Kawasaki

KDX200

Motorcycle Service Manual

LIST OF ABBREVIATIONS

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

(U. K. model only)

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

Brake Shoes or Pads
Clutch Friction Material
Gaskets
Insulators

SAFETY INSTRUCTIONS

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

Read OWNER'S MANUAL before operating.

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.

We recommend that all repairs and scheduled maintenance be performed in accordance with this service manual.

To get the longest life out of your motorcycle:

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

How to Use this Manual

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

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

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

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

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

WARNING

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

CAUTION

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

This manual contains 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.*

- •Indicate 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.

Quick Reference Guide

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.

General Information

1

Table of Contents

1-2 GENERAL INFORMATION

Before Servicing

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

Especially note the following:

(1) Dirt

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

(2) Tightening Sequence

Generally, when installing a part with several bolts, nuts, or screws, they should all be started in their holes and tightened to a snug fit. Then tighten them evenly in a cross pattern. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter of turn and then remove them.

Where there is a tightening sequence indication in this Service Manual, the bolts, nuts, or screws must be tightened in the order and method indicated.

(3) Torque

The torque values given in this Service Manual should always be adahered to. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.

(4) 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.

(5) 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.

(6) 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.

(7) 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.

(8) 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).

(9) 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.

(10) 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.

(11) Oil Seal and Grease Seal

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

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

(12) 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 oil, preferably high temperature grease on the lips to reduce rubber to metal friction.

(13) Circlip, Retaining Ring

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

(14) Cotter Pin

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

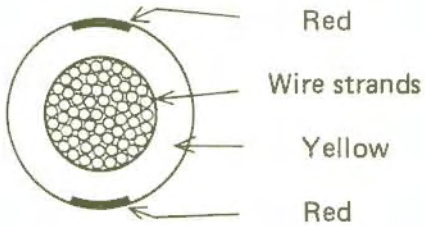
(15) Lubrication

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 strips 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 the following conditions or other damage. If there is any doubt as to their condition, replace them with new ones.

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

(19) Service Data

Numbers of service data in this text have the 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

KDX200-E1 Left Side View

KDX200-E1 Right Side View

General Specifications

Items			KDX200-E1
Dimensions:			
Overall length			2130 mm
Overall width			890 mm
Overall height			1250 mm
Wheelbase			1450 mm
Road clearance			340 mm
Seat height			910 mm
Dry weight			102 kg
Curb weight:	Front		53 kg
	Rear		58 kg
Fuel tank capacity			12.0 L
Engine:			
Type			2-stroke, single cylinder, piston reed valve
Cooling system			Liquid-cooled
Bore and stroke			66.0 x 58.0 mm
Displacement			198 mL
Compression ratio			7.7:1 (high speed), 9.2:1 (low speed)
Maximum horsepower			26.5 kW (36PS) @7500 r/min (rpm)
Maximum torque			34.3 N-m(3.5 kg-m, 25.3 ft-lb) @ 7000 r/min (rpm)
Carburetion system			Carburetor, KEIHIN PWK 35
Starting system			Primary kick
Ignition system			CDI
Ignition timing			21° BTDC @6000 r/min (rpm)
Spark plug			NGK B9ES ©Ⓤ NGK BR9ES
Port timing:	Inlet	Open	Full open
		Close	—
	Scavenging	Open	60° BBDC
		Close	60° ABDC
	Exhaust	Open	84° BBDC (low speed), 97° BBDC (high speed)
		Close	84° ABDC (low speed), 97° ABDC (high speed)
Lubrication system			Petrol mix (32:1)
Drive Train:			
Primary reduction system:			
	Type		Gear
	Reduction ratio		2.863 (63/22)
Clutch type			Wet, multi disc
Transmission:	Type		6-speed, constant mesh, return shift
	Gear ratios:	1st	2.692 (35/13)
		2nd	2.000 (28/14)
		3rd	1.533 (23/15)
		4th	1.235 (21/17)
		5th	1.041 (25/24)
		6th	0.869 (20/23)
Final drive system:	Type		Chain drive
	Reduction ratio		3.615 (47/13)
Overall drive ratio			9.002 @Top gear
Transmission oil:	Grade		SE class
	Viscosity		SAE 10W30 or 10W40
	Capacity		0.75 L

(Continued on next page.)

Item	KDX200-E1
Frame:	
Type	Tubular, single down tube
Steering angle	45° to either side
Caster (rake angle)	27°
Trail	112 mm
Front tire: Make/Type	DUNLOP K490 Ⓔ DUNLOP K990, Tube type
Size	80/100 — 21 51M
Rear tire: Make/Type	DUNLOP K695 Ⓔ DUNLOP K990, Tube type
Size	100/100 —18 59M
Front suspension: Type	Telescopic fork
Wheel travel	290 mm
Rear suspension: Type	Swing arm (Uni-trak)
Wheel travel	300 mm
Brake type: Front and Rear	Single disc
Effective disc diameter:	
Front	220 mm
Rear	190 mm
Electrical Equipment:	
Headlight:	12V 30W (quartz-halogen)
Taillight:	12V 10W

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

Ⓒ : Canadian model
Ⓔ : European model
Ⓤ : U. K. model

Periodic Maintenance Chart

The maintenance must be done in accordance with this chart to keep the motorcycle in good running condition.

	OPERATION \ FREQUENCY	Traveled Distance km				
		100	500	1000	1500	2000
ENGINE	Clutch—adjust	•	•	•	•	•
	Clutch and friction plates-check f		•	•	•	
	Throttle cable—adjust	•	•	•	•	•
	Spark plug—clean, gap	•	•	•	•	•
	Air cleaner element—clean		•	•	•	•
	Air cleaner element—replace	If damaged				
	Carburetor—inspect/adjust	•	•	•	•	•
	Transmission oil—change			•		•
	Piston and piston ring—clean/check f			•		•
	Cylinder head, cylinder and exhaust valves—inspect			•		•
	Small end bearing—check f			•		•
	Muffler—clean			•		•
	Exhaust pipe O-ring—replace			•		•
	Engine sprocket—check f			•		•
	Coolant—change	Every 2 years				
	Radiator hoses, connections—check f	•		•		•
	Spark arrester — cleaning	Every 4000 km				
CHASSIS	Brake adjustment—check f	•	•	•	•	•
	Brake pad wear—check		•	•	•	•
	Brake fluid level—check		•	•	•	•
	Brake fluid-change	Every 2 years				
	Brake master cylinder cup and dust seal—replace	Every 2 years				
	Brake caliper piston seal and dust seal—replace	Every 2 years				
	Brake hose—replace	Every 4 years				
	Spoke tightness and rim runout—check f	•	•	•	•	•
	Drive chain—adjust	•	Every 300 km			
	Drive chain—lubricate	Before and after each day of operation				
	Drive chain wear—check f		•	•	•	•
	Chain slipper and guide—replace	If damaged				
	Front fork—inspect/clean	•	•	•	•	•
	Front fork oil—change	Every year				
	Nuts, bolts, fasteners—check f	•		•		•
	Fuel system—clean	•	•	•	•	•
	Fuel hose-replace	Every 4 years				
	Steering play—check f	•	•	•	•	•
	Steering stem bearing—grease					•
	Rear sprocket—check f		•	•	•	•
	General lubrication—lubricate	•	•	•	•	•
	Wheel bearing—grease					•
	Swing arm and Uni-Trak linkage pivots—grease		•	•	•	•
	Swing arm and Uni-Trak linkage pivots—check f		•	•	•	•
	Rear shock oil—replace	Every year				

f Replace, add, adjust, clean or torque if necessary.

Torque and Locking Agent

Tighten all bolts and nuts to the proper torque using an accurate torque wrench. If insufficiently tightened, a bolt or nut may become damaged or fall off, possibly resulting in damage to the motorcycle and injury to the rider. A bolt or nut which is overtightened may become damaged, strip an internal thread, or break and then fall out. The following table lists the tightening torque for the major bolts and nuts, and the parts requiring use of a non-permanent locking agent or liquid gasket.

When checking the tightening torque of the bolts and nuts, first loosen the bolt or nut by half a turn and then tighten to specified torque.

Letter used in the "Remarks" column mean:
L : Apply a non-permanent locking agent to the threads.
LG : Apply liquid gasket to the threads.
S : Tighten the fasteners following the specified sequence.
* : Left-hand threads.

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Fuel System				
Rear Frame Pipe Mounting Bolts	25	2.6	19.0	
Cooling System:				
Water Pump Impeller Bolt	6.9	0.7	61 in-lb	
Coolant Drain Plug	15	1.5	11.0	
Engine Top End:				
Cylinder Head Nuts	25	2.5	18.0	
Spark Plug	27	2.8	20.0	
Cylinder Nuts	25	2.5	18.0	
Engine Bracket Mounting Bolts	29	3.0	22.0	
Exhaust Valve Operating Lever Nut *	8.3	0.85	74 in-lb	
Engine Right Side:				
External Shift Mechanism Return Spring Pin	20	2.0	14.5	L
Clutch Spring Bolts	9.3	0.95	82 in-lb	
Clutch Hub Nut	78	8.0	58	L
Primary Gear Nut	78	8.0	58	
Exhaust Valve Advancer Shaft Mounting Bolts	3.9	0.4	35 in-lb	
Exhaust Valve Operating Lever Nut *	8.3	0.85	74 in-lb	
Water pump impeller Bolt	6.9	0.7	61 in-lb	
Kick Ratchet Guide Bolt	—	—	—	L
Kick Pedal Nut	49	5.0	36	

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Engine Removal/Installation:				
Swing Arm Pivot Shaft Nut	78	8.0	58	
Engine Mounting Nuts	29	3.0	22.0	
Engine Bracket Mounting Nuts	29	3.0	22.0	
Engine Bottom End/Transmission:				
Transmission Oil Drain Plug	20	2.0	14.5	
Shift Drum Operating Plate Bolt	23	2.3	17.0	
Flywheel Bolt	64	6.5	47	
Wheels/Tires:				
Front Axle Nut	88	9.0	65	
Rear Caliper Mounting Bolts	25	2.5	18.0	
Rear Axle Nut	98	10.0	72	
Spoke Nipples	Not less than 1.5	Not less than 0.15	Not less than 13 in-lb	
Final Drive:				
Rear Axle Nut	98	10	72	
Rear Sprocket Bolts	26	2.7	19.5	
Brakes:				
Caliper Mounting Bolts (Front, Rear)	25	2.5	18.0	
Brake Hose Banjo Bolts	25	2.5	18.0	
Front Master Cylinder Clamp Bolts	8.8	0.9	78 in-lb	
Brake Disc Mounting Screws (Front, Rear)	9.8	1.0	87 in-lb	
Caliper Bleed Valves (Front, Rear)	7.8	0.8	69 in-ib	
Brake Pedal Mounting Bolt	8.8	0.9	78 in-lb	
Suspension:				
Front Fork Clamp Bolts (Upper,Lower)	20	2.0	14.5	
Front Fork Oil Drain Screw	—	—	—	L
Front Fork Cylinder Valve Assembly	71	7.2	52	L
Front Fork Top Bolts	27	2.8	20.0	
Swing Arm Pivot Shaft Nut	78	8.0	58	
Rear Shock Absorber Mounting Bolts	39	4.0	29	
Tie-Rod Mounting Nuts (Front, Rear)	81	8.3	60	
Rocker Arm Bracket Mounting Bolts	81	8.3	60	
Rocker Arm Nut	81	8.3	60	

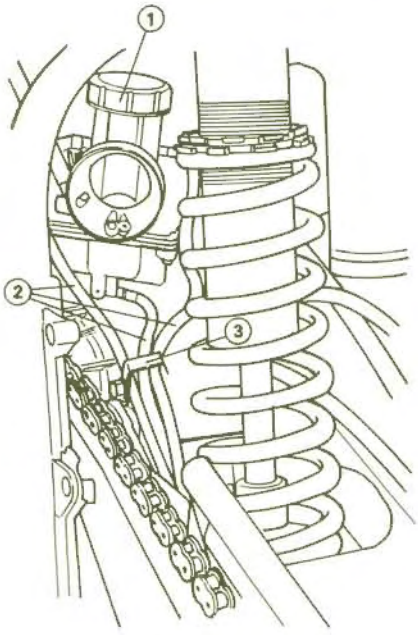
Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Steering:				
Steering Stem Head Nut	44	4.5	33	
Steering Stem Locknut	3.9	0.4	35 in-lb	
Handlebar Clamp Bolts	25	2.5	18.0	
Front Fork Clamp Bolts (Upper)	20	2.0	14.5	
Electrical System:				
Flywheel Bolt	64	6.5	47	
Spark Plug	27	2.8	20.0	

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

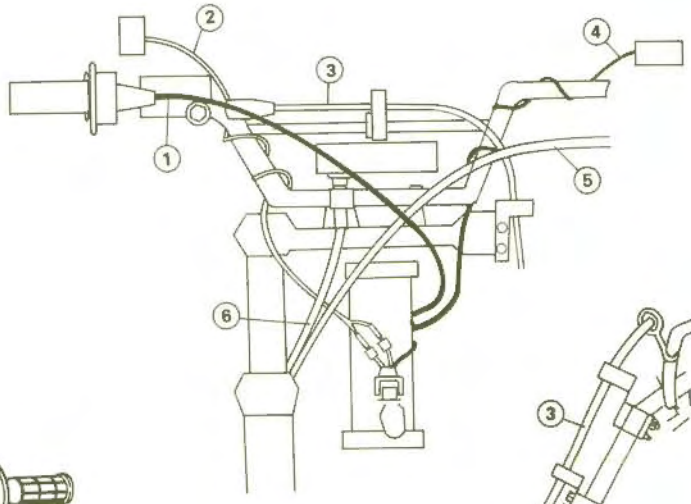
General Fasteners

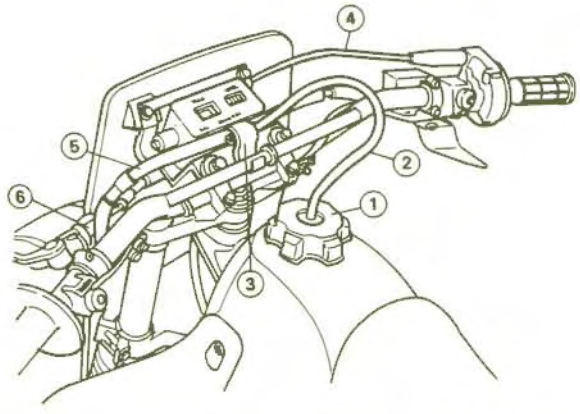
Threads diameter (mm)	Torque		
	N-m	kg-m	ft-lb
5	3.4—4.9	0.35—0.50	30—43 in-lb
6	5.9—7.8	0.60—0.80	52—69 in-lb
8	14—19	1.4—1.9	10.0—13.5
10	25—34	2.6—3.5	19.0—25
12	44—61	4.5—6.2	33—45
14	73—98	7.4—10.0	54—72
16	115—155	11.5—16.0	83—115
18	165—225	17—23	125—165
20	225—325	23—33	165—240

Cable, Hamess, Hose Routing

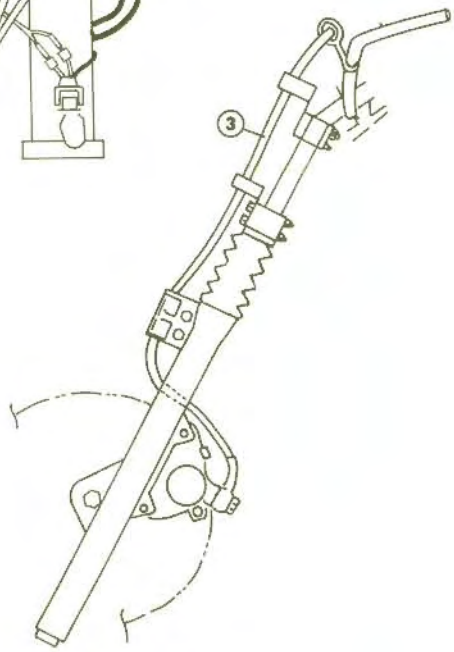


1. Carburetor
2. Hoses
3. Clamp

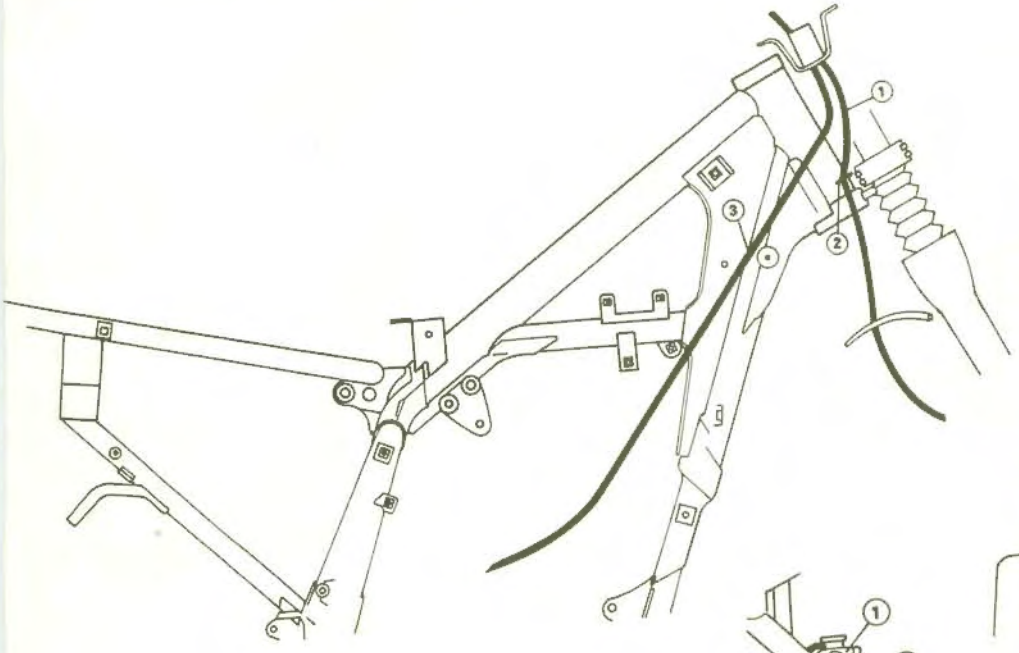




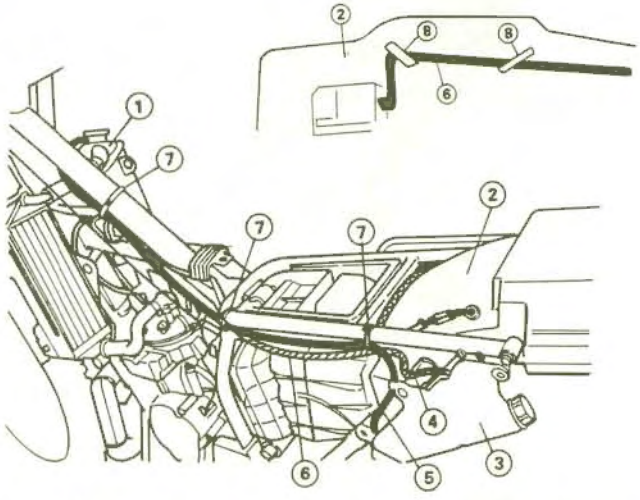
1. Fuel Tank Cap
2. Breather Hose
3. Clamp
4. Throttle Cable
5. Brake Hose
6. Clutch Cable



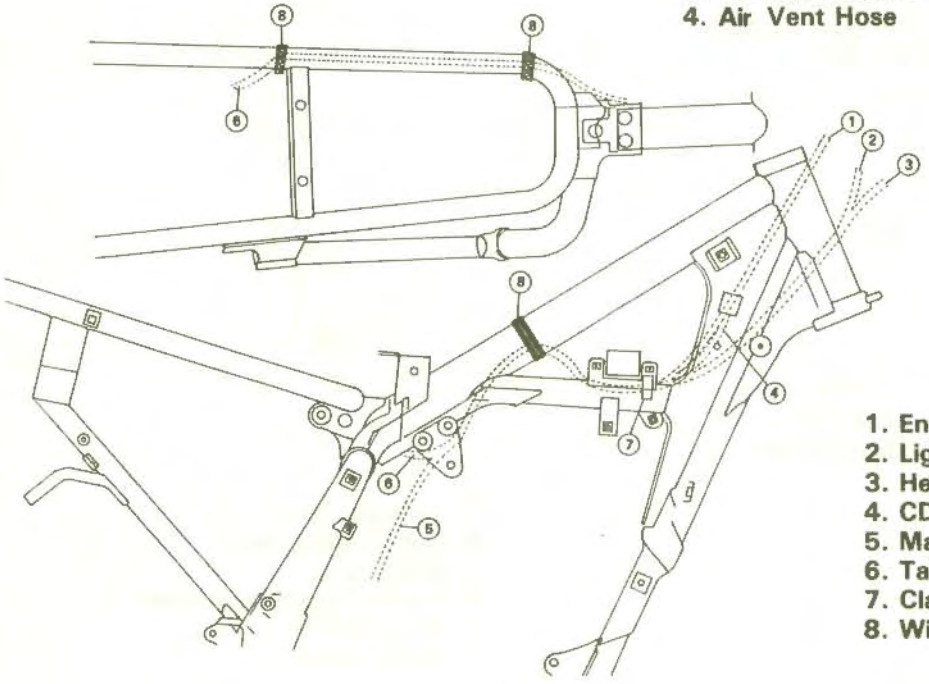
1. Throttle Cable
2. Light Switch Lead
3. Brake Hose
4. Engine Stop Button Lead
5. Clutch Cable
6. Meter Cable



1. Meter Cable
2. Clamp
3. Clutch Cable



1. Radiator
2. Rear Fender
3. Coolant Reserve Tank
4. Air Vent Hose
5. Breather Hose
6. Harness
7. Wiring Strap
8. Clamp



1. Engine Stop Button Lead
2. Light Switch Lead
3. Headlight Lead
4. CDI Unit Lead
5. Magneto Lead
6. Taillight Lead
7. Clamp
8. Wiring Strap

Fuel System

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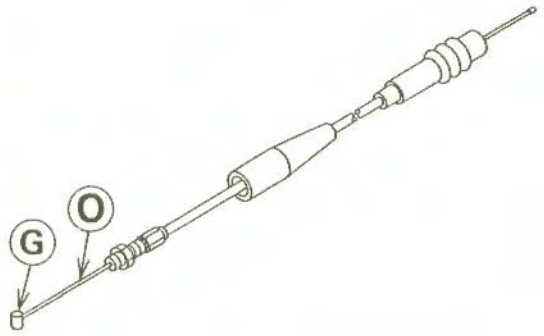
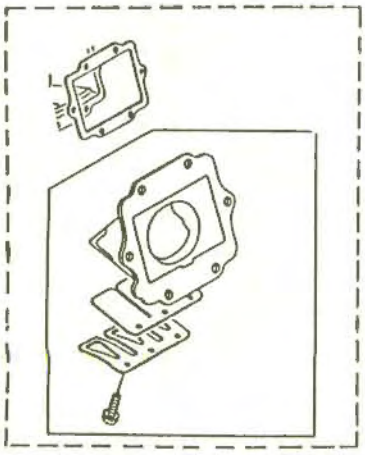
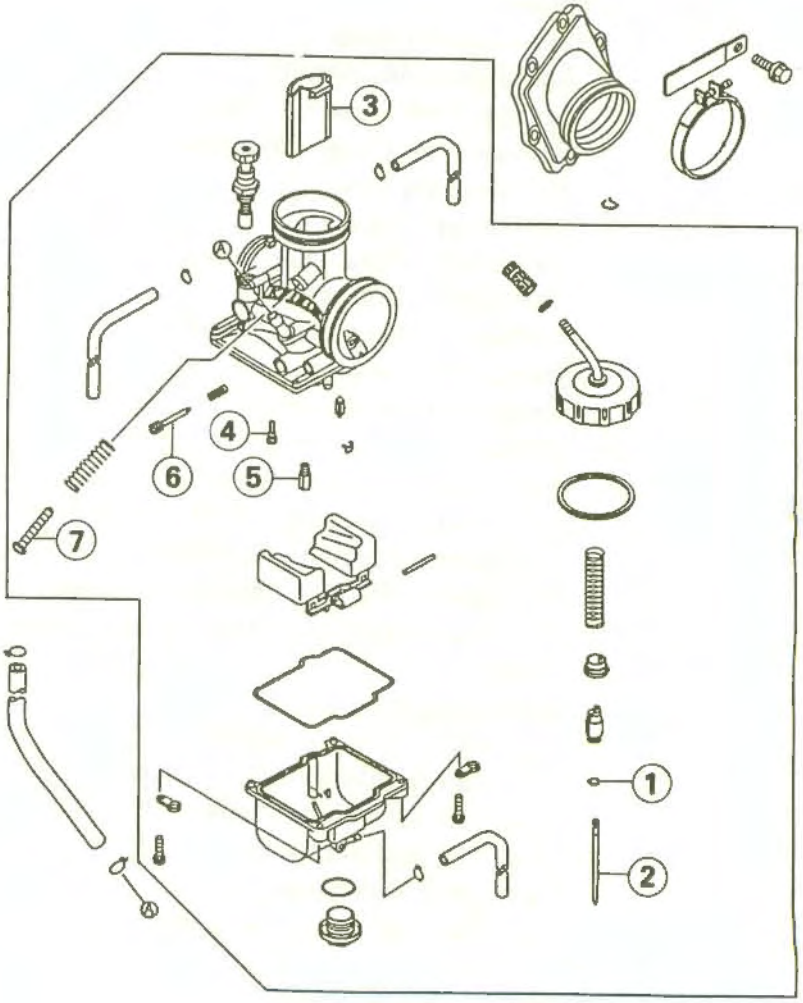
Exploded View



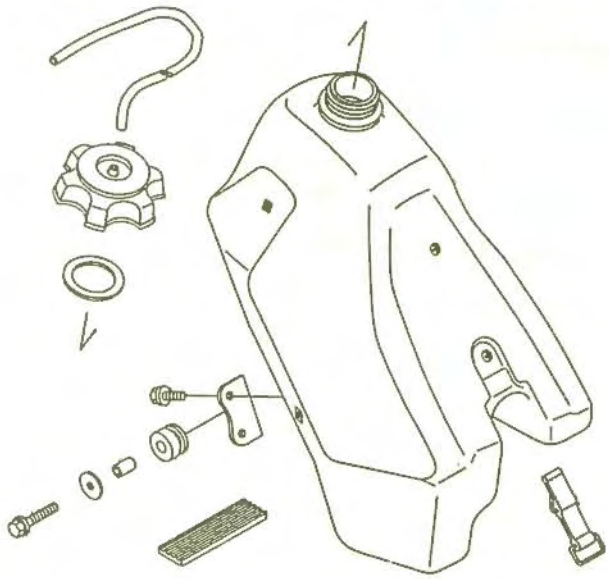


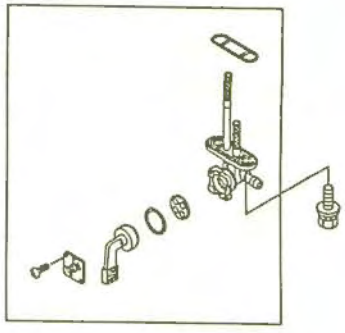


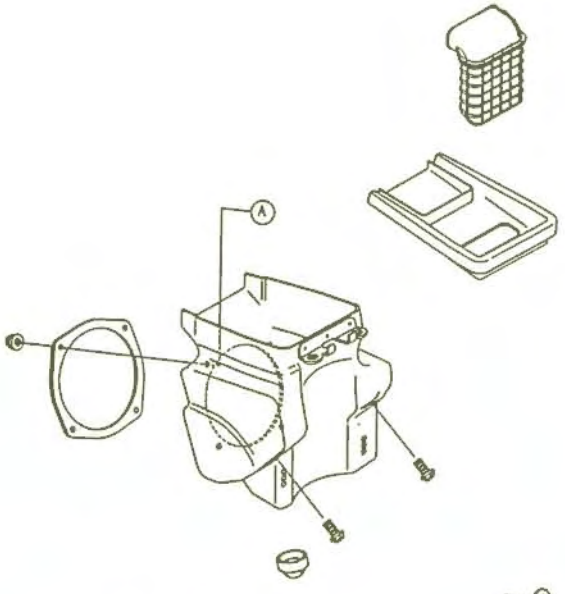
1. Jet Needle Clip
2. Jet Needle
3. Throttle Valve
4. Slow Jet
5. Main Jet
6. Air Screw
7. Idle Adjusting Screw

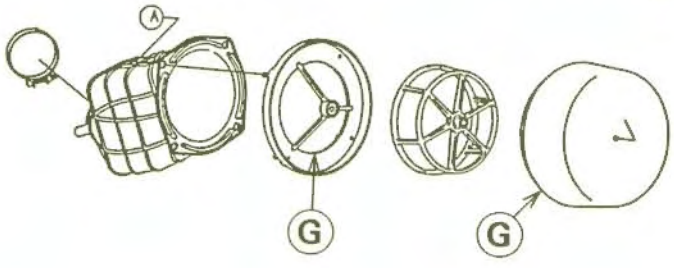
O: Apply oil

G: Apply grease









G: Apply grease

Specifications

Item	Standard	Service Limit
Throttle Grip Free Play	2 – 3 mm	– – –
Carburetor Specifications:		
Make/type	KEIHIN PWK35	– – –
Main jet	158	– – –
Throttle valve cutaway	6.0	– – –
Jet needle	R1172N	– – –
Jet needle clip position	4th groove from the top	– – –
Slow jet	48	– – –
Air screw	1½ (turn out)	
Service fuel level (below the bottom edge of the carb. body)	−1.0 ± 1 mm	– – –
Bore Center	32 mm	– – –
Float height	16 ± 1 mm	– – –
Air Cleaner Element Oil:	2-stroke racing oil or high-quality foam-air filter oil	– – –
Reed Valve:		
Reed warp	– – –	0.5 mm

Special Tools

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

Fuel Level Gauge: 57001-202

Pressure Cable Luber: K56019-021

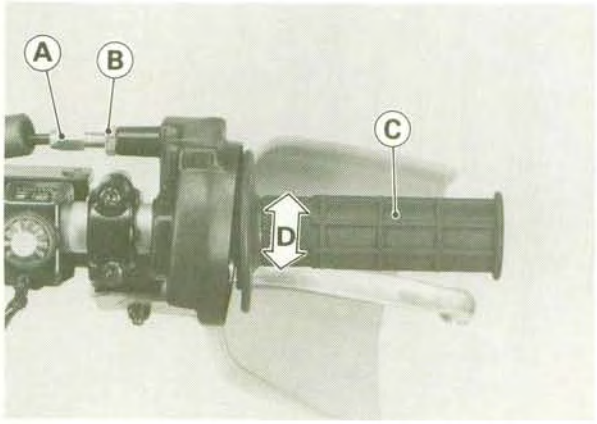
Throttle Grip and Cable

If the throttle grip has excessive free play due to cable stretch or misadjustment, there will be a delay in throttle response. Also, the throttle valve may not open fully at full throttle. On the other hand, if the throttle grip has no play, the throttle will be hard to control, and the idle speed will be erratic. Check the throttle grip play periodically in accordance with the Periodic Maintenance Chart, and adjust the play if necessary.

The throttle cable routing is shown in Cable, Harness, Hose Routing in the General Information chapter.

Throttle Grip Free Play Inspection

•Check throttle grip free play by lightly turning the throttle grip back and forth.



A. Adjuser
B. Locknut
C. Throttle Grip
D. Throttle Grip Free Play

Throttle Grip Free Play

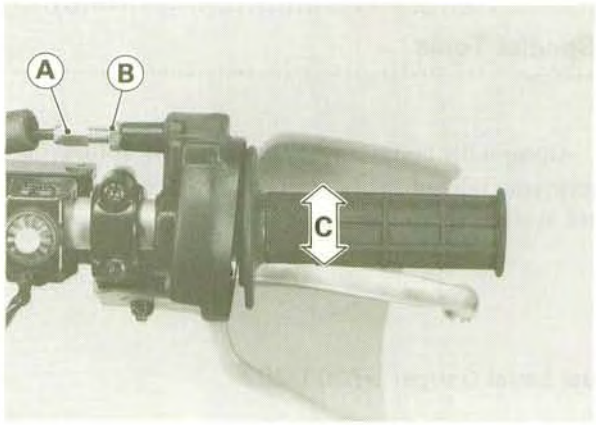
2 — 3 mm

★If the throttle grip free play is improper, adjust the throttle cable.

Throttle Cable Adjustment

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

•Turn the adjuster until the proper amount of throttle grip free play is obtained.

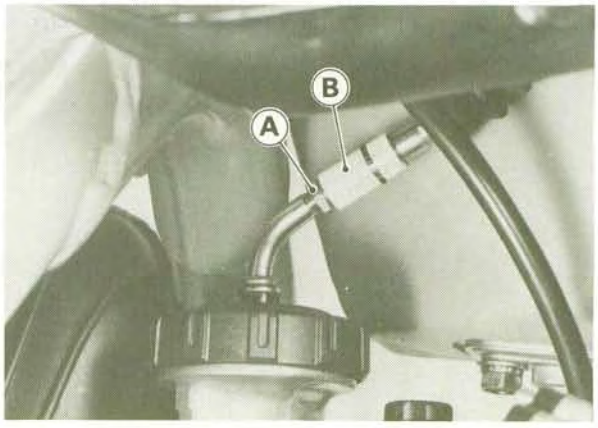


A. Adjuster
B. Locknut
C. Throttle Grip Free Play

•Tighten the locknut.

★If the throttle grip free play cannot be adjusted with the adjuster at the upper end of the throttle cable use the cable adjuster at the carburetor.

○Pull the boot off of the carburetor top. Make the necessary free play adjustment at the lower cable adjuster, tighten the locknut, and install the boot.



A. Locknut
B. Adjuster

•Turn the handlebar from side to side while idling the engine. If idle speed varies, the throttle cable may be poorly routed or it may be damaged.

WARNING

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

Throttle Cable Installation Notes

•Install the throttle cable in accordance with the Cable, Harness, Hose Routing section in the General Information chapter.
•After the installation, adjust the cable properly.

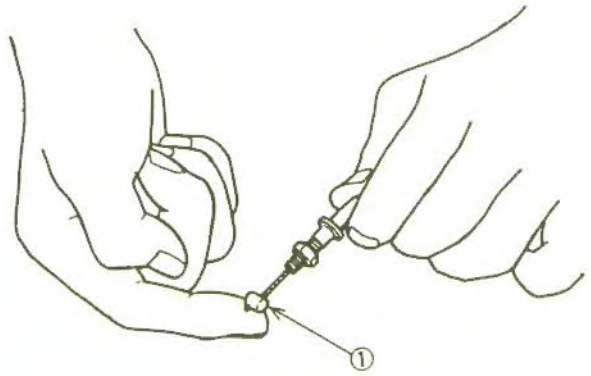
WARNING

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

Throttle Cable Lubrication

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

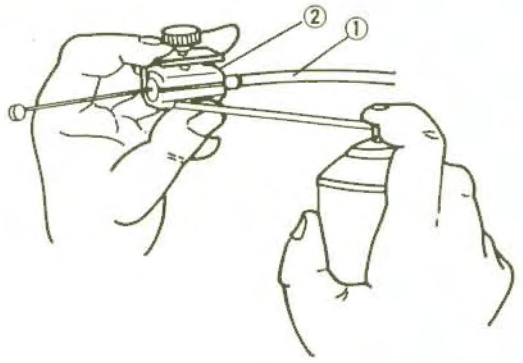
Cable Lubrication



1. Apply grease.

•Lubricate the cable with penetrating rust inhibitor through the Pressure Cable Luber (special tool).

Cable Lubrication

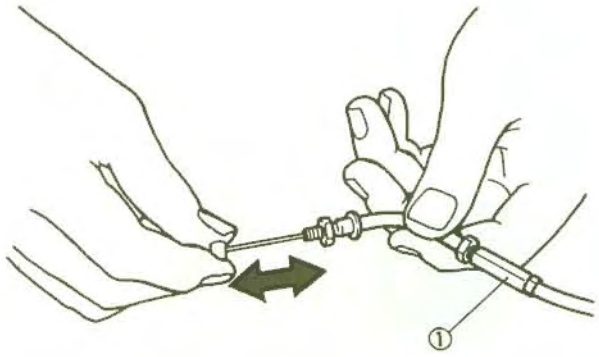


1. Cable 2. Pressure Cable Luber: K56019-021

Throttle Cable Inspection

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

Cable Inspection



1. Cable

★If cable movement is not free after lubricating, if the cable is frayed, or if the housing is kinked, replace the cable.

Carburetor

Since the carburetor regulates and mixes the fuel and air going to the engine, there are two general types of carburetor trouble: too rich a mixture (too much fuel), and too lean a mixture (too little fuel). Such trouble can be caused by dirt, wear, maladjustment, or improper fuel level in the float chamber. A dirty or damaged air cleaner can also alter the fuel to air ratio.

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 (see Cable, Harness, Hose Routing in the General Information chapter).

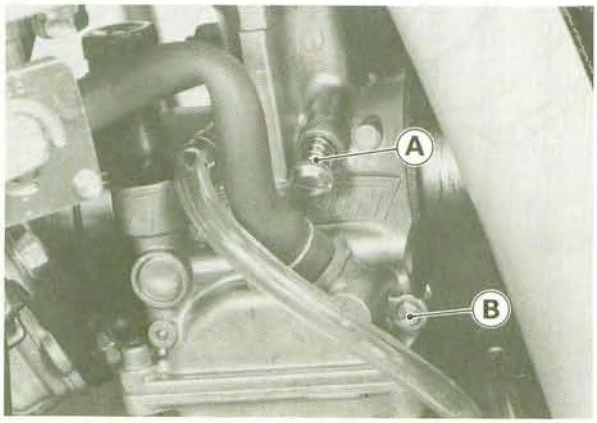
WARNING

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

• Check idle speed.
★Adjust it as needed.

Idle Speed Adjustment

- Start the engine and warm it up thoroughly.
- First turn in the air screw until it seats lightly, and back it out 1½ turns.
- Turn the idle adjusting screw to obtain the desired idle speed. If no idle is preferred, turn out the screw until the engine stops.



A. Idle Adjusting Screw B. Air Screw

- Open and close the throttle a few times to make sure that the idle speed is as desired. Readjust if necessary.

Service Fuel Level Inspection

WARNING

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

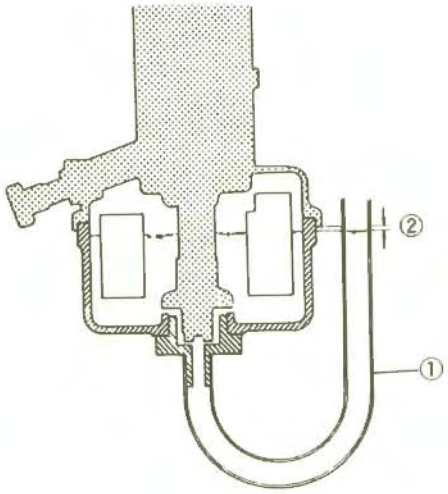
- Turn the fuel tap to the OFF position.
- Remove the fuel tank.
- Remove the carburetor, and hold it in true vertical position on a stand. The fuel hose and carburetor cable do not have to be removed to inspect the fuel level.
- Put the fuel tank on a bench, and connect the fuel tap to the carburetor using a suitable hose.
- Remove the drain plug from the bottom of the float bowl, and screw a fuel level gauge (special tool) into the plug hole.
- Hold the gauge vertically against the side of 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 ON position to feed fuel to the carburetor.
- 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 a suitable container and start the procedure over again.*

• Read the fuel level in the gauge and compare it to the specification.
• Turn the fuel tap to the OFF position and remove the fuel level gauge.
★If the fuel level is incorrect, adjust it.

Service Fuel Level
(below the bottom edge of the carb. body)
−1.0 ± 1 mm



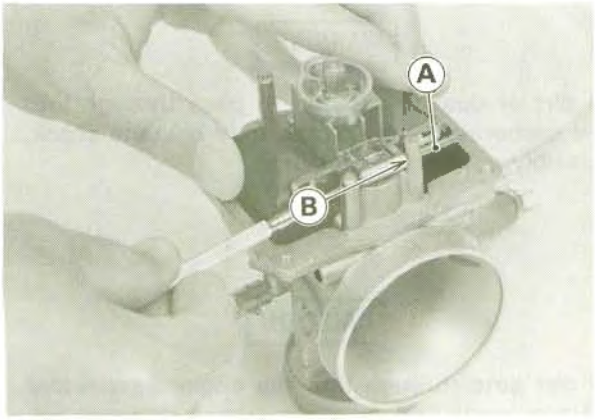
1. Fuel Level Gauge: 57001-202
2. Service Fuel Level

Service Fuel Level Adjustment

WARNING

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

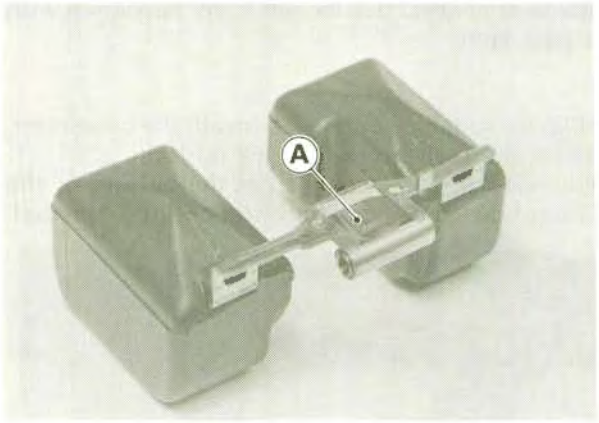
•Remove the carburetor, and drain the fuel into a suitable container.
•Remove the float bowl.
•Drive out the pivot pin and remove the float.



A. Pivot Pin B. Drive out the pin.

•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.

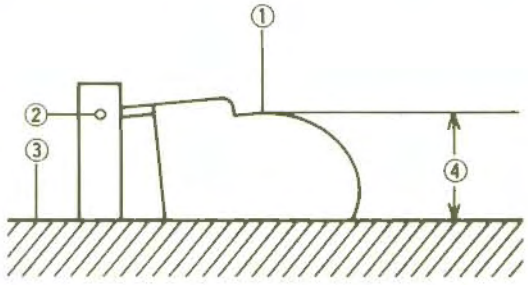
Float Height
16 ± 1 mm



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
4. Float Height

•Place a suitable container beneath the carburetor.

NOTE

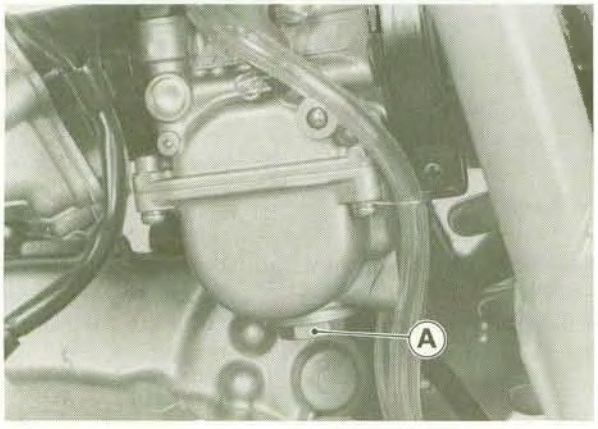
○*Float height is the distance from the float bowl mating surface of the carburetor body (with the gasket removed) to the top of the float. Measure the height with the carburetor upside down.*

Fuel System Clean

WARNING

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

- Place a suitable container beneath the carburetor.
- Turn the fuel tap to the OFF position.
- Remove the drain plug from the bottom of the float bowl and check for water or dirt in the fuel.



A. Drain Plug

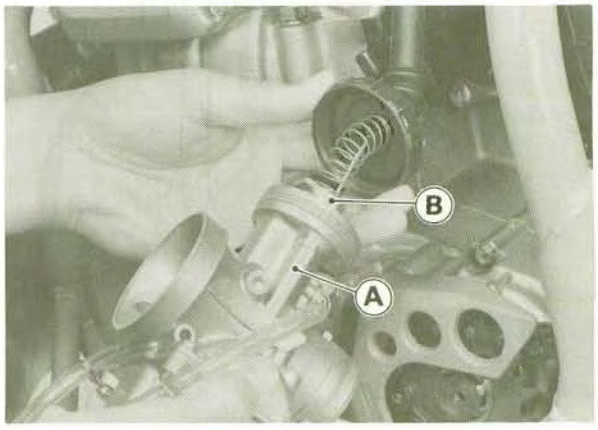
★If any water or dirt comes out, clean the carburetor, fuel tap and fuel tank (see Fuel Tank).
- Install the drain plug securely.

Carburetor Removal

WARNING

○**Gasoline is extremely flammable and can be explosive under certain conditions. Always stop the engine and do not smoke. Make sure the area is well ventilated and free any source of flame or sparks; this includes any appliance with a pilot light.**

- Turn the fuel tap to the OFF position and pull the fuel hose off the tap.
- Place a suitable container beneath the carburetor.
- Drain the fuel from the float bowl by remove the drain plug.
- Loosen the clamps, and remove the carburetor from the end of the air cleaner duct, and then pull it out of the carburetor holder.
- Unscrew the carburetor cap, and pull out the throttle valve assembly.



A. Carburetor B. Throttle Valve

CAUTION

○**If the throttle valve is not removed from the cable, wrap it in a clean cloth to avoid damage.**

- After removing the carburetor, push a clean, lint-free towel into the carburetor holder and the air cleaner duct to keep dirt or other foreign material from entering.

WARNING

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

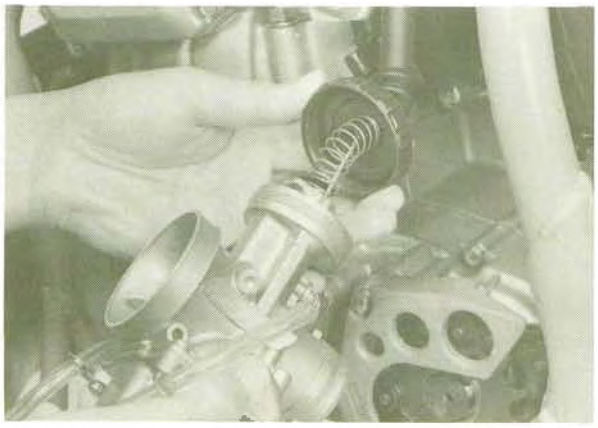
CAUTION

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

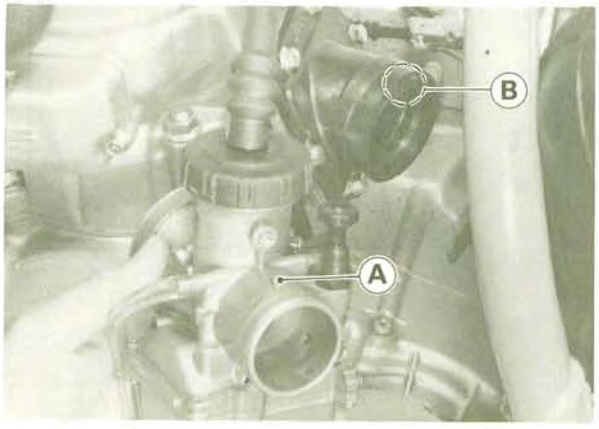
Carburetor Installation Notes

•Installation is the reverse of removal.

•Being careful not to bend or otherwise damage the jet needle. Check to see that the throttle valve goes all the way down into the carburetor body, and slides smoothly.



•When installing the carburetor into the carburetor holder, align the center of the carburetor with the groove on the holder.



A. Center of the carburetor
B. Groove

•Route the air vent tube properly (see Hose Routing in the General Information chapter).

CAUTION

○Always keep the tubes free of obstruction, and make sure they do not get pinched by the chain or shock absorber.

•After installing the carburetor, do the following.

○Turn the fuel tap to the ON or RES position, and check for fuel leakage from the carburetor.

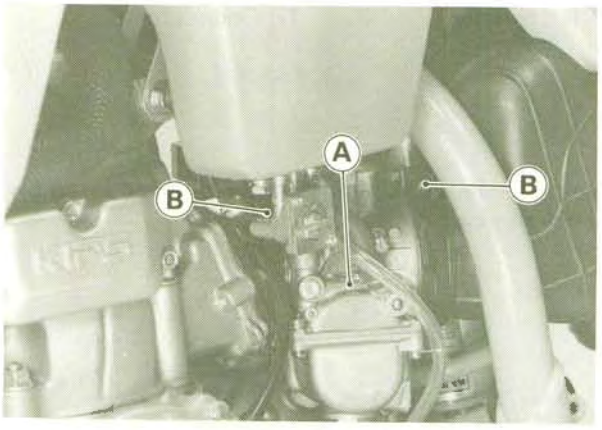
WARNING

○Fuel spilled from the carburetor is hazardous.

○Adjust the following items if necessary.
Throttle Cable
Idle Speed

Carburetor Disassembly

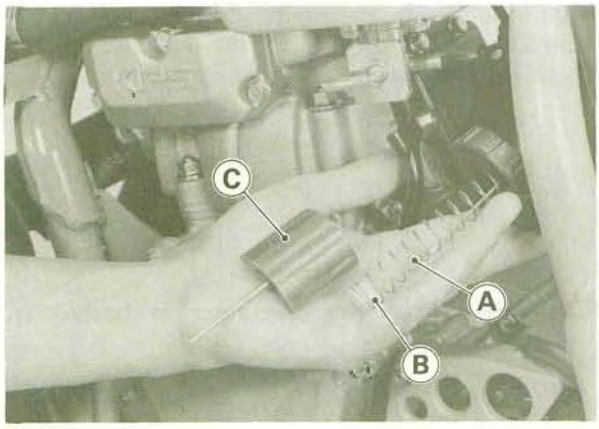
•Remove the carburetor.



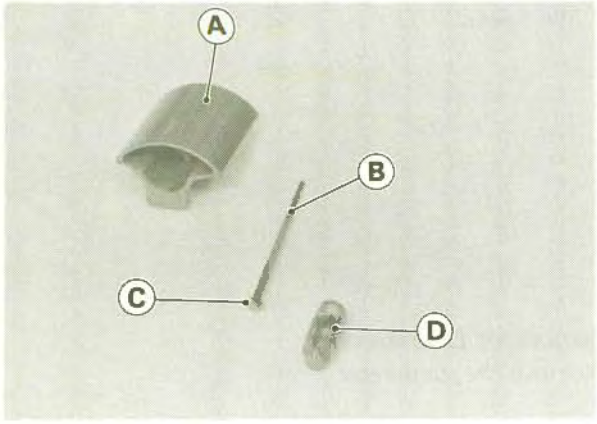
A. Carburetor B. Clamp Screw

•Remove the throttle valve assembly and carburetor cap from the carburetor cable lower end.

•Disassemble the throttle valve assembly; spring, retainer, connector, jet needle, circlip and throttle valve.

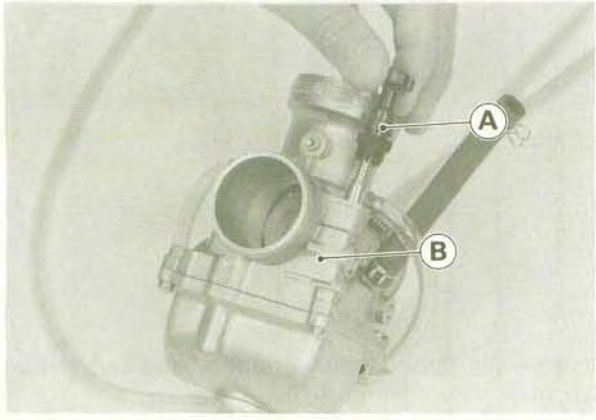


A. Spring
B. Retainer
C. Throttle Valve



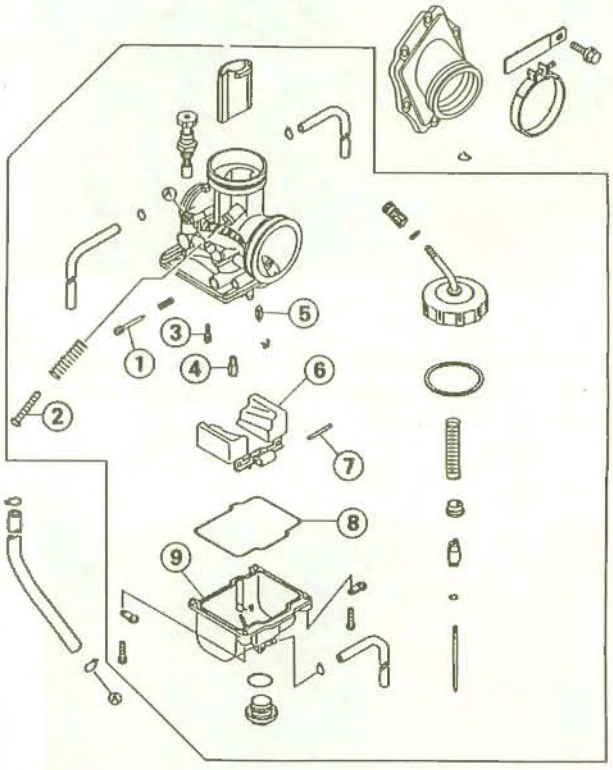
A. Throttle Valve
B. Jet Needle
C. Circlip
D. Connector

•Remove the choke knob/starter plunger assembly from the carburetor.



A. Choke Knob/Starter Plunger Assembly
B. Carburetor

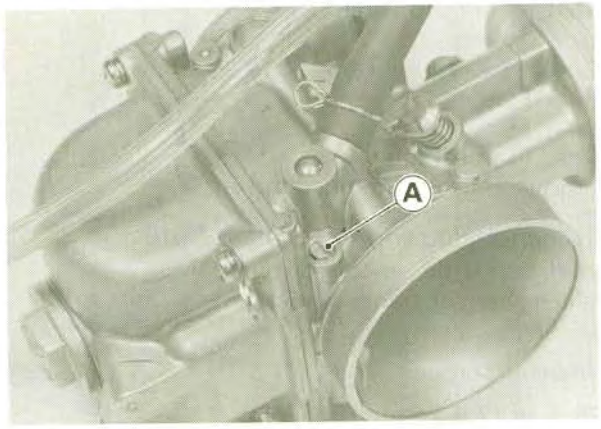
•Remove the following parts from the carburetor body.



1. Air Screw
2. Idle Adjusting Screw
3. Slow Jet
4. Main Jet
5. Float Valve Needle
6. Float
7. Pin
8. O-ring
9. Float Bowl

Carburetor Assembly Notes

- Assembly is the reverse of disassembly.
- Clean the disassembled parts before assembling.
- Replace the float bowl O-ring with a new one if it is deteriorated or damaged.
- Turn in the air screw fully but not tightly, and then back it out 1½ turns.



A. Air Screw

Carburetor Cleaning

WARNING

○Clean the carburetor 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 solvent to clean the carburetor.

- Make sure the fuel tap is in the OFF position.
- Drain the fuel in the carburetor.
- Remove the carburetor.
- Disassemble the carburetor.

CAUTION

○Do not use compressed air on an assembled carburetor, the float 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.

- 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, and install it on the motorcycle.

Carburetor Inspection

WARNING

○Gasoline is extremely flammable and can be explosive under certain conditions. Always stop the engine and 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 is incorrect, inspect the rest of the carburetor before correcting it.

- Pull the throttle cable to check that the throttle valve moves smoothly and returns by spring pressure.

★If the throttle valve does not move smoothly, replace the carburetor.

- Clean the carburetor.

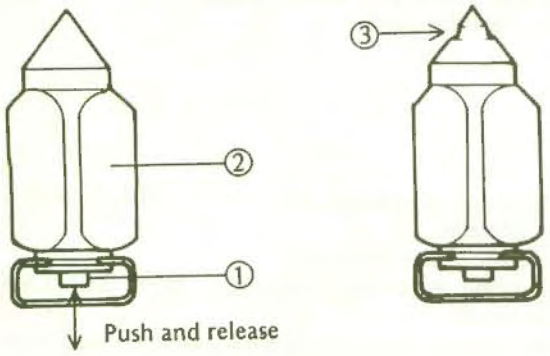
- Remove the float valve needle.
- Check the float valve needle for wear.

★If the needle is worn as shown below, replace the valve needle.

- Push the rod in the valve needle, then release it.

★If the rod does not come out fully by spring tension, replace the valve needle.

Float Valve Needle Wear



1. Rod
2. Valve Needle
3. Valve Needle Wear

- Remove the slow jet
- Check the slow jet for any damage.

★If the slow jet is damaged, replace it with a new one.

- Remove the throttle valve and jet needle.
- Inspect the outside of the throttle valve for scratches and abnormal wear.

★If it is badly scratched or worn, replace the throttle valve.

- Inspect the inside of the carburetor body for these same faults.

★If it is badly scratched or worn, replace the entire carburetor.

- Check the jet needle for wear.

★A worn needle jet should be replaced.

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

Air Cleaner

Air Cleaner Housing Removal

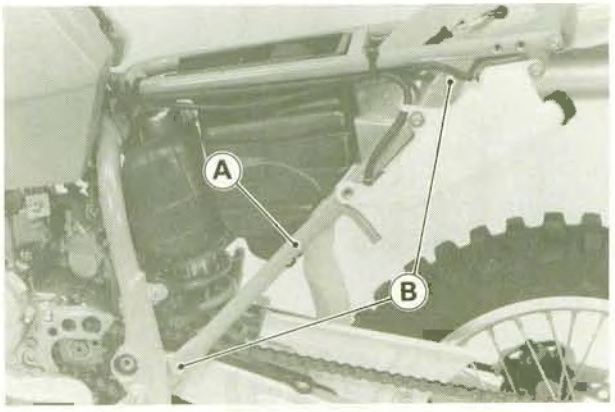
- Loosen the air cleaner duct clamp.
- Remove the following parts.
  - Seat
  - Air Cleaner Housing Cap
  - Side Covers
  - Coolant Reserve Tank
  - Rear Fender
  - Rear Flap
  - Rear Frame Pipe
- Remove the air cleaner housing.

Air Cleaner Housing Installation Notes

- Installation is the reverse of removal.
- Tighten the rear frame pipe mounting bolts to the specified torque.

