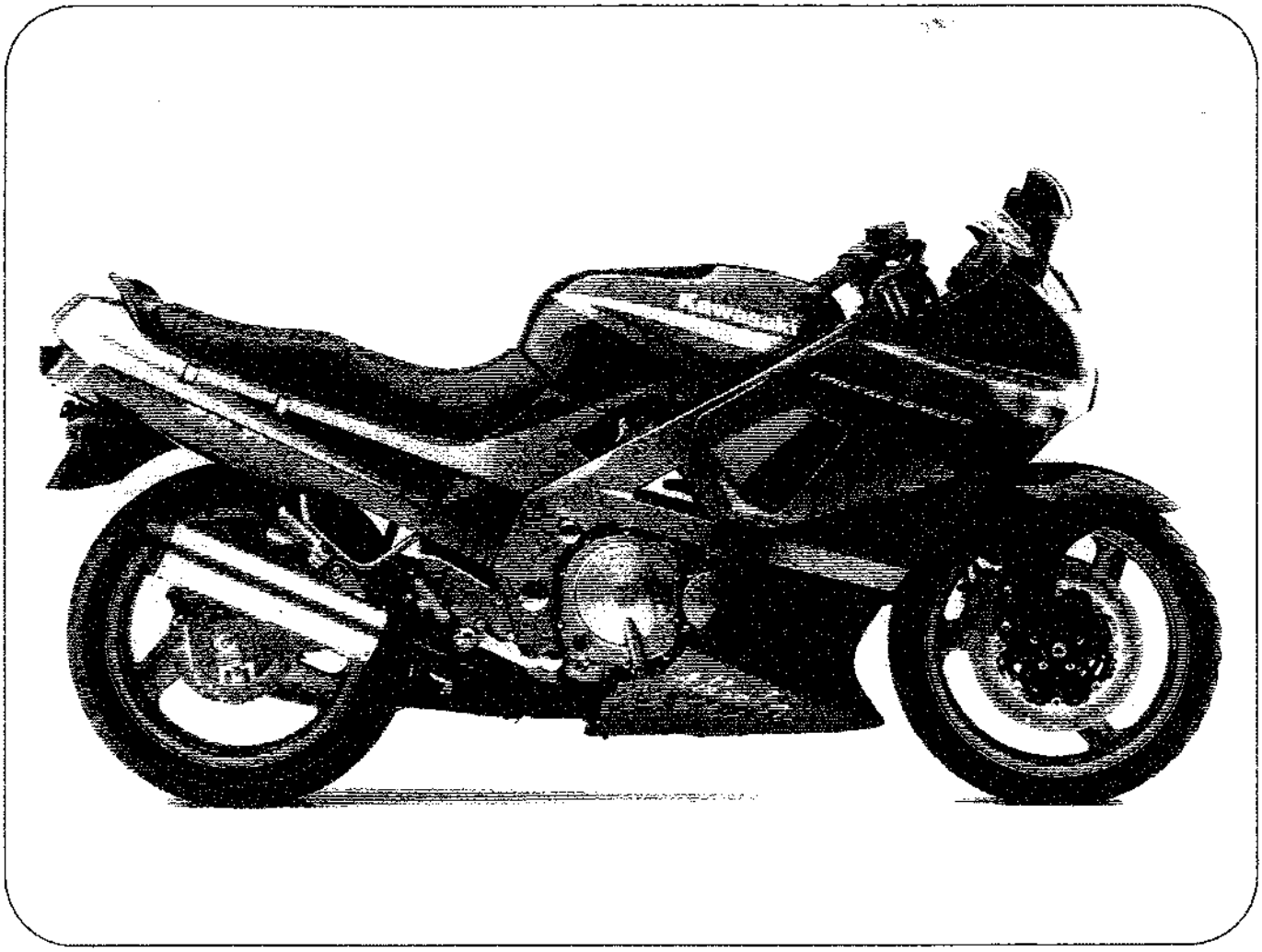
Kawasaki

Ninja ZX-6
ZZ-R600
ZZ-R500



Motorcycle
Service Manual

Quick Reference Guide

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This quick reference guide will assist you in locating a desired topic or procedure.

- Bend the pages back to match the black tab of the desired chapter number with the black tab on the edge at each table of contents page.
- Refer to the sectional table of contents for the exact pages to locate the specific topic required.

Kawasaki

Ninja ZX-6
ZZ-R 600
ZZ-R 500

Motorcycle
Service Manual

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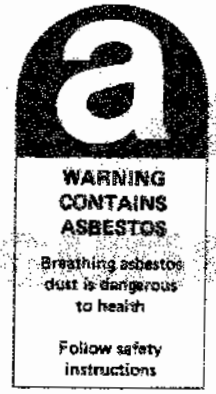
All information contained in this publication is based on the latest product information available at the time of publication. Illustrations and photographs in this publication are intended for reference use only and may not depict actual model component parts.

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Second Edition (7) : Jul. 9, 1997 (K)

LIST OF ABBREVIATIONS

A	ampere(s)	lb	pound(s)
ABDC	after bottom dead center	m	meter(s)
AC	alternating current	min	minute(s)
ATDC	after top dead center	N	newton(s)
BBDC	before bottom dead center	Pa	pascal(s)
BDC	bottom dead center	PS	horsepower
BTDC	before top dead center	psi	pound(s) per square inch
°C	degree(s) Celsius	r	revolution
DC	direct current	rpm	revolution(s) per minute
F	farad(s)	TDC	top dead center
°F	degree(s) Fahrenheit	TIR	total indicator reading
ft	foot, feet	V	volt(s)
g	gram(s)	W	watt(s)
h	hour(s)	Ω	ohm(s)
L	liter(s)		



This warning may apply to any of the following components or any assembly containing one or more of these components:-

Brake Shoes or Pads
Clutch Friction Material
Gaskets
Insulators

SAFETY INSTRUCTIONS

- Operate if possible out of doors or in a well ventilated place.
- Preferably use hand tools or low speed tools equipped, if necessary, with an appropriate dust extraction facility. If high speed tools are used, they should always be so equipped.
- If possible, dampen before cutting or drilling.
- Dampen dust and place it in properly closed receptacle and dispose of it safely.

Read OWNER'S MANUAL before operating.

EMISSION CONTROL INFORMATION

To protect the environment in which we all live, Kawasaki has incorporated crankcase emission (1) and exhaust emission (2) control systems in compliance with applicable regulations of the United States Environmental Protection Agency and California Air Resources Board. Additionally, Kawasaki has incorporated an evaporative emission control system (3) in compliance with applicable regulations of the California Air Resources Board on vehicles sold in California only.

1. Crankcase Emission Control System
   This system eliminates the release of crankcase vapors into the atmosphere. Instead, the vapors are routed through an oil separator to the intake side of the engine. While the engine is operating, the vapors are drawn into combustion chamber, where they are burned along with the fuel and air supplied by the carburetion system.
2. Exhaust Emission Control System
   This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this motorcycle. The fuel and ignition systems of this motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.
3. Evaporative Emission Control System
   Vapors caused by fuel evaporation in the fuel system are not vented into the atmosphere. Instead, fuel vapors are routed into the running engine to be burned, or stored in a canister when the engine is stopped. Liquid fuel is caught by a vapor separator and returned to the fuel tank.

The Clean Air Act, which is the Federal law covering motor vehicle pollution, contains what is commonly referred to as the Act's "tampering provisions."

"Sec. 203(a) The following acts and the causing thereof are prohibited...

(3)(A) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchaser, or for any manufacturer or dealer knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser.

(3)(B) for any person engaged in the business of repairing, servicing, selling, leasing, or trading motor vehicles or motor vehicle engines, or who operates a fleet of motor vehicles knowingly to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title following its sale and delivery to the ultimate purchaser..."

(Continued on next page.)

NOTE

- *The phrase "remove or render inoperative any device or element of design" has been generally interpreted as follows:*
  1. *Tampering does not include the temporary removal or rendering inoperative of devices or elements of design in order to perform maintenance.*
  2. *Tampering could include:*
     a. *Maladjustment of vehicle components such that the emission standards are exceeded.*
     b. *Use of replacement parts or accessories which adversely affect the performance or durability of the motorcycle.*
     c. *Addition of components or accessories that result in the vehicle exceeding the standards.*
     d. *Permanently removing, disconnecting, or rendering inoperative any component or element of design of the emission control systems.*

WE RECOMMEND THAT ALL DEALERS OBSERVE THESE PROVISIONS OF FEDERAL LAW, THE VIOLATION OF WHICH IS PUNISHABLE BY CIVIL PENALTIES NOT EXCEEDING $10,000 PER VIOLATION.

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its safe 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:

- Replacement of the original exhaust system or muffler with a component not in compliance with Federal regulations.
- Removal of the muffler(s) or any internal portion of the muffler(s).
- Removal of the air box or air box cover.
- Modifications to the muffler(s) or air intake system by cutting, drilling, or other means if such modifications result in increased noise levels.

Foreword

This manual is designed primarily for use by trained mechanics in a properly equipped shop. However, it contains enough detail and basic information to make it useful to the owner who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily. Whenever the owner has insufficient experience or doubts his ability to do the work, all adjustments, maintenance, and repair should be carried out only by qualified mechanics.

In order to perform the work efficiently and to avoid costly mistakes, read the text, thoroughly familiarize yourself with the procedures before starting work, and then do the work carefully in a clean area. Whenever special tools or equipment are specified, do not use makeshift tools or equipment. Precision measurements can only be made if the proper instruments are used, and the use of substitute tools may adversely affect safe operation.

For the duration of the warranty period, we recommend that all repairs and scheduled maintenance be performed in accordance with this service manual. Any owner maintenance or repair procedure not performed in accordance with this manual may void the warranty.

To get the longest life out of your Motorcycle:

- Follow the Periodic Maintenance Chart in the Service Manual.
- Be alert for problems and non-scheduled maintenance.
- Use proper tools and genuine Kawasaki Motorcycle parts. Special tools, gauges, and testers that are necessary when servicing Kawasaki motorcycles are introduced by the Special Tool Manual. Genuine parts provided as spare parts are listed in the Parts Catalog.
- Follow the procedures in this manual carefully. Don't take shortcuts.
- Remember to keep complete records of maintenance and repair with dates and any new parts installed.

How to Use this Manual

In preparing this manual, we divided the product into its major systems. These systems became the manual's chapters. All information for a particular system from adjustment through disassembly and inspection is located in a single chapter.

The Quick Reference Guide shows you all of the product's system and assists in locating their chapters. Each chapter in turn has its own comprehensive Table of Contents.

The Periodic Maintenance Chart is located in the General Information chapter. The chart gives a time schedule for required maintenance operations.

If you want spark plug information, for example, go to the Periodic Maintenance Chart first. The chart tells you how frequently to clean and gap the plug. Next, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Spark Plug section.

Whenever you see these WARNING and CAUTION symbols, heed their instructions! Always follow safe operating and maintenance practices.

⚠WARNING

This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

This manual contains four more symbols (in addition to WARNING and CAUTION) which will help you distinguish different types of information.

NOTE

○ This note symbol indicates points of particular interest for more efficient and convenient operation.

● Indicates a procedural step or work to be done.
○ Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a NOTE.
★ Indicates a conditional step or what action to take based on the results of the test or inspection in the procedural step or sub-step it follows.

In most chapters an exploded view illustration of the system components follows the Table of Contents. In these illustrations you will find the instructions indicating which parts require specified tightening torque, oil, grease or a locking agent during assembly.

1

General Information

Table of Contents

Before Servicing 1-2
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General Specifications 1-6
Periodic Maintenance Chart 1-9
Torque and Locking Agent 1-11
Cable, Wire, and Hose Routing 1-14

1-2 GENERAL INFORMATION

Before Servicing

Before starting to service a motorcycle, careful reading of the applicable section is recommended to eliminate unnecessary work. Photographs, diagrams, notes, cautions, warnings, and detailed descriptions have been included wherever necessary. Nevertheless, even a detailed account has limitations, a certain amount of basic knowledge is also required for successful work.

Especially note the following:

(1) Dirt

Before removal and disassembly, clean the motorcycle. Any dirt entering the engine or other parts will work as an abrasive and shorten the life of the motorcycle. For the same reason, before installing a new part, clean off any dust or metal filings.

(2) Battery Ground

Remove the ground (−) lead from the battery before performing any disassembly operations on the motorcycle. This prevents:

(a) the possibility of accidentally turning the engine over while partially disassembled.

(b) sparks at electrical connections which will occur when they are disconnected.

(c) damage to electrical parts.

(3) Tightening Sequence

Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them evenly in a cross pattern. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter of turn and then remove them. Where there is a tightening sequence indication in this Service Manual, the bolts, nuts, or screws must be tightened in the order and method indicated.

(4) Torque

When torque values are given in this Service Manual, use them. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.

(5) Force

Common sense should dictate how much force is necessary in assembly and disassembly. If a part seems especially difficult to remove or install, stop and examine what may be causing the problem. Whenever tapping is necessary, tap lightly using a wooden or plastic-faced mallet. Use an impact driver for screws (particularly for the removal of screws held by a locking agent) in order to avoid damaging the screw heads.

(6) Edges

Watch for sharp edges, especially during major engine disassembly and assembly. Protect your hands with gloves or a piece of thick cloth when lifting the engine or turning it over.

(7) High-Flash Point Solvent

A high-flash point solvent is recommended to reduce fire danger. A commercial solvent commonly available in North America is Stoddard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.

(8) Gasket, O-Ring

Do not reuse a gasket or O-ring once it has been in service. The mating surfaces around the gasket should be free of foreign matter and perfectly smooth to avoid oil or compression leaks.

(9) Liquid Gasket, Non-Permanent Locking Agent

Follow manufacturer's directions for cleaning and preparing surfaces where these compounds will be used. Apply sparingly. Excessive amounts may block engine oil passages and cause serious damage. An example of a non-permanent locking agent commonly available in North America is Loctite Lock'n Seal (Blue).

(10) Press

A part installed using a press or driver, such as a wheel bearing, should first be coated with oil on its outer or inner circumference so that it will go into place smoothly.

(11) Ball Bearing

When installing a ball bearing, the bearing race which is affected by friction should be pushed by a suitable driver. This prevents severe stress on the balls and races, and prevents races and balls from being dented. Press a ball bearing until it stops at the stop in the hole or on the shaft.

(12) Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals.

When pressing in a seal which has manufacturer's marks, press it in with the marks facing out. Seals should be pressed into place using a suitable driver, which contacts evenly with the side of seal, until the face of the seal is even with the end of the hole.

(13) Seal Guide

A seal guide is required for certain oil or grease seals during installation to avoid damage to the seal lips. Before a shaft passes through a seal, apply a little high temperature grease on the lips to reduce rubber to metal friction.

(14) Circlip, Retaining Ring

Replace any circlips and retaining rings that were removed with new ones, as removal weakens and deforms them. When installing circlips and retaining rings, take care to compress or expand them only enough to install them and no more.

(15) Cotter Pin

Replace any cotter pins that were removed with new ones, as removal deforms and breaks them.

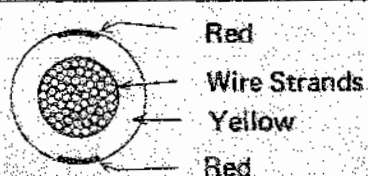
(16) Lubrication

Engine wear is generally at its maximum while the engine is warming up and before all the rubbing surfaces have an adequate lubricative film. During assembly, oil or grease (whichever is more suitable) should be applied to any rubbing surface which has lost its lubricative film. Old grease and dirty oil should be cleaned off. Deteriorated grease has lost its lubricative quality and may contain abrasive foreign particles.

Don't use just any oil or grease. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended. This manual makes reference to molybdenum disulfide grease (MoS_2) in the assembly of certain engine and chassis parts. Always check manufacturer recommendations before using such special lubricants.

(17) Electrical Wires

All the electrical wires are either single-color or two-color and, with only a few exceptions, must be connected to wires of the same color. On any of the two-color wires there is a greater amount of one color and a lesser amount of a second color, so a two-color wire is identified by first the primary color and then the secondary color. For example, a yellow wire with thin red stripes is referred to as a "yellow/red" wire; it would be a "red/yellow" wire if the colors were reversed to make red the main color.

Wire(cross-section)	Name of Wire Color
	Yellow/red

(18) Replacement Parts

When there is a replacement instruction, replace these parts with new ones every time they are removed. These replacement parts will be damaged or lose their original function once removed.

(19) Inspection

When parts have been disassembled, visually inspect these parts for the following conditions or other damage. If there is any doubt as to the condition of them, replace them with new ones.

Abrasion	Crack	Hardening	Warp
Bent	Dent	Scratch	Wear
Color change	Deterioration	Seizure	

(20) Specifications

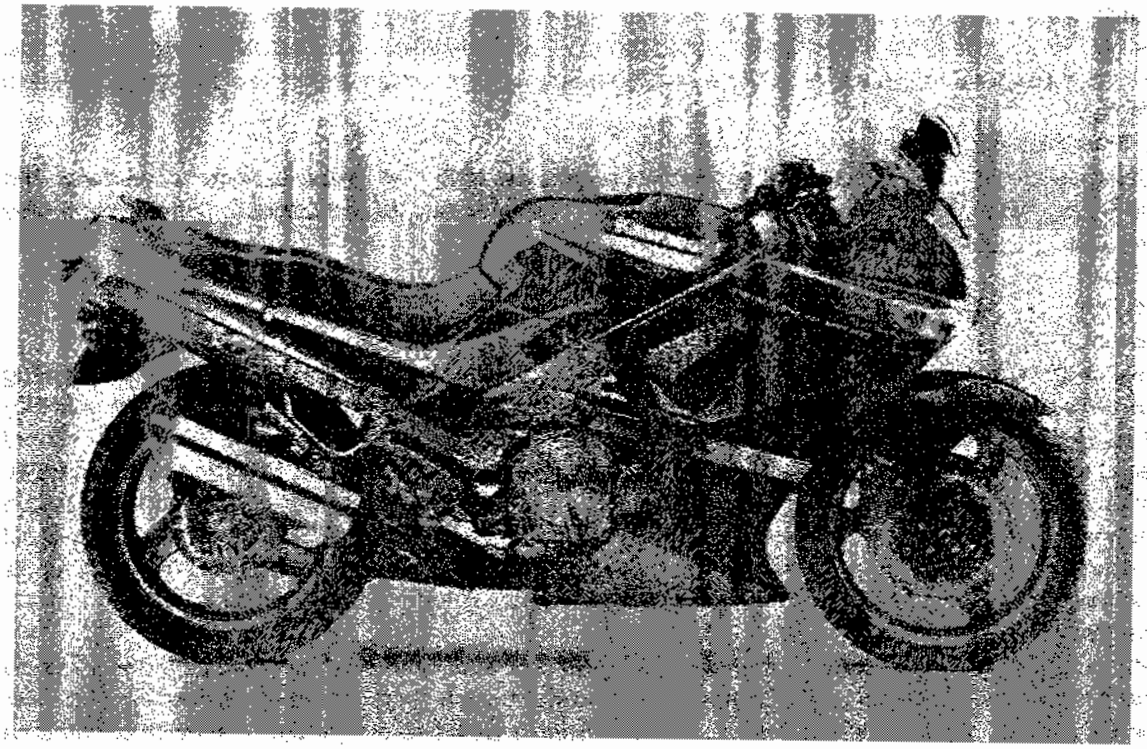
Specification terms are defined as follows.

"Standards" show dimensions or performances which brand-new parts or systems have.

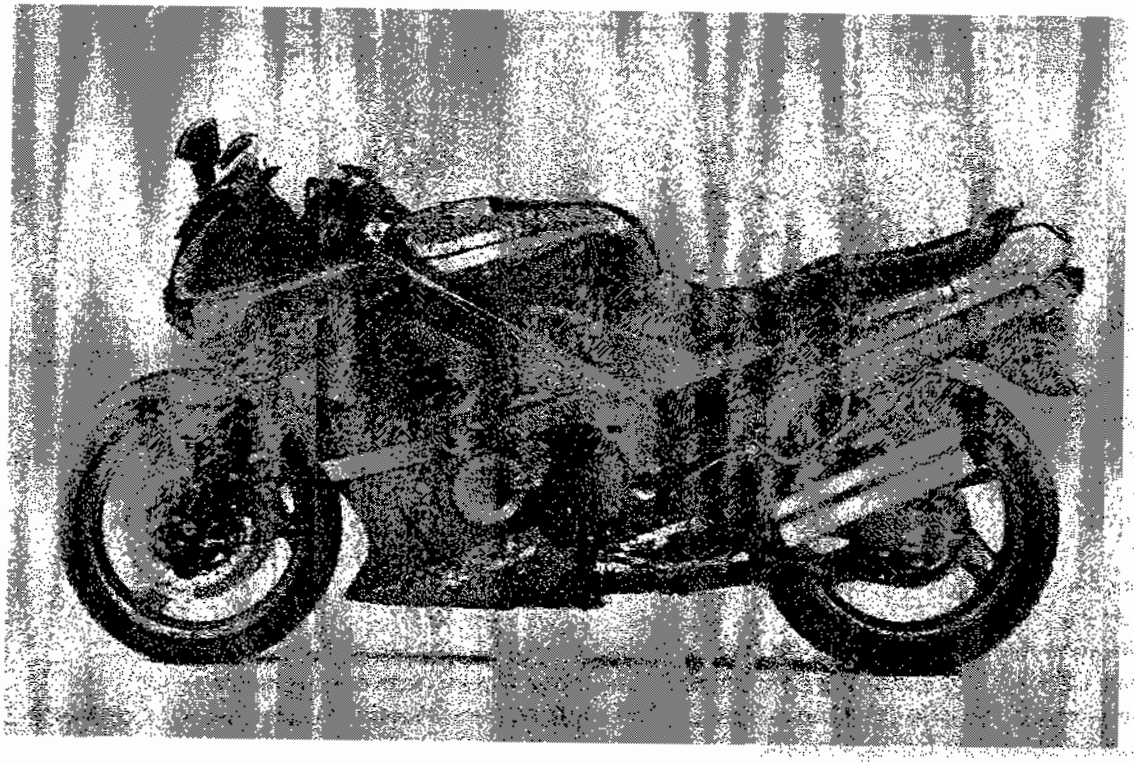
"Service Limits" indicate the usable limits. If the measurement shows excessive wear or deteriorated performance, replace the damaged parts.

Model Identification

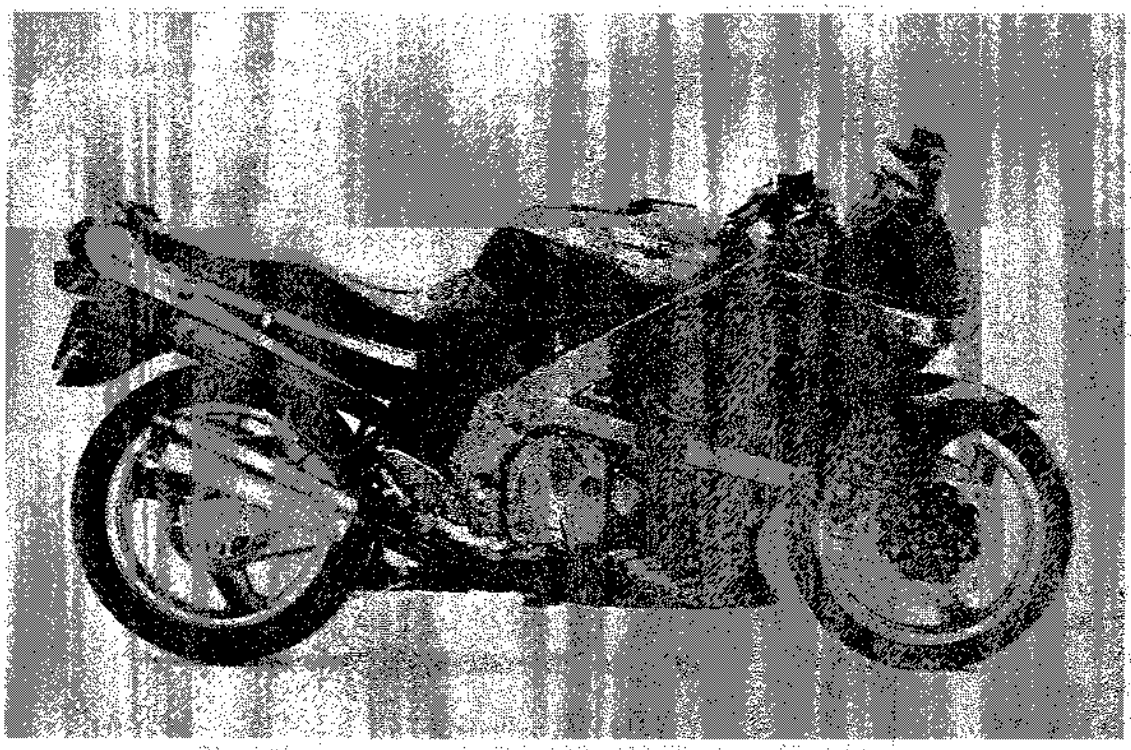
ZX600-D1 (US, Canada Models)



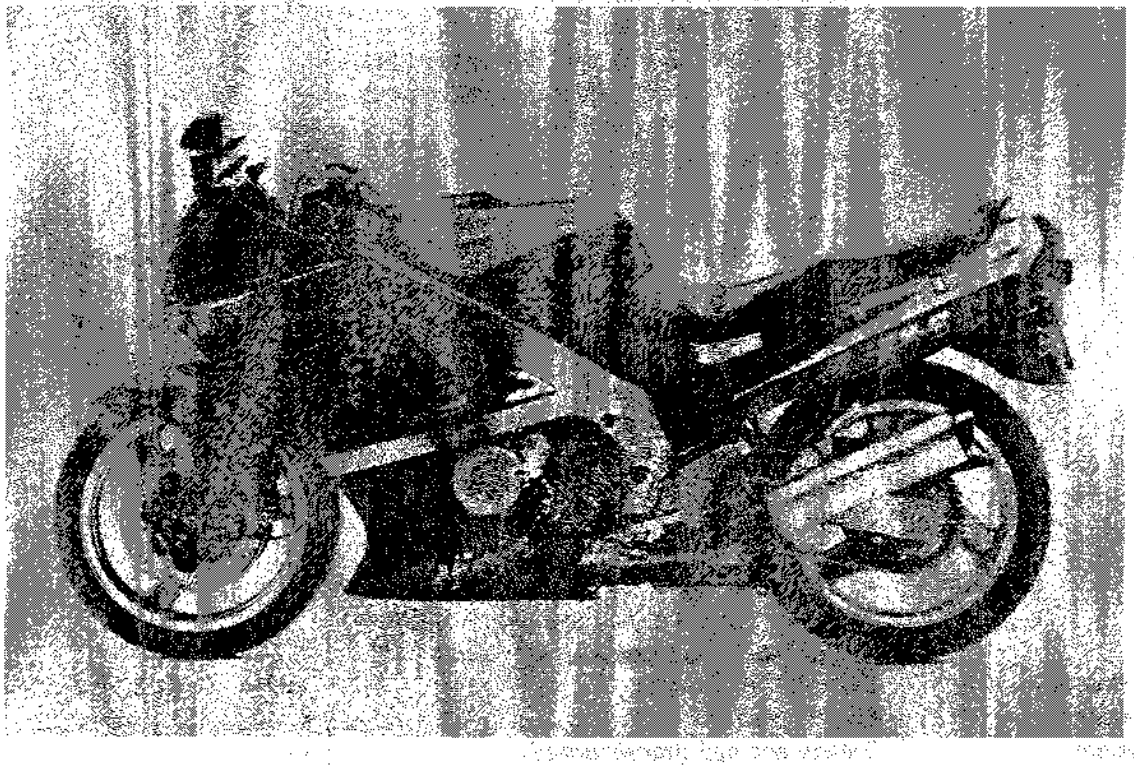
ZX600-D2



ZX600-D3



ZX600-D4



General Specifications

Items	ZX600-D1 ~ D4	ZX500-C1 ~ C3
Dimensions:		
Overall length	2 075 mm, (IT) 2 115 mm, (GR, NR, SD, ST, FG) 2 150mm	2 150 mm, (AR) 2 075 mm
Overall width	700 mm	←
Overall height	1 170mm	←
Wheelbase	1 440 mm	1 445 mm
Road clearance	110 mm	←
Seat height	780 mm	←
Dry weight	195 kg, (CA) 196.5 kg	195 kg
Curb weight: Front	110 kg	←
Rear	107 kg, (CA) 107.5 kg	107 kg
Fuel tank capacity	18.0 L	←
Performance:		
Minimum turning radius	2.8 m	←
Engine:		
Type	4-stroke, DOHC, 4-cylinder	←
Cooling system	Liquid-cooled	←
Bore and stroke	64.0 x 46.6 mm	57.5 x 46.6 mm
Displacement	599 mL	484 mL
Compression ratio	11.5	←
Maximum horsepower	72.1 kW (98 PS) @11 500 r/min (rpm), (AS) 69.9 kW (95 PS) @11 500 r/min (rpm), (CA, US) ---, (FR, UTAC's norm) 69.9 kW @11 500 r/min (rpm), (SD) 46.3 kW (63 PS) @11 000 r/min (rpm), (ST) 36.8 kW (50 PS) @6 000 r/min (rpm), (FG, DIN) 72.1 kW (98 PS) @11 500 r/min (rpm) (AR, C3) 68.4 kW (93PS) @11 500 r/min (rpm)	50.7 kW (69 PS) @11 000 r/min (rpm), (AR) 52.9 kW (72 PS) @11 000 r/min (rpm)
Maximum torque	63.7 N-m (6.5 kg-m, 47.0 ft-lb) @9 800 r/min (rpm), (AS) 62.8 N-m (6.4 kg-m, 46.3 ft-lb) @9 800 r/min (rpm), (CA, FR, UK, US) ---, (SD) 46.1 N-m (4.7 kg-m, 33.9 ft-lb) @8 000 r/min (rpm), (ST) 58.8 N-m (6.0 kg-m, 43.4 ft-lb) @5 500 r/min (rpm), (FG, DIN) 63.7 N-m (6.5 kg-m, 47.0 ft-lb) @9 800 r/min (rpm) (AR, C3) 59.8 N-m (6.1 kg-m, 44.1 ft-lb) @9 000 r/min (rpm)	47.1 N-m (4.8kg-m, 34.7 ft-lb) @10 000 r/min (rpm), (AR) 48.0 N-m (4.9 kg-m, 35.4 ft-lb) @10 000 r/min (rpm)
Carburetion system	KEIHIN CVKD36 x 4	KEIHIN CVKD30 x 4
Starting system	Electric starter	←
Ignition system	Battery and coil (transistorized)	←
Timing advance	Electronically advanced	←

Items		ZX600-D1 ~ D4	ZX500-C1 ~ C3
Ignition timing		From 12.5° BTDC @1 050 r/min (rpm) to 40° BTDC @3 000 r/min (rpm), (CA) From 7.5° BTDC @1 300 r/min (rpm) to 40° BTDC @3 000 r/min (rpm), (ST)(AR, D3) From 5° BTDC @1 300 r/min (rpm) to 40° BTDC @3 000 r/min (rpm)	From 12.5° BTDC @1 050 r/min (rpm) to 40° BTDC @3 000 r/min (rpm) (AR, C3) From 5° BTDC @ 1 300 r/min (rpm) to 40° BTDC 3000 r/min (rpm)
Spark plug		NGK CR9E or ND U27ESR-N, (CA, US) NGK C9E, or ND U27ES-N	NGK CR9E or ND U27ESR-N
Cylinder numbering method		Left to right, 1-2-3-4	←
Firing order		1-2-4-3	←
Valve timing:			
Inlet	Open	35°, (ST, D2 ~)(AR, D3) 20° BTDC	22° BTDC
	Close	65°, (ST, D2 ~)(AR, D3) 60° ABDC	62° ABDC
	Duration	280°,(ST, D2 ~)(AR, D3) 260°	264°
Exhaust	Open	60°, (ST, D2 ~)(AR, D3) 50° BBDC	52° BBDC
	Close	40°, (ST, D2 ~)(AR, D3) 30°ATDC	32° ATDC
	Duration	280°, (ST, D2 ~)(AR, D3) 260°	264°
Lubrication system		Forced lubrication (wet sump with cooler)	←
Engine oil:			
Grade		SE or SF class	←
Viscosity		SAE10W-40, 10W-50, 20W-40, or 20W-50	←
Capacity		3.7 L	←
Drive Train:			
Primary reduction system:			
Type		Gear	←
Reduction ratio		1.792 (95/53)	←
Clutch type		Wet multi disc	←
Transmission:			
Type		6-speed, constant mesh, return shift	←
Gear ratios:	1st	3.166 (38/12)	←
	2nd	2.125 (34/16)	←
	3rd	1.666 (35/21)	←
	4th	1.380 (29/21)	←
	5th	1.217 (28/23)	←
	6th	1.083 (26/24)	←
Final drive system:			
Type		Chain drive	←
Reduction ratio		3.000 (45/15)	3.200 (48/15)
Overall drive ratio		5.825 @Top gear	6.213 @Top gear
Frame:			
Type		Tubular, diamond	←
Caster (rake angle)		24.5°	←
Trail		95 mm	←
Front tire:			
Type		Tubeless	←
Size		120/60 VR17-V250, 120/60 ZR17, 110/70 V17-V250	←

Items		ZX600-D1 ~ D4	ZX500-C1 ~ C3
Rear tire:	Type	Tubeless	←
	Size	160/60 VR17-V250, 160/60 ZR 17, 160/60 VB 17	←
Front suspension:			
	Type	Telescopic fork (pneumatic)	←
	Wheel travel	130 mm	←
Rear suspension:			
	Type	Swing arm (uni-trak)	←
	Wheel travel	130 mm	←
Brake type:	Front	Dual discs	←
	Rear	Single disc	←
Electrical Equipment:			
Battery		12 V 12 Ah	←
Headlight:	Type	Semi-sealed beam	←
	Bulb	12 V 60/55 W (quartz-halogen)	←
Tail/brake light		12 V 5/21 W x 2, (CA, CN, SA, US) 12 V 8/27 W x 2	12 V 5/21 W x 2
Alternator:	Type	Three-phase AC	←
	Rated output	24 A--14V @8 000 r/min (rpm)	

Specifications are subject to change without notice, and may not apply to every country.

(AR) : Austrian Model
(AS) : Australian Model
(CA) : California Model
(CN) : Canadian Model
(FR) : French Model
(GR) : Greek Model
(IT) : Italian Model
(NR) : Norwegian Model
(SA) : South African Model
(SD) : Swedish Model
(ST) : Swiss Model
(US) : U.S. Model
(FG) : German Model

Periodic Maintenance Chart

The scheduled maintenance must be done in accordance with this chart to keep the motorcycle in good running condition. **The initial maintenance is vitally important and must not be neglected.**

	OPERATION \ FREQUENCY	Whichever comes first ▼ Every	*ODOMETER READING 800 km	5 000 km	10 000 km	15 000 km	20 000 km	25 000 km	30 000 km	
Emission Related	Spark plug – clean			•	•	•	•	•	•	
	Spark plug – check †			•	•	•	•	•	•	
	Valve clearance – check †		•		•		•		•	
	Air suction valve – check † (CA, ST, US)			•	•	•	•	•	•	
	Air cleaner element – clean		•		•				•	
	Air cleaner element – replace	5 cleanings					•			
	Throttle grip play – check †		•		•		•		•	
	Idle speed – check †		•	•	•	•	•	•	•	
	Carburetor synchronization – check †		•	•	•	•	•	•	•	
	Fuel system – check †				•		•		•	
	Evaporative emission control system (CA) – check †		•	•	•	•	•	•	•	
Non-Emission Related	Engine oil – change	year	•		•		•		•	
	Oil filter – replace		•		•		•		•	
	Radiator hoses, connections – check †	year	•		•		•		•	
	Coolant – change	2 years							•	
	Fuel hose – replace	4 years								
	Clutch – adjust		•	•	•	•	•	•	•	
	Drive chain wear – check †			•	•	•	•	•	•	
	Drive chain – lubricate	300 km								
	Drive chain slack – check †	800 km								
	Brake lining or pad wear – check †			•	•	•	•	•	•	
	Brake fluid level – check †	month	•	•	•	•	•	•	•	
	Brake fluid – change	2 years					•			
	Brake hose – replace	4 years								
	Brake master cylinder cup and dust seal – replace	2 years								

	OPERATION / FREQUENCY	Whichever comes first ▼ Every	*ODOMETER READING 800 km	5 000 km	10 000 km	15 000 km	20 000 km	25 000 km	30 000 km	
Non-Emission Related	Caliper piston seal and dust seal – replace	2 years								
	Brake light switch – check †		•	•	•	•	•	•	•	
	Steering – check †		•	•	•	•	•	•	•	
	Steering stem bearing – lubricate	2 years					•			
	Front fork oil – change								•	
	Tire wear – check †			•	•	•	•	•	•	
	Swing arm pivot, uni-trak linkage – lubricate				•		•		•	
	Battery electrolyte level – check †	month	•	•	•	•	•	•	•	
	General lubrication – perform			•	•	•	•	•	•	
	Nut, bolt, and fastener tightness – check †		•		•		•		•	

* : For higher odometer readings, repeat at the frequency interval established here.
† : Replace, add, adjust, clean, or torque if necessary.
(CA) : California Model
(ST) : Swiss Model (US) : US Model

Torque and Locking Agent

The following tables list the tightening torque for the major fasteners requiring use of a non-permanent locking agent or liquid gasket.

Letters used in the "Remarks" column mean:

- **L** : Apply a non-permanent locking agent to the threads.
- **LG** : Apply liquid gasket to the threads.
- **Lh** : Left-hand threads
- **M** : Apply molybdenum disulfide grease.
- **O** : Apply an oil to the threads and seating surface.
- **S** : Tighten the fasteners following the specified sequence.
- **SS** : Apply silicone sealant.
- **St** : Stake the fasteners to prevent loosening.

The table below, relating tightening torque to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. All of the values are for use with dry solvent-cleaned threads.

Basic Torque for General Fasteners

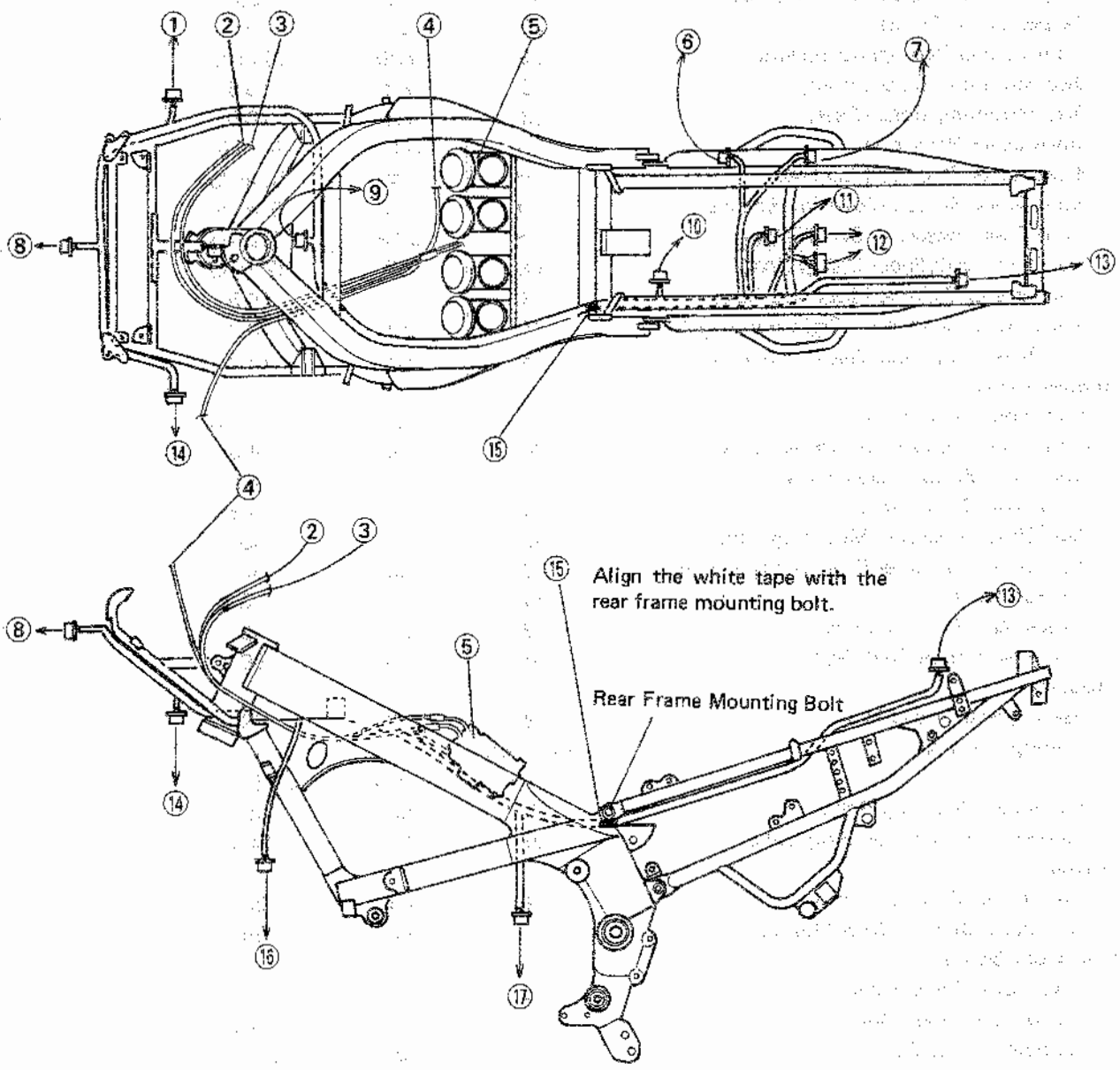
Threads dia. (mm)	Torque		
	N-m	kg-m	ft-lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in-lb
6	5.9 ~ 7.8	0.60 ~ 0.80	52 ~ 69 in-lb
8	14 ~ 19	1.4 ~ 1.9	10.0 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19.0 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17.0 ~ 23.0	125 ~ 165
20	225 ~ 325	23 ~ 33	165 ~ 240

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Fuel System:				
Carburetor Holder Bolts	12	1.2	104 in-lb	
Fuel Tap Plate Screws	1.0	0.10	9 in-lb	
Air Cleaner Housing Screws	5.4	0.55	48 in-lb	
Cooling System:				
Radiator Hose Clamp Bolts	2.0	0.20	17 in-lb	
Coolant Air Bleeder Bolt (thermostat housing)	7.8	0.80	69 in-lb	
Coolant Air Bleeder Bolt (water pump)	9.8	1.0	87 in-lb	
Coolant Drain Plugs	9.8	1.0	87 in-lb	
Thermostatic Fan Switch	18	1.8	13.0	
Water Temperature Sensor	7.8	0.80	69 in-lb	SS
Engine Top End:				
Spark Plug	13	1.3	113 in-lb	
Cylinder Head Cover Bolts	9.8	1.0	87 in-lb	
Cylinder Head Bolts New Parts	47	4.8	35	S, O (washer)
Used Parts	43	4.4	32	S, O (washer)
Pickup Coil Cover Bolts	8.8	0.90	78 in-lb	
Cylinder Head Jacket Plugs (PT⅛, PT¾)	20	2.0	14.5	
Camshaft Bearing Cap Bolts	12	1.2	104 in-lb	S
Camshaft Chain Tensioner Mounting Bolts	12	1.2	104 in-lb	
Camshaft Sprocket Bolts	15	1.5	11.0	L
Camshaft Chain Guide Bolts (Rear)	12	1.2	104 in-lb	
Oil Hose Banjo Bolts	25	2.5	18.0	
Clutch				
Clutch Cover Bolts	8.8	0.90	78 in-lb	
Clutch Lever Holder Bolts	7.8	0.80	69 in-lb	
Clutch Spring Bolts	8.8	0.90	78 in-lb	
Clutch Hub Nut	130	13.5	98	
Clutch Cover Damper Bolts	5.9	0.60	52 in-lb	L

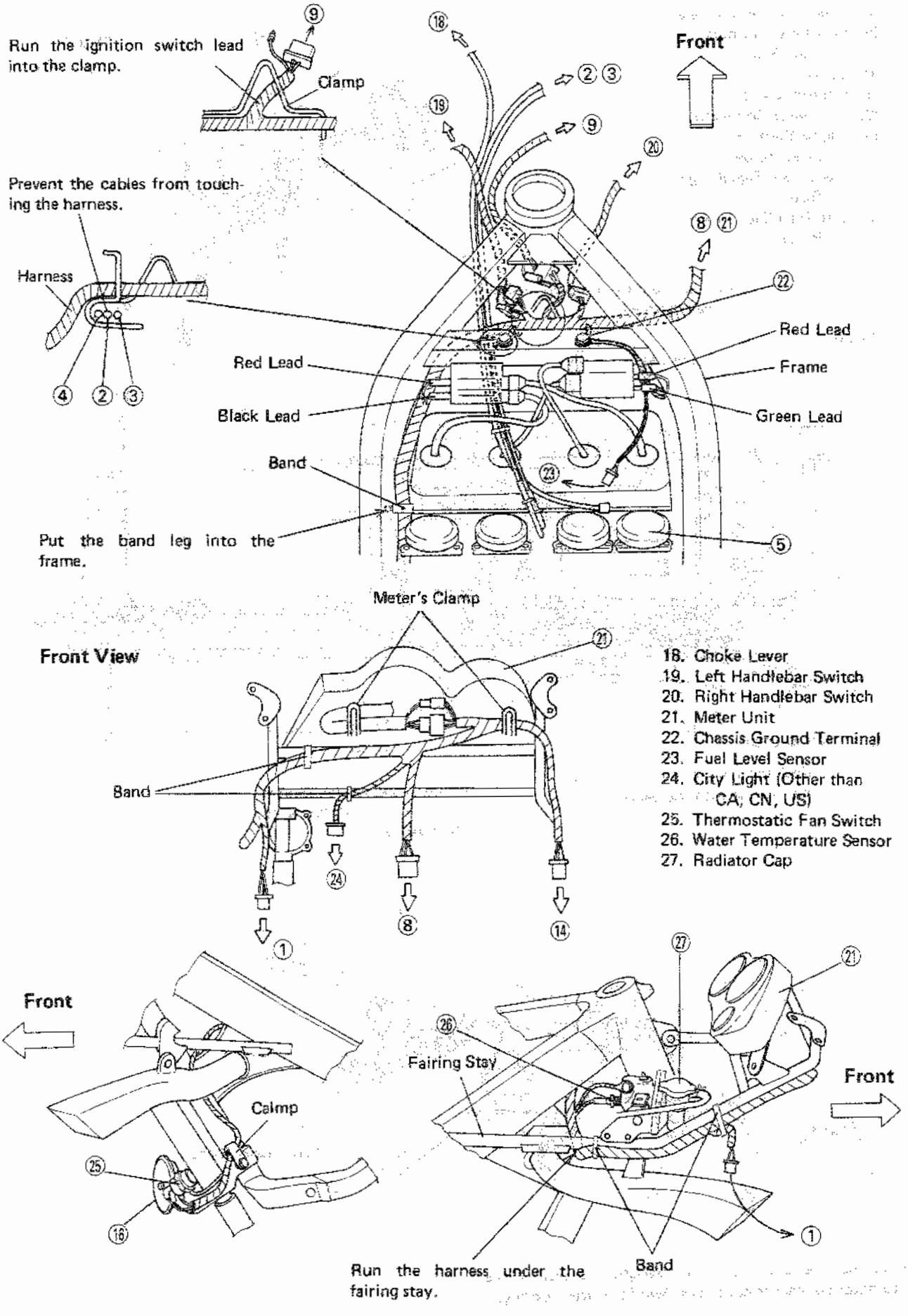
Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Engine Lubrication System:				
Engine Drain Plug	20	2.0	14.5	
Crankcase Main Oil Passage Plug	15	1.5	11.0	
Oil Pan Bolts	8.8	0.90	78 in-lb	
Oil Filter	9.8	1.0	87 in-lb	or hand-tight
Oil Filter Mounting Bolt	29	3.0	22	
Oil Pressure Relief Valve	15	1.5	11.0	L
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in-lb	
Oil Pressure Switch	15	1.5	11.0	SS
Oil Hose Banjo Bolts	25	2.5	18.0	
Oil Hose Clamp Bolts (Lower Crankcase)	8.8	0.90	78 in-lb	
Oil Hose Flange Bolts	12	1.2	104 in-lb	
Oil Separator Cover Bolts (Upper Crankcase)	9.8	1.0	87 in-lb	L
Engine Removal/Installation:				
Engine Mounting Bolts	44	4.5	33	
Engine Mounting Adjuster	9.8	1.0	87 in-lb	
Engine Mounting Bracket Bolts	20	2.0	14.5	
Crankshaft/Transmission:				
Oil Separator Cover Bolts	9.8	1.0	87 in-lb	L
Gear Positioning Lever Mounting Bolt	8.8	0.90	78 in-lb	
Oil Pressure Switch	15	1.5	11.0	SS
Neutral Switch	15	1.5	11.0	
Shift Shaft Return Spring Pin	20	2.0	14.5	L
Shift Drum Cam Bolts	12	1.2	104 in-lb	L
Shift Rod Plug (Left, M14)	15	1.5	11.0	
Connecting Rod Big End Cap Nuts	36	3.7	27	O (Threads, seating surfaces)
Crankcase Bolts φ8	27	2.8	20	S
φ6	12	1.2	104 in-lb	S
Timing Rotor Allen Bolt	25	2.5	18.0	
Crankcase Main Oil Passage Plug				
(Left, PT⅜)	20	2.0	14.5	L
(Right, M18)	15	1.5	11.0	
Oil Hose Banjo Bolts	25	2.5	18.0	
Oil Hose Bracket Bolts	8.8	0.90	78 in-lb	
Wheels/Tires:				
Front Axle Clamp Bolts	20	2.0	14.5	
Front Axle Nut	88	9.0	65	
Rear Axle Nut	88	9.0	65	
Final Drive:				
Engine Sprocket Nut	98	10.0	72	
Torque Link Nuts	34	3.5	25	
Rear Sprocket Nuts	74	7.5	54	
Rear Sprocket Studs	–	–	–	L
Brakes:				
Bleed Valves	7.8	0.80	69 in-lb	
Brake Hose Banjo Bolts	25	2.5	18.0	

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Torque Link Nut	34	3.5	25	
Caliper Mounting Bolts (Front, Rear)	34	3.5	25	
Caliper Bolts (Front)	21	2.1	15.0	
Front Caliper Pad Spring Screws	2.9	0.30	26 in-lb	
Disc Mounting Bolts (Front)	23	2.3	16.5	
Disc Mounting Bolts (Rear)	23	2.3	16.5	
Brake Lever Pivot Bolt	1.0	0.10	9 in-lb	
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in-lb	
Front Brake Switch Mounting Screws	1.0	0.10	9 in-lb	
Front Brake Reservoir Cap Screws	1.5	0.15	13 in-lb	
Front Master Cylinder Clamp Bolts	9.8	1.0	87 in-lb	
Rear Master Cylinder Mounting Bolts	23	2.3	16.5	
Brake Pedal Shaft Bolt (Right Footpeg Bolt)	25	2.5	18.0	L
Rear Master Cylinder Bracket Locknut	18	1.8	13.0	
Suspension:				
Front Fork Drain Bolts	7.8	0.80	69 in-lb	L
Front Fork Clamp Bolts (Upper, Lower)	20	2.0	14.5	
Front Fork Bottom Allen Bolts	20	2.0	14.5	L
Front Axle Clamp Bolts	20	2.0	14.5	
Rear Shock Absorber Mounting Nuts	59	6.0	43	
Rear Shock Absorber Preload Adjuster Nut	88	9.0	65	
Tie-Rod Nuts	59	6.0	43	
Rocker Arm Pivot Shaft Nut	59	6.0	43	
Swing Arm Pivot Shaft Nut	88	9.0	65	
Steering:				
Steering Stem Head Nut	39	4.0	29	
Steering Stem Nut	Hand-Tight or 4.9	← or 0.50	← or 43 in-lb	
Handlebar Mounting Bolts	29	3.0	22.0	L
Handlebar Holder Mounting Bolts	20	2.0	14.5	
Frame:				
Rear Frame Mounting Bolts	44	4.5	33	
Side Stand Bracket Bolts Mounting Bolts	49	5.0	36	L
Electrical System:				
Pickup Coil Cover Bolts	8.8	0.90	78 in-lb	
Timing Rotor Allen Bolts	25	2.5	18.0	
Alternator Cover Bolts	8.8	0.90	78 in-lb	
Alternator Rotor Bolt	78	8.0	58	
Alternator Stator Bolts	12	1.2	104 in-lb	
Starter Relay Terminal Nut	4.9	0.50	43 in-lb	
Starter Motor Terminal Nut	4.9	0.50	43 in-lb	
Starter Motor Through Bolts	5.9	0.60	52 in-lb	
Starter Clutch Bolt	34	3.5	25	L
Spark Plug	13	1.3	113 in-lb	
Handlebar Switch Housing Clamp Screws	3.4	0.35	30 in-lb	
Thermostatic Fan Switch	18	1.8	13.0	
Water Temperature Sensor	7.8	0.80	69 in-lb	SS
Oil Pressure Switch	15	1.5	11.0	SS
Neutral Switch	15	1.5	11.0	
Speedometer and Trip Meter Mounting Screws	–	–	–	L

Cable, Wire, and Hose Routing

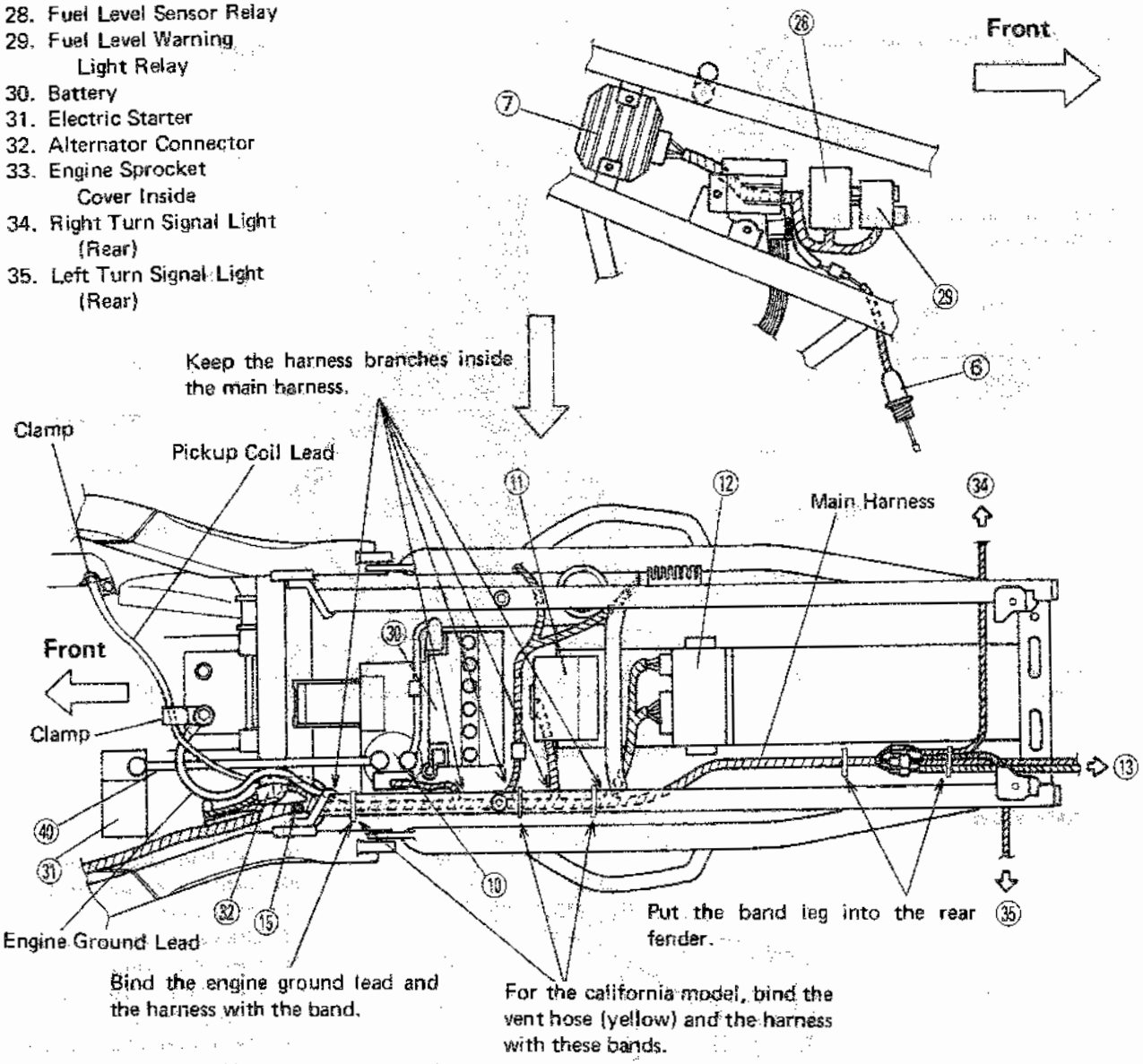


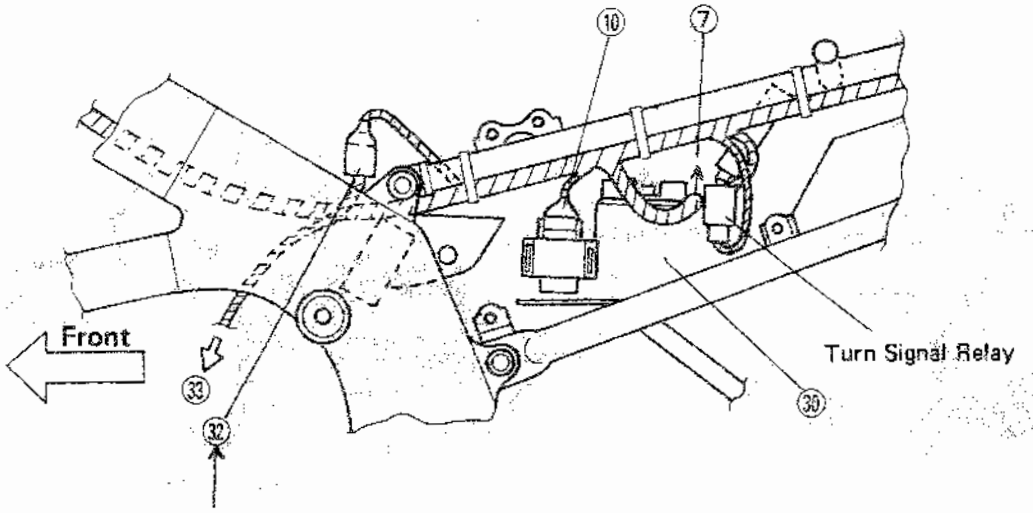
1. Right Turn Signal Light (Front)
2. Throttle Cable (Accelerator)
3. Throttle Cable (Decelerator)
4. Choke Cable
5. Carburetors
6. Rear Brake Light Switch
7. Regulator/Rectifier
8. Headlight
9. Ignition Switch
10. Starter Relay
11. IC Igniter
12. Junction Box
13. Tail/Brake Light
14. Left Turn Signal Light (Front)
15. White Tape
16. Horn
17. Side Stand Switch



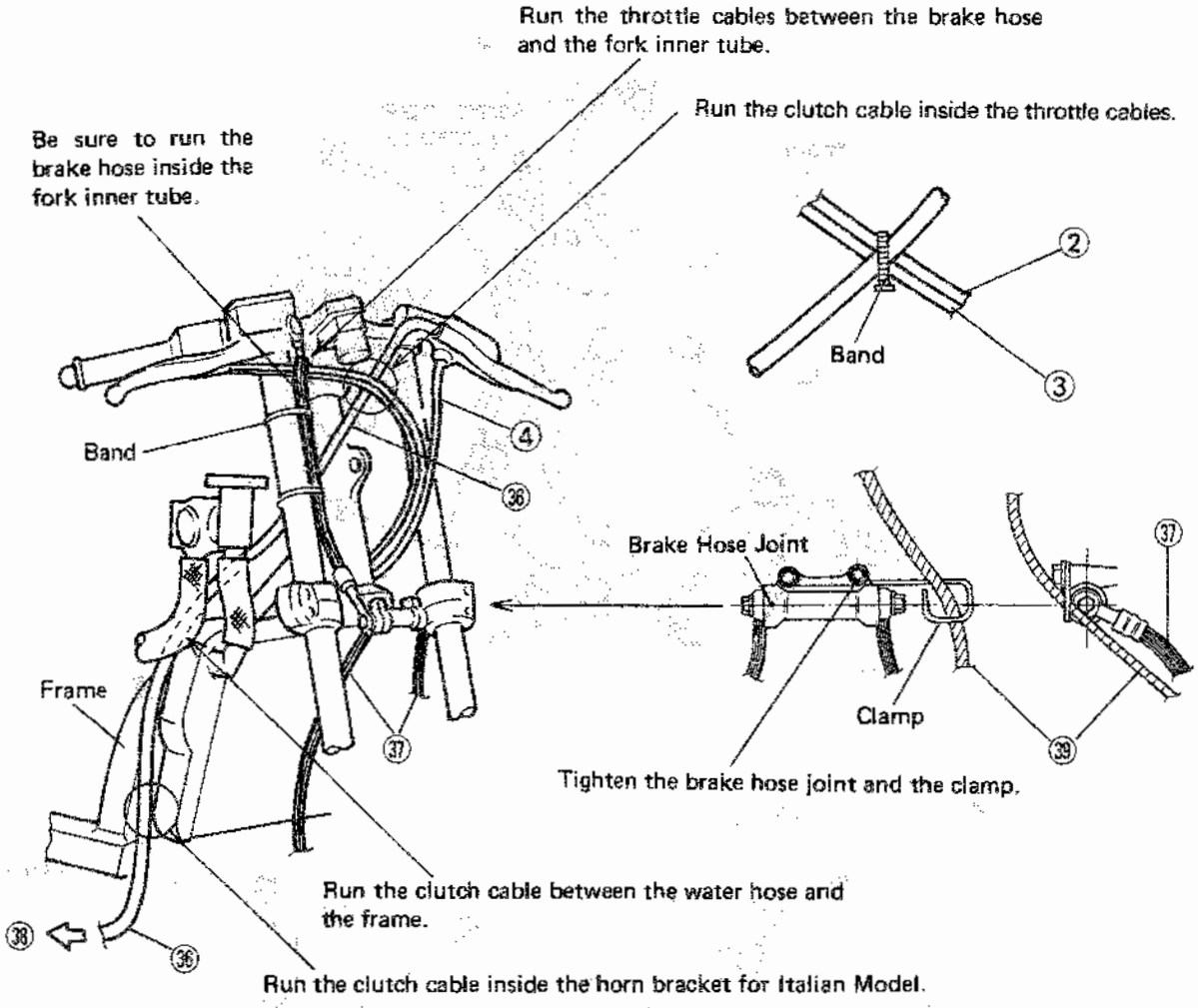
18. Choke Lever
19. Left Handlebar Switch
20. Right Handlebar Switch
21. Meter Unit
22. Chassis Ground Terminal
23. Fuel Level Sensor
24. City Light (Other than CA, CN, US)
25. Thermostatic Fan Switch
26. Water Temperature Sensor
27. Radiator Cap

28. Fuel Level Sensor Relay
29. Fuel Level Warning Light Relay
30. Battery
31. Electric Starter
32. Alternator Connector
33. Engine Sprocket Cover Inside
34. Right Turn Signal Light (Rear)
35. Left Turn Signal Light (Rear)

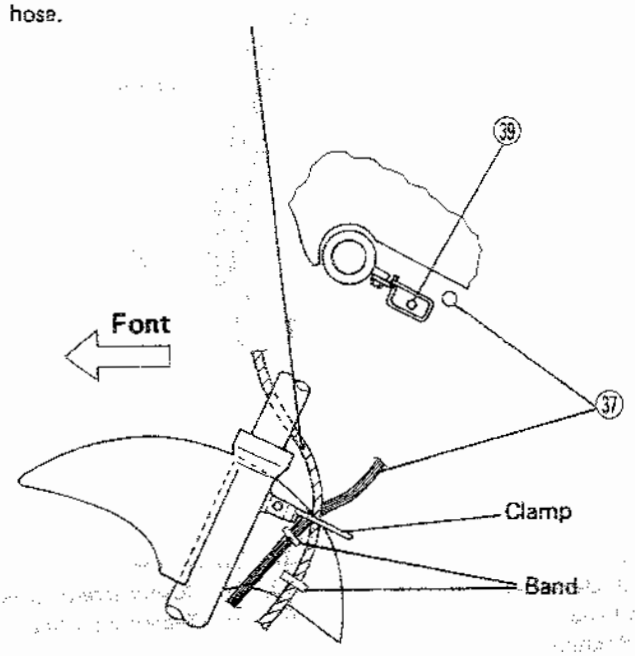




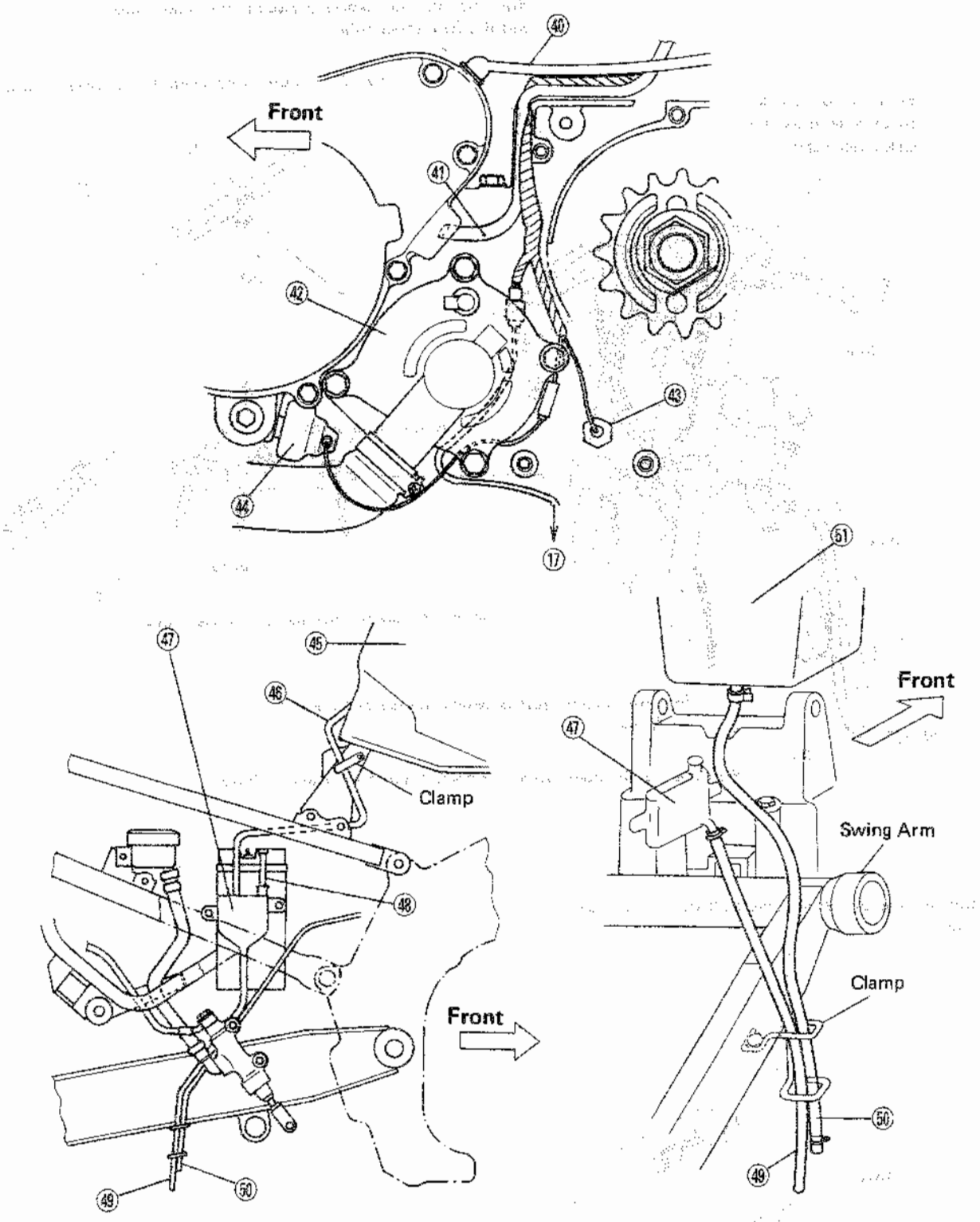
Hold the alternator connector upright and put on the alternator connector cover as shown for waterproofing.



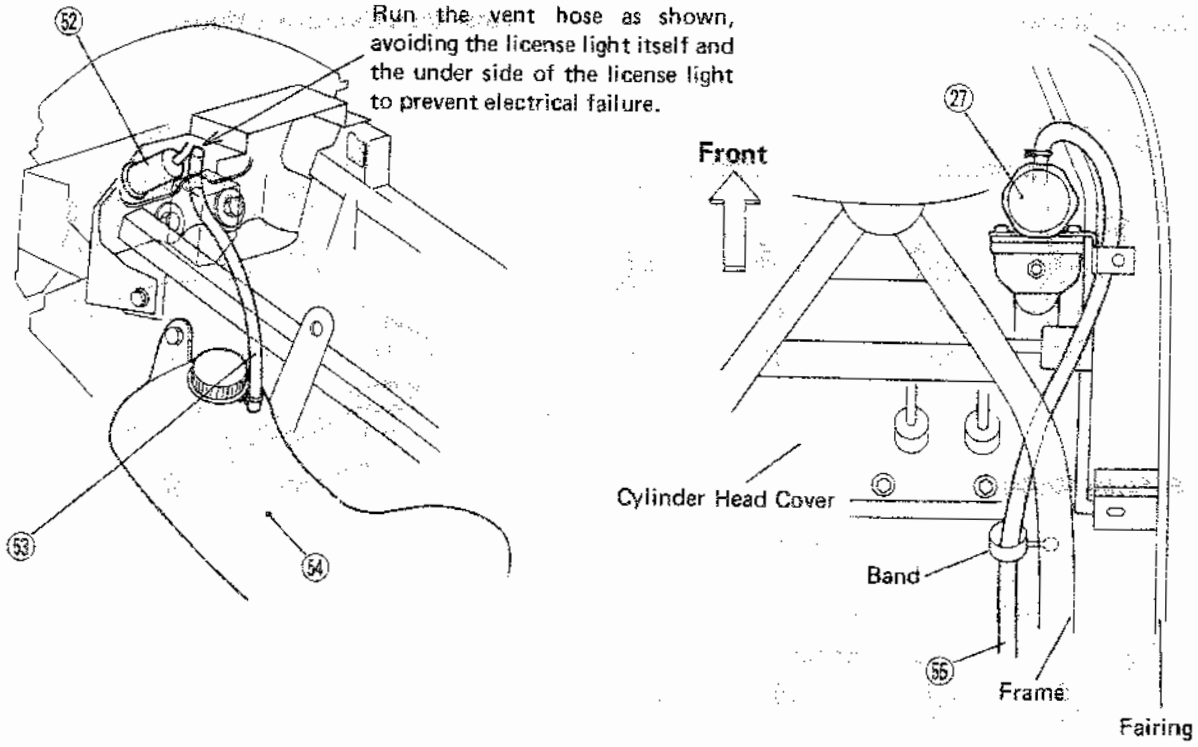
⑲
Run the speedometer cable outside of the brake hose.

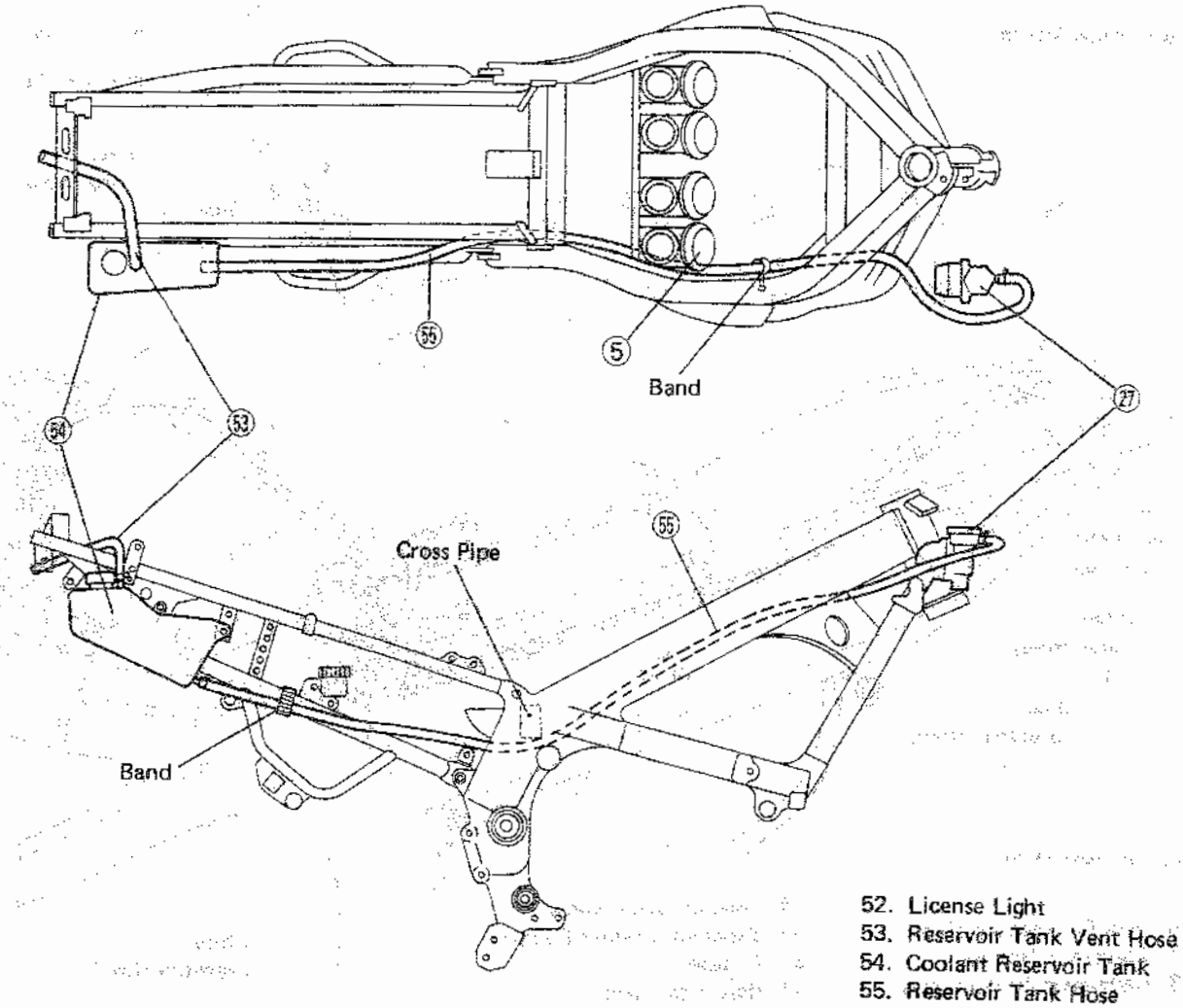


36. Clutch Cable
37. Brake Hose
38. Clutch Cover
39. Speedometer Cable



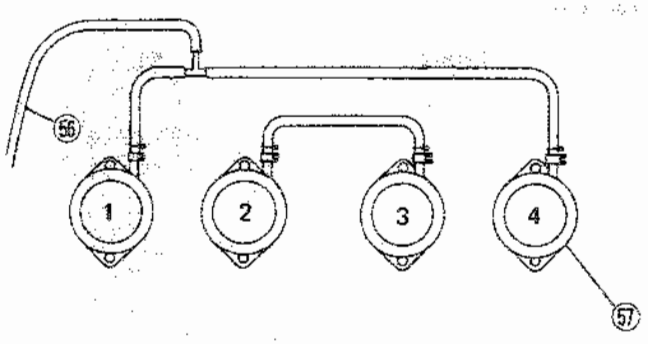
40. Electric Starter Cable
41. Alternator Lead
42. Water Pump
43. Neutral Switch
44. Oil Pressure Switch
45. Fuel Tank
46. Fuel Tank Overflow Drain Hose
47. Battery Breather
48. Battery Vent Hose
49. Drain Hose
50. Air Cleaner Drain Hose
51. Air Cleaner Housing



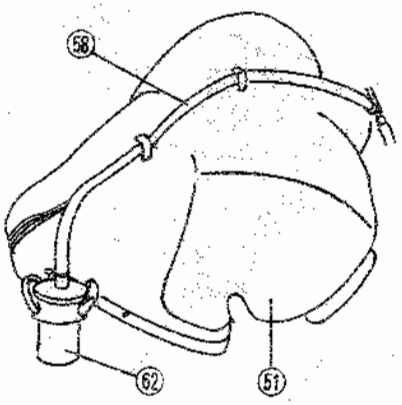


52. License Light
53. Reservoir Tank Vent Hose
54. Coolant Reservoir Tank
55. Reservoir Tank Hose

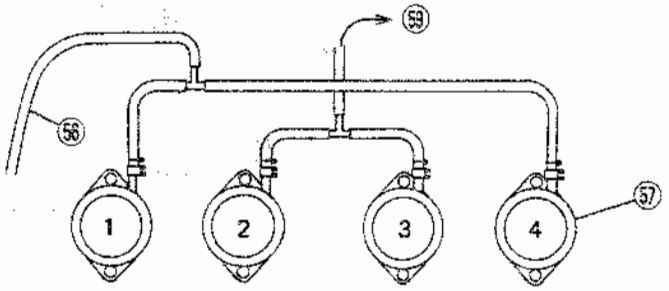
General Model



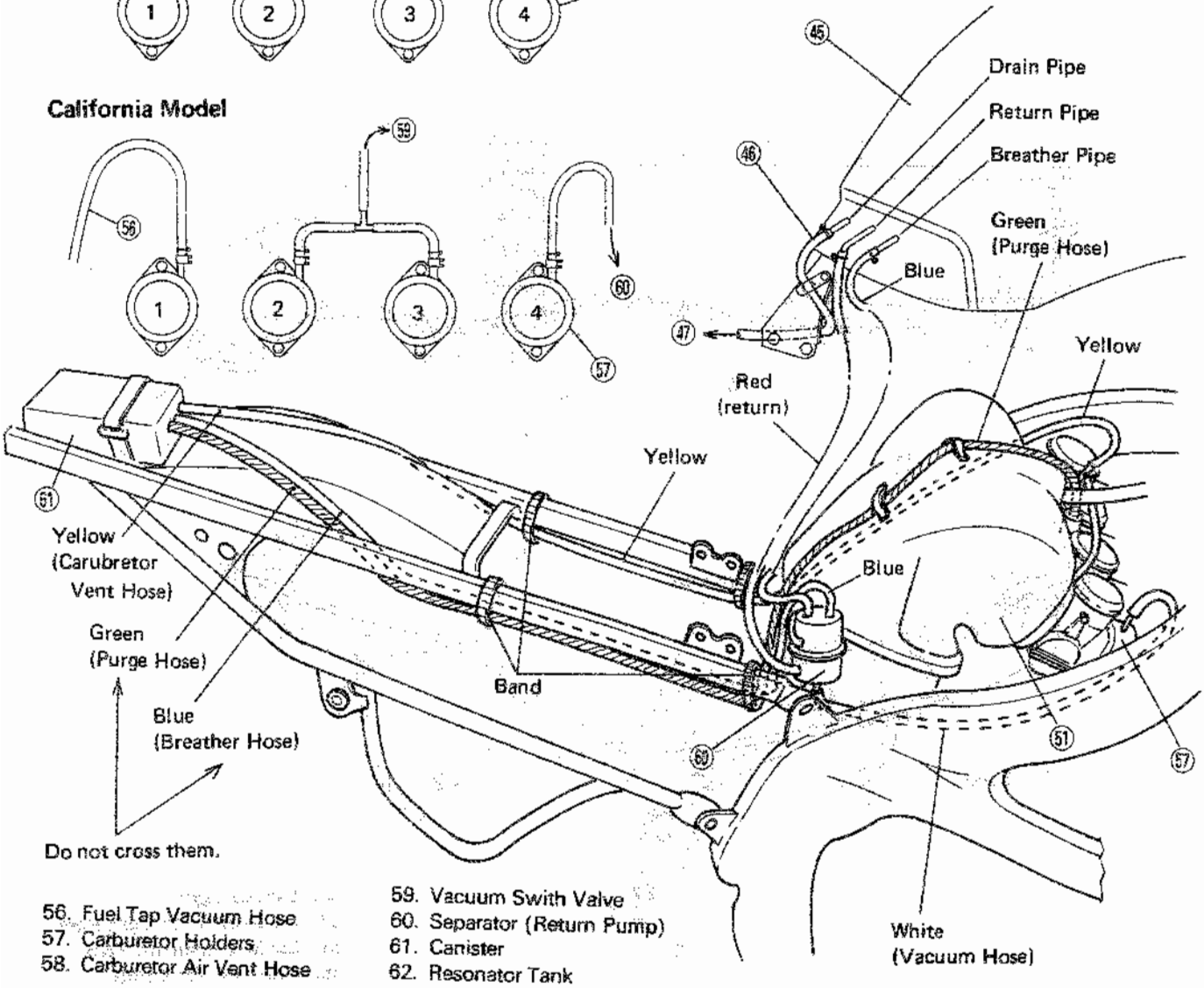
Other than California Model



US, Swiss Model



California Model



56. Fuel Tap Vacuum Hose
57. Carburetor Holders
58. Carburetor Air Vent Hose
59. Vacuum Swith Valve
60. Separator (Return Pump)
61. Canister
62. Resonator Tank

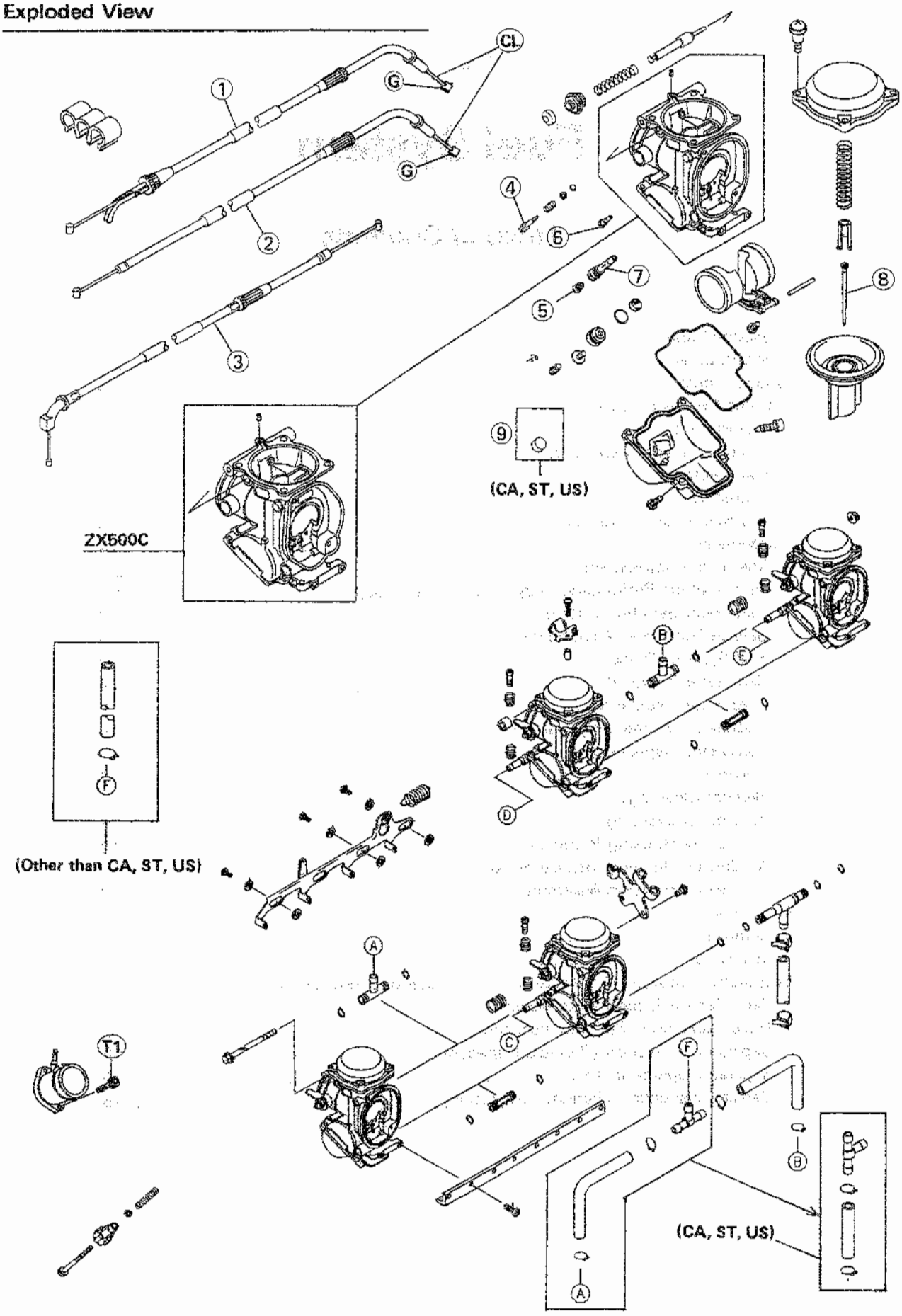
2

Fuel System

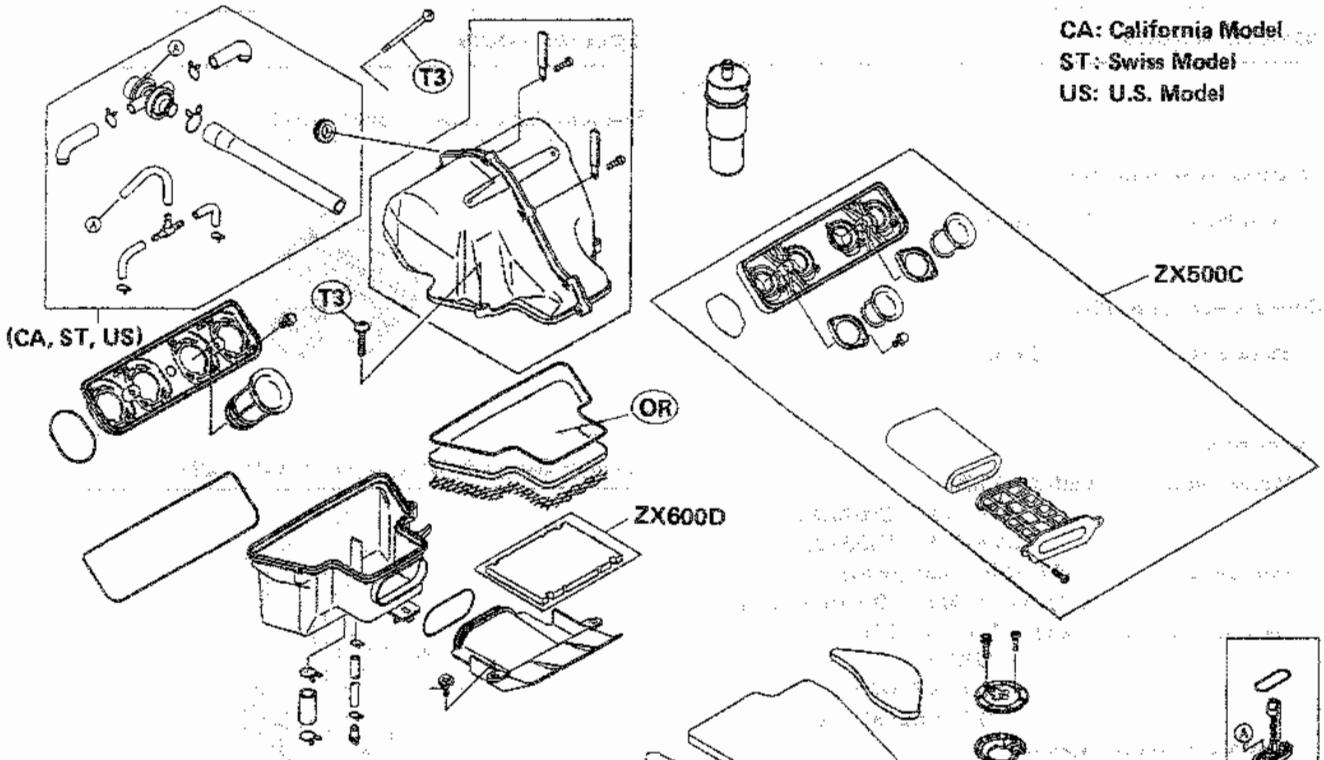
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  Canister Inspection (Periodic Inspection) 2-15

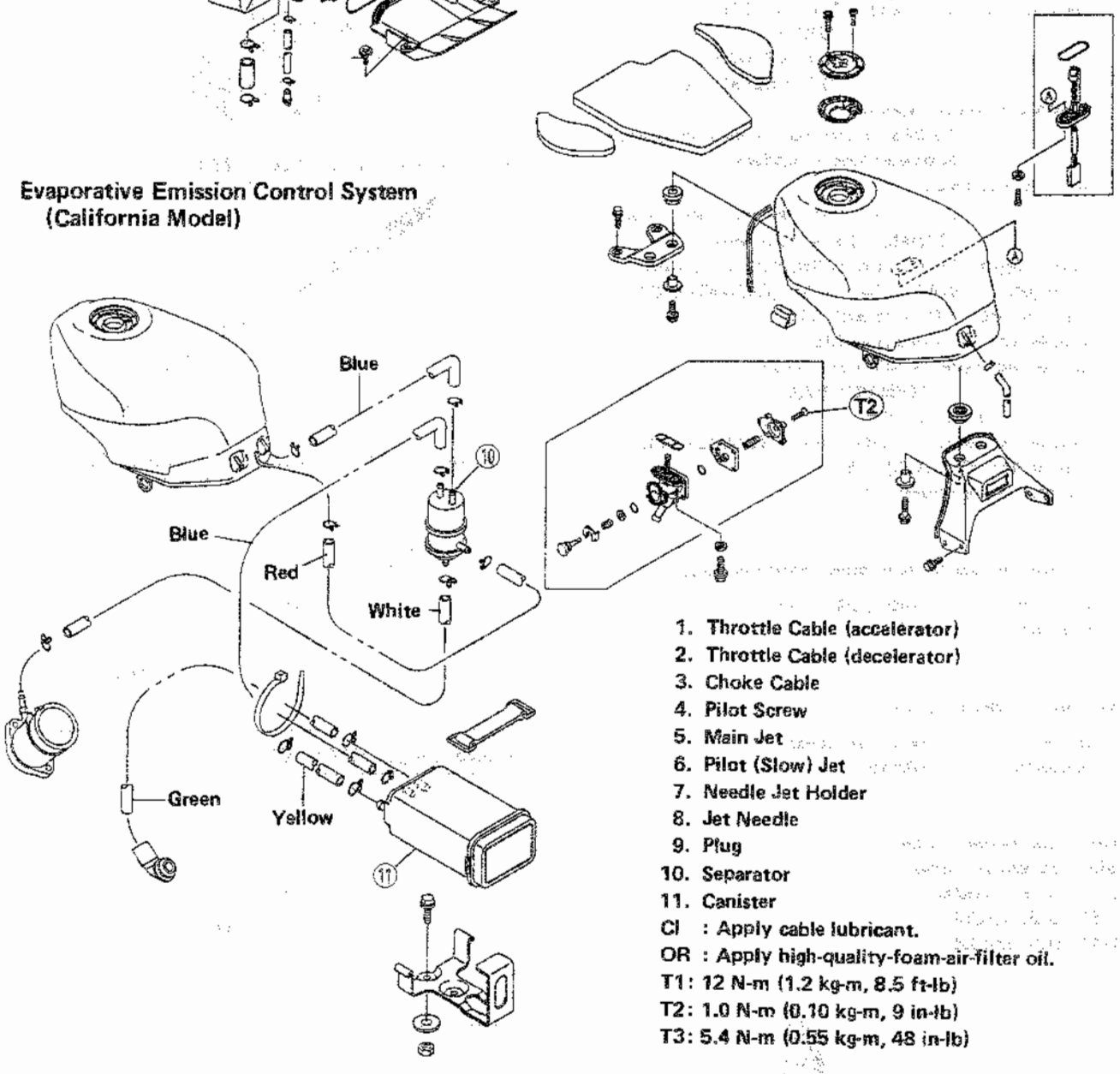
Exploded View



CA: California Model
ST: Swiss Model
US: U.S. Model



Evaporative Emission Control System (California Model)



1. Throttle Cable (accelerator)
2. Throttle Cable (decelerator)
3. Choke Cable
4. Pilot Screw
5. Main Jet
6. Pilot (Slow) Jet
7. Needle Jet Holder
8. Jet Needle
9. Plug
10. Separator
11. Canister

CI : Apply cable lubricant.
OR : Apply high-quality-foam-air-filter oil.
T1: 12 N-m (1.2 kg-m, 8.5 ft-lb)
T2: 1.0 N-m (0.10 kg-m, 9 in-lb)
T3: 5.4 N-m (0.55 kg-m, 48 in-lb)

Specifications

Throttle Grip Free Play

Standard: 2 ~ 3mm

Choke Cable Free Play

Standard: 2 ~ 3mm

Carburetor

Make, type: KEIHIN SEIKI,
CVK-D36 (ZX600D),
CVK-D30 (ZX500C)
Idle speed: 1 050 ±50 r/min (rpm),
(CA)(ST) 1 300 ±50 r/min (rpm)
Pilot screw (turns out): 1 ¾ ±¼, (SD) 2 ±¼,
(UK) 1 ½ ±¼
(CA, ST, US) –,
(ST, ZX500C) 2¼ ±¼
Synchronization vacuum:
2.7 kPa (2 cm Hg) or less difference between two cylinders
Service fuel level:
2 ~ 4 mm below the mark,
(ZX500C) 8.5 ~ 10.5 mm
Float height: 11 ±2 mm, (ZX500C) 13 ±2 mm
Main jet: #142, <CA> #145, (ZX500C) #100
Main air jet: #70, (ZX500C) #100
Needle jet: #6 (unremovable)
Jet needle mark: N14G, (ST) N14H,
(ZX500C) N76L
Pilot jet (slow jet): #35
Pilot air jet (slow air jet): #110, (ZX500C) #140
Starter jet: #52, (CA) #48
Throttle valve angle: 11°

High Altitude Carburetor Specifications (US)

Main jet: #140, (CA) #142
Pilot jet: #32

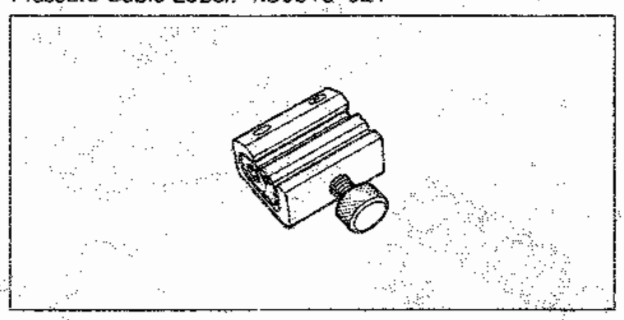
Air Cleaner Element Oil

Grade: SE or SF class
Viscosity: SAE30

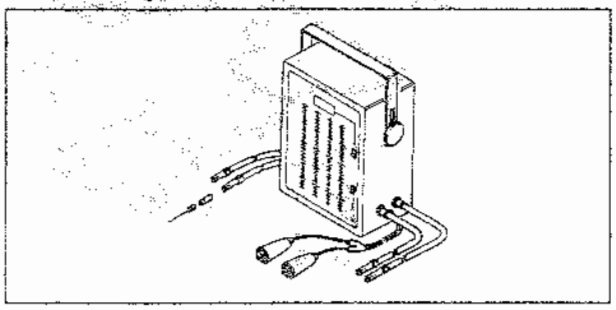
(CA) : California model
(SD) : Swedish model
(ST) : Swiss model
(US) : U.S. model
(UK) : U.K. model

Special Tools

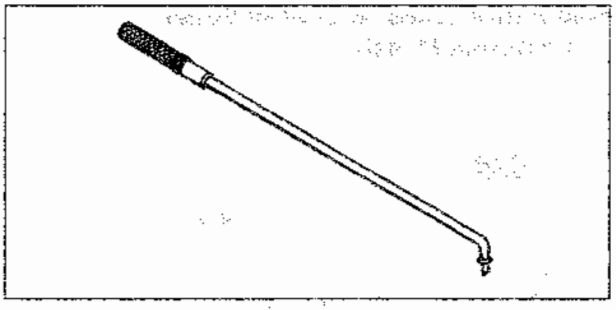
Pressure Cable Luber: K56019-021



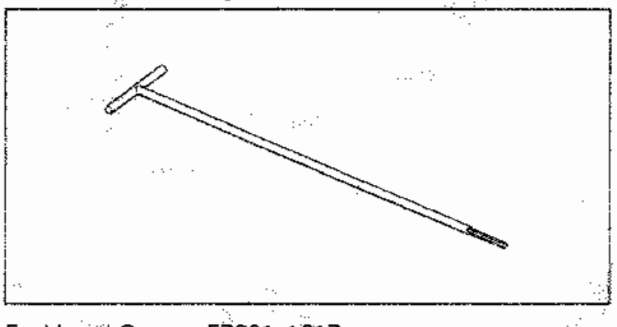
Vacuum Gauge & Tachometer: 57001-1291



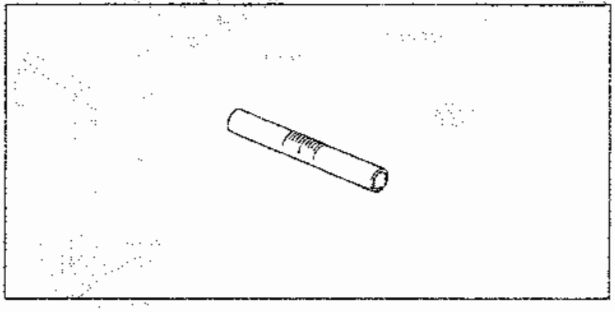
Pilot Screw Adjuster, A: 57001-1239



Carburetor Drain Plug Wrench, Hex 3: 57001-1269



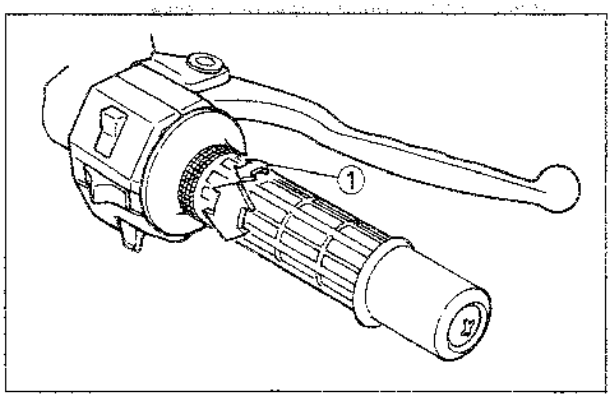
Fuel Level Gauge: 57001-1017



Throttle Grip and Cables

Adjustment

● Check throttle grip free play.

