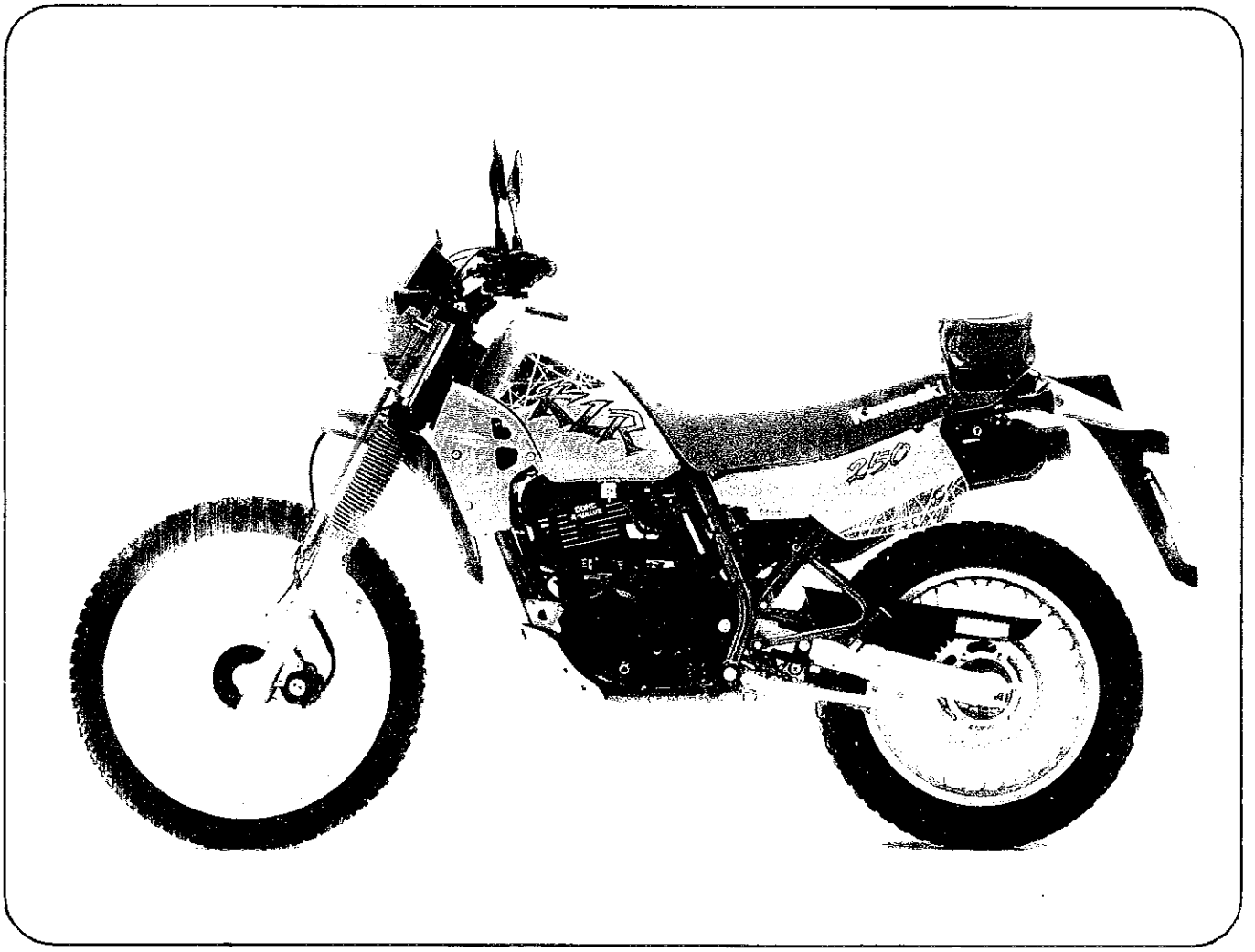
Kawasaki KLR 250



Motorcycle Service Manual Supplement

Quick Reference Guide

Kawasaki

KLR 250

Motorcycle Service Manual Supplement

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LIST OF ABBREVIATIONS

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

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

Brake Shoes or Pads
Clutch Friction Material
Gaskets
Insulators

SAFETY INSTRUCTIONS

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

Read OWNER'S MANUAL before operating.