Tightening Torque:

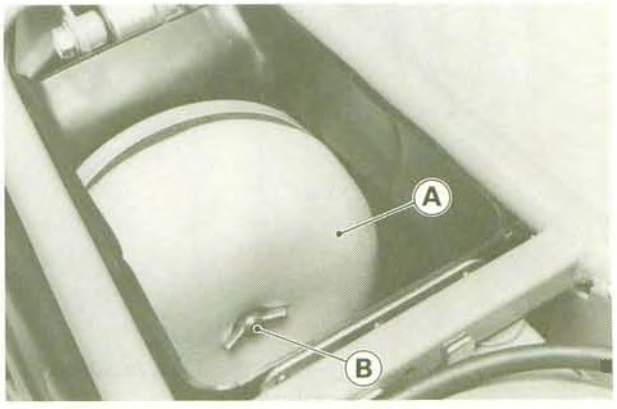
25 N-m (2.6 kg-m, 19.0 ft-lb)



A. Rear Frame Pipe
B. Mounting Bolts

Air Cleaner Element Removal

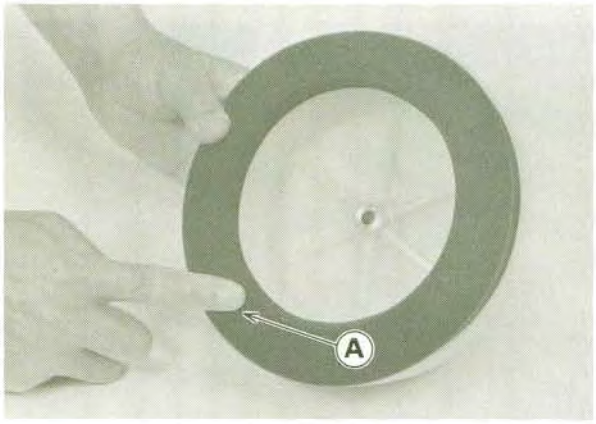
- Remove the seat.
- Pull the air cleaner housing cap out from the air cleaner housing.
- Remove the wing bolt and pull out the element.



A. Air Cleaner Element
B. Wing Bolt

Air Cleaner Element Installation Notes

•Installation is the reverse of removal.
•When installing the element, coat the lip of the element with a thick layer of all purpose grease to assure a complete seal against the air cleaner element base. Also, coat the base where the lip of the element fits.



A. Grease

Air Cleaner Element Cleaning and Inspection

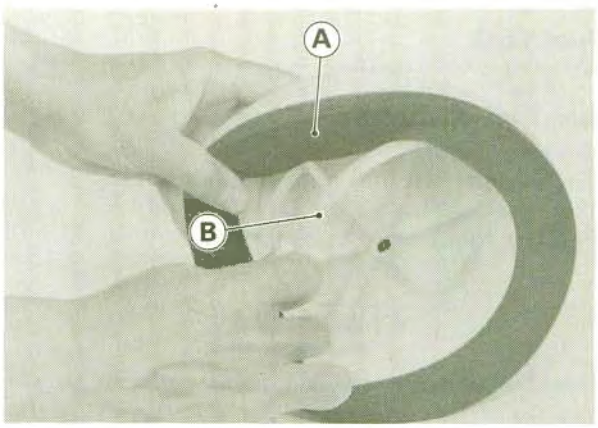
NOTE

○In dusty areas, the element should be cleaned more frequently than recommended interval.
○After riding through rain or on muddy roads, the element should be cleaned immediately.
○Since repeated cleaning opens the pores of the element, replace it with a new one in accordance with the Periodic Maintenance Chart. Also, if there is a break in the element material or any other damage to the element, replace the element with a new one.

WARNING

○Clean the element in a well-ventilated area, and take care that there are no sparks 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 a low flash-point solvent to clean the element.

•Remove the air cleaner element, and separate the element from the element frame.



A. Element B. Frame

• Clean the element in a bath of a high flash-point solvent, and squeeze the element dry.
• Check all the parts of the element for visible damage.
★If any of the parts of the element are damaged, replace them.
• After cleaning, saturate the element with 2-stroke racing oil or high-quality foam-air-filter oil, squeeze out the excess, then wrap it in a clean rag and squeeze it dry as possible. Be careful not to tear the element.
• Assemble the element.
• Install the element.

Fuel Tank

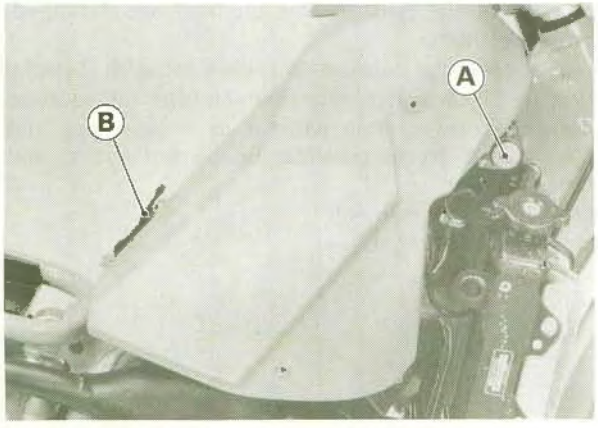
Fuel Tank Removal

- Remove the seat.
- Remove the left and right radiator covers.
- Turn the fuel tap to the OFF position.
- Pull the fuel hose off the fuel tap.

WARNING

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

- Unhooks the rubber band, and remove the fuel tank mounting bolts.
- Remove the fuel tank .

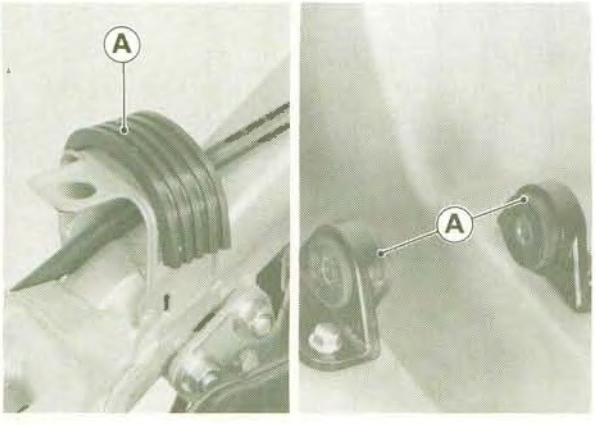


A. Mounting Bolt B. Rubber Band

- Drain the fuel tank.

Fuel Tank Installation Notes

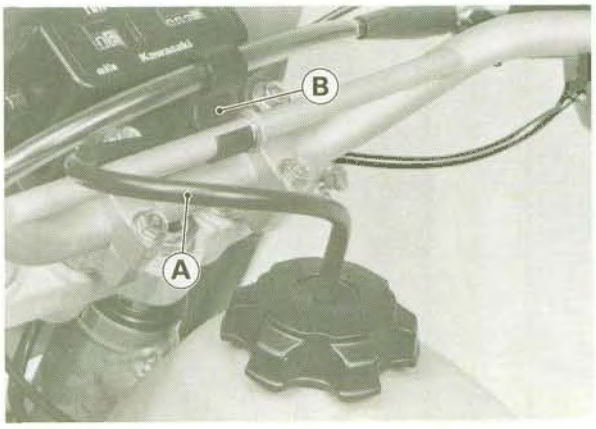
- Installation is the reverse of removal.
- Check the rubber dampers on the frame top-pipe and fuel tank.



A. Dampers

★If the dampers are damaged or deteriorated, replace them.

- Be sure the fuel hose is clamped to the fuel tap to prevent leaks.
- Insert the fuel tank breather hose outlet end into the hose clamp.



A. Fuel Tank Breather Hose
B. Hose Clamp

Fuel Tap Removal

- Remove the fuel tank and drain it.
- Remove the mounting bolts and take out the fuel tap.

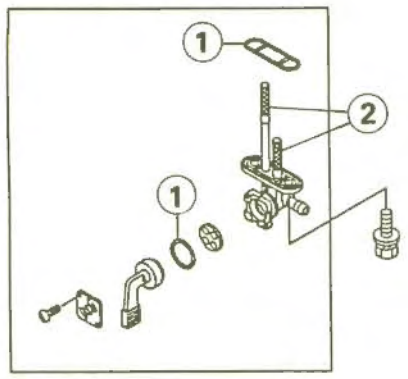
Fuel Tap Installation Notes

- Installation is the reverse of removal.
- 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.

Fuel Tap Inspection

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

Fuel Tap



1. O-ring 2. Filter Screen

★If the fuel tap screen has any breaks or is 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 at OFF position, replace the damaged O-ring.

Fuel Tank Cap Inspection

- Remove the fuel tank cap.
- Inspect the gasket on the tank cap for visible damage.

★Replace the gasket if it is damaged.

- Remove the breather hose and check to see that the hose is not clogged.

★If it is clogged, blow out the breather hose with compressed air.

Fuel Tank and Tap Cleaning

- Remove the fuel tank and drain it.
- 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 sparks or flame anywhere near the working area. Because of the danger of highly flammable liquids, do not use gasoline or low flash-point solvent to clean the tank.

- Pour the solvent out of the tank.
- Remove the fuel tap from the tank by taking out the bolts.
- Clean the fuel tap filter screen 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.

Reed Valve

Reed Valve Removal

- Remove the carburetor from the carburetor holder and air cleaner duct.
- Remove the carburetor holder mounting bolts, and move the holder rearward.
- Take the reed valve out of the cylinder.

Reed Valve Installation

- Installation is the reverse order of removal (see carburetor Installation Notes).
- Tighten the carburetor holder mounting bolts securely.

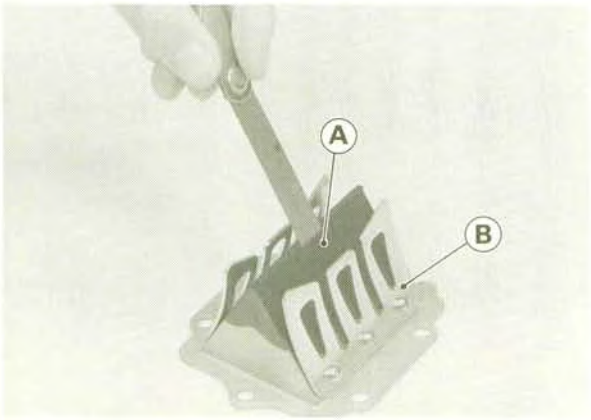
Reed Valve Inspection

- Inspect the reeds for cracks, folds, or other visible damage.

★ If there is any doubt as to the condition of a reed, replace the reed valve part with a new one.

★ If a reed becomes wavy, replace the valve part with a new one even if its warp is less than the service limit.

- Measure the clearance between the reed and holder, and check the reed warp as shown.



A. Reed B. Reed Valve Holder

★ If any one of the clearance measurements exceeds the service limit, replace the valve part with a new one.

Reed Warp

Service Limit: 0.5 mm

COOLING SYSTEM

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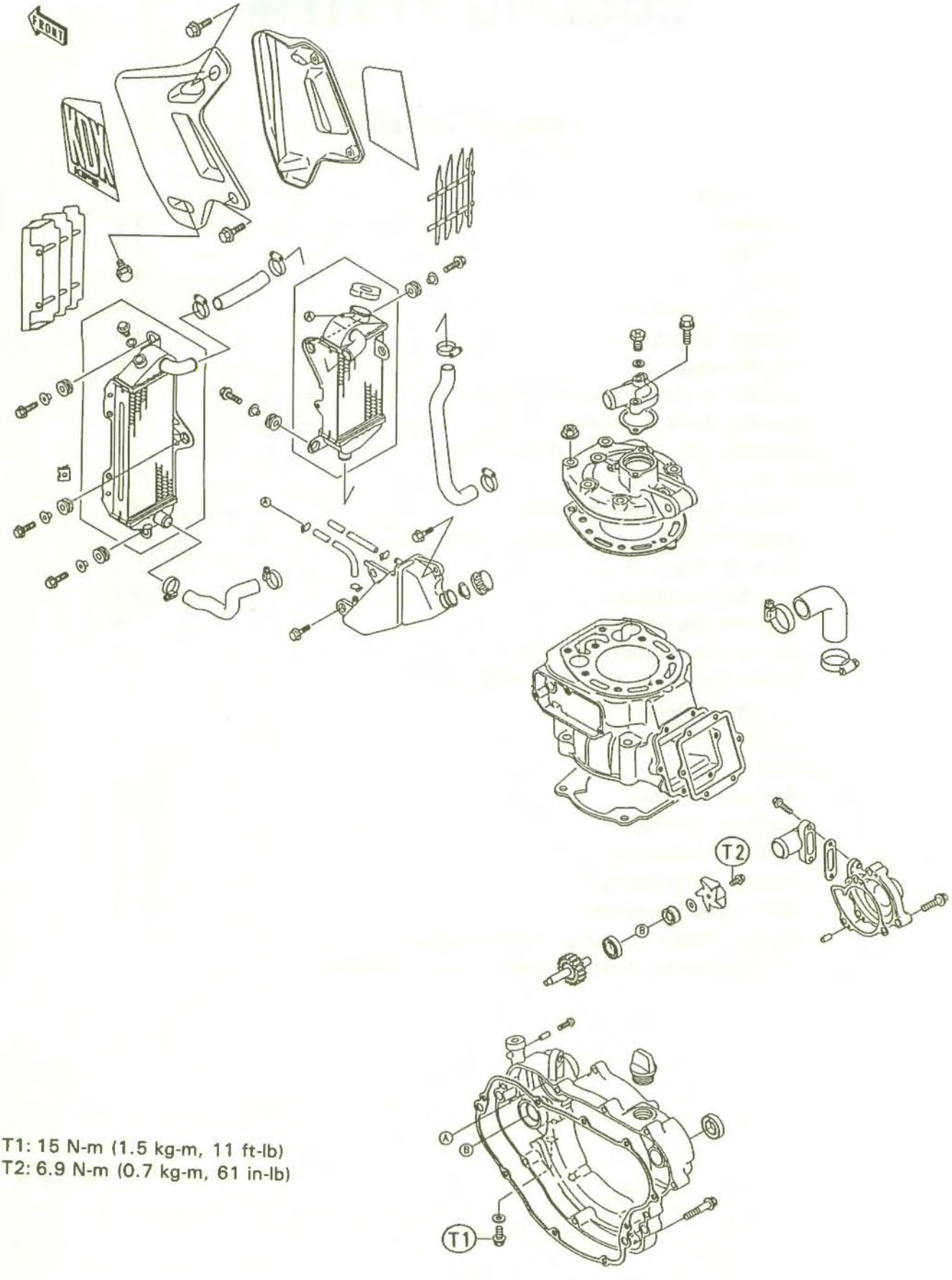
Exploded View



T1: 15 N-m (1.5 kg-m, 11 ft-lb)
T2: 6.9 N-m (0.7 kg-m, 61 in-lb)

Specifications

Item	Standard
Coolant:	
Type	Permanent type of antifreeze for aluminum engines and radiators
Color	Green
Mixed ratio	Soft water 50%, Coolant 50%
Total amount:	1.4L
Radiator:	
Cap relief pressure	95 — 125 kPa (0.95 — 1.25 kg/cm^2, 18 psi)

Special Tool

Bearing Driver Set: 57001-1129

Coolant

Check the coolant level each day before riding the motorcycle, and replenish coolant if the level is low. Change the coolant in accordance with the Periodic Maintenance Chart (see the General Information chapter).

Recommended coolant:
Permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)
Water and coolant mixture ratio:
1:1 (Water 50%, Coolant 50%)
Total amount:
1.4L

WARNING

○To avoid burns, do not remove the radiator cap or try to inspect the coolant level or change the coolant when the engine is still hot. Wait until it cools down.

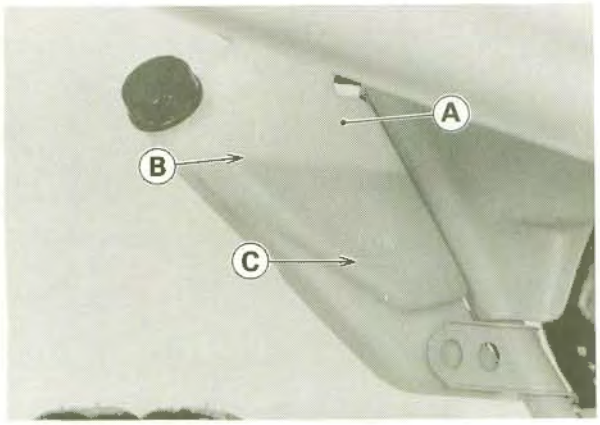
Coolant Inspection

Coolant Level:

- Situate the motorcycle so that it is perpendicular to the ground.
- Check the coolant level through the level marks on the reserve tank. The coolant level should be between the FULL and LOW marks.

NOTE

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



A. Reserve Tank
B. FULL Mark
C. LOW Mark

★If the coolant level is low, unscrew the cap from the reserve tank, and add coolant through the filler opening to the FULL mark. Install the cap.

Coolant Deterioration:

- Visually inspect the old coolant.

★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, check for a cooling system leak. It may be caused by exhaust gas leaking into the cooling system.

Coolant Change

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

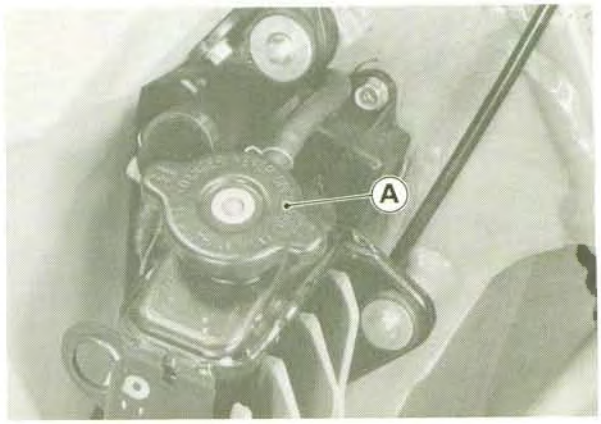
Coolant Draining:

WARNING

○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.

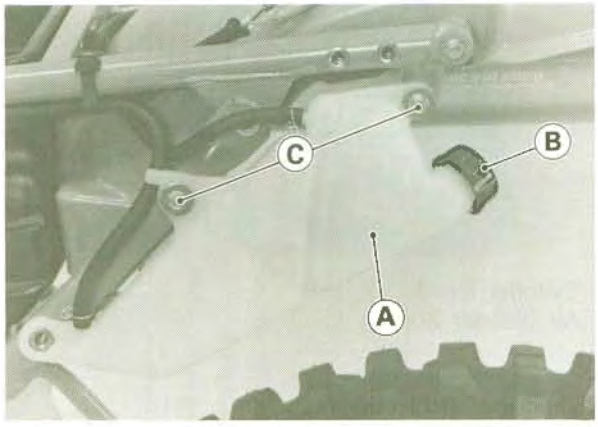
○Since coolant is harmful to the human body, do not use for drinking.

- Remove the right radiator cover.
- Remove the radiator cap in two steps. First turn the cap counterclockwise to the first stop and wait there for a few seconds. Then push down and turn it further in the same direction and remove the cap.



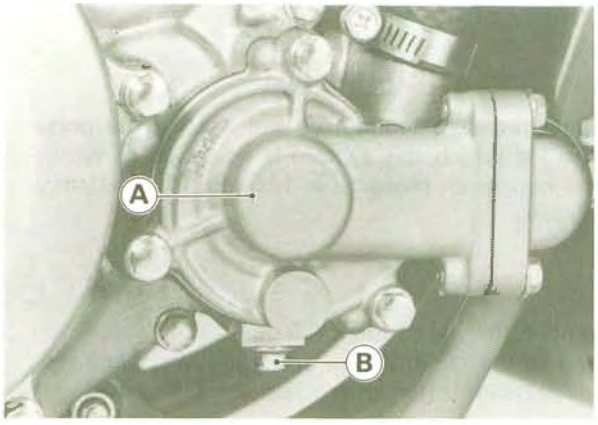
A. Radiator Cap

•Remove the left side cover.
•Remove the reserve tank from the frame by removing the bolts.



A. Reserve Tank
B. Cap
C. Bolts

•Unscrew the cap off the reserve tank, and pour the coolant into a container.
•Place a container under the coolant drain plug, and drain the coolant from the radiator and engine by removing the drain plug at the right engine cover. Immediately wipe or wash out any coolant that spills on the frame, engine, or wheel.



A. Water Pump Cover
B. Drain Plug

WARNING

○Coolant on tires will make them slippery and can cause an accident and injury.

•Inspect the old coolant for visual evidence of corrosion and abnormal smell (see Coolant Deterioration).

Coolant Filling:

CAUTION

○Use coolant containing corrosion inhibitors made specifically for aluminum engines and radiators in accordance with the instruction of the manufacture's.
○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 scale accumulation in the water passages, and considerably reduces the efficiency of the cooling system.

Coolant:

Type	:	**Permanent type antifreeze for aluminum engines and radiators**
Color	:	**Green**
Mixed ratio	:	**Soft water 50%, coolant 50%**
Freezing point	:	**−35°C (−31°F)**
Total amount	:	**1.4L**

•Install the reserve tank on the frame with two bolts.
•Install the drain plug. Always replace the gasket with a new one, if it is damaged.
•Tighten the drain plug to the specified torque.

Tightening Torque:

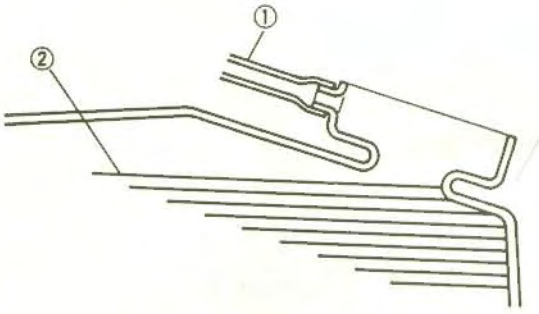
15 N-m (1.5 kg-m,11 ft-lb)

•Fill the radiator up to the bottom of the radiator filler neck with coolant, and install the cap, turning it clockwise about ¼ turn.

NOTE

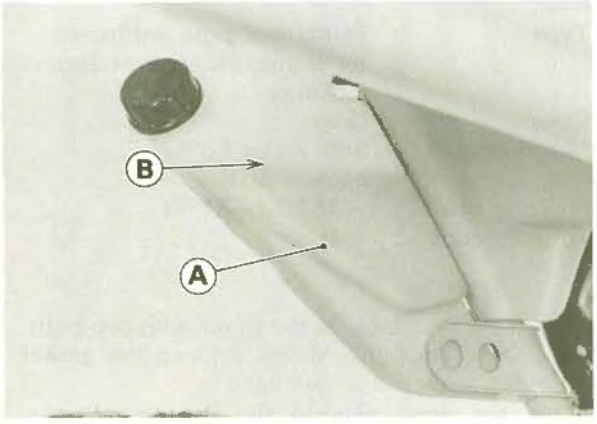
○Pour in the coolant slowly so that it can expel the air from the engine and radiator.
○The radiator cap must be installed in two steps. First turn the cap clockwise to the first stop. Then push down on it and turn it the rest of the way.

Radiator Filler Neck



1. Breather Hose 2. Coolant Level

•Fill the reserve tank up to the FULL mark with coolant, and install the cap.



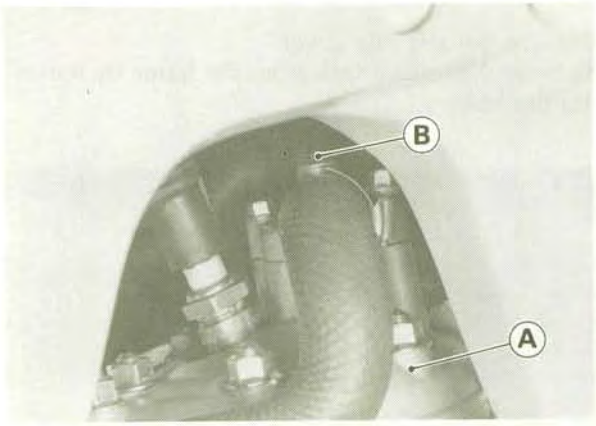
A. Reserve Tank B. FULL Mark

•Check the cooling system for leaks.
•Install the right radiator cap and left side cover.

Air Bleeding

Before putting the motorcycle into operation, any air trapped in the cooling system must be removed as follows.

•Loosen the air bleeder bolt on the rear of the cylinder head and until the coolant begins to flow out the air bleeder bolt hole (that is, after all the remaining air has been forced out).



A. Cylinder Head
B. Air Bleeder Bolt

•Tighen the air bleeder bolt.
•Start the engine, warm up the engine thoroughly, and then stop the engine.
•Remove the left side cover.
•Check the coolant level after the engine cools down.
★If the coolant level is low, remove the reserve tank cap, and add coolant up to the FULL mark.
•Install the reserve tank cap.
•Check the cooling system for leaks.
•Install the left side cover.

Cooling System Pressure Testing

Any time the system slowly loses coolant, inspect for leaks.

CAUTION

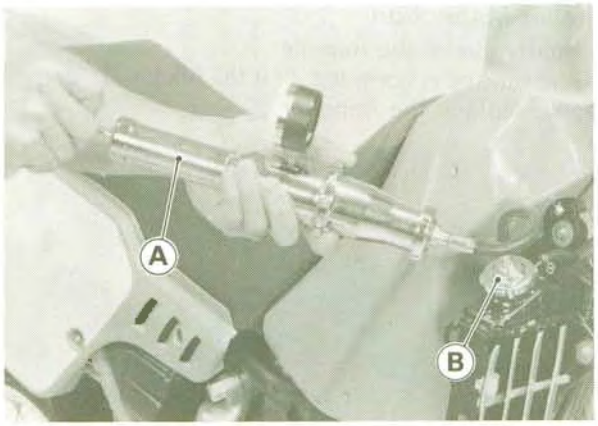
○**During pressure testing, do not exceed the pressure for which the system is designed to work. The maximum pressure is 125 kPa (1.25kg/cm², 18 psi).**

•Remove the right radiator cover.
•Remove the radiator cap, and install a cooling system pressure tester on the radiator filler neck.

NOTE

○*Wet the adapter cap sealing surfaces with water or coolant to prevent pressure leaks.*

•Build up pressure in the system carefully until the pressure reaches 125 kPa (1.25 kg/cm², 18 psi).
•Watch the gauge for at least 6 seconds. If the pressure holds steady, the cooling 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. Check the cylinder head gasket for leaks.

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 passages 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

○**Avoid the use of 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 opeating tempreature for about ten minutes.
- Stop the engine, and drain the cooling system after the coolant cools down.
- Fill the system with fresh water.
- Warm up the engine and drain the system after the coolant cools down.
- Repeat the previous two steps once more.
- Fill the system with a permanent type coolant, and bleed the air from the system (see Air Bleeding).

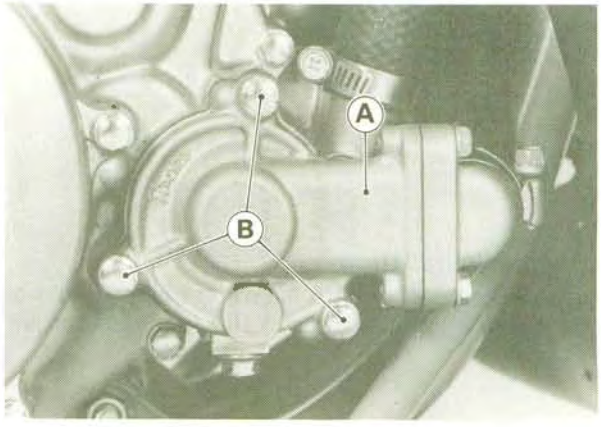
Disassembly and Assembly Precautions

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

Water Pump

Water Pump Cover Removal

- Drain the coolant (see Coolant Draining).
- Loosen the cooling hose clamps, and disconnect the cooling hoses on the water pump cover.
- Remove the water pump cover bolts, and remove the water pump cover.



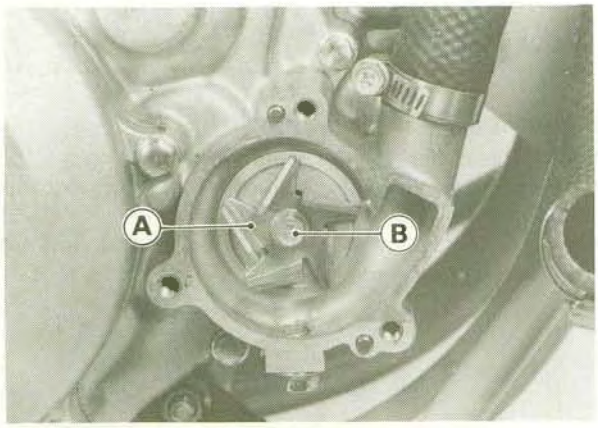
A. Water Pump Cover B. Bolts

Water Pump Cover Installation Notes

- Installation is the reverse of removal.
- Replace the pump cover gasket with a new one.
- Fill the cooling system (see Coolant Filling).
- Bleed the air from the cooling system.

Impeller Removal

- Drain the coolant (see Coolant Draining).
- Remove the cover bolts and take out the water pump cover from the right engine cover with the cooling hose (s) attached.
- Remove the impeller bolt, and pull out the impeller and washer.



A. Impeller B. Bolt

Impeller Installation

- Install the impeller onto the water pump shaft, and tighten the impeller bolt to the specified torque.

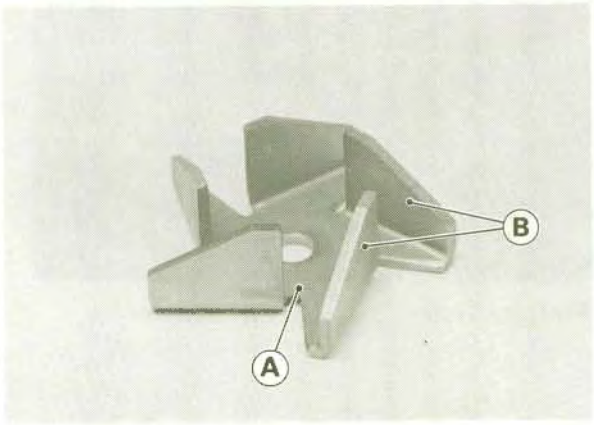
Tightening Torque:

6.9 N-m (0.7 kg-m, 61 in-lb)

Impeller Inspection

- Visually check the impeller.

★If the surface is corroded, or if the blades are damaged, replace the impeller.



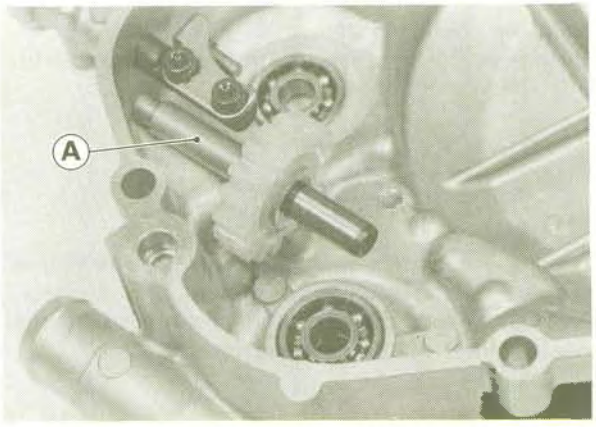
A. Impeller B. Blades

Water Pump Shaft Removal

- Remove the following parts.
  Impeller
  Right Engine Cover (see Right Engine Cover in the Engine Right Side chapter)
- Pull out the water pump shaft toward inside of the right engine cover.

CAUTION

○Be sure to pull out the shaft toward the inside of the cover to prevent the oil seal lips from peeling.

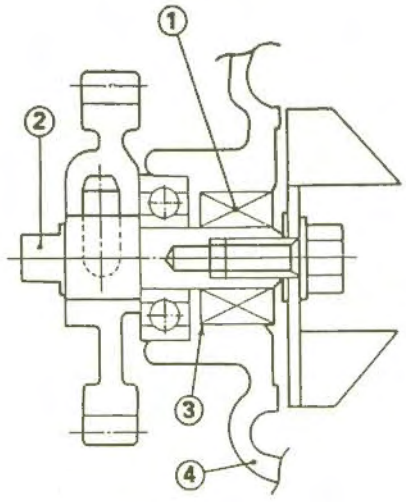


A. Water Pump Shaft

Water Pump Shaft Installation Notes

- Installation is the reverse of removal.
- To prevent the oil seal lips from peeling, apply a molybdenum disulfide grease to the water pump shaft and insert it into the oil seal from the inside of the right engine cover.

Water Pump Shaft Installation



1. Oil Seal
2. Water Pump Shaft
3. Marked Side
4. Right Engine Cover

CAUTION

○Be sure to apply a molybednum disulfide grease to the water pump shaft when installing. If it is installed dry, the seals may wear excessively.

Oil Seal Removal

- Remove the following parts.
  - Impeller
  - Right Engine Cover (see Right Engine Cover in the Engine Right Side chapter)
  - Water Pump Shaft
- Insert a bar into the water pump shaft hole from the outside of the right engine cover, and remove the ball bearing by tapping evenly around the bearing inner race.
- Insert a bar into the water pump shaft hole from the inside of the right engine cover, and remove the oil seal by tapping evenly around the seal lips.

Oil Seal Installation

CAUTION

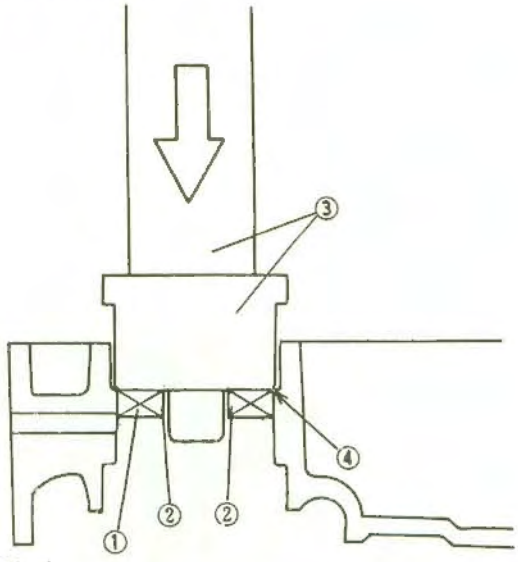
○If the oil seal or ball bearing is removed, replace all of them with new ones at the same time.

- Apply plenty of high temperature grease to the oil seal lips.
- Press the oil seal into the hole from the outside of the right engine cover with a bearing driver set special tool) so that the marked side faces toward the inside of the cover.

CAUTION

○Use a bearing driver larger in diameter than the oil seal, and press the oil seal into the hole until the edge of the oil seal is flush with the step for the ball bearing.

Oil Seal Installation



1. Oil Seal
2. Apply High Temperature Grease
3. Bearing Driver Set: 57001-1129
4. Step

- Press the ball bearing into the hole with a bearing driver set (special tool: 57001-1129) until the bearing is bottomed against the step.

Radiator

Radiator Removal

- Remove the radiator cover (s).
- Drain the coolant (see Coolant Draining).
- Loosen the hose clamps, and pull off the cooling and breather hoses.
- Remove the mounting bolts, and take out the radiator and radiator cover.

Radiator Installation

- Installation is the reverse of removal (see Coolant Filling).

Radiator Inspection

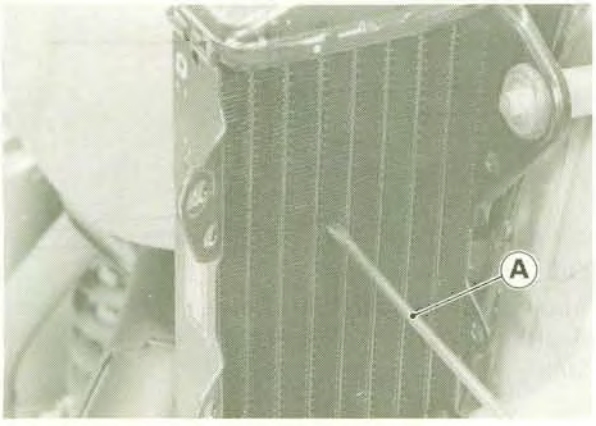
- Check the radiator core.

★If there are obstructions to air flow, remove them.

★If the corrugated fins are deformed, carefully straighten them with the thin blade of a screwdriver.

CAUTION

○Do not tear the radiator tubes while straightening the fins.



A. Thin Screwdriver

★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.

CAUTION

○When cleaning the radiator with compressed air, be careful of the following to avoid damage to the fins.

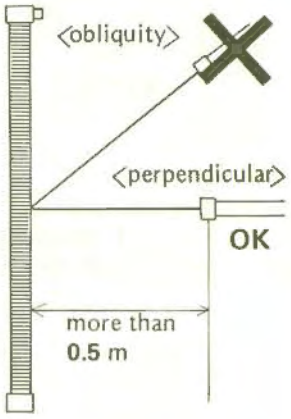
○Keep the air nozzle over 0.5 m (20 in.) away from the radiator.

○Blow air perpendicularly to the radiator core.

○Never blow air at an angle against the fins but straight through them in the direction of natural air flow.

○Never shake the air nozzle at a right angle against the fins, be sure to move it at a level with the fins.

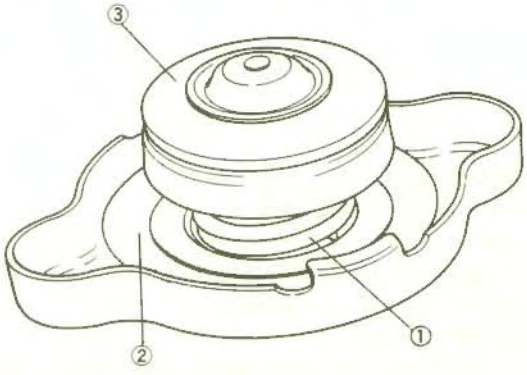
Radiator Cleaning



Radiator Cap Inspection

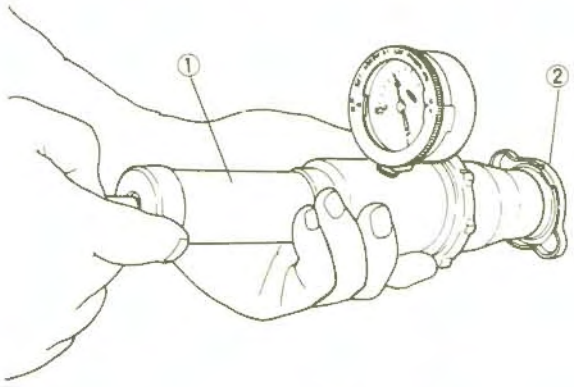
- Check the condition of the valve spring, and the top and bottom valve seals of the radiator cap.

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



1. Valve Spring
2. Top Valve Seal
3. Bottom Valve Seal

•Wet the top and bottom valve seals with water or coolant to prevent pressure leaks.
•Install the cap on a cooling system pressure tester.
•Watching the pressure gauge, pump the tester to build up the test pressure. The cap must open at the specified relief pressure (the gauge hand flicks down).



1. Pressure Tester 2. Radiator Cap

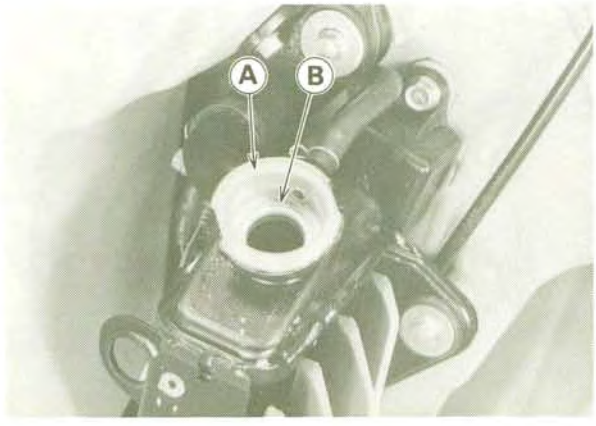
Radiator Cap Relief Pressure:

95—125kPa (0.95—1.25 kg/cm², 14—18 psi)

○ Also, the cap must hold the relief pressure for at least 6 seconds.
★ If the cap cannot hold the pressure, or if the relief pressure is too high or too low, replace the cap with a new one.

Filler Neck Inspection

•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.



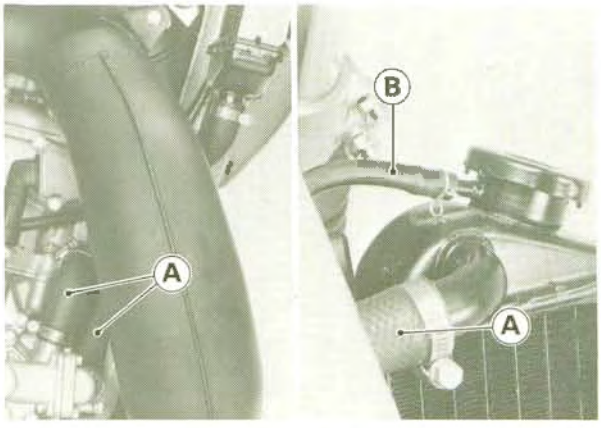
A. Top Sealing Seat B. Bottom Sealing Seat

Cooling Hoses, Breather Hose Inspection

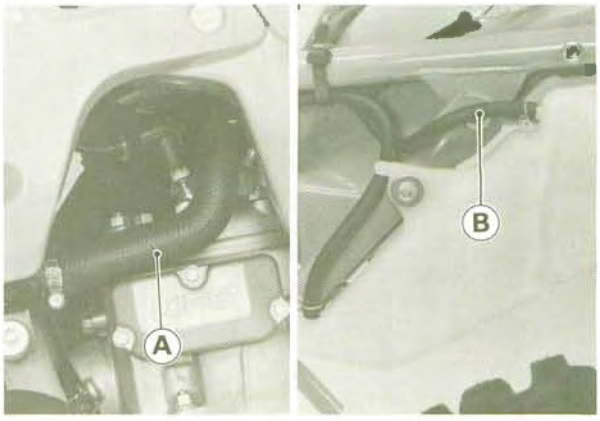
•In accordance with the Periodic Maintenance Chart, visually inspect the hoses for signs of deterioration. Squeeze the hose. A hose should not be hard and brittle, nor should it be soft or swollen.
•Replace any damaged hose.

Cooling Hoses, Breather Hose Installation Notes

•Install the cooling hoses or breather hose being careful to follow the preformed bends (see Exploded View, and Cable, Harness, Hose Routing in the General Information chapter). Avoid sharp bending, kinking, flattening, or twisting.
•Tighten the hose clamps securely.



A. Cooling Hoses B. Breather Hose



A. Cooling Hose B. Breather Hose

ENGINE TOP END

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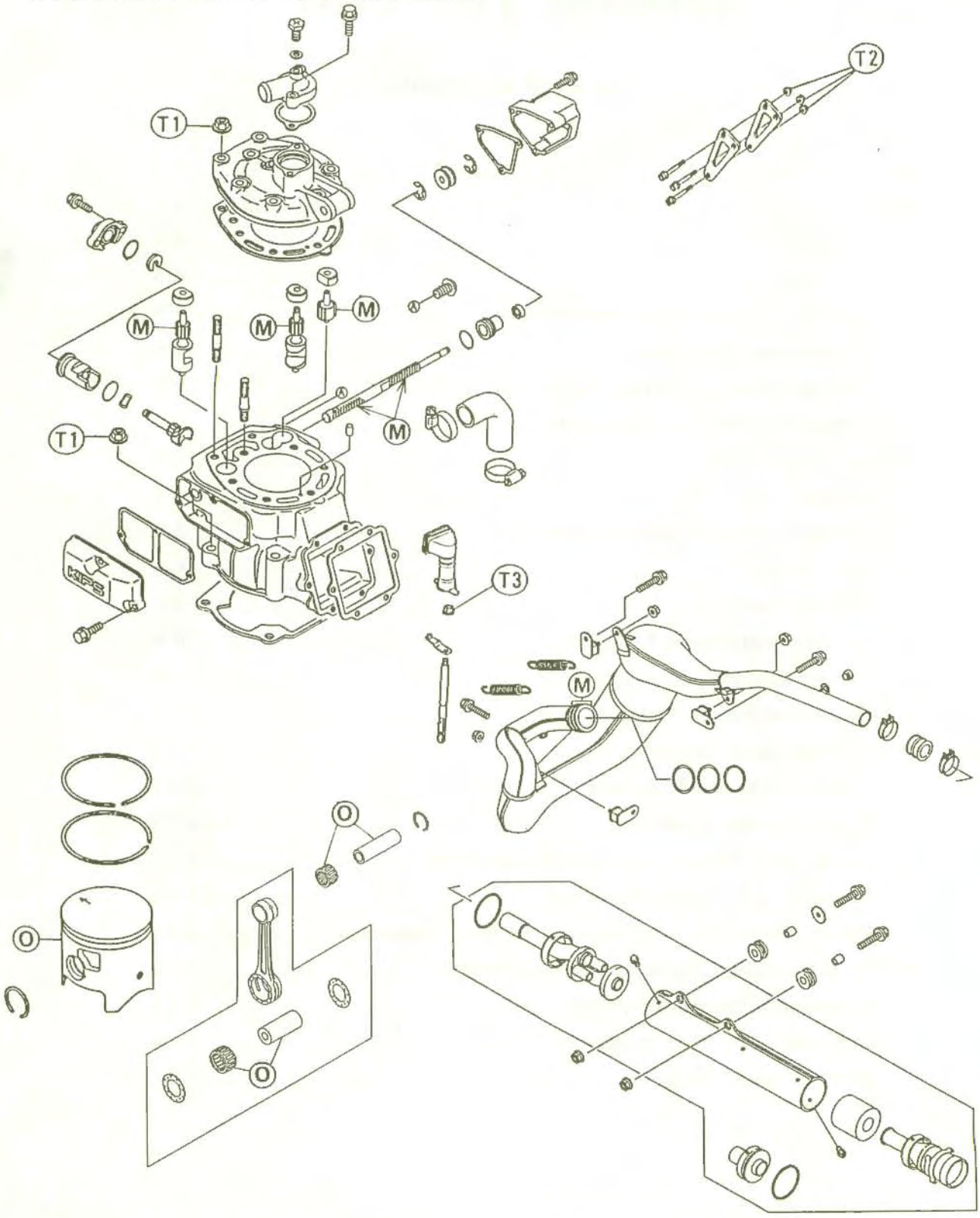
Exploded View



O: Apply engine oil to the surface.
M: Apply molybdenum disulfide grease.

T1: 25 N-m (2.5 kg-m, 18.0 ft-lb)
T2: 29 N-m (3.0 kg-m, 22.0 ft-lb)
T3: 8.3 N-m (0.85 kg-m, 74 in-lb)

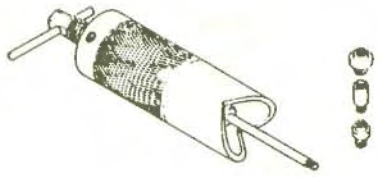
Specifications

Item	Standard	Service Limit
Cylinder Head:		
Cylinder compression	(usable range) 825 – 1280 kPa (8.4–13 kg/cm², 119–185 psi)	– – –
Cylinder head warp	– – –	0.03 mm
Cylinder, Piston:		
Cylinder inside diameter	66.016–66.031 mm	66.10 mm
Piston diameter	65.939–65.954 mm	65.79 mm
Piston/cylinder clearance	0.072–0.092 mm	– – –
Piston ring/groove clearance	0.025–0.065 mm	0.18 mm
Piston ring groove width	1.215–1.235 mm	1.30 mm
Piston ring thickness (Second ring)	1.17–1.19 mm	1.1 mm
Piston ring end gap	0.15–0.35 mm	0.7 mm
Piston pin diameter	15.995–16.000 mm	15.96 mm
Piston pin hole diameter	16.000–16.006 mm	16.07 mm
Small end inside diameter	21.003–21.014 mm	21.05 mm

Special Tool

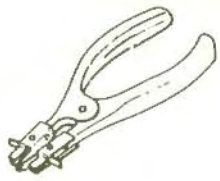
Compression Gauge: 57001-221

Piston Pin Puller Assembly: 57001-910



Adapter: 57001-1159

Piston Ring Pliers: 57001-115



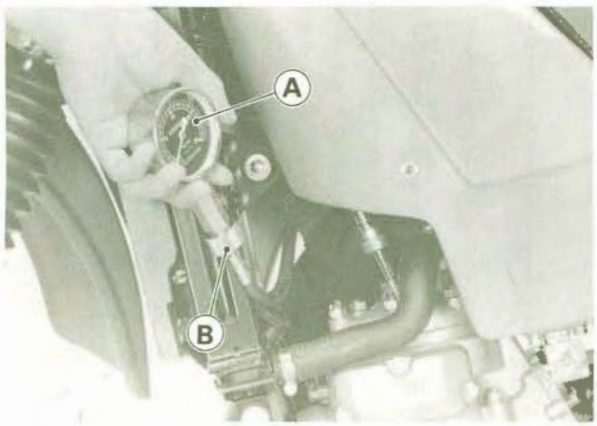
Cylinder Head

Cylinder Compression Measurement

- Start the engine
- Thoroughly warm up the engine so that the engine oil between the piston and cylinder wall will help seal compression as it does during normal running.
- Stop the engine.
- Remove the spark plug, and screw a compression gauge (special tool) firmly into the spark 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.

Cylinder Compression (Usable Range):

825–1280kPa (8.4–13 kg/cm², 119–185 psi)



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

★If cylinder compression is higher than the usable range, check the following:

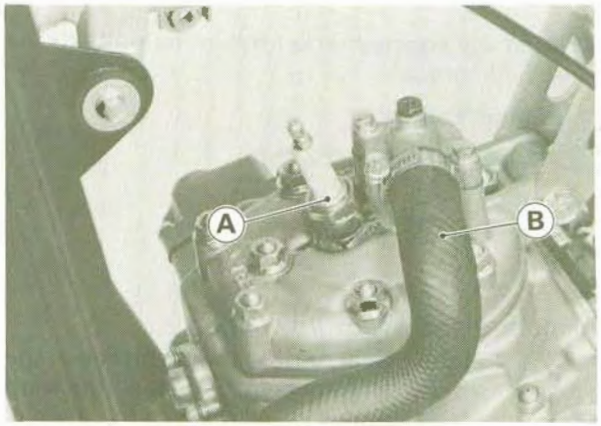
1. Carbon build-up on the piston head and cylinder head.
   — clean off any carbon on the piston head and cylinder head.
2. Cylinder head gasket, cylinder base gasket — use only the proper gaskets for the cylinder head and base. The use of gaskets of the incorrect thickness will change the compression.

★If cylinder compression is lower than the usable range, check the following:

1. Piston/cylinder clearance, piston seizure.
2. Gas leakage around the cylinder head — replace the damaged gasket and check the cylinder head for warping.
3. Piston ring, piston ring groove.

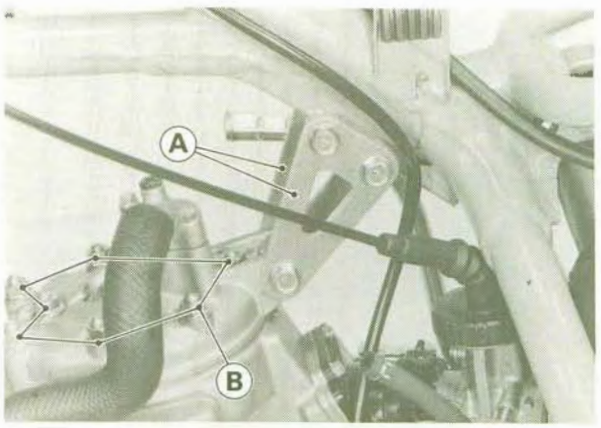
Cylinder Head Removal

- Drain the coolant (see Coolant Change in the Cooling System chapter).
- Remove the following parts:
  Seat
  Radiator Cover
  Fuel Tank
  Muffler
  Spark Plug
  Water Hose Lower End



A. Spark Plug B. Water Hose

- Remove the engine mounting brackets on the cylinder head.



A. Engine Mounting Brackets
B. Cylinder Head Nuts

- Remove the cylinder head nuts, and take off the cylinder head and gasket.

Cylinder Head Installation Notes

- Installation is the reverse of removal.
- Replace the head gasket with a new one.
- Scrape out any carbon and clean the head with a high flash-point solvent.
- Check for a crust of minerals and rust in the head water jacket, and remove them if necessary.

•Tighten the cylinder head nuts to the specified torque.

Tightening Torque:

25 N-m (2.5 kg-m, 18 ft—lb)

•Tighten the spark plug to the specified torque.

Tightening Torque:

27 N-m (2.8 kg-m, 20 ft—lb)

•Tighten the engine bracket mounting bolts to the specified torque.

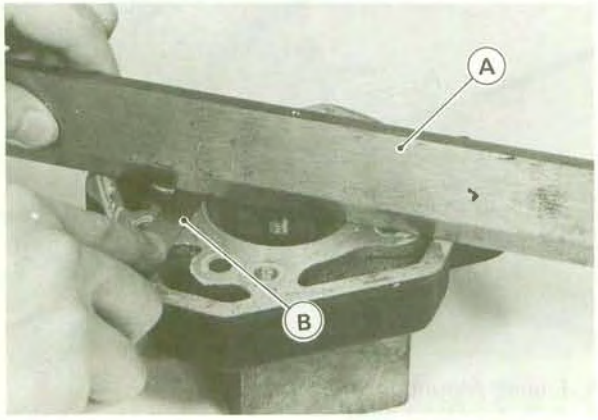
Tightening Torque:

29 N-m (3.0 kg-m, 22 ft-lb)

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: **0.03 mm**

Exhaust Valve (KIPS)

Exhaust Valve Removal

•Remove the carburetor (see carburetor Removal in the Fuel System chapter).

•Remove the cylinder head (see Cylinder Head Removal).

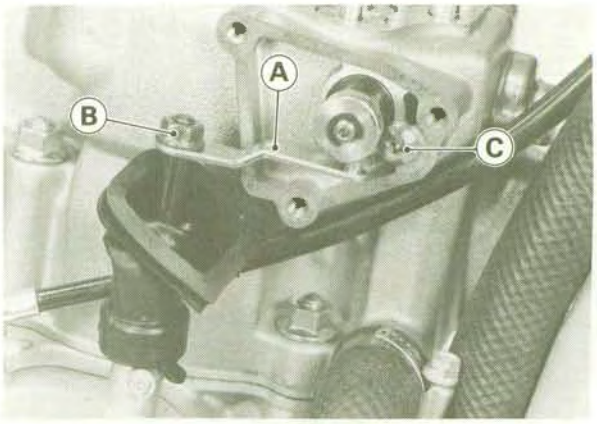
•Remove the right cover at the cylinder.

•Remove the shaft lever nut, and take off the shaft lever.

CAUTION

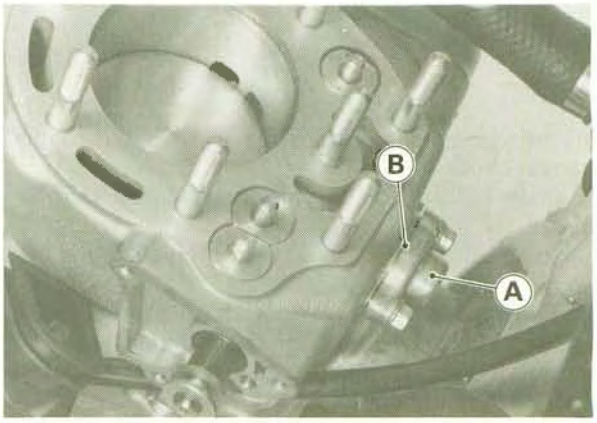
○Exhaust valve operating shaft lever nut has left-hand threads.

•Remove the exhaust valve operating rod retaining screw.



A. Shaft Lever C. Retaining Screw
B. Shaft Lever Nut

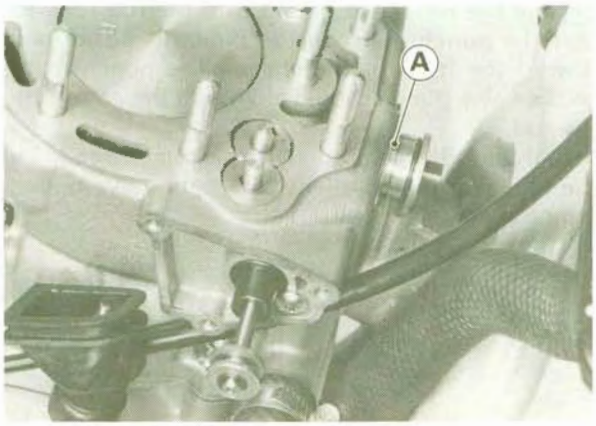
•Remove the main exhaust valve cover bolts, and remove the cover and gasket.



A. Cover B. Gasket

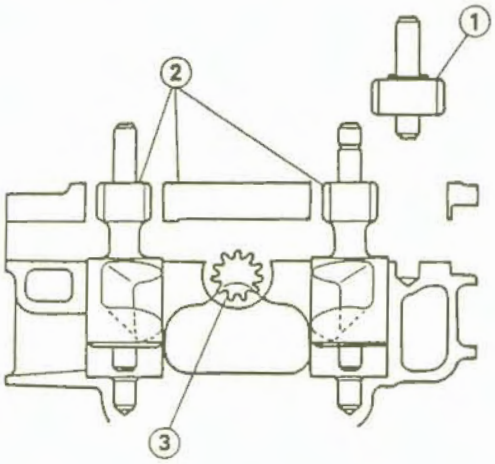
•Pull out the operating rod as far as it goes.

•Pull out the main exhaust valve until groove on the main exhaust valve holder coincide with cylinder surface.



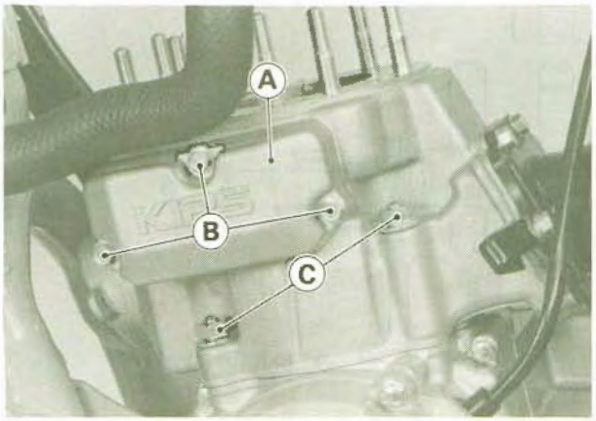
A. Groove

- Remove the idle gear.
- Lift up the right and left exhaust valves until the gear surfaces are flush with cylinder surface.



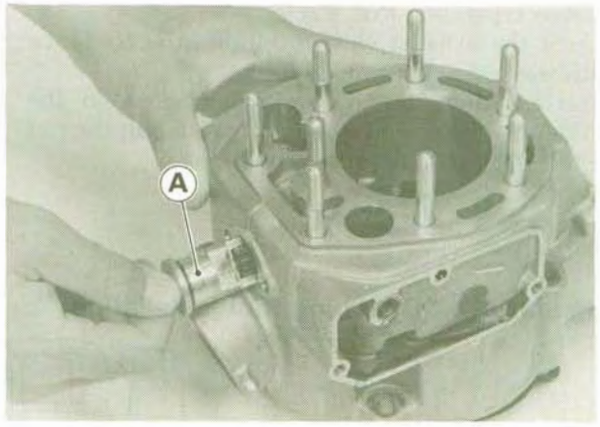
1. Idle Gear
2. Flush
3. Main Exhaust Valve

- Pull out the exhaust valve operating rod.
- Remove the right and left exhaust valves.
- Remove the water hose end at the cylinder.
- Unbolt the resonator.



