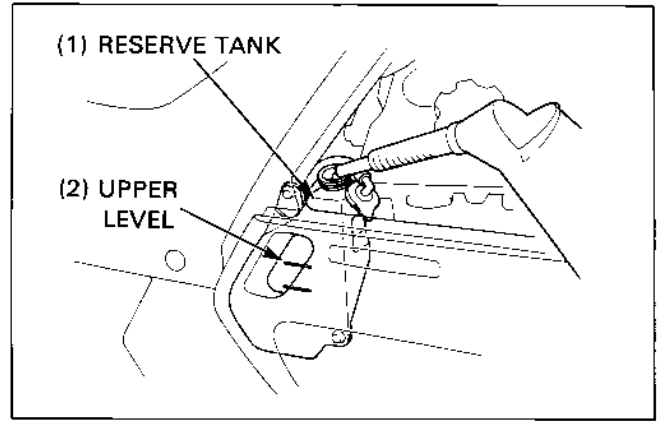
For coolant draining/refilling, see section 6.



(ABS/TCS or LBS-ABS/TCS model)

If the level is low, remove the right maintenance cover (page 2-5), remove the filler cap and add the recommended coolant the UPPER level line.

For coolant draining/refilling, see section 6.



## Timing Belt

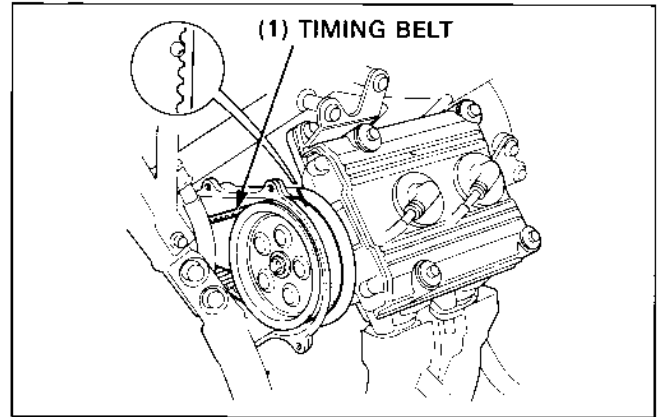
Remove the reduction holder covers (page 8-2).

Remove the timing hole cover (page 3-5).

Check the timing belt for cracking, damage or contamination with oil and/or coolant while turning the crankshaft clockwise.

If the belt is cracked or damaged, replace it with a new one (page 8-12).

If the belt is contaminated with oil and/or coolant, remove the timing belt cover (page 8-3). Clean the timing belt housing and pulleys thoroughly, then replace the belt with a new one.



## Brake Fluid

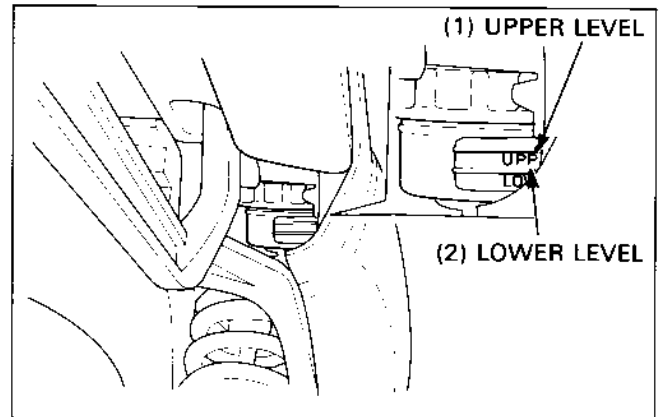
### NOTE

- For front brake fluid level checking and fluid replacement, refer to the Common Service Manual. For fluid replacement on the LBS-ABS/TCS model, see page 15-2.

### Rear Brake Fluid Level

Remove the right saddlebag (page 2-2).

Check the fluid level by viewing from the rear as shown. The level should be between the UPPER and LOWER level lines.





## Brake System (LBS-ABS/TCS model)

### NOTE

- The LBS-ABS/TCS brake pedal operation should be inspected as described below.
- The lever brake line of the LBS-ABS/TCS model should be inspected in the same manner as the lever brake line of the standard model and the ABS/TCS model.

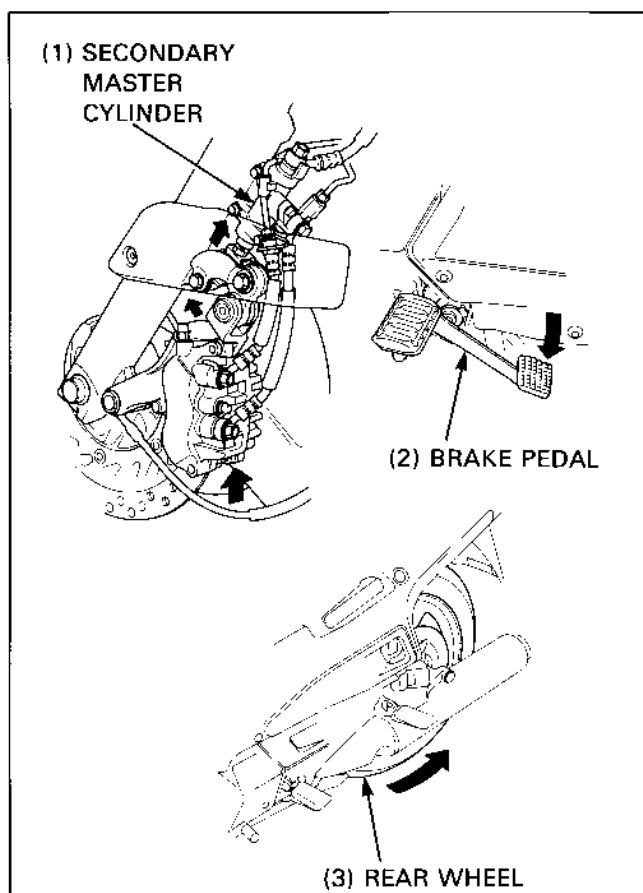
Place the motorcycle on its center stand and shift the transmission into neutral.

Push the secondary master cylinder by pressing the left front caliper.

The rear wheel should not be able to rotate when the secondary master cylinder is pushed forward.

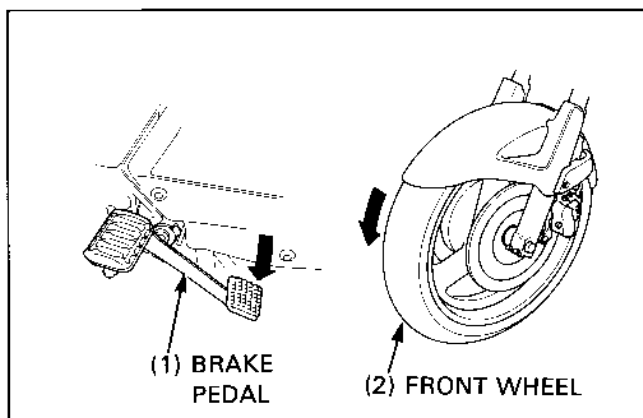
Also check the smooth operation of the brake linkage.

The rear wheel should not be able to rotate when the brake pedal is pressed.



Raise the front wheel off the ground by supporting the engine.

The front wheel should not be able to rotate when the brake pedal is pressed.



## Headlight Aim

**▲ WARNING**

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

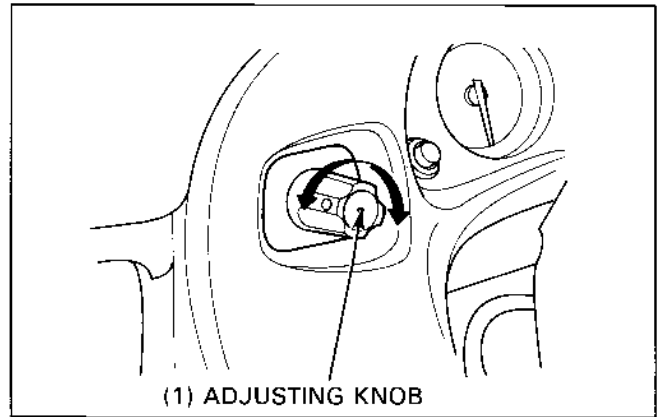
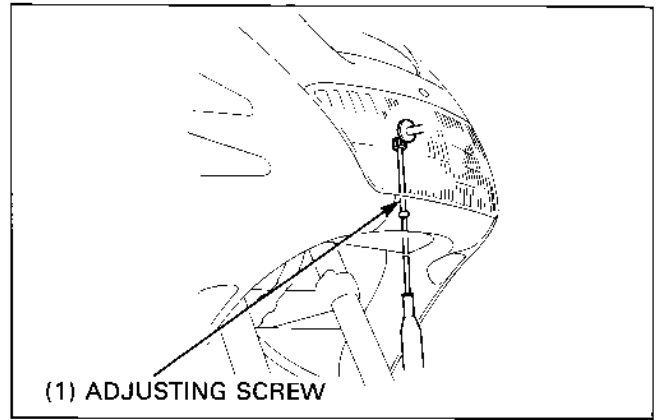
Place the motorcycle on a level surface.

**Horizontal:**

Insert a screwdriver into the hole in the middle fairing inner cover, and turn the adjusting screw to adjust the headlight beam.















**Vertical:**

Adjust the headlight beam to suit riding conditions by turning the headlight adjusting knob.



# 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.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use special tool</p>
	<p>Use optional tool. Use the same procedure you use to order parts.</p>
 <p>10 (1.0, 7.2)</p>	<p>Torque specification.    10 N·m (1.0 kg-m, 7.2 ft-lb)</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)</p>
	<p>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</p>
	<p>Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent)          Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A.          Honda Moly 60 (U.S.A. only)          Rocol ASP manufactured by Rocol Limited, U.K.          Rocol Paste manufactured by Sumico Lubricant, Japan</p>
	<p>Use silicone grease</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant</p>
	<p>Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>

# 4. Lubrication System

Service Information	4-1	Oil Cooler Removal/Installation	4-4
Troubleshooting	4-1	Oil Pump Removal/Installation	4-6
Lubrication System Diagram	4-2	Oil Pump Disassembly/Assembly	4-8

## Service Information

### ▲ WARNING

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that 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.
- Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

- 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.
- For oil pressure check, refer to section 4 of the Common Service Manual; for the switch location, see page 21-2 of this manual.
- For oil pressure light inspection, refer to section 25 of the Common Service Manual.

## Troubleshooting

### Oil level low

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

### Oil contamination (White appearance)

- Coolant mixing with oil.
  - Faulty head gasket.
  - Water leak in crankcase

### High oil pressure

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

### Low oil pressure

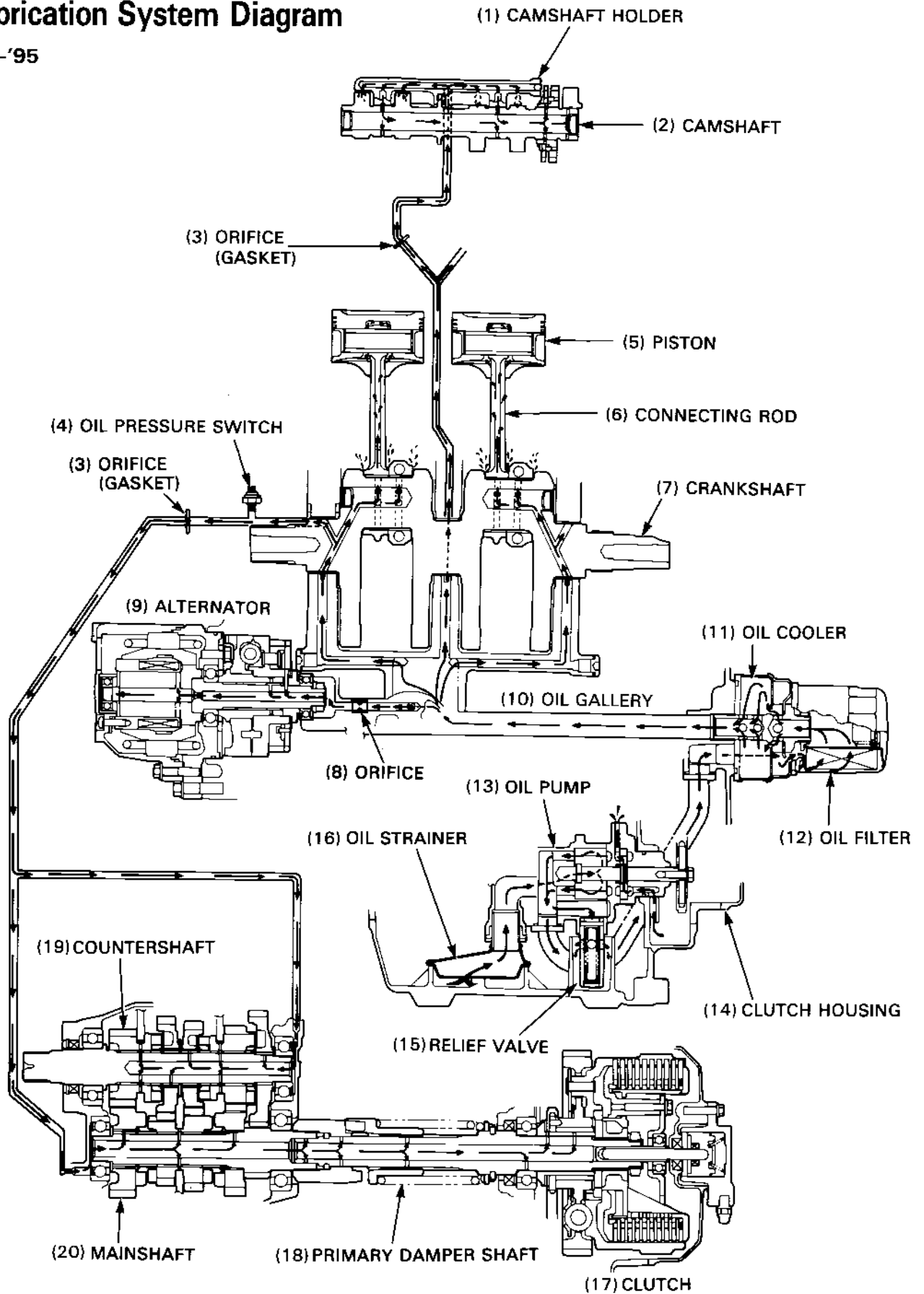
- Pressure relief valve stuck open.
- Clogged oil filter screen.
- Oil pump worn or damaged.
- Internal oil leak.
- Incorrect oil being used.
- Low oil level

### No oil pressure

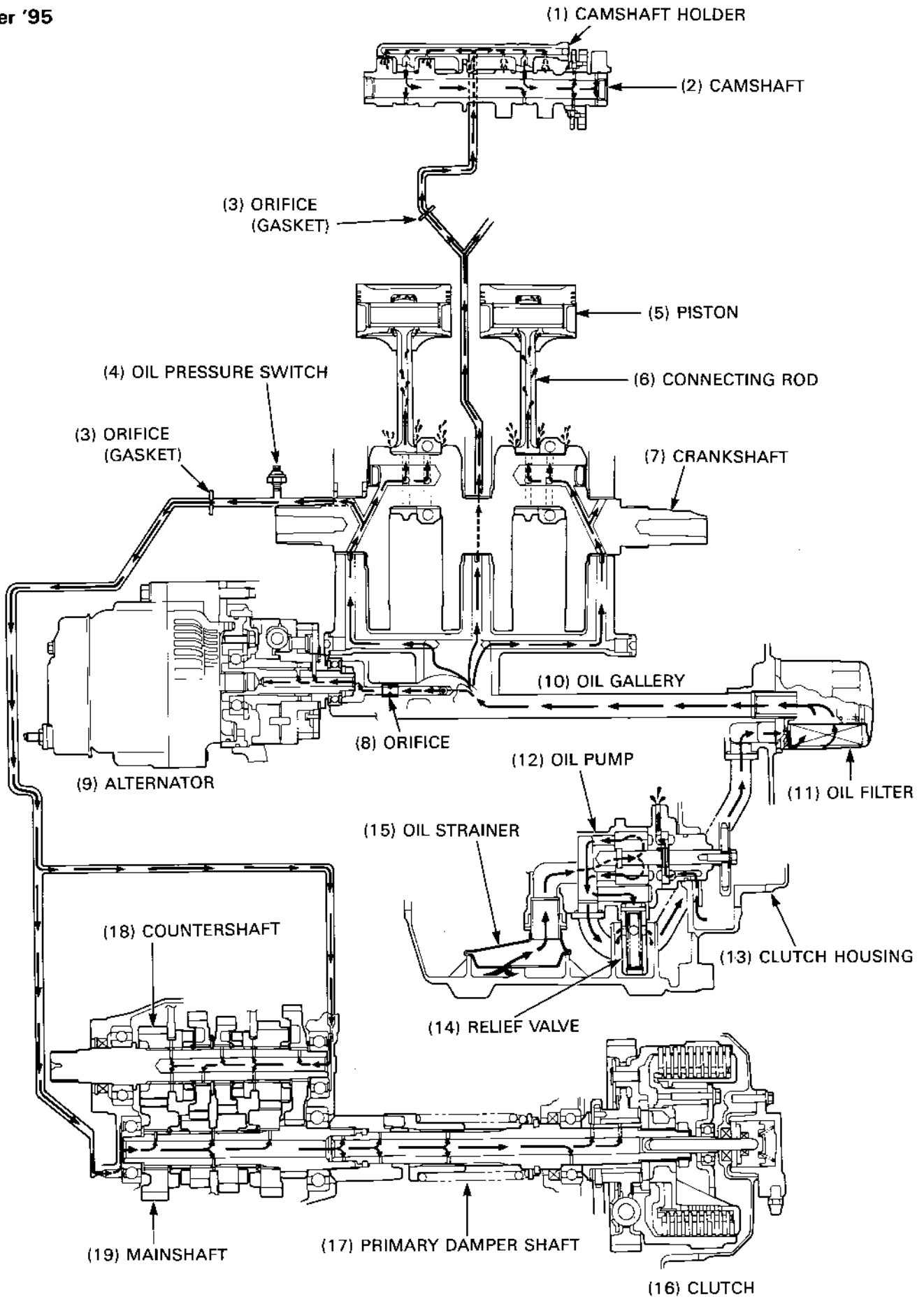
- Oil level too low
- Oil pump drive chain or drive/driven sprocket broken.

# Lubrication System Diagram

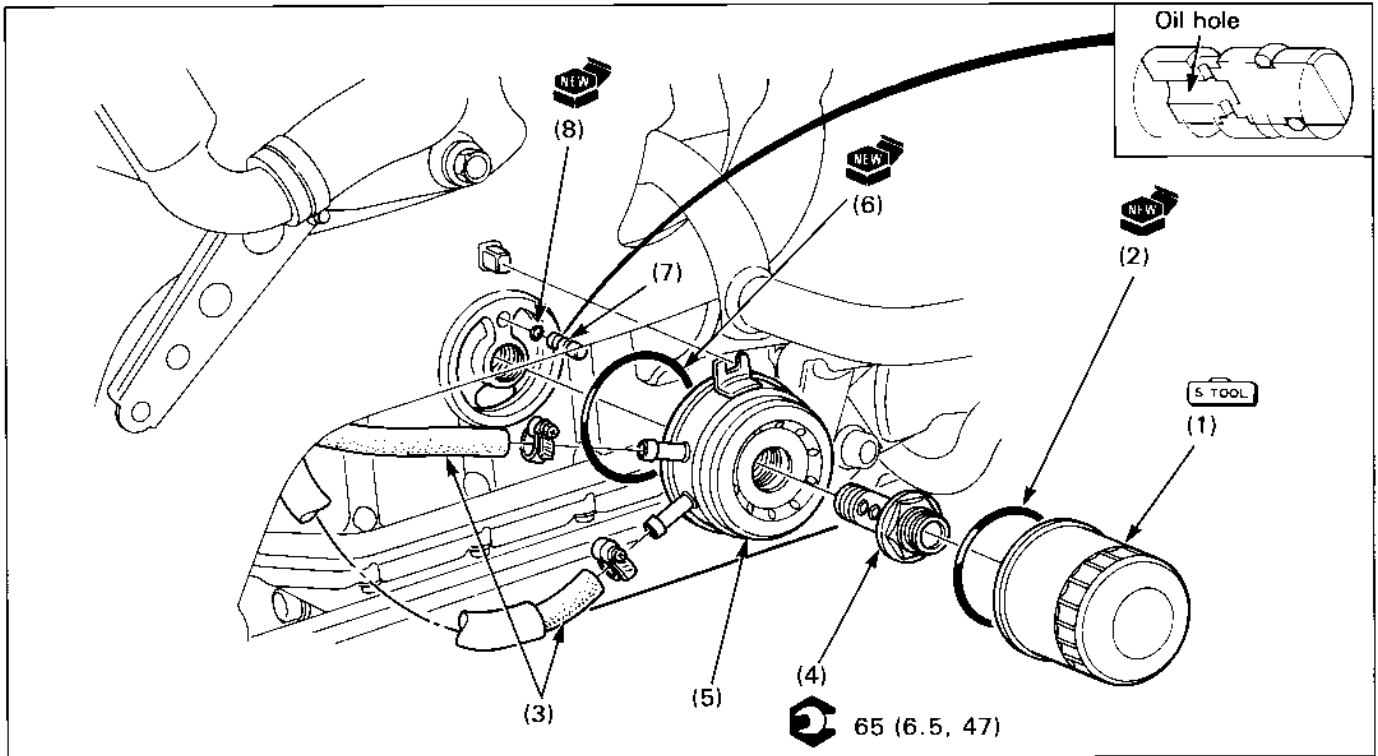
'91-'95



After '95



# Oil Cooler Removal/Installation



## Requisite Service

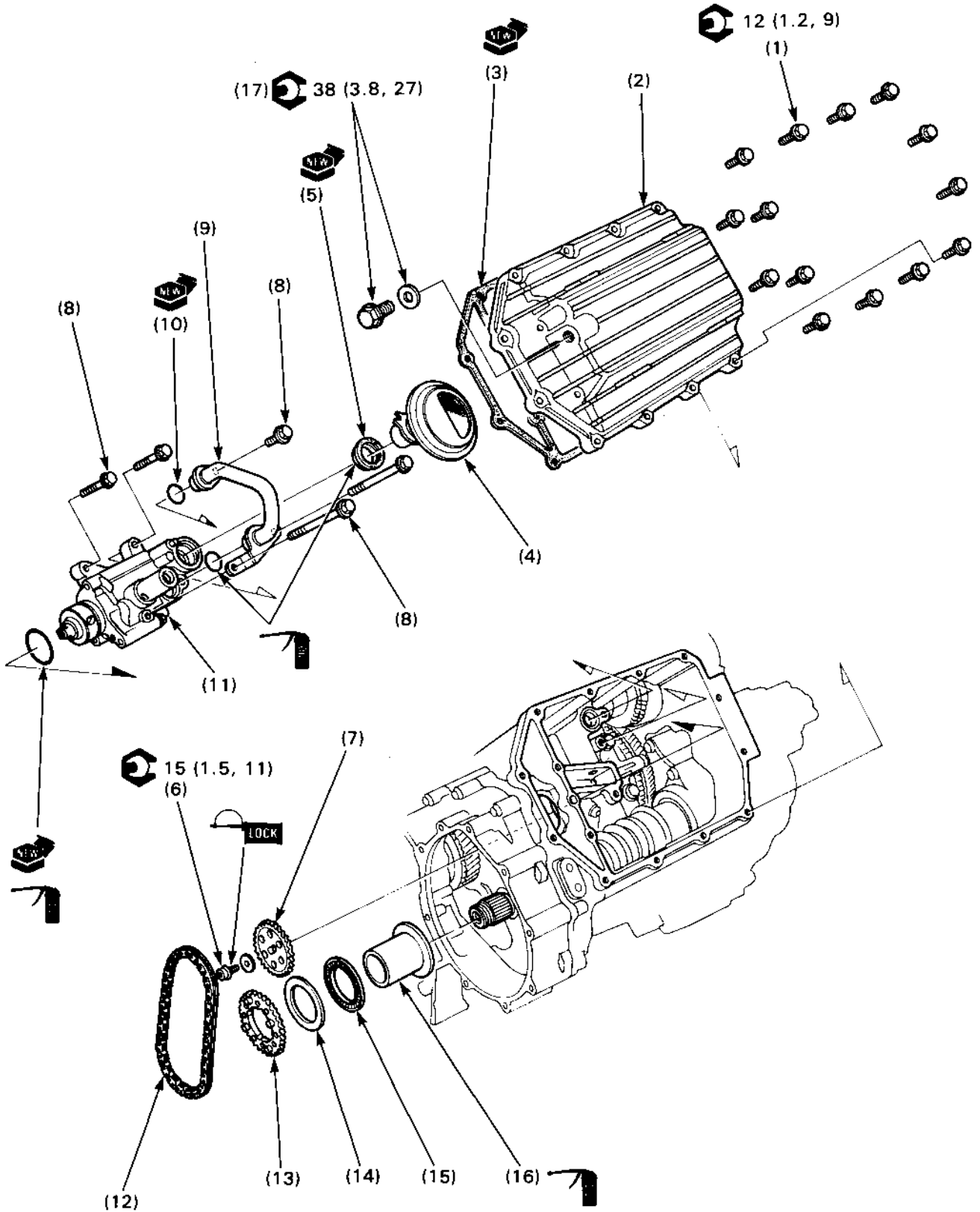
- Engine oil draining
- Left middle fairing removal/installation (page 2-8).

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal. Use oil filter wrench (07HAA-PJ70100).
(1) Oil filter	1	'91-'95 only  Install with the oil hole end facing IN as shown.
(2) O-ring	1	
(3) Water hose	2	
(4) Oil cooler bolt	1	
(5) Oil cooler	1	
(6) O-ring	1	
(7) Oil orifice	1	
(8) O-ring	1	

# MEMO



# Oil Pump Removal/Installation



NOTE

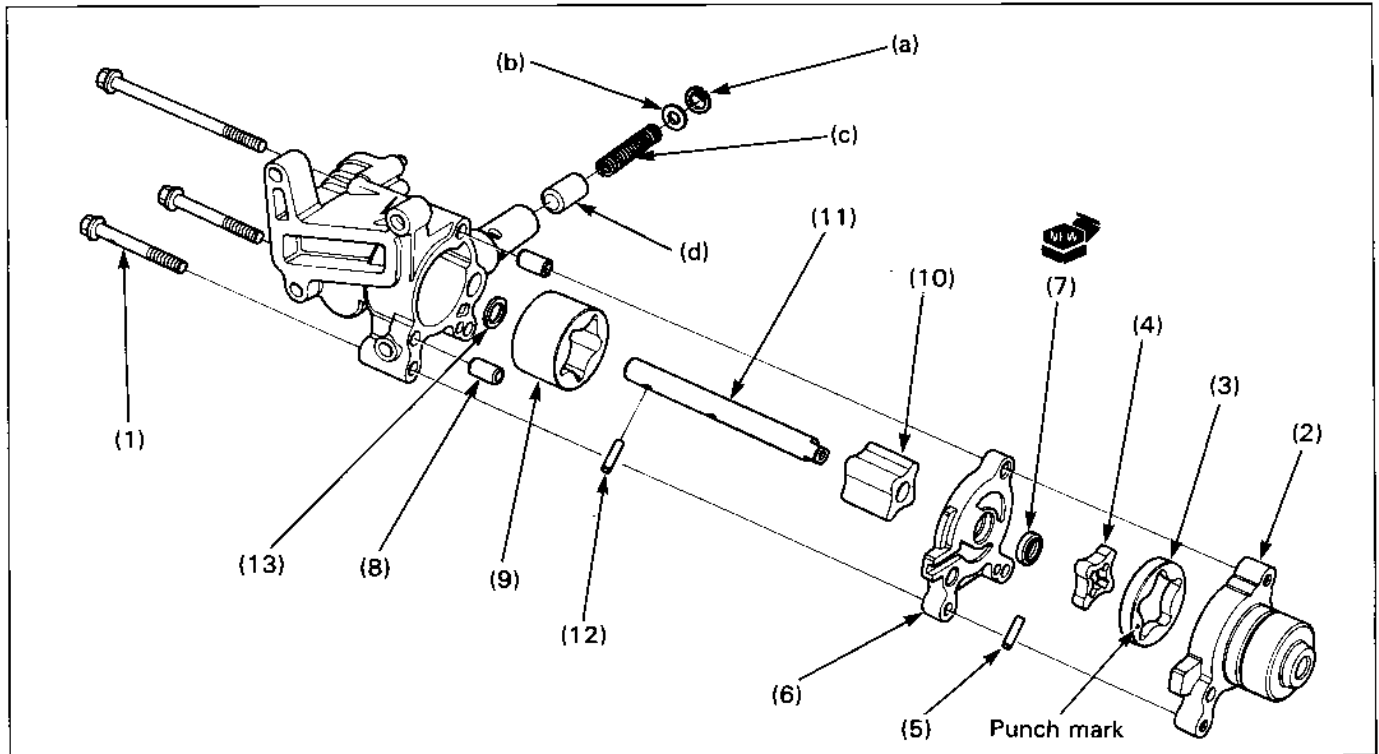
- The oil pump drive and driven sprockets, and clutch outer guide, can be removed without removing the oil pan.

**Requisite Service**

- Engine oil draining
- Exhaust pipe removal/Installation (page 2-18)
- Clutch disassembly/assembly (page 9-6)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Oil pan bolt	14	
(2) Oil pan	1	
(3) Gasket	1	
(4) Oil strainer	1	
(5) Oil strainer packing	1	
(6) Oil pump driven sprocket bolt	1	
(7) Oil pump driven sprocket	1	Install with the IN mark facing IN.
(8) Oil pipe/pump mounting bolt	5	
(9) Oil pipe	1	
(10) O-ring	2	
(11) Oil pump/O-ring	1/1	Disassembly/assembly (page 4-8)
(12) Oil pump drive chain	1	
(13) Oil pump drive sprocket	1	
(14) Washer	1	
(15) Thrust bearing	1	
(16) Clutch outer guide	1	
(17) Oil drain bolt/washer	1/1	

# Oil Pump Disassembly/Assembly



**NOTE**

- The oil pump must be replaced as an assembly.
- Before assembling the oil pump, clean all parts thoroughly with clean engine oil.















**Requisite Service**

- Oil pump removal/installation (page 4-6)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1) Bolt	3	
(2) Oil pump cover	1	
(3) Scavenging pump outer rotor	1	Install with the punch mark facing the cover.
(4) Scavenging pump inner rotor	1	
(5) Drive pin	1	
(6) Scavenging pump body	1	
(7) Oil seal	1	
(8) Dowel pin	2	
(9) Outer rotor	1	
(10) Inner rotor	1	
(11) Oil pump shaft	1	
(12) Drive pin	1	
(13) Washer	1	
(a) Snap ring	1	
(b) Washer	1	
(c) Relief valve spring	1	
(d) Relief valve piston	1	

# 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.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use special tool</p>
	<p>Use optional tool. Use the same procedure you use to order parts.</p>
 <p>10 (1.0, 7.2)</p>	<p>Torque specification.    10 N·m (1.0 kg-m, 7.2 ft-lb)</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)</p>
	<p>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</p>
	<p>Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent)          Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A.          Honda Moly 60 (U.S.A. only)          Rocol ASP manufactured by Rocol Limited, U.K.          Rocol Paste manufactured by Sumico Lubricant, Japan</p>
	<p>Use silicone grease</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant</p>
	<p>Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>

# 5. Fuel System

Service Information	5-1	Air Cleaner Housing Removal/Installation	5-10
Troubleshooting	5-2	Pilot Screw Adjustment	5-12
Carburetor Removal/Installation	5-3	High Altitude Adjustment (U.S.A. only)	5-16
Carburetor Separation/Combination	5-4	Emission Control System (U.S.A. only)	5-17
Carburetor Disassembly/Assembly	5-8	Carburetor Draining	5-18

## Service Information

5

### ⚠ WARNING

- **Bending or twisting the control cables will impair smooth operation and could cause the cable to stick or bind, resulting in loss of vehicle control.**
- **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.

### CAUTION

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

- Refer to section 2 for fuel tank removal and installation.
- Refer to section 21 for fuel pump inspection, 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 carburetors, place an approved gasoline container under the carburetor drain tube, then loosen the drain bolt and drain the carburetor (page 5-18).
- After removing the carburetors, 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.
- U.S.A. only:  
All hoses used in the secondary air supply system (All U.S.A. types) and evaporative emission control systems ('91—'93: Standard California type and U.S.A. ABS/TCS type/After '93: California type are numbered for identification. When connecting one of these hoses, compare the hose number with the Vacuum Hose Routing Diagram Label, page 1-35, and carburetor tubes. page 5-6.

### NOTE

- If the vehicle is to be stored for more than one month, drain the float bowls (page 5-18). Fuel left in the float bowls may cause clogged jets resulting in hard starting or poor driveability.

# Troubleshooting

### Engine won't start

- Too much fuel getting to the engine
  - Air cleaner clogged
  - Flooded carburetor
- Intake air leak
- Fuel contaminated/deteriorated
  - jets clogged
- Starting enrichment circuit clogged
- No fuel to carburetor
  - Fuel filter clogged
  - Fuel line clogged
  - Fuel level misadjusted
  - Fuel tank breather tube clogged
  - Fuel pump malfunction
  - Auto fuel valve malfunction

### Lean mixture

- Fuel jets clogged
- Float valve faulty
- Float level too low
- Fuel line restricted
- Carburetor air vent tube clogged
- Intake air leak
- Fuel pump malfunction
- Auto fuel valve malfunction
- Vacuum piston faulty
- Throttle valve faulty

### Rich mixture

- Starting enrichment valve open
- Float valve faulty
- Float level too high
- Air jets clogged
- Air cleaner contaminated
- Flooded carburetor
- Vacuum piston faulty

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

- Fuel line restricted
- Ignition malfunction
- Fuel mixture too lean/rich
- Fuel contaminated/deteriorated
  - jets clogged
- Intake air leak
- Idle speed misadjusted
- Float level misadjusted
- Fuel tank breather tube clogged
- Fuel pump malfunction
- Pilot screw misadjusted
- Starting enrichment circuit clogged
- Auto fuel valve malfunction
- EVAP CAV control valve faulty
- Hoses of the emission control system faulty
- EVAP purge control valve faulty

### Afterfire when engine braking is used

- Lean mixture in slow circuit
- Air cut-off valve malfunction
- Secondary air supply system faulty
- Hoses of emission control system faulty

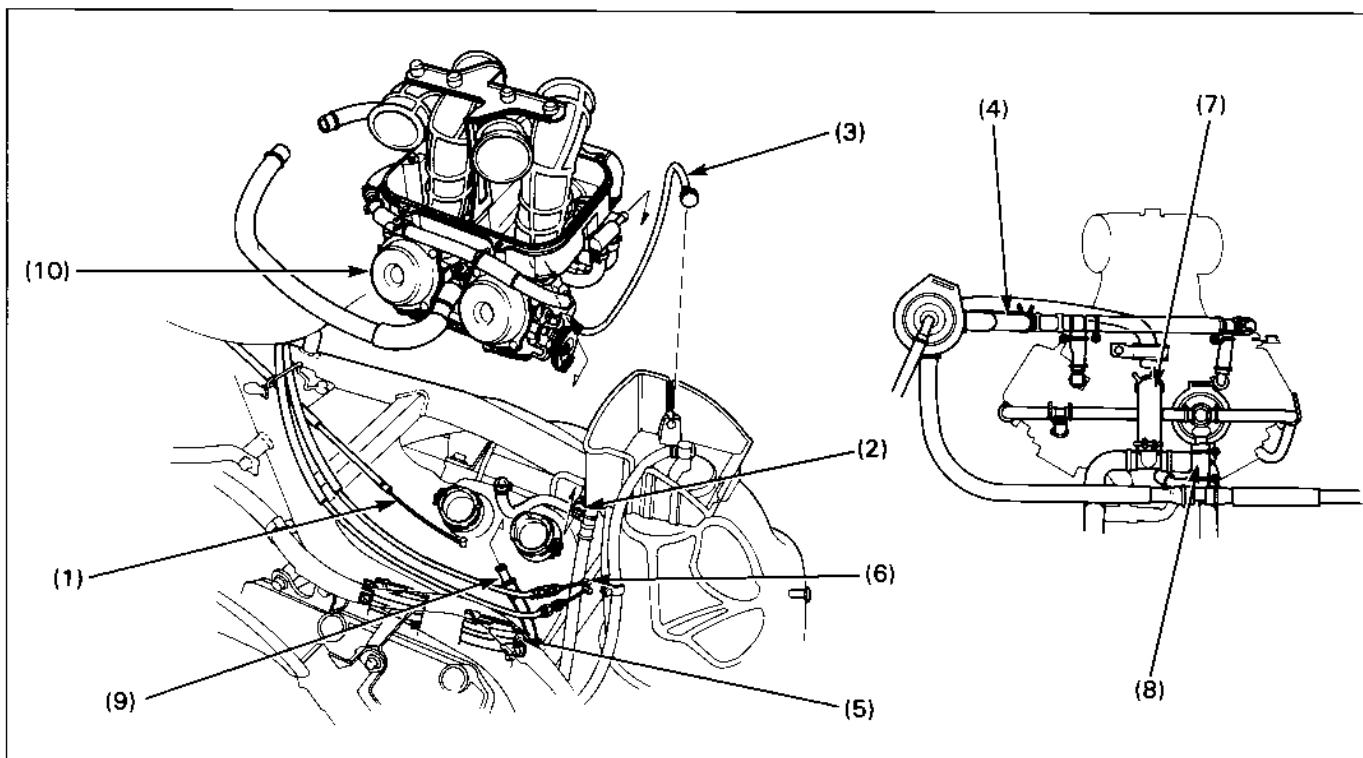
### Afterfire or misfiring during acceleration

- Ignition system malfunction
- Fuel mixture too lean

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

- Fuel system clogged
- Ignition system malfunction
- Faulty EVAP CAV control valve
- Damaged/misconnected emission control system hoses

## Carburetor Removal/Installation



### WARNING

- Gasoline is extremely flammable and is explosive under certain conditions.

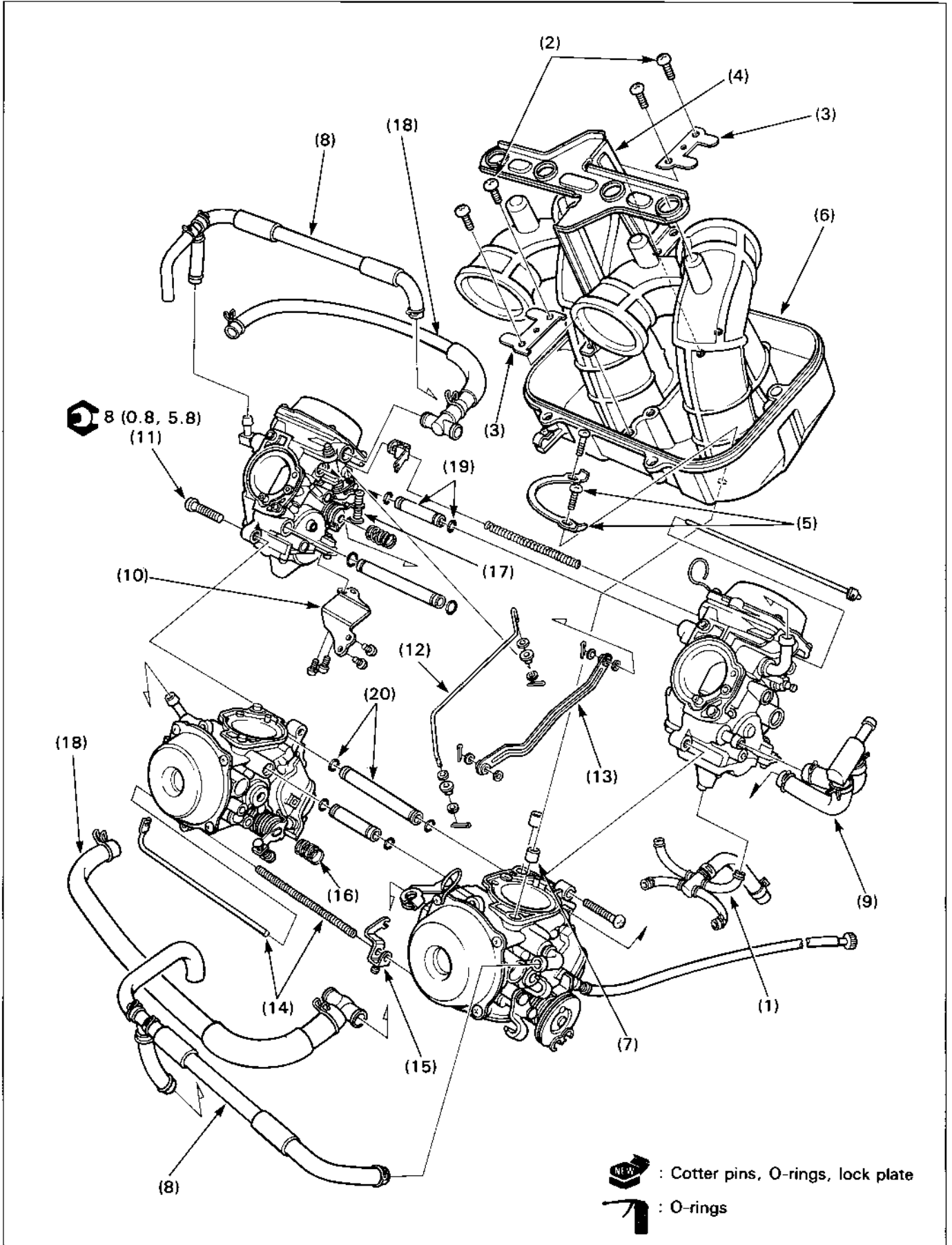
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.

### Requisite Service

- Fairing pocket removal/installation (page 2-6)
- Air cleaner housing removal/installation (page 5-10)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Choke cable	1	
(2) Fuel tube	1	
(3) Throttle stop screw cable	1	Remove from the fuel tank tray.
(4) No. 6 tube	1	Disconnect from the 3-way joint. ( '91-'93 : Standard California type and U.S.A. ABS/ TCS type/After '93 : California type)
(5) Connecting tube band screw	4	Loosen the screws.
(6) Throttle cable	2	
(7) No. 15 tube	1	Disconnect from the carburetor
(8) No. 4 tube	1	Disconnect from the EVAP purge control valve. ( '91-'93 : Standard California type and U.S.A. ABS/ TCS type/After '93 California type)
(9) Carburetor drain tube	1	
(10) Carburetor assembly	1	

# Carburetor Separation/Combination



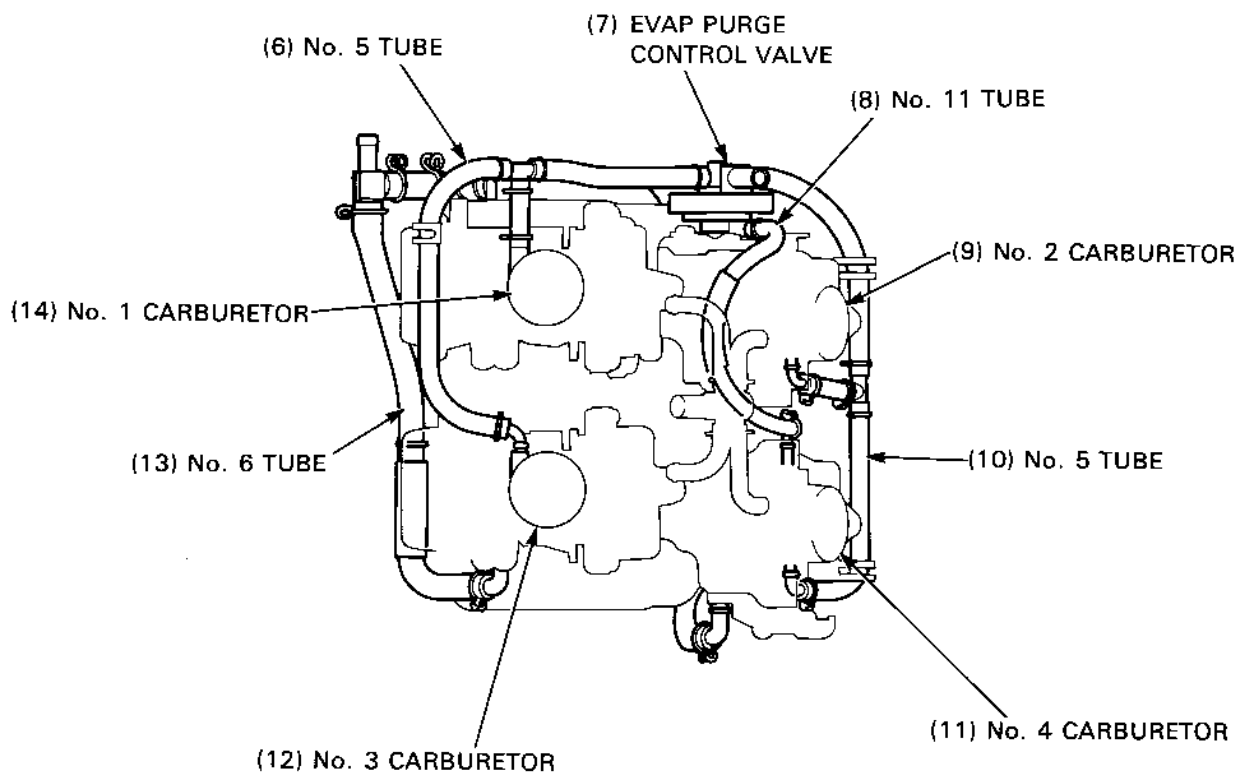
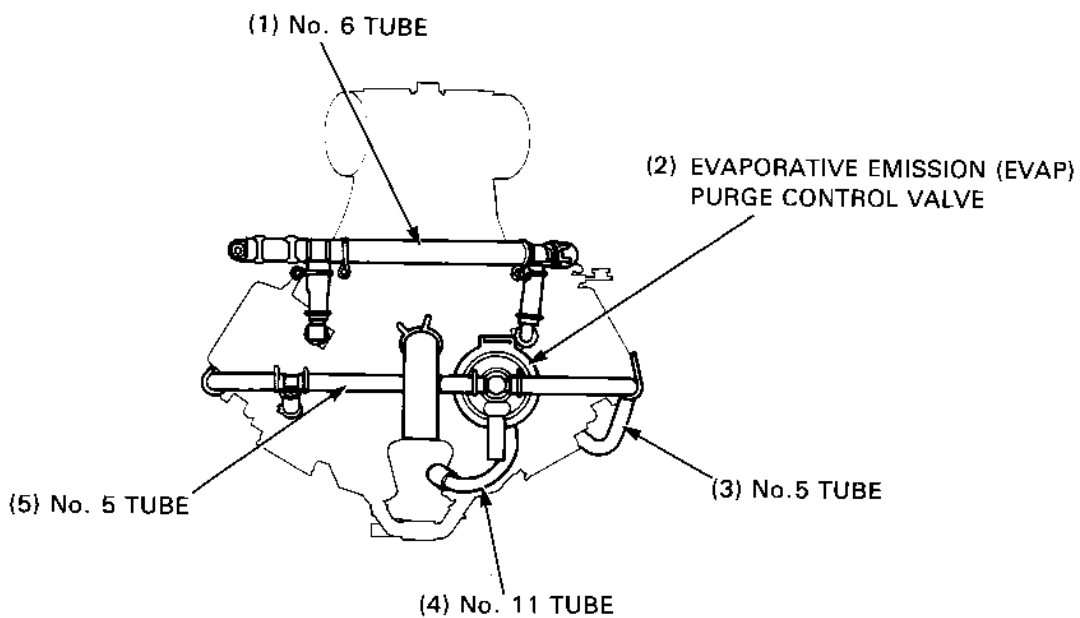


**Requisite Service**

- Carburetor removal/installation (page 5-3)
- EVAP purge control valve and tube removal/installation ('91-'93 : Standard California type and U.S.A. ABS/TCS type/After '93 : California type : page 5-17)

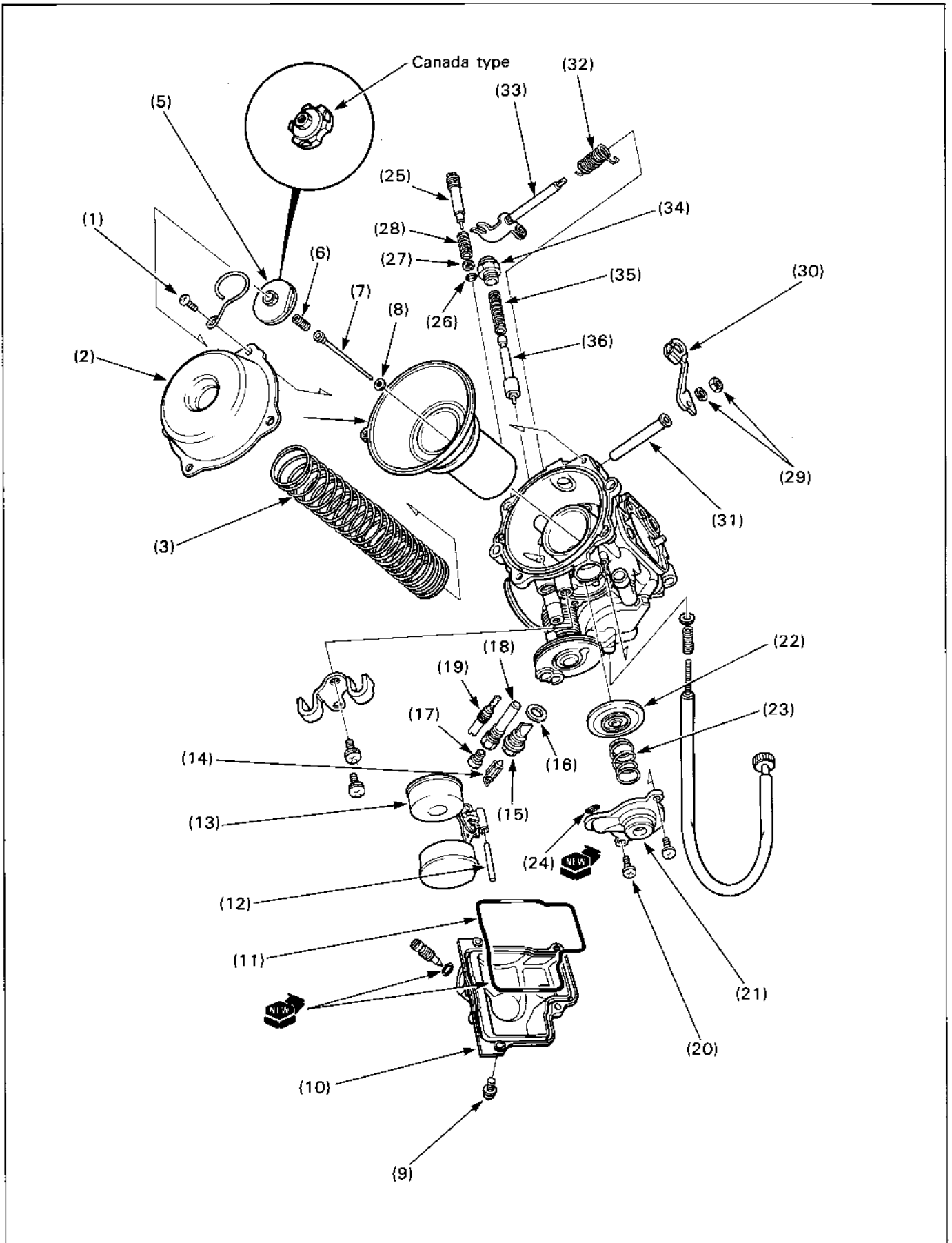
Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		
(1) Carburetor drain tube/joint assembly	1	
(2) Screw	4	
(3) Lock plate	2	
(4) Air duct holder	1	
(5) Screw/lock plate	8/4	
(6) Air chamber/duct assembly	1	
(7) Dowel pin	8	
(8) Air vent tube/joint assembly	2	
(9) Fuel tube/joint assembly	1	
(10) Carburetor joint bracket	1	Remove the four screws.
(11) Carburetor connecting screw	2	
(12) Starting enrichment valve link	1	Remove the cotter pins, washers and collars.
(13) Throttle link	1	Remove the cotter pins and washers.
(14) Starting enrichment valve arm shaft/spring	2/2	Loosen the starting enrichment valve arm screw.
(15) Starting enrichment valve arm	2	
(16) Thrust spring	2	
(17) Synchronization spring	3	
(18) Sub air cleaner tube/joint	2	
(19) Air joint pipe/O-ring	2/4	
(20) Fuel joint pipe/O-ring	2/4	
<b>Reassembly Order</b>		
(20) Fuel joint pipe/O-ring	2/4	
(19) Air joint pipe/O-ring	2/4	
(18) Sub air cleaner tube/joint	2	
(15) Starting enrichment valve arm	2	
(14) Starting enrichment valve rod/spring	2/2	Do not tighten the starting enrichment valve arm screw.
(11) Carburetor connecting screw	2	Do not tighten the screws.
(10) Carburetor joint bracket	1	Do not tighten the screws.
(13) Throttle link	1	Install with the washers and new cotter pins.
(12) Starting enrichment valve link	1	Install with the collars, washers and new cotter pins.
(6) Air chamber/duct assembly	1	Align the air duct flanges with the carburetor grooves. After installing, tighten the carburetor connecting screws and joint bracket screws. Then starting enrichment valve arm screws.
(5) Screw/lock plate	8/4	
(17) Synchronization spring	3	
(16) Thrust spring	2	
(9) Fuel tube/joint assembly	1	
(8) Air vent tube/joint assembly	2	
(7) Dowel pin	8	
(4) Air duct holder	1	
(3) Lock plate	2	
(2) Screw	4	
(1) Carburetor drain tube/joint assembly		

Carburetor Tube Routing ('91-'93 : Standard California type and U.S.A. ABS/TCS type)  
(After '93 : California type)



**MEMO**

# Carburetor Disassembly/Assembly



NOTE

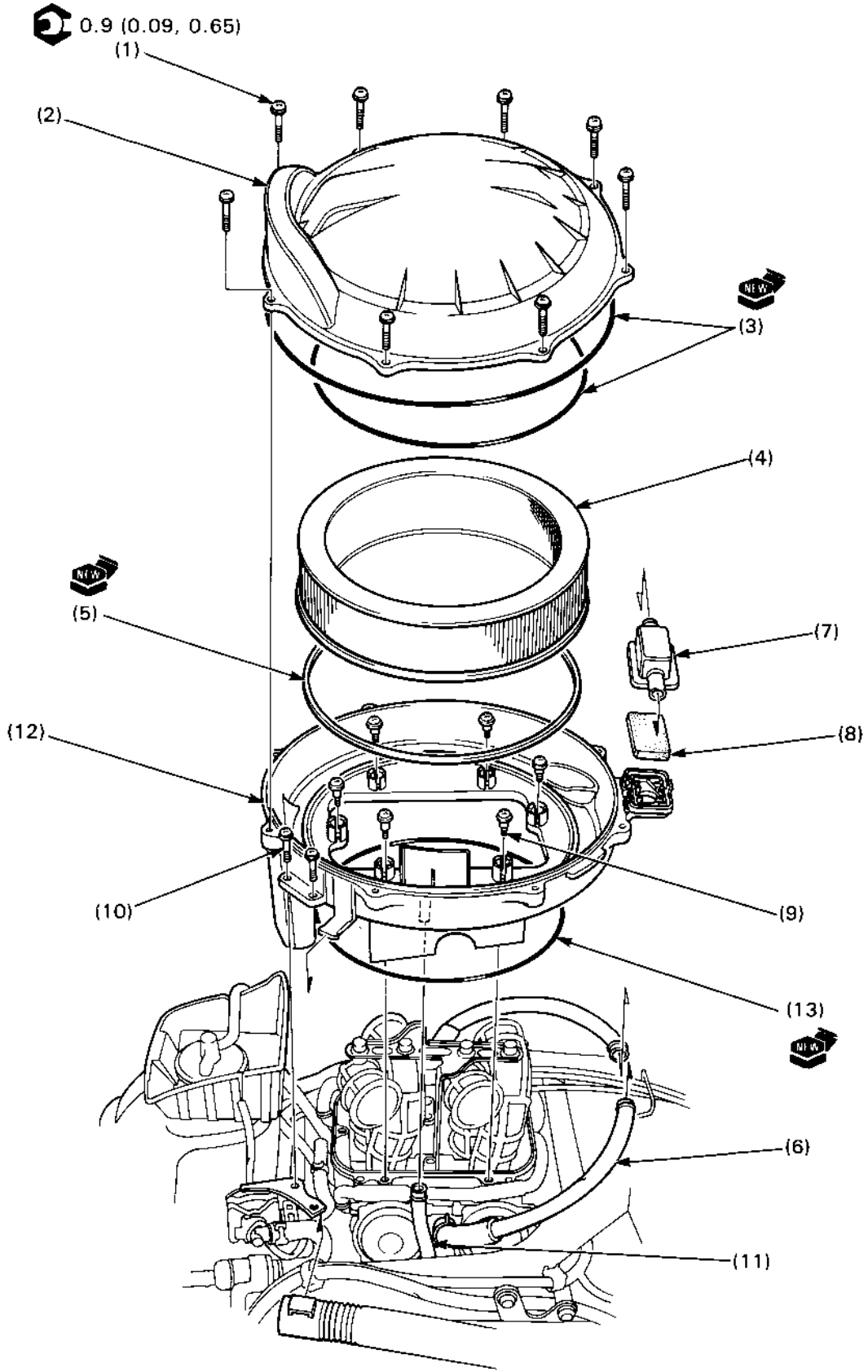
- The vacuum chamber and float chamber can be serviced with the carburetors assembled.
- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.

**Requisite Service**

- Carburetor separation/combination (page 5-4)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
<b>Vacuum chamber</b>		
(1) Screw	4	
(2) Vacuum chamber cover	1	
(3) Compression spring	1	
(4) Diaphragm/piston	1	
(5) Needle holder	1	
(6) Spring	1	
(7) Jet needle	1	
(8) Washer (Canada type only)	1	
<b>Float chamber</b>		
(9) Screw	4	
(10) Float chamber	1	
(11) O-ring	1	
(12) Float-pin	1	
(13) Float	1	
(14) Float valve	1	
(15) Float valve seat	1	
(16) Sealing washer	1	
(17) Main jet	1	
(18) Needle jet holder	1	
(19) Slow jet	1	
<b>Air cut-off valve</b>		
(20) Screw	2	
(21) Air cut-off valve cover	1	
(22) Diaphragm	1	
(23) Spring	1	
(24) O-ring	1	
<b>Pilot screw</b>		
(25) Pilot screw	1	
(26) O-ring	1	
(27) Washer	1	
(28) Spring	1	
<b>Starting enrichment (SE) valve</b>		
(29) Nut/washer	1/1	No.1, No.4 carburetor only
(30) SE valve lever	1	No.4 carburetor only (Plain washer for No.1 carburetor)
(31) Collar	1	No.1, No.4, carburetor only
(32) Spring	1	
(33) SE valve shaft	1	
(34) SE valve nut	1	
(35) SE valve spring	1	
(36) SE valve	1	

# Air Cleaner Housing Removal/Installation



**Requisite Service**

- Top shelter removal/installation (page 2-5)

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Air cleaner housing cover screw	8	
(2)	Air cleaner housing cover	1	
(3)	O-rings	2	Do not remove the O-rings from the air cleaner housing cover unless necessary.
(4)	Air cleaner	1	
(5)	Air cleaner gasket	1	Do not remove the gasket from the air cleaner housing unless necessary.
(6)	Sub air cleaner tube	2	
(7)	Sub air cleaner cover	1	
(8)	Sub air cleaner	1	
(9)	Air cleaner housing screw	6	
(10)	Auto fuel valve mounting screw	2	
(11)	Breather tube	1	
(12)	Air cleaner housing	1	
(13)	O-ring	1	

# Pilot Screw Adjustment

## Idle Drop Procedure

For pilot screw access, see pages 5-13, 14 and 15.

Adjust the pilot screws as follows:

### NOTE

- Make sure the carburetor synchronization is within specification before pilot screw adjustment.
- The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.
- A pilot screw wrench is necessary to turn the pilot screws. (All U.S.A. types)

**STOOL**

**Pilot screw wrench**      07KMA-MS60101 or  
 07LMA-MT8010A or  
 07MMA-MT3010A  
 (U.S.A. only)

Insert the pilot screw wrench from the direction shown to turn each pilot screw. Use a flashlight to help locate the pilot screw.

1. Turn each pilot screw clockwise until it seats lightly and back it out to the specification given. This is an initial setting prior to the final pilot screw adjustment.

**Initial opening:**

- 2-1/4 turns out (Standard 49 state type)
- 2-5/8 turns out (Standard California type and U.S.A. ABS/TCS type)
- 1-7/8 turns out (Canada type)

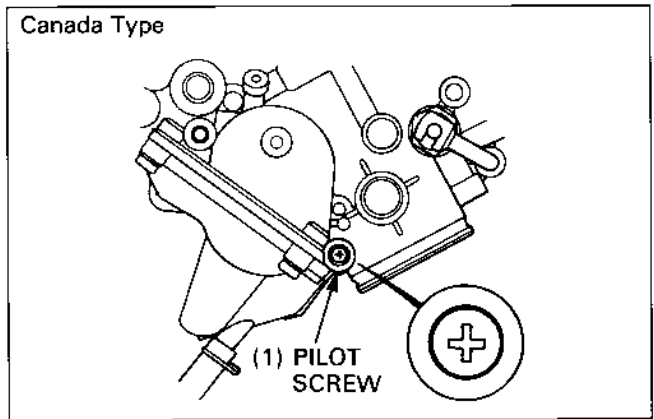
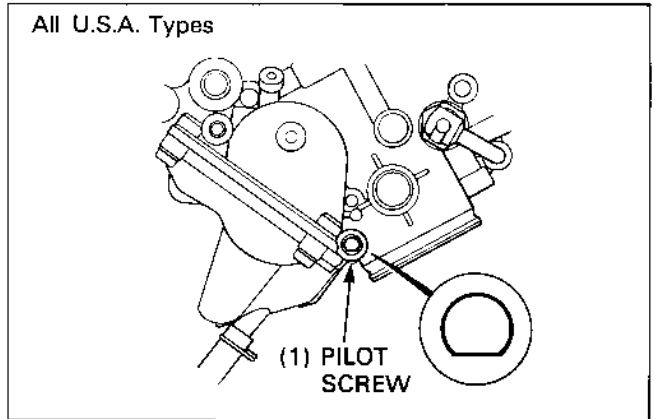
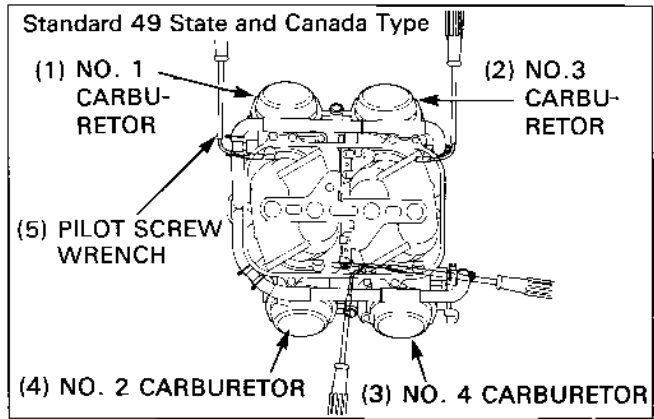
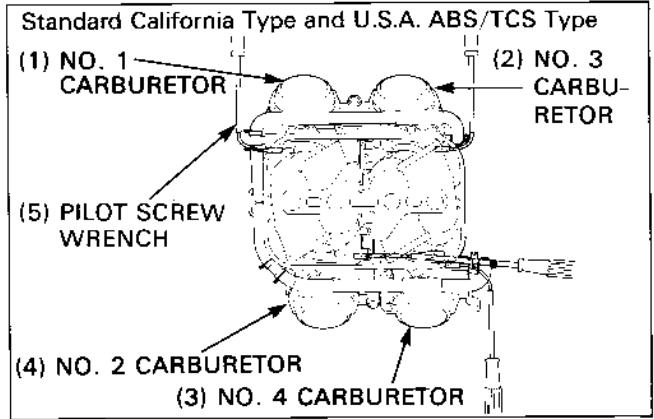
### CAUTION

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

2. Warm up the engine to operating temperature. Stop-and-go riding for 10 minutes is sufficient.
3. Attach the tachometer according to the tachometer manufacturer's instructions.
4. Adjust the idle speed with the throttle stop control knob.

**Idle speed:** 1,200 ± 100 rpm  
 1,000 ± 100 rpm (Canada type)

5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by successive 1/2 turn increments until engine speed does not increase.
7. Adjust the idle speed with the throttle stop control knob.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the No. 1 carburetor pilot screw out 7/8 turn from the position obtained in step 8.
10. Adjust the idle speed with the throttle stop control knob.
11. Perform steps 8, 9 and 10 for the No. 2, 3 and 4 carburetor pilot screws.





## Pilot Screw Access

### No. 1 Carburetor

Remove the right side Maintenance Cover. Remove the plastic timing belt cover on the front of the cylinder head. Using a 12-inch or longer #1 screwdriver and a flashlight to guide you, push the rubber carburetor heat insulator away from the carburetor body.

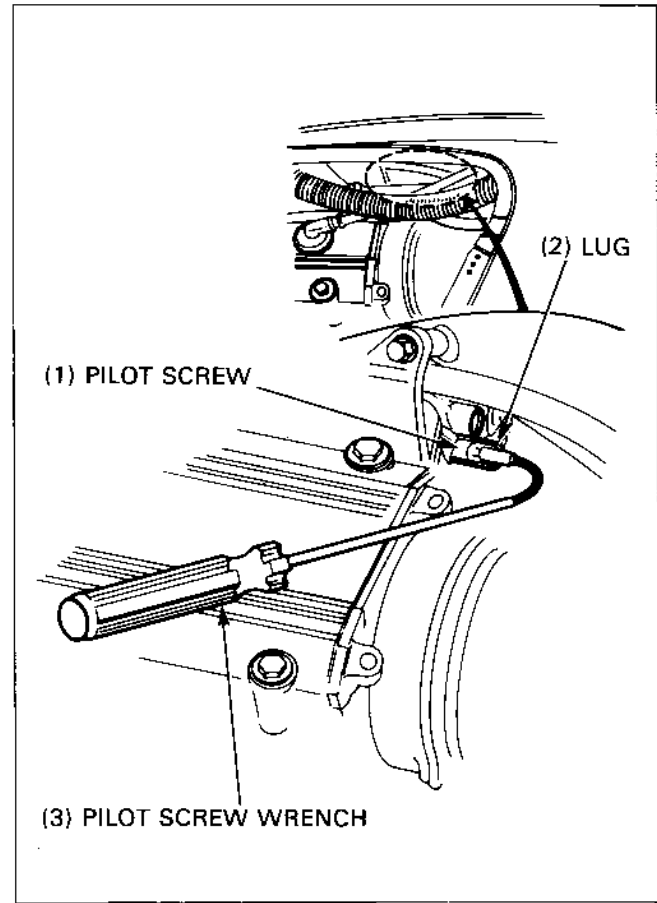
Insert the Pilot Screw Wrench into the pilot screw hole by using the lug on the carburetor body as a guide. Align the socket with the pilot screw head by turning the wrench slowly while pushing it lightly onto the pilot screw head.

Return the carburetor heat insulator to its original position after making the adjustment.



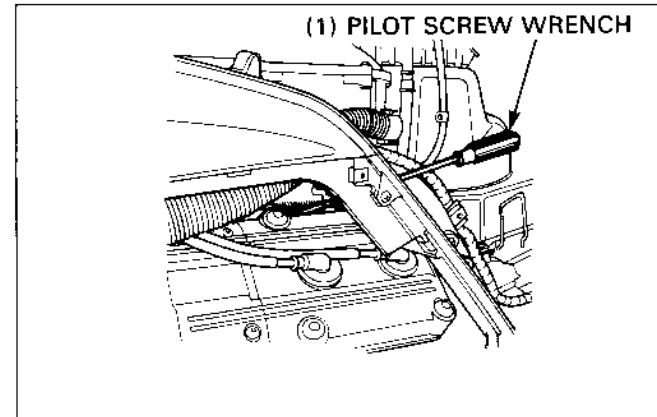
Pilot screw wrench

07LMA-MT8010A or  
07MMA-MT3010A

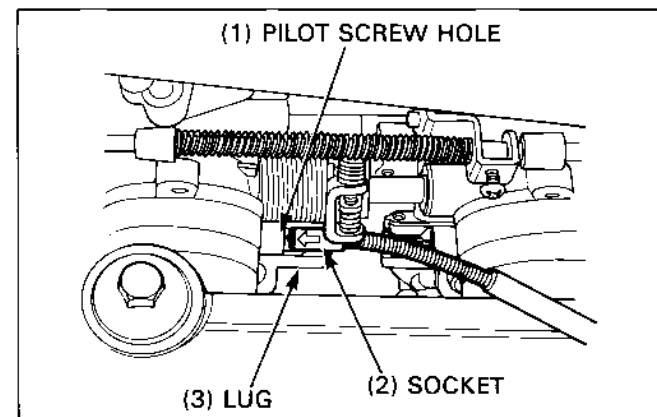


### No. 2 Carburetor

Insert the Pilot Screw Wrench from the rear upper side of the cylinder head between the frame and the fairing as shown.



Align the socket of the wrench to engage with the pilot screw head in the same manner as for No. 1 carburetor.

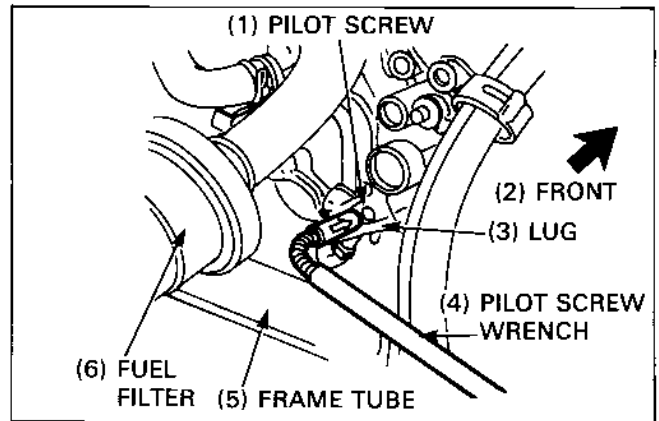


## Fuel System

### No. 3 Carburetor

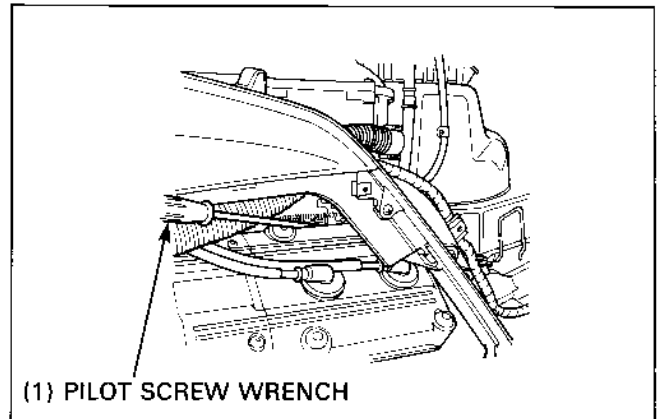
Insert the pilot screw wrench from the lower side of the auto fuel valve between the frame and the fuel filter as shown.

Align the socket of the wrench to engage with the pilot screw head in the same manner as for No. 1 carburetor.

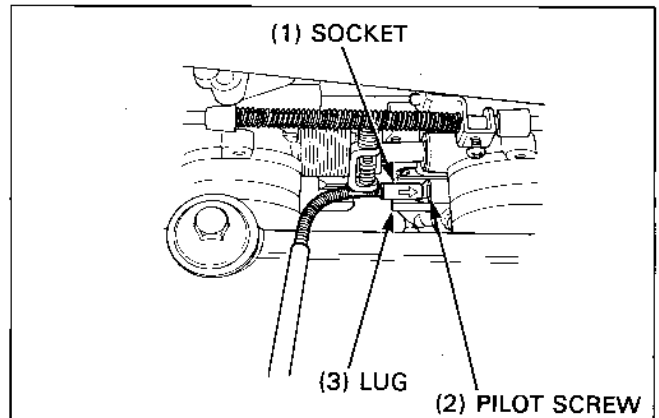


### No.4 Carburetor (Standard 49 state and Canada type)

Insert the pilot screw wrench from the front upper side of the cylinder head through the middle fairing hole as shown.

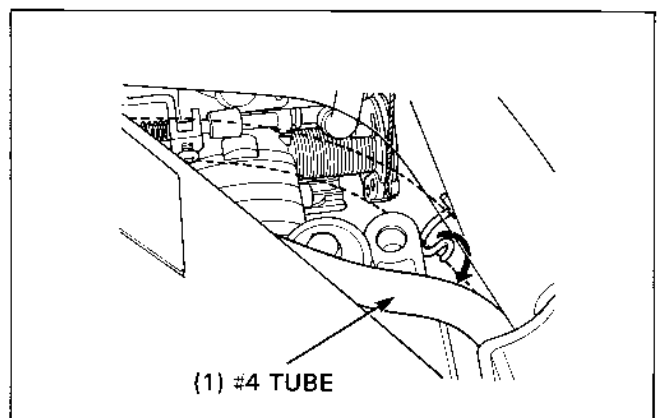


Align the socket of the wrench to engage with the pilot screw head in the same manner as for No. 1 carburetor.

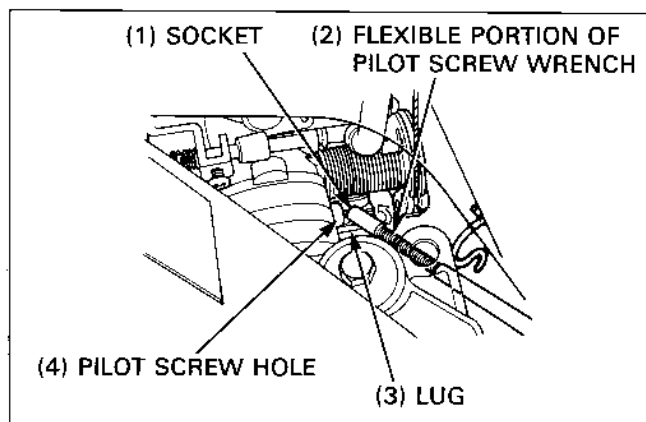


### No.4 Carburetor (Standard California type and U.S.A. ABS/TCS type)

Move the tube marked #4 down, out of the way as shown.



Position the socket end of the wrench against the lug on the carburetor.



Push the tool against the lug to bend the flexible portion of the tool under the throttle bell crank as shown.

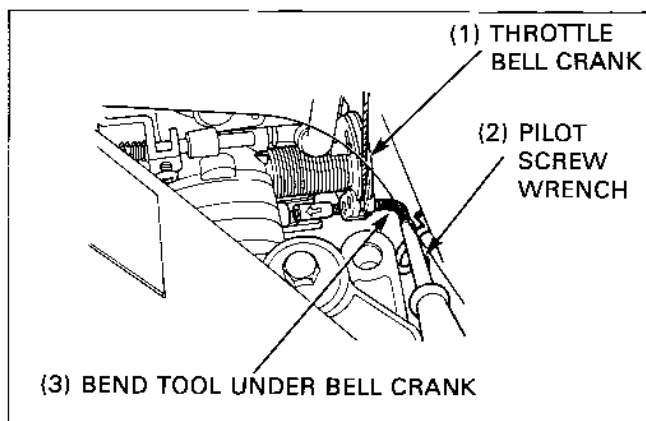
Align the socket of the wrench to engage with the pilot screw head in the same manner as for No. 1 carburetor.

Use a flashlight to verify that the socket seats on the pilot screw.

**NOTE**

- Do not operate the throttle when the Special Tool is on the pilot screw.

After making the adjustment, return the #4 tube to its original position.



## High Altitude Adjustment (U.S.A. only)

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

For pilot screw access, see pages 5-13, 14 and 15.

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

Turn each pilot screw clockwise 1/2 turn with a pilot screw wrench.

### NOTE

- A pilot screw wrench is necessary to turn the pilot screws.



**Pilot screw wrench**      07KMA-MS60101 or  
07LMA-MT8010A or  
07MMA-MT3010A  
(U.S.A. only)

Insert the pilot screw wrench from the direction shown for each pilot screw. Use a flashlight to help locate the pilot screw.

Adjust the idle speed to the specified rpm with the throttle stop control knob.

**Idle speed: 1,200 ± 100 rpm**

### NOTE

- These adjustments must be made at high altitude to ensure proper high altitude operation.

Attach the Vehicle Emission Control Information Update label on the left side of the frame as shown. See Service Letter No. 132 for information on obtaining the label.

### NOTE

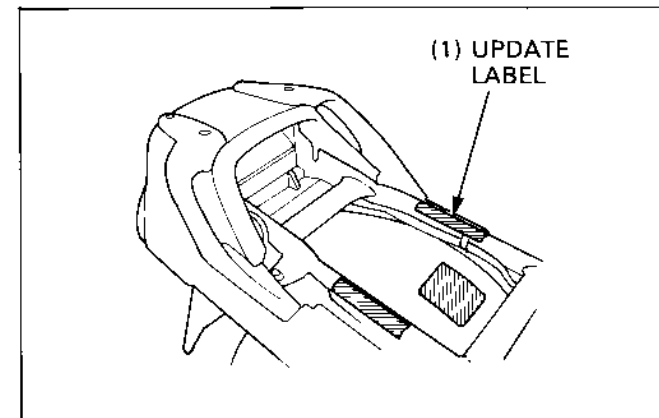
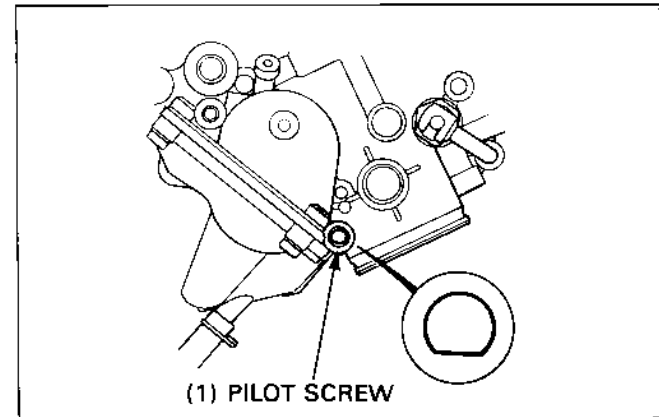
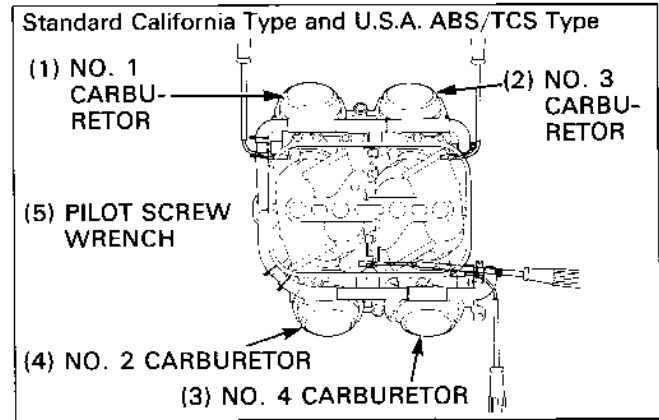
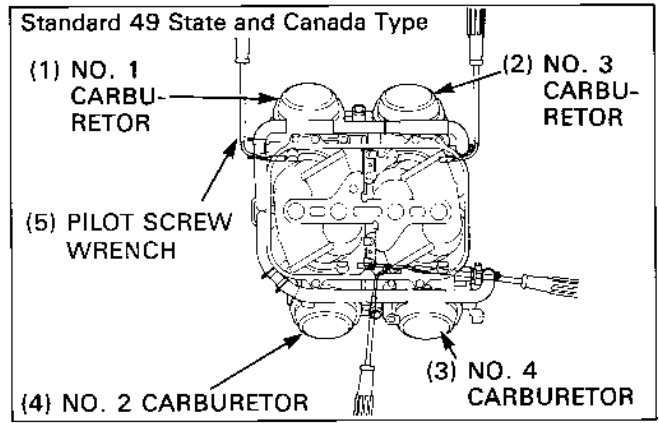
- Do not attach the label to any part that can be easily removed from the vehicle.

### ⚠ WARNING

- Operation at an altitude lower than 1,500 m (5,000 feet) with the carburetors adjusted for high altitudes may cause the engine to idle roughly and stall.

When the vehicle is to be operated continuously below 1,500 m (5,000 feet), turn each pilot screw counter-clockwise 1/2 turn to its original position and adjust the idle speed to the specified rpm. Remove the Vehicle Emission Control Update Label.

Be sure to do these adjustments at low altitude with the engine at normal operating temperature.



# Emission Control System (U.S.A. only)

## Secondary Air Supply System

### NOTE

- The pulse secondary air injection (PAIR) control valve and the pulse secondary air injection (PAIR) check valve are combined in one assembly.

Remove the fairing pocket (page 2-6).

Disconnect the No. 10 vacuum tube (routed from the PAIR control valve) from the 3-way joint.

Plug the 3-way joint and connect the vacuum pump to the No. 10 vacuum tube.

Remove the air cleaner housing cover and put your finger on the air suction port of the air chamber.

Perform the secondary air supply system inspection (refer to section 7 of the Common Service Manual).

**Specified vacuum: 360 mmHg (14.2 inHg)**

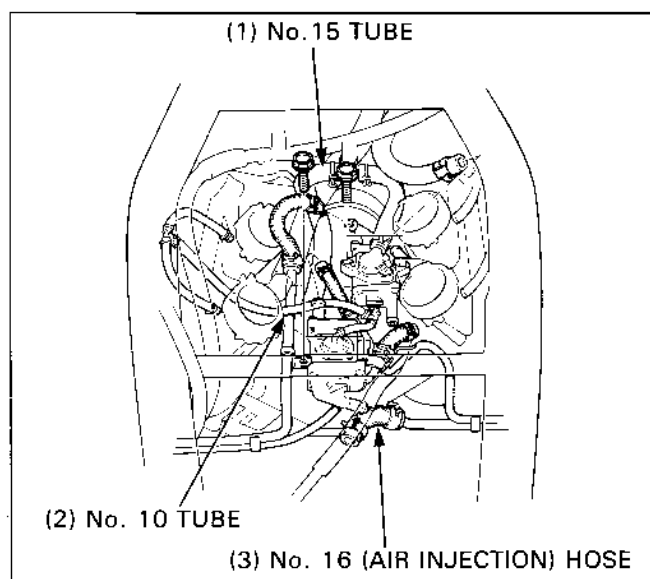
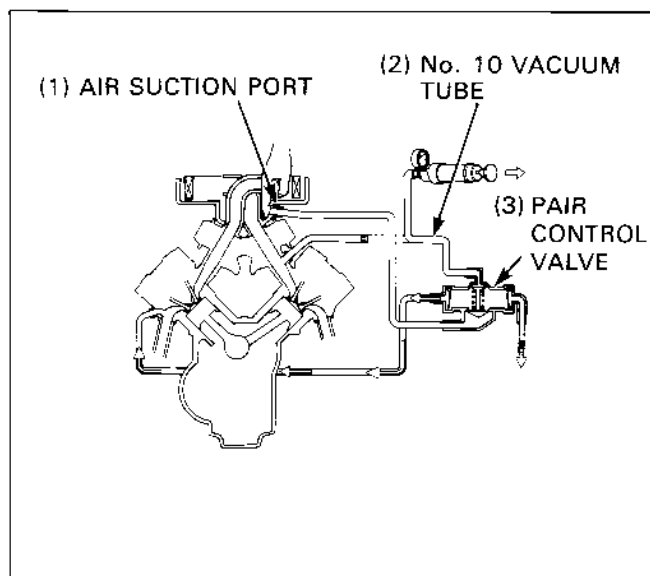
## Pulse Secondary Air Injection (PAIR) Control Valve Removal/Installation

Remove the carburetor (page 5-3).

Remove the heat insulator rubber.

Remove the bolts, disconnect the No. 16 (air injection) hoses, No. 10 tubes and No. 15 (air suction) tubes from the PAIR control valves, and remove the PAIR control valves.

Install the PAIR control valve in the reverse order of removal.



## Evaporative Emission (EVAP) Purge Control Valve and Tube Removal/Installation ( '91-'93 : Standard California type and U.S.A. ABS/TCS type) (After '93 : California type)

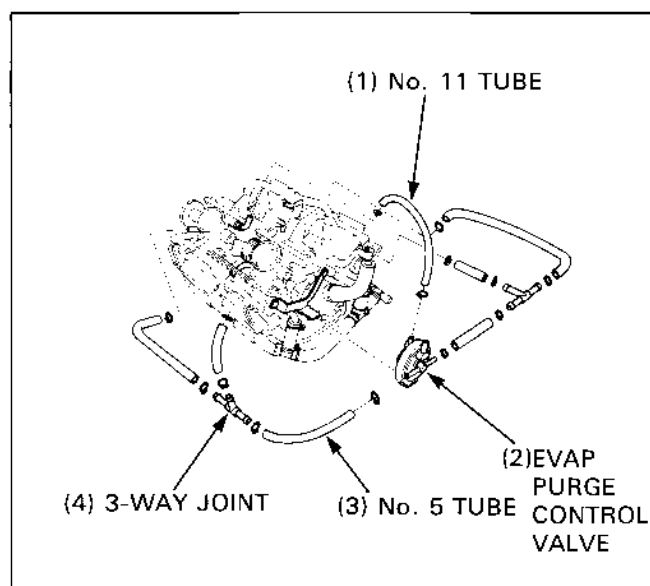
Remove the carburetor (page 5-3).

Remove the No. 5 and No. 11 tubes, 3-way joints and the EVAP purge control valve from the carburetor.

Install the EVAP purge control valve in the reverse order of removal.

### NOTE

- For EVAP purge control valve tube routing, see page 5-6.



## Carburetor Draining

Remove the maintenance covers (page 2-5).

Remove the access covers from the fairing pockets.

Place a suitable container under the carburetor drain hose.

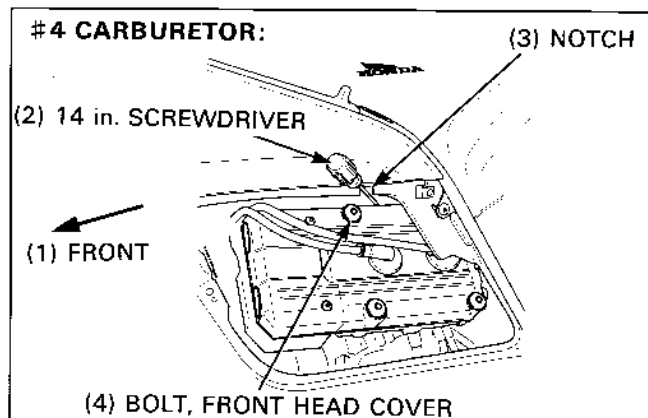
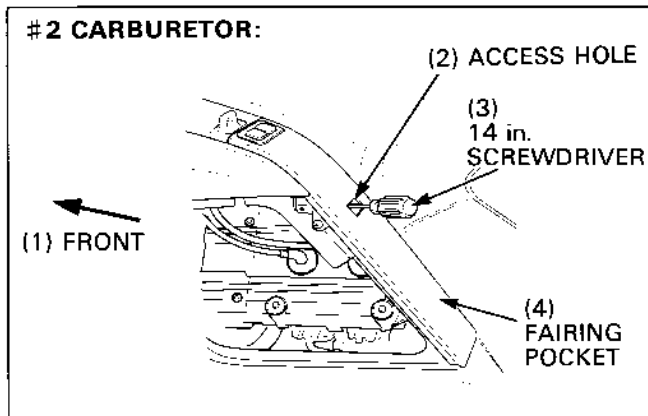
Drain the #2 carburetor by placing a long (minimum 14 in) flat blade screwdriver through the access hole, between the carburetor synchronization linkage and the carburetor-to-manifold boot. The screwdriver must be angled down, toward the front of the motorcycle.

An adjustable flashlight will help locate the drain screw.

Drain the #4 carburetor by placing a long screwdriver through the maintenance opening, above the cylinder head, to the rear of the head cover bolt, between the carburetor synchronization linkage and the carburetor-to-manifold boot. The screwdriver fits in a notch in the upper fairing. The screwdriver must be angled down, toward the rear of the motorcycle.

Loosen the screws until the fuel is drained, and tighten the screws.

Repeat this procedure on the right side of the motorcycle for the #1 (front) and #3 (rear) carburetors.



# Troubleshooting

### Engine won't start

- Too much fuel getting to the engine
  - Air cleaner clogged
  - Flooded carburetor
- Intake air leak
- Fuel contaminated/deteriorated
  - jets clogged
- Starting enrichment circuit clogged
- No fuel to carburetor
  - Fuel filter clogged
  - Fuel line clogged
  - Fuel level misadjusted
  - Fuel tank breather tube clogged
  - Fuel pump malfunction
  - Auto fuel valve malfunction

### Lean mixture

- Fuel jets clogged
- Float valve faulty
- Float level too low
- Fuel line restricted
- Carburetor air vent tube clogged
- Intake air leak
- Fuel pump malfunction
- Auto fuel valve malfunction
- Vacuum piston faulty
- Throttle valve faulty

### Rich mixture

- Starting enrichment valve open
- Float valve faulty
- Float level too high
- Air jets clogged
- Air cleaner contaminated
- Flooded carburetor
- Vacuum piston faulty

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

- Fuel line restricted
- Ignition malfunction
- Fuel mixture too lean/rich
- Fuel contaminated/deteriorated
  - jets clogged
- Intake air leak
- Idle speed misadjusted
- Float level misadjusted
- Fuel tank breather tube clogged
- Fuel pump malfunction
- Pilot screw misadjusted
- Starting enrichment circuit clogged
- Auto fuel valve malfunction
- EVAP CAV control valve faulty
- Hoses of the emission control system faulty
- EVAP purge control valve faulty

### Afterfire when engine braking is used

- Lean mixture in slow circuit
- Air cut-off valve malfunction
- Secondary air supply system faulty
- Hoses of emission control system faulty

### Afterfire or misfiring during acceleration















- Ignition system malfunction
- Fuel mixture too lean

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

- Fuel system clogged
- Ignition system malfunction
- Faulty EVAP CAV control valve
- Damaged/misconnected emission control system hoses

# 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.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use special tool</p>
	<p>Use optional tool. Use the same procedure you use to order parts.</p>
 <p>10 (1.0, 7.2)</p>	<p>Torque specification.    10 N·m (1.0 kg-m, 7.2 ft-lb)</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)</p>
	<p>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</p>
	<p>Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent)          Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A.          Honda Moly 60 (U.S.A. only)          Rocol ASP manufactured by Rocol Limited, U.K.          Rocol Paste manufactured by Sumico Lubricant, Japan</p>
	<p>Use silicone grease</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant</p>
	<p>Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>



# 7. Engine Removal Installation

Service Information

7-1

Engine Removal/Installation

7-2

## Service Information

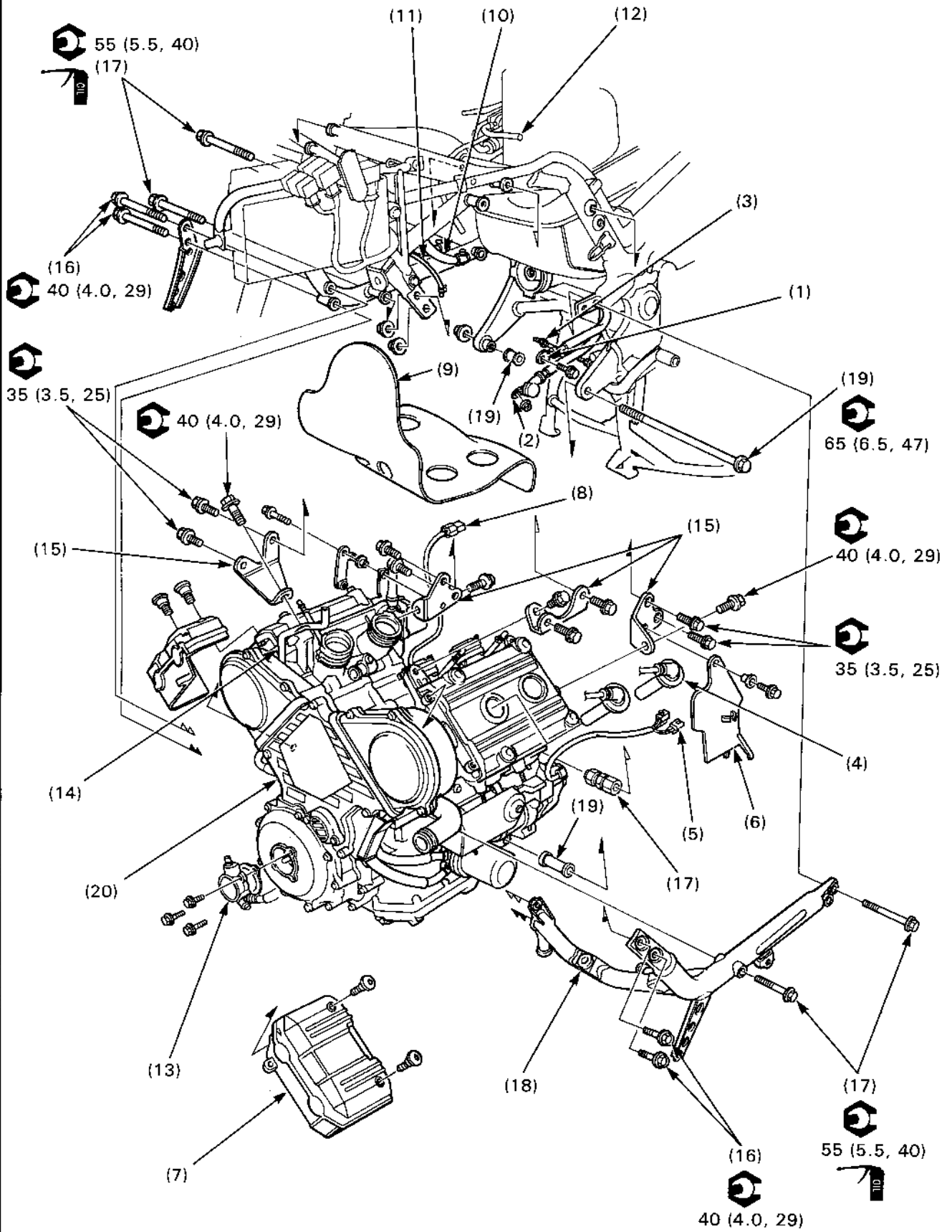
- A floor jack or other adjustable support is required to support and maneuver the engine.

### CAUTION

- **Do not support the engine using the oil filter.**
- The following components can be serviced with the engine installed in the frame.
  - Oil pump (Section 4)
  - Carburetor (Section 5)
  - Oil cooler (Section 5)
  - Water pump (Section 6)
  - Cylinder head (Section 8)
  - Timing belt (Section 8)
  - Clutch (Section 9)
  - Gearshift linkage (Section 10)
  - Alternator (Section 17)
  - Ignition pulse generator (Section 18)
  - Starter motor (Section 20)
- The following components require engine removal for service.
  - Transmission (Section 10)
  - Primary damper shaft (Section 10)
  - Crankshaft (Section 11)
  - Connecting rod (Section 11)
  - Piston (Section 11)
  - Primary drive gear (Section 11)
  - Starter clutch

# Engine Removal/Installation

'91-'95

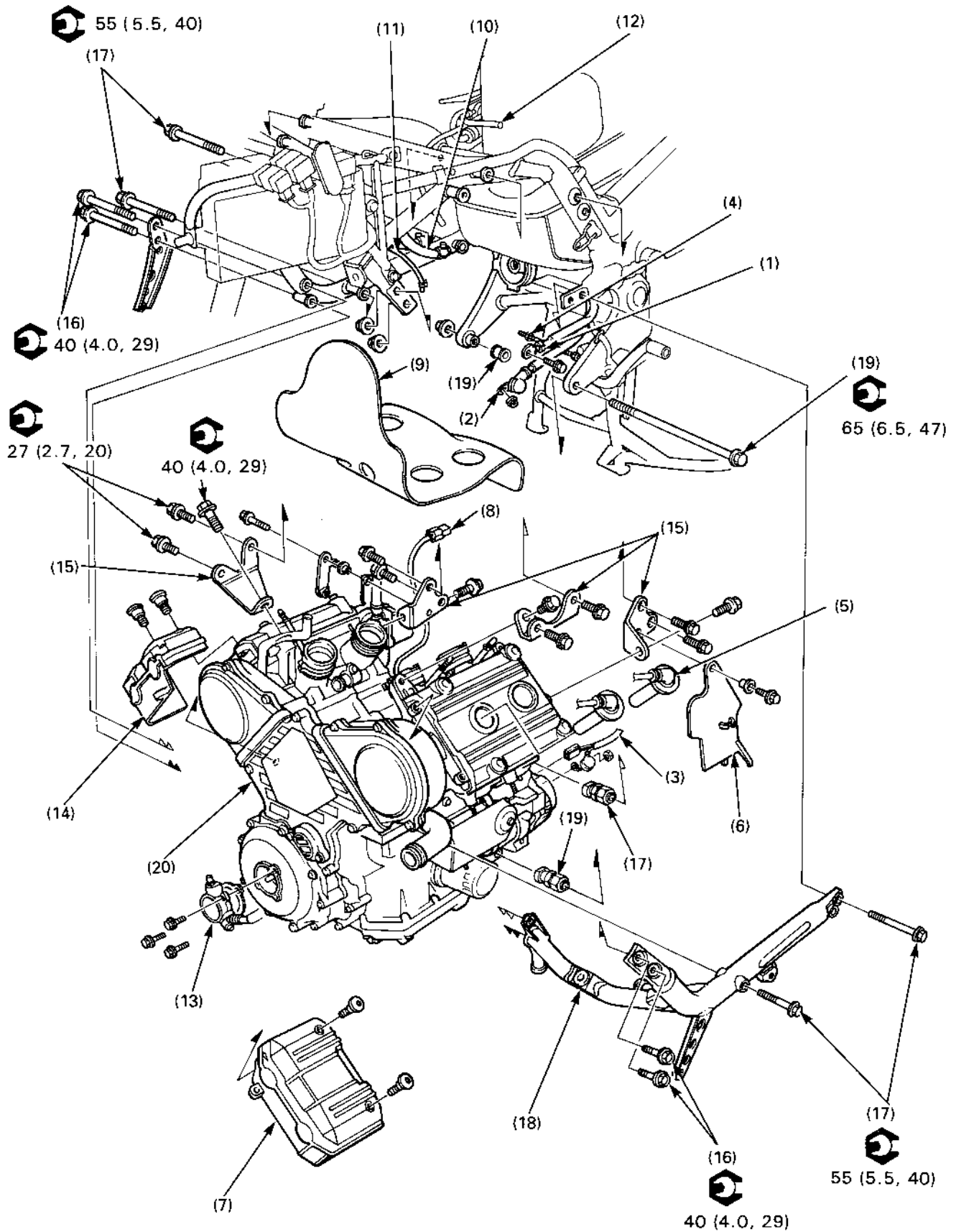


**Requisite Service**

- Muffler removal/installation (page 2-13)
- Exhaust pipe removal/installation (page 2-18)
- Carburetor removal/installation (page 5-3)
- Radiator removal/installation (page 6-5)

Procedure	Q'ty	Remarks	
<b>Removal Order</b>			
(1) Engine ground cable	1	Installation is in the reverse order of removal.	
(2) Starter motor cable	1		
(3) Gearshift pedal tie rod bolt	1	Loosen the lock nuts and remove the bolt by turning it.	
(4) Spark plug cap	4		
(5) Alternator wire connector	2		
(6) Heat guard plate	1		
(7) Front head cover	2		
(8) Ignition pulse generator wire connector	1		
(9) Carburetor heat insulator rubber	1		
(10) Water outlet hose	2		Disconnect from the cylinder heads.
(11) Water bypass hose	1		Disconnect from the water pipe.
(12) Auto fuel valve vacuum tube	1		Disconnect from the No.3 cylinder intake manifold.
(13) Clutch slave cylinder	1	Remove the three mounting bolts.	
(14) Breather hose	1	Remove from air cleaner housing.	
(15) Engine mounting bracket	4	<ul style="list-style-type: none"> <li>• Remove the two 8 mm bolts and 10 mm bolt per each bracket.</li> <li>• Tightening procedure (page 7-6)</li> </ul>	
(16) Sub frame bolt	4	Tightening procedure (page 7-6)	
(17) 10 mm engine mounting bolt/adjusting collar	4/1		
(18) Sub frame	1		
(19) 12 mm engine mounting bolt/collar	1/2		
(20) Engine assembly	1	<p>Move the engine assembly out of the frame to the left.</p> <p><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>• Carefully align the mounting points with the jack to prevent damage to the mounting bolt threads, wire harnesses and cables.</li> </ul>	

After '95



**Requisite Service**

- Muffler removal/installation (page 2-13).
- Exhaust pipe removal/installation (page 2-18).
- Carburetor removal/installation (page 5-3).
- Radiator removal/installation (page 6-5).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Engine ground cable	1	
(2)	Starter motor cable	1	
(3)	Alternator cable/connector	1	
(4)	Gearshift pedal tie rod bolt	1	Loosen the lock nuts and remove the bolt by turning it.
(5)	Spark plug cap	4	
(6)	Hear guard plate	1	
(7)	Front head cover	2	
(8)	Ignition pulse generator wire connector	1	
(9)	Carburetor heat insulator rubber	1	
(10)	Water outlet hose	2	Disconnect from the cylinder heads.
(11)	Water bypass hose	1	Disconnect form the water pipe.
(12)	Auto fuel valve vacuum tube	1	Disconnect from the No.3 cylinder intake manifold.
(13)	Clutch slave cylinder	1	Remove the three mounting bolts.
(14)	Breather hose	1	Remove from air cleaner housing.
(15)	Engine mounting bracket	4	<ul style="list-style-type: none"> <li>• Remove the two 8 mm bolts and 10 mm bolt per each bracket.</li> <li>• Tightening procedure (page 7-6)</li> </ul>
(16)	Sub frame bolt	4	Tightening procedure (page 7-6)
(17)	10 mm engine mounting bolt/adjusting collar	4/1	
(18)	Sub frame	1	
(19)	12 mm engine mounting bolt/adjusting collar	1/2	
(20)	Engine assembly	1	<p>Move the engine assembly out of the frame to the left.</p> <p><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>• Carefully align the mounting points with the jack to prevent damage to the mounting bolt threads, wire harnesses and cables.</li> </ul>

## Engine Mounting Bolt Tightening Procedure

Apply oil to the 10 mm engine mounting bolt threads and seating surfaces.

Loosely install all engine mounting bolts, nut, sub frame bolts, nuts, and engine mounting brackets.

Tighten the sub frame bolts in the sequence below.

①—②—③—④—⑤

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

Tighten the 10 mm engine mounting bolts ⑥ and ⑦.

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

Lengthen the adjusting collar on the 10 mm engine mounting bolt ⑧ until the collar contacts with the engine and frame by turning the adjusting nut of the collar.

### After '95:

Lengthen the lower adjusting collar on the 12 mm engine mounting bolt ⑩ until the collar contacts with the engine and frame by turning the adjusting nut of the collar. Tighten the adjusting nut of the lower adjusting collar.

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

Tighten the 10 mm engine mounting bolts ⑧ and ⑨.

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

Tighten the 12 mm engine mounting bolt ⑩ and nut ⑪.

**Torque: 85 N·m (6.5 kg-m, 47 ft-lb)**

Tighten the adjusting collar lock nut.

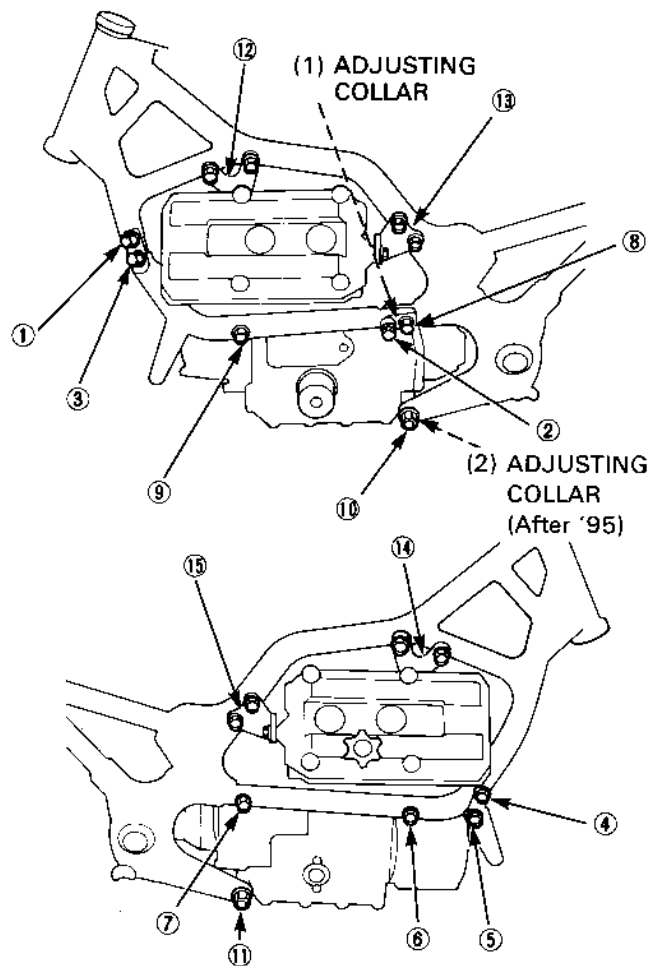
**Torque: '91-'95: 21 N·m (2.1 kg-m, 15 ft-lb)**

**After '95: 28 N·m (2.8 kg-m, 20 ft-lb)**

Tighten the engine mounting brackets ⑫, ⑬, ⑭ and ⑮.

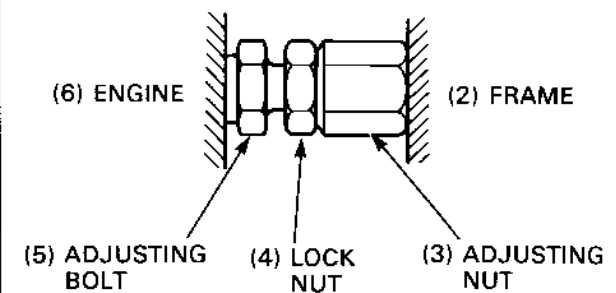
**Torque: 10 mm bolt: 40 N·m (4.0 kg-m, 29 ft-lb)**

**8 mm bolt: 35 N·m (3.5 kg-m, 25 ft-lb)**



'91-'95 Shown:

(1) ADJUSTING COLLAR



# 6. Cooling System

Service Information	6-1	Radiator Disassembly/Assembly	6-6
Troubleshooting	6-1	Water Pump Removal/Installation	6-7
System Flow Pattern	6-2	Radiator Reserve Tank Removal/Installation	6-8
Coolant Draining	6-4	Thermostat Removal/Installation	6-10
Radiator Removal/Installation	6-5		

## Service Information

6

### ⚠ 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 25 of the Common Service Manual for fan motor switch and thermo sensor inspections.

## Troubleshooting

### Engine temperature too high

- Faulty radiator cap.
- Insufficient coolant.
- Passages blocked in radiator, hoses, oil cooler, or water jacket.
- Air in system.
- Faulty water pump.
- Thermostat stuck closed.
- Faulty cooling fan motor.
- Faulty cooling fan motor switch.

### Engine temperature too low

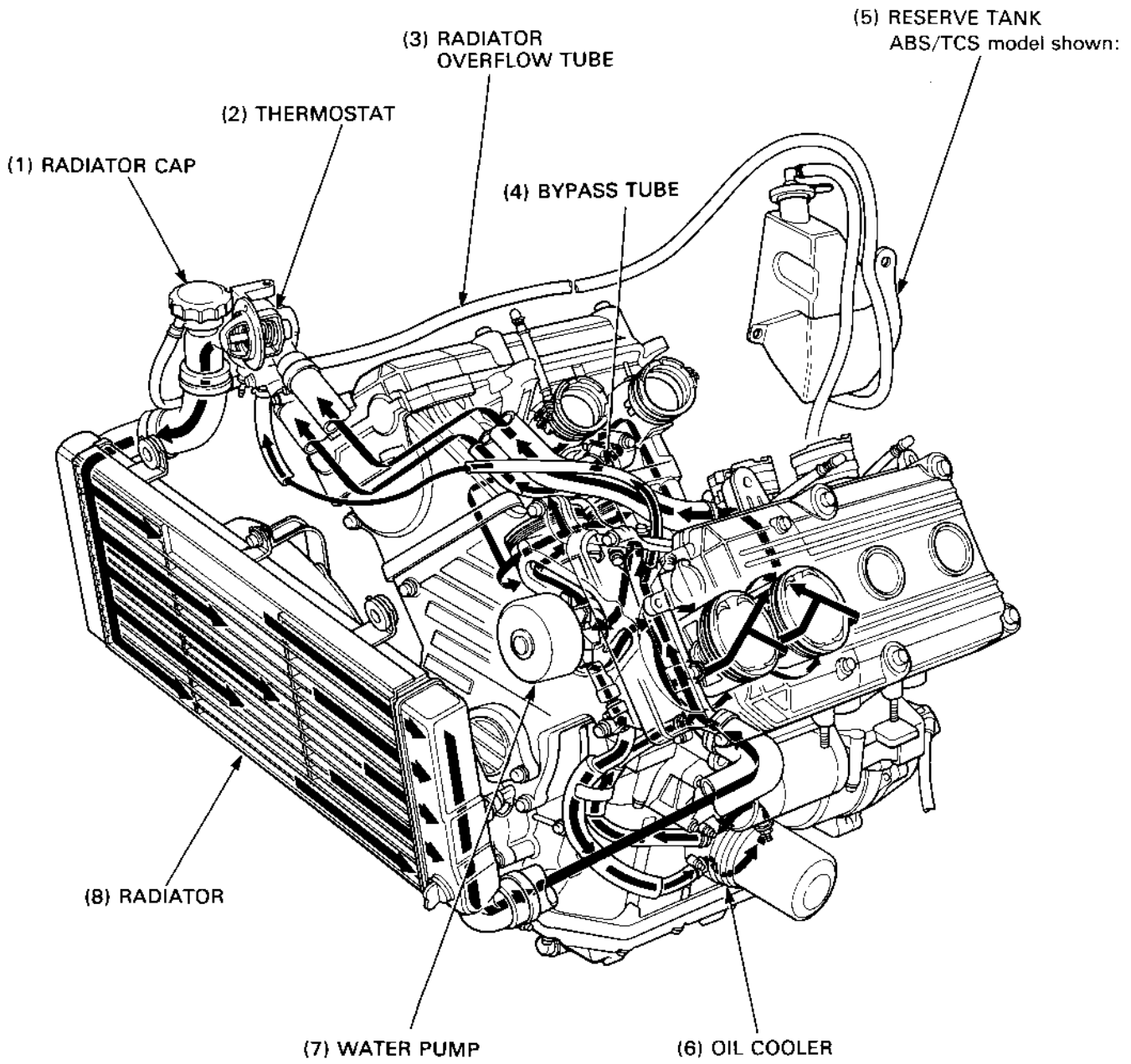
- Faulty temperature gauge or gauge sensor.
- Thermostat stuck open.
- Faulty cooling fan motor switch.
- Faulty cooling fan motor switch.

### Coolant leaks

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

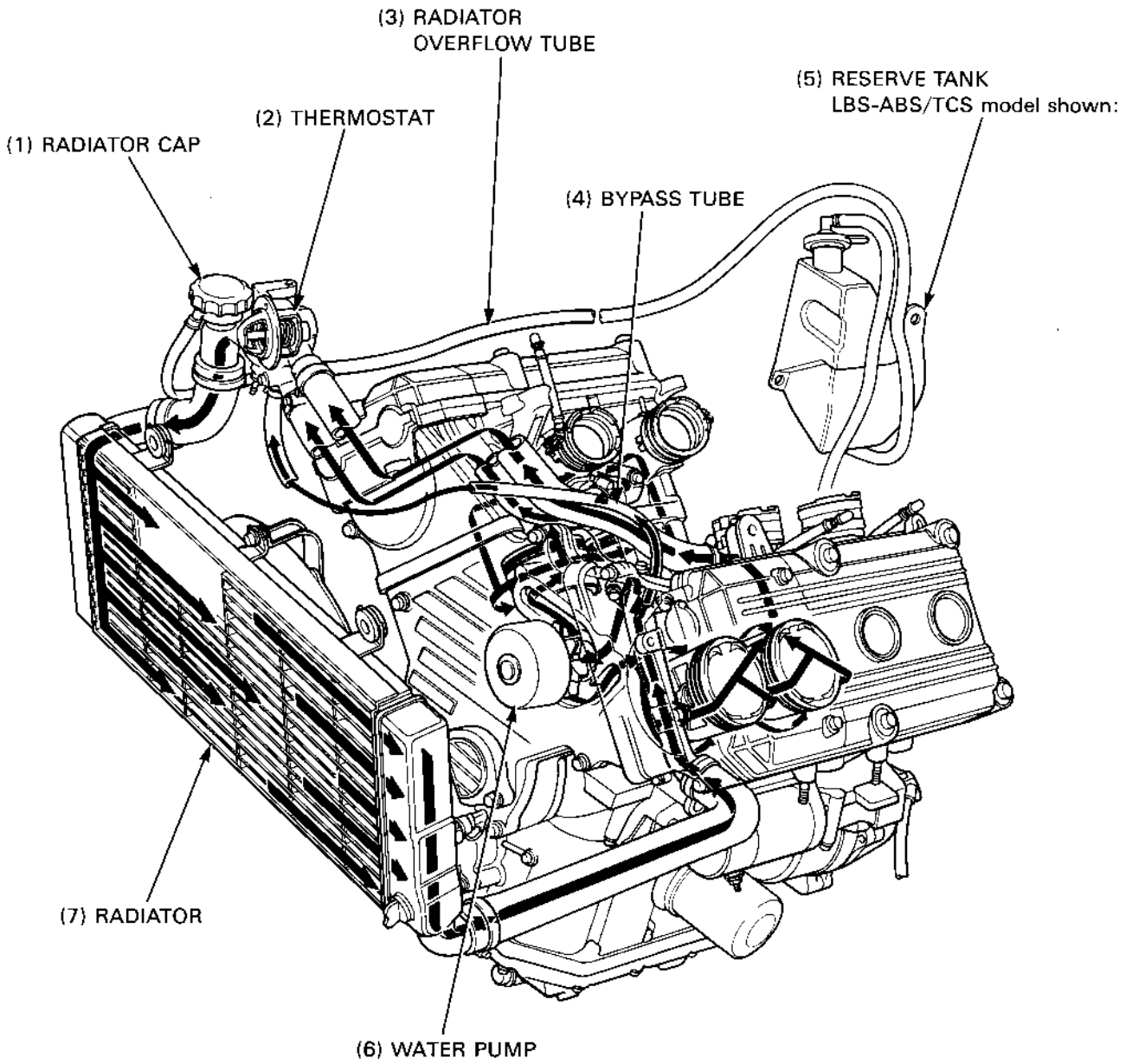
# System Flow Pattern

'91-'95





After '95



# Coolant Draining

**▲ WARNING**

• Wait until the engine is cool before servicing the cooling system. Removing the radiator cap while the engine is hot and the coolant is under pressure may cause serious scalding.

**NOTE**

• For coolant replacement, refer to section 5 of the Common Service Manual.

Remove the left and right middle fairings (page 2-8).  
Remove the radiator cap.

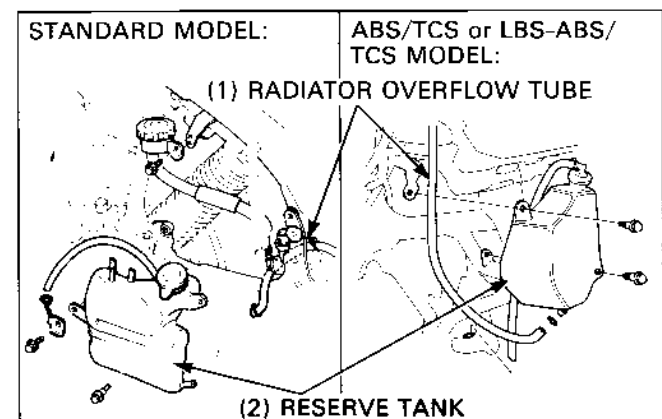
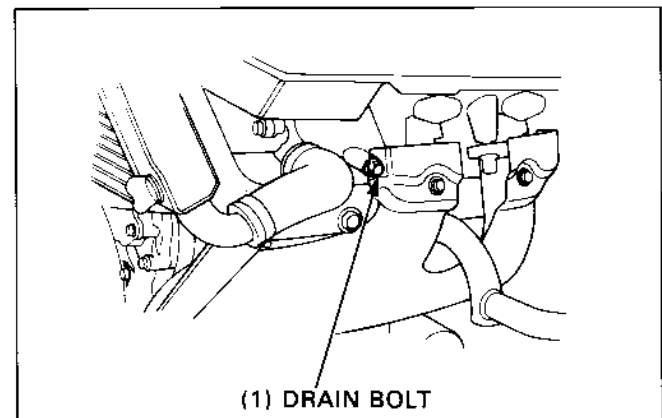
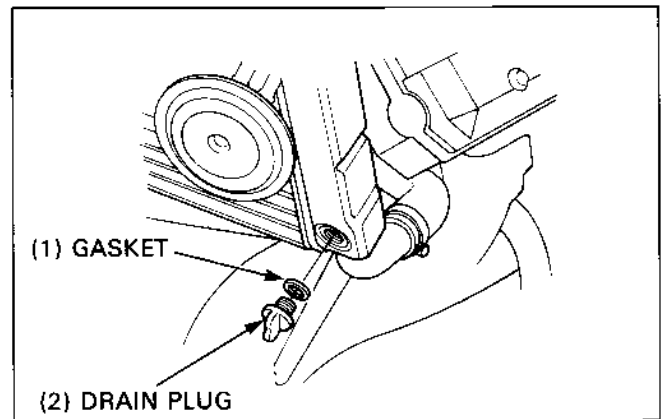
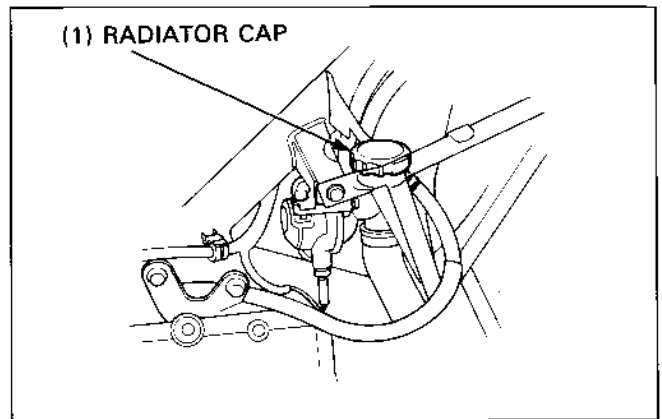
Remove the radiator drain plug and gasket, and drain the coolant from the radiator.

Remove the drain bolts and sealing washers from the left and right cylinders, and drain the coolant from the engine.

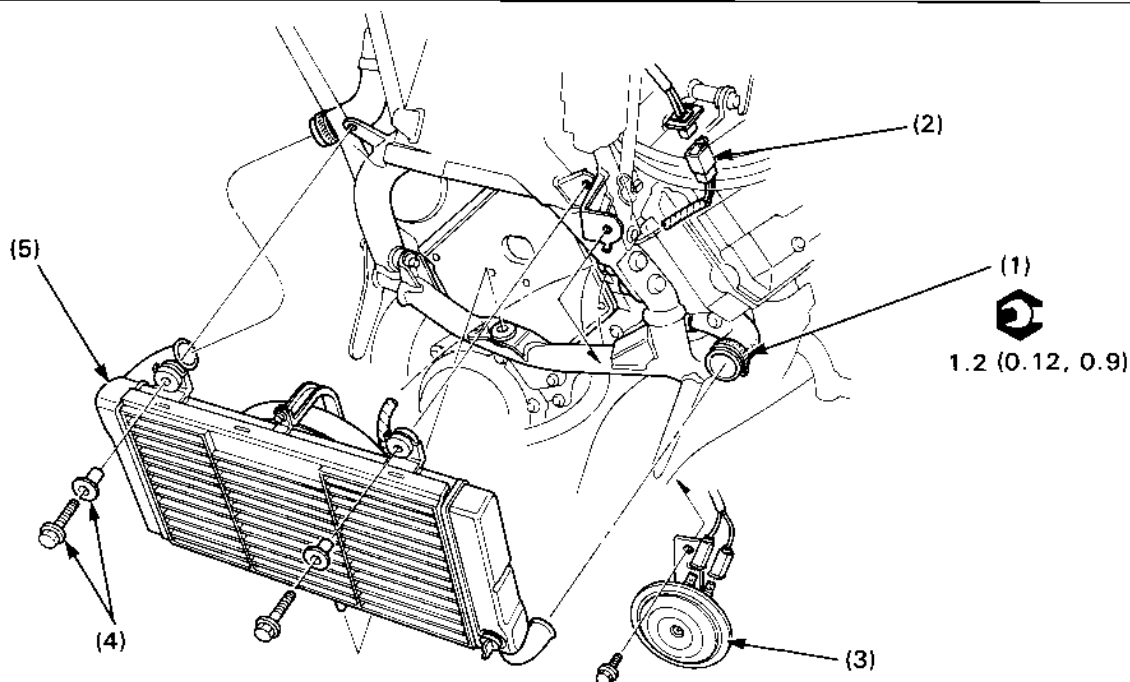
Remove the reserve tank mounting bolts (page 6-8).

Place a suitable container under the radiator overflow tube joint of the reserve tank, disconnect the overflow tube from the tank, and drain the coolant from the tank.

Install the drain plug with a gasket.  
Install the drain bolts with new sealing washers.  
Install the reserve tank (page 6-8).



## Radiator Removal/Installation

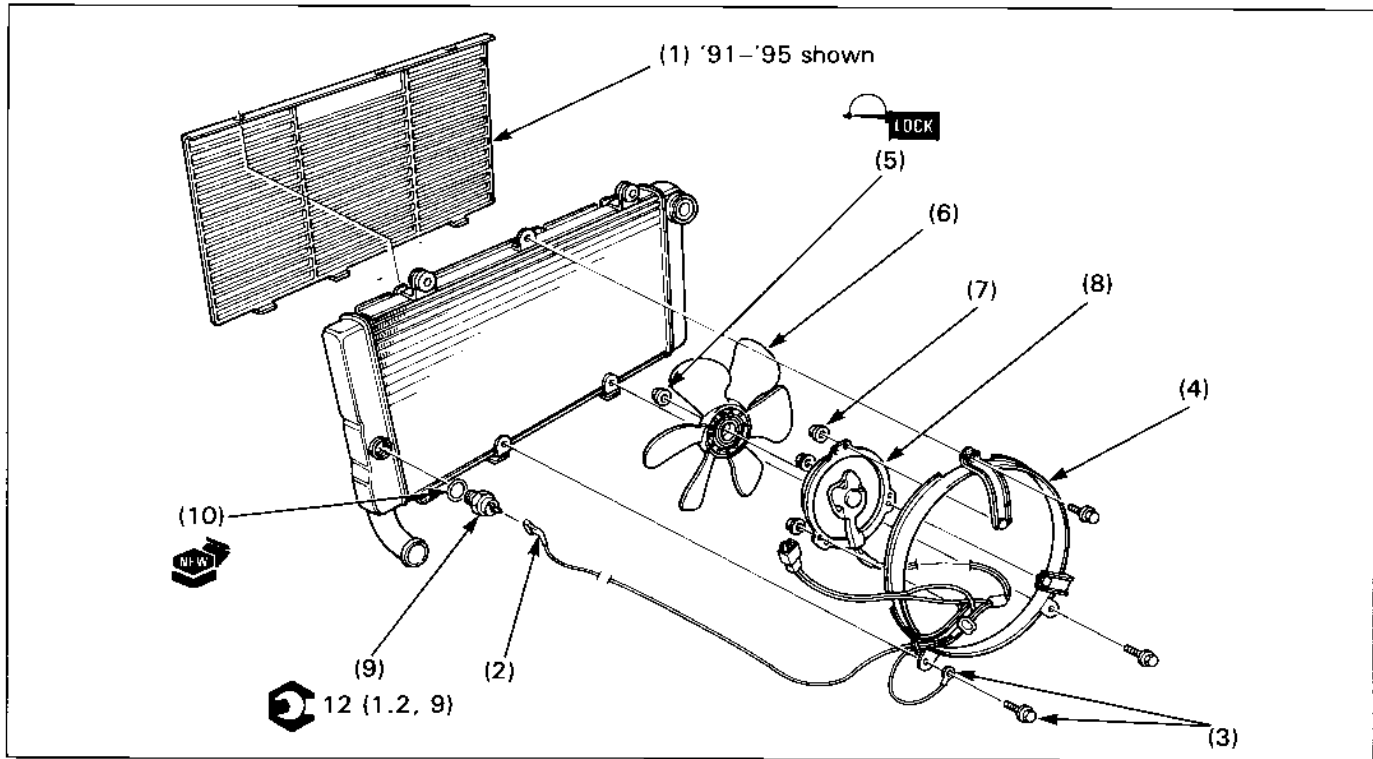


### Requisite Service

- Upper fairing removal/installation (page 2-9)
- Coolant draining (page 6-4)
- 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) Radiator hose	2	
(2) Fan motor switch connector	1	
(3) Horn	1	
(4) Radiator mounting bolt/collar	2/2	
(5) Radiator	1	At installation, align the pin of the radiator with the mounting grommet of the frame properly.

# Radiator Disassembly/Assembly

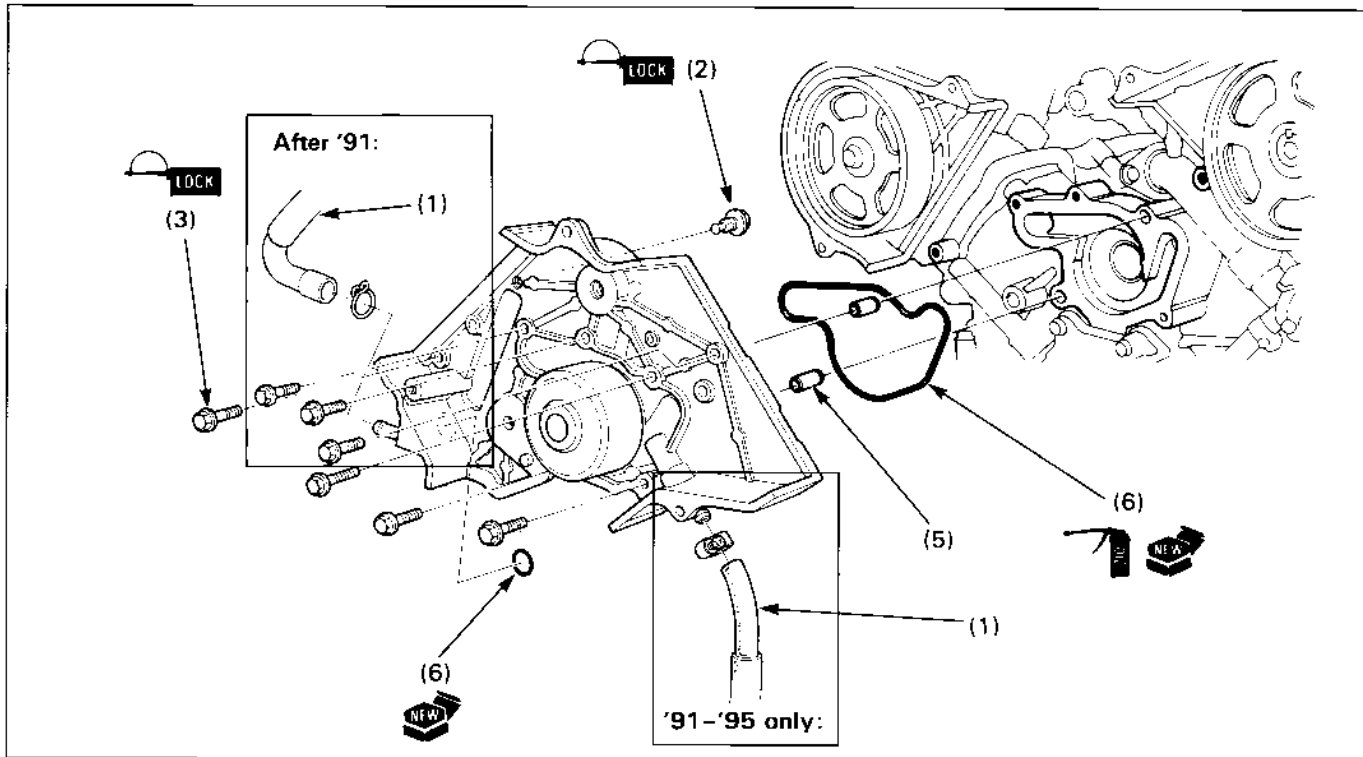


## Requisite Service

- Radiator removal/installation (page 6-5)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1) Radiator grille	1	
(2) Fan motor switch wire connector	1	
(3) Shroud mounting bolt/ground wire	3/1	
(4) Shroud	1	
(5) Fan mounting nut	1	
(6) Cooling fan	1	
(7) Fan motor mounting nut	3	
(8) Fan motor	1	
(9) Fan motor switch	1	
(10) O-ring	1	

# Water Pump Removal/Installation



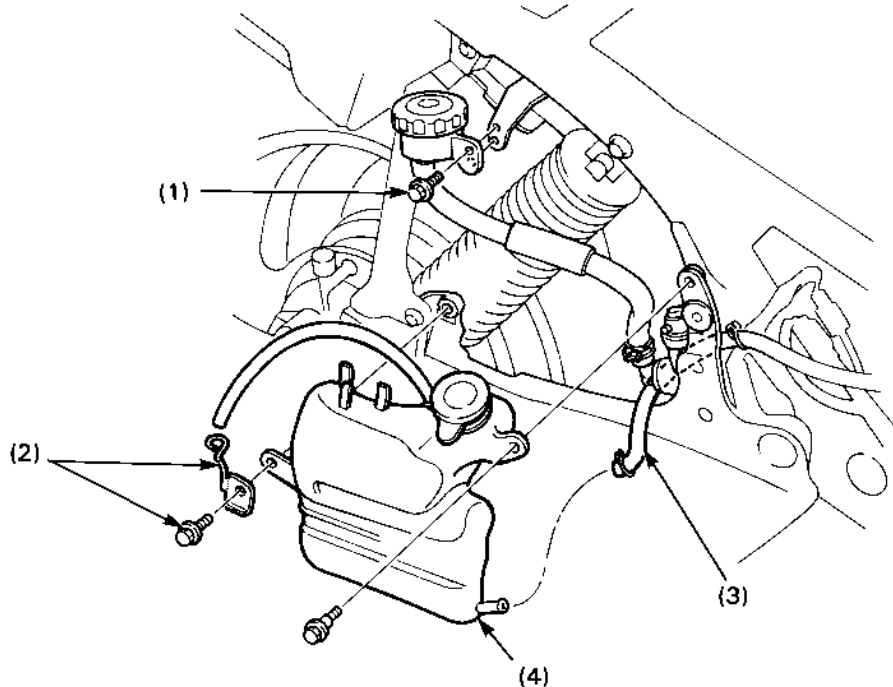
## Requisite Service

- Timing belt idle pulley removal/installation (page 8-10)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Oil cooler water hose/breather hose	1/1	
(2) Timing belt tensioner spring hook bolt	1	
(3) Bolt	7	
(4) Water pump	1	Be careful not to damage the reduction holder gasket.
(5) Dowel pin	2	
(6) O-ring	2	

# Radiator Reserve Tank Removal/Installation

## Standard Model

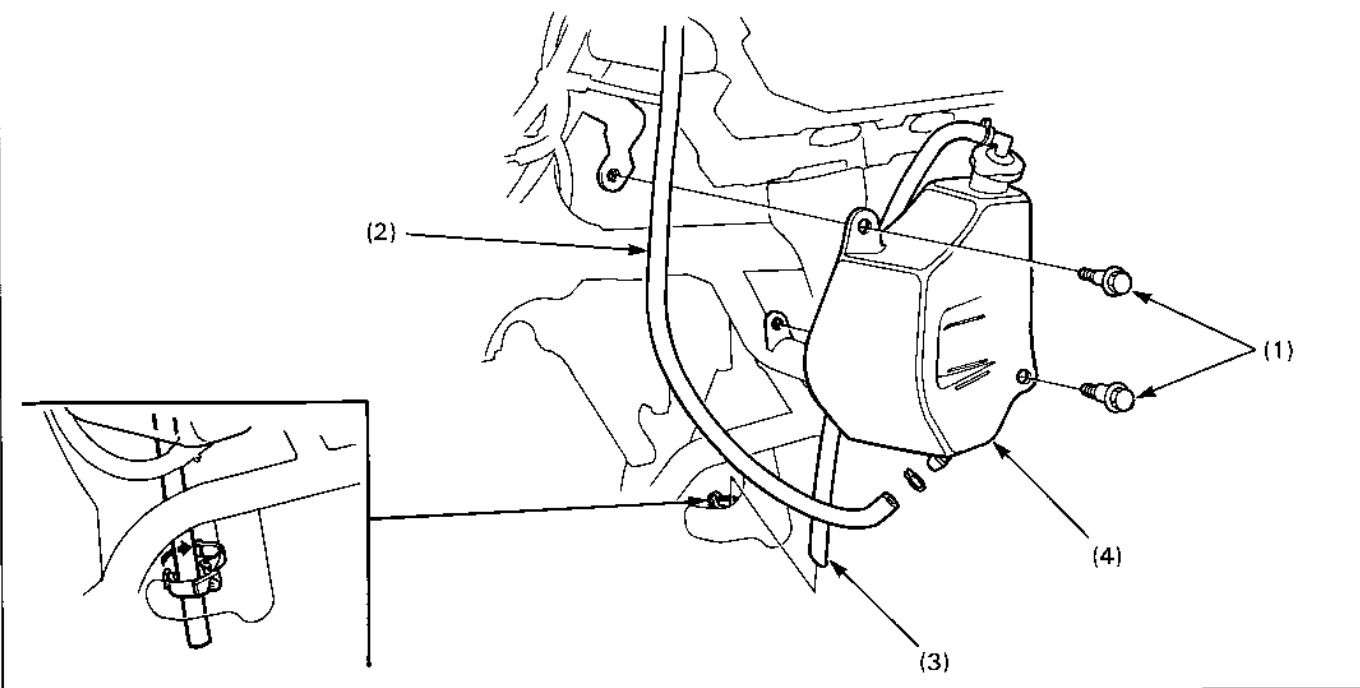


## Requisite Service

- Right side cover removal/installation (page 2-2)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Rear brake reservoir mounting bolt	1	
(2)	Reserve tank mounting bolt/clamp	2/1	
(3)	Radiator overflow tube	1	
(4)	Reserve tank	1	

## ABS/TCS or LBS-ABS/TCS Model

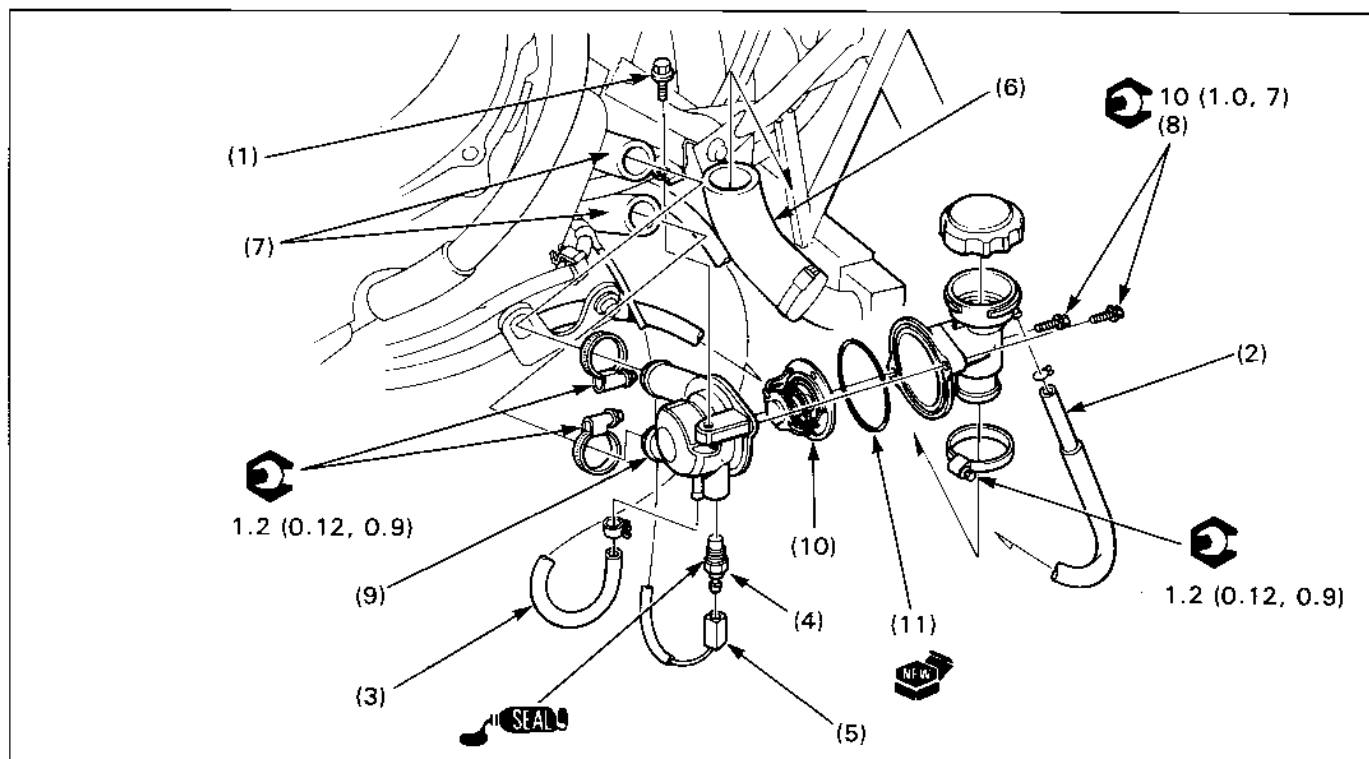


## Requisite Service

- Right middle fairing removal/installation (page 2-8).

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Reserve tank mounting bolt	2	
(2) Radiator overflow tube	1	
(3) Breather tube	1	
(4) Reserve tank	1	

## Thermostat Removal/Installation



### Requisite Service

- Upper fairing removal/installation (page 2-9)
- Coolant draining (page 6-4)
- 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) Mounting bolt	1	
(2) Radiator overflow tube	1	
(3) Bypass tube	1	
(4) Thermo sensor	1	Apply sealant to threads when installing.
(5) Thermo sensor wire connector	1	
(6) Radiator hose	1	
(7) Water hose	2	
(8) Thermostat case bolt	2	
(9) Thermostat case	1	
(10) Thermostat	1	
(11) O-ring	1	



# 8. Cylinder Head

<b>Service Information</b>	<b>8-1</b>	<b>Cylinder Head Removal/Installation</b>	<b>8-4</b>
<b>Troubleshooting</b>	<b>8-1</b>	<b>Cylinder Head Disassembly/Assembly</b>	<b>8-8</b>
<b>Cylinder Head Cover Removal/Installation</b>	<b>8-2</b>	<b>Timing Belt Pulley Removal/Installation</b>	<b>8-10</b>
<b>Timing Belt Cover Removal/Installation</b>	<b>8-3</b>		

## Service Information

- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling the cylinder head.
- Clean all disassembled parts with clean solvent and dry them by blowing them off compressed air before inspection.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their proper locations.
- Take care not to damage the cylinder walls and pistons.
- If valve seat cutting is required, a commercially available cutting set is recommended.

8

## Troubleshooting

- Engine top-end problems usually affect engine performance. These can be diagnosed by a compression or leak down test, or by tracing noises to the top-end with a sounding rod or stethoscope.
- If performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smokey, check for a seized piston ring.

