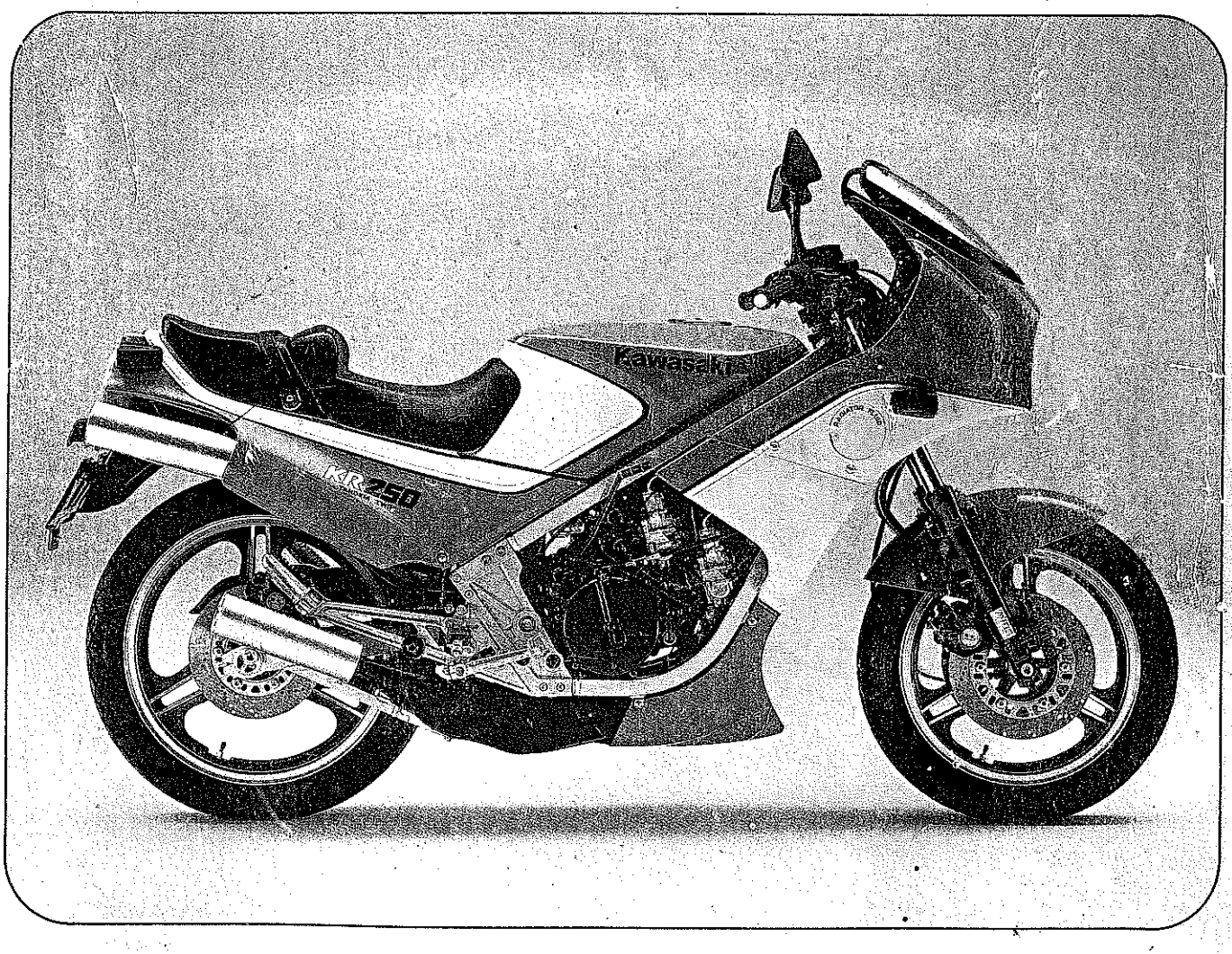
Kawasaki

KR250



Motorcycle Service Manual

Kawasaki

KR250

Motorcycle
Service Manual

All rights reserved. No parts of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic mechanical photocopying, recording or otherwise, without the prior written permission of Quality Assurance Department/Consumer Products Group/Kawasaki Heavy Industries, Ltd., Japan.

No liability can be accepted for any inaccuracies or omissions in this publication, although every possible care has been taken to make it as complete and accurate as possible.

The right is reserved to make changes at any time without prior notice and without incurring an obligation to make such changes to products manufactured previously. See your Motorcycle dealer for the latest information on product improvements incorporated after this publication.

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.

© Kawasaki Heavy Industries, Ltd. 1984, 1989

Second Edition (3) : Dec. 22, 1994 (M)

LIST OF ABBREVIATIONS

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

Read OWNER'S MANUAL before operating.

Quick Reference Guide

General Information	1
Fuel System	2
Cooling System	3
Engine Top End	4
Clutch	5
Engine Lubrication System	6
Engine Removal/Installation	7
Crankshaft/Transmission	8
Wheels/Tires	9
Final Drive	10
Brakes	11
Suspension	12
Steering/Handle	13
Frame	14
Electrical System	15
Appendix	16
Supplement – 1985 Model	17

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.

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 your warranty period, especially, 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. Dont'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 five 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 WARNING, CAUTION, or 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.
- ☆ Indicates a conditional sub-step or what action to take based upon the results of the conditional 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
Model Identification 1-4
General Specifications 1-5
Periodic Maintenance Chart 1-8

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, and 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. 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 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 evenly contacts 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 to the seal lips to reduce rubber to metal friction.

(14) Circlip, Retaining Ring

Replace any circlips and retaining rings that are 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.

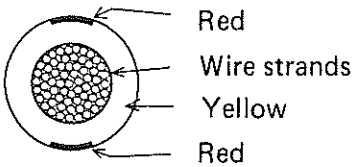
(15) Lubrication

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.

(16) 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

(17) 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.

(18) Inspection

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

Abrasion	Denting	Hardening	Warping
Bending	Deterioration	Scratching	Wear
Cracking	Discoloration	Seizure	

(19) Service Data

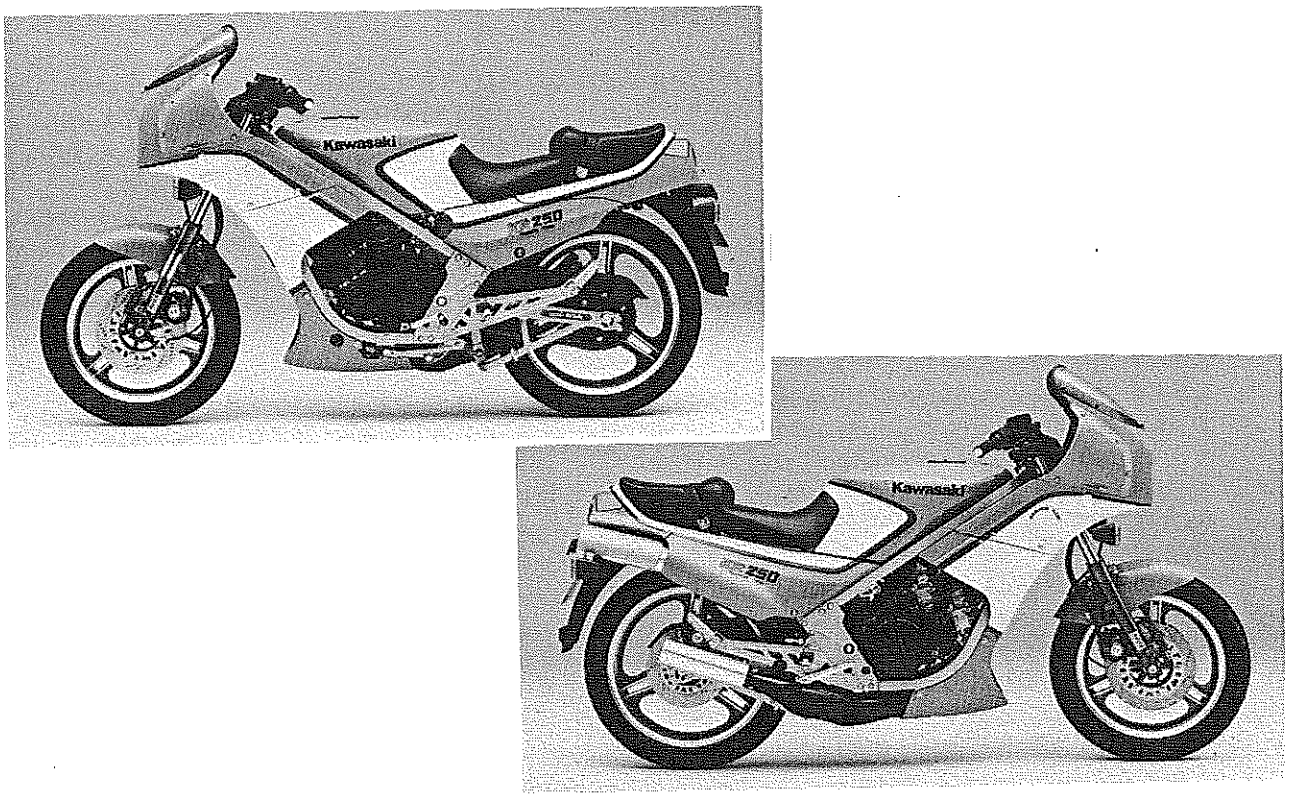
Numbers of service data in this text have following meanings:

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

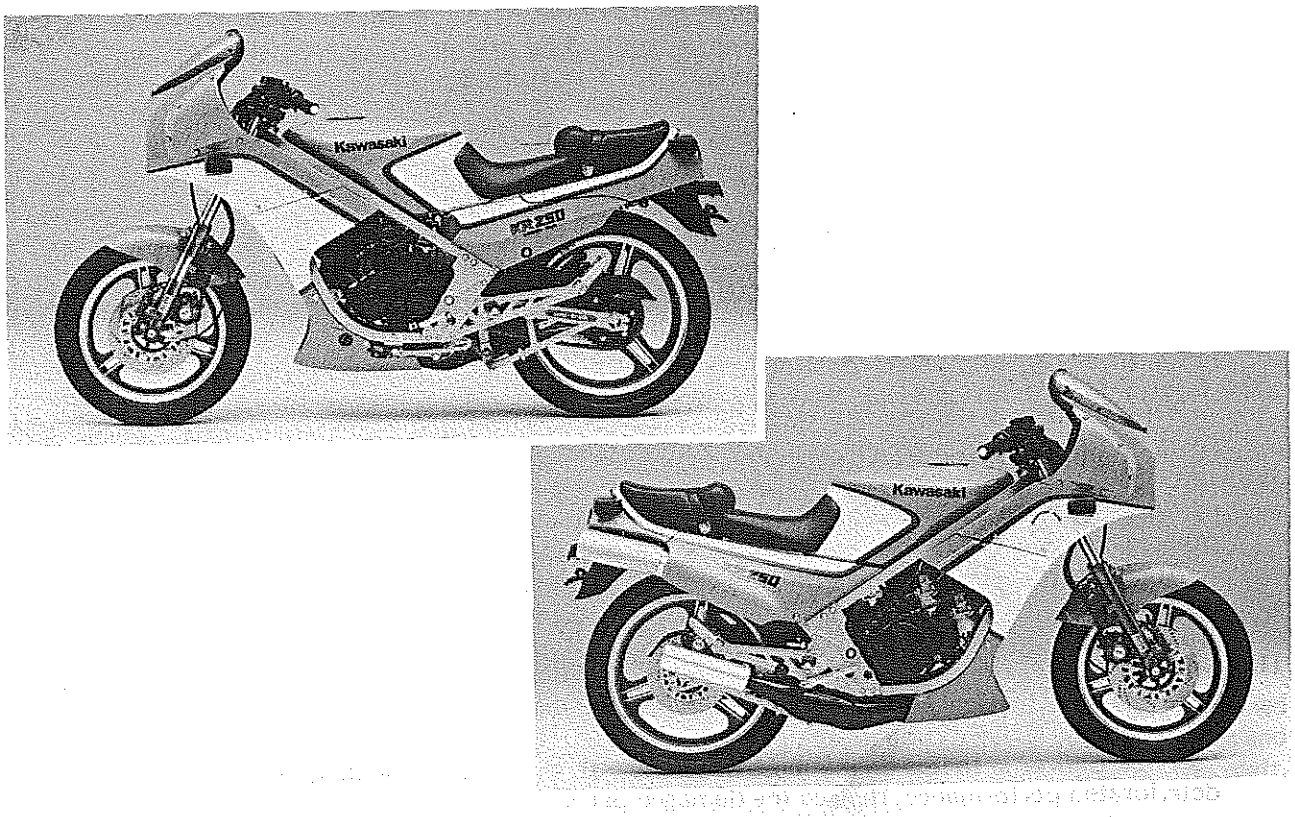
"Service Limits": Indicate the usable limits. If the measurement shows excessive wear or deteriorated performance, replace the damaged parts.

Model Identification

KR250-A1 Australian Model



KR250-A1 South African Model



General Specifications

Items	KR250-A1
Dimensions:	
Overall length	2,095 mm, Ⓢ 2,035 mm
Overall width	685 mm
Overall height	1,185 mm
Wheelbase	1,360 mm
Road clearance	130 mm
Seat height	790 mm
Dry weight	1,315 N (134 kg), Ⓢ 1,305 N (133 kg)
Curb weight: Front	726 N (74 kg)
Rear	824 N (84 kg), Ⓢ 815 N (83 kg)
Fuel tank capacity	18.0L
Performance:	
Climbing ability	32°
Braking distance	12.5 m from 50 km/h
Minimum turning radius	2.6 m
Engine:	
Type	2-stroke, 2-cylinder, rotary & reed valve (RRIS)
Cooling system	Liquid-cooled
Bore and stroke	56.0 x 50.6 mm
Displacement	249 mL
Compression ratio	7.0
Maximum horsepower	Max. 35.3 kW (48 PS) @10,000 r/min (rpm)
Maximum torque	36.3 N-m (3.7 kg-m, 26.8 ft-lb) @8,000 r/min (rpm)
Carburetion system	Carburetors, Mikuni VM28SS x 2
Starting system	Primary kick starter
Ignition system	CDI
Timing advance	Electronically advanced
Ignition timing	13.5° BTDC @1,300 r/min (rpm)
Spark plug	NGK B9ES (option B8ES)

Items		KR250-A1
Cylinder numbering method		Front to rear, 1-2
Firing order		1-2
Valve timing:		
Inlet	Open	120° BTDC
	Close	55° ATDC
	Duration	175°
Exhaust	Open	96° BBDC
	Close	96° ABDC
	Duration	192°
Scavenging	Open	62.5° BBDC
	Close	62.5° ABDC
	Duration	125°
Lubrication system		Superlube (oil injection)
Engine oil:		
Type		2-stroke oil for air-cooled engine
Capacity		1.5 L
Drive Train:		
Primary reduction system:		
Type		Gear
Reduction ratio		2.791 (67/24)
Clutch type		Wet multi disc
Transmission:		
Type		6-speed, constant mesh, return shift
Gear ratios:	1st	2.642 (37/14)
	2nd	1.777 (32/18)
	3rd	1.318 (29/22)
	4th	1.083 (26/24)
	5th	0.961 (25/26)
	6th	0.888 (24/27)
Final drive system:		
Type		Chain drive
Reduction ratio		2.714 (38/14)
Overall drive ratio		6.735 @Top gear
Transmission oil		
Grade		SE class
Viscosity		SAE10W30 or 10W40
Capacity		1.1 L

Items	KR250-A1
Frame:	
Type	Tubular, double cradle (aluminum)
Caster (rake angle)	27°
Trail	84 mm
Front tire:	
Type	Tubeless
Size	100/90-16 54 H
Rear tire:	
Type	Tubeless
Size	110/80-18 58 H
Front suspension:	
Type	Telescopic fork (pneumatic)
Wheel travel	140 mm
Rear suspension:	
Type	Swing arm (uni-trak)
Wheel travel	100 mm
Brake type:	
Front	Dual disc
Rear	Single disc
Electrical Equipment:	
Battery	12 V 4.5 Ah
Headlight:	
Type	Semisealed beam
Bulb	12 V 60/55 W (quartz-halogen)
Tail/brake light	12 V 5/21 W, Ⓢ 12 V 8/27 W
Alternator:	
Type	Three-phase AC
Rated output	11.5 A @8,000 r/min (rpm), 14 V
Voltage regulator:	
Type	Short-circuit

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

Ⓢ : South African Model

Periodic Maintenance Chart

The 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	4,000 km	8,000 km	12,000 km	16,000 km	20,000 km	24,000 km	See Page
Spark plug – clean		•	•	•	•	•	•	•	15-17
Spark plug – check †		•	•	•	•	•	•	•	15-17
Air cleaner element – clean			•		•		•		2-17
Air cleaner element – replace	5 cleanings			•		•		•	2-16
Throttle grip play – check †		•	•	•	•	•	•	•	2-5
Oil pump and carburetor synchonization –check +		•	•	•	•	•	•	•	6-5
Idle speed – check †		•	•	•	•	•	•	•	2-10
Fuel system – check †				•		•		•	2-11
Cylinder head bolt tightness – check †		•		•		•		•	4-6
Transmission oil – change	year	•		•		•		•	6-4
Fuel hose – replace	4 year								
Clutch – adjust		•	•	•	•	•	•		5-4
Drive chain wear – check †			•	•	•	•	•	•	10-5
Drive chain – lubricate	300 km								10-6
Drive chain slack – check †	800 km								10-4
Brake lining wear – check †			•	•	•	•	•	•	11-12
Brake fluid level – check †	month	•	•	•	•	•	•	•	11-13
Brake fluid – change	year			•		•		•	11-13
Brake hose and pipe – replace	4 years								11-16
Anti-dive brake plunger rubber cap, O-ring, and seal ring – replace	2 years								12-12
Brake master cylinder cup and dust seal – replace	2 years								11-11
Caliper piston seal and dust seal – replace	2 years								11-7
Steering – check †		•	•	•	•	•	•	•	13-4
Steering stem bearing – lubricate	2 years					•			13-7
Front fork oil – change				•		•		•	12-6
Tire wear – check †			•	•	•	•	•	•	9-9
Wheel bearing – lubricate	2 years					•			9-12
Speedometer gear – lubricate	2 years					•			9-14
Swing arm pivot, uni-trak linkage – lubricate				•		•		•	12-17
Coolant – change	2 years							•	3-4
Radiator hoses, connections – check †	year	•		•		•		•	3-8
Battery electrolyte level – check †	month	•	•	•	•	•	•	•	15-9
General Lubrication – perform			•	•	•	•	•	•	16-8
Nut, bolt, and fastener tightness – check †		•		•		•		•	16-8

* : For higher odometer readings, repeat at the frequency interval established here.
† : Replace, add, adjust, clean, or torque if necessary.

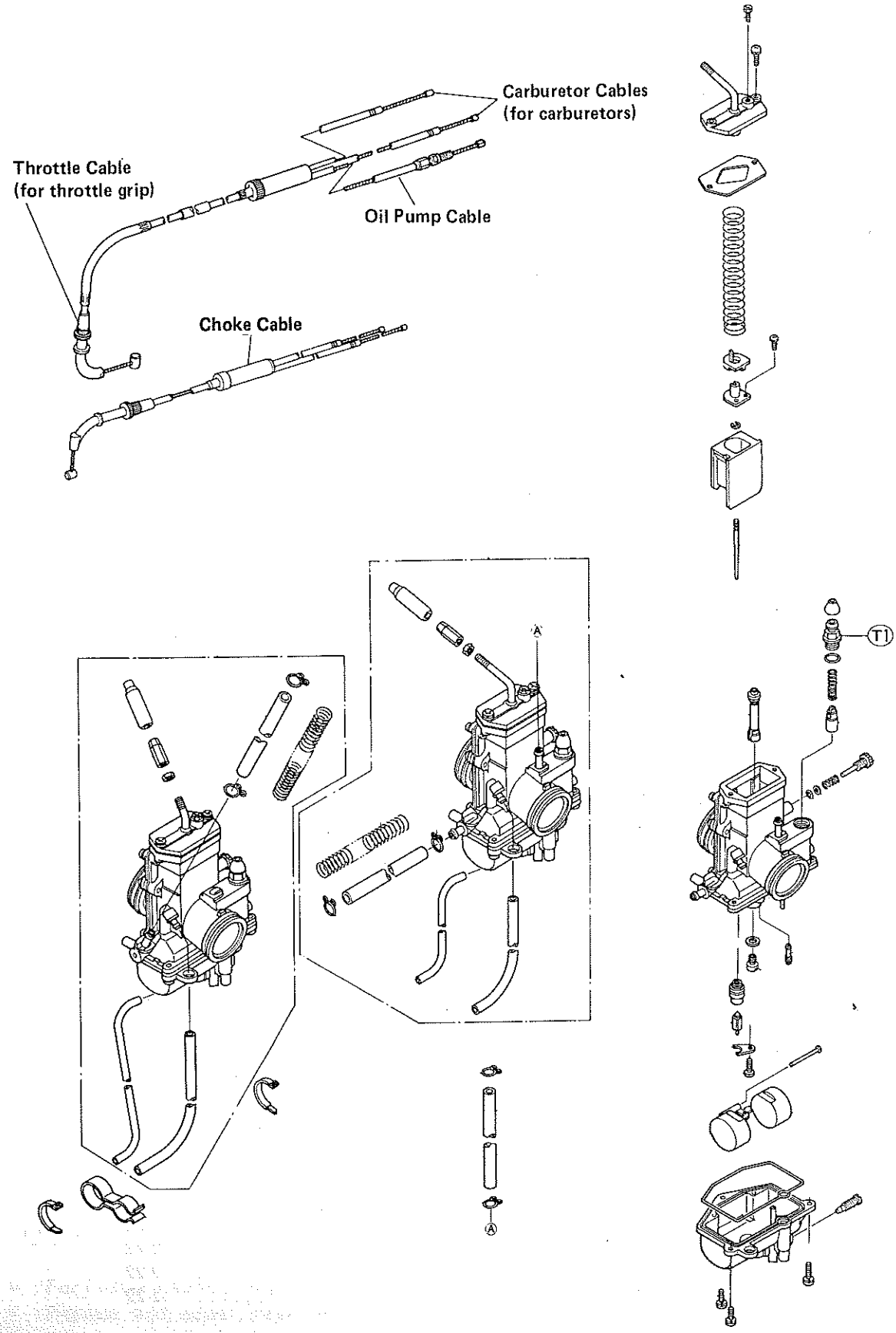
Fuel System

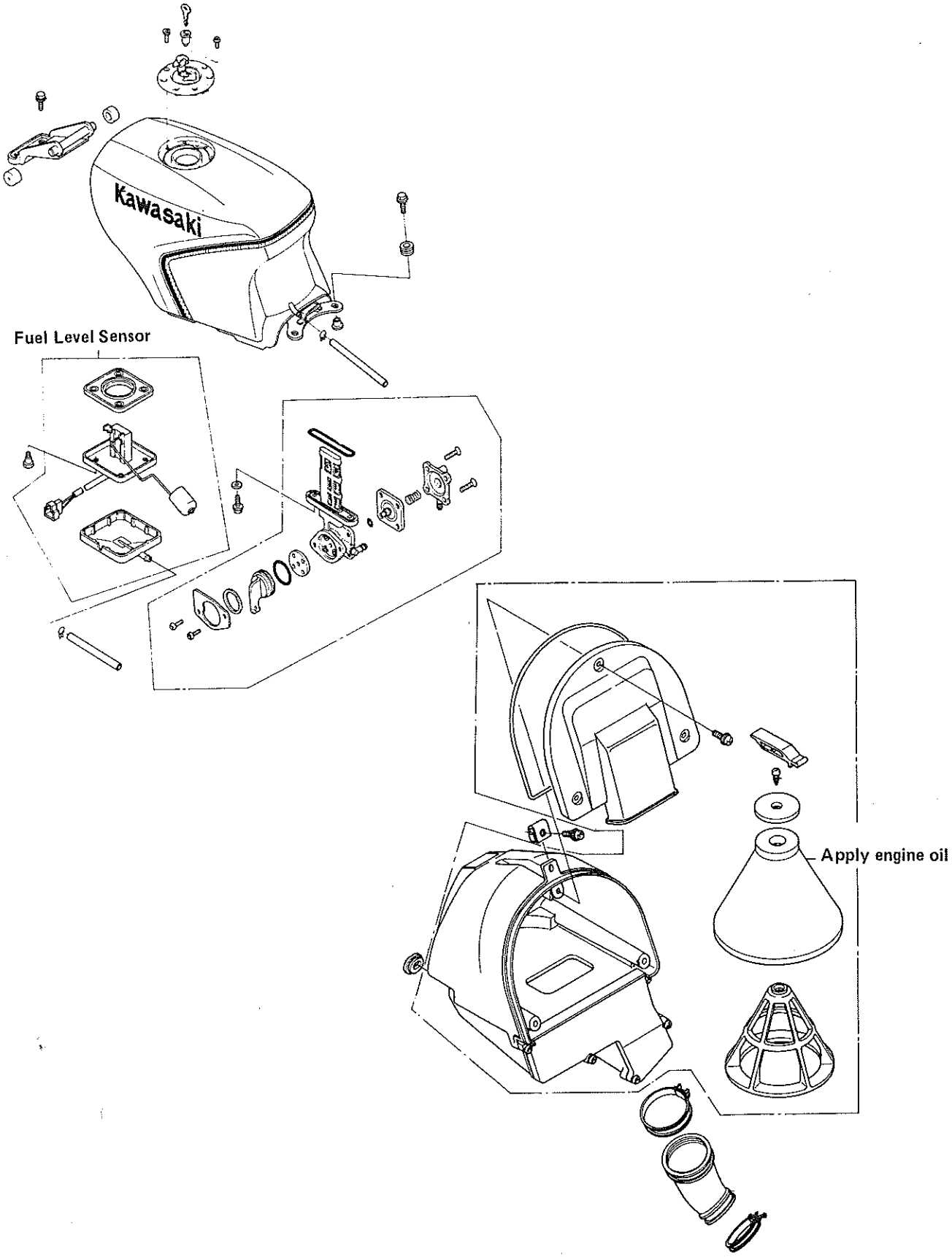
Table of Contents

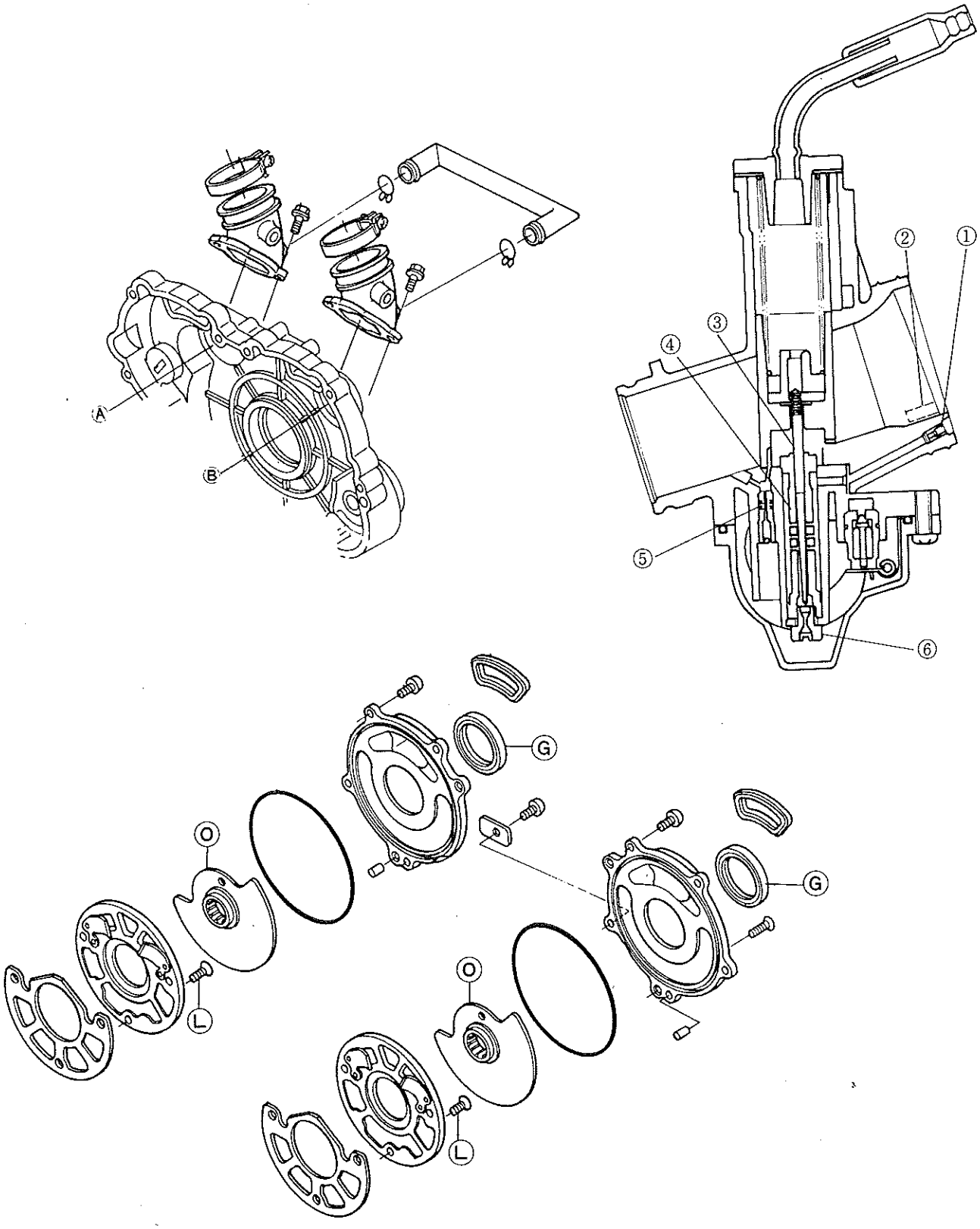
Exploded View 2-2
Specifications 2-5
Special Tools 2-5
Throttle Grip and Cables 2-5
Throttle Grip Play Inspection 2-5
Throttle Grip Play Adjustment 2-6
Throttle Control Cable Removal Note 2-6
Throttle Control Cable Installation Note 2-6
Throttle Control Cable Lubrication 2-6
Throttle Control Cable Inspection 2-7
Choke Cable 2-7
Choke Cable Free Play Inspection 2-7
Choke Cable Adjustment 2-7
Choke Cable Installation 2-7
Choke Cable Lubrication 2-8
Choke Cable Inspection 2-8
Carburetors 2-8
Throttle Valve Idle Opening Adjustment 2-8
Carburetor Synchronization 2-9
Idle Speed Inspection 2-10
Idle Speed Adjustment 2-10
Fuel Level Inspection 2-10
Fuel Level Adjustment 2-11
Float Removal 2-11
Fuel System Cleanliness Inspection 2-11
Carburetor Removal 2-12
Carburetor Installation Notes 2-12
Carburetor Cleaning 2-14
Carburetor Inspection 2-14
Air Cleaner 2-16
Air Cleaner Element Removal 2-16
Air Cleaner Element Installation 2-16
Element Inspection and Cleaning 2-17
Air Cleaner Housing Removal 2-17
Air Cleaner Housing Installation 2-18
Fuel Tank 2-18
Fuel Tank Removal 2-18
Fuel Tap Installation Note 2-19
Fuel Tap Assembly Note 2-19
Fuel Tank and Tap Cleaning 2-19
Fuel Tap Inspection 2-20
Fuel Tank and Cap Inspection 2-20
RRIS (Rotary & Reed Valve Intake System) 2-20
RRIS Removal 2-20
RRIS Installation Notes 2-21
Rotary Valve Cover Assembly Notes 2-21
Rotary Valve Cover Inspection 2-22
Rotary Valve Inspection 2-22
Reed Valve Assembly Inspection 2-22

Exploded View

T1: 2.5 N-m (0.25 kg-m, 22 in-lb)




Kawasaki
Fuel Level Sensor
Apply engine oil



G : Apply a high temperature grease to the internal surface.
L : Apply a non-permanent locking agent to the threads.
O : Apply engine oil to both sides.

1. Main Air Jet
2. Pilot Air Jet
3. Jet Needle
4. Needle Jet
5. Pilot Jet
6. Main Jet

Specifications

Throttle Grip Free Play

Standard:	**2 – 3 mm**

Choke Cable Free Play

Standard:	**2 – 3 mm**

Carburetor Specifications

Make/Type	Mikuni/VM28SS
Main Jet	137.5
Option Main Jet	132.5, 135, 140, 142.5
Main Air Jet	(1.5)
Needle Jet	O – 6
Jet Needle	5DH2-4
Jet Needle Clip Position	4
Pilot Jet	35
Starter Jet	70
Service Fuel Level	4 ±1 mm
Float Height	21 ±2 mm

Idle Speed

Standard: 1,300 ±100 r/m (rpm)

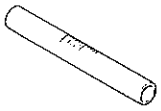
Air Cleaner Element Oil

Grade:	**SE class**
Viscosity	**SAE30**

Special Tools

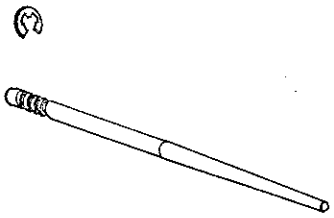
Along with common hand tools, the following more specialized tools are required for complete fuel system servicing.

Fuel Level Gauge: 57001-1017



Needles (2 sets)

Jet needle:	**16009-1051**
Circlip:	**16008-010**



Throttle Grip and Cables

The throttle grip controls the throttle valves and oil pump. If the throttle grip has excessive play due to either cable stretch or maladjustment, it will cause a delay in throttle response, especially at low engine speed and upset the oil pump synchronization. Also, the throttle valve may not open fully at full throttle. On the other hand, the throttle grip has no play, the throttle will be hard to control, and the idle speed will be hard erratic.

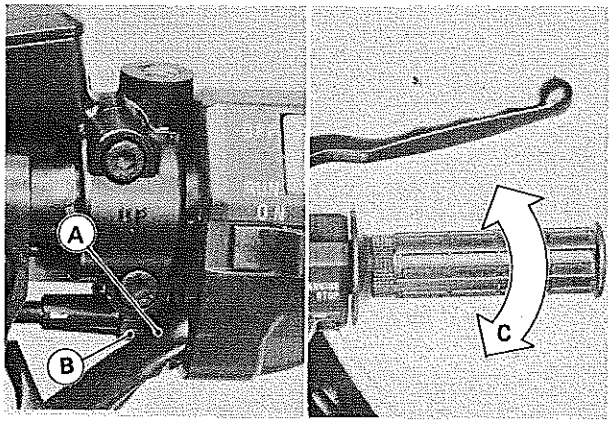
Throttle Grip Play Inspection

●Check throttle grip free play.

★If free play is not correct, adjust the throttle cable.

Throttle Grip Free Play

2 – 3 mm



A. Locknut
B. Adjusting Nut
C. Throttle Grip Free Play

★If the free play is correct, make the following test:
●Start the engine.
●Turn the handlebar from side to side while idling the engine.
★If idle speed varies, the throttle control cable may be poorly routed or it 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.**

Throttle Grip Play Adjustment

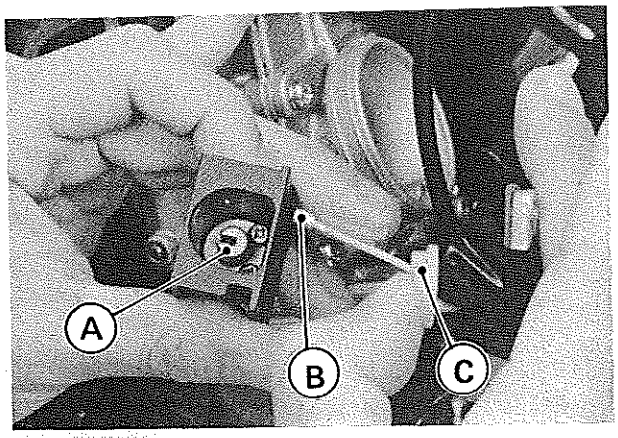
NOTE

○*If throttle grip play is adjusted, check the oil pump.*

●Loosen the locknut at the upper end of the throttle control cable.
●Turn the adjuster until throttle grip free play is correct. Turning the adjusting nut OUT (lengthening the adjusting nut) will reduce play.
●Tighten the locknut.
●Start the engine.
●Turn the handlebar from side to side while idling the engine.
★If idle speed varies, the cable may be poorly routed or it may be damaged.
●Correct any problem before operating the motorcycle.

Throttle Control Cable Removal Note

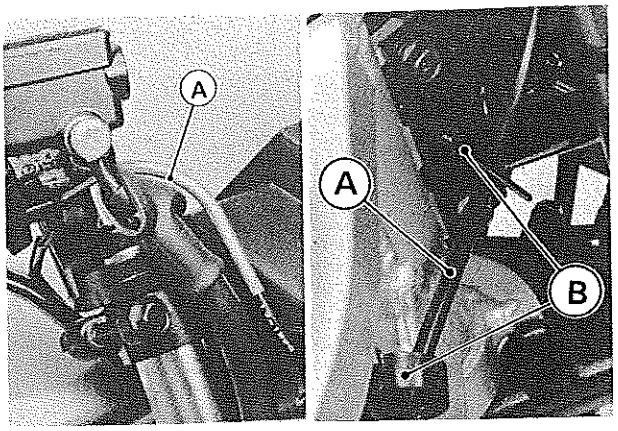
●Remove each carburetor cap.
●Lift up each throttle valve with the needle and spring installed.
●Pull off each plastic cable retainer.
●Slip the carburetor cable ends out of the cable hooks.



A. Cable Hook
B. Cable End
C. Retainer

Throttle Control Cable Installation Note

●Run the cable into the clamps on the headpipe right side.



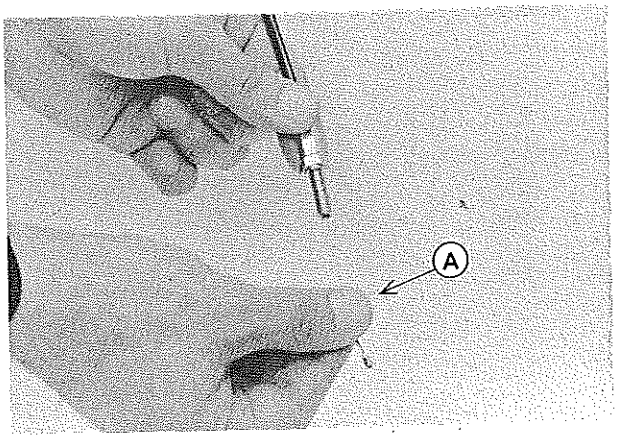
A. Throttle Cable
B. Clamps

WARNING

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

Throttle Control Cable Lubrication

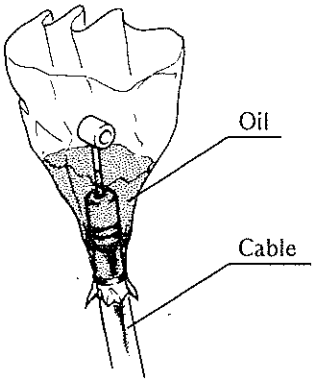
Whenever the cable is removed, and in accordance with the Periodic Maintenance Chart (see General Information chapter), perform the following.
●Apply a thin coating of grease to the cable lower end.



A. Apply grease.

●Lubricate the cable by seeping the oil between the cable and cable housing.

Cable Lubrication



Throttle Control Cable Inspection

- With the throttle cable disconnected at both ends, the cable should move freely within the cable housing.

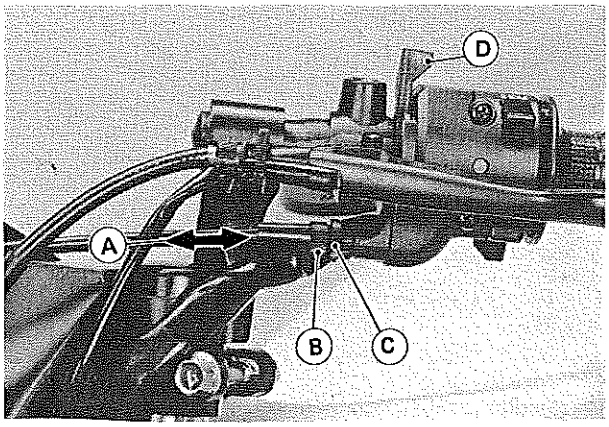
Choke Cable

Choke Cable Free Play Inspection

- Check that the choke lever returns properly and that the inner cable slides smoothly.

★If there is any irregularity, check the choke cable as following:

- Push the choke lever back all the way to its released position.
- Determine the amount of choke cable play at the adjusting nut of the choke cable. Pull out and push in the cable housing; the amount of cable travel is the amount of cable free play.



A. Play
B. Adjusting Nut
C. Locknut
D. Choke Lever

★If free play is not correct, adjust the choke cable.

Choke Cable Free Play

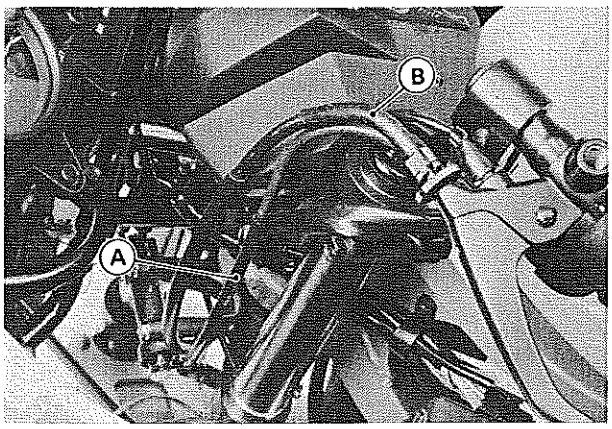
2 – 3 mm

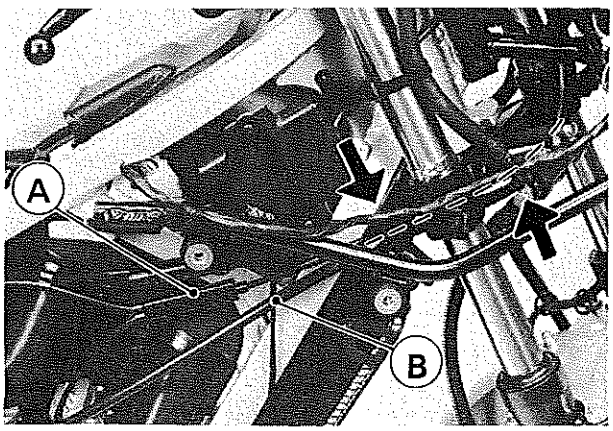
Choke Cable Adjustment

- Loosen the locknut at the adjusting nut of the choke cable, and turn the adjusting nut until the cable has the proper amount of play.
- Tighten the locknut after adjustment.

Choke Cable Installation

- Run the choke cable along with the clutch cable from the left side of the headpipe, to the bottom of the fork underbracket and to the left of the radiator cap.





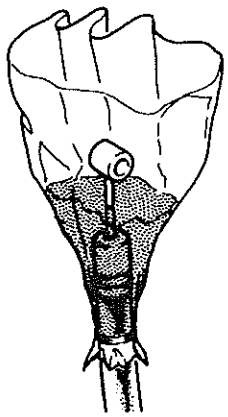
A. Choke Cable
B. Clutch Cable

Choke Cable Lubrication

Whenever the choke cable is removed, lubricate the choke cable as follows.

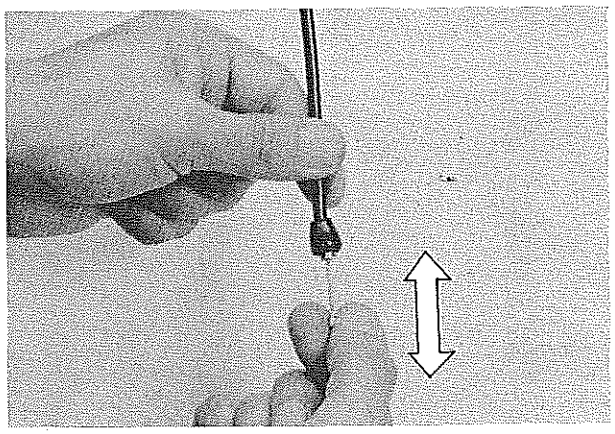
●Lubricate the choke cable by seeping the oil between the cable and cable housing.

Cable Lubrication



Choke Cable Inspection

●With the choke cable disconnected at the both ends, the cable should move freely within the cable housing.



★If cable movement is not free after lubricating (see Choke Cable Lubrication), if the cable is frayed, or if the housing is kinked, replace the cable.

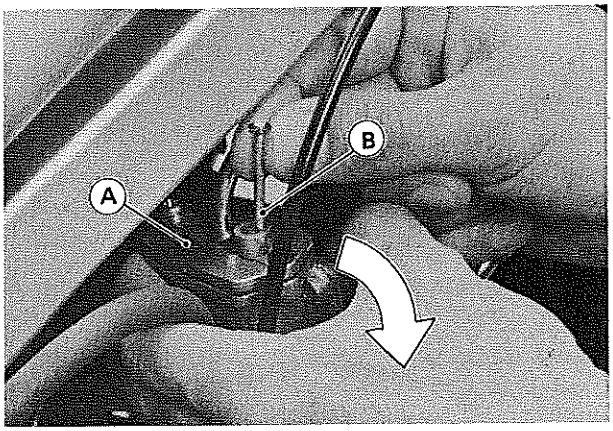
Carburetors

Throttle Valve Idle Opening Adjustment

○Adjust the throttle stop screw with the engine stopped in the following manner

●Remove the carburetor cap plugs and insert a needle (special tool) into each cap hole.

○With the rear carburetor installed, the needle may be inserted by twisting the carburetor a little outward.

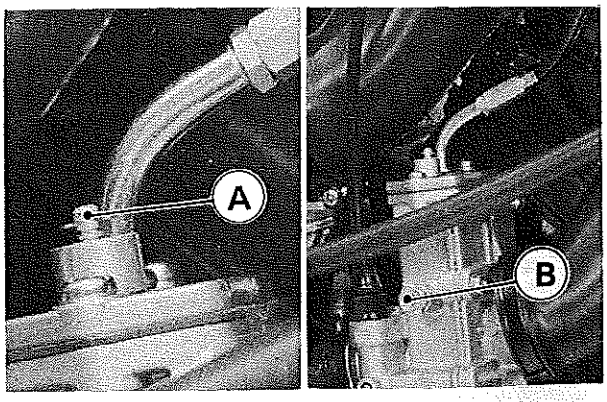


A. Rear Carburetor B. Needle

●Loosen the locknut at the upper end of the throttle cable.

●Screw in the adjusting nut to give the throttle grip ample play.

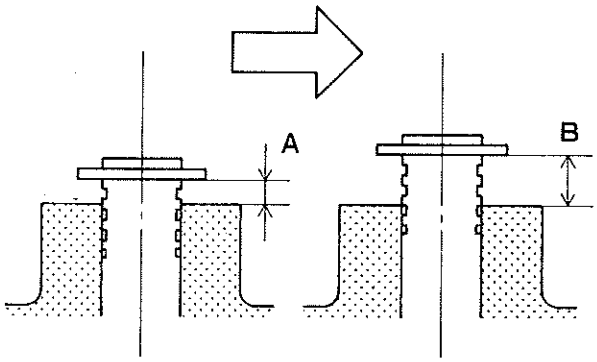
●With the throttle grip fully closed, turn each throttle stop screw in until each throttle valve bottoms out.



A. Needle:
Jet Needle : 16009-1051
Circlip : 16008-010
B. Throttle Stop Screw

•Measure each needle circlip height from the cap by inserting the thickness gauge.
•Turn each throttle stop screw in until each needle sticks **1.2 mm** further out from the valve closed position as shown. This presets the throttle valve opening at idle.

Throttle Valve Idle Opening



A : Valve Closed Position
B : Adjusted Position
B – A = 1.2 mm

NOTE

○*When measuring the needle height with a thickness gauge, hold the needle lightly to suppress needle movement.*
○*When the engine is broken in completely, reduce the throttle valve idle-opening.*

Throttle Valve Idle Opening

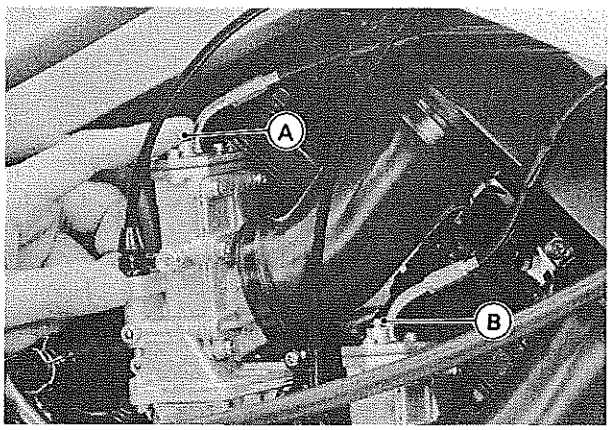
1.2 mm for new engine
1.1 mm for engine broken in

Carburetor Synchronization

Carburetor synchronization is an important part of idle adjustment.
•Check to see that both needle start rising together with a slight motion of the throttle grip.

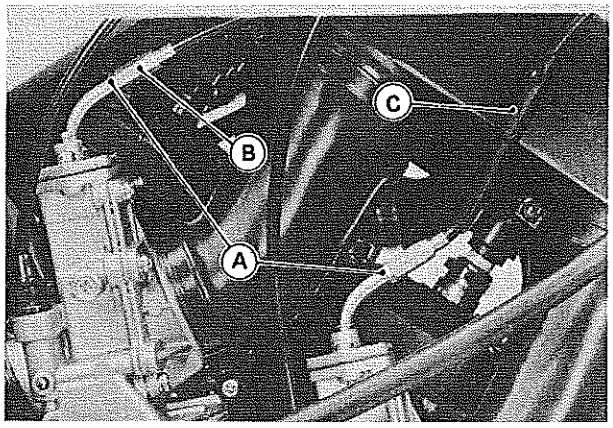
NOTE

○*Hold one of the needle top with finger pressure, and watch the other while turning the throttle grip gradually. This makes it easy to check the synchronization.*



A. Hold the needle top with finger pressure.
B. Watch the needle movement

★If the carburetor cables are maladjusted, adjust the cables as follows.
(1) Screw in the rear cable adjuster fully after loosening the locknut. The adjuster cover is easily slipped off by applying a soap and water solution.



A. Locknuts
B. Rear Cable Adjuster
C. Covers

(2) Adjust the front cable adjuster so that both needles start moving together.
(3) Tighten the locknut after adjustment.

•Adjust the throttle grip play.

NOTE

○*If the throttle grip play cannot be adjusted with the adjusting nut at the grip, turn in the front and rear carburetor adjusters evenly. Then, check the carburetor synchronization and adjust them if necessary.*

•Check the oil pump (see Carburetor and Oil Pump Synchronization in Engine Lubrication chapter).
•Pull out the needles and tighten the cap plugs.

Idle Speed Inspection

•Start the engine and warm it up thoroughly.
•With the engine idling, turn the handlebar to both sides.
★If handlebar movement changes the idle speed, the throttle cable may be improperly adjusted or incorrectly routed, or it may be damaged. Be sure to correct any of these conditions before riding.

WARNING

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

•Check idle speed.
★If the idle speed is correct, slide back the dust covers.

Idle Speed

1,300 ±100 r/min (rpm)

★If the idle speed is out of the specified range, adjust it as following.

Idle Speed Adjustment

•Stop the engine.
•Readjust the throttle valve idle opening.
★If the idle speed is lower than the specified range, set the valve opening larger than the specification. In the opposite case, set the opening smaller.
○Be sure to equalize the front and rear valve idle-openings.
•Check the carburetor synchronization.
•Check the oil pump synchronization.
•Open and close the throttles a few times to make sure that the idle speed is within the specified range. Readjust if necessary.

Fuel Level 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.**

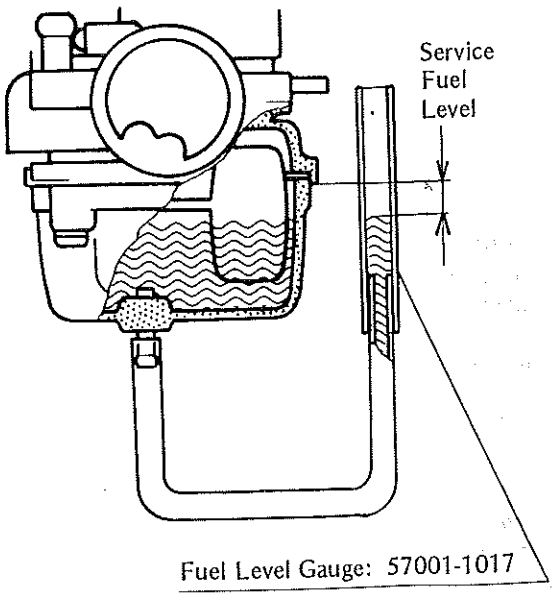
•Remove the carburetors, and hold them in true vertical position on a stand.
•Put the fuel tank on a bench, and connect the fuel tap to the carburetors using a suitable hose.
•Prepare a rubber hose (6 mm in diameter and about 300 mm long).
•Connect fuel level gauge 57001-1017 to the carburetor float bowl with the rubber hose.
•Hold the gauge vertically against the side of the carburetor body so that the "zero" line is several millimeters higher than the bottom edge of the carburetor body.
•Turn the fuel tap to the PRI position to feed fuel to the carburetor, then turn out the carburetor drain plug a few turns.
•Wait until the fuel level in the gauge settles.
•Keeping the gauge vertical, slowly lower the gauge until the "zero" line is even with the bottom edge of the carburetor body.

NOTE

○*Do not lower the "zero" line below the bottom edge of the carburetor body. If the gauge is lowered and then raised again, the fuel level measure shows somewhat higher than the actual fuel level. If the gauge is lowered too far, dump the fuel out of it into suitable container and start the procedure over again.*

•Read the fuel level in the gauge and compare it to the specification.
•Screw in the carburetor drain plug.
•Turn the fuel tap to the ON position and remove the fuel level gauge.
•Inspect the fuel level in the another carburetors in the same manner.
★If the fuel level is incorrect, adjust it (see Fuel Level Adjustment).

Service Fuel Level



Fuel level

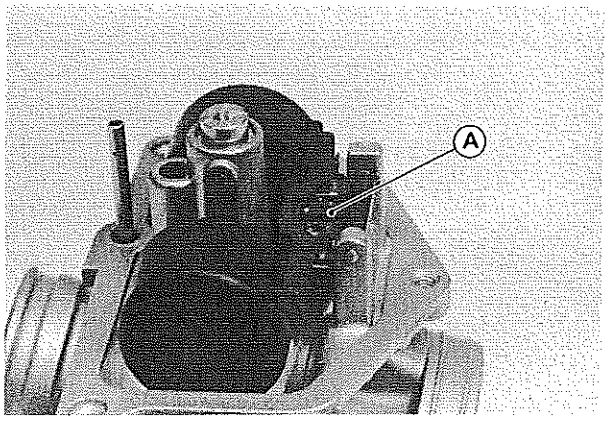
4.0 ±1 mm below the bottom edge of carburetor body

Fuel Level Adjustment

- Read the WARNING in the Fuel Level Inspection.
- Drain fuel from the carburetors into a suitable container.
- Remove the float bowl by taking out the screws with lockwashers.
- Bend the tang on the float arm very slightly to change the float height. Increasing the float height lowers the fuel level and decreasing the float height raises the fuel level.

Float Height

21.0 ±2.0 mm

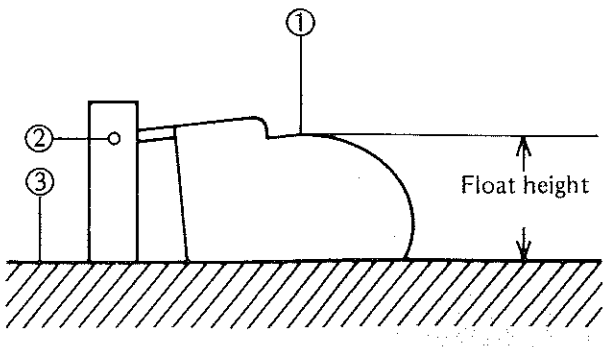


A. Tang

- Assemble the carburetor, and recheck the fuel level.

★If the fuel level cannot be adjusted by this method, the float or the float valve is damaged.

Float Height Measurement



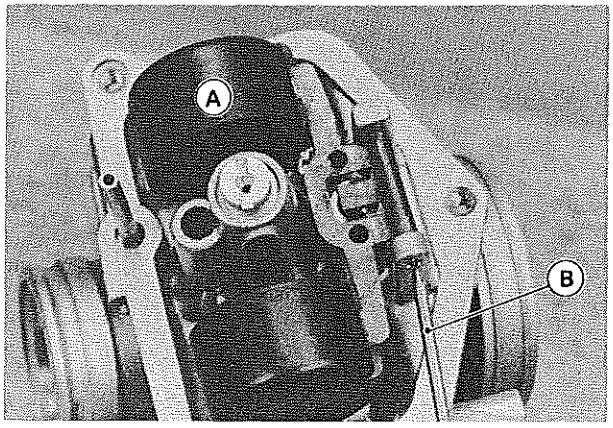
1. Float
2. Pivot pin
3. Float bowl mating surface

NOTE

○*Float height is the distance from the float bowl mating surface of the carburetor body (with the gasket removed) to the top of the float. Measure the height with the carburetor upside down.*

Float Removal

- Drive out the pivot pin and remove the float.



A. Pivot Pin B. Drive out the pin

Fuel System Cleanliness Inspection

WARNING

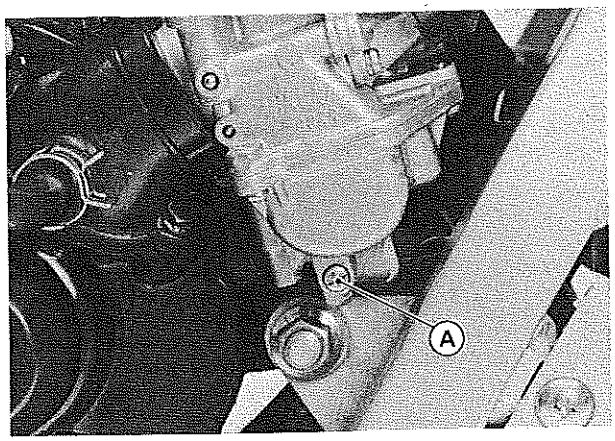
○**Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.**

○**Make sure the engine is cold before working. Wipe any fuel off the engine before starting it.**

- Turn the fuel tap to the PRI to drain the fuel into the suitable container.
- Turn out each drain plug a few turns and drain the carburetors, and check to see if water or dirt comes out.

★If any water or dirt comes out, clean the carburetors and the fuel tank.

- Tighten the drain plugs securely.



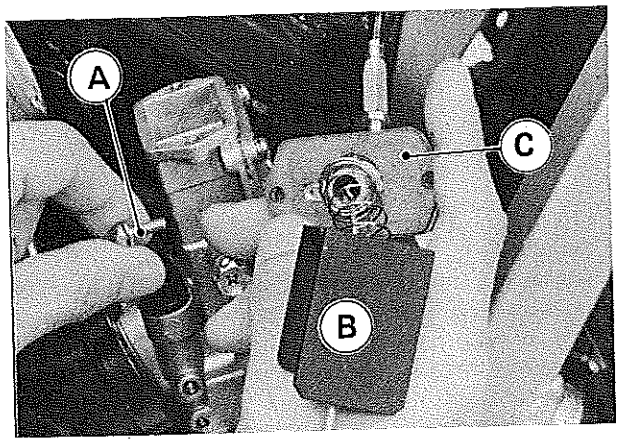
A. Drain Plugs

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 carburetor cap.
●Lift up the throttle valve with the needle and spring installed.



A. Cap Mounting Screws
B. Throttle Valves
C. Cap

●Turn the fuel tap to the ON or RES position to stop fuel flow and pull the fuel hoses off the tap.
●Loosen the clamps and remove the ducts.
●Remove the carburetors.

●After removing the carburetors, stuff pieces of lint-free, clean cloths into the carburetor holders and the intake ducts to keep the dirt out of the engine and air cleaner.

WARNING

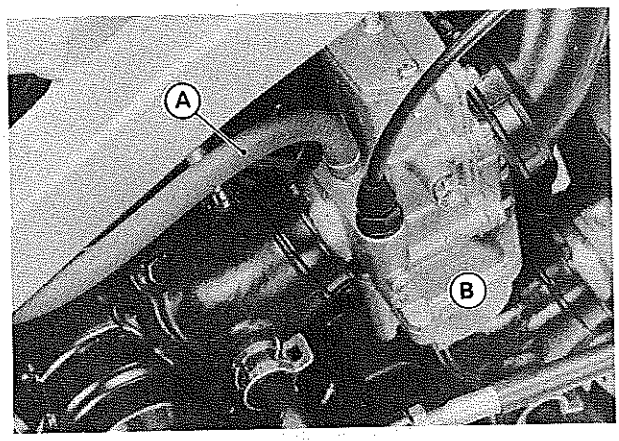
○If dirt or dust is allowed to pass through into the carburetors, the throttle may become stuck, possibly causing an accident.

CAUTION

○If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.
○If the throttle valves are not removed from the cables, wrap clean cloths around the throttle valves to avoid damaging to them.

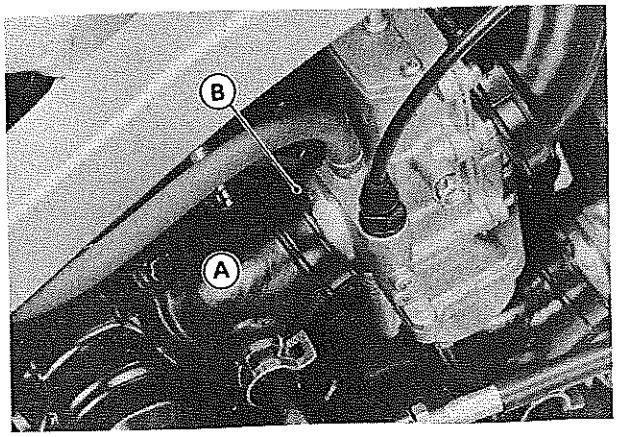
Carburetor Installation Notes

○The rear carburetor has a vacuum hose to the fuel tap.



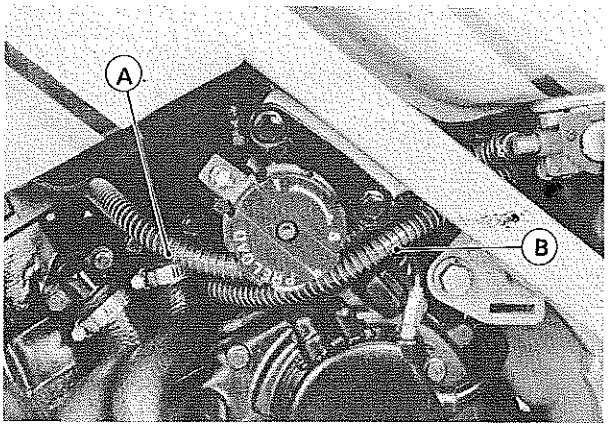
A. Vacuum Hose
B. Rear Carburetor

●Fit the ridge into the notch on the carburetor holders.



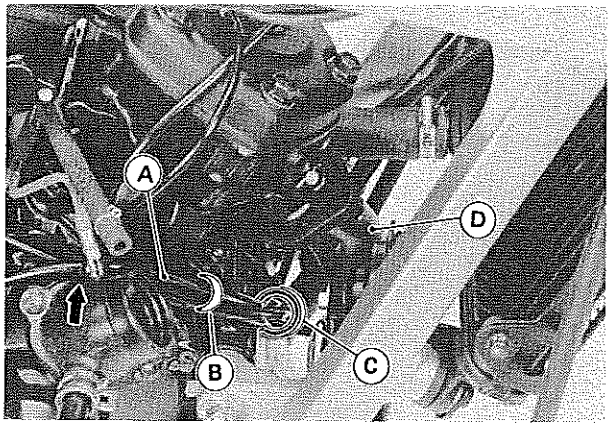
A. Holder
B. Ridge

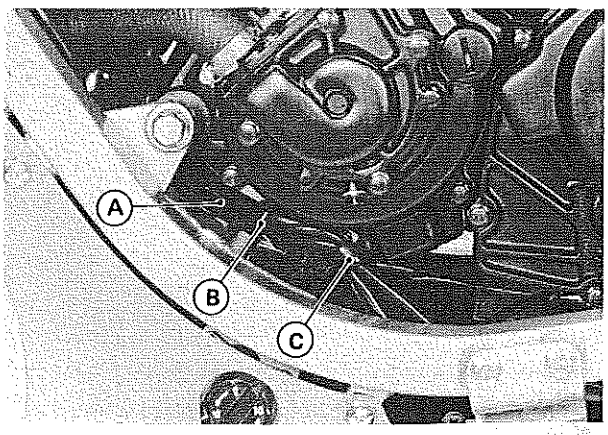
●Route the fuel hoses between the cylinders.



A. Upper Fuel Hose for front
B. Lower Fuel Hose for rear

●Route the carburetor vent tubes, overflow tubes, and the crankcase breather tube into the clamps, then bind them with the bands.



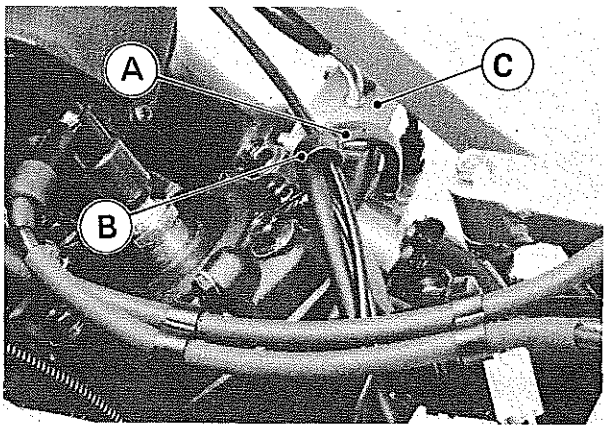


A. Tubes
B. Bands
C. Clamp
D. Muffler

CAUTION

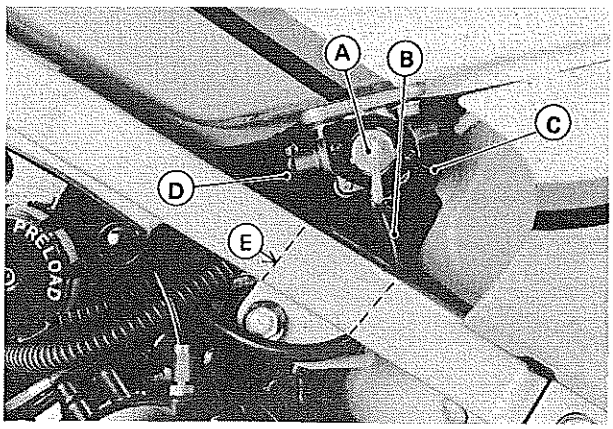
○Be sure to route and bind the tubes as shown to avoid their being burned by the muffler.
○Keep the tubes free of obstruction, and make sure they do not get pinched by the bands or clamps.

●Run the vacuum hose and the oil pump cable into the cylinder head clamp. After running it under the frame crosspipe, put the hose onto the fuel tap.



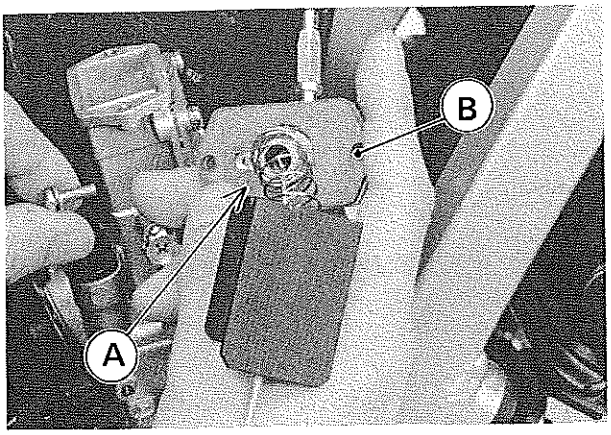
A. Vacuum Hose
B. Clamp
C. Rear Carburetor

●Install each hose to the fuel tap as shown.



A. Fuel Tap
B. Vacuum Hose
C. Fuel Hose for rear
D. Fuel Hose for front
E. Crosspipe

●Install each cap gasket so that it meets with the cap hole.



A. Hole B. Gasket

●Install the ducts.
●After installing the carburetors, perform the following.
○Check fuel leakage from the carburetors.

WARNING

○Fuel spilled from the carburetors is hazardous.

○Adjust the following item.
Idle speed
Throttle cable
Choke cable
Oil pump cable

Carburetor Cleaning

WARNING

○Clean the carburetors 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 carburetors.

CAUTION

○Do not use compressed air on an assembled carburetor, the float lever may be deformed by the pressure
○Remove as many rubber or plastic parts from the carburetor as possible before cleaning the carburetor with a cleaning solution. This will prevent damage or deterioration of the parts.
○DO NOT use a strong carburetor cleaning solution which could attack the plastic parts; instead, use a mild high flash-point cleaning solution safe for plastic parts.
○Do not use wire or any other hard instrument to clean carburetor parts, especially jets, as they may be damaged.

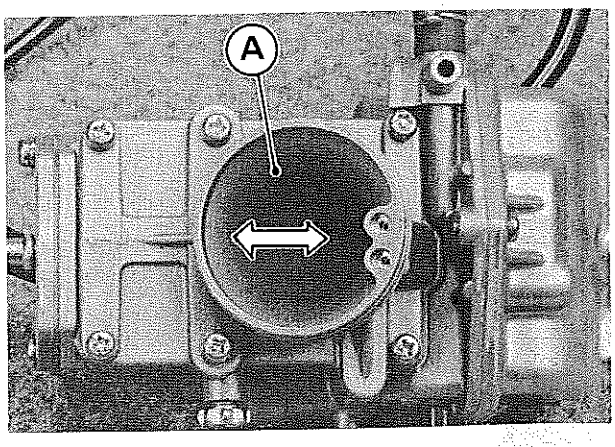
●Disassemble the carburetor.
●Immerse all the metal parts in a carburetor cleaning solution.
●Rinse the parts in water.
●When the parts are clean, dry them with compressed air.
●Blow through the air and fuel passages with compressed air.
●Assemble the carburetor.

Carburetor Inspection

WARNING

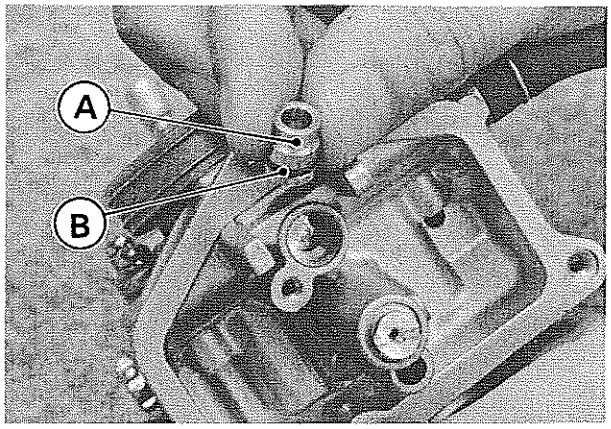
○Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

●Remove the carburetor.
●Before disassembling the carburetor, check the fuel level (see Fuel Level Inspection).
★If the fuel level is incorrect, inspect the rest of the carburetor before correcting it.
●Pull the carburetor cable to check that the throttle valve moves smoothly and return back with the spring tension.
★If the throttle valve does not move smoothly. Replace the carburetor.

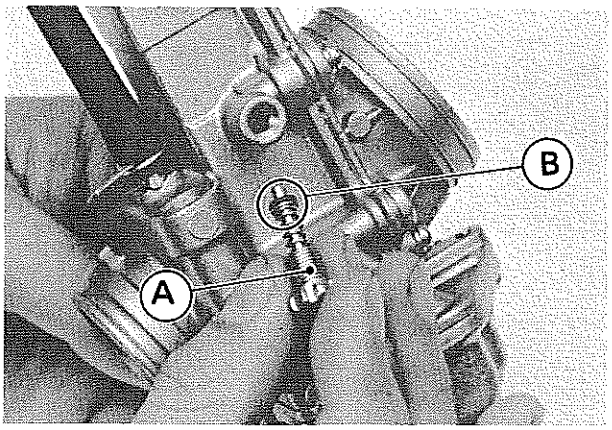


A. Throttle Valve

●Disassemble the carburetors.
●Clean the carburetor and check the parts as follows.
●Remove the float valve needle.
●Pull out the float valve seat.



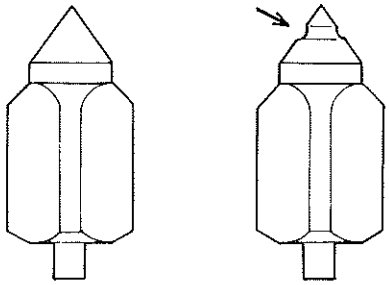
A. Valve Seat B. O-Ring



A. Throttle Stop Screw B. O-Ring

●Check the float valve needle and valve seat for wear.
★If the needle is worn as shown in the figure or the seat is worn, replace the valve needle and valve seat as a set.

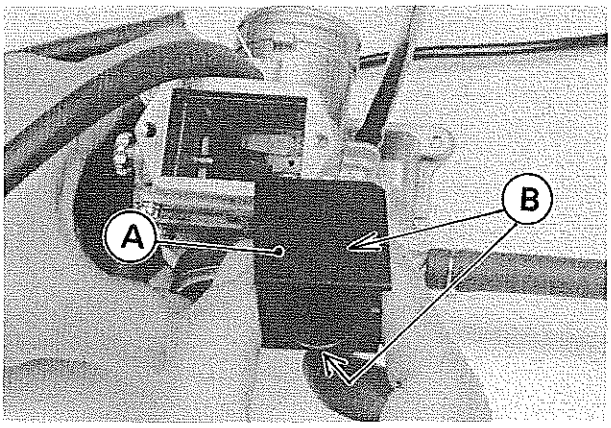
Valve Needle Wear



Good Bad

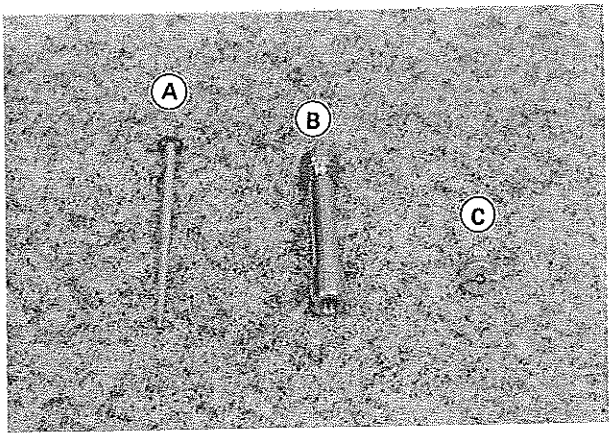
●Push the rod in the valve needle, then release it.
★If the rod does not spring out, replace the valve needle and valve seat as a set.
●Check the O-ring on the float valve seat for damage.
★If the O-ring is damaged, replace the O-ring and the float valve as a set.
●Check the throttle stop screw O-ring for damage.
★If the O-ring is damaged, replace it.

●Check the pilot jet for any damage.
★If the pilot jet is damaged, replace it with new one.
●Remove the throttle valve and jet needle.
●Inspect the outside of the throttle valve for scratches and abnormal wear.
★If the valve is badly scratched or worn, replace it.
●Inspect the inside of the carburetor body for these same faults.
●If it is badly scratched or worn, replace the entire carburetor.



A. Throttle Valve B. Sliding Surface

●Remove the main jet, and then press out the needle jet using a suitable bar (ϕ8 mm).
●Check the jet needle and needle jet for wear.
★A worn needle jet or jet needle should be replaced.



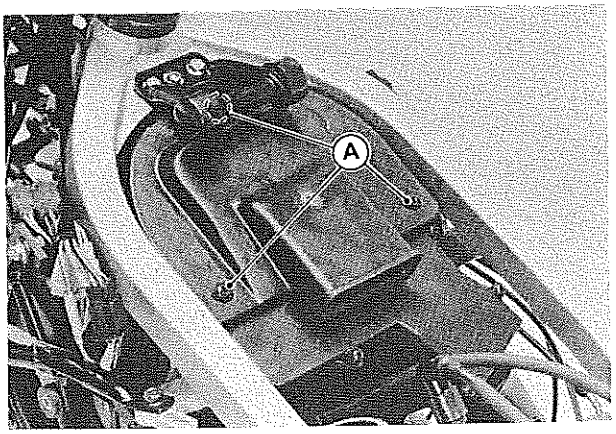
A. Jet Needle
B. Needle Jet
C. Main Jet

•Disassemble the carburetor , and clean the fuel and air passages with a high flash-point solvent and compressed air.

Air Cleaner

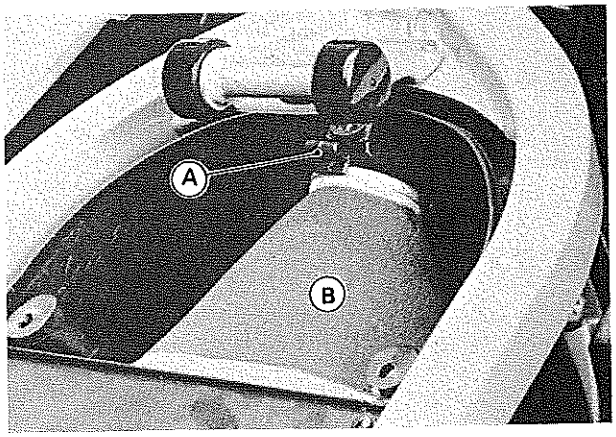
Air Cleaner Element Removal

•Remove the fuel tank.
•Remove the air cleaner cover by taking out the screws.



A. Screws

•Pull out the air cleaner element holder, and take off the element.



A. Element Holder
B. Element

•Push a clean, lint-free towel into the air cleaner housing to keep dirt or other foreign material from entering.

WARNING

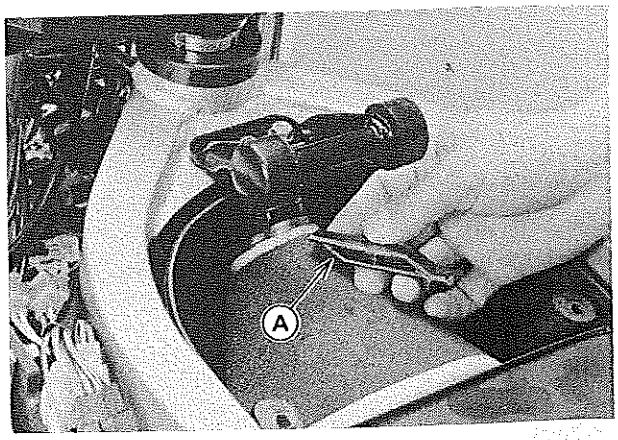
○**If dirt or dust is allowed to pass through into the carburetors, the throttle valves may become stuck, possibly causing an accident.**

CAUTION

○**If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.**

Air Cleaner Element Installation

•Element installation is the reverse of removal. Note the following.
•While pushing down the element against the opening to the ducts, insert the element holder completely with the chamfer facing downward.
○The element holder should be easily installed.



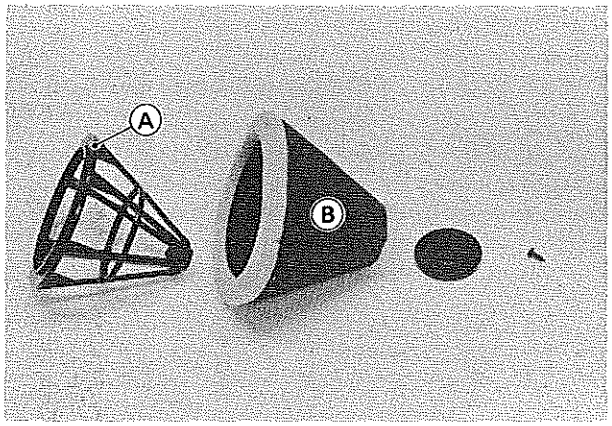
A. Chamfer

Element Inspection and Cleaning

NOTE

○*In dusty areas, the element should be cleaned more frequently than the recommended interval.*
○*After riding through rain or on muddy roads, the element should be cleaned immediately.*

●Remove the air cleaner.
●Disassemble the element and inspect the element parts for damage.
●The damaged part must be replaced or it will allow dirt into the carburetors.

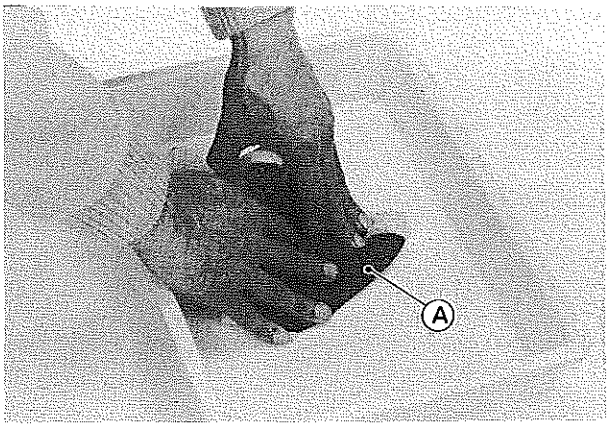


A. Frame B. Filter

WARNING

○**Clean the element in a well-ventilated area, and take care that there is no spark or flame near the working area. Because of the danger of highly flammable liquids, do not use gasoline or low flashpoint solvents to clean the element.**

●Clean the element in a bath of a high flash-point solvent, and then dry it with compressed air or by shaking it.
●After cleaning, saturate the sponge filter with SE class SAE 30 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.

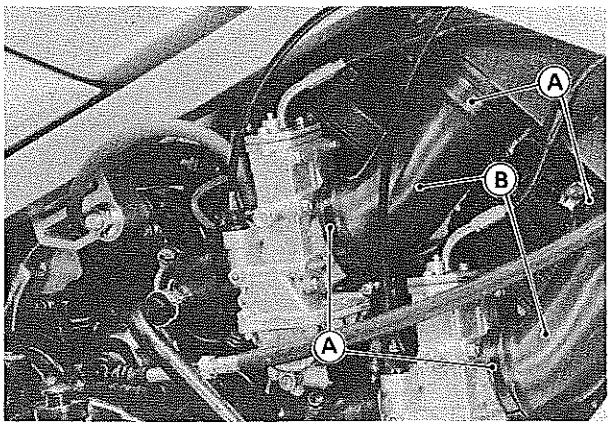


A. Filter

●Assemble the element.
●Install the element.

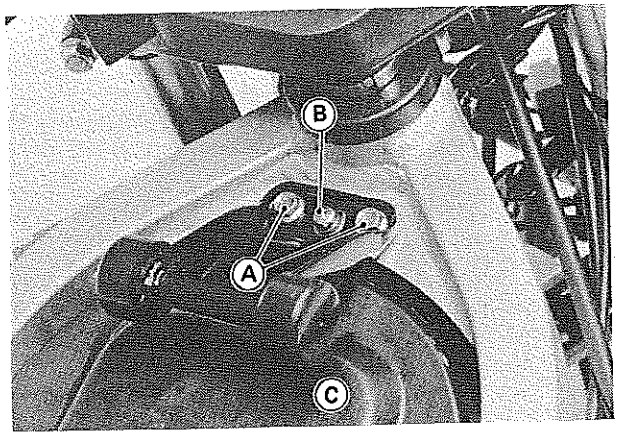
Air Cleaner Housing Removal

●Remove the fuel tank.
●Remove the air cleaner ducts by loosening the lower and upper clamps.



A. Clamps B. Ducts

●Remove the bracket bolts, tank bracket, and then the housing mount screws.

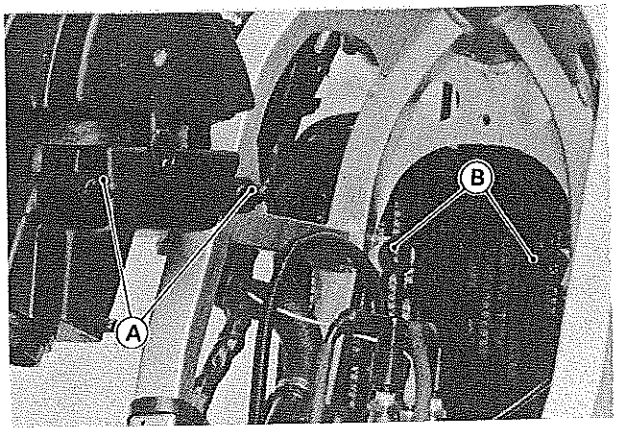


A. Bracket and Bolt
B. Screw
C. Air Cleaner Housing

●Take the housing off.

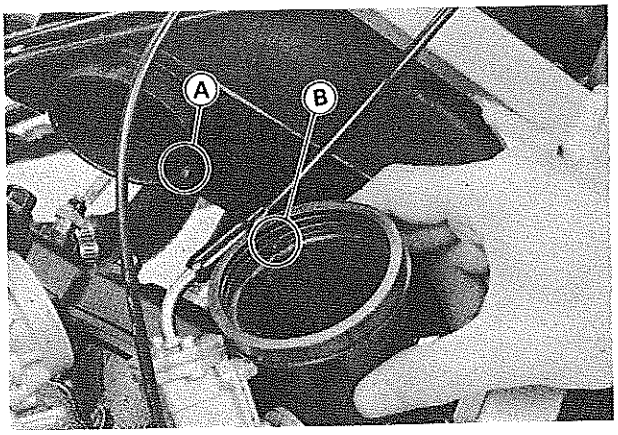
Air Cleaner Housing Installation

●While fitting the housing projections into the dampers, mount the air cleaner housing on the frame.



A. Projection
B. Damper

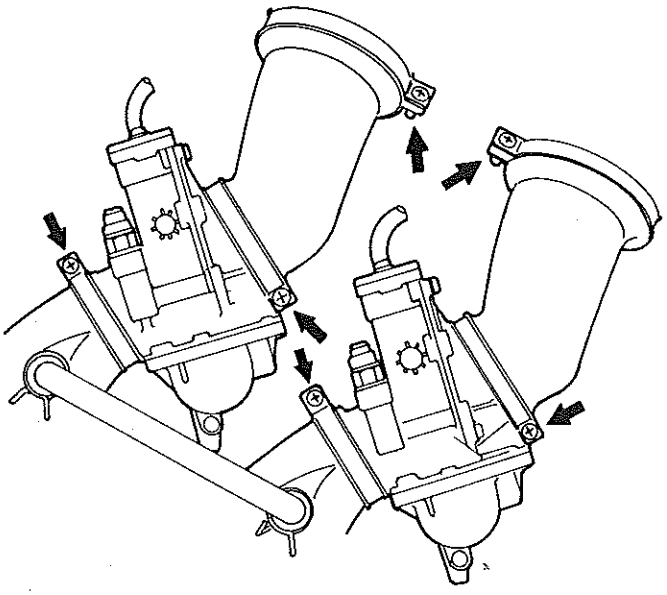
●Install the tank bracket and tighten the bolts and the screw.
●Fit the duct projection onto the housing outlet recess.
○These two ducts are identical.



A. Housing Outlet Recess B. Duct Projection

●Insert the ducts onto the carburetor outlets being careful of the clamp screw positions.
●Tighten the clamp screws.

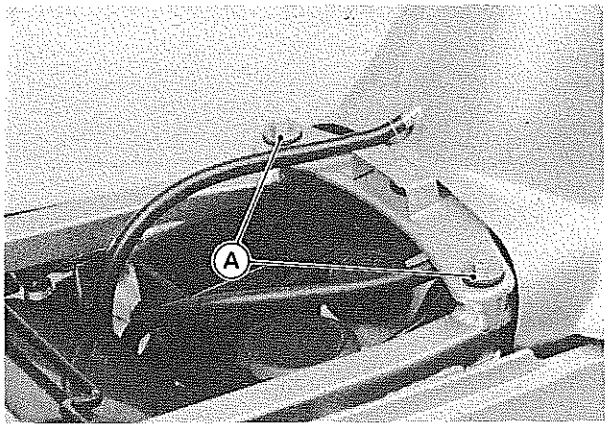
Clamp Screw Position



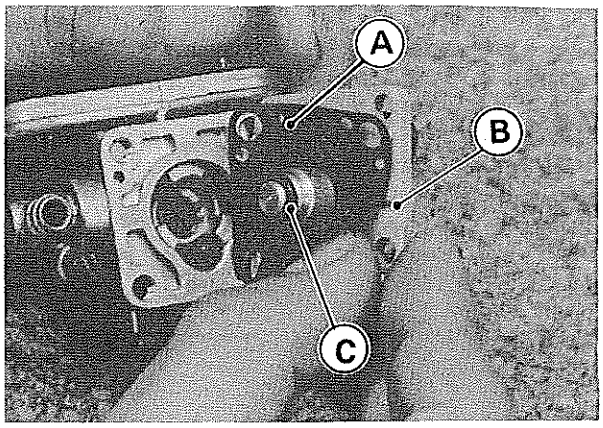
Fuel Tank

Fuel Tank Removal

●Remove the seat and both side covers.
●Remove the bolts from the rear end of the tank.



A. Bolts



A. Diaphragm Plate B. Groove C.O-ring

- Turn the fuel tap to the ON position to stop the fuel flow.
- Pull the hoses off the tank and tap.

WARNING

○Gasoline is extremely flammable and can be explosive under certain conditions. Turn the engine stop 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.

- Tilt the tank out the rear of the frame.
- Disconnect the fuel level sensor leads.
- Drain the fuel tank.

○Arrange a suitable container under the fuel tank.
○Turn the fuel tap PRI to drain the fuel into the container.

Fuel Tap Installation Note

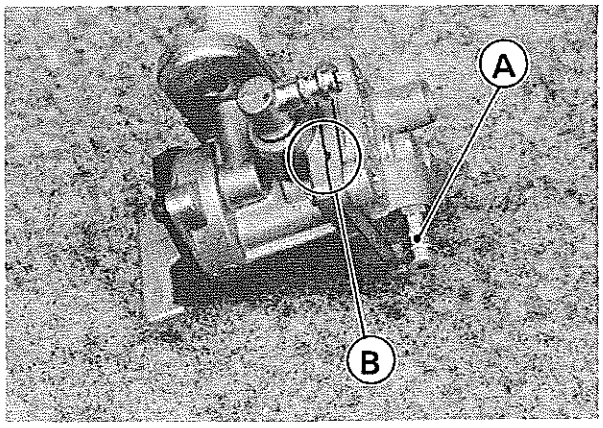
- Be sure the O-ring is in good condition to prevent leaks.
- Be sure to clamp the fuel hose to the tap to prevent leaks.
- Be sure the nylon washers are in good condition to prevent leaks.

○Do not use steel washers in place of the nylon washers, because they will not seal the bolts properly and fuel will leak.

Fuel Tap Assembly Note

- Install the diaphragm plate so that the groove in the plate faces toward the O-ring side.

- Orient the diaphragm plate and cover so that the groove and vacuum hose fitting come to the positions.



A. Vacuum hose fitting B. Groove

Fuel Tank and Tap Cleaning

- Remove the fuel tank and drain it (see Fuel Tank Removal).
- Pour some high flash-point solvent into the fuel tank and shake the tank to remove dirt and fuel deposits.

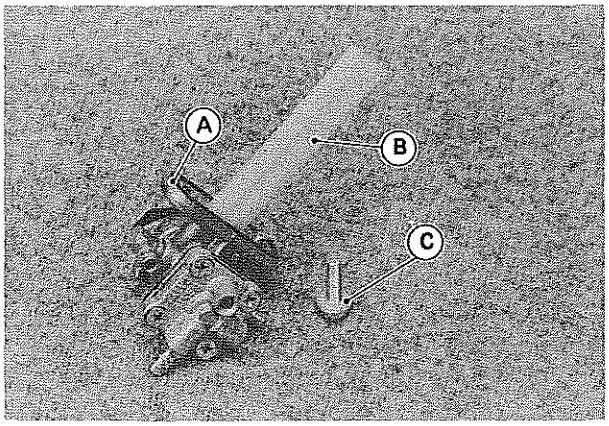
WARNING

○Clean the tank in a well-ventilated area, and take care that there is no spark or flame anywhere near the working area. Because of the danger of highly flammable liquids, do not use gasoline or low flash-point solvents to clean the tank.

- Pour the solvent out of the tank.
- Remove the fuel tap from the tank by taking out the bolts with nylon washers.
- Clean the fuel tap filter screens in a high flash-point solvent.
- Pour high flash-point solvent through the tap in all lever positions.
- Dry the tank and tap with compressed air.
- Install the tap in the tank.
- Install the fuel tank.

Fuel Tap Inspection

- Remove the fuel tap.
- Check the fuel tap filter screens for any breaks or deterioration.



A. O-ring
B. Filter Screens
C. Gasket

★If the fuel tap screens have any breaks or are deteriorated, it may allow dirt to reach the carburetor, causing poor running. Replace the fuel tap.

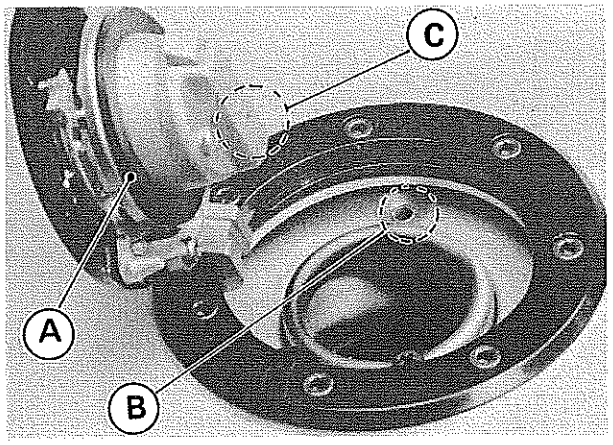
★If the fuel tap leaks, or allows fuel to flow when it is ON or RES without engine running, replace the damaged gasket or O-ring.

Fuel Tank and Cap Inspection

- Visually inspect the gaskets on the tank and cap for any damage.

★Replace the gaskets if they are damaged.

- Check to see if the breather and water drain pipes in the tank is not clogged up.
- Check the tank cap breather too.



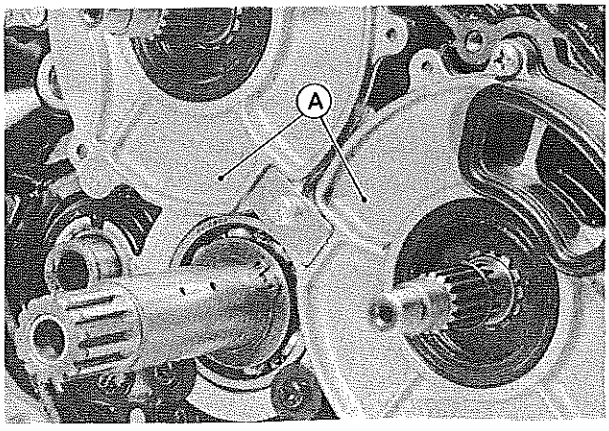
A. Gasket
B. Drain Pipe
C. Breather

★If they are clogged, remove the tank and drain it, and then blow the breather free with compressed air.

RRIS (Rotary & Reed Valve Intake System)

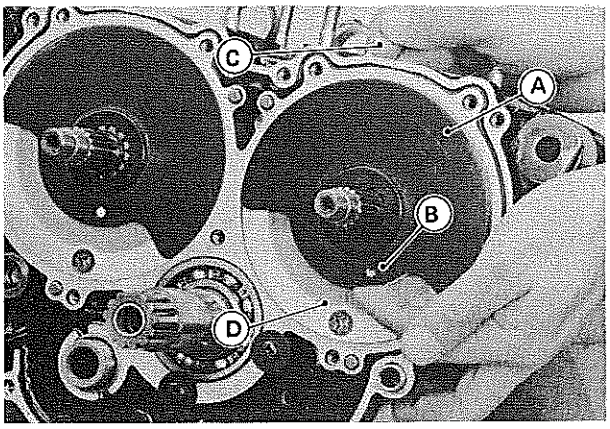
RRIS Removal

- Remove the primary gears (see Primary Gear Removal in Clutch).
- Remove the rotary valve covers.



A. Valve Cover

- Remove the cylinder head and cylinders (see Cylinder Head, Cylinder Removal in Engine Top End).
- Turn the rotary valves so that the valve web is on top as shown.
- Push and pry each rotary valve little by little with your thumbs to remove it.

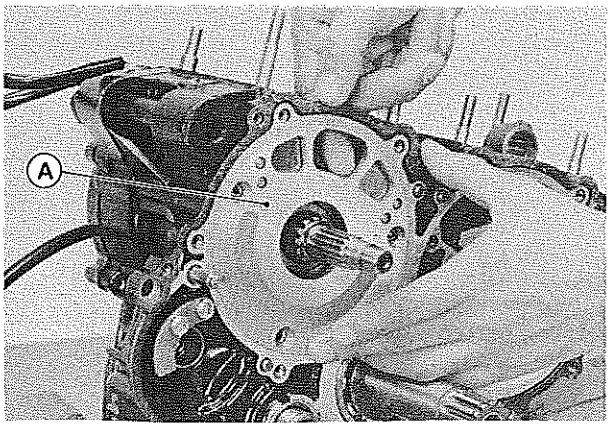


A. Rotary Valve
B. Pry here
C. Web (Push here)
D. Valve Assembly Screws

- Remove the reed valve assembly screws(6).
- Push the valve assembly out evenly with your thumbs to remove it.

CAUTION

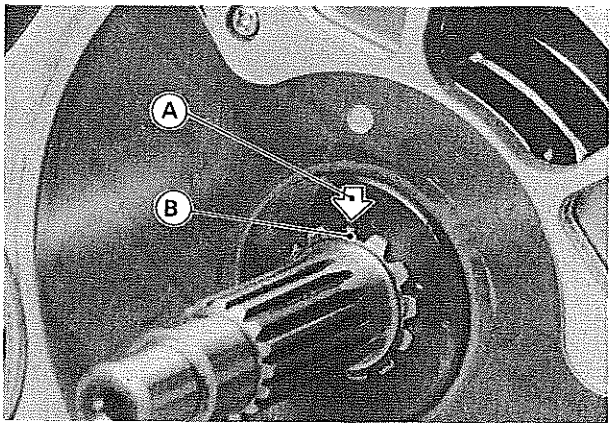
Be careful not to damage or deform the rotary valves and the reed valve assemblies during removal or installation.