A. Resonator B. Bolts C. Cylinder Nuts

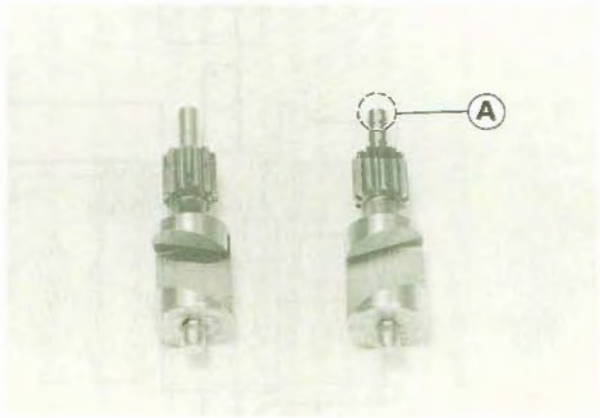
- Remove the cylinder, and remove the main exhaust valve.



A. Main Exhaust Valve

Exhaust Valve Installation Notes

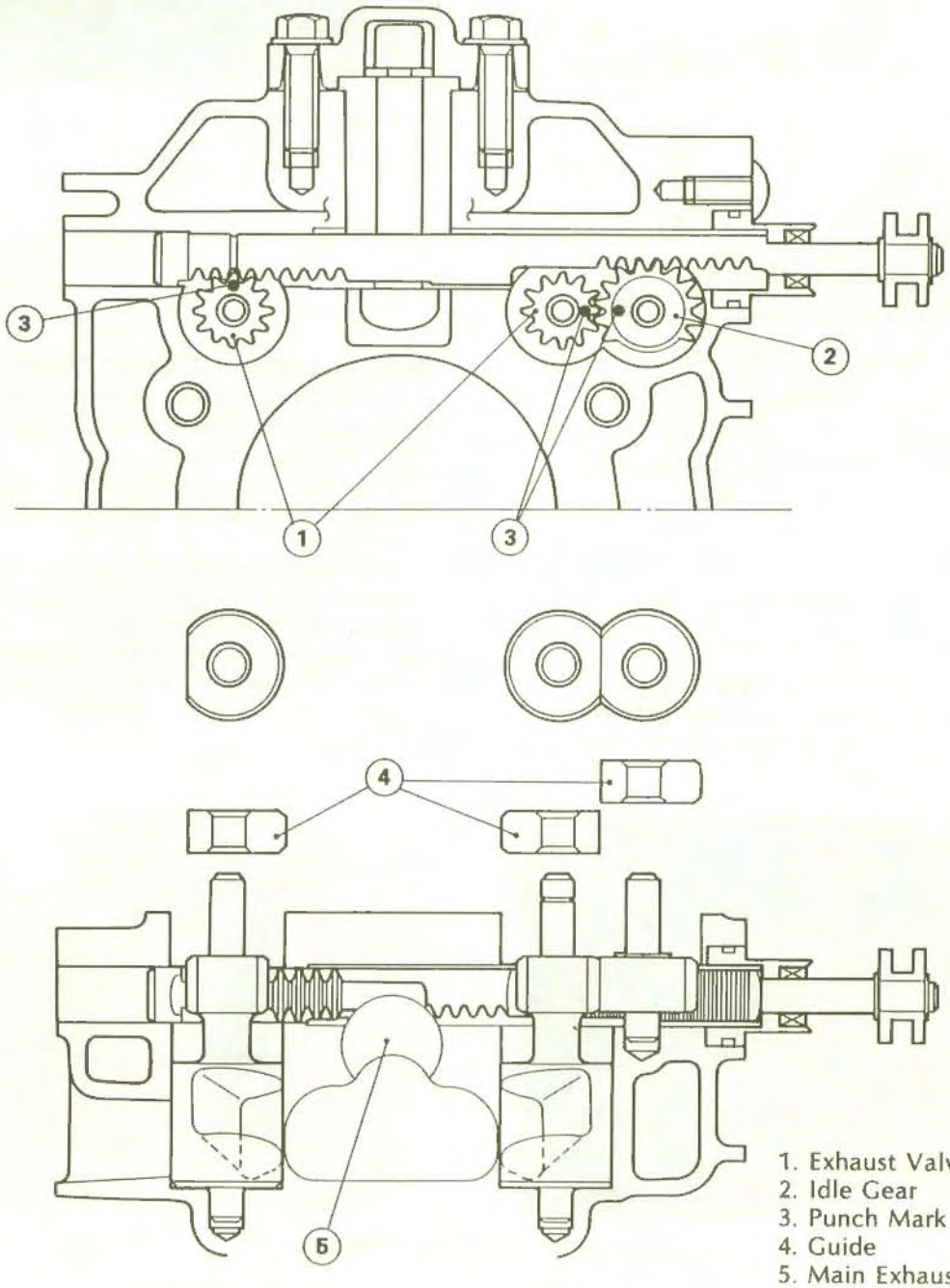
- Installation is the reverse of removal.
- Scrape out any carbon and clean the valves with a high flash-point solvent.
- Check the exhaust valves and valve operating rod for signs of damage. If necessary, replace them with new ones.
- Check the O-rings on the rod seal plug and main exhaust valve for signs of damage. If necessary, replace them with new ones.
- Be careful not to mix up the right and left exhaust valves. The right valve has an identifing groove.



A. Groove

- Apply a molybdenum disulfide grease to the following:
  - Exhaust Valve Upper and Lower Journals
  - Exhaust Valve Pinions
  - Valve Guides (inside)
  - Valve Operating Rod Journals
  - Valve Operating Rod Rack
- Adjust the exhaust valve position in accordance with the following procedure.
  - After installing the rod retaining screw in the cylinder with the valve operating rod, pull the rod to the right side as far as it will go.
  - Engage the left valve pinion with the rod rack so that the punch mark on the pinion is positioned toward the front of the engine. The punch mark on the valve pinion should align with the groove on the rod.
  - Install the idle gear so that the punch mark on the idle gear pinion aligns with right valve pinion punch mark.

Exhaust Valve Operating Rod Installation



1. Exhaust Valves
2. Idle Gear
3. Punch Mark
4. Guide
5. Main Exhaust Valve

Cylinder, Piston

Cylinder Removal

- Drain the coolant.
- Remove the following parts:
  Cylinder Head
  Clutch Cable Lower End
- Loosen the clamps, and pull the carburetor out of the holder and the air cleaner duct.
- Remove the carburetor holder mounting bolts, and pull the holder and reed valve out to the rear.
- Remove the right cover at the cylinder.
- Remove the shaft lever nut, and take off the shaft lever.

A. Shaft Lever

CAUTION

- **Exhaust valve operating shaft lever nut has left-hand threads.**

- Remove the cylinder nuts.
- Lift off the cylinder, and remove the cylinder base gasket. If necessary, tap lightly around the base of the cylinder with a plastic mallet, taking care not to damage the cylinder.

A. Plastic Mallet

- Remove the exhaust valves from the cylinder.

Cylinder Installation Notes

- Installation is the reverse of removal.
- Scrape any carbon out of the exhaust port.
- Check for a crust of minerals and rust in the cylinder water jacket, and remove them if necessary.
- Replace the cylinder base gasket with a new one.
- Apply engine oil to the piston surface, piston rings and cylinder bore.
- Check to see that the pin in each piston ring groove is between the ends of the piston ring, and fit the base of the cylinder over each ring, pressing in on opposite sides of the ring as necessary. Be certain that the rings do not slip out of position.
- Tighten the cylinder nuts to the specified torque.

Tightening Torque:

25 N-m (2.5 kg-m, 18 ft-lb)

- Tighten the shaft lever mounting nut to the specified torque.

Tightening Torque

8.3 N-m (0.85 kg-m, 74 in-lb)

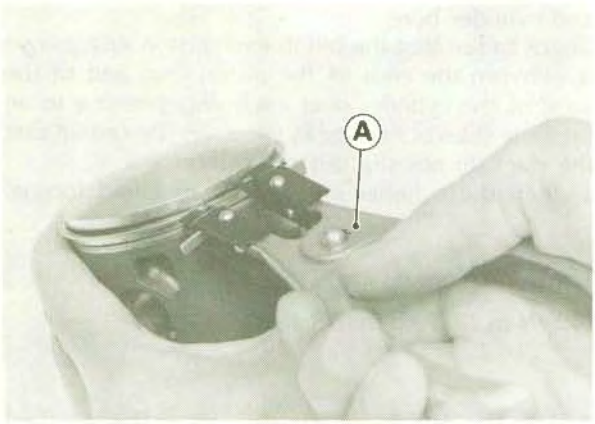
- Refer to Carburetor Installation Notes in the Fuel System chapter for carburetor installation.

Piston Removal

- Remove the cylinder.
- Stuff a clean cloth into the crankcase opening around the connecting rod so that no parts will fall into the crankcase.
- Remove one of the piston pin snap rings with needle nose pliers.
- Remove the piston by pushing the piston pin out the side from which the snap ring was removed. Use a piston pin puller assembly (special tool), if the pin is tight.

A. Piston Pin Puller Assembly: 57001-910

•Remove the top and second rings with piston ring pliers (special tool). If the special tool is not available, 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 Pliers: 57001-115

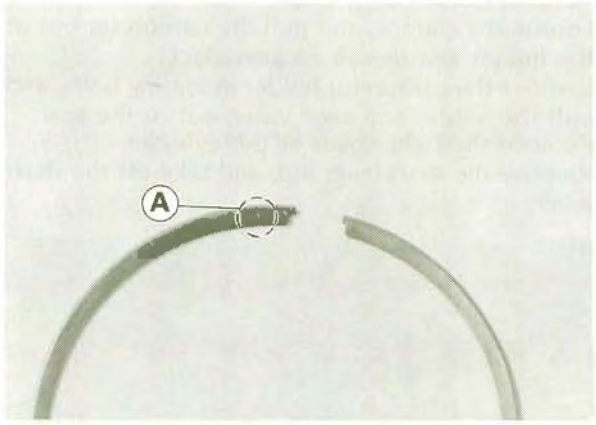
Piston Installation Notes

•Installation is the reverse of removal.
•Stuff a clean cloth into the crankcase opening around the connecting rod so that no parts will fall into the crankcase.
•Scrape any carbon off of the piston, then lightly polish the piston with fine emery cloth.
•Clean carbon and dirt out of the piston ring grooves using a suitable tool.

CAUTION

○Carbon particles can be very abrasive to piston rings. Don't allow such particles to fall onto the cylinder walls.

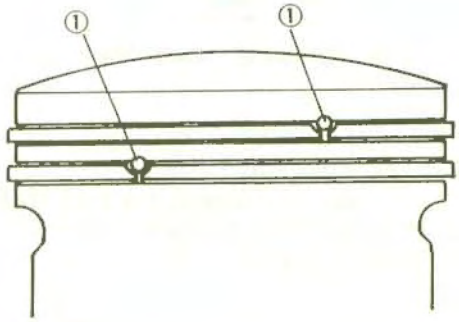
•When installing the piston rings on the piston, note the following:
○If installing the piston rings by hand, first fit one end of the piston ring against the pin in the ring groove, spread the ring opening with the other hand and then slip the ring into the groove.
○Install the top and second rings so that the "R"marked side faces up.



A. "R" Mark

○Install the rings so that the pin in each piston ring groove is between the ends of the piston ring.

Piston Ring Position



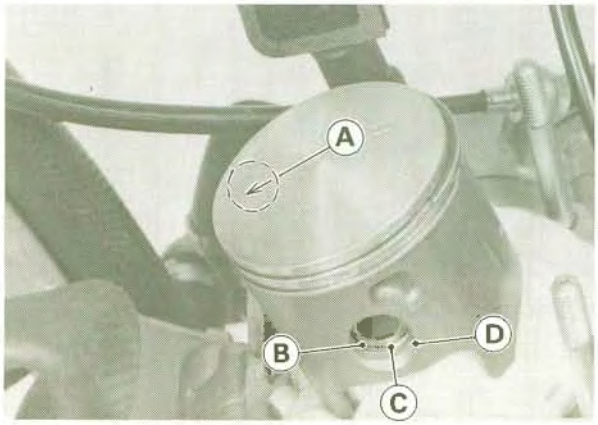
1. Pin

•Apply 2-stroke engine oil to the connecting rod needle bearing and the piston pin.
•Install the piston and piston pin. The arrow on the top of the piston must point toward the front.
•When installing a piston pin snap ring, compress it only enough to install it and no more.

CAUTION

○Do not reuse snap rings, as 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 notch in the edge of the piston pin hole.



A. Arrow
B. Snap Ring
C. Ring Opening
D. Notch

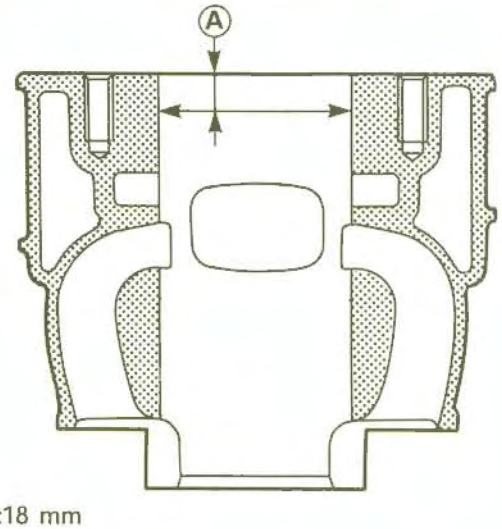
Cylinder Wear Inspection

NOTE

○*Measure the cylinder inside diameter when the cylinder is cold (room or ambient temperature).*

•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 shown in the figure.
★If any of the cylinder inside diameter measurements exceeds the service limit, the cylinder must be replaced with a new one since the ELECTRO FUSION cylinder cannot be bored or honed.

Cylinder Inside Diameter Measurement



Ⓐ :18 mm

Cylinder Inside Diameter
Standard: 66.016—66.031mm, and less than 0.01mm difference between any two measurements.

Service Limit: 66.10mm, or more than 0.05mm difference between any two measurements.

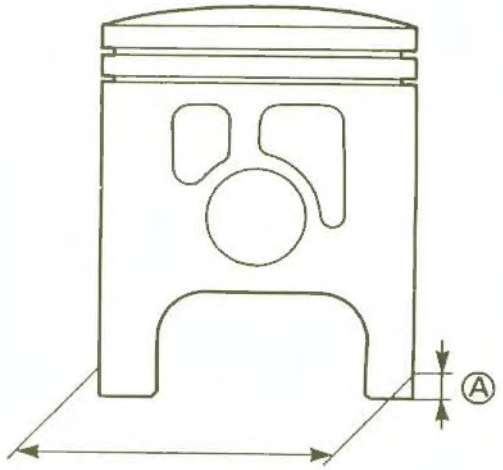
Piston Diameter Measurement

• Measure the outside diameter of the piston 15.5 mm up from the bottom of the piston at a right angle to the direction of the piston pin.
★If the measurement is under the service limit, replace the piston.

Piston Diameter

Standard: 65.939—65.954 mm
Service Limit: 65.79 mm

Piston Diameter Measurement



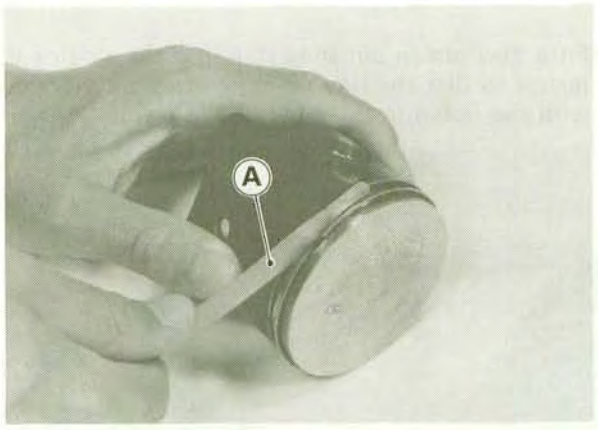
Ⓐ :15.5 mm

Piston/Cylinder Clearance

The piston-to-cylinder clearance is measured whenever a piston or cylinder is replaced with a new one. The standard piston-to-cylinder clearance must be adhered to whenever the cylinder is replaced.

If only a piston is replaced, the clearance may exceed the standard slightly. But it must not be less than the minimum, in order to avoid piston seizure.

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.



A. Thickness Gauge

Piston/Cylinder Clearance

0.072—0.092 mm

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 ring in its groove, make several measurements with a thickness gauge to determine piston ring/groove clearance.

★If the clearance exceeds the service limit, measure the thickness of the piston ring.

★If the ring has worn down to less than the service limit, replace the ring; if the groove width exceeds the service limit, replace the piston.

Piston Ring/Groove Clearance

Standard: 0.025—0.065 mm
Service Limit: 0.18 mm

Piston Ring Thickness (Second Ring)

Standard: 1.17—1.19 mm
Service Limit: 1.1 mm

Piston Ring Groove Width (Second Ring)

Standard: 1.215—1.235 mm
Service Limit: 1.30 mm

Piston Ring End Gap Inspection

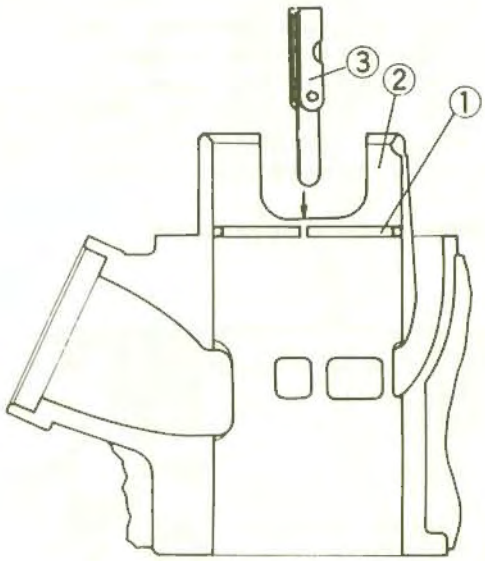
- Place the piston ring inside the cylinder, using the piston to locate the ring squarely in place.
- Set it close to the bottom of the cylinder, where cylinder wear is low.
- Measure the gap between the ends of the ring with a thickness gauge.

★If the gap is wider than the service limit, the ring is overworn and must be replaced.

Piston Ring End Gap

Standard: 0.15—0.35 mm
Service Limit: 0.70 mm

Ring End Gap Measurement



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

Piston, Piston Pin, Connecting Rod Wear Inspection

- Visually inspect the snap ring still 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.
- Measure the diameter of the piston pin with a micrometer.
★If the piston pin diameter is less than the service limit at any point, replace the piston pin.
- Using a cylinder gauge, measure the diameter of both of piston pin holes in the piston and the inside diameter of the connecting rod small end.
★If either piston pin hole diameter exceeds the service limit, replace the piston.
★If the connecting rod small end inside diameter exceeds the service limit, replace the crankshaft assembly.

Piston Pin Diameter

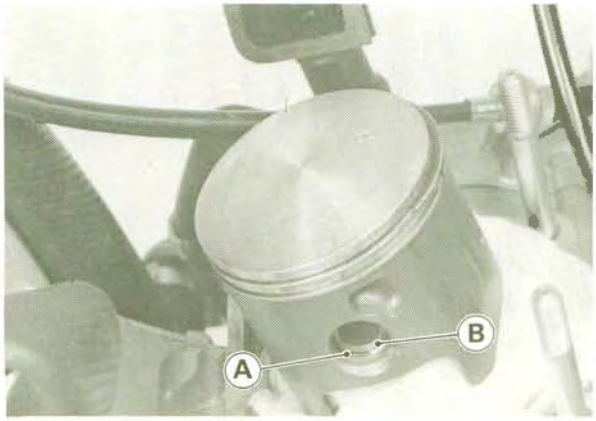
Standard:	**15.995–16.000 mm**
Service Limit:	**15.96 mm**

Piston Pin Hole Diameter

Standard:	**16.000–16.006 mm**
Service Limit:	**16.07 mm**

Small End Inside Diameter

Standard:	**21.003–21.014 mm**
Service Limit:	**21.05 mm**

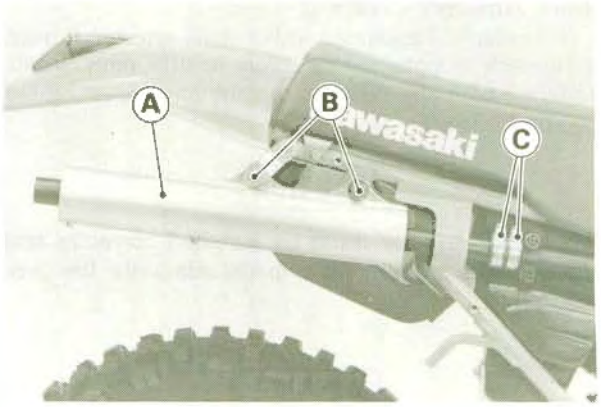


A. Snap Ring B. Piston Pin

Muffler (Expansion Chamber, Spark Arrester)

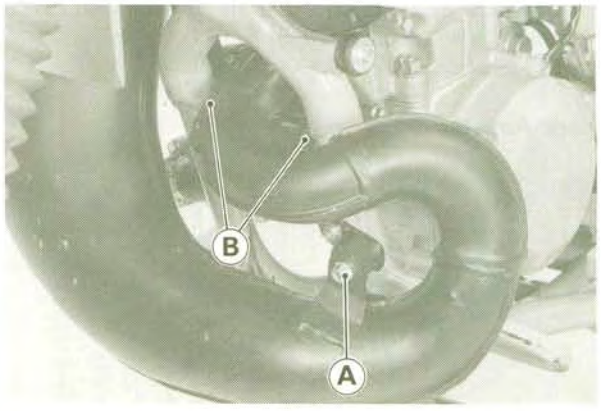
Expansion Chamber Removal

- Remove the right or left side covers.
- Loosen the clamp screws.
- Remove the spark arrester mounting bolts and pull the spark arrester off toward the rear.

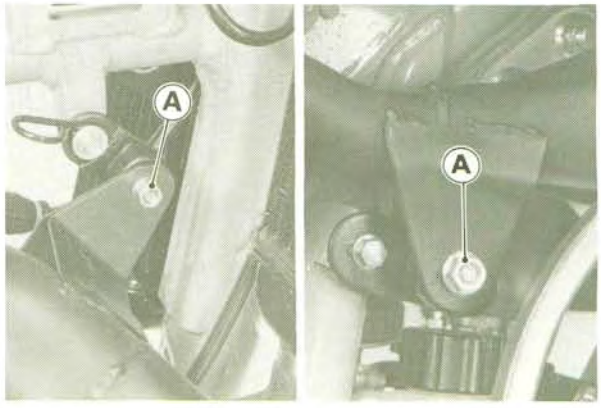


A. Spark Arrester C. Clamp Screws
B. Mounting Bolts

- Remove the exhaust pipe holding springs.
- Remove the muffler damper mounting nuts, and pull off the expansion chamber to the frontward.



A. Muffler Damper Mounting Nut
B. Exhaust Pipe Holding Springs



A. Muffler Damper Mounting Nut

Expansion Chamber Installation Notes

- Installation is the reverse of removal.
- Scrape any carbon out of the expansion chamber.
- Check the exhaust O-rings for signs of damage. If necessary, replace them with new ones.
- Check that the clamp is in good condition. Replace it, if necessary.

Spark Arrester Cleaning

This vehicle is equipped with a spark arrester. It must be properly maintained to ensure its efficiency. In accordance with the periodic maintenance chart, clean the spark arrester.

CAUTION

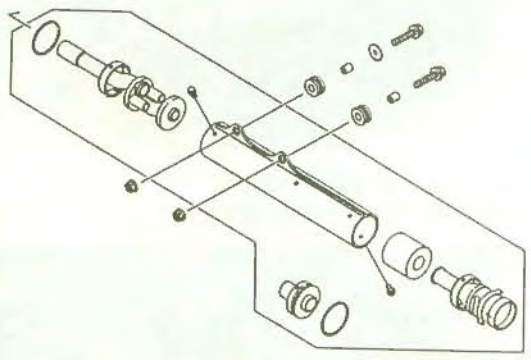
○The spark arrester must be installed correctly and functioning properly to provide adequate fire protection.

WARNING

○To avoid burns, be sure the exhaust system is cold before cleaning the spark arrester. The exhaust system becomes very hot soon after the engine is stared.

- Remove the spark arrester.
- Remove the all bolts on the spark arrester and disassemble the spark arrester.

Spark Arrseter

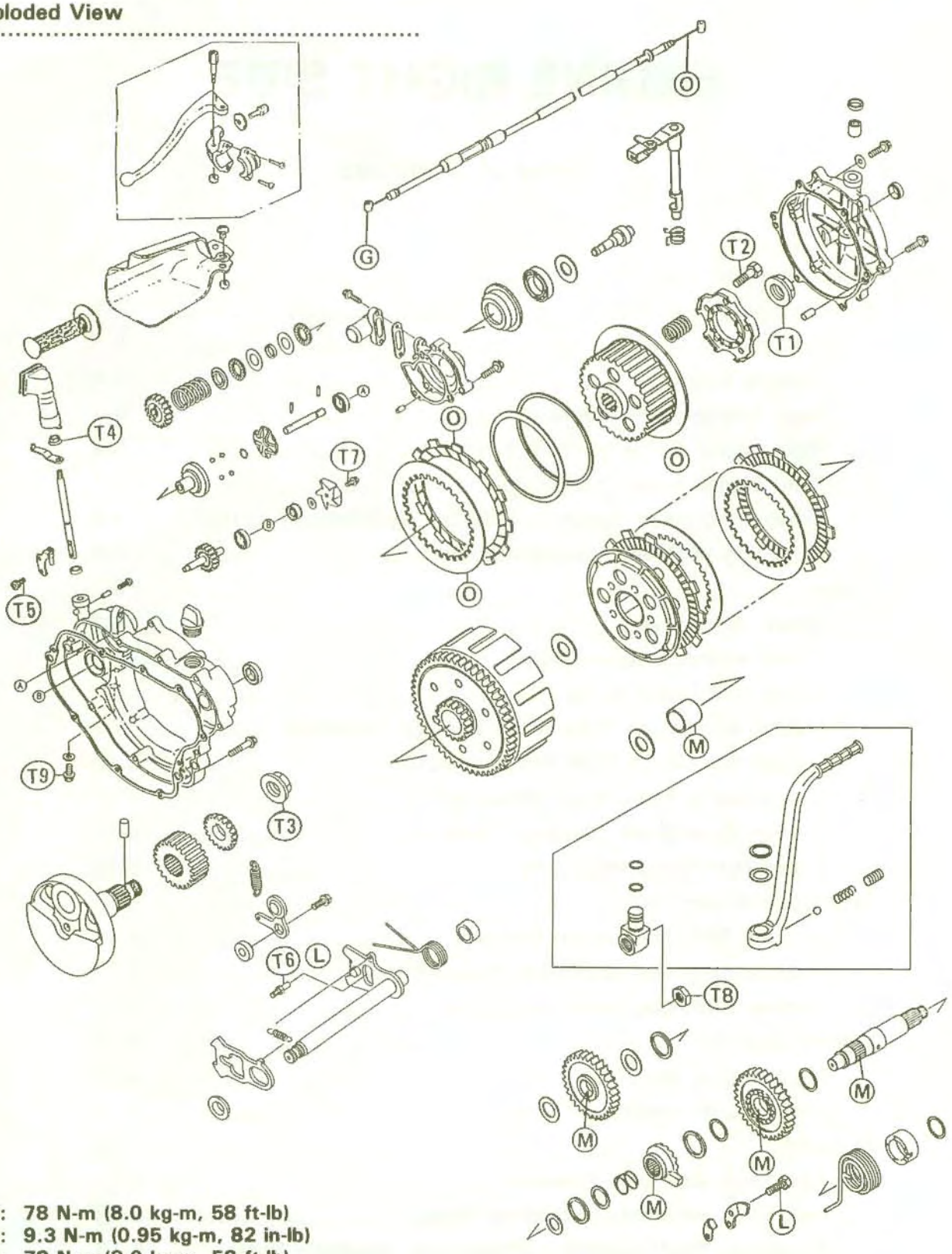


- With a wire brush, remove the carbon off the spark arrester parts and the inside of the spark arrester.
- Assemble the spark arrester parts into the spark arrester.
- Install the spark arrester on the rear end of the muffler and frame.
- Install the right side cover.

ENGINE RIGHT SIDE

Table of Contents

Exploded View



T1: 78 N-m (8.0 kg-m, 58 ft-lb)
T2: 9.3 N-m (0.95 kg-m, 82 in-lb)
T3: 78 N-m (8.0 kg-m, 58 ft-lb)
T4: 8.3 N-m (0.85 kg-m, 74 in-lb)
T5: 3.9 N-m (0.4 kg-m, 35 in-lb)
T6: 20 N-m (2.0 kg-m, 14.5 ft-lb)
T7: 6.9 N-m (0.7 kg-m, 61 in-lb)
T8: 49 N-m (5.0 kg-m, 36 ft-lb)
T9: 15 N-m (1.5 Kg-m, 11.0 ft-lb)

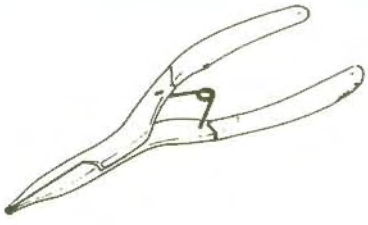
L: Apply a non-permanent locking agent to the threads.
M: Apply molybdenum disulfide grease.
G: Apply high temperature grease.
O: Apply transmission oil.

Specifications

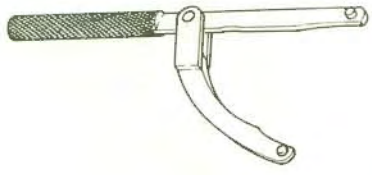
Item	Standard	Service Limit
Clutch:		
Clutch lever free play (lever end)	10 — 20 mm	— — —
Clutch Spring free length	35.8 mm	34.5 mm
Friction plate thickness	2.92 — 3.08 mm	2.7 mm
Clutch plate thickness	1.46 — 1.74 mm	1.3 mm
Friction plate/clutch housing clearance	0.20 — 0.60 mm	0.9 mm
Friction and clutch plate warp	not more than 0.15 mm	0.3 mm

Special Tools

Circlip Pliers: 57001-144



Flywheel Holder: 57001-306



Kick Shaft Oil Seal Guide: 57001-263

Shift Shaft Oil Seal Guide: 57001-264

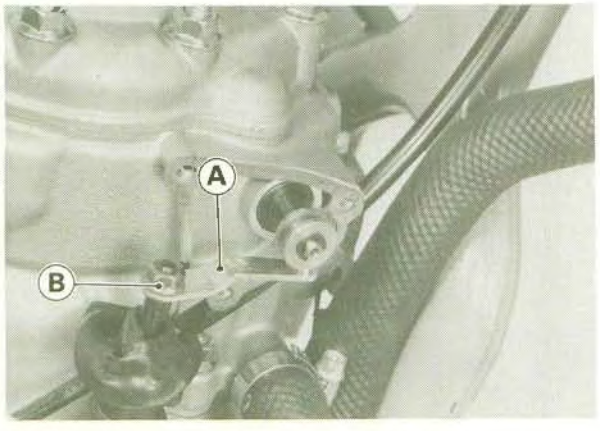
Right Engine Cover

Right Engine Cover Removal

- Drain the transmission oil (see Transmission Oil Change in the Engine Bottom End/Transmission chapter).
- Drain the coolant (see Coolant Change in the Cooling System chapter).
- Remove the following parts.
  Kick Pedal
  Clutch Cable Lower End
  Brake Pedal
  Expansion Chamber
  Impeller
- Pull off the water pump hose lower end.
- Remove the right cover side KIPS cover from the cylinder.
- Remove the shaft lever nut, and take off the shaft lever.

CAUTION

○Exhaust valve operating shaft lever nut has left-hand threads.



A. Shaft Lever B. Nut

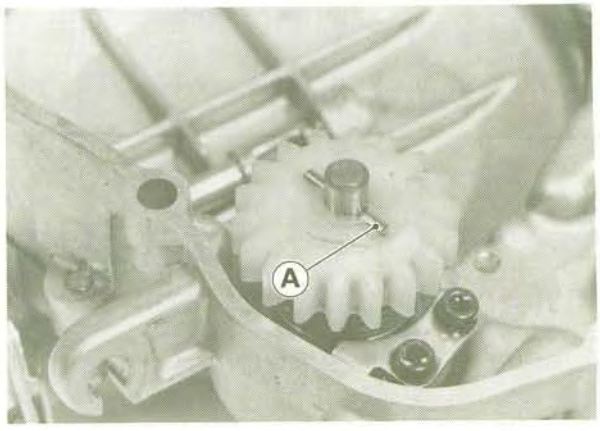
- Turn the clutch release lever toward the rear and free the release shaft from the clutch spring plate pusher.
- Take off the oil filler cap, and remove the right engine cover and bolts.

Right Engine Cover Installation Notes

- Installation is the reverse of removal. Note the following.
- There are two knock pins on the mating surfaces of the crankcase and right engine cover.
- In case the exhaust advancer assembly has been removed, install it and turn the gear so as to level the gear drive pin.

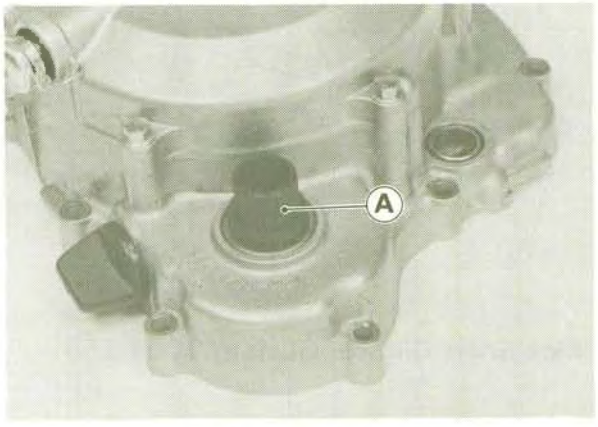
CAUTION

○If the gear drive pin is not positioned level, it may fall out when installing the right engine cover.



A. Gear Drive Pin (level position)

- Turn the clutch release lever toward the rear.
- Install the right engine cover using the kick shaft oil seal guide (special tool) to protect the cover oil seal.



A. Kick Shaft Oil Seal Guide: 57001-263

- Fit the shaft lever boss in the groove of the valve operating rod collar, and install the shaft lever on the lever shaft. Tighten the shaft lever nut to the specified torque.

Tightening Torque:

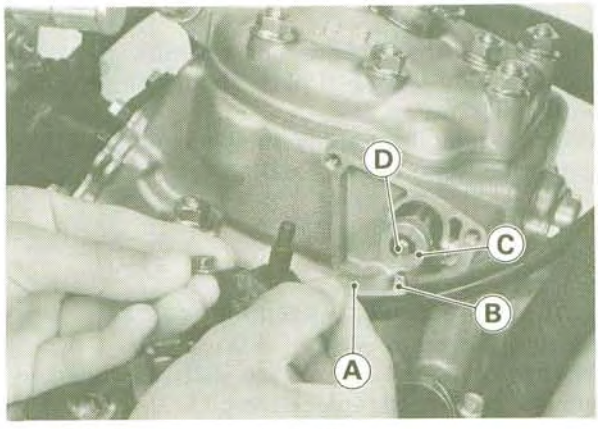
8.3 N-m (0.85 kg-m, 74 in-lb)

CAUTION

○Exhaust valve operating shaft lever nut has left - hand threads.

NOTE

○Tighten the shaft lever nut while holding the valve operating rod all the way in.



A. Shaft Lever
B. Boss
C. Collar
D. Valve Operating Rod

•Tighten the water pump impeller bolt to the specified torque.

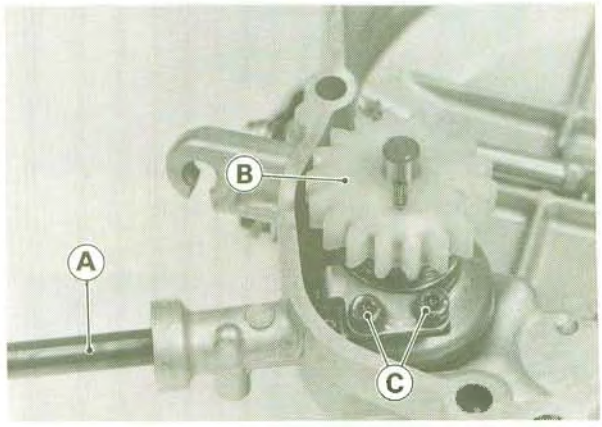
Tightening Torgue:

6.9 N-m (0.7 kg-m, 61 in-lb)

•Apply grease to the inside of the brake pedal boss.
•Fill the cooling system (see Coolant Filling in the Cooling System chapter).
•Fill the transmission with oil (see Transmission Oil Change in the Engine Bottom End/Transmission chapter).
•Adjust the following parts.
Clutch Cable
Rear Brake

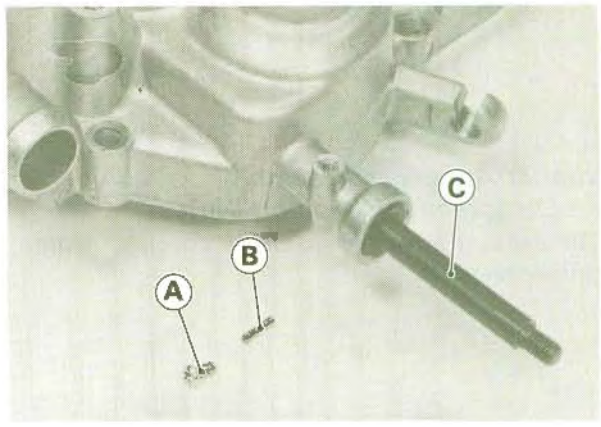
Right Engine Cover Disassembly

•Remove the right engine cover.
•Turn the lever shaft to the right, and remove the exhaust advancer assembly.
•Remove the Allen bolts, and take off the advancer lever.



A. Lever Shaft
B. Exhaust Advancer Assembly
C. Allen Bolts

•Remove the plug screw and take out the positioning pin.
•Pull the lever shaft out of the right engine cover.

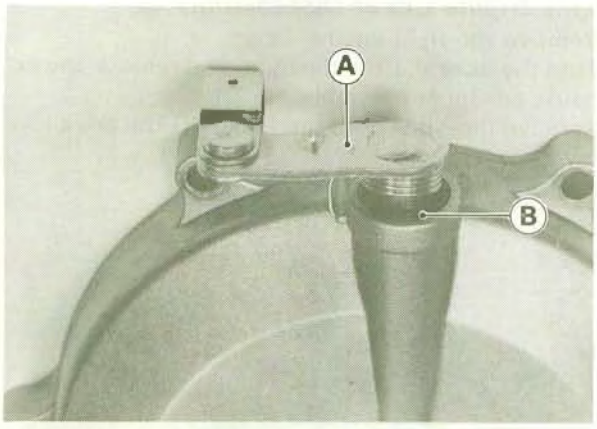


A. Plug Screw
B. Positioning Pin
C. Lever Shaft

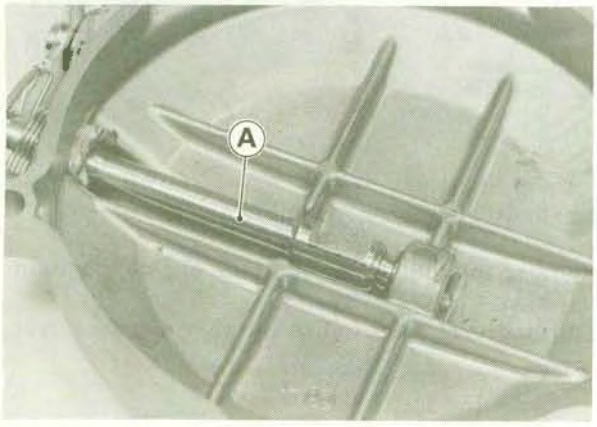
•Pull off the water pump shaft (see Water Pump Shaft Removal in the Cooling System chapter).

CAUTION

○Do not remove the clutch release shaft unless it is absolutely necessary. If removed, you must replace the oil seal with a new one.



A.Clutch Release Shaft B. Oil Seal



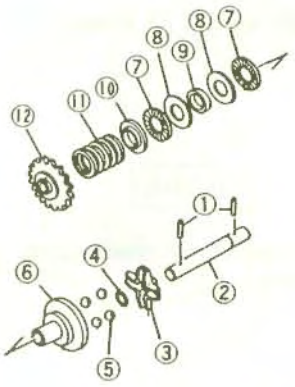
A. Clutch Release Shaft

Exhaust Advancer Assembly Disassembly/Assembly Notes

•The exhaust advancer assembly consists of the following parts.

A. Exhaust Advancer Assembly

Exhaust Advancer Assembly



1. Pins
2. Rod
3. Guide
4. O-ring
5. Steel Balls
6. Holder
7. Needle Bearing
8. Spacer
9. Collar
10. Collar
11. Spring
12. Gear

•Check the exhaust advancer assembly parts for damage. Any damaged parts should be replaced with new ones.
•When assembling, apply molybdenum disulfide grease between the rod and holder.

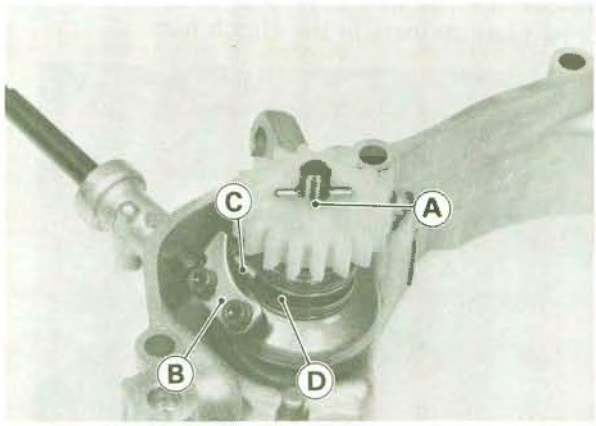
Right Engine Cover Assembly Notes

•Assembly is the reverse of disassembly.
•In case of the clutch release shaft has been removed, be sure to replace the oil seal with a new one and apply high temperature grease liberally to the oil seal lip.
•Apply high temperature grease to the oil seal lips before inserting the lever shaft.
•Apply molybdenum disulfide grease to the surface of the lever shaft, and insert the lever shaft into the right engine cover hole.
•Tighten the advancer lever mounting Allen bolts to the specified torque.

Tightening Torque

3.9 N-m (0.4 kg-m, 35 in-lb)

•Fit the advancer lever pin into the groove on the exhaust advancer assembly, and install the assembly in the engine cover while turning the lever shaft to the left.



A. Exhaust Advancer Assembly
B. Advancer Lever
C. Pin
D. Groove

•Tighten the exhaust valve advancer shaft plug screw securely.

Clutch

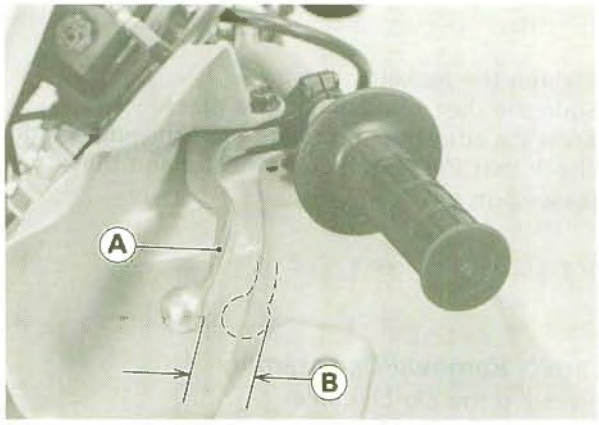
Proper clutch lever play is 10 — 20 mm . Play increases with cable stretch and friction plate wear, necessitating adjustment. When there is too much lever play, first try adjusting the cable at the clutch lever.

WARNING

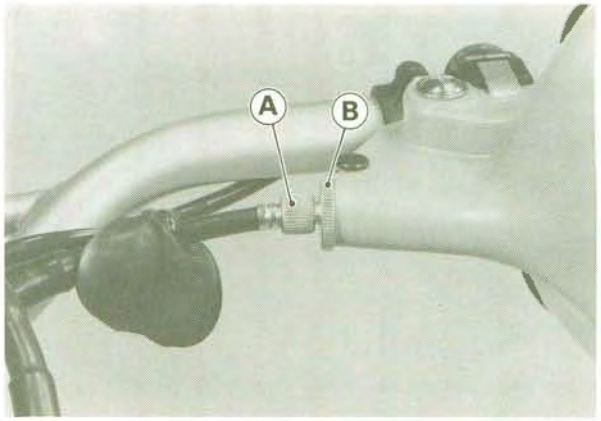
oTo avoid a serious burn, never touch the hot engine or exhaust chamber during clutch adjustment.

Clutch Adjustment

•Slide the clutch lever dust cover out of place.
•Loosen the knurled locknut, turn the adjuster to obtain the proper amount of lever play, and tighten the locknut.



A. Clutch Lever B. Clutch Lever Play 10—20 mm

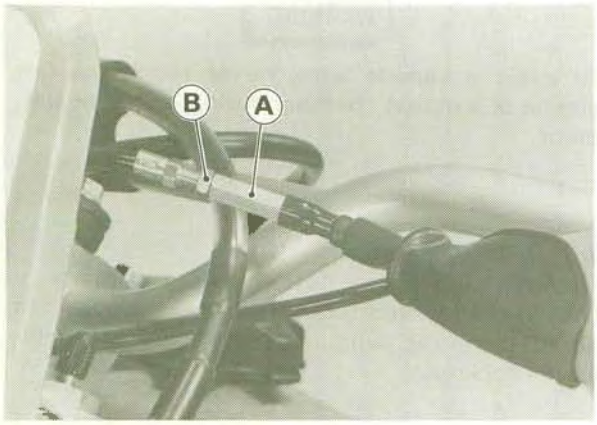


A. Adjuster B. Knurled Locknut

- Slide back the clutch lever dust cover.

★If the adjuster at the clutch lever has reached its limit, adjust the cable with the adjusting nut at the upper end of the clutch cable.

- Loosen the knurled locknut at the clutch lever.
- Turn the adjuster in all the way, then tighten the knurled locknut.
- Loosen the locknut at the upper end of the cable, and turn the adjusting nut so that clutch lever has 10 — 20 mm of play.

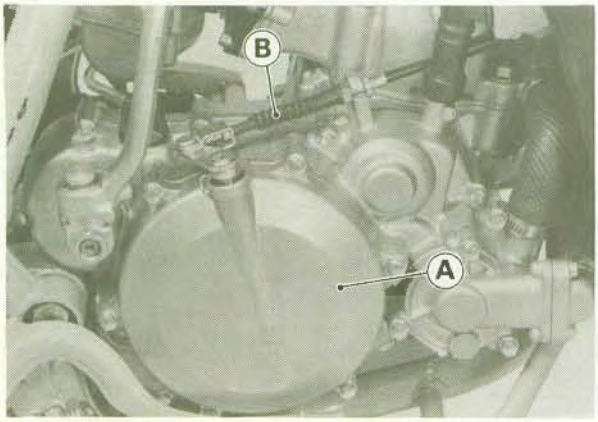


A. Adjusting Nut B. Locknut

- Tighten the locknut.
- Slide the dust cover back into place.
- After the adjustment is made, start the engine and check that the clutch does not slip and that it releases properly.

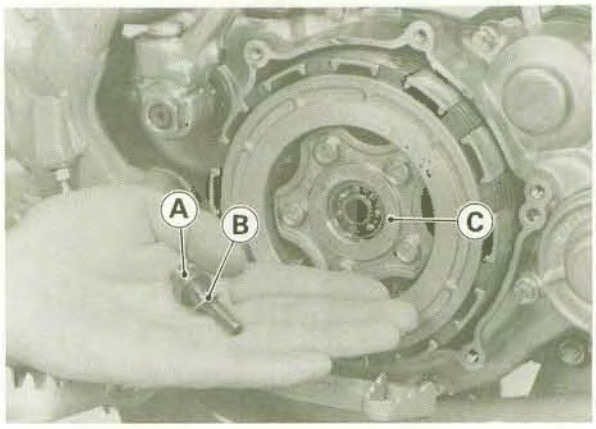
Clutch Removal/Disassembly

- Remove the clutch cable.
- Remove the clutch cover.



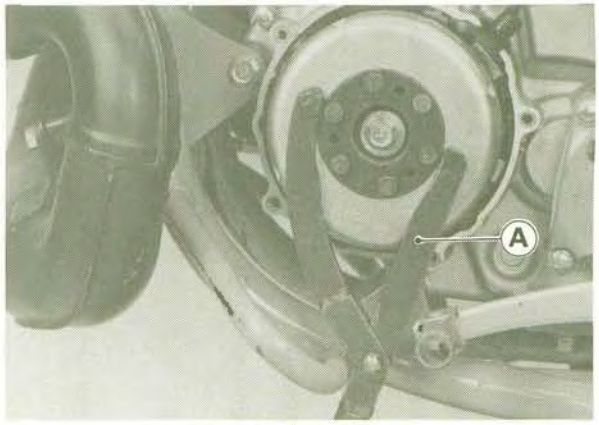
A. Clutch Cover B. Clutch Cable

- Remove the flat washer (if provided), clutch and spring plate pushers in the clutch hub.

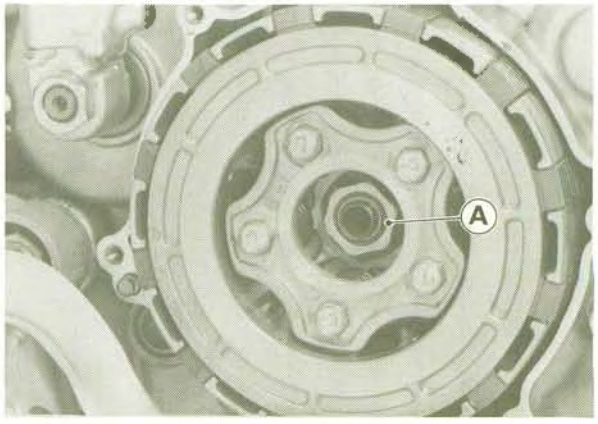


A. Clutch Pusher C. Spring Plate Pusher
B. Flat Washer (If provided)

- Remove the magneto cover.
- Use the Flywheel holder (special tool) to prevent the clutch from rotating, remove the clutch hub nut.

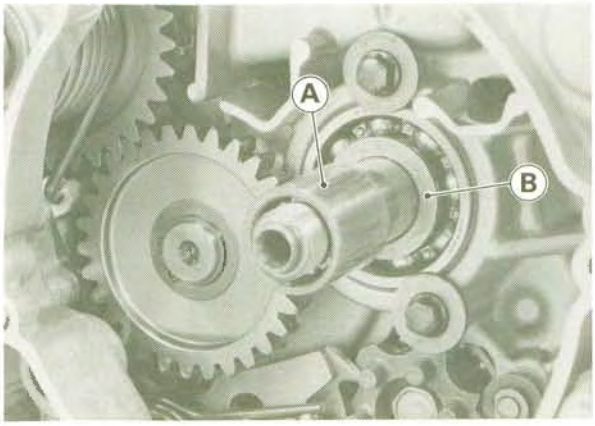


A. Flywheel Holder :57001-306



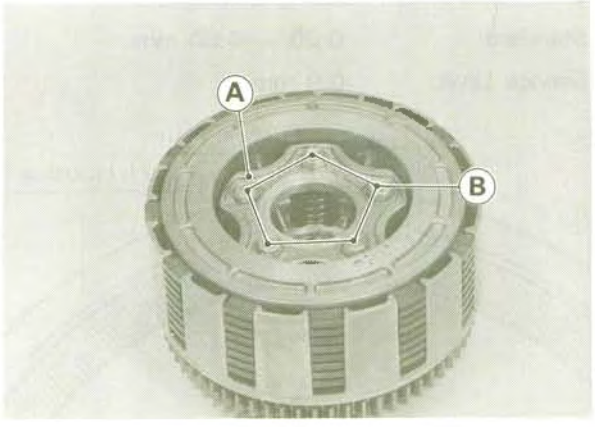
A. Clutch Hub Nut

- Remove the clutch assembly, sleeve and thrust washer.



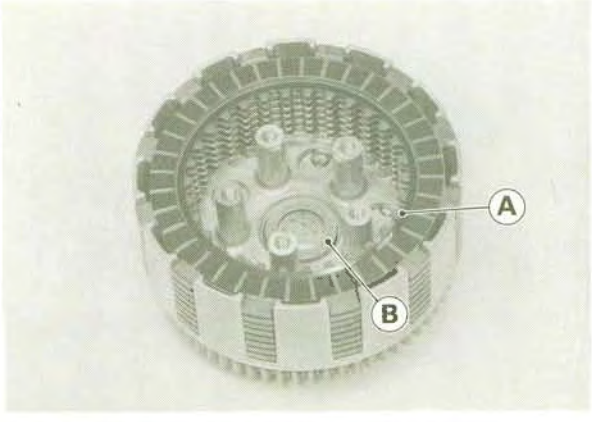
A. Sleeve B. Thrust Washer

•Unbolt the spring plate, and remove the spring and clutch hub.



A. Spring Plate B. Bolts

•Take out the jada spring, friction plates, clutch plates, and thrust washer from the clutch housing.



A. Jada Spring B. Thrust Washer

Clutch Installation Notes

•Installation is the reverse of removal.
•Apply molybdenum disulfide grease to the outside of the sleeve.
•Apply transmission oil to the the clutch housing gear and kick starter driven gear.
•Install the friction plates and clutch plates, starting with a friction plate and alternating them. Finishing with a friction plate.

CAUTION

○If dry clutch plates and friction plates are installed, apply transmission oil to the surfaces of each plate to avoide clutch plate seizure.

•Tighten the clutch spring bolts to the specified torque.

Tightening torque:

9.3 N-m (0.95kg-m, 82 in-lb)

•Tighten the clutch hub nut to the specified torque.

Tightening Torque:

78 N-m (8.0 kg-m, 58 ft-lb)

•Apply molybdenum disulfide grease to the clutch spring plate pusher.

Friction and Clutch Plate Wear, Damage Inspection

• Visually inspect the friction and clutch plates to see if they show any signs of seizure, or uneven wear.
★If any plates show signs of damage, replace the friction plates and clutch plates as a set.
• Measure the thickness of the friction and clutch plates with vernier calipers.
★If they have worn past the service limit, replace them with new ones.

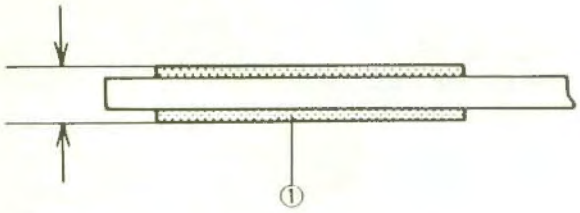
Friction Plate Thickness

Standard:	**2.92 — 3.08 mm**
Service Limit:	**2.7 mm**

Clutch Plate Thickness

Standard:	**1.46 — 1.74 mm**
Service Limit:	**1.30 mm**

Friction and Clutch Plate Thickness Measurement



1. Friction Plate

Friction and Clutch Plate Warp Inspection

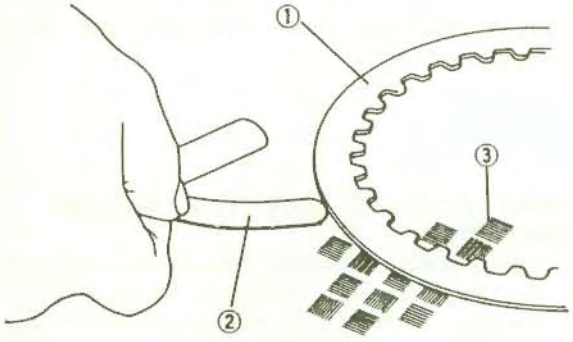
- Place each friction plate or clutch plate on a surface plate, and measure the gap between the surface plate and each friction plate or clutch plate. The gap is the amount of friction or clutch plate warp.

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

Friction and Clutch Plate Warp

Standard:	**not more than 0.15 mm**
Service Limit:	**0.3 mm**

Friction and Clutch Plate Warp Measurement



1. Plate
2. Thickness Gauge
3. Surface Plate

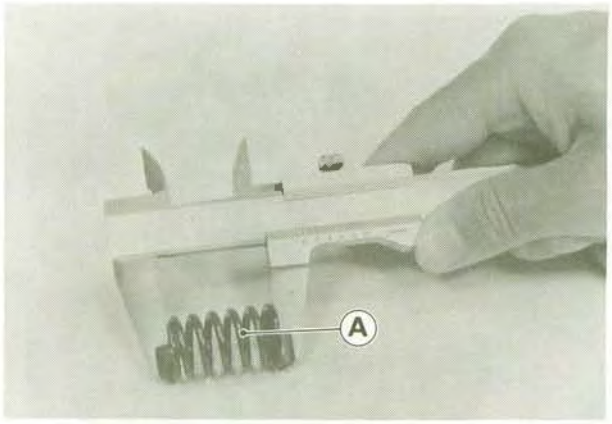
Clutch Spring Free Length Measurement

- Since the spring becomes shorter as it weakens, check its free length to determine its condition.

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

Clutch Spring Free Length

Standard:	**: 39.4 mm**
Service Limit:	**: 37.9 mm**



1. Clutch Spring

Friction Plate/Clutch Housing Clearance

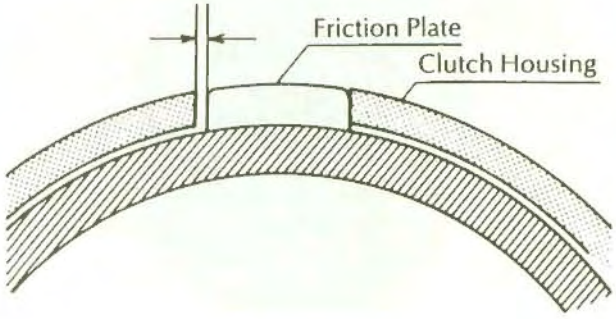
- Measure the clearance between the tangs on the friction plate and the fingers of the clutch housing.

★If this clearance is excessive, the clutch will be noisy.

★If the clearance exceeds the service limit, replace the friction plates.

Friction Plate/Clutch Housing Clearance

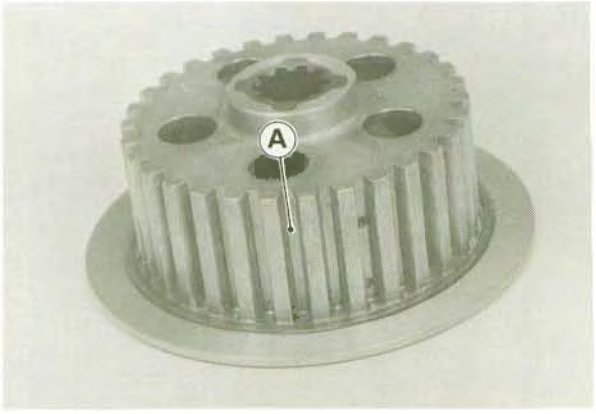
Standard:	**0.20 – 0.60 mm**
Service Limit:	**0.9 mm**



Clutch Hub Spline Inspection

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

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

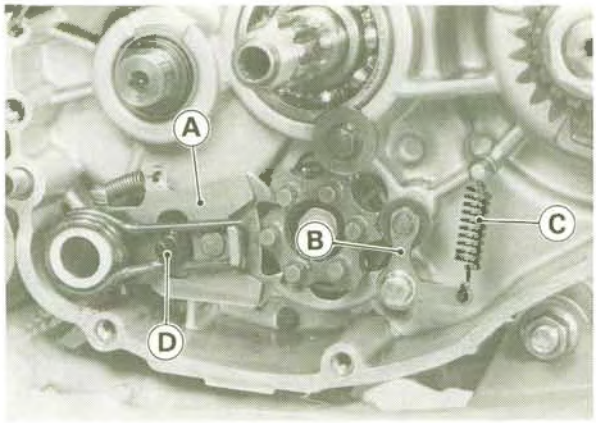


A. Clutch Hub Spline

External Shift Mechanism

External Shift Mechanism Removal

•Remove the following parts.
Shift Pedal
Magneto Cover
Right Engine Cover
Clutch Housing
Idle gear
•Pull out the shift shaft with the shift mechanism arm and arm spring, and remove the return spring.