### Compression too low, hard starting or poor performance at low speed

- Valves
  - Incorrect valve clearance
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
  - Sticking valve
- Cylinder head
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head

### Excessive noise

- Incorrect valve clearance
- Sticking or broken valve spring
- Damaged or worn camshaft
- Loose or damaged timing belt
- Weak or damaged belt tensioner
- Damaged timing belt pulleys

### Rough idle

- Low cylinder compression

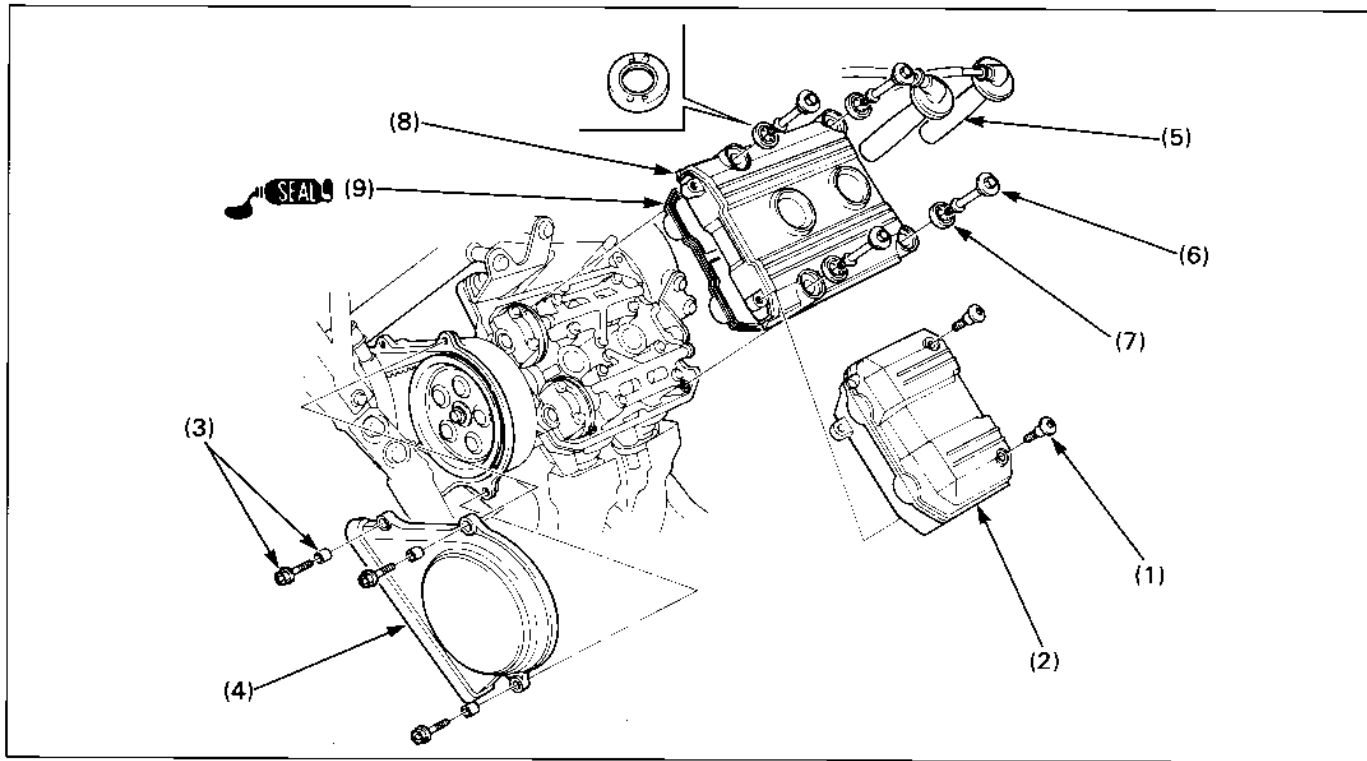
### Compression too high, overheating or knocking

- Excessive carbon build-up in cylinder head or combustion chamber

### Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal

# Cylinder Head Cover Removal/Installation

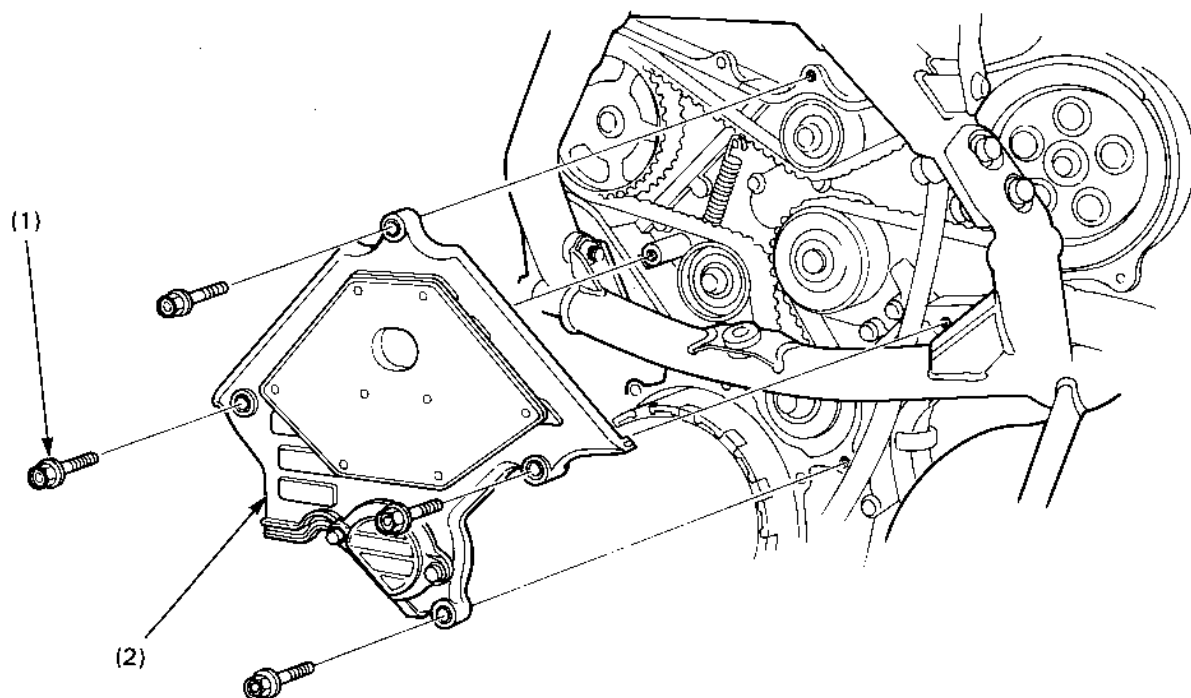


## Requisite Service

- Upper fairing removal/installation (page 2-9)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.  Install with the "UP" mark facing up. The right head cover has the oil filler cap.
(1)	Bolt	2	
(2)	Front head cover	1	
(3)	Bolt/collar	3/3	
(4)	Reduction holder cover	1	
(5)	Spark plug cap	2	
(6)	Cylinder head cover bolt	4	
(7)	Washer	4	
(8)	Cylinder head cover	1	
(9)	Gasket	1	

# Timing Belt Cover Removal/Installation

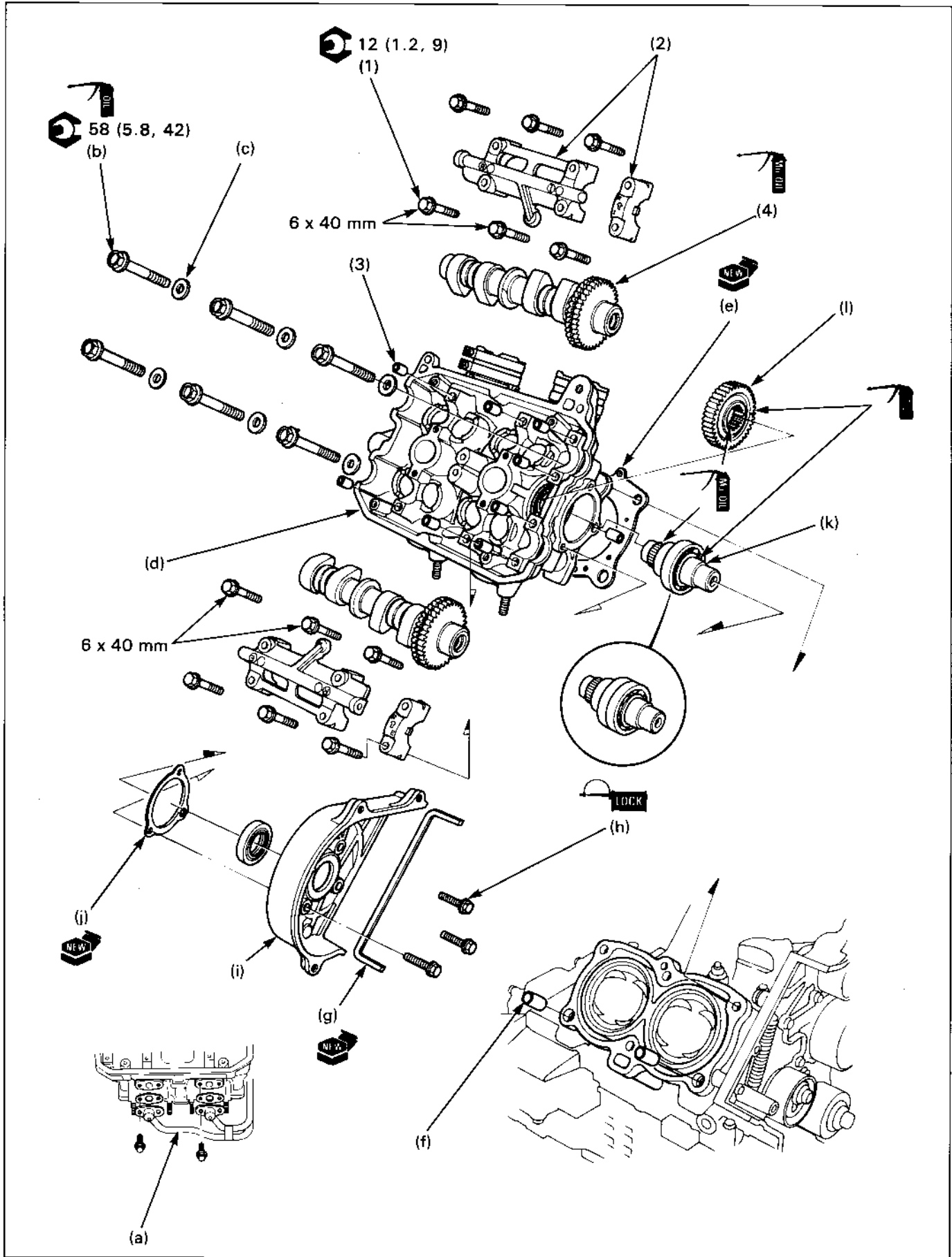


## Requisite Service

- Radiator removal/installation (page 6-5)
- Reduction holder cover removal/installation (page 8-2)
- Clutch cover removal/installation (page 9-6)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Bolt	4	
(2)	Timing belt cover	1	

# Cylinder Head Removal/Installation



## NOTE

- The camshaft can be removed with the timing belt driven pulley installed and without removing the carburetors and exhaust pipe. The timing belt driven pulley, carburetors and exhaust pipe must be removed to remove the cylinder head.
- Before removing the right cylinder camshaft, align the index line on the driven pulley with the index mark on the reduction holder. Before removing the left cylinder camshaft, align the punch mark on the driven pulley with the index mark on the reduction holder.
- For camshaft installation, see page 8-6.

## Requisite Service

- Cylinder head cover removal/installation (page 8-2)
- Timing belt driven pulley removal/installation (page 8-10)
- Carburetor removal/installation (page 5-3)
- Exhaust pipe removal/installation (page 2-18)

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Camshaft holder bolt 6 x 40 mm	4	Install in the positions shown on page 8-4
	6 x 45 mm	8	
(2)	Camshaft holder	4	Installation (page 8-6) At installation, apply molybdenum disulfide oil to the bearing and lobe surfaces (see page 8-6)
(3)	Dowel pin	8	
(4)	Camshaft	2	
(a)	Air injection pipe (U.S.A only)	2	
(b)	Cylinder head bolt	6	
(c)	Washer	6	
(d)	Cylinder head	1	
(e)	Cylinder head gasket	1	
(f)	Dowel pin	2	
(g)	Cam reduction holder gasket	1	
(h)	Bolt	3	
(i)	Cam reduction holder	1	
(j)	Gasket	1	
(k)	Cam reduction gear shaft	1	<ul style="list-style-type: none"> <li>• The shaft for the right cylinder has a single bearing and the one for the left cylinder has a double bearing.</li> <li>• Align the wide tooth with the wide groove (punch mark) of the reduction gear.</li> </ul>
(l)	Cam reduction gear	1	

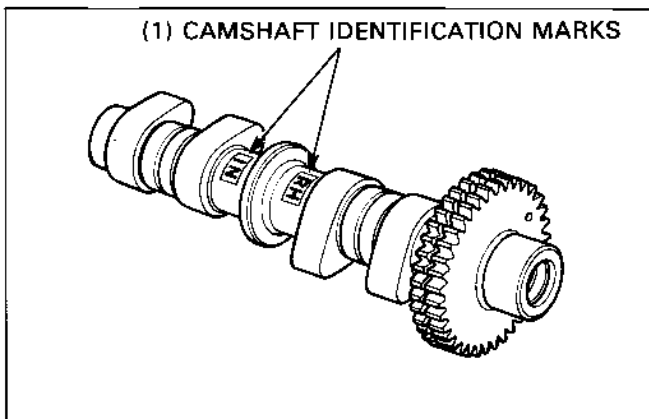
# Cylinder Head

## Camshaft Installation

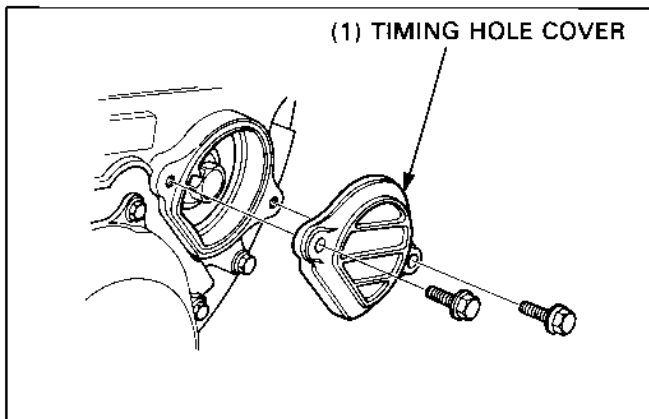
Lubricate the camshaft journals, cam lobes and driven gears with a mixture of engine oil and molybdenum disulfide grease in a 1:1 ratio.

### NOTE

- Each camshaft has the identification marks shown below.
  - Right intake camshaft: RH IN
  - Right exhaust camshaft: RH EX
  - Left intake camshaft: LH IN
  - Left exhaust camshaft: LH EX

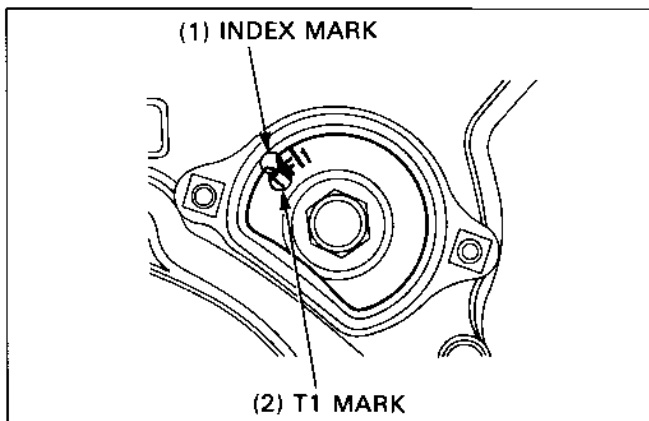


Remove the two bolts and timing hole cover.

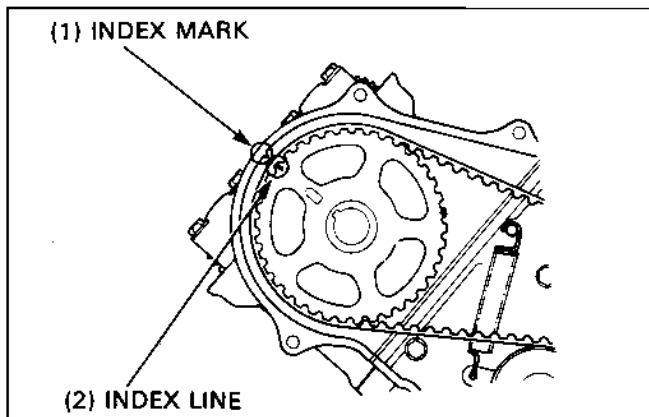


### Right cylinder head:

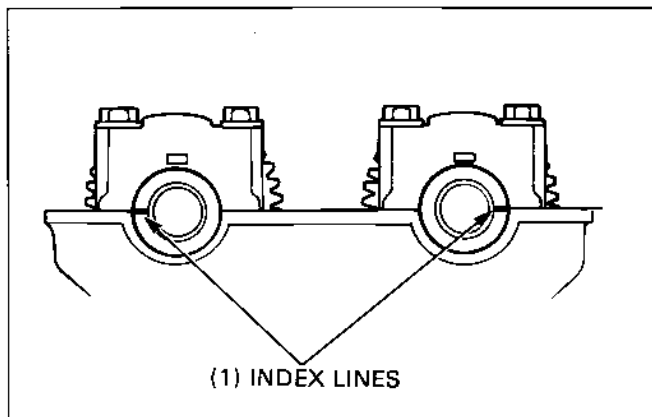
Turn the crankshaft clockwise and align the T1 Mark on the drive pulley guide plate with the Index Mark on the timing cover.



Make sure that the Index Line on the driven pulley aligns with the Index Mark on the reduction holder. If not, turn the crankshaft clockwise one full turn and realign the T1 Mark with the Index Mark.



Install the intake and exhaust camshafts so that the Index Lines on the end of the shafts are facing outward and that they align with the top of the cylinder head as shown.

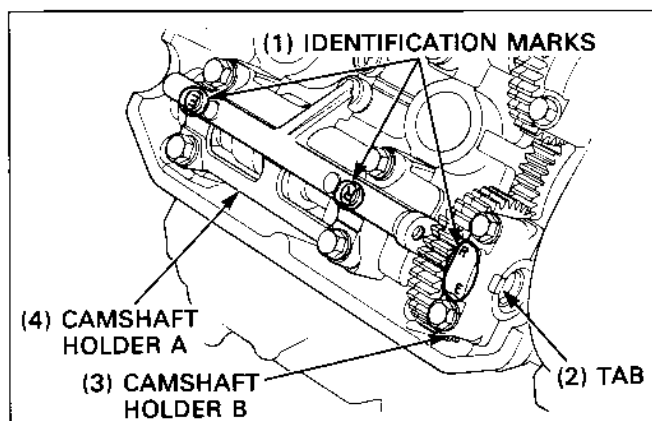


(1) INDEX LINES

Install the dowel pins and camshaft holders.

#### NOTE

- Each camshaft holder has the identification marks shown below.
  - Right intake camshaft holder: R I
  - Right exhaust camshaft holder: R E
  - Left intake camshaft holder: L I
  - Left exhaust camshaft holder: L E
- Install camshaft holder B with its tab facing out as shown.

(4) CAMSHAFT  
HOLDER A(3) CAMSHAFT  
HOLDER B

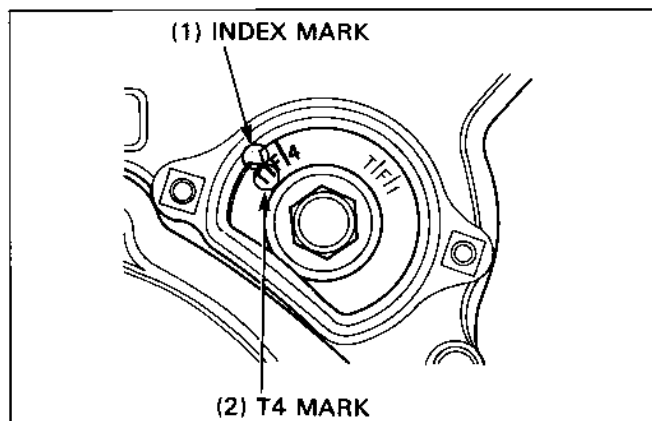
(2) TAB

#### Left cylinder head:

Turn the crankshaft clockwise and align the T4 Mark on the drive pulley guide plate with the Index Mark on the timing belt cover.

#### NOTE

- If the right camshaft has been removed, install it first, then turn the crankshaft clockwise 1-1/4 turns (450 degrees) and align the T4 Mark with Index Mark.

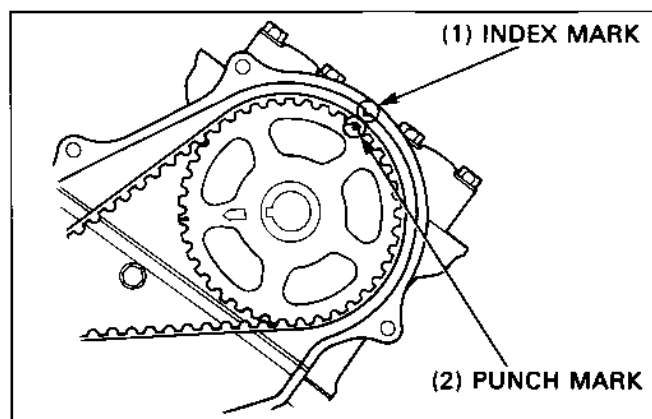


(1) INDEX MARK

(2) T4 MARK

Make sure that the Punch Mark on the driven pulley aligns with the Index Mark on the reduction holder. If not, turn the crankshaft clockwise one full turn and realign the T4 Mark with the Index Mark.

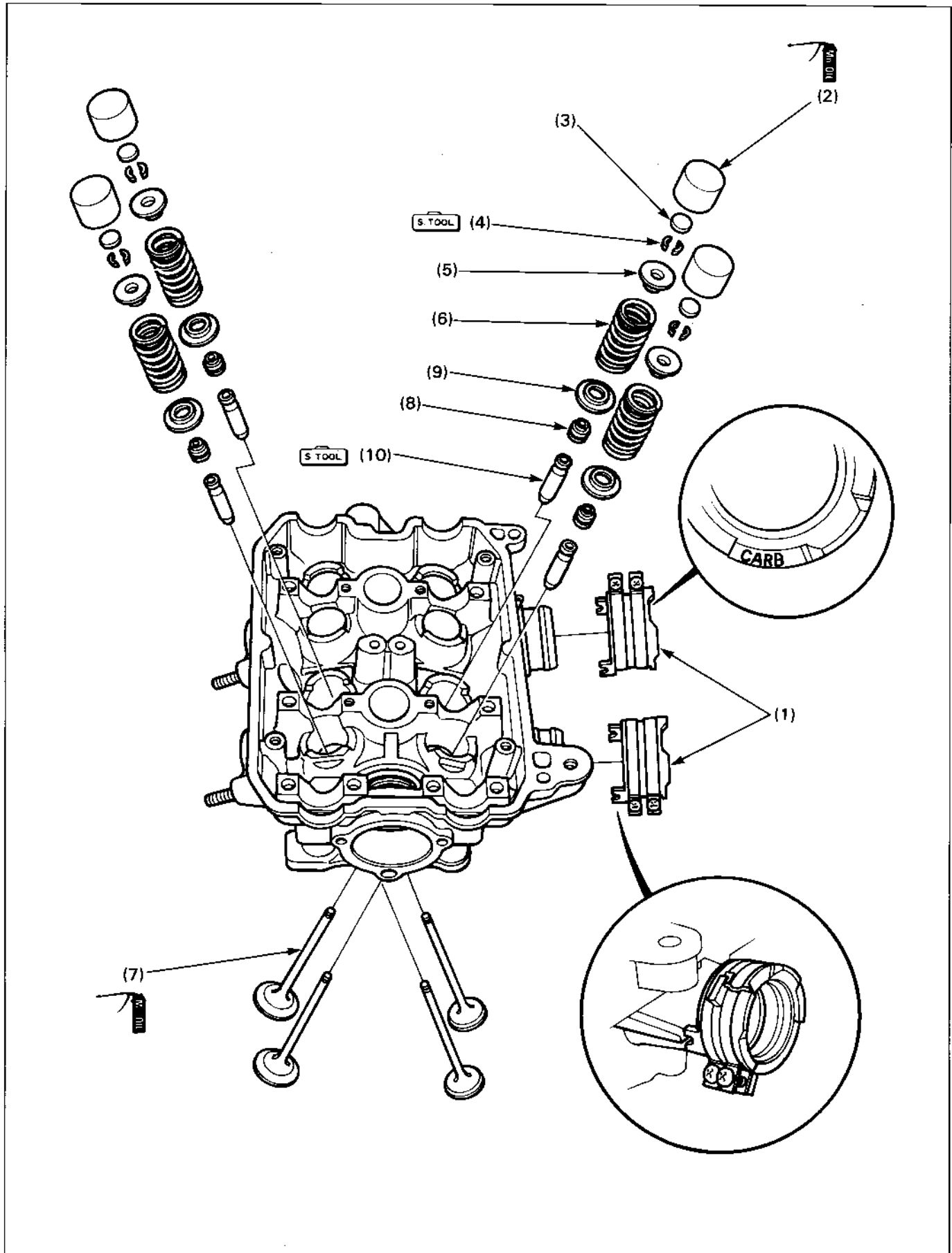
Install the intake and exhaust camshafts, and camshaft holders in the same manner as the right camshaft installation.



(1) INDEX MARK

(2) PUNCH MARK

# Cylinder Head Disassembly/Assembly





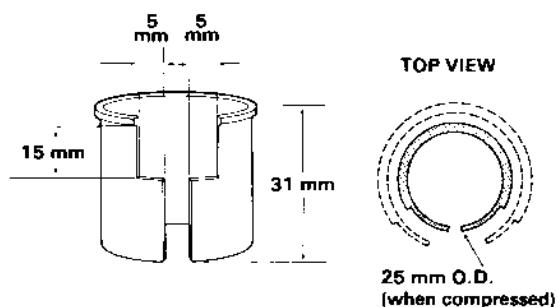
## NOTE

- The valve lifter and valve adjusting shim can be removed with the cylinder head installed. Refer to page 3-5 for the shim replacement.
- Mark all parts during disassembly so they can be placed back in their original position.

## Requisite Service

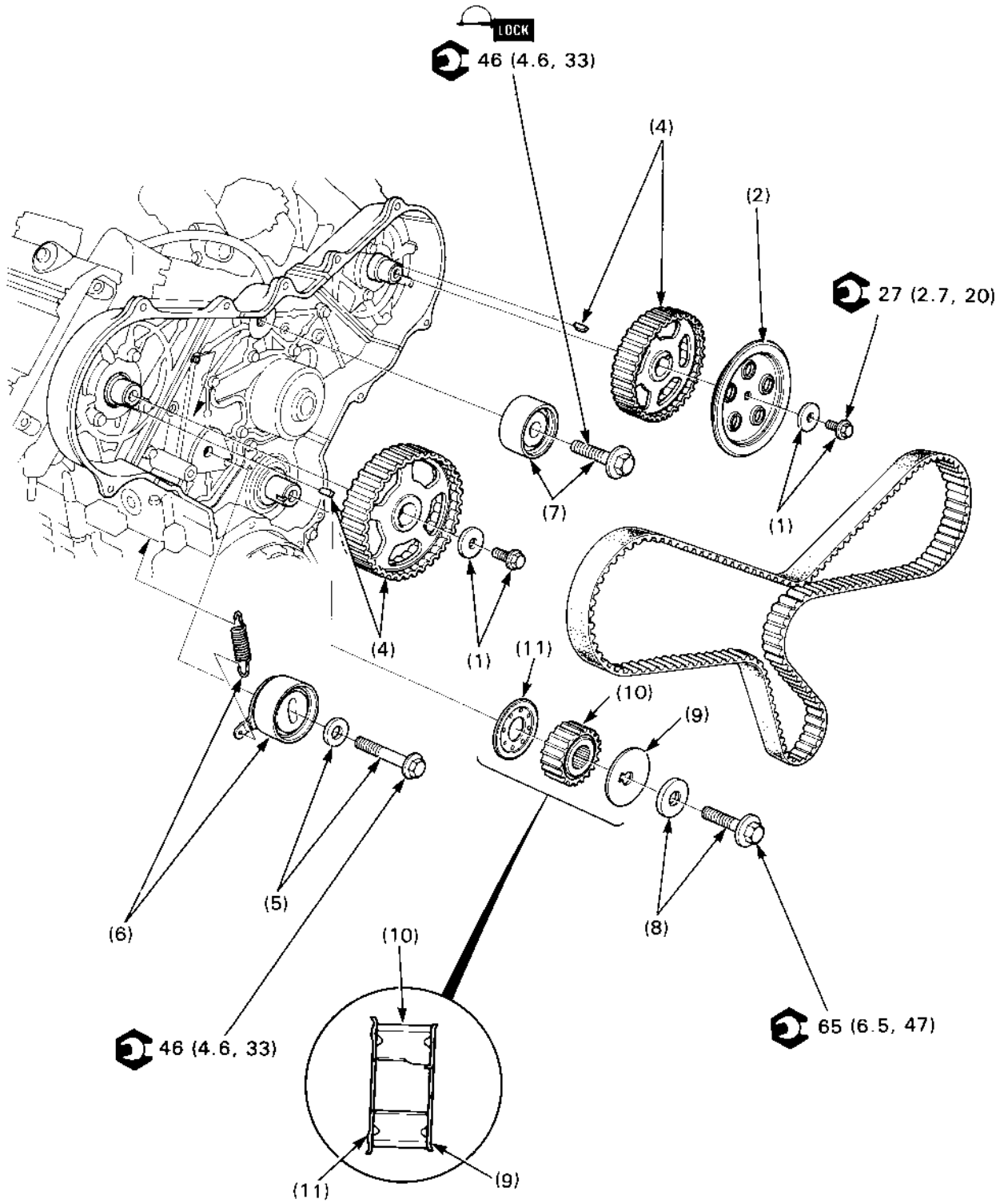
- Cylinder head removal/installation (page 8-4)

Procedure	Q'ty	Remarks
(1) <b>Disassembly Order</b> Carburetor insulator	2	Assembly is in the reverse order of disassembly. Install with the "CARB" mark facing to the carburetor and align the grooves with the lugs on the cylinder head.
(2) Valve lifter	8	<b>NOTE:</b> • Remove using a handlapping tool. Do not damage the cylinder head bucket sliding surface.
(3) Valve adjusting shim	8	
(4) Valve spring cotter	16	Use valve spring compressor (07757-0010000) with valve spring compressor attachment (07959-KM30101) and tappet hole protector (07HMG-MR70001) Not Available in U.S.A., to make equivalent tool, see below.
(5) Valve spring retainer	8	
(6) Valve spring	8	Install with the narrow pitch end facing down.
(7) Valve	8	
(8) Valve stem seal	8	
(9) Valve spring seat	8	
(10) Valve guide	8	Use valve guide driver (07HMD-ML00100 or 07HMD-ML00101).



Tappet hole protector; an equivalent tool can be made from a plastic 35 mm film container using the measurements shown above.

# Timing Belt Pulley Removal/Installation



## NOTE

- Perform the timing belt service while the engine is cold.

**Requisite Service**

- Timing belt cover removal/installation (page 8-3)
- Spark plug removal/installation

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Drive pulley bolt/washer	2/2	Hold the drive pulley bolt when loosening and tightening the driven pulley bolt.
(2)	Driven pulley guide	1	
(3)	Timing belt	1	Removal/installation (page 8-12)
(4)	Driven pulley/woodruff key	2/2	
(5)	Timing belt tensioner bolt/washer	1/1	
(6)	Tensioner roller/spring	1/1	
(7)	Idle pulley bolt/pulley	1/1	
(8)	Drive pulley bolt/washer	1/1	Hold the crankshaft by placing the transmission in 5th gear and applying the rear brake when loosening and tightening the drive pulley bolt.
(9)	Guide plate A	1	Install with the groove aligned with the woodruff key on the crankshaft.
(10)	Drive pulley	1	
(11)	Guide plate B	1	Install the guide plates with the flat side toward the drive pulley.

## Timing Belt Removal/Installation

### NOTE

- Perform this service while the engine is cold.
- For easy servicing, remove the spark plugs.

### CAUTION

- **Be careful not to contaminate the timing belt with oil etc.**
- **Do not bend the timing belt excessively.**

### Removal

Hold the crankshaft and remove the left driven pulley bolt, washer and guide.

Loosen the timing belt tensioner bolt 1/4—1/2 turn. Release the tensioner by turning the crankshaft counterclockwise while holding the right driven pulley, and temporarily tightening the tensioner bolt.

Turn the crankshaft clockwise and align the T1 Mark on the drive pulley guide plate with the Index Mark on the crankcase.

### CAUTION

- **When align the T1 Mark with the Index Mark, be sure that the Punch Mark on the drive pulley guide plate aligns with the Projection on the crankcase, too.**

Remove the timing belt from the pulleys.

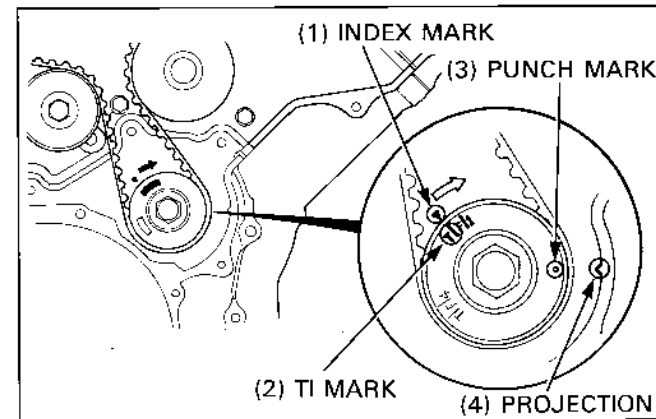
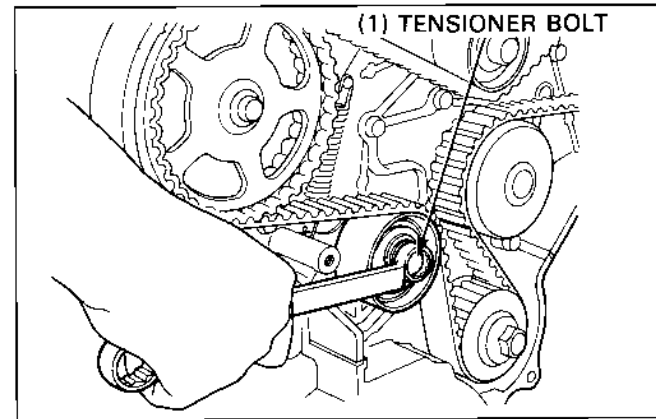
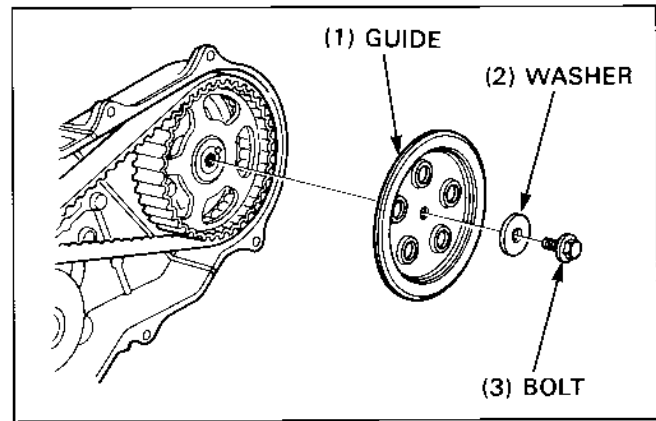
### CAUTION

- **Do not turn the camshafts after removing the timing belt or you may damage the valves and piston domes.**

### Installation

### NOTE

- When the camshafts are removed, install the camshaft first (page 8-6), then install the timing belt.
- Before installing the timing belt, move the tensioner pulley to the fully released position and temporarily tighten the tensioner bolt.



Align the T1 Mark on the drive pulley guide plate with the Index Mark on the crankcase.

#### CAUTION

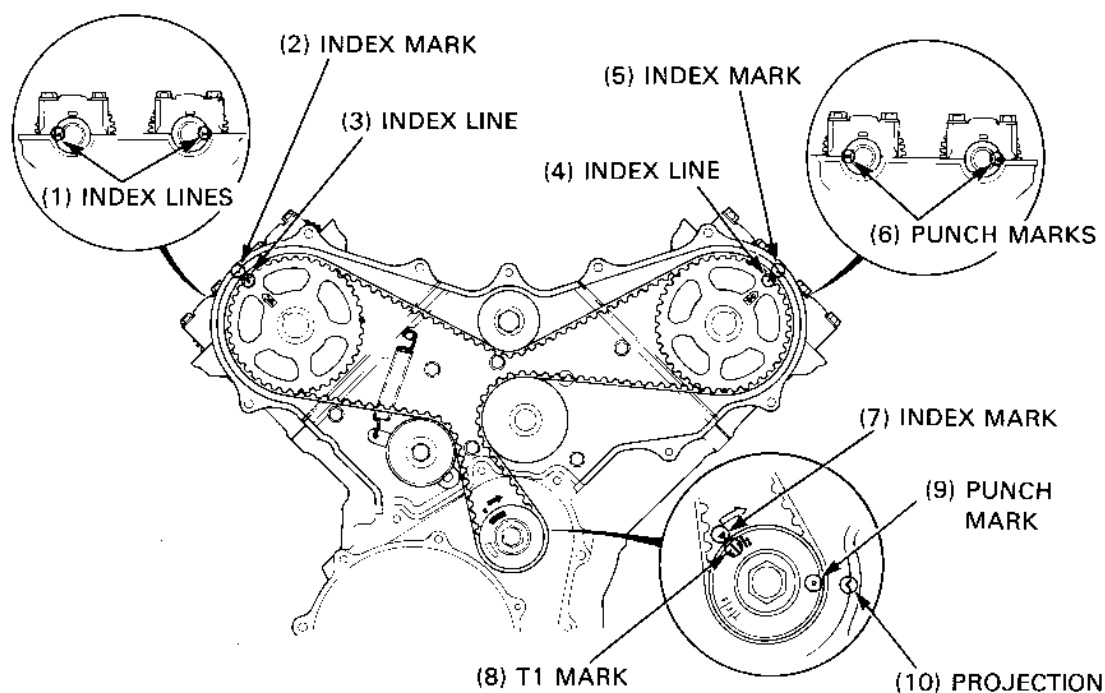
- When align the T1 Mark with the Index Mark, be sure that the Punch Mark on the drive pulley guide plate aligns with the Projection on the crankcase, too.

Align the Index Lines on the driven pulley with the Index Marks of the reduction holders.

#### NOTE

- When the Index Line is aligned with the Index Mark:
  - on right cylinder head, the Index Lines on the camshaft end are facing outward and align with the top of the cylinder head.
  - on left cylinder, the Punch Marks on the camshaft end are facing outward and align with the top of the cylinder head.

Install the timing belt on the drive pulley, next on the left driven pulley, then on the right driven pulley.



Install the left driven pulley guide, washer and bolt, and tighten the bolt while holding the crankshaft.

**Torque: 27 N·m (2.7 kg-m, 20 ft-lb)**

Loosen the timing belt tensioner bolt to apply the tension to the belt. Then turn the crankshaft 2 to 4 full turns to stabilize the belt run, and tighten the bolt.

**Torque: 46 N·m (4.6 kg-m, 33 ft-lb)**

When installing a new belt, apply initial tension to the belt as follows:

## Cylinder Head

Loosen the tensioner bolt.

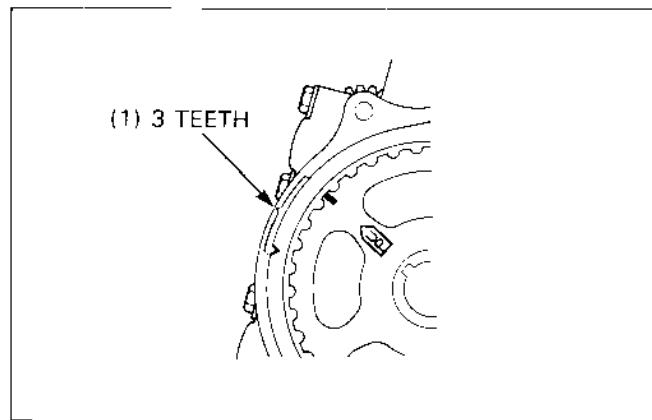
Turn the crankshaft clockwise 2 to 4 full turns, and align the T1 Mark with the Index Mark. (The Index Lines on the driven pulleys must align with the Index Marks.)

### CAUTION

- **When align the T1 Mark with the Index Mark, be sure that the Punch Mark on the drive pulley guide plate aligns with the Projection on the crankcase, too.**

Then turn the crankshaft clockwise 3 teeth further and tighten the tensioner bolt.

Torque: 46 N·m (4.6 kg-m, 33 ft-lb)



<b>Service Information</b>	<b>9-1</b>	<b>Clutch Slave Cylinder Removal/Installation</b>	<b>9-4</b>
<b>Troubleshooting</b>	<b>9-1</b>	<b>Clutch Disassembly/Assembly</b>	<b>9-6</b>
<b>Clutch Master Cylinder Disassembly/Assembly</b>	<b>9-2</b>		

## Service Information

- DOT 4 brake fluid is used for the hydraulic clutch and is referred to as clutch fluid in this section. Do not use other types of fluid as they are not compatible.
- Engine oil viscosity and level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the vehicle creeps with clutch disengaged, inspect the engine oil for proper level and the presence of additives before servicing the clutch system.
- Clutch maintenance can be done with the engine in the frame.

## Troubleshooting

### Clutch lever soft or spongy

- Air in hydraulic system
- Low fluid level
- Leaking hydraulic system

### Clutch slips

- Sticking hydraulic system
- Worn discs
- Weak clutch springs
- Hydraulic system clogged
- Oil additive used

### Clutch will not disengage or motorcycle creeps with clutch disengaged

- Warped plate
- Loose clutch lock nut
- Oil level too high, improper oil viscosity or oil additive used
- Air in hydraulic system
- Low fluid level
- Leaking or sticking hydraulic system

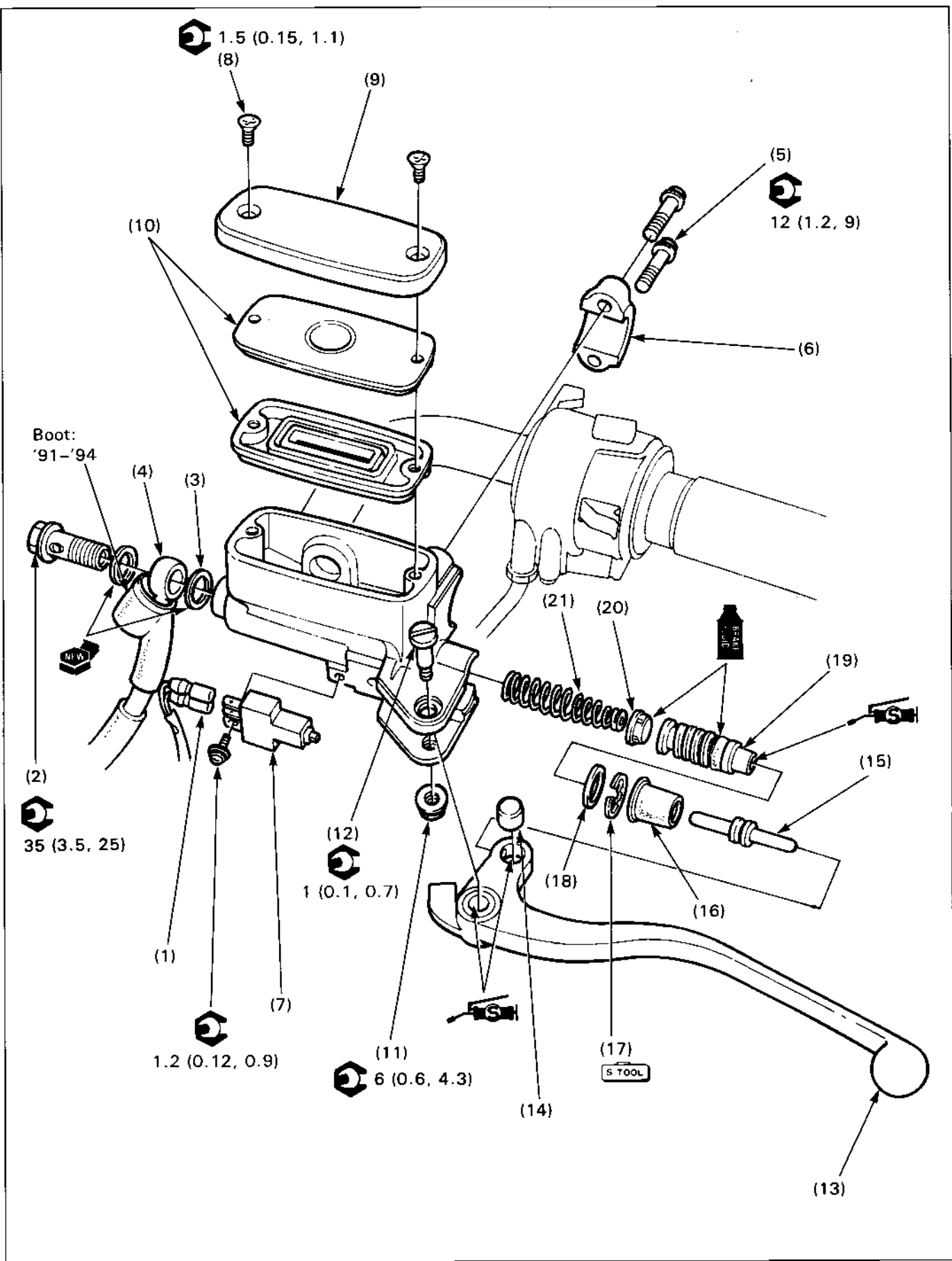
### Clutch lever too hard

- Sticking master piston
- Sticking slave cylinder piston
- Clogged hydraulic system

### Clutch operation feels rough

- Rough clutch outer slots
- Sticking master piston
- Sticking slave cylinder piston

# Clutch Master Cylinder Disassembly/Assembly





**CAUTION**

- Avoid spilling hydraulic clutch 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 clutch hose to prevent contamination. Do not allow the foreign material to enter the system.
- Handle the master piston, spring, primary cup and secondary cup as a set.
- Do not allow the lips of the master cylinder cups to turn inside out and be certain the snap ring is firmly seated in the groove.

**NOTE**

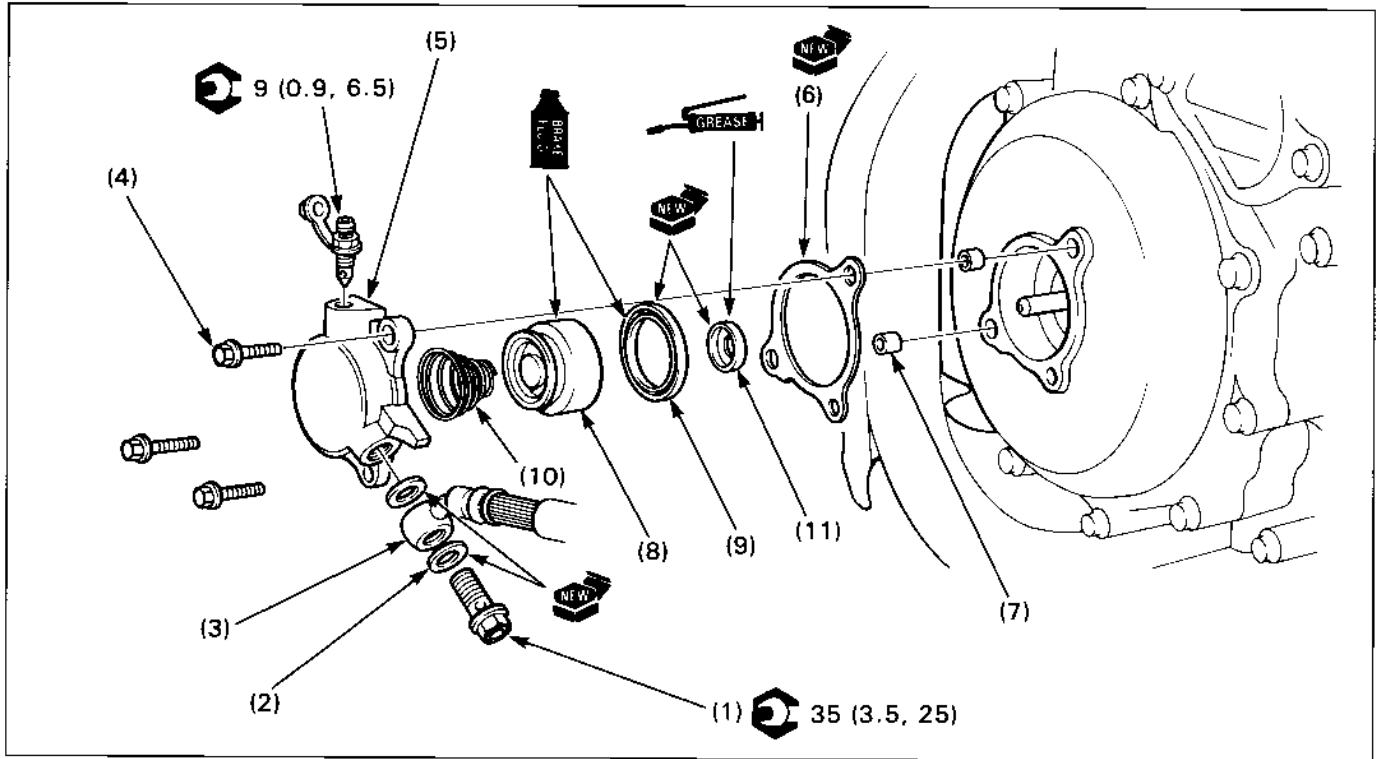
- Use only DOT 4 brake fluid from a sealed container.

**Requisite Service**

- Clutch fluid draining

Procedure		Q'ty	Remarks
	<b>Removal</b>		Installation is in the reverse order of removal.
(1)	Clutch switch wire	2	
(2)	Oil bolt	1	
(3)	Sealing washer	2	
(4)	Clutch hose	1	
(5)	Master cylinder holder bolt	1	
(6)	Master cylinder holder	1	Remove the master cylinder assembly from the handlebar.
(7)	Clutch switch	1	
(8)	Reservoir cap screw	2	
(9)	Reservoir cap	1	
(10)	Set plate/diaphragm	1/1	
(11)	Clutch lever pivot nut	1	
(12)	Clutch lever pivot screw	1	
(13)	Clutch lever	1	
(14)	Push rod end piece	1	
(15)	Push rod	1	
(16)	Boot	1	
(17)	Snap ring	1	Use snap ring pliers (07914—3230001).
(18)	Washer	1	
(19)	Master piston	1	
(20)	Primary cup	1	
(21)	Spring	1	

## Clutch Slave Cylinder Removal/Installation



## CAUTION

- Avoid spilling hydraulic clutch 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 clutch hose to prevent contamination. Do not allow the foreign material to enter the system.

## NOTE

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

## Requisite Service

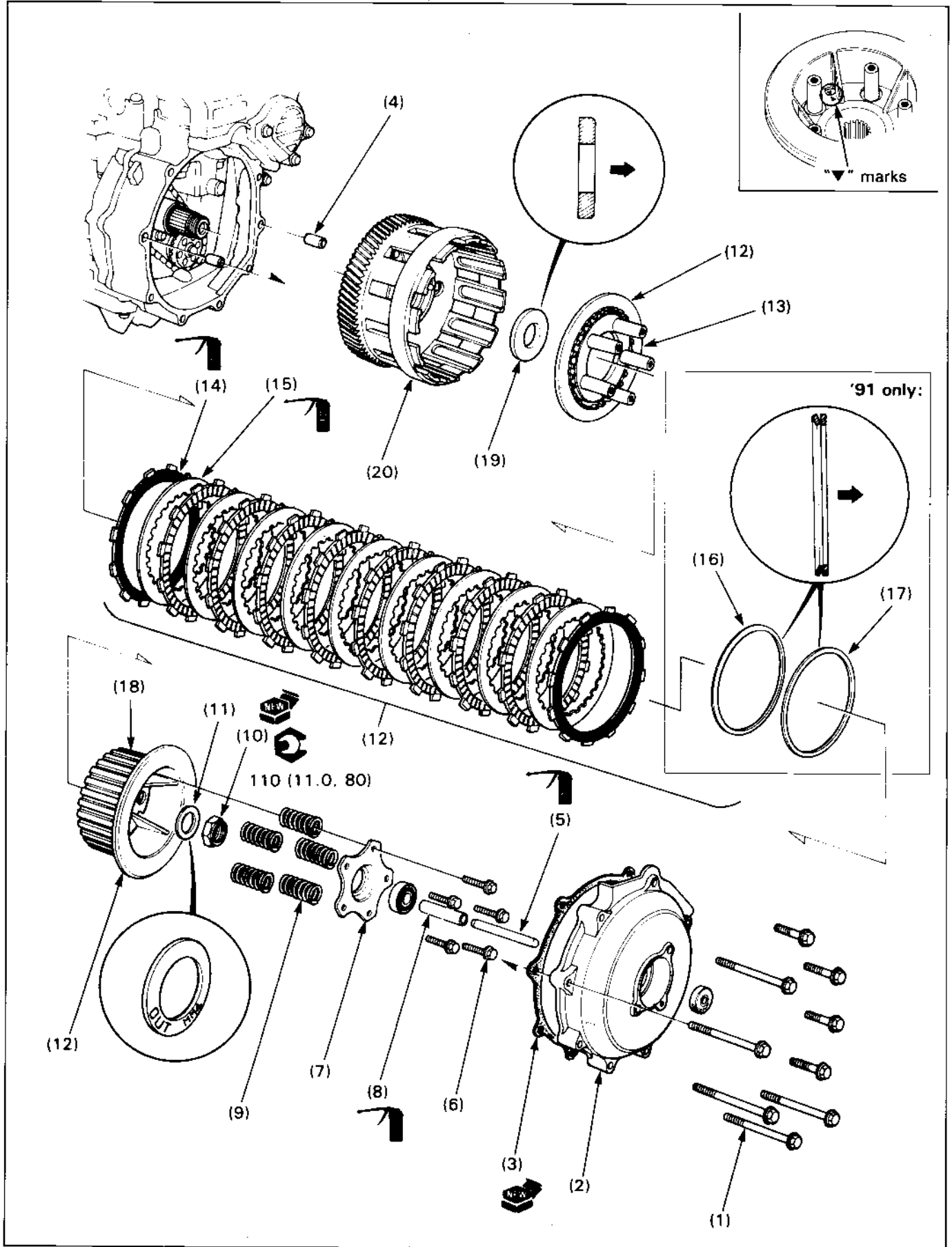
- Lower fairing removal/installation (page 2-4)
- Clutch fluid draining

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Oil bolt	1	
(2) Sealing washer	2	
(3) Clutch hose	1	
(4) Mounting bolt	3	
(5) Slave cylinder assembly	1	
(6) Gasket	1	
(7) Dowel pin	2	
(8) Slave cylinder piston	1	If piston removal is difficult, wrap the slave cylinder with a shop towel and apply compressed air to the fluid inlet to remove the piston.
(9) Piston seal	1	
(10) Spring	1	
(11) Oil seal	1	

---

**MEMO**

# Clutch Disassembly/Assembly



## NOTE

- It is not necessary to disconnect the clutch hydraulic system for clutch disassembly/assembly.

## Requisite Service

- Engine oil draining
- Clutch slave cylinder removal/installation (page 9-4)
- Right exhaust pipe removal/installation (page 2-18)

Procedure		Q'ty	Remarks
	<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1)	Clutch cover bolt	9	
(2)	Clutch cover	1	
(3)	Gasket	1	
(4)	Dowel pin	2	
(5)	Lifter rod	1	
(6)	Lifter plate bolt	5	<b>NOTE:</b> • After tightening the bolts, check that the lifter rod guide rotates smoothly.
(7)	Lifter plate	1	
(8)	Lifter rod guide	1	Remove from the lifter plate.
(9)	Clutch spring	5	
(10)	Lock nut	1	Removal/installation (page 9-8)
(11)	Lock washer	1	Install with the "OUT" mark facing out.
(12)	Clutch assembly	1	
(13)	— pressure plate	1	At installation, align the "▼" marks on the pressure plate and clutch center as shown.
(14)	— clutch disc	10	
(15)	— clutch plate	9	
(16)	—judder spring '91 only:	1	At installation, install with the convex side facing to the pressure plate as shown.
(17)	—spring seat '91 only:	1	
(18)	— clutch center	1	
(19)	— Washer	1	At installation, install with the chamfered side facing out.
(20)	Clutch outer	1	Installation (page 9-8)

## Clutch

### Clutch Lock Nut Removal/Installation

#### Removal

Unstake the clutch lock nut with a drill or grinder. Using the special tools, place a collar in each of the slots marked with a "5" on the tool.

Install the clutch center holder by aligning the collars in the slots so they fit over the bosses in the clutch center. Using a 17 mm wrench, tighten the collar nuts in position. Secure the holder to the clutch center using the clutch spring bolts.

Hold the clutch center with the clutch center holder and remove the lock nut.

**S TOOL**

Clutch center holder	07JMB-MN50300 or 07HGB-001010B (U.S.A. only)
Clutch holder collar (3 pieces)	07LMB-MT30100 or 07MPB-764021A (U.S.A. only)
Clutch center collars "B"	
Lock nut wrench, 30 x 32 mm	07710-0020400
Extension bar	07716-0020500
	Equivalent commercially available in U.S.A.

#### Installation

Hold the clutch center with the clutch center holder as described above.

**S TOOL**

Clutch center holder	07JMB-MN50300 or 07HGB-001010B (U.S.A. only)
Clutch holder collar (3 pieces)	07LMB-MT30100 or 07MPB-764021A (U.S.A. only)
Clutch center collars "B"	
Lock nut wrench, 30 x 32 mm	07716-0020400
Extension bar	07716-0020500
	Equivalent commercially available in U.S.A.

Install a new lock nut and tighten it.

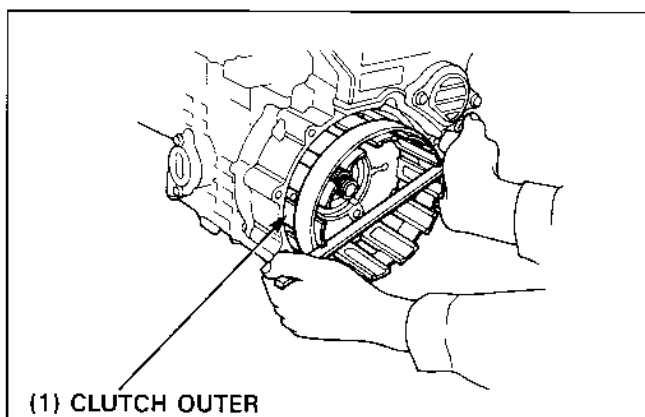
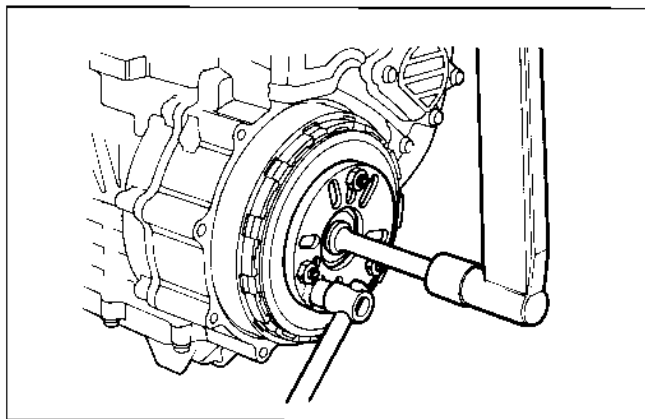
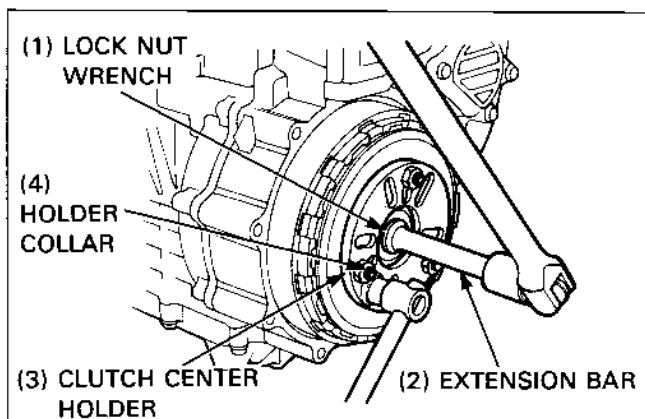
**Torque: 110 N·m (11.0 kg-m, 80 ft-lb)**

Stake the lock nut.

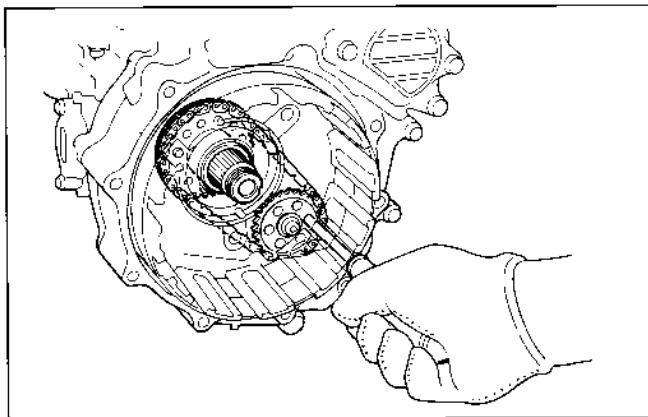
#### Clutch Outer Installation

Install the clutch outer onto the primary damper shaft and mesh it with the primary drive sub gear.

Turn the clutch outer counterclockwise while pushing inward as shown to align the primary drive sub gear teeth with the primary drive gear teeth. The clutch hub will move inward when the gear teeth align.



Turn the oil pump driven sprocket with a screwdriver as shown while pushing the clutch outer in until you feel a click. At this time, the holes in the clutch outer are aligned with the pins on the oil pump drive sprocket. Push in the clutch outer further to insert the pins into the holes.



# 10. Gearshift Linkage/Transmission

Service Information	10-1	Primary Damper Shaft Disassembly/Assembly	10-5
Troubleshooting	10-1	Transmission Removal/Installation	10-6
Gearshift Linkage Removal/Installation	10-2	Transmission Disassembly/Assembly	10-8
Transmission Unit/Primary Damper Shaft Removal/Installation	10-4		

## Service Information

- The gearshift linkage can be serviced with the engine installed in the frame.
- The transmission can be removed as a unit without separating the crankcases.

## Troubleshooting

### Hard to shift

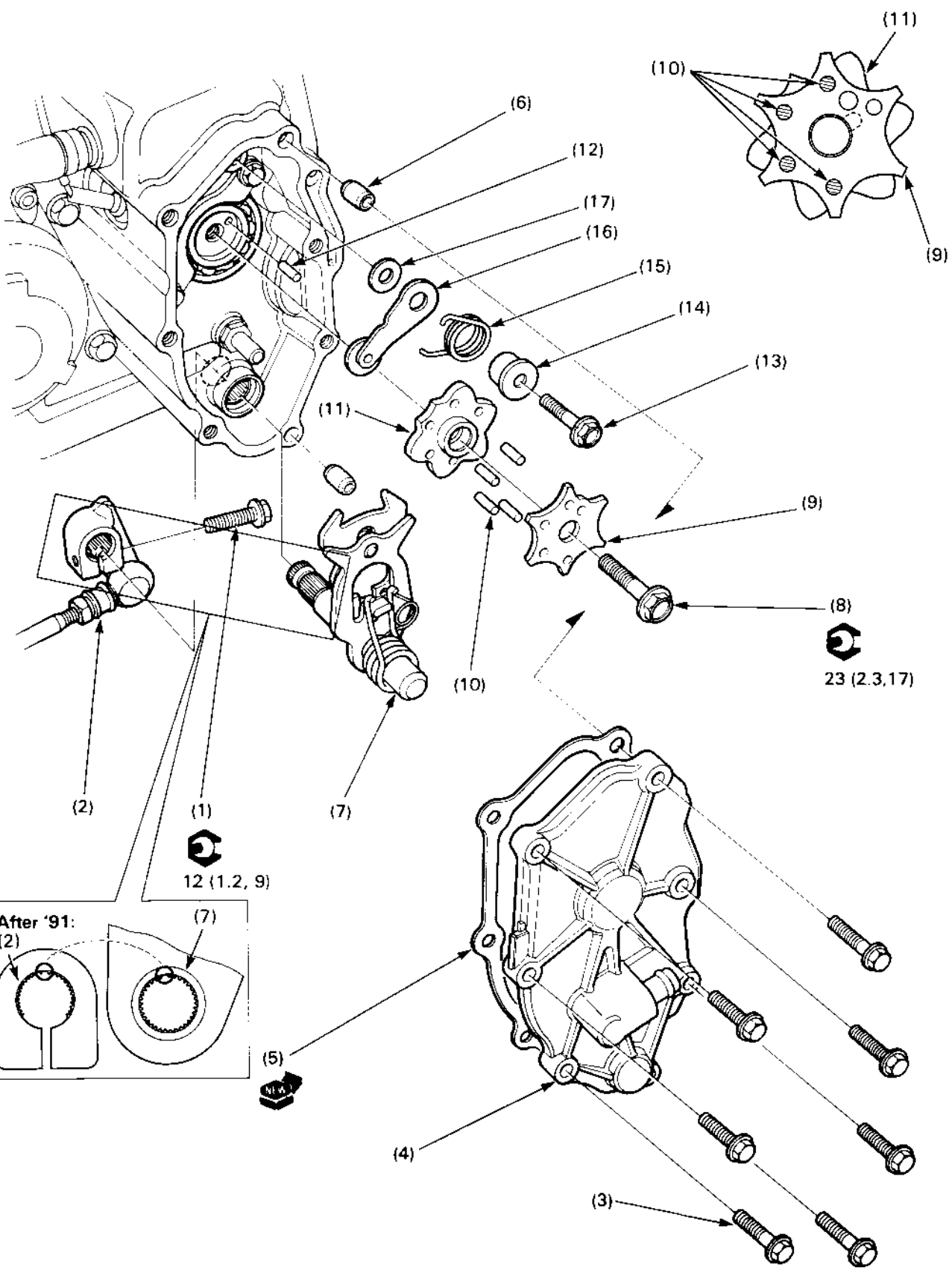
- Improper clutch operation
- Incorrect engine oil weight
- Bent shift forks
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam groove
- Bent gearshift spindle

### Transmission jumps out of gear

- Worn gear dogs or slots
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken shift linkage return spring



# Gearshift Linkage Removal/Installation

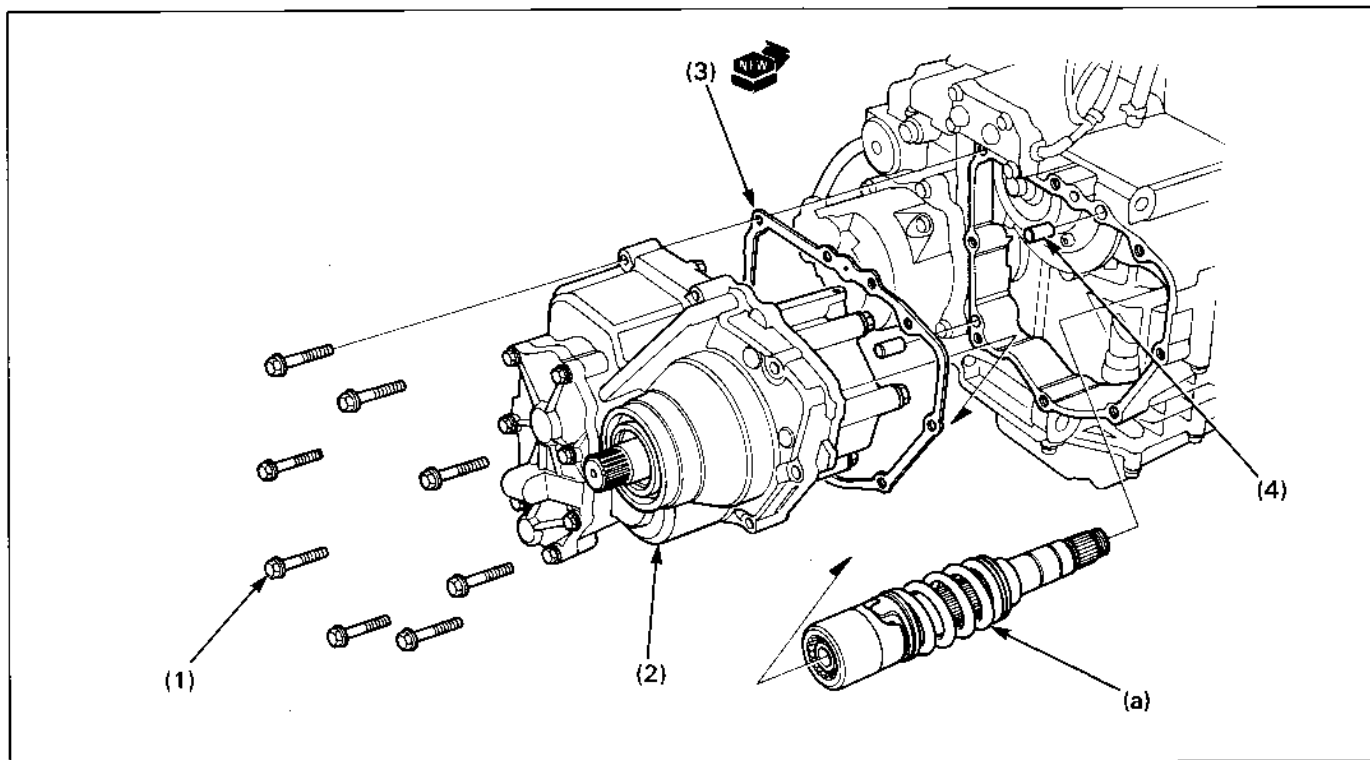


## Requisite Service

- Swingarm removal/installation (page 14-8)

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		
(1)	Gearshift arm bolt	1	Installation is in the reverse order of removal.
(2)	Gearshift arm	1	After *91: Align the wide groove on the gearshift arm with the wide tooth on the gearshift spindle.
(3)	Bolt	7	
(4)	Gearshift linkage cover	1	
(5)	Gasket	1	
(6)	Dowel pin	2	
(7)	Gearshift spindle assembly	1	Pull out the spindle while pushing the shift pawl in.
(8)	Shift drum center bolt	1	
(9)	Shift drum center plate	1	
(10)	Dowel pin	4	
(11)	Shift drum center	1	Align the groove in the shift drum center with the dowel pin.
(12)	Dowel pin	1	
(13)	Stopper arm bolt	1	
(14)	Collar	1	
(15)	Return spring	1	
(16)	Stopper arm	1	
(17)	Washer	1	

# Transmission Unit/Primary Damper Shaft Removal/Installation



**NOTE**

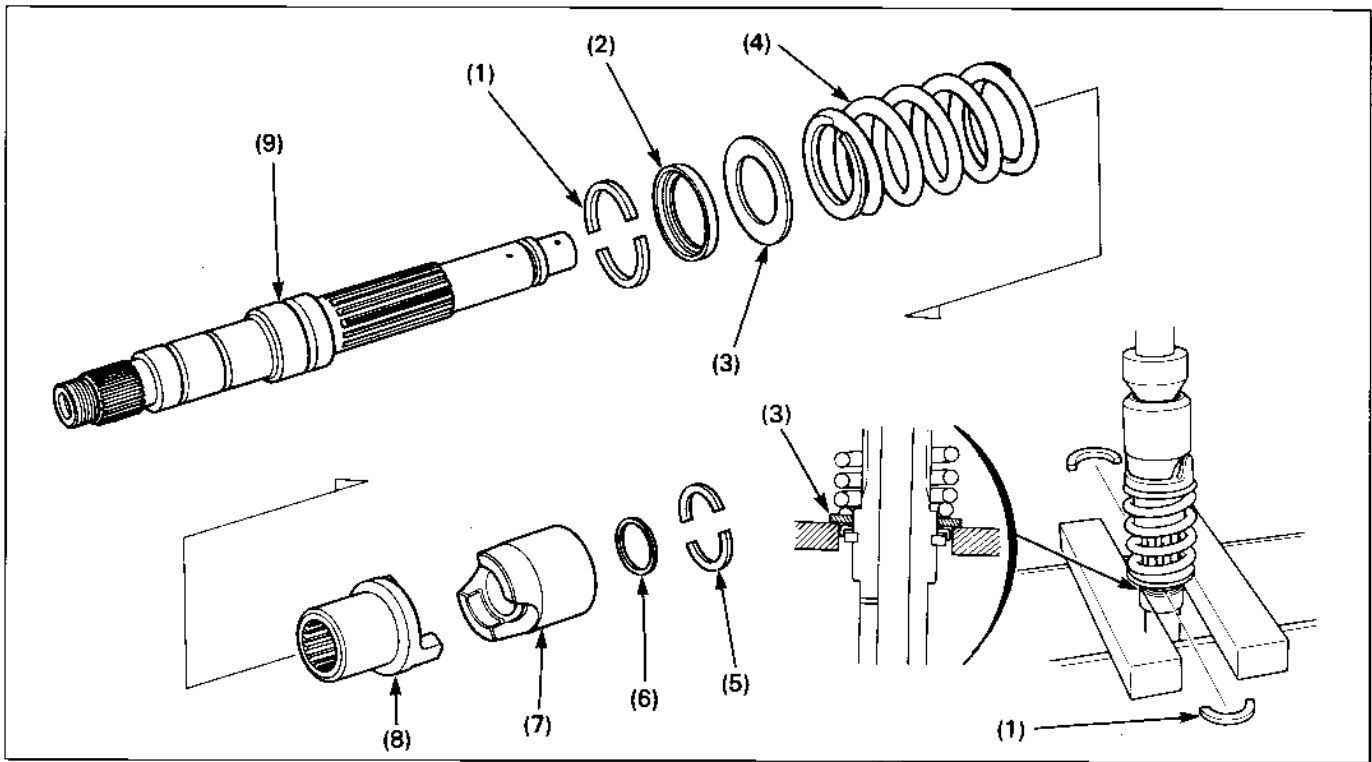
- The transmission can be removed from the engine as an unit.
- The transmission unit can be removed with the clutch installed.
- The clutch and oil pump drive sprocket must be removed to remove the primary damper shaft.

**Requisite Service**

- Engine removal/installation (page 7-2)
- Clutch disassembly/assembly (page 9-6)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Transmission unit mounting bolt	8	
(2)	Transmission unit	1	
(3)	Gasket	1	
(4)	Dowel pin	2	
(a)	Primary damper shaft	1	

# Primary Damper Shaft Disassembly/Assembly

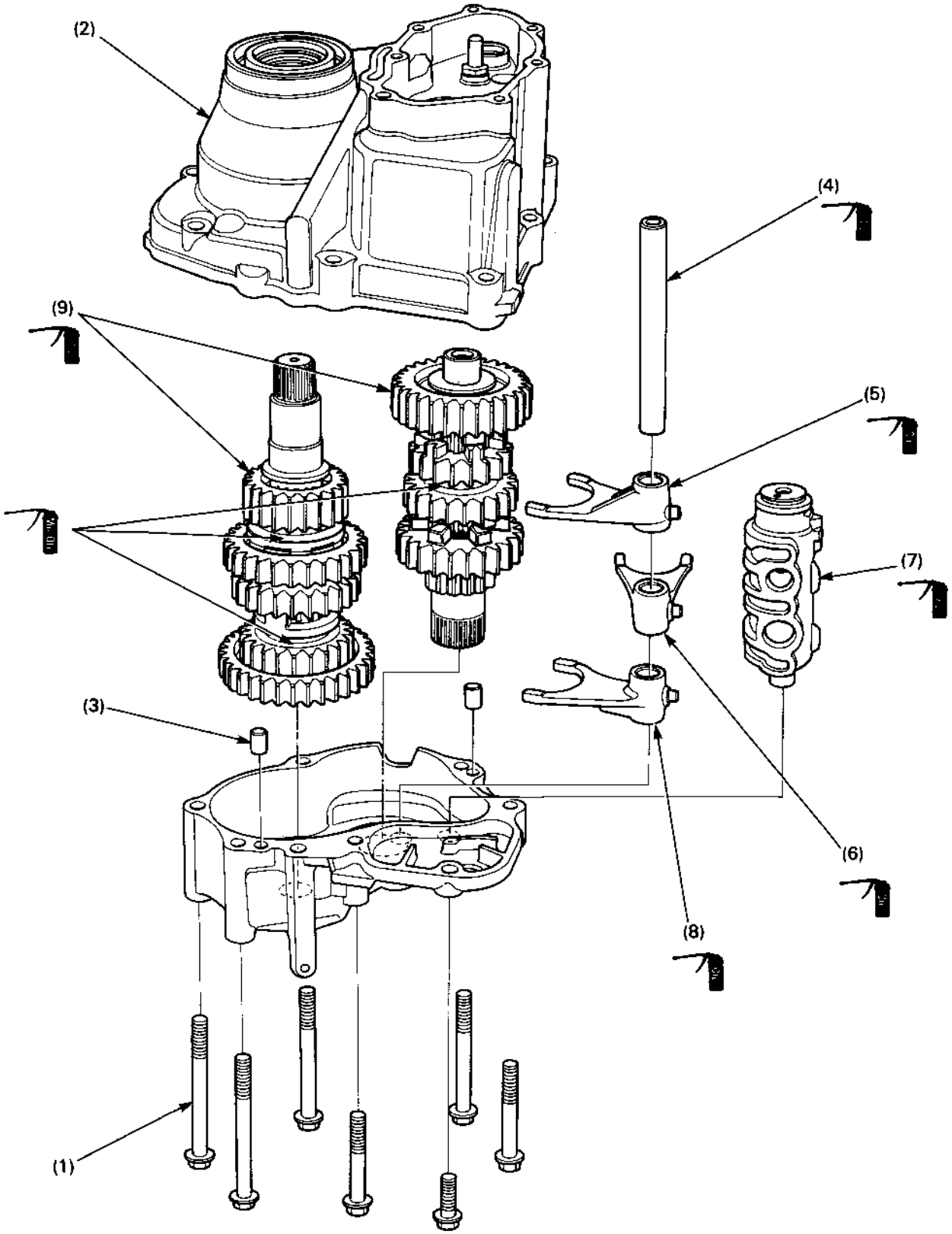


## Requisite Service

- Primary damper shaft removal/installation (page 10-4)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		
(1) Primary spring cotter	2	Assembly is in the reverse order of disassembly. Set the damper shaft assembly in a hydraulic press with the washer (3) supported. Compress the spring approx. 5 mm (0.2 in), slide the retainer (2) up and remove the cottes as shown. <b>CAUTION</b> • Do not compress the spring more than 7 mm (0.28 in).
(2) Primary spring retainer	1	
(3) Washer	1	
(4) Primary damper spring	1	Install with the small coil end facing away from the primary damper lifter as shown.
(5) Spring stopper washer	2	
(6) Washer	1	
(7) Damper cam	1	
(8) Primary damper lifter	1	
(9) Primary shaft	1	

# Transmission Removal/Installation

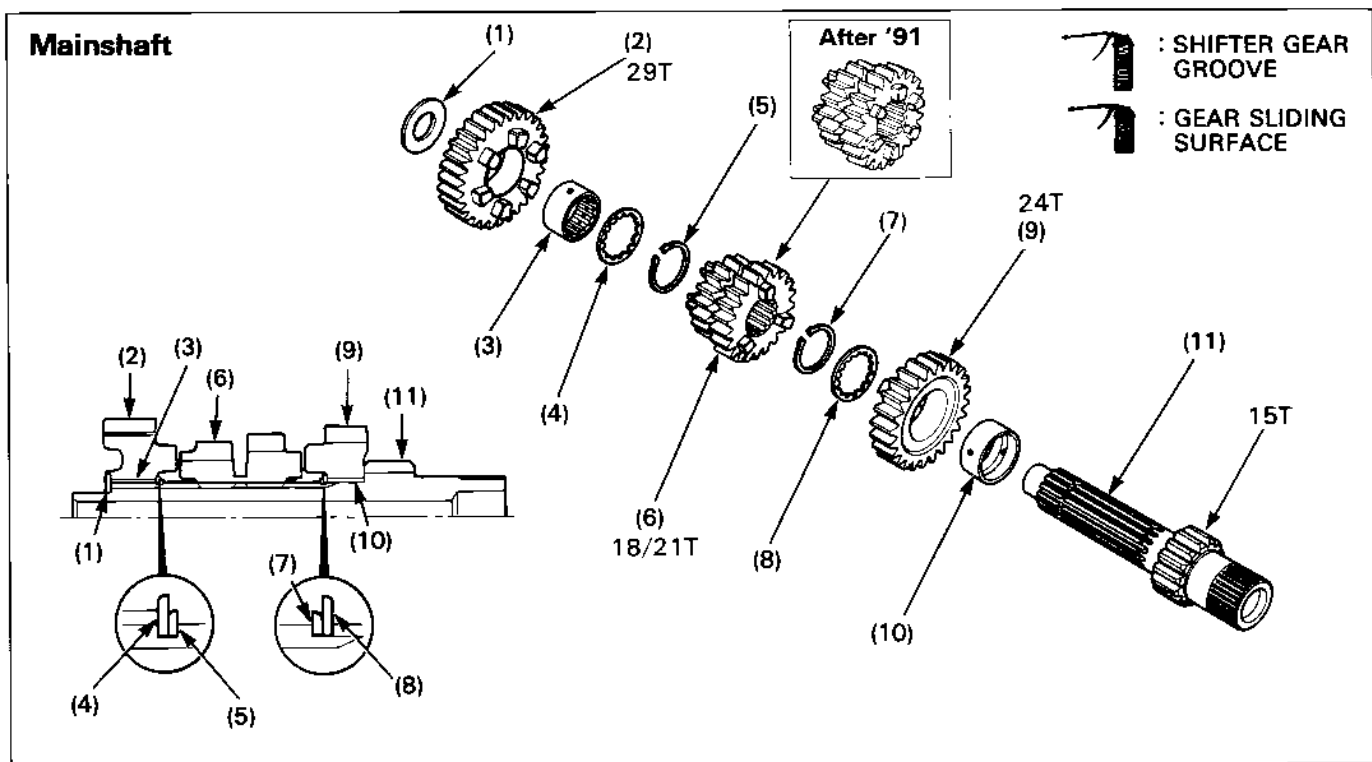


**Requisite Service**

- Gearshift linkage removal/installation (page 10-2)
- Transmission unit removal/installation (page 10-4)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Transmission case cover bolt	7	
(2)	Transmission case	1	
(3)	Dowel pin	2	
(4)	Shift fork shaft	1	
(5)	Rear shift fork	1	Install with the "R" mark facing down (forward).
(6)	Center shift fork	1	Install with the "C" mark facing down (forward).
(7)	Gearshift drum	1	
(8)	Front shift fork	1	Install with the "F" mark facing down (forward).
(9)	Mainshaft/countershaft assembly	1	

# Transmission Disassembly/Assembly



**NOTE**

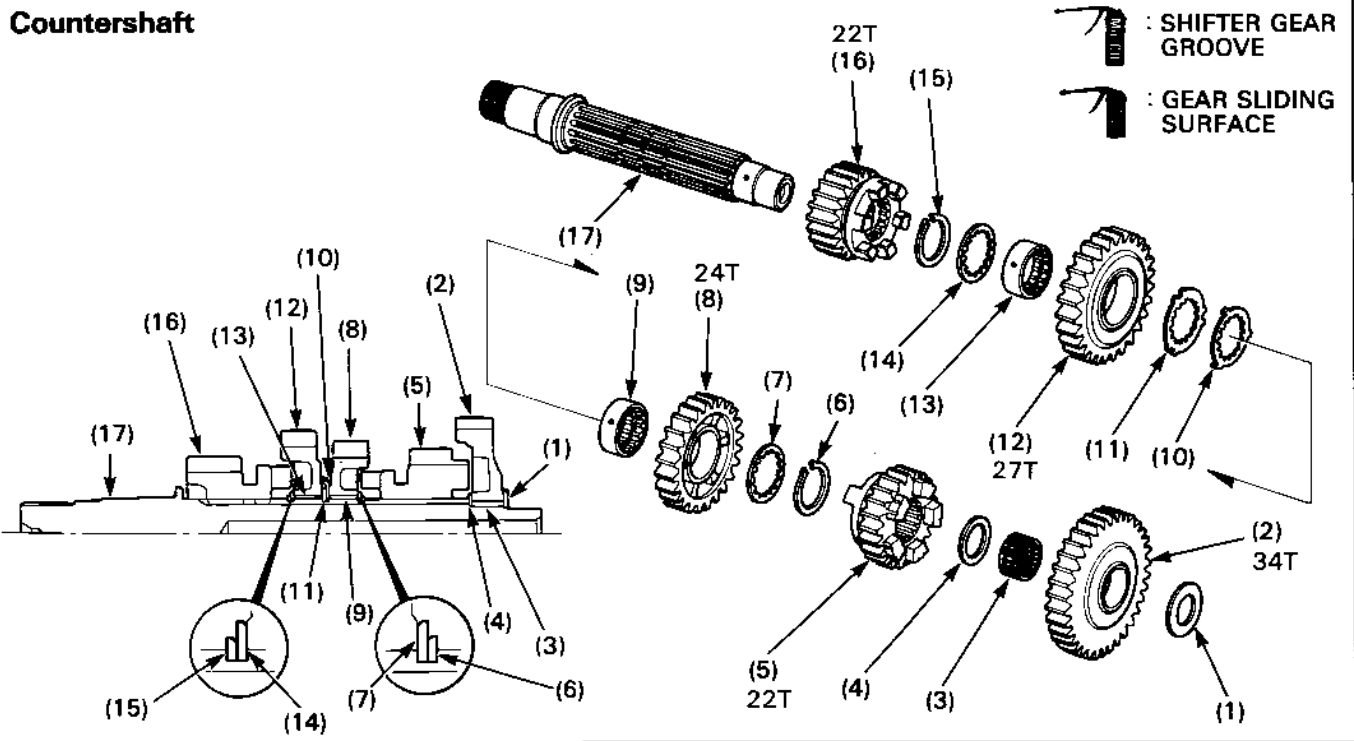
- Always install the thrust washers and snap rings with the chamfered (rolled) edge facing away from the thrust load.
- After installing a snap ring, slightly open the ring and rotate it in its groove to be sure it is fully seated.
- Do not use worn snap rings which could easily spin in the groove. They may be too loose to properly seat in the groove. Align the gap in the snap ring with the groove in the spline.
- Align all oil holes in the bushings with the shaft oil holes.

**Requisite Service**

- Transmission removal/installation (page 10-6)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		<b>Assembly is in the reverse order of disassembly.</b>
(1) Washer	1	
(2) M5 gear (29T)	1	
(3) M5 gear bushing	1	
(4) Spline washer	1	
(5) Snap ring	1	
(6) M2/M3 gear (18/21T)	1	
(7) Snap ring	1	Align the gap with the groove in the spline.
(8) Spline washer	1	
(9) M4 gear (24T)	1	
(10) M4 gear bushing	1	
(11) Mainshaft/M1 gear (15T)	1	

**Countershaft**



Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		<b>Assembly is in the reverse order of disassembly.</b>
(1) Washer	1	
(2) C1 gear (34T)	1	
(3) C1 gear needle bearing	1	
(4) Washer	1	
(5) C4 gear (22T)	1	
(6) Snap ring	1	
(7) Spline washer	1	
(8) C3 gear (24T)	1	
(9) C3 gear bushing	1	
(10) Lock washer	1	
(11) Spline washer	1	
(12) C2 gear (27T)	1	
(13) C2 gear bushing	1	
(14) Spline washer	1	
(15) Snap ring	1	
(16) C5 gear (22T)	1	
(17) Countershaft	1	



# 11. Crankcase/Piston/Crankshaft

<b>Service Information</b>	<b>11-1</b>	<b>Piston Removal/Installation</b>	<b>11-8</b>
<b>Troubleshooting</b>	<b>11-1</b>	<b>Primary Drive Gear/Starter Clutch Removal/Installation</b>	<b>11-10</b>
<b>Crankcase Separation/Assembly</b>	<b>11-2</b>		
<b>Crankshaft/Connecting Rod Removal/Installation</b>	<b>11-4</b>		

## Service Information

### CAUTION

- Improper installation of bearing inserts may block the oil holes, causing insufficient lubrication and eventual engine seizure.

- Remove the engine and separate the crankcases to inspect the crankshaft, connecting rod and starter clutch.
- Mark and store the connecting rod and crankshaft bearing inserts so they can be installed in their original locations for reassembly.
- Prior to assembling the crankcase halves, apply a sealant to their mating surfaces. Wipe off excess sealant thoroughly.
- Mark and store the disassembled parts to ensure that they are reinstalled in their original locations.

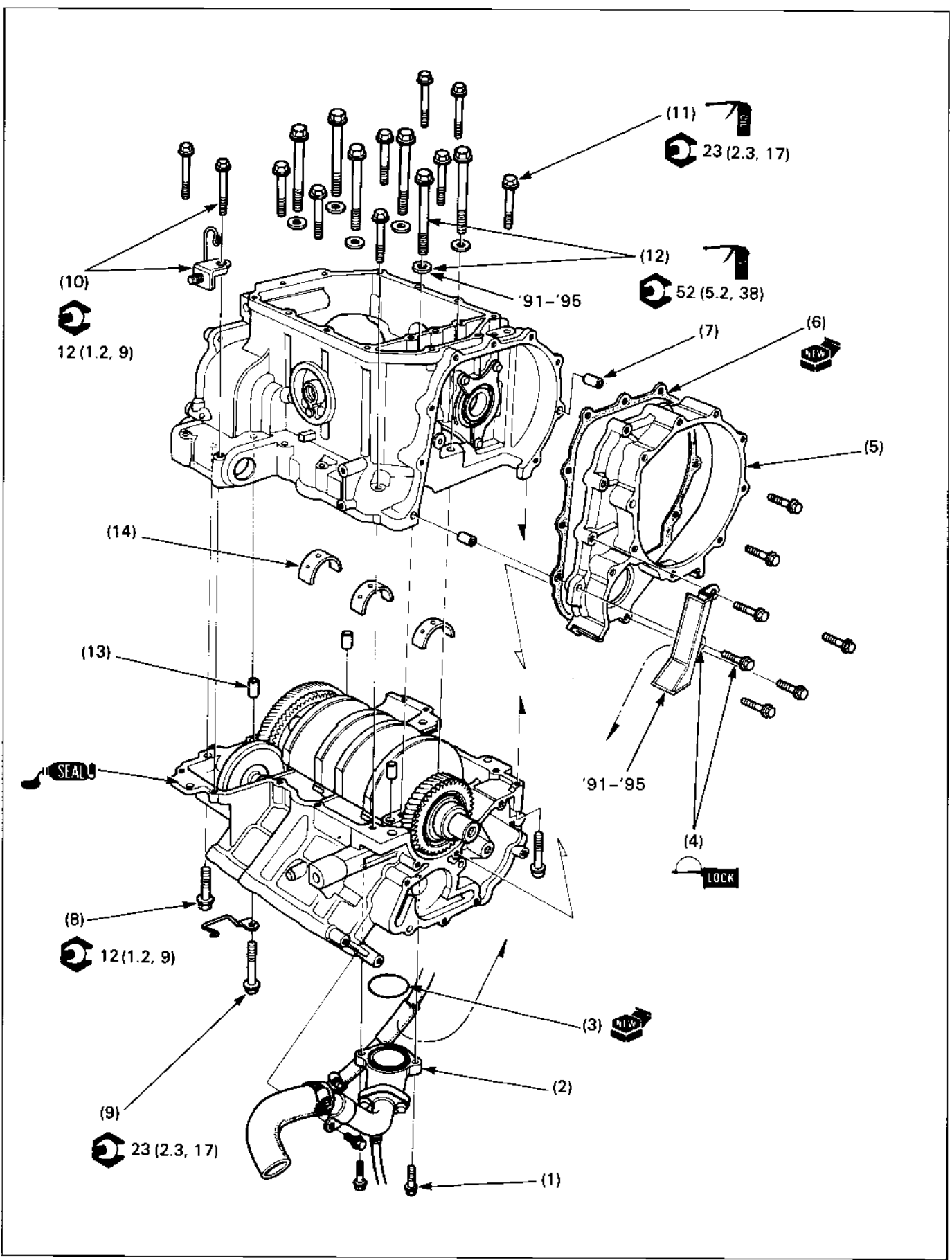
11

## Troubleshooting

### Excessive noise

- Worn connecting rod bearings
- Bent connecting rod
- Worn crankshaft main journal bearing

# Crankcase Separation/Assembly



**CAUTION**

- Improper installation of bearing inserts may block the oil holes causing insufficient lubrication and eventual engine seizure.

**NOTE**

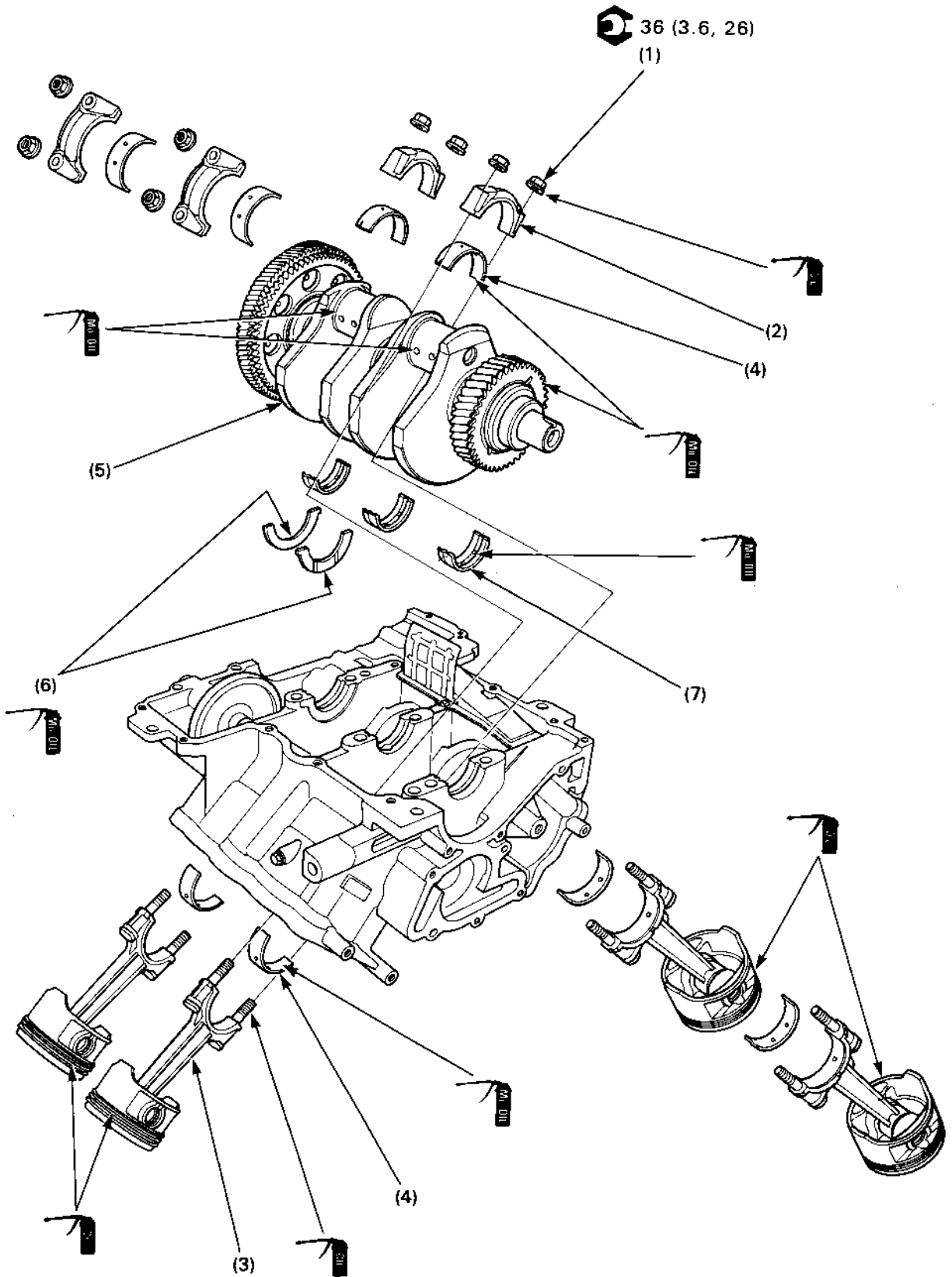
- Mark all parts during disassembly so they can be replaced in their original position.
- All bearing inserts are select fitted and are identified by color code. Select replacement bearings from the selection tables (pages 11-6 and 11-7).

**Requisite Service**

- Engine removal/installation (page 7-2)
- Cylinder head removal/installation (page 8-2)
- Oil cooler removal/installation (page 4-4)
- Alternator removal/installation (page 17-18)
- Starter motor removal/installation (page 20-6)
- Water pump removal/installation (page 6-7)
- Transmission/primary damper shaft removal/installation (page 10-4)
- Timing pulley removal/installation (page 8-10)
- Ignition pulse generator (page 18-9)

Procedure	Q'ty	Remarks
<b>Separation Order</b>		Assembly is in the reverse order of disassembly.
(1) Bolt	3	
(2) Water cover/pipe	1	
(3) O-ring	1	
(4) Bolt/cooler hose guard	7/1	Hose guard: '91-'95 only
(5) Clutch cover base	1	
(6) Gasket	1	
(7) Dowel pin	2	
(8) Upper crankcase bolt 6 mm	2	
(9) 8 mm	1	
(10) Lower crankcase bolt 6 mm/stay	4/1	
(11) 8 mm	6	
(12) 10 mm/washer	6/6	Washer: '91-'95 only
(13) Dowel pin	3	
(14) Crankshaft main journal bearing	3	Selection (page 11-6). See CAUTION above.

# Crankshaft/Connecting Rod Removal/Installation



**CAUTION**

- Improper installation of bearing inserts may block the oil holes causing insufficient lubrication and eventual engine seizure.

**NOTE**

- Mark all parts during disassembly so they can be replaced in their original position.
- All bearing inserts are select fitted and are identified by color code. Select replacement bearings from the selection tables (pages 11-6 and 11-7).

**Requisite Service**

- Crankcase separation/assembly (page 11-2)

	Procedure	Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Connecting rod bearing cap nut	8	
(2)	Connecting rod bearing cap	4	
(3)	Connecting rod/piston assembly	4	Piston removal/installation (page 11-8)
(4)	Connecting rod bearing	8	Selection (page 11-6). See CAUTION above.
(5)	Crankshaft	1	
(6)	Crankshaft thrust bearing	2	At installation, align the tab with the groove in the case.
(7)	Crankshaft journal bearing	3	Selection (page 11-6). See CAUTION above.

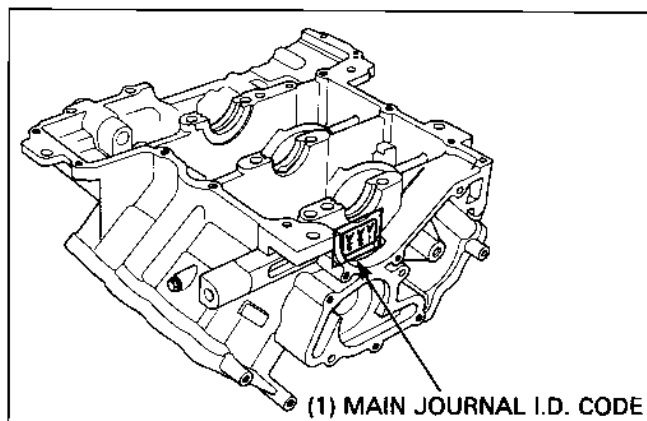
# Crankcase/Piston/Crankshaft

## Main Journal Bearing Selection

Record the crankcase I.D. code letters on the front side of the upper crankcase.

### NOTE

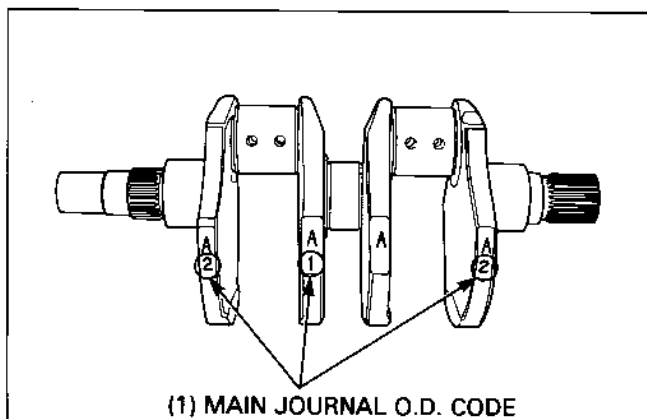
- Letter A, B or C is the code for the main journal I.D.
- The numerals 1, 2 and 3 stand for the crankshaft main journals, as viewed from the front.



Record the main journal O.D. code numbers on the crank weights.

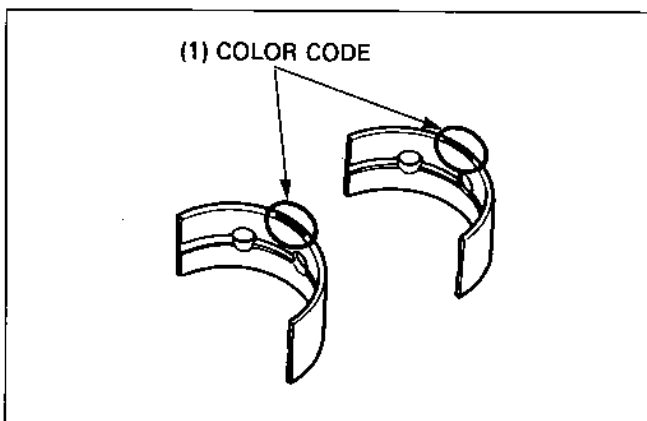
### NOTE

- Number 1, 2 or 3 is the code for the main journal O.D.



Cross reference the case and journal codes to determine the replacement bearing color code.

		Crankcase I.D. code	A	B	C
			43.000—43.006 mm (1.6929—1.6931 in)	43.006—43.012 mm (1.6931—1.6933 in)	43.012—43.018 mm (1.6933—1.6936 in)
1	39.994—40.000 mm (1.5746—1.5748 in)	Yellow	Green	Brown	
2	39.988—39.994 mm (1.5743—1.5746 in)	Green	Brown	Black	
3	39.982—39.988 mm (1.5741—1.5743 in)	Brown	Black	Blue	



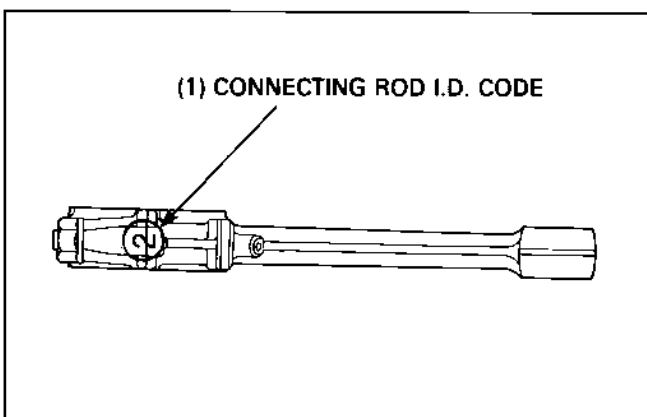
See section 14 of the Common Service Manual for crankshaft main bearing oil clearance inspection.

## Connecting Rod Bearing Selection

Record the connecting rod I.D. code number on the connecting rod.

### NOTE

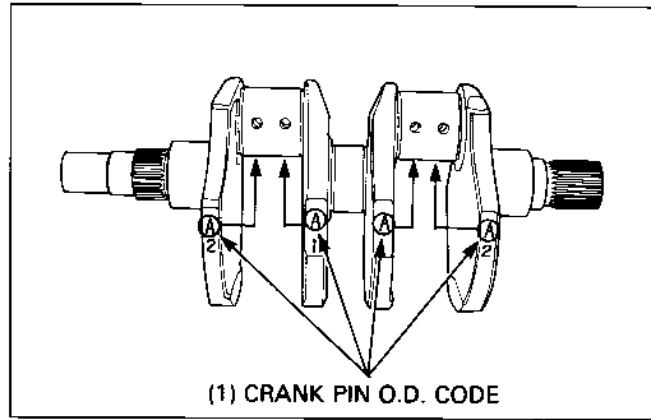
- Number 1, 2 or 3 is the code for the connecting rod I.D. code.



Record the crankpin O.D. code letters on the crank weights.

**NOTE**

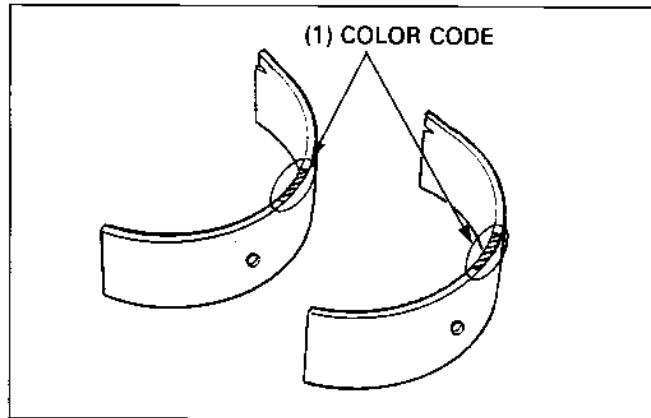
Letter A, B or C is the code for the crank pin O.D.



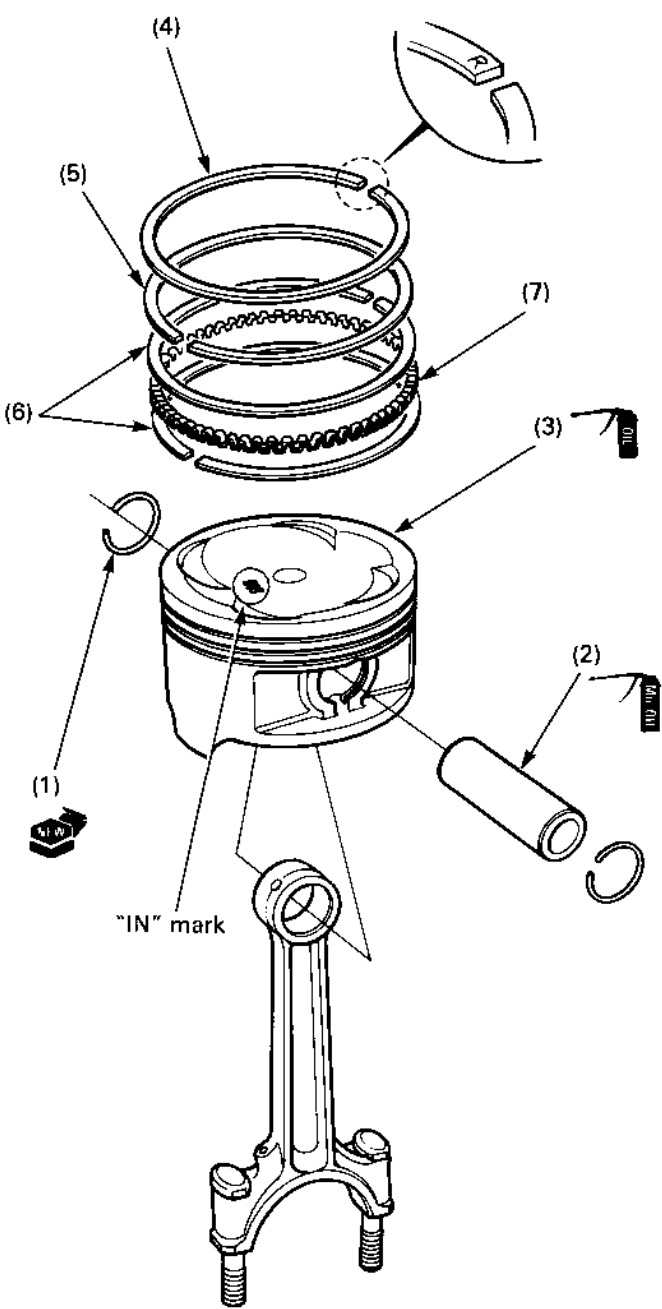
Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.

Connecting rod I.D. code		1	2	3
		Crank pin O.D. code	43.000— 43.006 mm (1.6929— 1.6931 in)	43.006— 43.012 mm (1.6931— 1.6933 in)
A	39.994—40.000 mm (1.5746—1.5748 in)	Yellow	Green	Brown
B	39.988—39.994 mm (1.5743—1.5746 in)	Green	Brown	Black
C	39.982—39.988 (1.5741—1.5743 in)	Brown	Black	Blue

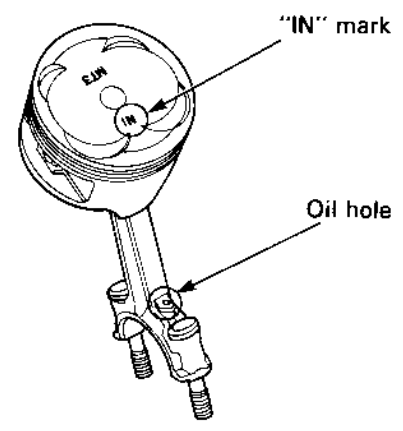
See section 14 of the Common Service Manual for connecting rod bearing oil clearance inspection.



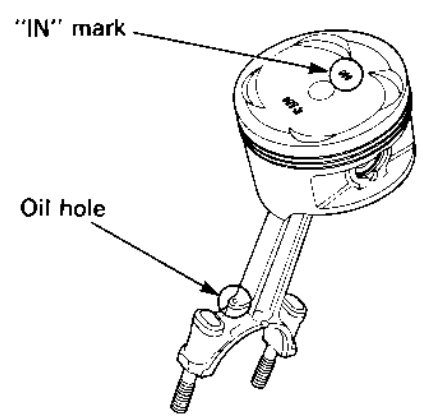
# Piston Removal/Installation



Left cylinder piston



Right cylinder piston



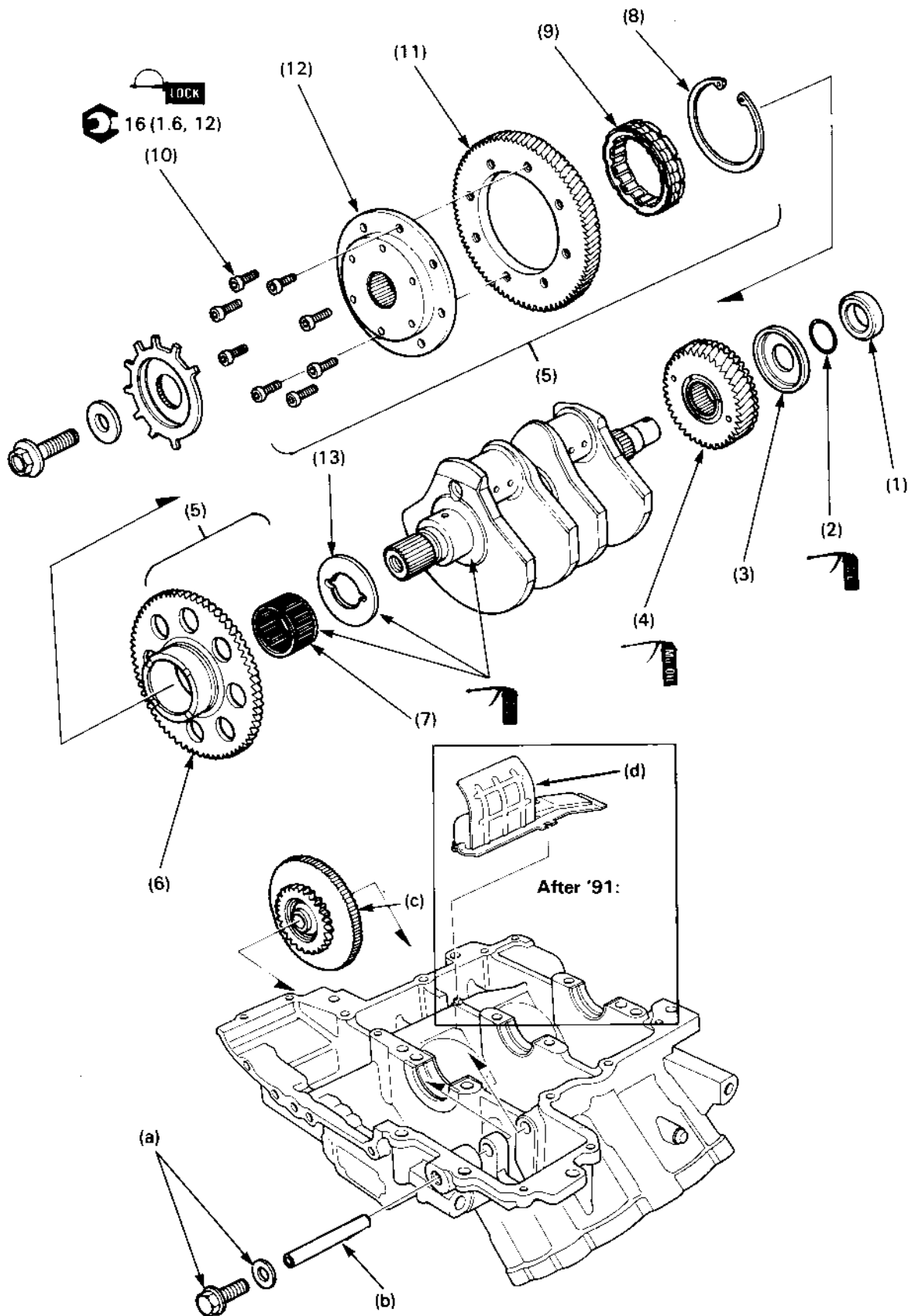


## Requisite Service

- Connecting rod removal/installation (page 11-4)

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Piston pin clip	2	
(2)	Piston pin	1	
(3)	Piston	1	Install the left cylinder piston so that the "IN" mark is facing the same direction as the oil hole in the connecting rod as shown. Install the right cylinder piston so that the "IN" mark is facing the opposite direction as the oil hole in the connecting rod as shown.
(4)	Piston top ring	1	Install with the marking facing up.
(5)	Piston second ring	1	Stagger position of ring end gaps as shown.
(6)	Side rail	2	
(7)	Spacer	1	

# Primary Drive Gear/Starter Clutch Removal/Installation



## NOTE

- The starter idle gear can be removed without removing the crankshaft.

## Requisite Service

- Crankshaft removal/installation (page 11-4)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Collar	1	
(2)	O-ring	1	
(3)	Stopper circlip	1	
(4)	Primary drive gear	1	Install with the "OUT" mark facing out.
(5)	Starter clutch assembly	1	At installation, align the wide groove in the starter clutch outer with the wide tooth on the crankshaft.
(6)	— Starter driven gear	1	
(7)	— Needle bearing	1	
(8)	— Snap ring	1	
(9)	— Starter clutch	1	
(10)	— Bolt	8	
(11)	— Alternator drive gear	1	
(12)	— Starter clutch outer	1	
(13)	Washer	1	
(a)	Bolt/washer	1	
(b)	Starter idle gear shaft	1	
(c)	Starter idle gear	1	
(d)	Oil separate plate After '91	1	Install in position shown at assembly.

# 12. Final Drive

<b>Service Information</b>	<b>12-1</b>	<b>Final Gear Case Removal/Installation</b>	<b>12-3</b>
<b>Troubleshooting</b>	<b>12-1</b>	<b>Final Gear Case Disassembly</b>	<b>12-4</b>
<b>Driveshaft Disassembly/Assembly</b>	<b>12-2</b>	<b>Final Gear Case Assembly</b>	<b>12-6</b>

## Service Information

- Replace all oil seals and O-rings whenever the final drive gear assembly is disassembled.
- Check the tooth contact pattern and gear backlash when the bearing, gear set and/or gear case is replaced. (Section 15 of the Common Service Manual)

## Troubleshooting

### Excessive noise in final drive

- Worn or damaged ring gear and driven flange
- Damaged driven flange or wheel hub
- Worn or damaged pinion gear and/or pinion joint splines
- Excessive backlash between pinion and ring gears.
- Low oil level

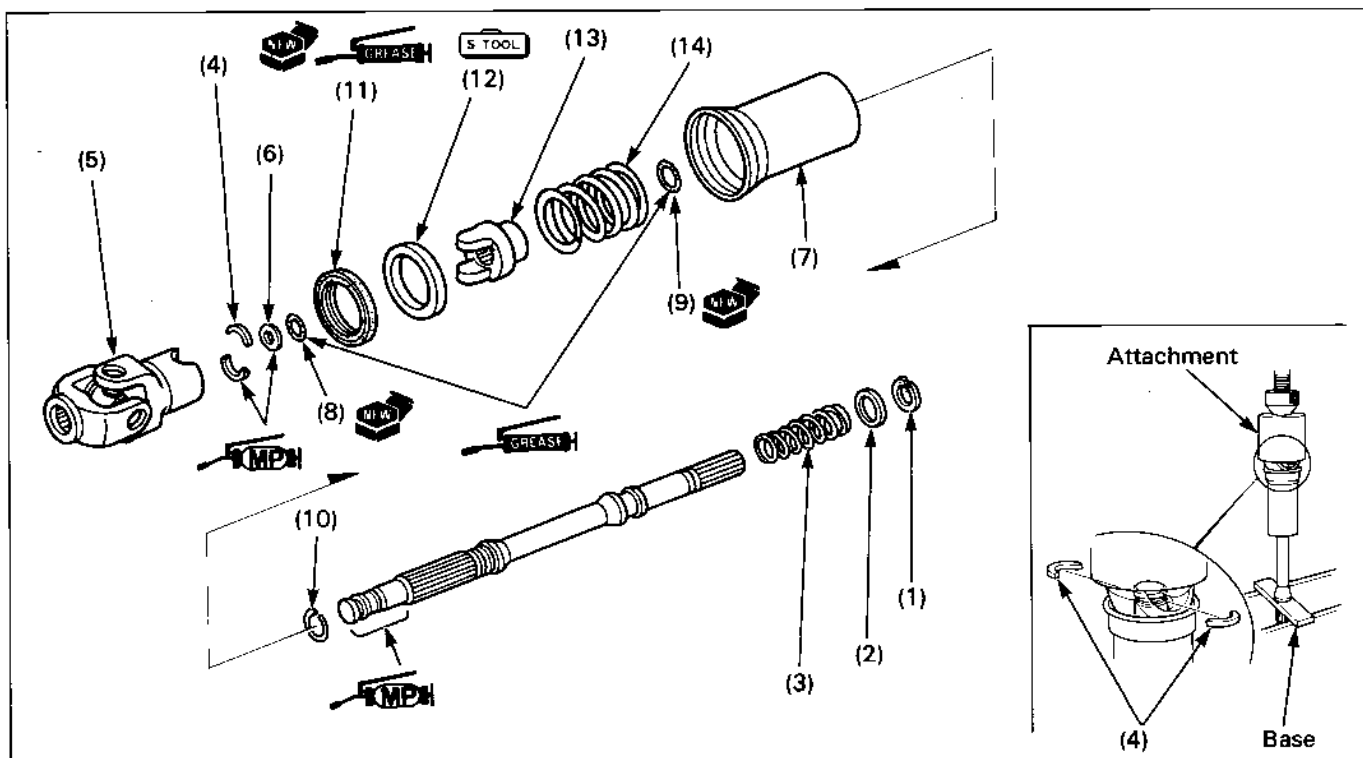
### Excessive rear wheel backlash

- Worn driveshaft splines
- Excessive backlash between ring gear and pinion gear
- Worn driven flange and ring gear splines
- Excessive play in final drive case bearings
- Worn driveshaft and or pinion joint splines

### Oil leaks at final gear case

- Clogged breather hole
- Oil level too high
- Faulty oil seal(s)

## Driveshaft Disassembly/Assembly



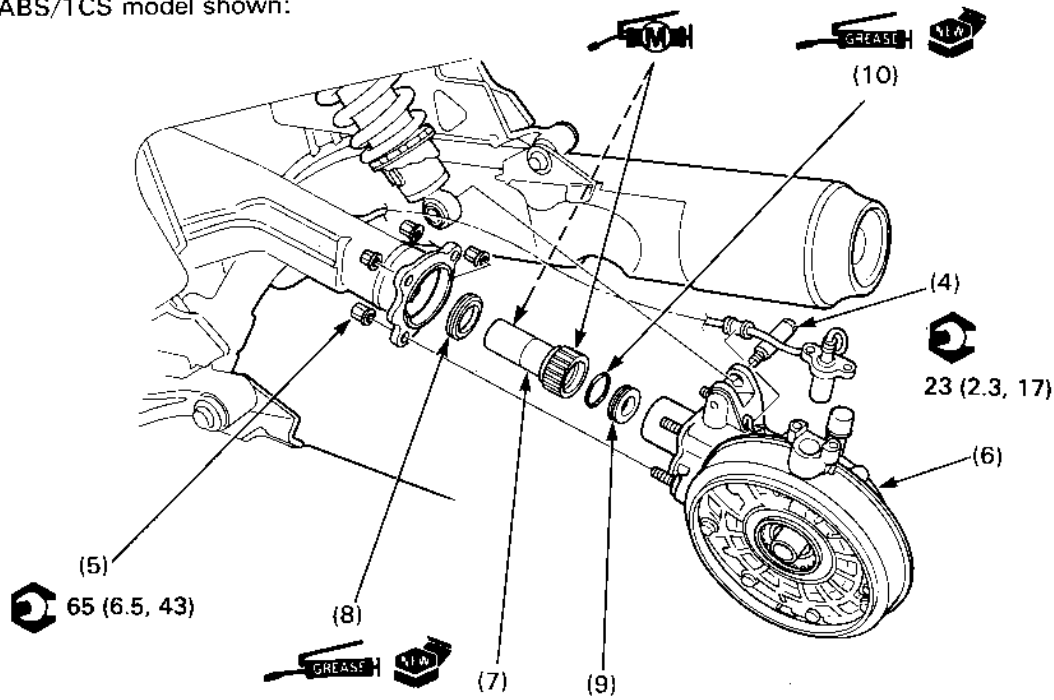
## Requisite Service

- Swingarm removal/installation (page 14-8)

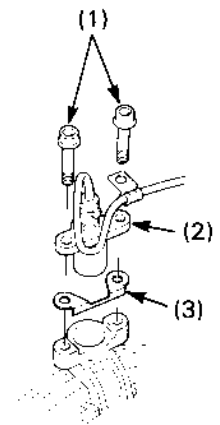
Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1) Snap ring	1	
(2) Spring stopper	1	
(3) Driveshaft spring	1	
(4) Universal joint cotter	2	Support the driveshaft with the yoke joint compressor base (07LMF-MT30120), compress the spring with the yoke joint compressor attachment (07LMF-MT30110) using the hydraulic press and remove the cotters as shown.
(5) Universal joint	1	
(6) Thrust washer	1	
(7) Damper case	1	Fill the case with 30 cc (1.0 US oz, 1.1 Imp oz) of Hypoid gear oil (SAE # 80) after installation.
(8) 14.8 x 2.4 mm O-ring	1	
(9) 19 x 1.9 mm O-ring	1	
(10) Case stopper ring	1	
(11) Oil seal	1	Remove from the damper case.
(12) Oil seal guide	1	If necessary, remove using the bearing race remover (07946-3710500). Install using the driver (07749-0010000) and attachment, 52 x 55 mm (07746-0010400).
(13) Damper cam	1	
(14) Damper spring	1	

# Final Gear Case Removal/Installation

ABS/TCS model shown:



ABS/TCS or LBS-ABS/TCS model:



## NOTE

- ABS/TCS or LBS-ABS/TCS model: After installing the rear wheel, perform the wheel sensor air gap inspection (page 16-A-51 or 16-B-34).

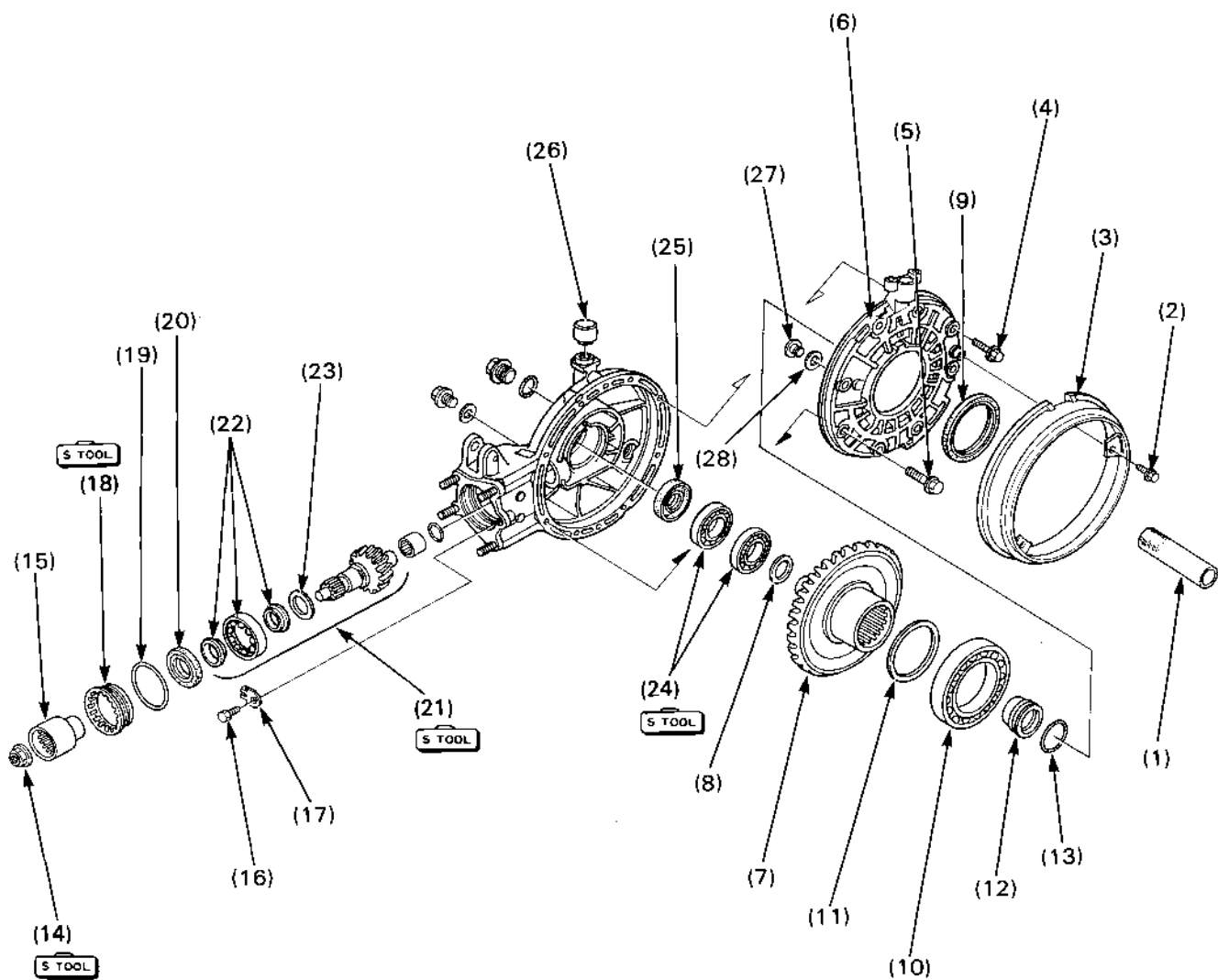
## Requisite Service

- Rear wheel removal/installation (page 14-2)
- Final gear oil draining

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Wheel sensor mounting bolt	2	ABS/TCS or LBS-ABS/TCS model
(2) Wheel sensor	1	Remove from wire clamp.
(3) Sensor shim	(1)	
(4) Shock absorber lower mounting bolt	1	
(5) Final gear case mounting nut	4	Support the final gear case and remove the nuts. At installation, loosely install the nuts, install the rear wheel completely (page 14-2), then tighten the nuts.
(6) Final gear case assembly	1	At installation, apply molybdenum disulfide grease to the driveshaft joint splines and remove the grease from the one spline groove to allow air to escape from the joint.
(7) Driveshaft joint	1	Install into the final gear case being careful not to damage the oil seal lip.
(8) Oil seal	1	Remove from the driveshaft joint.
(9) Driveshaft cap	1	
(10) O-ring	1	Remove from the driveshaft cap.

# Final Gear Case Disassembly

ABS/TCS model shown:



**WARNING**

- Always wear insulated gloves when handling a heated gear case to prevent burning your hands.

**CAUTION**

- Do not use a torch to heat the final gear case; it may cause warping.

**NOTE**

- Keep dust and dirt out of the gear case.
- Be careful not to damage the case and cover mating surfaces.
- Refer to section 15 of the Common Service Manual for the backlash inspection and the gear tooth contact pattern check. See page 1-11 for the backlash specification.

**Requisite Service**

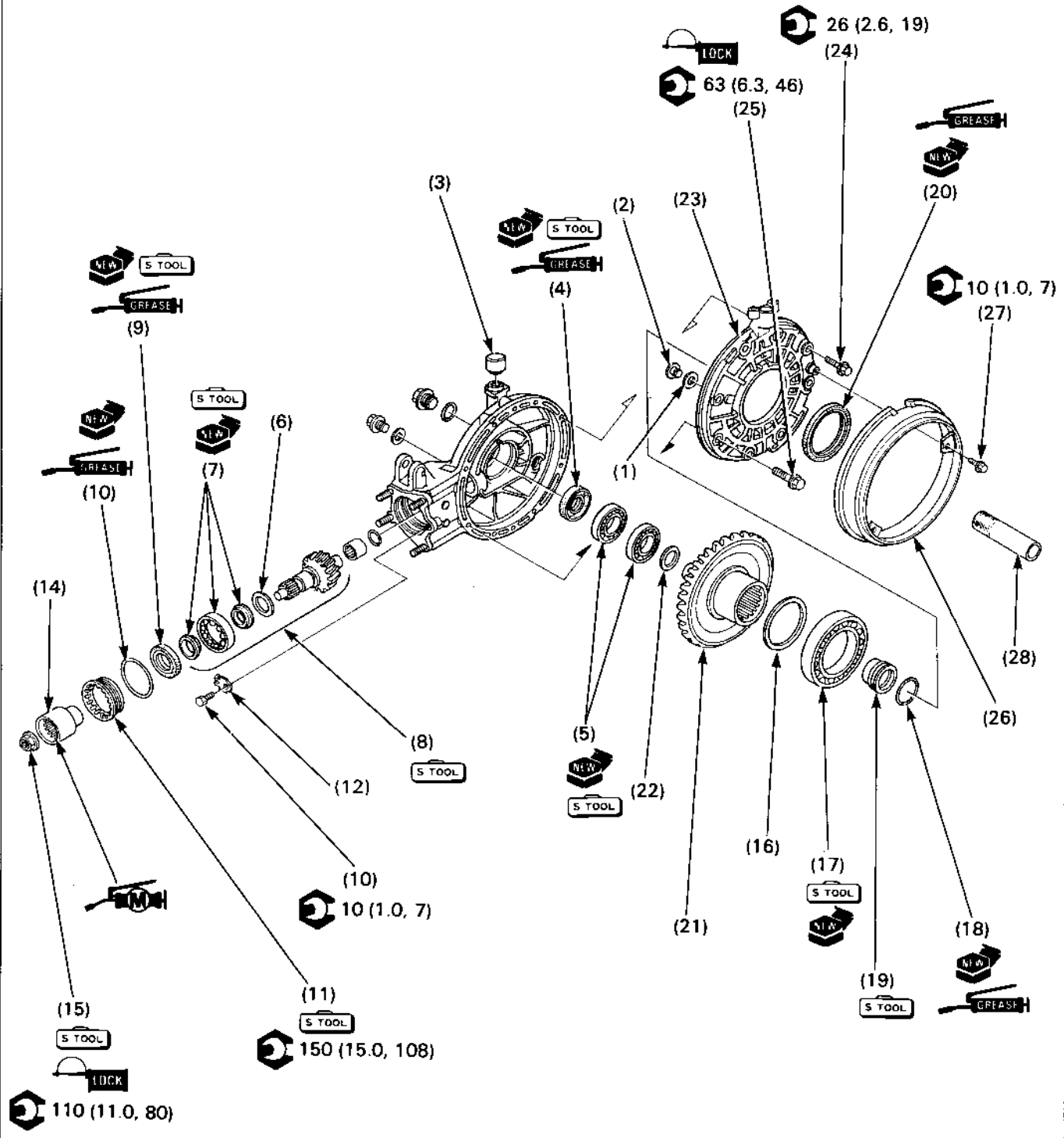
- Final gear case removal (page 12-3)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			
(1)	Distance collar	1	
(2)	Bolt Standard model ABS/TCS or LBS-ABS/TCS model	1 3	
(3)	Dust guard plate	1	
(4)	8 mm gear cover bolt	6	
(5)	10 mm gear case cover bolt	2	
(6)	Gear case cover	1	
(7)	Ring gear	1	<b>NOTE</b> • If the ring gear stays in the cover, press the ring gear out of the cover.
(8)	Wave washer	1	
(9)	Oil seal	1	
(10)	Ring gear bearing	1	Pry out the bearing from the ring gear.
(11)	Ring gear shim	1	
(12)	O-ring guide	1	Remove by tapping from the opposite side.
(13)	O-ring	1	Remove from the guide.
(14)	Pinion joint nut	1	Removal (page 12-8)
(15)	Pinion joint	1	
(16)	Bolt	1	
(17)	Pinion retainer lock washer	1	
(18)	Pinion retainer	1	Removal (page 12-8)
(19)	O-ring	1	Remove from the pinion retainer.
(20)	Oil seal	1	
(21)	Pinion gear assembly	1	Removal (page 12-9)
(22)	Pinion bearing/inner race	1/2	Remove from the shaft with the bearing puller.
(23)	Pinion gear shim	1	
(24)	Final gear case bearing	2	Removal (page 12-9)
(25)	Oil seal	1	
(26)	Breather cap	1	
(27)	Ring gear stop pin	1	
(28)	Stop pin shim	1	



# Final Gear Case Assembly

ABS/TCS model shown:



## NOTE

- Keep dust and dirt out of the gear case.
- Be careful not to damage the case and cover mating surfaces.
- Refer to section 15 of the Common Service Manual for the backlash inspection, the gear tooth contact pattern check and the ring gear-to-stop pin clearance check.
- If the gear set, pinion gear bearing, ring gear bearing, gear case bearing and/or gear case are replaced, install a 1.50 mm pinion gear shim and a 2.00 mm ring gear shim.
- The ring gear and pinion gear must be replaced as a set.

## Requisite Service

- Final gear case installation (page 12-3)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			
(1)	Stop pin shim	1	Selection (page 12-10)
(2)	Ring gear stop pin	1	
(3)	Breather cap	1	Clean the breather hole and install.
(4)	Oil seal	1	Use the driver (07749-0010000) and attachment, 52 x 55 mm (07746-0010400).
(5)	Final case bearing	2	Use the driver (07749-0010000), attachment, 52 x 68 mm (07746-0010500) and pilot, 35 mm (07746-0040800).
(6)	Pinion gear shim	1	Selection (page 12-10)
(7)	Pinion bearing/outer race	1/2	Drive onto the pinion gear, using the driver, 40 mm I.D. (07746-0030100) and attachment, 25 mm I.D. (07746-0030200).
(8)	Pinion gear assembly	1	Drive into the gear case until enough threads are visible to engage the pinion retainer, using the bearing race insert attachment (07931-4630300).
(9)	Oil seal	1	Install into the pinion retainer, using the driver (07749-0010000) and attachment, 52 x 55 mm (07746-0010400).
(10)	O-ring	1	Install onto the pinion retainer.
(11)	Pinion retainer	1	Installation (page 12-8).
(12)	Pinion retainer lock washer	1	NOTE • There are two types (A or B) of lock washers.
(13)	Bolt	1	
(14)	Pinion joint	1	
(15)	Pinion joint nut	1	Installation (page 12-8)
(16)	Ring gear shim	1	Selection (page 12-11)
(17)	Ring gear bearing	1	Installation (page 12-9)
(18)	O-ring	1	Install onto the O-ring guide.
(19)	O-ring guide	1	Drive in the ring gear, using the driver (07749-0010000) and attachment, 42 x 47 mm (07746-0010300).
(20)	Oil seal	1	
(21)	Ring gear	1	
(22)	Wave washer	1	
(23)	Gear case cover	1	Clean the mating surfaces of the case and cover thoroughly, and apply liquid sealant to them.
(24)	10 mm gear case cover bolt	2	
(25)	8 mm gear case cover bolt	6	
(26)	Dust guard plate	1	
(27)	Bolt	1	Standard model
		3	ABS/TCS or LBS-ABS/TCS model
(28)	Distance collar	1	Install with the polished side toward the final gear case.

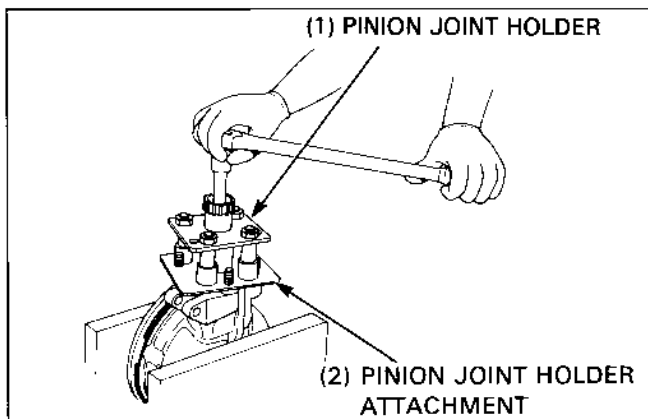
## Pinion Joint Nut Removal/Installation

### Removal

Install the pinion joint holder and remove the pinion joint nut.



Pinion joint holder                      07924—ME40000  
Pinion joint holder attachment      07924—9690102



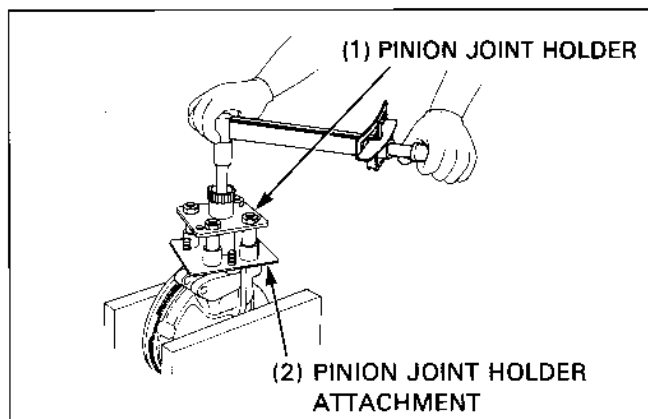
### Installation

Install the pinion joint and pinion joint nut.  
Install the pinion joint holder and tighten the pinion joint nut.

Torque: 110 N·m (11.0 kg-m, 80 ft-lb)



Pinion joint holder                      07924—ME40000  
Pinion joint holder attachment      07924—9690102



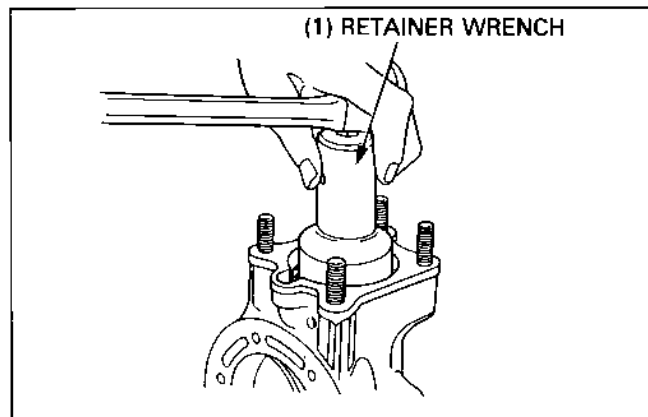
## Pinion Retainer Removal/Installation

### Removal

Remove the pinion retainer with the pinion retainer wrench.



Pinion retainer wrench                07910—MA10100



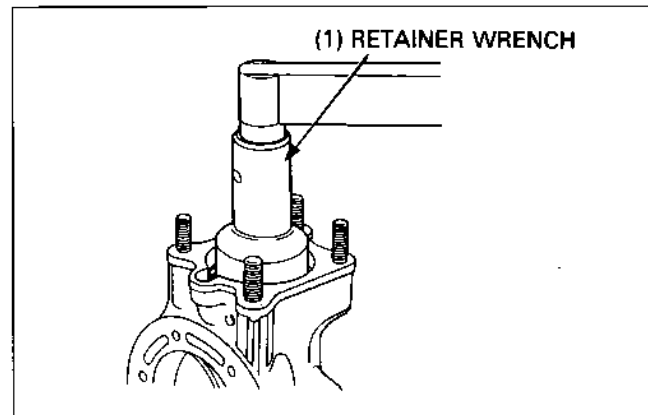
### Installation

Coat the O-ring on the pinion retainer with grease or gear oil. Screw the pinion retainer in, pressing the pinion bearing in place, then tighten it with the pinion retainer wrench.

Torque: 150 N·m (15.0 kg-m, 108 ft-lb)



Pinion retainer wrench                07910—MA10100



## Pinion Gear Assembly Removal

Pull the pinion gear off with the pinion puller.

**S TOOL**

Shaft puller

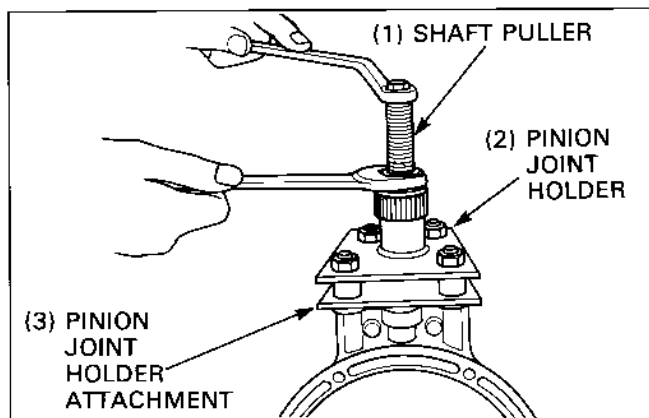
07931—ME40000 or  
07931—ME4010A  
(U.S.A. only)

Pinion joint holder

07924—ME40000

Pinion joint holder attachment

07924—9690102



## Final Gear Case Bearing Removal

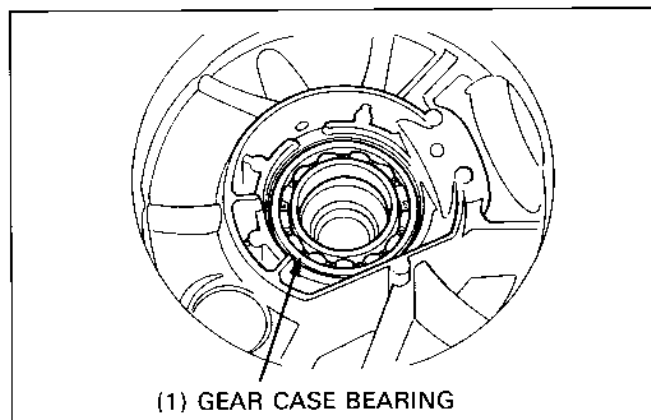
Heat the gear case to approximately 80°C (176°F)

### ▲ WARNING

- Always wear insulated gloves when handling the gear case after it has been heated.

### CAUTION

- Do not use a torch to heat the gear case, or it may cause warping.



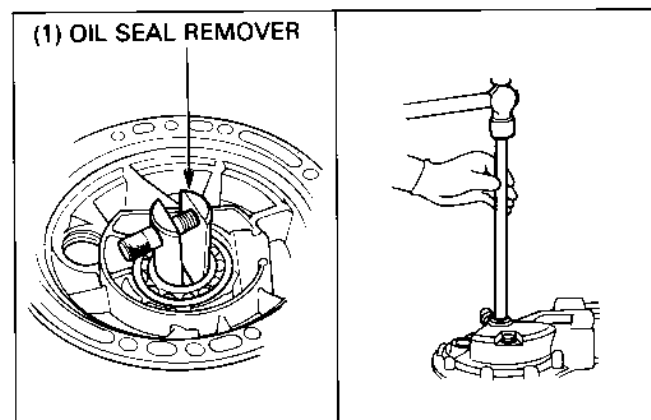
Install the oil seal remover into the gear case bearing.

**S TOOL**

Oil seal remover

07948—4630100

Turn the gear case over and drive the gear case bearing out.



## Ring Gear Bearing Installation

If the ring gear assembly was loose against the cover:  
Install the original shim onto the ring gear.

### NOTE

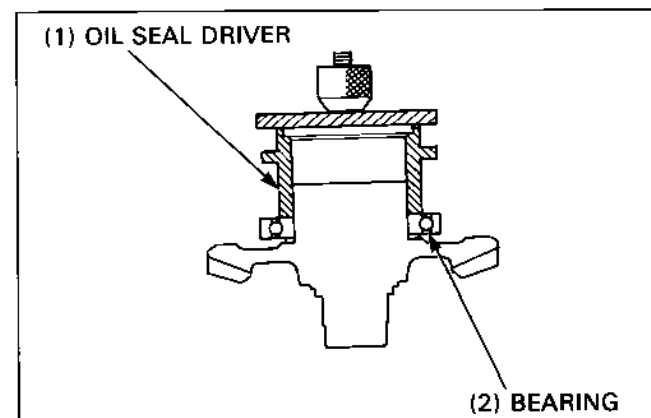
- If the gear set, pinion bearing, ring gear bearing, gear case bearing and/or gear case are replaced, install a 2.00 mm thick shim (standard).

Place a new ring gear bearing on the ring gear and drive it on with the oil seal driver.

**S TOOL**

Oil seal driver

07965—MC70100

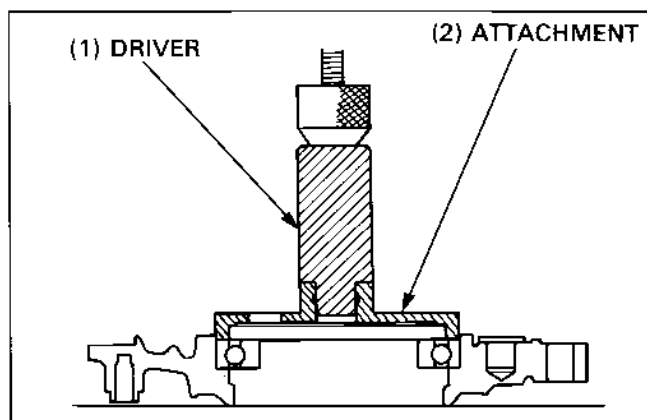


## Final Drive

If the ring gear stayed in the cover:  
Press the ring gear bearing into the case cover.

 S TOOL

Driver 07749—0010000  
Oil seal driver attachment 07948—SB00101



Install the original shim onto the ring gear.

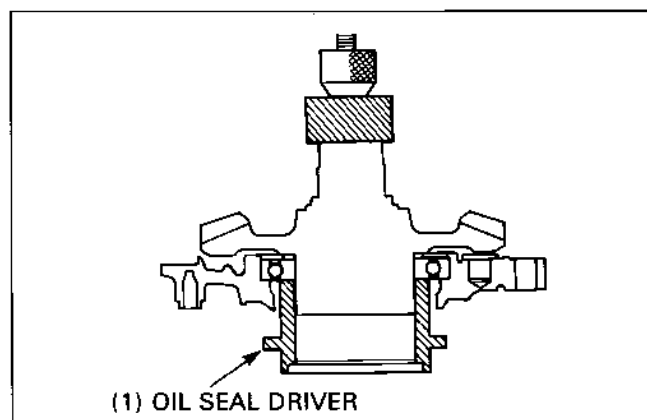
NOTE

- If the gear set, pinion bearing, ring gear bearing, gear case bearing and/or gear case are replaced, install a 2.00 mm thick shim (standard).

Support the bearing inner race with the oil seal driver attachment, and press the ring gear into the bearing with a suitable tool.

 S TOOL

Oil seal driver 07965—MC70100



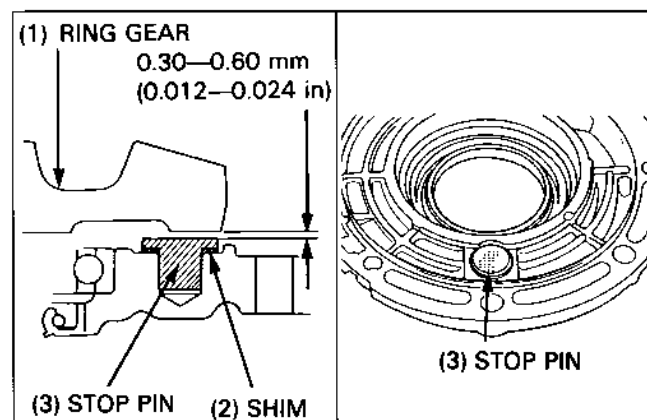
### Stop Pin Shim Selection

Measure the ring gear-to-stop pin clearance (Section 5 of the Common Service Manual).