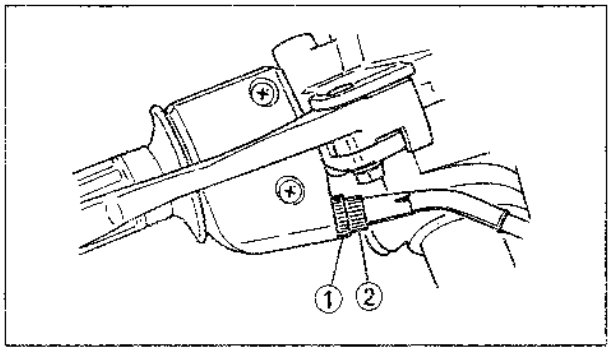


1. Throttle Grip Free Play

Throttle Grip Free Play

Standard: 2 ~ 3 mm

★ If the free play is incorrect, loosen the locknut and turn the adjuster of the accelerator cable until the proper amount of throttle grip play is obtained.



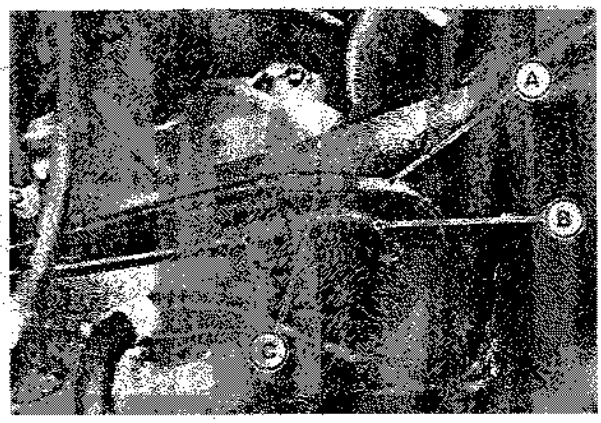
1. Locknut 2. Adjuster

● Tighten the locknut against the adjuster securely.

★ If the play can not be adjusted by using the adjuster at the throttle grip, use the adjusters at the carburetors.

● Screw in the adjuster fully at the throttle grip and tighten the locknut.

● Remove the fuel tank (see Fuel Tank Removal).



A. Accelerator Cable C. Adjusting Nuts
B. Decelerator Cable

● Loosen all the adjusting nuts and slide both throttle cables at the carburetor to obtain the specified free play.

● Tighten the adjusting nuts.

● Check that the throttle linkage lever stops against the idle adjusting screw with the throttle grip released and stops against the carburetor stopper with the throttle grip opened.

Lubrication and Inspection

● Lubricate the throttle cable in accordance with the Periodic Maintenance Chart.

○ Use the pressure cable luber (special tool: K56019-021) to lubricate the throttle cable.

● With the throttle cable disconnected at both ends, the cable should move freely within the cable housing (see General Lubrication in the Appendix chapter).

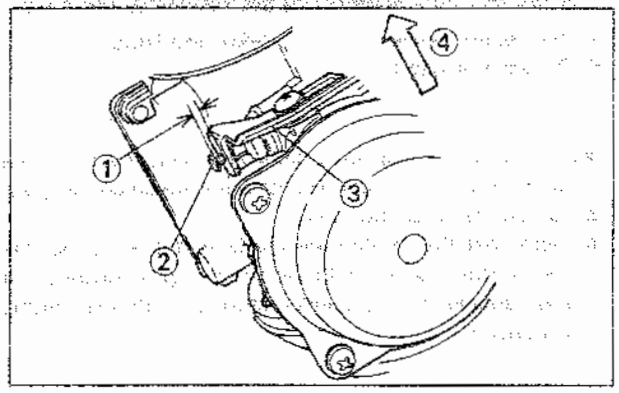
Choke Cable

Adjustment

●Check choke cable free play.

○Remove the fuel tank (see Fuel Tank Removal).

○Determine the amount of choke cable play at the choke lever. Pull the choke lever until the starter plunger lever at the carburetor contacts with the starter plunger; the amount of choke lever lower end travel is the amount of choke cable play.

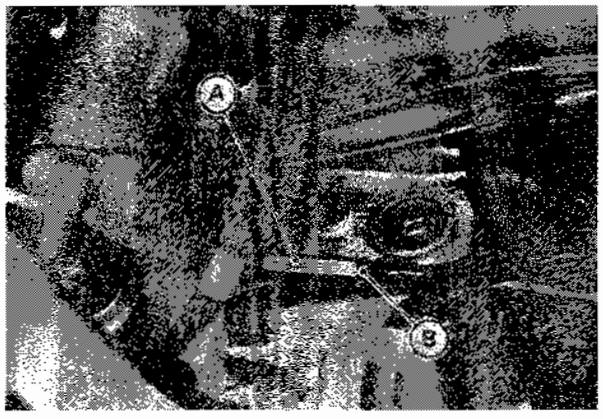


1. Play
2. Starter Plunger
3. Starter Plunger Lever
4. Front

Choke Cable Play

Standard: 2 ~ 3 mm

★If the play is incorrect, loosen the locknut and turn the adjuster at the middle of the cable until the proper amount of choke cable play is obtained.



A. Adjuster
B. Locknut

●Tighten the locknut against the adjuster securely.

Lubrication and Inspection

●Lubricate the choke in accordance with the Periodic Maintenance Chart.

○Use the pressure cable luber (special tool: K56019-021) to lubricate the choke cable.

●With the choke cable disconnected at both ends, the cable should move freely in the cable housing (see General Lubrication in Appendix chapter).

Carburetors

Idle Speed Adjustment

●Start the engine and warm it up thoroughly.
●Turn the handlebar from side to side while idling the engine.
★If idle speed varies, the throttle cables may be poorly routed or they may be damaged.
●Correct any problem before operating the motorcycle.

⚠WARNING

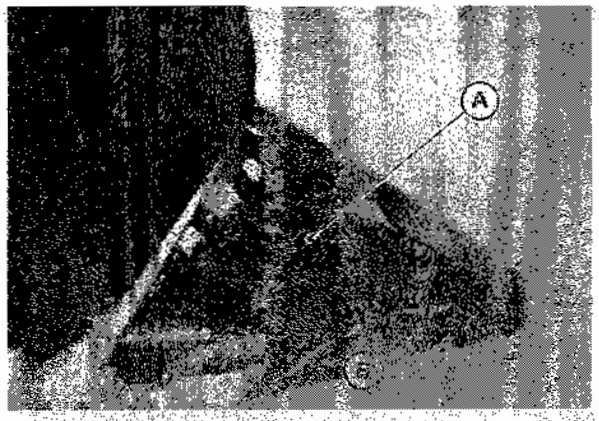
Operation with an improperly adjusted, incorrectly routed, or damaged cable could result in an unsafe riding condition.

●Check idle speed.

Idle Speed

1 000 ~ 1 100 r/min (rpm)
(CA)(ST) 1 250 ~ 1 350 r/min (rpm)

●Turn the idle adjusting screw until idle speed is correct.



A. Idle Adjusting Screw B. Front

High Altitude Performance Adjustment (US model)

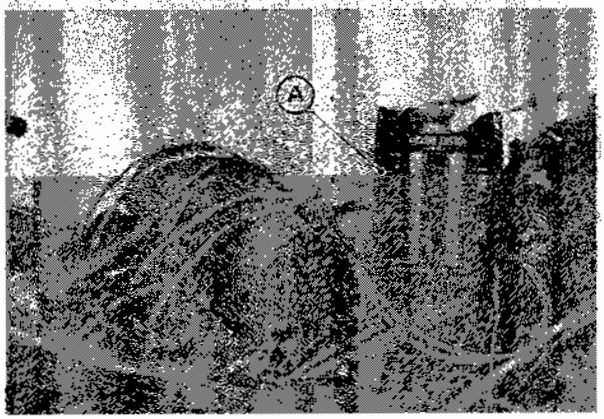
○To improve the EMISSION CONTROL PERFORMANCE of vehicle operated above **4000 feet**, Kawasaki recommends the following Environmental Protection Agency (EPA) approved modification.
●Change the main jet and pilot jet for high altitude use.

High Altitude Carburetor Specifications

Main Jet	:	**#140, (CA) #142**
Pilot Jet	:	**#32**

Carburetor Synchronization

●Remove the fuel tank (see Fuel Tank Removal).
●Start the engine and warm it up thoroughly.
●Check idle speed.
●Attach the vacuum gauge & tachometer (special tool) to the fittings on the carburetor holders.



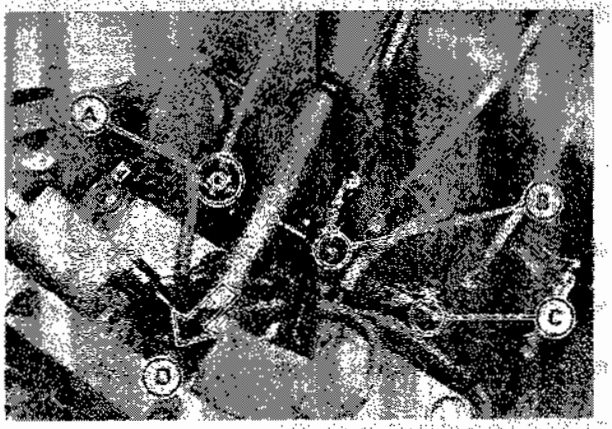
A. Vacuum Gauge & Tachometer: 57001-1291

●Start the engine and let it idle to measure the carburetor intake vacuum.

Carburetor Synchronization Vacuum

Standard: Less than 2.7 kPa (2 cm Hg) difference between any two carburetors

●Turn the adjusting screws to synchronize the carburetors.



A. Right Adjusting Screw C. Left Adjusting Screw
B. Center Adjusting Screw D. Front

○First synchronize the left two and then the right two carburetors by means of the left and right adjusting screws. Then synchronize the left two carburetors and the right two carburetors using the center adjusting screw.
★If the carburetor synchronization cannot be obtained by using the adjusting screws, check for dirt or blockage.
●Check the pilot screw settings using the pilot screw adjuster "A" (special tool).



A. Pilot Screw Adjuster: 57001-1239

● Check the carburetor synchronization again.

NOTE

○ *Do not turn the pilot screws carelessly during carburetor synchronization. You may cause poor running at low engine speed.*

● Check idle speed.

Service Fuel Level Adjustment

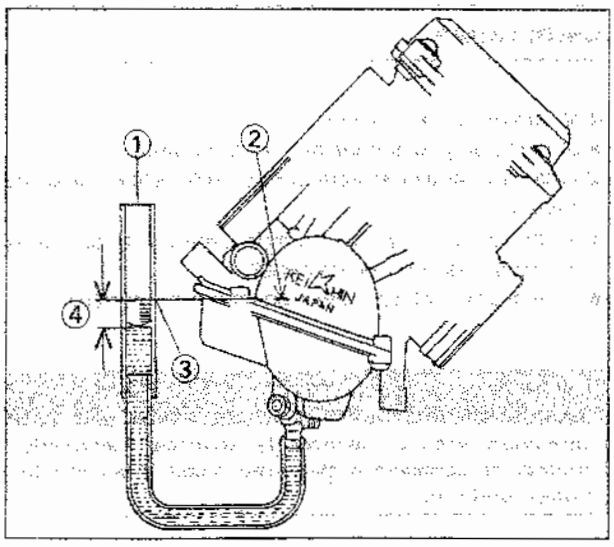
⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

● Prepare a fuel hose (O.D. 6 mm, I.D. 3.5 mm and 300 mm in length).
● Connect the fuel level gauge (special tool) to the carburetor float bowl with the fuel hose.
● Situate the motorcycle so that it is perpendicular to the ground.
● Check the fuel level as shown.
○ Turn out the carburetor drain plug a few turns (see Fuel System Check). Wait until the fuel level in the gauge settles.

NOTE

○ *Keeping the gauge vertical, align the top line with the mark on the carburetor body right side. Then turn out the drain plug to feed fuel to the gauge.*



1. Fuel Level Gauge: 57001-1017
2. Mark
3. Top Line
4. Fuel Level

Service Fuel Level

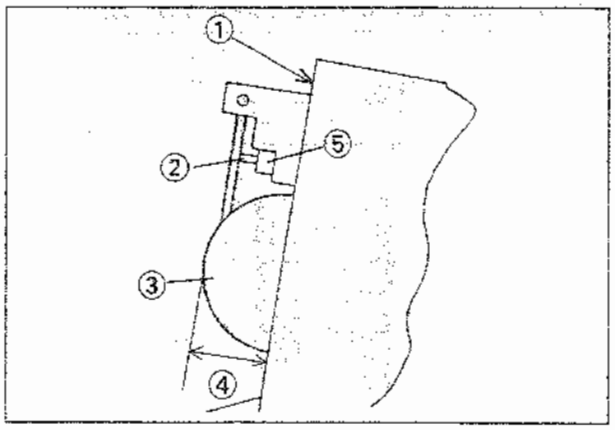
2 ~ 4 mm (ZX500C, 8.5 ~ 10.5 mm) below the mark on the carburetor body

● Repeat the measurement for the other carburetors in the same manner.
● To adjust the fuel level, remove the float bowl, and bend the tang on the float arm to change the float height.



A. Float B. Tang

● Measure the float height tilting the carburetor so that the tang on the float just touches the needle rod in the float valve.
○ Increasing the float height lowers the fuel level and decreasing the float height raises the fuel level.



1. Float Bowl Mating Surface
2. Needle Rod
3. Float
4. Float Height
5. Float Valve

Float Height

Standard: **11 ±2 mm (ZX500C 13 ±2 mm)**

NOTE

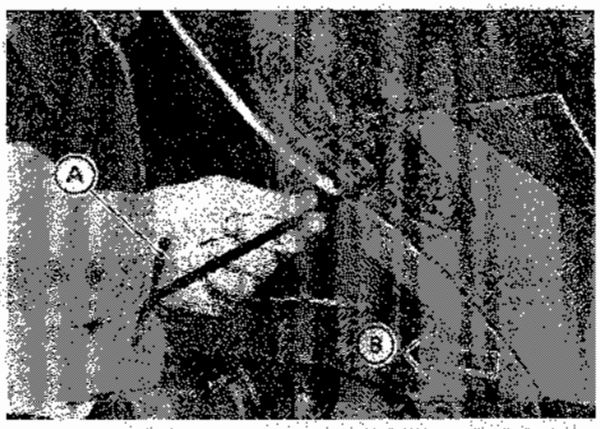
○*Do not push the needle rod in during the float height measurement.*

Fuel System Check

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Connect a suitable hose to the fitting at the bottom of each carburetor float bowl.
- Run the lower ends of the hoses into a suitable container.
- Remove the seat (see Frame chapter).
- Push the fuel tap button "ON" to prime the carburetors.
- Turn out each drain plug a few turns with the carburetor drain plug wrench (special tool) and drain the float bowls.



A. Drain Plug Wrench: 57001-1269 B. Front

- Check to see if water or dirt comes out.
- Tighten the drain plugs and release the fuel tap button.

★If any water or dirt appeared during the above inspection, clean the fuel system.

Carburetor Removal

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Remove the following.
  - Fuel Tank (see Fuel Tank Removal)
  - Air Cleaner Housing (see Air Cleaner Housing Removal)
  - Choke Cable
- Loosen the carburetor clamps and remove the carburetors.
- Split the throttle grip case and remove the throttle cable ends.
- Slip the tips of the throttle inner cable out of the pulley to complete carburetor assembly removal.

Carburetor Installation

- Install the carburetor holder so that the pipe is upward.
- Align the tang areas of the carburetor clamp with the holder grooves and install the clamps as shown being careful of the screw position and the screw head direction (see Engine Top End chapter).

⚠WARNING

Be sure to install the holder clamp screws in the direction shown. Or, the screws could come in contact with the throttle linkage resulting in an unsafe riding condition.

●Install the holder hoses as shown in the Cable, Wire and Hose Routing section of the General Information chapter.

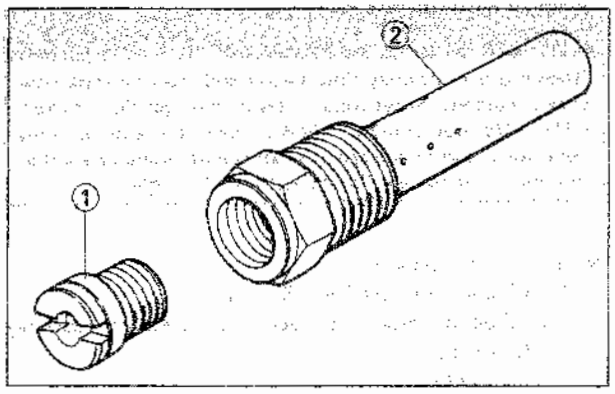
Carburetor Disassembly/Assembly

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

CAUTION

During carburetor disassembly, be careful not to damage the diaphragm. Never use a sharp edge to remove the diaphragm.
Do not force the needle jet holder (air bleed pipe) and main jet or overtighten them. They could be damaged requiring replacement.



1. Main Jet 2. Needle Jet Holder

★If the needle jet is damaged, replace the carburetor.

●For the US and Swiss models, remove and install the pilot screw plug as follows:

○Punch a hole in the plug and pry it out with an awl or other suitable tool.

○Turn in the pilot screw and count the number of turns until it seats fully but not tightly, and then remove the screw. This is to set the screw to its original position when assembling.

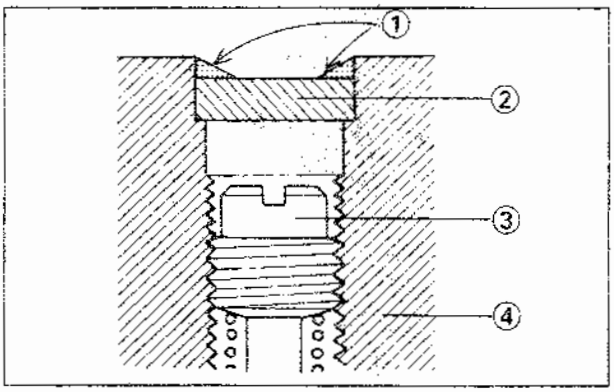
○When installing, turn in the pilot screw fully but not tightly and then back it out the same number of turns counted during disassembly.

○Install a new plug in the pilot screw hole, and apply a small amount of a bonding agent to the circumference of the plug to fix the plug.

CAUTION

Do not apply too much bonding agent to the plug or the pilot screw itself may be fixed.

Plug Installation (US and Swiss Models)



1. Apply bonding agent. 3. Pilot Screw
2. Plug 4. Carburetor Body

Carburetor Inspection

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

●Remove the fuel tank (see this chapter).

●Slide the starter plunger lever right to left to check that the starter plungers move smoothly and return with spring tension.

★If the starter plungers do not work properly, replace the carburetors.

●Turn the throttle cable lever to check that the throttle butterfly valves move smoothly and return by spring tension.

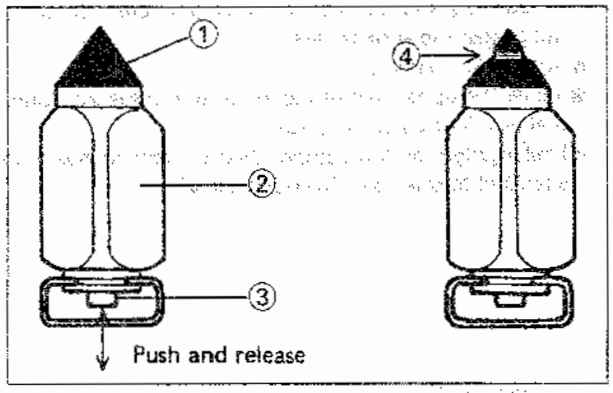
★If the throttle valves do not move smoothly, Replace the valves and/or carburetors.

●Remove the carburetors (see this chapter).

●Check that the O-rings on the float bowl and pilot screws and the diaphragm on the vacuum piston are in good condition.

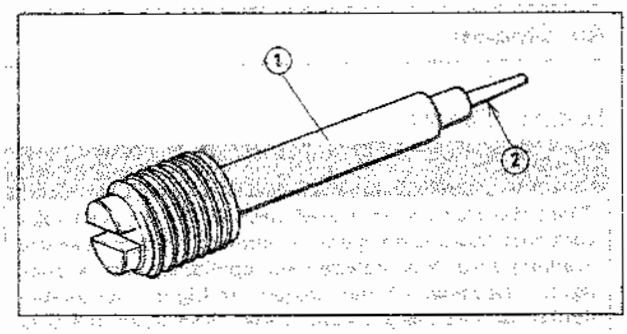
★If any of the O-rings or diaphragms are not in good condition, replace them.

●Check the plastic tip of the float valve needle. It should be smooth without any grooves, scratches, or tears.



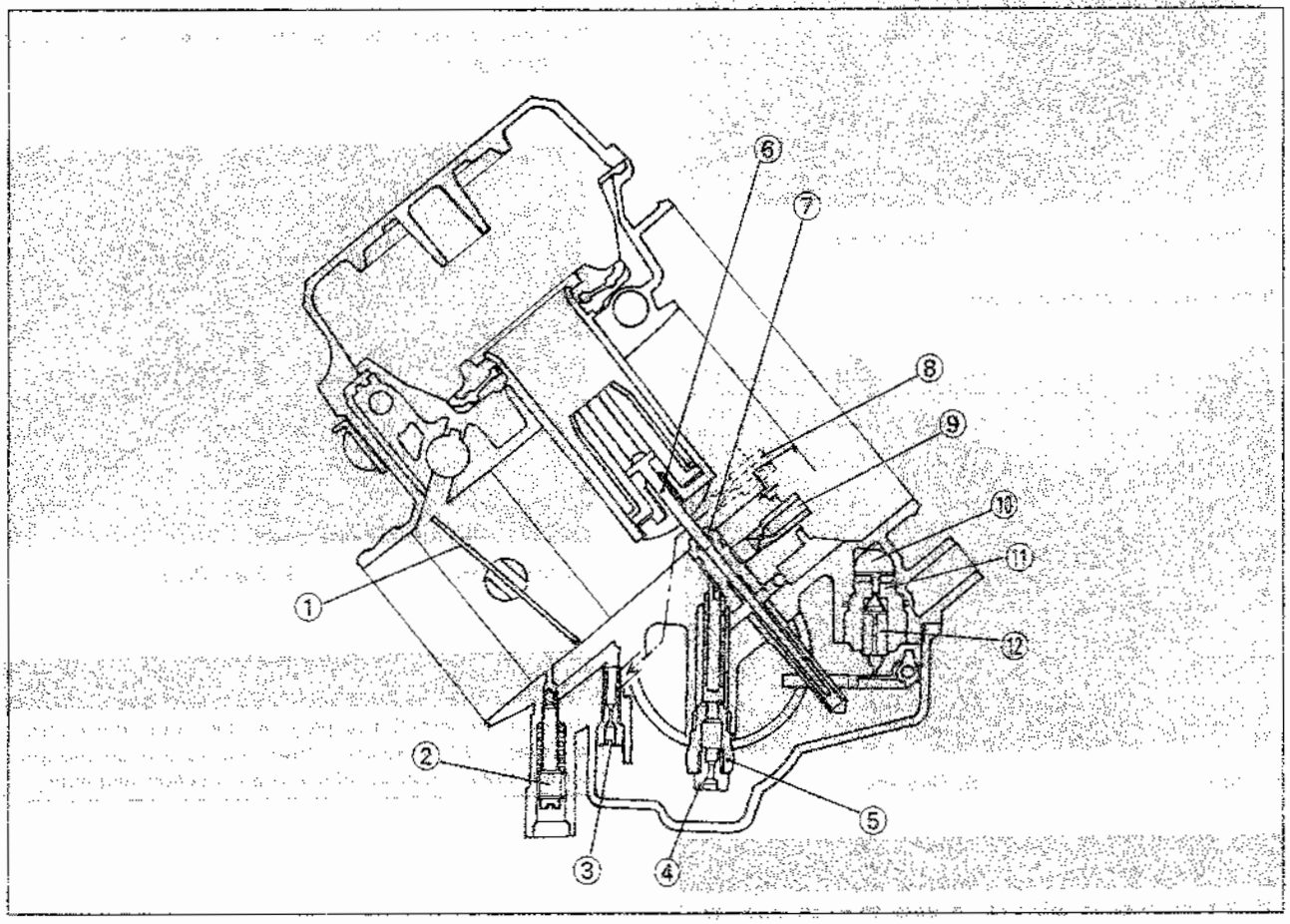
1. Plastic Tip
2. Valve Needle
3. Rod
4. Valve Needle Wear

★If the plastic tip is damaged, replace the needle.
●Push the rod in the valve, then release it.
★If the rod does not spring out, replace the valve.
●Check the tapered portion of the pilot screw for wear or damage.



1. Pilot Screw
2. Tapered Portion

★If the pilot screw is worn or damaged on the tapered portion, it will prevent the engine from idling smoothly. Replace it.



1. Throttle Valve
2. Pilot Screw
3. Pilot Jet
4. Main Jet
5. Jet Needle Holder
6. Jet Needle
7. Needle Jet
8. Pilot Air Jet
9. Main Air Jet
10. Fuel Strainer
11. Valve Set
12. Float Valve

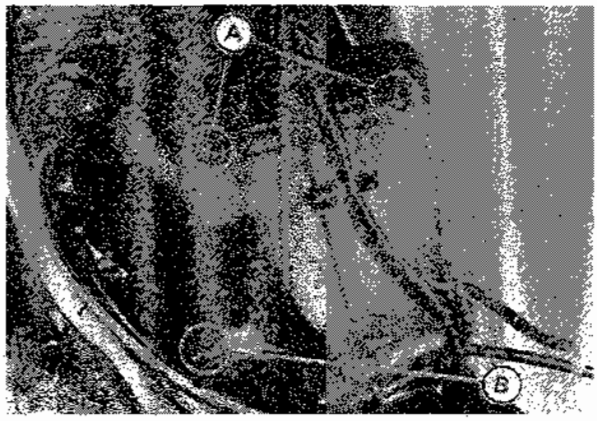
Air Cleaner

Element Cleaning

⚠WARNING

Clean the element in a well-ventilated area, and take care that there is no spark or flame anywhere near the working area; this includes any appliance with a pilot light. Because of the danger of highly flammable liquids, do not use gasoline or low-flash point solvents to clean the element. A fire or explosion could result.

●Remove the following.
Fuel Tank (see this chapter)
Upper Half of Air Cleaner Housing



A. Front Screw B. Rear Screw

●Peel the air cleaner element.



A. Front B. Element

⚠WARNING

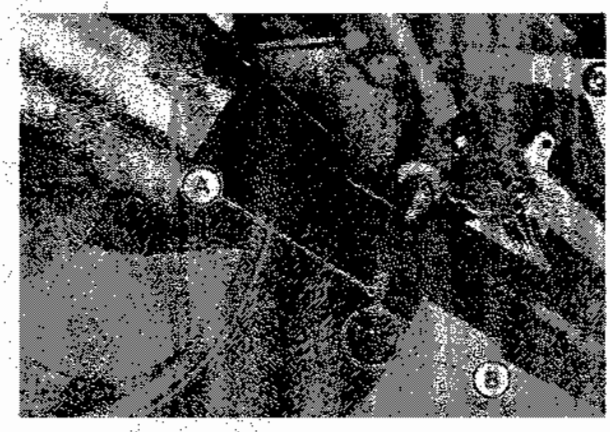
If dirt or dust is allowed to pass through into the carburetors, the throttle may become stuck, possibly causing accident.

●Wash the element in a bath of high-flash point solvent and then dry it with compressed air or by shaking it.
●After cleaning, saturate the sponge filter with SE or SF class SAE30 oil, squeeze out the excess, then wrap it in a clean rag and squeeze it dry as possible. Be careful not to tear the sponge filter.
●Install the element.
●Install the upper half of the air cleaner housing. Check that the O-rings are in place.
●First, tighten the front screw, then the rear screws to the specified torque (see Exploded View).

Air Cleaner Draining

A drain hose is provided beneath the air cleaner housing, and accumulates the water or oil from the bottom of the housing. Usually water or oil does not collect at the bottom of the housing. In the event that rain water is drawn in through the air cleaner, or if engine oil is blown back, drain the housing.

●Visually check the drain hose if the water or oil accumulates in the hose.
★If any water or oil accumulates in the hose, drain it by taking off the drain plug at the lower end of the drain hose.
●Be sure to install the plug firmly, or the air will be drawn in through it.



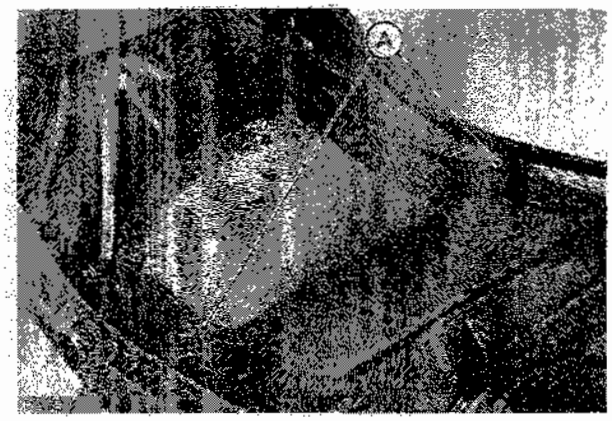
A. Drain Hose B. Drain Plug

⚠WARNING

Be sure to install the plug in the drain hose after draining. Oil could drain from the open hose and get on the tires which could cause an accident and injury.

Air Cleaner Housing Removal

●Remove the following.
Inlet Duct



A. Inlet Duct Mounting Bolts

Fuel Tank (see Fuel Tank Removal)
Air Cleaner Housing Front Screws and Rear Bolt
Drain Hose
Crankcase Breather Hose

● Move the lower half forward to clear the hook and remove the air cleaner housing assembly.



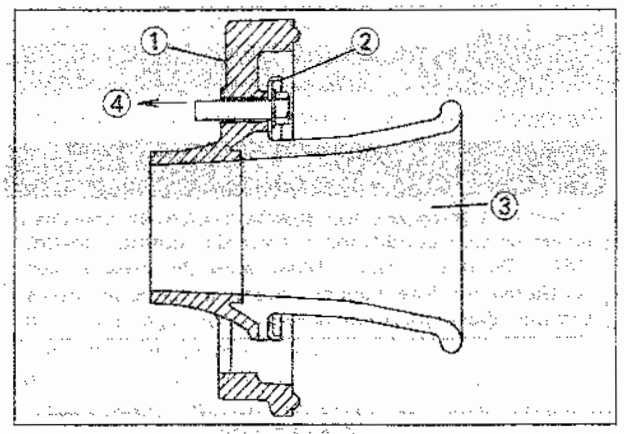
A. Front Screws B. Rear Bolt

Air Cleaner Housing Installation Note

● Insert the rear hook portion and connect the breather hose to the crankcase fitting.

Air Cleaner Housing Assembly

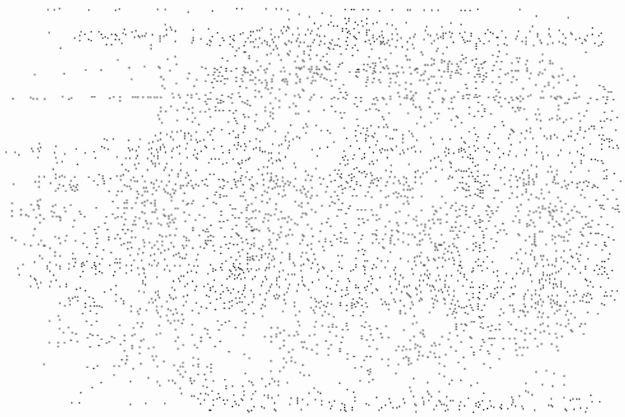
● For the ZX500C model, install the ducts on the air cleaner housing holder as shown.



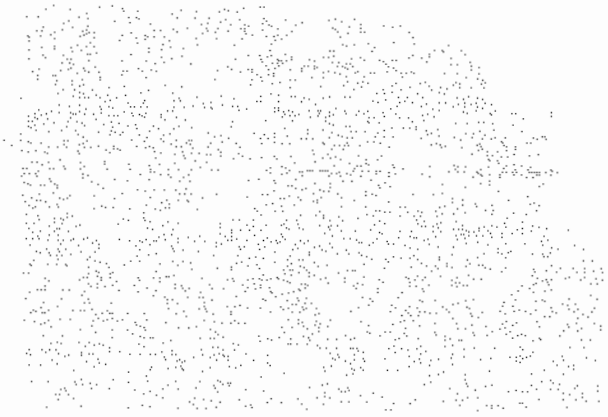
1. Holder 3. Ducts (#1, #4 : Short) (#2, #3 : Long)
2. Plate 4. Carburetors









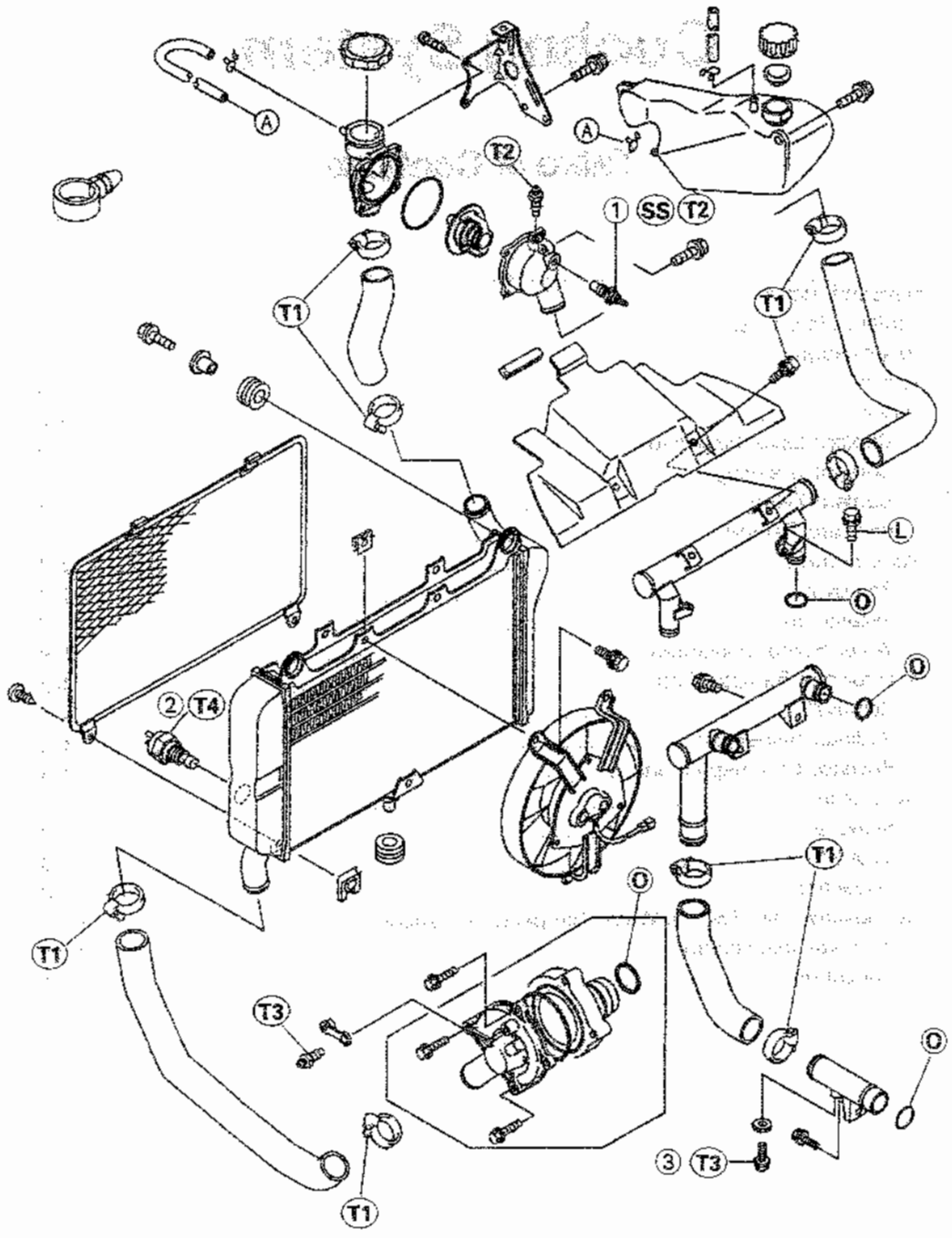


Cooling System

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Exploded View

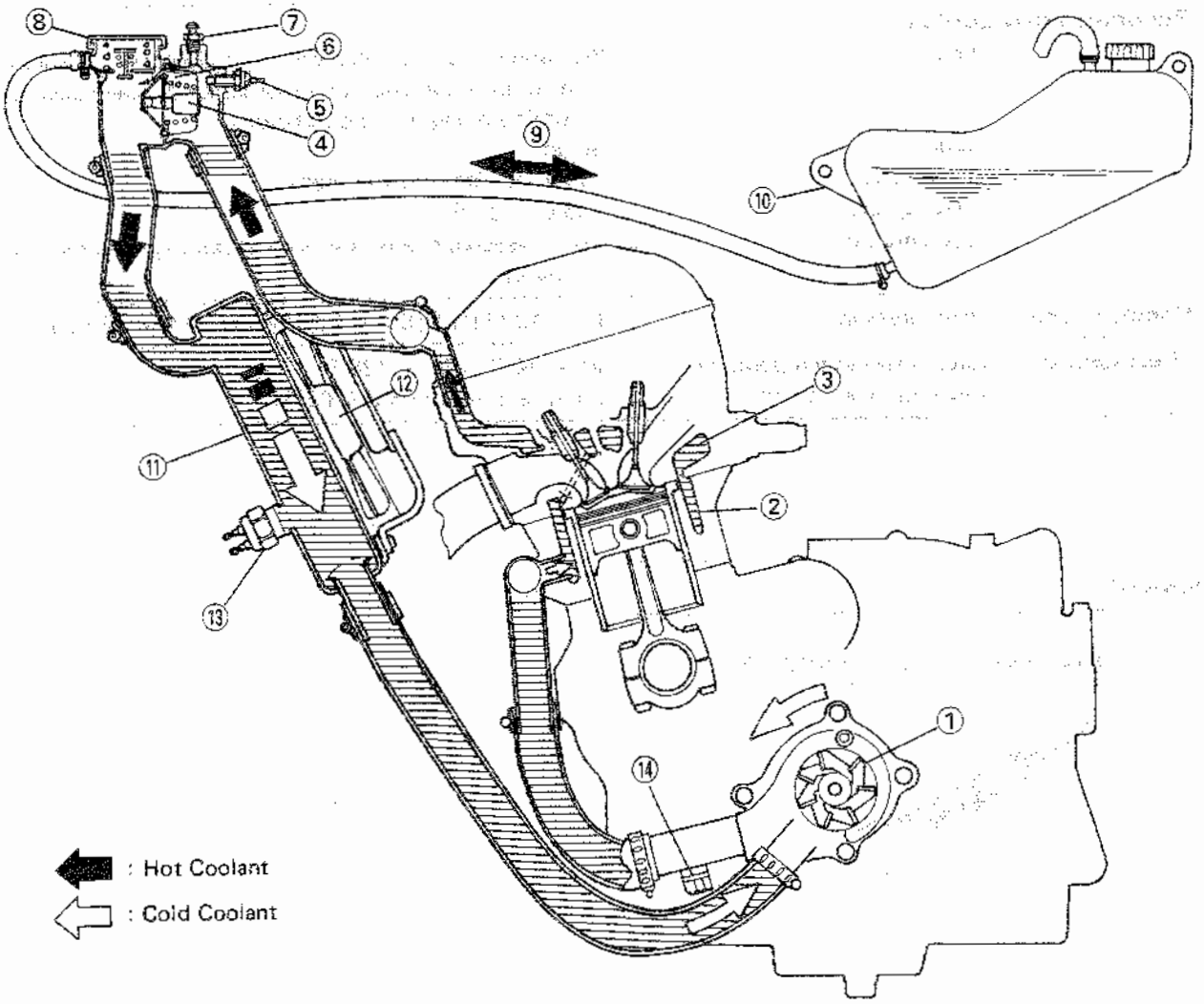


1. Water Temperature Sensor
2. Thermostatic Fan Switch
3. Drain Plug

L : Apply a non-permanent locking agent.
SS : Apply silicone sealant.
O : Apply oil.

T1 : 2.0 N-m (0.20 kg-m, 17 in-lb)
T2 : 7.8 N-m (0.80 kg-m, 69 in-lb)
T3 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T4 : 18 N-m (1.8 kg-m, 13.0 ft-lb)

Coolant Flow Chart



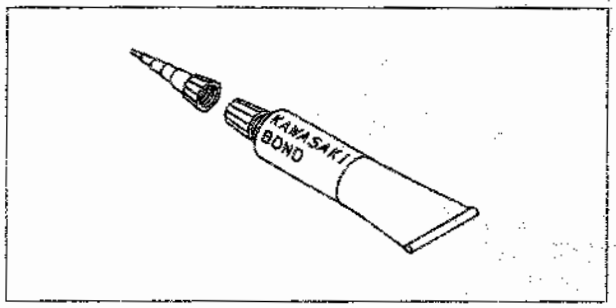
1. **Water Pump coupled with oil pump**
2. **Cylinder Jacket**
3. **Cylinder Head Jacket**
4. **Thermostat**
5. **Water Temperature Sensor**
6. **Hole (Air bleeder hole)**
   When the engine is cold, the thermostat is closed so that the coolant flow is restricted through the air bleeder hole, causing the engine to warm up more quickly.
7. **Air Bleeder Bolt**
8. **Radiator Cap**
9. **To reservoir tank**
   When the engine is hot, the pressure valve in the radiator cap allows air and vapor to escape into the reservoir tank. When the engine cools down, the pressure drop draws the vacuum valve (another small valve) open, admitting coolant from the reservoir tank into the radiator.
10. **Reservoir Tank**
11. **Radiator**
12. **Radiator Fan**
13. **Thermostatic Fan Switch**
14. **Drain Bolt**

Specifications

Item		Standard
Recommended Coolant:		
	Type	Permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)
	Color	Green
	Mixed ratio	Soft water 50%, coolant 50%
	Freezing point	−35°C (−31°F)
	Total amount	2.5 L (reservoir tank full level including radiator and engine)
Radiator Cap:	Relief pressure	93 ~ 123 kPa (0.95 ~ 1.25 kg/cm², 14 ~ 18 psi)
Thermostat:	Valve opening temperature	80 ~ 84°C (176 ~ 183°F)
	Valve full opening lift	8 mm or more @ 95°C (203°F)

Sealant

Kawasaki Bond (Silicone Sealant): 56019-120



Coolant

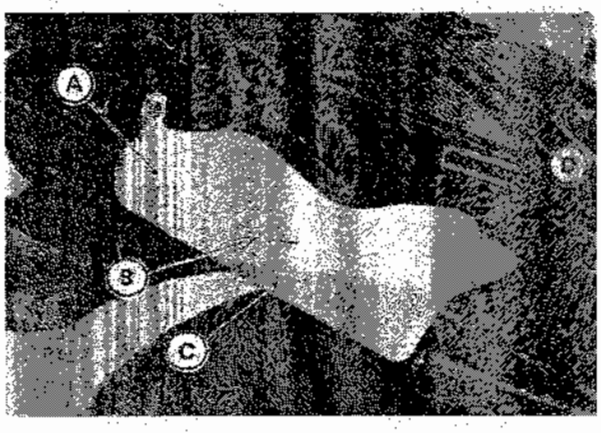
Coolant Level Inspection

NOTE

○*Check the level when the engine is cold (room or ambient temperature).*

●Check the coolant level in the reservoir tank with the motorcycle held perpendicularly.

★If the coolant level is lower than the LOW mark add coolant to the FULL mark.



A. Reservoir Tank
B. FULL Mark
C. LOW Mark
D. Front

CAUTION

For refilling, add the specified mixture of coolant and soft water. Adding water alone dilutes the coolant and degrades its anticorrosion properties.
The diluted coolant can attack the aluminum engine parts. In an emergency, soft water can be added. But the diluted coolant must be returned to the correct mixed ratio within a few days.
If coolant must be added often, or the reservoir tank has run completely dry; there is probably leakage in the cooling system. Check the system for leaks.

Coolant Draining

⚠WARNING

To avoid burns, do not remove the radiator cap or try to change the coolant when the engine is still hot. Wait until it cools down.
Coolant on tires will make them slippery and can cause an accident and injury. Immediately wipe up or wash away any coolant that spills on the frame, engine, or wheels.
Since coolant is harmful to the human body, do not use for drinking.

●Remove the lower fairing (see Frame chapter).

●Place a container under the drain plug at the bottom of the water pipe.

●Drain the coolant from the radiator and engine by removing the drain plug.



A. Drain Plug
B. Front
C. Water Pump

●Remove the following.
Right Inner Cover on the Upper Fairing (see Frame chapter)
Radiator Cap



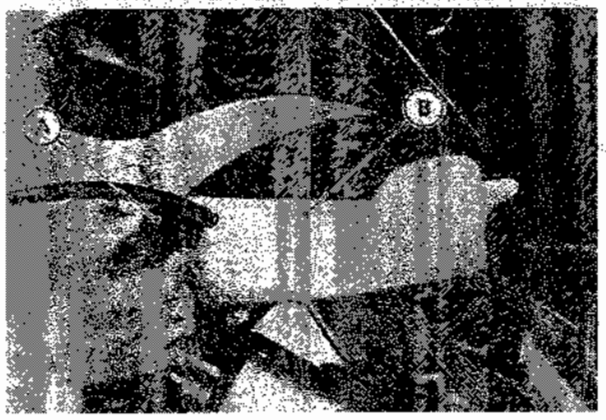
A. Radiator Cap

○The coolant will drain from the radiator and engine.

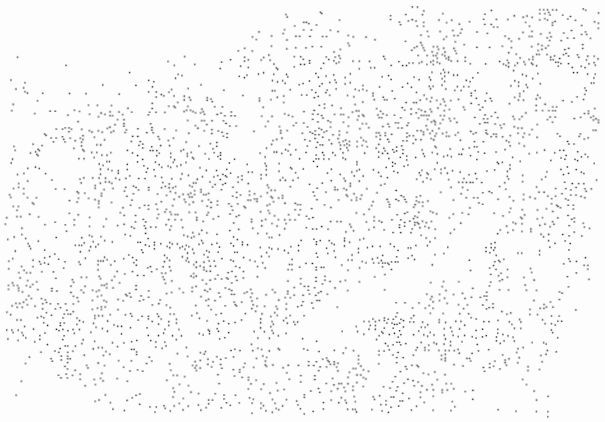
●Remove the right side cover (see Frame chapter).

●Unscrew the bolts and remove the reservoir tank with hoses left installed.

●Unscrew the cap and pour the coolant into a container.



A. Cap
B. Reservoir Tank



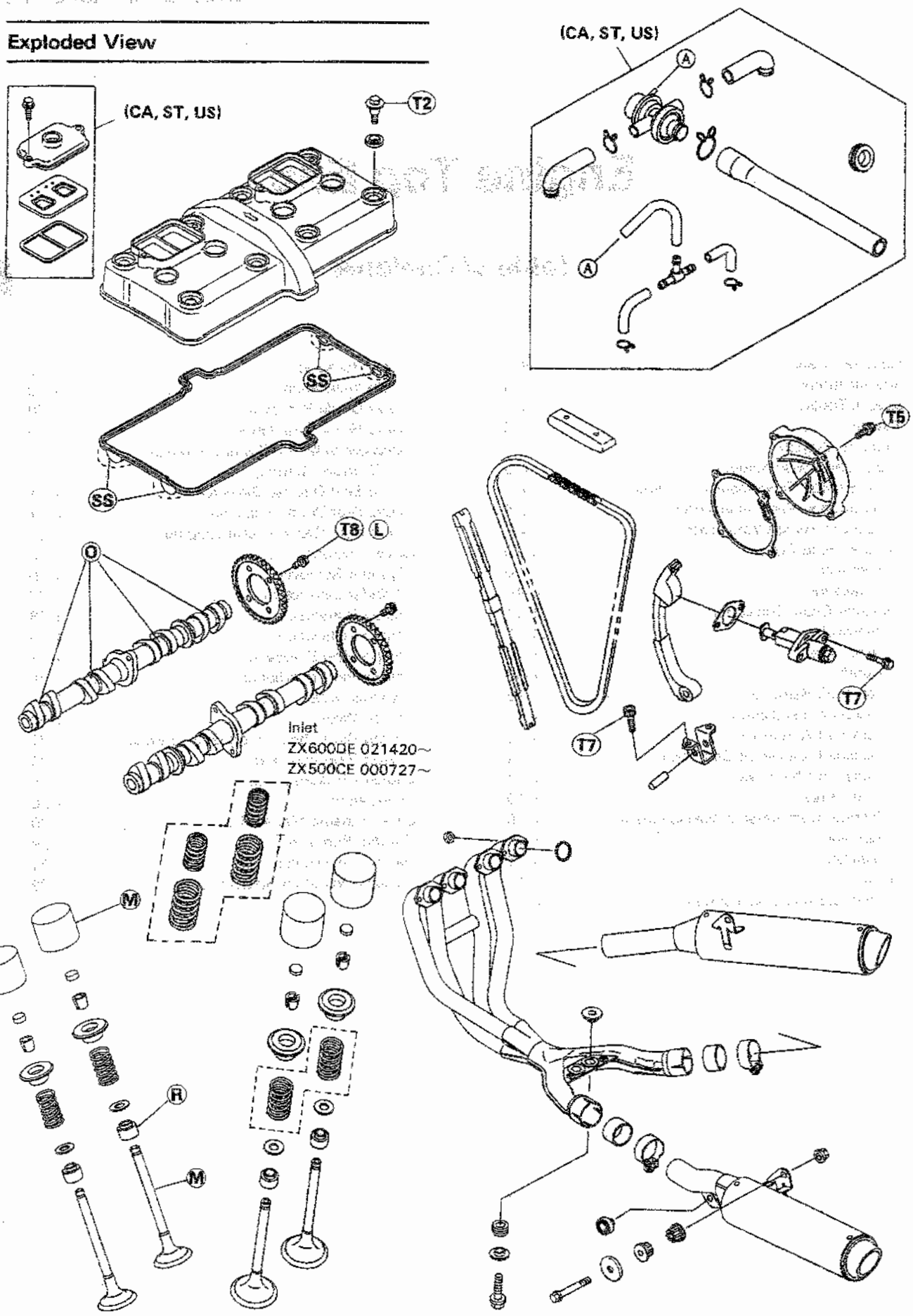


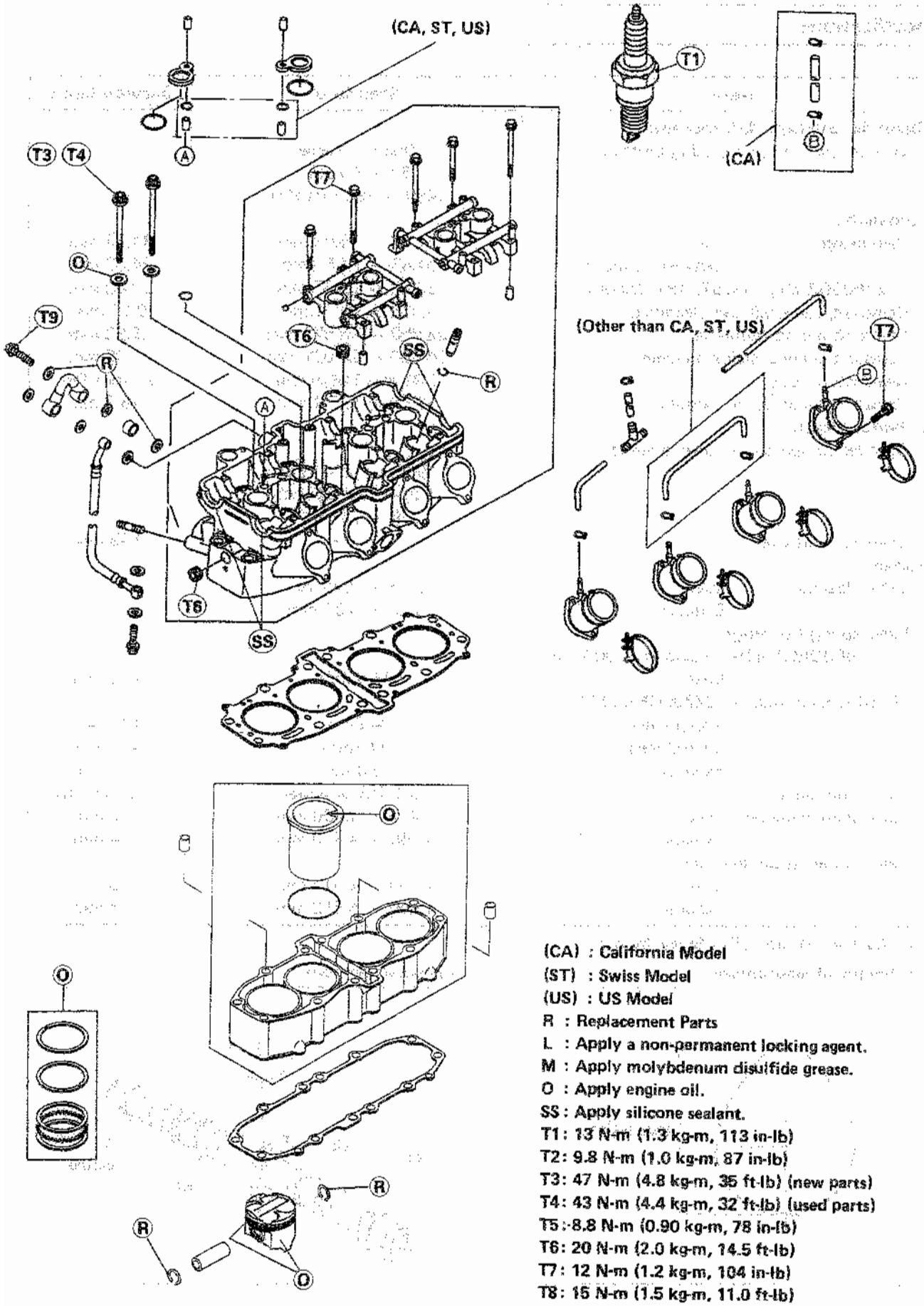
Engine Top End

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Exploded View





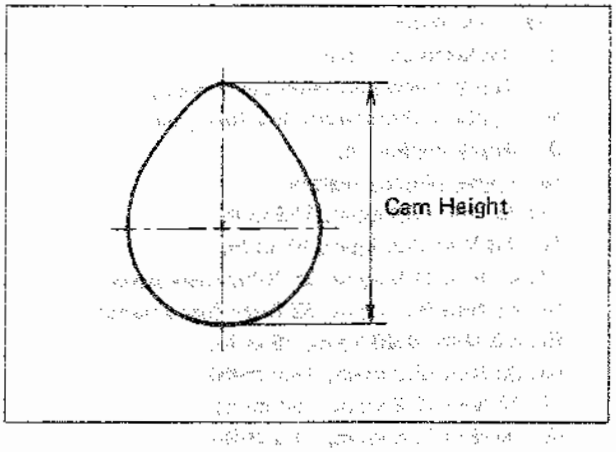
(CA) : California Model
(ST) : Swiss Model
(US) : US Model
R : Replacement Parts
L : Apply a non-permanent locking agent.
M : Apply molybdenum disulfide grease.
O : Apply engine oil.
SS : Apply silicone sealant.
T1 : 13 N-m (1.3 kg-m, 113 in-lb)
T2 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T3 : 47 N-m (4.8 kg-m, 35 ft-lb) (new parts)
T4 : 43 N-m (4.4 kg-m, 32 ft-lb) (used parts)
T5 : 8.8 N-m (0.90 kg-m, 78 in-lb)
T6 : 20 N-m (2.0 kg-m, 14.5 ft-lb)
T7 : 12 N-m (1.2 kg-m, 104 in-lb)
T8 : 15 N-m (1.5 kg-m, 11.0 ft-lb)
T9 : 25 N-m (2.5 kg-m, 18.0 ft-lb)

Specifications

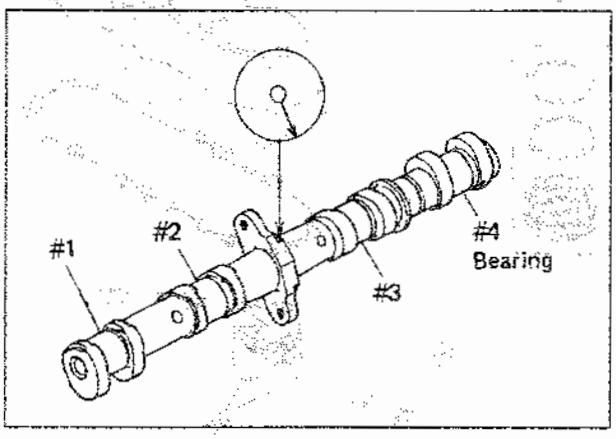
Item		Standard	Service Limit
Clean Air System (US model):			
Vacuum switch valve closing pressure:		Open → Close 57 ~ 65 kPa (430 ~ 490 mm Hg)	– – –
Camshaft:			
Cam height:	Inlet	34.93 ~ 35.07 mm	34.83 mm
	Exhaust ZX600D	34.43 ~ 34.57 mm	34.33 mm
ZX600D2(ST), D3(ST, AR), ZX500C		33.93 ~ 34.07 mm	33.83 mm
Camshaft, camshaft cap clearance		0.028 ~ 0.071 mm	0.16 mm
Camshaft journal diameter		23.950 ~ 23.972 mm	23.92 mm
Camshaft bearing inside diameter		24.000 ~ 24.021 mm	24.08 mm
Camshaft runout		0.02 mm TIR or less	0.1 mm TIR
Camshaft chain 20-link length		127.0 ~ 127.4 mm	128.9 mm
Cylinder Head:			
Cylinder compression (Usable range)		960 ~ 1470 kPa (9.8 ~ 15.0 kg/cm², 139 ~ 213 psi)	– – –
Cylinder head warp		– – –	0.05 mm
Valves:			
Valve clearance:	Inlet	0.15 ~ 0.24 mm	– – –
	Exhaust	0.22 ~ 0.31 mm	– – –
Valve spring free length:			
(~ ZX600DE021419, ~ ZX500CE 000726)			
	Inlet	42.9 mm	41.2 mm
(ZX600DE 021420 ~, ZX500CE 000727 ~)			
	Inlet(Inner)	44.5mm	43.1mm
	Inlet(Outer)	44.1mm	42.7mm
	Exhaust	46.8 mm	45.1 mm
Valve stem bend		0.01 TIR or under	0.05 mm TIR
Valve stem diameter:	Inlet	4.475 ~ 4.490 mm	4.46 mm
	Exhaust	4.455 ~ 4.470 mm	4.44 mm
Valve guide inside diameter:			
	Inlet	4.500 ~ 4.512 mm	4.58 mm
	Exhaust	4.500 ~ 4.512 mm	4.58 mm

(AR): Austrian Model (ST) Swiss Model

Cam Height Measurement

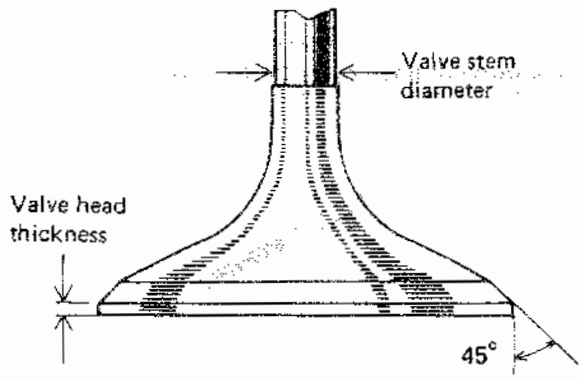


Camshaft Runout

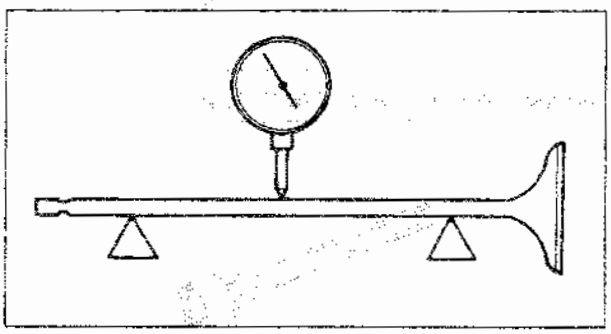


Item			Standard	Service Limit
Valve/valve guide clearance (wobble method):	Inlet		0.034 ~ 0.116 mm	0.33 mm
	Exhaust		0.088 ~ 0.167 mm	0.37 mm
Valve seat cutting angle				
	ZX600D		45°, 30°, 32°, 60°, 67.5°	– – –
	ZX500C		45°, 22.5°, 30°, 67.5°, 65°	– – –
Valve seat surface:				
Width:	Inlet		0.5 ~ 1.0 mm	– – –
	Exhaust		0.5 ~ 1.0 mm	– – –
Outside diameter:				
	ZX600D	Inlet	25.13 ~ 25.33 mm	– – –
		Exhaust	21.13 ~ 21.33 mm	– – –
	ZX500C	Inlet	19.33 ~ 19.53 mm	– – –
		Exhaust	15.73 ~ 15.93 mm	– – –
Valve head thickness:	Inlet		0.5 mm	0.25 mm
	Exhaust	ZX600D	0.8 mm	0.50 mm
		ZX500C	0.7 mm	0.40 mm
Cylinder, Piston:				
Cylinder inside diameter:				
		ZX600D	64.000 ~ 64.012 mm	64.10 mm
		ZX500C	57.500 ~ 57.512 mm	57.60 mm
Piston diameter:		ZX600D	63.940 ~ 63.960 mm	63.79 mm
		ZX500C	57.440 ~ 57.460 mm	57.29 mm
Piston/cylinder clearance			0.040 ~ 0.072 mm	– – –
Oversize piston and rings			+ 0.5 mm	– – –
Piston ring/groove clearance:				
	Top	ZX600D	0.03 ~ 0.07 mm	0.17 mm
		ZX500C	0.05 ~ 0.09 mm	0.19 mm
	Second		0.03 ~ 0.07 mm	0.17 mm
Piston ring groove width:				
	Top	ZX600D	0.82 ~ 0.84 mm	0.92 mm
		ZX500C	0.84 ~ 0.86 mm	0.94 mm
	Second		0.82 ~ 0.84 mm	0.92 mm
Piston ring thickness:				
	Top		0.77 ~ 0.79 mm	0.7 mm
	Second		0.77 ~ 0.79 mm	0.7 mm
Piston ring end gap:				
	Top		0.15 ~ 0.30 mm	0.6 mm
	Second		0.30 ~ 0.45 mm	0.75 mm

Valve Head

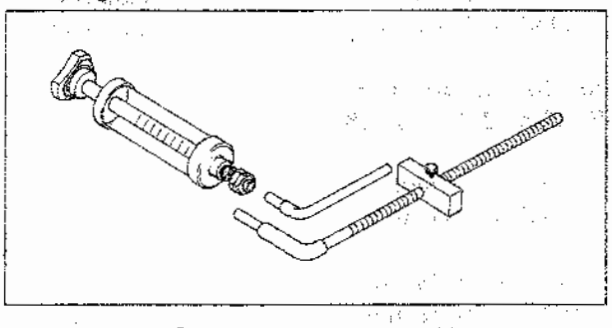


Valve Stem Bend

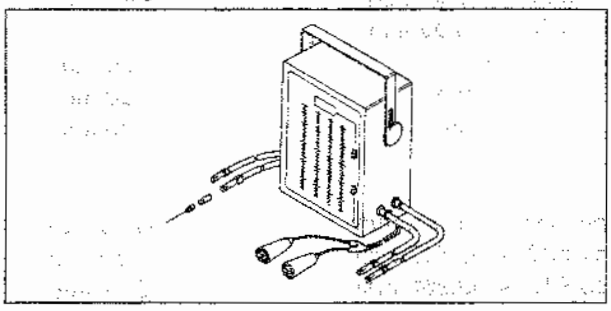


Special Tools

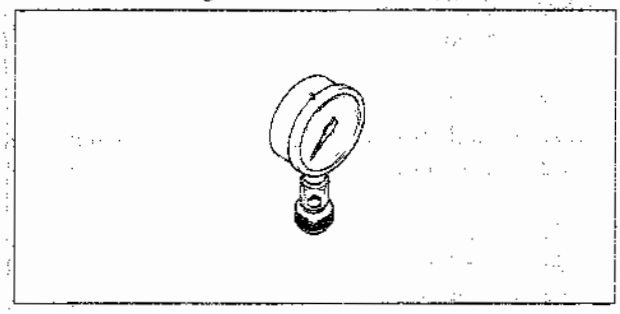
Oil Syringe: 57001-1290



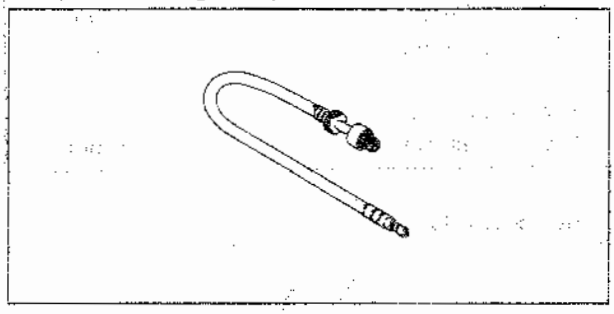
Vacuum Gauge & Tachometer: 57001-1291



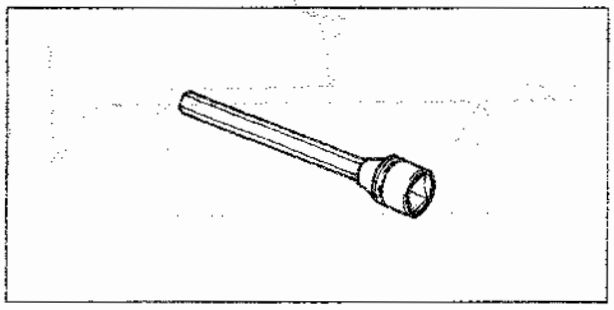
Compression Gauge: 57001-221



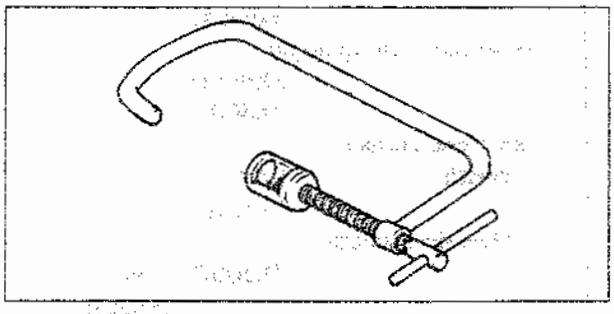
Compression Gauge Adapter, M10 X 1.0: 57001-1317



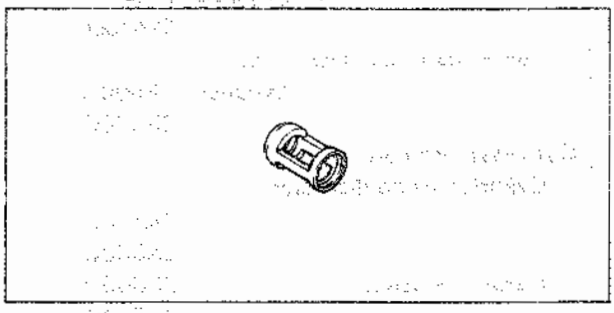
Hexagon Wrench, Hex 8: 57001-1234



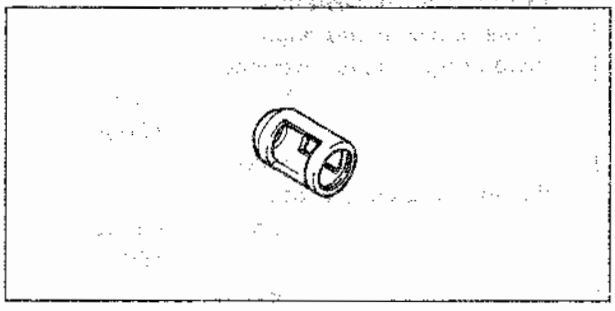
Valve Spring Compressor Assembly: 57001-241



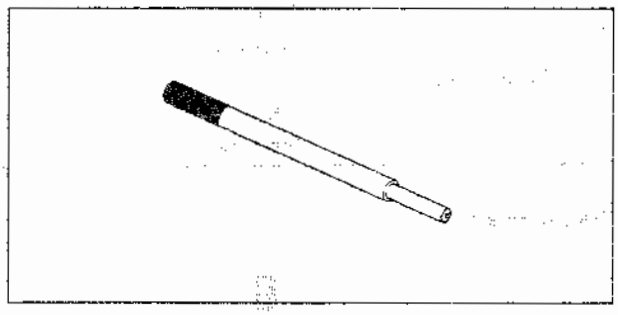
Valve Spring Compressor Adapter, Φ20: 57001-1154



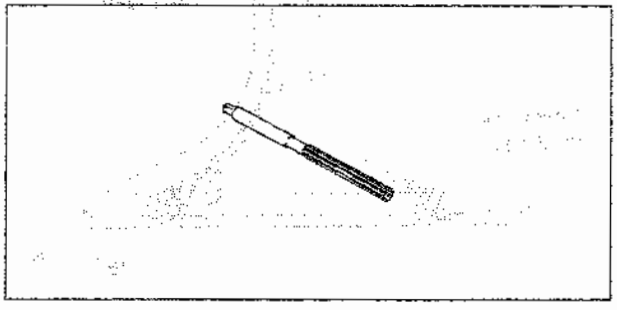
Valve Spring Compressor Adapter, Φ22: 57001-1202



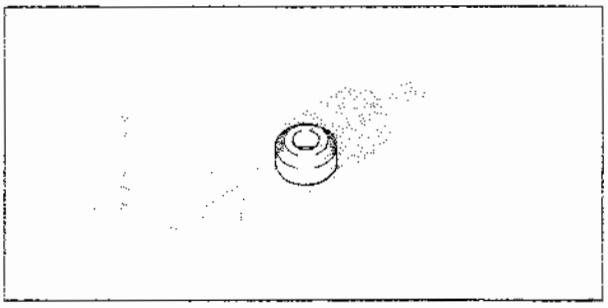
Valve Guide Arbor, Φ4.5: 57001-1331



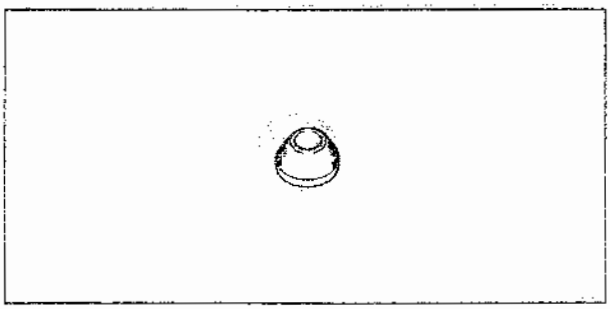
Valve Guide Reamer, Φ4.5: 57001-1333



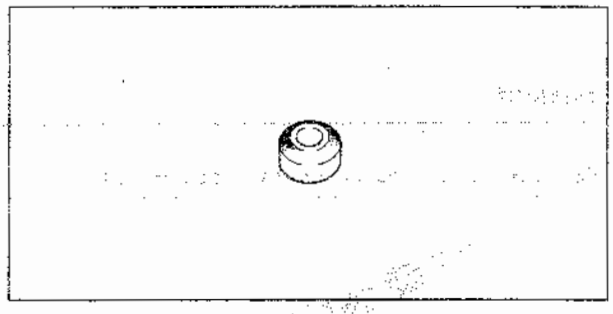
Valve Seat Cutter, 45° – Φ27.5: 57001-1114



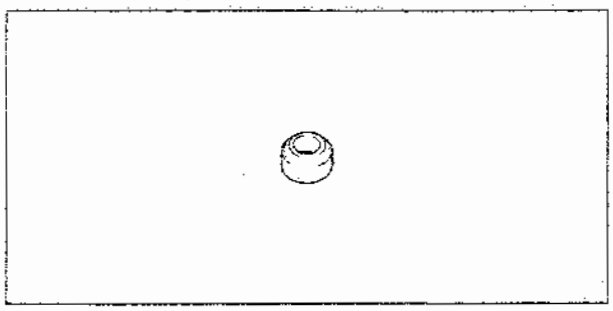
Valve Seat Cutter, 67.5° – Φ22: 57001-1207



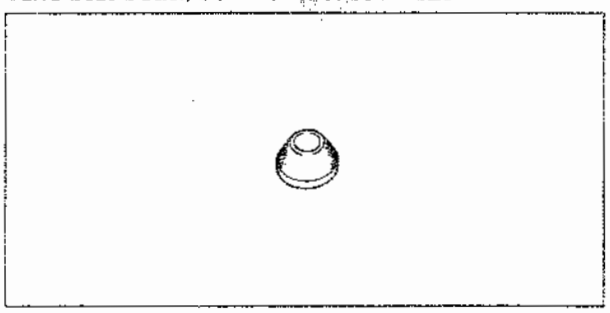
Valve Seat Cutter, 32° – Φ28: 57001-1119



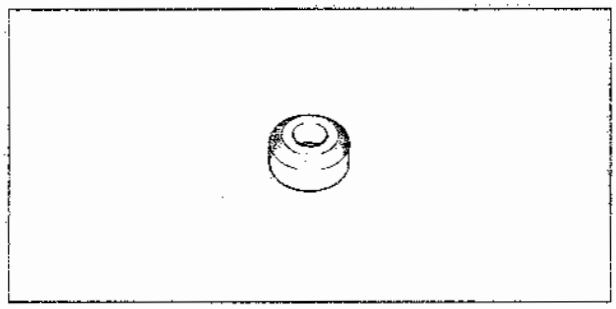
Valve Seat Cutter, 45° – Φ22: 57001-1205



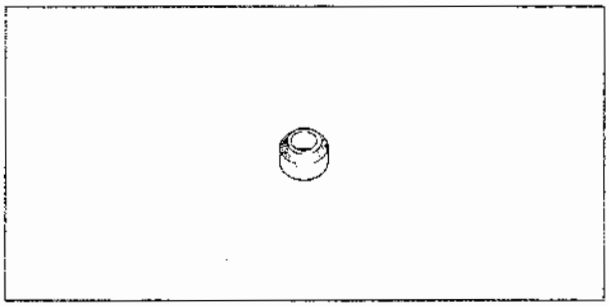
Valve Seat Cutter, 60° – Φ25: 57001-1328



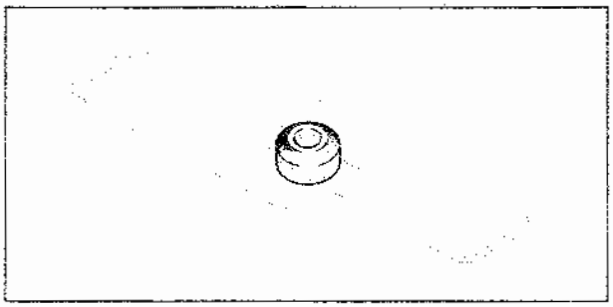
Valve Seat Cutter, 22.5° – Φ21: 57001-1309



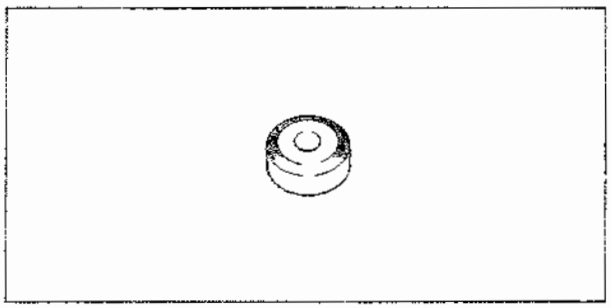
Valve Seat Cutter, 45° – Φ24.5: 57001-1113



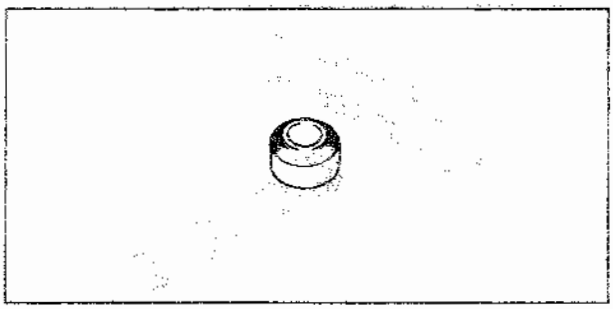
Valve Seat Cutter, 45° – Φ18: 57001-1306



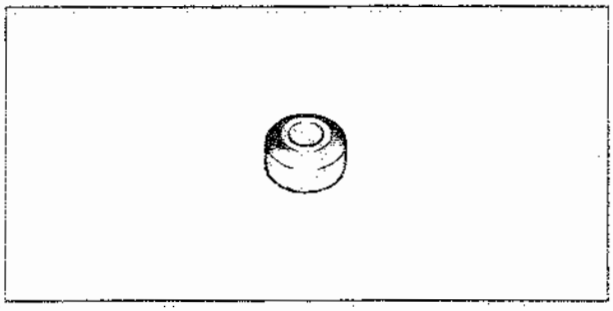
Valve Seat Cutter, 30° – Φ23.5: 57001-1329



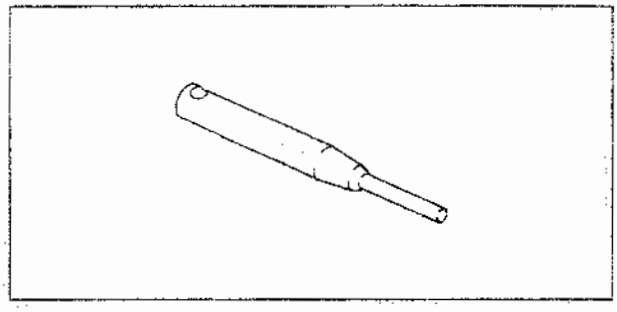
Valve Seat Cutter, 30° – Φ18: 57001-1308



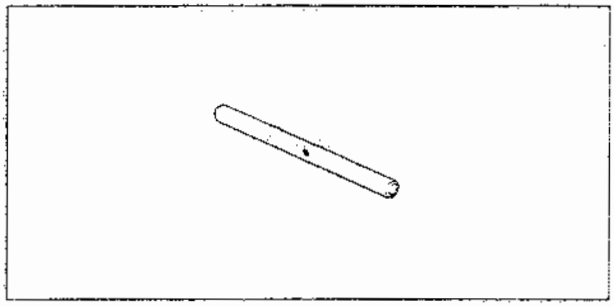
Valve Seat Cutter, 65° – Φ19: 57001-1310



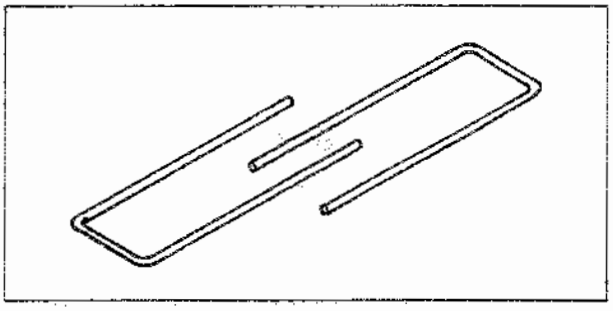
Valve Seat Cutter Holder, Φ4.5: 57001-1330



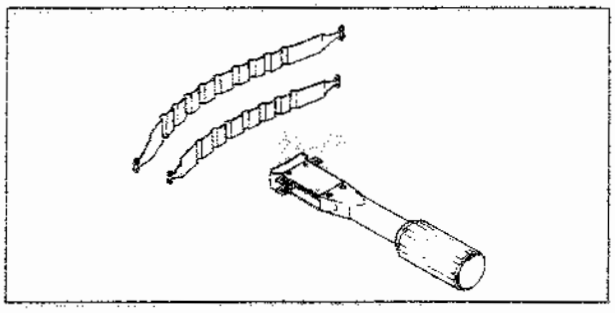
Valve Seat Cutter Holder Bar: 57001-1128



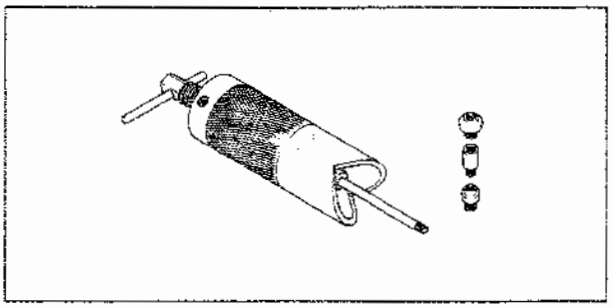
Piston Base, Φ2.3: 57001-1336



Piston Ring Compressor Assembly: 57001-1094

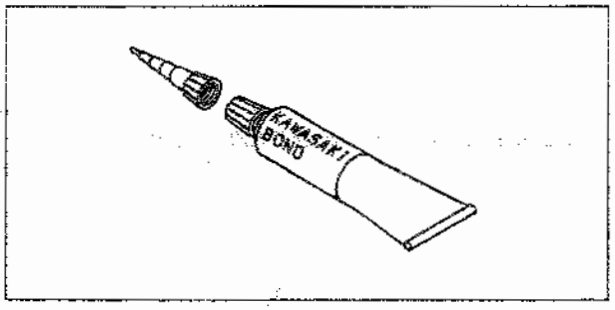


Piston Pin Puller Assembly: 57001-910



Sealant

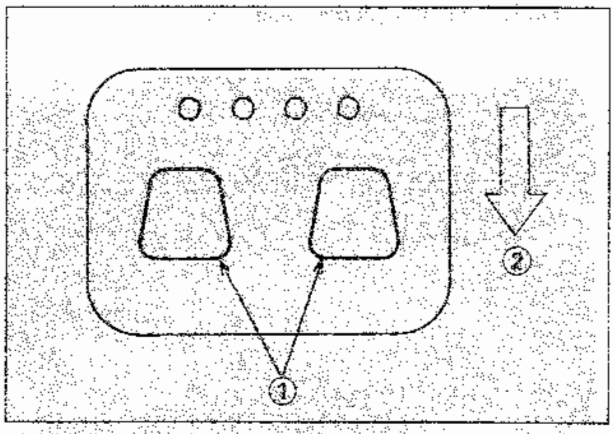
Kawasaki Bond (Silicone Sealant): 56019-120



Clean Air System (U.S. and Swiss models)

Air Suction Valve Installation Note

● Replace the gasket with a new one, and install the air suction valve so that the wider side of the reed faces toward the rear.

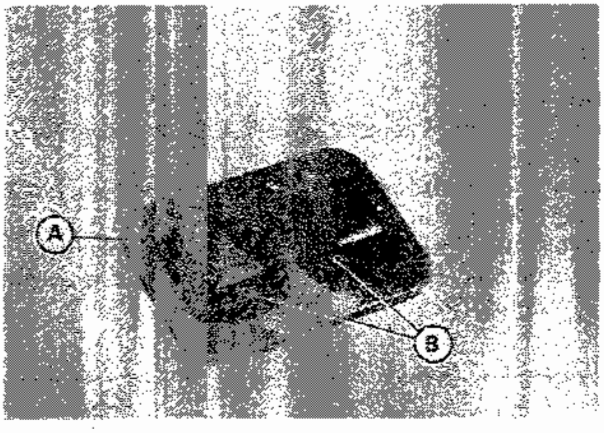


1. Wider Side 2. Rear

Air Suction Valve Inspection

● Visually inspect the reeds for cracks, folds, warps, heat damage, or other damage.

★ If there is any doubt as to condition of the reed, replace the air suction valve as an assembly.



A. Valve Holder B. Reeds

● Check the reed contact areas of the valve holder for grooves, scratches, any signs of separation from the holder, or heat damage.

★ If there is any doubt as to the condition of the reed contact areas, replace the air suction valve as an assembly.

● If any carbon or other foreign particles have accumulated between the reed and the reed contact area, wash the valve assembly with high-flash point solvent.

CAUTION

Do not scrape off the deposits with a scraper as this could damage the rubber, requiring replacement of the air suction valve assembly.

Vacuum Switch Valve Test

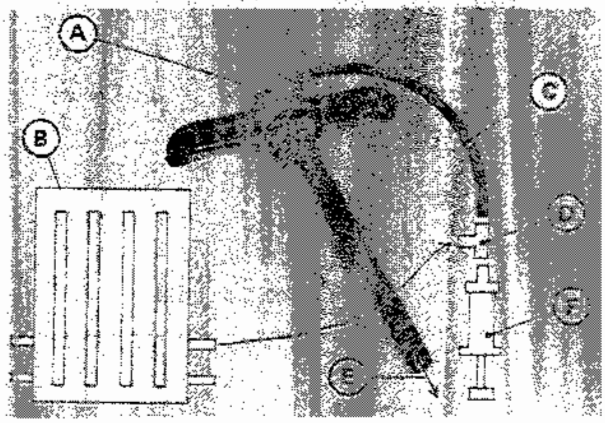
Using the vacuum gauge & tachometer (special tool) and the oil syringe (special tool), inspect the vacuum switch operation as follows:

● Remove the fuel tank (see Fuel System chapter).

● Remove the vacuum switch valve.

● Connect the vacuum gauge & tachometer and oil syringe (special tools) to the vacuum hose as shown.

● Gradually raise the vacuum (lower the pressure) applied to the vacuum switch valve, and check the valve operation. When the vacuum is low, the vacuum switch valve should permit air to flow. When the vacuum rises to a certain level **57 ~ 65 kPa (430 ~ 490 mm Hg)**, it should stop air flow.



A. Vacuum Switch Valve
B. Vacuum Gauge & Tachometer: 57001-1291
C. Vacuum Hose
D. Three Way Joint
E. Air Flow
F. Oil Syringe: 57001-1290

★ If the vacuum switch valve does not operate as described, replace it with a new one.

NOTE

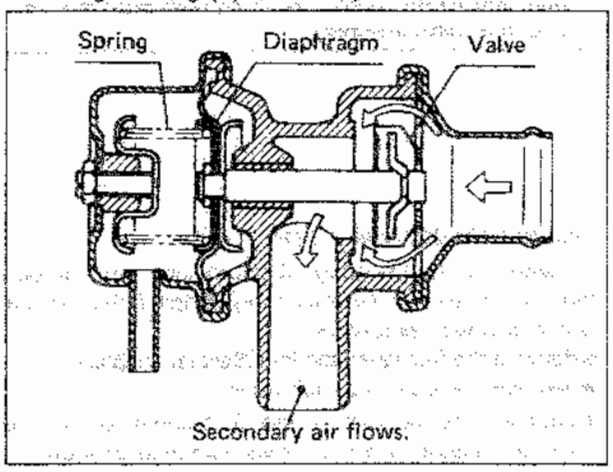
○ *To check air flow through the vacuum switch valve, just blow through the air hose.*

Vacuum Switch Valve Closing Pressure

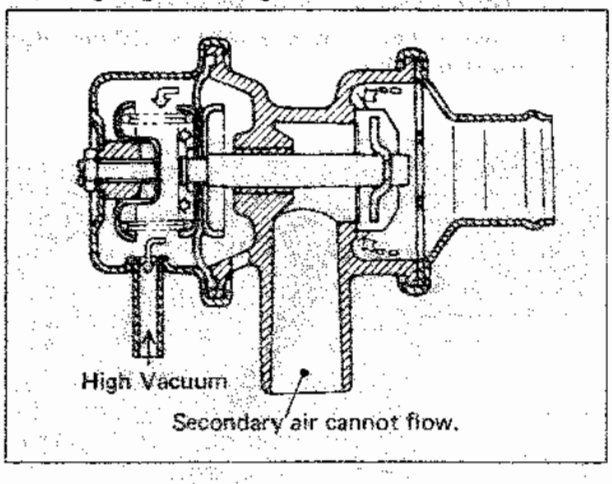
Open → Close :57 ~ 65 kPa (430 ~ 490 mm Hg)

Vacuum Switch Valve Operation

1. During Cruising (open throttle)



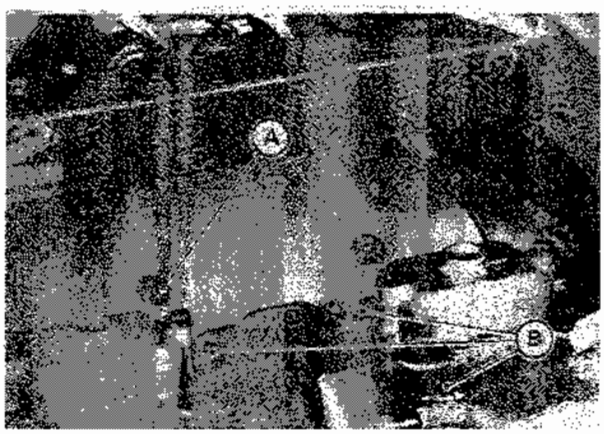
2. During Engine Braking



Cylinder Head Cover

Removal

● Remove the following.
Fuel Tank (see Fuel System chapter)
Ignition Coils
Carburetors (see Fuel System chapter)
Air Suction Valve (U.S. and Swiss Models)
Baffle Plate on Cylinder Head Cover

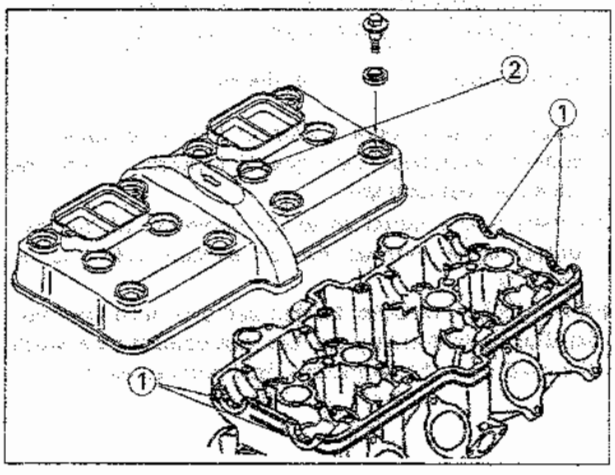


A. Baffle Plate Screws B. Head Cover Bolts

● Remove the cylinder head cover bolts and take off the cover.

Installation

● Replace the head cover gasket with new one if it is damaged.
● Apply silicone sealant to the crescent-shaped area of the cylinder head.
● Point the arrow on the cylinder head cover forward.
● Tighten the cover bolts to the specified torque (see Exploded View).

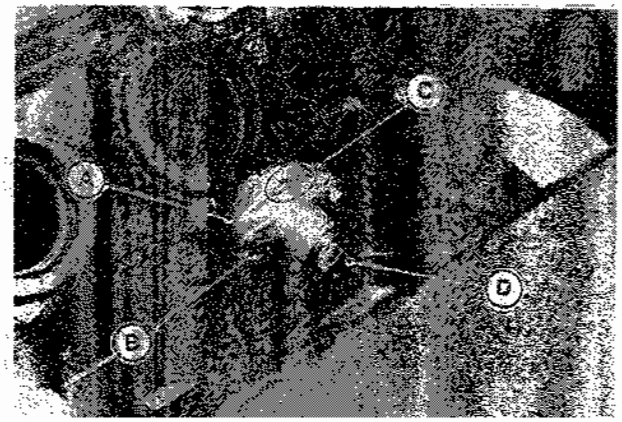


1. Silicone Sealant Applied Areas 2. Arrow

Camshaft Chain Tensioner

Removal

- Remove the carburetors (see Fuel System chapter).
- Loosen the cap bolt.
- Remove the mounting bolts and take off the camshaft chain tensioner.



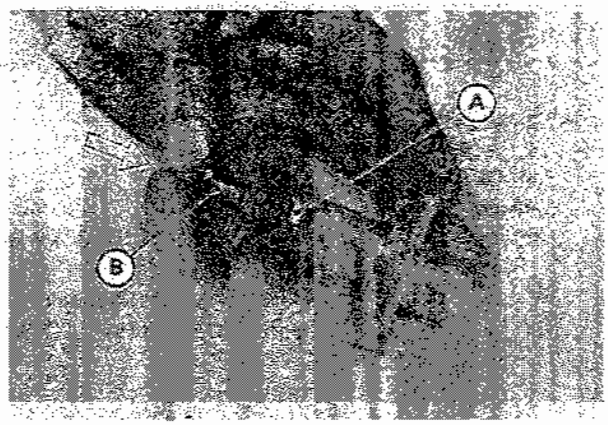
A. Camshaft Chain Tensioner
B. Mounting Bolts
C. Arrow Mark
D. Cap Bolt

CAUTION

This is a non-return type cam chain tensioner. The push rod does not return to its original position once it moves out to take up cam chain slack. Observe all the rules listed below:
When removing the tensioner, do not take out the mounting bolts only halfway. Retightening the mounting bolts from this position could damage the tensioner and the camshaft chain. Once the bolts are loosened, the tensioner must be removed and reset as described in "Chain Tensioner Installation."
Do not turn over the crankshaft while the tensioner is removed. This could upset the cam chain timing, and damage the valves.

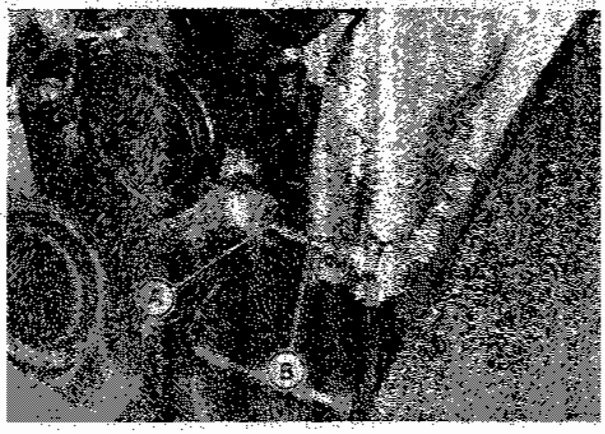
Installation

- Remove the cap bolt.
- Push the stopper to release the ratchet and push the push rod into the tensioner body.



A. Push the stopper.
B. Push the rod.

- Install the tensioner with the arrow mark upward in the head (see Removal).
- Tighten the tensioner mounting bolts to the specified torque (see Exploded View).
- Put the spring and guide pin in and tighten the cap bolt.



A. Spring
B. Guide Pin

- Turn the crankshaft 2 turns clockwise to allow the tensioner to expand.

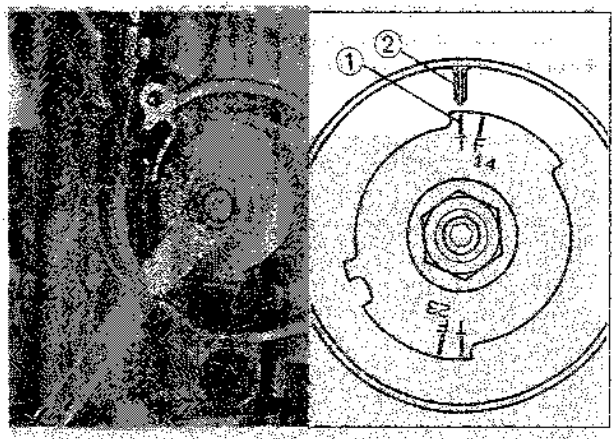
Camshaft

Camshaft Removal

● Remove the following.
Fuel Tank (see Fuel System chapter)
Carburetors (see Fuel System chapter)
Cylinder Head Cover (see Cylinder Head Cover Removal)
Pickup Coil Cover (see Electrical System chapter)
Camshaft Chain Tensioner (see Camshaft Chain Tensioner Removal)

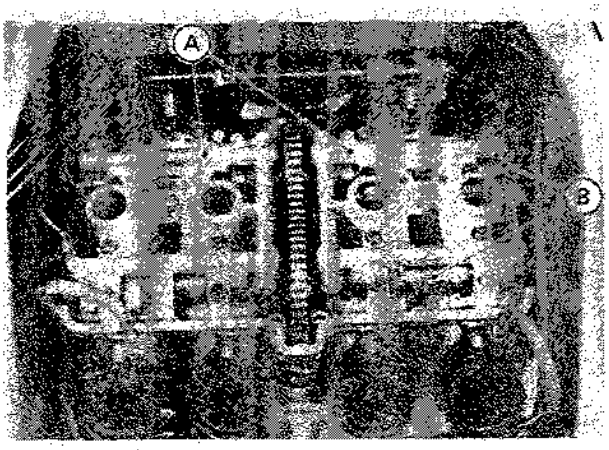
NOTE

○ *Before removing the chain tensioner, position the crankshaft at #1, 4 piston TDC.*



1. TDC Mark 2. Timing Mark

● Remove the camshaft cap bolts in the reverse order of the numbers embossed on the caps.
● Take off the camshaft caps and camshafts.



A. Camshaft Caps B. Camshafts

● Stuff a clean cloth into the chain tunnel to keep any parts from falling into the crankcase.

CAUTION

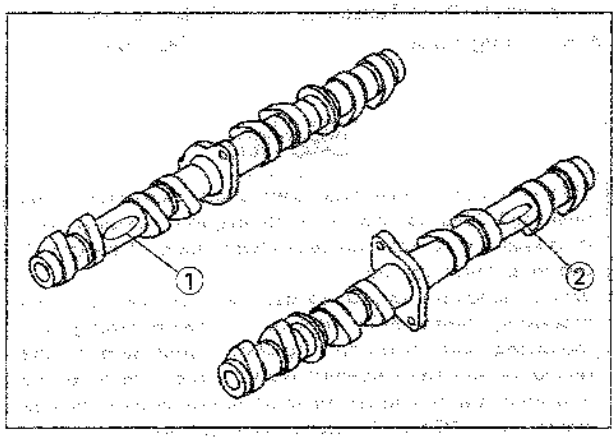
The crankshaft may be turned, while the camshafts are removed. Always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower (crankshaft) sprocket. A kinked chain could damage both the chain and the sprocket.

Camshaft Installation

● Installation is the reverse of removal. Note the following.
● Apply engine oil to all cam parts and journals.
● If a new camshaft is to be used, apply a thin coat of molybdenum disulfide grease to the cam surfaces and journals.

NOTE

○ *The exhaust camshaft has a 520 EX mark and the inlet camshaft has a 520 IN mark. Be careful not to mix them up.*



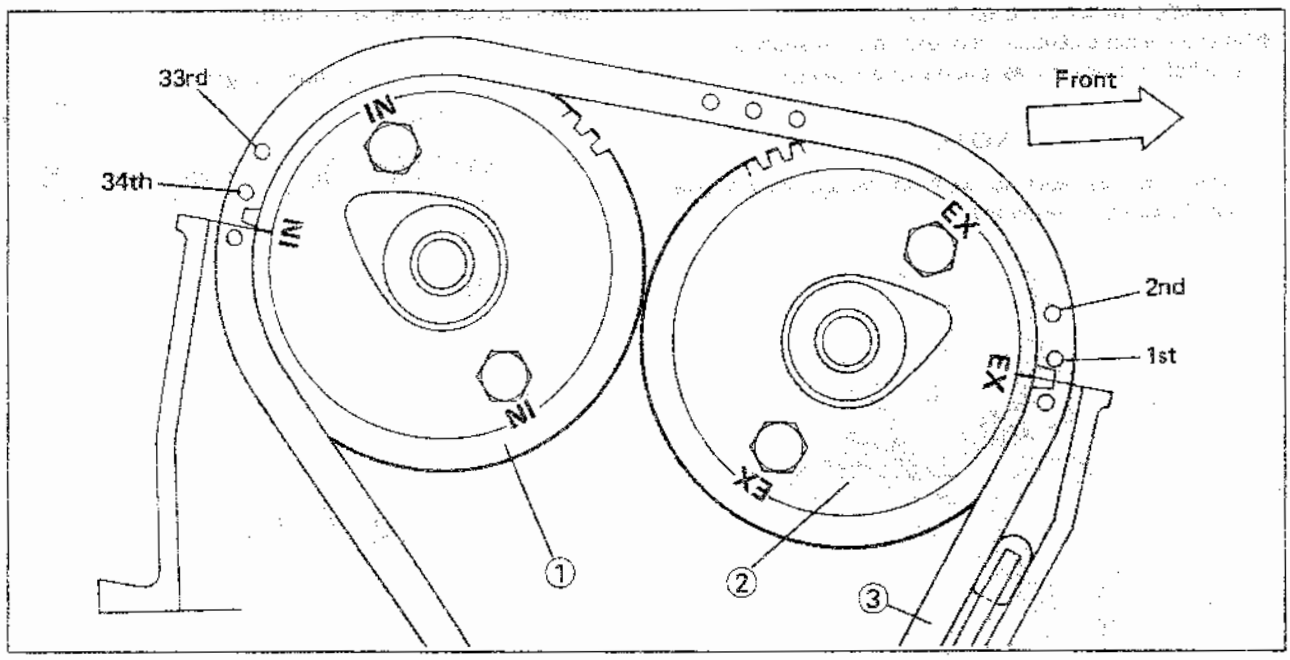
1. 520 EX Mark 2. 520 IN Mark

● Position the crankshaft at #1, 4 piston TDC (see Camshaft Removal).