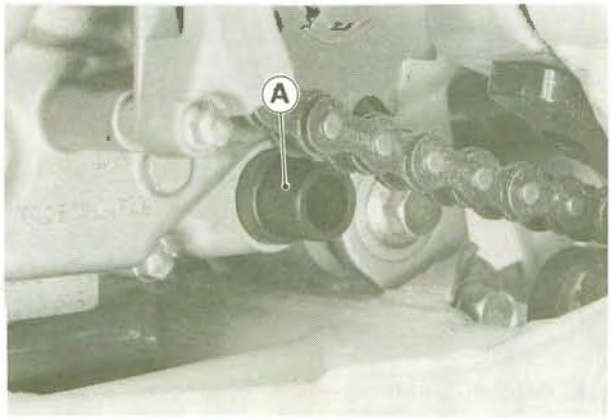


A. External Shift Mechanism
B. Neutral Set Lever
C. Return Spring
D. Return Spring Pin

•Remove the bolt, and take off the neutral set lever.

External Shift Mechanism Installation Notes

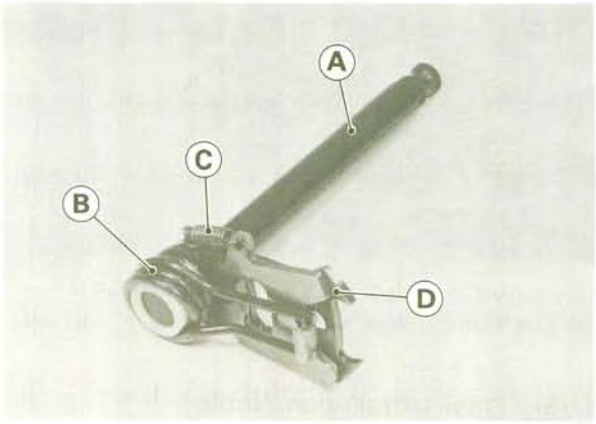
•Installation is the reverse of removal.
•Insert the shift shaft into the crankcase using the shift shaft oil seal guide (special tool) on the oil seal in the left crankcase half to protect the seal.
○Before installing the shift shaft, apply high temperature grease to the oil seal lips.



A. Shift Shaft Oil Seal Guide: 57001-264

External Shift Mechanism Inspection

• Examine the shift shaft for any damage.
○ Check the shift shaft for bending or damage to the splines.
☆ If the shaft is bent, straighten or replace it. If the splines are damaged, replace the external shift mechanism.
○ Check the return spring and arm spring for cracks or distortion.
☆ If the springs are damaged in any way, replace them.
○ Check the shift mechanism arm for distortion.
☆ If the shift mechanism arm is damaged in any way, replace the external shift mechanism.



A. Shift Shaft
B. Return Spring
C. Arm Spring
D. Shift Mechanism Arm

• Check that the return spring pin is not loose.
★ If it is loose, unscrew it, apply a non-permanent locking agent to the threads, and tighten it to the specified torque.

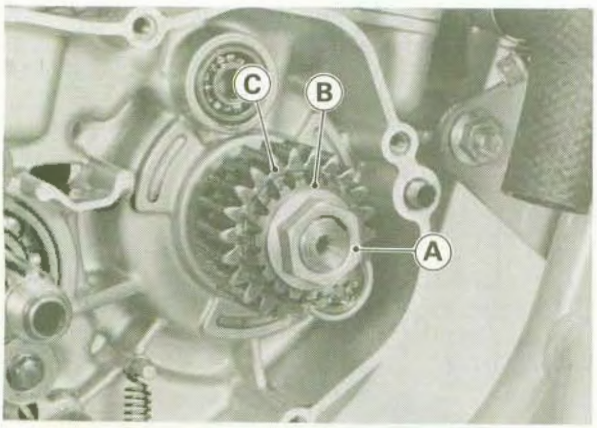
Tightening Torque:
20 N-m (2.0 kg-m, 14.5 ft-lb)

• Check the neutral set lever and its spring for cracks or distortion.
★ If the lever or spring is damaged in any way, replace them.

Primary Gear

Primary Gear Removal

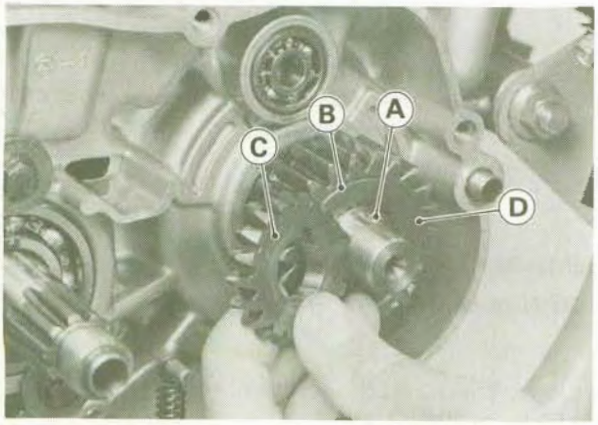
- Remove the right engine cover (see Right Engine Cover Removal).
- Remove the clutch (see Clutch Removal).
- Remove the primary gear nut, water pump drive gear, pin, and primary gear.



A. Primary Gear Nut
B. Water Pump Drive Gear
C. Primary Gear

Primary Gear Installation Notes

- Installation is the reverse of removal.
- Install the primary gear on the crankshaft with groove side facing out.
- Install the pin into the crankshaft hole.
- Install the water pump drive gear so that chamfered side faces outward.



A. Pin
B. Groove
C. Water Pump Drive Gear
D. Primary Gear

- Tighten the primary gear nut to the specified torque.

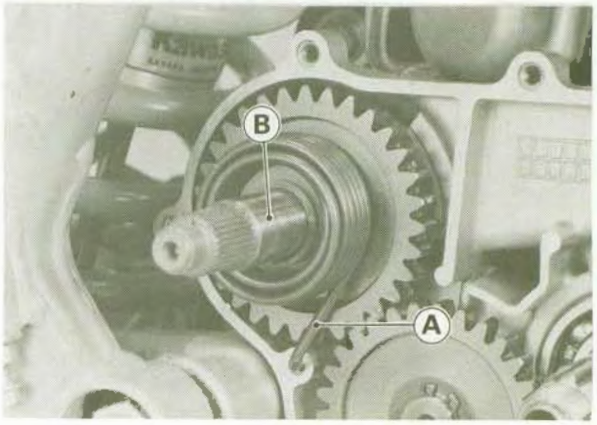
Tightening Torque:

78 N-m (8.0 kg-m, 58 ft-lb)

Kickstarter

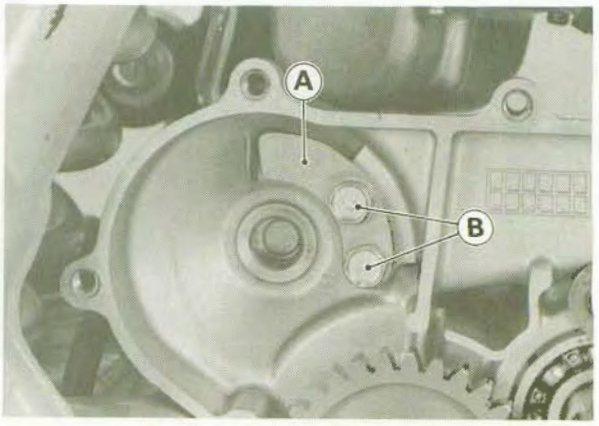
Kick Shaft Assembly Removal

- Remove the following parts.
  Right Engine Cover
  Clutch Housing
- Pull the end of the kick spring out of the hole in the crankcase.



A. Kick Spring
B. Kickstarter Assembly

- Remove the kickstarter assembly.
- Remove the ratchet guide, stopper and bolts.



A. Ratchet Guide
B. Bolts

Kick Shaft Assembly Installation Notes

- Installation is the reverse of removal.
- Apply a non-permanent locking agent to the threads of the ratchet guide bolts.

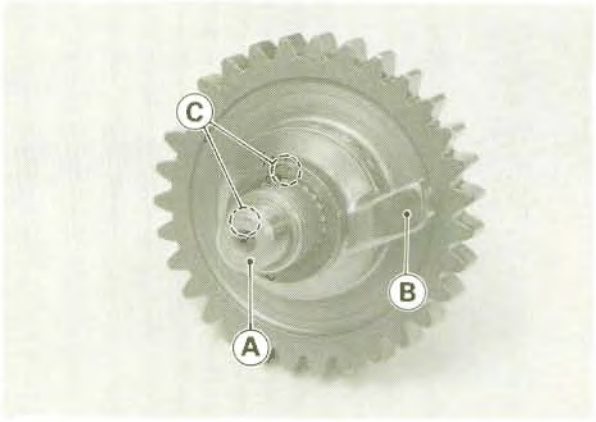
Kickstarter Assembly Disassembly/Assembly Notes

- The kickstarter assembly consists of the following parts.
- Check the kickstarter assembly parts for damage. Any damaged parts should be replaced with new ones.

1. Washer
2. Idle Gear
3. Circlip
4. Spring
5. Ratchet Gear
6. Kick Gear
7. Kick Shaft
8. Kick Spring
9. Spring Guide
10. Bolts
11. Ratchet Guide
12. Stopper

CAUTION

○When assembling the ratchet gear onto the kick shaft, align the punch mark on the ratchet gear with the punch mark on the kick shaft.

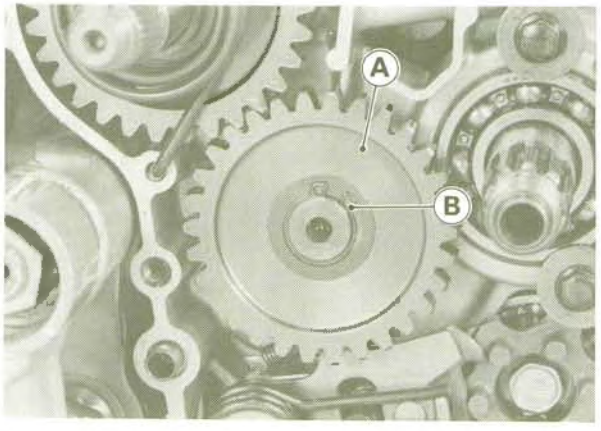


A. Kick Shaft
B. Ratchet Gear
C. Punch Marks

- Apply molybdenum disulfide grease to the inside of the kick gear and ratchet gear.
- Replace the circlips that were removed with new ones.

Kickstarter Idle Gear Removal Notes

- Remove the right engine cover and clutch housing before idle gear removal (see Right Engine Cover Removal and Clutch Removal).
- Remove the idle gear circlip and pull off the idle gear.



A. Idle Gear
B. Circlip

Kick Starter Idle Gear Installation Notes

- Installation is the reverse of removal (see Right Engine Cover Installation Notes and Clutch Installation Notes).
- Apply molybdenum disulfide grease to the inside of the idle gear.
- Install the thrust washer, idle gear, thrust washer and circlip. The side of the hub that protrudes the most faces in.
- Replace the circlip that was removed with a new one.

Engine Removal/Installation

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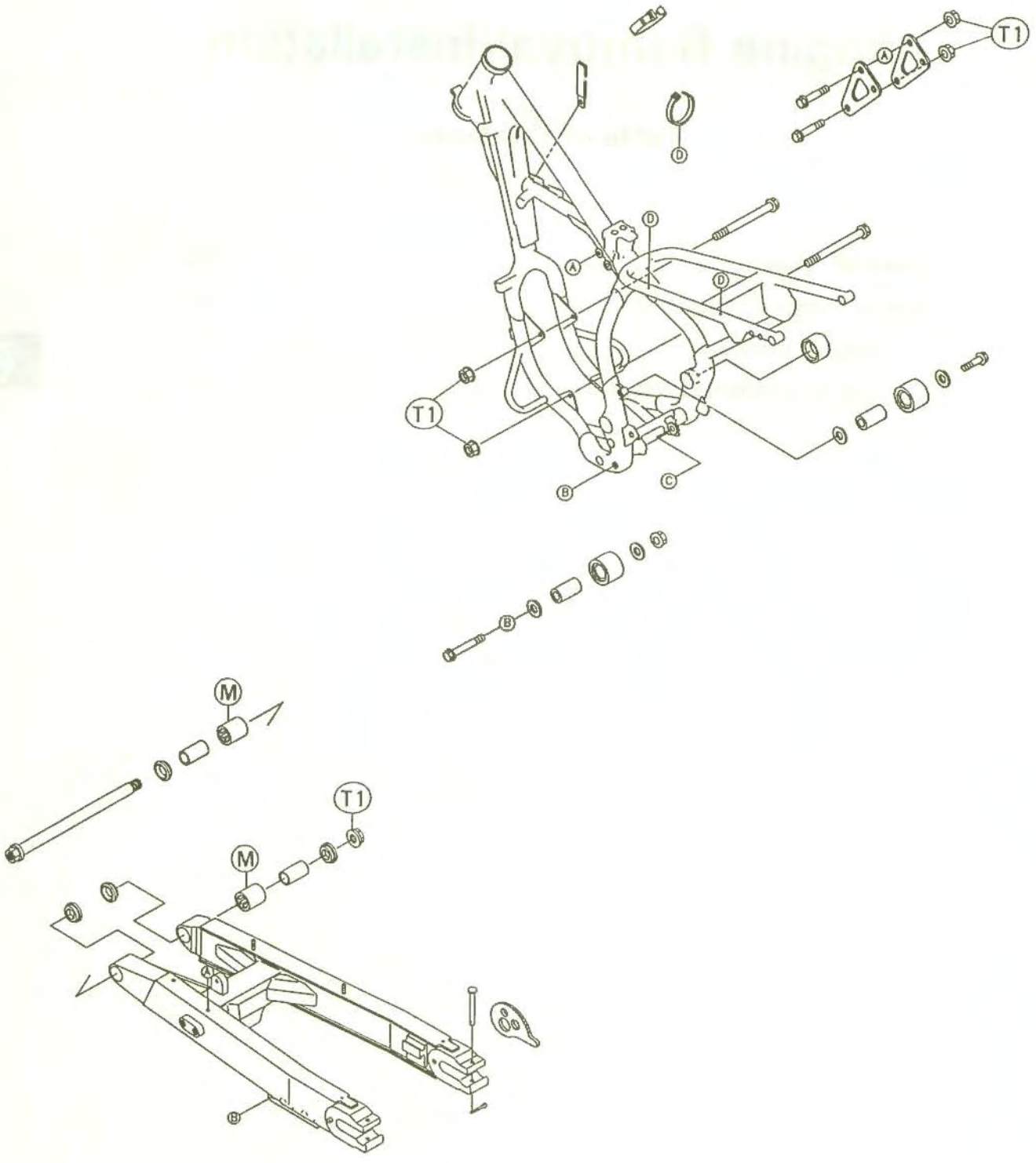
Exploded View



T1: 29 N-m (3.0 kg-m, 22 ft-lb)
T2: 78 N-m (8.0 kg-m, 58 ft-lb)

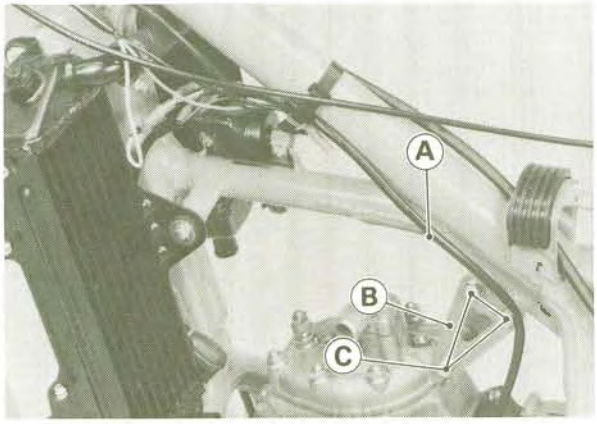
M: Apply molybdenum disulfide grease.

Engine Removal/Installation

Engine Removal

- Drain the transmission oil (see Transmission Oil Change in the Engine Bottom End/Transmission chapter).
- Drain the coolant (see Coolant Change in the Cooling System chapter).
- Remove the following parts.
  - Right and Left Side Covers
  - Radiator Cover
  - Seat
  - Fuel Tank
  - Expansion Chamber
  - Spark Plug
  - Cooling Hoses
  - Carburetor (with Cables and Hoses)
  - Clutch Cable Lower End
  - Engine Sprocket Cover
  - Drive Chain and Engine Sprocket
  - Shift Pedal
  - Brake Pedal

- Disconnect the magneto output lead, and free the leads from the frame.
- Remove the engine brackets and mounting bolts.



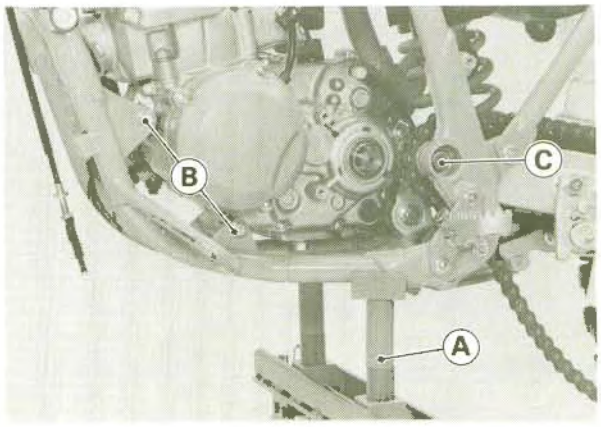
A. Magneto Lead
B. Engine Brackets
C. Mounting Bolts

- Place a jack stand (special tool) under the frame to lift the motorcycle off the ground, and put blocks under the front and rear tires to steady the motorcycle.

WARNING

○The swing arm pivot shaft also serves as the engine mounting bolt. Take precautions to insure the frame is well supported, and that the motorcycle will not fall over when the pivot shaft is removed.

- Remove the engine mounting bolts.
- Pull out the swing arm pivot shaft.
- Lift the engine out to the right.



A. Jack Stand :57001-1238
B. Engine Mounting Bolts
C. Swing Arm Pivot Shaft

Engine Installation Notes

- Engine installation is the reverse of removal.
- Tighten the nuts to the specified torque.

Tightening Torque:

Engine Mounting Nuts:

29 N-m (3.0 kg-m, 22 ft-lb)

Engine Bracket Mounting Nuts:

29 N-m (3.0 kg-m, 22 ft-lb)

Pivot Shaft Nut :

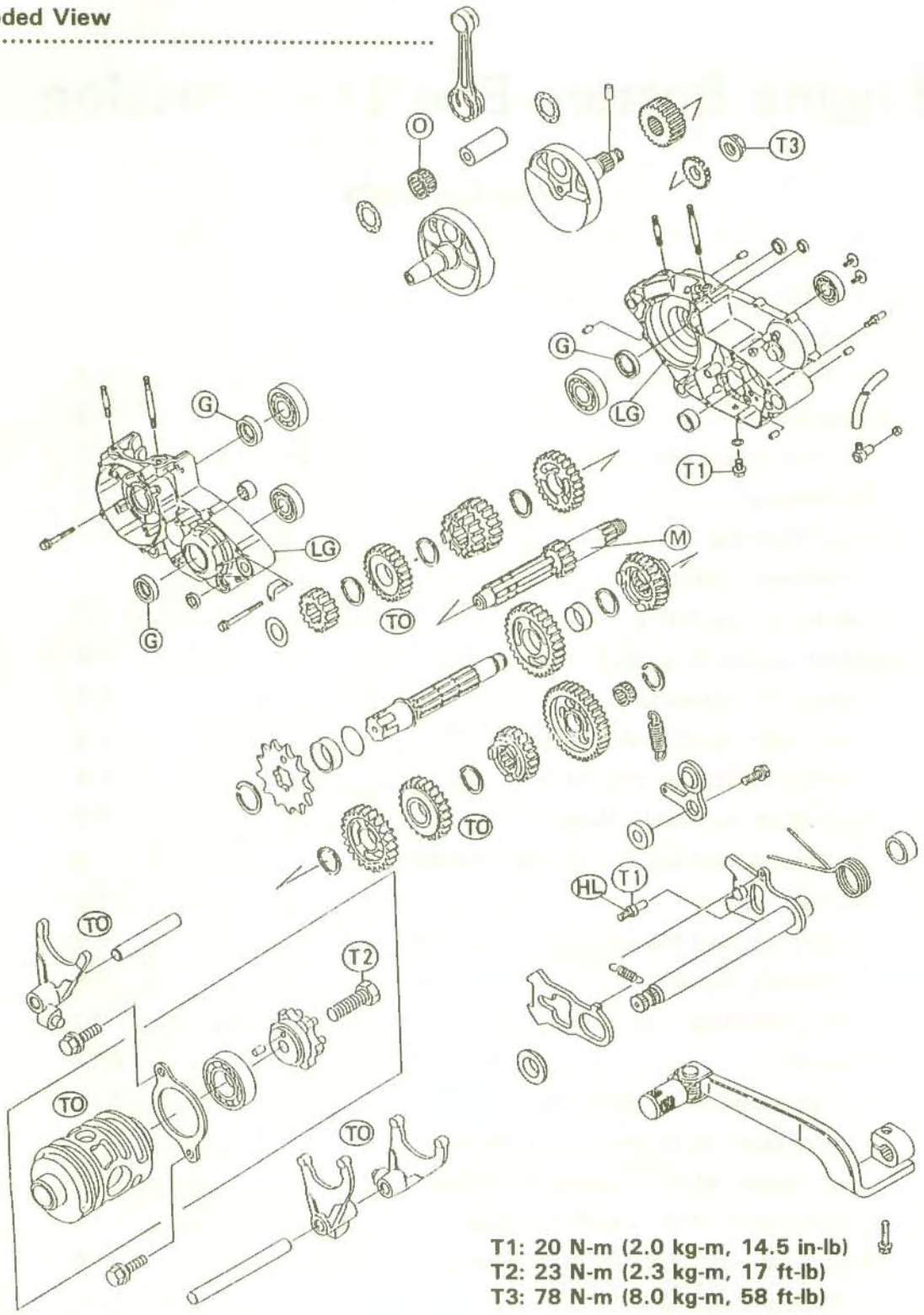
78 N-m (8.0 kg-m, 58 ft-lb)

- To route the leads, cables and hoses, refer to the General Information chapter.
- To install parts removed, refer to the appropriate chapters.
- Fill the engine with coolant (see Coolant Change in the Cooling System chapter).
- Fill the engine with transmission oil (see Transmission Oil Change in the Engine Bottom End/Transmission chapter).
- Adjust the following parts:
  - Throttle Cable
  - Clutch Cable
  - Drive Chain
  - Rear Brake

Engine Bottom End/Transmission

Table of Contents

Exploded View



T1: 20 N-m (2.0 kg-m, 14.5 in-lb)
T2: 23 N-m (2.3 kg-m, 17 ft-lb)
T3: 78 N-m (8.0 kg-m, 58 ft-lb)

O : Apply 2 stroke engine oil
TO : Apply transmission oil to the transmission gears and shift forks, etc.
M : Apply a thin coat of a molybdenum disulfide grease.
G : Apply high temperature grease.

LG : Apply liquid gasket to the left and right case mating surface.
HL : Apply a non-permanent locking agent to the threads.

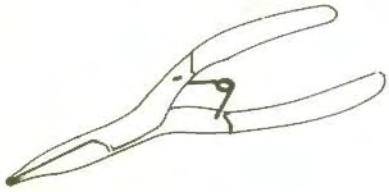
Specifications

Item	Standard	Service Limit
Transmission Oil:		
Grade	SE class	— — —
Viscosity	SAE 10W 30 or 10W 40	— — —
Amount	0.75 L	— — —
Crankshaft, Connecting Rod:		
Connecting rod		
Bend and twist:	not more than 0.03mm/ 100mm	0.20mm/100mm
Big end radial clearance:	0.026—0.043 mm	0.10 mm
Big end side clearance:	0.40—0.50 mm	0.70 mm
Crankshaft runout	under 0.03 mm	0.05 mm
Transmission:		
Gear backlash	0.04—0.19 mm	0.26 mm
Shift fork finger thickness	3.9—4.0 mm	3.8 mm
Gear shift fork groove width	4.05—4.15 mm	4.25 mm
Shift fork guide pin diameter	5.975—5.994 mm	5.87 mm
Shift drum groove width	6.05—6.20 mm	6.25 mm

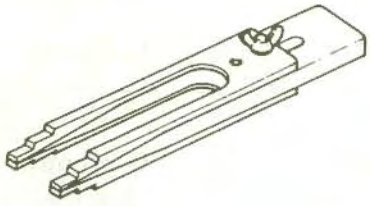
Special Tools

Along with common hand tools and precision instruments, specialized tools are required for complete crankshaft/transmission servicing.

Circlip Pliers: 57001-144

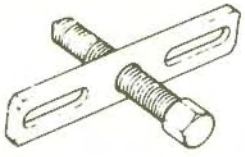


Crankshaft Jig: 57001-1174



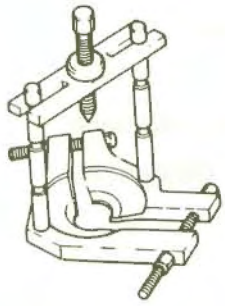
Bearing Driver Set: 57001-1129

Kick Shaft Oil Seal Guide: 57001-263



Shift Shaft Oil Seal Guide: 57001-264

Bearing Puller: 57001-158



Crankcase Splitting Tool Set: 57001-1098

Adapter: 57001-136

Transmission Oil

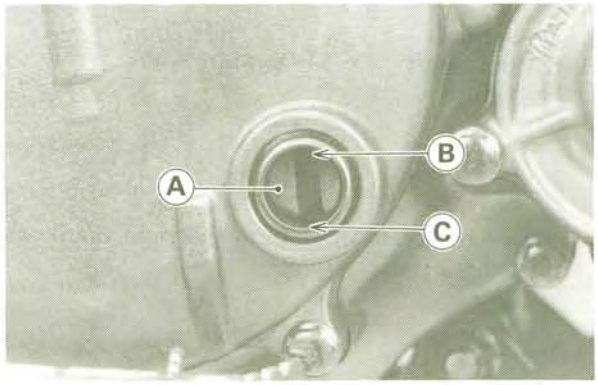
In order for the transmission and clutch to function properly, always maintain the transmission oil at the proper level and change the oil periodically.

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

- Situate the motorcycle so that it is perpendicular to the ground.
- If the motorcycle has just been used, wait several minutes until the oil settles.
- Check that the oil level comes up between the upper and lower levels through the oil level gauge on the right engine cover.



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

★ If the oil level is too high, remove the excess oil with unscrew the drain plug.
★ If the oil level is too low, add the correct amount of oil through the oil filler opening. Use the same type and make of oil that is already in the engine.

NOTE

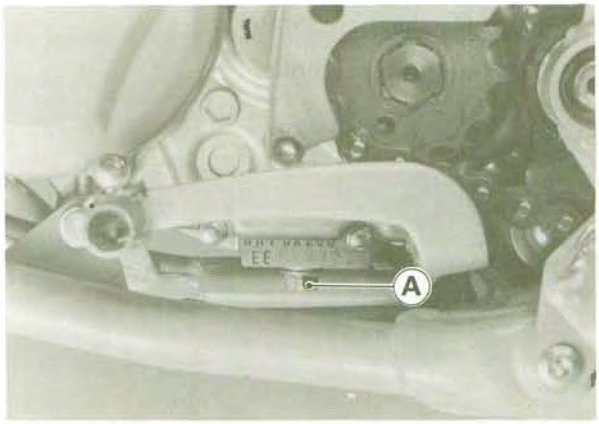
○*If the transmission oil type and make are unknown, use any brand of the specified oil to top up the level in preference to running the engine with the oil level low. Then at your earliest convenience, change the oil completely.*

Oil Change

- 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 oil drain plug on the bottom of the engine, and let the oil drain completely.

NOTE

○*Hold the motorcycle upright so that the oil may drain completely.*



A: Transmission Oil Drain Plug

- Check the gasket at the drain plug for damage.

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

- After the oil has completely drained out, install the drain plug with the gasket, and tighten it to the specified torque.

Tightening torque:

20 N-m (2.0 kg-m, 14.5 ft-lb)

- Fill the engine with a good quality motor oil specified in the table.
- Check the oil level.

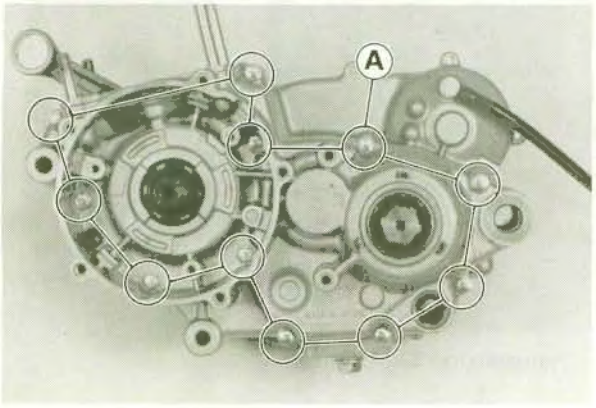
Transmission Oil

Grade: **SE class**
Viscosity: **SAE 10W30 or 10W40**
Amount: **0.75 L**

Crankcase Splitting

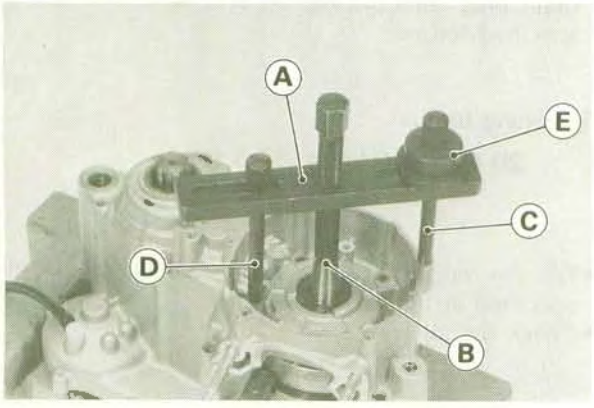
Crankcase Splitting

- Remove the engine (see the Engine Removal/Installation chapter).
- Set the engine on a clean surface while parts are being removed.
- Remove the following parts from the engine:
  - Magneto Cover
  - Output Shaft Sleeve and O-ring
  - Cylinder Head
  - Cylinder
  - Piston
  - Right Engine Cover
  - Clutch
  - Water Pump Drive Gear and Primary Gear
  - Kickstarter Assembly
  - Kickstarter Idle Gear
  - Neutral Set Lever
  - Magneto Flywheel and Stator
- Remove the crankcase bolts.



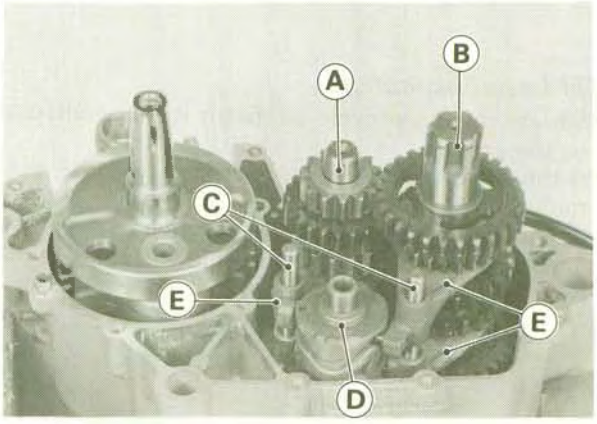
A: Crankcase Bolts

- Install the crankcase splitting tool, adapter (special tools) and suitable tool into the left side of the crankcase. Be certain to screw the tool in all the way.



A. Crankcase Splitting Tool Set: 57001-1098
B. Adapter: 57001-136
C. 6 mm Bolt
D. 5 mm Bolt
E. Suitable Tool

- Tighten the bolt on the crankcase splitting tool to split the crankcase halves.
- Once the crankcase is split, remove the crankcase splitting tool, and lift off the left crankcase.
- Pull off the shift rod, and disengage the shift fork guide pins from the shift drum grooves, and remove the shift drum.
- Remove the shift forks, and output and drive shaft assemblies.



A. Drive Shaft
B. Output Shaft
C. Shift Rods
D. Shift Drum
E. Shift Forks

- Remove the crankshaft from the right crankcase half using a press.

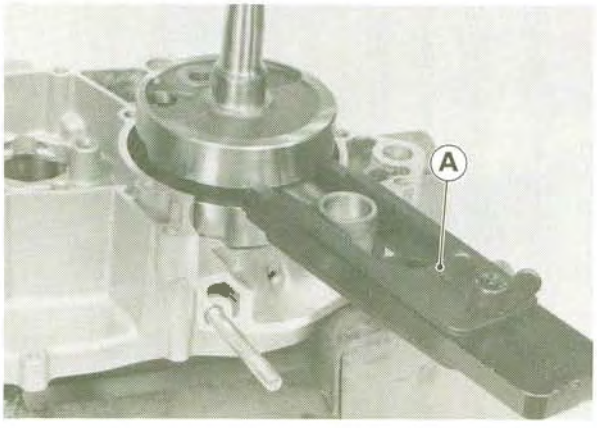
Crankcase Assembly

- Before fitting the left case on the right case, note the following.
  - Chip off the old gasket from the mating surfaces of the crankcase halves, and clean off the crankcase with a high flash-point solvent. After cleaning, apply transmission oil to the transmission gears, shift drum, shift forks and so on.
  - Be sure to replace any oil seal removed with a new one. Press in the new oil seal using a press and suitable tools so that the seal surface is flush with the surface of the crankcase.
  - Apply high temperature grease to the oil seal lips.
  - Press in the ball bearings using the bearing driver set (special tool: 57001-1129) until the bearing is bottomed.

NOTE

○Do not remove the bearings unless it is necessary. Removal may damage them.
○Install the bearings for the crankshaft in the right and left crankcase so that their sealed sides face toward the oil seal side.

○ Tighten the output and drive shaft bearing retaining bolts securely.
☆ If the crankshaft bearings stay on the crankshaft when splitting the crankcase, remove the bearings from the crankshaft and reinstall them in the crankcase, and then assemble the crankcase (see Crankshaft Removal and Installation Notes).
• Turn the crankshaft to BDC, and install the crankshaft jig (special tool) between the flywheels opposite the connecting rod big end to protect flywheel alignment as shown.
○ If the crankshaft has been removed from the crankcase, install the crankshaft jig (special tool) between the crankshaft flywheels before pressing the crankshaft into the right crankcase half.

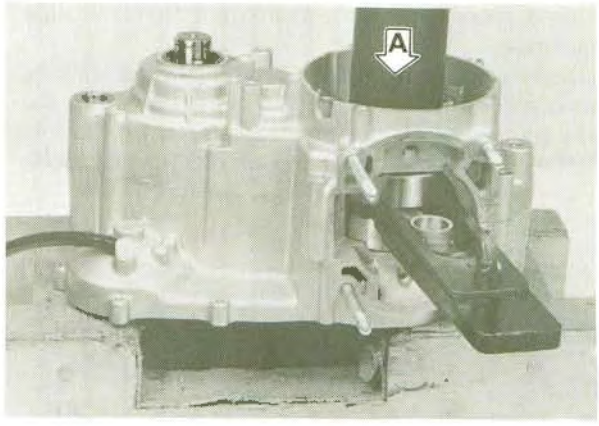


A. Crankshaft Jig: 57001-1174

•Check to see that the crankcase knock pins are in place on the right crankcase half. If any of them has been removed, replace it with a new one.
•Apply liquid gasket to the mating surface of the left crankcase half.
•Using a suitable tool on the left crankcase to press around the hole for the crankshaft, fit the crankcase halves together with a press on the tool.

NOTE

○Constantly check the alignment of the two crankcase halves, and the position of the transmission shafts, and shift drum. The front and rear of the crankcase must be pushed together evenly.



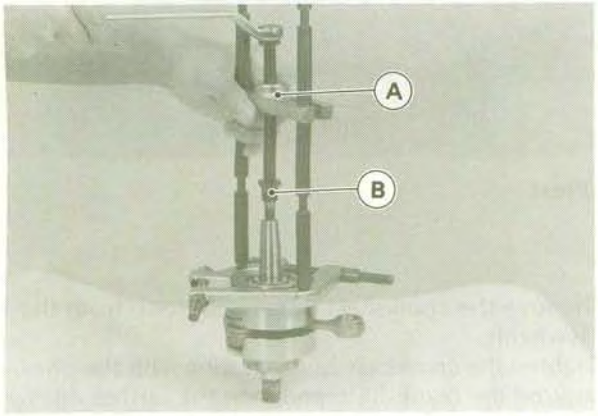
A. Press

• Remove the crankshaft jig (special tool) from the flywheels.
• Tighten the crankcase bolts starting with the ones around the crankshaft, and then the farther ones.
• Check to see that the crankshaft, drive shaft, and output shaft all turn freely (in the neutral position).
★ If the crankshaft will not turn, probably the crankshaft is not centered; tap the appropriate end of the crankshaft with a mallet to reposition it.
• Spinning the output shaft, shift the transmission through all the gears to make certain there is no binding and that all the gears shift properly.
• Install the parts removed in the reverse order of removal, and refer to the appropriate chapters.
○ Replace the O-ring on the output shaft with a new one.

Crankshaft, Connecting Rod

Crankshaft Removal

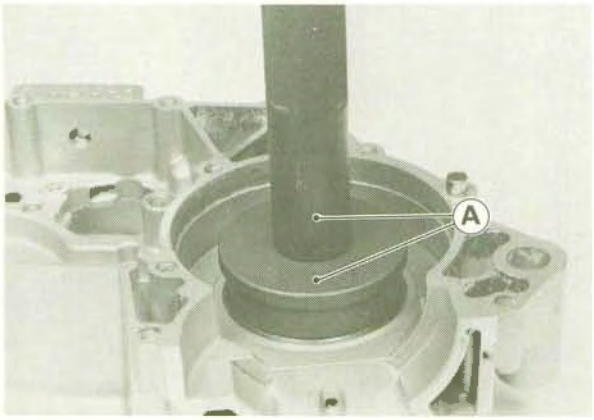
- Split the crankcase (see Crankcase Splitting).
- Remove the transmission shafts (see Transmission Shaft Removal).
- Using a press remove the crankshaft from the right crankcase.
- If the bearings stay on the crankshaft when splitting the crankcase or removing the crankshaft from the right crankcase, remove the bearings from the crankshaft with a bearing puller and adapter (special tools).



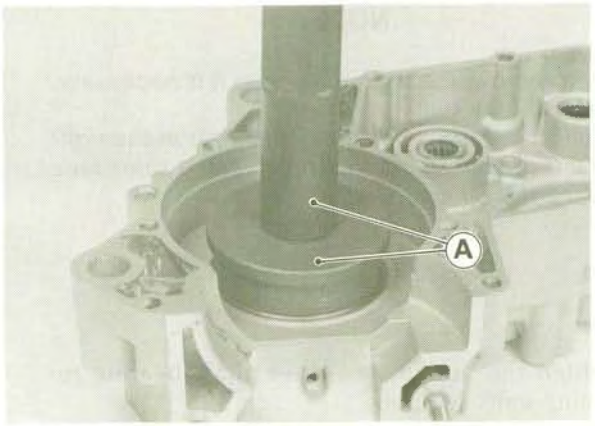
A. Bearing Puller: 57001-158
B. Adapter: 57001-136

Crankshaft Installation Notes

- Installation is the reverse of removal (see Transmission Shaft Installation Notes and Crankcase Assembly).
- When installing the crankshaft bearings, apply high temperature grease to the outer sides of the bearings, and then press them into the crankcase using the bearing driver set (special tool) until the bearing bottoms against the step.

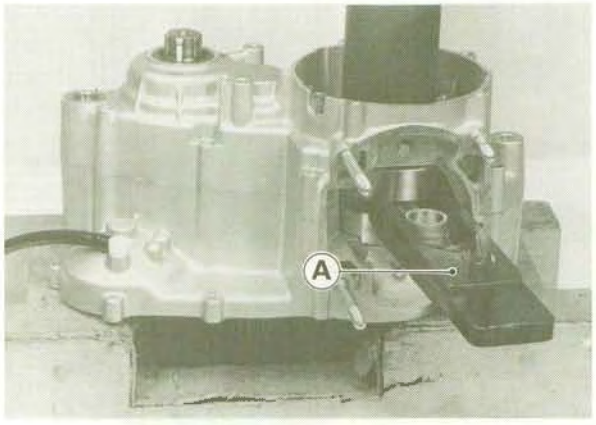


A. Bearing Driver Set: 57001-1129



A. Bearing Driver Set: 57001-1129

- Insert the crankshaft jig (special tool) between the crankshaft flywheels opposite the connecting rod big end to protect flywheel alignment as shown, and press the crankshaft into the right crankcase.
  - When pressing, position the jig in the crankcase opening so the jig does not hit the crankcase.



A. Crankshaft Jig: 57001-1174

- Apply 2-stroke oil to the connecting rod big end bearing.

Crankshaft Disassembly Note

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.

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

Crankshaft Assembly Notes

Since the 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 bend, twist

○Connecting rod big end radial clearance.

○Cold-fitting tolerance between crankpin and flywheels.

○Side clearance between the connecting rod big end and one of the flywheels.

○Crankshaft runout.

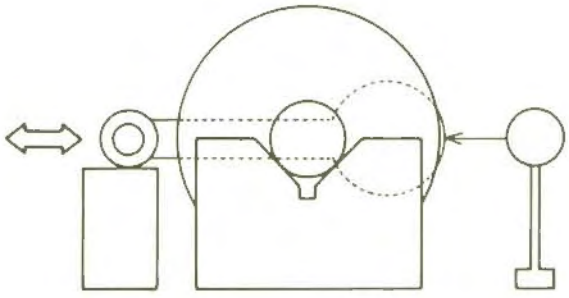
Connecting Rod Big End Radial Clearance

- Set the crankshaft in a flywheel alignment jig or on V blocks, and place a dial gauge against the connecting rod big end.
- 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:	**0.026 – 0.043 mm**
Service Limit:	**0.1 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 Big End Side Clearance

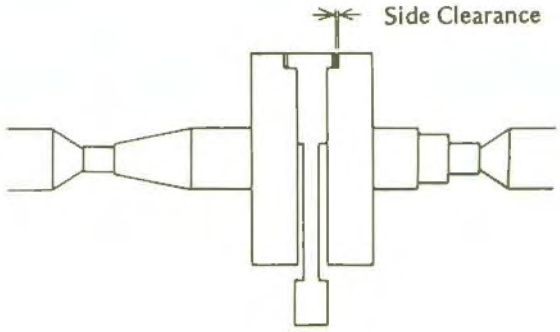
- Measure the side clearance of the connecting rod with a thickness gauge.

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

Connecting Rod Big End Side Clearance

Standard:	**0.40–0.50 mm**
Service Limit:	**0.70 mm**

Side Clearance



Crankshaft Runout

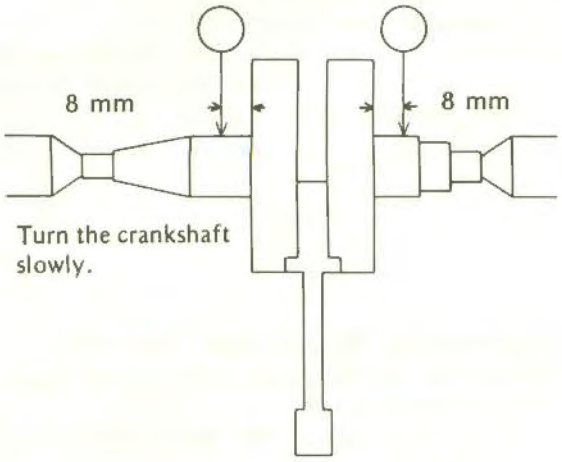
•Set the crankshaft in a flywheel alignment jig or on V blocks, and place a dial gauge against the points indicated.

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

Crankshaft Runout

Standard:	**Not more than 0.03mm**
Service Limit:	**0.05 mm**

Crankshaft Runout



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

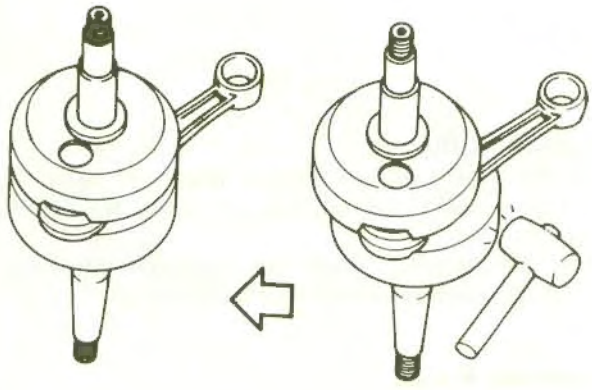
Crankshaft Alignment

- 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 cases of both 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.

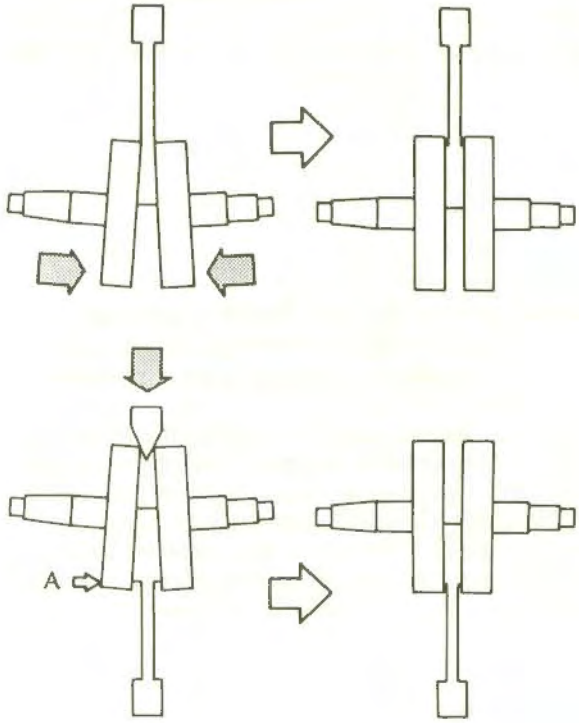
Horizontal Misalignment



CAUTION

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

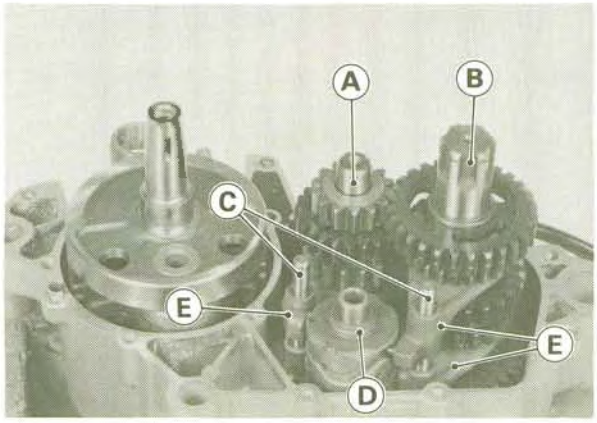
Vertical Misalignment



Transmission

Transmission Shaft Removal

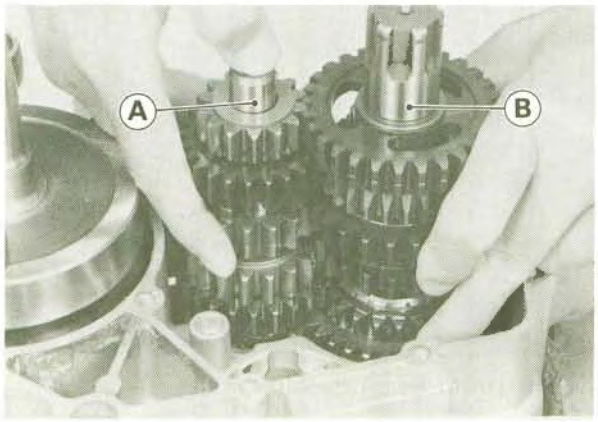
- Split the crankcase (see Crankcase Splitting).
- Pull off the shift rod, and disengage the shift fork guide pins from the shift drum grooves.
- Remove the shift drum.
- Remove the shift forks from the transmission gears.
- Take out the drive shaft and output shaft together, with their gears meshed.



A. Drive Shaft
B. Output Shaft
C. Shift Rods
D. Shift Drum
E. Shift Forks

Transmission Shaft Installation Notes

- Installation is the reverse of removal.
- Hold the drive shaft and output shaft together, with their gears meshed, and fit them into the right crankcase half.



A. Drive Shaft B. Output Shaft

- To install the shift forks and shift drum, see the Shift Drum and Fork Installation Notes.

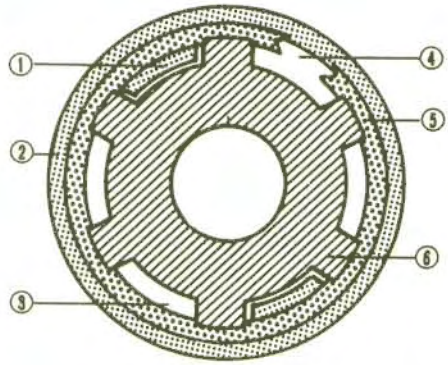
Transmission Shaft Disassembly Notes

- Using circlip pliers (special tool: 57001-144) to remove the circlips, disassemble the transmission shaft.

Transmission Shaft Assembly Notes

- Assembly is the reverse of removal.
- Apply transmission oil liberally to the transmission shaft, gears and bearings.
- Replace any circlips that were removed with new ones.
  - Always install circlips so that the opening is aligned with a spline groove, and install toothed washers so that the teeth are not aligned with the circlip opening. To install a circlip without damage, first fit the circlip onto the shaft expanding it just enough to install it, and then use a suitable gear to push the circlip into place.

Circlip and Toothed Washer Installation

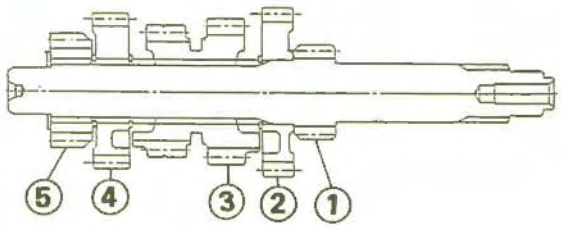


1. Teeth of Toothed Washer
2. Toothed Washer
3. Groove of Shaft
4. Opening of Circlip
5. Circlip
6. Shaft

- The drive shaft gears can be identified by size; the smallest diameter gear is 1st gear, and the largest is 6th. Be sure that all parts are put back in the correct sequence, facing the proper direction, and that all circlips and the washer are properly in place.

Drive Shaft Gears

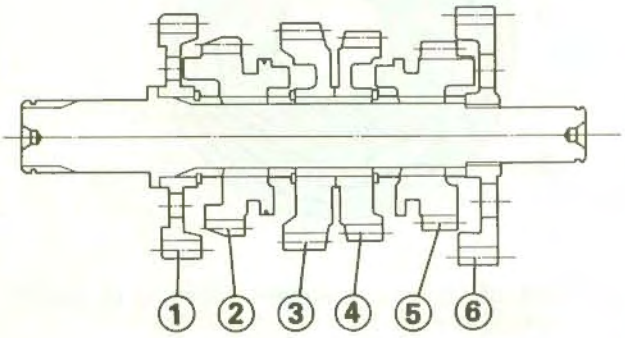
1. 1st gear (13T; part of drive shaft)
2. 6th gear (23T; dog recesses face left)
3. 3rd/4th gear (15T/17T; larger gear faces right)
4. 5th gear (24T; dog recesses face right)
5. 2nd gear (14T; chamfered side faces right)



•The output shaft gears can be identified by size; the largest diameter gear is 1st gear, and the smallest is 6th. Be sure that all parts are put back in the correct sequence and facing the proper direction, and that all circlips and washers are properly in place.

Output Shaft Gears

1. 2nd gear (28T; dog recesses face right)
2. 5th gear (25T; fork groove goes to the right side of the gear teeth)
3. 3rd gear (23T; dog recesses face left)
4. 4th gear (21T; dog recesses face right)
5. 6th gear (20T; fork groove goes to the left side of the gear teeth)
6. 1st gear (35T; plain side faces right)



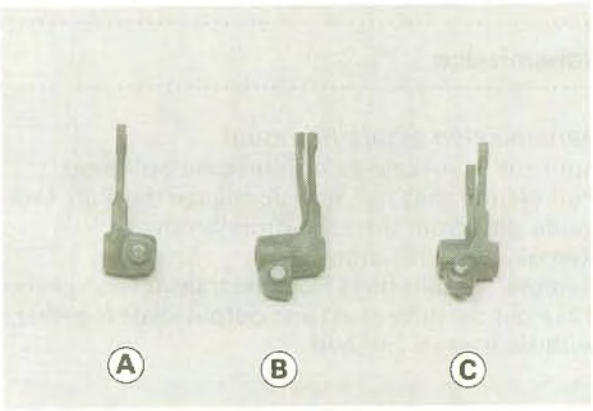
•Check that each gear spins or slides freely on the transmission shaft without binding after assembly.

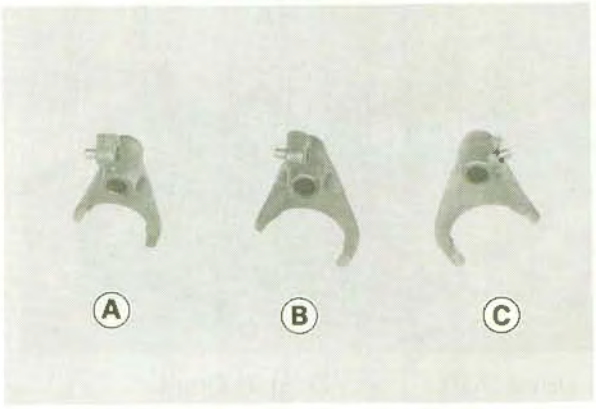
Shift Drum and Fork Installation Notes

•Apply a little transmission oil to the shift fork fingers, and fit the shift forks into the gear grooves.

Shift Fork Identification

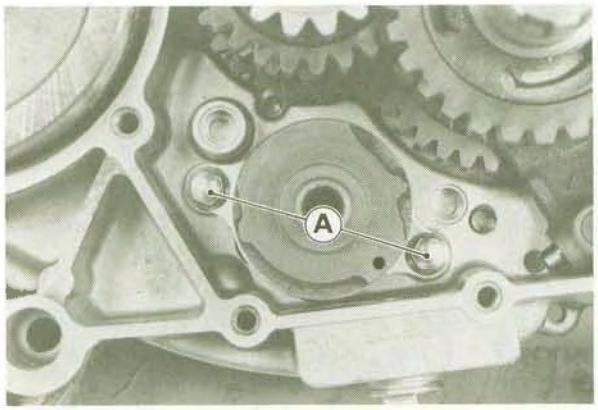
Drive shaft 3rd and 4th gear shift fork	fingers are shorter than those of the other two shift forks
Output shaft 5th gear shift fork	guide pin goes to left side of the fingers
Output shaft 6th gear shift fork	guide pin goes to right side of the fingers





A. Drive Shaft 3rd and 4th Gear Shift Fork
B. Output Shaft 5th Gear Shift Fork
C. Output Shaft 6th Gear Shift Fork

•Install the shift drum assembly and tighten the shift drum bearing holder bolts securely.



A. Shift Drum Bearing Holder Bolts

•Fit the shift fork guide pins into the corresponding shift drum grooves.
•Tighten the shift drum operating plate bolt to the specified torque.

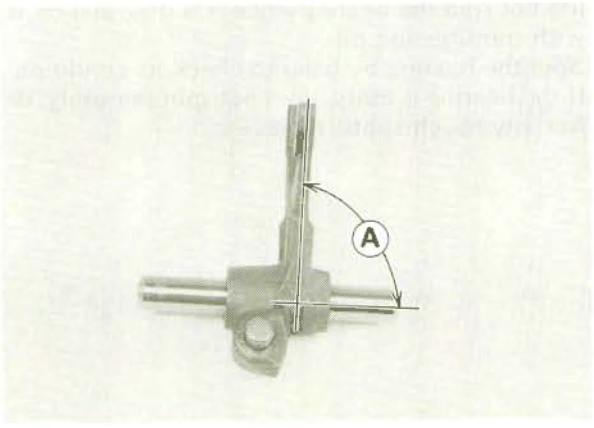
Tightening Torque:

23 N-m (2.3 kg-m, 17 ft-lb)

•Apply a little transmission oil to the shift rod, and slide it into the shift forks.

Shift Fork Bending

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



A. 90°

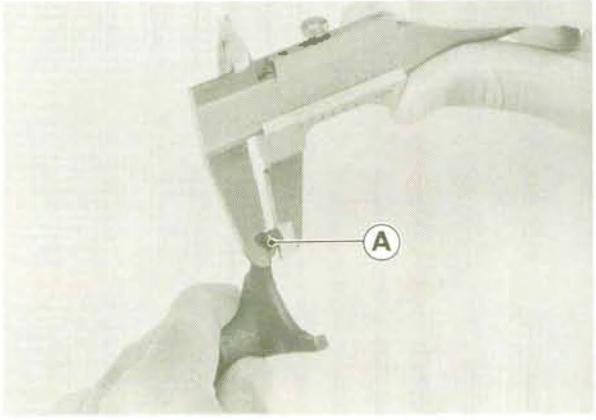
Shift Fork/Gear Groove Wear

• Measure the thickness of the shift fork fingers, and measure the width of the shift fork grooves in the transmission gears.