Clearance: 0.30—0.60 mm (0.012—0.024 in)

Install a stop pin shim to obtain the correct clearance.

Shim thickness: A: 0.10 mm  
A: 0.15 mm



### Ring Gear Shim Selection

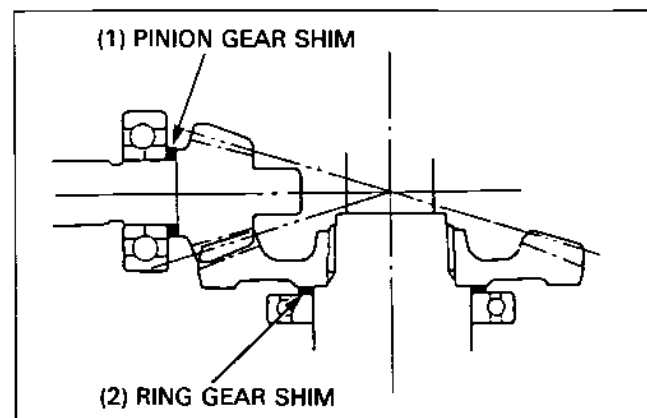
Check the tooth contact pattern (Section 5 of the Common Service Manual).

If the pattern is not correct, remove and change the pinion gear shim.

The pattern will shift about 1.5—2.0 mm (0.06—0.08 in) when the thickness of the shim is changed by 0.1 mm (0.004 in)

NOTE

- Thirteen shims (A—M) are available in thickness intervals of 0.03 mm. The thinnest is 1.32 mm and the thickest is 1.68 mm.
- The standard shim (G) thickness is 1.50 mm.



## Pinion Gear Shim Selection

Check the gear backlash (Section 5 of the Common Service Manual).

**Backlash: 0.05—0.15 mm (0.002—0.006 in)**

If the backlash is not within the specifications, remove and change the ring gear shim.

The backlash is changed by about 0.06—0.07 mm (0.002—0.003 in) when the thickness of the shim is changed by 0.10 mm (0.004 in).

### NOTE

- Seventeen shims (A—Q) are available in thickness intervals of 0.03 mm. The thinnest is 1.82 mm and the thickest is 2.30 mm.
- The standard shim (G) thickness is 2.00 mm.

# 13. Front Wheel/Suspension/Steering

Service Information	13-1	Fork Removal/Installation	13-11
Troubleshooting	13-1	Left Fork Disassembly	13-14
Handlebar Cover Removal/Installation	13-2	Left Fork Assembly	13-18
Handlebar Removal/Installation	13-4	Right Fork Disassembly	13-22
Anti-dive Case Disassembly/Assembly	13-5	Right Fork Assembly	13-26
Front Wheel Removal/Installation	13-6	Steering Stem Removal/Installation	13-30
Front Wheel Disassembly/Assembly	13-10		

## 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.
- 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 15 for brake system information.
- Refer to the section 21 for light, meter and switch information.

## Troubleshooting

### Hard steering

- Steering head bearing adjustment nut too tight
- Faulty steering head bearings
- Damaged steering head bearings
- Low 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 bearings
- Worn swingarm pivot bearings

### Front wheel wobbling

- Bent rim
- Worn front wheel bearings
- Faulty tire

### Wheel turns hard

- Brake misadjusted
- Faulty wheel bearings
- Faulty speedometer gear

### Soft suspension

- Weak fork springs
- Low fluid level in fork
- Faulty anti-dive system

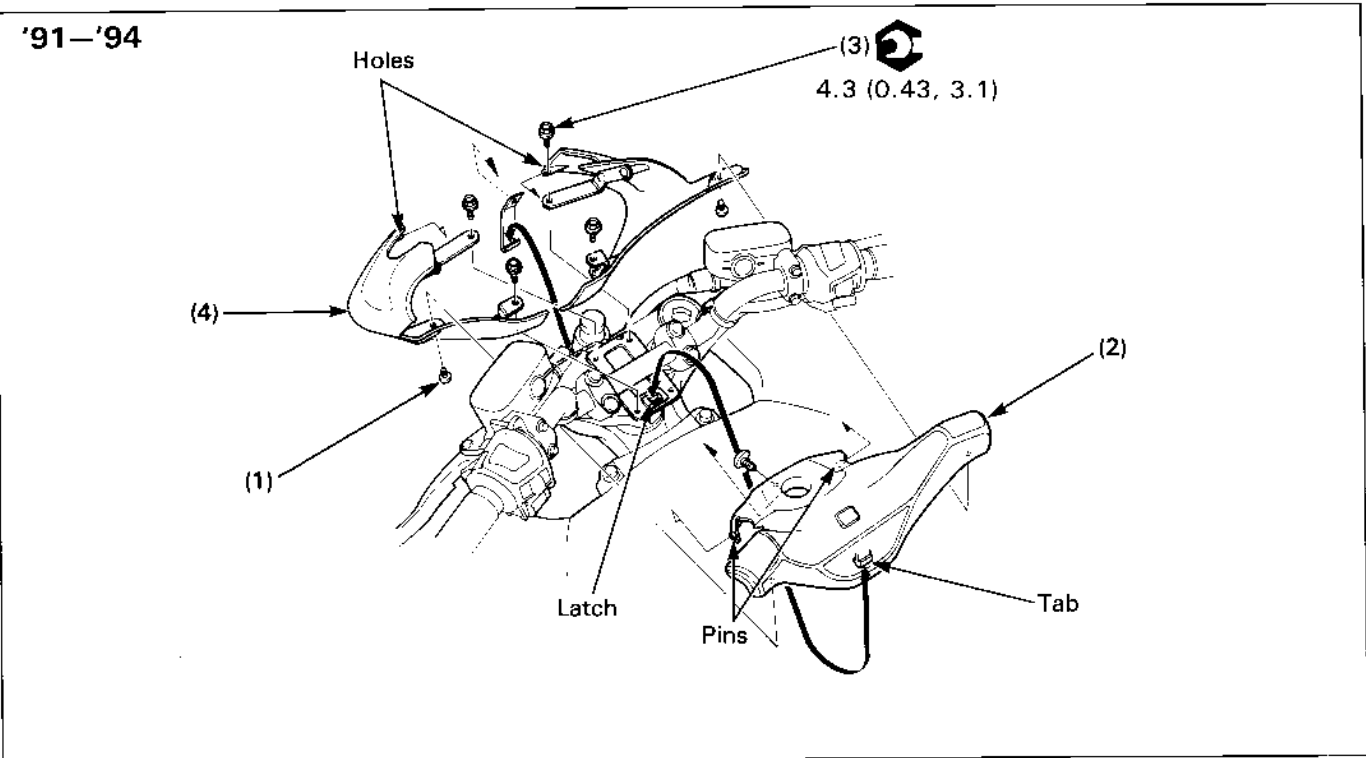
### Hard suspension

- Incorrect fluid viscosity
- Bent fork tubes
- Clogged fluid passage

### Front suspension noise

- Low fluid level in fork
- Loose fork fasteners
- Lack of grease in speedometer gearbox

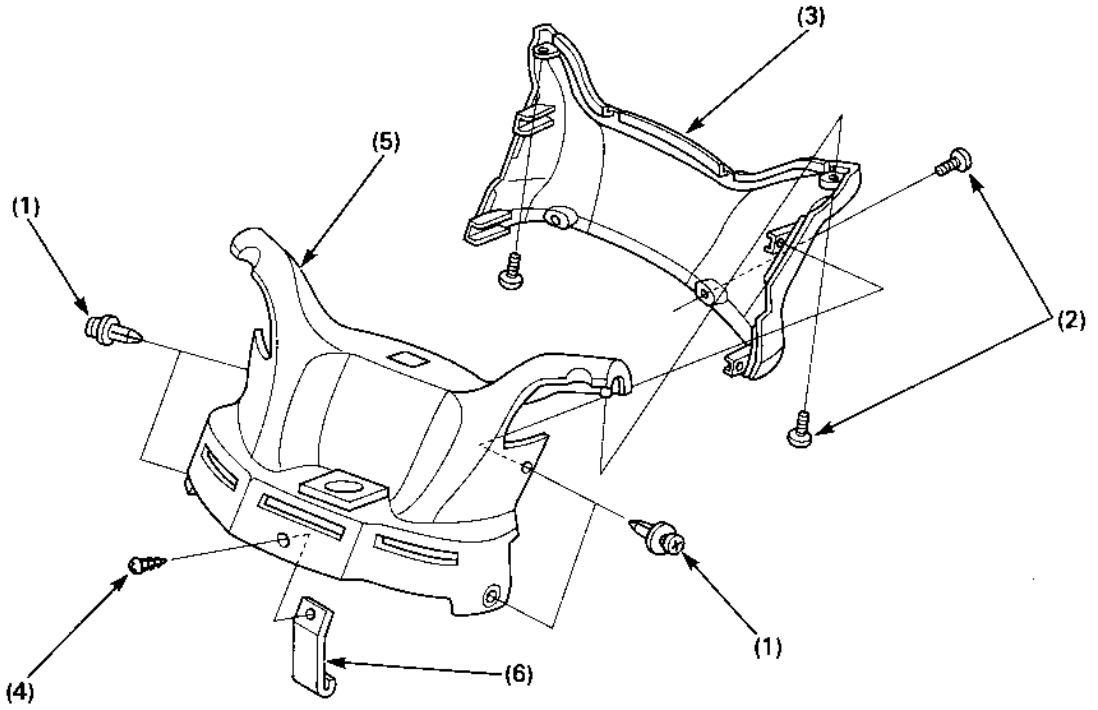
# Handlebar Cover Removal/Installation



Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Screws	2	At installation, align the pins with the holes in the lower cover and insert the tab into the latch securely.
(2) Handlebar upper cover	1	
(3) Bolt	4	
(4) Handlebar lower cover	2	

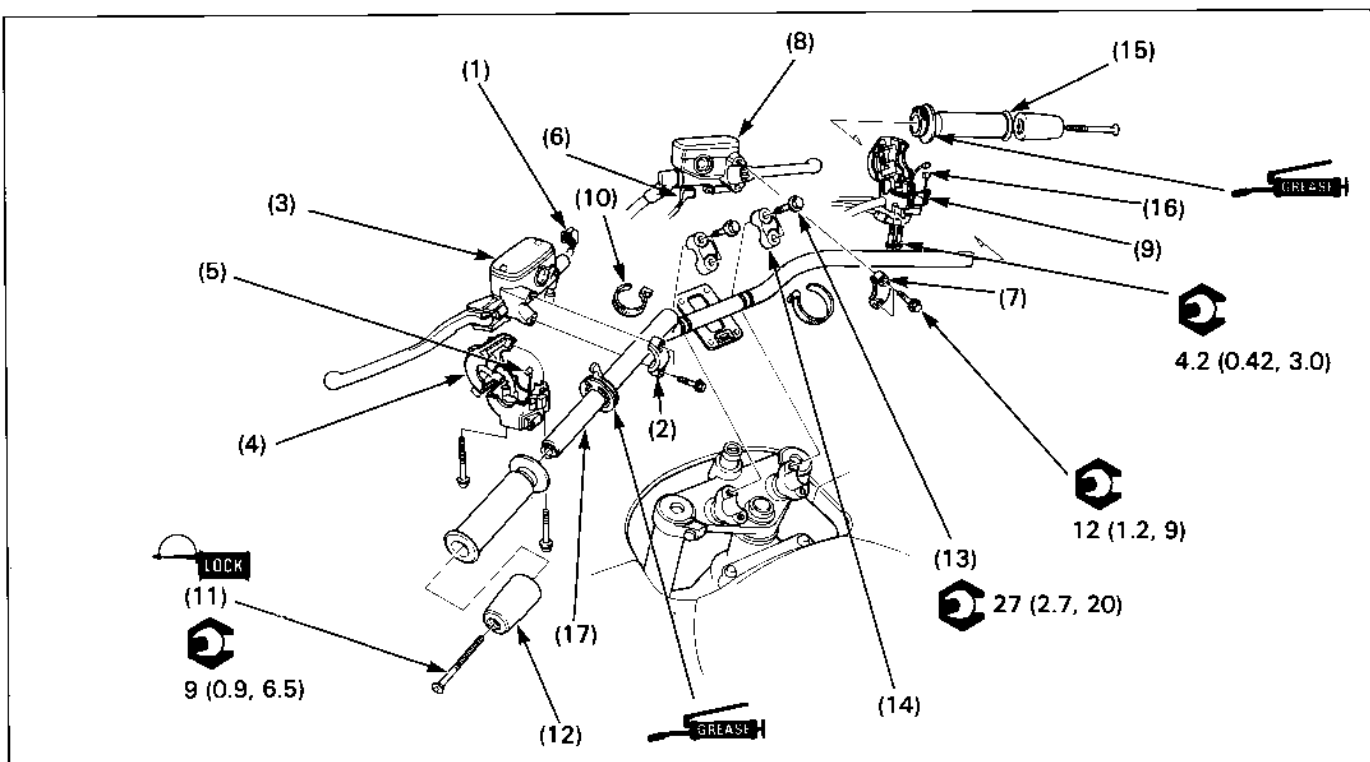


After '94



Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Trim clip	4	
(2)	Screw	4	
(3)	Handlebar rear cover	1	
(4)	Screw	1	
(5)	Handlebar front cover	1	
(6)	Handlebar cover stay	1	

# Handlebar Removal/Installation

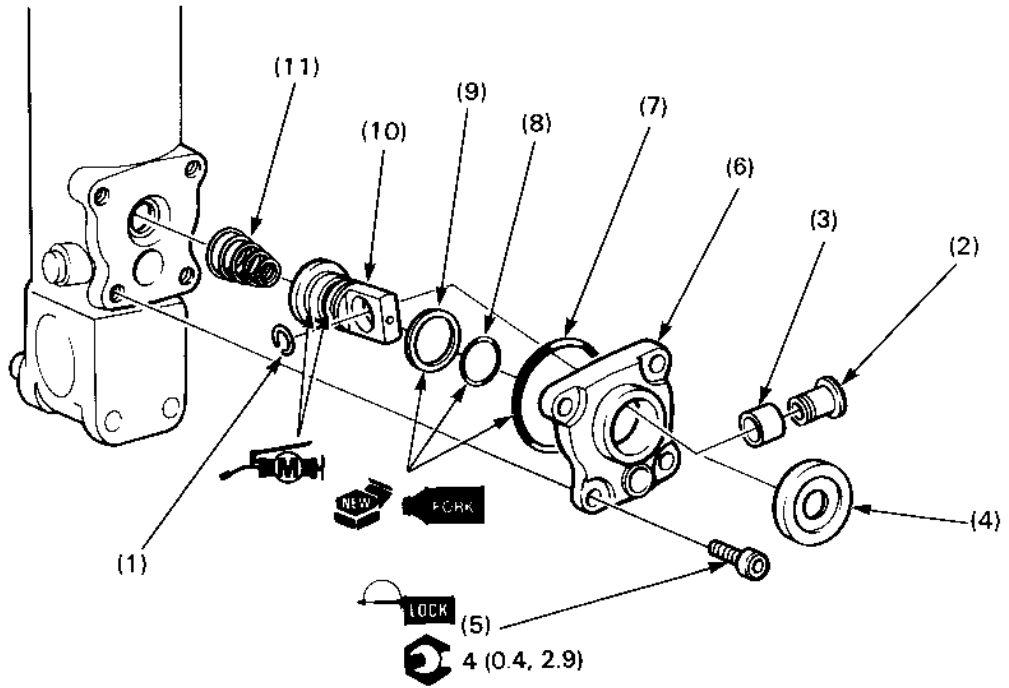


## Requisite Service

- Handlebar cover removal/installation (page 13-2)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Clutch switch wire	2	
(2)	Clutch master cylinder holder	1	
(3)	Clutch master cylinder	1	<b>CAUTION</b> • Keep master cylinder upright, to prevent air from entering the system.
(4)	Left handlebar switch	1	
(5)	Choke cable	1	Disconnect from the choke lever flange.
(6)	Front brake light switch wire	2	
(7)	Brake master cylinder holder	1	
(8)	Brake master cylinder	1	<b>CAUTION</b> • Keep master cylinder upright, to prevent air from entering the system.
(9)	Right handlebar switch	1	
(10)	Wire band	2	
(11)	Handlebar weight screw	2	
(12)	Handlebar weight	2	
(13)	Handlebar upper holder bolt	4	
(14)	Handlebar upper holder	2	
(15)	Throttle grip	1	
(16)	Throttle cable	2	Disconnect from the throttle grip flange.
(17)	Handlebar	1	

## Anti-dive Case Disassembly/Assembly



### ⚠ WARNING

- The anti-dive case is under spring pressure. Use care when removing the case to keep it from becoming a projectile.

### Requisite Service

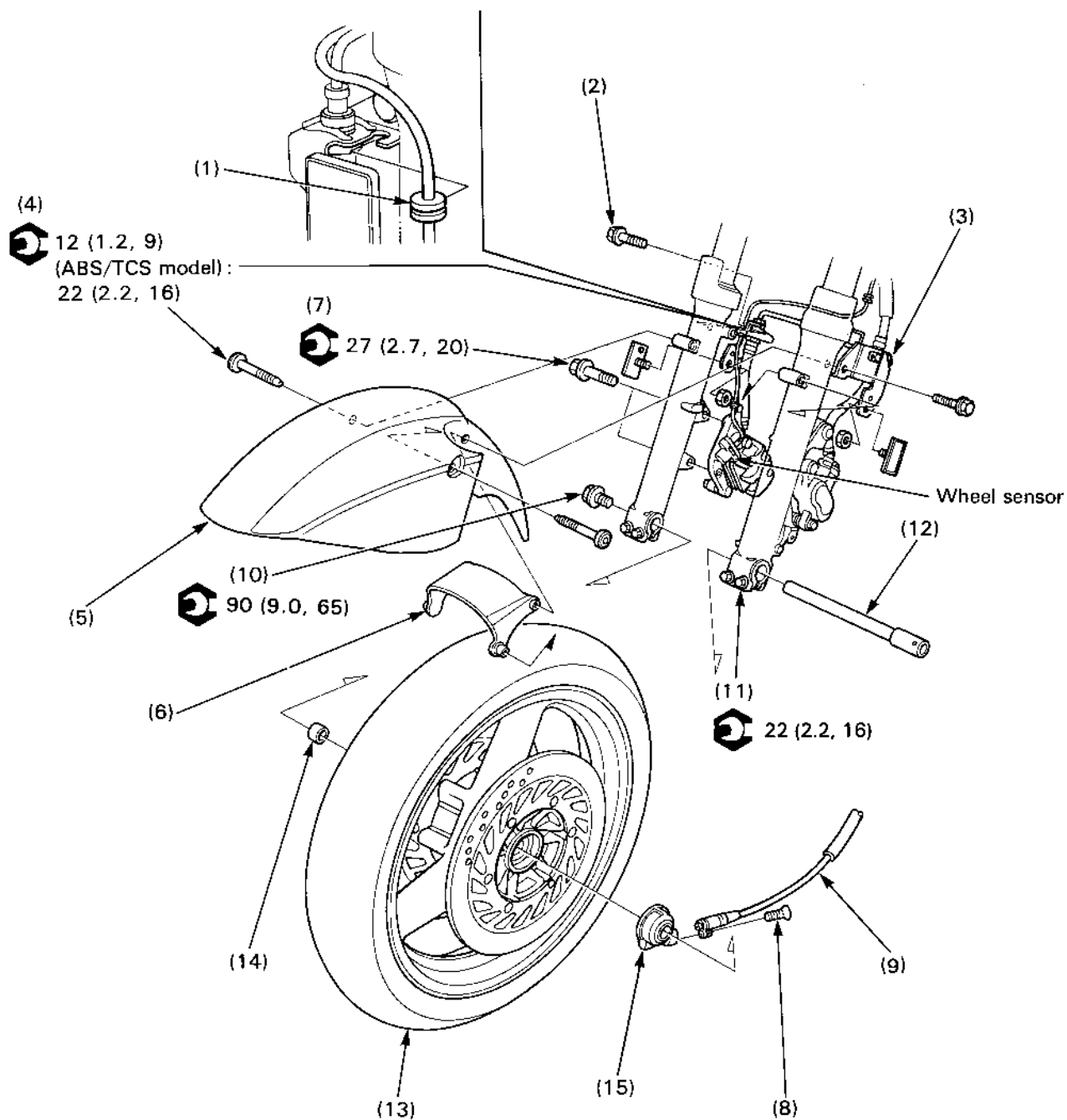
- Left fork oil draining (Standard and ABS/TCS model)
- Right fork oil draining (LBS-ABS/TCS model)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1) Stop ring	1	
(2) Pivot collar	1	
(3) Bushing	1	
(4) Rubber boot	1	
(5) Socket bolt	4	
(6) Case cover	1	
(7) O-ring	1	
(8) Piston seal	1	
(9) Oil seal	1	
(10) Anti-dive piston	1	
(11) Spring	1	

# Front Wheel Removal/Installation

## Standard and ABS/TCS Model

ABS/TCS model shown:



**▲ WARNING**

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Brake dust may contain asbestos. Inhaled asbestos fibers have been found to cause respiratory disease and cancer.
- Never use an air hose or dry brush to clean brake assembly. Use an OSHA-approved vacuum cleaner or an alternate method approved by OSHA, designed to minimize the hazard caused by airborne asbestos fibers.

**CAUTION**

- After installing the front wheel, apply the front brake and check the brake operation.

**NOTE**

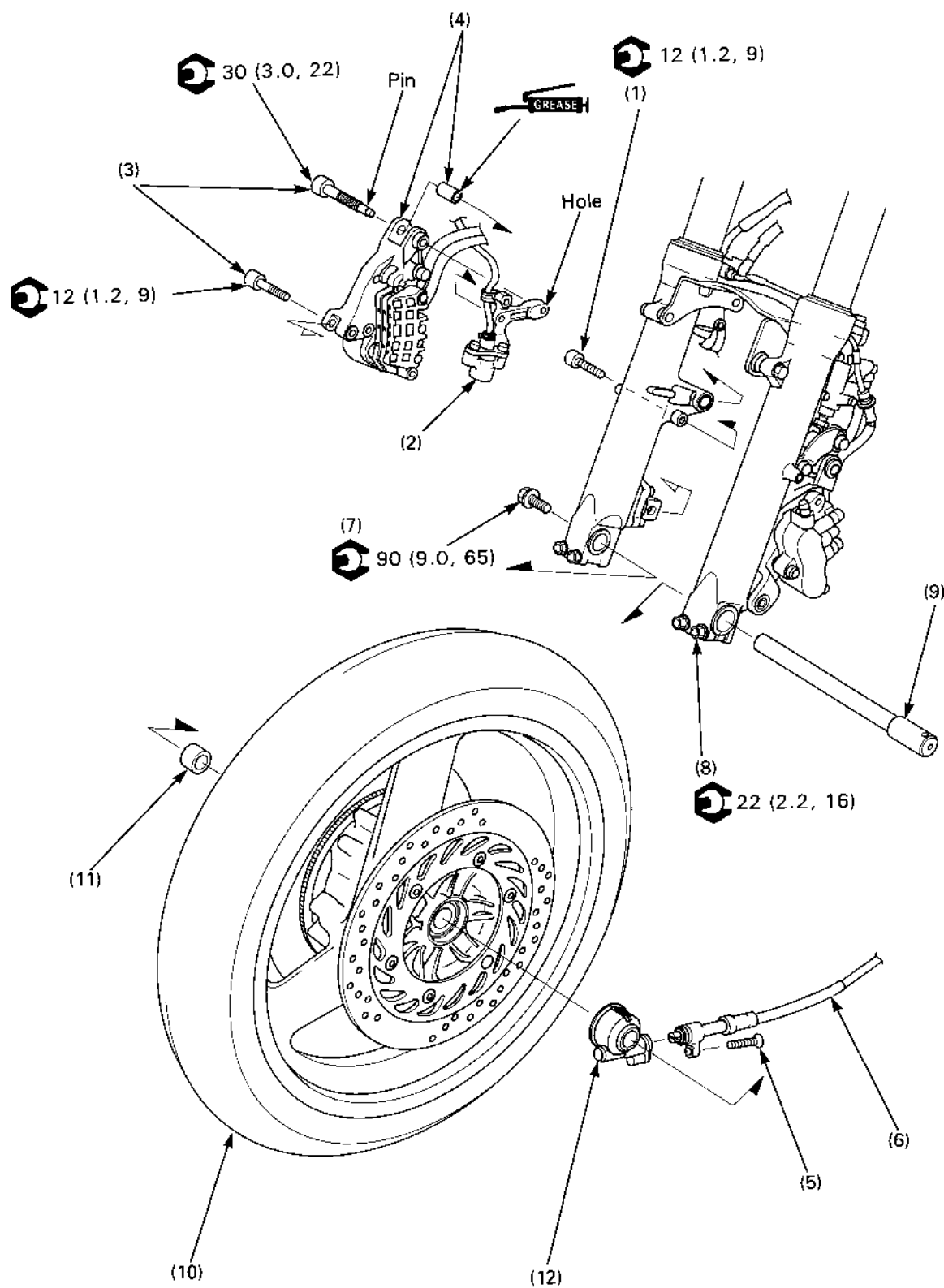
- Do not depress the brake lever when the caliper is removed, or it will be difficult to refit the disc between the brake pads.

**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>		Installation is in the reverse order of removal.
(1) Wheel sensor wire grommet (ABS/TCS model only)	2	Remove the left grommet first.
(2) Bolt	2	
(3) Front brake hose stay	2	Remove from the front forks.
(4) Socket bolt	2	
(5) Front fender	1	
(6) Front fender plate	1	
(7) Right front brake caliper mounting bolt	2	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• <b>ABS/TCS model only: Be careful not to damage the tip of the wheel sensor.</b></li> <li>• <b>Do not hang the caliper from the brake hose. Air may enter the brake system.</b></li> </ul>
(8) Speedometer cable set screw	1	
(9) Speedometer cable	1	
(10) Front axle bolt	1	
(11) Front axle pinch bolt	4	Loosen the bolts.
(12) Front axle	1	
(13) Front wheel assembly	1	
(14) Right side collar	1	
(15) Speedometer gear box	1	

LBS-ABS/TCS Model



**⚠ WARNING**

- A contaminated brake disc or pad reduces stopping power, discard contaminated pads and clean contaminated disc with a high quality 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.

**CAUTION**

- After installing the front wheel, operate the brake lever and pedal and check the brake operation (page 3-13).

**NOTE**

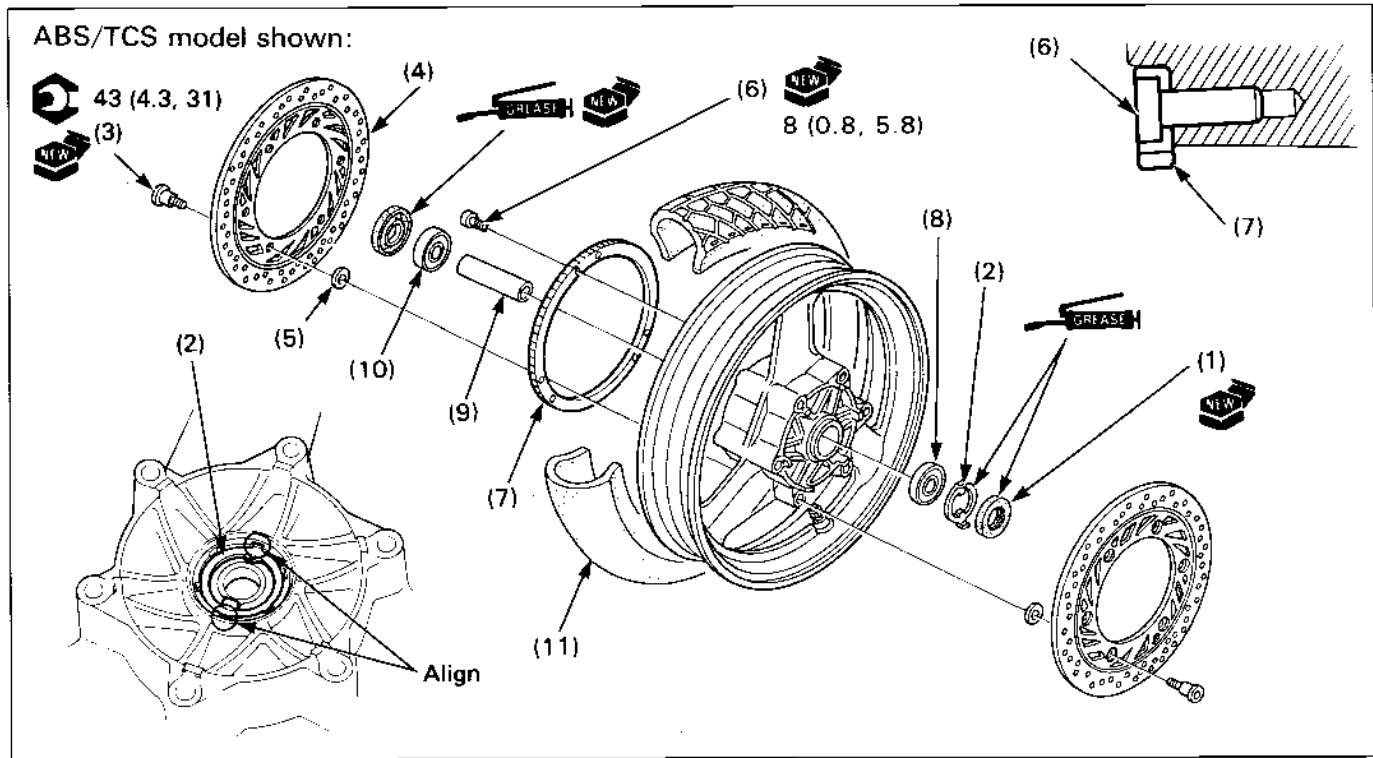
- Do not depress the brake lever or pedal when the front caliper is removed, or it will be difficult to refit the disc between the brake pads.

**Requisite Service**

- Raise the wheel off the ground by placing a jack or other support under the engine.
- Front fender removal/installation (page 2-11).

Procedure		Q'ty	Remarks
(1)	<b>Removal Order</b> Sensor bracket bolt	1	Installation is in the reverse order of removal. <b>CAUTION</b> • Be careful not to damage the tip of the wheel sensor. NOTE • When tightening, perform the air gap inspection (page 16-B-34).
(2)	Wheel sensor assembly	1	NOTE • At installation, route the sensor wire properly (page 1-25), and align the hole in the bracket with the pin of the upper caliper mounting bolt.
(3)	Right front brake caliper mounting bolt	2	<b>CAUTION</b> • Do not hang the caliper from the brake hose/pipe.
(4)	Front brake caliper/pivot collar	1/1	
(5)	Speedometer cable setting screw	1	
(6)	Speedometer cable	1	
(7)	Front axle bolt	1	
(8)	Front axle pinch bolt	4	Only loosen these bolts.
(9)	Front axle	1	
(10)	Front wheel assembly	1	
(11)	Right side collar	1	
(12)	Speedometer gear box	1	

# Front Wheel Disassembly/Assembly



**NOTE**

- The left brake disc has "L" mark and the right brake disc has "R" mark. Install them on the correct sides.
- Always replace wheel bearings as a set.
- For wheel bearing replacement, refer to the section 1 of the Common Service Manual.

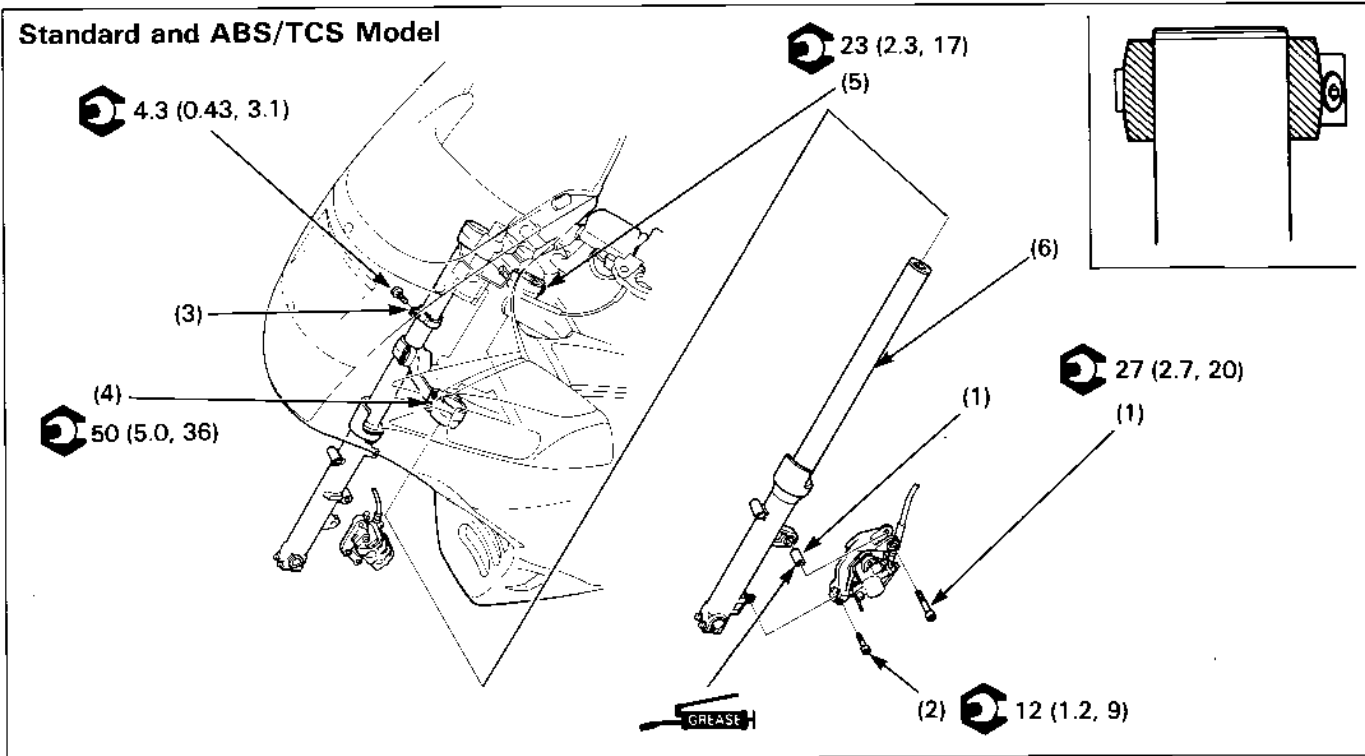
**Requisite Service**

- Front wheel removal/installation (page 13-6)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1) Dust seal	2	
(2) Speedometer gear retainer	1	At installaion, align the tabs with the slots in the wheel hub
(3) Brake disc bolt	12	
(4) Brake disc	2	Install the disc with the "L" mark on the left side, and the disc with the "R" mark on the right side.
(5) Gasket	12	
(6) Torx bolt (T25) (ABS/TCS or LBS-ABS/TCS model)	6	
(7) Pulser ring (ABS/TCS or LBS-ABS/TCS model)	1	Install the pulser ring with the concave portion of bolt hole facing out. <b>CAUTION</b> • Be careful not to deform, distort, or damage the pulser ring.
(8) Left wheel bearing (6004UU)	1	
(9) Distance collar	1	
(10) Right wheel bearing (6004UU)	1	At installation, drive a new right wheel bearing in the hub first, then drive a new left bearing in.
(11) Front tire	1	



## Fork Removal/Installation



## NOTE

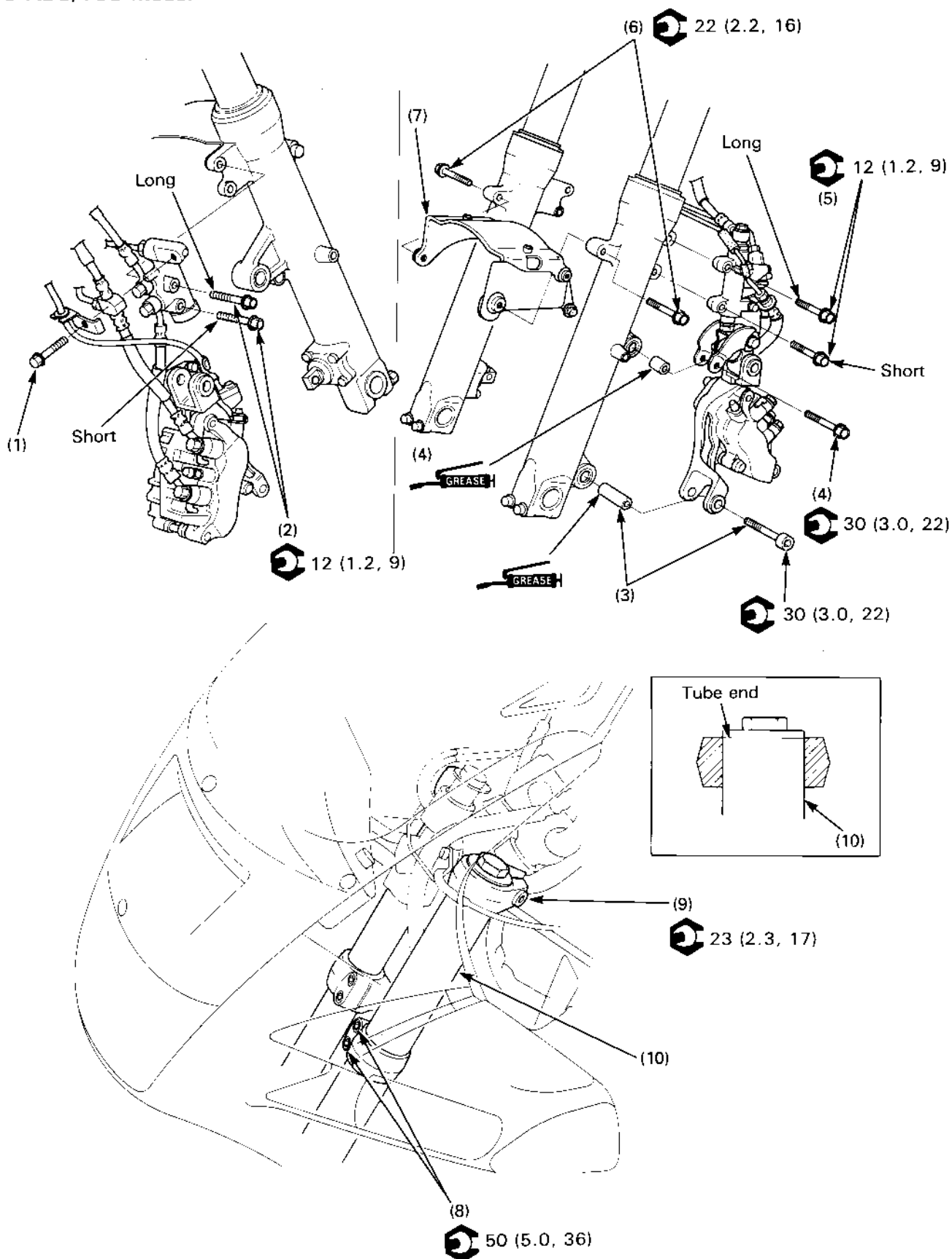
- When the fork is to be disassembled, loosen the fork bolt but do not remove it.
- After assembling the fork, tighten the fork cap temporarily before tightening the upper fork pinch bolt.

## Requisite Service

- Handlebar cover removal/installation (page 13-2)
- Front wheel removal/installation (page 13-6)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Left brake caliper pivot bolt (upper)/collar	1/1	<b>CAUTION</b> • Do not hang the brake caliper from the brake hose. Right fork only. Loosen the bolts. Loosen the bolt <b>NOTE</b> • Be careful not to let the fork drop when loosening the bolt. At installation, align the end of the fork tube with the upper surface of the top bridge.
(2) Left brake caliper pivot bolt (lower)	1	
(3) Brake hose clamp (Standard model)	1	
(4) Lower fork pinch bolt	4	
(5) Upper fork pinch bolt	2	
(6) Fork assembly	1	

LBS-ABS/TCS Model



**CAUTION**

- When performing this service, provide the calipers with a support (s). Do not hang the calipers from the brake hose and pipe.

**NOTE**

- When the fork is to be disassembled, loosen the fork cap but do not remove it yet.
- After assembling the fork, tighten the fork cap which is temporarily tightened before tightening the upper fork pinch bolt.

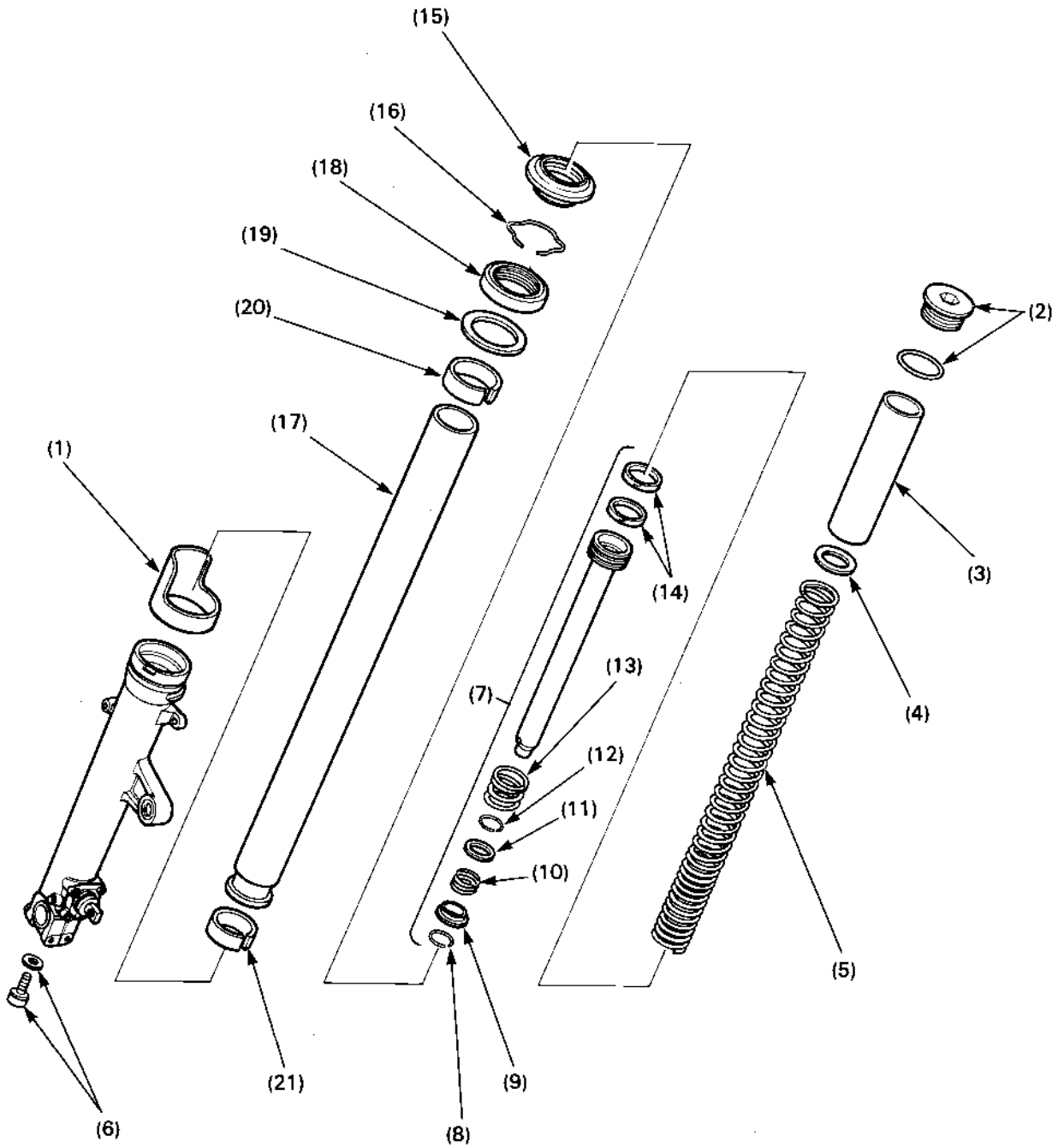
**Requisite Service**

- Handlebar cover removal/installation (page 13-2).
- Front wheel removal/installation (page 13-6).

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Oil pipe and wire stay fixing bolt	1	
(2)	Delay valve mounting bolt	2	Secure the upper bolt with the fender plate.
(3)	Left brake caliper pivot bolt (lower)/collar	1/1	
(4)	Secondary master cylinder link plate bolt (lower; slider-to-link bolt)/collar	1/1	Secure the upper bolt with the fender plate.
(5)	Secondary master cylinder mounting bolt	2	
(6)	Fender plate mounting bolt	2	
(7)	Front fender plate	1	
(8)	Lower fork pinch bolt	4	Only loosen.
(9)	Upper fork pinch bolt	2	Only loosen.
			<b>NOTE</b>
			• Be careful not to let the fork drop when loosening the bolt.
(10)	Fork assembly	1	At installation, align the end of the fork tube with the upper surface of the top bridge.

# Left Fork Disassembly

Standard and ABS/TCS Model



**WARNING**

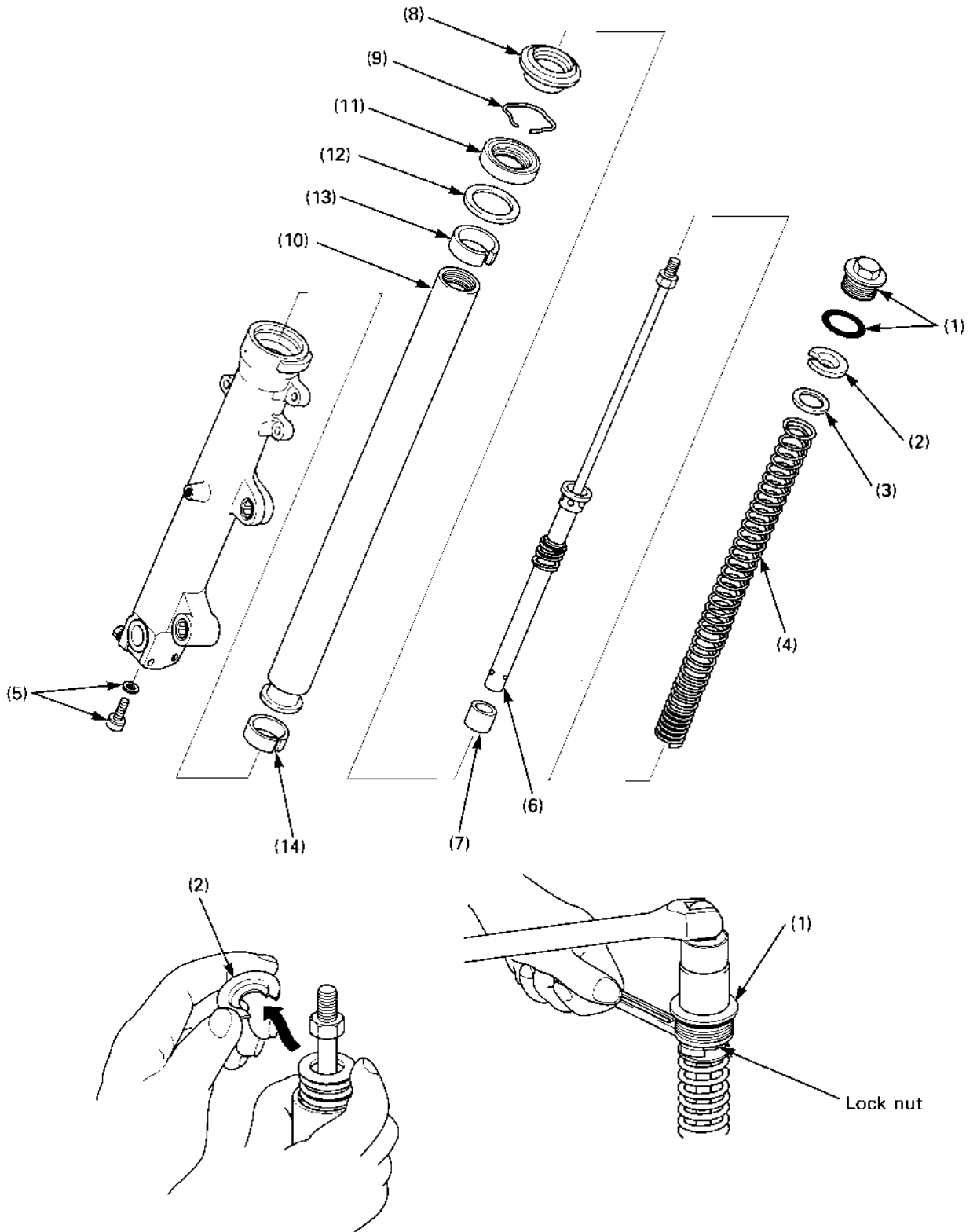
- The fork cap is under spring pressure. Use care when removing it.

**Requisite Service**

- Fork removal (page 13-11)

	Procedure	Q'ty	Remarks
	<b>Disassembly Order</b>		
(1)	Fork tube protector	1	<b>NOTE</b> • Do not remove unless necessary.
(2)	Fork cap/O-ring	1/1	
(3)	Spring collar	1	
(4)	Spring seat	1	
(5)	Fork spring	1	Drain the fork fluid after removing the spring.
(6)	Socket bolt/washer	1/1	
(7)	Fork piston assembly	1	
(8)	Stopper ring	1	Remove from the fork piston.
(9)	Oil lock valve	1	
(10)	Oil lock valve spring	1	
(11)	Spring seat	1	
(12)	Stopper ring	1	
(13)	Rebound spring	1	
(14)	Piston rings	2	<b>NOTE</b> • Do not remove the piston rings unless they are to be replaced.
(15)	Dust seal	1	
(16)	Stopper ring	1	<b>CAUTION</b> • Be careful not to damage the fork tube sliding surface.
(17)	Fork tube	1	
(18)	Oil seal	1	
(19)	Back-up ring	1	
(20)	Slider bushing	1	
(21)	Fork tube bushing	1	<b>NOTE</b> • Do not remove bushing unless it is to be replaced.

LBS-ABS/TCS Model



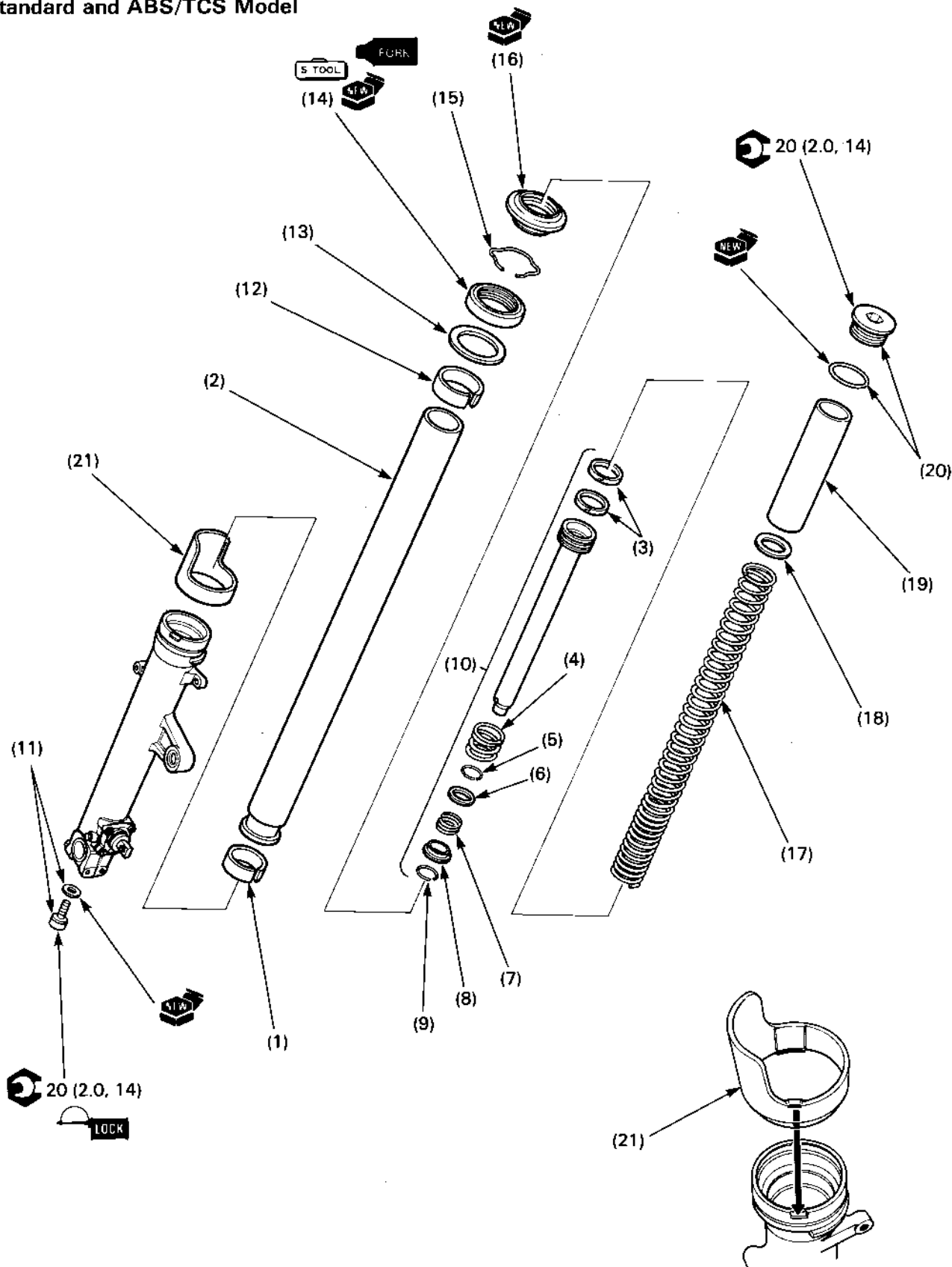
## Requisite Service

- Fork removal (page 13-12).

Procedure		Q'ty	Remarks
	<b>Disassembly Order</b>		
(1)	Fork cap/O-ring	1/1	Remove the cap from the fork tube, then remove it from the fork damper rod while holding the lock nut as shown. Remove the stopper while compressing the fork spring as shown.  <b>CAUTION</b> • Be careful not to damage the fork tube sliding surface.  <b>NOTE</b> • Do not remove the bushing unless it is to be replaced.
(2)	Spring seat stopper	1	
(3)	Spring seat	1	
(4)	Fork spring	1	
(5)	Socket bolt/washer	1/1	
(6)	Fork damper	1	
(7)	Oil lock piece	1	
(8)	Dust seal	1	
(9)	Stopper ring	1	
(10)	Fork tube	1	
(11)	Oil seal	1	
(12)	Back-up ring	1	
(13)	Slider bushing	1	
(14)	Fork tube bushing	1	

# Left Fork Assembly

Standard and ABS/TCS Model

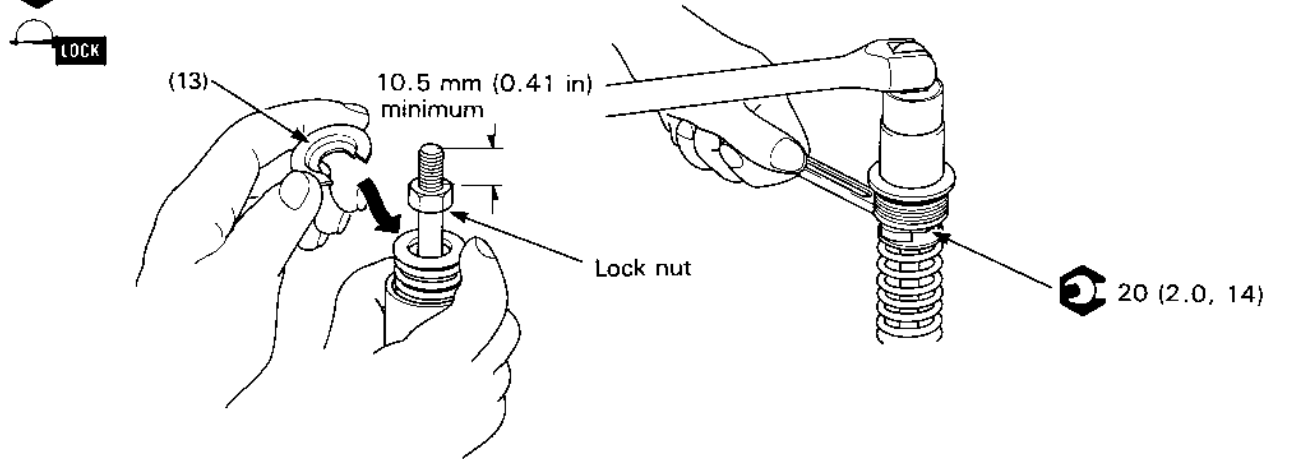
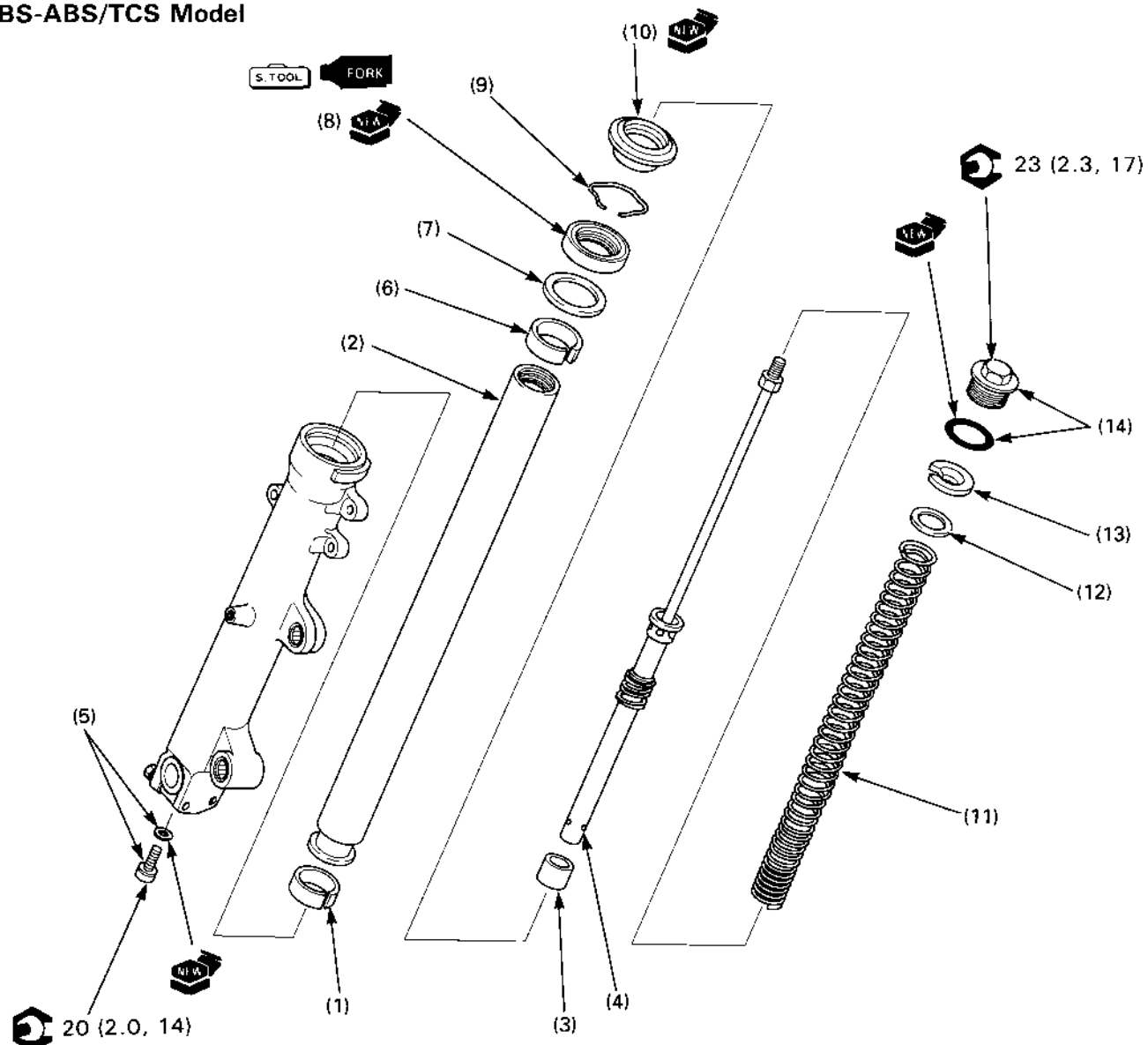




Procedure		Q'ty	Remarks
	<b>Assembly Order</b>		
(1)	Fork tube bushing	1	
(2)	Fork tube	1	
(3)	Piston rings	2	Install onto the fork piston
(4)	Rebound spring	1	
(5)	Stopper ring	1	
(6)	Spring seat	1	
(7)	Oil lock valve spring	1	
(8)	Oil lock valve	1	
(9)	Stopper ring	1	
(10)	Fork piston assembly	1	
(11)	Socket bolt/washer	1/1	
(12)	Slider bushing	1	
(13)	Back-up ring	1	
(14)	Oil seal	1	NOTE <ul style="list-style-type: none"> <li>• Wrap vinyl tape around the fork tube top end to avoid damaging the oil seal lip during installation.</li> <li>• Drive the slider bushing and oil seal into the slider using the fork seal driver body (07947—KA50100) and attachment (07947—KFO0100).</li> </ul>
(15)	Stopper ring	1	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• Be careful not to damage the fork tube sliding surface.</li> </ul>
(16)	Dust seal	1	Pour in the fork fluid to the specified level with the fork fully compressed before installing the fork spring.
(17)	Fork spring	1	Wipe fluid off the spring thoroughly using a clean lint free cloth and install with the tightly wound coil end facing down.
(18)	Spring seat	1	
(19)	Spring collar	1	
(20)	Fork cap/O-ring	1/1	Screw in the bolt, but do not tighten yet. <b>CAUTION</b> <ul style="list-style-type: none"> <li>• Be careful not to cross-thread the fork cap.</li> </ul>
(21)	Fork tube protector	1	Align the lug with the groove in the fork slider. NOTE <ul style="list-style-type: none"> <li>• For easy installation, immerse in hot water (50—60°C/122—140°F).</li> </ul>

After completing fork assembly, refer to fork installation procedures (page 13-11).

LBS-ABS/TCS Model

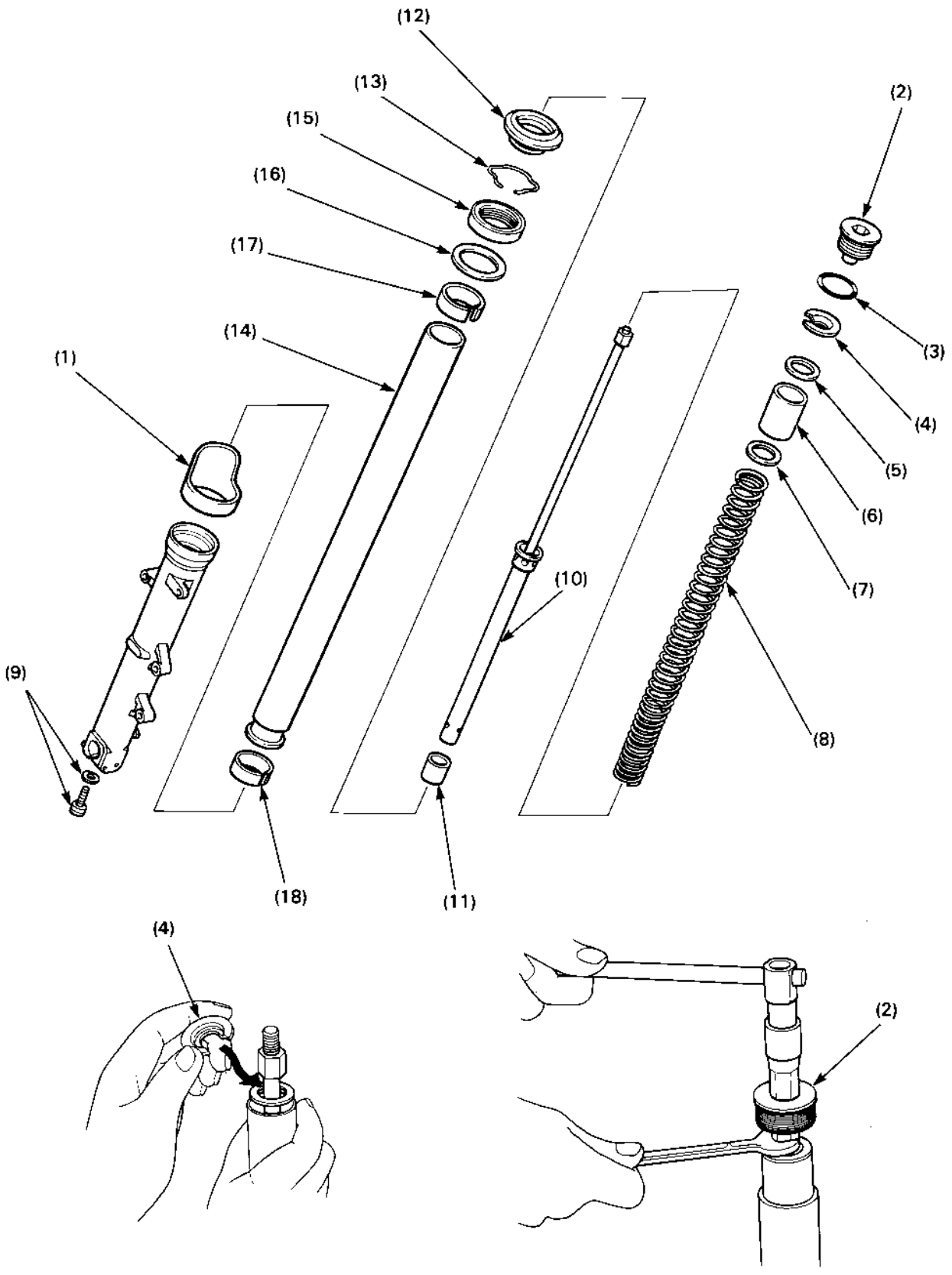


	Procedure	Q'ty	Remarks
	<b>Assembly Order</b>		
(1)	Fork tube bushing	1	
(2)	Fork tube	1	
(3)	Oil lock piece	1	Install onto the end of the fork damper.
(4)	Fork damper	1	
(5)	Socket bolt/washer	1/1	
(6)	Slider bushing	1	
(7)	Back-up ring	1	
(8)	Oil seal	1	NOTE <ul style="list-style-type: none"> <li>• Wrap vinyl tape around the fork tube top end to avoid damaging the oil seal lip during installation.</li> <li>• Drive the slider bushing and oil seal into the slider using the fork seal driver body (07947-KA50100) and attachment (07947-KA40200).</li> </ul>
(9)	Stopper ring	1	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• <b>Be careful not to damage the fork tube sliding surface.</b></li> </ul>
(10)	Dust seal	1	Pour in the fork fluid to the specified level before installing the fork spring.
(11)	Fork spring	1	Wipe fluid off the spring thoroughly using a clean lint-free cloth and install with the tightly wound coil end facing down.
(12)	Spring seat	1	
(13)	Spring seat stopper	1	Install the stopper between the spring seat and lock nut while compressing the fork spring as shown. <p>NOTE</p> <ul style="list-style-type: none"> <li>• Before installing the stopper, measure the distance between the lock nut and the top of the damper rod, it should be at least 10.5 mm (0.41 mm)</li> </ul>
(14)	Fork cap/O-ring	1/1	Install the fork cap onto the damper rod and tighten the lock nut as shown, then screw it into the fork tube, but do not tighten yet. <p><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>• <b>Be careful not to cross-thread the fork cap.</b></li> </ul>

After completing fork assembly, refer to fork installation procedure (page 13-13).

# Right Fork Disassembly

Standard and ABS/TCS Model

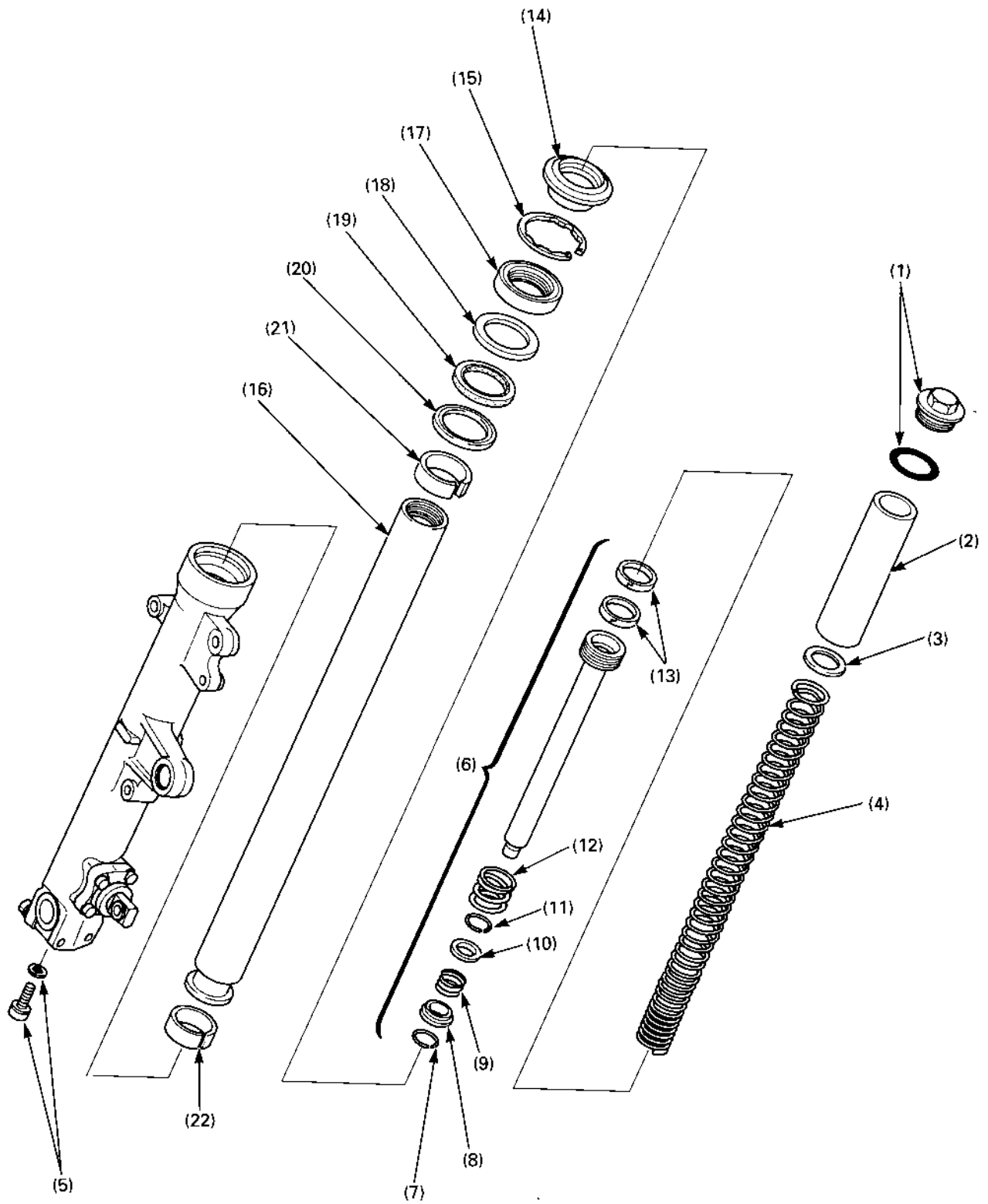


## Requisite Service

- Fork removal (page 13-11)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			
(1)	Fork tube protector	1	<b>NOTE</b> • Do not remove unless necessary.
(2)	Fork cap	1	Remove the fork cap from the fork tube, then remove it from the fork damper rod while holding the lock nut as shown.
(3)	O-ring	1	
(4)	Spring seat stopper	1	Remove the stopper while compressing the fork spring as shown.
(5)	Spring seat	1	
(6)	Spring collar	1	
(7)	Spring seat	1	
(8)	Fork spring	1	
(9)	Socket bolt/washer	1/1	
(10)	Fork damper	1	
(11)	Oil lock piece	1	
(12)	Dust seal	1	
(13)	Stopper ring	1	<b>CAUTION</b> • Be careful not to damage the fork tube sliding surface.
(14)	Fork tube	1	
(15)	Oil seal	1	
(16)	Back-up ring	1	
(17)	Slider bushing	1	
(18)	Fork tube bushing	1	<b>NOTE</b> • Do not remove the bushing unless it is to be replaced.

LBS-ABS/TCS Model



**⚠ WARNING**

- The fork cap is under spring pressure. Use care when removing it.

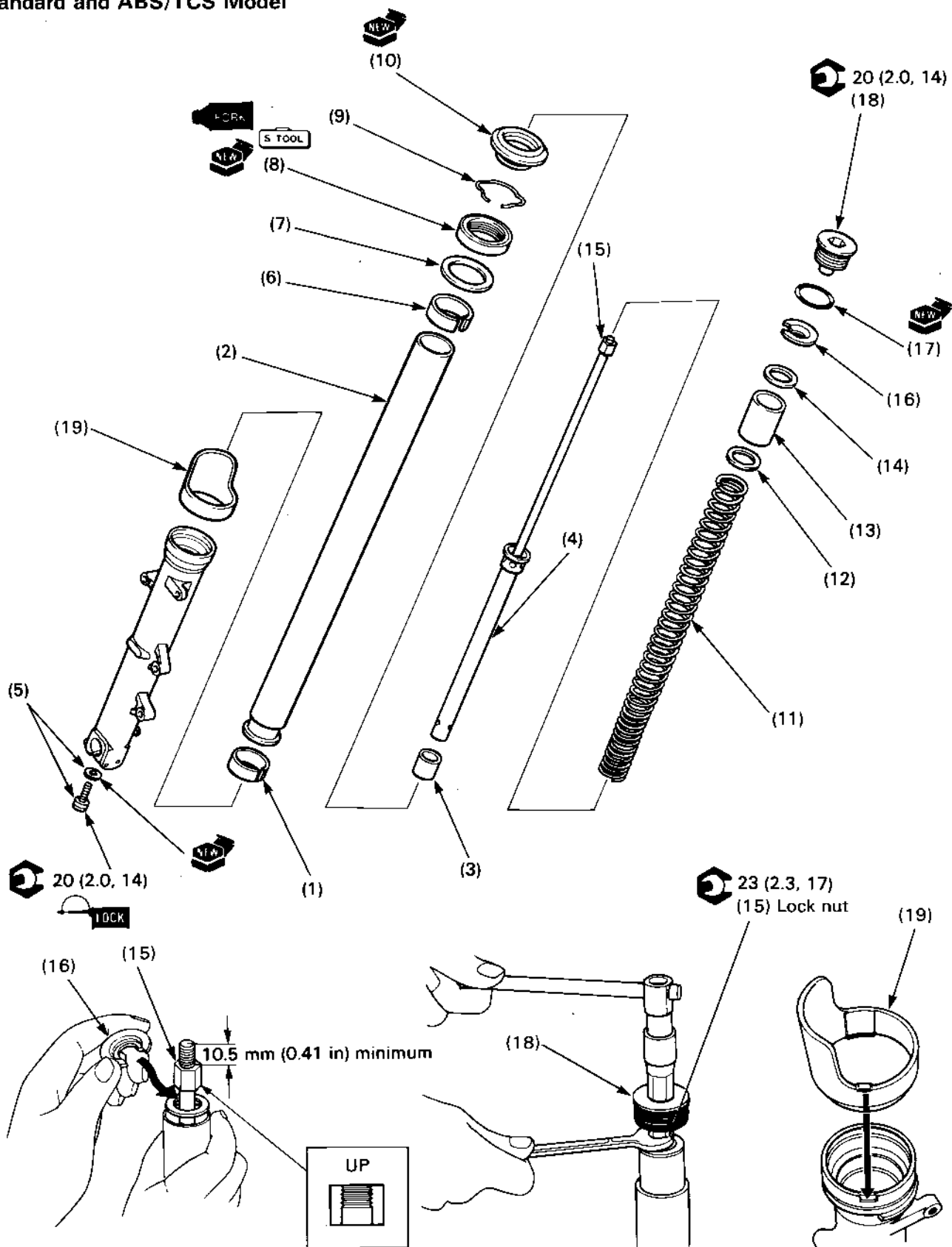
**Requisite Service**

- Fork removal (page 13-12).

Procedure	Q'ty	Remarks
<b>Disassembl Order</b>		
(1) Fork cap/O-ring	1/1	
(2) Spring collar	1	
(3) Spring seat	1	
(4) Fork spring	1	Drain the fork fluid after removing the spring.
(5) Socket bolt/washer	1/1	
(6) Fork piston assembly	1	
(7) Stopper ring	1	Remove from the fork piston.
(8) Oil lock valve	1	
(9) Oil lock valve spring	1	
(10) Spring seat	1	
(11) Stopper ring	1	
(12) Rebound spring	1	
(13) Piston ring	2	NOTE • Do not remove the piston rings unless they are to be replaced.
(14) Dust seal	1	
(15) Snap ring	1	<b>CAUTION</b> • Be careful not to damage the fork tube sliding surface.
(16) Fork tube	1	
(17) Oil seal	1	
(18) Back-up ring (upper)	1	
(19) Packing	1	
(20) Back-up ring (lower)	1	
(21) Slider bushing	1	
(22) Fork tube bushing	1	NOTE • Do not remove bushing unless it is to be replaced.

# Right Fork Assembly

Standard and ABS/TCS Model

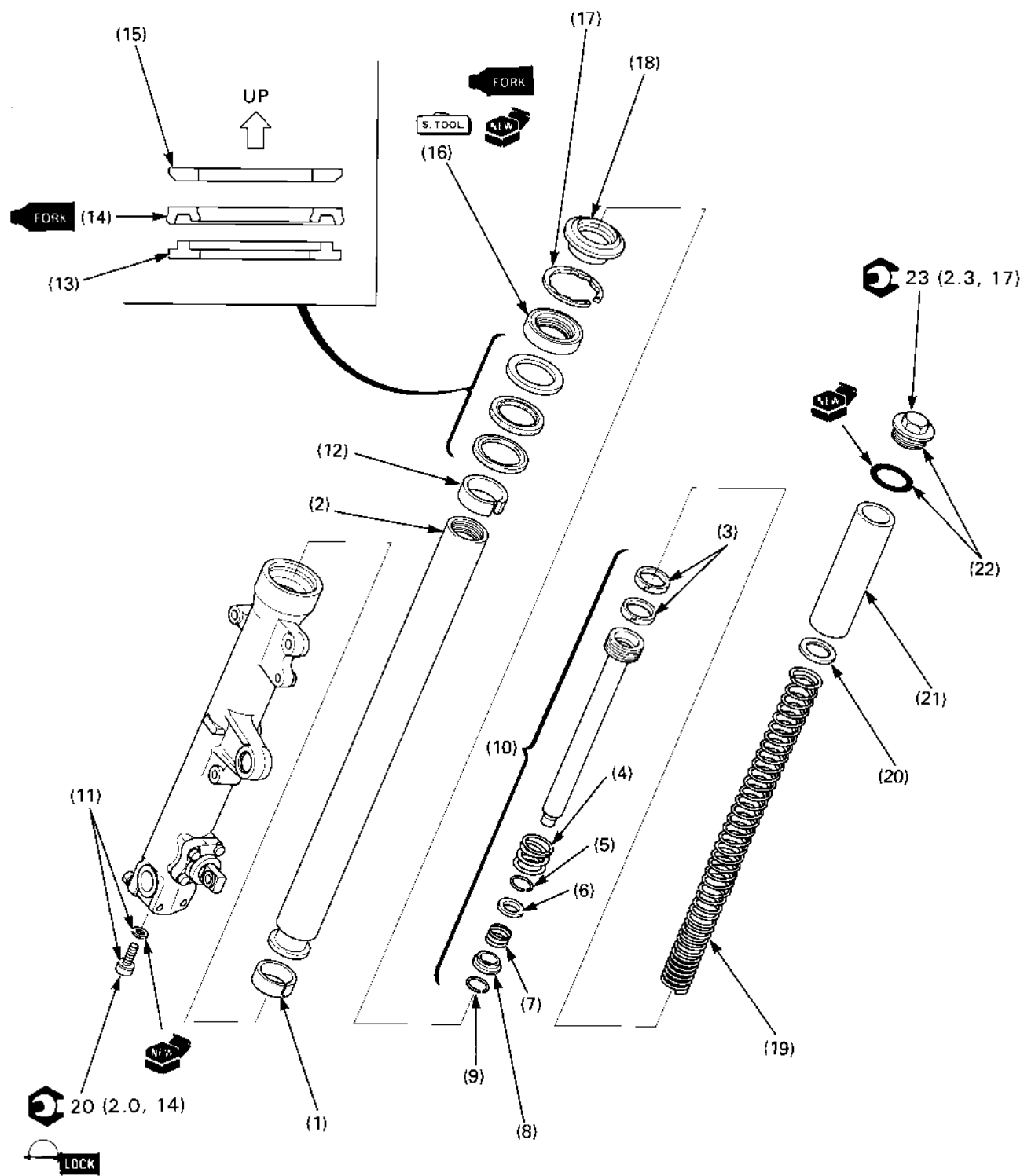




Procedure		Q'ty	Remarks
<b>Assembly Order</b>			
(1)	Fork tube bushing	1	
(2)	Fork tube	1	
(3)	Oil lock piece	1	Install onto the end of the fork damper.
(4)	Fork damper	1	
(5)	Socket bolt/washer	1/1	
(6)	Slider bushing	1	
(7)	Back-up ring	1	
(8)	Oil seal	1	NOTE <ul style="list-style-type: none"> <li>• Wrap vinyl tape around the fork tube top end to avoid damaging the oil seal lip during installation.</li> <li>• Drive the slider bushing and oil seal into the slider using the fork seal driver body (07947—KA50100) and attachment (07947—KF00100).</li> </ul>
(9)	Stopper ring	1	<b>CAUTION</b> <ul style="list-style-type: none"> <li>• Be careful not to damage the fork tube sliding surface.</li> </ul>
(10)	Dust seal	1	Pour in the fork fluid to the specified level with the fork fully compressed before installing the fork spring.
(11)	Fork spring	1	Wipe fluid off the spring thoroughly using a clean lint free cloth and install with the tightly wound coil end facing down.
(12)	Spring seat	1	
(13)	Spring collar	1	
(14)	Spring seat	1	
(15)	Lock nut	1	Install in the direction shown in the illustration—with the fully threaded end up.
(16)	Spring seat stopper	1	Install the stopper between the spring seat and lock nut while compressing the fork spring as shown. <p>NOTE</p> <ul style="list-style-type: none"> <li>• Before installing the stopper, measure the distance between the lock nut and the top of the damper rod. It should be at least 10.5 mm (0.41 in)</li> </ul>
(17)	O-ring	1	
(18)	Fork cap	1/1	Install the fork cap onto the damper rod and tighten the lock nut as shown, then screw it into the fork tube, but do not tighten yet. <p><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>• Be careful not to cross-thread the fork cap.</li> </ul>
(19)	Fork pipe protector	1	Align the lug with the groove in the fork slider. <p>NOTE</p> <ul style="list-style-type: none"> <li>• For easy installation, immerse in hot water (50–60°C/122–140°F).</li> </ul>

After completing fork assembly, refer to fork installation procedures (page 13-11).

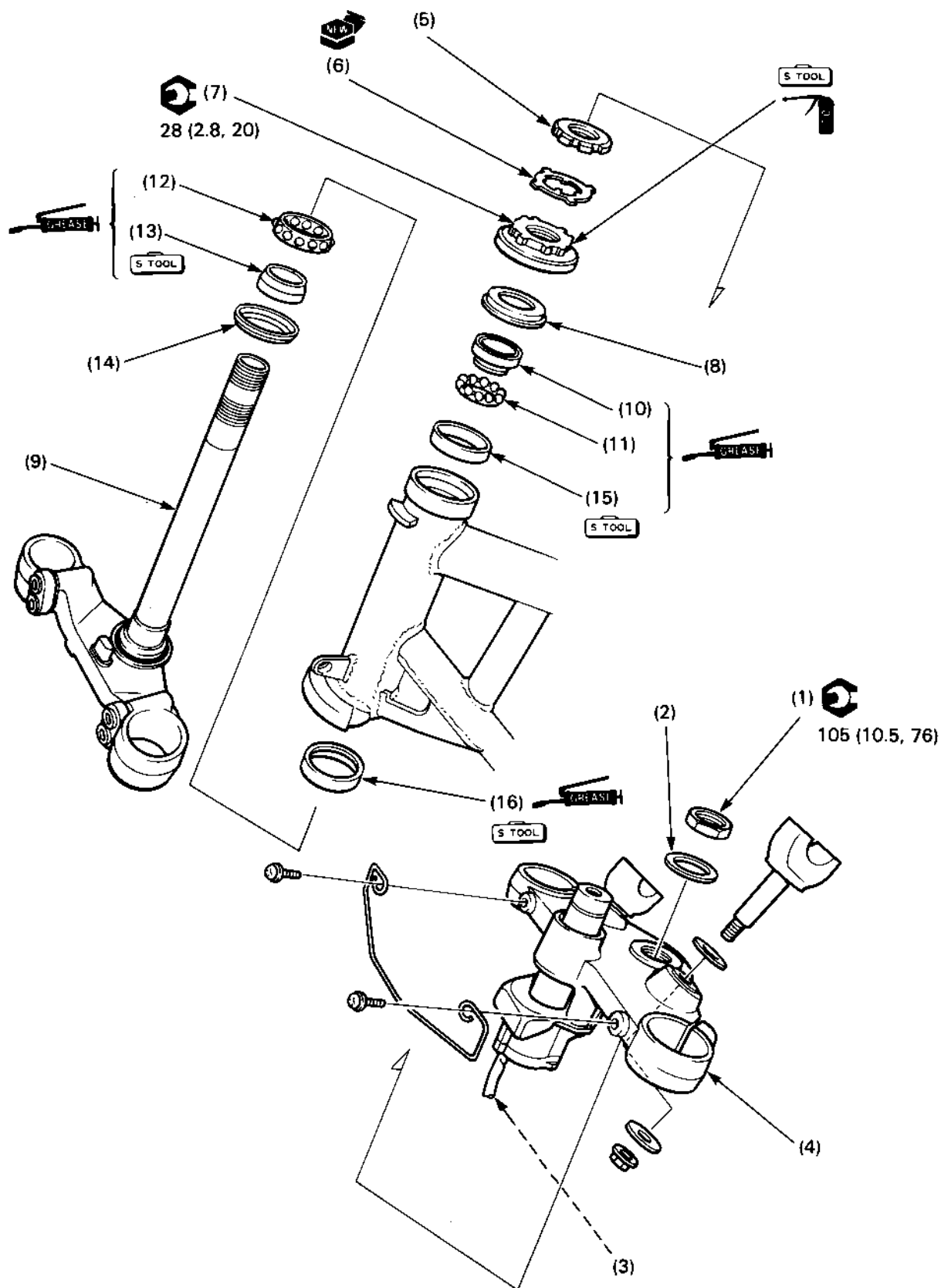
LBS-ABS/TCS Model



Procedure	Q'ty	Remarks
<b>Assembly Order</b>		
(1) Fork tube bushing	1	
(2) fork tube	1	
(3) Piston ring	2	Install onto the fork piston.
(4) Rebound spring	1	
(5) Stopper ring	1	
(6) Spring seat	1	
(7) Oil lock valve spring	1	
(8) Oil lock valve	1	
(9) Stopper ring	1	
(10) Fork piston assembly	1	
(11) Socket bolt/washer	1/1	
(12) Slider bushing	1	
(13) Back-up ring (lower)	1	Install with the flat side facing down.
(14) Packing	1	Install with the groove side facing down.
(15) Back-up ring (upper )	1	Install with the camfered side facing down.
(16) Oil seal	1	NOTE
		<ul style="list-style-type: none"> <li>• Wrap vinyl tape around the fork tube top end to avoid damaging the oil seal lip during installation.</li> <li>• Drive the slider bushing and oil seal into the slider using the fork seal driver body (07947-KA50100) and attachment (07947-KA40200).</li> </ul>
(17) Snap ring	1	<b>CAUTION</b>
		<ul style="list-style-type: none"> <li>• <b>Be careful not to damage the fork tube sliding surface.</b></li> </ul>
(18) Dust seal	1	Pour in the fork fluid to the specified level before installing the fork spring.
(19) Fork spring	1	Wipe fluid off the spring thoroughly using a clean lint free cloth and install with the tightly wound coil end facing down.
(20) Spring seat	1	
(21) Spring collar	1	
(22) Fork cap/O-ring	1/1	Screw in the cap, but do not tighten yet.
		<b>CAUTION</b>
		<ul style="list-style-type: none"> <li>• <b>Be careful not to cross-thread the fork cap bolt.</b></li> </ul>

After completing fork assembly, refer to fork installation procedures (page 13-13).

# Steering Stem Removal/Installation



## NOTE

- The steering head bearings and races should always be replaced as a set.
- When loosening and tightening the steering stem nut, temporarily install the fork legs.

## Requisite Service

- Handlebar removal/installation (page 13-4)
- Fork removal/installation (page 13-11)

Procedure	Qty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Steering stem nut	1	
(2) Washer	1	
(3) Ignition switch wire	1	Disconnect at the connector holder. At installation, route the wire properly (page 1-25).
(4) Fork top bridge	1	
(5) Lock nut	1	
(6) Lock washer	1	
(7) Steering bearing adjustment nut	1	
(8) Dust seal	1	
(9) Steering stem	1	
(10) Upper bearing inner race	1	
(11) Upper bearing	1	
(12) Lower bearing	1	
(13) Lower bearing inner race	1	Install using the steering stem driver (07946—MB00000).
(14) Dust seal	1	
(15) Upper bearing outer race	1	Remove using the race remover attachment (07953—MJ1000B). Install using the driver (07749—0010000) and attachment, 42 x 47 mm (07746—0010300).
(16) Lower bearing outer race	1	Remove using the race bearing remover (07946—3710500). Install with the driver (07749—0010000) and attachment, 52 x 55 mm (07746—0010400).

# 15. Brake System

<b>Service Information</b>	<b>15-1</b>	<b>Rear Brake Caliper Disassembly/ Assembly</b>	<b>15-20</b>
<b>Troubleshooting</b>	<b>15-1</b>	<b>Rear Brake Pedal Removal/ Installation</b>	<b>15-24</b>
<b>Brake Fluid Filling/Bleeding (LBS-ABS/TCS model)</b>	<b>15-2</b>	<b>Secondary Master Cylinder Disassembly/ Assembly (LBS-ABS/TCS model)</b>	<b>15-26</b>
<b>Brake Pad Replacement</b>	<b>15-8</b>	<b>Delay Valve Removal/Installation (LBS-ABS/TCS model)</b>	<b>15-28</b>
<b>Front Master Cylinder Disassembly/ Assembly</b>	<b>15-10</b>	<b>Proportional Control Valve Removal/ Installation (LBS-ABS/TCS model)</b>	<b>15-29</b>
<b>Front Brake Caliper Disassembly/ Assembly</b>	<b>15-12</b>		
<b>Rear Master Cylinder Disassembly/ Assembly</b>	<b>15-16</b>		

## Service Information

### ⚠ WARNING

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Brake dust may contain asbestos, inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard of airborne asbestos fibers.

- 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.
- The brake fluid air bleeding procedure on the ABS/TCS ('92-'95) model must be performed in the same manner as in the ordinal air bleeding procedure. Note that replacement and bleeding air from the brake fluid in the modulator is not necessary, as it is sealed in the modulator. On the LBS-ABS/TCS model (After '95), refer to page 15-2.
- 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.

15

## Troubleshooting

### Brake lever/pedal soft or spongy

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

# Brake Fluid Filling/Bleeding (LBS-ABS/TCS model)

**⚠ 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.

**CAUTION**

- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

**NOTE**

- On the LBS-ABS/TCS model, note that there is no brake fluid in the modulator (except in the modulator head), because the modulator is the motor-driven hydraulic pressure type. Therefore, brake fluid replacement and bleeding air from the modulator body is not necessary.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

## Lever Brake Line

**FLUID FEEDING**

Support the motorcycle on its center stand. Turn the handlebar to the left until the reservoir is level before removing the reservoir cap.

Remove the reservoir cap, set plate and diaphragm.

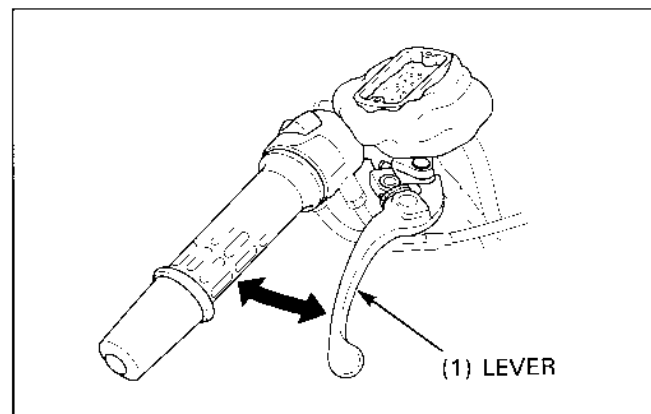
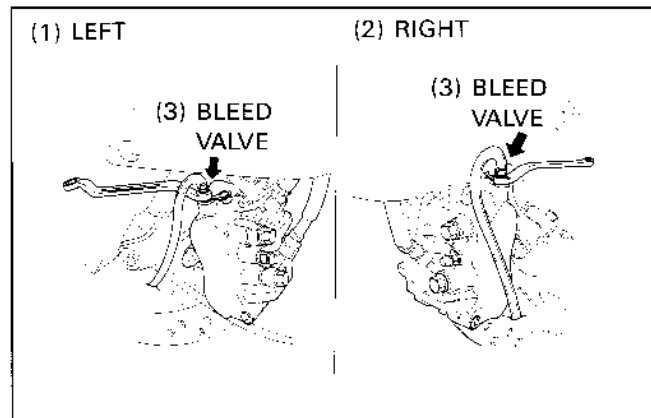
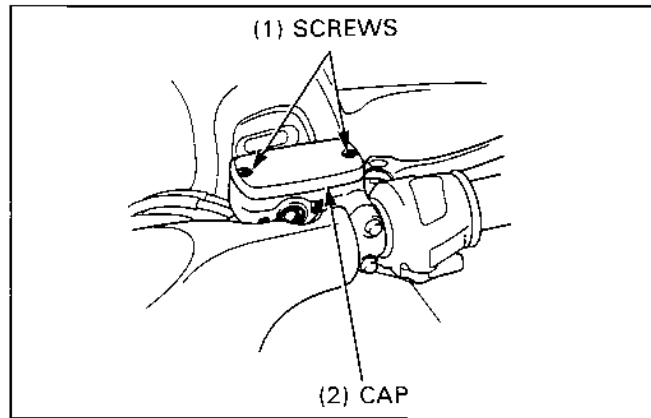
Connect a commercially available brake bleeder (example, Mityvac P/N 6826) to the outer bleed valve (upper side of the each front caliper).

Fill the reservoir with DOT 4 brake fluid from a sealed container.

**CAUTION**

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. They are not compatible.

Operate the brake lever several times to bleed air from the master cylinder.



1. Pump the brake bleeder and loosen the bleed valve.  
Add brake fluid when the fluid level in the reservoir is low.

NOTE

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.

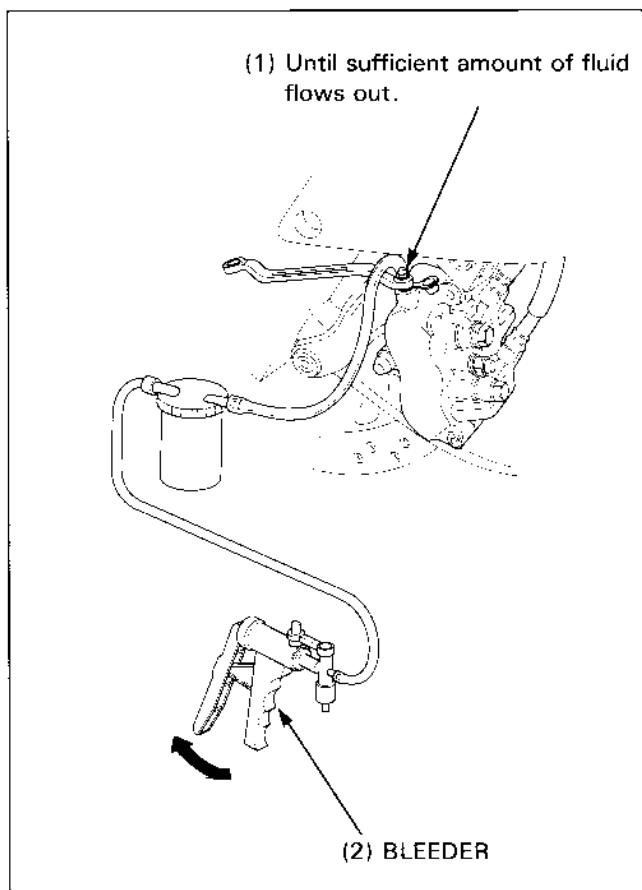
Repeat the above procedure until sufficient amount of the fluid flows out from the bleed valve.  
Close the bleed valve.

NOTE

- It is not a problem if the fluid flowing out from the bleed valve contains air bubbles because the lines will be bled in later steps.
- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

2. Perform step 1 for the other side bleed valve.

Next, perform the air bleeding from the system (page 15-4).



If a commercial brake bleeder is not available, use the following procedure:

Connect a transparent bleed hose to the bleed valve and place the other end of the hose in a container.

1. Pump the brake lever several (5-10) times quickly, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.

NOTE

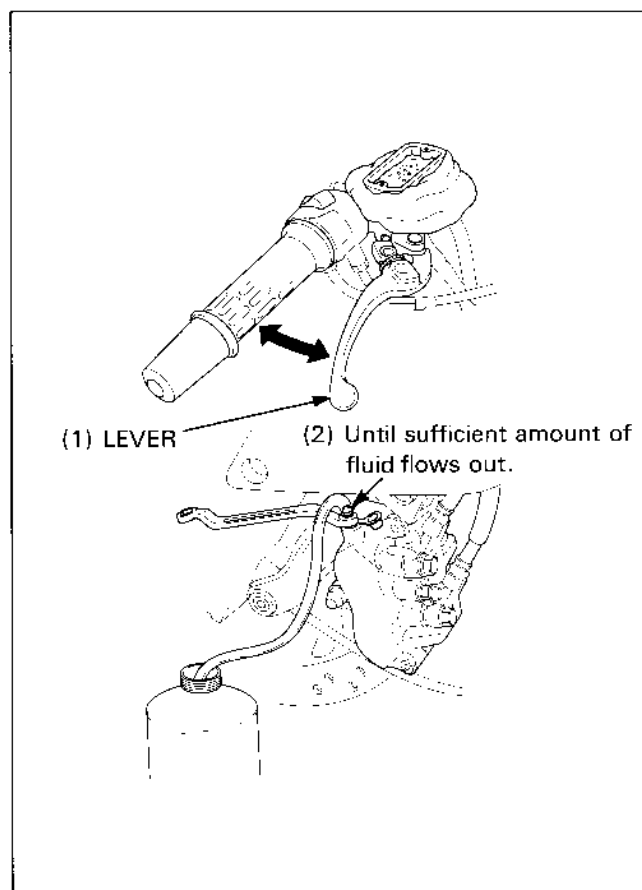
- It is not a problem if the fluid flowing out from the bleed valve contains air bubbles because the lines will be bled in later steps.
- Do not release the brake lever until the bleed valve has been closed.

Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1-2 until sufficient amount of the fluid flows out from the bleed valve.

2. Perform step 1 for the other side bleed valve.

Next, perform the air bleeding from the system (page 15-4).





# Brake System

## AIR BLEEDING

1. Connect a transparent bleed hose to the bleed valve.

Pump the brake lever several (5-10) times quickly, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.

### NOTE

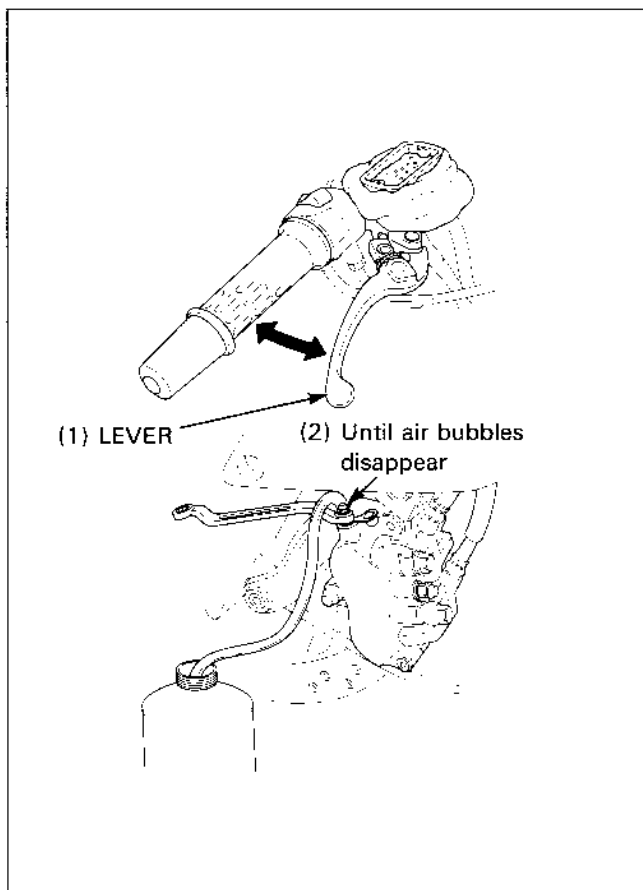
- Do not release the brake lever until the bleed valve has been closed.

Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

Repeat above procedure until air bubbles do not appear in the transparent hose.

2. Perform step 1 for the other side bleed valve.

Make sure the bleed valves are closed and operate the brake lever. If it still feels spongy, bleed the system again.



After bleeding air completely, tighten the bleed valves to the specified torque.

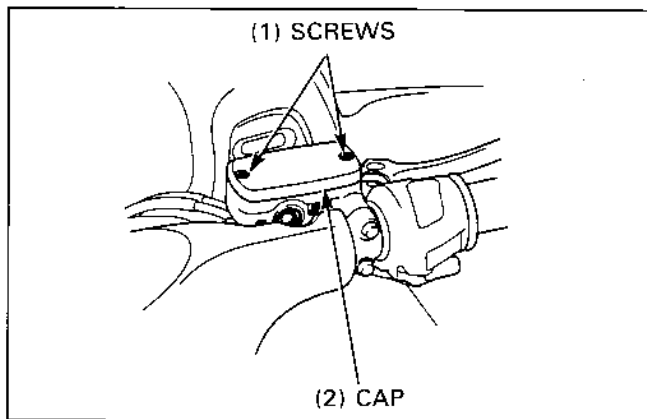
**Torque: 5.5 N·m (0.55 kg·m, 4.0 ft·lb)**

Fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cap and tighten the cap screws.

**Torque: 1.5 N·m (0.15 kg·m, 1.1 ft·lb)**

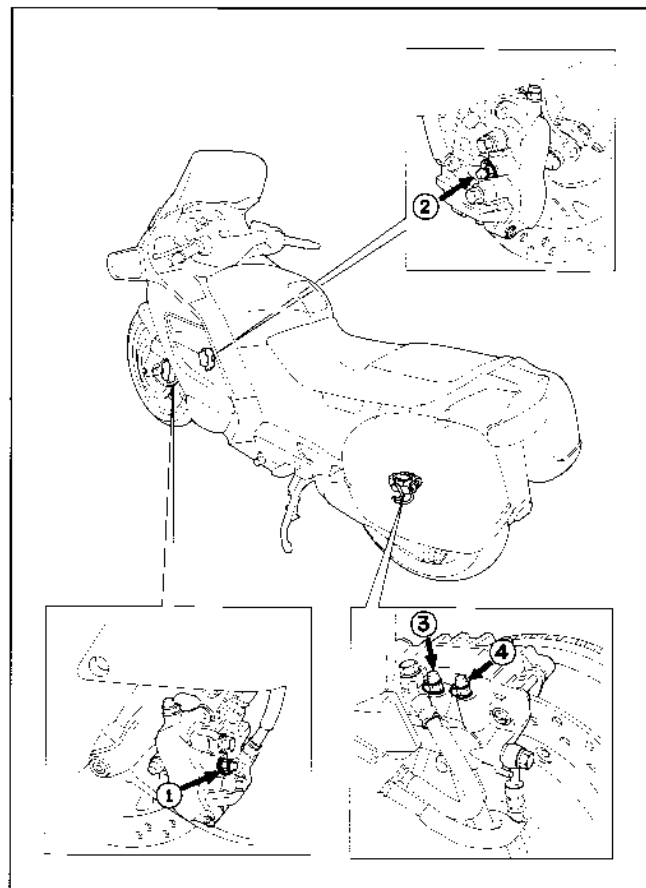
Check the front brake operation (page 3-13).



## Pedal Brake Line

### NOTE

- Refer to the Technical Features (Section 23) for additional information pertaining to the pedal brake line.
- Before performing this service, have at least 500 cc (16.9 US oz, 14.1 Imp oz) of brake fluid.
- Insert fluid and bleed air from the pedal brake line in the following sequence:
  1. Left front caliper lower side bleed valve (from the rear brake pedal master cylinder–front modulator–delay valve line)
  2. Right front caliper lower side bleed valve (from the rear brake pedal master cylinder–front modulator–delay valve line)
  3. Rear caliper front side bleed valve (from the rear brake pedal master cylinder–rear modulator line)
  4. Rear caliper rear side bleed valve (from the secondary master cylinder–PCV–rear modulator line)



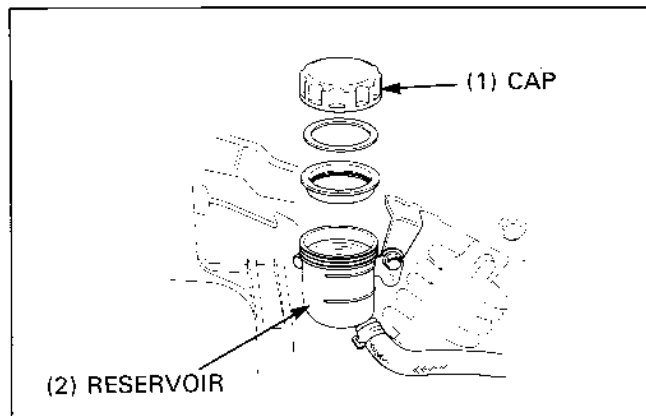
### FLUID FEEDING

Support the motorcycle on its center stand.  
Remove the right side cover (page 2-2).

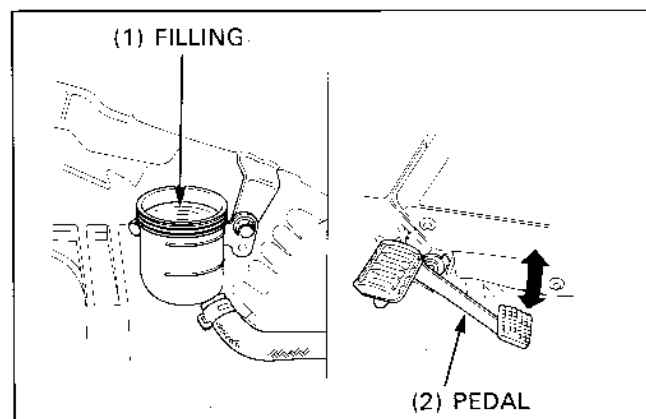
Remove the reservoir cap.  
Fill the reservoir with DOT 4 brake fluid from a sealed container.

### CAUTION

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. They are not compatible.



Operate the brake pedal several times until brake fluid level in the reservoir goes down.



## Brake System

### NOTE

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.

1. Connect a commercially available brake bleeder (example, Mityvac P/N 6826) to the left front caliper lower side bleed valve.

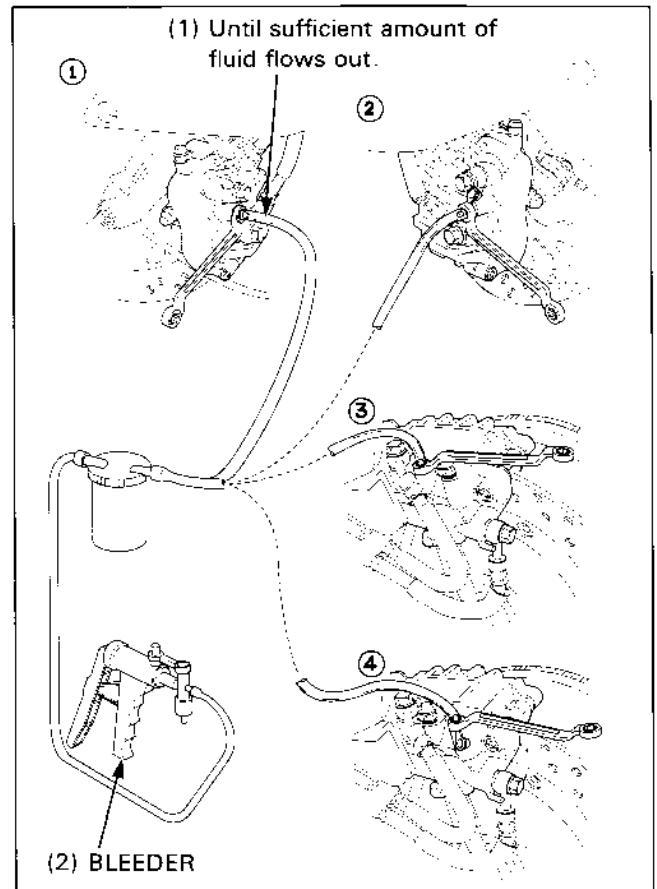
Pump the brake bleeder and loosen the bleed valve. Add brake fluid when the fluid level in the reservoir is low. Repeat the above procedure until sufficient amount of the fluid flows out from the bleed valve. Close the bleed valve.

### NOTE

- It is not a problem if the fluid flowing out from the bleed valve contains air bubbles because the lines will be bled in later steps.
- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

2. Repeat step 1 for each valve in the sequence as follows:
  - the right front caliper lower-side bleed valve
  - the rear caliper front-side bleed valve
  - the rear caliper rear-side bleed valve

Next, perform the air bleeding from the system (page 15-7).



If a commercial brake bleeder is not available, use the following procedure:

1. Connect a transparent bleed hose to the left front caliper lower-side bleed valve.

Pump the brake pedal several (5-10) times quickly, then depress the brake pedal all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.

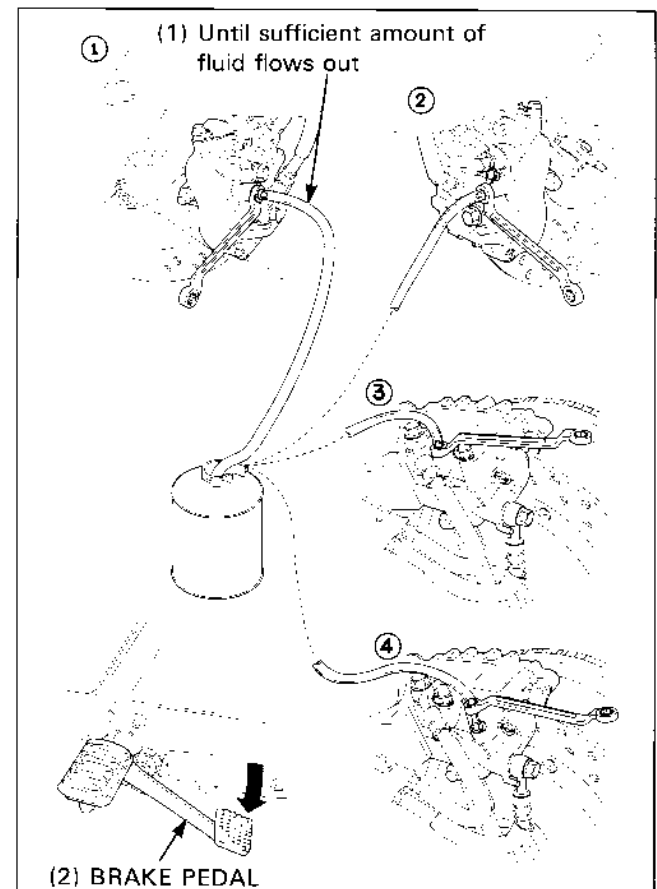
### NOTE

- It is not a problem if the fluid flowing out from the bleed valve contains air bubbles because the lines will be bled later, steps.
- Do not release the brake pedal until the bleed valve has been closed.

Release the brake pedal slowly and wait several seconds after it reaches the end of its travel. Repeat the above procedure until sufficient amount of the fluid flows out from the bleed valve.

2. Repeat step 1 for each valve in the sequence as follows:
  - the right front caliper lower-side bleed valve
  - the rear caliper front-side bleed valve
  - the rear caliper rear-side bleed valve

Next, perform the air bleeding from the system (page 15-7).



**AIR BLEEDING**

1. Connect a transparent bleed hose to the left front caliper lower-side bleed valve.

Pump the brake pedal several (5–10) times quickly, then depress the brake pedal all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.

**NOTE**

- Do not release the brake pedal until the bleed valve has been closed.

Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.

Repeat above procedure until air bubbles do not appear in the transparent hose.

After the air bubbles cease to appear in the fluid, repeat air bleeding procedure about 2–3 times.

**NOTE**

- Note that you may feel strong resistance on the brake pedal during pumping to bleed air from the right front caliper. This symptom is caused by the delay valve function. Be sure to depress the brake pedal fully to the bottom.

2. Repeat step 1 for each valve in the sequence as follows:
  - the right front caliper lower-side bleed valve
  - the rear caliper front-side bleed valve
  - the rear caliper rear-side bleed valve

Make sure the bleed valves are closed and operate the brake pedal. If it still feels spongy, bleed the system again.

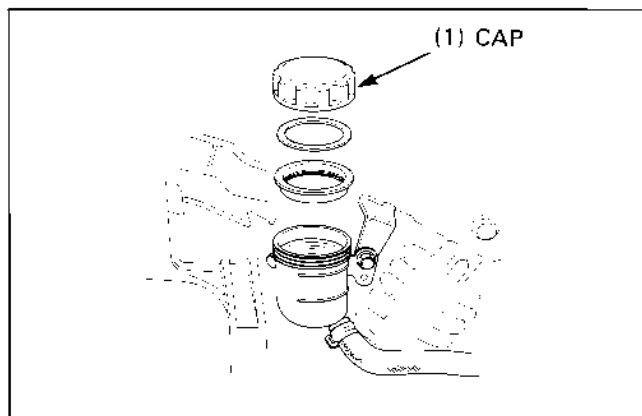
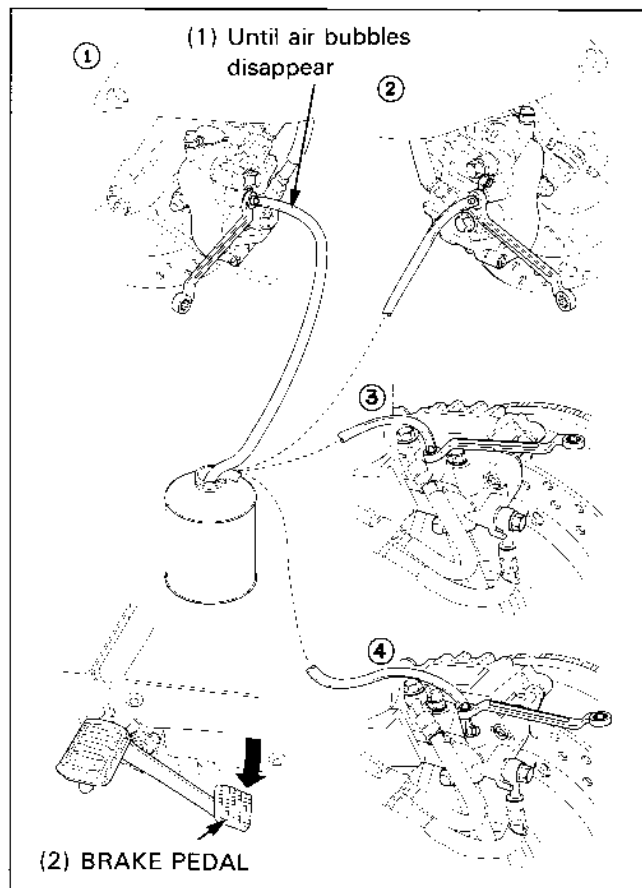
After bleeding air completely, tighten the bleed valves to the specified torque.

**Torque: 5.5 N·m (0.55 kg·m, 4.0 ft·lb)**

Fill the reservoir to the upper level line with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cap.

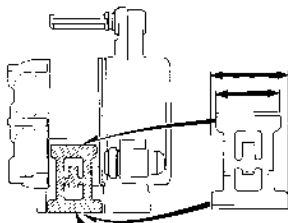
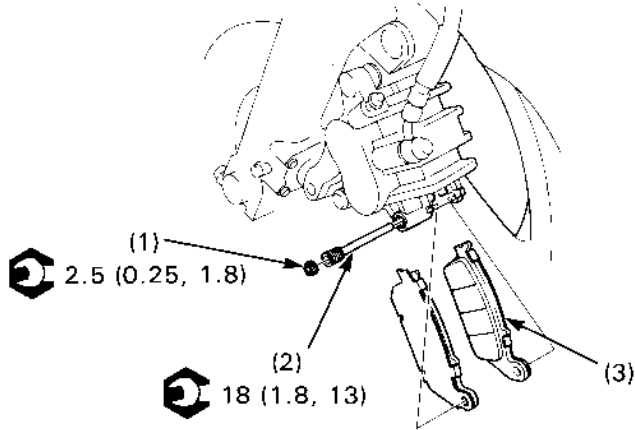
Check the pedal line brake operation (page 3-13).



# Brake Pad Replacement

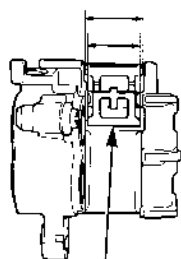
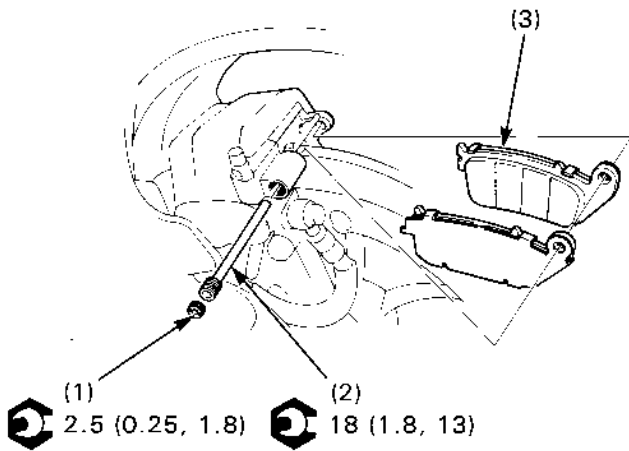
## Standard and ABS/TCS Model

Front



(4) Pad spring

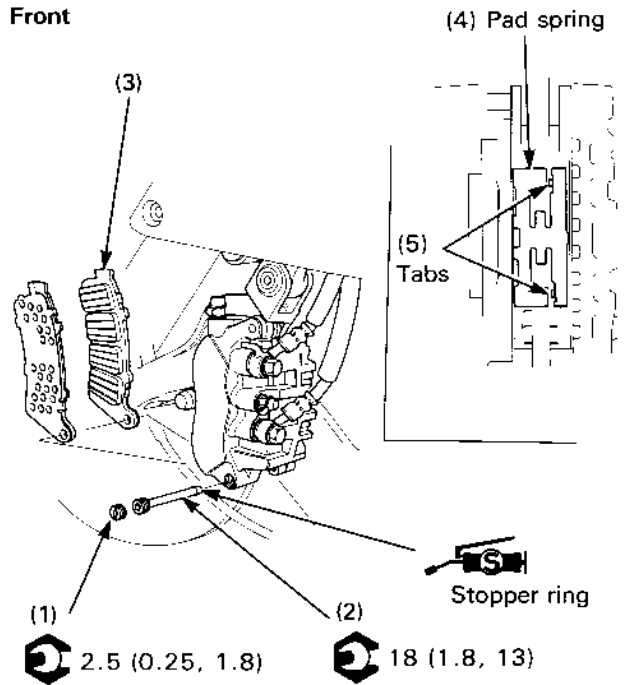
Rear



(4) Pad spring

## LBS-ABS/TCS Model

Front



(4) Pad spring

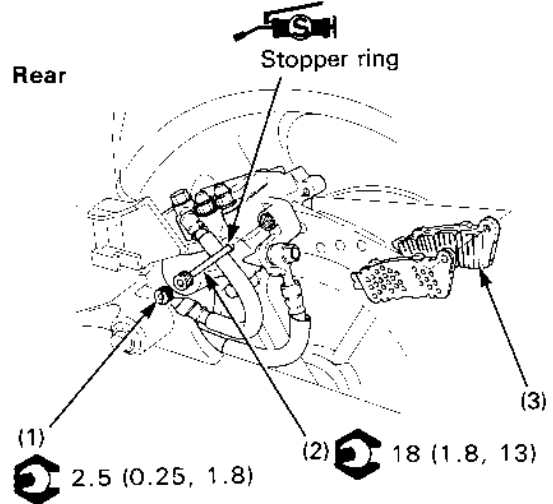
(5) Tabs

Stopper ring

(1) 2.5 (0.25, 1.8)

(2) 18 (1.8, 13)

Rear



Stopper ring

(1) 2.5 (0.25, 1.8)

(2) 18 (1.8, 13)

(3)

(4) Pad spring

(5) Tabs

**⚠ WARNING**

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Brake dust may contain asbestos. Inhaled asbestos fibers have been found to cause respiratory disease and cancer.
- After replacement, operate the brake lever or pedal to seat the caliper pistons against the pads and check the brake operation [For front brake pad of the LBS-ABS/TCS model, operate the lever and pedal (page 3-13) ].

- Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard of airborne asbestos fibers.

**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 pin plug threads to prevent rust.

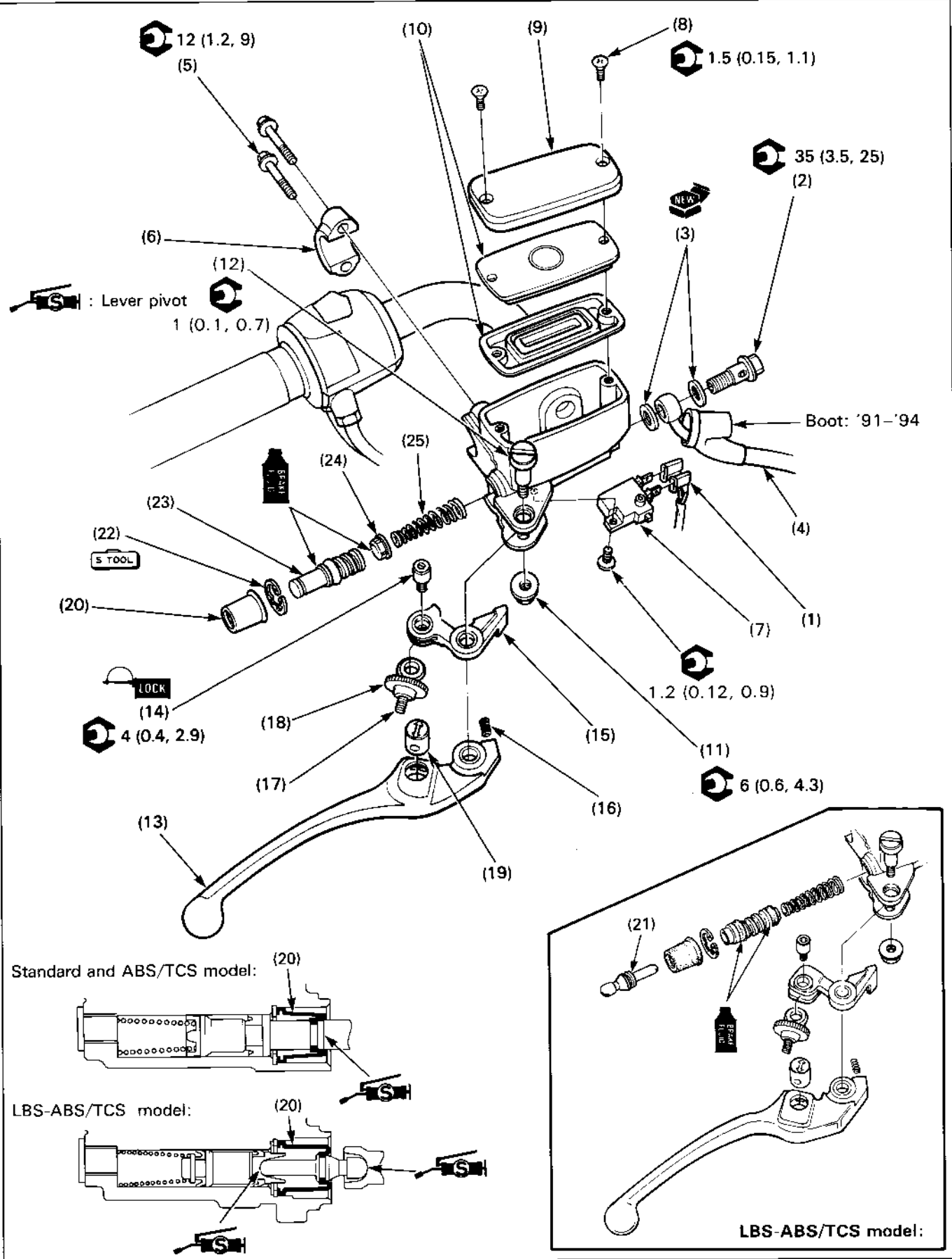
**Standard and ABS/TCS model:**

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Pad pin plug	1	
(2)	Pad pin	1	
(3)	Pad	2	NOTE
			<ul style="list-style-type: none"> <li>• Push the pistons all the way in to provide clearance for the new pads.</li> <li>• Before installing the pads, make sure that the pad spring is positioned properly as shown.</li> </ul>

**LBS-ABS/TCS model:**

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Pad pin plug	1	
(2)	Pad pin	1	
(3)	Pad	2	NOTE
			<ul style="list-style-type: none"> <li>• Push the piston all the way in to provide clearance for the new pads.</li> <li>• On the rear pad, be careful not to scratch the rear wheel hub.</li> <li>• When installing the inside pad, insert between the tabs (retainers) of the pad spring and caliper body.</li> </ul>

# Front Master Cylinder Disassembly/Assembly



**▲ WARNING**

- Check the brake system by applying the lever brake after 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 foreign material to enter the system.
- Do not allow the lips of the master cylinder piston cups to be turned inside out and be certain the snap ring is firmly seated in the groove.

**NOTE**

- Use only DOT 4 brake fluid from a sealed container.
- After assembly, align the index mark on the adjuster with the arrow mark on the joint pin.

**Requisite Service**

- Handlever cover removal/installation (page 13-2)
- Front brake fluid draining/air bleeding (Standard and ABS/TCS model: section 17 in Common Service Manual)
- Lever brake line fluid draining/air bleeding (LBS-ABS/TCS model: page 15-2)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly. At assembly, check the brake system by applying the brake after bleeding air from the system.
(1)	Brake switch wires	2	
(2)	Oil bolt	1	
(3)	Sealing washer	2	
(4)	Brake hose	1	
(5)	Master cylinder holder bolt	2	
(6)	Master cylinder holder	1	Remove the master cylinder assembly from the handlebar.
(7)	Brake switch	1	
(8)	Reservoir cap screw	2	
(9)	Reservoir cap	1	
(10)	Set plate/diaphragm	1/1	
(11)	Brake lever pivot nut	1	
(12)	Brake lever pivot bolt	1	
(13)	Brake lever assembly	1	
(14)	Socket bolt	1	
(15)	Adjuster arm	1	
(16)	Brake lever spring	1	
(17)	Adjuster rod	1	At installation, apply silicone grease.
(18)	Adjuster	1	
(19)	Joint pin	1	
(20)	Boot	1	
(21)	Push rod	1	LBS-ABS/TCS model
(22)	Snap ring	1	Use snap ring pliers (07914-3230001).
(23)	Master piston	1	
(24)	Primary cup	1	On the LBS-ABS/TCS model, it is installed onto the piston.
(25)	Spring	1	



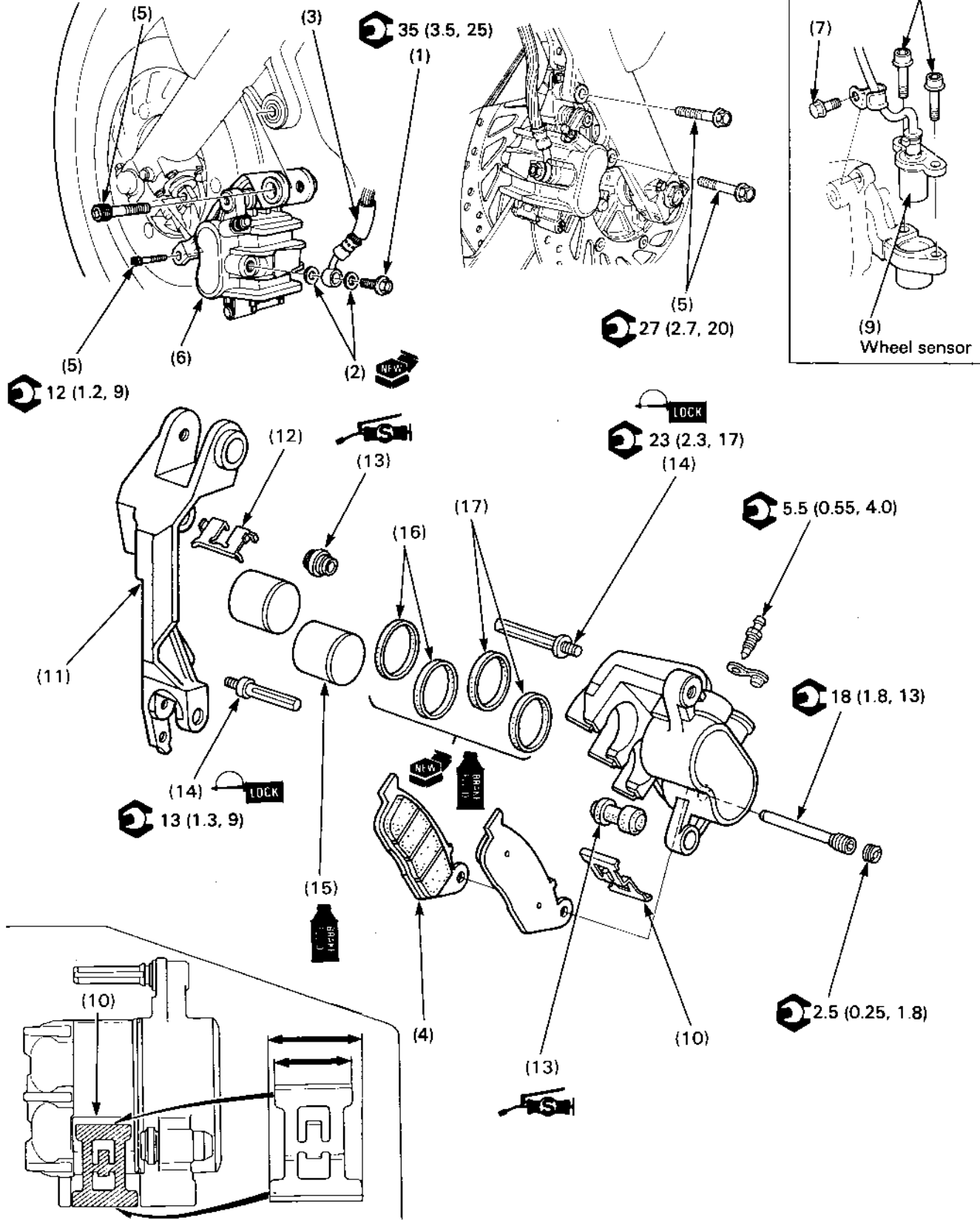
# Front Brake Caliper Disassembly/Assembly

Standard and ABS/TCS Model

Left side:  27 (2.7, 20)

Right side:

ABS/TCS model:



- ⚠ WARNING**
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
  - Brake dust may contain asbestos. Inhaled asbestos fibers have been found to cause respiratory disease and cancer.
  - Check the brake system by applying the brake after air bleeding.

- Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard of airborne asbestos fibers.

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

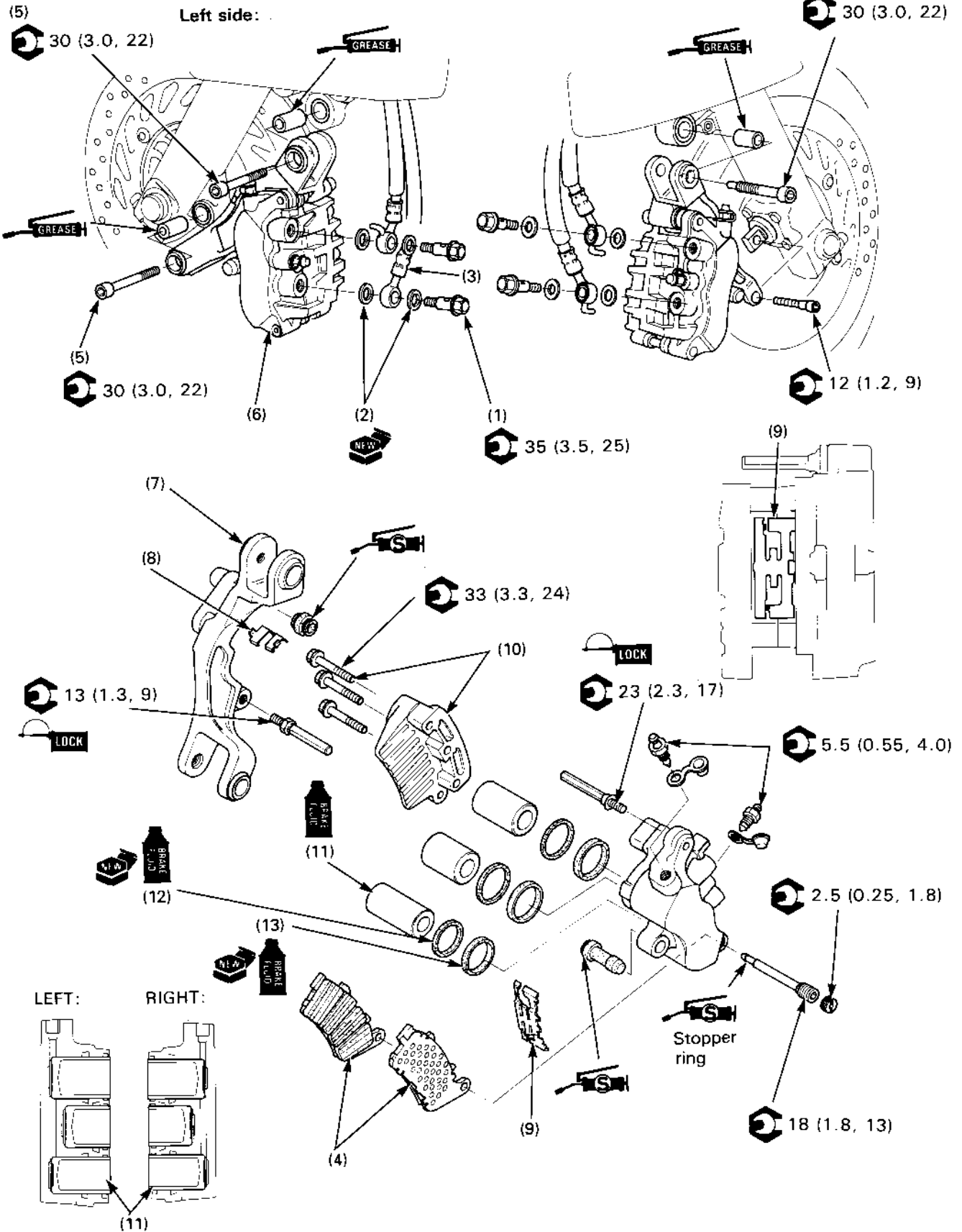
- NOTE**
- Do not remove the bleed valve unless it is replaced.

**Requisite Service**

- Front brake fluid draining/air bleeding (section 17 in Common Service Manual)

Procedure		Q'ty	Remarks
	<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly. At assembly, check the brake system by applying the brake after bleeding air from the system.
(1)	Brake oil bolt	1	
(2)	Sealing washer	2	
(3)	Brake hose	1	
(4)	Pad	2	Removal/installation (page 15-8)
(5)	Caliper mounting bolt	2	Install the bolt with longer threads at the upper side.
(6)	Brake caliper assembly	1	
(7)	Wheel sensor wire clamp bolt	1	
(8)	Wheel sensor mounting bolt	2	
(9)	Wheel sensor	1	<b>CAUTION</b> • Be careful not to damage the wheel sensor.
(10)	Pad spring	1	Install as shown.
(11)	Caliper bracket	1	
(12)	Pad retainer	1	
(13)	Caliper pin bolt boot	2	
(14)	Caliper pin bolt	2	Do not remove unless necessary.
(15)	Caliper piston	2	
(16)	Dust seal	2	<b>CAUTION</b> • Be careful not to damage the piston sliding surface.
(17)	Piston seal	2	

LBS-ABS/TCS Model



**⚠ WARNING**

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Brake dust may contain asbestos. Inhaled asbestos fibers have been found to cause respiratory disease and cancer.
- Check the brake system by applying the lever and pedal brake after air bleeding (page 3-13).

- Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard of airborne asbestos fibers.

**CAUTION**

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

**NOTE**

- Do not remove the bleed valve unless it is replaced.
- Reinstall the removed pistons and seals in the original position securely.
- After installing the right caliper, check the wheel speed sensor air gap (page 16-B-34).

**Requisite Service**

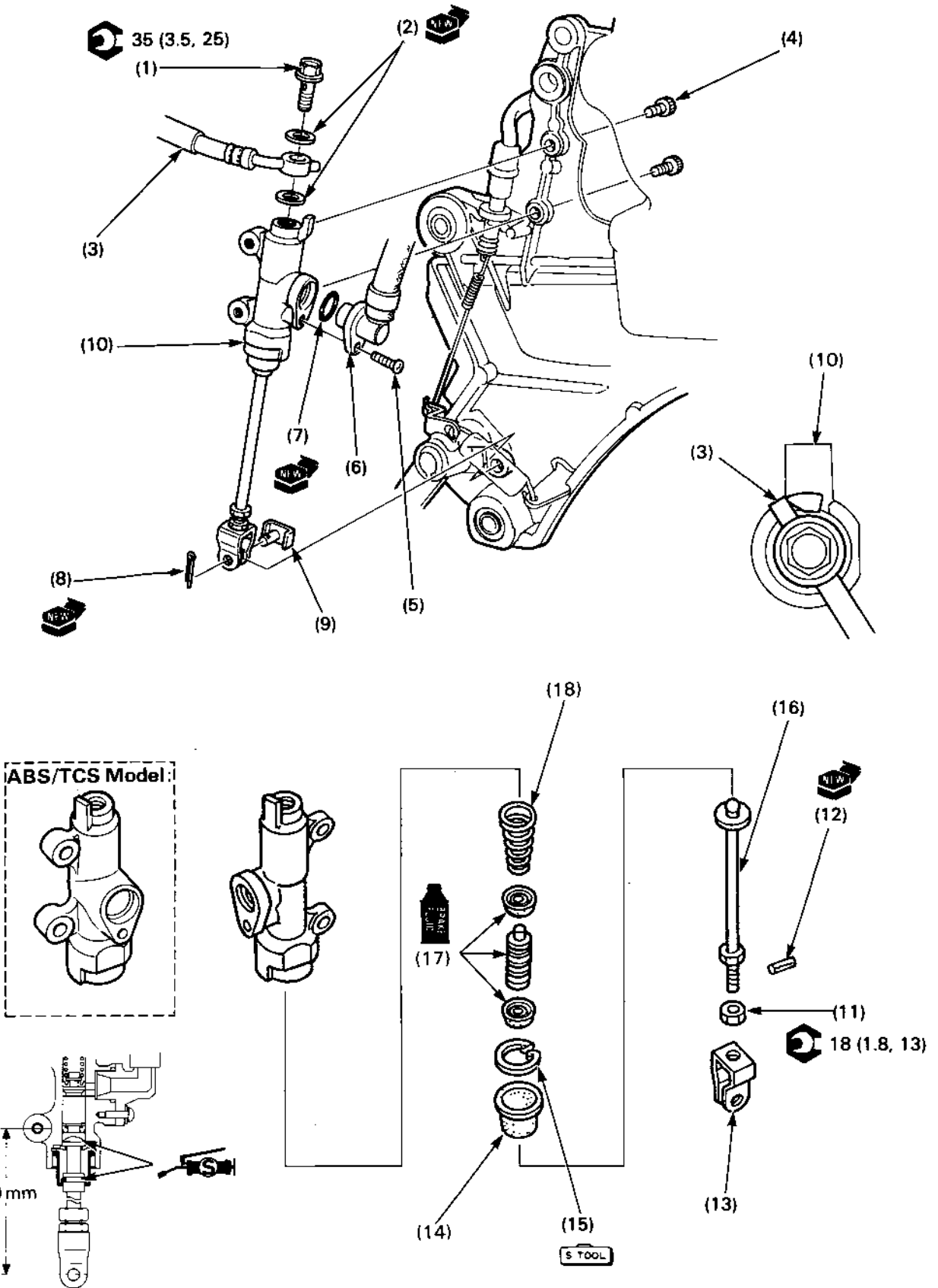
- Lever and pedal brake lines fluid draining/air bleeding (page 15-2)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Brake oil bolt	2	
(2)	Sealing washer	4	
(3)	Brake hose	2	
(4)	Pad	2	Removal/installation (page 15-8)
(5)	Caliper mounting bolt	2	On the left side, install the bolt with longer threads at the lower side.
(6)	Brake caliper assembly	1	
(7)	Caliper bracket	1	
(8)	Pad retainer	1	
(9)	Pad spring	1	Install as shown.
(10)	Assembly bolt/caliper body	3/1	
(11)	Caliper piston	3	
(12)	Dust seal	3	<b>CAUTION</b> • Be careful not to damage the piston sliding surface.
(13)	Piston seal	3	

# Rear Master Cylinder Disassembly/Assembly

## Standard and ABS/TCS Model

Standard model shown:



**▲ WARNING**

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

**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 foreign material to enter the system.
- Do not allow the lips of the master cylinder piston cups to be turned inside out and be certain the snap ring is firmly seated in the groove.

**NOTE**

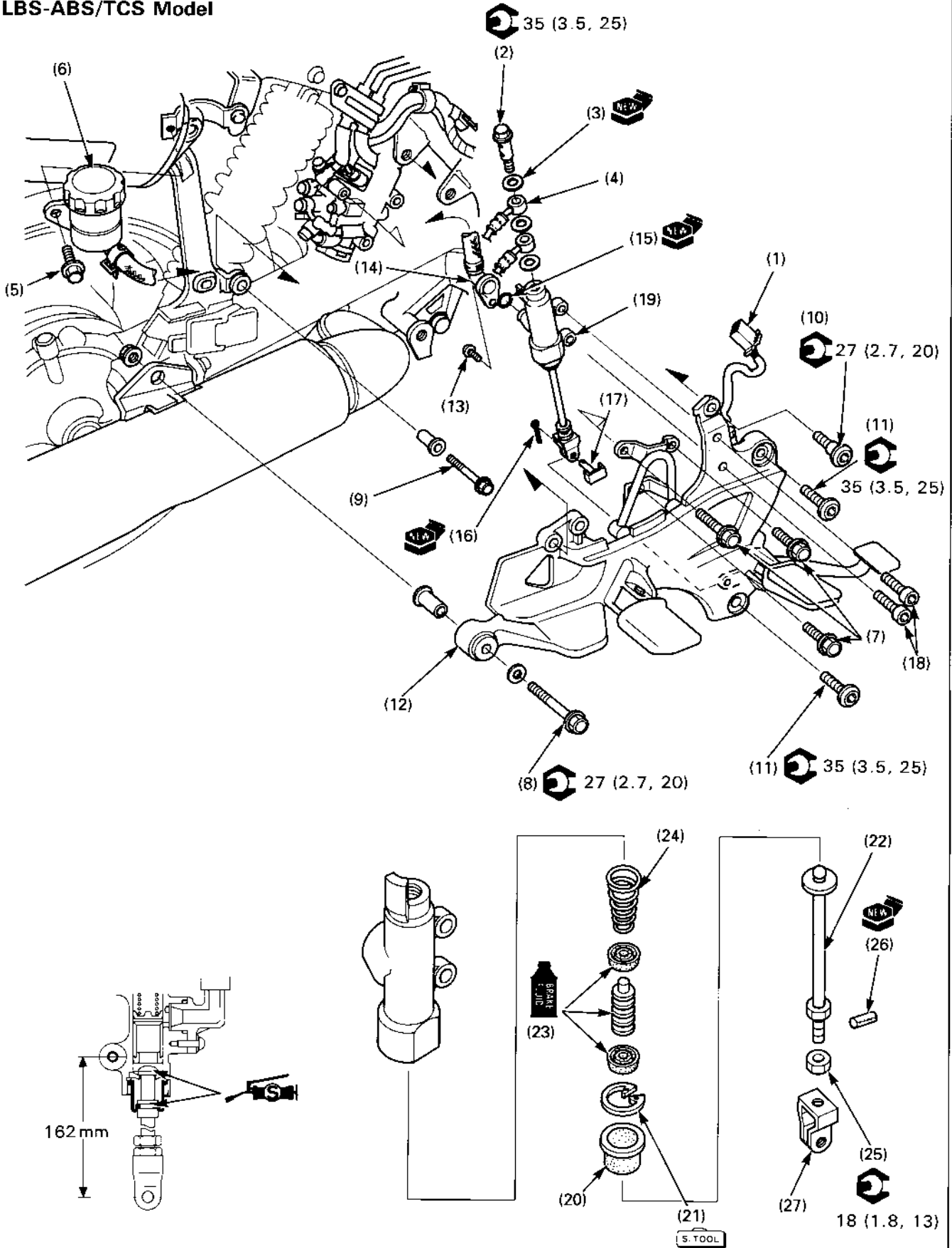
- Use only DOT 4 brake fluid from a sealed container.
- Loosen and tighten the oil bolt and master cylinder mounting bolts with the step holder installed.
- The master piston, piston cups and spring must be replaced as a set.