A. Reed Valve Assembly

RRIS Installation Notes

- Apply a non-permanent locking agent to the threads of the reed valve assembly screws.
- Apply a thin coat of two-stroke engine oil to both sides of the rotary valve.
- Fit the valve in place so that the indication mark aligns with the notch on the crankshaft spline.

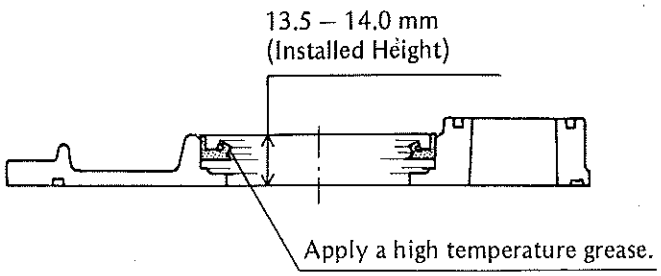


A. Indication Mark
B. Notch

Rotary Valve Cover Assembly Notes

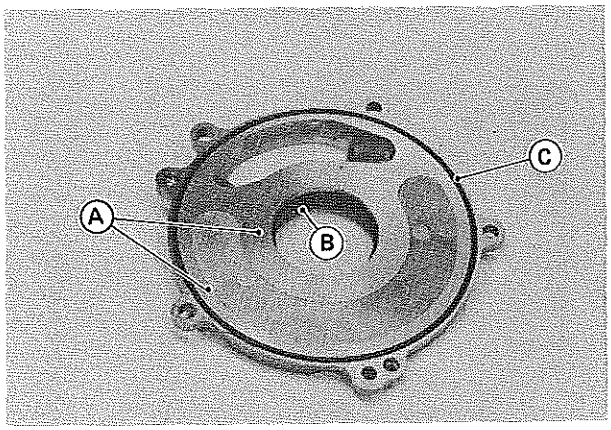
- Press in the oil seal being careful of the installation direction and position as shown.
- Apply a high temperature grease to the oil seal lips.

Oil Seal Installation



Rotary Valve Cover Inspection

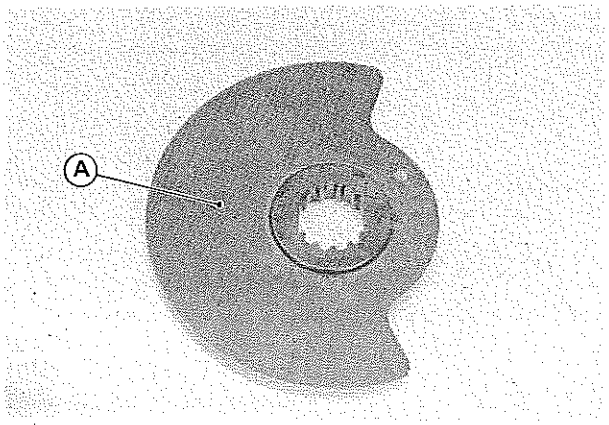
●Visually inspect the oil seal and the O-ring.
★If the lips of the oil seal is deformed, hardened, discolored, or otherwise damaged, replace the oil seal.
★The O-ring should be replaced if damaged.
●Visually inspect the friction surface of each valve cover.
★If it has abrasions or scratches, it should be replaced.



A. Friction Surface
B. Oil Seal
C. O-ring

Rotary Valve Inspection

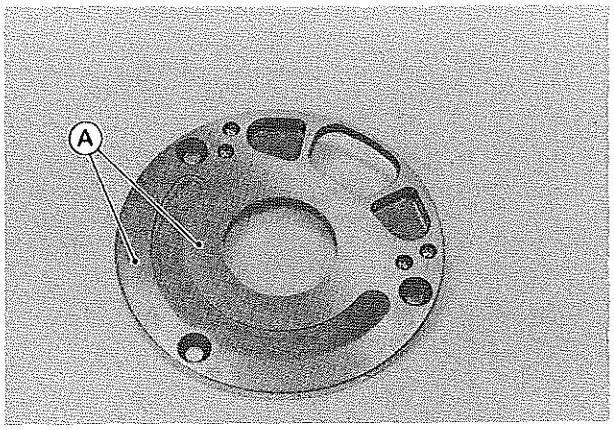
●Visually inspect each rotary valve.
★If the rotary valve is deformed, or excessively worn, replace it.



A. Friction Surface

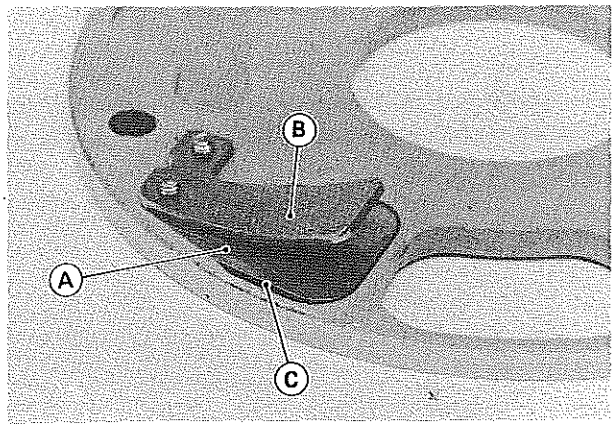
Reed Valve Assembly Inspection

●Visually inspect the friction surface and the reed valves as follows.
★If any of them are damaged, replace the reed valve assembly.
○Abnormal wear of the friction surface.



A. Friction Surface

○Abnormal wear of the reed contact areas: Grooves, scratches, or any signs of rubber coating separation
○Valve stops deformation or cracks

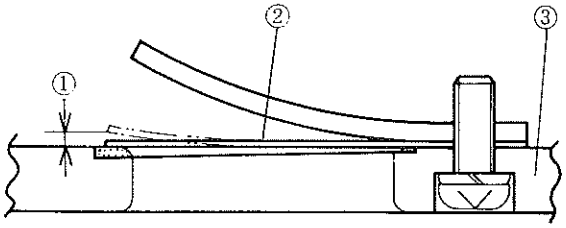


A. Reed
B. Valve Stop
C. Rubber Coating

○Reed cracks, folds, or any other damage
○Excessive reed warp

Reed Warp
Service Limit: **0.2 mm**

Reed Warp (exaggerated for illustration)



1. Warp
2. Reed
3. Reed Valve Holder

○Wavy reed
★If a reed become wavy, replace the valve assembly even if its warp is less than the service limit.

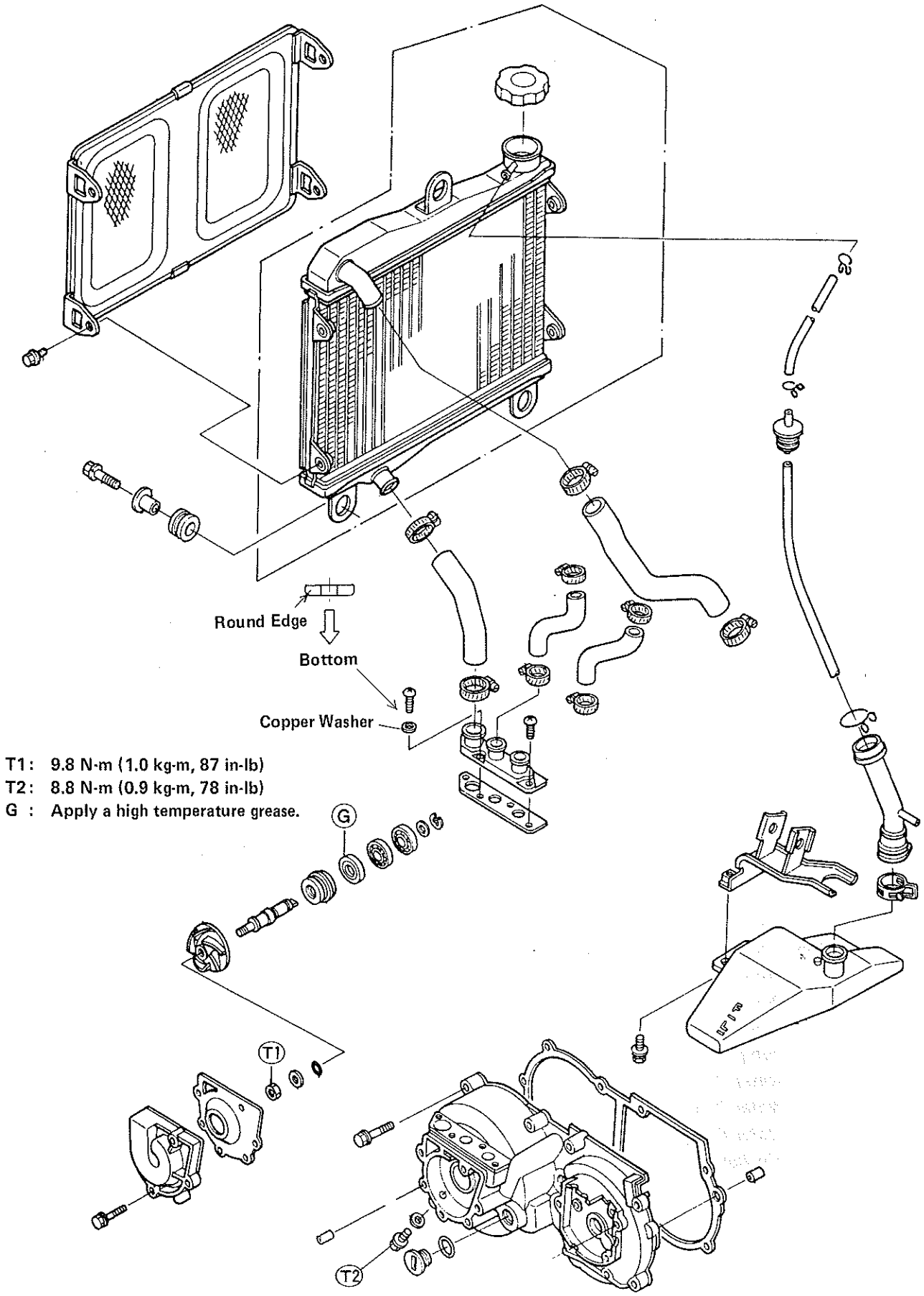
Cooling System

Table of Contents

3

Exploded View 3-2
Specifications 3-3
Coolant 3-4
Coolant Level Inspection 3-4
Coolant Inspection 3-4
Coolant Draining 3-4
Coolant Filling 3-5
Air Bleeding 3-6
Visual Leak Inspection 3-6
Cooling System Pressure Testing 3-6
Cooling System Flushing 3-7
Disassembly and Assembly Precautions 3-7
Radiator 3-7
Radiator Removal 3-7
Radiator Hose, Reservoir Tank Hose Installation Note 3-7
Radiator Hose, Reservoir Tank Hose Inspection 3-8
Radiator Inspection 3-8
Radiator Cleaning Note 3-9
Radiator Cap Inspection 3-9
Thermostat 3-9
Thermostat Installation Note 3-9
Thermostat Inspection 3-10
Water Temperature Sensor 3-10
Removal Caution 3-10
Installation Note 3-10
Inspection 3-10
Water Pump, Mechanical Seal 3-10
Pump Cover Removal 3-10
Pump Housing Inspection 3-11
Pump Impeller Inspection 3-11
Pump Impeller Removal/Installation Note 3-11
Water Pump Installation Note 3-11
Water Pump Disassembly 3-11
Water Pump Assembly Note 3-12
Mechanical Seal Inspection 3-12

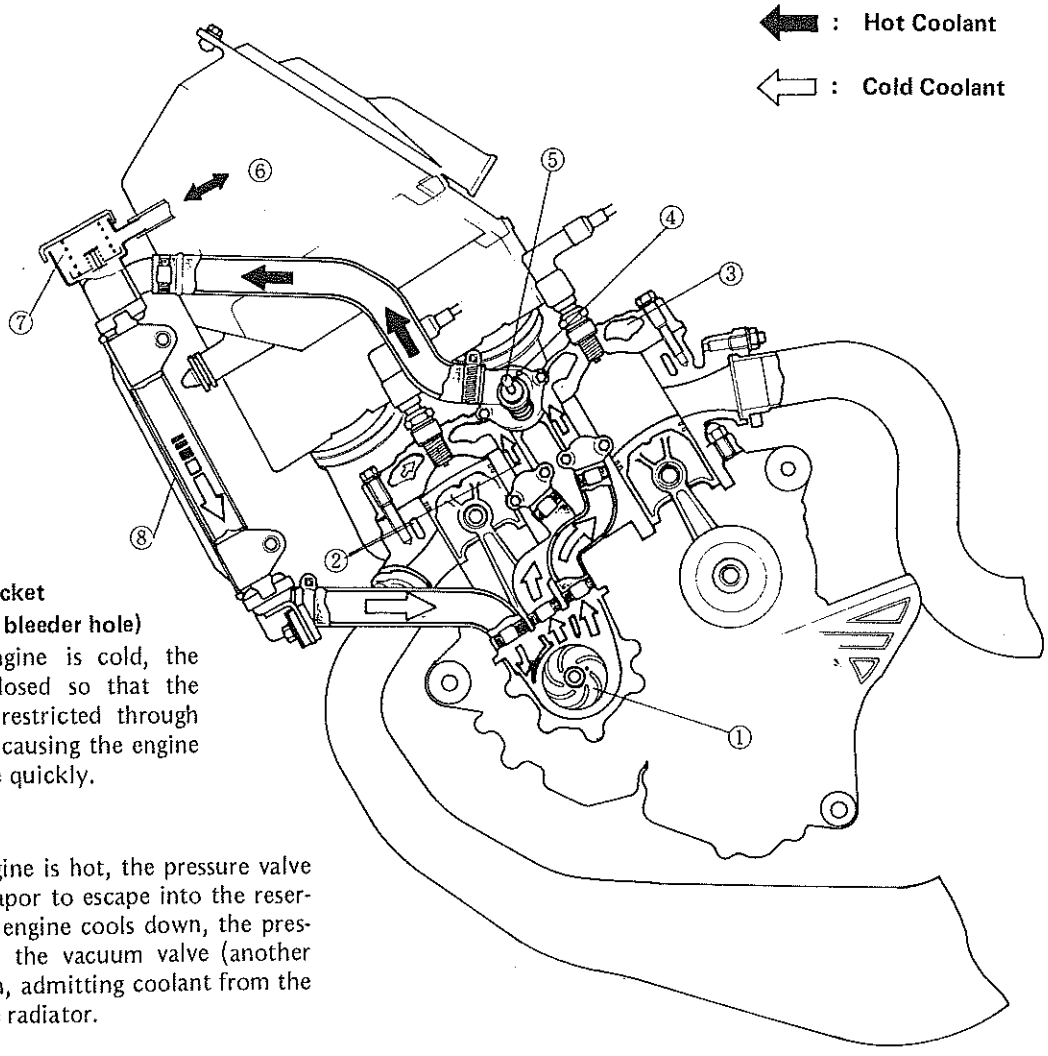
Exploded Views



Specifications

Item	Standard
Coolant Provided when Shipping:	
Type	Permanent type of antifreeze for aluminum engine and radiator
Color	Green
Mixed ratio	Soft water 57%, coolant 43%
Freezing point	–30°C (–22°F)
Total amount	1.8 L (reservoir tank full level)
Radiator Cap:	
Relief pressure	73.5 – 103 kPa (0.75 – 1.05 kg/cm², 11 – 15 psi)
Thermostat:	
Valve opening temperature	63.5 – 66.5°C (146 – 152°F)
Valve full open lift	not less than 6 mm @80°C (176°F)

Cooling System



1. **Water Pump**
2. **Cylinder Jacket**
3. **Cylinder Head Jacket**
4. **Bypass Hole (Air bleeder hole)**
   When the engine is cold, the thermostat is closed so that the coolant flow is restricted through the bypass hole, causing the engine to warm up more quickly.
5. **Thermostat**
6. **To reservoir tank**
   When the engine is hot, the pressure valve allows air and vapor to escape into the reservoir. When the engine cools down, the pressure drop draws the vacuum valve (another small valve) open, admitting coolant from the reservoir into the radiator.
7. **Radiator Cap**
8. **Radiator**

Coolant

Coolant Level Inspection

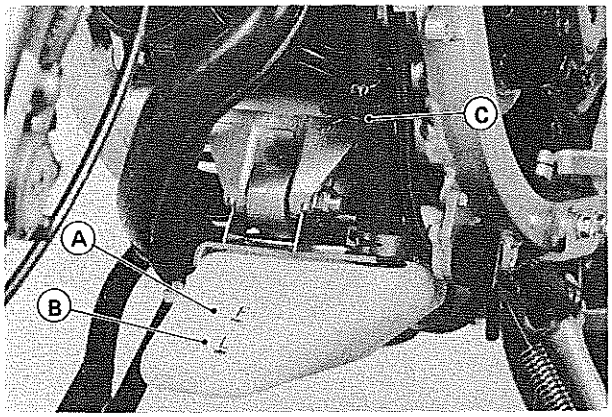
•Situate the motorcycle so that it is perpendicular to the ground.

•Check the level through the coolant level gauge on the reservoir tank. The coolant level should be between the FULL and the LOW marks.

NOTE

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

★If the coolant level is low, pull off the reservoir tank cap and add coolant through the filler opening to the FULL mark. (In the photograph, the fairing has been removed for clarity.)



A. FULL mark
B. LOW Mark
C. Tank Cap

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 mixture 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 (see Visual Leak Inspection, and Pressure Testing).

Coolant Inspection

•Visually inspect the coolant in the reservoir tank.

○If whitish cotton-like wafts are observed, aluminum parts in the cooling system are corroded. If the coolant is brown, iron or steel parts are rusting. In either case, flush the cooling system.

○If the coolant gives off an abnormal smell when changing, check for a cooling system leak. It may be caused by exhaust gas leaking into the cooling system.

Coolant Draining

The coolant should be changed periodically to ensure long engine life.

CAUTION

○Use coolant containing corrosion inhibitors made specifically for aluminum engines and radiators in accordance with the instructions of the manufactures (see Coolant Filling section).

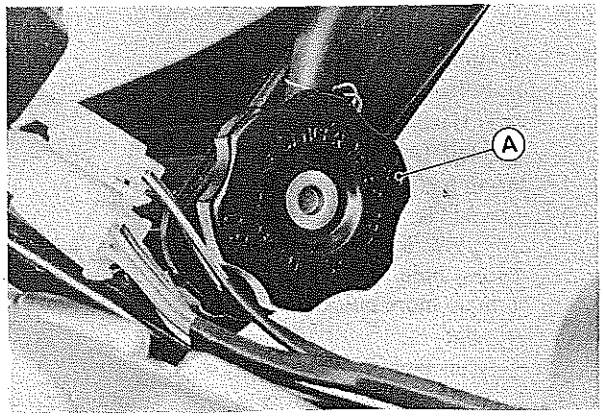
WARNING

○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 other painted parts.

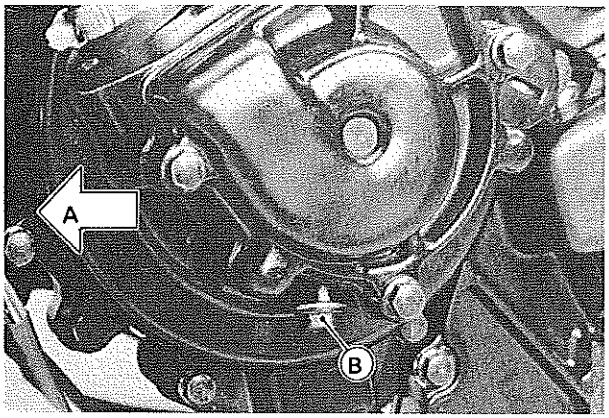
○Since coolant is harmful to the human body, do not use for drinking.

•Remove the radiator cap in two steps. First turn the cap counterclockwise to the first stop and wait there for a few seconds to allow any pressure to escape. Then push down and remove the cap.



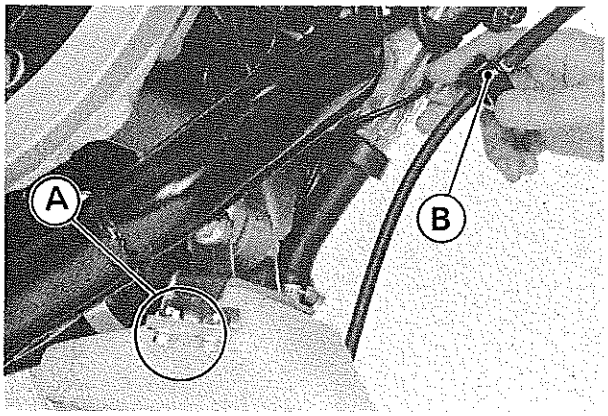
A. Radiator Cap

•Drain the coolant from the radiator and engine by removing the drain plug at the bottom of the water pump body (left side).



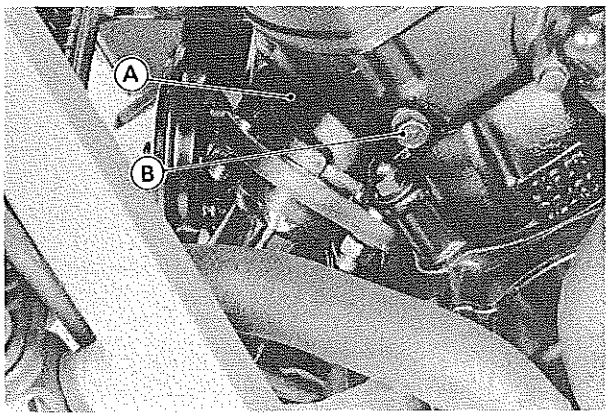
A. Front B. Drain Plug

- Remove the lower fairing.
- Pull the reservoir tank cap out.
- Unscrew the bolts, remove the reservoir tank and pour the coolant into a container.



A. Mounting Bolts B. Tank Cap

- Remove the drain plug at the bottom of the front cylinder.



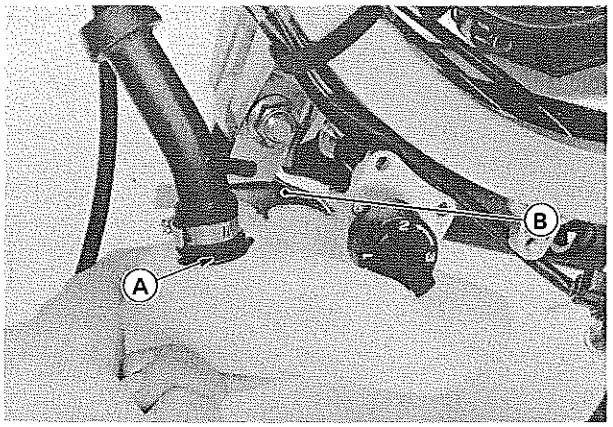
A. Front Cylinder B. Drain Plug

- Inspect the old coolant for color, smell (mentioned above).

Coolant Filling

- Install the drain plugs. Always replace the gaskets with new ones, if they are damaged.
- Tighten the drain plugs to the specification (see Exploded Views).
- Install the reservoir tank.

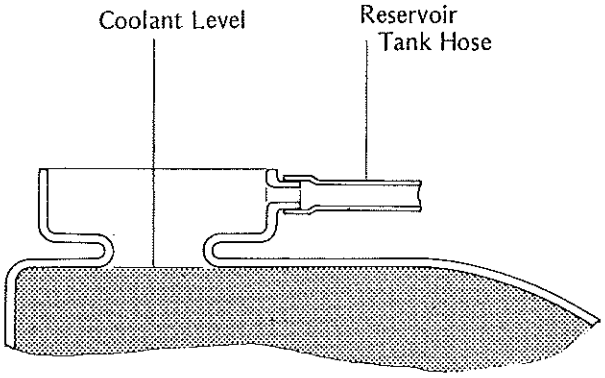
○After fitting the hose groove into the mounting bracket, tighten the mounting bolts.



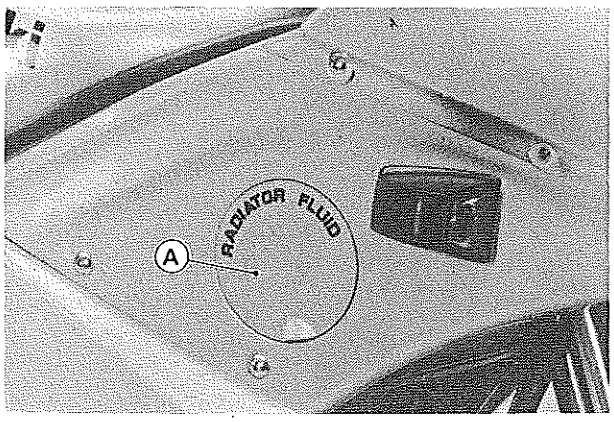
A. Hose Groove B. Mounting Bracket

- Fill the radiator up to the bottom of the radiator filler neck with coolant, and install the cap by turning it clockwise about ¼ turn while pushing it down.

Radiator Filler Neck



○A suitable coolant filler can be put into the fairing right side by removing the lid.



A. Lid

NOTE

○*Pour in the coolant slowly so that the air in the engine and radiator can escape.*
○*The radiator cap must be installed in two steps. First turn the cap clockwise to the first stop. Then push down on it and turn it the rest of the way.*

●Fill the reservoir tank up to the FULL mark with coolant, install the cap, and then bleed the system.

CAUTION

○**Soft or distilled water must be used with the antifreeze (see below for antifreeze) in the cooling system.**
○**If hard water is used in the system, it causes scales accumulation in the water passages, and considerably reduces the efficiency of the cooling system.**

NOTE

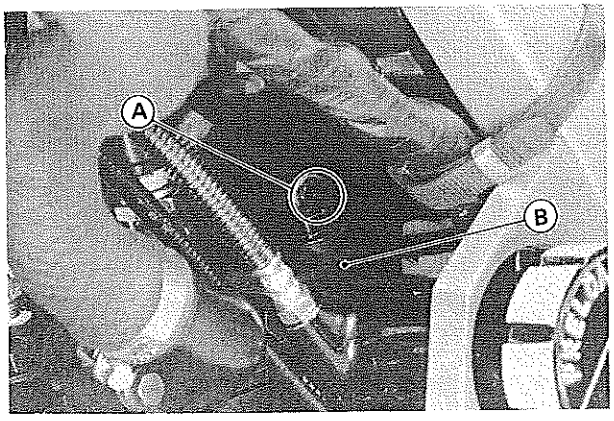
○*Choose a suitable mixture ratio by referring to the coolant manufacturer's directions.*

The coolant provided when shipping

Type	:	**Permanent type antifreeze for aluminum engine and radiator**
Color	:	**green**
Mixed ratio	:	**soft water 57%, coolant 43%**
Freezing point	:	**−30° (−22°F)**
Total amount	:	**1.8 L (up to "Full" mark)**

Air Bleeding

Before putting the motorcycle into operation, any air trapped in cooling system must be removed as follows.
●Remove the radiator cap.
●Loosen the air bleeder bolt on the top of the rear cylinder head.

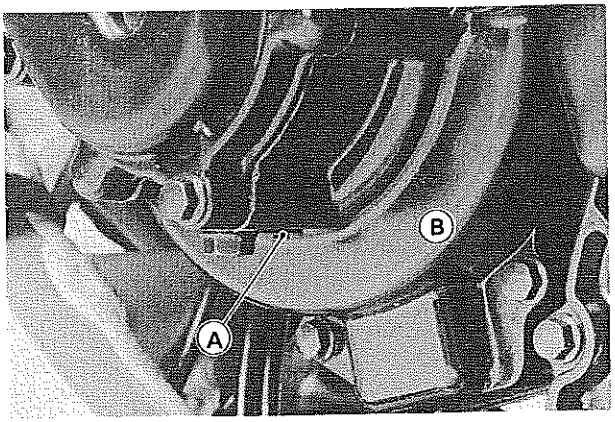


A. Air Bleeder Bolt B. Rear Cylinder Head

●Pour the coolant into the radiator until the coolant begins to flow out the air bleeder bolt hole (that is, all the remaining air forced out).
●Tighten the air bleeder bolt.
●Fill the radiator up to the radiator filler neck with coolant.
●Check the cooling system for leaks.
●Start the engine, warm it up thoroughly, and then stop it.
●Check the coolant level in the reservoir tank after the engine cools down.
★If the coolant level is low, add coolant up to the Full mark through the reservoir tank opening.

Visual Leak Inspection

Any time the system slowly loses water, insepct for leaks.
●Check the water pump body drainage outlet passage for coolant leaks.
★If the mechanical seal is damaged, the coolant leaks through the seal and drains through the passage. Disassemble the water pump and check the mechanical seal (see Mechanical Seal Inspection).
★If there are no apparent leaks, pressure test the system.



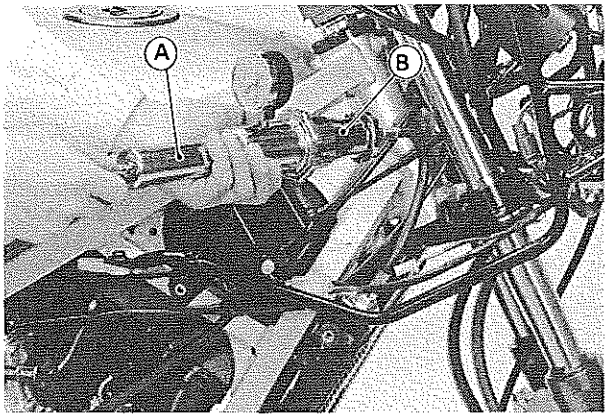
A. Drainage Outlet Passage B. Left Engine Cover

Cooling System Pressure Testing

CAUTION

○**During pressure testing, do not exceed the pressure for which the system is designed. The maximum pressure: 103 kPa (1.05 kg/cm², 15 psi).**

●Remove the radiator cap, and install a cooling system pressure tester on the radiator filler neck.
●Wet the cap sealing surfaces with water or coolant to prevent pressure leaks.
●Build up pressure in the system carefully until the pressure reaches 103 kPa (1.05 kg/cm², 15 psi).
●Watch the gauge for at least 6 seconds. If the pressure holds steady, the system is all right.



A. Pressure Tester B. Adapter

- Remove the pressure tester, replenish the coolant, and install the radiator cap.

*If the pressure drops and no external source is found, check for internal leaks. Droplets in the engine oil indicate internal leakage. Check the cylinder head gasket, the water pump mechanical seal and oil seal.

Cooling System Flushing

Over a period of time, the cooling system accumulates rust, scale, and lime in the water jacket and radiator. When this accumulation is suspected or observed, flush the cooling system. If this accumulation is not removed, it will clog up the water passage and considerably reduce the efficiency of the cooling system.

- Drain the cooling system.
- Fill the cooling system with fresh water mixed with a flushing compound.

CAUTION

○**Do not use a flushing compound which is harmful to the aluminum engine and radiator. Carefully follow the instructions supplied by the manufacturer of the cleaning product.**

- Warm up the engine, and run it at normal operating temperature for about ten minutes.
- Stop the engine, and drain the cooling system.
- Fill the system with fresh water.
- Warm up the engine and drain the system.
- Repeat the previous two steps once more.
- Fill the system with a permanent type coolant, and bleed the air from the system.

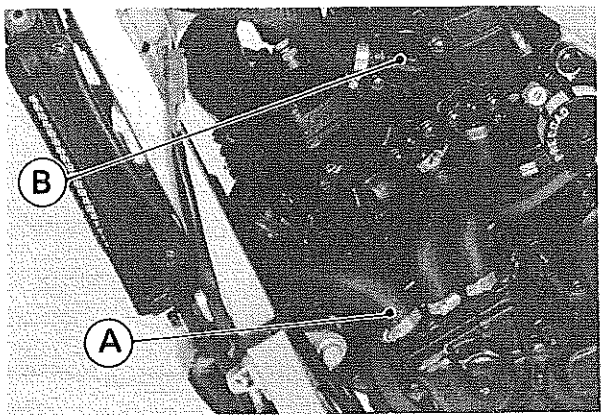
Disassembly and Assembly Precautions

- Prior to disassembly of cooling system parts (radiator, thermostat, pump, sensor, etc), wait until coolant cools down and drain coolant.
- After assembling and filling the system with coolant, bleed the air from the system.

Radiator

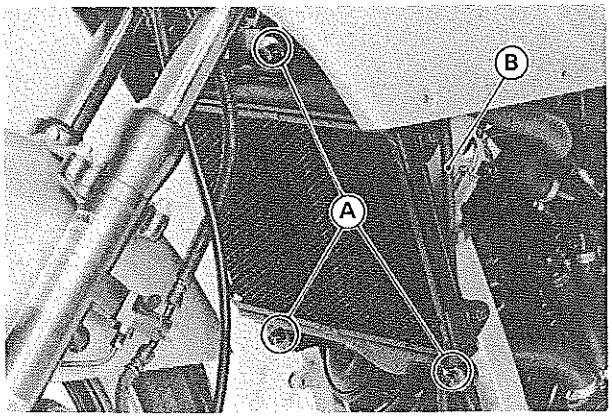
Radiator Removal

- Remove the fairings (see Fairing Removal in Frame).
- Separate the radiator hose from the cylinder head by removing the thermostat cover.
- Remove the hose clamp and radiator hose from the left engine cover.



A. Hose Clamp and Radiator Hose
B. Thermostat Cover

- Remove the reservoir tank hose end at the radiator.
- Remove the radiator mounting bolts (3).
- Remove the radiator taking care not to damage the radiator core.



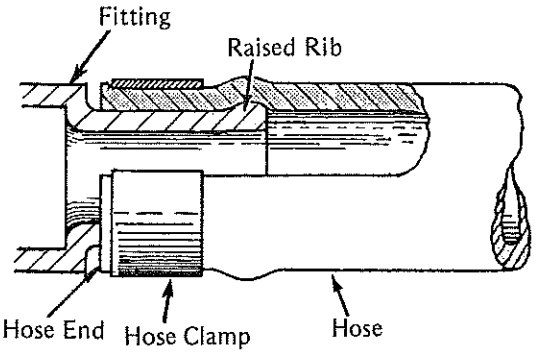
A. Radiator Mounting Bolts B. Reservoir Tank Hose

Radiator Hose, Reservoir Tank Hose Installation Note

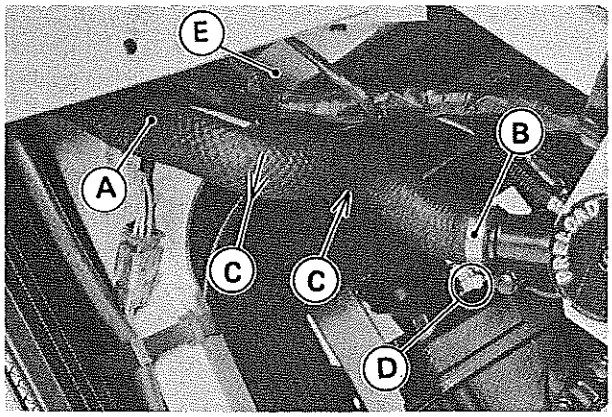
- Install the radiator hoses being careful to follow bending direction. (see Exploded Views). Avoid sharp bending, kinking, flattening, or twisting.

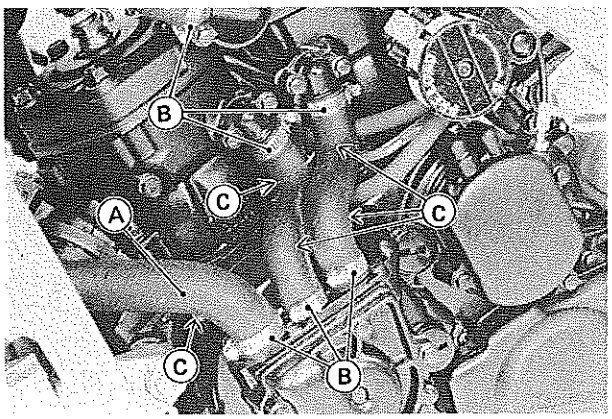
- Insert the hoses onto fittings completely.
- Install the clamps as near as possible to the end of the hose to clear the fitting raised rib. This will prevent the hoses from working loose.

Hose and Clamp Installation



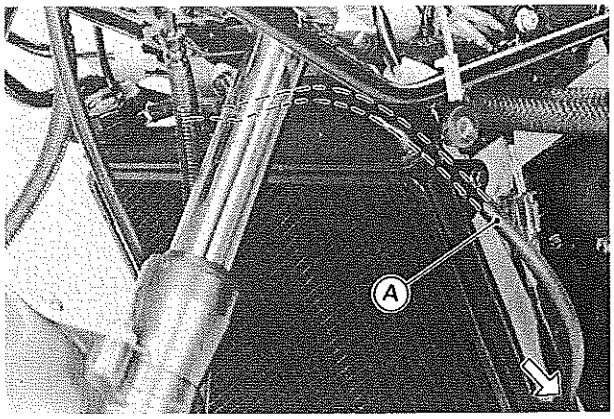
- Tighten the hose clamp securely.
- Install the hose clamp at the thermostat cover so that the clamp screw is below the hose for spark plug removal convenience.
- Keep the upper radiator hose about **10 mm** away from the frame.





A. Radiator Hose
B. Clamp
C. Bend
D. Hose Clamp Screw
E. Frame

- Route the reservoir tank hose as shown.



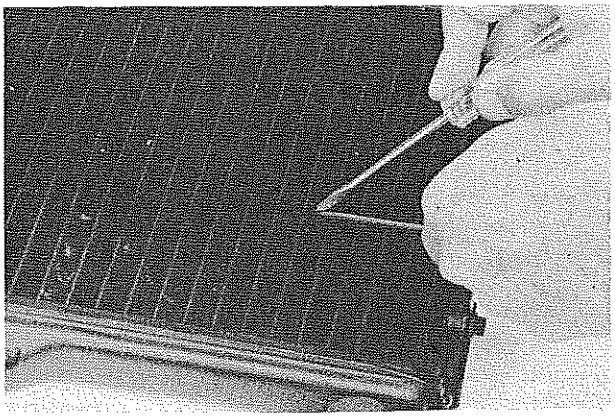
A. Reservoir Tank Hose

Radiator Hose, Reservoir Tank Hose Inspection

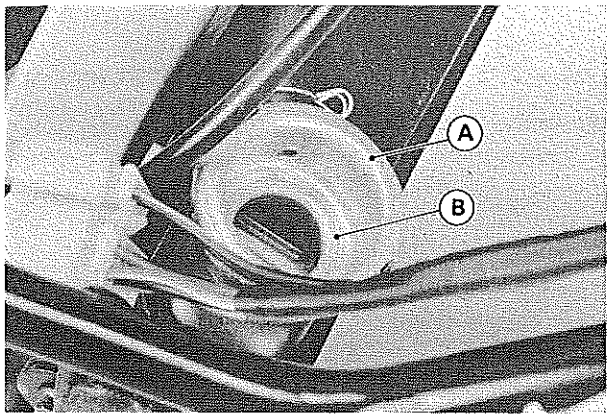
- In accordance with the Periodic Maintenance Chart, visually inspect the hoses for signs of deterioration. Squeeze the hose. A hose should not be hard and brittle, nor should it be soft or swollen.
- Replace any damaged hose.
- Retighten the hose clamps.

Radiator Inspection

- Check the radiator core.
- ★If there are obstructions to air flow, remove them.
- ★If the corrugated fins are deformed, carefully straighten them with the blade of a thin screw driver.



- ★If the air passages of the radiator core are blocked more than 20% by unremovable obstructions or irreparably deformed fins, replace the radiator with a new one.
- Check the radiator filler neck for signs of damage.
- Check the condition of the top and bottom sealing seats in the filler neck. They must be smooth and clean for the radiator cap to function properly.

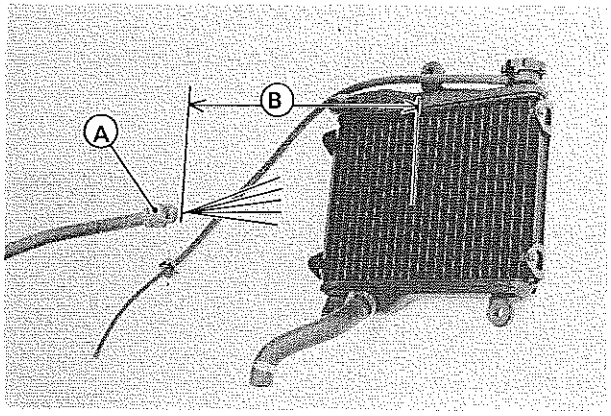


A. Top Sealing Seat B. Bottom Sealing Seat

Radiator Cleaning Note

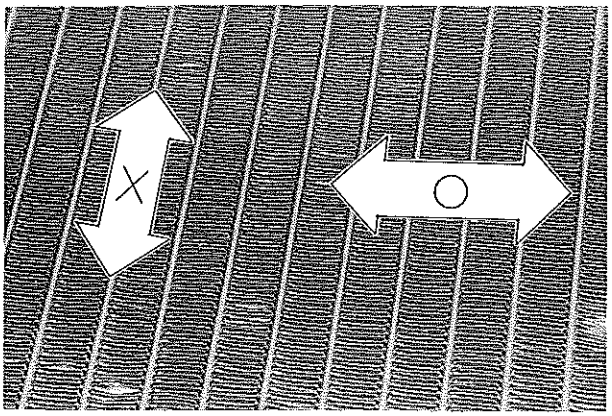
When cleaning the radiator with a steam cleaner, be careful of the followings to prevent radiator damage.

- Keep the steam gun more than **50 cm** away from the radiator core.



A. Steam Gun B. More than 50 cm

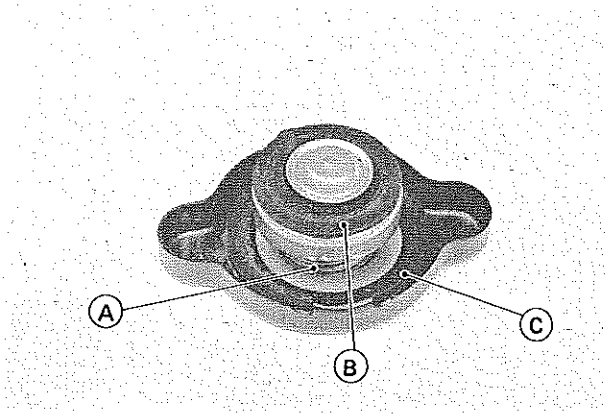
- Run the gun horizontally following the core fin direction holding it perpendicular to the core surface.



Radiator Cap Inspection

- Check the condition of the valve spring, and the top and bottom valve seals of the radiator cap.

★If any one of them shows visible damage, replace the cap.



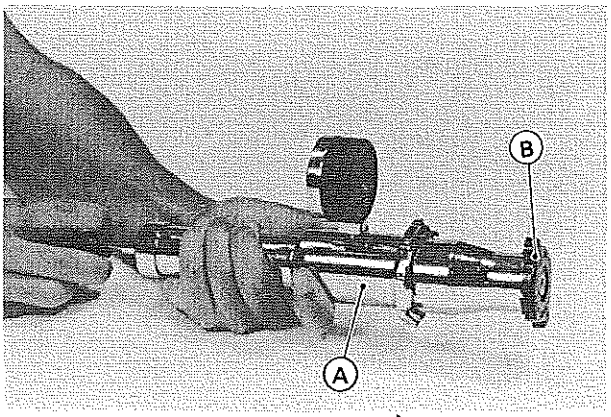
A. Valve Spring C. Top Seal
B. Bottom Seal

- Wet the cap sealing surfaces with water or coolant to prevent pressure leaks. Install the cap on a cooling pressure tester.
- Watching the gauge, pump the tester to build up the pressure. The cap must retain the pressure for at least 6 seconds. Also the cap must open at the pressure shown in the table.

Radiator Cap Relief Pressure

73.5 – 103 kPa
(0.75 – 1.05 kg/cm^2, 11 – 15 psi)

★If the cap cannot hold the specified pressure, or if it holds too much pressure, replace it with a new one.

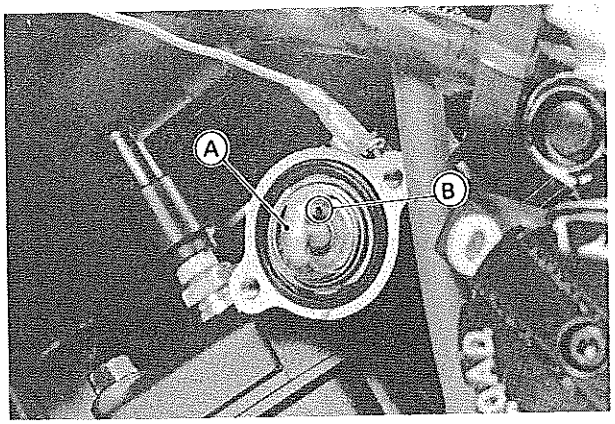


A. Pressure Tester B. Radiator Cap

Thermostat

Thermostat Installation Note

- Install the thermostat so that the air bleeder hole is on top with the engine installed in the frame.

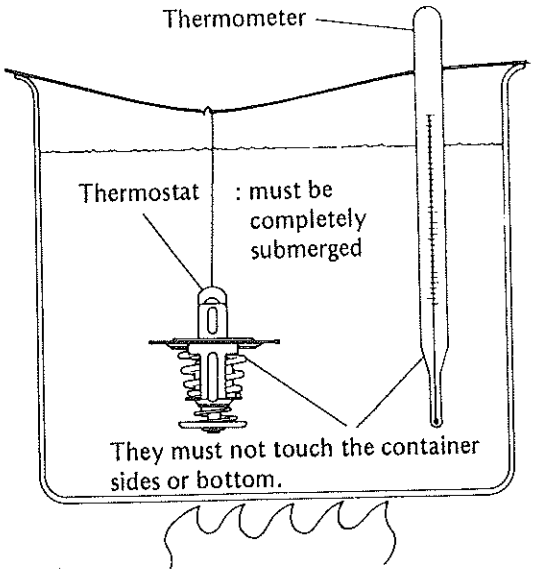


A. Thermostat B. Air Bleeder Hole

Thermostat Inspection

- Remove the thermostat, and inspect the thermostat valve at room temperature.
- ★If the valve is open, replace the valve with a new one.
- To check valve opening temperature, suspend the thermostat and an accurate thermometer in a container of water.
- Place the container over a source of heat and gradually raise the temperature of the water while stirring the water gently.

Valve Opening Temperature Measurement



- Watch the valve. As soon as the valve starts to open, note the temperature.
- ★If it is out of the service limit range, replace the thermostat.

Thermostat Valve Opening Temperature

63.5 – 66.5°C (146 – 152°F)

Water Temperature Sensor

Removal Caution

CAUTION

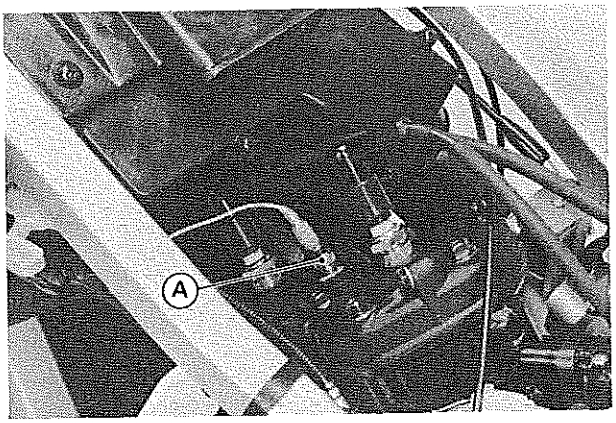
- **The water temperature sensor should never be allowed to fall on a hard surface. Such a shock to these parts can damage them.**

Installation Note

- Apply a liquid gasket compound to the threads before mounting the sensor.
- Tighten the sensor to the specified torque (see Exploded Views).

Inspection

Refer to the Electrical System chapter.

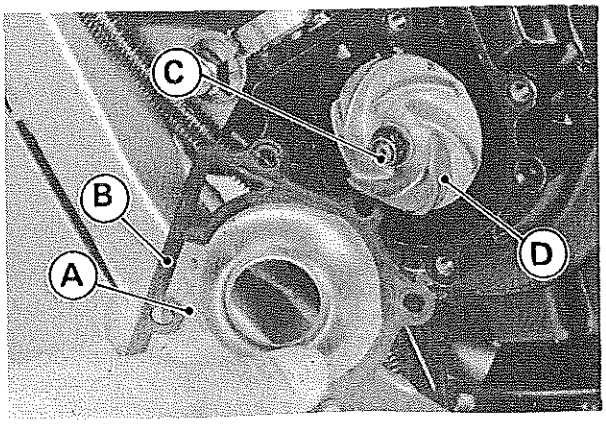


A. Water Temperature Sensor

Water Pump, Mechanical Seal

Pump Cover Removal

- Remove the pump housing.



A. Pump Housing
B. Rubber Coating
C. Nut
D. Impeller

Pump Housing Inspection

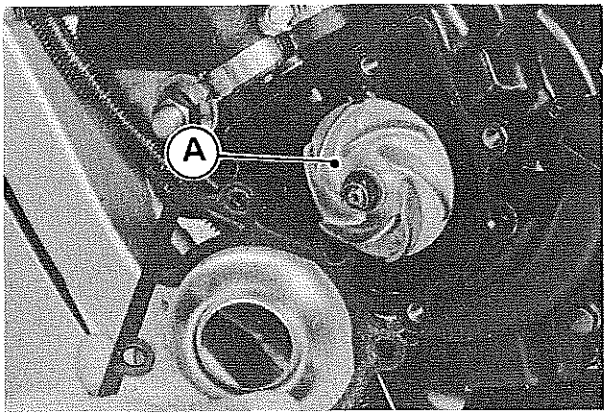
●Visually inspect the rubber coating on the pump housing.

★If the coating has any signs of separation, or other damage, replace the pump housing.

Pump Impeller Inspection

●Visually check the impeller.

★If the surface is corroded, or if the blades are damaged, replace the water pump impeller and O-ring.



A. Impeller

Pump Impeller Removal/Installation Note

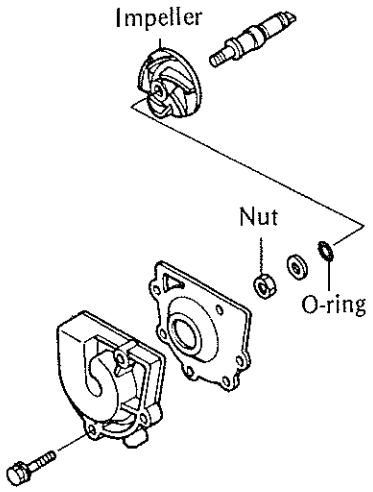
CAUTION

○**The impeller has an O-ring. Turn the impeller clockwise during installation, and counterclockwise during removal. This is to prevent impeller O-ring damage by the shaft threads.**

●Remove the impeller by taking off the nut.

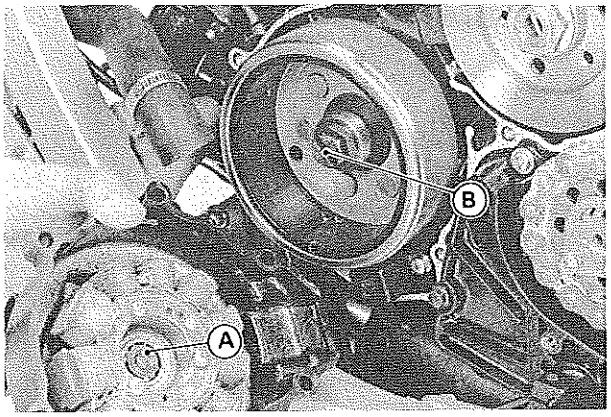
●Tighten the nut to the specified torque.

Water Pump Impeller



Water Pump Installation Note

●When installing the water pump, note the position of the magneto bolt slot and turn the water pump shaft so that the projection fits into the slot.



A. Water Pump Shaft Projection
B. Magneto Bolt Slot

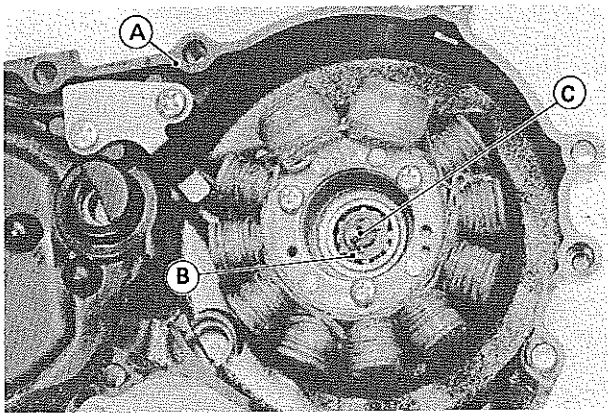
Water Pump Disassembly

NOTE

○***Do not remove the impeller, only the left engine cover for water pump disassembly.***

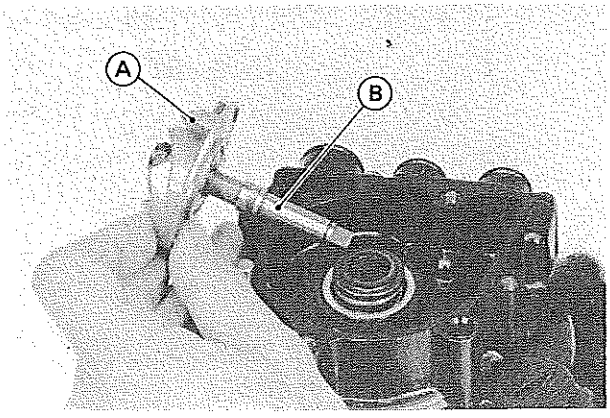
●Remove the left engine cover (see Left Engine Cover Removal in Electrical System).

●Remove the circlip and the washer.



A. Left Engine Cover
B. Circlip and Washer
C. Water Pump Shaft

●Remove the water pump shaft and impeller by tapping the shaft lightly.

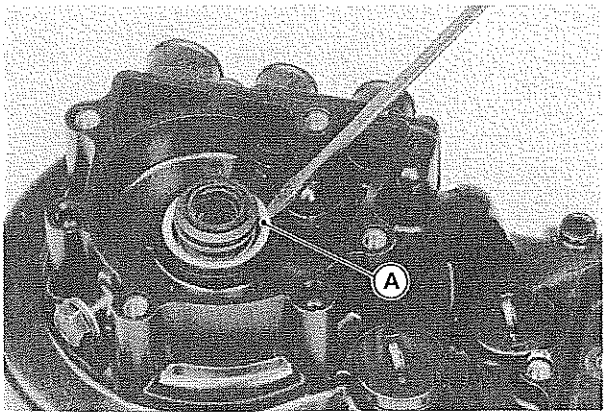


A. Water Pump Impeller
B. Shaft

CAUTION

○**Be careful not to damage the sealing surface of the mechanical seal.**

●Pull the mechanical seal out of the left engine cover with a sharp hook, after prying the flange off.
●Pull out the oil seal with a sharp hook.



A. Flange

CAUTION

○**Replace the mechanical seal and the oil seal with new ones.**

Water Pump Assembly Note

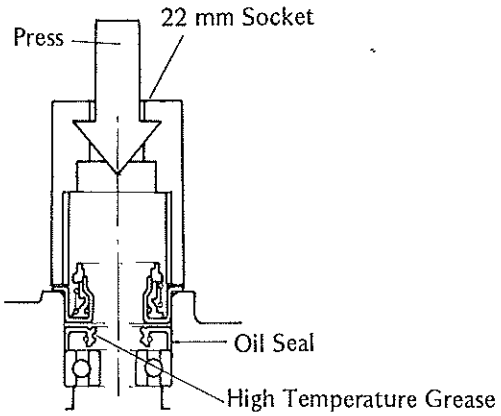
●Apply high temperature grease and install the oil seal as shown.

NOTE

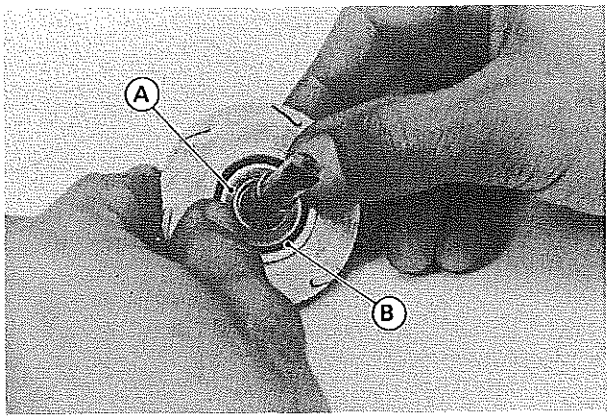
○*Since the replacement mechanical seal has an adhesive coated body, do not apply a liquid gasket to the exterior surface of the body.*

●Press the seal body into the hole by using a 22 mm socket until it stops at the bottom surface of the engine cover.

Mechanical Seal Assembly



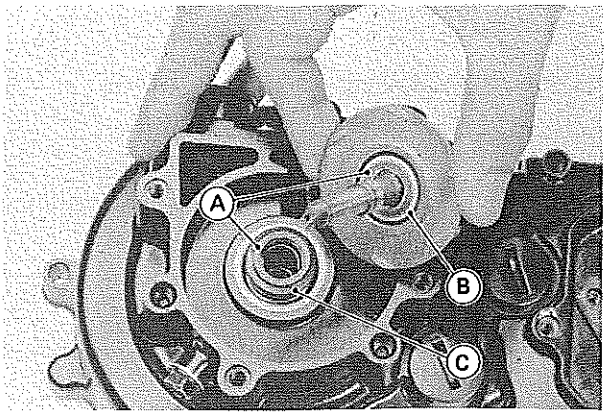
●Clean the sliding surface of the mechanical seal with a high flash-point solvent, and apply a little coolant to the sliding surface to give the mechanical seal initial lubrication.
●After applying coolant to the surfaces of the rubber seal and sealing seat, install the seal and seat into the impeller with finger pressure until they bottom out.



A. Sealing Seat
B. Rubber Seal

Mechanical Seal Inspection

●Visually inspect the mechanical seal.
★If any one of the parts is damaged, replace the mechanical seal as a unit.
○The sealing seat and rubber seal may be removed easily by hand



A. Impeller Sealing Seat Surface
B. Rubber Seal
C. Mechanical Seal Diaphragm

Engine Top End

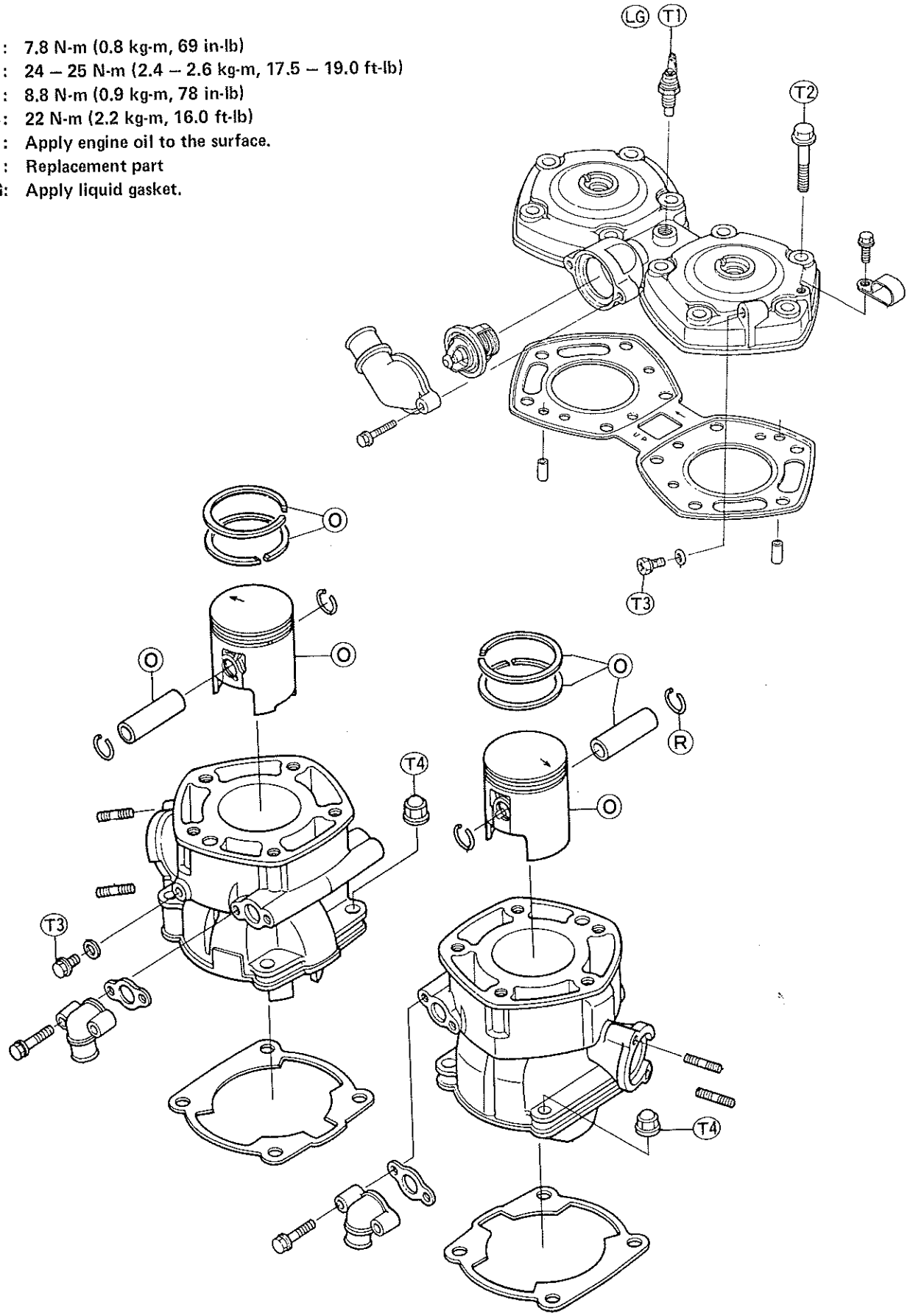
4

Table of Contents

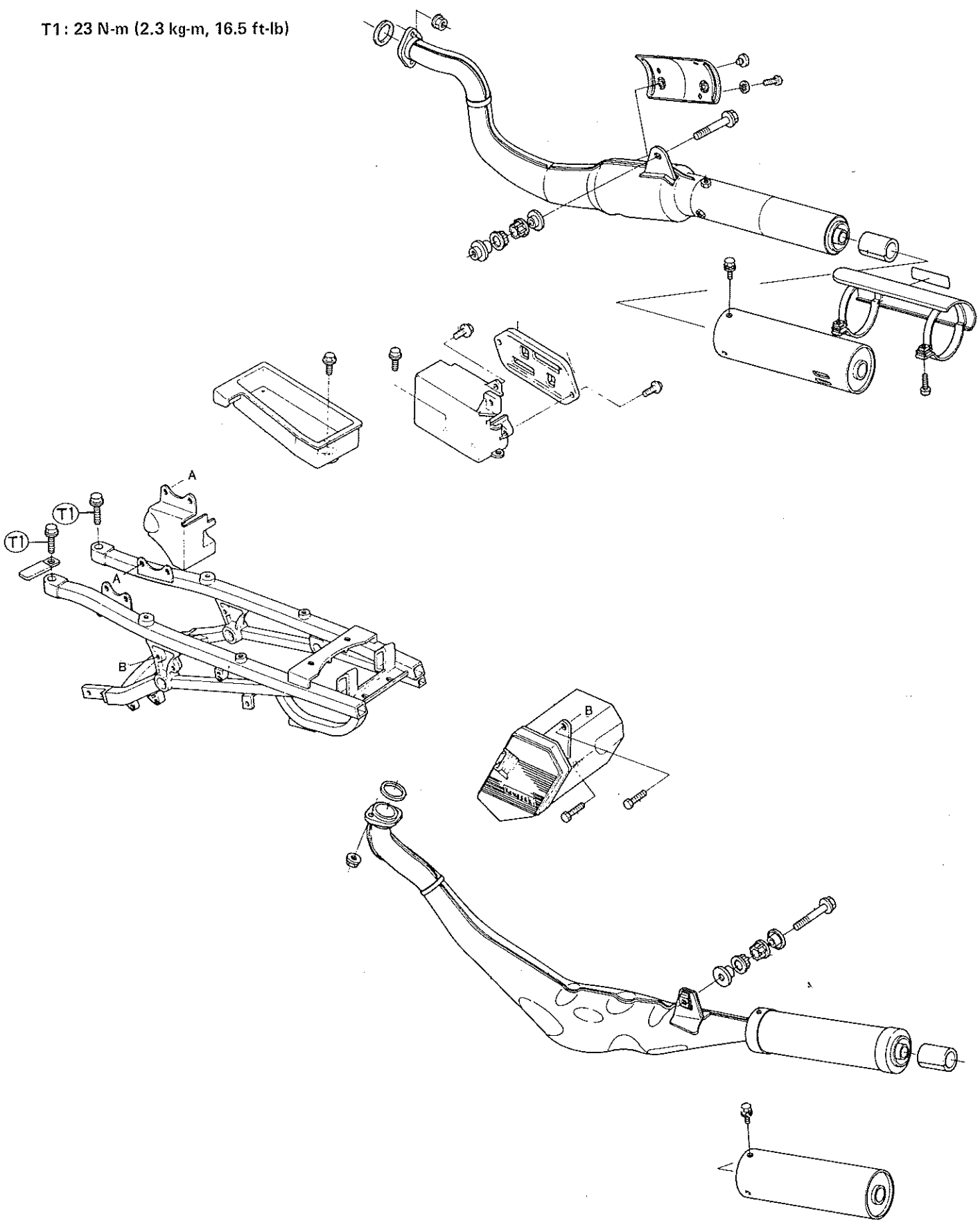
Exploded View 4-2
Specifications 4-4
Special Tools 4-4
Cylinder Head 4-5
Compression Measurement 4-5
Cylinder Head Removal 4-5
Cylinder Head Installation Notes 4-6
Cylinder Head Warp Inspection 4-6
Cylinder, Piston 4-7
Cylinder Removal 4-7
Piston Removal Notes 4-7
Piston Installation Notes 4-7
Cylinder Installation Note 4-8
Cylinder Assembly Note 4-9
Cylinder Wear Inspection 4-9
Piston Diameter Measurement 4-10
Piston/Cylinder Clearance 4-10
Piston Ring, Piston Ring Groove Inspection 4-10
Piston Ring End Gap 4-10
Piston, Piston Pin, Connecting Rod Wear Inspection 4-11
Muffler
Front Muffler Removal 4-11
Rear Muffler Removal 4-11
Muffler Installation Notes 4-14

Exploded View

T1: 7.8 N-m (0.8 kg-m, 69 in-lb)
T2: 24 – 25 N-m (2.4 – 2.6 kg-m, 17.5 – 19.0 ft-lb)
T3: 8.8 N-m (0.9 kg-m, 78 in-lb)
T4: 22 N-m (2.2 kg-m, 16.0 ft-lb)
O : Apply engine oil to the surface.
R : Replacement part
LG: Apply liquid gasket.



T1 : 23 N-m (2.3 kg-m, 16.5 ft-lb)



Specifications

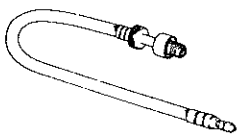
Item		Standard	Service Limit
Cylinder Compression:		(usable range) 735 – 1,130 kPa (7.5 – 11.5 kg/cm²) (107 – 164 psi)	– – –
Cylinder head warp		– – –	0.05 mm
Cylinder Block, Piston:			
Cylinder inside diameter		56.015 – 56.030 mm	56.090 mm
Piston diameter		55.960 – 55.975 mm	55.80 mm
Piston/cylinder clearance		0.050 – 0.060 mm	– – –
Piston ring/groove clearance			
	Top (keystone)	– – –	– – –
	Second	0.03 – 0.07 mm	0.18 mm
Piston ring groove width			
	Top (keystone)	– – –	– – –
	Second	1.22 – 1.24 mm	1.33 mm
Piston ring thickness	Top (keystone)	– – –	– – –
	Second	1.17 – 1.19 mm	1.10 mm
Piston ring end gap	Top	0.15 – 0.35 mm	0.65 mm
	Second	0.15 – 0.35 mm	0.65 mm

Special Tools

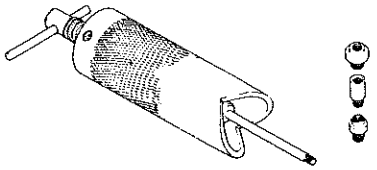
Compression Gauge: 57001-221



Adapter: 57001-1159



Piston Pin Puller Assembly: 57001-910



Adapter: 57001-913



NOTE

○*The adapter (P/N 57001-913) is included in the piston pin puller assembly (P/N 57001-910).*

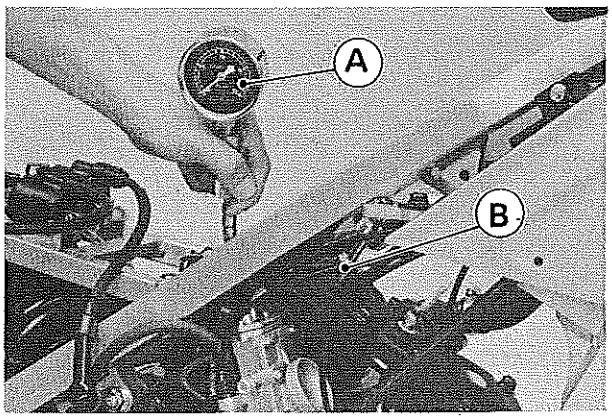
Cylinder Head

Carbon builtup inside the combustion chambers interferes with heat dissipation and increases the compression which may result in preignition, detonation, and overheating. Trouble can also arise from improper head mounting or mounting torque, which may cause compression leakage.

Compression Measurement

- Throughly warm up the engine so that engine oil between the piston and cylinder wall will help seal compression as it does during normal running.
- Stop the engine.
- Remove the fuel tank and the air cleaner housing (see Fuel Tank Removal, Air Cleaner Housing Removal in Fuel System chapter).
- Remove the spark plugs and attach compression gauge (special tool) firmly into the sprak plug hole.
- With the throttle fully open, turn the engine over sharply with the kickstarter several times until the compression gauge stops rising; the compression is the highest reading obtainable.
- Repeat the measurement for the other cylinder.

Cylinder Compression (Usable Range)
735 – 1,130 kPa (7.5 – 11.5 kg/cm^2, 107 – 164 psi)



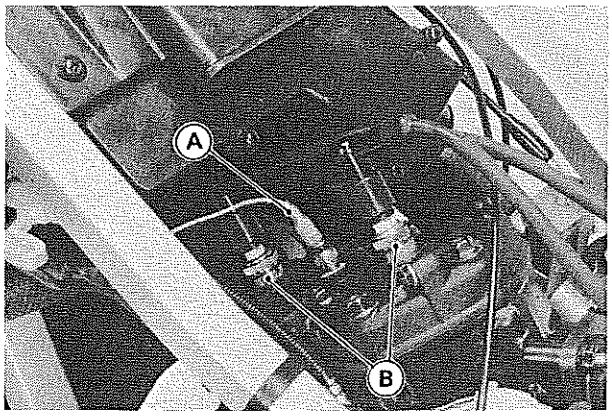
A. Compression Gauge: 57001-221
B. Adapter: 57001-1159

★If the cylinder compression is higher than the usable range, check the following:
- ○Carbon build-up on the piston crown and cylinder head—clean off any carbon on the piston crowns and cylinder head.
- ○Cylinder head gasket, cylinder base gaskets—use only the proper gaskets. The use of a gasket of incorrect thickness will change the compression.

★If cylinder compression is lower than the usable range, check the following:
- ○Gas leakage around the cylinder head—replace the damaged gasket and check the cylinder head for warp.
- ○Gas leakage from the crank chamber—check the crankshaft oil seals, valve cover oil seals and O-rings, and reed valves.
- ○Check the joint between the crankcase halves.
- ○Piston/cylinder clearance, piston seizure.
- ○Piston rings, piston ring grooves wear.

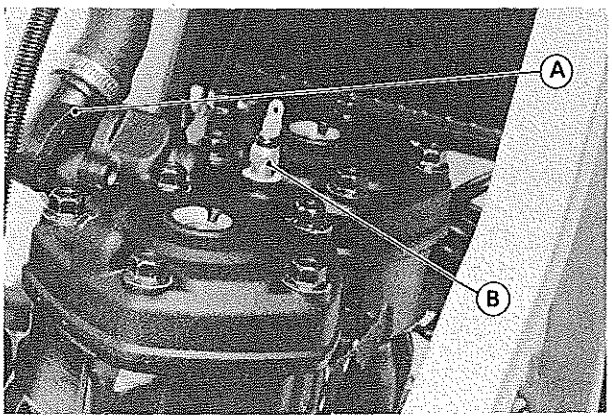
Cylinder Head Removal

- Remove the air cleaner (see Air Cleaner Housing Removal in Fuel System chapter).
- Drain the coolant (see Coolant Draining in Cooling System).
- Remove the spark plugs.
- Pull off the lead of the water temperature sensor.



A. Water Temperature Sensor Lead
B. Spark Plugs

- Remove the thermostat cap.

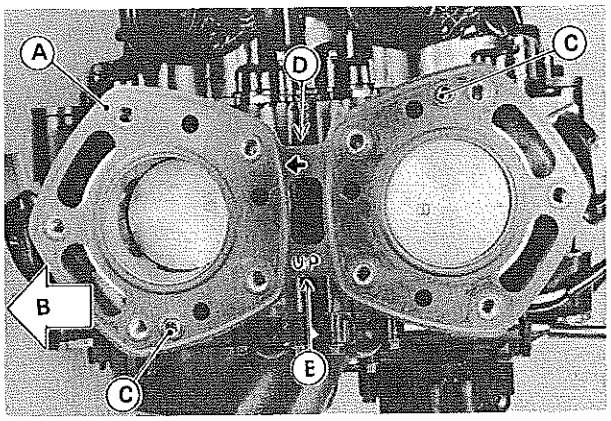


A. Thermostat Cap B. Water Temperature Sensor

Cylinder Head Installation Notes

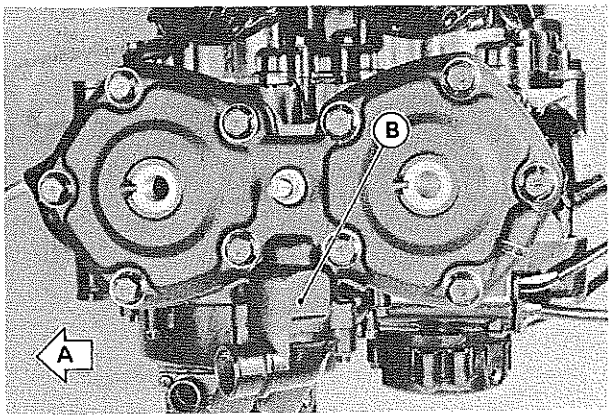
●See that the knock pins(2) are in place and install the new cylinder head gasket.

●The UP mark of the gasket must face upward and "Front" mark must face forward.



A. New Cylinder Head Gasket
B. Front
C. Knock Pins
D. "Front" Mark
E. UP Mark

●Install the cylinder head so that the thermostat housing is on the engine left side as shown.



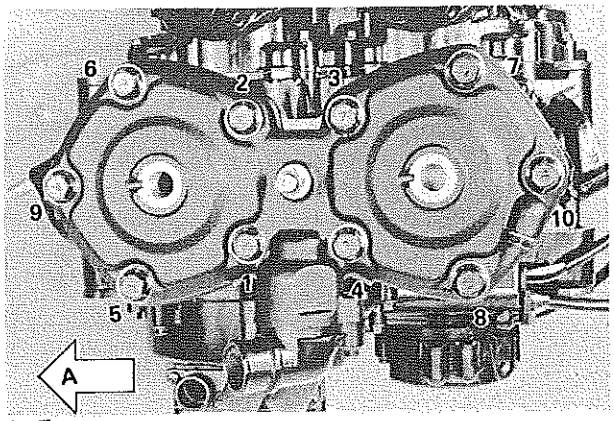
A. Front
B. Thermostat Housing

●Tighten the cylinder head bolts to the specified torque, following the specified tightening sequence.

○The sequence numbers are marked on the cylinder head.

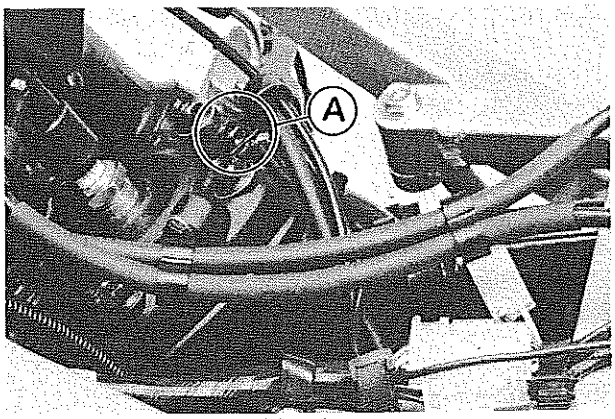
○Tighten them first to about one half of the specifed torque, and then tighten them to the specified torque in the order of index number.

○Finally, retighten them to the specified torque again in order to check that they are tightened securely.



A. Front

●Be sure to install the main harness ground lead.

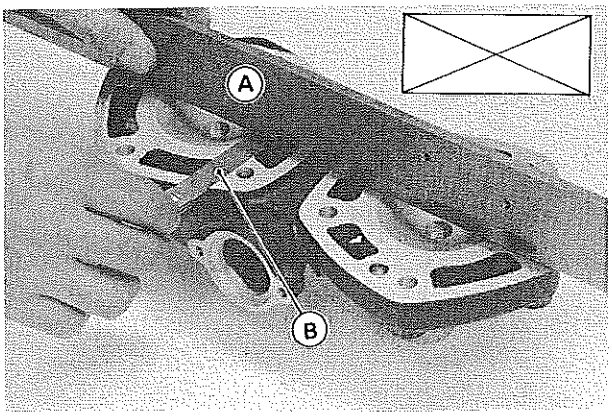


A. Main Harness Ground Lead

Cylinder Head Warp Inspection

●Lay a straightedge across the lower surface of the head at several different points, and measure warp by inserting a thickness gauge between the straightedge and the head.

★If warp exceeds the service limit, repair the mating surface. Replace the cylinder head if the mating surface is badly damaged.



A. Straightedge
B. Thickness Gauge

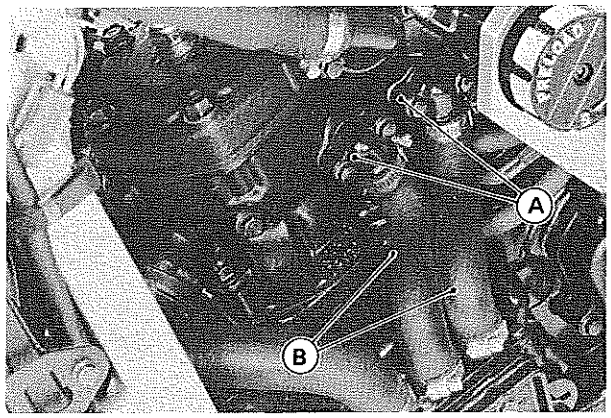
Cylinder Head Warp

Service Limit: **0.05 mm**

Cylinder, Piston

Cylinder Removal

- Remove the front and rear mufflers.
- Remove the cylinder head.
- Separate the fittings and water hoses.

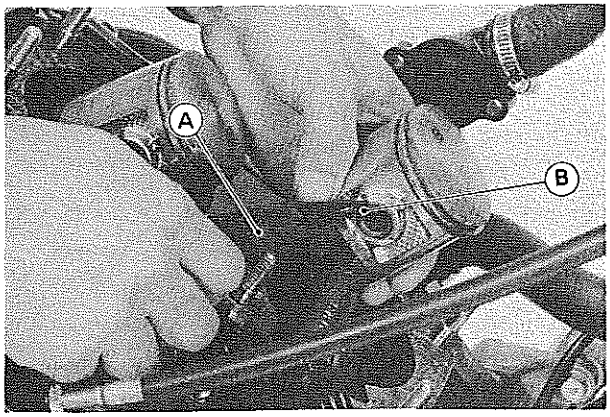


A. Fittings B. Water Hoses

- Lift off the cylinders, and remove the cylinder base gaskets. If necessary, tap lightly around the base of the cylinders with a plastic mallet, taking care not to damage the cylinders.
- Before the cylinders are off the pistons, cover the cylinder base holes with sheets of cloths to prevent dirt or moisture from entering.

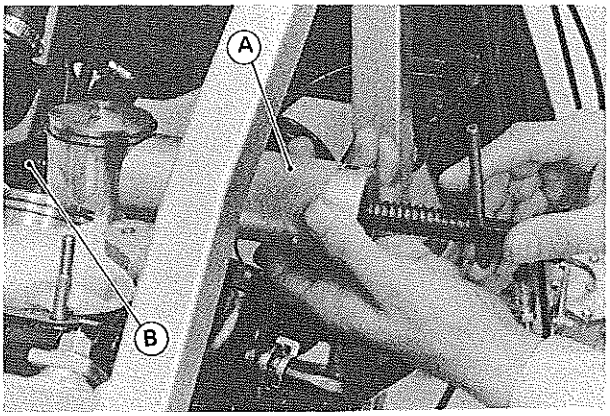
Piston Removal Notes

- Remove the piston pin snap ring.



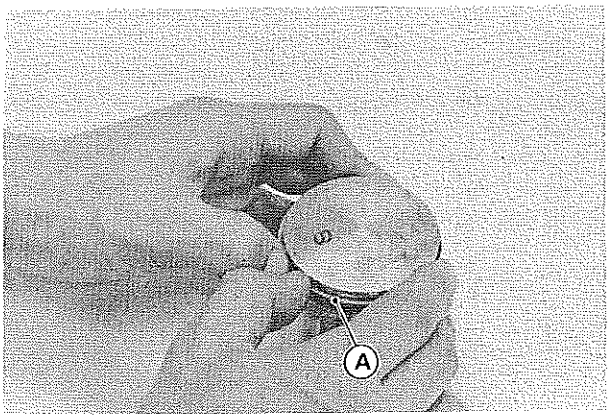
A. Pliers B. Snap Ring

- Remove the piston by pushing its pin out the side that the snap ring was removed. Use piston pin puller assembly (special tool), if the pin is tight.



A. Piston Pin Puller Assembly: 57001-910
B. Adapter: 57001-913

- Carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring to remove it.

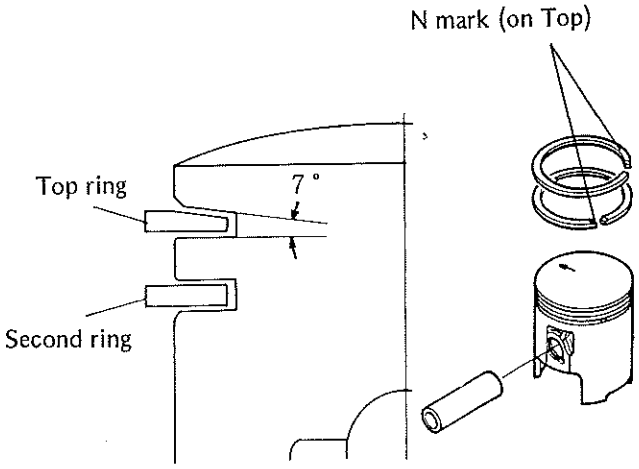


A. Piston Ring

Piston Installation Notes

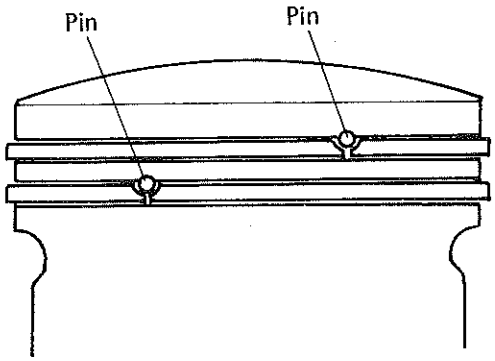
- Do not mix up the second ring with the top ring.
- Install the piston rings so that the correct side faces upwards as shown.

Piston Rings

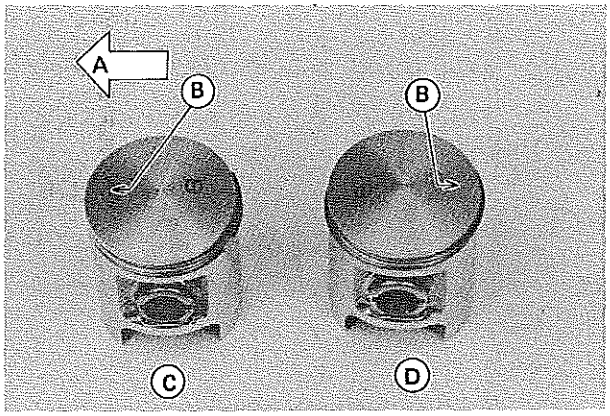


•When installing the piston rings by hand, first fit one end of the piston ring against the pin in the ring groove, spread the ring opening with the other hand and then slip the ring into the groove.
•Check to see that the pin in each piston ring groove is between the ends of the piston ring.

Piston Ring Position



○Be careful not to mix up the front piston with the rear piston. They must be installed in the original cylinders respectively.
•The arrow on the Top of the front piston must point toward front and the arrow on the rear piston must point toward rear.



A. Front
B. Arrow
C. Front Piston
D. Rear Piston

CAUTION

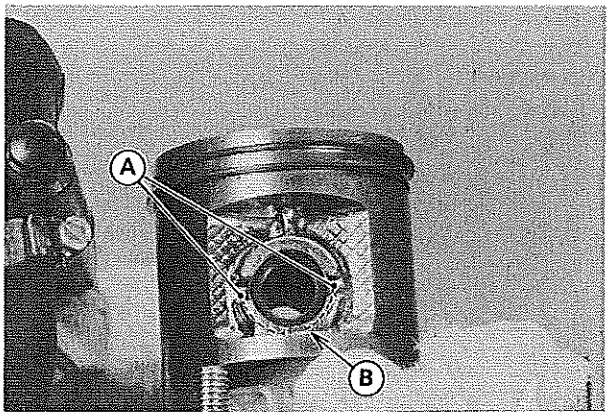
○**Incorrect installation of the pistons could cause piston ring breakage and result in severe engine damage.**

•When installing a piston pin snap ring, compress it only enough to install it and no more.

CAUTION

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

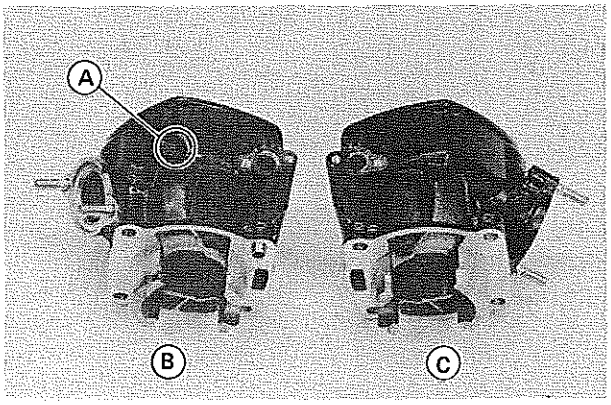
•Fit a new piston pin snap ring into the side of the piston so that the ring opening does not coincide with the slits of the piston pin hole.



A. Slit
B. Ring Opening

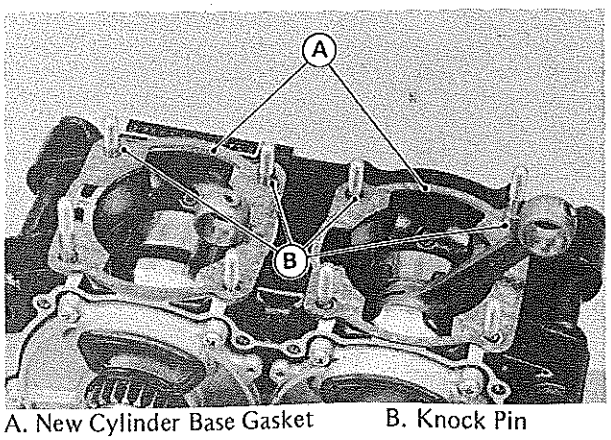
Cylinder Installation Note

○The front cylinder has a coolant drain plug. Be careful not to mix up the front cylinder with the rear cylinder.



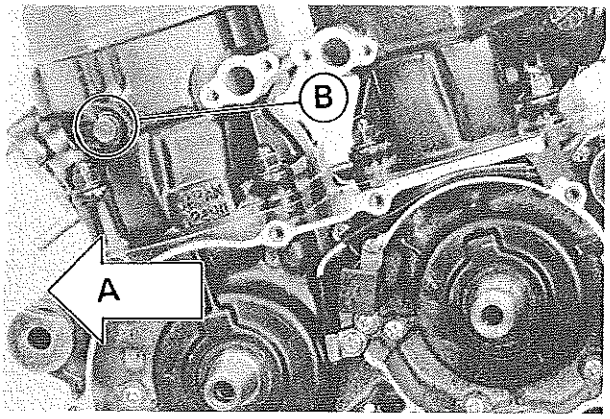
A. Drain Plug
B. Front Cylinder
C. Rear Cylinder

•Apply a little two-stroke oil to the piston rings and the inside surface of the cylinder.
•Install the new cylinder base gaskets. Check that the knock pins(2) are in place.



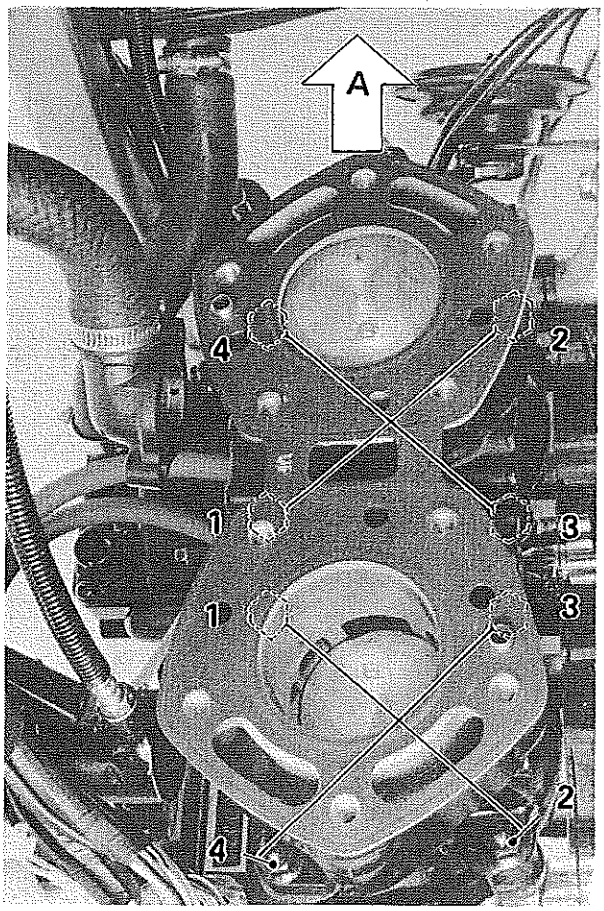
A. New Cylinder Base Gasket
B. Knock Pin

•Install the cylinders being careful of installation direction as shown.



A. Front B. Coolant Drain Plug

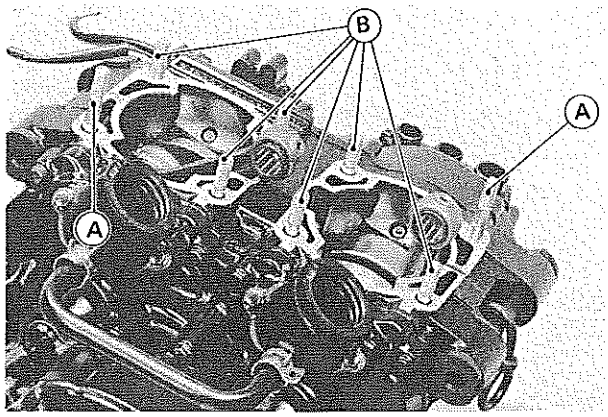
●Tighten the cylinder nuts to the specified torque (see Exploded Views), following the specified tightening sequence.



A. Front 1 – 4. Cylinder Nut

Cylinder Assembly Note

●Screw the cylinder studs in the correct locations as shown.



A. Nominal Length: 45 mm
B. Nominal Length: 30 mm

Cylinder Wear Inspection

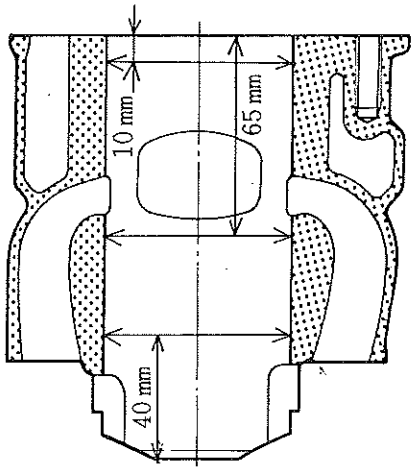
●Inspect the inside of the cylinder for scratches and abnormal wear.

★If the cylinder is damaged or badly worn, replace it with a new one.

●Since there is a difference in cylinder wear in different directions, take a side-to-side and a front-to-back measurement at each of the 3 locations (total of 6 measurements) shown in the figure.

★If the cylinder inside diameter measurement exceeds the service limit, the cylinder must be replaced with a new one since the ELECTROFUSION cylinder cannot be bored or honed.

Cylinder Diameter Measurement



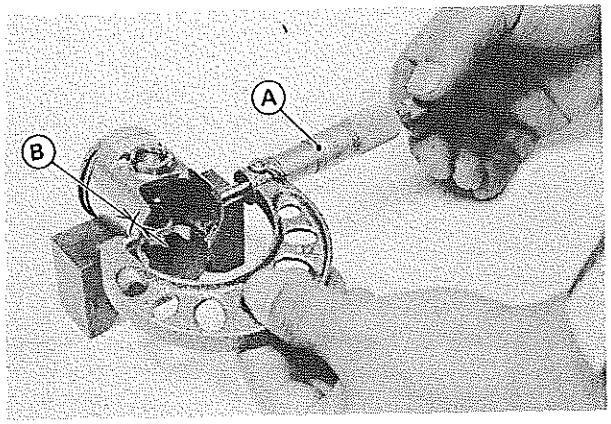
Cylinder Inside Diameter

Standard: 56.015 – 56.030 mm and less than 0.01 mm difference between any two measurements

Service Limit: 56.09 mm, or more than 0.05 mm difference between any two measurements

Piston Diameter Measurement

●Measure the outside diameter of the piston **10 mm** up from the bottom of the piston at a right angle to the direction of the piston pin.



A. Micrometer B. 10 mm

Piston Diameter

Standard:	**55.960 – 55.975 mm**
Service Limit:	**55.80 mm**

NOTE

○*Abnormal wear such as a marked diagonal pattern across the piston skirt may mean a bent connecting rod or crankshaft.*

Piston/Cylinder Clearance

The most accurate way to find the piston clearance is by making separate piston and cylinder diameter measurements and then computing the difference between the two values. Measure the piston diameter as just described, and measure the cylinder diameter at the very bottom of the cylinder.

Piston/Cylinder Clearance

0.045 – 0.055 mm

NOTE

○*Whenever the piston or cylinder has been replaced with a new one, the motorcycle must be broken in the same as with a new machine.*

Piston Ring, Piston Ring Groove Inspection

●Visually inspect the piston rings and the piston ring grooves.

★If the rings are worn unevenly or damaged, they must be replaced.

★If the piston ring grooves are worn unevenly or damaged, the piston must be replaced and fitted with new rings.

●Check for uneven groove wear by inspecting the ring seating.

★The rings should fit perfectly parallel to the groove surfaces. If not, the piston must be replaced.

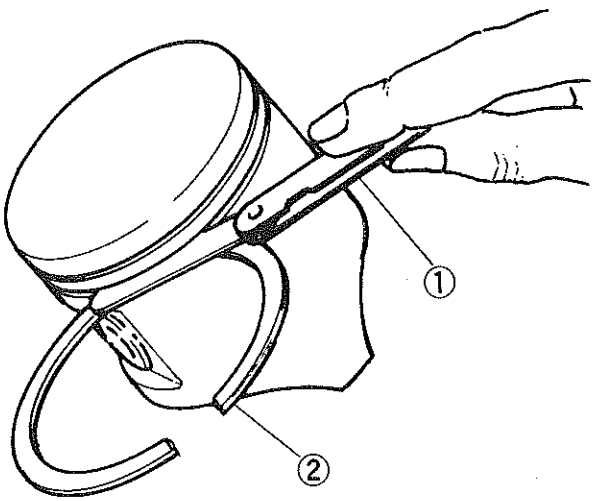
●With the piston rings in their grooves, make several measurements with a thickness gauge to determine piston ring/groove clearance.

Piston Ring Groove Clearance

	Standard	Service Limit
Top	N/A*	N/A*
Second	0.03 – 0.07 mm	0.18 mm

***Tapered Ring**

Groove Clearance Measurement



1. Thickness Gauge: 57001-1081
2. Piston Ring

Piston Ring End Gap

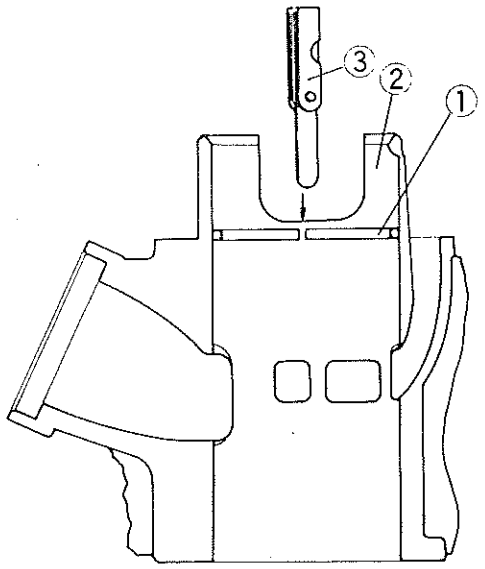
●Place the piston ring inside the cylinder, using the piston to locate the ring squarely in place. Set it close to the bottom of the cylinder, where cylinder wear is low.