CAUTION

The crankshaft may be turned, while the camshafts are removed, but always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower (crankshaft) sprocket. A kinked chain could damage both the chain and the sprocket.

● Install the camshafts in the following order.
○ The sprocket bolt heads must face the right side.
Camshaft Cap O-Rings
Exhaust Camshaft and Caps (time the camshaft)
Inlet Camshaft and Caps (time the camshaft)
● Engage the camshaft chain with the camshaft sprockets so that the timing marks on the sprockets are positioned as shown.
● Install the camshaft caps in the correct locations.



1. Inlet Side
2. Exhaust Side
3. Pull the exhaust side taut.

○The right camshaft cap has an R mark and the left camshaft cap has an L mark. Be careful not to mix up these caps.

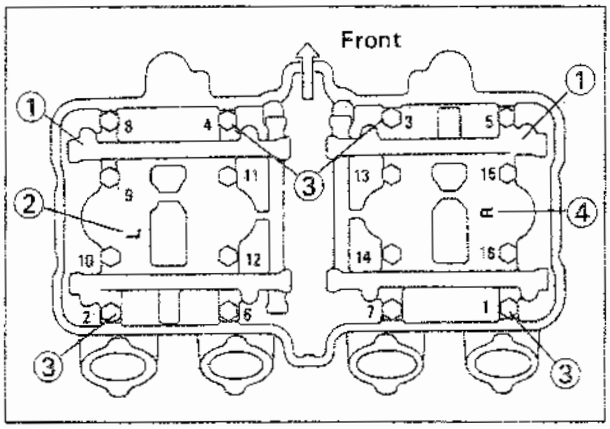
●Tighten the cap bolts in the numerical order.

●First tighten the longer cap bolts (#1 ~ #4 bolts in the figure) evenly until the dowel pins are about to fit the holes.

●Next, temporarily tighten eight cap bolts (#1 ~ #8 bolts in the figure) evenly, noting that the dowel pins fit in the holes.

○Temporarily tighten the rest of the bolts.

●Finally tighten all the bolts to the specified torque (see Exploded View) in the numerical order.



1. Camshaft Caps
2. L Mark
3. Longer Bolts
4. R Mark

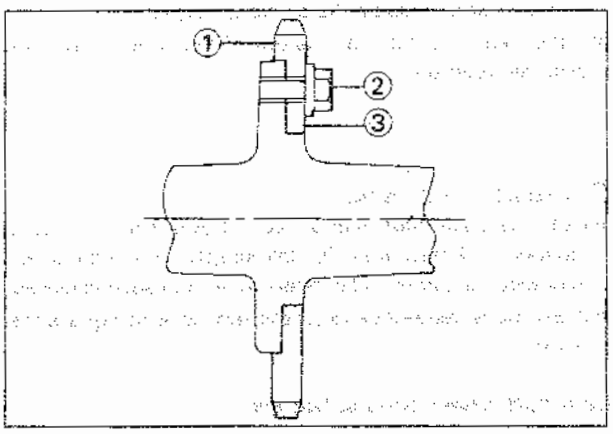
CAUTION

The camshaft caps are machined with the cylinder head. So, if a cap is installed in a wrong location, the camshaft may seize because of improper oil clearance in the bearings.

●Install the following.
Camshaft Chain Tensioner (see this chapter)
Pickup Coil Cover (see Electrical System chapter)

Camshaft Assembly

●The inlet and exhaust camshaft sprockets are the same, but sprocket position is different. Install them with the marked side facing outward (see the illustration in Camshaft Installation).



1. Sprocket
2. Bolt Head
3. Marked Side

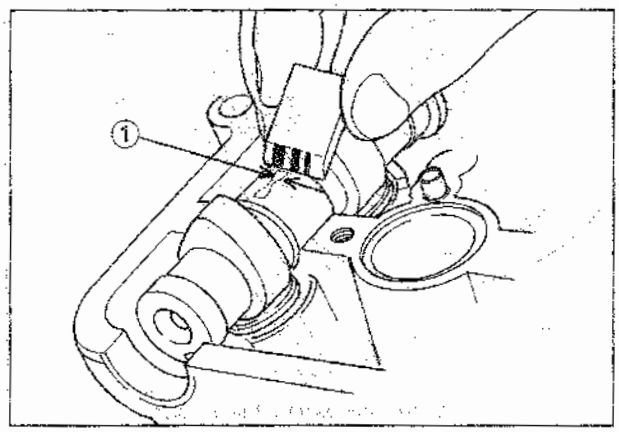
●Apply a non-permanent locking agent to the camshaft sprocket bolts and tighten them to the specification (see Exploded View).

Camshaft, Camshaft Cap Wear

● Measure each clearance between the camshaft and the camshaft cap using plastigauge (press gauge).

NOTE

○ *Tighten the camshaft cap bolts to the specified torque (see Camshaft Installation).*



1. Plastigauge Width

NOTE

○ *Do not turn the camshaft when the plastigauge is between the journal and camshaft cap.*

★ If any clearance exceeds the service limit, measure the diameter of each camshaft journal with a micrometer.

Camshaft Bearing Oil Clearance

Standard:	**0.028 ~ 0.071 mm**
Service Limit:	**0.16 mm**

★ If the camshaft journal diameter is less than the service limit (see Specifications), replace the camshaft with a new one and measure the clearance again.

★ If the clearance still remains out of the limit, replace the cylinder head unit.

Camshaft Chain Wear

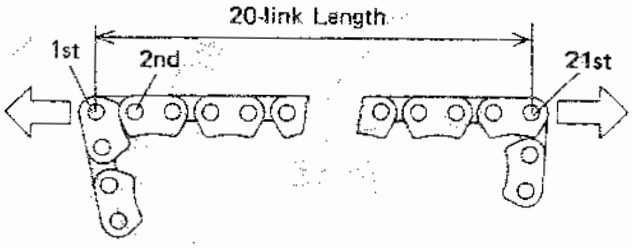
● Hold the chain taut with a force of about 5 kg in some manner, and measure a 20-link length. Since the chain may wear unevenly, take measurement at several places.

★ If any measurement exceeds the service limit, replace the chain.

Camshaft Chain 20-Link Length

Standard:	**127.0 ~ 127.4 mm**
Service Limit:	**128.9 mm**

Chain Length Measurement



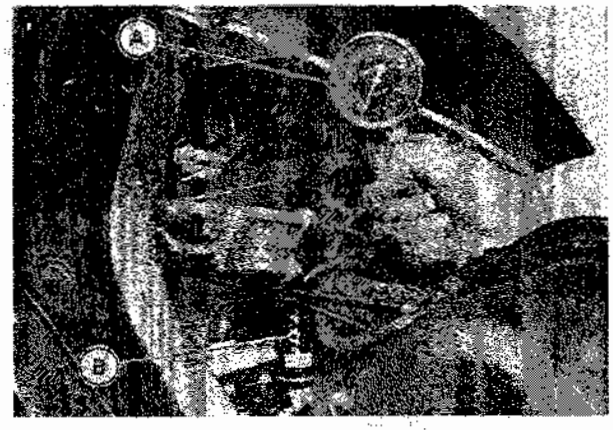
Cylinder Head

Cylinder Compression Measurement

NOTE

○*Use the battery which is fully charged.*

●Warm up the engine thoroughly.
●Remove the following.
Fuel Tank (see Fuel System chapter)
Spark Plugs
●Attach the compression gauge, and adapter (special tools) firmly into the spark plug hols.



A. Compression Gauge: 57001-221
B. Adapter: 57001-1317

●Hold the throttle wide open and crank the engine with the starter.
●When the gauge stops rising, stop cranking and read the gauge.

Cylinder Compression

Usable Range:
960 ~ 1470 kPa @350 r/min (rpm)
(9.8 ~ 15 kg/cm², 139 ~ 213 psi)

★If cylinder compression is higher than the specified range, check the following.
Carbon build-up on the cylinder head combustion chamber
Carbon build-up on the piston head
★If cylinder compression is lower than the specified range, check the following.
Valve not seating properly
Piston/cylinder clearance excessive
Gas leakage around the cylinder head gasket
Valve clearance too small
Piston ring/piston ring groove clearance

Removal

●Drain the coolant (see Cooling System chapter).
●Remove the following.
Upper Fairing (see Frame chapter)
Exhaust Manifold (see this chapter)
Cylinder Head Cover (see this chapter)
Camshaft Chain Tensioner (see this chapter)
Camshafts (see Camshaft Removal)
Water Pipe and Radiator Hose
Oil Hoses on Cylinder Head
●Remove the cylinder head bolts, using the hexagon wrench (special tool: 57001-1234). If the engine is in the frame, use a suitable commercially available wrench.



A. Water Pipe B. Cylinder Head Bolts

○Raise the head slightly and pull out the right two bolts and left two bolts.



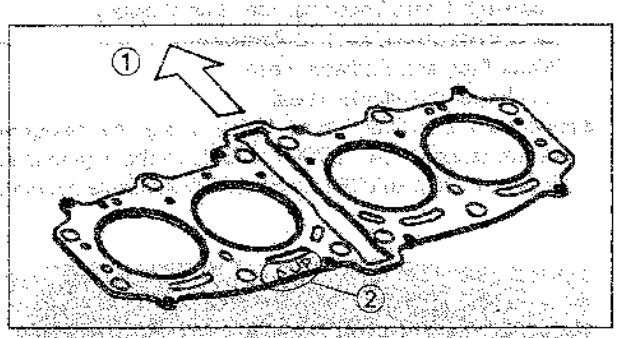
A. Raise the cylinder head.
B. Remove the side bolts.

●Remove the cylinder head.

Installation

● Installation is the reverse of removal. Note the following.

● Install the new cylinder head gasket with the side marked UP facing up.

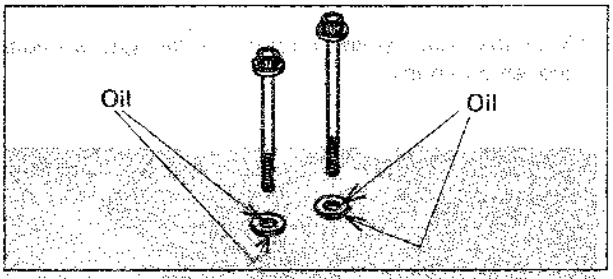


1. Front 2. "UP" Mark

NOTE

○ *The camshaft caps are machined with the cylinder head, so if a new cylinder head is installed, use the caps that are supplied with the new head.*

● Apply engine oil to both sides of the cylinder head bolt washers.



○ Note number 5 and 7 head bolts are longer.

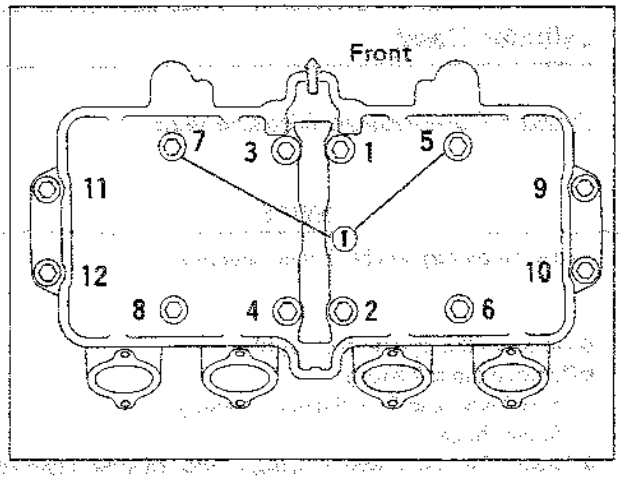
● Tighten the cylinder head bolts following the tightening sequence.

○ Tighten them first to 20 N-m (2.0 kg-m, 14.5 ft-lb) of torque, and then tighten them to the specified torque in the numerical order embossed on the head.

Tightening Torque:

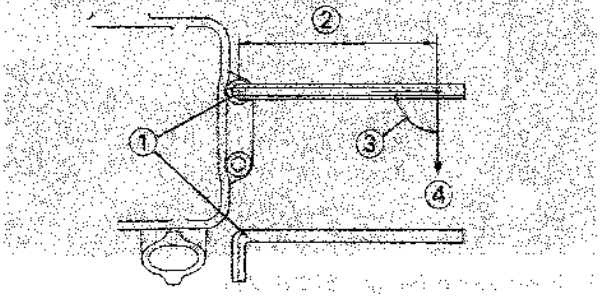
New bolts, washers, cylinder head:
47 N-m (4.8 kg-m, 35 ft-lb)

Used bolts, washers, cylinder head:
43 N-m (4.4 kg-m, 32 ft-lb)



1. Longer Bolts

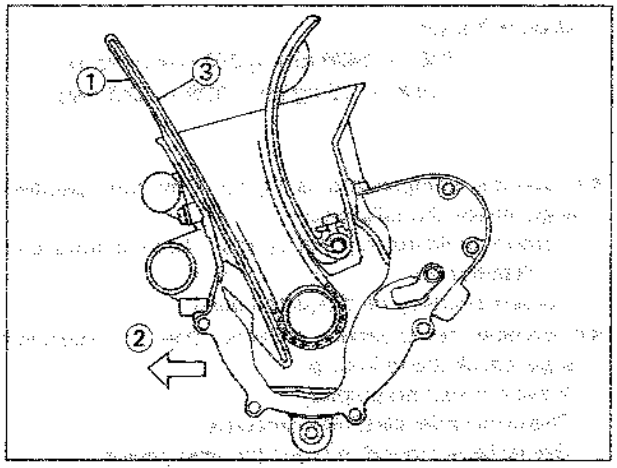
○ If the engine is in the frame, the side bolts can be tightened to the specified torque using a hexagonbar wrench on the side bolts, and pulling the wrench at the point of 150 mm length to 32 kg (or 29.4 kg for used bolt).



1. Hexagonbar Wrench 3. 90°
2. (150) mm 4. 32 kg (29.4 kg for used bolt)

● Tighten the oil hose banjo bolts to the specified torque (see Exploded View).

● Install the front camshaft chain guide with its UP mark on top. Push the guide all the way down.



1. UP mark 3. Front Camshaft Chain Guide
2. Front

Valves

Valve Clearance Adjustment

NOTE

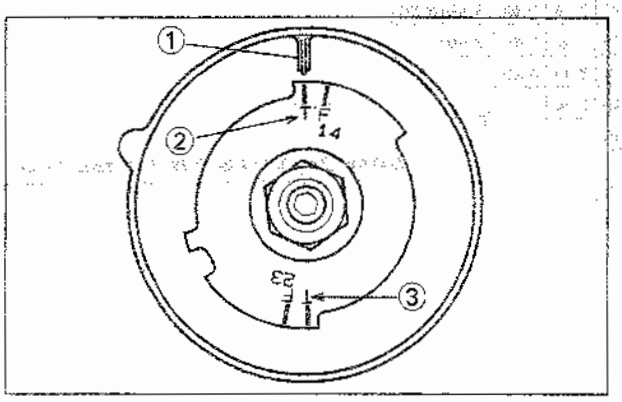
○*Valve clearance must be checked and adjusted when the engine is cold (at room temperature).*

●Remove the following.
Pickup Coil Cover (see Electrical System chapter)
Cylinder Head Cover (see Cylinder Head Cover Removal)

●Check the valve clearance when the pistons are at TDC as follows.

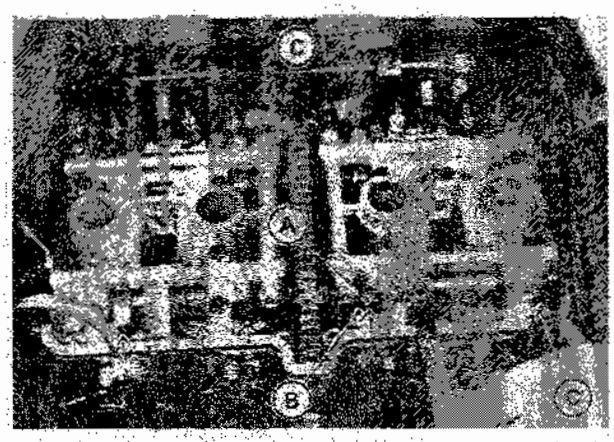
○The pistons are numbered beginning with the engine left side.

○Using a wrench on the timing rotor bolt, turn the crankshaft clockwise until a TDC mark on the rotor is aligned with the timing mark on the crankcase. And the cam lobe is pointing away from the valve lifter the end of the compression stroke.



1. Timing Mark
2. TDC Mark for #1, 4 Pistons
3. TDC Mark for #2, 3 Pistons

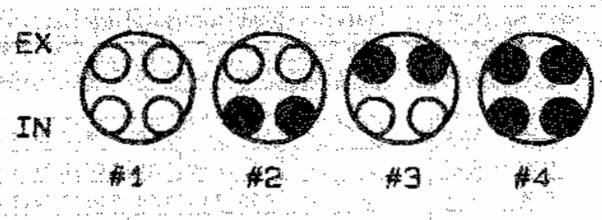
○Using a thickness gauge, measure the valve clearance between the cam and the valve lifter.



A. Cam
B. Valve Lifter
C. Measure here.

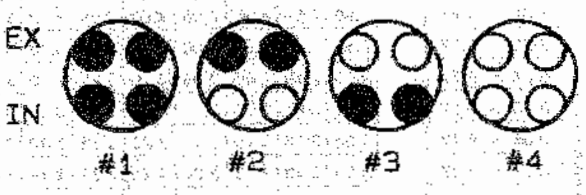
○**When positioning #4 piston TDC at the end of the compression stroke:**
Inlet valve clearance of #2 and #4 cylinders
Exhaust valve clearance of #3 and #4 cylinders

Measuring Valves ●



○**When positioning #1 piston TDC at the end of the compression stroke:**
Inlet valve clearance of #1 and #3 cylinders
Exhaust valve clearance of #1 and #2 cylinders

Measuring Valves ●



Valve Clearance

Standard: **IN. 0.15 ~ 0.24 mm**
EX. 0.22 ~ 0.31 mm

★If the valve clearance is not within the specified range, first record the clearance, and then adjust it .

●To change the valve clearance, remove the camshaft chain tensioner, the camshafts, and the valve lifters. Replace the shim with one of a different thickness.

○Mark and record the valve lifter and shim locations so they can be reinstalled in their original positions.

●To select a new shim which brings the valve clearance within the specified range, refer to the Valve Clearance Adjustment Charts.

●Apply a thin coat of molybdenum disulfide grease to the valve lifters.

●Install the camshafts. Be sure to time the camshafts properly (see Camshaft Installation).

○Remeasure any valve clearance that was adjusted. Readjust if necessary.

CAUTION

Do not put shim stock under the shim. This may cause the shim to pop out at high rpm, causing extensive engine damage.
Do not grind the shim. This may cause it to fracture, causing extensive engine damage.

●Install the pickup coil cover with the UP mark facing upward (see Electrical System chapter).

VALVE CLEARANCE ADJUSTMENT CHART

INLET VALVE

	PRESENT SHIM																				
PART No. (92180 -)	1014	1018	1018	1020	1022	1024	1026	1028	1030	1032	1034	1036	1038	1040	1042	1044	1046	1048	1050	1052	1054
MARK	50	55	60	65	70	75	80	85	90	95	00	05	10	15	20	25	30	35	40	45	50
THICKNESS (mm)	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50

Example

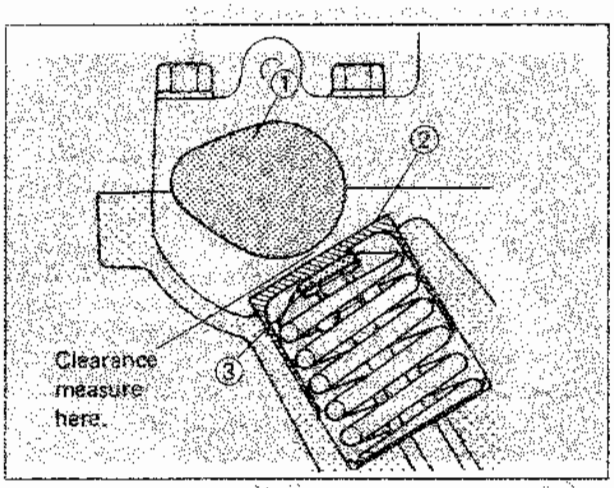
VALVE CLEARANCE MEASUREMENT (mm)

0.00 ~ 0.02					2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30
0.03 ~ 0.07				2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35
0.08 ~ 0.12			2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40
0.13 ~ 0.14		2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45
0.15 ~ 0.24	SPECIFIED CLEARANCE/NO CHANGE REQUIRED																				
0.25 ~ 0.27	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	
0.28 ~ 0.32	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50		
0.33 ~ 0.37	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50			
0.38 ~ 0.42	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50				
0.43 ~ 0.47	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50					
0.48 ~ 0.52	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50						
0.53 ~ 0.57	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50							
0.58 ~ 0.62	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50								
0.63 ~ 0.67	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50									
0.68 ~ 0.72	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50										
0.73 ~ 0.77	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50											
0.78 ~ 0.82	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50												
0.83 ~ 0.87	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50													
0.88 ~ 0.92	3.20	3.25	3.30	3.35	3.40	3.45	3.50														
0.93 ~ 0.97	3.25	3.30	3.35	3.40	3.45	3.50															
0.98 ~ 1.02	3.30	3.35	3.40	3.45	3.50																
1.03 ~ 1.07	3.35	3.40	3.45	3.50																	
1.08 ~ 1.12	3.40	3.45	3.50																		
1.13 ~ 1.17	3.45	3.50																			
1.18 ~ 1.22	3.50																				

INSTALL THE SHIM OF THIS THICKNESS (mm)

1. Measure the clearance (when engine cold).
2. Check present shim size.
3. Match clearance in vertical column with present shim size in horizontal column.
4. The shim specified where the lines intersect is the one that will give you the proper clearance.

Example : Present shim is **3.15 mm.**
Measured clearance is **0.35 mm.**
Replace **3.15 mm** shim with **3.30 mm** shim.



1. Cam
2. Valve Lifter
3. Shim

NOTE

○ *If there is no clearance, select a shim which is several sizes smaller and then measure the clearance.*

VALVE CLEARANCE ADJUSTMENT CHART

EXHAUST VALVE

	PRESENT SHIM ← Example																					
PART No. (92180 -)	1014	1016	1018	1020	1022	1024	1026	1028	1030	1032	1034	1036	1038	1040	1042	1044	1046	1048	1050	1052	1054
MARK	50	55	60	65	70	75	80	85	90	95	00	05	10	15	20	25	30	35	40	45	50
THICKNESS (mm)	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50

VALVE CLEARANCE MEASUREMENT (mm)	INSTALL THE SHIM OF THIS THICKNESS (mm)																				
0.00 ~ 0.04						2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25
0.05 ~ 0.09					2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30
0.10 ~ 0.14				2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35
0.15 ~ 0.19			2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40
0.20 ~ 0.21		2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45
0.22 ~ 0.31	SPECIFIED CLEARANCE/NO CHANGE REQUIRED																				
0.32 ~ 0.34	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	
0.35 ~ 0.39	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50		
0.40 ~ 0.44	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50			
0.45 ~ 0.49	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50				
0.50 ~ 0.54	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50					
0.55 ~ 0.59	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50						
0.60 ~ 0.64	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50							
0.65 ~ 0.69	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50								
0.70 ~ 0.74	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50									
0.75 ~ 0.79	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50										
0.80 ~ 0.84	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50											
0.85 ~ 0.89	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50												
0.90 ~ 0.94	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50													
0.95 ~ 0.99	3.20	3.25	3.30	3.35	3.40	3.45	3.50														
1.00 ~ 1.04	3.25	3.30	3.35	3.40	3.45	3.50															
1.05 ~ 1.09	3.30	3.35	3.40	3.45	3.50																
1.10 ~ 1.14	3.35	3.40	3.45	3.50																	
1.15 ~ 1.19	3.40	3.45	3.50																		
1.20 ~ 1.24	3.45	3.50																			
1.25 ~ 1.29	3.50																				

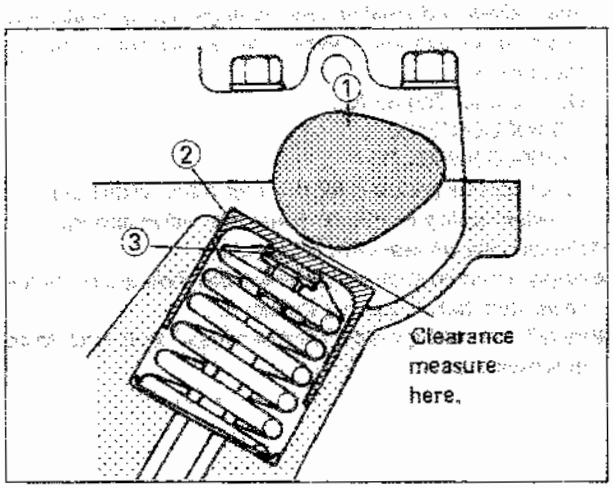
Example

1. Measure the clearance (when engine cold).
2. Check present shim size.
3. Match clearance in vertical column with present shim size in horizontal column.
4. The shim specified where the lines intersect is the one that will give you the proper clearance.

Example : Present shim is **3.10 mm**.
Measured clearance is **0.40 mm**.
Replace **3.10 mm** shim with **3.25 mm** shim.

NOTE

If there is no clearance, select a shim which is several sizes smaller and then measure the clearance.



1. Cam
2. Valve Lifter
3. Shim

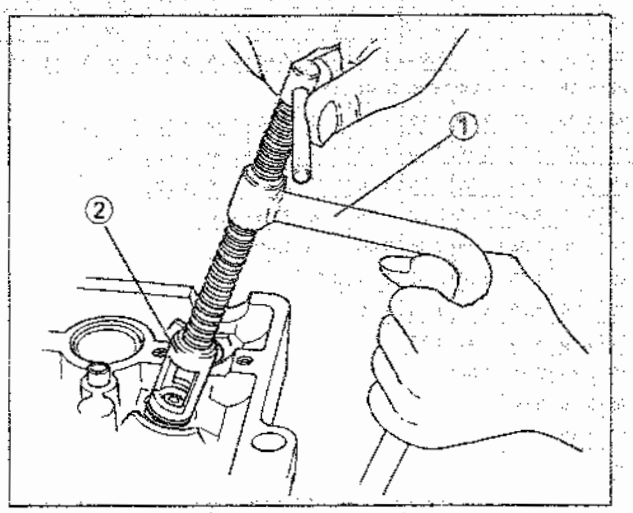
Valve Removal

● Remove the valve lifter and shim.

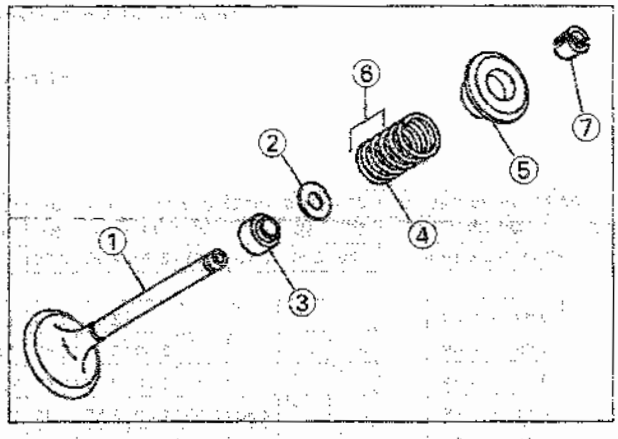
NOTE

○ *Mark and record the valve lifter and shim locations so they can be installed in their original positions.*

● Using the valve spring compressor assembly (special tool), remove the valve.



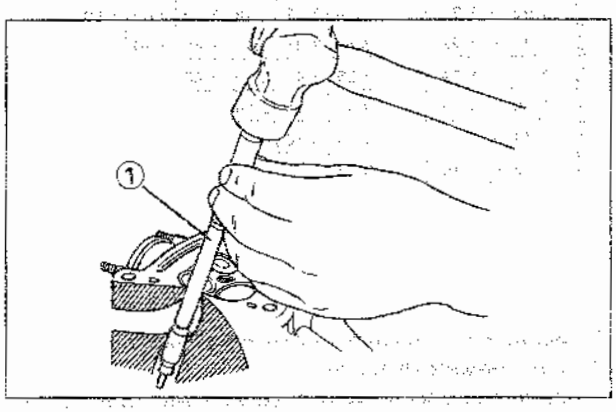
1. Valve Spring Compressor Assembly: 57001-241
2. Adapter: 57001-1154 (Exhaust)
   57001-1202 (Inlet)



1. Valve Stem
2. Spring Seat
3. Oil Seal
4. Spring
5. Retainer
6. Closed Coil End
7. Split Keepers

Valve Guide Removal

● Heat the area around the valve guide to about 120 ~ 150°C (248 ~ 302°F), and hammer lightly on valve guide arbor (special tool) to remove the guide from the top of the head.



1. Valve Guide Arbor: 57001-1331

Valve Installation

● Use larger valve springs, spring seats, and retainers for inlet valves and smaller valve springs, spring seats, and retainers for exhaust valves. Be careful not to mix up these parts.

○ On and after Engine No.
ZX600DE021420
ZX500CE000727
Dual springs are used for the inlet valve, install the smallest spring inside the larger inlet valve spring.

● Replace the oil seal with a new one.

● Apply a thin coat of molybdenum disulfide grease to the valve stem before valve installation.

● Install the springs so that the closed coil end faces downwards.

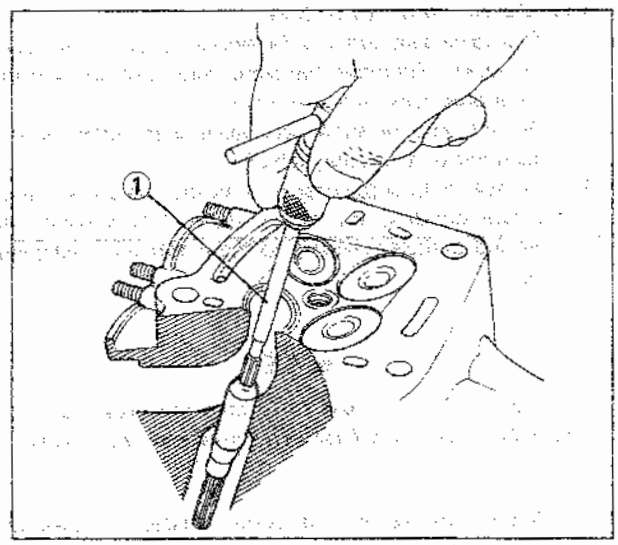
Valve Guide Installation

● Apply oil to the valve guide outer surface before installation.

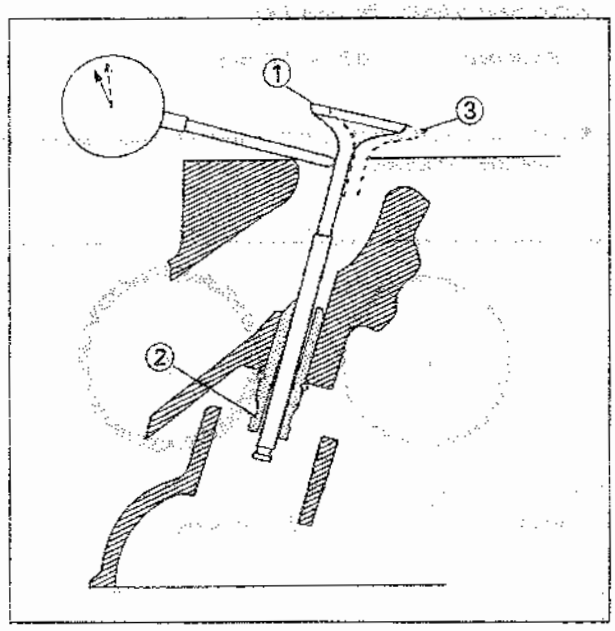
● Heat the area around the valve guide hole to about 120 ~ 150°C (248 ~ 302°F).

● Drive the valve guide in from the top of the head using the valve guide arbor (special tool: 57001-1331). The circlip stops the guide from going in too far.

● Ream the valve guide with valve guide reamer (special tool) even if the old guide is re-used.



1. Valve Guide Reamer: 57001-1333



1. New Valve
2. Valve Guide
3. Move the valve.

Measure Valve-to-Guide Clearance (Wobble Method)

If a small bore gauge is not available, inspect the valve guide wear by measuring the valve to valve guide clearance with the wobble method as indicated below.

- Insert a new valve into the guide and set a dial gauge against the stem perpendicular to it as close as possible to the cylinder head mating surface.
- Move the stem back and forth to measure valve/valve guide clearance.
- Repeat the measurement in a direction at a right angle to the first.

★If the reading exceeds the service limit, replace the guide.

NOTE

○*The reading is not actual valve/valve guide clearance because the measuring point is above the guide.*

Valve/Valve Guide Clearance (Wobble Method)

	Standard	Service Limit
Inlet	0.034 ~ 0.116 mm	0.33 mm
Exhaust	0.088 ~ 0.167 mm	0.37 mm

Valve Seat Outside Diameter

- If the outside diameter of the seating pattern on the valve seat is too large or too small, repair the valve seat.

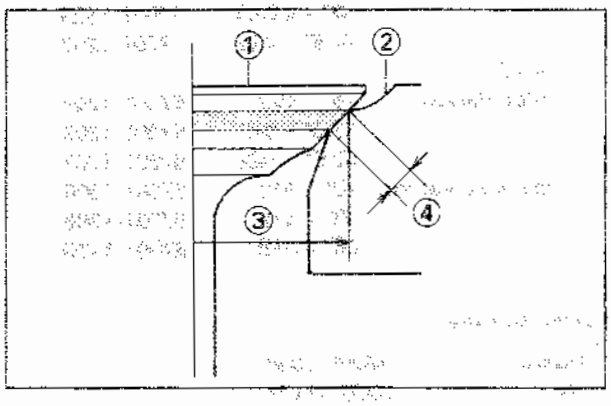
Valve Seat Outside Diameter

ZX600D	Inlet :	25.13 ~ 25.33 mm
	Exhaust :	21.13 ~ 21.33 mm
ZX500C	Inlet :	19.33 ~ 19.53 mm
	Exhaust :	15.73 ~ 15.93 mm

Valve Seat Width Inspection

- Check the valve seat width.

○Measure the seat width of the portion where there is no build-up carbon (white portion) of the valve seat with a vernier caliper.

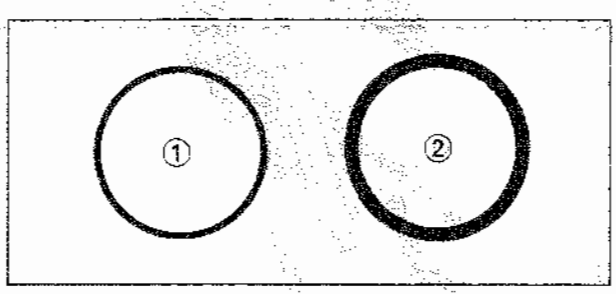


1. Valve
2. Valve Seat
3. Seating Surface Outside Diameter
4. Valve Seat Width

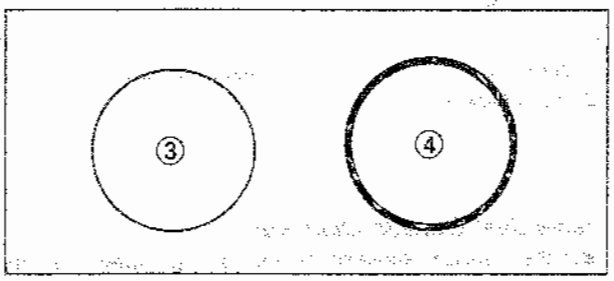
Valve Seat Width (IN and EX)

Standard: 0.5 ~ 1.0 mm

★If the valve seat width is not within the specified range, repair the valve seat.



1. Good 2. Too wide



3. Too narrow 4. Uneven

Valve Seat Repair (Valve Lapping)

●Using the valve seat cutters (special tools), repair the valve seat.

Valve Seat Cutters

ZX600D			
	Inlet Valves:	45° - φ27.5	57001-1114
		30° - φ28	57001-1119
		60° - φ25	57001-1328
	Exhaust Valves:	45° - φ24.5	57001-1113
		32° - φ23.5	57001-1329
		67.5° - φ22	57001-1207
ZX500C			
	Inlet Valves:	45° - φ22	57001-1205
		22.5° - φ21	57001-1309
		67.5° - φ22	57001-1207
	Exhaust Valves:	45° - φ18	57001-1306
		30° - φ18	57001-1308
		65° - φ19	57001-1310

Holder and Bar

Holder:	57001-1330
Bar:	57001-1128

★If the manufacturer's instructions are not available, use the following procedure.

Seat Cutter Operating Care:

1. This valve seat cutter is developed to grind the valve for repair. Therefore the cutter must not be used for other purposes than seat repair.
2. Do not drop or shock the valve seat cutter, or the diamond particles may fall off.
3. Do not fail to apply engine oil to the valve seat cutter before grinding the seat surface. Also wash off ground particles sticking to the cutter with washing oil.

NOTE

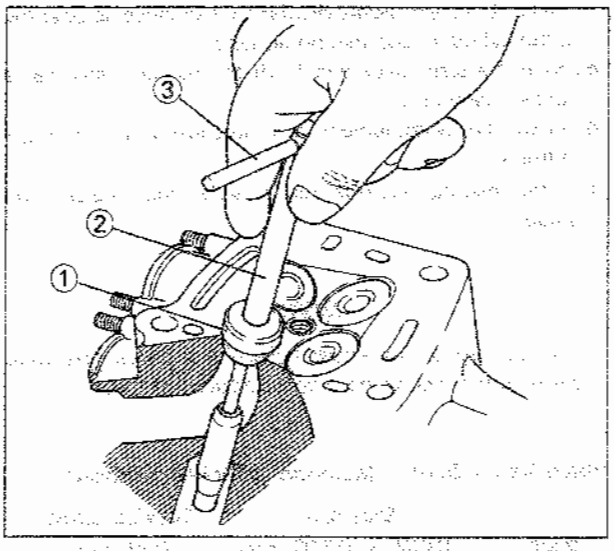
○*Do not use a wire brush to remove the metal particles from the cutter. It will take off the diamond particles.*

4. Setting the valve seat cutter holder in position, operate the cutter in one hand. Do not apply too much force to the diamond portion.

NOTE

○*Prior to grinding, apply engine oil to the cutter and during the operation, wash off any ground particles sticking to the cutter with washing oil.*

5. After use, wash it with washing oil and apply thin layer of engine oil before storing.



1. Cutter 3. Bar: 57001-1128
2. Cutter Holder: 57001-1330

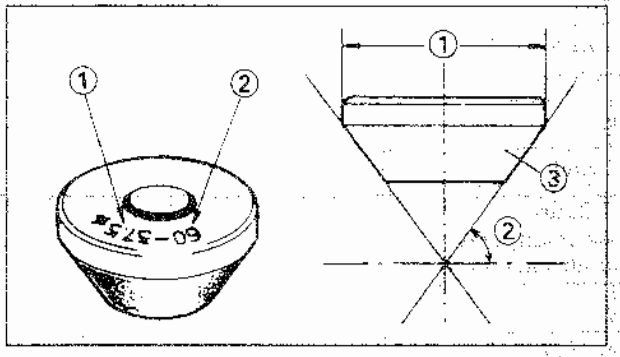
Marks Stamped on the Cutter:

The marks stamped on the back of the cutter represent the following.

60°.....Cutter angle

37.5φ.....Outer diameter of cutter

Cutter



1. Outer Diameter of Cutter
2. Angle of Cutter
3. Cutter

Operating Procedures:

- ●Clean the seat area carefully.
- ●Coat the seat with machinist's dye.
- ●Fit a 45° cutter into the holder and slide it into the valve guide.
- ●Press down lightly on the handle and turn it right or left. Grind the seating surface only until it is smooth.

CAUTION

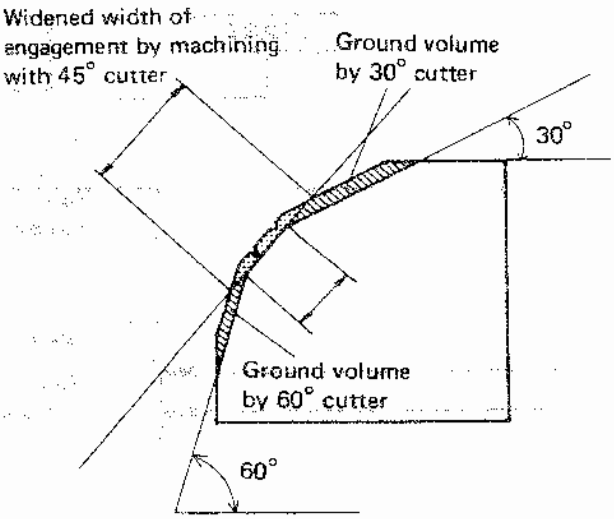
Do not grind the seat too much. Overgrinding will reduce valve clearance by sinking the valve into the head. If the valve sinks too far into the head, it will be impossible to adjust the clearance, and the cylinder head must be replaced.

- ●Measure the outside diameter of the seating surface with a vernier caliper.
- ★If the outside diameter of the seating surface is too small, repeat the 45° grind until the diameter is within the specified range.
- ★If the outside diameter of the seating surface is too large, make the 30° (32°, 22.5 °) grind described below.
- ★If the outside diameter of the seating surface is within the specified range, measure the seat width as described below.
- ●Grind the seat at a 30° (32°, 22.5°) angle until the seat O.D. is within the specified range.
- ○To make the 30° (32°, 22.5°) grind, fit a 30° (32°, 22.5°) cutter into the holder, and slide it into the valve guide.
- ○Turn the holder one turn at a time while pressing down very lightly. Check the seat after each turn.

CAUTION

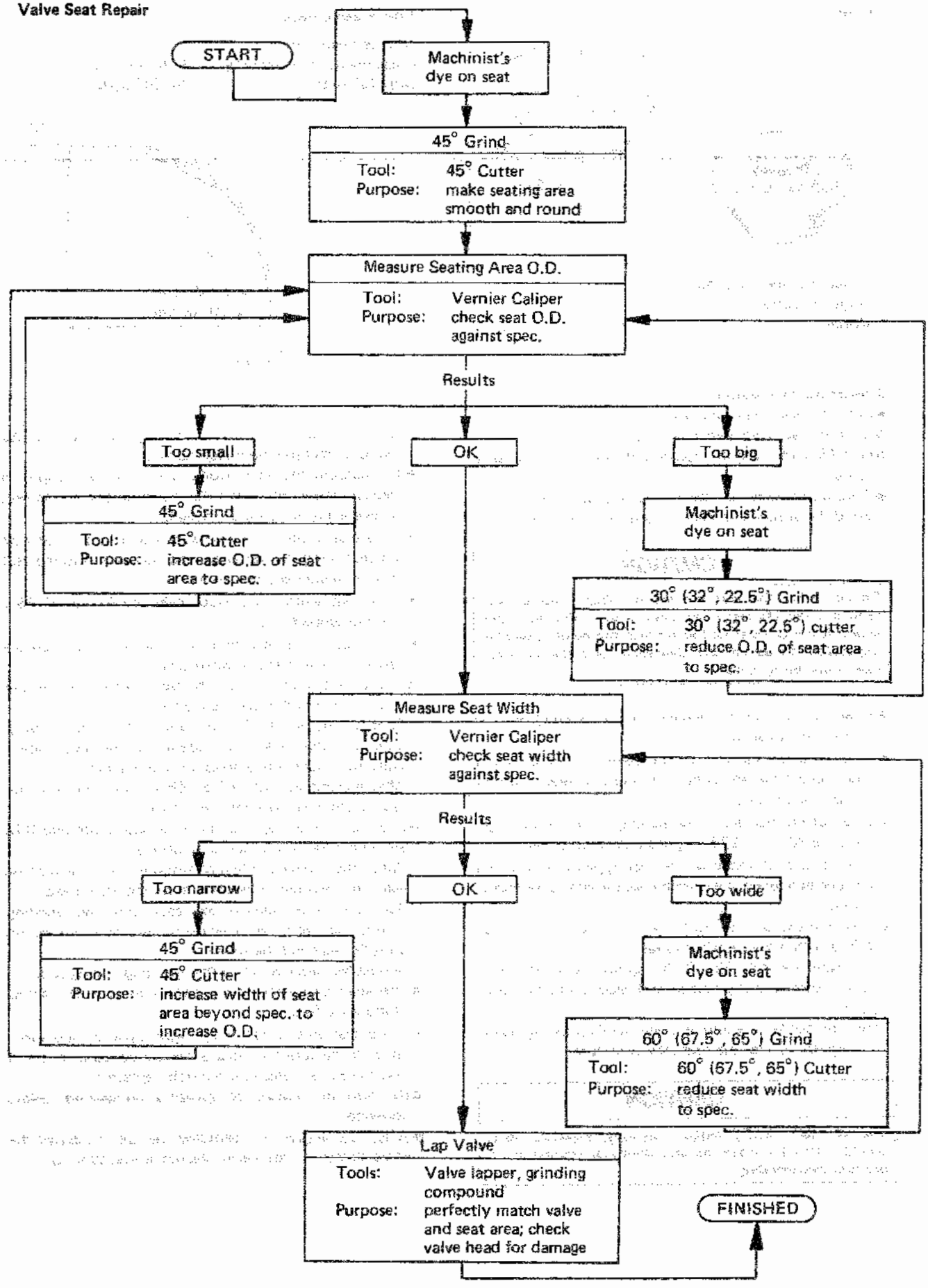
The 30° (32°, 22.5°) cutter removes material very quickly. Check the seat outside diameter frequently to prevent overgrinding.

Valve Seat Repair

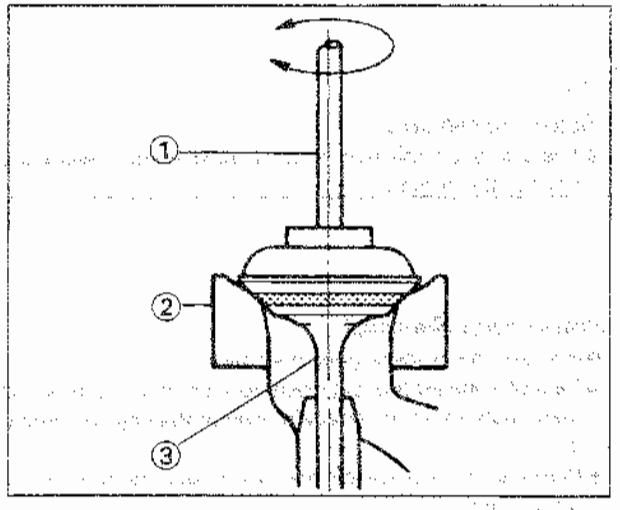


- ○After making the 30° (32°, 22.5°) grind, return to the seat O.D. measurement step above.
- ●To measure the seat width, use a vernier caliper to measure the width of the 45° angle portion of the seat at several places around the seat.
- ★If the seat width is too narrow, repeat the 45° grind until the seat is slightly too wide, and then return to the seat O.D. measurement step above.
- ★If the seat width is too wide, make the 60° (67.5°, 65°) grind described below.
- ★If the seat width is within the specified range, lap the valve to the seat as described below.
- ●Grind the seat at a 60° (67.5°, 65°) angle until the seat width is within the specified range.
- ○To make the 60° (67.5°, 65°) grind, fit 60° (67.5°, 65°) cutter into the holder, and slide it into the valve guide.
- ○Turn the holder, while pressing down lightly.
- ○After making the 60° (67.5°, 65°) grind, return to the seat width measurement step above.
- ●Lap the valve to the seat, once the seat width and O.D. are within the ranges specified above.
- ○Put a little coarse grinding compound on the face of the valve in a number of places around the valve head.
- ○Spin the valve against the seat until the grinding compound produces a smooth, matched surface on both the seat and the valve.
- ○Repeat the process with a fine grinding compound.
- ●The seating area should be marked about in the middle of the valve face.
- ★If the seat area is not in the right place on the valve, check to be sure the valve is the correct part. If it is, it may have been refaced too much; replace it.
- ●Be sure to remove all grinding compound before assembly.
- ●When the engine is assembled, be sure to adjust the valve clearance (see Valve Clearance Adjustment).

Valve Seat Repair



Valve Lapping



1. Lapper
2. Valve Seat
3. Valve

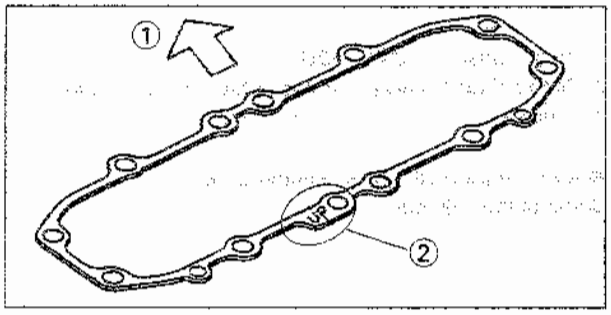
Cylinder, Pistons

Cylinder Removal

● Remove the following.
Cylinder Head (see Cylinder Head Removal)
Water Hose
Front Camshaft Chain Guide
● Remove the cylinder.

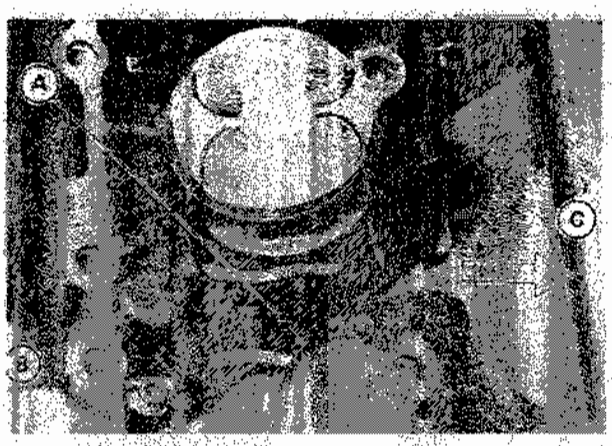
Cylinder Installation

● Install the new cylinder gasket so that the UP mark faces up as shown.



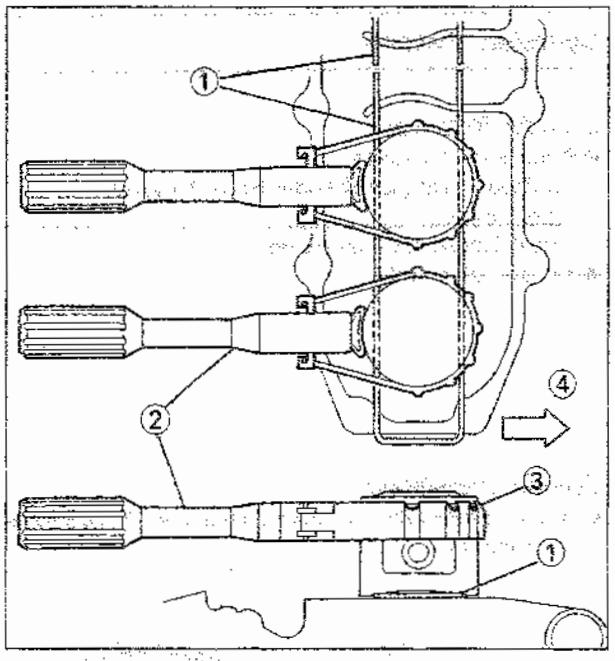
1. Front
2. UP Mark

○ Put the rear camshaft chain guide on the upper crankcase and install it with the holder. Note the direction of the holder.



A. Rear Chain Guide
B. Holder
C. Front

● Using the piston base and piston ring compressor assemblies (special tools), install the cylinder block.



1. Piston Base: 57001-1336
2. Piston Ring Compressor Assembly: 57001-1094
3. Chamfer 4. Front

- Apply engine oil to the cylinder bore.
- Install the cylinder.

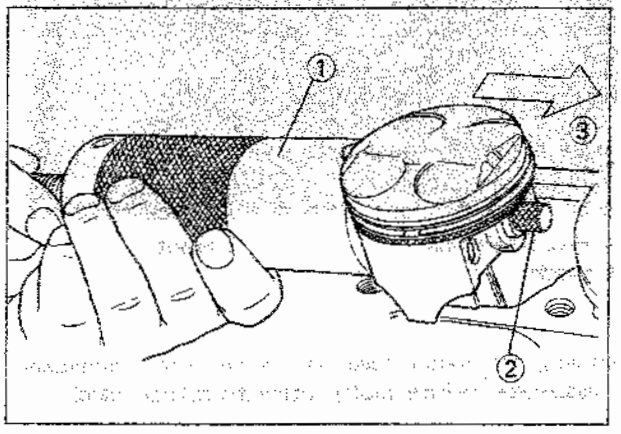
Piston Removal

- Remove the cylinder (see this chapter).
- Place a clean cloth under the pistons and remove the piston pin snap rings from the inside of each piston.

CAUTION

Do not reuse snap rings, as removal weakens and deforms them. They could fall out and score the cylinder wall.

- Using the piston pin puller assembly (special tool), remove the piston pins.



1. Piston Pin Puller Assembly: 57001-910
2. Adapter 3. Outside

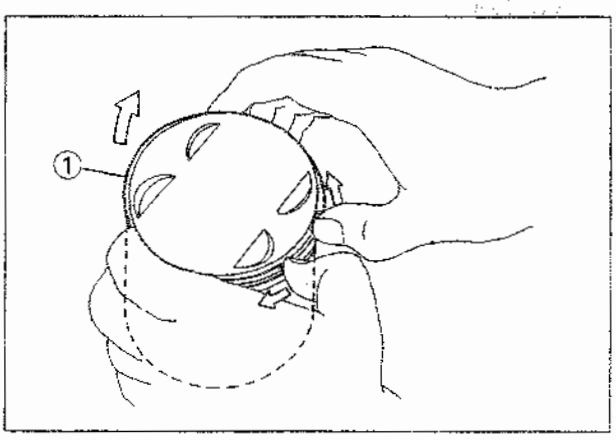
- Remove the piston.

Piston Installation

- The arrow on the piston head must point toward the front of the engine.

Piston Ring Removal

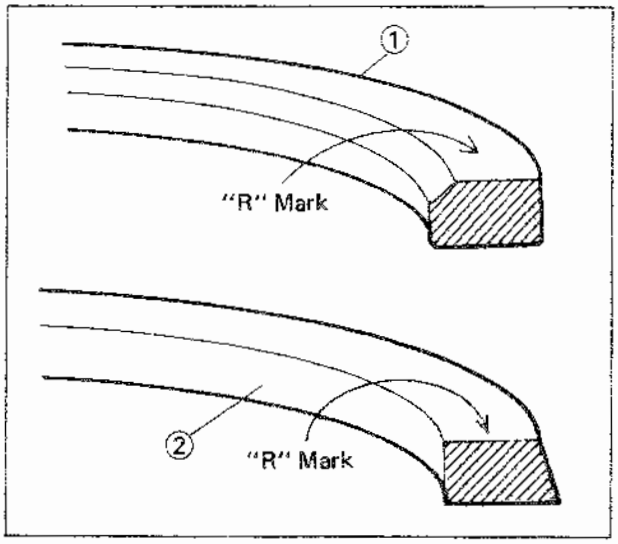
- Remove the cylinder (see this chapter).
- Carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring to remove it.
- Remove the 3-piece oil ring with your thumbs in the same manner.



1. Piston Ring

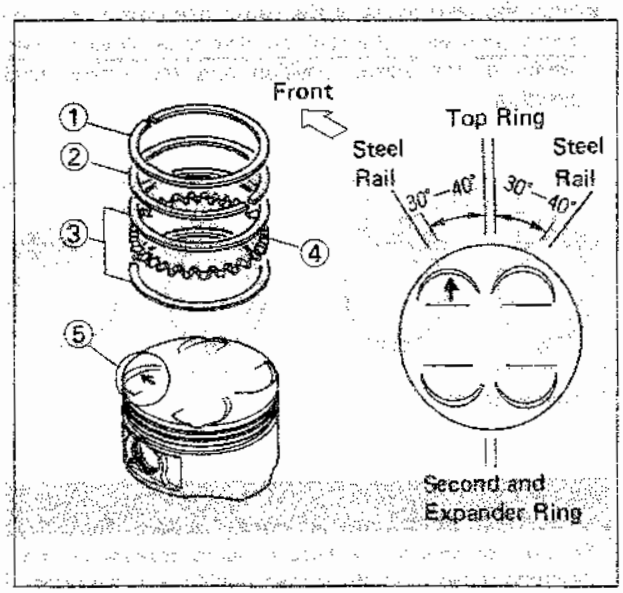
Piston Ring Installation

- The top and second rings must be installed with the R marks on the rings facing up.



1. Top Ring 2. Second Ring

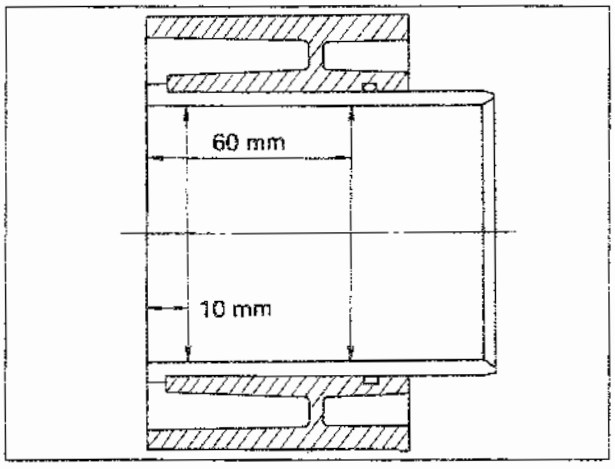
●The arrow on the piston head must point toward the front of the engine.
●The piston ring openings must be positioned as shown. The openings of the oil ring steel rails must be about 30 ~ 40° of angle from the opening of the top ring.



1. Top Ring
2. Second Ring
3. Oil Ring Steel Rails
4. Oil Ring Expander
5. Arrow

Cylinder Wear

●Measure the cylinder inside diameter taking a side-to-side and a front-to back measurement at each of the two positions (total of four measurements) shown below.



Cylinder Inside Diameter

ZX600D

Standard:	**64.000 ~ 64.012 mm**
Service Limit:	**64.10 mm**

ZX500C

Standard:	**57.500 ~ 57.512 mm**
Service Limit:	**57.60 mm**

Piston Wear

●Measure the piston outside diameter 5 mm up from the bottom of the piston at a right angle to the direction of the piston pin.

Piston Outside Diameter

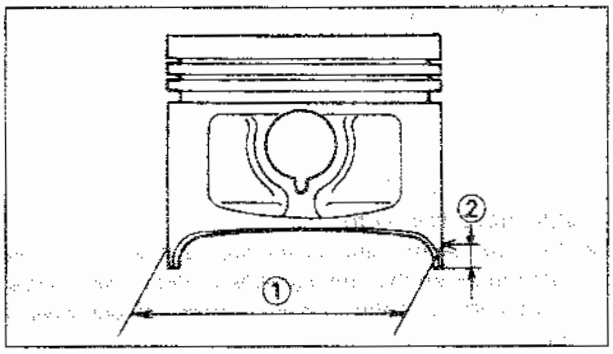
ZX600D

Standard:	**63.940 ~ 63.960 mm**
Service Limit:	**63.79 mm**

ZX500C

Standard:	**57.440 ~ 57.460 mm**
Service Limit:	**57.29 mm**

Piston Diameter Measurement



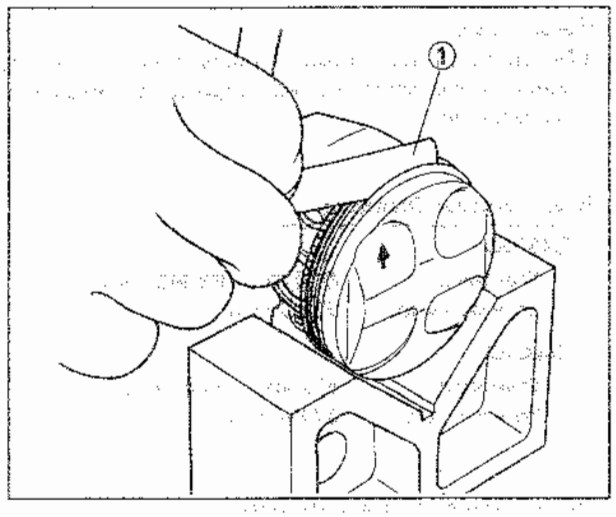
1. Piston Outside Diameter
2. 5mm up from bottom

Piston Ring, Piston Ring Groove Wear

●Check for uneven groove wear by inspecting the ring seats.
★The rings should fit perfectly parallel to the groove surfaces. If not, the piston must be replaced.
●With the piston rings in their grooves, make several measurements with a thickness gauge to determine piston ring/groove clearance.

Piston Ring/Groove Clearance

	Standard	Service Limit
Top:		
ZX600D	**0.03 ~ 0.07 mm**	**0.17 mm**
ZX500C	**0.05 ~ 0.09 mm**	**0.19 mm**
Second:	**0.03 ~ 0.07 mm**	**0.17 mm**



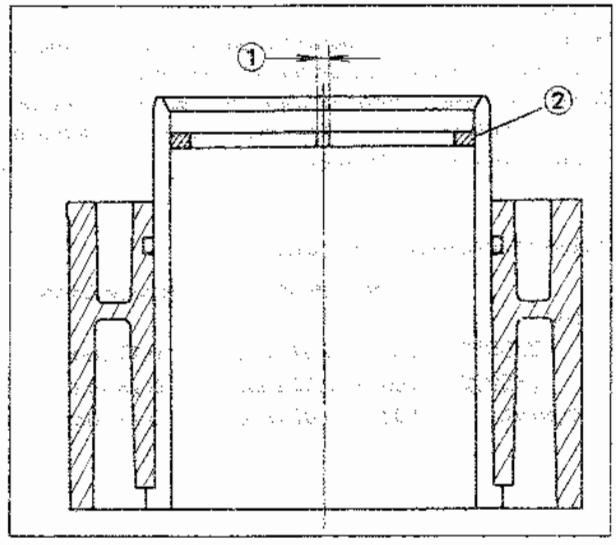
1. Thickness Gauge

Piston Ring End Gap

- Place the piston ring inside the cylinder, using the piston to locate the ring squarely in place. Set it close to the bottom of the cylinder, where cylinder wear is low.
- Measure the gap between the ends of the ring with a thickness gauge.

Piston Ring End Gap

	Standard	Service Limit
Top	0.15 ~ 0.30 mm	0.6 mm
Second	0.30 ~ 0.45 mm	0.75 mm

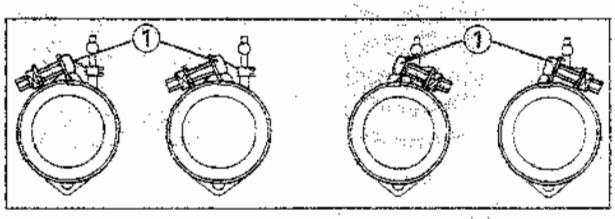


1. Gap 2. Piston Ring

Carburetor Holders

Installation

- Install the carburetor holder so that the pipe is upward.
- Align the tang areas of the carburetor clamp with the holder grooves and install the clamps as shown being careful of the screw position and the screw head direction.



1. Screw Heads

⚠WARNING

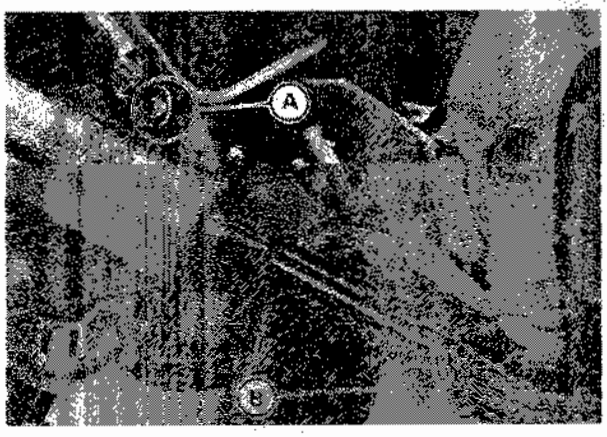
Be sure to install the holder clamp screws in the direction shown. Or, the screws could come in contact with the throttle linkage resulting in an unsafe riding condition.

- Install the holder hoses as shown in the Cable, Wire, and Hose Routing section of the General Information chapter.

Muffler, Exhaust Manifold

Muffler Removal

● Loosen the muffler clamp bolt.
● Remove the muffler mounting bolt and nut.



A. Muffler Mounting Bolt and Nut B. Clamp Bolt

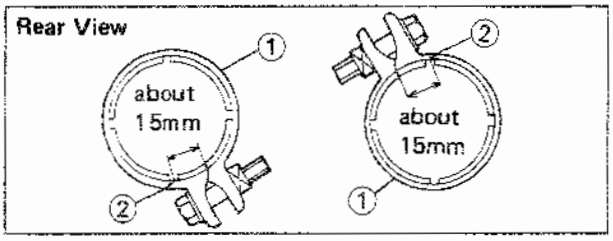
● Pull off the muffler to the rear.

Muffler Installation

● Check the gasket at the connection and replace it if damaged.
● Install the muffler clamps as follows.

Early Model

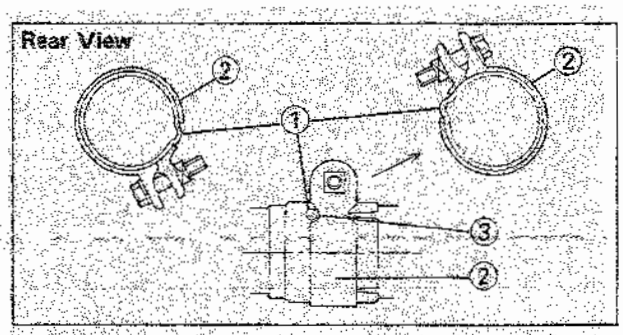
○ Install the clamps as shown, noting the position of the exhaust manifold slit.



1. Clamps 2. Slits

Late Model

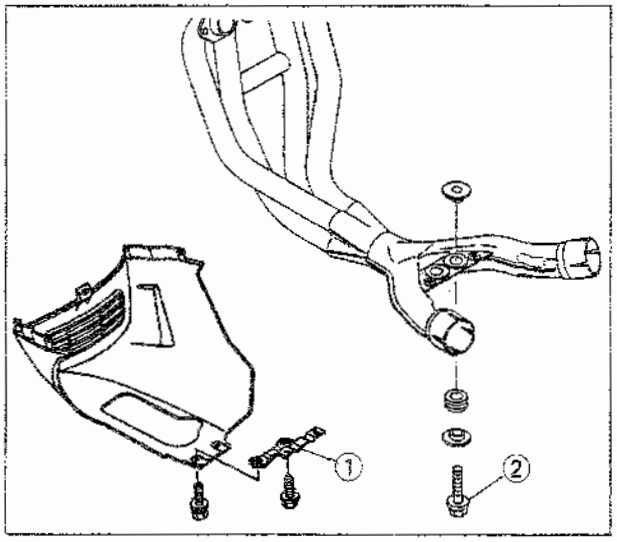
○ Install the clamps so that either groove fits the projection on the exhaust manifold.



1. Projection 3. Groove
2. Clamps

Exhaust Manifold Removal

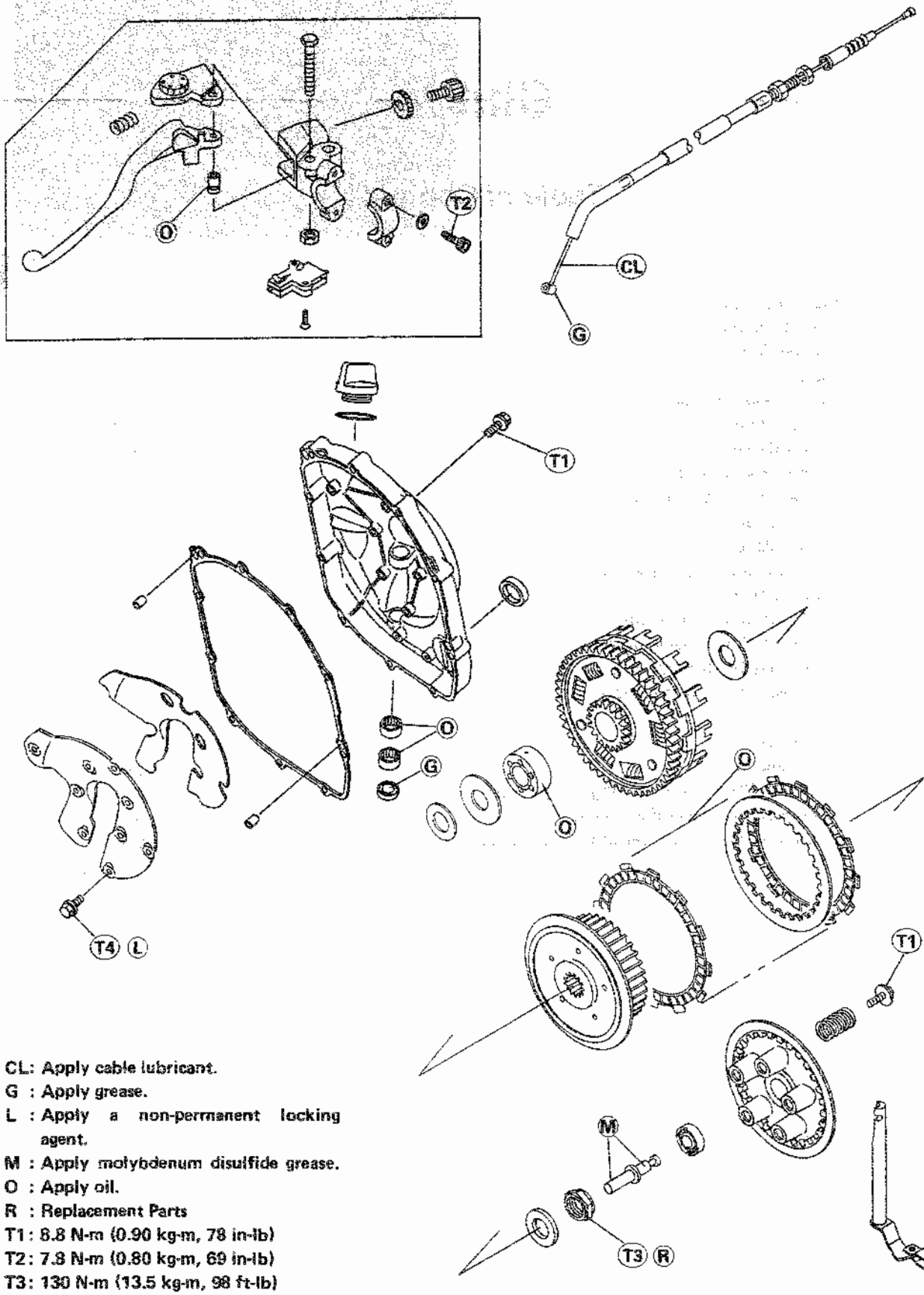
● Remove the following.
Muffler (see this chapter)
Lower Fairing (see Frame chapter)
Horn(s)
Oil Cooler (see Engine Lubrication System chapter)
Lower Fairing Bracket
Lower Exhaust Manifold Bolts



1. Lower Fairing Bracket
2. Lower Exhaust Manifold Bolts

● Remove the nuts and take off the exhaust manifold.

Exploded View



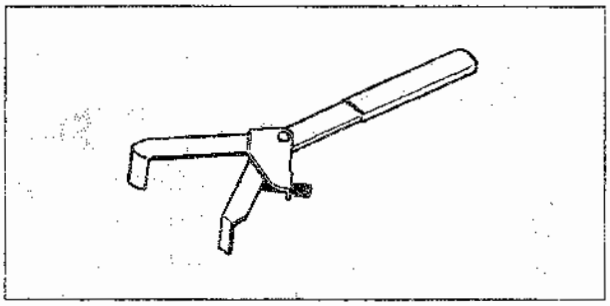
CL: Apply cable lubricant.
G : Apply grease.
L : Apply a non-permanent locking agent.
M : Apply molybdenum disulfide grease.
O : Apply oil.
R : Replacement Parts
T1: 8.8 N-m (0.90 kg-m, 78 in-lb)
T2: 7.8 N-m (0.80 kg-m, 69 in-lb)
T3: 130 N-m (13.5 kg-m, 98 ft-lb)
T4: 5.9 N-m (0.60 kg-m, 52 in-lb)

Specifications

Item	Standard	Service Limit
Clutch lever free play	2 ~ 3 mm	- - -
Friction plate thickness	2.9 ~ 3.1 mm	2.8 mm
Friction and steel plate warp	0.2 mm or under	0.3 mm
Clutch spring free length	33.6 mm	32.6 mm

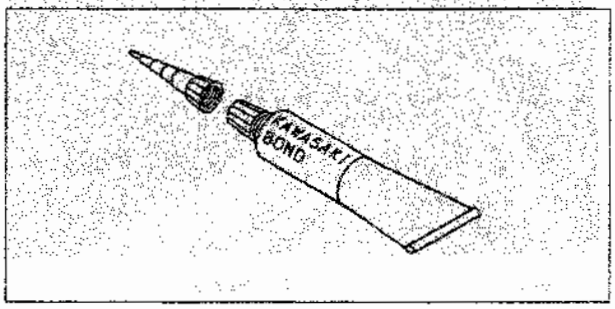
Special Tools

Clutch Holder: 57001-1243



Sealant

Kawasaki Bond (Silicone Sealant): 56019-120



Clutch Lever Adjuster

The adjuster has 5 positions so that the clutch lever position can be adjusted to suit the operator's hand.

Adjustment

●Push the lever forward and turn the adjuster to align the number with the triangular mark on the lever holder.

○The distance from the grip to the lever is minimum at Number **5** and maximum at Number **1**.



A. Mark B. Adjuster

Clutch Cable

Due to friction plate wear and clutch cable stretch over a long period of use, the clutch must be adjusted in accordance with the Periodic Maintenance Chart.

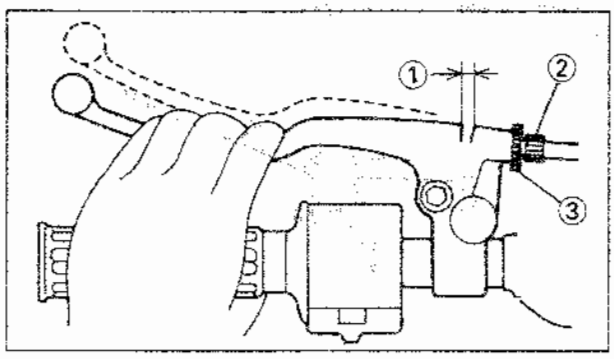
⚠WARNING

To avoid a serious burn, never touch the engine or exhaust pipe during clutch adjustment.

Free Play Check

●Pull the clutch lever just enough to take up the free play.

●Measure the gap between the lever and the lever holder.



1. Clutch Lever Free Play: 2 ~ 3 mm
2. Adjuster 3. Locknut

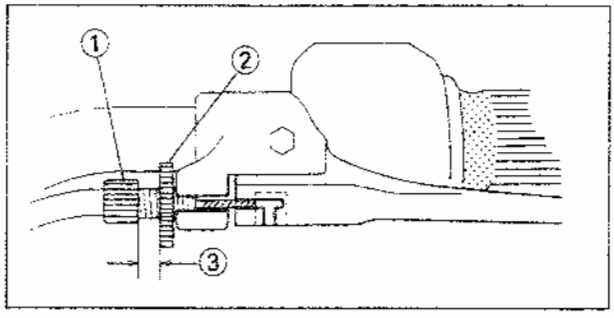
★If the gap is too wide, the clutch may not release fully. If the gap is too narrow, the clutch may not engage fully. In either case, adjust the clutch.

Free Play Adjustment

●Remove the following.
Lower Fairing (see Frame chapter)
Dust cover at the Clutch Cable Lower End

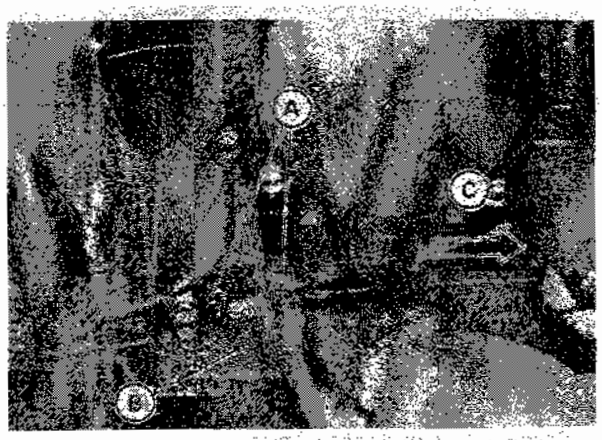
●Loosen the knurled locknut at the clutch lever.

●Turn the adjuster so that 5 ~ 6 mm of threads are visible.



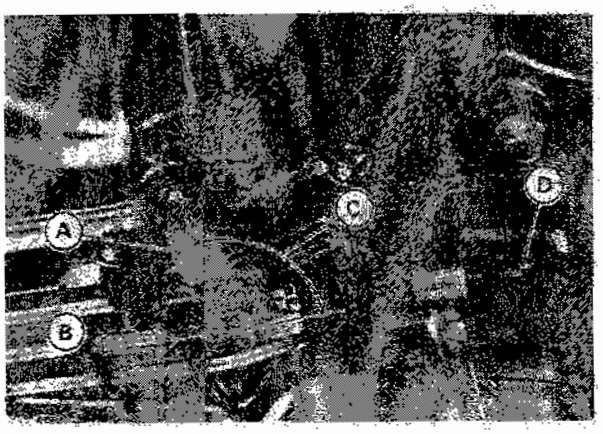
1. Adjuster 3. (5 ~ 6) mm
2. Knurled Locknut

●Loosen both adjusting nuts at the clutch cover as far as they will go.
●Pull the clutch outer cable tight and tighten the adjusting nuts against the bracket.



A. Adjusting Nuts
B. Bracket
C. Pull the outer cable.

●Slip the rubber dust cover back into place.
●Turn the adjuster at the clutch lever until the free play is correct.
●Tighten the knurled locknut at the clutch lever.
●Push the release lever toward the front of the motorcycle until it becomes hard to turn.
○At this time, the release lever should have the proper angle shown.



A. Release Lever
B. Push
C. 80 ~ 90°
D. Clutch Cable

★If the angle is wrong, check the clutch and release parts for wear.

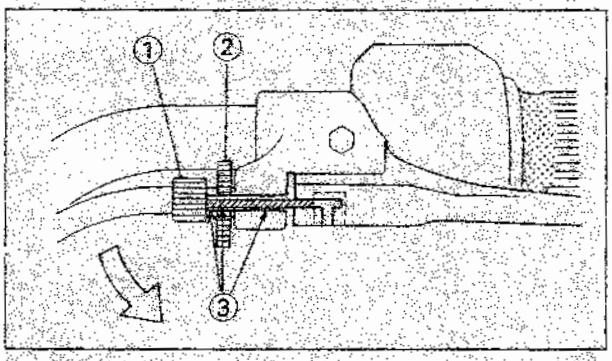
NOTE

○*Be sure that the outer cable end at the clutch lever is fully seated in the adjuster at the clutch lever, or it could slip into place later, creating enough cable play to prevent clutch disengagement.*

●After the adjustment, start the engine and check that the clutch does not slip and that it releases properly.

Removal

●Remove the lower fairing (see Frame chapter).
●Slide the dust cover at the clutch cable lower end out of place.
●Loosen the nuts, and slide the lower end of the clutch cable to give the cable plenty of play.
●Push the lever forward and turn the adjuster to align the Number **5** with the triangular mark on the lever holder.
●Loosen the knurled locknut at the clutch lever, and screw in the adjuster.
●Line up the slots in the clutch lever, knurled locknut, and adjuster, and then free the cable from the lever.



1. Adjuster
2. Knurled Locknut
3. Slots

●Free the clutch inner cable tip from the clutch release lever.

CAUTION

Do not remove the clutch release shaft unless it is absolutely necessary. If removed, oil will leak and the release shaft oil seal must be replaced with a new one.

●Push the release lever toward the front of the motorcycle and tape the release lever to the clutch cover to prevent the release shaft from falling out.
●Pull the clutch cable out of the frame.

Installation

●Run the clutch cable according to the Cable, Wire, and Hose Routing section of the General Information chapter.
●Adjust the clutch cable (see this chapter).

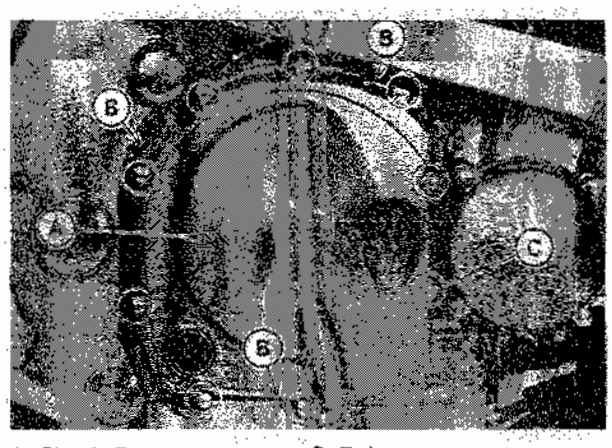
Lubrication and Inspection

●Lubricate the clutch cable using the pressure cable luber (special tool: K56019-021) in accordance with the Periodic Maintenance Chart.
●With the cable disconnected at both ends, the cable should move freely within the cable housing (see General Lubrication in the Appendix chapter).

Clutch Cover

Clutch Cover Removal

● Remove the following.
Engine Oil (drain, see Engine Lubrication System chapter)
Lower Fairing (see Frame chapter)
Clutch Cable Lower End (see this chapter)
Clutch Cover Mounting Bolts

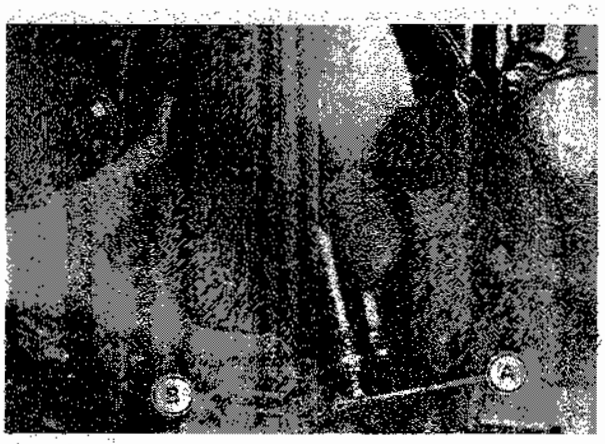


A. Clutch Cover
B. Pry Points
C. Bolts

CAUTION

Do not remove the clutch shaft unless it is absolutely necessary. If removed, the release shaft oil seal replacement may be required.

● Turn the release lever toward the rear as shown, and remove the clutch cover.

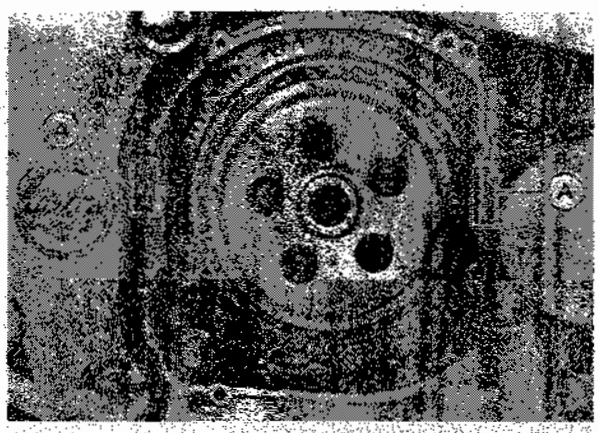


A. Release Lever
B. Rear

● Tape the release lever to prevent the release shaft from falling out.

Clutch Cover Installation

● Apply silicone sealant to the crankcase halve mating surface on the front and rear sides of the cover mount.



A. Silicone Sealant Applied Areas

● Replace the cover gasket.
● Tighten the cover bolts to the specified torque (see Exploded View).
● Run the pickup coil lead correctly (see General Information chapter).
● Fill the engine with engine oil (see Engine Lubrication System chapter).

Release Shaft Removal

CAUTION

Do not remove the clutch release lever and shaft assembly unless it is absolutely necessary. If removed, the oil seal replacement may be required.

● Remove the clutch cover (see this chapter).
● Pull the lever and shaft assembly out of the clutch cover.

Release Shaft Installation

● Apply high-temperature grease to the oil seal lips on the lower ridege of the clutch cover.
● Apply oil to the bearing in the hole of the clutch cover.
● Apply oil to the release shaft.
● Install the clutch cover (see this chapter).
● Turning the release lever toward the rear, insert the release shafts straight into the lower hole of the clutch cover.

CAUTION

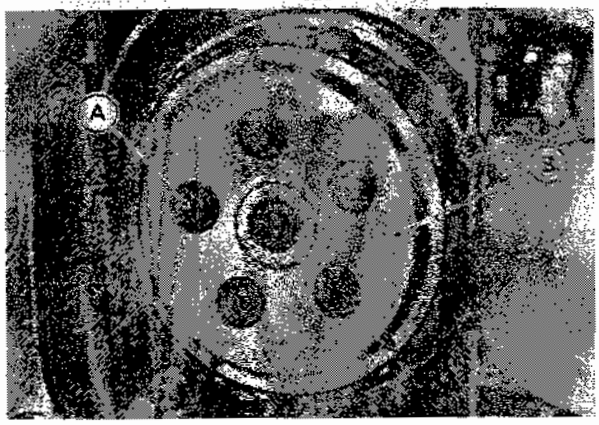
When inserting the release shaft, be careful not to remove the spring of the oil seal.

● Turn the release lever towards the front of the motorcycle until it becomes hard to turn.

Clutch

Removal

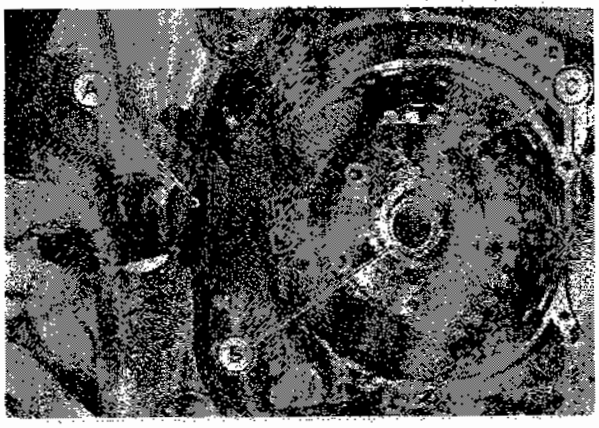
● Remove the following.
Clutch Cover (see this chapter)
Clutch Springs and Bolts
Clutch Spring Plate (with thrust bearing and pusher)



A. Clutch Spring Bolts B. Clutch Spring Plate

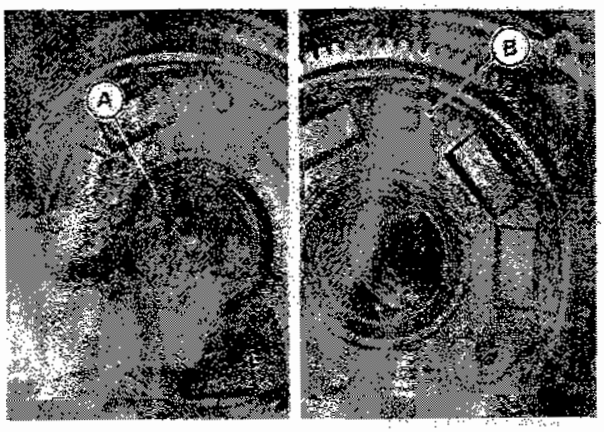
Friction Plates and Steel Plates

● Using the clutch holder (special tool), hold the clutch hub to remove the nut and the hub.



A. Clutch Holder: 57001-1243 C. Clutch Hub
B. Clutch Hub Nut

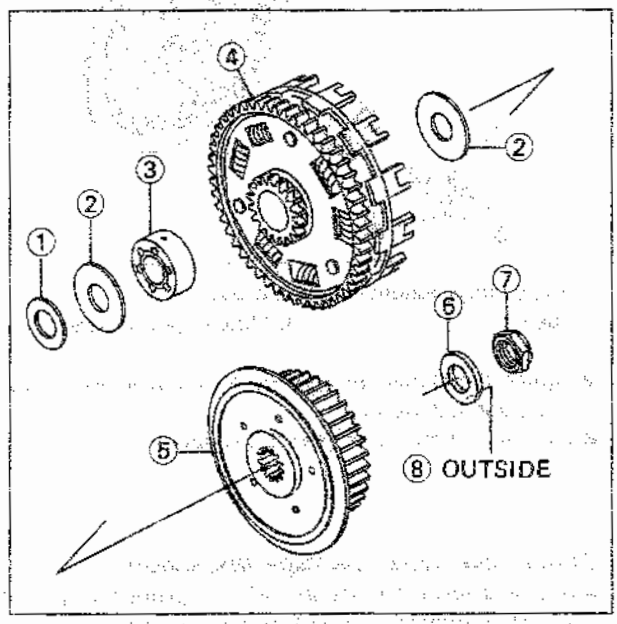
● Using the two 8 mm bolts, pull out the sleeve.
● Remove the clutch housing.



A. Sleeve B. Clutch Housing

Installation

● Install the following on the drive shaft.
○ Install the washer of the clutch hub nut so that the OUTSIDE mark faces out.



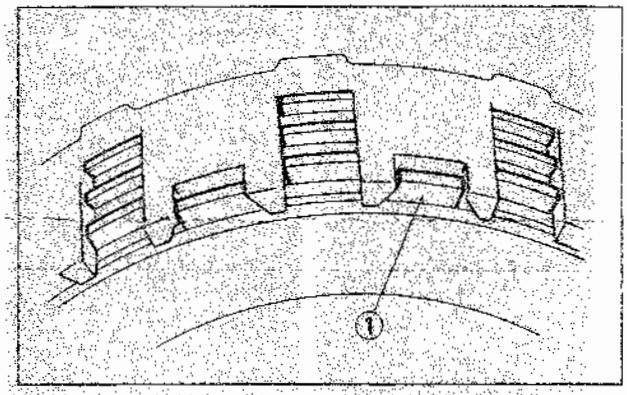
1. Small Washer
2. Large Washer
3. Sleeve
4. Clutch Housing
5. Clutch Hub
6. Washer
7. Nut
8. Outside Mark

● Discard the used clutch hub nut, and install a new nut.
● Tighten the clutch hub nut to the specified torque (see Exploded View).

CAUTION

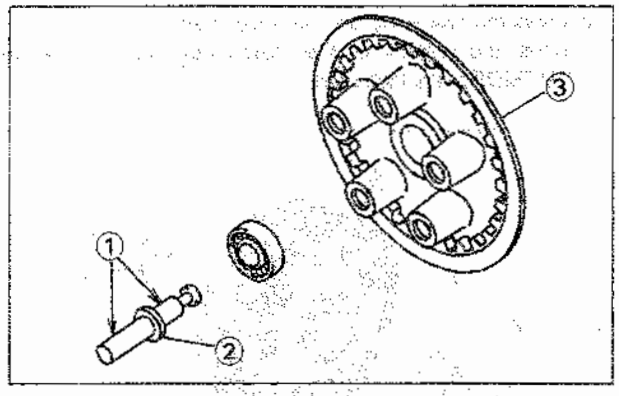
If new dry friction plates and steel plates are installed, apply engine oil to the surfaces of each plate to avoid clutch plate seizure.

○ Install the last friction plate fitting the tangs in the groove on the housing as shown.



1. Last Friction Plate

● Apply molybdenum disulfide grease to the pusher end and install the pusher and bearing in the clutch spring plate.

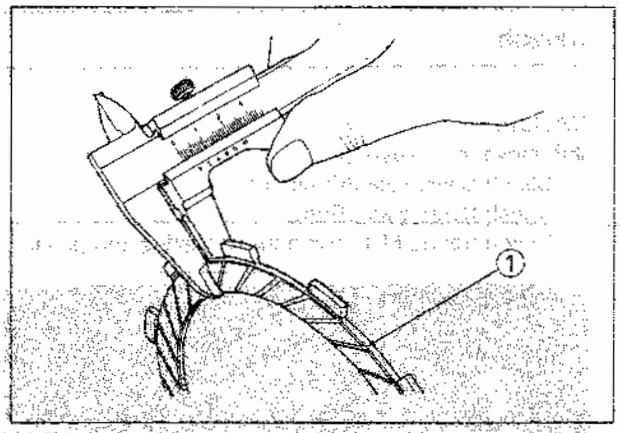


1. Appiy molybdenum disulfide grease.
2. Pusher
3. Clutch Spring Plate

● Tighten the clutch spring bolts to the specified torque (see Exploded View).
● Install the clutch cover (see this chapter).

Clutch Plate Wear, Damage Inspection

● Visually inspect the friction and steel plates for signs of seizure, overheating (discoloration), or uneven wear.
● Measure the thickness of the friction plates at several points.



1. Friction Plate

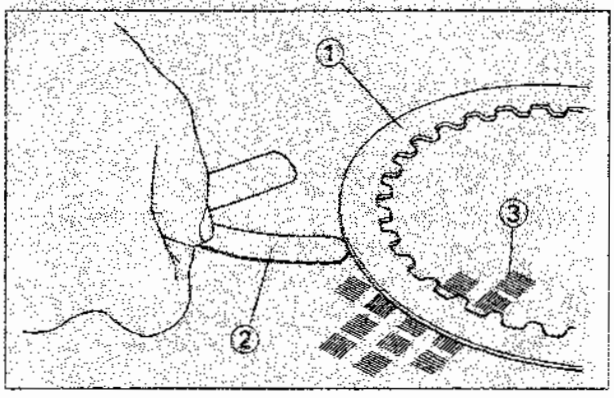
Friction Plate Thickness

Standard:	**2.9 ~ 3.1 mm**
Service Limit:	**2.8 mm**

★ If any plates show signs of damage, or if they have worn past the service limit, replace them with new ones.

Friction and Steel Plate Warp

★ If any plate is warped over the service limit, replace the plates as a set.



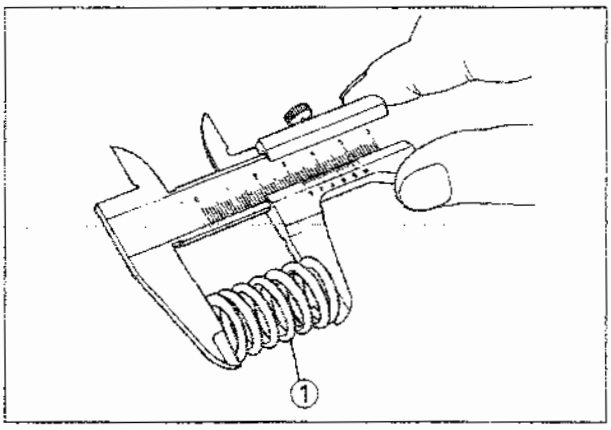
1. Friction or Steel Plate
2. Thickness Gauge
3. Surface Plate

Friction and Steel Plate Warp

Standard:	**0.2 mm or under**
Service Limit:	**0.3 mm**

Clutch Spring Free Length Measurement

★ If any of spring is shorter than the service limit, it must be replaced.



1. Clutch Spring

Clutch Spring Free Length

Standard:	**33.6 mm**
Service Limit:	**32.6 mm**



Engine Lubrication System

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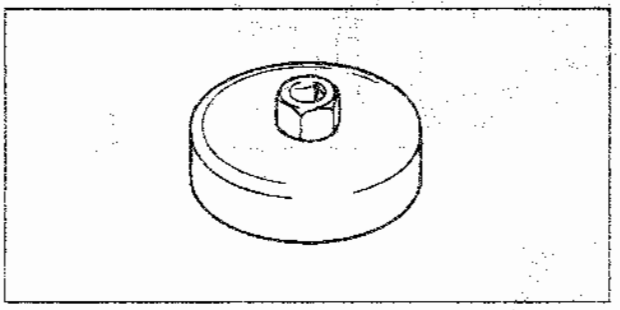
6-6 ENGINE LUBRICATION SYSTEM

Specifications

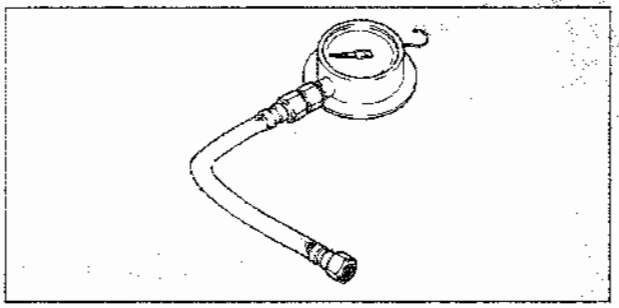
Item	Standard
Engine Oil:	
Grade	SE or SF class
Viscosity	SAE 10W-40, 10W-50, 20W-40, or 20W-50
Capacity	2.8 L (when filter is not removed) 3.2 L (when filter is removed) 3.7 L (when engine is completely dry)
Oil Pressure Measurement:	
Oil Pressure @4,000 r/min (rpm), oil temp. 90°C (194°F)	410 ~ 470 kPa (4.2 ~ 4.8 kg/cm², 60 ~ 68 psi)

Special Tools

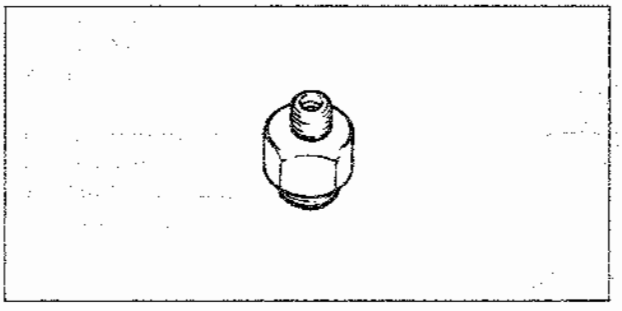
Oil Filter Wrench: 57001-1249



Oil Pressure Gauge, 10 kg/cm²: 57001-164

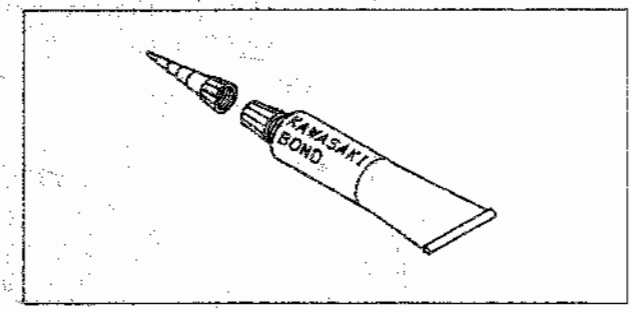


Oil Pressure Gauge Adapter, M18 x 1.5: 57001-1278



Sealant

Kawasaki Bond (Silicone Sealant): 56019-120



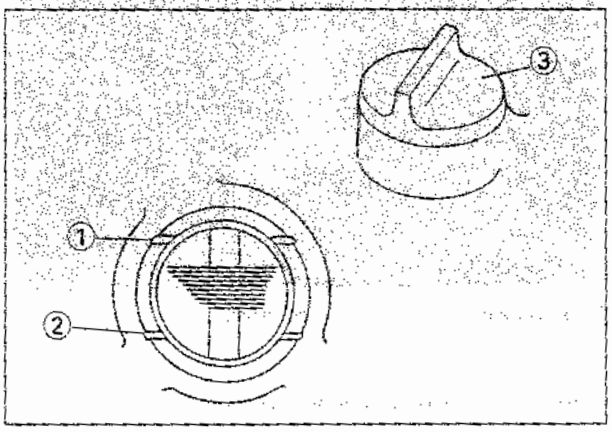
Engine Oil and Oil Filter

⚠WARNING

Motorcycle operation with insufficient, deteriorated, or contaminated engine oil will cause accelerated wear and may result in engine or transmission seizure, accident, and injury.