**Requisite Service**

- Rear brake fluid draining/air bleeding (section 17 in Common Service Manual)
- Right step holder removal/installation (page 2-13)

Procedure		Q'ty	Remarks
	<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1)	Oil bolt	1	
(2)	Sealing washer	2	
(3)	Brake hose	1	
(4)	Mounting bolt	2	
(5)	Reservoir hose joint screw	1	
(6)	Reservoir hose joint	1	
(7)	O-ring	1	
(8)	Cotter pin	1	
(9)	Joint pin	1	
(10)	Master cylinder assembly	1	
(11)	Lock nut	1	Loosen the nut.
(12)	Spring pin	1	
(13)	Push rod joint	1	
(14)	Boot	1	
(15)	Snap ring	1	Use snap ring pliers (07914—3230001).
(16)	Push rod	1	
(17)	Master piston/piston cup	1/2	
(18)	Spring	1	

LBS-ABS/TCS Model



**⚠ WARNING**

- Check the brake system by applying the brake after air bleeding (page 3-13).

**CAUTION**

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

**NOTE**

- The master piston, piston cups and spring must be replaced as a set.
- Use only DOT 4 brake fluid from a sealed container.

**Requisite Service**

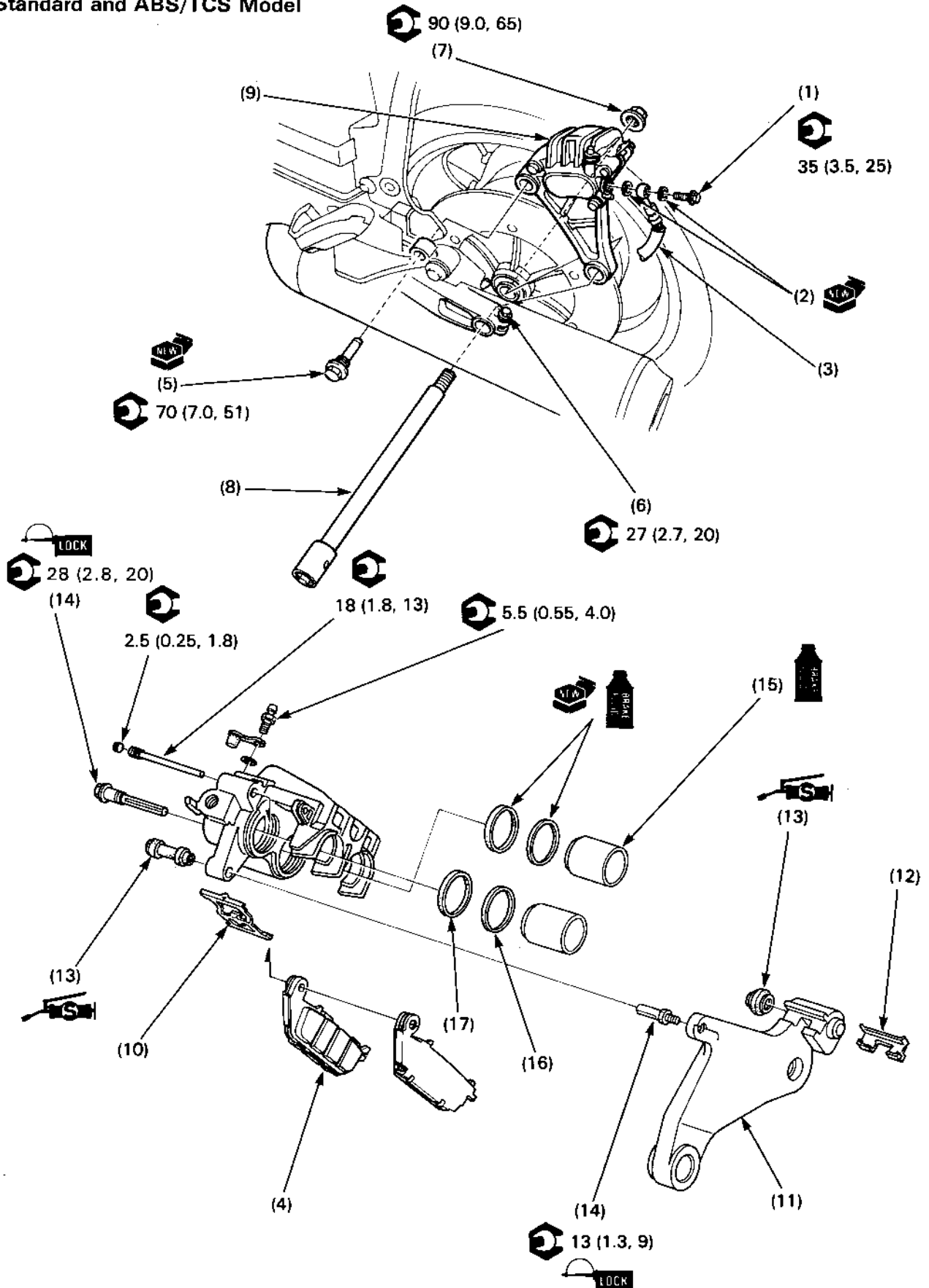
- Pedal brake line fluid draining/air bleeding (page 15-2).
- Right pivot cover removal/installation (page 2-5).

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly. Before removing the step holder, loosen the master cylinder mounting bolts.
(1)	Brake light switch 2P (Black) connector	1	
(2)	Oil bolt	1	
(3)	Sealing washer	3	
(4)	Brake hose	2	
(5)	Reservoir bolt	1	
(6)	Master cylinder reservoir	1	
(7)	Modulator mounting bolt	3	
(8)	Muffler mounting bolt	1	
(9)	Right step holder bolt 6 mm	1	
(10)	8 mm	1	
(11)	10 mm	2	
(12)	Right step holder	1	
(13)	Hose joint screw	1	
(14)	Reservoir hose joint	1	
(15)	O-ring	1	
(16)	Cotter pin	1	
(17)	Joint pin	1	
(18)	Mounting bolt	1	
(19)	Master cylinder assembly	1	
(20)	Boot	1	
(21)	Snap ring	1	Use snapping pliers (07914-3230001).
(22)	Push rod	1	
(23)	Master piston/cup	1/2	
(24)	Spring	1	
(25)	Lock nut	1	Loosen the nut.
(26)	Spring pin	1	
(27)	Push rod joint	1	



# Rear Brake Caliper Disassembly/Assembly

Standard and ABS/TCS Model



**▲ 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.**
- **Check the brake system by applying the brake after air bleeding.**
- **Brake dust may contain asbestos. Inhaled asbestos fibers have been found to cause respiratory disease and cancer.**

- Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard of airborne asbestos fibers.

**CAUTION**

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

**NOTE**

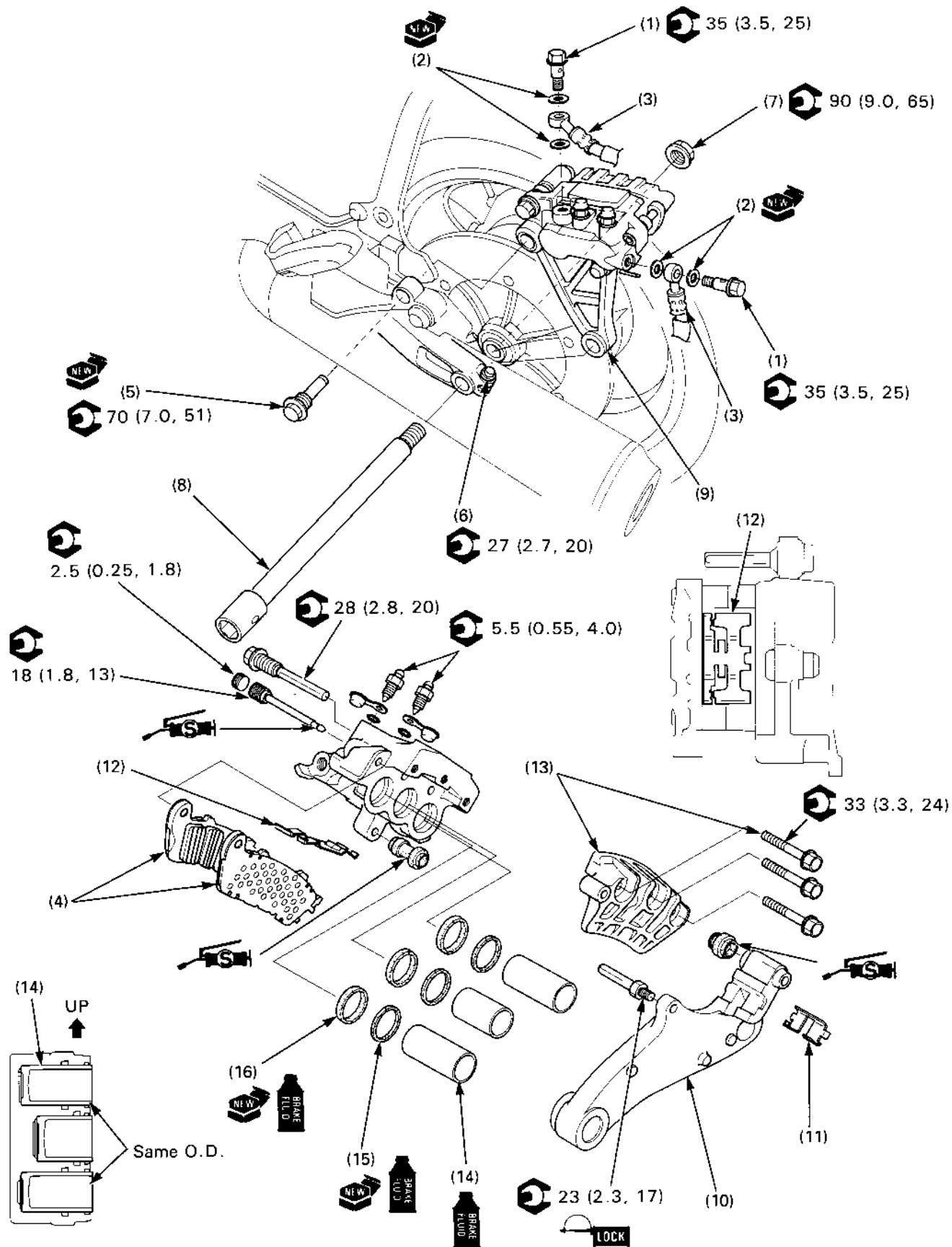
- Do not remove the bleed valve unless it is replaced.

**Requisite Service**

- Rear brake fluid draining/air bleeding (section 17 in Common Service Manual)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Brake oil bolt	1	
(2)	Sealing washer	2	
(3)	Brake hose	1	
(4)	Pad	2	Removal/installation (page 15-8)
(5)	Caliper stopper pin bolt	1	
(6)	Rear axle pinch bolt	1	Loosen the bolt.
(7)	Rear axle nut	1	
(8)	Rear axle	1	
(9)	Brake caliper assembly	1	After removing the caliper assembly, temporarily install the rear axle and axle nut.
(10)	Pad spring	1	
(11)	Caliper bracket	1	
(12)	Pad retainer	1	
(13)	Caliper pin bolt boot	2	
(14)	Caliper pin bolt	2	Do not remove unless necessary.
(15)	Caliper piston	2	
(16)	Dust seal	2	<b>CAUTION</b>
(17)	Piston seal	2	• <b>Be careful not to damage the piston sliding surface.</b>

LBS-ABS/TCS model



**WARNING**

- Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Check the brake system by applying the pedal brake after air bleeding (page 3-13).

**CAUTION**

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

**NOTE**

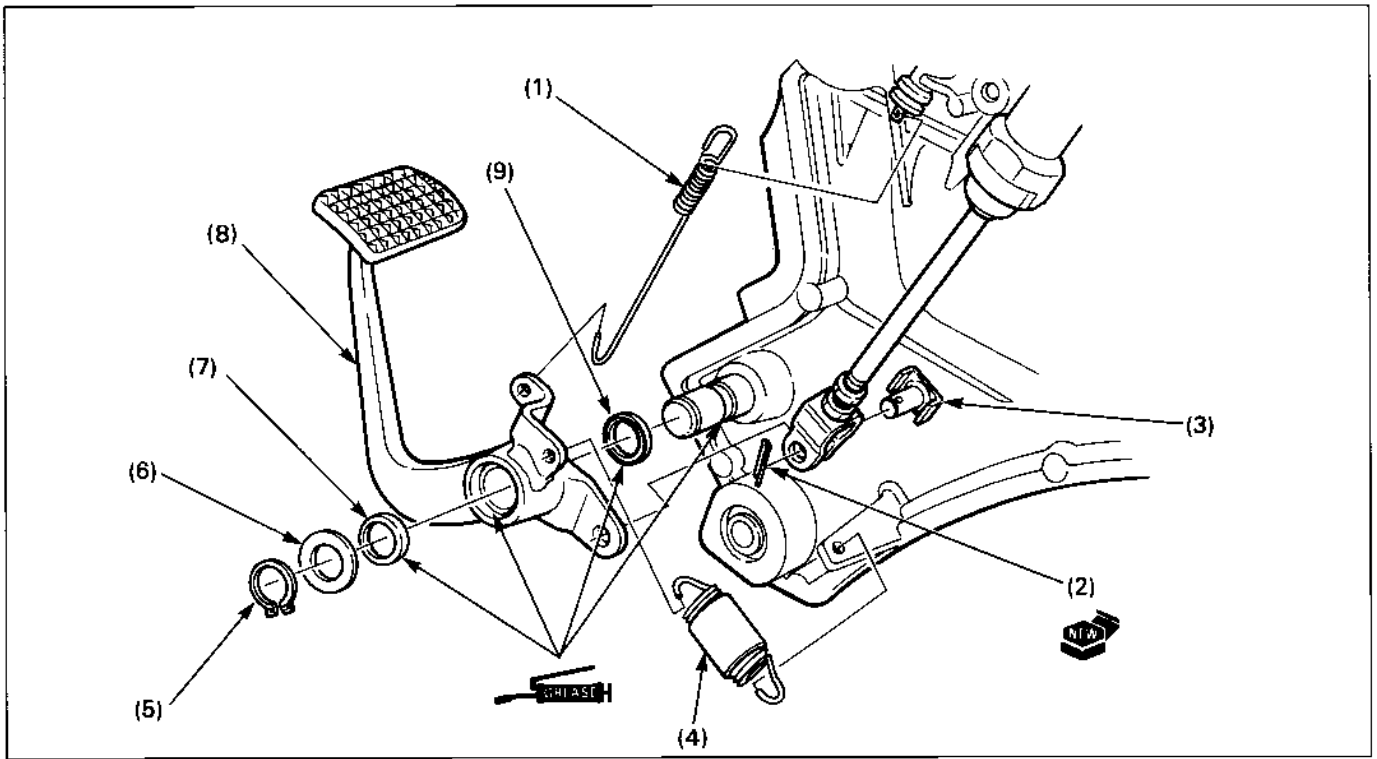
- Do not remove the bleed valve unless it is replaced.

**Requisite Service**

- Pedal brake line fluid draining/air bleeding (page 15-2)

Procedure		Q'ty	Remarks
	<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1)	Brake oil bolt	2	
(2)	Sealing washer	4	
(3)	Brake hose	2	
(4)	Pad	2	Removal / installation (page 15-8)
(5)	Caliper stopper pin bolt	1	
(6)	Rear axle pinch bolt	1	Loosen the bolt.
(7)	Rear axle nut	1	
(8)	Rear axle	1	
(9)	Brake caliper assembly	1	After removing the caliper assembly, temporarily install the rear axle and axle nut.
(10)	Caliper bracket	1	
(11)	Pad retainer	1	
(12)	Pad spring	1	Install as shown.
(13)	Assembly bolt / caliper body	3/1	
(14)	Caliper piston	3	
(15)	Dust seal	3	<b>CAUTION</b> • Be careful not to damage the piston sliding surface.
(16)	Piston seat	3	

# Rear Brake Pedal Removal/Installation



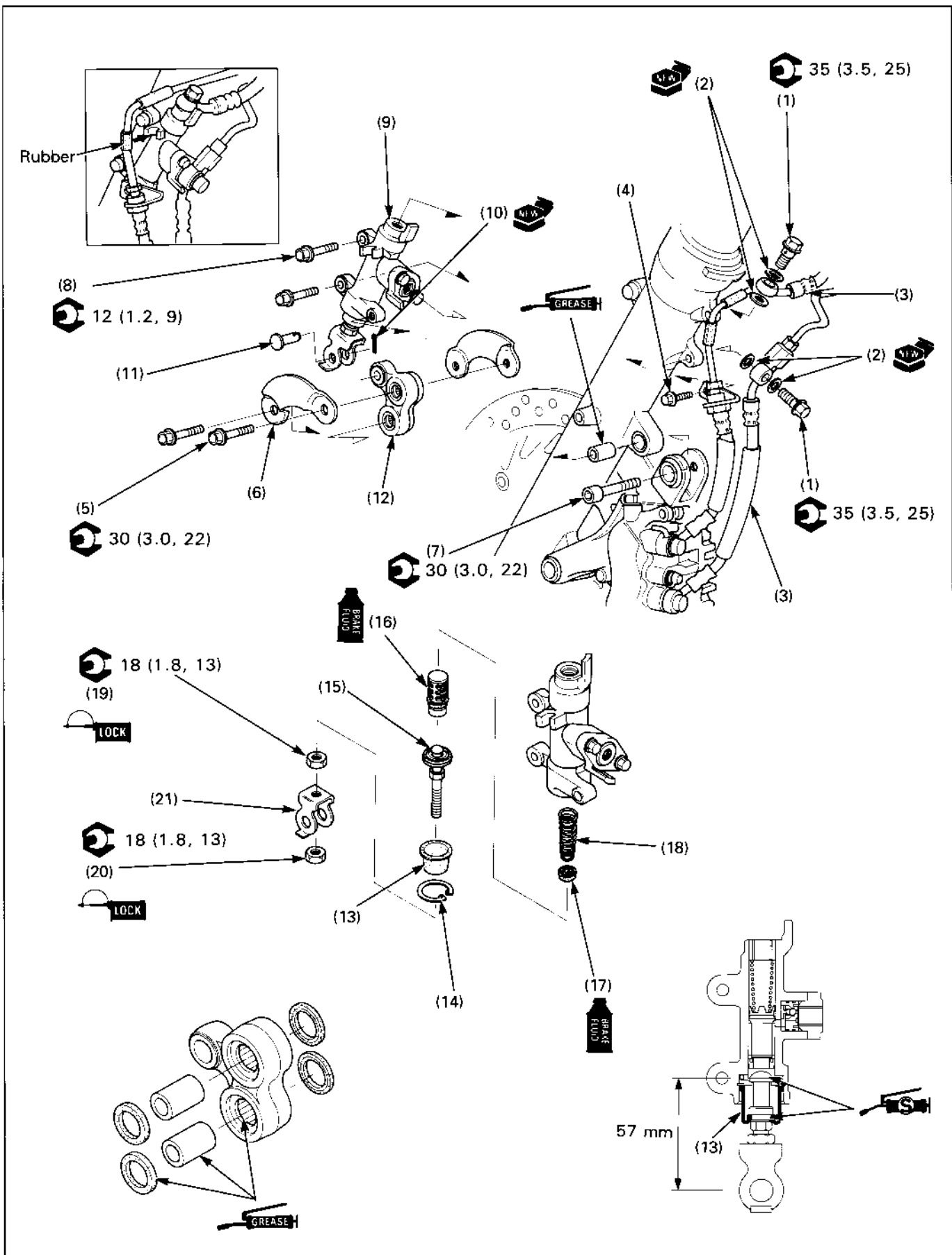
## Requisite Service

- Right step holder removal/installation (page 2-13)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Rear brake light switch spring	1	
(2) Cotter pin	1	
(3) Joint pin	1	
(4) Brake pedal return spring	1	
(5) Snap ring	1	
(6) Washer	1	
(7) Dust seal	1	
(8) Brake pedal	1	
(9) Dust seal	1	

**MEMO**

# Secondary Master Cylinder Disassembly / Assembly (LBS-ABS/TCS model)



**⚠ WARNING**

- Check the brake system by applying the brake after air bleeding (page 3-13).

**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 foreign material to enter the system.
- Do not allow the lips of the cups to be turned inside out and be certain the snap rings is firmly seated in the groove.

**NOTE**

- The master piston, piston cups and spring must be replaced as a set.
- Use only DOT 4 brake fluid from a sealed container.

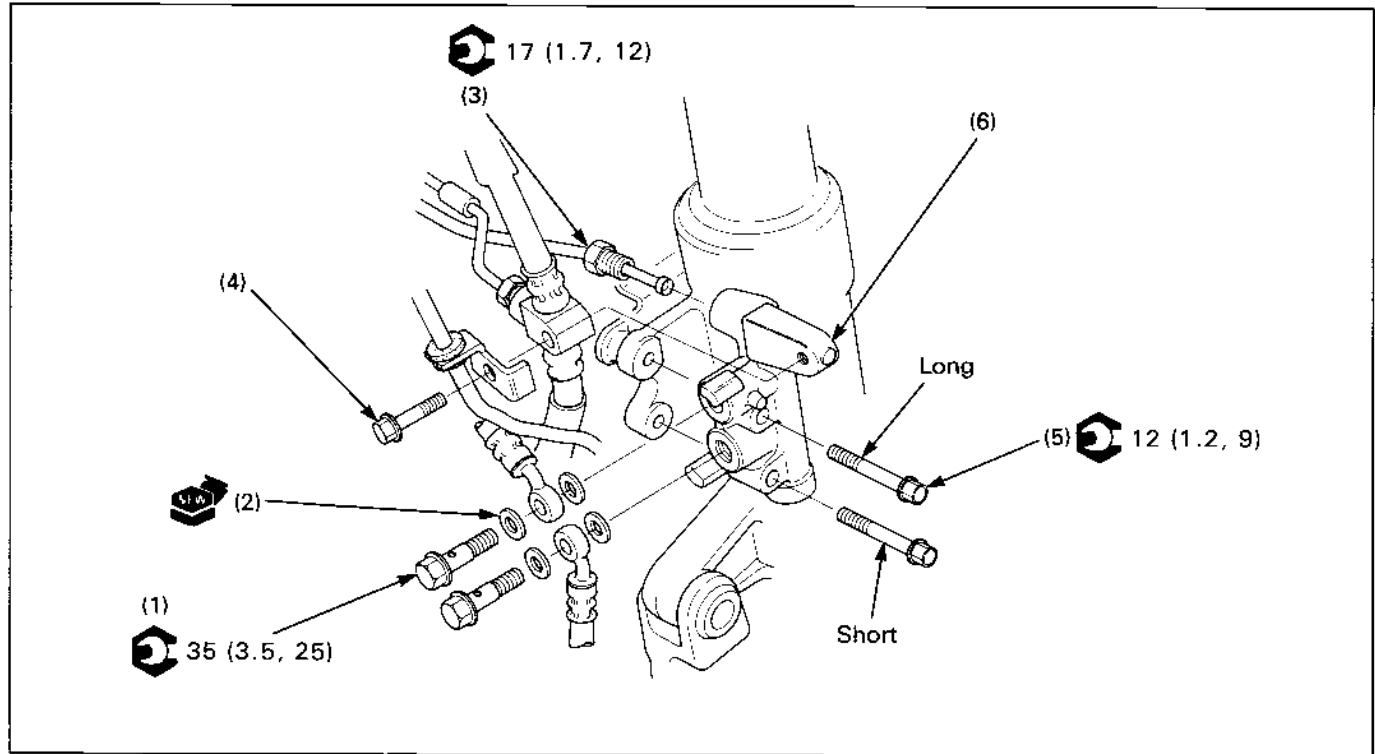
**Requisite Service**

- Pedal brake line fluid draining/air bleeding (page 15-2)
- Front fender removal/installation (page 2-11)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Oil bolt	2	
(2)	Sealing washer	4	
(3)	Brake hose	2	
(4)	Oil pipe stay bolt	1	
(5)	Link plate bolt	2	
(6)	Link plate	2	
(7)	Upper caliper pivot bolt	1	
(8)	Master cylinder mounting bolt	2	Install the bolt with longer threads at the upper side.
(9)	Secondary master cylinder & link arm assembly	1	
(10)	Cotter pin	1	
(11)	Joint pin	1	
(12)	Link arm	1	
(13)	Boot	1	
(14)	Snap ring	1	Use snap ring pliers (07914-3230001).
(15)	Push rod	1	
(16)	Master piston	1	
(17)	Primary cup	1	
(18)	Spring	1	
(19)	Lock nut	1	Loosen the nut.
(20)	Push rod nut	1	
(21)	Push rod joint	1	



## Delay Valve Removal/Installation (LBS-ABS/TCS model)



**WARNING**

- Check the brake system by applying the pedal brake after air bleeding (page 3-13).

**CAUTION**

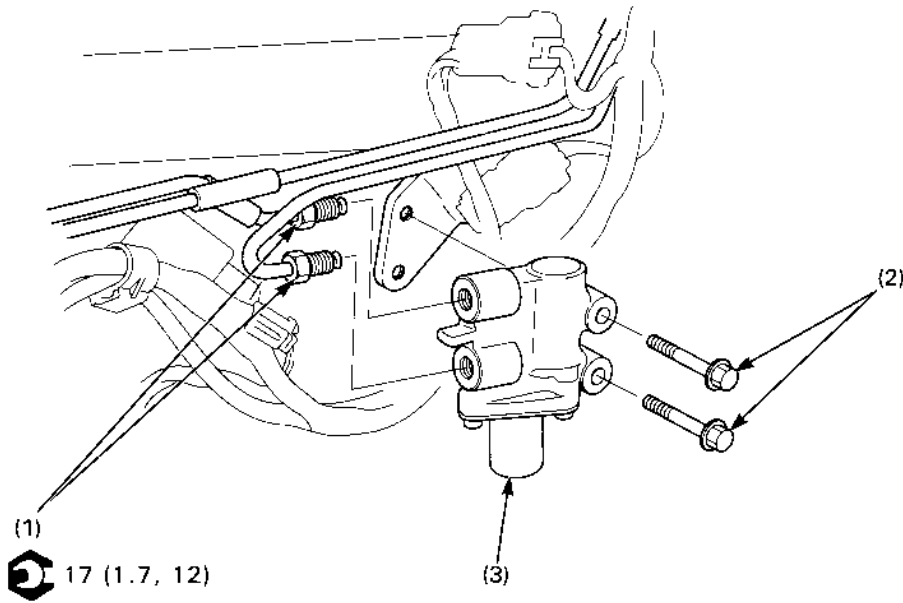
- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.
- When removing the oil bolt or pipe, cover the end of the brake hose and pipe to prevent contamination. Do not allow foreign material to enter the system.

**Requisite Service**

- Pedal brake line fluid draining/air bleeding (page 15-2)
- Front fender removal/installation (page 2-11)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Oil bolt	2	
(2) Sealing washer	4	
(3) Oil pipe joint nut	1	
(4) Wire stay & hose joint bolt	1	
(5) Mounting bolt	2	Install the bolt with longer threads at the upper side.
(6) Delay valve	1	

## Proportional Control Valve Removal/Installation (LBS-ABS/TCS model)



**WARNING**

- Check the brake system by applying the pedal brake after air bleeding (page 3-13).

**CAUTION**

- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.
- When disconnecting the oil pipe, cover the end of the oil pipe to prevent contamination. Do not allow foreign material to enter the system.

### Requisite Service

- Pedal brake line fluid draining/air bleeding (page 15-2)
- Right side cover removal/installation (page 2-2)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal. Be careful not to deform the oil pipe.
(1) Oil pipe joint nut	2	
(2) Mounting bolt	2	
(3) Proportional control valve	1	

# 14. Rear Wheel/Suspension

<b>Service Information</b>	<b>14-1</b>	<b>Shock Absorber Removal/Installation</b>	<b>14-6</b>
<b>Troubleshooting</b>	<b>14-1</b>	<b>Shock Absorber Disassembly/Assembly</b>	<b>14-7</b>
<b>Rear Wheel Removal/Installation</b>	<b>14-2</b>	<b>Swingarm Removal/Installation</b>	<b>14-8</b>
<b>Rear Wheel Disassembly/Assembly</b>	<b>14-4</b>		

## Service Information

### ⚠ WARNING

- **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 indicated by the arrow.
- Refer to the section 15 for brake system information.
- Use only genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.

## Troubleshooting

### Rear wheel wobbling

- Bent rim
- Worn rear wheel bearing(s)
- Faulty tire
- Unbalanced tire and wheel
- Low tire pressure
- Faulty swingarm pivot bearing(s)

### Hard suspension

- Damaged shock absorber mount bushing
- Incorrect suspension adjustment
- Bent damper rod
- Damaged swingarm pivot bearing(s)
- Lack of lubrication in swing arm pivot bearings or suspension pivot points

### Wheel turns hard

- Faulty wheel bearing(s)
- Brake drag (section 15)
- Bent rear axle

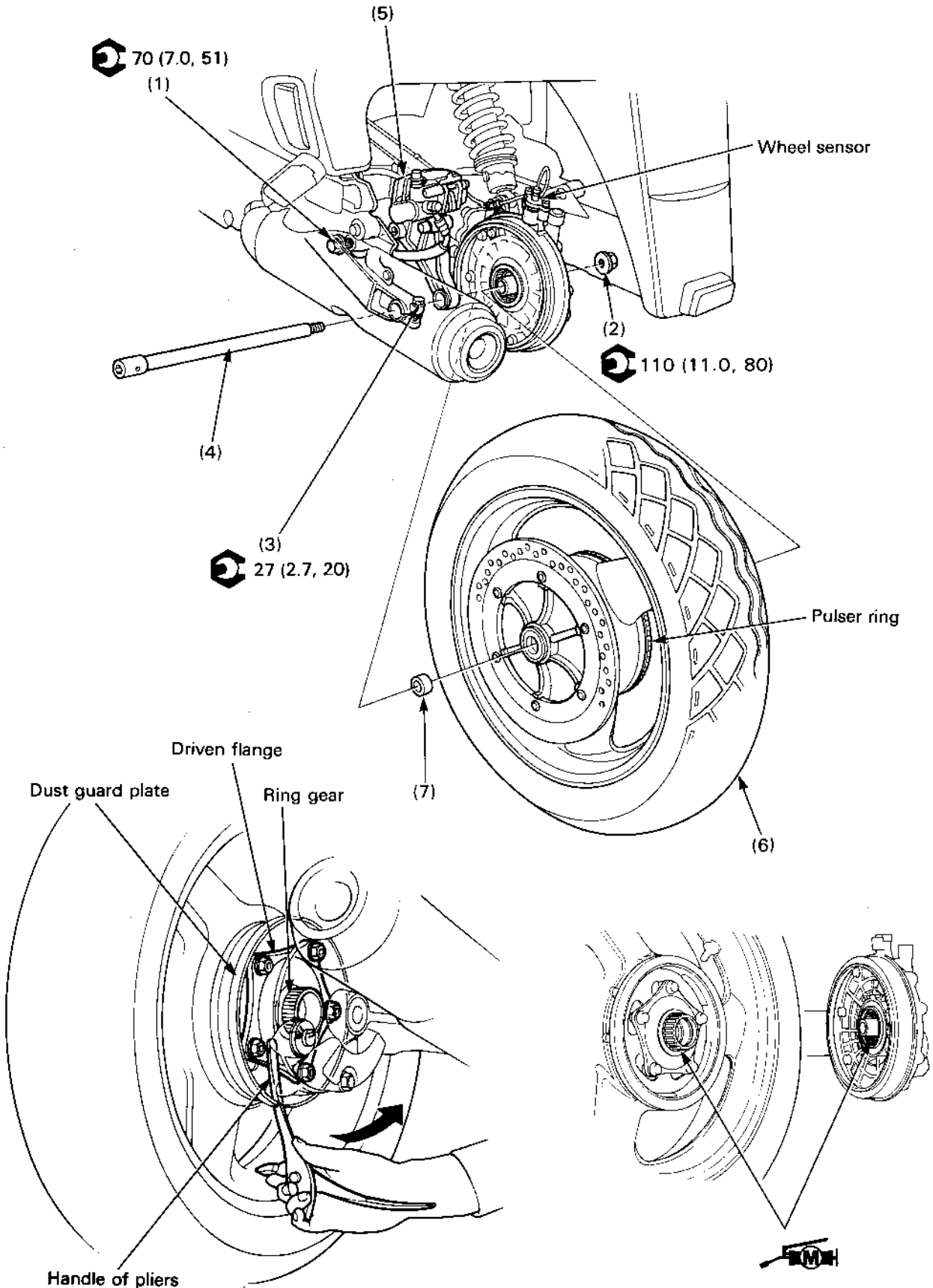
### Soft suspension

- Weak shock absorber spring
- Oil leakage from damper unit
- Incorrect suspension adjustment

14

# Rear Wheel Removal/Installation

ABS/TCS model shown:



**⚠ 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**

- ABS/TCS or LBS-ABS/TCS model: Do not remove the wheel sensor to remove and install the rear wheel.
- Do not depress the brake pedal when the caliper is removed, or it will be difficult to refit the disc between the brake pad.
- 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.
- Apply multipurpose NLGI No. 2 grease (molybdenum disulfide additive) to the driven flange and the ring gear engagement splines.

**Requisite Service**

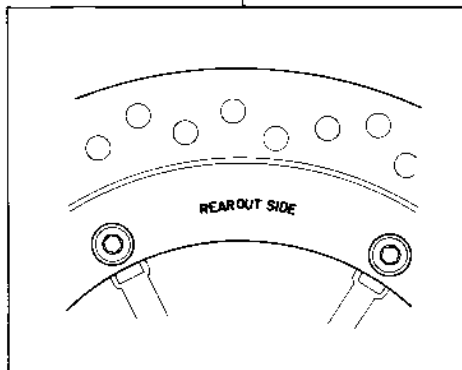
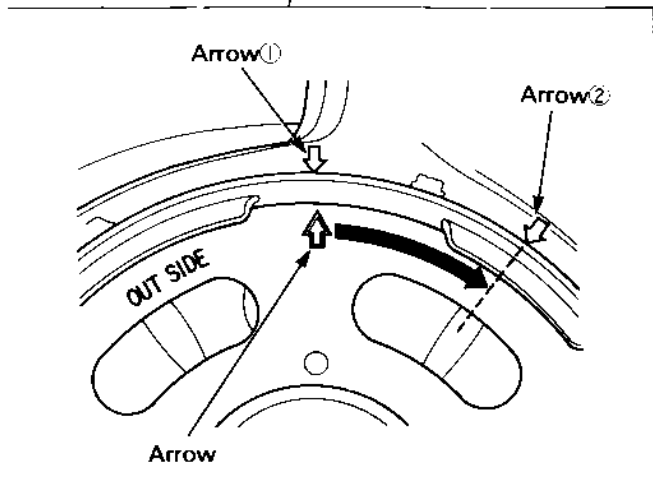
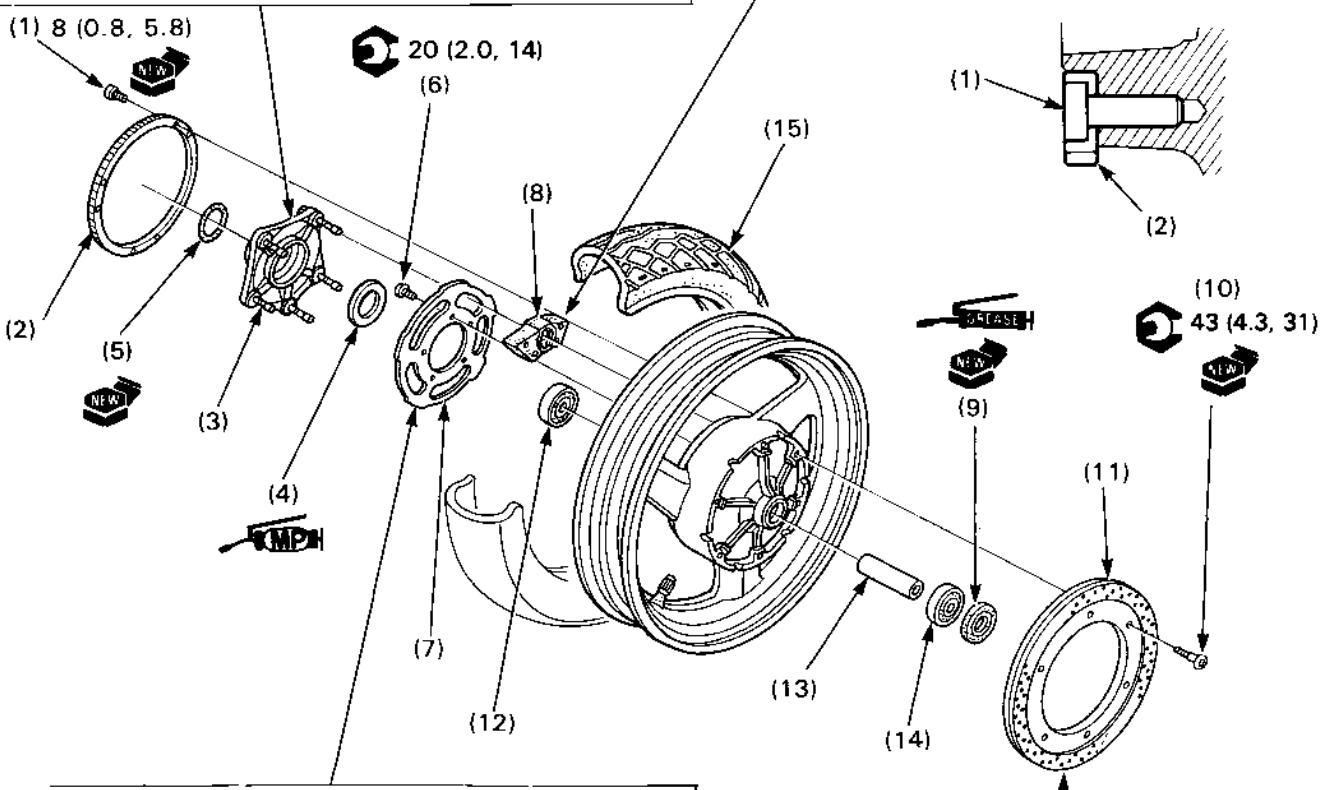
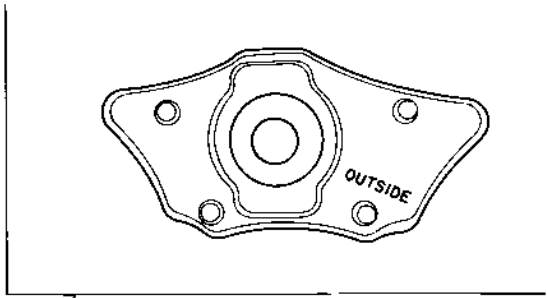
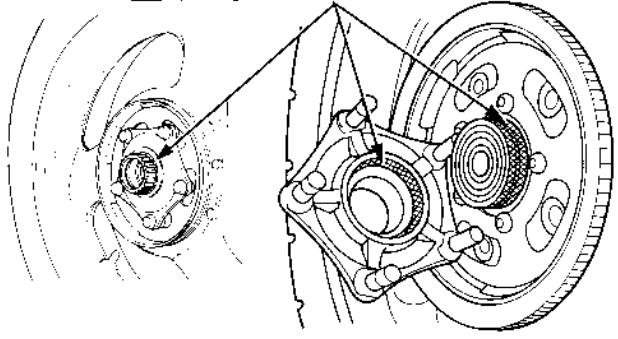
- Place the motorcycle on its center stand.

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Rear caliper stopper pin bolt	1	Loosen the bolt.
(2)	Rear axle nut	1	
(3)	Rear axle pinch bolt	1	
(4)	Rear axle	1	
(5)	Rear caliper assembly	1	Remove from the brake disc.
(6)	Rear wheel assembly	1	Separate the driven flange of the wheel from the ring gear of the final drive gear by prying the driven flange with the handle of the pliers through the slot in the dust guard plate as shown. <b>CAUTION</b> • <b>ABS/TCS or LBS-ABS/TCS model: Be careful not to damage the pulser ring and wheel sensor.</b>
(7)	Side collar	1	

# Rear Wheel Disassembly/Assembly

ABS/TCS model shown:

**MPH** (3 g/0.11 oz to each surface)



## NOTE

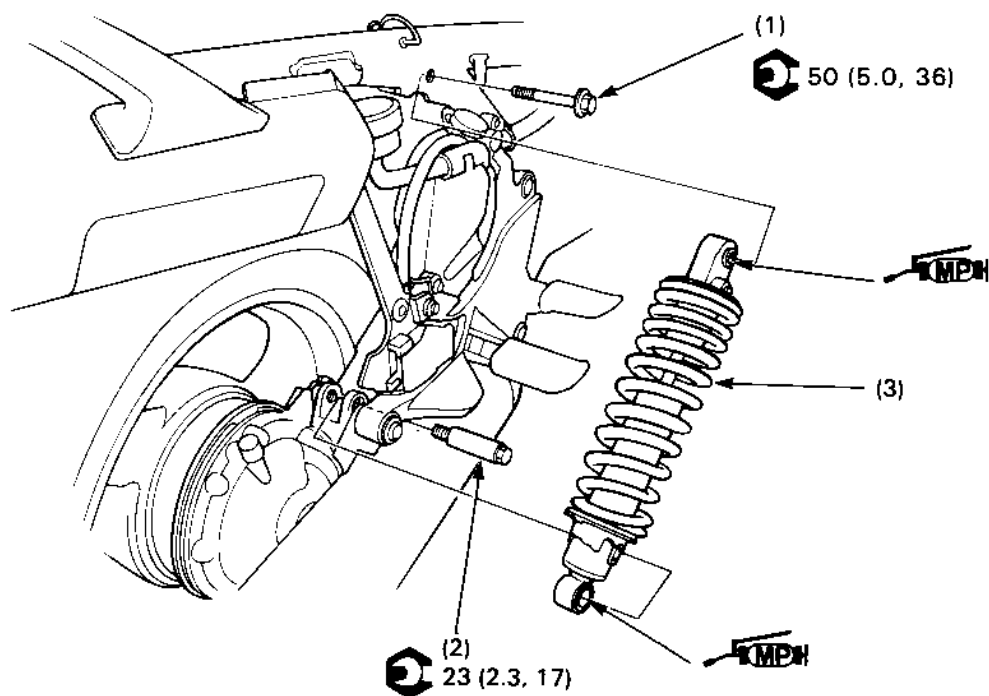
- Replace the rear wheel damper rubbers as a set.
- Replace the wheel bearings as a set.
- For wheel bearing replacement, refer to the section 1 of the Common Service Manual.
- ABS/TCS or LBS-ABS/TCS model: When the pulser ring is replaced, perform the wheel sensor air gap inspection (page 16-A-51 or 16-B-34) after installing the rear wheel.

## Requisite Service

- Rear wheel removal/installation (page 14-2).

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Torx bolt (T25) (ABS/TCS or LBS-ABS/TCS model)	6	
(2)	Pulser ring (ABS/TCS or LBS-ABS/TCS model)	1	Install the pulser ring with the concave of bolt hole facing out. <b>CAUTION</b> • <b>Be careful not to deform, distort, or damage the pulser ring.</b>
(3)	Final driven flange	1	At assembly, apply 3 g (0.11 oz) of molybdenum disulfide paste to the driven flange mating surface of the hub, to the inside diameter of the driven flange and to the splines of the driven flange as shown.
(4)	Thrust washer	1	
(5)	O-ring	1	
(6)	Socket bolt	5	
(7)	Damper holder plate	1	Remove the plate by turning it counterclockwise and aligning the arrow on the plate with the arrow ① on the wheel as shown. Install the plate, aligning the arrow with the arrow ①, and turn it clockwise until the arrow aligns with the arrow ② as shown.
(8)	Rear wheel damper rubber	5	Install with the "OUTSIDE" mark facing out.
(9)	Dust seal	1	
(10)	Socket bolt	6	
(11)	Rear brake disc	1	Install with the "OUTSIDE" mark facing out.
(12)	Right wheel bearing (dual, 20x47x20.6 mm)	1	
(13)	Distance collar	1	
(14)	Left wheel bearing (6204UU)	1	At installation, drive a new left wheel bearing in the hub first, then drive a new right bearing in.
(15)	Rear tire	1	

## Shock Absorber Removal/Installation



## NOTE

- Use a floor jack or other adjustable support under the final drive to relieve stress for ease of left shock absorber lower mounting bolt removal/installation.
- Note the position of the spring preload adjuster for future reference. Adjust the spring preload adjuster to the softest position for disassembly. Return the adjuster to the position noted before disassembly.

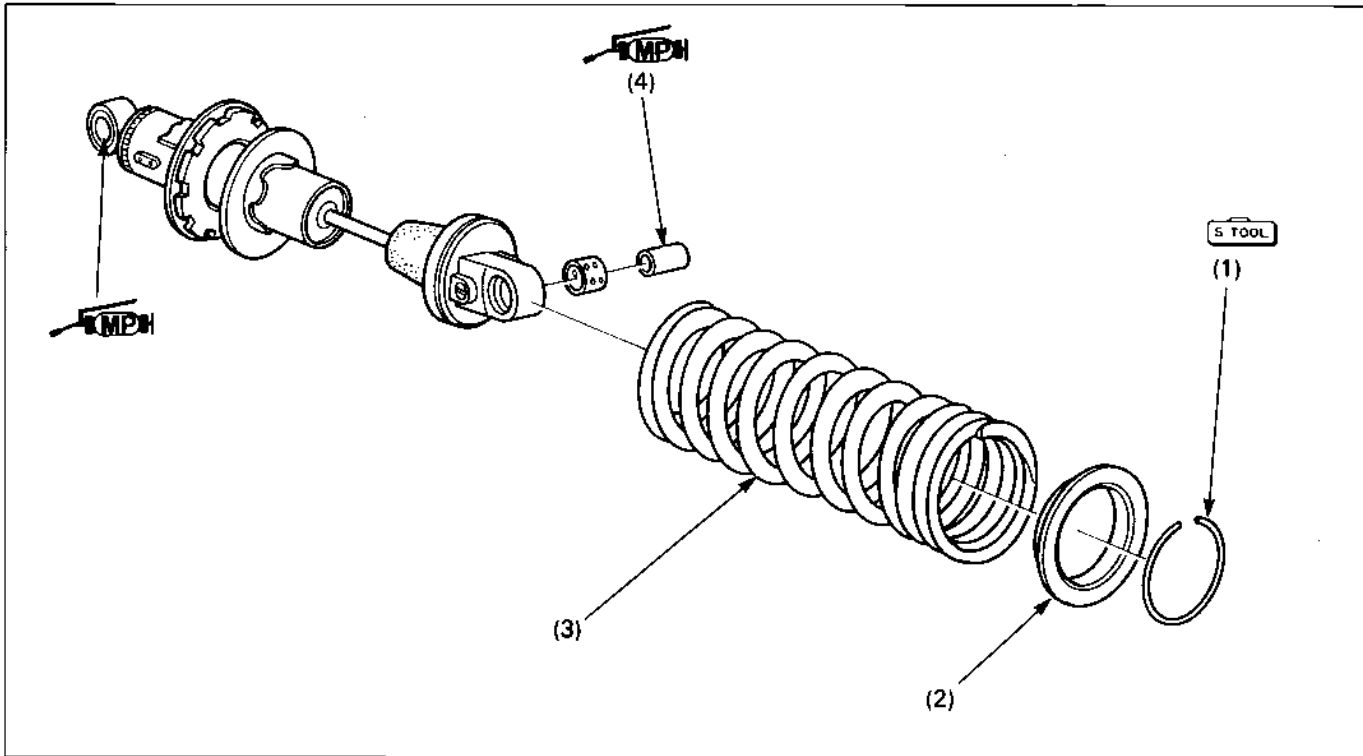
## Requisite Service

- Place the motorcycle on its center stand
- Right side cover (page 2-2)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Upper mounting bolt	1	
(2) Lower mounting bolt	1	
(3) Shock absorber assembly	1	Disassembly/assembly (page 14-7)



## Shock Absorber Disassembly/Assembly



## NOTE

- Adjust the spring preload adjuster to the softest position before disassembly.

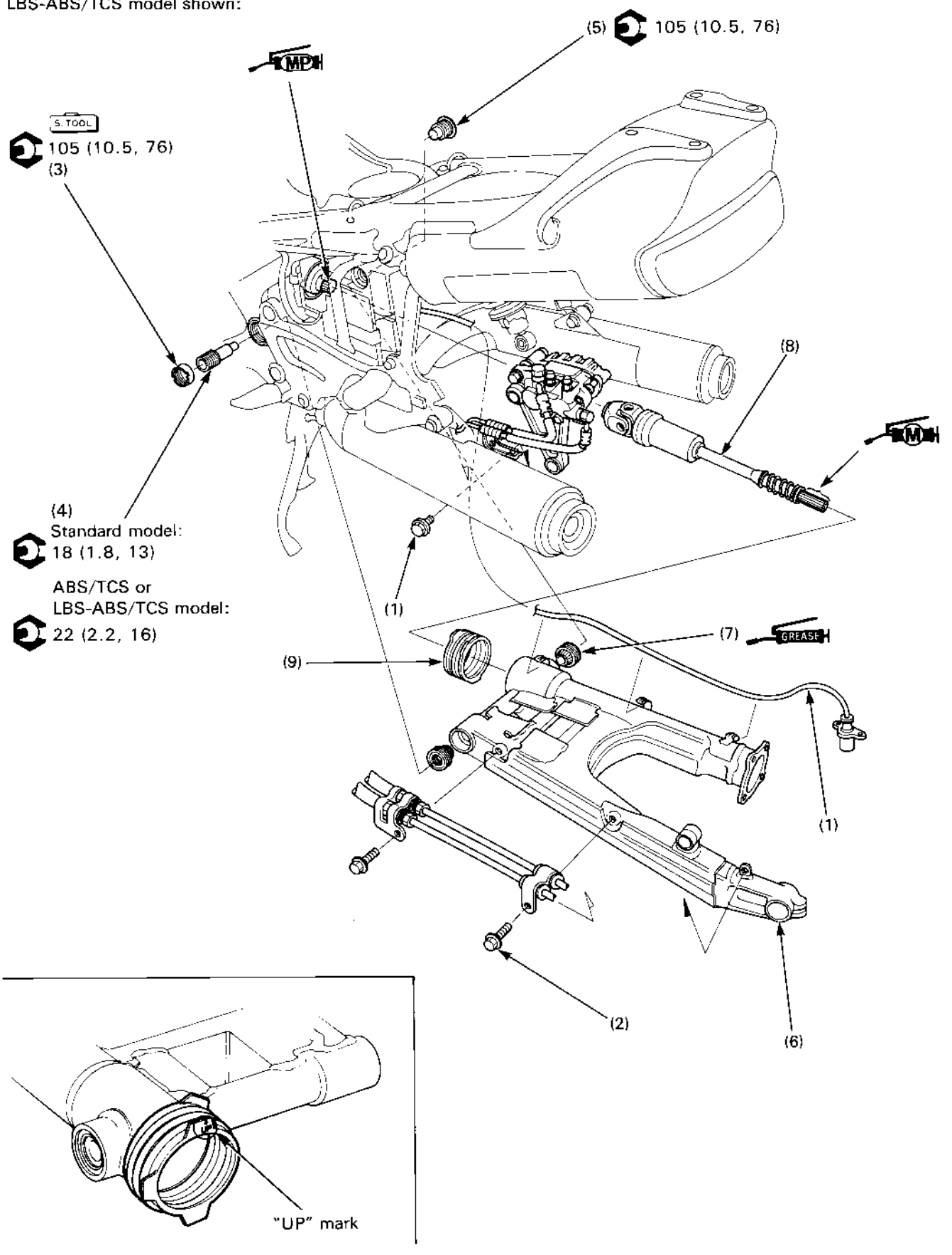
## Requisite Service

- Shock absorber removal/installation (page 14-6)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		
(1) Stopper ring	1	Assembly is in the reverse order of disassembly. Compress the shock absorber spring using the spring compressor (07GME-0010000) and attachment (07959-MB10000) and remove the stopper ring.
(2) Upper spring seat	1	
(3) Spring	1	Install with the tightly wound coil end facing up.
(4) Upper mount collar	1	

# Swingarm Removal/Installation

LBS-ABS/TCS model shown:



## NOTE

- Replace the pivot bearings and outer races as a set.

## Requisite Service

- Final gear case removal/installation (page 12-3)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			
(1)	Wheel sensor wire (ABS/TCS or LBS-ABS/TCS model only)	1	Installation is in the reverse order of removal. Remove the wire harness from the swingarm.
(2)	Rear brake hose clamp bolt	2	Remove the rear brake hose clamp from the swingarm.
(3)	Left pivot lock nut	1	Use the swingarm lock nut wrench (07908-4690003).
(4)	Left pivot bolt	1	
(5)	Right pivot bolt	1	
(6)	Swingarm	1	
(7)	Pivot bearing	2	Pivot bearing outer race replacement (page 14-10)
(8)	Driveshaft assembly	1	Disassembly/Assembly (page 12-2)
(9)	Rubber boot	1	
<b>Installation Order</b>			
(9)	Rubber boot	1	Install with the "UP" mark facing up.
(8)	Driveshaft assembly	1	Install into the swingarm
(7)	Pivot bearing	1	
(5)	Right pivot bolt	1	
(6)	Swingarm	1	Install in the frame and on the right pivot bolt while engaging the driveshaft joint with the countershaft.
(4)	Left pivot bolt	1	After installing the pivot bolts, fit the rubber boot tab into the transmission case groove properly.
(3)	Left pivot lock nut	1	Tighten the nut with the swingarm lock nut wrench (07908-4690003 or KS-HBA-08-469, U.S.A. only) while holding the left pivot bolt.
(2)	Rear brake hose clamp bolt	4	Install the clamp onto the swingarm.
(1)	Wheel sensor wire harness	1	Install the wire harness onto the swingarm.

## Rear Wheel/Suspension

### Pivot Bearing Outer Race Replacement

Punch or drill a 13 mm (1/2 in) hole into each grease retainer.

Remove the attachment from the bearing remover. Slide the shaft through the hole and install the attachment onto the shaft.

Install the sliding weight and remove the outer race with the grease retainer.

Repeat for the other side.

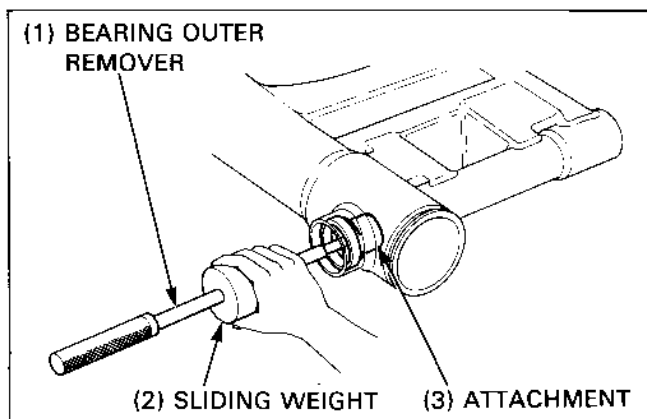
**S TOOL**

**Pivot bearing outer remover**

**07936-4150000**

**Sliding weight**

**07741-0010201**



Install new bearing outer races into the swingarm pivot.

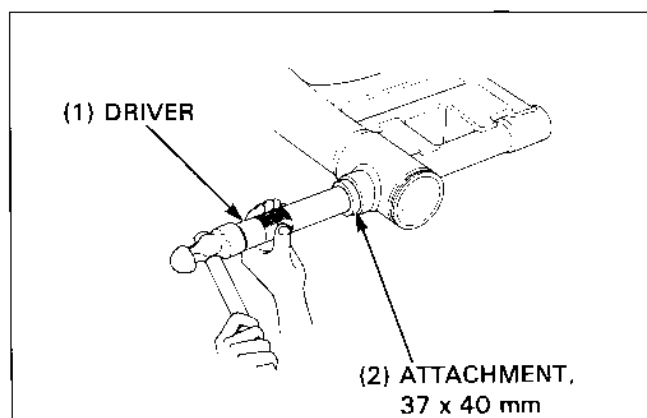
**S TOOL**

**Driver**

**07749-0010000**

**Attachment, 37 x 40 mm**

**07746-0010200**



# 16-A. ABS ('92 - '95)

Service Information	16-A-1	Troubleshooting	16-A-5
System Location	16-A-2	Wheel Sensor Air Gap Inspection	16-A-51
System Wiring Connections/Locations	16-A-3	Front Modulator Removal/Installation	16-A-52
Circuit Diagram	16-A-4	Rear Modulator Removal/Installation	16-A-54

## Service Information

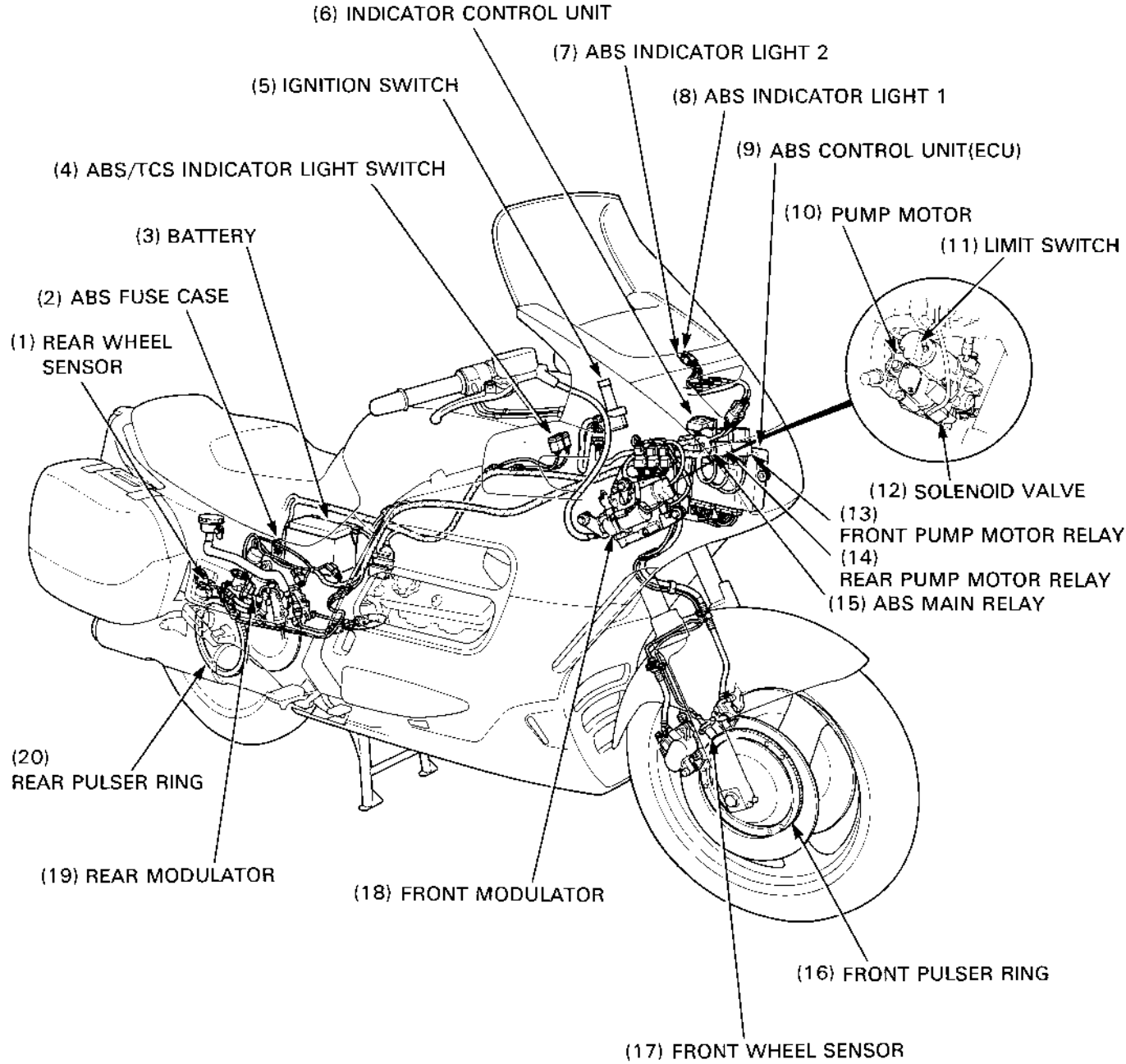
### CAUTION

- Use a fully charged battery for troubleshooting. Do not diagnose the ABS with a charger connected to the battery.
- On removal and installation of the wheels and wheel sensors, be careful not to damage the wheel sensors and pulser rings.

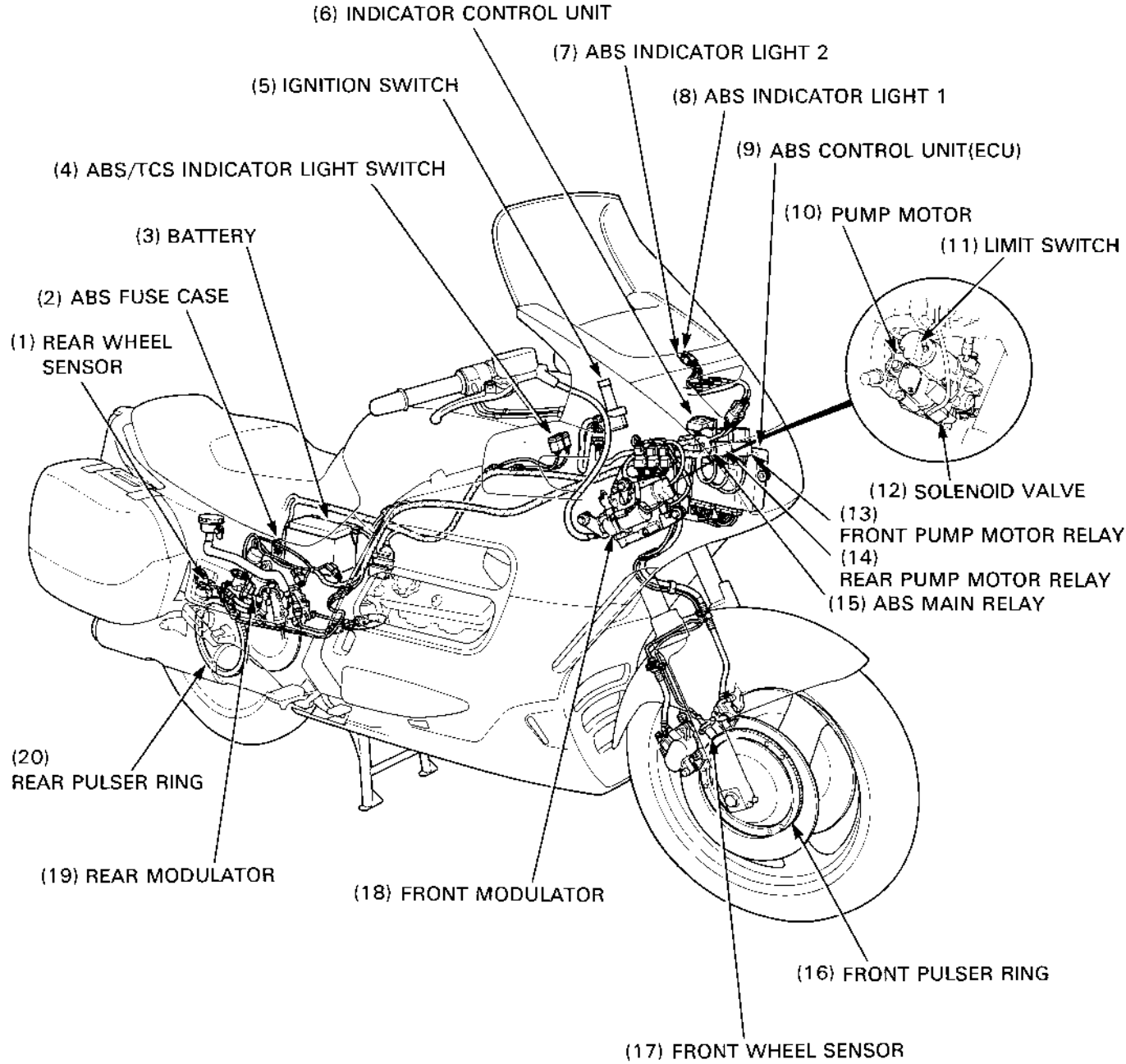
### NOTE

- Check the following before performing any ABS troubleshooting.
  - Pre-start self-diagnosis of ABS
  - ABS indicator lightIf an abnormality is found during the above checks, perform the ABS troubleshooting following the Symptom-to-System Chart (page 16-A-8). The ABS is normal if no trouble is found. Go to the checks on the other basic systems (e.g., brake system).
- Troubles not resulting from a faulty ABS, i.e. brake disc squeak, unevenly worn brake pad, etc., cannot be recognized by the ABS diagnosis system. (See the Common Service Manual.)
- Record the symptom of the problem and the problem code in MEMO before troubleshooting.
- When the ABS is faulty, the ABS indicator light blinks or it comes on. The ABS does not function at this time; take care during the test ride.
- Do not disassemble the modulator assembly. If it is faulty, replace it as an assembly.
- After replacing the modulator, bleed air from the brake fluid according to the standard air bleeding procedure. Note that replacement and bleeding air from the brake fluid is not possible, as it is sealed in the modulator.
- When the rear wheel sensor or rear pulser ring is replaced, perform the air gap inspection (page 16-A-51).
- The ABS indicator light might blink in the following cases. If the indicator light blinks, clear the problem code and perform the pre-start self-diagnosis of the ABS (page 16-A-5). The ABS is normal if the ABS indicator light goes off.
  - The motorcycle has continuously run on the bumpy road.
  - The ABS control unit (ECU) was disrupted by extremely powerful radio wave (Electromagnetic Interference).
  - After riding (i.e. after the pre-start self-diagnosis), the engine was kept running and the rear wheel turning (for more than 30 seconds) with the motorcycle on the center stand.
- The ABS indicator light might blink in the following cases. If the indicator light blinks, service the faulty parts, clear the problem code, and perform the pre-start self-diagnosis of the ABS (page 16-A-5). The ABS is normal if the ABS indicator light goes off.
  - Incorrect tire pressure
  - Tires not recommended for the motorcycle were installed.
  - Deformation of the wheel
- After troubleshooting, clear the problem code and perform the pre-start self-diagnosis again to be sure that the ABS indicator light is operating normally.

# System Location



# System Location



# System Wiring Connections/Locations

Refer to section 2, (frame/body panels/exhaust system), for the parts that must be removed for service.

① REAR LIMIT SWITCH  
-R. side cover (page 2-2)



② ABS/TCS INDICATOR LIGHT SWITCH  
-Top shelter (page 2-5)



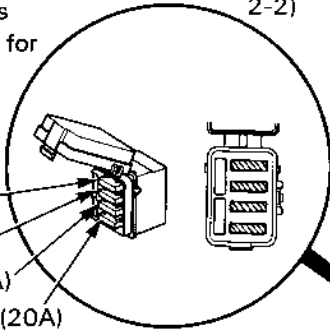
③ ABS IN...  
-Inner sc... (page 2-...)



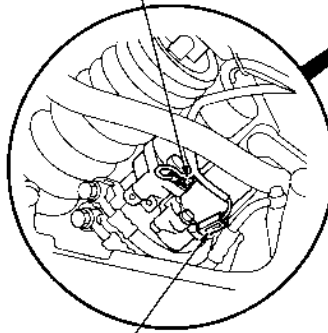
For example: ② ABS/TCS INDICATOR LIGHT SWITCH  
←Maintenance part  
-Top shelter  
The parts that must be removed for service.

ABS FUSE CASE  
-L. side cover (page 2-2)

ABS MAIN (10A)  
FRONT SOLENOID (10A)  
REAR SOLENOID (10A)  
PUMP MOTOR (20A)



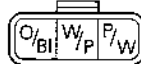
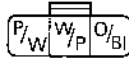
④ GROUND TERMINAL  
-R. side cover (page 2-2)



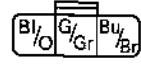
⑤ REAR PUMP MOTOR  
-R. side cover (page 2-2)

⑥ FRONT PUMP  
-Upper fairing (page 2-9)

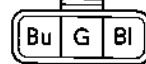
Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY



⑦ REAR SOLENOID VALVE  
-R. side cover (page 2-2)



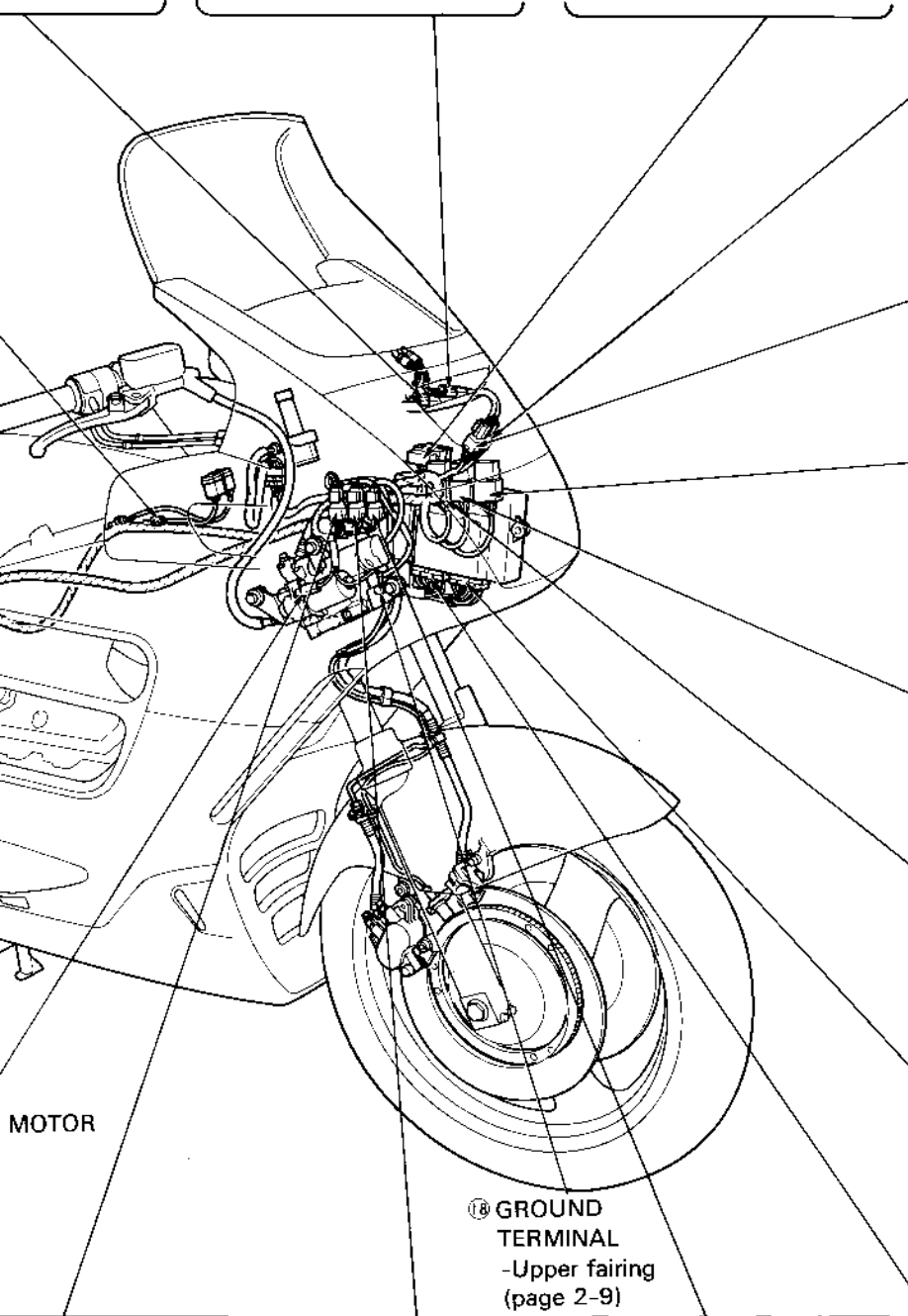
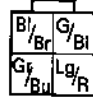
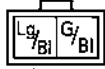
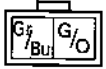
⑧ REAR WHEEL SENSOR  
-R. side cover (page 2-2)



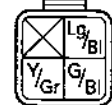
⑨ FROM...  
-Upper fairing (page 2-9)



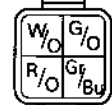
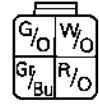
- ③ INDICATOR LIGHT 2  
-Inner screen (page 2-7)
- ④ ABS INDICATOR LIGHT 1  
-Inner screen (page 2-7)
- ⑤ INDICATOR CONTROL UNIT  
-L. fairing pocket (page 2-6)



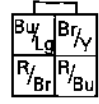
- ⑥ INDICATOR (BLACK)  
-Inner screen (page 2-7)



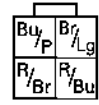
- ⑦ INDICATOR (WHITE)  
-Inner screen (page 2-7)



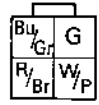
- ⑧ FRONT PUMP MOTOR RELAY  
-Upper fairing (page 2-9)



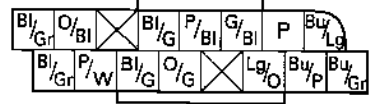
- ⑨ REAR PUMP MOTOR RELAY  
-Upper fairing (page 2-9)



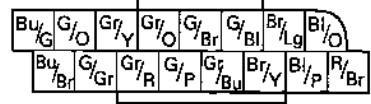
- ⑩ ABS MAIN RELAY  
-Upper fairing (page 2-9)



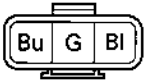
- ⑪ ECU (BLACK)  
-Upper fairing (page 2-9)



- ⑫ ECU (WHITE)  
-Upper fairing (page 2-9)



- ⑬ FRONT WHEEL SENSOR  
-Upper fairing (page 2-9)



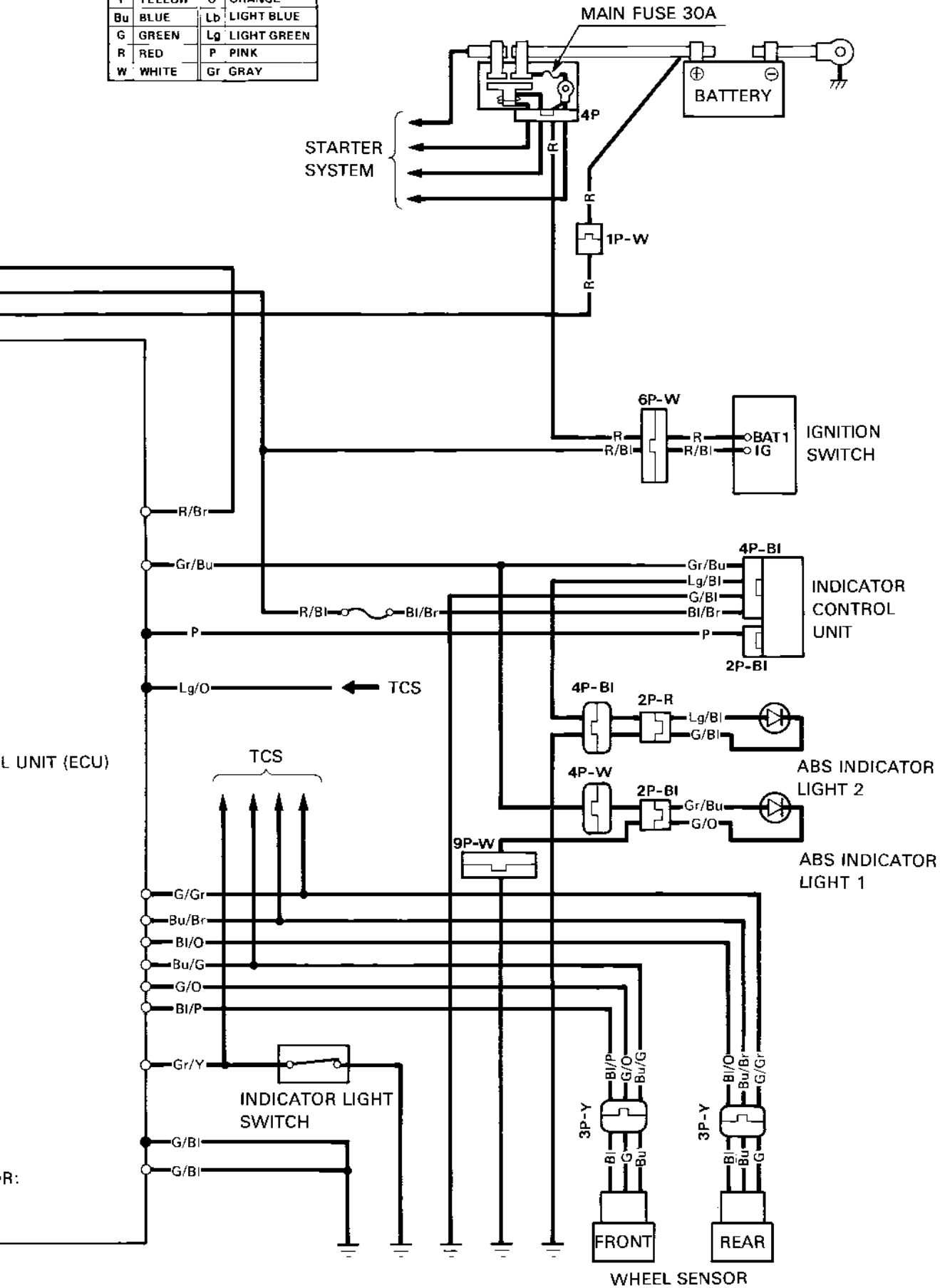
- ⑭ FRONT SOLENOID VALVE  
-Upper fairing (page 2-9)



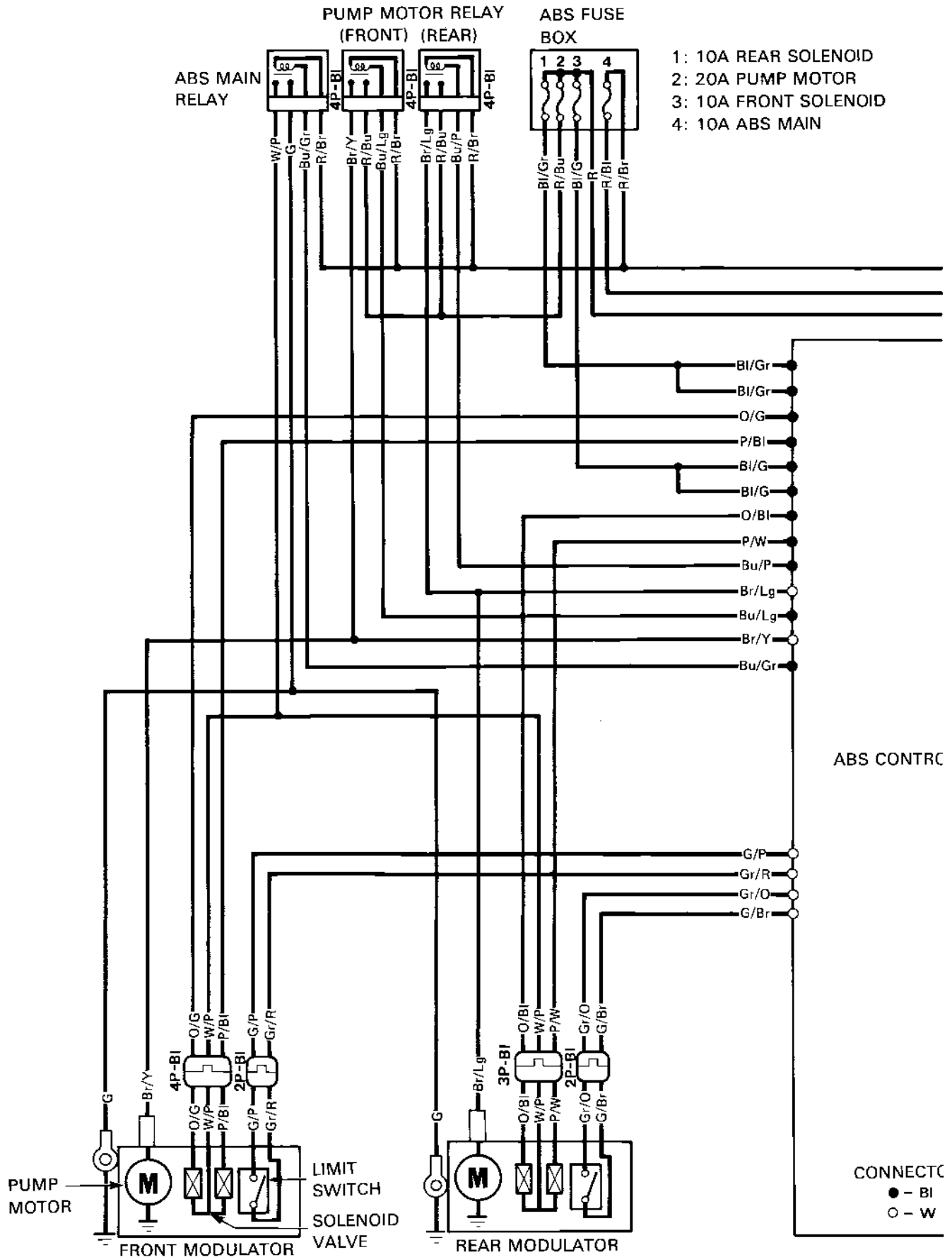
- ⑮ FRONT LIMIT SWITCH  
-Upper fairing (page 2-9)



Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY



# Circuit Diagram



# Troubleshooting

## Before Beginning Troubleshooting:

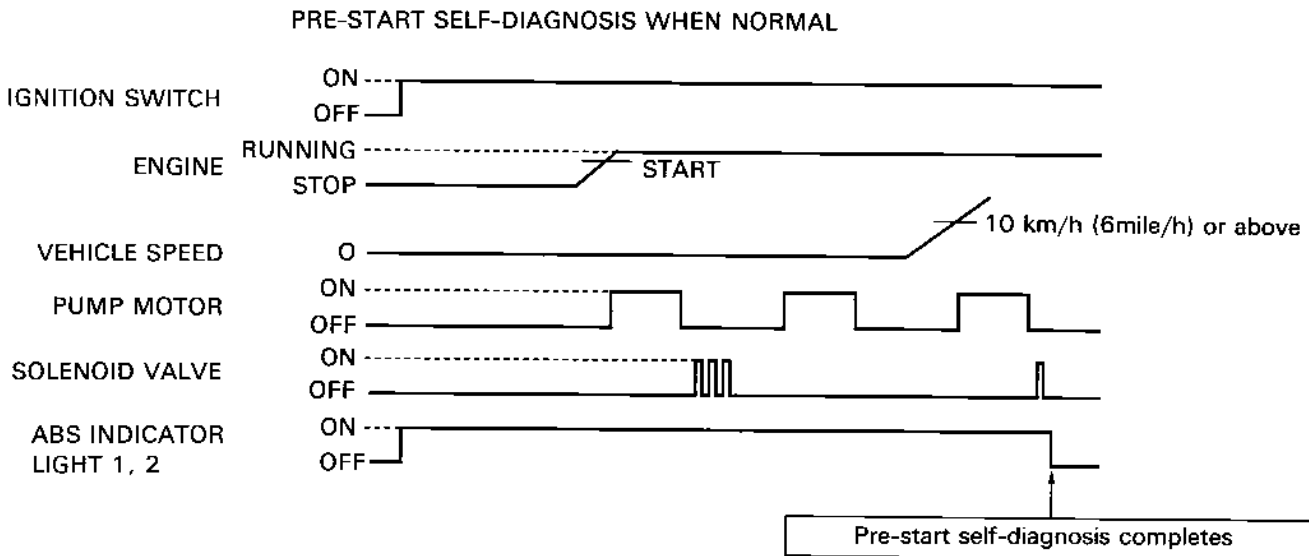
### Summary of ABS pre-start self-diagnosis system

The ABS pre-start self-diagnosis system diagnoses the electrical system as well as the hydraulic system operation in the modulator. When there is any abnormality, the problem and the problem part can be detected by outputting the problem code.

After starting the engine, the ABS pre-start self-diagnosis system operates the pump motor and solenoid valve inside the modulator, checks the limit switch ON/OFF condition with the ECU and detects whether the hydraulic operation is normal. Then, the diagnosis system enters the stand-by phase for receiving the signal from the wheel sensor, and it completes the pre-start self-diagnosis when the wheel sensor signal is input in the ECU at approximately 10 km/h (6 mile/h) or more of the vehicle speed.

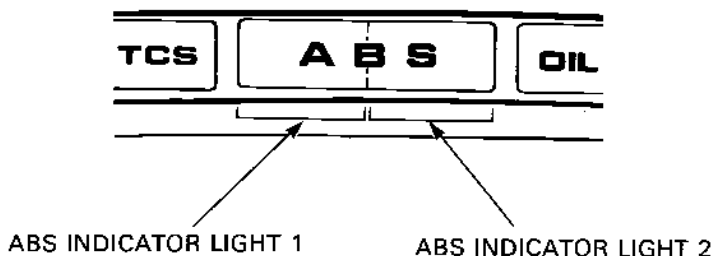
If the ABS is normal, the ABS indicator light goes off just after starting the engine and the motorcycle is in motion indicating that the diagnosis is completed.

If a problem is detected, the ABS indicator light blinks or comes on and stays on to notify the rider of the problem. The self-diagnosis is also made while the motorcycle is running, and the indicator light blinks when a problem is detected. When the indicator light blinks, the cause of the problem can be identified by retrieving the problem code following the specified retrieval procedure. (page 16-A-6)



### Pre-start self-diagnosis procedure (Everyday check-up)

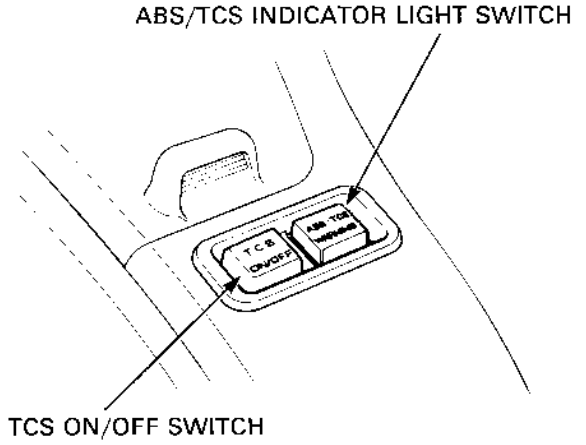
1. Turn the ignition switch ON.
2. Be sure that the ABS indicator lights 1 and 2 come ON.
3. Start the engine.
4. Ride the motorcycle and raise the vehicle speed to approximately 10 km/h (pre-start self-diagnosis completes).
5. The ABS is normal if both the ABS indicator lights 1 and 2 go off.



Retrieval of/Clearing Problem Code

NOTE

- The ABS indicator light indicates the problem code by its number of blinks (see the next page).
- The problem code is not cleared when the ignition switch is turned OFF during output of the problem code. However, output cannot be restarted by turning the ignition switch ON. Restart the output following the problem code retrieval procedure.
- After retrieving the problem code, be sure to record it in MEMO, etc. Clear the problem code after troubleshooting.



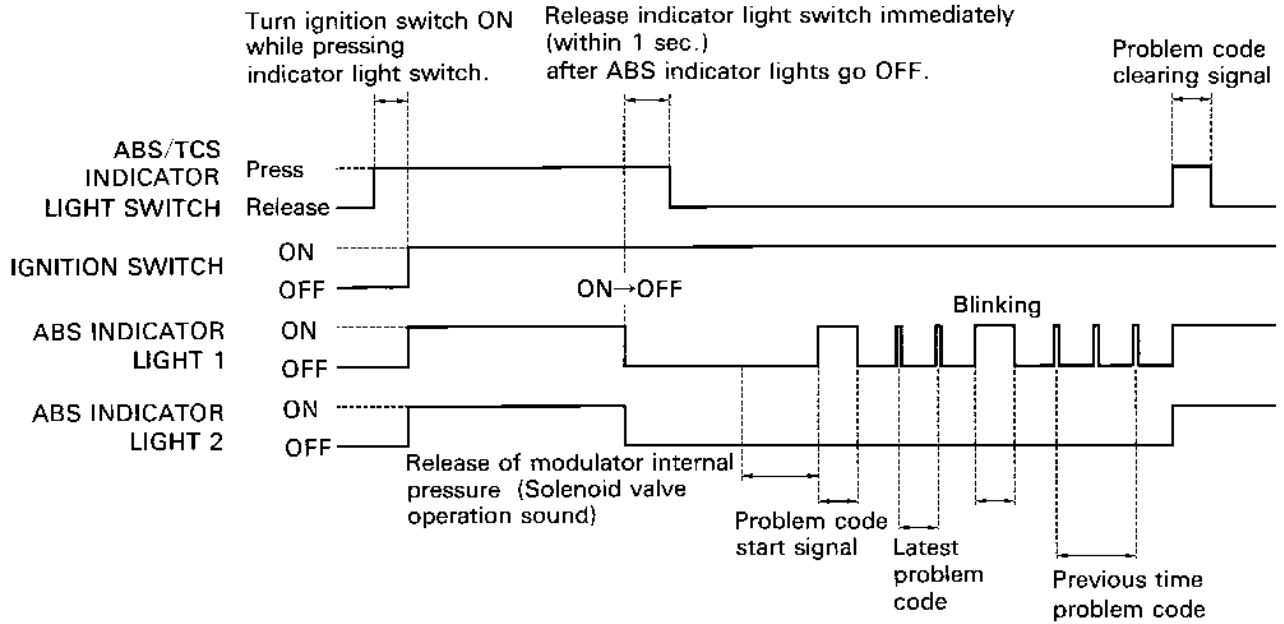
Retrieval:

1. Turn the ignition switch OFF.
  2. Turn the ignition switch ON while pressing the ABS/TCS indicator light switch. The ABS indicator light 1 and 2 should come ON.
  3. Hold the ABS/TCS indicator light switch pressed (for approximately 5 seconds). The ABS indicator light 1 and 2 should go OFF.
  4. Release the ABS/TCS indicator light switch immediately (within 1 second) after the ABS indicator light go OFF.
- ⇒ Output of the problem code starts and the ABS indicator light 1 blinks. (The ABS indicator light 2 is OFF this time.)



Clearing:

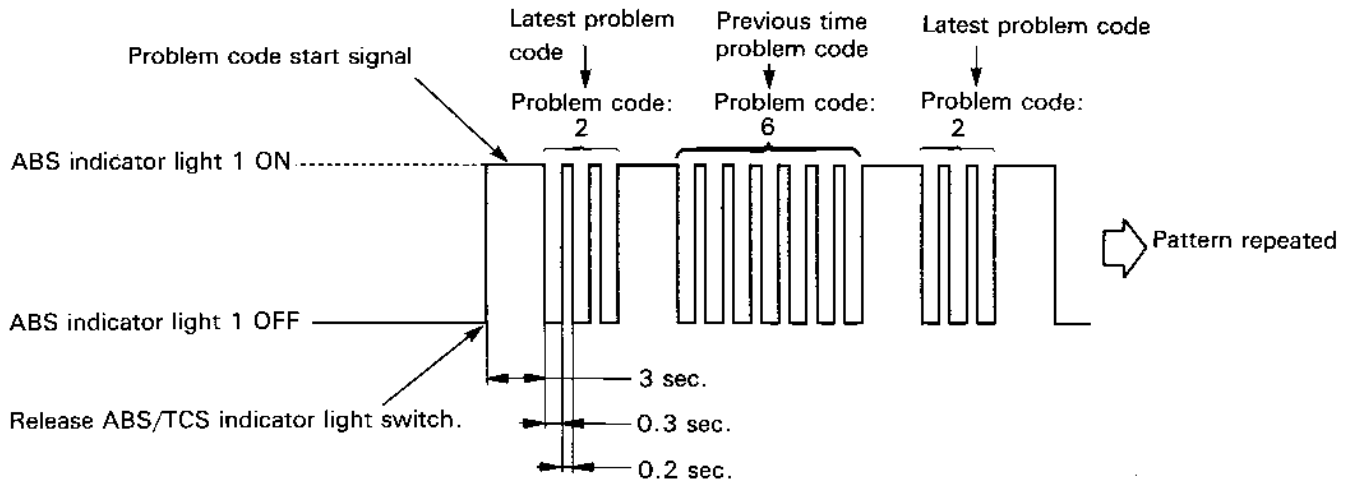
5. Press the ABS/TCS indicator light switch during output of the problem code (while the ABS indicator light is blinking).
- ⇒ The Problem code is cleared and the ABS indicator light 1 and 2 comes ON and stay ON.



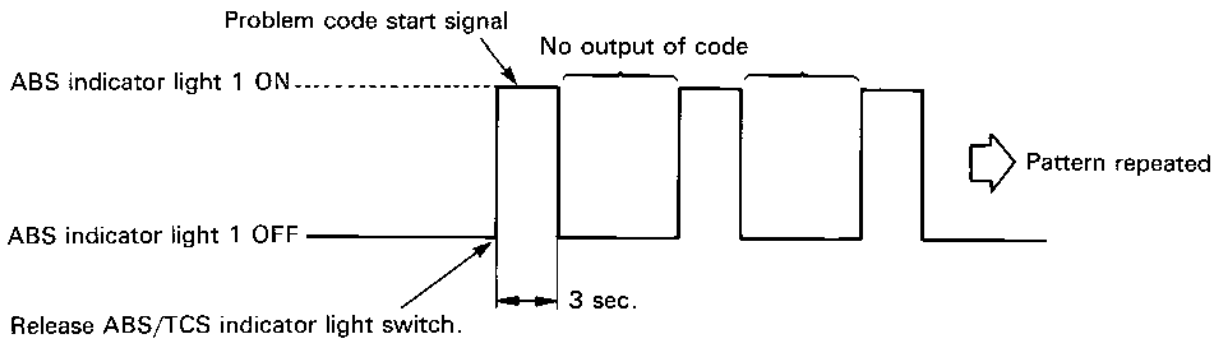
## Problem code indication pattern

Example:

- When the problem code is stored;



- When the problem code not stored;



### NOTE

- The ECU can store up to two problem codes. The latest problem code is output first, then the previous one is output. When the two problem codes are output, diagnose on the latest problem code (i.e. code output first).
- After troubleshooting, perform the pre-start self-diagnosis again to be sure that there is no problem in the ABS indicator lights and the problem code is cleared.
- See page 16-A-46 for the problems that are not represented with the problem codes.
- Check the following before performing ABS troubleshooting:
  - Pre-start self-diagnosis of ABS
  - ABS indicator light

If an abnormality is found during the above checks, perform the ABS troubleshooting following the Symptom-to-System Chart (see the following page). The ABS is normal if no trouble is found. Go on to check the other basic systems (e.g., brake system).

Symptom-to-System Chart

Problem		Affected														Reference page				
Problem code	Item	Fuse		Modulator						ABS main relay	Wheel sensor		Pulser ring		Power circuit (charging)	Wire harness	Control unit (ECU)	ABS indicator light	Indicator control unit	
		ABS main	Pump motor	Solenoid	Pump motor		Solenoid valve		Limit switch		Front	Rear	Front	Rear						
					Front	Rear	Front	Rear	Front											Rear
①	Faulty front hydraulic pressure circuit system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-9	
②	Faulty rear hydraulic pressure circuit system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-16	
③	Faulty front hydraulic control system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-23	
④	Faulty rear hydraulic control system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-30	
⑤	Faulty front wheel speed sensor system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-37	
⑥	Faulty rear wheel speed sensor system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-40	
⑦	Faulty ABS main relay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-43	
⑧	Faulty power circuit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-45	
⑨	Faulty control unit (ECU)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-45	
—	Problems not recognized by control unit (ECU)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16-A-46	

NOTE

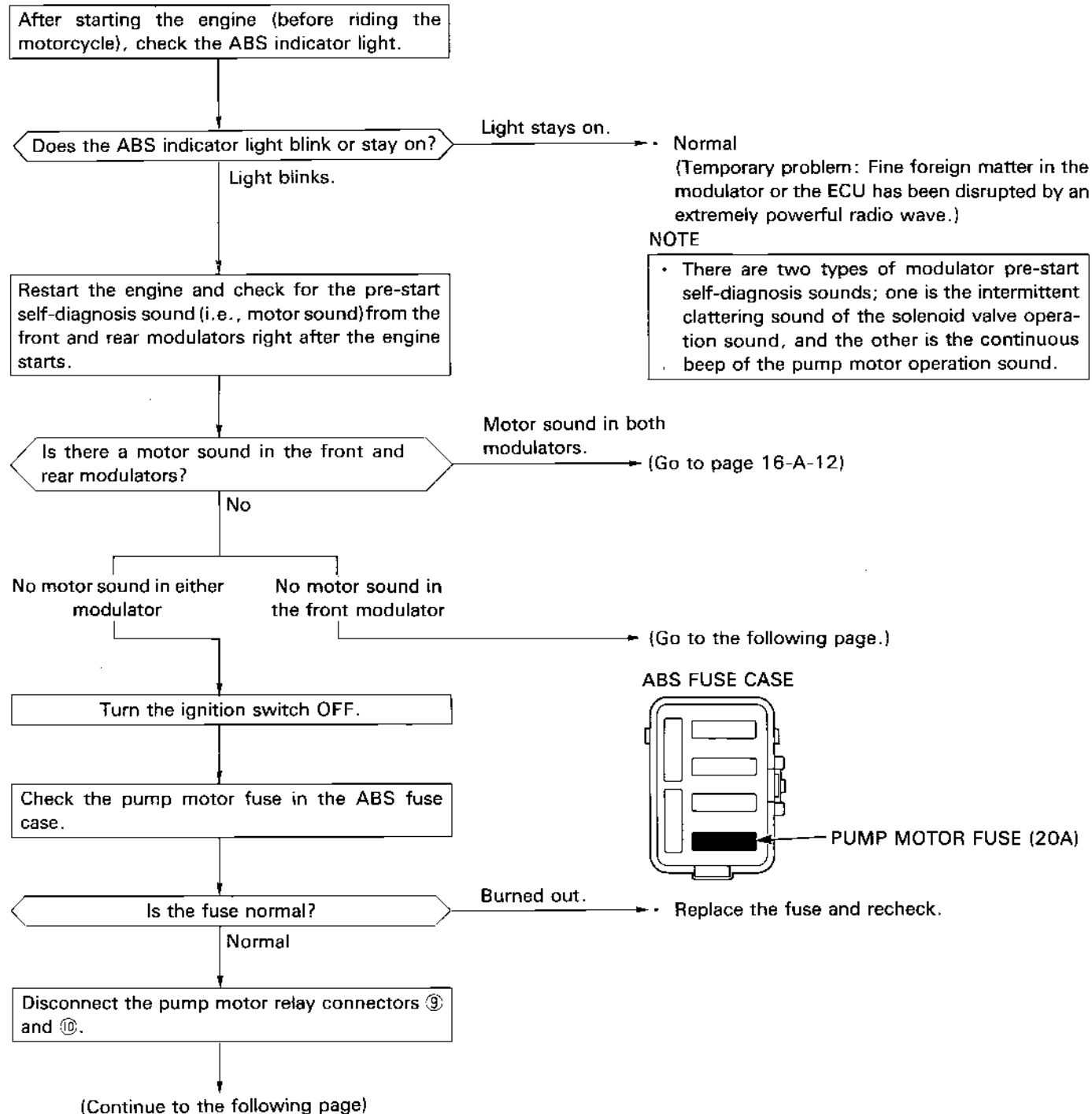
- Check the following before performing ABS troubleshooting.
  - Pre-start self-diagnosis of ABS (page 16-A-5)
  - ABS indicator light (page 16-A-5)
 If an abnormality is found during the above checks, perform the ABS troubleshooting following the Symptom-to-System Chart. The ABS is normal if no trouble is found. If no trouble is found, continue on to the other basic system checks (e.g., brake system).
- After troubleshooting, clear the problem code (page 16-A-6) and perform the pre-start self-diagnosis again (page 16-A-6) to be sure that the ABS indicator light is operating properly.

## Flowcharts

## NOTE

- Turn the ignition switch OFF unless otherwise specified.
- When the control unit (ECU) or modulator is detected to be faulty, recheck the wire harnesses and connectors connections closely before replacing the control unit or modulator.
- After troubleshooting, perform the pre-start self-diagnosis again and be sure that the ABS indicator light is normal.
- The encircled numbers in the text and connector diagrams indicate the connectors (see page 16-A-3).

## Problem code 1: Faulty front hydraulic pressure circuit system





(From the previous page: Disconnect the pump motor relay connectors ⑨ and ⑩.)

Check for voltage between the pump motor relay connector ⑧ and ⑨ terminals and the body ground respectively.

Does battery voltage register?

Battery voltage

Check the harnesses and connectors for secure connection (page 16-A-3).

(From the previous page: No motor sound in the front modulator)

Turn the ignition switch OFF.

Interchange the front and rear pump motor relays with each other.

Start the engine. Check whether the front and rear pump motor sounds interchanged with each other.

Did the pump motor sounds interchange?  
(No motor sound in the rear pump motor?)

Did not interchange.

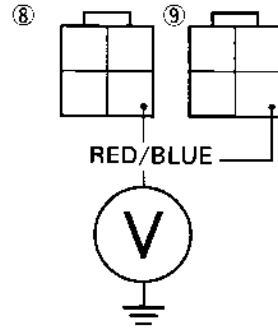
Turn the ignition switch OFF.

Disconnect the pump motor relay connector ⑧ and the BLACK connector ⑪ of the ECU.

Check for continuity between the pump motor relay connector ⑧ terminal and the BLACK connector ⑪ terminal of the ECU.

(Continue to the following page)

View from terminal side.



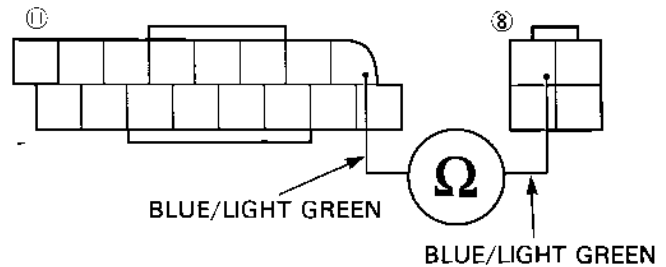
No battery voltage

Repair open in the RED or RED/BLUE harnesses between the battery and pump motor relay.

Interchanged.

Faulty pump motor relay

View from terminal side



(From the previous page)

Is there continuity?

No continuity

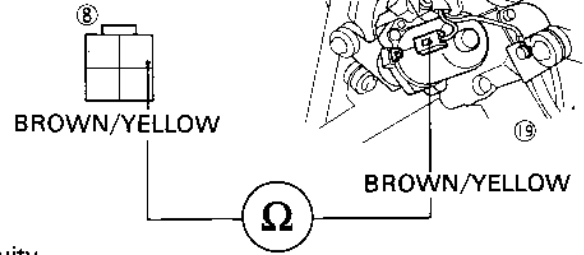
• Repair open in the BLUE/LIGHT GREEN harness between the pump motor relay and ECU.

Continuity

Disconnect the pump motor connector ⑨.

Check for continuity between the pump motor relay connector ⑧ terminal and pump motor connector ⑨ terminal.

View from terminal side



Is there continuity?

No continuity

• Repair open in the BROWN/YELLOW harness between the pump motor relay and pump motor.

Continuity

Install the pump motor relay connector ⑧, pump motor connector ⑨ and the BLACK connector ⑩ of the ECU.

Start the engine and check the front pump motor relay for a clicking sound at the relay contact point.

Is there a clicking sound in the relay?

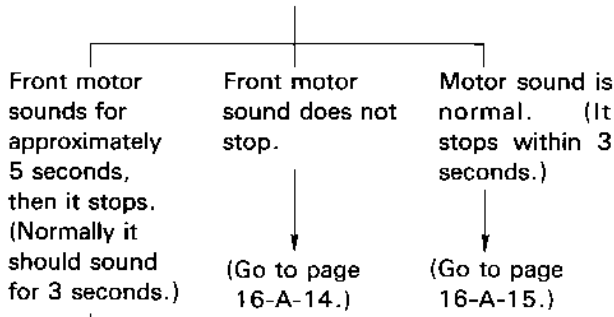
Sound

• Faulty modulator

No sound

• Faulty ECU

(From page 16-A-9: Motor sound in both modulators.)



Turn the ignition switch OFF.

Interchange the front and rear pump motor relays with each other.

Start the engine. Did the front and rear motor sounds interchange with each other?

Interchanged. • Faulty pump motor relay

Did not interchange.

Check the modulator limit switch connector ⑬ for secure connection.

Is it connected securely?

Poor connection • Connect securely and recheck.

Secure connection

Turn the ignition switch OFF.

Disconnect the limit switch connector ⑬.

Start the engine. Check for continuity between the switch side terminals of the limit switch connector ⑬ during pump motor rotation (see page 16-9).

Is there continuity during pump motor rotation?

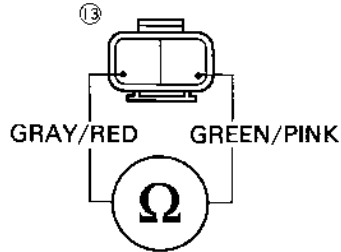
No continuity • Repair open in the limit switch side GRAY/RED or GREEN/PINK harness.  
• Faulty modulator

Continuity

Clear the problem code.

(Continue to the following page)

View from terminal side



(From the previous page)

Turn the ignition switch OFF.

Connect the main harness side terminals of the limit switch connector ⑬ with a piece of jumper wire.

Perform the pre-start self-diagnosis and retrieve the problem code.

Is the problem code "3"?

Problem code "3"

Check the harnesses and connectors for secure connection (page 16-A-3).

Problem code "1"

Turn the ignition switch OFF.

Disconnect the WHITE connector ⑫ of the ECU.

While connecting the main harness side terminals of the limit switch connector ⑬ with a jumper wire, check for continuity between the WHITE connector ⑫ terminals of the ECU.

Is there continuity?

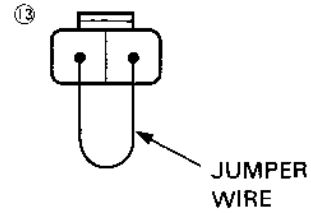
No continuity

Repair open in GRAY/RED or GREEN/PINK harness between the ECU and modulator (limit switch).

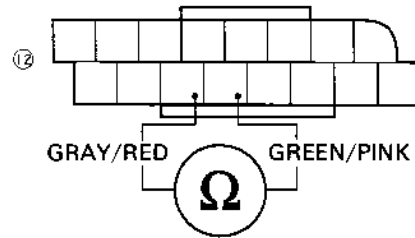
Continuity

Faulty ECU

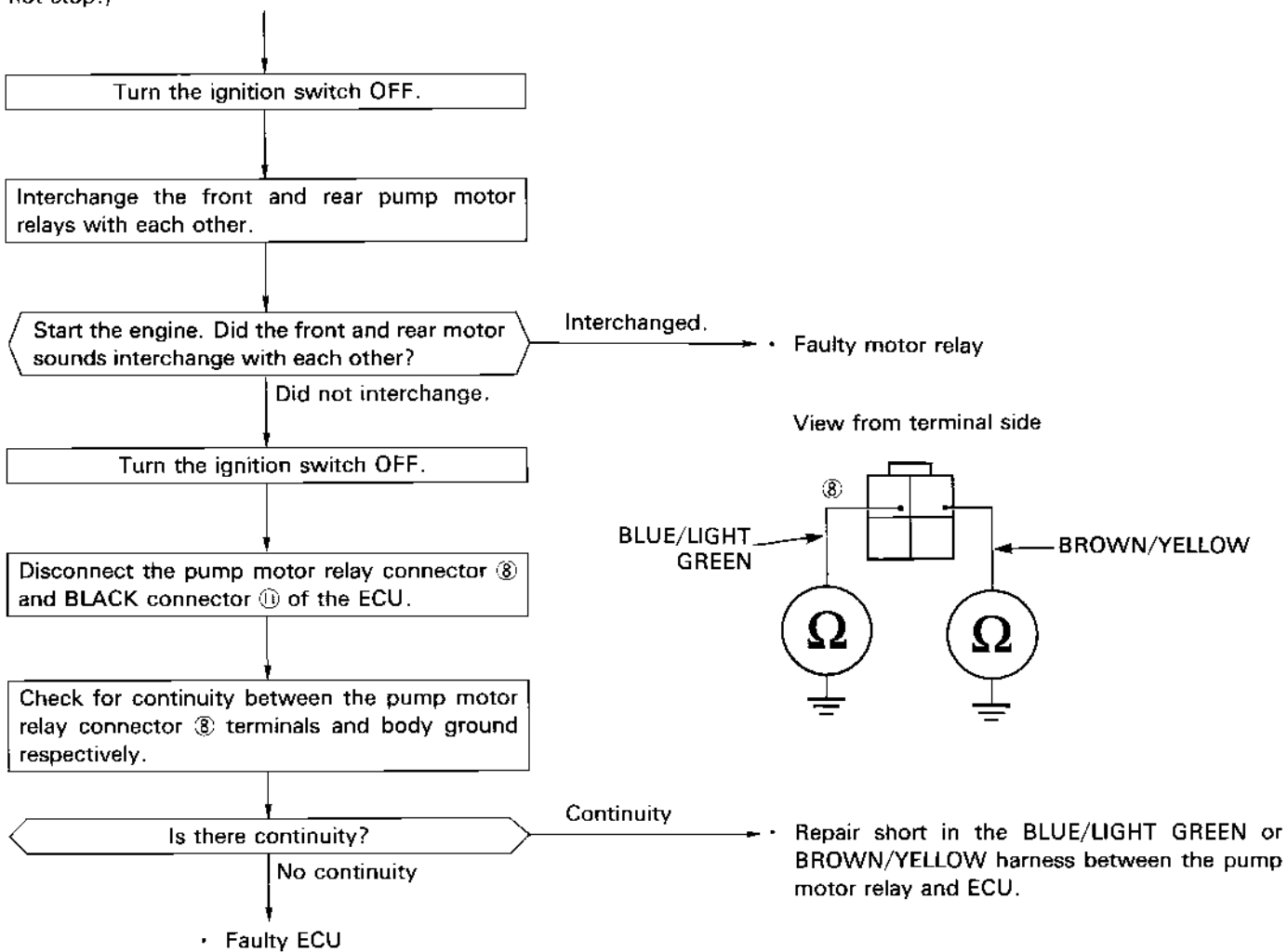
View from terminal side



View from terminal side



(From page 16-A-12: Front motor sound does not stop.)



(From page 16-A-12: Motor sound is normal.)

Turn the ignition switch OFF.

Interchange the front and rear pump motor relays with each other.

Perform the pre-start self-diagnosis and retrieve the problem code.

Is the problem code "2"?

Problem code "2"

• Faulty front pump motor relay

Problem code "1"

Turn the ignition switch OFF.

Disconnect the pump motor relay connector ⑧ and WHITE connector ⑫ of the ECU.

Check for continuity between the pump motor relay connector ⑧ and WHITE connector ⑫ of the ECU.

Is there continuity?

No continuity

• Repair open in the BROWN/YELLOW harness between the pump motor relay and ECU.

Continuity

Disconnect the front and rear modulator pump motor connectors ⑲ and ⑳.

Check for continuity between the pump motor relay connector ⑧ and body ground.

Is there continuity?

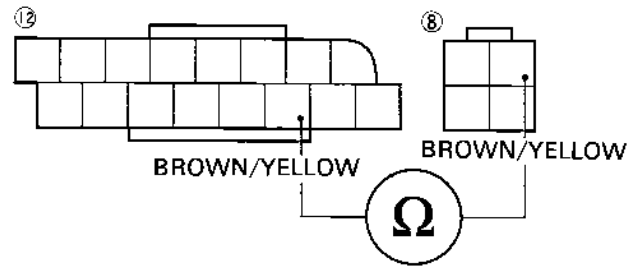
Continuity

• Repair short in the BROWN/YELLOW harness between the pump motor relay and ECU.

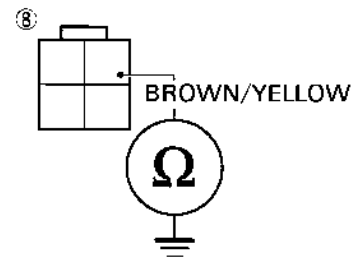
No continuity

• Faulty ECU

View from terminal side



View from terminal side



**Problem code 2: Faulty rear hydraulic pressure circuit system**

After starting the engine (before riding the motorcycle), check the ABS indicator light.

Does the ABS indicator light blink or stay on?

Light stays on.

- Normal (Temporary problem: Fine foreign matter in the modulator or the ECU has been disrupted by an extremely powerful radio wave.)

Light blinks.

**NOTE**

- There are two types of the modulator pre-start self-diagnosis sounds; one is the intermittent clattering sound of the solenoid valve operation sound, and the other is the continuous beep of the pump motor operation sound.

Restart the engine and check for the pre-start self-diagnosis sound (i.e., motor sound) from the front and rear modulators right after the engine starts.

Is there a motor sound in the front and rear modulators?

Motor sound in both modulators.

(Go to page 16-A-19.)

No

No motor sound in either modulator.

No motor sound in the rear modulator.

(Go to the following page.)

Turn the ignition switch OFF.

Check the pump motor fuse in the ABS fuse case.

**ABS FUSE CASE**



PUMP MOTOR FUSE (20A)

Is the fuse normal?

Burned out.

- Replace the fuse and recheck.

Normal

Disconnect the pump motor relay connectors ⑨ and ⑩.

(Continue to the following page)

(From the previous page: Disconnect the pump motor relay connectors ⑨ and ⑩.)

Check for voltage between the pump motor relay connector ⑧ and ⑨ terminals and the body ground respectively.

Does battery voltage register?

No battery voltage

Repair open in the RED or RED/BLUE harnesses between the battery and pump motor relay.

Battery voltage

Check the harnesses and connectors for secure connection (page 16-A-3).

(From the previous page: No motor sound in the rear modulator.)

Turn the ignition switch OFF.

Interchange the front and rear pump motor relays with each other.

Start the engine. Check whether the front and rear pump motor sounds interchanged with each other.

Did the pump motor sounds interchange? (No motor sound in the front pump motor?)

Interchanged.

Faulty pump motor relay

Did not interchange.

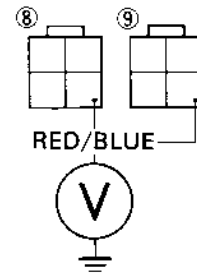
Turn the ignition switch OFF.

Disconnect the pump motor relay connector ⑨ and the BLACK connector ⑪ of the ECU.

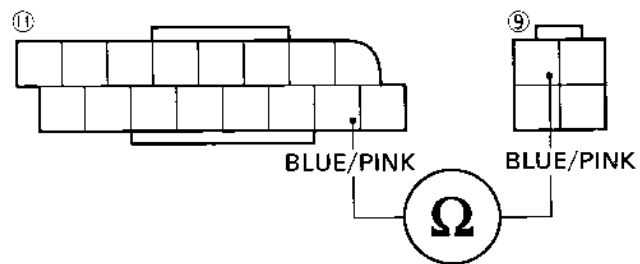
Check for continuity between the pump motor relay connector ⑨ terminal and the BLACK connector ⑪ terminal of the ECU.

(Continue to the following page)

View from terminal side

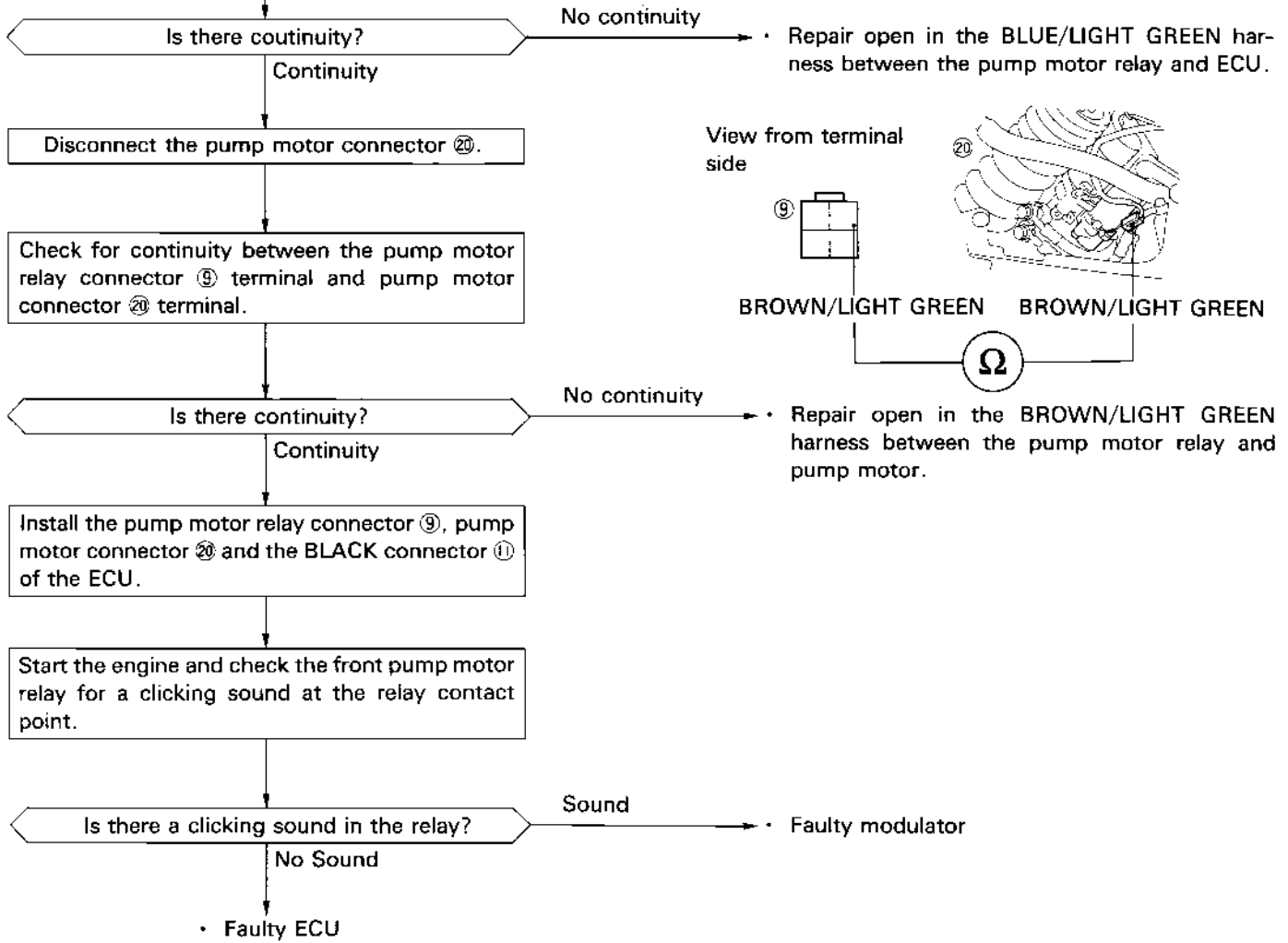


View from terminal side





(From the previous page)



(From page 16-A-16: Motor sound in both modulators.)

Rear motor sounds for approximately 5 seconds, then it stops. (Normally, it should sound for approximately 3 seconds.)

Rear motor sound does not stop.

(Go to page 16-A-21).

Motor sound is normal. (It stops within 3 seconds.)

(Go to page 16-A-22).

Turn the ignition switch OFF.

Interchange the front and rear pump motor relays with each other.

Start the engine. Did the front and rear motor sounds interchange with each other?

Interchanged.

• Faulty pump motor relay

Did not interchange

Check the modulator limit switch connector ① for secure connection.

Is it connected securely?

Poor connection

• Connect securely and recheck.

Secure connection

Turn the ignition switch OFF.

Disconnect the limit switch connector ①.

Start the engine. Check for continuity between the switch side terminals of the limit switch connector ① during pump motor rotation (see page 16-16).

Is there continuity during pump motor rotation?

No continuity

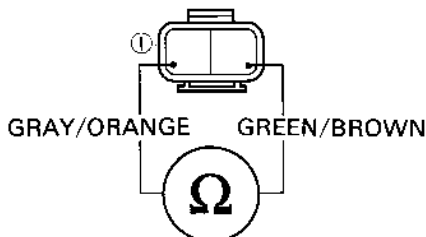
• Repair open in the limit switch side GRAY/ORANGE or GREEN/BROWN harness.  
• Faulty modulator

Continuity

Clear the problem code.

(Continue to the following page)

View from terminal side



(From the previous page)

Turn the ignition switch OFF.

Connect the main harness side terminals of the limit switch connector ① with a piece of jumper wire.

Perform the pre-start self-diagnosis and retrieve the problem code.

Is the problem code "4"?

Problem code "4"

• Check the harness and connector for secure connection (page 16-A-3).

Problem code "2"

Turn the ignition switch OFF.

Disconnect the WHITE connector ⑫ of the ECU.

While connecting the main harness side terminals of the limit switch connector ① with a jumper wire, check for continuity between the WHITE connector ⑫ terminals of the ECU.

Is there continuity?

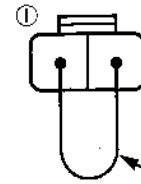
No continuity

• Repair open in the GRAY/ORANGE or GREEN/BROWN harness between the ECU and modulator (limit switch).

Continuity

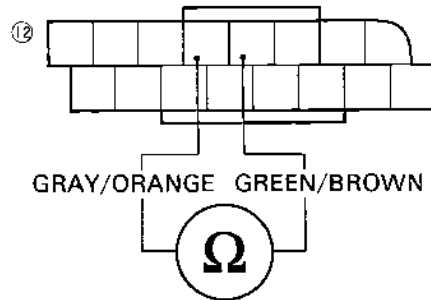
• Faulty ECU

View from terminal side



JUMPER WIRE

View from terminal side



(From page 16-A-19: Rear motor sound does not stop.)

Turn the ignition switch OFF.

Interchange the front and rear pump motor relays with each other.

Start the engine. Did the front and rear motor sounds interchange with each other?

Interchanged.

• Faulty motor relay

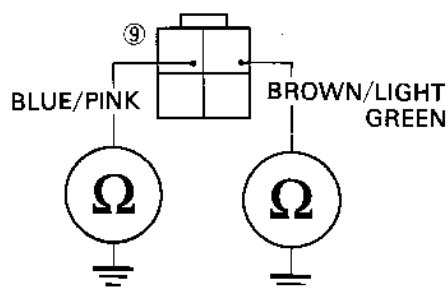
Did not interchange.

View from terminal side

Turn the ignition switch OFF.

Disconnect the pump motor relay connector ⑨ and BLACK connector ⑪ of ECU.

Check for continuity between the pump motor relay connector ⑨ terminals and body ground respectively.



Is there continuity?

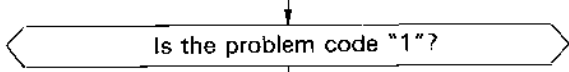
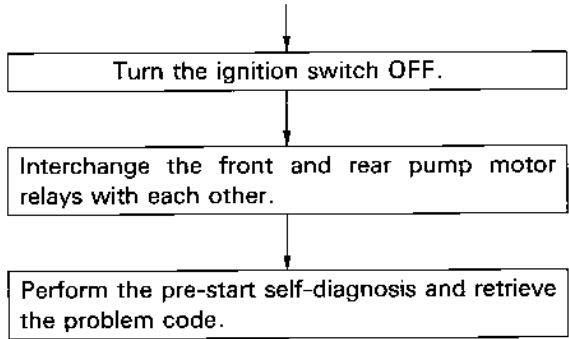
Continuity

• Repair short in the BLUE/PINK or BROWN/LIGHT GREEN harness between the pump motor relay and ECU.

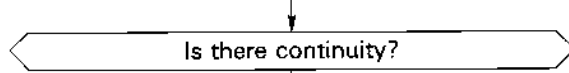
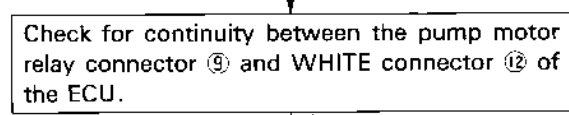
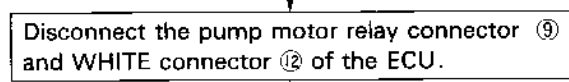
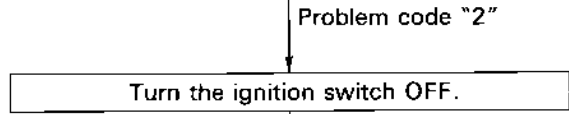
No continuity

• Faulty ECU

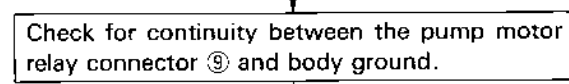
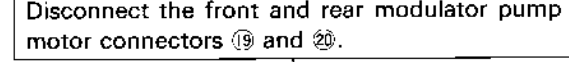
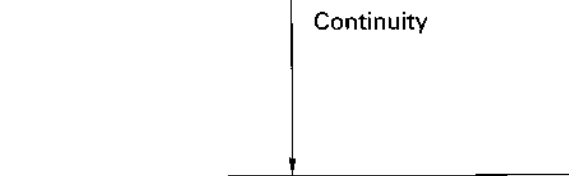
(From page 16-A-19: Motor sound is normal.)



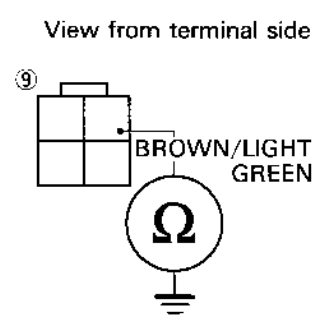
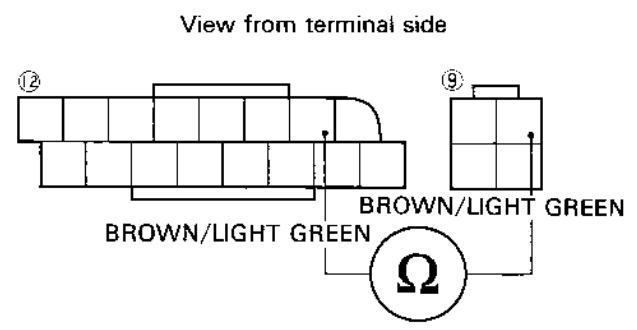
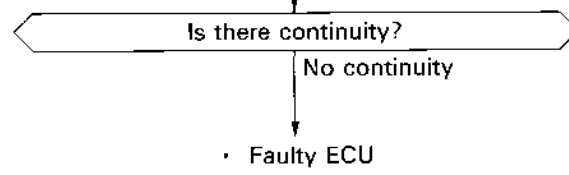
Problem code "1" → • Faulty rear pump motor relay



No continuity → • Repair open in the BROWN/LIGHT GREEN harness between the pump motor relay and ECU.

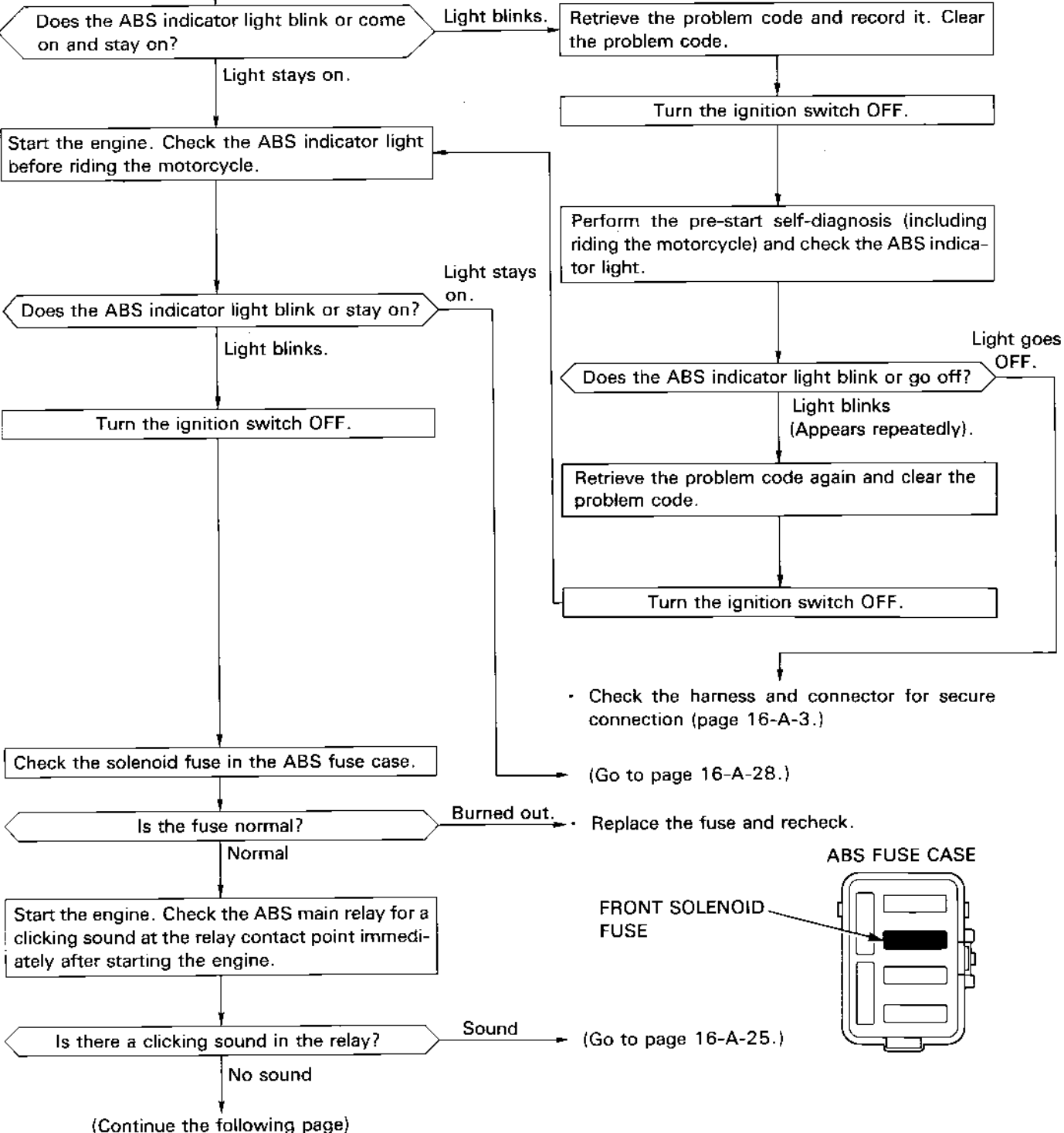


Continuity → • Repair short in the BROWN/LIGHT GREEN harness between the pump motor relay and ECU.



### Problem code 3: Faulty front hydraulic control system

Turn the ignition switch ON (but do not start the engine) and check the ABS indicator light 1 and 2.



(From the previous page)

Disconnect the ABS main relay connector ⑩ and connect the headlight relay instead.

Restart the engine. Check the ABS indicator light 1 and 2 before riding the motorcycle.

Does the ABS indicator light blink or stay on?

Light stays on.

Faulty ABS main relay

Light blinks.

Disconnect the ABS main relay connector ⑩ from the headlight relay.

Turn the ignition switch ON.

Check for voltage between the ABS main relay connector ⑩ terminal and body ground.

Does battery voltage register?

No battery voltage

Repair open in the RED/BROWN harness between the ABS main relay and ABS main fuse.

Battery voltage

Turn the ignition switch OFF.

Connect the ABS main relay connector ⑩ to the ABS main relay and disconnect the BLACK connector ⑪ of the ECU.

Turn the ignition switch ON.

Check for voltage between the BLACK connector ⑪ terminal of the ECU and body ground.

Does battery voltage register?

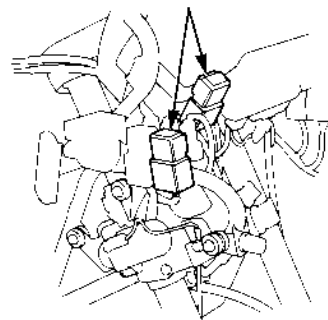
No battery voltage

Repair open in the BLUE/GRAY harness between the ABS main relay and ECU.

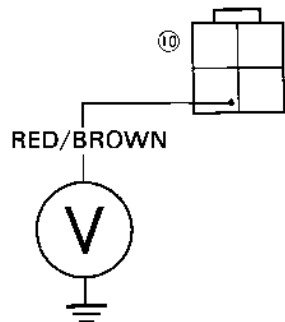
Battery voltage

Faulty ECU

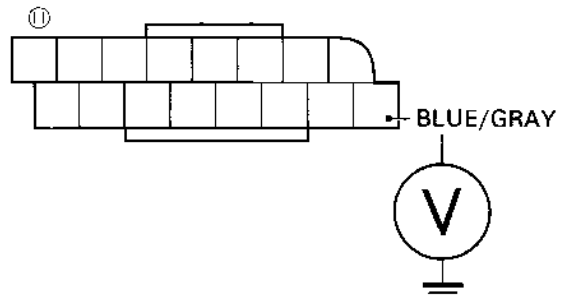
HEADLIGHT RELAY



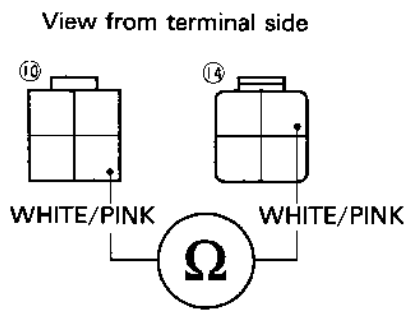
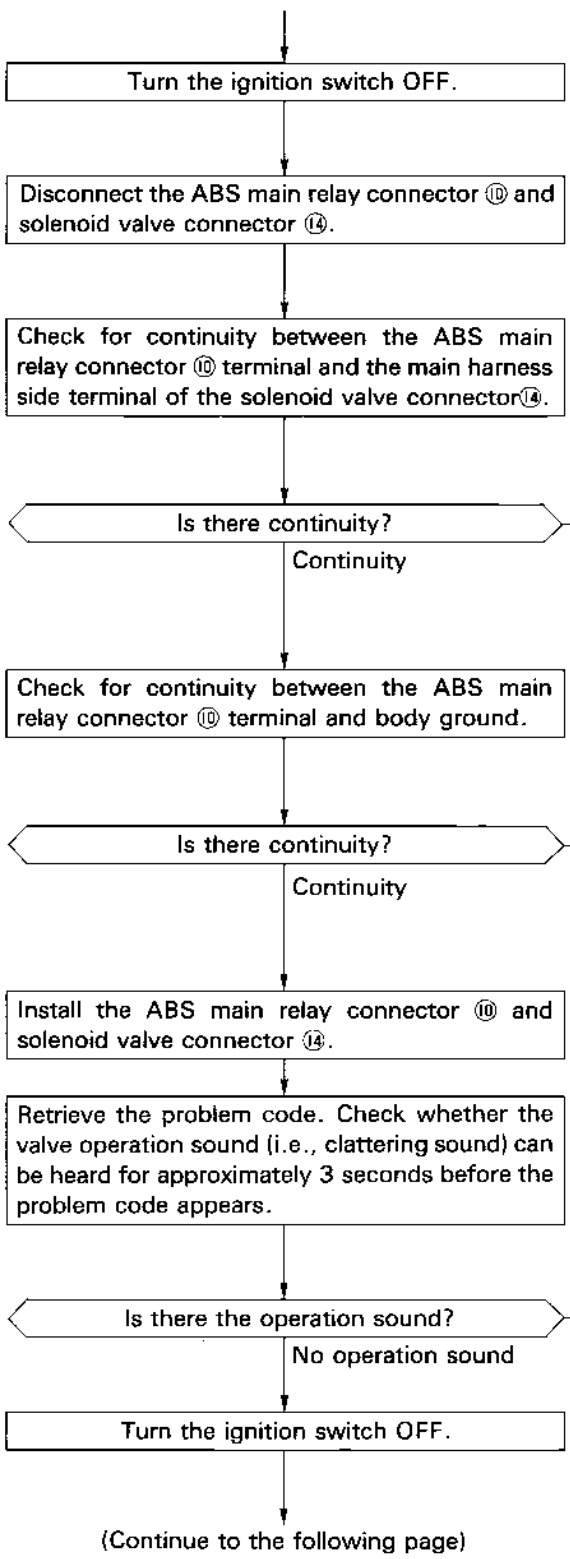
View from terminal side



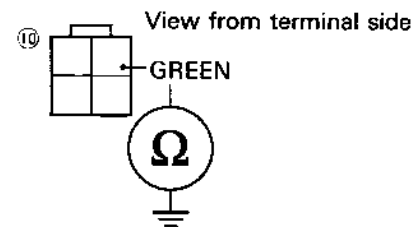
View from terminal side



(From page 16-A-23: Operation sound in the ABS main relay.)



No continuity → Repair open in the WHITE/PINK harness between the ABS main relay and modulator (solenoid valve).



No continuity → Open harness between the ABS main relay and modulator ground terminal ⑩, or poor grounding.



(From the previous page)

Disconnect the solenoid valve connector ⑭ and BLACK connector ① of the ECU.

Check for continuity between the main harness side terminal of the solenoid valve connector ⑭ and BLACK connector ① terminal of the ECU.

Is there continuity?

Continuity

Turn the ignition switch ON.

Check for voltage between the BLACK connector ① terminals of the ECU and body ground respectively.

Does battery voltage register?

Battery voltage

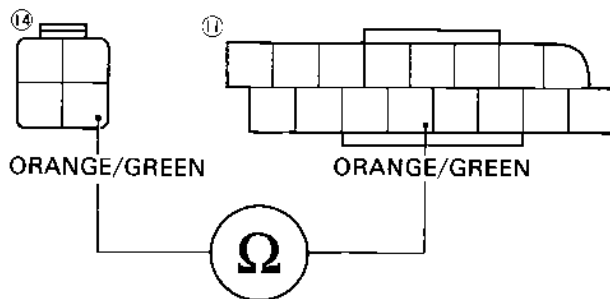
Connect the valve side terminals of the solenoid valve connector ⑭ to the battery terminals.  
 ORANGE/GREEN: Positive (+)  
 WHITE/PINK: Negative(-)

When connecting, is there the valve operation sound (i.e., clattering sound)?

Operation sound

• Faulty ECU

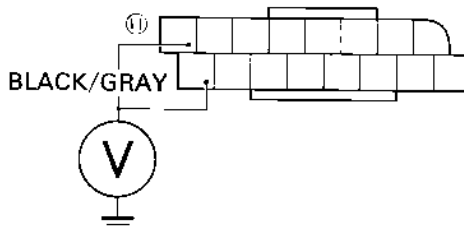
View from terminal side



No continuity

- Repair open in the ORANGE/GREEN harness between the modulator (solenoid valve) connector and ECU.

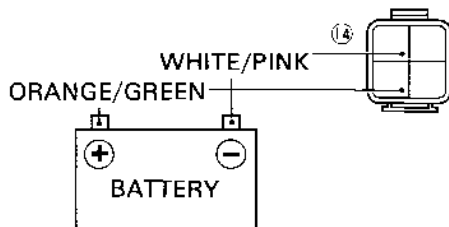
View from terminal side



No battery voltage

- Repair open in the BLACK/GRAY or RED harness between the ECU and battery.

View from terminal side



No operation sound

- Repair open in the ORANGE/GREEN or WHITE/PINK harness of the valve solenoid.
- Faulty modulator

**CAUTION**

- Connect to the battery terminals securely. Be sure not to connect to the battery terminals for more than 5 seconds continuously.

(From page 16-A-25: Valve operation sound.)

After checking the operation sound, turn the ignition switch OFF and disconnect the limit switch connector ⑬.

Check for continuity between the switch side terminals of the limit switch connector ⑬.

Is there continuity?

Continuity

• Faulty modulator

No continuity

Disconnect the WHITE connector ⑫ of the ECU.

Check for continuity between the main harness side terminal of the limit switch connector ⑬ and body ground.

Is there continuity?

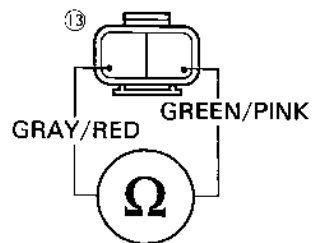
Continuity

• Repair short in the GRAY/RED harness between the ECU and limit switch connector.

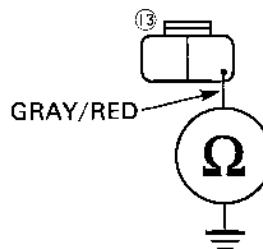
No continuity

• Faulty ECU

View from terminal side



View from terminal side



(From page 16-A-23: ABS indicator light stays on.)

Start the motorcycle. Raise the vehicle speed to 10 km/h (6 mile/h) and check the ABS indicator light. (After checking, the motorcycle can be parked.)

The ABS indicator light 1 and 2 blink as the motorcycle starts to move.

The ABS indicator light 1 and 2 go off once as the motorcycle starts to move, then they blink.

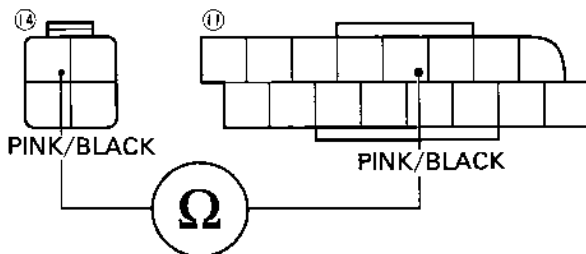
Go to page 16-A-29

Turn the ignition switch OFF.

Disconnect the solenoid valve connector ⑭ and BLACK connector ① of the ECU.

Check for continuity between the main harness side terminal of the solenoid valve connector ⑭ and BLACK connector ① terminal of the ECU.

View from terminal side



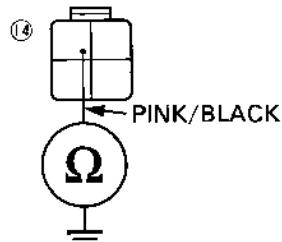
Is there continuity?

No continuity

Repair open in the PINK/BLACK harness between the solenoid connector and ECU.

Continuity

View from terminal side



With the BLACK connector of the ECU disconnected, check for continuity between the main harness side terminal of the solenoid valve connector ⑭ and body ground.

Is there continuity?

Continuity

Repair short in the PINK/BLACK harness between the solenoid connector and ECU.

No continuity

Connect the BLACK connector ① of the ECU.

Disconnect the limit switch connector ⑬.

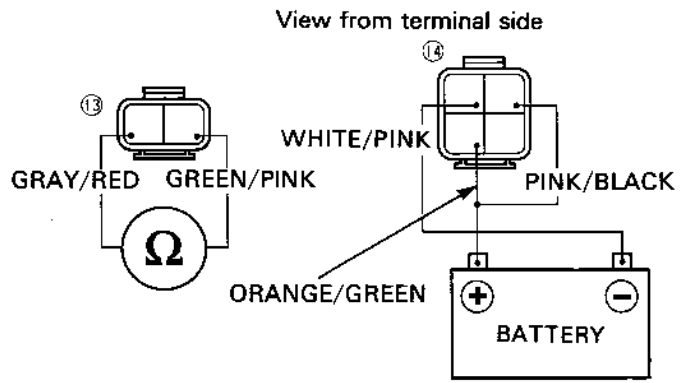
(Continue to the following page)

(From the previous page)

Check for continuity between the switch side terminals of the limit switch connector ⑬.