●Measure the gap between the ends of the ring with a thickness gauge.

Piston Ring End Gap

	Standard	Service Limit
Top	0.15 – 0.35 mm	0.65 mm
Second	0.15 – 0.35 mm	0.65 mm

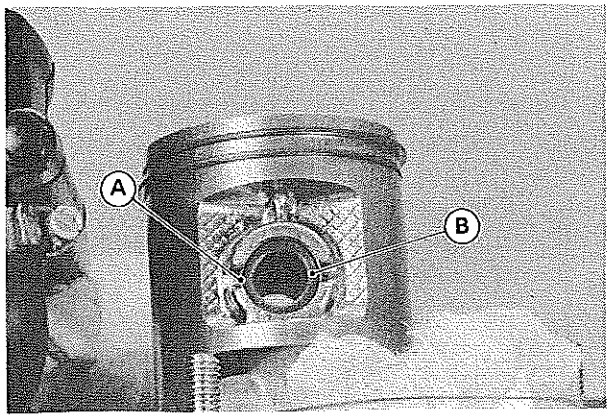
End Gap Measurement



1. Piston Ring 2. Cylinder Block 3. Thickness Gauge

Piston, Piston Pin, Connecting Rod Wear Inspection

- Visually inspect the snap rings are fitted in place.
- ★If the ring shows weakness or deformation, replace the ring. Also if the pin hole groove shows excessive wear, replace the piston.
- Visually inspect the piston pin hole and connecting rod small end hole.
- ★If the piston pin hole shows uneven wear, replace the piston.
- ★If the rod small end hole shows uneven wear, replace the rod, or crankshaft assembly.
- Visually inspect the outer surface of the piston pin.
- ★If the pin shows color change or stepped wear, replace the pin and needle bearing.

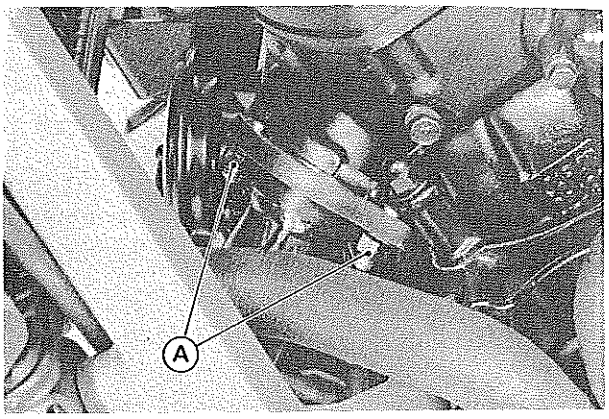


A. Snap Ring B. Piston Pin

Muffler

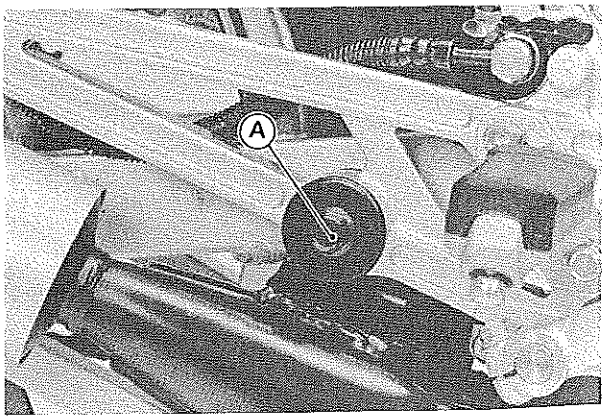
Front Muffler Removal

- Remove the lower fairing (see Fairing Removal in Frame chapter).
- Remove the exhaust flange holder nuts.



A. Nut

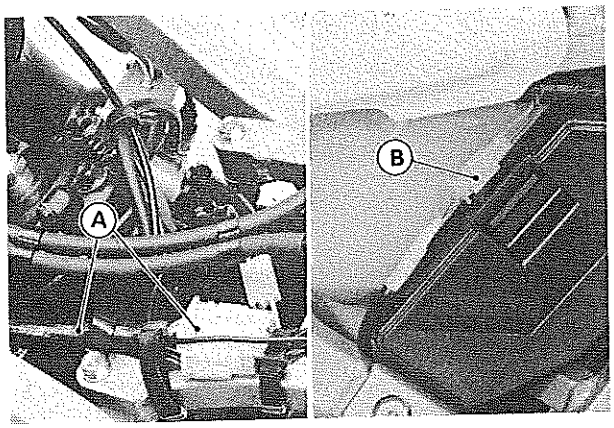
- Remove the front muffler mounting bolt.



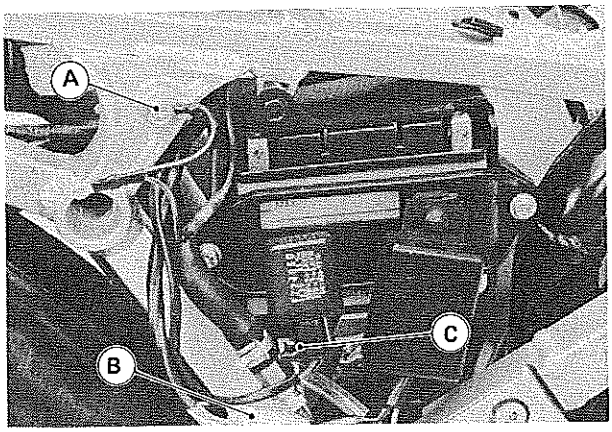
A. Bolt

Rear Muffler Removal

- Remove the seat and the fuel tank (see Fuel Tank Removal in Fuel System chapter).
- Pull off the following connectors and the terminals.
  - Main harness and connectors
  - Rear brake switch connector
  - Ignition coil lead terminals and the ground terminal
  - Battery terminal and main harness ground terminal
  - Fuse connector
  - Turn signal relay terminals

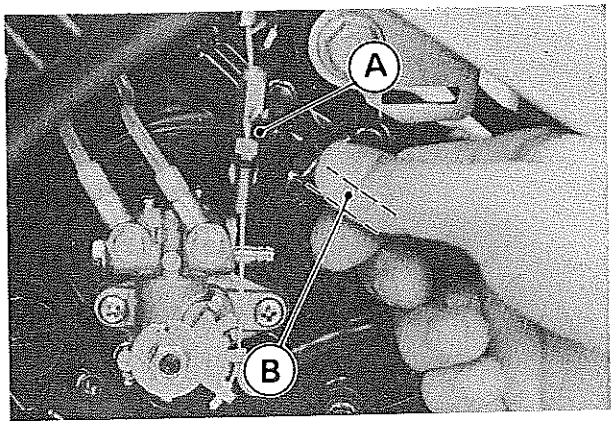


A. Main Harness and Connectors
B. Rear Brake Switch Connector



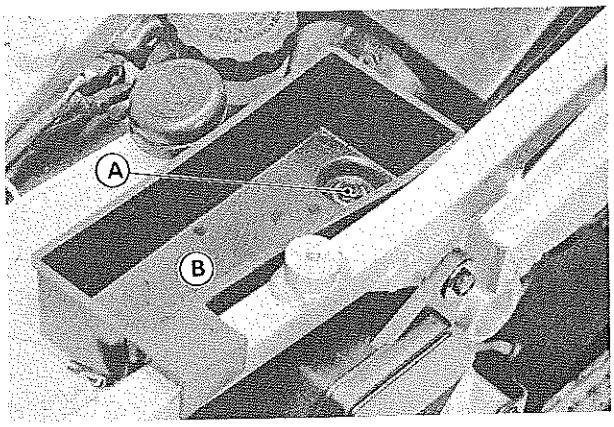
A. Main Harness Ground Terminal
B. Fuse Connector
C. Turn Signal Replay Terminals

●Remove the oil pump cover and oil pump inlet hose. Screw one of the mounting bolts into the inlet hose to keep the oil from flowing out, and hold the end of the hose upwards.



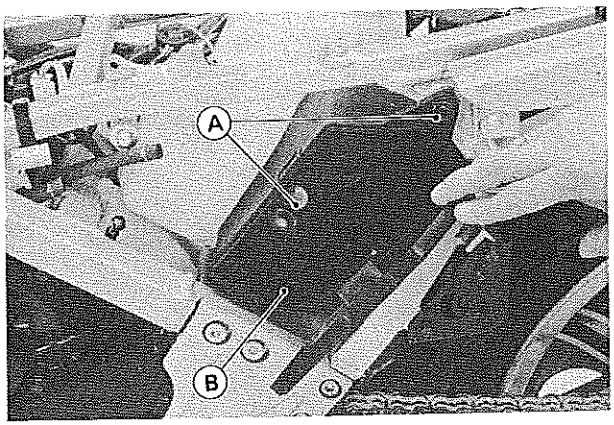
A. Mounting Bolt B. Inlet Hose from the oil tank

●Remove the bolt and tool case.



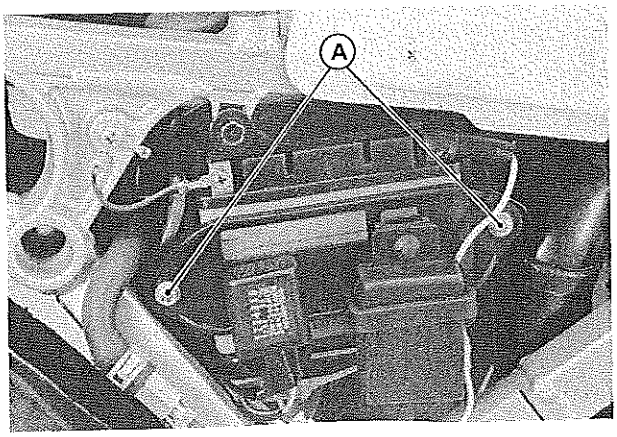
A. Bolt B. Tool Case

●Remove the bolts and take out the storage case.

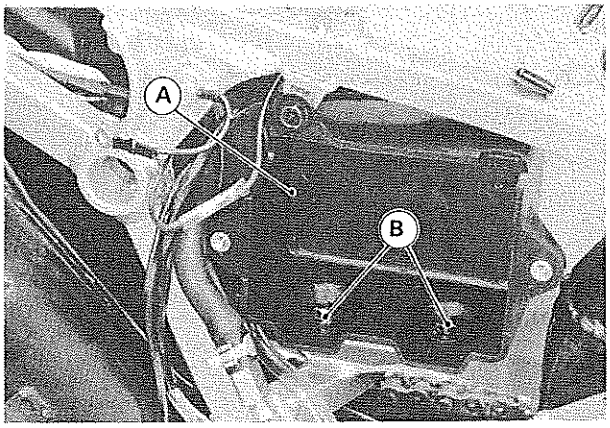


A. Bolts B. Storage Case

●Remove the battery and then the battery case by taking off the screws and the bolts.

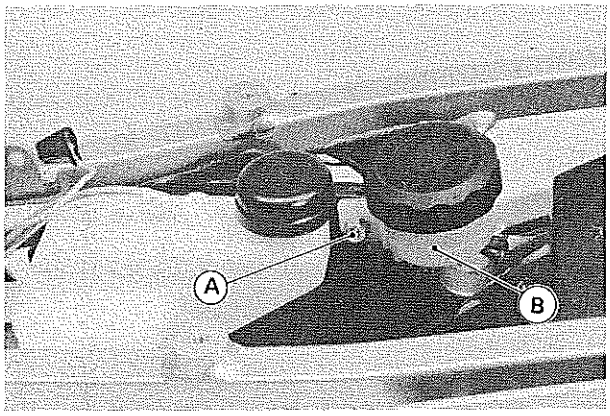


A. Screws



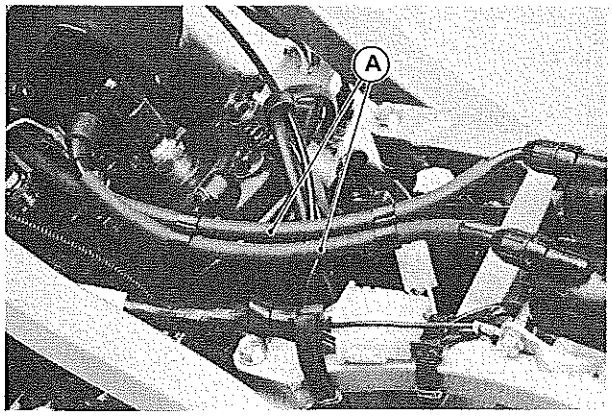
A. Battery Case B. Bolts

●Remove the rear brake reservoir tank mounting bolt.



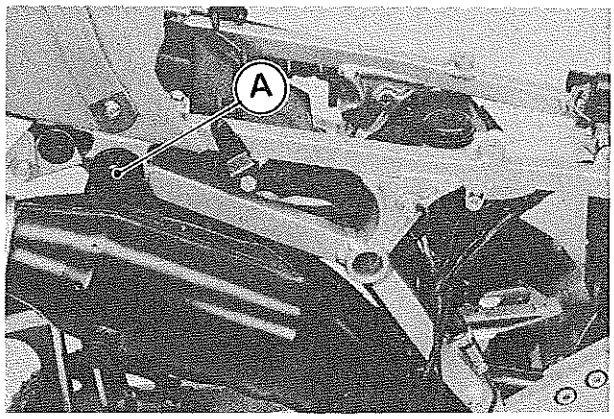
A. Bolt B. Brake Reservoir Tank

●Remove the spark plug leads from the plugs.



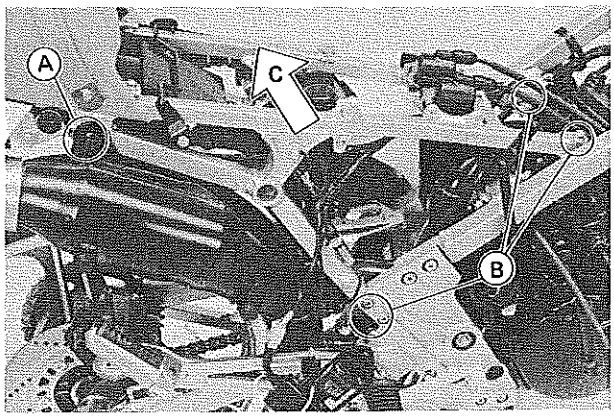
A. Spark Plug Lead

●Remove the rear muffler mounting bolt.



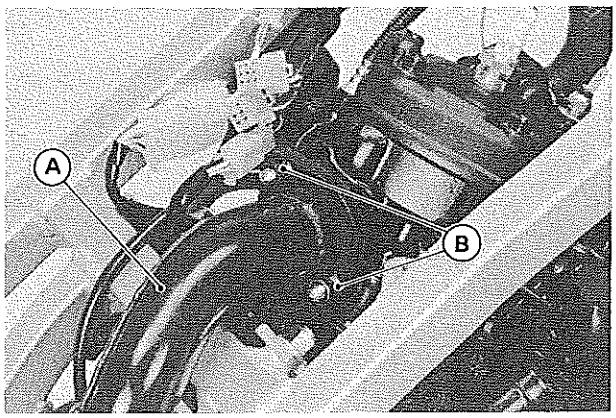
A. Rear Muffler Mounting Bolt

●Remove the rear frame with the oil tank and the ignition coils installed by taking off the following bolts.



A. Rear Muffler Mounting Bolt
B. Rear Frame Mounting Bolts
C. Frame Removal Direction

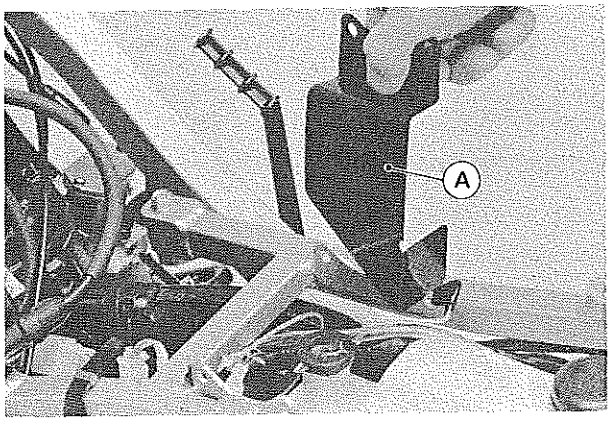
●Remove the exhaust flange nuts and rear muffler.



A. Rear Muffler B. Nut

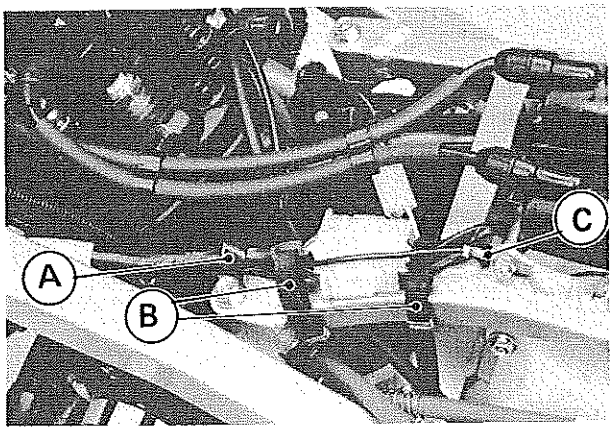
Muffler Installation Notes

●Check the gasket at each muffler, and replace it if damaged.
●Tighten the muffler mounting bolts and exhaust flange nuts in the order and method indicated below.
○First, tighten all the bolts and nuts to a snug fit.
○Next, tighten the exhaust flange nuts evenly to avoid exhuast leaks. After rear frame installation, tighten the rear exhaust flange nuts.
○Finally, tighten the mounting bolts securely.
●Be sure to install the ignition coil bracket.



A. Ignition Coil Bracket

●Hold the main harness on the rear frame with clamps to avoid its being burned by the rear muffler.
●Be sure to install the main harness ground terminal on the ignition coil mounting nut.



A. Clamps
B. Clamps
C. Ground Terminal

CAUTION

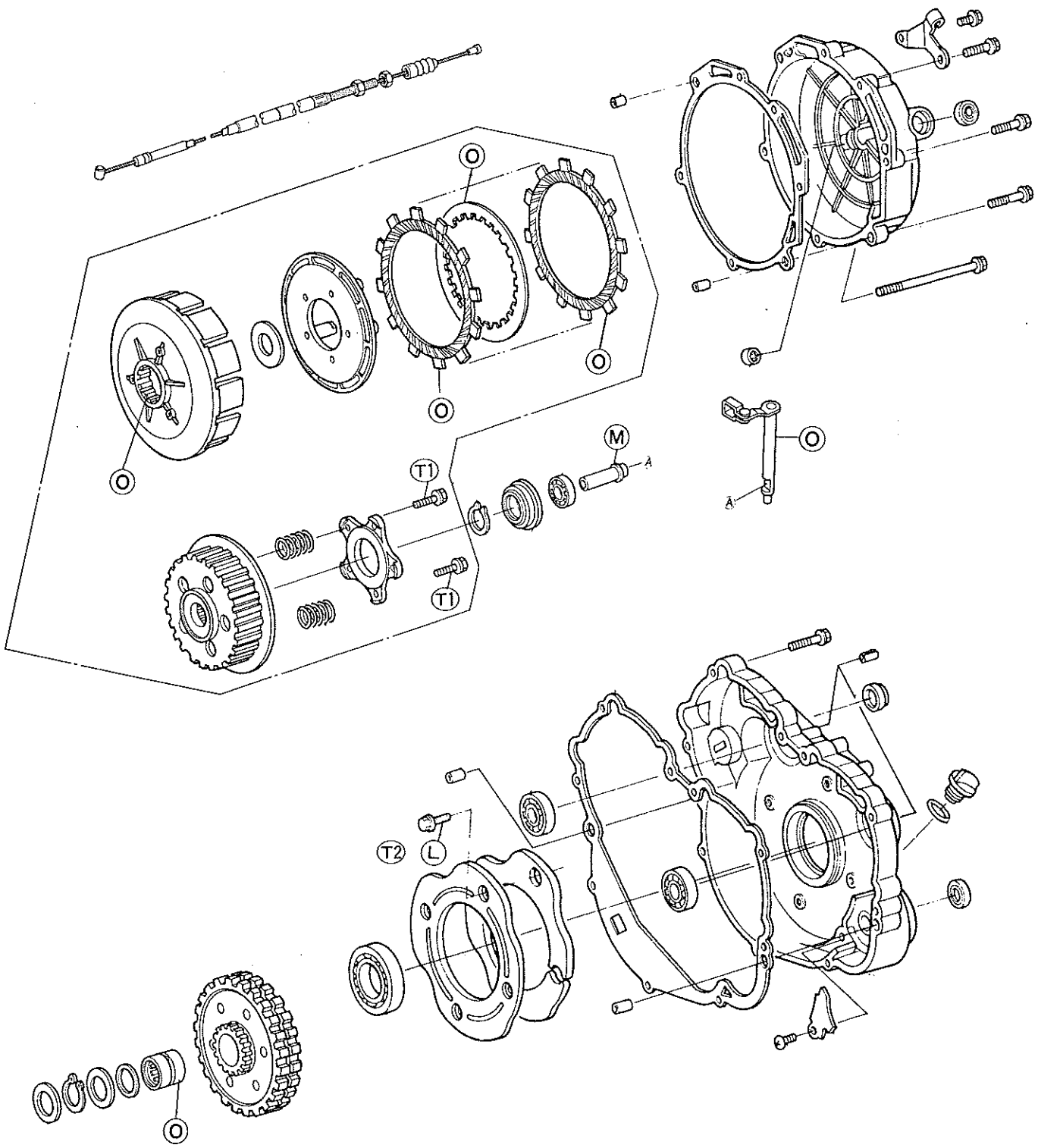
○After rear muffler installation, make sure the wires and the tubes do not touch the muffler.

Clutch

Table of Contents

Exploded View 5-2
Specifications 5-3
Special Tools 5-3
Clutch 5-4
Clutch Lever Play Inspection 5-4
Clutch Lever Play Adjustment 5-4
Clutch Cable Removal 5-5
Clutch Release Removal Note 5-5
Clutch Disassembly 5-5
Clutch Assembly 5-6
Friction Plate Wear, Damage Inspection 5-7
Friction or Steel Plate Warp Inspection 5-8
Clutch Spring Free Length Measurement 5-8
Clutch Housing Finger Inspection 5-8
Clutch Hub Spline Inpsection 5-8
Primary Gear, Clutch Gear 5-8
Primary Gear and Clutch Gear Removal 5-8
Primary Gear Installation 5-9
Primary Gear Timing Procedure 5-10
Primary Gear Disassembly 5-11
Primary Gear Assembly 5-11
Primary Gear Damper Inspection 5-13
Kickstarter 5-13
Kickstarter Removal 5-13
Kickstarter Installation 5-13
Kickstarter Assembly Notes 5-14
Kick Lever Installation 5-14
Right Engine Cover 5-15
Right Engine Cover Cleaning 5-15
Spring Pin Assembly Note 5-15
Cover Damper Installation 5-15
Clutch Cover 5-15
Clutch Cover Installation 5-15
Clutch Cable 5-16
Clutch Cable Installation 5-16

Exploded View



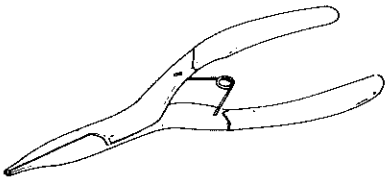
T1: 8.8 N-m (0.9 kg-m, 78 in-lb)
T2: 9.8 N-m (1.0 kg-m, 87 in-lb)
L : Apply a non-permanent locking agent.
M : Apply a molybdenum disulfide grease.
O : Apply transmission oil to the surface.

Specifications

Item	Standard	Service Limit
Clutch:		
Clutch lever free play	0.5 to 1.0 mm	— — —
Clutch spring free length	34.6 – 36.0 mm	34.2 mm
Friction plate thickness	2.9 – 3.1 mm	2.7 mm
Friction and steel plate warp	not more than 0.2 mm	0.3 mm

Special Tools

Circlip Pliers: 57001-144



Bearing Driver: 57001-1160



Clutch

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.

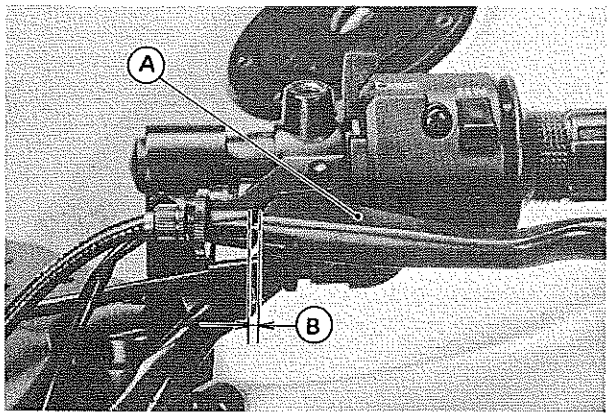
WARNING

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

Clutch Lever Play Inspection

●Check that the clutch lever has **0.5 to 1.0 mm** of play as shown in the figure.

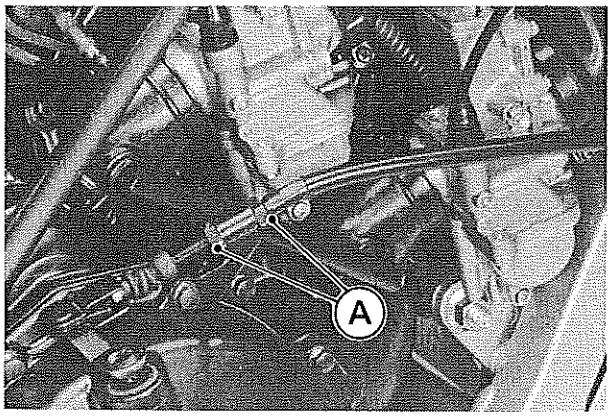
★If the check reveals improper play, adjust the clutch.



A. Clutch Lever B. Play

Clutch Lever Play Adjustment

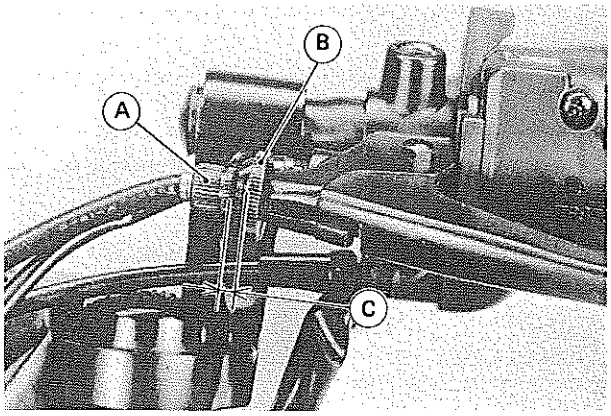
●Loosen both adjuster nuts at the clutch cover as far as they will go.



A. Adjuster Nuts

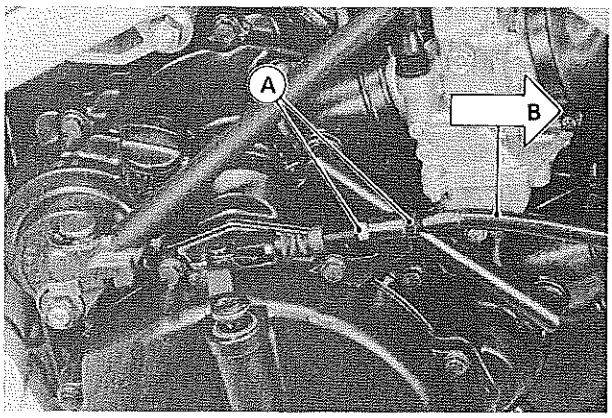
●Loosen the locknut at the clutch lever.

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



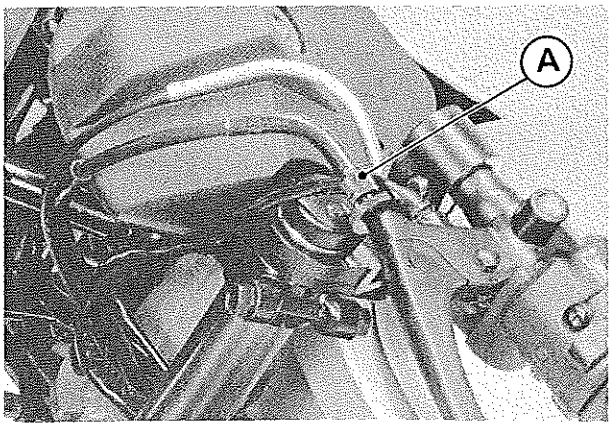
A. Adjuster C. 5 to 6 mm
B. Locknut

●Pull the clutch cable tight and tighten the adjuster nuts against the bracket.



A. Adjuster Nuts B. Pull the clutch cable

●Turn the adjuster at the clutch lever until the free play is correct.



Clutch Lever Free Play
0.5 to 1.0 mm

●Tighten the locknut at the clutch lever.

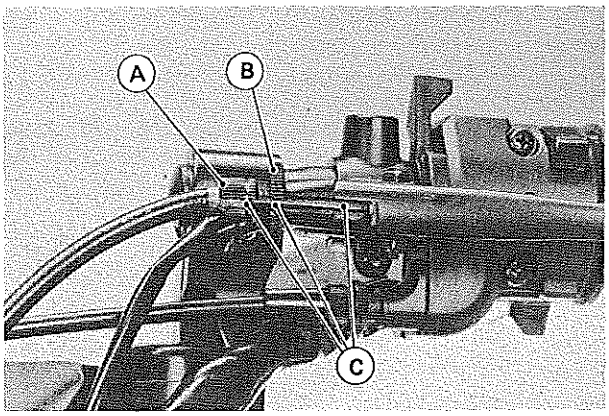
NOTE

○*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 the place later, creating enough cable play to prevent clutch disengagement.*

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

Clutch Cable Removal

●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.
●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.

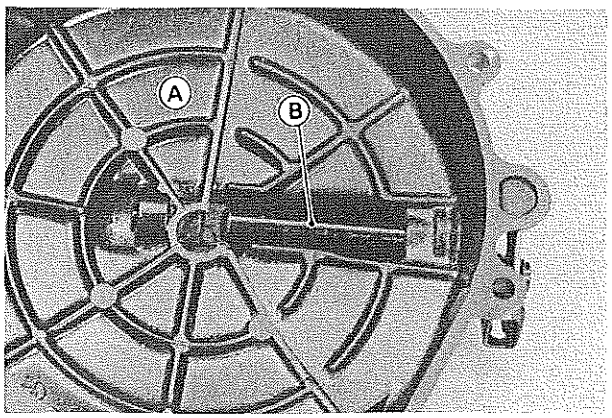


A. Adjuster
B. Knurled Locknut
C. Slot

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

Clutch Release Removal Note

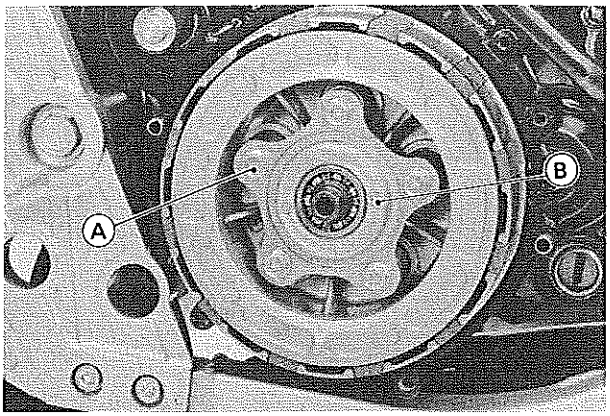
●Remove the clutch cover, and then pull the clutch release shaft out of the cover.



A. Clutch Cover
B. Clutch Release

Clutch Disassembly

●Remove the clutch cable lower end.
●Remove the clutch cover.
★If the clutch springs, friction plates or steel plates are to be disassembled, remove the clutch spring bolts.

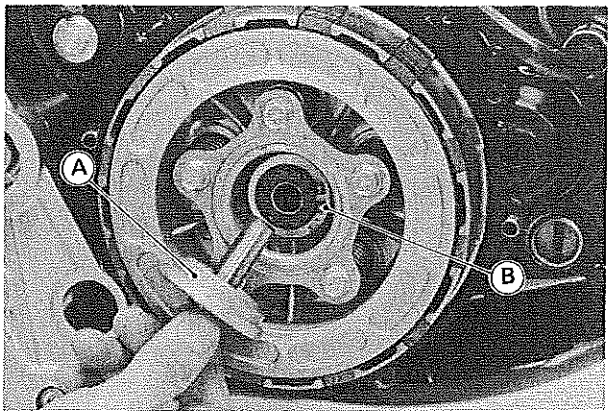


A. Clutch Spring Bolt
B. Bearing Holder

NOTE

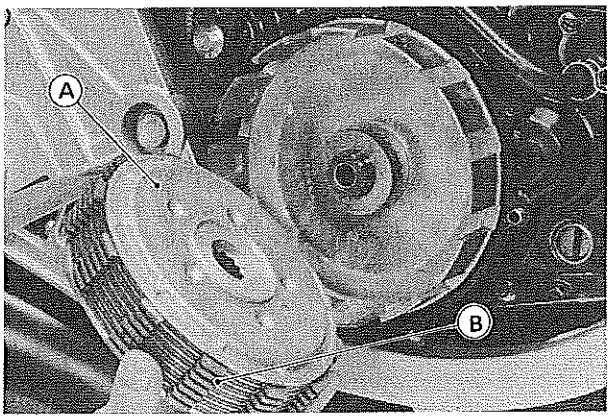
○*It is not necessary to remove the clutch spring bolts for clutch assembly removal.*

●Remove the bearing holder and then the circlip.



A. Bearing Holder
B. Circlip

●Remove the clutch hub and the clutch plates.

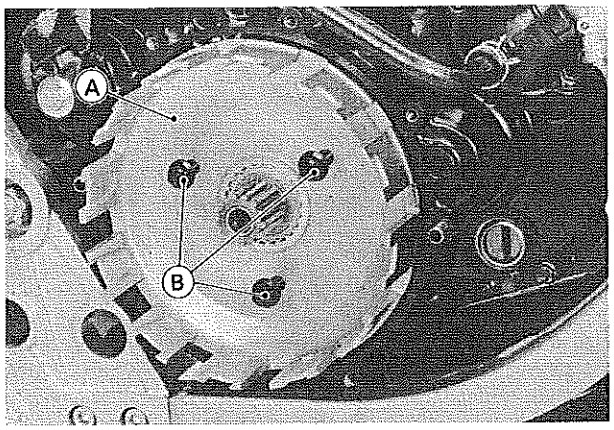


A. Clutch Hub
B. Clutch Plates

●Pull out the clutch housing.
★If the clutch housing is hard to remove, pull it out using three bolts (ϕ8 mm x L20 mm). Screw the three bolts in the housing evenly.

CAUTION

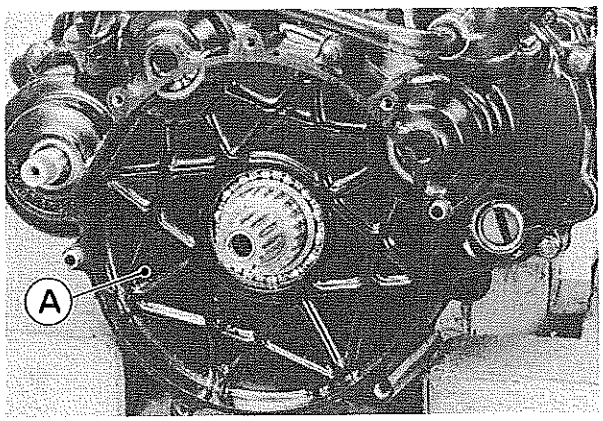
○**Use the round end or the dog point bolts to prevent right engine cover damage.**



A. Clutch Housing B. Bolts

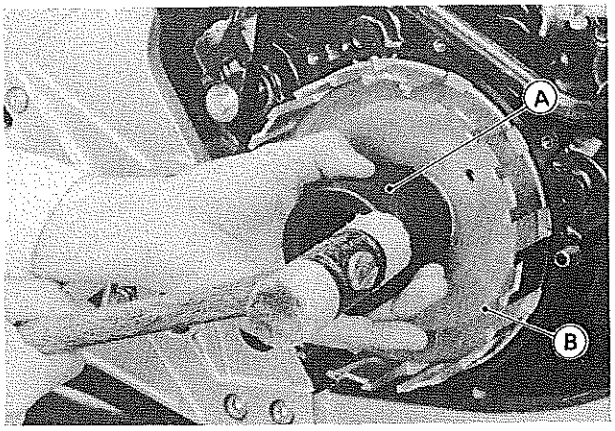
Clutch Assembly

●Install the right engine cover.

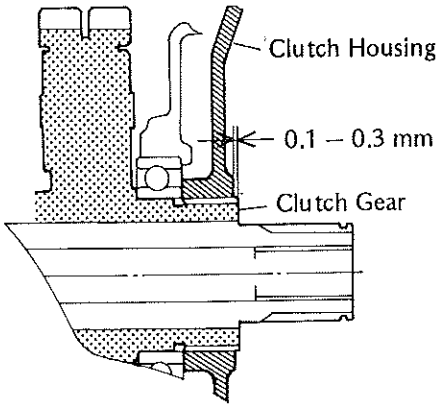


A. Right Engine Cover

●After inserting the clutch housing, install the thrust washer (ϕ47 x ϕ25.5 x t2.5).
★If the clutch housing is hard to install, push it in evenly using the bearing driver (special tool) until the clutch housing end is recessed **0.1 – 0.3 mm** from the clutch gear end.



A. Bearing Driver: 57001-1160 B. Clutch Housing



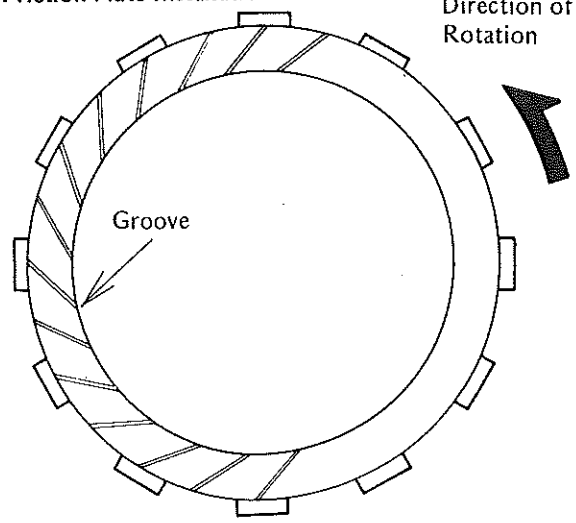
CAUTION

○**Do not push the clutch housing in too strong. This could cause improper disengaging in clutch.**

●Install the friction plates and steel plates, starting with a friction plate and alternating them.

○The grooves on the friction plate surfaces are cut tangentially and radially, install the friction plates so that the grooves run toward the center in the direction of the clutch housing rotation (counterclockwise viewed from the engine right side)

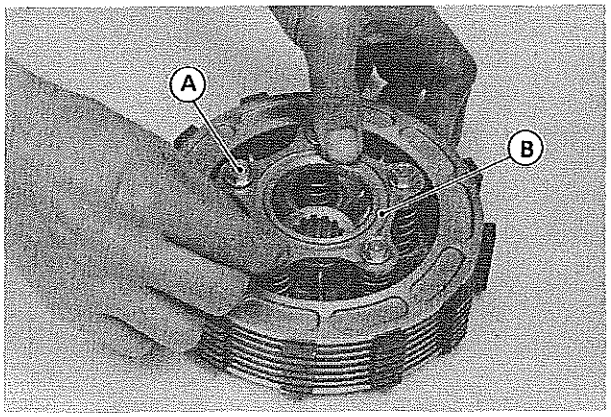
Friction Plate Installation



CAUTION

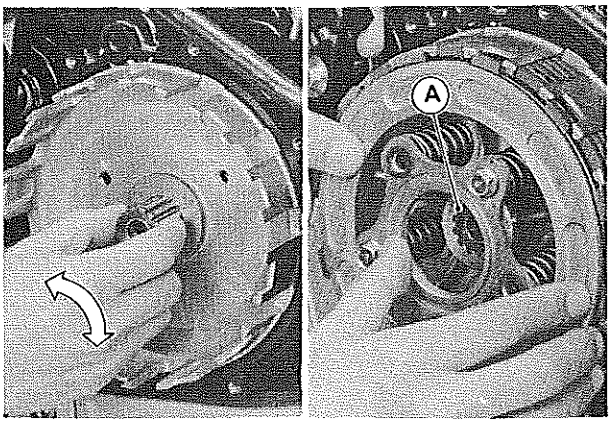
○If new dry steel plates and friction plates are installed, apply engine oil to the surfaces of each plate to avoid clutch plate seizure.

●After installing the clutch springs, tighten the clutch spring bolts fingertight while compressing the holder.



A. Clutch Spring Bolt B. Holder

○Install the clutch hub assembly while hand turning the shaft a little at a time in order to fit the splines. Do not force the clutch hub in order to prevent the hub spline damage.

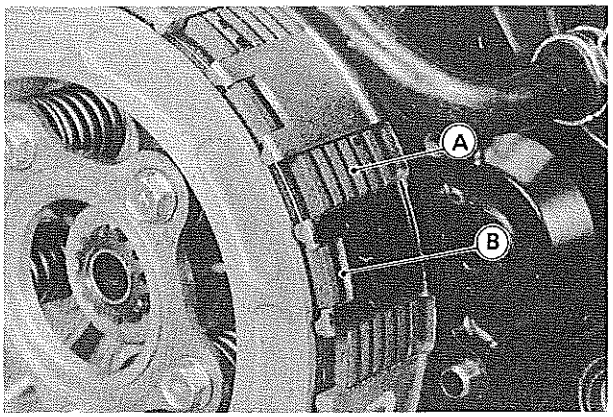


A. Clutch Hub

NOTE

○*First, Install the six friction plates fitting the tangs of plates in the grooves* A *in the clutch housing. And then, install the last one fitting the tangs in the grooves* B *in the housing.*

●Then, tighten the clutch spring bolts to the specified torque.
●Discard the used clutch hub circlip, and install a new one.
●Install the clutch spring plate pusher, applying a molybdenum disulfide grease to the surface.

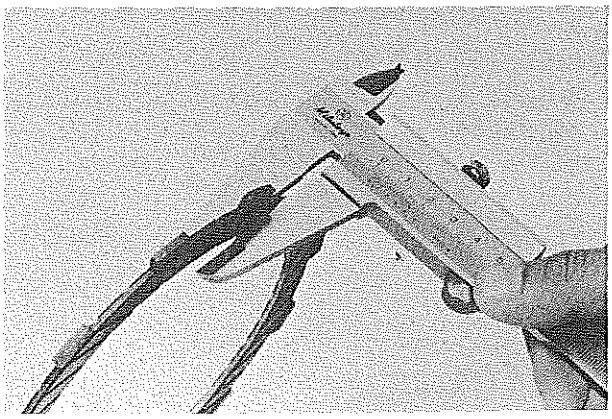


A. Groove A B. Groove B

Friction Plate Wear, Damage Inspection

●Visually inspect the friction plates to see if they show any signs of seizure, overheating, or uneven wear.
★If any plates show signs of damage, replace the friction plates and steel plates as a set.

Friction Plate Thickness Measurement



Friction Plate Thickness

Standard	**2.9 – 3.1 mm**
Service Limit	**2.7 mm**

Friction or Steel Plate Warp Inspection

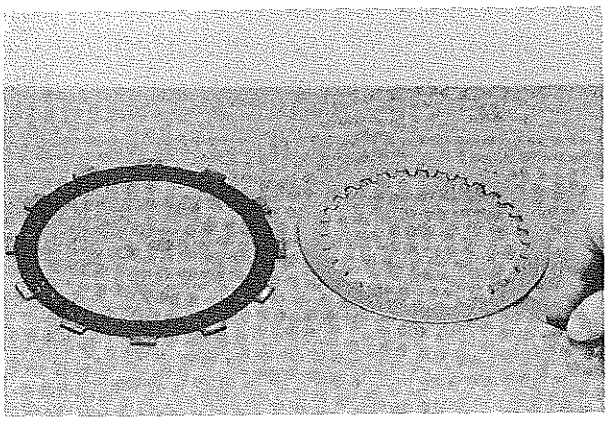
●Place each friction plate or steel plate on a surface plate, and measure the gap between the surface plate and each friction plate or steel plate. The gap is the amount of friction or steel plate warp.

★If any plate is warped over the service limit, replace it with a new one.

Friction and Steel Plate Warp

Standard:	**less than 0.2 mm**
Service Limit:	**0.3 mm**

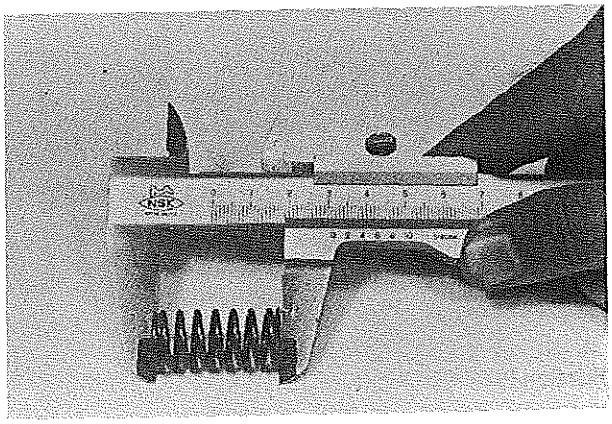
Friction and Steel Plate Warp Measurement



Clutch Spring Free Length Measurement

Clutch Spring Free Length

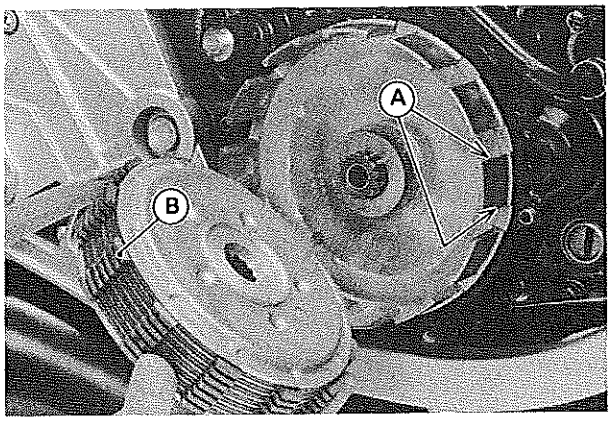
Standard	**34.6 – 36.0 mm**
Service Limit	**34.2 mm**



Clutch Housing Finger Inspection

●Visually inspect the fingers of the clutch housing where the tangs of the friction plates hit them.

★If they are badly worn or if there are grooves cut where the tangs hit, replace the housing. Also, replace the friction plates if their tangs are damaged.

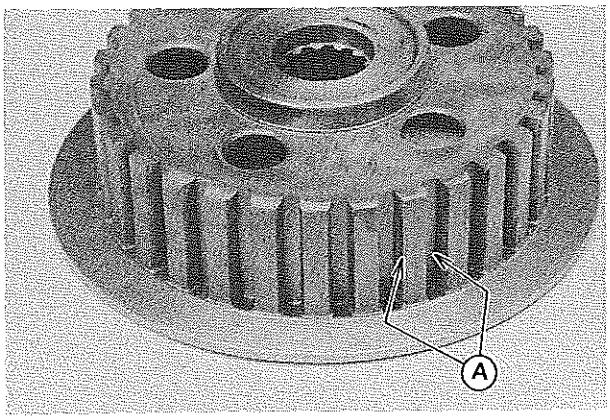


A. Clutch Housing Finger B. Friction Plate Tang

Clutch Hub Spline Inspection

●Visually inspect where the teeth on the steel plates wear against the splines of the clutch hub.

★If there are notches worn into the splines, replace the clutch hub. Also, replace the steel plates if their teeth are damaged.



A. Clutch Hub Spline

Primary Gear, Clutch Gear

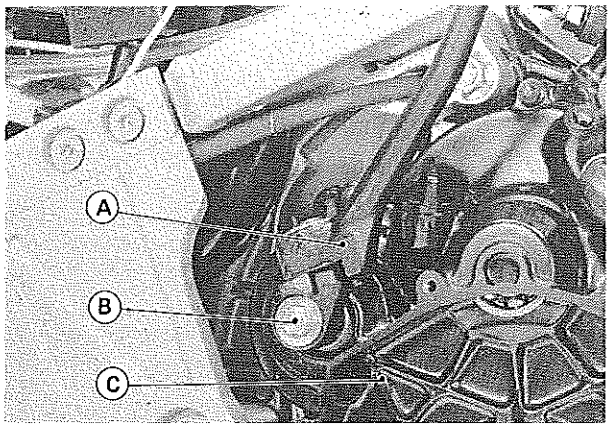
Primary Gear and Clutch Gear Removal

●Remove the carburetors (see Fuel System).

●Remove the clutch.

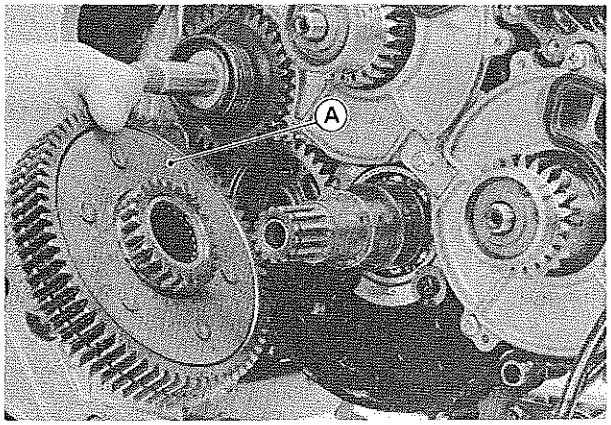
●Remove the kick lever assembly by taking off the mounting nut.

●Remove the right engine cover.



A. Kick Lever Assembly
B. Nut
C. Right Engine Cover

●Remove the clutch gear.

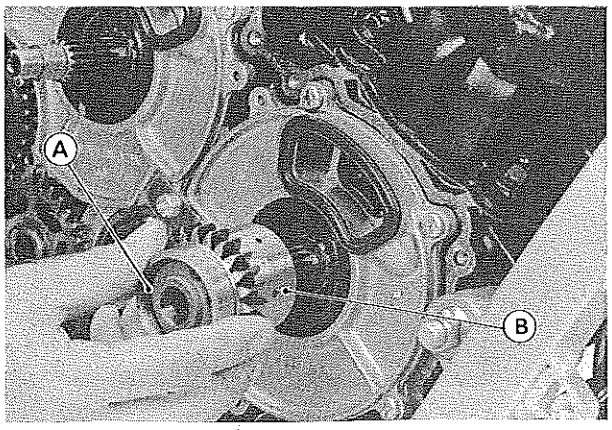


A. Clutch Gear

●Pull out the primary gears (with a built–in damper).

NOTE

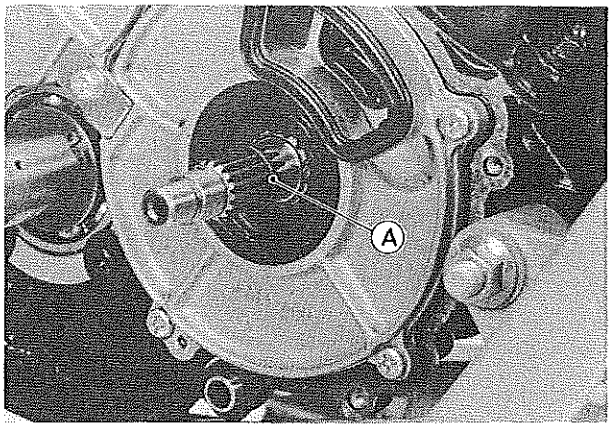
○*It is not necessary to remove the primary gear circlips for primary gear removal.*



A. Circlips
B. Primary Gears

Primary Gear Installation

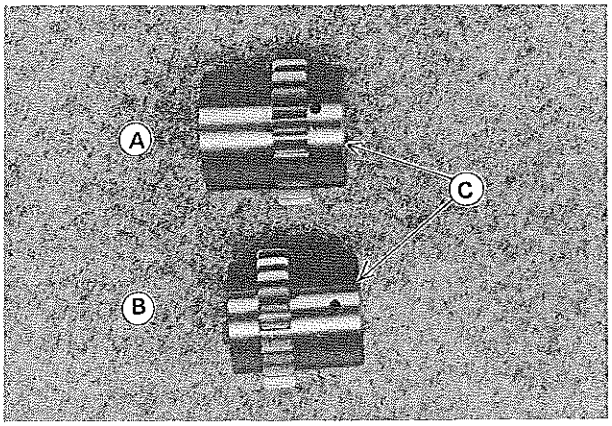
●Be sure to install the front and rear crankshaft O-rings.



A. O-ring

NOTE

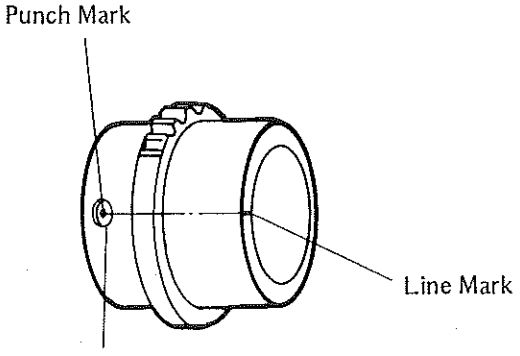
○*The front and rear primary gears have different gear positions as shown. Be careful not to mix up these gears.*



A. Front Primary Gear
B. Rear Primary Gear
C. Large Chamfered End

●Before installing the primary gears, check to see that the damper cam punch mark is visible through the location hole.

★If the mark is not visible, align the punch mark with a hole on the extention of the line mark (see Primary Gear Assembly).

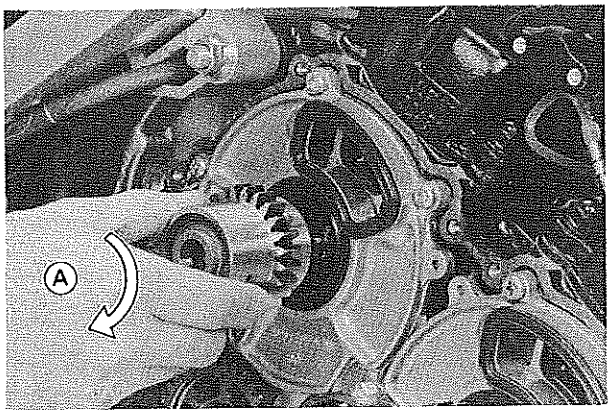


Primary Gear Timing Procedure

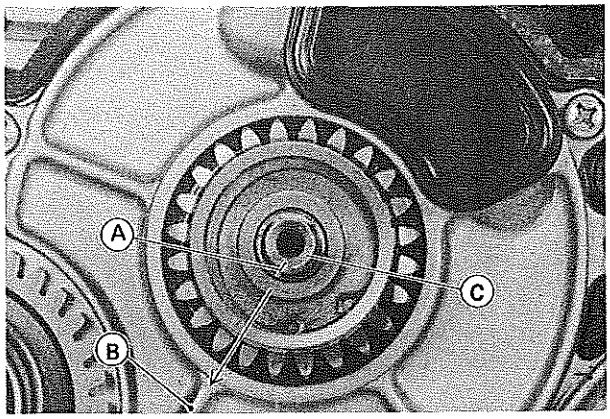
●Install the rear primary gear with the teeth located inboard.

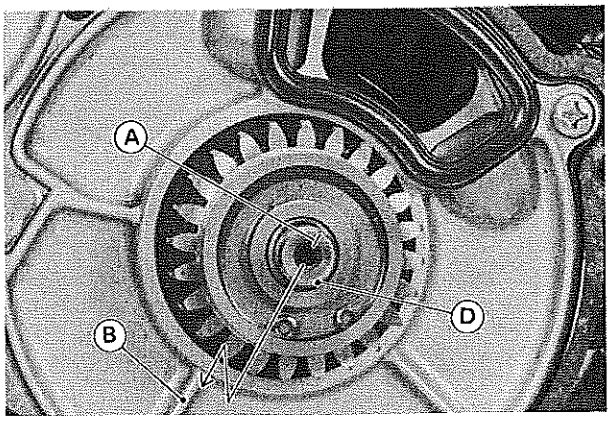
CAUTION

○**Install each primary gear while hand turning it in order to prevent the oil seal lip damage.**



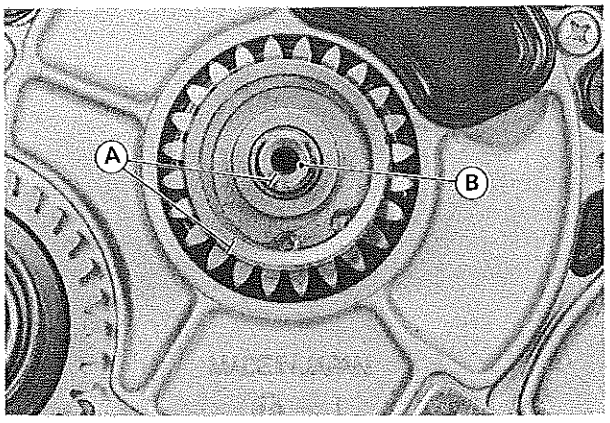
A. Hand turn the primary gear.





A. Marks
B. Rib
C. Rear Crankshaft
D. Front Crankshaft

●When installing the primary gears, align the gear marks with the crankshaft marks respectively as shown.



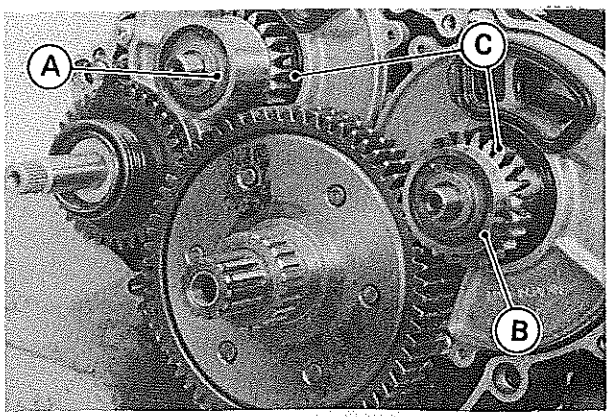
A. Line Marks
B. Crankshaft

●Position the front crankshaft at TDC and the rear crankshaft at BDC.

○Then, the mark on the front crankshaft is up, and the mark on the rear crankshaft down. Besides each mark direction aligns with the rotary valve cover rib line.

●After inserting the two washers, install the clutch gear.

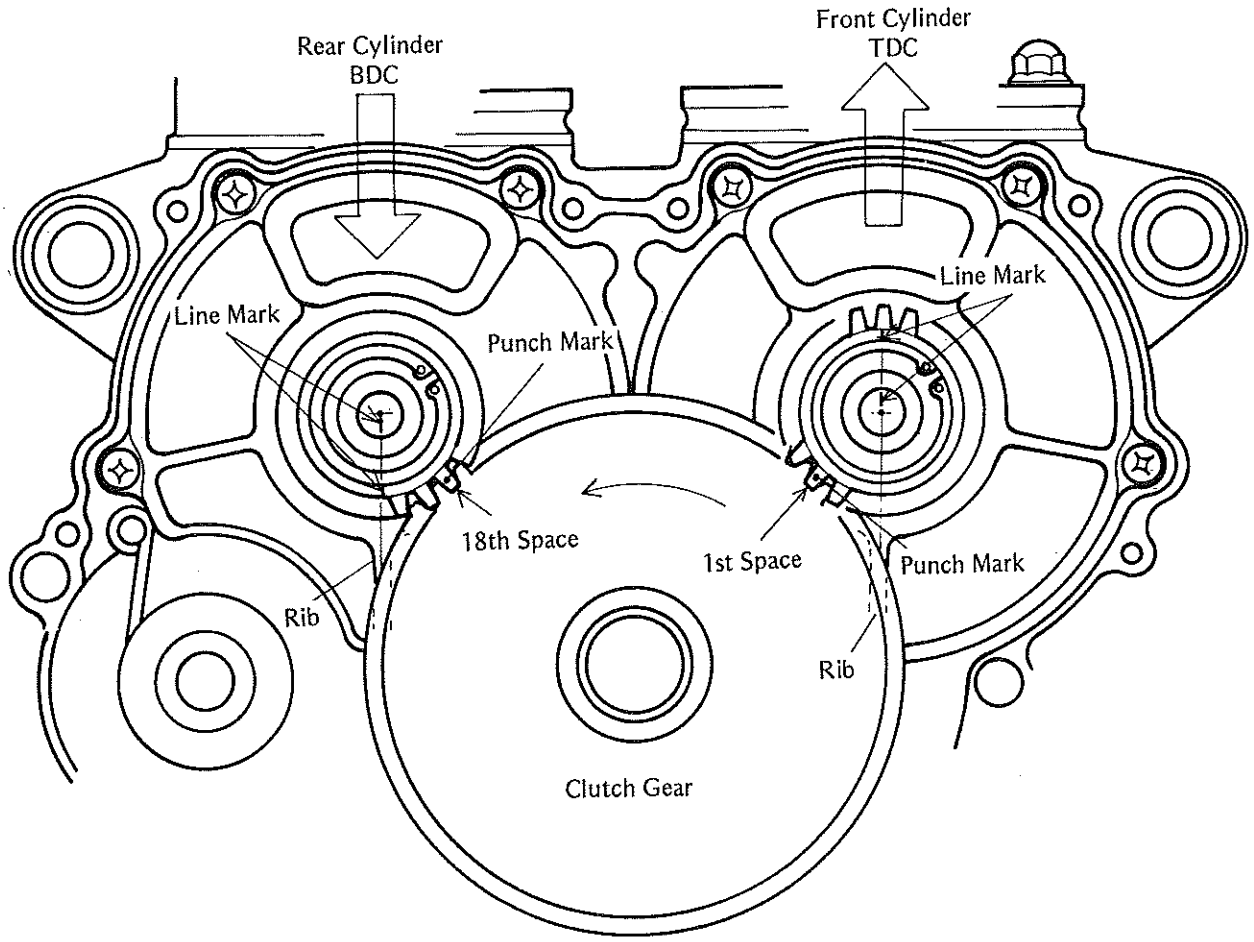
●Finally install the front primary gear with the teeth located outboard.



A. Rear Primary Gear
B. Front Primary Gear
C. Gear Teeth

Primary Gear Timing (Righthand View)

○The following figure shows the locations among the marks, the primary gears and the clutch gear after correct installation.

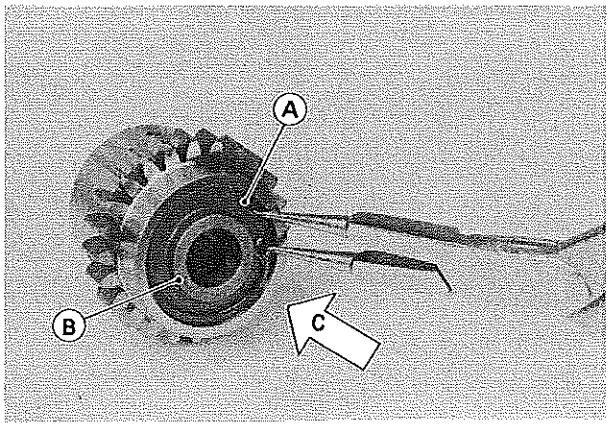


Primary Gear Disassembly

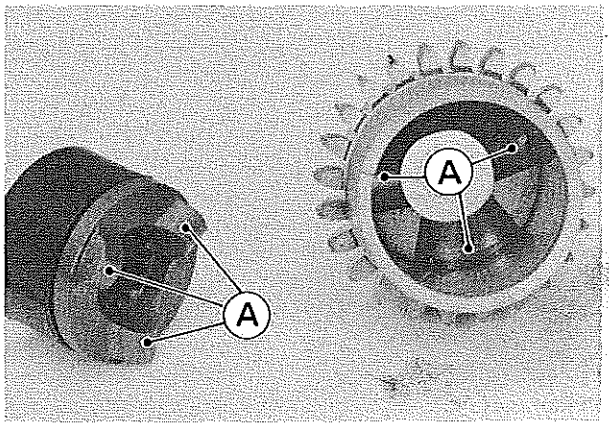
- Remove the primary gear
- Take off the circlip while compressing the retainer boss.

Primary Gear Assembly

- Apply a molybdenum disulfide engine assembly grease to the cam surfaces of the damper cams and primary gears.



A. Circlip
B. Retainer
C. Press here.

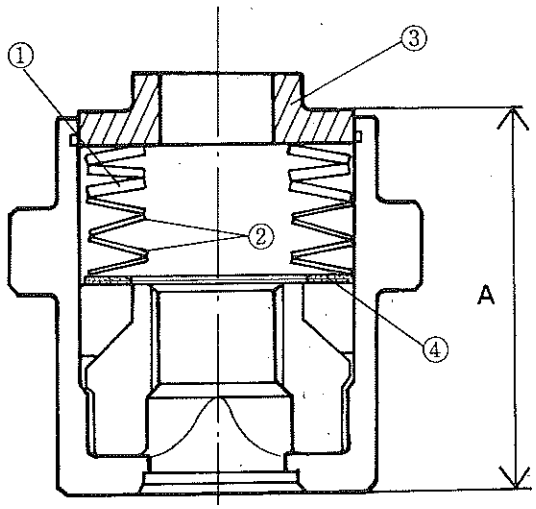


A. Cam Surfaces

●Select the washers using the following steps in order to keep the variation in the damper spring load at minimum.

○First, insert two washers **1.2 mm** thick and place the thin springs (4), the thick springs (3) and then the retainer in this order, being careful of the installation direction.

Washer Selection



1. Thick Damper Springs
2. Thin Damper Springs
3. Retainer
4. Washer

○Next, measure the dimension **A**.

Dimension A

Standard : 50.3 – 50.7 mm

○Finally, select washers according to the table below and install them.

Washer Selection

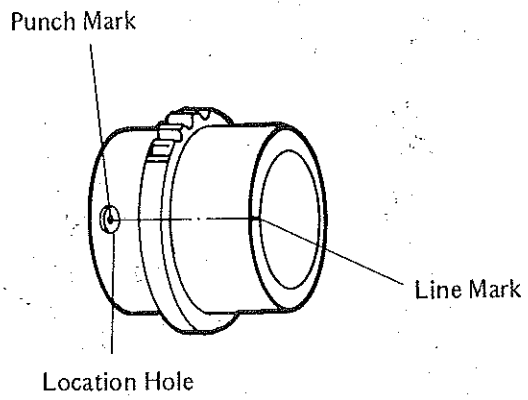
Dimension A not less than – less than	Thickness and Nos.
51.5 mm	1.2 mm
51.1 – 51.5 mm	0.8 mm x 2
50.7 – 51.1 mm	0.8 mm + 1.2 mm
50.3 – 50.7 mm (specified dimension)	**1.2 mm x 2 (no change required)**
49.9 – 50.3 mm	0.8 mm x 2 + 1.2 mm
49.5 – 49.9 mm	0.8 mm + 1.2 mm x 2

Washer Part Nos.

t0.8 mm : 92022-1616
t1.2 mm : 92022-213

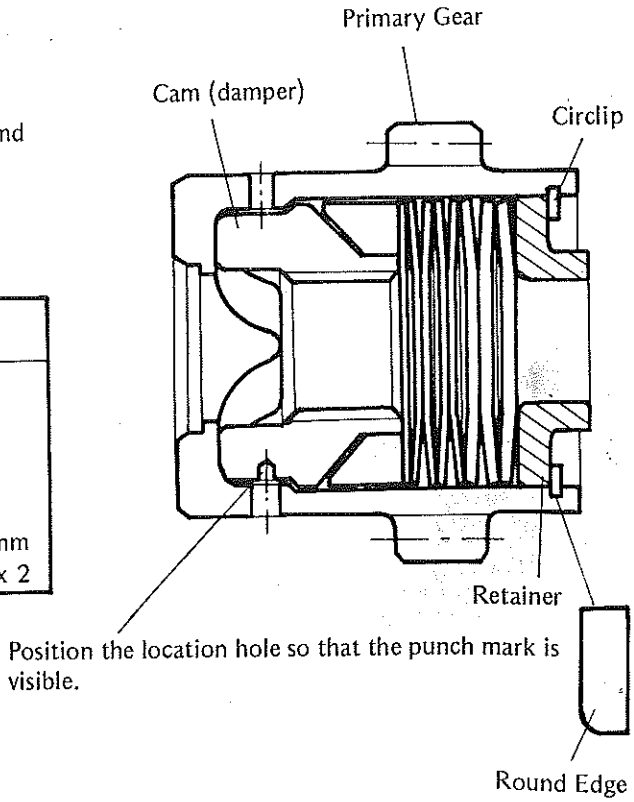
●Align the damper cam punch mark with one of the primary gear holes spaced equally round the circumference.

○Select a locating hole on the extention of the line mark from among the holes.



●Install the circlip with the round edge faces in to prevent the circlip from slipping out.

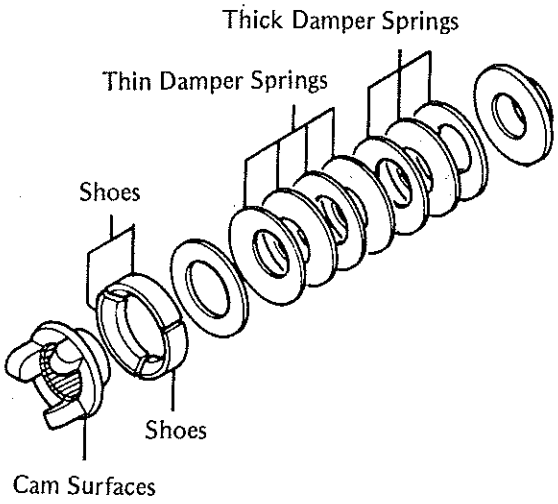
●Fit a new circlip into the groove, while pushing the retainer only enough to install the circlip and no more.



Primary Gear Damper Inspection

- Visually inspect the cam surfaces of the primary gears and the damper cams.
- ★If they are badly worn, replace the primary gears and the damper cams.
- Visually inspect the damper springs for cracks or other damage.
- ★If they are damaged, replace them with new ones.
- Visually inspect the damper shoes.
- ★If the abnormal wear or the exposed base metal is found, replace all the damper shoes.

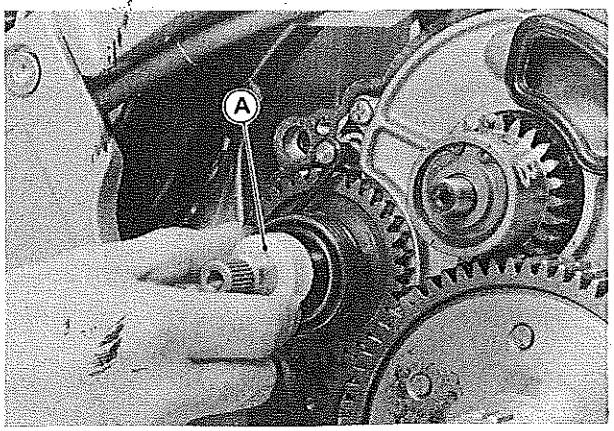
Primary Gear Damper



Kickstarter

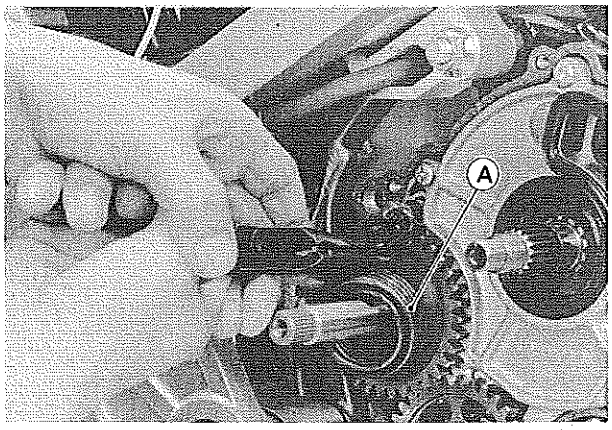
Kickstarter Removal

- Remove the clutch gear and the primary gears.
- Pull off the kick spring guide.



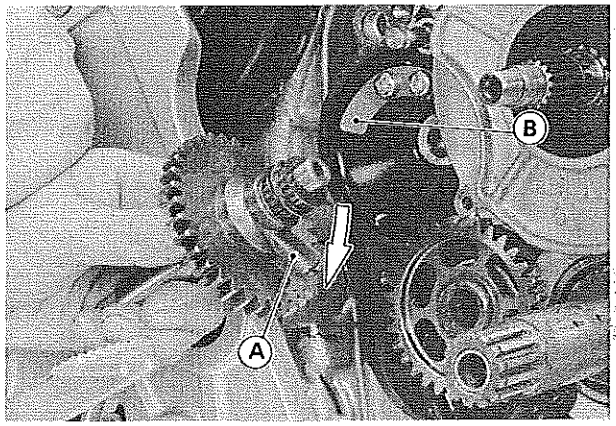
A. Kick Spring Guide

- Remove the kickstarter spring.



A. Spring

- Remove the kick shaft assembly, twisting it counterclockwise.

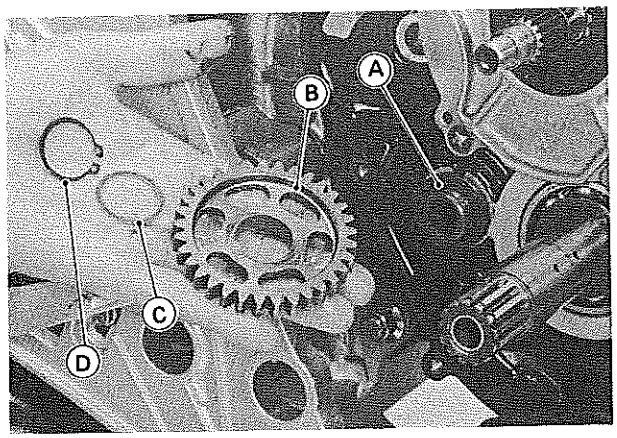


A. Ratchet B. Kick Guide

- Remove the circlip and pull out the kick idle gear.

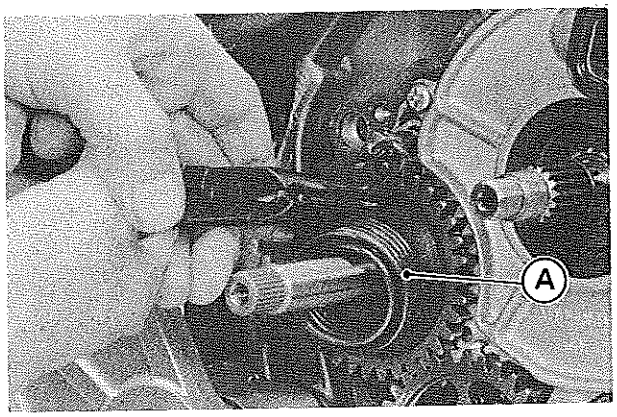
Kickstarter Installation

- Apply a little molybdenum disulfide grease to the bearing housing of the kick idle gear.
- Install the idle gear being careful of the installation direction.
- Install the washer, idle washer, and circlip in that order.



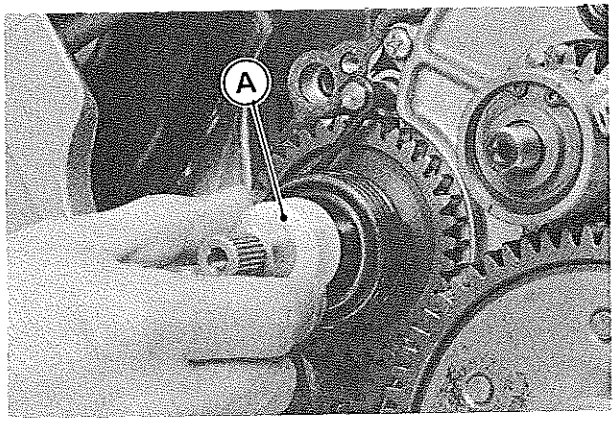
A. Washer
B. Idle Gear
C. Washer
D. Circlip

●With needle nose pliers, insert the end of the kick spring on the pin.



A. Kick Spring

●Push in the kick spring guide completely.

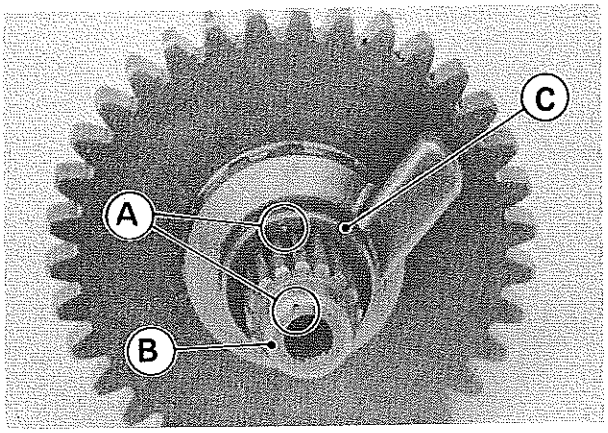


A. Kick Spring Guide

Kickstarter Assembly Notes

NOTE

○*When installing the ratchet on the kick shaft, align the ratchet punch mark with the punch mark on the kick shaft.*



A. Align the marks
B. Kick shaft
C. Ratchet

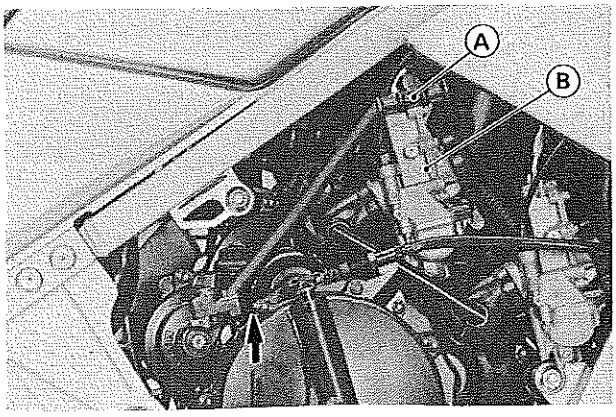
CAUTION

○**Misalignment of the ratchet gear changes the kick spring preload. Light preload could cause mechanism noise, while heavy preload could weaken or break the spring.**

Kick Lever Installation

●Install the kick lever so that the pedal is located beside the rear carburetor.

○Make sure the lever does not touch the fuel tank or the right engine cover.

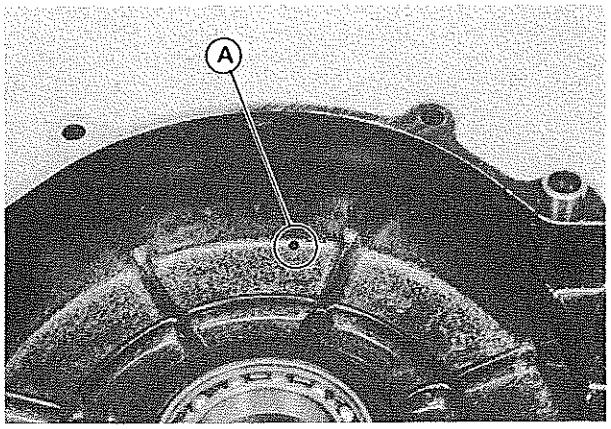


A. Pedal
B. Rear Carburetor

Right Engine Cover

Right Engine Cover Cleaning

●Blow the oil passage clean with compressed air.



A. Oil Passage

Spring Pin Assembly Note

●Press the new spring pins in the right engine cover so that the grooves face up with the engine unit installed on the frame. The pins supply oil to the primary gear dampers.

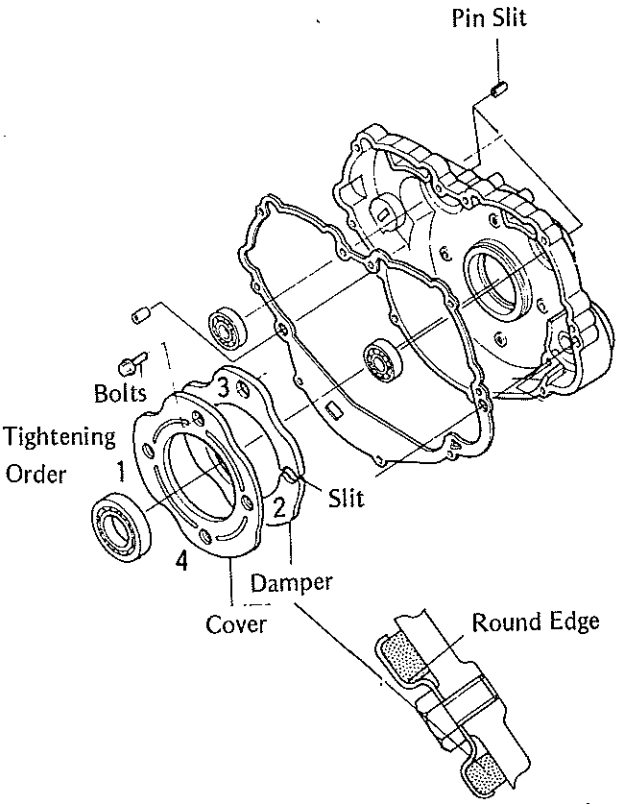
CAUTION

○**Improper spring pin installation could cause mechanical noise.**

Cover Damper Installation

●Position the damper slit as shown.
●Install the damper so that the damper's round edge faces the damper cover.
●If the damper mounting bolts are used ones, apply a non-permanent locking agent to the threads.
●Tighten the damper mounting bolts to the specified torque in the order of index number.

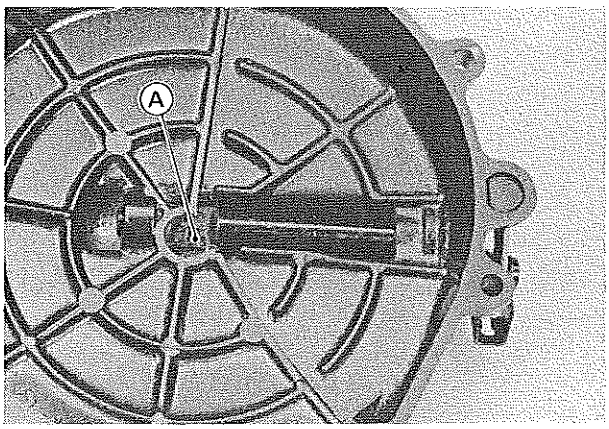
Clutch Damper Installation



Clutch Cover

Clutch Cover Installation

●Install the clutch cover with the clutch release flat surface faced to the front.

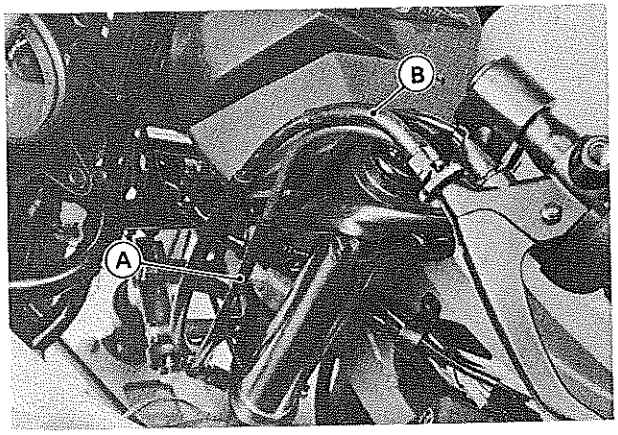


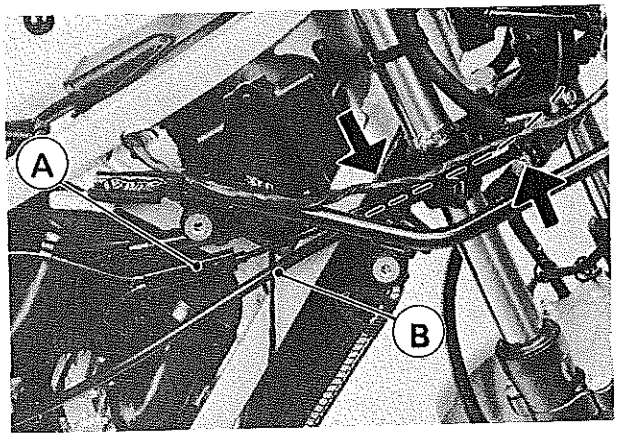
A. Flat Surface

Clutch Cable

Clutch Cable Installation

- Run the clutch cable along with the choke cable from the left side of the headpipe, to the bottom of the fork underbracket and to the left of the radiator cap.





A. Choke Cable B. Clutch Cable

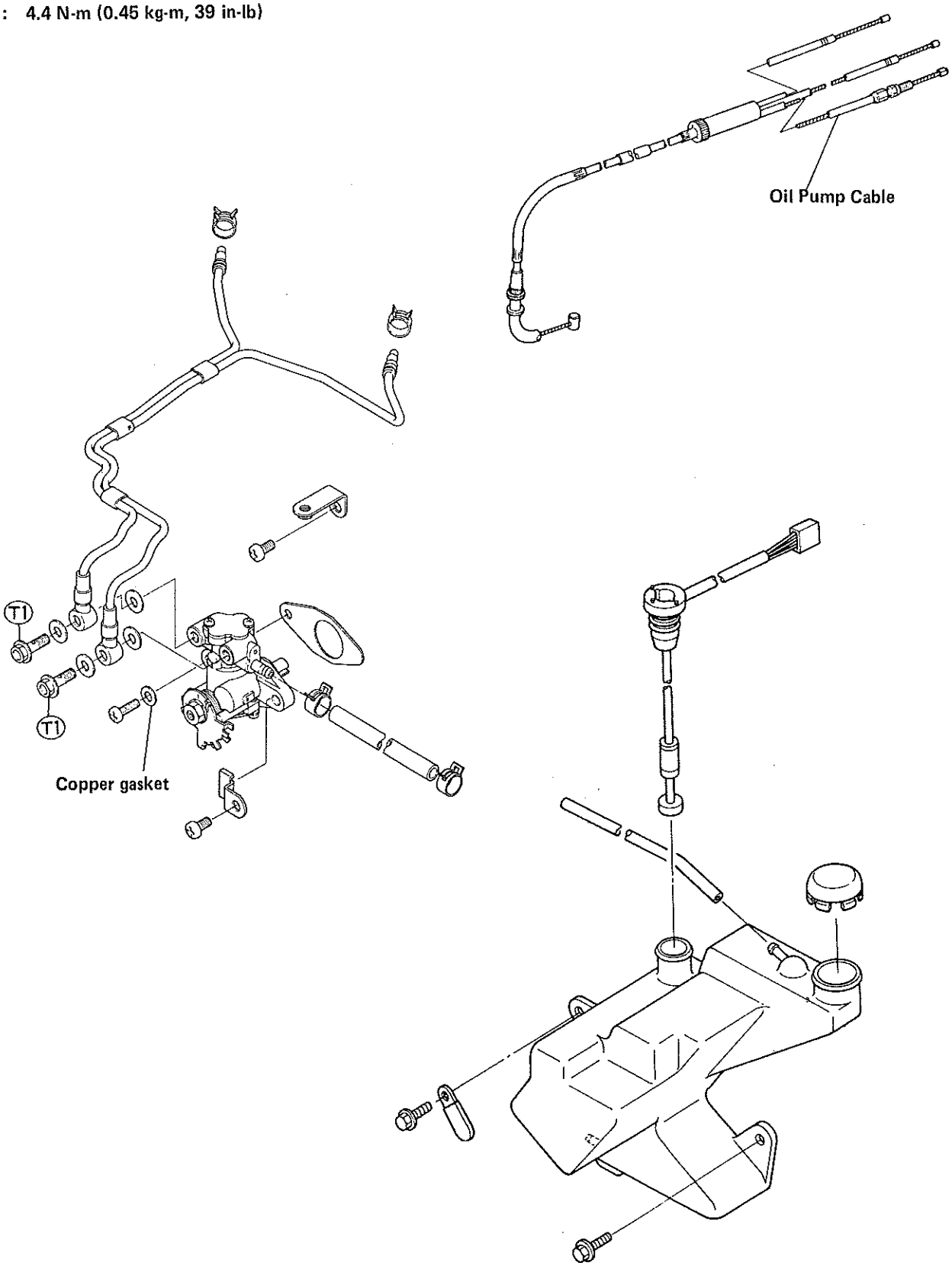
Engine Lubrication System

Table of Contents

Exploded View 6-2
Specifications 6-3
Transmission Oil 6-4
Oil Level Inspection 6-4
Oil Changing 6-4
Oil Pump and Carburetor Synchronization 6-5
Synchronization Inspection 6-5
Synchronization Adjustment 6-5
Engine Oil Pump 6-6
Bleeding the Oil Pump 6-6
Oil Pump Performance Test 6-6
Oil Pump Check Valve Inspection 6-7
Oil Pump Removal 6-7
Oil Pump Installation Notes 6-8
Oil Pump Assembly Caution 6-9
Engine Oil Tank 6-9
Removal Note 6-9
Oil Tank Installation Note 6-9

Exploded View

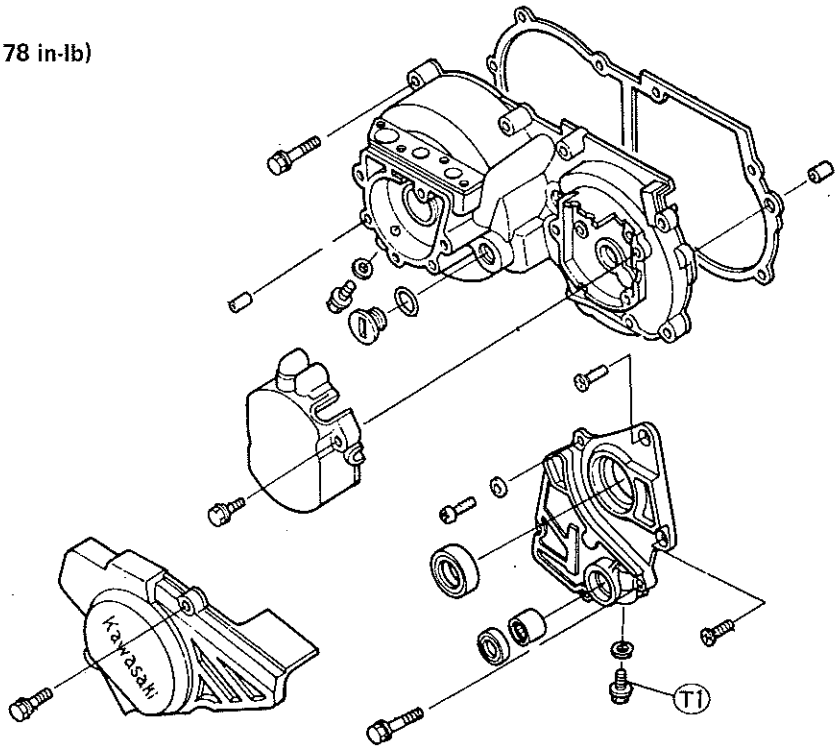
T1: 4.4 N-m (0.45 kg-m, 39 in-lb)



Specifications

Item		Standard	Service Limit
Engine Lubrication System:			
Transmission oil:	Grade	SE class	
	Viscosity	SAE 10W30 or 10W40	
	Amount	1.1 L	
Engine oil pump:	Oil pump output @2,000 r/min (rpm), 3 min.	3.7 – 4.6 mL (per one outlet)	– – –

Transmission Drain Plug
T1: 8.8 N-m (0.9 kg-m, 78 in-lb)



Transmission Oil

In order for the transmission and clutch to function properly, always maintain the transmission oil at the proper level and change the oil periodically.

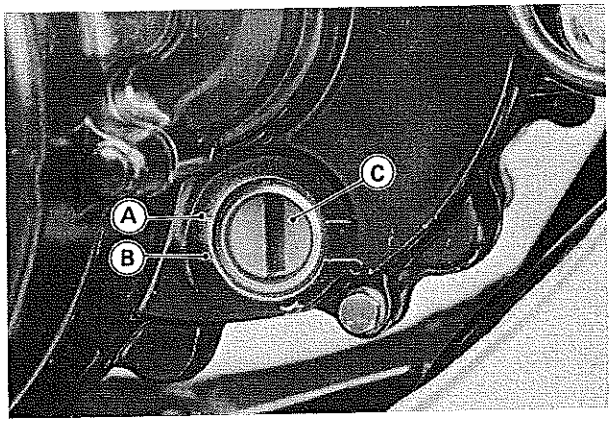
WARNING

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

Oil Level Inspection

- If the motorcycle has just been used, wait several minutes for all the oil to drain down.
- If the oil has been poured in since the motorcycle was last used, kick the engine over 3 or 4 times with the ignition switch left in the OFF position. This ensures that the oil will "settle".
- Situate the motorcycle so that it is perpendicular to the ground.
- Check the oil level through the oil level gauge.

★The oil level should come up between the upper and lower levels.



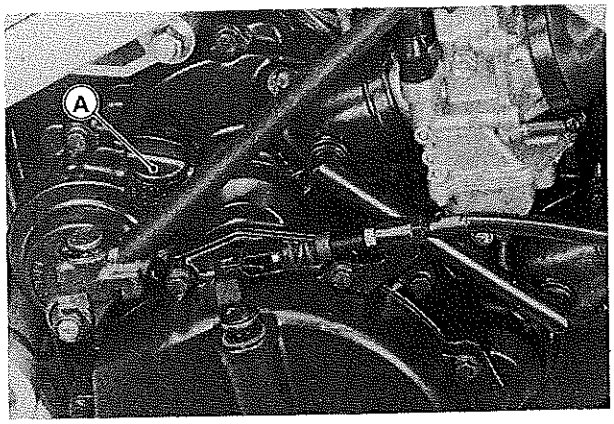
A. Upper Level
B. Lower Level
C. Oil Level Gauge

★If the oil level is too high, remove the excess oil, using a syringe or some other suitable device.

★If the oil level is too low, add oil through the oil filler opening. Use the same type and make of oil that is already in the engine.

NOTE

○If the oil must be refilled but the type and brand of the oil that already is in the engine are unidentified, change the oil in the engine completely.

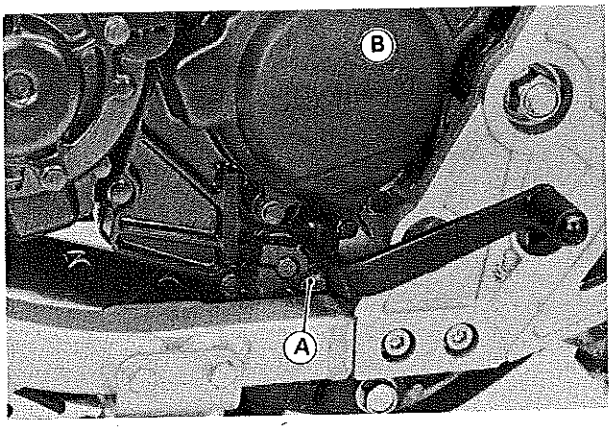


A. Oil Filler Opening Plug

- Install the oil filler opening plug.

Oil Changing

- Warm up the engine thoroughly so that the oil will pick up any sediment and drain easily. Then stop the engine.
- Place an oil pan beneath the engine.
- Remove the transmission drain plug.



A. Transmission Drain Plug B. Chain Cover

- With the motorcycle perpendicular to the ground, let the oil completely drain.
- After the oil has completely drained, install the drain plug with its gasket. Proper torque for it is shown in Exploded Views.

NOTE

○Replace the damaged gasket with a new one.

- Fill the engine up to the proper level with a transmission oil specified in the table.
- Check the oil level.

Transmission Oil

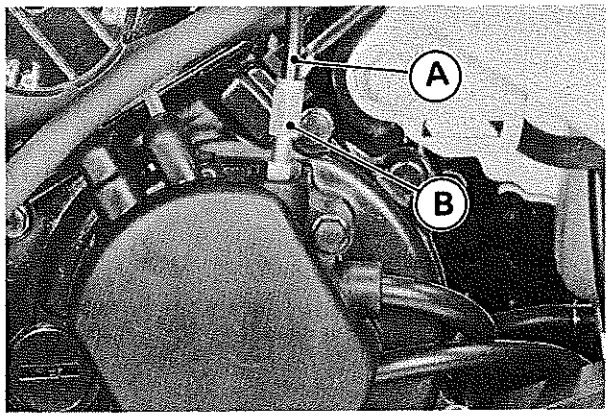
Grade	:	**SE class**
Viscosity	:	**SAE 10W30 or 10W40**
Capacity	:	**1.1 L**

Oil Pump and Carburetor Synchronization

Oil pump cable stretch will upset the synchronization between the oil pump and the carburetor, necessitating pump cable adjustment.

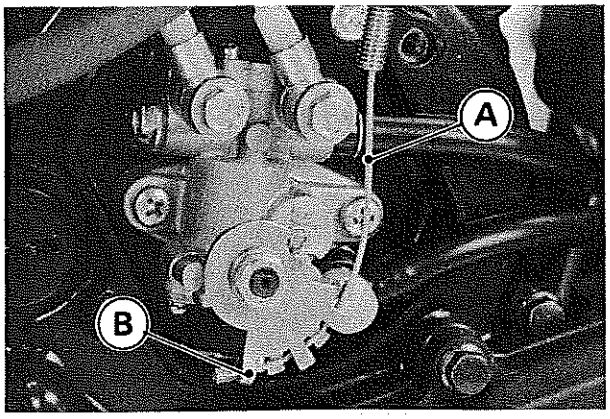
Synchronization Inspection

- Check the throttle grip play. (see Throttle Grip Inspection).
- Remove the oil pump cover.
- Check to see that the outer cable end of the oil pump is fully seated in the cable adjuster.



A. Outer Cable B. Cable Adjuster

- Make sure the tab on the oil pump lever is bent to hold the oil pump inner cable securely.



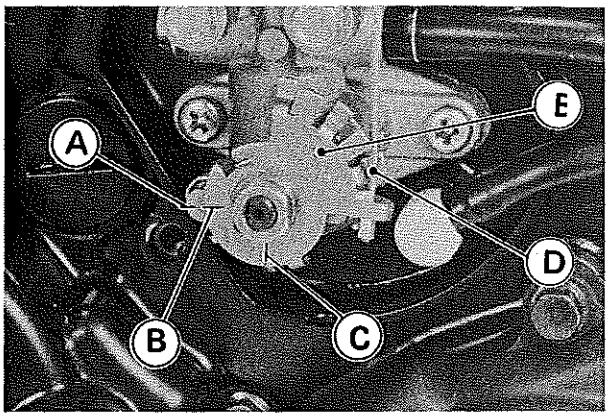
A. Inner Cable B. Tab

- Turn the throttle grip fully, and check to see if the synchronization mark on the pump lever alignes with the mark on the lever stop.