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

Shift Fork Finger Thickness

Standard:	**3.9—4.0 mm**
Service Limit:	**3.8 mm**

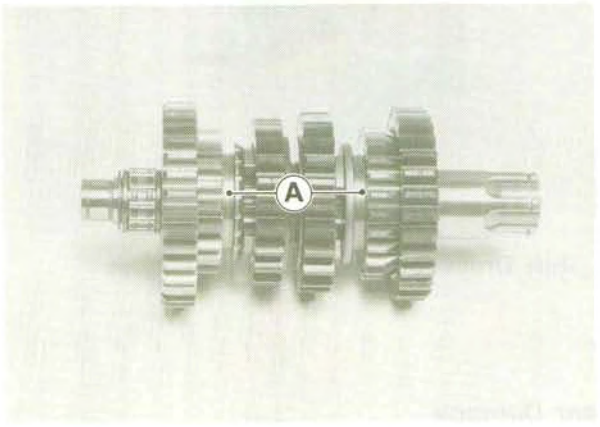


A. Shift Fork Fingers

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

Gear Shift Fork Groove Width

Standard:	**4.05—4.15 mm**
Service Limit:	**4.25 mm**



A. Gear Shift Fork Grooves

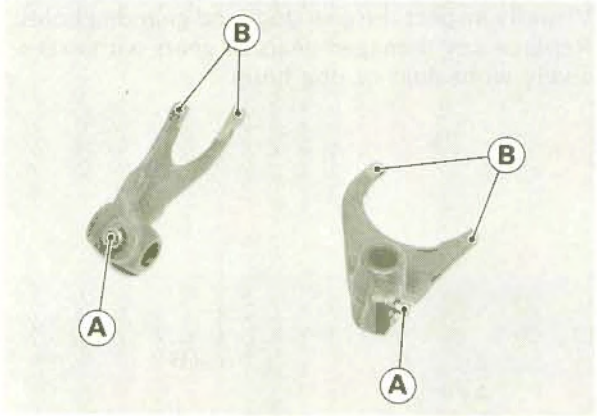
Shift Fork Guide Pin/Shift Drum Groove Wear

• Measure the diameter of each shift fork guide pin, and measure the width of each shift drum groove.

★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:	**5.975 — 5.994 mm**
Service Limit:	**5.87 mm**

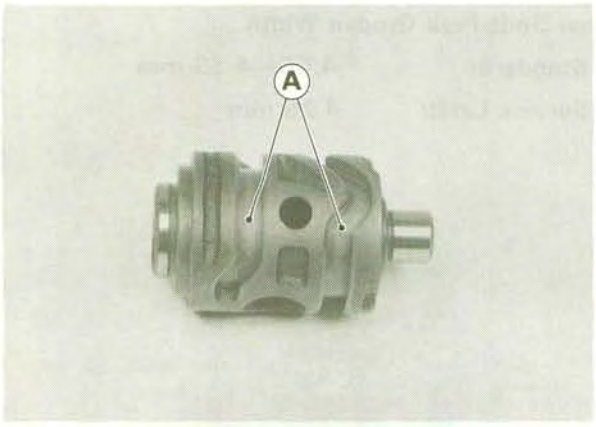


A. Shift Fork Guide Pin B. Shift Fork Fingers

★If any shift drum groove is worn over the service limit, the drum must be replaced.

Shift Drum Groove Width

Standard:	**6.05—6.20 mm**
Service Limit:	**6.25 mm**



A. Shift Drum Grooves

Gear Damage

- Visually inspect the gear teeth on the transmission gears.

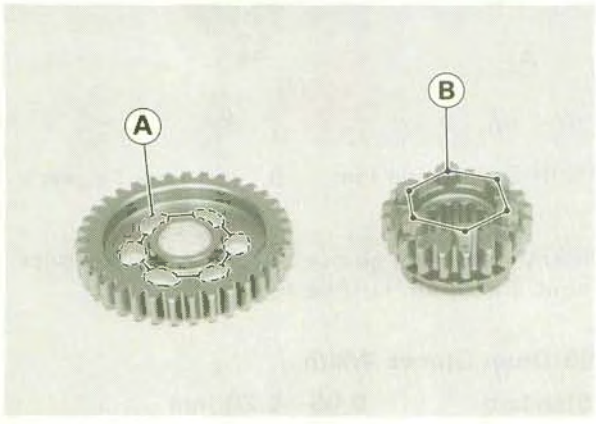
★Repair lightly damaged gear teeth with an oilstone. The gear must be replaced if the teeth are badly damaged.

★At the same time that a gear is repaired or replaced, the driving gear should also be inspected and repaired or replaced if necessary.

Gear Dog/Gear Dog Hole Damage

- Visually inspect the gear dogs and gear dog holes.

★Replace any damaged gears or gears with excessively worn dogs or dog holes.



A. Dog Holes B. Dogs

Ball Bearing/Needle Bearing Wear

- Check the ball and needle bearings on the crankcase.

○ Since the ball and needle 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 transmission 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.

Wheels/Tires

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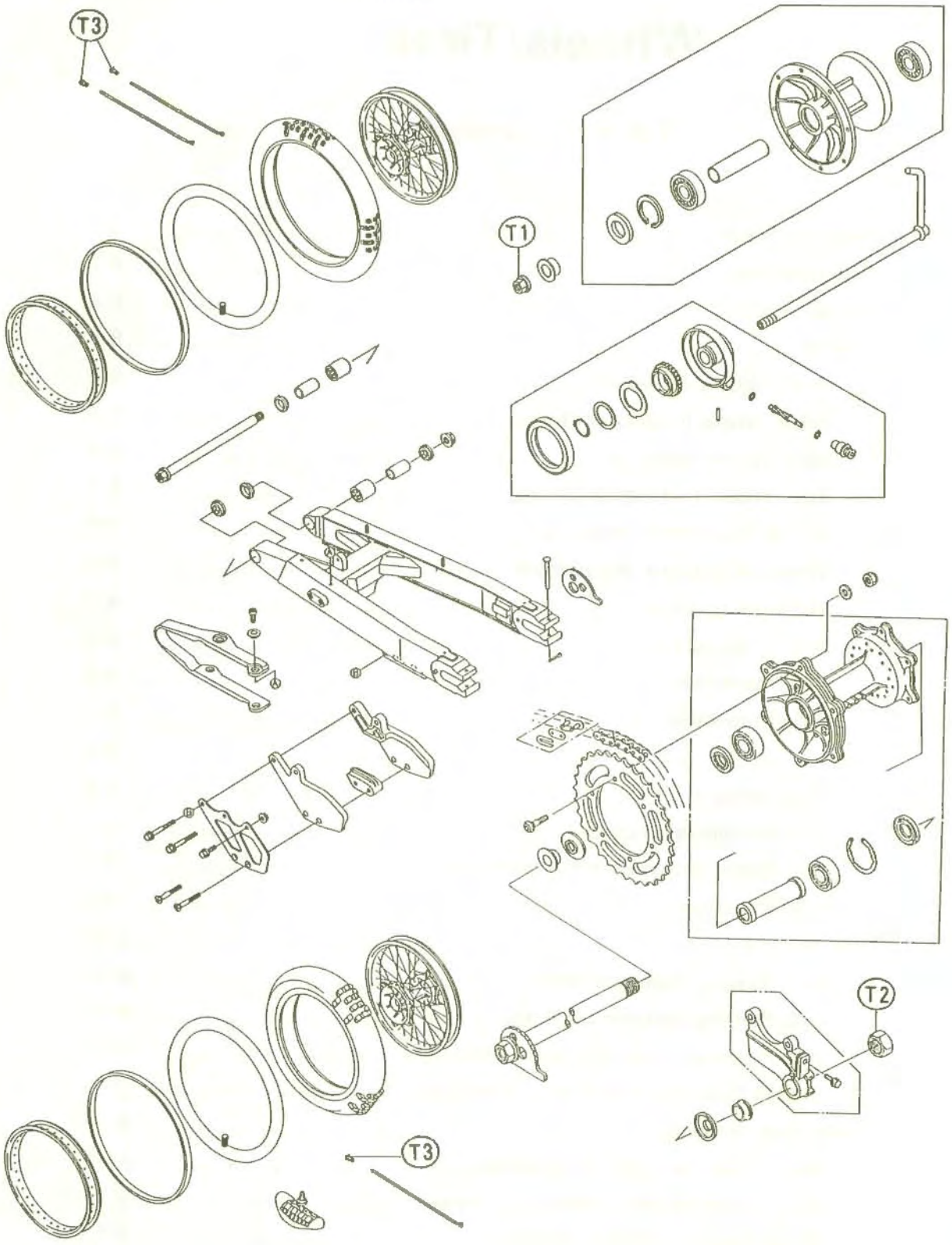
Exploded View



T1: 88 N-m (9.0 kg-m, 65 ft-lb)
T2: 98 N-m (10 kg-m, 72 ft-lb)
T3: 1.5 N-m (0.15 kg-m, 13 in-lb)

Specifications

Item		Standard	Service Limit
Wheels:			
Rim runout:	Axial	Under 0.5 mm	2 mm
	Radial	Under 0.8 mm	2 mm
Axle runout/100 mm		Under 0.10 mm	0.2 mm (0.7 mm:RL)
Tires:			
Front:	Size	80/100−21 51M	———
	Make, type	DUNLOP K490 Ⓔ DUNLOP K990	
Rear:	Size	100/100−18 59M	———
	Make, type	DUNLOP K695 Ⓔ DUNLOP K990	
Air pressure		100 kPa(1.0 kg/cm^2, 14 psi)	———

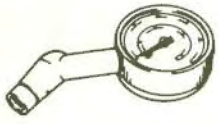
Ⓔ: European Model

Special Tools

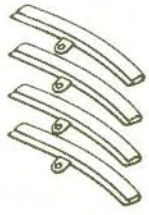
Bearing Driver Set: 57001-1129

Tire Iron: 57001-1073

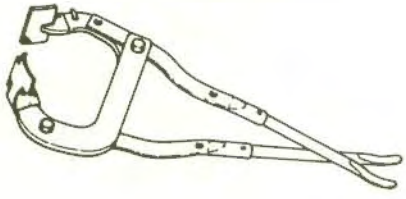
Tire Pressure Gauge: 52005-1003



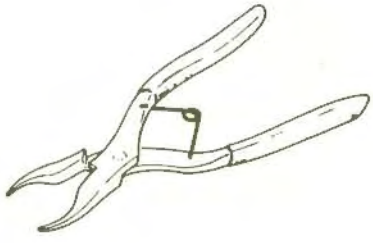
Rim Protector: 57001-1063



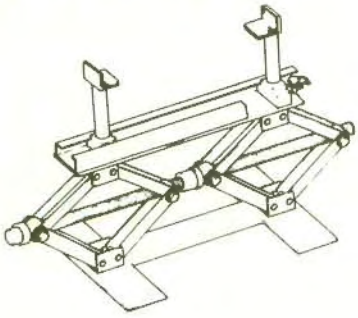
Bead Breaker Ass'y: 57001-1072



Circlip Pliers: 57001-143



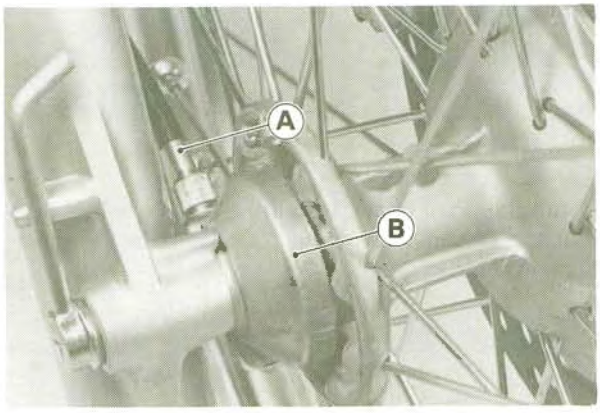
Jack Stand: 57001-1238



Wheels

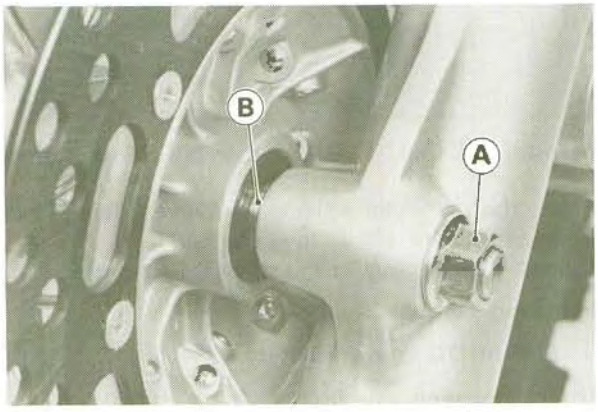
Front Wheel Removal

- Using the jack stand (special tool : 57001-1238) under the frame, and stabilize the motorcycle.
- Place a stand or block under the engine so that the front wheel is raised off the ground.
- Disconnect the meter cable lower end from the meter gear housing.



A. Meter Cable
B. Meter Gear Housing

- Remove the axle nut, pull out the axle and remove the wheel.



A. Axle Nut B. Collar

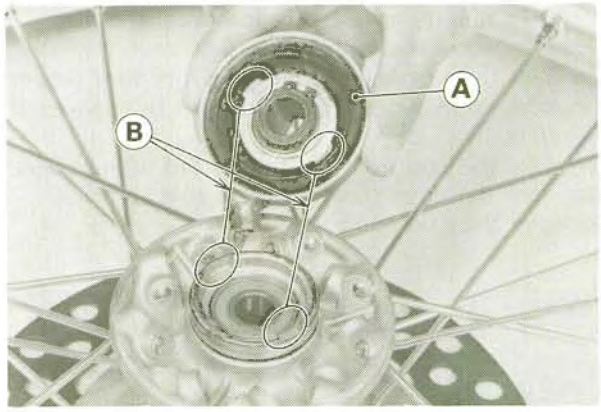
CAUTION

○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.

- Insert a wood wedge between the disc brake pads this prevents them from being moved out of their proper position, should the brake lever be squeezed accidentally.

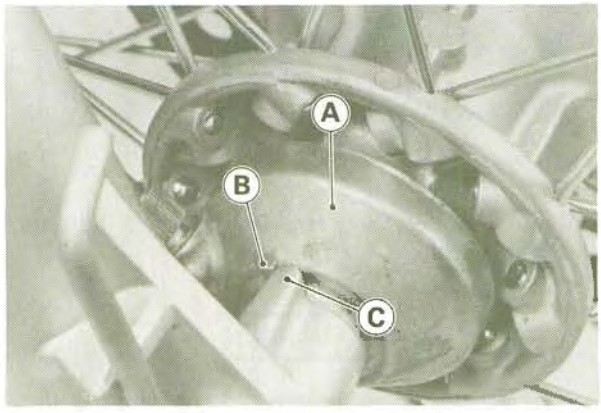
Front Wheel Installation Notes

- Installation is the reverse of removal.
- Install the collar on the left side of the hub.
- Install the meter gear housing so that it fits in the meter gear drive notches.



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

- Fit the meter gear housing stop to the fork leg stop.



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

- Tighten the axle nut to the specified torque.

Tightening Torque:

88N-m (9.0 kg-m, 65 ft-lb)

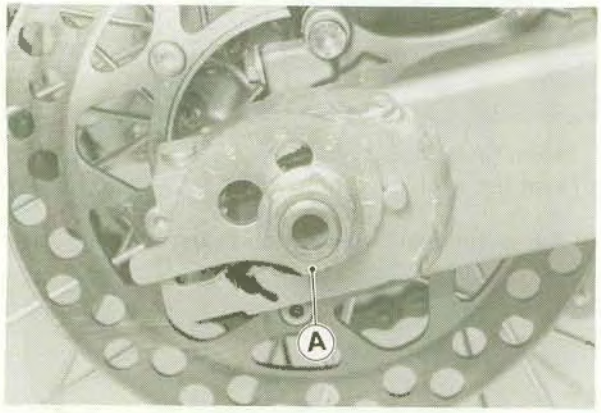
- Check the front brake for weak braking power and brake drag.

WARNING

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

Rear Wheel Removal

- Place the jack stand (special tool : 57001-1238) under the frame so that the rear wheel is raised off the ground.
- Remove the caliper cover, unscrew the caliper mounting bolts, and remove the caliper from the disc.
- Insert a wood wedge between the brake pads this prevents them from being moved out of their proper position, should the brake pedal be squeezed accidentally.
- Remove the clip from the master link using pliers, and free the drive chain from the rear sprocket.
- Remove the axle nut.



A. Axle Nut

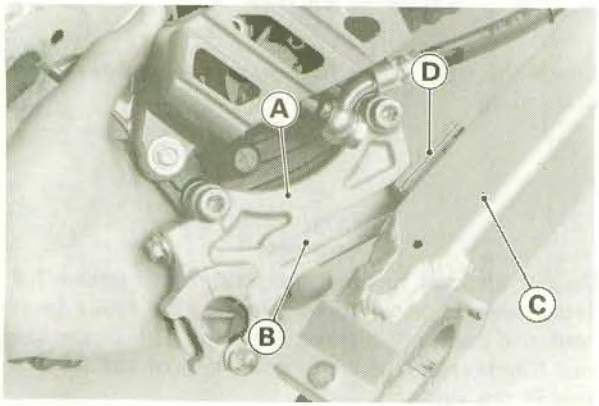
- Pull out the axle, and remove the chain adjuster, and rear wheel.

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.

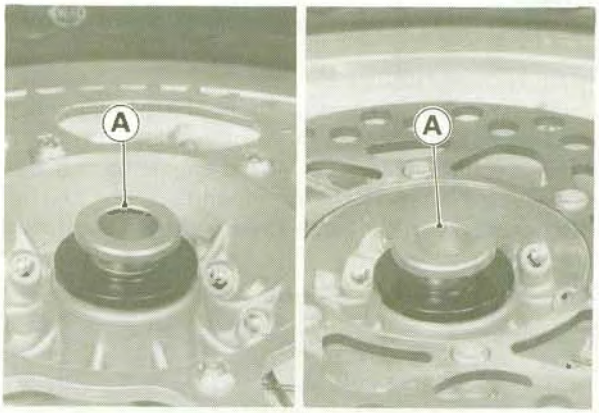
Rear Wheel Installation Notes

- Installation is the reverse of removal.
- Fit the brake holder stop against the swing arm stop.



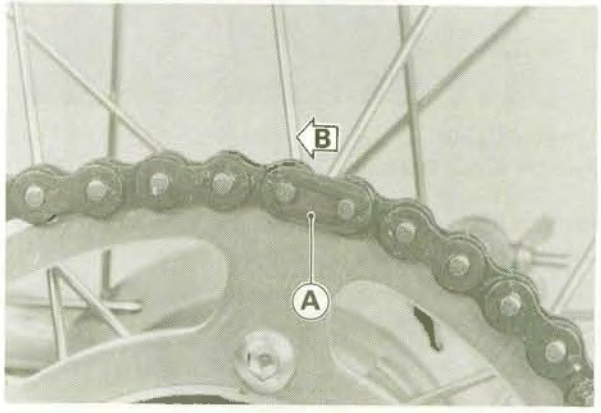
A. Brake Holder
B. Stop (Brake Holder)
C. Swing Arm
D. Stop (Swing Arm)

- Install the collar on the left and right side of the hubs.



A. Collar

- Install the drive chain. Install the master link clip so that the closed end of the "U" points in the direction of chain rotation.



A. Master Link Clip B. Direction of Chain Rotation

- Check the drive chain slack (see Drive Chain Slack Inspection in the Final Drive chapter).
- Tighten the axle nut to the specified torque.

Tightening Torque:

98N-m (10 kg-m, 72 ft-lb)

- The caliper mounting bolts to the specified torque.

Tightening Torque:

25N-m (2.5 kg-m, 18 ft-lb)

WARNING

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

- Check the rear brake for weak braking power and brake drag.

Wheel Alignment Inspection

- Refer to Wheel Alignment Inspection in the Final Drive chapter.

Wheel Alignment Adjustment

•Refer to Wheel Alignment Adjustment in the Final Drive chapter.

Wheel Inspection

- Place the jack stand under the frame so that the front/rear wheel is raised off the ground.
- Spin the wheel lightly, and check for roughness or binding.

★If roughness or binding is found, replace or lubricate the hub bearings.

- Visually inspect the front and rear axles for damage.

★If axle is damaged or bent, replace it.

Spoke Inspection

- Check that all the spokes are tightened evenly.

★If spoke tightness is uneven or loose, tighten the spoke nipples to the specified torque evenly.

Tightening Torque:

1.5N-m (0.15 kg-m, 13 in-lb)

[not over 3N-m (0.3 kg-m, 26 in -lb)]

- Check the rim runout.

WARNING

○If any spoke breaks, it should be replaced immediately. A missing spoke places an additional load on the other spokes, which will eventually cause other spokes to break.

Rim Inspection

- Inspect the rim for small cracks, dents, bending, or warping.

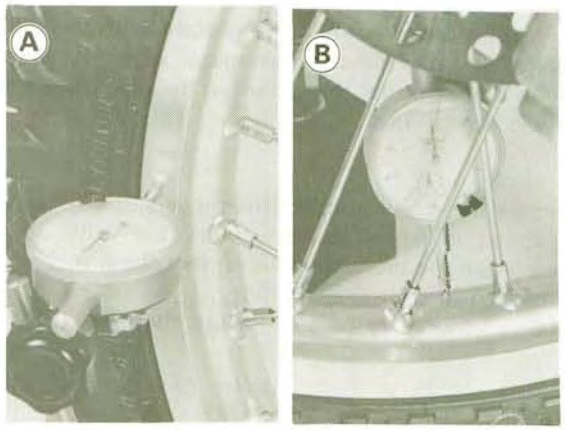
★If there is any damage to the rim, it must be replaced.

- Set a dial gauge against the side of the rim, and rotate the rim to measure the axial runout. The difference between the highest and lowest dial readings is the amount of runout.
- Set a dial gauge against the outer circumference of the rim,and rotate the rim 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, correct the rim warp (runout). A certain amount of rim warp can be corrected by recentering the rim. Loosen some spokes and tighten others within the standard torque to change the position of different parts of the rim. If the rim is badly bent, however, it must be replaced.

Rim Runout (with tire installed)

	Standard	Service Limit
Axial	under 0.5 mm	2 mm
Radial	under 0.8 mm	2 mm



A. Axial Rim Runout
B. Radial Rim Runout

Axle Inspection

- Place the axle in V blocks that are 100 mm apart, and set a dial gauge on the axle at a point halfway between the blocks. Turn the axle to measure the runout. The difference between the highest and lowest dial readings is the amount of runout.

★If runout exceeds the repair limit, replace it.

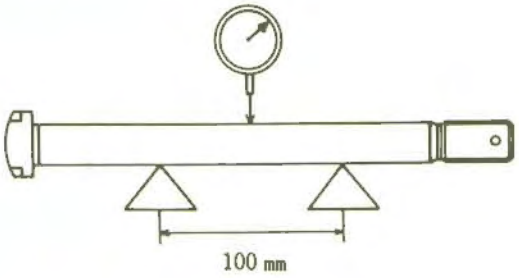
★If runout only exceeds the service limit, straighten the axle.

★If the axle cannot be straightened to within the service limit, replace the axle.

Axle Runout/100 mm

Standard:	**under 0.10 mm**
Service Limit:	**0.2 mm**
repair Limit:	**0.7 mm**

Axle Runout



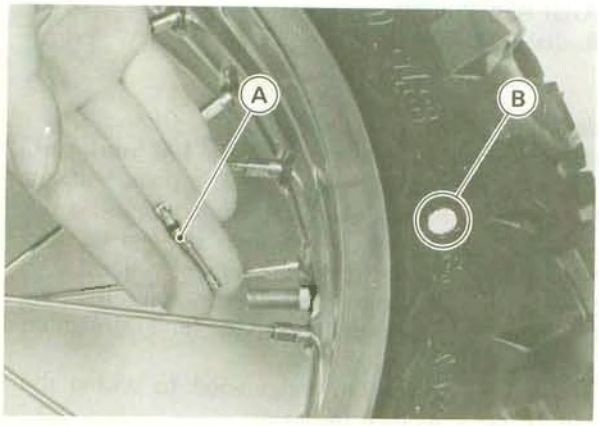
Tires

Tire Removal

CAUTION

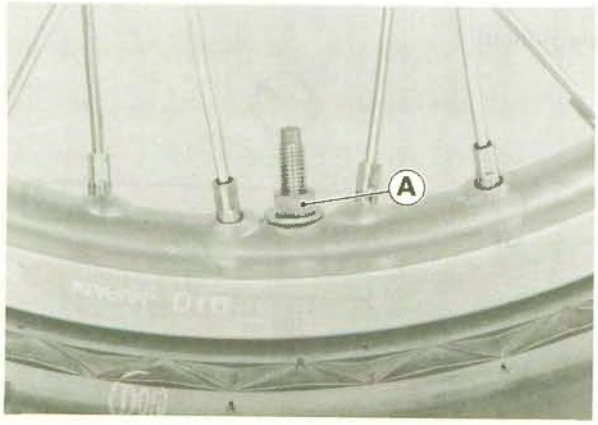
○Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so the disc does not touch the ground.

•Remove the wheel from the motorcycle (see Wheels).
•To maintain wheel balance, mark the valve stem position on the tire with chalk so that the tire can be reinstalled in the same position.
•Take out the valve core to let out the air.



A. Unscrew valve core. B. Mark valve stem position.

○When handling the rim, be careful not to damage the aluminum rim flanges.
•Loosen the bead protector nut.



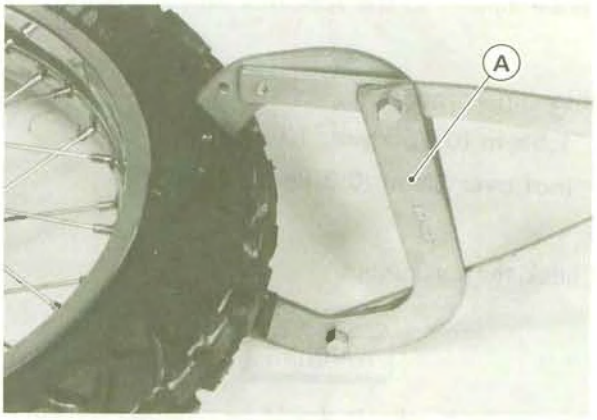
A. Bead Protector Nut

•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

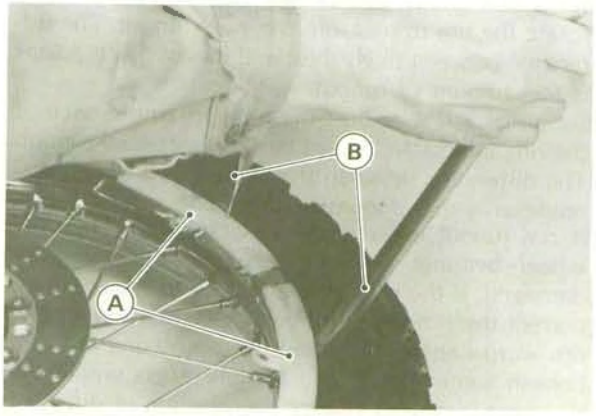
○Never lubricate with mineral oil (engine oil) or gasoline because they will cause deterioration of the tire.

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



A. Bead Breaker: 57001-1072

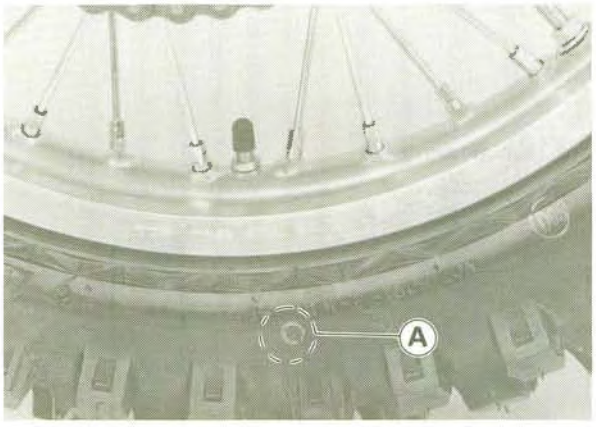
•Pry the tire off the rim with tire irons (special tool) protecting the rim with rim protectors (special tool).



A. Rim Protectors: 57001-1063
B. Tire Irons: 57001-1073

Tire Installation Notes

- Installation is the reverse of removal (see Wheels).
- 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).



A. Balance Mark

- Tighten the bead protector nut securely.
- Check and adjust the air pressure after installing.

Tire Pressure Inspection/Adjustment

- Using tire pressure gauge (special tool), measure the tire pressure when the tires are cold.

★Adjust the tire presure to suit track conditions and rider preference, but do not stray too far from the recommended pressure.

Track Condition	Tire Pressure
○When the track is wet, muddy, sandy or slippery, reduce the tire pressure to increase the tire tread surface on the ground.	80 kPa (0.8 kg/cm², 11 psi)
○When the track is pebbly or hard, increase the tire pressure to prevent damage or punctures, though the tires will skid more easily.	100 kPa (1.0 kg/cm², 14 psi)

A. Tire Pressure Gauge: 52005-1003

Tire Inspection

As the tire tread wears down, the tire becomes more susceptible the puncture and failure.

- 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.

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**	**80/100−21 51M**
	Make, Type	**DUNLOP K490**
		Ⓔ DUNLOP K990
Rear:	**Size**	**100/100−18 59M**
	Make, Type	**DUNLOP K695**
		Ⓔ DUNLOP K990

Ⓔ: European Model

Hub Bearing

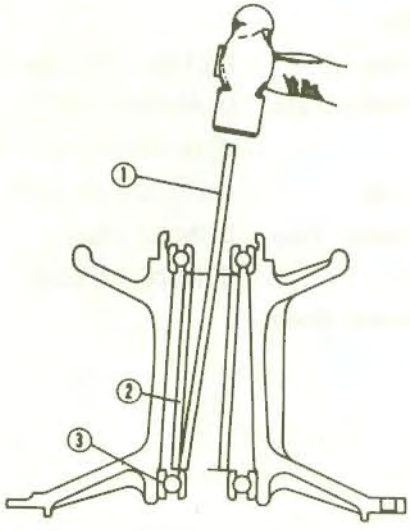
CAUTION

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

Hub Bearing Removal Notes

•Remove the hub bearing by tapping evenly around the bearing inner race as shown.

Bearing Removal



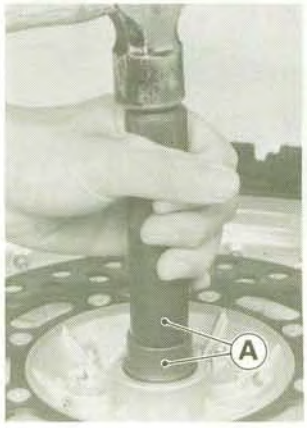
1. Bar
2. Distance Collar
3. Hub Bearing

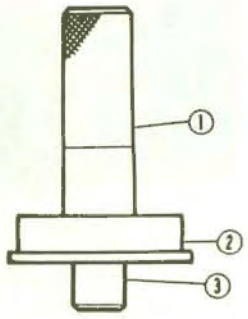
Hub Bearing Installation Notes

•Before installing the wheel bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.

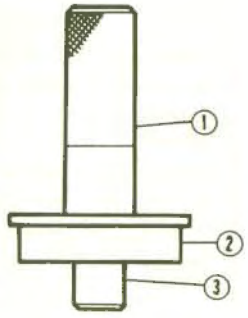
•Inspect the bearings and replace them if necessary. Lubricate them and install them using the bearing driver set (special tool) so that the marked or shielded sides face out.

Front Hub Bearing





Rear Hub Bearing



A. Bearing Driver Set: 57001-1129
1. Bearing Driver Holder
2. Bearing Driver
3. Bearing Driver

•Inspect the grease seal and replace if necessary. Press it in until it stops at the circlip in the hole using the same special tools used for bearing installation.

Hub Bearing Inspection and Lubrication

Since the wheel bearings are made to extremely close tolerances, the clearance cannot normally be measured.

- For front hub bearing, turn each bearing back and forth while checking for roughness or binding.

★If roughness or binding is found, replace the bearing.

- For rear hub bearing, wash the bearing with a high flash-point solvent, dry it (do not spin it while it is dry), and oil it. Spin it by hand to check its condition.

★If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced.

★If the bearing is to be used again, rewash it with a quality high flash-point solvent. Dry it and pack it with good bearing grease, turning it by hand a few times to make sure the grease is distributed uniformly inside the bearing, and wipe the old grease out of the hub before bearing installation. Clean and grease the wheel bearings in accordance with the Periodic Maintenance Chart.

NOTE

○*Since the bearings on the rear wheel hub are packed with grease and shielded, they are not be lubricated.*

A. Grease.

- Examine the bearing seal for tears or leakage.

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

Grease Seal Inspection and Lubrication

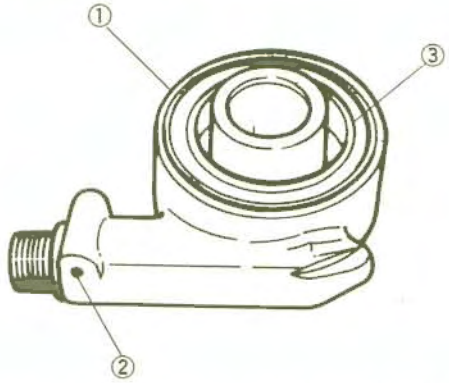
If the grease seals are examined without removing the seals themselves, look for discoloration (indicating the rubber has deteriorated), hardening, damage to the internal ribbing, or other damage. If the seal or internal ribbing has hardened, the clearance between the seal and the axle sleeve will not be taken up, which will allow dirt and moisture to enter and reach the bearing. If in doubt as to its condition and whenever a seal is removed for greasing the bearing, the seal should be replaced. The seals are generally damaged upon removal.

Meter Gear Housing

Meter Gear Housing Disassembly

- Remove the front wheel (see wheel).
- Pull the meter gear housing and collar off the front wheel.
- Pull out the grease seal using a hook.

Meter Gear Housing



1. Meter Gear Housing
2. Pin
3. Grease Seal

- Pull out the meter gear.
- If the meter cable bushing or meter 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 tool, tap out the pin, and then pull out the meter cable bushing, pinion, and washers.

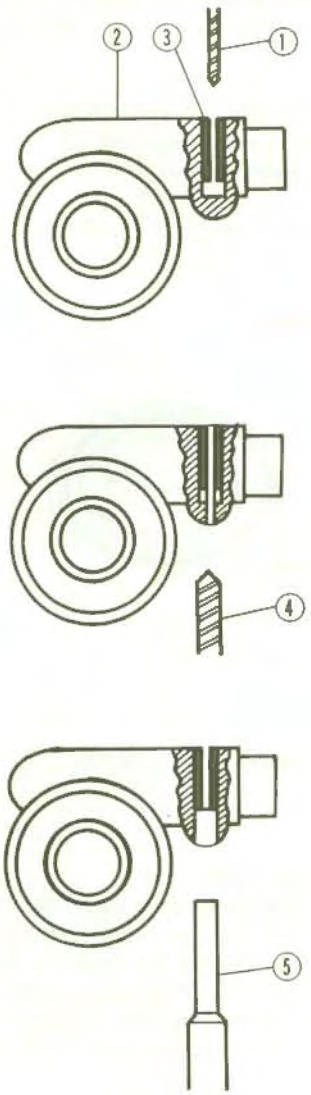
NOTE

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

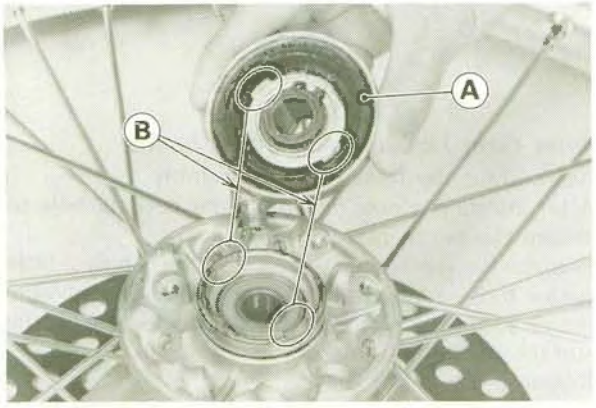
Meter Gear Housing Assembly Notes

- Assembly is the reverse of disassembly.
- 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 meter gear.
- Install the meter gear housing so that it fits in the meter gear drive notches.

Meter Gear Housing Pin Removal



1. 1—1.5 mm Bit
2. Housing
3. Pin
4. 3—3.5 mm Bit
5. 3 mm Rod

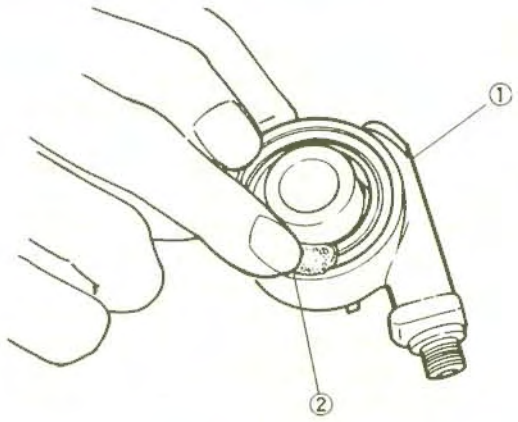


A. Meter Gear Housing
B. Fit in the gear drive notches.

Meter Gear Housing Lubrication

•Clean and grease the meter gear housing

Meter Gear Housing Lubrication



1. Meter Gear Housing
2. Grease.

Final Drive

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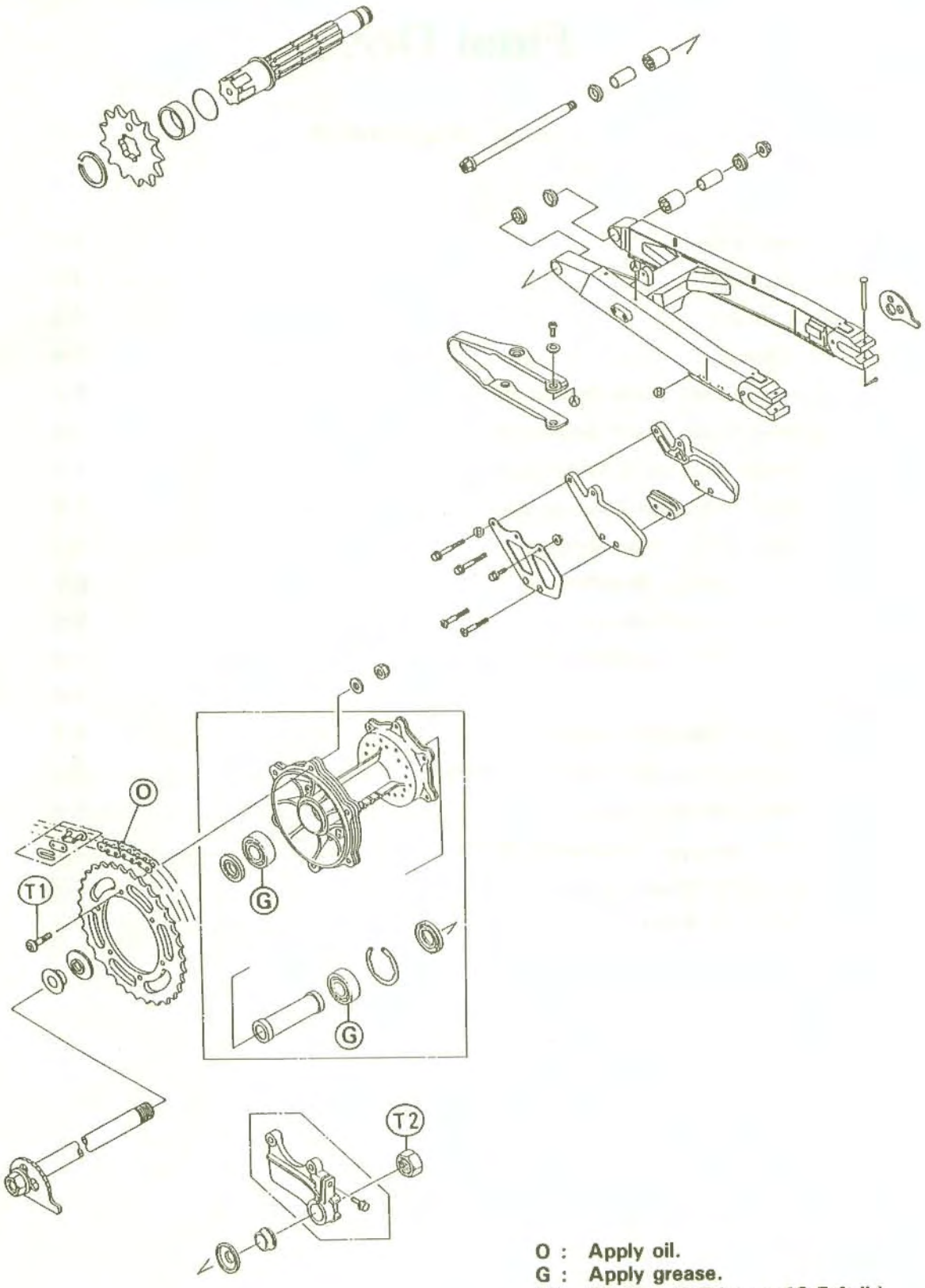


O : Apply oil.
G : Apply grease.
T1: 26 N-m (2.7 kg-m, 19.5 ft-lb)
T2: 98 N-m (10 kg-m, 72 ft-lb)

Specifications

Item	Standard	Service Limit
Drive Chain:		
Make	Daido	— — —
Type	D.I.D 520 K	— — —
Length:	110 Link	— — —
Chain slack	50—60 mm	Less than 50mm, or more than 65mm
20-link length	317.5 mm	323 mm
Sprockets:		
Engine sprocket diameter	55.49—55.69mm/13T	55.2 mm
Rear sprocket diameter	227.43—227.93mm/47T	227.1 mm
Rear sprocket warp	Under 0.4 mm	0.5 mm

Special Tools

Bearing Driver Set: 57001-1129

Drive Chain

Drive Chain Slack Inspection

•Support the motorcycle on its side stand.
•Check the wheel alignment (see Wheel Alignment Inspection), and adjust it if necessary (see Wheel Alignment Adjustment).

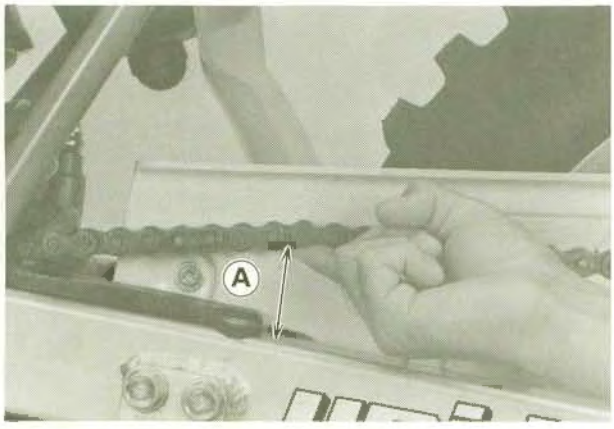
NOTE

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

• Rotate the rear wheel to find the position where the chain is tightest.
• Measure the space between the chain and the swing arm at the rear of the chain slipper as shown.
★ If the drive chain slack exceeds the standard, adjust it.

Drive Chain Slack

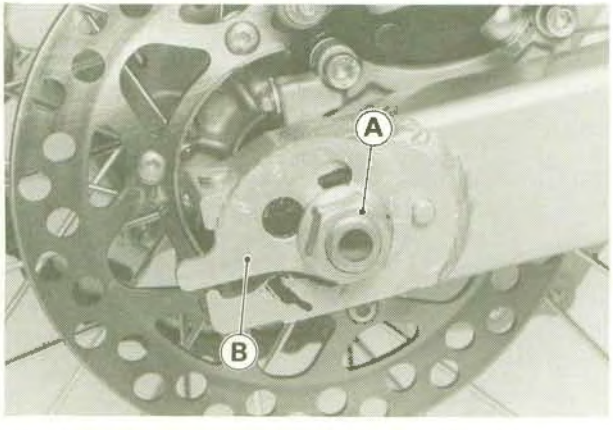
Standard: 50—60 mm



A. 50—60 mm

Drive Chain Slack Adjustment

•Loosen the left and right chain adjuster locknuts.
•Loosen the axle nut.



A. Axle Nut B. Chain Adjuster

•Rotate the chain adjuster at each end of the swing arm to obtain the specified chain slack.
•Check the wheel alignment.
•Tighten the axle nut to the specified torque.

Tightening Torque:

98 N-m (10 kg-m, 72 ft-lb)

•Rotate the wheel, measure the chain slack again at the tightest position, and readjust if necessary.

WARNING

○ **If the axle nut is not securely tightened, an unsafe riding condition may result.**

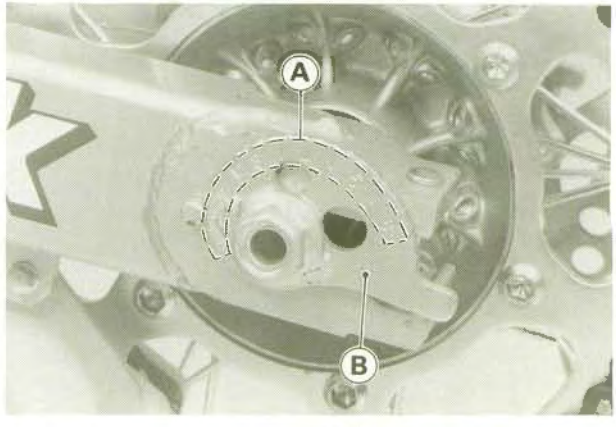
•Check the rear brake for weak braking power, and brake drag (see the Brakes chapter).

NOTE

○ *In wet and muddy conditions, mud sticks to the chain and sprockets resulting in an overly tight chain, and the chain may break. To prevent this, adjust the chain to 55 — 65 mm of slack whenever necessary.*

Wheel Alignment Inspection

•Check that the mark on the left chain adjuster aligns with the same mark as the right chain adjuster.



A. Marks B. Chain Adjuster

NOTE

○Wheel alignment can also be checked using the straightedge or string method.

WARNING

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

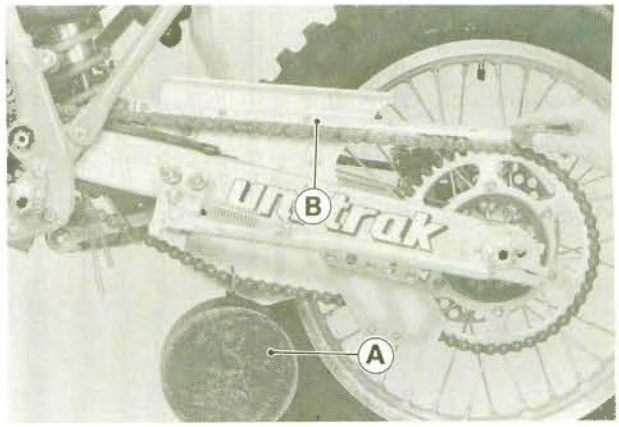
Wheel Alignment Adjustment

This procedure is the same as Drive Chain Slack Adjustment.

Drive Chain Wear Inspection

- Rotate the rear wheel to inspect the drive chain for damaged rollers, and loose pins and links.
- ★ If there is any irregularity, replace the drive chain.
- ★ Lubricate the drive chain if it appears dry.
- Stretch the chain taut by hanging a 10 kg (20 lb) weight on the chain.
- Measure the length of 20 links on the straight part of the chain from the pin center of the 1st pin to the pin center of the 21st pin. Since the chain may wear unevenly, take measurements at several places.
- ★ If any measurements exceed the service limit, replace the chain. Also, replace the front and rear sprockets when the drive chain is replaced.

Drive Chain Wear Inspection



A. Weight B. Measure

Drive Chain 20-Link Length

Standard: 317.5 mm

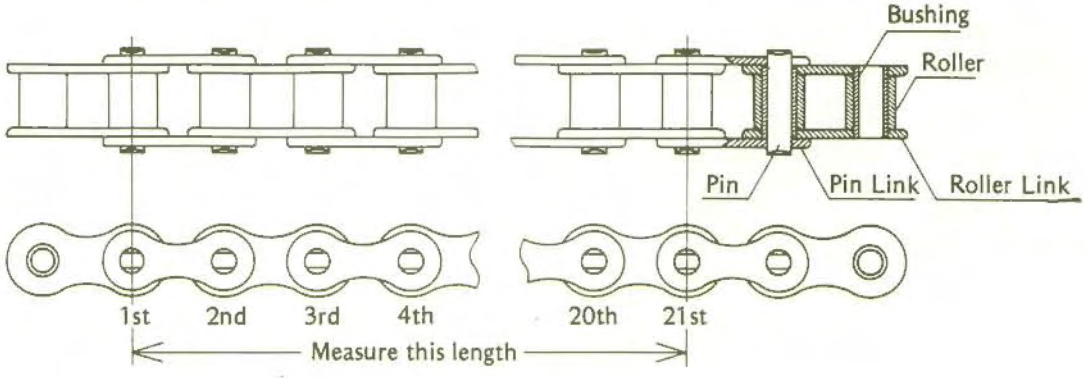
Service Limit: 323 mm

WARNING

○If the drive chain wear exceeds the service limit, replace the chain or an unsafe riding condition may result. 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.

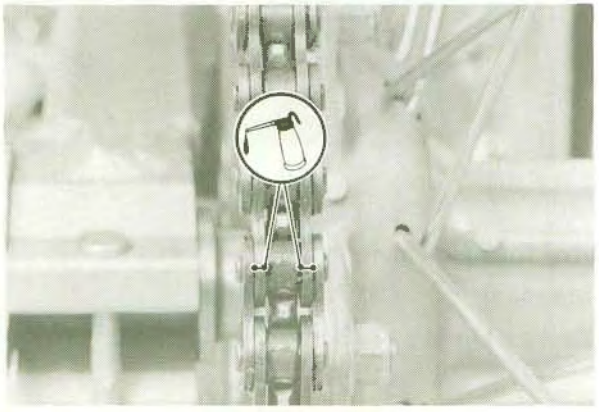
Drive Chain

Make	Daido
Type	D.I.D520 K
Links:	110



Drive Chain Lubrication

- If the chain appears especially dirty, it should be cleaned before lubrication with high flash point solvent.
- Apply oil to the sides of the rollers so that oil will penetrate to the rollers and bushings.
- Wipe off any excess oil.

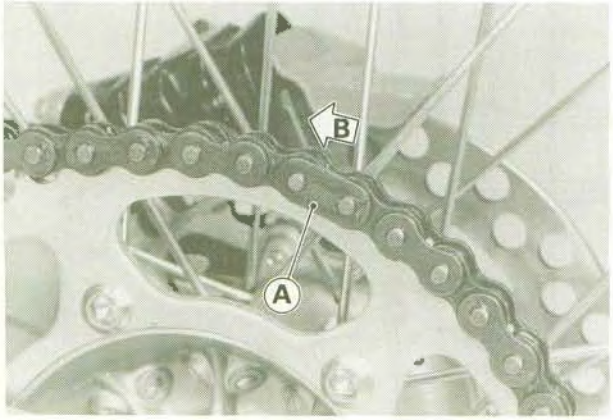


Drive Chain Removal

- Remove the engine sprocket or magneto cover
- Remove the clip from the master link using pliers, and free the drive chain from the rear sprocket.
- Remove the drive chain from the chassis.

Drive Chain Installation Notes

- Installation is the reverse of removal.
- Fit the drive chain back onto the sprockets with the ends at the rear sprocket.
- Install the master link from the frame side.
- Install the clip so that the closed end of the "U" pointed in the direction of chain rotation.



A. Clip
B. Direction of Drive Chain Rotation

- Adjust the drive chain slack (see Drive Chain Slack Adjustment).
- Check the brake for weak braking power, and brake drag (see the Brakes chapter).

Sprocket

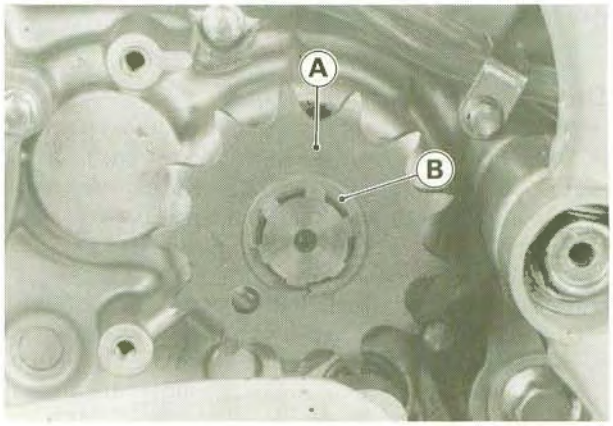
Engine Sprocket Removal

- Remove the following parts.
  Engine Sprocket Cover
  Drive Chain (free of engine sprocket)

- Remove the circlip, and pull off the engine sprocket.

Engine Sprocket Installation Notes

- Installation is the reverse of removal.



A. Engine Sprocket
B. Circlip

Rear Sprocket Removal

- Remove the rear wheel (see Rear Wheel Removal in the Wheels/Tires chapter).

CAUTION

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

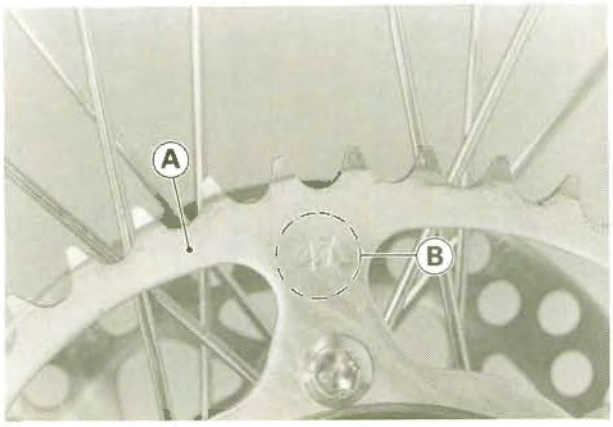
- Unscrew the rear sprocket bolts, and remove the rear sprocket.

Rear Sprocket Installation Notes

- Installation is the reverse of removal.
- Install the rear sprocket so that the marked side faces out.
- Tighten the rear sprocket bolts to the specified torque.

Tightening Torque

26 N-m (2.7 kg-m, 19.5 ft-lb)



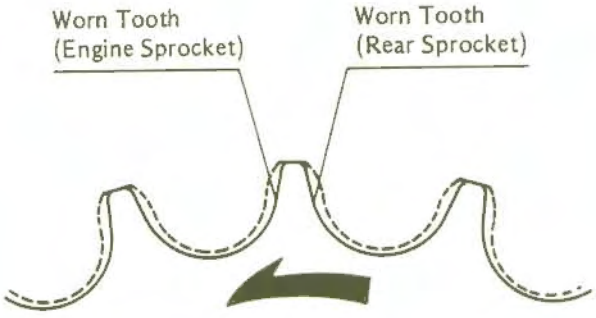
A. Rear Sprocket B. Mark

Sprocket Wear Inspection

- Visually inspect the front and rear sprocket teeth for wear and damage.

★ If they are worn as illustrated or damaged, replace the sprocket.

Sprocket Wear Inspection



Direction of rotation

- Measure the diameter of the sprocket at the base of the teeth.

★ If the sprocket is worn down to less than the service limit, replace the sprocket.

Sprocket Diameter

(Engine)

Standard:	**55.49–55.69 mm**
Service Limit:	**55.2 mm**

(Rear)

Standard:	**227.43–227.93 mm**
Service Limit:	**227.1 mm**

NOTE

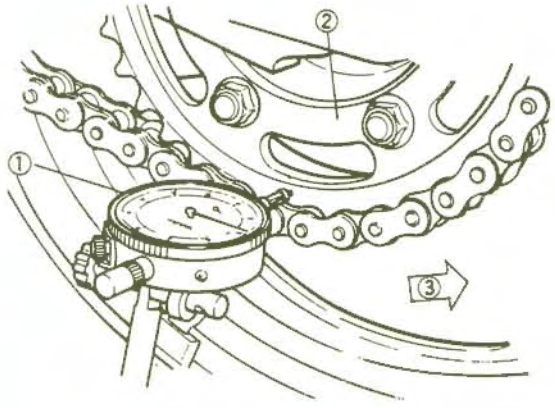
○If a sprocket requires replacement, the chain is probably worn also. When replacing a sprocket, inspect the chain.

Sprocket Warp Inspection

- Elevate the rear wheel so that it will turn freely, and set a dial gauge against the rear sprocket near the teeth as shown. Rotate the rear wheel. The difference between the highest and lowest dial gauge readings is the amount of runout (warp).