EMISSIONT CONTROL INFORMATION

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

1. Crankcase Emission Control System

   This system eliminates the release of crankcase vapors into the atmosphere. Instead, the vapors are routed through an oil separator to the intake side of the engine. While the engine is operating, the vapors are drawn into combustion chamber, where they are burned along with the fuel and air supplied by the carburetion system.

2. Exhaust Emission Control System

   This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this motorcycle. The fuel and ignition systems of this motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.

3. Evaporative Emission Control System

   Vapors caused by fuel evaporation in the fuel system are not vented into the atmosphere. Instead, fuel vapors are routed into the running engine to be burned, or stored in a canister when the engine is stopped. Liquid fuel is caught by a vapor separator and returned to the fuel tank.

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

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

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

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

(Continued on next page.)

NOTE

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

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

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

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

Among those acts presumed to constitute tampering are the acts listed below:

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

Foreword

This KLR250 Service Manual Supplement is designed to be used in conjunction with the KLR600 Motorcycle Service Manual (P/N 99924-1050-01). The maintenance and repair procedures described in this supplement are only those that are unique to the KLR250 motorcycle. Most service operations for these models remain identical to those described in the base Service Manual. Complete and proper servicing of the KLR250 motorcycle therefore requires both this supplement and the base Service Manual.

The base Service Manual and this Supplement are designed primarily for use by motorcycle mechanics in a properly equipped shop. However, they contain enough detail and basic information to make them useful to the operator who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and work shop procedures must be understood in order to carry out maintenance and repair satisfactorily. Whenever the operator has insufficient experience or doubts his ability to do the work, the adjustments, maintenance, and repair should be carried out only by qualified mechanics.

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

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 systems 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 served, could result in damage to or destruction of equipment.**

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

NOTE

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

●Indicates a procedural step or work to be done.
○Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a WARNING, CAUTION, or NOTE.

★Indicates a conditional step or what action to take based on the results of the test or inspection in the procedural step or sub-step it follows.

☆Indicates a conditional sub-step or what action to take based upon the results of the conditional step it follows.

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

General Information

1

Table of Contents

Before Servicing

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

Especially note the following:

(1) Dirt

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

(2) Battery Ground

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

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

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

(c) damage to electrical parts.

(3) Tightening Sequence

Generally, when installing a part with several bolts, nuts, or screws, 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.

(4) Torque

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

(5) Force

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

(6) Edges

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

(7) High Flash-point Solvent

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

(8) Gasket, O-ring

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

(9) Liquid Gasket, Non-permanent Locking Agent

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

(10) Press

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

(11) Ball Bearing

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

(12) Oil Seal and Grease Seal

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

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

(13) Seal Guide

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

(14) Circlip, Retaining Ring

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

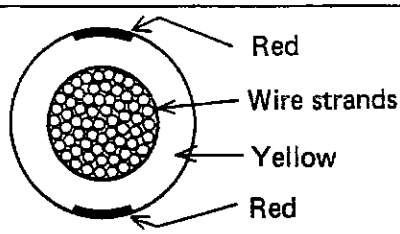
(15) Lubrication

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

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

(16) Electrical Wires

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

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

(17) Replacement Parts

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

(18) Inspection

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

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

(19) Service Data

Numbers of service data in this text have following meanings:

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

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

Model Identification

KL250-D2 Left Side View: U.S. Model

KL250-D2 Right Side View: European Model

General Specifications

Items	KL250-D2, D3	KL250-D4, D5	KL250-D6	KL250-D7~
Dimensions:				
Overall length	2,200 mm, Ⓒ Ⓢ Ⓤ 2,140 mm	←	←	←
Overall width	855 mm	←	←	←
Overall height	1,210 mm	←	←	←
Wheelbase	1,415 mm	←	←	←
Road clearance	270 mm	←	←	←
Seat height	855 mm	←	←	←
Dry weight	1,160 N (118 kg), Ⓒ Ⓢ Ⓤ 1,150 N (117 kg), Ⓒⓐ 1,160 N (117.5 kg)	←	←	←
Curb weight: Front	600 N (61 kg), Ⓒⓐ 600 N (61.5 kg)	←	←	←
Rear	720 N (73 kg), Ⓒ Ⓢ Ⓤ 700 N (72 kg)	←	←	←
Fuel tank capacity	11.0 L	←	←	←
Performance:				
Climbing ability	32°	←	←	←
Braking distance	12.5 m from 50 km/h	←	←	←
Minimum turning radius	2.2 m	←	←	←
Engine:				
Type	4-stroke, DOHC, 4-valve, 1-cylinder	←	←	←
Cooling system	Liquid-cooled	←	←	←
Bore and stroke	74.0 x 58.0 mm	←	←	←
Displacement	249 mL	←	←	←
Compression ratio	11.0	←	←	←
Maximum horsepower	20.6 kW (28 PS) @9000 r/min (rpm),	← —	←	16.9 kW (23 PS) @9000 r/min (rpm),
	Ⓢ 12.5 kW (17 PS) @7,000 r/min (rpm)	Ⓤ Ⓒⓐ ——	Ⓤ Ⓒⓐ ——	Ⓦⓖ 12.5 kW (17 PS) @7800 r/min (rpm) DIN
	Ⓦⓖ 12,5 kW (17 PS) @9,000 r/min (rpm), DIN			Ⓤ Ⓒⓐ ——
Maximum torque	23 N-m (2.3 kg-m, 16.5 ft-lb) @8,000 r/min (rpm),	←	←	19.5 N-m (1.95 kg-m, 14ft-lb) @7500 r/min (rpm), Ⓦⓖ 17.5 N-m (1.75 kg-m, 12.5 ft-lb) @3500 r/min (rpm) DIN
	Ⓤ Ⓒⓐ ——		Ⓐ 20 N-m (2.0 kg-m, 14.5 ft-lb) @8,000 r/min (rpm)	
	Ⓢ 19 N-m (1.9 kg-m, 13.5 ft-lb) @4,000 r/min (rpm)			
	Ⓦⓖ 19 N-m (1.9 kg-m, 13.5 ft-lb) 4,000 r/min (rpm) (DIN)			
Carburetion system	Carburetor, Keihin CVK34	←	←	←
Starting system	Primary kick	←	←	←
Ignition system	CDI	←	←	←
Timing advance	Electrically advanced	←	←	←
Ignition timing	From 10° BTDC @1,300 r/min (rpm) to 35° BTDC @3,000 r/min (rpm)	←	←	←
Spark plug	NGK DPR9EA-9 or ND X27EPR-U9			
	Ⓐ Ⓤ Ⓒⓐ NGK DP9EA-9 or ND X27EP-U9	←	←	← D14 ~ : ※

(Continued on next page)