Connect the valve side terminals of the solenoid valve connector ⑭ to the battery terminals, and check for continuity between the switch side terminals of the limit switch connector ⑬.

- Connect the PINK/BLACK (Inlet valve side) harness to the terminal first, then connect the ORANGE/GREEN (Outlet valve side) harness immediately.



**CAUTION**

- Connect to the battery terminals securely. Be sure not to connect to the battery terminals for more than 5 seconds continuously.

Does continuity stop within 1 second after connecting the ORANGE/GREEN harness?

Continuity stops. • Faulty modulator

Continuity

• Faulty ECU

(From page 16-A-28: The ABS indicator light 1 and 2 go off as the motorcycle starts to move, then they blink.)

Retrieve the problem code.

Is the problem code "3"?

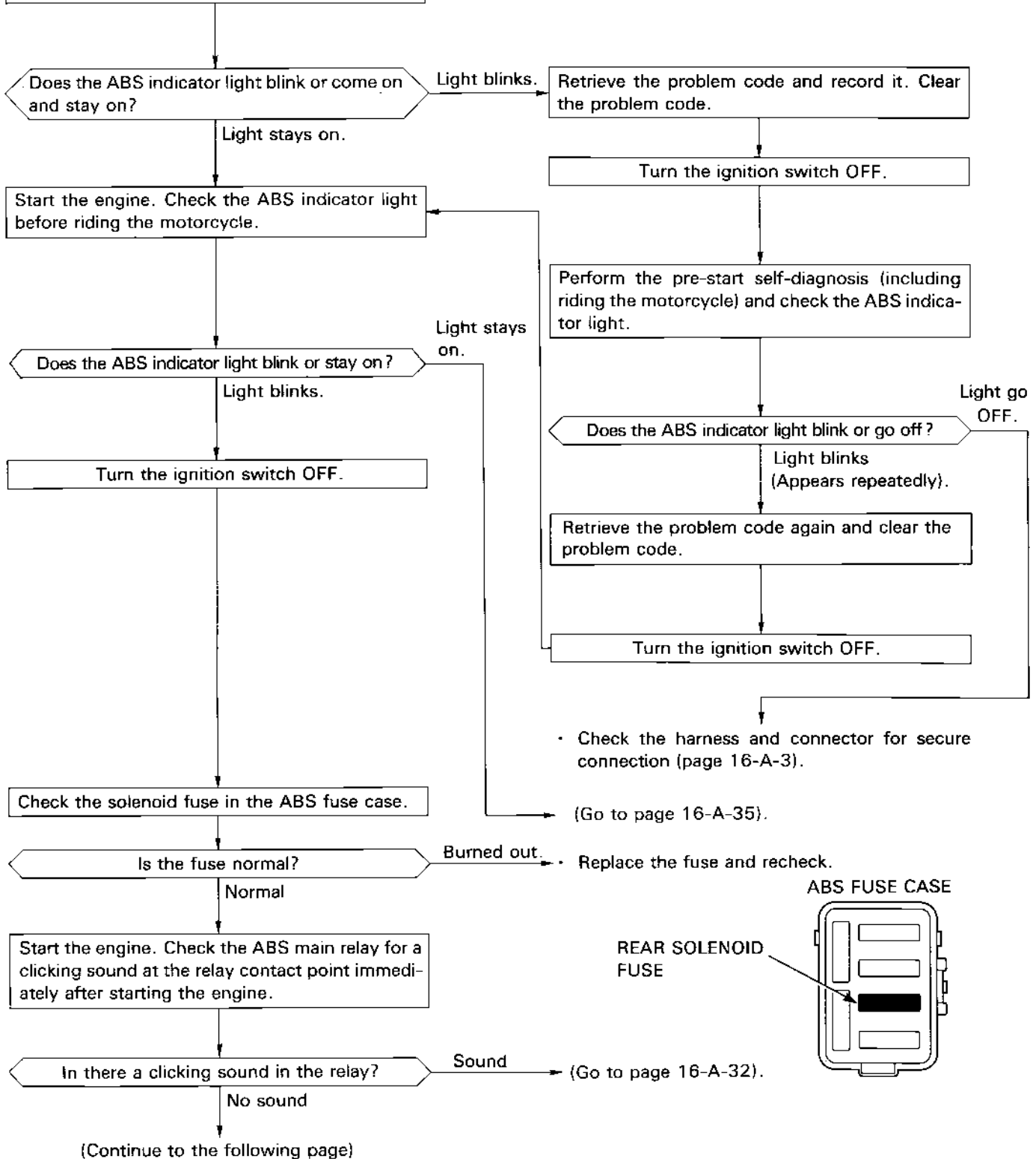
No problem code • Check the harness and connector for secure connection (page 16-A-3).

Problem code "3"

• Faulty ECU

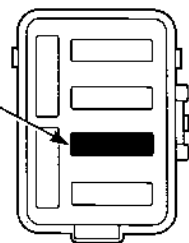
**Problem code 4: Faluty rear hydraulic control system**

Turn the ignition switch ON (but do not start the engine) and check the ABS indicator light 1 and 2.



ABS FUSE CASE

REAR SOLENOID FUSE



(From the previous page)

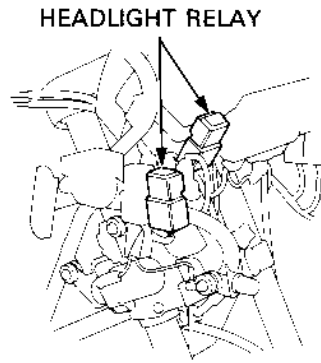
Disconnect the ABS main relay connector ⑩ and connect the headlight relay instead.

Restart the engine. Check the ABS indicator light before riding the motorcycle.

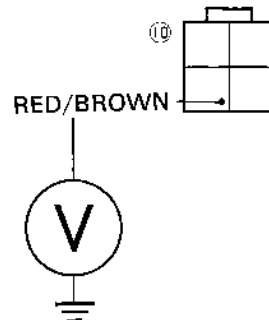
Does the ABS indicator light 1 and 2 stay on?  
Light blinks.

Light stays on.

• Faulty ABS main relay



View from terminal side



Disconnect the ABS main relay connector ⑩ from the headlight relay.

Turn the ignition switch ON.

Check for voltage between the ABS main relay connector ⑩ terminal and body ground.

Does battery voltage register?  
Battery voltage

No battery voltage

• Repair open in the RED/BROWN harness between the ABS main relay and ABS main fuse.

Turn the ignition switch OFF.

Connect the ABS main relay connector ⑩ to the ABS main relay and disconnect the BLACK connector ⑪ of the ECU.

Turn the ignition switch ON.

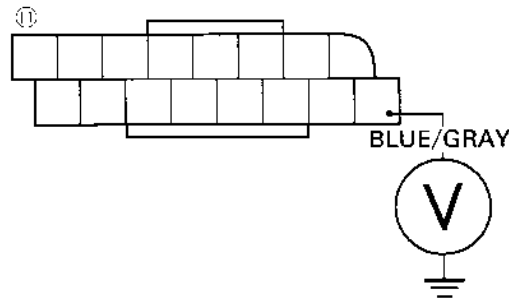
Check for voltage between the BLACK connector ⑪ terminal of the ECU and body ground.

Does battery voltage register?  
Battery voltage

No battery voltage

• Repair open in the BLUE/GRAY harness between the ABS main relay and ECU.

View from terminal side



• Faulty ECU

(From page 16-A-30: Operation sound in the ABS main relay.)

Turn the ignition switch OFF.

Disconnect the ABS main relay connector ⑩ and solenoid valve connector ⑰.

Check for continuity between the ABS main relay connector ⑩ terminal and the main harness side terminal of the solenoid valve connector ⑰.

Is there continuity?

No continuity • Repair open in the WHITE/PINK harness between the ABS main relay and modulator (solenoid valve).

Continuity

Check for continuity between the ABS main relay connector ⑩ terminal and body ground.

Is there continuity?

No continuity • Open harness between the ABS main relay and modulator ground terminal ⑱, or poor grounding.

Continuity

Install the ABS main relay connector ⑩ and solenoid valve connector ⑰.

Retrieve the problem code. Check whether the valve operation sound (i.e. clattering sound) can be heard for approximately 3 seconds before the problem code appears.

Is there the operation sound?

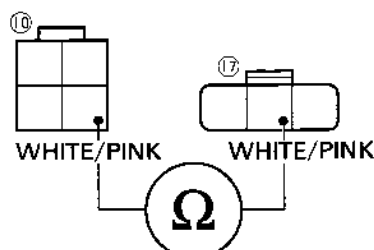
Operation sound → Go to page 16-A-34.

No operation sound.

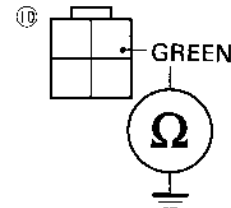
Turn the ignition switch OFF.

(Continue to the following page)

View from terminal side



View from terminal side



(From the previous page)

Disconnect the solenoid valve connector ⑦ and BLACK connector ⑩ of the ECU.

Check for continuity between the main harness side terminal of the solenoid valve connector ⑦ and BLACK connector ⑩ of the ECU.

Is there continuity?

Continuity

Turn the ignition switch ON.

Check for voltage between the BLACK connector ⑩ terminals of the ECU and body ground respectively.

Does battery voltage register?

Battery voltage

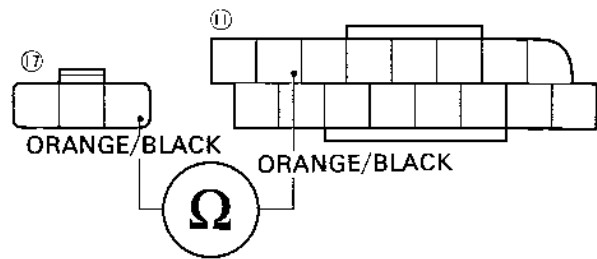
Connect the valve side terminals of the solenoid valve connector ⑦ to the battery terminals.  
ORANGE/BLACK: Positive (+)  
WHITE/PINK: Negative (-)

When connecting, is there valve operation sound (i.e. clattering sound)?

Operation sound

Faulty ECU

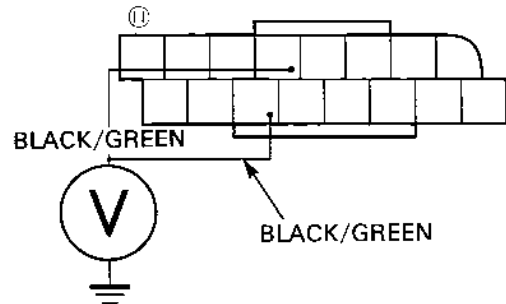
View from terminal side



No continuity

Repair open in the ORANGE/BLACK harness between the modulator (solenoid valve) connector and ECU.

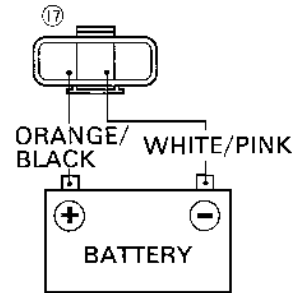
View from terminal side



No battery voltage

Repair open in the BLACK/GREEN or RED harness between the ECU and battery.

View from terminal side



No operation sound

Repair open in the ORANGE/BLACK or WHITE/PINK harness of the valve solenoid.  
Faulty modulator

**CAUTION**

Connect to the battery terminals securely. Be sure not to connect to the battery terminals for more than 5 seconds continuously.



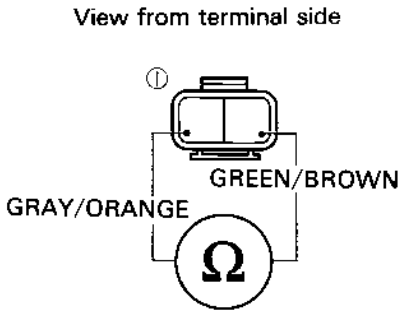
(From page 16-A-32: Valve operation sound.)

After checking the operation sound, turn the ignition switch OFF and disconnect the limit switch connector ①.

Check for continuity between the switch side terminals of the limit switch connector ①.

Is there continuity?

Continuity



• Faulty modulator

No continuity

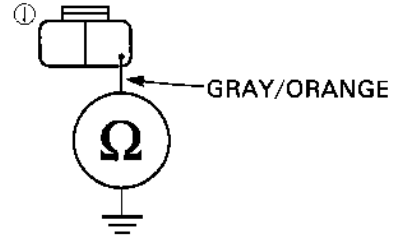
Disconnect the WHITE connector ② of the ECU.

Check for continuity between the main harness side terminal of the limit switch connector ① and body ground.

Is there continuity?

Continuity

View from terminal side



• Repair short in the GRAY/ORANGE harness between the ECU and limit switch connector.

No continuity

• Faulty ECU

(From page 16-A-30: ABS indicator light stays on.)

Start the motorcycle. Raise the vehicle speed to 10 km/h (6 mile/h) and check the ABS indicator light. (After checking, the motorcycle can be parked.)

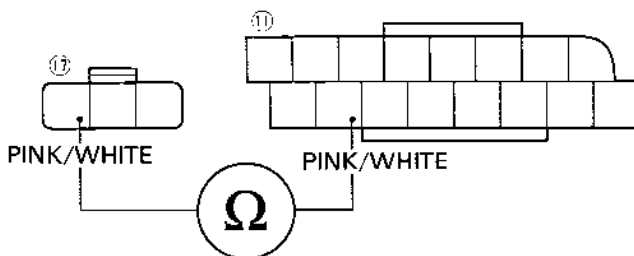
The ABS indicator light 1 and 2 blink as the motorcycle start to move.      The ABS indicator light 1 and 2 go off once as the motorcycle starts to move, then they blink.

(Go to page 16-A-36.)

Turn the ignition switch OFF.

View from terminal side

Disconnect the solenoid valve connector ⑰ and BLACK connector ⑩ of the ECU.



Check for continuity between the main harness side terminal of the solenoid valve connector ⑰ and BLACK connector ⑩ of the ECU.

Is there continuity?

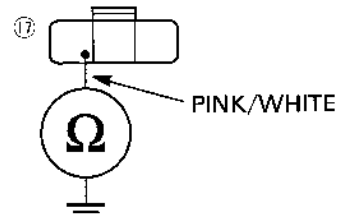
No continuity

Repair open in the PINK/WHITE harness of the solenoid connector and ECU.

Continuity

View from terminal side

With the BLACK connector of the ECU disconnected, check for continuity between the main harness side terminal of the solenoid valve connector ⑰ and body ground.



Is there continuity?

Continuity

Repair short in the PINK/WHITE harness between the solenoid connector and ECU.

No continuity

Connect the BLACK connector ⑩ of the ECU.

Disconnect the limit switch connector ①.

(Continue to the following page)

(From the previous page)

Check for continuity between the switch side terminals of the limit switch connector ①.

Connect the valve side terminals of the solenoid valve connector ⑱ to the battery, and check for continuity between the switch side terminals of the limit switch connector ①.

- Connect the PINK/WHITE (Inlet valve side) harness to the battery first, then connect the ORANGE/BLACK (Outlet valve side) harness immediately.

Does continuity stop within 1 second after connecting the ORANGE/BLACK harness?

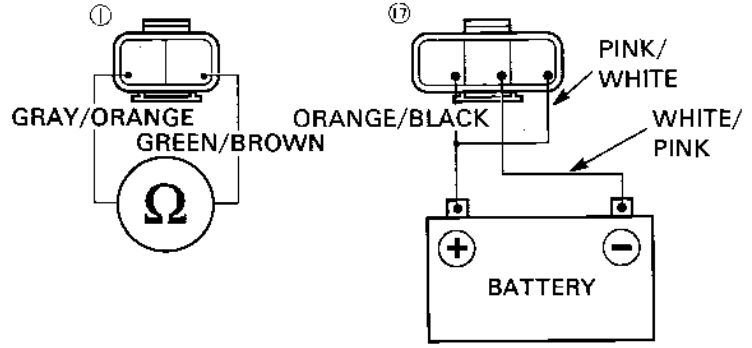
Continuity stops.

- Faulty modulator

Continuity

- Faulty ECU

View from terminal side



**CAUTION**

- Connect to the battery terminals securely. Be sure not to connect to the battery terminals for more than 5 seconds continuously.

(From page 16-A-35: The ABS indicator light 1 and 2 go off as the motorcycle starts to move, then they blink.)

Retrieve the problem code.

Is the problem code "4"?

No problem code

- Check the harness and connector for secure connection (page 16-A-3).

Problem code "4"

- Faulty ECU

## Problem code 5: Faulty front wheel speed sensor system

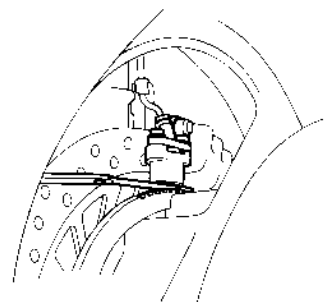
### CAUTION

- When removing/installing the wheel sensor and wheel, take care not to damage the tip of the sensor.

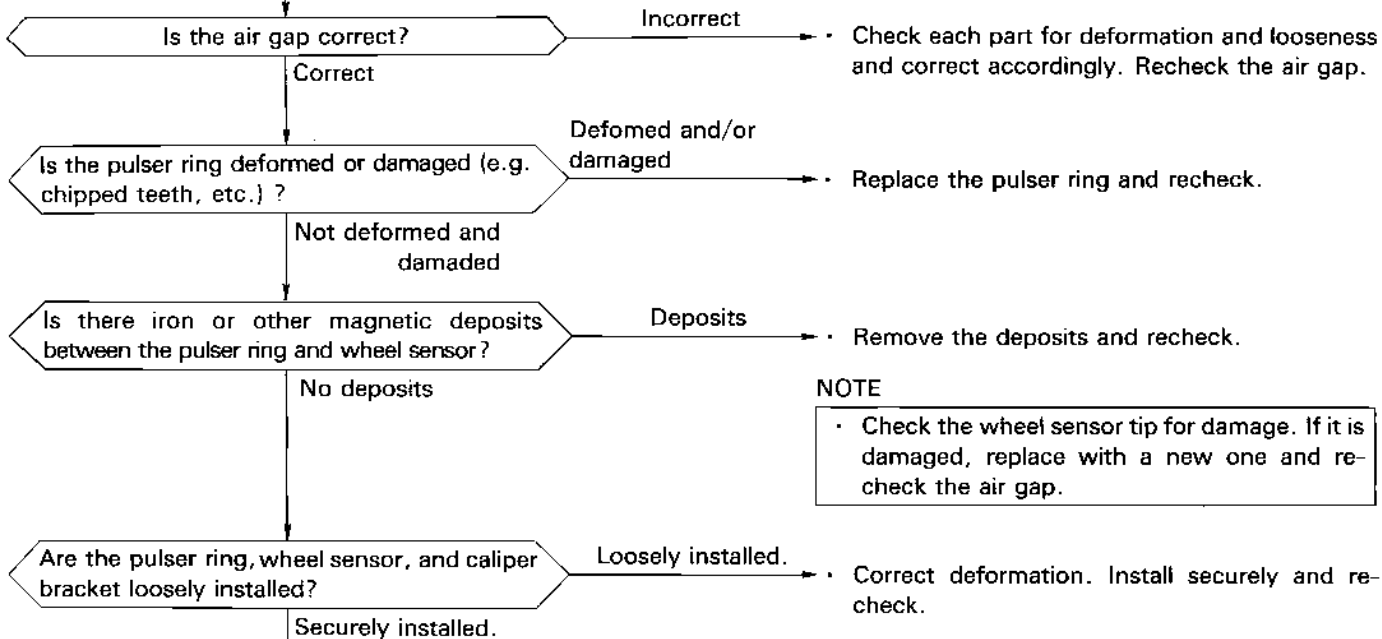
### NOTE

- Check the tire size and air pressure and check the tire for deformation before troubleshooting.
- The ABS indicator light might come on while riding under the following conditions. Turn the ignition switch OFF and perform the pre-start self-diagnosis. The ABS is normal if the warning light goes off. However, the problem code is stored in the ECU. Ask the rider for the riding conditions in detail when he brings his motorcycle to your dealership for inspection.
  - The motorcycle has continuously run on bumpy road.
  - After riding on the road (after the pre-start self diagnosis), the engine was kept running and the rear wheel turning (for more than 30 seconds) with the motorcycle placed on the center stand.

- Perform the inspection of the wheel sensor. Check the area around the wheel sensor as well.



Place the motorcycle on its center stand and measure the air gap between the pulser ring and wheel sensor.  
Standard:  $0.8 \pm 0.4$  mm ( $0.031 \pm 0.016$  in)



### NOTE

- Check the wheel sensor tip for damage. If it is damaged, replace with a new one and recheck the air gap.

(Continue to the following page)

(From the previous page)

- Check the wheel sensor signal in the ECU.

Retrieve the problem code and record it. Clear the problem code.

Turn the front wheel [Vehicle speed: approximately 4 km/h (2.5 mile/h) or above, i.e. as fast as when the wheel is turned with all your strength by hand.]

Check the ABS indicator light.

Does the light blink or stay on?

Light stays on.

Perform the pre-start self-diagnosis (including riding the motorcycle), then check the TCS indicator light.

Does the light stay on or go off?

Does not go off.

Turn the ignition switch OFF.

Disconnect the wheel sensor connector ⑮.

Turn the ignition switch ON.

Check for voltage between the main harness side terminals of the wheel sensor connector ⑮.

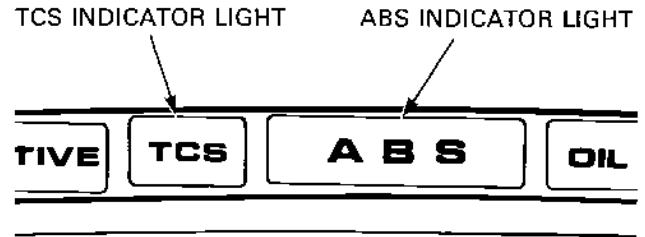
Does battery voltage register?

Battery voltage

(Continue to the following page)

NOTE

- Turn the front wheel with the problem code cleared. (Do not operate the ignition switch after clearing the problem code.)



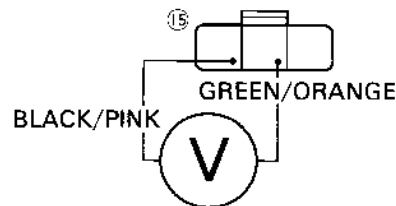
Light blinks. (Sensor signal is input in the ECU.)

- Check the harness and connector for secure connection (page 16-A-3).

Light goes off.

- Repair open in the BLUE/GREEN harness between the wheel sensor and ABS ECU.
- Faulty ABS ECU

View from terminal side



No battery voltage

- Repair open in the BLACK/PINK or GREEN/ORANGE harness between the wheel sensor and ABS ECU.
- Faulty ABS ECU

(From the previous page)

Turn the ignition switch OFF.

Disconnect the WHITE connector ⑫ of the ECU.

Check for continuity between the WHITE connector ⑫ terminal of the ECU and the main harness side terminal of the wheel sensor connector ⑮.

Is there continuity?

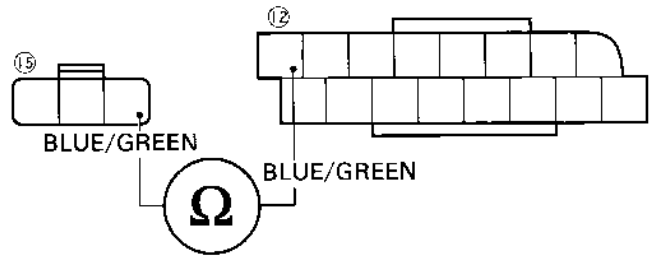
Continuity

• Faulty wheel sensor

No continuity

• Repair open in the BLUE/GREEN harness between the wheel sensor and ABS ECU.

View from terminal side



**Problem code 6: Faulty rear wheel speed sensor system**

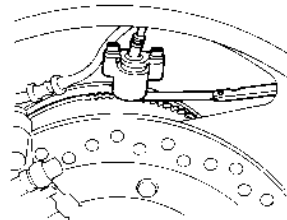
**CAUTION**

• When removing/installing the wheel sensor and wheel, take care not to damage the tip of the sensor.

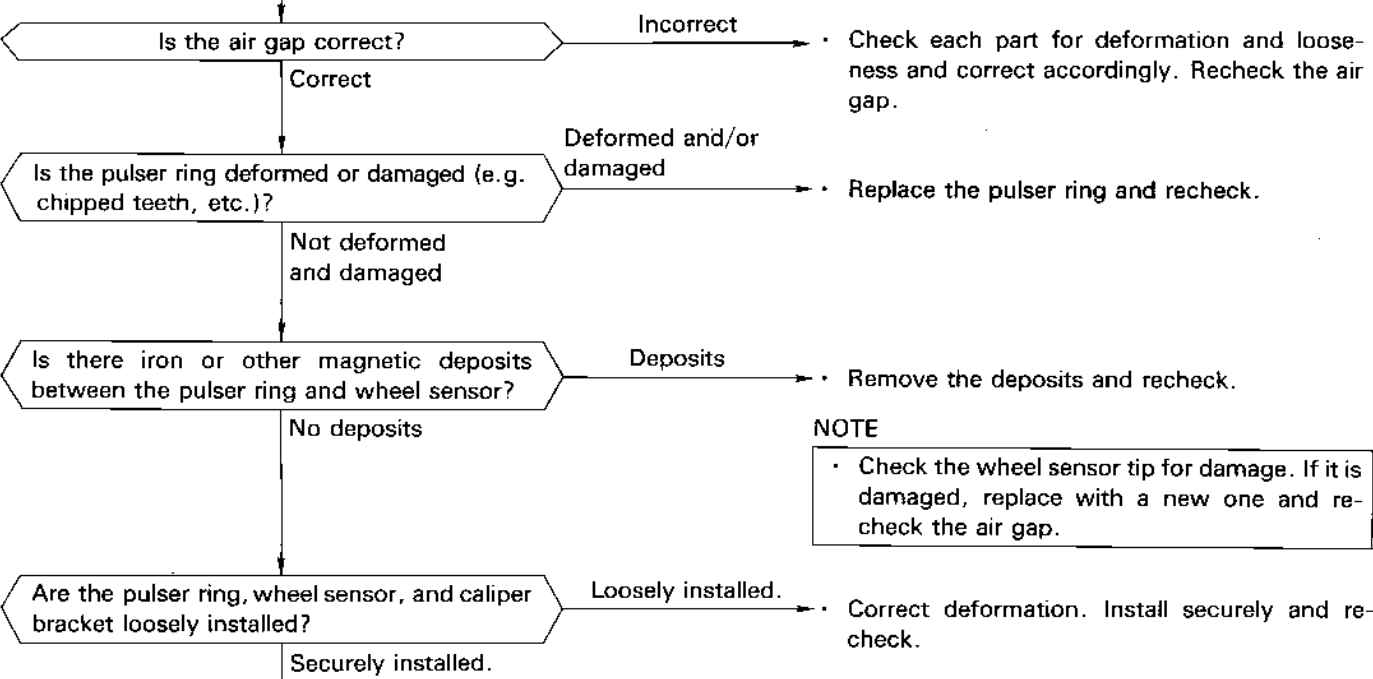
**NOTE**

- Check the tire size and air pressure and check the tire for deformation before troubleshooting.
- The ABS indicator light might come on while riding under the following conditions. Turn the ignition switch OFF and perform the pre-start self-diagnosis. The ABS is normal if the warning light goes off. However, the problem code is stored in the ECU. Ask the rider for the riding conditions in detail when he brings his motorcycle to your dealership for inspection. (Was the motorcycle has continuously run on bumpy road?)
- When the rear wheel sensor or rear pulser ring is replaced, perform the air gap inspection (page 16-A-51).

- Perform the inspection of the wheel sensor. Check the area around the wheel sensor as well.



Place the motorcycle on its center stand and measure the air gap between the pulser ring and wheel sensor.  
 Standard:  $0.8 \begin{smallmatrix} +0.4 \\ -0.1 \end{smallmatrix}$  mm  
 ( $0.031 \begin{smallmatrix} +0.016 \\ 0.004 \end{smallmatrix}$  in)



**NOTE**

- Check the wheel sensor tip for damage. If it is damaged, replace with a new one and recheck the air gap.

(Continue to the following page)

(From the previous page)

- Check the wheel sensor signal in the ECU.

Retrieve the problem code and record it. Clear the problem code.

Turn the rear wheel [Vehicle speed: approximately 4 km/h (2.5 mile/h) or above, i.e. as fast as when the wheel is turned with all your strength by hand.]

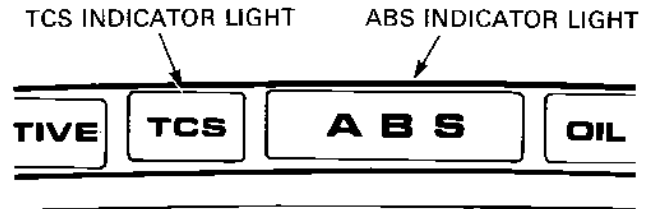
Check the ABS indicator light.

Does the light blink or stay on?

Light blinks. (Sensor signal is input in the ECU.)

**NOTE**

- Turn the rear wheel with the problem code cleared. (Do not operate the ignition switch after clearing the problem code.)



- Check the harness and connector for secure connection (page 16-A-3).

Light stays on.

Perform the pre-start self-diagnosis (including riding the motorcycle), then check the TCS indicator light.

Does the light stay on or go off?

Light goes off.

- Repair open in the BLUE/GREEN harness between the wheel sensor and ABS ECU.
- Faulty ABS ECU

Does not go off.

Turn the ignition switch OFF.

Disconnect the wheel sensor connector ⑩.

Turn the ignition switch ON.

Check for voltage between the main harness side terminals of the wheel sensor connector ⑩.

Does battery voltage register?

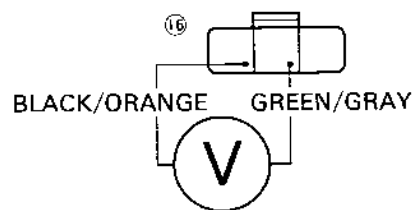
No battery voltage

- Repair open in the BLACK/ORANGE or GREEN/GRAY harness between the wheel sensor and ABS ECU.
- Faulty ABS ECU

Battery voltage

(Continue to the following page)

View from terminal side





(From the previous page)

Turn the ignition switch OFF.

Disconnect the WHITE connector ⑫ of the ECU.

Check for continuity between the WHITE connector ⑫ terminal of the ECU and the main harness side terminal of the wheel sensor connector ⑮.

Is there continuity?

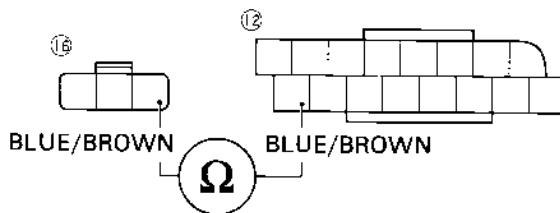
continuity

• Faulty wheel sensor

No continuity

• Repair open in the BLUE/BROWN harness between the wheel sensor and ABS ECU.

View from terminal side



**Problem code 7: Faulty ABS main relay system**

Disconnect the ABS main relay connector ⑩.

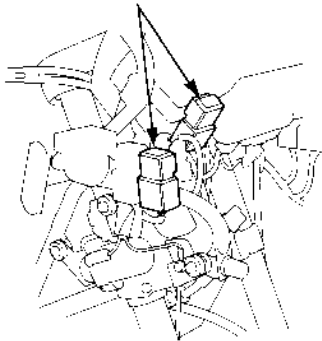
Perform the pre-start self-diagnosis and retrieve the problem code.

Problem code "3"      Problem code "7"      (Go to the following page.)

Clear the problem code.

Connect the headlight relay to the ABS main relay connector ⑩.

**HEADLIGHT RELAY**



Perform the pre-start self-diagnosis and check the ABS indicator light.

Does the light blink or go off?      Light goes off.      • Faulty ABS main relay

Light blinks.

Connect the ABS main relay to the ABS main relay connector ⑩. (Return to the original condition.)

Disconnect the BLACK connector ⑪ of the ECU.

Turn the ignition switch ON and check the ABS main relay for the operation sound (i.e. clattering sound).

Is there a clattering sound?      Clattering sound      • Repair short in the BLUE/GRAY harness between the ABS main relay and ECU.

No clattering sound

• Faulty ECU

(From the previous page: problem code "7")

Clear the problem code.

Disconnect the front and rear modulator solenoid connectors ⑭ and ⑰.

Perform the pre-start self-diagnosis and retrieve the problem code.

Problem code "7"

Problem code "3"

Turn the ignition switch OFF.

Disconnect the BLACK connector ⑪ of the ECU.

Check for continuity between the harness side terminals of the solenoid connectors ⑰ or ⑭ and the body ground respectively.

Is there continuity?

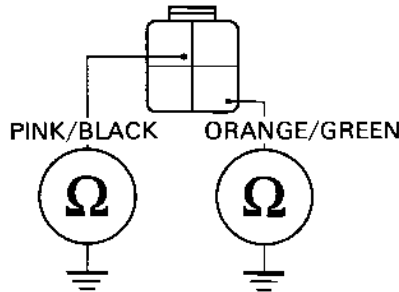
No continuity

Faulty ECU

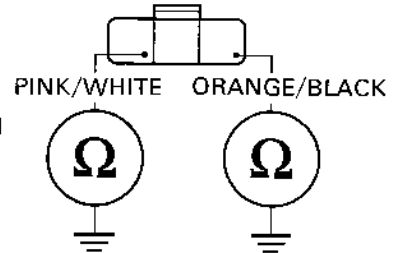
Repair short in the WHITE/PINK harness between the ABS main relay and solenoid.

View from terminal side

⑭ FRONT:



⑰ REAR:

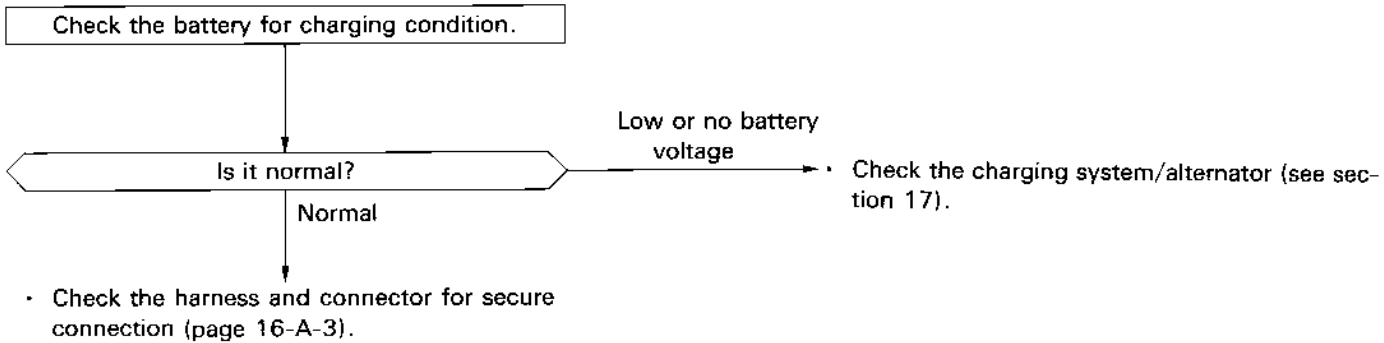


Continuity

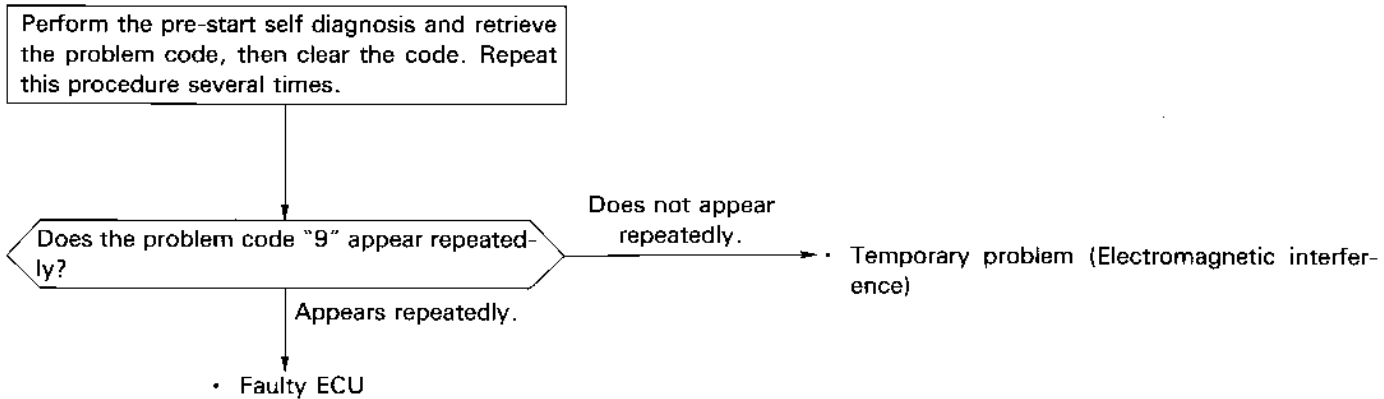
Repair short in the ORANGE/BLACK and PINK/WHITE, or ORANGE/GREEN and PINK/BLACK harnesses between the ECU and solenoid.

**Problem code 8: Faulty power circuit****NOTE**

- Before starting the troubleshooting, check to see whether the idle speed conforms to the specified speed. If the idle speed is below specification, adjust idle speed.
- Ask the rider about the following when the motorcycle is brought in for inspection.
  - Ask whether the motorcycle has been run with electrical accessories.
  - Ask whether the motorcycle has been left for a long time with the ignition switch in the ON position. This problem code will light up to indicate battery discharge.

**Problem code 9: Faulty ECU****NOTE**

- The ABS indicator light blinks or comes on and stays on when the ECU has been disrupted by an extremely powerful radio wave (Electromagnetic Interference). This is just a temporary symptom. Clear the problem code and the ECU will operate normally unless the symptom recurs.



Trouble not represented by a problem code

– Abnormal sound from the modulator

(Difference in sound level is twice or more between the front and rear modulators during the pre-start self-diagnosis.):

**WARNING**

- Connect the pump motor terminal to the battery securely. Avoid loose terminal connections and do not allow the battery terminals to contact the frame and other parts.
- The modulator motor becomes very hot when it is turned ON repeatedly to check for the motor sound. Take care not to burn your hands, etc.

**CAUTION**

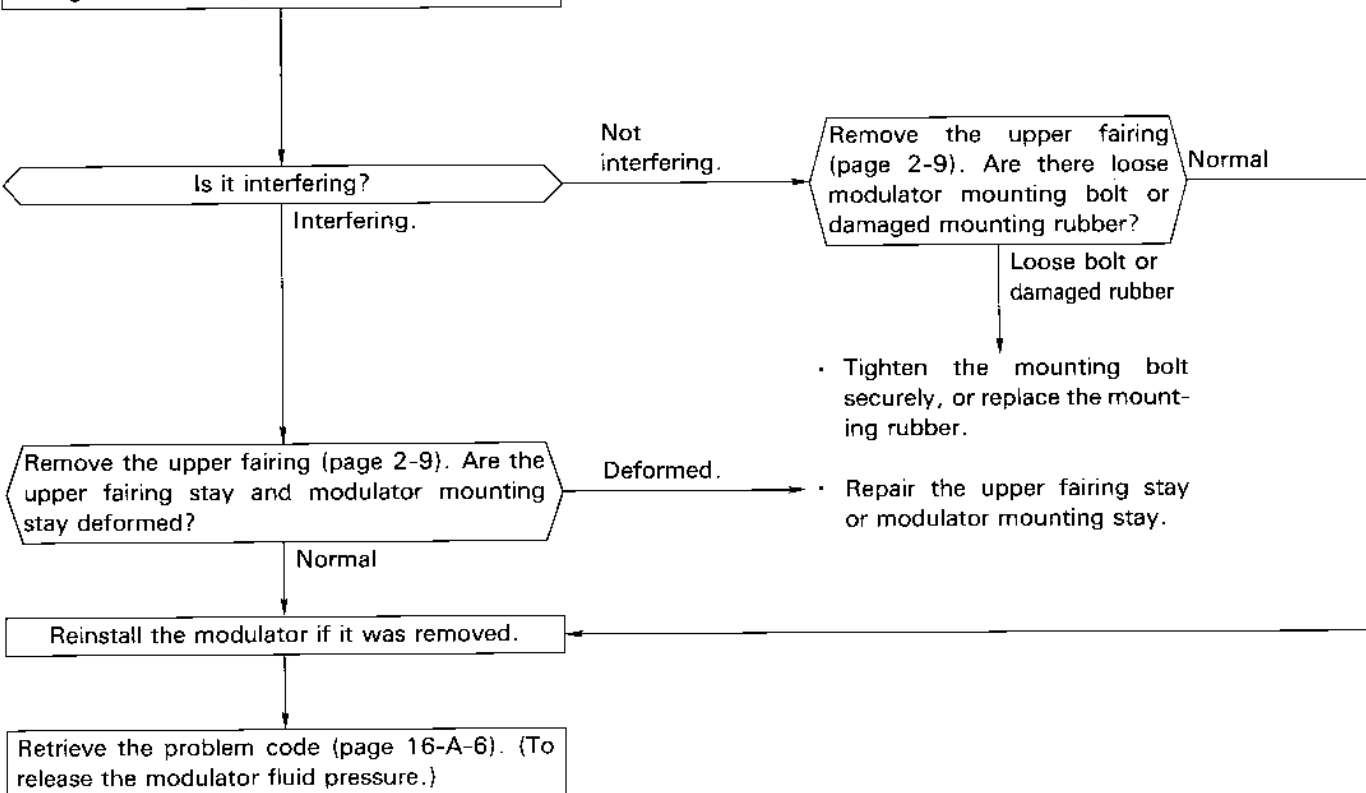
- Do not turn the motor continuously for more than 30 seconds. If you have to turn the motor repeatedly to check for the sound, be sure to stop the motor within 30 seconds and wait at least one minute before starting it again. Otherwise, the motor can be damaged.

**NOTE**

- There are two types of the modulator sounds; the solenoid valve clattering sound and the pump motor beep sound.

**Front modulator:**

Remove the instrument panel (page 2-7). Check the modulator for interference with the upper fairing and/or other parts.



(Continue to following page)

(From the previous page)

Turn the ignition switch OFF.

Remove the right side cover (to compare the modulator sound between the front and rear modulators).

Disconnect the pump motor connectors (19 and 20) from the front and rear modulators.

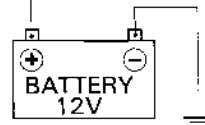
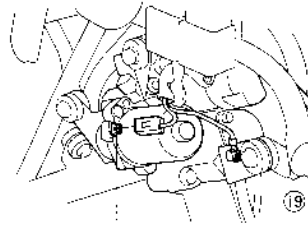
Connect the front and rear pump motor terminals to the battery respectively, and compare the sound (motor sound) between the front and rear modulators.

Does the sound change within 3 seconds after connecting the pump motor terminal to the battery, and does the sound level drop?

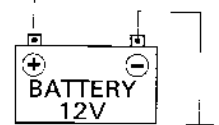
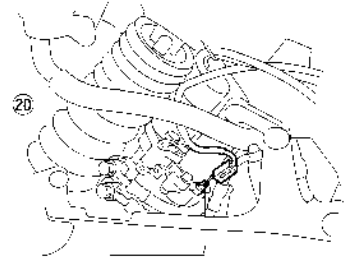
Front modulator sound does not change (regular).

• Faulty front modulator

FRONT MODULATOR



REAR MODULATOR



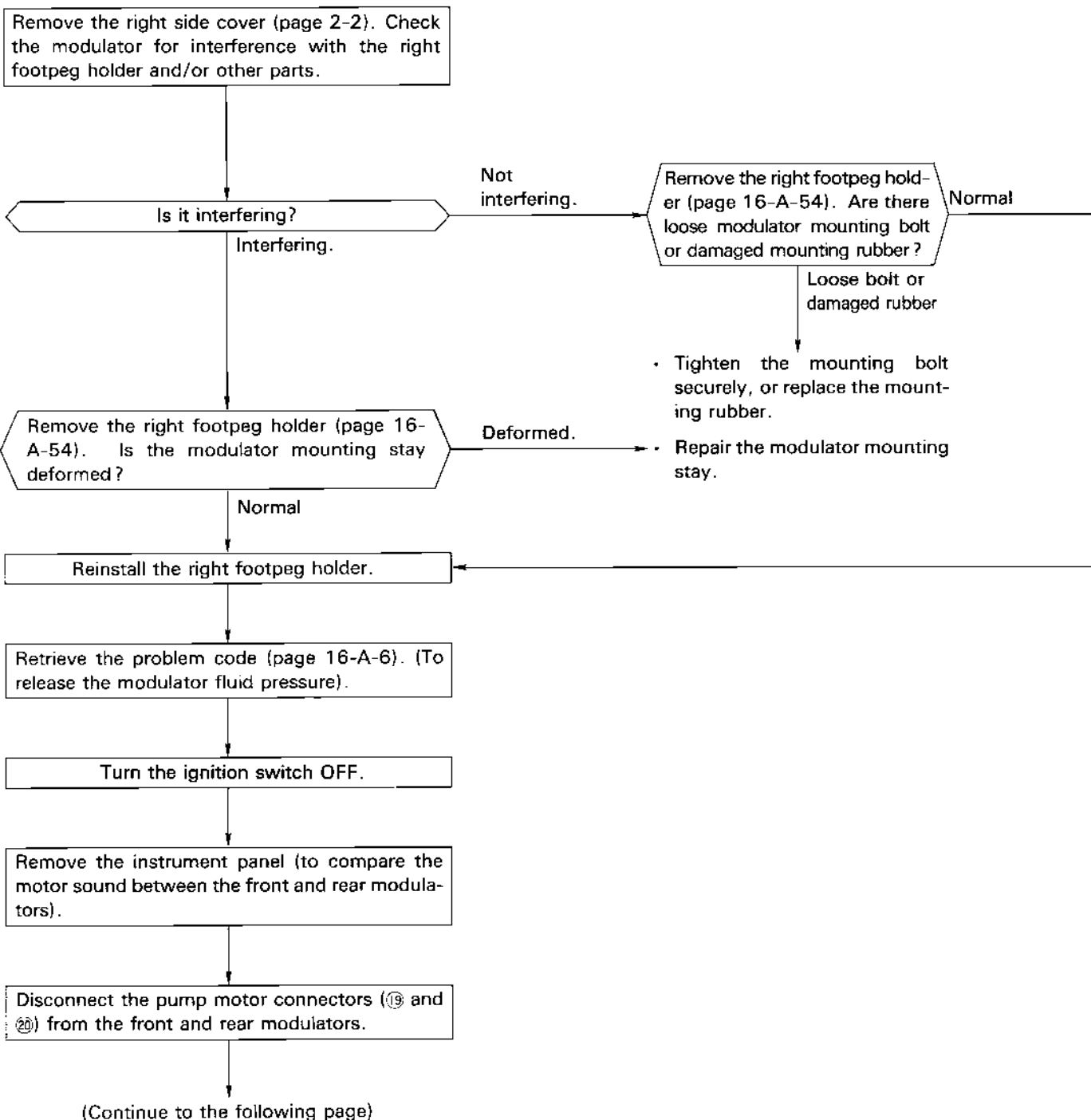
Sound changes and drops at the front and rear modulators.

- Normal: Recheck the front modulator for proper mounting (page 16-A-46). (Improper mounting may cause unnecessary vibrational noise.)

## NOTE

- After checking the motor sound, connect the front and rear pump motor connectors, retrieve the problem code and erase it (page 16-A-6).

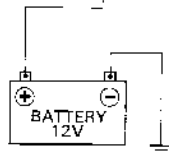
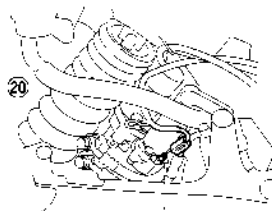
Rear modulator:



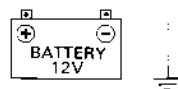
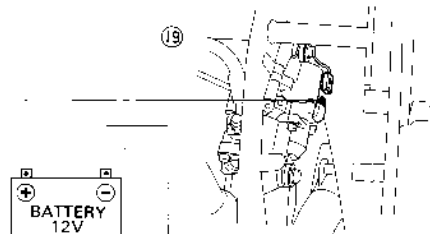
(From the previous page)

Connect the front and rear pump motor terminals to the battery respectively, and check the motor sound between the front and rear modulators.

REAR MODULATOR



FRONT MODULATOR



Does the sound change within 3 seconds after connecting the terminals to the battery, and does the sound level drop?

Sound changes and drops at the front and rear modulators.

- Normal: Recheck the rear modulator for proper mounting (page 16-A-48). (Improper mounting may cause unnecessary vibrational noise.)

Rear modulator sound does not change (regular).

- Faulty rear modulator

NOTE

- After checking the motor sound, connect the front and rear pump motor connectors, retrieve the problem code and erase it (page 16-A-6).



- Faulty ABS indicator light

- When the pre-start self-diagnosis sound (motor sound) from the modulator can be heard after starting the engine, and where the ABS operates normally while riding:

- Before pre-start self-diagnosis (Ignition switch ON)

		ABS indicator light 2		
		ON	Blink	OFF
ABS indicator light 1	ON	Normal	A	A. B. F. E
	Blink	/	/	/
	OFF	D. G. I. K	D. G. I. K	D. E. F. G. I

- While riding

		ABS indicator light 2		
		ON	Blink	OFF
ABS indicator light 1	ON	/	/	I
	Blink	/	/	/
	OFF	/	A. C. I	Normal

- When there is no motor sound in the modulator after starting the engine and the indicator light is faulty (i.e. pre-start self-diagnosis does not start):

- Before riding (with the engine started and the motorcycle parked)

		ABS indicator light 2		
		ON	Blink	OFF
ABS indicator light 1	ON	H. I. J. M	I	I
	Blink	I	/	I
	OFF	/	K. L	I

- While riding

		ABS indicator light 2		
		ON	Blink	OFF
ABS indicator light 1	ON	I. J. M	I	I
	Blink	I	H	I
	OFF	/	K. L	I

A : Faulty indicator control unit

B : Poor connection of the indicator control unit connector ⑤ (4P)

C : Poor connection of the indicator control unit connector ⑤ (2P)

D : Faulty ABS indicator light LED 1, poor connection of the connector ③

E : Faulty ABS indicator light LED 2, poor connection of the connector ④

F : Poor connection of the ABS indicator light connector ⑥

G : Poor connection of the ABS indicator light connector ⑦

H : Faulty indicator light switch, poor connection of the connector ②

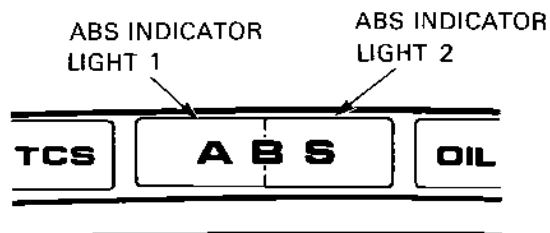
I : Faulty ABS ECU

J : Faulty TCS/ignition control module (ICM), Open or short in the LIGHT GREEN/ORANGE harness between the TCS/ ICM and ABS ECU

K : Poor connection of the ABS ECU connector ⑩

L : Burned ABS main fuse (10A)

M : Improper battery charge (See section .17.)



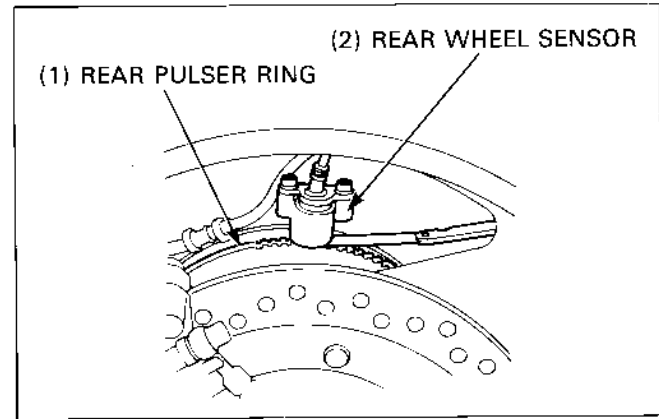
## Wheel Sensor Air Gap Inspection (Rear wheel only)

Place the motorcycle on its center stand.

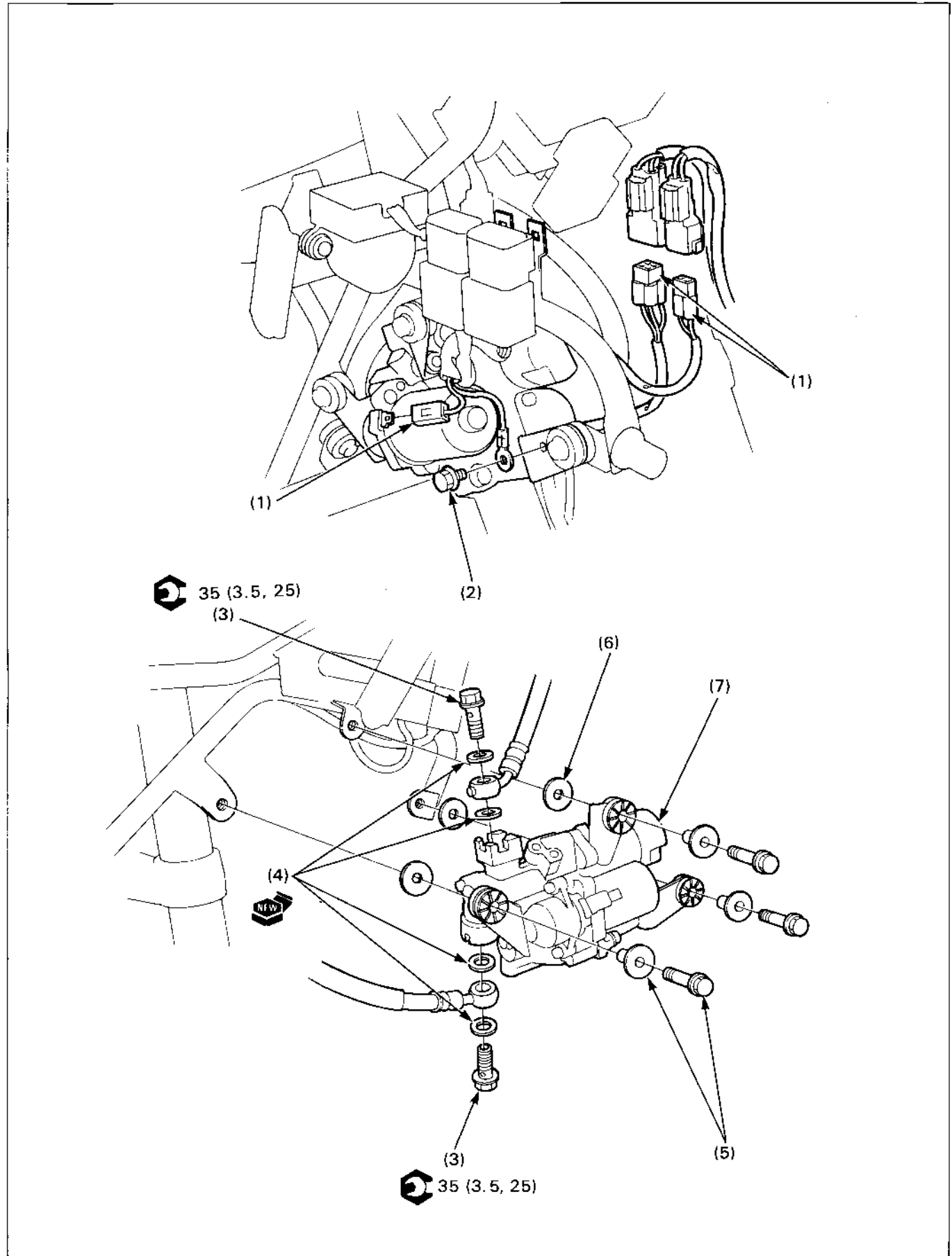
Measure the air gap between the wheel sensor and pulser ring using a feeler gauge. It must be within the specification.

**Standard:**  $0.8 \begin{smallmatrix} -0.4 \\ 0.1 \end{smallmatrix} \text{ mm}$  ( $0.031 \begin{smallmatrix} +0.016 \\ 0.004 \end{smallmatrix} \text{ in}$ )

If not within specification, perform the shim adjustment.



# Front Modulator Removal/Installation



**⚠ WARNING**

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

**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 foreign material to enter the system.
- When removing and installing the modulator, take care not to drop or strike the modulator.

**NOTE**

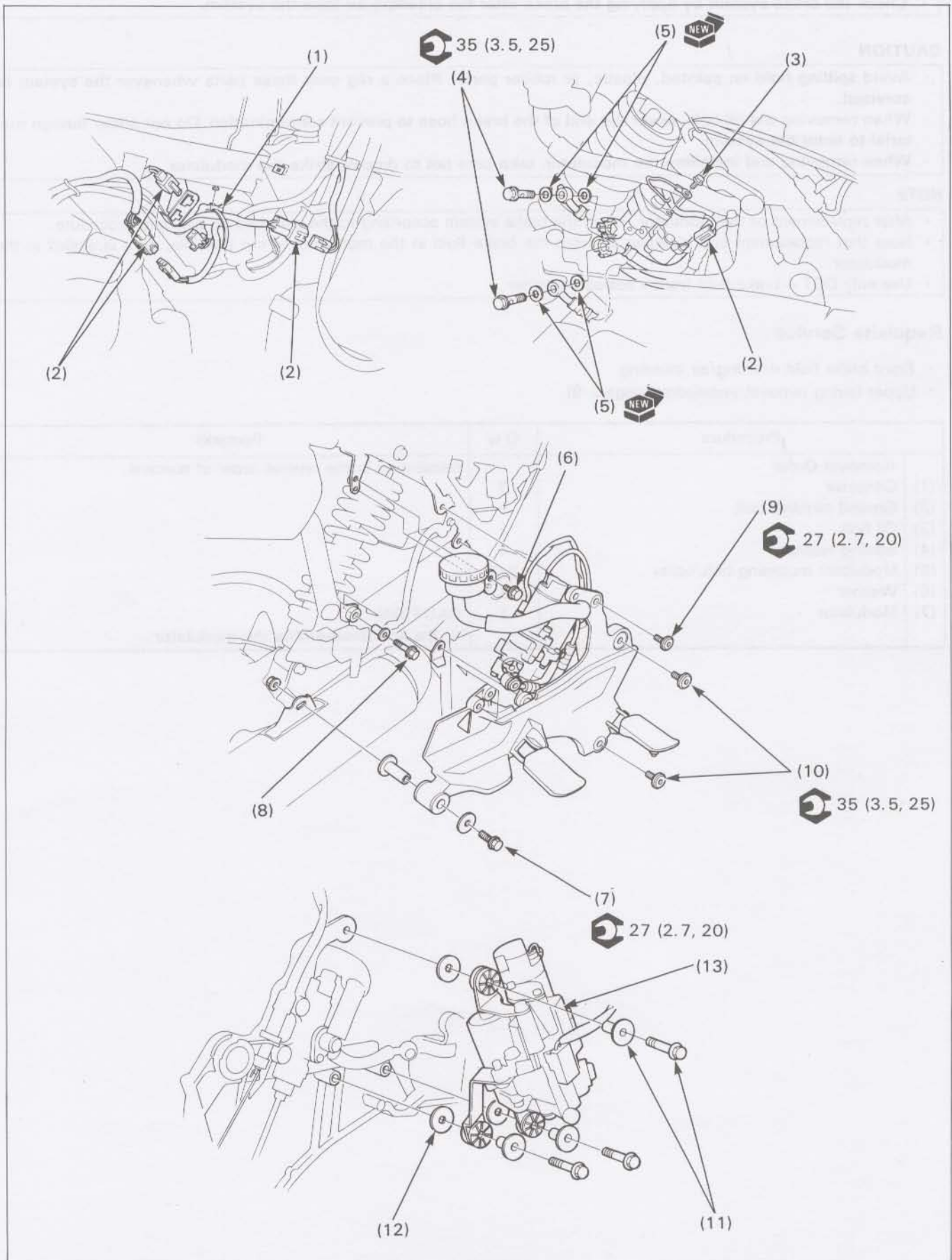
- After replacement of the moduator, bleed the brake system according to the standard air bleeding procedure.
- Note that replacement and bleeding air from the brake fluid in the modulator is not possible, as it is sealed in the modulator.
- Use only DOT 4 brake fluid from a sealed container.

**Requisite Service**

- Front brake fluid draining/air bleeding
- Upper fairing removal/installation (page 2-9).

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation in the reverse order of removal.
(1)	Conector	3	
(2)	Ground terminal bolt	1	
(3)	Oil bolt	2	
(4)	Sealing washer	4	
(5)	Modulator mounting bolt/collar	3/3	
(6)	Washer	3	
(7)	Modulator	1	<b>CAUTION</b> • Do not disassemble the modulator.

# Rear Modulator Removal/Installation



**▲ WARNING**

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

**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 foreign material to enter the system.
- When removing and installing the modulator, take care not to drop or strike the modulator.

**NOTE**

- After replacement of the modulator, bleed the brake system according to the standard air bleeding procedure.
- Note that replacement and bleeding air from the brake fluid in the modulator is not possible, as it is sealed in the modulator.
- Use only DOT 4 brake fluid from a sealed container.

**Requisite Service**

- Rear brake fluid draining/air bleeding
- Right pivot cover removal/installation (page 2-5)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	Harness band	1	
(2)	Connector	4	
(3)	Ground terminal bolt	1	
(4)	Oil bolt	2	
(5)	Sealing washer	4	
(6)	Reservoir bolt	1	
(7)	Muffler mounting bolt	1	
(8)	Right footpeg holder bolt 6 mm	1	
(9)	8 mm	1	
(10)	10 mm	2	
(11)	Modulator mounting bolt/collar	3/3	
(12)	Washer	3	
(13)	Modulator	1	<b>CAUTION</b> • Do not disassemble the modulator.

# 16-B. ABS (After '95)

<b>Service Information</b>	<b>16-B-1</b>	<b>Troubleshooting</b>	<b>16-B-5</b>
<b>System Location</b>	<b>16-B-2</b>	<b>Wheel Speed Sensor Air Gap Inspection</b>	<b>16-B-34</b>
<b>System Wiring Connections/Locations</b>	<b>16-B-3</b>	<b>Front Modulator Removal/Installation</b>	<b>16-B-36</b>
<b>Circuit Diagram</b>	<b>16-B-4</b>	<b>Rear Modulator Removal/Installation</b>	<b>16-B-38</b>

## Service Information

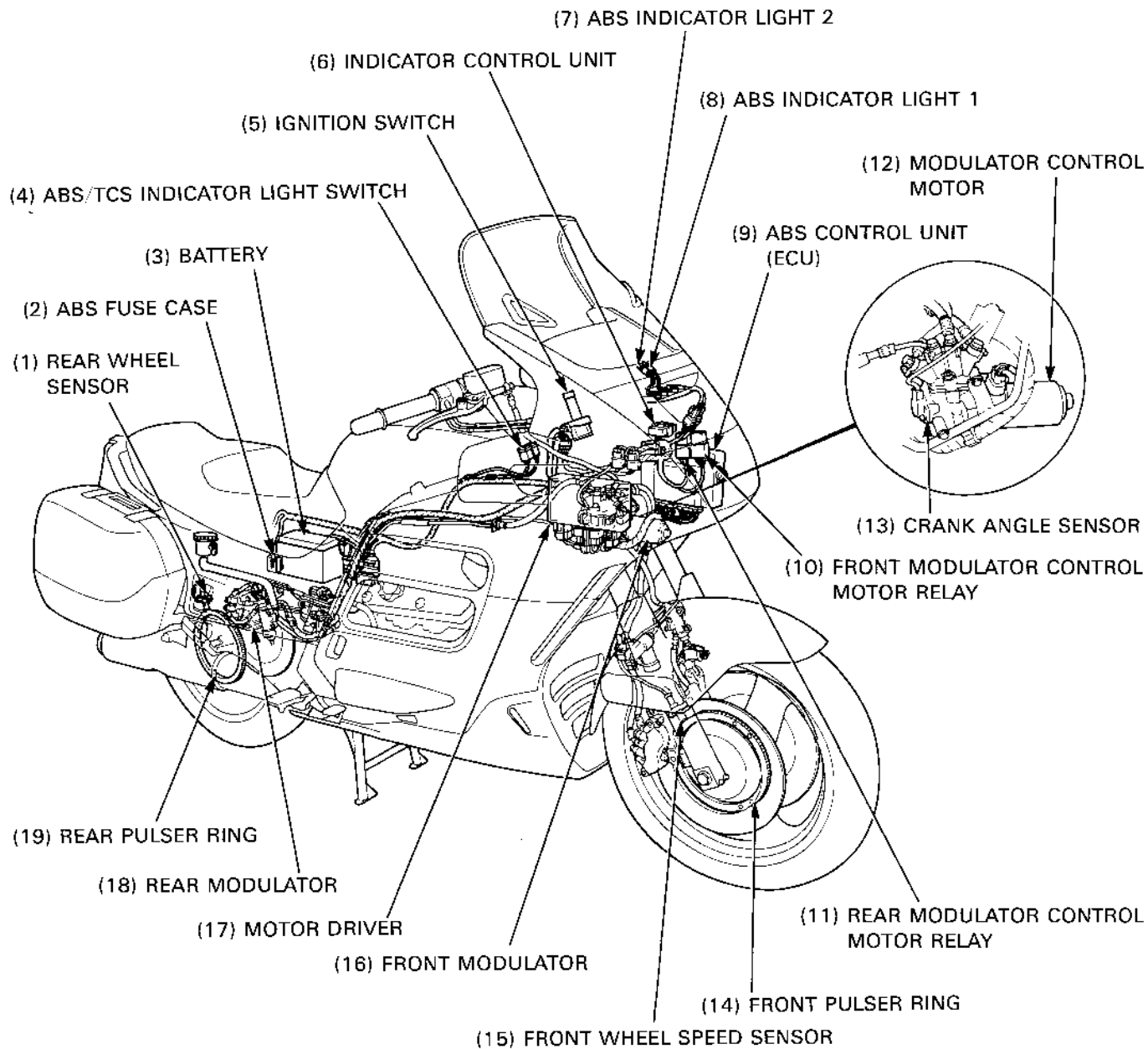
### CAUTION

- Use a fully charged battery for troubleshooting. Do not diagnose the ABS with a charger connected to the battery.
- On removal and installation of the wheels and wheel speed sensors, be careful not to damage the wheel speed sensors and pulser rings.

### NOTE

- Check the following before performing any ABS troubleshooting.
  - Pre-start self-diagnosis of ABS
  - ABS indicator lightIf an abnormality is found during the above checks, perform the ABS troubleshooting following the Symptom-to-System Chart (page 16-B-8). The ABS is normal if no trouble is found. Go to the checks on the other systems (e.g., LBS or basic brake system).
- Troubles not resulting from a faulty ABS, i.e. brake disc squeak, unevenly worn brake pad, etc., cannot be recognized by the ABS diagnosis system. (See the Common Service Manual.)
- Record the symptom of the problem and the problem code in MEMO before troubleshooting.
- When the ABS is faulty, the ABS indicator light blinks or it comes on. The ABS does not function at this time; take care during the test ride.
- Do not disassembly the modulator assembly. If it is faulty, replace it an assembly.
- Refer to page 15-2 for brake fluid filling and bleeding. Note that there is no brake fluid in the modulator (except in the modulator head), because the modulator is the motor-driven hydraulic pressure type. Therefore, brake fluid replacement and bleeding air from the modulator body is not necessary.
- When the wheel is removed, perform the air gap inspection (page 16-B-51).
- The ABS indicator light might blink in the following cases. If the indicator light blinks, clear the problem code and perform the pre-start self-diagnosis of the ABS (page 16-5). The ABS is normal if the ABS indicator light goes off.
  - The motorcycle has continuously run on the bumpy road.
  - The ABS control unit (ECU) was disrupted by extremely powerful radio wave (Electromagnetic Interference).
  - After riding (i.e. after the pre-start self-diagnosis), the engine was kept running and the rear wheel turning (for more than 30 seconds) with the motorcycle on the center stand.
- The ABS indicator light might blink in the following cases. If the indicator light blinks, service the faulty parts, clear the problem code, and perform the pre-start self-diagnosis of the ABS (page 16-B-5). The ABS is normal if the ABS indicator light goes off.
  - Incorrect tire pressure
  - Tires not recommended for the motorcycle were installed.
  - Deformation of the wheel
- After troubleshooting, clear the problem code and perform the pre-start self-diagnosis again to be sure that the ABS indicator light is operating normally.

# System Location





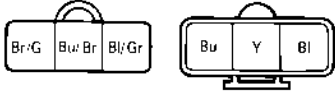
# System Wiring Connections/Locations

Refer to section 2, for the parts that must be removed for service.

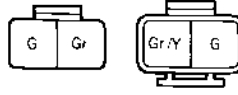
For example: ① CRANK ANGLE SENSOR ← Maintenance part

-R. side cover (page 2-2) ← The parts that must be removed for service

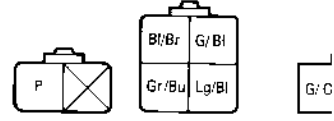
- ① REAR MODULATOR  
CRANK ANGLE SENSOR  
-R. side cover (page 2-2)



- ② ABS/TCS INDICATOR  
LIGHT SWITCH  
-Top shelter  
(page 2-5)



- ③ INDICATOR CONTROL  
UNIT  
-L. fairing pocket  
(page 2-6)



ABS MAIN (30A)

FRONT MODULATOR  
CONTROL MOTOR  
(10A)

REAR MODULATOR  
CONTROL MOTOR  
(10A)

ABS FUSE CASE

-L. side cover (page 2-2)

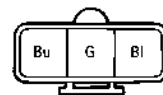
Bl ... BLACK	Br ... BROWN
Y ... YELLOW	O ... ORANGE
Bu ... BLUE	Lb ... LIGHT BLUE
G ... GREEN	Lg ... LIGHT GREEN
R ... RED	P ... PINK
W ... WHITE	Gr ... GRAY



- ⑬ REAR MODULATOR CONTROL MOTOR  
-R. side cover (page 2-2)



- ⑭ REAR WHEEL SPEED SENSOR  
-R. side cover  
(page 2-2)



- ⑮ MOTOR DRIVE  
(4P Blue)  
-Upper fairing  
(page 2-9)

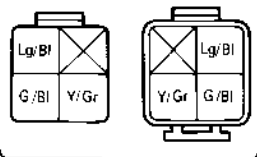
④ ABS INDICATOR LIGHT 1  
-Inner screen  
(page 2-7)



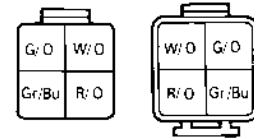
⑤ ABS INDICATOR LIGHT 2  
-Inner screen  
(page 2-7)



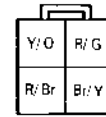
⑥ INDICATOR (Black)  
-Inner screen  
(page 2-7)



⑦ INDICATOR (White)  
-Inner screen (page 2-7)



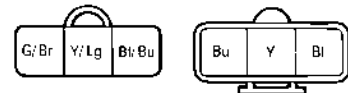
⑧ FRONT MODULATOR CONTROL MOTOR RELAY - Upper fairing  
(page 2-9)



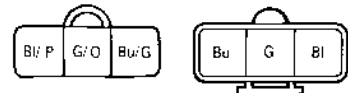
⑨ REAR MODULATOR CONTROL MOTOR RELAY - Upper fairing  
(page 2-9)



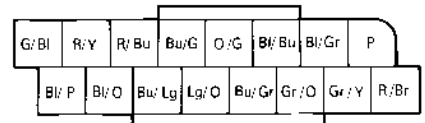
⑩ FRONT MODULATOR CRANK ANGLE SENSOR - Upper fairing (page 2-9)



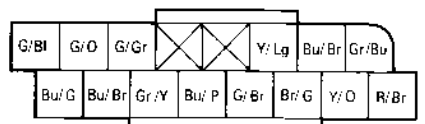
⑪ FRONT WHEEL SPEED SENSOR - Upper fairing (page 2-9)



⑫ ECU (Black)  
-Upper fairing (page 2-9)



⑬ ECU (White)  
-Upper fairing (page 2-9)



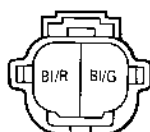
⑭ MOTOR DRIVER (12P)  
-Upper fairing  
(page 2-9)



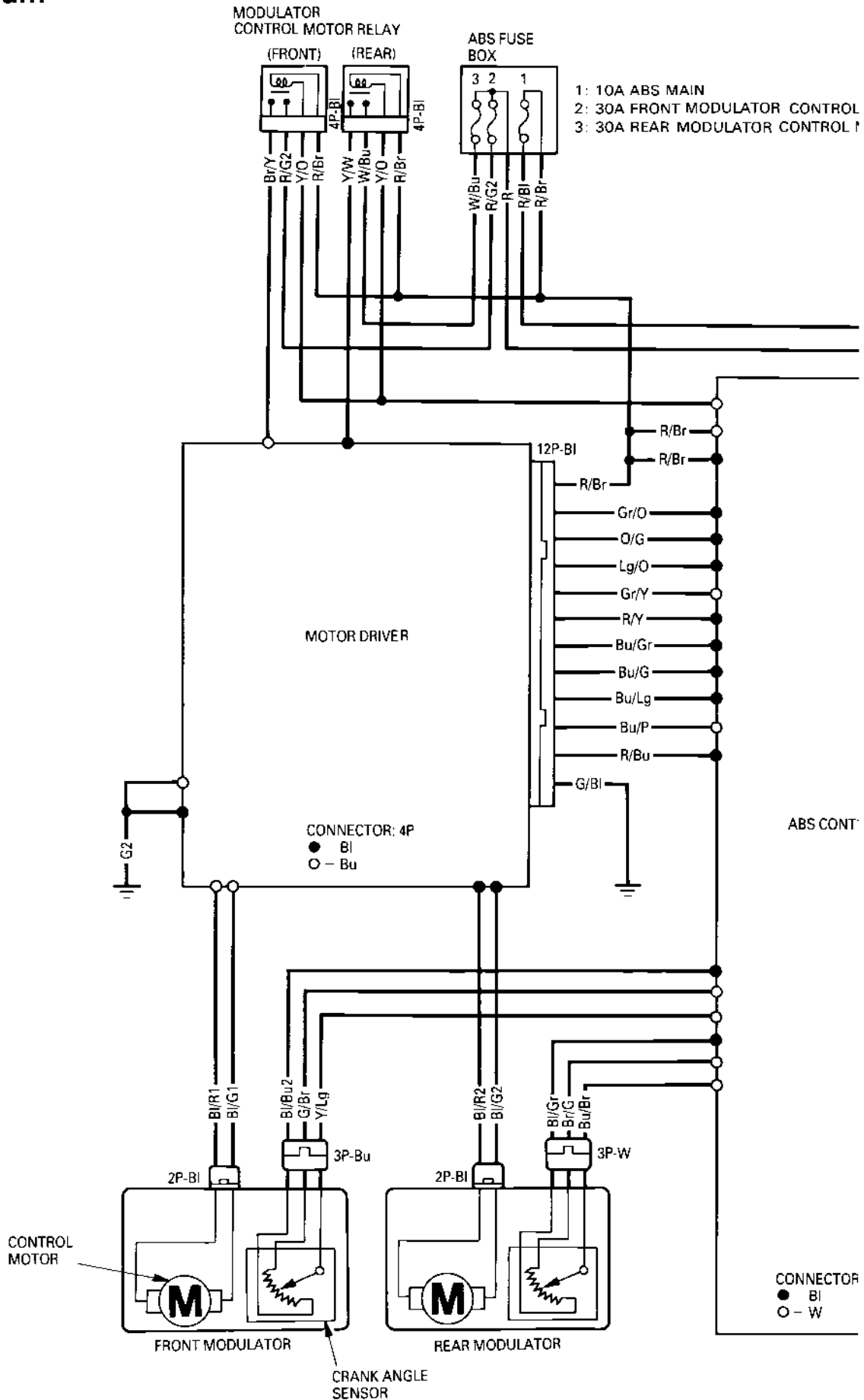
⑮ MOTOR DRIVER (4P Black)  
-Upper fairing  
(page 2-9)



⑯ FRONT MODULATOR CONTROL MOTOR  
-Upper fairing (page 2-9)



# Circuit Diagram





# Troubleshooting

## Before Beginning Troubleshooting

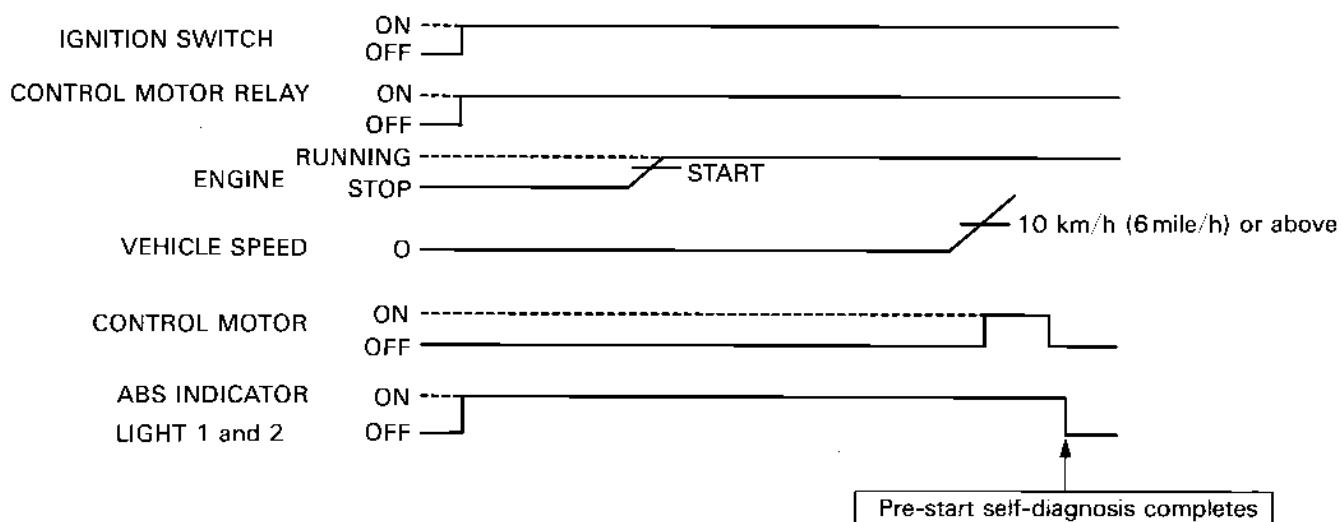
### Summary of ABS pre-start self-diagnosis system

The ABS pre-start self-diagnosis system diagnoses the electrical system as well as the operating status of the modulator. When there is any abnormality, the problem and the problem part can be detected by outputting the problem code.

When the vehicle speed is approximately 10 km/h (6 mile/h) or more, the wheel speed sensor signal is input to the ABS control unit (ECU), then the ABS pre-start self-diagnosis system operates the control motor inside the modulator, checks the crank angle condition with ABS control unit (ECU) and thereby it detects whether the modulator operation is normal, and it completes the pre-start self-diagnosis.

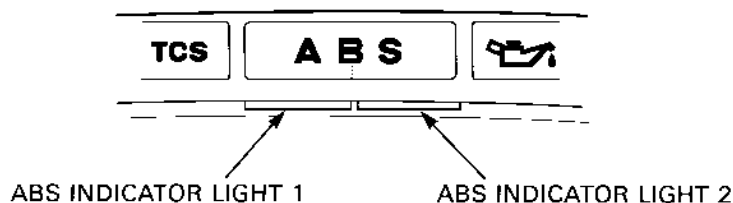
When the ABS is normal, the ABS indicator light goes off just after starting up indicating that the diagnosis is completed. If a problem is detected, the ABS indicator light blinks or comes on and stays on to notify the rider of the problem. The self-diagnosis is also made while the motorcycle is running, and the indicator light blinks when a problem is detected. When the indicator light blinks, the cause of the problem can be identified by retrieving the problem code following the specified retrieval procedure. (page 16-B-6)

### PRE-START SELF-DIAGNOSIS WHEN NORMAL



### Pre-start self-diagnosis procedure (Everyday check-up)

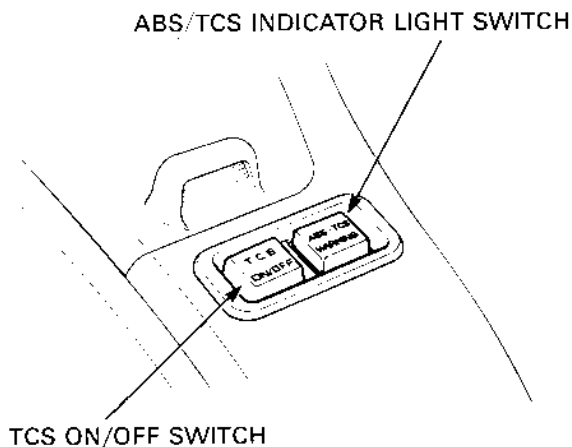
1. Turn the ignition switch ON.
2. Be sure that the ABS indicator lights 1 and 2 come ON.
3. Start the engine.
4. Ride the motorcycle and raise the vehicle speed to approximately 10 km/h (pre-start self-diagnosis completes).
5. The ABS is normal if both the ABS indicator light 1 and 2 go OFF.



**Retrieval of/Clearing Problem Code**

**NOTE**

- The ABS indicator light indicates the problem code by its number of blinks (see the next page).
- The problem code is not cleared when the ignition switch is turned OFF during output of the problem code. However, output cannot be restarted by turning the ignition switch ON. Restart the output following the problem code retrieval procedure.
- After retrieving the problem code, be sure to record it in MEMO, etc. Clear the problem code after troubleshooting.



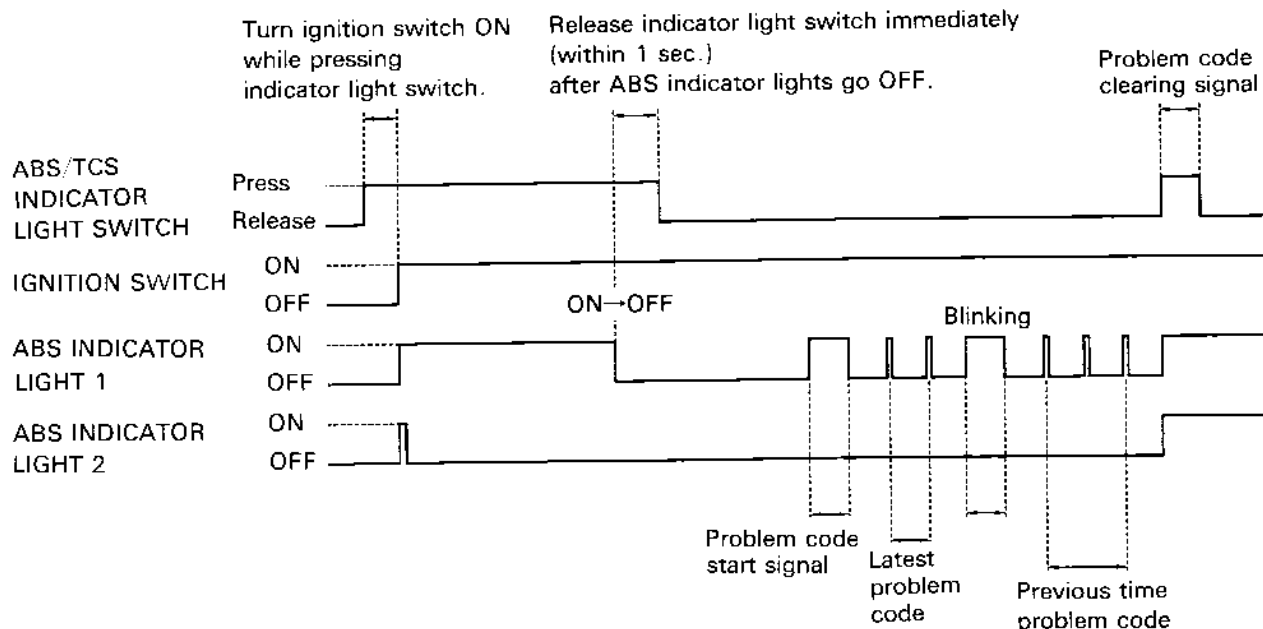
**Retrieval:**

1. Turn the ignition switch OFF.
  2. Turn the ignition switch ON while pressing the ABS/TCS indicator light switch. The ABS indicator light 1 and 2 should come ON. (The ABS indicator light 2 is OFF this time.)
  3. Hold the ABS/TCS indicator light switch pressed (for approximately 5 seconds). The ABS indicator light 1 should go OFF.
  4. Release the ABS/TCS indicator light switch immediately (within 1 second) after the ABS indicator light go OFF.
- ⇨ Output of the problem code starts and the ABS indicator light 1 blinks.



**Clearing:**

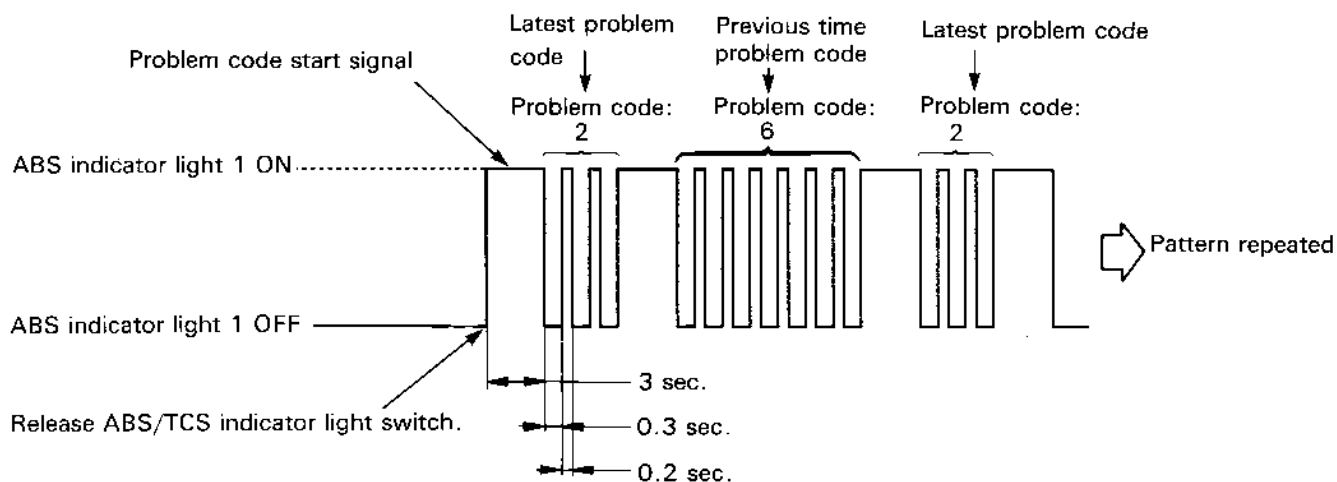
5. Press the ABS/TCS indicator light switch during output of the problem code (while the ABS indicator light is blinking).
- ⇨ The Problem code is cleared and the ABS indicator light 1 and 2 comes ON and stay ON.



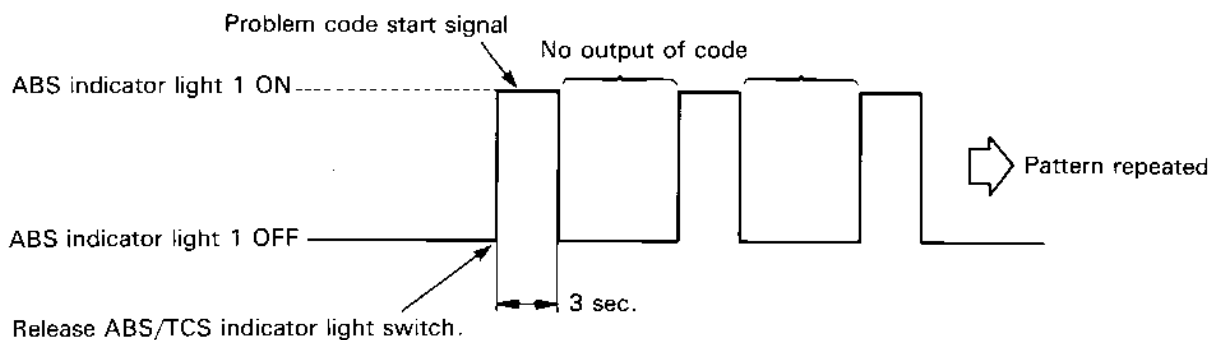
## Problem code indication pattern

### Example:

- When the problem code is stored;



- When the problem code not stored;



### NOTE

- The ECU can store up to two problem codes. The latest problem code is output first, then the previous one is output. When the two problem codes are output, diagnose on the latest problem code (i.e. code output first).
- After troubleshooting, perform the pre-start self-diagnosis again to be sure that there is no problem in the ABS indicator lights and the problem code is cleared.
- See page 16-B-33 for the problems that are not represented with the problem codes.
- Check the following before performing ABS troubleshooting:
  - Pre-start self-diagnosis of ABS
  - ABS indicator light

If an abnormality is found during the above checks, perform the ABS troubleshooting following the Symptom-to-System Chart (see the following page). The ABS is normal if no trouble is found. Go on to the check the other basic systems (e.g., LBS or basic brake system).

Symptom-to System Chart

Problem		Affected																			
Problem code	Item	Fuse		Modulator				Modulator control motor relay		Motor driver		Wheel speed sensor		Pulser ring		Power circuit (charging)	Wire harness	ABS control unit (ECU)	ABS indicator light	Indicator control unit	Reference page
		ABS main	Modulator control motor	Control motor		Crank angle sensor	Modulator control motor relay	Motor driver	Wheel speed sensor	Pulser ring											
				Front	Rear						Front	Rear									
①	Faulty front modulator crank angle sensor system					○		○									○	○		16-B-9	
②	Faulty rear modulator crank angle sensor system						○		○									○	○	16-B-12	
③	Faulty front modulator control motor system		○		○					○								○	○	16-B-15	
④	Faulty rear modulator control motor system			○		○				○								○	○	16-B-19	
⑤	Faulty front wheel speed sensor system										○		○					○	○	16-B-23	
⑥	Faulty rear wheel speed sensor system											○		○				○	○	16-B-26	
⑦	Faulty power circuit														○			○	○	16-B-29	
⑧	Faulty ABS control unit (ECU)					○	○			○								○	○	16-B-31	
—	Problems not recognized by ABS control unit (ECU)	○														○	○	○	○	16-B-33	

NOTE

- Check the following before performing ABS troubleshooting.
  - Pre-start self-diagnosis of ABS (page 16-B-5)
  - ABS indicator light (page 16-B-5)
 If an abnormality is found during the above checks, perform the ABS troubleshooting following the Symptom-to-System Chart. The ABS is normal if no trouble is found. If no trouble is found, continue on to the other system checks (e.g., LBS or basic brake system).
- After troubleshooting, clear the problem code (page 16-B-6) and perform the pre-start self-diagnosis again (page 16-B-5) to be sure that the ABS indicator light is operation properly.



**Flowcharts**

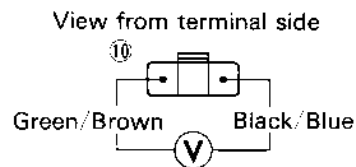
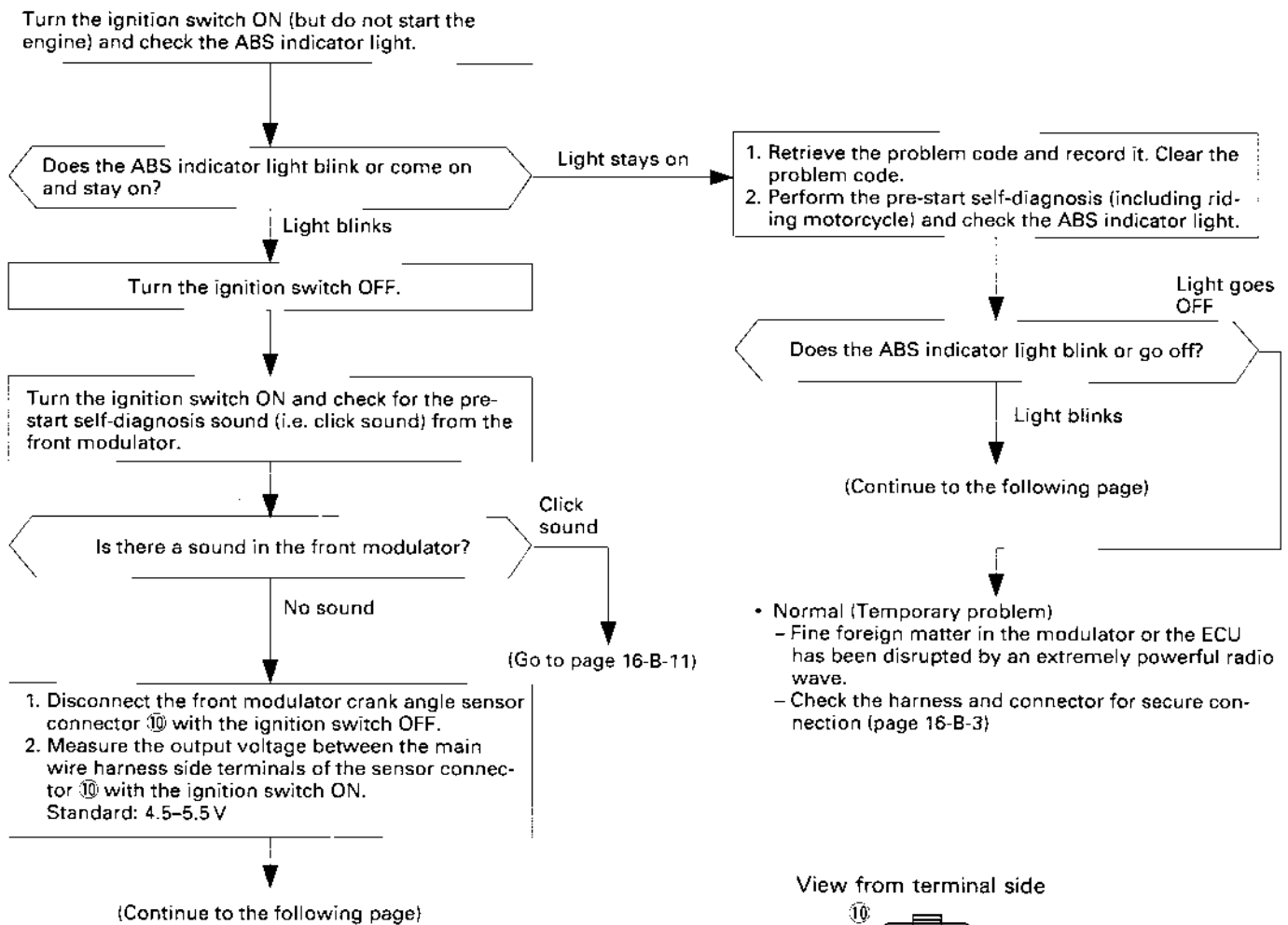
**CAUTION**

- Use a fully charged battery. Do not diagnose with a charger connected to the battery.

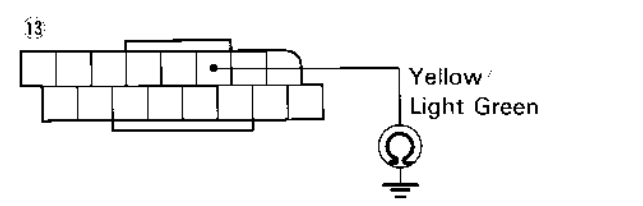
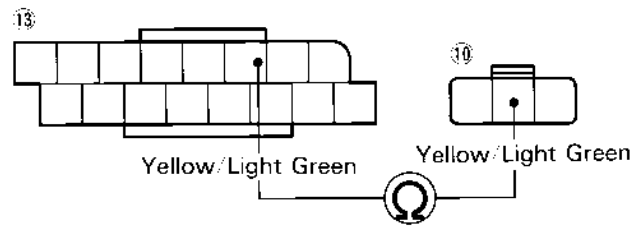
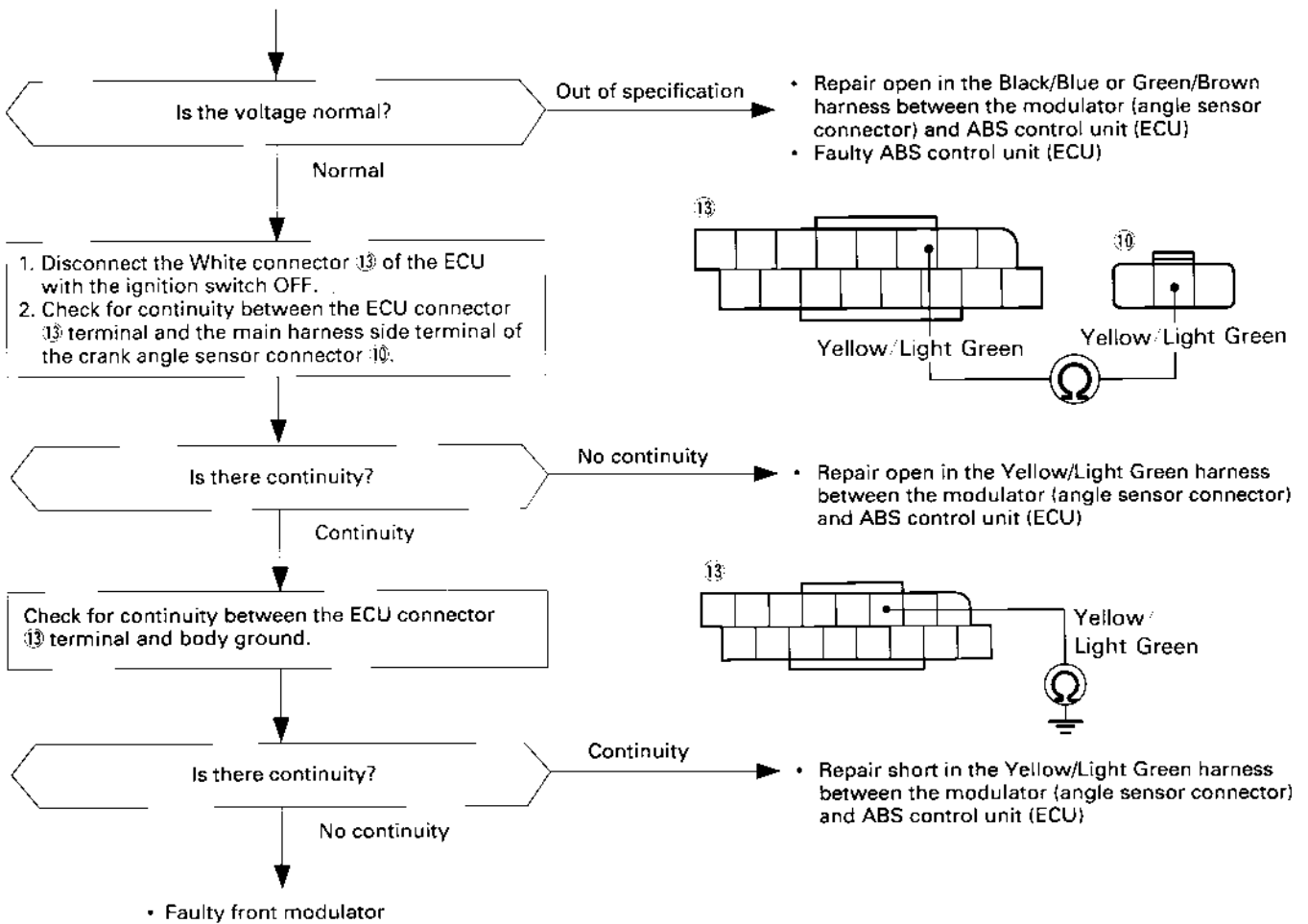
**NOTE**

- Turn the ignition switch OFF unless otherwise specified.
- When the ABS control unit (ECU), motor driver or modulator is detected to be faulty, recheck the wire harnesses and connectors connections closely before replacing the control unit, motor driver or modulator.
- After troubleshooting, perform the pre-start self-diagnosis again and be sure that the ABS indicator light is normal.
- The encircled numbers in the texts and connector diagrams indicate the connectors (see page 16-B-3). All connectors diagrams in the text are view from the terminal side.

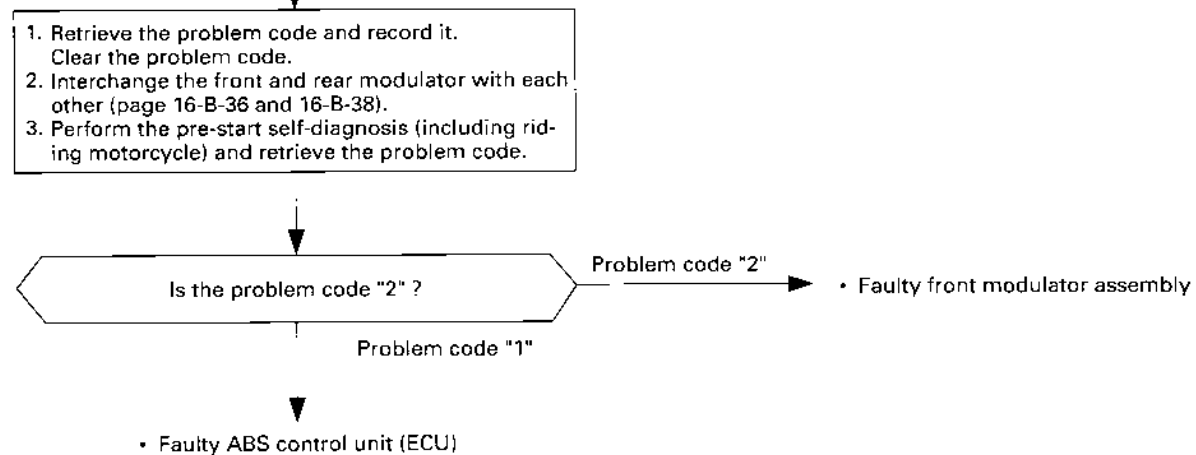
**Problem code 1: Faulty front modulator crank angle sensor system**



(From the previous page: Measure the output voltage at the 10 connector)

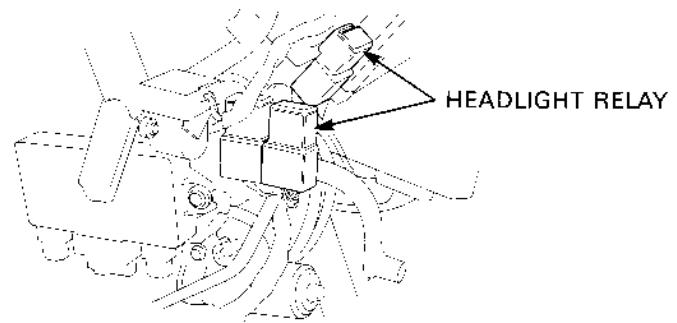


(From the previous page: Light blinks)



(From page 16-B-9: Click sound)

1. Disconnect the front modulator control motor relay connector ⑧ and connect the headlight relay instead with the ignition switch OFF.
2. Turn the ignition switch ON and check the ABS indicator light.



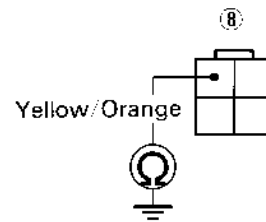
Does the ABS indicator light blink or come on and stay on?

Light stays on

- Faulty front modulator control motor relay

Light blinks

1. Disconnect the front and rear modulator control motor relay connector ⑧/⑨ and ECU White connector ⑬ with the ignition switch OFF.
2. Check for continuity between the connector ⑧ terminal and body ground.



Is there continuity?

Continuity

- Repair short in the Yellow/Orange harness between the front/rear modulator control motor relay and ABS control unit (ECU).

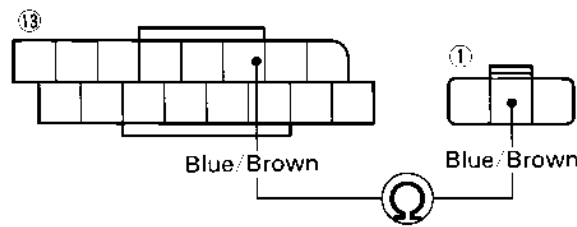
No continuity

- Faulty ABS control unit (ECU)



(From the previous page: Normal)

1. Disconnect the White connector ⑬ of the ECU with the ignition switch OFF.
2. Check for continuity between the ECU connector ⑬ terminal and the main harness side terminal of the crank angle sensor connector ①.

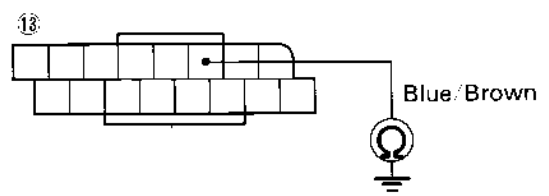


Is there continuity?

- No continuity → • Repair open in the Blue/Brown harness between the modulator (connector angle sensor) and ABS control unit (ECU)

Continuity

- Check for continuity between the ECU connector ⑬ terminal and body ground.



Is there continuity?

- Continuity → • Repair short in the Blue/Brown harness between the modulator (angle sensor connector) and ABS control unit (ECU)

No continuity

• Faulty rear modulator

(From the previous page: Light blinks)

1. Retrieve the problem code and record it. Clear the problem code.
2. Interchange the front and rear modulator with each other (page 16-B-36 and 16-B-38).
3. Perform the pre-start self-diagnosis (including riding motorcycle) and retrieve the problem code.

Is the problem code "1" ?

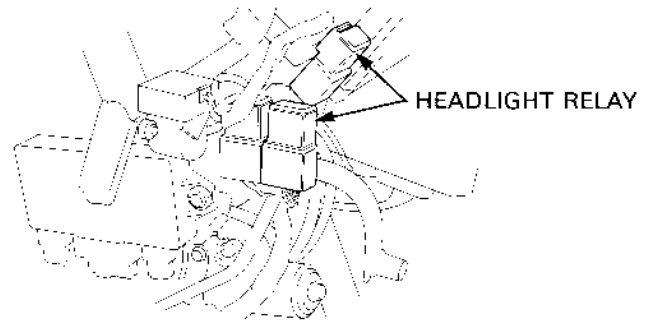
- Problem code "1" → • Faulty rear modulator assembly

Problem code "2"

• Faulty ABS control unit (ECU)

(From page 16-B-12: Click sound)

1. Disconnect the rear modulator control motor relay connector ⑨ and connect the headlight relay instead with the ignition switch OFF.
2. Turn the ignition switch ON and check the ABS indicator light.



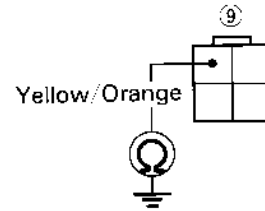
Does the ABS indicator light blink or come on and stay on?

Light stays on

- Faulty rear modulator control motor relay

Light blinks

1. Disconnect the front and rear modulator control motor relay connector ⑧/⑨ and ECU White connector ⑬ with the ignition switch OFF.
2. Check for continuity between the connector ⑨ terminal and body ground.



Is there continuity?

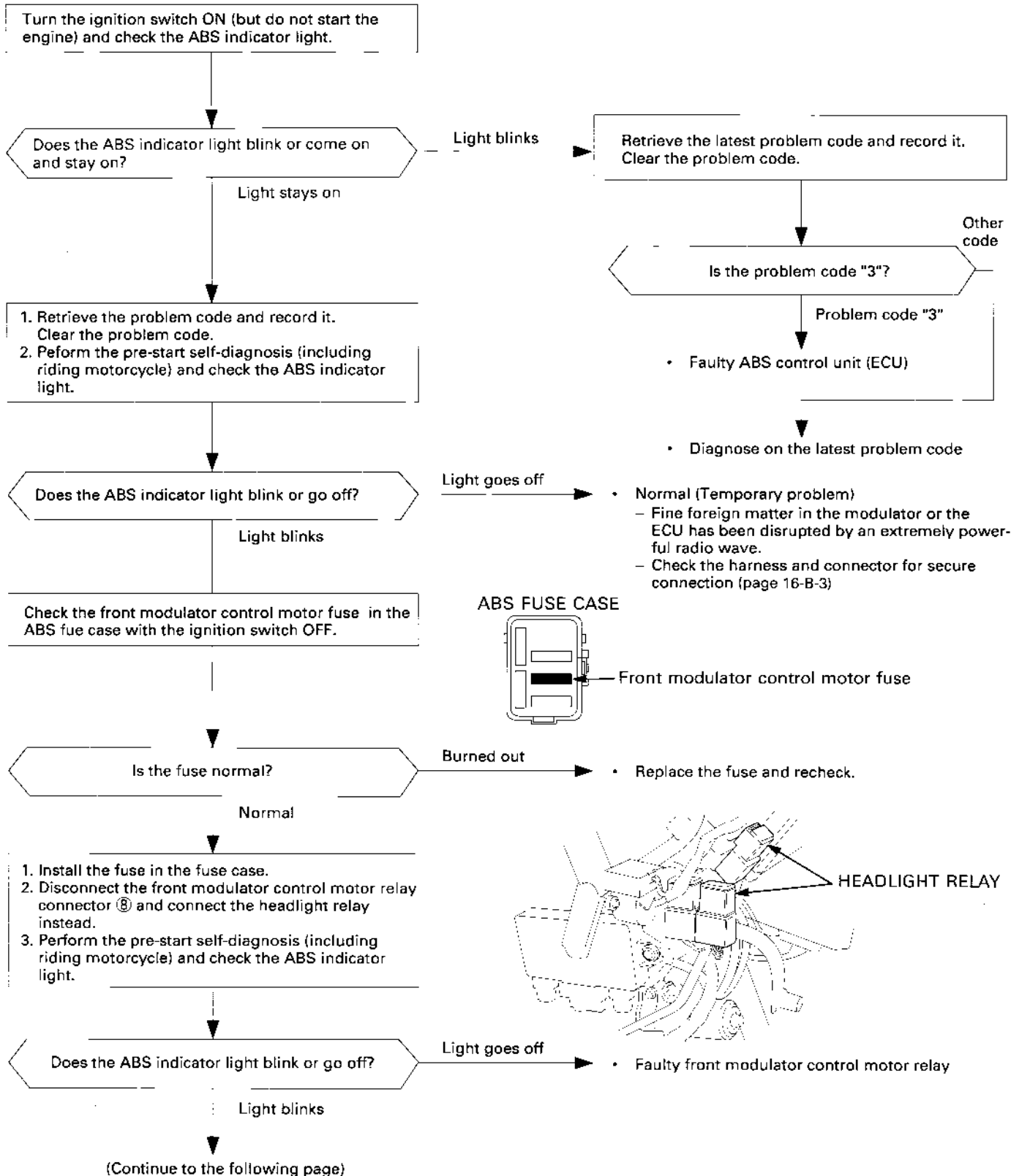
Continuity

- Repair short in the Yellow/Orange harness between the front/rear modulator control motor relay and ABS control unit (ECU).

No continuity

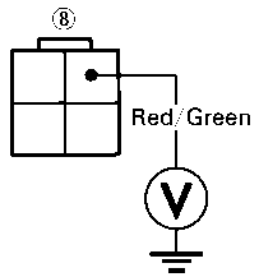
- Faulty ABS control unit (ECU)

**Problem code 3: Faulty front modulator control motor system**



(From the previous page: Light blinks)

1. Disconnect the front modulator control motor relay connector ⑧ with the ignition switch OFF.
2. Check for voltage between the relay connector ⑧ terminal and body ground.



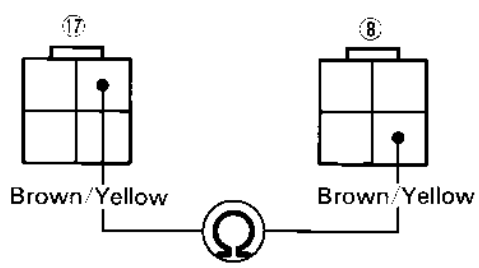
Does battery voltage register?

Voltage

No voltage →

- Repair open in the Red or Red/Green harness between the front modulator control motor relay and battery.

1. Disconnect the motor driver Blue connector ⑰.
2. Check for continuity between the relay connector ⑧ and motor driver connector ⑰ terminals.



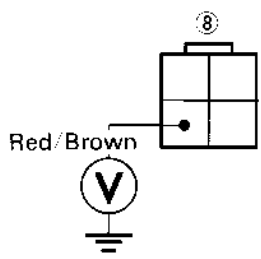
Is there continuity?

Continuity

No continuity →

- Repair open in the Brown/Yellow harness between the front modulator control motor relay and motor driver.

- Check for voltage between the relay connector ⑧ terminal and body ground with the ignition switch ON.



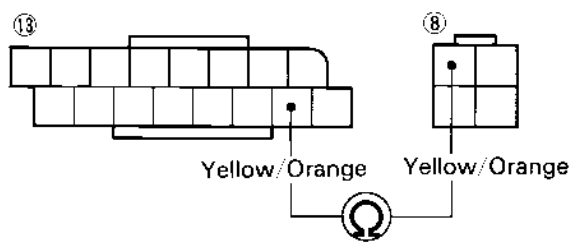
Does battery voltage register?

Voltage

No voltage →

- Repair open in the Red/Brown harness between the fuse case and front modulator control motor relay.

1. Disconnect the White connector ⑬ of the ECU with the ignition switch OFF.
2. Check for continuity between the ECU connector ⑬ and relay connector ⑧ terminals.



Is there continuity?

Continuity

No continuity →

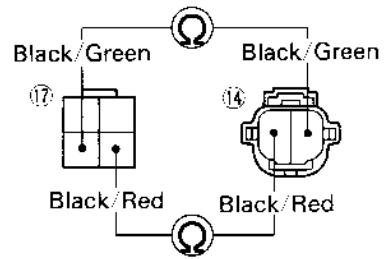
- Repair open in the Yellow/Orange harness between the ABS control unit (ECU) and front modulator control motor relay.

(Continue to the following page)



(From the previous page: Continuity)

1. Disconnect the front modulator control motor connector ⑭ of the front modulator.
2. Check for continuity between the motor connector ⑭ and motor driver connector ⑰ terminals.



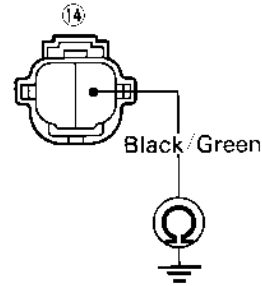
Is there continuity?

No continuity

- Repair open in the Black/Red or Black/Green harness between the front modulator (control motor) and motor driver.

Continuity

- Check for continuity between the control motor connector ⑭ and body ground.



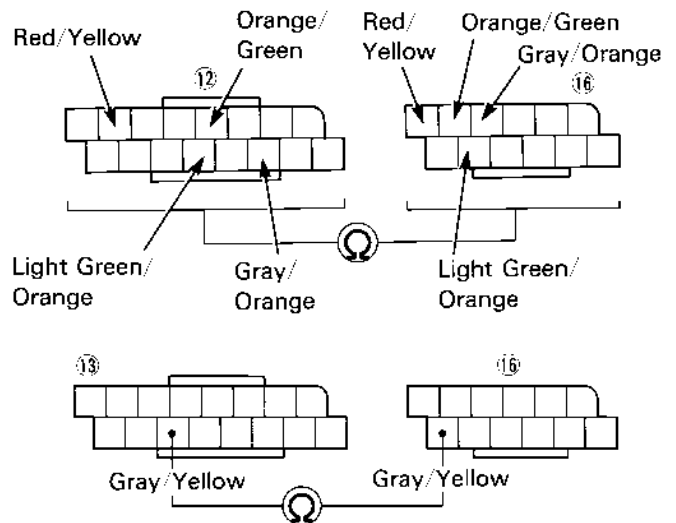
Is there continuity?

Continuity

- Repair short in the Black/Green harness between the front modulator (control motor) and motor driver.

No continuity

1. Disconnect the Black connector ⑫ of the ECU and motor driver 12P connector ⑯.
2. Check for continuity between the ECU connectors ⑫/⑬ and connector ⑯ terminals in the same harness colors.



Is there continuity?

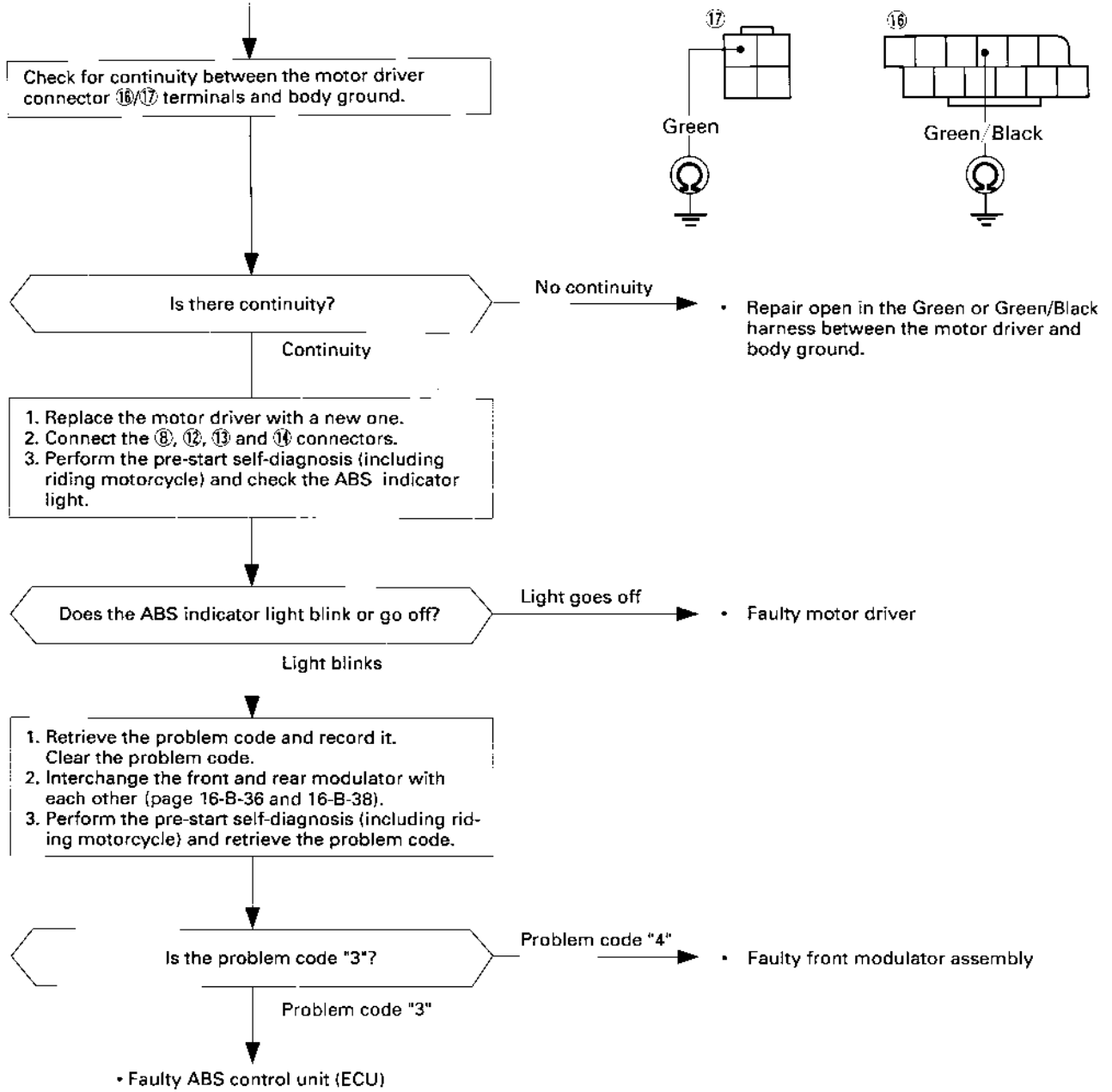
No continuity

- Repair open in the harness between the ABS control unit (ECU) and motor driver.

Continuity

(Continuity to the following page)

(From the previous page: Continuity)



**Problem code 4: Faulty rear modulator control motor system**

Turn the ignition switch ON (but do not start the engine) and check the ABS indicator light.

Does the ABS indicator light blink or come on and stay on?

Continuity

1. Retrieve the problem code and record it. Clear the problem code.  
2. Perform the pre-start self-diagnosis (including riding motorcycle) and check the ABS indicator light.

Does the ABS indicator light blink or go off?

Light blinks

Check the rear modulator control motor fuse in the ABS fuse case with the ignition switch OFF.

Is the fuse normal?

Normal

1. Install the fuse in the fuse case.  
2. Disconnect the rear modulator control motor relay connector ⑨ and connect the headlight relay instead.  
3. Perform the pre-start self-diagnosis (including riding motorcycle) and check the ABS indicator light.

Does the ABS indicator light blink or go off?

Light blinks

(Continue to the following page)

Light blinks

Retrieve the latest problem code and record it. Clear the problem code.

Is the problem code "4"?

Other code

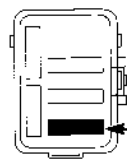
Problem code "4"

- Faulty ABS control unit (ECU)

- Diagnose on the latest problem code

- Normal (Temporary problem)
  - Fine foreign matter in the modulator or the ECU has been disrupted by an extremely powerful radio wave.
  - Check the harness and connector for secure connection (page 16-B-3)

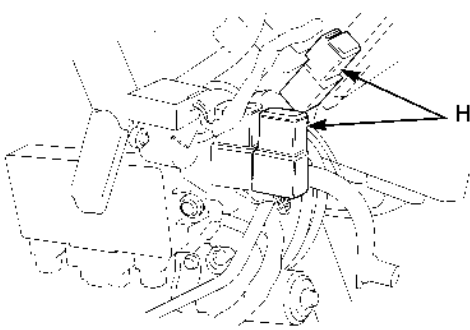
ABS FUSE CASE



Rear modulator control motor fuse

Burned out

- Replace the fuse and recheck.



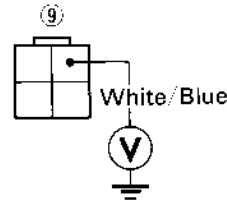
HEADLIGHT RELAY

Light goes off

- Faulty rear modulator control motor relay

(From the previous page: Light blinks)

1. Disconnect the rear modulator control motor relay connector ⑨ with the ignition switch OFF.
2. Check for voltage between the relay connector ⑨ terminal and body ground.



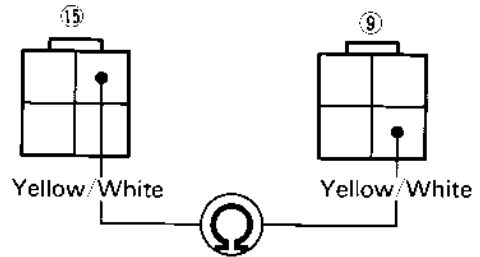
Does battery voltage register?

No voltage

- Repair open in the Red or White/Blue harness between the rear modulator control motor relay and battery.

Voltage

1. Disconnect the motor driver 4P Black connector ⑮.
2. Check for continuity between the relay connector ⑨ and motor driver connector ⑮ terminals.



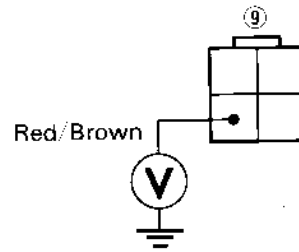
Is there continuity?

No continuity

- Repair open in the Yellow/White harness between the rear modulator control motor relay and motor driver.

Continuity

- Check for voltage between the relay connector ⑨ terminal and body ground with the ignition switch ON.



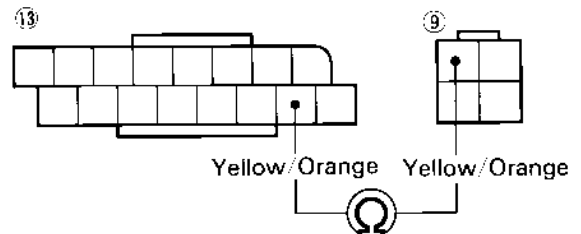
Does battery voltage register?

No voltage

- Repair open in the Red/Brown harness between the fuse case and rear modulator control motor relay.

Voltage

1. Disconnect the White connector ⑬ of the ECU with the ignition switch OFF.
2. Check for continuity between the ECU connector ⑬ and relay connector ⑨ terminals.



Is there continuity?

No continuity

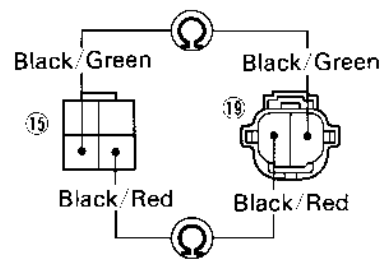
- Repair open in the Yellow/Orange harness between the ABS control unit (ECU) and rear modulator control motor relay.

Continuity

(Continue to the following page)

(From the previous page: Continuity)

1. Disconnect the rear modulator control motor connector ⑱ of the rear modulator.
2. Check for continuity between the motor connector ⑱ and motor driver connector ⑮ terminals.



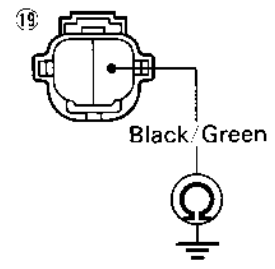
Is there continuity?

No continuity

- Repair open in the Black/Red or Black/Green harness between the rear modulator (control motor) and motor driver.

Continuity

- Check for continuity between the control motor connector ⑱ and body ground.



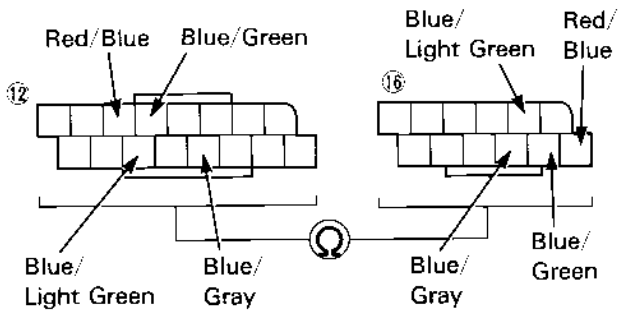
Is there continuity?

Continuity

- Repair short in the Black/Green harness between the rear modulator (control motor) and motor driver.

No continuity

1. Disconnect the Black connector ⑫ of the ECU and motor driver 12P connector ⑰.
2. Check for continuity between the ECU connectors ⑫/⑬ and connector ⑰ terminals in the same harness colors.

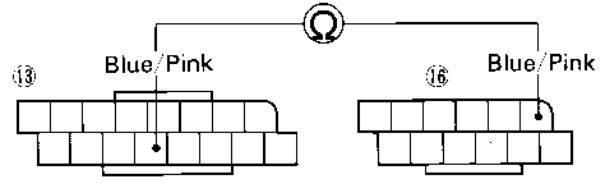


Is there continuity?

No continuity

- Repair open in the harness between the ABS control unit (ECU) and motor driver.

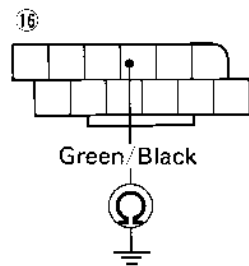
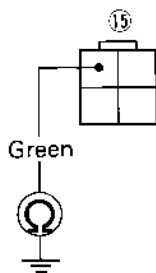
Continuity



(Continue to the following page)

(From the previous page: Continuity)

Check for continuity between the motor driver connector ⑮/⑯ terminals and body ground.



Is there continuity?

No continuity

- Repair open in the Green or Green/Black harness between the motor driver and body ground.

Continuity

1. Replace the motor driver with a new one.
2. Connect the ⑨, ⑫, ⑬ and ⑰ connectors.
3. Perform the pre-start self-diagnosis (including riding motorcycle) and check the ABS indicator light.

Does the ABS indicator light blink or go off?

Light goes off

- Faulty motor driver

Light blinks

1. Retrieve the problem code and record it. Clear the problem code.
2. Interchange the front and rear modulator with each other (page 16-B-36 and 16-B-38).
3. Perform the pre-start self-diagnosis (including riding motorcycle) and retrieve the problem code.

Is the problem code "4"?

Problem code "3"

- Faulty rear modulator assembly

Problem code "4"

- Faulty ABS control unit (ECU)

## Problem code 5: Faulty front wheel speed sensor system

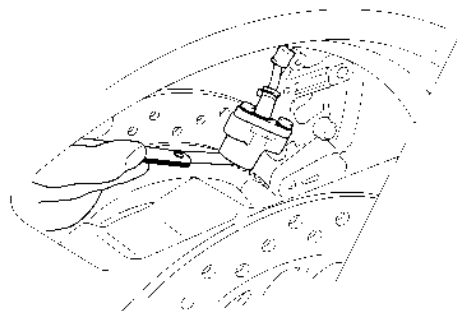
## CAUTION

- When removing/installing the wheel speed sensor and wheel, take care not to damage the sensor and pulser ring.

## NOTE

- Check the tire size and air pressure and check the tire for deformation before troubleshooting.
- The ABS indicator light might come on while riding under the following conditions. Turn the ignition switch OFF and perform the pre-start self-diagnosis. The ABS is normal if the indicator light goes off. However, the problem code is stored in the ECU. Ask the rider for the riding conditions in detail when the brings his motorcycle to your dealership for inspection.
  - The motorcycle has continuously run on bumpy road.
  - After riding on the road (after the pre-start self-diagnosis), the engine was kept running and the rear wheel turning (for more than 30 seconds) with the motorcycle placed on the center stand.

- Perform the inspection of the wheel speed sensor. Check the area around the wheel speed sensor as well.



Place the motorcycle on its center stand and measure the air gap between the pulser ring and wheel speed sensor (page 16-B-34).  
Standard: 0.4–0.5 mm (0.016–0.020 in)

Is the air gap correct?

Incorrect

- Check each part for deformation and looseness and correct accordingly. Recheck the air gap.

Correct

Is the pulser ring deformed or damaged (e.g. chipped teeth, etc.)?

Deformed and/or damaged

- Replace the pulser ring and recheck.

Not deformed and damaged

Is there iron or other magnetic deposits between the pulser ring and wheel speed sensor?

Deposits

- Remove the deposits and recheck.

No deposits

Are the pulser ring and sensor bracket loosely installed?

Loosely installed

- Correct deformation. Install securely and recheck.

Securely installed

(Continue to the following page)

## NOTE

- Check the wheel speed sensor tip for damage. If it is damaged, replace with a new one and recheck the air gap.

(From the previous page)

1. Retrieve the problem code and record it.  
Clear the problem code.  
2. With the ignition switch in the ON position (do not operate the ignition switch after clearing the problem code), turn the front wheel (Vehicle speed: approximately 4 km/h [2.5 mile/h] or above) and check the ABS indicator light.

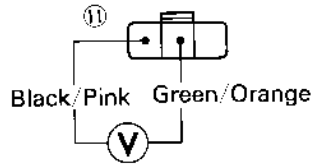
Does the ABS indicator light blink or stay on?

Light blinks (Sensor signal is input in the ECU)

- Normal (Temporary problem)
  - The ECU has been disrupted by an extremely powerful radio wave.
  - Check the harness and connector for secure connection at the wheel speed sensor system (page 23-117).

Light stays on

1. Disconnect the front wheel speed sensor connector ① with the ignition switch OFF.  
2. Check for voltage between the main harness side terminals of the sensor connector ①.



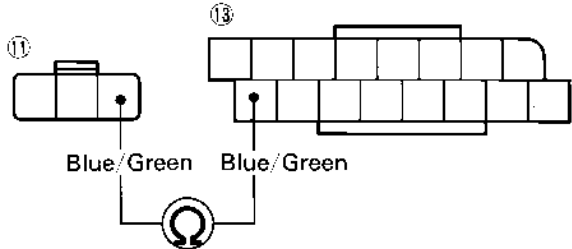
Does battery voltage register?

No voltage

- Repair open in the Black/Pink or Green/Orange harness between the wheel speed sensor and ABS control unit (ECU).

Voltage

1. Disconnect the White connector ⑬ of the ECU with the ignition switch OFF.  
2. Check for continuity between the ECU ⑬ connector and sensor connector ① terminals.



Is there continuity?

No continuity

- Repair open in the Blue/Green harness between the ABS control unit (ECU) and wheel speed sensor.

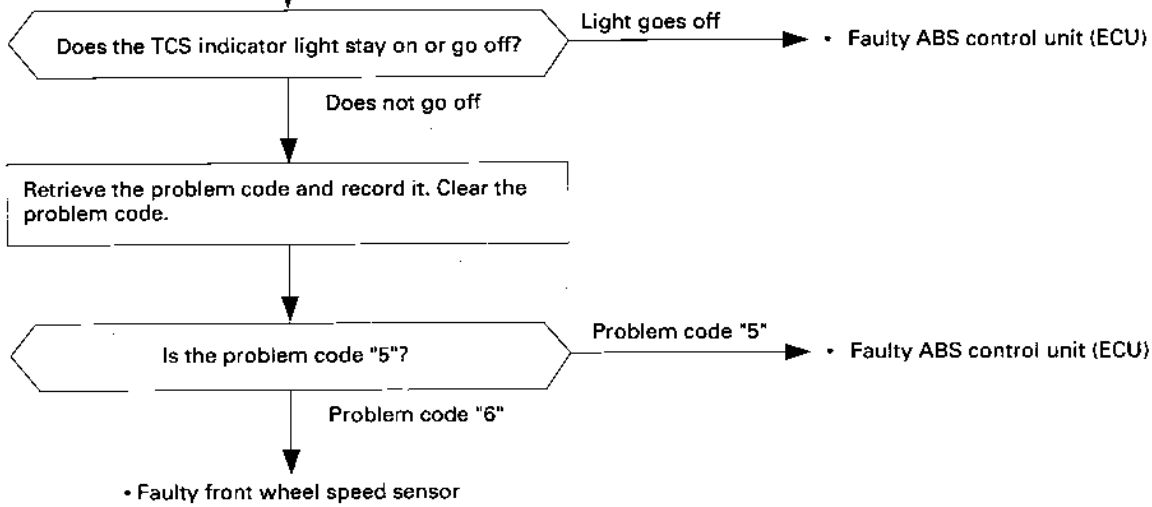
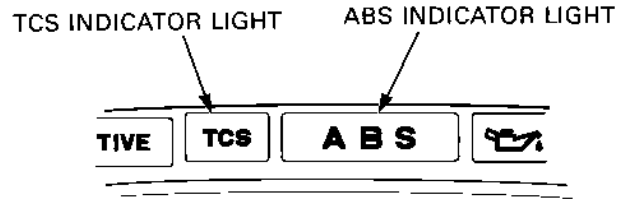
Continuity

(Continue to the following page)



(From the previous page)

1. Interchange the front and rear wheel speed sensor with each other.
2. Connect the ECU connector ⑬.
3. Perform the pre-start self-diagnosis (including riding motorcycle), then check the TCS indicator light.



Problem code 6: Faulty rear wheel speed sensor system

CAUTION

When removing/installing the wheel speed sensor and wheel, take care not to damage the sensor and pulser ring.

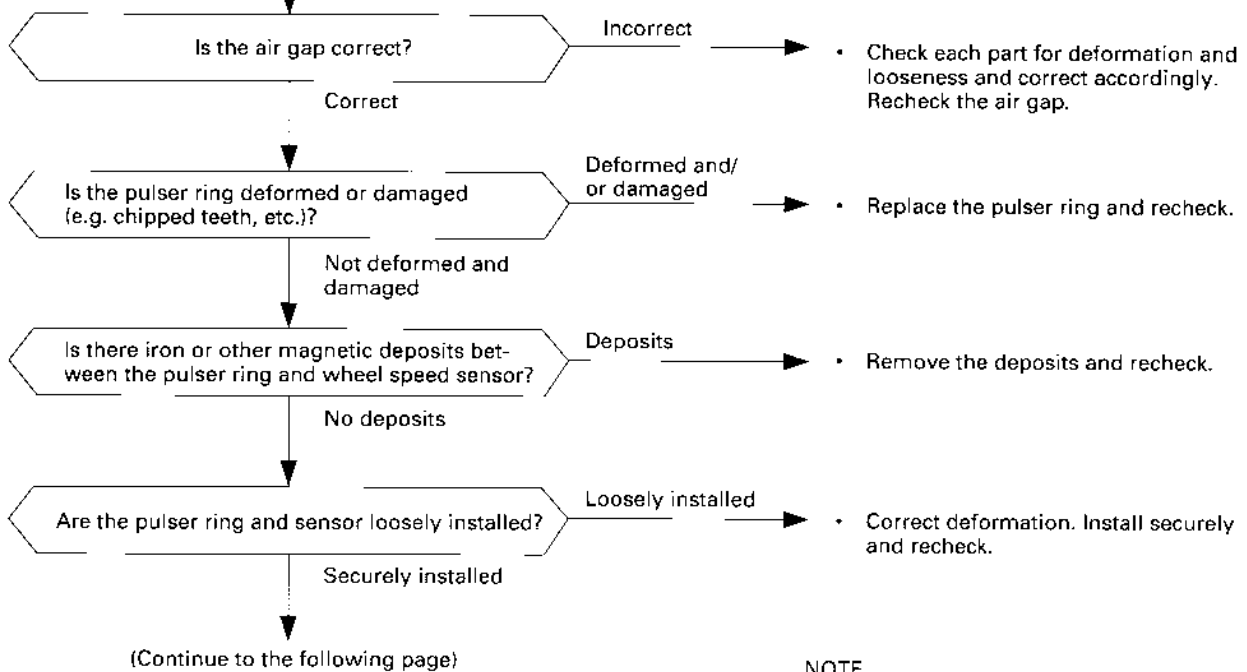
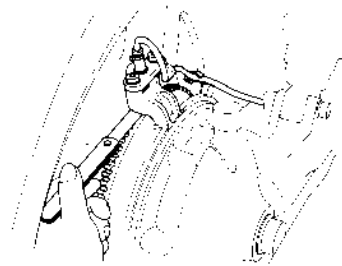
NOTE

Check the tire size and air pressure and check the tire for deformation before troubleshooting. The ABS indicator light might come on while riding under the following conditions. Turn the ignition switch OFF and perform the pre-start self-diagnosis. The ABS is normal if the indicator light goes off. However, the problem code is stored in the ECU. Ask the rider for the riding conditions in detail when he brings his motorcycle to your dealership for inspection (Was the motorcycle continuously run on bumpy road?).

- Perform the inspection of the wheel speed sensor. Check the area around the wheel speed sensor as well.

Place the motorcycle on its center stand and measure the air gap between the pulser ring and wheel speed sensor (page 16-B-34).

Standard: 0.8 +0.4/-0.1 mm (0.031 +0.016/-0.004 in)



NOTE

Check the wheel speed sensor tip for damage. If it is damaged, replace with a new one and recheck the air gap.

(From the previous page)

1. Retrieve the problem code and record it. Clear the problem code.
2. With the ignition switch in the ON position (do not operate the ignition switch after clearing the problem code), turn the rear wheel (Vehicle speed: approximately 4 km/h [2.5 mile/h] or above) and check the ABS indicator light.

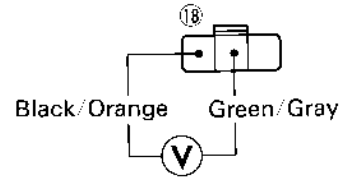
Does the ABS indicator light blink or stay on?

Light blinks  
(Sensor signal is input in the ECU)

- Normal (Temporary problem)
  - The ECU has been disrupted by an extremely powerful radio wave.
  - Check the harness and connector for secure connection at the wheel speed sensor system (page 16-B-3).

Light stays on

1. Disconnect the rear wheel speed sensor connector ⑱ with the ignition switch OFF.
2. Check for voltage between the main harness side terminals of the sensor connector ⑱.



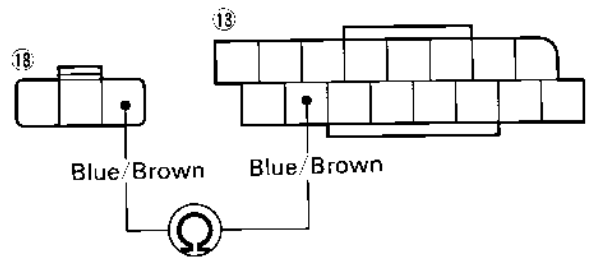
Does battery voltage register?

No voltage

- Repair open in the Black/Orange or Green/Gray harness between the wheel speed sensor and ABS control unit (ECU).

Voltage

1. Disconnect the White connector ⑲ of the ECU with the ignition switch OFF.
2. Check for continuity between the ECU ⑲ connector and sensor connector ⑱ terminals.



Is there continuity?

No continuity

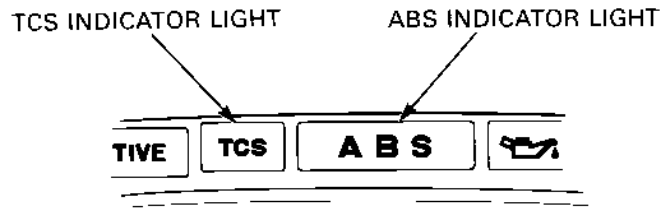
- Repair open in the Blue/Brown harness between the ABS control unit (ECU) and wheel speed sensor.

Continuity

(Continue to the following page)

(From the previous page)

1. Interchange the front and rear wheel speed sensor with each other.
2. Connect the ECU connector ⑬. Perform the pre-start self-diagnosis (including riding motorcycle), then check the TCS indicator light.



Does the TCS indicator light stay on or go off?

Light goes off

• Faulty ABS control unit (ECU)

Does not go off

Retrieve the problem code and record it. Clear the problem code.

Is the problem code "6"?