NOTE

○*The pump lever has two marks on it. One is the synchronization mark which is used to check the oil pump synchronization, and the other is the idle mark which is not used during oil pump synchronization.*

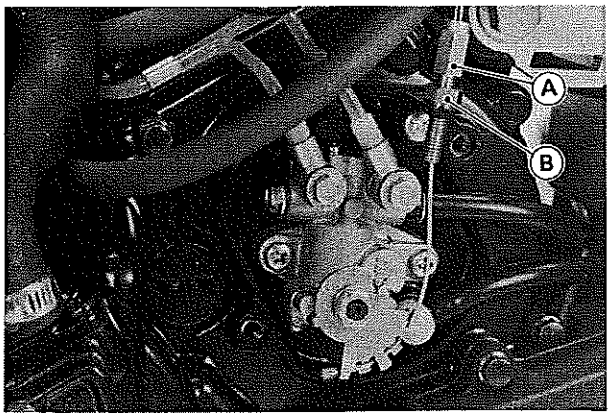
★If they do not line up, adjust the oil pump cable as follows.



A. Mark on Lever Stop
B. Synchronization Mark
C. Idle Mark
D. Inner Cable
E. Pump Lever

Synchronization Adjustment

- Loosen the oil pump cable adjuster locknut, and turn the adjuster to synchronize the pump with the carburetor.



A. Cable Adjuster B. Locknut

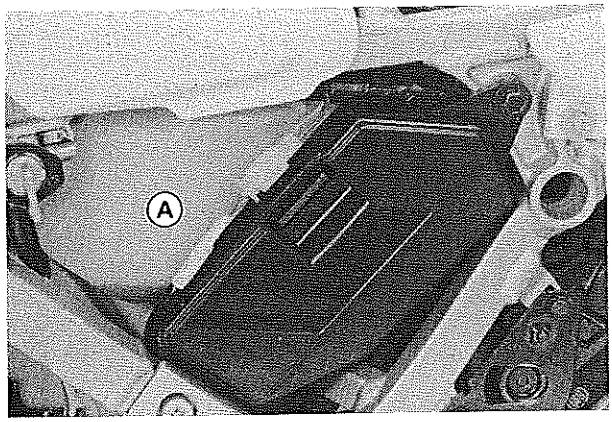
- Tighten the locknut, and check the pump synchronization. Re-adjust if necessary.
- Install the oil pump cover.

Engine Oil Pump

Bleeding the Oil Pump

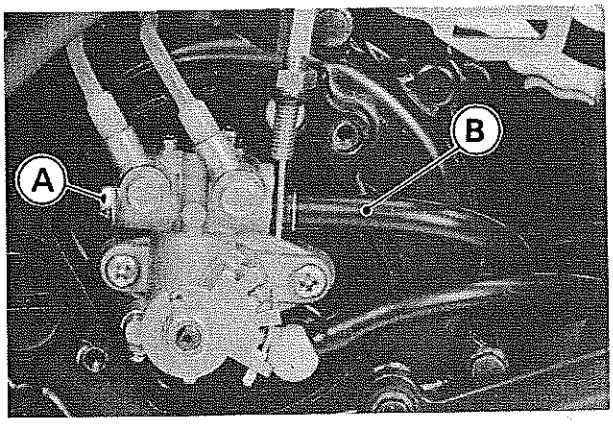
When either of the oil pump hoses has been removed, air may become trapped inside, which will obstruct oil flow.

- First check that there is plenty of engine oil in the oil tank.



A. Oil Tank

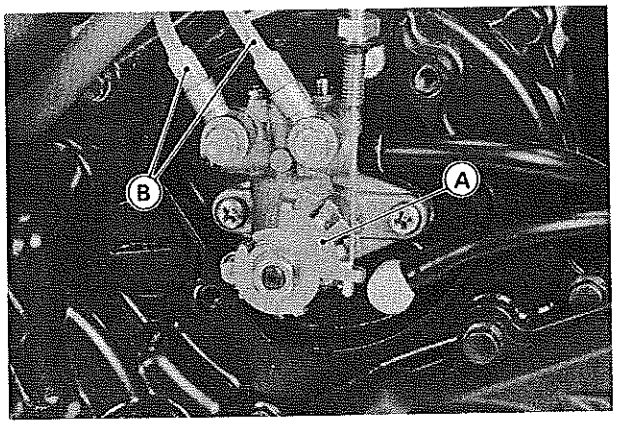
- Remove the oil pump cover.
- Bleed the air from the oil pump inlet hose and oil pump body by backing out the bleeder bolt on the oil pump body a couple of turns. Leave it until the oil flows out of the bleeder bolt, and tighten the bolt securely.



A. Bleeder Bolt B. Inlet Hose

- Bleed the air from the outlet hoses with the engine idling (below **2,000 rpm**), and with the oil pump lever opened fully to maximize the pump output by pulling the oil pump cable outer tube.
- Keep the engine idling until the air is completely pumped out.

★If air bubbles continue to appear in the outlet hoses, check the oil hose connections at the pump and tank.



A. Oil Pump Lever: opened fully B. Outlet Hose

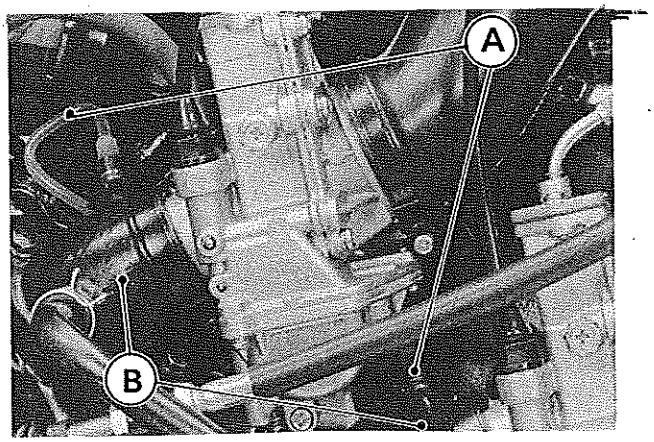
Oil Pump Performance Test

CAUTION

- **Use a 30:1 mixture of gasoline to oil in the fuel tank or the optional fuel tank in place of the gasoline normally used.**
- **Make sure the work area is well ventilated.**

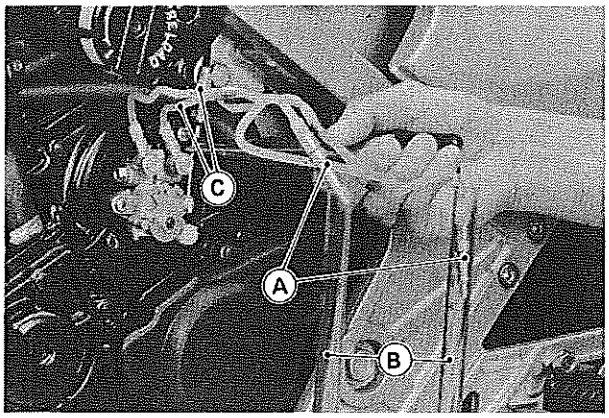
If a drop in oil pump performance is suspected, check the rate that the oil is being pumped.

- Remove the oil pump cover.
- Remove the oil pump outlet hoses from the carburetor holders. Fit the holes with suitable bolts (φ6 mm x L16 mm) instead of the outlet hoses.



A. Outlet Hoses B. Carburetor Holder

- Lay the hoses as shown in the figure, to lead the pump output into containers.



A. Check Valve C. Outlet Hose
B. Container

●Start the engine, and keep it at **2,000 rpm.**
●Opening the oil pump lever fully, collect the oil that is, being pumped for **3 minutes.** If the each quantity of oil collected corresponds with the table, the oil pump is operating properly.

Oil Pump Output

Standard: 3.7 – 4.6 mL per one outlet hose

† 3 minutes measurement at 2,000 rpm of engine speed, oil pump lever fully opened.

★If the oil pump output is subnormal, inspect the oil pump, the inlet and outlet tubes for oil leaks.
★If any oil leaks is not found, replace the oil pump.

Oil Pump Check Valve Inspection

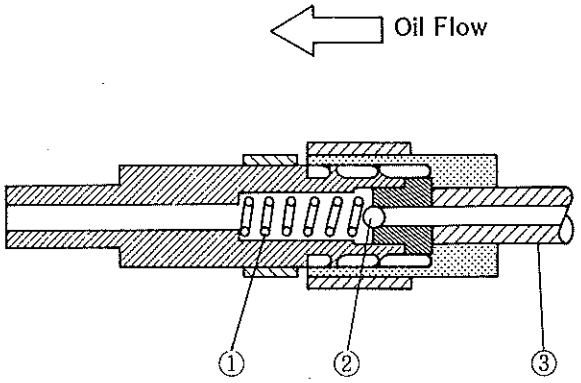
The check valve opens when oil pressure is in the direction of the indication mark, and allows oil flow in that one direction only. When the engine or the oil pump is stopped, the check valve stops oil flow, and any oil that has passed a check valve is prevented from returning.

○Check valves are assembled at the end of the outlet hoses and can not be removed from the tube.
●If oil will not pass through the check valve, clean the valve out by using a high flash-point solvent in a squirt gun or syringe.
★If the check valve does not work properly after being cleaned out, whether allowing oil to pass in both directions or not allowing oil to pass at all, replace the outlet hoses.

CAUTION

○**Do not use compressed air on the valve since doing so would damage the valve spring.**

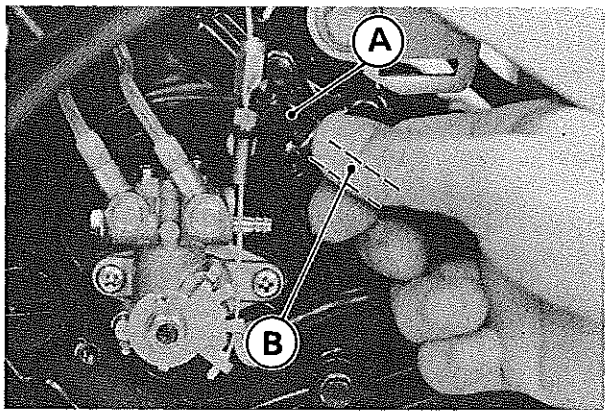
Check Valve



1. Spring
2. Steel Ball
3. Outlet Hose

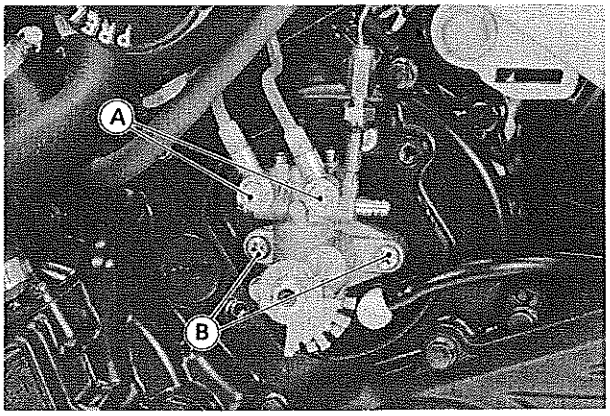
Oil Pump Removal

●Remove the oil pump cover on the engine left side.
●Pull off the oil pump inlet hose. Screw one of the mounting bolts into the inlet hose to keep the oil from flowing out.



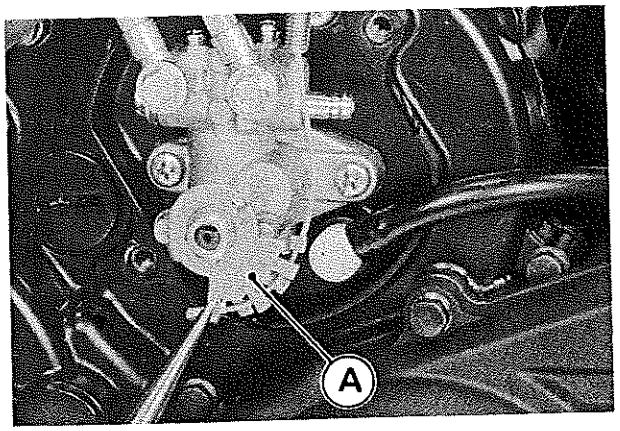
A. Bolt B. Inlet Hose

●Remove the banjo bolts of the oil pump outlet hoses.



A. Banjo Bolts B. Screws

●Remove the oil pump cable form the oil pump lever.



A. Oil Pump Lever

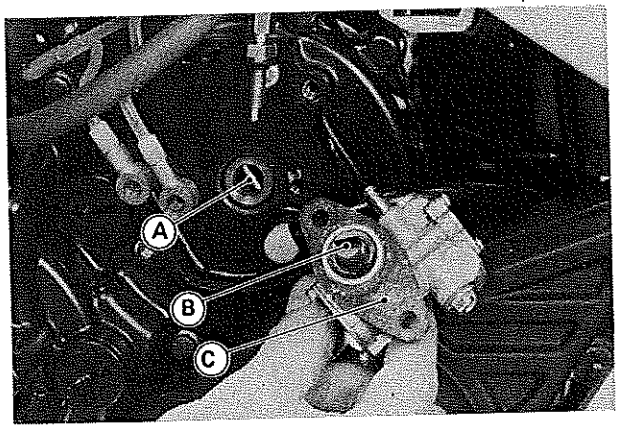
●Remove the oil pump.

Oil Pump Installation Notes

CAUTION

○**Do not attempt to install the left engine cover with the pump installed, or the pump may be broken.**

●Install the new gasket.
●When mounting the oil pump, note the position of the pin in the crankshaft, and then turn the oil pump shaft so that it will fit onto the pin.

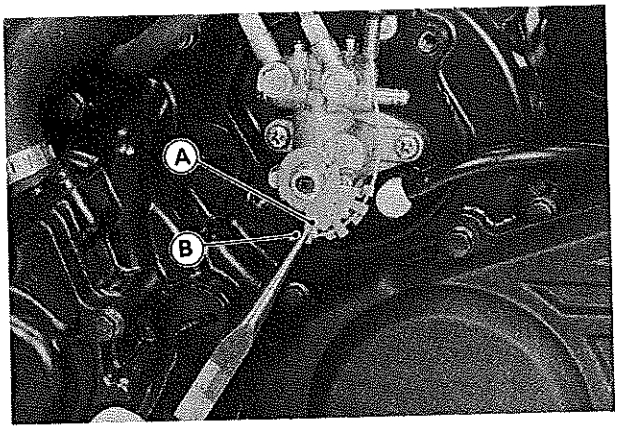


A. Crankshaft Pin
B. Pump Shaft Slot
C. Gasket

●Install the pump cable.

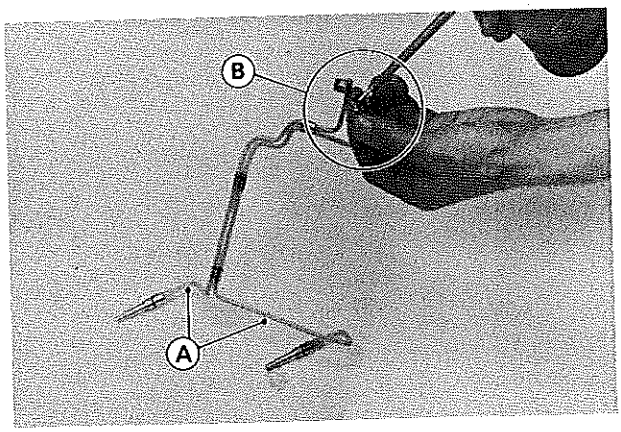
CAUTION

○**Make sure the tab on the oil pump lever is bent to hold the cable nipple securely. If loose, the cable may slip out, resulting in piston seizure.**



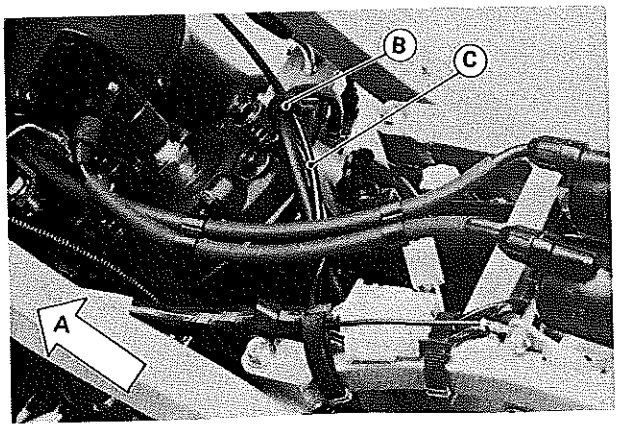
A. Tab
B. Cable Nipple

●Install the inlet hose.
●Fill the outlet hoses with 2-stroke oil. This shortens air bleeding time.



A. Outlet Hose
B. Apply a 2-stroke oil.

●Bleed the oil pump (see Oil Pump Bleeding).
●Route the oil pump cable as shown.



A. Front
B. Clamp
C. Oil Pump Cable

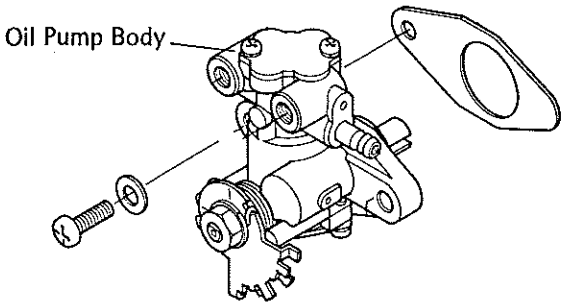
●Adjust the oil pump cable (see Oil Pump Synchronization).

Oil Pump Assembly Caution

CAUTION

○If the trouble is with internal parts of the oil pump, replace the pump as a unit. The pump is precision made with no allowance for replacement of individual parts.

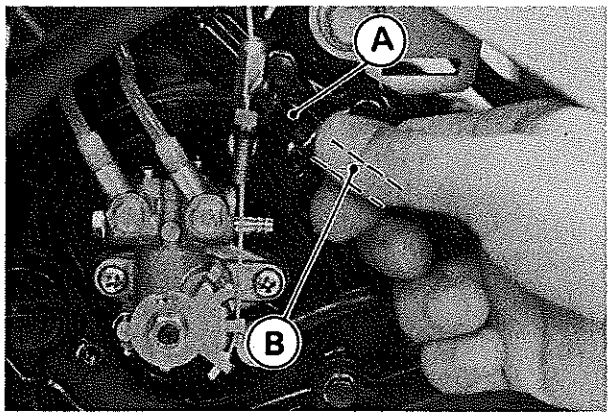
Oil Pump



Engine Oil Tank

Removal Note

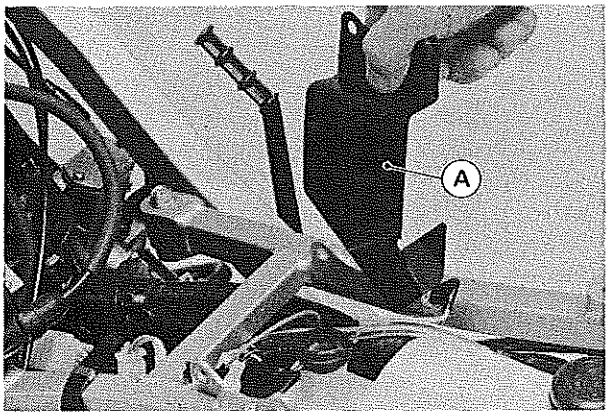
●Remove the oil pump cover. Pull off the oil pump inlet hose. Screw one of the mounting bolts into the inlet hose to keep the oil from flowing out, and keep the end of the hose upward.



A. Mounting Bolt B. Inlet Hose from the Tank

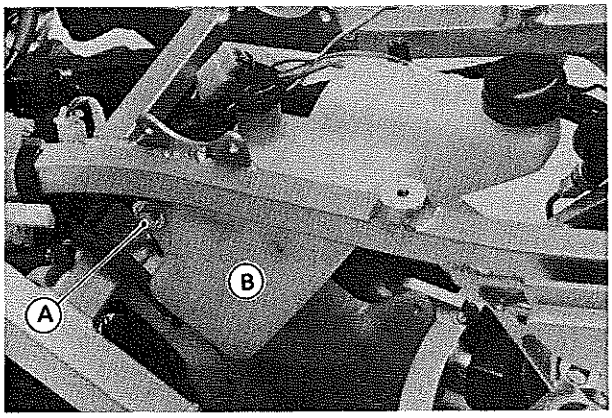
●Remove the following parts (see Rear Muffler Removal in Engine Top End).
- ○Seat and fuel tank
- ○Tool case
- ○Storage case
- ○Battery and battery case
- ○Rear brake master cylinder and brake hose

●Remove the ignition coils and brakcet.



A. Ignition Coil Bracket

●Remove the oil tank.



A. Bolt B. Oil Tank

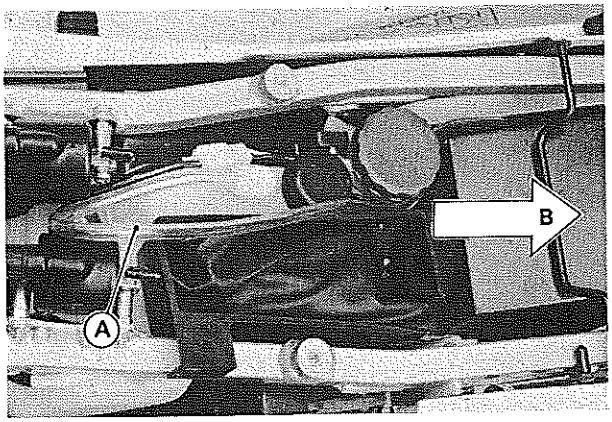
Oil Tank Installation Note

●Route the oil tank breather tube, being sure that the tube does not get pinched or twisted.

●Make sure the tube is kept away from the rear muffler.

CAUTION

○Always keep the oil tank breather tube free of obstruction, and make sure it does not get pinched, crimped, bent sharply, or melted by the exhaust pipe. If the breather is obstructed, engine oil flow to the oil pump will be hindered and serious engine damage will occur.



A. Breather Tube B. Rear

★If any air has gotten trapped in the oil pump inlet hose, bleed the oil pump (see Oil Pump Bleeding).

CAUTION

○To avoid serious engine damage, air in the oil pump line must be removed by bleeding.

Engine Removal/Installation

Table of Contents

Engine Removal/Installation

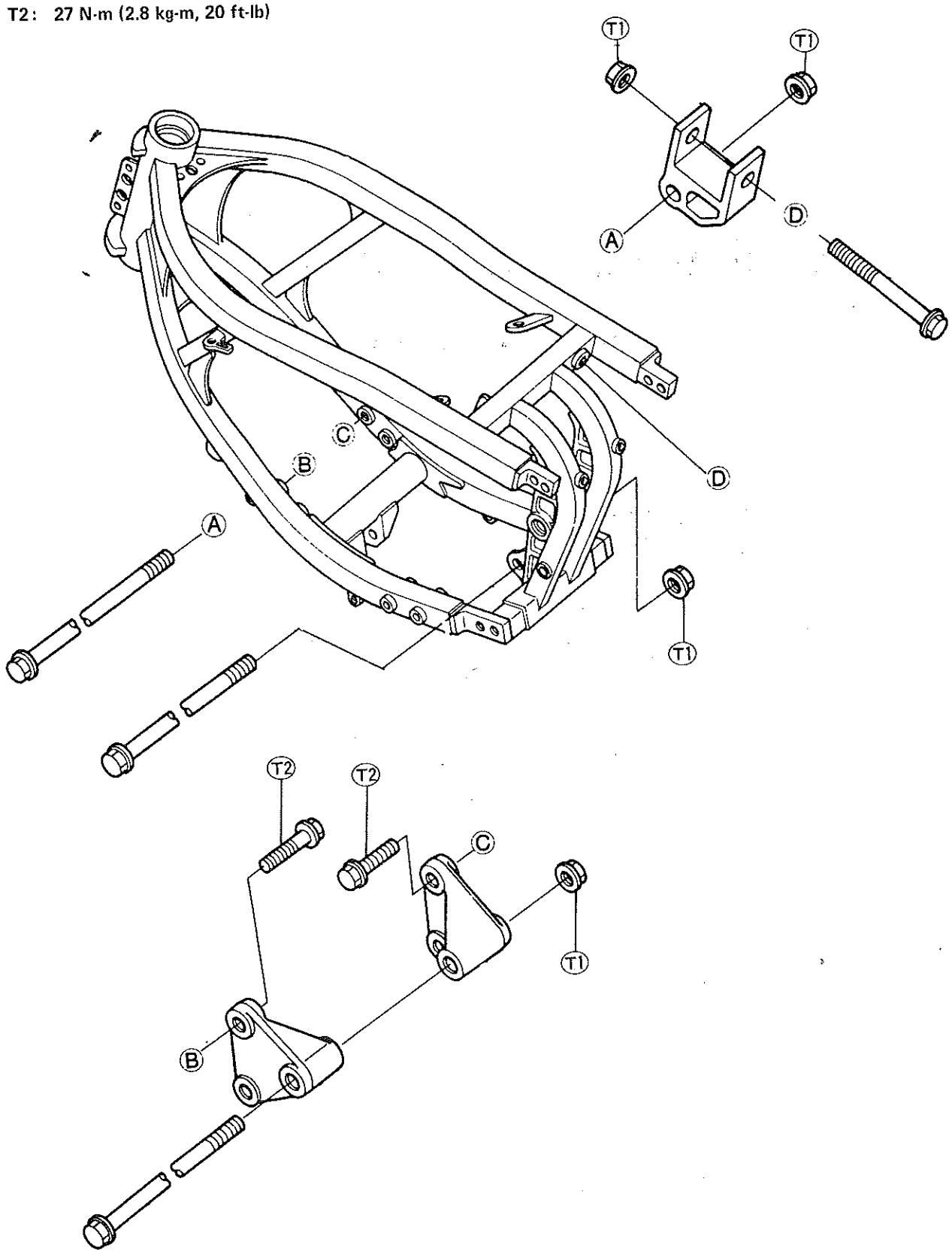
Exploded View 7-2

Engine Removal 7-3

Engine Installation 7-3

Exploded View

T1: 39 N·m (4.0 kg-m, 29 ft-lb)
T2: 27 N·m (2.8 kg-m, 20 ft-lb)

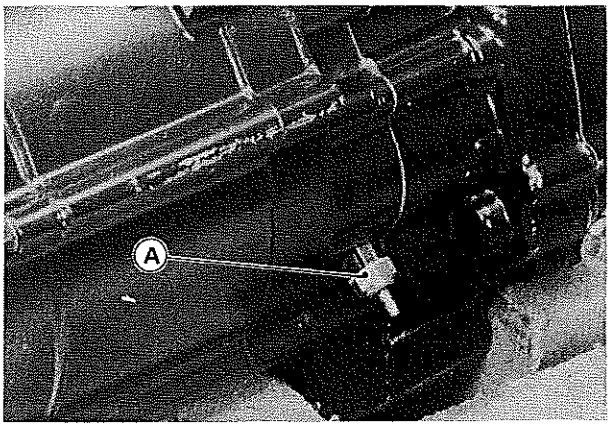


Engine Removal/Installation

Engine Removal

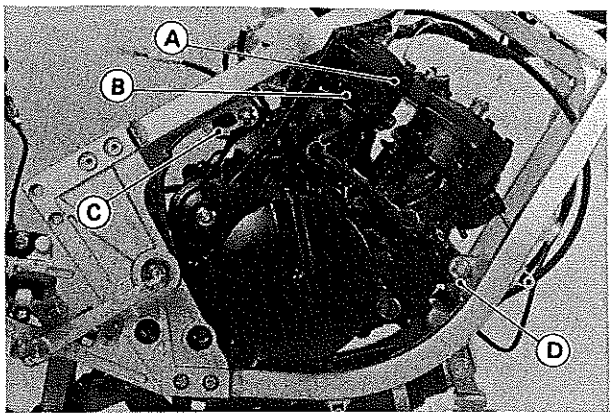
- Set the motorcycle up its side stand so that it is stable during removal and installation.
- For later installation convenience, note and record how and where cables, wirings, and hoses are routed. They should not be bent sharply, kinked, or twisted.
- Drain the transmission oil (see Transmission Oil Change in Engine Lubrication System).
- Drain the coolant (see Coolant Draining in Cooling System). To avoid burns, wait until the coolant cools down.

- Remove the neutral switch at the engine bottom to prevent its damage.



A. Neutral Switch

- Remove the following parts.
  - Fairing (see, Frame).
  - Seat
  - Fuel tank (see Fuel Sytem).
  - Radiator (with horn), radiator hoses, reservoir tank (see Cooling System).
  - Air cleaner housing and ducts (see Fuel System).
  - Front muffler (see Engine Top End).
  - Shift pedal
  - Engine sprocket (see Final Drive).
  - Clutch cable (see Clutch).
  - Throttle control cable, choke cable and oil pump cable (see Fuel System, Engine Lubrication System).
- Remove the cylinder head and the rear cylinder (see Engine Top End).
- Remove the engine mounting bolts and brackets starting with top to bottom.



A. Cylinder Head
B. Rear Cylinder
C. Upper Mounting Brackets
D. Lower Mounting Brackets

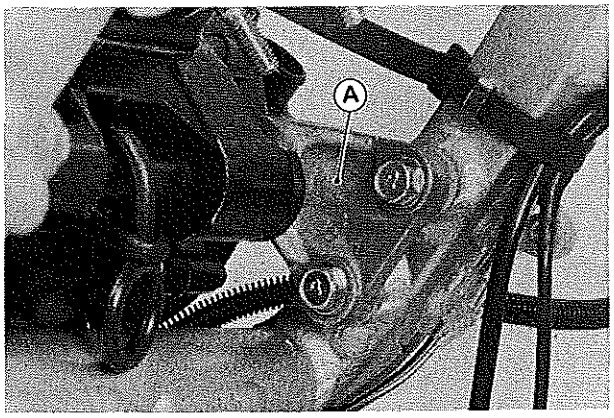
NOTE

- *Remove the cylinder head and the rear cylinder for removal convenience.*

- Take out the engine unit from the vehicle right side; opposite the side stand.

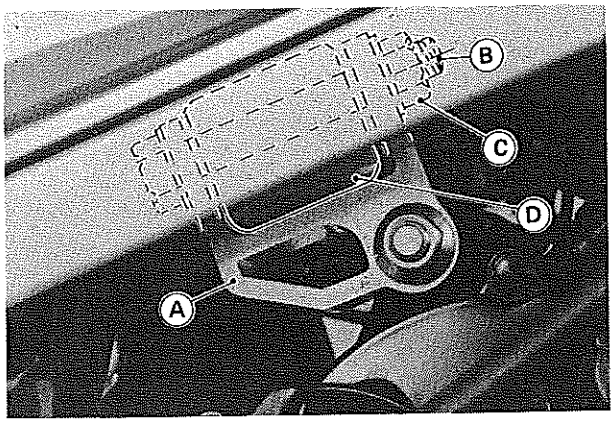
Engine Installation

- Install the lower mounting brackets in advance.



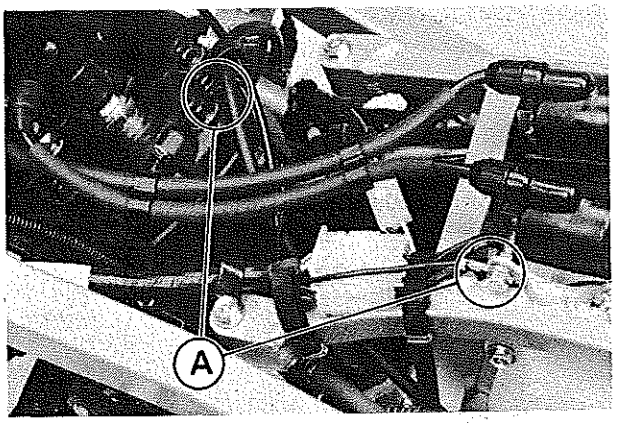
A. Lower Mounting Brackets (left and right)

- Mount the engine unit with the cylinder head and rear cylinder removed.
- Temporarily install the engine mounting bolts and nuts. The upper bracket nut is on top as shown.
- Tighten the upper bracket nut to the specified torque so that the upper bracket makes contact with the frame crosspipe.



A. Upper Bracket
B. Mounting Bolt
C. Mounting Nut
D. Crosspipe

- Tighten other mounting bolts and nuts to the specified torque.
- Install the neutral switch. Always replace the gasket with new one, if it is damaged.
- Be sure to install the main harness ground (–) leads on the cylinder head and the ignition coil bracket.



A. Main Harness Ground Lead

- Be sure to route the following cables, wires and tubes to avoid their being burned by the mufflers.
  - Carburetor vent tubes, overflow tubes and crankcase breather tube (see Fuel System).
  - Fuel tank breather tubes (see Fuel System).
  - Oil tank breather tube and oil pump cable (see Engine Lubrication System).
  - Spark plug leads and main harness (see Engine Top End).
- Fill the transmission with transmission oil.
- Fill the cooling system with coolant.
- Adjust the following parts.
  - Drive chain
  - Clutch cable
  - Choke cable
  - Throttle cable and carburetor cable (idle speed).
  - Oil pump cable
- Bleed air in the cooling system and the oil pump.

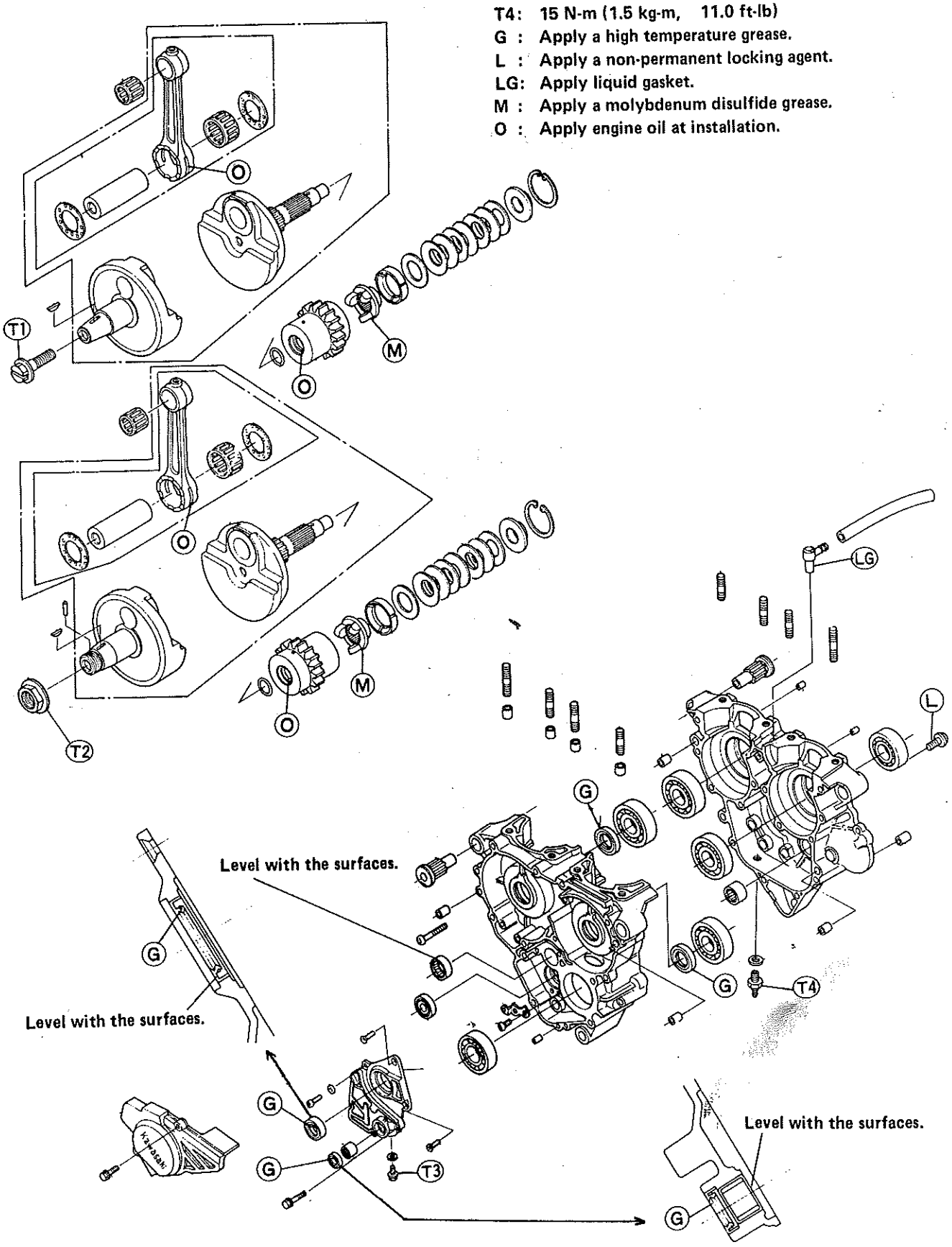
Crankshaft/Transmission

Table of Contents

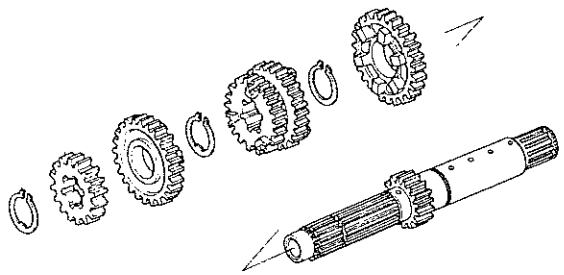
Exploded View 8-2
Specifications 8-4
Special Tools 8-4
Crankcase Splitting 8-5
Crankcase Splitting 8-5
Crankcase Assembly 8-5
Crankshaft 8-7
Crankshaft Installation Notes 8-7
Crankshaft Disassembly Note 8-8
Crankshaft Assembly Notes 8-8
Connecting Rod Big End Radial Clearance 8-8
Big End Seizure 8-9
Connecting Rod Side Clearance 8-9
Crankshaft Runout 8-9
Crankshaft Alignment 8-9
Transmission 8-10
External Shift Mechanism Removal Note 8-10
Transmission Disassembly Note 8-10
Transmission Assembly 8-11
Shift Drum, Fork and Rod Installation Notes 8-12
External Shift Mechanism Installation 8-12
Shift Fork Bending 8-14
Shift Fork/Gear Groove Wear 8-14
Shift Fork Guide Pin and Collar 8-14
Shift Drum Groove Wear 8-15
Gear Dog/Gear Dog Hole Damage 8-15
Ball and Needle Bearing Wear 8-15

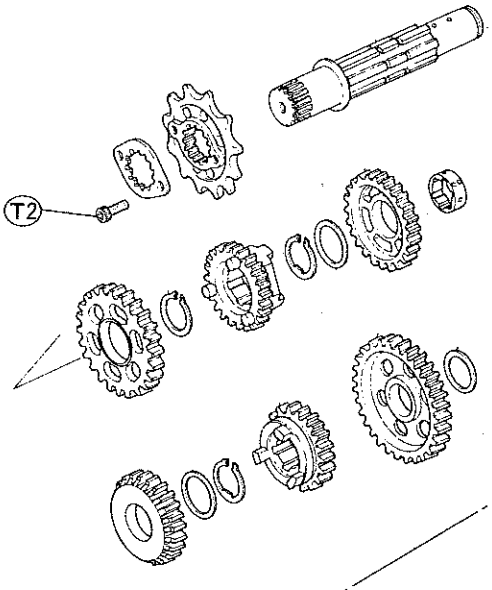
Exploded View

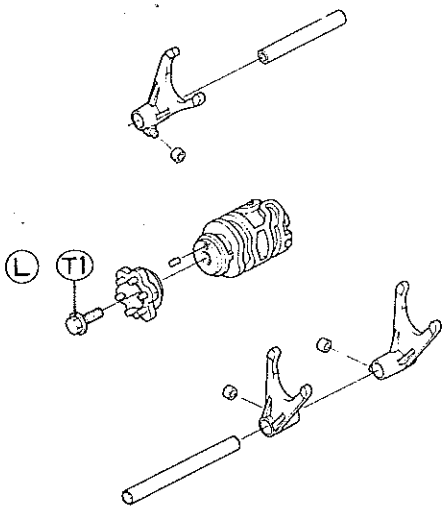
T1: 64 – 74 N-m (6.5 – 7.5 kg-m, 47 – 54 ft-lb)
T2: 64 – 74 N-m (6.5 – 7.5 kg-m, 47 – 54 ft-lb)
T3: 8.8 N-m (0.9 kg-m, 78 in-lb)
T4: 15 N-m (1.5 kg-m, 11.0 ft-lb)
G : Apply a high temperature grease.
L : Apply a non-permanent locking agent.
LG: Apply liquid gasket.
M : Apply a molybdenum disulfide grease.
O : Apply engine oil at installation.

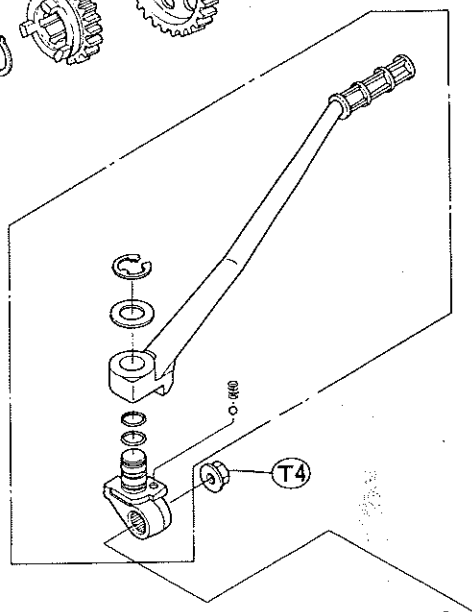


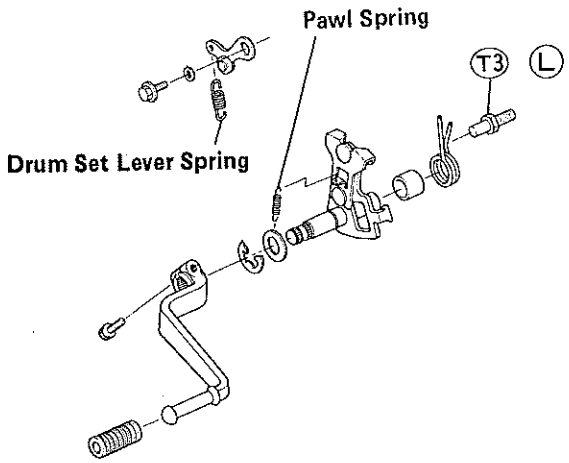
T1: 22 N-m (2.2 kg-m, 16.0 ft-lb)
T2: 12 N-m (1.2 kg-m, 8.5 ft-lb)
T3: 22 N-m (2.2 kg-m, 16.0 ft-lb)
T4: 41 N-m (4.2 kg-m, 30 ft-lb)
L : Apply a non-permanent locking agent to the threads.
M : Apply a molybdenum disulfide grease.

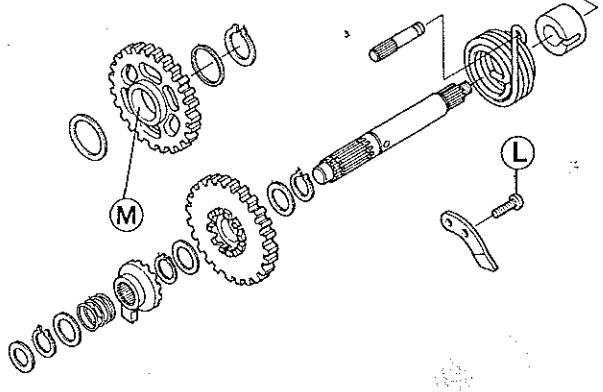










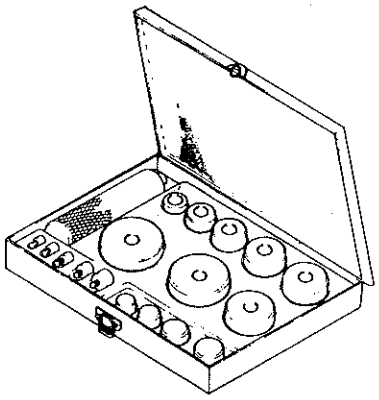


Specifications

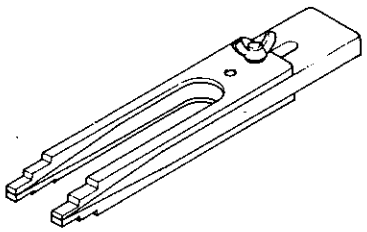
Item	Standard	Service Limit
Crankshaft, Connecting Rod:		
Connecting rod Big end radial clearance	0.016 – 0.031 mm	0.08 mm
Big end side clearance	0.4 – 0.5 mm	0.7 mm
Crankshaft runout	0.04 mm	0.1 mm
Cold-fitting to tolerance between	Right side : 0.092 – 0.112 mm	– – –
Crankpin and flywheels	Left side : 0.077 – 0.097 mm	– – –
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	4.85 – 4.95 mm	4.8 mm
Shift drum groove width	8.05 – 8.20 mm	8.3 mm
Shift fork guide collar inside diameter	4.95 – 5.05 mm	5.1 mm
Shift fork guide collar outside diameter	7.95 – 8.05 mm	7.9 mm

Special Tools

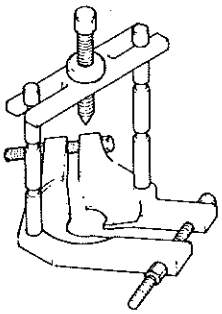
Bearing Driver Set: 57001-1129



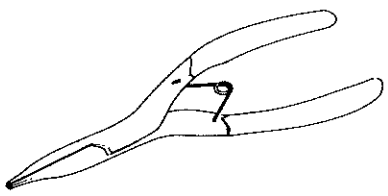
Crankshaft Installation Jig (2 sets): 57001-1174



Bearing Puller: 57001-158



Circlip Pliers: 57001-144



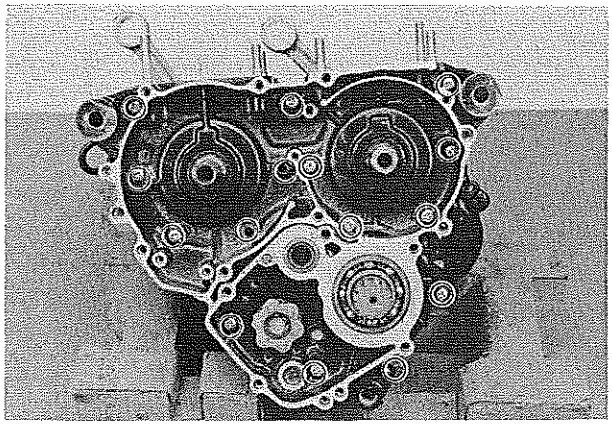
Crankcase Splitting

Crankcase Splitting

- Remove the engine (see Engine Removal/Installation chapter).
- Set the engine on a clean surface or, preferably, onto a suitable block to hold the engine steady while parts are being removed.
- Remove the following parts from the engine.

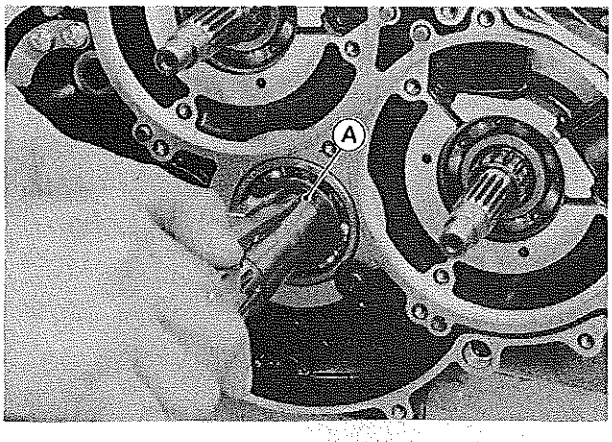
○Cylinder and cylinder base gaskets.
○Clutch gear
○Primary gears
○Reed valve assemblies
○Engine sprocket
○Magneto flywheel
○Rotor (pulser)

- Remove the external shift mechanism (see below).
- Remove the 6 mm left crankcase screws (15).



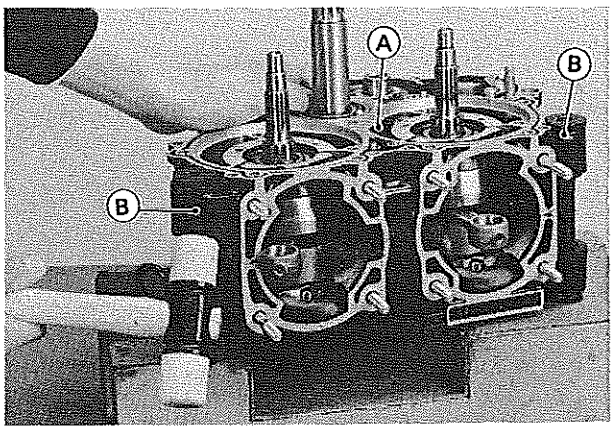
A. Left Crankcase

- Remove the circlip (drive shaft).



A. Circlip

- Tap the right crankcase portions as shown with a plastic mallet to slit the crankcase evenly.



A. Right Crankcase B. Tap here

○Crankcase bearing removal and installation require the use of a press, bearing driver, and/or bearing driver holder (special tools: P/N 57001-1129).
○In the absence of the above mentioned tools, satisfactory results may be obtained by quickly heating the case (in the area immediately surrounding the bearing) to approximately **93°C (200°F)** max, and tapping the bearing in or out.

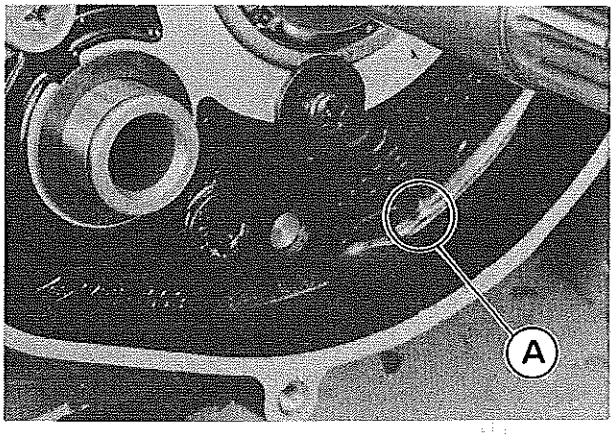
- Using a hook, pull out the oil seals.

CAUTION

○Do not heat the case with a torch. This will warp the case. Soak the case in oil and heat the oil.

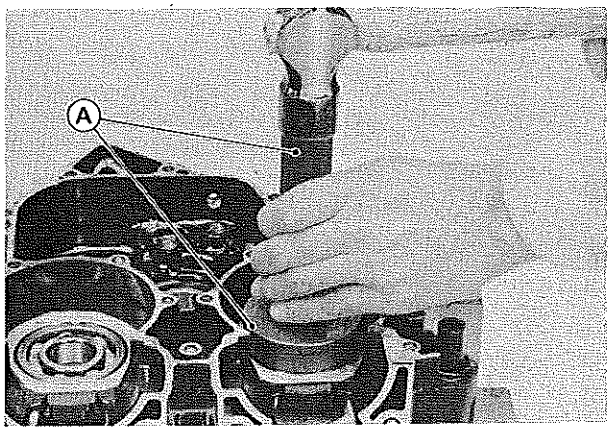
Crankcase Assembly

- Blow the right crankcase oil passage clean with compressed air.



A. Oil Passage

●Press each crankcase bearing into using the bearing driver (special tool) which does not contact the bearing inner race.

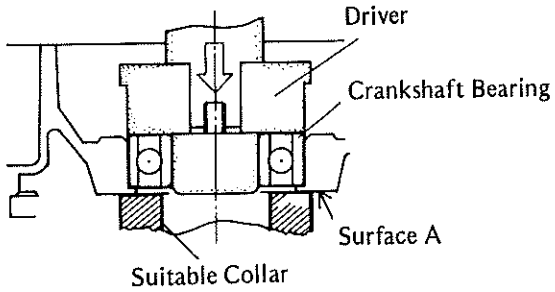


A. Bearing Driver: 57001-1129

CAUTION

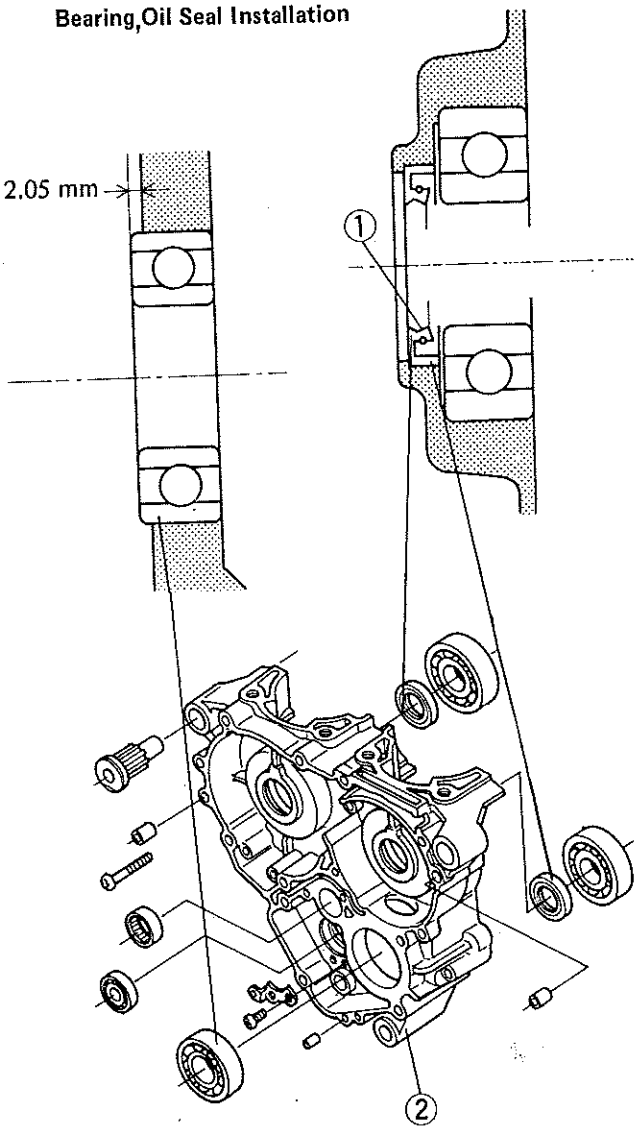
○**When installing the right or left crankshaft bearing, be sure to hold the crankcase surface A to prevent the case damage.**

Bearing Installation



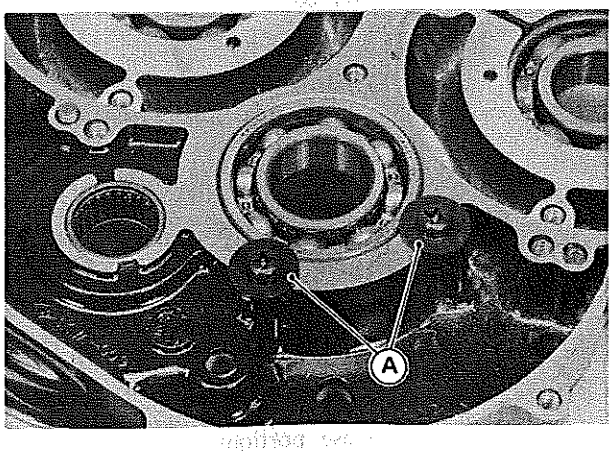
●Press in the following bearing and oil seal being careful of the installation dimension and direction as shown.
●Apply a high temperature grease to all the seal lips.

Bearing, Oil Seal Installation



1. Apply a high temperature grease.
2. Left Crankcase

●Be sure to install the retainers of the drive shaft RH bearing.



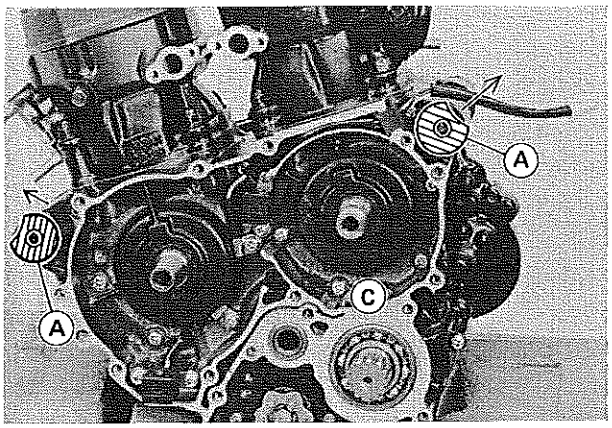
A. Retainers

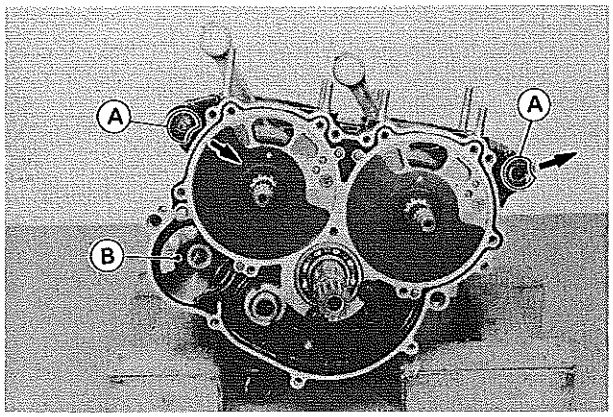
●Lubricate the rubber damper surface with a soap and water solution, and press them into each crankcase half.

CAUTION

○**Do not lubricate the rubbers with mineral oil because this will cause early deterioration of the rubbers.**

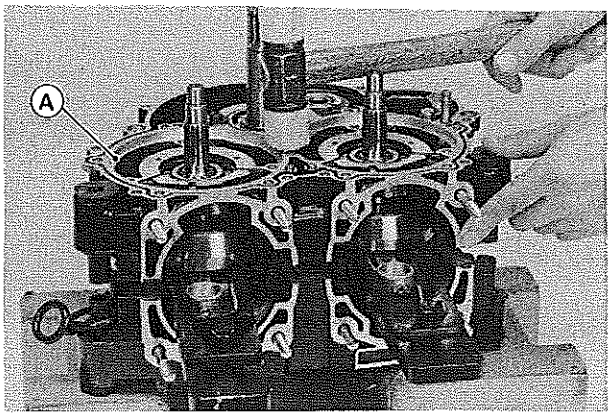
●Press the dampers in so that each dent points toward the indication mark direction as shown.





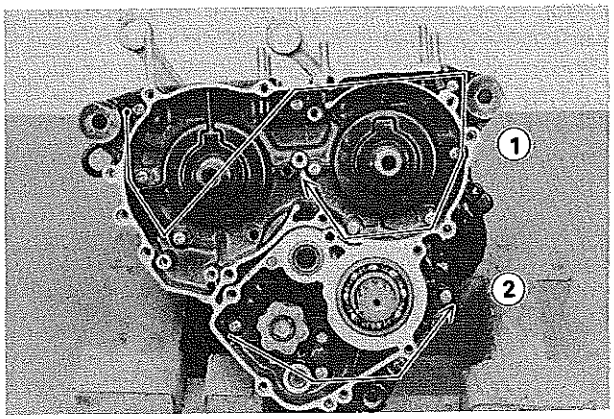
A. Engine Damper
B. Right Crankcase
C. Left Crankcase

●Install the crankshafts, the transmission gears and shafts.
●Check to see that the knock pins are in place on the left crankcase half.
●With a high flash-point solvent, clean off the mating surfaces of the crankcases halves and wipe dry.
●Apply a liquid gasket to the mating surface of the right crankcase half.
●Install the right crankcase while tapping it lightly and evenly with a plastic mallet.



A. Right Crankcase

●Tighten the left crankcase screws in the order of index number.



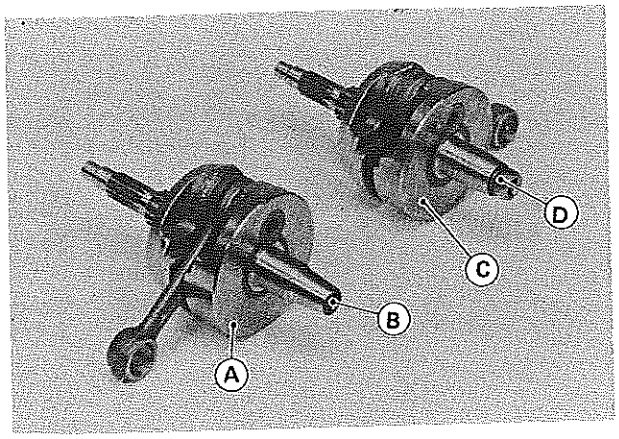
●After tightening all crankcase bolts, check the following items.
○Drive shaft and output shafts turn freely.
○While spinning the output shaft, gears shift smoothly from the 1st to 6th gear, and 6th to 1st.

Crankshaft

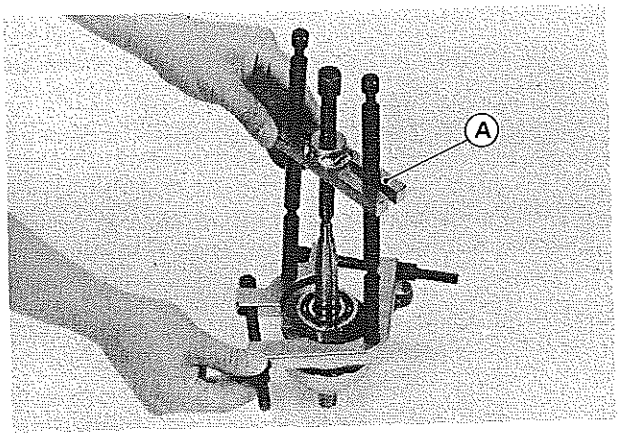
Crankshaft Installation Notes

NOTE

○*The front crankshaft has an internal thread, and the rear crankshaft has an external thread at each end. Be careful not to confuse these shafts when installing.*



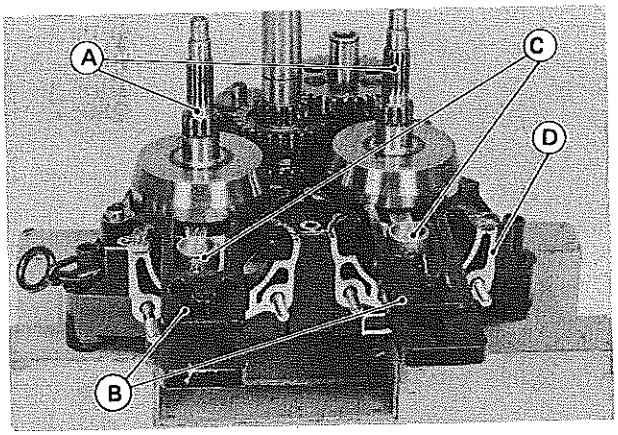
A. Front Crankshaft
B. Internal Thread
C. Rear Crankshaft
D. External Thread



A. Bearing Puller: 57001-158

●If it should be necessary to disassemble the crankshaft, use a press to remove the crankpin.

●Fit each crankshaft assembly into the left crankcase using a crankshaft installing jig inserted between the flywheels opposite the connecting rod big end.
○These special tools are easily adjustable to fit in any gap between the flywheels and can prevent the gap change.
●Install the crankshafts as shown.



A. Crankshaft
B. Crankshaft Installing Jig: 57001-1174
C. Connecting Rod
D. Left Crankcase

Crankshaft Assembly Notes

Since assembly of the crankshaft demands exacting tolerances, the disassembly and reassembly of the crankshaft can only be done by a shop having the necessary tools and equipment.

●Reassemble the crankshaft according to the standard tolerances in Specifications.
○Connecting rod big end radial clearance.
○Cold-fitting tolerance between crankpin and flywheels.
○Side clearance between the connecting rod and one of the flywheels.
○Crankshaft runout.

Crankshaft Disassembly Note

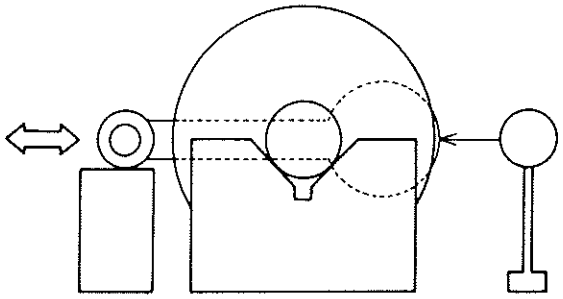
●Remove the bearing on the crankshaft using the bearing puller (special tool).

Connecting Rod Big End Radial Clearance

●Set the crankshaft in flywheel alignment jig or on V blocks, and place a dial gauge against the big end of the connecting rod.
●Push the connecting rod first towards the gauge and then in the opposite direction. The difference between the two gauge readings is the radial clearance.
★If the radial clearance exceeds the service limit, the crankshaft should be either replaced or disassembled and the crankpin, needle bearing, and connecting rod big end examined for wear.

Connecting Rod Big End Radial Clearance

Standard :	**0.016 – 0.031 mm**
Service Limit :	**0.08 mm**



Big End Seizure

★In case of serious seizure with damaged flywheels, the crankshaft must be replaced.

★In case of less serious damage, disassemble the crankshaft and replace the crankpin, needle bearing, side washers, and connecting rod.

Connecting Rod Side Clearance

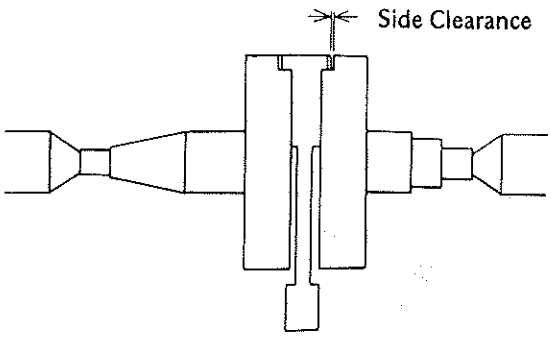
●Measure the side clearance of the connecting rod with a thickness gauge.

★If the clearance exceeds the service limit, replace the crankshaft.

Connecting Rod Side Clearance

Standard :	**0.4 – 0.5 mm**
Service Limit:	**0.8 mm**

Side Clearance



Crankshaft Runout

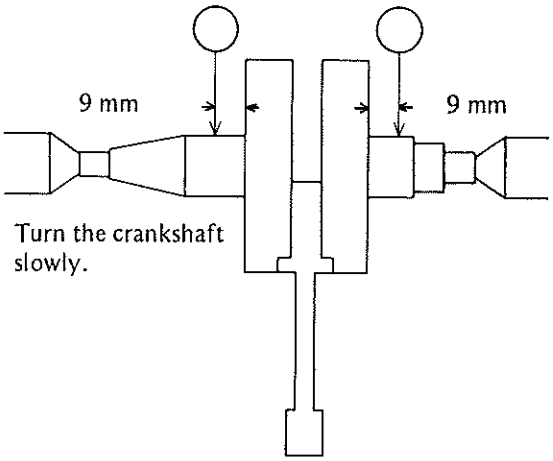
●Set the crankshaft in a flywheel alignment jig or on V blocks, and place a dial gauge against the points indicated.

●Turn the crankshaft slowly. The maximum difference in gauge readings is the crankshaft runout.

Crankshaft Runout

Standard :	**0.04 mm**
Service Limit :	**0.1 mm**

Crankshaft Runout



Crankshaft Alignment

★If the runout at either point exceeds the service limit, align the flywheels so that the runout falls within the service limit.

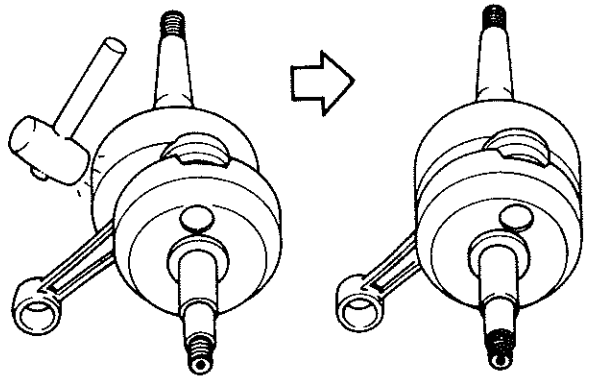
●In the case of horizontal misalignment, which is the most common, strike the projecting rim of the flywheel with a plastic, soft lead, or brass hammer as indicated in the figure.

●Recheck the runout with a dial gauge, repeating the process until the runout falls within the service limit.

○Vertical misalignment is corrected either by driving a wedge in between the flywheels or by squeezing the flywheel rims in a vise, depending on the nature of the misalignment. In both cases of horizontal and vertical misalignment, correct the horizontal misalignment first.

★If flywheel misalignment cannot be corrected by the above method, replace the crankpin or the crankshaft itself.

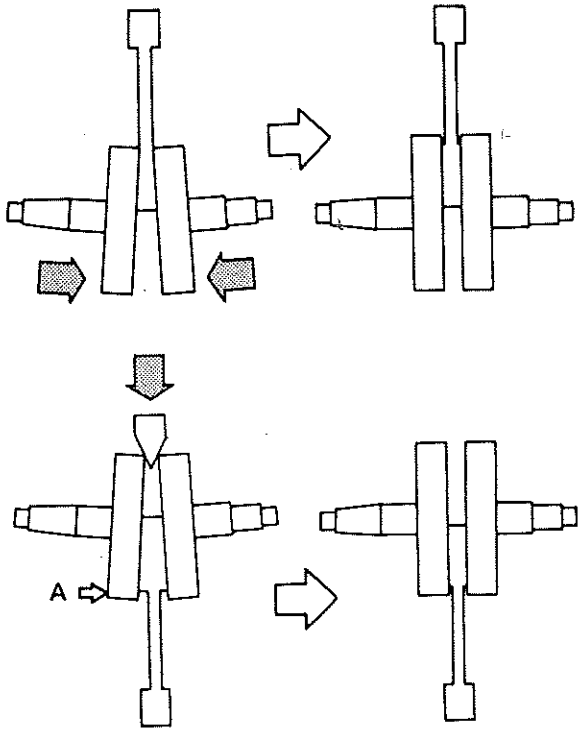
Horizontal Misalignment



CAUTION

○**Don't hammer the flywheel at point "A".**

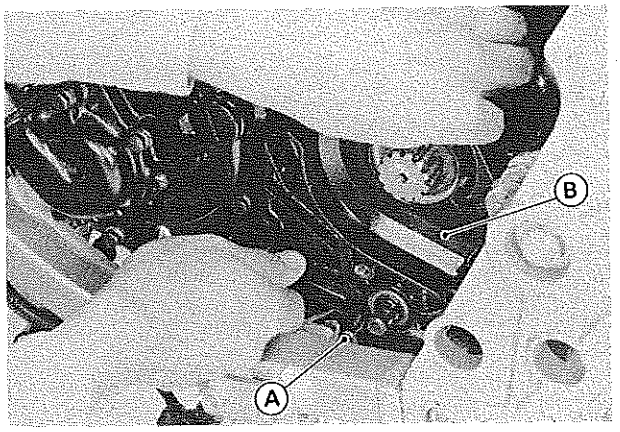
Vertical Misalignment



Transmission

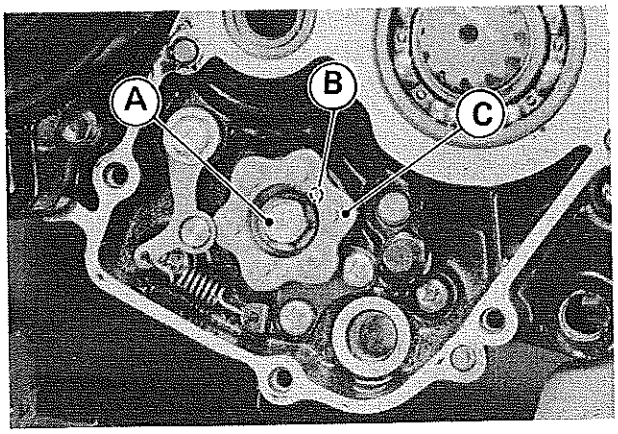
External Shift Mechanism Removal

- Remove the engine sprocket (see Final Drive).
- Remove the shift pedal.
- Remove the shift cover screws and bolts.
- If the engine unit is mounted on the frame, remove the following bolt along with the cover.



A. Bolt B. Shift Cover

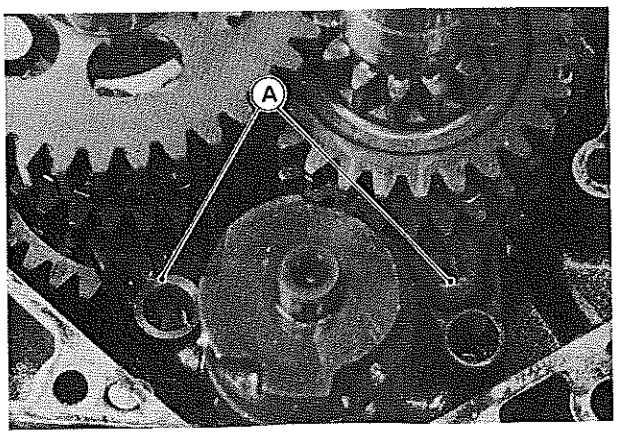
- Remove the cam mounting bolt.



A. Bolt C. Cam
B. Knock Pin

Transmission Disassembly Note

- After removing the shift rods and the shift drum, pull out the shift forks.

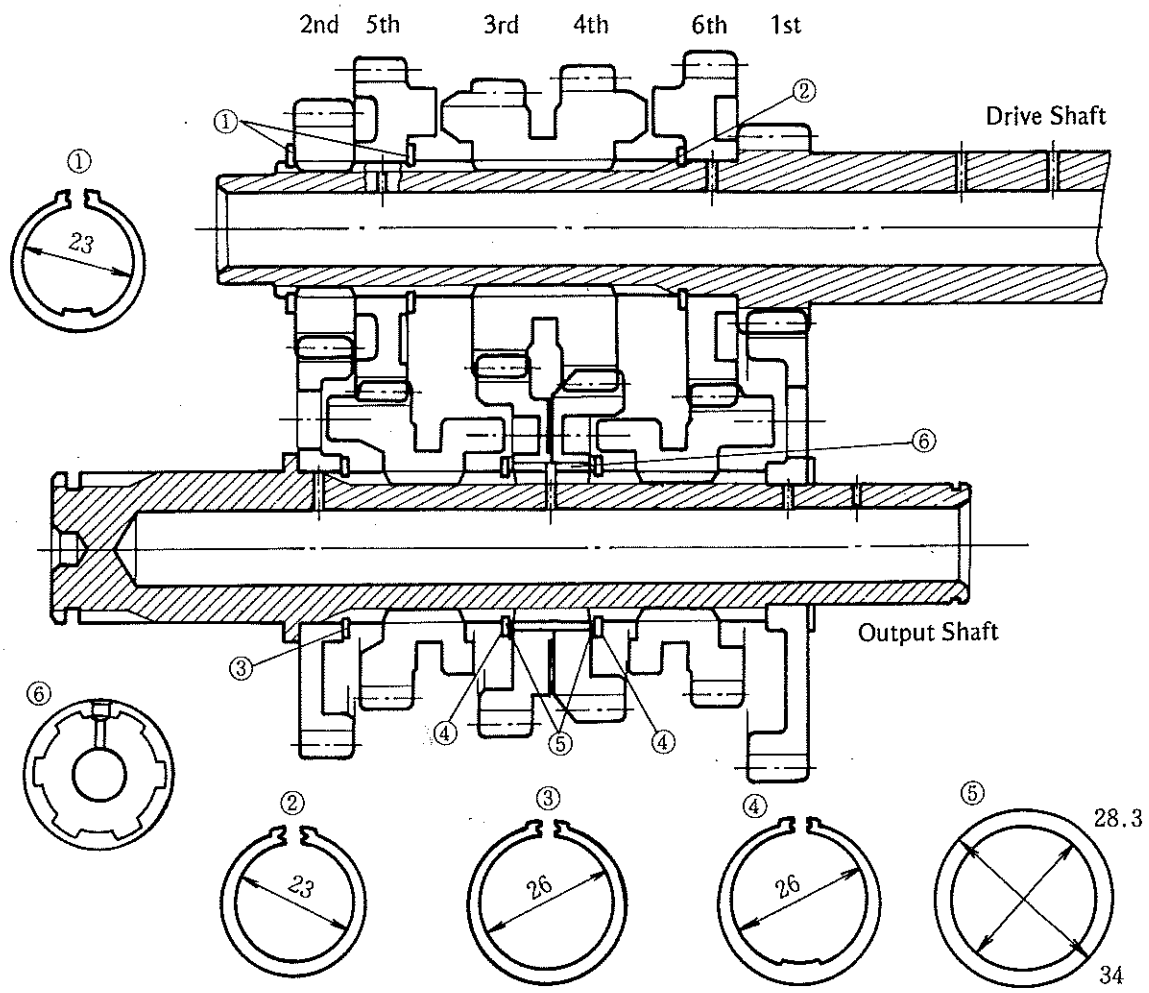


A. Shift Forks

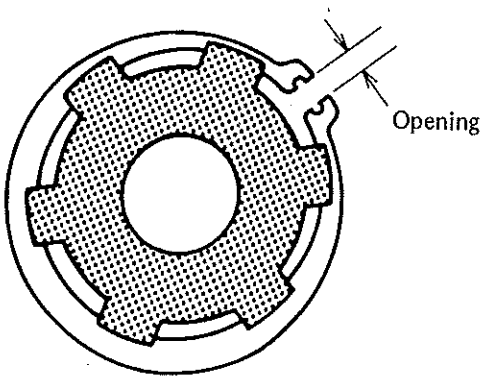
Transmission Assembly

- Use a high flashpoint solvent to clean the crankcase and all the transmission, shift drum, and crankshaft part.
- Apply transmission oil to the transmission gears and shift drum where they turn in the crankcase and on the drive and output shafts.
- Align the bushing oil hole of 3rd/4th gear with the output shaft oil hole as shown.
- Replace any circlips that were removed with new ones.
- Always install circlips so that the opening is aligned with a spline groove.
- Install the drive shaft, output shaft, and shift drum in the left crankcase half.

Transmission Assembly

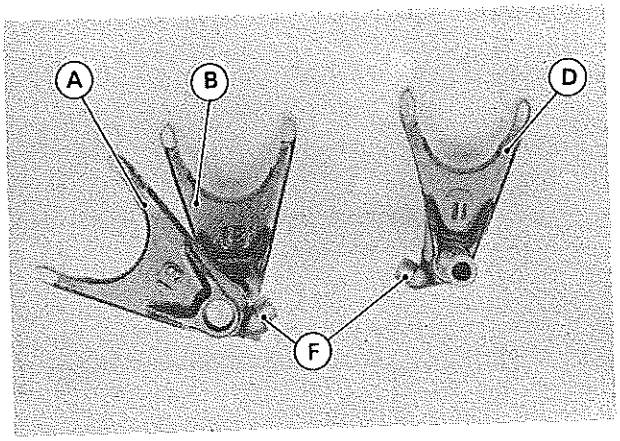


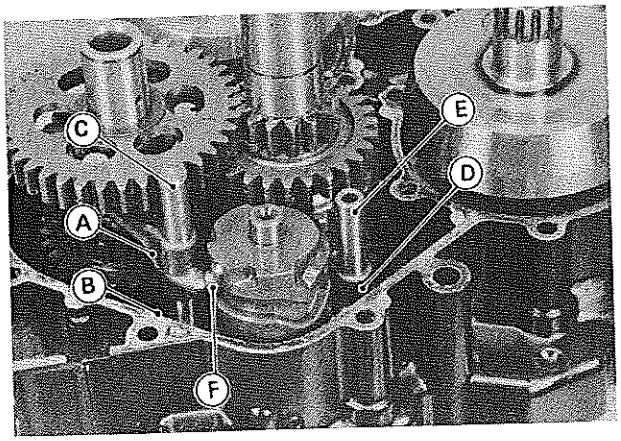
Circlip Installation



Shift Drum, Fork and Rod Installation Notes

- ●Be sure to insert the collar onto each shift fork guide pin.
- ○The shift forks and rods can be identified by the numbers **11**, **12** and **13**, and the rod length.
- ●Install the shift forks with the identification numbers faced upward in position shown.

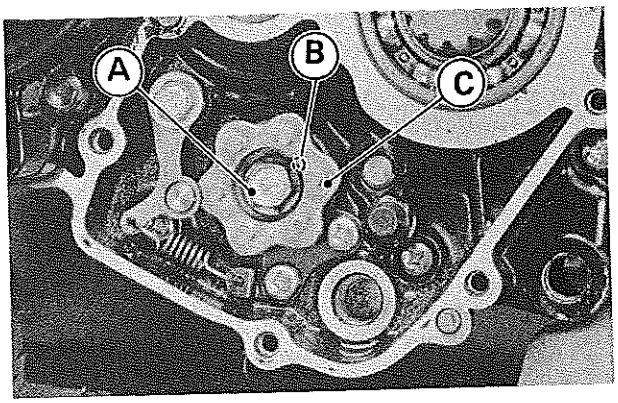




A. Shift Fork (No. **13**)
B. Shift Fork (No. **12**)
C. Shift Rod (long)
D. Shift Fork (No. **11**)
E. Shift Rod (short)
F. Collar

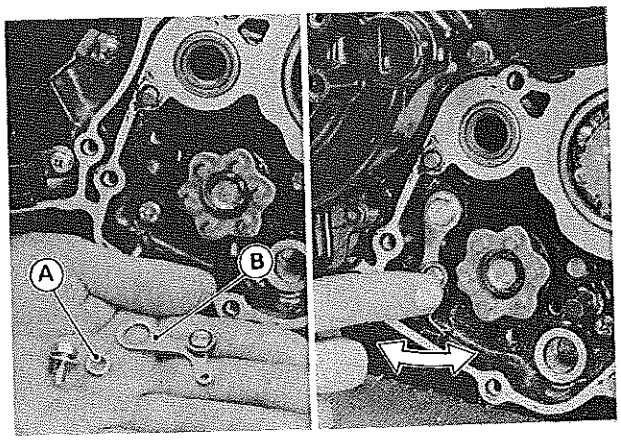
External Shift Mechanism Installation

- ●Fit the knock pin into the cam hole to install the cam.
- ●Apply a non-permanent locking agent to the threads of the cam mounting bolt (shift drum) and tighten it to the specified torque.



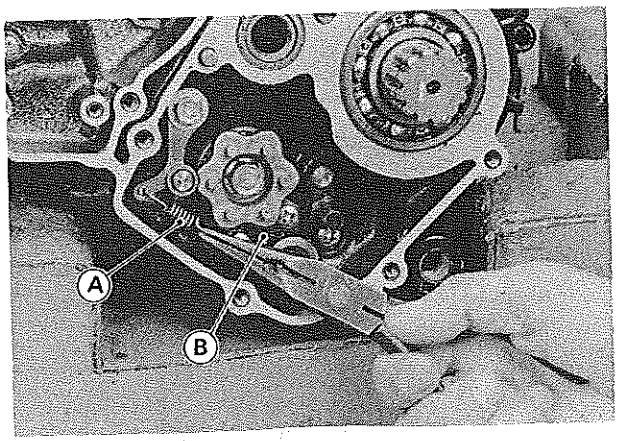
A. Cam Mounting Bolt
B. Knock Pin
C. Cam

- ●After installing the collar onto the gear positioning lever, tighten the mounting bolt. Check that the lever turns freely.



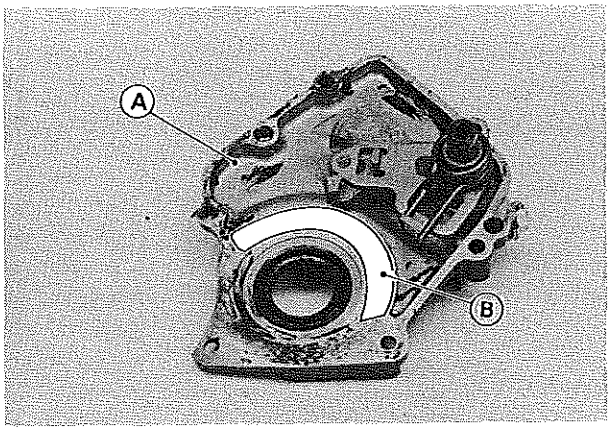
A. Collar
B. Gear Positioning Lever

- ●With needle nose pliers, insert the end of the return spring onto the position plate.



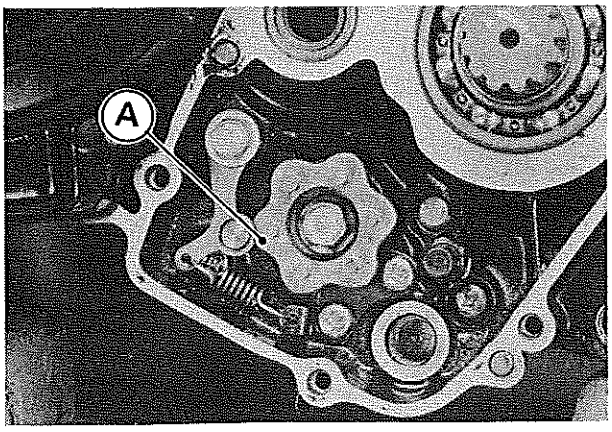
A. Spring
B. Position Plate

•Check to see that the knock pins are in place on the mating surface.
•With a high flash point solvent, clean off the mating surfaces of the crankcase and the shift cover.
•Apply a liquid gasket to the mating surface of the cover except to the area shown.



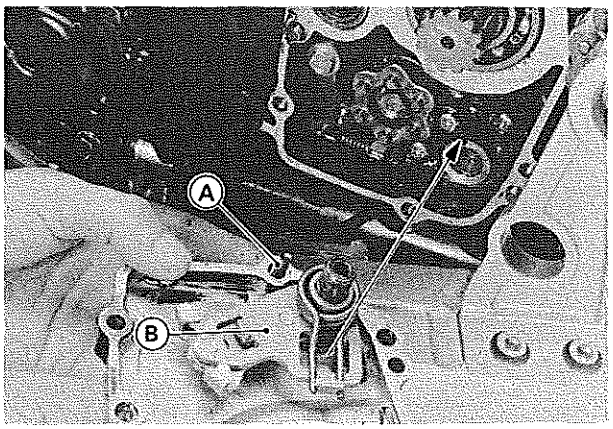
A. Shift Cover
B. Do not apply a liquid gasket here.

•Set the shift drum in neutral position as shown.



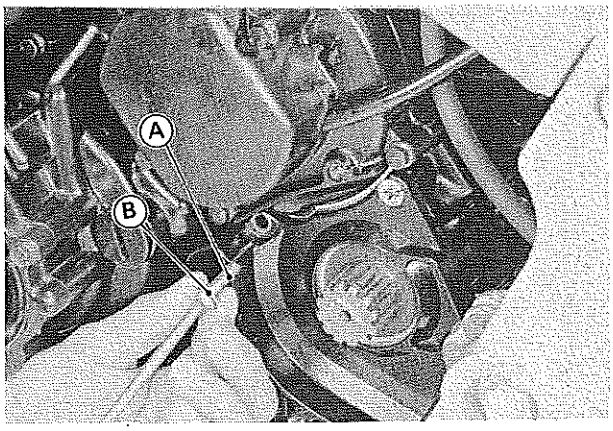
A. Neutral Detent

○Install the shift cover with the mounting bolt and the shift shaft inserted in, if the engine unit is mounted on the frame.
•Install the shift cover while fitting the shift pawl and the return spring onto the shift drum pin and the return spring pin.



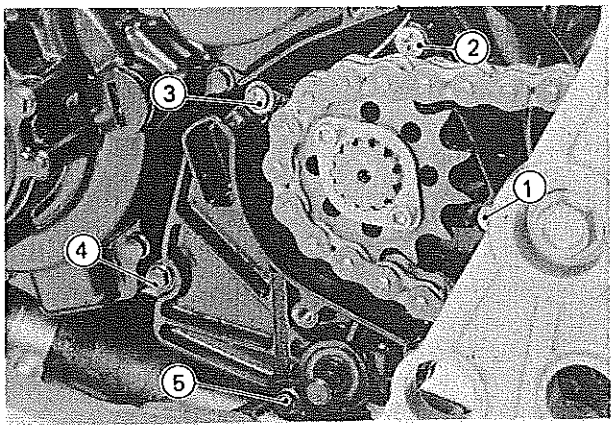
A. Mounting Bolt B. Shift Pawl

○The following screw has a aluminum gasket.
★Replace the gasket with new one if it is damaged.

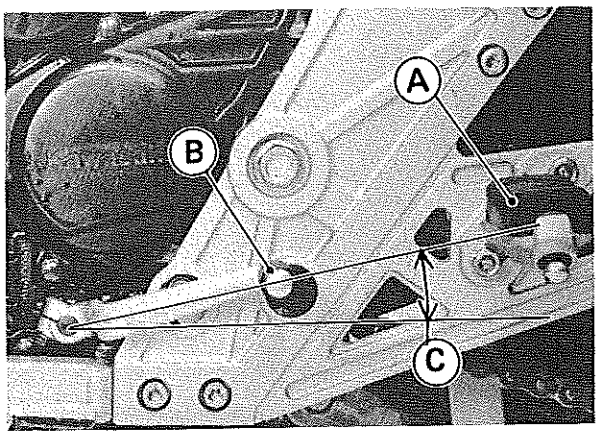


A. Screw B. Gasket

•Tighten the shift cover mounting screws and bolts, following the specified tightening sequence.



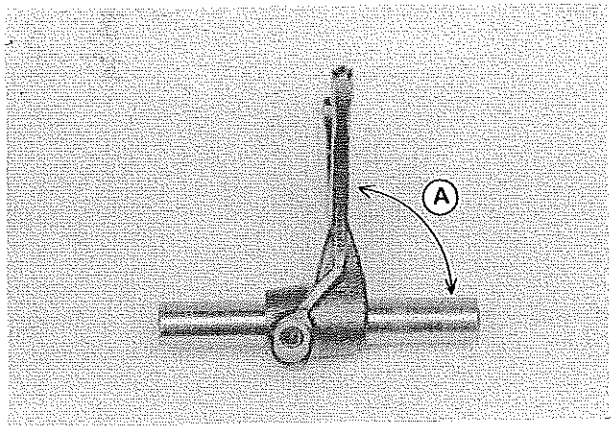
•Install the shift pedal so that the pedal points to the foot peg center.



A. Shift Pedal
B. Foot Peg
C. About 15°

Shift Fork Bending

•Visually inspect the shift forks, and replace any fork that is bent. A bent fork could cause difficult in shifting, or allow the transmission to jump out of gear when under power.



A. 90°

Shift Fork/Gear Groove Wear

•Measure the thickness of the ears shift fork, and measure the width of the shift fork grooves on transmission gears.

★If the thickness of a shift fork ear is less than the service limit, the shift fork must be replaced.

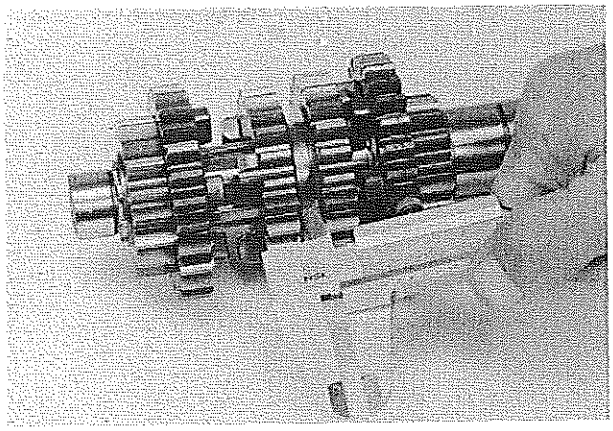
Shift Fork Ear Thickness

Standard :	**4.9 – 5.0 mm**
Service Limit:	**4.8 mm**

★If a gear shift fork groove is worn over the service limit, the gear must be replaced.

Gear Shift Fork Groove Width

Standard:	**5.05 – 5.15 mm**
Service Limit:	**5.3 mm**



Shift Fork Guide Pin and Collar

•Measure the diameter of each shift fork guide pin, the outer and inner diameter of each collar.

★If the guide pin on any shift fork is less than the service limit, the fork must be replaced.

Shift Fork Guide Pin Diameter

Standard:	**4.85 – 4.95 mm**
Service Limit:	**4.8 mm**

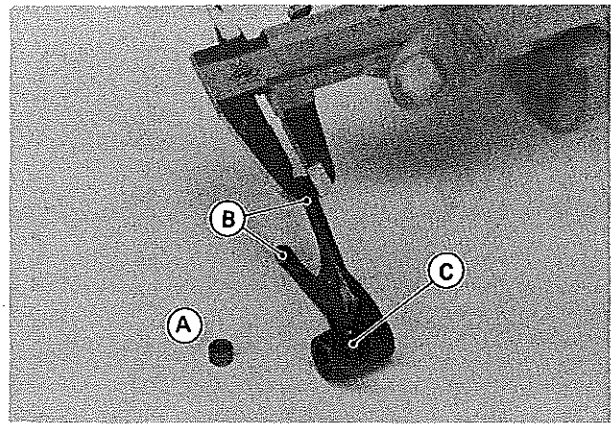
★If the collar on any shift fork is out of the service limit, replace the collar.

Collar Inner Diameter

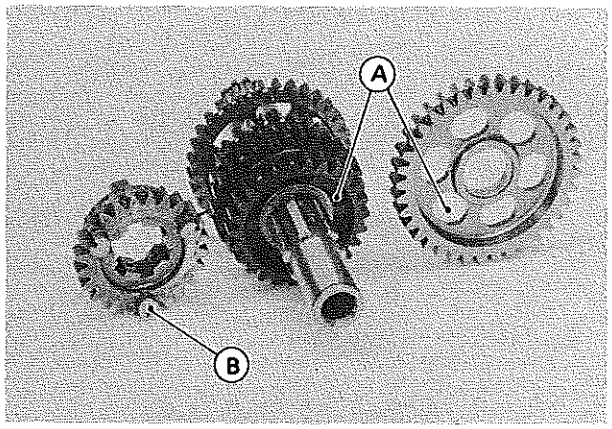
Standard:	**4.95 – 5.05 mm**
Service Limit:	**5.10 mm**

Collar Outer Diameter

Standard:	**7.95 – 8.05 mm**
Service Limit:	**7.90 mm**



A. Collar
B. Shift Fork Ears
C. Guide Pin



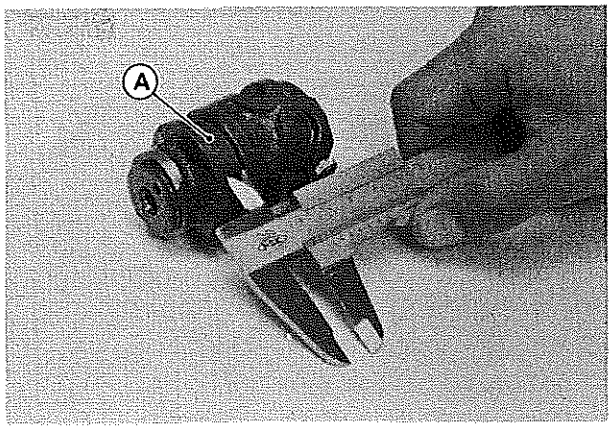
A. Dog Hole
B. Dog

Shift Drum Groove Wear

•Measure the width of each shift drum groove.
★If any shift drum groove is worn over the service limit, the drum must be replaced.

Shift Drum Groove Width

Standard:	**8.05 – 8.20 mm**
Service Limit:	**8.3 mm**



A. Shift Drum Grooves

Gear Dog/Gear Dog Hole Damage

•Visually inspect the gear dogs and gear dog holes.
★Replace any gears that have damaged or excessively worn dogs or dog holes.

Ball and Needle Bearing Wear

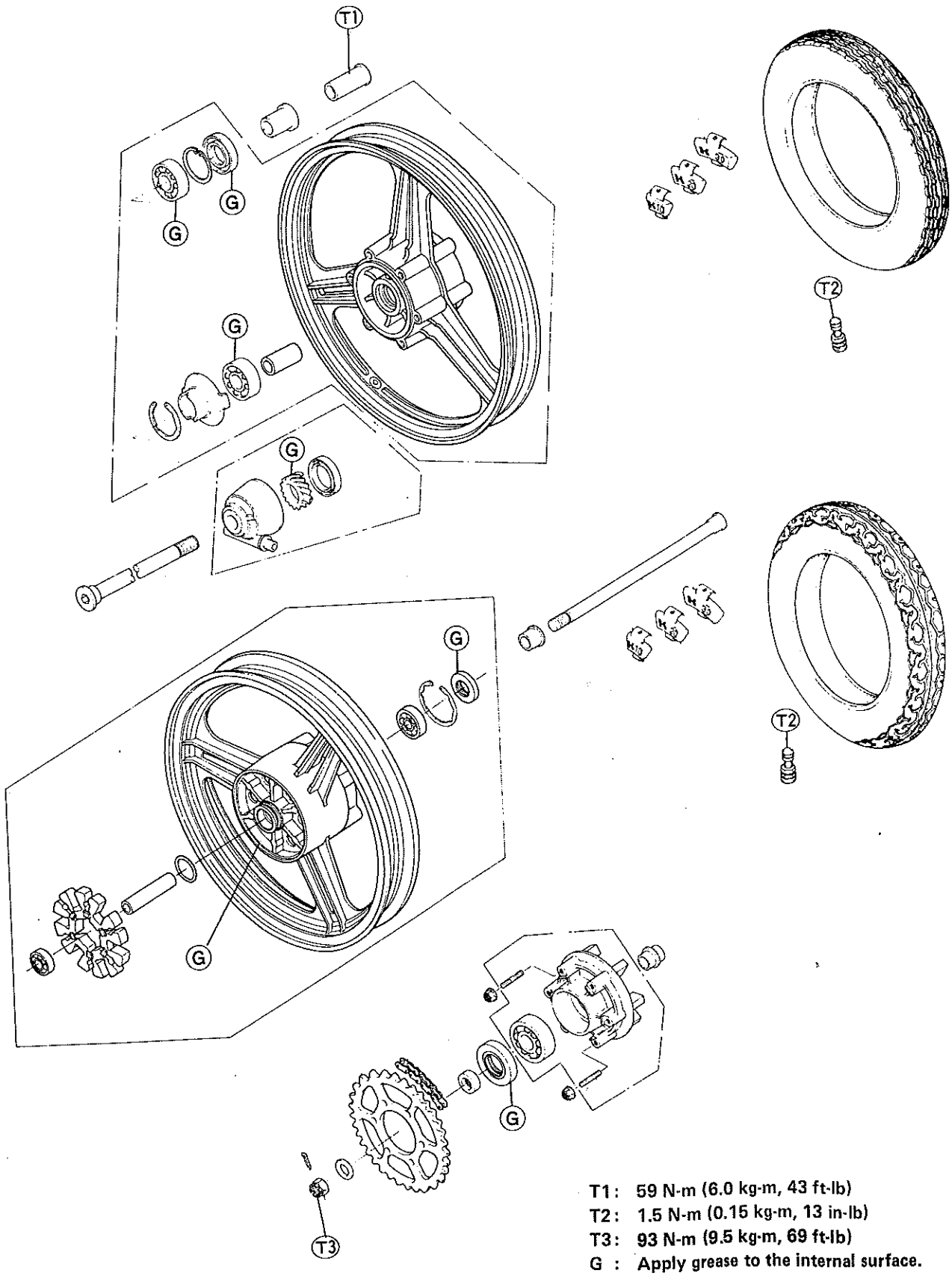
•Check the following ball bearings: shift drum LH, drive shaft RH, and output shaft LH.
○Since the ball bearings are made to extremely close tolerances, the wear must be judged by feel rather than measurement. Clean each bearing in a high flash-point solvent, dry it (do not spin the bearing while it is dry), and oil it with engine oil.
○Spin the bearing by hand to check its condition.
★If the bearing is noisy, does not spin smoothly, or has any rough spots, replace it.
•Check the following needle bearing: drive shaft LH and output shaft RH.
○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 a needle bearing, replace it.