Items	KL250-D2, D3	KL250-D4, D5	KL250-D6	KL250-D7~
Valve timing:				
Inlet Open	41° BTDC	←	←, Ⓐ 31° BTDC	←, Ⓐ Ⓔ Gr WG 31° BTDC
Close	51° ABDC	←	←, Ⓐ 53° ABDC	←, Ⓐ Ⓔ Gr WG 53° ABDC
Duration	272°	←	←, Ⓐ 264°	←, Ⓐ Ⓔ Gr WG 264°
Exhaust Open	70° BBDC	←	←, Ⓐ 57° BBDC	←, Ⓐ Ⓔ Gr WG 57° BBDC
Close	30° ATDC	←	←, Ⓐ 27° ATDC	←, Ⓐ Ⓔ Gr WG 27° ATDC
Duration	280°	←	←, Ⓐ 264°	←, Ⓐ Ⓔ Gr WG 264°
Lubrication system	Forced lubrication (wet sump)	←	←	←
Engine oil: Grade	SE or SF class	←	←	←
Viscosity	SAE 10W40, 10W50, 20W40, 20W50	←	←	←
Capacity	1.5 L, 2.0 L (Engine No. KL250DE013168 ~)	←	←	←
Drive Train:				
Primary reduction system:				
Type	Gear	←	←	←
Reduction ratio	2.913 (67/23)	←	←	←
Clutch type	Wet multi disc	←	←	←
Transmission: Type	6-speed, constant mesh, return shift	←	←	←
Gear ratios: 1st	3.000 (30/10)	←	←	←
2nd	2.000 (30/15)	←	←	←
3rd	1.500 (27/18)	←	←	←
4th	1.250 (25/20)	←	←	←
5th	1.050 (21/20)	←	←	←
6th	0.904 (19/21)	←	←	←
Final drive system:				
Type	Chain drive	←	←	←
Reduction ratio	2.933 (44/15)	←	←, Ⓐ 2.800 (42/15)	←, Ⓐ Ⓔ Gr WG 2.800 (42/15)
Overall drive ratio	7.731 @Top gear	←	←, Ⓐ 7.379	←, Ⓐ Ⓔ Gr WG 7.379
Frame:				
Type	Tubular, semi-double cradle	←	←	←
Caster (rake angle)	28.5°	←	←	←
Trail	117 mm	←	←	←
Front tire: Type	Dunlop K750A	←	←, Ⓐ Dunlop TRAIL MAX	←, Ⓐ Ⓔ Gr WG Dunlop TRAIL MAX
Size	3.00-21 4PR	←	←	←
Rear tire: Type	Dunlop K750/K150	←	←, Ⓐ Dunlop TRAIL MAX	←, Ⓐ Ⓔ Gr WG Dunlop TRAIL MAX
Size	4.60-17 4PR	←	←	←
Front Suspension:				
Type	Telescopic fork (pneumatic)	←	←	←
Wheel travel	230 mm	←	←	←
Rear Suspension:				
Type	Swing arm (uni-trak)	←	←	←
Wheel travel	230 mm	←	←	←
Brake type: Front	Single disc	←	←	←
Rear	Drum	←	←	←

(Continued on next page)

Items	KL250-D2~
Electric Equipment:	
Battery	12 V 4 Ah
Headlight: Type	Semi-sealed beam
Bulb	12 V 60/55 W (quartz-halogen), (A1) (SA) 12 V 35/36.5 W (quartz-halogen)
Tail/brake light	12 V 5/21 W, (C) (SA) (U) 12 V 8/27 W
Alternator: Type	Single-phase AC
Rated output	10.5 A @8,000 r/min (rpm), 14 V

※ : (U) (Cal) NGK DPR9EA-9 or ND X27EPR-U9

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

(A) : Australian Model
(A1) : Australian Model (~'91)
(C) : Canadian Model
(Cal) : California Model
(E) : European Model
(Gr) : Greek Model
(S) : Swiss Model
(SA) : South African Model
(U) : U. S. Model
(WG) : West German Model