Problem code "6"

• Faulty ABS control unit (ECU)

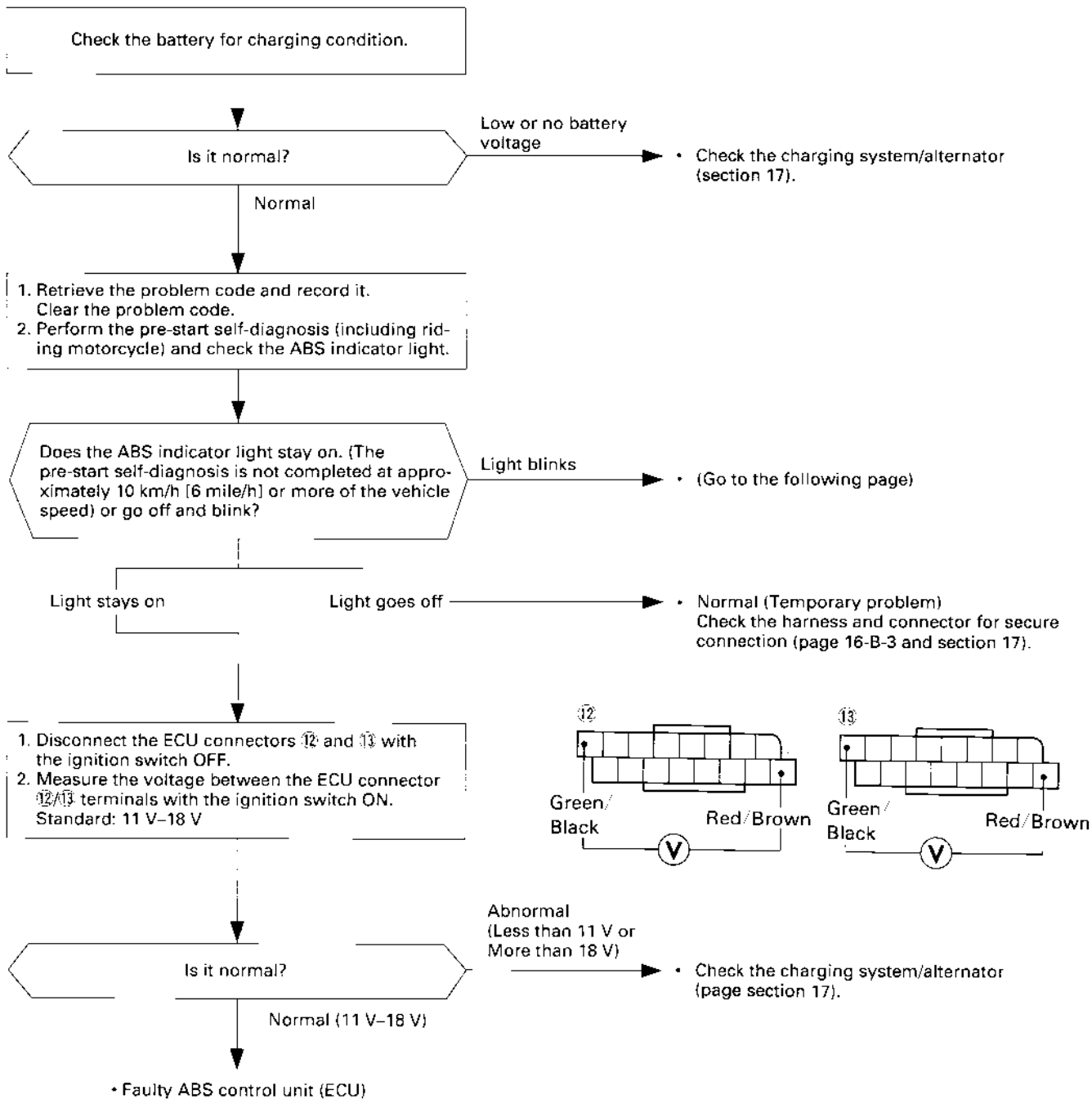
Problem code "5"

• Faulty rear wheel speed sensor

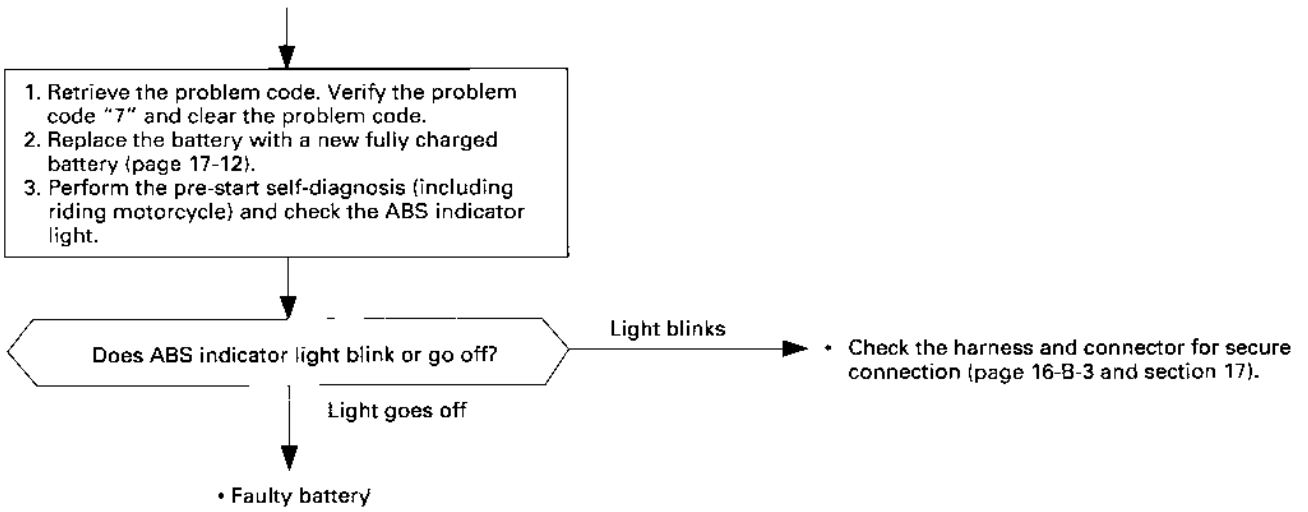
**Problem code 7: Faulty power circuit**

**NOTE**

- Before starting the troubleshooting, check to see whether the idle speed conforms to the specified speed. If the idle speed is below specification, adjust idle speed.
- Ask the rider about the following when the motorcycle is brought in for inspection.
  - Ask whether the motorcycle has been run with electrical accessories.
  - Ask whether the motorcycle has been left for a long time with the ignition switch in the ON position. This problem code will light up to indicate battery discharge.



( From the previous page: Light blinks )

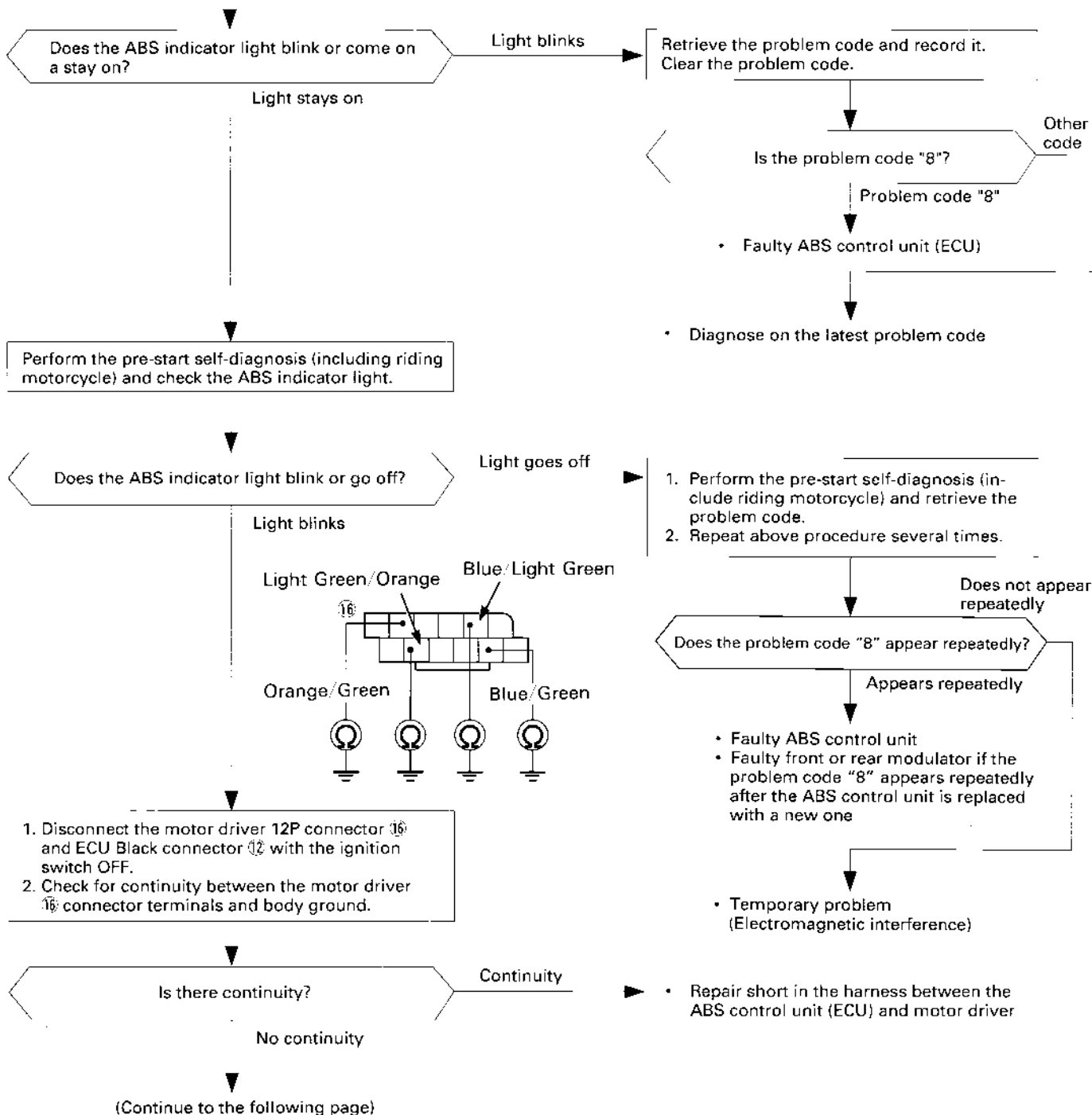


**Problem code 8: Faulty ABS control unit (ECU)**

**NOTE**

- The ABS indicator light blinks or comes on and stays on when the ECU has been disrupted by an extremely powerful radio wave (Electromagnetic interference). This is just a temporary symptom. Clear the problem code and the ECU is normal unless the symptom recurs. Ask the ride whether he used a radio apparatus or a security unit of a radio system when he brings his motorcycle to your dealership for inspection.

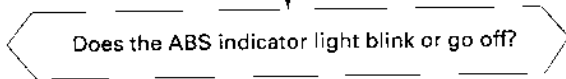
Turn the ignition switch ON (but do not start the engine) and check the ABS indicator light.



(From the previous page)



- 1. Connect the ECU connectors (12).
- 2. Replace the motor driver with a new one.
- 3. Retrieve the problem code and record it.  
Clear the problem code.
- 4. Perform the pre-start self-diagnosis (including riding motorcycle) and check the ABS indicator light.



Light goes off



• Faulty motor driver

Light blinks



• Faulty ABS control unit (ECU)



**Trouble not represented by a problem code: Faulty ABS indicator light**

- When the clicking sound in the modulator control motor relay can be heard after turning the ignition switch ON, and where the ABS operates normally while riding:

- Before pre-start self-diagnosis (Ignition switch ON)

		ABS indicator light 2		
		ON	Blink	OFF
ABS indicator light 1	ON	Normal	A	A. B. F. E
	Blink	/	/	/
	OFF	D. G. I. J	D. G. I. J	D. E. F. G. I

- While riding

		ABS indicator light 2		
		ON	Blink	OFF
ABS indicator light 1	ON	/	/	I
	Blink	/	/	/
	OFF	/	A. C. I	Normal

- When there is no clicking sound in the modulator control motor relay after turning the ignition switch ON and the indicator light is faulty (i.e. pre-start self-diagnosis does not start).

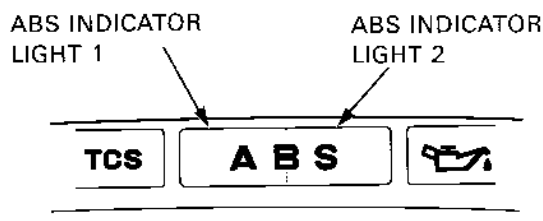
- Before riding (with the engine started and the motorcycle parked)

		ABS indicator light 2		
		ON	Blink	OFF
ABS indicator light 1	ON	H. I. L	I	I
	Blink	I	/	I
	OFF	/	J. K	I

- While riding

		ABS indicator light 2		
		ON	Blink	OFF
ABS indicator light 1	ON	I. L	I	I
	Blink	I	H	I
	OFF	/	J. K	I

- A: Faulty indicator control unit
- B: Poor connection of the indicator control unit connector ③ (4P)
- C: Poor connection of the indicator control unit connector ③ (2P)
- D: Faulty ABS indicator light LED 1, poor connection of the connector ④
- E: Faulty ABS indicator light LED 2, poor connection of the connector ⑤
- F: Poor connection of the ABS indicator light connector ⑥
- G: Poor connection of the ABS indicator light connector ⑦
- H: Faulty indicator light switch, poor connection of the connector ②
- I: Faulty ABS ECU
- J: Poor connection of the ABS ECU connector ⑬
- K: Burned ABS main fuse (10A)
- L: Improper battery charge (See section 17.)



# Wheel Speed Sensor Air Gap Inspection

## Front

Raise the front wheel off the ground. Measure the air gap between the wheel speed sensor and pulser ring all the way around while rotating the front wheel by hand. It must be within the specification.

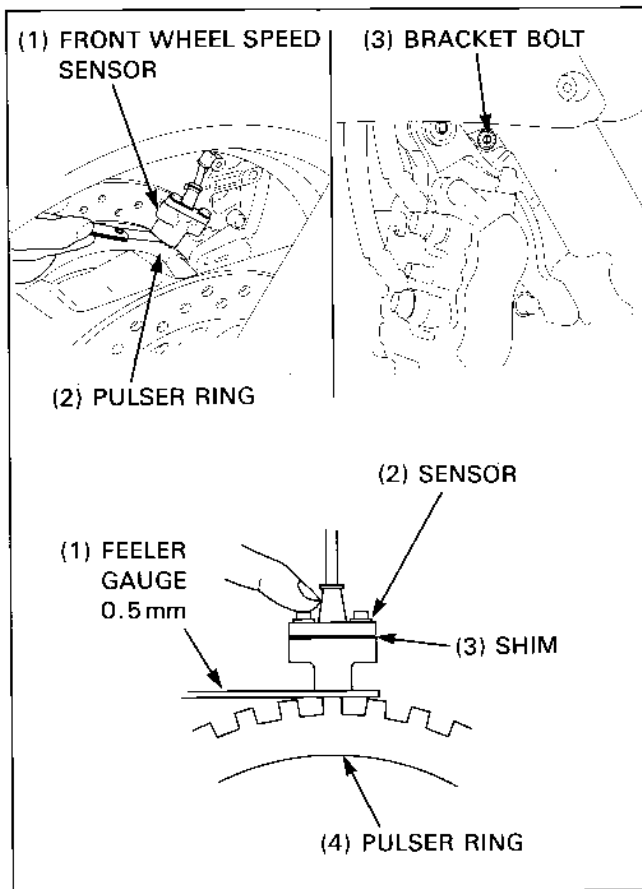
**Standard: 0.4–0.5 mm (0.016–0.020 in)**

Adjust by following procedure:  
 Turn the front wheel so one of the poles of the pulser ring and sensor face each other.  
 Insert a feeler gauge 0.5 mm between the sensor and pole, then hold the sensor lightly against the pole.  
 Tighten the sensor bracket bolt.

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

Take off feeler gauge from the gap.  
 Rotate the front wheel one full turn to make sure that the pulser ring does not interfere with the sensor.

If not still within specification, remove the sensor mounting bolts and perform the shim adjustment.  
 Adjust the air gap again.

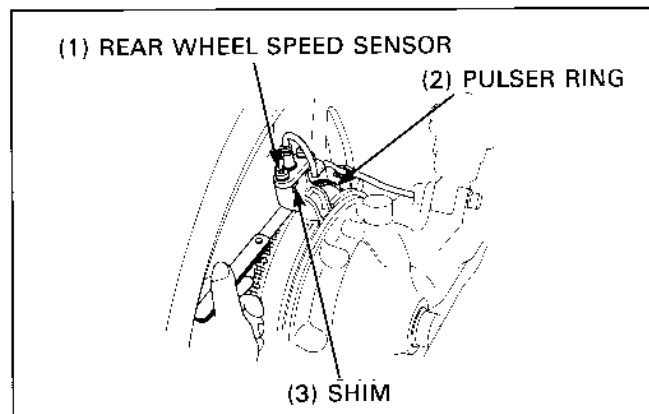


## Rear

Place the motorcycle on its center stand. Measure the air gap between the wheel speed sensor and pulser ring all the way around while rotating the rear wheel by hand. It must be within the specification.

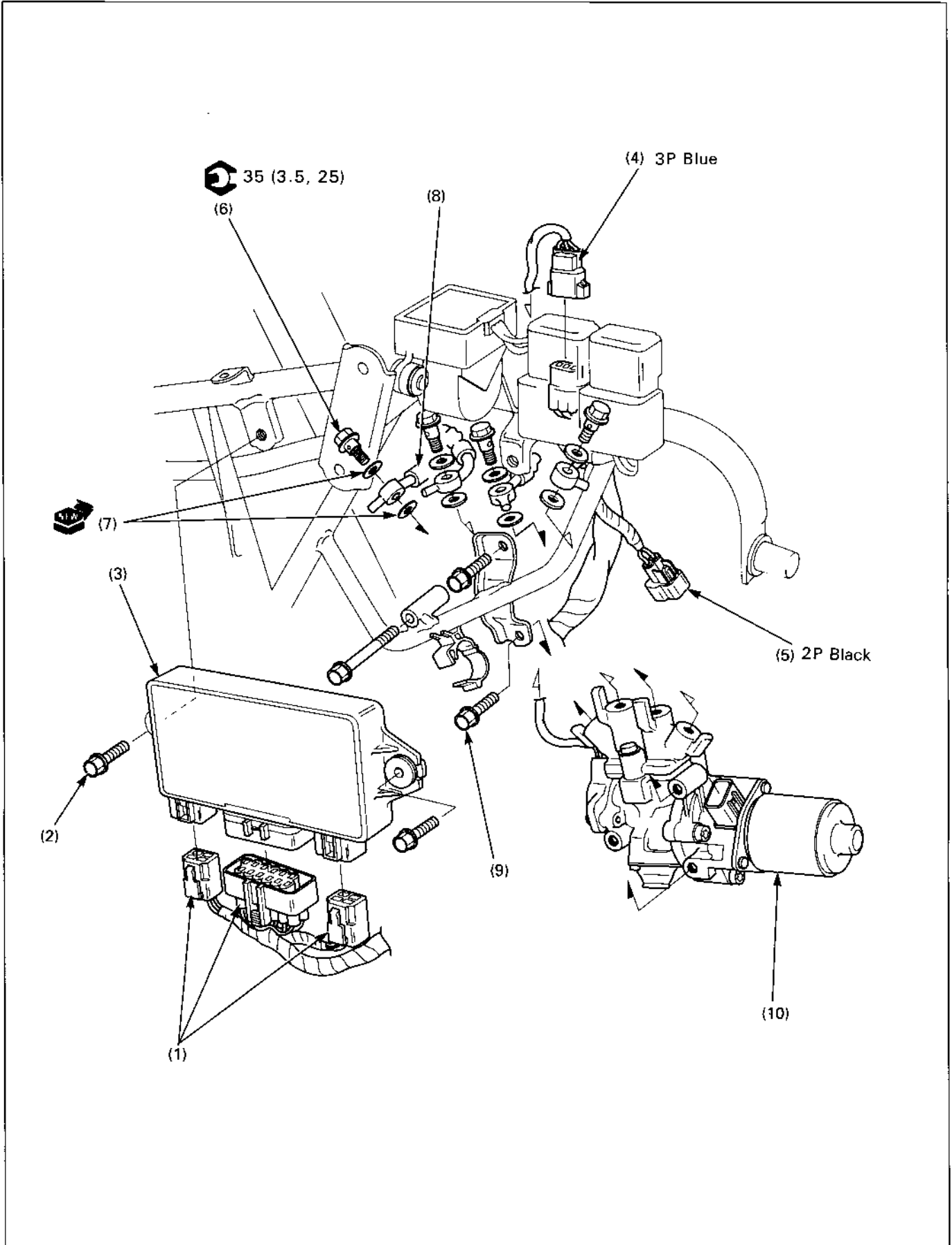
**Standard:  $0.8 \pm_{0.1}^{0.4}$  mm ( $0.031 \pm_{0.004}^{0.016}$  in)**

If not within specification, remove the sensor mounting bolts and perform the shim adjustment.  
 Rotate the rear wheel one full turn to make sure that the pulser ring does not interfere with the sensor.



# MEMO

# Front Modulator Removal/Installation



**WARNING**

- Check the brake system applying the lever and pedal brake after the air bleeding (page 3-13).

**CAUTION**

- Avoid spilling fluid on a painted, plastic, or rubber parts. Place a rag over these parts whenever system is serviced.
- When removing the oil bolts, cover the end of the brake hose to prevent contamination. Do not allow foreign material to enter the system.
- When removing and installing the modulator and motor driver, take care not to drop or strike the modulator.

**NOTE**

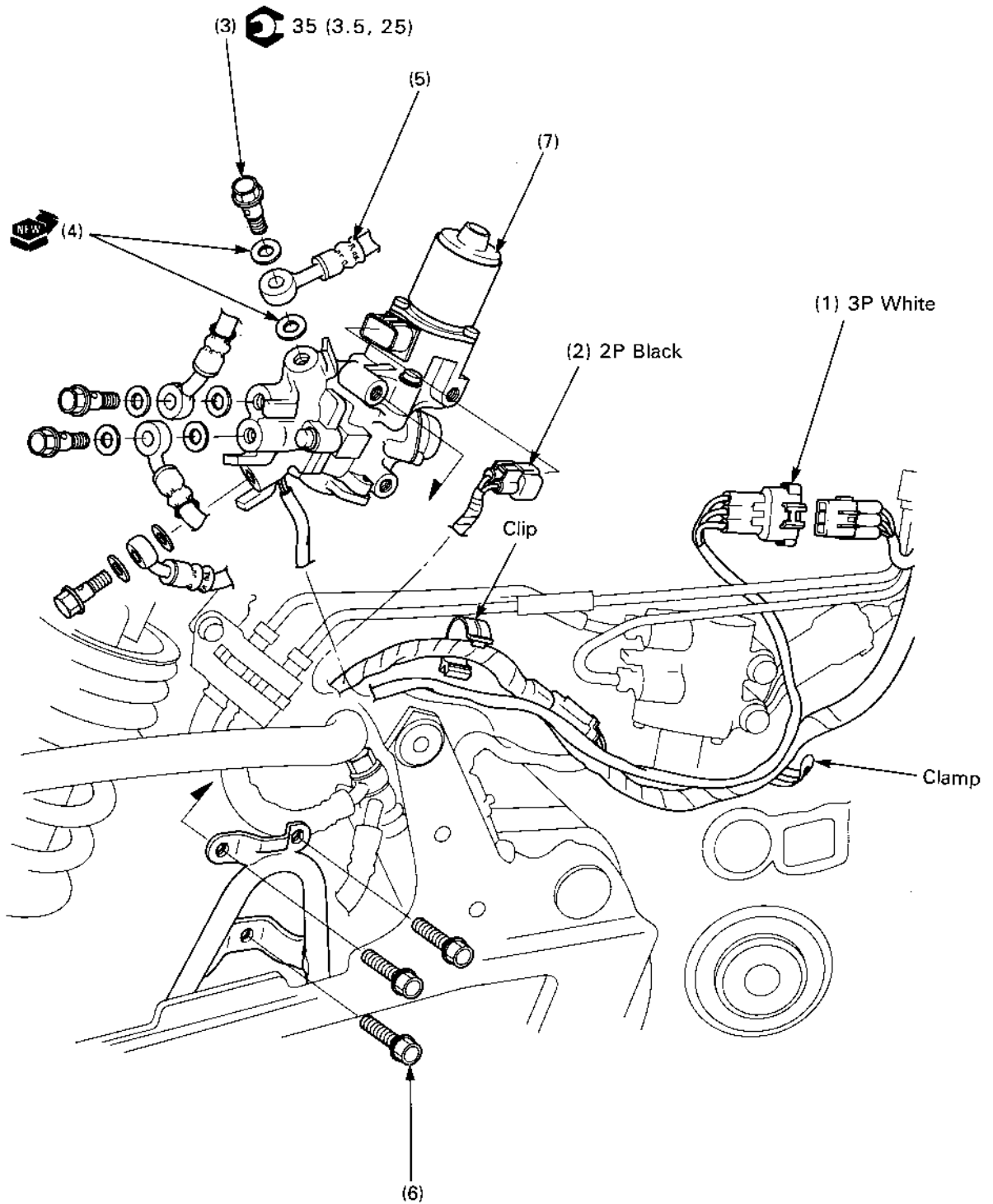
- Note that there is no brake fluid in the modulator (except in the modulator head), because the modulator is the motor-driven hydraulic pressure type. Therefore, brake fluid replacement and bleeding air from the modulator body is not necessary.
- Use only DOT 4 brake fluid from a sealed container.

**Requisite Service**

- Lever and pedal brake line fluid draining/air bleeding (page 15-2)
- Upper fairing removal/installation (page 2-9)

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Motor driver connector	3	
(2)	Motor driver mounting bolt	2	
(3)	Motor driver	2	
(4)	Modulator crank angle sensor connector	1	
(5)	Modulator control motor connector	1	
(6)	Oil bolt	4	
(7)	Sealing washer	8	
(8)	Brake hose	4	NOTE
			• The reference numbers are stamped on each brake hose end and the modulator head. When installing, align each numbers (page 1-37)
(9)	Modulator mounting bolt	3	
(10)	Front modulator	1	CAUTION
			• Do not disassemble the modulator.

# Rear Modulator Removal/Installation



**WARNING**

- Check the brake system by applying the pedal brake after the air bleeding (page 3-13).

**CAUTION**

- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever system is serviced.
- When removing the oil bolt, cover the end of the brake hose to prevent contamination. Do not allow foreign material to enter the system.
- When removing and installing the modulator, take care not to drop or strike the modulator.

**NOTE**

- Note that there is no brake fluid in the modulator (except in the modulator head), because the modulator is the motor-driven hydraulic pressure type. Therefore, brake fluid replacement and bleeding air from the modulator body is not necessary.
- Use only DOT 4 brake fluid from a sealed container.

**Requisite Service**

- Pedal brake line fluid draining/air bleeding (page 15-2)
- Right side cover removal/installation (page 2-2)

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		
(1)	Modulator crank angle sensor connector	1	Installation is in the reverse order of removal. Remove the sensor wire from the clamp and clip.
(2)	Modulator control motor connector	1	
(3)	Oil bolt	4	
(4)	Sealing washer	8	
(5)	Brake hose	4	
			<b>NOTE</b>
			• The reference numbers are stamped on each brake hose end and the modulator head. When installing, align each numbers (page 1-41).
(6)	Modulator mounting bolt	3	<b>CAUTION</b>
(7)	Rear modulator	1	
			• Do not disassemble the modulator.

# 17. Charging System/Alternator

Service Information	17-1	Battery Removal/Installation	17-12
System Location	17-2	Stator Coil Removal/Installation ( '91-'95)	17-13
Troubleshooting	17-4	Alternator Removal/Installation (After '95)	17-14
Charging System Inspection ('91-'95)	17-6	Alternator Disassembly/Assembly (After '95)	17-16
Regulator/Rectifier ('91-'95)	17-7	Alternator Shaft Removal/Installation	17-18
Alternator Inspection ('91-'95)	17-8	Alternator Shaft Disassembly/ Assembly	17-20
	(After '95)	17-10	

## 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.

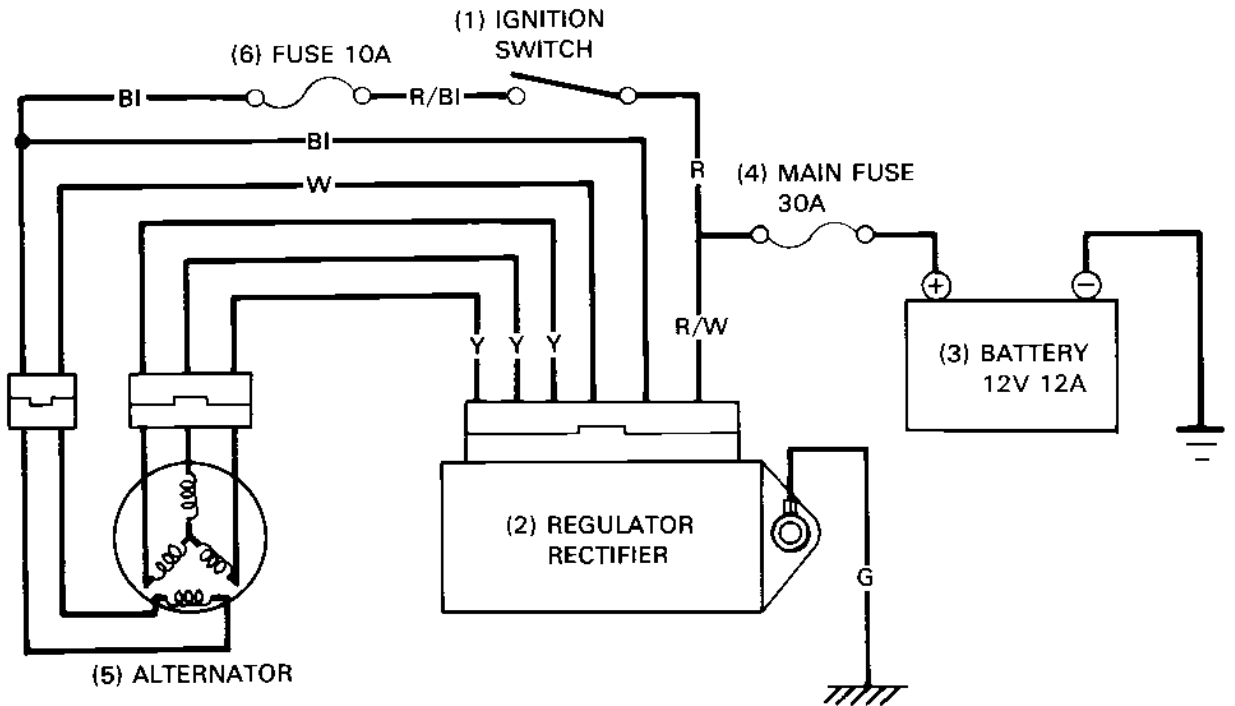
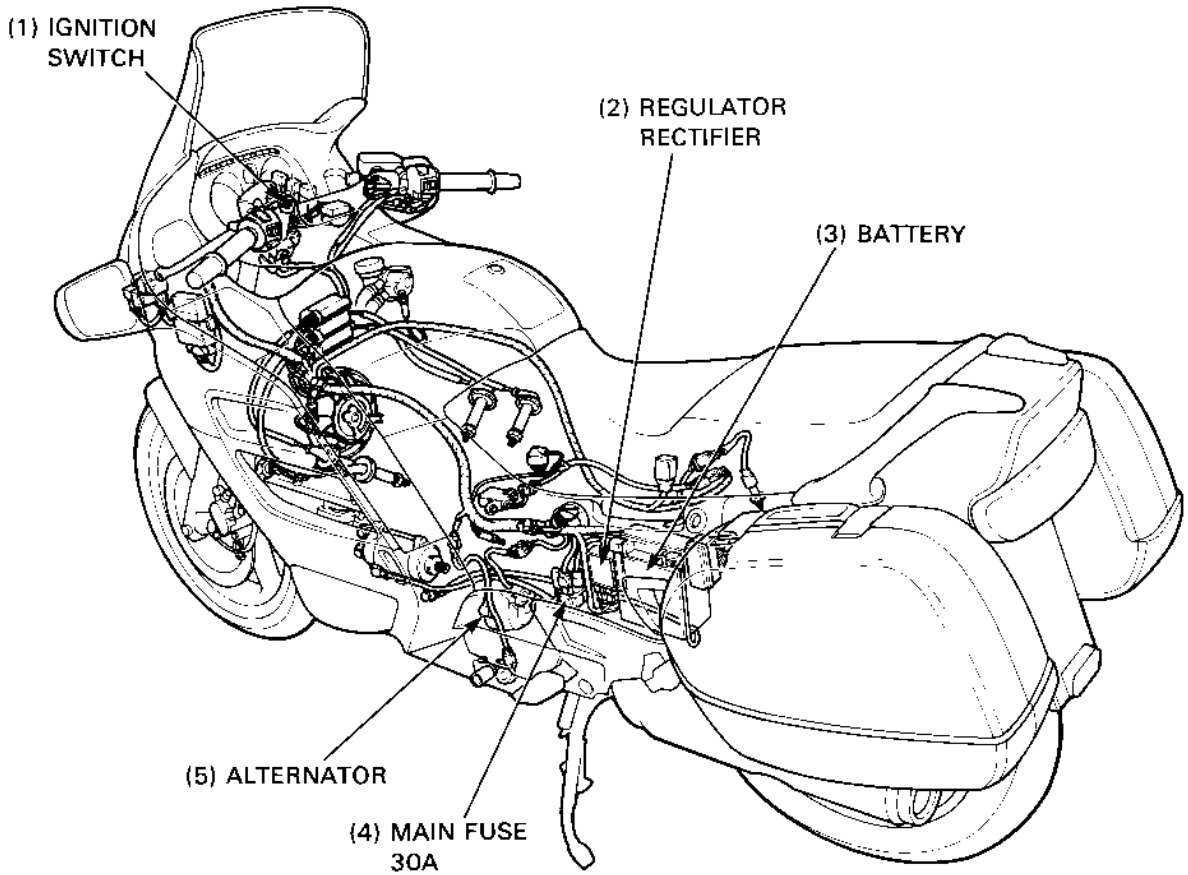
- Battery can be damaged if overcharged or undercharged, or if left to discharge for long periods. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of a battery deteriorates after 2–3 years.
- Battery voltage may recover after battery 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 it is initial-charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 17-4).
- For battery testing/charging, refer to section 22 of the Common Service Manual.
- For charging system location, see page 17-2.



# System Location

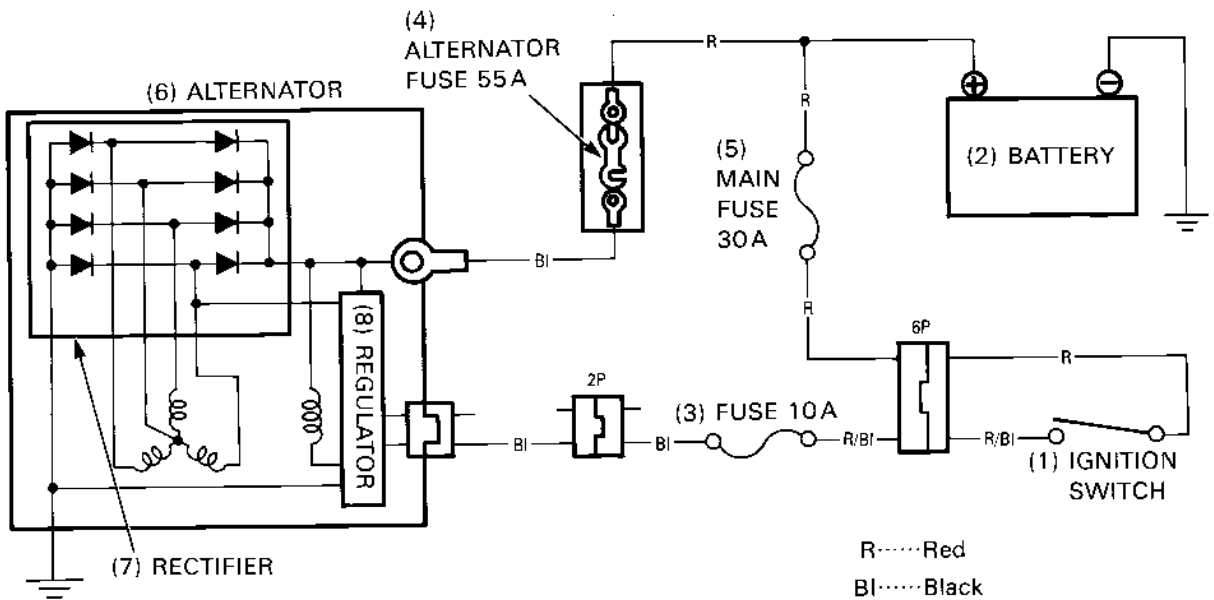
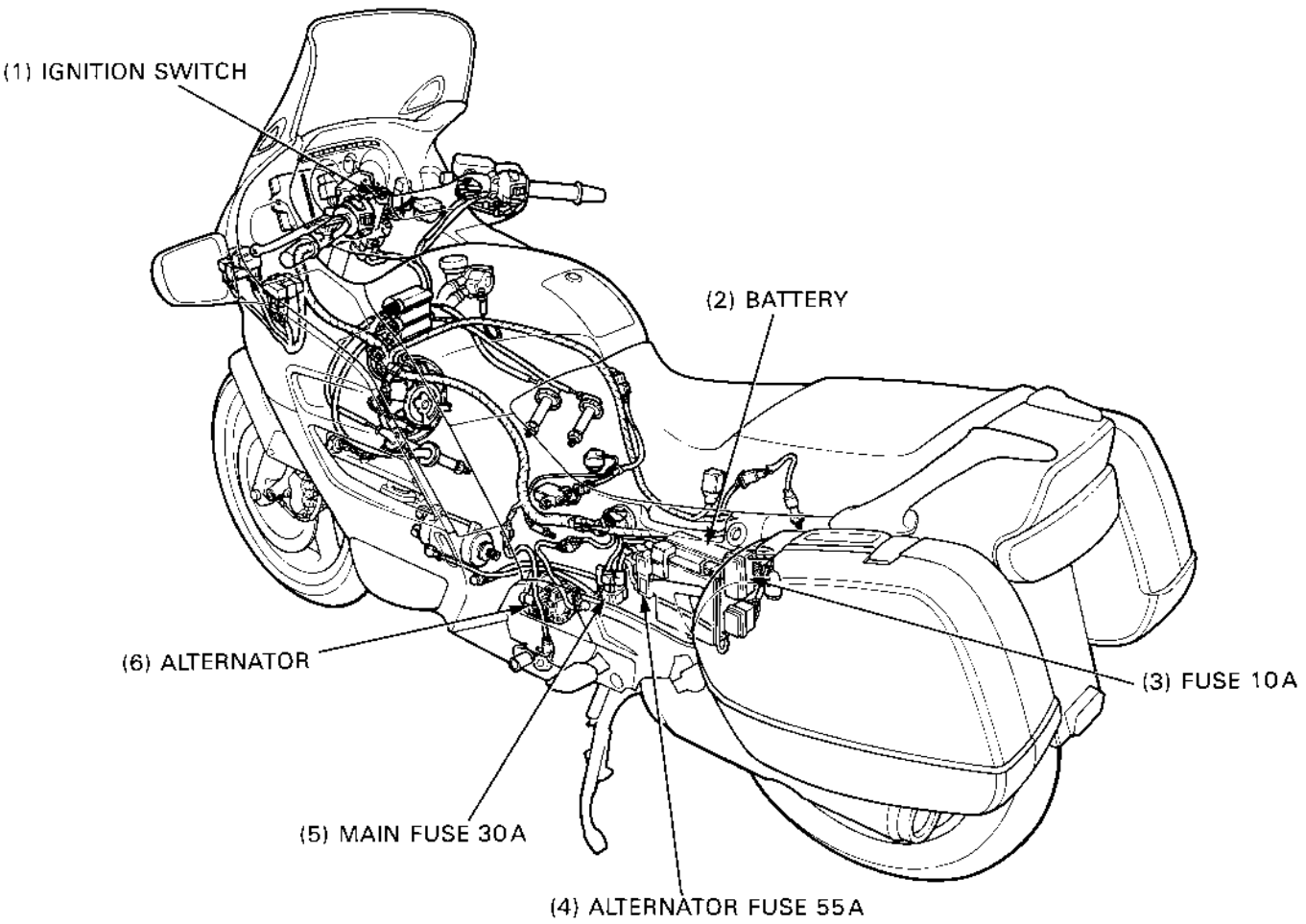
'91-'95

Standard model shown:



After '95

LBS-ABS/TCS model shown:



# Troubleshooting

'91-'95

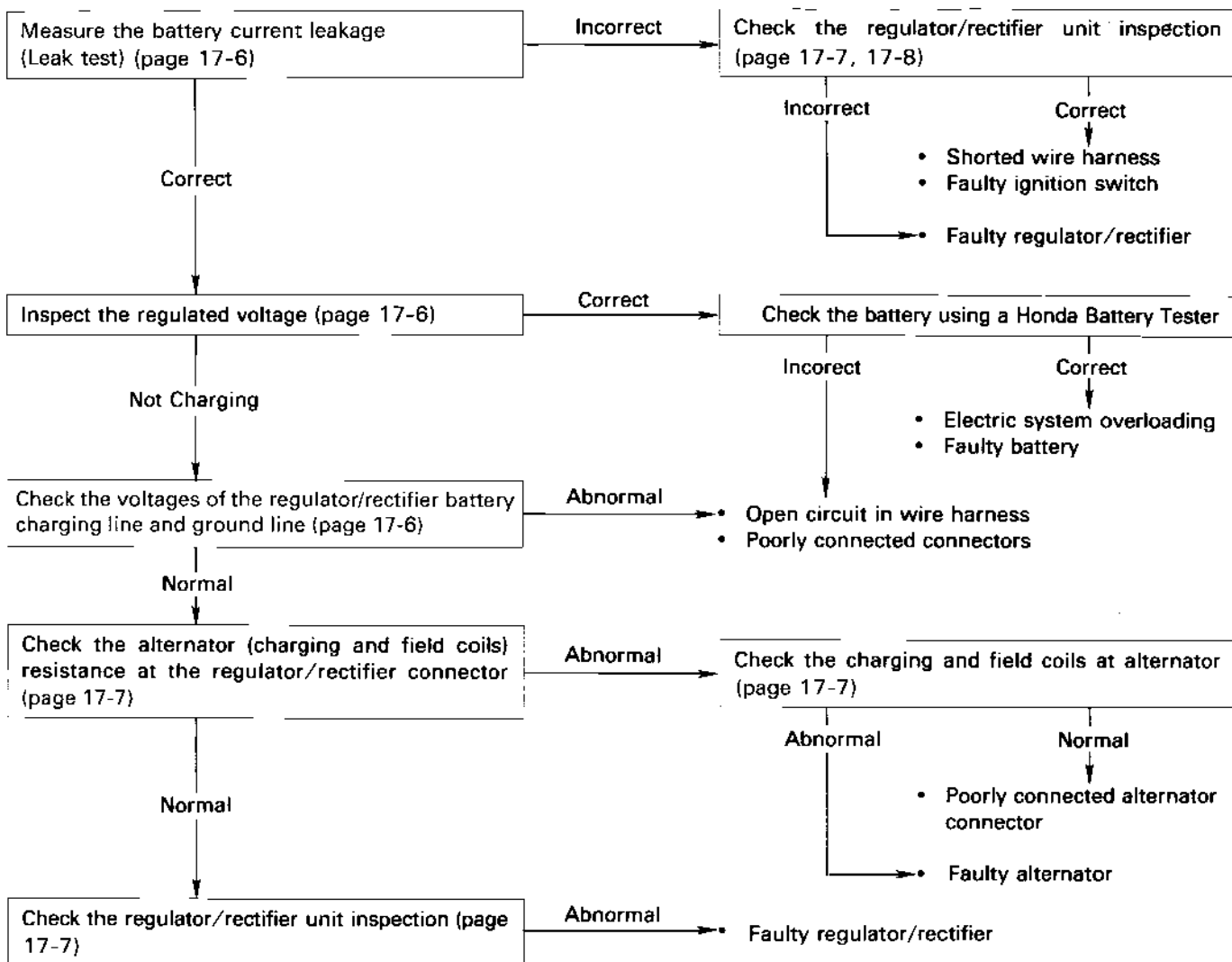
## Battery Overcharging

- Faulty regulator/rectifier

## Battery Undercharging

### NOTE

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

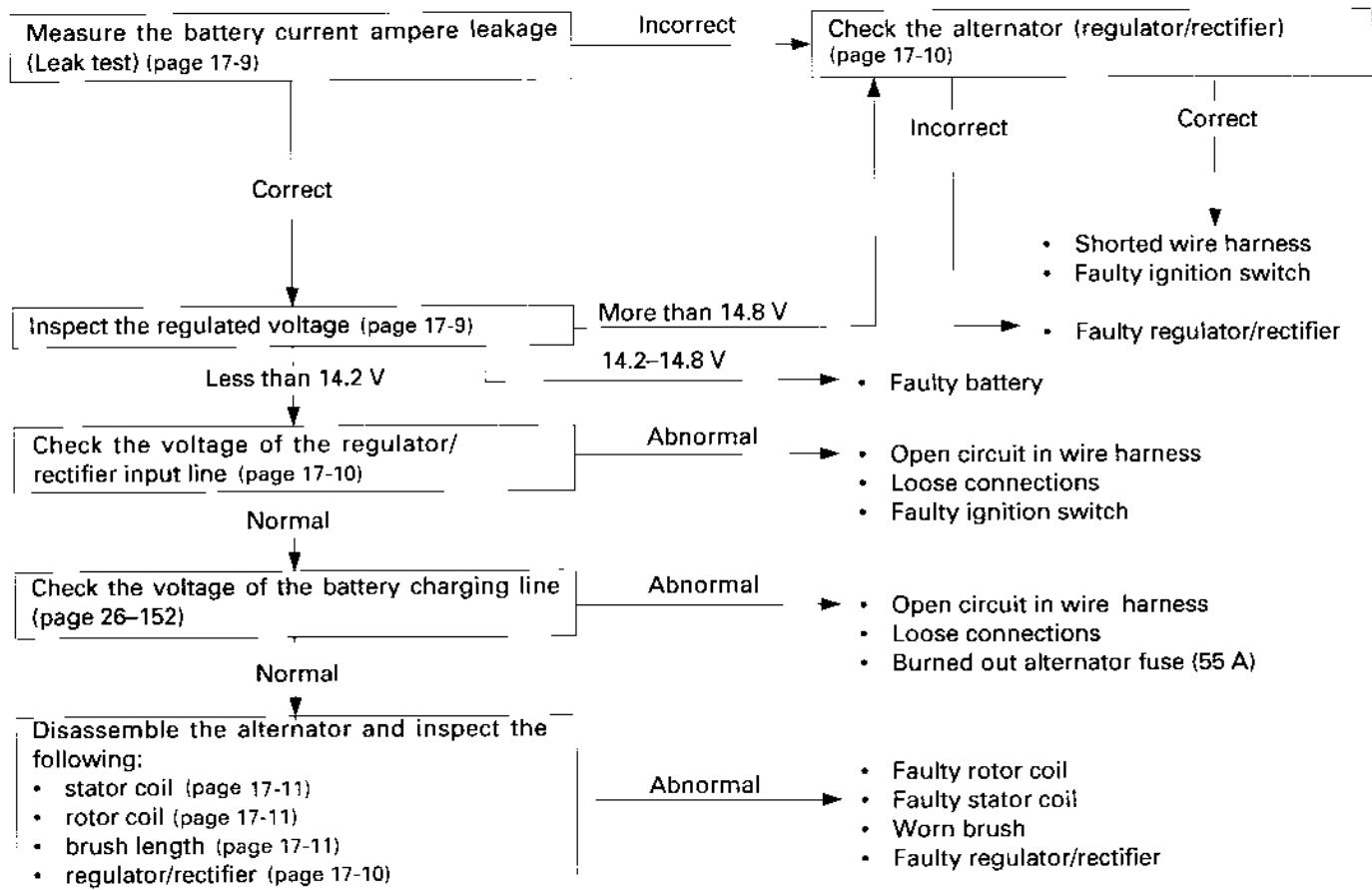


After '95

- Inspect the following before diagnosis the system.
  - discharged battery
  - loose or corroded terminals of the connectors

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 checking the battery condition.



## Charging System Inspection ('91-'95)

### Current Leakage Test

Turn off the ignition switch, and disconnect the ground (-) cable from the battery.

Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery (-) terminal.

With the ignition switch off, check for current leakage.

#### NOTE

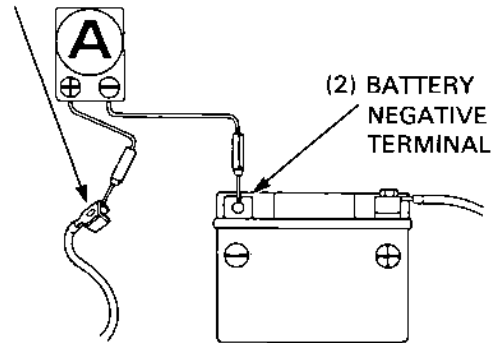
- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow larger than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse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

**Specified Current Leakage: 3 mA max.**

If current leakage exceeds the specified value, a short circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

(1) BATTERY GROUND CABLE



### 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 12.6 V.

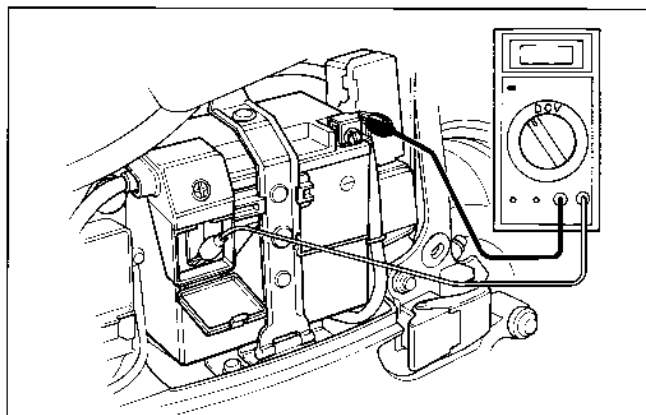
Remove the left side cover (page 2-2).

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

#### ▲ 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.

Connect a voltmeter between the battery terminals.



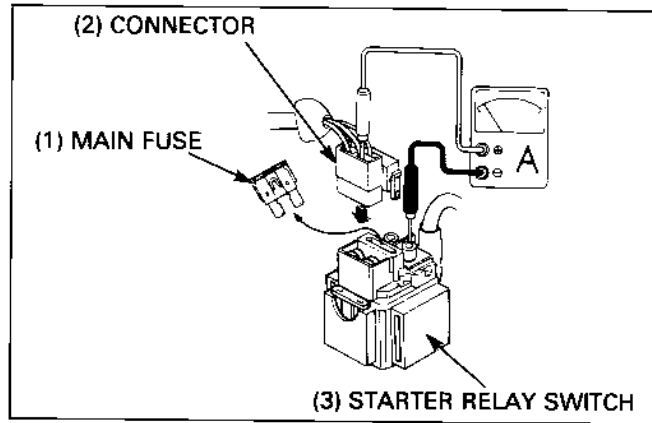
Disconnect the starter relay switch connector and remove the main fuse.

Reconnect the connector securely.

Connect the ammeter as shown.

**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 the positive cable, a sudden surge of current to the starter motor could damage the ammeter.
- Always turn the ignition off when conducting the test. Disconnecting the ammeter or wires when current is flowing may damage the ammeter.



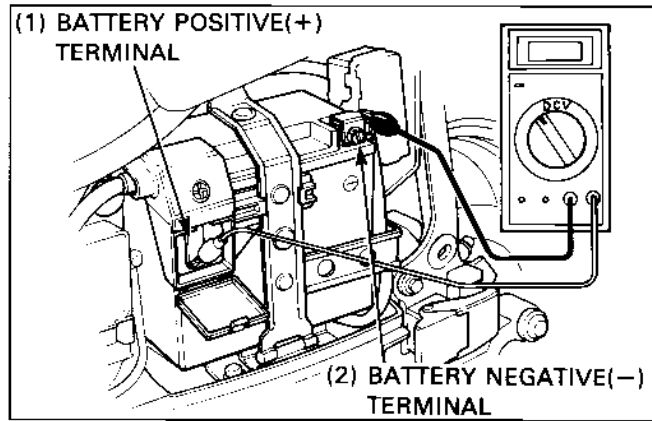
**NOTE**

- Before making this test, all the lights and the other electrical equipment should be OFF.
- Use fully charged battery to make this test for correct measurement.

Start the engine and increase the engine speed gradually.

**Regulated Voltage:** 12.6–15.0 V/5,000 rpm

**Charging Current:** 0–1.0 A/5,000 rpm



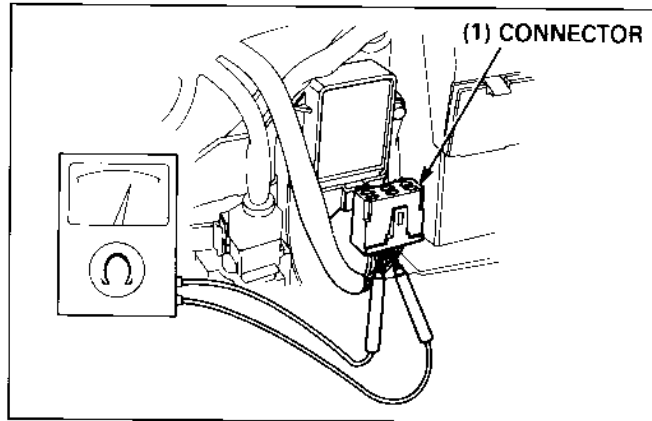
## Regulator/Rectifier ('91-'95)

### Wire Harness Inspection

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

Disconnect the regulator/rectifier 6P connector and check the connector for loose or corroded terminals.

Measure the following between the connectors of the wire harness side.



Item	Terminals	Specification
Battery charging line	Red/White (+) and ground	Battery voltage should register.
Charging coil line	Yellow and Yellow	0–1.0Ω (20°C/68° F)
Field coil line	White and Black	0–4.0Ω (20°C/68° F)

## Charging System/Alternator

### Unit Inspection

Unit: k $\Omega$

Provided 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.

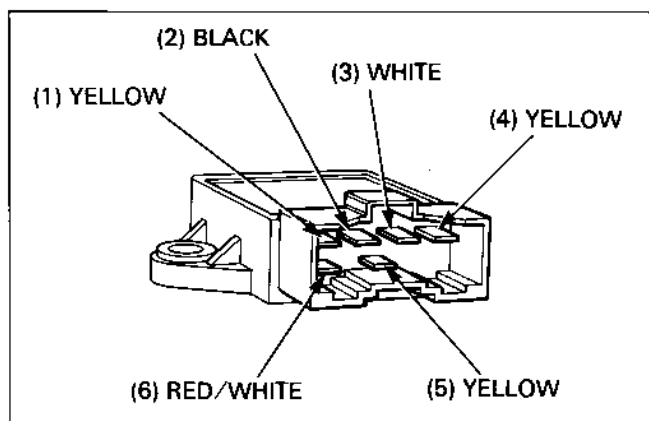
#### Specified Multimeter :

— SP—15D (SANWA Analogue type)  
— TH—5H (KOWA Analogue type)

- Select the following range :  
SANWA : k $\Omega$   
KOWA : X100
- An old battery stored in the multimeter could cause inaccurate readings. Check the battery if the multimeter resistance is incorrect.

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

+ Probe - Probe	Red/ White	Yellow 1	Yellow 2	Yellow 3	White
Red/White		$\infty$	$\infty$	$\infty$	$\infty$
Yellow 1	7.5		$\infty$	$\infty$	$\infty$
Yellow 2	7.5	$\infty$		$\infty$	$\infty$
Yellow 3	7.5	$\infty$	$\infty$		$\infty$
White	60	28	28	28	



### Alternator Inspection ('91-'95)

#### NOTE

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

Remove the left side cover (page 2-2) and disconnect the alternator 3P (Red) and 2P (Black) connectors.

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

**Yellow terminal-Yellow terminal: 0—1.0 $\Omega$**

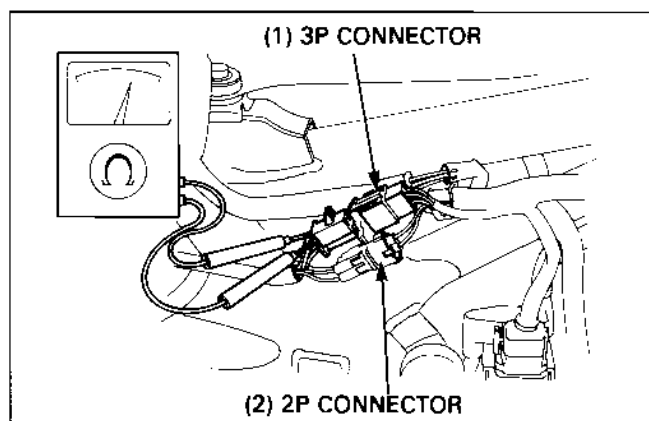
**Yellow terminal-White terminal: No continuity**

**Yellow terminal-Red/white terminal: No continuity**

Measure the resistance between the white and black terminals and check for continuity between the 2P connector terminals.

**Standard: 0—4.0 $\Omega$  (20°C/68° F)**

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



## Charging System Inspection (After '95)

### Current Leakage Test

Remove the left side cover (page 2-2).  
Turn off the ignition switch, and disconnect the ground (-) cable from the battery.

Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery (-) 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: 2 mA max.**

If current leakage exceeds the specified value, a short circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

### Regulated Voltage Inspection

#### NOTE

- Before performing this test, be sure that the battery is fully charged and that voltage between its terminals is greater than 12.6 V.

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

#### ▲ WARNING

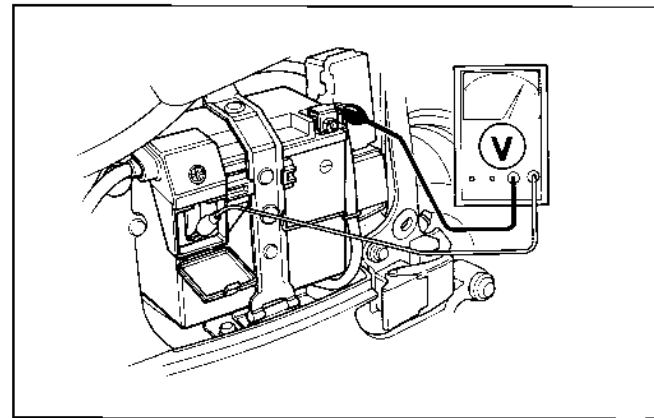
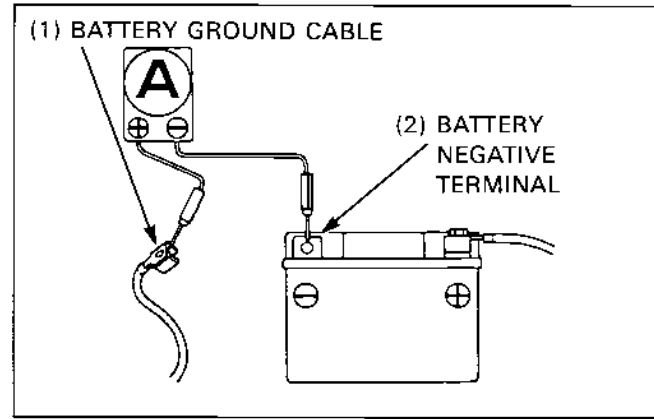
- If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

#### CAUTION

- Be careful not to short any tester probes.

Connect a voltmeter between the battery terminals.  
Turn the headlight ON (High beam) and start the engine.  
Gradually increase the engine speed and check that the voltage is regulated.

**Regulated Voltage: 14.2–14.8 V/5,000 min<sup>-1</sup> (rpm)**





**Wire Harness Inspection**

Disconnect the battery negative (-) cable.

**⚠ WARNING**

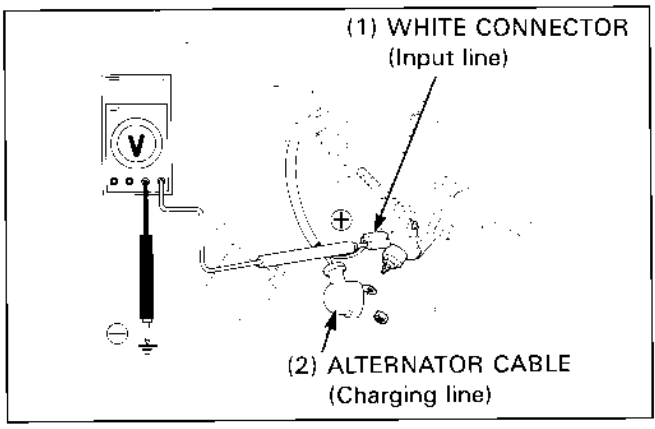
• **Disconnect the battery negative cable from the battery to prevent sparking when disconnecting the alternator cable.**

Disconnect the alternator cable and White connector from the alternator.

Connect the battery negative (-) cable onto the battery.

Measure the voltage between each wire (wire harness side) and ground as indicated on the chart.

Disconnect the battery negative (-) cable to avoid sparking which would otherwise occur when connecting each wire to the alternator.



ITEM	TERMINALS	SPECIFICATION
Battery charging line	Alternator cable terminal (+) and ground (-)	Battery voltage should register.
Battery voltage input line	White connector terminal (+) and ground (-)	Battery voltage should register with the ignition switch ON.

**Alternator Inspection (After '95)**

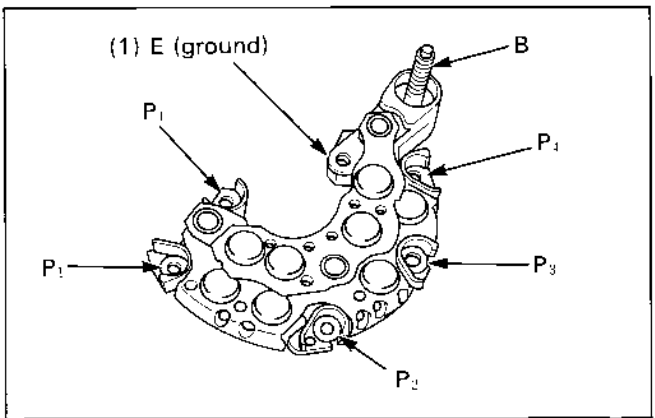
Disassemble the alternator (page 17-16)

**Rectifier**

Before inspecting, the rectifier must be separated from the regulator.

**NOTE**

• The diodes are designed to allow current to pass in one direction while blocking it in the opposite direction. Since the alternator rectifier is made up of eight diodes, each diode must be tested for continuity in both directions that has diode checking capability; a total of 16 checks.



Check for continuity in each direction between  
 - B and P (P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub>) terminals.  
 - E (ground) and P (P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub>) terminals.

All diodes should have continuity in only one direction.

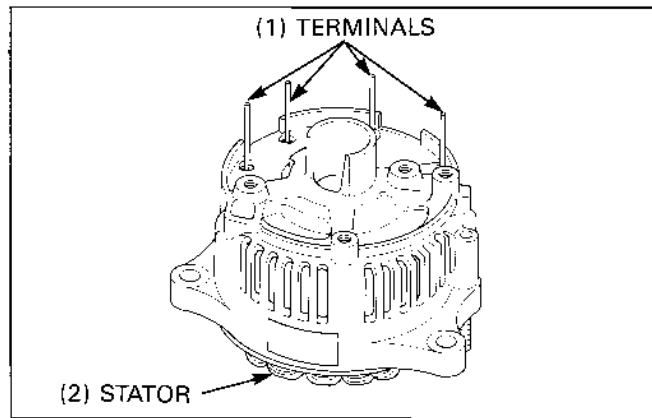
If any of the diodes fails, replace the rectifier assembly. (Diodes are not available separately.)

### Stator

Check the resistance between each pair of terminals. There should be minimal resistance.

**Standard:** 0.22 – 0.26  $\Omega$  (20°C/68°F)

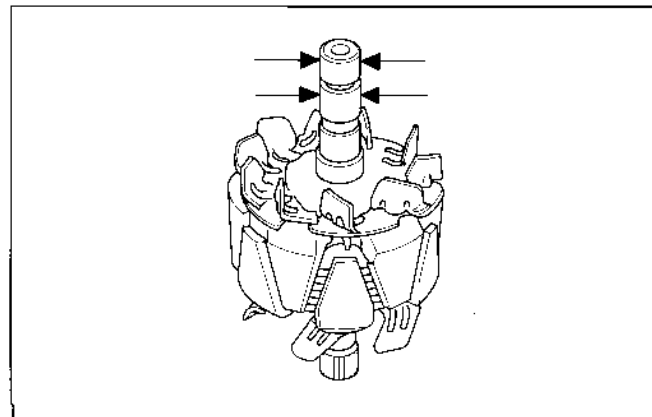
Check for continuity between each terminal and the coil core. There should be no continuity.



### Rotor Coil

Check the slip rings for stepped wear. Measure the O.D. of each slip ring.

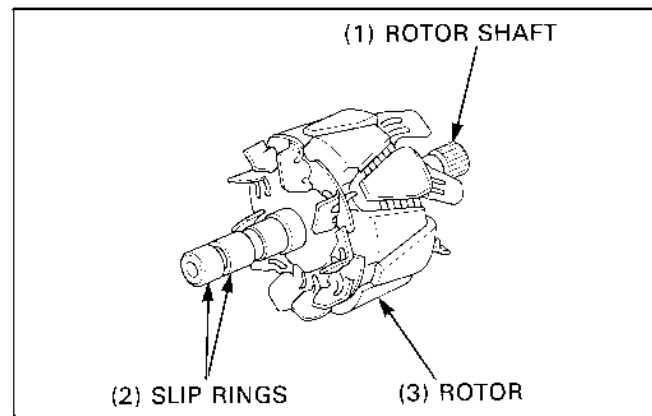
**Service Limit:** 12 mm (0.5 in)



Measure the resistance between the slip rings.

**Standard:** 2.6 – 3.2  $\Omega$  (20°C/68°F)

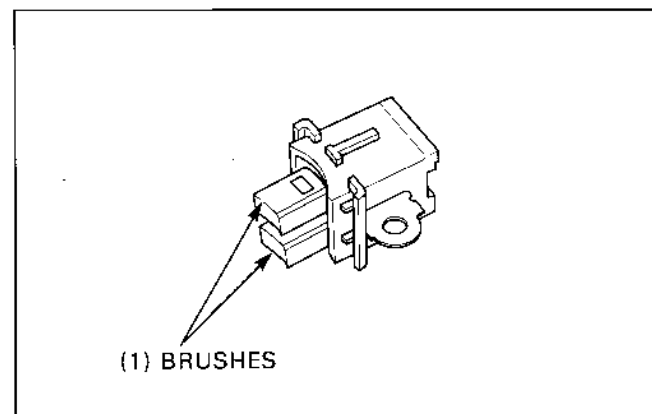
Check for continuity between the slip ring and the rotor or rotor shaft. There should be no continuity.



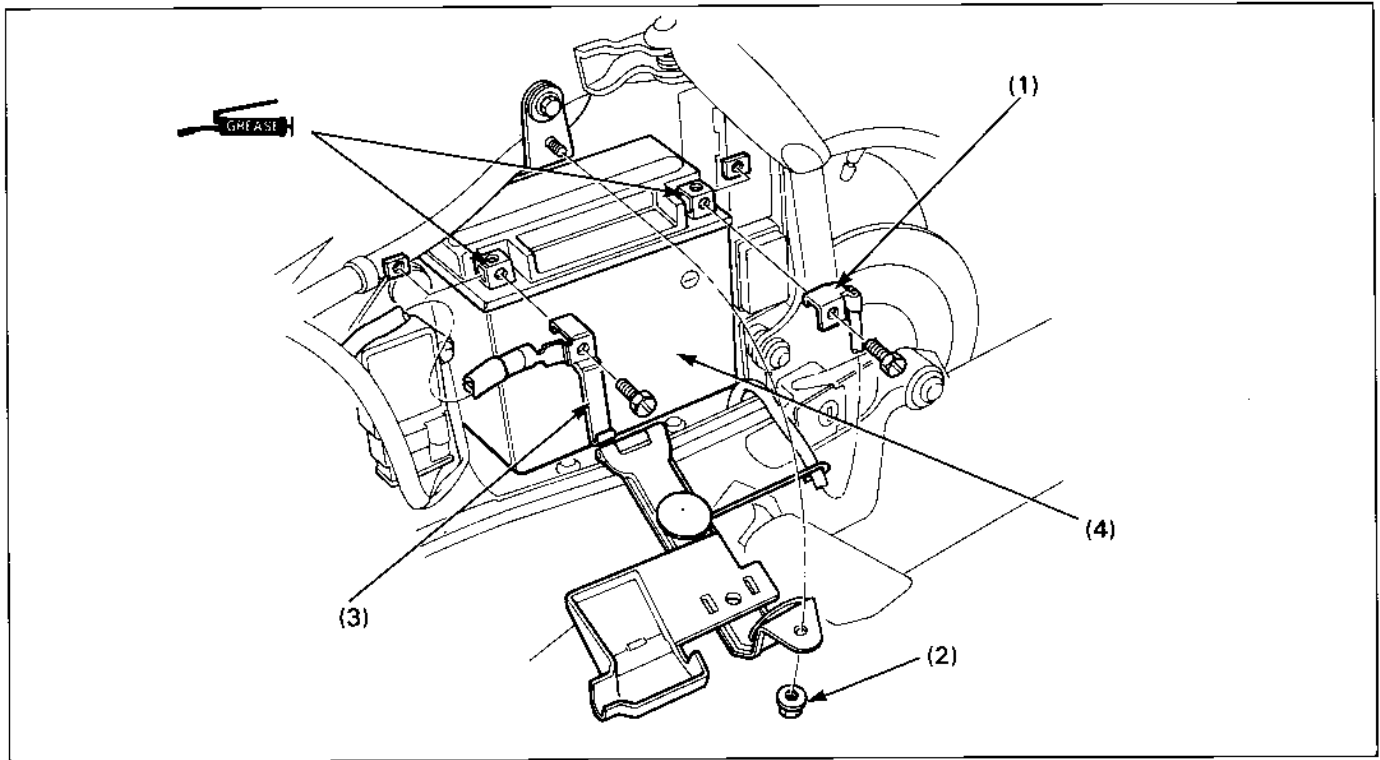
### Brushes

Measure each brush length.

**Service Limit:** 4.7 mm (0.19 in)



## Battery Removal/Installation

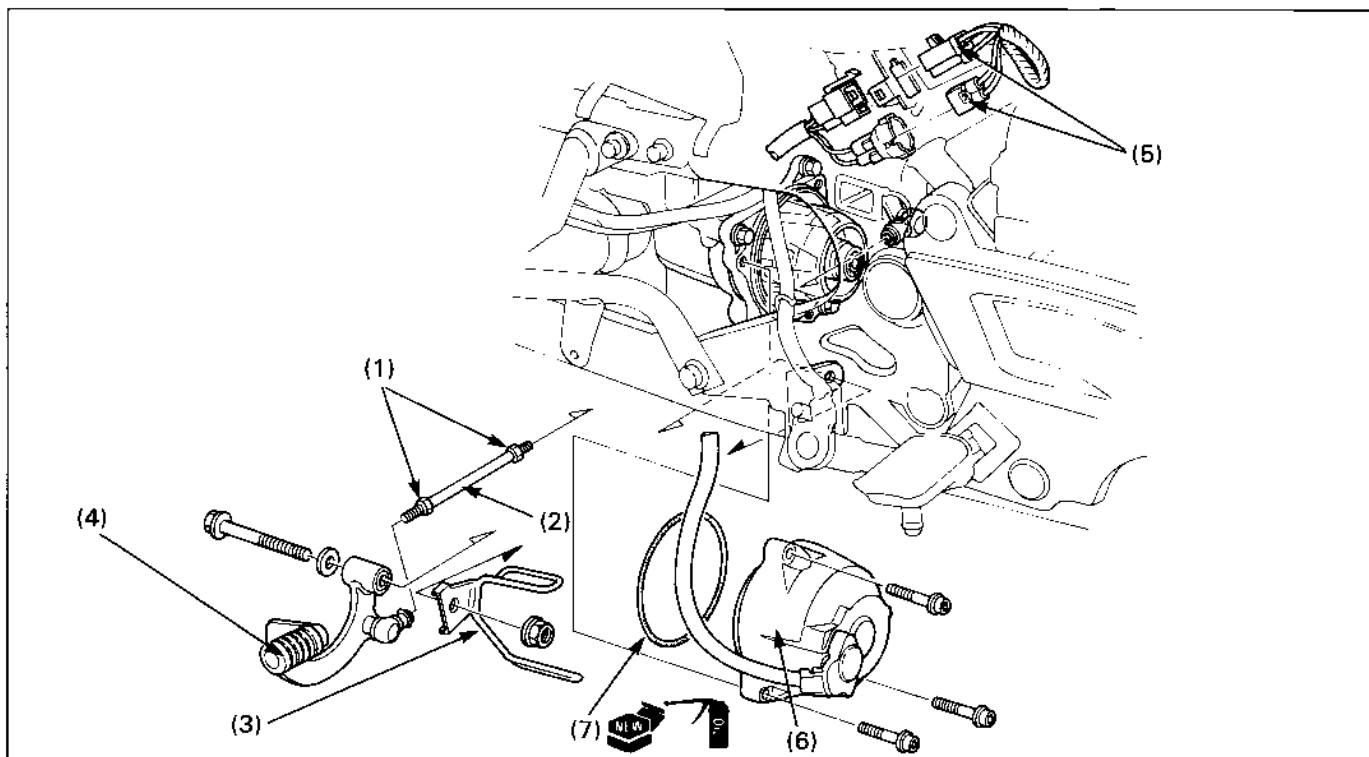


### Requisite Service

- Left side cover removal/installation (page 2-2)
- With the ignition switch "OFF", disconnect the negative (-) cable first, then the positive (+) cable.

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Battery negative (-) cable	1	
(2) Battery holder nut	1	After removing, open the battery holder.
(3) Battery positive (+) cable	1	
(4) Battery	1	

## Stator Coil Removal/Installation ('91-'95)



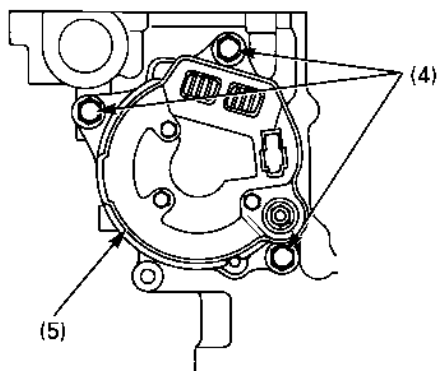
## Requisite Service

- Swingarm removal/installation (page 14-8)

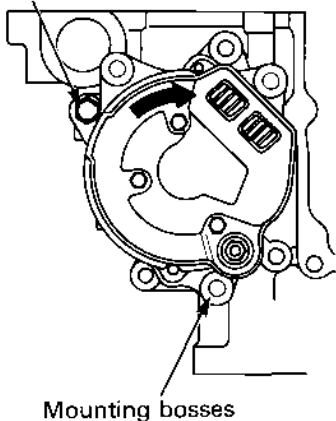
Procedure	Q'ty	Remarks
<b>Removal Order</b>		
(1) Lock nut	2	Installation is in the reverse order of removal. It is not necessary to remove, just loosen.  After installation, route the tubes correctly (page 1-25).
(2) Gearshift pedal connecting rod	1	
(3) Tube holder	1	
(4) Gearshift pedal	1	
(5) Alternator connector	2	
(6) Stator assembly	1	
(7) O-ring	1	

# Alternator Removal/Installation (After '95)

View from rear:



Secure with a 8mm bolt



8mm bolt

Alternator base

Rubber cap

(5)

(6)

(3)

(1)

(4)

Alternator base

(6)

Mounting bosses

0.8 (8, 5.8)

(4)

(5)

Alternator shaft assembly

**▲ WARNING**

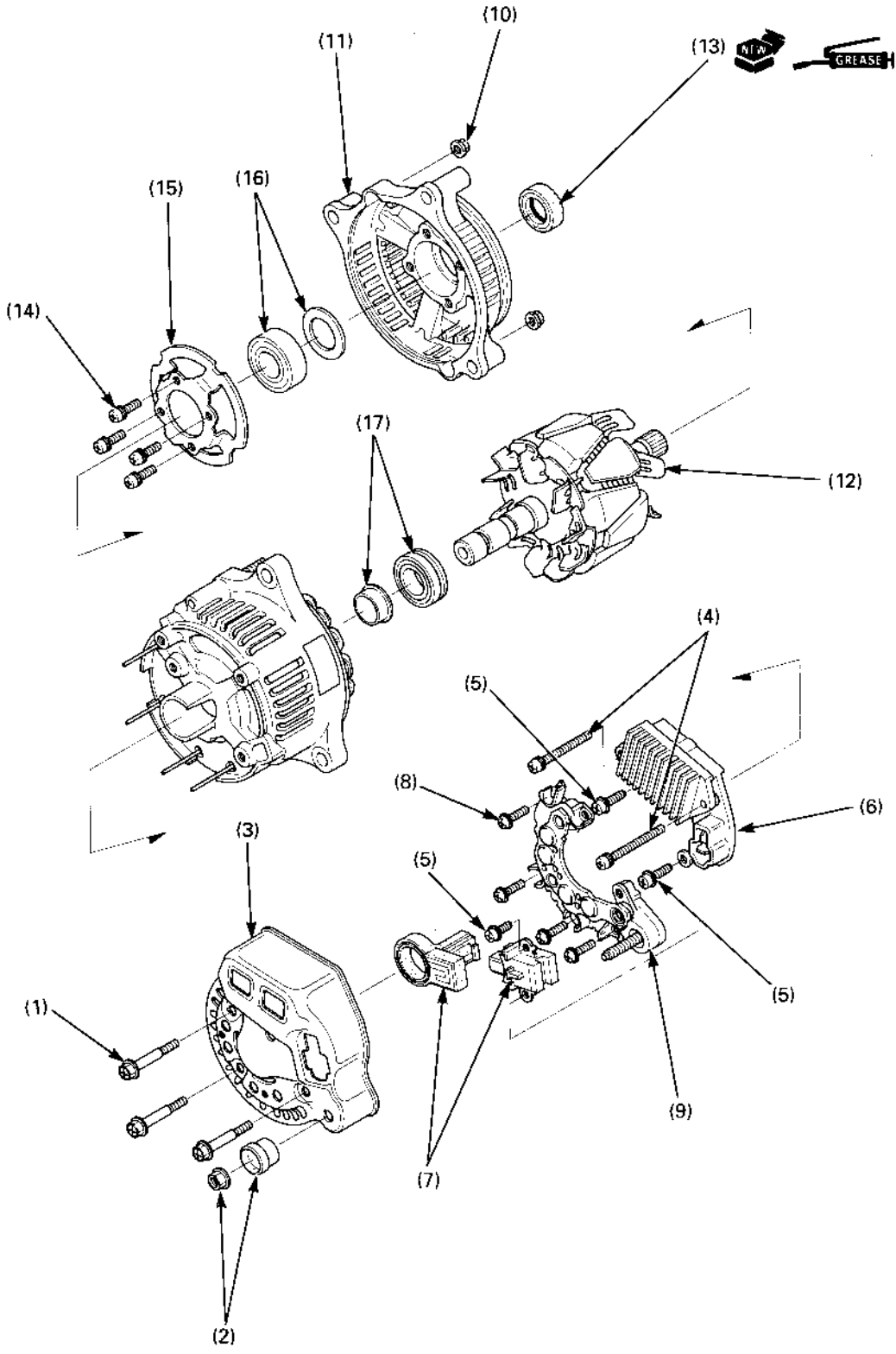
- Before servicing, disconnect the battery negative cable from the battery to prevent sparking when disconnecting the alternator cable.

**Requisite Service**

- Fuel tank removal/installation (page 2-12)
- Swingarm removal/installation (page 14-8)
- Left pivot cover removal/installation (page 2-5)

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	2P (White) connector	1	
(2)	Terminal nut	1	After tightening the terminal nut, install the terminal cap to the terminal flange securely.
(3)	Alternator cable	1	
(4)	Mounting bolt	3	<b>NOTE</b> <ul style="list-style-type: none"> <li>• Before removing the alternator, turn the alternator clockwise and temporarily secure the alternator base with a 8 mm bolt as shown. If the alternator base is not secured, it will cause the alternator shaft to come out with the alternator. If this occurs, oil pan removal will be necessary when reinstalling (page 17-18).</li> </ul>
(5)	Alternator	1	Pry the mounting bosses of the alternator using a screwdriver. Disassembly/assembly (page 17-16)
(6)	O-ring	1	

# Alternator Disassembly/Assembly (After '95)



## Requisite Service

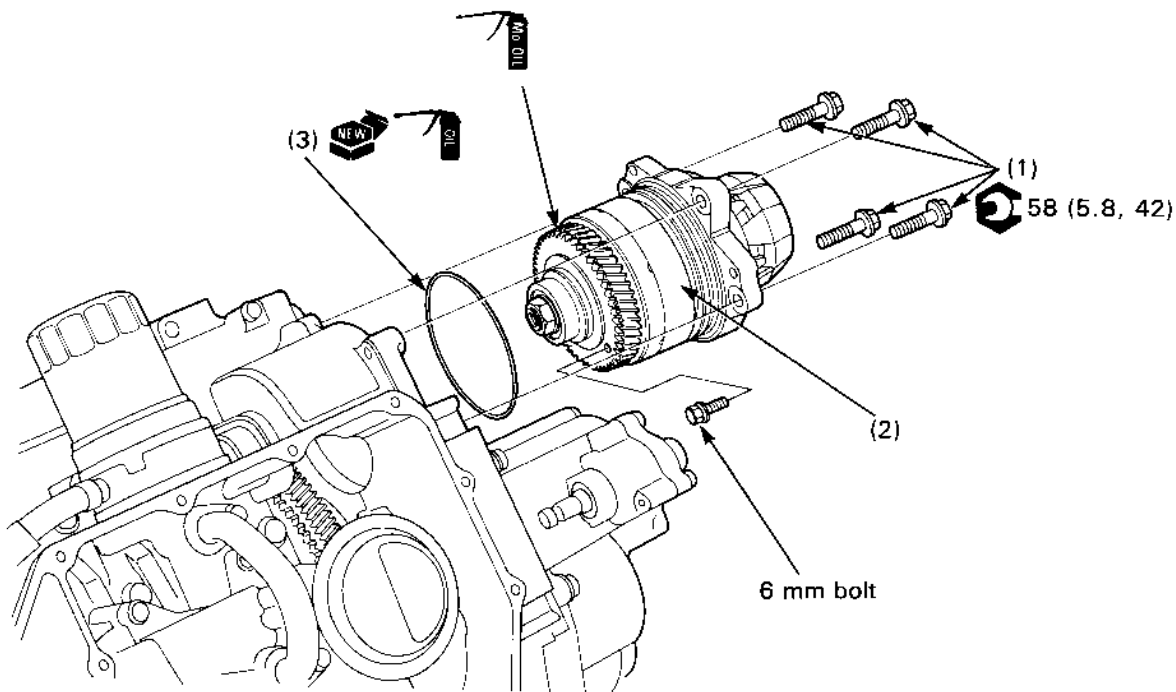
- Alternator removal/installation (page 17-14)

Procedure		Q'ty	Remarks
	<b>Disassembly or der</b>		Assembly is in the reverse order of disassembly.
(1)	End cover screw	3	
(2)	Nut/terminal insulator	1/1	
(3)	Rear end cover	1	
(4)	Terminal screw (pan-head)	2	
(5)	Terminal screw (flange)	3	
(6)	Regulator	1	
(7)	Brush assembly/holder insulator	1/1	
(8)	Terminal screw (flange)	4	
(9)	Rectifier	1	
(10)	Housing nut	2	
(11)	Rear housing	1	Before installing, clean the slip rings thoroughly.
(12)	Rotor	1	NOTE: • Use a hydraulic press. Do not strike the slip ring of the rotor shaft.
(13)	Oil seal	1	
(14)	Retainer screw	4	
(15)	Bearing retainer	1	
(16)	Front bearing (6202)/washer	1/1	
(17)	Spacer ring/rear bearing (6002)	1/1	



# Alternator Shaft Removal/Installation

'91-'95

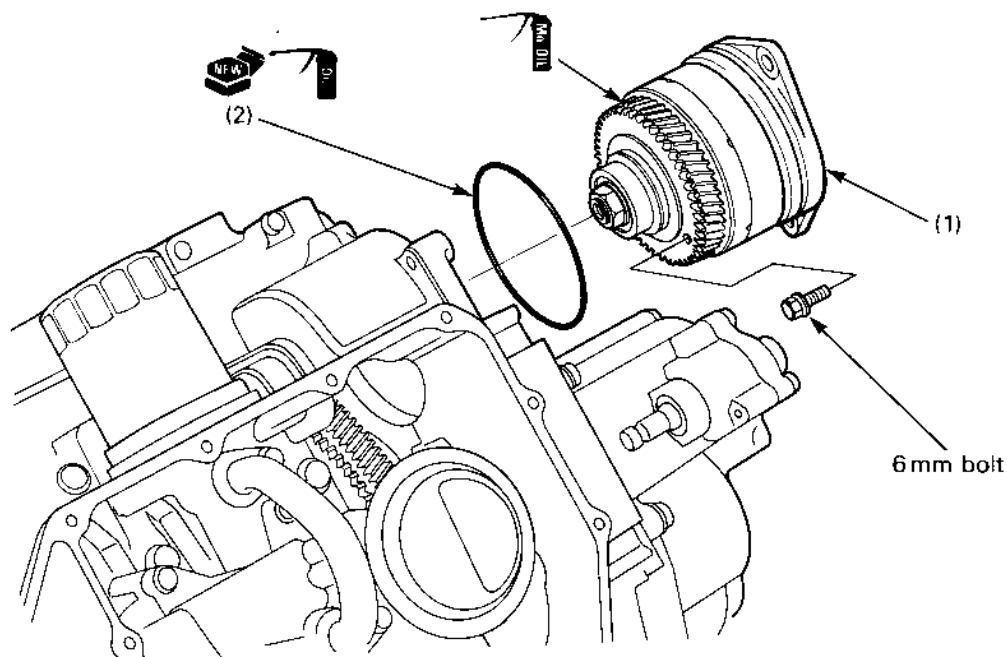


## Requisite Service

- Engine removal/installation (page 7-2)
- Oil pan removal/installation (page 4-6)
- Stator coil removal/installation (page 17-13)

Procedure		Q'ty	Remarks
(1)	<b>Removal Order</b> Alternator shaft bolt	4	Installation is in the reverse order of removal. NOTE Before removing, insert a 6 mm bolt in the holes in the alternator shaft driven gears for easy alternator shaft assembly installation. After installing, do not forget to remove the bolt.
(2)	Alternator shaft assembly	1	NOTE Before installing, apply molybdenum disulfide grease to the alternator shaft driven gears. Disassembly/assembly (page 17-20)
(3)	O-ring	1	

After '95



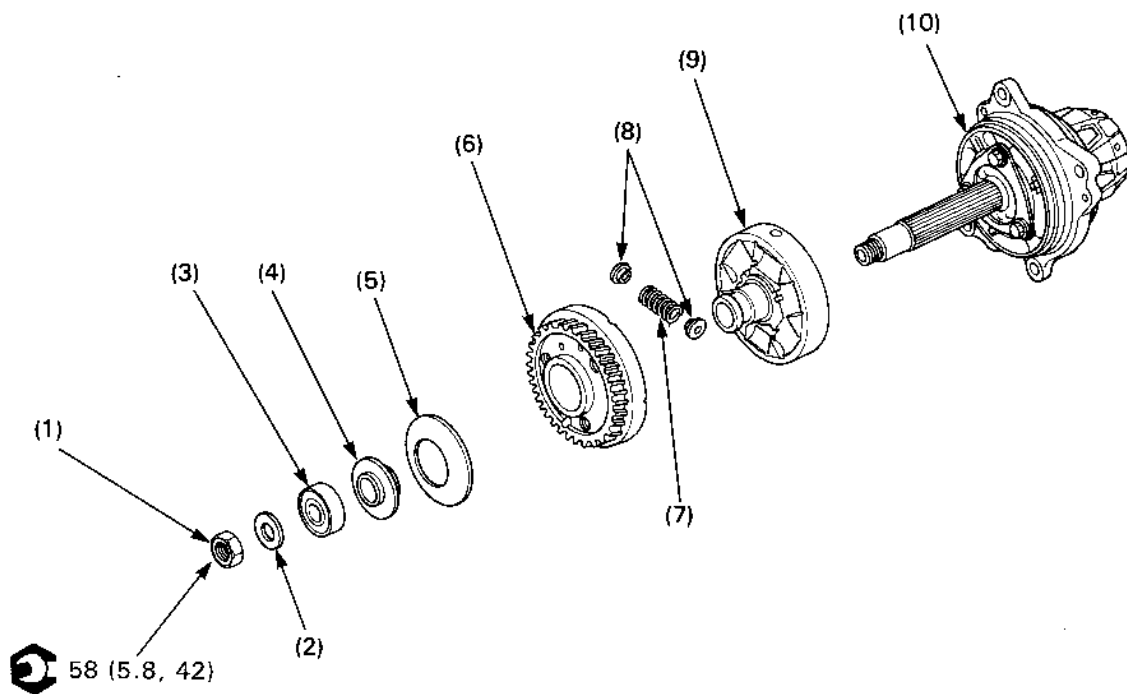
**Requisite Service**

- Oil pan removal/installation (page 4-6)
- Alternator removal/installation (page 17-14)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Alternator shaft assembly	1	NOTE • Before removing, insert a 6 mm bolt into the holes in the alternator shaft driven gears for easy alternator shaft assembly installation. After installing, do not forget to remove the 6 mm bolt.
(2) O-ring	1	NOTE • Before installing, apply molybdenum oil solution to the alternator shaft driven gears. Disassembly/assembly (page 17-21)

# Alternator Shaft Disassembly/Assembly

'91-'95

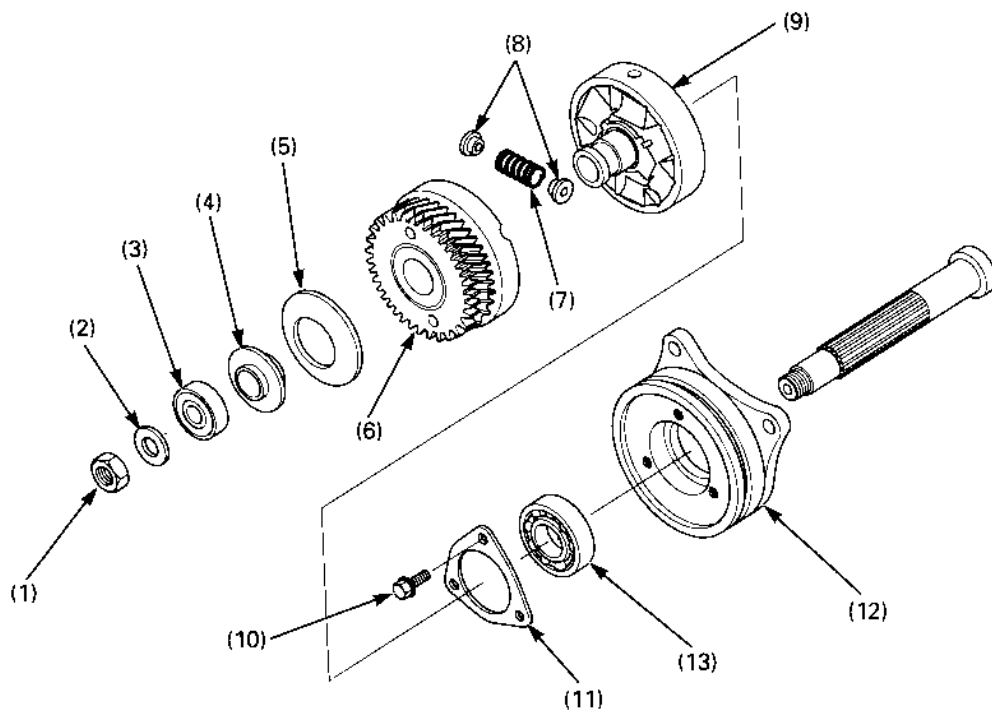


## Requisite Service

- Alternator shaft removal/installation (page 17-18).

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.  Install the washer with the tapered side facing to the shaft nut.
(1) Alternator shaft nut	1	
(2) Washer	1	
(3) Bearing	1	
(4) Shaft collar	1	
(5) Cone washer	1	
(6) Alternator shaft driven gear	1	
(7) Damper spring	6	
(8) Spring seat	12	
(9) Flywheel	1	
(10) Alternator shaft assembly	1	

After '95

















**Requisite Service**

- Alternator shaft removal/installation (page 17-19)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1) Alternator shaft nut	1	
(2) Washer	1	
(3) Bearing (6003)	1	
(4) Shaft collar	1	
(5) Cone washer	1	Install the washer with the tapered side facing to the shaft nut.
(6) Alternator shaft driven gear	1	
(7) Damper spring	4	
(8) Spring seat	8	
(9) Flywheel	1	
(10) Bolt	3	
(11) Retainer plate	1	
(12) Alternator base	1	
(13) Bearing (20 x 47 x 10.5)	1	

# 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.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use special tool</p>
	<p>Use optional tool. Use the same procedure you use to order parts.</p>
 <p>10 (1.0, 7.2)</p>	<p>Torque specification.    10 N·m (1.0 kg-m, 7.2 ft-lb)</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)</p>
	<p>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</p>
	<p>Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent)          Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A.          Honda Moly 60 (U.S.A. only)          Rocol ASP manufactured by Rocol Limited, U.K.          Rocol Paste manufactured by Sumico Lubricant, Japan</p>
	<p>Use silicone grease</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant</p>
	<p>Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>

# 18. Ignition System

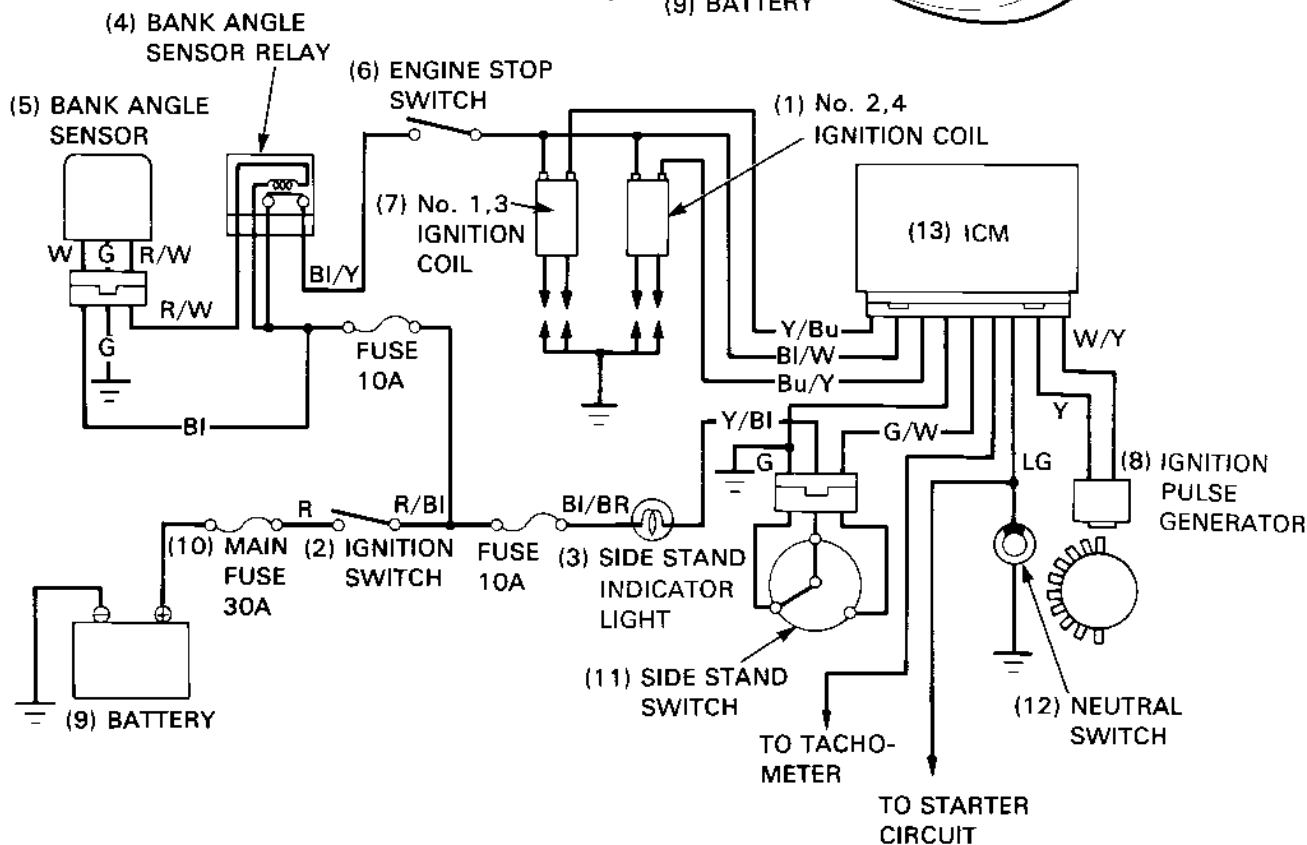
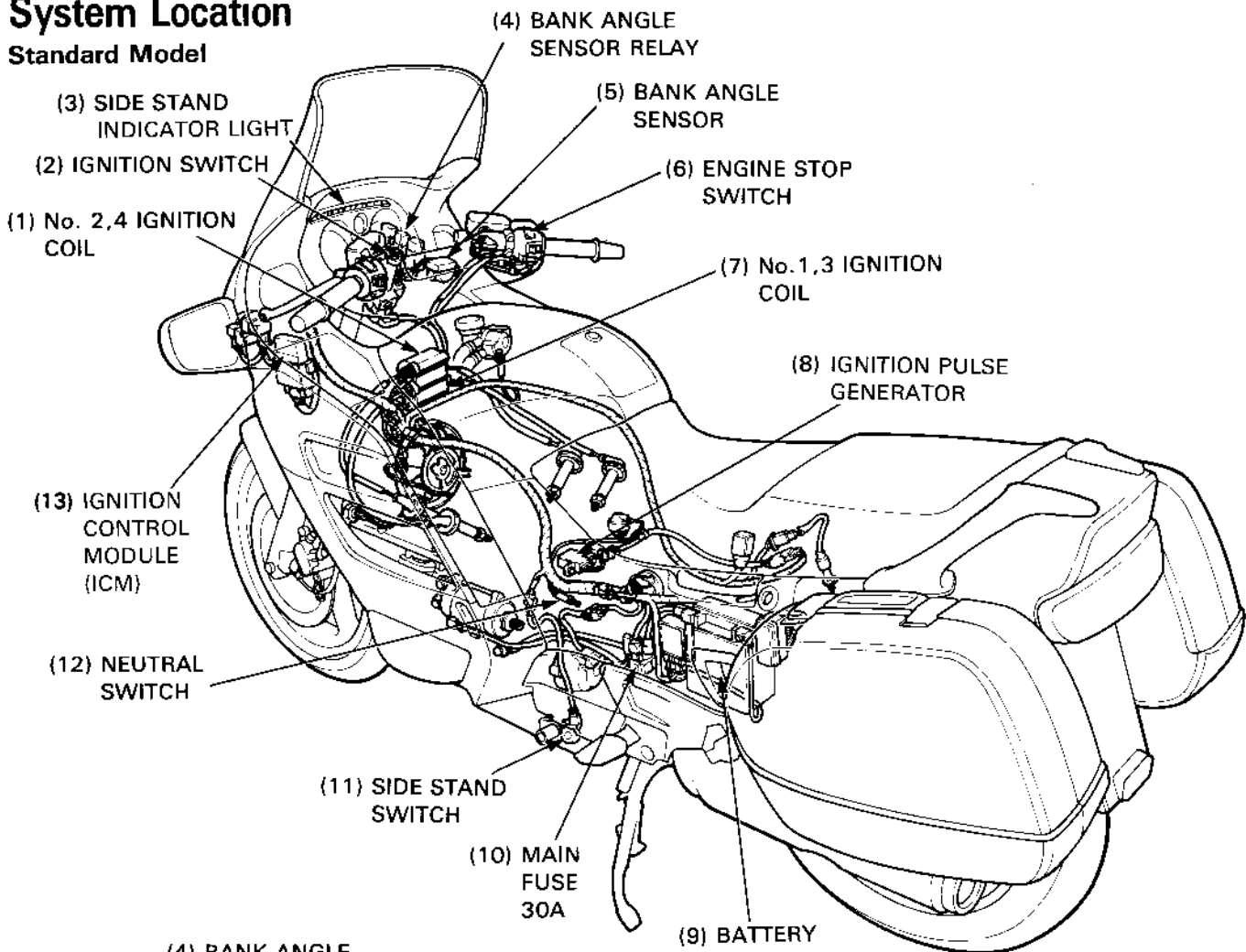
Service Information	18-1	Ignition Coil	18-8
System Location	18-2	Ignition Pulse Generator Inspection	18-9
Troubleshooting	18-4	Ignition Pulse Generator Removal/ Installation	18-10
Ignition System Inspection	18-6	Ignition Timing	18-11

## Service Information

- When checking the ignition system, always follow the steps in the troubleshooting flow chart (page 18-4).
- 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 ignition control module (ICM) 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 neutral switch inspection, refer to section 25 of the Common Service Manual; for switch location, see page 18-2 or 18-3 of this manual (System Location).
- For the ignition switch and engine stop switch inspection, check for continuity on the continuity chart of the Wiring Diagram (section 22). Refer to page 21-4 for side stand switch inspection.

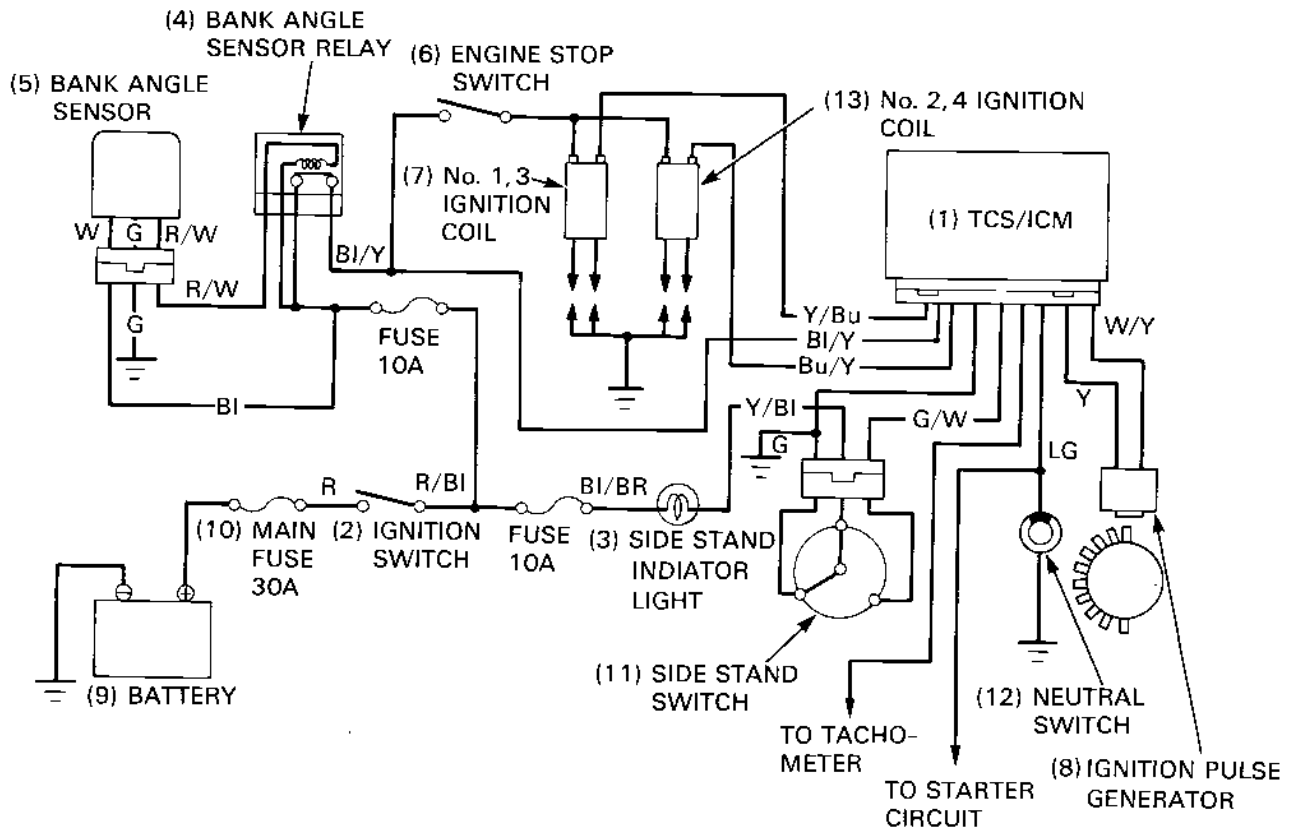
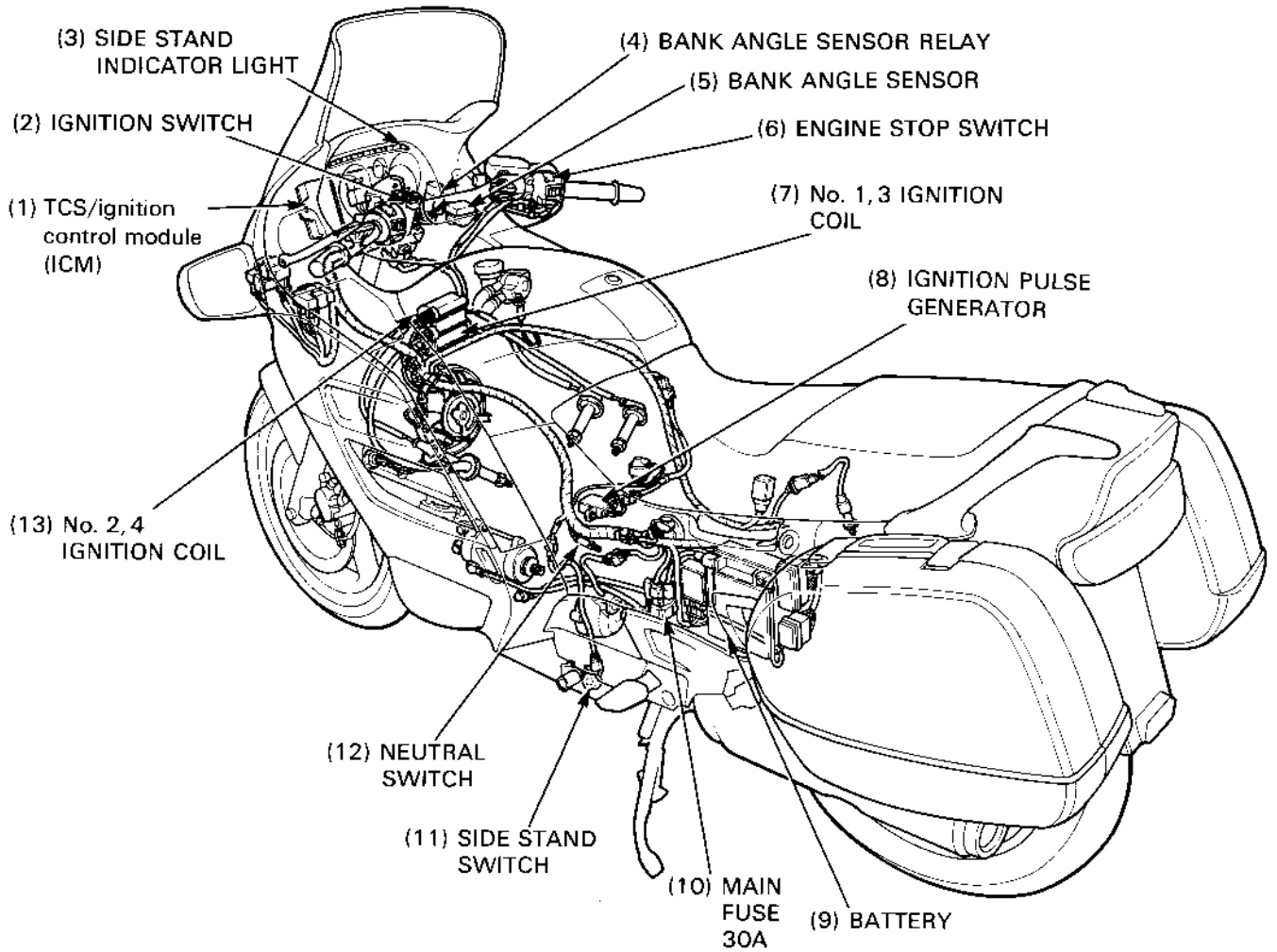
# System Location

## Standard Model



ABS/TCS or LBS-ABS/TCS Model

ABS/TCS model shown:

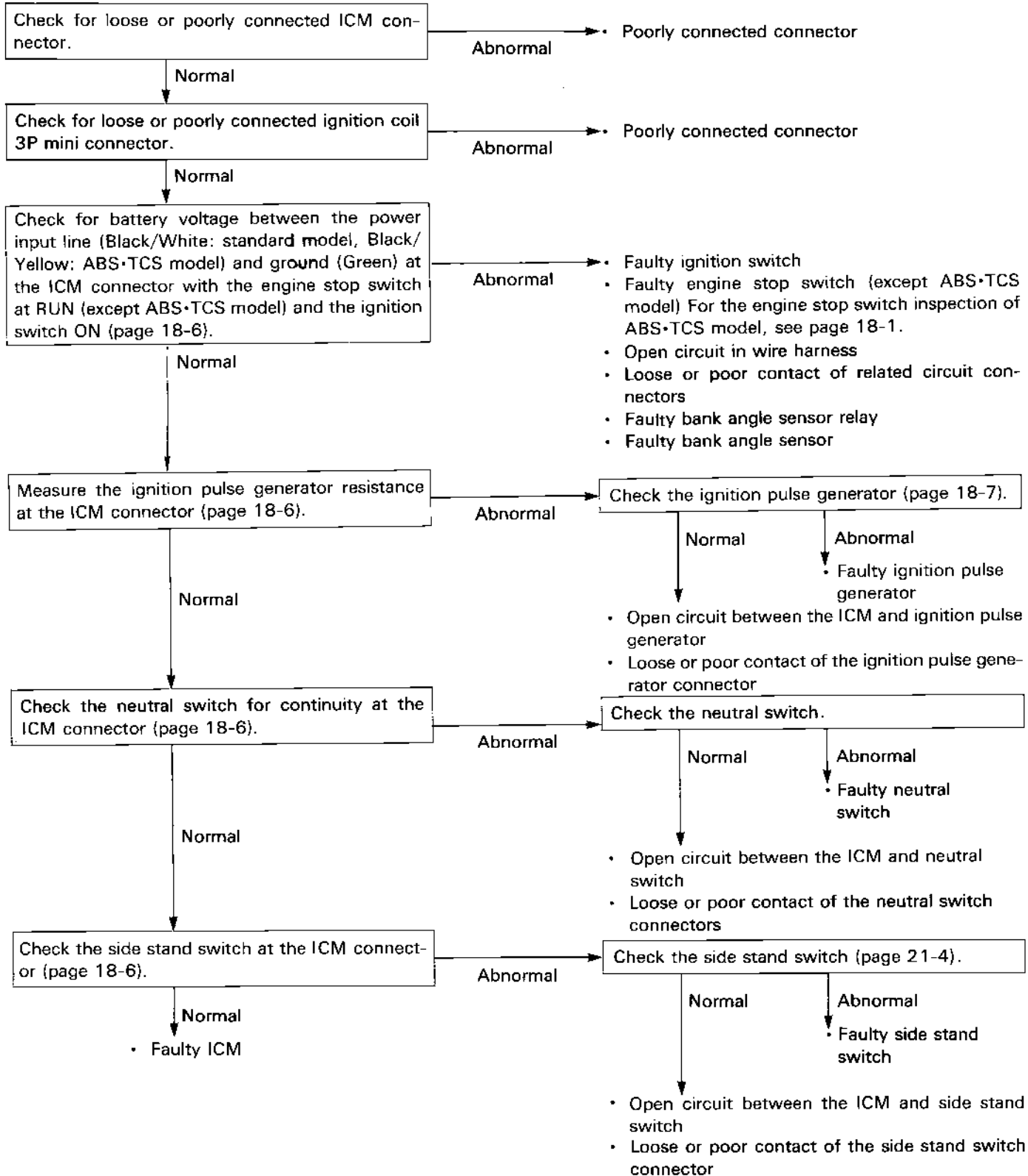




# Troubleshooting

## No spark at all plugs (Faulty input system)

- If there is no spark at all plugs, the problem could be at the input of the ignition system (ignition pulse generator, power input circuit of the ignition control module (ICM), neutral switch, side stand switch or ICM).



**No spark at either ignition group**

• If there is no spark at either group, the problem is suspected in the primary coil side of the ignition system (ignition coil, or ignition control module (ICM) and ignition coil circuit).

Switch the ignition coil primary terminal connection between the faulty pair and good pair. Try spark test again.

"No Spark" condition shifts to other pair

"No Spark" condition remains with faulty pair

Remove the faulty pair ignition coil and check the ignition coil resistance (page 18-7).

- Faulty ignition coil
- Faulty spark plug wire

Measure resistance of the ignition primary coil at ICM connector (page 18-6).

Abnormal

- Poor or loose contact of ignition coil 3P mini connector
- Open circuit between the ICM and ignition coil

Normal

- Faulty ICM

**No spark at one plug (Trouble in secondary coil side)**

• Faulty spark plug is most likely.

Replace (suspected bad spark plug) with known good spark plug and conduct spark test.

Normal

- Original spark plug no good.

Abnormal

Put the spark plug wire on and measure resistance of ignition secondary coil (page 18-7).

Normal

Conduct spark test on good ignition coil.

Abnormal

Normal

Remove the spark plug wire, and measure the resistance of the ignition secondary coil (page 18-7).

Abnormal

- Faulty ignition coil

Normal

- Poor contact of spark plug wire
- Faulty spark plug wire

**Side stand switch does not function at all.**

Side Stand Indicator:  
Check the side stand indicator for function.

Normal

- Faulty side stand switch
- Open circuit in Green/White or Green wire

Abnormal

Side Stand Switch:  
Check the side stand switch for continuity.

Normal

- Loose or poor contact of related connectors
- Open or short circuit in wire harness
- Burnt indicator bulb

Abnormal

- Faulty side stand switch

# Ignition System Inspection

**NOTE**

- Check the system components and lines step-by-step according to the troubleshooting chart on pages 18-4 and 18-5.

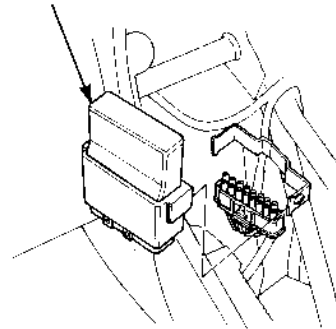
**Standard model:**

Remove the left fairing pocket (page 2-6).

Remove the ignition control module (ICM) from the stay, disconnect the ICM connector and check it for loose or corroded terminals.

**STANDARD MODEL:**

(1) ICM



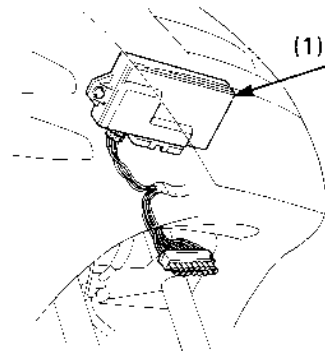
**ABS/TCS or LBS-ABS/TCS model:**

Remove the middle fairing inner cover (page 2-7).

Disconnect the TCS/ignition control module (ICM) 16P connector and check it for loose or corroded terminals.

**ABS/TCS or LBS-ABS/TCS MODEL:**

(1) TCS/ICM



Measure the data between the connector terminals using the following chart.

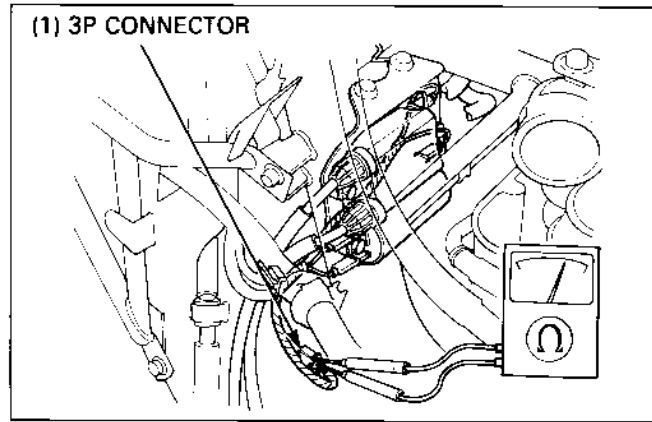
Item		Terminals	Standards (20°C/68°F)
Battery voltage input line		Black/white [ABS/TCS or LBS-ABS/TCS model: Black/Yellow] (+) and Ground (-) with the engine stop switch RUN (Standard model) and the ignition switch ON.	Battery voltage should register
Ignition pulse generator line		Yellow and White/yellow	405–495 Ω
Ignition primary coil line	No. 1,3	Yellow/blue and Black/white	2.16–3.19 Ω
	No. 2,4	Blue/yellow and Black/white	
Neutral switch line		Light green and Ground	Continuity in neutral No continuity in any gear
Side stand switch line		Green/white and Ground	Continuity with the stand up No continuity with the stand down
Ground line		Green and Ground	Continuity
Tachometer line		Yellow/green and Green wire connector of the harness side at the instruments	Continuity

# Ignition Coil

## Inspection

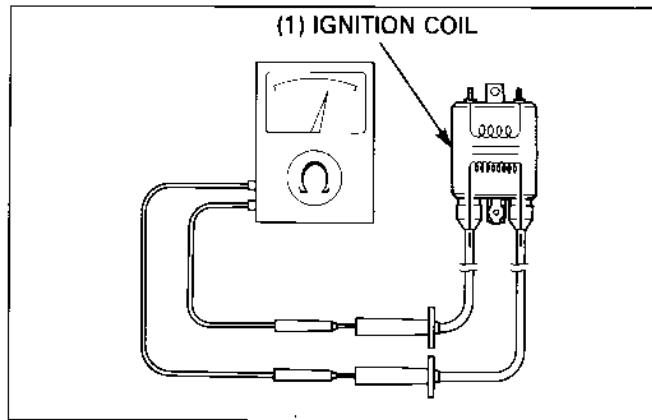
Remove the upper fairing (page 2-9).  
Disconnect the ignition primary coil 3P connector (white) and measure the primary coil resistance between each ignition coil.

**Primary coil resistance:**  
**Standard: 2.16–3.19 $\Omega$  (20°C/68° F)**



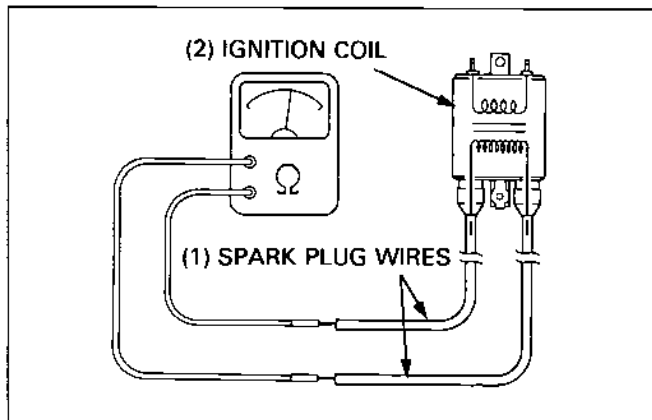
Disconnect the spark plug caps from the plugs and measure the secondary coil resistance with the spark plug caps in place.

**Standard: 22.5–27.5k $\Omega$  (20°C/68° F)**



If the resistance is out of the range, remove the spark plug caps and measure the resistance between the secondary coil terminals

**Standard: 13.5–16.5k $\Omega$  (20°C/68° F)**



# Ignition Pulse Generator Inspection

## NOTE

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

### Standard model:

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

### ABS/TCS or LBS-ABS/TCS model:

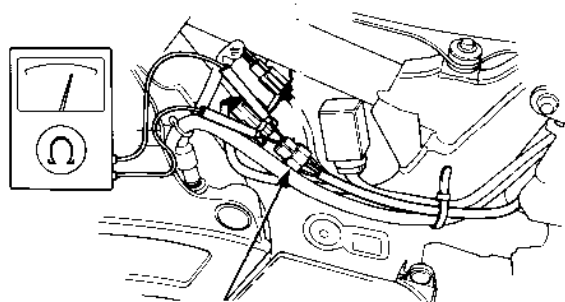
Remove the top shelter (page 2-5).

Disconnect the ignition pulse generator 4P connector and measure the resistance between the White/Yellow and Yellow wires.

**Standard: 405—495Ω (20°C/68°F)**

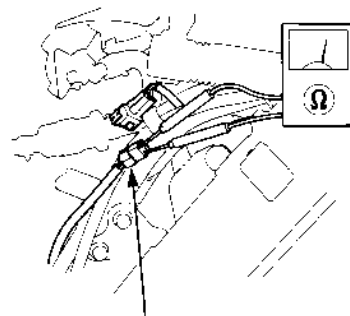
Refer to page 18-9 for ignition pulse generator replacement.

### STANDARD MODEL:



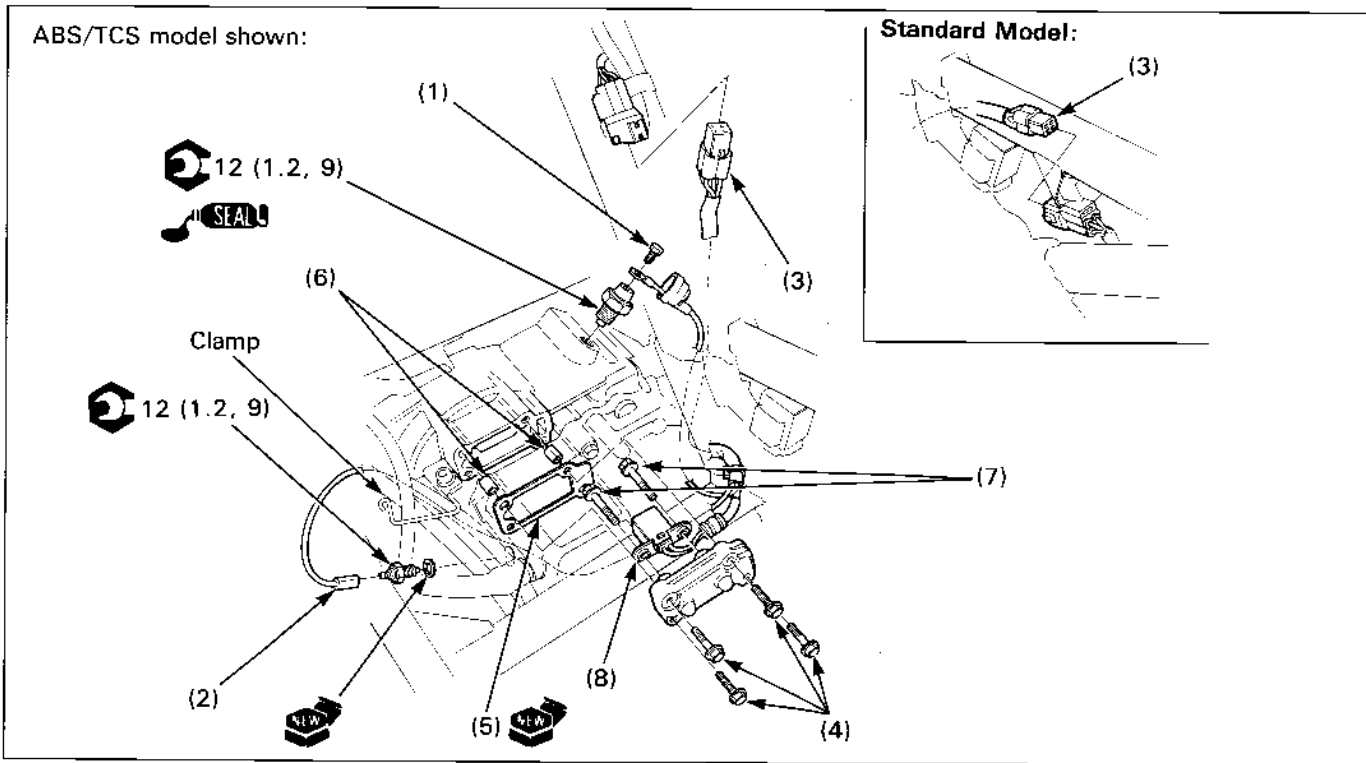
(1) IGNITION PULSE GENERATOR 4P CONNECTOR

### ABS/TCS or LBS-ABS/TCS MODEL:



(1) IGNITION PULSE GENERATOR 4P CONNECTOR

# Ignition Pulse Generator Removal/Installation



## Requisite Service

- Fuel tank Removal/Installation (page 2-12).

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.  At installation, insert the neutral-switch wire into the clamp as shown.
(1) Oil pressure switch terminal	1	
(2) Neutral switch connector	1	
(3) Waterproof connector (4P)	1	
(4) Bolt	4	
(5) Gasket	1	
(6) Dowel pin	2	
(7) Bolt	2	
(8) Ignition pulse generator	1	

Service Information	19-1	Circuit Diagram	19-4
System Location	19-2	Troubleshooting	19-5
System Wiring Connections/Locations	19-3		

## Service Information

### CAUTION

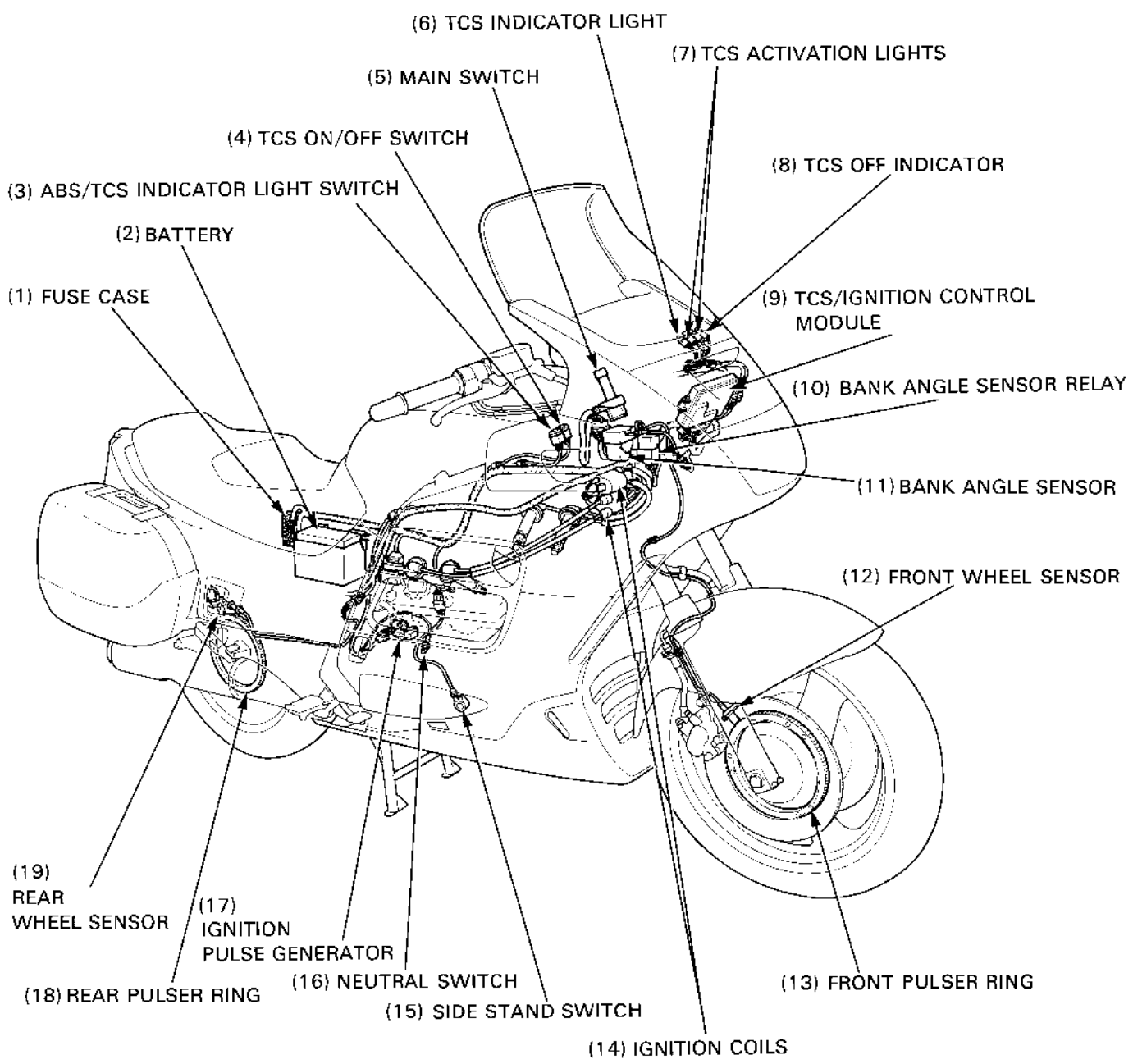
- Use the fully charged battery for troubleshooting. Do not diagnose the TCS with a charger connected to the battery.
- On removal and installation of the wheel sensors/wheels, be careful not to damage the wheel sensors and pulser rings.

### NOTE

- Check the following before performing any TCS troubleshooting.
  - Pre-start self-diagnosis of TCS
  - Check on all lights and indicators of TCSIf an abnormality is found during the above checks, perform the TCS troubleshooting following the Symptom-to-System Chart (page 19-6). The TCS is normal if no trouble is found. Go on to the check the other basic systems (e. g. fuel system, ignition system, etc.).
- Record the symptom of the problem and the problem code in MEMO before troubleshooting.
- When the TCS is faulty, the TCS indicator light blinks or it comes on. The TCS does not function this time; take care during the test ride.
- The TCS OFF indicator turns on when the TCS ON/OFF switch connector is disconnected and then reconnected with the ignition switch ON. The TCS can be recovered this time by pushing the TCS ON/OFF switch. Take care when removing the left side pocket.
- When the rear wheel sensor or rear pulser ring is replaced, perform the air gap inspection (16-51).
- The TCS indicator light might blink in the following cases. If the indicator light blinks, turn the ignition switch OFF and perform the pre-start self-diagnosis (page 19-5). The TCS is normal if the TCS indicator light goes off.
  - The TCS/ignition control module was disrupted due to an extremely powerful radio wave (Electromagnetic Interference).
  - After riding (i.e. after the pre-start self- diagnosis), either front or rear wheel was stopped and the other wheel was turned (for more than 10 seconds) with the engine kept running.
    - Example: • Only the rear wheel was turned with the motorcycle set on the main stand.
    - Only the front wheel was turned for inspection of the meter.
- When, after the test ride (i.e. after pre-start self- diagnosis), the motorcycle is set on the center stand with the engine running and the throttle is opened quickly with the gear engaged (rear wheel idles), the ignition timing is retarded because of the difference in wheel speed between the front and rear wheels, which might cause afterfire and afterburn.
- The TCS indicator light might blink under the following conditions. Turn the ignition switch OFF to return to the normal condition and perform the pre-start self-diagnosis (page 19-5) of the TCS. The TCS is normal if the TCS indicator goes off:
  - Improper tire air pressure
  - Tire not recommended for the motorcycle is installed.
  - Deformation of the wheel

# System Location

ABS/TCS model shown:

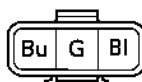
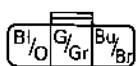




# System Wiring Connections/Locations

· Refer to section 2, (frame/body panels /exhaust system), for the parts that must be removed for service.

① REAR WHEEL SENSOR  
-R. side cover (page 2-2)



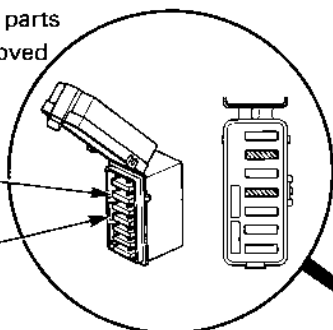
② TCS ON/OFF SWITCH  
-Top shelter  
(page 2-5)



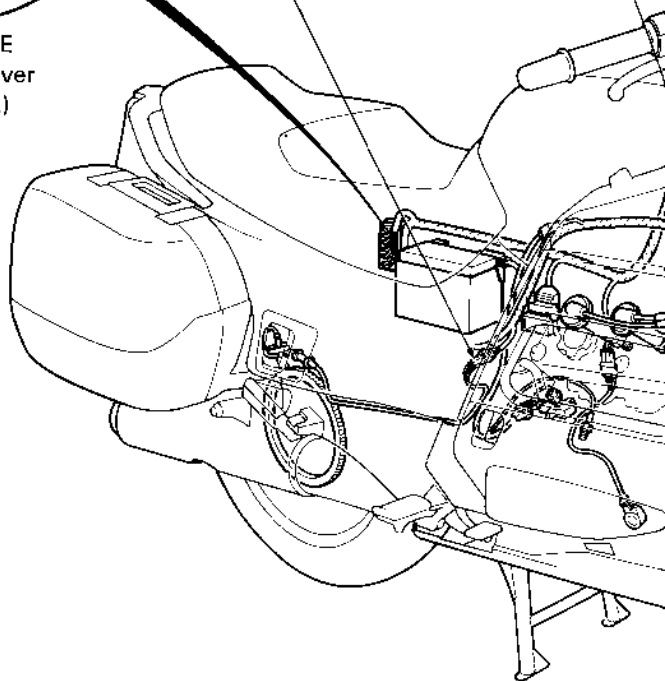
For example: ② TCS SWITCH ← Maintenance part  
-Top shelter ← The parts that must be removed for service.

INDICATOR FUSE  
("METER TAIL POSITION")

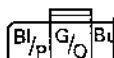
IGNITION FUSE  
("IGN ACG STARTER")



FUSE CASE  
-L. side cover  
(page 2-2)



Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY



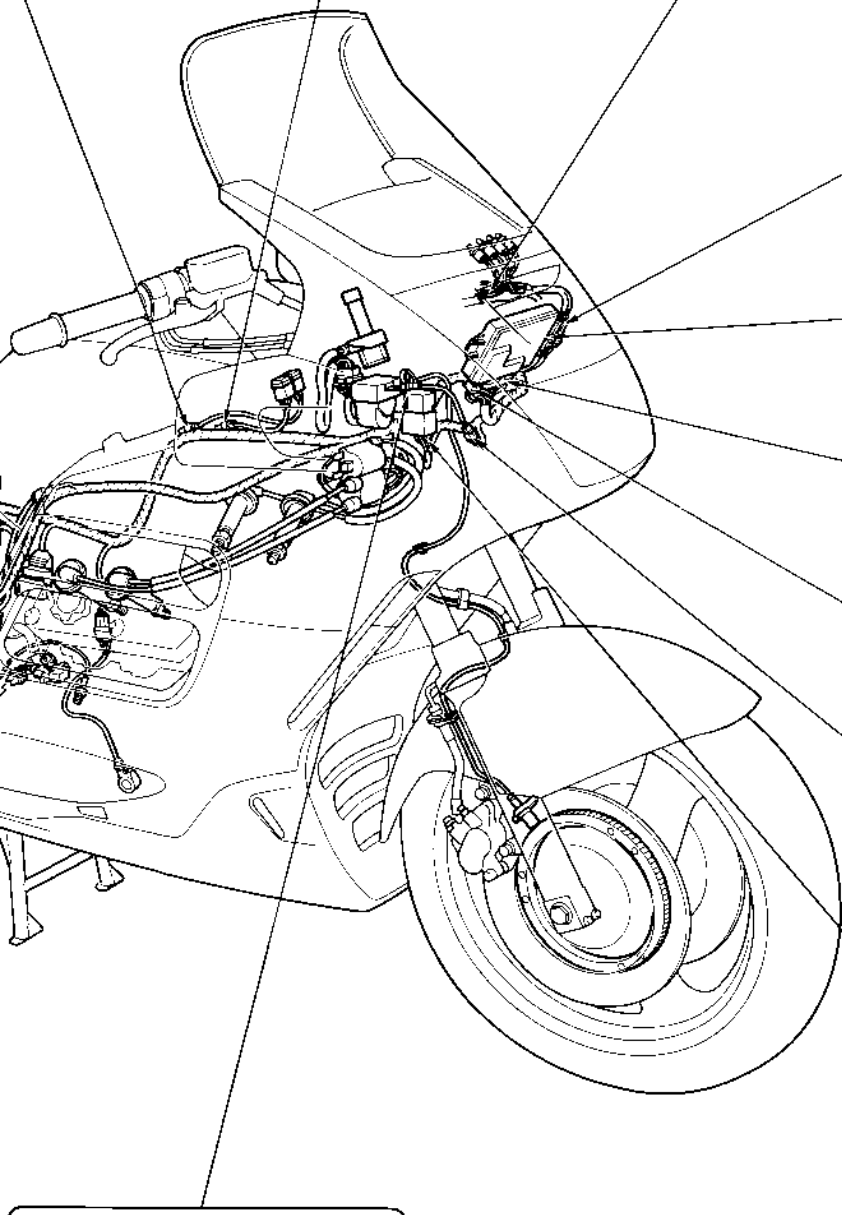
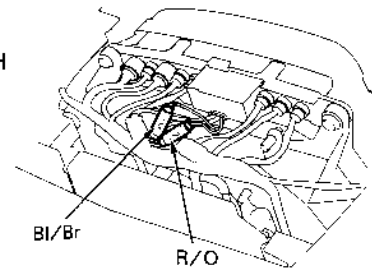
① FRONT  
-Upper  
(page

F SWITCH

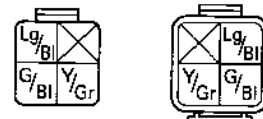


③ ABS/TCS INDICATOR LIGHT SWITCH  
-Top shelter (page 2-5)

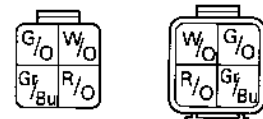
④ TCS INDICATOR LIGHT  
-Inner screen (page 2-7)



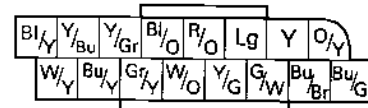
⑤ INDICATOR (BLACK)  
-Inner screen (page 2-7)



⑥ INDICATOR (WHITE)  
-Inner screen (page 2-7)



⑦ TCS/IGNITION CONTROL MODULE (ICM) (16P)  
-Upper fairing (page 2-9)



⑧ TCS/IGNITION CONTROL MODULE (ICM) (4P)  
-Upper fairing (page 2-9)



⑨ BANK ANGLE SENSOR  
-Upper fairing (page 2-9)



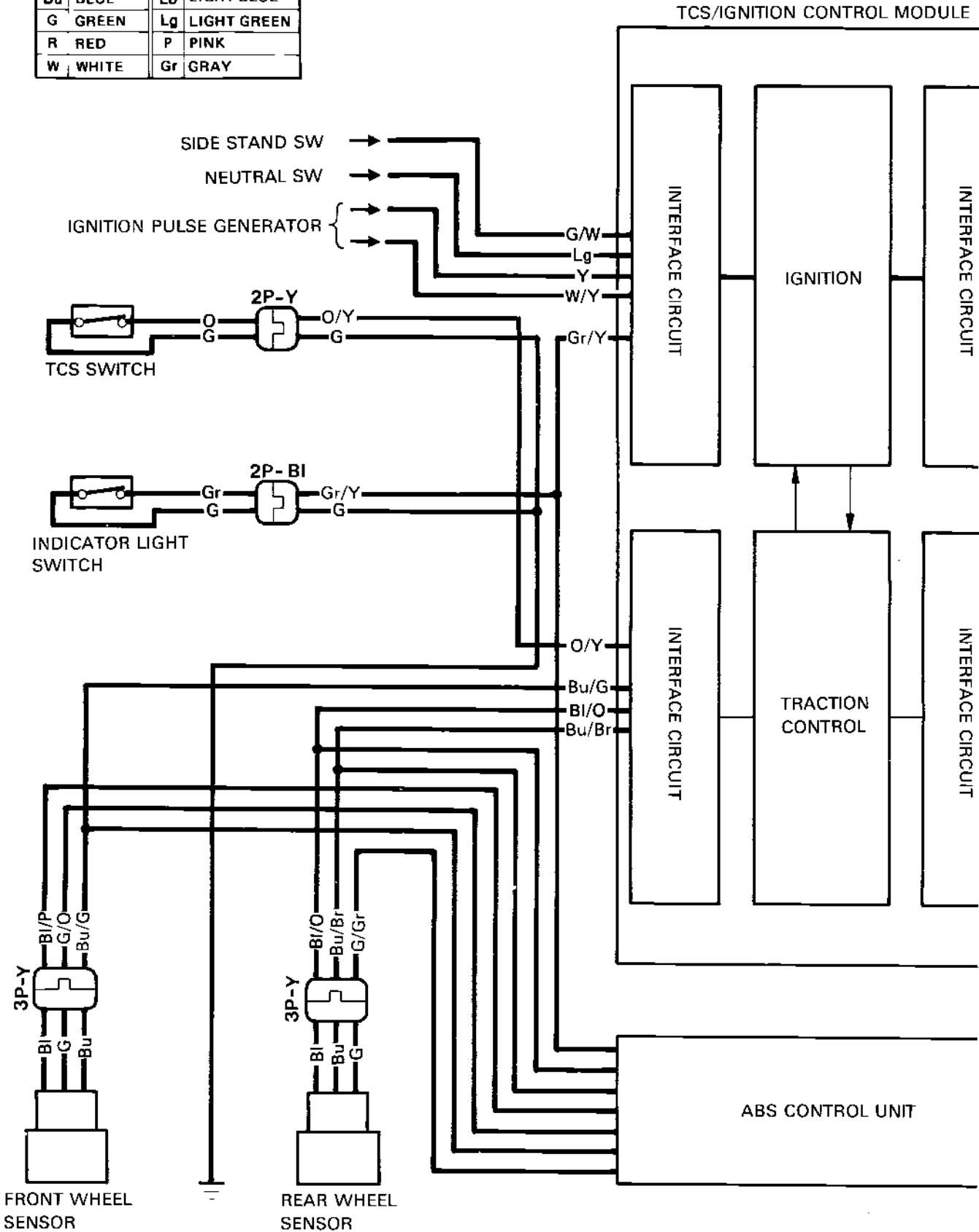
⑩ BANK ANGLE SENSOR RELAY  
-Upper fairing (page 2-9)



⑪ FRONT WHEEL SENSOR  
-Upper fairing  
(page 2-9)

# Circuit Diagram

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY





# Troubleshooting

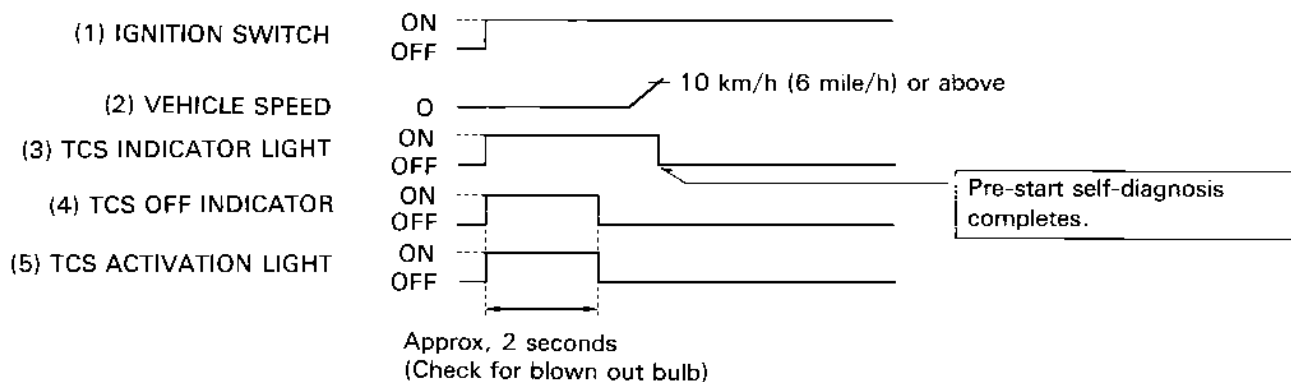
## Before Beginning Troubleshooting:

### Summary of TCS pre-start self-diagnosis system

The TCS pre-start self-diagnosis system diagnoses inside the TCS/ignition control module (ICM) and the electrical circuit of the wheel sensors.

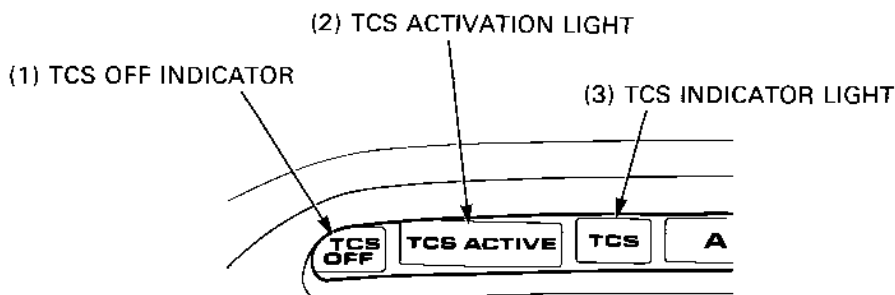
When the ignition switch is turned ON, the TCS starts the pre-start self-diagnosis to check inside the TCS/ICM for condition. Then it goes to the stand-by mode for the wheel sensor signal. After starting the motorcycle, the pre-start self-diagnosis completes when the wheel sensor signal is transmitted to the TCS/ICM with the front/rear wheel rotating at the speed of approximately 10 km/h (6 mile/h) or above.

If the TCS is normal, the indicator light goes off after the motorcycle starts notifying the rider that the pre-start self-diagnosis is completed. When a problem is detected, the indicator light blinks or stays ON to notify the rider. The self-diagnosis is made while the motorcycle is moving, too, and the indicator light blinks when a problem is detected. (The TCS OFF indicator comes ON simultaneously.) The probable cause of the trouble can be detected from the lighting condition of the TCS indicator light, indicator, etc. (see the following page).



### Pre-start self-diagnosis procedure (Pre-start check-up)

1. Turn the ignition switch ON.
2. Be sure that the TCS OFF indicator and TCS activation light turn ON for approximately 2 seconds and then go OFF, and be sure that the TCS indicator light stays ON.
3. Start the engine and ride the motorcycle until the engine speed reaches approximately 10 km/h (6 mile/h).
4. The TCS is normal if the TCS indicator light goes OFF.