Wheels/Tires

Table of Contents

Exploded View 9-2
Specifications 9-3
Special Tools 9-3
Wheels (Rims) 9-4
Front Wheel Removal 9-4
Front Wheel Installation 9-4
Rear Wheel Removal 9-5
Rear Wheel Installation 9-5
Wheel Inspection 9-5
Axle Inspection 9-5
Wheel Balance Check 9-6
Wheel Balance Adjustment 9-6
Tires 9-7
Tire Removal 9-7
Tire Installation 9-8
Tire Inpsection 9-9
Tire Repair 9-10
Hub Bearings 9-10
Front Hub Bearing Removal 9-10
Rear Hub Bearing Removal 9-11
Front or Rear Hub Bearing Installation 9-12
Front Hub Bearing and Rear Wheel Coupling Bearing Lubrication, Inspection 9-12
Rear Hub Bearing Inspection 9-12
Speedometer Gear Housing 9-13
Speedometer Gear Housing Disassembly 9-13
Speedometer Gear Housing Assembly 9-13
Speedometer Gear Assembly Lubrication 9-14

Exploded View



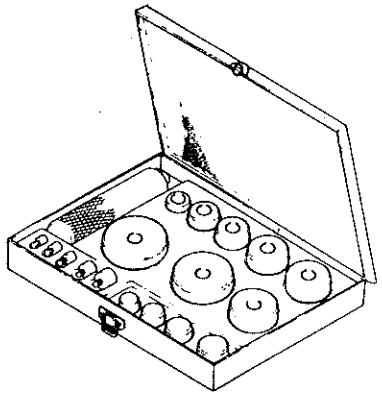
T1: 59 N-m (6.0 kg-m, 43 ft-lb)
T2: 1.5 N-m (0.15 kg-m, 13 in-lb)
T3: 93 N-m (9.5 kg-m, 69 ft-lb)
G : Apply grease to the internal surface.

Specifications

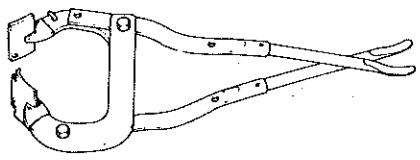
Item		Standard		
Wheels:				
Wheel balance		Imbalance of less than 0.1 N (10 g)		
Front tire	Make & type	Bridgestone G519 Tubeless		
	Tire size	100/90-16 54H		
	Air pressure	200 kPa (2.0 kg/cm², 28 psi)		
	Tread depth	4.3 mm (service limit : 1 mm)		
Rear tire	Make & type	Bridgestone G518 Tubeless		
	Tire size	110/80-18 58H		
	Air pressure	over	up to	
		– – –	956 N (97.5 kg, 215 lb)	221 kPa (2.25 kg/cm², 32 psi)
		956 N (97.5 kg, 215 lb)	1,471 N (150 kg, 331 lb)	245 kPa (2.50 kg/cm², 36 psi)
		1,471 N (150 kg, 331 lb)	1,735 N (177 kg, 391 lb)	275 kPa (2.80 kg/cm², 40 psi)
	Tread depth	7 mm (Service limit: 2mm, over 110 km/h: 3mm)		
Rim runout	Axial	– – – (service limit : 0.5 mm)		
	Radial	– – – (service limit : 0.8 mm)		

Special Tools

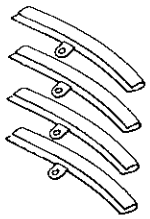
Bearing Driver Set: 57001-1129



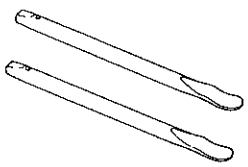
Bead Breaker Assembly: 57001-1072



Rim Protector: 57001-1063



Tire Iron: 57001-1073



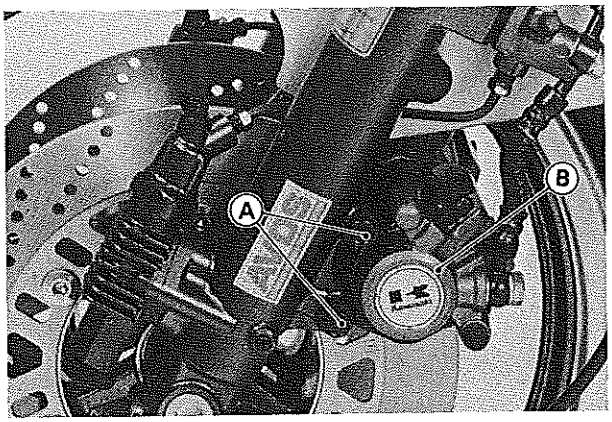
NOTE

○*The tire irons (P/N 57001-1073) are included in the bead breaker assembly (P/N 57001-1072).*

Wheels (Rims)

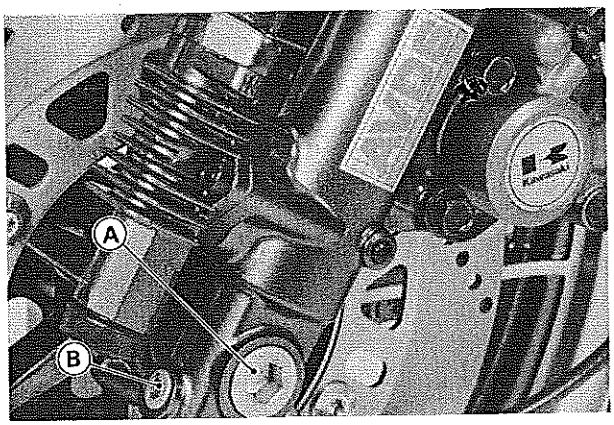
Front Wheel Removal

●Remove the following parts before front wheel removal.
○Speedometer cable lower end
○Either of brake calipers



A. Caliper Mounting Bolts B. Caliper

○Left side axle clamp bolts loosened



A. Axle B. Axle Clamp Bolt

○Axle loosend (axle head is on left side)
●Lift the front wheel off the ground (see Front Fork Air Pressure Adjustment in Suspension chapter).
●Pull out the axle to the left and drop the front wheel out of the fork.
●Remove the front wheel.

CAUTION

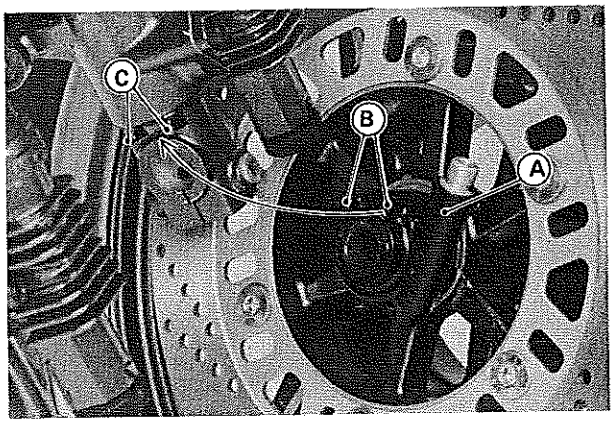
○Do not lay the wheel down on one of the discs. This can damage or warp the disc. Place blocks under the wheel so that the discs do not touch the ground.

Front Wheel Installation

●When installing the front wheel, be careful of the following items.
○Installation is the reverse of removal.

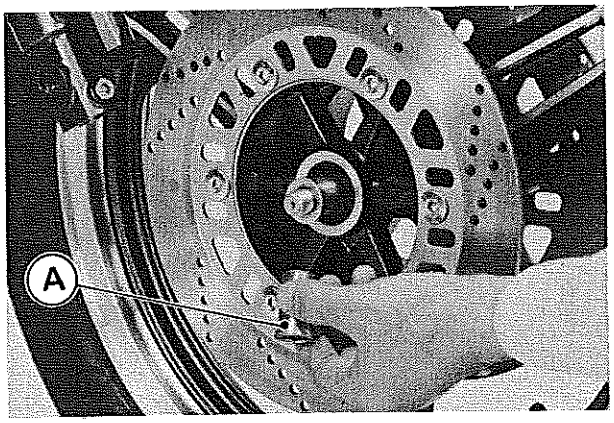
NOTE

○Install the speedometer gear housing so that it fits in the speedometer gear drive notches.
○Fit the speedometer gear housing stop in the fork leg stop.



A. Speedometer Gear Housing
B. Housing Stop
C. Fork Leg Stop

●Be sure to insert the collar on the right side of the hub.



A. Collar

○Tighten the axle nut to the specified torque.
○Tighten the axle clamp bolts to the specified torque.
○Tighten the caliper mounting bolts to the specified torque.
○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

- Remove or loosen the following parts before rear wheel removal.
  - Front muffler
  - Caliper fixing bolt and collar fixing bolt (loosen)
  - Drive chain (fully loosen)
  - Axle nut and alxe (remove)
  - Caliper (remove)
- Pull off the drive chain toward the left, and remove the rear wheel.

CAUTION

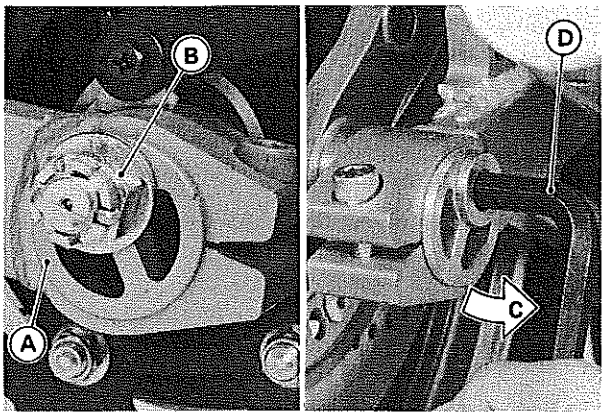
- **Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so the disc does not touch the ground.**

Rear Wheel Installation

- When installing the rear wheel, be careful of the following items.
  - Installation is the reverse of removal.
  - Adjust the drive chain after installation (see Drive Chain Adjustment in Final Drive chapter).

NOTE

- *When adjusting the drive chain, turn the chain adjuster toward the direction as shown.*



A. Chain Adjuster
B. Axle Nut
C. Rotation
D. Allen Wrench

- Tighten the axle nut and chain adjuster clamp bolts to specified torque.

Wheel Inspection

If there is any doubt as to the condition of the wheel, or if the wheel has received a heavy impact, check the rim runout as follows:

Remove the tire and support the wheel by the axle. Set a dial gauge against the side of the rim, and rotate the wheel to measure the axial runout. The difference between the highest and lowest dial readings is the amount of runout.

Set the dial gauge against the outer circumference of the rim, and rotate the wheel to measure radial runout. The difference between the highest and lowest dial readings is the amount of runout.

If rim runout exceeds the service limit, check the wheel bearings first. Replace them if they are damaged. If the problem is not due to the bearings, the wheel must be replaced. Do not attempt to repair a damaged wheel.

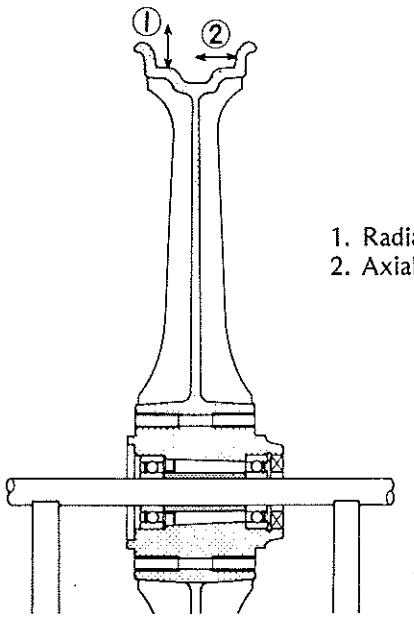
Radial Runout

Service Limit: **0.8 mm**

Axial Runout

Service Limit: **0.5 mm**

Rim Runout



1. Radial Runout
2. Axial Runout

Carefully inspect the wheel for small cracks, dents, bending, or warp. If there is any damage to the wheel, it must be replaced.

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.**

If the rim has scratch deeper than **0.5 mm** and/or across the rim sealing surface, replace the wheel.

Axle Inspection

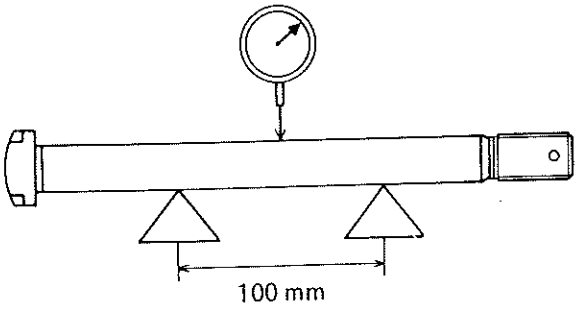
To measure axle runout, remove the axle, place it in V blocks that are 100 mm apart, and set a dial gauge on the axle at a point halfway between the block. Turn the axle to measure the runout. The amount of runout is the amount of dial variation.

If runout exceeds the service limit, straighten the axle or replace it. If the axle cannot be straightened to within tolerance, or if runout exceeds the repair limit, replace the axle.

Axle Runout/100 mm

Service Limit:	**0.2 mm**
Repair Limit:	**0.7 mm**

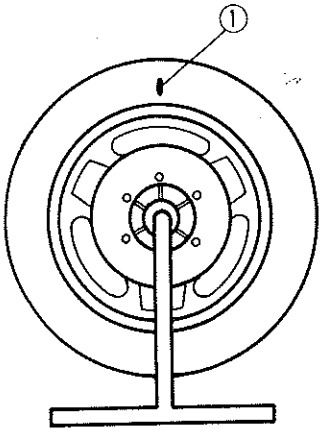
Axle Runout



Wheel Balance Check

- Support the wheel so that it can be spun freely.
- Spin the wheel lightly, and mark the wheel at the top when the wheel stops.

Wheel Balance Check



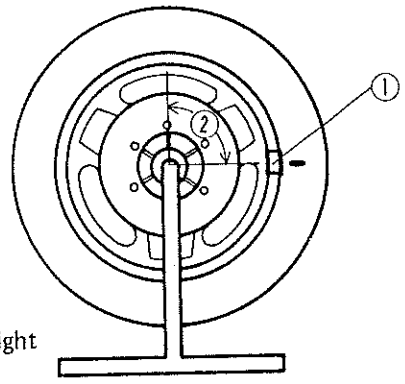
1. Mark

- Repeat this procedure several times. If the wheel stops of its own accord in various positions, it is well balanced.

Wheel Balance Adjustment

- If the wheel always stops in one position, provisionally attach a balance weight on the rim at the marking using an adhesive tape.
- Rotate the wheel ¼ turn, and see whether or not the wheel stops in this position. If it does, the correct balance weight is being used.
- If the wheel rotates and the weight goes up, replace the weight with the next heavier size. If the wheel rotates and the weight goes down, replace the weight with the next lighter size. Repeat these steps until the wheel remains at rest after being rotated ¼ turn.
- Rotate the wheel another ¼ turn, and then another ¼ turn to see if the wheel is correctly balanced.
- Repeat the entire procedure as many times as necessary to achieve correct wheel balance.

Wheel Balance Adjust



A. Balance Weight
B. ¼ Turn

Balancer Weight Installation:

- It is not necessary to reduce the tire pressure for balancer 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 on the rim flange.

CAUTION

- **Do not lubricate the tire bead with engine oil or gasoline 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

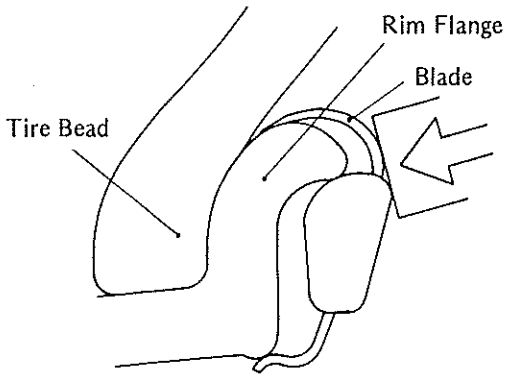
- **If the balance weight has any play on the rim flange, the blade and/or clip of weight are widened. Replace the loose balance weight.**
- **Do not reuse balance weights.**

Balance Weight

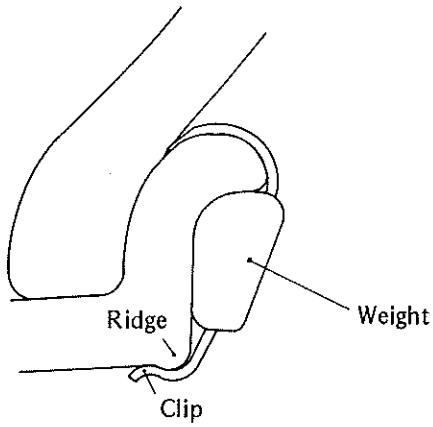
Part Number	Weight (grams)
41075-1014	10
41075-1015	20
41075-1016	30

Installing Balance Weight

(a) Press or lightly hammer the weight in.



(b) Installation completed.

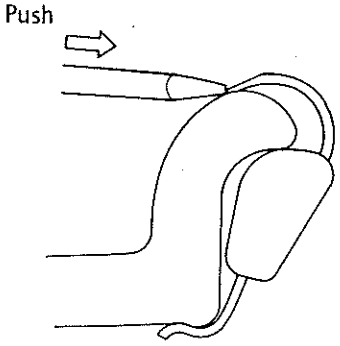


Remove of Balance Weight:

(a) When the tire is not on the rim.

- Push the blade portion toward the outside with a regular tip screw driver, and slip the weight of the rim flange.
- Discard the used balance weight.

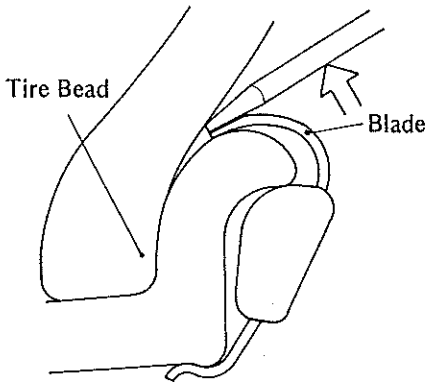
Removing Balance Weight (without tire on the rim)



(b) When the tire is on the rim.

- Pry the Balance weight off the rim flange using a regular tip screw driver as shown in the figure.
  - Insert a tip of the screw driver 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.

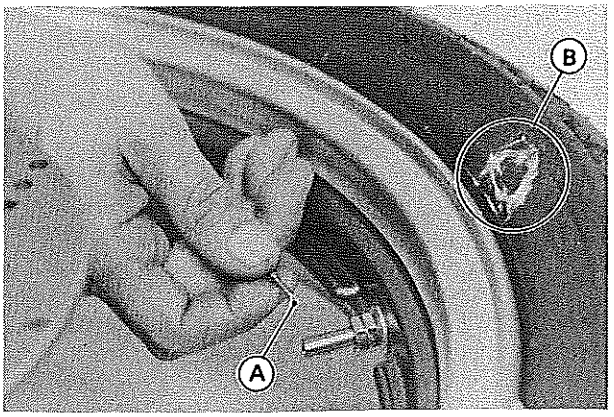
Removing Balance Weight (with tire on the rim)



Tires

Tire Removal

- Remove the wheel from the motorcycle, and remove the disc(s) from the hub.
- To maintain wheel balance, mark the valve stem position on the tire with chalk so that the tire will be reinstalled in the same position.
- Take out the valve core to let out the air.



A. Valve Core B. Chalk Mark

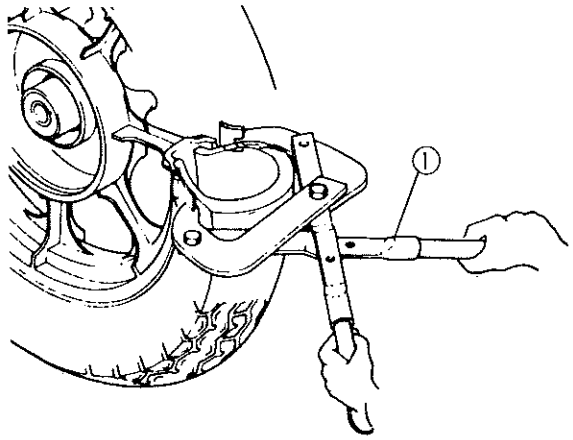
●Lubricate the tire beads and rim flanges on both sides with a soap and water solution or rubber lubricant. This helps the tire beads slip off the rim flanges.

CAUTION

○**Never lubricate with mineral oil (engine oil) or gasoline because they will cause deterioration of the tire.**

●Break the beads away from both sides of the rim with the bead breaker (special tool).

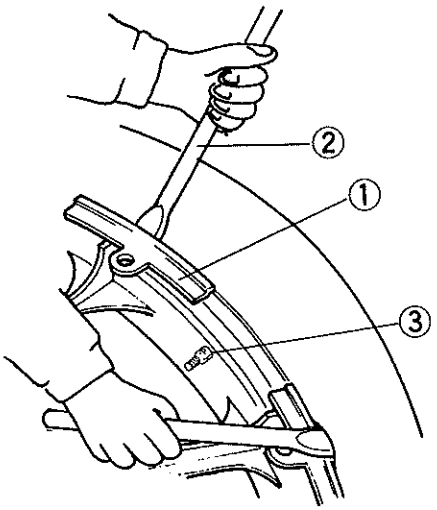
Tire Beads Breaker



A. Bead Breaker: 57001-1072

●Install the rim protectors (special tools) around the valve stem. Lubricate the tire irons and rim protectors with a soap and water solution, or rubber lubricant.
●Step on the side of the tire opposite the valve stem, and start prying the tire off the rim near the valve stem with tire irons (special tools).

Tire Removal



1. Rim Protectors: 57001-1063
2. Tire Irons: 57001-1073
3. Valve Stem

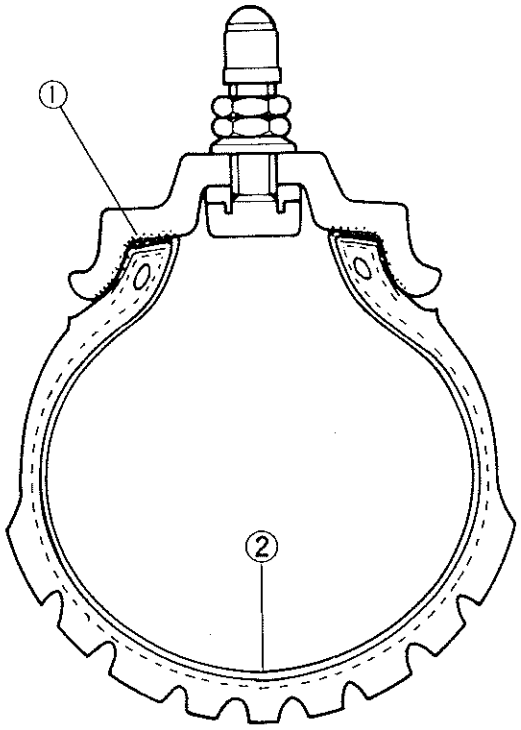
NOTE

○*For easier removal, always position the tire bead opposite the valve stem in the rim well, and pry the tire bead a little at a time.*

CAUTION

○**Be careful not to scratch the inner liner and air sealing surfaces of the rim and tire with the tire irons. A scratched inner liner or sealing surface may allow air to leak.**

Air Sealing Surfaces



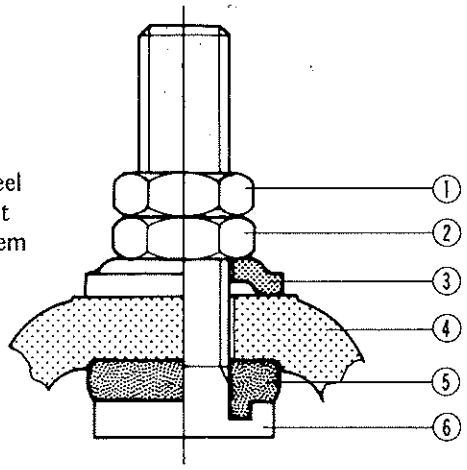
1. Air Sealing Surfaces
2. Inner Liner

●After removing the bead on one side, turn the wheel over and remove the other side.
●Remove the rim from the tire.
●Remove the rim protectors from the rim.

Tire 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.
●Replace the valve with a new one. Tighten the mounting nut and locknut to the specified torque.

Air Valve

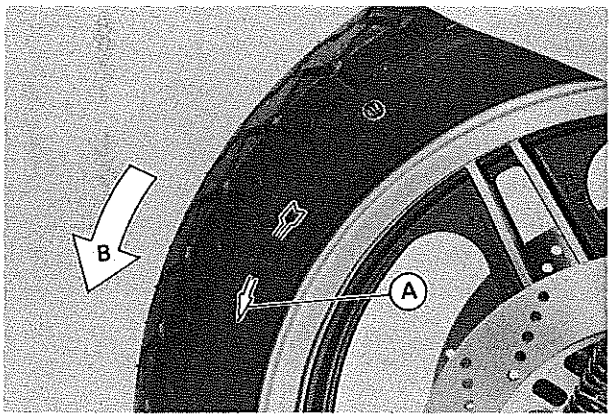


1. Locknut
2. Nut
3. Washer
4. Cast Wheel
5. Grommet
6. Valve Stem

- Apply a soap and water solution, or rubber lubricant to the rim flanges, rim protectors, tire beads, and tire irons.
- 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.



A. Rotaion Mark (Arrow)
B. Rotation Direction

- 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).
- Fit the rim protectors on the rim flange near the valve stem.
- By hand, slide as much as possible of the lower side of the tire bead over the rim flange, starting at the side opposite the valve.
- Use tire irons to install the remaining part of the tire bead which cannot be installed by hand. For easy tire installation, position the part of the bead which is already over the rim flange in the rim well.

NOTE

○To prevent rim damage, be sure to place the rim protectors at any place the tire irons are applied.

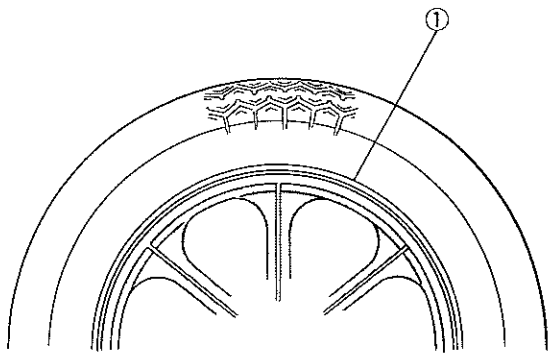
- Install the other side of the tire bead onto the rim in the same manner.
- Lubricate the tire beads and rim flanges with a soap and water solution or rubber lubricant to help seat the tire beads in the sealing surfaces of the rim while inflating the tire.
- Center the rim in the tire beads, and inflate 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 390 kPa (4.0 kg/cm^2, 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.

Rim Line



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 it, and check for bubbles that would indicate leakage.
- Adjust the air pressure to the specified pressure (see Tire Inspection).
- Adjust the wheel balance (see Wheel Balance).

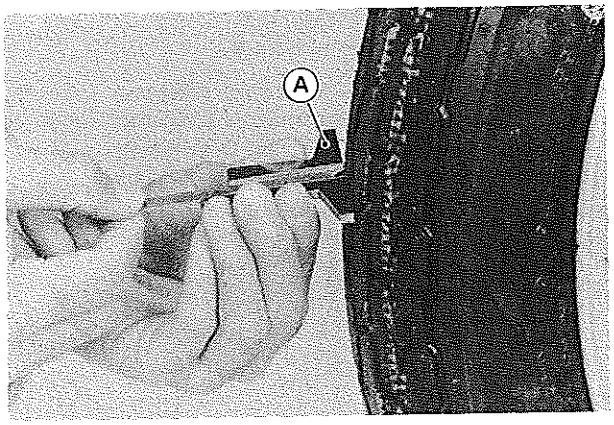
Tire Inspection

As the tire tread wears down, the tire becomes more susceptible to puncture and failure. An Accepted estimate is that 90% of all tire failures occur during the last 10% of tread life (90% worn). So it is false economy and unsafe to use the tires until they are bald.

- Remove any imbedded stones or other foreign particles from the tread.

- Visually inspect the tire for cracks and cuts, replacing the tire in case of bad damage. Swelling or high spots indicate internal damage, requiring tire replacement.
- Measure the tread depth at the center of the tread with a depth gauge. Since the tire may wear unevenly, take measurements at several places.

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



A. Depth Gauge

Tire Tread Depth

Front	
Standard	**4.3 mm**
Service Limit	**1 mm**
Rear	
Standard	**7.0 mm**
Service Limit	**2 mm (Up to 110 km/h)**
	3 mm (Over 110 km/h)

WARNING

○To ensure safe handling and stability, use only the recommended standard tires for replacement, inflated to the standard pressure.

NOTE

○Check and balance the wheel when a tire is replaced with a new one.

Standard Tire

Front	
Size	100/90-16 54H
Make, Type	TUBELESS
	BRIDGESTONE G519
Rear	
Size	110/80-18 58H
Make, Type	TUBELESS
	BRIDGESTONE G518

Tire Repair

Currently two types of repair for tubeless tires have come into wide use. One type is called temporary (external) repairs which can be carried out without removing the tire from the rim, and another type is called permanent (internal) repairs which require tire removal. It is generally understood that higher running durability is obtained by permanent (internal) repairs than by temporary (external) ones. Also, permanent (internal) repairs also have the advantage of permitting a thorough examination for secondary damage not visible from external inspection of the tire. For these reasons, Kawasaki does not recommend temporary (external) repair. Only appropriate permanent (internal) repairs are recommended. Repair methods may vary slightly from make to make. Follow the repair methods indicated by the manufacturer of the repair tools and materials so that safe results can be obtained.

Hub Bearings

Front Hub Bearing Removal

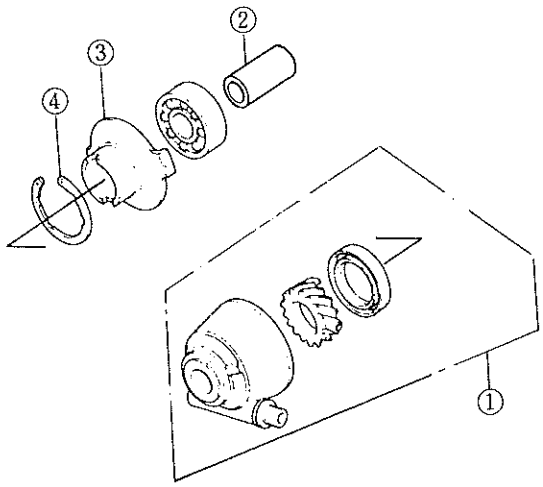
CAUTION

○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 disc does not touch the ground.

Tire Air Pressure (when cold)

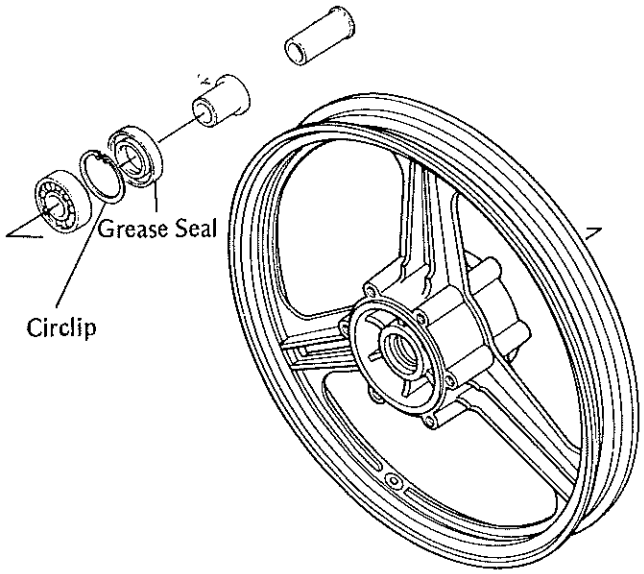
	Load	Air Pressure
Front	———	200 kPa (2.0 kg/cm², 28 psi)
Rear	Up to 956 N (97.5 kg, 215 lb)	221 kPa (2.25 kg/cm², 32 psi)
	Over 956 – up to 1,471 N (97.5 – 150 kg, 215 – 331 lb)	245 kPa (2.5 kg/cm², 36 psi)
	Over 1,471 N – up to 1,735 N (150 – 177 kg, 331 – 391 lb)	275 kPa (2.8 kg/cm², 40 psi)

●Remove the front wheel.
●Remove the speedometer gear housing, and collar from the wheel.
●Remove the disc mounting Allen bolts and take off the discs.
●Remove the circlip and speedometer receiver.



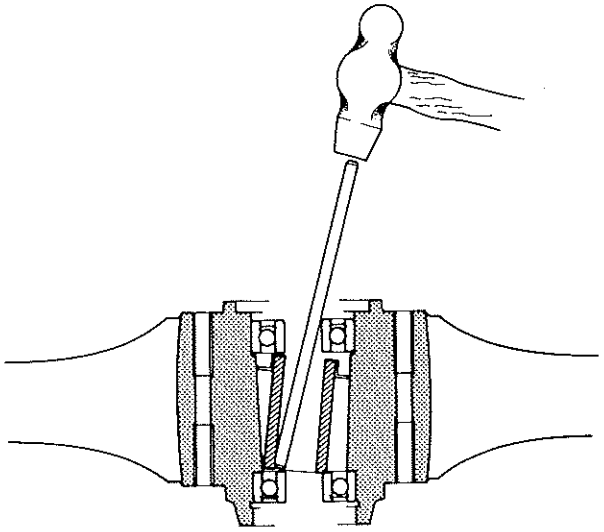
1. Speedometer Gear Housing
2. Collar
3. Speedometer Receiver
4. Circlip

●Remove the grease seal using a hook, and remove the circlip.



●Insert a metal rod into the hub from the left side, and remove the right side bearing by tapping evenly around the bearing inner race.
●Remove the remaining bearing by tapping evenly around the bearing inner race. The distance collar comes out with the bearing.

Bearing Removal

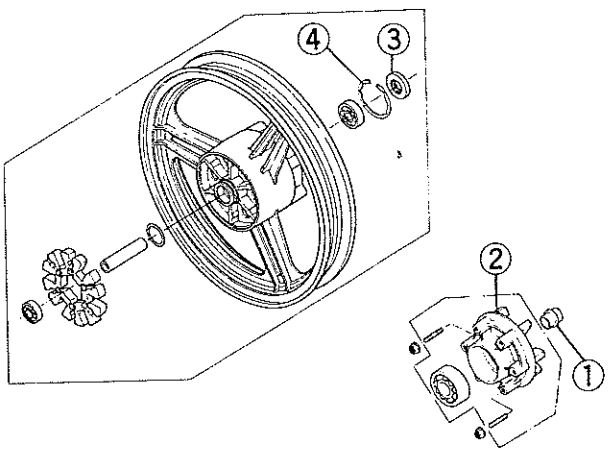


Rear Hub Bearing Removal

CAUTION

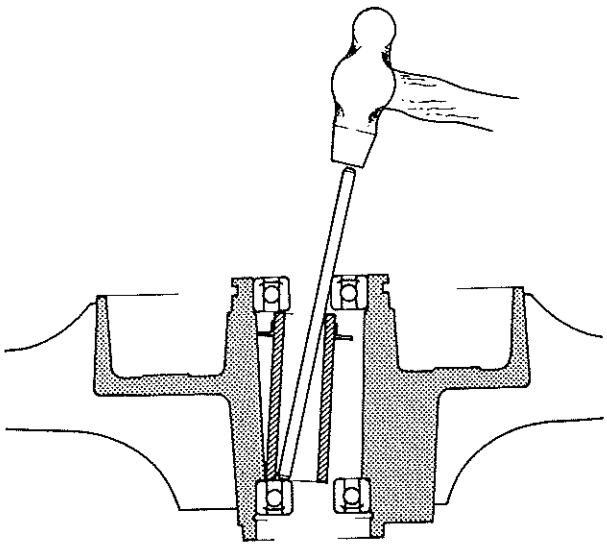
○**Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that disc does not touch the ground.**

●Remove the rear wheel.
●Remove the coupling sleeve, rear wheel coupling, and coupling collar from the wheel.
●Remove the disc mounting Allen bolts and take off the disc.
●Remove the grease seal using a hook, and remove the circlip.



1. Coupling Sleeve
2. Coupling
3. Grease Seal
4. Circlip

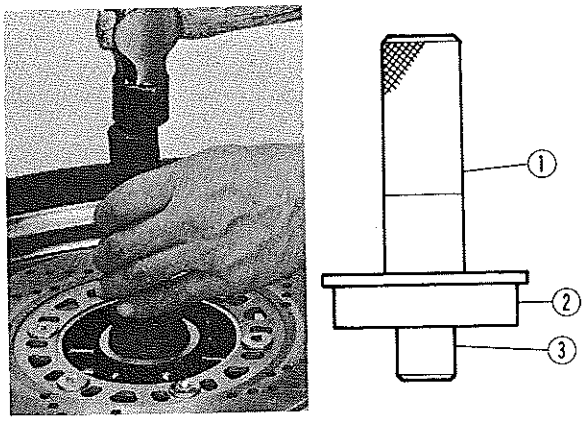
Bearing Removal



- Insert a metal rod into the hub from the left side, and remove the right side bearing by tapping evenly around the bearing inner race.
- Remove the remaining bearing by tapping evenly around the bearing inner race. The distance collar comes out with the bearing.

Front or Rear Hub Bearing Installation

- Before installing the wheel bearings, blow any dirt or foreign particles out of the hub with compressed air.
- Pack each front bearing with wheel bearing grease.
- Press either front bearing into the hub so that the shield sides face outwards. Press either rear hub bearing into the hub so that the marked sides face outwards.
- Use the bearing driver (special tool) which does not contact the bearing inner race.
- Press the wheel bearing (right side) into the hub until it sotps at the bottom of the hole.

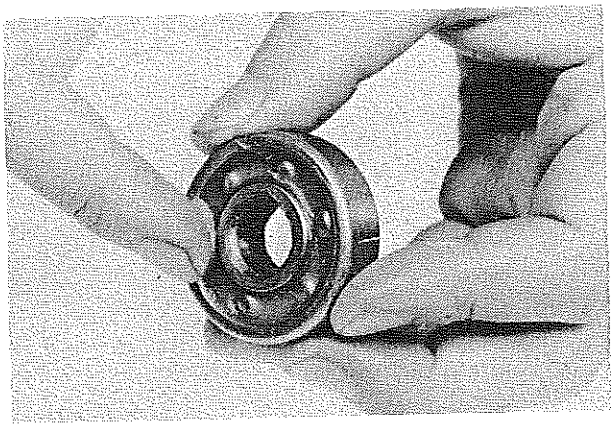


1. Bearing Driver holder: 57001-1132
2. Bearing Driver
3. Bearing Driver

○Tighten the disc mounting Allen bolts to the specified torque. The disc must be installed with the chamfered hole side facing toward the wheel or the marked side facing outwards. After installing the disc, check the disc runout. Completely clean off any grease that has gotten on either side of the disc with a high flash-point solvent. Do not use on which will leave any oily residue.

Front Hub Bearing and Rear Wheel Coupling Bearing Lubrication, Inspection

- Remove the wheel bearings on the front wheel hub and rear wheel coupling.
- Wipe the oil grease out of the hub before bearing installation.
- Wash the bearings with a high flash-point solvent, and dry them (do not spin it while it is dry).
- Inspect the bearings for damage, replace any damaged bearing.
- Pack the bearings with good quality bearing grease. Turn the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing.



- Examine the bearing seal for tears or leakage.

★If the seal is torn or is leaking, replace the bearing.

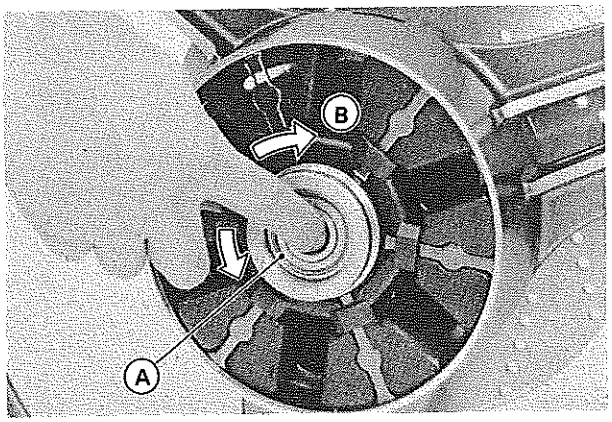
Rear Hub Bearing Inspection

NOTE

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

- Turn each bearing back and forth while checking for roughness or binding. If roughness or binding is found, replace the beairng.

●Examine the bearing shield for damage or leakage.
★If the shield is damaged or is leaking, replace the bearing.

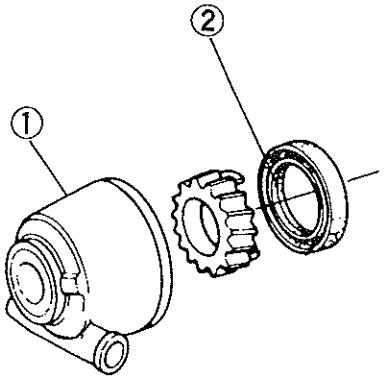


A. Bearing Shield B. Turn Inner Race

Speedometer Gear Housing

Speedometer Gear Housing Disassembly

●Pull the speedometer gear housing off the front wheel.
●Pull out the grease seal using a hook.



1. Speedometer Gear Housing 2. Grease Seal

●Pull out the speedometer gear.
●If the speedometer cable bushing or speedometer pinion needs to be removed, first drill the housing through the pin using a 1.0 to 1.5 mm drill bit. Drill the housing from the under side using a 3.0 to 3.5 mm drill bit. Using a suitable 3 mm rod, tap out the pin, and then pull out the speedometer cable bushing, pinion, and washers.

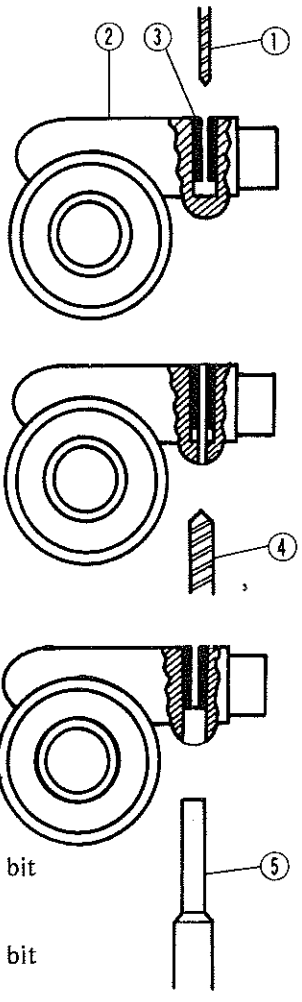
NOTE

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

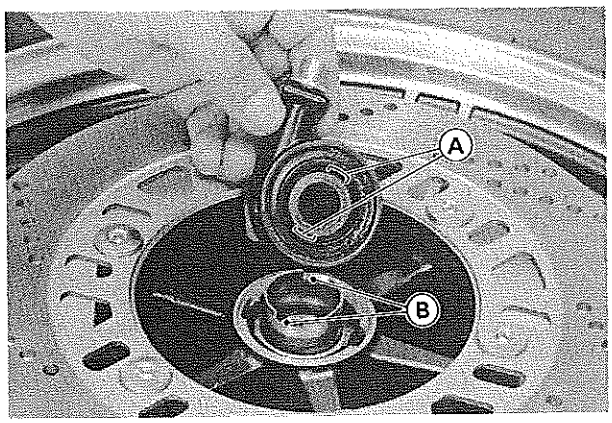
Speedometer Gear Housing Assembly

●When assembling the speedometer gear housing, be careful of the following items.
○After inserting a new pin, stake the housing hole to secure the pin in place.
○Replace the grease seal with a new one. Apply a little grease to the seal. Install it using a press or a suitable driver so that the face of the seal is level with the surface of the housing.
○Regrease the speedometer gear.
○Install the speedometer gear housing so that it fits in the speedometer gear drive notches.

Speedometer Gear Housing Pin Removal



1. 1 ~ 1.5 mm bit
2. Housing
3. Pin
4. 3 ~ 3.5 mm bit
5. 3 mm Rod

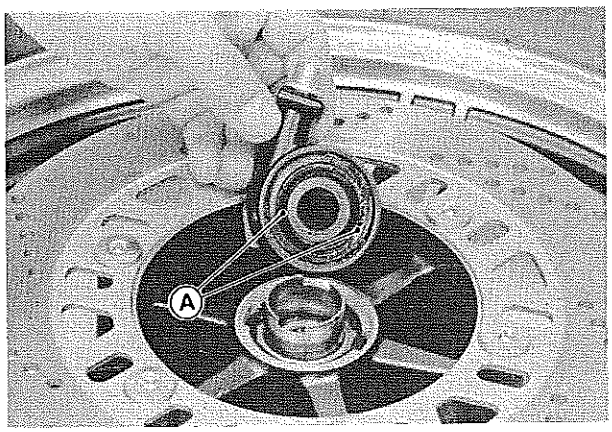


A. Speedometer Gear Housing
B. Fit in the gear drive notches.

Speedometer Gear Assembly Lubrication

Clean and grease the speedometer gear assembly in accordance with the Periodic Maintenance Chart.

- Remove the speedometer gear housing and disassemble the speedometer gear.
- Clean the gear and exposed portion of the pinion with a high flash-point solvent, dry them, and apply a grease to the gear teeth and inside of the gear sleeve.



A. Grease

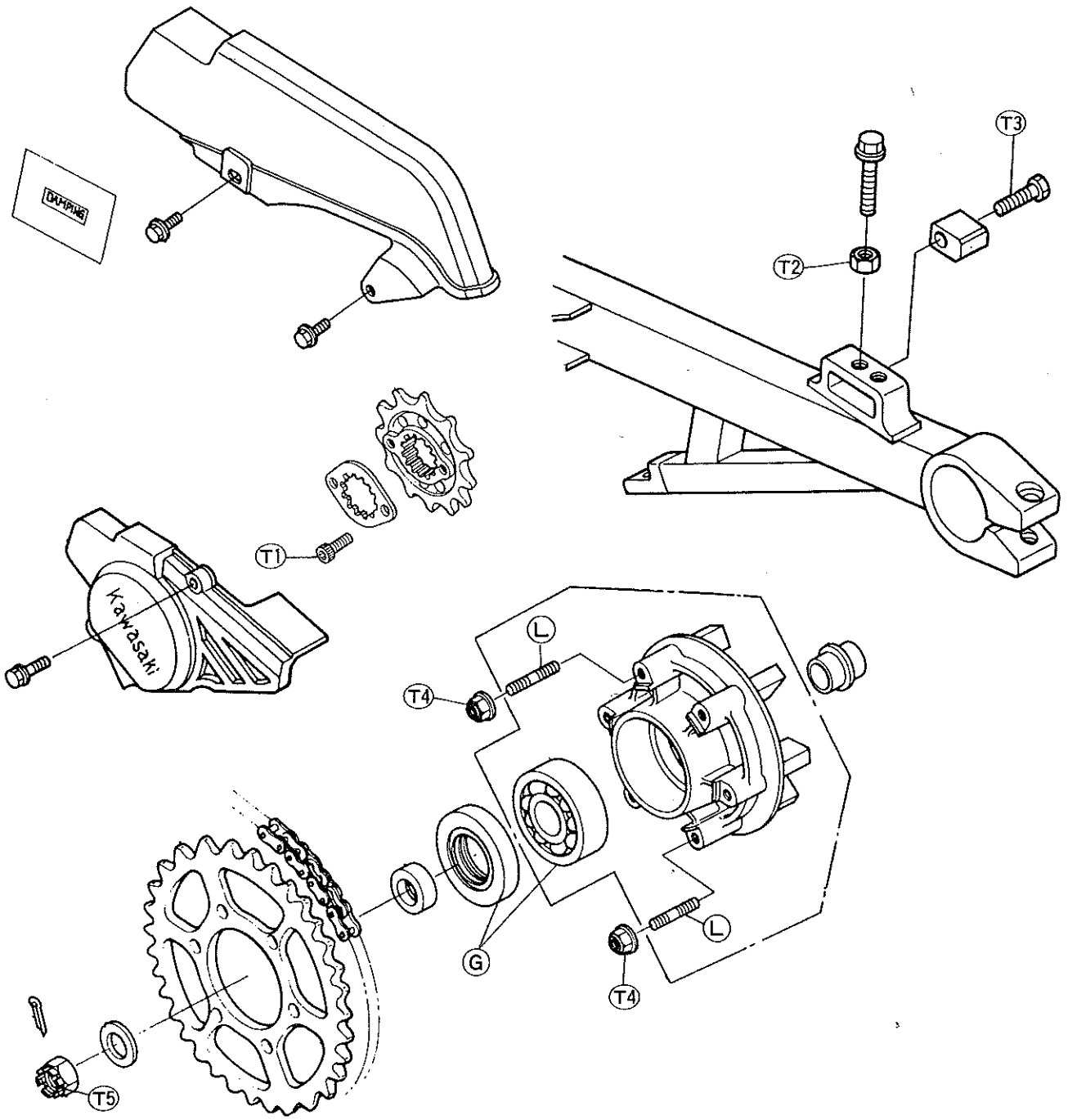
- Assemble the speedometer gear and install the speedometer gear housing.

Final Drive

Table of Contents

Exploded View 10-2
Specifications 10-3
Drive Chain 10-4
Drive Chain Slack Inspection 10-4
Drive Chain Slack Adjustment 10-4
Wheel Alignment Adjustment 10-5
Drive Chain Wear Inspection 10-5
Drive Chain Lubrication 10-6
Chain Guide Wear Inpsection 10-6
Drive Chain Removal 10-6
Chain Installation Note 10-7
Sprocket 10-7
Engine Sprocket Removal 10-7
Engine Sprocket Installation 10-8
Rear Sprocket Removal Note 10-8
Rear Sprocket Installation Note 10-8
Sprockets Inspection 10-8

Exploded View



T1: 12 N-m (1.2 kg-m, 8.5 ft-lb)
T2: 23 N-m (2.3 kg-m, 16.5 ft-lb)
T3: 35 N-m (3.6 kg-m, 26 ft-lb)
T4: 67 N-m (6.8 kg-m, 49 ft-lb)
T5: 93 N-m (9.5 kg-m, 69 ft-lb)
G : Apply grease to the internal surface.
L : Apply a non-permanent locking agent.

Specifications

Item	Standard	Service Limit
Drive Chain:		
Make and type	Enuma, EK520 HVDO	
Chain slack:	20 – 30 mm	20 – 35 mm
20-link length	317.0 – 317.7 mm	323 mm

Drive Chain

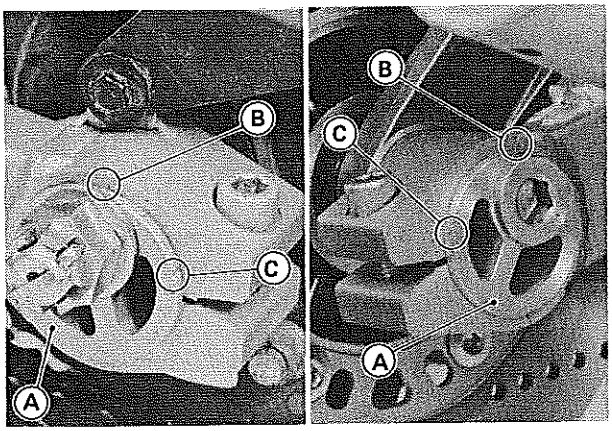
The drive chain must be checked, adjusted, and lubricated in accordance with the Periodic Maintenance Chart for safety and to prevent excessive wear. If the chain becomes badly worn or maladjusted – either too loose or too tight – the chain could jump off the sprocket or break.

WARNING

○A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control.

Drive Chain Slack Inspection

- Set the motorcycle up on its side stand.
- Check to see if wheel alignment is properly adjusted. The left and right notches on the swing arm should point to the same marks or positions on the left and right chain adjusters. If they do not, adjust wheel alignment as described in the later paragraph–Wheel Alignment Adjustment.



A. Chain Adjusters
B. Mark
C. Notch

NOTE

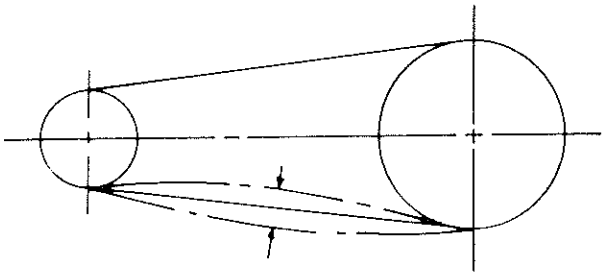
○Wheel alignment can also be checked using the straight-edge or string method.

WARNING

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

- Rotate the rear wheel to find the position where the chain is tightest, and measure the vertical movement midway between the sprockets.
- If the drive chain is too tight or too loose, adjust it so that the chain slack will be within the standard value.

Chain Slack Inspection



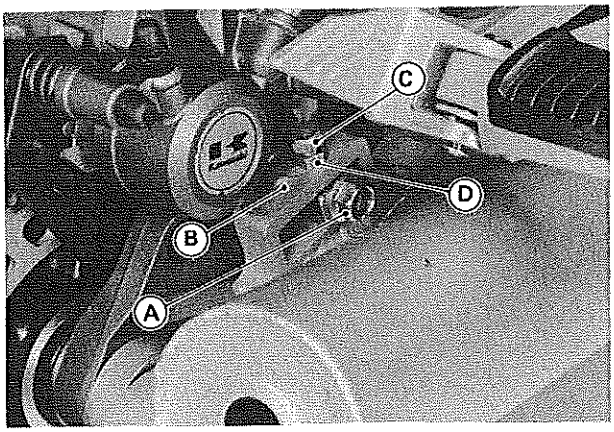
Chain Slack

Drive Chain Slack

Standard:	**20 – 30 mm**
Too Tight:	**Less than 20 mm**
Too Loose:	**More than 35 mm**

Drive Chain Slack Adjustment

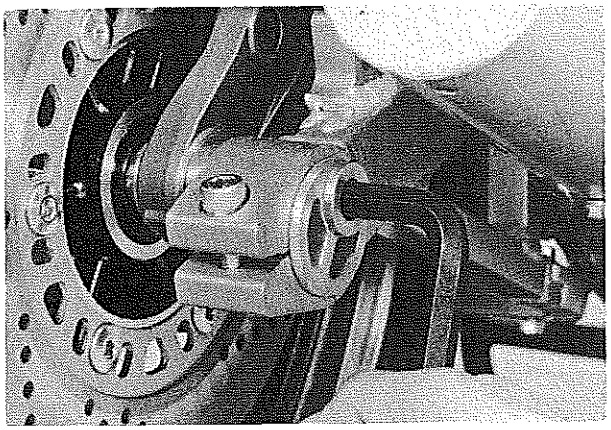
- Loosen the locknut and collar fixing bolt.
- Loosen the caliper fixing bolt.

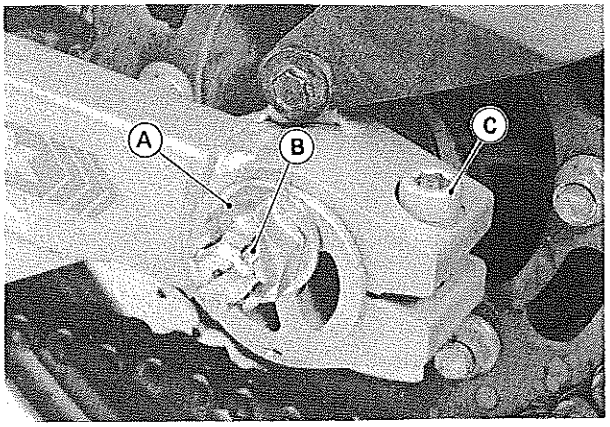


A. Caliper Fixing Bolt
B. Tapped Hole
C. Collar Fixing Bolt
D. Locknut

○Do not loosen the axle nut.

- Loosen the left and right chain adjuster clamp bolts.
- Turn the chain adjusters forward or rearward until the drive chain has the correct amount of chain slack.





A. Axle Nut
B. Cotter Pin
C. Clamp Bolt

•Tighten the chain adjuster clamp bolts to the specified torque.

WARNING

○**If the clamp bolts are not securely tightened, an unsafe riding condition may result.**

•Rotate the wheel, measure the chain slack again at the tightest position, and readjust if necessary.
•Tighten the caliper fixing bolt, collar fixing bolts and locknut securely.

NOTE

○*After chain adjustment, check that the collar is under the collar fixing bolt. If it is not, move the fixing bolt to another hole in the swing arm.*

•Check the rear brake effectiveness.

Wheel Alignment Adjustment

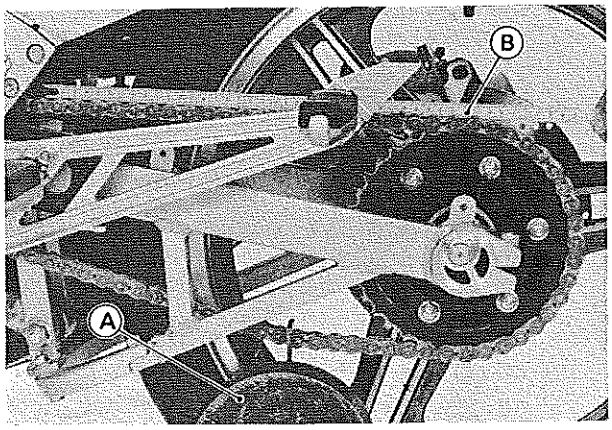
★If the wheel alignment is maladjusted, adjust it as follows.
•Remove the cotter pin from the axle nut, and loosen the nut.
•Loosen the collar and caliper fixing bolts.
•Loosen the left or right chain adjuster clamp bolt, and turn the chain adjuster so that the left and right notches on the swing arm point to the same marks or positions on the left and right adjusters.
•Inspect the chain slack.
•Tighten the collar and caliper fixing bolts.
•Tighten the clamp bolts and axle nut to the specified torque.
•Insert a new cotter pin through the axle nut, and spread its end.

WARNING

○**If the axle nut and clamp bolts are not securely tightened, an unsafe riding condition may result.**

Drive Chain Wear Inspection

•Rotate the rear wheel to inspect the drive chain for damaged rollers, and loose pins and links.
•Also inspect the sprockets for unevenly or excessively worn teeth, and damaged teeth.
★If there is any irregularity, replace the drive chain and both sprockets.
•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 measurements at several places.



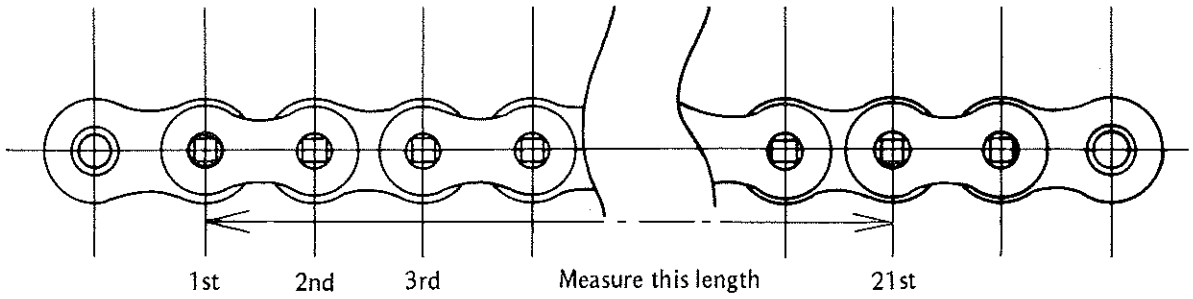
A. Weight
B. Measure

Drive Chain 20 link Length

Standard:	**317.0 – 317.7 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.

Drive Chain Length



Drive Chain Lubrication

The chain should be lubricated with a lubricant which will both prevent the exterior from rusting and also absorb shock and reduce friction in the interior of the chain. An effective, good quality lubricant specially formulated for chains is best for regular chain lubrication.

If 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.

•If the chain appears especially dirty, it should be cleaned before 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 trichlorethylene will cause deterioration and swelling of the O-rings.

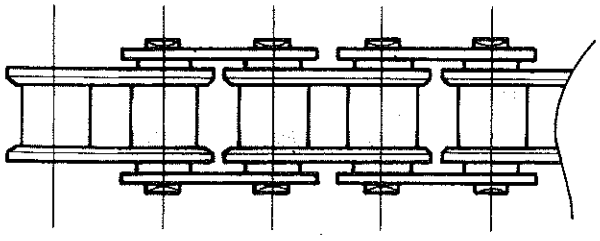
○Immediately blow the chain dry with compressed air after cleaning.

○Complete cleaning and drying the chain within 10 minutes.

•Apply oil to the sides of the rollers so that oil will penetrate to the rollers and bushings. Apply the oil to the O-rings so that the O-rings will be coated with oil.

•Wipe off any excess oil.

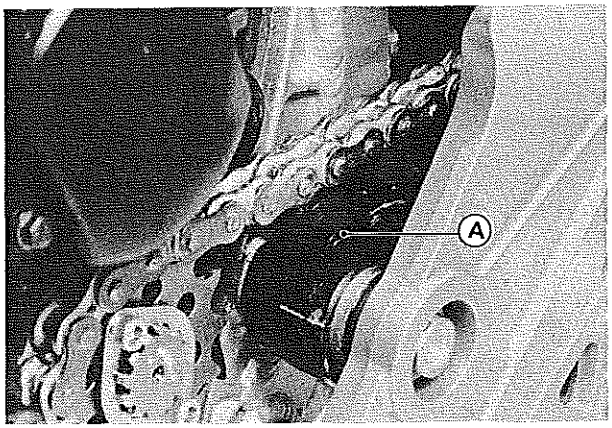
Drive Chain



Chain Guide Wear Inspection

•Visually inspect the drive chain guide rubber.

★If the rubber protrusion is worn down halfway or more, or damaged, replace it.

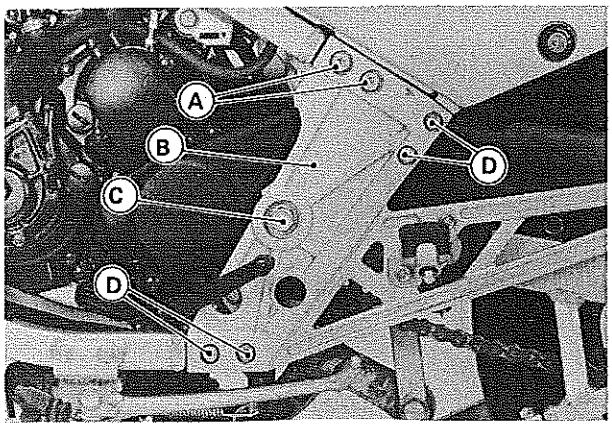


A. Drive Chain Guide

Drive Chain Removal

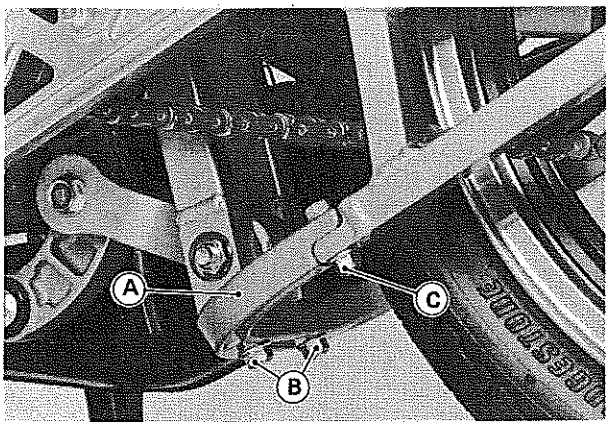
•Remove the pivot shaft nut.

•Take off the left footpeg bracket by removing the mounting bolts and nuts.



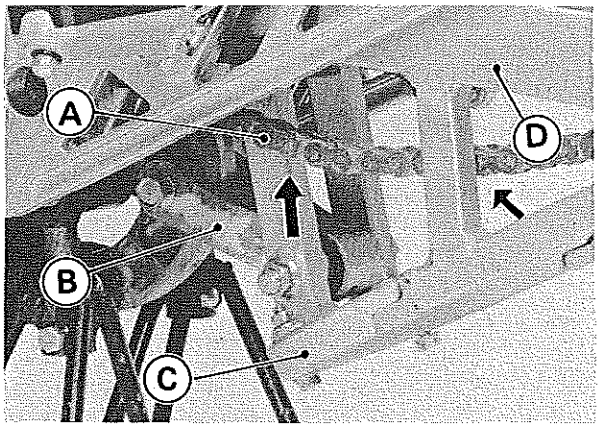
A. Bolts and Nuts
B. Left Footpeg Bracket
C. Pivot Shaft Nut
D. Bolts

●Remove the drive chain cover.
●Remove the front muffler, and then the swing arm holder.



A. Swing Arm Holder
B. Holder Mounting Bolts
C. Holder Mounting Bolts and Nuts

●Turn the chain adjuster so that the chain is too loose.
●Remove the drive chain toward the left.



A. Drive Chain
B. Tie Rod
C. Swing Arm Holder
D. Swing Arm

●Adjust the chain slack.

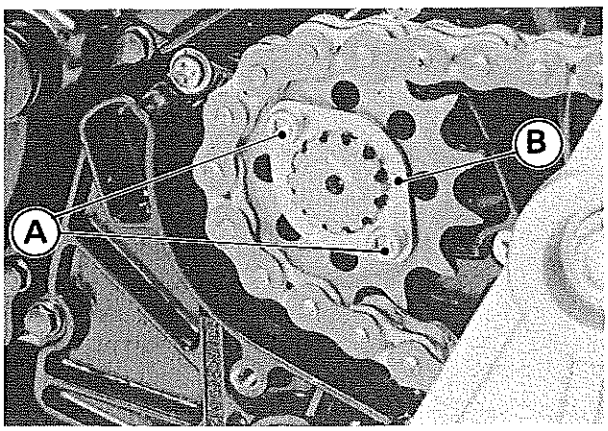
WARNING

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

Sprocket

Engine Sprocket Removal

●Remove the engine sprocket cover.
●Loosen the engine sprocket bolts.
●Loosen the locknut and caliper fixing bolt.
●Loosen the left and right chain adjuster clamp bolts.
●Turn the chain adjusters so that the chain is loose.

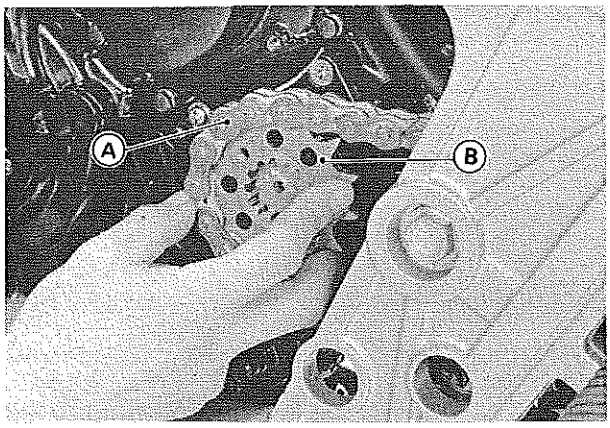


A. Sprocket Bolt
B. Holding Plate

Chain Installation Notes

●After running the drive chain into the swing arm, install the swing arm holder (see Swing Arm Holder Installation in Suspension chapter).

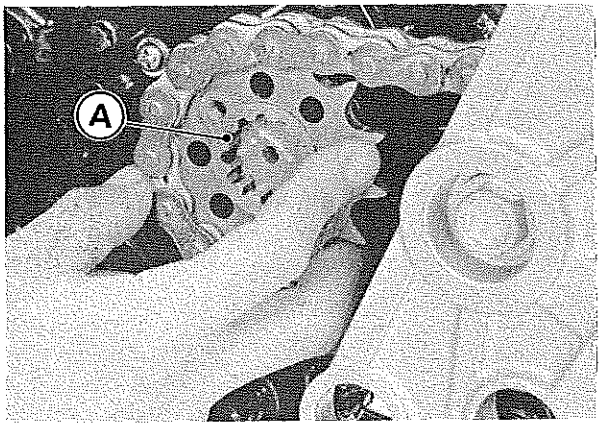
●Remove the sprocket holding plate and pull the engine sprocket off the output shaft with the drive chain.



A. Drive Chain B. Engine Sprocket

Engine Sprocket Installation

●Engage the sprocket with the drive chain so that the plate mating surface looks outwards.
●Install the sprocket onto the output shaft.
●Insert the holding plate.



A. Holding Plate Mating Surface

●Tighten the sprocket bolts to the specification.
●Adjust the chain slack.

Rear Sprocket Removal Note

●Loosen the rear sprocket nuts (6).
●Remove the rear wheel (see Rear Wheel Removal in Wheel and 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.**

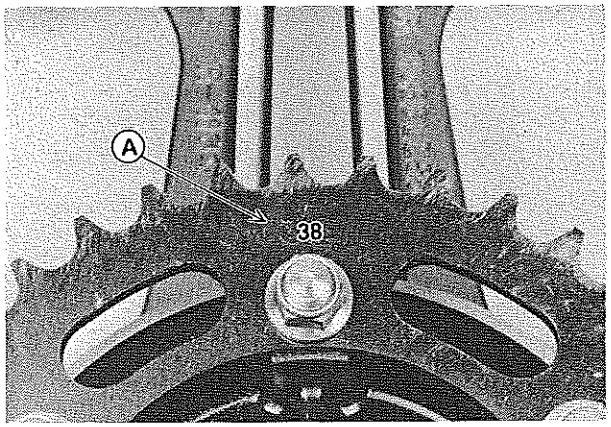
●Remove the rear sprocket nuts (6) to separate the rear sprocket from wheel coupling.

Rear Sprocket Installation Note

●Install the rear sprocket facing the tooth number marking outward.

WARNING

○**By installing the sprocket this way, the chamfered hole side of the rear sprocket facing toward the flange. If not, the sprocket will not seat on the flange evenly, causing the drive chain to be thrown off by excessive sprocket runout during operation. This can result in rear wheel lockup and loss of control.**



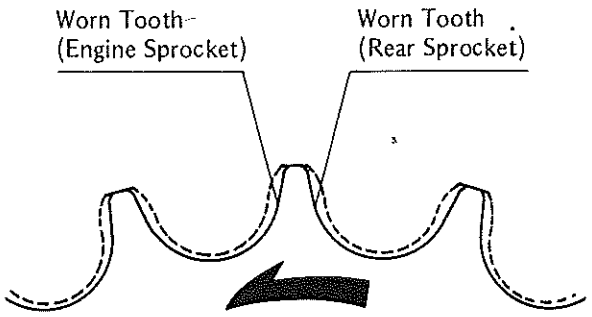
A. Tooth Number Marking

●Tighten the rear sprocket mounting nuts to the specified torque first, then loose them about ¼ turns.
●Again tighten them to the specified torque securely.

Sprockets Inspection

●Visually inspect the sprocket teeth. If they are worn as illustrated, replace the sprocket.

Sprocket Teeth



Direction of rotation

NOTE

○*If a sprocket requires replacement, the chain is provably worn also. Upon replacing a sprocket, inspect the chain.*

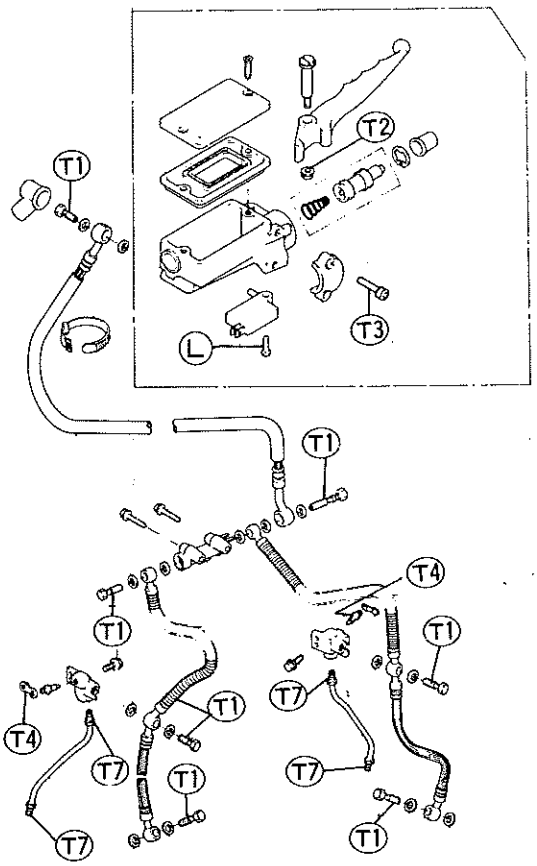
Brakes

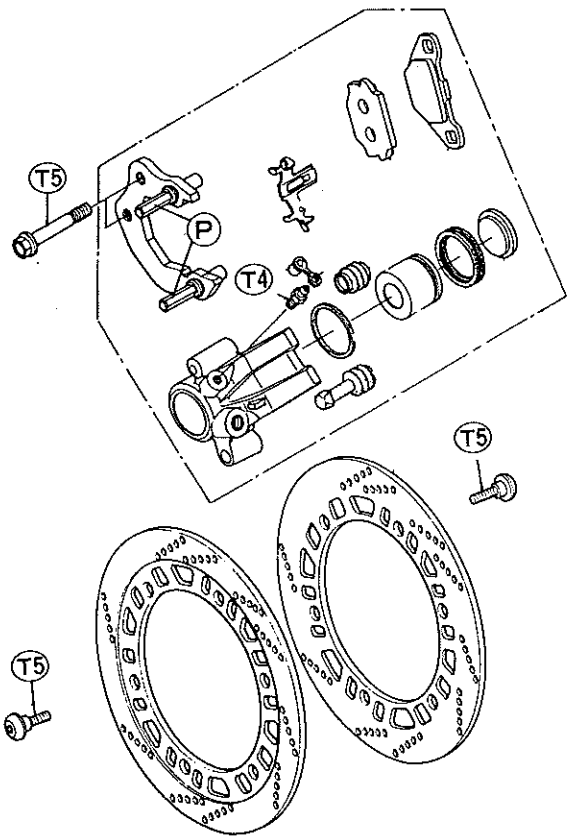
Table of Contents

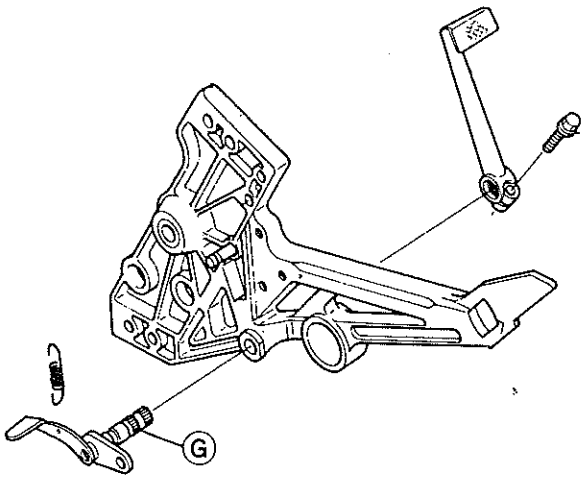
Exploded View 11-2
Specifications 11-3
Special Tool 11-3
Brake Adjustment 11-4
Front Brake Adjustment 11-4
Rear Brake Pedal Position Inspection 11-4
Brake Pedal Position Adjustment 11-4
Calipers 11-5
Front Caliper Removal 11-5
Rear Caliper Removal 11-6
Caliper Installation Notes 11-6
Caliper Disassembly Notes 11-6
Caliper Assembly Notes 11-6
Fluid Seal Damage 11-7
Dust Seal and Cover Damage 11-7
Piston, Cylinder Damage 11-7
Caliper Holder Shaft Wear 11-7
Brake Pads 11-7
Pad Removal 11-7
Pad Installation Notes 11-8
Lining Wear 11-8
Master Cylinders 11-8
Front Master Cylinder Removal 11-8
Rear Master Cylinder Removal 11-8
Front Master Cylinder Installation Notes 11-9
Rear Master Cylinder Installation Notes 11-10
Inspection and Adjustment After Installation 11-10
Front Master Cylinder Disassembly Notes 11-10
Rear Master Cylinder Disassembly Notes 11-10
Front Master Cylinder Assembly Notes 11-11
Rear Master Cylinder Assembly Notes 11-11
Master Cylinder Inspection 11-11
Reservoir Disassembly Notes 11-11
Reservoir Assembly Notes 11-12
Discs 11-12
Disc Wear 11-12
Disc Cleaning 11-12
Disc Warp 11-12
Brake Fluid 11-13
Fluid Level Inspection 11-13
Brake Fluid Recommendation 11-13
Brake Fluid Change 11-13
Bleeding the Brake Line 11-14
Brake Hoses 11-16
Brake Hose, Pipe Inspection 11-16
Brake Hose Replacement 11-16

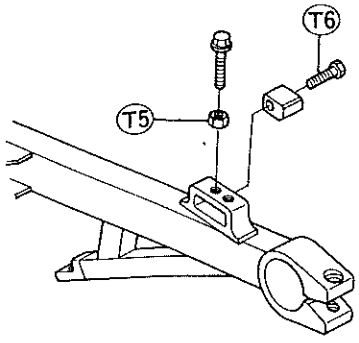
Exploded View

T1: 25 N-m (2.5 kg-m, 18.0 ft-lb)
T2: 5.9 N-m (0.6 kg-m, 52 in-lb)
T3: 8.8 N-m (0.9 kg-m, 78 in-lb)
T4: 7.8 N-m (0.8 kg-m, 69 in-lb)
T5: 23 N-m (2.3 kg-m, 16.5 ft-lb)
T6: 35 N-m (3.6 kg-m, 26 ft-lb)
T7: 15 N-m (1.5 kg-m, 11.0 ft-lb)
G : Apply grease.
P : Apply PBC (Poly Butyl Cuprysil) grease.
L : Apply a non-permanent locking agent to the threads.







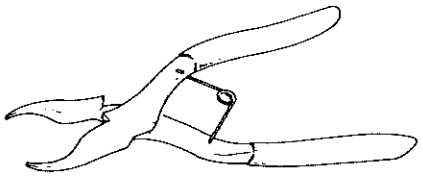


Specifications

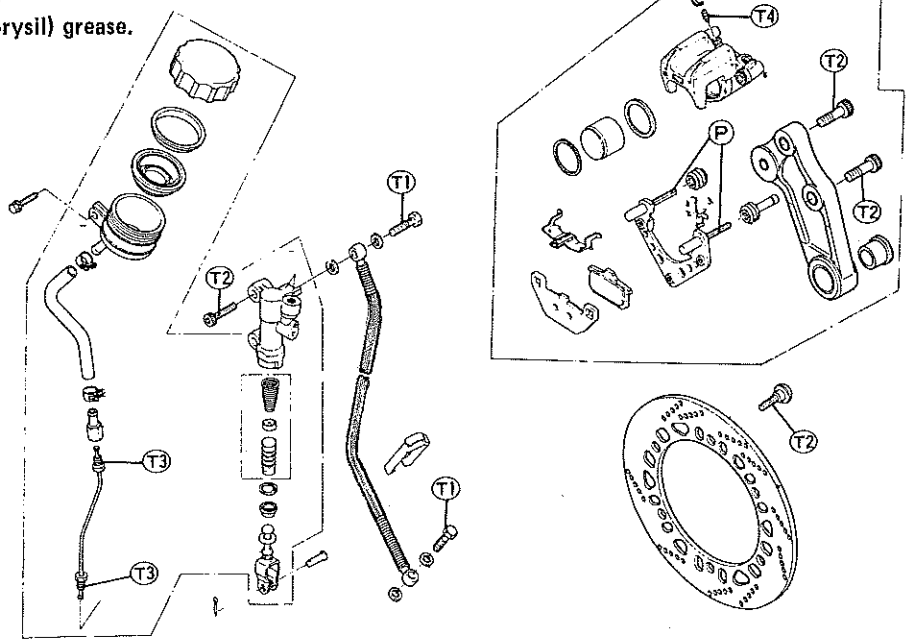
Item		Standard	Service Limit
Brakes:			
Brake fluid grade		D.O.T.3	— — —
Brake lever		Non adjustable	— — —
Brake pedal position		27 — 37 mm (lower than the footpeg top)	— — —
Brake light switch:	Front	Non adjustable	— — —
	Rear	ON after about 5 — 6 mm pedal travel	— — —
Front disc brake			
Pad lining thickness		4.5 mm	1 mm
Disc thickness		3.8 — 4.1 mm	3.5 mm
Disc runout		0.2 mm	0.3 mm
Rear disc brake			
Pad lining thickness		4.85 mm	1 mm
Disc thickness		5.8 — 6.1 mm	5 mm
Disc runout		not more than 0.2 mm	0.3 mm

Special Tools

Circlip Pliers: 57001-143



T1: 25 N-m (2.5 kg-m, 18.0 ft-lb)
T2: 23 N-m (2.3 kg-m, 16.5 ft-lb)
T3: 15 N-m (1.5 kg-m, 11.0 ft-lb)
T4: 7.8 N-m (0.8 kg-m, 69 in-lb)
P : Apply PBC (Poly Butyl Cuprysil) grease.



Brake Adjustment

Front Brake Adjustment

Disc and disc pad wear is automatically compensated for and has no effect on brake lever action. So there are no parts that require adjustment on the front brake. However if the brake lever has a soft, or "spongy feeling", check the brake fluid level in the master cylinder and bleed the air from the brake line (see Bleeding the Brake Line).

NOTE

○*Check the brake fluid level in accordance with the Periodic Maintenance Chart.*

Rear Brake Pedal Position Inspection

Disc and disc pad wear is automatically compensated for and has no effect on brake pedal action. However, the brake pedal position may occasionally require adjustment due to wear of the pedal pivot, or in case of disassembly. If the brake pedal has a soft, or "spongy feeling", check the brake fluid level in the reservoir and bleed the air from the brake line (see Bleeding the Brake).

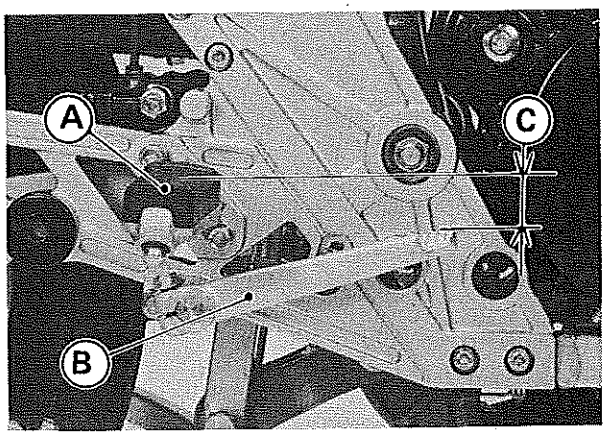
NOTE

○*Check the brake fluid level in accordance with the Periodic Maintenance Chart.*

●When the brake pedal is in its position, it should be at the correct position.

Pedal Position

Pedal Position **27 – 37 mm below top of footpeg**



A. Footpeg
B. Brake Pedal
C. Pedal position

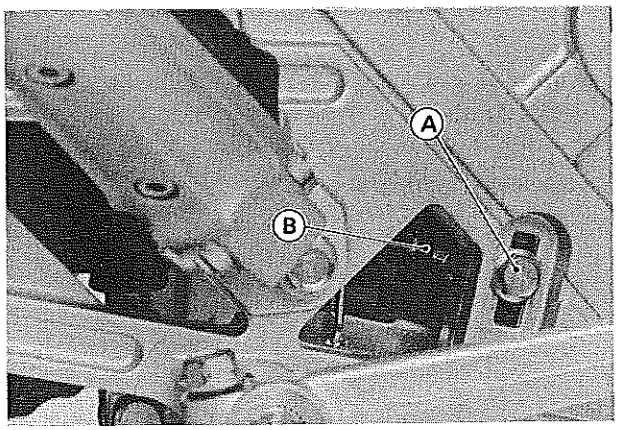
●If it is not, adjust the brake pedal position as follows.

Brake Pedal Position Adjustment

NOTE

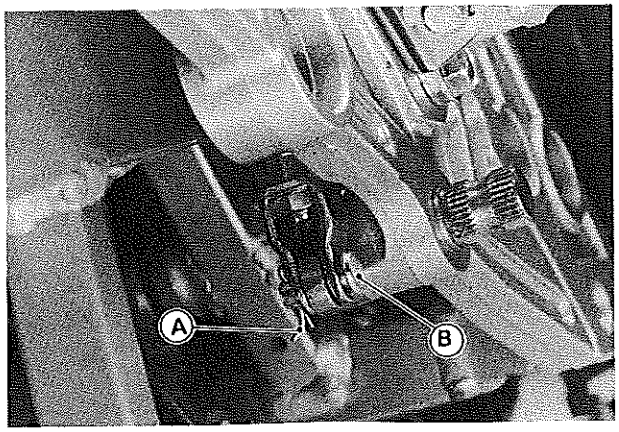
○*It is not necessary to remove the right footpeg bracket for the pedal position adjustment.*

●Remove the front muffler (see Front Muffler Removal in Engine Top chapter).
●Separate the brake switch by removing the mounting bolt.



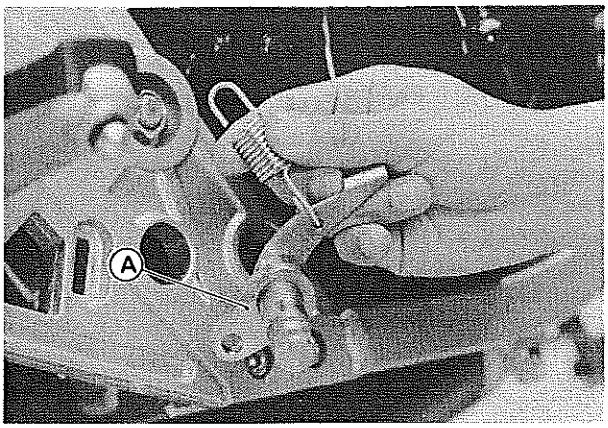
A. Mounting Bolt
B. Brake Switch

●Remove the brake pedal by taking off the mounting bolt.
●Pull out the cotter pin and the pin joint.



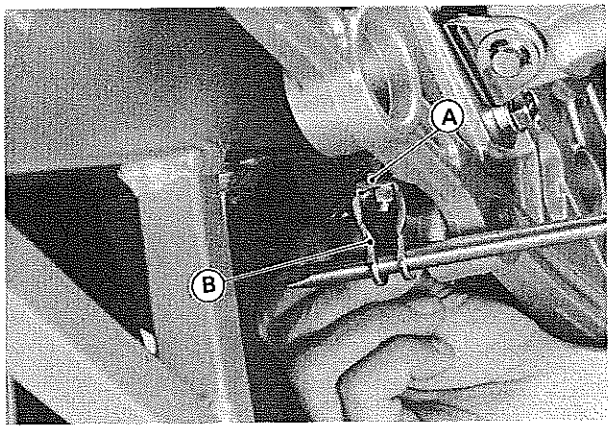
A. Cotter Pin
B. Pin Joint

●After removing the return spring from top hook, push out the pedal shaft.



A. Pedal Shaft

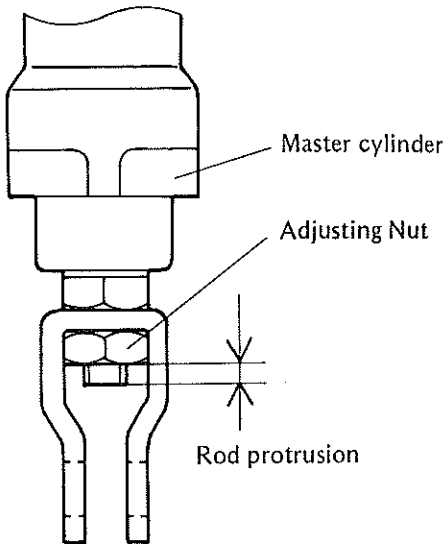
●Loosen the locknut of the master cylinder.
●Turn up or turn down the locknut and clevis to adjust the brake pedal position.
●After the adjustment is made, tighten the locknut with the clevis held.



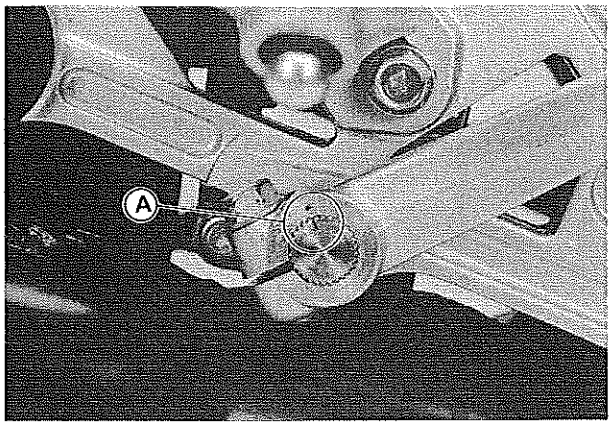
A. Locknut B. Clevis

NOTE

○*If the pedal position cannot be adjusted by turning the clevis, the brake pedal may be deformed or incorrectly installed.*
○*If the brake rod protrusion is 3.5 – 5.5 mm below the adjusting nut, the pedal position will be within the standard range (27 – 37 mm).*



●Install the brake pedal on the shaft so that the mark on the pedal is aligned with the mark on the shaft.



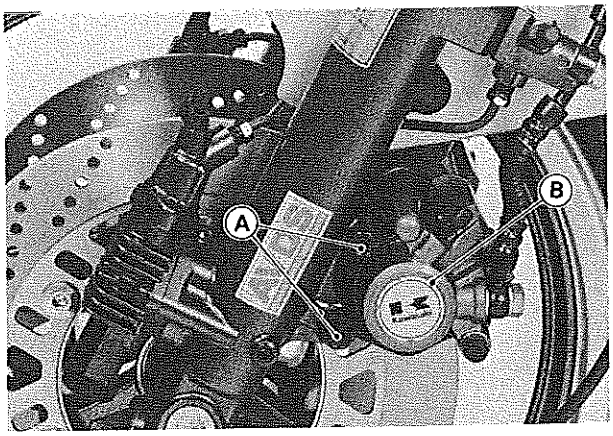
A. Marks

●Check the brake pedal position, and readjust it if necessary.
●Check the brake light switch operation and adjust the switch if necessary (see Electrical System chapter).

Calipers

Front Caliper Removal

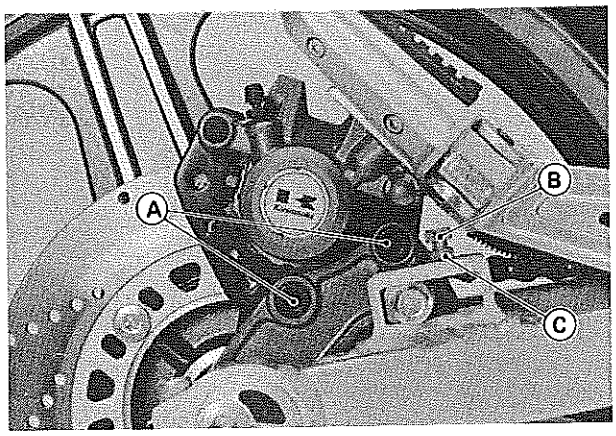
●Separate the brake hose from the caliper by taking off the banjo bolt.
●Remove the caliper mounting bolts, and take off the calipers.



A. Mounting Bolts B. Caliper

Rear Caliper Removal

- Remove the brake hosé from the caliper by taking off the banjo bolt.
- Remove the front muffler.
- Loosen the locknut and remove the collar fixing bolt.
- Remove the caliper mounting bolts, and take off the caliper.



A. Mounting Bolts C. Locknut
B. Collar Fixing Bolt

- If the caliper is to be disassembled after removal and if compressed air is not available, remove the piston using the follwoing two steps before disconnecting the brake hose from the caliper.
  - Remove the pads.
  - Pump the brake lever or pedal to remove the caliper piston.
  - Immediately wipe up any brake fluid that spills.

Caliper Installation Notes

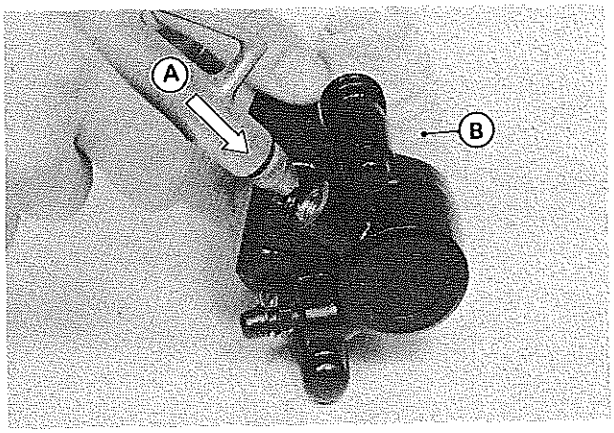
- Connect the brake hose to the caliper putting a new flat washer on each side of the brake hose fitting.
- Check the fluid level in the master cylinder, and bleed the brake line (see Bleeding the Brake Line).
- Check the brake for weak braking power, brake drag, and fluid leakage.

Caliper Disassembly Notes

- Using compressed air, remove the piston.
  - Cover the caliper opening with a clean, heavy cloth.
  - Remove the piston by lightly applying compressed air to where the brake line fits into the caliper.

WARNING

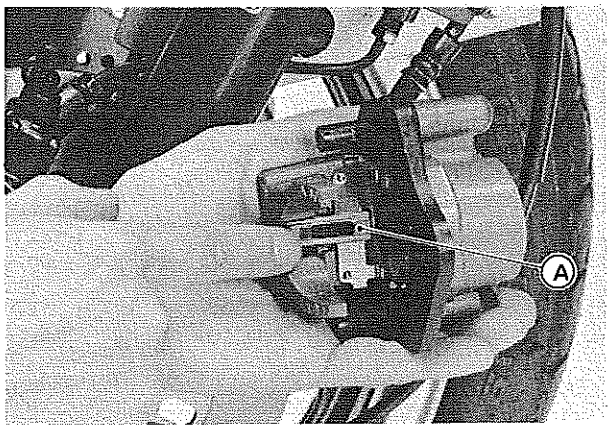
  - **To avoid serious injury, never place your fingers or palm inside the caliper opening. If you apply compressed air into the caliper, the piston may crush your hand or fingers.**



A. Apply compressed air. B. Cloth

Caliper Assembly Notes

- Apply brake fluid to the outside of the piston and the fluid seal, and push the piston into the cylinder by hand. Take care that neither the cylinder nor the piston skirt get scratched.
- Apply a thin coat of PBC (Poly Butyl Cuprysil) grease to the caliper holder shafts and holder holes. (PBC is a special high temperature, water-resistant grease).
- Install the anti-rattle spring in the calipers as shown.



A. Anti-rattle spring

Fluid Seal Damage:

The fluid seal around the piston maintains the proper pad/disc clearance. If this seal is not satisfactory, pad wear will increase, and constant pad drag on the disc will raise brake and brake fluid temperature.

Replace the fluid seals under any of the following conditions: (a) fluid leakage around the pad; (b) brakes overheat; (c) there is a large difference in left and right pad wear; (d) the seal is stuck to the piston. If the fluid seal is replaced, replace the dust seal as well. Also, replace all seals every other time the pads are changed.

Dust Seal and Cover Damage

- ●Check that the dust seals and covers are not cracked, worn, swollen, or otherwise damaged.
- ★If they show any damage, replace them.