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

Sprocket Warp Inspection



1. Dial Gauge
2. Rear Sprocket
3. Rotate

Rear Sprocket Warp

Standard:	**Under 0.4 mm**
Service Limit:	**0.5 mm**

Brakes

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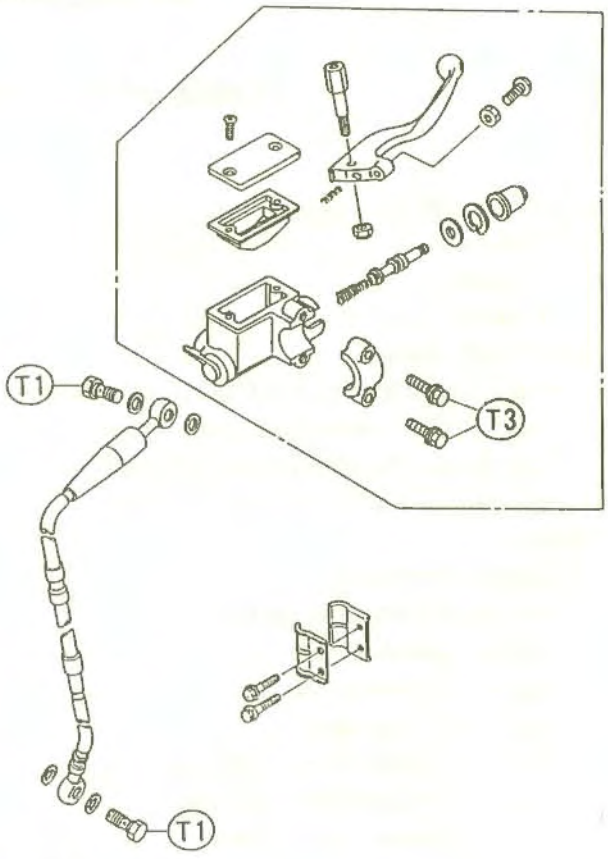
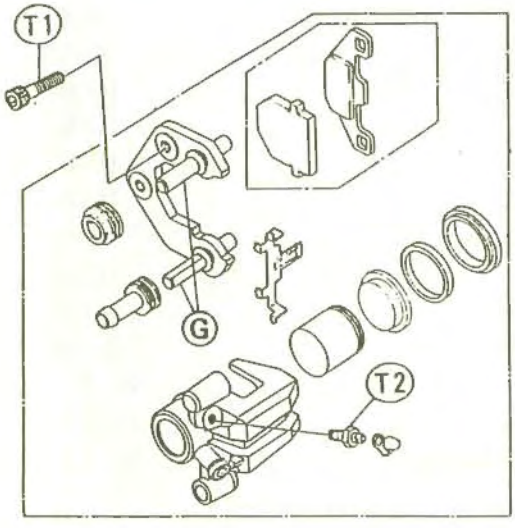
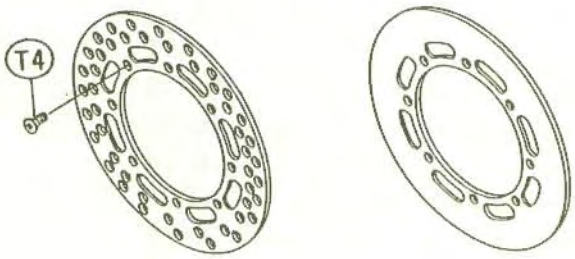
Front Disc Brake

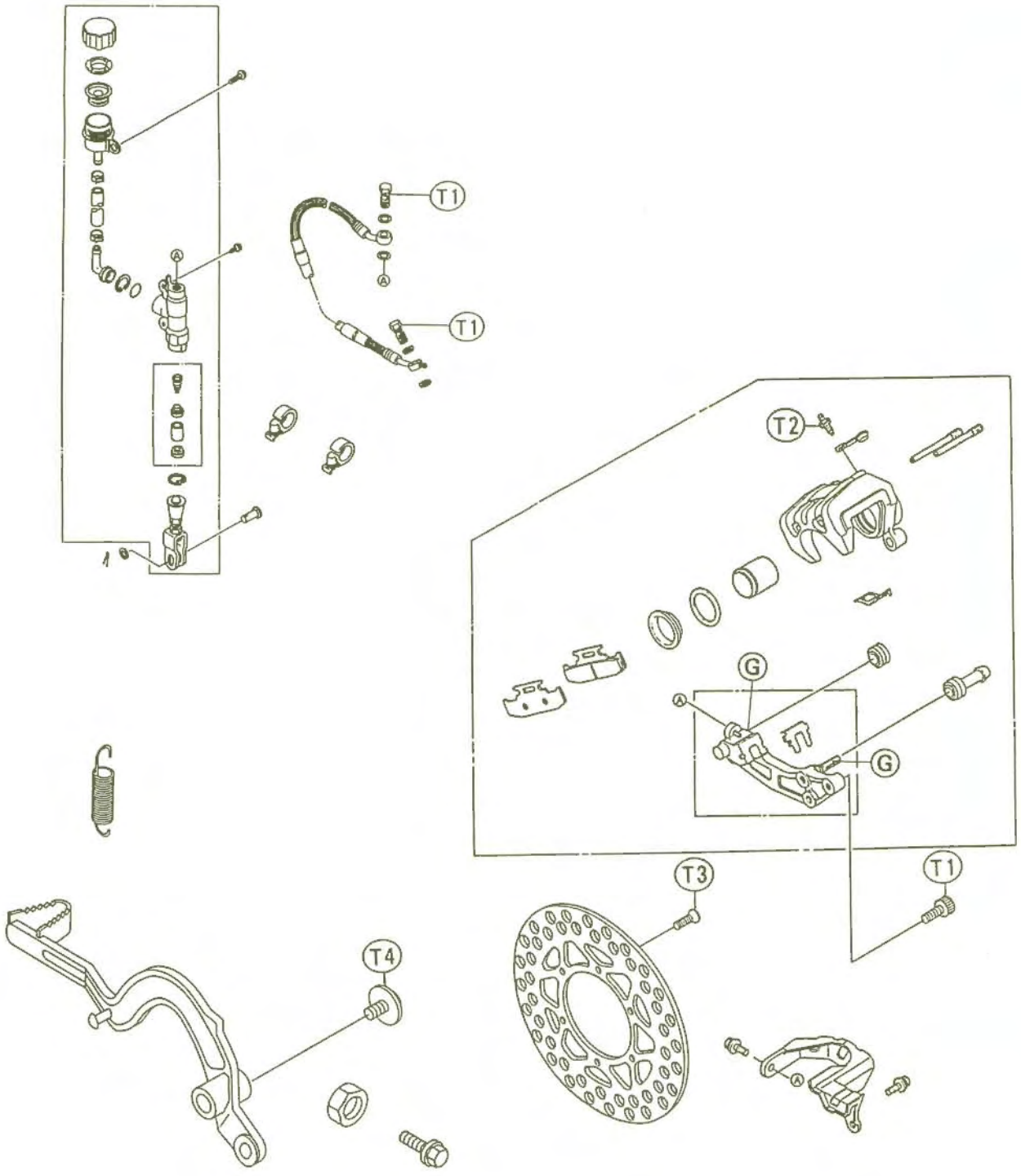






G : Apply poly butyl cuprysil grease.
T1 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T2 : 7.8 N-m (0.8 kg-m, 69 in-lb)
T3 : 8.8 N-m (0.9 kg-m, 78 in-lb)
T4 : 9.8 N-m (1.0 kg-m, 87 in-lb)

Rear Disc Brake



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T2 : 7.8 N-m (0.8 kg-m, 69 in-lb)
T3 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T4 : 8.8 N-m (0.9 kg-m, 78 in-lb)

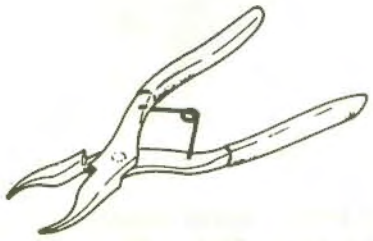
Specifications

Disc Brake

Item	Standard	Service Limit
Brake Adjustment:		
Brake lever Play	Adjustable (to suit rider)	— — —
Brake pedal position	Adjustable (to suit rider)	— — —
Brake pedal play	Adjustable (to suit rider)	— — —
Brake Pads:		
Pad lining thickness:		
Front and rear	4.5 mm	1 mm
Brake Discs:		
Disc thickness: Front	3.05 — 3.35 mm	2.5 mm
Rear	4.35—4.65 mm	3.8 mm
Disc runout	not more than 0.12 mm	0.3 mm
Brake Fluid:		
Recommended disc brake fluid:		
Grade	D.O.T.3	— — —
Brand	Atlas Extra Heavy Duty	— — —
	Shell Super Heavy Duty	— — —
	Texaco Super Heavy Duty	— — —
	Wagner Lockheed Heavy Duty	— — —
	Castrol Girling-Universal	— — —
	Castrol GT (LMA)	— — —
	Castrol Disc Brake Fluid	— — —

Special Tool

Circlip Pliers: 57001-143



Disc Brakes

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 discs, 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 reach and break down 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 Adjustment:

Brake Lever/Pedal Free Play/Adjustment

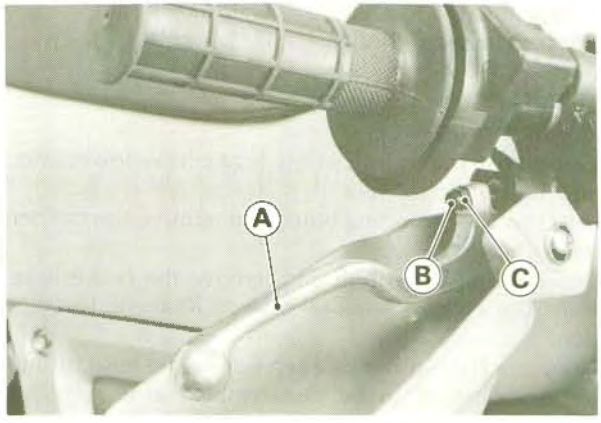
Disc and disc pad wear is automatically compensated for and has no effect on brake lever/pedal action. So there are no parts that require adjustment on the brakes except brake lever play, brake pedal position and pedal play.

If the brake lever/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 Line).

Front Brake Lever Play Adjustment

Adjust the front brake lever to suit you.

- Loosen the adjuster locknut and turn the adjuster to either side.
- After adjustment, tighten the locknut.

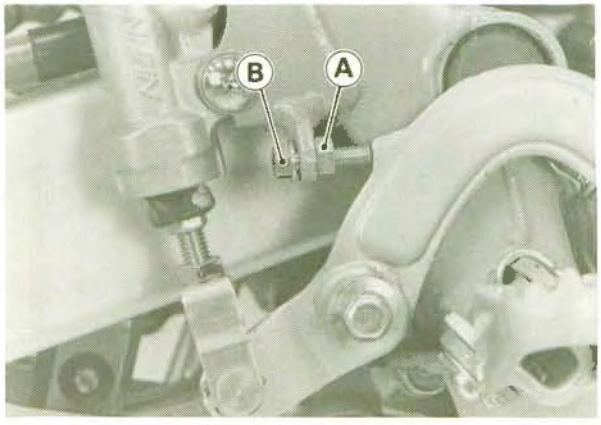


A. Brake Lever
B. Adjuster
C. Locknut

Rear Brake Pedal Position Adjustment

Adjust the rear brake pedal position to suit you.

- Loosen the locknut, turn the adjusting bolt, and then tighten the locknut.

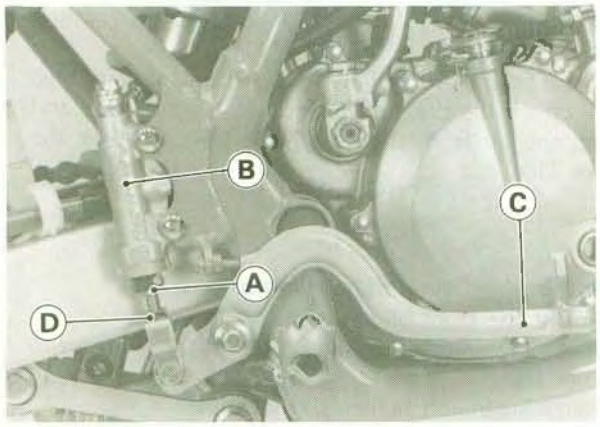


A. Locknut
B. Adjusting Bolt

Rear Brake Pedal Play Adjustment

Adjust the rear brake pedal play to suit you.

- Loosen the adjuster locknut and turn the adjuster on the rear master cylinder.
- After adjustment, tighten the locknut securely.



A. Adjuster
B. Rear Master Cylinder
C. Brake Pedal
D. Locknut

Caliper:

Caliper Removal

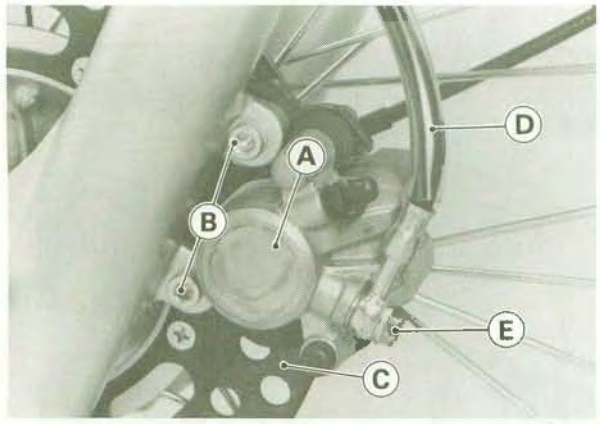
- Loosen the banjo bolt at the brake hose lower end, and tighten it loosely.
- Unscrew the mounting bolts, and remove the caliper from the disc.
- Unscrew the banjo bolt and remove the brake hose from the caliper (see Brake Hose Removal/Installation).
  - There is a flat washer on each side of the hose fitting.

If the caliper is to be disassembled after removal and if compressed air is not available, remove the piston using the following steps before disconnecting the brake hose from the caliper.

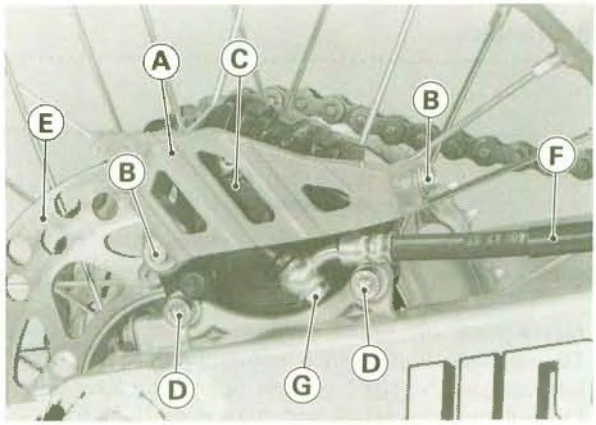
- Remove the pads.
- Pump the brake lever or pedal to remove the caliper piston.

NOTE

Immediately wipe up any brake fluid that spills.



A. Front Caliper
B. Caliper Mounting Bolts
C. Brake Disc
D. Brake Hose
E. Banjo Bolt



A. Caliper Cover
B. Mounting Bolt
C. Rear Caliper
D. Caliper Mounting Bolt
E. Brake Disc
F. Brake Hose
G. Banjo Bolt

Caliper Installation Notes

- Installation is the reverse of removal.
- Tighten the caliper mounting bolts to the specified torque.

Tightening Torque:

25 N-m (2.5 kg-m, 18 ft-lb)

- Use a new flat washer on each side of the brake hose fitting, and tighten the banjo bolt to the specified torque.

Tightening Torque:

25 N-m (2.5 kg-m, 18 ft-lb)

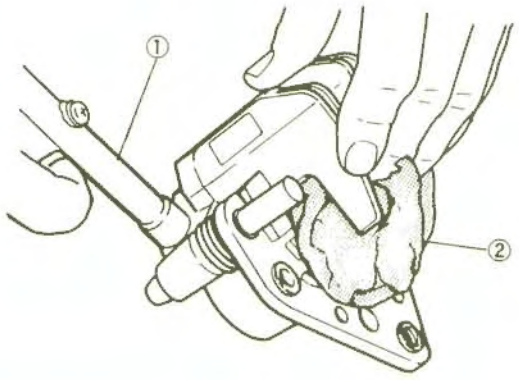
- Check the brake fluid level in the reservoir, and bleed the brake line (see Bleeding the Brake Line).
- Check the brake for weak braking power, brake drag, and fluid leakage by operating the brake lever/pedal.

Caliper Disassembly

- Remove the pads, insulator (front only), spring, and dust seal (see Pad Removal).
- 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.



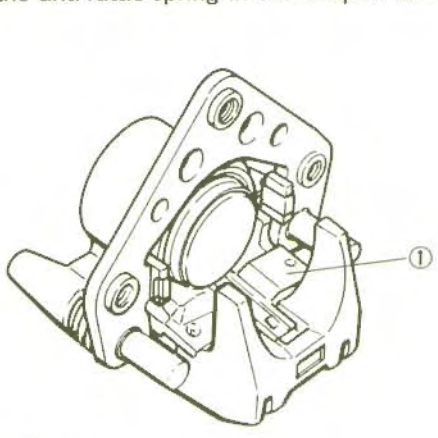
1. Apply compressed air. 2. Cloth

NOTE

oIf the caliper is to be disassembled after removal and compressed air is not available, remove the piston using the following three steps before disconnecting the brake hose from the caliper.
oPrepare a suitable dished container for brake fluid, and perform the work above it.
oRemove the pads, insulator (front only), spring, and dust seal (see Pad Removal).
oPump the brake lever or pedal to remove the caliper piston.
oImmediately wipe up any brake fluid that spills. It ruins painted or plated surfaces.

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.
•Install the dust seal around the piston. Check that dust seal is properly fitted into the grooves in the piston and caliper.
•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.



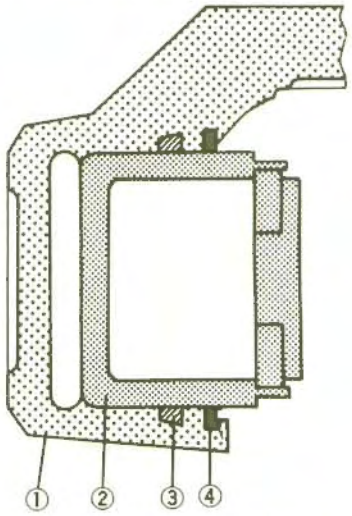
1. Anti-rattle Spring

•Install the pads (see Pad Installation).

Fluid Seal Damage

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

Caliper



1. Caliper
2. Piston
3. Fluid Seal
4. Dust Seal

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 and 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

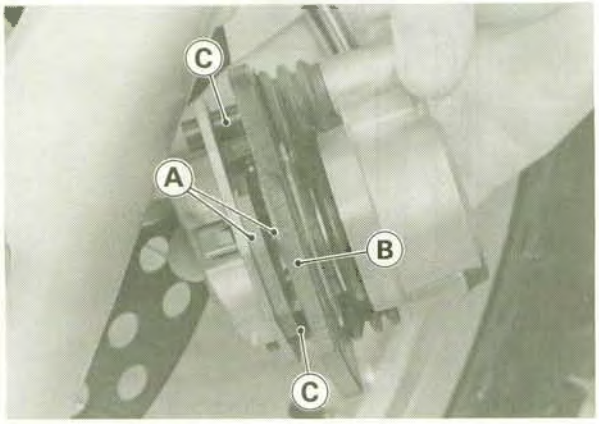
The caliper body must slide smoothly on the caliper holder shafts. If the body does not slide smoothly, one pad will wear more than the other, pad wear will increase, and constant drag on the disc will raise brake and brake fluid temperature.

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

Brake Pads:

Pad Removal

- Remove the caliper from the disc, and take out the piston side pad from the caliper holder.
- Push the caliper holder toward the piston, and then remove the pad from the caliper holder shaft.



A. Pads
B. Caliper Holder
C. Holder Shaft

Pad Installation

- Push the caliper piston in by hand as far as it will go.
- Install the insulator on the piston (front only).
- Install the anti-rattle spring.
- Install the piston side pad first, and then install the remaining pad.

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.**

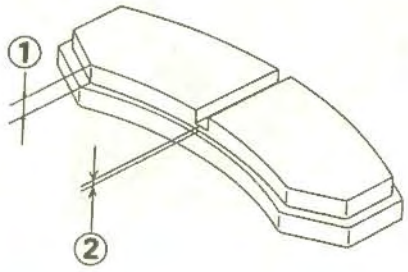
Pad Inspection

- Check the lining thickness and condition of the pads in each caliper.

★ If either pad is damaged, replace both pads in the caliper as a set.

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

Lining Thickness Measurement



1. Lining Thickness
2. Service Limit

Pad Lining Thickness (mm)

	Front and rear
Standard	4.5
Service Limit	1

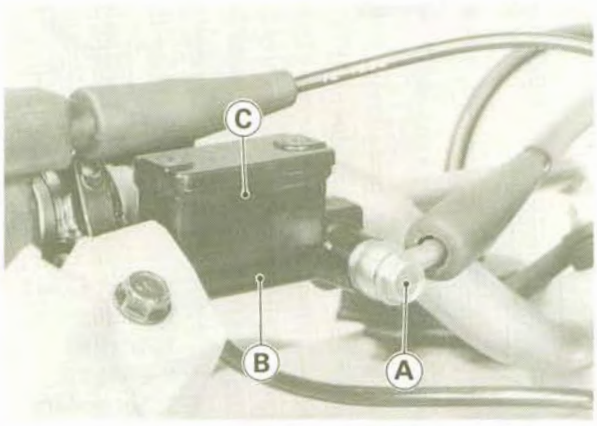
Master Cylinder:

CAUTION

○**Brake fluid quickly ruins painted or plated surfaces; any spilled fluid should be completely wiped up immediately.**

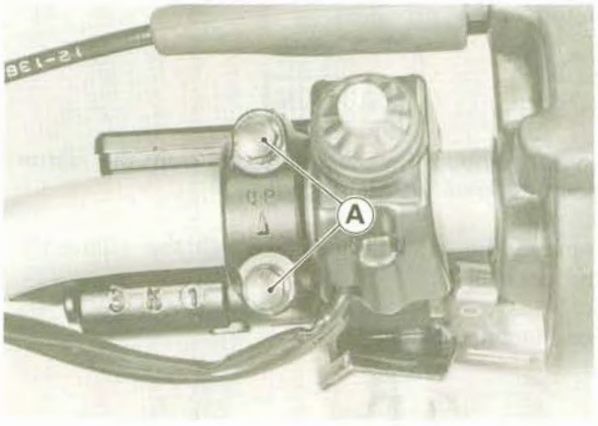
Front Master Cylinder Removal

- 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
B. Master Cylinder
C. Reservoir

- When removing the brake hose, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.
- Unscrew the clamp bolts, and take off the master cylinder as an assembly with the reservoir and brake lever.



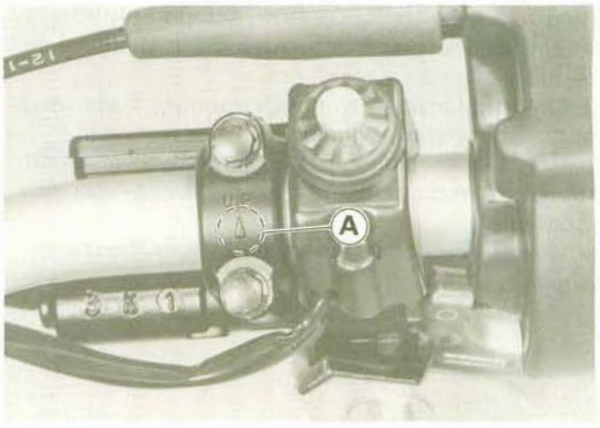
A. Clamp Bolts

Front Master Cylinder Installation Notes

- Installation is the reverse of removal.
- Tighten the upper clamp bolt first and then tighten the lower clamp bolt to the specified torque. There will be a gap at the lower part of the clamp after tightening.

Tightening Torque:

8.8 N-m (0.9 kg-m, 78 in-lb)



A. Arrow Mark

- Use a new flat washer on each side of the brake hose fitting, and tighten the banjo bolt to the specified torque.

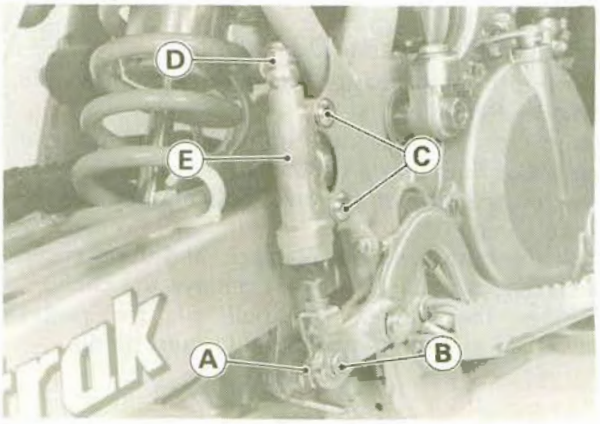
Tightening Torque:

25 N-m (2.5 kg-m, 18 ft-lb)

- Bleed the brake line after master cylinder installation (see Bleeding the Brake Line).
- Check the brake for weak braking power, brake drag, and fluid leakage.

Rear Master Cylinder Removal

- Remove the reservoir mounting bolt.
- Remove the cotter pin, and pull out the joint pin.
- Unscrew the banjo bolt to disconnect the brake hose from the master cylinder. There is a flat washer on each side of the hose fitting.



A. Cotter Pin
B. Joint Pin
C. Master Cylinder Mounting Screws
D. Banjo Bolt
E. Master Cylinder

•When removing the brake hose, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.
•Unscrew the master cylinder mounting bolts, and remove the master cylinder with the reservoir.
•Unscrew the reservoir cap (the diaphragm comes off with the reservoir cap) and pour the brake fluid into a container.
•Remove the reservoir and its hose from the master cylinder.

Rear Master Cylinder Installation Notes

•Installation is the reverse of removal.
•Tighten the master cylinder mounting bolts securely.
•Use a new flat washer on each side of the brake hose fitting, and tighten the banjo bolts to the specified torque.

Tightening Torque:

25 N-m (2.5 kg-m, 18 ft-lb)

•Tighten the reservoir mounting bolt securely.
•Bleed the brake line after master cylinder installation (see Bleeding the Brake Line).
•Check the brake for weak braking power, brake drag, and fluid leakage.
•Check the brake pedal position.

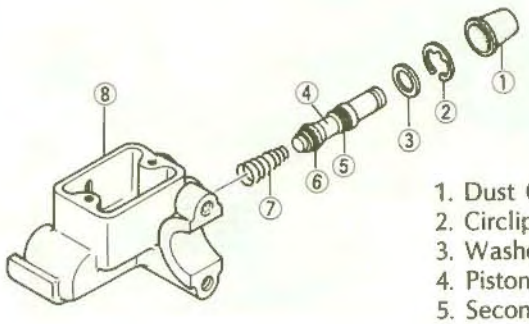
Front Master Cylinder Disassembly

•Remove the front master cylinder (see Front Master Cylinder Removal)
•Remove the reservoir cap and diaphragm, and pour the brake fluid into a container.
•Unscrew the locknut and pivot bolt, and remove the brake lever.
•Push the dust cover out of place, and using circlip pliers (special tool: 57001-143), remove the circlip.
•Remove the washer, and pull out the piston, secondary cup, primary cup, and return spring.

CAUTION

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

Front Master Cylinder



1. Dust Cover
2. Circlip
3. Washer
4. Piston
5. Secondary Cup
6. Primary Cup
7. Return Spring
8. Reservoir

Rear Master Cylinder Disassembly

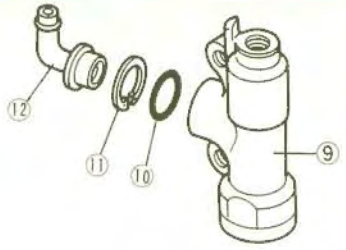
•Remove the rear master cylinder (see Rear Master Cylinder Removal).
•Slide the dust cover on the push rod out of place, and using circlip pliers (special tool: 57001-143), remove the circlip.
•Pull out the push rod with the piston stop.
•Take off the piston, secondary cup, primary cup, and return spring.

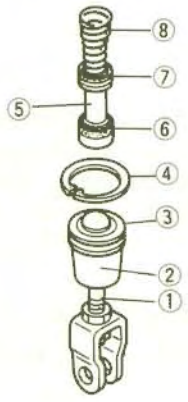
CAUTION

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

•Remove the circlip, and take off the connector and packing.

Rear Master Cylinder





1. Push Rod
2. Dust Cover
3. Piston Stop
4. Circlip
5. Piston
6. Secondary Cup
7. Primary Cup
8. Return Spring
9. Master Cylinder
10. Packing
11. Circlip
12. Connector

Master Cylinder Assembly Notes

- Assembly is the reverse of disassembly.
- Take care not to damage the inner surface of the cylinder, or the piston.
- Clean all parts with brake fluid or alcohol, and apply brake fluid to the inner surface of the cylinder before assembly.
- Tighten the brake lever pivot bolt locknut securely.

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 each master cylinder and on the outside of each piston.

★If a 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, the piston assembly should be replaced to renew the cups.

★If fluid leakage is noted at the brake lever, the piston assembly should be replaced 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.

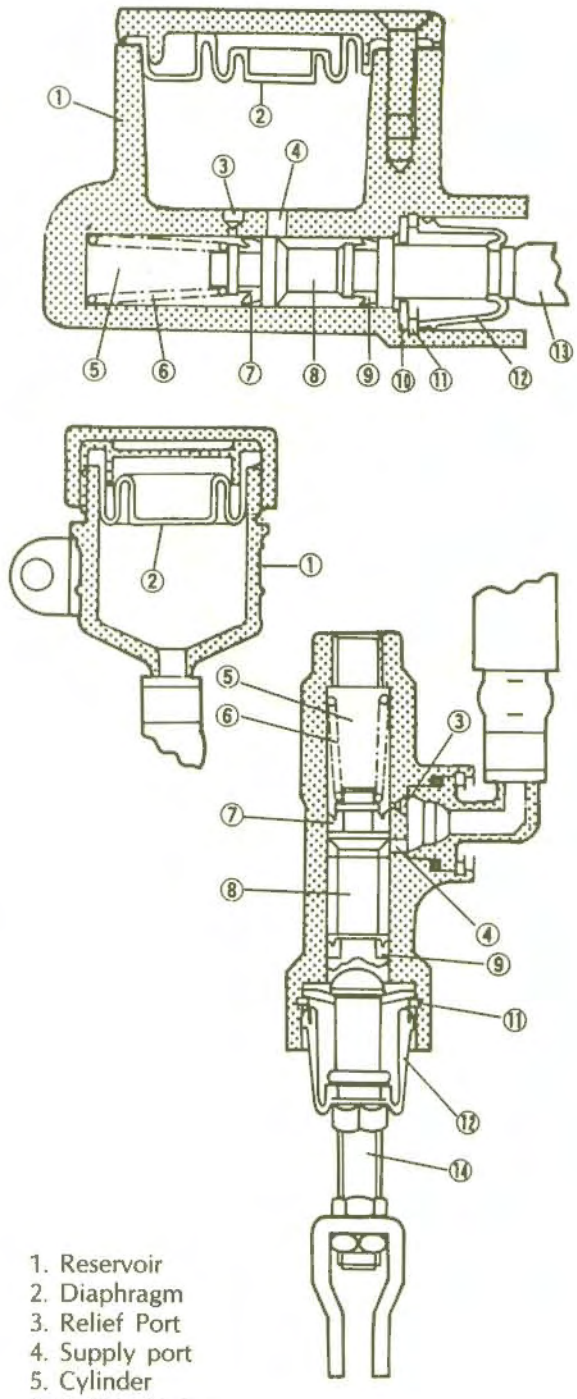
- Check the piston return springs for any damage.

★If a spring is damaged, replace it.

- Check the packing in the rear master cylinder for damage.

★If a packing is damaged, replace it.

Front and Rear Master Cylinder



1. Reservoir
2. Diaphragm
3. Relief Port
4. Supply port
5. Cylinder
6. Return Spring
7. Primary Cup
8. Piston
9. Secondary Cup
10. Washer
11. Circlip
12. Dust Cover
13. Brake Lever
14. Push Rod

Brake Disc:

Disc Inspection

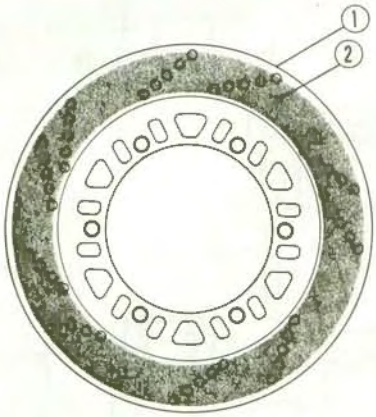
- Visually inspect the disc.

★If it is scratched or damaged, replace the disc.

- 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.

Disc Thickness Measurement



1. Disc
2. Measuring Area

Disc Thickness

Standard:	**Front:**	**3.05 — 3.35 mm**
	Rear:	**4.35 — 4.65 mm**
Service Limit:	**Front:**	**2.5 mm**
	Rear:	**3.8 mm**

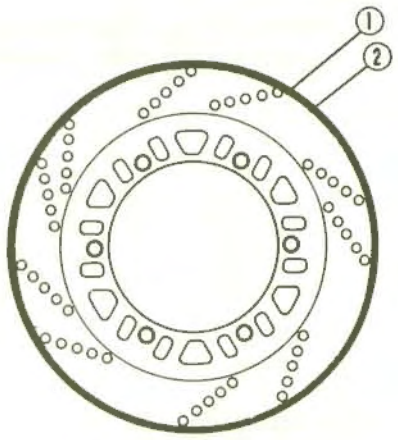
- Place a stand or block under the motorcycle so that the front/rear wheel is raised off the ground.
- Set up a dial gauge against the disc as illustrated.

○ For the front disc, turn the handlebar fully to one side.

- Rotate the wheel to measure disc runout. The difference between the highest and lowest dial readings is the amount of runout.

★If disc runout exceeds the service limit, replace the disc.

Disc Runout Measurement



1. Disc
2. Measuring Area

Disc Runout

Standard:	**under 0.12 mm**
Service Limit:	**0.3 mm**

Brake Fluid:

Brake Fluid Requirement

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 Disc Brake Fluid

Grade	D.O.T.3.
Brand	Atlas Extra Heavy Duty Sheel Super Heavy Duty Texaco Super Heavy Duty Wagner Lockheed Heavy Duty Castrol Girling-Universal Castrol GT (LMA) Castrol Disc Brake Fluid

Brake Fluid Level Inspection

Inspect the brake fluid level in the front and rear brake fluid reservoirs periodically.

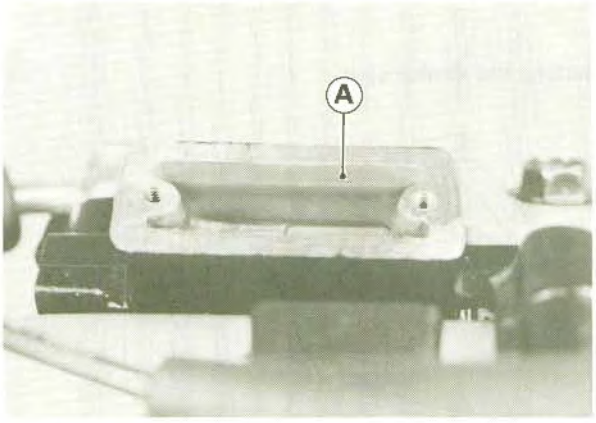
•Check the brake fluid level in the reservoir.

NOTE

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

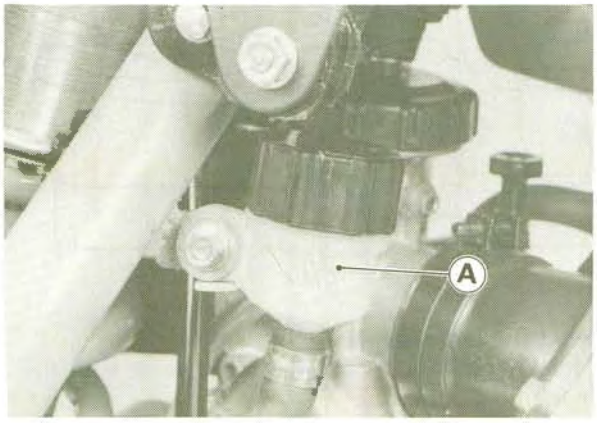
★The front and rear reservoirs must be kept more than half full with brake fluid. If the amount of brake fluid is insufficient, add brake fluid.

Front Brake Fluid Reservoir



A. Front Reservoir

Rear Brake Fluid Reservoir



A. Rear Reservoir

Brake Fluid Change

Change the brake fluid periodically. The brake fluid should also be changed if it becomes contaminated with dirt or water.

Changing Brake Fluid:

•Level the master cylinder brake fluid reservoir.
•Remove the rubber cap on the bleed valve.
•Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
•Open the bleed valve (counterclockwise to open).
•Pump the brake lever or pedal until all the fluid is drained from the line.
•Close the bleed valve.
•Remove the reservoir cap.
•Fill the reservoir with fresh specified brake fluid.

WARNING

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

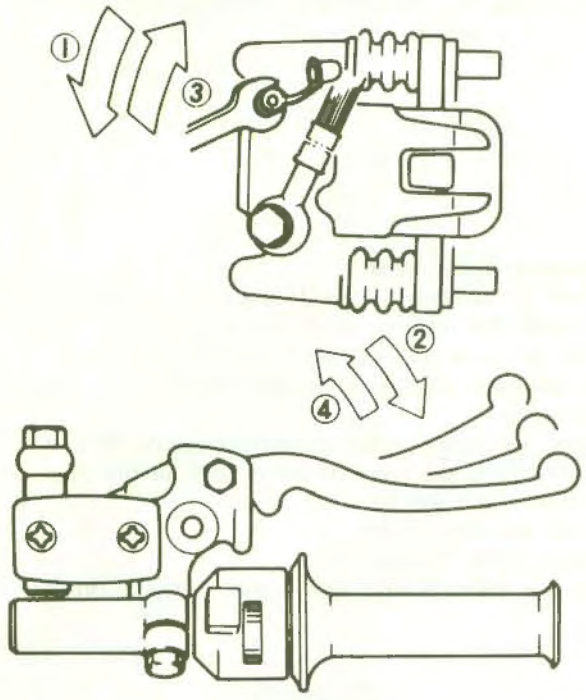
•Install the reservoir cap.
•Open the bleed valve, apply the brake with the brake lever or pedal.
•Close the valve with the brake held applied, and then quickly release the lever or pedal.
•Repeat this operation until the brake line is filled and fluid starts coming out of the plastic hose.

NOTE

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

•Bleed the air from the lines (see Bleeding the Brake Line).

Filling up the Brake Line



1. Open the bleed valve.
2. Apply the brake and hold it.
3. Close the bleed valve with the brake held applied.
4. Then quickly release the brake.

Bleeding the Brake Line

The brake fluid has a very low compression coefficient so that almost all 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.

NOTE

- *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.*

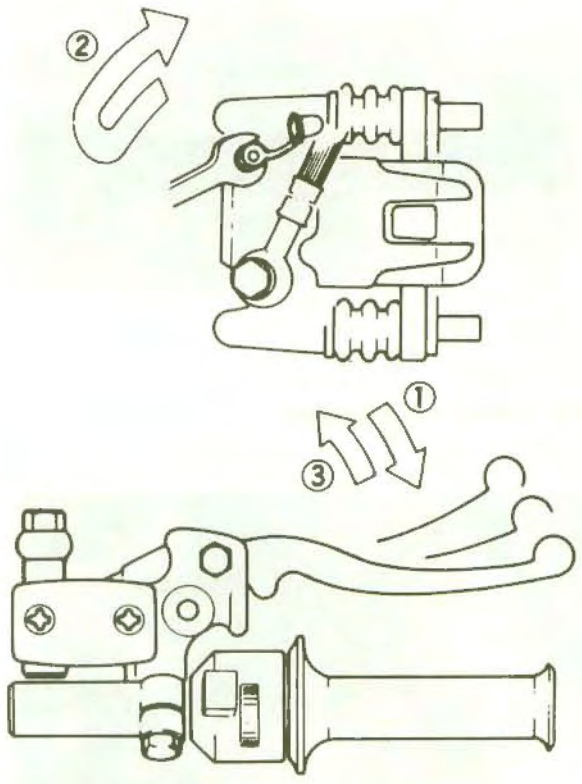
- With the reservior cap off, slowly pump the brake lever or pedal several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir. This bleeds the air from the master cylinder end of the line.
- Install the reservoir cap, and connect a clear plastic hose to the bleed valve at the caliper.
- Run the other end of the plastic hose into a container.
- Pump the brake lever or pedal a few times until it becomes hard and then, holding the lever or pedal squeezed, quickly open (turn counterclockwise) and close the bleed valve.
- Release the brake.
- Repeat this operation until no more air can be seen coming out into the plastic hose.
- Remove the clear plastic hose.
- Tighten the bleed valve to the specified torque, and install the rubber cap.

Tightening Torque

7.8N-m (0.8 kg-m, 69 in-lb)

- Check that the brake fluid is filled to more than 1/2 in the reservoir (with the master cylinder held level).
- After bleeding is done, check the brake for weak braking power, brake drag, and fluid leakage.

Bleeding the Brake Line



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

Brake Hose:

Brake Hose Removal/Installation Notes

•When removing the brake hose, take care not to spill the brake fluid on the frame or other painted parts.

•When removing the brake hose, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.

CAUTION

○**Brake fluid quickly ruins painted or plated surfaces; any spilled fluid should be completely wiped up immediately.**

•There is a flat washer on each side of the brake hose fitting. Replace them with new ones during installation.

•When installing the hoses, avoid sharp bending, kinking, flattening or twisting, and route the hoses according to the Hose Routing section in the General Information chapter.

•Tighten the banjo bolts at the hose fittings to the specified torque.

Tightening Torque:

25N-m (2.5 kg-m, 18 ft-lb)

•Bleed the brake line after installing the brake hose (see Bleeding the Brake Line).

Brake Hose 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.

Suspension

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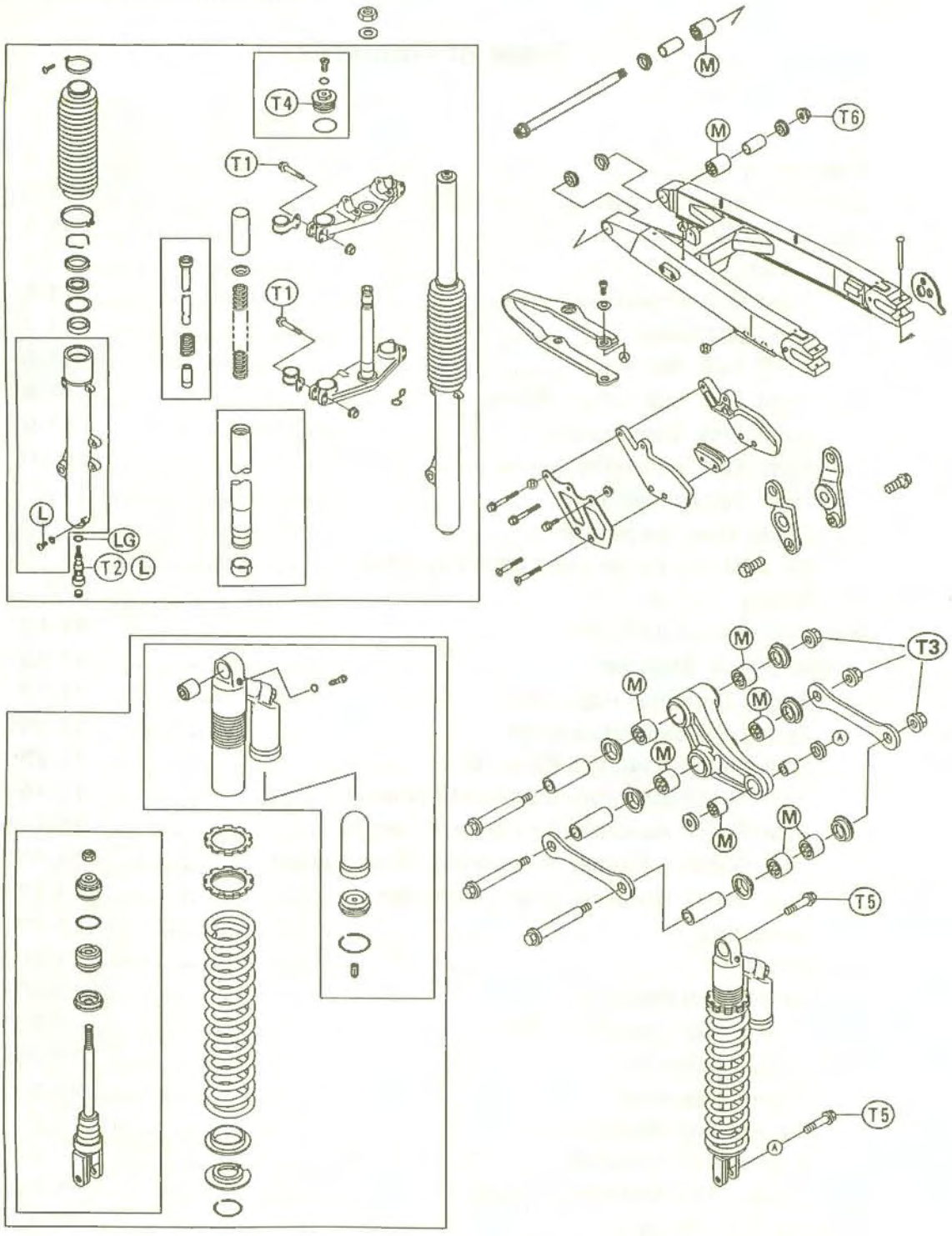
Exploded View



L : Apply a non-permanent locking agent to the threads.
LG: Apply liquid gasket to both sides of the gasket.
M : Apply plenty of molubdenum disulfide grease to the inside.

T1 : 20 N-m (2.0 kg-m, 14.5 ft-lb)
T2 : 71 N-m (7.2 kg-m, 52 ft-lb)
T3 : 81 N-m (8.3 kg-m, 60 ft-lb)
T4 : 29 N-m (3.0 kg-m, 22 ft-lb)
T5 : 39 N-m (4.0 kg-m, 29 ft-lb)
T6 : 78 N-m (8.0 kg-m, 58 ft-lb)

Specifications

Item	Standard	Service Limit
Front Fork:		
Air pressure:	Atmospheric pressure	— — —
Oil viscosity:	KAYABA G10 or SAE 10W	— — —
Oil capacity:	618 ± 4 mL	— — —
		(adjustable range)
Oil level: (fully compressed, spring removed)	140 ± 2 mm	110 — 170 mm
Compression Damping Adjustment:	Adjuster turned fully ocunterclockwise	16 turns (clockwise)
Fork spring free length:	496 mm	486 mm
Rear Suspension		
Rear Shock Absorber:		
Rebound damping:	Adjuster turned fully counterclockwise	16 turns(clockwise)
Spring preload: (adjusting nut position from the center of the upper mounting hole)	110.5 mm	102 — 122 mm
		(adjustable range)
Gas Reservoir		
Compression damping:	Adjuster turned fully counterwise	16 turns(clockwise)
Gas pressure:	1200 kPa (12 kg/cm^2, 170 psi)	1000—1500 kPa (10—15kg/cm^2, 142—213 psi)

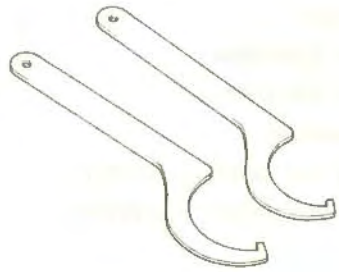
Special Tools

Front Fork Cylinder Holder: 57001-183

Front Fork Oil Seal Driver: 57001-1219

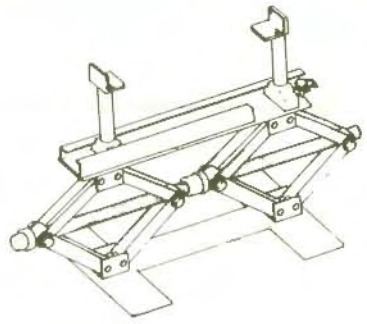
Adapter: 57001-1057

Hook Wrench: 57001-1101

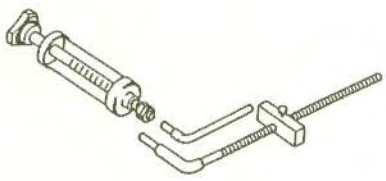


Front Fork Outer Tube Weight: 57001-1218

Jack Stand: 57001-1238



Oil Level Gauge: 57001-1290



Front Fork

Front Fork Adjustment

The front fork should always be adjusted for the rider's weight and track conditions by using one or more of the following methods.

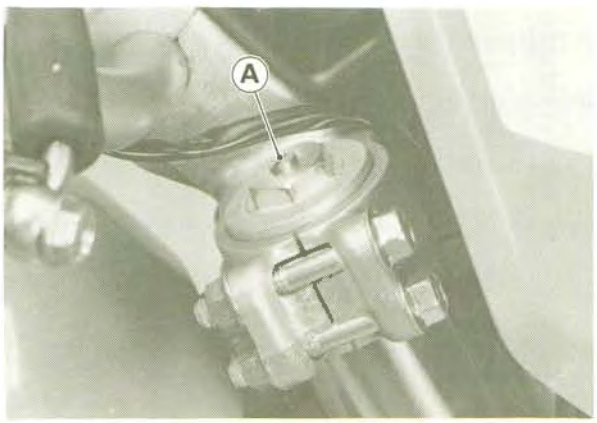
Basically, there are three adjustments you can make to the front fork.

- Air pressure —Air pressure acts as a progressive spring and affects the entire range of fork travel. The air pressure in the fork increases as the fork heats up, so the fork action on your KDX will get stiffer as the race progresses. Because of this, we don't recommended using air pressure for additional springing. Your KDX forks are designed to work without adding any air.
- Compression damping adjustment-this adjustment affects how quickly the fork compresses. The fork compression damping adjuster has 16 clicks. The sested position (full counterclockwise until the adjuster stops) is full soft. From that point, 8 clicks clockwise is the standard setting, and 16 clicks (full clockwise until the adjuster stops) is full hard.
- Oil level adjustment—The effects of higher or lower fork oil level are only felt during the final 100 mm of fork travel. A higher oil level (more oil) will make the fork rebound more quickly. A lower oil level (less oil) will make the fork rebound more slowly.
- Fork springs —Optional springs are available that are softer and stiffer than standard.

Air Pressure

The standard air pressure in the front fork legs is atmospheric pressure. The air pressure in the front legs increases as the fork heats up, so the fork action will get stiffer as vehicle operation progresses.

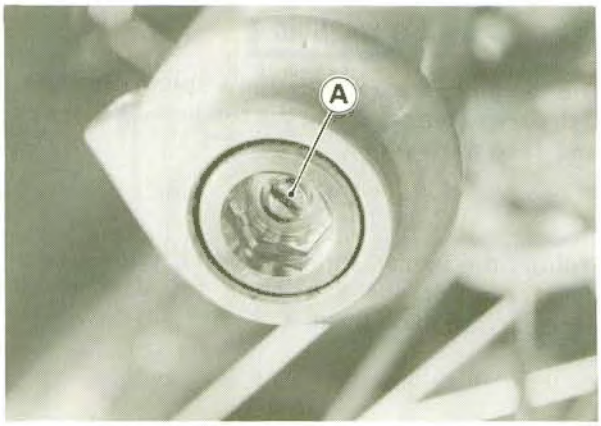
- Park the vehicle on level ground.
- Remove the screws at the top of the front fork top bolts.



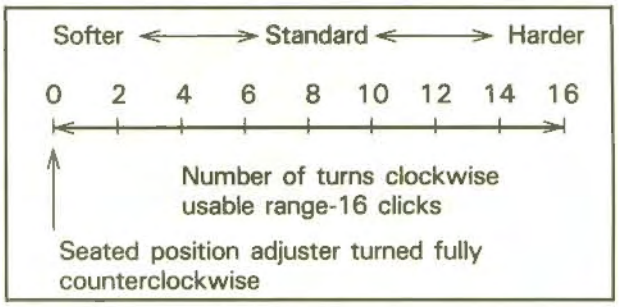
A. Screw

Compression Damping Adjustment

- Clean the bottom of the outer tubes.
- Remove the caps on the bottom of the outer tubes.
- To adjust compression damping, turn the adjuster on the front fork cylinder valve with the blade of a screwdriver until you feel a click. Adjust the compression damping to suit your preference under special condition.



A. Adjuster



CAUTION

- **The left and right fork legs must have the same shock damping.**

- Put the caps into the bottom of the outer tubes.

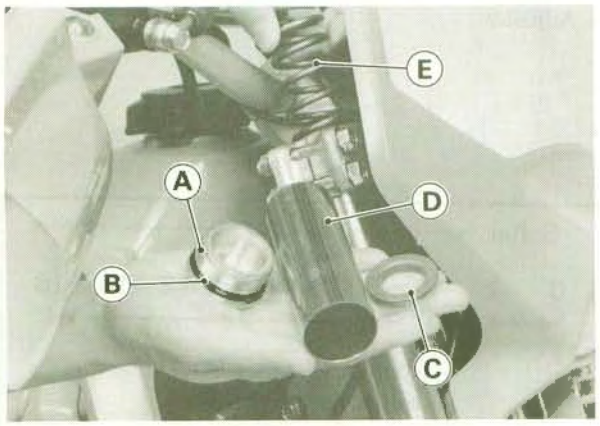
Oil Level Adjustment

- Using the jack stand (special tool) under the frame, stabilize the motorcycle.
- Place a stand or block under the engine so that the front wheel is reised off the ground.
- Remove the top bolts from the top of the fork tubes.

WARNING

○The top bolts are under extreme spring pressure. Usa care when removing the top bolts. Wear eye and face protection.

- Pull out the spacer, spring seat and spring. Check the O-ring of the top bolts for damage. If necessary, replace them.



A. Top Bolt
B. O-Ring
C. Spring Seat
D. Spacer
E. Spring

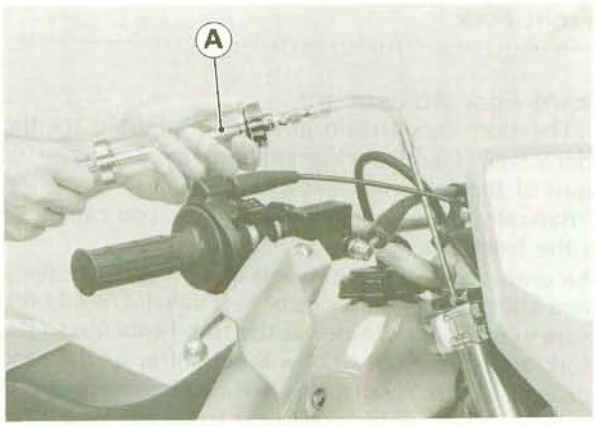
- Take out the stand or other suitable means under the engine, and slowly compress the front forks all the way.
- In this position,put the oil level gauge (specal tool) on the tube, and measure the distance from the top of the inner tube to the oil level.

Standard Oil Level:

140 ± 2 mm

Adjustable Range:

110 – 170 mm



A. Oil Level Gauge: 57001-1290

- Adjust the oil level as required within the adjustable range using one of the following oils.

Recommended Oil

KAYABA G10 or SAE10W

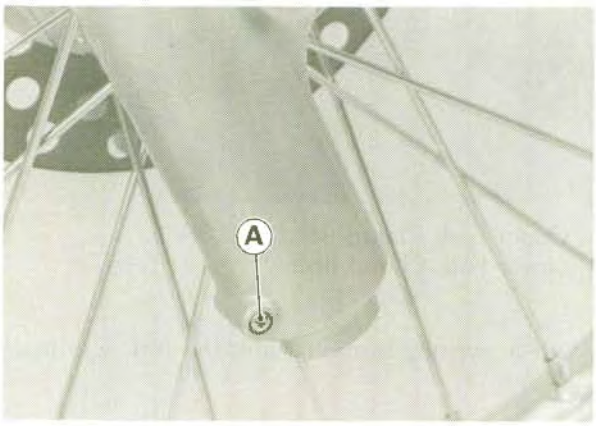
Fork Spring

Different fork springs are available to achieve suitable front fork action in accordance with the rider's weight and track condition.

★ Harder springs make the fork stiffer, and rebound action quicker.
★ Softer springs make the fork softer, and rebound action slower.

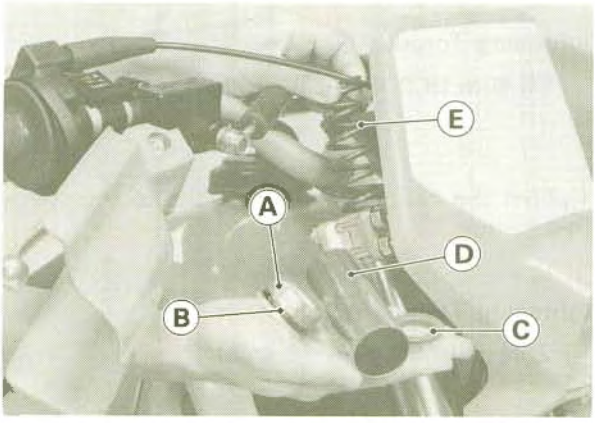
Fork Oil Change

•Remove the drain screw from the lower end of the outer tube on each side.



A. Drain Screw

•Compress the front fork a few times to pump out the oil.
•Using the jack stand (special tool) under the frame, stabilize the motorcycle.
•Place a stand or block under the engine so that the front wheel is rised off the ground.
•Apply a non-permanent locking agent to the drain screws and install them.
•Remove the top bolts from the top of the fork tubes.
•Pull out the spacer, spring seat and spring. Check the O-ring of the top bolts for damage. If necessary, replace them.



A. Top Bolt
B. O-ring
C. Spring Seat
D. Spacer
E. Spring

•Pour in the type and amount of fork oil specified.

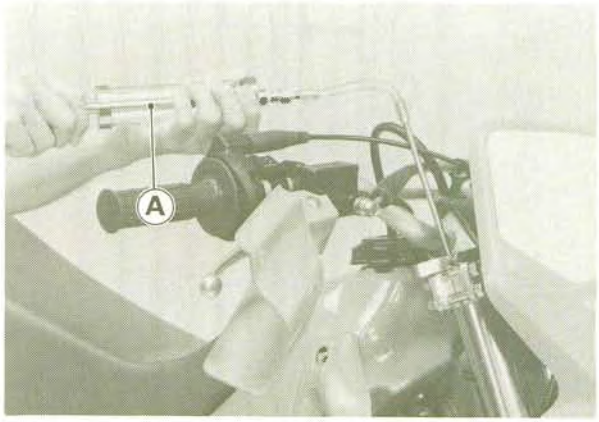
Recmmended Oil:

KAYABA G10 or SAE 10W

Front Fork Oil Capacity:

618 ± 4 mL

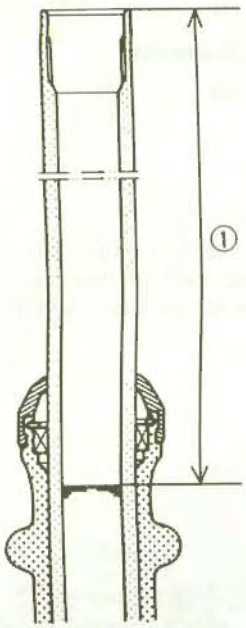
• Check the oil level.
○ With the fork fully compressed, put the oil level gauge (special tool) on the top of the tube, and measure the distance from the top of the inner tube to the oil.



A. Oil Level Gauge: 57001-1290

★If the oil is above or below the specified level, remove or add oil and recheck the oil level.

Fork Oil Level Measurment



1. Oil Level

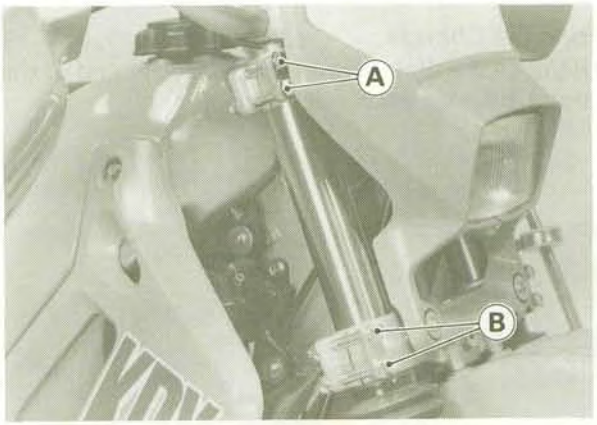
Front Fork Oil Level (Standard)

140 ± 2 mm

•Install the parts removed.

Front Fork Removal

•Remove the caliper from the fork leg to be removed, and rest the caliper on some kind of stand so that it doesn't dangle.
•Remove the front wheel (see Front Wheel Removal in the Wheels/Tires chapter).
•Loosen the upper and lower fork clamp bolts.



A. Upper Fork Clamp Bolts
B. Lower Fork Clamp Bolts

•With a twisting motion, work the fork leg down and out.

Front Fork Installation Notes

•Installation is the reverse of removal.
•If the fork leg was disassembled, check the fork oil level.
•Route the cables and hose according to the Cable, Harness, Hose Routing section in the General Information chapter.
•Tighten the lower and upper clamp nuts to the specified torque.

Tightening Torque

20N-m (2.0 kg-m, 14.5 ft-lb)

•Tighten the axle nut to the specified torque.

Tightening Torque:

88 N-m (9.0 kg-m, 65 ft-lb)

•Tighten the caliper mounting bolts to the specified torque.

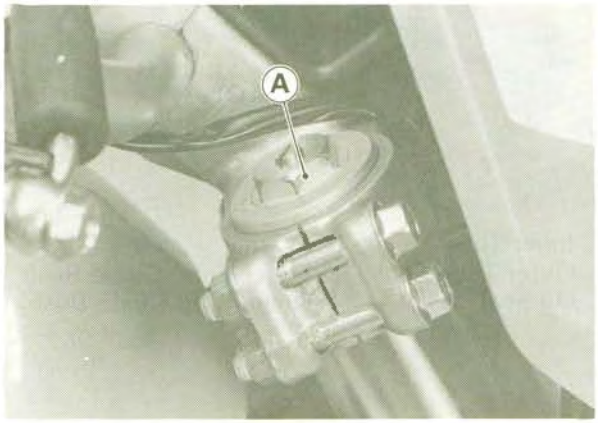
Tightening Torque:

25N-m (2.5 kg-m, 18 ft-lb)

•Check front brake operation after installation.