### NOTE

- Check the following before performing TCS troubleshooting:
  - Pre-start self-diagnosis of TCS
  - Check all lights and indicators of TCS

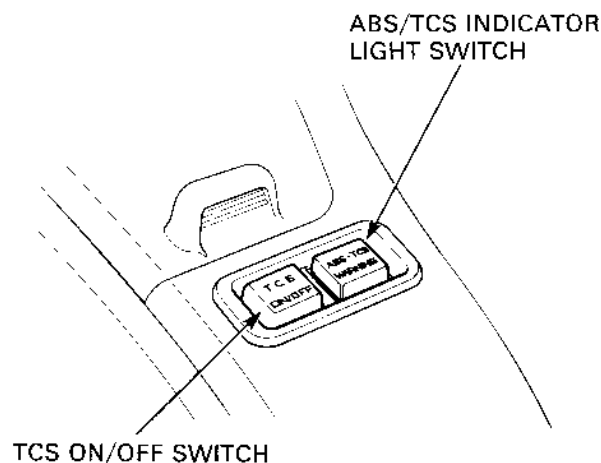
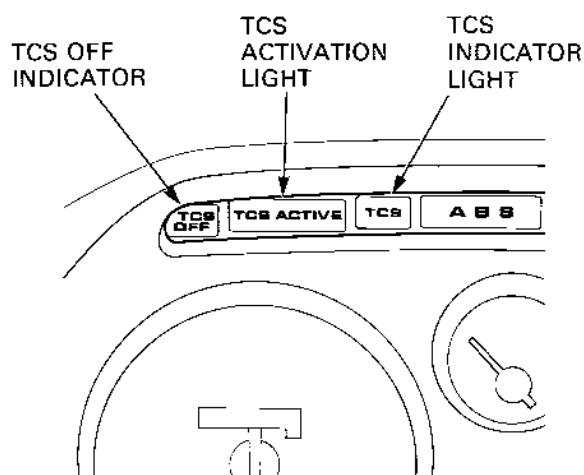
If an abnormality is found during the above checks, perform the TCS troubleshooting following the Symptom-to-System Chart (see the following page). The TCS is normal if no trouble is found. Go on to check the other basic systems (e.g., fuel system, ignition system).

Symptom-to-System Chart

Symptom	Affected									Reference page	
	Fuse		TCS ON/OFF switch system	ABS/TCS indicator light switch system	Wheel sensor system		TCS/ignition control module (ICM)	Indicator system			
	Indicator	Ignition			Front	Rear		TCS OFF indicator	TCS indicator light		TCS activation light
Lights and indicator of TCS do not turn on when the ignition switch is ON.	○	○					○	○	○	○	19-7
Lights and indicator of TCS (except TCS indicator light) do not go off 2 seconds after the ignition switch is ON.							○	○	○	○	19-10
TCS indicator light does not go off after the motorcycle starts to move.					○	○	○		○		19-11
TCS indicator light blinks and TCS OFF indicator turns on after the ignition switch is ON or while riding.					○	○	○				19-13
TCS does not turn on or off by pushing the TCS ON/OFF switch.			○				○				19-15
When TCS indicator light blinks while riding, it does not go off by operating the indicator light switch.				○			○				19-17

NOTE

- Check the following before performing TCS troubleshooting:
  - Pre-start self-diagnosis of TCS (page 19-5)
  - Check all lights and indicators of TCS (page 19-5)
- If an abnormality is found during the above checks, perform the TCS troubleshooting following the Symptom-to-System Chart. The TCS is normal if no trouble is found. Go on to the check the other basic systems (e.g. fuel system, ignition system, etc.).
- After troubleshooting, perform the pre-start self-diagnosis again (page 19-5) to be sure that the indicator lights of the TCS are operating properly.



## Flowcharts

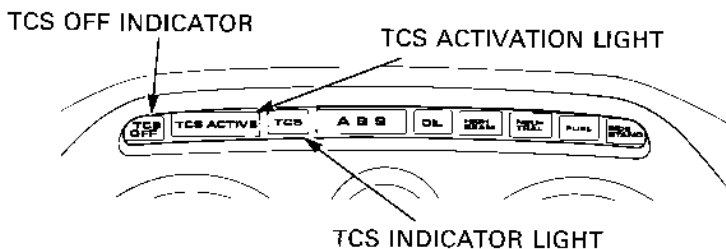
## NOTE

- Turn the ignition switch OFF unless otherwise specified.
- When the TCS/ignition control module (ICM) is found to be faulty, recheck the connectors before replacing the TCS/ICM.
- After troubleshooting, perform the pre-start self-diagnosis again and be sure that the indicator light of the TCS are normal.
- The encircled numbers in the text and connector diagrams indicate the connectors (see page 19-3).

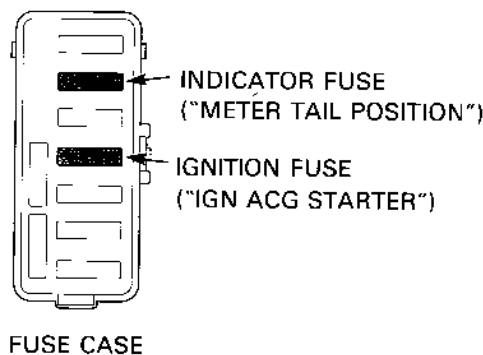
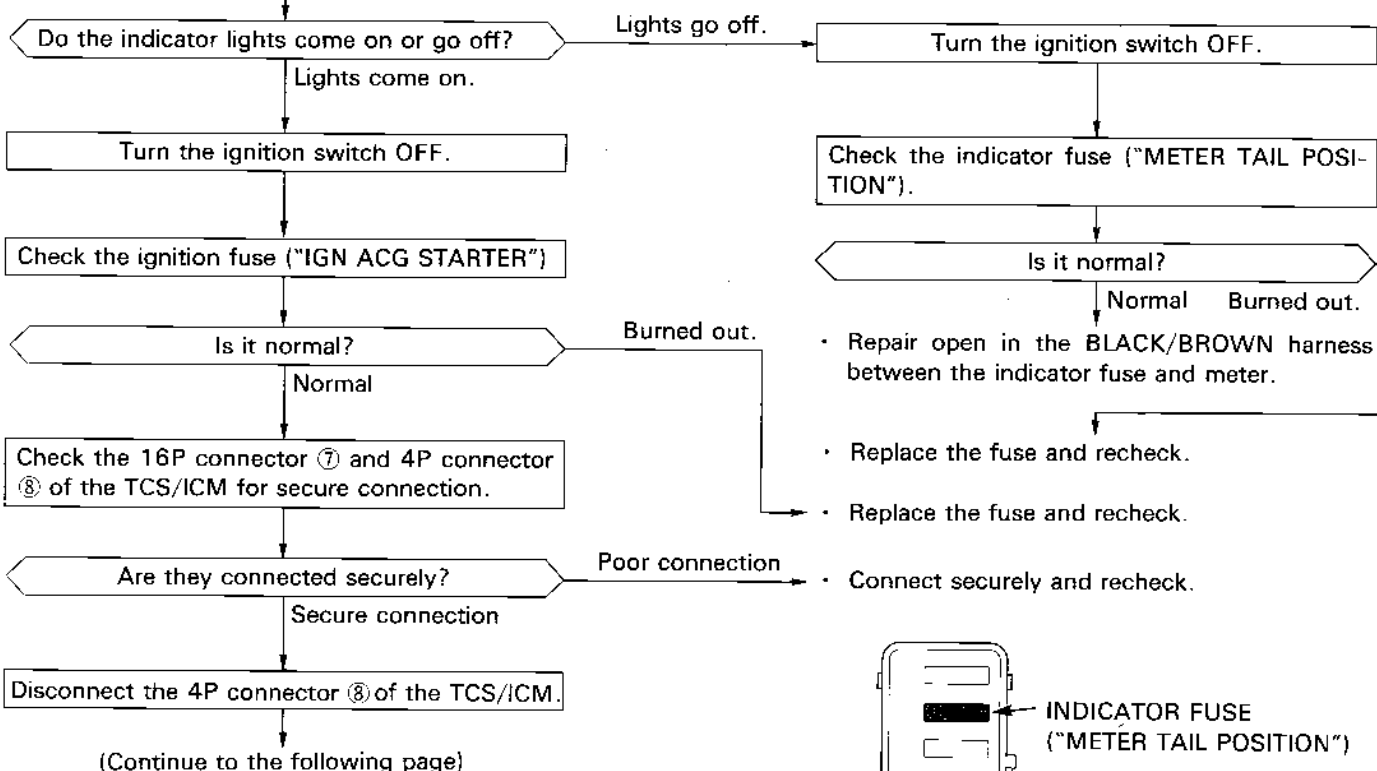
Lights and indicators of the TCS do not turn on when the ignition switch is ON.

## NOTE

- The indicator lights of the TCS must turn on when the ignition switch is ON. The TCS activation light and TCS OFF indicator should go off approximately 2 seconds after the ignition switch is ON, while the TCS indicator light should not go off unless the motorcycle starts to move.



Check the indicator lights other than of TCS (e. g., neutral, fuel, and oil pressure switch indicator lights).



(From the previous page)

Check for continuity between the GREEN terminal of the TCS/ICM 4P connector ⑧ and body ground.

Is there continuity?

Continuity

Disconnect the 16P connector ⑦ and 4P connector ⑧ of the TCS/ICM.

Turn the ignition switch ON.

Check for voltage between the BLACK/YELLOW terminal of the TCS/ICM 16P connector ⑦ and the GREEN terminal of the 4P connector ⑧

Does battery voltage register?

Battery voltage

Turn the ignition switch OFF.

TCS activation light and OFF indicator do not come on (See page 19-7)

TCS indicator light does not come on (See page 19-7).

(To the following page.)

Install the 4P connector ⑧ of the TCM/ICM.

Connect the WHITE/ORANGE terminal (TCS OFF indicator) and the YELLOW/GRAY terminal (TCS activation light) of the TCS/ICM 16P connector ⑦ to the body to ground.

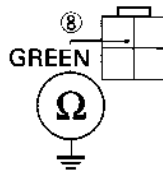
Turn the ignition switch ON and check the TCS OFF indicator or TCS activation light.

Does the light come on or go off?

Light comes on.

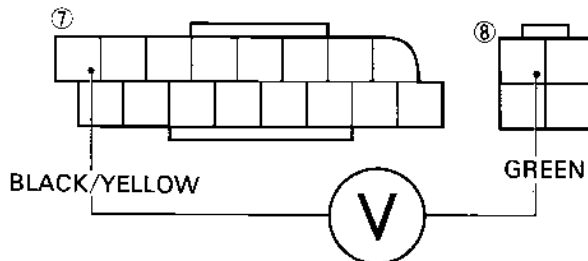
• Faulty TCS/ICM

View from terminal side



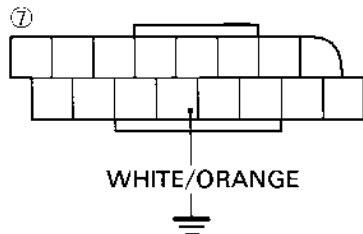
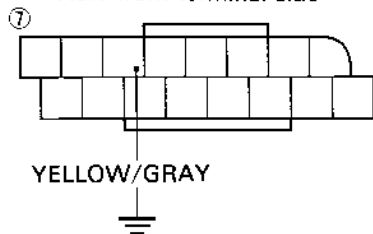
No continuity → • Repair open in the GREEN harness between the TCS/ICM and body ground, or poor grounding.

View from terminal side



No battery voltage → • Repair open in the BLACK/YELLOW harness between the bank angle sensor relay and TCS/ICM.  
• Repair open in the BLACK harness between the ignition fuse and bank angle sensor relay.

View from terminal side



Light goes off. → • Replace the burned out bulb.  
• Repair open in the WHITE/ORANGE or YELLOW/GRAY harness between the TCS/ICM and meter.



(From the previous page)

Connect the 4P connector ⑧ of the TCS/ICM.

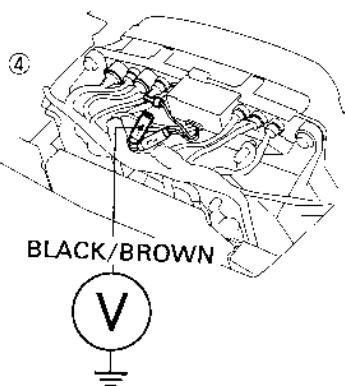
Disconnect the BLACK/BROWN connector ④ of the TCS indicator light.

Turn the ignition switch ON.

Check for voltage between the BLACK/BROWN connector ④ of the TCS indicator light and body ground.

Does battery voltage register?

No battery voltage



- Repair open in the BLACK/BROWN harness between the indicator fuse and meter.

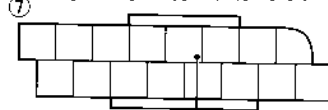
Battery voltage

Turn the ignition switch OFF.

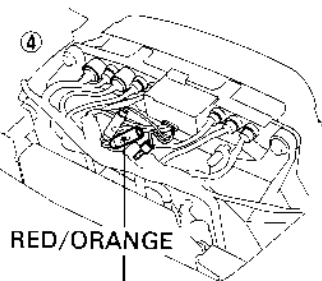
Disconnect the RED/ORANGE connector ④ of the TCS indicator light.

Check for continuity between the RED/ORANGE terminal ④ of the TCS indicator light and the RED/ORANGE terminal ⑦ of the TCS/ICM 16P connector.

View from terminal side



RED/ORANGE



RED/ORANGE

Is there continuity?

No continuity

- Repair open in the RED/ORANGE harness between the TCS/ICM and meter.

Continuity

Connect the TCS/ICM 16P connector ⑦ and connect the BLACK/BROWN and WHITE/ORANGE connectors of the TCS indicator light.

Replace the LED of the TCS indicator light.

Turn the ignition switch ON and check the TCS indicator light.

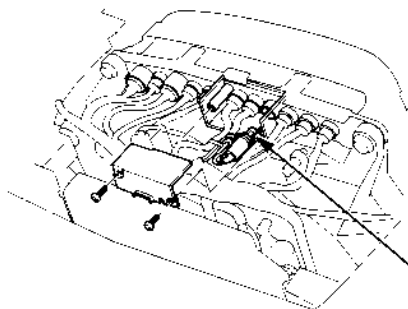
Does the light come on?

Light comes on.

- Faulty TCS indicator light LED

Light goes off.

- Faulty TCS/ICM



TCS INDICATOR LIGHT LED

Indicator lights of the TCS (except TCS indicator light) do not go off 2 seconds after the ignition switch is ON.

**NOTE**

- The indicator lights of the TCS must come on when the ignition switch is ON. The TCS activation light and TCS OFF indicator should go off approximately 2 seconds after the ignition switch is ON, while the TCS indicator light should not go off unless the motorcycle starts to move.

Turn the ignition switch OFF.

Disconnect the 16P connector ⑦ and 4P connector ⑧ of the TCS/ICM.

Turn the ignition switch ON and check the TCS activation light and TCS OFF indicator.

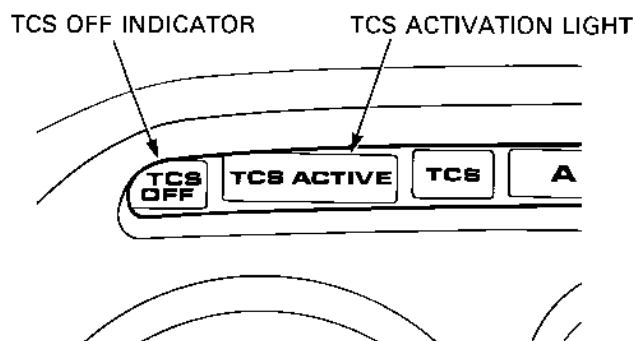
Do the lights come on or go off?

Lights come on

- Repair short in the YELLOW/GRAY harness (TCS activation light) or WHITE/ORANGE harness (TCS OFF indicator) between the TCS/ICM and meter.

Lights go off.

- Faulty TCS/ICM



**TCS indicator light does not go off after the motorcycle starts to move.**

**NOTE**

- If the TCS is normal, the wheel sensor system self checks and the TCS indicator light goes off after the motorcycle starts to move.

Turn the ignition switch OFF.

Check the 16P connector ⑦ and 4P connector ⑧ of the TCS/ICM for secure connection.

Are they connected securely?

Secure connection

Disconnect the 4P connector ⑧ of the TCS/ICM.

Check for continuity between the GREEN terminal of the TCS/ICM 4P connector ⑧ and body ground.

Is there continuity?

Continuity

Check the wheel sensor connectors (⑩ for front and ⑪ for rear) for secure connection.

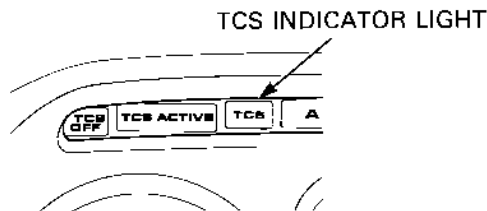
Are they connected securely?

Secure connection

Disconnect the 16P connector ⑦ of the TCS/ICM and the wheel sensor connectors (⑩ for front and ⑪ for rear).

Check for continuity between the 16P connector ⑦ terminals of the TCS/ICM and the main harness side terminal of the wheel sensor connectors (⑩ for front and ⑪ for rear).

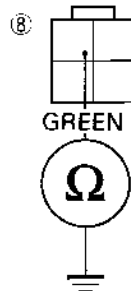
(Continue to the following page)



Poor connection

- Connect securely and recheck.

View from terminal side



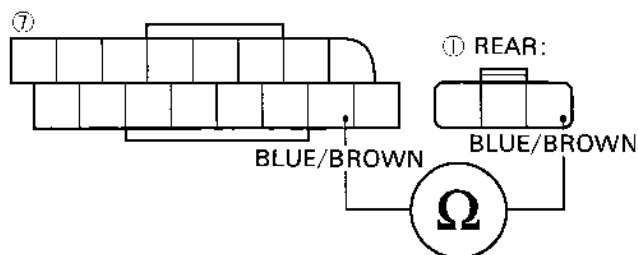
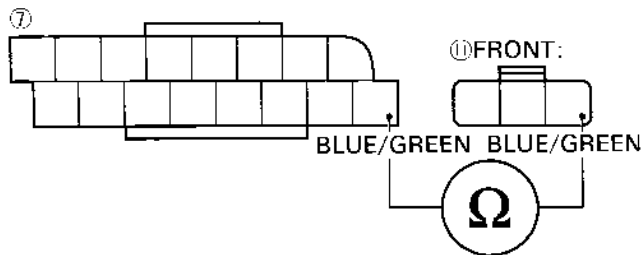
No continuity

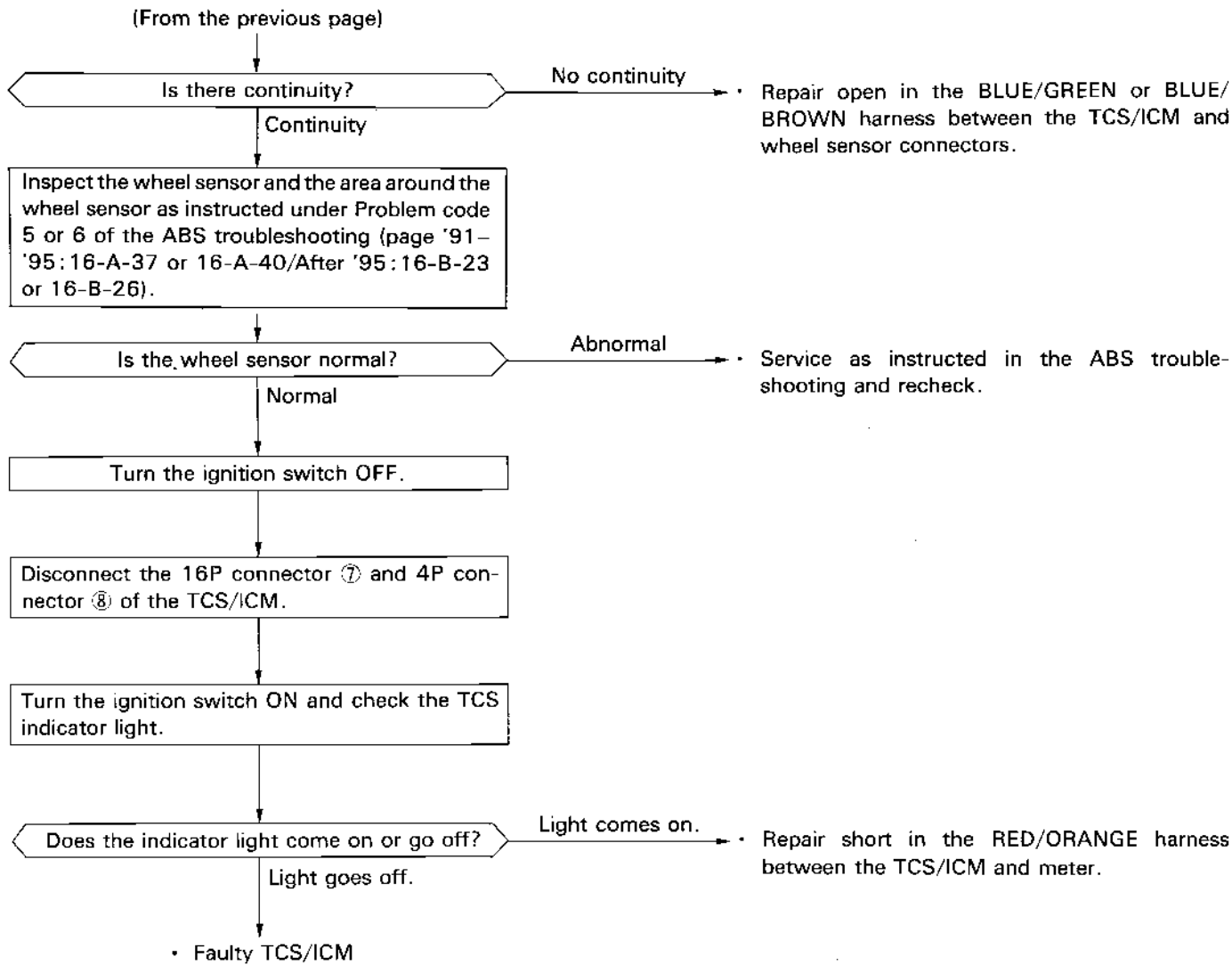
- Repair open in the GREEN harness between the TCS/ICM and body ground, or poor grounding.

Poor connection

- Connect securely and recheck.

View from terminal side





TCS indicator light blinks and TCS OFF indicator comes on after the ignition switch is turned ON or while riding.

## NOTE

- TCS indicator light should go off after the motorcycle starts to move.

Turn the ignition switch OFF.

Check the 16P connector ⑦ and 4P connector ⑧ of the TCS/ICM for secure connection.

Are they connected securely?

Secure connection

Disconnect the 4P connector ⑧ of the TCS/ICM.

Check for continuity between the GREEN terminal of the TCS/ICM 4P connector ⑧ and body ground.

Is there continuity?

Continuity

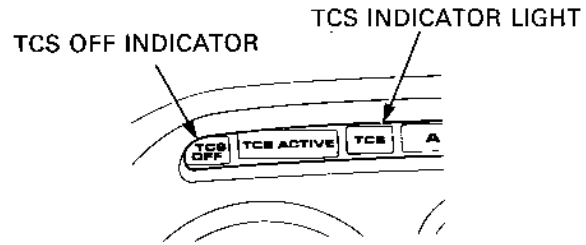
Check the wheel sensor connectors (⑩ for front and ⑪ for rear) for secure connection.

Are they connected securely?

Secure connection

Disconnect the 16P connector ⑦ of the TCS/ICM and the wheel sensor connectors (⑩ for front and ⑪ for rear).

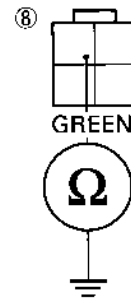
(Continue to the following page)



Poor connection

- Connect securely and recheck.

View from terminal side



No continuity

- Repair open in the GREEN harness between the TCS/ICM and body ground, or poor grounding.

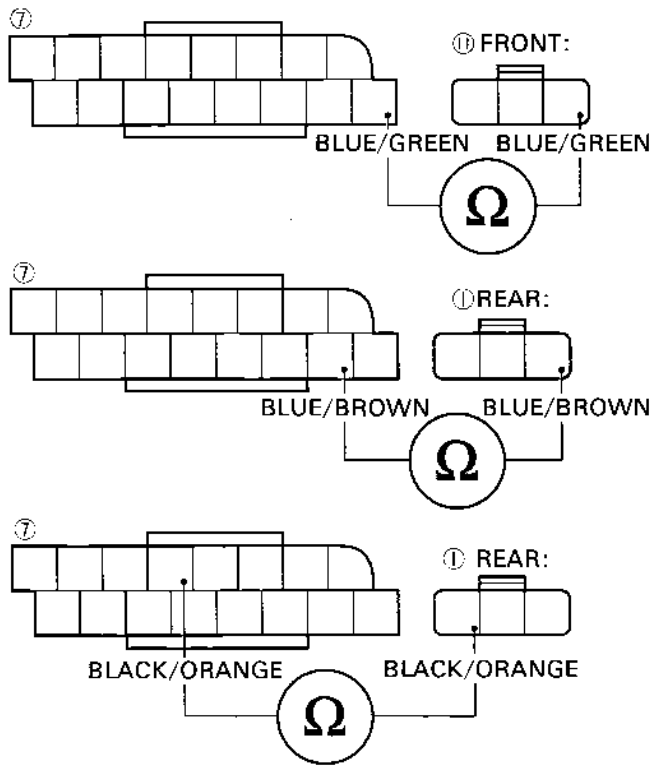
Poor connection

- Connect securely and recheck.

(From the previous page)

Check for continuity between the 16P connector ⑦ terminal of the TCS/ICM and the main harness side terminals of the wheel sensor connector (① for front and ② for rear).

View from terminal side



Is there continuity?

No continuity

• Repair open in the BLUE/GREEN, BLUE/BROWN, or BLACK/ORANGE harness between the TCS/ICM and wheel sensor connectors.

No continuity

Inspect the wheel sensor and the area around the wheel sensor as instructed under Problem code 5 or 6 of the ABS troubleshooting (page '91-'95: 16-A-37 or 16-A-40/After '95: 16-B-23 or 16-B-26).

Is the wheel sensor normal?

Abnormal

• Service as instructed in the ABS troubleshooting and recheck.

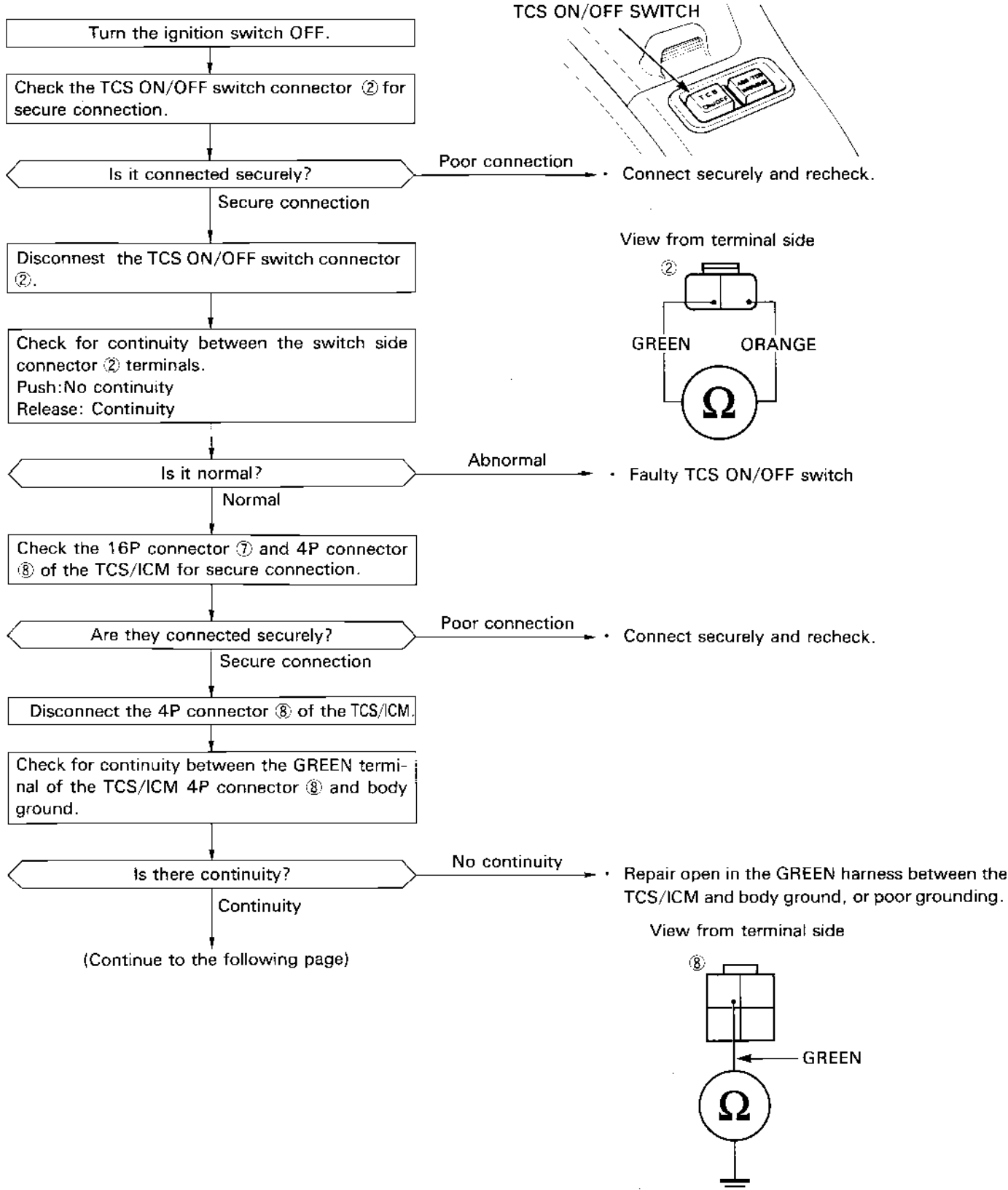
Normal

• Faulty TCS/ICM

**TCS does not turn ON or OFF by operating the TCS ON/OFF switch.**

## NOTE

- The TCS should automatically turn ON when the ignition switch is ON. The TCS can then be turned ON/OFF by operating the TCS ON/OFF switch.



(From the previous page)

Disconnect the 16P connector ⑦ and 4P connector ⑧ of the TCS/ICM, and disconnect the TCS ON/OFF switch connector ②.

Check for continuity between the TCS/ICM 4P connector ⑧ terminal and main harness side connector ② terminal of the TCS ON/OFF switch, and between the TCS/ICM 16P connector ⑦ terminal and harness side connector ② terminal of the TCS ON/OFF switch.

Is there continuity?

Continuity

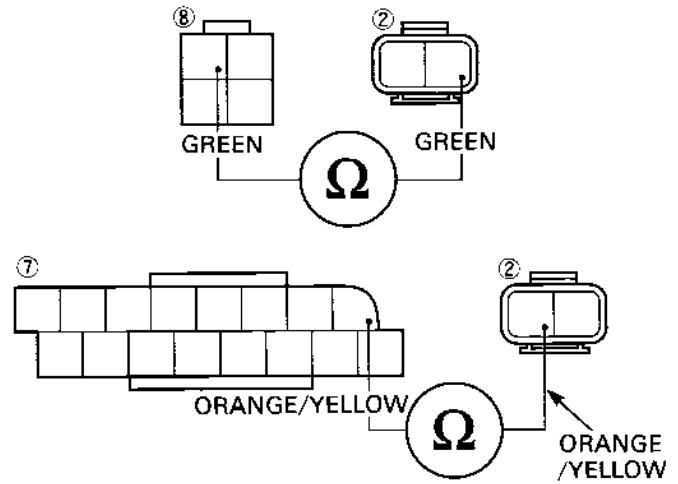
With the TCS ON/OFF switch connector ② disconnected, check for continuity between the 16P connector ⑦ terminal and 4P connector ⑧ of the TCS/ICM.

Is there continuity

No continuity

• Faulty TCS/ICM

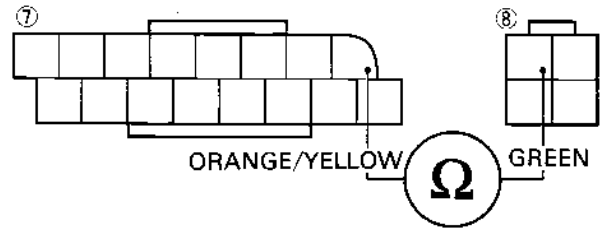
View from terminal side



No continuity

• Repair open in the GREEN harness or ORANGE/YELLOW harness between the TCS/ICM and TCS ON/OFF switch connector.

View from terminal side



Continuity

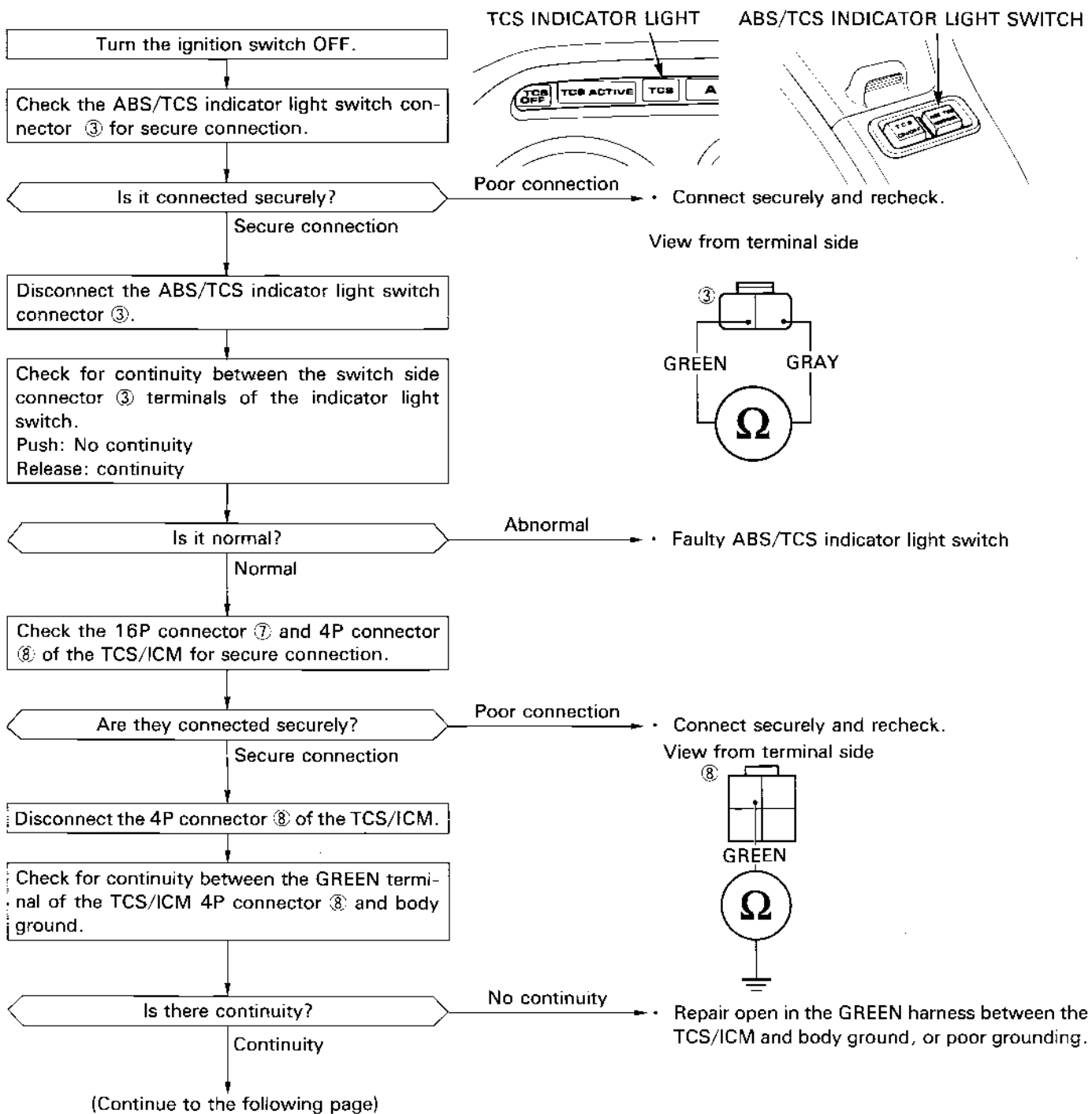
• Repair short in the ORANGE/YELLOW harness between the TCS/ICM and TCS ON/OFF switch.



## TCS indicator light blinks while riding and does not go off by operating ABS/TCS indicator light switch.

### NOTE

- When the TCS is faulty and the TCS indicator light blinks and TCS OFF indicator light comes on, the TCS indicator light can be turned off by operating the ABS/TCS indicator light switch. (However, the TCS OFF indicator cannot be turned off.)



(From the previous page)

Disconnect the 16P connector ⑦ and 4P connector ⑧ of the TCS/ICM, and disconnect the ABS/TCS indicator light switch connector ③.

Check for continuity between the 4P connector ⑧ terminal of the TCS/ICM and the main harness side connector ③ terminal of the ABS/TCS indicator light switch, and between the 16P connector ⑦ terminal of the TCS/ICM and the main harness side connector ③ terminal of the ABS/TCS indicator light switch.

Is there continuity?

Continuity

Disconnect the WHITE connector of the ABS TCS/ICM (page 16-3-②).

With the ABS/TCS indicator light switch connector ③ disconnected, check for continuity between the 16P connector ⑦ terminal and 4P connector ⑧ terminal of the TCS/ICM.

Is there continuity?

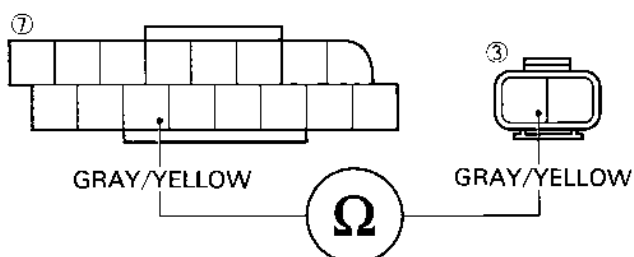
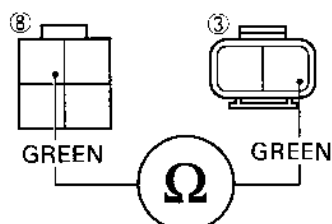
No continuity

Install the 4P connector ⑧ of the TCS/ICM and the WHITE connector (page 16-3-②) of the ABS ECU. (Do not yet install the ABS/TCS indicator light switch connector ③ and 16P connector ⑦ of the TCS/ICM.)

Turn the ignition switch ON.

(Continue to the following page)

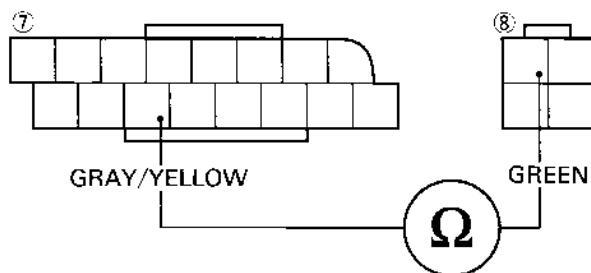
View from terminal side



No continuity

- Repair open in the GREEN harness or GRAY/YELLOW harness between the TCS/ICM and ABS/TCS indicator light switch connector.

View from terminal side



Continuity

- Repair short in the GRAY/YELLOW harness between the TCS/ICM and ABS/TCS indicator light switch.

(From the previous page)

Check for voltage between the main harness side connector ③ terminals of the ABS/TCS indicator light switch.

Is there approximately 5V?

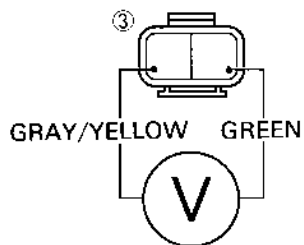
Yes

• Faulty TCS/ICM

No

• Faulty ABS ECU

View from terminal side



# 20. Electric Starter

<b>Service Information</b>	<b>20-1</b>	<b>Starter Motor Removal/Installation</b>	<b>20-6</b>
<b>System Location</b>	<b>20-2</b>	<b>Starter Motor Disassembly/Assembly</b>	<b>20-7</b>
<b>Troubleshooting</b>	<b>20-4</b>		

## Service Information

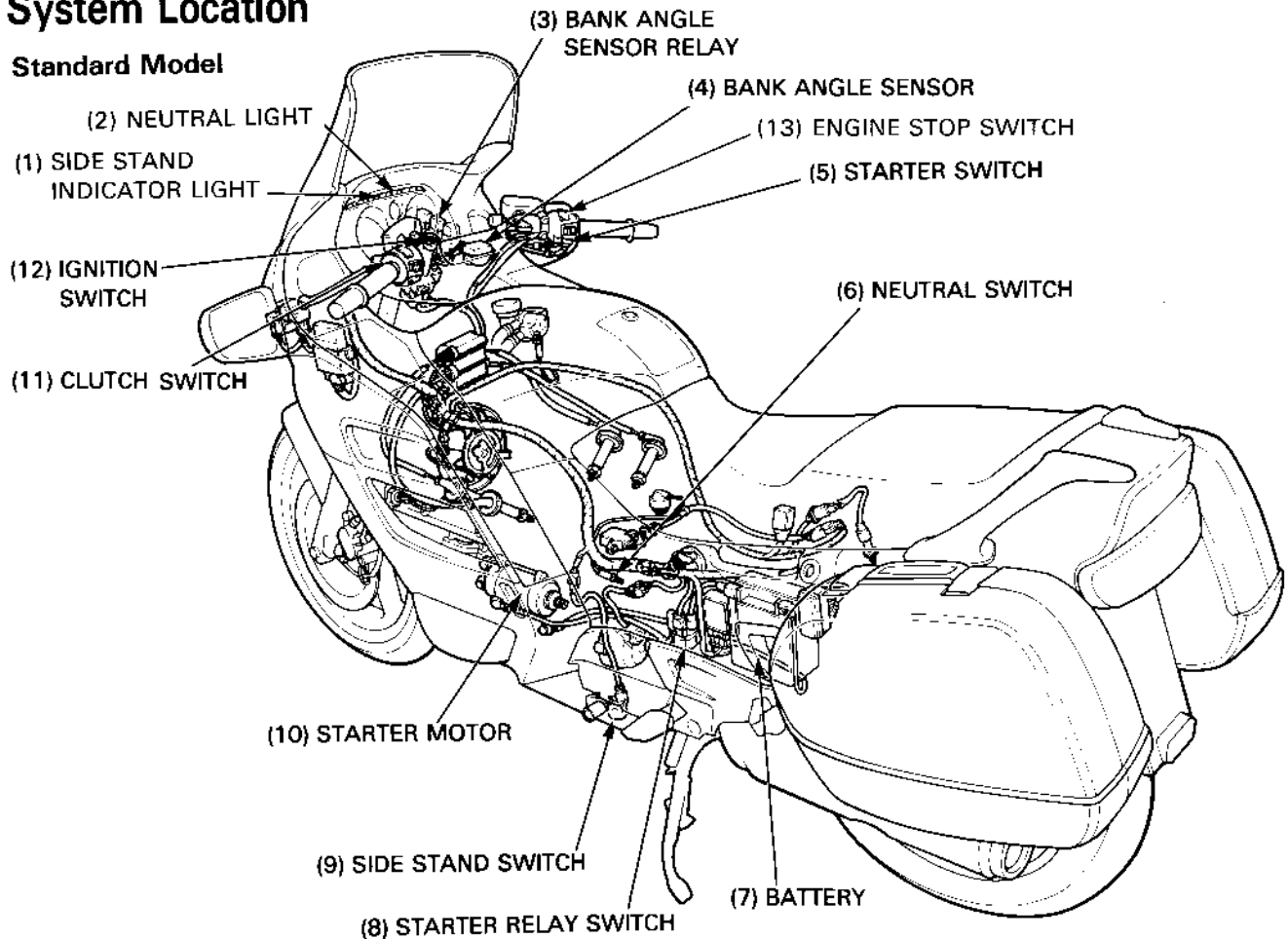
### ▲ WARNING

- **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 kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- For the following component inspections, refer to the following pages; for the parts locations, see page 20-2 of this manual (System Location).

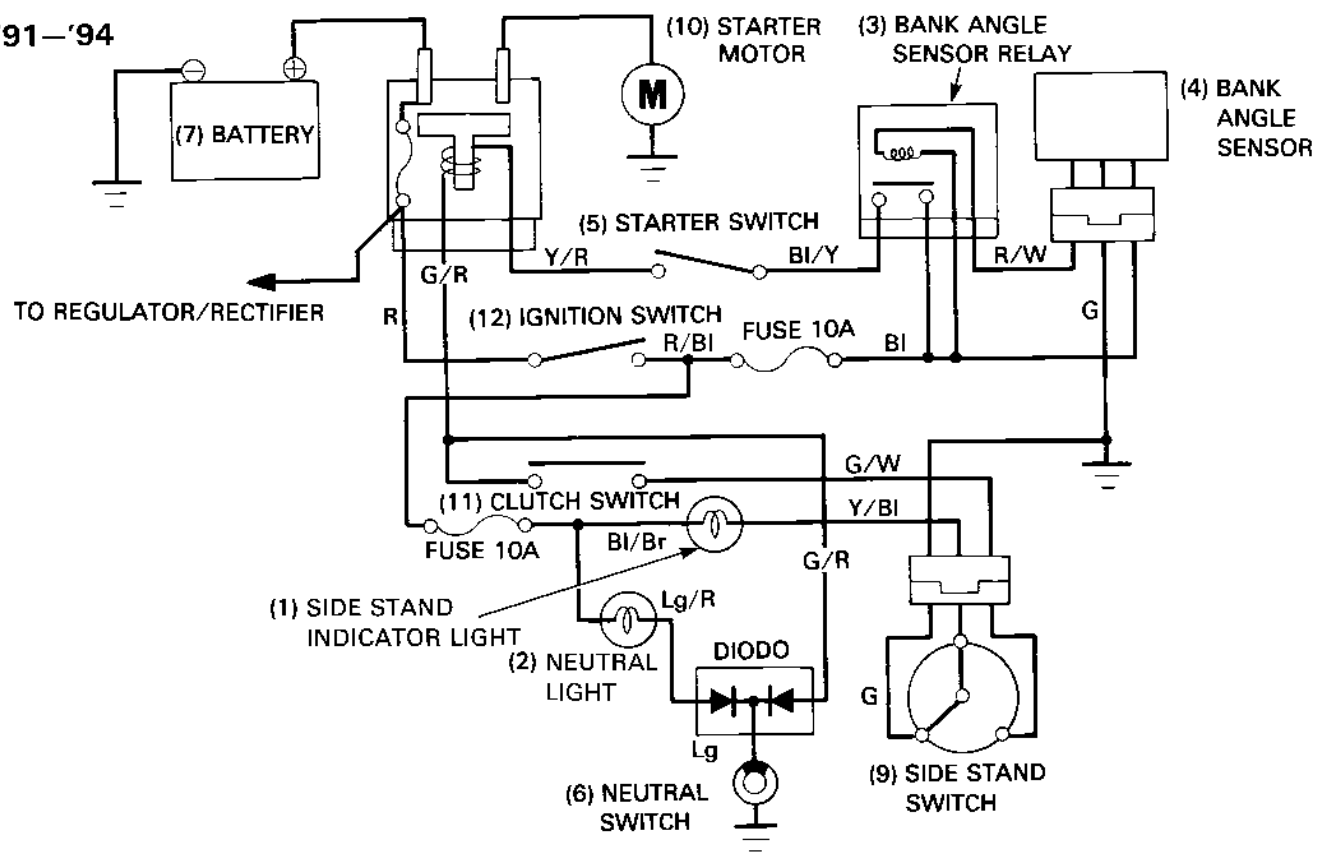
Clutch switch diode	Section 24 of the Common Service Manual.
Starter motor	Section 24 of the Common Service Manual.
Clutch switch	Section 25 of the Common Service Manual.
Neutral switch	Section 25 of the Common Service Manual.
Ignition switch	Check for continuity on the continuity chart of the Wiring Diagram, section 22.
Side stand switch	See page 21-4.

# System Location

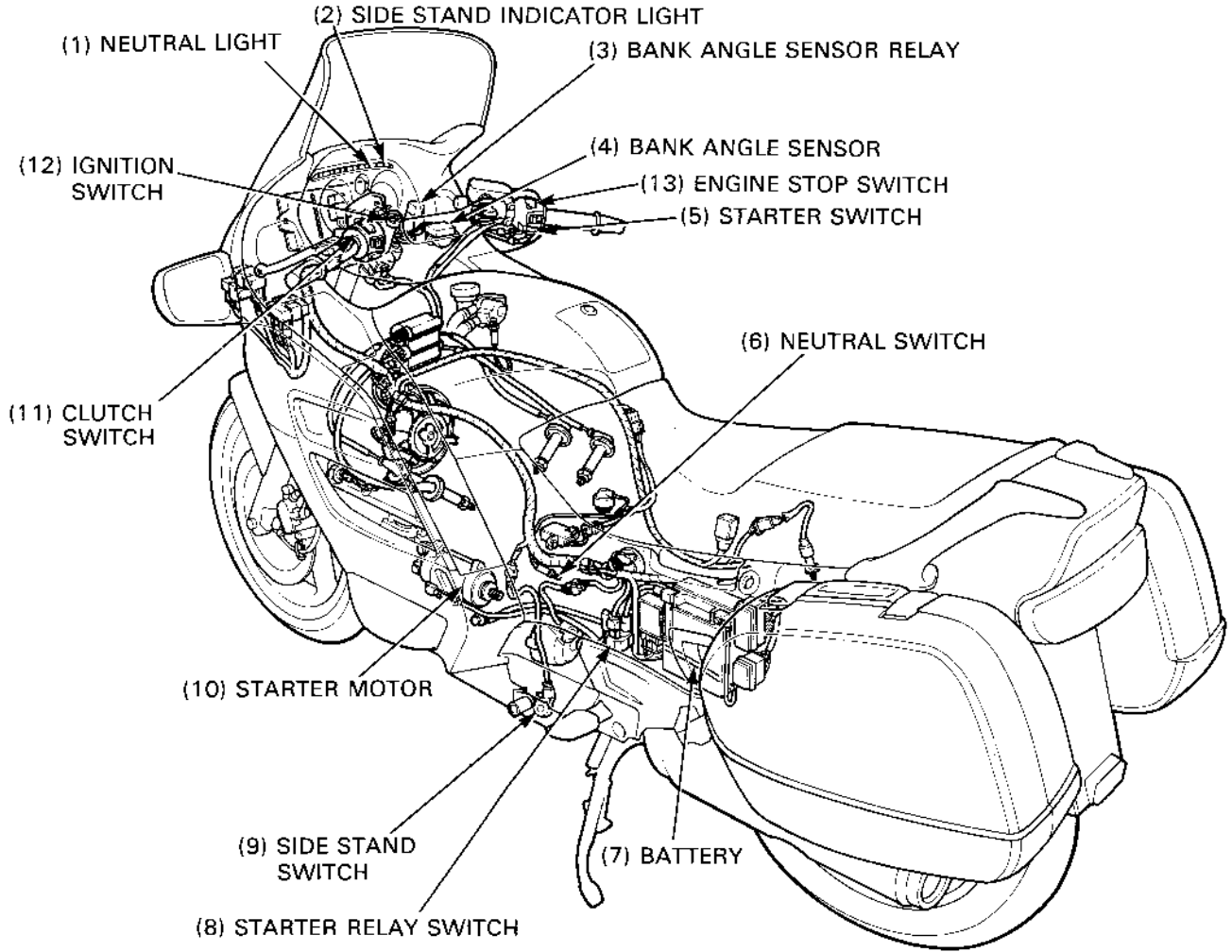
## Standard Model



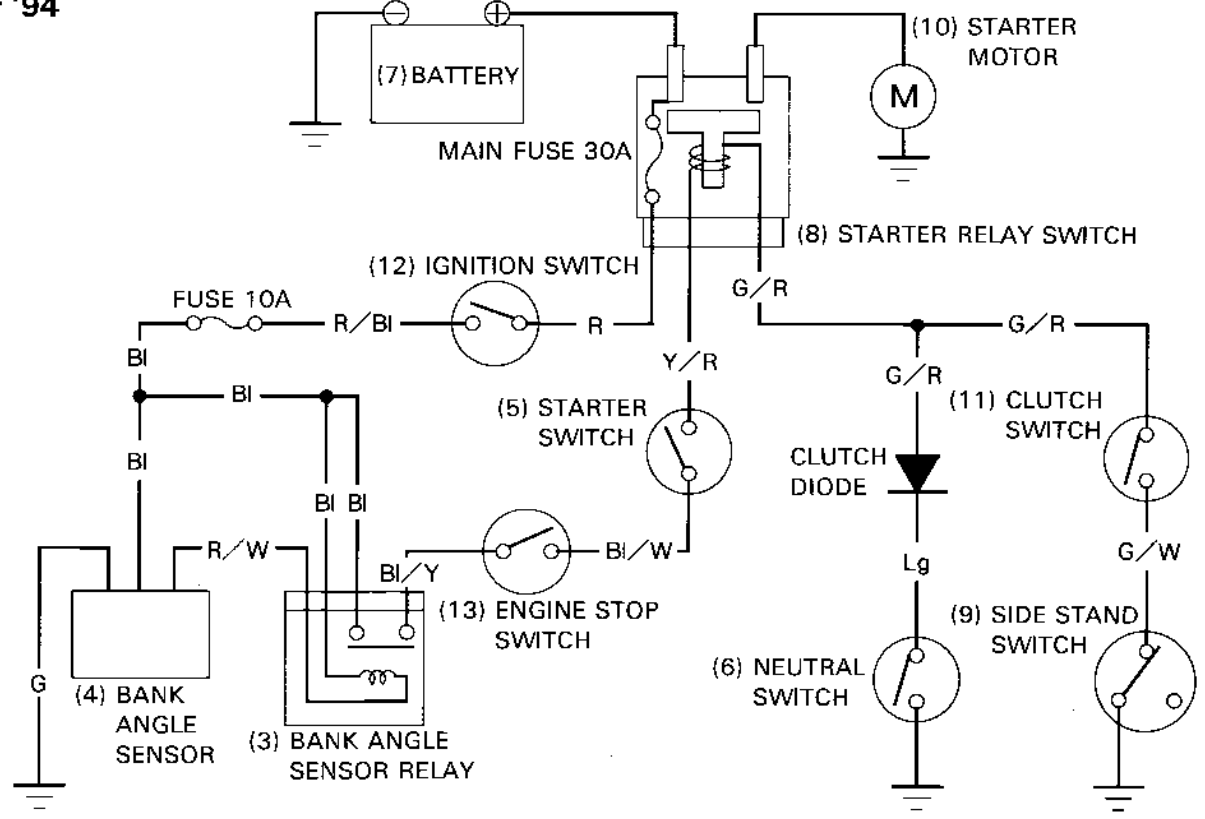
'91-'94



ABS/TCS or LBS-ABS/TCS Model



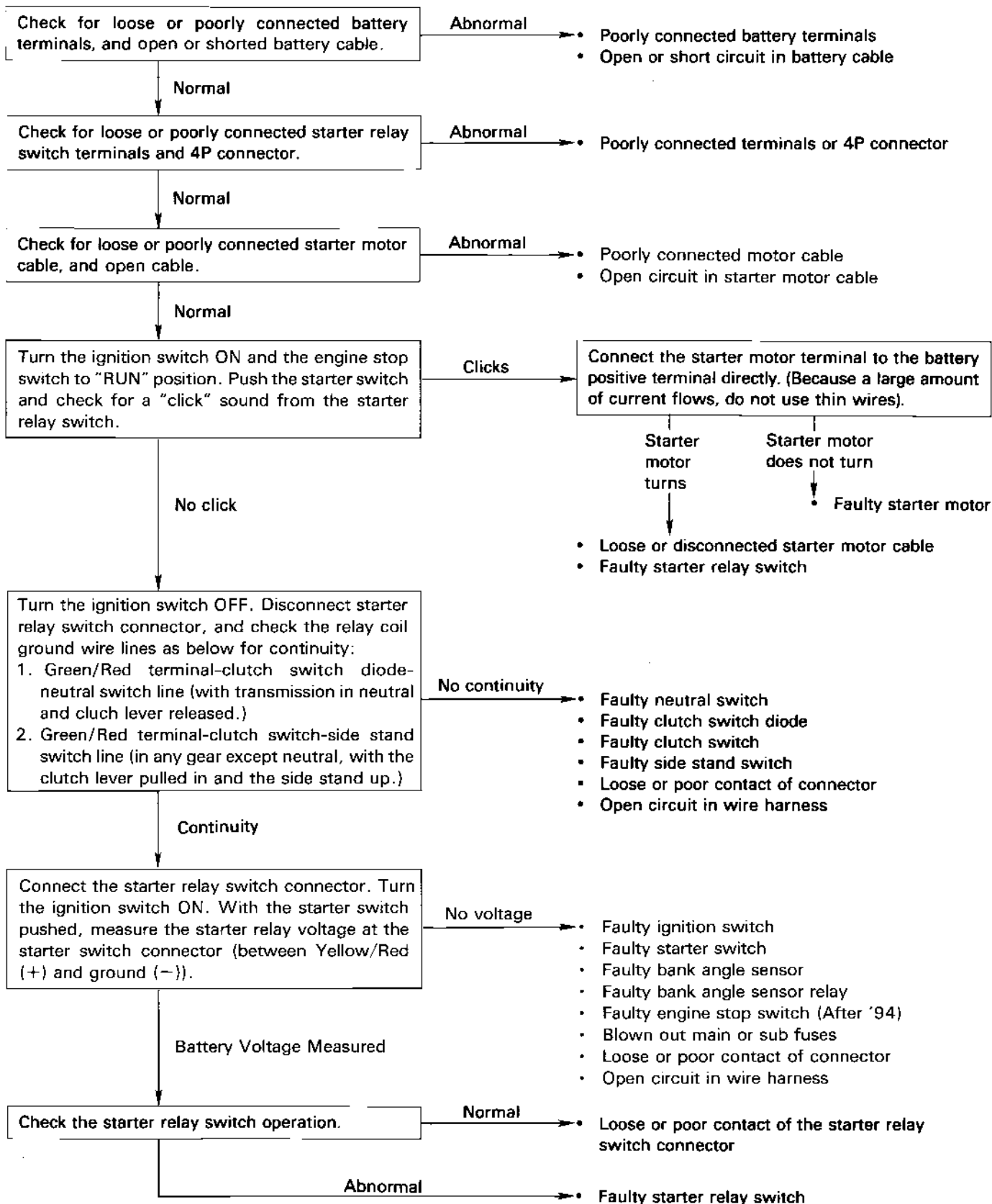
After '94



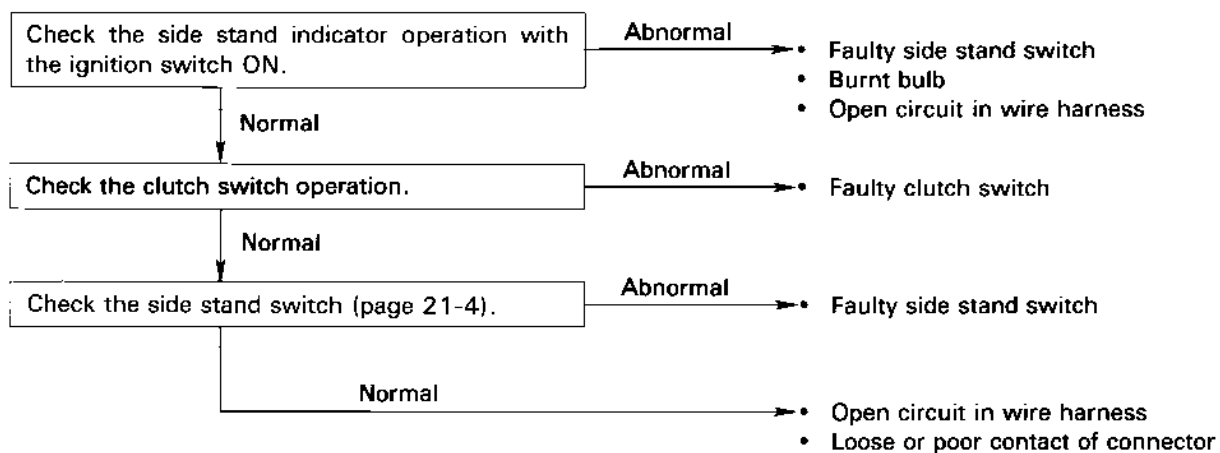
# Troubleshooting

## Starter motor will not turn

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



The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.



#### 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 turns, but engine does not turn

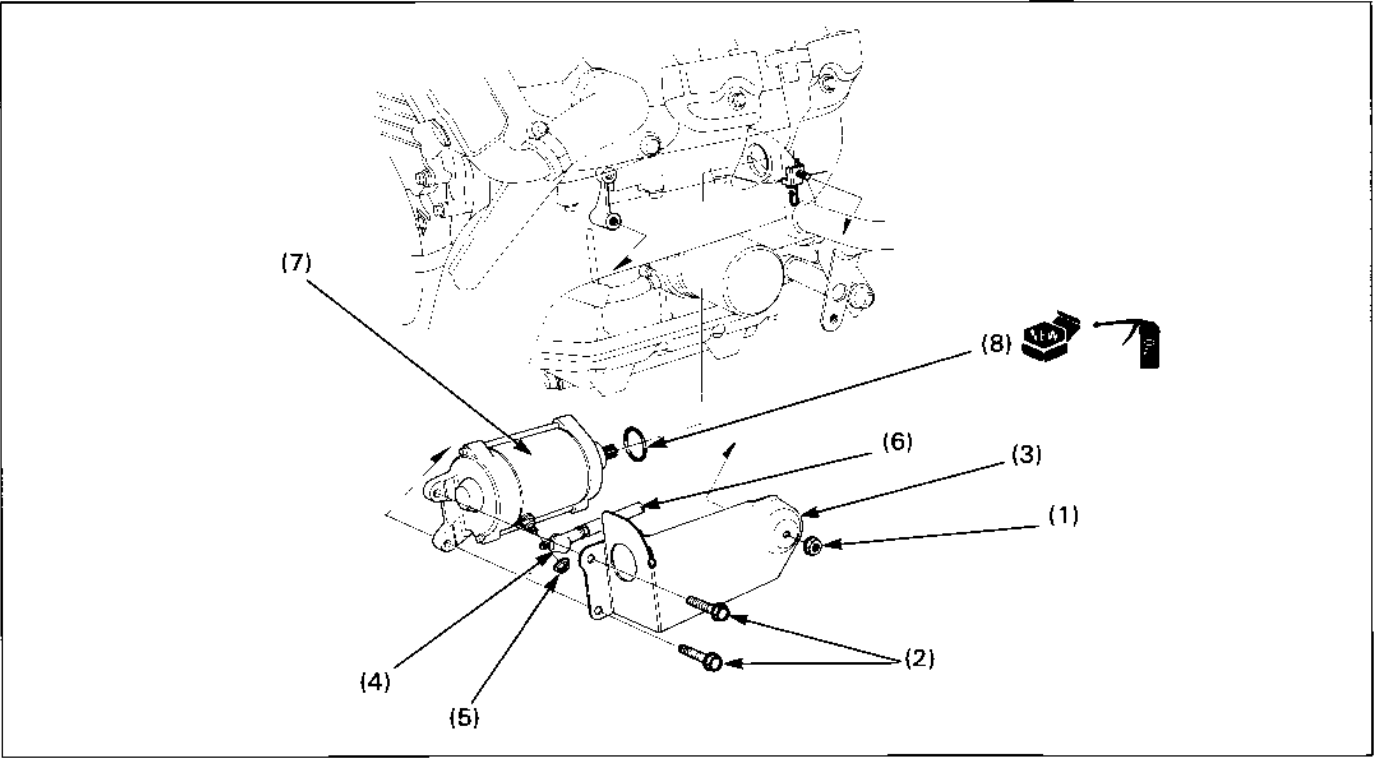
- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter pinion
- Damaged reduction gears

#### Starter relay switch "clicks", but engine does not turn over

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



# Starter Motor Removal/Installation

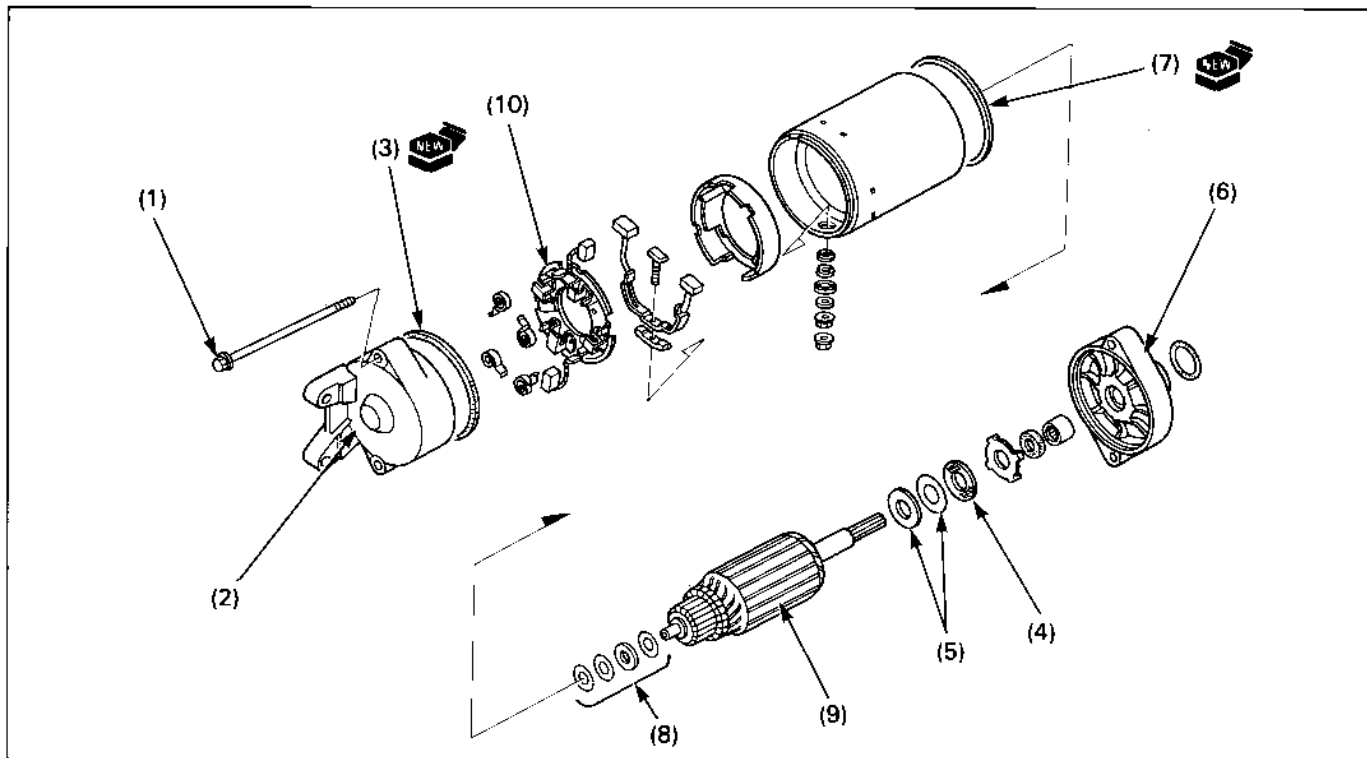


## Requisite Service

- Middle fairing removal/installation (page 2-8)
- With the ignition switch "OFF", remove the negative cable at the battery before servicing the starter motor.

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Heat guard mounting nut	1	
(2) Starter motor mounting bolt	2	
(3) Starter motor heat guard	1	
(4) Starter motor terminal cover	1	
(5) Terminal nut	1	
(6) Starter motor cable	1	
(7) Starter motor assembly	1	
(8) O-ring	1	

# Starter Motor Disassembly/Assembly



## Requisite Service

- Starter motor removal/installation (page 20-6)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1) Starter motor cover bolt	2	
(2) Front cover	1	
(3) Packing	1	
(4) Insulator washer	1	
(5) Shim	—	Note the location and number of the shims.
(6) Rear Cover	1	
(7) Packing	1	
(8) Shim	—	Note the location and number of the shims.
(9) Armature	1	
(10) Brush holder	1	

# 21. Lights/Meters/Switches

<b>Service Information</b>	<b>21-1</b>	<b>Bank Angle Sensor</b>	<b>21-5</b>
<b>System Location</b>	<b>21-2</b>	<b>Fuel Cut-off Relay</b>	<b>21-5</b>
<b>Headlight</b>	<b>21-3</b>	<b>Fuel Pump Inspection</b>	<b>21-6</b>
<b>Front Turn Signal</b>	<b>21-3</b>	<b>Fuel light Test Circuit Inspection</b>	<b>21-6</b>
<b>Rear Turn Signal and Brake/Taillight</b>	<b>21-3</b>	<b>Fuel Pump Removal/Installation</b>	<b>21-7</b>
<b>Position Light</b>	<b>21-4</b>	<b>Combination Meter Removal/Installation</b>	<b>21-8</b>
<b>Indicator Bulb Replacement</b>	<b>21-4</b>	<b>Combination Meter Disassembly/Assembly</b>	<b>21-10</b>
<b>Side Stand Switch</b>	<b>21-4</b>		

## Service Information

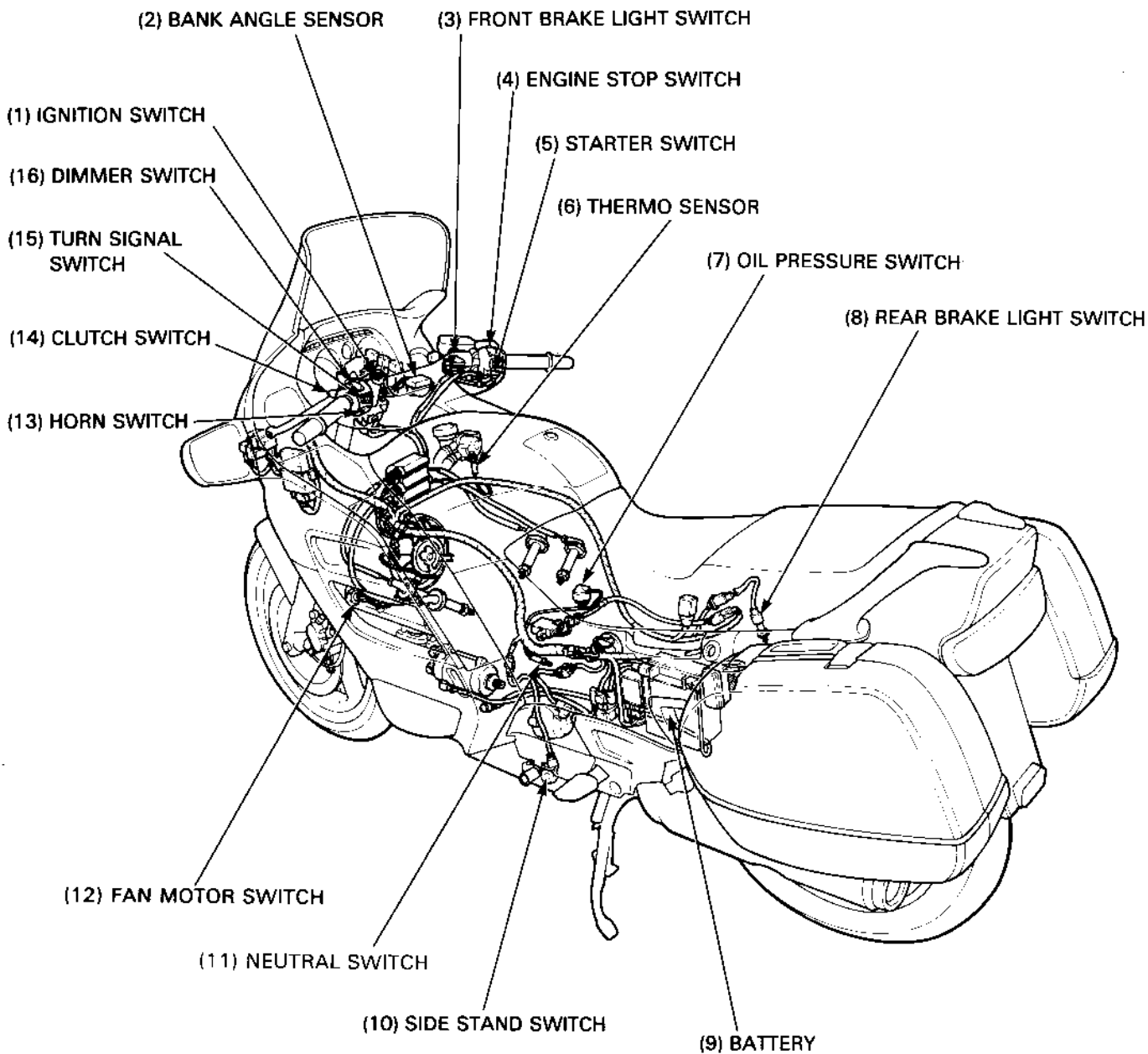
### ⚠ WARNING

- 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 an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated 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 fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened 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.  
For the following component locations, see page 21-2 of this manual (System Location); for inspections, refer to the applicable pages.

Component	Inspection method	Remarks
Clutch switch	Section 25 of the Common Service Manual	
Front brake light switch	Section 25 of the Common Service Manual	
Horn	Section 25 of the Common Service Manual	
Handlebar switches	Check for continuity on the continuity chart of the Wiring Diagram, section 22.	Switch connectors are located behind the instruments (page 1-25).
Ignition switch		
Neutral switch	Section 25 of the Common Service Manual	TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb) Apply sealant to the threads.
Oil pressure switch/indicator light	Section 25 of the Common Service Manual	Oil pressure check: Section 4 of the Common Service Manual. Oil pressure switch torque: 12 N·m (1.2 kg-m, 9 ft-lb)
Fan motor switch	Section 25 of the Common Service Manual	
Rear brake light switch	Section 25 of the Common Service Manual	
Turn signal lights	Section 25 of the Common Service Manual	

# System Location

Standard model shown:



# Headlight

## Bulb Replacement

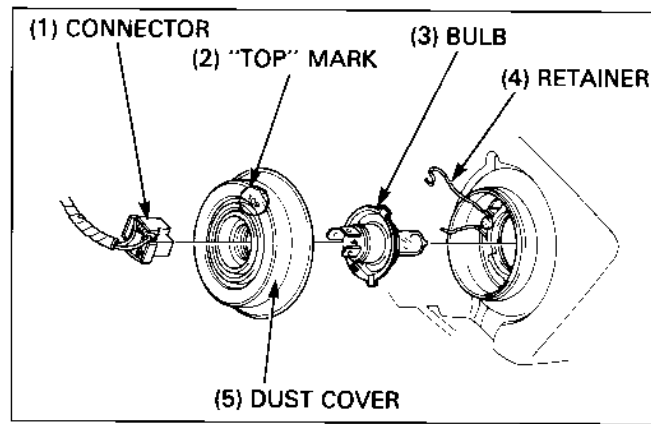
Remove the middle fairing inner cover (page 2-7).  
 Disconnect the connector and remove the dust cover.  
 Remove the bulb by removing the bulb retainer.  
 Install a new headlight bulb.

### CAUTION

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

### NOTE

- Install the dust cover with its "TOP" mark facing up.



# Front Turn Signal

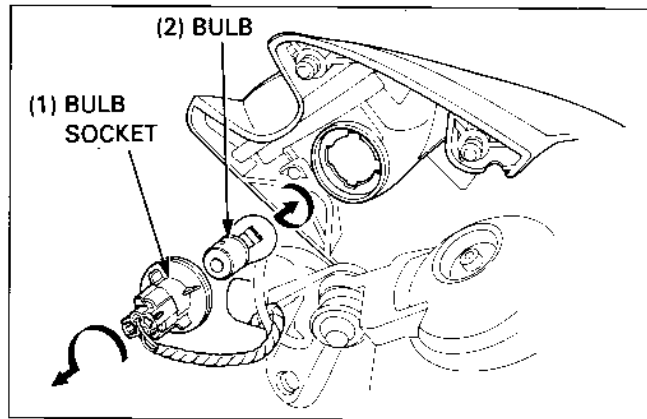
## Bulb Replacement

Remove the rear view mirror (page 2-8).  
 Remove the bulb socket by turning it counterclockwise.  
 Remove the bulb by turning it counterclockwise while pushing in the bulb.

### NOTE

- Check that the rubber seal is in good condition and replace it if necessary.

Installation is in the reverse order of removal.  
 Install the rear view mirror (page 2-8).



# Rear Turn Signal and Brake/ Taillight

## Bulb Replacement

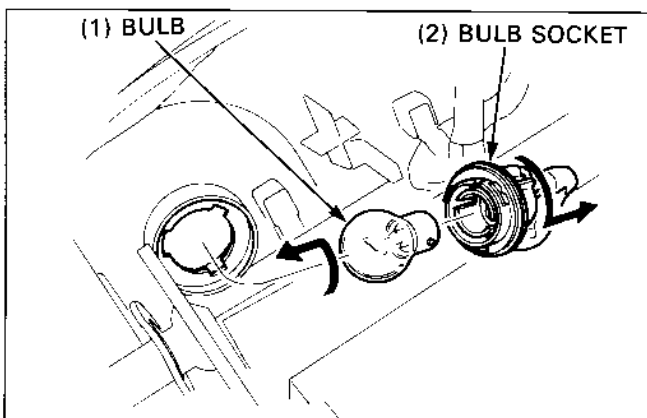
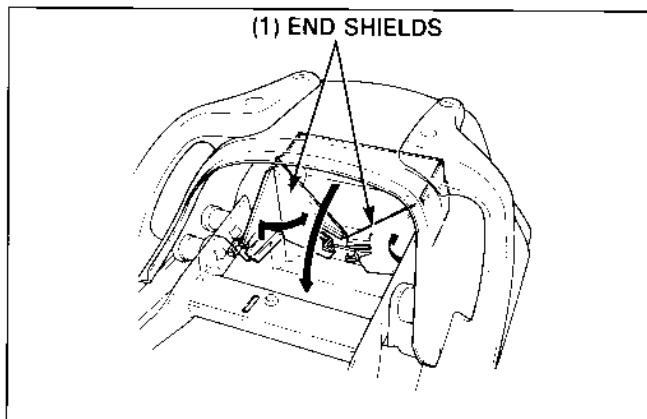
Remove the seat (page 2-2).  
 Fold the rear end shields as shown.

Remove the bulb socket by turning it counterclockwise.  
 Remove the bulb by turning it counterclockwise while pushing in the bulb.

### NOTE

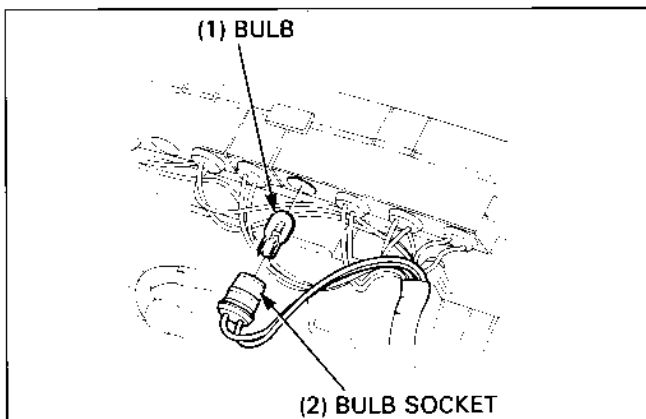
- Check that the rubber seal is in good condition and replace it if necessary.

Installation is in the reverse order of removal.  
 Install the seat (page 2-2).



## Indicator Bulb Replacement

Remove the instrument panel (page 2-7).  
 Remove the bulb socket and bulb.  
 Install a new bulb and install the removed parts in the reverse order of removal.



## Side Stand Switch

### Inspection

Remove the left side cover (page 2-2).  
 Disconnect the side stand 3P connector (green) and check for continuity between each terminal as shown below.  
 There should be continuity between the ○—○ positions on the continuity chart.

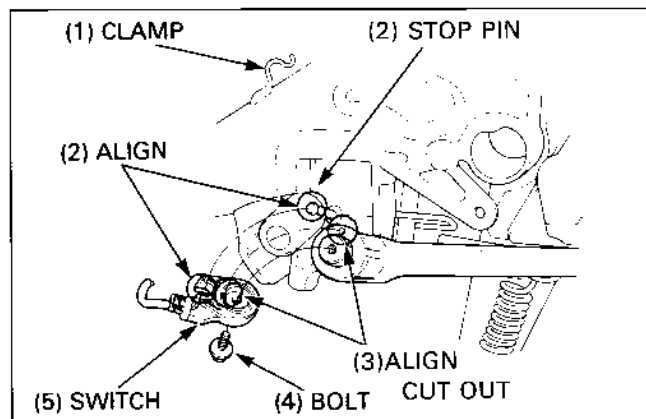
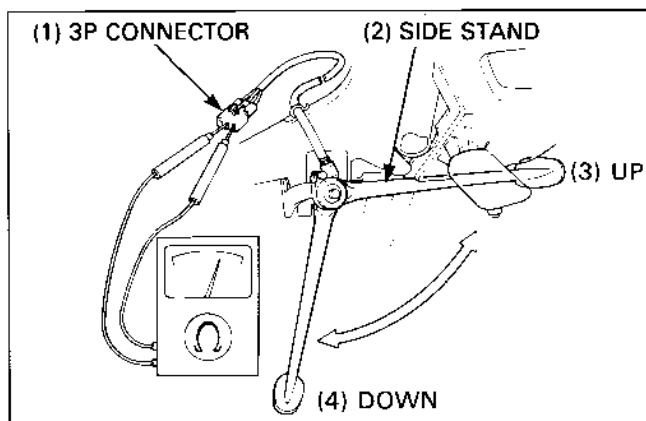
	Green/ White	Yellow/ Black	Green
Side stand down		○	○
Side stand up	○		○

Replace the side stand switch if Continuity is not as shown in the chart above.

### Replacement

Remove the pivot cover (page 2-5).  
 Disconnect the 3P connector (green) and release the wire from the clamp.  
 Remove the bolt and side stand switch.  
 Install the side stand switch aligning the stop pin on the frame with the cut out of the switch and the pin on the switch with the hole in the side stand.  
 Secure the side stand switch with the bolt.

**Torque: 10 N·m (1.0 kg-m, 7 ft-lb)**  
 Install removed parts in the reverse order of removal.

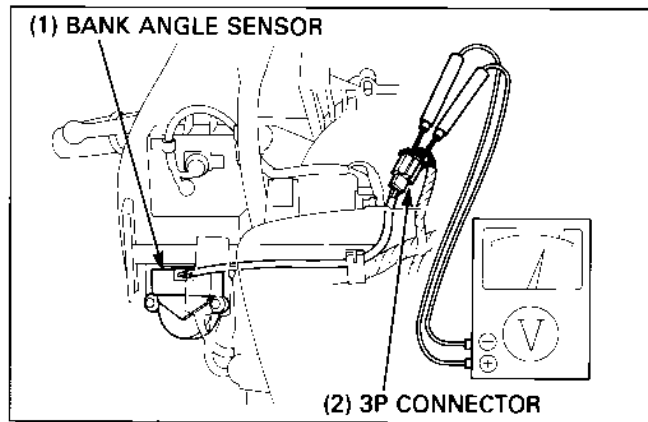


# Bank Angle Sensor

## Inspection

Remove the upper fairing (page 2-9).  
Turn the ignition switch "ON" and measure voltage between the following terminals of the bank angle sensor with the 3P connector (green) connected.

Terminals	Standard voltage
Red/White (+) and Green (-)	0-3.0V
White (+) and Green (-)	10.0-14.0V



Remove the screws and bank angle sensor.  
Turn the ignition switch "OFF".  
Place the bank angle sensor horizontal with the connector connected and turn the ignition switch "ON".  
The bank angle sensor is normal if the bank angle sensor relay clicks and the power supply line is closed.  
Position the bank angle sensor at approximately 50 degrees to the left or right with the ignition switch "ON".  
The bank angle sensor is normal if the bank angle sensor relay clicks and the power supply line is open.

## NOTE

- If you repeat this test, first turn the ignition switch "OFF", then back to "ON" before you try the test again.

Installation is in the reverse order of removal.

# Fuel Cut-off Relay

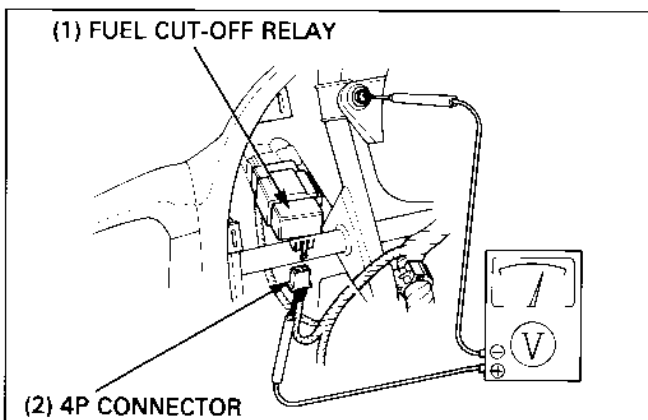
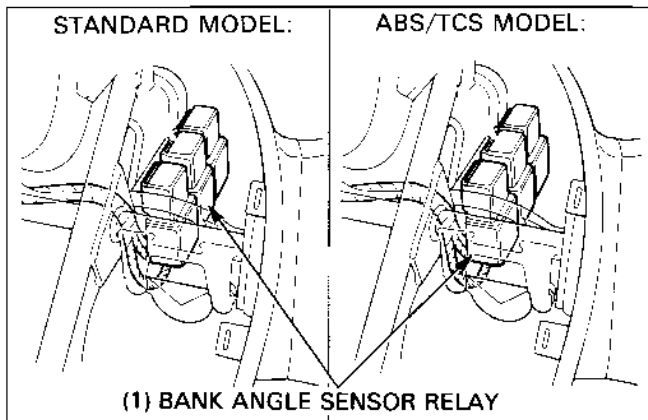
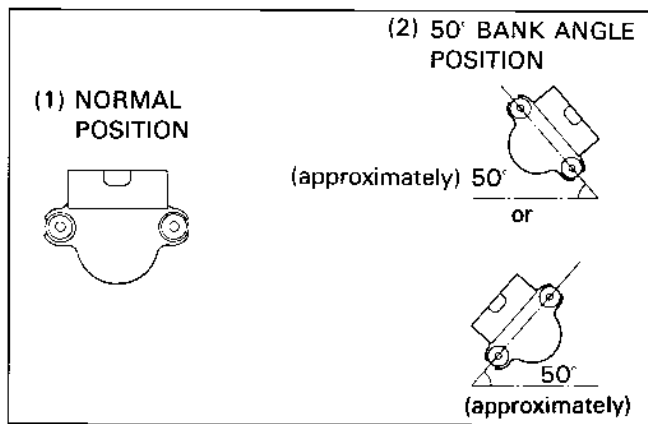
### ⚠ WARNING

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

Remove the instrument panel (page 2-7).  
Check the sub fuse (10A:IGN, STARTER, ACG).  
Check the relay 4P connector (white) for looseness and corrosion.

Disconnect the relay connector and test the wires to the main harness side.

Item	Standard
Between the Bl/W (+) and body ground (-) with the ignition switch "ON".	Battery voltage should register
Bu/Y wire between the pump relay and fuel pump.	Continuity
Br/R wire between the fuel pump relay and fuel pump.	Continuity
Green wire and body ground	Continuity



## Fuel Pump Inspection

Turn the ignition switch "OFF".  
 Remove the instrument panel (page 2-7).  
 Remove the seat (page 2-2).  
 Disconnect the fuel outlet tube at the fuel filter.

**⚠ WARNING**

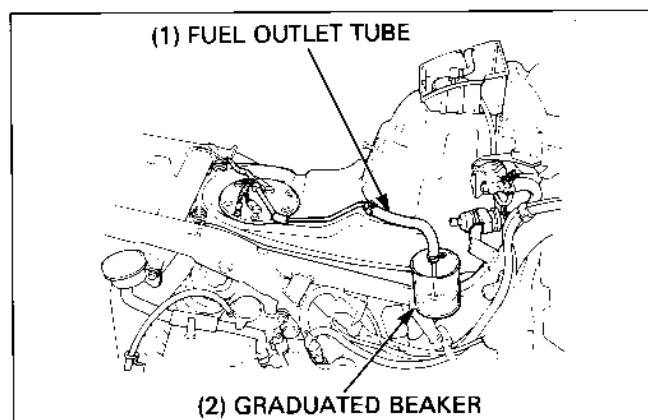
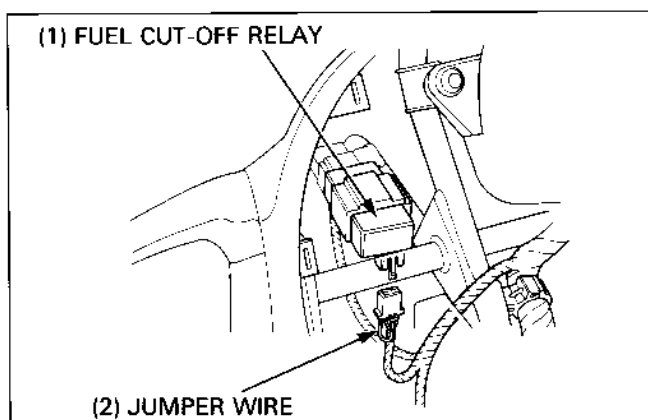
- Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area.  
 Do not smoke or allow flames or sparks in the your work area or where gasoline is stored.

Short the Black and Brown/Red wire terminals with a jumper wire.

Turn the ignition switch "ON" and let fuel flow into a graduated beaker for 5 seconds, then turn the ignition switch "OFF".

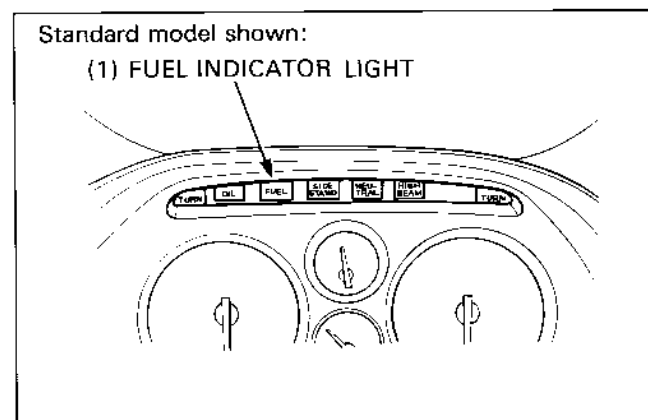
Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

Fuel pump flow minimum capacity:  
 640cc (0.676 U.S.qt, 0.563 Imp qt)/minute



## Fuel Light Test Circuit Inspection

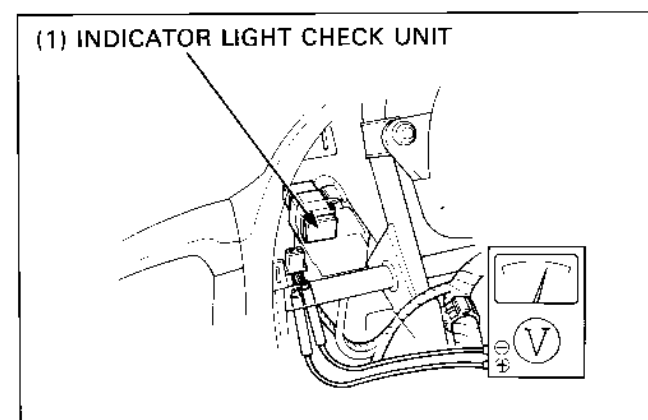
Turn the ignition switch "ON".  
 The fuel indicator light should come on for few seconds, then go off.  
 If it does not come on, check the fuel sensor circuit.



If there is no problem with the circuit, remove the upper fairing (page 2-9) and disconnect the indicator light check unit connector.

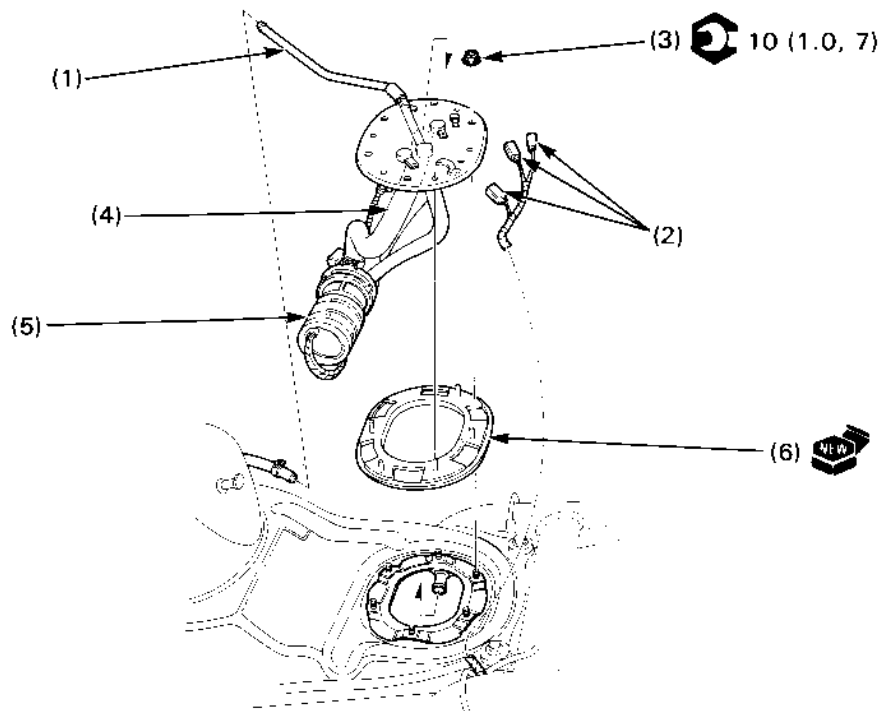
Measure the voltage between the Black/Brown and Green/Black wires of the connector at the wire harness side.

Battery voltage should be measured.  
 If battery voltage is measured, replace the check unit.  
 If battery voltage is not measured, check the wire harness for an open, short circuit or loose connection.





## Fuel Pump Removal/Installation



### ⚠ WARNING

- Gasoline is extremely flammable and is explosive under certain conditions. Refuel in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in your work area or where gasoline is stored.
- Keep away from flames or sparks. Wipe up spilled gasoline at once.

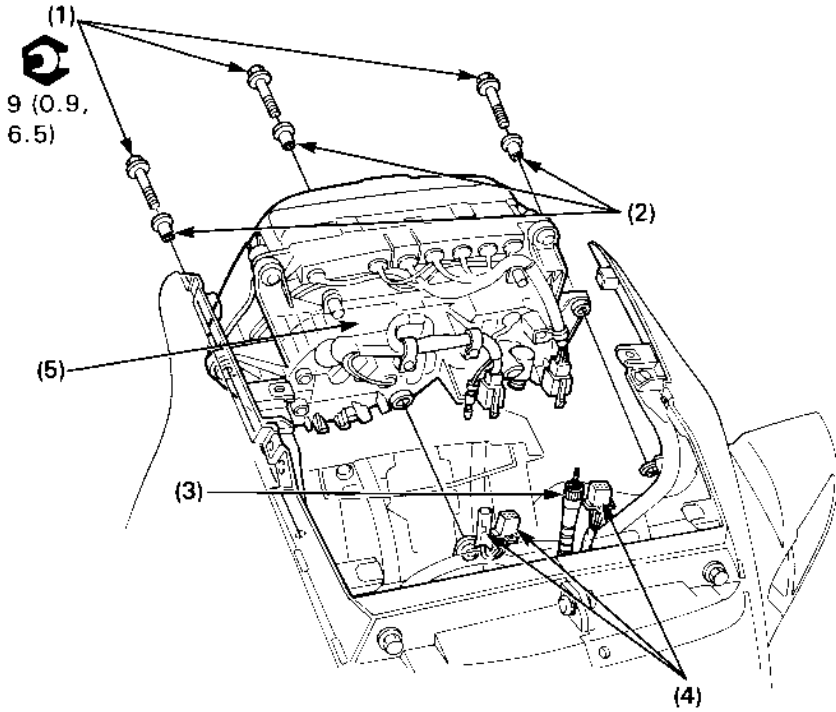
### Requisite Service

- Seat removal/installation (page 2-2)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Fuel outlet tube	1	
(2) Fuel pump/level sensor connector	3	
(3) Fuel pump mounting nut	6	
(4) Fuel inlet tube	1	
(5) Fuel pump assembly	1	
(6) Base packing	1	

# Combination Meter Removal/Installation

Standard Model

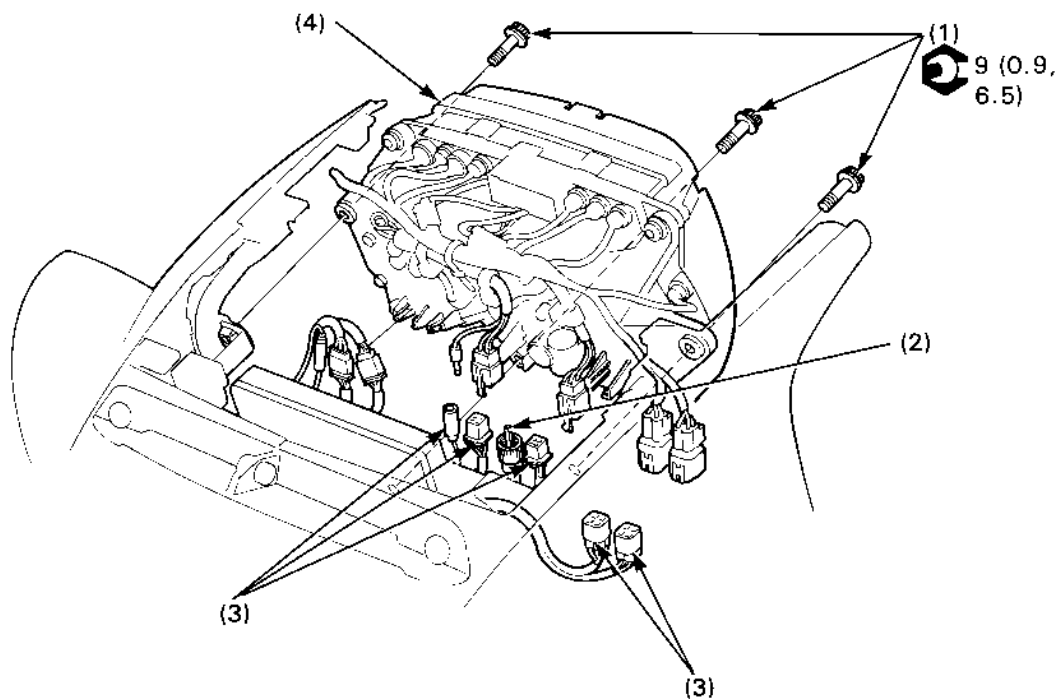


## Requisite Service

- Instrument panel removal/installation (page 2-7)

Procedure		Q'ty	Remarks
	<b>Removal Order</b>		Installation is in the reverse order of removal.
(1)	Meter mounting bolt	3	
(2)	Collar	3	
(3)	Speedometer cable	1	
(4)	Meter connector	3	
(5)	Meter assembly	1	

## ABS/TCS Model



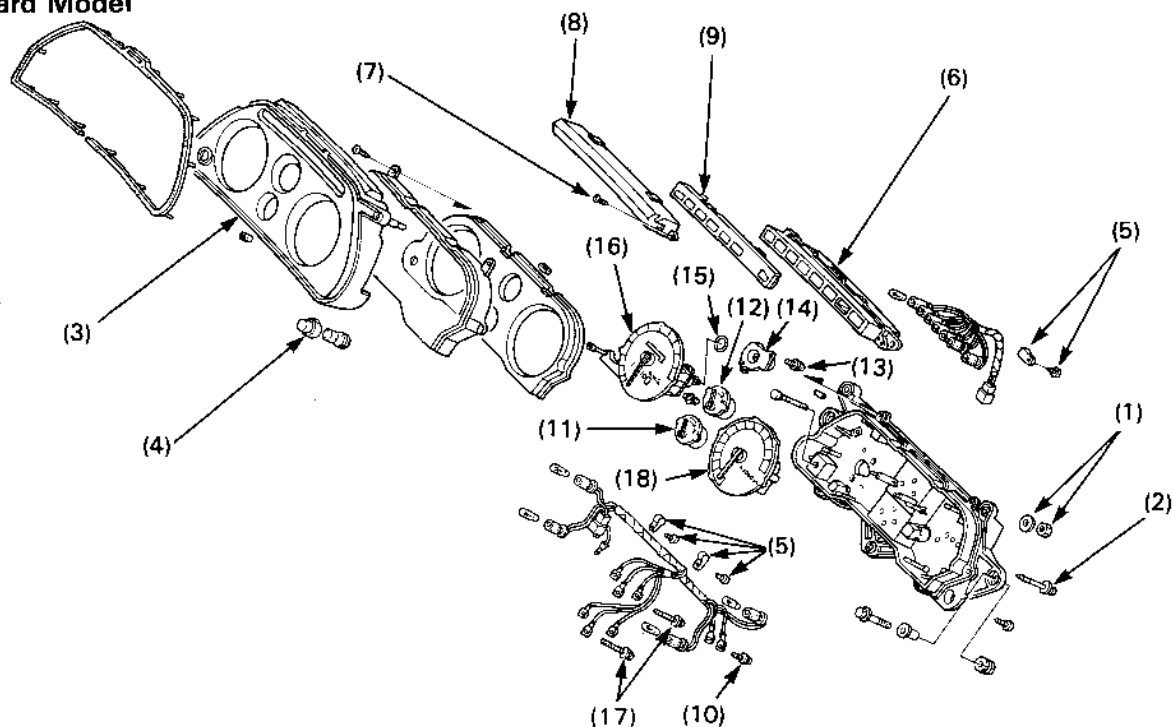
## Requisite Service

- Instrument panel removal/installation (page 2-7)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Meter mounting bolt	3	
(2) Speedometer cable	1	
(3) Meter connector	5	
(4) Meter assembly	1	

# Combination Meter Disassembly/Assembly

## Standard Model

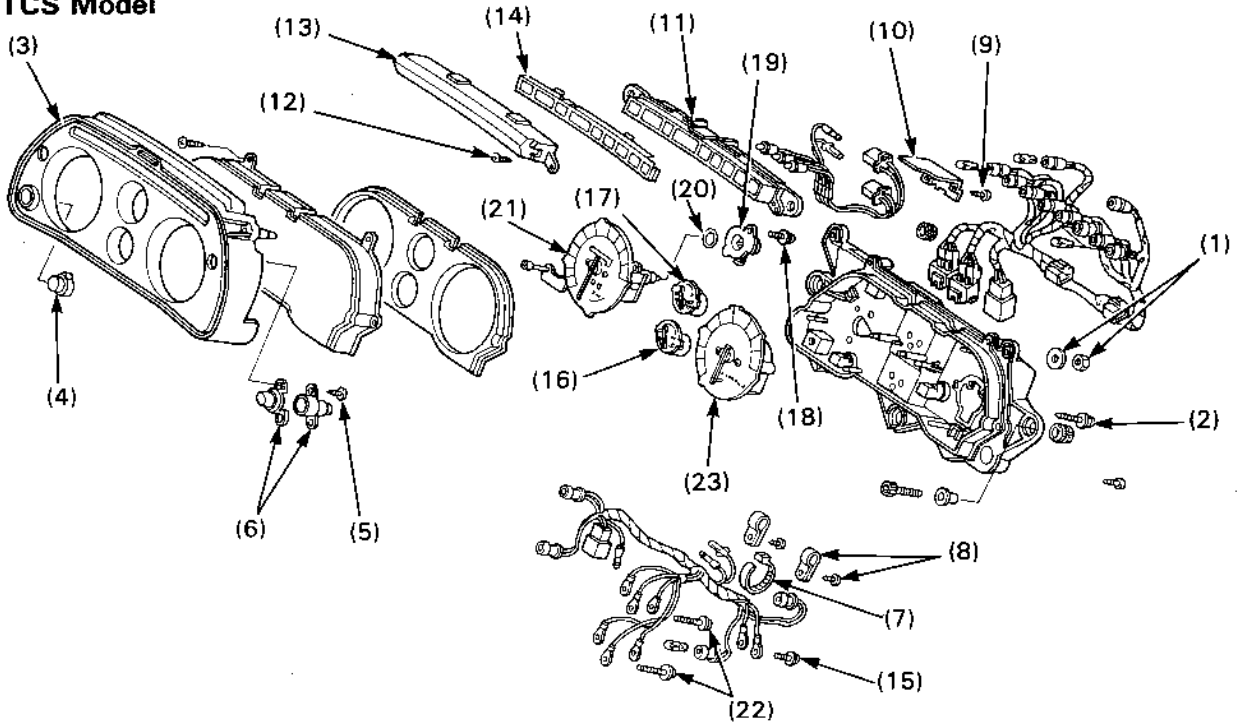


### Requisite Service

- Combination meter removal/installation (page 21-8)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1) Nut/washer	2/2	
(2) Screw	5	
(3) Meter visor	1	
(4) Reset knob	1	
(5) Screw/Band	3/3	
(6) Indicator housing	1	
(7) Screw	2	
(8) Cover	1	
(9) Indicator lens	1	
(10) Terminal screw	6	
(11) Fuel gauge	1	
(12) Temperature gauge	1	
(13) Screw	4	
(14) Speedometer gear box	1	
(15) O-ring	1	
(16) Speedometer	1	
(17) Screw	2	
(18) Tachometer	1	

**ABS/TCS Model**

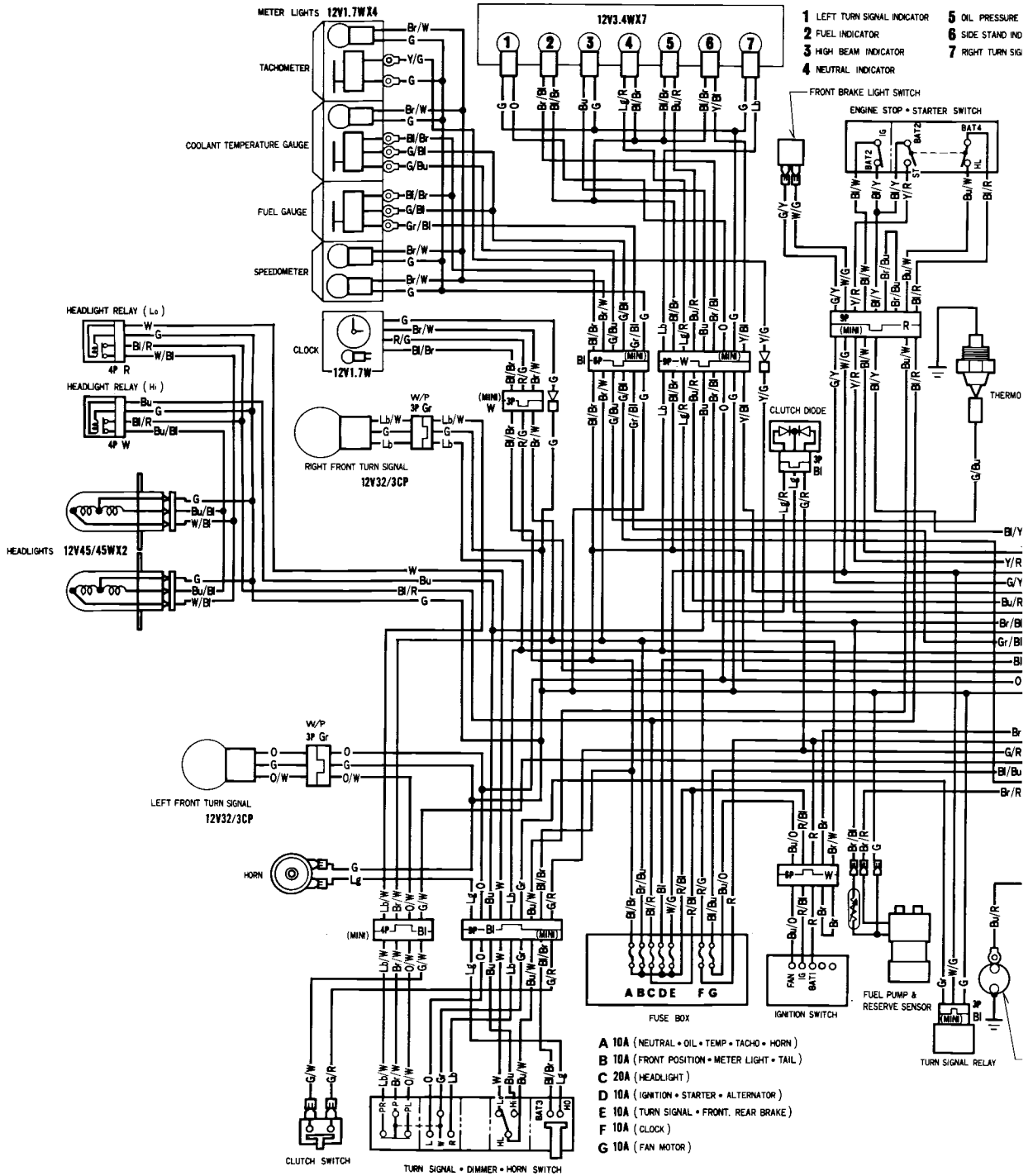


**Requisite Service**

- Combination meter removal/installation (page 21-9)

Procedure		Q'ty	Remarks
<b>Disassembly Order</b>			Assembly is in the reverse order of disassembly.
(1)	Nut/washer	2/2	
(2)	Screw	5	
(3)	Meter visor	1	
(4)	Reset knob	1	
(5)	Screw	4	
(6)	Lens/case	1/1	
(7)	Harness band	1	
(8)	Screw/band	2/2	
(9)	Screw	2	
(10)	Cover	1	
(11)	Indicator housing	1	
(12)	Screw	2	
(13)	Cover	1	
(14)	Indicator lens	1	
(15)	Terminal screw	6	
(16)	Fuel gauge	1	
(17)	Temperature gauge	1	
(18)	Screw	4	
(19)	Speedometer gear box	1	
(20)	O-ring	1	
(21)	Speedometer	1	
(22)	Screw	2	
(23)	Tachometer	1	

# 22. Wiring Diagram (Standard Model) ('91-'94)



- 1 LEFT TURN SIGNAL INDICATOR
- 2 FUEL INDICATOR
- 3 HIGH BEAM INDICATOR
- 4 NEUTRAL INDICATOR
- 5 OIL PRESSURE
- 6 SIDE STAND IND
- 7 RIGHT TURN SIGNAL

- A 10A (NEUTRAL + OIL + TEMP + TACHO + HORN)
- B 10A (FRONT POSITION + METER LIGHT + TAIL)
- C 20A (HEADLIGHT)
- D 10A (IGNITION + STARTER + ALTERNATOR)
- E 10A (TURN SIGNAL + FRONT. REAR BRAKE)
- F 10A (CLOCK)
- G 10A (FAN MOTOR)

TURN SIGNAL SWITCH

	W	R	L	P	PR	PL
R	○	○		○	○	○
N				○	○	○
L	○		○	○	○	○

DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	○
(N)			
Hi	○	○	○

HORN SWITCH

	HO	BAT3
FREE		
PUSH	○	○

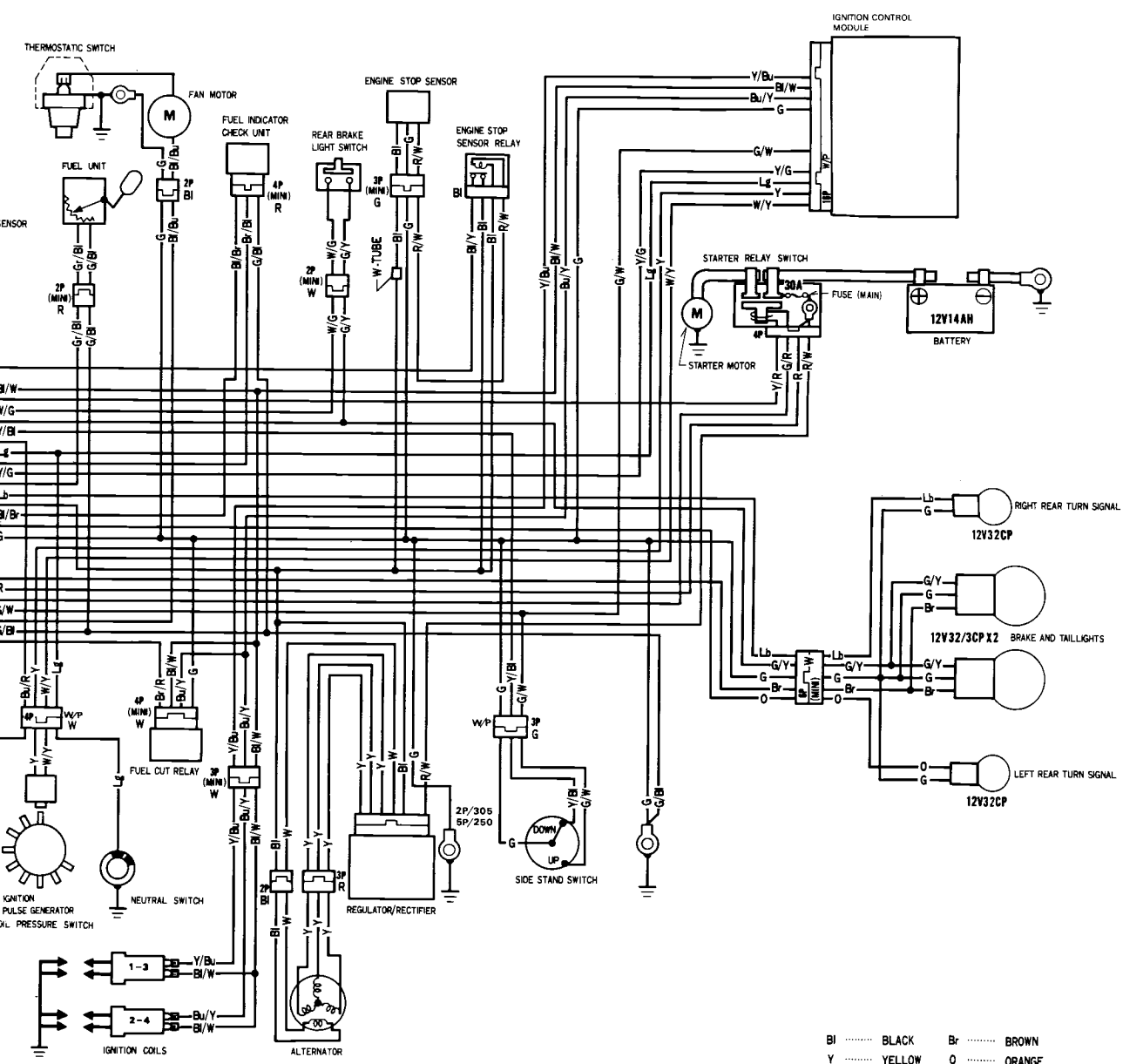
ENGINE STOP SWITCH

	IG	BAT2
OFF		
RUN	○	○

STARTER SWITCH

	ST	BAT2	BAT4
FREE			○
PUSH	○	○	

LIGHT  
ATOR  
AL INDICATOR

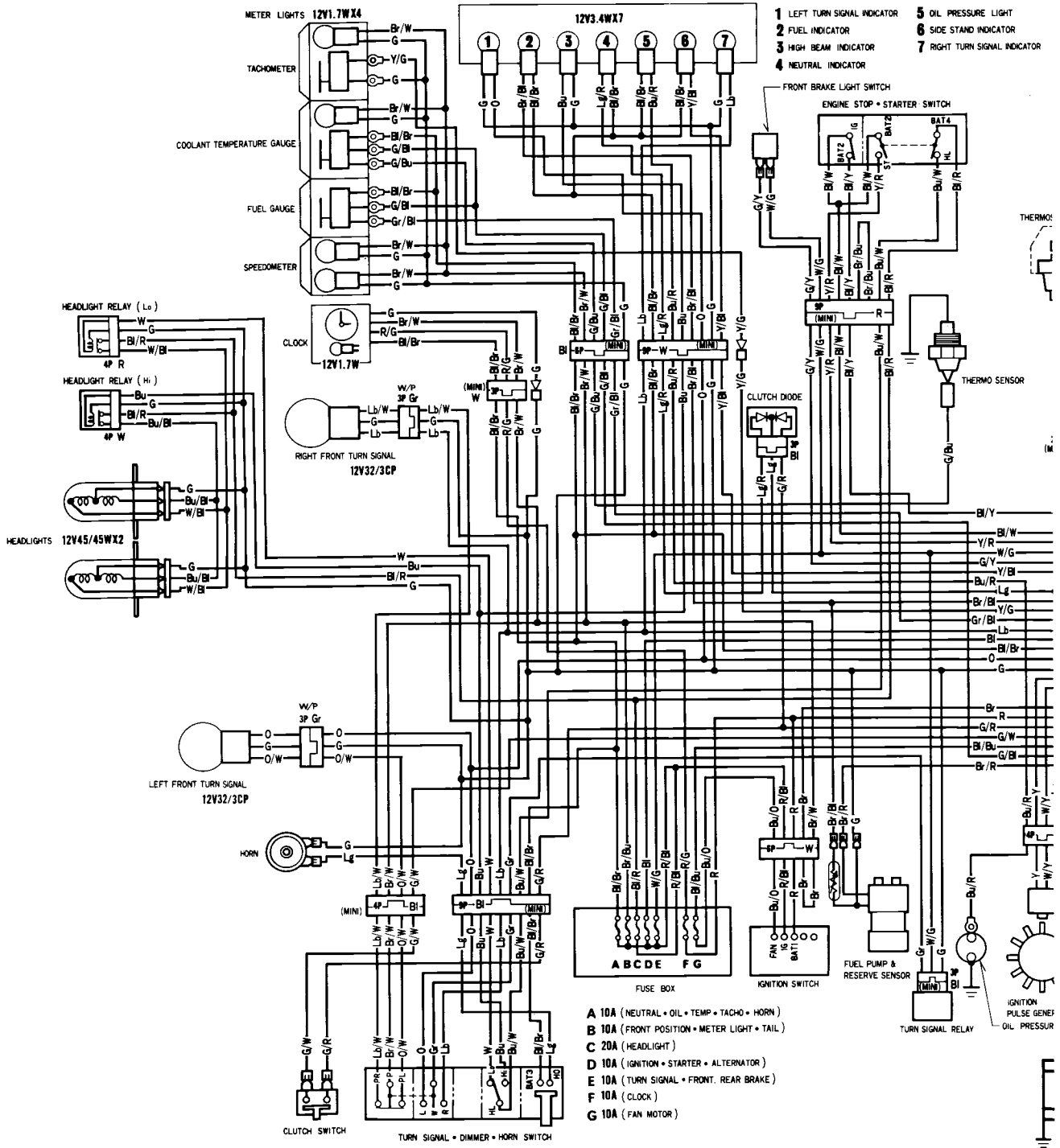


- BI ..... BLACK
- Y ..... YELLOW
- Bu ..... BLUE
- G ..... GREEN
- R ..... RED
- W ..... WHITE
- Br ..... BROWN
- O ..... ORANGE
- Lb ..... LIGHT BLUE
- Lg ..... LIGHT GREEN
- P ..... PINK
- Gr ..... GRAY

IGNITION SWITCH

	FAN	IG	BATI
ON	○	○	○
OFF			
LOCK			

(Standard Model) ('95)



TURN SIGNAL SWITCH

	W	R	L	P	PR	PL
R	○	○		○	○	○
N				○	○	○
L			○	○	○	○

DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
(N)			○
Hi			○

HORN SWITCH

	HO	BAT3
FREE		
PUSH	○	○

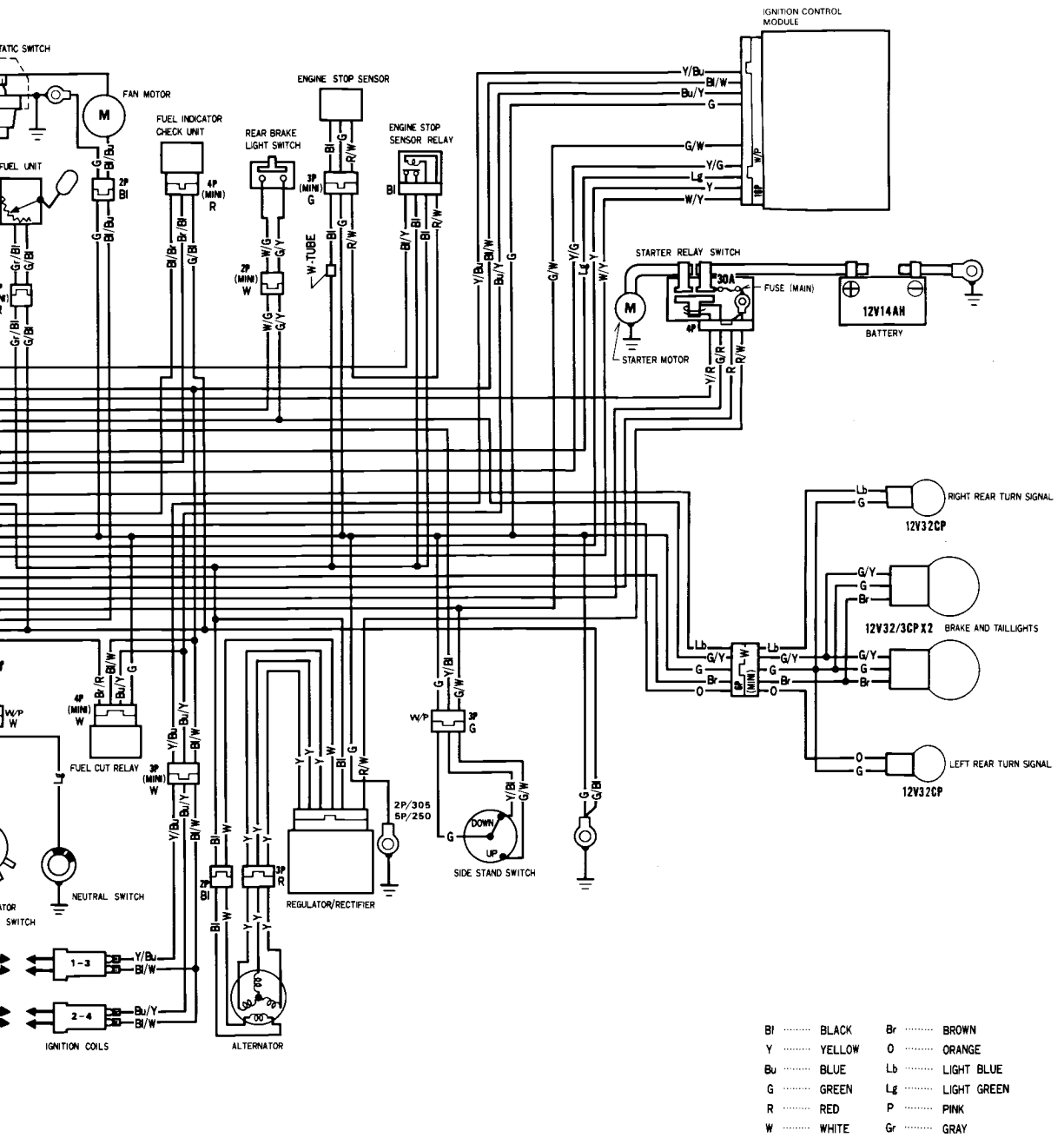
ENGINE STOP SWITCH

	IG	BAT2
OFF		
RUN	○	○

STARTER SWITCH

	ST	BAT2	BAT4	HL
FREE			○	○
PUSH	○	○		





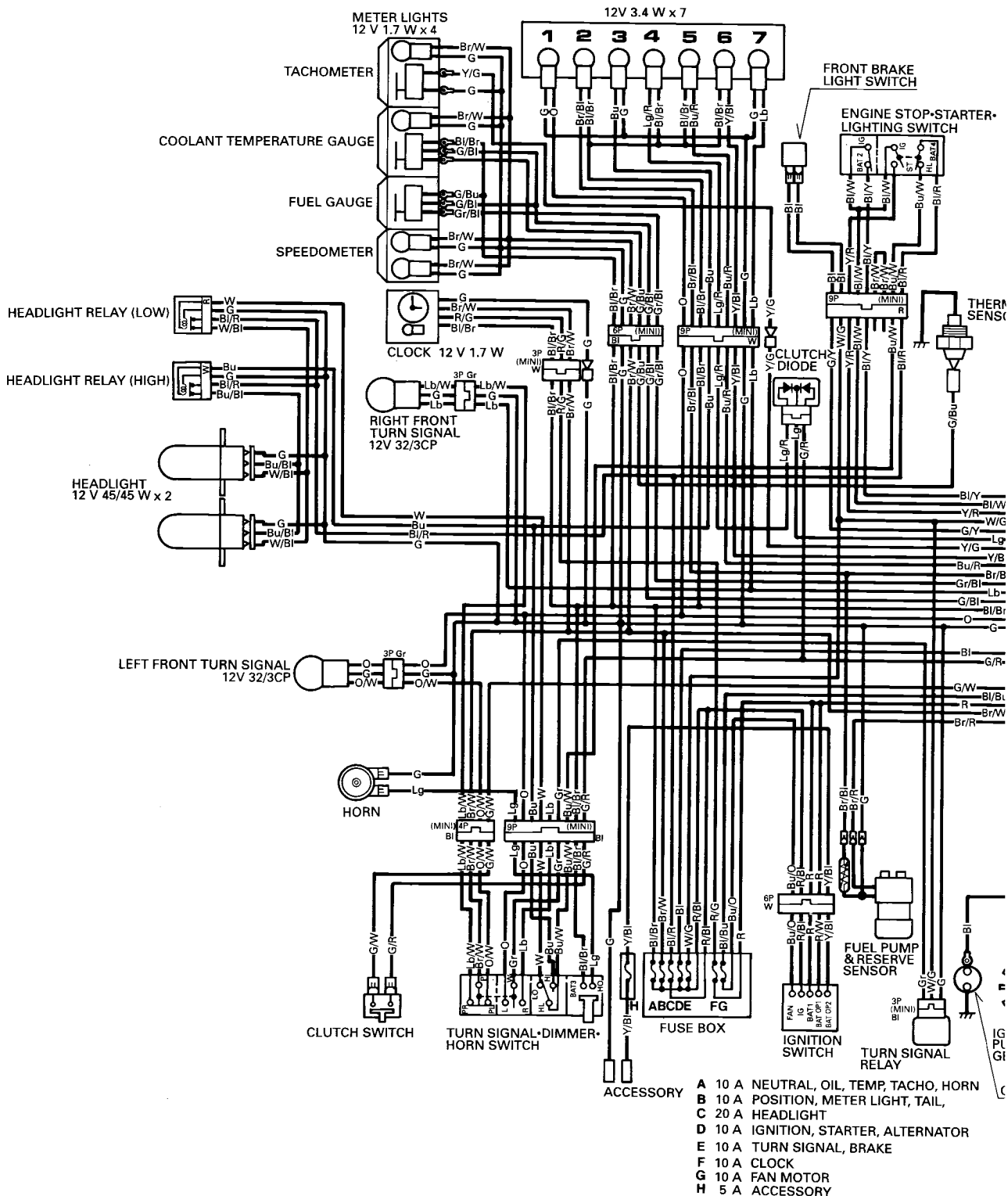
- BI ..... BLACK
- Y ..... YELLOW
- Bu ..... BLUE
- G ..... GREEN
- R ..... RED
- W ..... WHITE
- Br ..... BROWN
- O ..... ORANGE
- Lb ..... LIGHT BLUE
- Lg ..... LIGHT GREEN
- P ..... PINK
- Gr ..... GRAY

IGNITION SWITCH

	FAN	IG	BATI
ON	○	○	○
OFF			
LOCK			

# (Standard Model) (After '95)

- 1 LEFT TURN SIGNAL INDICATOR
- 2 FUEL INDICATOR
- 3 HIGH BEAM INDICATOR
- 4 NEUTRAL INDICATOR
- 5 OIL PRESSURE INDICATOR
- 6 SIDE STAND INDICATOR
- 7 RIGHT TURN SIGNAL INDICATOR



**TURN SIGNAL SWITCH**

	W	R	L	P	PR	PL
R	○	○		○	○	○
N				○	○	○
L			○	○	○	○

**DIMMER SWITCH**

	HL	LO	HI
LO	○	○	○
(N)	○	○	○
HI	○	○	○

**HORN SWITCH**

	HO	BAT3
FREE		
PUSH		

**IGNITION SWITCH**

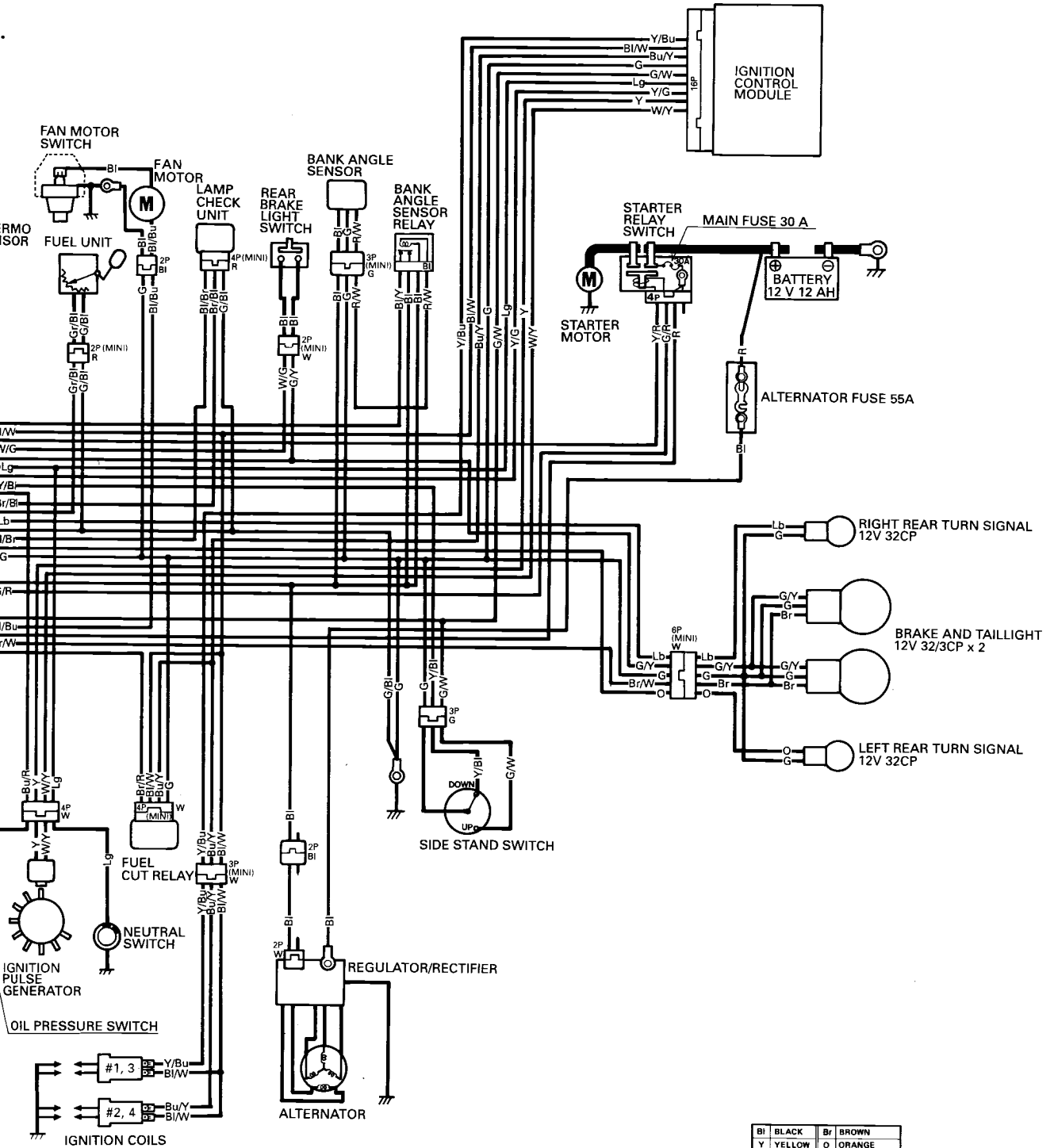
	FAN	IG	BAT1	BAT OP1	BAT OP2
ON	○	○	○	○	○
OFF					
LOCK					

ENGINE STOP SWITCH

	IG	BAT 2
OFF		
RUN	○	○

STARTER SWITCH

	ST	IG	BAT 4	HL
FREE			○	○
PUSH	○	○		



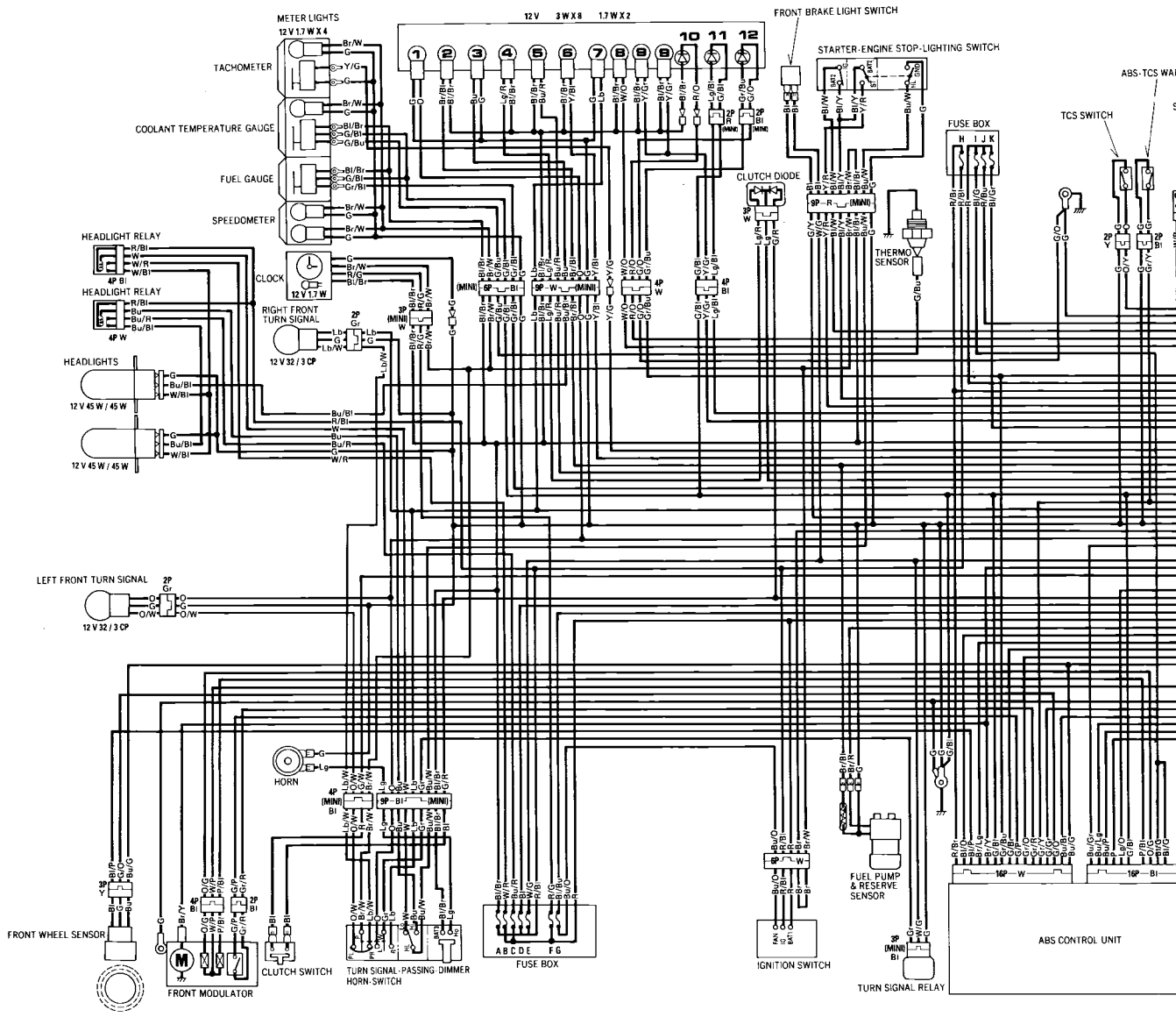
BI	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

0030Z-MAJ-A200

(ABS/TCS Model) ('92-'94)

- 1 LEFT TURN SIGNAL INDICATOR
- 2 FUEL INDICATOR
- 3 HIGH BEAM INDICATOR
- 4 NEUTRAL INDICATOR
- 5 OIL PRESSURE LIGHT
- 6 SIDE STAND INDICATOR
- 7 RIGHT TURN SIGNAL INDICATOR
- 8 TCS OFF INDICATOR
- 9 TCS ACTIVATION
- 10 TCS INDICATOR
- 11 ABS INDICATOR 1
- 12 ABS INDICATOR 2

ENGINE STOP SWITCH		STARTER S	
OFF	IG	BAT1	S
RUN	○	○	○
		FREE	PUSH



TURN SIGNAL SWITCH				
W	R	L	P	PL
R	○	○	○	○
N			○	○
L	○	○	○	○

PASSING SWITCH		
BAT4	HI	
FREE	○	○
PUSH	○	○

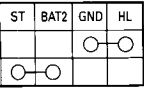
DIMMER SWITCH		
HL	LO	HI
Lo	○	○
(N)	○	○
Hi	○	○

HORN SWITCH		
HO	BAT3	
FREE	○	○
PUSH	○	○

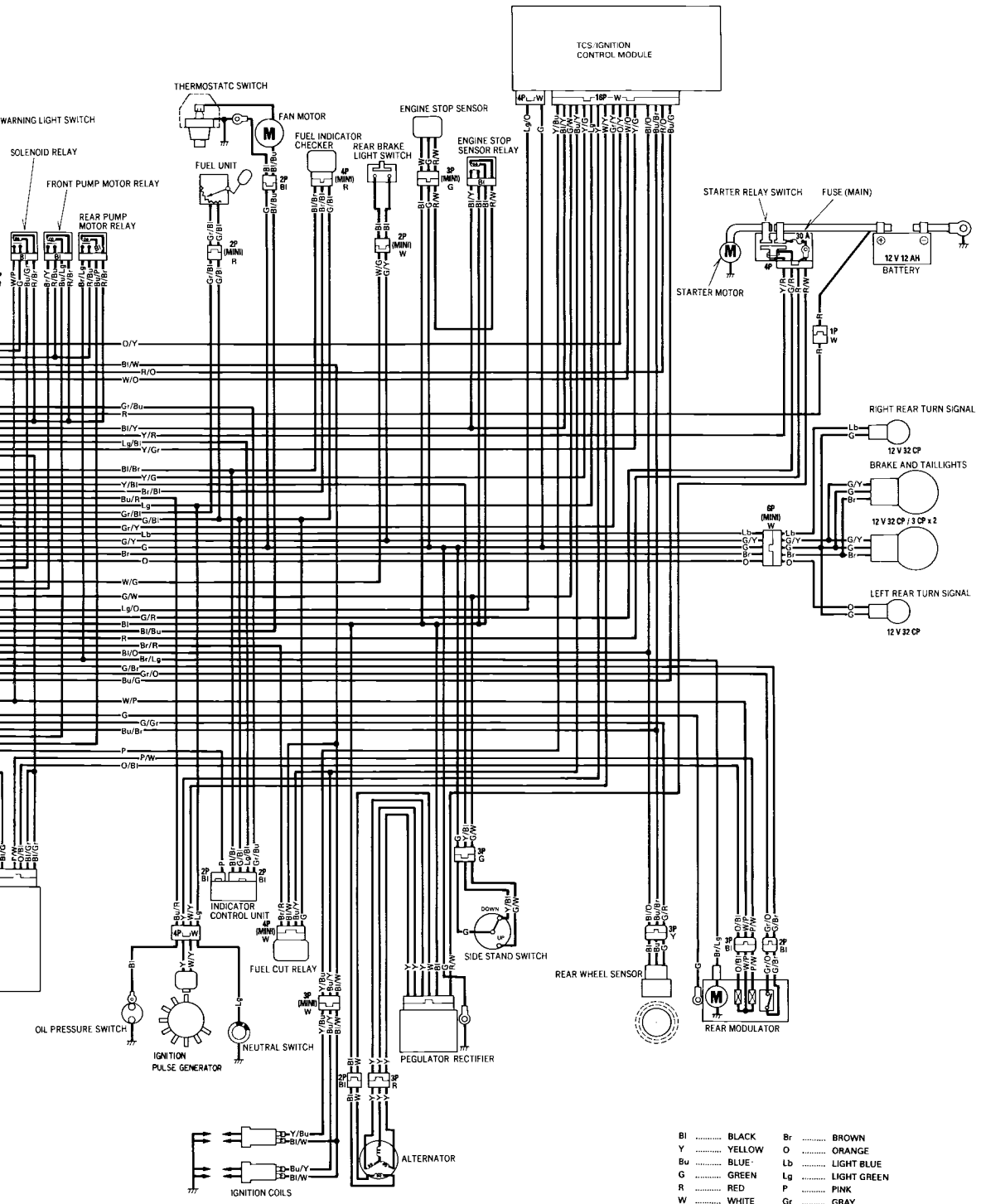
IGNITION SWITCH			
FAN	IG	BAT1	
ON	○	○	○
OFF			
LOCK			

- A 10 A FRONT POSITION-METER LIGHT-TAIL NEUTRAL-OIL-TACHO-TEMP-HORN
- B 15 A HEADLIGHT LOW
- C 15 A HEADLIGHT HIGH
- D 10 A IGNITION-STARTER-ALTERNATOR
- E 10 A TURN SIGNAL-FRONT REAR BRAKE
- F 10 A CLOCK
- G 10 A FAN MOTOR

R SWITCH



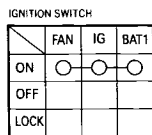
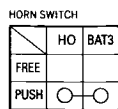
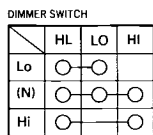
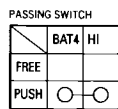
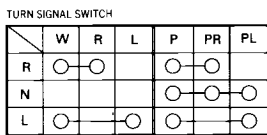
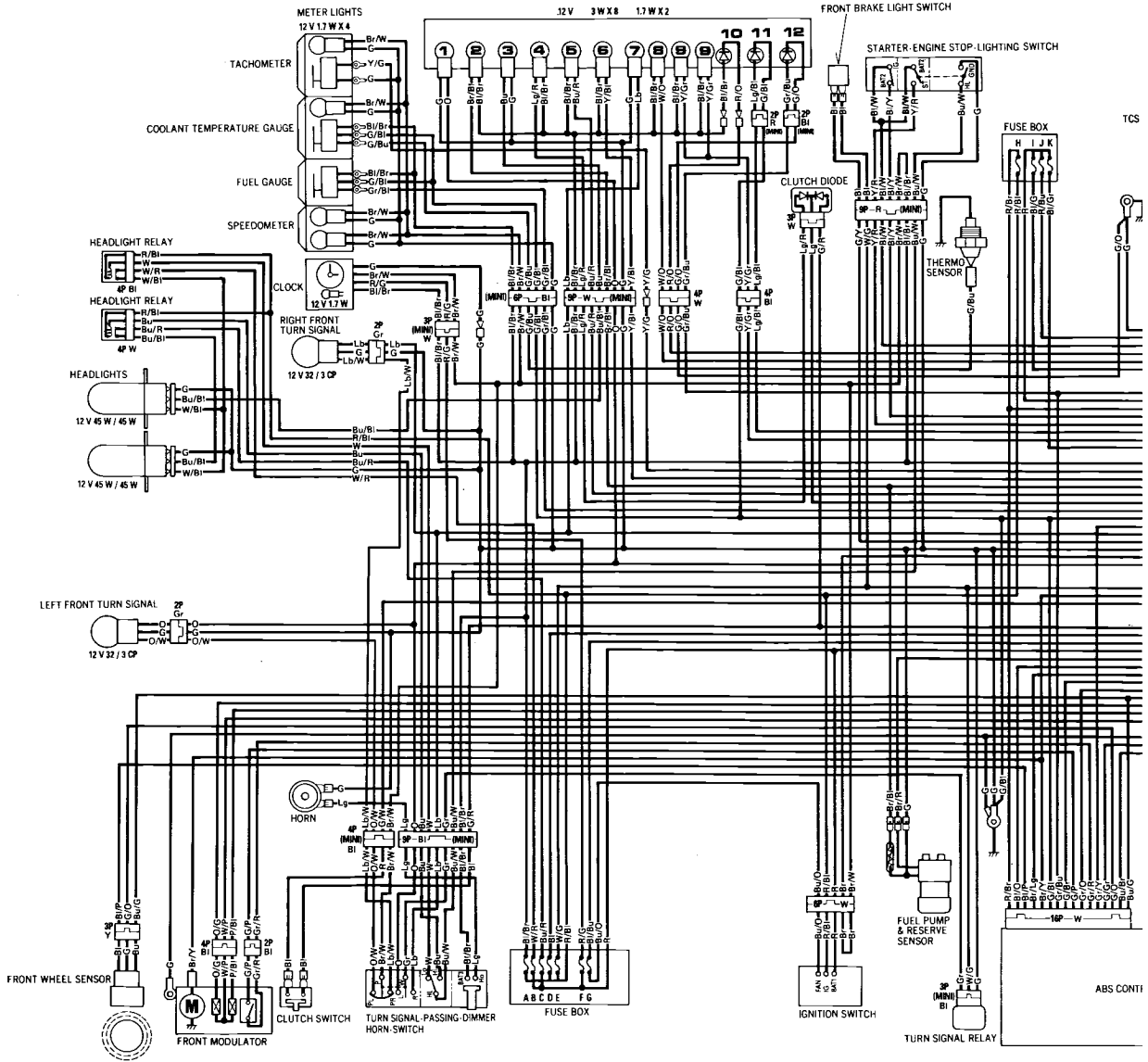
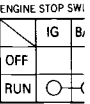
- H** 10 A ABS MAIN
- I** 10 A B 1 FRONT SOLENOID
- J** 20 A PUMP MOTOR
- K** 10 A B 2 REAR SOLENOID



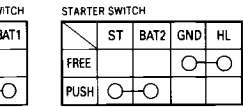
- |    |       |        |    |       |             |
|----|-------|--------|----|-------|-------------|
| Bl | ..... | BLACK  | Br | ..... | BROWN       |
| Y  | ..... | YELLOW | O  | ..... | ORANGE      |
| Bu | ..... | BLUE   | Lb | ..... | LIGHT BLUE  |
| G  | ..... | GREEN  | Lg | ..... | LIGHT GREEN |
| R  | ..... | RED    | P  | ..... | PINK        |
| W  | ..... | WHITE  | Gr | ..... | GRAY        |

# (ABS/TCS Model) ('95)

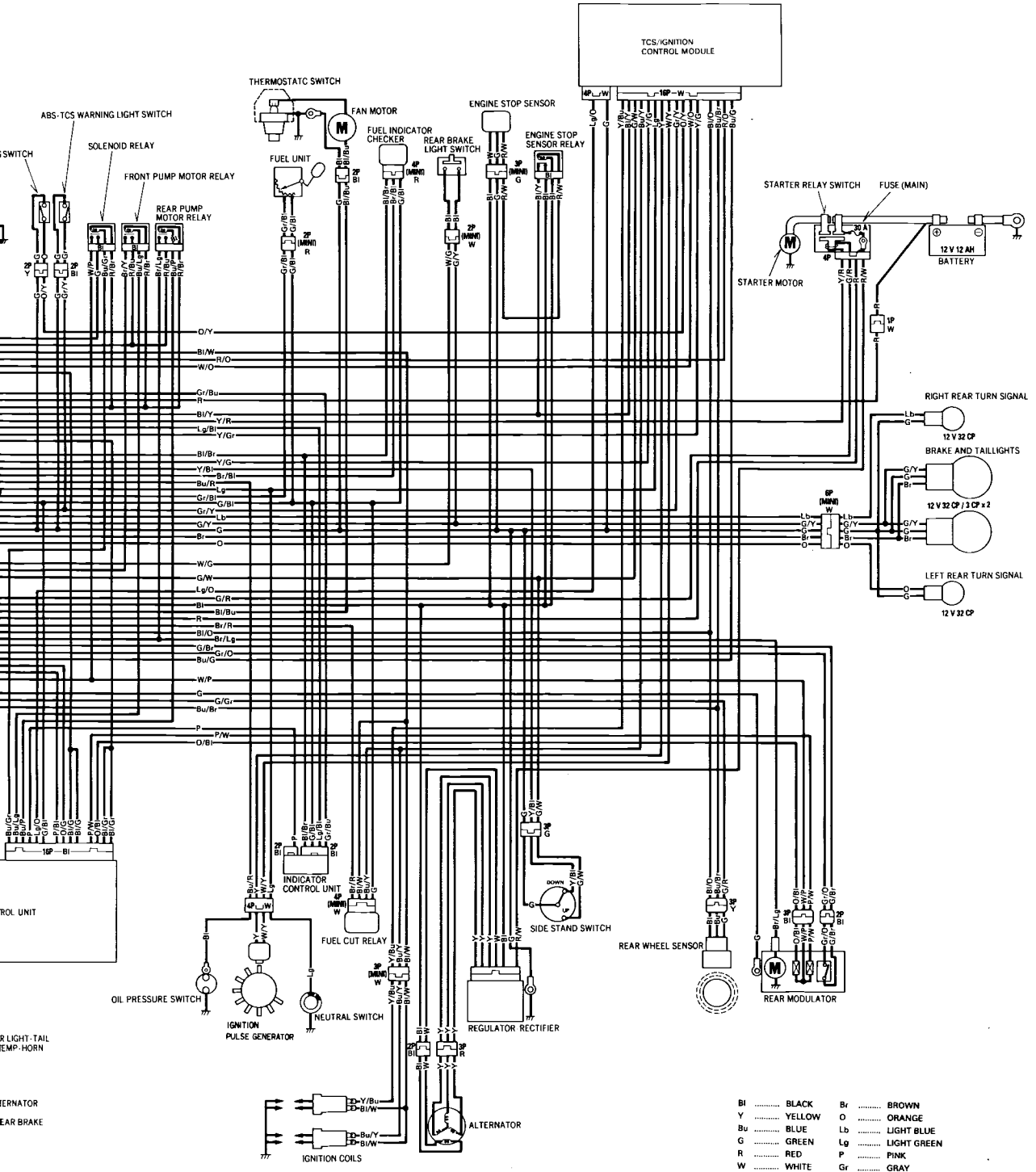
- 1 LEFT TURN SIGNAL INDICATOR
- 2 FUEL INDICATOR
- 3 HIGH BEAM INDICATOR
- 4 NEUTRAL INDICATOR
- 6 OIL PRESSURE LIGHT
- 6 SIDE STAND INDICATOR
- 7 RIGHT TURN SIGNAL INDICATOR
- 8 TCS OFF INDICATOR
- 9 TCS ACTIVATION
- 10 TCS INDICATOR
- 11 ABS INDICATOR 1
- 12 ABS INDICATOR 2



- A 10A FRONT POSITION-METER NEUTRAL-OIL-TACHO-T
- B 15A HEADLIGHT LOW
- C 15A HEADLIGHT HIGH
- D 10A IGNITION-STARTER-ALT
- E 10A TURN SIGNAL-FRONT RT
- F 10A CLOCK
- G 10A FAN MOTOR



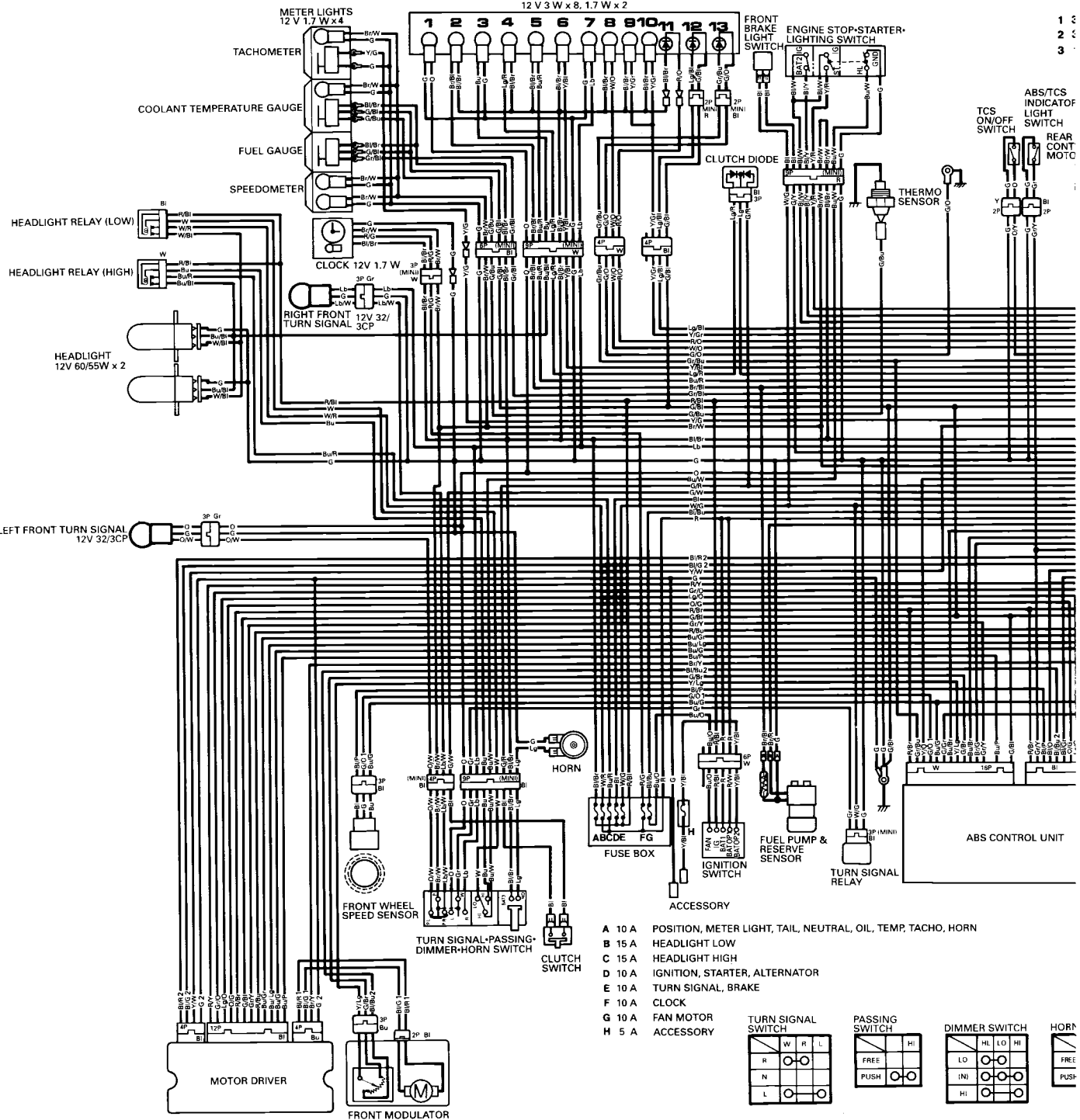
- H 10 A** ABS MAIN
- I 10 A** B 1 FRONT SOLENOID
- J 20 A** PUMP MOTOR
- K 10 A** B 2 REAR SOLENOID



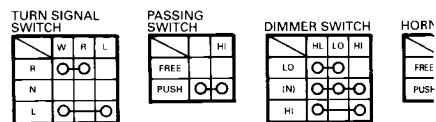
- |    |       |        |    |       |             |
|----|-------|--------|----|-------|-------------|
| Bl | ..... | BLACK  | Br | ..... | BROWN       |
| Y  | ..... | YELLOW | O  | ..... | ORANGE      |
| Bu | ..... | BLUE   | Lb | ..... | LIGHT BLUE  |
| G  | ..... | GREEN  | Lg | ..... | LIGHT GREEN |
| R  | ..... | RED    | P  | ..... | PINK        |
| W  | ..... | WHITE  | Gr | ..... | GRAY        |

# (LBS-ABS/TCS Model) (After '95)

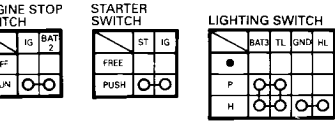
- 1 LEFT TURN SIGNAL INDICATOR
- 2 FUEL INDICATOR
- 3 HIGH BEAM INDICATOR
- 4 NEUTRAL INDICATOR (1.7 W)
- 5 OIL PRESSURE INDICATOR
- 6 SIDE STAND INDICATOR (1.7 W)
- 7 RIGHT TURN SIGNAL INDICATOR
- 8 TCS OFF INDICATOR
- 9 TCS ACTIVATION LIGHT
- 10 TCS ACTIVATION LIGHT
- 11 TCS INDICATOR LIGHT
- 12 ABS INDICATOR LIGHT 1
- 13 ABS INDICATOR LIGHT 2



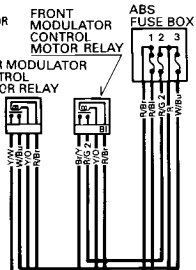
- A 10 A POSITION, METER LIGHT, TAIL, NEUTRAL, OIL, TEMP, TACHO, HORN
- B 15 A HEADLIGHT LOW
- C 15 A HEADLIGHT HIGH
- D 10 A IGNITION, STARTER, ALTERNATOR
- E 10 A TURN SIGNAL, BRAKE
- F 10 A CLOCK
- G 10 A FAN MOTOR
- H 5 A ACCESSORY







**30A** ABS MAIN  
**30A** FRONT CONTROL MOTOR  
**10A** REAR CONTROL MOTOR



**FAN MOTOR SWITCH**



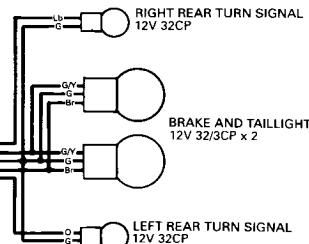
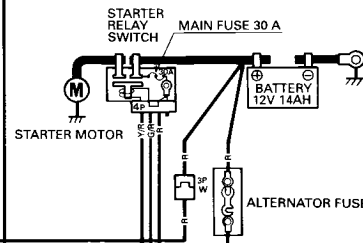
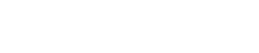
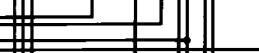
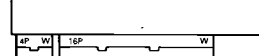
**FAN MOTOR**



**REAR BRAKE LIGHT SWITCH**



**BANK ANGLE SENSOR**



**FUEL UNIT**



**LAMP CHECK UNIT**



**BANK ANGLE SENSOR RELAY**



**FUEL CUT RELAY**



**INDICATOR CONTROL UNIT**



**REGULATOR/RECTIFIER**



**REAR WHEEL SPEED SENSOR**



**REAR MODULATOR**



**OIL PRESSURE SWITCH**



**IGNITION PULSE GENERATOR**



**NEUTRAL SWITCH**



**SIDE STAND SWITCH**



**REGULATOR/RECTIFIER**



**IGNITION COILS**



**ALTERNATOR**



**IGNITION SWITCH**



**IGNITION SWITCH**



**IGNITION SWITCH**



**IGNITION SWITCH**



**IGNITION SWITCH**



**IGNITION SWITCH**



**IGNITION SWITCH**



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**IGNITION SWITCH**



**IGNITION SWITCH**



**IGNITION SWITCH**



**IGNITION SWITCH**



**IGNITION SWITCH**



**IGNITION SWITCH**



Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Ld	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

**0030Z-MAJ-A300**

# 23. Technical Features

ABS (Anti-lock Brake System) ['92-'95]	23-1	LBS (Linked Brake System) [After '95]	23-17
[After '95]	23-10	TCS (Traction Control System) [After '91]	23-23

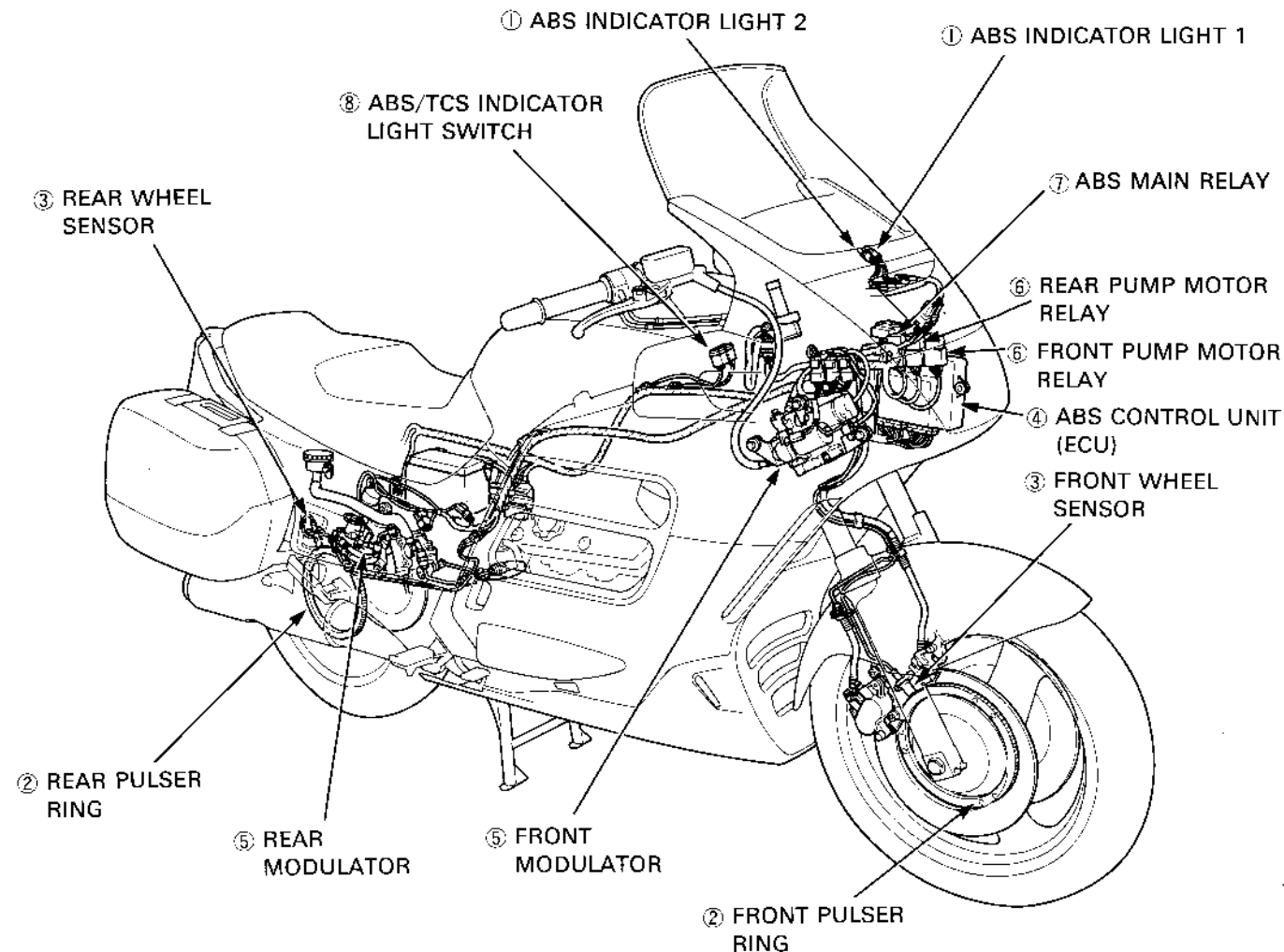
## ABS (Anti-lock Brake System) ['92-'95]

### Summary

The Anti-lock Brake System (ABS) is designed to help prevent wheel lock up during hard braking or braking on loose or slippery surfaces. ABS momentarily reduces the brake caliper fluid pressure when the wheels are about to lock. When the system senses that the tendency for wheel lock is reduced, brake caliper fluid pressure is restored. ABS repeats this cycle as required for secure brake performance with minimum possibility of wheel lock.