Piston, Cylinder Damage

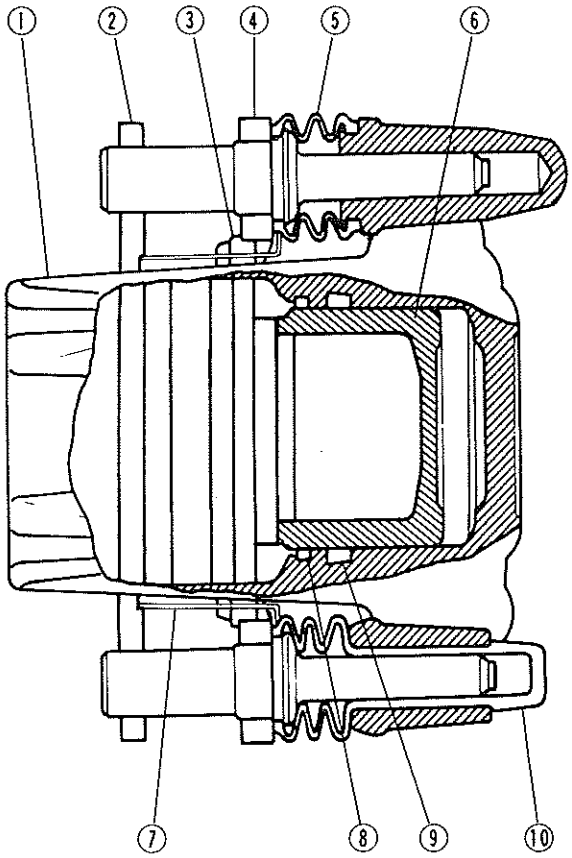
- ●Visually inspect the piston and cylinder surfaces.
- ★Replace the cylinder and piston if they are badly scored or rusty.

Caliper Holder Shaft Wear

The caliper body must slide smoothly on the caliper holder shafts. If the body does not slide smoothly, one pad will wear more than the other, pad wear will increase, and constant drag on the disc will raise brake and brake fluid temperature.

- ●Check to see if the caliper holder shafts are not badly worn or stepped, or rubber friction boot are not damaged.
- ★If the shafts rubber friction boot are damaged, replace the rubber friction boot, and the caliper holder.

Caliper (rear)

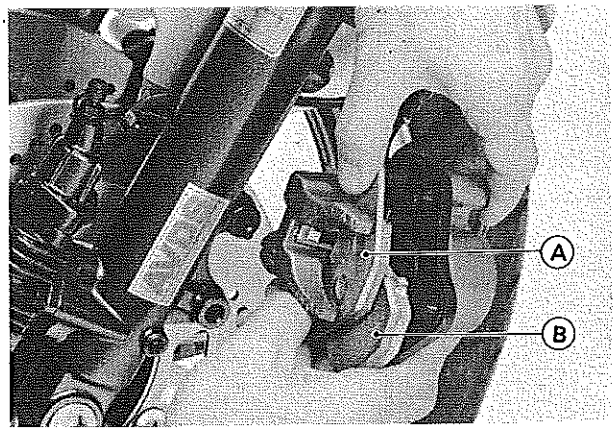


1. Caliper
2. Brake Pad
3. Brake Pad
4. Caliper Holder
5. Dust Cover
6. Piston
7. Anti-Rattle Spring
8. Dust Seal
9. Fluid Seal
10. Friction Boot

Brake Pads

Pad Removal

- ●Lift off the caliper by taking off the mounting bolts.
- ●Push the caliper holder toward the piston side, and then remove the pads.



A. Pad B. Pad

Pads Installation Notes

•Push the caliper piston in by hand as far as it will go.

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.

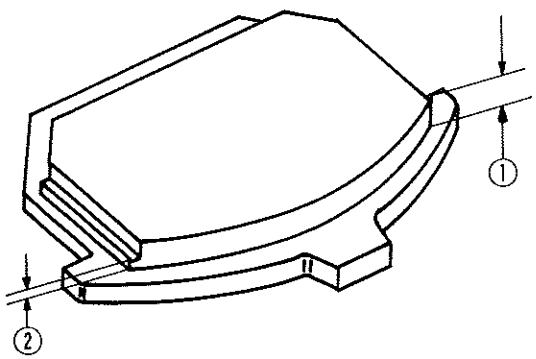
Lining Wear

In accordance with the Periodic Maintenance Chart, inspect the front and rear brakes for wear.

•Check the lining thickness of the pads in each caliper.

★If the lining thickness of either pad is less than the service limit, replace both pads in the caliper as a set.

Brake Pad



1. Lining Thickness 2. Service Limit

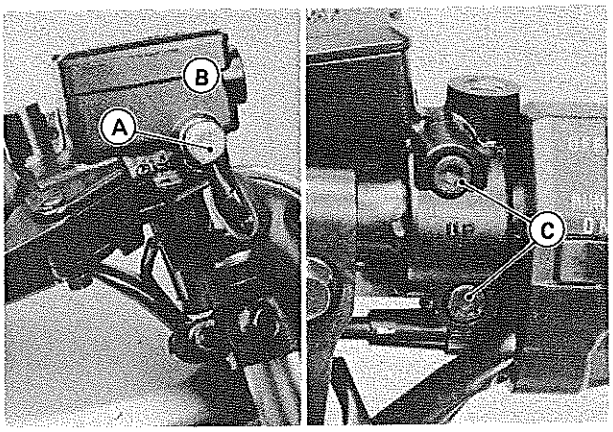
Pad Lining Thickness

Standard	**4.5 mm (front)**
	4.85 mm (rear)
Service Limit	**1 mm**

Master Cylinders

Front Master Cylinder Removal

•Pull back the dust cover, and remove the banjo bolt to disconnect the upper brake hose from the master cylinder. There is a flat washer on each side of the hose fitting.



A. Banjo Bolt C. Clamp Bolts
B. Master Cylinder

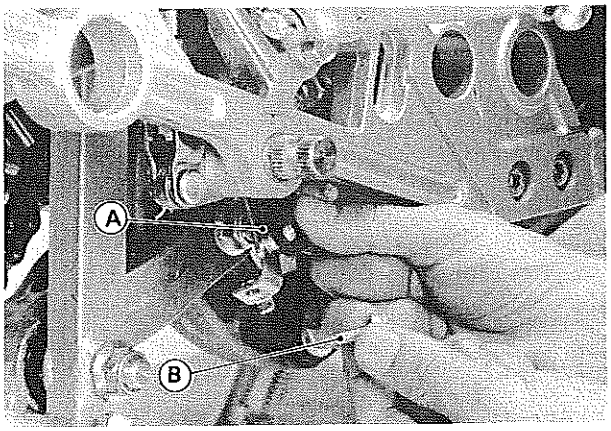
•Remove the clamp bolts and take off the master cylinder. Immediately wipe up any brake fluid that spills.

Rear Master Cylinder Removal

•Remove the front muffler.

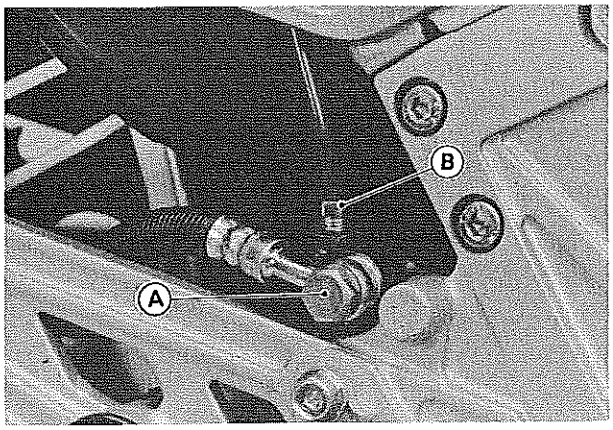
•Remove the right side cover.

•Separate the brake switch by removing the mounting bolt.



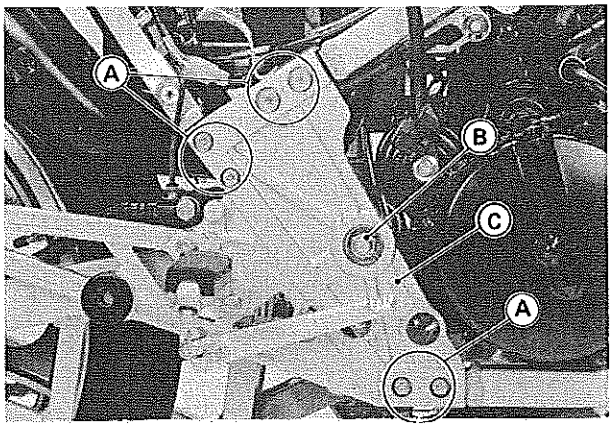
A. Brake Switch B. Mounting Bolt

- Place a container beneath the master cylinder.
- Remove the banjo bolt to disconnect the brake hose from the master cylinder. There is a flat washer on each side of the hose fittings.
- Remove the lower pipe joint to disconnect the brake pipe from the master cylinder.



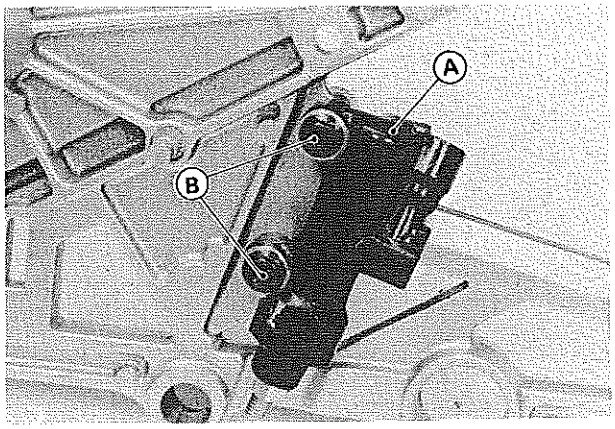
A. Banjo Bolt B. Lower Pipe Joint

- Remove the footpeg bracket bolts and nuts.
- Remove the pivot shaft.
- Remove the footpeg bracket with the rear master cylinder.



A. Footpeg Bracket Bolts and Nuts
B. Pivot Shaft
C. Footpeg Bracket

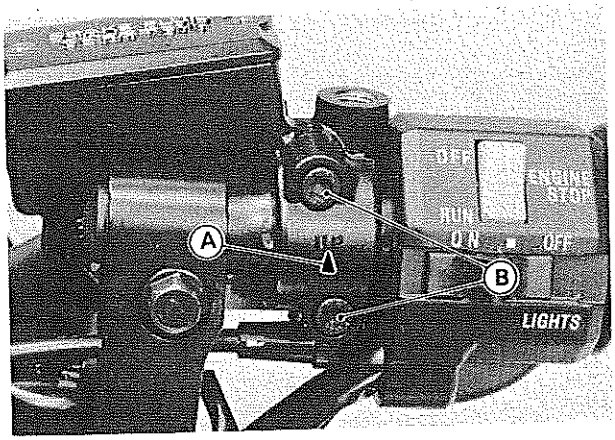
- Remove the cotter pin and the pin joint of the master cylinder.
- Remove the master cylinder by taking off the mounting bolts.



A. Master Cylinder B. Mounting Bolts

Front Master Cylinder Installation Notes

- Master Cylinder Clamp Installation:
  - The master cylinder clamp must be installed with the arrow mark upward.
  - Torque the upper clamp bolt first, and then the lower clamp bolt to the specification. There will be a gap at the lower part of the clamp after tightening.
- Use a new flat washer on each side of the brake hose fitting, and tighten the banjo bolt to the specified torque.



A. Tighten upper clamp bolt first.
B. Arrow Mark

Rear Master Cylinder Installation Notes

- Use a new flat washer on each side of the brake hose fitting, and tighten the banjo bolts to the specified torque.
- Tighten the rear master cylinder mounting bolts (2) to the specified torque.
- Check and adjust the following items.
  - Rear brake light switch (see Rear Brake Light Switch Adjustment in Electrical System chapter).

Inspection After Installation

- Bleed the brake line after master cylinder installation.
- Check the brake for weak braking power, brake drag, and fluid leakage.

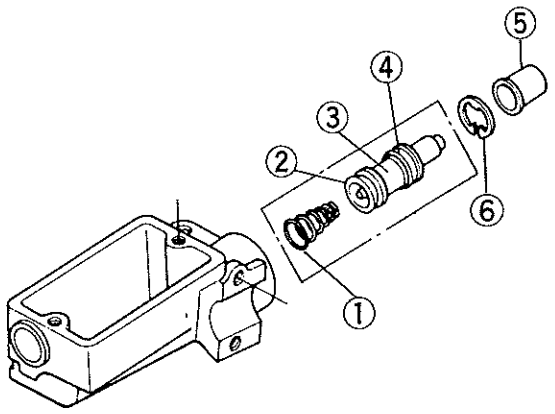
Front Master Cylinder Disassembly Notes

- Remove the front master cylinder from the handlebar.
- Remove the master cylinder cap and diaphragm, and empty out the brake fluid.
- Remove the locknut and pivot bolt, and remove the brake lever.
- Slide out the dust seal.
- Remove the stopper with a circlip pliers.
- Remove the piston with the secondary cup, primary cup and spring.

NOTE

- *Do not remove the secondary cup from the piston since removal will damage it.*

Front Master Cylinder



1. Spring
2. Primary Cup
3. Piston
4. Secondary Cup
5. Dust Seal
6. Stopper

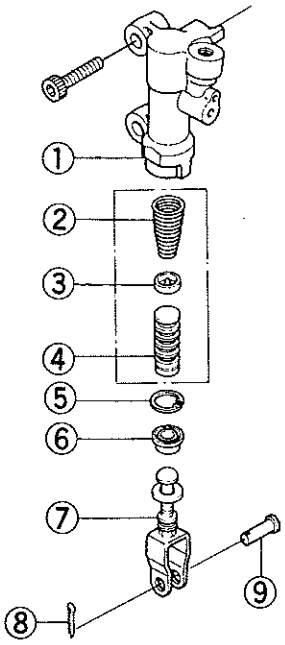
Rear Master Cylinder Disassembly Notes

- Remove the rear master cylinder from the right footpeg bracket.
- Slide the dust cover out of its place.
- Remove the stopper with a circlip pliers and the push rod.
- Then remove the piston and secondary cup, spring and primary cup.

NOTE

- *Do not remove the secondary cup, from the piston since removal will damage it.*

Rear Master Cylinder



1. Master Cylinder
2. Spring
3. Primary Cup
4. Piston and Secondary Cup
5. Stopper
6. Dust Seal
7. Rod and Yoke
8. Cotter Pin
9. Pin Joint

Front Master Cylinder Assembly Notes

●Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

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, motor 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.**

●Apply brake fluid to the removed parts and to the inner wall of the cylinder.

○Tighten the brake lever pivot bolt and tighten the locknut to the specified torque.

Rear Master Cylinder Assembly Notes

●Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

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, motor 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.

●When assembling the rear master cylinder parts, they must be assembled correctly.

Master Cylinder Inspection (Visual Inspection)

●Disassemble the front and rear master cylinders.

●Check that there are no scratches, rust or pitting on the inside of the master cylinder and on the outside of the piston.

★If the master cylinder or piston shows any damage, replace them.

●Inspect the primary cups and secondary cups.

★If a cup is worn, damaged, softened (rotted), or swollen, replace the piston assembly.

★If fluid leakage is noted, the piston assembly should be replace to renew the cup.

●Check the dust covers for damage.

★If they are damaged, replace them.

●Check that the relief and supply ports are not plugged.

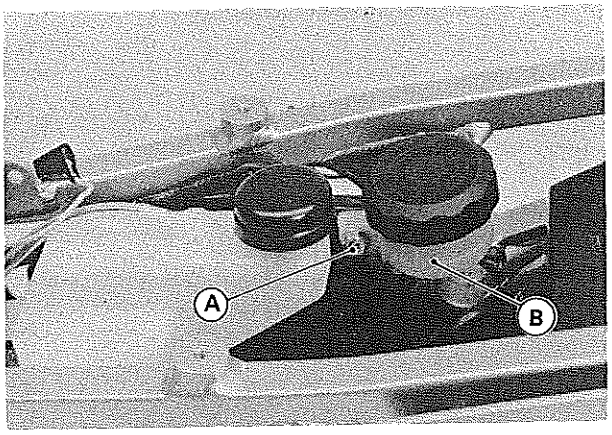
★If the small relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.

●Check the piston return springs for any damage.

★If the spring is damaged, replace the piston assembly.

Reservoir Disassembly Notes

●Remove the rear brake reservoir mounting bolt, and take the reservoir off the frame (see Rear Muffler Removal in Engine Top End).



A. Bolt B. Reservoir

- Take off the reservoir cap and diaphragm, and empty the brake fluid into a suitable container.
- Loosen the hose clamps, and pull the brake hose off the reservoir. Immediately wipe up any brake fluid that spills.

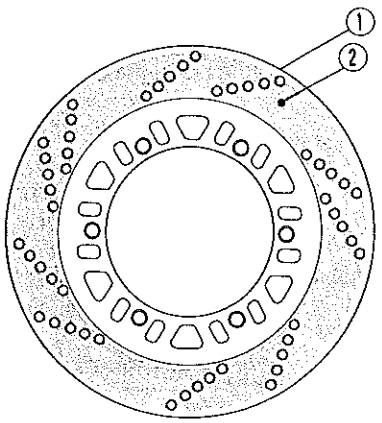
Reservoir Assembly Notes

- Fill the reservoir with fresh brake fluid, and bleed the brake line (see Bleeding the Brake).

Discs

Disc Wear

Measure the thickness of each disc at the point where it has worn the most. Replace the disc if it has worn past the service limit.



1. Brake Disc
2. Measuring Points

Front Disc Thickness	
Standard	**3.8 – 4.1 mm**
Service Limit	**3.5 mm**
Rear Disc Thickness	
Standard	**5.8 – 6.1 mm**
Service Limit	**5.0 mm**

Disc Cleaning

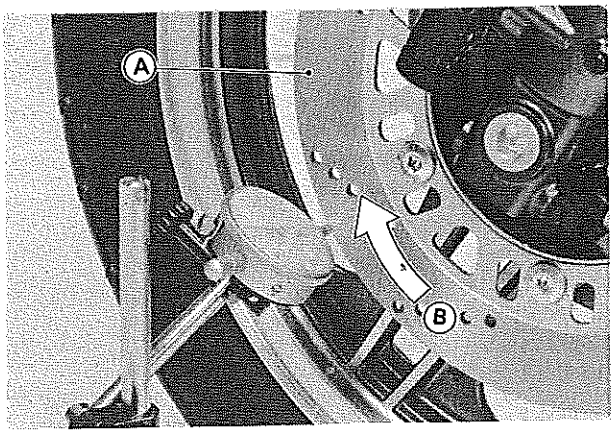
Poor braking can be caused by oil on the disc. Oil on the disc must be cleaned off with an oilless cleaning fluid such as trichloroethylene or acetone.

WARNING

- **These cleaning fluid are usually highly flammable and harmful if breathed for prolonged periods. Be sure to heed the fluid manufacturers warnings.**

Disc Warp

- Jack up the motorcycle so that the front wheel is off the ground (see Front Fork Air Pressure Adjustment in Suspension chapter).
- Turn the handlebar fully to one side.
- Set up a dial gauge against the front disc as shown, and measure disc runout.
- Remove the jack, and raise the rear wheel off the ground, and then measure the rear disc runout.
- If runout exceeds the service limit, replace the disc.



A. Brake Disc B. Turn the disc by hand

Disc Runout	
Standard	**Under 0.2 mm**
Service Limit	**0.3 mm**

Brake Fluid

Fluid Level Inspection

In accordance with the Periodic Maintenance Chart, inspect the brake fluid level in the front and rear brake fluid reservoirs.

●Check the brake fluid level in the reservoir.

NOTE

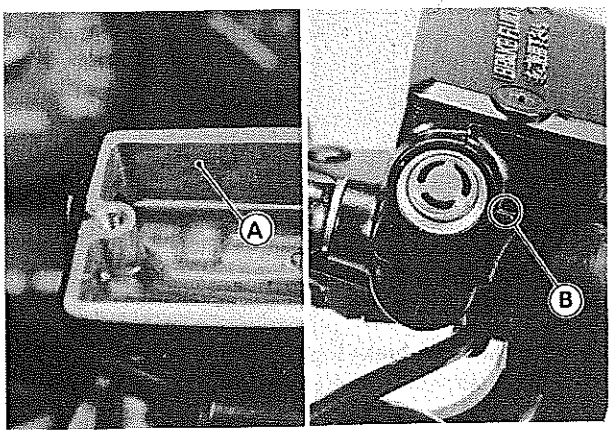
○*Hold the reservoir horizontal when checking brake fluid level.*

★The fluid level must be kept above the lower level lines. If the fluid level is under the lower level line, fill the reservoir to the upper level line in the reservoir.

WARNING

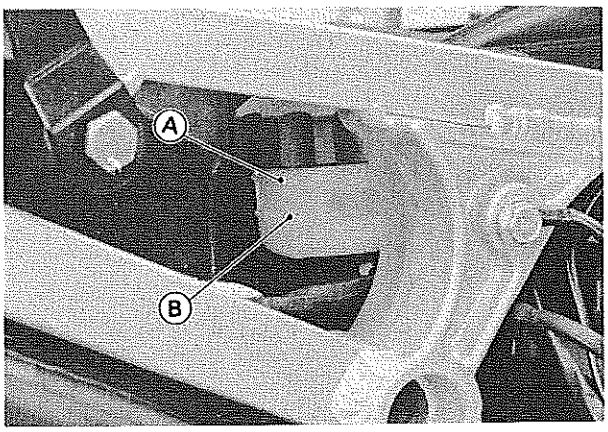
○**Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that already is in the reservoir are unidentified. After changing the fluid, use only the same type and brand of fluid thereafter. Mixing different types and brands of brake fluid lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.**

Front Brake Fluid Reservoir



A. Upper Level Line B. Lower Level Line

Rear Brake Fluid Reservoir



A. Upper Level Line B. Lower Level Line

Brake Fluid Recommendation

Recommended fluids are given in the table below. If none of the recommended brake fluids are available, use extra heavy-duty brake fluid only from a container marked D.O.T.3.

Recommended Brake Fluid

Atlas Extra Heavy Duty
Shell Super Heavy Duty
Taxaco Super Heavy Duty
Wagner Lockheed Heavy Duty
Castrol Girling – Universal
Castrol GT (LMA)
Castrol Disc Brake Fluid

Brake Fluid Change

In accordance with the Periodic Maintenance Chart, change the brake fluid. The brake fluid should also be changed if it becomes contaminated with dirt or water.

●Remove the reservoir cap, and remove the rubber cap on the bleed valve on the caliper.
●Attach a clear plastic hose to the bleed valve, and run the other end of the hose into a container.
●Open the bleed valve (counterclockwise to open), and pump the brake lever or pedal until all the fluid is drained from the line.
●Close the bleed valve.
○Front brake: Since a dual disc brake is used, repeat the above 4 steps one more time for the other side.

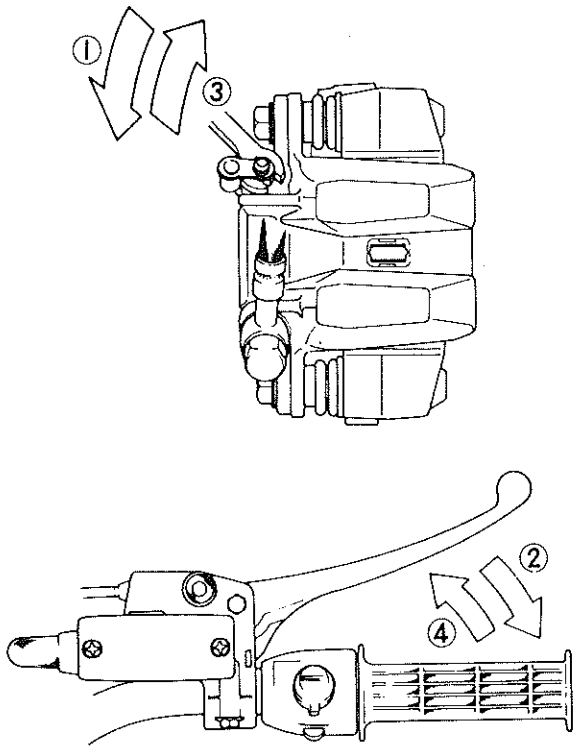
- Fill the reservoir with fresh brake fluid.
- Open the bleed valve, apply the brake by the brake lever or pedal, close the valve with the brake held applied, and then quickly release the lever or pedal. Repeat this operation until the brake line is filled and fluid starts coming out of the plastic hose.

NOTE

○Replenish the fluid in the reservoir as often as necessary to keep it from running completely out.

- Front brake: Repeat the above 2 steps one more time for the other side.
- Bleed the air from the lines (continue with Bleeding the Brake).

Filling up the Brake Line



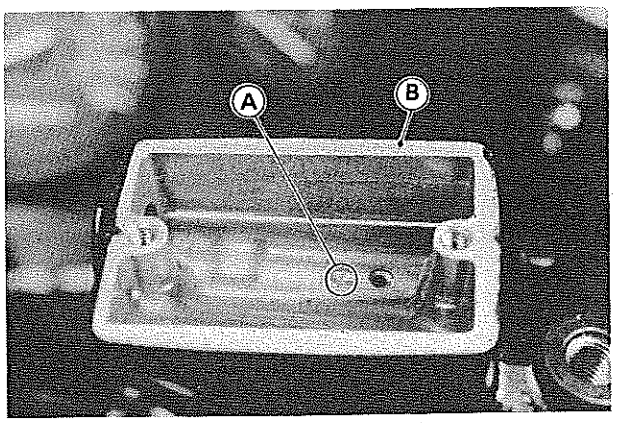
1. Open the bleed valve.
2. Apply the brake and hold it.
3. Close the bleed valve
4. Then release the brake suddenly.

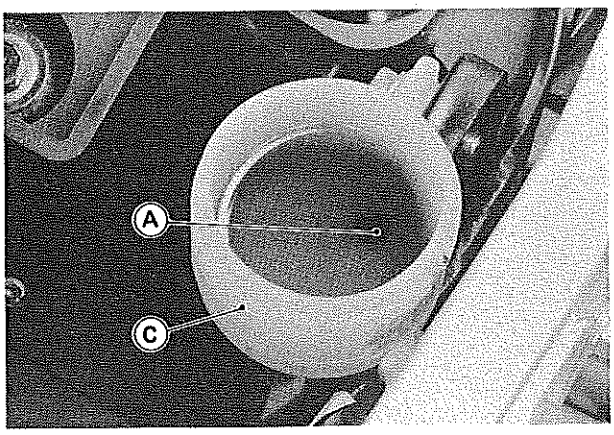
Bleeding the Brake Line

The brake fluid has a very low compression coefficient so that almost all the movement of the brake lever or pedal is transmitted directly to the caliper for braking action. Air, however, is easily compressed. When air enters the brake lines, brake lever or pedal movement will be partially used in compressing the air. This will make the lever or pedal feel spongy, and there will be a loss in braking power.

Bleed the air from the brake whenever brake lever or pedal action feels soft or spongy, after the brake fluid is changed, or whenever a brake line fitting has been loosened for any reason.

- Remove the reservoir cap, and check that there is plenty of fluid in the reservoir. The fluid level must be checked several times during the bleeding operation and replenished as necessary. 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.
- With the reservoir cap off, slowly pump the brake lever or pedal several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir. This bleeds the air from the master cylinder end of the line.

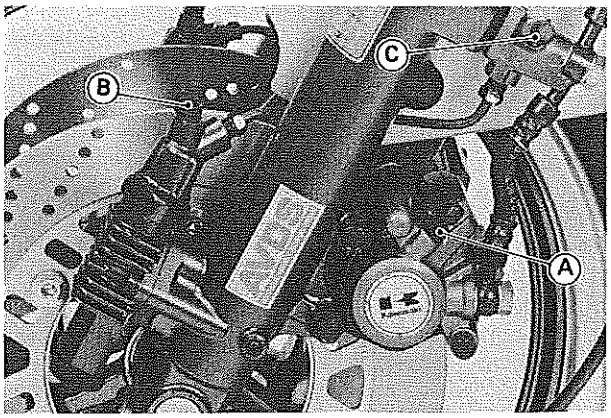




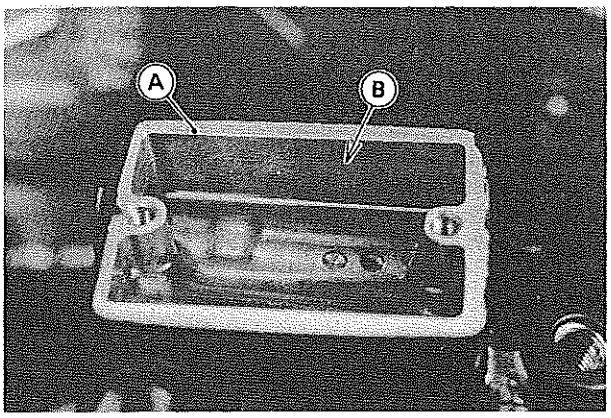
A. Hole
B. Reservoir (Front)
C. Reservoir (Rear)

Bleeding the front brake line:

- Bleed the air from the front brake line, first using the bleed valves on the brake calipers and the antidive units, and then using the bleed valves on the junction blocks.



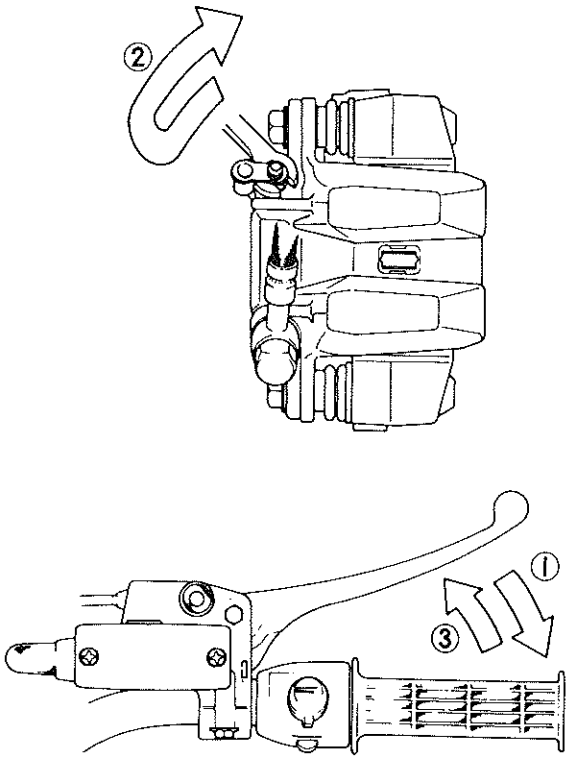
A. Bleed Valve (caliper)
B. Bleed Valve (anti-dive unit)
C. Bleed Valve (junction block)



A. Front Brake Reservoir B. Upper Level Line

- Repeat the previous step one more time for the other side.
- When air bleeding is finished, install the rubber cap(s) on the bleed valve, and check that the brake fluid is filled to the upper level line marked in the reservoir (handlebar turned so that the reservoir is level).

Bleeding the Brake Line



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

Bleeding the rear brake line:

- Install the reservoir cap, and connect a clear plastic hose to the bleed valve at the caliper, running the other end of the hose into a container. Pump the brake pedal a few times until it becomes hard and then, holding the pedal pushed down, quickly open (turn counterclockwise) and close the bleed valve. Then release the pedal. Repeat this operation until no more air can be seen coming out into the plastic hose. Check the fluid level in the reservoir every so often, replenishing it as necessary.

WARNING

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

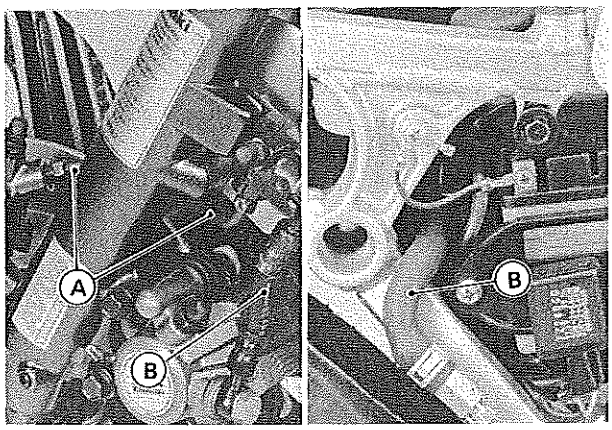
1. Never reuse old brake fluid.
2. Do not use fluid from a container that has been left unsealed or that has been open for a long time.
3. Do not mix two types and brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also 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 Hoses

Brake Hose, Pipe Inspection

- The high pressure inside the brake line can cause fluid to leak or the hose to burst if the line is not properly maintained. Bend and twist the rubber hose while examining it. Replace it if any cracks or bulges are noticed.
- The brake pipes which feed the brake fluid to the anti-dive units are made of plated steel, and will rust if the plating is damaged. Replace the pipe if it is rusted, cracked (especially check the fittings), or if the plating is badly scratched.



A. Brake Pipe B. Brake Hose

Brake Hose Replacement

- Pump the brake fluid out of the line as explained in the Brake Fluid Change in Brake Fluid Section.
- Remove the banjo bolts at both ends of the brake hose, and pull the hose off the motorcycle. Especially, for the brake hose between the rear master cylinder and the reservoir, loosen the clamps at both ends of the hose, and take off the hose.
- Install the new brake hose in its place, and tighten the banjo bolts to the specified torque, noting the following:

○Use a new flat washer for each side of the fittings.

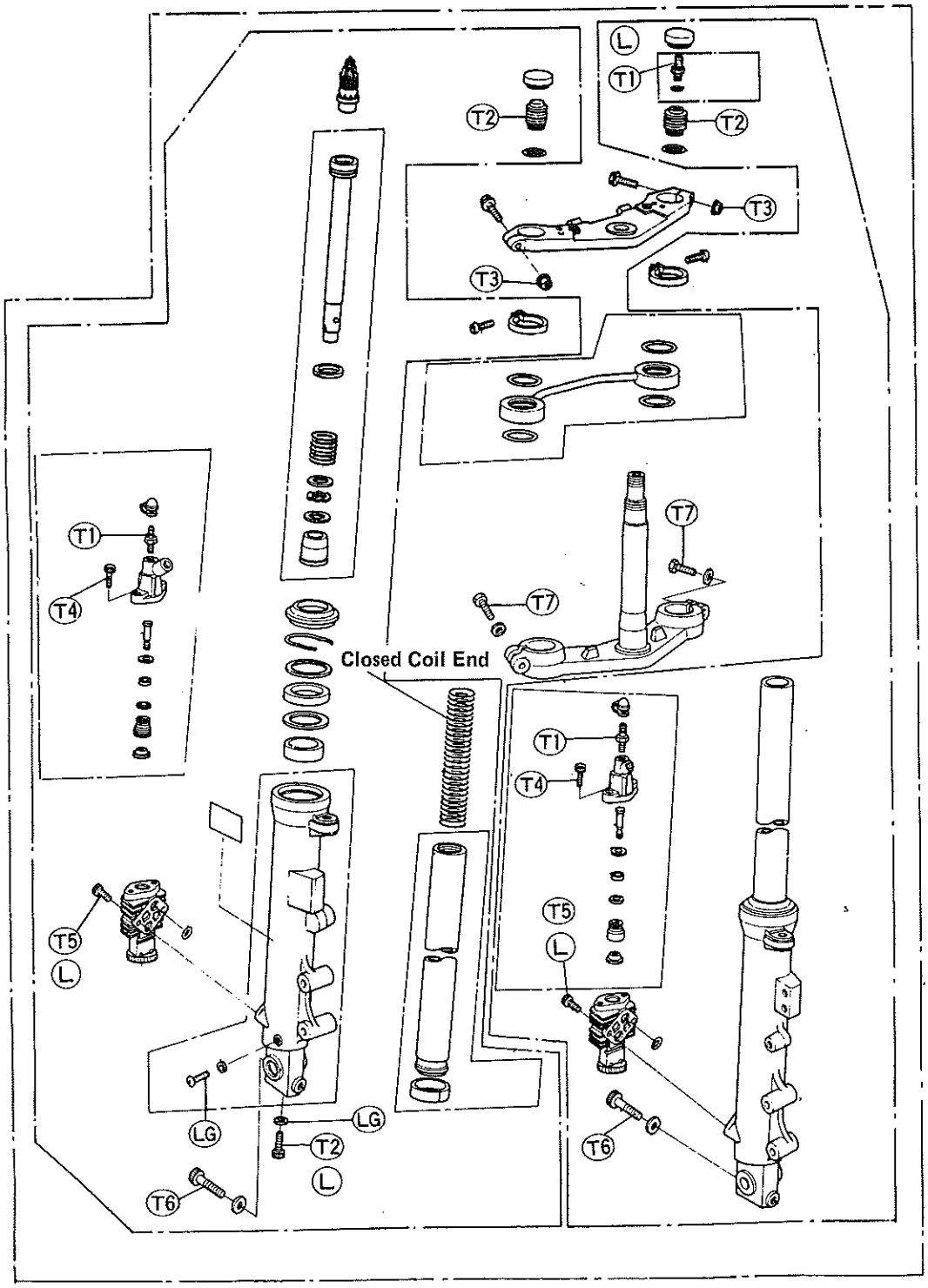
Suspension

Table of Contents

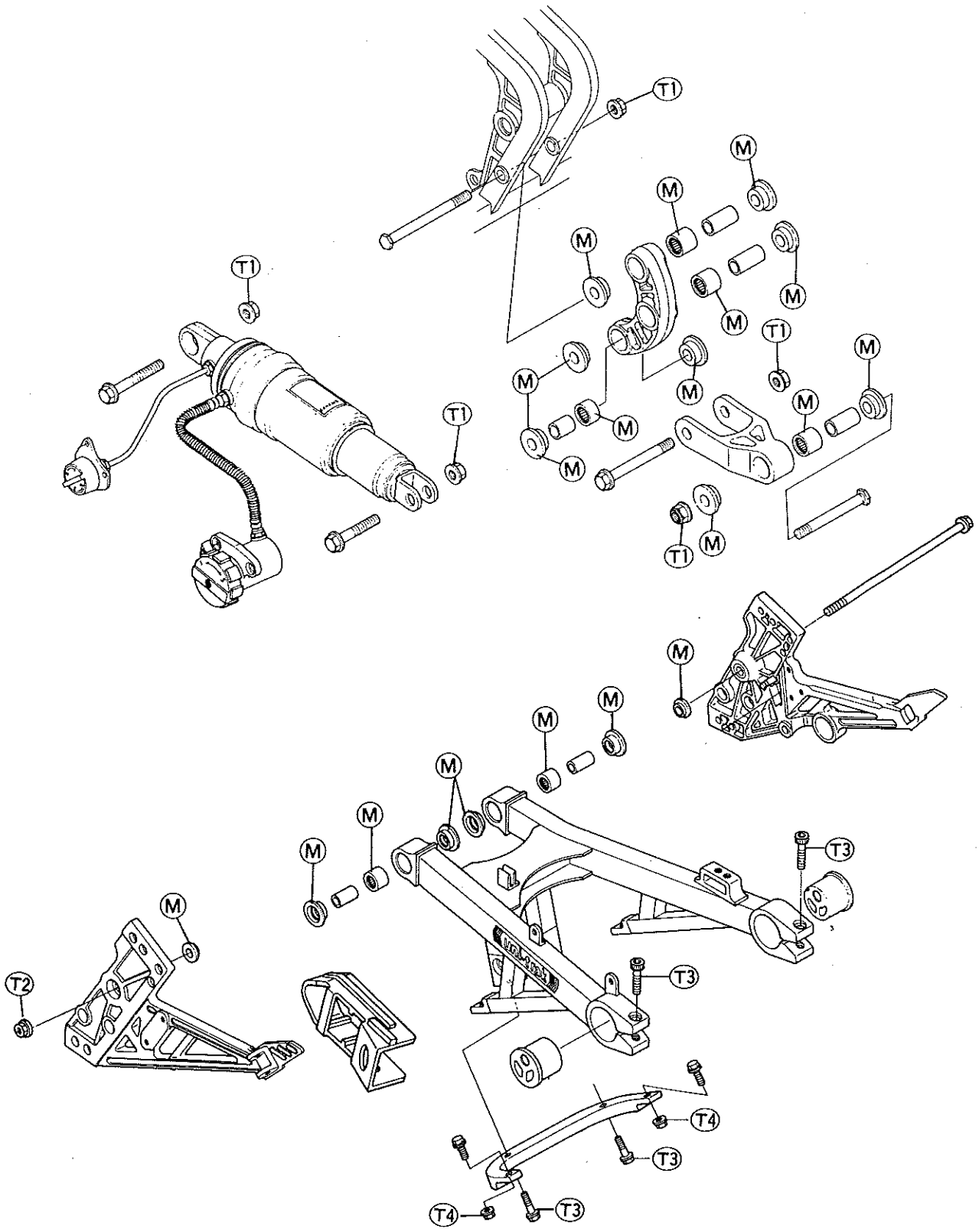
Exploded View 12-2
Specifications 12-4
Special Tools 12-4
Front Fork 12-5
Air Pressure Adjustment 12-5
Anti-Dive Adjustment 12-5
Fork Oil Changing 12-6
Front Fork Removal (each fork leg) 12-6
Front Fork Installation Note 12-7
Front Fork Disassembly 12-8
Front Fork Assembly 12-8
Inner Tube Inspection 12-9
Guide Bush Inspection 12-9
Oil Seal and Dust Seal Inspection 12-10
AVDS (Automatic Variable Damping System) 12-10
Anti-Dive Valve Removal 12-10
TCV (Travel Control Valve) Removal 12-10
Anti-Dive Installation 12-10
TCV Installation Notes 12-10
Anti-Dive Brake Plunger Disassembly 12-11
Brake Fluid and Fork Oil Leak Inspection 12-11
Brake Plunger Assembly Test 12-11
Anti-Dive Valve Assembly Test 12-11
Brake Pipe Damage 12-12
Anti-Dive System Part Replacement 12-12
TCV Troubleshooting 12-12
Rear Shock Absorber 12-13
Spring Force Adjustment 12-13
Damping Force Adjustment 12-13
Rear Shock Absorber Removal 12-14
Rear Shock Absorber Installation Note 12-15
Rear Shock Absorber Inspection 12-15
Rear Shock Scrapping 12-16
Swing Arm, Uni-trak 12-16
Swing Arm Removal 12-16
Swing Arm Installation 12-16
Uni-trak Removal 12-17
Swing Arm, Uni-trak Sleeve Inspection 12-17
Swing Arm, Uni-trak Needle Bearing Inspection 12-17
Swing Arm, Uni-trak Lubrication 12-17

Exploded View

T1: 7.8 N-m (0.8 kg-m, 69 in-lb)
T2: 23 N-m (2.3 kg-m, 16.5 ft-lb)
T3: 21 N-m (2.1 kg-m, 15.0 ft-lb)
T4: 4.4 N-m (0.45 kg-m, 39 in-lb)
T5: 6.9 N-m (0.7 kg-m, 61 in-lb)
T6: 20 N-m (2.0 kg-m, 14.5 ft-lb)
T7 : 27 N-m (2.8 kg-m, 20 ft-lb)
L : Apply a non-permanennt locking agent to the threads.
LG: Apply liquid gasket.



T1: 49 N-m (5.0 kg-m, 36 ft-lb)
T2: 59 N-m (6.0 kg-m, 43 ft-lb)
T3: 35 N-m (3.6 kg-m, 26 ft-lb)
T4: 23 N-m (2.3 kg-m, 16.5 ft-lb)
M : Apply a molybdenum disulfide grease to the internal surface.

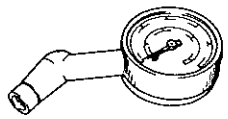


Specifications

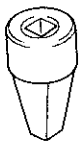
Item	Standard	Service Limit
Front Fork:		
Oil type	SAE10W	– – –
Oil capacity	281 ±4 mL (when assembling) approx. 240 mL (when oil changing)	– – –
Oil level (extended, without main spring)	331 ±2mm	– – –
Air pressure	59 –78 kPa (0.6 – 0.8 kg/cm², 8.5 – 11 psi)	– – –
Anti-Dive setting	No.1	
Rear Shock Absorber:		
Damper setting	No.1	
Spring setting	No.1	
Swing Arm		
Sleeve outside diameter	19.979 – 20.000 mm	19.95 mm
Uni-trak		
Sleeve outside diameter		
Rocker arm	26.979 – 27.000 mm	26.95 mm
Tie-rod	26.979 – 27.000 mm	26.95 mm

Special Tools

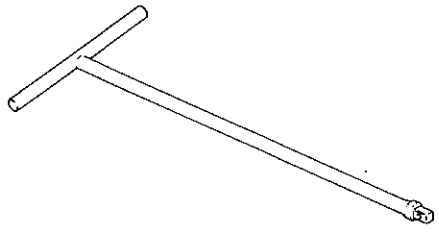
Air Pressure Gauge: 52005-1003



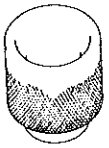
Front Fork Cylinder Holder Adapter: 57001-1057



Front Fork Cylinder Holder Handle: 57001-183



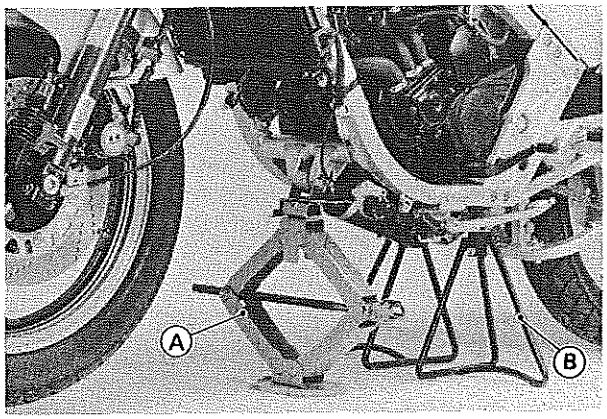
Front Fork Oil Seal Driver: 57001-1091



Front Fork

Air Pressure Adjustment

•Hold the frame by lift or chain block to raise the front wheel. Or, after removal of the front muffler and the reservoir tank, support the frame and the tank bracket with a stand and a jack as shown.



A. Jack B. Stand

•Use the air pressure gauge (special tool: P/N 52005-1003) specially made for air suspensions.
•Check and adjust the air pressure when the front fork is cold (room temperature).

NOTE

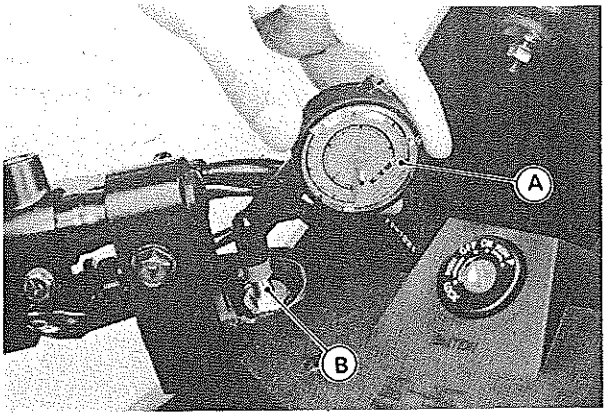
○*Do not use a tire gauge for checking air suspension's air pressure. They do not indicate the correct pressure because of air leaks that occur when the gauge is applied to the valve.*
○*Lower air pressure is for comfortable riding, but it should be increased for high speed riding, or riding on bad roads.*

CAUTION

○**Inject air little by little so that air pressure does not rise rapidly. Air pressure exceeding 245 kPa (2.50 kg/cm², 36 psi) may damage the oil seal.**

WARNING

○**Be sure to adjust the air pressure within the usable range. Pressure too high or too low can produce a hazardous riding condition.**
○**Only air or nitrogen gas can be used. Never inject oxygen or any kind of explosive gas.**
○**Do not incinerate the front fork.**
○**Do not remove the springs and rely on compressed air only. Correct springs must be used in this suspension system. Use without springs can lead to a condition causing accident and injury.**



A. Pressure Gauge: 52005-1003 B. Air Valve

Front Fork Air Pressure

Standard	**69 kPa (0.7 kg/cm², 10 psi)**
Usable range:	**59 – 78 kPa (0.6 – 0.8 kg/cm², 8.5 – 11 psi)**

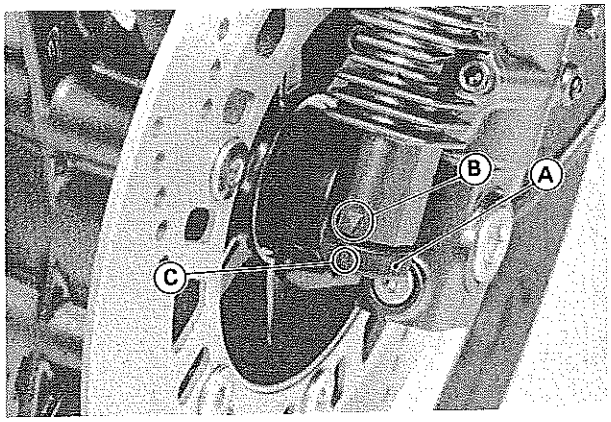
Anti-Dive Adjustment

The anti-dive adjuster on each front fork leg has 3 positions so that the anti-dive system can be adjusted for different road and loading conditions. The numbers on the adjuster show the setting position of the anti-dive system.

•Turn the anti-dive adjuster until you feel a click so that the desired position number aligns with the triangular mark.
•Check to see that both adjusters are turned to the same relative position.

WARNING

○**If both anti-dive adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.**



A. Anti-Dive Adjuster C. Position Number
B. Triangular Mark

Anti-Dive Adjustment

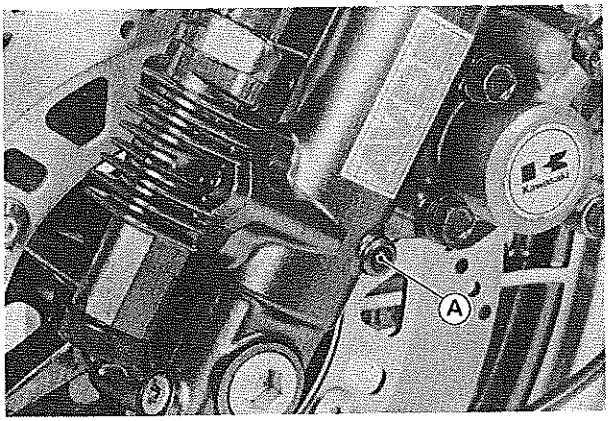
Position 1	**Weak**
Position 2	**Moderate**
Position 3	**Strong**

NOTE

○*The recommended setting position is the lowest position for one rider with no accessories.*

Fork Oil Changing

- Release the air in both fork legs through the air valve at the top of the fork leg.
- Unscrew the drain screw and top plug from one fork leg, and pull out the fork spring.



A. Drain Screw

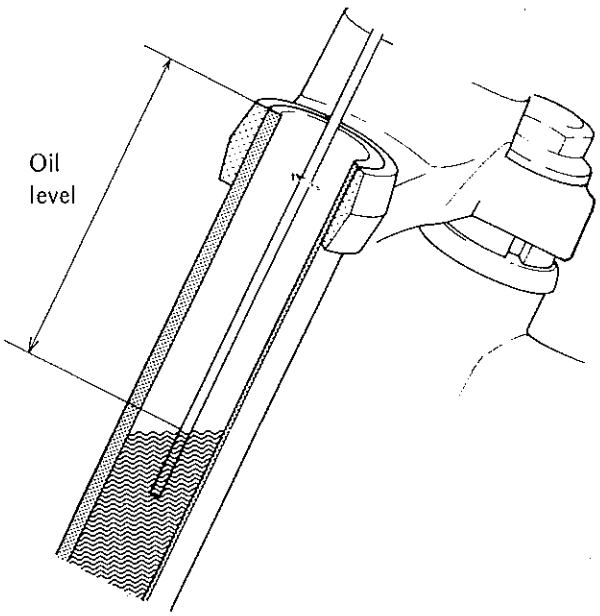
- Allow the oil to drain into a suitable container. If you pump the fork legs to force out the oil, be sure to catch the oil in a container as it squirts out.
- Wash the drain screw threads clean of oil, and blow them dry.
- Apply a liquid gasket to the threads of the drain screw, an install the screw and gasket.
- Pour in the type and amount of oil and adjust the oil level (see Specification).
- Pump the fork enough times to expel the air from the upper and lower chambers.
- With the fork **fully extended,** insert a tape measure or rod in the inner tube, and measure the distance from the top of the inner tube to the oil.

★If the oil is above or below the specified level, remove or add oil and recheck the oil level.

CAUTION

○**The operation of air front fork is especially dependent upon correct oil level. Higher level than specified may cause oil leakage and seal breakage. So be sure to maintain the specified level.**

Fork Oil Level Measurement



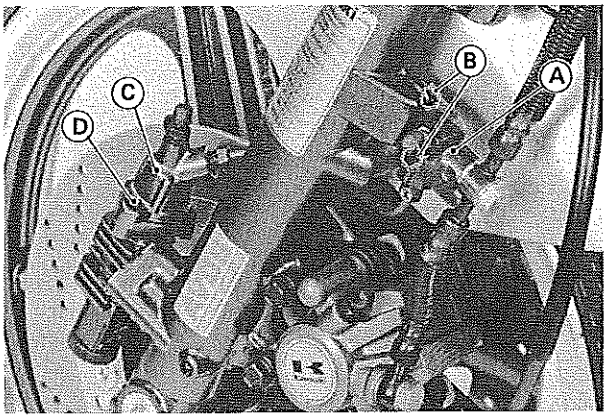
- Inspect the O-ring on the top plug, and replace it with a new one if it is damaged.
- Install the spring.
- Tighten the top plug.
- Change the oil of the other fork leg in the same manner.
- Adjust the air pressure.

Front Fork Oil

Viscosity	**SAE 10W**
When changing oil:	**about 240 mL**
After disassembly and completely dry:	**281 ±4 mL**
Oil level (extended, without main spring)	**331 ±2 mm**

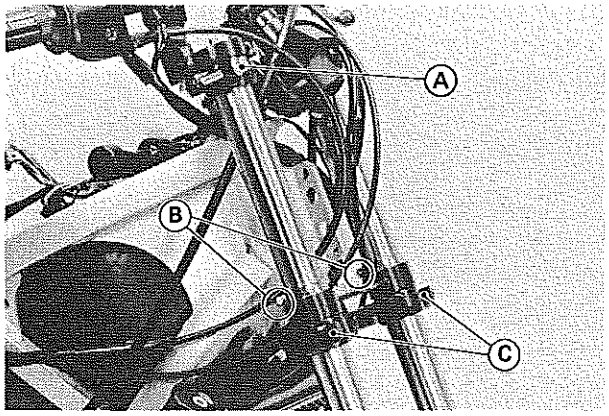
Front Fork Removal (each fork leg)

- Remove the fork leg from the motorcycle as follows.
- Release air pressure from the fork.
- Remove the fairing assembly (see Fairing Removal in Frame chapter).
- Remove the handlebars.
- Loosen the front fork top plug if the front fork is to be disassembled.
- Remove the front wheel (see Front Wheel Removal in Wheels and tires chapter).
- Remove the front fender (see Front Fender Removal in Frame).
- Remove the brake plunger Allen bolts and separate the plunger.
- Remove the brake joint mounting bolt and take the joint off.



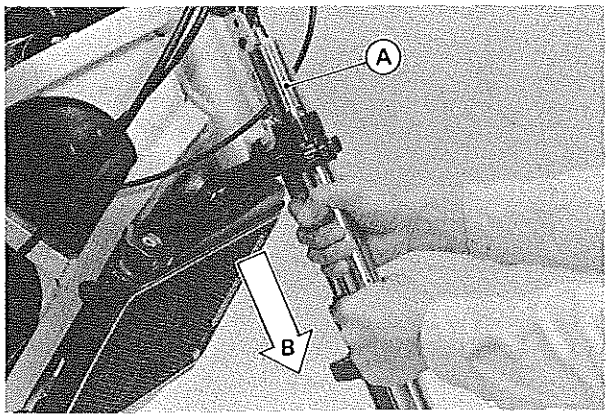
A. Brake Joint
B. Joint Mounting Bolt
C. Brake Plunger
D. Brake Plunger Allen Bolt

•Loosen the upper and lower fork clamp bolts, and the connecting pipe clamp screws.



A. Upper Clamp Bolt
B. Connecting Clamp Screw
C. Lower Clamp Bolt

•With a twisting motion, work the fork leg down and out.

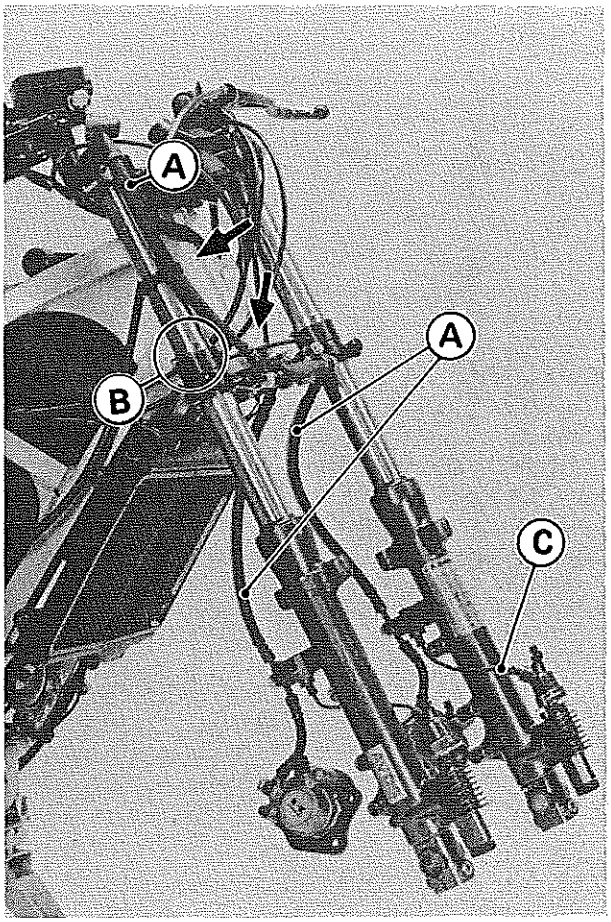


A. Fork Leg
B. Removal Direction

•Stick a tape on the air hole to keep the oil from flowing out of the fork.

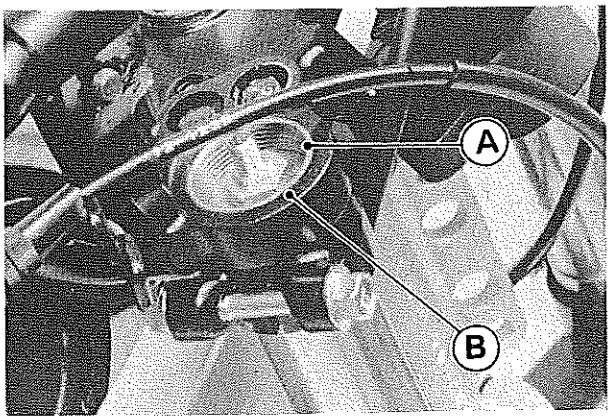
Front Fork Installation Note

•Install the brake hoses, the brake pipes and the connecting pipes as shown.



A. Brake Hoses
B. Clamp Screws
C. Brake Pipe

•Install the fork tube so that the top of the fork inner tube is aligned with upper surface of the handle holder.
•Tighten the clamp bolts to the specified torque (see Exploded Views).



A. Inner Tube Top
B. Upper Surface of the Handle Holder

•Set the connecting pipe on the steering stem and tighten the clamp screws.
•After installing the fork tube, tighten the top plug to the specified torque (see Exploded Views).
•Apply a non-permanent locking agent to the air valve, and tighten the valve to the specified torque (see Exploded Views).

Front Fork Disassembly

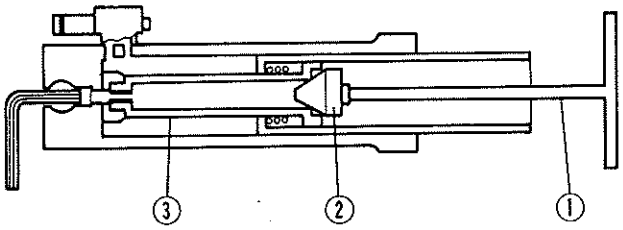
•Remove the front fork leg.
•Remove the top plug, O-ring, and spring.

NOTE

○*The top plug should be loosened before the fork is removed.*

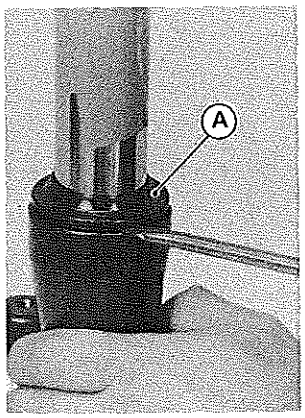
•Pour out the fork oil, and take off the main spring and the TCV (Travel Control Valve).
•Stop the cylinder from turning by using the front fork cylinder holder and adapter (special tools). Unscrew the Allen bolt and take off the bolt, and gasket from the bottom of the outer tube.

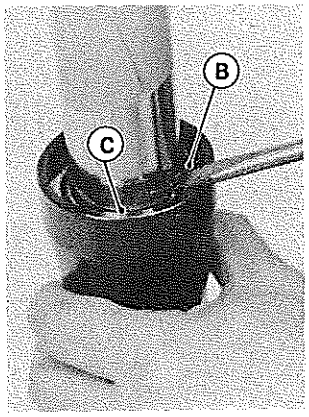
Front Fork Cylinder Holder Removal



1. Front Fork Cylinder Holder Handle: 57001-183
2. Adapter: 57001-1057
3. Front Fork Cylinder

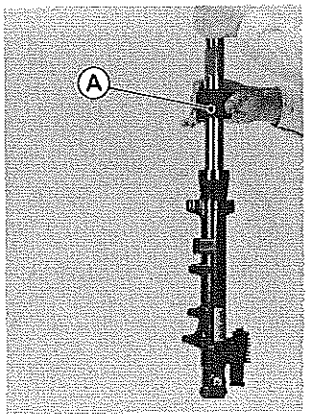
•Remove the piston and cylinder unit and short spring up side down of the front fork.
•Separate the inner tube from the outer tube as follows.
○Remove the dust seal from the outer tube.
○Remove the snap ring and washer from the outer tube.

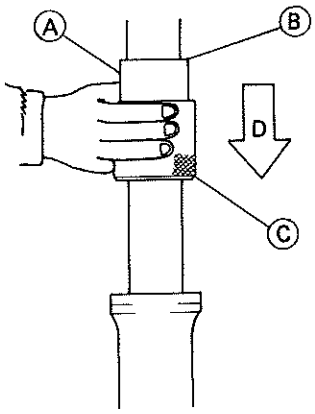




A. Dust Seal
B. Snap Ring
C. Washer

○Holding the inner tube by hand and keeping the fork leg in a vertical position, tap the outer tube on the upper end with the driver (special tool) until the outer tube falls off the inner tube. Face the big end of the driver downward.



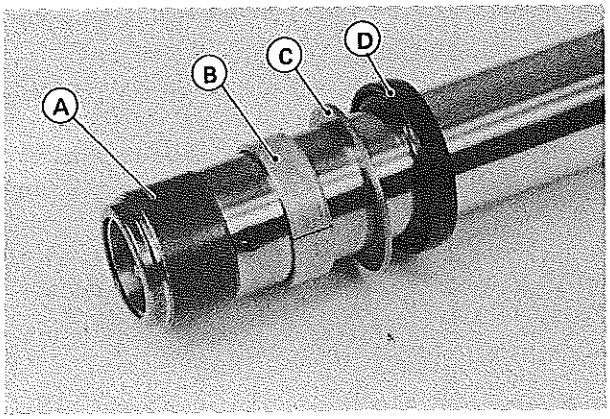


A. Driver: 57001-1091
B. Small End
C. Big End
D. Tap

CAUTION

○**To avoid damaging the inner tube guide bush, do not tap the outer tube when the fork leg is put horizontally on a work bench.**

•Remove the oil seal, washer and outer tube guide bush, from the inner tube.
•Remove the cylinder base out of the outer tube bottom.

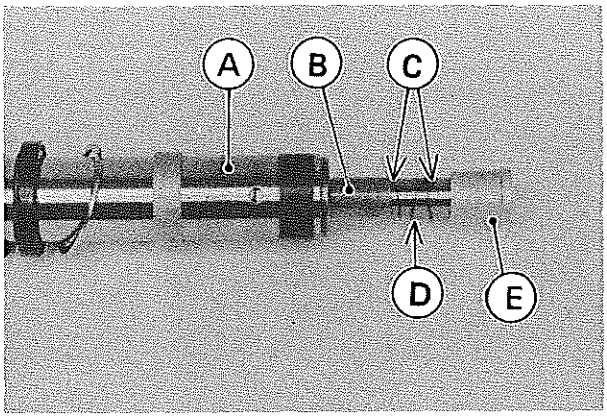


A. Inner Tube Guide Bush
B. Outer Tube Guide Bush
C. Washer
D. Oil Seal

Front Fork Assembly

•Fork assembly is the reverse of disassembly. Pay attention to the following items.
○Check the top plug O-rings. Replace them with new ones if damaged.
○Replace the removed oil seal with a new one.

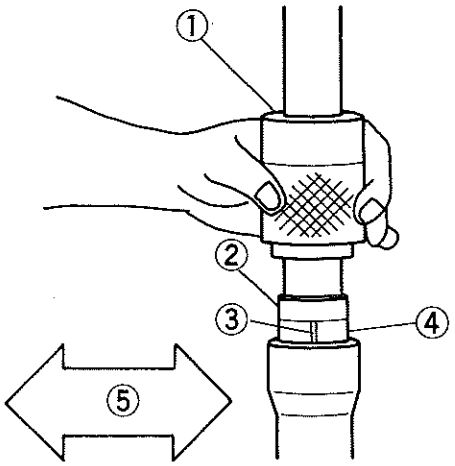
○Inspect the guide bushes (see Guide Bush Inspection), and replace them with new ones if necessary.
○Insert the cylinder unit to the inner tube, and put on the washers and cylinder base.



A. Inner Tube
B. Cylinder
C. Spring Washer
D. Washer
E. Cylinder Base

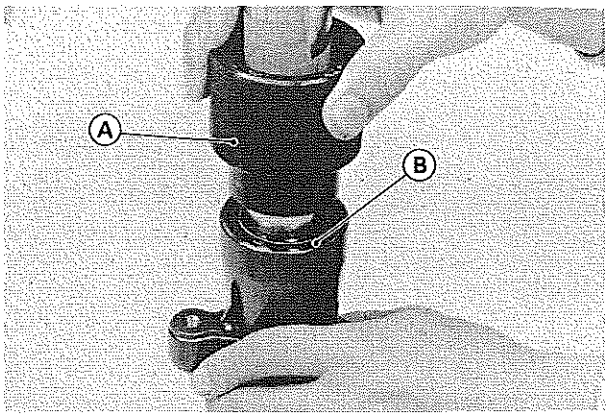
○Insert the inner tube and cylinder as a set into the outer tube.
○Apply liquid gasket to both sides of the gasket, apply a non-permanent locking agent to the Allen bolt.
Tighten the Allen bolt to the specified torque, using the front fork cylinder holder handle and holder adapter (special tools) to stop the cylinder from turning.
●Install the guide bush with a used guide bush as a tool by tapping the used guide bush with the driver (special tool) until it stops. The bush split must be faced toward the left or right.

Guide Bush Installation



1. Driver: 57001-1091
2. Used Guide Bush
3. Slit
4. New Guide Bush
5. Front and Rear

●Replace the oil seal with a new one.
●Apply oil to the outside, and install it with the oil seal driver (special tools).



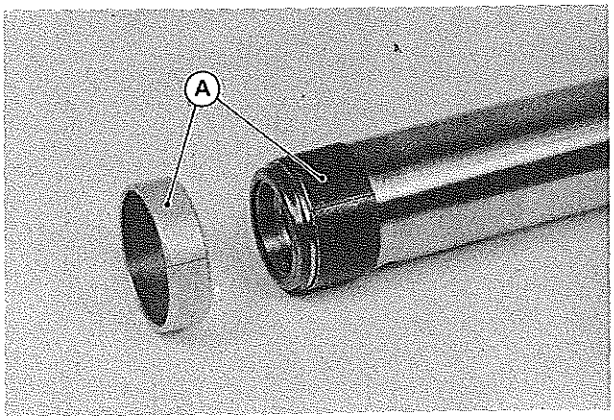
A. Oil Seal Driver: 57001-1091
B. Oil Seal

Inner Tube Inspection
●Visually inspect the inner tube, and repair any damage.
●Nicks or rust damage can sometimes be repaired by using a wet-stone to remove sharp edges or raised areas which cause seal damaged.
★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.
●Temporarily assemble the inner and outer tubes, and pump them back and forth manually to check for smooth operation.

CAUTION

○If the inner tube is bent or badly creased, replace it. Excessive bending, followed by subsequent straightening, can weaken the inner tube.

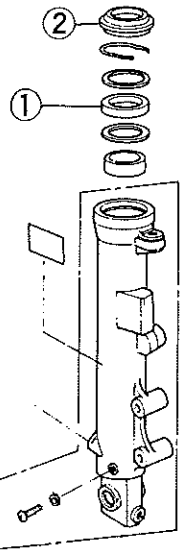
Guide Bush Inspection
●Visually inspect the guide bushes, and replace them if necessary.



A. Guide Bushes

Oil Seal and Dust Seal Inspection

- Inspect the oil seal and dust seal for any signs of deterioration or damage.
- ★Replace them if necessary. Replace the oil seal with a new one whenever it has been removed.

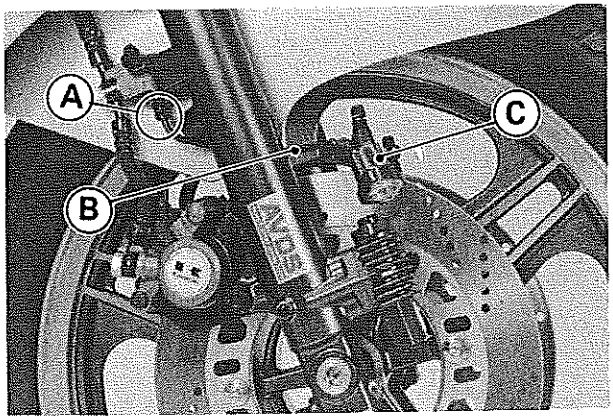


1. Oil Seal
2. Dust Seal

AVDS (Automatic Variable Damping System)

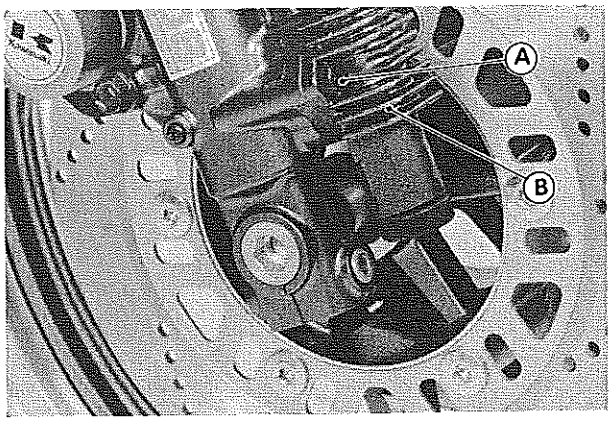
Anti-Dive Removal

- Remove the bolts and separate the brake plunger from the anti-dive valve.
- Drain the front brake oil (see Brake chapter).
- Remove the brake pipe joint, and then brake pipe and brake plunger.



A. Brake Pipe Joint
B. Brake Pipe
C. Brake Plunger

- Remove the mounting bolts and take off the anti-dive valve from the outer tube.



A. Bolts
B. Anti-Dive Valve Assembly

NOTE

○*Do not disassemble the anti-dive valve assembly for repair or replacement of internal parts. Always replace it as a a unit.*

TCV (Travel Control Valve) Removal

- Remove the front fork leg.
- Remove the top plug, O-ring, spring, and pour the fork oil, and take off the TCV up side down of the fork.

NOTE

○*Do not disassemble the TCV assembly for repair or replacement of parts. Always replace it as a unit.*

Anti-Dive Installation

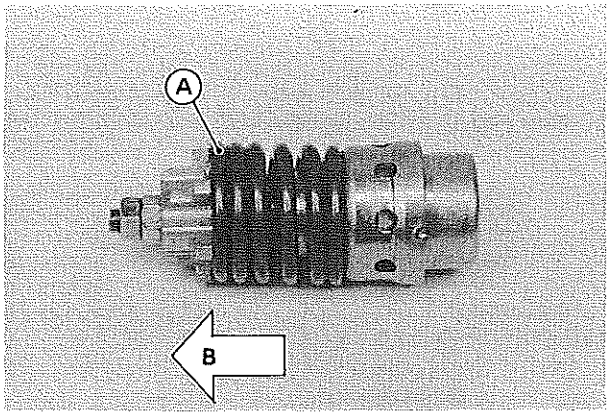
- Reinstall the anti-dive valve and brake plunger assembly, and brake pipe.

NOTE

○*Bleed the anti-dive and brake line after anti-dive valve installation.*

TCV Installation Notes

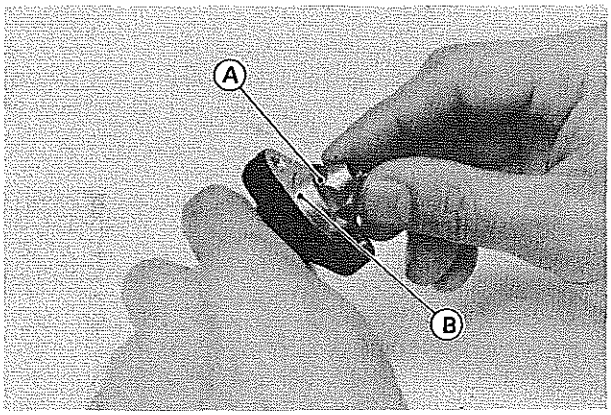
- Install the TCV with the nut side end top.
- Installation is the reverse of removal.
- Install the fork main springs so that the end with more closely spaced coils is upward.



A. TCV B. Top

Anti-Dive Brake Plunger Disassembly

- Remove the rubber cap.
- Remove the seal case using a suitable nut.

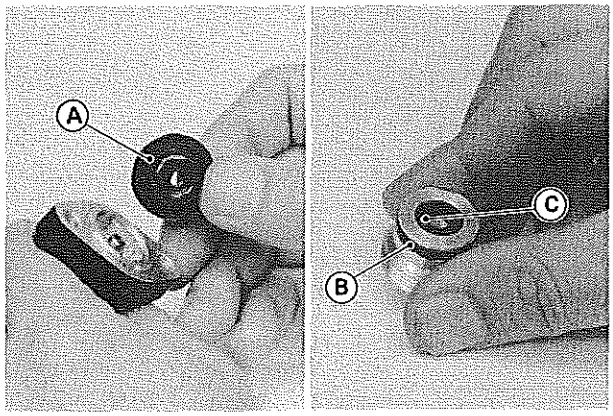


A. Suitable Nut (width across flats: 14 mm) B. Seal Case

Brake Fluid and Fork Oil Leak Inspection

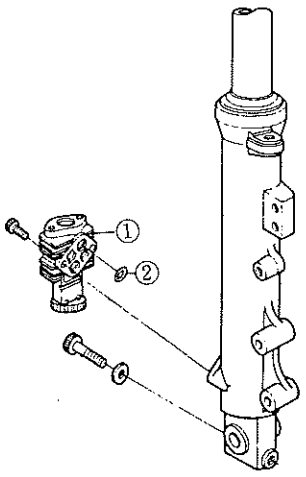
- Visually inspect the anti-dive unit for brake fluid and fork oil leakage.

★If the brake fluid leaks, replace the brake plunger parts – the rubber cap, O-ring, and seal ring.



A. Rubber Cap C. Seal Ring
B. O-Ring

★If the fork oil leaks, replace the O-rings or anti-dive valve assembly.



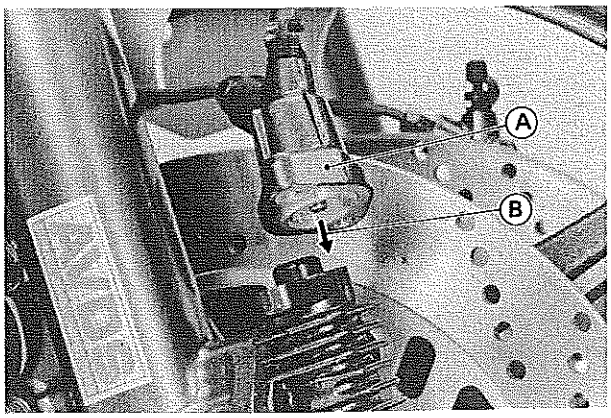
1. Anti-Dive Valve Assembly
2. O-ring

Brake Plunger Assembly Test

The brake plunger assembly can be tested by separating it from the anti-dive valve assembly with the brake line connected to the brake plunger assembly.

- Separate the plunger assembly from the anti-dive valve assembly being careful not to damage or deform the brake pipe.
- Check to see if the plunger in the brake plunger assembly comes out by a **2 mm** when the front brake is lightly applied, and check to see if the plunger goes in smoothly when it is pushed in with your finger.

★If the plunger does not move lightly or is stuck in the body, replace the brake plunger assembly.



A. Brake plunger B. 2 mm

Anti-Dive Valve Assembly Test

The operation of the anti-dive valve assembly can be checked by removing the front fork leg from the motorcycle.

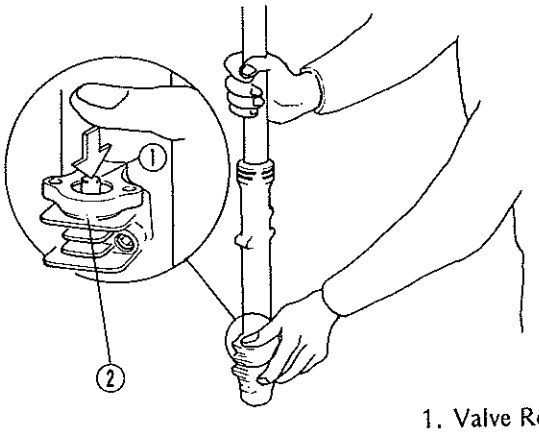
- Separate the brake plunger assembly from the anti-dive valve assembly with the brake line connected.
- Unscrew the top plug, and take the fork spring out of the fork tube.
- Remove the front wheel, disc brake caliper, front fender and brake line junction from the fork leg.
- Remove the front fork leg with its anti-dive valve assembly installed and tape the equalizing hole in the fork inner tube to prevent the fork oil from flowing out during anti-dive valve assembly test.
- With the fork leg held upright, compress the fork leg, and see that the compression stroke is light and smooth when the vlave rod is not pushed in and that there is notable damping when the valve rod is pushed in with your finger.

NOTE

○*The extension stroke should be smooth with notable damping regardless of valve rod positions.*

★If the fork leg has heavy compression stroke when the valve rod is left released, or if it has light compression stroke when the rod is pushed in; the anti-dive valve assembly does not operate properly necessitating replacement of the anti-dive assembly.

Anti-Dive Assembly Test



1. Valve Rod
2. Valve Assy

Brake Pipe Damage

- The brake pipes which feed the brake fluid to the anti-dive units are made of plated steel, and will rust if the plating is damaged. Replace the pipe if it is rusted, cracked (especially check the fitting), or if the plating is badly scratched.

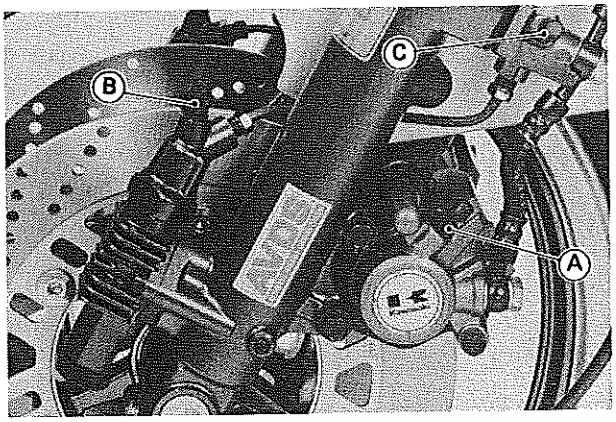
Anti-Dive System Part Replacement

In accordance with the Periodic Maintenance Chart, replace the following anti-dive system parts.

Periodic Replacement Parts on Anti-Dive System

Brake plunger parts:
rubber cap, O-ring, seal ring
Brake pipe (between anti-dive unit and brake pipe joint)

- Be sure to bleed the air from the brake line after replacement.
- Bleed the air from the brake line, first using the bleed valves on the brake calipers and the anti-dive units, and then using the bleed valves on the junction blocks.

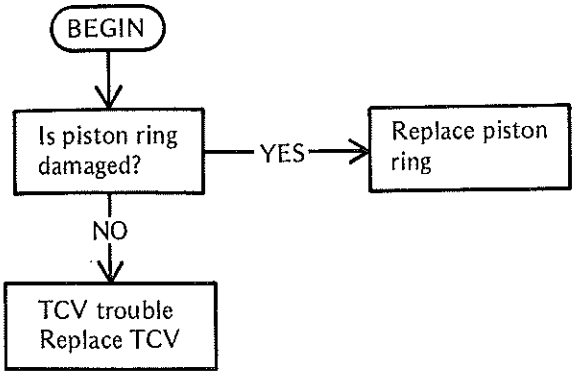


A. Air Bleed Valve (caliper)
B. Air Bleed Valve (anti-dive)
C. Air Bleed Valve (junction block)

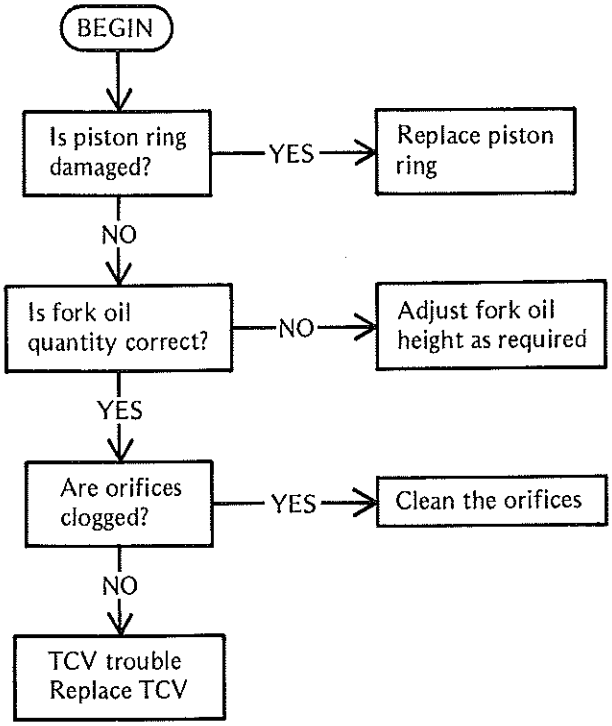
TCV Troubleshooting

If the damping force is not working, inspect the TCV according to the troubleshooting guide.

Damping force is not working
at compression stroke



Damping force is not working on extension stroke



Rear Shock Absorber

The rear shock absorber can be adjusted by changing the spring force and damping force to suit various riding and loading conditions.

Spring Force Adjustment

○The numbers on the window show the setting position.

●Turn the preload adjuster until the desired number is at middle of the window and you feel a click.

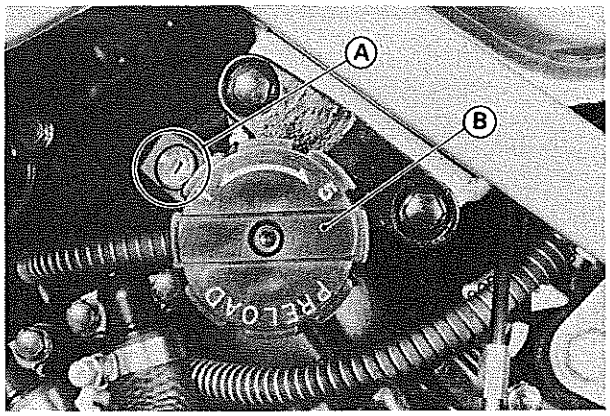
NOTE

○*The recommended setting position is the 1 position for one rider with no accessories.*

★If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

Spring Force

Adjuster Position	Spring Force	Setting	Load	Road
1 ↑↓ 5	↓ Stronger	Soft ↑↓ Hard	Light ↑↓ Heavy	Good ↑↓ Bad



A. Numbers on the window B. Dial (Preload Adjuster)

Damping Force Adjustment

●Turn the remote damper adjuster to the desired position so that the number on the adjuster aligns with the arrow.

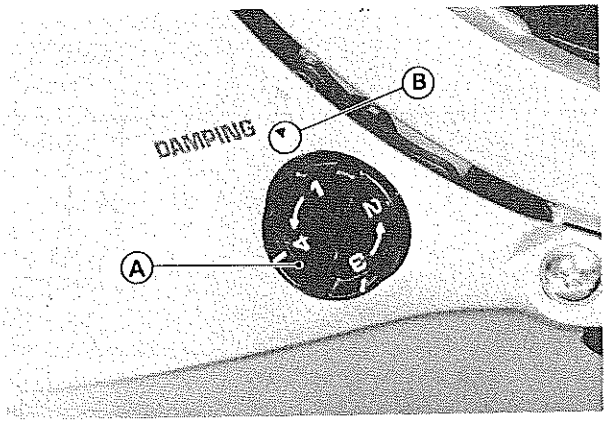
NOTE

○*The damping force can be left soft for average riding. But it should be adjusted harder for high speed riding, or riding with a passenger. If the damper setting feels too soft or too stiff, adjust it in accordance with the following table:*

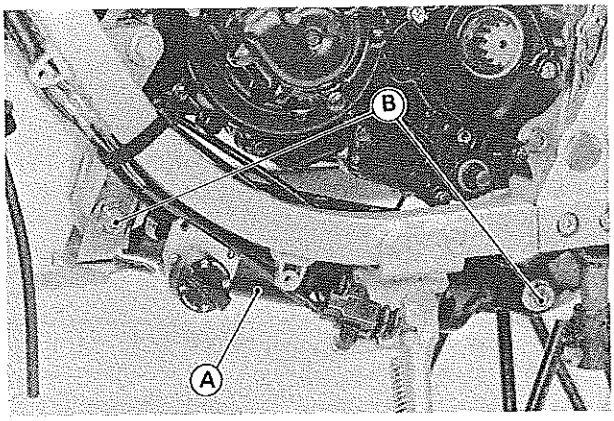
○*The recommended setting position is the 1 position for one rider with no accessories.*

Damping Force

Setting Position	Damping Force	Setting	Load	Road	Speed
1	↓ Stronger	Soft ↑↓ Hard	Light ↑↓ Heavy	Good ↑↓ Bad	Low ↑↓ High
2					
3					
4					



A. Dumper Adjuster B. Triangular Mark



A. Rear Shock Absorber B. Bolts and Nuts

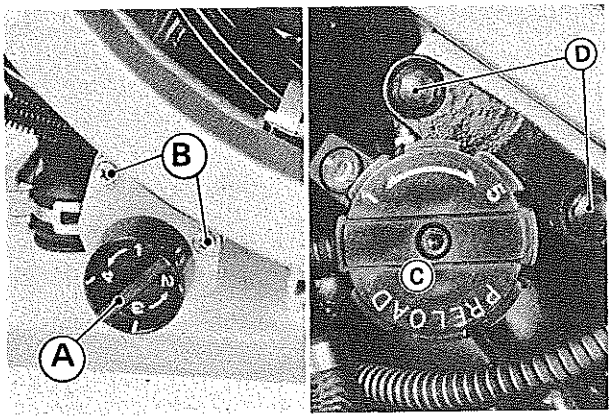
●Remove the shock absorber by taking off the mounting bolts and nuts.

NOTE

○*Support the rear wheel to slide out the shock absorber mounting bolts.*
○*Do not twist the damper adjuster body and cable during the shock absorber removal or installation. This could cause the plastic gear in the absorber to turn and to upset the adjuster indication requiring adjuster matching.*

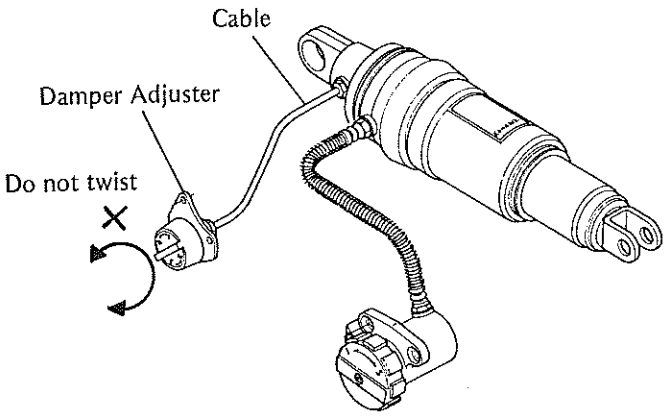
Rear Shock Absorber Removal

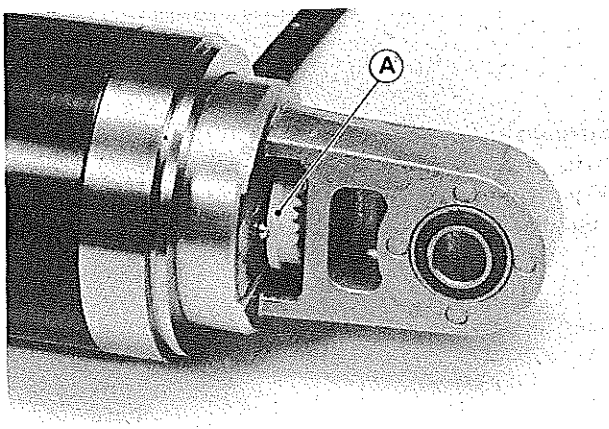
●Remove the following parts before rear shock absorber removal.
○Lower fairing
○Coolant reserve tank
○Front muffler
●Remove the remote adjusters.



A. Damper Adjuster
B. Screws
C. Preload Adjuster
D. Bolts

●Loosen the shock absorber mounting bolts. Do not remove them yet.
●Use a stand under the frame or other suitable means to lift the rear wheel.





A. Plastic Gear

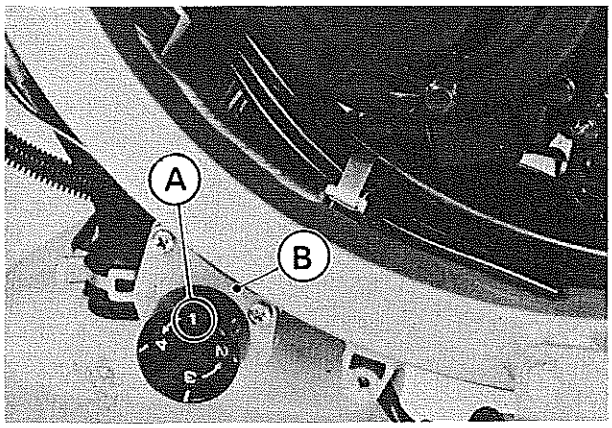
Rear Shock Absorber Installation Notes

Damper Indication Check

NOTE

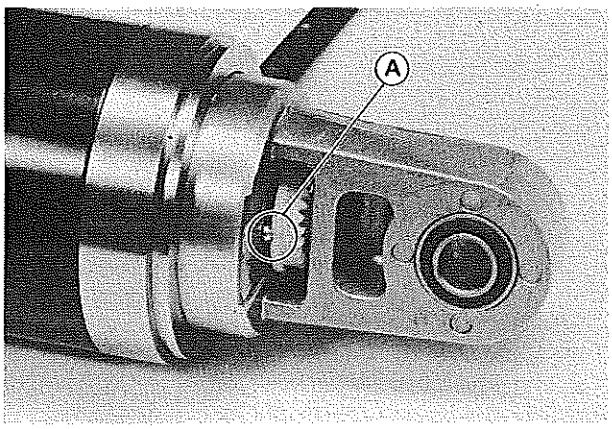
○*Before installation, check to see if the damper adjuster indication matches with the plastic gear mark in the shock absorber.*

●Turn the damper adjuster dial until you feel a click and the number 1 is located on the mounting bracket as shown.



A. Dial 1 B. Mounting Bracket

●Slide the dust cover off of the shock absorber top.
●Check that the gear mark I is at the middle of the window.



A. Gear Mark I (red painted mark)

★Any other mark in the window means that the damper adjuster is upset and needs to be matched.

Damper Adjuster Matching

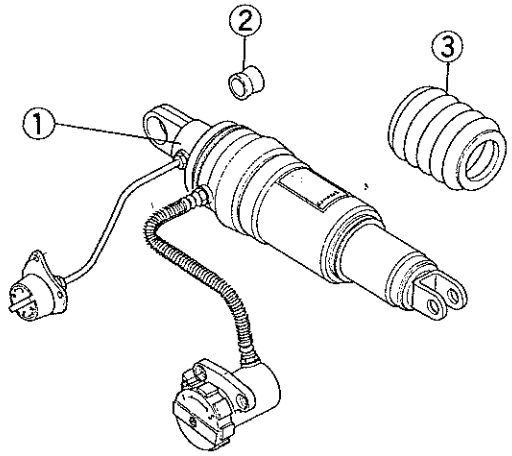
●While keeping the dial 1 in position on the bracket, turn the adjuster body and cable in the same direction until the mark I on the plastic gear is at the middle of the window (see above).
●Install the damper adjuster on the frame being careful not to twist the adjuster body and cable.
●Slide back the dust cover.
●Install the rear shock absorber and tighten the mounting bolts to the specified torque.

Rear Shock Absorber Inspection

Since the rear shock absorber is sealed unit which cannot be disassembled, only external checks of operation are necessary.

●With the shock removed, extend it and see that the extension stroke is smooth and that there is damping in addition to spring resistance to extend. When the unit is released, the spring should not suddenly snap it to original length. It should retract smoothly with notable damping. When the shock absorber is operated, there should be no oil leakage.
★If the shock absorber does not perform all of these operations satisfactorily, repalce the shock absorber.
●Check the rubber damper and rear boot.
★Replace any that is worn, cracked, hardened, or otherwise damaged.
★If the front boot is damaged, replace the shock absorber.

Rear Shock Absorber Inspection

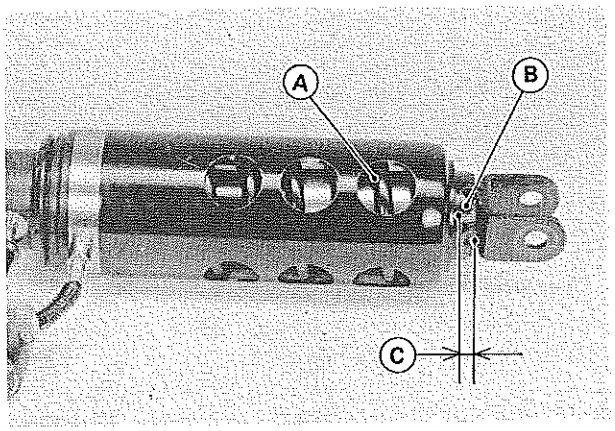


1. Front Boot
2. Damper
3. Rear Boot

Rear Shock Scrapping

WARNING

○Since the rear shock absorber contains nitrogen gas, do not incinerate or disassemble the rear shock absorber.
○Since the oil in the shock absorber will be blown out by high pressure gas, do not try to release the oil.
○Before a rear shock absorber is scrapped, drill a hole at a point about 3 – 5 mm forward from the rear of the cylinder 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.

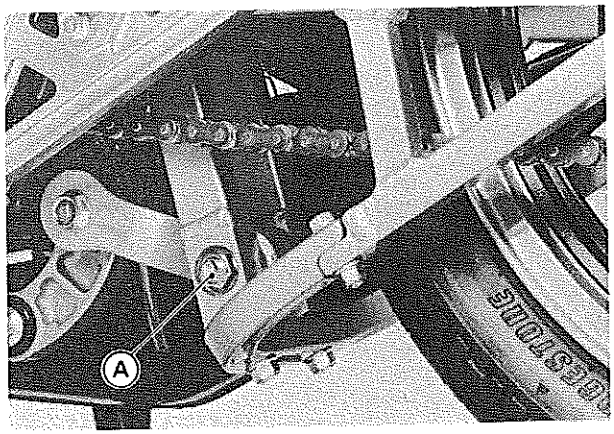


A. Rear of the shock absorber
B. Drill here
C. 3 – 5 mm

Swing Arm, Uni-trak

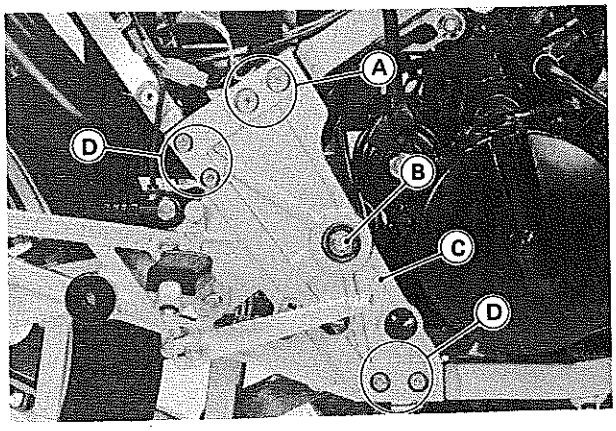
Swing Arm Removal

●Remove the following parts before swing arm removal. Support the frame with a stand during swing arm removal.
○Front Muffler
○Rear Wheel
○Rear Brake Caliper
○Engine Sprocket
●Remove the bolt and nut of the tie rod.



A. Bolt and Nut

●Remove the pivot shaft. If the pivot shaft is difficult to remove, loosen the right side footpeg bracket bolts and nuts.



A. Bolts and Nuts
B. Pivot Shaft
C. Right Side Footpeg Bracket
D. Bolts

●Remove the swing arm with the drive chain.

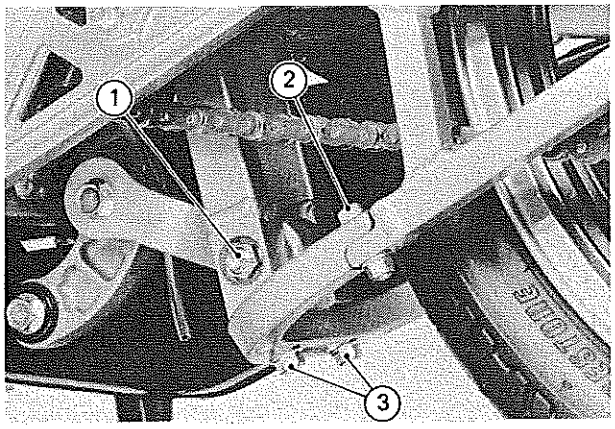
Swing Arm Installation

●Run the drive chain into the swing arm.
●Temporarily install the swing arm.
●Insert the pivot shaft from the vehicle right side for drive chain installation or removal convenience.
●Tighten the pivot shaft nut to the specified torque.
●Install the tie-rod and swing arm holder.