Oil Level Inspection

● Support the motorcycle perpendicular to the ground.
● Check that the engine oil level is between the upper and lower levels in the gauge.



1. Upper Level
2. Lower Level
3. Oil Filler Opening Plug

NOTE

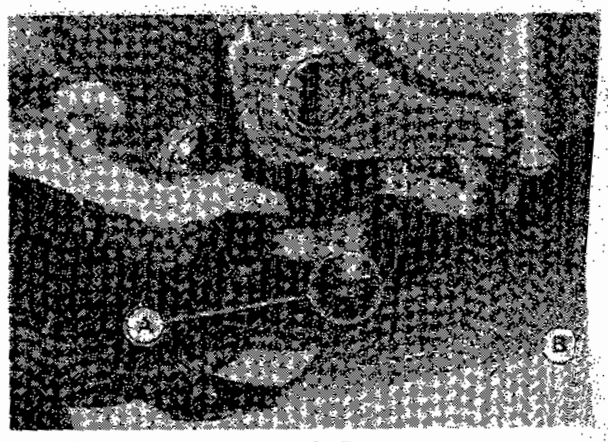
○ *Situate the motorcycle so that it is perpendicular to the ground.*
○ *If the motorcycle has just been used, wait several minutes for all the oil to drain down.*
○ *If the oil has just been changed, start the engine and run it for several minutes at idle speed. This fills the oil filter with oil. Stop the engine, then wait several minutes until the oil settles.*

CAUTION

Racing the engine before the oil reaches every part can cause engine seizure.
If the engine oil gets extremely low or if the oil pump or oil passages clog up or otherwise do not function properly, the oil pressure warning light will light. If this light stays on when the engine is running above idle speed, stop the engine immediately and find the cause.

Engine Oil Change

● Support the motorcycle perpendicular to the ground after warming up the engine.
● Remove the engine drain plug to drain the oil.



A. Drain Plug B. Front

○ The oil in the filter can be drained by removing the filter (see Oil Filter Change).
★ Replace the drain plug gasket with a new one if it is damaged.
● Tighten the drain plug to the specified torque (see Exploded View).
● Pour in the specified type and amount of oil.

Engine Oil

Grade:	**SE or SF class**
Viscosity:	**SAE 10W-40, 10W-50, 20W-40, or 20W-50**
Amount:	**3.7 L (engine is completely dry)**
	3.2 L (filter is removed)
	2.8 L (filter is not removed)

Oil Filter Change

● Remove the following.
Lower Fairing (see Frame chapter)
Engine Oil (see Engine Oil Change)
● Remove the oil filter with the oil filter wrench (special tool).



A. Oil Filter B. Oil Filter Wrench: 57001-1249

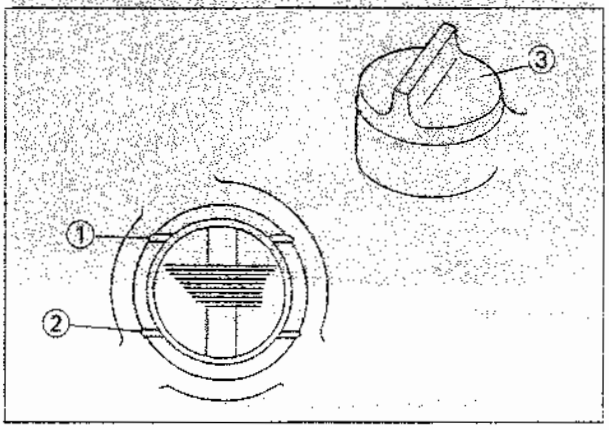
Engine Oil and Oil Filter

⚠WARNING

Motorcycle operation with insufficient, deteriorated, or contaminated engine oil will cause accelerated wear and may result in engine or transmission seizure, accident, and injury.

Oil Level Inspection

- Support the motorcycle perpendicular to the ground.
- Check that the engine oil level is between the upper and lower levels in the gauge.



1. Upper Level
2. Lower Level
3. Oil Filler Opening Plug

NOTE

○ Situate the motorcycle so that it is perpendicular to the ground.

○ If the motorcycle has just been used, wait several minutes for all the oil to drain down.

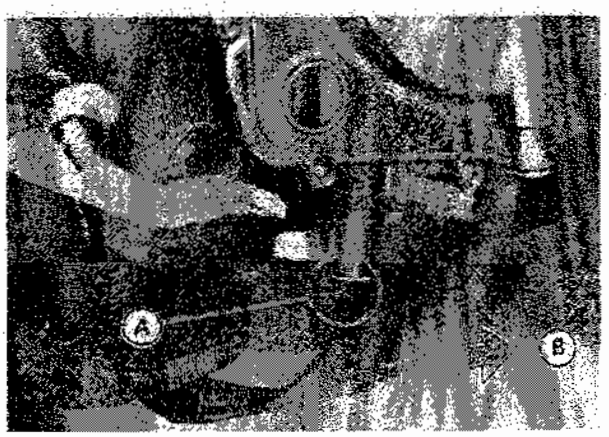
○ If the oil has just been changed, start the engine and run it for several minutes at idle speed. This fills the oil filter with oil. Stop the engine, then wait several minutes until the oil settles.

CAUTION

Racing the engine before the oil reaches every part can cause engine seizure.
If the engine oil gets extremely low or if the oil pump or oil passages clog up or otherwise do not function properly, the oil pressure warning light will light. If this light stays on when the engine is running above idle speed, stop the engine immediately and find the cause.

Engine Oil Change

- Support the motorcycle perpendicular to the ground after warming up the engine.
- Remove the engine drain plug to drain the oil.



A. Drain Plug B. Front

○ The oil in the filter can be drained by removing the filter (see Oil Filter Change).

★ Replace the drain plug gasket with a new one if it is damaged.

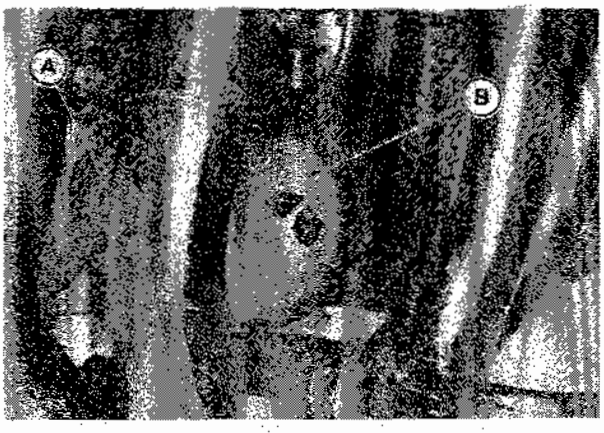
- Tighten the drain plug to the specified torque (see Exploded View).
- Pour in the specified type and amount of oil.

Engine Oil

Grade: SE or SF class
Viscosity: SAE 10W-40, 10W-50, 20W-40, or 20W-50
Amount: 3.7 L (engine is completely dry)
3.2 L (filter is removed)
2.8 L (filter is not removed)

Oil Filter Change

- Remove the following.
  Lower Fairing (see Frame chapter)
  Engine Oil (see Engine Oil Change)
- Remove the oil filter with the oil filter wrench (special tool).



A. Oil Filter B. Oil Filter Wrench: 57001-1249

●Replace the filter with a new one.
●When installing the oil filter, be careful of the following.
○Apply oil to the gasket before installation.
○Tighten the filter with the oil filter wrench (special tool) to the specified torque (see Exploded View) or tighten it with hands about ¾ turns after gasket contacts the mounting surface of engine.
●Pour in the specified type and amount of oil.

Oil Pan

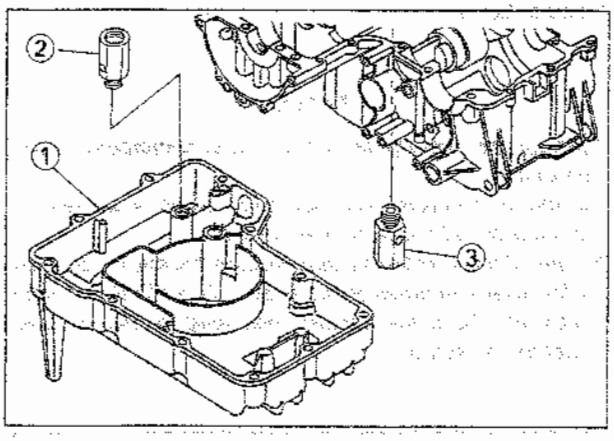
Removal

●Set the motorcycle up on its center stand.
●Remove the following.
Lower Fairings (see Frame chapter)
Engine Oil (Drain, see this chapter)
Clutch Cable Lower End (see Clutch chapter)
Oil Cooler (see this chapter)
Exhaust Manifold (see Engine Top End chapter)
Oil Hoses
●Remove the oil pan bolts and take off the oil pan.
○The clutch cable comes off.
●Remove the oil screen.



A. Oil Screen B. Front

○Remove the relief valves as necessary.



1. Oil Pan
2. Relief Valve for Oil Cooler and Transmission
3. Relief Valve for Main Oil Passage

Installation

● Installation is the reverse of removal. Note the following.

● Clean the oil screen.

● Apply a non-permanent locking agent to the threads of the relief valves and tighten them to the specified torque (see Exploded View).

● Replace the oil pan gasket with a new one.

● Replace the O-rings with new ones if they are damaged. The O-rings between the oil pan and the crankcase must be installed with the flat side facing to the crankcase.

● Tighten the oil pan bolts to the specified torque (see Exploded View).

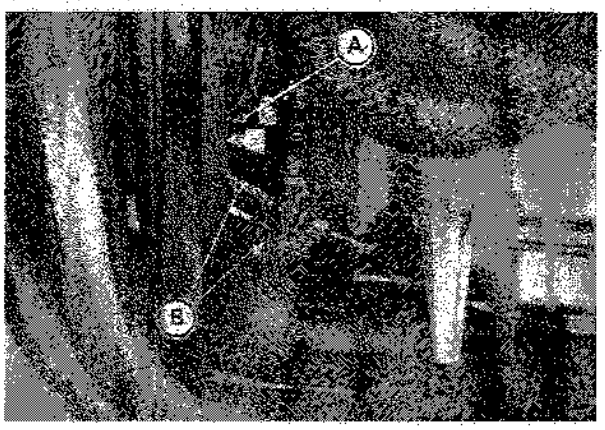


A. Oil Pan
B. Bolts
C. Oil Hoses
D. Clutch Cable Bracket

● Replace the washer on each side of the oil hose banjo bolts with a new one.

● To prevent O-ring damage, grease the O-rings on the oil hose flange.

● Install the oil hoses on the oil pan so that the hoses do not touch the exhaust pipes.



A. Oil Hose (to the cylinder head)
B. Oil Hoses (to the oil cooler)

● Tighten the banjo bolts and the flange bolts to the specified torque (see Exploded View).

● Adjust the clutch cable (see Clutch chapter).

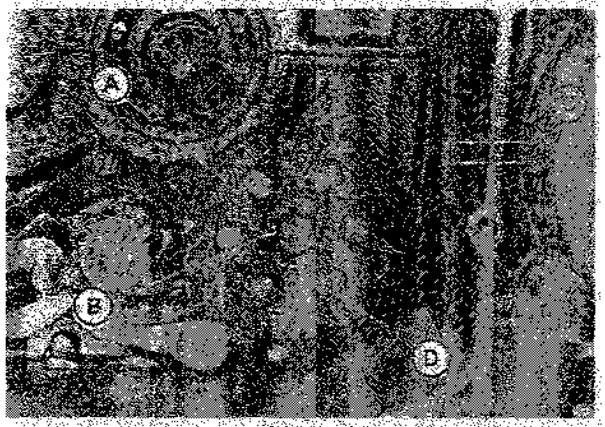
Oil Pump

Removal

● Remove the following.
Clutch (see Clutch chapter)
Oil Pump Gear Circlip
Oil Pump Gear
Oil Pump Gear Drive Pin

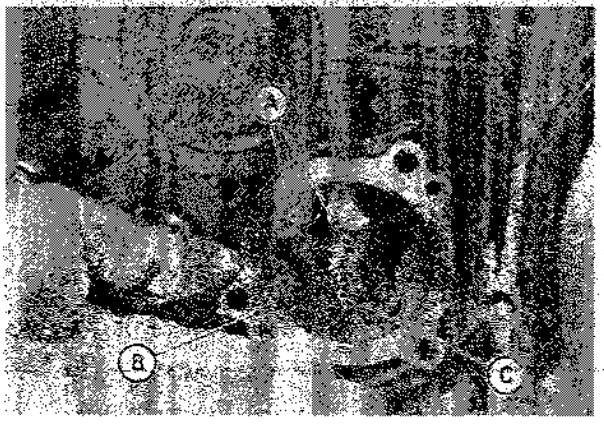
CAUTION

When removing the oil pump gear, be careful not to let the gear drive pin fall out into the crankcase half.



A. Oil Pump Gear
B. Gear Drive Pin
C. Front
D. Circlip

Oil Pump Cover
Oil Pump Outside Rotors
Oil Pump Housing



A. Outside Rotors
B. Housing
C. Shaft

● Remove the oil pump shaft and inside rotors.

Installation

● Installation is the reverse of removal. Note the following.

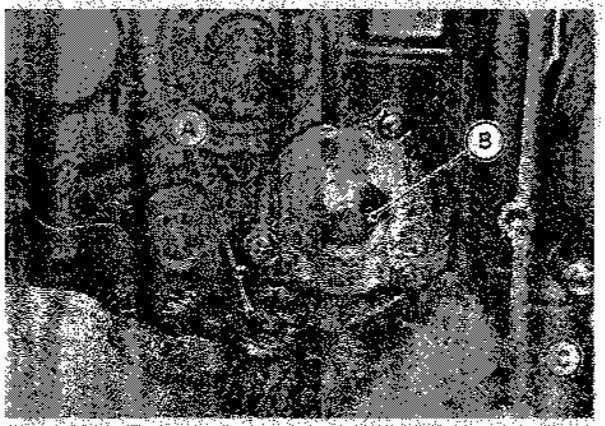
● Install the inside rotors and oil pump shaft into the crankcase.

● Turn the oil pump shaft so that the pump shaft projection fits the slot in the end of the water pump shaft slot.



A. Inside Rotors B. Pump Shaft Projection

● Install the oil pump gear, so that the projection faces in.



A. Projection C. Hole
B. Gear Drive Pin

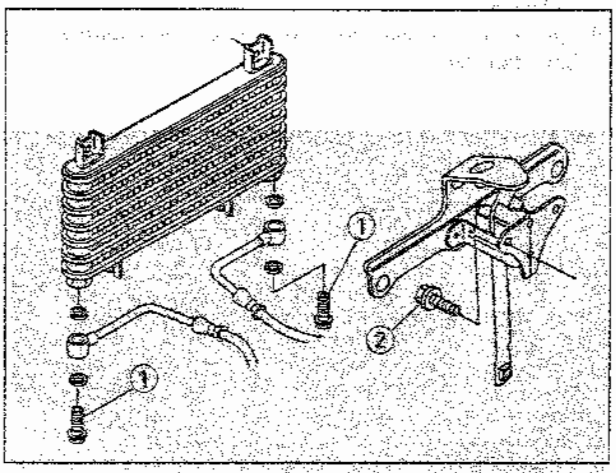
CAUTION

When installing the oil pump gear, set the gear drive pin horizontal to prevent the pin from falling out into the crankcase hole.

Oil Cooler

Removal

● Remove the following.
Lower Fairing (see Frame chapter)
Engine Oil (Drain, see this chapter)
Banjo Bolts
Oil Cooler Bracket Bolts



1. Banjo Bolts 2. Oil Cooler Braclet Bolts

● Remove the oil cooler.

Installation

● Installation is the reverse of removal. Note the following.

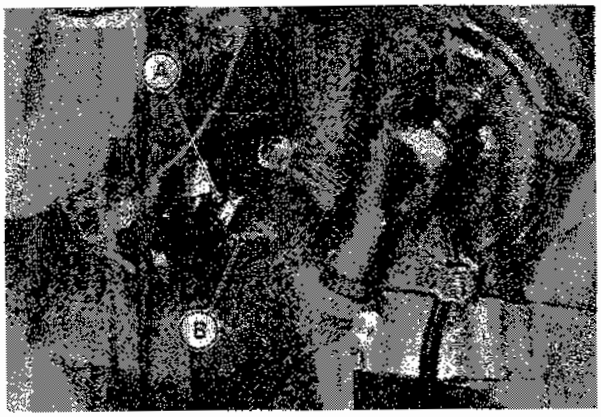
● Replace the washer on each side of the banjo bolts with a new one if the banjo bolt was removed.

● Tighten the banjo bolts to the specified torque (see Exploded View).

Oil Pressure Switch

Removal

● Remove the following.
  Lower Fairing (see Frame chapter)
  Water Pump (see Cooling System chapter)
● Drain the engine oil (see this chapter).
● Remove the switch terminal, and remove the oil pressure switch.



A. Oil Pressure Switch B. Terminal

Installation

● Apply silicone sealant to the threads of the oil pressure switch and tighten it to the specified torque (see Exploded View).
● Run the oil pressure switch lead as shown in the Cable, Wire, and Hose Routing section of the General Information chapter.

Oil Pressure Measurement

Oil Pressure Measurement

NOTE

○ *Measure the oil pressure after the engine is warmed up.*

● Remove the following.
  Lower Fairing (see Frame chapter)
  Oil Passage Plug
● Attach the oil pressure gauge and adapter (special tools) to the plug hole.

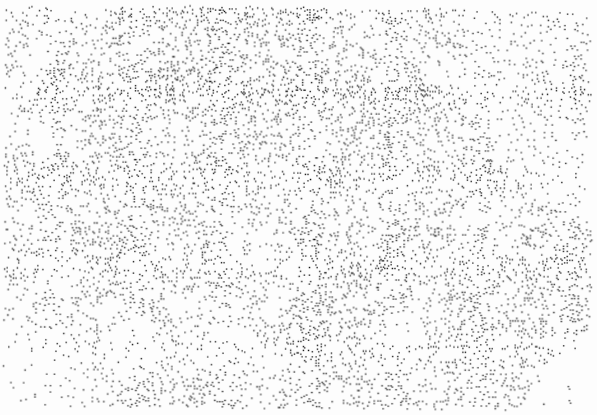


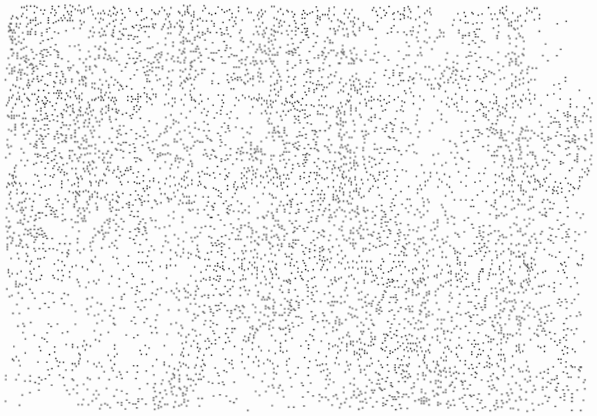
A. Oil Pressure Gauge: 57001-164
B. Adapter: 57001-1278

Oil Pressure

Standard	**410 ~ 470 kPa (4.2 ~ 4.8 kg/cm², 60 ~ 68 psi) @4000 r/min (rpm), 90°C (194°F) of oil temp**

★ If the oil pressure is much lower than the standard, check the oil passages for clogging and the oil pump, relief valve, and/or crankshaft bearing inserts for wear immediately.



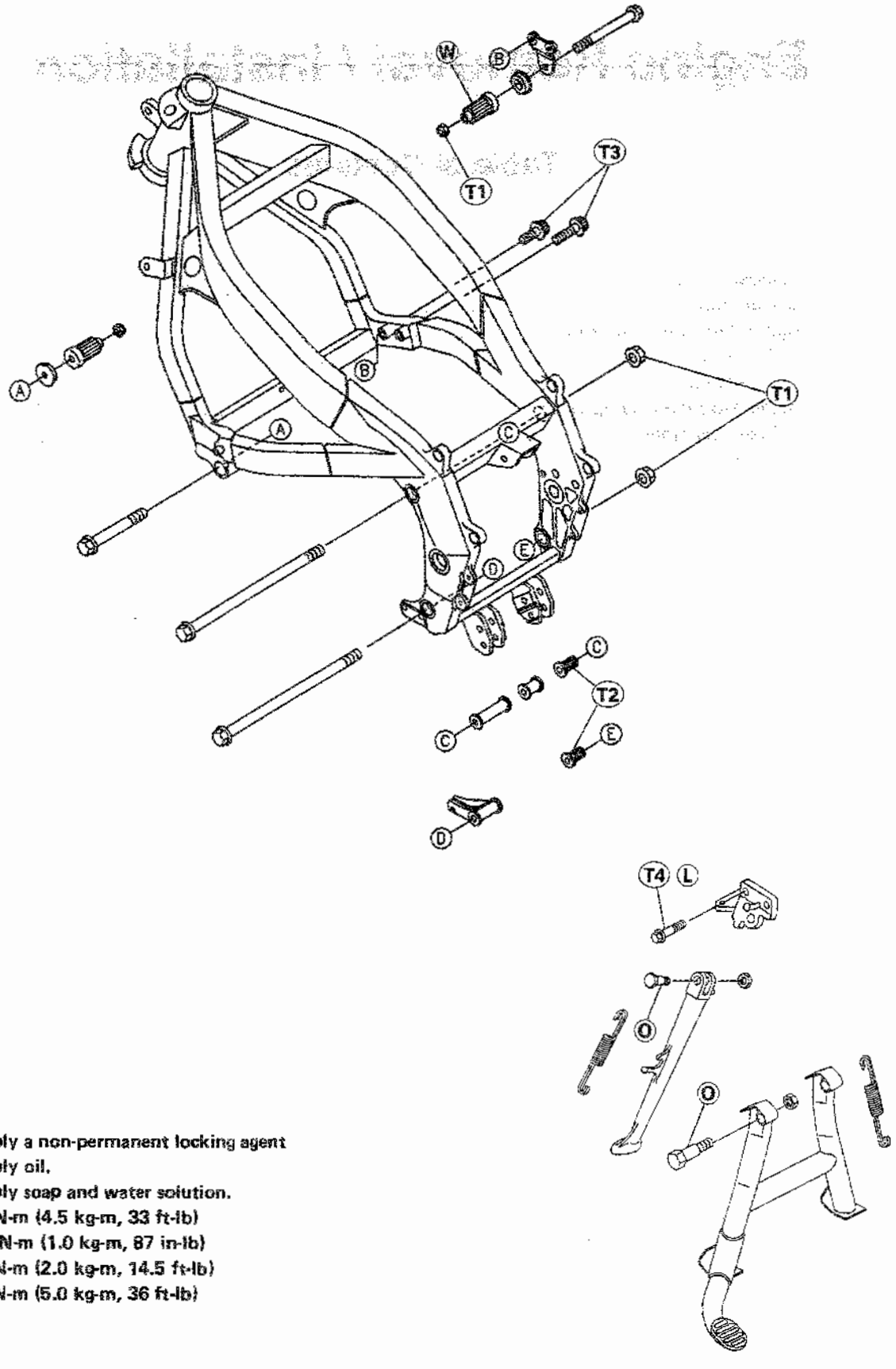


Engine Removal / Installation

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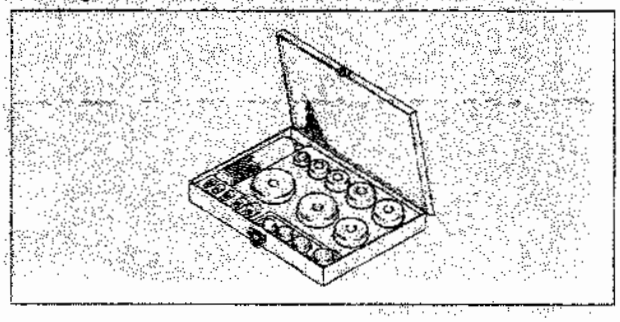
Exploded View



L : Apply a non-permanent locking agent
O : Apply oil.
W : Apply soap and water solution.
T1 : 44 N-m (4.5 kg-m, 33 ft-lb)
T2 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T3 : 20 N-m (2.0 kg-m, 14.5 ft-lb)
T4 : 49 N-m (5.0 kg-m, 36 ft-lb)

Special Tool

Bearing Driver Set: 57001-1129

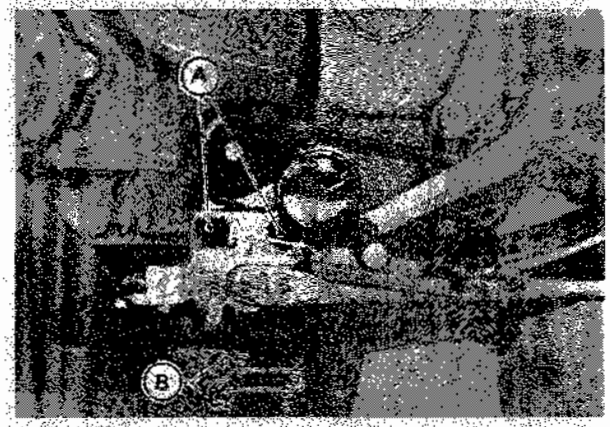


Engine Removal/Installation

Removal

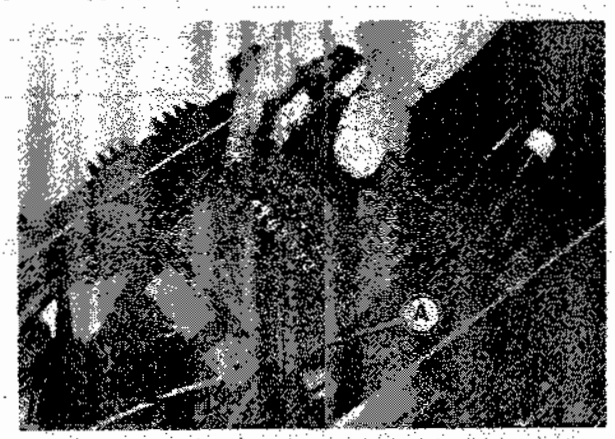
● Set the motorcycle up on its center stand.

● Remove the following.
Engine Oil (Drain, see Engine Lubrication System chapter)
Coolant (Drain, see Cooling System chapter)
Side Stand and Switch Connector
Fuel Tank (see Fuel System chapter)
Upper Fairing (see Frame chapter)
Air Cleaner Housing (see Fuel System chapter)
Carburetors (see Fuel System chapter)
Vacuum Switch Valve and Hoses (see Engine Top End chapter)
Baffle Plate on Cylinder Head Cover
Oil Cooler (see Engine Lubrication System chapter)
Radiator (see Cooling System chapter)
Exhaust Manifold (see Engine Top End chapter)
Shift Pedal
Engine Sprocket (see Final Drive chapter)

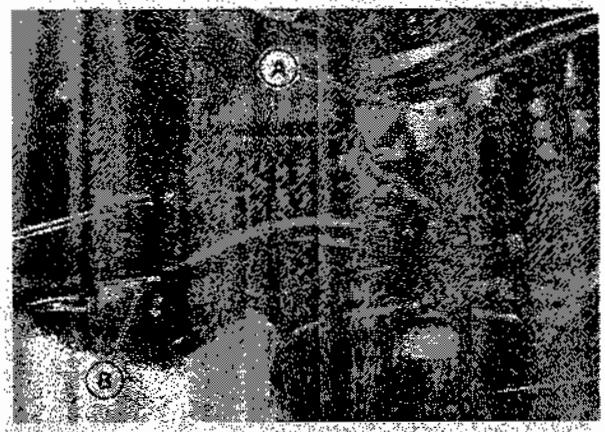


A. Side Stand Bracket Bolts B. Front

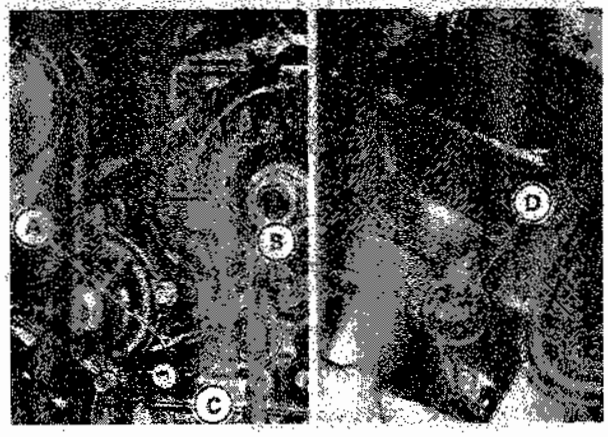
● Disconnect the wiring from the engine and free it from the clamps.
Pickup Coil Lead Connector (from IC Igniter)
Battery Ground Lead Terminal and Connector
Starter Motor Lead
Oil Pressure Switch Connector
Alternator Leads
Neutral Switch Connector
Spark Plug Leads



A. Pickup Coil Lead Connector



A. Battery Ground Lead Terminal and Connector
B. Alternator Lead Connector

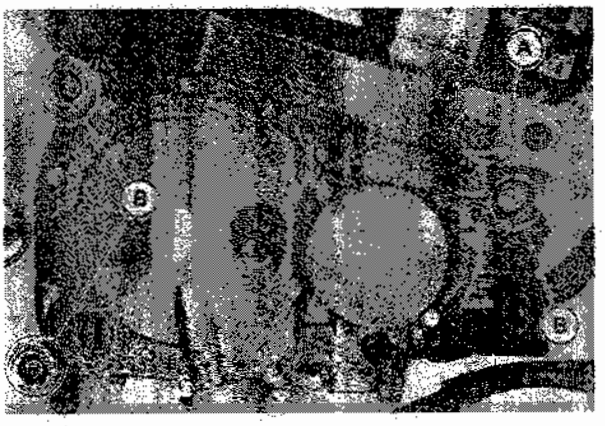


A. Oil Pressure Switch Connector
B. Side Stand Switch Lead Connector
C. Neutral Switch Connector
D. Starter Motor Lead Terminal

○The following parts may be removed with the engine in the frame.
Clutch (see Clutch chapter)
Electric Starter (see Electric System chapter)
Alternator (see Electric System chapter)
Cylinder (see Engine Top End chapter)

●Support the engine with jacks before taking out the engine mounting bolts.

●Remove the engine bracket and the engine mounting bolts and nuts.



A. Engine Bracket Bolts
B. Engine Mounting Bolts and Nuts

●Screw back all the engine mounting adjusters for clearance around the rear of the engine.

●Drape a cloth on the frame down tube cross bar for damage protection.

●Lower the engine and remove the jacks and wooden boards.

○Take care not to allow the shift shaft to touch the side stand bracket.



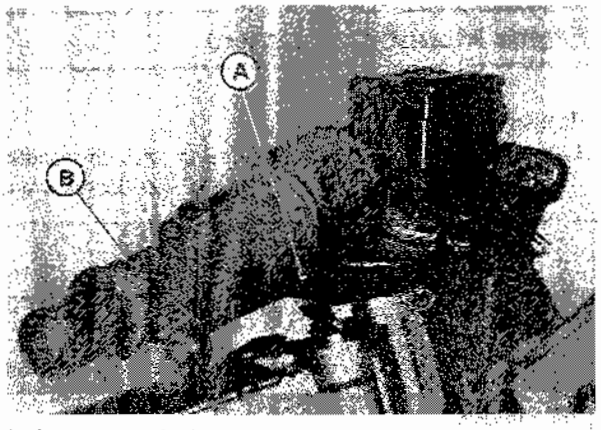
A. Engine Mounting Adjusters
B. Wooden Boards
C. Jacks

NOTE

○*The drive chain will be removed from the output shaft when removing the engine.*

●Lift up the engine and move it right to free the output shaft from the drive chain, and then lower the engine.

●Squeeze the brake lever slowly and hold it with a band.



A. Squeeze brake lever. B. Band

- Block the front wheel and lift the front of the frame.
- Tilt the frame toward the vehicle left side with the front brake held to clear the engine, and then take out the engine from the right side.

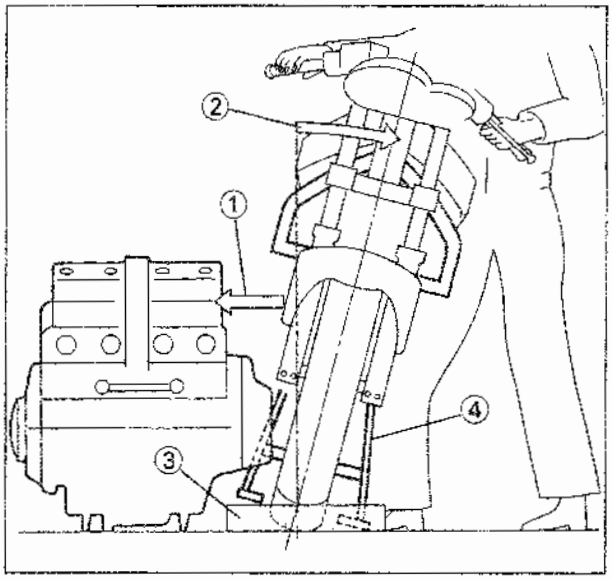
CAUTION

Be sure to hold the front brake when tilting the frame, or the vehicle will fall over. The engine or the vehicle could be damaged.

⚠WARNING

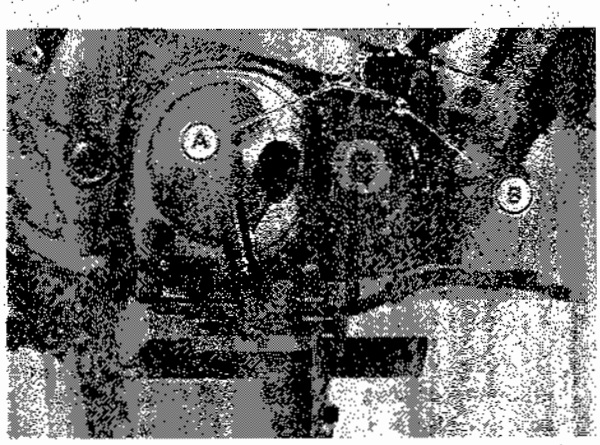
Be sure to hold the front brake when tilting the frame, or the vehicle will fall over. It could cause an accident and injury.

○A person should tilt the frame and another person should take out the engine.



1. Take out the engine
2. Tilt the frame.
3. Wooden Board (60 ~ 70 mm thick)
4. Center Stand

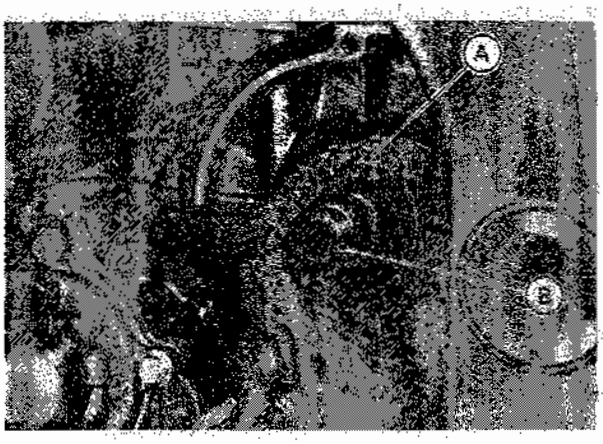
○If the cylinder is removed, the engine may be removed easily; it is not necessary to remove the radiator and to tilt the frame. Stuff a clean cloth between the pistons and the crankcase to hold the piston.



A. Piston B. Clean Cloth

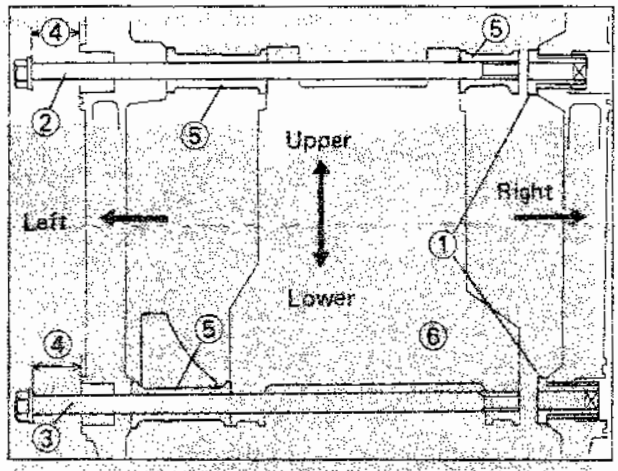
Installation

- Installation is the reverse of removal. Note the following.
- Before engine installation, install the engine mounting adjusters (rear) and screw them back.
- Hang the drive chain over the output shaft just before moving the engine into its final position in the frame.



A. Drive Chain B. Output Shaft

- Insert the collars and the rear lower and upper mounting bolts from the engine left side. Leave it protruding about 25 mm as shown.



1. Mounting Adjusters
2. Rear Upper Mounting Bolt
3. Rear Lower Mounting Bolt
4. About 25 mm
5. Collars
6. Engine

- Screw the lower engine mounting adjuster (right) in against the engine and tighten it to the specified torque.
- Turn the upper engine mounting adjuster (right) in against the engine, and torque it too.

Tightening Torque:

Mounting Adjuster:
About 9.8 N-m (1 kg-m, 87 in-lb)

- Push both mounting bolts through.
- Tighten the following fasteners to the specified torque (see Exploded View).
  Engine Mounting Bolts and Nuts
  Engine Mounting Bracket Bolts
- Run the wires, cables, and hoses as shown in the Cable, Wire, and Hose Routing section of the General Information chapter.
- Apply a non-permanent locking agent to the threads of the side stand bracket bolts and tighten the bolts to the specified torque (see Exploded View).
- Adjust the following.
  Clutch Cable
  Throttle Cables (see Fuel System chapter)
  Choke Cable(see Fuel System chapter)
  Drive Chain (see Final Drive chapter)
- Fill the engine with engine oil (see Engine Lubrication System chapter).
- Fill the engine with coolant and bleed the air from the cooling system (see Cooling System chapter).
- Adjust the carburetor synchronization and idling.

Engine Mounting Dampers

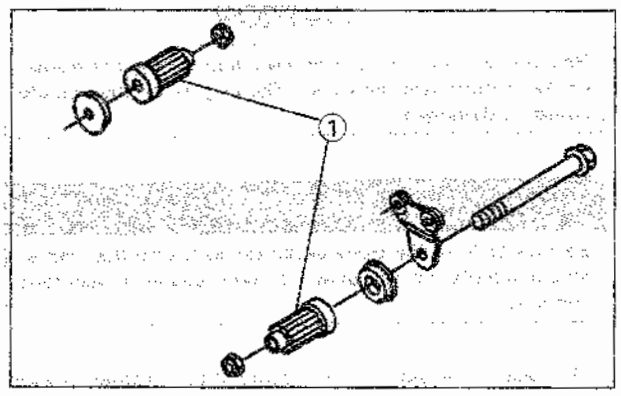
Assembly Notes

- When installing the rubber dampers into the bracket (front), lubricate the outer surface of the dampers with a soap and water solution.

CAUTION

Do not lubricate the rubber dampers with engine oil or petroleum distillates because they will deteriorate the rubbers.

- Install the dampers in the brackets using a suitable bearing driver in the bearing driver set (special tool: 57001-1129).



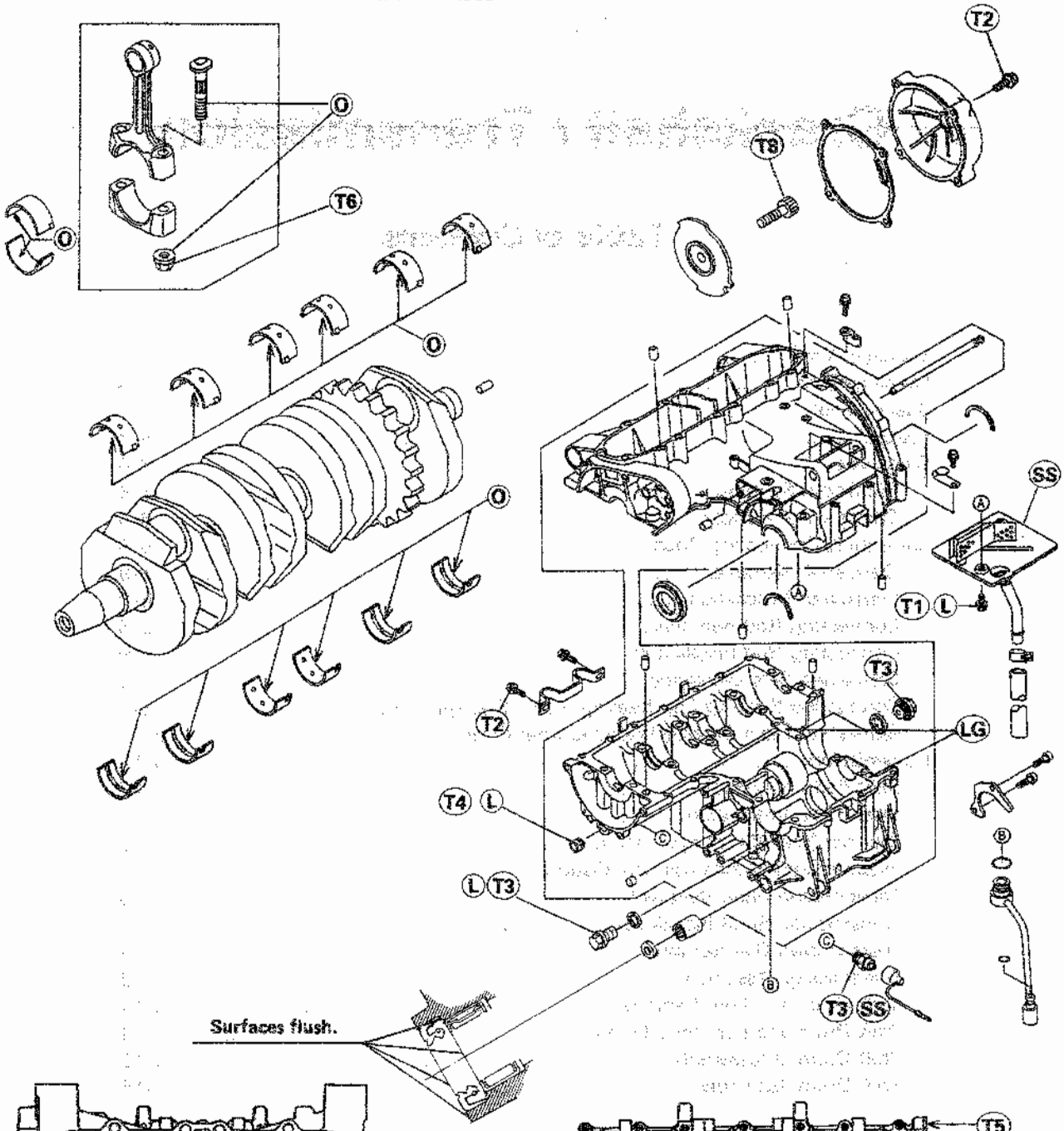
1. Rubber Dampers

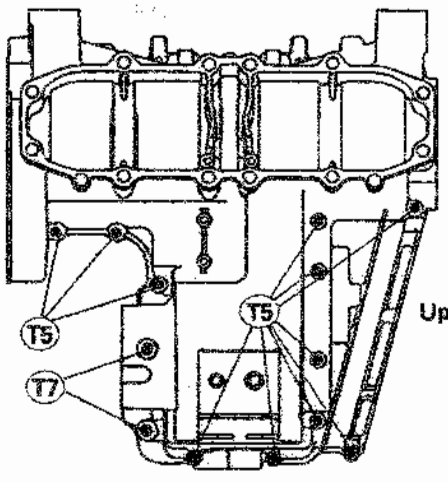
Crankshaft / Transmission

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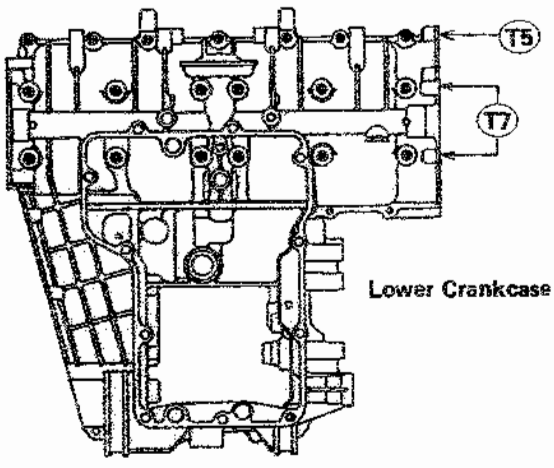
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Exploded View

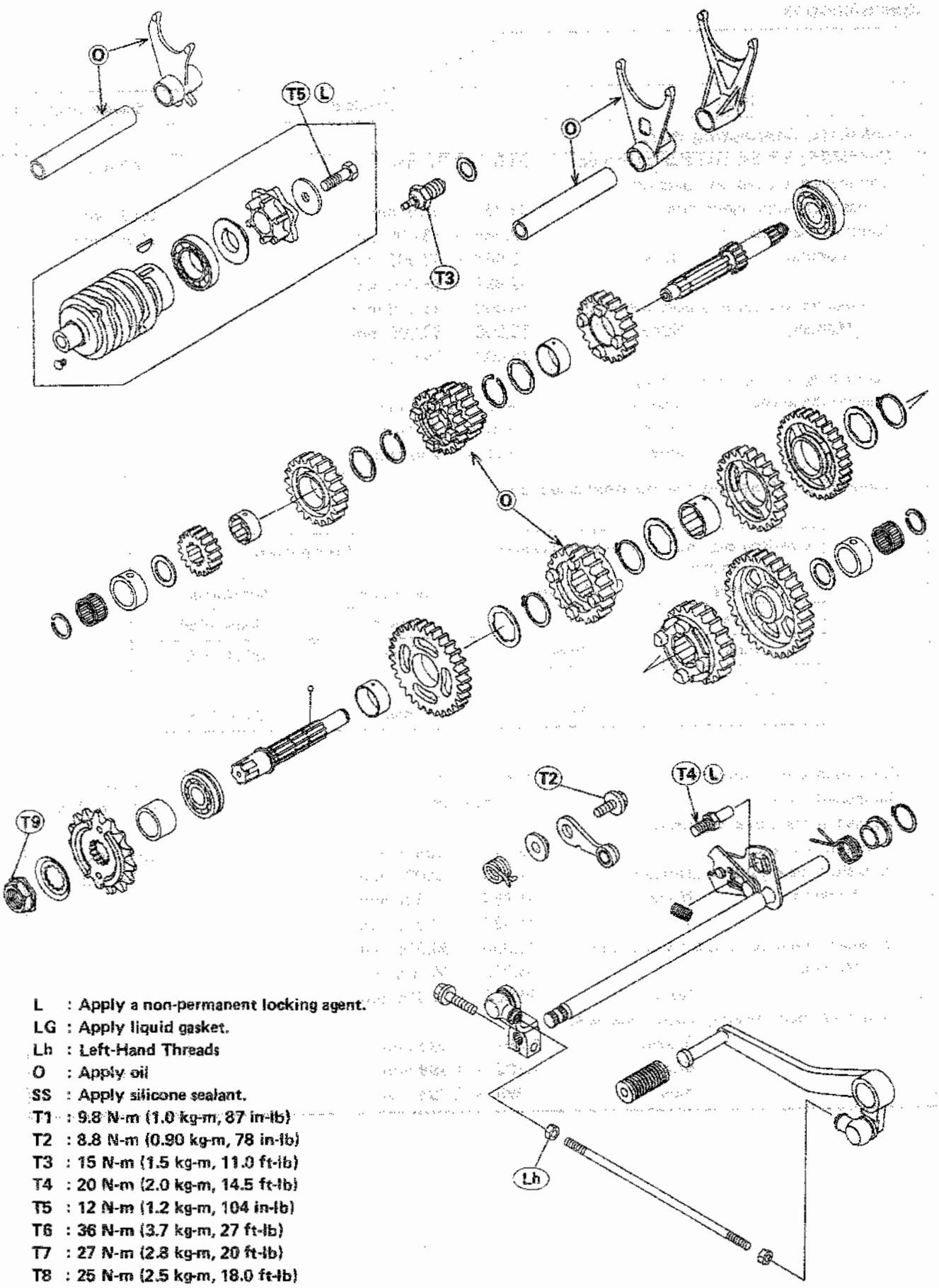




Upper Crankcase



Lower Crankcase



L : Apply a non-permanent locking agent.
LG : Apply liquid gasket.
Lh : Left-Hand Threads
O : Apply oil
SS : Apply silicone sealant.
T1 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T2 : 8.8 N-m (0.90 kg-m, 78 in-lb)
T3 : 15 N-m (1.5 kg-m, 11.0 ft-lb)
T4 : 20 N-m (2.0 kg-m, 14.5 ft-lb)
T5 : 12 N-m (1.2 kg-m, 104 in-lb)
T6 : 36 N-m (3.7 kg-m, 27 ft-lb)
T7 : 27 N-m (2.8 kg-m, 20 ft-lb)
T8 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T9 : 98 N-m (10.0 kg-m, 72 ft-lb)

Specifications

Item		Standard	Service Limit
Crankshaft, Connecting Rods:			
Connecting rod big end side clearance		0.05 ~ 0.21 mm	0.40 mm
Connecting rod big end bearing insert/crankpin clearance		0.035 ~ 0.059 mm	0.10 mm
Crankpin diameter:		32.984 ~ 33.000 mm	32.97 mm
Marking	None	32.984 ~ 32.992 mm	– – –
	O	32.993 ~ 33.000 mm	– – –
Connecting rod big end bore diameter:		36.000 ~ 36.016 mm	– – –
Marking	None	36.000 ~ 36.008 mm	– – –
	O	36.009 ~ 36.016 mm	– – –
Connecting rod big end bearing insert thickness:	Brown	1.480 ~ 1.485 mm	– – –
	Black	1.485 ~ 1.490 mm	– – –
	Blue	1.489 ~ 1.494 mm	– – –

Connecting rod big end bearing insert selection:

Con-Rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert	
		Size Color	Part Number
None	O	Brown	13034-1069
None	None	Black	13034-1068
O	O		
O	None	Blue	13034-1067

Crankshaft side clearance		0.05 ~ 0.21 mm	0.40 mm
Crankshaft runout		0.02 mm TIR	0.05 mm TIR
Crankshaft main bearing insert, journal clearance		0.014 ~ 0.038 mm	0.070 mm
Crankshaft main journal diameter:		31.984 ~ 32.000 mm	31.96 mm
Marking	None	31.984 ~ 31.992 mm	– – –
	1	31.993 ~ 32.000 mm	– – –
Crankcase main bearing bore diameter:		36.000 ~ 36.016 mm	– – –
Marking	O	36.000 ~ 36.008 mm	– – –
	None	36.009 ~ 36.016 mm	– – –
Crankshaft main bearing insert thickness:			
	Brown	1.991 ~ 1.995 mm	– – –
	Black	1.995 ~ 1.999 mm	– – –
	Blue	1.999 ~ 2.003 mm	– – –

Item	Standard	Service Limit
Crankshaft main bearing insert selection:		

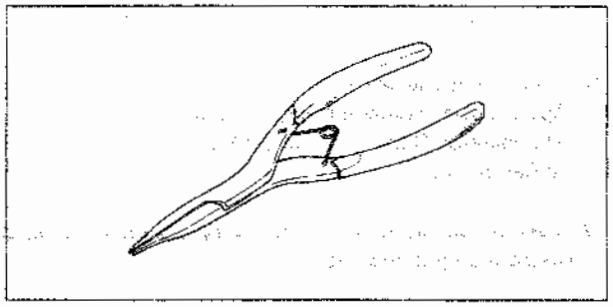
Crankcase Main Bearing Bore Diameter Mark	Crankshaft Main Journal Diameter Mark	Bearing Insert*		
		Size Color	Part Number	Journal Nos.
O	1	Brown	13034-1016	1, 2, 5
			13034-1066	3, 4, 6
None	1	Black	13034-1017	1, 2, 5
O	None		13034-1065	3, 4, 6
None	None	Blue	13034-1018	1, 2, 5
			13034-1064	3, 4, 6

*The bearing inserts for Nos. 1, 2, and 5 journals have an oil groove, respectively.

Transmission:		
Shift fork ear thickness	4.9 ~ 5.0 mm	4.8 mm
Gear shift fork groove width	5.05 ~ 5.15 mm	5.2 mm
Shift fork guide pin diameter	7.9 ~ 8.0 mm	7.8 mm
Shift drum groove width	8.05 ~ 8.20 mm	8.30 mm

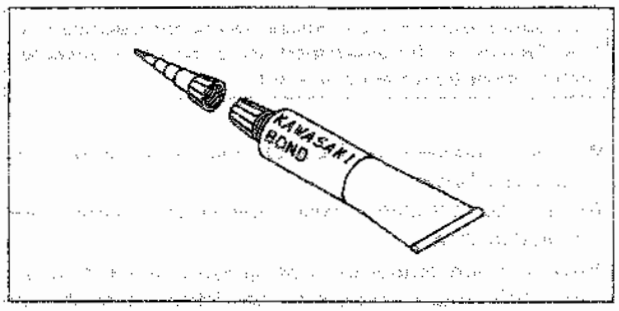
Special Tool

Outside Circlip Pliers: 57001-144

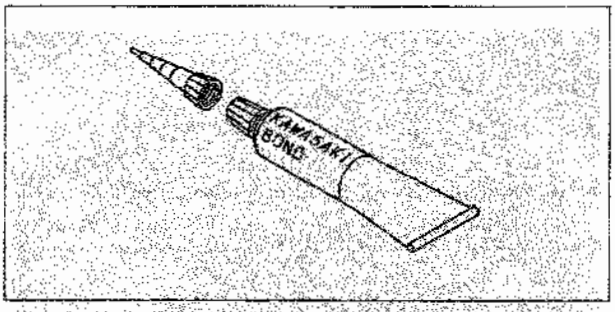


Sealant

Kawasaki Bond (Liquid Gasket – Black): 92104-1003



Kawasaki Bond (Silicone Sealant): 56019-120



Crankcase

Crankcase Splitting

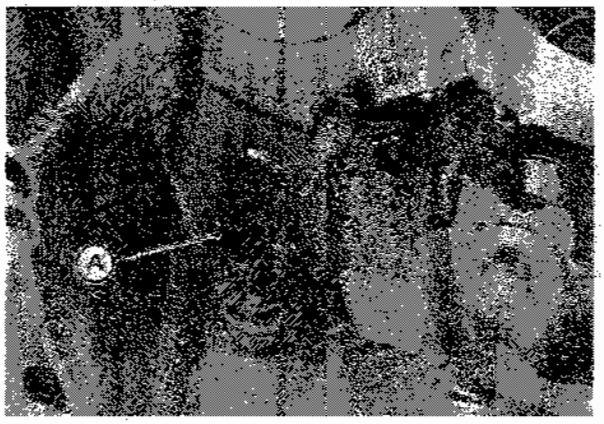
- If the transmission drive shaft is to be removed, remove the clutch (see Clutch chapter).
- Remove the engine (see Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove the following parts from the engine.
  - External Shift Mechanism (see this chapter)
  - Starter Motor (see Electrical System chapter)
  - Alternator (see Electrical System chapter)
  - Pickup Coil (see Electrical System chapter)
  - Clutch Cover
  - Oil Pan
  - Water Pump (see Cooling System chapter)
  - Oil Pump (see Engine Lubrication System chapter)
- Remove the following parts if the crankshaft is to be removed.
  - Cylinder Head (see Engine Top End chapter)
  - Cylinder Block (see Engine Top End chapter)
  - Pistons (see Engine Top End chapter)
- Remove all the crankcase bolts (lower and upper). First remove the 6 mm bolts.
- Split the crankcase.

Crankcase Assembly

CAUTION

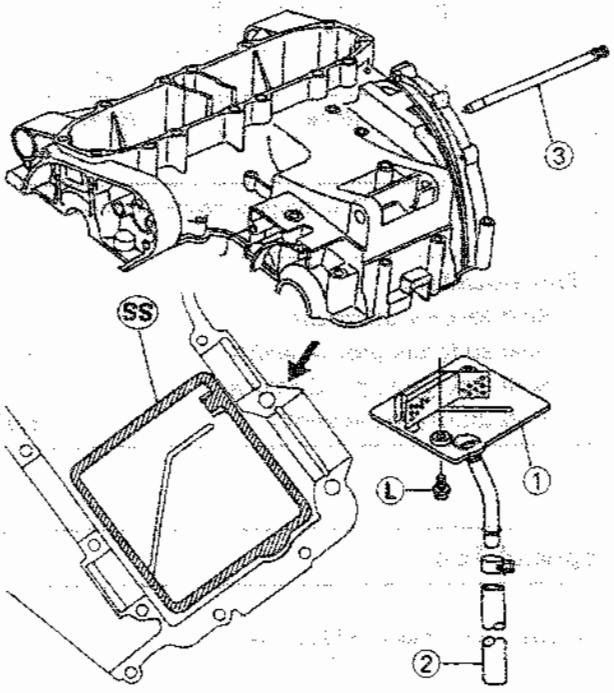
The upper and lower crankcase halves are machined at the factory in the assembled state, so the crankcase halves must be replaced as a set.

- Using compressed air, blow out the oil passages in the crankcase halves.
- Install the shift shaft oil seal in the direction shown (see Exploded View).
- Apply a non-permanent locking agent to the threads of the shift return spring pin and tighten it to the specified torque (see Exploded View).



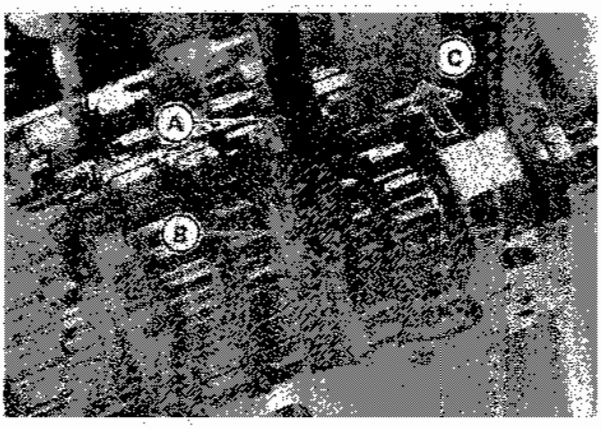
A. Return Spring Pin

- Put the oil pipe in until the right side is even with the end of the hole.
- With a high-flash point solvent, clean off the mating surfaces of the crankcase halves and wipe dry.
- Apply silicone sealant to the oil separator plate mating surface 1 to 1.5 mm thick, wait until sealant dries, and then install the oil separator plate.
- Apply a non-permanent locking agent to the threads and tighten the bolts to the specified torque (see Exploded View).



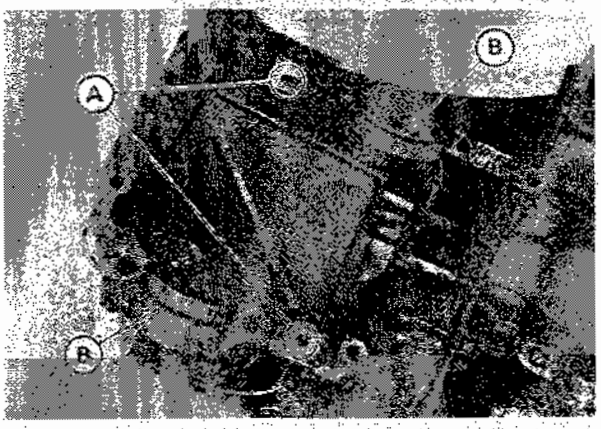
SS : Apply silicone sealant.
L : Apply a non-permanent locking agent.
1. Oil Separator Plate
2. Oil Return Hose
3. Oil Pipe

- Install the oil return hose. The clamp tab must be faced toward the right and left.



A. Oil Return Hose
B. Clamp Tab
C. Front

● Install the dowel pins, set pins, and rings.

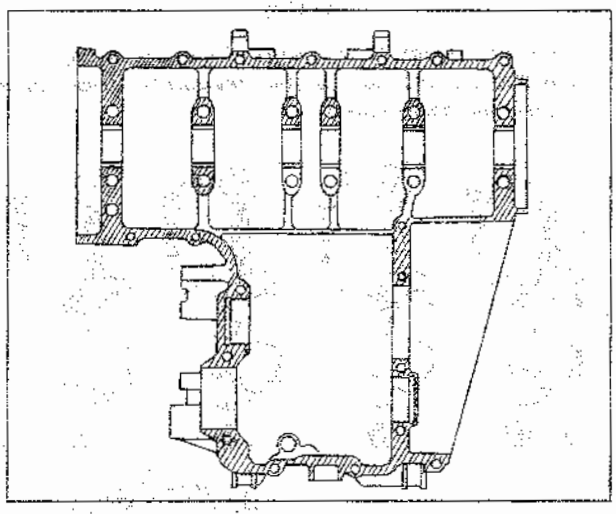


A. Set Pins B. Set Rings

● Apply engine oil to the transmission gears, ball bearings, shift drum, and crankshaft main bearing inserts.
● Apply Kawasaki Bond (Liquid Gasket – Black: 92104-1003) to the mating surface of the lower crankcase half.

CAUTION

Do not apply liquid gasket around the crankshaft main bearing inserts.

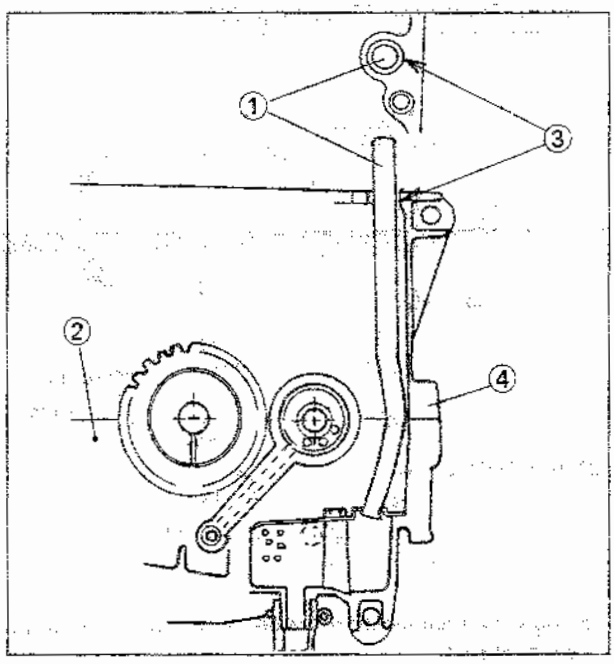


: Liquid Gasket Applied Areas

● Install the lower crankcase half.
● Run the oil return hose through the lower crankcase hole.

CAUTION

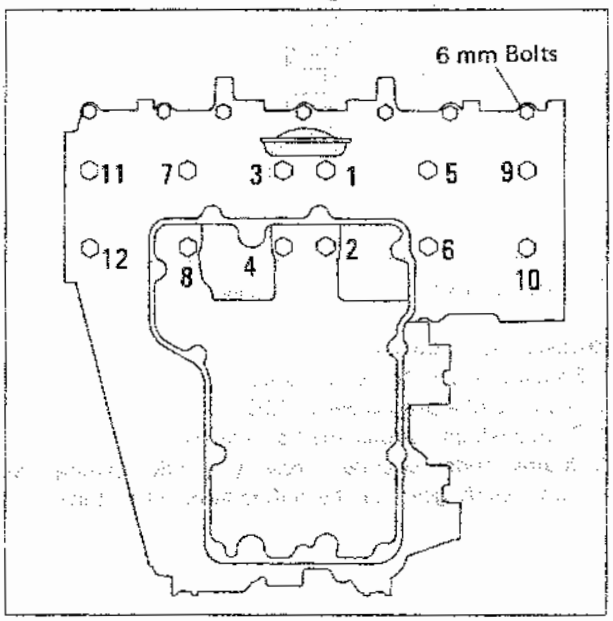
Be careful not to pinch the oil return hose between the crankcase halves. A clogged oil return hose could cause blowing out oil through the breather hose.



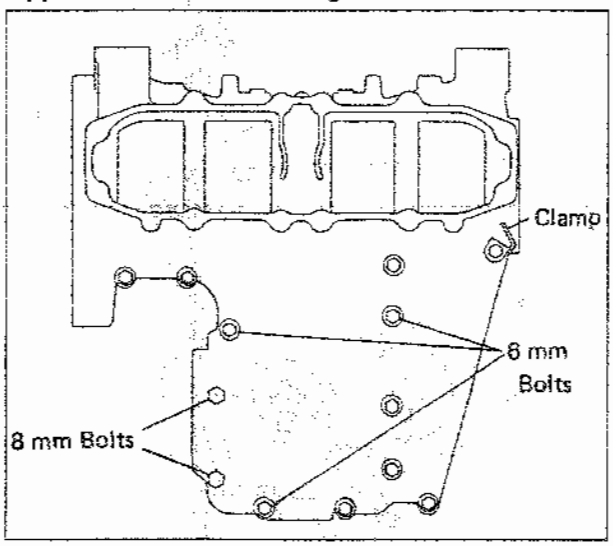
1. Oil Return Hose
2. Upper Crankcase
3. Hole
4. Lower Crankcase

● Install the 8 millimeter bolts. The two long bolts are for number 1 and number 3.
● Tighten the crankcase mounting bolts in the numerical order embossed on the case to the specified torque (see Torque and Locking Agent in the General Information chapter).
○ Following the tightening sequence, tighten the 8 mm bolts first to about one half of the specified torque, and finally to the specified torque.
○ Tighten the 6 mm bolts to the specified torque.

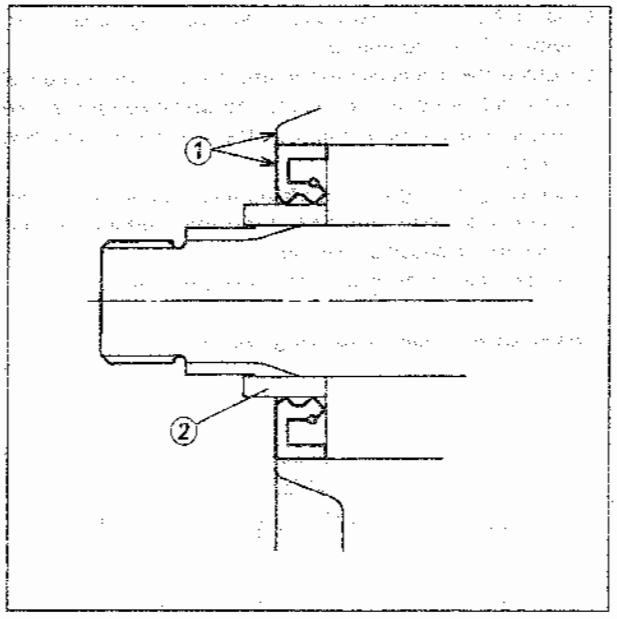
Lower Crankcase Mounting Bolts



Upper Crankcase Mounting Bolts



- Apply high temperature grease to the lips of the output shaft oil seal.
- Press the output shaft oil seal into the crankcase until the face of the seal is even with the end of the hole.



1. Surfaces flush. 2. Collar

- Check the following.

○ Shift drum is in the neutral position.
○ The #1 and 4 pistons are at TDC.
○ Drive shift and output shift turn freely.
○ Neutral finder operates properly (while spining the output shaft, gears can be shifted from 1st to 2nd).

Crankshaft/Connecting Rods

Crankshaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the crankshaft.

Crankshaft Installation

CAUTION

If the crankshaft, bearing inserts, or crankcase halves are replaced with new ones, select the bearing inserts and check clearance with a plastigauge before assembling engine to be sure the correct bearing inserts are installed.

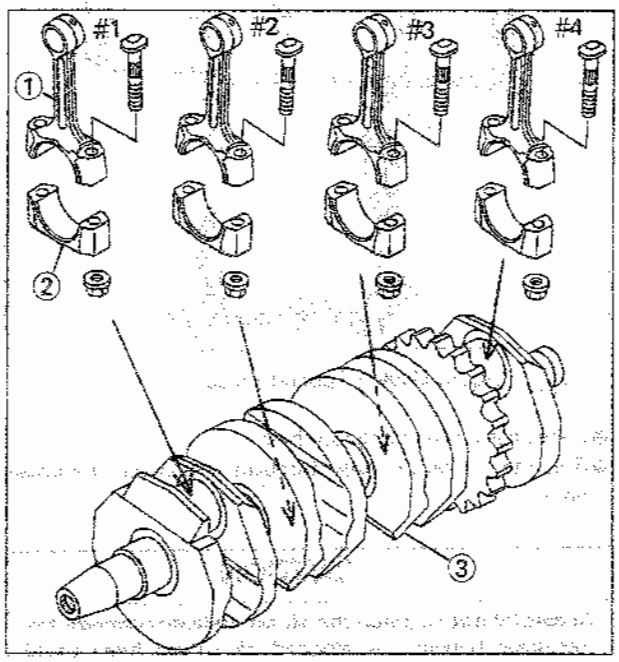
- Apply engine oil to the crankshaft main bearing inserts.
- Install the crankshaft with the camshaft chain hanging on it.

Connecting Rod Removal

- Remove the crankshaft (see Crankshaft Removal).
- Remove the connecting rods from the crankshaft.

NOTE

○ *Mark and record the locations of the connecting rods and their big end caps so that they can be reassembled in their original positions.*

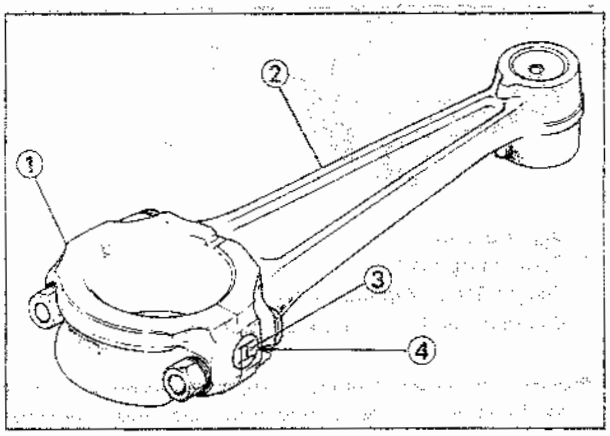


1. Connecting Rod 3. Crankshaft
2. Big End Cap

Connecting Rod Installation

CAUTION

To minimize vibration, a pair of connecting rods (left two rods or right two) should have the same weight mark.



1. Big End Cap
2. Connecting Rod
3. Weight Mark, Alphabet
4. Diameter Mark

CAUTION

If the connecting rods, big end bearing inserts, or crankshaft are replaced with new ones, select the bearing insert and check clearance with a plastigauge before assembling engine to be sure the correct bearing inserts are installed.

- Apply engine oil to the big end bearing inserts.
- Apply oil to the big end cap bolt threads and the seating surface of the nuts.
- Tighten the big end cap nuts to the specified torque (see Exploded View).

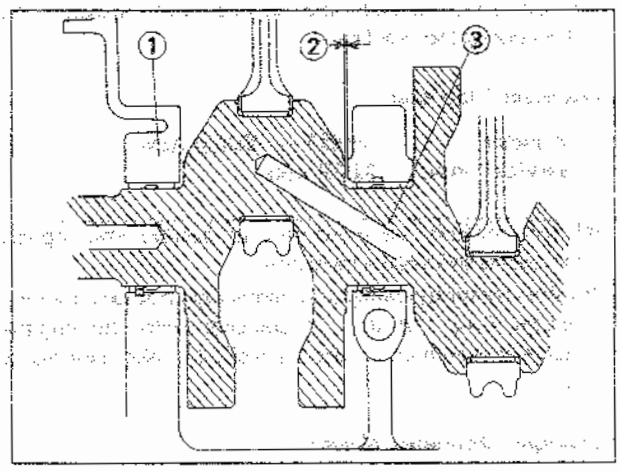
Crankshaft Side Clearance

- Insert a thickness gauge between the crankcase and the crankweb at the #2 journal to determine clearance.

★If the clearance exceeds the service limit, replace the crankcase halves as a set.

Crankshaft Side Clearance

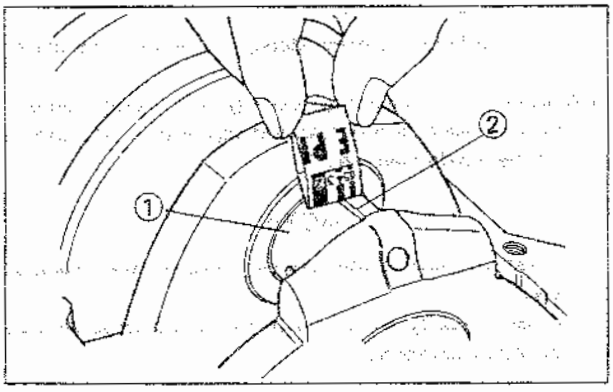
Standard:	**0.05 ~ 0.21 mm**
Service Limit:	**0.40 mm**



1. Crankcase
2. Measure here.
3. #2 Journal

Connecting Rod Big End Bearing Insert/Crankpin Wear

- Measure the bearing insert/crankpin clearance with a plastigauge.



1. Crankpin
2. Plastigauge

NOTE

○*Tighten the big end cap nuts to the specified torque (see Exploded View).*

○*Do not move the connecting rod and crankshaft during clearance measurement.*

Connecting Rod Big End Bearing Insert/Crankpin Clearance

Standard:	**0.035 ~ 0.059 mm**
Service Limit:	**0.10 mm**

★If clearance is within the standard, no bearing replacement is required.

★If clearance is between 0.059 mm and the service limit (0.10 mm), replace the bearing inserts with inserts painted blue. Check insert/crankpin clearance with the plastigauge. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.

★If clearance exceeds the service limit, measure the diameter of the crankpins.

Crankpin Diameter

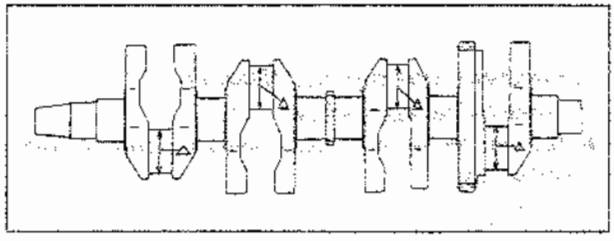
Standard: 32.984 ~ 33.000 mm
Service Limit: 32.97 mm

★If any crankpin has worn past the service limit, replace the crankshaft with a new one.

★If the measured crankpin diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

Crankpin Diameter Marks

None: 32.984 ~ 32.992 mm
○: 32.993 ~ 33.000 mm



△ : Crankpin Diameter Marks, "○" mark or no mark

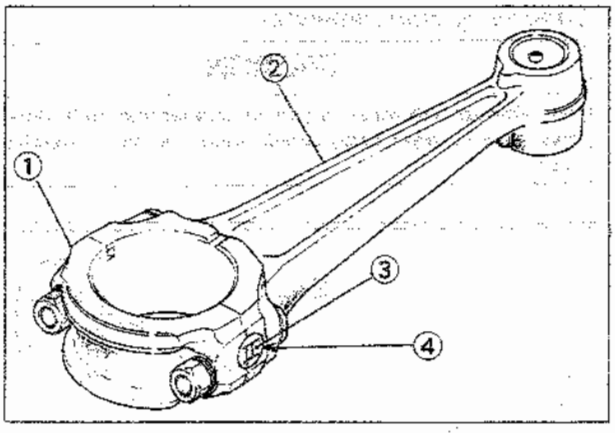
●Measure the connecting rod big end inside diameter, and mark each connecting rod big end in accordance with the inside diameter.

NOTE

○ *Tighten the nuts to the specified torque (see Exploded View).*
○ *The mark already on the big end should almost coincide with the measurement.*

Connecting Rod Big End Bore Diameter Marks

None: 36.000 ~ 36.008 mm
○: 36.009 ~ 36.016 mm

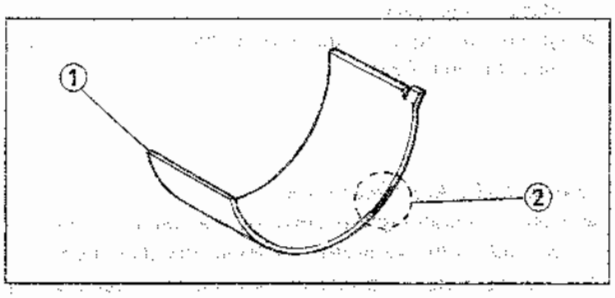


1. Big End Cap
2. Connecting Rod
3. Weight Mark (Alphabet)
4. Diameter Mark, "○" mark or no mark

●Select the proper bearing insert in accordance with the combination of the connecting rod and crankshaft coding.

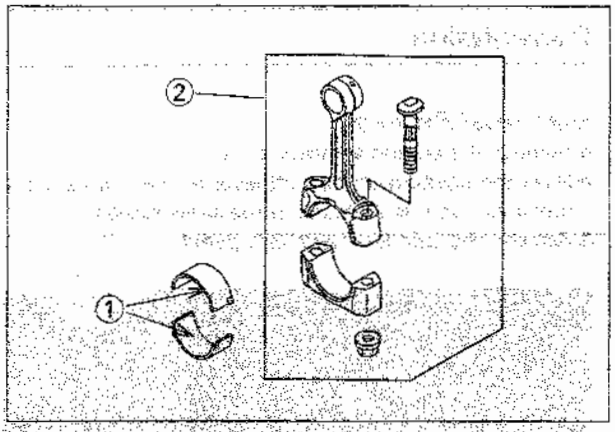
Big End Bearing Insert Selection

Con-Rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert	
		Size Color	Part Number
None	○	Brown	13034-1069
None	None	Black	13034-1068
○	○		
○	None	Blue	13034-1067



1. Bearing Insert 2. Color Size Mark

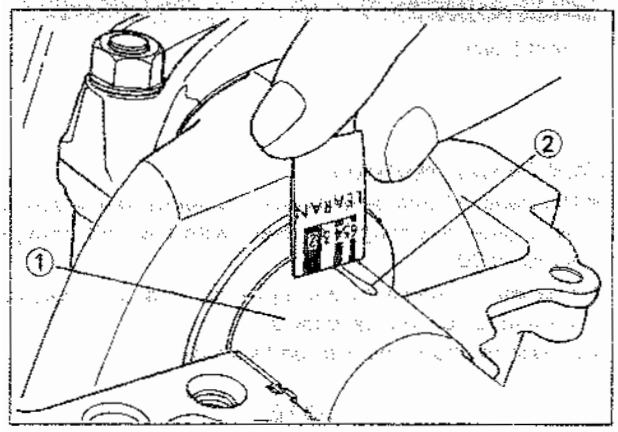
●Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigauge.
●Apply oil to the inner surface of the connecting rod big end.



1. Oil 2. Connecting Rod

Crankshaft Main Bearing/Journal Wear

●Measure the bearing insert/crankshaft main journal clearance with a plastigauge.



1. Crankshaft Main Journal 2. Plastigauge

NOTE

○*Tighten the crankcase bolts to the specified torque (see Exploded View).*

○*Do not turn the crankshaft during clearance measurement.*

○*Journal clearance less than 0.025 mm can not be measured by plastigauge, however, using genuine parts maintains the minimum standard clearance.*

Crankshaft Main Bearing Insert/Journal Clearance

Standard: 0.014 ~ 0.038 mm
Service Limit: 0.070 mm

★If clearance is within the standard, no bearing replacement is required.

★If clearance is between 0.038 mm and the service limit (0.070 mm), replace the bearing inserts with inserts painted blue. Check insert/journal clearance with the plastigauge. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.

★If clearance exceeds the service limit, measure the diameter of the crankshaft main journal.

Crankshaft Main Journal Diameter

Standard: 31.984 ~ 32.000 mm
Service Limit: 31.96 mm

★If any journal has worn past the service limit, replace the crankshaft with a new one.

★If the measured journal diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

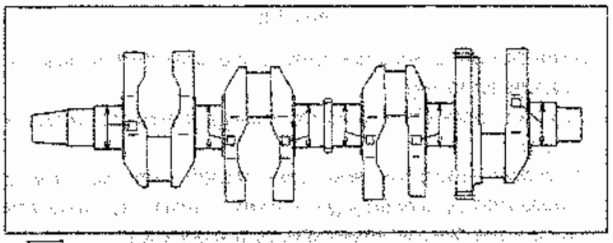
Crankshaft Main Journal Diameter Marks

None: 31.984 ~ 31.992 mm
1: 31.993 ~ 32.000 mm

Main Bearing Insert Selection

Crankcase Main Bearing Bore Diameter Mark	Crankshaft Main Journal Diameter Mark	Crankshaft Bearing Insert*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	13034-1016	1, 2, 5
			13034-1066	3, 4, 6
None	1	Black	13034-1017	1, 2, 5
○	None		13034-1065	3, 4, 6
None	None	Blue	13034-1018	1, 2, 5
			13034-1064	3, 4, 6

*The bearing inserts for Nos. 1, 2, and 5 journals have an oil groove, respectively.



□ :Crankshaft Main Journal Diameter Marks, "1" mark or no mark

● Measure the main bearing bore diameter, and mark the upper crankcase half in accordance with the bore diameter.

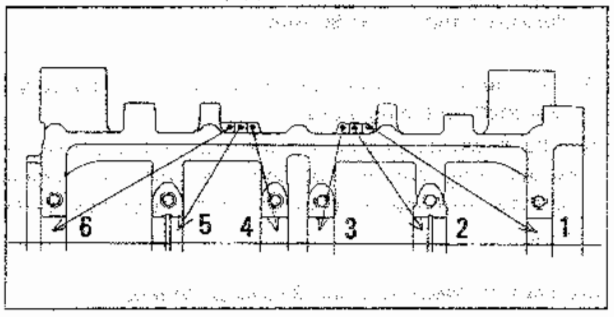
NOTE

○ *Tighten the crankcase bolts to the specified torque (see Torque and Locking Agent in the General Information chapter).*

○ *The mark already on the upper crankcase half should almost coincide with the measurement.*

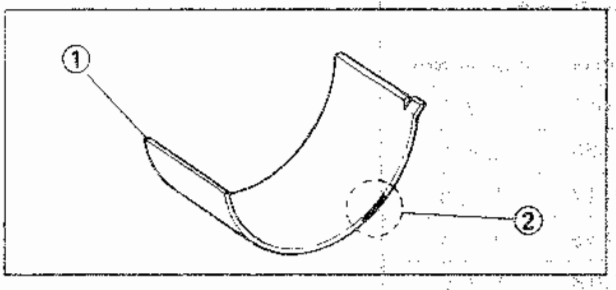
Crankcase Main Bearing Bore Diameter Marks

○:	**36.000 ~ 36.008 mm**
None:	**36.009 ~ 36.016 mm**



● : Crankcase Main Bearing Bore Diameter Marks, "○" mark or no mark

● Select the proper bearing insert in accordance with the combination of the crankcase and crankshaft coding.



1. Bearing Insert 2. Size Color Mark

● Install the new inserts in the crankcase halves and check insert/journal clearance with plastigauge.

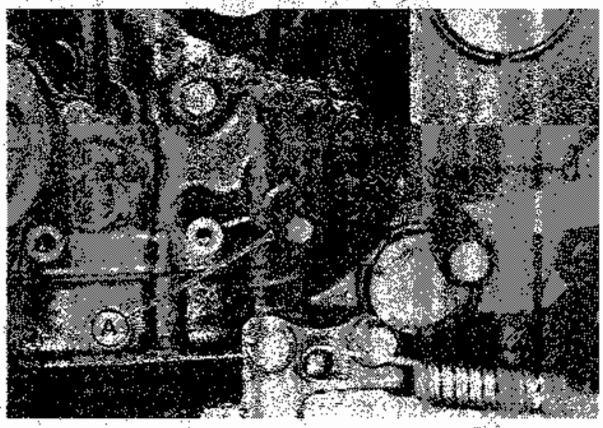
Transmission

Shift Pedal Removal

● Remove the engine sprocket cover.

● Mark the position of the shift lever on the shift shaft so that it can be installed later in the same position.

● Remove the shift lever and shift pedal.



A. Shift Lever

Shift Pedal Installation

● The standard shift pedal position is about 10 mm above the engine mounting bolt (rear) with the shift linkage angles at 90°.

★ If necessary, adjust the pedal position from the standard position to suit you as follows.

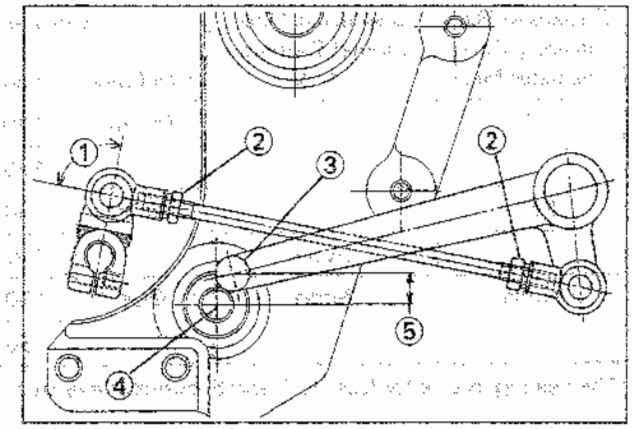
● Loosen the front and rear rod locknuts.

NOTE

○ *The locknut next to the L mark rod has left-hand threads.*

● Turn the rod to adjust the pedal position.

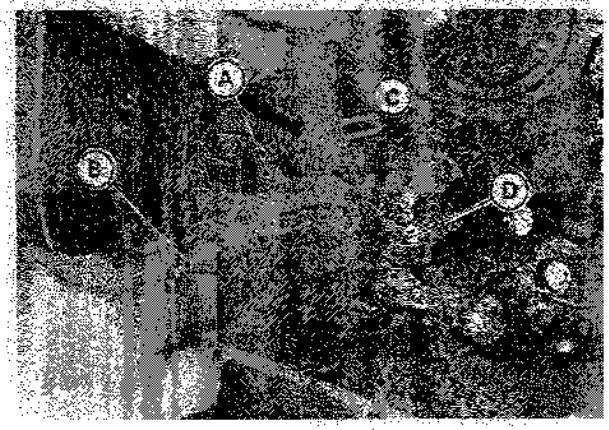
● Tighten the locknuts securely.



1. About 90°
2. Locknuts
3. Shift Pedal
4. Engine Mounting Bolt
5. Pedal Position: about 10mm

External Shift Mechanism Removal

- Remove the shift pedal (see this chapter).
- Remove the clutch (see Clutch chapter).
- Turn the shift drum to the 1st gear position.
- Remove the shift shaft while pushing the shift mechanism arm toward the shaft.

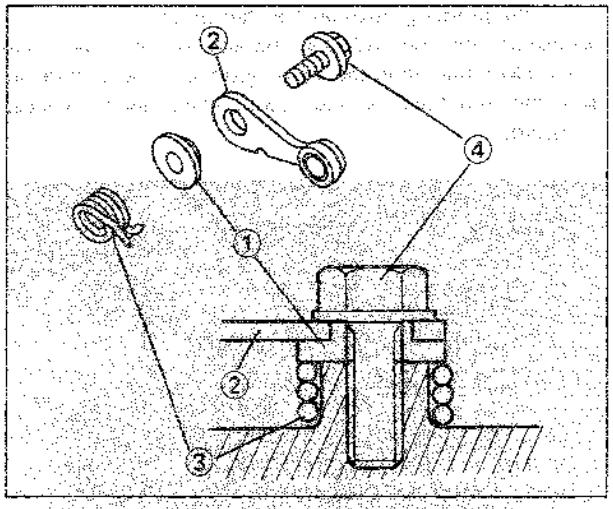


A. Shift Mechanism Arm
B. Shift Shaft
C. Push
D. 1st Gear Position

- Remove the gear positioning lever mounting bolt and take off the gear positioning lever.

External Shift Mechanism Installation

- Install the gear positioning lever and spring as shown.



1. Flanged Collar
2. Shift Lever
3. Spring
4. Bolt

Transmission Shaft Removal

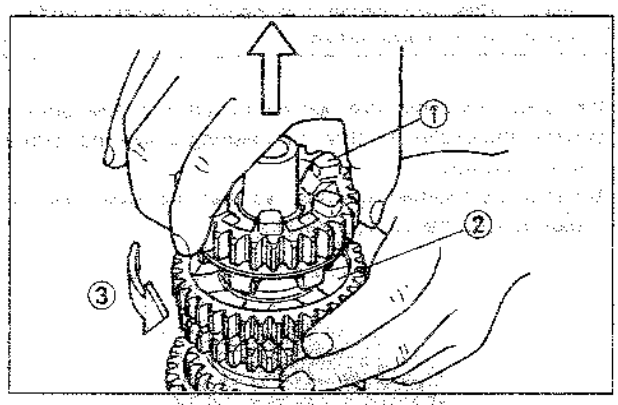
- Remove the clutch (see Clutch chapter).
- Remove the engine (see Engine Removal/Installation chapter).
- Split the crankcase (see this chapter).
- Remove the drive shaft and output shaft.

Transmission Shaft Installation

- Be careful of the following.
  - Apply engine oil to the sliding portion of the gears and bearings.
  - Check to see that the set pins and set rings are in place.
  - Install the drive shaft and output shaft into the upper crankcase half.

Transmission Disassembly

- Remove the transmission shafts.
- Using the circlip pliers (special tool: 57001-144) to remove the circlips, disassemble the transmission shafts.
- The 5th gear on the output shaft has three steel balls assembled into it for the positive neutral finder mechanism. Remove the 5th gear as follows.
  - Set the output shaft in a vertical position holding the 3rd gear.
  - Spin the 5th gear quickly and pull it off upward.

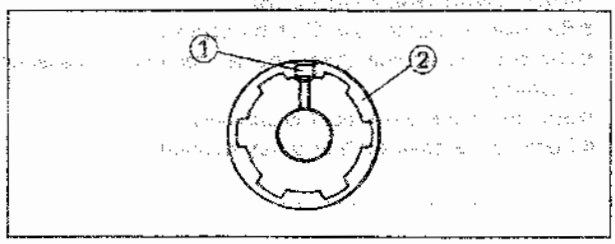


1. 5th Gear
2. 3rd Gear
3. Spin quickly

Transmission Assembly

- Install the gear bushings on the shafts with their oil holes aligned with the shaft oil holes.

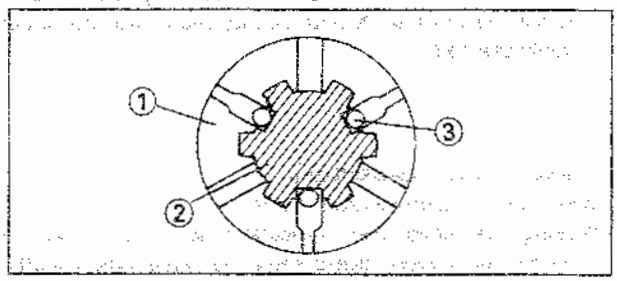
Section AA



1.Oil Hole 2. Bushing

●Fit the steel balls into the 5th gear holes as shown.

Section BB

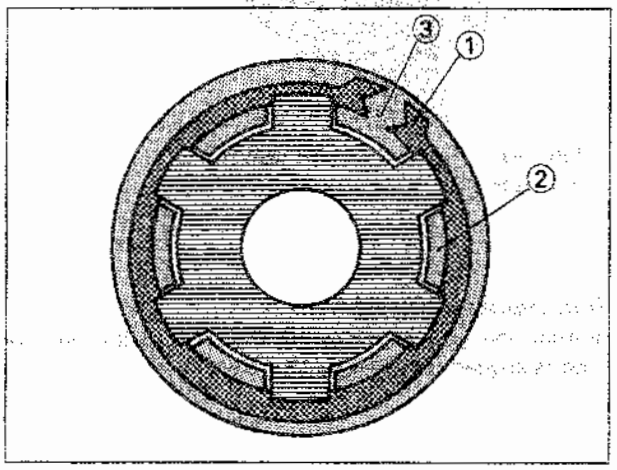


1. Gear 3. Steel Balls
2. Shaft

CAUTION

Do not apply grease to the steel balls to hold them in place. This will cause the positive neutral finder mechanism to malfunction.

●Replace any circlip that were removed with new ones.
●Install the circlips so that the opening is aligned with a spline groove.
●Install the toothed washers so that the teeth are not aligned with the circlip opening.



1. Circlip 3. Groove
2. Toothed Washer

●Install the second gear on the drive shaft with the chamfer side of the spline facing inward.

Shift Drum and Fork Removal

●Remove the following.
External Shift Mechanism (see this chapter)
Lower Crankcase Half (see Crankcase Splitting)
Shift Drum Holding Plate

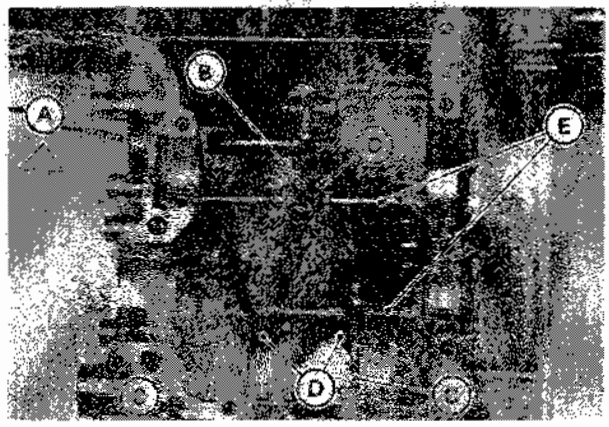


A. Shift Drum Holding Plate

●Pull out the shift rods and take off the shift forks.
●Pull out the shift drum.

Shift Drum and Fork Installation

●Position the drive shaft shift rod (longer rod) with its groove toward the clutch side.
●Three shift forks are used. Fit each shift fork into the groove of the proper gear so that the shift fork guide pin is in the proper groove on the shift drum.
●Position the one with shortest ears on the drive shaft and place the pin in the center groove in the shift drum.
●Of the two forks on the output shaft, each rib faces inward.



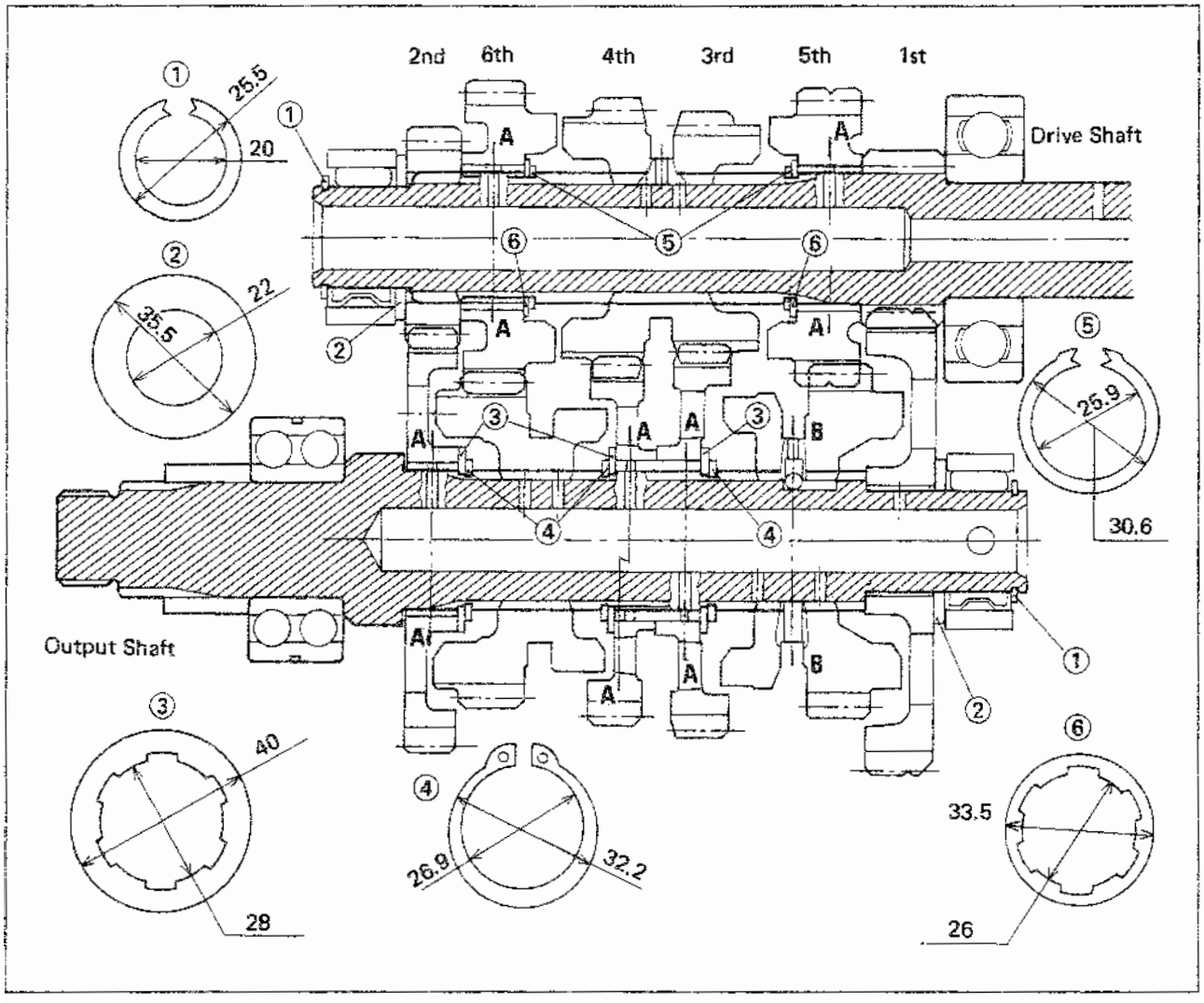
A. Front D. Ribs
B. Fork (Drive Shaft) E. Shift Rods
C. Forks (Output Shaft)

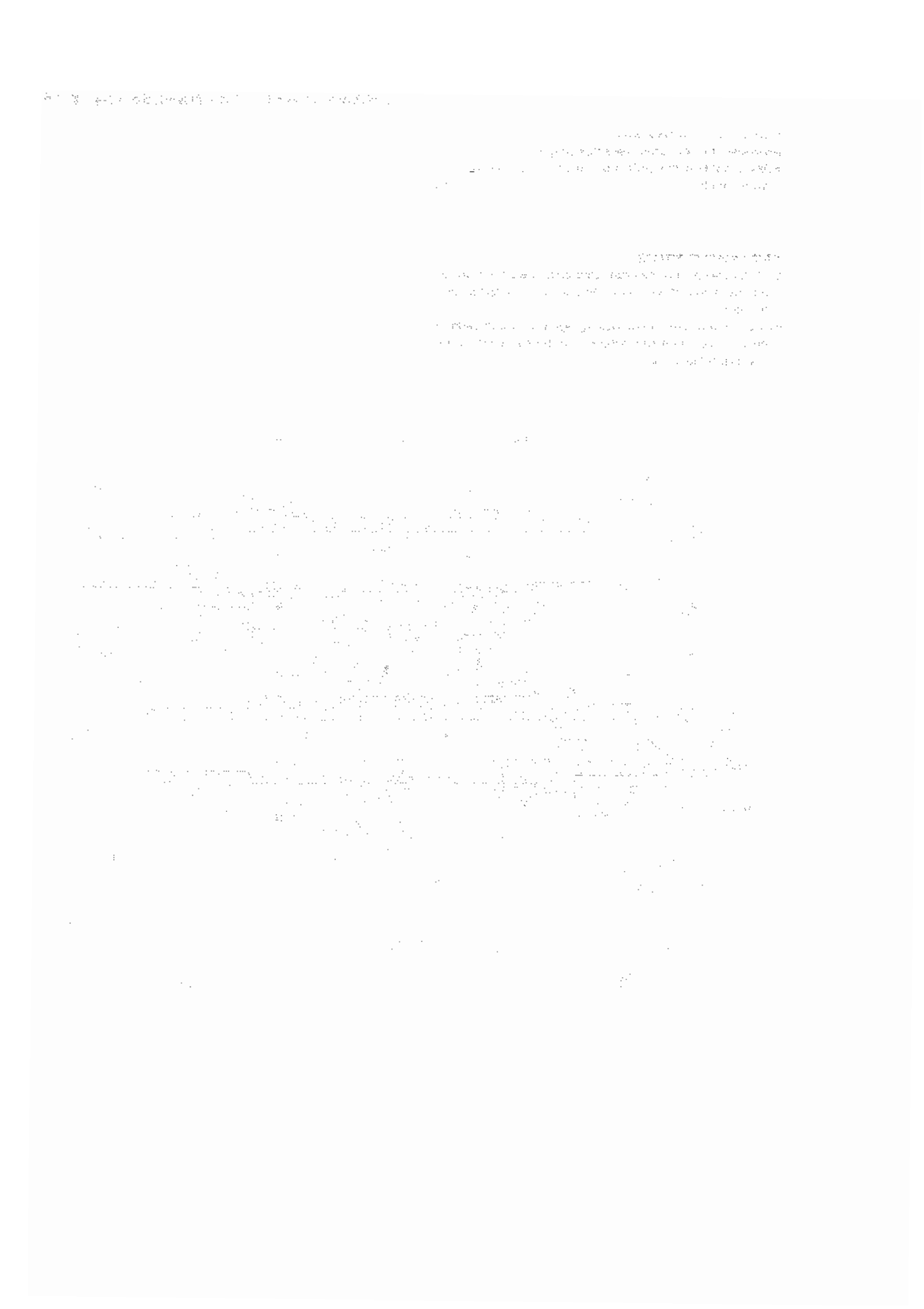
Shift Drum Disassembly

- Remove the shift drum (see this chapter).
- While holding the shift drum with a vise, remove the drum cam bolt.