## Technical Features

The braking effectiveness and balance of the motorcycle can be significantly affected by the way the front and rear brakes are applied. This ABS system is characterized by high deceleration and follow-up performance thanks to its quick response to a variety of road surface conditions. It is also characterized by its compact size, which is achieved by collective arrangement of the hydraulic control components in the modulator.



- ① ABS indicator lights  
Blinks or stays ON when a problem occurred in the ABS.
- ② Pulser ring  
Rotates together with the wheel and detects the wheel speed using the wheel sensor.
- ③ Wheel sensor  
Inputs the pulse signal, generated proportionally to the rotating speed of the pulser ring, in the control unit.
- ④ ABS control unit (ECU)  
Controls ABS by monitoring the input signal of each sensor and switch.
- ⑤ Modulator  
Adjusts the caliper fluid pressure.
- ⑥ Pump motor relay  
Controls the modulator motor power source based on a signal from the control unit (ECU).
- ⑦ ABS main relay  
When the control unit detects abnormality, power to the solenoid valve is shut off by the ABS main relay as it receives the signal from the control unit.
- ⑧ ABS/TCS indicator light switch  
A common switch for the ABS and TCS. When the ABS indicator lights 1 and 2 blink, the ABS indicator light 1 can be dimmed and the indicator light 2 can be turned OFF in order not to interfere with the rider's vision. The ABS/TCS indicator light switch is also used to output the problem code.

## System Construction

### Modulator:

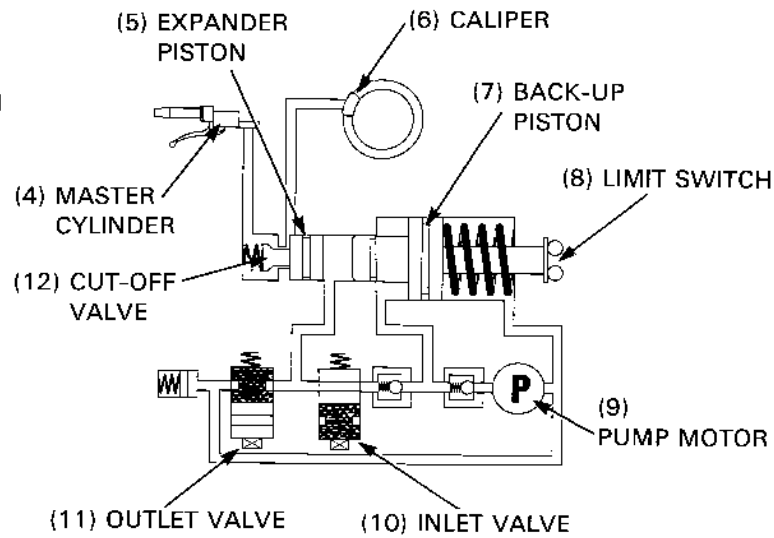
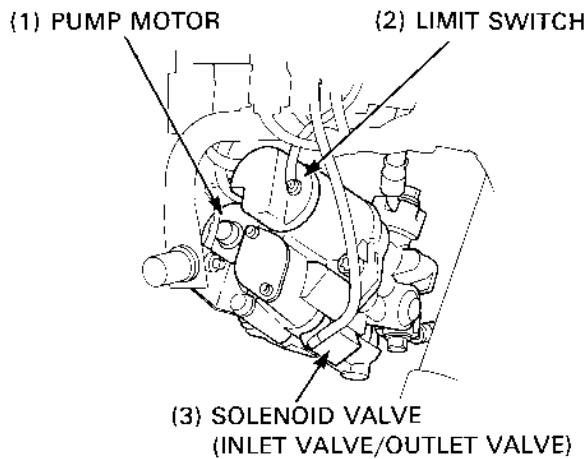
The modulator controls and supplies the brake fluid that is essential for the ABS operation. The motorcycle is equipped with separate and independent front and rear modulators.

The modulators are sealed type containing the brake fluid and constituent parts, and are maintenance free. Additionally, they have no reservoir pipe and are light-weight and compact. These features make the modulators well suited for motorcycles.

The modulator consists of the following parts;

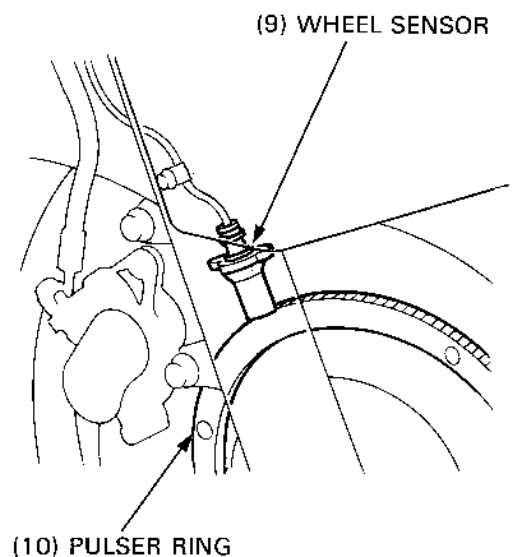
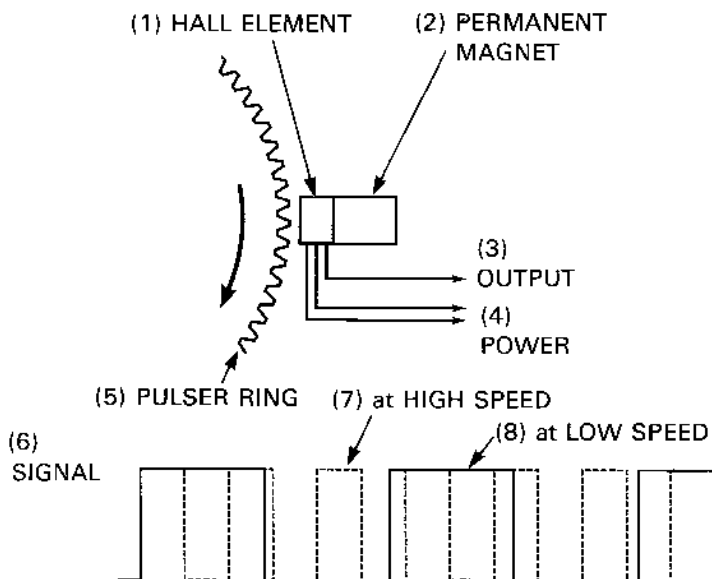
- Expander piston: Operates in accordance with the change in the piston fluid pressure and adjusts the caliper fluid pressure.
- Back-up piston: Pushes the expander piston up when fault occurs.
- Limit switch: Detects the pressure in the system by detecting the back-up piston position.
- Pump motor: Drives the pump to generate pressure in the system.
- Inlet valve/Outlet valve: Adjusts the pressure in the system.

Front modulator shown:



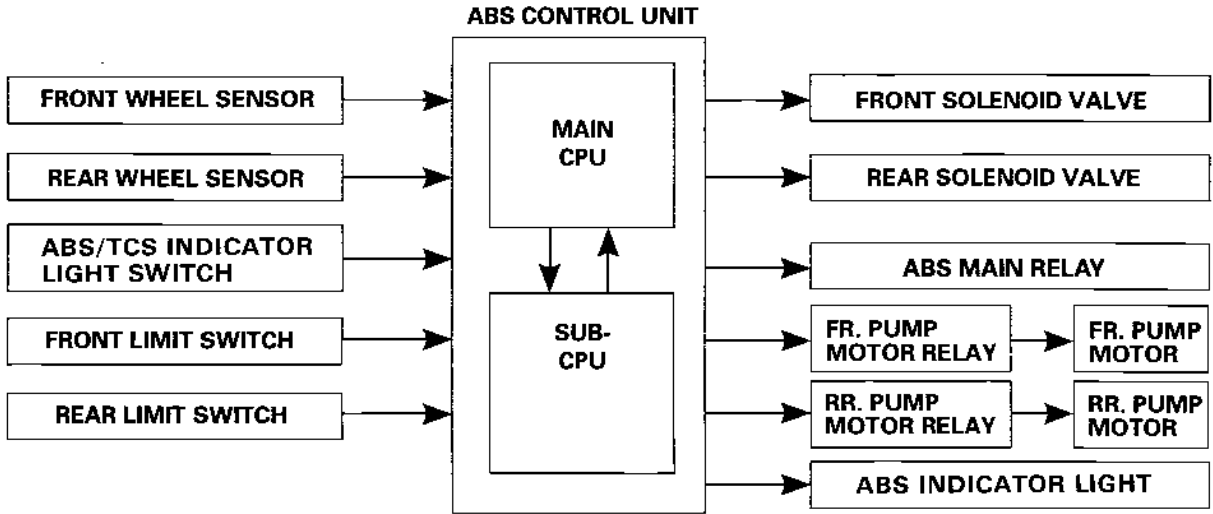
### Wheel sensor/pulser ring:

The wheel sensor is the contactless sensor that detects front and rear wheel speed. Consisting of a permanent magnet and Hall element, the sensor is connected to the ABS control unit. When the projection on the outer circumference of the pulser ring that is rotating with the front/rear wheel passes across the wheel sensor, a pulse signal is generated at the sensor. The control unit detects the wheel speed as it receives the pulse signal, because the frequency of the signal increases proportionally to the wheel speed.

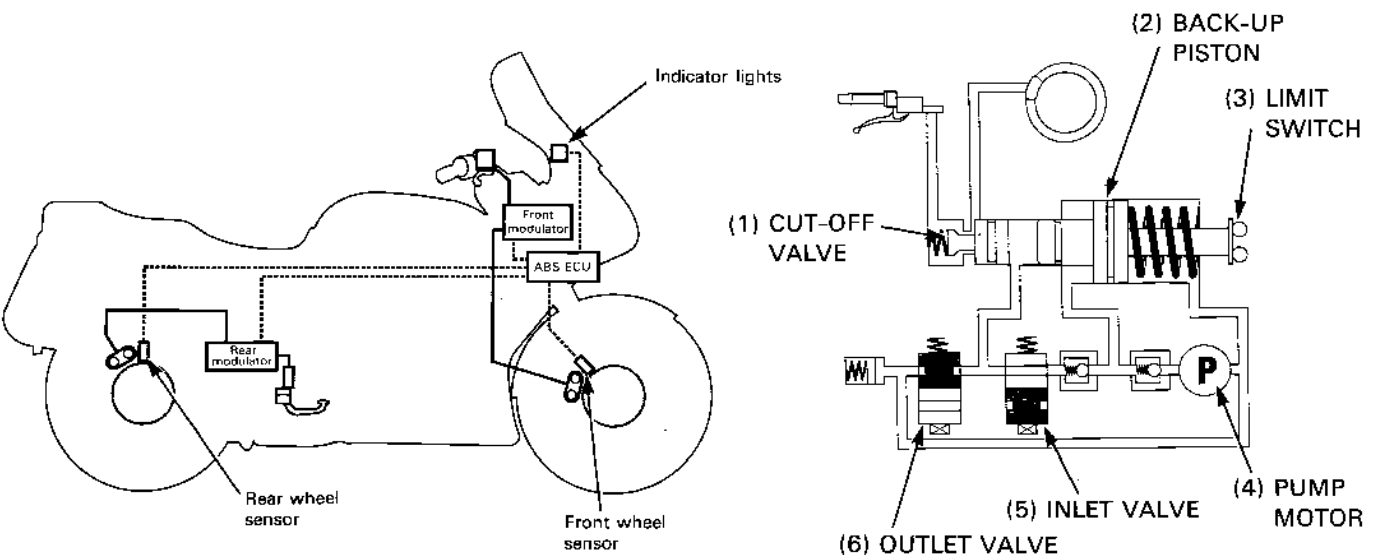


**ABS control unit (ECU):**

The ABS control unit consists of two systems that monitors each other: the main CPU and the sub CPU. The control unit is designed to activate the solenoid valve and pump motor only when the calculation results of both systems agree with each other.



The control unit detects the wheel speed as it receives the signal from each wheel sensor. When the unit senses that the wheel are about to lock, it controls the caliper fluid pressure by activating the solenoid valve of each modulator. The control unit also includes a change-over function to the regular system that monitors the system condition by receiving signals from the limit switch, pump motor etc. It stops the ABS function and switches back to the regular brake system when the control unit detects an abnormality in the ABS.



**• Pump motor control**

The ABS control unit monitors the pressure accumulation by receiving a signal from the limit switch. When the pressure drops, the back-up piston moves forward and the limit switch turns OFF to operate the pump. When the pressure rises to a given level, the limit switch turns ON to stop the pump. (The pump is operated continuously while the ABS is active.)

- Self-diagnosis function

When the engine starts, the ABS control unit evaluates the hydraulic circuit condition by activating the pump motors and solenoid valves and receiving the signal from the limit switch. The ABS indicator light blinks when an abnormality is detected in the circuit. When the circuit is normal, the ABS indicator light stays ON indicating that the control unit is in the stand-by mode for the wheel sensor signal. The wheel sensors send signals to the ECU after the motorcycle starts to move (approximately 10km/h or above). The ABS indicator light goes off when the ECU receives signals from the wheel sensor and the wheel sensor system is found to be normal.

The ABS control unit monitors the main function while the motorcycle is moving, too.

When it detects a problem with the system, it blinks the ABS indicator light and stops the system immediately. When the control unit detects a problem while the ABS is active, it stops the system and blinks the ABS indicator light, notifying the rider of the problem and that the system is deactivated.

- Change-over function to the regular system

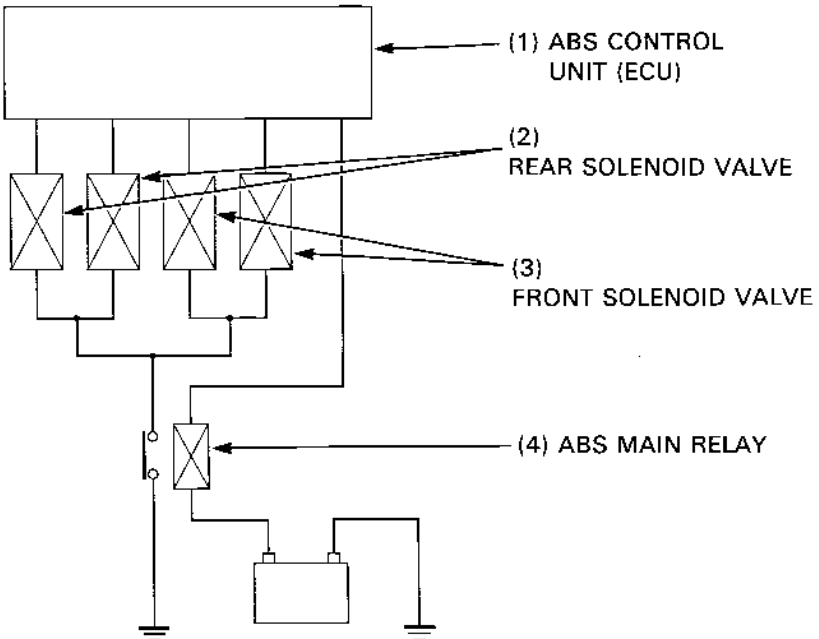
When the ABS control unit detects a problem in the system by the self-diagnosis function, the control unit activates the ABS main relay and shuts off the ground circuits of the front and rear solenoid valves to stop the solenoid valve. The ABS stops its function when the system is faulty and switches to the regular brake system.

- Problem code storage function

The problems can be memorized and stored in the control unit (up to two codes), and can be retrieved and indicated by the number of blinks of the ABS indicator light (page 16-A-6).

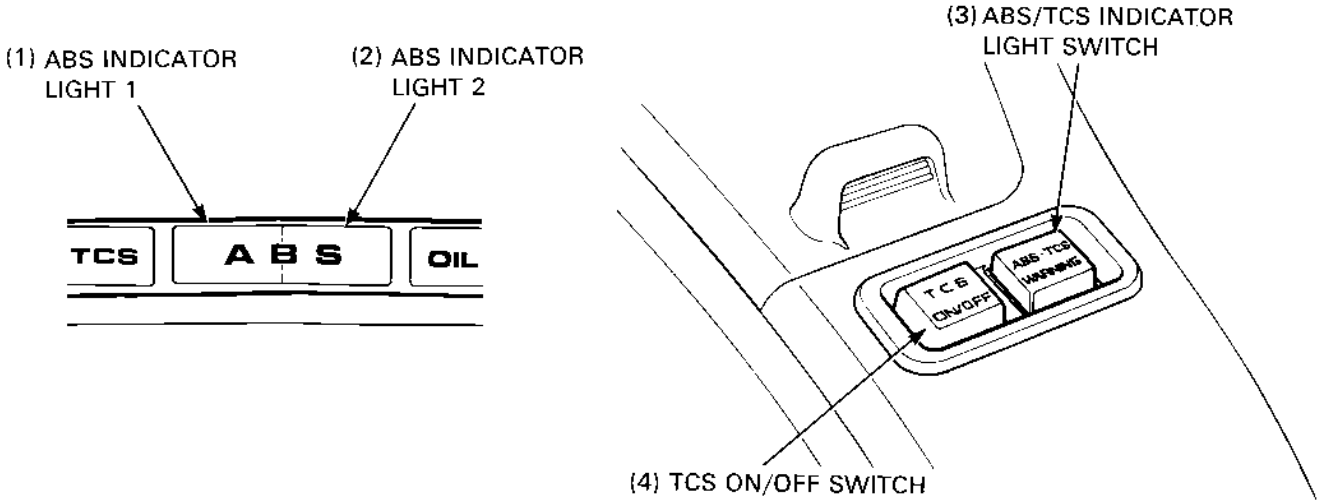
**ABS main relay:**

The secondary side contact points of the ABS main relay is the normal open type, where the electric current does not normally flow. When the current flows to the primary side relay coil, the contact points close forming the ground circuit of the solenoid valve.



**ABS/TCS indicator light switch:**

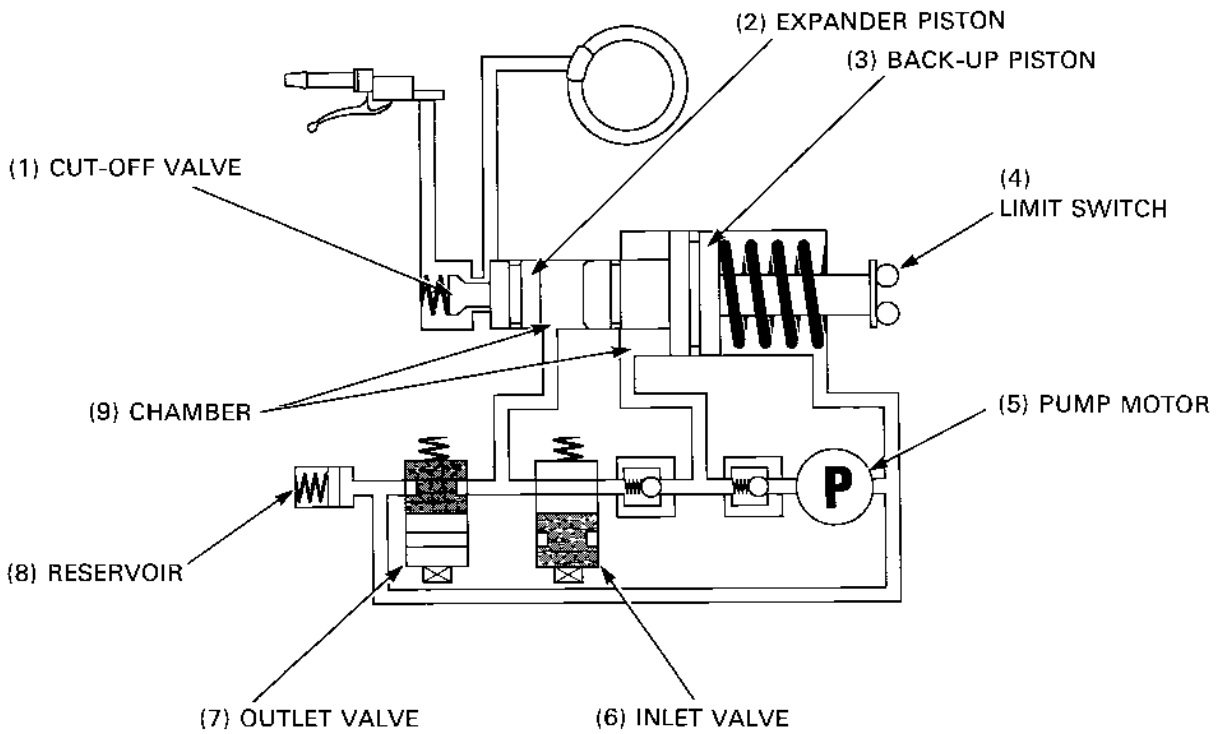
When a problem occurs with the ABS and ABS indicator lights 1 and 2 blink, ABS indicator light 1 can be dimmed and the indicator light 2 can be turned OFF by pressing the ABS/TCS indicator light switch. Dimming and turning off these indicator lights keeps them from interfering with the rider's vision. Another function of the ABS/TCS indicator light switch is to retrieve the problem codes that are stored in the control unit according to the problem code storage function explained in the previous page. The problem codes are indicated by the number of times the ABS indicator light blinks. When two problem codes are stored, the latest problem code is output first.



**ABS Operation**

**Regular brake system operation:**

Brake fluid pressure is accumulated fully in the system. When the pressure drops, the pump motor operates to accumulate pressure. The expander piston and back-up piston are supported by this brake fluid pressure. The cut-off valve is pushed by the expander piston as it opens at this time and the master cylinder and caliper are interconnected with a passage. The fluid pressure in the master cylinder is transmitted to the caliper by way of the cut-off valve; allowing the brake to operate. As the outlet valve closes, the high pressure of the brake fluid is maintained in the chamber and the expander piston is not affected by the operation of the regular brake system. This condition is the same as when the ABS is in the stand-by mode.





## Technical Features

### When ABS is working:

- Pressure DECREASE

When the control unit detects that the wheels are about to lock, the control unit sends signals to activate the pump motor and to open the outlet valve, while closing the inlet valve. The brake fluid in chamber B flows through the outlet valve into the reservoir side and pushes the expander piston back. Then, the cut-off valve, supported by the expander piston, is closed by the spring force shutting the passage between the master cylinder and caliper. Simultaneously, as the expander piston moves backward, the volume of chamber A increases and, the caliper fluid pressure is reduced.

- Pressure HOLD

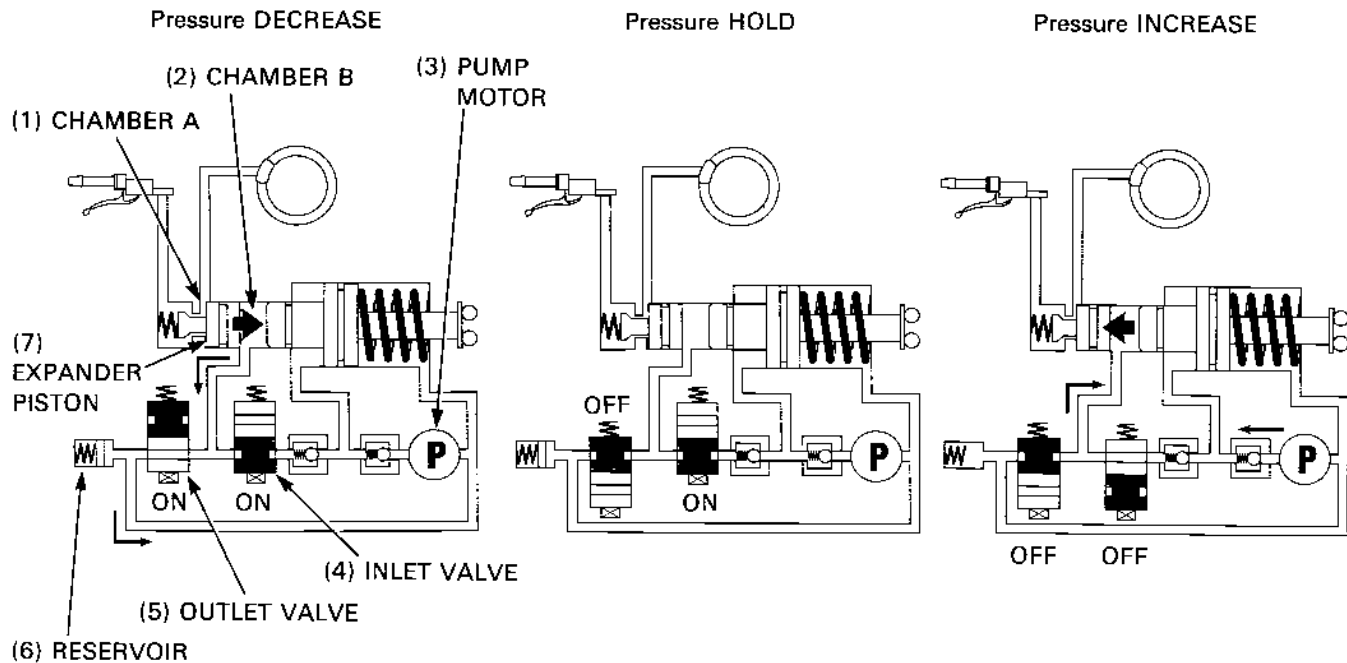
When both the outlet valve and inlet valve are closed, the brake fluid pressure in chamber A is maintained. The caliper fluid pressure can then be maintained at a given level.

- Pressure INCREASE

When the pressure is increasing, the outlet valve closes and the inlet valve opens; this allows the brake fluid from the pump to flow through the inlet valve to chamber B. The brake fluid then pushes the expander piston forward and fluid flows to the caliper.

The ABS control unit controls the brake fluid pressure and prevents a wheel from locking by performing the sequential operations of the above "Pressure Decrease", "Pressure Hold" and "Pressure Increase" in accordance with the wheel rotation.

When the control unit senses that the possibility of wheel lock has passed, it closes the outlet valve and opens the inlet valve to move the expander piston to the forward-most position. This in turn opens the cut-off valve and the passage between the master cylinder and caliper to restore regular brake operation (page 23-7).



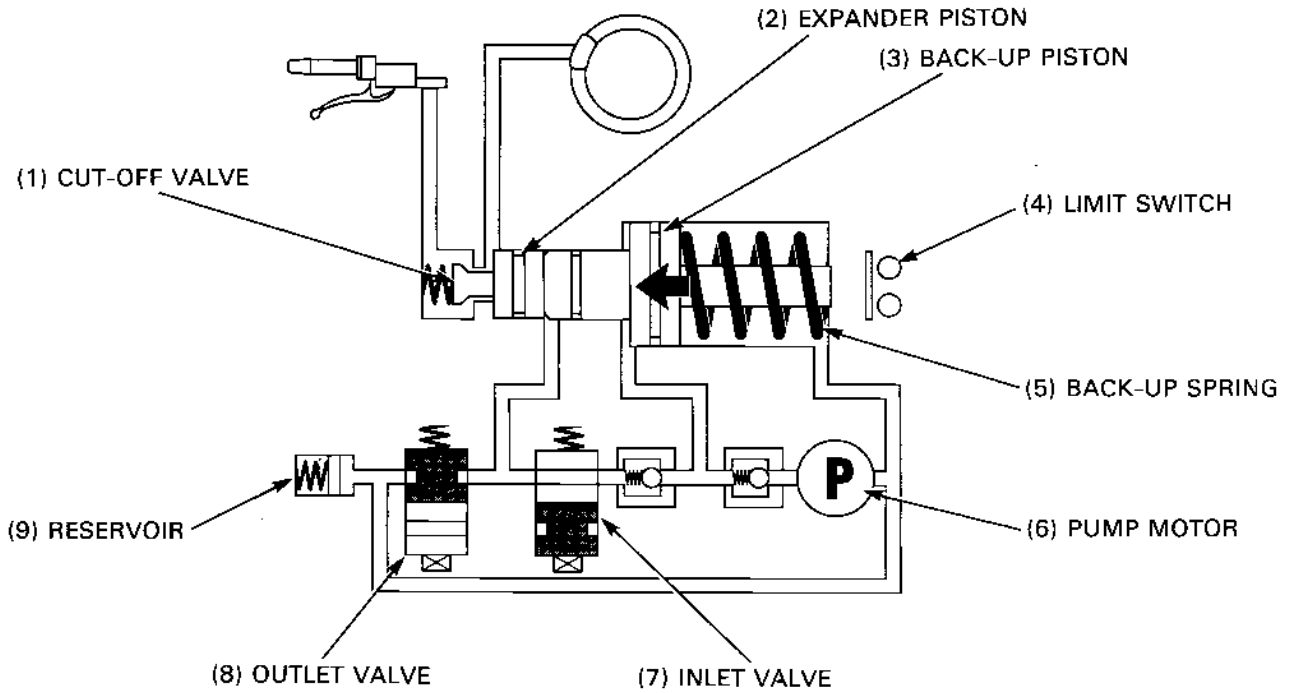
- Fluid Pressure Control

Operation	Caliper fluid pressure	Inlet valve		Outlet valve	
		Electric signal	Pressure relief passage	Electric signal	Pressure relief passage
To release braking force	Decrease	ON	Closes	ON	Open
To maintain braking force	Hold	ON	Closes	OFF	Closes
To apply braking force	Increase	OFF	Opens	OFF	Closes

**When trouble occurs:**

When the fluid pressure in the chamber (page 23-7) cannot be maintained for some reason, the back-up piston is pushed forward by the mechanical back-up spring force, which in turn pushes the expander piston up and the cut-off valve opens fully. Fluid pressure in the master cylinder can then be transmitted by way of the cut-off valve to the caliper. Regular brake operation can then be maintained.

As the back-up piston spring is preloaded enough to with stand the maximum brake pressure from the master cylinder the expander piston cannot move backward during regular brake operation.



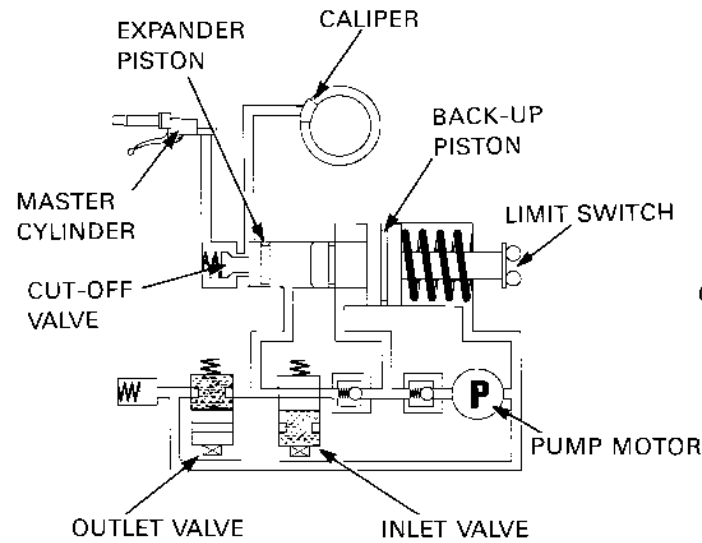
# ABS (Anti-lock Brake System) [After '95]

## Summary

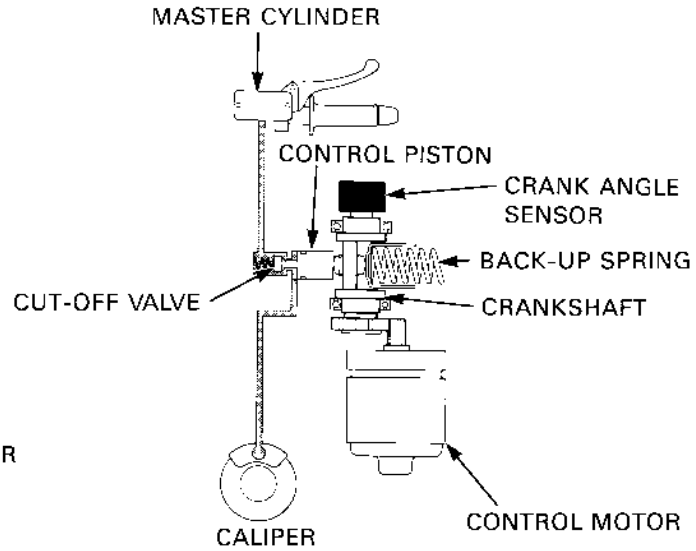
The ABS is designed to help prevent wheel lock up during hard braking or braking on loose or slippery surfaces. ABS momentarily reduces the brake caliper fluid pressure when the wheels are about to lock. When the system senses that the tendency for wheel lock is reduced, brake caliper fluid pressure is restored. ABS repeats this cycle as required for secure brake performance with minimum possibility of wheel lock.

The conventional ABS is composed of the modulator with controlled hydraulic pressure circuit consisting of the pump and inlet/outlet solenoid valves. The system indirectly controls brake fluid pressure that regulates the fluid pressure inside the controlled hydraulic circuit by actuating the solenoid valves.

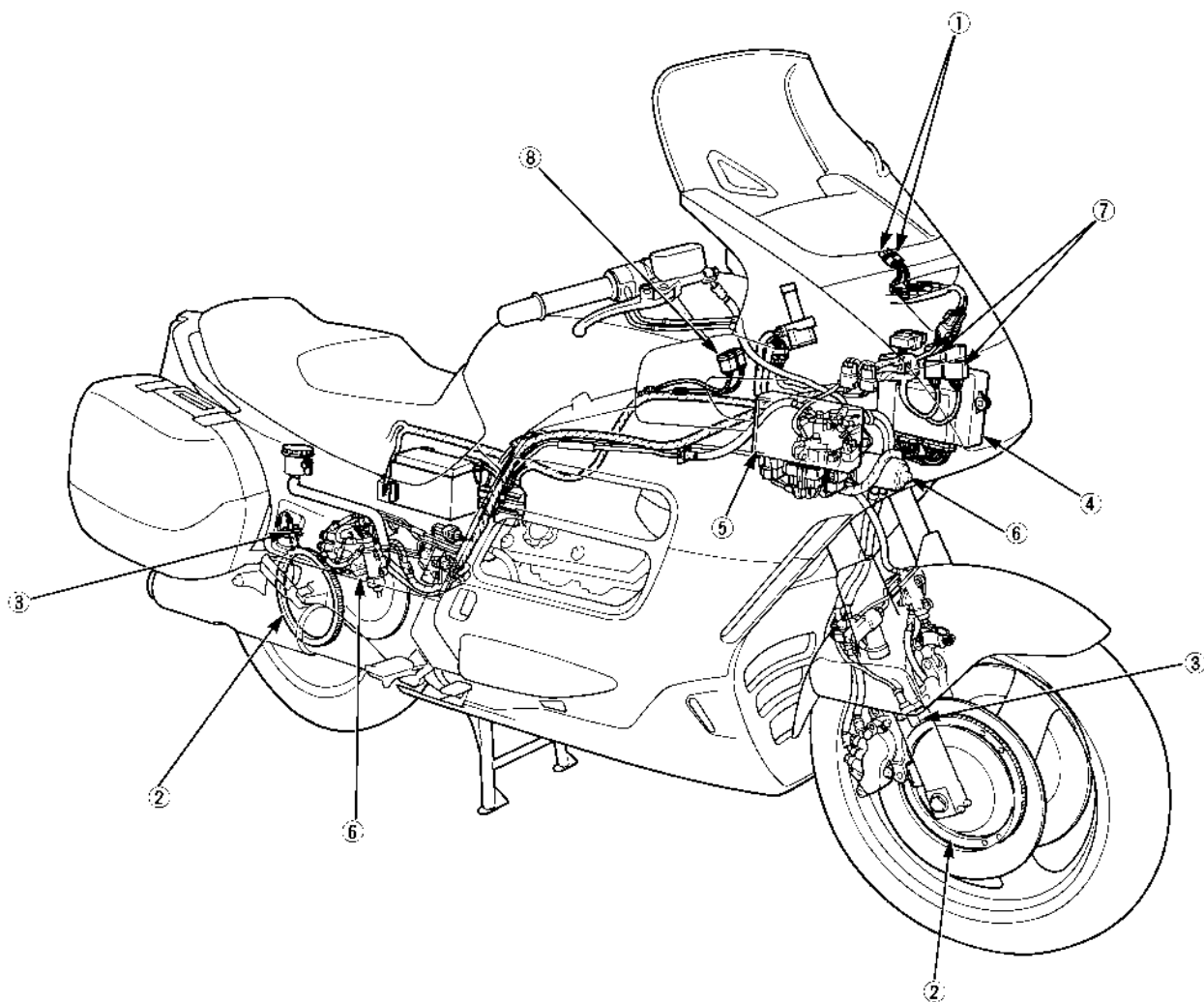
In this ABS, brake fluid pressure is directly controlled by motor's regulating of the rotational angle of piston-crank mechanism, which in turn controls the brake fluid. Therefore, in comparison with conventional systems, the modulator size, number of parts required, and weight are all substantially reduced. In addition, the fluid pressure can be regulated continuously, unlike the conventional ABS which has staged control. This ABS embodies such a high accuracy control system in a more simplified system.



CONVENTIONAL ABS

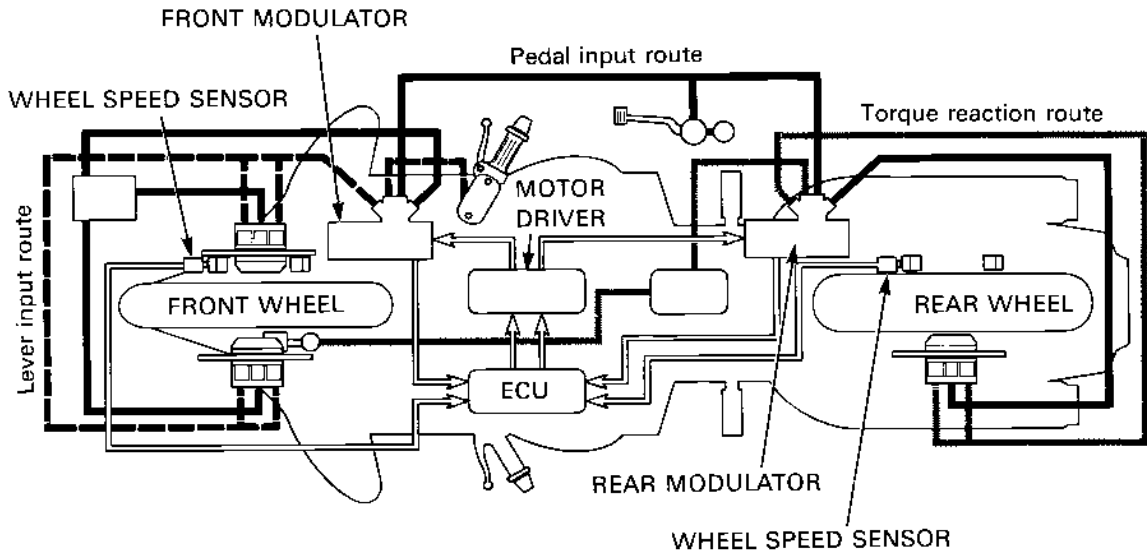


NEW ABS



- ① ABS indicator lights  
Blinks or stays ON when a problem occurs in the ABS.
- ② Pulser ring  
Rotates together with the wheel and detects the wheel speed using the wheel speed sensor.
- ③ Wheel speed sensor  
Inputs the pulse signal, generated proportionally to the rotating speed of the pulser ring, in the ABS control unit (ECU).
- ④ ABS control unit (ECU)  
Controls ABS by monitoring the input signals of each sensor.
- ⑤ Motor driver  
Receives control signal from the ABS control unit (ECU) and delivers high-amperage electrical power output to the modulator's motor for quick changes in operation.
- ⑥ Modulator  
Adjusts the caliper fluid pressure.
- ⑦ Modulator control motor relays (front and rear)  
When the ABS control unit (ECU) detects abnormality, power to the motor driver is shut off by the control motor relays as it receives the final from the ABS control unit (ECU).
- ⑧ ABS/TCS indicator light switch  
A common switch for the ABS and TCS. When ABS indicator lights 1 and 2 blink, ABS indicator light 1 can be dimmed and indicator light 2 can be turned OFF in order not to interfere with the rider's vision. The ABS/TCS indicator light switch is also used to output the problem code.

System Construction

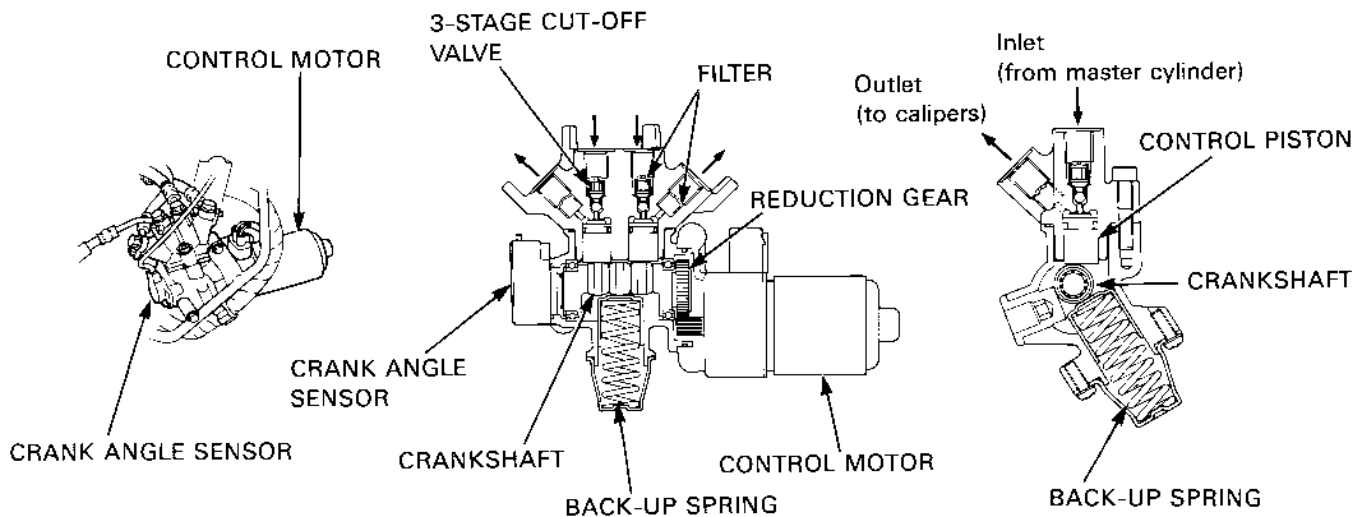


**Motor Driven Modulator:**

The modulator controls the brake fluid pressure that is essential for the ABS operation. The motorcycle is equipped with separate and independent front and rear modulators. At the same time, in order to combine with the LBS (Linked Brake System), a single modulator controls two routes for brake fluid pressure, as two routes for braking input are given respectively to the front and rear wheels.

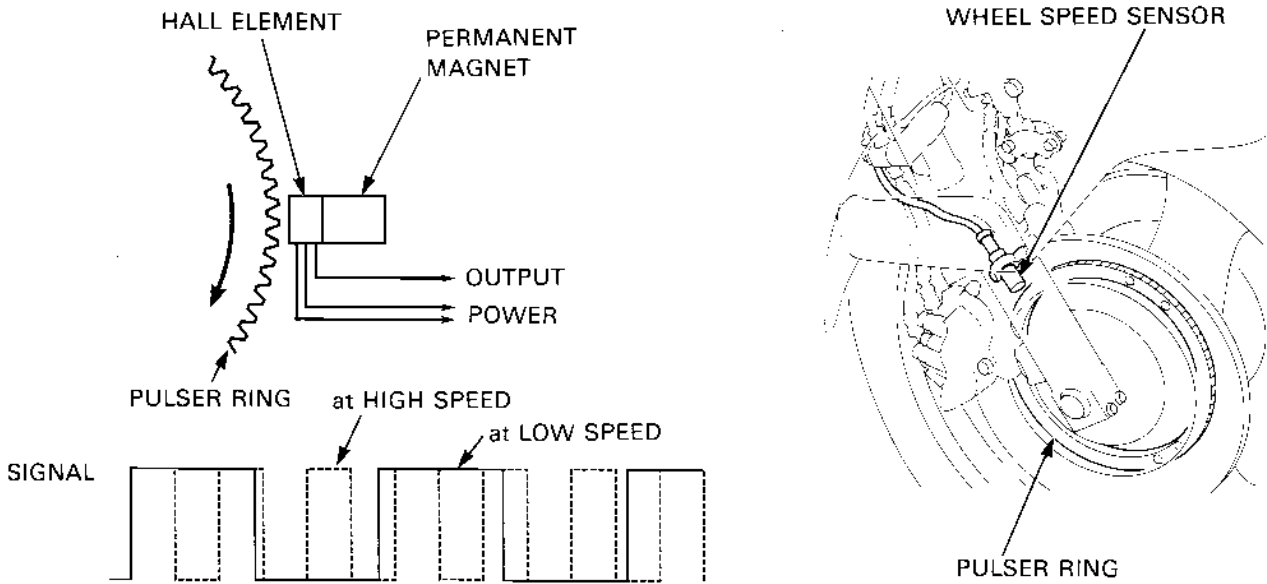
The modulator consists of the following parts;

- **Control piston**: Operates in accordance with the change of the crankshaft angle and adjusts the caliper fluid pressure. Because each modulator must provide simultaneous control over two separate systems, each features two sets of control pistons.
- **Crankshaft**: Turns with the control motor to change the piston position.
- **Back-up spring**: Pushes the control pistons up (hold the cut-off valve open) by way of the crankshaft.
- **Control motor**: Drives the crankshaft and adjust the pressure in the system.
- **Crank angle sensor**: Detects the crank angle.
- **Cut-off valve (3-stages)**: Cuts hydraulic pressure to the brake caliper.



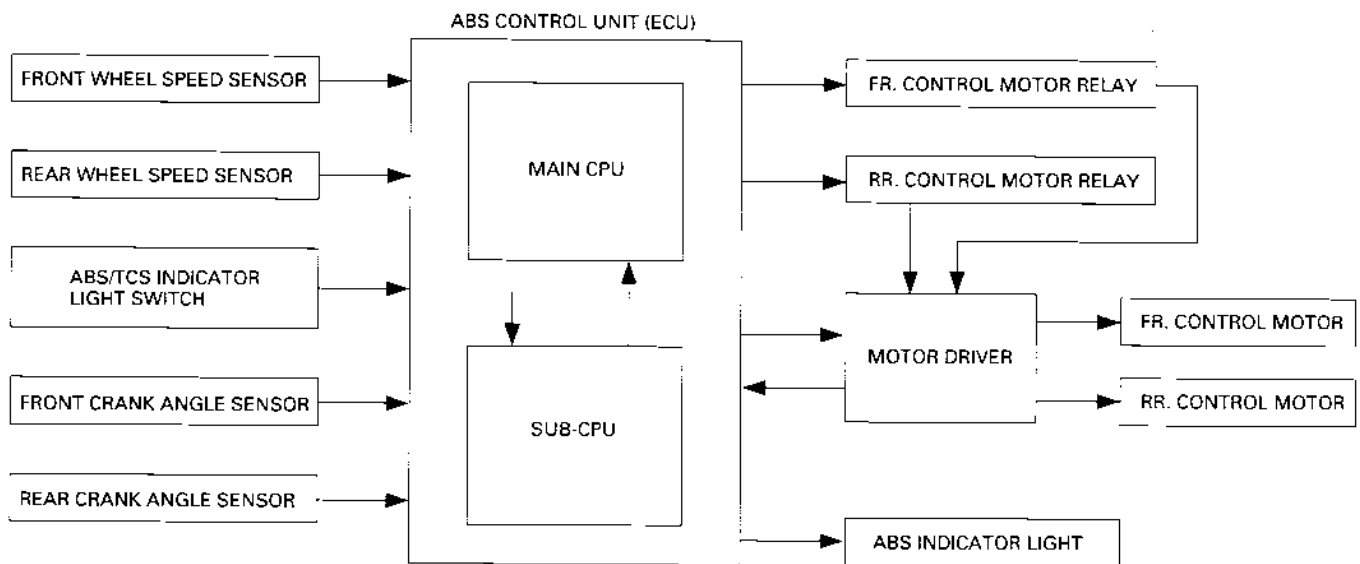
**Wheel Speed Sensor/Pulser Ring:**

The wheel speed sensor is the contactless sensor that detects front and rear wheel speed. Consisting of a permanent magnet and Hall element, the sensor is connected to the ABS control unit. When the projection on the outer circumference of the pulser ring that is rotating with the front/rear wheel passes across the wheel speed sensor, a pulser signal is generated at the sensor. The ABS control unit detects the wheel speed as it receives the pulse signal, because the frequency of the signal increases proportionally to the wheel speed.



**ABS Control Unit (ECU)/Motor Driver:**

The dual-CPU configuration ensures instant recognition of computer-related malfunctions, since the parallel CPUs run constant checks on each other whenever the ignition switch is ON. The ABS control unit (ECU) is designed to activate the modulator control motor only when the calculation results of both systems agree with each other.



The ABS control unit (ECU) detects the wheel speed as it receives the signal from each wheel speed sensor. When the unit senses that the wheels are about to lock, it controls the caliper fluid pressure by activating the control motor of each modulator. The control unit also includes a change-over function to the standard LBS operation that monitors the system condition by receiving signals from the wheel speed sensor, crank angle sensor, etc. It stops the ABS function and switches back to the standard LBS operation when the control unit detects an abnormality in the ABS.

- Modulator motor control

The ABS control unit monitors both front and rear wheel speed sensors and the modulator crank angle sensors that provide precise readings of each modulator's crankshaft positioning (i.e., control piston position). The ABS control unit directs its control signals to the motor driver that delivers high-amperage electrical power output to the control motors and operate the system.

- Self-diagnosis function

When the ignition switch is ON, the ABS control unit evaluates the control motor relays. The indicator light blinks when an abnormality is detected in the system. When the system is normal, the ABS indicator light stays ON indicating that the ABS control unit is in the stand-by mode for the wheel speed sensor and modulator crank angle sensor signals. The wheel speed sensors send signals to the ABS control unit after the motorcycle starts to move (approximately 10 km/h or above), then the ABS control unit evaluates the system condition by activating the modulator control motors and receiving the signal from the crank angle sensors. The ABS indicator light goes off when the system is found to be normal.

The ABS control unit monitors the main function while the motorcycle is moving, whether the brakes are engaged or not. When it detects a problem with the system, it blinks the ABS indicator light and stops the system immediately. When the control unit detects a problem while the ABS is active, it stops the system and blinks the ABS indicator light, notifying the rider of the problem and that the system is deactivated.

- Change-over function to the standard (LBS) system

When the ABS control unit detects a problem in the system by the self-diagnosis function, the control unit stops the ABS function. The back-up spring pushes the control piston automatically to open the cut-off valve and restore standard LBS operation (page 23-16).

- Problem code storage function

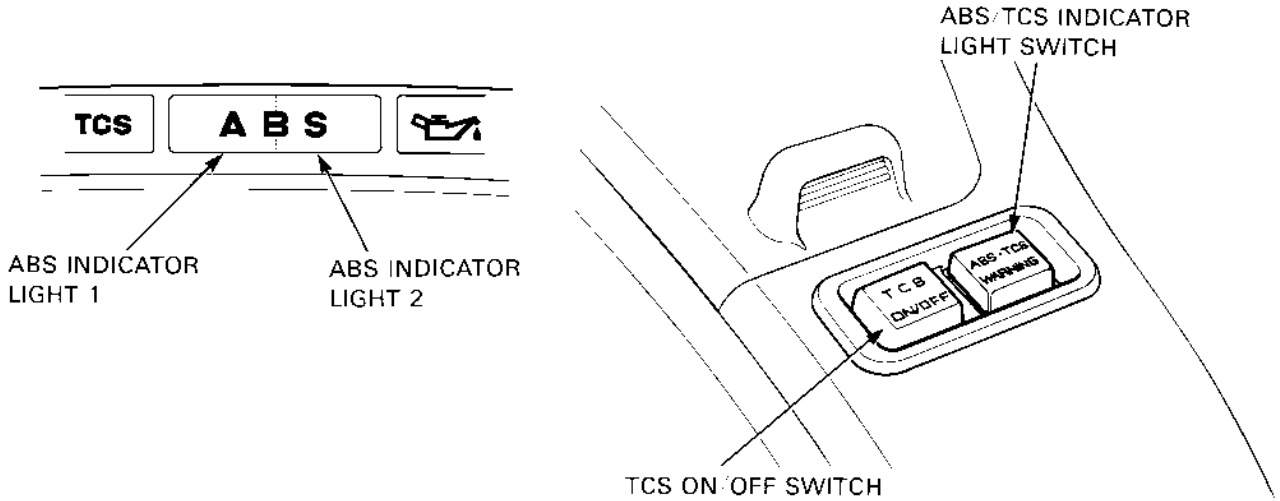
The problems can be memorized and stored in the ABS control unit (up to two codes), and can be retrieved and indicated by the number of blinks of the ABS indicator light (page 16-B-6).

**ABS/TCS Indicator Light Switch:**

When a problem occurs with the ABS and ABS indicator lights 1 and 2 blink, ABS indicator light 1 can be dimmed and the indicator light 2 can be turned OFF by pressing the ABS/TCS indicator light switch.

Dimming and turning off these indicator lights keeps them from interfering with the rider's vision.

Another function of the ABS/TCS indicator light switch is to retrieve the problem codes that are stored in the ABS control unit according to the problem code storage function explained above. The problem codes are indicated by the number of times the ABS indicator light blinks. When two problem codes are stored, the last problem code is output first.



**3-Stage Cut-off Valve:**

In conventional ABS configurations, a ball-type cut-off valve is used to cut hydraulic pressure to the brake calipers. In this ABS, an additional orifice valve is positioned directly behind the cut-off valve to realize three stages of valve operation.

- 1st stage

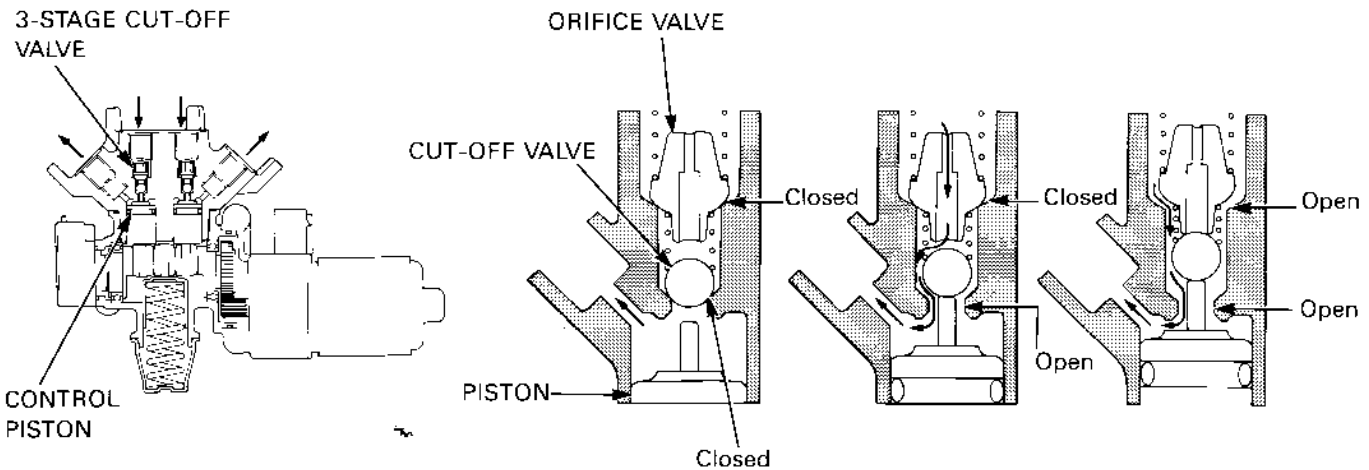
When the ABS is enabled, the control piston moves down to close both the cut-off valve and the orifice valve, cutting the hydraulic line between the master cylinder and the brake caliper.

- 2nd stage

The control piston moves up slightly to open only the cut-off valve, leaving the orifice valve closed. This stage permits only a small amount of hydraulic pressure to seep through the center of the orifice valve to the brake caliper.

- 3rd stage

The control piston returns to its uppermost position, opening both the cut-off valve and the orifice valve, and restoring the full hydraulic pressure needed for standard ABS brake operation.





## ABS Operation

- Pressure DECREASE

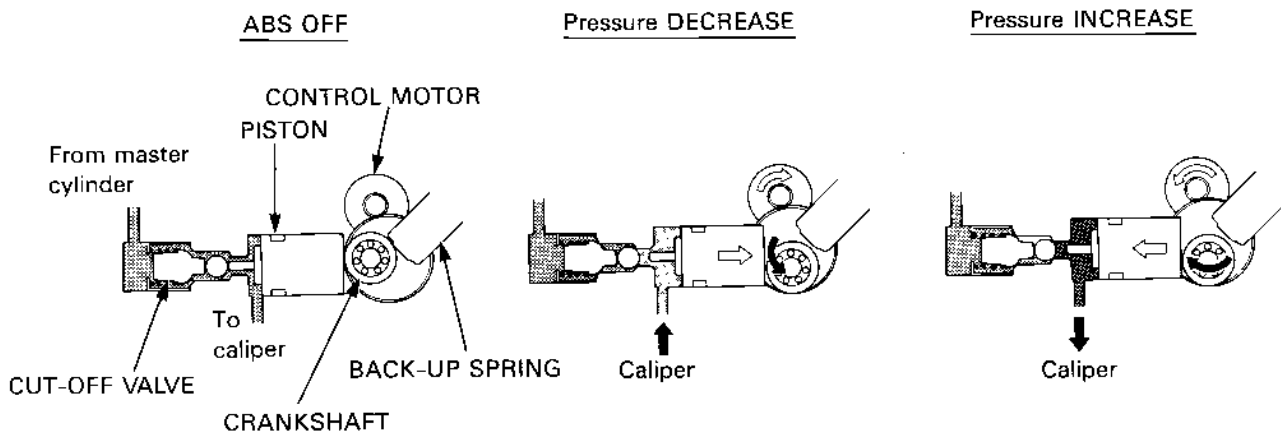
When the ABS control unit (ECU) detects any tendency towards wheel lock, it rapidly reduces hydraulic pressure to the brake caliper by rotating the crankshaft to lower the control pistons, closing the 3-stage cut-off valves.

- Pressure HOLD

Following a predetermined decompression interval, the crankshaft is rotated up slightly to move the control pistons into the pressure HOLD position, which permits the slipping wheel to recover its rotational speed.

- Pressure INCREASE

Once the ABS control unit detects full wheel speed recovery, it rotates the crankshaft back into its highest position. This rapid cycle of pressure DECREASE, HOLD, and INCREASE makes possible nearly instantaneous correction of changes in wheel rotation while ensuring highly accurate control of hydraulic pressure to both independent sets of brake caliper pistons.



- Automatic protection against system failure

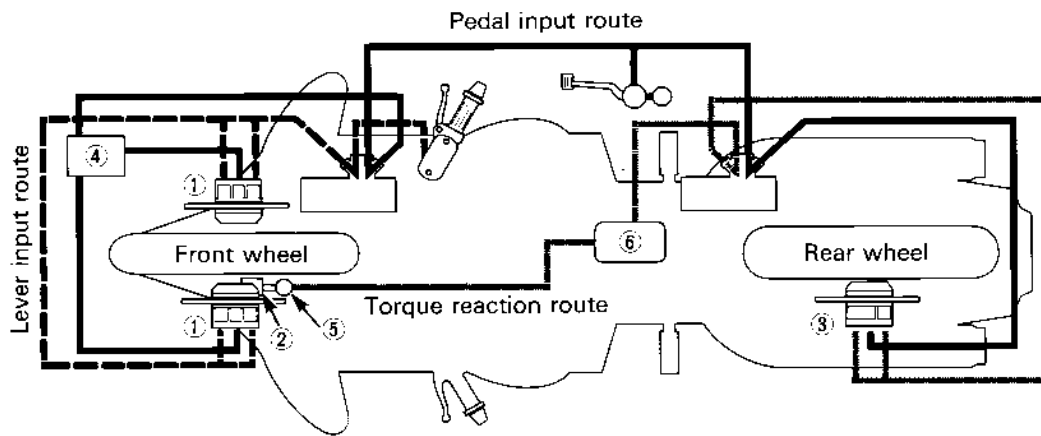
During conventional braking operation, the modulator's control piston remains in its uppermost position to hold the cut-off valve open. If any malfunction in the ABS is detected at this time, the system is turned off without affecting the control piston's position, thus maintaining standard LBS operation. During ABS operation, if any malfunction—such as loss of the modulator motor's power—is detected, the control piston back-up spring pushes the control piston into its upper most position to open the cut-off valve and restore standard LBS operation.

# LBS (Linked Brake System) [After '95]

## Summary

The Linked Brake System (LBS) was designed to engage both front and rear brakes when either the front brake lever or rear brake pedal is used.

Not merely a linked system that divides pedal braking force between the rear caliper and one of the front calipers, this system features a set of 3-piston calipers that are connected to two independent hydraulic systems. These combine to provide an optimal balance of front and rear braking forces whenever either the brake lever and and/or the brake pedal is used. Featuring no electronic control about the LBS, the completely hydraulic system's key component is a mechanical linkage that transmits front caliper braking force to a secondary master cylinder mounted on the left fork slider.



① Front calipers (3-pistons)

② Link mechanism

③ Rear caliper (3-pistons)

④ Delay valve

Slows front brake engagement to minimize its associated dive when performing minor speed corrections with only the brake pedal.

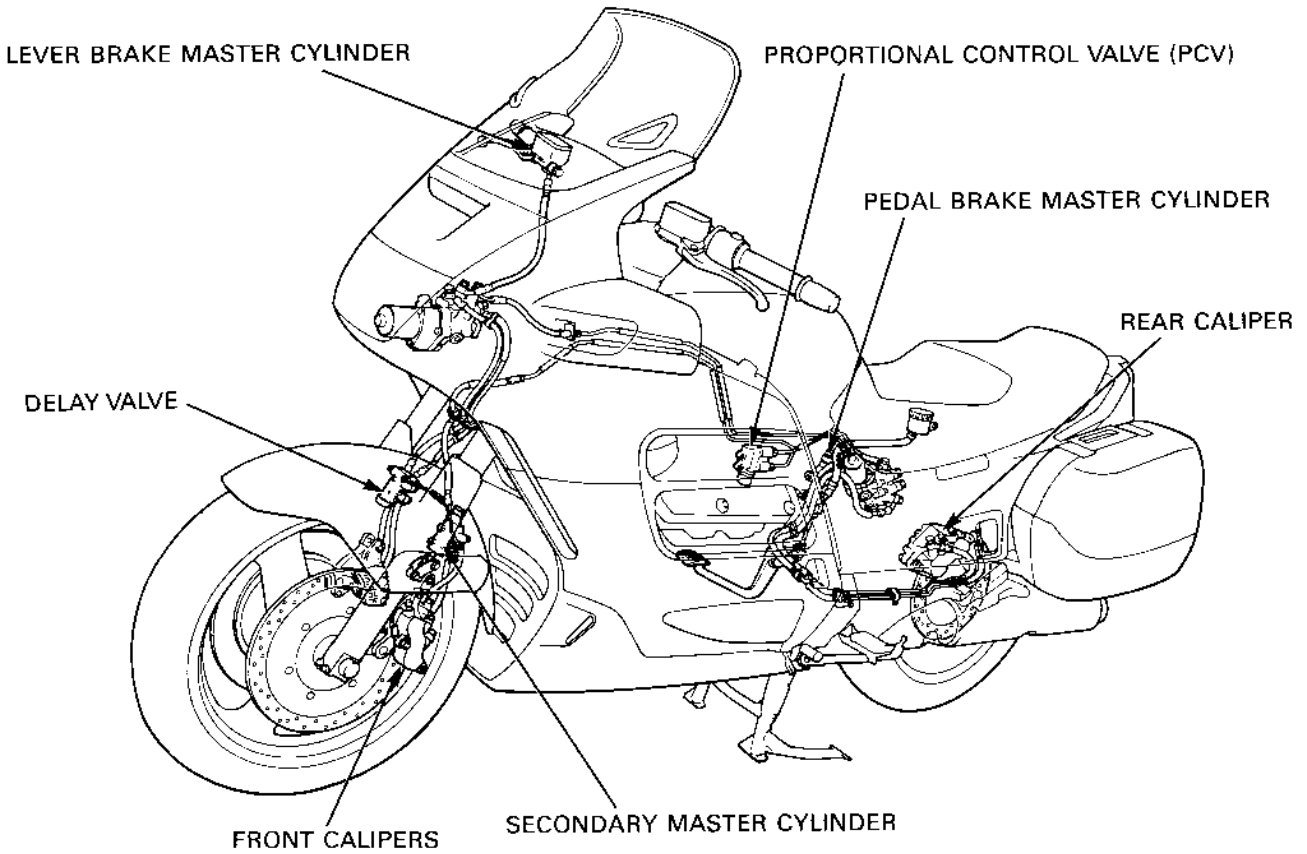
⑤ Secondary master cylinder

Transmits the rotational torque exerted on the front caliper to the rear brake caliper by way of the Proportional Control Valve (PCV).

⑥ Proportional control valve (PCV)

Regulates the rear caliper hydraulic pressure from the secondary master cylinder.

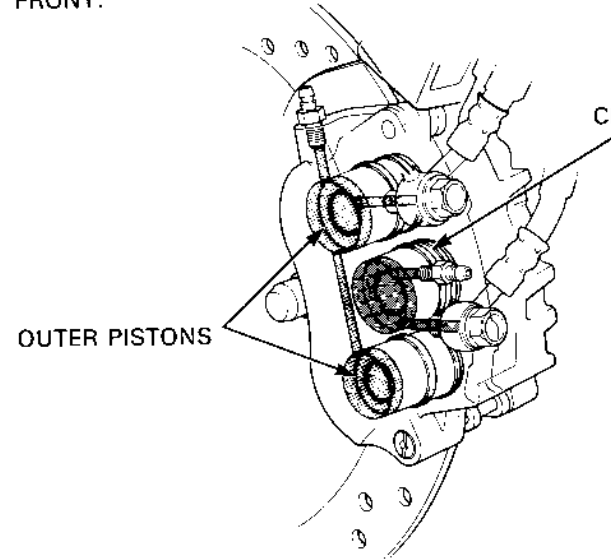
System Construction



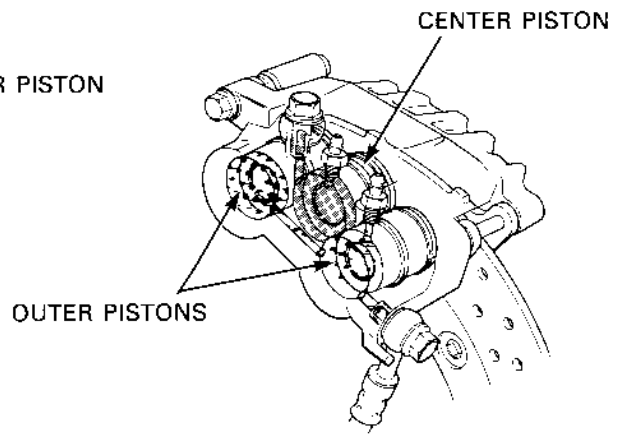
**3-Piston Caliper:**

A set of three newly designed 3-piston calipers are controlled by two independent hydraulic systems. The center piston of all three calipers are operated directly by the brake pedal. The two outer pistons of the front calipers are controlled by the brake lever, and the two in the rear are controlled by the servomechanism-actuated secondary master cylinder (page 23-17). This arrangement delivers a broad, yet easily controlled range of braking force, depending on which either or both of the two (lever and pedal) brake are engaged.

FRONT:

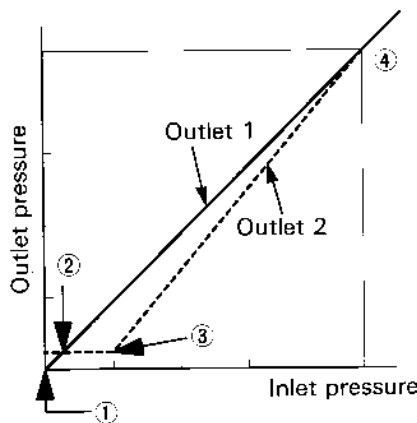
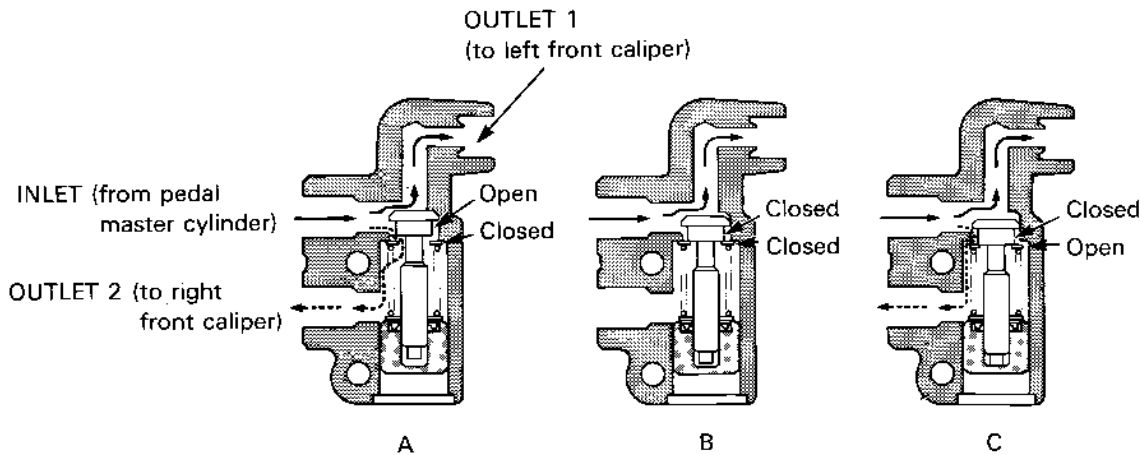
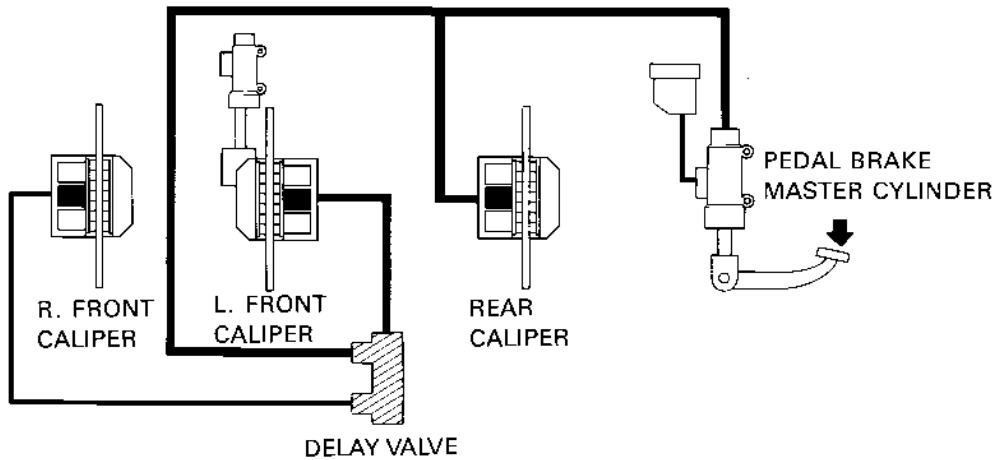


REAR:



**Delay Valve:**

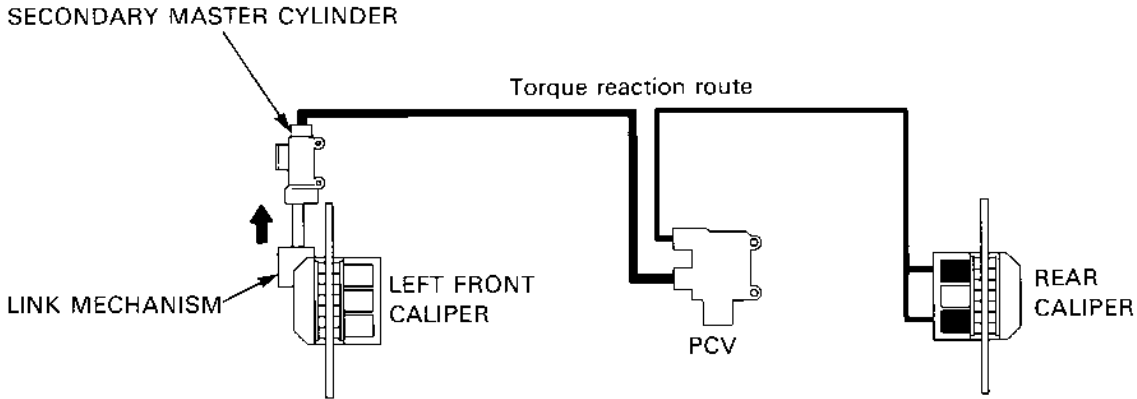
The delay valve positioned between the pedal brake master cylinder and the center pistons of the front calipers, the delay valve engages only the left front caliper at first, effectively reducing the initial front wheel braking force (Fig. A-B). As pedal pressure gradually increases, the delay valve introduces pressure to the right front caliper, which increases to match the pressure to the left front caliper at a predetermined level (Fig. C). The resulting feel is of comfortably even deceleration that begins at the rear, with little of the rapid forward dive that is usually brought on when the front brakes are suddenly applied.



- ①-② : Fig. A
- ②-③ : Fig. B
- ③-④ : Fig. C
- ④- : Alternating Fig. B and C

## Link Mechanism/Secondary Master Cylinder:

The system's servomechanism uses the rotational torque exerted on the front caliper when they are engaged to actuate a secondary master cylinder by way of its caliper mounting linkage. This secondary master cylinder then applies a corresponding amount of pressure to the rear brake caliper.



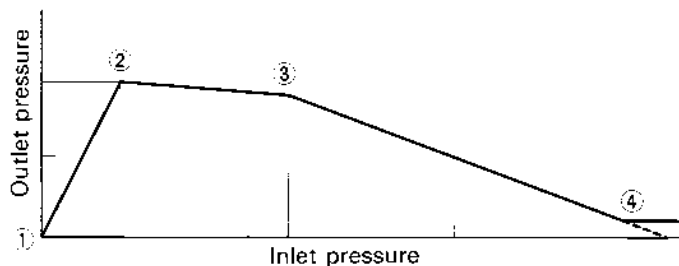
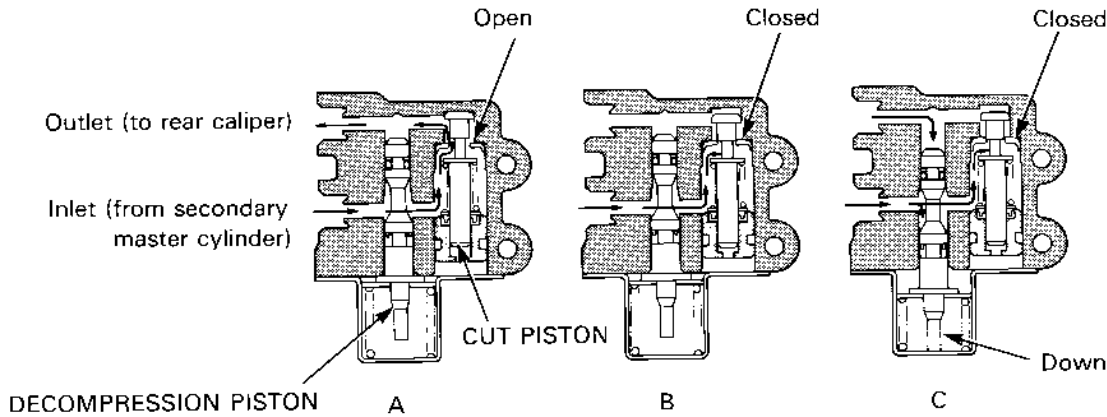
## Proportional Control Valve (PCV):

The PCV installed between the secondary master cylinder and the outer pistons of the rear caliper, regulates pressure in three stages of operation.

Initially, the PCV's output pressure increases in direct proportion to the increasing input pressure originating from the secondary master cylinder (Fig. A).

As input pressure continues to increase, the cut piston activates, closing the valve and causing the output pressure to hold (Fig. B).

A further increase in input pressure forces the decompression piston down, which expands a sub-chamber that draws pressure off the output side of the PCV (Fig. C).



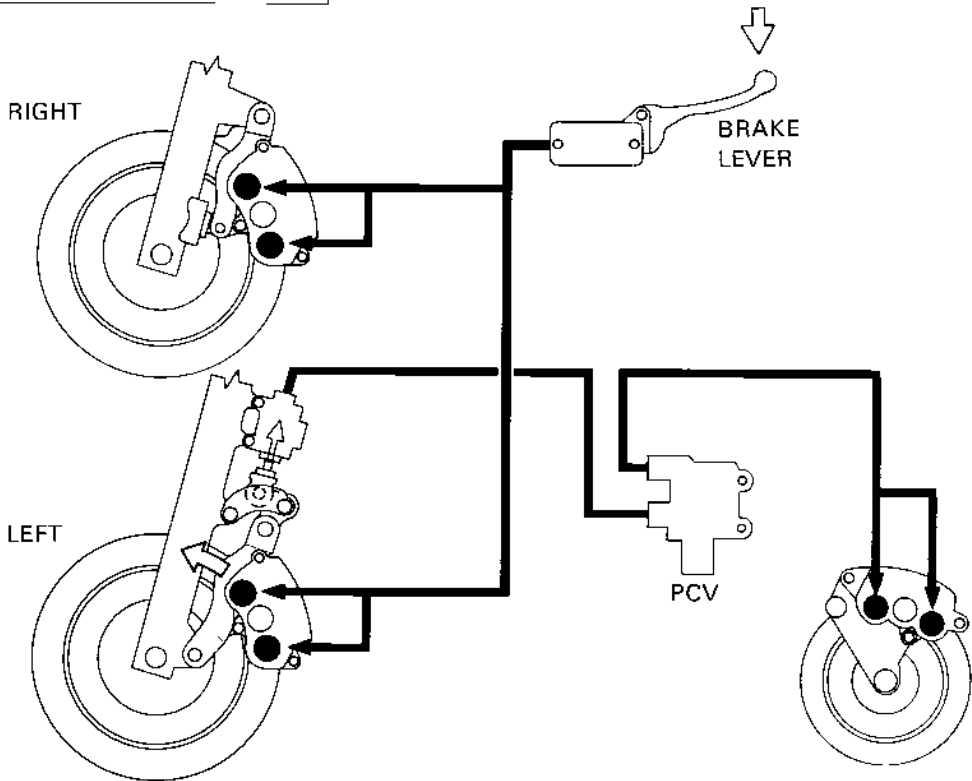
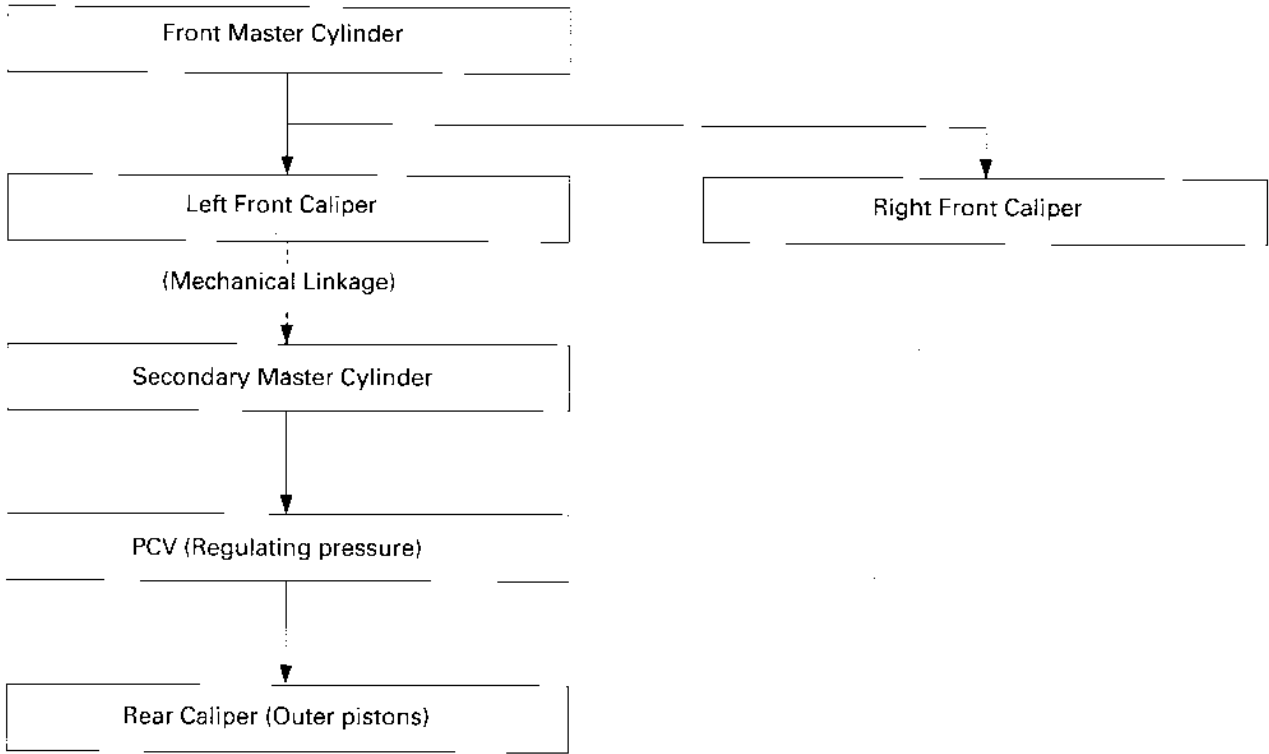
- ①-② : Fig. A
- ②-③ : Fig. B
- ③-④ : Fig. C

## LBS Operation

### When hand brake is applied:

On initial operation, the hand brake works like any conventional motorcycle front brake system. A squeeze on the brake lever pressurizes the master cylinder which transmits its increased hydraulic pressure to the two outer pistons of the front calipers, causing a corresponding braking force to be applied to the front wheel.

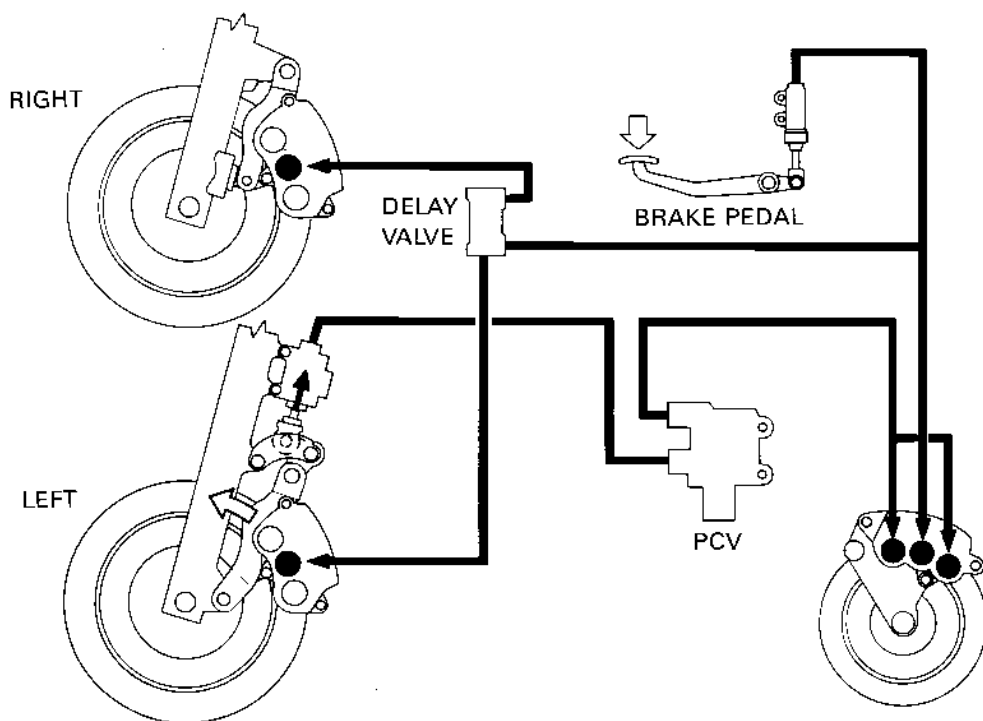
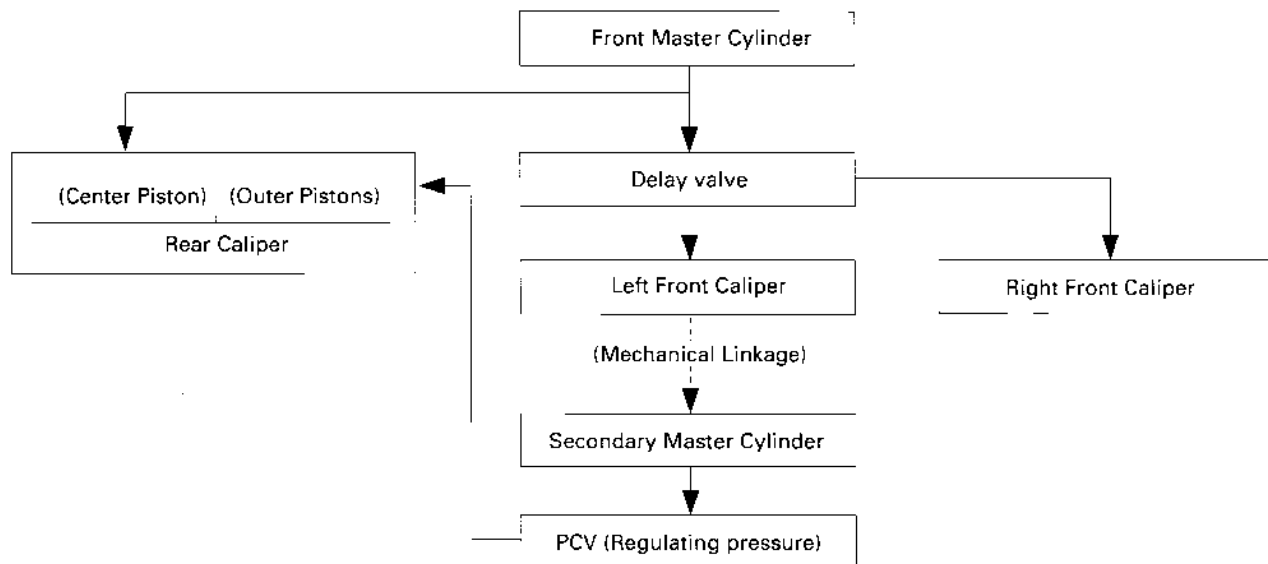
In response to the braking force applied by the front caliper onto the spinning brake rotor, the caliper is pulled in the direction of wheel rotation, around its lower caliper pivot. This forward caliper motion also acts on the link arm which is connected to the secondary master cylinder. This direct pressure on the secondary master cylinder is regulated by the PCV which then transmits its hydraulic pressure to the outer pistons of the rear caliper.



## Technical Features

### When foot brake is applied:

When the brake pedal is pressed, hydraulic pressure from the rear master cylinder is routed through two lines. One connects directly to the rear caliper and acts on the center piston. The other line runs to the center pistons of the front calipers by way of the delay valve that slows front brake engagement to minimize its associated dive. As during hand brake operation, hydraulic pressure from the secondary master cylinder passes through the PCV, and acts on the outer pistons of the rear caliper. Because hydraulic pressure from the rear master cylinder is also being applied by the rear caliper's center piston, the braking force applied to the rear wheel is greater than that applied when using the brake lever only.

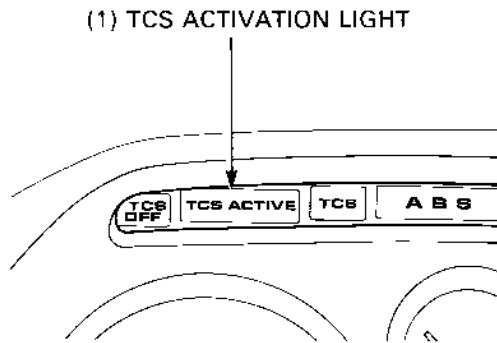


The system offers the same braking feel as conventional brake systems, but adds a more progressive range of brake control and enhanced balance of braking capability. Because the two systems are independent of each other, both the brake pedal and the lever can be used in any combination without resulting in excessive braking force or other unusual responses.

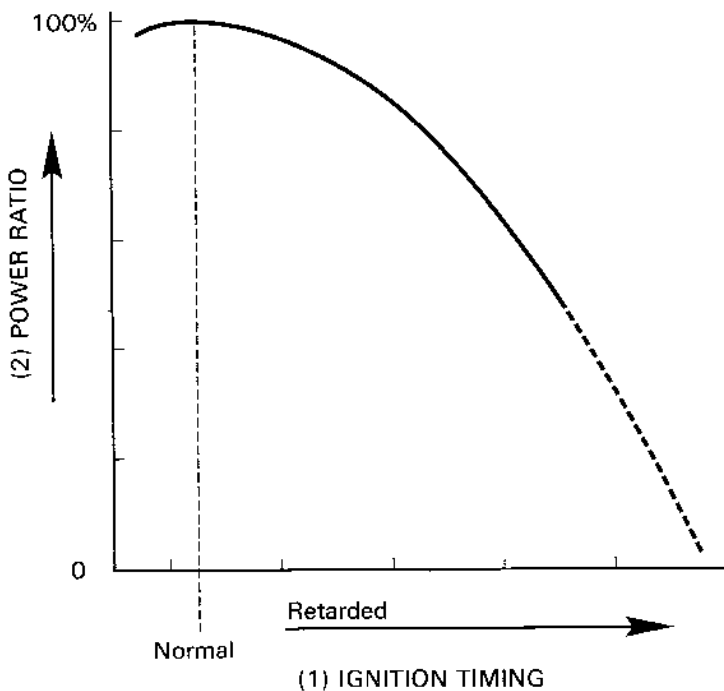
# TCS (Traction Control System) [After '91]

## Summary

The Traction Control System (TCS) is designed to help prevent excessive rear wheel slippage during hard acceleration or acceleration on loose or slippery surfaces. TCS helps maintain rear wheel traction by controlling the ignition timing when it senses rear wheel slippage. The system alerts the rider that TCS is active by turning the TCS activation light on.



The TCS adjusts and controls the engine power by adjusting the ignition timing. This helps match the rear wheel torque to the road surface traction condition.



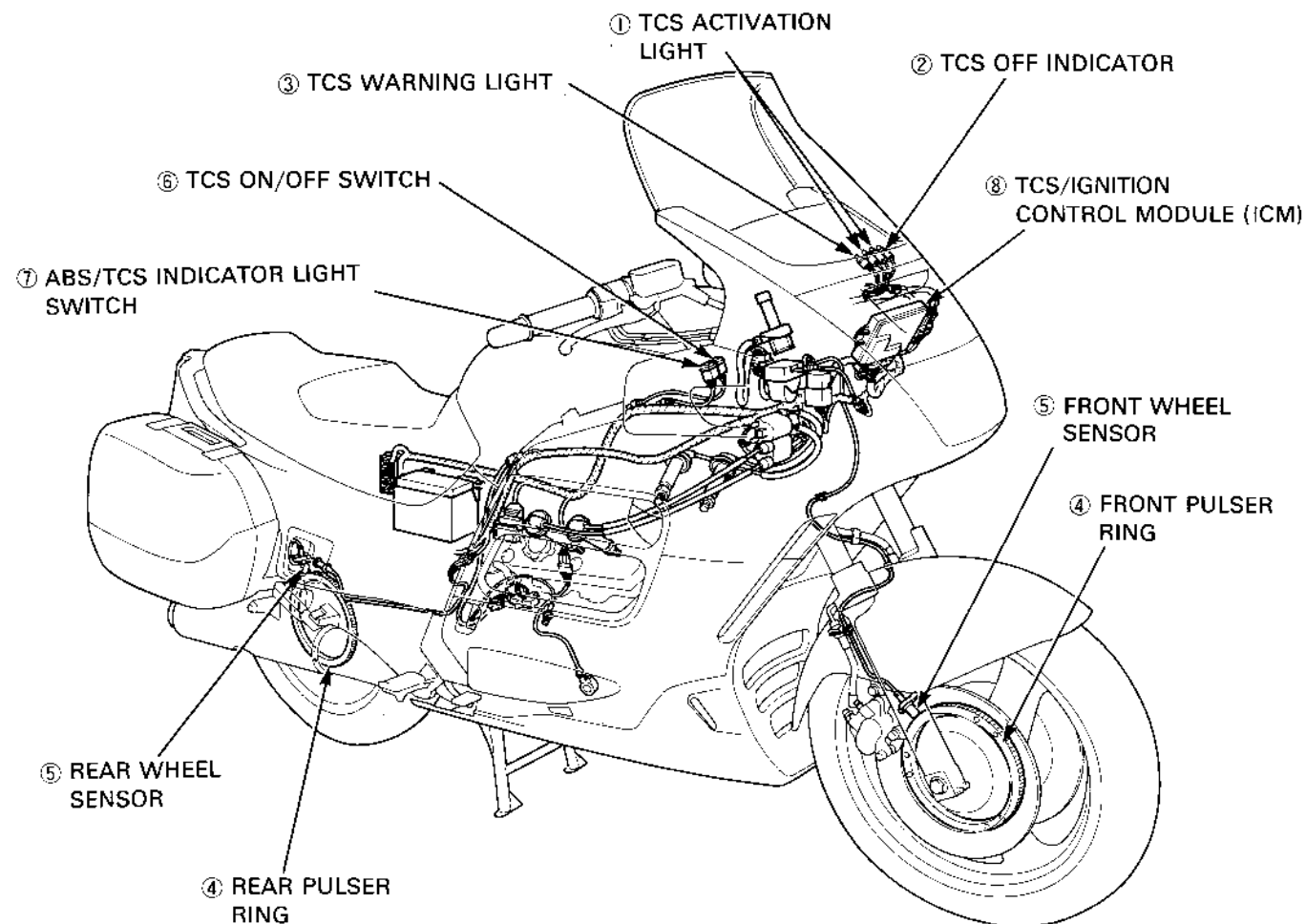


## Technical Features

The TCS/ignition control module (ICM) judges the rear tire traction conditions as it receives the signal from the front and rear wheel sensors.

When the TCS is activated the TCS/ICM turns on the TCS activation light and controls engine power through changes in ignition timing. The TCS automatically turns ON by turning the ignition switch ON, and can be turned OFF manually as the rider wishes by pushing the TCS ON/OFF switch.

Note that the TCS cannot be turned OFF when it is active or while the motorcycle is moving.



- ① TCS activation light  
Turns ON when the TCS is active.
- ② TCS OFF indicator  
Turns ON when the TCS is turned OFF using the TCS switch or when the TCS is not activated because of a problem with the TCS.
- ③ TCS indicator light  
Blinks when a problem occurs in the TCS. The light stays ON when the pre-start self-diagnosis is not passed.
- ④ Pulser ring  
Rotates together with the wheel and detects the wheel speed using the wheel sensor.
- ⑤ Wheel sensor  
Sends the pulse signal, generated proportional to the rotating speed of the pulser ring, to the TCS/ICM.
- ⑥ TCS ON/OFF Switch  
The TCS can be turned ON and OFF by pushing the TCS ON/OFF switch. The TCS OFF indicator comes ON when the TCS ON/OFF switch is OFF.
- ⑦ ABS/TCS indicator light switch  
The indicator light switch is the common switch between the ABS and TCS.  
When the TCS indicator light blinks, it can be turned OFF so it does not interfere with the rider's vision. (The TCS OFF indicator stays ON).
- ⑧ TCS/ignition control module (ICM)  
While receiving signals from the front and rear wheel sensors, the TCS/ICM judges the running condition and it outputs a signal for appropriate ignition timing.

**System Construction**

**TCS/ignition control module (ICM):**

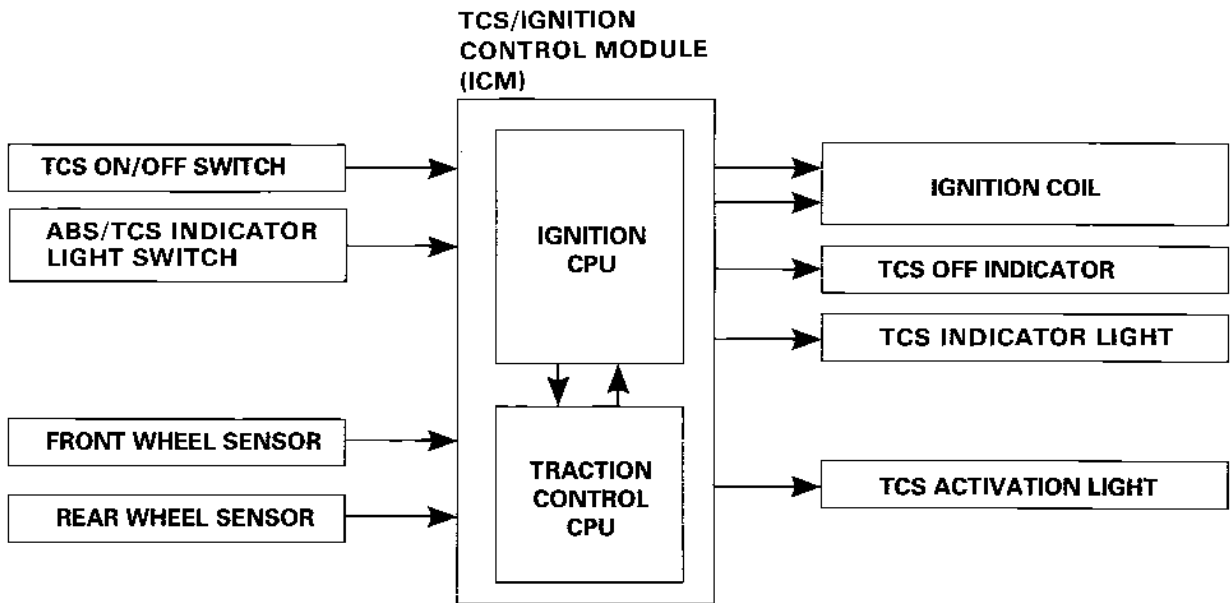
The TCS/ICM detects front and rear wheel speed by receiving signals from the wheel sensors. When the rear wheel speed exceeds a given ratio of front-to-rear wheel speed, the TCS/ICM judges that the rear driving wheel is beginning to slip and it activates the TCS.

The TCS/ICM body is the ECU that is integrated with the spark unit. As the ignition CPU and the traction control CPU communicate with each other and the ignition CPU monitors the traction control CPU, the engine will operate normally even if the TCS becomes inoperative due to a problem in the system.

When the TCS is inoperative, the TCS indicator light and TCS OFF indicator turn ON.

The TCS/ICM constantly monitors the input signal inside the TCS/ICM, and shuts off the TCS when it detects a problem with the system.

Simultaneously, the TCS/ICM turns ON or makes the TCS indicator light blink notifying the rider of the problem with the system, and turning the TCS OFF indicator ON to notify the rider of the inoperative state of the TCS.



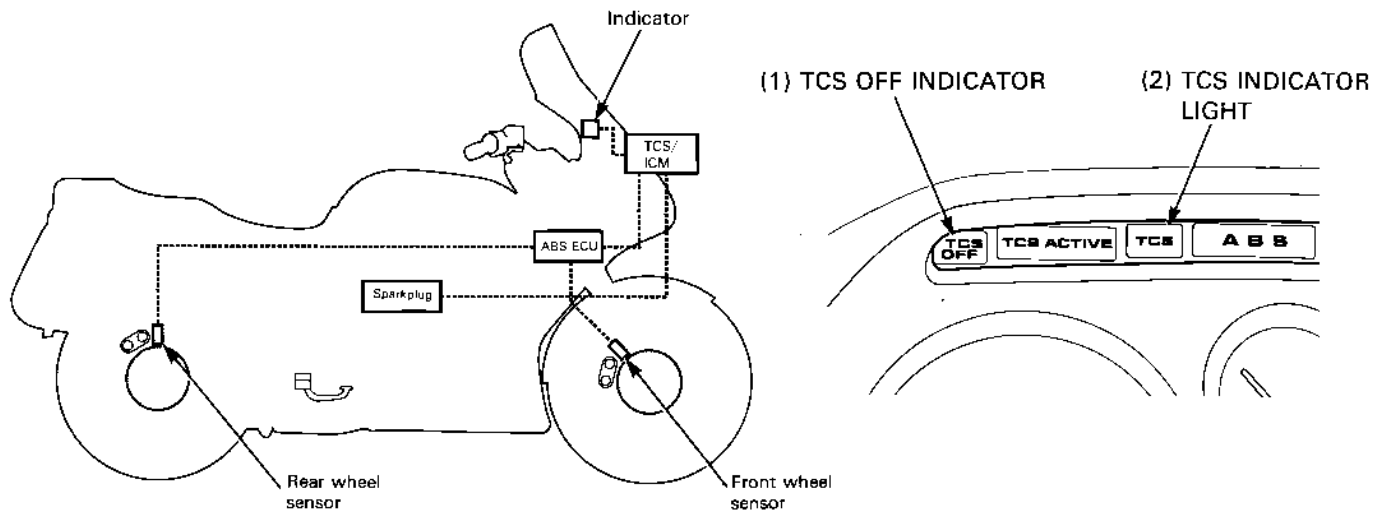
## Technical Features

### • Self-diagnosis function

The TCS/ICM starts self-diagnosis as the ignition switch is turned ON. It diagnoses the TCS/ICM itself and the wheel sensor power source. When it detects a problem, it stops TCS operation, makes the TCS indicator light blink and turns on the TCS OFF indicator light to notify the rider of a fault in the TCS. When the TCS/ICM is found to be normal, it moves to the stand-by mode for the wheel sensor signal and the TCS indicator light turns ON. (The TCS does not function when the TCS indicator light is ON).

The wheel sensors send signals to the TCS/ICM after the motorcycle is in motion [approximately 10km/h(6 mile/h) or above] , and the TCS indicator light goes OFF after the wheel sensor signal is input and the wheel sensors are found to be as normal.

If the TCS indicator light stays ON, there is an abnormality with the wheel sensors.



### Wheel sensor/pulser ring:

The ABS and TCS share the same wheel sensor/pulser rings.

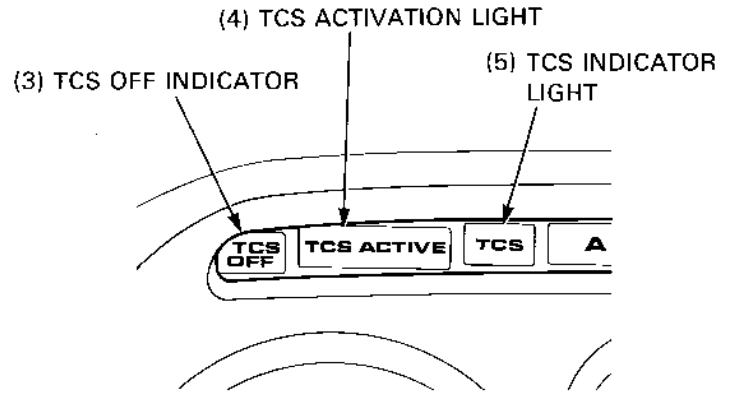
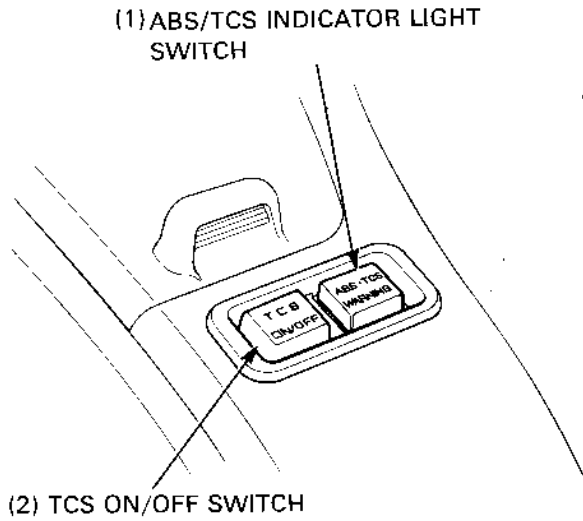
They transmit the vehicle speed signal to both the ABS control unit and the TCS/ICM. (See page 23-3)

**ABS/TCS indicator light switch:**

When a problem with the TCS occurs, the TCS indicator light blinks and the TCS OFF indicator turns ON. The TCS indicator light can be turned OFF by pressing the ABS/TCS indicator light switch. Turns off the indicator light prevents the light from interfering with the rider's vision. The TCS OFF indicator does not go off but stays ON.

**TCS ON/OFF switch:**

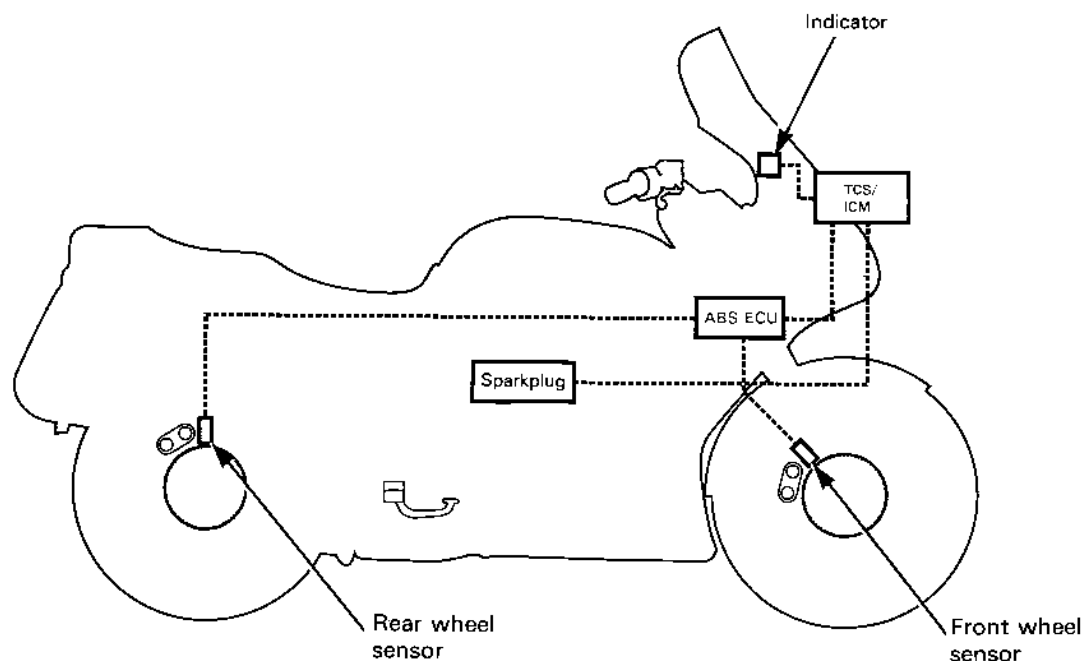
The TCS can be turned ON and OFF by pushing the TCS ON/OFF switch. The TCS is activated when the switch is ON, the TCS activation light turns ON, and when the TCS is active. When the TCS ON/OFF switch is OFF, the TCS cannot be activated but the TCS OFF indicator comes ON. The TCS cannot be shut off when it is active or while riding.



### TCS Operation

#### When TCS is active:

After receiving the signal from the front and rear wheel sensors, the TCS/ICM judges whether traction control is required by detecting the rear wheel speed and comparing it to the front wheel speed (i.e. vehicle speed). The engine will operate normally when the TCS is not active. When the rear wheel speed exceeds a given ratio of the front-to-rear wheel speed, the TCS/ICM judges that the rear wheel is slipping excessively and controls the engine power by determining the suitable ignition timing. The TCS performs the above operations instantaneously to help prevent the skid from becoming excessive and to hold it within a specified range.



#### When a problem occurs:

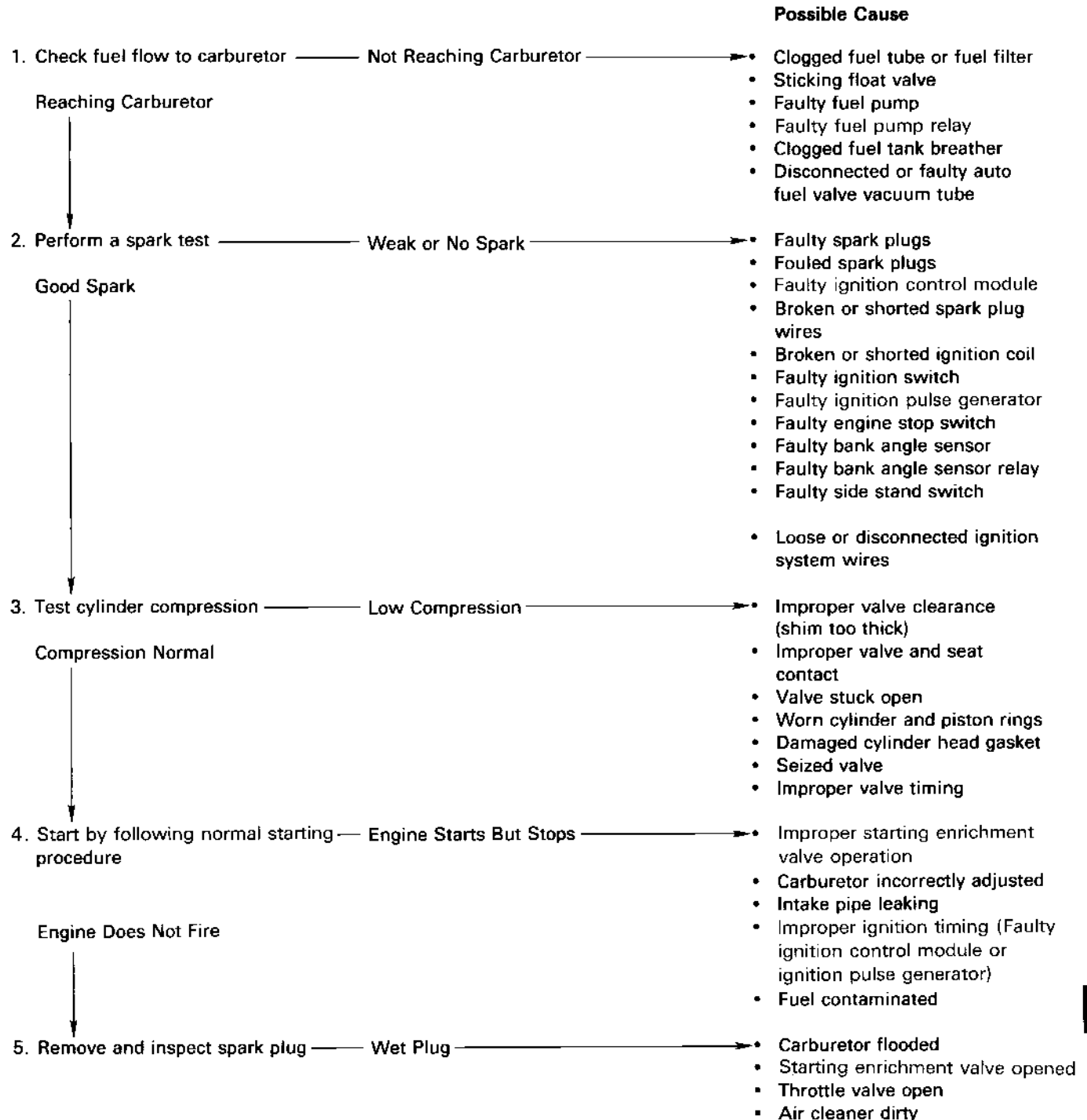
When the TCS/ICM detects a problem with the TCS, it makes the TCS indicator light blink, turns the TCS OFF indicator ON, and immediately shuts off the TCS function. When the TCS/ICM detects a problem while the TCS is active, it returns the engine slowly to regular ignition timing, then deactivates the TCS.

# 24. Troubleshooting

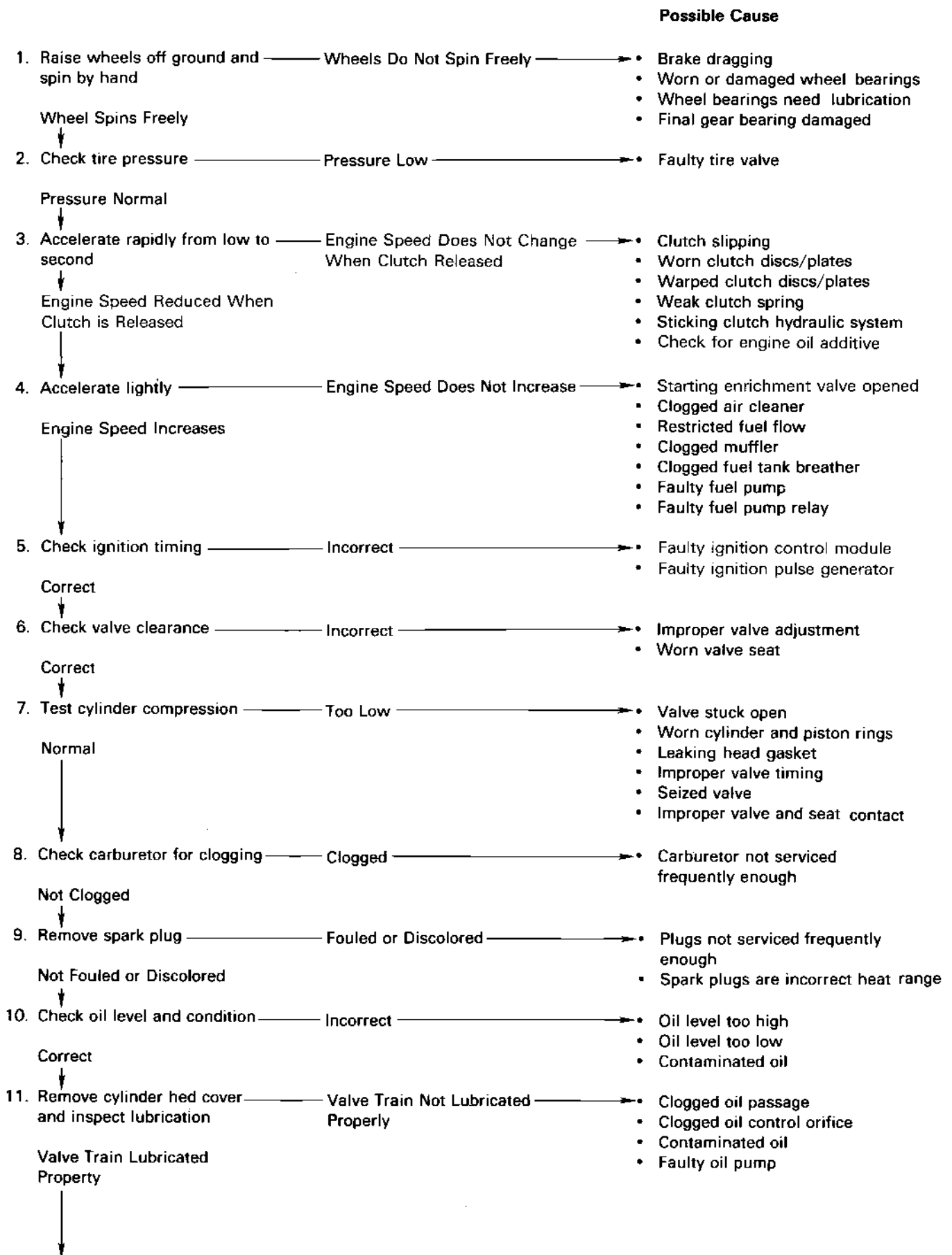
Engine Does Not Start or is Hard to Start	24-1
Engine Lacks Power	24-2
Poor Performance at Low and Idle Speeds	24-3

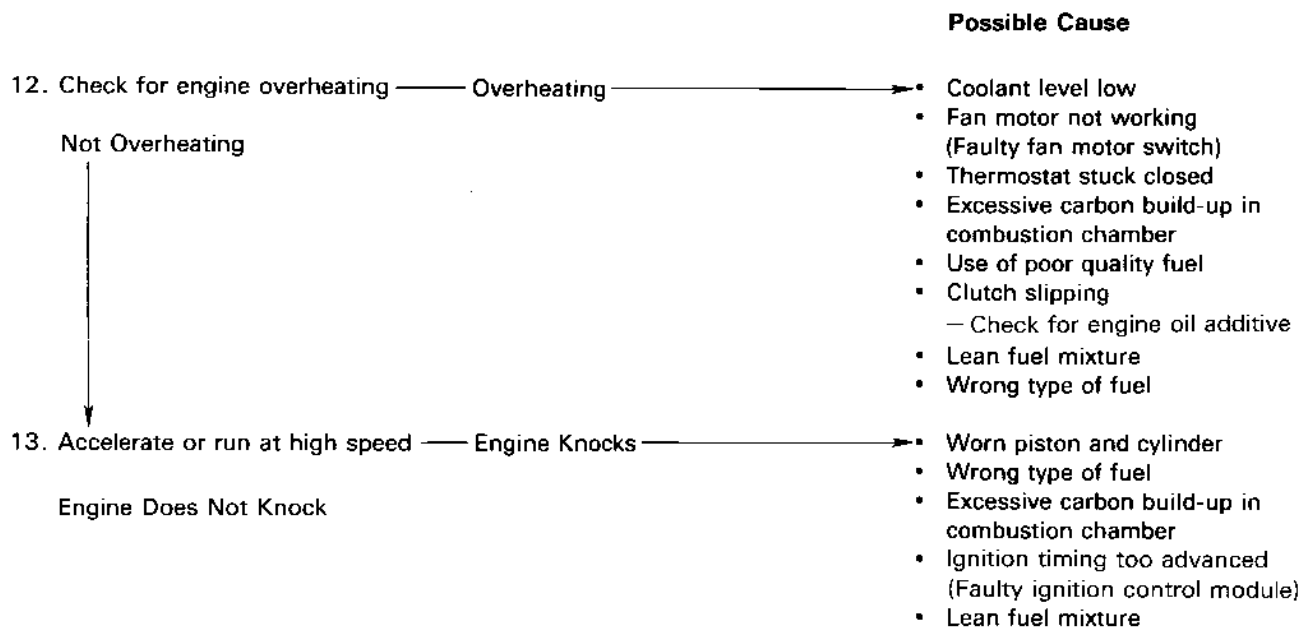
Poor Performance at High Speed	24-4
Poor Handling	24-4

## Engine Does Not Start or is Hard to Start

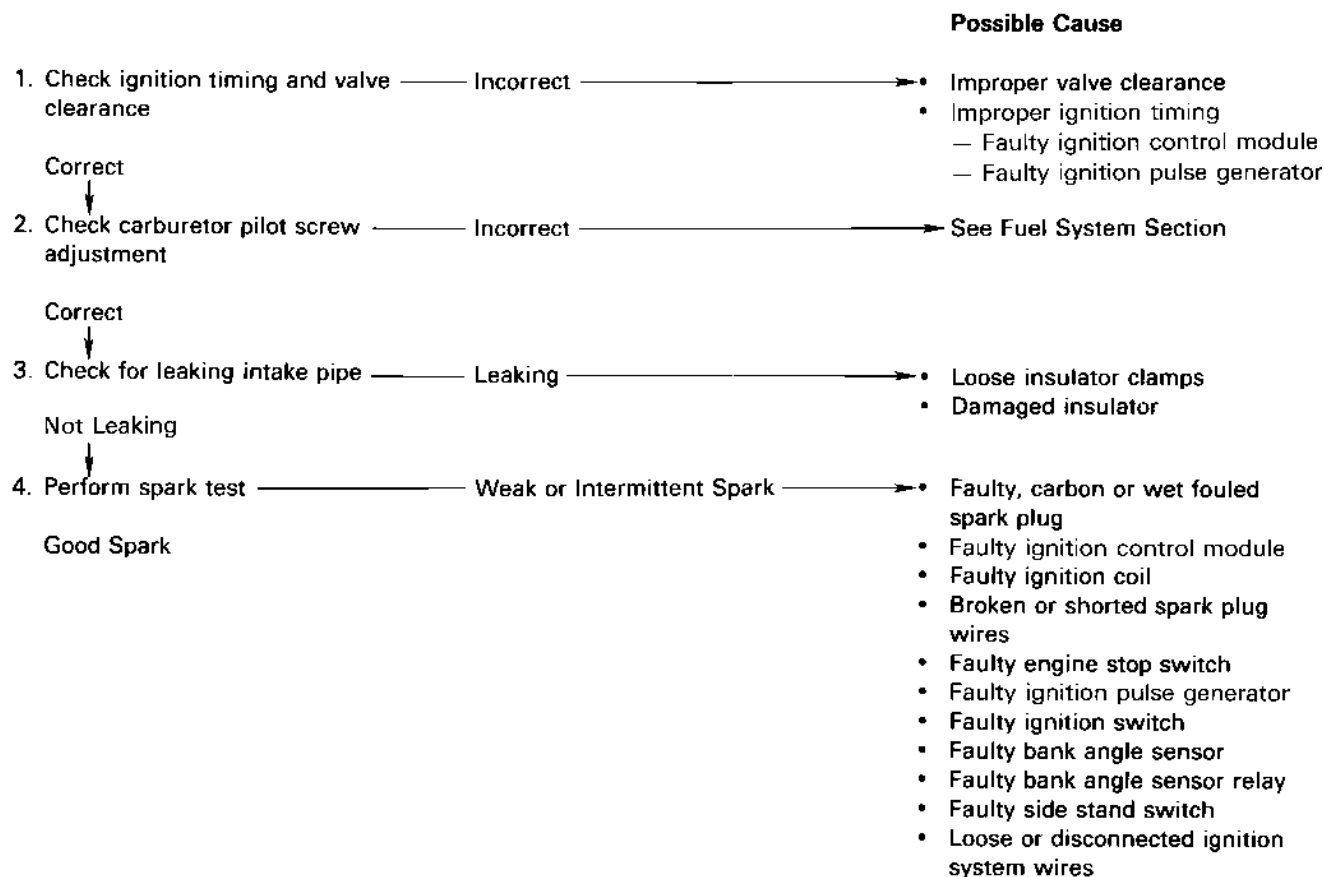


# Engine Lacks Power



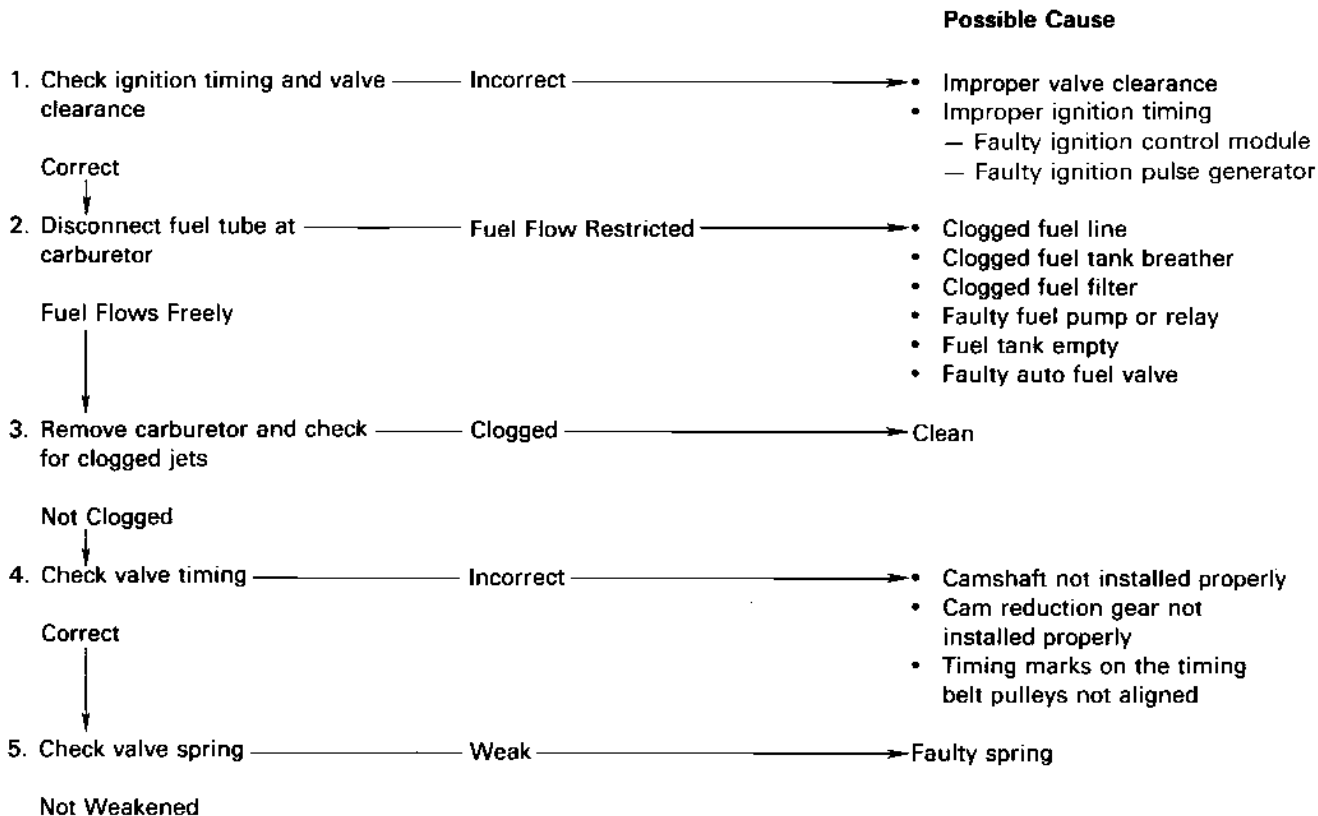


## Poor Performance at Low and Idle Speeds





# Poor Performance at High Speed



# Poor Handling —> Check tire pressure