NOTE

○*If the holder mounting bolts are used ones, apply a non-permanent locking agent to the threads.*

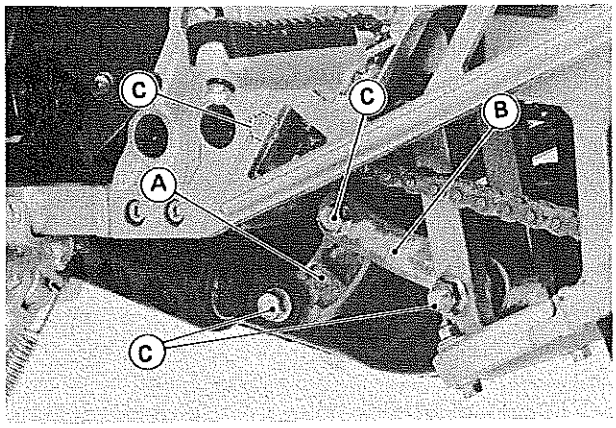
•Tighten the tie-rod bolt and nut, the holder mounting bolts and nuts, and the holder mounting bolts to the specified torque in the order of index number.



1. Tie-Rod Bolt and Nut
2. Holder Mounting Bolts and Nuts
3. Holder Mounting Bolts

Uni-trak Removal

•Support the frame with a stand during Uni-trak removal.
•Remove the following bolts and nuts while holding up the rear wheel, and take off the rocker arm and the tie rod.



A. Rocker Arm
B. Tie Rod
C. Bolts and Nuts

Swing Arm, Uni-trak Sleeve Inspection

★If there is visible damage, or the outside diameter is worn past the service limit, replace the sleeve and needle bearing as a set (see Specification section).

Swing Arm, Uni-trak Needle Bearing Inspection

•The rollers in the needle bearings wear so little that the wear is difficult to measure. Instead, inspect the needle bearings for abrasion, color change, or other damage.
★If there is any doubt as to the condition of either needle bearing, replace the bearing and sleeve as a set.

Swing Arm, Uni-trak Lubrication

In order for the uni-trak suspension to function safely and wear slowly, it should be lubricated in accordance with the Periodic Maintenance Chart or whenever disassembled.

•Disassemble the uni-trak suspension.
•Using a high flash-point solvent, wash the sleeves and needle bearings, and dry them.
•Inspect the needle bearings, sleeves and grease seals for abrasion, color change, or other damage.
•Apply a molybdenum disulfide chassis assembly grease to the outer circumference of the sleeves, and pack the needle bearings with same grease (see Exploded Views).
•Assemble the uni-trak suspension.

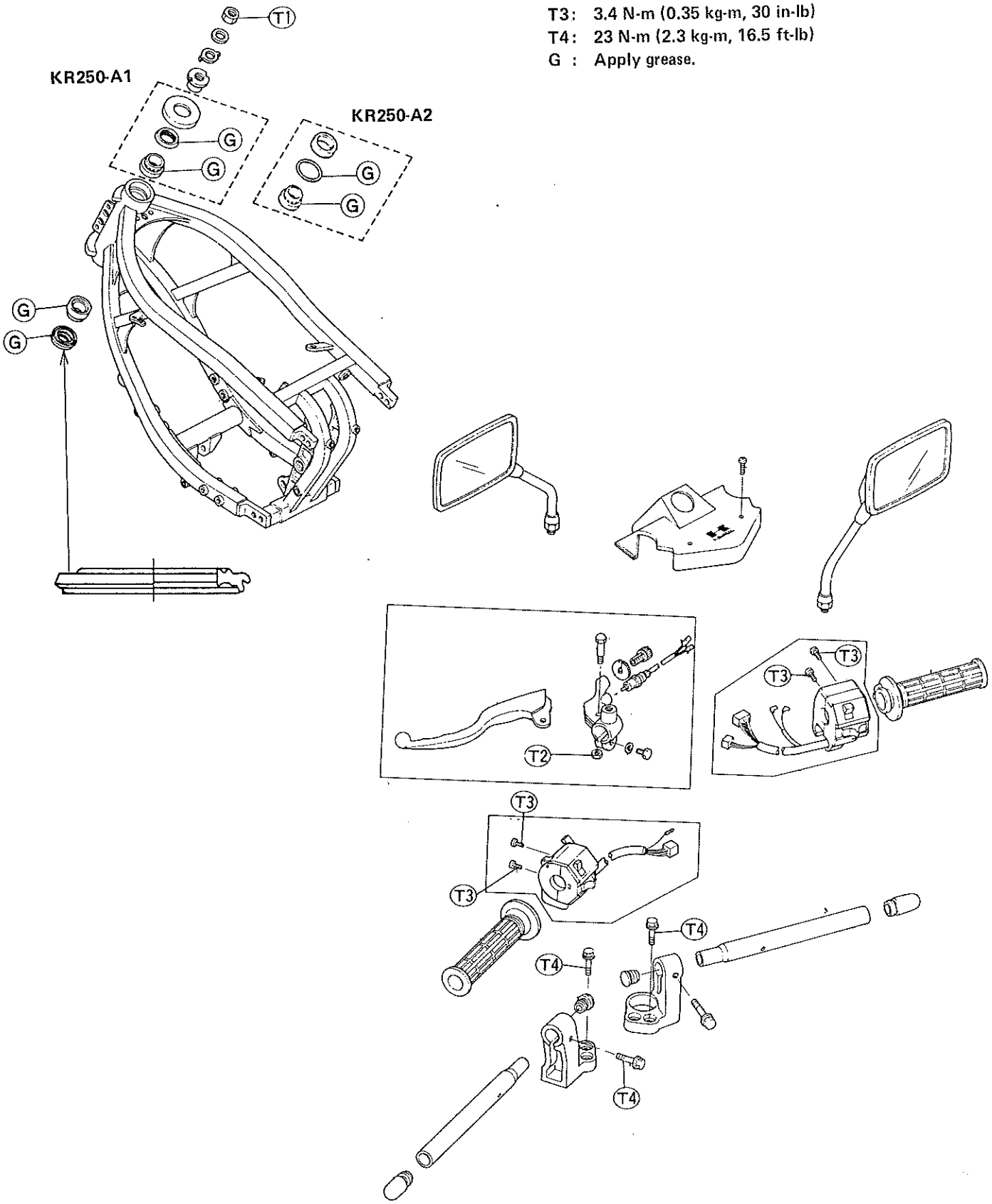
Steering/Handle

Table of Contents

Exploded View 13-2
Special Tools 13-3
Steering Adjustment 13-4
Steering Inspection 13-4
Steering Adjustment 13-4
Steering Removal/Installation 13-5
Steering Stem Removal 13-5
Steering Stem Installation 13-6
Steering Maintenance 13-7
Steering Stem Bearing Lubrication 13-7
Bearing Wear, Damage 13-7
Grease Seal Deterioration, Damage 13-7
Steering Stem Warp 13-7
Handlebars 13-7
Handlebars Installation Notes 13-7

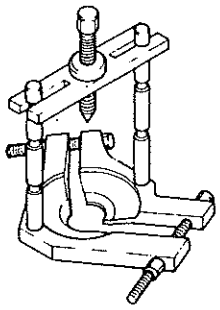
Exploded View

T1: 39 N-m (4.0 kg-m, 29 ft-lb)
T2: 5.9 N-m (0.6 kg-m, 52 in-lb)
T3: 3.4 N-m (0.35 kg-m, 30 in-lb)
T4: 23 N-m (2.3 kg-m, 16.5 ft-lb)
G : Apply grease.



Special Tools

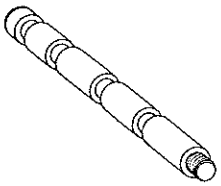
Bearing Puller: 57001-158



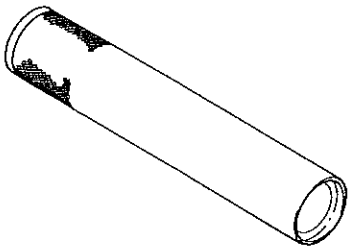
Adapter: 57001-317



Pole: 57001-1190



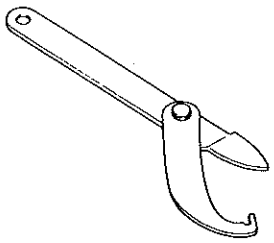
Stem Bearing Driver: 57001-137



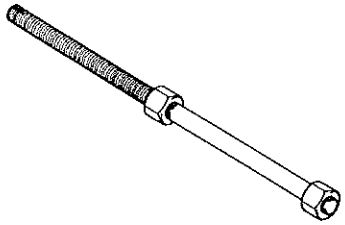
Adapter: 57001-1092



Stem Nut Wrench: 57001-1100



Driver Press Shaft: 57001-1075



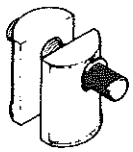
Driver: 57001-1106



Driver: 57001-1076



Stem Bearing Remover: 57001-1107



NOTE

○*The poles (P/N 57001-1190) are included in the bearing puller (P/N 57001-158).*

Steering Adjustment

When the steering bearings are properly adjusted, the handlebar will turn freely from side to side with no looseness of the steering stem within the frame. In other words, the bearings will have little or no free play and absolutely no preload. Inspect the steering according to the Periodic Maintenance Chart or if the following symptoms are noticed.

Symptoms:

Tight

1. The motorcycle wanders while being ridden.
2. The steering feels tight.
3. The bearing races becomes notched.

Loose

1. The forks "clunk" or "click" when the brake is applied or when the motorcycle is ridden over a pothole.
2. The handlebars seem to vibrate more than normal.

Steering Inspection

- Use a suitable means to lift the front wheel off the ground (see Front Fork Air Pressure Adjustment in Suspension).

Checking for Steering Too Tight:

- 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 fork hits the stop.

★If the wheel binds or catches before the stop, the steering is too tight.

NOTE

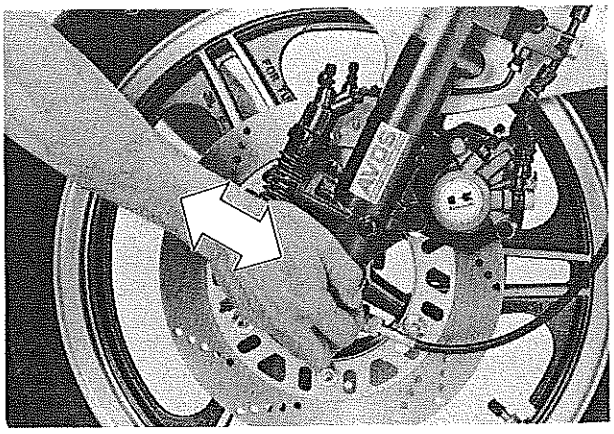
○*The cables and wiring will have some effect on the motion of the fork which must be taken into account. Be sure the wires and cables are properly routed.*

○*The bearings must be in good condition and properly lubricated in order for any test to be valid.*

Checking for Steering Too Loose:

- Stand in front of the motorcycle and grasp the lower ends of fork near the axle.
- Feel for steering looseness by pushing and pulling the forks.

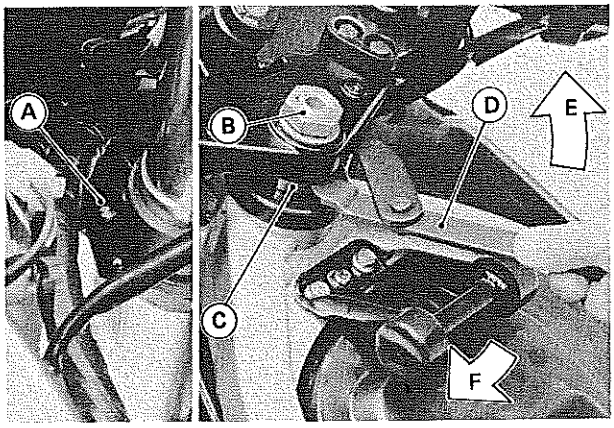
★If you feel looseness, the steering is too loose.



Steering Adjustment

Proper steering adjustment is completed by finding out the correct position of the stem locknut and by tightening the stem head nut to the specified torque.

- Remove all the fairings.
- Remove the fuel tank to avoid damaging the painted surface.
- Remove the screws, and take off the stem head cover.
- Loosen the front fork lower clamp bolts and stem head nut.
- Lift the front wheel off the ground.
- Loosen the stem locknut all the way with the stem nut wrench (special tool).



A. Lower Clamp Bolts
B. Stem Head Nut
C. Stem Locknut
D. Stem Nut Wrench: 57001-1100
E. Loosen the stem locknut
F. Tighten the stem locknut

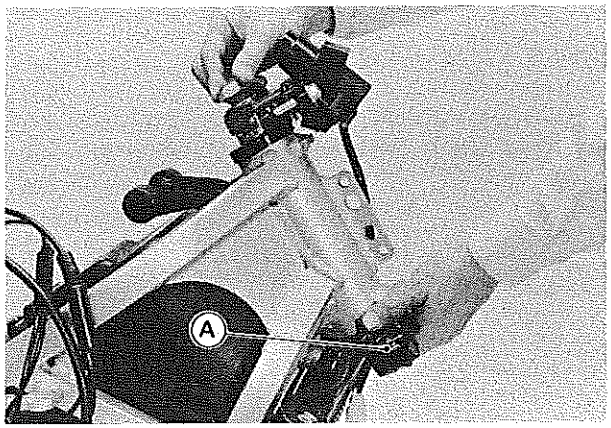
- If the steering is too tight, loosen the stem locknut a fraction of turn; if the steering is too loose, tighten the locknut a fraction of turn. Turn the locknut a 1/8 turn at maximum at a time.

●Tighten the steering stem head nut to the specified torque.
●Tighten the front fork lower clamp bolts to the specified torque.
●Check the steering again.
★If the steering is still too tight or too loose, repeat the adjustment.
●Install the removed parts.

Steering Removal/Installation

Steering Stem Removal

●Remove the following parts.
○Fuel tank
○Front wheel
○Fairing, fairing stay
○Handlebars
○Front fork legs
●Remove the mounting bolts (2), free the brake hose joint from the stem base, and remove the front brake assembly as a set.
●Remove the stem head nut and flat washer.
●Remove the steering stem head.
●Take off the lockwasher.
●Push up on the stem base, and remove the steering stem locknut with the stem nut wrench (special tool), then remove the steering stem and stem base (single unit).



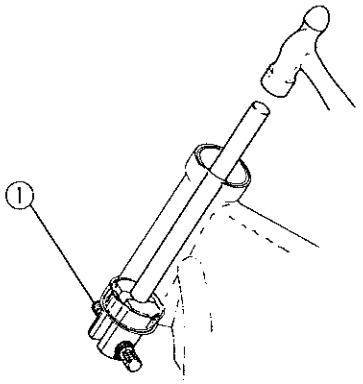
A. Steering Stem and Stem Base

●Remove the steering stem cap and upper tapered roller bearing inner race.
●To remove the outer races pressed into the head pipe, install the stem bearing remover (special tool) as shown below, and hammer the stem bearing remover to drive it out.

NOTE

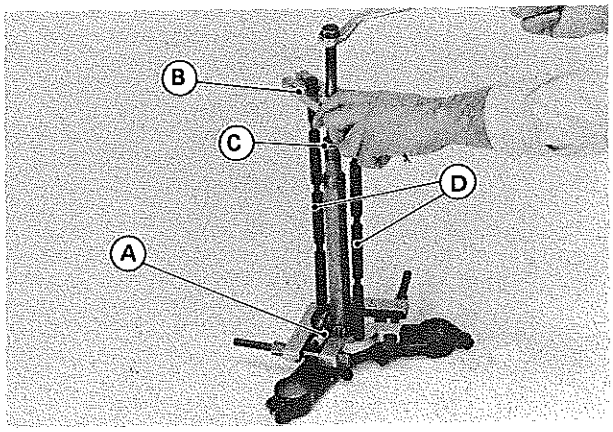
○*If any steering stem bearing is damaged, it is recommended that both the upper and lower bearings (including outer races) should be replaced with new ones.*

Outer Race Removal



1. Stem Bearing Remover: 57001-1107

●Remove the lower inner race with grease seal which is pressed onto the steering stem, with the steering stem bearing puller and adapters (special tools).

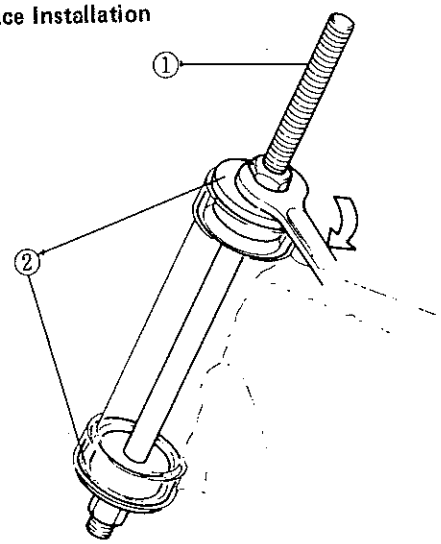


A. Lower Inner Race and Grease Seal
B. Bearing Puller: 57001-158
C. Adapters: 57001-317
D. Pole: 57001-1190

Steering Stem Installation

•Apply grease to the outer races, and then drive them into the head pipe using the drivers and the driver press shaft (special tools).

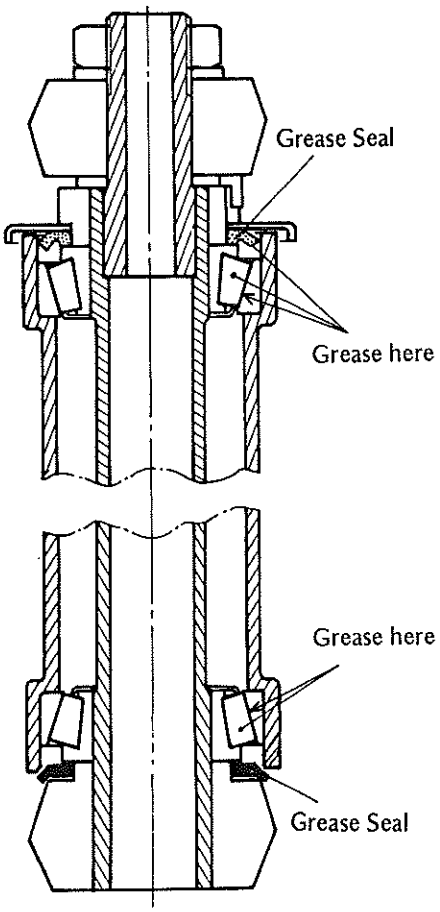
Outer Race Installation



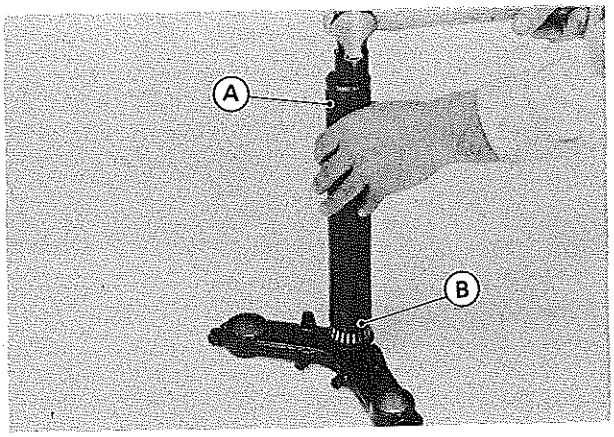
1. Driver Press Shaft: 57001-1075
2. Driver: 57001-1106

•Install the grease seals being careful of the direction shown. Apply grease to the lips, and insert them into the head pipe.

Grease Seal Installation



•Apply grease to the tapered roller bearing, and drive it onto the steering stem using the stem bearing driver and adapter (special tools).



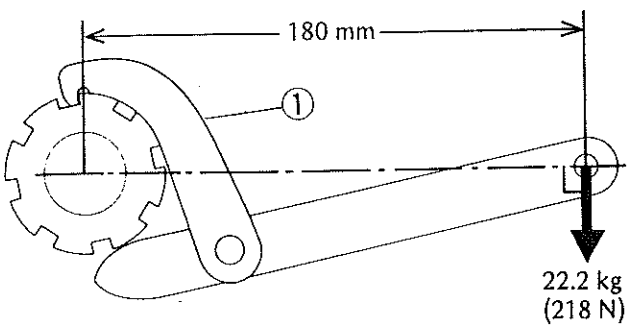
A. Stem Bearing Driver: 57001-137
B. Adapter: 57001-1092

•After lubricating the steering stem bearing liberally with grease, turn the bearing around by hand a few times to make sure the grease is distributed sufficiently inside the bearing.
•Install the stem locknut so that the smaller diameter side faces down.
•Install the lockwasher, steering stem head, washer, and nut. Loosely install the nut at this time.

The following four steps should be performed after steering bearing installation. This procedure settle the bearings in place.

○Using the stem nut wrench, tighten the stem locknut to 39 N-m (4.0 kg-m, 29 ft-lb) of torque. To tighten the steering stem locknut to the specified torque, hook the wrench on the stem locknut, and pull the wrench at the hole by 22.2 kg force in the direction shown.

Torquing Stem Locknut



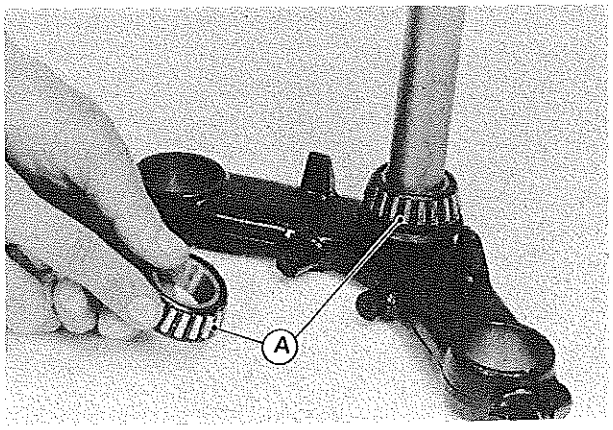
1. Stem Nut Wrench: 57001-1100

○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 locknut a fraction of a turn until it turns lightly.
○Turn the stem locknut lightly clockwise until it just becomes hard to turn. Do not overtighten, or the steering will be too tight.
•Adjust the steering (see Steering Adjustment).
•Reinstall the following parts.
○Front fork legs
○Handlebars
○Fairing stay, fairing
○Front wheel
○Fuel tank
•Route the cables and harnesses correctly. The cables and wiring harnesses must not hinder handlebar movement.
•Check and adjust the following items.
○Front brake
○Clutch
○Throttle cable
○Headlight aim

Steering Maintenance

Steering Stem Bearing Lubrication

In accordance with the Periodic Maintenance Chart, the steering stem bearings should be relubricated.
•Remove the steering stem.
•Using a high flash-point solvent, wash the upper and lower tapered roller bearings in the cages, and 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.
•Turn the bearing around by hand a few turns to make sure the grease is distributed sufficiently inside the bearing.
•Install the steering stem, and adjust the steering.



A. Steering Stem Bearings

Bearing Wear, Damage

•Using a high flash-point solvent, wash the upper and lower tapered rollers in the cages, and 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 damage.

Grease Seal Deterioration, Damage

•Inspect the grease seal on the upper and lower tapered roller bearing for any signs of deterioration or damage.
★Replace the grease seal if necessary.

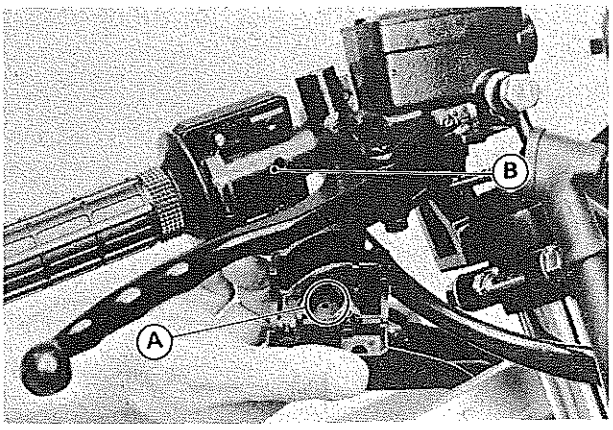
Steering Stem Warp

•Whenever the steering stem is removed, or if the steering cannot be adjusted for smooth action, check the steering stem for straightness.
★If the steering stem shaft is bent, replace the steering stem.

Handlebars

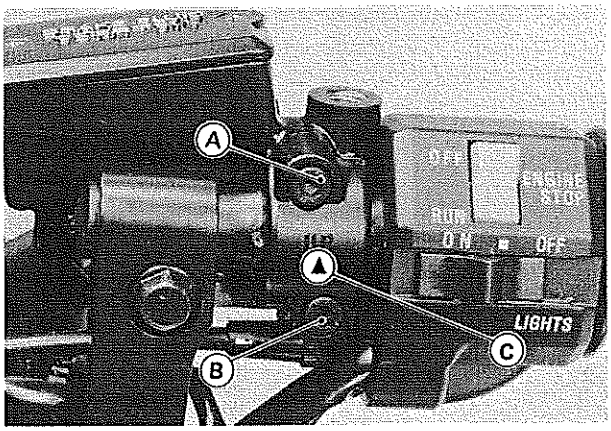
Handlebars Installation Notes

•Position the handlebar on the stem head, and tighten the mounting bolts to the specified torque.
•The front half of both the left and right switch housings has a small projection. Fit the projection into a small hole in the handlebar.



A. Projection B. Hole

●The front brake master cylinder clamps must be installed with the arrow mark upward. Tighten the upper clamp bolt first, and then the lower clamp bolt both to the specified torque. There will be a gap at the lower part of the clamp after tightening.



A. Upper Clamp: tightened first
B. Lower Clamp
C. Arrow Mark

●Check and adjust the following items:
○Throttle grip
○Clutch
○Front brake

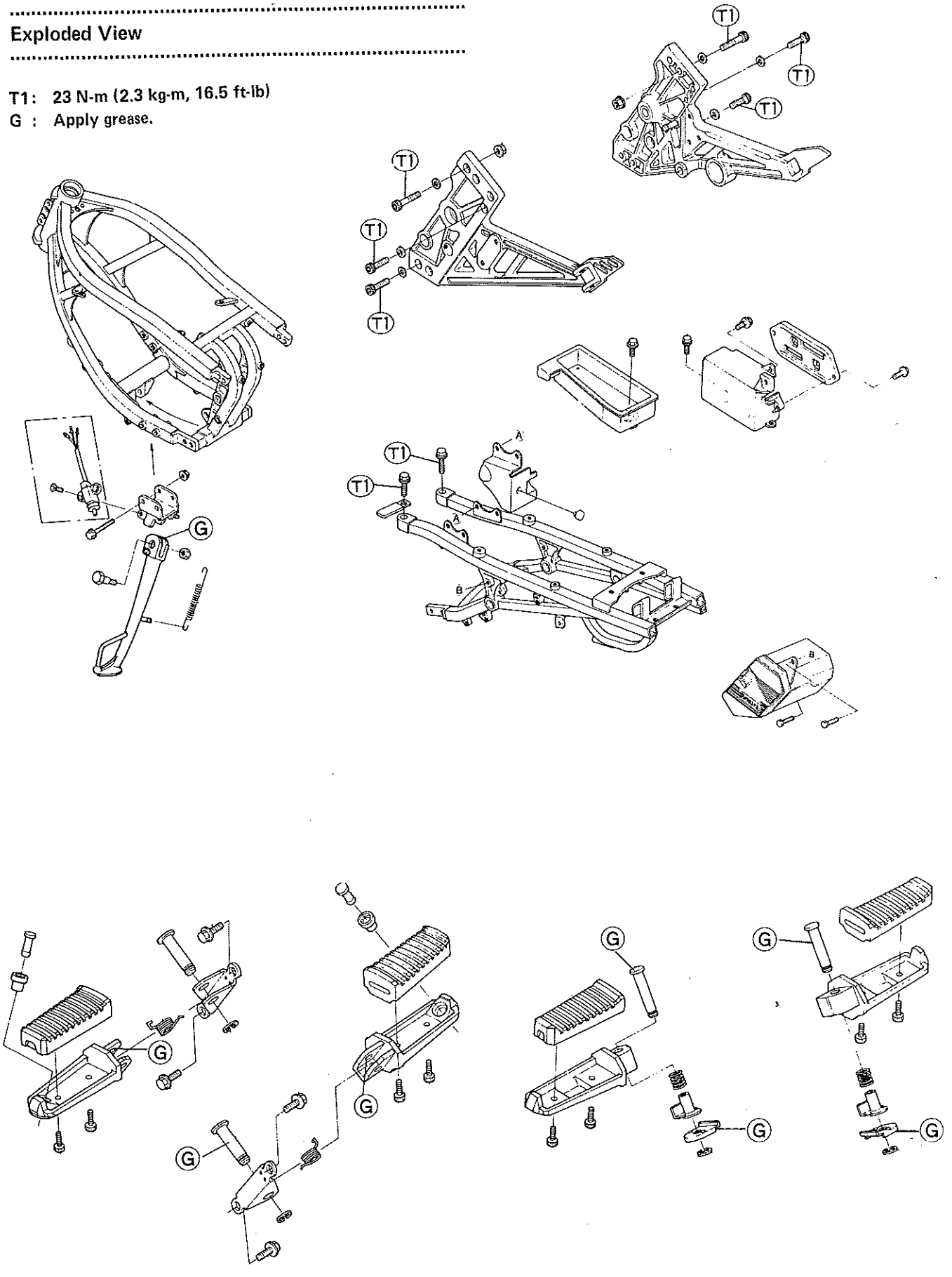
Frame

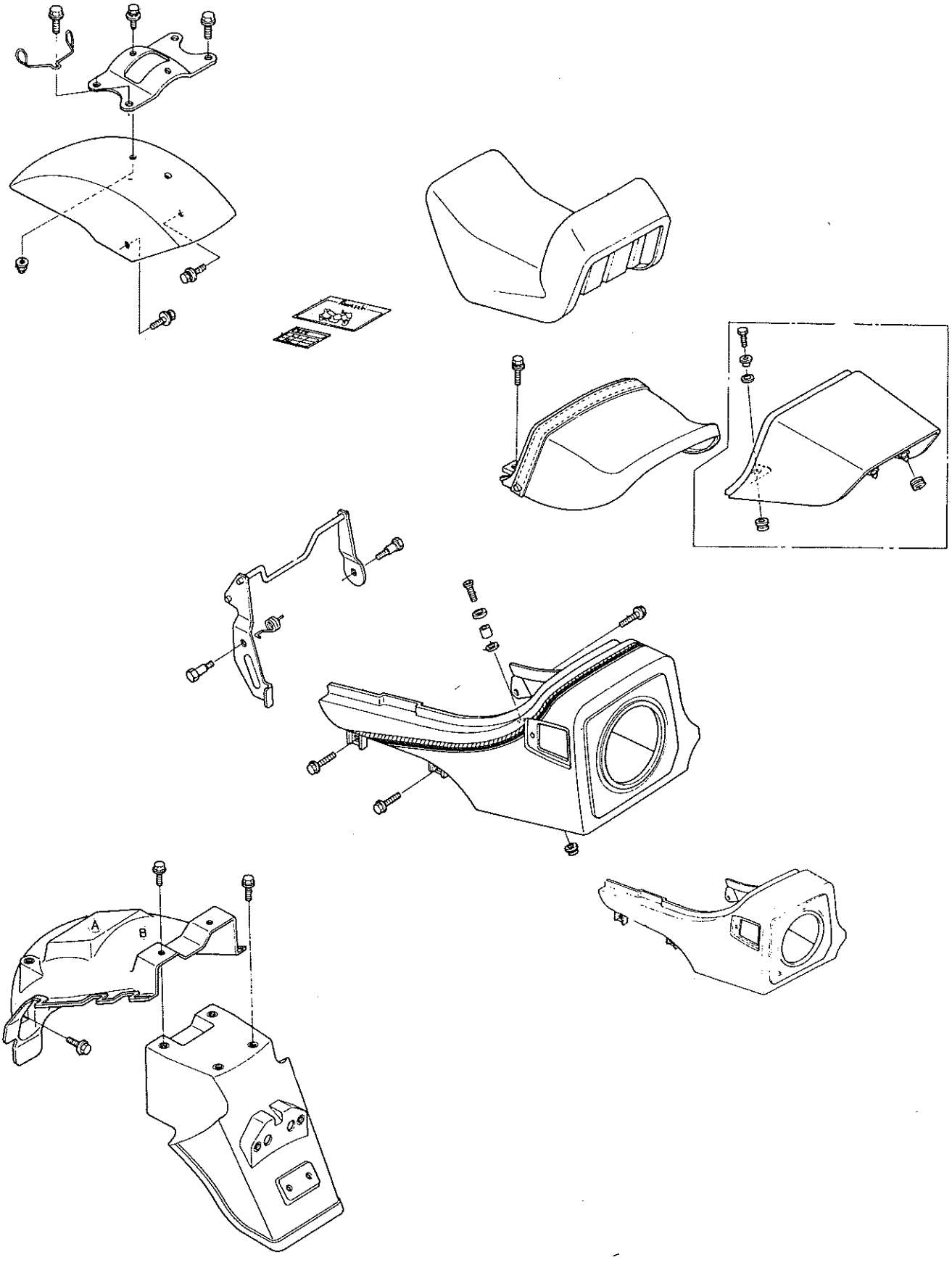
Table of Contents

Exploded View 14-2
Rear Frame 14-5
Rear Frame Removal/Installation 14-5
Fenders 14-5
Front Fender Removal 14-5
Seat Cover Removal 14-5
Fender and Seat Cover Installation Caution 14-5
Fairings 14-5
Fairing Removal 14-5
Fairing Installation Note 14-6
Fairing Stay Removal 14-6

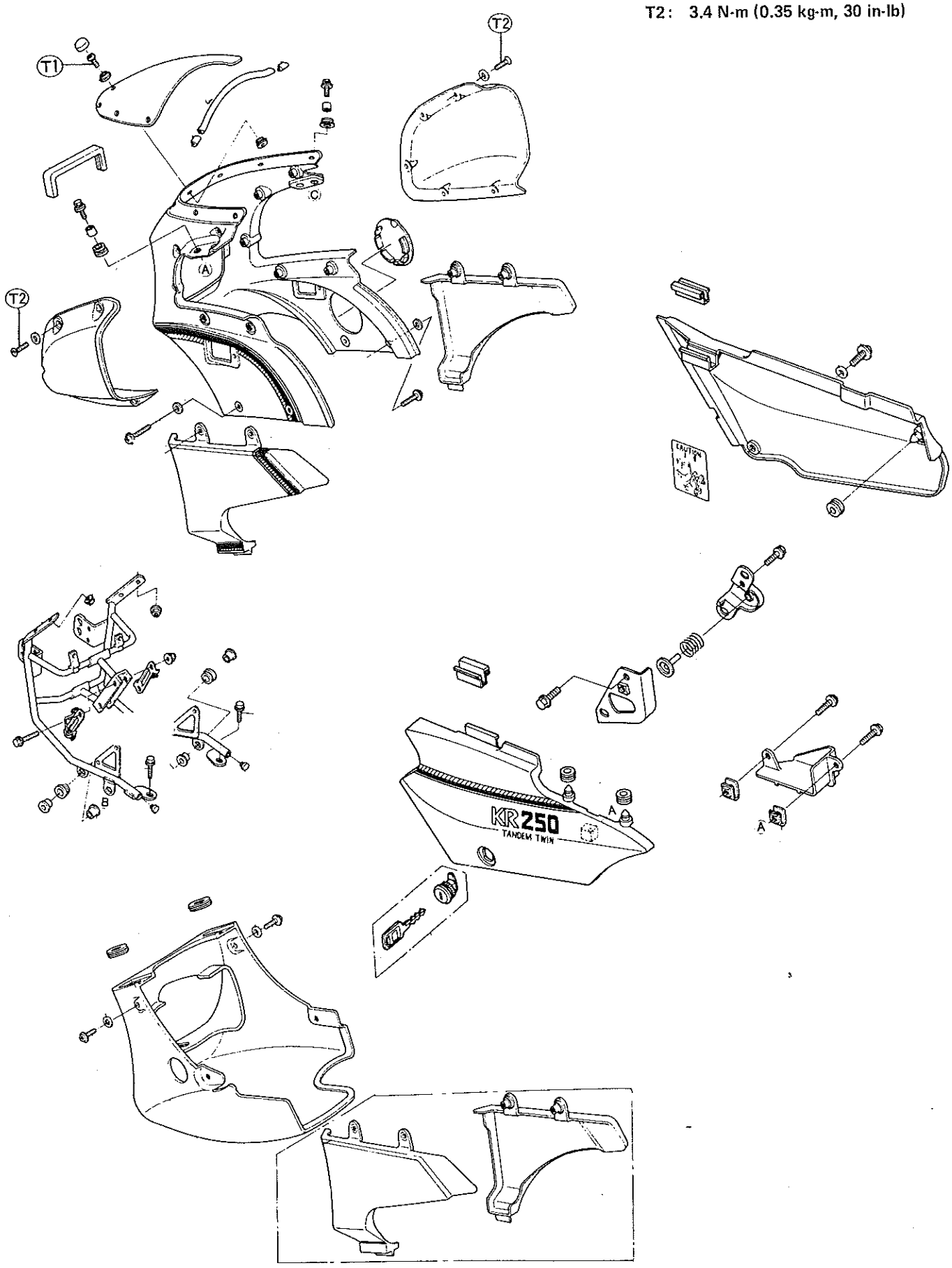
Exploded View

T1: 23 N-m (2.3 kg-m, 16.5 ft-lb)
G : Apply grease.




A
B

T1: 1.5 N-m (0.15 kg-m, 13 in-lb)
T2: 3.4 N-m (0.35 kg-m, 30 in-lb)



Rear Frame

Rear Frame Removal/Installation

○See Rear Muffler Removal/Installation in Engine Top End chapter.

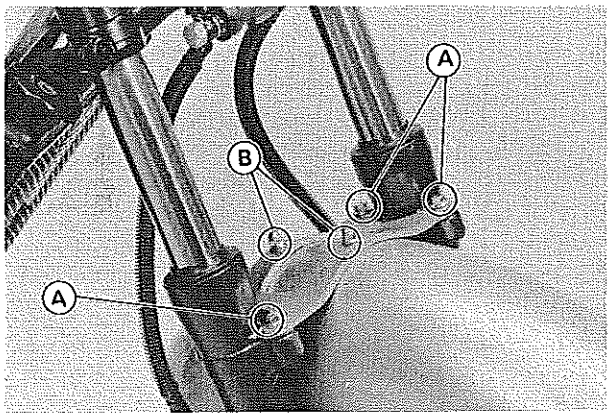
Fenders

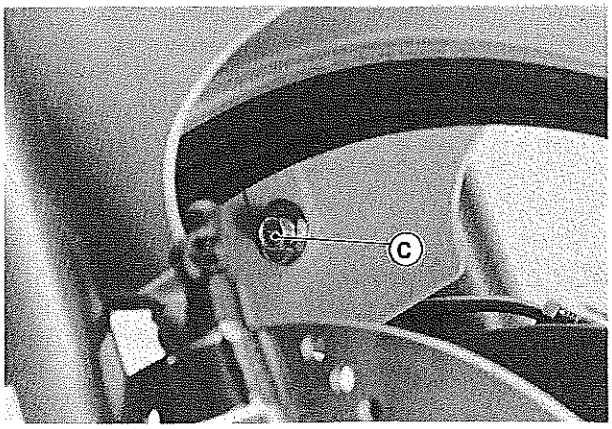
Front Fender Removal

NOTE

○*It is necessary to remove the front wheel for the front fender removal.*

●Remove the front wheel (see Wheel/Tires chapter).
●Remove the following bolts and nuts.



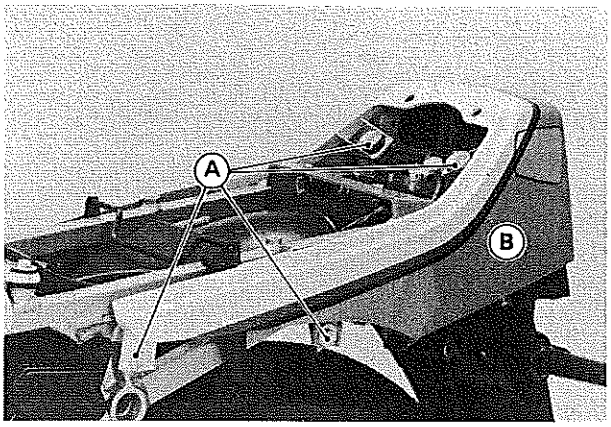


A. Bolts (4)
B. Bolts and Nuts
C. Bolts (2)

●Take off the front fender.

Seat Cover Removal

●Remove the rear seat.
●Pull off the connectors (tail light).
●Remove the following bolts.



A. Bolts B. Seat Cover

●Take off the seat cover.

Fender and Seat Cover Installation Caution

CAUTION

○**Tighten adequately the mounting screws and bolts to prevent damage to plastic fenders and seat cover.**

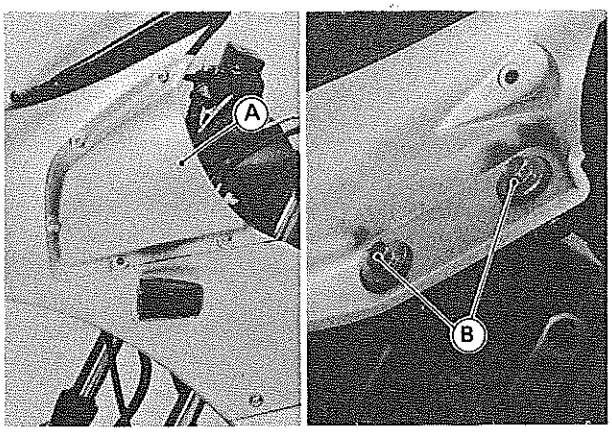
Fairings

Fairing Removal

NOTE

○*Remove the fairings in sequence, lower, middle, and upper.*

●After taking off the upper fairing covers, remove the upper fairing mounting bolts and nuts.



A. Fairing Cover B. Mounting Bolts and Nuts

- Pull off the connectors (front turn signal light).
- Take off the upper fairing.

CAUTION

○When removing the upper fairing, be careful not to damage the inside surface of the windshield.

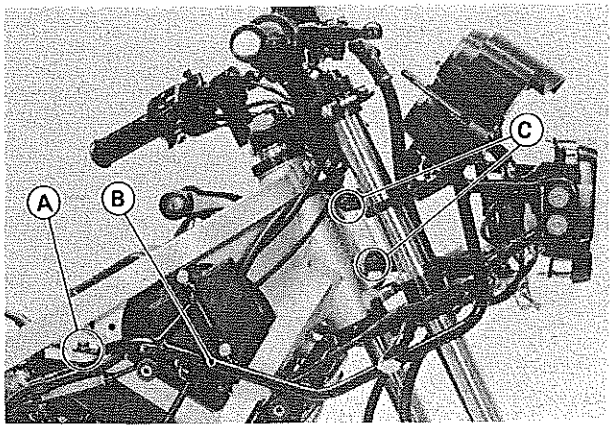
Fairing Installation Note

CAUTION

○Tighten adequately the mounting screws and bolts to prevent damage to plastic fairings.

Fairing Stay Removal

- Pull off the following connectors.
  - ○Meter connectors
  - ○CDI unit connectors
  - ○LH and RH switch connectors
- Remove the fairing stay by taking off the mounting bolts and nuts.



A. Mounting Bolts (left and right)
B. Fairing Stay
C. Mounting Bolts and Nuts

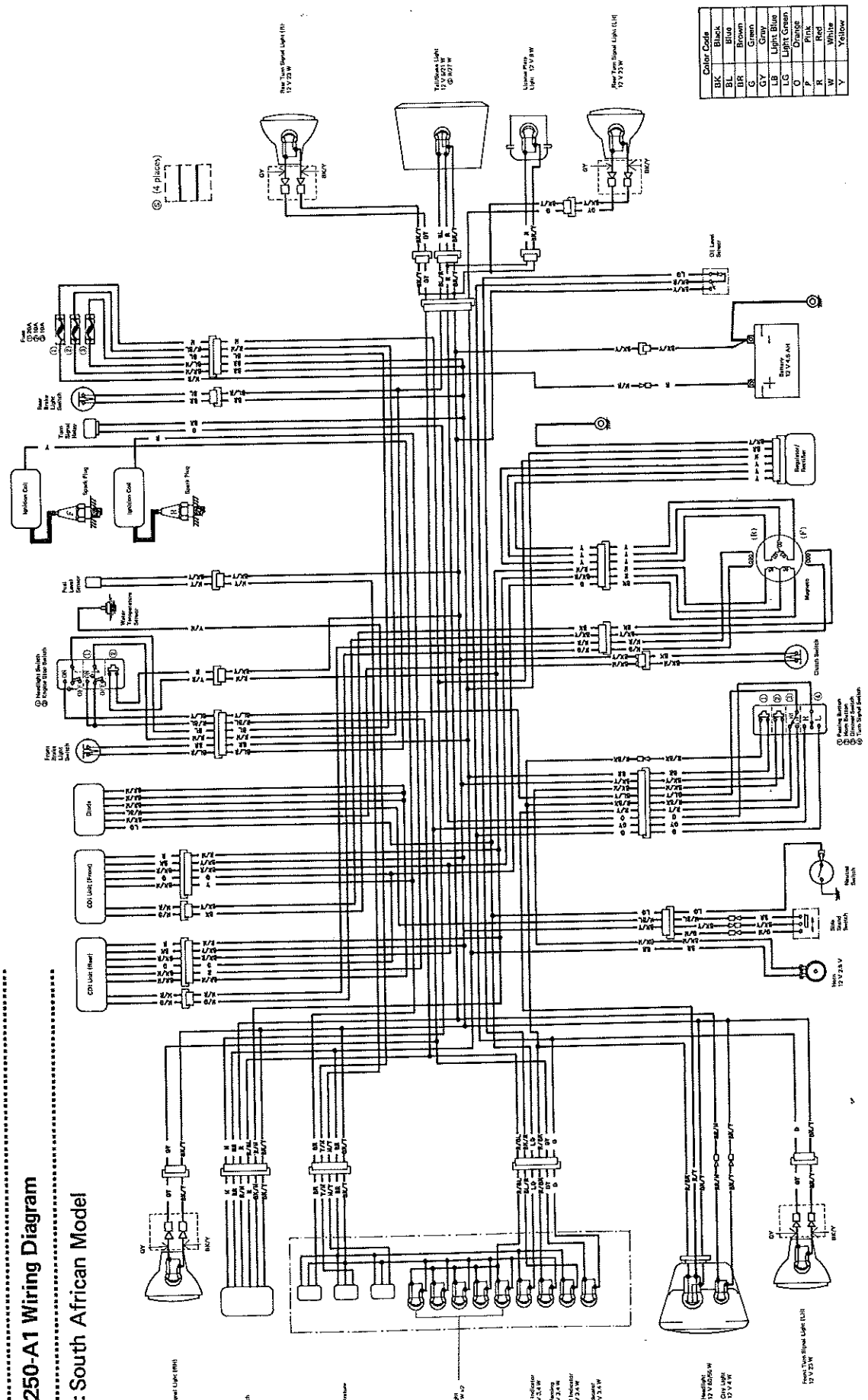
Electrical System

Table of Contents

Wiring Diagram 15-2
Exploded View 15-3
Specifications 15-6
Special Tools 15-7
Precautions 15-8
Elctrical Wiring 15-8
Wiring Inspection 15-8
Battery 15-8
Precautions 15-8
Electrolyte Level Inspection 15-9
Battery Condition 15-9
Battery Initial Charging 15-10
Battery Ordinary Charging 15-10
Battery Test Charging 15-11
Battery Vent Hose Routing 15-12
Charging System 15-13
Regulator/Rectifier Output Voltage Measurement 15-13
Regulator/Rectifier Output Current Measurement 15-14
Stator Coil Resistance Measurement 15-14
Stator Coil Insulation Test 15-14
Regulator/Rectifier Inspection 15-15
Ignition System 15-16
Ignition System Wiring Diagram 15-16
Safety Instruction 15-17
Ignition System Inspection Note 15-17
Spark Plug Removal 15-17
Spark Plug Installation 15-17
Spark Plug Cleaning and Inspection 15-17
Spark Plug Gap 15-17
Ignition Coil Installation 15-18
Ignition Coil Arcing Distance Measurement 15-18
Ignition Coil Resistance Measurement 15-18
Ignition Timing Inspection (Dynamic) 15-19
CDI Unit Installation 15-20
CDI Unit Inspection 15-20
Diode Inspection 15-21
Exciter Coil Resistance Measurement 15-22
Left Engine Cover Removal 15-22
Left Engine Cover Installation Notes 15-22
Pickup Coil Installation Note 15-23
Pickup Coil Inspection 15-23
Flywheel Magneto Removal 15-24
Rotor (pulser) Removal 15-24
Flywheel Magneto/Rotor Installation Notes 15-25
Lighting System 15-25
Headlight Beam Horizontal Adjustment 15-25
Headlight Beam Vertical Adjustment 15-25
Headlight Bulb Replacement Notes 15-25
Tail/Brake Light Bulb Replacement Notes 15-26
Tail/Brake Light Lens Removal/Installation Note 15-26
Licence Plate Light Bulb Replacement Notes 15-26
Inspection 15-27
Turn Signal System 15-27
Turn Signal Light Bulb Replace Note 15-27
Turn Signal Inspection 15-27
Meters and Gauges 15-28
Meter Panel Removal 15-28
Meter Panel Disassembly 15-28
Bulb Replacement Notes 15-29
Meter Panel Assembly Note 15-29
Tachometer Inspection 15-29
Fuel Gauge Operation Inspection 15-30
Water Temperature Gauge Operation Inspection 15-30
Engine Oil Level Warning System Troubleshooting 15-31
Oil Level Sensor Check 15-33
Switches and Sensors 15-33
Rear Brake Light Switch Inspection 15-33
Rear Brake Light Switch Adjustment 15-33
Switch Inspection 15-34
Fuel Level Sensor Installation 15-35
Fuel Level Sensor Inspection 15-35
Water Temperature Sensor Inspection 15-35

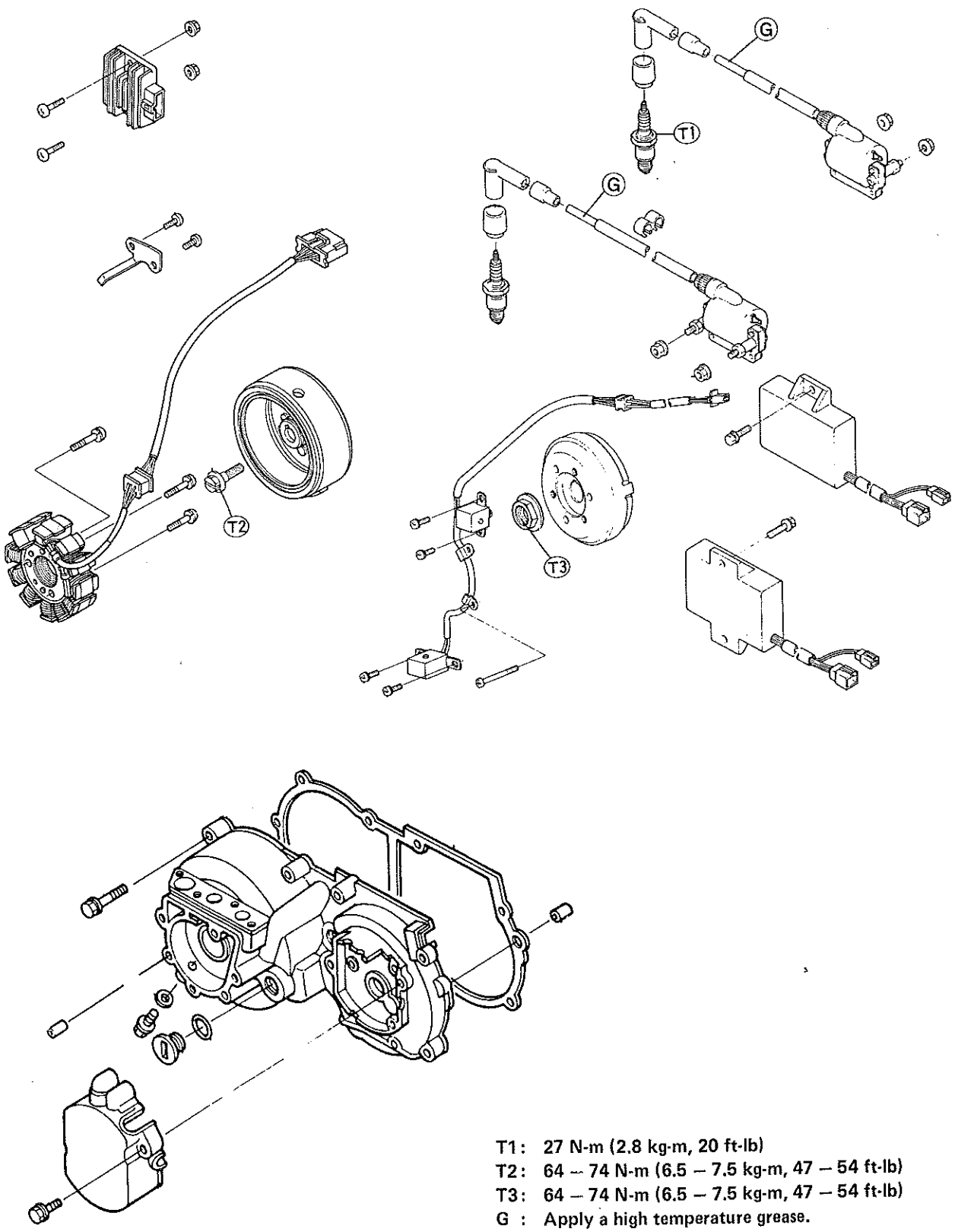
KR250-A1 Wiring Diagram

Ⓢ : South African Model



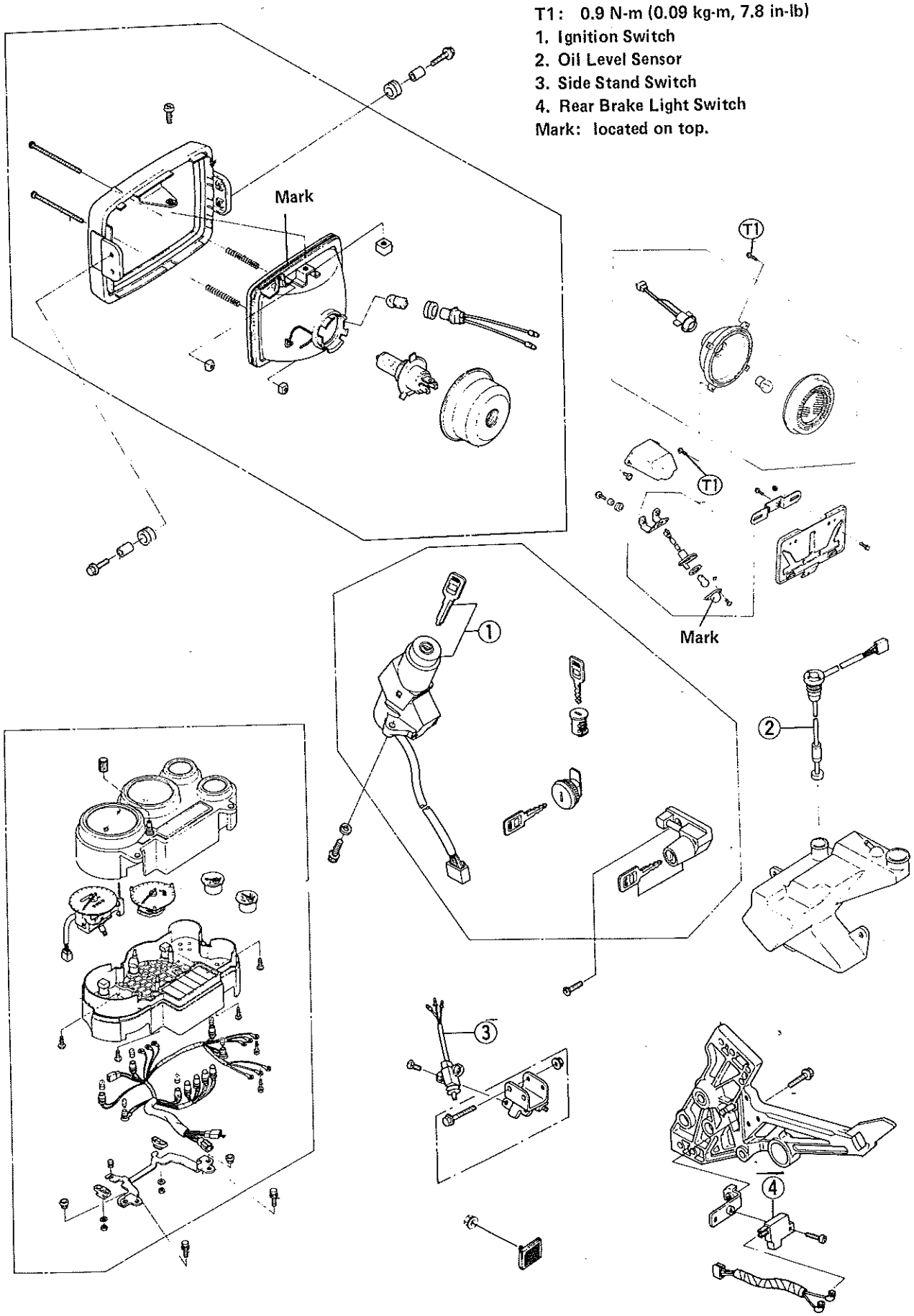
(1814A, 1815A)

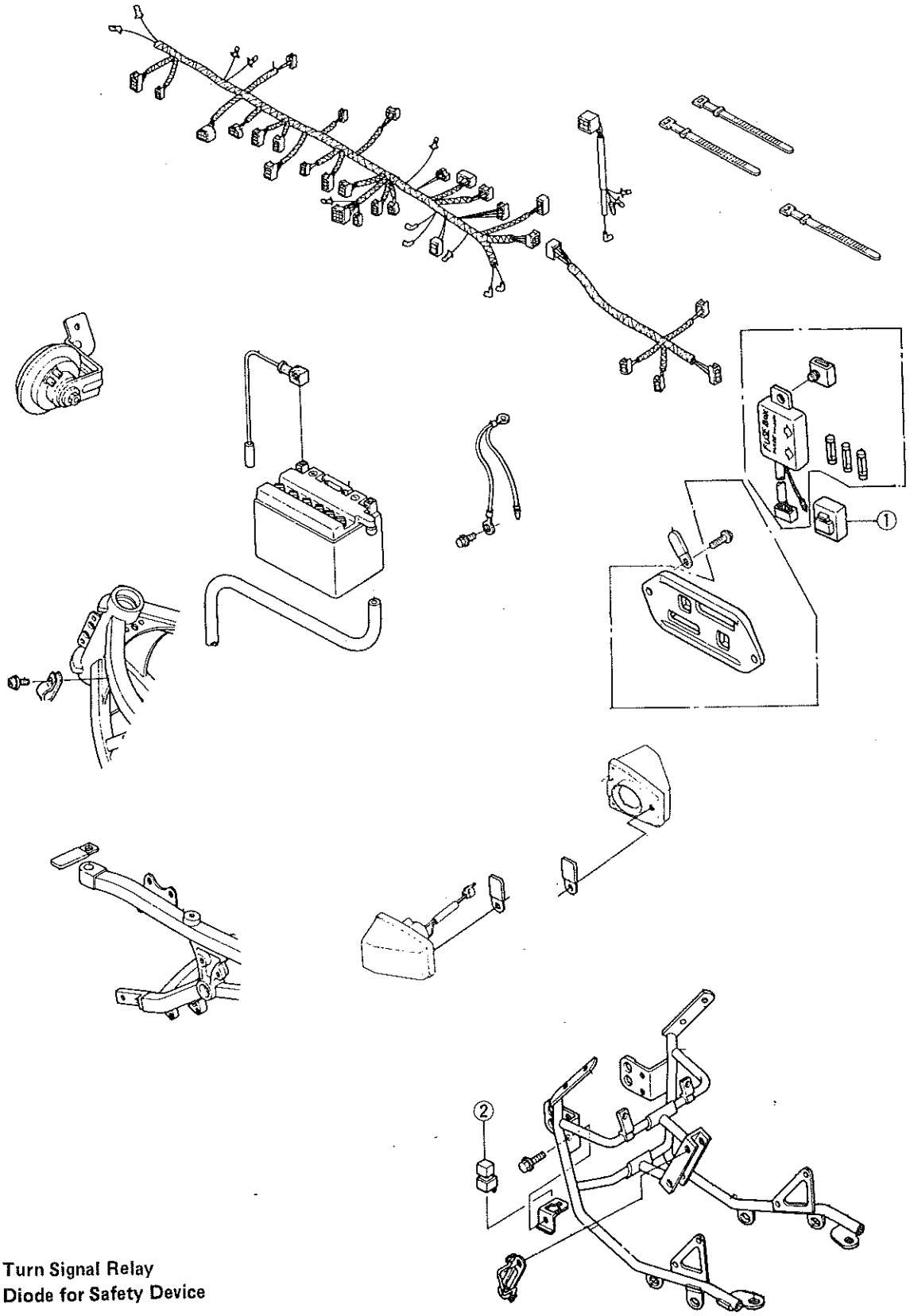
Exploded View



T1: 27 N-m (2.8 kg-m, 20 ft-lb)
T2: 64 – 74 N-m (6.5 – 7.5 kg-m, 47 – 54 ft-lb)
T3: 64 – 74 N-m (6.5 – 7.5 kg-m, 47 – 54 ft-lb)
G : Apply a high temperature grease.

T1: 0.9 N-m (0.09 kg-m, 7.8 in-lb)
1. Ignition Switch
2. Oil Level Sensor
3. Side Stand Switch
4. Rear Brake Light Switch
Mark: located on top.





1. Turn Signal Relay
2. Diode for Safety Device

Specifications

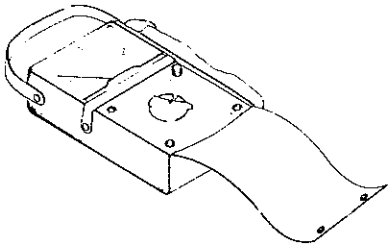
Item	Standard
Battery:	
Electrolyte level	Between upper and lower levels
Electrolyte amount	46 mL per one cell
Specific gravity of electrolyte	1.28 @20°C (68°F)
Charging System:	
Regulator/rectifier output voltage	Battery voltage to 14 V
Regulator/rectifier output amperage	11A
Stator coil (charging) resistance	0.3 – 1.0 Ω (Y – Y)
Ignition System:	
Spark plug gap	0.7 – 0.8 mm
Cap resistance (spark plug)	3.75 – 6.25 kΩ
Ignition coil	
Primary winding resistance	0.17 – 0.25 Ω
Secondary winding resistance	3.2 – 4.8 kΩ
Exciter coil resistance	1 – 3 Ω (W – R)
	90 – 170 Ω (BK – R)
Pickup coil resistance	121 – 151 Ω
Pickup coil air gap	0.4 – 0.8 mm
CDI unit resistance	in the text
Fuel Gauge:	
Fuel level sensor resistance	
Full	10 – 16 Ω
Empty	90 – 100 Ω
Meter Unit:	
Tachometer resistance	60 – 90 Ω (R – BK)
Water temperature sensor	100 – 150 Ω @80°C (176°F)
	52 – 78 Ω @100°C (212°F)

Rear Brake Light Switch:	On after about 5 – 6 mm pedal travel

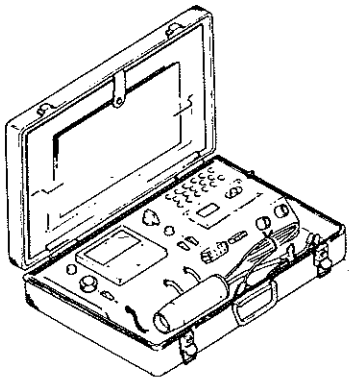
Special Tools

Along with common hand tools, the following more specialized tools are required for complete electrical system servicing.

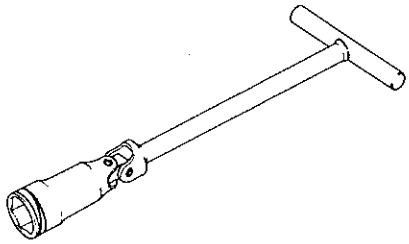
Hand Tester: 57001-983



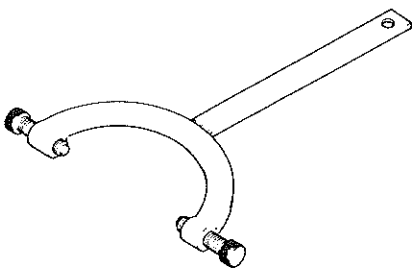
Electro Tester: 57001-980



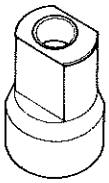
Spark Plug Wrench: 57001-110



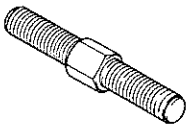
Flywheel Holder: 57001-308



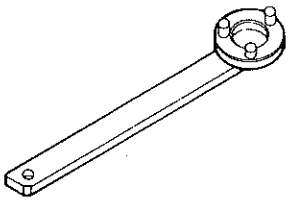
Flywheel Puller: 57001-1191



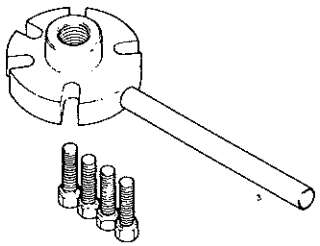
Rotor Puller: 57001-1099



Rotor Holder: 57001-1197



Magneto Puller: 57001-259

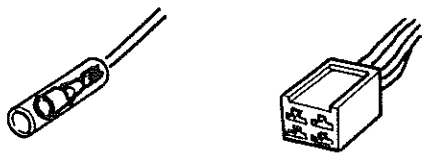


Precautions

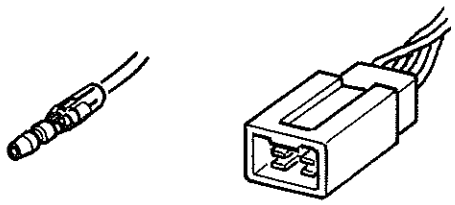
There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

- ○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 the engine is running.
- ○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 insect 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 an ohmmeter between the ends of the leads.
- ○Set the meter to the x 1 Ω range, and read the meter.
- ★If the meter does not read 0 Ω, the lead is defective. Replace the lead or the wiring harness if necessary.

Battery

Precautions:

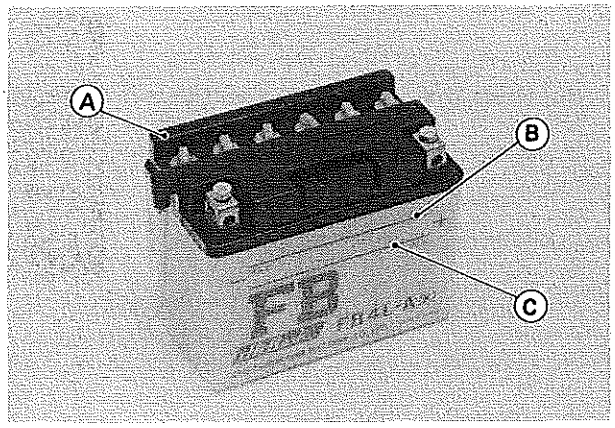
Following a few simple rules will greatly extend the life of the battery.

- ○When the level of the electrolyte in the battery is low, add only distilled water to each cell, until the level is at the upper level line marked on the outside of the battery. Ordinary tap water is not a substitute for distilled water and will shorten the life of the battery.

○Never add sulphuric acid solution to the battery. This will make the electrolyte solution too strong and will ruin the battery within a very short time.
○Avoid quick-charging the battery. A quick-charge will damage the battery plates.
○Never let a good battery stand for more than 30 days without giving it a supplemental charge, and never let a discharged battery stand without charging it. If a battery stands for any length of time, it slowly self-discharges. Once it is discharged, the plates sulphate (turn white), and the battery will no longer take a charge.
○Keep the battery well-charged during cold weather so that the electrolyte does not freeze and crack open the battery. The more discharged the battery becomes, the more easily it freezes.
○DON'T INSTALL THE BATTERY BACKWARDS. The negative side is grounded.

Electrolyte Level Inspection

●Remove the battery.
●Visually check the electrolyte level in the battery.



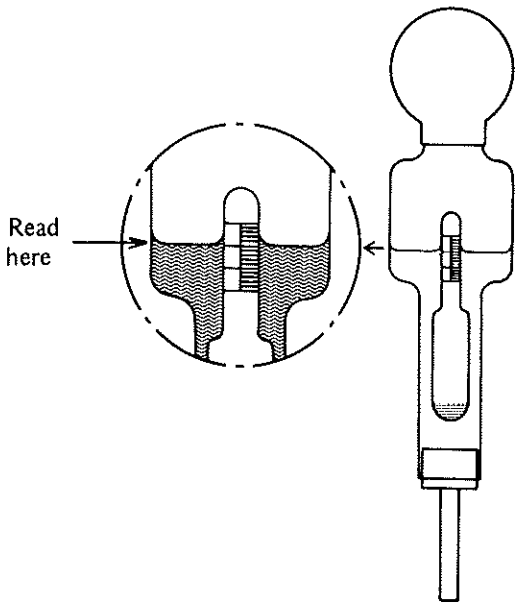
A. Battery
B. Upper Level
C. Lower Level

★If the level line of electrolyte in any cell is below the lower level line on the battery case, add distilled water only to that cell.
●Install the battery.

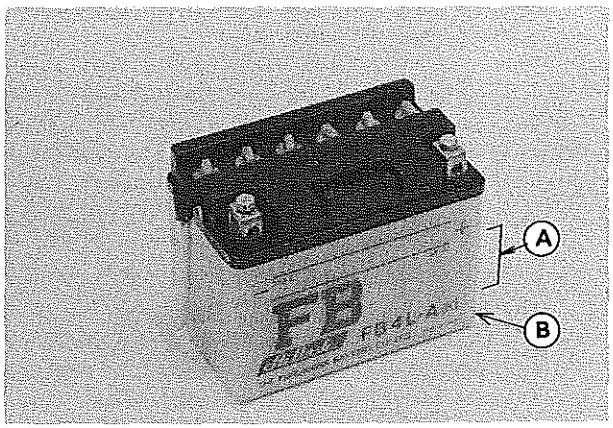
Battery Condition

●Before charging, check battery condition by testing the specific gravity of the electrolyte in each cell.
○Draw a little fluid from the cell with a hydrometer.
○Read the level of the electrolyte on the floating scale. This is the specific gravity of the electrolyte.

Hydrometer



●Look for sediment and white sulfation inside the cells on the bottom of the plates.



A. Sulfation here
B. Sediment here

●See the Battery Troubleshooting Guide in Battery Test Charging.
★If the specific gravity is below 1.280 the battery needs to be charged.

NOTE

○*The specific gravity of the electrolyte varies with changes in temperature, so the specific gravity reading must be corrected for the temperature of the electrolyte.*

○*Celsius: Add 0.007 points to reading for each 10°C above 20°C or subtract 0.007 points for each 10°C below 20°C.*
○*Fahrenheit: Add 0.004 points to reading for each 10°F above 68°F or subtract 0.004 points for each 10°F below 68°.*

★If the specific gravity of any of the cells is more than 0.050 away from any other reading, the battery will probably not accept a charge. It is generally best to replace a battery in this condition.
★If the specific gravity of all the cells is 1.280 or more the battery is fully charged.

Battery Initial Charging

Before being placed in service, a new battery should be given an initial charging.
●Cut off the sealed end of the battery vent hose and remove the filler caps.
●Fill each cell to the upper level line on the battery case with fresh electrolyte 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.*

●Leaving the caps off the cells, connect the battery to a charger, set the charging rate at 1/10 the battery capacity, and charge it for 10 hours. For example, if the battery is rated at 18 Ah, the charging rate would be 1.8 A.

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

○**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.**

●Turn the charger off, then disconnect it from the battery.
●Check battery voltage. Battery voltage should be 12 – 13 V.
●Check the specific gravity of each cell with a hydrometer (see Battery Condition).
★If the voltmeter or hydrometer readings are below those specified, additional charging is necessary before the battery can be installed.

Battery Ordinary Charging

●Remove the battery from the motorcycle.

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.**

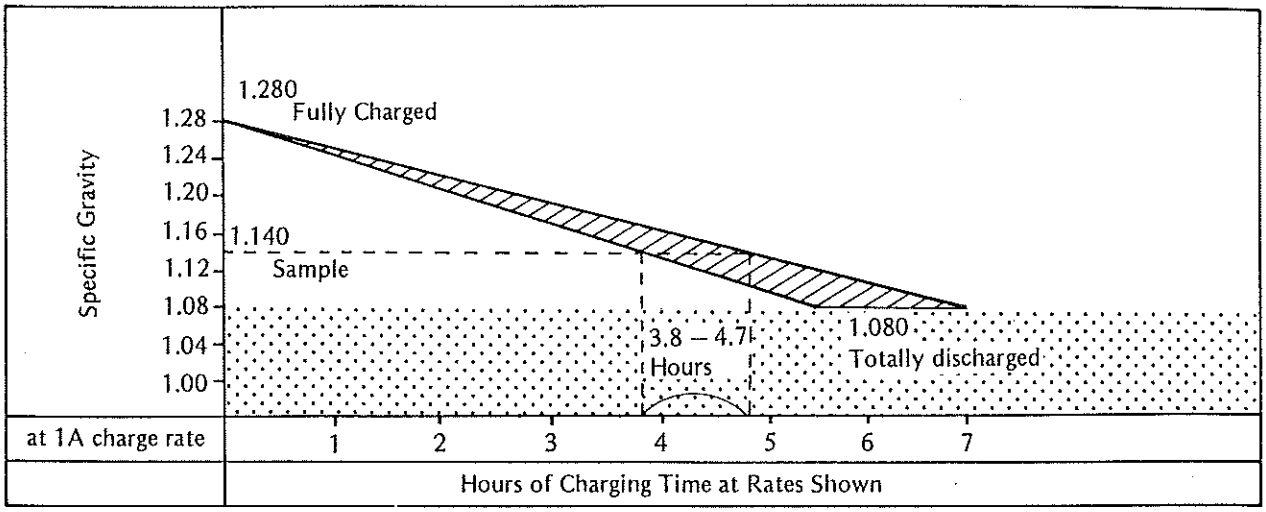
●Clean off the battery using a baking soda-and-water solution.
○Mix one heaping tablespoon of baking soda in one cup of water.
○Be careful not to get any of the cleaning solution in the battery.
○The terminals must be especially clean.
●If any of the cells are low, fill them to the LOWER level line with distilled water only. The electrolyte will expand during charging, and the level will rise.
●Connect a charger to the battery BEFORE plugging it in or turning it on.

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.**

●Set the charge rate and time according to the battery condition previously determined (see Battery Condition), using the table.

Battery Charging Rate/Time Table (12 V 4.5 Ah)



CAUTION

○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.

●Turn the charger off or unplug it, then disconnect it from the battery.

●Check battery condition (See Battery Condition).

★If the battery condition indicates that it is not fully charged, additional charging time is necessary.

Battery Test Charging

●If the battery is suspected of being defective, sulfated, or unable to take a charge, consult the table.

Battery Troubleshooting Guide

	Good Battery	Suspect Battery	Action
Plates	(+) chocolate color (–) gray	white (sulphated); + plates broken or corroded	Replace
Sediment	none, or small amount	sediment up to plates, causing short	Replace
Voltage	above 12 V	below 12 V	Test charge
Electrolyte Level	above plates	below top of plates	Fill and test charge
Specific Gravity	above 1.200 in all cells; no two cells more than 0.020 different	below 1.100, or difference of more than 0.020 between two cells	Test charge

●To test charge a battery, perform the ordinary charging procedure and monitor the battery voltage and other signs as mentioned below.

★If the battery voltage suddenly jumps to over 13 V just after the start of charging, the plates are probably sulfated. A good battery will rise to 12 V immediately and then gradually go up to 12.5 or 13 V in about 30 min. to an hour after the start of charging.

★If one cell produces no gas bubbles or has a very low specific gravity, it is probably shorted.

★If there does not appear to be enough sediment in a cell to short the plates, but that cell has a very low specific gravity after the battery is fully charged, the trouble may be that there is not enough acid in that one cell. In this case only, sulfuric acid solution may be added to correct the specific gravity.

★If a fully charged battery not in use loses its charge after 2 to 7 days; or if the specific gravity drops markedly, the battery is defective. The self-discharge rate of a good battery is only about 1% per day.

CAUTION

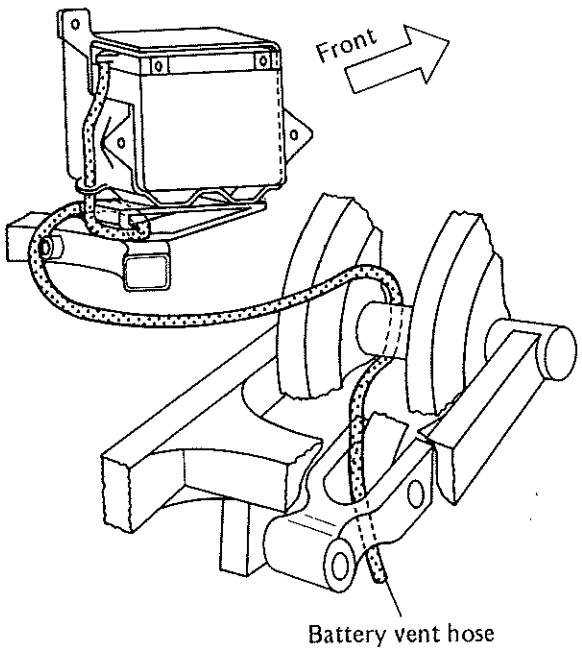
○Make sure the battery vent hose is kept away from the drive chain. Battery electrolyte can corrode and dangerously weaken the chain.

○Always keep the battery vent hose free of obstruction, and make sure it does not get pinched, crimped, or melted shut by contact with the hot muffler. If battery gases cannot escape through this hose, they can explode the battery.

Battery Vent Hose Routing

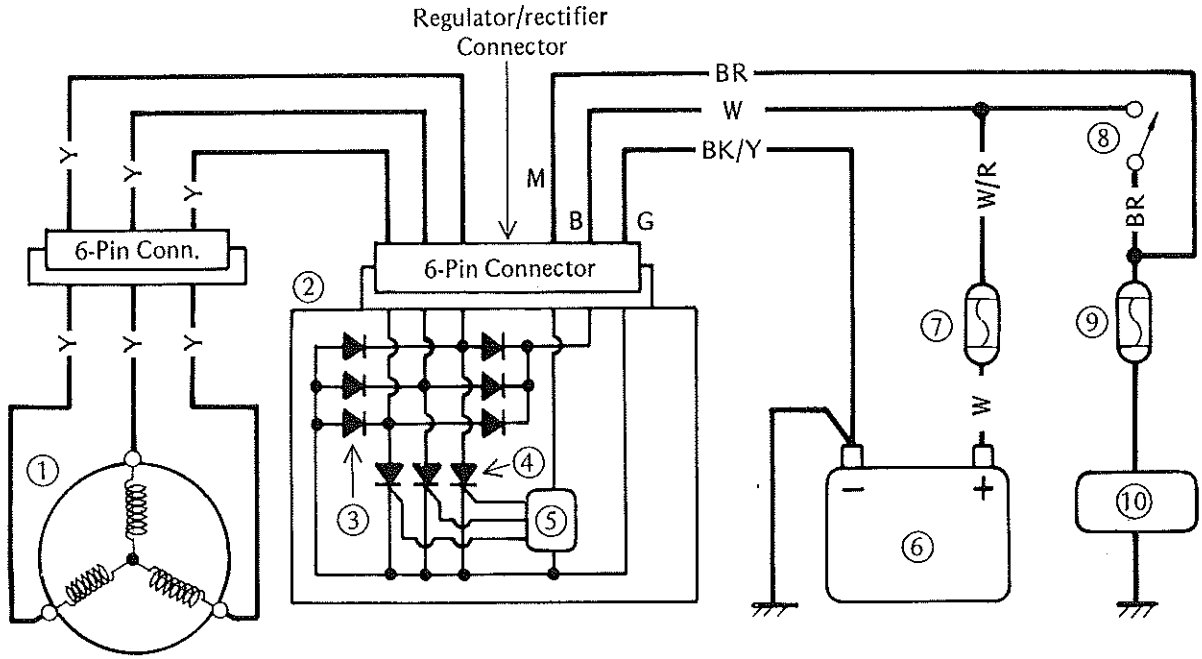
●Route the battery vent hose as shown.

Battery Vent Hose Routing



Charging System

Charging System Wiring Diagram



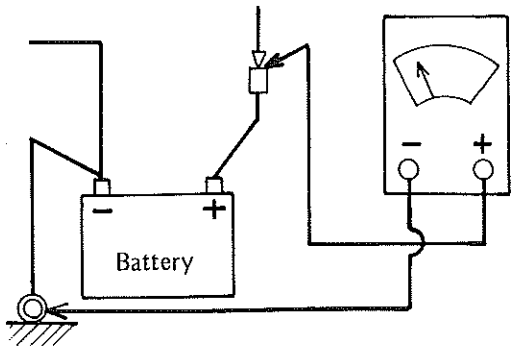
1. Magneto
2. Regulator/rectifier
3. Diodes
4. Thyristors
5. Control circuit
6. 12 V battery
7. 20 A fuse
8. Ignition switch
9. 10 A fuse
10. Loads:
    Headlight, Meter unit, Horn, Turn signal light, Brake light, Tail light

Regulator/Rectifier Output Voltage Measurement

●Warm up the engine to obtain actual alternator operating conditions.

●Stop the engine and connect a voltmeter to the battery leads as shown.

Regulator/Rectifier Output Voltage



●Start the engine, and note the voltage readings at various engine speeds with the headlight turned on and then turned off.

★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 stay within the specified range.

★If the output voltage is much higher than the specification, the regulator/rectifier is defective.

★If the output voltage does not rise as the engine speed increases, then the regulator/rectifier is defective or the alternator output is insufficient for the loads.

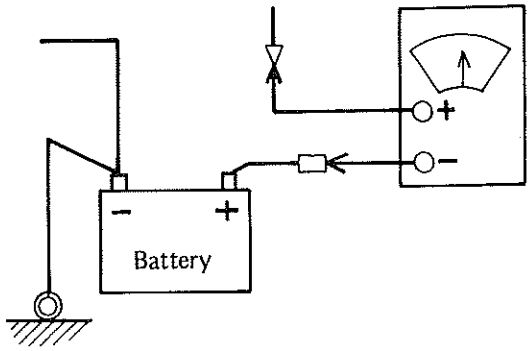
Regulator/Rectifier Output Voltage

Meter range:	**25 V DC**
Connection:	**Battery lead (connected)**
Meter (+) –	**W/R lead**
Meter (–) –	**BK/Y lead**
Reading:	**Battery voltage to 14 V**

Regulator/Rectifier Output Current Measurement

- Set the ammeter to the 20 A DC range.
- Disconnect the battery + lead.
- Connect the – meter lead to the battery + lead, and connect the + meter lead to the W/R lead. This puts the meter on series with the regulator/rectifier and battery so that the battery charging amperage can be measured.

Regulator/Rectifier Output Current



- Start the engine, and run it at 4,000 rpm.
- Measure the amperage when the headlight and dimmer switch are ON and High positions.

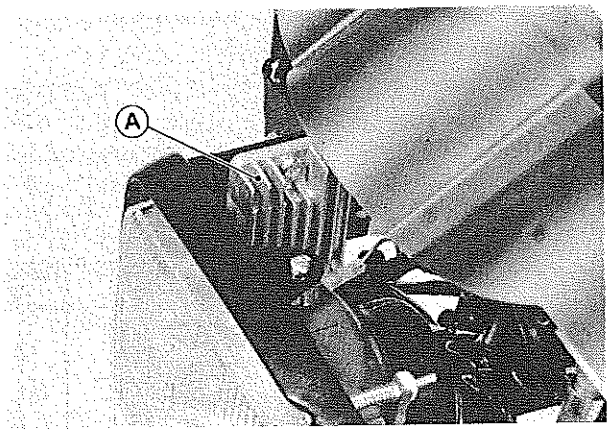
Regulator/Rectifier Output Current

Headlight:	**ON**
Dimmer switch:	**HI**
Meter Reading:	**11 A @4,000 rpm**

★If the output current is much higher than the specification, the regulator/rectifier is defective.
★If the above check shows a low reading, inspect the regulator/rectifier or the stator coil.

Stator Coil Resistance Measurement

- Disconnect the regulator/rectifier connector.



A. Regulator/Rectifier

- Zero the ohmmeter, and connect it to the leads from the alternator (magneto) stator.

★If the measurement is higher than the specification, the stator has an open lead, or there are poor wires or bad connections between the regulator/rectifier connector and the alternator stator. Replace the damaged parts.
★If the measurement is lower than the specification, the stator or the wires between the regulator/rectifier connector and the alternator stator is shorted, and must be replaced.

Stator Coil Resistance

Meter range:	**x 1 Ω**
Connection:	**Female regulator/rectifier connector (disconnected)**
One meter lead–	**One yellow lead**
Other meter lead–	**Another yellow lead**
Reading:	**0.3 – 1.0 Ω**

Stator Coil Insulation Test

- Disconnect the regulator/rectifier connector.
- Zero the ohmmeter, and connect it to the leads from the alternator stator.

★Any meter reading less than infinity (∞) indicates a short, necessitating stator replacement.

Stator Coil Insulation

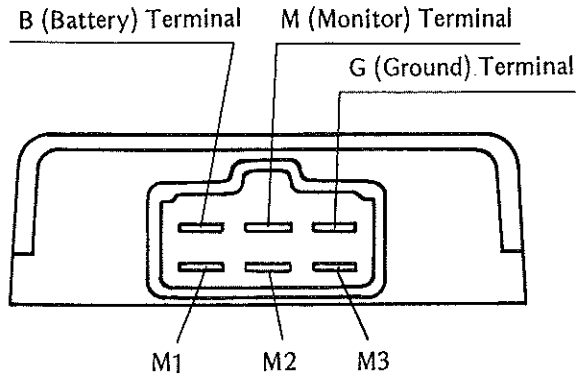
Meter range:	**x 1 kΩ**
Connection:	**Female regulator/rectifier connector (disconnected)**
One meter lead–	**One yellow alternator lead**
Other meter lead–	**Chassis ground**
Reading:	**No reading (∞ Ω)**

Regulator/Rectifier Inspection

- Remove the regulator/rectifier.
- Pull out the connector.
- Be sure to set the ohmmeter to the **100 Ω range** and zero the meter.
- Check the resistance between the regulator/rectifier terminals following the table.

★If there is more resistance than the specified value, the unit has an open lead and must be replaced. Much less than this resistance means the unit is shorted, and must be replaced.

Regulator/Rectifier Terminal



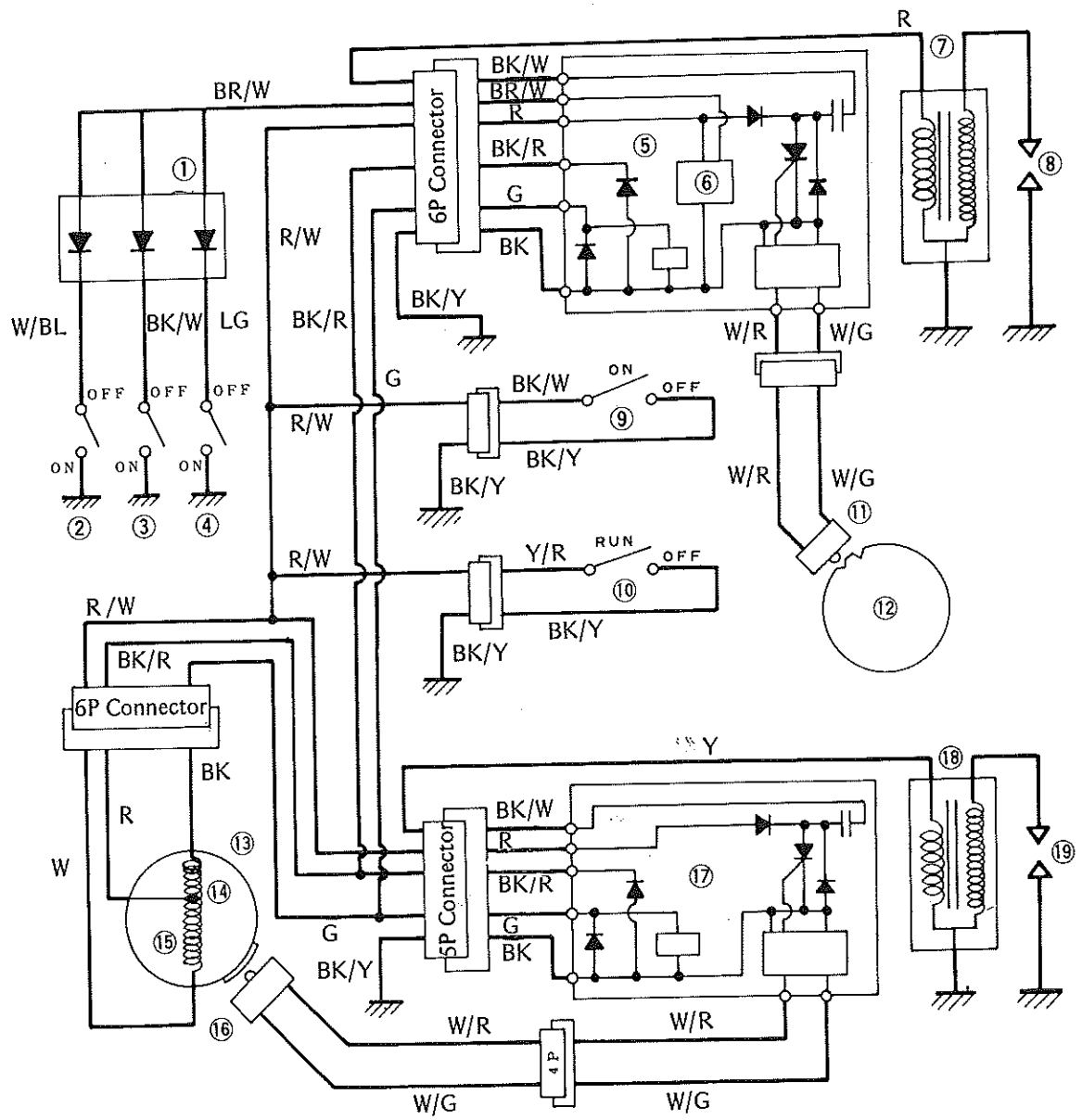
B (Battery) Terminal
M (Monitor) Terminal
G (Ground) Terminal
M1 (Magneto) Terminal
M2 (Magneto) Terminal
M3 (Magneto) Terminal

Regulator/Rectifier Resistance

Range x 100 Ω		Meter (+) Lead Connection			
Meter (−) Lead Connection	Terminal	G	M	B	M1, 2, 3
	G		0.2 – 0.8 kΩ	0.4 – 2 kΩ	0.2 – 0.6 kΩ
	M	0.3 – 1 kΩ		1 – 50 kΩ	0.5 – 3 kΩ
	B	∞	∞		∞
	M1, 2, 3	∞	∞	0.2 – 0.6 kΩ	

Ignition System

Ignition System Wiring Diagram



1. Diode
2. Sidestand switch
3. Clutch switch
4. Neutral switch
5. CDI unit (rear)
6. Interlock circuit
7. Ignition coil (rear)
8. Spark plug (rear)
9. Ignition switch
10. Engine stop switch
11. Pickup coil
12. Rotor (pulser)
13. Flywheel magneto
14. Exciter coil (low speed)
15. Exciter coil (high speed)
16. Pickup coil
17. CDI unit (front)
18. Ignition coil (front)
19. Spark plug (front)

CDI Unit: The CDI unit has two functions. The first function is to supply current to the primary winding of the ignition coil. The second function is to determine the ignition timing at which the charge stored in the capacitor is released in a single surge flowing through the primary winding of the ignition coil.

Pickup Coil: Every time either end of the timing plate on the flywheel passes under the pick-up coil, a pulse is generated and sent to the CDI unit.

Interlock Circuit (Safety Device): If the side stand is down, the clutch engaged, and the transmission in gear, the ignition system will not work. If any of these conditions is not met, the ignition system works and the engine can be started and run. The motorcycle cannot be ridden with the side stand down.

Safety Instructions

WARNING

○**The ignition system produces extremely high voltage. Do not touch the spark plugs, high tension coils, or spark plug leads while the engine is running, or you could receive a severe electrical shock.**

Ignition System Inspection Note

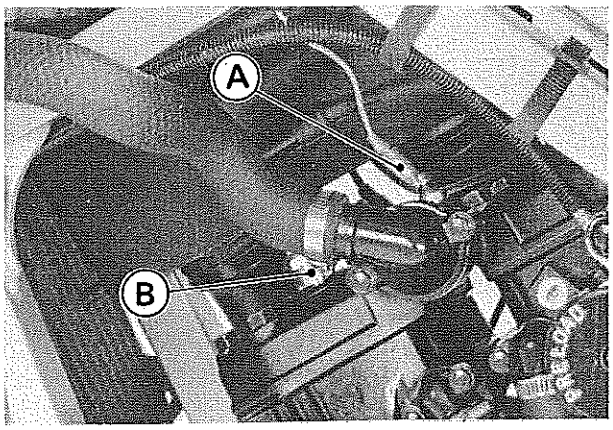
○For any ignition system problems, always check the ignition system wiring first (see Wiring Inspection).

Spark Plug Removal

●Pull out the water temperature sensor lead.
●Carefully pull the spark plug cap from the spark plug and unscrew the spark plug.
○The spark plug wrench (57001-110) may be used after removal of the air cleaner housing.

CAUTION

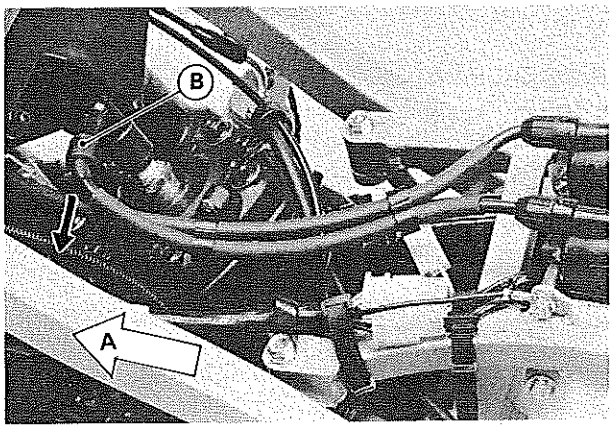
○**Be careful not to damage the water temperature sensor with the wrench during the spark plug removal.**



A. Water Temperature Sensor Lead
B. Spark Plug

Spark Plug Installation

●Tighten the spark plugs to the specified torque (see Exploded View).
●Install the rear spark plug cap across and run toward left to prevent interference with the fuel tank.



A. Front B. Rear Spark Plug

Spark Plug Cleaning and Inspection

●Remove the spark plugs.
●Clean the spark plug, preferably in a sandblasting device, and then clean off any abrasive particles. The plug may also be cleaned using a high flash-point solvent and a wire brush or other suitable tool.
★If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard spark plug or its equivalent.

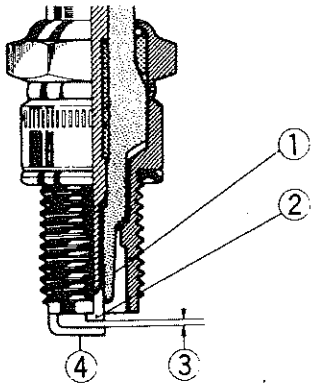
Spark Plug Gap

●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

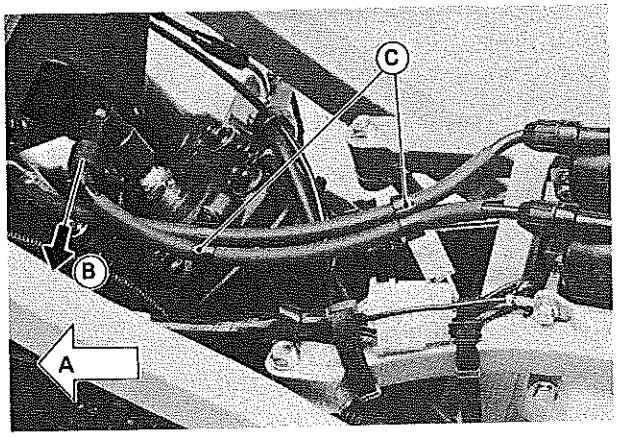
Spark Plug Gap



1. Insulator
2. Center Electrode
3. Plug Gap
4. Side Electrode

Ignition Coil Installation

●Secure the spark plug leads with clamps to prevent interference with the rear muffler and the fuel tank.
●Run the rear spark plug lead on the left side.



A. Front
B. Rear Spark Plug
C. Clamps

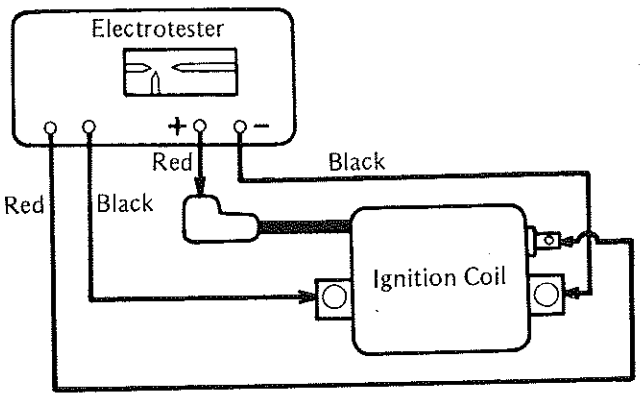
Ignition Coil Arcing Distance Measurement

○Measure the arcing distance with a Kawasaki Electro Tester (special tool) to check the condition of the ignition coil.
●Remove the ignition coil.
●Connect the ignition coil (with the spark plug cap left installed at each of the spark plug lead) to the tester, and measure the arcing distance.