Periodic Maintenance Chart

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

FREQUENCY / OPERATION	Whichever comes first — Every	*ODOMETER READING 800 km	5,000 km	10,000 km	15,000 km	20,000 km	25,000 km	30,000 km	See Page
Spark plug –clean		●	●	●	●	●	●	●	15-13
Spark plug – check †		●	●	●	●	●	●	●	15-13
Valve clearance – check †		●	●	●	●	●	●	●	4-10
Air cleaner element – clean			●		●		●		B.M 2-7
Air cleaner element – replace	5 cleanings			●		●		●	B.M 2-7
Throttle grip play – check †		●	●	●	●	●	●	●	2-5
Idle speed – check †		●	●	●	●	●	●	●	B.M 2-4
Fuel system – check †				●		●		●	B.M 2-8
Cylinder head bolt tightness – check †		●		●		●		●	4-2
Cylinder head nut tightness – check †		●		●		●		●	4-2
Coolant – change	2 years							●	3-4
Spark arrestor – clean (for Ⓤ, Ⓒ model)			●	●	●	●	●	●	4-13
Evaporative emission control system –check (for Ⓒa model)		●	●	●	●	●	●	●	2-7
Engine oil –change	year	●	●	●	●	●	●	●	6-4
Oil filter – replace		●		●		●		●	6-4
Radiator hoses, connections – check †	year	●		●		●		●	B.M 5-8
Fuel hose – replace	4 years								– – –
Clutch – adjust		●	●	●	●	●	●	●	5-4
Drive chain wear – check †			●	●	●	●	●	●	B.M 9-4
Drive chain – lubricate	300 km								B.M 9-5
Drive chain slack – check †	800 km								10-4
Brake lining wear – check †			●	●	●	●	●	●	B.M 10-4
Brake fluid level – check †	month	●	●	●	●	●	●	●	B.M 10-4
Brake fluid – change	year			●		●		●	B.M 10-4
Brake hose – replace	4 years								– – –
Master cylinder cup and dust seal – replace	2 years								– – –
Caliper piston seal and dust seal – replace	2 years								– – –
Brake play – check †		●	●	●	●	●	●	●	B.M 10-8
Brake light switch – check †		●	●	●	●	●	●	●	B.M 10-11
Brake camshaft – lubricate	2 years					●			B.M 10-11
Brake cable – replace	2 years								– – –
Steering – check †		●	●	●	●	●	●	●	B.M 11-6
Steering stem bearing – lubricate	2 years					●			13-5
Front fork oil – change				●		●		●	12-4
Tire wear – check †			●	●	●	●	●	●	9-5
Wheel bearing – lubricate	2 years					●			B.M 8-8
Speedometer gear – lubricate	2 years					●			B.M 12-4
Spoke tightness and rim runout – check †		●	●	●	●	●	●	●	B.M 8-6
Swing arm pivot, uni-trak linkage – lubricate				●		●		●	B.M 11-14
Battery electrolyte level – check †	month	●	●	●	●	●	●	●	15-9
General lubrication – perform			●	●	●	●	●	●	B.M 1-8
Nut, bolt, and fastener tightness – check †		●		●		●		●	B.M 1-8

* : For higherodometer readings, repeat at the frenquency interval established here.

† : Replace, add, adjust, clean, or torque if necessary.

B.M : Base Manual (KLR600)