Shift Drum Assembly

- Fit the spacer and the drum cam onto the shift drum so that the woodruff key fits in the groove in the spacer and the cam.
- Apply a non-permanent locking agent to the threads of the drum cam bolt and tighten it to the specified torque (see Exploded View).



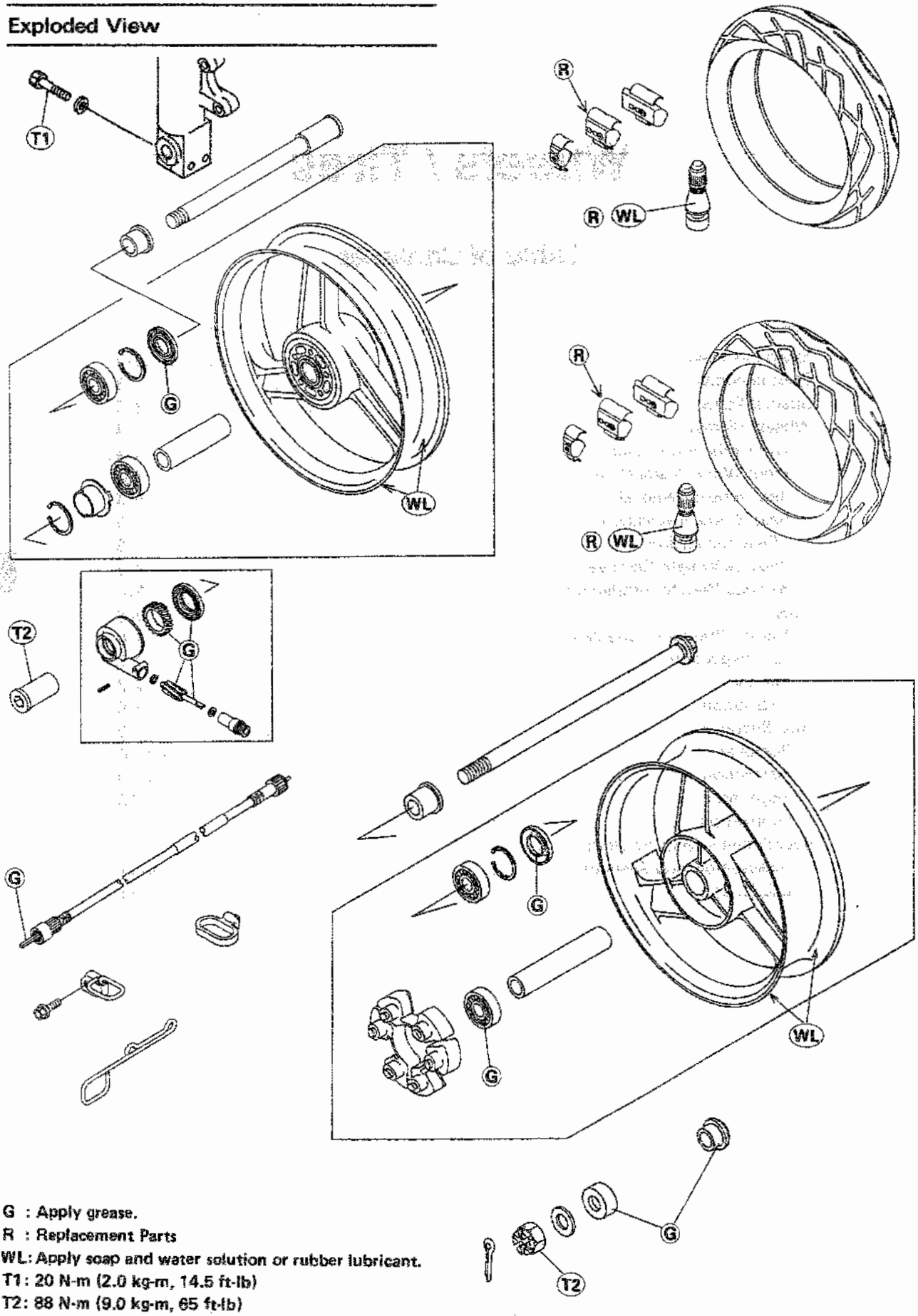


Wheels / Tires

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Exploded View



G : Apply grease.
R : Replacement Parts
WL: Apply soap and water solution or rubber lubricant.
T1: 20 N-m (2.0 kg-m, 14.5 ft-lb)
T2: 88 N-m (9.0 kg-m, 65 ft-lb)

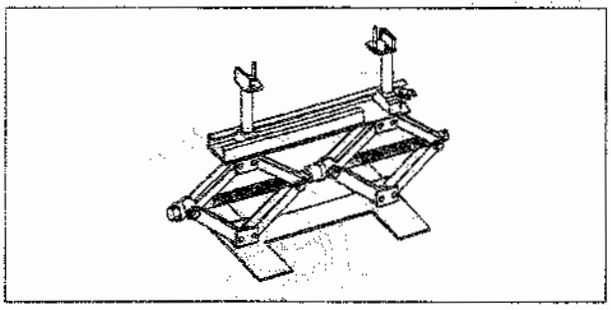
Specifications

Item		Standard	Service Limit
Rim runout:	Axial	– – –	0.5 mm
	Radial	– – –	0.8 mm
Axle runout/100 mm:		0.05 mm or under	0.2 mm
Wheel balance		10 g or under	– – –
Balance weights		10 g, 20 g, 30 g	– – –
Tire tread depth:	Front	4.0 mm	1 mm
	Rear	6.0 mm	2 mm (Up to 130 km/h) (Up to 80 mph) 3 mm (Over 130 km/h) (Over 80 mph)

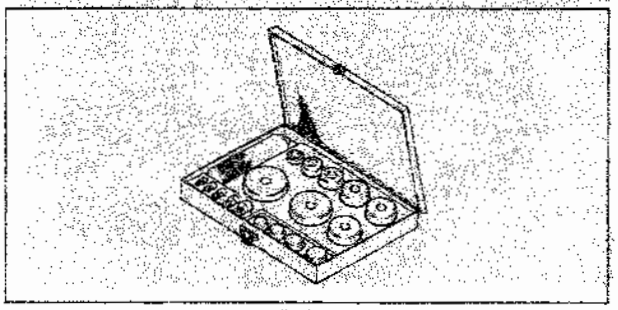
Tire air pressure		Load	Air Pressure (when cold)
	Front	Up to 183 kg (404 lb)	250 kPa (2.5 kg/cm², 36 psi)
	Rear	Up to 183 kg (404 lb)	290 kPa (2.9 kg/cm², 41 psi)
Standard tire		Size	Make, type
	Front	120/60 VR17-V250	DUNLOP K510F, Tubeless
		120/60 ZR17	METZELER ME1 FRONT COMP K, Tubeless PIRELLI MP7 SPORT, Tubeless
		110/70 V17-V250	METZELER ME1 FRONT RACING, Tubeless
	Rear	160/60 VR17-V250	DUNLOP K510, Tubeless
		160/60 ZR17	METZELER ME1 COMP K, Tubeless PIRELLI MP7 SPORT, Tubeless
		160/60 VB17	METZELER ME1 COMP K, Tubeless

Special Tools

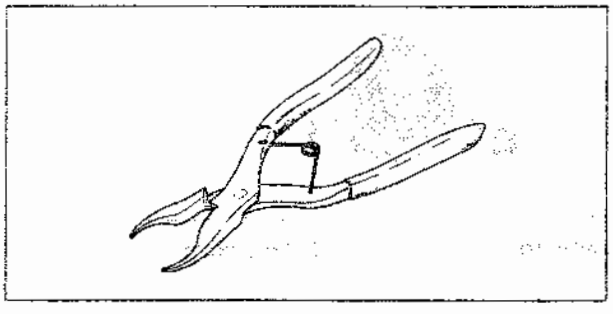
Jack: 57001-1238



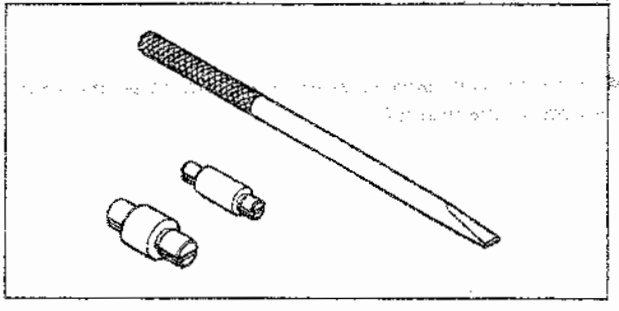
Bearing Driver Set: 57001-1129



Inside Circlip Pliers: 57001-143



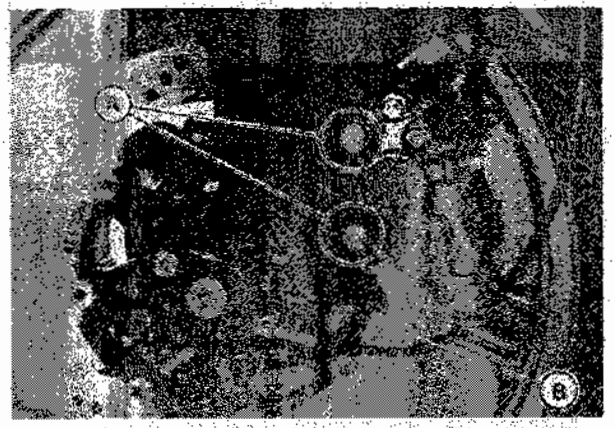
Bearing Remover Set: 57001-1264



Wheels (Rims)

Front Wheel Removal

●Set the motorcycle up on its center stand.
●Remove the following.
Speedometer Cable Lower End
Right and Left Brake Calipers
Front Fender



A. Caliper Mounting Bolts B. Speedometer Cable

Right Side Axle Clamp Bolts (Loosen)
Axle (Loosen)
Right Side Collar
Speedometer Housing



A. Axle C. Front
B. Axle Clamp Bolts

●Using the jack (special tool) or a stand, raise the front wheel off the ground.



A. Jack: 57001-1238 C. Wooden Board
B. Exhaust Pipe

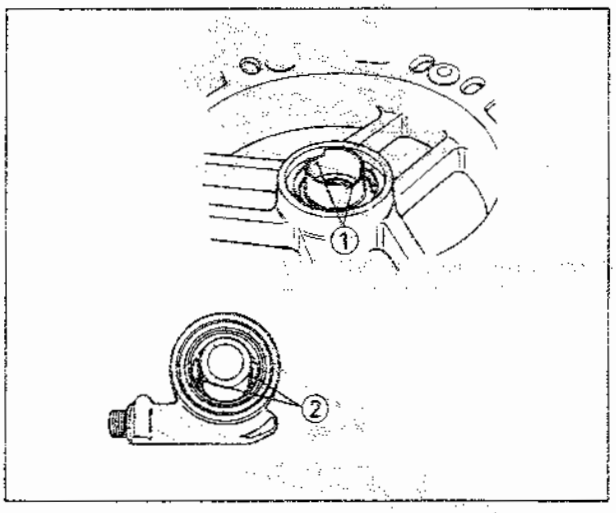
●Pull out the axle to the right and drop the front wheel out of the forks.

CAUTION

Do not lay the wheel down on one of the discs. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

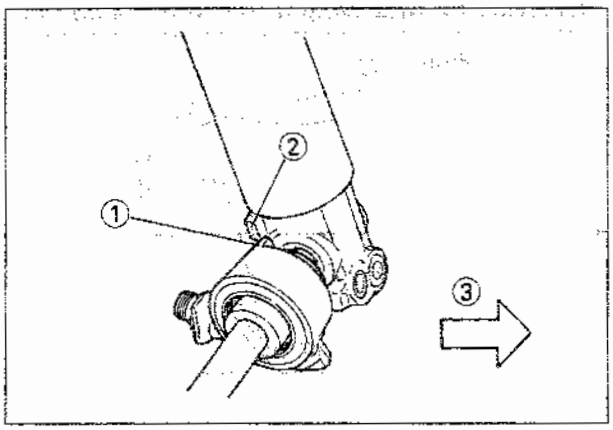
Front Wheel Installation

●Installation is the reverse of removal. Note the following.
●Put the speedometer gear drive onto the wheel hub notches, then install the housings so that it fits in the drive notches.



1. Notches 2. Projections

●Fit the speedometer gear housing stop in the fork leg stop.



1. Housing Stop
2. Fork Leg Stop
3. Front

- Fit the collar in the right side of the hub.
- Tighten the following fasteners to the specified torque (see Exploded View) in the order listed.
  - Axle Nut
  - Axle Clamp Bolts
  - Caliper Mounting Bolts
- Check the front brake.

⚠WARNING

Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brakes will not function on the first application of the lever if this is not done.

Rear Wheel Removal

- Set the motorcycle up on its center stand.
- Remove the following.
  - Torque Link Rear End
  - Cotter Pin and Axle Nut
- Remove the drive chain from the rear sprocket toward the left (see Final Drive chapter).



A. Drive Chain

- Pull out the axle.
- Move the rear wheel back and remove the rear caliper with the caliper holder installed.



A. Rear Wheel B. Rear Caliper and Caliper Holder

CAUTION

Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

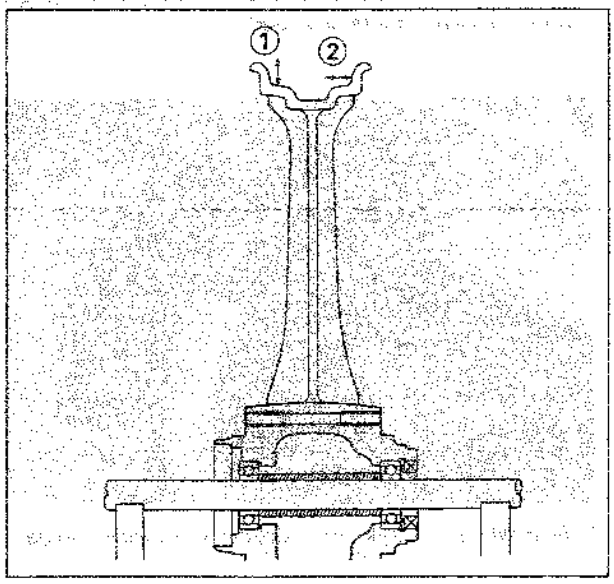
Rear Wheel Installation

- Installation is the reverse of removal. Note the following.
- Adjust the drive chain after installation (see Final Drive chapter).
- Tighten the following fasteners to the specified torque (see Exploded View).
  - Axle Nut
  - Torque Link Nuts
- Check the rear brake.

Wheel Inspection

- Remove the tire from the wheel (see Tire Removal).
- Measure the rim runout by using a dial gauge.

Rim Runout



1. Radial Runout 2. Axial Runout

★If rim runout exceeds the service limit, check the wheel bearings (see this chapter).
★If the problem is not due to the bearings, the wheel must be replaced.

Axial Runout

Service Limit: 0.5 mm

Radial Runout

Service Limit: 0.8 mm

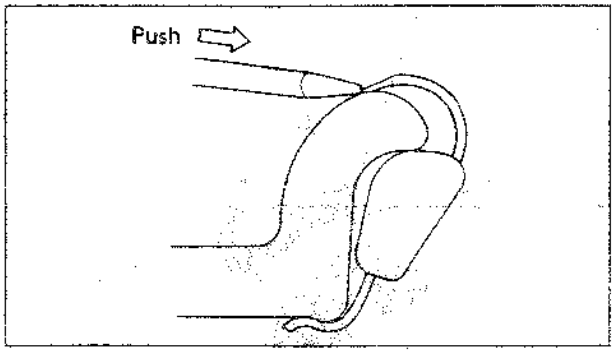
⚠WARNING

Never attempt to repair a damaged wheel. If there is any damage besides wheel bearings, the wheel must be replaced to insure safe operational condition.

Balance Weight Removal

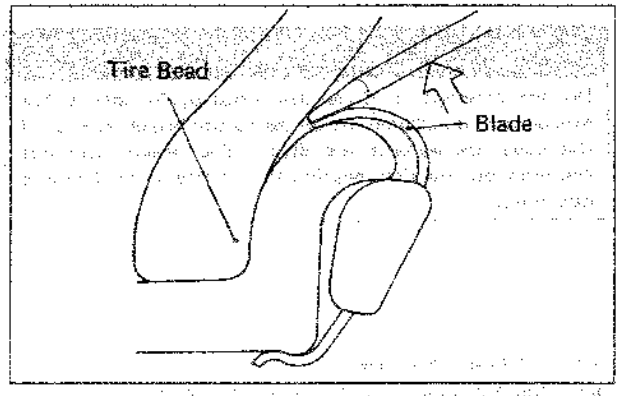
(a) When the tire is not on the rim.
● Push the blade portion toward the outside with a regular tip screwdriver, and slip the weight off the rim flange.
● Discard the used balance weight.

Removing Balance Weight (without tire on rim)



(b) When the tire is on the rim.
● Pry the balance weight off the rim flange using a regular tip screwdriver as shown in the figure.
○ Insert a tip of the screwdriver between the tire bead and weight blade until the end of the tip reaches the end of the weight blade.
○ Push the driver grip toward the tire so that the balance weight slips off the rim flange.
● Discard the used balance weight.

Removing Balance Weight (with tire on rim)



Balance Weight Installation

● Check if the weight portion has any play on the blade-and-clip plate.
★If it does, discard it.
● Lubricate the balance weight blade, tire bead, and rim flange with a soap and water solution or rubber lubricant. This helps the balance weight slip onto the rim flange.

CAUTION

Do not lubricate the tire bead with engine oil or petroleum distillates because they will deteriorate the tire.

● Install the balance weight on the rim.
○ Slip the weight on the rim flange by pushing or lightly hammering the weight in the direction shown in the figure.

○Check that the blade and weight seat fully on the rim flange, and that the clip is hooked over the rim ridge and reaches rim flat portion.

⚠WARNING

If the balance weight has any play on the rim flange, the blade and/or clip have been stretched. Replace the loose balance weight.
Do not reuse used balance weight.

Balance Weight

Part Number	Weight(grams)
41075-1014	10
41075-1015	20
41075-1016	30

⚠WARNING

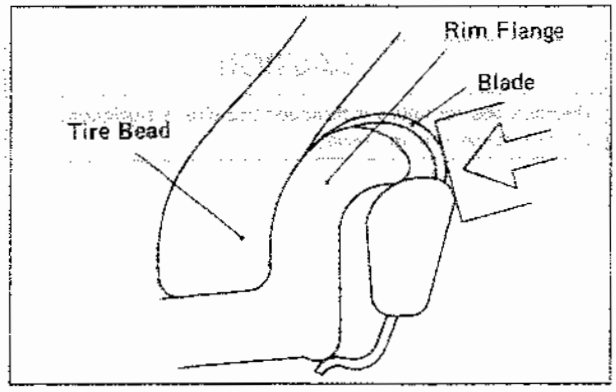
When installing the balancer weights more than 40 g on the front wheel, do not install the weights on one side only of the wheel. Install the weights on each side of the wheel according to the following combinations to keep good riding condition

Weight Installation on Front Wheel (g)

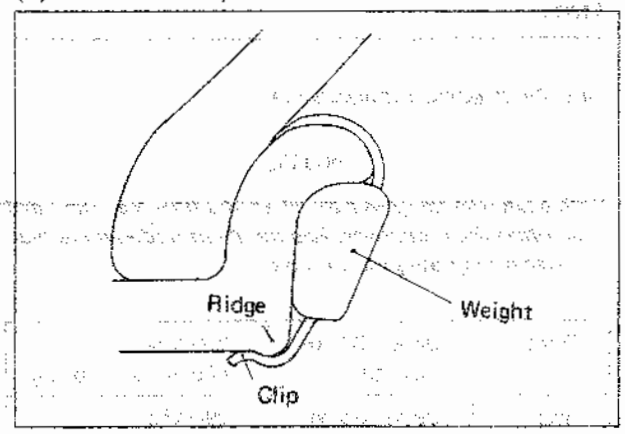
One Side	Other Side	Total
20	20	40
30	20	50
30	30	60
30	30 + 10 (or 20 + 20)	70
30	30 + 20	80
30	30 + 30	90

Installing Balance Weight

(a) Press or lightly hammer the weight in.



(b) Installation completed.



Tires

Tire Air Pressure Inspection

NOTE

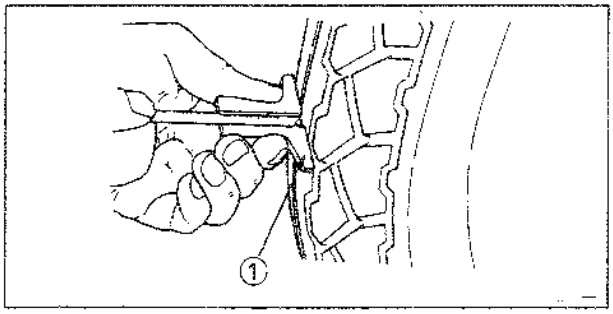
○*Measure the tire pressure when the tires are cold (that is, when the motorcycle has not been ridden more than a mile during the past 3 hours).*

Front	Up to 183 kg (404 lb)	250 kPa (2.5 kg/cm², 36 psi)
Rear	Up to 183 kg (404 lb)	290 kPa (2.9 kg/cm², 41 psi)

Tire Inspection

●Visually inspect the tire for cracks and cuts, replacing the tire in case of bad damage.

●Measure the tread depth at the center of the tread with a depth gauge.



1. Depth Gauge

★If any measurement is less than the service limit, replace the tire.

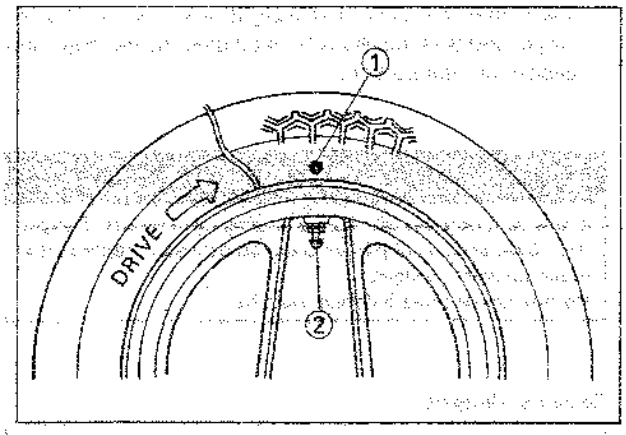
Tire Tread Depth

Front
Standard 4.0 mm
Service Limit 1 mm
Rear
Standard 6.0 mm
Service Limit 2 mm (Up to 130 km/h)
3 mm (Over 130 km/h)

Removal

●Remove the following.
Wheel (see this chapter)
Disc(s)
Valve Core (let out the air)

●To maintain wheel balance, mark the valve stem position on the tire with chalk so that the tire can be reinstalled in the same position.



1. Chalk Mark or Yellow Mark 2. Valve Stem

●Lubricate the tire beads and rim flanges on both sides with a soap and water solution or rubber lubricant. This helps the tire beads slip off the rim flanges.

CAUTION

Never lubricate with engine oil or petroleum distillates because they will deteriorate the tire.

●Remove the tire from the rim using a suitable commercially available tire changer.

NOTE

○*The tires cannot be removed with hand tools because they fit the rims too tightly.*

Installation

●Inspect the rim and tire, and replace them if necessary.

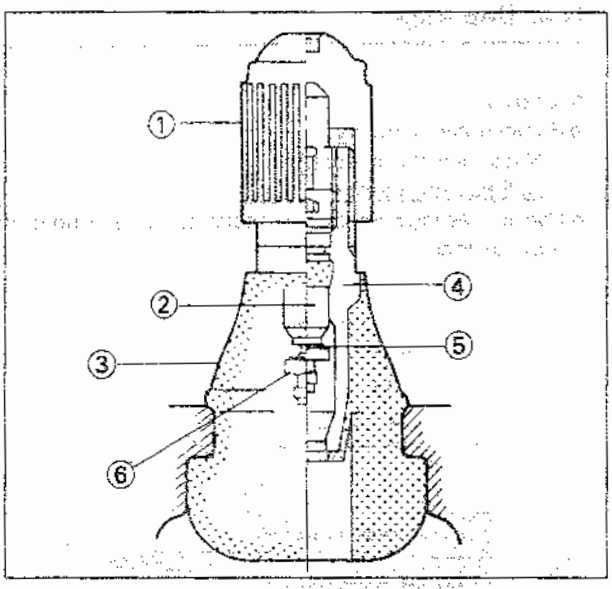
●Clean the sealing surfaces of the rim and tire, and smooth the sealing surfaces of the rim with a fine emery cloth if necessary.

●Remove the air valve and discard it.

CAUTION

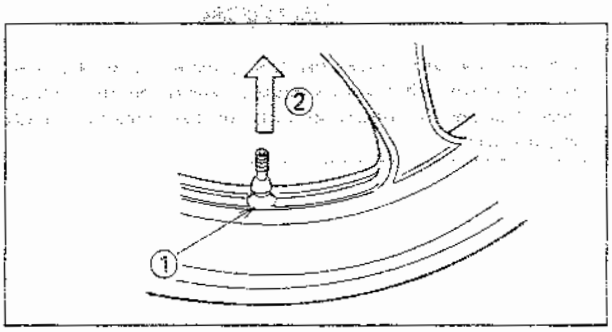
Replace the air valve whenever the tire is replaced. Do not reuse the air valve.

Air Valve



1. Plastic Cap
2. Valve Core
3. Stem Seal
4. Valve Stem
5. Valve Seat
6. Valve Opened

● Install a new valve in the rim.
○ Remove the valve cap, lubricate the stem with a soap and water solution or rubber lubricant, and pull the stem through the rim from the inside out until it snaps into place.



1. Apply soap and water solution or rubber lubricant
2. Pull the stem out.

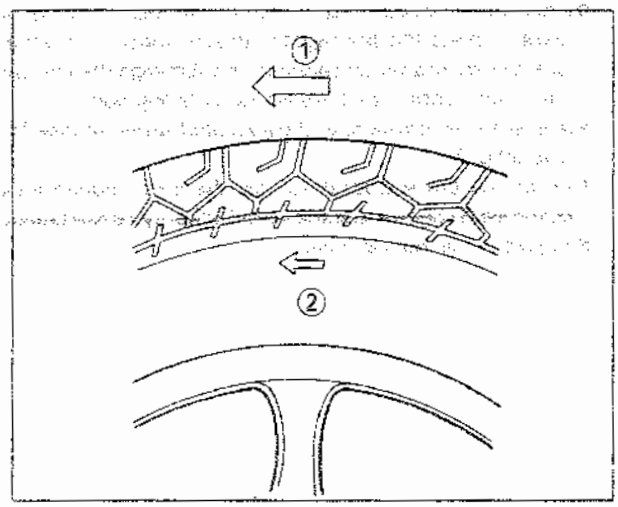
CAUTION

Do not use engine oil or petroleum distillates to lubricate the stem because they will deteriorate the rubber.

● Apply a soap and water solution, or rubber lubricant to the rim flange and tire beads.
● Check the tire rotation mark on the front and rear tires and install them on the rim accordingly.

NOTE

○ *The direction of the tire rotation is shown by an arrow on the tire sidewall.*



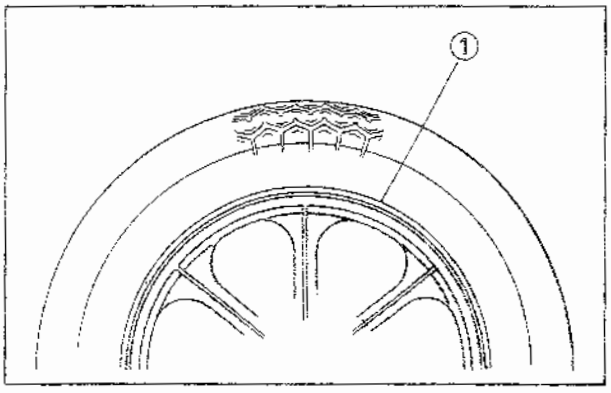
1. Rotation Direction
2. Rotation Mark (Arrow)

● Position the tire on the rim so that the valve is at the tire balance mark (the chalk mark made during removal, or the yellow paint mark on a new tire).
● Install the tire on the rim using a suitable commercially available tire changer.
● Lubricate the tire beads and rim flanges with a soap and water solution or rubber lubricant to help seat the tire beads in the sealing surfaces of the rim while inflating the tire.
● Center the rim in the tire beads, and inflate the tire with compressed air until the tire beads seat in the sealing surfaces.

⚠WARNING

Be sure to install the valve core whenever inflating the tire, and do not inflate the tire to more than 400 kPa (4.0 kg/cm², 57 psi). Overinflation can explode the tire with possibility of injury and loss of life.

● Check to see that the rim lines on both sides of the tire sidewalls are parallel with the rim flanges.



1. Rim Line

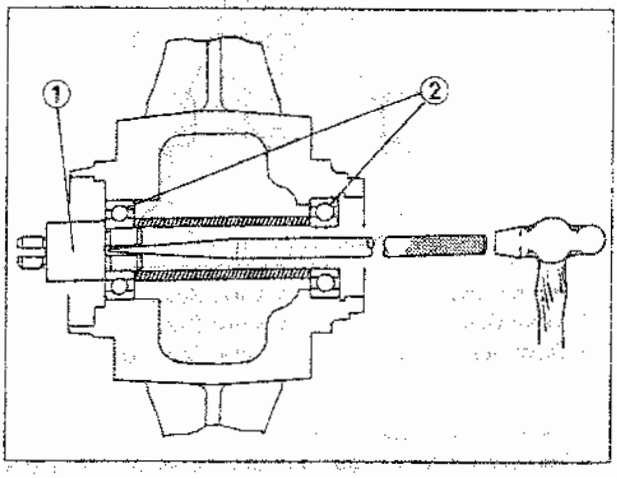
● If the rim flanges and tire sidewall rim lines are not parallel, remove the valve core. Lubricate the rim flanges and tire beads. Install the valve core and inflate the tire again.

- After the tire beads seat in the rim flanges, check for air leaks. Inflate the tire slightly above standard inflation. Use a soap and water solution or submerge the tire, and check for bubbles that would indicate leakage.
- Adjust the air pressure to the specified pressure (see Tire Inspection).
- Install the brake disc(s) so that the disc rotation mark aligns with the tire rotation (see Brake System chapter).
- Adjust the wheel balance.

Hub Bearings

Removal

- Remove the following.
  Wheel (see this chapter)
  Oil Seals and Circlips
- Use the bearing remover (special tool) to remove the hub bearings



1. Bearing Remover Set: 57001-1264
2. Hub Bearing

CAUTION

Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

Installation

- Install the bearings by using the bearing driver set (special tools: 57001-1129).

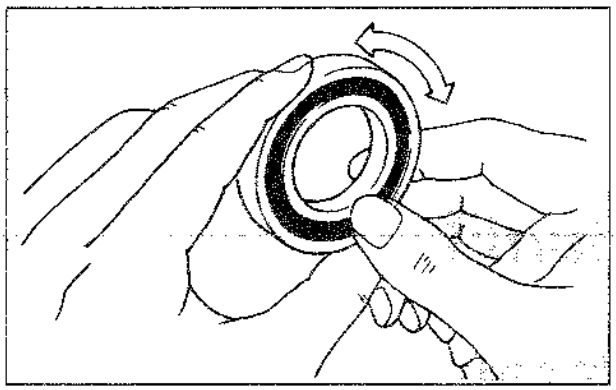
NOTE

○*Install the bearings so that the marked side faces out.*

Inspection

- Turn each bearing back and forth while checking for roughness or binding. If roughness or binding is found, replace the bearing.
- Examine the bearing shield or seal for damage or leakage.

★If the shield or seal is damaged or is leaking, replace the bearing.



Lubrication

NOTE

○*Since the hub bearings are packed with grease and sealed or shielded, they are not required to be removed for lubrication.*

Speedometer Gear Housing

Disassembly and Assembly

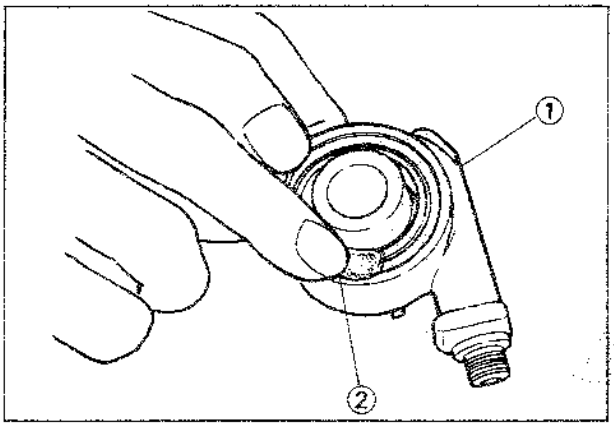
NOTE

○*It is recommended that the assembly be replaced rather than attempting to repair the components.*

● Install the speedometer gear housing so that it fits in the speedometer gear drive notches (see Front Wheel Installation).

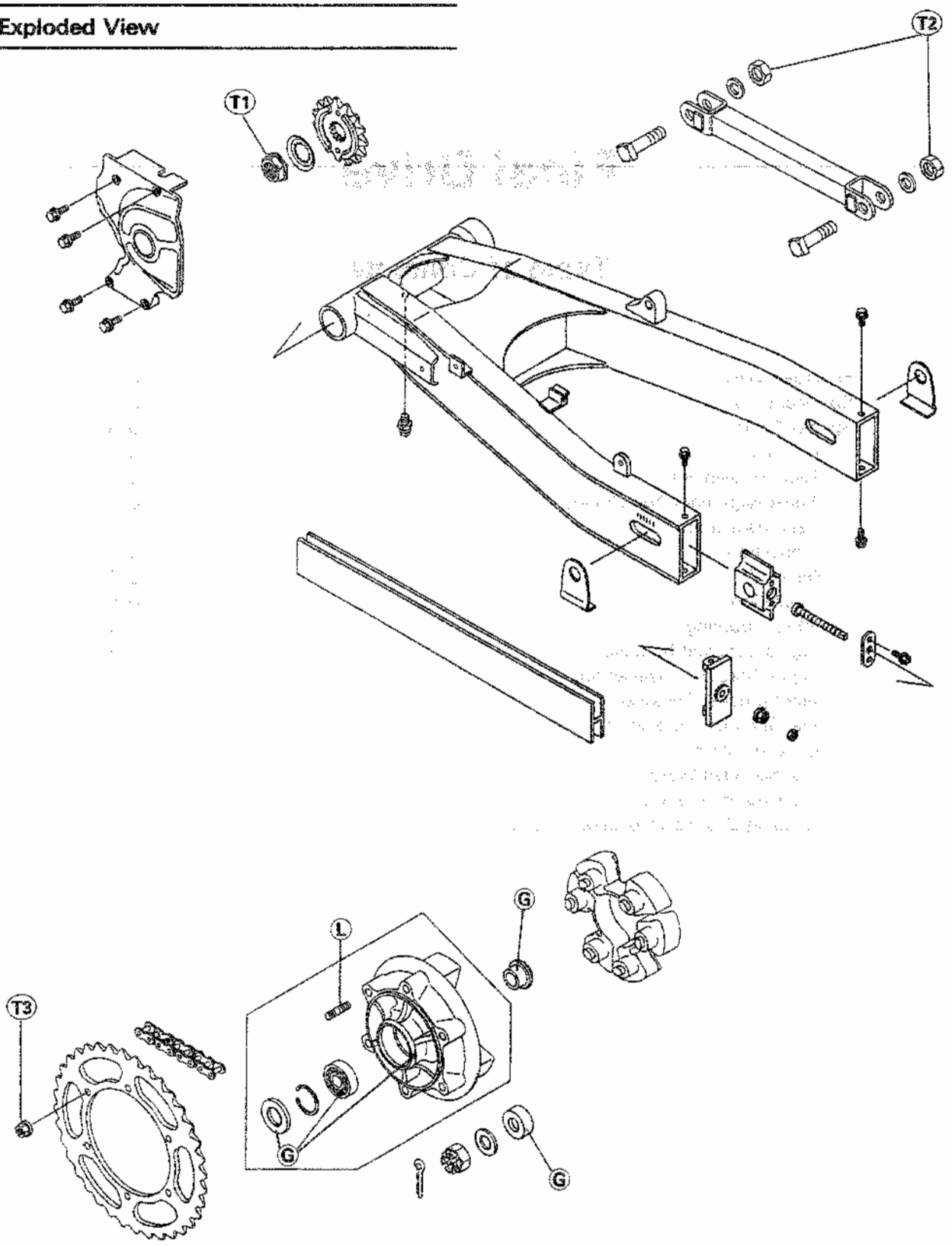
Lubrication

● Clean and grease the speedometer gear housing.



1. Speedometer Gear Housing 2. Grease.

Exploded View



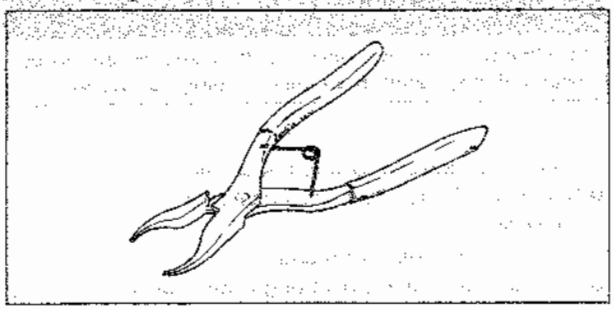
G : Apply grease.
L : Apply a non-permanent locking agent.
T1: 98 N-m (10.0 kg-m, 72 ft-lb)
T2: 34 N-m (3.5 kg-m, 25 ft-lb)
T3: 74 N-m (7.5 kg-m, 54 ft-lb)

Specifications

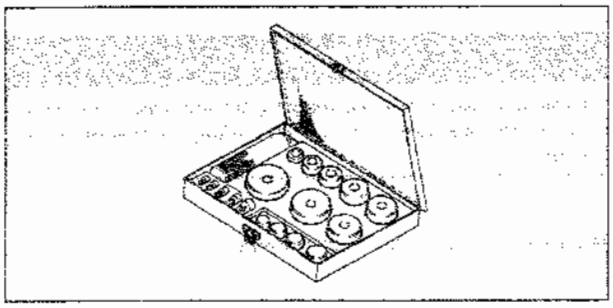
Item	Standard	Service Limit
Drive Chain:		
Make and type	Endless 110 links (ZX600D), 112 links (ZX500C) ENUMA EK50MV-0	– – –
Chain slack	35 ~ 40 mm	(Usable range) Less than 35 mm, or more than 45 mm
20-link length	317.5 ~ 318.4 mm	323 mm
Sprockets:		
Rear sprocket warp	0.4 mm or under	0.5 mm

Special Tools

Inside Circlip Pliers: 57001-143



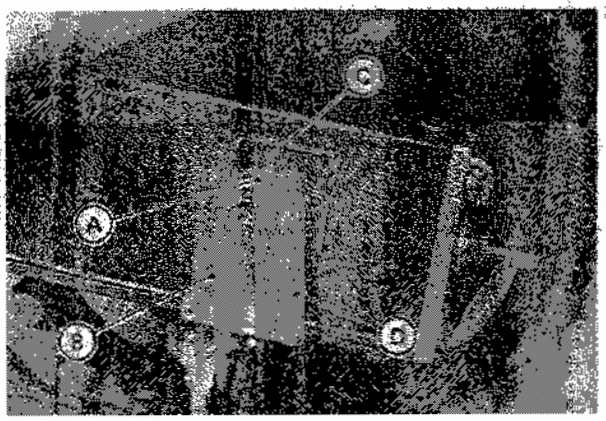
Bearing Driver Set: 57001-1129



Drive Chain

Slack Adjustment

●Set the motorcycle up on its center stand.
●Check to see that the notches on the alignment indicators on both sides are in the same position.

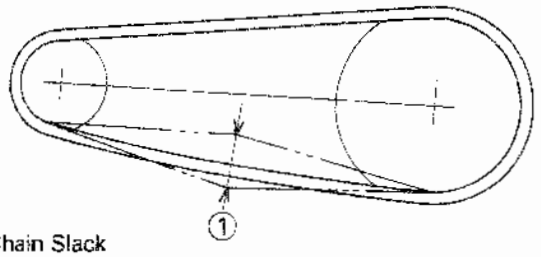


A. Notch
B. Alignment Indicator
C. Swing Arm Marks
D. Cotter Pin

NOTE

○*Clean the chain if it is dirty, and lubricate it if it appears dry.*

●Turn the rear wheel to find the position where the chain is tightest.
●Measure the vertical movement midway between the sprockets.
★If the chain slack exceeds the standard, adjust it as follows.

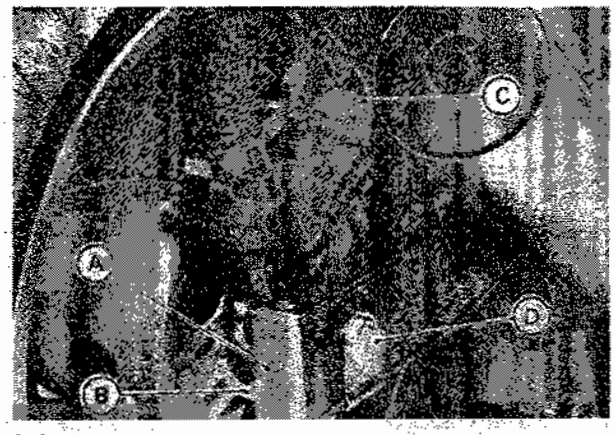


1. Chain Slack

Chain Slack

Standard:	**35 ~ 40 mm**
Usable Range	**Less than 35 mm, or more than 45 mm**

○Loosen the following nuts.
Axle Nut
Both Chain Adjuster Locknuts
Torque Link Nuts



A. Locknut
B. Adjuster
C. Torque Link Nut
D. Axle

●Turn the chain adjusters forward or rearward until the drive chain has the correct amount of chain slack.
●The right and left notches on the alignment indicators should point to the same marks or positions on the swing arm (see above).

⚠WARNING

Misalignment of the wheel will result in abnormal wear and may result in an unsafe riding condition.

○Tighten the adjuster locknuts securely.
●Tightening Torque (see Exploded View):
Axle Nut
Torque Link Nuts (front and rear)
●Insert a new cotter pin through the axle and nut, and spread its ends.

⚠WARNING

If the axle nut is not securely tightened and the cotter pin is not installed, an unsafe riding condition may result.

●Check the rear brake effectiveness.

Wheel Alignment Adjustment

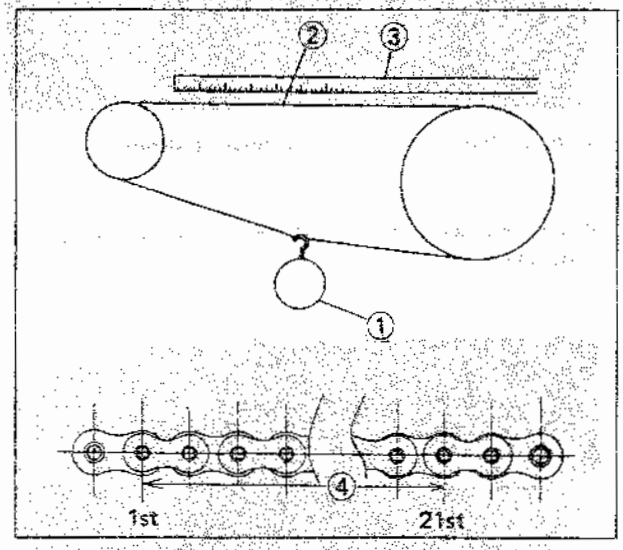
●Check to see if wheel alignment is properly adjusted. The right and left notches on the alignment indicators should point to the same marks or positions on the swing arm.
★If they are not, adjust the chain slack and align the wheel alignment (see Drive Chain Slack Adjustment).

⚠WARNING

Misalignment of the wheel will result in abnormal wear and may result in an unsafe riding condition.

Wear Inspection

- Set the motorcycle up on its center stand.
- Remove the chain cover.
- Stretch the chain taut hanging a 98 N (10 kg, 20 lb) weight on the chain.
- Measure the length of 20 links on the straight part of the chain from pin center of the 1st pin to pin center of the 21st pin. Since the chain may wear unevenly, take measurement at several places.



1. Weight
2. Straight Part
3. Ruler
4. Measure this length.

Drive Chain 20-Link Length

Standard:	**317.5 ~ 318.4 mm**
Service Limit:	**323 mm**

★If any measurement exceeds the service limit, replace the chain. Also, replace the engine and rear sprockets when the drive chain is replaced.

⚠WARNING

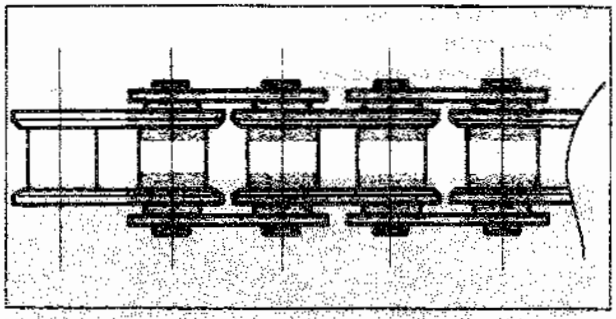
For safety, use only the standard chain. It is an endless type and should not be cut for installation.

Lubrication

CAUTION

The O-rings between the side plates seal in the lubricant between the pin and the bushing. To avoid damaging the O-rings and resultant loss of lubricant, observe the following rules.
Use only kerosene or diesel oil for cleaning an O-ring drive chain. Any other cleaning solution such as gasoline or trichloroethylene will cause deterioration and swelling of the O-rings.
Immediately blow the chain dry with compressed air after cleaning.
Complete cleaning and drying the chain within 10 minutes.

- If a special lubricant is not available, a heavy oil such as SAE 90 is preferred to a lighter oil because it will stay on the chain longer and provide better lubrication.



■ : Oil Applied Areas

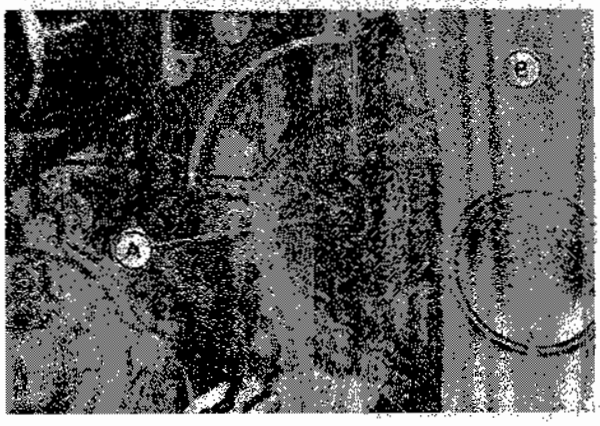
Removal

- Remove the following.
  Engine Sprocket (see this chapter)
  Swing Arm (see Suspension chapter)

NOTE

○*The swing arm may be moved with the rear wheel left installed on it.*

- Remove the drive chain from the output shaft.



A. Output Shaft
B. Drive Chain

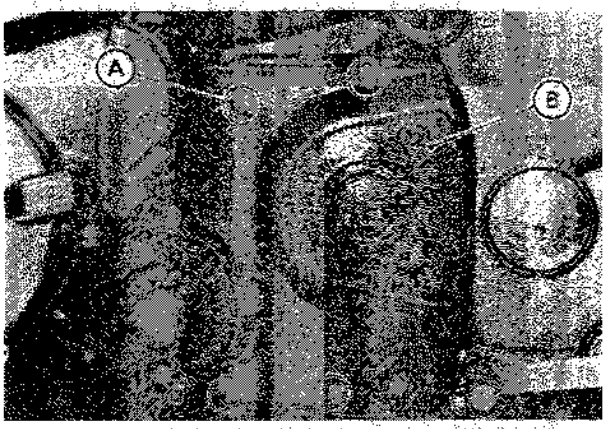
Installation

- Installation is the reverse of removal. Note the following.
- Install the following parts.
  Swing Arm (see Suspension chapter)
  Rear wheel (see wheels/Tires chapter)
  Engine Sprocket (see this chapter)
- Adjust the drive chain (see this chapter).

Sprocket, Coupling

Engine Sprocket Removal

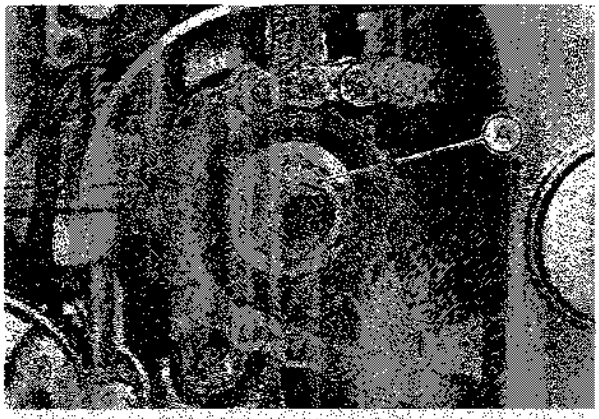
● Remove the following.
Shift Pedal
Engine Sprocket Cover
Engine Sprocket Nut



A. Bolts B. Engine Sprocket Cover

NOTE

○ *When loosening the engine sprocket nut, hold the rear brake on.*



A. Engine Sprocket Nut

● Loosen the drive chain (see Drive Chain Slack Adjustment).
● Remove the drive chain from the rear sprocket toward the left.



A. Drive Chain B. Rear Sprocket

● Pull the engine sprocket off the output shaft along with the chain.



● Remove the engine sprocket.

Engine Sprocket Installation

● Installation is the reverse of removal. Note the following.
● Replace the sprocket lockwasher and the rear axle cotter pin.
● Either side of the sprocket may be faced out.
● Tighten the following fasteners to the specified torque (see Exploded View).
Engine Sprocket Nut
Axle Nut (see Wheels/Tires chapter)
Torque Link Nuts (front and rear)
● Bend the lockwasher after tightening the engine sprocket nut.

Rear Sprocket Removal

●Remove the rear wheel (see Wheels/Tires chapter).

CAUTION

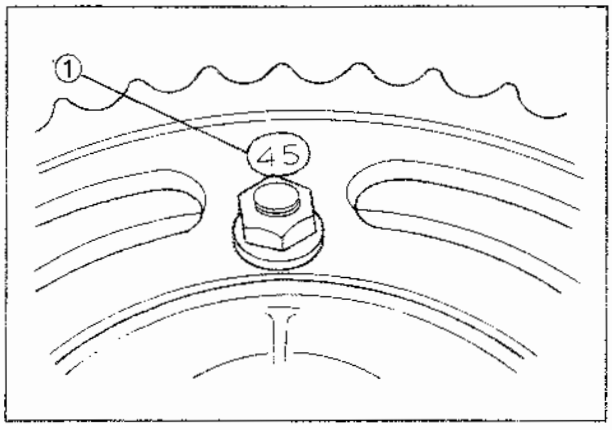
Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

●Pull out the rear wheel coupling from the rear wheel.
●Remove the rear sprocket nuts.
●Remove the rear sprocket.

Rear Sprocket Installation

●Installation is the reverse of removal. Note the following.

○Install the sprocket facing the tooth number marking outward.



1. Tooth Number Marking

●Tighten the rear sprocket nuts to the specified torque (see Exploded View).
●Install the rear wheel (see Wheels/Tires chapter).

Sprocket Wear

●Visually inspect the engine and rear sprocket teeth.

★If the teeth are worn as illustrated, replace the sprocket, and inspect the drive chain and engine sprocket (see Drive Chain Wear Inspection).

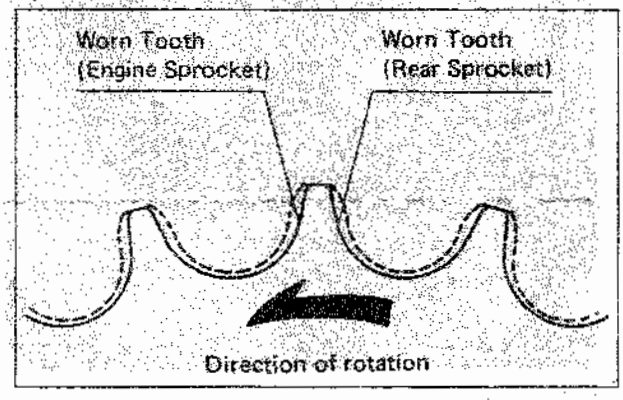
CAUTION

If a sprocket requires replacement, the drive chain is probably worn also. Upon replacing the rear sprocket, inspect the chain and engine sprocket.

NOTE

○*Sprocket wear is exaggerated for illustration.*

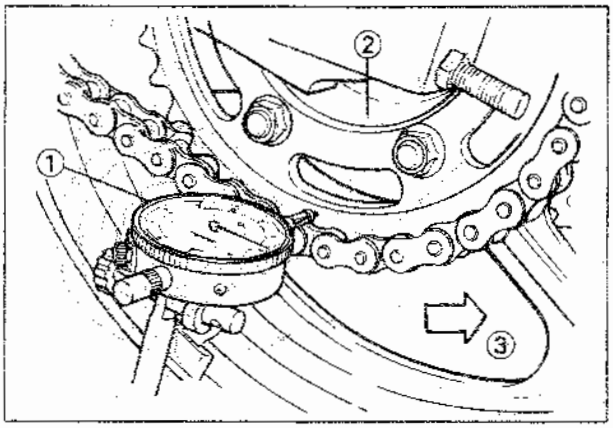
Sprocket Teeth



Rear Sprocket Warp

●Set the motorcycle up on its center stand so that the rear wheel will turn freely, and set a dial gauge against the rear sprocket near the teeth as shown. Turn the rear wheel. The difference between the highest and lowest dial gauge readings is the amount of runout (warp).

★If the runout exceeds the service limit, replace the rear sprocket.



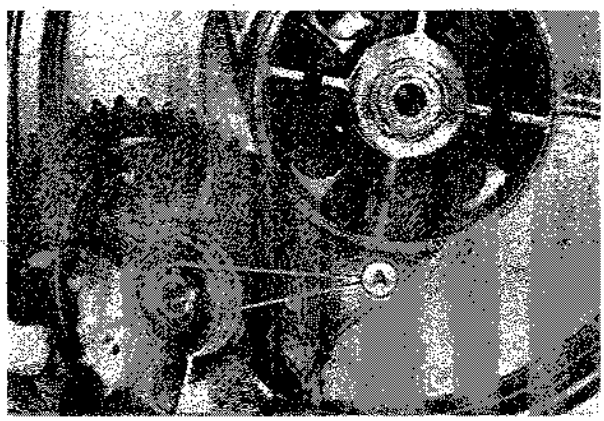
1. Dial Gauge
2. Rear Sprocket
3. Turn.

Rear Sprocket Warp

Standard:	**0.4 mm or under**
Service Limit:	**0.5 mm**

Coupling Installation

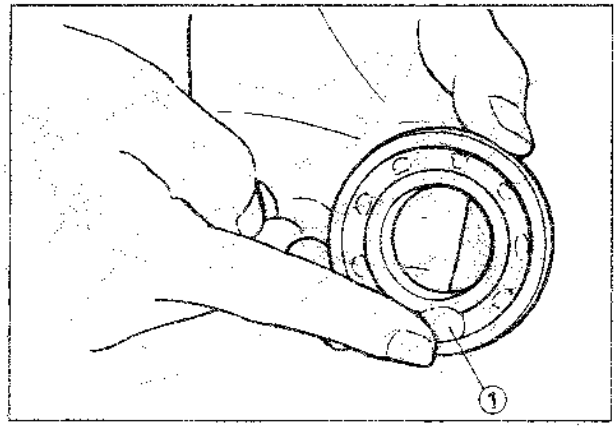
●Grease the following.
Ball Bearing
Coupling Grease Seal
Coupling Internal Surface



A. Grease here.

Coupling Bearing Inspection, Lubrication

- Remove the coupling bearing.
- Wipe the old grease out of the coupling before bearing installation.
- Wash the bearings with a high-flash point solvent, and dry them (do not spin them while they are dry).
- Inspect the bearing for damage. Replace the damaged bearing.
- Pack the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing.



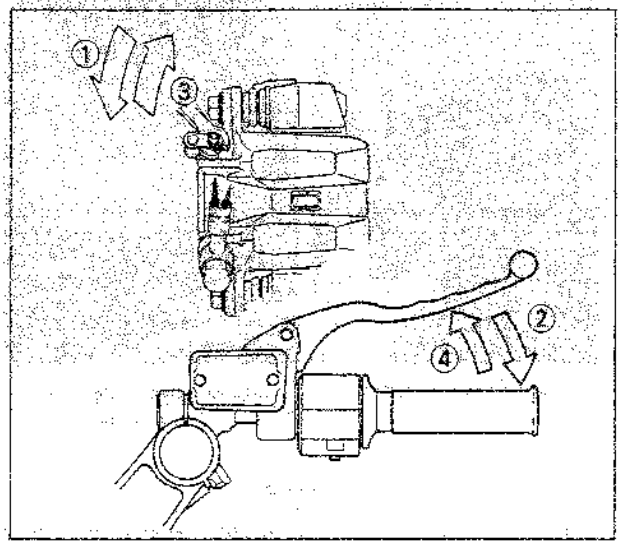
1. Grease

Brakes

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● Remove the reservoir cap and the rubber cap on the bleed valve.
● Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
● Fill the reservoir with new brake fluid.
● Change the brake fluid as follows:



1. Open the bleed valve.
2. Apply the brake and hold it.
3. Close the bleed valve.
4. Release the brake lever.

● Check the fluid level in the reservoir often, replenishing it as necessary.

NOTE

○ *If the fluid in the reservoir runs completely out any time during fluid changing, air will enter the line, and the system must be bled.*
○ *Front Brake: Repeat the above steps one more time for the other caliper.*
○ *Rear Brake: Repeat the above steps one more time for the other bleed valve.*

● Repeat this operation until fresh brake fluid comes out into the plastic hose or the color of the fluid changes.

⚠WARNING

Do not mix two brands of fluid. Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified.

Bleeding the Brake Line

NOTE

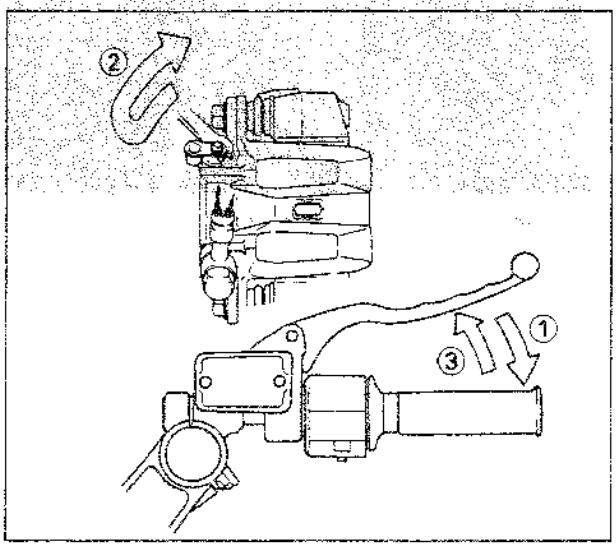
○ *The procedure to bleed the front brake line is as follows. Bleeding the rear brake line is the same as for the front brake.*

● Bleed the air whenever brake parts are replaced or reassembled.
● Remove the reservoir cap and fill the reservoir with fresh brake fluid.
● Slowly pump the brake lever or pedal several times until no air bubbles can be seen rising up through the fluid from the hose at the bottom of the reservoir. This bleeds the air from the master cylinder and the brake line.

NOTE

○ *Tap the brake hose lightly going from the caliper to the reservoir side and bleed the air off at the reservoir.*

● Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
● Bleed the brake line and the caliper as follows:



1. Hold the brake applied.
2. Quickly open and close the valve.
3. Release the brake.

● The fluid level must be checked several times during the bleeding operation and replenished as necessary.

NOTE

○ *If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.*
○ *Front Brake: Repeat the above steps one more time for the other caliper.*
○ *Rear Brake: Repeat the above steps one more time for the other bleed valve.*
○ *If the brake lever action still feels soft or spongy, tap the brake hose from bottom to top and air will rise up to the*

top part of the hose. Slowly pump the brake lever in the same manner as above.

⚠WARNING

When working with the disc brake, observe the precautions listed below.

1. Never reuse old brake fluid.
2. Do not use fluid from a container that has been left unsealed or that has been open for a long time.
3. Do not mix two types and brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.
4. Don't leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid.
5. Don't change the fluid in the rain or when a strong wind is blowing.
6. Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely and will eventually deteriorate the rubber used in the disc brake.
7. When handling the disc pads or disc, be careful that no disc brake fluid or any oil gets on them. Clean off any fluid or oil that inadvertently gets on the pads or disc with a high-flash point solvent. Do not use one which will leave an oily residue. Replace the pads with new ones if they cannot be cleaned satisfactorily.
8. Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely wiped up immediately.
9. If any of the brake line fittings or the bleed valve is opened at any time, the **AIR MUST BE BLED FROM THE BRAKE.**

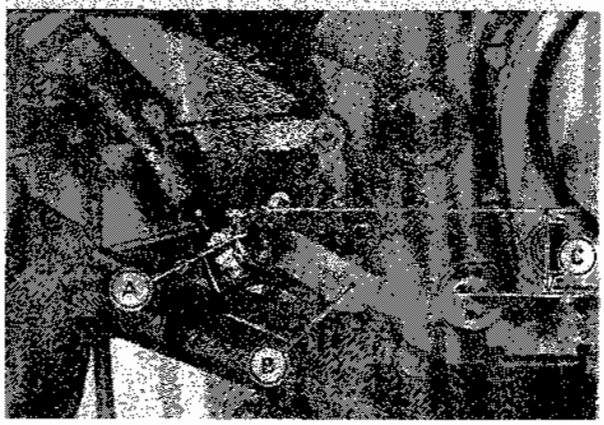
Brake Pedal

Brake Pedal Position Adjustment

● Check that the brake pedal is in the correct position.

Pedal Position

Standard: **About 55 mm below top of footpeg**

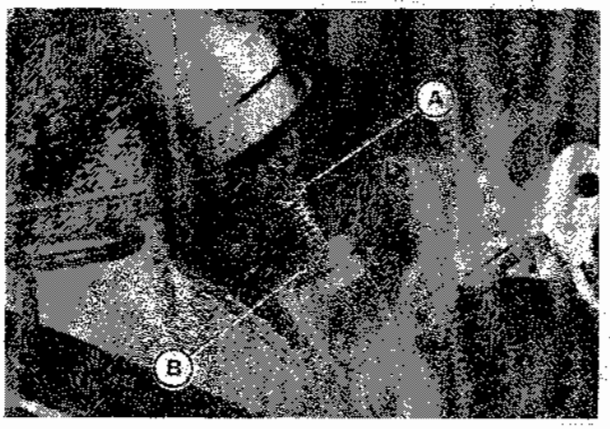


A. Footpeg
B. Brake Pedal
C. Pedal Position

NOTE

○ *Usually it is not necessary to adjust the pedal position, but always adjust it when tampering with the hex head on the master cylinder.*

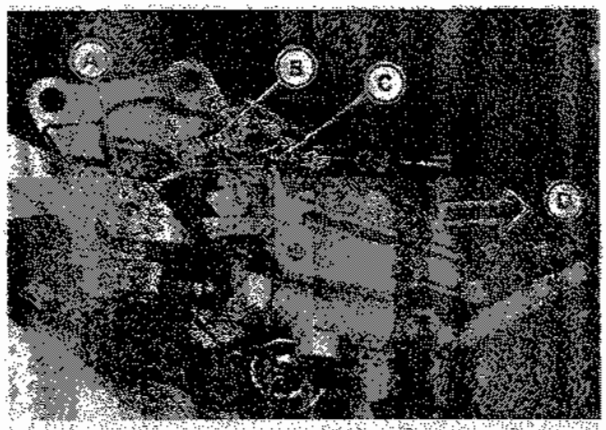
● Loosen the locknut and turn the push rod with the hex head to achieve correct pedal position.
● Tighten the locknut to the specified torque (see Exploded View).



A. Hex Head
B. Locknut

Removal

● Remove the following.
Front Footpeg Bracket (right side)
Brake Pedal Return Spring
Brake Switch Spring
Brake Shaft Bolt

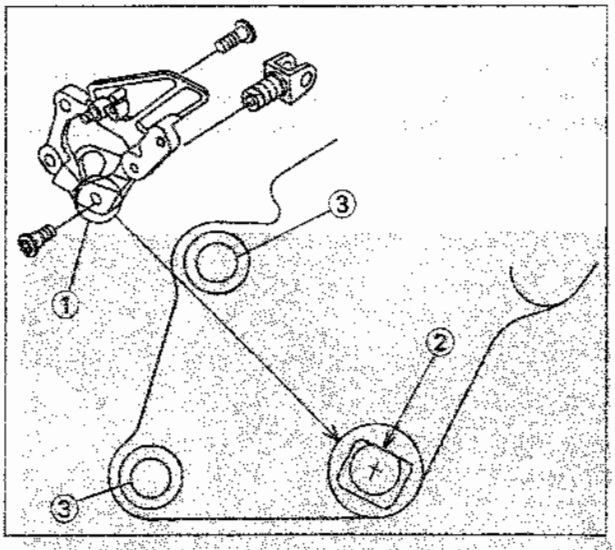


A. Brake Shaft Bolt
B. Return Spring
C. Brake Switch Spring
D. Front

● Pull out the brake pedal and shaft.

Installation Notes

● Grease the brake shaft.
● Insert the brake shaft into the footpeg bracket noting the position of the brake shaft flat.



1. Footpeg Bracket Hole
2. Brake Shaft Flat
3. Bolt Holes

● Apply a non-permanent locking agent to the threads of the brake shaft bolt and tighten it to the specified torque (see Exploded View).
● Check the brake pedal position and adjust it if necessary (see Brake Pedal Position Adjustment).

Calipers

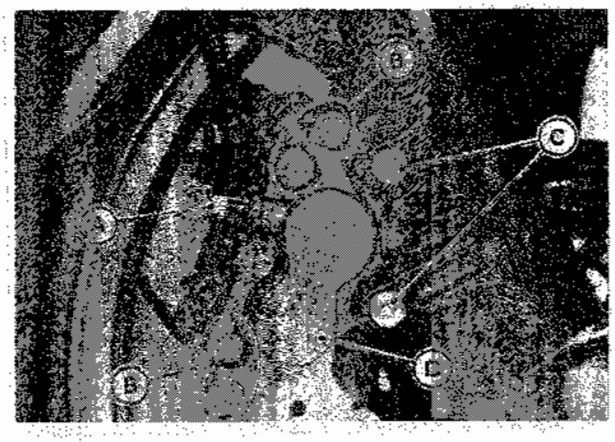
Caliper Removal

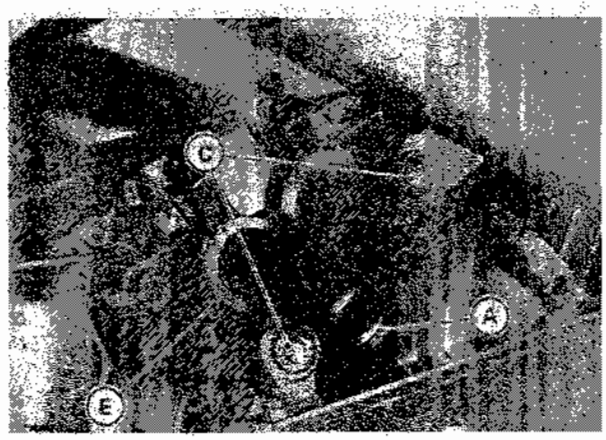
● Remove the following.
Banjo Bolt (at the caliper)
Caliper Mounting Bolts

CAUTION

Do not loosen the caliper bolts on the front caliper. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper bolts will cause brake fluid leakage.

● Remove the caliper.





A. Banjo Bolt
B. Caliper Bolts
C. Caliper Mounting Bolts
D. Front Caliper
E. Rear Caliper

CAUTION

Immediately wipe up any brake fluid that spills.

Caliper Installation

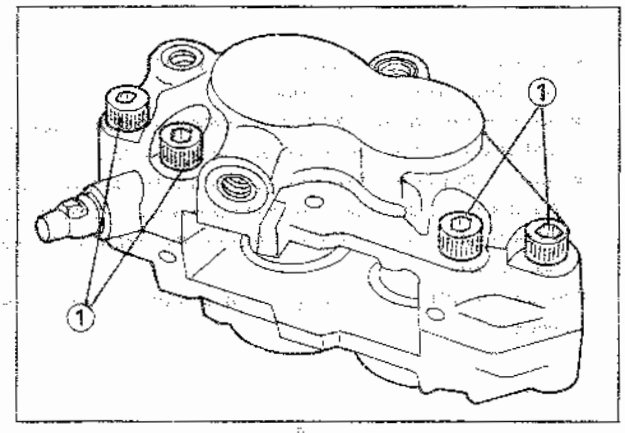
- Tighten the caliper mounting bolts to the specified torque (see Exploded View).
- Connect the brake hose to the caliper putting a new flat washer on each side of the brake hose fitting.
- Tighten the banjo bolt to the specified torque (see Exploded View).
- Check the fluid level in the master cylinder (reservoir), and bleed the brake line (see Bleeding the Brake).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠WARNING

Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brakes will not function on the first application of the lever or pedal if this is not done.

Front Caliper Disassembly

- Remove the following.
  Front Caliper (see this chapter)
  Front Brake Pads (see this chapter)
- Remove the caliper bolts and split the front caliper.

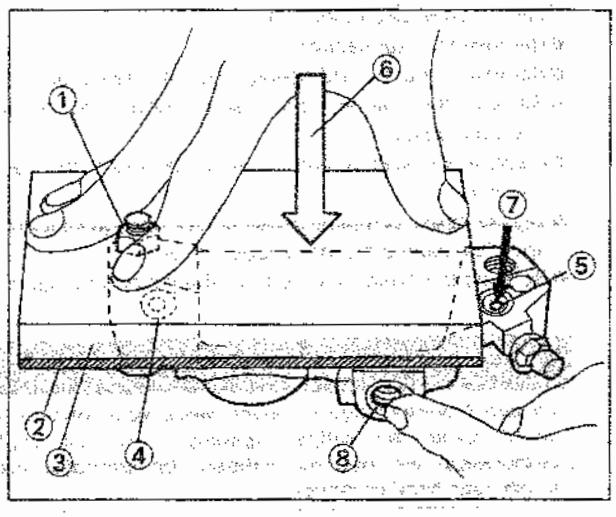


1. Caliper Bolts

- Remove the piston insulator and the O-rings.
- Using compressed air, remove the pistons. One way to remove the pistons is as follows.

○ Install a wooden board more than 10 mm thick and a rubber gasket on the caliper half as shown. Leave one of the oil passages open.

○ Lightly apply compressed air to the oil passage until the pistons hit the rubber gasket. Block the hose joint opening during this operation.

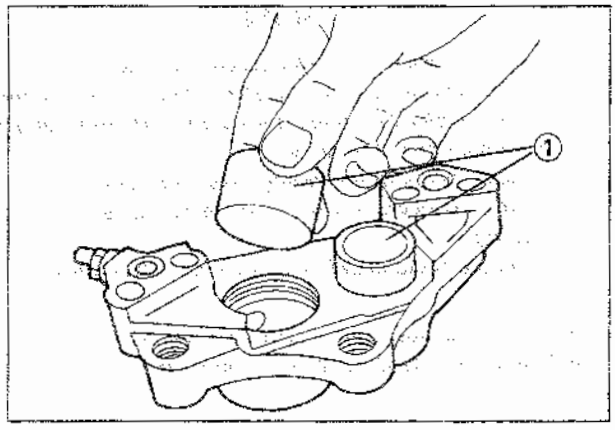


1. Bolt and Nut
2. Rubber Gasket
3. Wooden Board
4. Oil Passage sealed by Rubber Gasket
5. Oil Passage
6. Push down.
7. Apply compressed air.
8. Hose Joint Opening

⚠WARNING

To avoid serious injury, never place your fingers or palm in front of the piston. If you apply compressed air into the caliper, the piston may crush your hand or fingers.

○ Pull out the pistons by hand.



1. Pistons

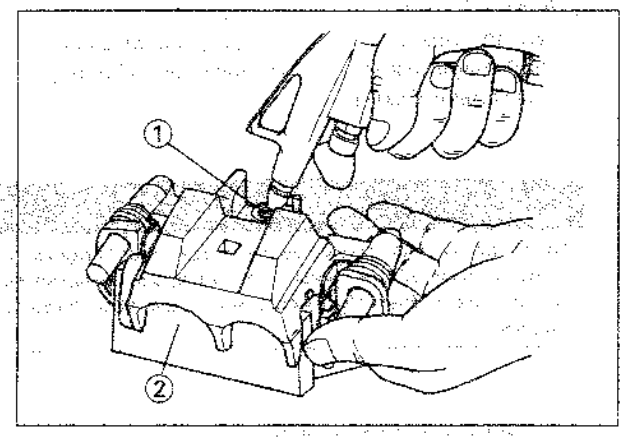
- Remove the following.
  Dust Seals
  Fluid Seals
- Repeat the previous step to remove the pistons from the other side of the caliper body.

Rear Caliper Disassembly

- Remove the rear caliper.
- Remove the pads and spring (see Pad Removal).
- Remove the caliper holder, shaft rubber friction boot and dust cover.
- Insert a wooden board 5 mm thick inside the caliper opening.
- Lightly apply compressed air to the hose joint opening until the pistons hit the wooden board.
- Remove the board and pull out the pistons by hand.

⚠WARNING

To avoid serious injury, never place your fingers or palm inside the caliper opening. If you apply compressed air into the caliper, the piston(s) may crush your hand or fingers.



1. Apply compressed air. 2. Wooden Board

NOTE

○If the rear caliper is to be disassembled after removal and compressed air is not available, remove the piston(s) using the following three steps before disconnecting the brake hose from the caliper.

○Remove the pads and spring (see Pad Removal).

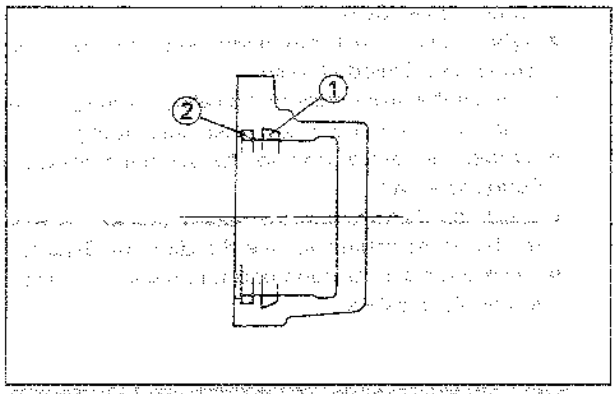
○Insert a wooden board 5 mm thick inside the caliper opening.

○Pump the brake pedal to remove the caliper pistons.

- Remove the dust seal(s) and fluid seal(s).
- Remove the bleed valve and rubber cap.

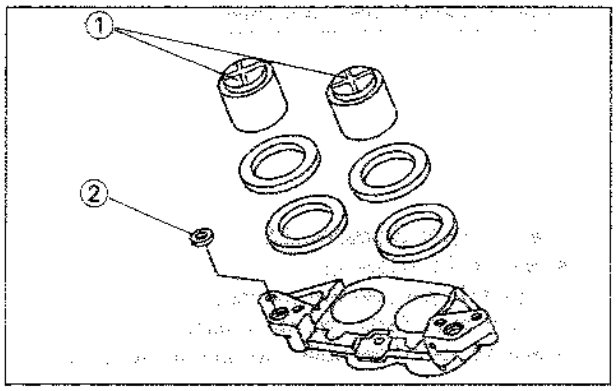
Assembly Notes

- Tighten the bleed valve to the specified torque (see Exploded View).
- It is recommended that the fluid seal, which is removed, be replaced with a new one.
- Replace the O-rings (front caliper) and the dust seal if they are damaged.
- Apply brake fluid to the cylinders, pistons, and fluid seals, and push the pistons into the cylinders by hand. Take care that neither the cylinder nor the piston skirt get scratched.



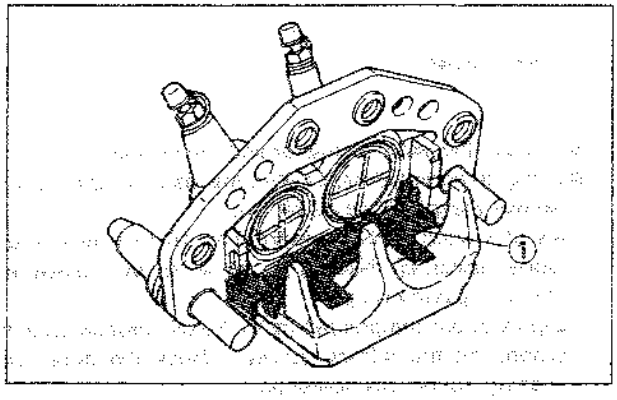
1. Fluid Seal 2. Dust Seal

- Be sure to install the following (front caliper).



1. Piston Insulators 2. O-Rings

- Tighten the caliper bolts to the specified torque (see Exploded View, front caliper).
- Replace the caliper holder shaft rubber friction boot and dust cover if they are damaged (rear caliper).
- Apply a thin coat of silicone grease to the caliper holder shafts and holder holes (silicone grease is a special high temperature, water-resistant grease, see Exploded View, rear caliper).
- Install the anti-rattle spring in the caliper as shown (rear caliper).



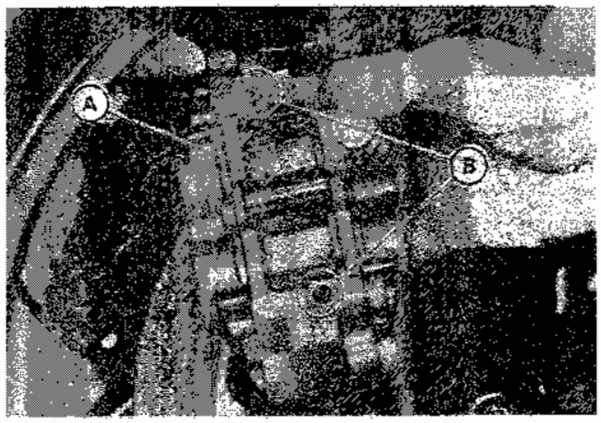
1. Anti-Rattle Spring

- Install the pads (see Pad Installation).

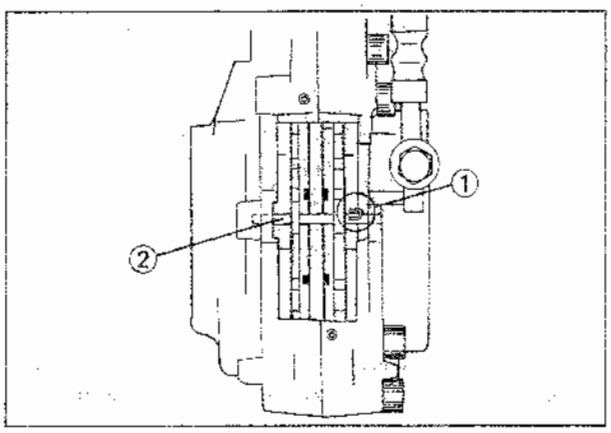
Brake Pads

Front Brake Pad Removal

●Remove the following.
Front Caliper
Pad Spring
Clip
Pad Pin



A. Pad Spring B. Screws



1. Clip 2. Pad Pin

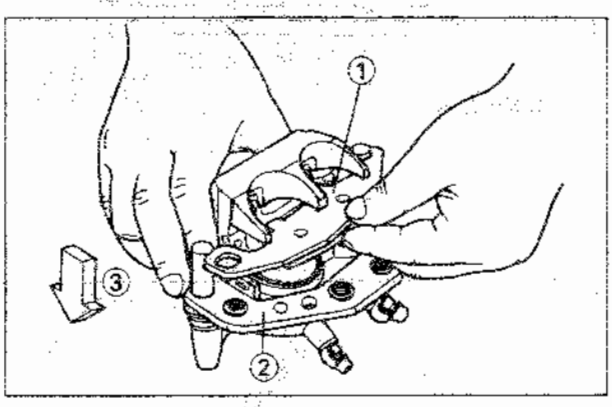
●Remove the brake pads.



A. Pads

Rear Brake Pad Removal

●Remove the rear caliper with the hose installed (see this chapter).
●Take off the piston side pad from the caliper holder.
●Push the caliper holder to the piston side, and then remove the pad from the caliper holder shaft.



1. Pad 3. Push the caliper holder.
2. Caliper Holder

Installation Notes

●Push the caliper pistons in by hand as far as they will go.
●For the front brake pad, install the pad pin(s) and clip(s) as shown. The clip(s) must be "outside" of the pads (see Front Brake Pad Removal).

⚠WARNING

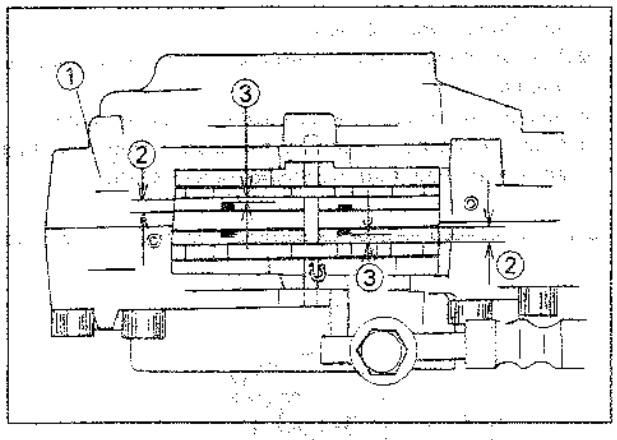
Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brake will not function on the first application of the lever or pedal if this is not done.

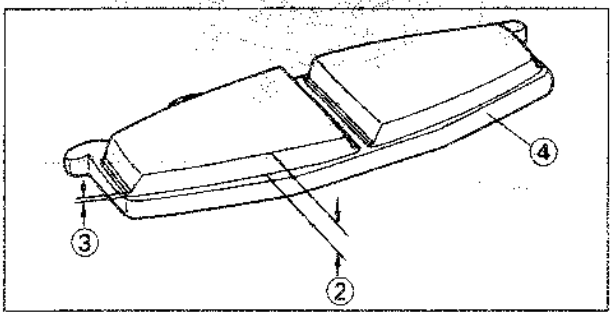
Lining Wear

●Remove the caliper(s) with the hose installed (see this chapter).
●For the front caliper pad inspection, remove the pad spring.
★If the lining thickness of either pad is less than the service limit, replace both pads in the caliper as a set.

Pad Lining Thickness (front and rear)

Front
Standard: **4.0 mm**
Service Limit: **1 mm**
Rear
Standard: **4.35 mm**
Service Limit: **1 mm**





1. Front Caliper
2. Lining Thickness
3. Service Limit
4. Rear Caliper Pad

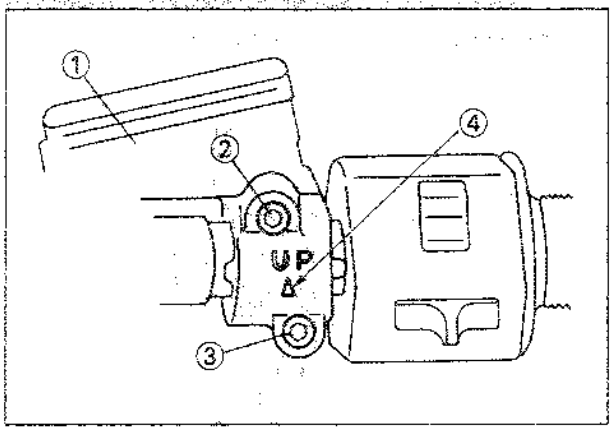
Master Cylinders

Front Master Cylinder Removal

- Drain the front brake fluid (see Brake Fluid Change).
- Remove the following.
  - Brake Hose Banjo Bolt
  - Front Brake Switch Leads
  - Master Cylinder Clamp Bolts
- Remove the front master cylinder.

Front Master Cylinder Installation

- The master cylinder clamp must be installed with the arrow mark upward.
- Tighten the upper clamp bolt first, and then the lower clamp bolts to the specified torque (see Exploded View). There will be a gap at the lower part of the clamp after tightening.

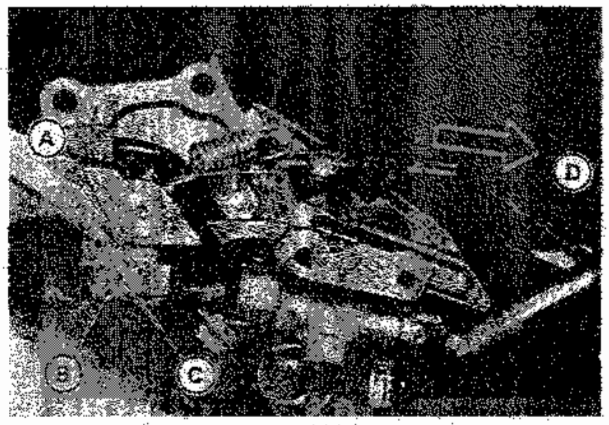


1. Front Master Cylinder
2. Tighten upper clamp bolts first.
3. Lower Clamp Bolt
4. Arrow Mark

- Use a new flat washer on each side of the brake hose fitting.
- Tighten the banjo bolts to the specified torque (see Exploded View).

Rear Master Cylinder Removal Notes

- Drain the rear brake fluid (see Brake Fluid Change).
- Loosen the rear master cylinder mounting bolts and banjo bolt.
- Remove the following.
  - Front Footpeg Bracket (right side)
  - Banjo Bolt
  - Brake Hose
- Remove the cotter pin and then pull the joint pin out of the push rod clevis and brake pedal.



A. Clevis
B. Cotter Pin
C. Joint Pin
D. Front

● Remove the master cylinder by taking off the mounting bolts.

Rear Master Cylinder Installation Notes

● Use a new flat washer on each side of the brake hose fitting.
● Tighten the banjo bolts to the specified torque (see Exploded View).
● Tighten the rear master cylinder mounting bolts (2) to the specified torque (see Exploded View).

Inspection and Adjustment after Installation

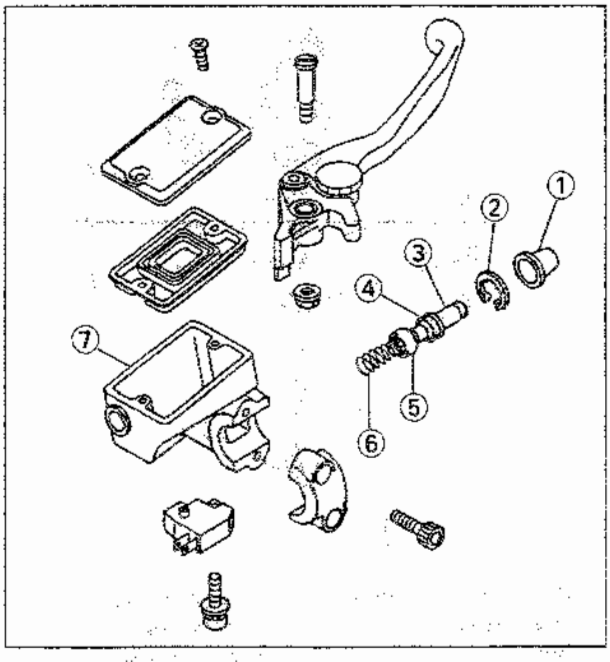
● Fill the brake line with the brake fluid (see Brake Fluid Change).
● Check and adjust the following items after installation.
Brake Pedal Position
Rear Brake Light Switch Timing (see Electrical System chapter)
Brake Line Air Bleed
Brake Drag
Braking Power
Brake Fluid Leakage

Front Master Cylinder Disassembly

● Remove the following parts.
Front Master Cylinder (see this chapter)
Brake Lever Pivot Bolt and Locknut
Brake Lever
Dust Cover
Retainer (use the inside circlip pliers: 57001-143)
Piston with Secondary Cup
Primary Cup
Spring

CAUTION

Do not remove the secondary cup from the piston since removal will damage them.



1. Dust Cover
2. Retainer
3. Piston
4. Secondary Cup
5. Primary Cup
6. Return Spring
7. Reservoir

Rear Master Cylinder Disassembly

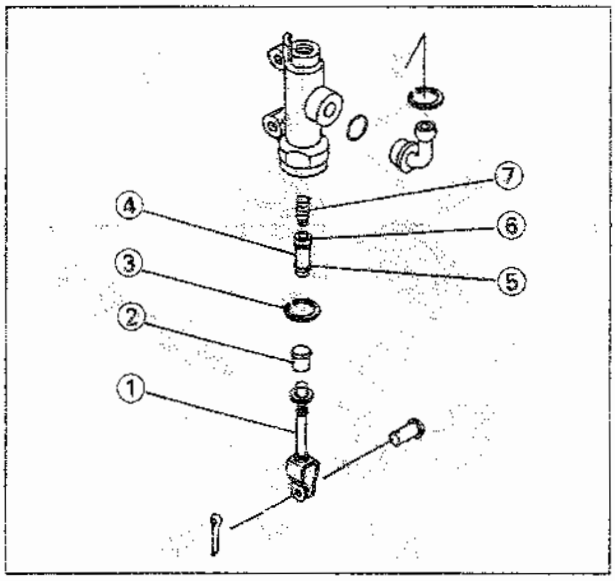
NOTE

○ Do not remove the push rod clevis for master cylinder disassembly since removal requires brake pedal position adjustment.

● Remove the following.
Rear Master Cylinder (see Rear Master Cylinder Removal)
Dust Cover on Push Rod
Retainer (use the inside circlip pliers: 57001-143)
Push Rod with Clevis installed
Piston and Secondary Cup
Primary Cup
Spring

CAUTION

Do not remove the secondary cup from the piston since removal will damage them.



1. Push Rod and Clevis
2. Dust Cover
3. Retainer
4. Piston
5. Secondary Cup
6. Primary Cup
7. Return Spring

Assembly

- Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.
- Apply brake fluid to the removed parts and to the inner wall of the cylinder.

CAUTION

Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely, and will eventually deteriorate the rubber used in the disc brake.

- Take care not to scratch the piston or the inner wall of the cylinder.
- Tighten the brake lever pivot bolt locknut to the specified torque (front brake, see Exploded View).

Inspection (Visually)

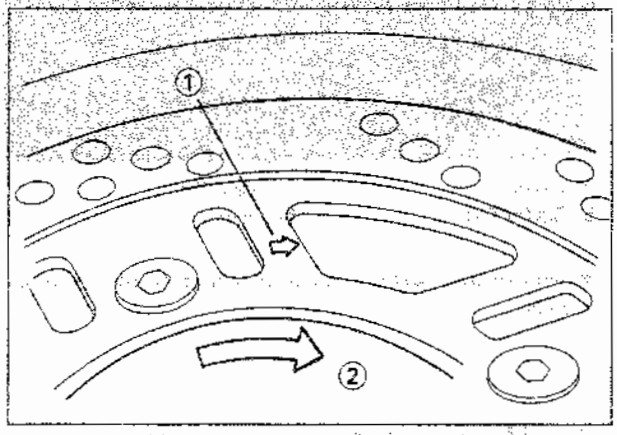
- Disassemble the front or rear master cylinder.
- Check that there are no scratches, wear, rust, or pitting on the following parts.
  - Inside of the Master Cylinder
  - Outside of the Piston
  - Primary Cup
  - Secondary Cup
  - Dust Cover
  - Return Spring
  - Relief and Supply Port Plugged

★If they are damaged, replace them.

Brake Discs

Installation

- Install the brake disc on the wheel so that the rotation mark aligns with the tire rotation.



1. Rotation Mark
2. Rotation Direction

- Tighten the disc mounting bolts to the specified torque (see Exploded View).

Wear

★Replace the disc if the sliding surfaces have worn past the service limit.

Front Disc Thickness

Standard:	**4.3 ~ 4.6 mm**
Service Limit:	**4.0 mm**

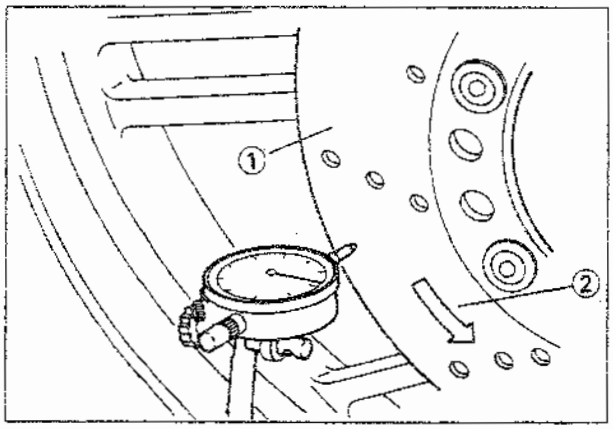
Rear Disc Thickness

Standard:	**5.8 ~ 6.1 mm**
Service Limit:	**5.0 mm**

Warp

- Lift the wheel off the ground using the center stand or the jack (see Wheels/Tires chapter).
- For front disc inspection, turn the handlebar fully to one side.
- Set up a dial gauge against the disc as shown and measure disc runout.

★If runout exceeds the service limit, replace the disc.