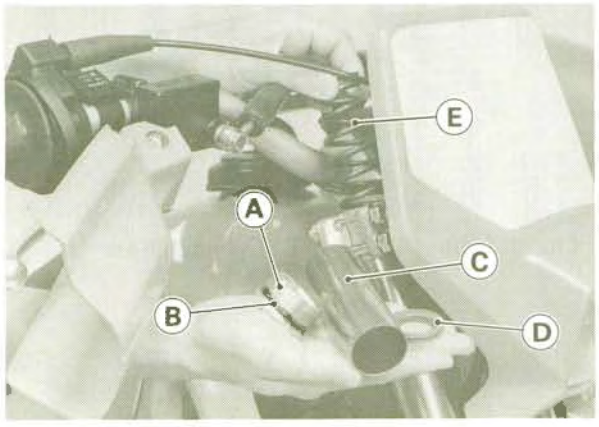
Front Fork Disassembly

•Remove the front fork leg.
•Remove the dust boot from the fork leg.
•Remove the top bolt from the top of the fork tubes.



A. Top Bolt

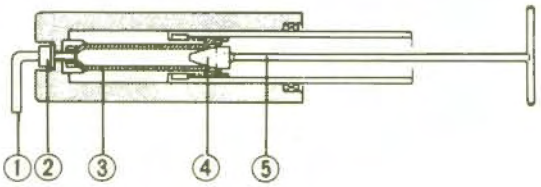
•Pull out the spacer, spring seat, and spring. Check the O-ring of the top bolts for damage. If necessary, replace them.



A. Top Bolt
B. O-Ring
C. Spacer
D. Spring Seat
E. Spring

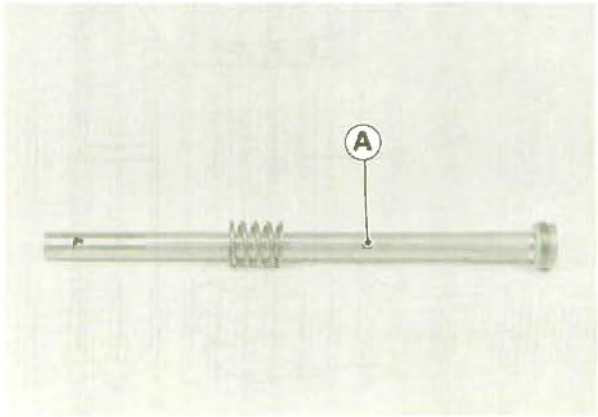
•Pour the fork oil into a container.
•Clean the bottom of the outer tube.
•Remove the caps on the bottom of the outer tubes.
•Hold the front fork with a vise.
•Stop the cylinder from turning by using the cylinder holder and adapter (special tools). Unscrew the cylinder valve assembly, and take the cylinder valve assembly and gasket out of the bottom of the outer tube.

Allen Bolt Installation/Removal



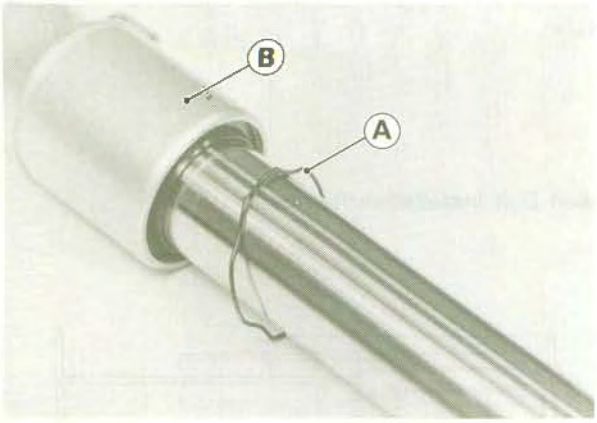
1. Cylinder Holder: 57001-183
2. Adapter: 57001-1057
3. Cylinder Unit
4. Cylinder Valve Assembly

•Remove the cylinder unit from the top of the front fork tube.



A. Cylinder Unit

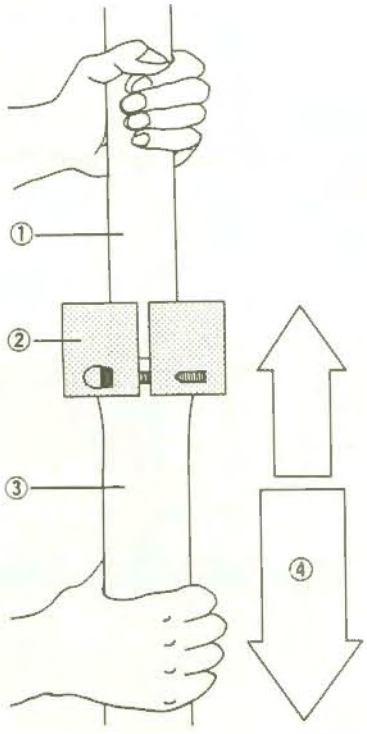
•Separate the inner tube from the outer tube as follows.
○Remove the retaining ring from the outer tube.



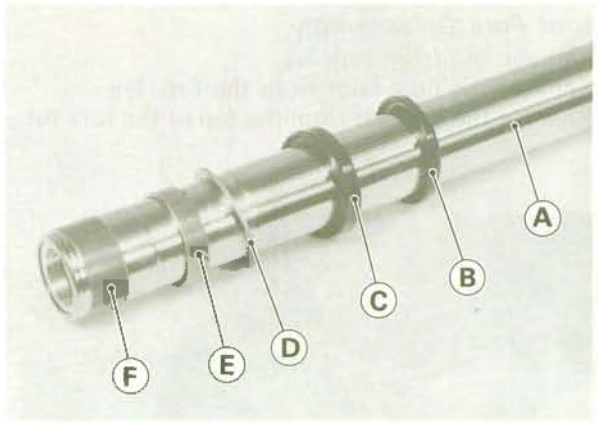
A. Retaining Ring B. Outer Tube

○Mount the front fork outer tube weight (special tool) on the top of the outer tube, by fitting the step of the weight (special tool) to the top corner of the outer tube.
○Holding the inner tube by hand in a vertical position, stroke the outer tube up and down several times and pull it down. This shock to the fork leg separtes the outer tube from the inner tube.

Front Fork Separation

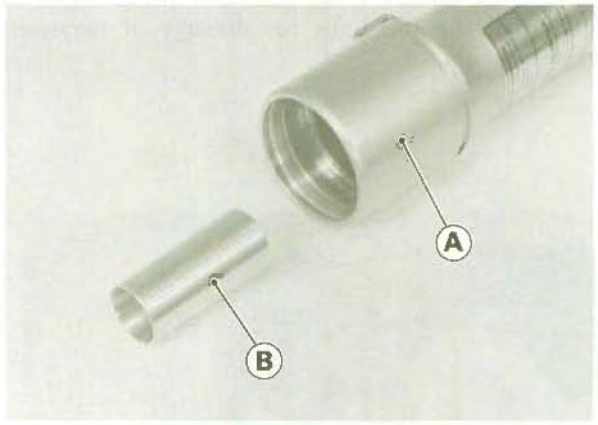


1. Inner Tube
2. Front Fork Outer Tube Weight: 57001-1218
3. Outer Tube
4. Stroke



A. Inner Tube D. Washer
B. Outer Tube Seal E. Outer Tube Guide Bush
C. Oil Seal F. Inner Tube Guide Bush

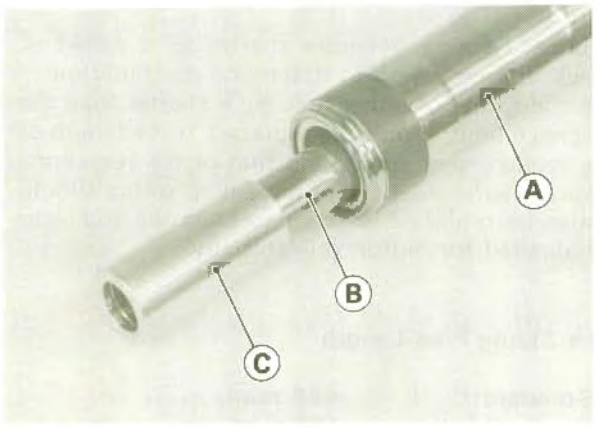
•Remove the cylinder base from the bottom of the outer tube.



A. Outer Tube B. Cylinder Base

Front Fork Assembly Notes

•Assembly is the reverse of disassembly.
•Check the O-ring at the top bolt. Replace it with a new one if damaged.
•Replace the oil seal removed with a new one.
•Replace the guide bushes with new ones.
•Insert the cylinder unit in the inner tube.
•Insert the cylinder base in the cylinder unit.



A. Inner Tube
B. Cylinder Unit
C. Cylinder Base

- Insert the inner tube and cylinder unit as a set into the outer tube.

★Visually inspect the cylinder valve assembly for damages, and replace it if necessary.

A. Cylinder Valve Assembly

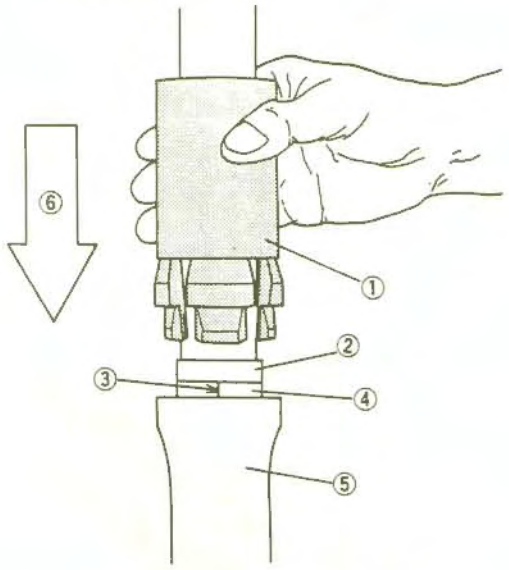
- Apply a liquid gasket to both sides of the gasket, and apply a non-permanent locking agent to the threads of the cylinder valve assembly at the bottom of the outer tube.
- Stop the cylinder from turning by using the cylinder holder and adapter (special tools: 57001-183, 57001-1057), tighten the cylinder valve assembly to the specified torque.

Tightening Torque

71 N-m (7.2 kg-m, 52 ft-lb)

- Install the cap on the bottom of the outer tube.
- When replacing the outer tube guide bush with a new one, hold the used guide bush against the new one, and tap the used guide bush with the front fork oil seal driver (special tool) until it stops. The slit in the bush must face toward the wheel.

Guide Bush Installation



1. Front Fork Oil Seal Driver: 57001-1219
2. Used Guide Bush
3. Slit (face toward the wheel)
4. New Guide Bush
5. Outer Tube
6. Tap

- After installing the washer, install the oil seal by using the fork oil seal driver (special tool: 57001-1219).
- Using the fork oil seal driver (special tool: 57001-1219), install the dust seal.
- Pour in the type and amount of fork oil specified, and adjust the oil level (see Fork Oil Change).

Inner Tube Inspection

- Visually inspect the inner tube, 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 damage.

★If the damage is not repairable, replace the inner tube. Since damage to the inner tube damages the oil seal, replace the oil seal whenever the inner tube is repaired or replaced.

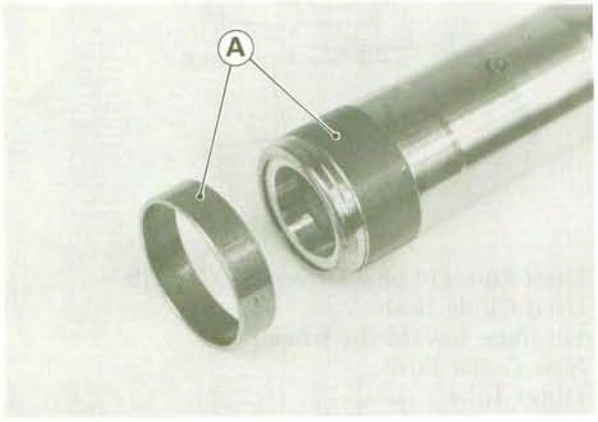
• Temporarily assemble the inner and outer tubes, and pump them back and forth manually to check for smooth operation.

CAUTION

○If the inner tube is badly bent or creased, replace it. Excessive bending, followed by subsequent straightening, can weaken the inner tube.

Guide Bush Inspection

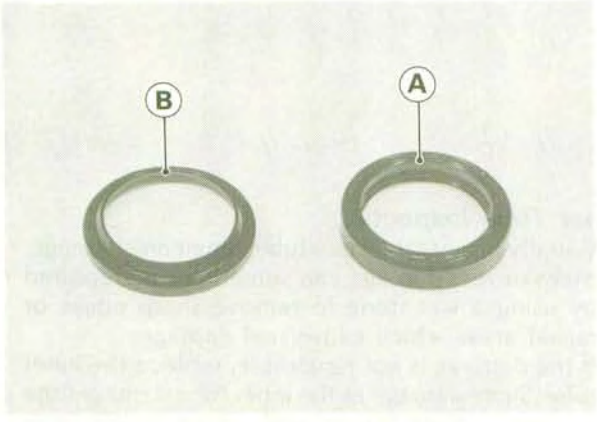
•Visually inspect the guide bushes, and replace them if necessary.



A. Guide Bushes

Oil Seal and Outer Tube Seal Inspection

• Inspect the outer tube 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.



A. Oil Seal B. Outer Tube Seal

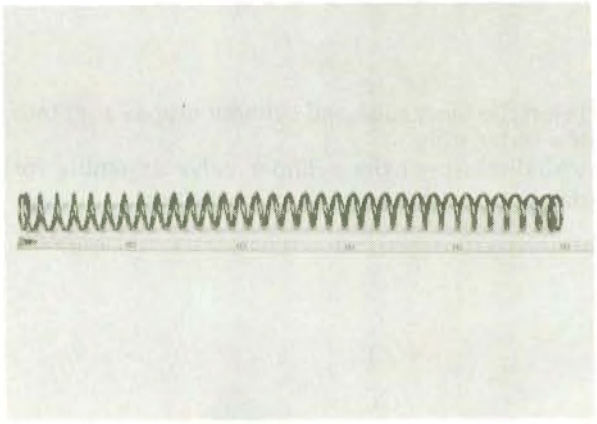
Spring Tension

Since a spring becomes shorter as it weakens, check its free length to determine its condition.

★If the spring of either fork leg is shorter than the service limit, it must be replaced. If the length of a replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the fork legs balanced for motorcycle stability.

Fork Spring Free Length

Standard:	**496 mm**
Service Limit:	**486 mm**



Rear Suspension (Uni-Trak)

Rear Shock Absorber:

The rear suspension system of this motorcycle is Uni-trak. It consists of a rear shock absorber, swing arm, tie rod and rocker arm.

To suit to various riding conditions, the spring preload of the shock absorber can be adjusted or the spring can be replaced with an optional one. Also the damping force can be adjusted easily so changing oil viscosity is unnecessary.

Shock Damping Adjustment

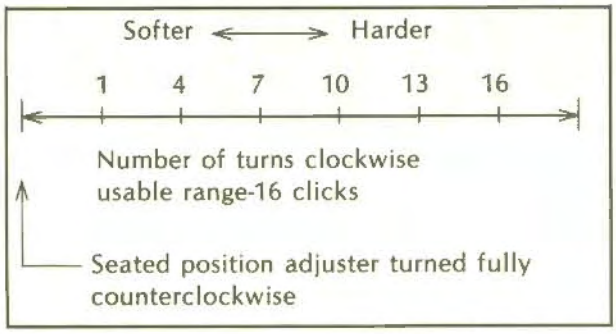
Rear Shock Absorber

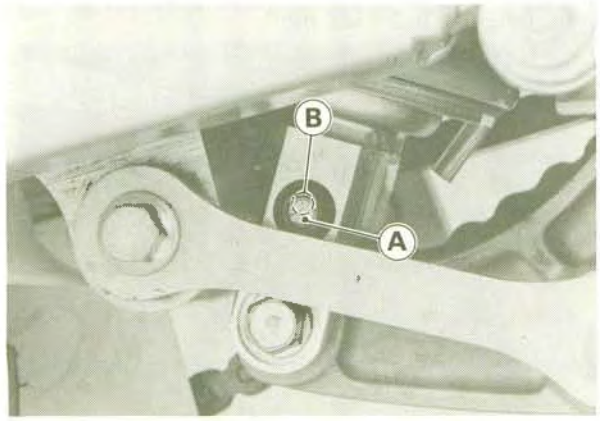
Rebound Damping Adjustment

To adjust shock rebound damping, turn the rebound damping adjuster on the rear shock absorber lower end with the blade of a screwdriver until you feel a click.

If the damper setting feels too soft or too stiff, adjust it in accordance with the following table:

Rebound Damping Adjustment





A. Rebound Damping Adjuster
B. Mark

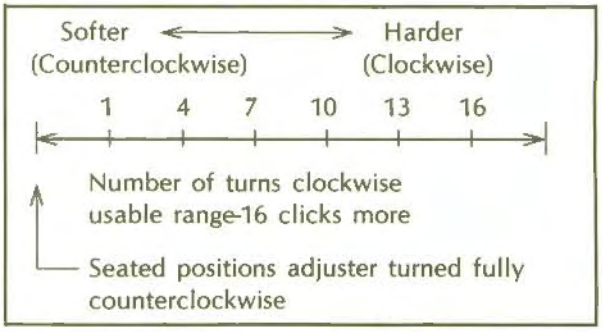
Gas Reservoir

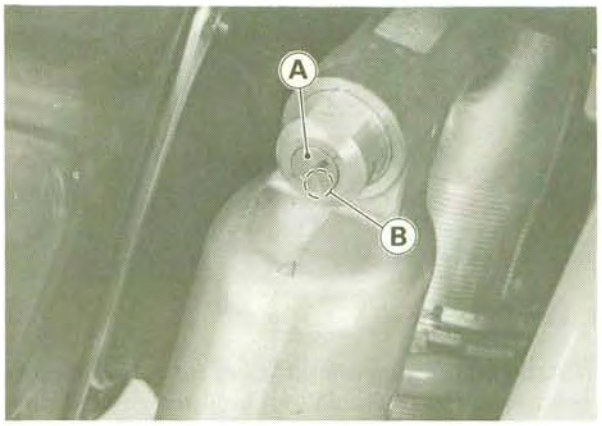
Compression Damping Adjustment

To adjust compression damping, turn the compression damping adjuster on the gas reservoir with the blade of a screwdriver until you feel a click.

If the damper setting feels too soft or too stiff, adjust it in accordance with the following table.

Compression Damping Adjustment





A. Compression Damping Adjuster
B. Mark

Gas Pressure Adjustment

The gas pressure in the gas reservoir can be adjusted for different course and loading conditions.

The following table shows an example of gas pressure adjustment. To obtain stable handling or a suitable riding condition, adjust the gas pressure for different course and loading conditions as necessary. The standard gas pressure is 1200 kPa (12.0 kg/cm^2, 170 psi). Ordinarily, the heavier the total load becomes, the higher the gas pressure should be set.

Gas Pressure Adjustment (Adjustable Range)

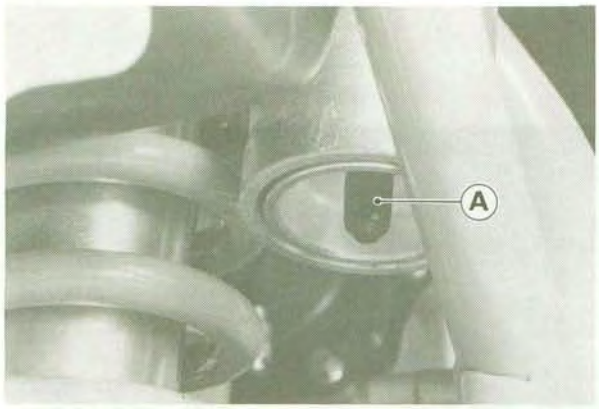
Gas Pressure kPa (kg/cm², psi)	Setting	Load	Course
1000 (10.0, 142)	Soft	Light	Smooth
↕	↕	↕	↕
1500 (15.0, 213)	Hard	Heavy	Rough

To adjust the gas pressure:

NOTE

○*Check and adjust the gas pressure when the gas reservoir is cold (room temperature).*

- Place the jack stand (special tool) under the frame so that the rear wheel is raised off the ground.
- Remove the valve cap and check the gas pressure with the air pressure gauge.



A. Valve Cap

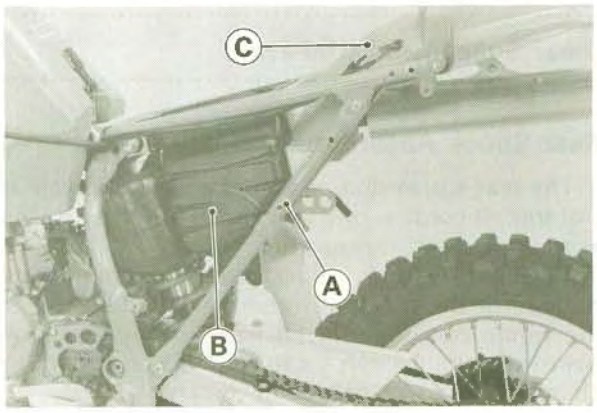
- If standard pressure is insufficient for you, add nitrogen gas using a suitable tool until the desired pressure is reached. Change the gas pressure within the range specified in the table above to suit various riding conditions.

WARNING

○**Use only nitrogen gas.**
○**Do not incinerate the gas reservoir.**

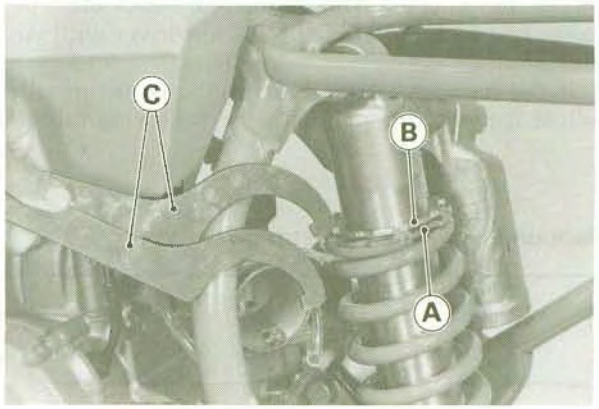
Spring Preload Adjustment

- Remove the seat, right and left side covers.
- Loosen the air cleaner duct clamp screw.
- Remove the rear frame pipe, rear fender and air cleaner case.



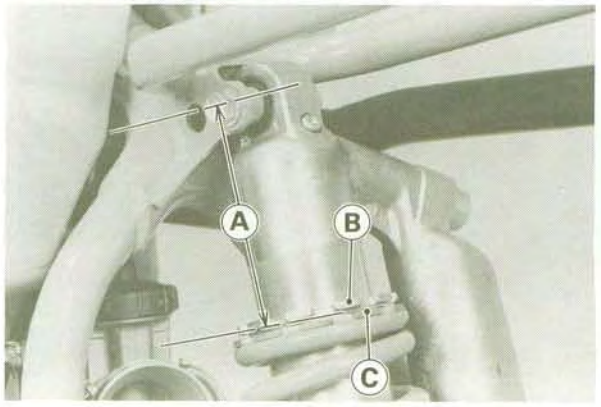
A. Rear Frame Pipe
B. Air Cleaner Case
C. Rear Fender

- Place the jack stand (special tool) under the frame so that the rear wheel is raised off the ground.
- Using the hook wrenches (special tools), loosen the locknut and turn the adjusting nut as required. Turning the adjusting nut down makes the spring preload stronger.



A. Adjusting nut
B. Locknut
C. Hook Wrench: 57001-1101

- Standard spring preload is 609 N (62.1kg, 134 lb). The adjusting nut changes the preload 68 N (6.9 kg, 15 lb) turn.
- The standard adjusting nut position from the center of the upper mounting hole is 110.5 mm. The adjustable range is 102—122 mm.



A. Adjusting Nut Position
B. Locknut.
C. Adjusting Nut

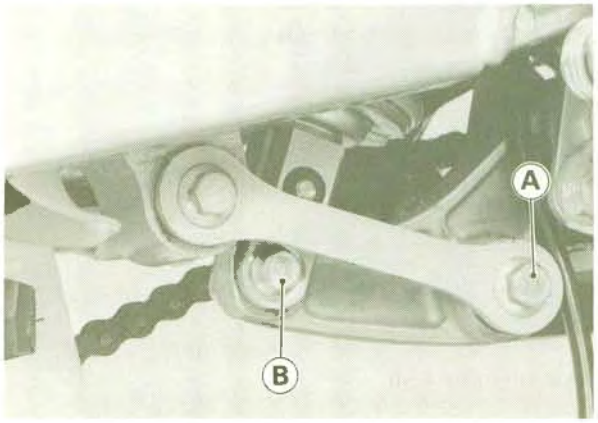
•Tighten the locknut securely.
•After adjusting, move the spring up and down to make sure that the spring is seated.
•Install the parts removed.

CAUTION

○When pulling out the mounting bolts, lift the rear wheel slightly. Forcing or tapping on a bolt could damage the bolt, sleeve, and bearing.

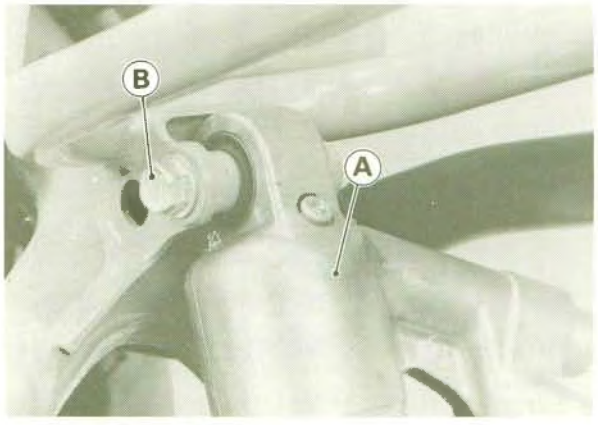
Rear Shock Absorber Removal

•Remove the following parts.
Seat
Right and Left Side Covers
Rear Frame Pipe
Rear Fender
Air Cleaner case
•Place the jack stand (special tool) under the frame so that rear wheel is raised off the ground.
•Remove the tie-rod front mounting nut, and pull out the mounting bolt.
•Remove the rear shock absorber lower mounting bolt, and pull out the mounting bolt.



A. Tie-Rod Front Mounting Bolt
B. Rear Shock Absorber Lower Mounting Bolt

•Remove the rear shock absorber upper mounting bolt, and pull the rear shock absorber down and out.



A. Rear Shock Absorber
B. Rear Shock Absorber Upper Mounting Bolt

Rear Shock Absorber Installation Notes

•Installation is the reverse of removal.
•Tighten the rear shock absorber upper, lower and tie-rod front mounting bolts to the specified torque.

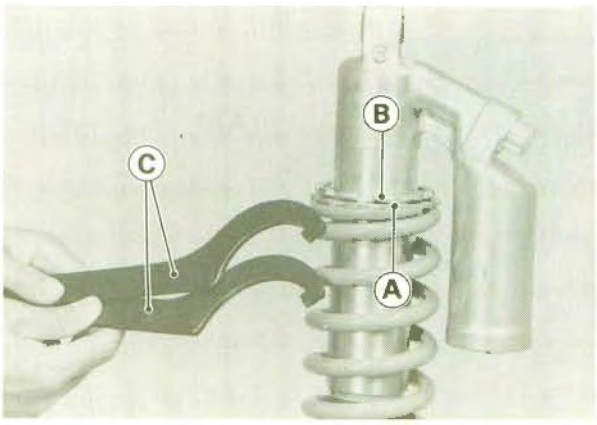
Tightening Torque:

Rear Shock Absorber Bolt (Upper and Lower):
39 N-m (4.0 kg-m, 29 ft-lb)

Uni-trak Tie-rod Nut:
81 N-m (8.3 kg-m, 60 ft-lb)

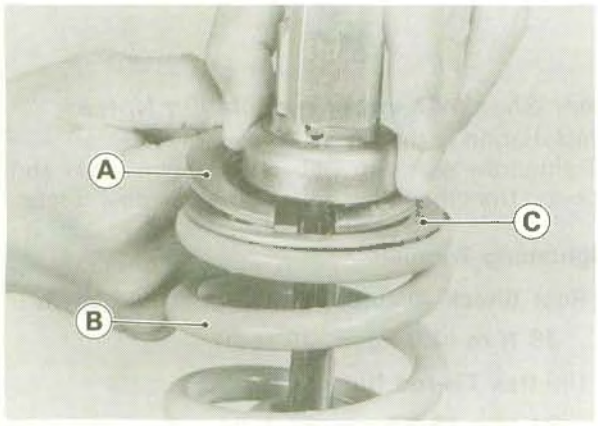
Rear Shock Absorber Spring Replacement

In addition to the standard spring, heavy and light springs are available. If the standard spring is improper for your purpose, select a proper one according to the rider's weight or course conditions.
•Remove the following parts.
Seat
Right and Left Side Covers
Rear Frame Pipe
Rear Fender
Air Cleaner case
•Remove the rear shock absorber.
•Clean the threaded portion on the upper of the rear shock absorber.
•Hold the upper of the rear shock absorber with a vise.
•Using the hook wrenches (special tools), loosen the locknut and turn the adjusting nut all way down.



A. Adjusting Nut C. Hook Wrenches: 57001-1101
B. Locknut

•Slide down the rubber bumper.
•Remove the spring retainer clip and spring guide from the shock absorber and lift off the spring .



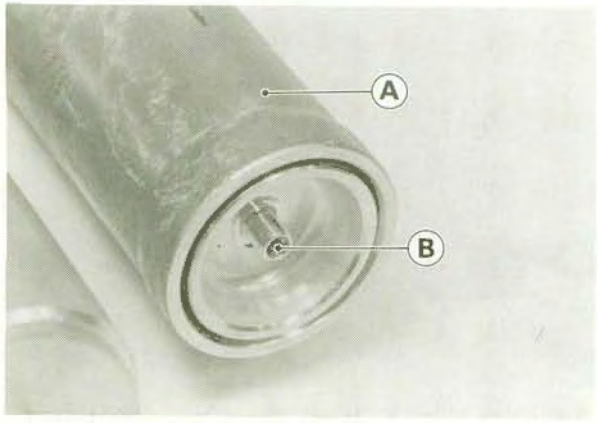
A. Retainer Clip C. Spring Guide
B. Spring

•Exchange the spring for an optional part.
•Install the spring, spring guide and retainer clip.
•Install the rear shock absorber on the frame.
•Adjust the spring preload (see Spring Preload Adjustment).

Rear Shock Absorber Disassembly (Oil Change)

The oil should be changed in the rear shock absorber at least once per racing season. The frequency for best performance must be based upon riding conditions and rider ability.

•Remove the rear shock absorber from the frame (see Rear Shock Absorber Removal).
•Remove the shock absorber spring (see Rear Shock Absorber Spring Replacement).
•Point the valve away from you. Slowly release nitrogen gas pressure by pushing down the valve core with a screwdriver.



A. Gas Reservior B. Valve

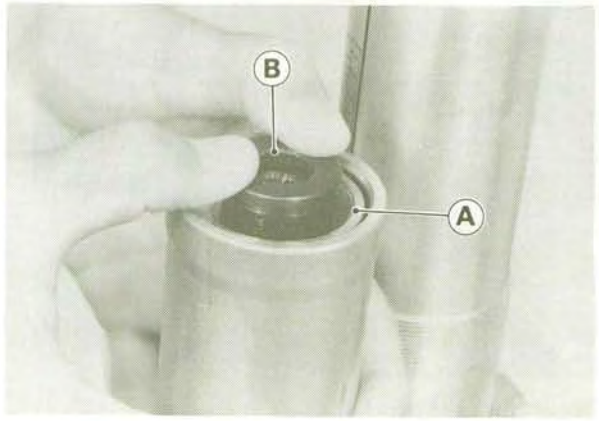
WARNING

○Be sure to point the reservior valve away from you when releasing nitrogen gas pressure. An oil mist is often released with the nitrogen.
○Always release nitrogen gas pressure before explosive separation of parts.

•Adjust the gas reservoir damping adjuster to the softest position.
•Remove the air bleeder bolt (Allen bolt), and pump the rear shock to drain the oil out of the rear shock body and gas reservoir.

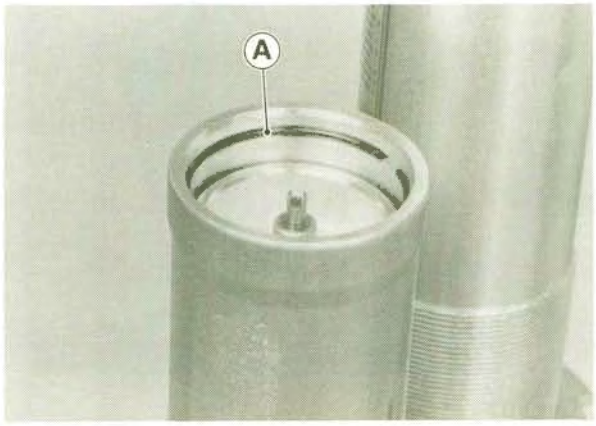
A. Air Bleeder Bolt

•Install the air bleeder bolt.
•Hold the upper end of the rear shock with the vise again.
•Push the reservoir cap in 10mm with a suitable tool.



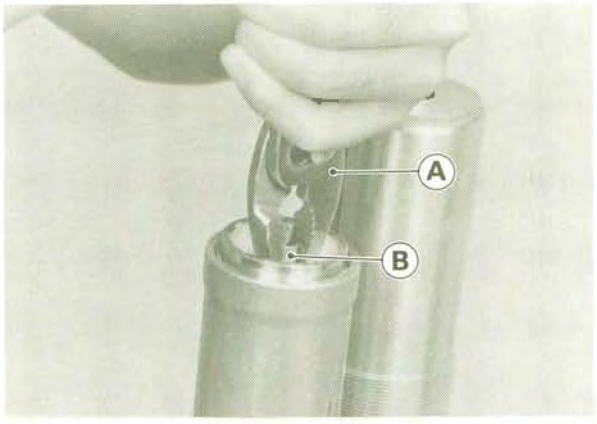
A. Reservoir Cap B. Suitable Tool

•Remove the circlip from the gas reservoir.



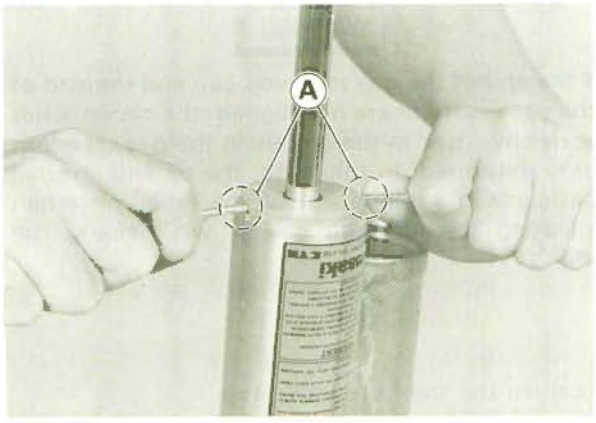
A. Circlip

•Install a steel tire valve cap on the gas reservoir valve, hold the steel cap with pliers, and pull the gas reservoir cap out of the gas reservoir.



A. Pliers B. Steel Cap

•Pry at the gaps in the stop with suitable tools to free the stop from the rear shock body.



A. Gaps

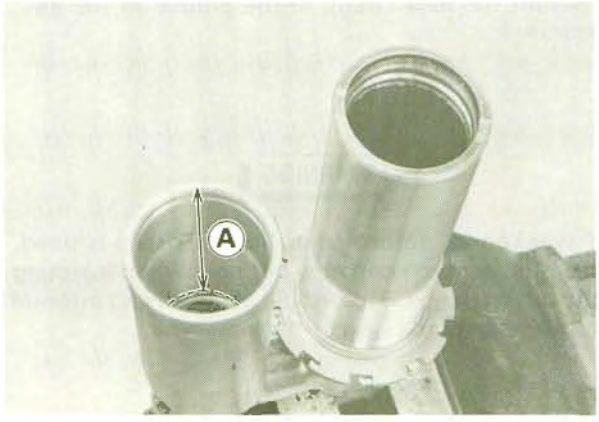
•Slide the stop up to the top of the push rod then lightly tap around the seal with a suitable rod and mallet, and push the seal assembly 10 mm down. Remove the circlip.

A. Circlip

•Lightly move the push rod back and forth, and pull out the push rod assembly.
•Pour the oil out of the rear shock body and gas reservoir.

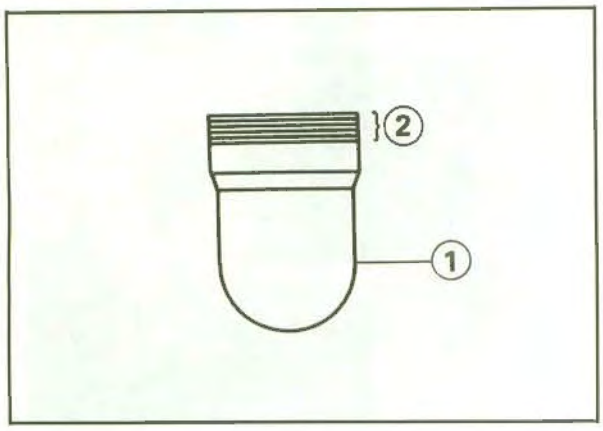
Rear Shock Absorber Assembly Notes

•Assembly is reverse of disassembly.
•Adjust the gas reservoir damping adjuster to the softest position.
•Install the air bleeder bolt.
○Check the O-ring on the air bleeder bolt, and replace it if necessary.
•Pour KYB K2-C (SAE 5W or Bel-Ray SE2 #40) oil into the gas reservoir to 60 — 70 mm from the gas reservoir upper end.



A. 60 — 70 mm

•Check that the bladder on the gas reservoir cap is not partially collapsed.
•If it is, push down the valve core with a screwdriver.
•Check the bladder for sign of damage or crack. If necessary, replace it with a new one.



1. Bladder 2. Lip

CAUTION

○Do not use a damaged or partially collapsed bladder, because it may burst, gently reducing rear shock performance.

•Apply grease to the lip of the bladder.
•Push the bladder into the gas reservoir slowly until it just clears the circlip groove. Wipe out any spilled oil.

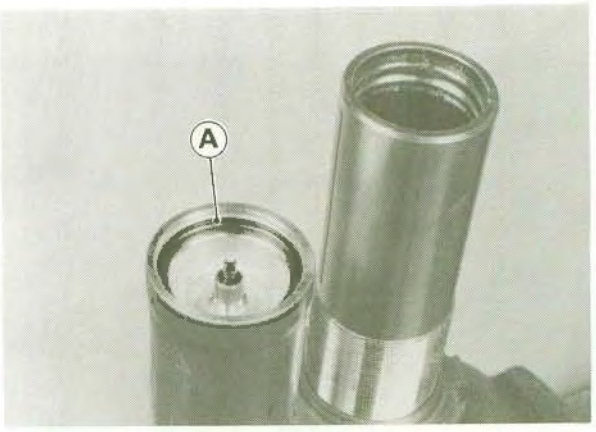
CAUTION

○Ensure that no air remains in the system.

•Mount the new circlip in the groove in the gas reservoir.

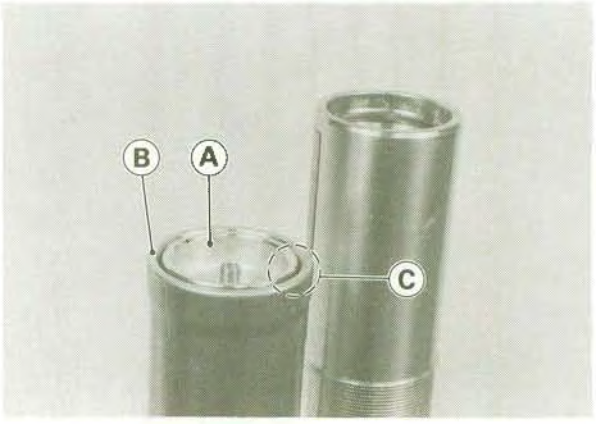
WARNING

○If weakened, deformed or flawed circlip is used, the gas reservoir cap may not hold when injecting the nitrogen gas. This would allow oil and internal parts to explode out of the reservoir.



A. Circlip

•Install a steel tire valve cap on the gas reservoir valve, hold the steel cap with pliers, and pull up the gas reservoir cap against the circlip. The end of the gas reservoir cap must align with the end of the gas reservoir.



A. Gas Reservoir Cap C. Aligned
B. Gas Reservoir End

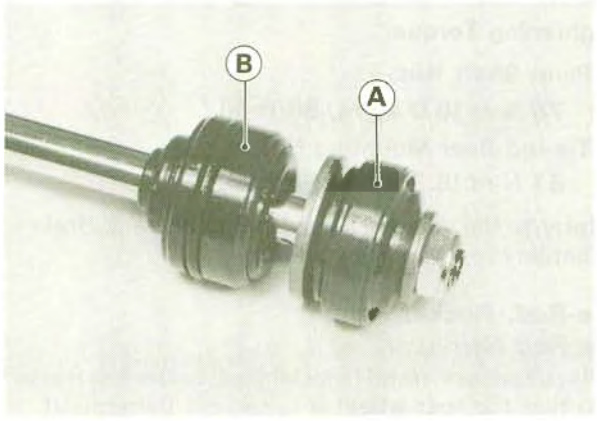
WARNING

○If the end of the gas reservoir cap and the end of the gas reservoir are not aligned, the circlip is not correctly fitted in the groove in the gas reservoir or is deformed. In this case, the oil and internal parts could explode out of the reservoir when injecting the nitrogen gas or while riding the motorcycle.

•Remove the steel tire valve cap.
•Pour KYB K2-C (SAE 5W or Bel-Ray SE2 #40) oil into the rear shock body to 45 mm from the lower end of the rear shock body.

A. 45 mm

•Insert the piston end of the push rod assembly into the rear shock body slowly, and pump the push rod until all the air is forced out of the rear shock body.

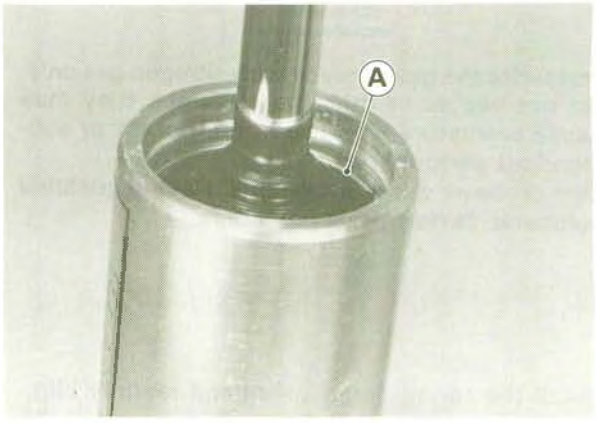


A. Piston B. Seal Assembly.

•Push the seal assembly into the rear shock body until it just clears the circlip groove.
•Fit the new circlip into the groove in the rear shock body.

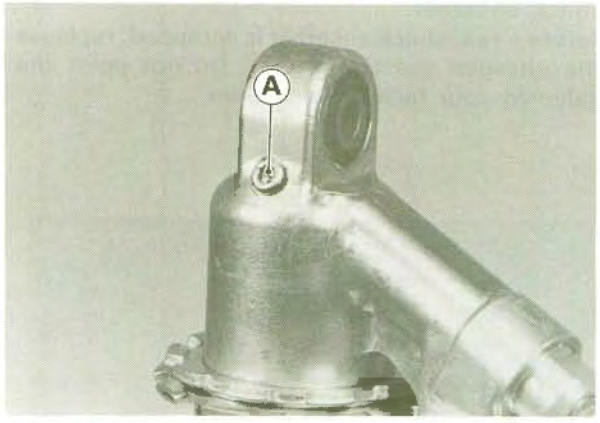
CAUTION

oIf the circlip is not a certain fit in the groove in the rear shock body, the push rod assembly may come out of the shock absorber when injecting the nitrogen gas or riding the motorcycle.



A. Circlip

•Pull up the push rod assembly against the circlip.
•Force the stop into the rear shock body by lightly tapping around the edge of the stop with a mallet.
•Hold the lower end of the push rod assembly with a vise.
•Pump the rear shock up and down several times, and then leave it in the fully extened position for about three minutes.
•Remove the air bleeder bolt from the upper part of the rear shock body.



A. Air Bleeder Bolt

★If oil comes out of the air bleeder bolt hole, let it overflow until it stops.
★If oil does not come out of the air bleeder bolt hole, add the specified oil into the air bleeder bolt hole until it overflow (that is, until all the remaining air is forced out).
• Install the air bleeder bolt securely.
• Fully extend the push rod assembly.
• Injection nitrogen gas to a pressure of 50 kPa (0.5 kg/cm^2, 7 psi) through the valve on the gas reservoir.
• Check the rear shock body and gas reservoir for oil and gas leaks.
★If there are no leaks, inject the nitrogen gas up to the specified pressure. The adjustable gas pressure range is 1000 — 1500 kPa (10 — 15 kg/cm^2, 142 — 213 psi) and the factory standard gas pressure is 1200 kPa (12 kg/cm^2, 170 psi).

WARNING

○Pressurize the gas reservoir with nitrogen gas only. Do not use air or other gases, since they may cause premature wear, rust, fire hazard or sub-standard performance.
○High pressure gas is dangerous. Have a qualified mechanic perform this procedure.

•Install the spring, spring guide and retainer clip.
•Adjust spring preload. Reinstall the rear shock absorber.

Scrapping

WARNING

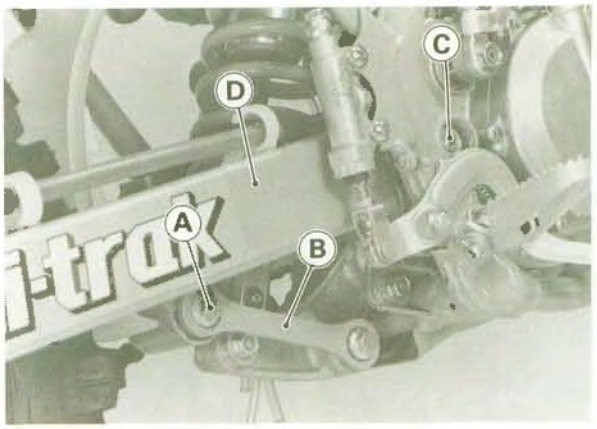
○Since the rear shock absorber contains nitrogen gas, do not incinerate or disassemble the rear shock absorber.
○Before a rear shock absorber is scrapped, replease the nitrogen gas completely. Do not point the valve to your face or body then.

A. Valve

Swing Arm:

Swing Arm Removal

•Remove the rear wheel (see Rear Wheel Removal in the Wheel/Tires chapter).
•Remove the tie-rod rear mounting bolts.
•Pull out the swing arm pivot shaft, and remove the swing arm.



A. Rear Mounting Bolt
B. Tie-rod
C. Swing Arm Pivot Shaft
D. Swing Arm

•Separate the chain guides and chain slippers from the swing arm.

Swing Arm Installation Notes

•Installation is the reverse of removal.
•Apply plenty of molybdenum disulfide grease to the inside of the needle bearings and sleeves.
•Tighten the swing arm pivot shaft nut, and the tie-rod rear mounting nut to the specified torque.

Tightening Torque:

Pivot Shaft Nut:
78 N-m (8.0 kg-m, 58 ft-lb)

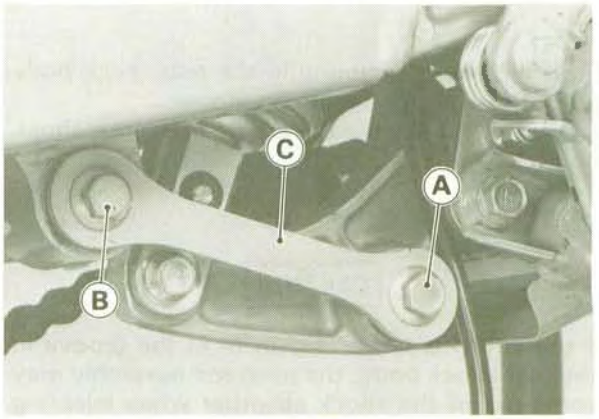
Tie-rod Rear Mounting Nut:
81 N-m (8.3 kg-m, 60 ft-lb)

•Refer to the Wheels/Tires, Final Drive, and Brakes chapters for wheel installation.

Tie-Rod, Rocker Arm:

Tie-Rod Removal

•Place the jack stand (special tool) under the frame so that the rear wheel is raised off the ground.
•Remove the tie-rod front mounting bolt.
•Remove the tie-rod rear mounting bolts, and then take out the tie-rods.



A. Tie-Rod Front Mounting Bolt
B. Tie-Rod Rear Mounting Bolt
C. Tie-Rod

Tie-Rod Installation Notes

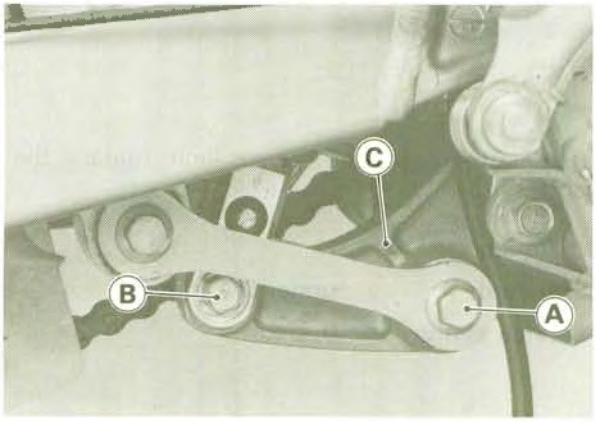
- Installation is the reverse of removal.
- Tighten the tie-rod front and rear mounting nuts to the specified torque.

Tightening Torque:

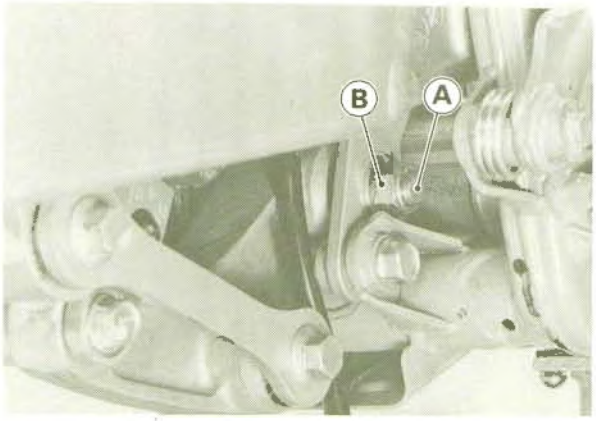
81 N-m (8.3 kg-m, 60 ft-lb)

Rocker Arm Removal

- Place the jack stand (special tool) under the frame so that the rear wheel is reised off the ground.
- Remove the left footpeg.
- Remove the tie-rod front mounting bolt.
- Remove the rear shock absorber lower mounting bolt.
- Remove the rocker arm pivot shaft and nut.



A. Tie-Rod Front Mounting Bolt
B. Rear Shock Absorber Lower Mounting Bolt
C. Rocker Arm



A. Rocker Arm Pivot Shaft B. Nut

- Remove the rocker arm.

Rocker Arm Installation Notes

- Installation is the reverse of removal.
- Apply plenty of molybdenum disulfide grease to the inside of the rocker arm hole, outside of the sleeve, and needle bearings.
- Tighten the following parts to the specified torque.

Tightening Torque:

Rocker Arm Nut:

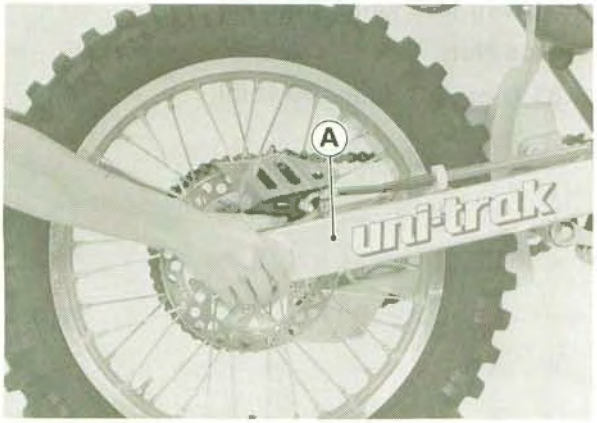
81 N-m (8.3 kg-m, 60 ft-lb)

Tie-rod Nut:

81 N-m (8.3 kg-m, 60 ft-lb)

Uni-trak Maintenancce

Check the uni-trak component parts for wear periodically, or whenever excessive play is suspected.
- Place the jack stand (special tool) under the frame so that the rear wheel is raised off the ground.
- Push and pull on the swing arm, up and down, to check for wear.

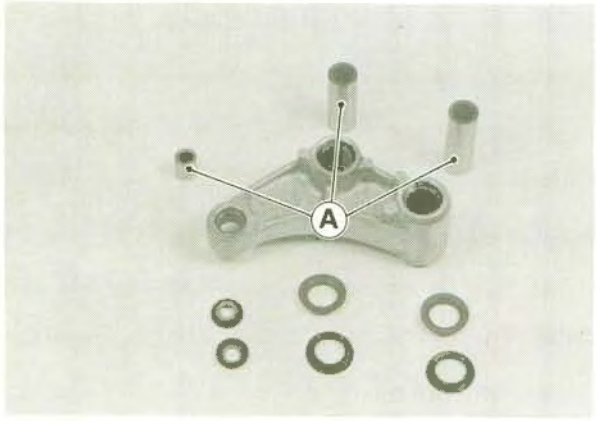


A. Swing Arm

- A small amount of play on the swing arm is normal and no corrective action is needed. However, if excessive play is felt, remove the uni-trak parts from the frame and check for wear.

Sleeve:
- Pull out the sleeve of the rocker arm, and measure the outside diameter of the sleeve.

★If the sleeve is worn past the service limit, replace the sleeve.



A. Sleeves

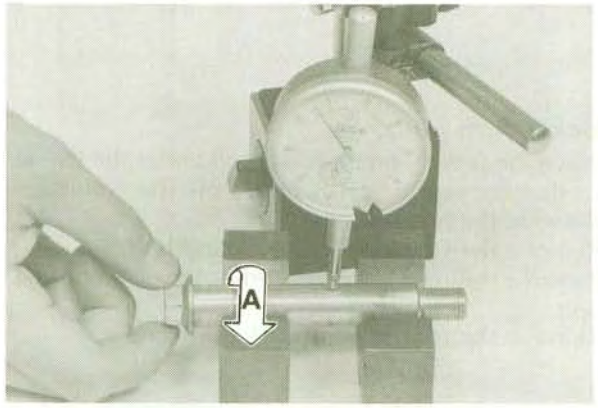
Sleeve Outside Diameter

Standard:	**21.987 – 22.000 mm**
Service Limit:	**21.85 mm**

Rocker Arm:
Mounting Bolt Bend

A bent bolt causes vibration, poor handling, and instability.

To measure bolt runout, remove the bolt, place it in V blocks, and set a dial gauge to the bolt at a point halfway between the blocks. Turn the bolt to measure the runout. The amount of dial variation is the amount of runout.



A. Turn

★If runout exceeds the service limit, replace the bolt.

Bolt Runout

Standard:	**under 0.1 mm**
Service Limit:	**0.2 mm**

Steering

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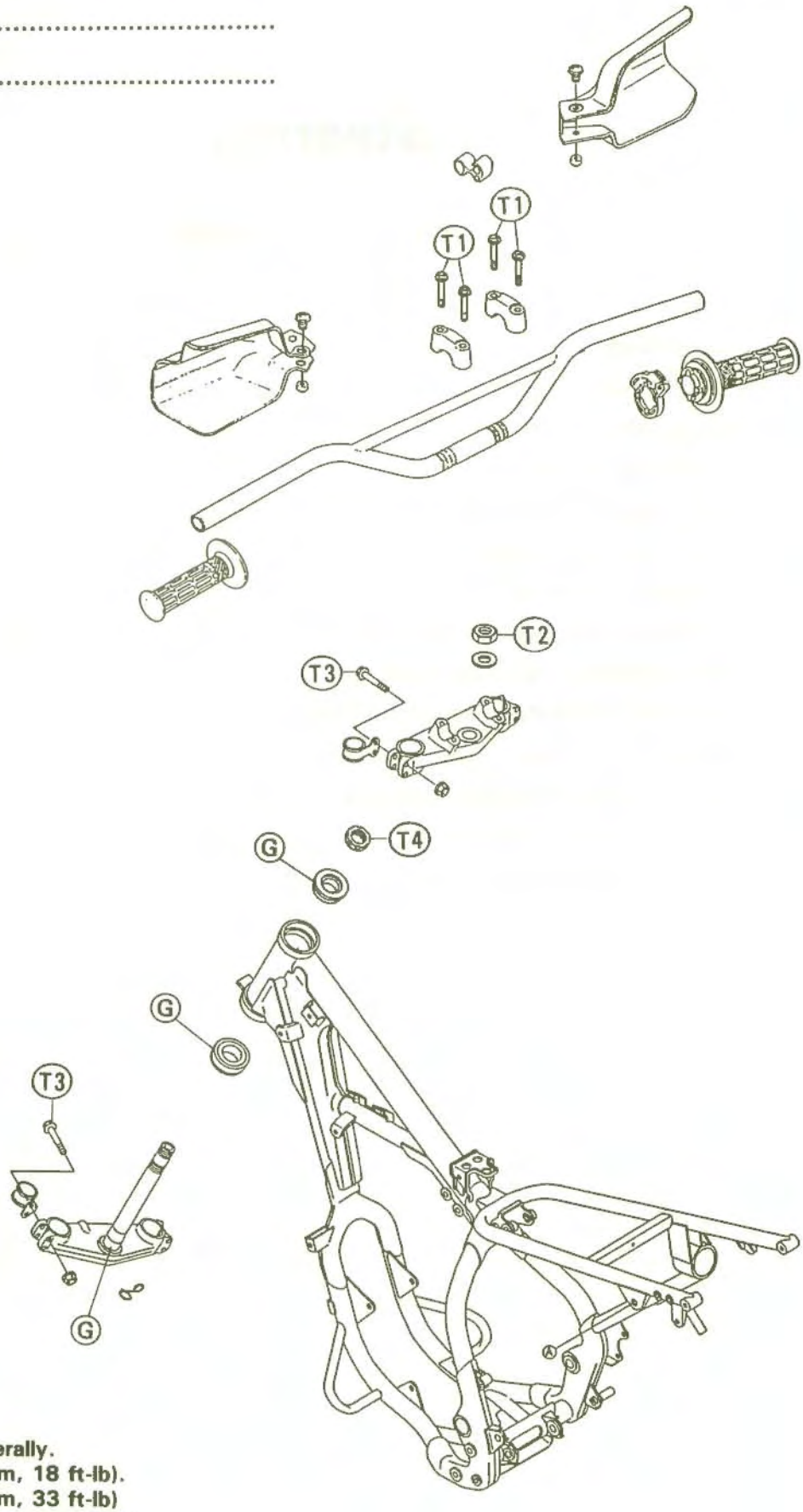
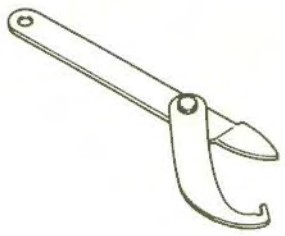
Exploded View



G : Apply grease liberally.
T1: 25 N-m (2.5 kg-m, 18 ft-lb).
T2: 44 N-m (4.5 kg-m, 33 ft-lb)
T3: 20 N-m (2.0 kg-m, 14.5 ft-lb)
T4: Tighten all snugly, then loosen.
Retighten to 4 N-m (0.4 kg-m, 35 in-lb)

Special Tools

Stem Nut Wrench: 57001-1100



Bearing Driver Set: 57001-1129

Stem Bearing Driver: 57001-137

Stem Bearing Driver Adapter: 57001-1074

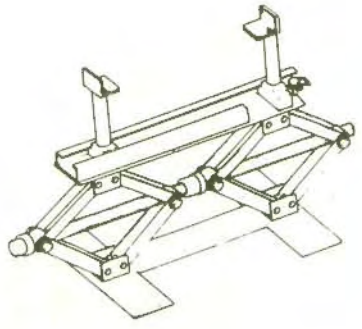
Stem Bearing Remover: 57001-1107

Driver Press Shaft: 57001-1075

Driver:
57001-1106

57001-1076

Jack Stand: 57001-1238



Steering Adjustment

Steering Inspection

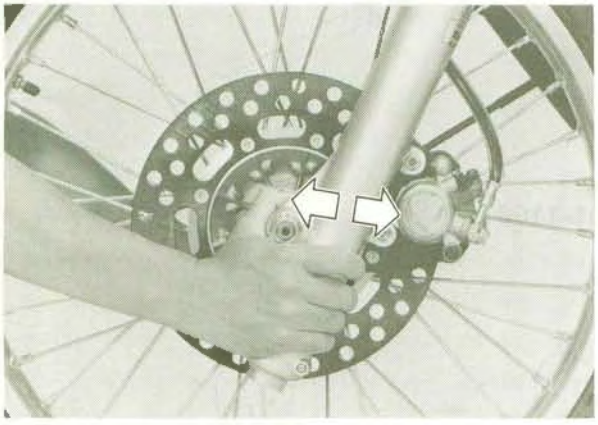
- Using the jack stand (special tool: 57001-1238) and stabilize the motorcycle.
- Place a stand or block under the engine so that the front wheel is raised off the ground.
- With the front wheel pointing straight ahead, alternately nudge each end of the handlebar. The front wheel should swing fully left and right from the force of gravity until the fork hits the stop.