Ⓒa : California Model Ⓤ : U.S. Model Ⓒ : Canadian Model

▒ : **Omit item for D4 and after model (applicable for D2, D3 model also).**

Fuel System

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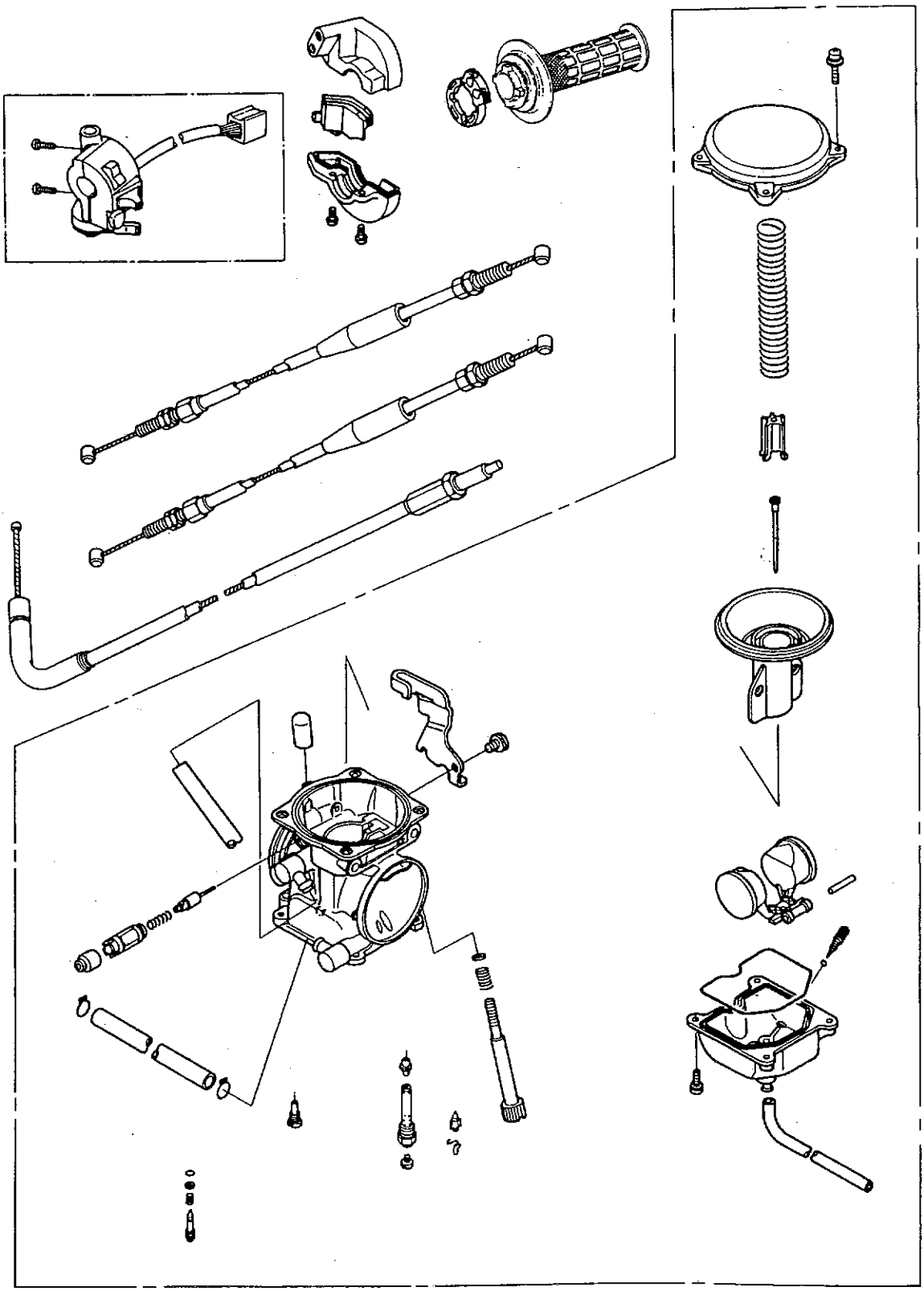
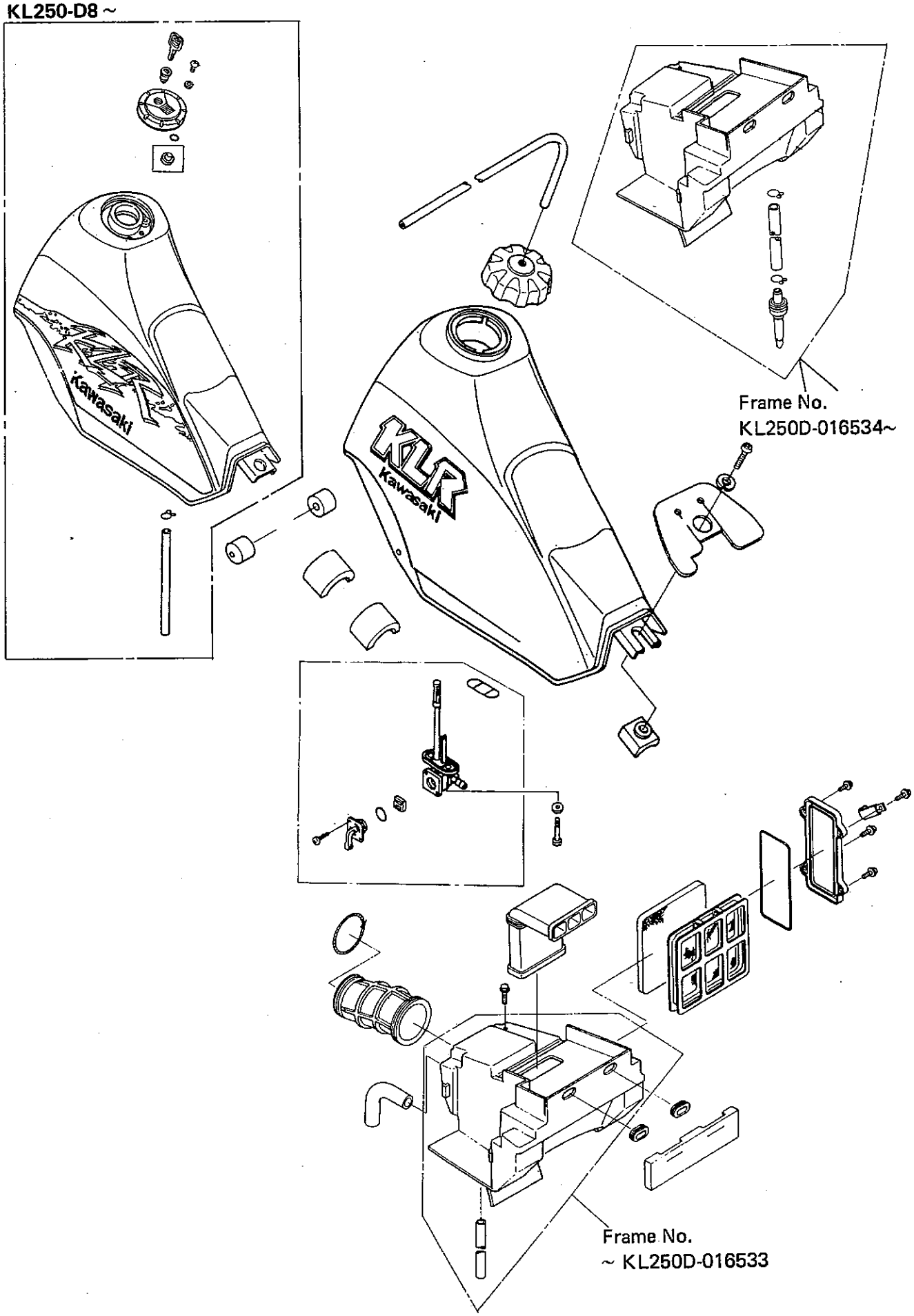
Exploded Views