1. Brake Disc 2. Turn the wheel by hand.

Disc Runout

Standard:	**0.2 mm or under**
Service Limit:	**0.3 mm**

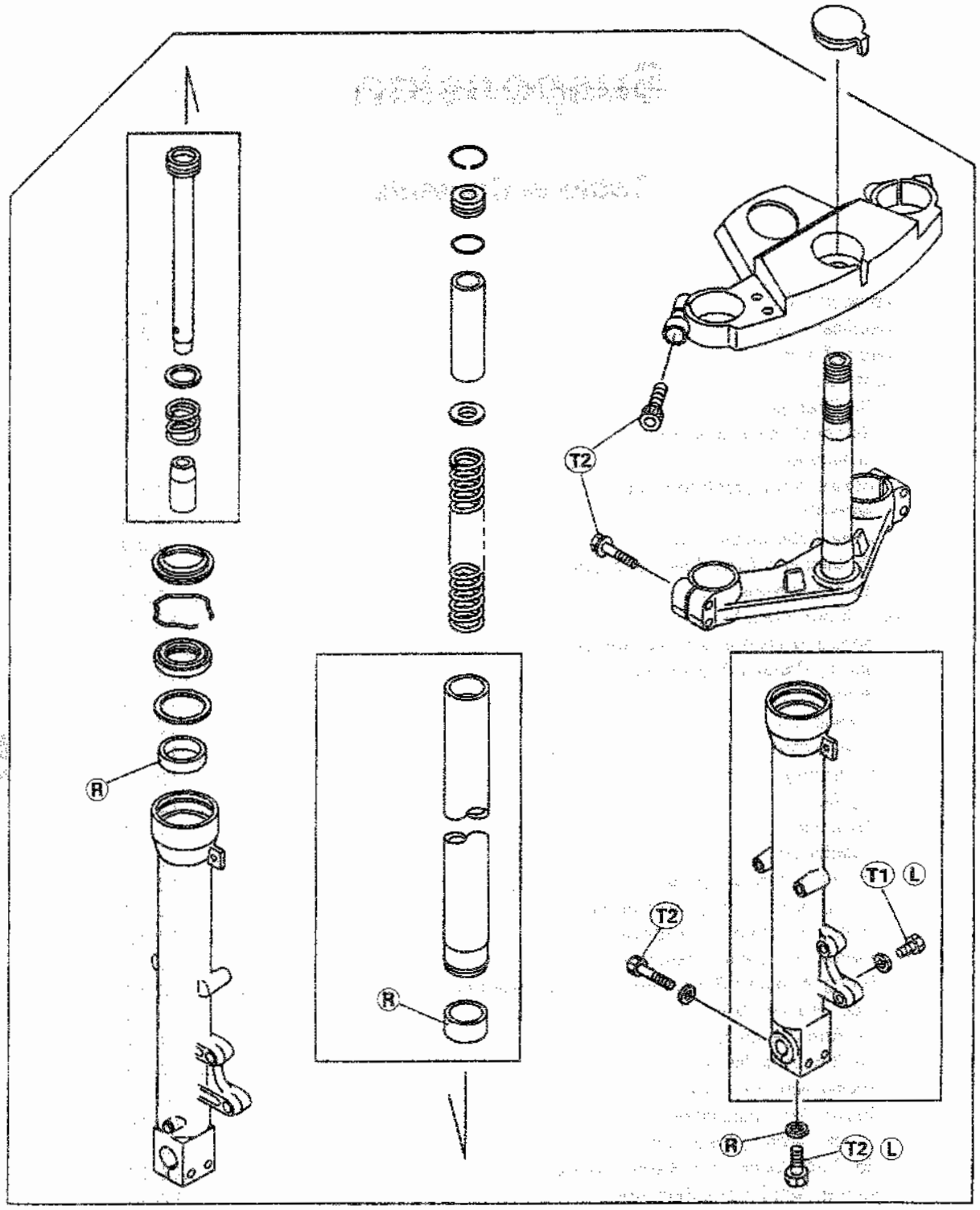


Suspension

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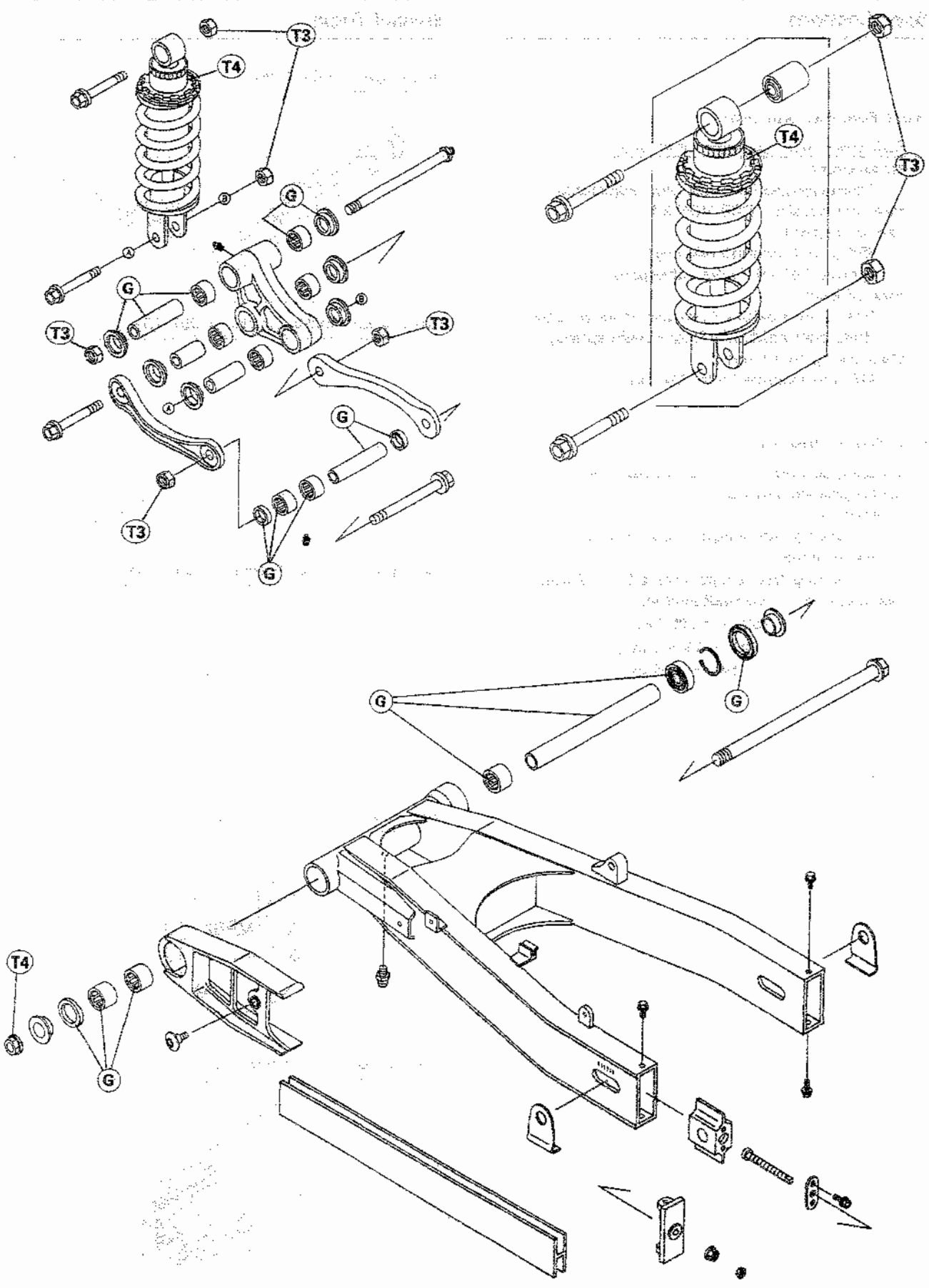
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Exploded View



L : Apply a non-permanent locking agent.
G : Apply grease.
R : Replacement Parts

T1: 7.8 N-m (0.80 kg-m, 69 in-lb)
T2: 20 N-m (2.0 kg-m, 14.5 ft-lb)
T3: 59 N-m (6.0 kg-m, 43 ft-lb)
T4: 88 N-m (9.0 kg-m, 65 ft-lb)


T3
T4
G
T3
T3
T3
G
T3
G
G
T4
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T4
G

Specifications

Front Fork (per one unit)

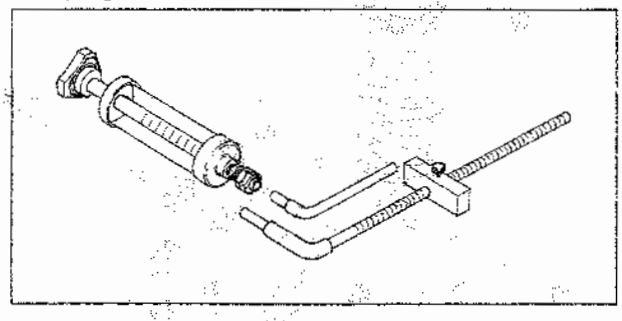
Fork inner tube diameter: φ41 mm
Air pressure:
Atomospheric pressure (non-adjustable)
Fork oil viscosity: SAE 10W-20
Fork oil capacity:
452 ± 4mL (completely dry)
approx. 384 mL (when changing oil)
Fork oil level:
140 ±2 mm below from top of inner tube
(fully compressed, without main spring)
Main spring free length:
415 mm (service limit: 407 mm)

Rear Shock Absorber

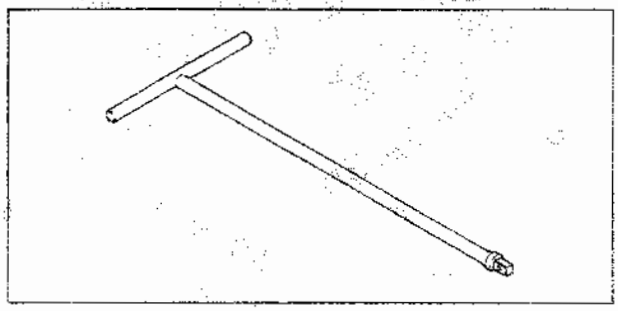
Damping setting: 1 of 3 positions
Spring preload setting:
Standard:
Spring free length minus 8 mm
Usable range:
Spring free length minus 8 ~ 17 mm
Gas pressure: Non-adjustable,
980 ~ 1 280 kPa
(10 ~ 13 kg/cm^2,
142 ~ 185 psi)

Special Tools

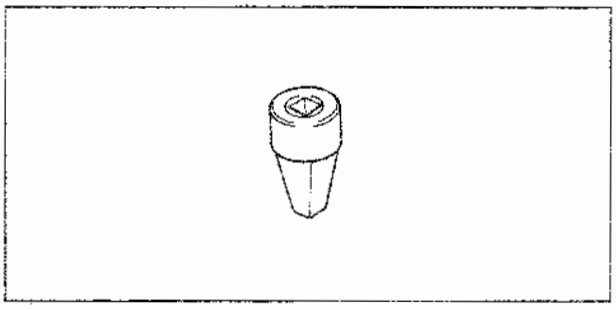
Oil Syringe: 57001-1290



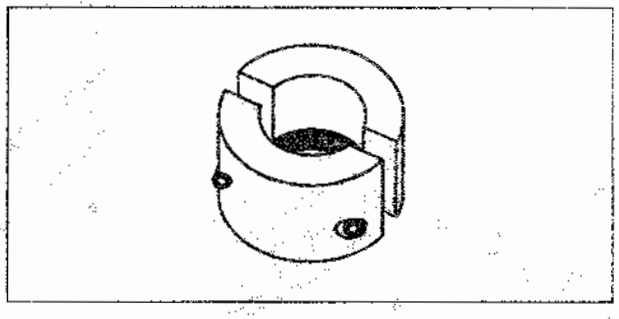
Fork Cylinder Holder Handle: 57001-183



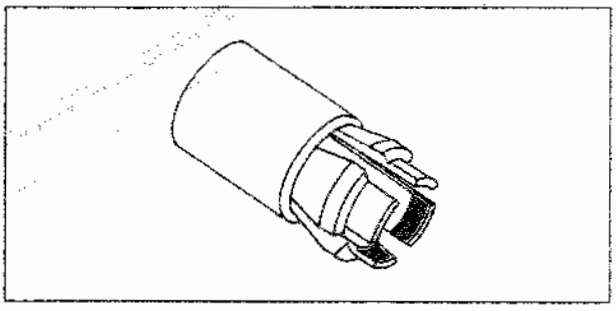
Fork Cylinder Holder Adapter: 57001-1057



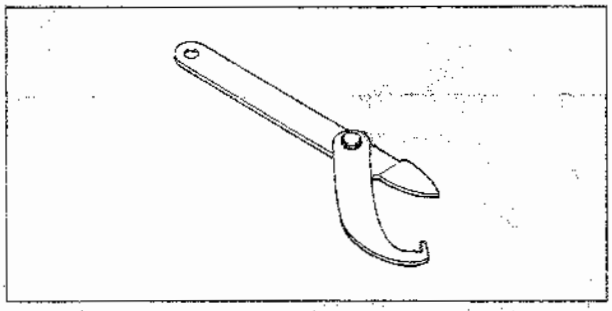
Fork Outer Tube Weight: 57001-1218



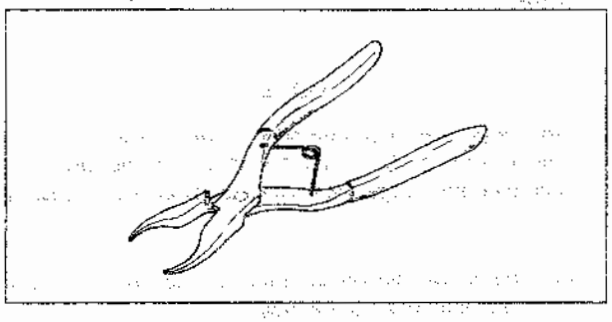
Fork Oil Seal Driver: 57001-1219



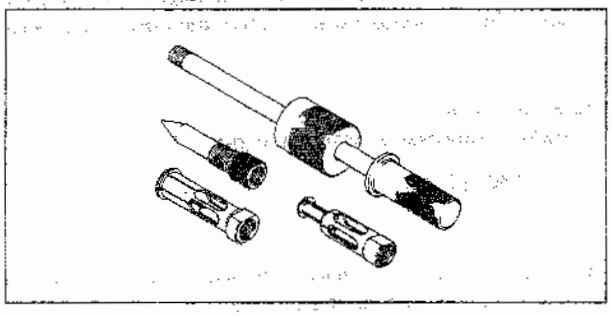
Steering Stem Nut Wrenches (2): 57001-1100



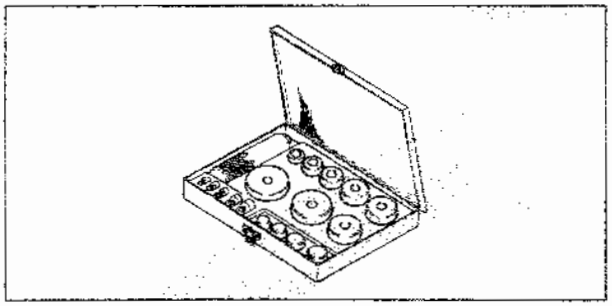
Inside Circlip Pliers: 57001-143



Oil Seal & Bearing Remover: 57001-1058



Bearing Driver Set: 57001-1129



Front Fork

Oil Change

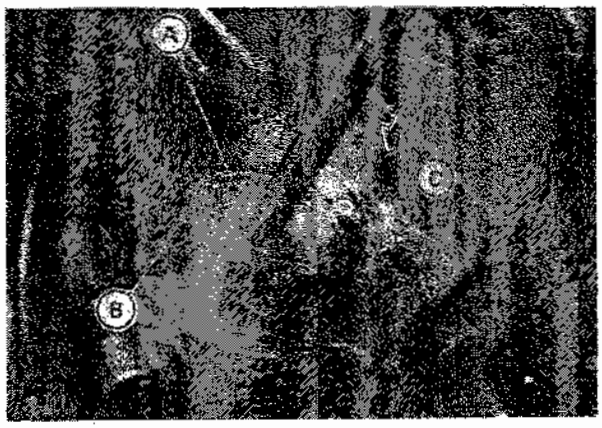
- Unscrew the drain bolt.
- Allow the oil to drain into a suitable container. If you pump the fork legs to force out the oil, be sure to catch the oil in a container as it squirts out.
- Raise the front wheel off the ground (see Wheels/Tires chapter).
- Remove the following.

Handlebar Holders



A. Handlebar Holder Bolts

Top Plugs (loosen the upper clamp bolts)
Spacers
Spring Seats
Main Springs



A. Top Plug
B. Ring
C. Push here.

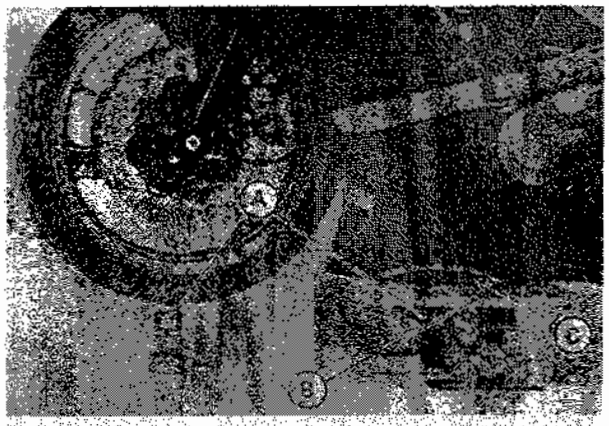
- Wash the drain bolt threads clean of oil, and blow them dry.
- Apply a non-permanent locking agent to the threads of the drain bolt and install the bolt and a new gasket.
- Tighten the drain bolt to the specified torque (see Exploded View).
- Pour in the type and amount of fork oil specified

Front Fork Oil

Viscosity:	SAE 10W-20
Amount per side:	
When changing oil:	approx. 384 mL
After disassembly and completely dry:	452 ±4 mL

★If necessary, measure the oil level as follows.

○Slowly compress the front fork fully by pushing up the outer tubes using a jack or other suitable means under the front wheel.



A. Jacks
B. Wooden Board
C. Exhaust Pipe

○Wait until the oil level settles.

○Insert a tape measure or rod into the inner tube, and measure the distance from the top of the inner tube to the oil.

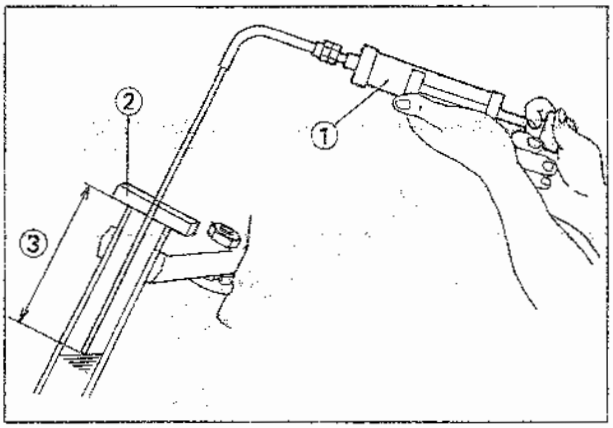
NOTE

○*Fork oil level may also be measured using the oil syringe (special tool) as follows.*

○*The tape measure, rod, or oil syringe pipe should be in the middle of the inner tube, or the correct oil level can not be measured.*

○Set the oil syringe stopper so that its lower side shows the oil level distance specified.

○Put the gauge tube into the inner tube and position the stopper across the top end of the inner tube.



1. Oil Syringe: 57001-1290
2. Stopper
3. Oil Level Distance

NOTE

○*The gauge tube is graduated in 1 cm division.*

○*The syringe body is graduated in 10 mL divisions, excluding the gauge tube which is about 5 mL capacity.*

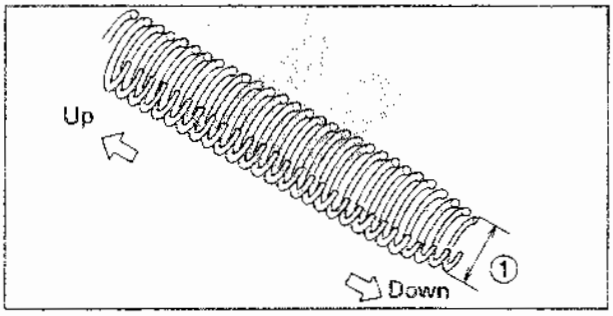
○Pull the handle slowly to draw out the excess oil until no more oil comes up the tube.

★If no oil is drawn out, there is not enough oil in the inner tube. Pour in some more oil, then draw out the excess.

Fork Oil Level
(Fully compressed without spring)
140 ±2 mm

★If the oil is above or below the specified level, remove or add oil and recheck the oil level.

●Install the main spring so that the smaller diameter end downward



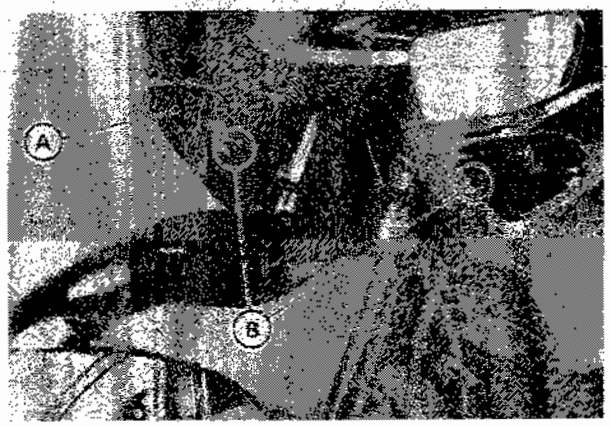
1. Smaller Diameter End

●Change the oil of the other fork leg in the same manner.

●Install the parts removed.

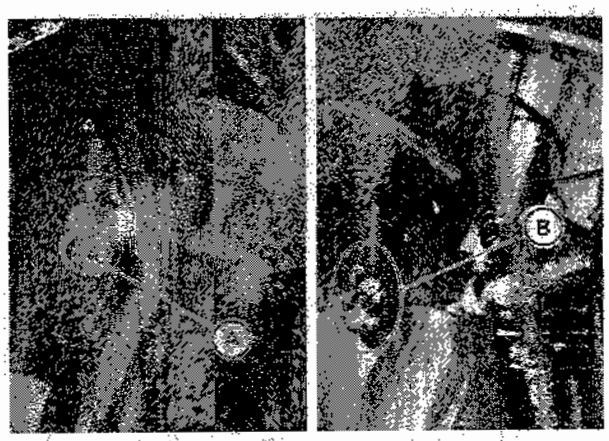
Removal (each fork leg)

●Remove the following.
Lower Inner Fairing on Upper Fairing
Handlebar Holder and Handlebar



A. Lower Inner Fairing B. Screws

Front Wheel (see Wheels/Tires chapter)
Fork Clamp Bolts (upper and lower, loosen)

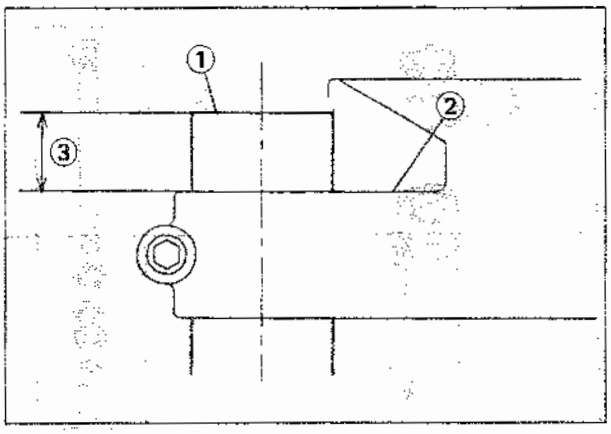


A. Upper Fork Clamp Bolt
B. Lower Fork Clamp Bolts

●With a twisting motion, work the fork leg down and out.

Installation

●Install the fork as shown.



1. Inner Tube Top 3. 15 ~ 16.5 mm
2. Steering Stem Head Surface

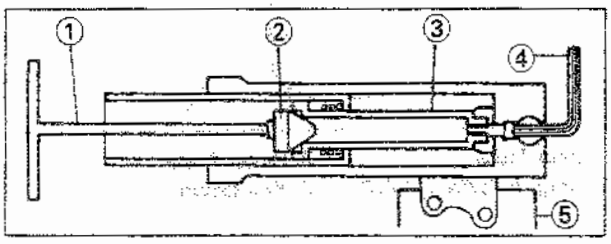
●Install the front wheel (see Wheels/Tires chapter).
●Tighten the following fasteners to the specified torque (see Exploded View).
Fork Clamp Bolts
Handlebar Holder Bolts
●Check the front brake after installation.

⚠WARNING

Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brake will not function on the first application of the lever if this is not done.

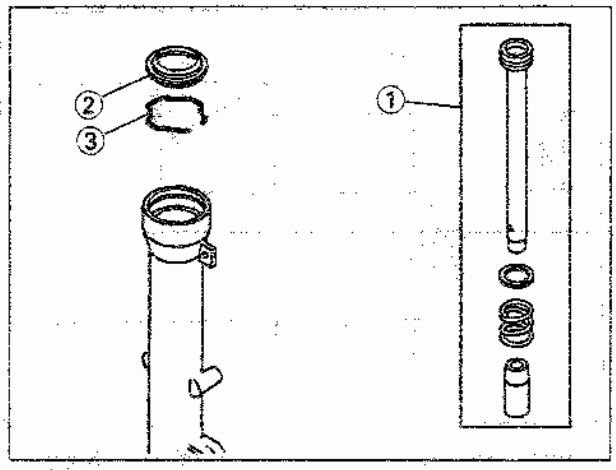
Disassembly (each fork)

●Drain the fork oil (see Oil Change).
●Remove the front fork (see this chapter).
●Hold the outer tube in a vise.
●Stop the cylinder from turning by using the front fork cylinder holder (special tool).
●Unscrew the Allen bolt, then take the bolt and gasket out of the bottom of the outer tube.



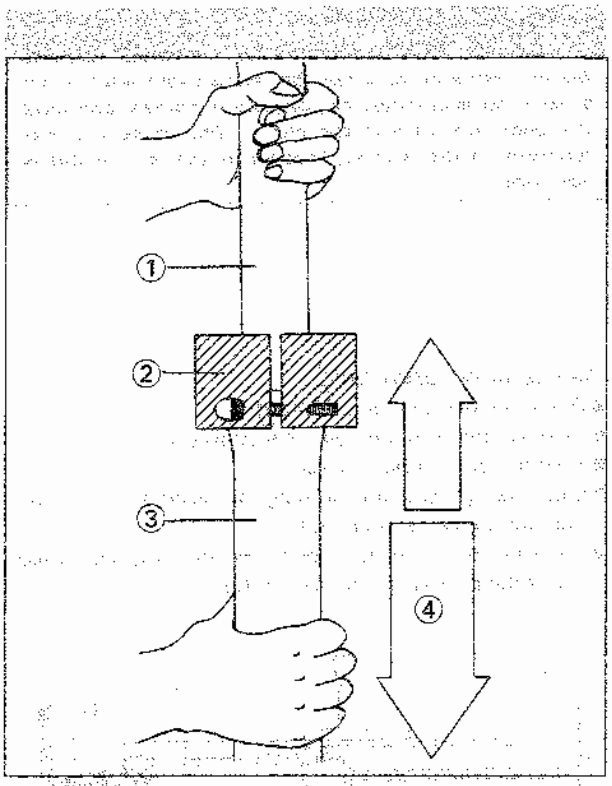
1. Cylinder Holder Handle: 57001-183
2. Cylinder Holder Adapter: 57001-1057
3. Piston Cylinder Unit
4. Allen Wrench 5. Vise

●Remove the following.



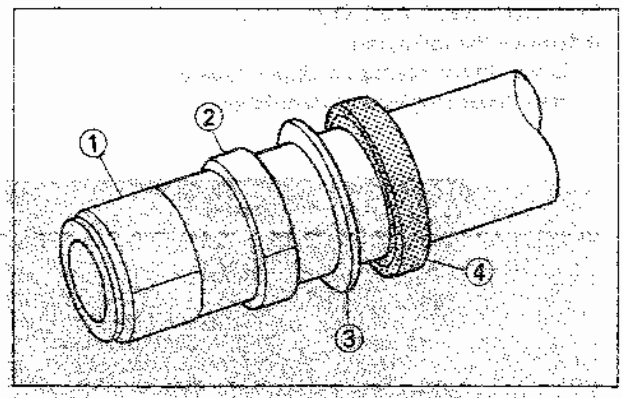
1. Piston Cylinder Unit
2. Dust Seal
3. Retainer

○ Do not disassemble the piston cylinder unit.
● Use the fork outer tube weight (special tool) to separate the inner tube from the outer tube.
○ Holding the inner tube by hand in a vertical position, pull down the outer tube several times to pull out the inner tube.



1. Inner Tube
2. Weight: 57001-1218
3. Outer Tube
4. Pull down.

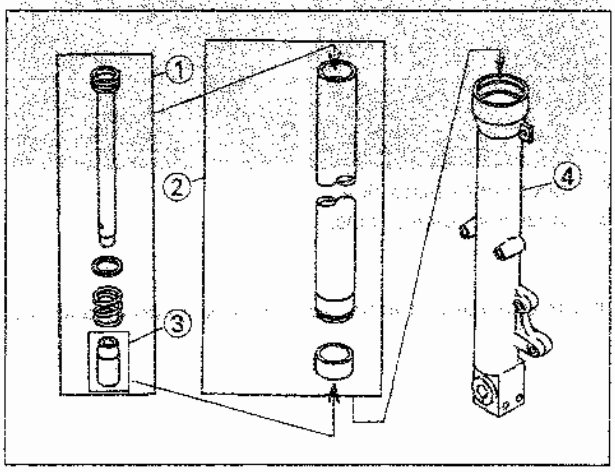
○ The oil seal, washer, and guide bushes come off with the inner tube.



1. Inner Tube Guide Bush
2. Outer Tube Guide Bush
3. Washer
4. Oil Seal

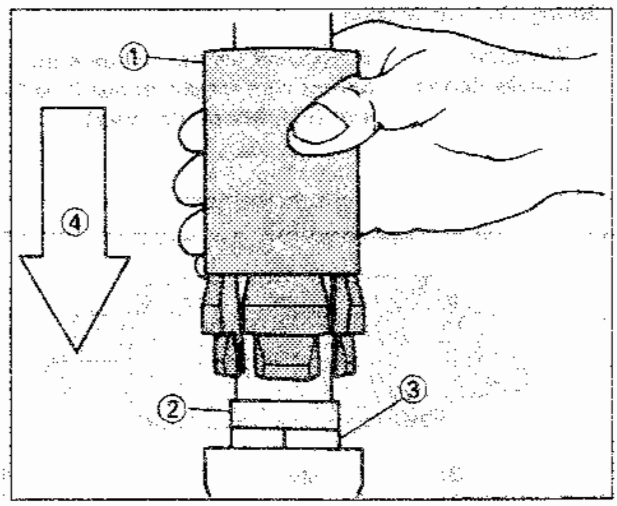
Assembly

● Assembly is the reverse of disassembly. Note the following.
● Check the top plug O-ring and replace it with new one if necessary.
● Replace the following parts removed with a new one.
Guide Bushes
Oil Seal
Bottom Allen Bolt Gasket
● Install the new guide bush on the inner tube.
● Install the piston cylinder unit, inner tube, and cylinder base in the outer tube as shown.



1. Piston Cylinder Unit
2. Inner Tube
3. Cylinder Base
4. Outer Tube

● Apply a non-permanent locking agent to the bottom Allen bolt and tighten it to the specified torque (see Exploded View).
● Install the guide bush (with a used guide bush on it) by tapping the used guide bush with the fork oil seal driver (special tool) until it stops.



1. Driver: 57001-1219
2. Used Guide Bush
3. New Guide Bush
4. Tap

● Install the following.
Washer
Oil Seal (use the fork oil seal driver: 57001-1219, the marked side upward)
Retainer
Dust Seal
Fork Oil (see Fork Oil Change)
Main Spring (with smaller diameter end)
Spring Retainer
Spacer
● Install the front fork (see this chapter).

Inner Tube Inspection

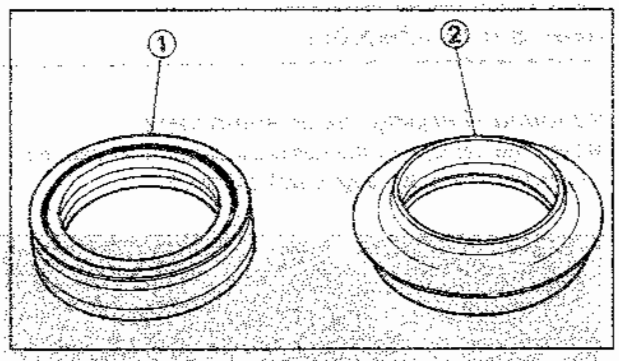
★ If the inner tube is damaged, replace it.
● Nicks or rust damage can sometimes be repaired by using a wet-stone to remove sharp edges or raised areas which cause seal damage.
★ If the damage is not repairable, replace the inner tube. Since damage to the inner tube damages the oil seal, replace the oil seal whenever the inner tube is repaired or replaced.

CAUTION

If the inner tube is badly bent or creased, replace it. Excessive bending, following by subsequent straightening, can weaken the inner tube.

Oil Seal and Dust Seal Inspection

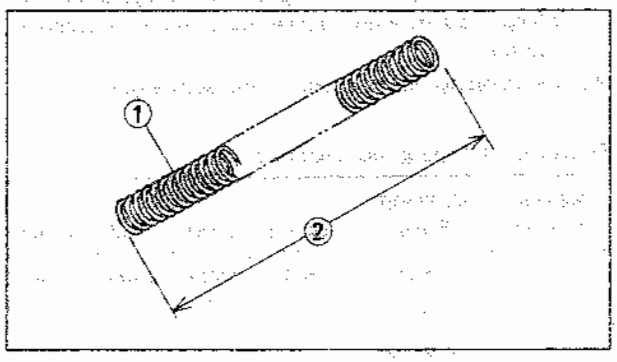
★ If dust seal has any damage or wear, replace it.
● Replace the oil seal with a new one whenever it has been removed.



1. Oil Seal
2. Dust Seal

Spring Tension

★ If the spring of either fork leg is shorter than the service limit, it must be replaced. If the length of a replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the fork legs balanced for motorcycle stability.



1. Fork Spring
2. Free Length

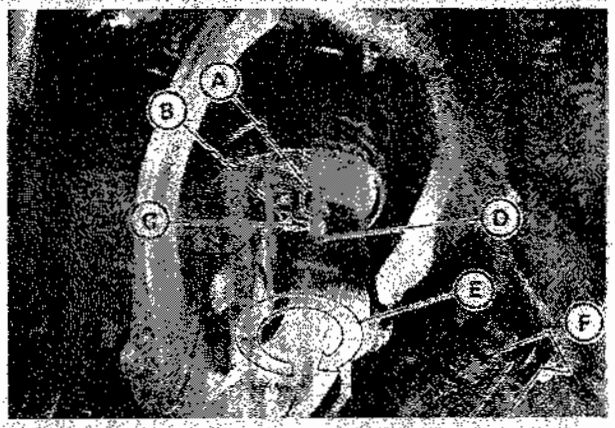
Fork Spring Length

Standard:	**415 mm**
Service Limit:	**407 mm**

Rear Shock Absorber

Rebound Damping Force Adjustment

●Turn the adjuster to the desired number until you feel a click and the notch aligns with the mark.



A. Mark
B. Adjuster
C. Notch
D. Number
E. Clockwise
F. Rear

○The standard adjuster setting for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is number 1.

★If the damping feels too soft or too stiff, adjust it.

Rebound Damping Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
	Weak	Soft	Light	Good	Low
1	↓	↑	↑	↑	↑
2	Clockwise				
3	↓ Strong	↓ Hard	↓ Heavy	↓ Bad	↓ High

Spring Preload Adjustment

●Remove the shock absorber from the frame (see this chapter).

●Loosen the locknut (white) and turn out the adjusting nut (yellow) to free the spring using stem nut wrenches (special tools: 57001-1100).

●Measure the spring free length.

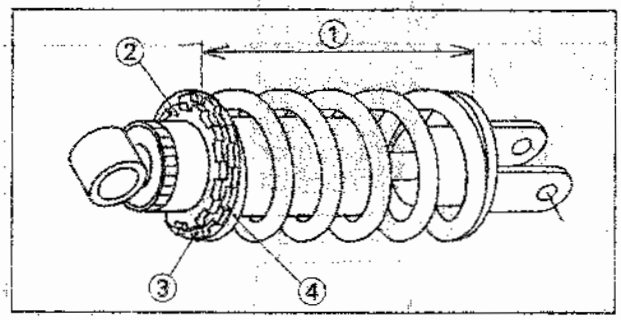
●Install the rear shock absorber spring so that the smaller diameter end facing upward.

●Turn in the adjusting nut to the desired position and tighten the locknut to the specified torque (see Exploded View).

○The standard adjusting nut setting for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is 8 mm of spring preload from the free length.

Spring Preload Setting

Standard: Spring free length minus 8 mm
Usable Range: Spring free length minus 8 to 17 mm (weaker to stronger)



1. Spring Length
2. Locknut
3. Adjusting Nut
4. Spring Smaller End

★If the spring action feels too soft or too stiff, adjust it.

Spring Adjustment

Adjuster Position	Spring Force	Setting	Load	Road	Speed
8 mm		Soft	Light	Good	Low
↕	↓	↕	↕	↕	↕
17 mm	Strong	Hard	Heavy	Bad	High

Removal

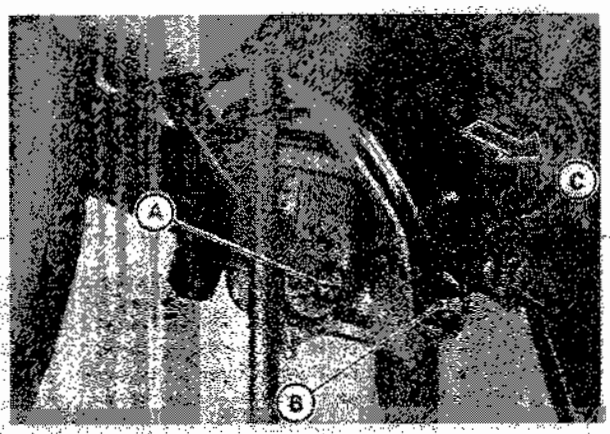
●Set the motorcycle up on its center stand.

●Remove the following.
Side Covers (see Frame chapter)
Lower Tie-Rod Bolts and Nut
Shock Absorber Bolts and Nuts

○Support the rocker arm to slide out the bolts.



A. Shock Absorber Bolt



A. Shock Absorber Bolt
B. Lower Tie-Rod Bolt
C. Front

● Remove the shock absorber toward the ground.

Installation

● Installation is the reverse of removal. Note the following.
● Pack the rocker arm needle bearings with grease.
● Set the damping adjuster and spring preload (see this chapter).
● Install the rear shock absorber so that the damper adjuster mark faces rearward (see Rebound Damping Force Adjustment).
● Tighten the following nuts to the specified torque (see Exploded View).
Tie-Rod Nut
Shock Absorber Nuts

Disassembly

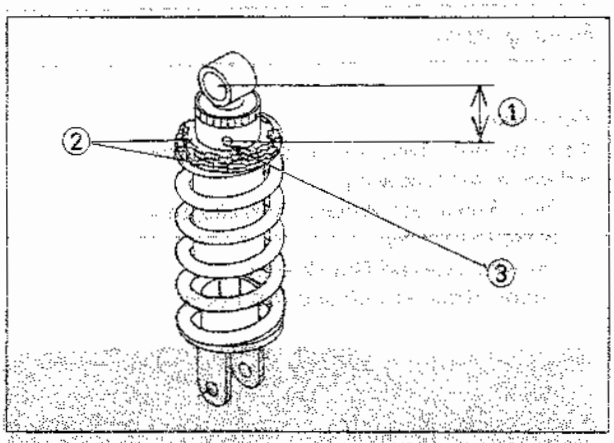
● Since the rear shock absorber contains high-pressure nitrogen gas, do not disassemble the rear shock absorber.

Scrapping

⚠WARNING

Since the rear shock absorber contains nitrogen gas, do not incinerate the rear shock absorber without first releasing the gas or it may explode.
Before a rear shock absorber is scrapped, drill a hole at the point shown to release the nitrogen gas completely. Wear safety glasses when drilling the hole, as the gas may blow out bits of drilled metal when the hole opens.

● Hold the rear shock upright with the nut side up to prevent the oil from blowing out of the shock when drilling.
● Drill a hole at the point shown.

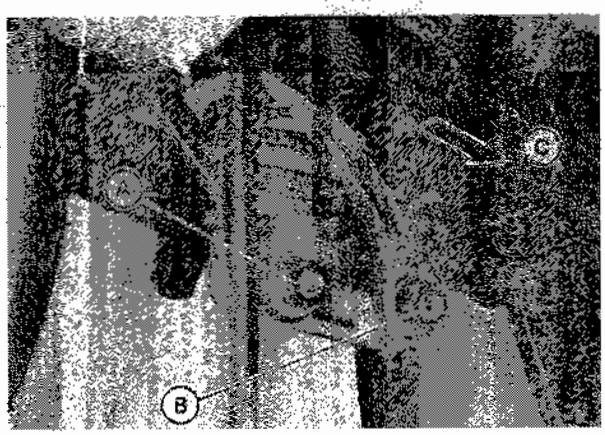


1. 35 mm
2. Nuts
3. Hole

Swing Arm

Removal

- Set the motorcycle up on its center stand.
- Remove the following.
  - Rear Wheel (see Wheels/Tires chapter)
  - Brake Hose Strap
  - Tie-Rod Bolt and Nut (lower)
  - Shock Absorber Bolt and Nut (lower)



A. Shock Absorber Bolt and Nut C. Front
B. Tie-Rod Bolt and Nut

- Remove the swing arm pivot shaft while supporting the swing arm.
- Remove the swing arm toward the rear with the chain left on the engine sprocket.



A. Swing Arm Pivot Shaft Nut B. Chain

Installation

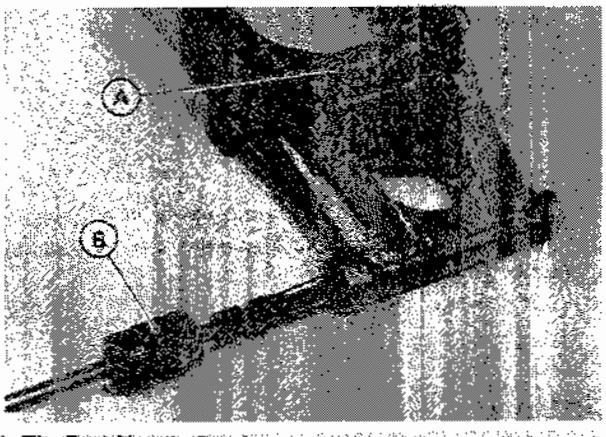
- Installation is the reverse of removal. Note the following.
- Pack the following bearings with grease.
  - Swing Arm Ball Bearing
  - Swing Arm Needle Bearings
  - Rocker Arm Needle Bearings
- Tighten the following fasteners to the specified torque (see Exploded View).
  - Pivot Shaft Nut
  - Shock Absorber Nut
  - Tie-Rod Nut
- Install the following.
  - Rear Wheel (see Wheels/Tires chapter)
  - Drive Chain
- Check the rear brake after installation.

⚠WARNING

Do not attempt to drive the motorcycle until a full brake pedal is obtained by pumping the brake pedal until the pads are against the disc. The brake will not function on the first application of the pedal if this is not done.

Swing Arm Bearing Removal

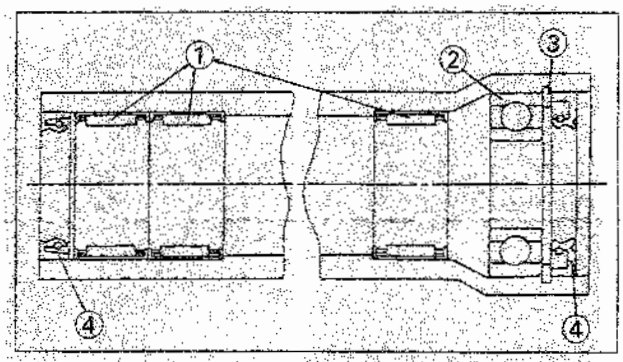
- Remove the circlip using inside circlip pliers (special tool: 57001-143).
- Remove the ball bearing and the needle bearings using the oil seal & bearing remover (special tool: 57001-1058).
- Insert a metal rod into the swing arm from the left side, and remove the right side tie-rod needle bearing in the swing arm by tapping evenly around the bearing.
- Remove the remaining tie-rod bearing by tapping evenly around the bearing.



A. Tie-Rod Needle Bearing
B. Oil Seal & Bearing Remover: 57001-1058

Swing Arm Bearing Installation

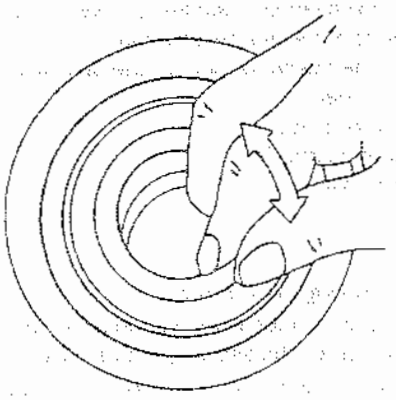
- Install the ball bearing and the needle bearings as shown using a suitable bearing driver in the bearing driver set (special tool: 57001-1129).



1. Needle Bearings
2. Ball Bearing
3. Circlip
4. Grease Seals

Swing Arm Bearing Inspection

●Wash the ball bearing with a high-flash point solvent, dry it (do not spin it while it is dry), and oil it. Spin it by hand to check its condition.



★If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced.

●The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.

★If there is any doubt as to the condition of any of the needle bearings, replace the sleeve, the ball bearing, and all the needle bearings as a set.

Swing Arm Sleeve Inspection

★If there is visible damage, replace the sleeve, the ball bearing, and all the needle bearings as a set.

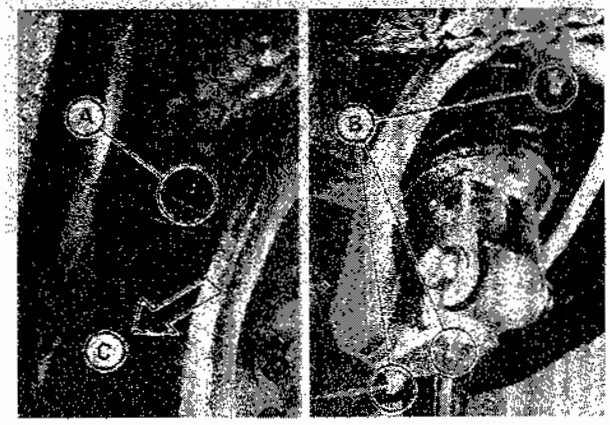
Swing Arm and Rocker Arm Pivot Lubrication

●Lubricate the swing arm and rocker arm pivots with grease through the grease fitting using a grease gun according to the Periodic Maintenance Chart (see General Information chapter and General Lubrication in the Appendix chapter).

●It is normal for a small amount of grease to seep out around the grease seals.

★If the swing arm or rocker arm pivots are disassembled, lubricate the pivots as follows.

●Wipe all the old grease off the bearings, sleeves, and grease seals and grease them.

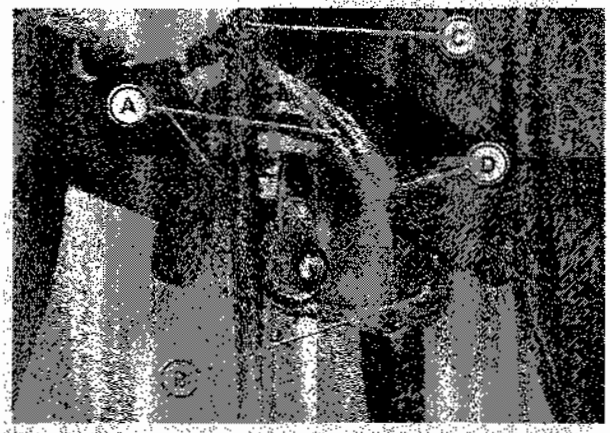


A. Swing Arm Grease Nipple
B. Rocker Arm Grease Nipples
C. Front

Tie-Rod, Rocker Arm

Tie-Rod Removal

● Remove the following.
Lower and Upper Tie-Rod Bolts



A. Tie-Rod
B. Lower Tie-Rod Bolt
C. Upper Tie-Rod Bolt
D. Arrow

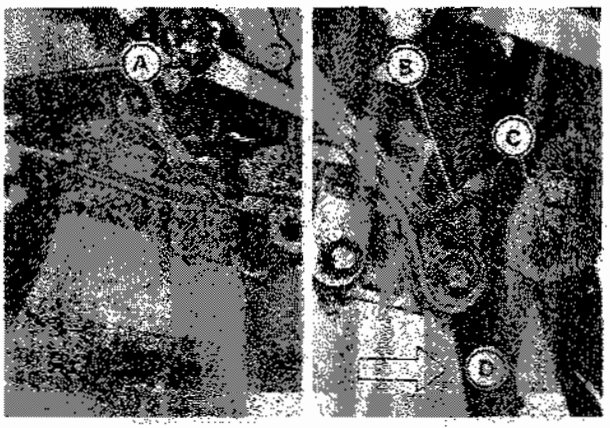
● Remove the tie-rods.

Tie-Rod Installation

● Pack the following bearings with molybdenum disulfide grease.
Rocker Arm Needle Bearings
Tie-Rod Needle Bearings
● Install the tie-rod so that the arrow faces downward (see above photo).
● Tighten the tie-rod upper and lower nuts to the specified torque (see Exploded View).

Rocker Arm Removal

● Set the motorcycle up on its side stand.
● Remove the following.
Muffler (see Engine Top End chapter).
Lower Tie-Rod Bolt and Nut
Lower Rear Shock Absorber Bolt and Nut
Center Stand Return Spring



A. Center Stand Return Spring
B. Rocker Arm
C. Bolt and Nut
D. Front

● Set the motorcycle up on its center stand.
● Squeeze the brake lever slowly and hold it with a band.
● Remove the rocker arm by removing the bolt and nut.

Rocker Arm Installation

● Installation is the reverse of removal. Note the following.
● Apply molybdenum disulfide grease to the grease seal and inside of the needle bearings.
● Tighten the following nuts to the specified torque (see Exploded View).
Rocker Arm Nut
Shock Absorber Nut
Tie-Rod Nut

Needle Bearing Inspection

★ If there is any doubt as to the condition of either needle bearing, replace the bearing(s) and sleeve as a set.
● To remove the needle bearings, use the oil seal & bearing remover (special tool: 57001-1058).

Tie-Rod, Rocker Arm Sleeve Inspection

★ If there is visible damage, replace the sleeve and needle bearing(s) as a set.

Rocker Arm Pivot Lubrication

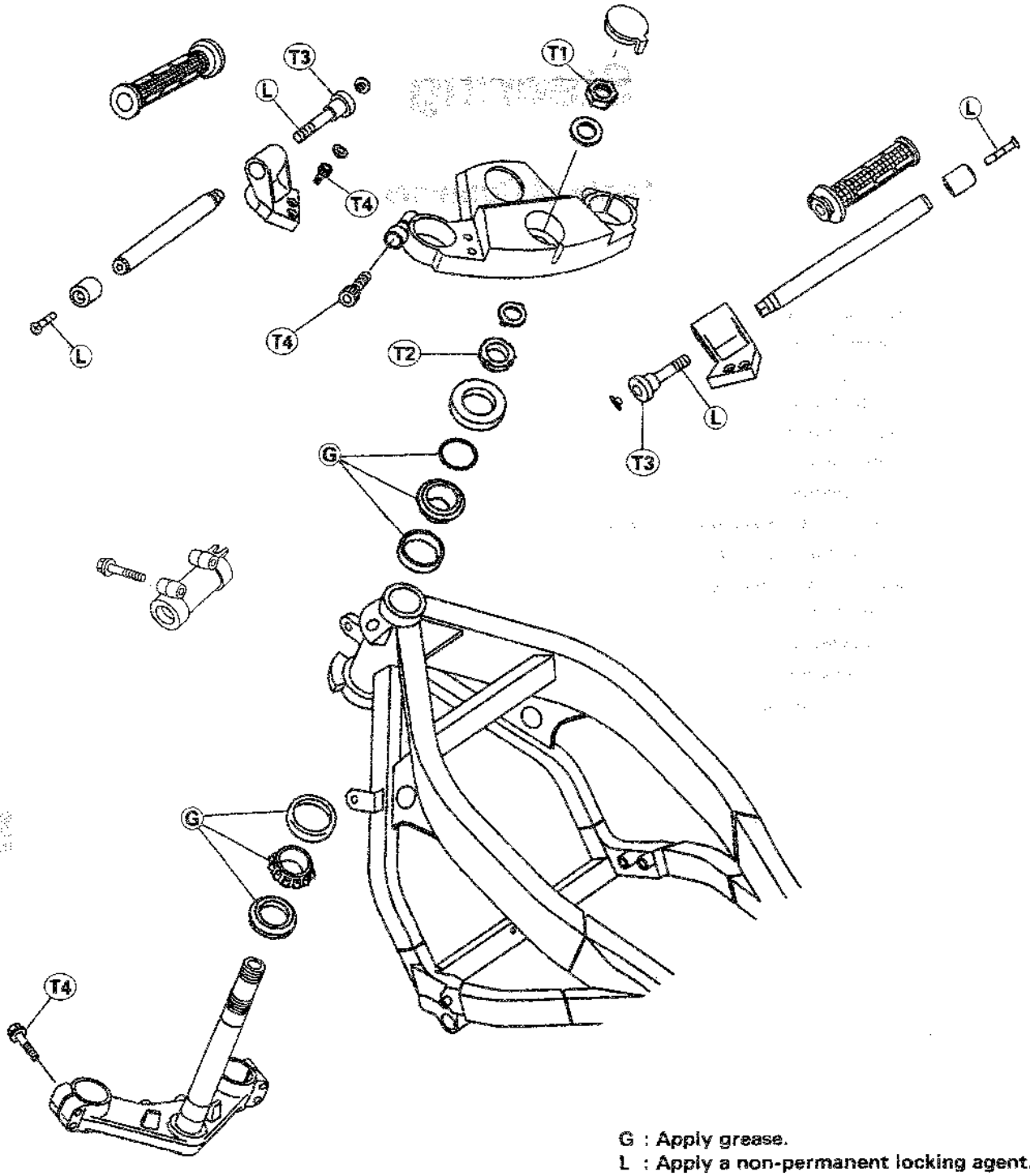
See Swing Arm and Rocker Arm Pivot Lubrication.

Steering

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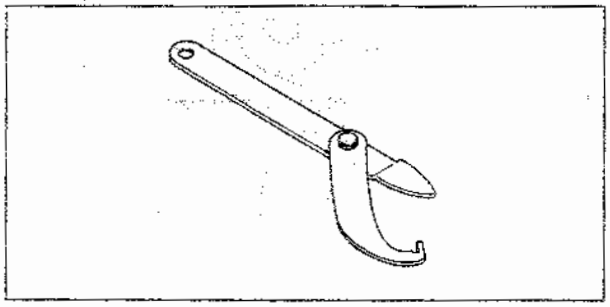
Exploded View



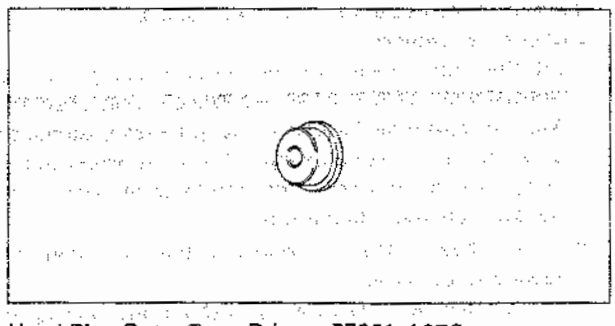
G : Apply grease.
L : Apply a non-permanent locking agent.
T1: 39 N-m (4.0 kg-m, 29 ft-lb)
T2: 4.9 N-m (0.50 kg-m, 43 in-lb) or hand tight
T3: 29 N-m (3.0 kg-m, 22.0 ft-lb)
T4: 20 N-m (2.0 kg-m, 14.5 ft-lb)

Special Tools

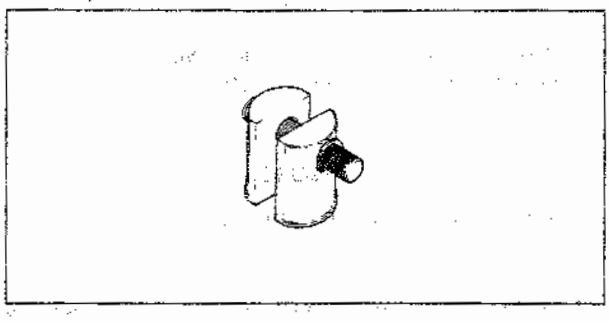
Steering Stem Nut Wrench: 57001-1100



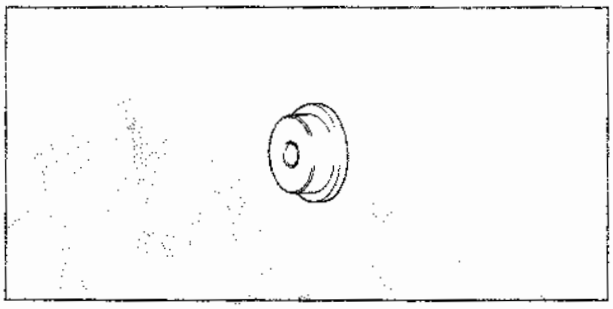
Head Pipe Outer Race Driver: 57001-1106



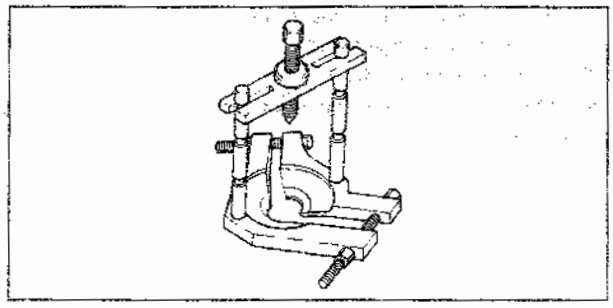
Head Pipe Outer Race Remover: 57001-1107



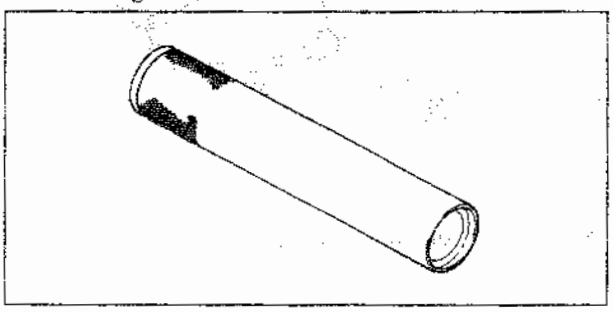
Head Pipe Outer Race Driver: 57001-1076



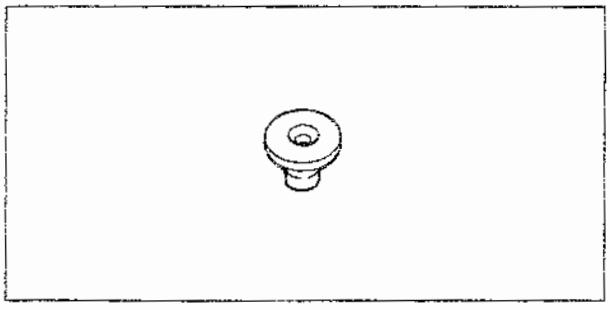
Bearing Puller: 57001-158



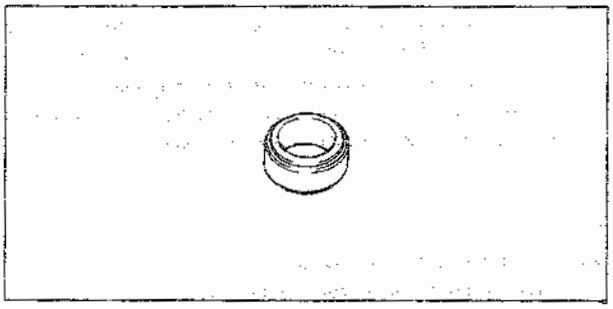
Stem Bearing Driver: 57001-137



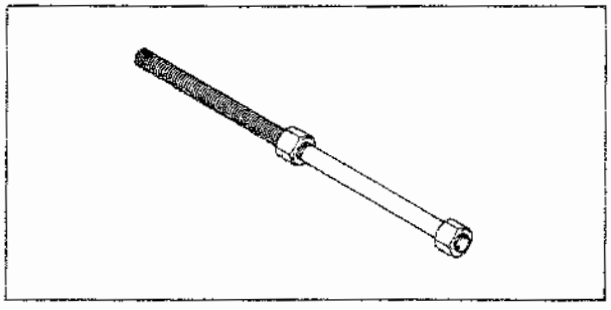
Bearing Puller Adapter: 57001-317



Stem Bearing Driver Adapter: 57001-1074



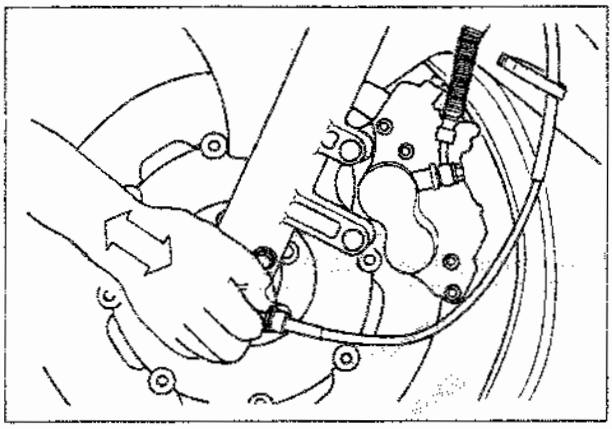
Head Pipe Outer Race Press Shaft: 57001-1075



Steering

Adjustment

●Set the motorcycle up on its center stand.
●Check the steering.
○Lift the front wheel off the ground using the jack (special tool: 57001-1238, see Wheels/Tires chapter).
○With the front wheel pointing straight ahead, alternately tap each end of the handlebar. The front wheel should swing fully left and right from the force of gravity until the lower bracket hits the stop.
★If the wheel binds or catches before the stop, the steering is too tight.
○Feel for steering looseness by pushing and pulling the legs.

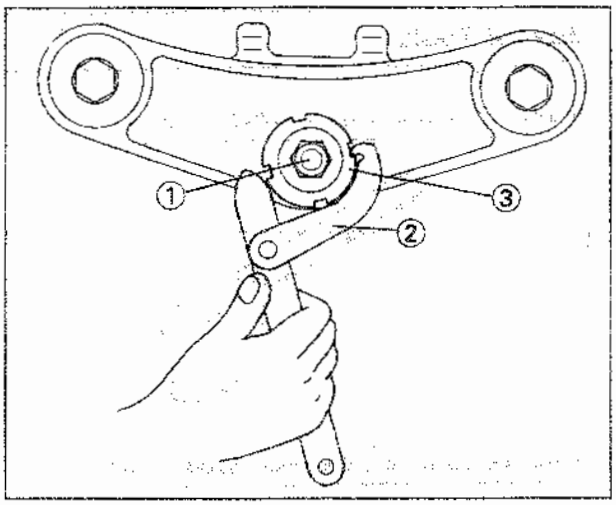


★If you feel looseness, the steering is too loose.

NOTE

○*The cables and wiring will have some effect on the motion of the fork which must be taken into account. Be sure the wires and cables are properly routed.*
○*The bearings must be in good condition and properly lubricated in order for any test to be valid.*

★Adjust the steering if necessary.
●Remove the following parts.
Lower Inner Fairing (see Frame chapter)
Fork Lower Clamp Bolts (both sides, loosen)
Stem Head Nut (Loosen)
●Move back the fuel tank with the hoses installed (see Fuel System chapter).
●Adjust the steering with the stem nut wrench (special tool).
★If the steering is too tight, loosen the stem nut a fraction of turn.
★If the steering is too loose, tighten the stem nut a fraction of turn.



1. Stem Head Nut 3. Stem Nut
2. Stem Nut Wrench: 57001-1100

NOTE

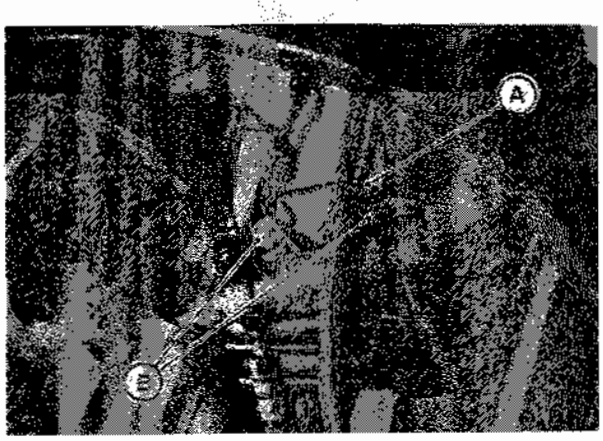
○*Turn the nut 1/8 turn at a time maximum.*

●Tighten the following bolts and nut to the specified torque (see Exploded View).
Front Fork Lower Clamp Bolts
Steering Stem Head Nut
●Check the steering again.
★If the steering is still too tight or too loose, repeat the adjustment.

Steering Stem

Removal

● Remove the following parts.
Front Fork Legs (see Suspension chapter)
Brake Hose Joint and Brake Hose Strap
Steering Stem Head Nut
Stem Head



A. Hose Strap B. Brake Hose Joint Bolts

● Push up on the stem base, and remove the steering stem nut using the stem nut wrench (special tool: 57001-1100), then remove the steering stem base.

Installation

● Installation is reverse of the removal. Note the following.
● Route the cables, wires, and hoses as shown in the Cable, Wire, and Hose Routing section of the General Information chapter.
● Check and adjust the following items after installation.
Steering
Throttle Cables
Choke Cables
Clutch Cable
Front Brake
Headlight Aim
Rear View Mirrors

⚠WARNING

Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brakes will not function on the first application of the lever if this is not done.

Stem Cap Deterioration, Damage

● Inspect the grease seal of the stem cap for any signs of deterioration or damage.
★ Replace the stem cap if necessary.

Steering Stem Warp

★ If the steering stem shaft is bent, replace the steering stem.

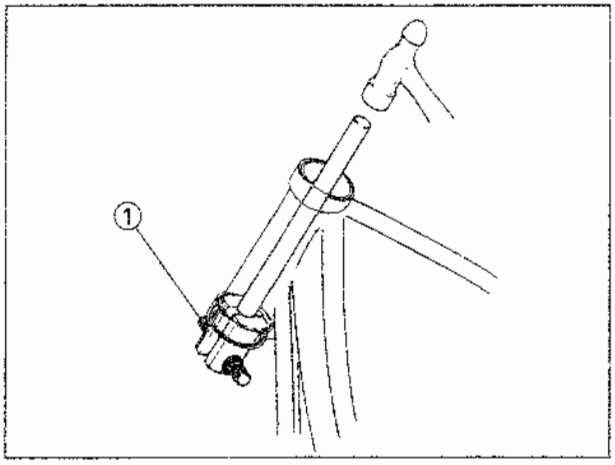
Steering Stem Bearing

Removal

- Remove the steering stem (see this chapter).
- Remove the upper tapered roller bearing.
- To remove the outer races pressed into the head pipe, install the outer race remover (special tool) as shown below.

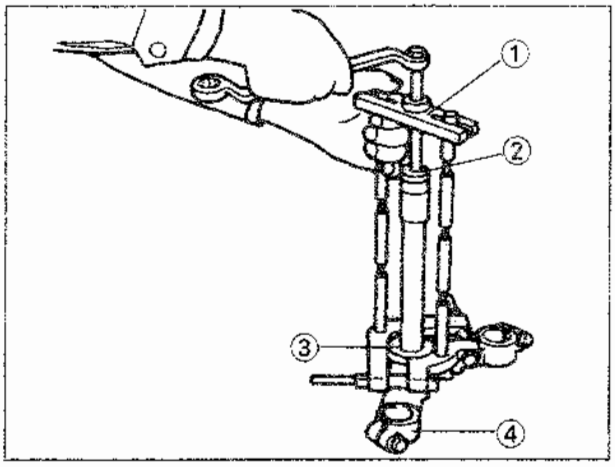
NOTE

○ *If either steering stem bearing is damaged, it is recommended that both the upper and lower bearings (including outer races) should be replaced with new ones.*



1. Outer Race Remover: 57001-1107

- Remove the lower tapered roller bearing (with its grease seal) which is pressed onto the steering stem with the steering stem bearing puller and adapter (special tools).

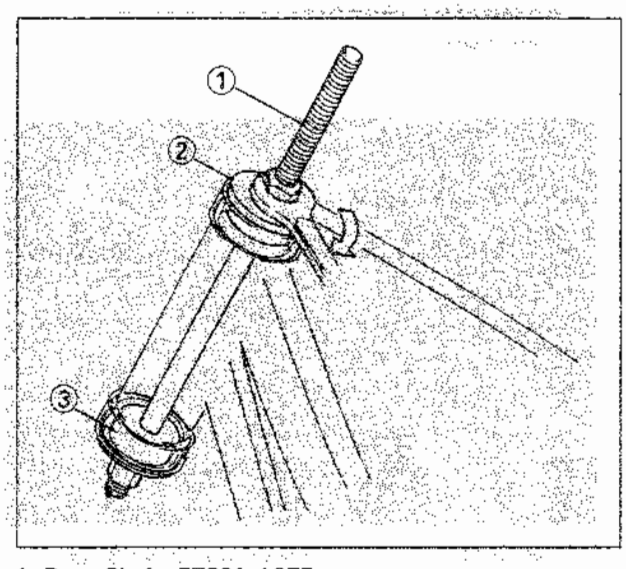


1. Bearing Puller : 57001-158
2. Adapter : 57001-317
3. Tapered Roller Bearing
4. Stem Base

Installation

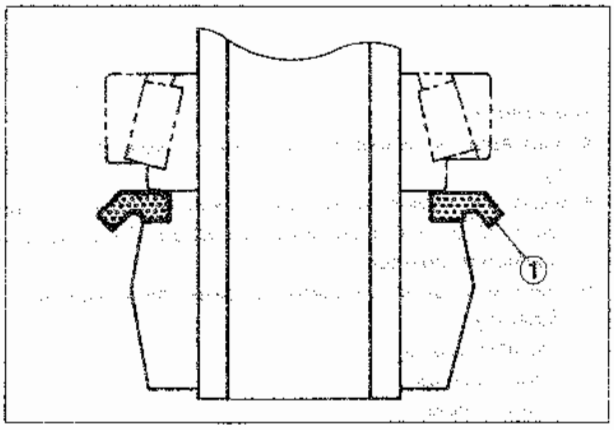
- Installation is the reverse of removal. Note the following.

○ Apply grease to the outer races, and then drive them into the head pipe using the drivers and the press shaft (special tools).



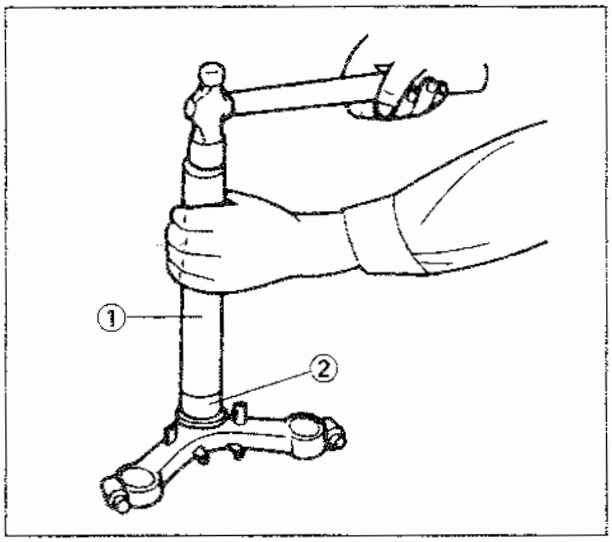
1. Press Shaft: 57001-1075
2. Driver: 57001-1106
3. Driver: 57001-1076

- Install the grease seal, noting the direction shown.



1. Grease Seal

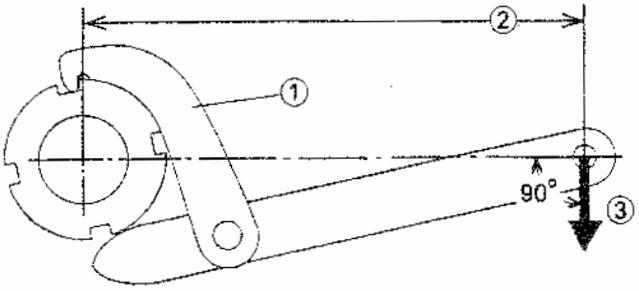
○ Apply grease to the lower tapered roller bearing, and drive it onto the steering stem using the stem bearing driver and adapter (special tools: 57001-137 and 57001-1074).



1. Stem Bearing Driver: 57001-137
2. Adapter: 57001-1074

●The following four steps should be performed after steering bearing installation. This procedure settles the bearings in place.

○Using the stem nut wrench, tighten the stem nut to 39 N-m (4.0 kg-m, 29 ft-lb) of torque. (To tighten the steering stem nut to the specified torque, hook the wrench on the stem nut, and pull the wrench at the hole by 22.2 kg force in the direction shown.)



1. Stem Nut Wrench: 57001-1100
2. 180 mm
3. 22.2 kg

○Check that there is no play and the steering stem turns smoothly without the rattle.

★If not, the steering stem bearing may be damaged.

○Again back out the stem nut a fraction of turn until it turns lightly.

○Turn the stem nut lightly clockwise until it just becomes hard to turn. Do not overtighten, or the steering will be too tight.

Lubrication

●Perform the following.

○Remove the steering stem (see this chapter).

○Using a high-flash point solvent, wash the upper and lower tapered roller bearings in the cages.

○Wipe the upper and lower outer races, which are press-fitted into the frame head pipe, clean of grease and dirt.

○Visually check the outer races and the rollers.

★Replace the bearing assemblies if they show wear or damage.

○Pack the upper and lower tapered roller bearings in the cages with grease, and apply light coat of grease to the upper and lower outer races.

○Install the steering stem, and adjust the steering.

Wear, Damage

★Replace the bearing assemblies if they show damage.



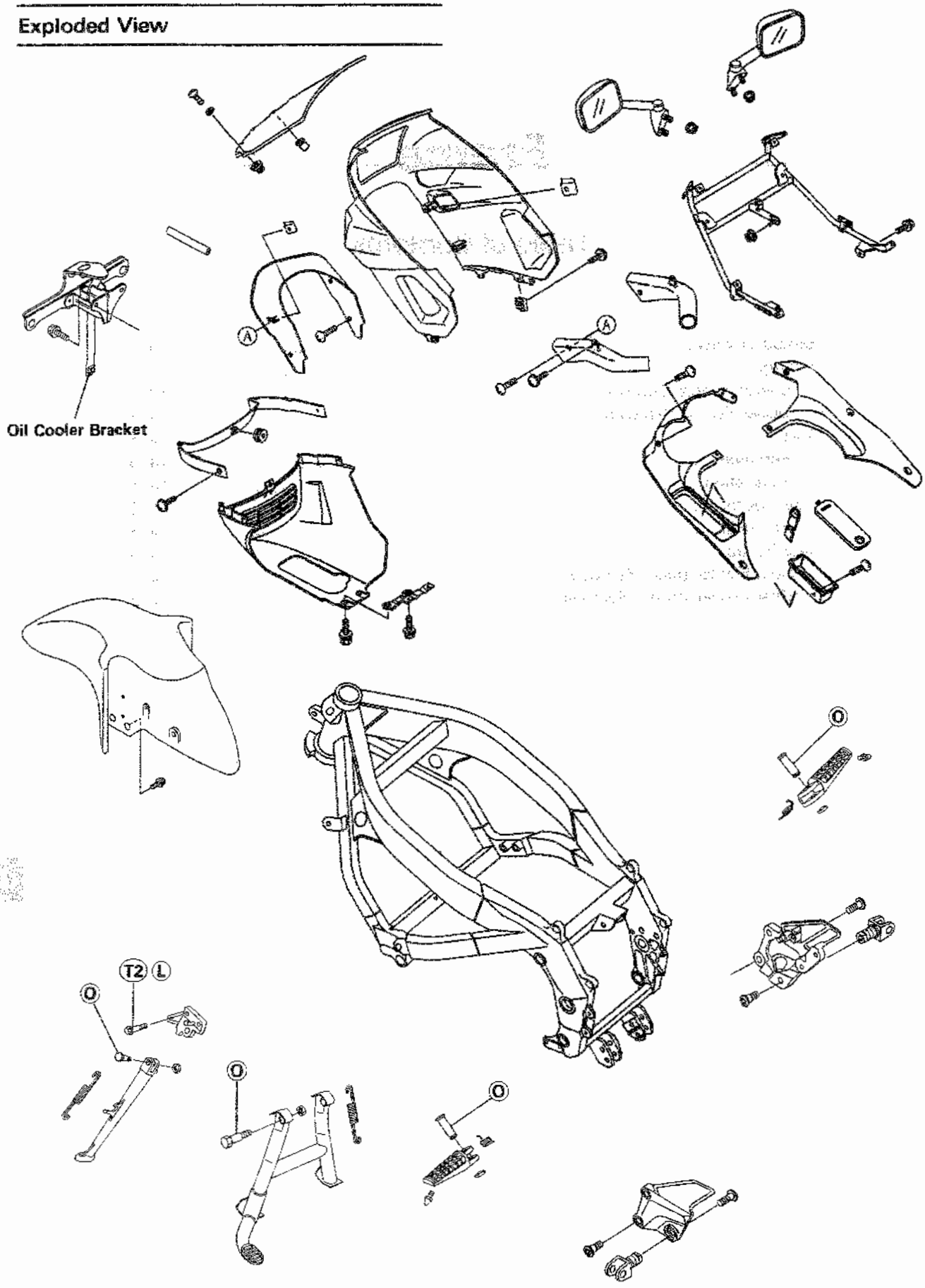


Frame

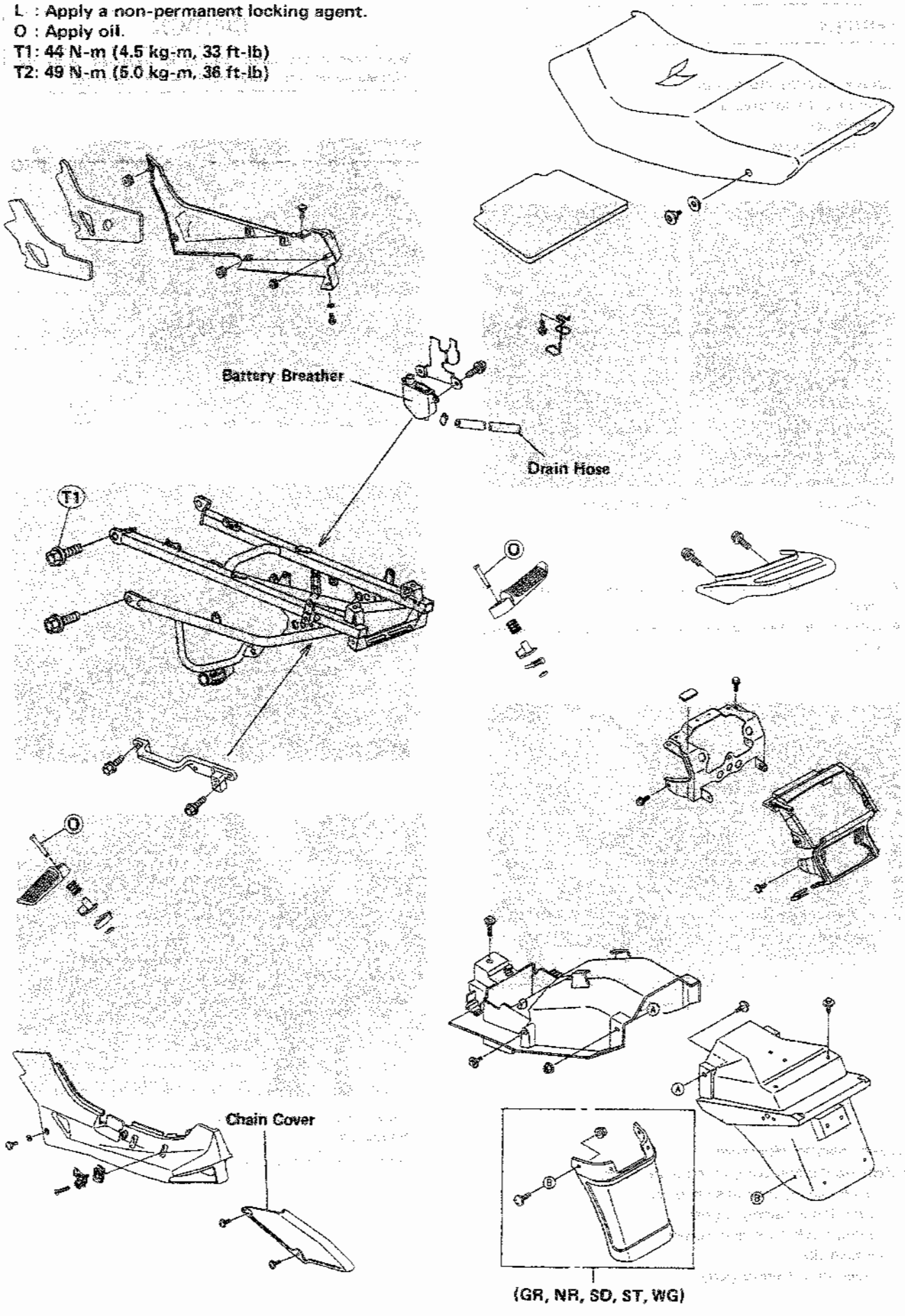
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Exploded View



L : Apply a non-permanent locking agent.
O : Apply oil.
T1: 44 N-m (4.5 kg-m, 33 ft-lb)
T2: 49 N-m (5.0 kg-m, 36 ft-lb)

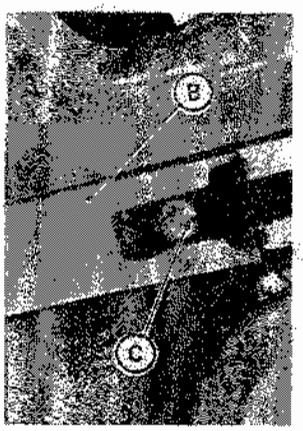


Fairings

Lower Fairing Removal

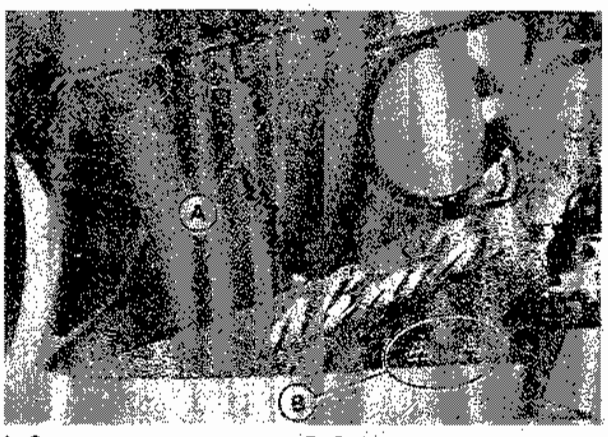
● Remove the following.
Reflector
Cover Screws





A. Reflector
B. Cover
C. Cover Screw

● Pull the cover forward to clear the tabs and remove the cover.
● Remove the lower fairing by taking off the screws and bolts.



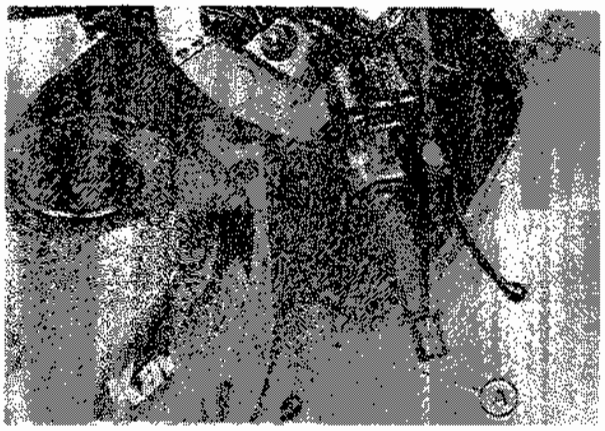
A. Screws
B. Bolts

Upper Fairing Removal

● Remove the following in the order listed.
Lower Fairing (see this chapter)
Upper Inner Fairing (right)
Fairing Pocket Lid and Screw
Windshield
Upper Inner Fairing (left)

CAUTION

Note that if the inner fairing is removed with the windshield on, the windshield may be damaged.

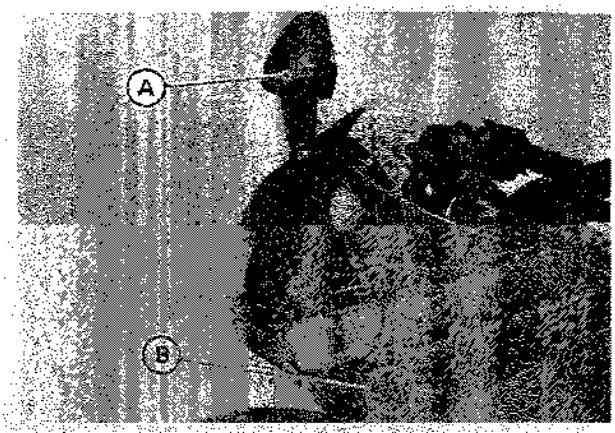






A. Upper Inner Fairing (Right)
B. Windshield
C. Upper Inner Fairing (Left)

Rear View Mirrors
Cooling Duct Screws
Turn Signal Light Connectors
Headlight Connector



A. Rear View Mirror B. Screw

● Remove the upper fairing.



Seat

Removal

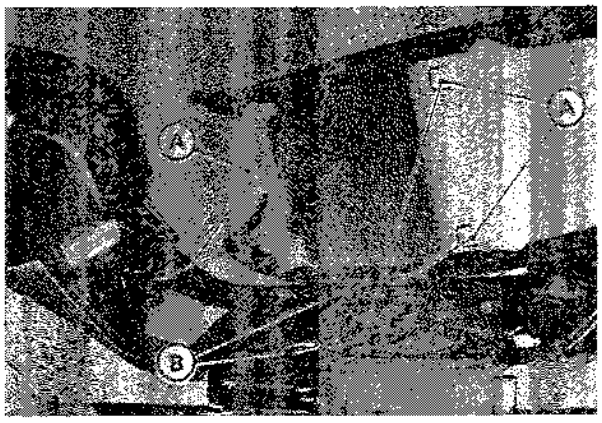
● Remove the seat bolts.
● Swing open the rear seat and remove it.



A. Seat Bolts

Installation

● Slip the hooks of the seat under the braces on the frame.

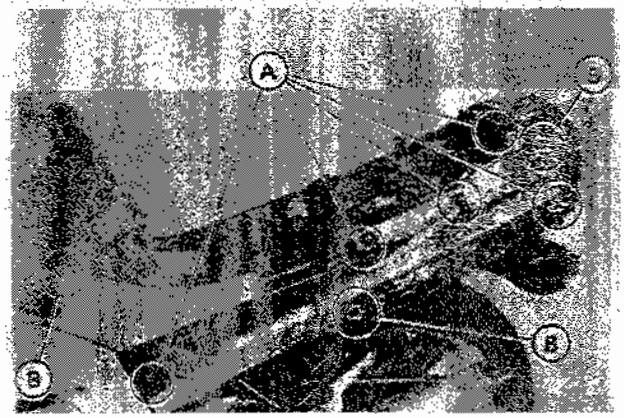


A. Hooks B. Stoppers

Side Covers

Removal

● Remove the following.
Seat (see this chapter)
Grab Rail
Side Cover Screws



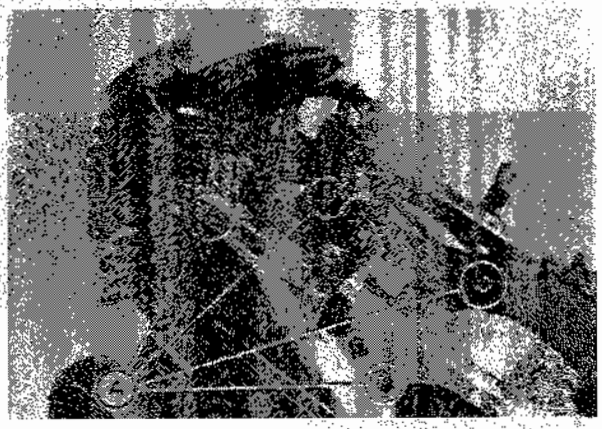
A. Screws B. Stoppers

● Pull the rear part and front part of the side cover evenly outward to clear the stoppers.
● Remove the side cover.
● Remove the other side cover in the same manner.

Rear Fender

Rear Fender (rear) Removal

● Remove the following.
Seat (see this chapter)
Side Covers (see this chapter)
Rear Fender Bolts and Nuts

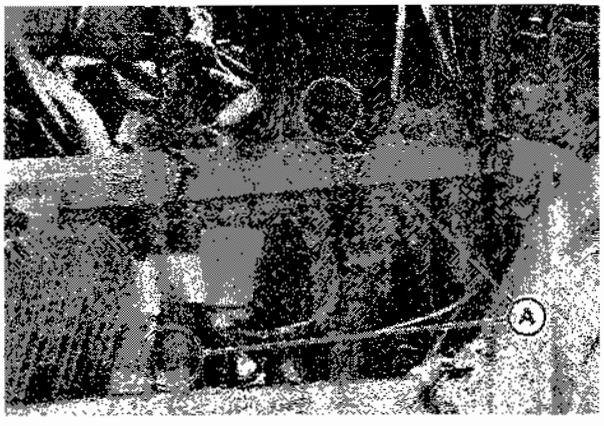


A. Bolts and Nuts

● Remove the rear fender (rear).

Rear Fender (front) Removal

● Remove the following.
Rear Fender (rear) (see this chapter)
Tail/Brake Light Connectors
Turn Signal Light Connectors
Turn Signal Relay
Starter Relay
Junction Box
Igniter
Battery Breather
Rear Brake Reservoir
Rear Fender Bolts
Battery



A. Rear Fender Bolts

● Remove the lower tie-rod bolt and nut to lower the rear wheel.

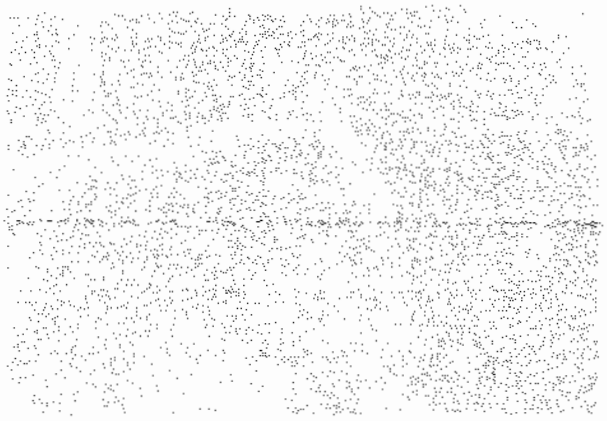


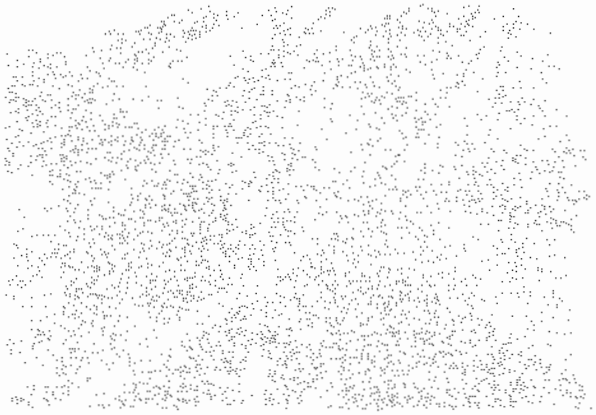
A. Lower Tie-Rod Bolt and Nut

● Remove the rear fender (front).