★If the steering binds or catches before the stop, check the routing of the cables, hoses, and harnesses.

★If the steering feels tight, adjust or lubricate the steering.

- Feel for steering looseness by pushing and pulling the forks.

★If you feel looseness, adjust the steering.

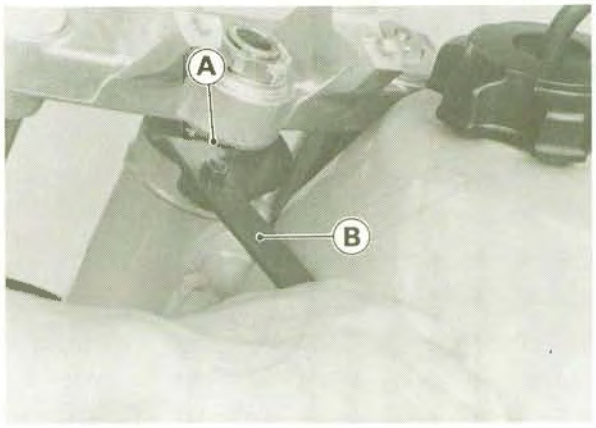


Steering Adjustment

- Remove the headlight and meter unit.
- Using the jack stand (special tool: 57001-1238) and stabilize the motorcycle.
- Place a stand or block under the engine so that the front wheel is raised off the ground.
- Remove the handlebar.
- Loosen the steering stem head nut and the front fork upper clamp bolts.

A. Stem Head Nut

- Turn the steering stem locknut with the stem nut wrench (special tool) to obtain the proper adjustment.



A. Stem Locknut
B. Stem Nut Wrench: 57001-1100

★If the steering is too tight, loosen the stem locknut a fraction of a turn; if the steering is too loose, tighten the locknut a fraction of a turn. Turn the locknut 1/8 turn at a time maximum.

- Tighten the steering stem head nut to the specified torque.

Tightening Torque

44 N-m (4.5 kg-m, 33 ft-lb)

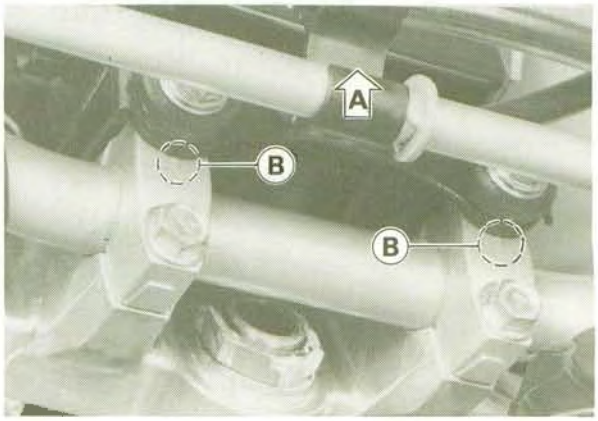
- Tighten the front fork upper clamp bolts to the specified torque.

Tightening Torque

20 N-m (2.0 kg-m, 14.5 ft-lb)

- Install the parts removed.

○Install the handlebar clamp so that the arrow on the clamp points at the front.



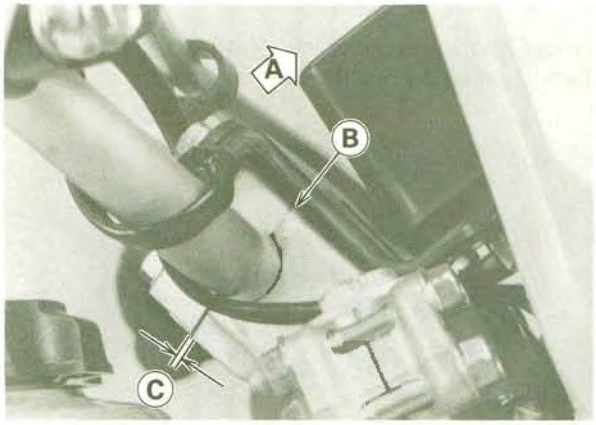
A. Front B. Arrow

oTighten the handlebar clamp bolts to the specified torque.

Tightening Torque:

25 N-m (2.5 kg-m, 18 ft-lb)

oTigthen the clamp bolts, front first and then the rear. If the handlebar clamp is correctly installed, there will be no gap at the front and a gap at the rear after tightening.

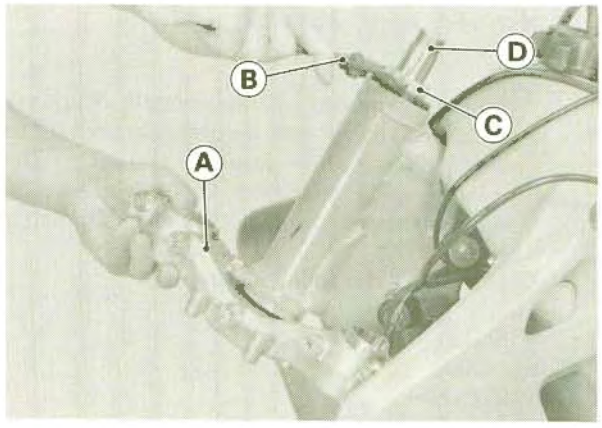


A. Front
B. No Gap
C. Gap

Steering Removal/Installation

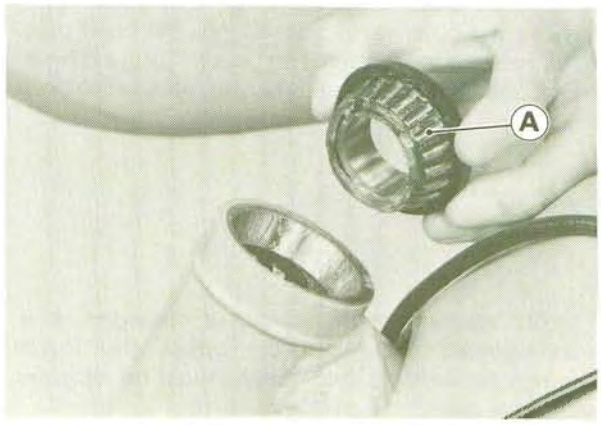
Steering Stem Removal

- Remove the following parts.
  - Front Wheel
  - Brake Hose Clamp
  - Caliper Mounting Bolts
  - Master Cylinder Clamp
  - Front Fender
  - Meter Cable Lower End
  - Headlight and meter unit
  - Handlebar
  - Front Fork
- Remove the steering stem head nut and washer.
- Remove the steering stem head.
- 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.



A. Stem Base
B. Stem Nut Wrench : 57001-1100
C. Steering Stem Locknut
D. Steering Stem

oRemove the upper tapered roller bearing.



A. Tapered Roller Bearing

Steering Stem Installation Notes

•Installation is the reverse of removal.
•Apply grease to the upper tapered roller bearing and put it on the outer race.
•Using the stem nut wrench (special tool), temporarilly tighten the stem locknut to press the tapered roller bearing against the outer race.
•Back out the stem locknut a fraction of a turn until it turns lightly and then tighten the stem locknut to the specified torque again.

Tightening Torque:

3.9 N-m (0.4 kg-m, 35 in-lb)

•Connect the connectors, and route them according to the Cable, Harness, Routing section in the General information chapter.
•Tighten the stem head nut to the specified torque.

Tightening Torque:

44 N-m (4.5 kg-m, 33 ft-lb)

•Install the parts removed (see appropriate chapters).
•Route the cables, hoses, and harnesses according to the Cable, Harness, Hose Routing section in the General Information chapater. The cables, hoses, and wiring harnesses must not hinder handlebar movement.
•Check and adjust the following items.
Steering
Front Brake
Clutch Cable
Throttle Cable

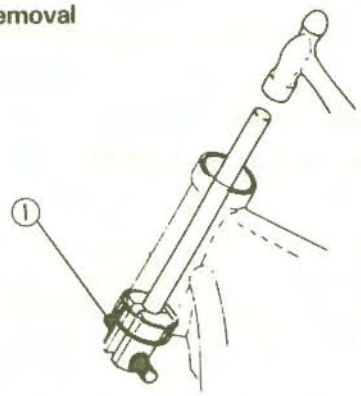
Steering Stem Race Removal

•Remove the steering stem.
•Remove the outer races from the head pipe.
○Remove the outer races pressed into the head pipe, using the stem bearing remover (special tool) as shown below, and hammer the stem bearing remover to drive it out.

NOTE

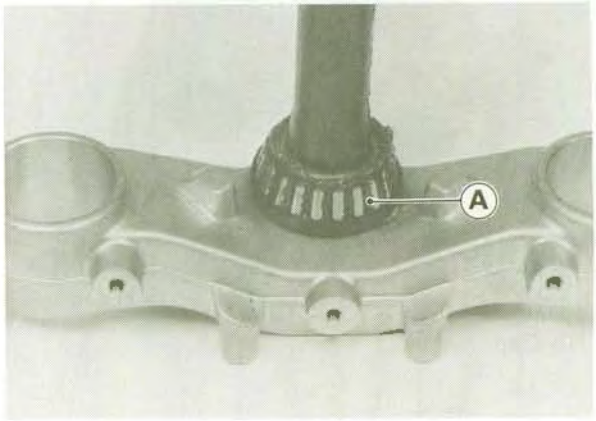
○*If either steering stem bearing is damaged, it is recommended that both the upper and lower bearings (including outer races) should be replaced with new ones.*

Outer Race Removal



1. Stem Bearing Remover: 57001-1107

•Remove the lower inner race (with its grease seal) which is pressed onto the steering stem.

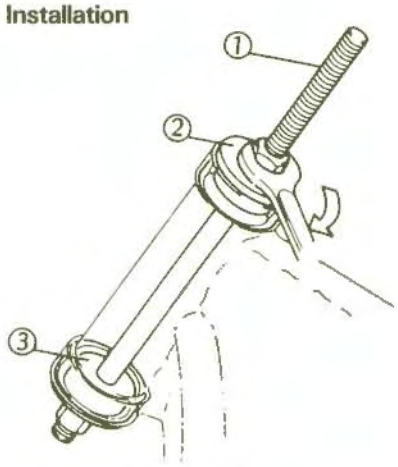


A. Roller Bearing

Steering Stem Race Installation Notes

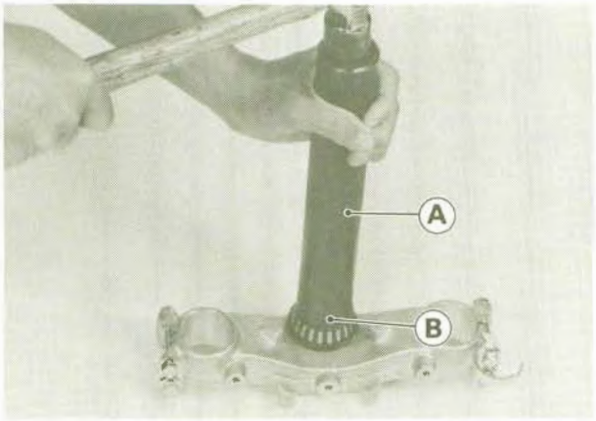
•Installation is the reverse of removal.
•Apply grease to the outer races, and then drive them into the head pipe using the drivers and the driver press shaft (special tools).

Outer Race Installation



1. Driver Press Shaft: 57001-1075
2. Driver: 57001-1106
3. Driver: 57001-1076

•Apply grease to the lower 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: 57001-1074

•Apply grease to the upper tapered roller bearing and put it on the outer race.
•Refer to Steering Stem Installation Notes.

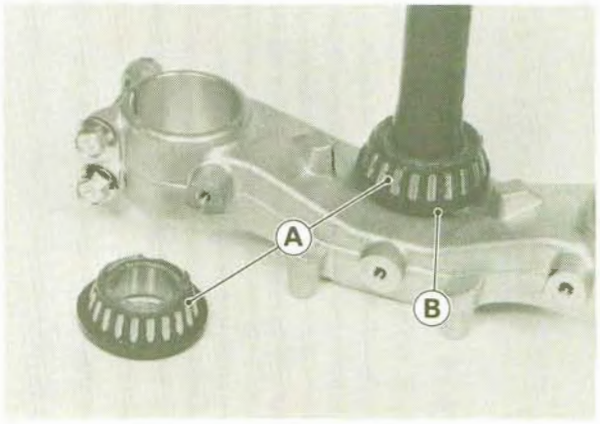
Steering Maintenance

Steering Stem Bearing Lubrication

- Remove the steering stem (see Steering Stem Removal).
- 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 off grease and dirt.
- Visually check the outer races and the rollers.

★Replace the bearing assemblies if they show wear or damages.

- Pack the upper and lower tapered roller bearings in the cages with grease, and apply a light coat of grease to the upper and lower outer racaes.



A. Steering Stem (tapered roller) Bearings
B. Grease Seal

•Install the steering stem, and adjust the steering (see Steering Stem Installation, Steering Adjustment).

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 off grease and dirt.
- Visually check the outer races and the rollers.

★Replace the bearing assemblies if they show damage.

Steering Stem Warp

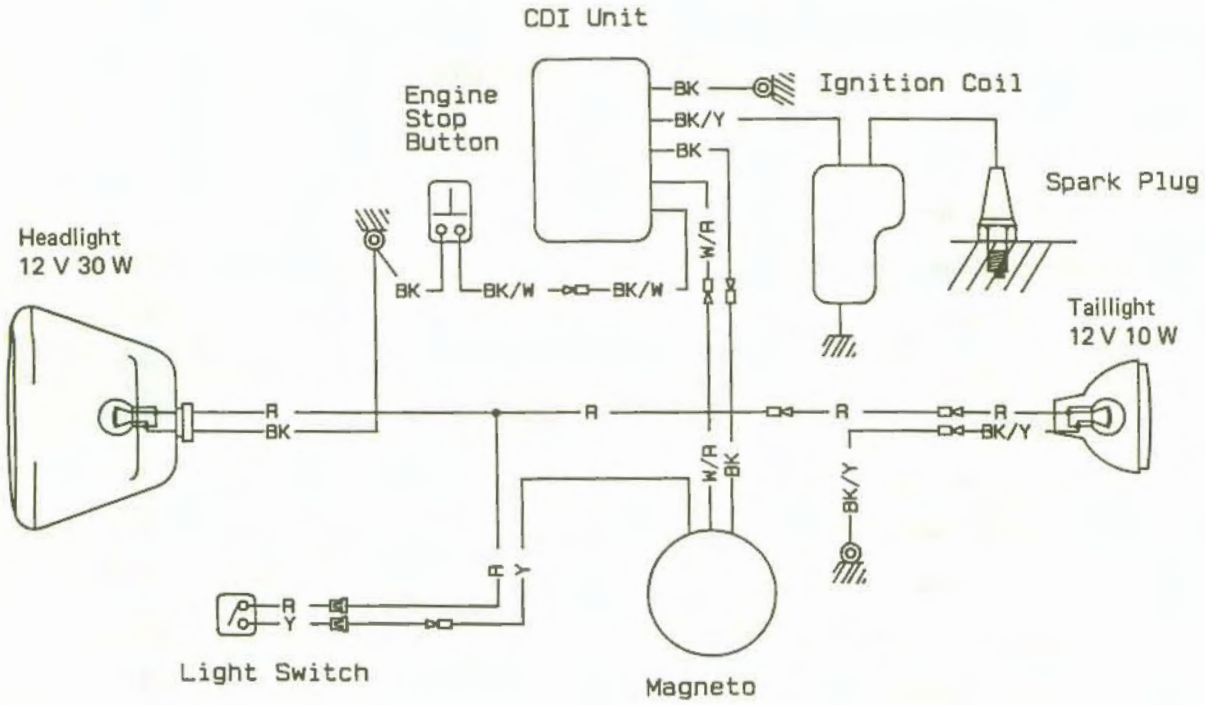
- Whenever the steering stem is removed, or if the steering cannot be adjusted for smooth action, check the steering stem for straightness.

★If the steering stem shaft is bent, replace the steering stem.

Electrical System

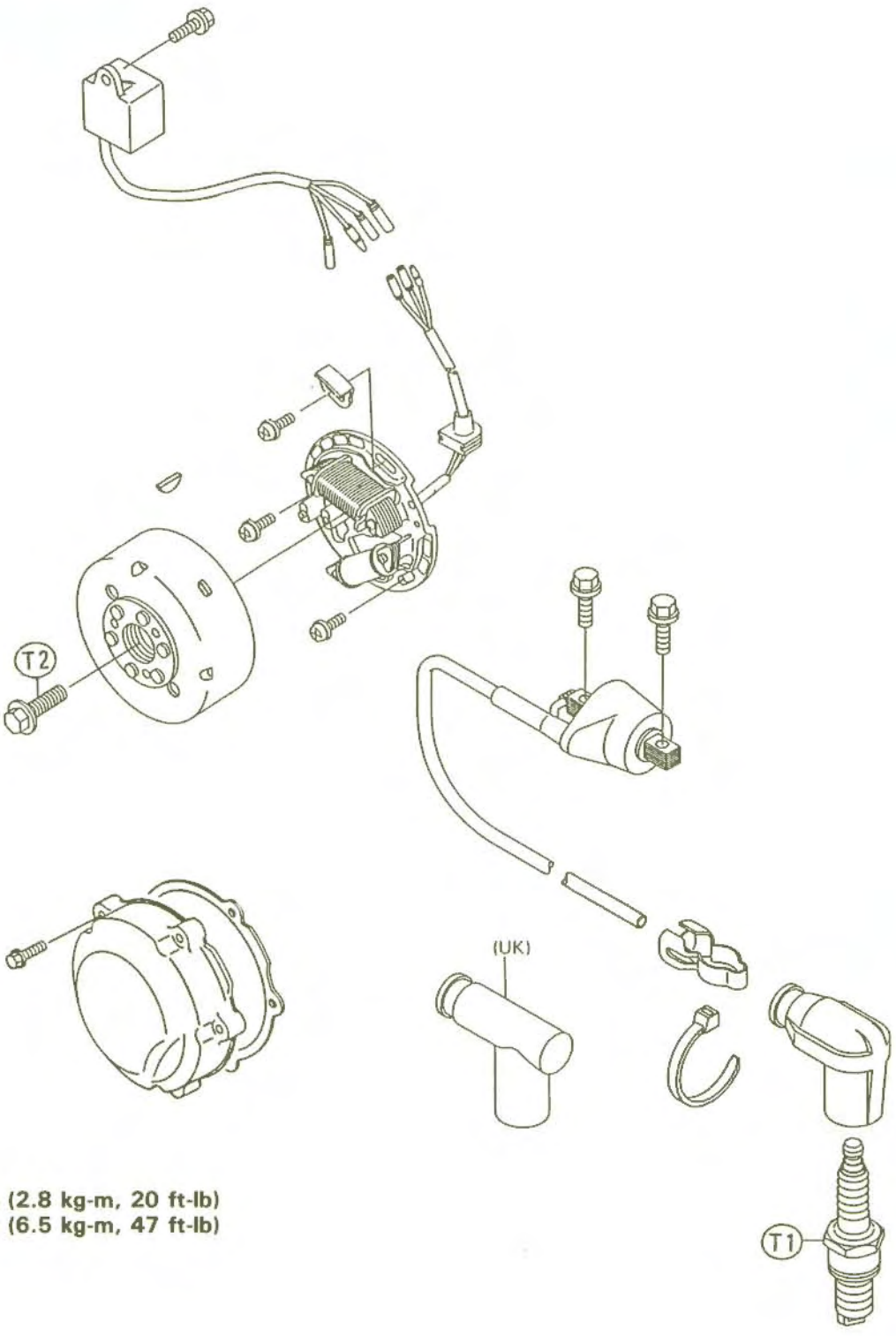
Table of Contents

Wiring Diagram



Exploded View

(UK): U.K. Model



T1 : 27 N-m (2.8 kg-m, 20 ft-lb)
T2 : 64 N-m (6.5 kg-m, 47 ft-lb)

Specifications

Item	Standard
Ignition System:	
Ignition timing:	21° BTDC @6000r/min (rpm)
Ignition coil:	
3 needle arcing distance	7 mm or more
Primary winding resistance	1.0 Ω ± 15%
Secondary winding resistance	5.9 KΩ ± 15%
CDI unit internal resistance	refer to 13 −11
Spark plug:	NGK B9ES Ⓒ Ⓤ NGK BR9ES
Spark plug gap	0.7−0.8 mm

Ⓒ: Canadian model

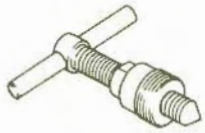
Ⓤ: U. K. model

Special Tools

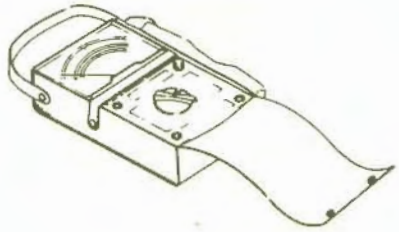
Along with common hand tools, the following more specialized tools are required for complete electrical system servicing.

Flywheel Holder: 57001-306

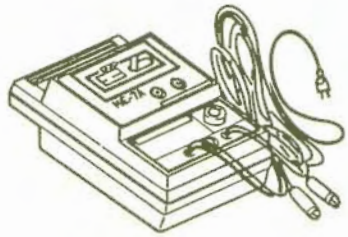
Flywheel Puller: 57001-252



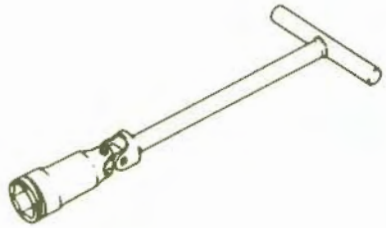
Coil Tester: 57001-1242



Hand Tester: 57001-983



Spark Plug Wrench, Hex 18: 57001-1024



Precautions

There are a number of important precautions that are musts when servicing the electrical system. Learn and observe all the rules below.

oThe 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.

oTroubles 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.

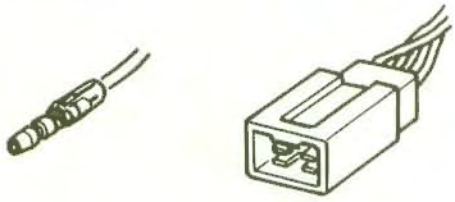
oMake sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.

oMeasure coil and winding resistance when the part is cold (at room temperature).

oElectrical Connectors

Female Connectors

Male Connectors



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.

oUse the wiring diagram to find the ends of the lead which is suspected of being a problem.

oConnect an ohmmeter between the ends of the leads.

oSet the meter to the x 1Ω range, and lead the meter.

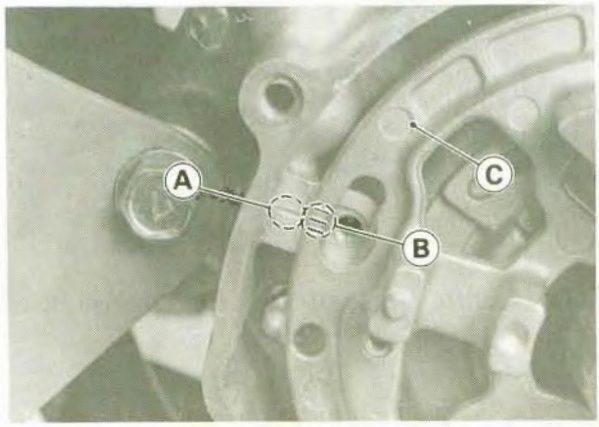
★If the meter does not read zero Ω, the lead is defective. Replace the lead or the wiring harness if necessary.

Ignition Timing

Ignition Timing Adjustment

- Remove the magneto cover.
- Remove the flywheel magneto (See the Flywheel Magneto Removel).
- Loosen the front magneto stator screw.
- Check to see if the center mark of the three marks on the magneto stator is aligned with the mark on the crankcase.

★If the marks are not aligned, loosen the another screws, and turn the magneto stator.



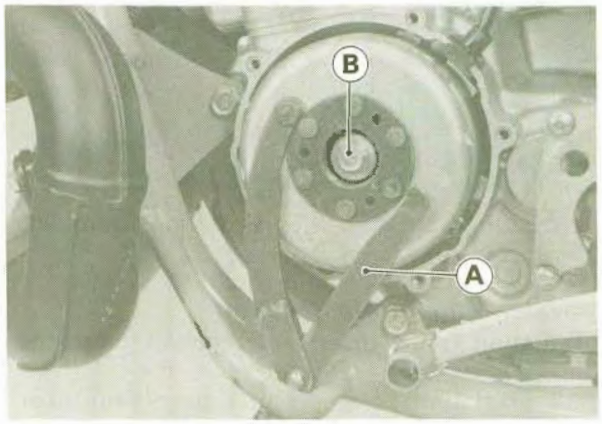
A. Timing Mark (Crankcase)
B. Timing Marks (Stator Plate)
C. Magneto Stator

- Tighten the screws securely.
- Install the flywheel (see Flywheel magneto Installation).
- Install the magneto cover.

Flywheel Magneto

Flywheel Magneto Removal

- Remove the magneto cover.
- Using the magneto flywheel holder (special tool) to hold the flywheel steady, and remove the flywheel bolt.

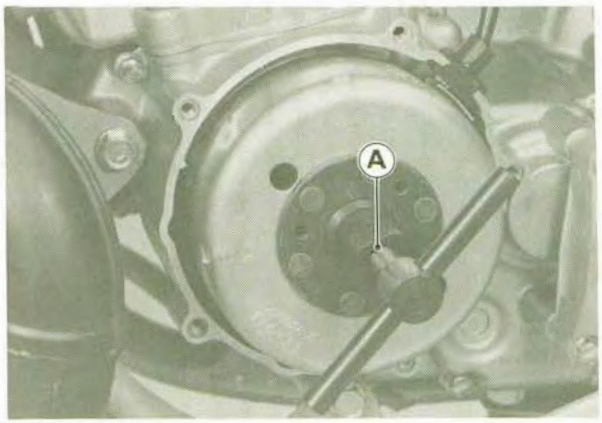


A. Magneto Flywheel Holder: 57001-306
B. Flywheel Bolt

- Screw the flywheel puller (special tool) into the flywheel by turning it counterclockwise (left-hand thread).
- Remove the flywheel from the crankshaft by turning in the puller center bolt and tapping the head of the bolt lightly with a hammer, while holding the puller body steady. There is a woodruff key in the crankshaft tapered portion.

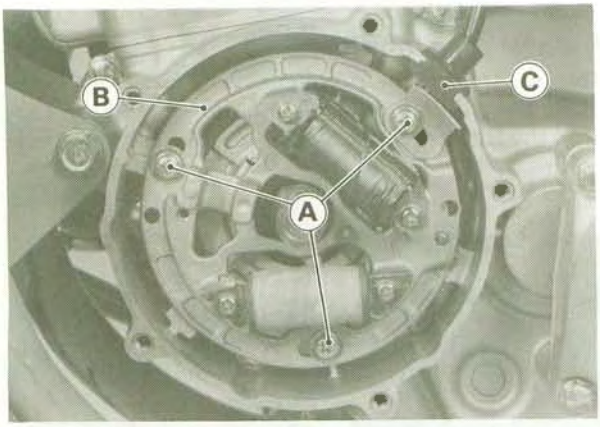
CAUTION

○Never strike the grab bar or the flywheel itself. Striking the bar can bend it. If the flywheel is struck, the magnets may lose their magnetism.



A. Flywheel Puller: 57001-252

•Unscrew the mounting screws, and remove the stator and the wiring grommet.

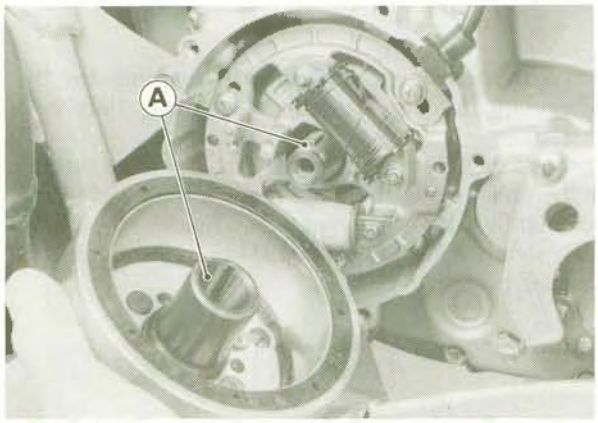


A. Mounting Screws
B. Stator
C. Wiring Grommet

Flywheel Magneto Installation

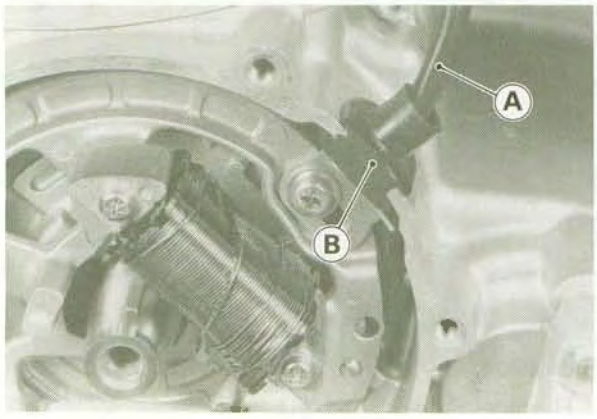
•Installation is the reverse of removal. Note the following:

○Using a high flash-point solvent, clean off any oil or dirt that may be on the crankshaft taper or in the hole in the flywheel. Dry them with a clean cloth.



A. Clean Off

○Set the stator wiring grommet securely in the notch in the left crankshaft half, and route the wires according to the Cable, Harness, Hose Routing section in the General Information chapter.



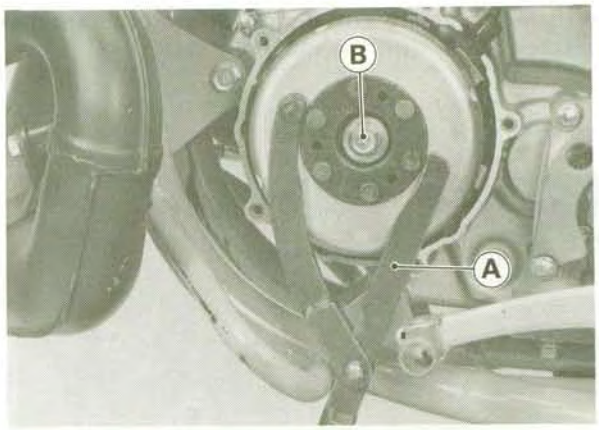
A. Stator Lead
B. Grommet

○Fit the woodruff key securely in the slot in the crankshaft before installing the flywheel.

○Hold the flywheel steady with the flywheel holder (special tool), and tighten the flywheel bolt to the specified torque.

Tightening Torque:

64 N-m (6.5 kg-m, 47 ft-lb)



A. Flywheel Holder: 57001-306
B. Flywheel Bolt

○Replace the gasket if it is hardened or damaged.

Flywheel Magneto Inspection

There are three types of magneto problems: short, open (wire burned out), or loss in flywheel magnetism. A short or open in one of the coil wires will result either a low output, or no output at all. A loss in flywheel magnetism, which may be caused by dropping or hitting the flywheel, or just by aging, will result in low output. Inspect the coils and the flywheel (see Ignition System).

Ignition System

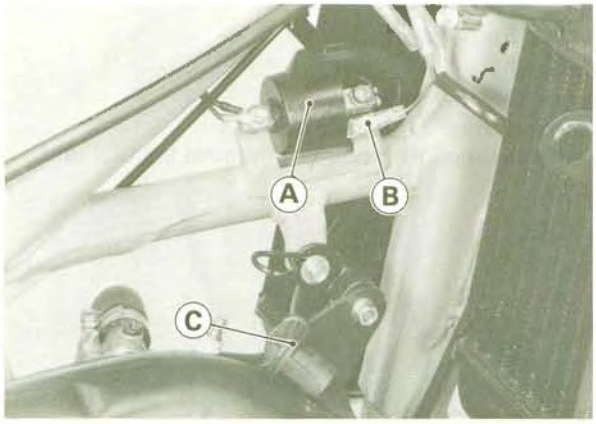
Safety Instructions:

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 Coil Removal

•Remove the following parts.
Seat
Radiator Cover
Fuel Tank
•Disconnect the ignition coil primary leads.
•Pull the plug cap off the spark plug.
•Unscrew the mounting bolt, and remove the ignition coil.



A. Ignition Coil
B. Primary Lead
C. Plug Cap

Ignition Coil Installation

•Installation is the reverse of removal.

Ignition Coil Inspection

Measuring arcing distance:

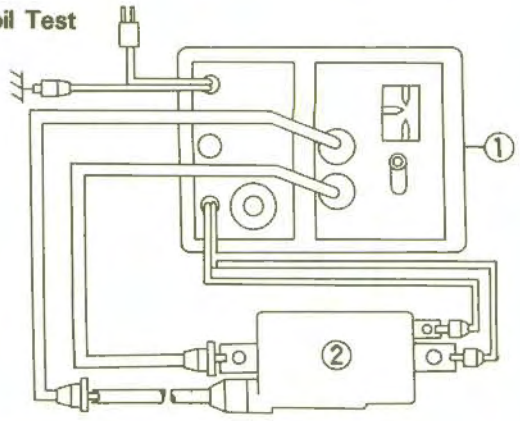
The most accurate test for determining the condition of the ignition coil is made by measuring arcing distance with coil tester (special tool) tester using the 3-needle method.

NOTE

○*Since a tester other than the coil tester (special tool: 57001-1242) may produce a different arcing distance, the coil tester (special tool: 51001-1242) is recommended for reliable results.*

•Remove the ignition coil.
•Connect the ignition coil (with the spark plug cap left installed on the spark plug lead) to the tester, and measure the arcing distance.

Ignition Coil Test



1. Coil Tester: 57001-1242
2. Ignition Coil

WARNING

○To avoid extremely high voltage shocks, do not touch the coil or lead.

★If the distance reading is less than the specified value, the ignition coil or spark plug cap is defective.

Ignition Coil Arcing Distance

7 mm or more

•To determine which part is defective, measure the arcing distance again with the spark plug cap removed from the ignition coil lead.
★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.

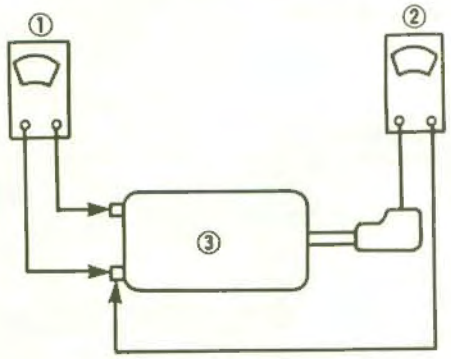
Measuring coil resistance:

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.
•Remove the ignition coil.
•Measure the primary winding resistance.
○Connect an ohmmeter between the coil terminals.
○Set the meter to the x 1Ω range, and read the meter.
•Measure the secondary winding resistance.
○Pull the spark plug cap off the lead.
○Connect an ohmmeter between the spark plug lead and the ground lead terminal.
○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:	**1.0 Ω ± 15%**
Secondary windings:	**5.9 kΩ ± 15%**

Ignition Coil Winding Resistance



1. Measure primary winding resistance.
2. Measure secondary winding resistance.
3. Ignition Coil

★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 lead for visible damage.

★If the spark plug lead is damaged, replace the coil.

Spark Plug Cleaning and Inspection
- Remove the spark plug, and visually inspect it.
- 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.

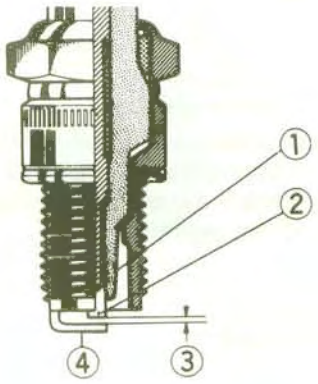
Spark Plug Gap Inspection
- Measure the gap with a wire-type thickness gauge.

★If the gap is incorrect, carefully bend the side electrode with a suitable tool to obtain the correct gap.

Spark Plug Gap

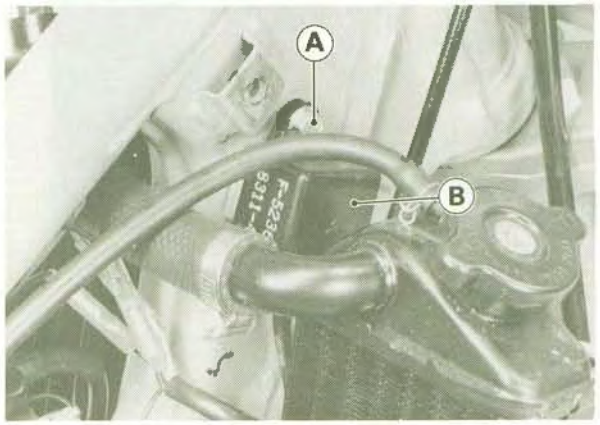
0.7 — 0.8 mm

Spark Plug Gap



1. Insulator
2. Center Electrode
3. Plug Gap
4. Side Electrode

CDI Unit Inspection
- Remove the seat.
- Remove the fuel tank.
- Disconnect the CDI unit lead.
- Unscrew the mounting bolt, and remove the CDI unit.



A. Mounting Bolt B. CDI Unit

CAUTION

○Use only Kawasaki Hand Tester 57001-983 for this test. A tester other than the Kawasaki Hand Tester may show different readings.

○Do not use a megger or a meter with a large-capacity battery, or the CDI unit will be damaged.

- Set the Kawasaki Hand Tester to the x 1 kΩ range, connect the Tester to the terminals in the CDI unit lead, and check the internal resistance following the table.

★If the readings do not correspond to the table, replace the CDI unit.

CDI Unit Test Using the Kawasaki Hand Tester

Tester Negative (−) Lead Connection	Lead Color	Tester Positive (+) Lead Connection: Black/White (Stop)	Black (Ground)	White/Red (Charge)	Black (Ing. Coil)	Black/Yellow (Ground)
	Black/White (Stop)		∞	0	∞	∞
	Black (Ground)	3.0 — 3.9 kΩ		2.9 — 3.9 kΩ	∞	0
	White/Red (Charge)	0	∞		∞	∞
	Black (Ign. Coil)	9.2 — 14.5 KΩ	2.8 — 3.7 KΩ	9.0 — 14.5 kΩ		2.8 — 3.7 kΩ
	Black/Yellow (Ground)	2.9 — 3.9 kΩ	0	2.9 — 3.9 kΩ	∞	

Stator Coil Inspection

- Remove the seat and fuel tank.
- Disconnect the magneto lead.
- Zero the ohmmeter, and connect it as shown in the table.

Stator Coil Resistance

Connections	Reading
White/Red—Black	304—456Ω
Yellow—Black	1.76—2.64 Ω

- Note the resistance reading.

★If there is more resistance than shown in the table, the stator has a broken wire, the leads between the stator and the connector are open, or the connections are bad. Check the stator and the leads, and fix or replace the damaged parts.

★If there is much less resistance than shown in the table, the stator is shorted, or the leads between the stator and the connector is grounded. Check the stator and the leads, and fix or replace the damaged parts.

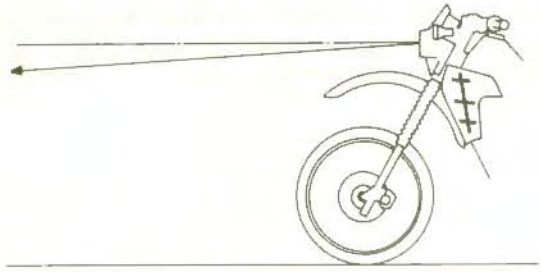
Lighting System

Headlight Beam Vertical Adjustment

Adjust the headlight so that it points slightly below horizontal. Turnung the adjusting screw clockwise makes the headlight beam point upward.

A. Adjusting Screw

Vertical Adjustment

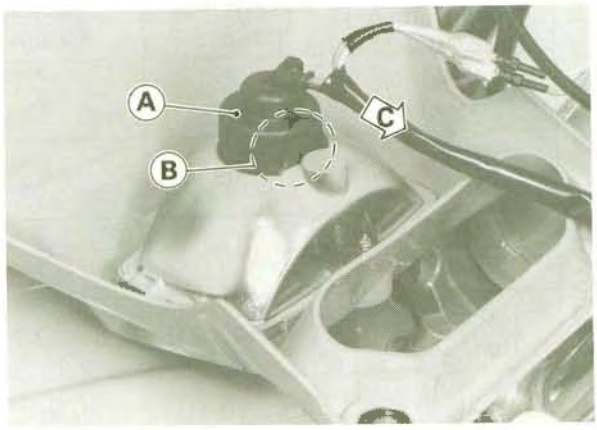


Headlight Bulb Replacement Notes

CAUTION

oWhen 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.

•Install the dust cover so that the stepped portion down and the cover fits onto the bulb.

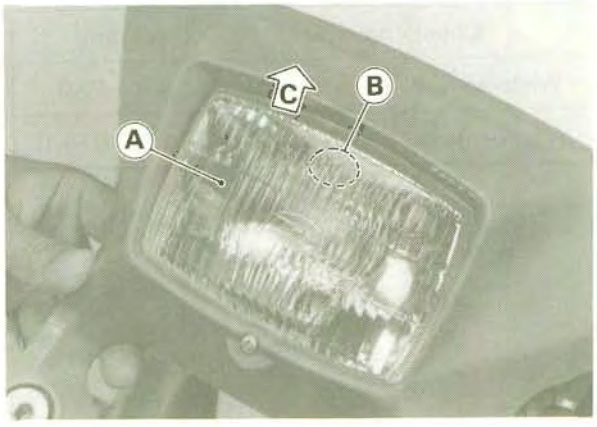


A. Dust Cover
B. Stepped Portion
C. Down

•Check the headlight aim after installation.

Headlight Unit Removal/Installation Note

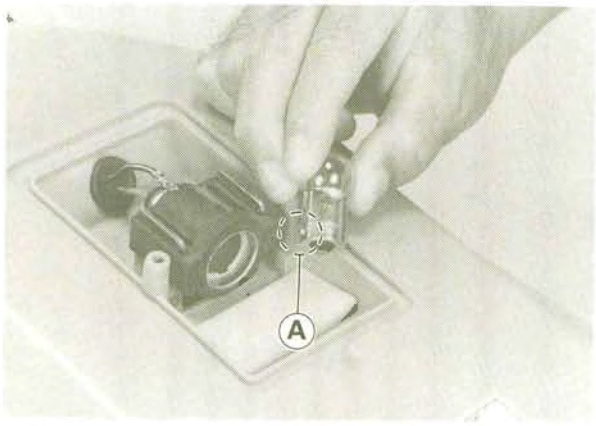
•Install the headlight unit so that the "TOP" mark on the lens points up.



A. Headlight
B. Top Mark
C.Up

Taillight Bulb Replacement Note

•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

Taillight Lens

Removal/Installation Note

- Be careful not to overtighten the lens mounting screws.

A. Screws

APPENDIX

Table of Contents

Troubleshooting Guide

NOTE

This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.

Engine Doesn't Start; Starting Difficulty:

Engine won't turn over:
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Kick shaft return spring broken
- Kick ratchet gear not engaging

No fuel flow:
- No fuel in tank
- Fuel tap turned off
- 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:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap not in good contact
- Spark plug incorrect
- CDI unit trouble
- Ignition coil trouble
- Ignition coil resistor open
- Flywheel magneto damaged
- Wiring shorted or open

Fuel/air mixture incorrect:
- Idle adjusting screw maladjusted
- Slow jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter jet clogged

Compression Low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Cylinder base gasket damaged
- Reed valve damaged
- Cylinder nut loose

Poor Running at Low Speed:

Spark weak:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- CDI unit trouble
- Ignition coil trouble
- Flywheel magneto damaged
- Ignition coil lead or CDI unit lead not in good contact

Fuel/air mixture incorrect:
- Idle adjusting screw maladjusted
- Slow jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter plunger stuck open
- Float level too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner duct loose

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Cylinder base gasket damaged
- Reed valve damaged
- Cylinder nut loose

KIPS ports stuck open:
- KIPS exhaust valve stuck open (valve seizure, or carbon accumulation)
- KIPS exhaust valves assembled incorrectly
- Exhaust advancer spring damaged
- Exhaust valve operating rod seizure
- Rod (for KIPS) seized in crankcase

Other:
- CDI unit trouble
- Transmission oil viscosity too high
- Brake dragging

Poor Running or 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
- Spark plug incorrect
- CDI unit trouble
- Ignition coil trouble
- Flywheel magneto damaged
- Ignition coil lead or CDI unit lead not in good contact

Fuel/air mixture incorrect:
- Main jet clogged or wrong size
- Jet needle 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 to carburetor insufficient
- Water or foreign matter in fuel
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner duct loose
- Fuel tap clogged
- Fuel line clogged

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Cylinder base gasket damaged
- Reed valve damaged
- Cylinder nut loose

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

KIPS ports stuck closed:
- KIPS ports stuck closed
- KIPS exhaust valves stuck closed (valve seizure, or carbon accumulation)
- KIPS exhaust valves assembled incorrectly
- KIPS ports clogged (carbon accumulation)
- Exhaust valve operating rod seizure
- Rod (for KIPS) seized in crankcase

Knocking:
- Carbon built up in combustion chamber
- Fuel poor quality or incorrect
- Spark plug incorrect
- CDI unit trouble

Overheating:

Firing incorrect:
- Spark plug dirty, broken, or maladjusted
- Spark plug incorrect
- CDI unit trouble

Fuel/air mixture incorrect:
- Main jet clogged or wrong size
- Fuel level in carburetor float bowl too low
- Carburetor holder loose
- Air cleaner poorly sealed, or missing
- Air cleaner duct poorly sealed
- Air cleaner clogged

Compression high:
- Carburetor built up in combustion chamber

Engine load faulty:
- Brake dragging
- Clutch slipping
- Transmission oil level too high
- Transmission oil viscosity too high

Lubrication inadequate;
- Transmission oil level too low
- Transmission oil poor quality or incorrect

Coolant incorrect:
- Coolant level too low
- Coolant deteriorated

Cooling system component incorrect:
- Radiator clogged
- Radiator cap trouble
- Water pump not rotating

Clutch Operation Faulty:

Clutch slipping:
- No clutch lever play
- Clutch cable maladjusted
- Clutch inner cable catching
- Friction plate worn or warped
- Steel plate worn or warped
- Clutch spring broken or weak
- Clutch release mechanism trouble
- Clutch hub or housing unevenly worn

Clutch not disengaging properly:
- Clutch lever play excessive
- Clutch plate warped or too rough
- Clutch spring tension uneven
- Transmission oil deteriorated
- Transmission oil viscosity too high
- Transmission oil level too high
- Clutch housing frozen on drive shaft
- Clutch release mechanism trouble

Gear Shifting Faulty:

Doesn't go into gear; shift pedal does't return:
- Clutch not disengaging
- Shift fork bent or seized
- Gear stuck on the shaft
- Gear positioning lever binding
- Shift return spring weak or broken
- Shift return spring pin loose
- Shift mechanism arm spring broken
- Shift mechanism arm broken
- Shift drum broken

Jumps out of gear:
Shift fork worn
Gear groove worn
Gear dogs and/or dog holes worn
Shift drum groove worn
Gear positioning lever spring weak or broken
Shift fork pin worn
Drive shaft, output shaft, and/or gear splines worn

Overshifts:
Gear positioning lever spring weak or broken
Shift mechanism arm spring broken

Abnormal Engine Noise:

Knocking:
CDI unit trouble
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Spark plug incorrect
Overheating

Piston slap:
Cylinder/piston clearance excessive
Cylinder, piston worn
Connecting rod bent
Piston pin, piston holes worn

Other noise:
Connecting rod small end clearance excessive
Connecting rod big end clearance excessive
Piston ring worn, broken or stuck
Piston seizure, damage
Cylinder head gasket leaking
Exhaust pipe leaking at cylinder head connection
Crankshaft runout excessive
Engine mounts loose
Crankshaft bearing worn
Primary gear worn or chipped

Abnormal Drive Train Noise:

Clutch noise:
Clutch housing/friction plate clearance exccessive
Clutch housing gear/primary gear backlash excessive
Metal chip jammed in clutch housing gear teeth

Transmission noise:
Crankcase bearing worn or damaged
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
Output shaft idle gear worn or chipped

Drive chain noise:
Drive chain adjusted improperly
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 trouble
Cylinder damaged

Other noise
Bracket, nut, bolt, etc. not properly mounted or tightened

Exhaust Smoke:

Excessive white smoke:
Throttle cable maladjusted

Brownish smoke:
Air cleaner clogged
Main jet too large or fallen out
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 ball damaged
Bearing race dented or worn
Steering stem lubrication inadequate
Steering stem bent
Tire air pressure too low

Handlebar shakes or excessivery vibrates:
Tire worn
Swing arm bushing or needle bearing damaged
Rim warped, or not balanced
Front, rear axle runout excessive
Wheel bearing worn
Handlebar clamp loose
Steering stem head nut loose

Handlebar pulls to one side:
Frame bent
Wheel misalignment
Swing arm bent or twisted
Swing arm pivot shaft runout excessive
Steering maladjusted
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 leg bent
Tire air pressure too high
Rear shock absorber maladjusted
(Too soft)
Front fork oil insufficient and/or leaking
Front fork oil viscosity too low
Front fork, rear shock absorber spring weak
Rear shock absorber gas leaking
Rear shock absorber maladjusted

Brakes Don't Hold:

Air in the brake line
Pad or disc worn
Brake fluid leak
Disc warped
Contaminated pads
Brake fluid deteriorated
Primary or secondary cup damaged
Master cylinder scratched inside
Brake maladjustment (lever or pedal play excessive)

General 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

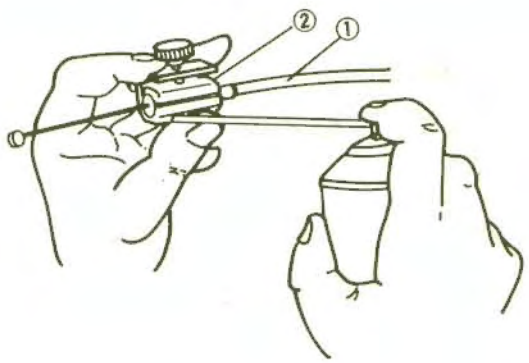
o *Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure spray water, perform the general lubrication.*

Pivots: Lubricate with Motor Oil.
Clutch Lever
Front Brake Lever
Kick Pedal
Shift Pedal
Rear Brake Pedal
Drive Chain

Points: Lubricate with Grease.
Clutch Inner Cable Upper and Lower Ends
Throttle Inner Cable Upper End
Meter Inner Cable Lower End
Swing Arm Pivot
Tie-Rod Pivot
Rocker Arm Pivot
Wheel Bearing
Steering Stem Bearing

Cables: Lubricate with Motor Oil.
Clutch Cable
Throttle Cable

Cable Lubrication



1. Cable
2. Pressure Cable Luber: K56019-021

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol	Power
mega	M	x 1,000,000
kilo	k	x 1,000
centti	c	x 0.01
mili	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

Unit of Temperature:

$$\frac{9\,(°C + 40)}{5} - 40 = °F$$

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

$$\frac{5\,(°F + 40)}{9} - 40 = °C$$

Unit Conversion Table

cc	x	.0610	=	cu in
cc	x	.02816	=	oz (imp)
cc	x	.03381	=	oz (US)
cu in	x	16.39	=	cc
ft-lbs	x	12	=	in lbs
ft-lbs	x	.1383	=	kg-m
gal (imp)	x	4.546	=	litres
gal (imp)	x	1.201	=	gal (US)
gal (US)	x	3.7853	=	liters
gal (US)	x	.8326	=	gal (Imp)
grams	x	.03527	=	oz
in	x	25.40	=	mm
in lbs	x	.0833	=	ft-lbs
in lbs	x	.0115	=	kg-m
kg	x	2.2046	=	lbs
kg	x	35.274	=	oz
kg-m	x	7.233	=	ft-lbs
kg-m	x	86.796	=	in-lbs
kg/cm^2	x	14.22	=	lbs/in^2
km	x	.6214	=	mile
lb	x	.4536	=	kg
lb/in^2	x	.0703	=	kg/cm^2
litre	x	28.16	=	oz (imp)
litre	x	33.81	=	oz (US)
litre	x	.8799	=	qt (imp)
litre	x	1.0567	=	qt (US)
metre	x	3.281	=	ft
mile	x	1.6093	=	km
mm	x	.03937	=	in
oz (imp)	x	35.51	=	cc
oz (US)	x	29.57	=	cc
oz (weight)	x	28.35	=	grams
qt (imp)	x	1.1365	=	litre
qt (imp)	x	1.201	=	qt (US)
qt (US)	x	.9463	=	litre
qt (US)	x	.8326	=	qt (imp)
kg/cm^2	x	98.07	=	kPa
lbs/in^2	x	6.896	=	kPa
kPa	x	.1450	=	lbs/in^2

$°C \rightarrow °F: \frac{9\,(°C + 40)}{5} - 40 = °F$

$°F \rightarrow °C: \frac{5\,(°F + 40)}{9} - 40 = °C$

List of Abbreviations

ABDC	after bottom dead center
ATDC	after top dead center
BBDC	before bottom dead center
BDC	bottom dead center
BTDC	before top dead center
cc	cubic centimeters
cu in	cubic inches
ft	foot, feet
ft-lbs	foot-pounds
gal	gallon, gallons
hp	horsepower
in	inch, inches
in-lb	inch-pounds
kg	kilogram, kilograms
kg/cm^2	kilograms per square centimeter
kg-m	kilogram meters
km	kilometer
kph	kilometers per hour
lb, lbs	pound, pounds
lbs/in^2	pounds per square inch
ltr	liter, litre
m	meter, meters
mi	mile, miles
mm	milimeters
mph	miles per hour
oz	ounce, ounces
psi	pounds per square inch
qt	quart, quarts
rpm	revolutions per minute
sec	second, seconds
SS	standing start
TDC	top dead center
"	inch, inches
r/min	revolutions per minute
ℓ	liter, litre
kPa	kilo-Pascals

Decimal Equivalents

INCH					MM INCH
1/64				.015625	1 mm= .03937 inch
	1/32			.3125	
3/64				.046875	
		1/16		.0625	2 mm= .07874 inch
5/64				.078125	
	3/32			.09375	
7/64				.109375	3 mm= .11811 inch
			1/8	.125	
9/64				.140625	4 mm= .15748 inch
	5/32			.15625	
11/64				.171875	
		3/16		.1875	5 mm= .19685 inch
13/64				.203125	
	7/32			.21875	6 mm= .23622 inch
15/64				.234375	
			1/4	.25	7 mm= .27559 inch
17/64				.265625	
	9/32			.28125	
19/64				.296875	8 mm= .31496 inch
		5/16		.3125	
21/64				.328125	9 mm= .35433 inch
	11/32			.34375	
23/64				.359375	
			3/8	.375	10 mm= .39370 inch
25/64				.390625	
	13/32			.40625	11 mm= .43307 inch
27/64				.421875	
		7/16		.4375	12 mm= .47244 inch
29/64				.453125	
	15/32			.46875	
31/64				.484375	13 mm= .51181 inch
			1/2	.5	

INCH					MM INCH
33/64				.515625	14 mm= .55118 inch
	17/32			.53125	
35/64				.546875	
		9/16		.5625	15 mm= .59055 inch
37/64				.578125	
	19/32			.59375	
39/64				.609375	16 mm= .62992 inch
			5/8	.625	
41/64				.640625	
	21/32			.65625	17 mm= .66929 inch
43/64				.671875	
		11/16		.6875	
45/64				.703125	18 mm= .70866 inch
	23/32			.71875	
47/64				.734375	
			3/4	.75	19 mm= .74803 inch
49/64				.765625	
	25/32			.78125	20 mm= .78740 inch
51/64				.796875	
		13/16		.8125	
53/64				.828125	21 mm= .82677 inch
	27/32			.84375	
55/64				.859375	
			7/8	.875	22 mm= .86614 inch
57/64				.890625	
	29/32			.90625	23 mm= .90551 inch
59/64				.921875	
		15/16		.9375	24 mm= .94488 inch
61/64				.953125	
	31/32			.96875	
63/64				.984375	25 mm= .98425 inch
			1	1.	