KL250-D8 ~


Kawasaki
KLR
Kawasaki
Frame No.
KL250D-016534~
Frame No.
~ KL250D-016533

Fuel System Specifications

Throttle Grip Free Play

Standard: **2 – 3 mm**

Choke Cable Free Play

Standard: **2 – 3 mm**

Carburetor Specifications

KL250-D2 – D6

Make Type	CVK34
Main Jet	120, Ⓤ (Cal) 118
Main Air Jet	50
Jet Needle	N31A, Ⓤ (Cal) N31C
Pilot Jet	35
Pilot Air Jet	145
Pilot Screw	2 turns out, Ⓤ (Cal) – (WG) 1¾ (D6)
Stater Jet	40
Fuel Level	1.5 mm (upper) – 0.5 mm (lower) from bottom edge of carburetor body
Float Height	17 mm

KL250-D7~

Make Type	CVK34
Main Jet	122, Ⓒ 120, Ⓤ (Cal) 118
Main Air Jet	50
Jet Needle	N60P, Ⓒ N31A, Ⓤ (Cal) N31C
Pilot Jet	35
Pilot Air Jet	150, Ⓒ Ⓤ (Cal) 145
Pilot Screw	1¼ turns out, Ⓒ 2.0, Ⓤ (Cal) –
Starter Jet	40
Fuel Level	1.5 mm (upper) – 0.5 mm (lower) from bottom edge of carburetor body
Float Height	17 mm

Ⓤ : U.S. Model (Cal) : California Model
(WG) : West German Model

Idle Speed

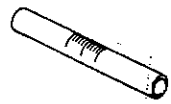
Standard: **1,200 – 1,400 r/min (rpm)**

Air Cleaner Element Oil

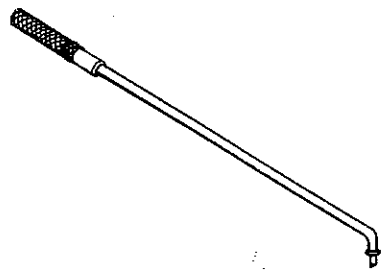
Grade: **SE class**
Viscosity: **SAE 30**