A. Rear Fender (front)



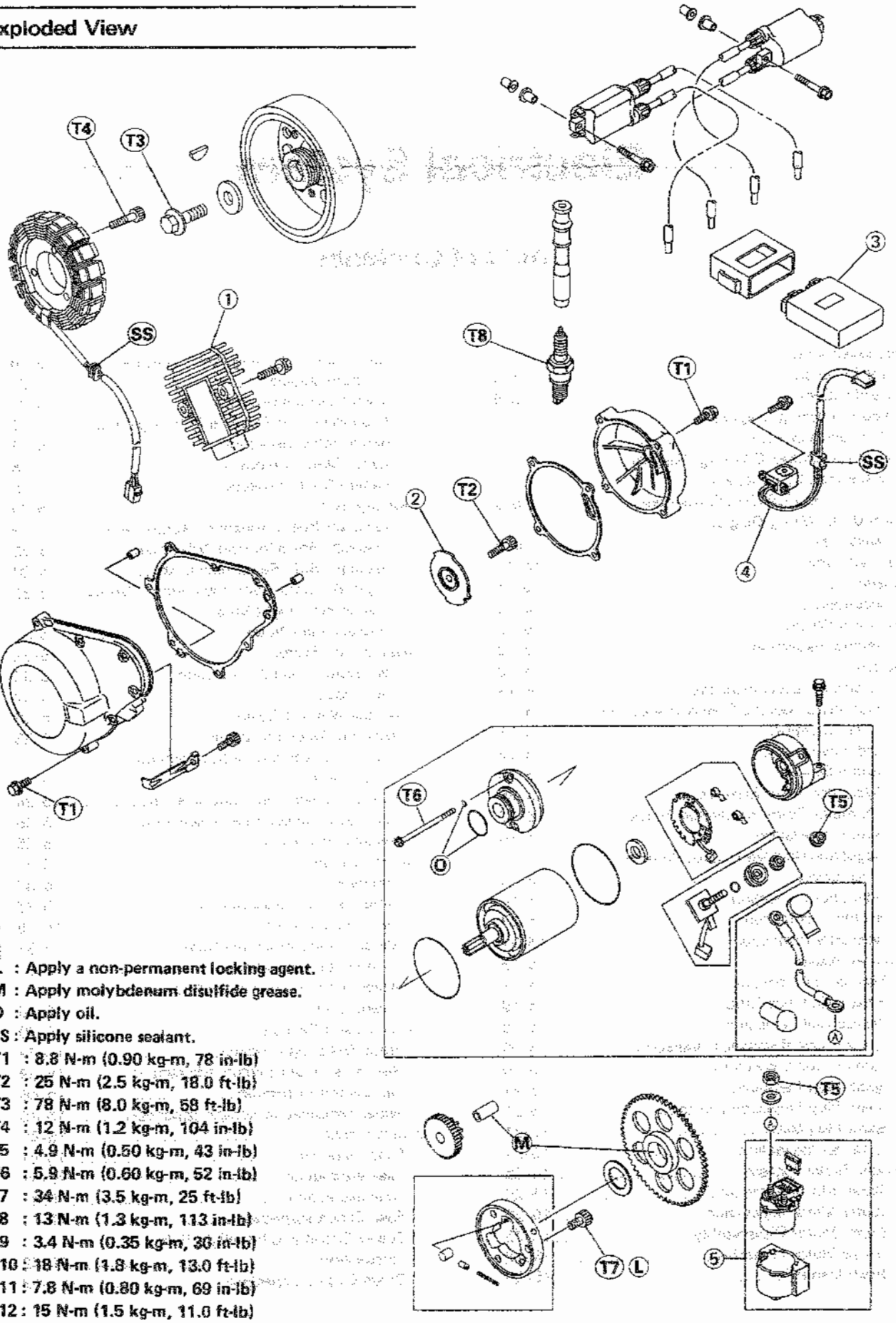


Electrical System

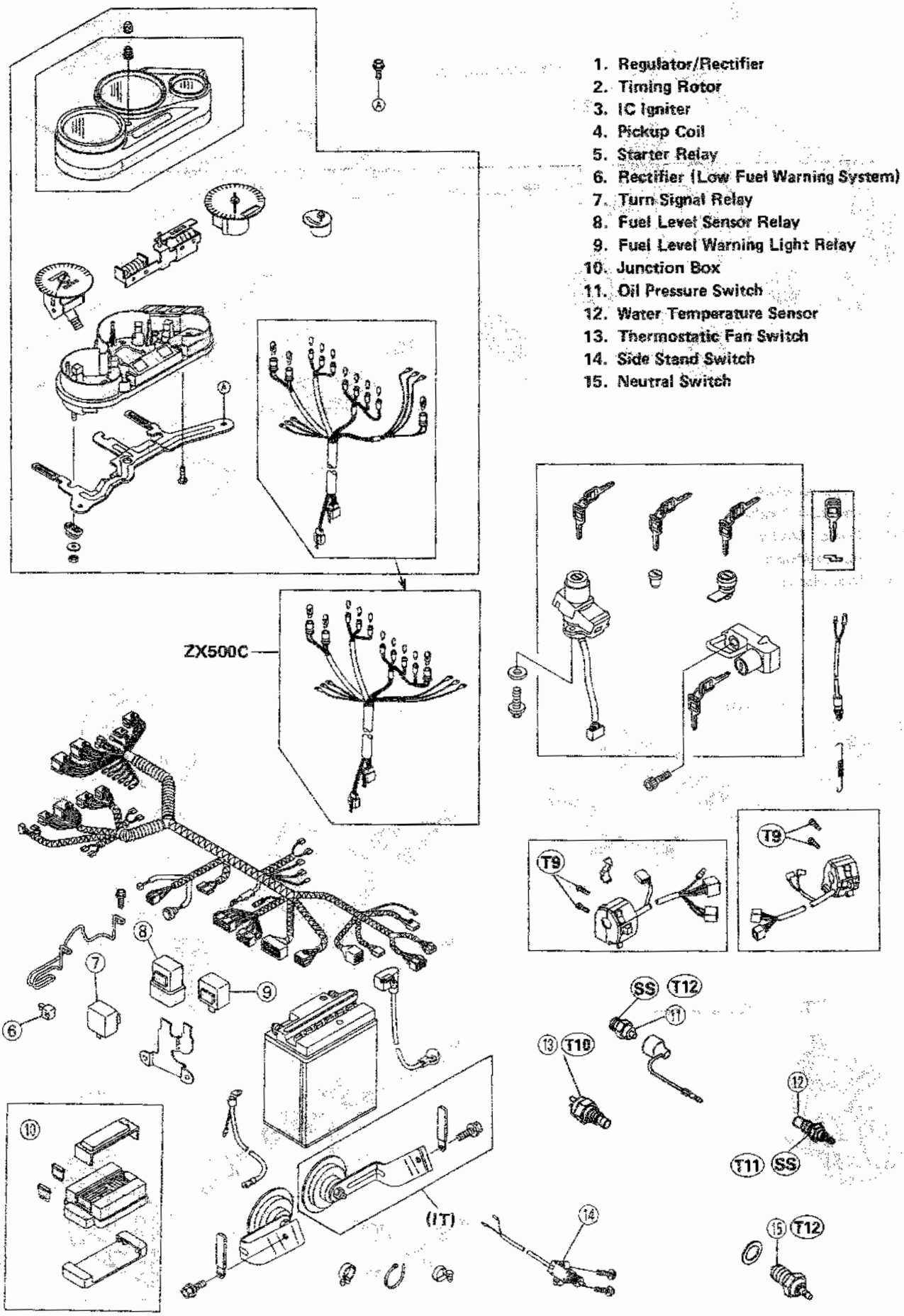
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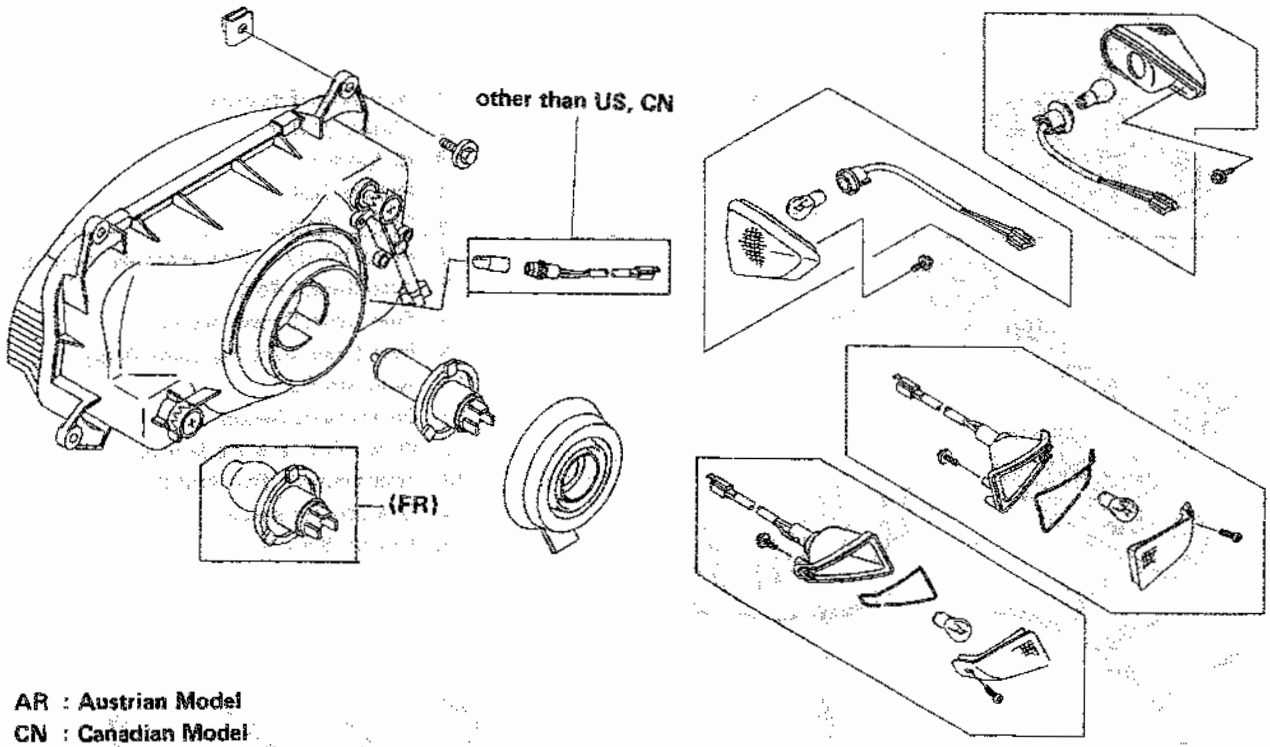
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Exploded View

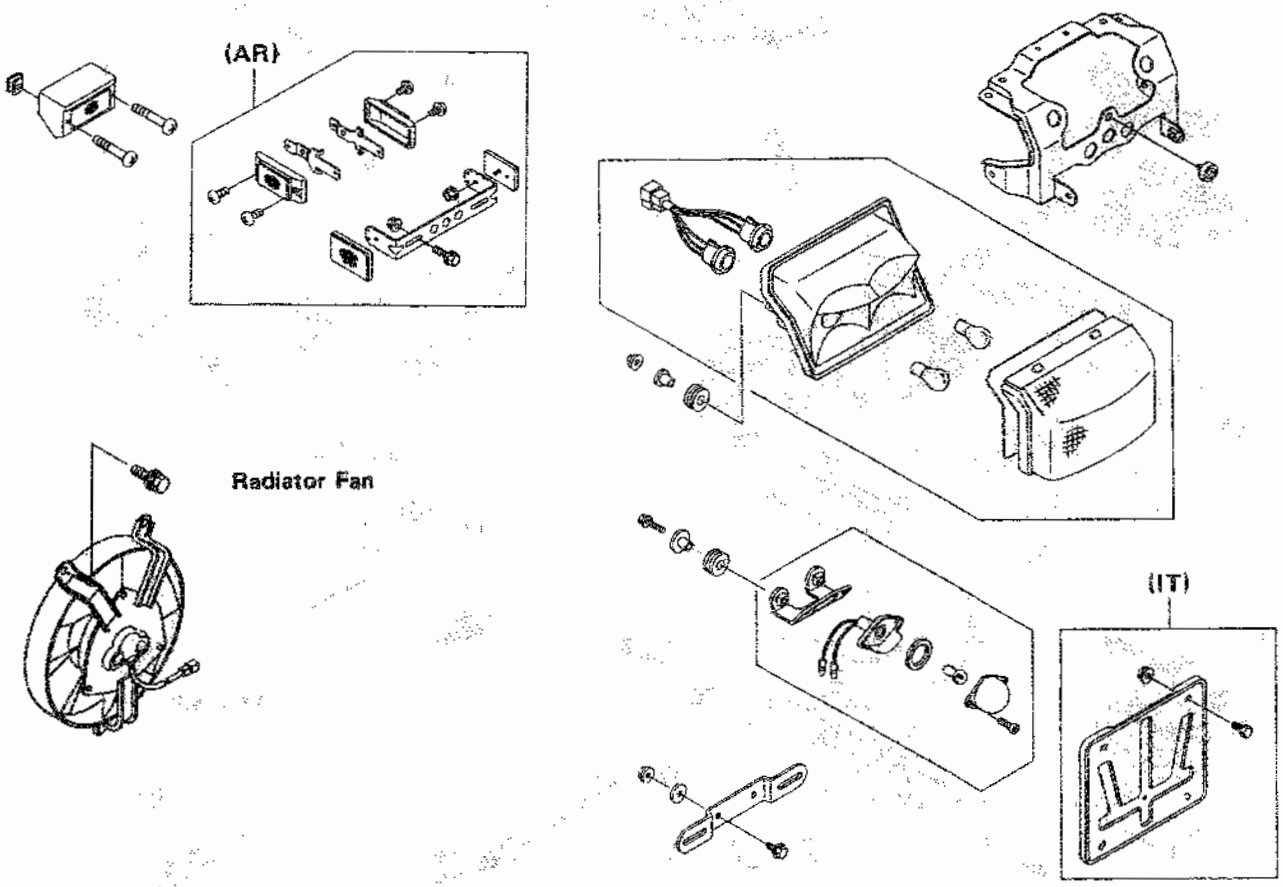


L : Apply a non-permanent locking agent.
M : Apply molybdenum disulfide grease.
O : Apply oil.
SS : Apply silicone sealant.
T1 : 8.8 N-m (0.90 kg-m, 78 in-lb)
T2 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T3 : 78 N-m (8.0 kg-m, 58 ft-lb)
T4 : 12 N-m (1.2 kg-m, 104 in-lb)
T5 : 4.9 N-m (0.50 kg-m, 43 in-lb)
T6 : 5.9 N-m (0.60 kg-m, 52 in-lb)
T7 : 34 N-m (3.5 kg-m, 25 ft-lb)
T8 : 13 N-m (1.3 kg-m, 113 in-lb)
T9 : 3.4 N-m (0.35 kg-m, 30 in-lb)
T10 : 18 N-m (1.8 kg-m, 13.0 ft-lb)
T11 : 7.8 N-m (0.80 kg-m, 69 in-lb)
T12 : 15 N-m (1.5 kg-m, 11.0 ft-lb)

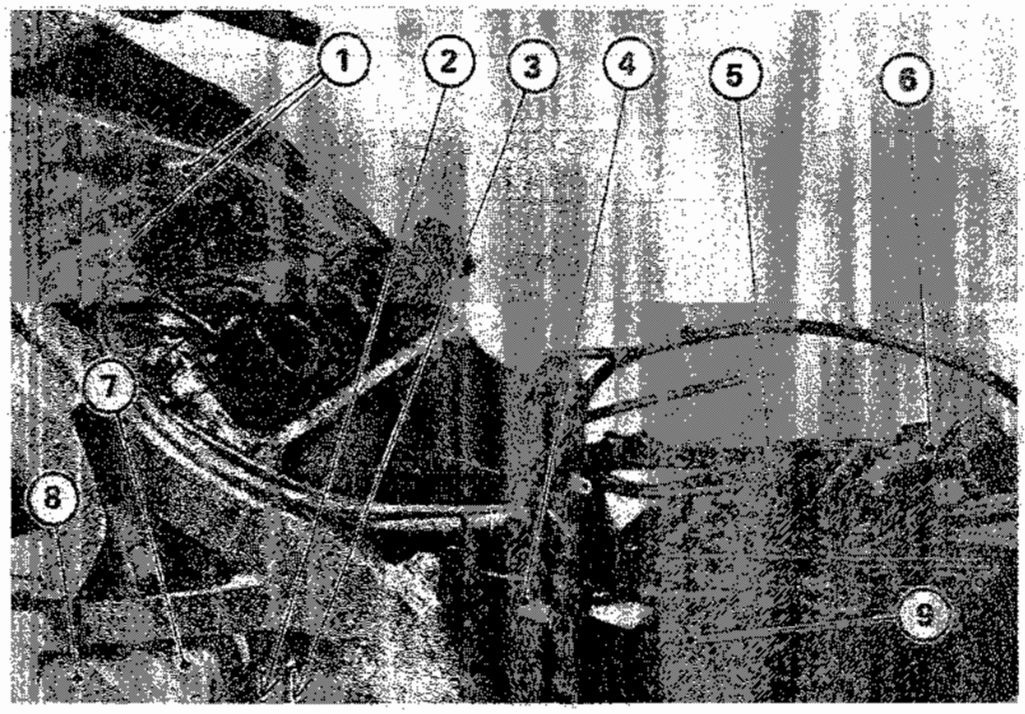

1. Regulator/Rectifier
2. Timing Rotor
3. IC Igniter
4. Pickup Coil
5. Starter Relay
6. Rectifier (Low Fuel Warning System)
7. Turn Signal Relay
8. Fuel Level Sensor Relay
9. Fuel Level Warning Light Relay
10. Junction Box
11. Oil Pressure Switch
12. Water Temperature Sensor
13. Thermostatic Fan Switch
14. Side Stand Switch
15. Neutral Switch
ZX500C
T9
T9
SS
T12
11
13
T10
12
T11
SS
(IT)
14
15
T12

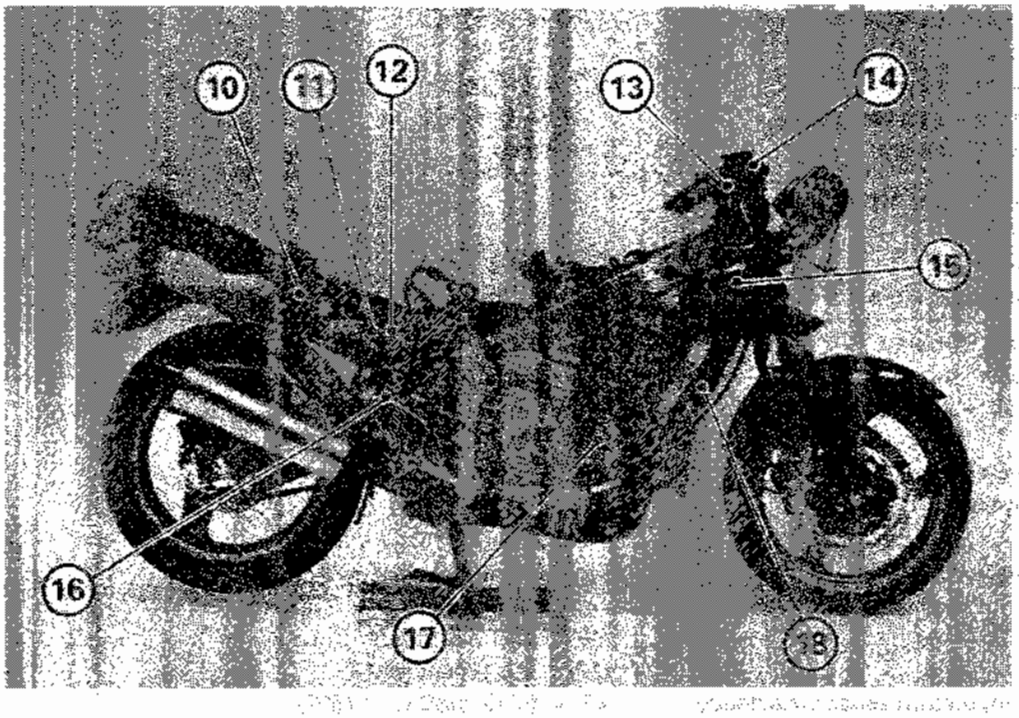


AR : Austrian Model
CN : Canadian Model
FR : French Model
IT : Italian Model
US : U.S. Model



Parts Location



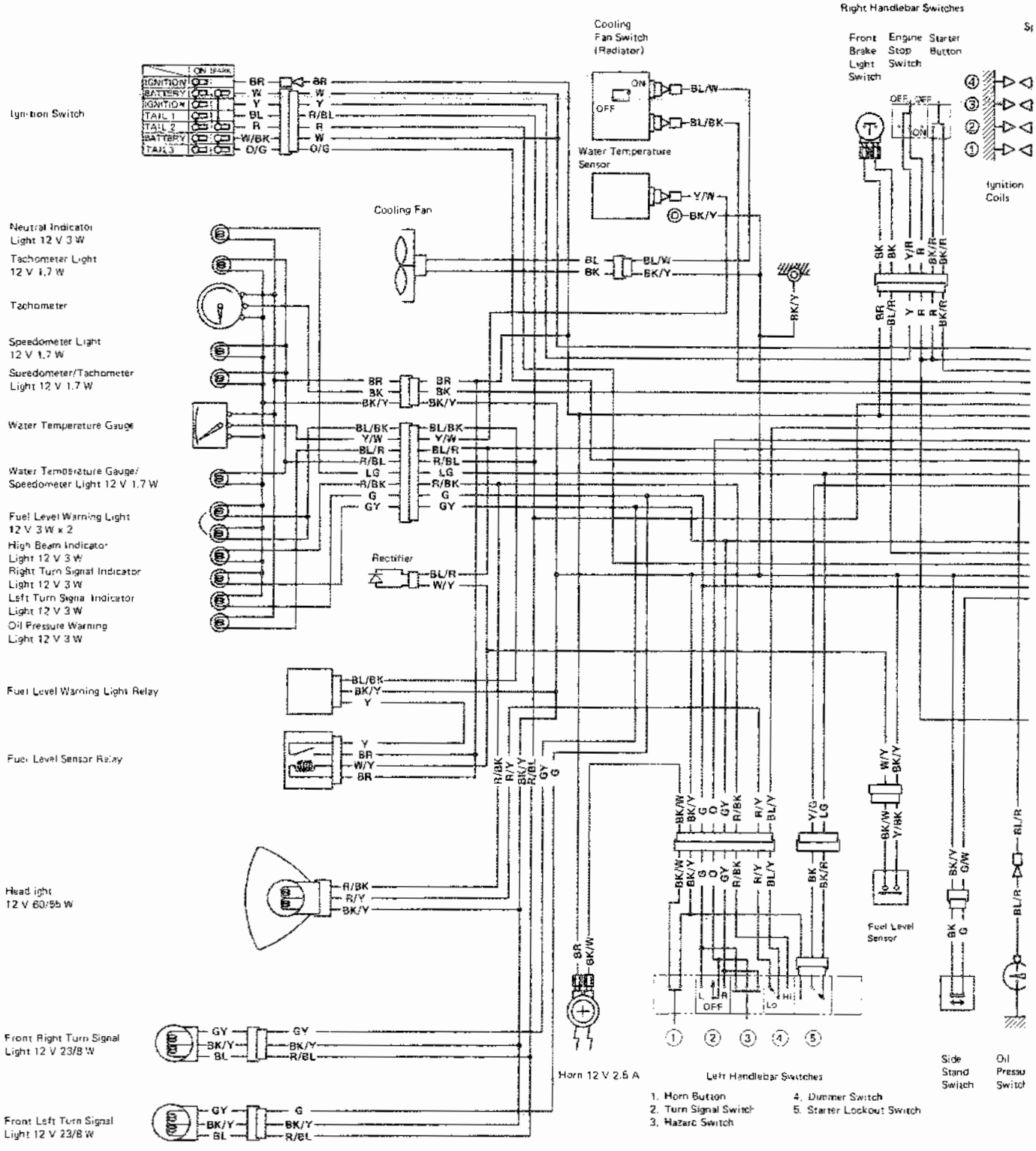


1. Ignition Coils
2. Oil Pressure Switch
3. Neutral Switch
4. Starter Relay and Main Fuse
5. IC Igniter
6. Junction Box
7. Starter Motor
8. Alternator
9. Turn Signal Relay
10. Regulator/Rectifier
11. Fuel Level Sensor Relay
12. Fuel Level Warning Light Relay
13. Front Brake Light Switch
14. Starter Lockout Switch
15. Water Temperature Sensor
16. Rear Brake Light Switch
17. Pickup Coil
18. Fan Switch

Specifications

Item	Standard	Service Limit
Battery:		
Capacity	12 V 12 Ah	– – –
Electrolyte level	Between upper and lower levels	– – –
Specific gravity	1.280 @20°C (68°F)	– – –
Charging System:		
Alternator type	Three-phase AC	– – –
Charging voltage (regulator/rectifier output voltage)	14 ~ 15 V	– – –
Alternator output voltage	45 V or more	– – –
Stator coil resistance	0.2 ~ 0.6 Ω	– – –
Ignition System:		
Pickup coil air gap	0.4 ~ 0.6 mm	– – –
Pickup coil resistance	380 ~ 570 Ω	– – –
Ignition timing	From 12.5° BTDC @1 050 r/min (rpm) to 40° BTDC @3 000 r/min (rpm), (CA) From 7.5° BTDC @1 300 r/min (rpm) to 40° BTDC @3 000 r/min (rpm), (ST) (AR:D3, C3) From 5° BTDC @1 300 r/min (rpm) to 40° BTDC @3 000 r/min (rpm)	– – –
Ignition coil:		
3 needle arcing distance	6 mm or more	– – –
Primary winding resistance	2.3 ~ 3.5 Ω	– – –
Secondary winding resistance	12.0 ~ 18.0 kΩ	– – –
Spark plug:		
Spark plug gap	0.7 ~ 0.8 mm	– – –
Spark plug cap resistance	3.75 ~ 6.25 kΩ	– – –
IC igniter resistance	in the text	– – –
Electrical Starter System:		
Starter motor:		
Brush length	11.6 ~ 12.4 mm	8.5 mm
Commutator diameter	27.8 ~ 28.1 mm	27.0 mm
Switch and Sensor:		
Rear brake light switch timing	ON after about 10 mm petal travel	– – –
Engine oil pressure switch connections	when engine is stopped : ON when engine is running : OFF	– – –
Fan switch connections:		
Rising temperature	From OFF to ON at 93 ~ 103°C (199 ~ 217°F)	– – –
Falling temperature	From ON to OFF at 91 ~ 95°C (196 ~ 203°F)	
	ON : Less than 0.5 Ω	– – –
	OFF : More than 1 MΩ	– – –
Water temperature sensor resistance	47 ~ 57 Ω @80°C (175°F)	– – –
	25 ~ 30 Ω @100°C (212°F)	– – –

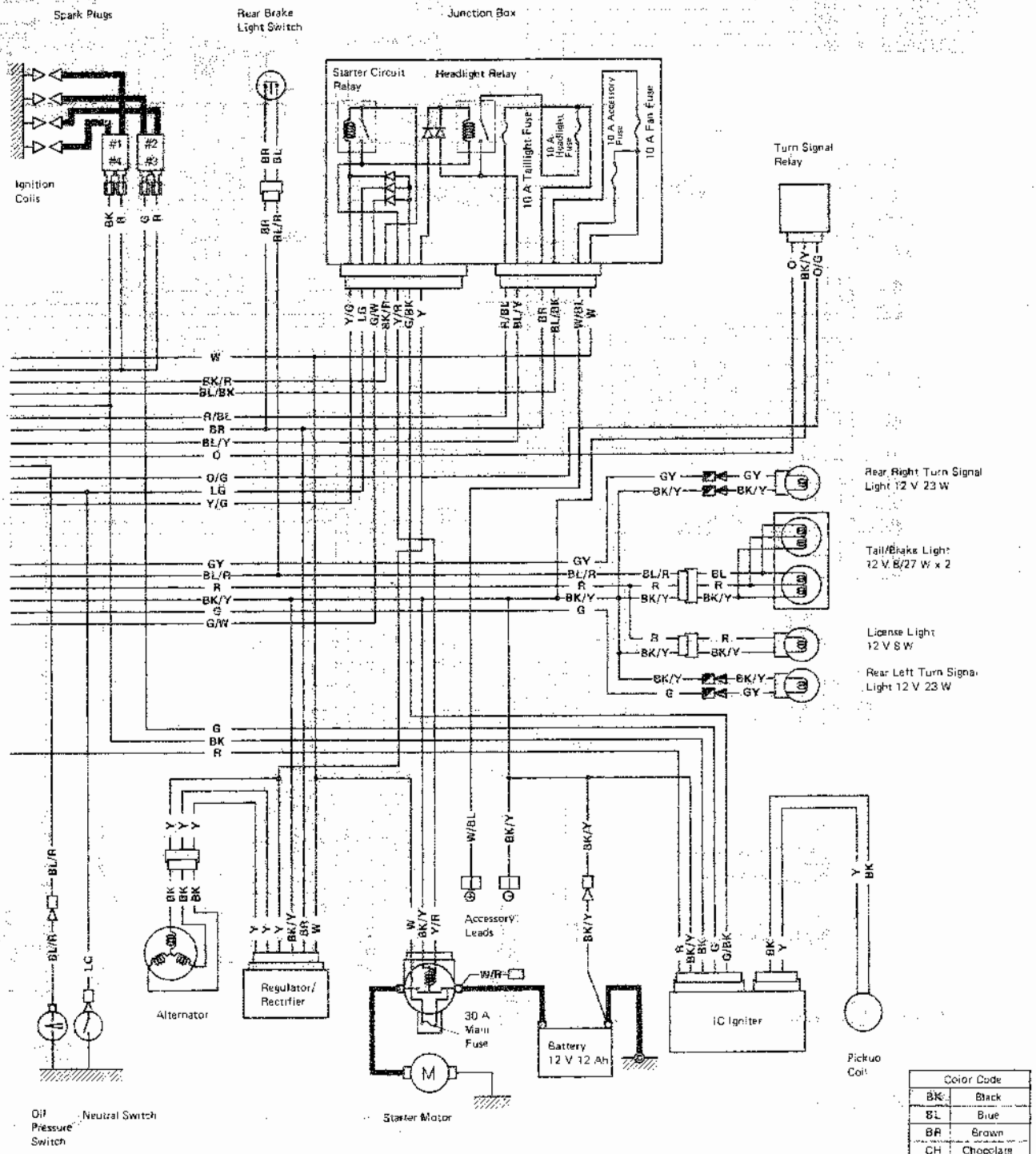
ZX600-D Wiring Diagram (U.S. and Canada)



LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Hazard Switch				Turn Signal Switch				Dimmer Switch			Starter Lockout Switch			
Color	BK/Y	BK/W	Color	GY	O	G	Color	GY	O	G	Color	R/BK	BL/Y	R/Y	Color	BK/Y	BK	BK/R
ON (Push)	○	○	ON	○	○	○	R	○	○		HI	○	○		Released		○	○
							N (OFF Push)											
			OFF				L			○	LO		○		Pulled in		○	

Color		
OFF, LOCK		
ON		
P (PARK)		



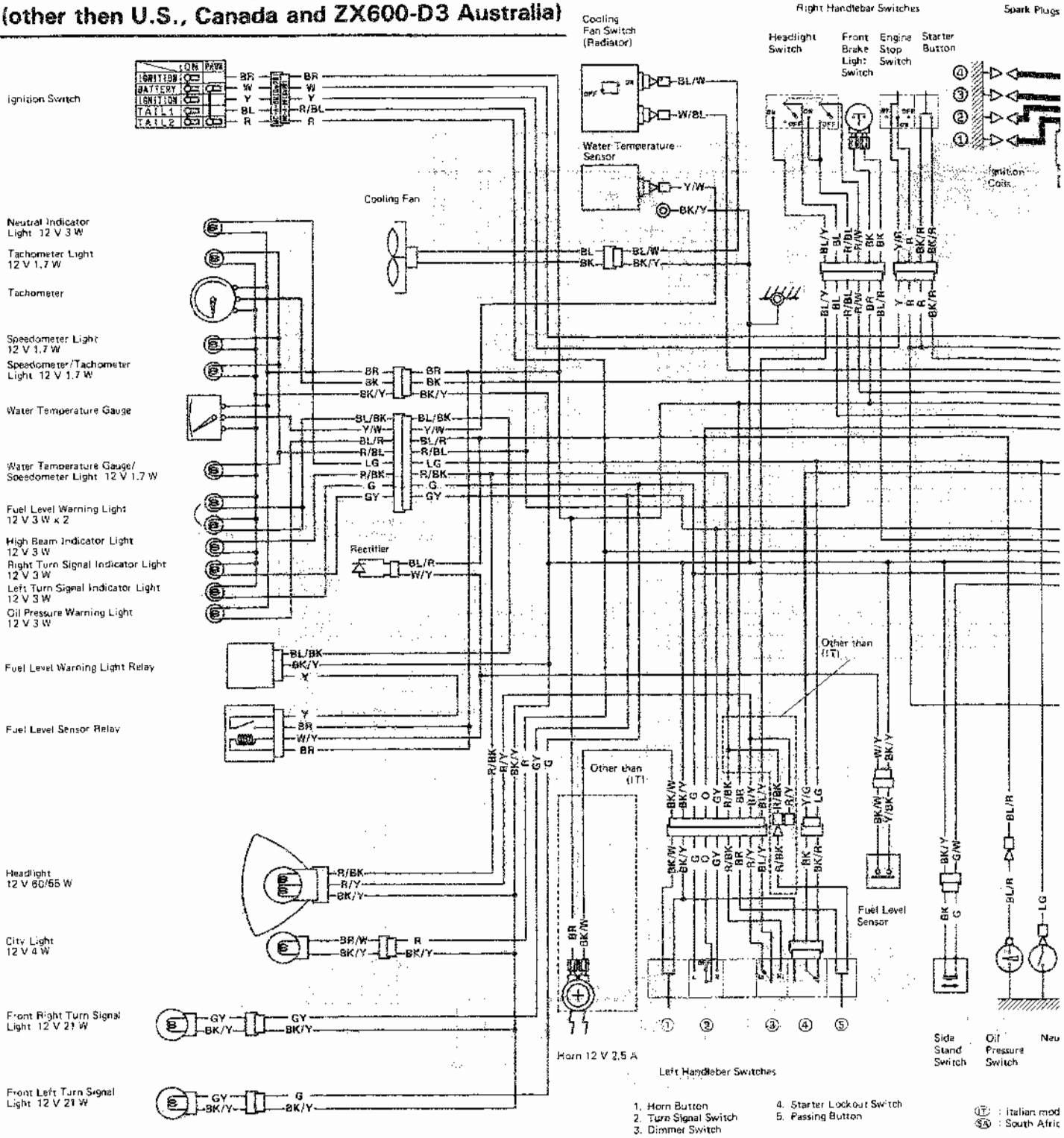
IGNITION SWITCH CONNECTIONS							
	Light	Battery	Ignition	Tail 1	Tail 2	Battery	Tail 3
Color	BR	W	Y	BL	R	W/BK	O/G
LOCK							
ON	○	○		○			
PARK	○	○					

RIGHT HANDLEBAR SWTICH CONNECTIONS								
Engine Stop Switch			Starter Button			Front Brake Light Switch		
Color	Y/R	R	Color	BK/R	BK/R	Color	BK	BK
OFF			PUSH	○	○	Released		
RUN	○		Released			Pulled in	○	○

Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark green
G	Green
GY	Gray
LB	Light blue
LG	Light green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

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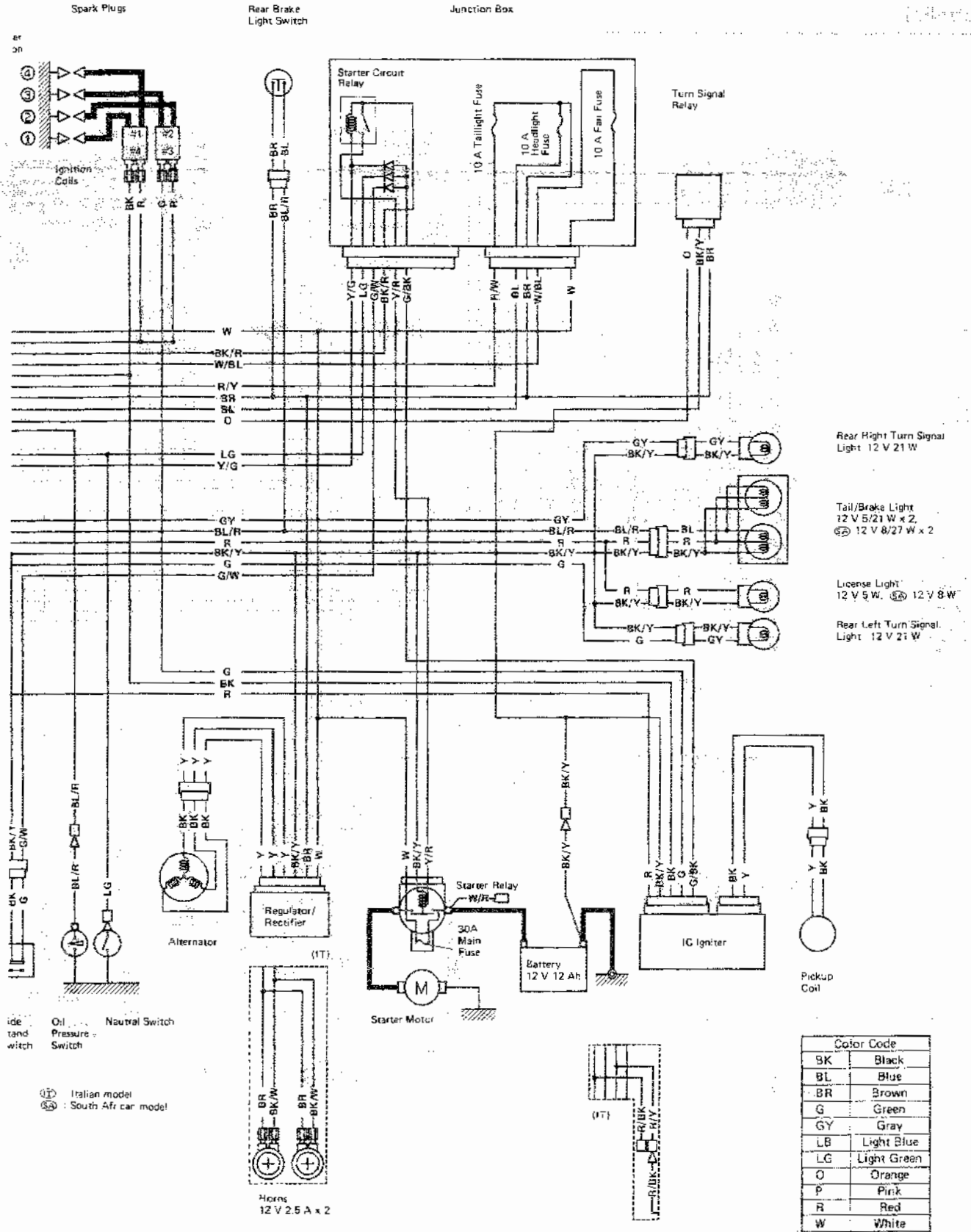
ZX600-D, ZX500-C Wiring Diagram
(other then U.S., Canada and ZX600-D3 Australia)



LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Passing Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch			
Color	BK/Y	BK/W	Color	R/BK	BR	Color	GY	O	G	Color	R/BK	BL/Y	R/Y	Color	BK/Y	BK	BK/R
Released			Released			R				HI				Released			
ON (PUSH)			ON (PUSH)			N (OFF, PUSH)											
						L				LO				PULL			

	IGNIT
	Ignition
Color	BR
OFF, LOCK	
ON	
P (PARK)	



Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
R	Red
W	White
Y	Yellow

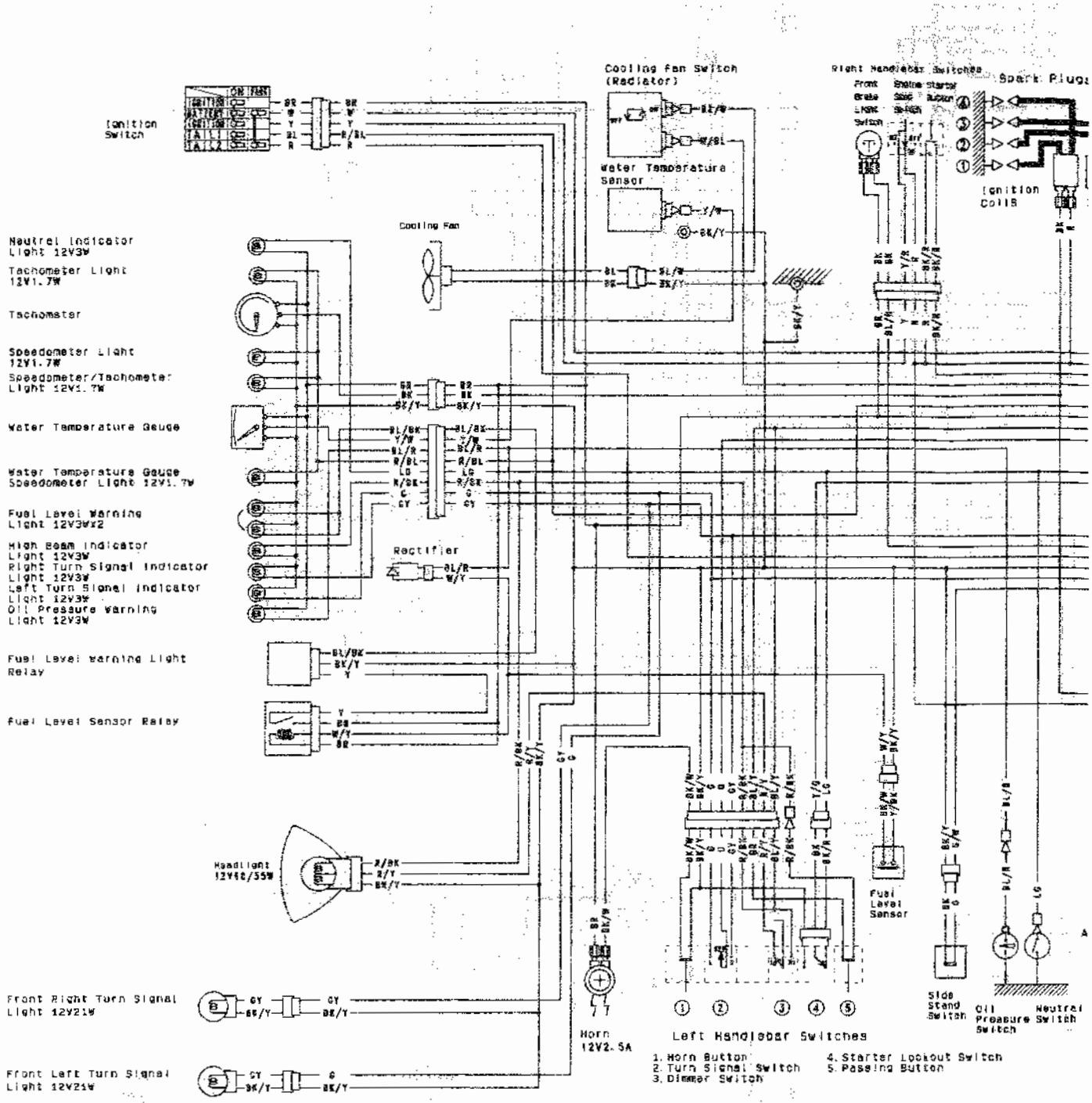
IGNITION SWITCH CONNECTIONS

	Ignition	Battery	Ignition	Tail 1	Tail 2
Color	BR	W	Y	BL	R
OFF, LOCK					
ON	○	○	○	○	○
P (PARK)	○	○		○	○

RIGHT HANDLEBAR SWITCH CONNECTIONS

Engine Stop Switch			Starter Button			Head light Switch					Front Brake Light Switch		
Color	Y/R	R	Color	BK/R	BK/R	Color	R/W	R/BL	BL	SL/Y	Color	BK	BK
OFF			PUSH	○	○	OFF					Released		
RUN	○					○							
			Released			ON	○	○	○		Pulled in	○	

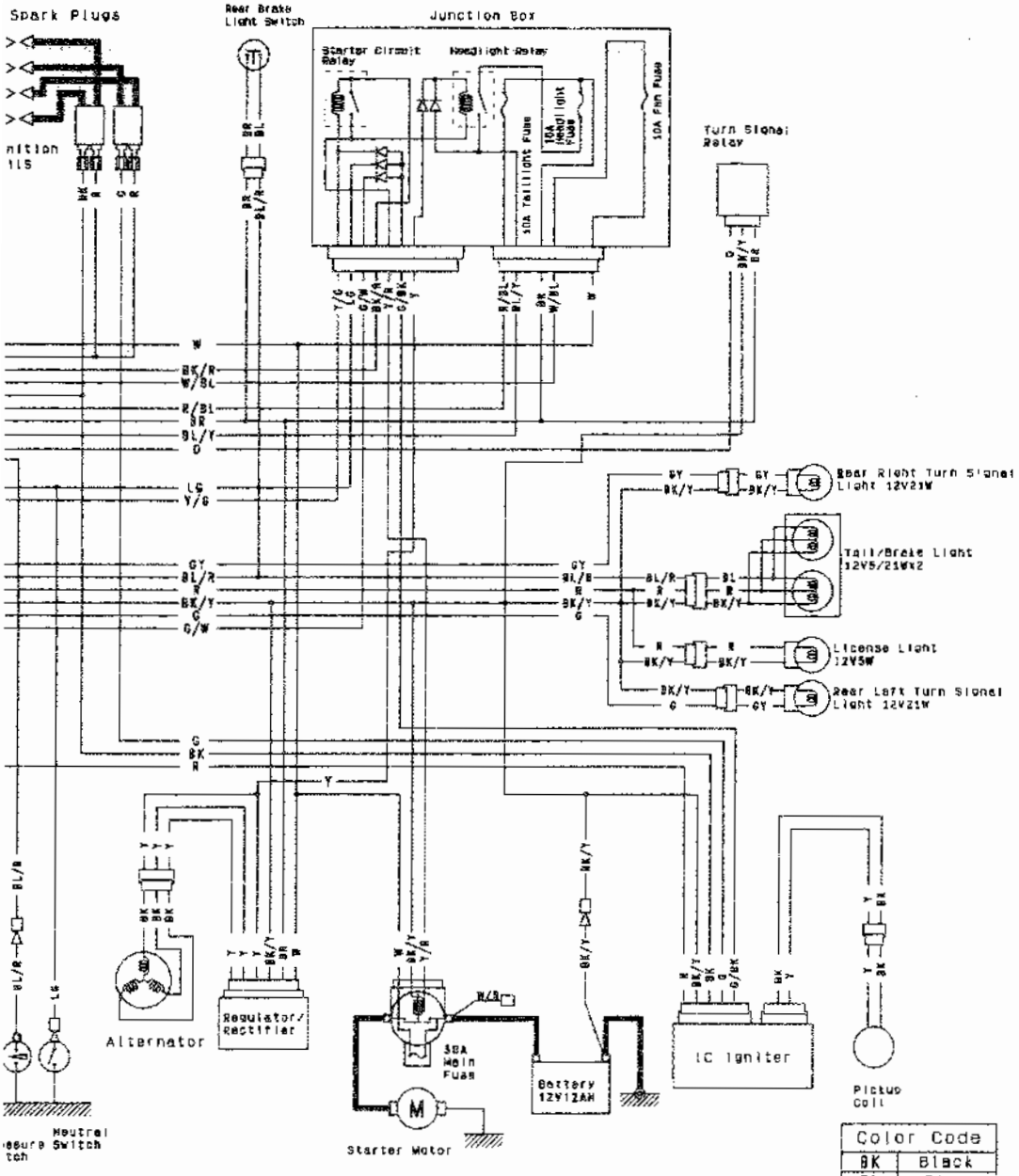
ZX600-D3 Wiring Diagram (Australia)



LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Passing Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch			
Color	BK/Y	BK/W	Color	R/BK	BR	Color	GY	O	G	Color	R/BK	BL/Y	R/Y	Color	BK/Y	BK	BK/R
Released			Released			R				HI				Released			
OR (Push)			OR (Push)			N(OFF, PUSH)											
						L				LO				Pulled in			

IGNITI	
Color	
OFF, LOCK	
ON	
P(PARK)	



Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
R	Red
W	White
Y	Yellow

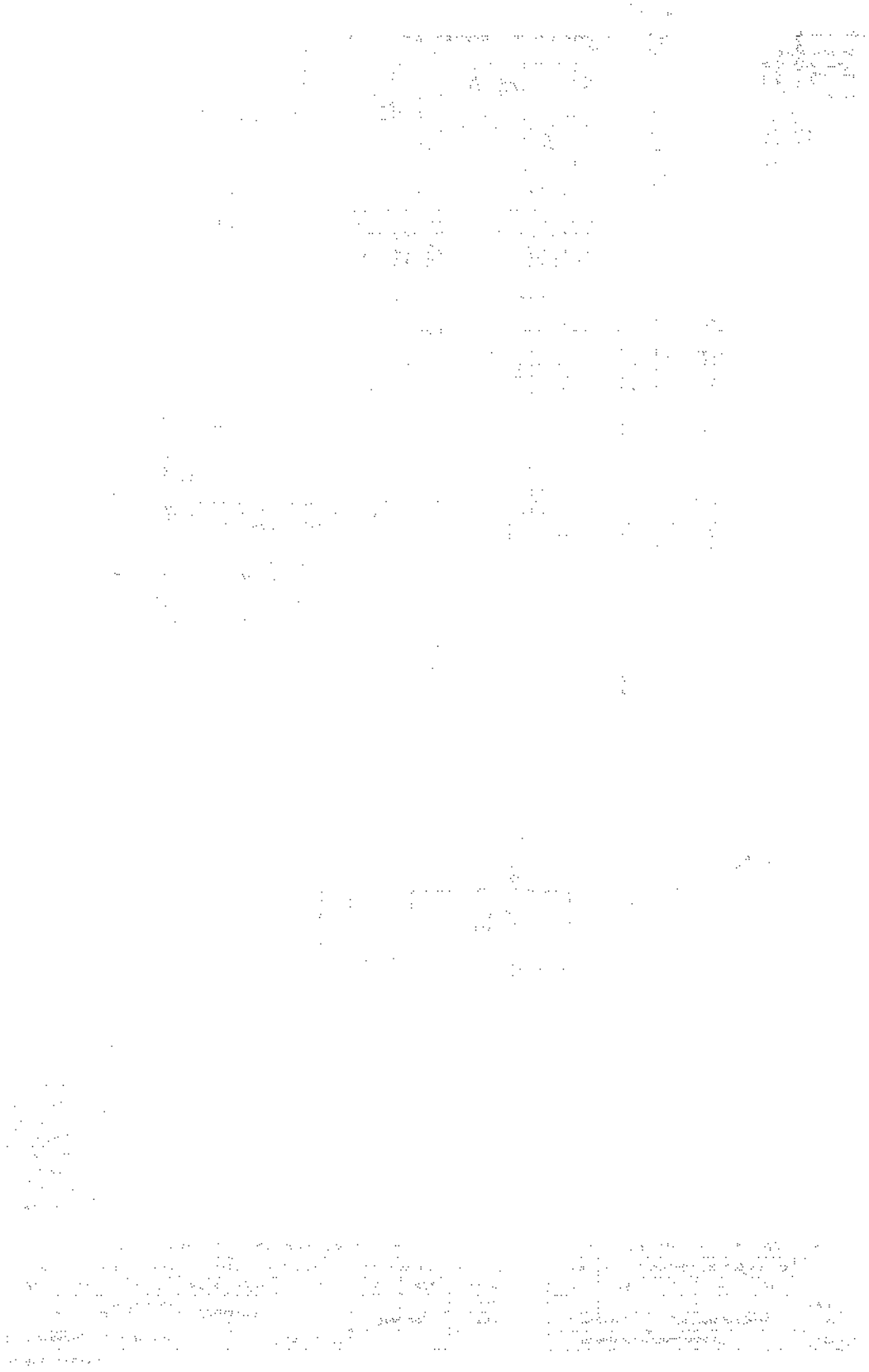
IGNITION SWITCH CONNECTIONS

	Ignition	Battery	Ignition	Tail	Tail
Color	BR	W	Y	BL	R
OFF, LOCK					
ON	○	○	○	○	○
P(PARK)		○	○	○	○

RIGHT HANDLEBAR SWITCH CONNECTIONS

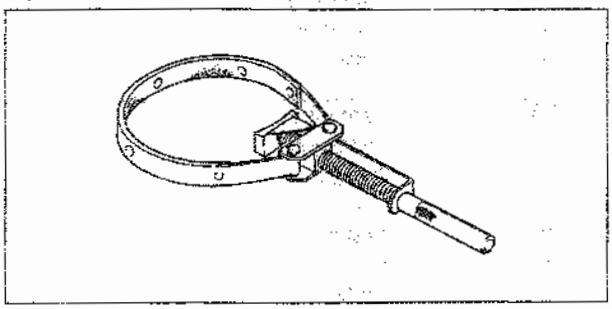
Engine Stop Switch			Starter Button			Front Brake Light Switch		
Color	Y/R	R	Color	BK/R	BK/R	Color	BK	BK
OFF			PUSH	○	○	Released		
RUN	○	○						
			Released			Pulled in	○	○

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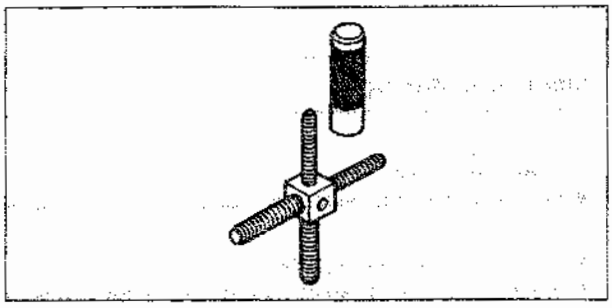


Special Tools

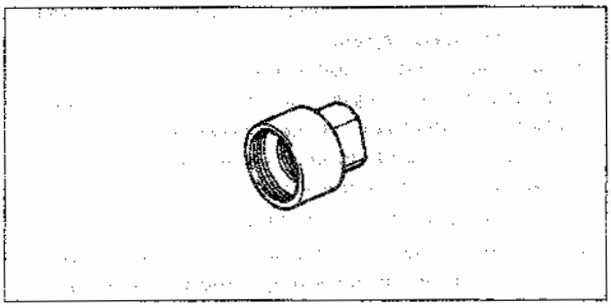
Flywheel Holder: 57001-1313



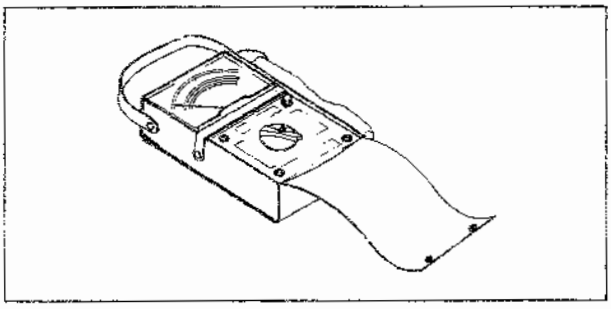
Rotor Puller, M16/M18/M20/M22 x 1.5: 57001-1216



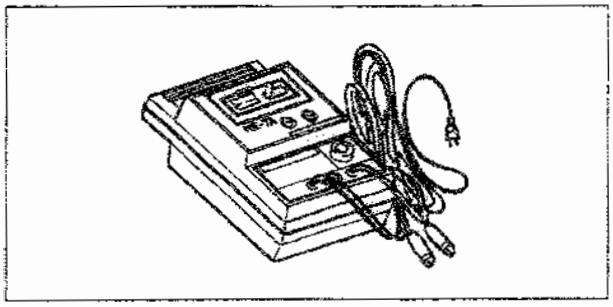
Flywheel Puller, M35 X 1.5: 57001-1223



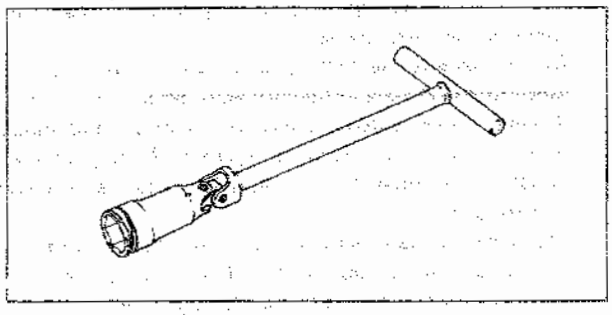
Hand Tester: 57001-983



Coil Tester: 57001-1242

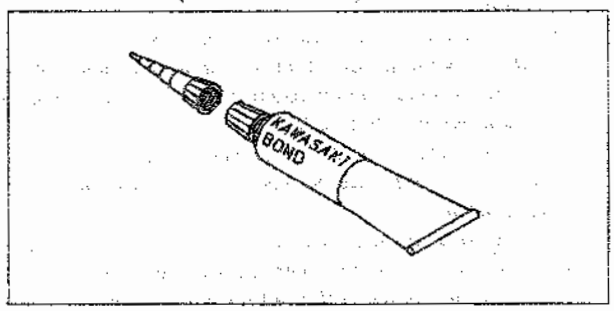


Spark Plug Wrench, Hex 16: 57001-1262



Sealant

Kawasaki Bond (Silicone Sealant): 56019-120

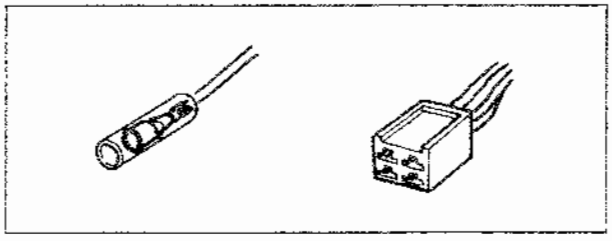


Precautions

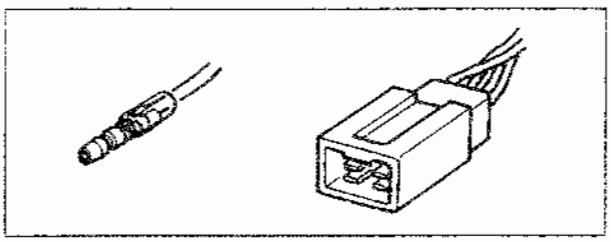
There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

- Do not reverse the battery lead connections. This will burn out the diodes in the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- To prevent damage to electrical parts, do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running.
- Because of the large amount of current, never keep the starter switch pushed when the starter motor will not turn over, or the current may burn out the starter motor windings.
- Do not use a meter illumination bulb rated for other than voltage or wattage specified in the wiring diagram, as the meter or gauge panel could be warped by excessive heat radiated from the bulb.
- Take care not to short the leads that are directly connected to the battery positive (+) terminal to the chassis ground.
- Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was caused by some other item or items, they too must be repaired or replaced, or the new replacement will soon fail again.
- Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.
- Measure coil and winding resistance when the part is cold (at room temperature).
- Electrical Connectors

Female Connectors



Male Connectors



- Color Codes:

BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark green
G	Green
GY	Gray
LB	Light blue
LG	Light green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

Electrical Wiring

Wiring Inspection

- Visually inspect the wiring for signs of burning, fraying, etc.

★If any wiring is poor, replace the damaged wiring.

- Pull each connector apart and inspect it for corrosion, dirt, and damage.

★If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.

- Check the wiring for continuity.
- Use the wiring diagram to find the ends of the lead which is suspected of being a problem.
- Connect the hand tester (special tool: 57001-983) between the ends of the leads.
- Set the tester to the x 1 Ω range, and read the tester.

★If the tester does not read 0 Ω, the lead is defective. Replace the lead or the wiring harness if necessary.

Battery

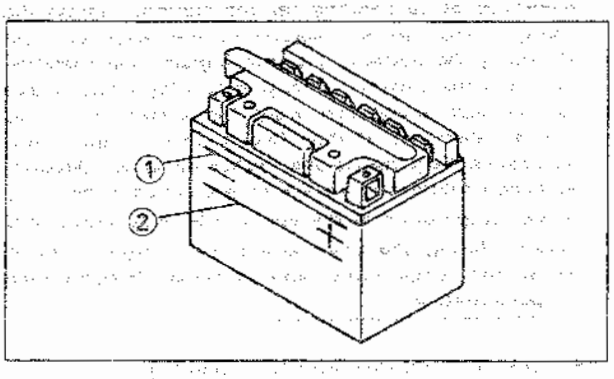
Electrolyte Level Inspection

●The electrolyte level should be between the upper and the lower level lines.

★If the level of electrolyte in any cell is below the lower level line, add only distilled water to cell, until the level is at the upper level line.

CAUTION

Ordinary tap water is not a substitute for distilled water and will shorten the life of the battery.



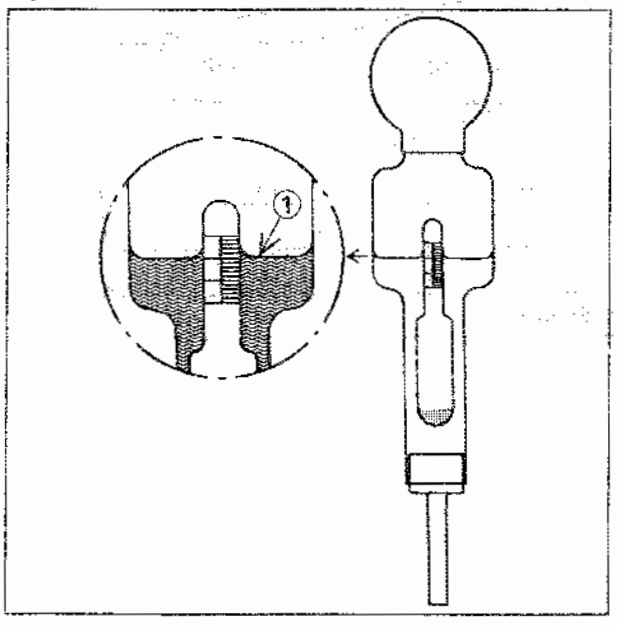
1. Upper Level Line 2. Lower Level Line

Electrolyte Specific Gravity Inspection

●Check battery condition by testing the specific gravity of the electrolyte in each cell with a hydrometer.

○Read the level of the electrolyte on the floating scale.

Hydrometer

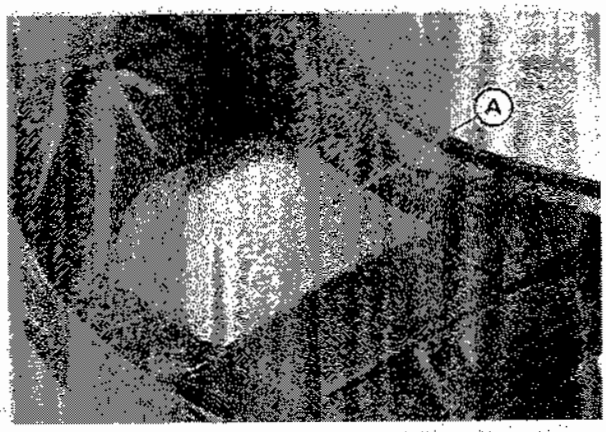


1. Read here.

★If the specific gravity is below 1.20 (charge 60%), the battery needs to be charged.

Initial Charging

●Remove the following.
Seat (see Frame chapter)
Inlet Duct



A. Inlet Duct

●Take out the battery.

●Cut off the sealed end of the battery vent hose and remove the filler cap.

⚠WARNING

Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

●Fill each cell to the upper level line on the battery case with fresh electrolyte (specific gravity: 1.280) at a temperature of 30°C (86°F) or less. Let the battery stand for about 30 minutes before charging.

NOTE

○*If the electrolyte level drops, add electrolyte to the upper level line before charging.*

●Set the charging rate at 1/10 the battery capacity, and **charge it for 10 hours.** For example, if the battery is rated at 12 Ah, the charging rate would be 1.2 A.

CAUTION

If the battery is not given a full initial charging, it will discharge in a few weeks. After that it can not be charged by supplement charging.
Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat which can warp the plates and cause internal shorting. Higher-than-normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.
If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

Ordinary Charging

- Remove the battery (see Initial Charging).
- Set the charging rate and time according to the battery condition previously determined (see Electrolyte Specific Gravity Inspection), using the Battery Charging Rate/Time Table.

⚠WARNING

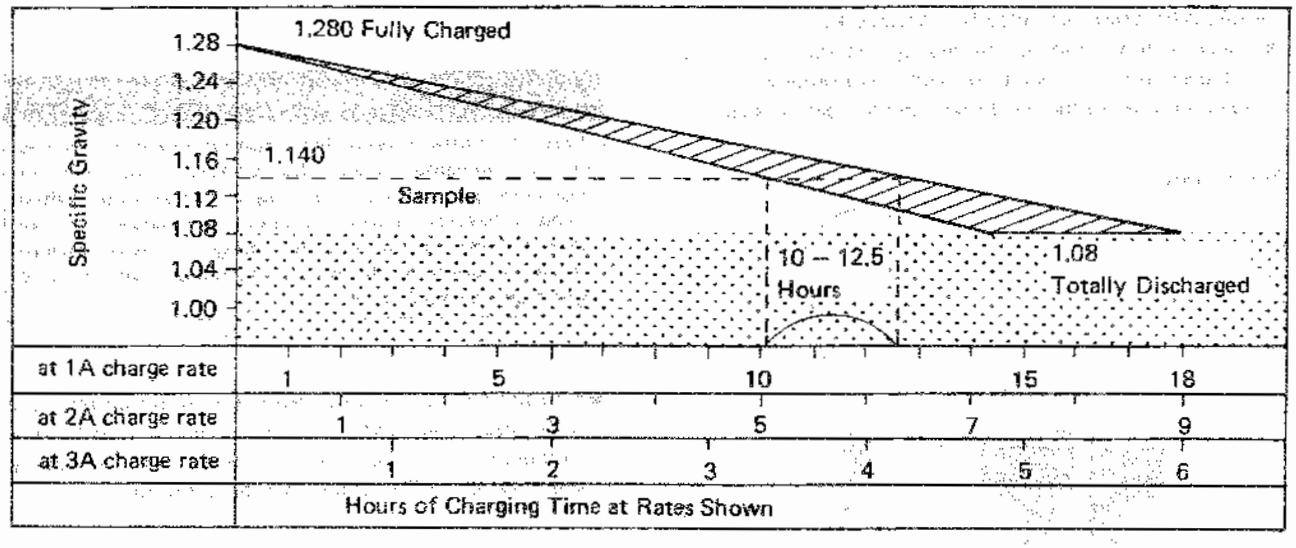
Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

CAUTION

Always remove the battery from the motorcycle for charging. If the battery is charged while still installed, battery electrolyte may spill and corrode the frame or other parts of the motorcycle.
Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat which can warp the plates and cause internal shorting. Higher-than-normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.
If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

- Check the electrolyte level after charging.

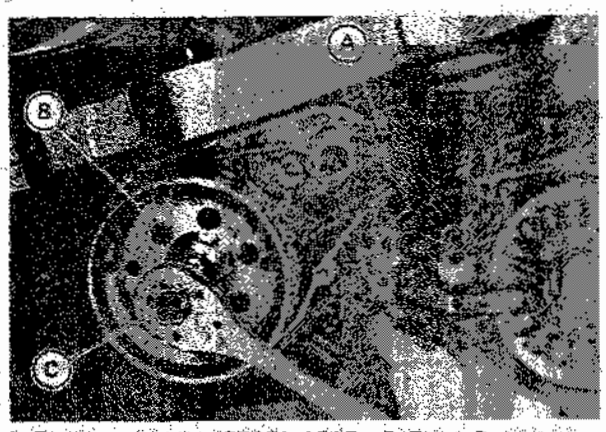
Battery Charging Rate/Time Table (12V 12Ah)



Charging System

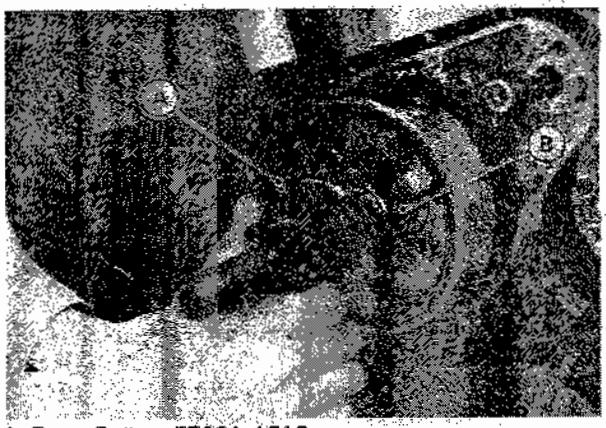
Alternator Rotor Removal

- Set the motorcycle up on its center stand.
- Place a suitable container under the alternator cover.
- Remove the alternator cover.
- Wipe oil off the outer circumference of the rotor.
- Hold the alternator rotor steady with the flywheel holder (special tool), and remove the rotor bolt.



A. Flywheel Holder: 57001-1313 C. Rotor Bolt
B. Rotor

- Threads the flywheel puller (special tool) and the rotor puller (special tool) onto the alternator rotor.
- Holding the flywheel puller, turn the rotor puller until the alternator rotor is forced off the end of the crankshaft.



A. Rotor Puller: 57001-1216
B. Flywheel Puller: 57001-1223

CAUTION

If the rotor is difficult to remove, turn the puller while tapping the end of the puller covered with the cap. Do not attempt to strike the alternator rotor itself. Striking the rotor can cause the magnets to lose their magnetism.

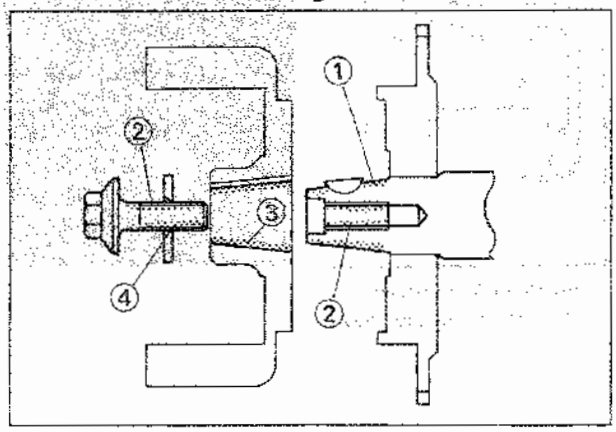
Alternator Rotor Installation Notes

- Clean the following portions with an oil-less cleaning fluid such as trichloroethylene or acetone.

⚠WARNING

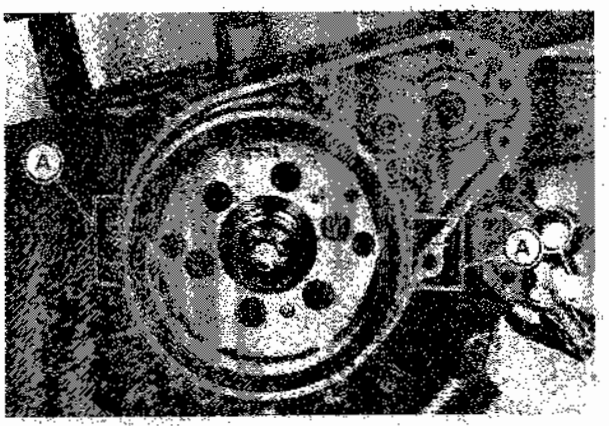
These cleaning fluids are usually highly flammable and harmful if breathed for prolonged periods. Be sure to heed the fluid manufacturer's warnings.

Alternator Rotor Cleaning Area



1. The tapered portion of the crankshaft.
2. The alternator rotor bolt and the threads in the crankshaft.
3. The tapered portion of the alternator rotor.
4. Chamfer

- Install the washer so that the chamfer side faces out.
- Tighten the alternator rotor bolt to the specified torque (see Exploded View) while holding the alternator rotor steady with the flywheel holder (special tool: 57001-1313).
- Apply silicone sealant to the crankcase halves mating surface on the front and rear sides of the cover mount.

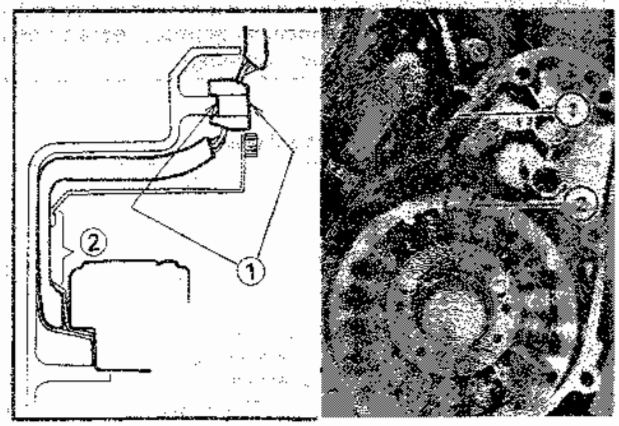


A. Silicone Sealant Applied Areas

- Install a new gasket and the alternator cover.
- Tighten the cover bolts to the specified torque (see Exploded View).
- Fill the engine with engine oil (see Engine Lubrication System chapter).

Stator Installation

- Secure the stator coil leads with a clamp.
- Be careful not to pile up the stator coil leads too high.
- Fit the stator coil lead grommet into the notch of the cover securely.
- Apply silicone sealant to the grommet.



1. Apply silicone sealant.
2. Do not pile up the leads.

Regulator/Rectifier Output Voltage Inspection

- Check the battery condition (see Battery section).
- Warm up the engine to obtain actual alternator operating conditions.
- Remove the right side cover (see Frame chapter).
- Check that the ignition switch is turned off, and connect the hand tester (special tool: 57001-983) as shown in the table.
- Start the engine, and note the voltage readings at various engine speeds with the headlight turned on and then turned off. (To turn off the headlight of US model, disconnect the headlight connector in the upper fairing.) The readings should show nearly battery voltage when the engine speed is low, and, as the engine speed rises, the readings should also rise. But they must be kept under the specified voltage.

Regulator/Rectifier Output/Voltage

Meter	Connections		Reading
Range	Meter (+) to	Meter (−) to	
25 V DC	White	Black/Yellow	14 ~ 15 V

- Turn off the ignition switch to stop the engine, and disconnect the hand tester.

★If the regulator/rectifier output voltage is kept between the values given in the table, the charging system is considered to be working normally.

★If the output voltage is much higher than the values specified in the table, the regulator/rectifier is defective or the regulator/rectifier leads are loose or open.

★If the battery voltage does not rise as the engine speed increases, then the regulator/rectifier is defective or the alternator output is insufficient for the loads. Check the alternator and regulator/rectifier to determine which part is defective.

Alternator Inspection

There are three types of alternator failures: short, open (wire burned out), or loss in rotor magnetism. A short or open in one of the coil wires will result in either a low output, or no output at all. A loss in rotor magnetism, which may be caused by dropping or hitting the alternator, by leaving it near an electromagnetic field, or just by aging, will result in low output.

- To check the alternator output voltage, do the following procedures.
  - Remove the left side cover (see Frame chapter).
  - Disconnect the alternator connector (connector 1).
  - Connect the hand tester (special tool) as shown in the table.
  - Start the engine.
  - Run it at the rpm given in the table.
  - Note the voltage readings (total 3 measurements).

Alternator Output Voltage

Meter	Connections		Reading
Range	Meter (+) to	Meter (−) to	@4 000 rpm
250 V AC	One black lead (Connector 1)	Another black lead (Connector 1)	45 V or more

★If the output voltage shows the value in the table, the alternator operates properly and the regulator/rectifier is damaged. A much lower reading than that given in the table indicates that the alternator is defective.

- Check the stator coil resistance as follows:
  - Stop the engine.
  - Connect the hand tester (special tool) as shown in the table.
  - Note the readings (total 3 measurement).

Stator Coil Resistance

Meter	Connections		Reading
Range	Meter (+) to	Meter (−) to	
× 1 Ω	One black lead (Connector 1)	Another black lead (Connector 1)	0.2 ~ 0.6 Ω

★If there is more resistance than shown in the table, or no hand tester reading (infinity) for any two leads, the stator has an open lead and must be replaced. Much less than this resistance means the stator is shorted, and must be replaced.

- Using the highest resistance range of the hand tester, measure the resistance between each of the black leads and chassis ground.

★Any hand tester reading less than infinity (∞) indicates a short, necessitating stator replacement.

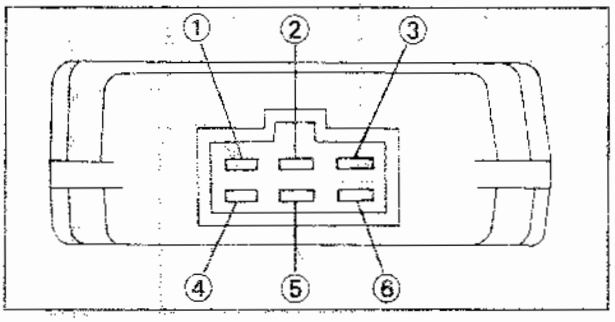
★If the stator coils have normal resistance, but the voltage check showed the alternator to be defective; then the rotor magnetism have probably weakened, and the rotor must be replaced.

Rectifier Inspection

- Check the rectifier resistance as follows.
- Remove the right side cover (see Frame chapter).
- Disconnect the regulator/rectifier connector.
- Connect the hand tester (special tool) to the regulator/rectifier as shown in the table, and check the resistance in both directions of each diode in the rectifier following the table.

Rectifier Circuit Inspection

No.	Connections		Reading	Meter Range
	Meter (+) to	Meter (−) to		
1	Y_1	W	∞	x 10 Ω or x 100 Ω
2	Y_2			
3	Y_3			
4	Y_1	BK/Y	1/2 scale	
5	Y_2			
6	Y_3			
7	W	Y_1		
8		Y_2		
9		Y_3		
10	BK/Y	Y_1	∞	
11		Y_2		
12		Y_3		



1. W Lead Terminal
2. BR Lead Terminal
3. BK/Y Lead Terminal
4. Y_1 Lead Terminal
5. Y_2 Lead Terminal
6. Y_3 Lead Terminal

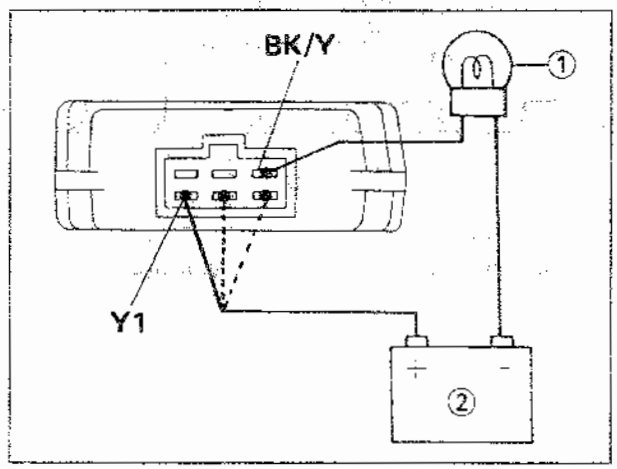
NOTE

○ *The actual meter reading varies with the meter used and the individual diode, but, generally speaking, the lower reading should be from zero to one half the scale.*

Regulator Inspection

To test the regulator out of circuit, use three 12 V batteries and a test light (12 V 3 ~ 6 W bulb in a socket with leads).

- Remove the right side cover (see Frame chapter).
- Disconnect the regulator/rectifier connector.
- Using auxiliary leads, connect one of the yellow lead terminal at the unit to the battery (+) terminal, and connect the test light between the black/yellow lead terminal at the unit, and the battery (−) terminal.
- At this time the bulb should not be lit.

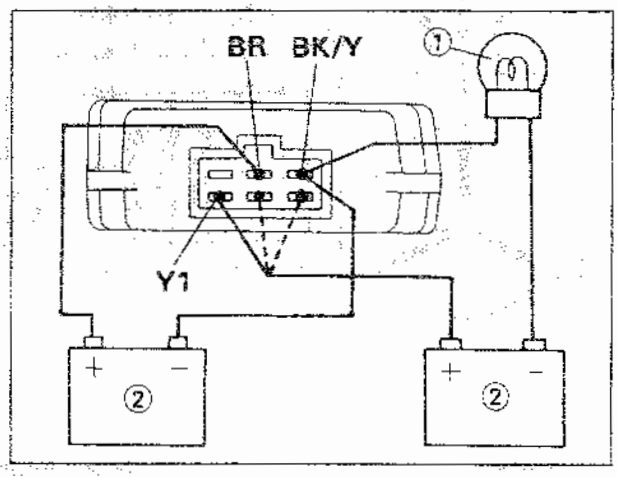


1. Test Light 2. 12 V Battery

CAUTION

The test light works as an indicator and also as a current limiter to protect the regulator/rectifier from excessive current. Do not use an ammeter instead of a test light.

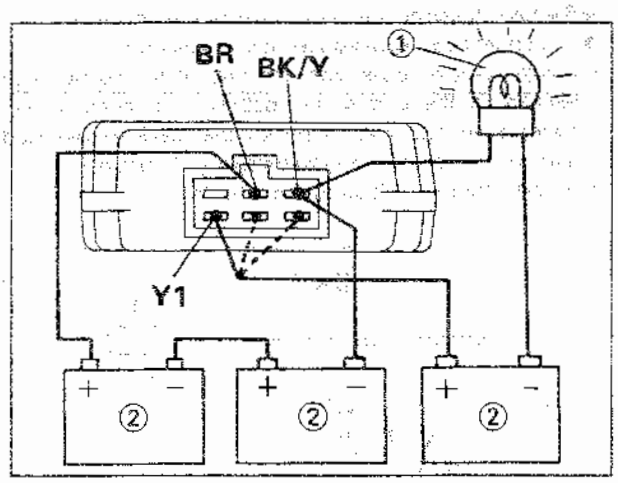
- Connect the brown lead terminal to the other battery (+) terminal and connect the black/yellow lead terminal to the battery (−) terminal momentarily. At this time the bulb should not be lit.



1. Test Light 2. 12 V Batteries

- To apply 24 V to the regulator/rectifier, connect two 12 V batteries in series, and connect the brown lead

terminal to the battery (+) terminal and the black/yellow lead terminal to the battery (−) terminal momentarily. The bulb should now light and stay on until the bulb circuit is opened.



1. Test Light 2. 12 V Batteries

CAUTION

Do not apply more than 24 volts. If more than 24 volts is applied, the regulator/rectifier may be damaged. Do not apply 24 V more than a few seconds. If 24 volts is applied for more than a few seconds, the regulator/rectifier may be damaged.

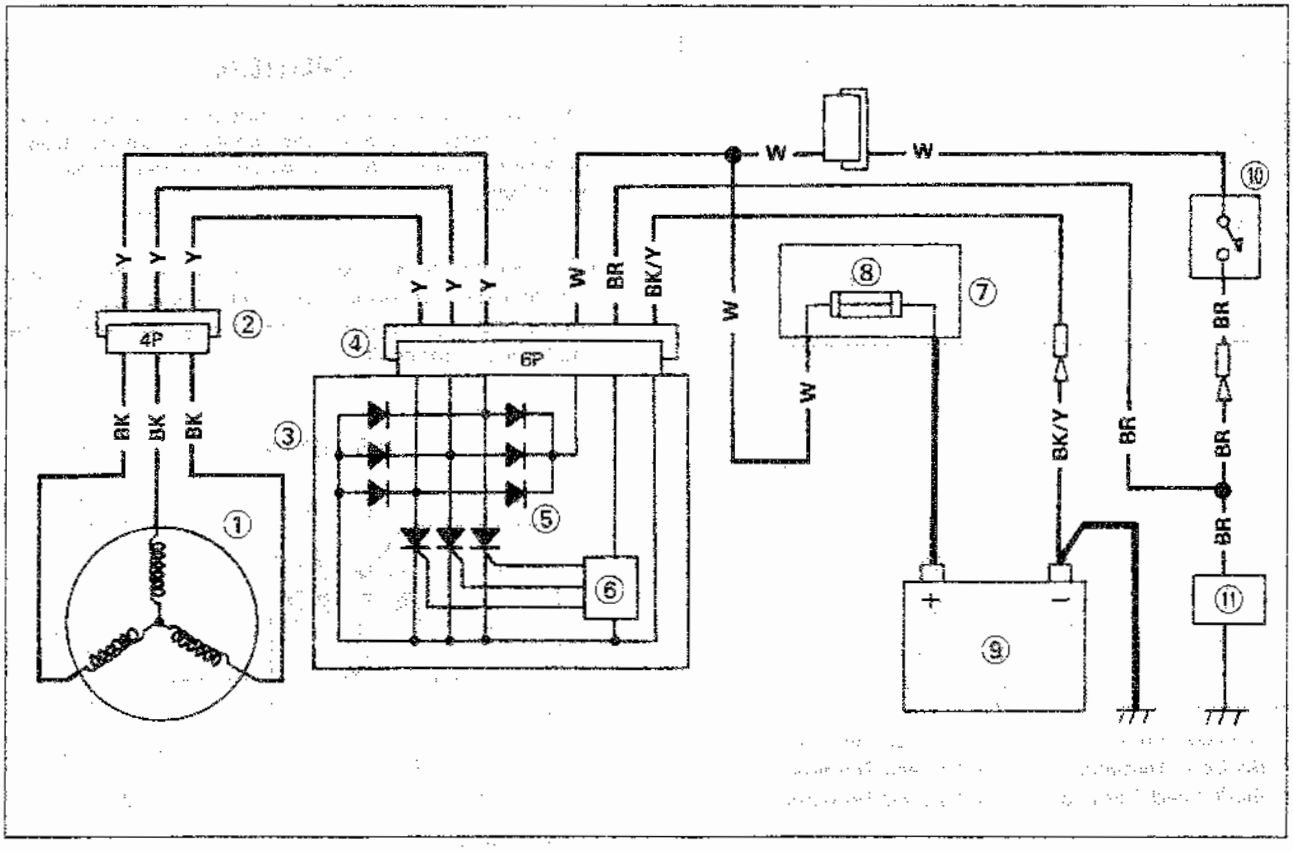
● Repeat the above three steps for other two yellow leads (in connector 2 which leads to the regulator/rectifier)).

★ Replace the regulator/rectifier if the bulb does not light as described above.

NOTE

○ *The above test is not foolproof. If the above checks show the regulator/rectifier is not damaged, but there is still trouble in the charging system, first carefully inspect the alternator, battery, wiring, and all connections. Replace the regulator/rectifier if all these other components turn out good.*

Charging System Wiring Diagram



1. Alternator
2. Connector 1
3. Regulator/Rectifier
4. Connector 2
5. Diode (Rectifier)
6. Control Circuit (IC)
7. Starter Relay
8. Main Fuse 30 A
9. Battery
10. Ignition Switch
11. Load

Ignition System

⚠WARNING

The ignition system produces extremely high voltage. Do not touch the spark plugs, ignition coils, or spark plug leads while the engine is running, or you could receive a severe electrical shock.

CAUTION

Do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent IC igniter damage.
Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and IC igniter.

Pickup Coil Removal

- Remove the following.
  - Seat (see Frame chapter)
  - Inlet Duct
  - Pickup Coil Lead Connector (from the igniter)
  - Lower Fairing (see Frame chapter)
  - Pickup Coil Cover
- Remove the pickup coil.



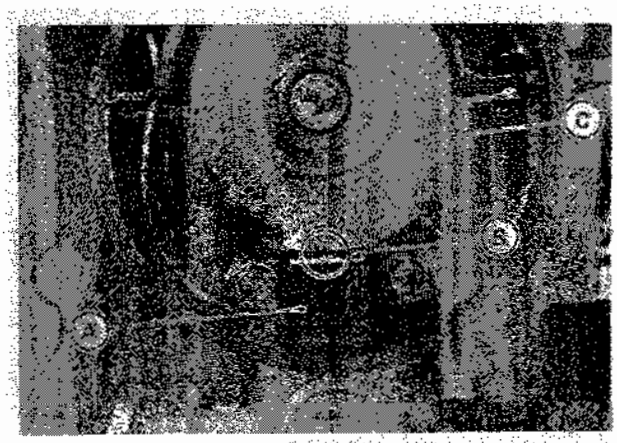
A. Pickup Coil B. Mounting Bolts

Pickup Coil Installation

- Install the pickup coil so that the air gap (clearance between the timing rotor projection and the pickup coil core) has correct clearance.

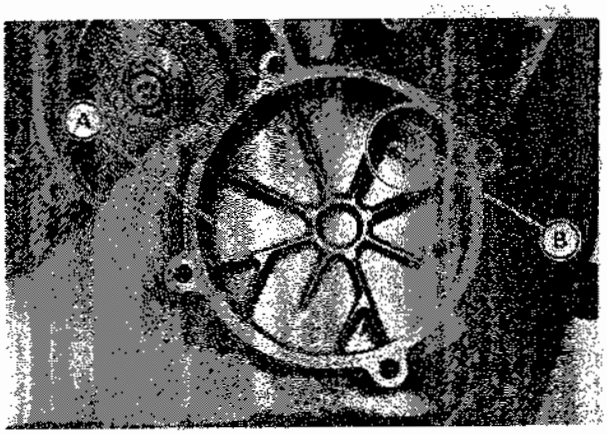
Pickup Coil Air Gap

0.5 ± 0.1 mm



A. Pickup Coil C. Timing Rotor
B. Air Gap

- Route the pickup coil lead correctly (see Cable, Wire, and Hose Routing in the General Information chapter).
- Apply silicone sealant to the crankcase halves mating surface on the front and rear sides of the cover mount.
- The pickup coil cover must be installed with "UP" mark facing upward.



A. Pickup Coil Cover B. UP Mark

- Tighten the pickup coil cover bolts to the specified torque (see Exploded View).

Pickup Coil Inspection

- Remove the following.
  - Seat (see Frame chapter)
  - Inlet Duct
  - Pickup Coil Lead Connector (from IC Igniter)



A. Pickup Coil Lead Connector

● Set the hand tester (special tool: 57001-983) to the x 100 Ω range and connect it to the pickup coil lead connector.

★ If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

Pickup Coil Resistance

380 ~ 570 Ω

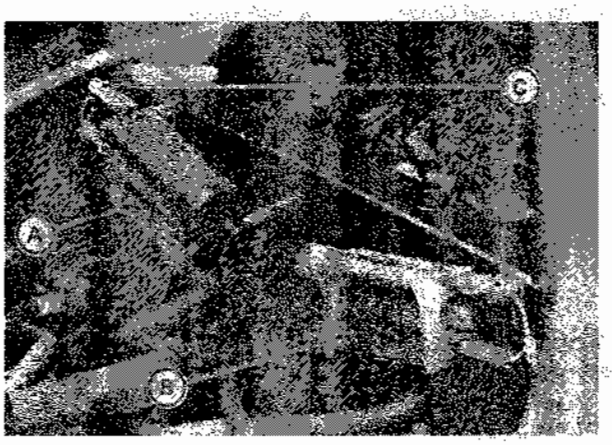
● Using the highest resistance range of the hand tester, measure the resistance between the pickup coil leads and chassis ground.

★ Any hand tester reading less than infinity (∞) indicates a short, necessitating replacement of the pickup coil assembly.

Ignition Coil Removal/Installation

● Remove the fuel tank (see Fuel System chapter).

● Disconnect the leads and remove the ignition coils.



A. #1, #4 Coil
B. #2, #3 Coil
C. Red Leads

● Install the ignition coils. Note the following.

○ Connect the primary winding leads to the ignition coil terminals (see Cable, Wire, and Hose Routing section in the General Information chapter).

Black Lead → to #1, #4 Coil
Green Lead → to #2, #3 Coil
Red Leads → to both Coils

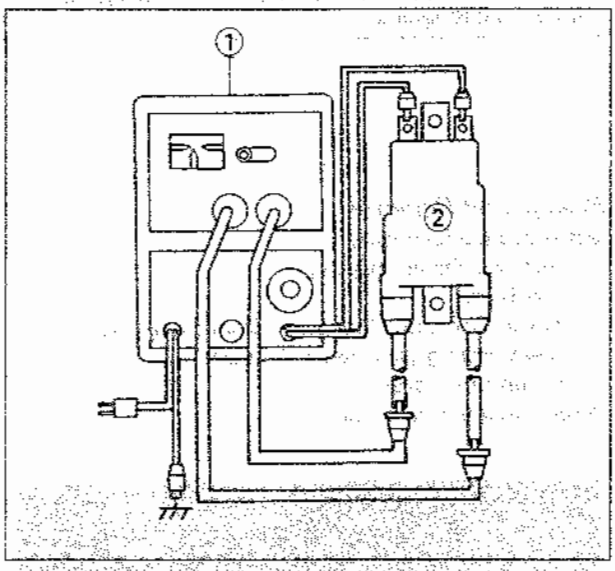
Ignition Coil Inspection

● Remove the ignition coils (see this chapter).

● Measure the arcing distance with the Kawasaki coil tester (special tool: 57001-1242) to check the condition of the ignition coil.

NOTE

○ *Since a tester other than the Kawasaki coil tester may produce a different arcing distance, the Kawasaki coil tester is recommended for reliable results.*



1. Ignition Coil Tester: 57001-1242
2. Ignition Coil

⚠WARNING

To avoid extremely high voltage shocks, do not touch the coil or lead.

★ If the distance reading is less than the specified value, the ignition coil or spark plug caps are defective.

Ignition Coil Arcing Distance

6 mm or more

● To determine which part is defective, measure the arcing distance again with the spark plug caps removed from the ignition coil.

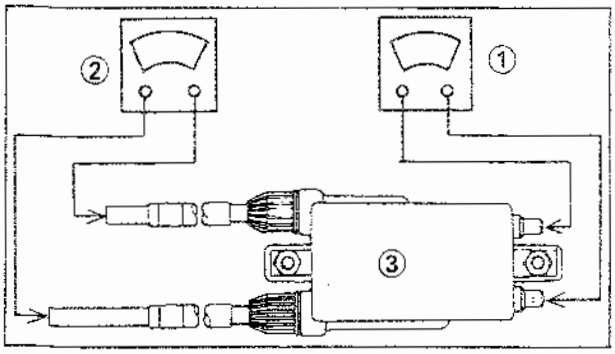
★ If the arcing distance is subnormal as before, the trouble is with the ignition coil itself. If the arcing distance is now normal, the trouble is with the spark plug caps.

● If the coil tester is not available, the coil can be checked for a broken or badly shorted winding with the hand tester (special tool).

NOTE

○*The hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.*

●Remove the plug caps by turning it counterclockwise.
●Measure the primary winding resistance as follows.
○Connect the tester between the coil terminals.
○Set the tester to the x 1 Ω range, and read the tester.
●Measure the secondary winding resistance as follows.
○Connect the tester between the spark plug leads.
○Set the tester to the x 1 kΩ, and read the tester.



1. Measure primary winding resistance.
2. Measure secondary winding resistance.
3. Ignition Coil

●If the hand tester does not read as specified, replace the coil.

Ignition Coil Winding Resistance

Primary Windings:	**2.3 ~ 3.5 Ω**
Secondary Windings:	**12.0 ~ 18.0 kΩ**

Spark Plug Removal

●Remove the following.
Fuel Tank (see Fuel System chapter)
Spark Plug Caps
●Remove the spark plugs using the spark plug wrench (special tool: 57001-1262).

Spark Plug Installation Notes

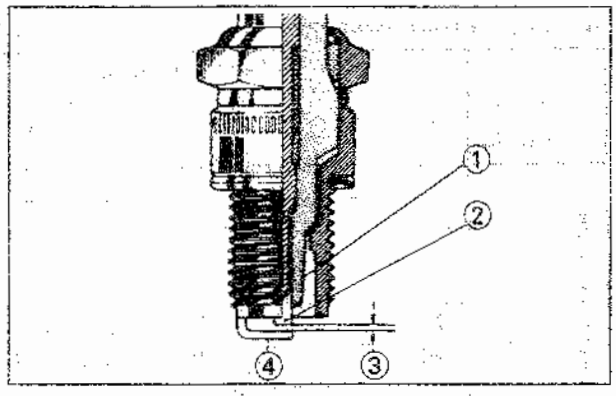
●Insert the spark plug vertically into the plug hole with the plug installed in the plug wrench.
●Tighten the plugs to the specified torque (see Exploded View).
●Fit the plug caps securely.

Spark Plug Gap

●Measure the gap with a wire-type thickness gauge.
★If the gap is incorrect, carefully bend the side electrode with a suitable tool to obtain the correct gap.

Spark Plug Gap

0.7 ~ 0.8 mm



1. Insulator
2. Center Electrode
3. Plug Gap
4. Side Electrode

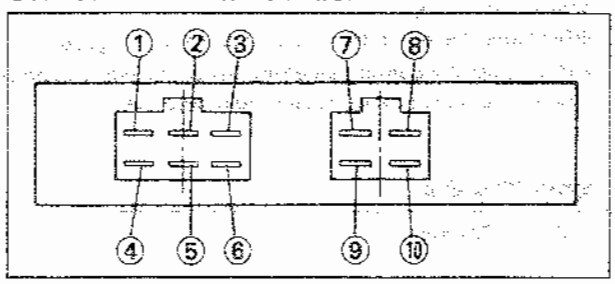
IC Igniter Inspection

●Remove the following.
Seat (see Frame chapter)
Inlet Duct
IC Igniter
●Set the hand tester (special tool) to the x 1 kΩ range and make the measurements shown in the table.
★If the tester readings are not as specified, replace the IC igniter.

CAUTION

Use only Hand Tester 57001-983 for this test. A multi-meter other than the Kawasaki Hand Tester may show different readings.
If a megger or a meter with a large-capacity battery is used, the IC igniter will be damaged.

Connector Terminal Number



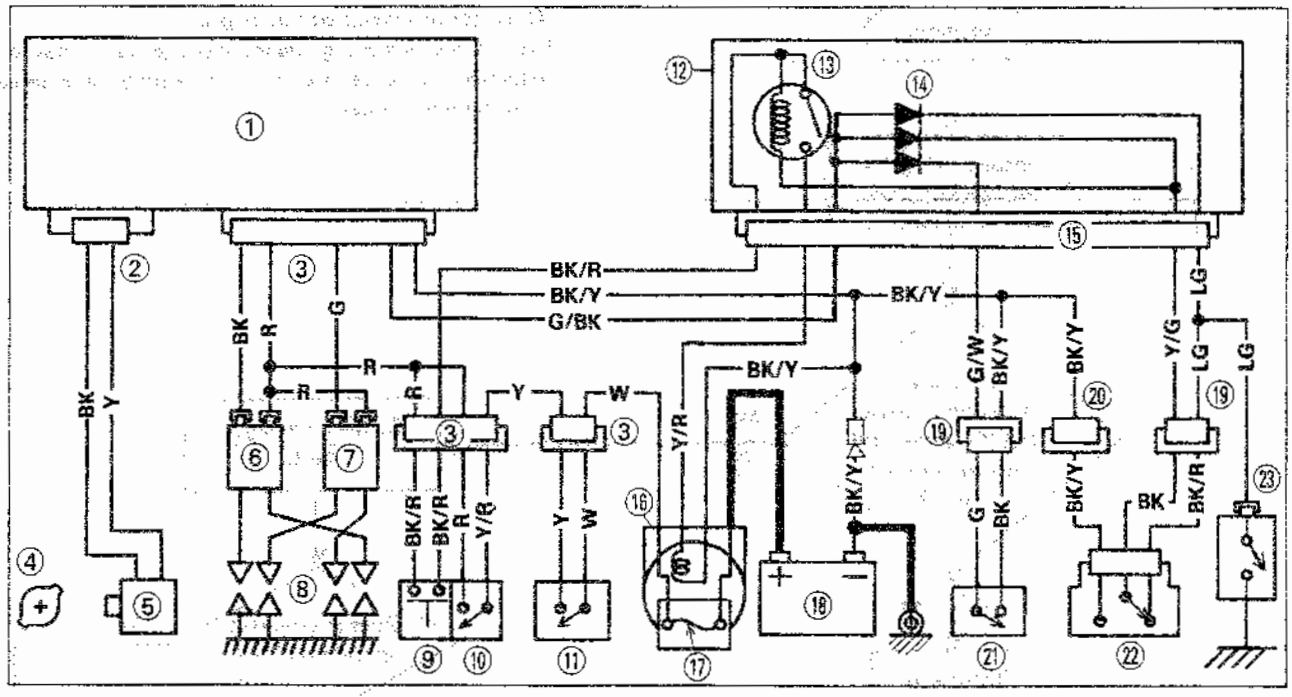
IC Igniter Internal Resistance (kΩ)

Tester (−) Lead Connection	Terminal No.	Tester (+) Lead Connection 1	2	3	4	5	6
	1		∞	∞	∞	∞	∞
	2	∞		∞	∞	∞	∞
	3	12 – 40	∞		12 – 40	7.6 – 14.0	4 – 10
	4	∞	∞	∞		∞	∞
	5	33 – 102	∞	7.6 – 14.0	33 – 102		17 – 35
	6	2 – 4	∞	3.4 – 7.0	2 – 5	12 – 23	

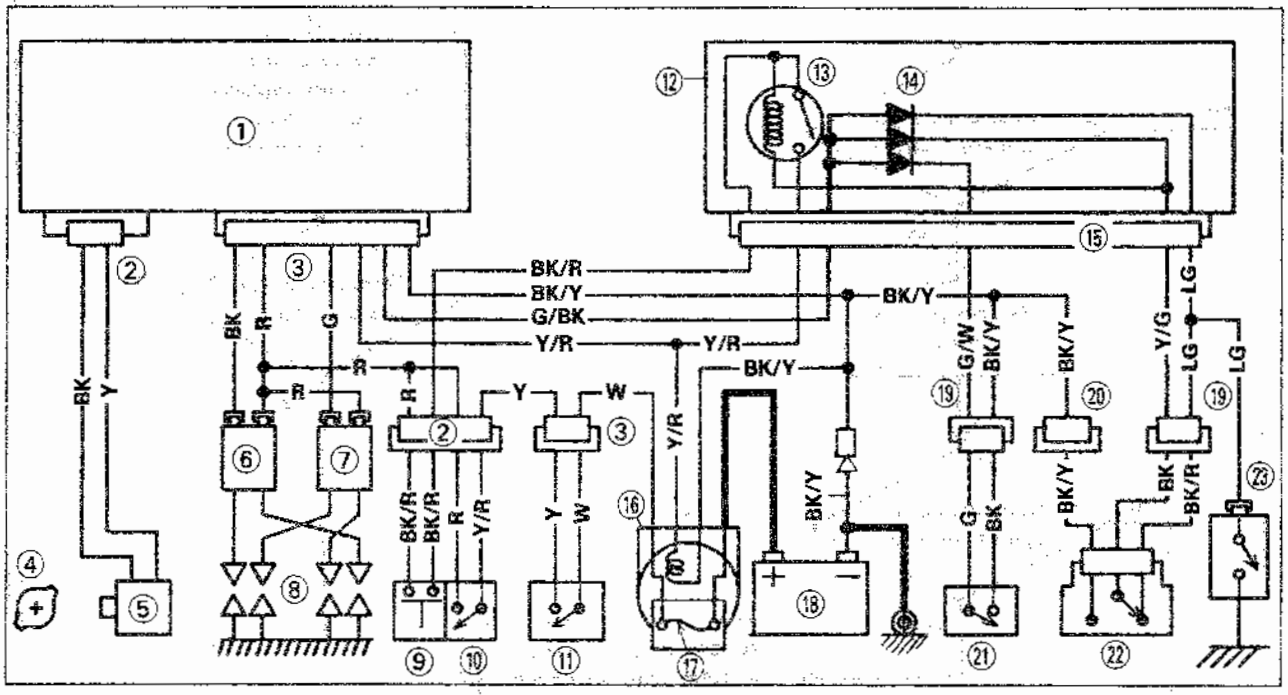
(kΩ)

Tester (−) Lead Connection	Terminal Number	Tester (+) Lead Connection 7	8	9	10
	7		∞	∞	∞
	8	∞		∞	33 – 60
	9	∞	∞		∞
	10	∞	32 – 60	∞	

Ignition System Circuit (U.S., Canada models)



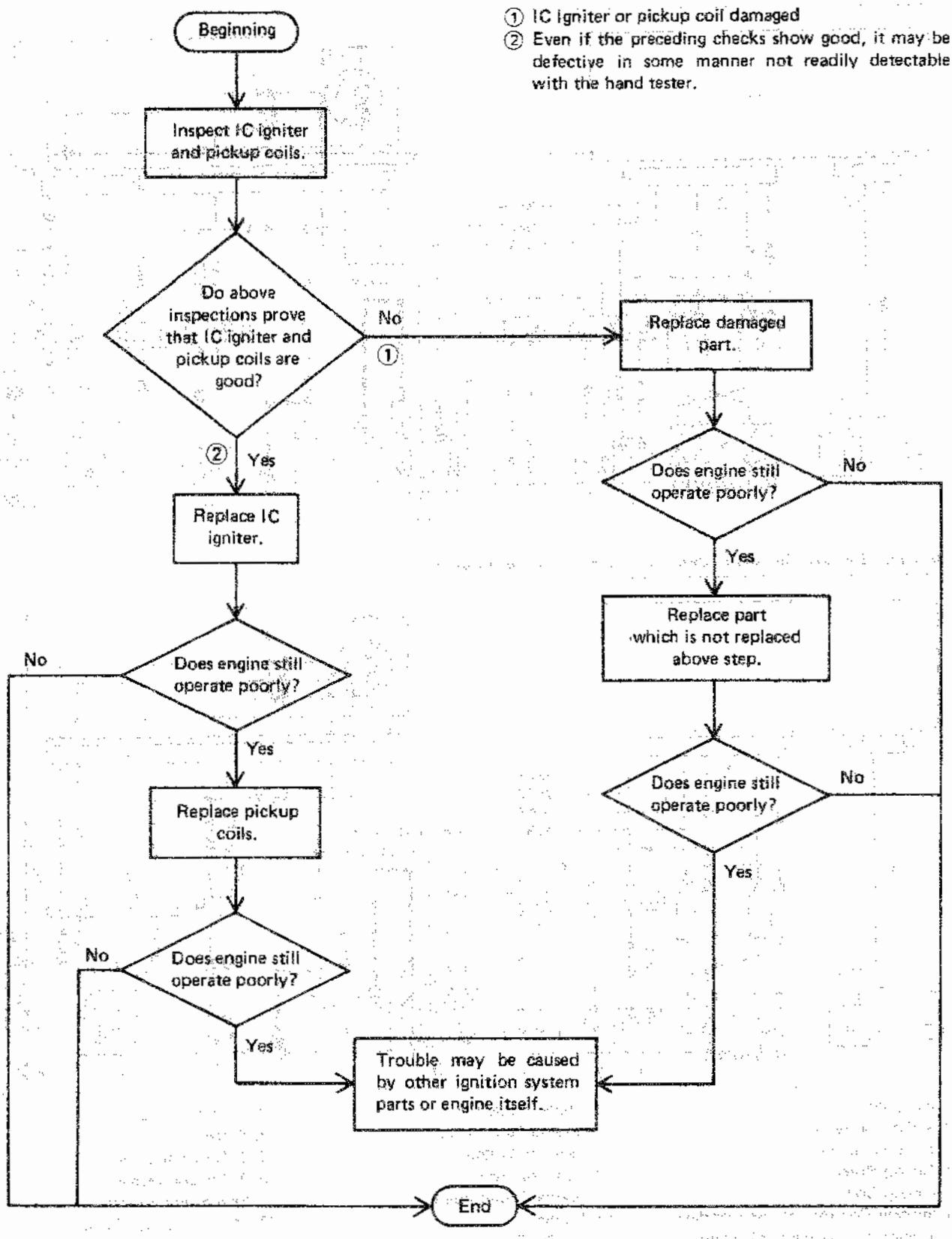
Ignition System Circuit (other than U.S., Canada models)



1. IC Igniter
2. 4-Pin Connector
3. 6-Pin Connector
4. Timing Rotor
5. Pickup Coil
6. Ignition Coil (for #1, #4 cylinder)
7. Ignition Coil (for #2, #3 cylinder)
8. Spark Plugs
9. Starter Button
10. Engine Stop Switch
11. Ignition Switch
12. Junction Box
13. Starter Circuit Relay
14. Diodes
15. 10-Pin Connector
16. Starter Relay
17. 30 A Main Fuse
18. Battery
19. 2-Pin Connector
20. 9-Pin Connector
21. Side Stand Switch
22. Starter Lockout Switch
23. Neutral Switch

IC Igniter Troubleshooting:

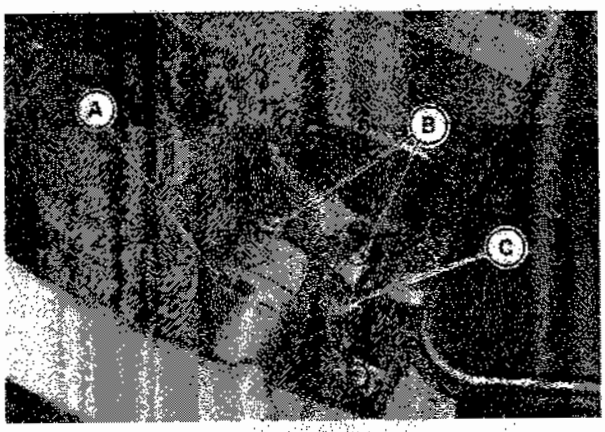
① IC Igniter or pickup coil damaged
② Even if the preceding checks show good, it may be defective in some manner not readily detectable with the hand tester.