WARNING

○To avoid extremely high voltage shocks, do not touch the coil or leads.

Ignition Coil Test



★If the distance reading is less than the specified value, the ignition coil or spark plug cap is defective.

Ignition Coil Arcing Distance

6 mm or more

●To determine which part is defective, measure the arcing distance again with the spark plug cap 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 cap.

Ignition Coil Resistance Measurement

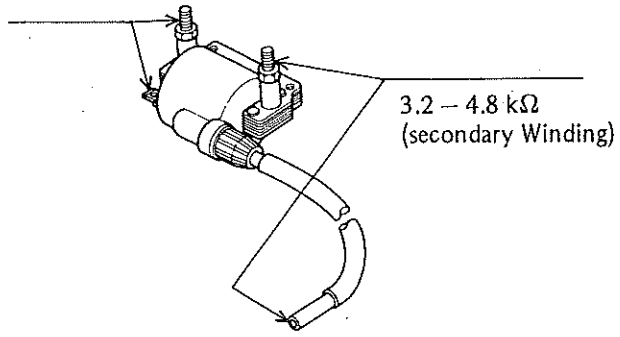
If the arcing tester is not available, the coil can be checked for a broken or badly shorted winding with an ohmmeter. However, an ohmmeter cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.
●Disconnect the primary leads from the coil terminals.
●Measure the primary winding resistance.
○Connect an ohmmeter between the coil terminals.
○Set the tester to the x 1 Ω range, and read the meter.
●Measure the secondary winding resistance.
○Pull the spark plug cap off each lead.
○Connect the hand tester between the spark plug leads.
○Set the meter to the x 1 kΩ range, and read the meter.
★If the meter does not read as specified, replace the coil.

Ignition Coil Winding Resistance

Primary windings:	**0.17 – 0.25 Ω**
Secondary windings:	**3.2 – 4.8 kΩ**

Measuring Ignition Coil Resistance

0.17 – 0.25 Ω
(Primary Winding)



★If the meter reads as specified, the ignition coil windings are probably good. However, if the ignition system still does not perform as it should after all other components have been checked, test replace the coil with one known to be good.

●Check the spark plug leads for visible damage.

★If any spark plug lead is damaged, replace the coil.

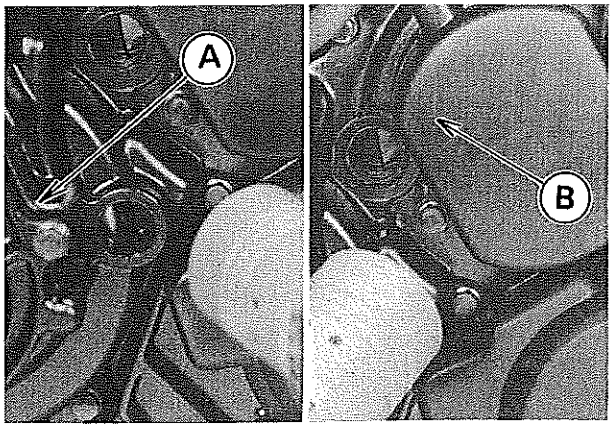
Ignition Timing Inspection (Dynamic)

This model has a Capacitor Discharge Ignition (CDI) system. Since the CDI system has no mechanical parts such as a cam or contact breakers, **no periodic maintenance is required.**

●Remove the two caps on the left engine cover.

●Connect a strobe light in the manner prescribed by the manufacturer in order to check the ignition timing under operating conditions.

○Use the front spark plug lead for the magneto timing inspection and the rear spark plug lead for the rotor (pulser) timing inspection.

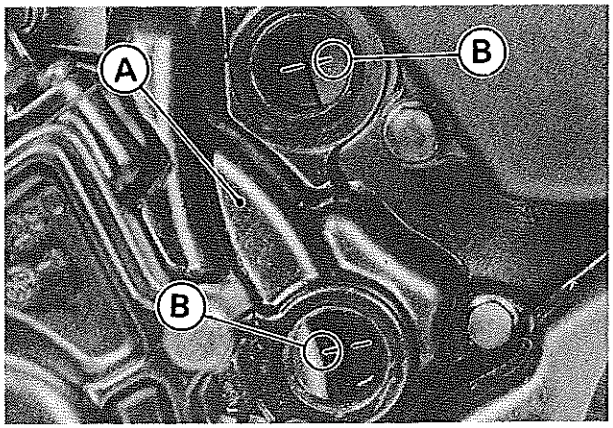


A. Magneto B. Rotor (pulser)

●Start the engine, run the engine at 1,300 rpm, and direct the light at the timing marks on the flywheel or rotor and left engine cover. The marks should align at 1,300 rpm.

Ignition Timing

13.5° BTDC @1,300 r/min (rpm)

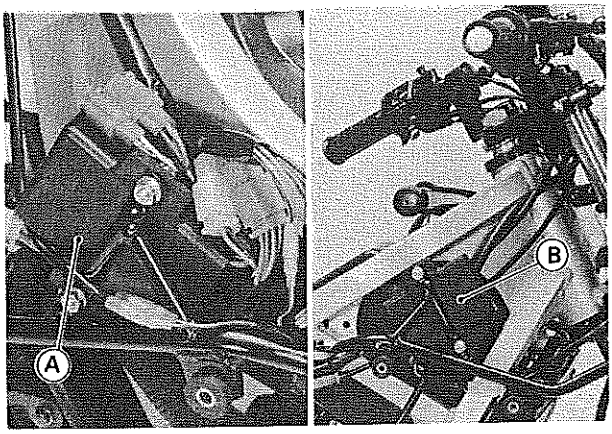


A. Left Engine Cover B. F Mark

★If the ignition timing is suspect, check the CDI unit and the pickup coil (see CDI Unit Inspection, Pickup Coil Inspection).

CDI Unit Installation

●Install the CDI unit equipped with the red connectors on the left side and the CDI unit equipped with the white connectors on the right side of the fairing stay, respectively.



A. Left CDI Unit (Red Connector)
B. Right CDI Unit (White Connector)

WARNING

○Do not exchange the left CDI unit for the right CDI unit. This would make the interlock circuit of no effect.

CDI Unit Inspection

●Pull out the large and small connectors for the right and left CDI units.
●Set the ohmmeter to the x 1 kΩ range, and connect it to the leads from the CDI unit to check the internal resistance of the CDI unit.
★If the readings do not correspond to the table, replace the CDI unit.

CAUTION

○Use only Hand Tester 57001-983 for this test. A tester other than the Kawasaki Hand Tester may show different readings.
○If a megger or a meter with a large-capacity battery is used, the CDI unit will be damaged.

Left CDI Unit Internal Resistance: equipped with red connectors **Unit. kΩ**

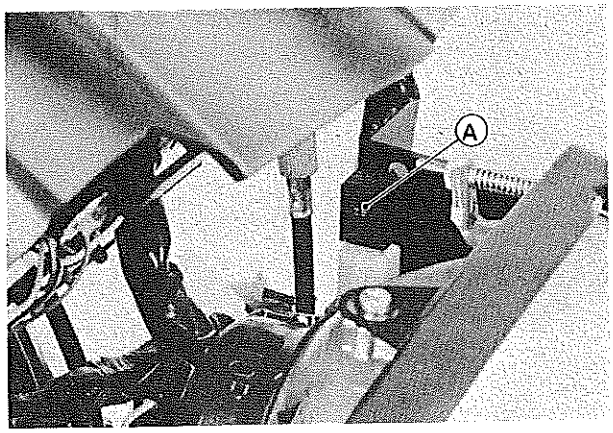
Range x 1 kΩ		Meter (+) Lead Connection							
		R	BK/R	G	W/R	W/G	BK/W	BK	BR/W
Meter (−) Lead Connection	R		250 – 1,000	65 – 280	30 – 120	30 – 120	∞	30 – 120	11 – 44
	BK/R	∞		∞	∞	∞	∞	∞	∞
	G	∞	250 – 1,000		8 – 54	8 – 52	∞	7 – 52	∞
	W/R	∞	7 – 30	2 – 10		0.1 – 0.6	∞	0.1 – 0.6	∞
	W/G	∞	6 – 30	2 – 9	0.1 – 0.6		∞	0	∞
	BK/W	∞	∞	∞	∞	∞		∞	∞
	BK	∞	6 – 30	2 – 9	0.1 – 0.6	0	∞		∞
	BR/W	11 – 44	200 – 800	30 – 120	8 – 40	8 – 40	∞	8 – 40	

Right CDI Unit Internal Resistance: equipped with white connectors **Unit: kΩ**

Range x 1 kΩ		Meter (+) Lead Connection						
		R	BK/R	G	W/R	W/G	BK/W	BK
Meter (–) Lead Connection	R		∞	∞	∞	∞	∞	∞
	BK/R	∞		∞	∞	∞	∞	∞
	G	∞	250 – 1,000		8 – 54	8 – 52	∞	7 – 52
	W/R	∞	7 – 30	2 – 10		0.1 – 0.6	∞	0.1 – 0.6
	W/G	∞	6 – 30	2 – 9	0.1 – 0.6		∞	0
	BK/W	∞	∞	∞	∞	∞		∞
	BK	∞	6 – 30	2 – 9	0.1 – 0.6	0	∞	

Diode Inspection

●Disconnect the diode assembly from the left side of the headlight.



A. Diode

●Zero the ohmmeter, and connect it to each pair of terminals: 1-2, 3-4, 5-6.

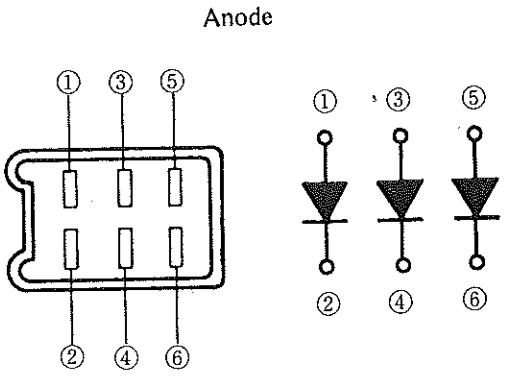
●Check the resistance in both directions between the terminals.

★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 diode assembly must be replaced.

NOTE

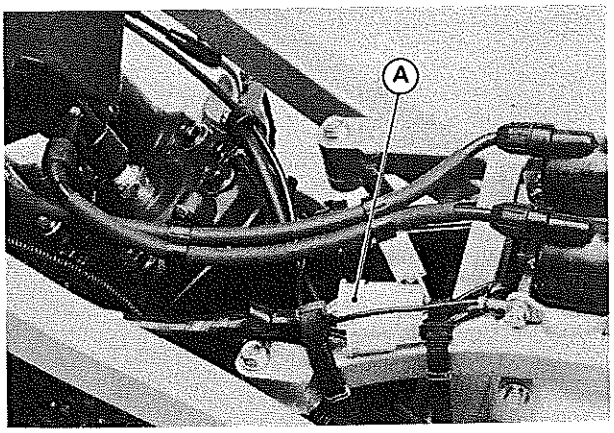
○*The actual meter reading varies with the meter used and the individual diode, but, generally speaking, the lower reading should be from zero to the first ⅓ of the scale.*

Diode Polarity



Exciter Coil Resistance Measurement

●Pull out the magneto connector under the fuel tank.



A. Magneto (Alternator) Connector

●Zero the ohmmeter, and connect it to the leads from the exciter coil to check the resistance.

★If the reading is not the specified value, replace the stator.

Exciter Coil Resistance

W – Meter – R : 1 – 3 Ω
BK – Meter – R : 90 – 170 Ω

●Using the highest resistance range of the ohmmeter, check the resistance between the exciter coil leads and chassis ground.

★Any meter reading less than infinity indicates a short, necessitating replacement of the stator.

Left Engine Cover Removal

●Drain the coolant by removing the plug at the bottom of the water pump cover (see Cooling System chapter).

●Remove the water pump cover (see Cooling System chapter).

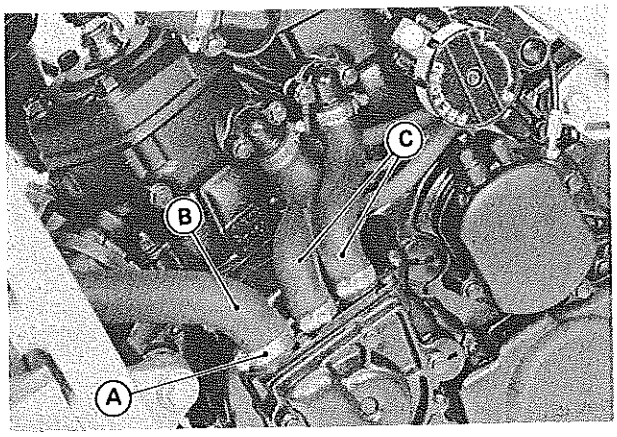
●Remove the fuel tank (see Fuel system chapter).

●Pull out the magneto connector and the pickup coil connectors.

●Remove the oil pump (see Engine Lubrication System chapter).

●Pull out the radiator hose by loosening the clamp.

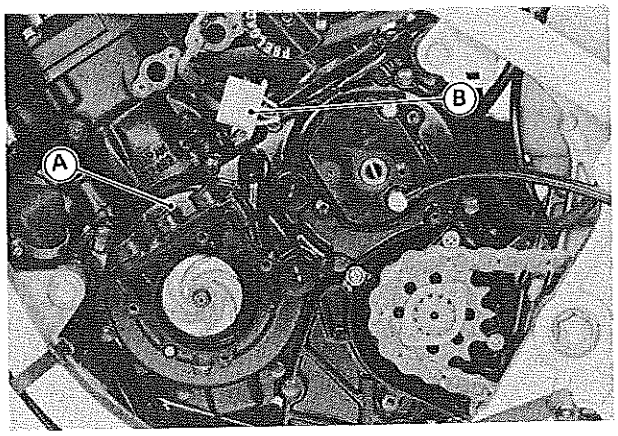
●Separate the water hoses from the cylinders by removing the fittings.



A. Clamp
B. Radiator Hose
C. Hoses

●Remove the chain cover (see Final Drive chapter).

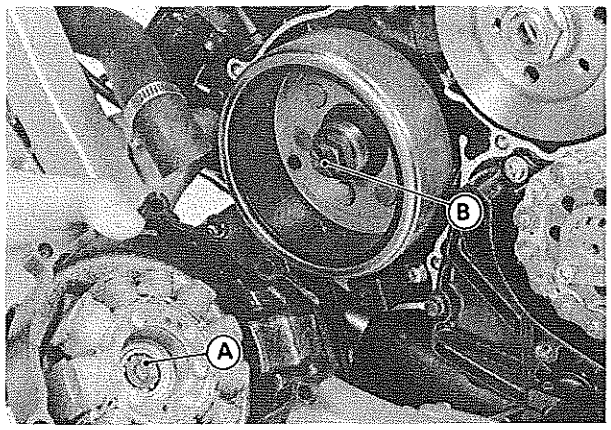
●Remove the left engine cover by taking off the mounting bolts.



A. Left Engine Cover
B. Magneto Connectors

Left Engine Cover Installation Notes

●When installing the left engine cover, note the position of the magneto bolt slot and turn the water pump shaft so that the projection fits into the slot.



A. Water Pump Shaft Projection
B. Magneto Bolt Slot

•Install the Oil Pump (see Engine Lubrication System).

CAUTION

○**Do not attempt to install the left engine cover with oil pump installed, or the pump may be broken.**

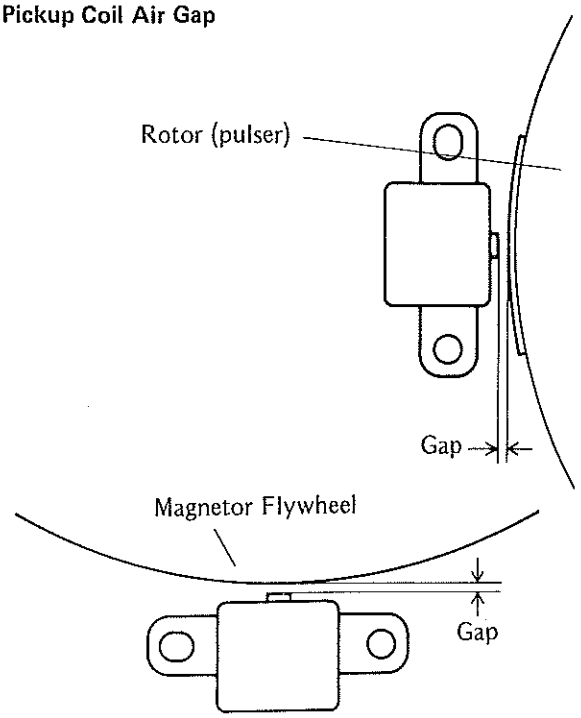
Pickup Coil Installation Note

•Adjust the gap between the pickup coil core and the magneto (or the rotor) at installation.

Pickup Coil Air Gap

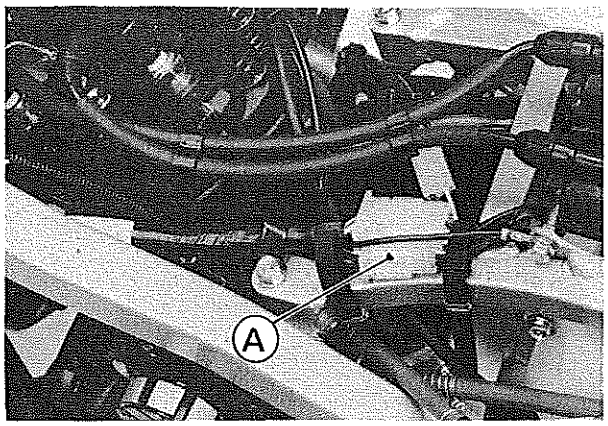
0.4 – 0.8 mm

Pickup Coil Air Gap



Pickup Coil Inspection

•Pull out the pickup coil connector under the fuel tank.



A. Pickup Coil Connector

•Zero the ohmmeter, and connect it to pickup coil leads.

★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

Connection:	**Male Connector**
	BK/Y – Meter – BK, or
	W/R – Meter – WG
Reading:	**121 – 151 Ω**

•Using the highest resistance range of the ohmmeter, measure the resistance between the pickup coil leads and chassis ground.

★Any meter reading less than infinity (∞) indicates a short, necessitating replacement of the pickup coil assembly.

•Remove the left engine cover.

•Check the pickup coil air gaps.

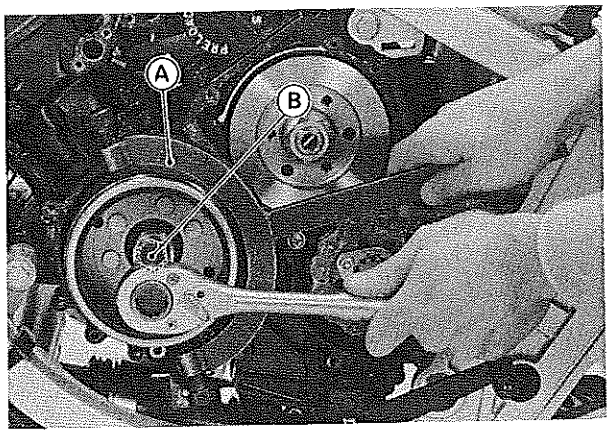
★If both air gaps are not equal, reposition the pickup coils.

Pickup Coil Air Gap

0.4 – 0.8 mm

Flywheel Magneto Removal

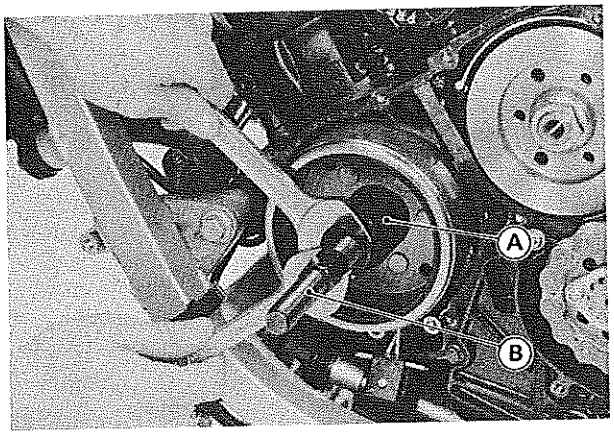
- Remove the left engine cover.
- When loosening the magneto flywheel bolt, use the flywheel holder (special tool) to keep the flywheel from turning as shown.



A. Flywheel Holder: 57001-308
B. Flywheel Bolt

- Remove the magneto flywheel as shown.

○ If the flywheel is difficult to remove and a hammer is used, turn the puller shaft with a wrench on it while tapping the head of the shaft with a hammer.



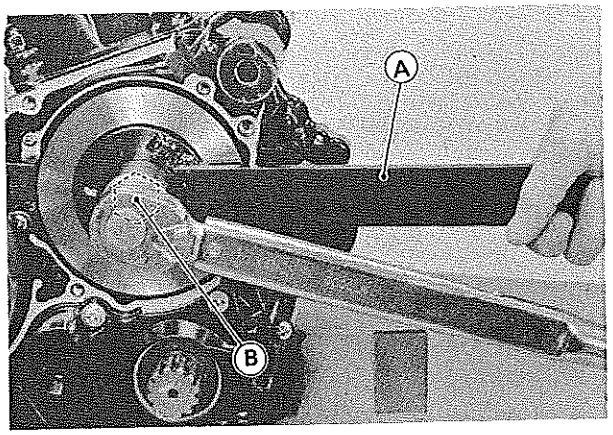
A. Magneto Flywheel Puller: 57001-1191
B. Rotor Puller: 57001-1099

CAUTION

○ **Be careful not to strike the flywheel itself. Striking the flywheel can cause the magneto to lose their magnetism.**

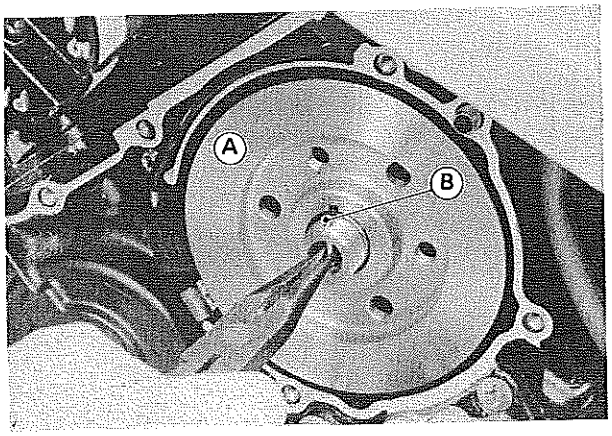
Rotor (pulser) Removal

- When loosening the rotor nut, use the rotor holder (special tool) to keep the rotor from turning as shown.



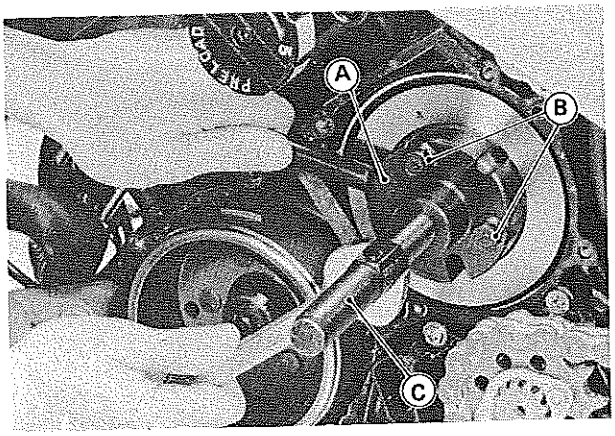
A. Rotor Holder: 57001-1197
B. Rotor Nut

- Take off the pin joint.



A. Rotor (pulser) B. Pin Joint

- Install the magneto puller (special tool) using the suitable bolts (ϕ8 mm x L35 mm).
- Remove the rotor with the same rotor puller (special tool) used during the flywheel removal.



A. Magneto Puller: 57001-259
B. Suitable Bolts
C. Rotor Puller: 57001-1099

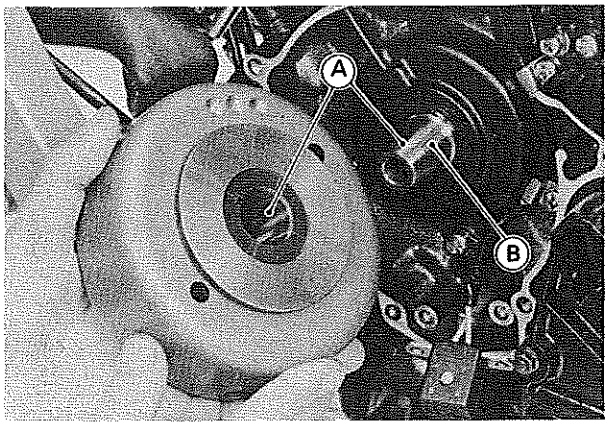
Flywheel Magneto/Rotor Installation Notes

•Clean off any oil or dirt that may be on the crankshaft tapers, magneto flywheel hub, or rotor hub.

CAUTION

○**Oil, dirt, or incorrect tightening may cause flywheel bolt or rotor nut loosening, and serious damage.**

•See that each key is fitted in place on the crankshaft properly, and then fit the flywheel or the rotor in place.



A. Tapered Shaft B. Key

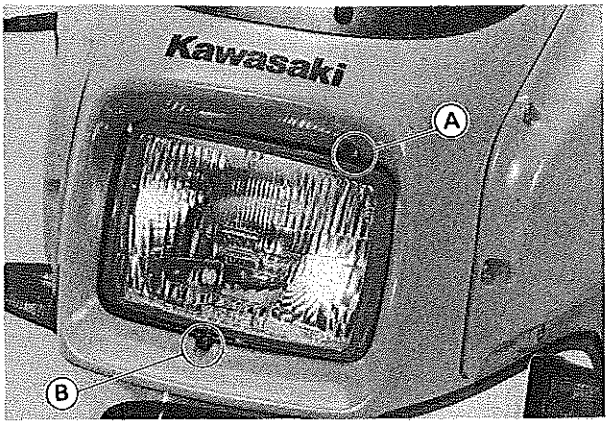
•Tighten the flywheel bolt or the rotor nut to the specified torque with the same holders (special tool) used during removal.

Lighting System

Headlight Beam Horizontal Adjustment:

The headlight beam is adjustable both horizontally and vertically. Headlight aiming must be correctly adjusted for your safe riding as well as oncoming drivers. In most areas it is illegal to ride with improperly adjusted headlights.

•Turn the adjusting screw on the headlight rim in or out until the beam points straight ahead. Turning the adjusting screw clockwise makes the headlight beam point to the right.



A. Adjusting Screw for horizontal adjustment
B. Adjusting Screw for vertical adjustment

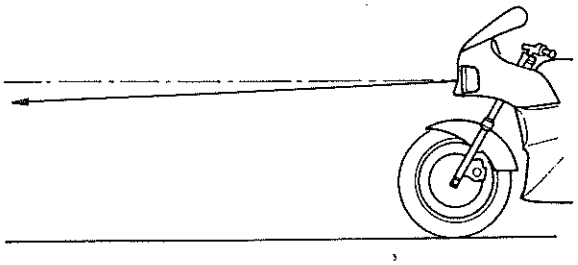
Headlight Beam Vertical Adjustment

•Turn the lower adjusting screw to adjust the light vertically. Turning the screw clockwise makes the light beam point upward.

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.*

Vertical Adjustment



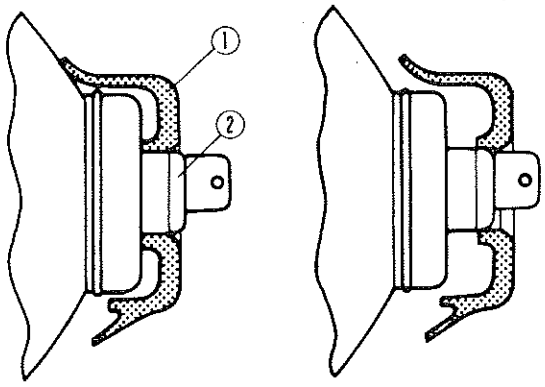
Headlight Bulb Replacement Notes

CAUTION

○**When handling the quartz-halogen bulbs, 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.**

●Fit the dust cover onto the bulb firmly as shown in the figure.

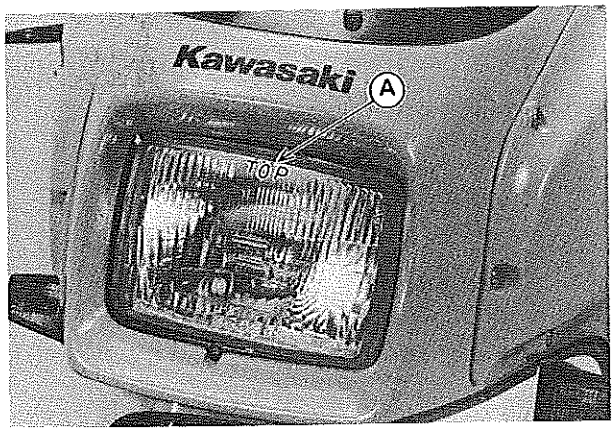
Dust Cover Installation



Good Bad

1. Dust cover
2. Headlight Bulb

●Install the headlight unit so that the "TOP" mark is on top.

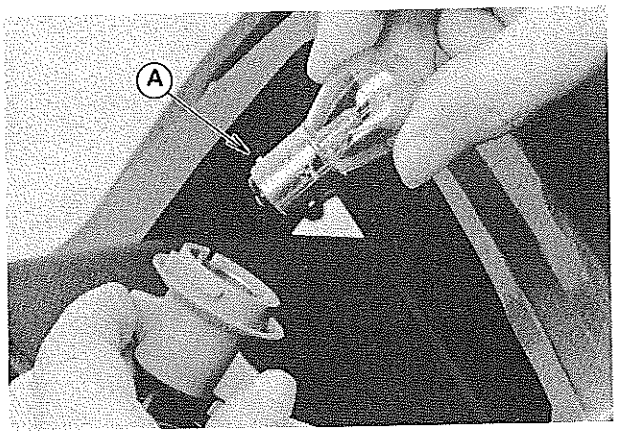


A. Top Mark

●Check the headlight aiming after installation.

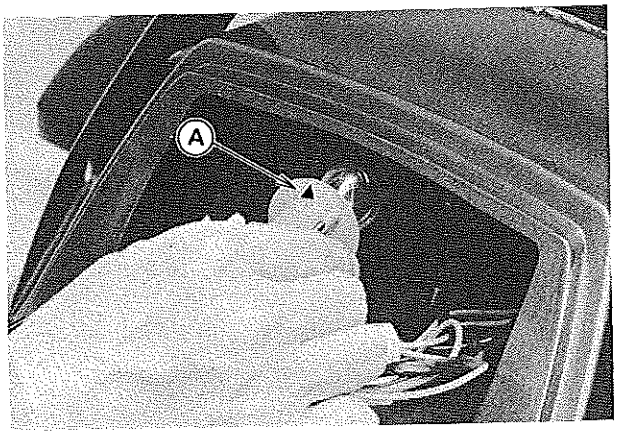
Tail/Brake Light bulb Replacement Notes

●Insert the new bulb by aligning the pins with the grooves in the walls of the socket so that the pin closest to the bulb base is to the upper right.



A. Pin Closest to Base.

●Insert the socket by aligning the tangs with the catches in the housing so that the triangular mark points up, and turn it clockwise.



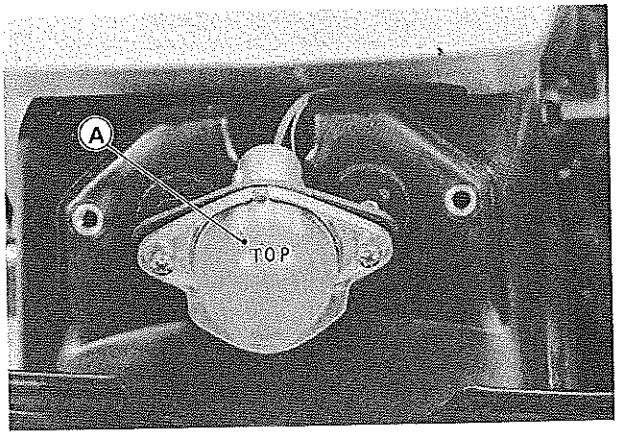
A. Triangular Mark

Tail/Brake Light Lens Removal/Installation Note

●Be careful not to overtighten the lens mounting screws.

License Plate Light Bulb Replacement Notes

●Install the bulb socket and lens so that the "TOP" mark on the lens points up.



A. "TOP" Mark

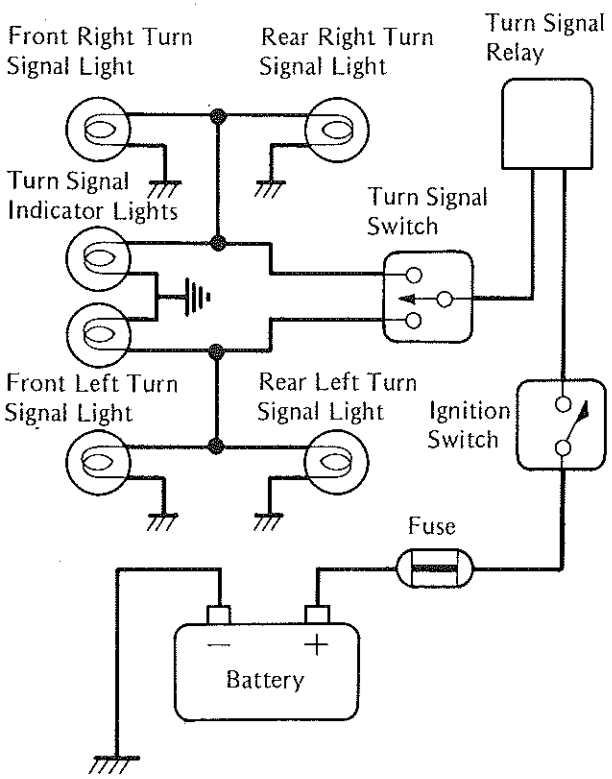
●Be careful not to overtighten the lens and socket mounting screws.

Inspection:

○For any lighting system problems, always check the lighting system wiring and the bulbs first *(see Wiring Inspection)*.

Turn Signal System

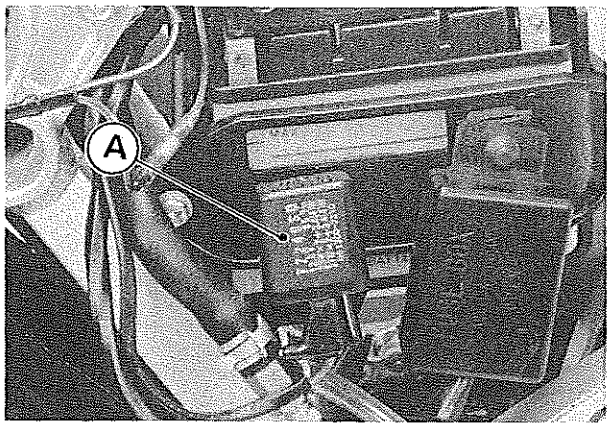
Turn Signal Circuit



Turn Signal Light Bulb Replacement Note

●Be careful not to overtighten the lens mounting screws.

Turn Signal Inspection



A. Turn Signal Relay

(1) Neither right nor left turn signals come on at all:
- ●Check that battery voltage is normal.
- ●Remove the right side cover.
- ●Unplug the relay leads and use an ohmmeter to check that there is continuity (close to zero ohms) between the relay terminals.
- ★If there is no ohmmeter reading, or if there is several ohms resistance, replace the relay with a new one.
- ●Turn the meter to the 25 V DC range, connect the (+) meter lead to the brown lead that was disconnected from the relay, and connect the (—) meter lead to the orange lead.
- ●With the ignition switch on, first switch the turn signal switch to the R and then to the L position. The meter should register battery voltage at either position.
- ★If it does not, the fuse, ignition switch, or wiring is at fault.

(2) Both right or both left turn signals come on and stay on or flash too slowly:
- ●Check that battery voltage is normal.
- ●Check that all wiring connections are good.
- ●Check that the turn signal bulbs and indicator bulbs are of the correct wattage.
- ★If all of the above check good, replace the relay.

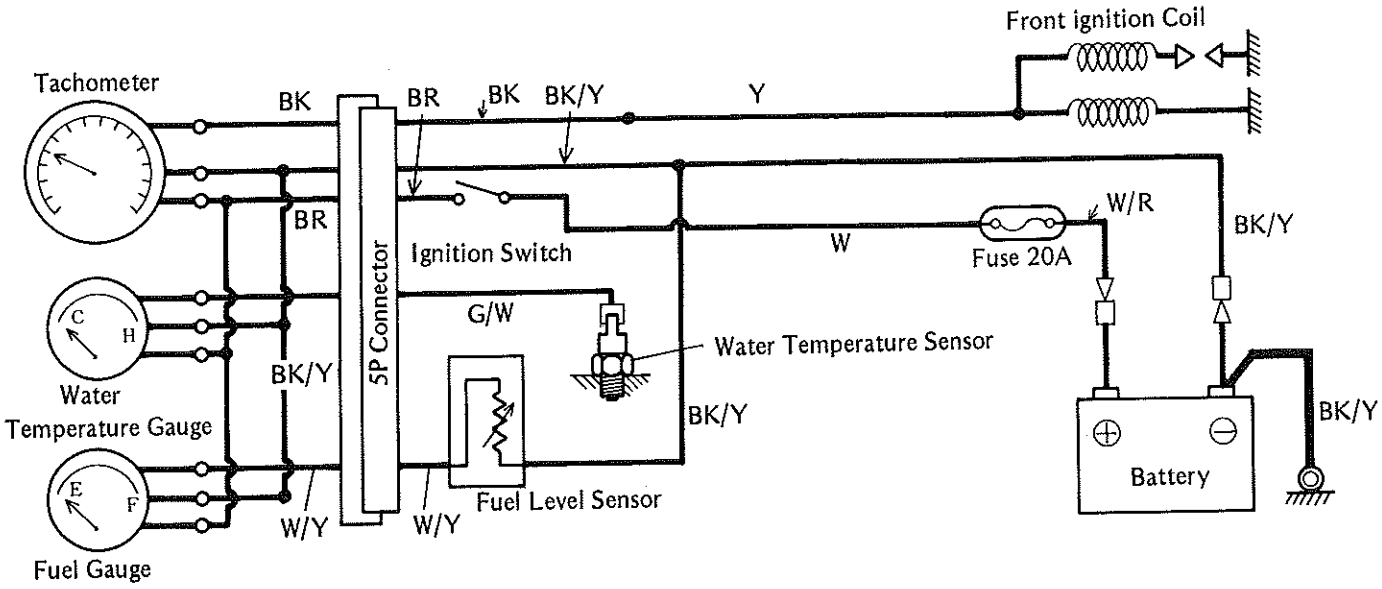
(3) A single light on one side comes on and stays on:
- ★Either the light that does not come on is burned out or of the incorrect wattage, or the wiring is broken or improperly connected.

(4) Neither light on one side comes on:
- ★Unless both lights for that side are burned out, the trouble is with the turn signal switch.

(5) Flashing rate is too fast:
- ★If this occurs on both the right and left sides, check that the battery is not being overcharged.
- ★If the magneto and the battery voltage are normal, replace the turn signal relay.
- ★If this occurs on only one side, one or both of the turn signal bulbs are of too high a wattage.

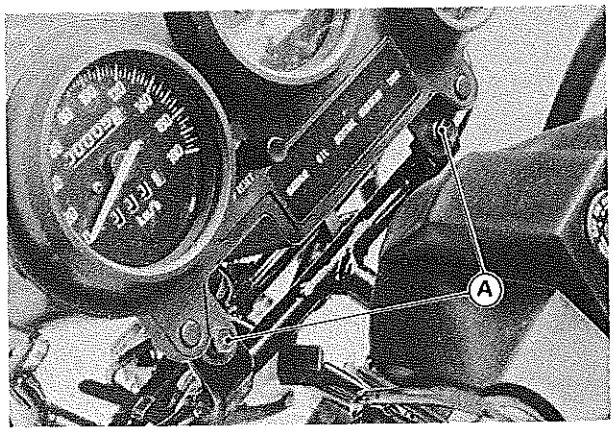
Meters and Gauges

Tachometer, Water Temperature Gauge and Fuel Gauge Circuit Diagram



Meter Panel Removal

- Remove the upper fairing (see Fairing Removal in Frame).
- Remove the speedometer cable from the meter unit.
- Pull out the meter connectors.
- Remove the meter unit by taking off the mounting bolts.



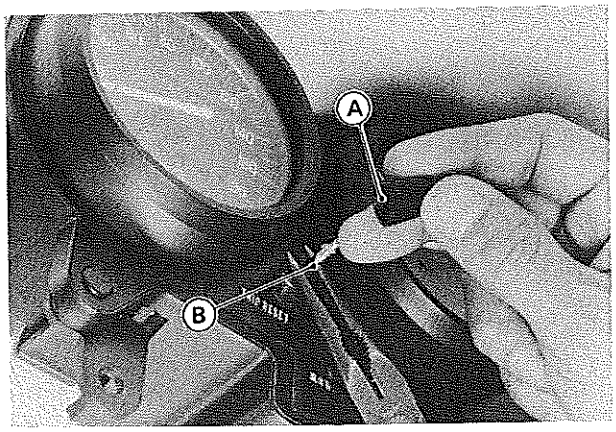
A. Mounting Bolts

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.

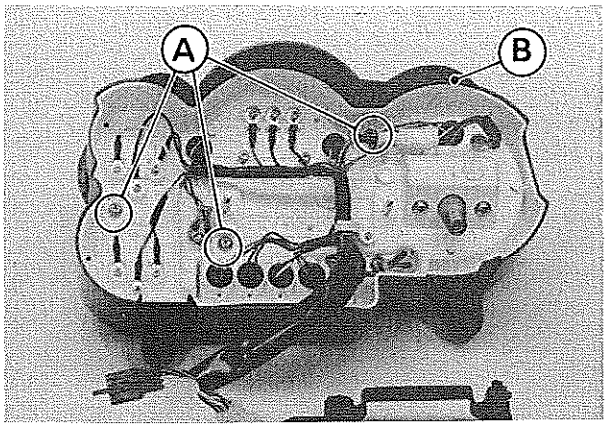
Meter Panel Disassmbly

- Remove the mounting bracket.
- Remove the reset knob while holding the shaft with needle nose pliers.



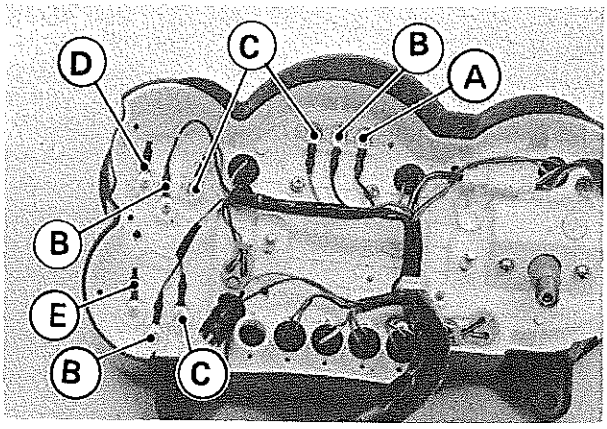
A. Knob B. Shaft

- Remove the cover by taking off the screws (3).



A. Screws B. Cover

•Separate each meter unit by removing the mounting screws.



A. BK Lead
B. BK/Y Leads
C. BR Leads
D. Y Lead
E. W/Y Lead

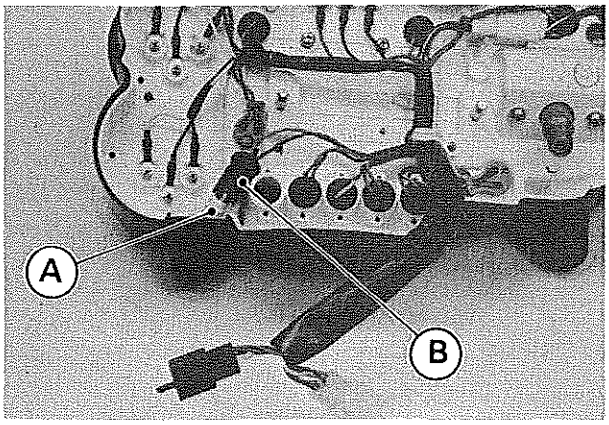
Bulb Replacement Notes

•To remove the wedge-base type bulbs (indicator and illumination), pull out the bulb sockets and pull the bulbs off the sockets.

○These bulbs are identical.

CAUTION

○**Do not use bulbs rated for greater wattage than the specified value, as the meter or gauge panel could become warped by excessive heat radiated from the bulbs.**



A. Bulb B. Socket

Meter Panel Assembly Note

•Install each lead on the original position as shown.

Tachometer Inspection

NOTE

○*The tachometer inspection is explained on the assumption that the ignition system operates normally.*

•Check to see that the rubber dampers are installed at the meter mounting bracket.

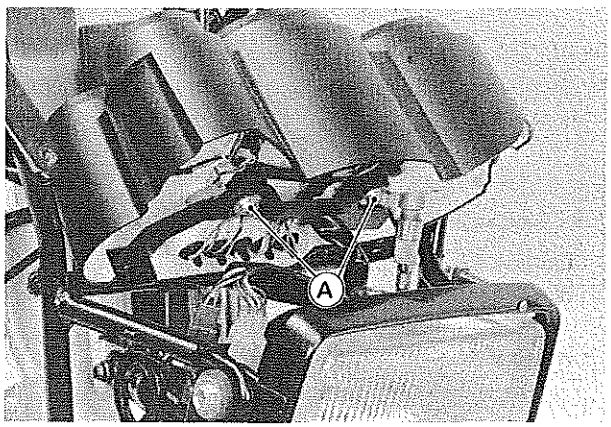
★Install a new damper where it is absent.

•Check to see that the rubber dampers at the meter mounting bracket are in good condition. They should not be hard or cracked.

★Replace any damaged rubber dampers with new ones.

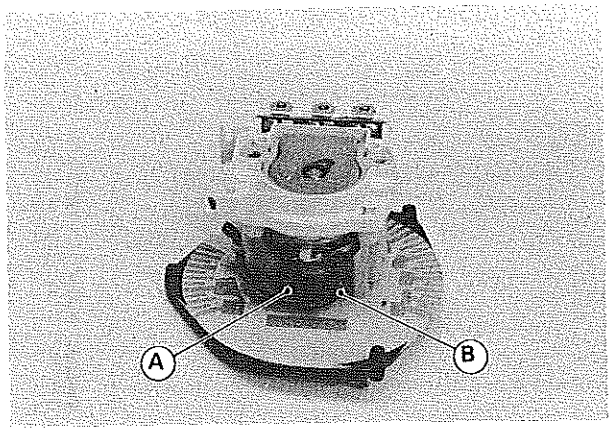
•Check to see that all meter mounting bolts and nuts are tightened securely.

★Tighten the loose fasteners.



A. Dampers and Nuts

●Check the tachometer circuit wiring (see Wiring Inspection).
★If all wiring and components other than the tachometer unit check out good, the unit is suspect.
●Take off the tachometer unit.
●Check the resistance between the leads shown in the figure.

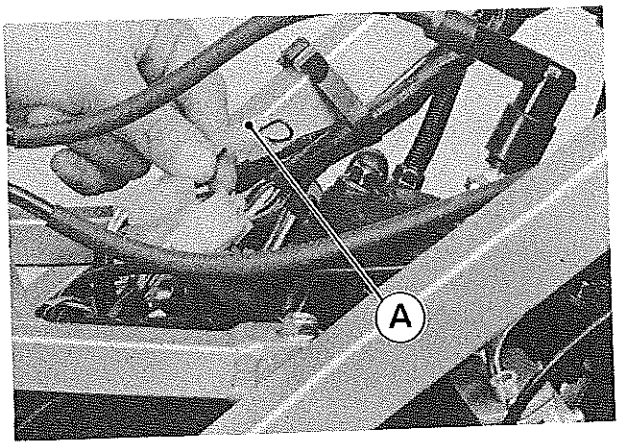


A. R lead B. BK lead

★If the resistance is found to be out of the specified range, replace the tachometer unit.

Tachometer Resistance

BK – Meter – R : 60 – 90 Ω



A. 2-pin Connector
Open or short-circuit the leads.

CAUTION

○**Do not short-circuit the leads longer than necessary. When the needle swings to the "F" position, stop short-circuiting otherwise a good meter could be damaged.**

★If the gauge readings are correct, the fuel level sensor is bad. If these readings are not obtained, the trouble is with the gauge and/or wiring.
●Check the fuel gauge circuit wiring (see Wiring Inspection).
★If all wiring and components other than the fuel gauge unit check out good, the unit is defective.

Fuel Gauge Operation Inspection

●Prepare an auxiliary wire, and check the operation of the gauge.

Fuel Gauge Operation Check

Ignition Switch Position:	**ON**
Wire Location:	**Female 2-pin sensor connector (disconnected)**
Results:	**Gauge should read E when connector wires are opened.** **Gauge should read F when connector wires are shorted.**

Water Temperature Gauge Operation Inspection

●Prepare an auxiliary wire, and check the operation of the gauge.

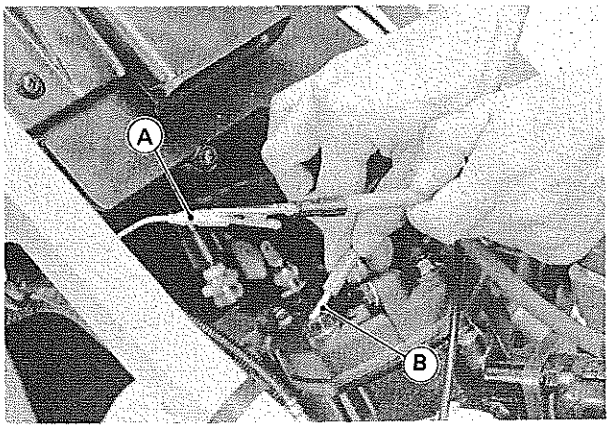
Gauge Operation Test

Ignition Switch Position:	**ON**
Wire Location:	**Female, Sensor Connector (disconnected)**
Results:	**Gauge should read C when connector wire is opened.** **Gauge should read H when connector wire is grounded to engine.**

CAUTION

○Do not ground the wiring longer than necessary. After the needle swings to the H position, stop the test. Otherwise the gauge could be damaged.

★If the gauge readings are correct, the water temperature sensor is bad. If these readings are not obtained, the trouble is with the gauge and/or wiring.
●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 unit is defective.

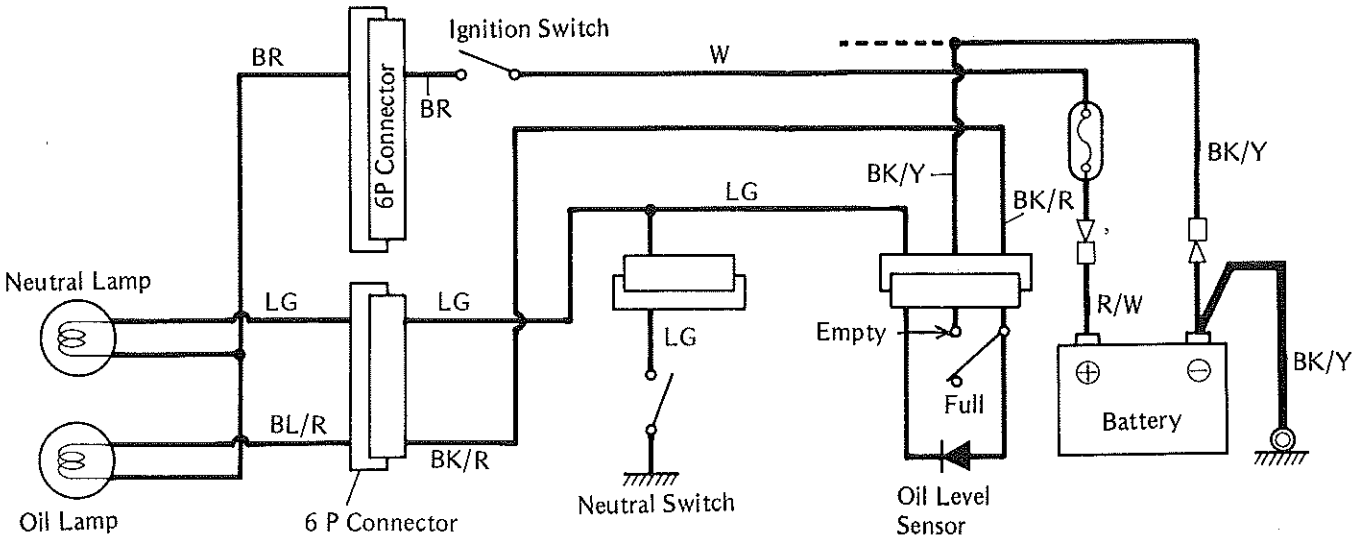


A. Sensor Connector
B. Open or ground the lead to check the circuit.

Engine Oil Level Warning System Troubleshooting

Engine Oil Level Warning Circuit

When the engine oil level is too low, the warning light goes on until oil is added. But if the transmission is in neutral position, the light stays on regardless of oil amount. This is to show whether the warning light bulb has burned out.

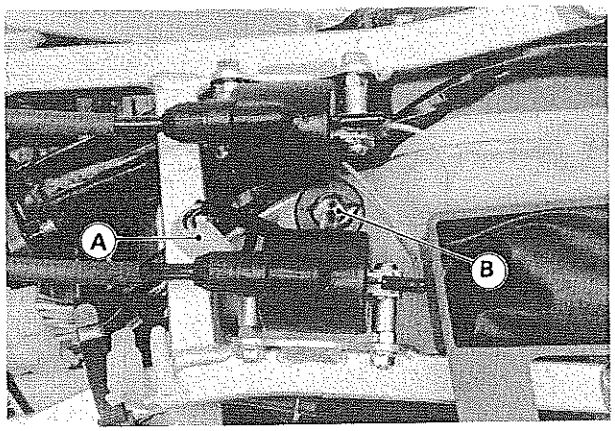


(1) The warning light does not come on with the ignition switch ON and the transmission in Neutral position.
- ●Check the warning light bulb for burning out.
- ●Check the battery condition.
- ●Check the neutral idicator circuit wiring.
- ★If these components check out good, pull out the oil level sensor 3-pin connector to check the wiring.

Warning System Wiring Check

Ignition Switch Position:	**ON**
Connection:	**3 pin connector male, short together BK/R and BK/Y leads**
Results:	**Oil warning light should light**

★If the above check shows normal, inspect the oil level sensor.



A. 3-Pin Connector B. Oil Level Sensor

(2) Oil level is low enough but the warning light does not come on.
- ●Pull out the oil level sensor 3-pin connector to check the power supply or the wiring as follows.

Power Supply Check

Ignition Switch Position:	**ON**
Meter Range:	**25 V DC**
Connection:	**3-pin connector male,**
Meter (+) — BK/R	
Meter (—) — Chassis ground	
Result:	**Battery voltage**

Wiring Check

Ignition Switch Position:	**OFF**
Meter Range:	**x 1 Ω**
Connection:	**3-pin connector male, BK/Y — Meter— Chassis ground**
Result:	**0 Ω**

★If the above check shows normal, inspect the oil level sensor.

(3) Fuel level or oil level is not low but the warning light stays on continuously.
- ●Check the oil level sensor.

(4) Warning light goes on and off irregularly.
- ●Check that oil 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 the problem persists, recheck the wiring and check if the sensor lead is shorting intermittently.

(5) Oil light goes on in accordance with neutral light.
- ●Check the diode in the oil level sensor.
- ●If the meter reads low or light in both directions, the diode is defective and the sensor must be replaced.

Oil Level Sensor Diode Check

Meter Range:	**x 1 Ω**
Connection:	**Oil level sensor LG — Meter — BK/R**
Result:	**Low in one direction more than ten times as much in the other direction.**

NOTE

○*The actual meter reading varies with the meter used and the individual rectifier, but, generally speaking, the lower reading should be within 1/3 scale of zero ohms.*

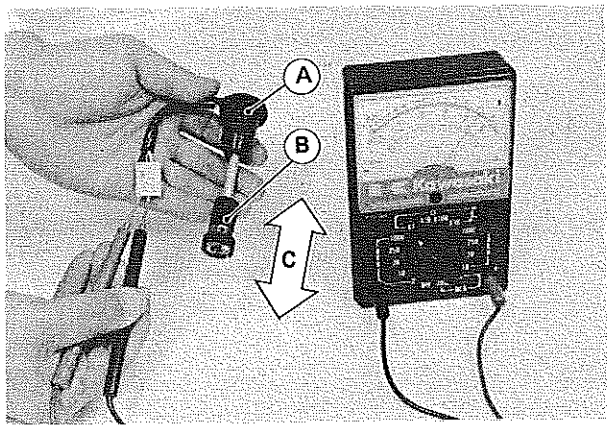
Oil Level Sensor Check

- Remove the engine oil level sensor from the oil tank.
- Check that the float moves up and down smoothly without binding. It should go down under its own weight.

★If the float does not move smoothly or if the sensor has visual damage, replace the sensor.

- Set an ohmmeter to the x 1 Ω range, and connect the ohmmeter leads to the BK/R and BK/Y leads to check the switching operation of the float.
- The ohmmeter should show continuity when the float is at the bottom.

★If it does not, replace the sensor.



A. Oil Level Sensor C. Up and Down Smoothly
B. Float

Switches and Sensors

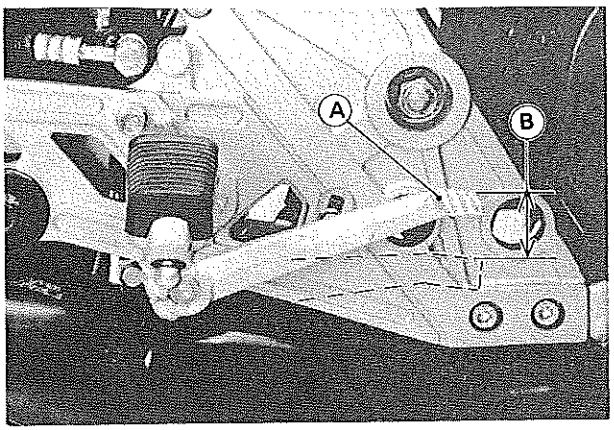
Rear Brake Light Switch Inspection

NOTE

○*The rear brake light switch is not required adjustment in periodically. But, whenever the brake pedal position is changed, the rear brake light switch must be checked and adjusted.*

- Turn on the ignition switch.
- Check the operation of the rear brake light switch by depressing the brake pedal. The brake light should go on after about **5 – 6 mm** of pedal travel.

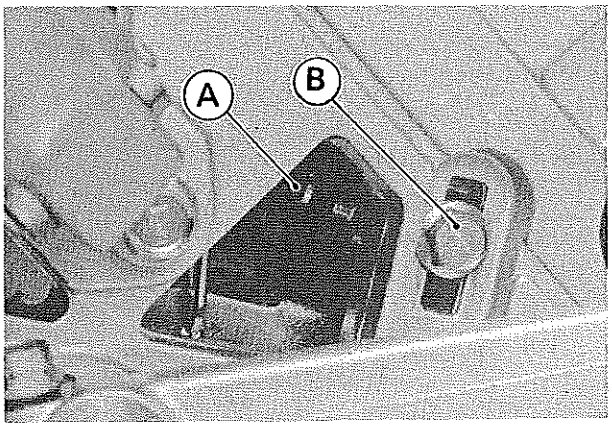
★If it does not, adjust the brake light switch.



A. Rear Brake Pedal B. 5 to 6 mm

Rear Brake Light Switch Adjustment

- Loosen the switch mounting bolt.



A. Rear Brake Light Switch B. Switch Mounting Bolt

- Raise or lower the switch position to adjust the gap between the switch body and the brake pedal lever.
- After tightening the mounting bolt, check to see if the switch has the specified gap.

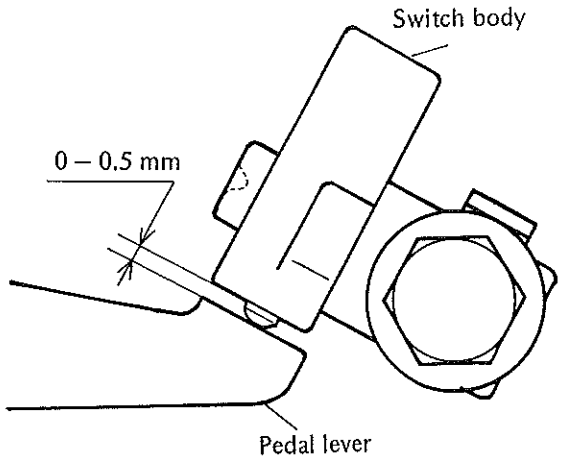
Brake Light Switch Adjustment

Switch Gap: 0 – 0.5 mm
(for reference, ON after about 5 – 6 mm pedal travel)

CAUTION

○**Too low brake switch positioning depresses the brake pedal and could cause the brake dragging.**

Rear Brake Switch Adjustment



Switch Inspection

- Using an ohmmeter, check to see that only the connectings shown in the table have continuity (about zero ohms).

★If the switch has an open or short, repair it or replace it with new one.

Ignition Switch Connections

	BK/W	BK/Y	W	BR	R/W	R
LOCK	○	○				
OFF	○	○				
ON			○		○	
PARK	○		○		○	

Dimmer Switch Connections

	R/BK	BL/Y	R/Y
HI	○	○	
LO		○	○

Turn Signal Switch Connections

	GY	O	G
R	○	○	
N			
L		○	○

Passing Button Connections

	BR	R/BK
Free		
Push on	○	○

Horn Button Connections

	BK/W	BK/Y
Free		
Push on	○	○

Engine Stop Switch Connections

	R	Y/R
OFF	○	○
RUN		

Headlight Switch Connections

	R/W	R/BL	BL	BL/Y
OFF				
■	○	○		
ON	○	○	○	○

Front Brake Light Switch Connections

	BR	BL/R
When brake lever is pulled in	○	○

Rear Brake Light Switch Connections

	BR	BL
When brake pedal is pushed down	○	○

Side Stand Switch Connections

	BR	BK/Y	G/W
When side stand is up	○	○	
When side stand is down		○	○

Neutral Switch Connections

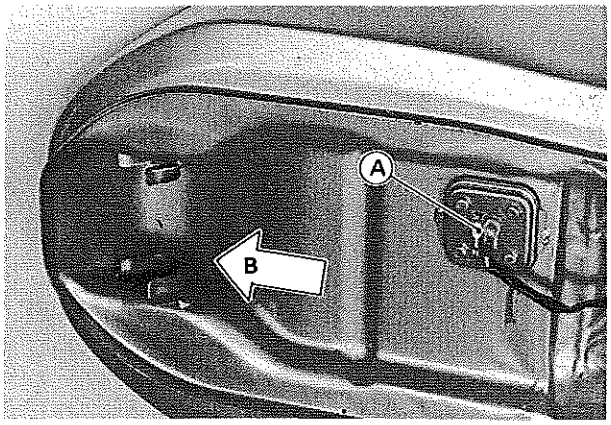
	LG	⏚
When transmission is in neutral	○	○
When transmission is not in neutral		

Clutch Switch Connections

	BK/W	BK
When clutch lever is pulled in	○	○
When clutch lever is released		

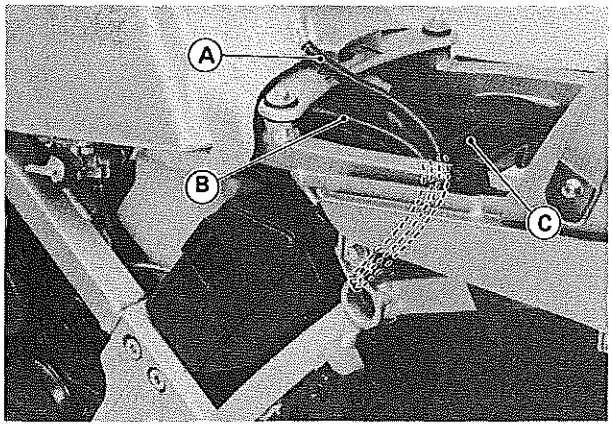
Fuel Level Sensor Installation

●Install the sensor being careful of the installation position of the sensor lead terminal.



A. Terminal B. Front

●Run the level sensor breather tube under the tool case bottom along with the fuel tank breather tube.



A. Breather Tube for fuel tank
B. Breather Tube for level sensor
C. Tool Case

CAUTION

○Keep the tubes free of obstruction, and make sure they do not touch the rear muffler.

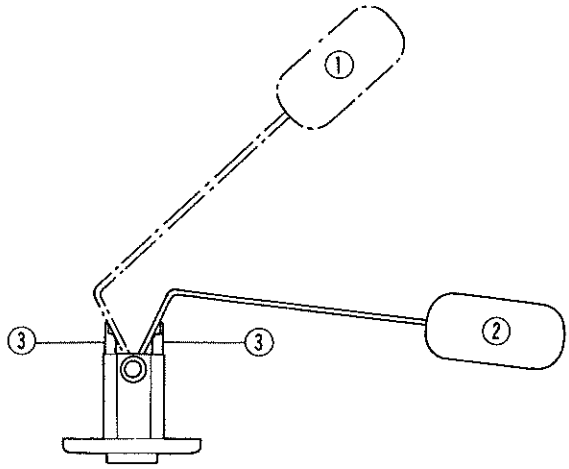
Fuel Level Sensor Inspection

●Remove the fuel level sensor.

●Check that the float moves up and down smoothly without binding. It should go down under its own weight.

★If the float does not move smoothly, replace the sensor.

Fuel Level Sensor



1. Float in full position
2. Float in empty position
3. Float arm stop

●Measure the resistance of the fuel level sensor with an ohmmeter.

★If the ohmmeter does not show the specified values, or the readings do not change smoothly as the float moves up and down, replace the sensor.

Fuel Level Sensor Resistance

Full Position: 10 – 16 Ω
Empty Position: 90 – 100 Ω

●Inspect the leads and 2-pin connector.

★If they show any signs of damage, replace the sensor.

Water Temperature Sensor Inspection

●Remove the water temperature sensor.

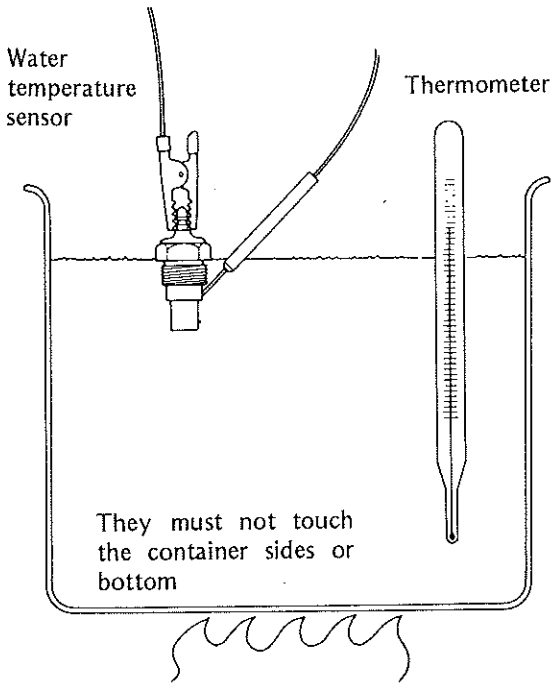
●Suspend the sensor in a container of water so that the temperature sensing projection and threaded portion are submerged. The sensor must not touch the container sides or bottom.

- Suspend an accurate thermometer in the water. It must not touch the container, either.
- Place the container over a source of heat and gradually raise the temperature of the water while stirring the water gently.
- Using an ohmmeter, measure the internal resistance of the sensor across the terminal and the body at the temperatures shown in the table.
- If the ohmmeter does not show the specified values, replace the sensor.

Internal Resistance of Water Temperature Sensor

80°C (176°F): 100 – 150 Ω
100°C (212°F): 52 – 78 Ω

Water Temperature Sensor Inspection



Appendix

Table of Contents

Additional Considerations for Racing 16-2
Carburetor 16-2
Spark Plug 16-2
Spark Plug Inspection 16-3
Troubleshooting Guide 16-4
General Lubrication 16-8
Lubrication 16-8
Nut, Bolt, and Fastener Tightness 16-8
Tightness Inspection 16-8
Standard Torque Table 16-9
Unit Conversion Table 16-10

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 points.

- 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 competitive 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.

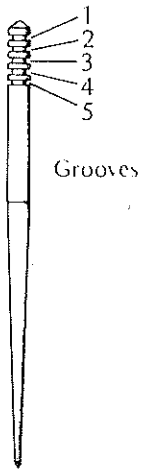
Carburetors:

Sometimes an alteration may be desirable for improved performance under special conditions when proper mixture is not obtained after the carburetors have been properly adjusted, and all parts cleaned and found to be functioning properly.

If the engine still exhibits symptoms of overly 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.

For the models other than the US model, a certain amount of adjustment can be made by changing the position of the needle. There are five grooves at the top of the needle. Changing the position of the clip to a groove closer to the bottom raises the needle, which makes the mixture richer at a given position of the throttle valve.

Jet Needle



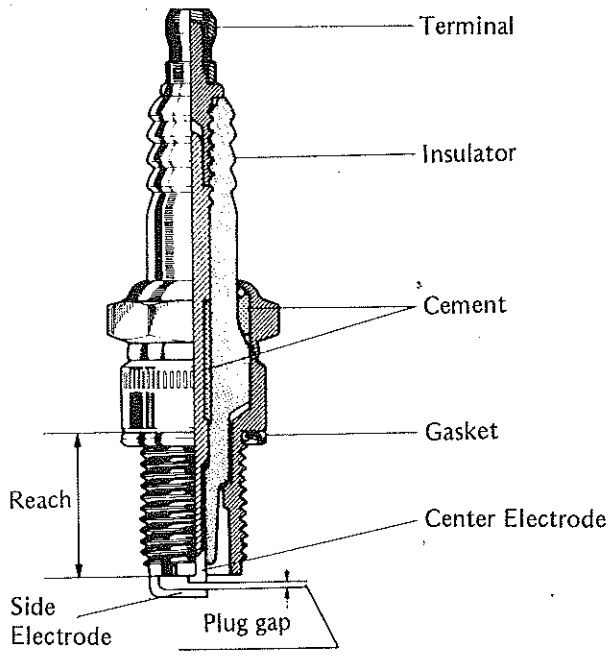
Spark Plug:

The spark plug ignites the fuel/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 adjusted.

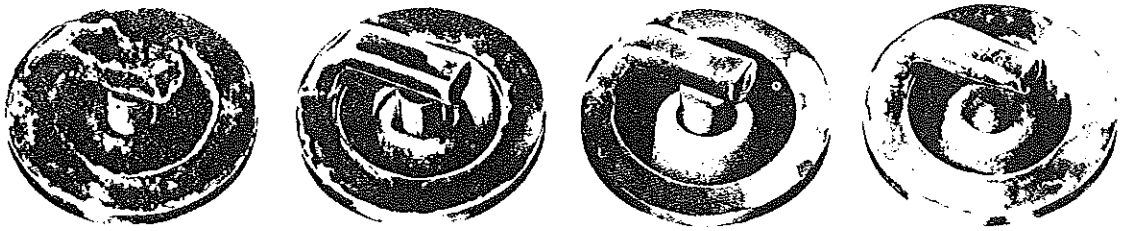
Test have shown the plug listed in the "General Specifications" section in the "General Information" chapter to be the best plug for general use.

Since spark plug requirements change with the ignition and carburetion adjustments and with riding conditions, whether or not a spark plug of a correct heat range is used should be determined by removing and inspecting the plug.

Spark Plug



Spark Plug Condition



Carbon Fouling | Oil Fouling | Normal Operation | Overheating

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 high 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.

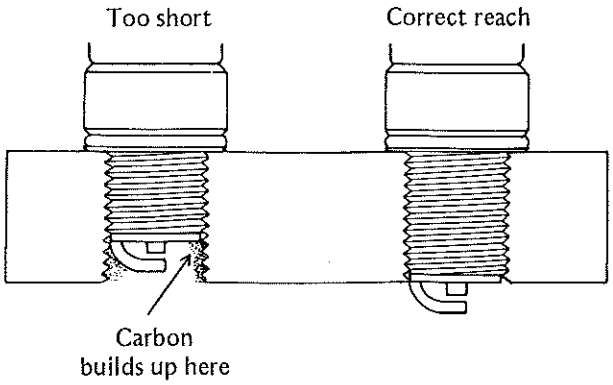
Spark Plug Inspection

- 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 (NGK B8ES) 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 insulator type (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, preignition, 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	:	**14 mm**
Pitch	:	**1.25 mm**
Reach	:	**19.0 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). The standard plug has been selected to match the normal usage of this motorcycle in combined street and highway riding. Unusual riding conditions may require a different spark plug heat range. For racing, install the colder plug.*

Trouble shooting 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. Electrical trouble-shooting is not covered here due to its complexity. For electrical problems, refer to the appropriate heading in Electrical System.

Engine Doesn't Start; Starting Difficulty

Engine won't turn over
- Cylinder, piston seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or crankcase bearing seizure
- Kickstarter return spring broken
- Kick ratchet gear not engaging

No fuel flow
- No fuel in tank
- Sticking of the valve in valve in the automatic fuel tap
- Fuel tap vacuum hose clogged
- Tank cap air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded
- Float level too high
- Float valve worn or stuck open
- Starting technique faulty
- (When flooded, kick with the throttle fully open to allow more air to reach the engine)

No spark, spark weak
- Ignition switch not on
- Engine stop switch turned off
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- Ignition coil register open
- CDI unit broken
- Pickup coil broken or maladjusted
- Flywheel magneto damaged
- Pulser rotor damaged
- Ignition or engine stop switch shorted
- Wiring shorted or open

Fuel/air mixture incorrect
- Throttle stop screw maladjusted
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Starter jet clogged

Compression low
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Reed valve damaged
- Rotary valve cover oil seal deteriorated or damaged
- Rotary valve cover large O-ring deteriorated or damaged

Poor Running at Low Speed

Spark weak
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- CDI unit broken pickup coil broken or maladjusted
- Flywheel magneto damaged
- Pulser rotor damaged

Fuel/air mixture incorrect
- Throttle stop screw maladjusted
- Carburetors not synchronizing
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Starter plunger stuck open
- Float level too high or too low
- Fuel tank air vent obstructed

Compression low
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Reed valve damaged
- Rotary valve cover oil seal deteriorated or damaged
- Rotary valve cover large O-ring deteriorated or damaged

Poor Running No Power at High Speed

Firing incorrect
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- Ignition timing malfunction
- Ignition coil register open
- CDI unit broken
- Pickup coil broken or maladjusted

Fuel/air mixture incorrect
- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Jet needle clip in wrong position
- Float level too high or too low

Air jet or air passage clogged
Air cleaner clogged, poorly sealed, or missing
Starter plunger stuck open
Fuel to carburetor insufficient
Water or foreign matter in fuel
Fuel tank air vent obstructed
Fuel line clogged
Fuel tap clogged
Air cleaner duct loose

Compression low
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/land clearance excessive
Cylinder head gasket or base gasket damaged
Cylinder head not sufficiently tightened down
Cylinder head warped
Sprak plug loose
Crankshaft oil seal deteriorated or damaged
Reed valve damaged
Rotary valve cover oil seal deteriorated or damaged
Rotary valve cover large O-ring deteriorated or damaged

Oil and fuel/air mixture incorrect
Oil pump cable maladjusted
Throttle control cable maladjusted
Crankshaft oil seal deteriorated or damaged
Rotary valve cover oil seal deteriorated or damaged
Rotary valve cover large O-ring deteriorated or damaged
No oil in oil tank
Oil pump damaged
Oil line or check valve clogged
Air in oil pump or oil line

Engine rpm will not rise properly
Starter plunger stuck open
Float level too high or too low
Main jet clogged
Throttle valve does not fully open
Air cleaner clogged
Muffler clogged
Water or foreign matter in fuel
Cylinder exhaust port clogged
Brake dragging
Clutch slipping
Overheating
Transmission oil level too high
Transmission oil viscosity too high
Crankshaft bearing worn or damaged

Knocking
Ignition timing malfunction
Carbon built up in combustion chamber
Fuel poor quality or inccorect
Spark plug incorrect

Overheating

Firing incorrect
Spark plug dirty, damaged, or maladjusted
Ignition timing malfunction

Fuel/air mixture incorrect
Main jet clogged or wrong size
Float level too low
Air cleaner clogged
Air cleaner duct loose

Oil and fuel/air mixture incorrect
Throttle control cable maladjusted
No oil in oil tank
Oil pump damaged
Oil line or check valve clogged
Air in oil pump or oil line

Compression high
Carbon built up in combustion chamber

Engine load faulty
Clutch slipping
Transmission oil level too high
Brake dragging

Gauge incorrect
Water temperature gauge broken
Water temperature sensor broken

Coolant incorrect
Coolant leve too low
Coolant deteriorated

Cooling system component incorrect
Radiator clogged
Thermostat trouble
Radiator cap trouble
Water pump not rotating
Water pump impeller damaged

Over Cooling

Gauge incorrect
Water temperature gauge broken
Water temperature sensor broken

Cooling stystem component incorrect
Thermostat trouble

Fuel and Oil Consumption Excessive

Idle too fast
Throttle stop screw maladjusted
Throttle control cable catching or poorly adjusted

Fuel/air mixture too rich
Jet needle or needle jet worn
Starter plunger stuck open
Float level too high
Air cleaner clogged

Compression low
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/land clearance excessive
Cylinder head gasket or base gasket damaged
Cylinder head not sufficiently tightened down
Cylinder head warped
Spark plug loose
Crankshaft oil seal deteriorated or damaged
Reed valve damaged
Rotary valve cover oil seal deteriorated or damaged
Rotary vlave cover large O-ring deteriorated or damaged

Exhaust obstructed
Muffler clogged
Cylinder exhaust port clogged

Engine load faulty
Clutch slipping
Transmission oil level too high
Brake dragging

Clutch Operation Faulty

Clutch slipping
No clutch lever play
Friction plate worn or warped
Steel plate worn or warped
Clutch spring weak
Clutch cable maladjusted
Clutch inner cable catching
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 tension uneven
Transmission oil deteriorated
Transmission oil viscosity too high
Clutch housing gear frozen on drive shaft
Clutch release mechanism trouble

Gear Shifting Faulty

Doesn't into gear; shift pedal doesn't return
Clutch not disengaging
Shift fork bent or seized
Shift return spring weak or broken
Shift lever broken
Shift return spring pin loose
Shift pawl spring broken
Set levers binding
External shift mechanism arm pawl worn

Jumps out of gear
Shift fork worn
Gear groove worn
Gear dogs, holes, and/or recesses worn
Shift drum groove worn
Shift drum set lever spring weak or broken
Shift fork guide pin or collar worn
Drive shaft, output shaft, and/or gear splines worn

Overshifts
Shift drum set lever spring weak or broken

Abnormal Engine Noise

Knocking
Ignition timing malfunction
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Overheating
Spark plug incorrect

Piston slap
Cylinder/piston clearance excessive
Cylinder, piston worn
Connecting rod bent
Piston pin, piston pin hole worn

Other noise
Connecting rod small end clearance excessive
Connecting rod big end clearance excessive
Piston ring worn, broken, or stuck
Piston seizure or damaged
Cylinder head gasket leaking
Exhaust pipe leaking at cylinder connection
Crankshaft runout excessive
Engine mount loose
Crankshaft bearing worn

Abnormal Drive Train Noise

Clutch noise
Primary gear cam damper damaged
Clutch rubber damper deteriorated
Clutch housing/friction plate clearance excessive
Clutch housing gear/primary gear backlash excessive
Metal chip jammed in clutch housing gear teeth

Transmission noise
Crankcase bearing worn
Transmission gear worn or chipped
Metal chip jammed in gear teeth
Transmission oil insufficient or too thin
Kick ratchet gear not properly disengaging from kick gear
Kick idle gear worn or chipped

Drive chain noise
Chain worn
Rear and/or engine sprocket(s) 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 damaged
Cylinder damaged

Other noise
Bracket, nut, bolt, etc. not properly mounted or tightened

Exhaust Smoke

Excessive white smoke
Oil pump cable maladjusted
Throttle control cable maladjusted
Engine oil poor quality or incorrect
Crankshaft oil seal damaged
Rotary valve cover oil seal deteriorated or damaged

Rotary valve cover large O-ring deteriorated or damaged

Brownish smoke
Air cleaner clogged
Main jet too large or fallen off
Starter plunger stuck open
Float level too high

Handling and/or Stability Unsatisfactory

Handlebar hard to turn
Control cable routing incorrect
Wiring routing incorrect
Steering stem locknut too tight
Bearing roller damaged
Bearing race dented or worn
Steering stem lubrication inadequate
Steering stem bent
Tire air pressure too low

Handlebar shakes or excessively vibrates
Tire worn
Swing arm bushing or needle bearing damaged
Rim warped
Front, rear axle runout excessive
Wheel bearing worn
Handlebar clamp loose

Handlebar pulls to one side
Frame bent
Wheel misalignment
Swing arm bent or twisted
Swing arm pivot shaft runout excessive
Steering stem bent
Front fork leg bent
Right/left front fork oil level uneven

Shock absorption unsatisfactory
(Too hard)
Front fork oil excessive
Front fork oil viscosity too high
Front fork air pressure too high
Tire air pressure too high
Rear suspension maladjusted
(Too soft)
Front fork oil insufficient and/or leaking
Front fork oil viscosity too low
Front fork air pressure too low
Front fork, rear shock absorber spring(s) weak
Rear shock absorber oil leaking
Rear shock absorber gas leaking

Brake Doesn't Hold

Disc brake
Air in the brake line
Pad or disc worn
Brake fluid leak
Brake plunger of AVDS damaged
Disc warped
Contaminated pad
Brake fluid deteriorated
Primary cup or secondary cup damaged
Master cylinder scratched inside

Battery Discharged

Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte level too low)
Battery lead making poor contact
Regulator/rectifier damaged
Ignition switch damaged
Load excessive (e.g., bulb of excessive wattage)
Flywheel magneto damaged
Stator coil open or short
Wiring faulty

Battery Overcharged

Battery damaged
Regulator/rectifier trouble

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.*

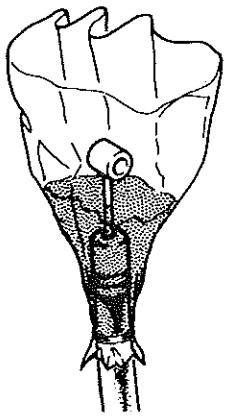
Pivots: Lubricate with Motor Oil.
- Side Stand
- Clutch Lever
- Brake Lever
- Brake Pedal Shaft
- Rear Brake Rod Joint
- Kick Pedal

Points: Lubricate with Grease.
- Throttle Inner Cable Lower End
- Oil Pump Inner Cable Lower End
- Speedometer Inner Cable*

*Grease the lower part of the inner cable sparingly.

Cables: Lubricate with Motor Oil.
- Choke Cable
- Throttle Control Cable
- Oil Pump Cable

Cable Lubrication



Nut, Bolt, and Fastener Tightness

Tighteness Inspeciton

●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 appropriate chapter for torque specifications. If torque specifications are not in the appropriate chapter, see the Standard Torque Table. First loosen each fastener 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
  - Chain Adjuster Clamp Bolts
- Brakes:
  - Front Master Cylinder Clamp Bolts
  - Front Caliper Mounting Bolts
  - Rear Master Cylinder Mounting Bolt
  - Rear Caliper Holder Fixing Bolt
  - Rear Caliper Holder Collar Bolt
  - Brake Lever Pivot Nut
  - Brake Pedal Bolt
  - Brake Rod Joint Cotter Pin
- Suspension:
  - Front Fork Clamp Bolts
  - Front Fender Mounting Bolts and Nuts
  - Rear Shock Absorber Mounting Bolts
  - Swing Arm Pivot Shaft Nut
  - Uni-trak Link Nuts
  - Swing Arm Holder Mounting Bolts
- Steering
  - Stem Head Nut
  - Handlebar Holder Bolts
  - Handlebar Holder Clamp Bolts
- Engine:
  - Engine Mounting Bolts
  - Cylinder Head Bolts
  - Muffler Mounting Nuts
  - Muffler Mounting Bolts
  - Clutch Lever Pivot Nut
- Others:
  - Side Stand Bolt
  - Front Footpeg Mounting Bolts
  - Rear Frame Mounting Bolts
  - Footpeg Bracket Mounting Bolts

Standard Torque Table

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

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	125 – 165
20	225 – 325	23 – 33	165 – 240

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/cm^2
kPa	x	0.1450	=	psi
kPa	x	0.7501	=	cm Hg
kg/cm^2	x	98.07	=	kPa
kg/cm^2	x	14.22	=	psi
cm Hg	x	1.333	=	kPa

Units of Speed:

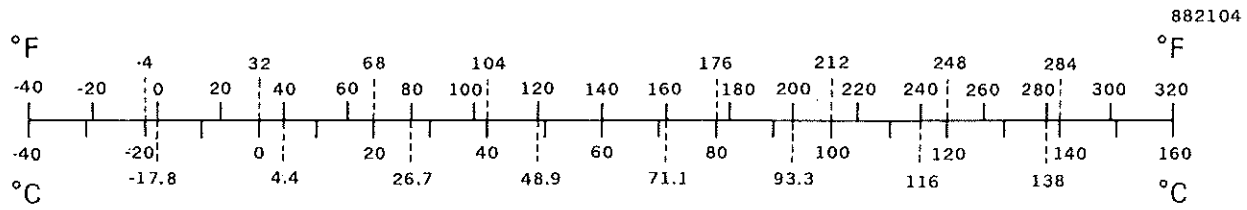
km/h	x	0.6214	=	mph

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:

$$\frac{9\,(°C + 40)}{5} - 40 = °F \qquad \frac{5\,(°F + 40)}{9} - 40 = °C$$



Supplement – 1985 Model

This "Supplement – 1985 Model" chapter is designed to be used in conjunction with the front part of this manual (up to the end of the "Appendix" chapter). The maintenance and repair procedures described in this chapter are only those that are unique to the 1985 KR250-A2 motorcycle. Most service operations for these models remain identical to those described in front of this chapter. Complete and proper servicing of the 1985 KR250-A2 motorcycle, therefore requires mechanics to read both this chapter and the text in front of this chapter.

Table of Contents

Clutch 17-2
Clutch 17-2
Primary Gear Assembly 17-2
Primary Gear Damper Inspection 17-3
Crankshaft/Transmission 17-4
Exploded View 17-4

Clutch

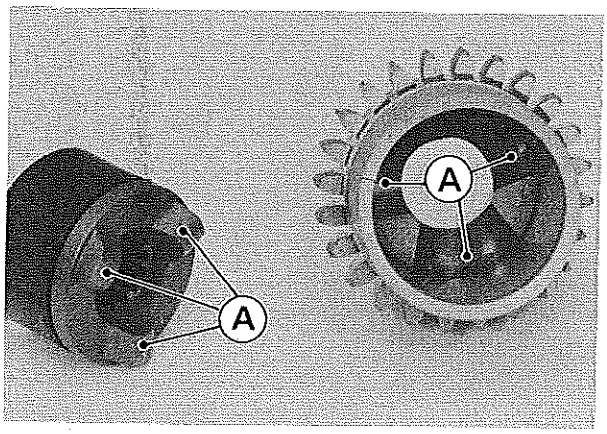
Clutch

The following procedures are only those that are unique to the KR250-A2 model. For all other procedures refer to the front of this manual.

Primary Gear Assembly

The parts installation order of the primary gear assembly is changed on the KR250-A2.

- Apply a molybdenum disulfide engine assembly grease to the cam surfaces of the damper cams and primary gears.

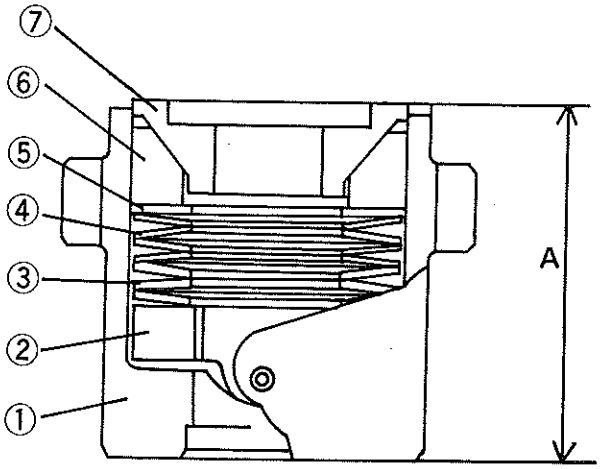


A. Cam Surfaces

- Select the washers using the following steps in order to keep the variation in the damper spring load at minimum.

○ First, insert a washer **1.0 mm** thick and place the shoes, and the retainer in this order, being careful of the installation direction.

Washer Selection



1. Primary Gear
2. Damper Cam
3. Thick Damper Springs
4. Thin Damper Springs
5. Washer
6. Shoes
7. Retainer

○ Next, measure the dimension A.

Dimension A

Standard: 51.9 – 52.3 mm

○ Finally, select washers according to the table below and install them.

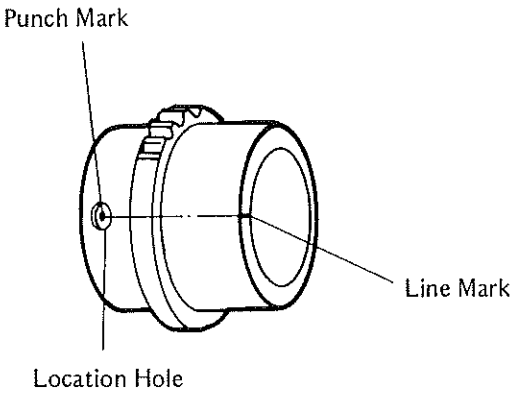
Washer Selection

Dimension A not less than – less than	Thickness and Nos.
52.3 – 53.0 mm	0.8 mm
51.9 – 52.3 mm	1.0 mm
51.7 – 51.9 mm	1.2 mm
51.5 – 51.7 mm	1.4 mm
51.3 – 51.5 mm	0.8 mm x 2
51.1 – 51.3 mm	0.8 mm + 1.0 mm
50.9 – 51.1 mm	1.0 mm x 2

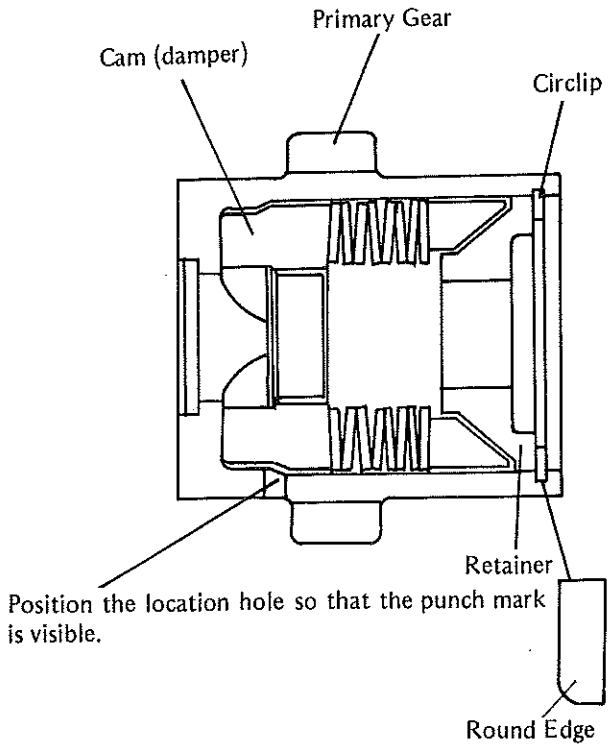
Washer Part Nos.

t0.8 mm	**92022-1734**
t1.0 mm	**92022-1735**
t1.2 mm	**92022-1736**
t1.4 mm	**92022-1764**

●Align the damper cam punch mark with one of the primary gear holes spaced equally routed circumference.
○Select a locating hole on the extention of the line mark from among the holes.



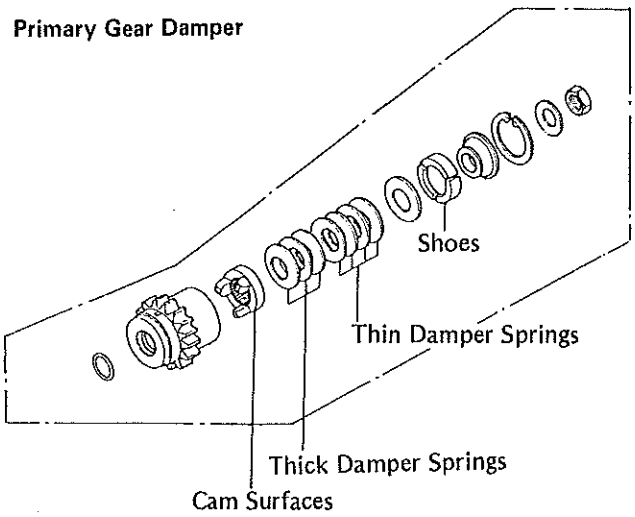
●Install the circlip with the round edge faces in to prevent the circlip from slipping out.
●Fit a new circlip into the groove, while pushing the retainer only enough to install the circlip and no more.



Primary Gear Damper Inspection

●Visually inspect the cam surfaces of the primary gears and the damper cams.
★If they are badly worn, replace the primary gears and the damper cams.
●Visually inspect the damper springs for cracks or other damage.
★If they are damaged, replace them with new ones.
●Visually inspect the damper shoes.
★If the abnormal wear or the exposed base metal is found, replace all the damper shoes.

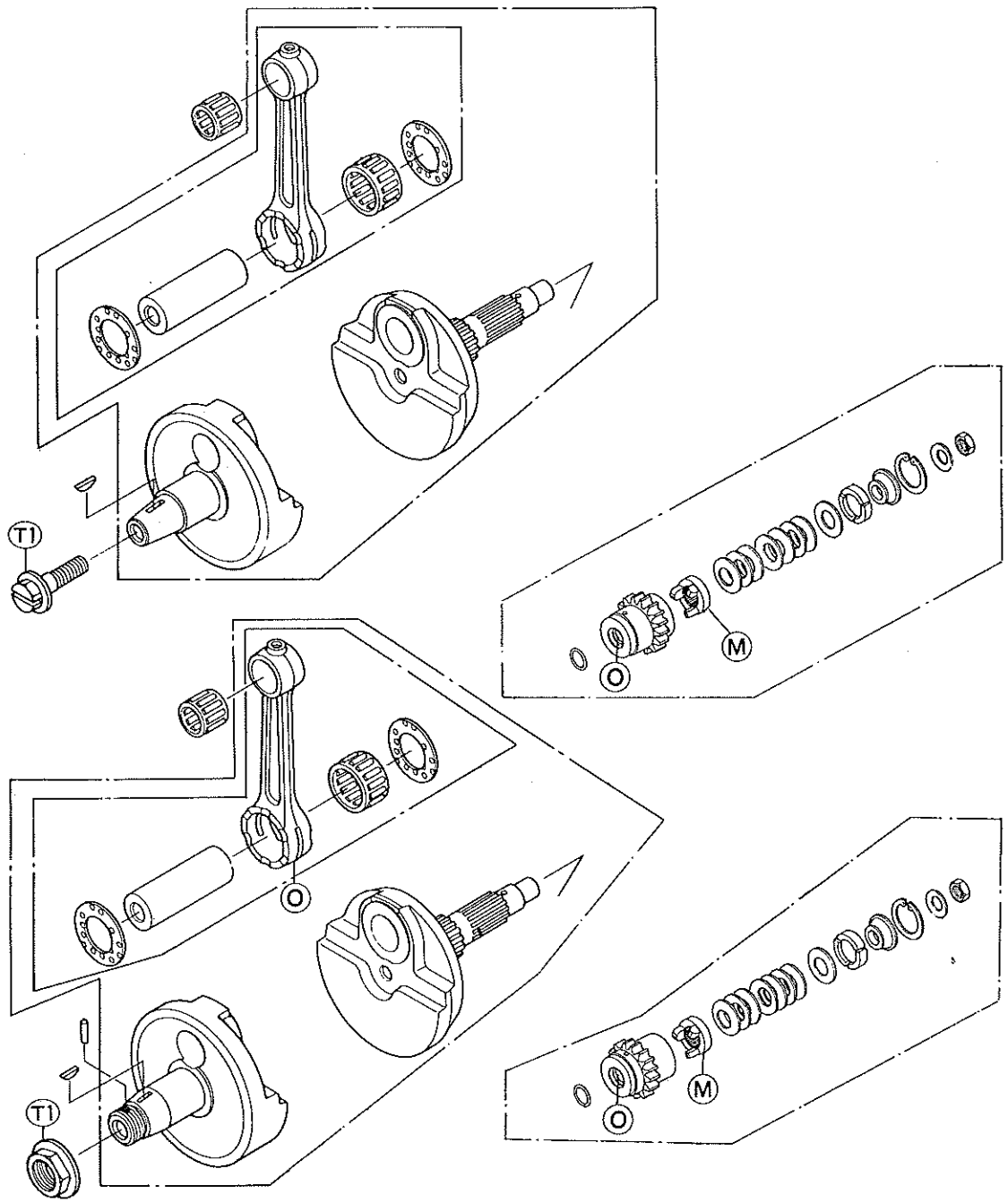
Primary Gear Damper



Crankshaft/Transmission

Exploded View

The following informations are only those that are unique to the KR250-A2 model. For all other data refer to the front part of this manual.



T1: 64 – 74 N-m (6.5 – 7.5 kg-m, 47 – 54 ft-lb)
M : Apply a molybdenum disulfide grease.
O : Apply engine oil at installation.

MODEL APPLICATION

Year	Model	Beginning Frame No.
1984	KR250-A1	KR250A-000001
1985	KR250-A2	KR250A-011201

KAWASAKI
HEAVY INDUSTRIES, LTD.
CONSUMER PRODUCTS GROUP

Part No. 99924-1053-02

Printed in Japan