Electric Starter System

Starter Motor Removal

● Remove the carburetors (see Fuel System chapter).
● Remove the terminal nut and the mounting bolts, then remove the starter motor.



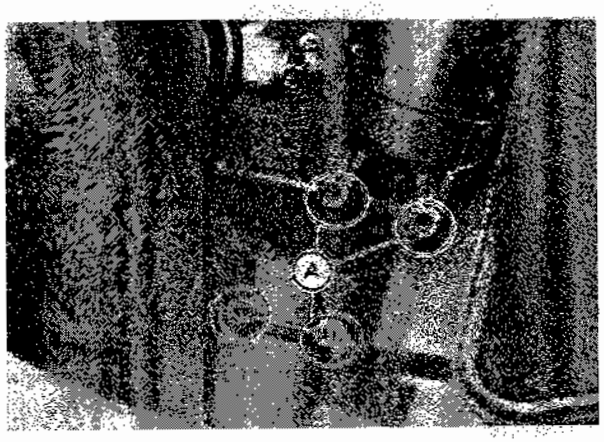
A. Starter Motor
B. Mounting Bolts
C. Terminal Nut

Starter Motor Installation

CAUTION

Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.

● When installing the starter motor, clean the starter motor legs and crankcase where the starter motor is grounded.



A. Clean here.

● Apply a small amount of engine oil to the O-ring.

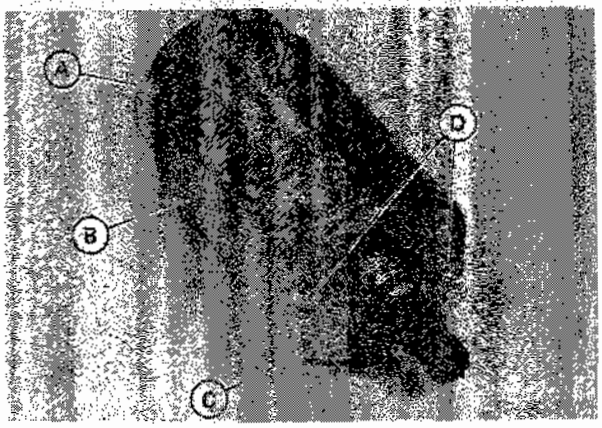


A. O-Ring

● Tighten the terminal nut to the specified torque (see Exploded View).

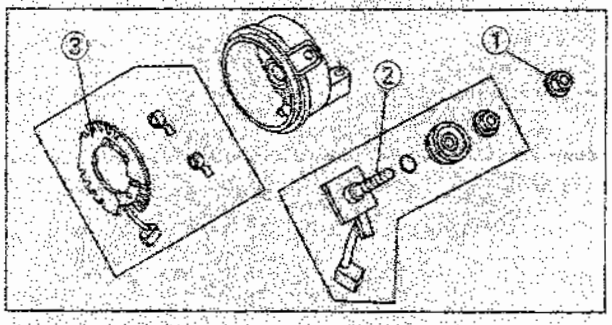
Starter Motor Disassembly

● Remove both end covers and pull the armature out of the yoke.
○ The brush plate comes off with the rear end cover.



A. Rear End Cover
B. Yoke
C. Front End Cover
D. Bolts

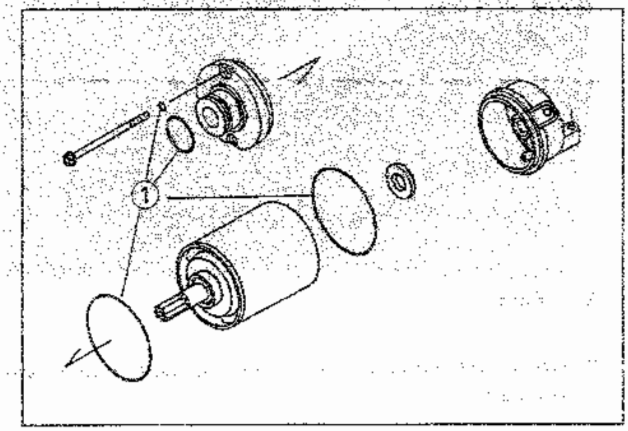
● Holding the spring with a suitable clamp, take off the brush from the holder.
● Remove the nut and terminal bolt, and then remove the brush with the brush plate.



1. Nut
2. Terminal Bolt
3. Brush Plate

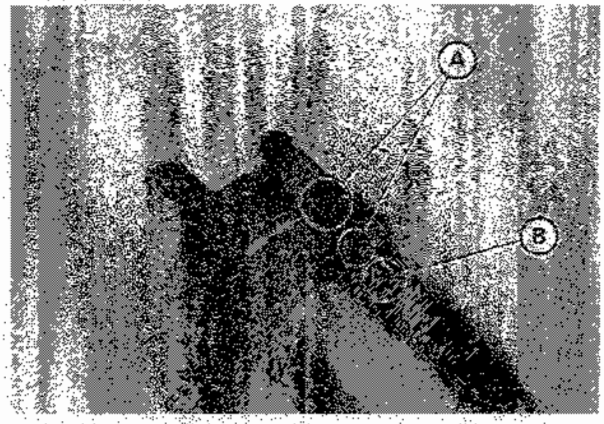
Starter Motor Assembly

● Assembly is the reverse of removal. Note the following.
● Apply oil to the O-rings and install them.



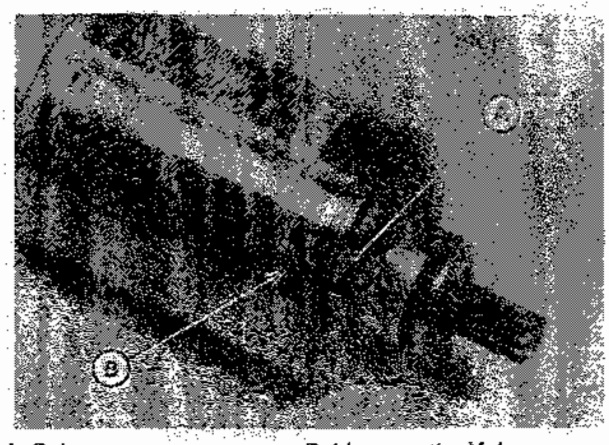
1. O-Rings

● Align the notch in the brush plate with the end cover notch and the mark on the yoke.



A. Notches B. Mark on the Yoke

● Align the lines marked on the yoke with the through bolt.



A. Bolt B. Lines on the Yoke

Brush Inspection

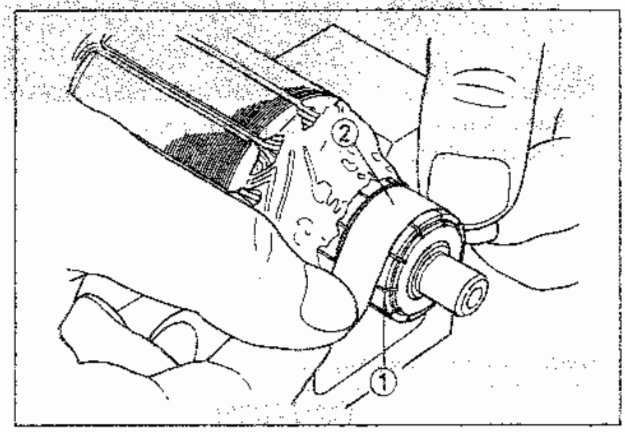
● Measure the length of each brush.
★ If any is worn down to the service limit, replace the carbon brush holder assembly and the terminal bolt assembly.

Starter Motor Brush Length

Standard:	**11.6 ~ 12.4 mm**
Service Limit:	**8.5 mm**

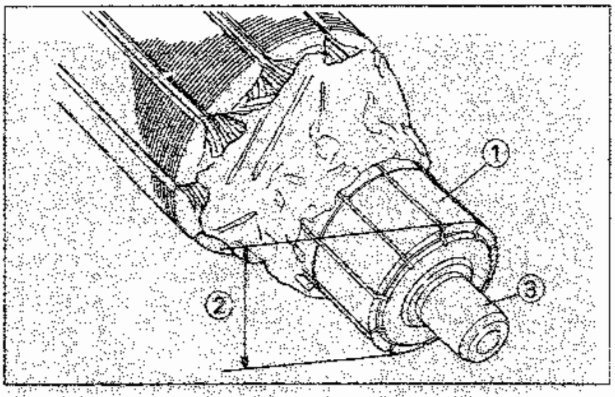
Commutator Cleaning and Inspection

● Smooth the commutator surface if necessary with fine emery cloth, and clean out the grooves as illustrated.



1. Commutator 2. Emery Cloth

● Measure the diameter of the commutator.
★ Replace the starter motor with a new one if the commutator diameter is less than the service limit.



1. Commutator Segment 3. Shaft
2. Diameter

Commutator Diameter

Standard:	**27.8 ~ 28.1 mm**
Service Limit:	**27 mm**

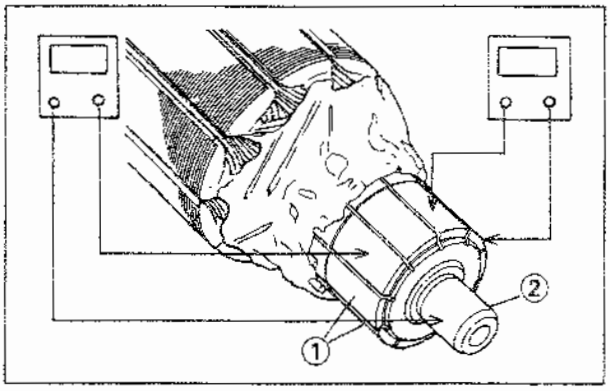
Armature Inspection

● Using the x 1 Ω ohmmeter range, measure the resistance between any two commutator segments.

★ If there is a high resistance or no reading (∞) between any two segments, a winding is open and the starter motor must be replaced.

● Using the highest ohmmeter range, measure the resistance between the segments and the shaft.

★ If there is any reading at all, the armature has a short and the starter motor must be replaced.



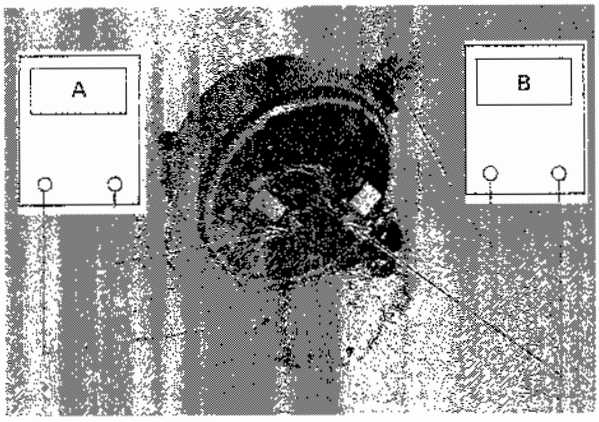
1. Segment 2. Shaft

NOTE

○ *Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with an ohmmeter. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.*

Brush Lead Inspection

● Using the x 1 Ω ohmmeter range, measure the resistance as shown.

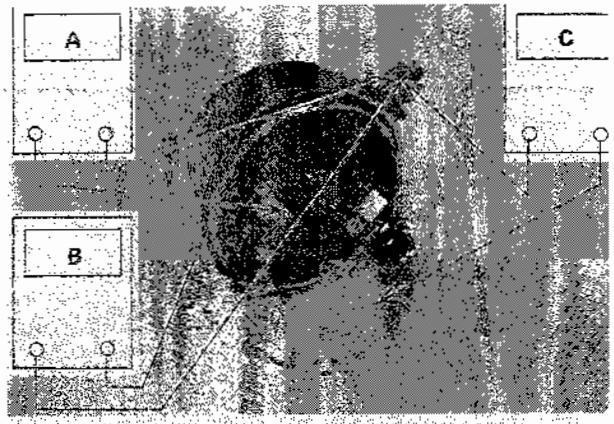


A. Brush Plate and Negative Brush
B. Terminal Bolt and Positive Brush

★ If there is not close to zero ohms, the brush lead has an open. Replace the terminal bolt assembly and/or the brush holder assembly.

Brush Plate and Terminal Bolt Inspection

● Using the highest ohmmeter range, measure the resistance as shown.



A. Terminal Bolt and Negative Brush Holder
B. Terminal Bolt and End Cover
C. Terminal Bolt and Brush Plate

★ If there is any reading, the brush holder assembly and/or terminal bolt assembly have a short. Replace the brush holder assembly and/or the terminal bolt assembly.

Starter Relay Inspection

● Remove the left side cover (see Frame chapter).

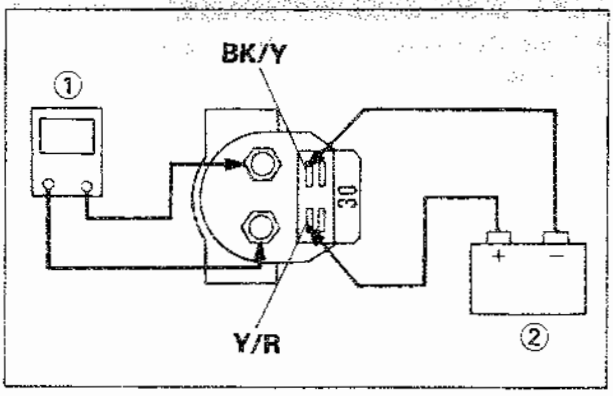
● Remove the starter relay.

● Connect the hand tester and 12 V battery to the starter relay as shown.

★ If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

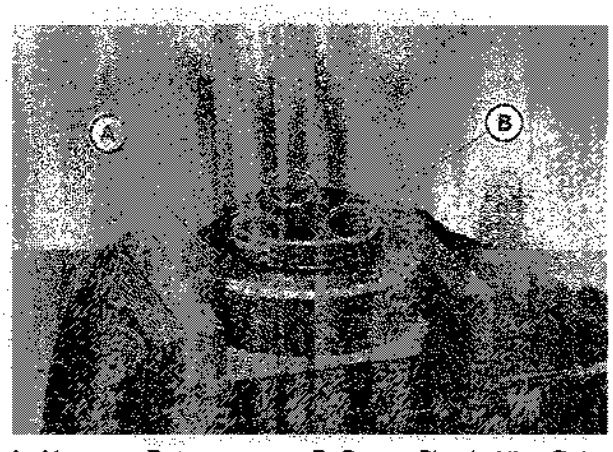
Hand Tester Range: x 1 Ω range
Criteria: When battery is connected → 0 Ω
When battery is disconnected → ∞ Ω



1. Tester 2. 12 V Battery

Starter Clutch Removal

- Remove the alternator rotor (see Alternator Rotor Removal).
- Holding the rotor in a vise, remove the Allen bolts and separate the starter clutch.

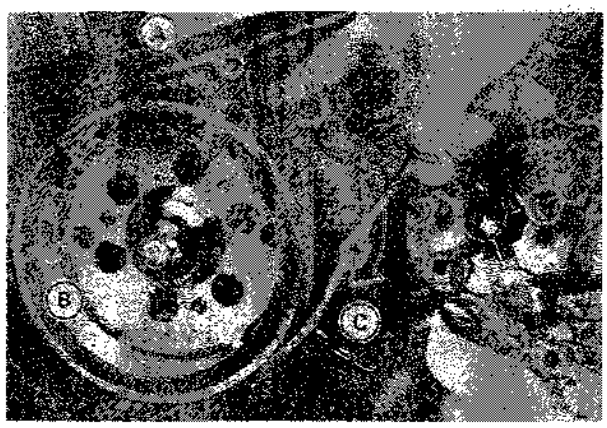


A. Alternator Rotor B. Starter Clutch Allen Bolts

Starter Clutch Inspection

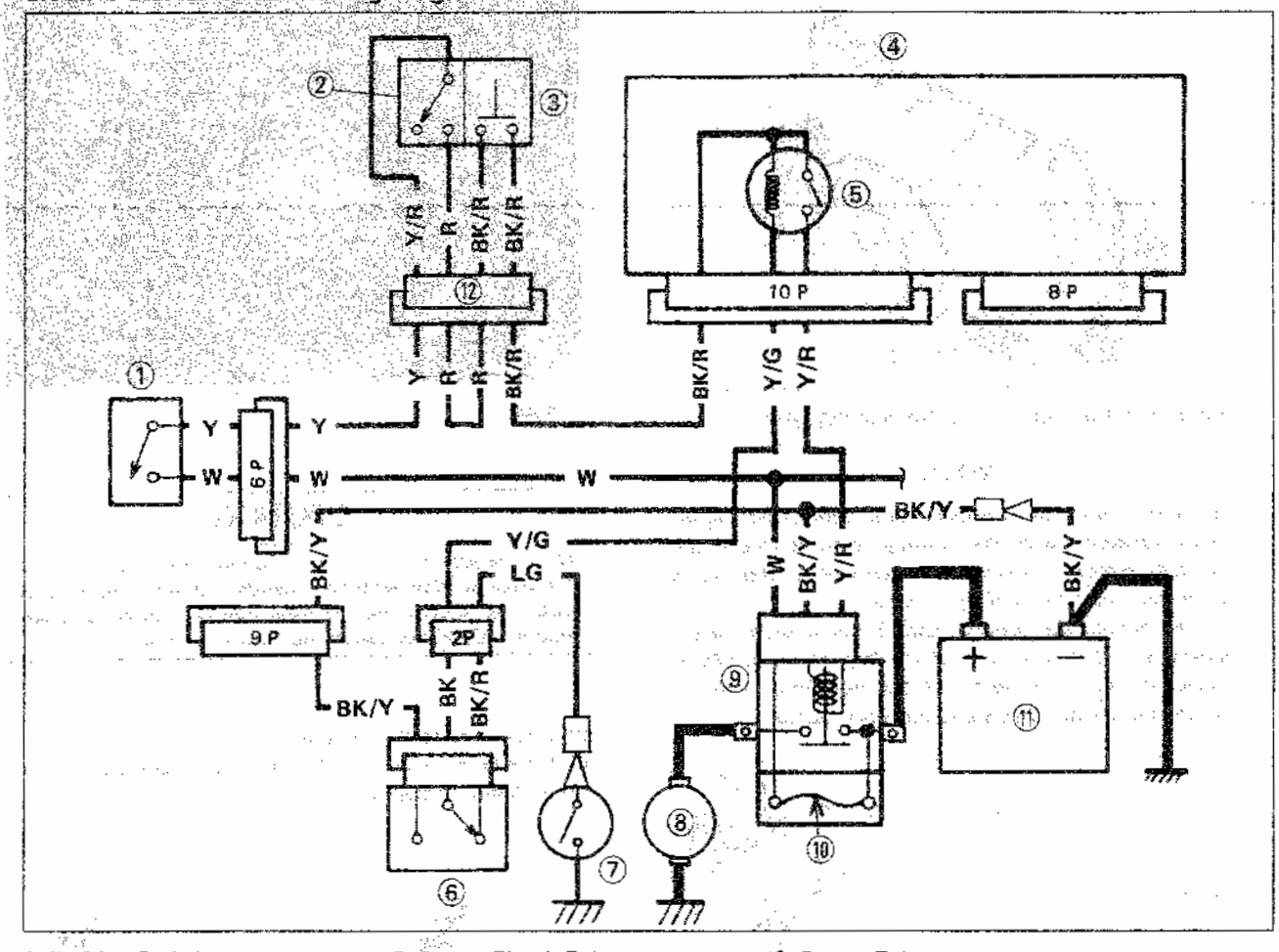
- Remove the following.
  Alternator Cover
  Starter Idle Gear
- Turn the starter clutch gear by hand. The starter clutch gear should turn clockwise freely, but should not turn counterclockwise.

★If the clutch does not operate as it should or if it makes noise, disassemble the starter clutch, examine each part visually, and replace any worn or damaged parts.



A. Starter Clutch Gear C. Turns freely.
B. Locked

Electric Starter Circuit Wiring Diagram



1. Ignition Switch
2. Engine Stop Switch
3. Starter Button
4. Junction Box
5. Starter Circuit Relay
6. Starter Lockout Switch
7. Neutral Switch
8. Starter Motor
9. Starter Relay
10. 30 A Main Fuse
11. Battery
12. 6P (U.S., Canada) or 4P Connector

Lighting System

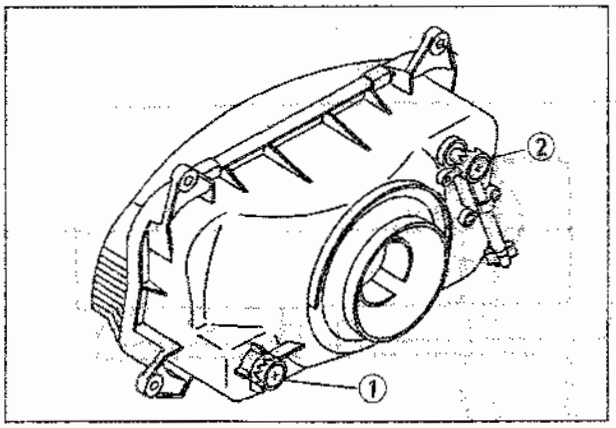
The US and Canada models have a headlight relay in the junction box. In these models, the headlight does not go on when the ignition switch is first turned on, but the headlight goes on once the starter button is pushed to start the engine, and stays on until the ignition switch is turned off. But the headlight goes out whenever the starter button is pushed to restart the engine after engine stalling.

Headlight Beam Horizontal Adjustment

● Turn the adjuster on the headlight in or out by hand until the beam points straight ahead.

Headlight Beam Vertical Adjustment

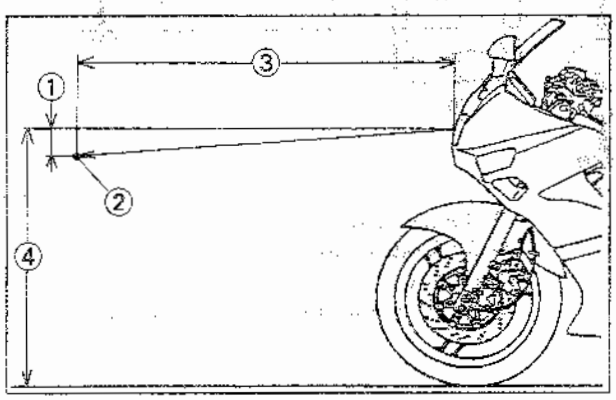
● Turn the adjuster on the headlight in or out by hand to adjust the headlight vertically.



1. Horizontal Adjuster 2. Vertical Adjuster

NOTE

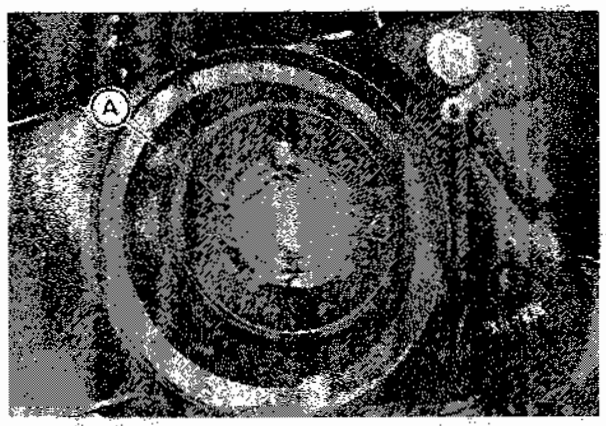
- *On high beam, the brightest point should be slightly below horizontal with the motorcycle on its wheels and the rider seated. Adjust the headlight to the proper angle according to local regulations.*
- *For US model, the proper angle is 0.4 degrees below horizontal. This is 50 mm (2 in) drop at 7.6 m (25 ft) measured from the center of the headlight with the motorcycle on its wheels and the rider seated.*



1. 50 mm (2 in)
2. Center of Brightest Spot
3. 7.6 m (25 ft)
4. Height of Headlight Center

Headlight Bulb Replacement Notes

- Remove the following.
  - Upper Fairing (see Frame chapter)
  - Headlight Bulb Dust Cover
  - Hook

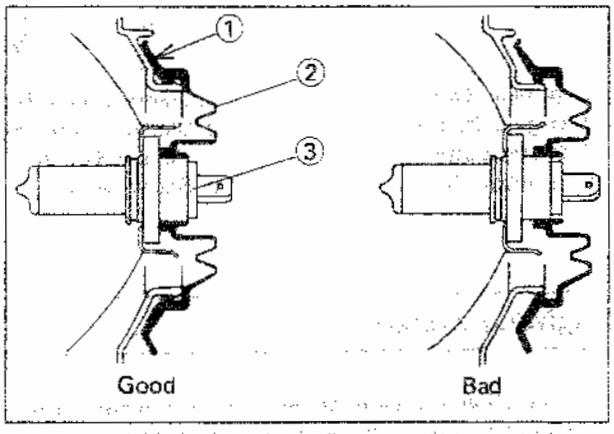


A. Hook

CAUTION

When handling the quartz-halogen bulb, never touch the glass portion with bare hands. Always use a clean cloth. Oil contamination from hands or dirty rags can reduce bulb life or cause the bulb to explode.

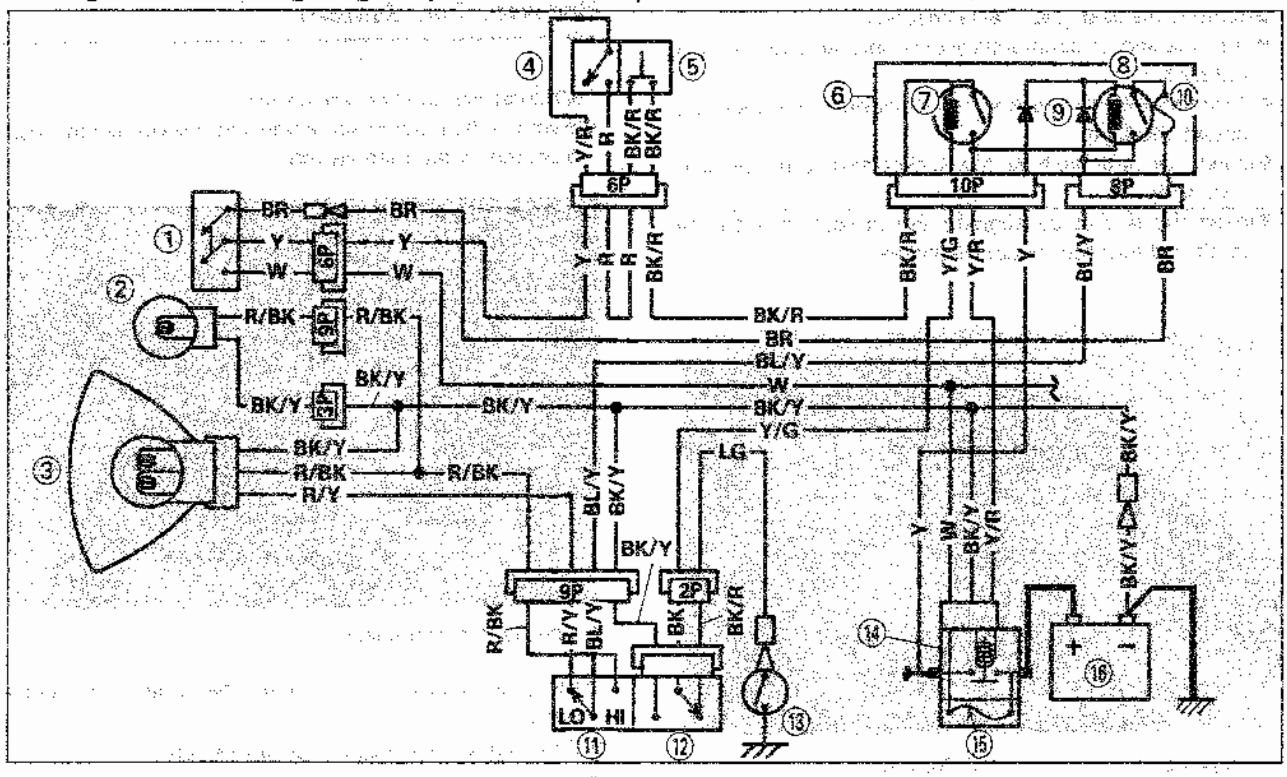
- Remove the headlight bulb.
- Fit the dust cover with the Top mark upward onto the bulb firmly as shown.



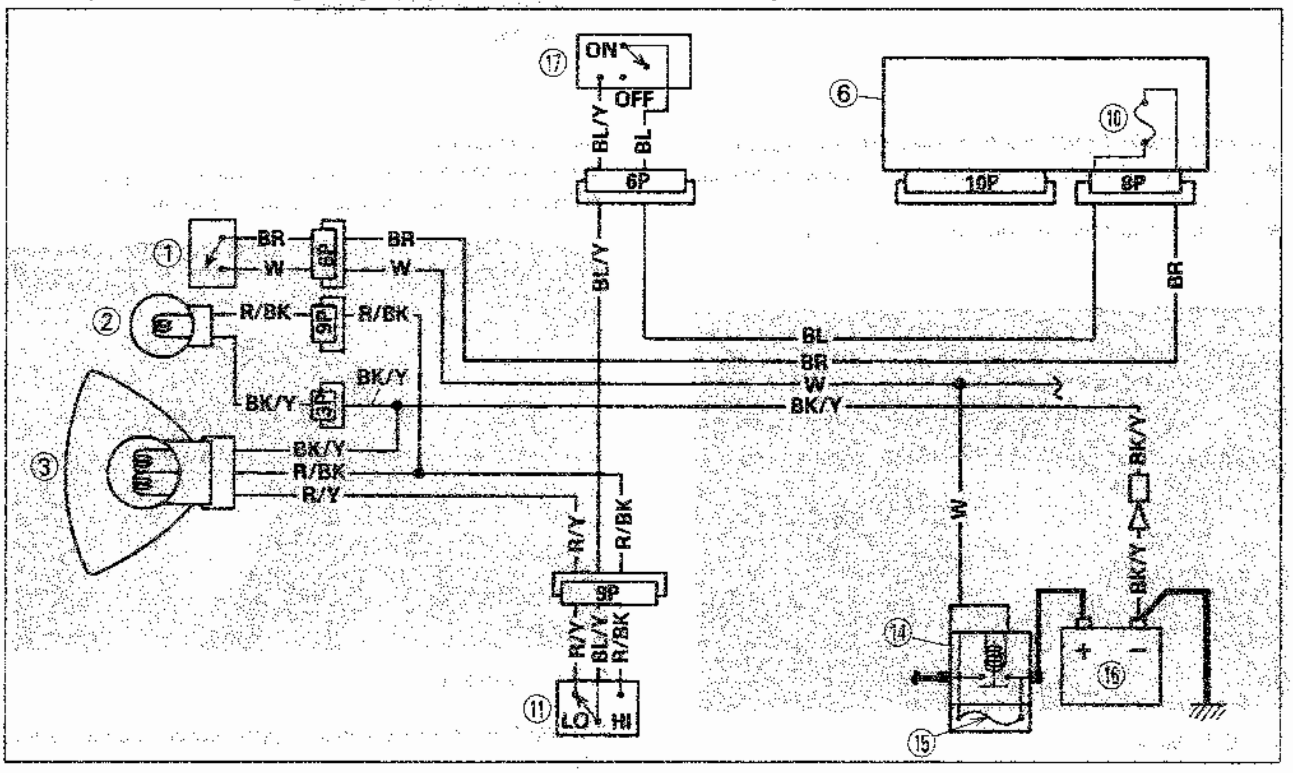
1. Top Mark
2. Dust Cover
3. Headlight Bulb

- After installation, adjust the headlight aim (see this chapter).

Headlight Circuit Wiring Diagram (U.S. and Canada)



Headlight Circuit Wiring Diagram (Other than U.S. and Canada)



1. Ignition Switch
2. High Beam Indicator Light
3. Headlight
4. Engine Stop Switch
5. Starter Button
6. Junction Box
7. Starter Circuit Relay
8. Headlight Relay
9. Diodes
10. 10 A Headlight Fuse
11. Dimmer Switch
12. Starter Lockout Switch
13. Neutral Switch
14. Starter Relay
15. 30 A Main Fuse
16. Battery
17. Headlight Switch

Tail/Brake Light Bulb Replacement Notes

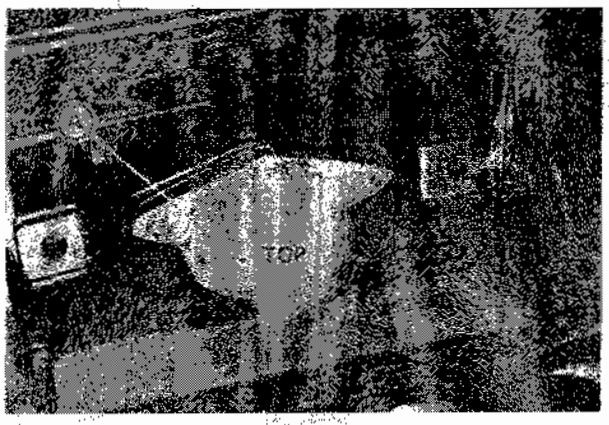
- Remove the seat (see Frame chapter).
- Turn the socket counterclockwise and remove the bulb and socket.
- Push the bulb into socket, turn it counterclockwise, and remove the bulb.
- Insert the new bulb in the socket and turn the bulb clockwise.
- Insert the socket by aligning the projection with the notch and turn the socket clockwise.



A. Projections B. Notches

Licence Plate Light Bulb Replacement Notes

- Install the bulb lens so that the "TOP" mark on the lens points up.
- Do not overtighten the lens mounting screws.



A. "TOP" Mark

Radiator Fan System

Fan System Circuit Inspection

- Remove the inner lower fairing and disconnect the leads from the radiator fan switch.



A. Fan Switch Terminals

- Using an auxiliary wire, connect the radiator fan switch leads.

★If the fan rotates, inspect the fan switch.

★If the fan does not rotate, inspect the following.

Leads and Connectors
Main Fuse and Fan Fuse
Fan Motor

Fan Inspection

- Remove the fuel tank (see Fuel System chapter).
- Disconnect the 2-pin connector in the fan leads.

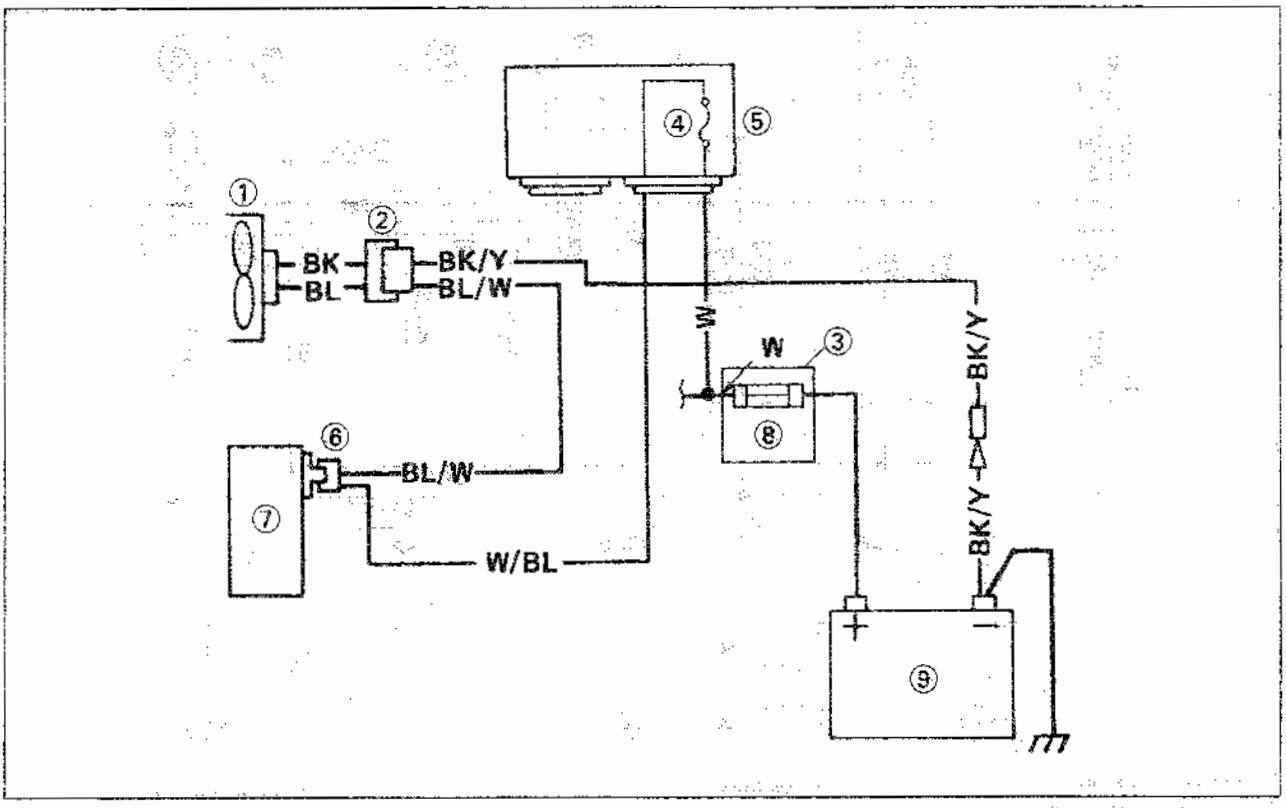


A. Fan Connector

- Using two auxiliary wires, supply battery power to the fan.

★If the fan does not rotate at this time, the fan is defective and must be replaced.

Radiator Fan Circuit



1. Radiator Fan
2. 2-Pin Connector
3. Starter Relay
4. 10A Fan Fuse
5. Junction Box
6. Fan Switch
7. Radiator
8. 30A Main Fuse
9. Battery

Low Fuel Warning System

When the ignition switch is turned on, the warning lights flash regardless of fuel amount. This is to show if the light bulb has burned out. If the engine runs and the fuel level is too low, the warning lights flash until fuel is added. If the system does not function properly, inspect it as follows.

Warning System Inspection

(1) The warning lights do not flash when the ignition switch is turned on.

●Check the warning light bulbs, the oil pressure switch, the rectifier (see below), and the wiring (see Wiring Inspection).

(2) The warning lights do not flash when the engine runs and the fuel level is too low.

●Check the fuel level warning light operation (see below).

★If the operation is good, replace the fuel level sensor.

★If the operation is bad, check the warning system circuit wiring (see Wiring Inspection).

★If the wiring is good, check the fuel level sensor relay (see below). Replace the damaged fuel level sensor relay.

★If the fuel level sensor relay is good, check the fuel level warning light relay (see below). Replace the damaged fuel level warning light relay.

(3) Fuel level is not low but the warning lights stay on continuously.

●Check the warning system circuit wiring.

★If it is good, check the fuel level warning light relay or replace the fuel level sensor.

(4) Warning lights go on and off irregularly.

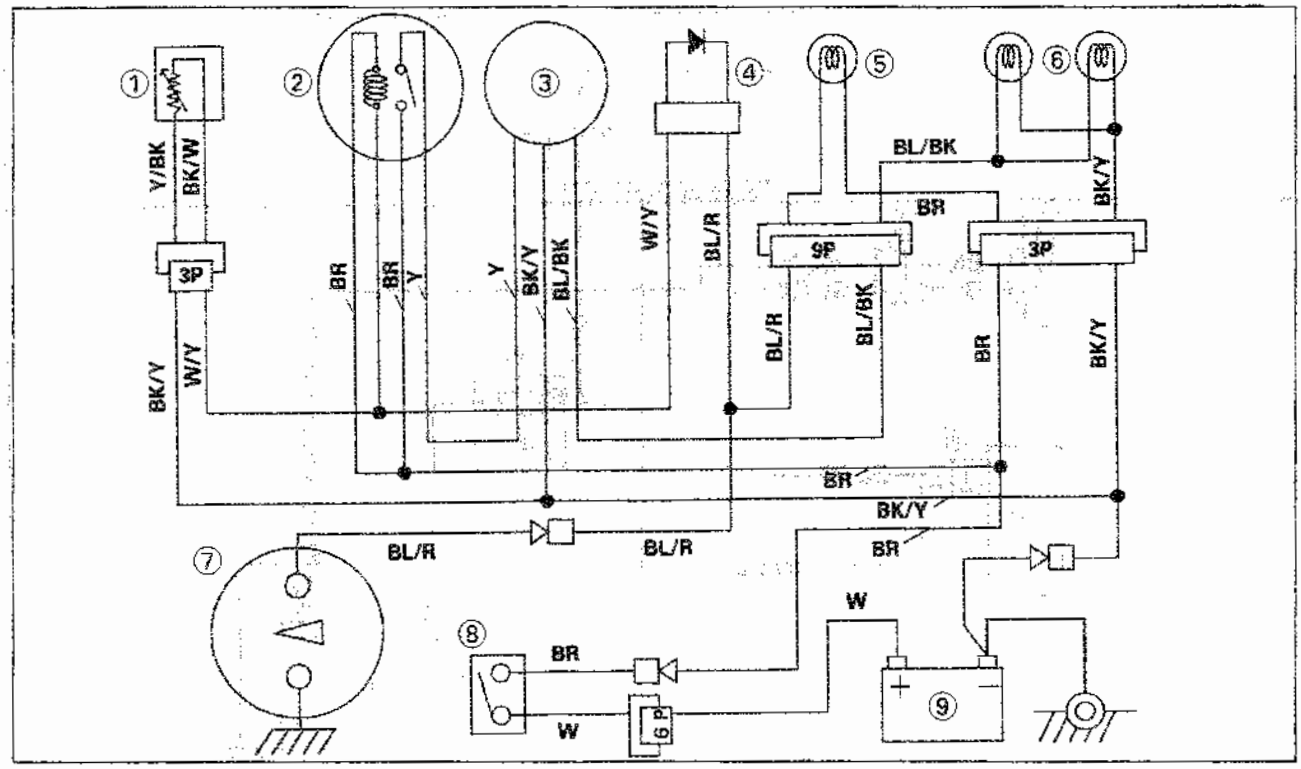
●Check that the fuel is well above the low level.

●Check that the wiring is not shorting out against other parts.

●Check that the battery charging voltage is normal.

★If all the above checks are good, replace the fuel level sensor.

Low Fuel Warning System



1. Fuel Level Sensor
2. Fuel Level Sensor Relay
3. Fuel Level Warning Light Relay
4. Rectifier
5. Oil Pressure Warning Light
6. Fuel Level Warning Lights
7. Oil Pressure Switch
8. Ignition Switch
9. Battery

Fuel Level Warning Light Operation Inspection

● Prepare an auxiliary wire, and check the operation of the warning light.

Fuel Level Warning Light Operation Check

Ignition Switch Position: ON
Wire Location:
Male 2-pin fuel level sensor connector (disconnected)
Results: Lights should go off when connector wires are opened.
Lights should flash when connector wires are shorted.

★ If the operation is good, replace the fuel level sensor.

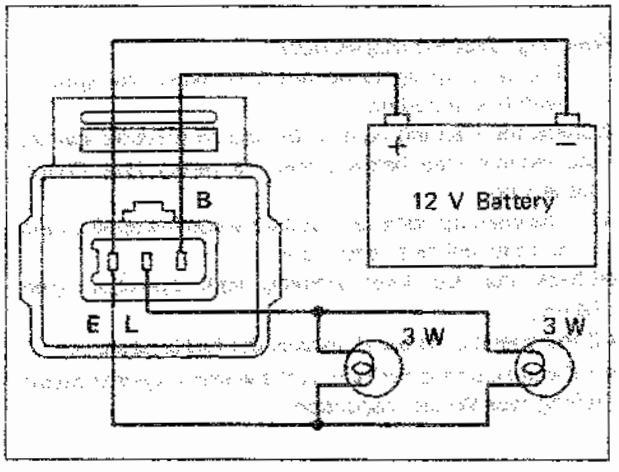
Fuel Level Warning Light Relay Inspection

● Remove the right side cover (see Frame chapter).
● Remove the fuel level warning light relay.
● Connect one 12 V battery and two bulbs (12 V, 3 W x 2) as indicated in the figure, and count how many times the lights flash for one minute.

★ If the lights do not flash as specified, replace the light relay.



A. Male 2-Pin Connector



Testing Fuel Level Warning Light Relay

Load		
The Number of Lights	Wattage (W)	Flashing Times (c/m*)
1	3	140 ~ 200
2	6	70 ~ 100

(*) : Cycle(s) per minute

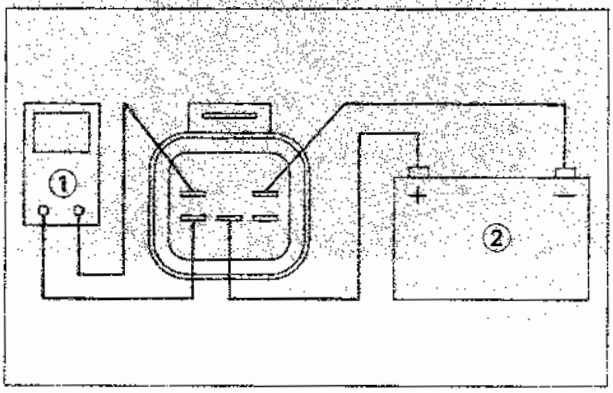
Fuel Level Sensor Relay Inspection

- Remove the right side cover (see Frame chapter).
- Remove the fuel level sensor relay.
- Connect the hand tester and 12 V battery to the relay as shown.

★If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

Hand Tester Range: x 1 Ω range
Criteria: When battery is connected → 0 Ω
When battery is disconnected → ∞ Ω



1. Hand Tester 2. 12 V Battery

Rectifier Inspection

- Remove the upper inner fairings and the windshield (see Upper Fairing Removal in the Frame chapter).
- Pull the rectifier out of the main harness.
- Zero the hand tester, and connect it to each terminal to check the resistance in both directions.

★The resistance should be low in one direction and more than ten times as much in the other direction. If the rectifier shows low or high in both directions, the rectifier is defective and the rectifier must be replaced.

NOTE

○ *The actual meter reading varies with the meter used and the individual rectifier, but, generally speaking, the lower reading should be from zero to one half the scale.*

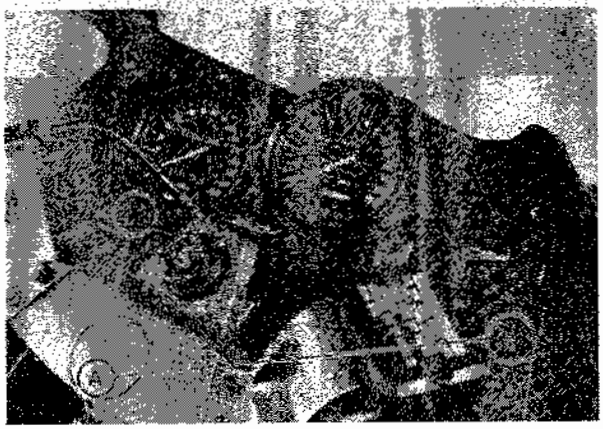


A. Rectifier

Meters, Gauges

Removal

- Remove the following.
  - Upper Fairing (see Frame chapter)
  - Speedometer Cable Lower End
  - Wiring Connectors
- Remove the meter unit by taking off the mounting bolts.



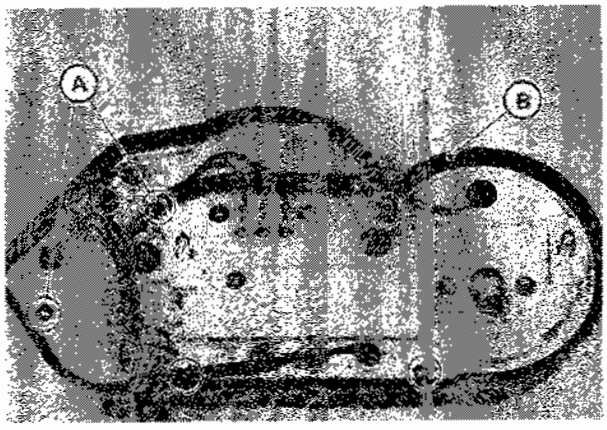
A. Meter Mounting Bolts

CAUTION

Place the meter or gauge so that the face is up. If a meter or gauge is left upside down or sideways for any length of time, it will malfunction.

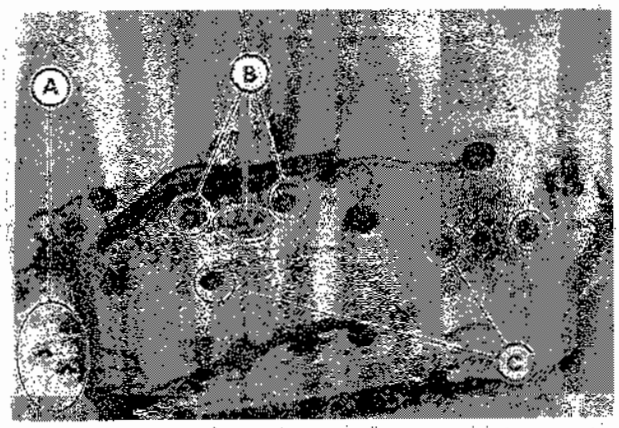
Meter, Gauges Disassembly

- Remove the meter unit (see this chapter).
- Remove the nuts and take off the mounting bracket.
- Turn the reset knob counterclockwise and remove it.
- Take off the cover by removing the screws.



A. Screws B. Cover

- Take off the water temperature gauge by removing the screws.
- Take off the tachometer unit, and then the speedometer unit and trip meter unit by removing the screws.



A. Water Temperature Gauge Screws
B. Tachometer Screws
C. Speedometer and Trip Meter Screws

- Separate the trip meter from the speedometer by removing the screws.



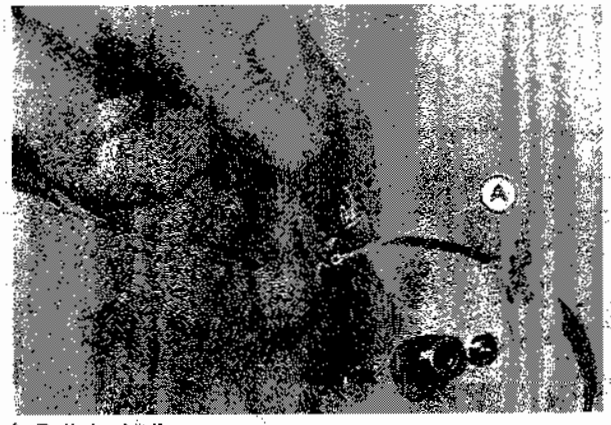
A. Trip Meter Mounting Screws
B. Speedometer

Bulb Replacement

- To remove the wedge-base type bulb, pull the bulb out of the socket.

CAUTION

Do not use bulb rated for greater wattage than the specified value.
Do not turn the bulb to prevent damage to the bulb.



A. Pull the bulb.

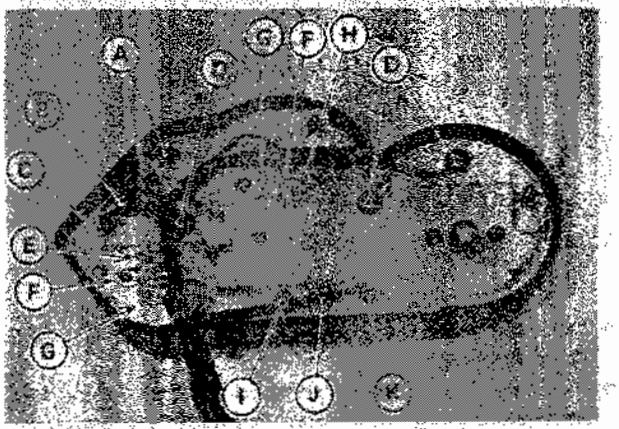
Meter, Gauge Assembly Note

- Tighten the trip meter mounting screws and check that the trip meter gears mesh smoothly.



A. Trip Meter Gears

- Install each lead on the original position shown.



A. BL/BK, BK/Y Leads
B. BR, BL/R Leads
C. R/BK, BK/Y Leads
D. R/BL, BK/Y Leads
E. Y/W Lead
F. BK/Y Lead
G. BR Lead
H. BK Lead
I. GY, BK/Y Leads
J. LG, BR Leads
K. G, BK/Y Leads

- Apply a non-permanent locking agent to the threads of the speedometer and trip meter mounting screws.

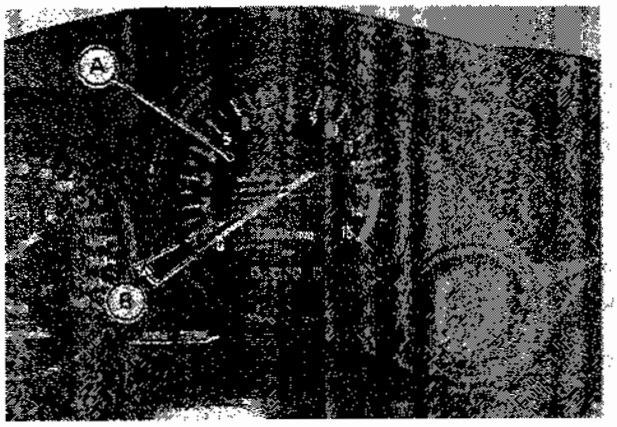
Tachometer Inspection

- Check the tachometer circuit wiring (see Tachometer Circuit and Wiring Inspection).

★If all wiring and components other than the tachometer unit check out good, the unit is suspect. Check the unit as shown.

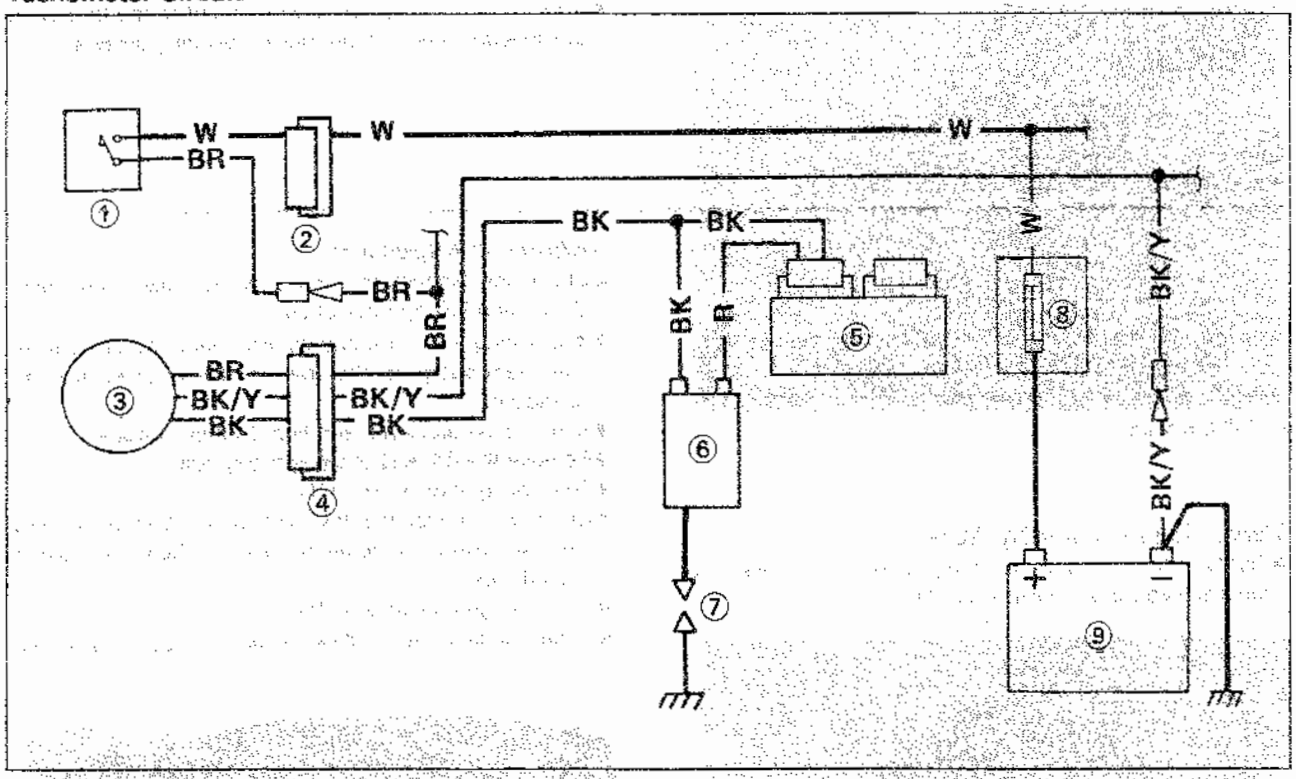
- Remove the fuel tank (see Fuel System chapter).
- Remove the BK lead of the ignition coil.
- Turn the ignition switch ON.
- Open or connect the BK lead to the battery positive terminal using an auxiliary lead. Then the pointer should flick.
- Turn the ignition switch OFF.

★If the pointer does not flick, replace the tachometer unit.



A. Tachometer B. Pointer flicks.

Tachometer Circuit



1. Ignition Switch
2. 6-Pin Connector
3. Tachometer
4. 3-Pin Connector
5. IC Igniter
6. Ignition Coil (#1, #4)
7. Spark Plug
8. 30A Main Fuse in Starter Relay
9. Battery

Water Temperature Gauge Operation Inspection

- Remove the upper inner fairing (right side, see Frame chapter).
- Prepare an auxiliary wire, and check the operation of the gauge.

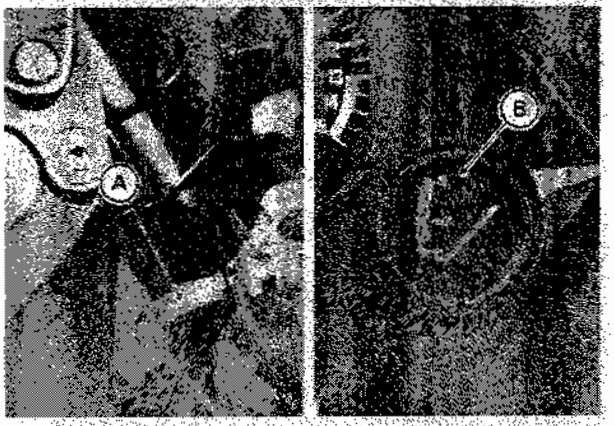
Gauge Operation Test

Ignition Switch Position: ON
Wire Location: Water temperature sensor female connector (disconnected)
Results: Gauge should read C when sensor wire is opened.
Gauge should read H when sensor wire is grounded to engine.

CAUTION

Do not ground the wiring longer than necessary. After the pointer swings to the H position, stop the test. Otherwise the gauge could be damaged.

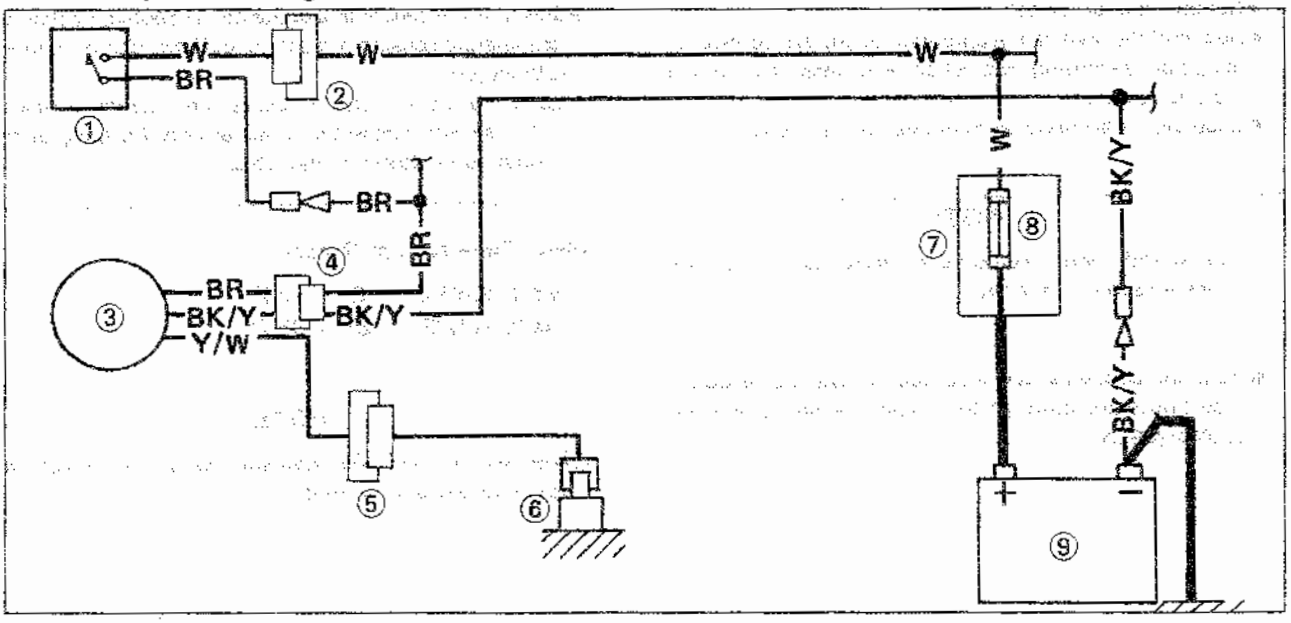
★If these readings are not correct, the trouble is with the gauge and/or wiring.



A. Sensor Connector B. Water Temperature Gauge

- Check the water temperature gauge circuit wiring (see Wiring Inspection).
- If all wiring and components other than the water temperature gauge unit check out good, the gauge is defective.

Water Temperature Gauge Circuit



1. Ignition Switch
2. 6-Pin Connector
3. Water Temperature Gauge
4. 3-Pin Connector
5. 9-Pin Connector
6. Water Temperature Sensor
7. Starter Relay
8. 30A Main Fuse
9. Battery

Switches and Sensors

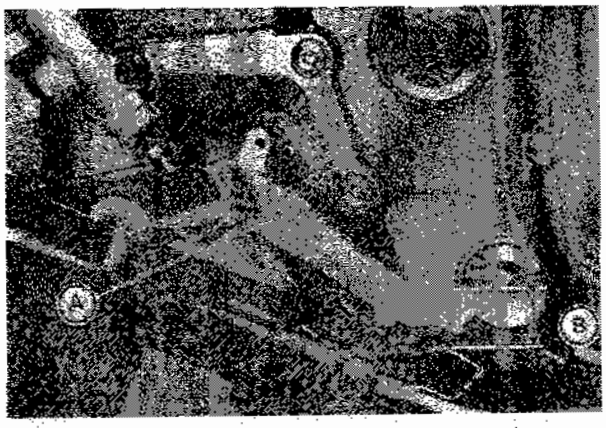
Front Brake Light Testing

- Turn on the ignition switch.
- The brake light should go on when the front brake is applied.

★If it does not, inspect the switch.

Rear Brake Light Switch Adjustment

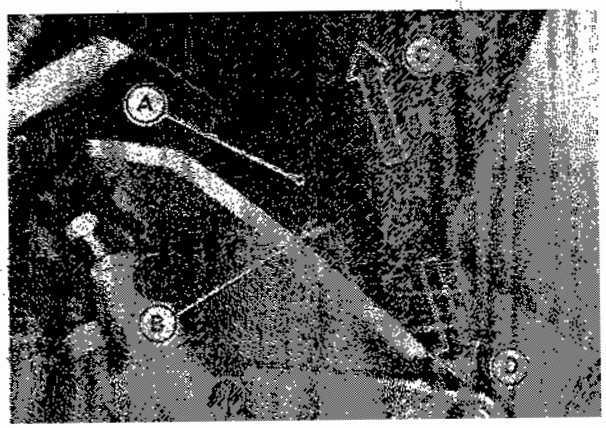
- Check the operation of the rear brake light switch by depressing the brake pedal. The brake light should go on after about **10 mm** of pedal travel.



A. Brake Pedal B. 10 mm

★If it does not, adjust the brake light switch.

- Turn the adjusting nut to adjust the switch.



A. Switch Body
B. Adjusting Nut
C. Light sooner.
D. Light later.

CAUTION

To avoid damaging the electrical connections inside the switch, be sure that the switch body does not turn during adjustment.

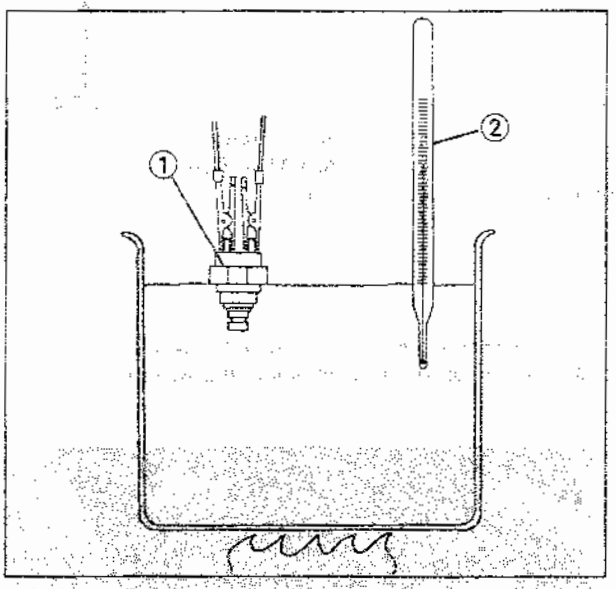
Fan Switch Inspection

- Remove the fan switch.
- Suspend the switch in a container of coolant so that the temperature-sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer in the coolant.

NOTE

○ *The switch and thermometer must not touch the container sides or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.



1. Fan Switch 2. Thermometer

- Using the hand tester (special tool), measure the internal resistance of the switch across the terminals at the temperatures shown in the table.

★If the hand tester does not show the specified values, replace the switch.

Fan Switch Resistance

○ Rising temperature:
From OFF to ON at 93 ~ 103°C
(199 ~ 217°F)
○ Falling temperature:
From ON to OFF at 91 ~ 95°C
(196 ~ 203°F)
ON: Less than 0.5 Ω
OFF: More than 1 MΩ

Water Temperature Sensor Inspection

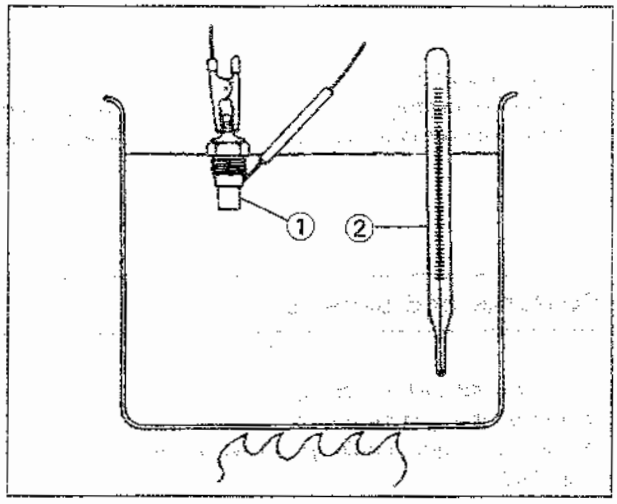
- Suspend the sensor in a container of coolant so that the temperature sensing projection and threaded portion are submerged.
- Using the hand tester, measure the internal resistance of the sensor across the terminal and the body at the temperatures shown in the table.

Water Temperature Sensor

80°C (176°F): 47 ~ 57 Ω
100°C (212°F): 25 ~ 30 Ω

NOTE

○ *The sensor and thermometer must not touch the container sides or bottom.*



1. Water Temperature Sensor 2. Thermometer

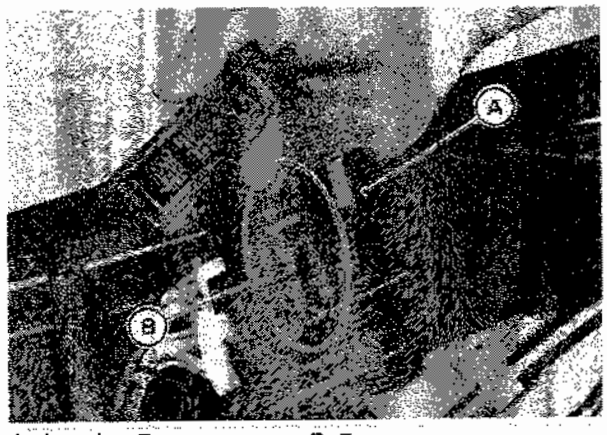
★If the hand tester does not show the specified values, replace the sensor.

Junction Box

The junction box has fuses, relays, and diodes. The relays and diodes can not be removed.

Fuse Removal

- Remove the seat (see Frame chapter).
- Unlock the hook to lift up the locking arm.
- Pull the fuses straight out of the junction box with needle nose pliers.



A. Junction Box B. Fuses

- Remove the left side cover (see Frame chapter).
- Pull out the main fuse from the starter relay.



A. Main Fuse

Fuse Installation

★If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of proper amperage.

Fuse Inspection

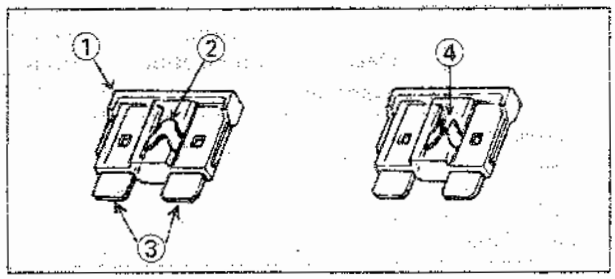
- Remove the fuse (see Fuse Removal).
- Inspect the fuse element.

★If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

CAUTION

When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

Fuse



1. Housing
2. Fuse Element
3. Terminals
4. Blown Element

Fuse Circuit Inspection

- Remove the junction box (see Fuse Removal).
- Pull off the connectors from the junction box.
- Make sure all connector terminals are clean and tight, and none of them have been bent.

★Clean the dirty terminals, and straighten slightly-bent terminals.

- Check conductivity of the numbered terminals with the hand tester (special tool).

★If the tester dose not read as specified, replace the junction box.

Fuse Circuit Inspection

Meter Connection	Meter Reading (Ω)
1 – 2	0
1 – 3B	0
6 – 7	0
6 – 17	0
1 – 7	∞
*8 – 17	∞

Starter Circuit and Headlight Relay Inspection

- Remove the junction box (see Fuse Removal).
- Check conductivity of the following numbered terminal by connecting the hand tester (special tool) and one 12 V battery to the junction box as shown.

★If the relay does not work as specified, replace the junction box.

Relay Inspection (with the battery disconnected)

	Meter Connection	Meter Reading (Ω)
Headlight Relay	*7 – 8	∞
	*7 – 13	∞
Starter Circuit Relay	11 – 13	∞
	12 – 13	∞

Relay Inspection (with the battery connected)

	Meter Connection	Battery Connection + –	Meter Reading (Ω)
Headlight Relay	*7 –8	*9 – 13	0
Starter Circuit Relay	11 – 13	11 – 12	0

(*) : U.S., Canadian Models only

Diode Circuit Inspection

- Remove the junction box from the motorcycle.
- Pull off the connectors from the junction box.
- Check conductivity of the following pair of terminals.

Terminals for Diode Circuit Inspection

***13-8, *13-9, 12-14, 15-14, 16-14**

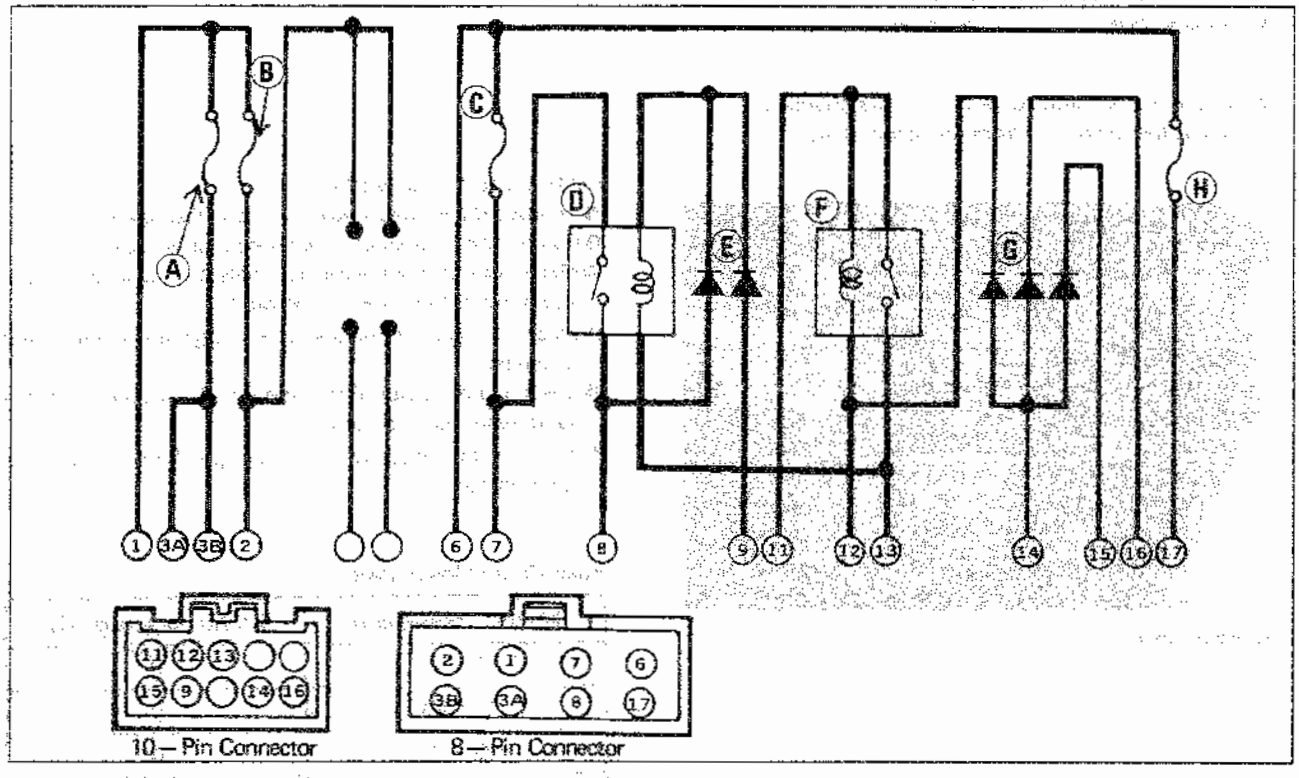
(*) : U.S., Canada Models only

★The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the junction box must be replaced.

NOTE

○The actual meter reading varies with the meter used and the individual diodes, but, generally speaking, the lower reading should be from zero to one half the scale.

Junction Box Internal Circuit



A . 10A Accessory Fuse
B . 10A Fan Fuse
C . 10A Headlight Fuse
D . Headlight Relay
E . Diodes
F . Starter Circuit Relay
G. Diodes for Interlock Circuit
H. 10 A Tail Light Fuse

Appendix

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Additional Considerations for Racing

This motorcycle has been manufactured for use in a reasonable and prudent manner and as a vehicle only. However, some may wish to subject this motorcycle to abnormal operation, such as would be experienced under racing conditions. KAWASAKI STRONGLY RECOMMENDS THAT ALL RIDERS RIDE SAFELY AND OBEY ALL LAWS AND REGULATIONS CONCERNING THEIR MOTORCYCLE AND ITS OPERATION.

Racing should be done under supervised conditions, and recognized sanctioning bodies should be contacted for further details. For those who desire to participate in competitive racing or related use, the following technical information may prove useful. However, please note the following important notes.

- You are entirely responsible for the use of your motorcycle under abnormal conditions such as racing, and Kawasaki shall not be liable for any damages which might arise from such use.
- Kawasaki's Limited Motorcycle Warranty and Limited Emission Control Systems Warranty specifically exclude motorcycles which are used in competition or related uses. Please read the warranty carefully.
- Motorcycle racing is a very sophisticated sport, subject to many variables. The following information is theoretical only, and Kawasaki shall not be liable for any damages which might arise from alterations utilizing this information.
- When the motorcycle is operated on public roads, it must be in its original state in order to ensure safety and compliance with applicable regulations.

Carburetor:

Sometimes an alteration may be desirable for improved performance under special conditions when proper mixture is not obtained after the carburetor has been properly adjusted, and all parts cleaned and found to be functioning properly.

If the engine still exhibits symptoms of overly rich or lean carburetion after all maintenance and adjustments are correctly performed, the main jet can be replaced with a smaller or larger one. A smaller numbered jet gives a leaner mixture and a larger numbered jet a richer mixture.

Spark Plug:

The spark plug ignites the fuel and air mixture in the combustion chamber. To do this effectively and at the proper time, the correct spark plug must be used, and the spark plug must be kept clean and the gap adjusted.

Tests have shown the plug listed in the "General Information" chapter to be the best plug for general use.

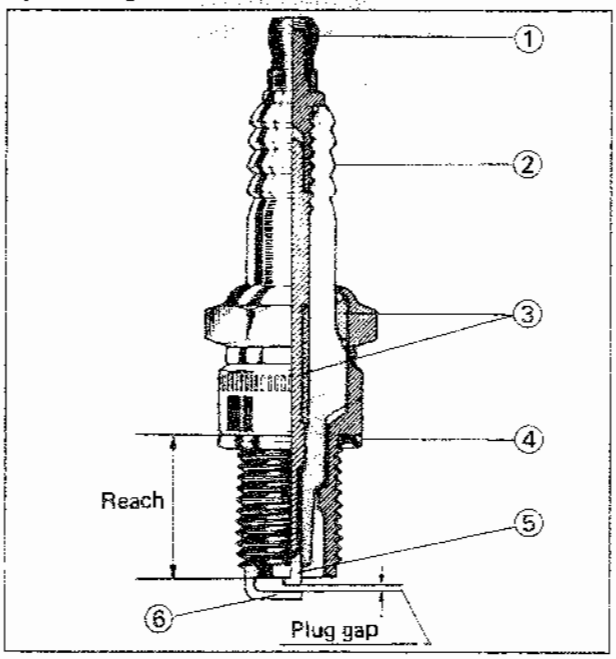
Since spark plug requirements change with the ignition and carburetion adjustments and with riding conditions, whether or not a spark plug of the correct heat range is used should be determined by removing and inspecting the plug.

When a plug of the correct heat range is being used, the electrodes will stay hot enough to keep all the carbon burned off, but cool enough to keep from damaging the engine and the plug itself. This temperature is about 400 ~ 800°C (750 ~ 1,450°F) and can be judged by noting the condition and color of the ceramic insulator around the center electrode. If the ceramic is clean and of a light brown color, the plug is operating at the right temperature.

A spark plug for higher operating temperatures is used for racing. Such a plug is designed for better cooling efficiency so that it will not overheat and thus is often called a "colder" plug. If a spark plug with too cool a heat range is used – that is, a "cold" plug that cools itself too well – the plug will stay too cool to burn off the carbon, and the carbon will collect on the electrodes and the ceramic insulator.

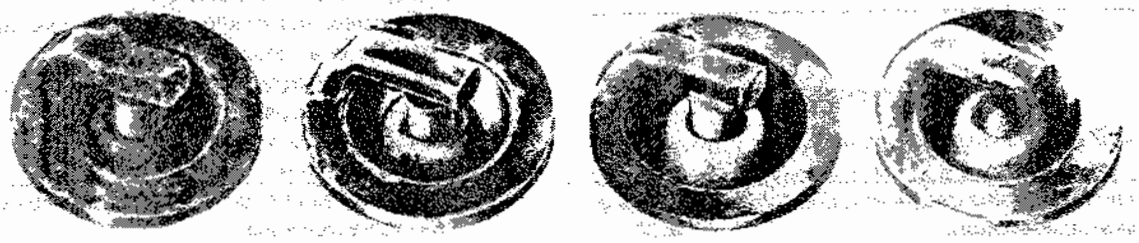
The carbon on the electrodes conducts electricity, and can short the center electrode to ground by either coating the ceramic insulator or bridging across the gap. Such a short will prevent an effective spark. Carbon build-up on the plug can also cause other troubles. It can heat up red-hot and cause preignition and knocking, which may eventually burn a hole in the top of the piston.

Spark Plug



1. Terminal
2. Insulator
3. Cement
4. Gasket
5. Center Electrode
6. Side Electrode

Spark Plug Condition



Carbon Fouling | Oil Fouling | Normal Operation | Overheating

Spark Plug Inspection

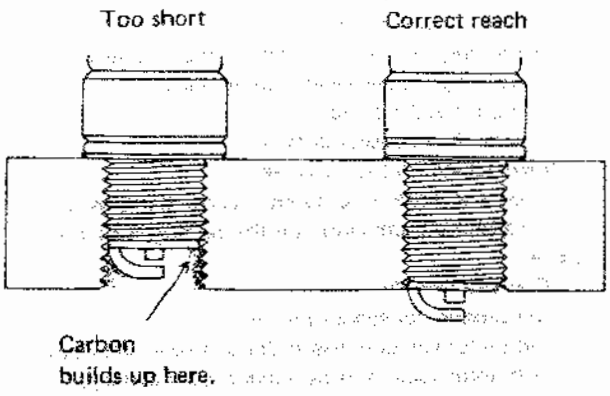
●Remove the spark plug and inspect the ceramic insulator.

★Whether or not the right temperature plug is being used can be ascertained by noting the condition of the ceramic insulator around the electrode. A light brown color indicates the correct plug is being used. If the ceramic is black, it indicates that the plug is firing at too low a temperature, so the next hotter type should be used instead. If the ceramic is white, the plug is operating at too high a temperature and it should be replaced with the next colder type.

CAUTION

If the spark plug is replaced with a type other than the standard plug, make certain the replacement plug has the same thread pitch and reach (length of threaded portion) and the same type electrode (regular type or projected type) as the standard plug.
If the plug reach is too short, carbon will build up on the plug hole threads in the cylinder head, causing overheating and making it very difficult to insert the correct spark plug later.
If the reach is too long, carbon will build up on the exposed spark plug threads causing overheating, preigniton, and possibly burning a hole in the piston top. In addition, it may be impossible to remove the plug without damaging the cylinder head.

Plug Reach



Standard Spark Plug Threads

Diameter:	10 mm
Pitch:	1.0 mm
Reach:	19 mm

NOTE

○*The heat range of the spark plug functions like a thermostat for the engine. Using the wrong type of spark plug can make the engine run too hot (resulting in engine damage) or too cold (with poor performance, misfiring, and stalling).*

Troubleshooting Guide

NOTE

○ This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.

Engine Doesn't Start, Starting Difficulty:

Starter motor not rotating:
- Starter lockout or neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Relays not contacting or operating
- Starter button not contacting
- Wiring open or shorted
- Ignition switch trouble
- Engine stop switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:
- Starter motor clutch trouble

Engine won't turn over:
- Valve seizure
- Valve lifter seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure
- Starter idle gear seizure

No fuel flow:
- No fuel in tank
- Fuel tap vacuum hose clogged
- Fuel tap vacuum valve trouble
- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded:
- Fuel level in carburetor float bowl too high
- Float valve worn or stuck open
- Starting technique faulty
- (When flooded, crank the engine with the throttle fully open to allow more air to reach the engine.)

No spark; spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap not in good contact
- Spark plug incorrect
- IC igniter trouble
- Neutral, starter lockout, or side stand switch trouble
- Pickup coil trouble
- Ignition coil trouble
- Ignition or engine stop switch shorted
- Wiring shorted or open
- Fuse blown

Fuel/air mixture incorrect:
- Pilot screw and/or idle adjusting screw maladjusted
- Pilot jet, or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter jet clogged

Compression Low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Poor Running at Low Speed:

Spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Pilot screw maladjusted
- Pilot jet, or air passage clogged
- Air bleed pipe bleed holes clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter plunger stuck open
- Fuel level in carburetor float bowl too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner duct loose
- Air cleaner O-ring damaged

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head warped
- Cylinder head gasket damaged
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Other:
- IC igniter trouble
- Carburetors not synchronizing
- Carburetor vacuum piston doesn't slide smoothly
- Carburetor vacuum piston diaphragm damage
- Engine oil viscosity too high
- Drive train trouble
- Brake dragging
- Air suction valve trouble

Poor Running or No Power at High Speed:

Firing incorrect:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Starter plunger stuck open
- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Air jet clogged
- Fuel level in carburetor float bowl too high or too low
- Bleed holes of needle jet holder or needle jet clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Air cleaner O-ring damaged
- Water or foreign matter in fuel
- Carburetor holder loose
- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface.)

Knocking:
- Carbon built up in combustion chamber
- Fuel poor quality or incorrect
- Spark plug incorrect
- IC igniter trouble

Miscellaneous:
- Throttle valve won't fully open
- Carburetor vacuum piston doesn't slide smoothly
- Carburetor vacuum piston diaphragm damaged
- Brake dragging
- Clutch slipping
- Overheating
- Engine oil level too high
- Engine oil viscosity too high
- Drive train trouble
- Air suction valve trouble

Overheating:

Firing incorrect:
- Spark plug dirty, broken, or maladjusted
- Spark plug incorrect
- IC igniter trouble

Fuel/air mixture incorrect:
- Main jet clogged or wrong size
- Fuel level in carburetor float bowl too low
- Carburetor holder loose
- Air cleaner duct loose
- Air cleaner poorly sealed, or missing
- Air cleaner O-ring damaged
- Air cleaner clogged

Compression high:
- Carbon built up in combustion chamber

Engine load faulty:
- Clutch slipping
- Engine oil level too high
- Engine oil viscosity too high
- Drive train trouble
- Brake dragging

Lubrication inadequate:
- Engine oil level too low
- Engine oil poor quality or incorrect
- Oil cooler fin damaged
- Oil cooler clogged

Gauge incorrect:
- Water temperature gauge (meter unit) broken
- Water temperature sensor broken

Coolant incorrect:
- Coolant level too low
- Coolant deteriorated

Cooling system component incorrect:
- Radiator fin damaged
- Radiator clogged
- Thermostat trouble
- Radiator cap trouble
- Thermostatic fan switch trouble
- Fan motor broken
- Fan blade damaged
- Water pump not turning
- Water pump impeller damaged

Over Cooling:

Gauge incorrect:
- Water temperature gauge (meter unit) broken
- Water temperature sensor broken

Cooling system component incorrect:
- Thermostatic fan switch trouble
- Thermostat trouble

Clutch Operation Faulty:

Clutch slipping:
- No clutch lever play
- Clutch inner cable catching
- Friction plate worn or warped
- Steel plate worn or warped
- Clutch spring broken or weak
- Clutch release mechanism trouble
- Clutch hub or housing unevenly worn

Clutch not disengaging properly:
- Clutch lever play excessive
- Clutch plate warped or too rough
- Clutch spring compression uneven
- Engine oil deteriorated
- Engine oil viscosity too high
- Engine oil level too high
- Clutch housing frozen on drive shaft
- Clutch release mechanism trouble
- Clutch hub nut loose

Gear Shifting Faulty:

Doesn't go into gear; shift pedal doesn't return:
- Clutch not disengaging
- Shift fork bent or seized
- Gear stuck on the shaft
- Gear positioning lever binding
- Shift return spring weak or broken
- Shift return spring pin loose
- Shift mechanism arm spring broken
- Shift mechanism arm broken
- Shift pawl broken

Jumps out of gear:
- Shift fork worn, bent
- Gear groove worn
- Gear dogs and/or dog holes worn
- Shift drum groove worn
- Gear positioning lever spring weak or broken
- Shift fork pin worn
- Drive shaft, output shaft, and/or gear splines worn

Overshifts:
- Gear positioning lever spring weak or broken
- Shift mechanism arm spring broken

Abnormal Engine Noise:

Knocking:
- IC igniter trouble
- Carbon built up in combustion chamber
- Fuel poor quality or incorrect
- Spark plug incorrect
- Overheating

Piston slap:
- Cylinder/piston clearance excessive
- Cylinder, piston worn
- Connecting rod bent
- Piston pin, piston pin hole worn

Valve noise:
- Valve clearance incorrect
- Valve spring broken or weak
- Camshaft bearing worn
- Valve lifter worn

Other noise:
- Connecting rod small end clearance excessive
- Connecting rod big end clearance excessive
- Piston ring worn, broken, or stuck
- Piston seizure, damage
- Cylinder head gasket leaking
- Exhaust pipe leaking at cylinder head connection
- Crankshaft runout excessive
- Engine mounts loose
- Crankshaft bearing worn
- Primary gear worn or chipped
- Camshaft chain tensioner trouble
- Camshaft chain, sprocket, guide worn
- Air suction valve damaged
- Vacuum switch valve damaged
- Alternator rotor loose

Abnormal Drive Train Noise:

Clutch noise:
- Weak or damaged clutch spring damper
- Clutch housing/friction plate clearance excessive
- Clutch housing gear worn
- Outside friction plate installed incorrectly

Transmission noise:
- Bearings worn
- Transmission gears worn or chipped
- Metal chips jammed in gear teeth
- Engine oil insufficient

Drive chain noise:
- Drive chain adjusted improperly
- Chain worn
- Rear and/or engine sprocket worn
- Chain lubrication insufficient
- Rear wheel misaligned

Abnormal Frame Noise:

Front fork noise:
- Oil insufficient or too thin
- Spring weak or broken

Rear shock absorber noise:
- Shock absorber damaged

Disc brake noise:
- Pad installed incorrectly
- Pad surface glazed
- Disc warped
- Caliper trouble

Other noise:
- Bracket, nut, bolt, etc. not properly mounted or tightened

Oil Pressure Warning Light Goes On:

Engine oil pump damaged
Engine oil screen clogged
Engine oil level too low
Engine oil viscosity too low
Camshaft bearings worn
Crankshaft bearings worn
Oil pressure switch damaged
Relief valve stuck open
O-ring at the oil passage in the crankcase damaged

Exhaust Smokes Excessively:

White smoke:
Piston oil ring worn
Cylinder worn
Valve oil seal damaged
Valve guide worn
Engine oil level to high

Black smoke:
Air cleaner clogged
Main jet too large or fallen off
Starter plunger stuck open
Fuel level in carburetor float bowl too high

Brown smoke:
Main jet too small
Fuel level in carburetor float bowl too low
Air cleaner duct loose
Air cleaner O-ring damaged
Air cleaner poorly sealed or missing

Handling and/or Stability Unsatisfactory:

Handlebar hard to turn:
Cable routing incorrect
Hose routing incorrect
Wiring routing incorrect
Steering stem nut too tight
Steering bearing damaged
Steering bearing lubrication inadequate
Steering stem bent
Tire air pressure too low

Handlebar shakes or excessively vibrates:
Tire worn
Swing arm pivot bearings worn
Rim warped, or not balanced
Wheel bearing worn
Handlebar mounting bolt loose
Steering stem head nut loose

Handlebar pulls to one side:
Frame bent
Wheel misalignment
Swing arm bent or twisted
Steering maladjusted
Front fork leg bent
Right and left fork oil level uneven

Shock absorption unsatisfactory:
(Too hard)
Front fork oil excessive
Front fork oil viscosity too high
Rear shock absorber adjustment too hard
Tire air pressure too high
Front fork leg bent
(Too soft)
Tire air pressure too low
Front fork oil insufficient and/or leaking
Front fork oil viscosity too low
Rear shock adjustment too soft
Front fork, rear shock absorber spring weaken
Rear shock absorber oil leaking

Brake Doesn't Hold:

Air in the brake line
Pad or disc worn
Brake fluid leakage
Disc warped
Contaminated pad
Brake fluid deteriorated
Primary or secondary cup damaged in master cylinder
Master cylinder scratched inside

Battery Discharged:

Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte level too low)
Battery leads making poor contact
Load excessive (e.g., bulb of excessive wattage)
Ignition switch trouble
Alternator trouble
Wiring faulty
Regulator/rectifier trouble

Battery Overcharged:

Regulator/rectifier trouble
Battery faulty

General Lubrication

Lubrication

- Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.
- Lubricate the points listed below with indicated lubricant.

NOTE

○ *Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure spray water, perform the general lubrication.*

Pivots: Lubricate with Motor Oil.
Center Stand
Side Stand
Clutch Lever
Rear Brake Pedal Joint
Footpegs

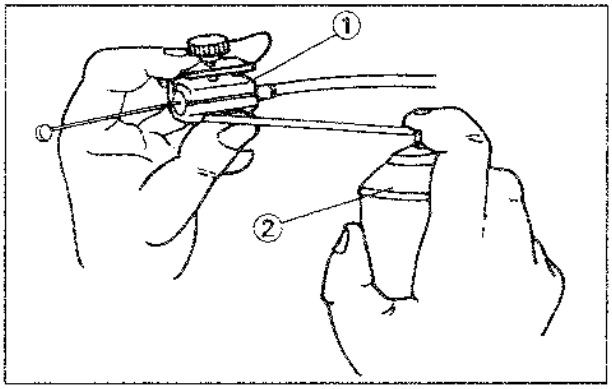
Points: Lubricate with Grease.
Throttle Inner Cable Lower End
Clutch Inner Cable Upper and Lower Ends
Speedometer Inner Cable*
Swing Arm Pivot Shaft**
Uni-Trak Linkage**
(*): Grease the lower part of the inner cable sparingly.
(**): Apply molybdenum disulfide grease.

Cables: Lubricate with Cable Lubricant.
Choke Cable
Throttle Cable
Clutch Cable

- Lubricate the cables by seeping the oil between the cable and cable housing.

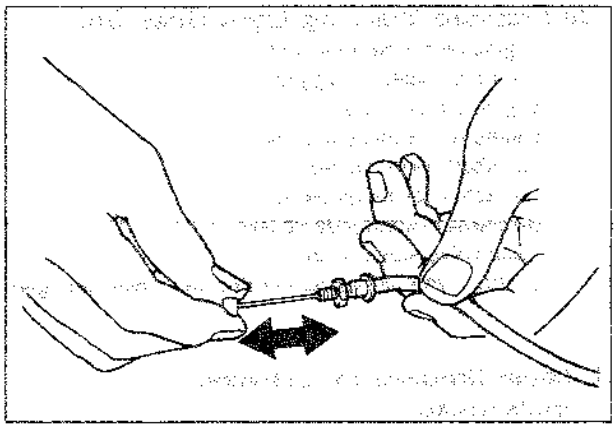
○ The cable may be lubricated by using a pressure cable luber (special tool) with an aerosol cable lubricant.

Cable Lubrication



1. Pressure Cable Luber (Special tool: K56019-021)
2. Aerosol Cable Lubricant

- With the cable disconnected at the both ends, the cable should move freely within the cable housing.



★ If cable movement is not free after lubricating, if the cable is frayed, or if the cable housing is kinked, replace the cable.

Nut, Bolt, and Fastener Tightness

Tightness Inspection

●Check the tightness of the bolts and nuts listed here. Also, check to see that each cotter pin is in place and in good condition.

NOTE

○*For the engine fasteners, check the tightness of them when the engine is cold (at room temperature).*

★If there are loose fasteners, retorque them to the specified torque following the specified tightening sequence. Refer to the Torque and Locking Agent section of the General Information chapter for torque specifications. For each fastener, first loosen it by ½ turn, then tighten it.

★If cotter pins are damaged, replace them with new ones.

Nut, bolt and fastener to be checked

Wheels:
- Front Axle Nut
- Front Axle Clamp Bolts
- Rear Axle Nut Cotter Pin
- Rear Axle Nut

Final Drive:
- Chain Adjuster Locknuts
- Rear Sprocket Nuts

Brakes:
- Front Master Cylinder Clamp Bolts
- Caliper Mounting Bolts
- Rear Master Cylinder Mounting Bolts
- Torque Link Nut
- Brake Lever Pivot Nut
- Brake Pedal Bolt
- Brake Rod Joint Cotter Pin

Suspension:
- Front Fork Clamp Bolts
- Front Fender Mounting Bolts
- Rear Shock Absorber Nuts
- Swing Arm Pivot Shaft Nut
- Uni-Trak Link Nuts

Steering:
- Stem Head Nut
- Handlebar Mounting Bolts

Engine:
- Engine Mounting Bolts
- Cylinder Head Cover Bolts
- Cylinder Head Bolts
- Exhaust Manifold Nuts
- Muffler Mounting Bolt and Nut
- Clutch Lever Pivot Nut

Others:
- Side Stand Bracket Bolts
- Footpeg Bracket Bolts
- Footpeg Bracket Mounting Bolts
- Rear Frame Bolts

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol	Power
mega	M	x 1 000 000
kilo	k	x 1 000
centi	c	x 0.01
milli	m	x 0.001
micro	μ	x 0.000001

Units of Mass:

kg	x	2.205	=	lb
g	x	0.03527	=	oz

Units of Volume:

L	x	0.2642	=	gal (US)
L	x	0.2200	=	gal (imp)
L	x	1.057	=	qt (US)
L	x	0.8799	=	qt (imp)
L	x	2.113	=	pint (US)
L	x	1.816	=	pint (imp)
mL	x	0.03381	=	oz (US)
mL	x	0.02816	=	oz (imp)
mL	x	0.06102	=	cu in

Units of Force:

N	x	0.1020	=	kg
N	x	0.2248	=	lb
kg	x	9.807	=	N
kg	x	2.205	=	lb

Units of Length:

km	x	0.6214	=	mile
m	x	3.281	=	ft
mm	x	0.03937	=	in

Units of Torque:

N-m	x	0.1020	=	kg-m
N-m	x	0.7376	=	ft-lb
N-m	x	8.851	=	in-lb
kg-m	x	9.807	=	N-m
kg-m	x	7.233	=	ft-lb
kg-m	x	86.80	=	in-lb

Units of Pressure:

kPa	x	0.01020	=	kg/cm²
kPa	x	0.1450	=	psi
kPa	x	0.7501	=	cm Hg
kg/cm²	x	98.07	=	kPa
kg/cm²	x	14.22	=	psi
cm Hg	x	1.333	=	kPa

Units of Speed:

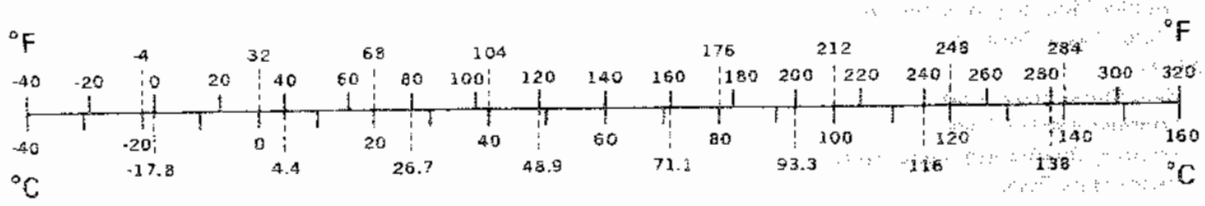
km/h	x	0.6214	=	mph

Units of Power:

kW	x	1.360	=	PS
kW	x	1.341	=	HP
PS	x	0.7355	=	kW
PS	x	0.9863	=	HP

Units of Temperature:

$$\frac{9\,(°C + 40)}{5} - 40 = °F \qquad \frac{5\,(°F + 40)}{9} - 40 = °C$$



MODEL APPLICATION

Year	Model	Beginning Frame No.
1990	ZX500-C1	ZX500C-000001
	ZX600-D1	JKAZX4D1□LA000001,or JKAZX4D1□LB500001, or ZX600D-000001
1991	ZX500-C2	ZX500C-001701
	ZX600-D2	JKAZX4D1□MA014001, or JKAZX4D1□MB502201,or ZX600D-014001,or ZX600D-600001
1992	ZX500-C3	ZX500C-003501
	ZX600-D3	JKAZX4D1□NA028001, or JKAZX4D1□NB505201, or ZX600D-028001, or ZX600D-602501
1993	ZX600-D4	JKAZX4D1□PB508301

□: This digit in the frame number changes from one machine to another.

Kawasaki
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Consumer Products Group

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