Special Tool

Fuel Level Gauge: 57001-1017



Pilot Screw Adjuster "A": 57001-1239

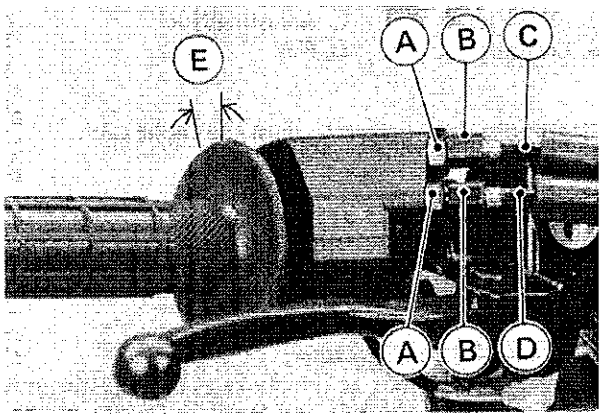


Throttle Grip and Cable

Throttle Grip Play Inspection

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

Throttle Grip Free Play
2 – 3 mm



A. Lcoknut
B. Adjuster
C. Accelerator Cable
D. Decelrator Cable
E. Free Play

★If the free play is correct, make the following test:
•Start the engine.
•Turn the handlebar from side to side while idling the engine.
•If idle speed varies, the throttle cable may be poorly routed or it may be damaged.
•Correct any problem before operating the motorcycle.

WARNING

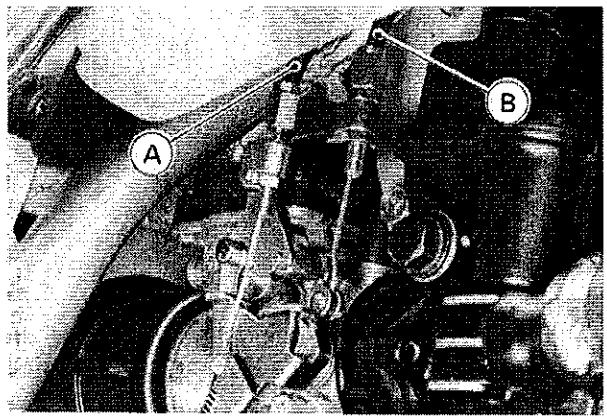
○**Operation with an improperly adjusted, incorrectly routed, or damaged cable could result in an unsafe riding condition.**

Throttle Cable Adjustment

•Loosen the locknut, and screw both throttle cable adjusters in fully at the upper end of the throttle cables so as to give the throttle grip plenty of play.
•Turn out the decelerator cable adjuster until there is no clearance between the cable and adjuster when the throttle grip is completely closed.
•Turn out the accelerator cable adjuster until there is no clearance between the cable and adjuster when the throttle grip is completely closed.
•Turn in the decelerator cable adjuster until correct throttle grip play is obtained. Tighten both locknuts.

NOTE

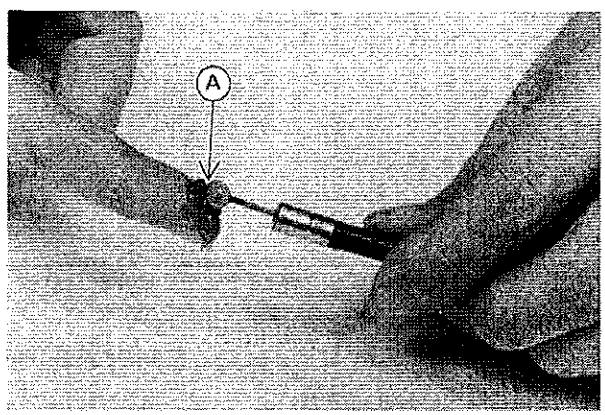
○*If the throttle cables cannot be adjusted by using the cable adjusting nuts at the upper end of the throttle cables, use the cable adjusters at the lower ends of the throttle cables. Do not forget to securely tighten the adjuster mounting nuts.*



A. Accelerator Cable
B. Decelerator Cable
C. Adjusters
D. Locknuts

Throttle Cable Lubrication

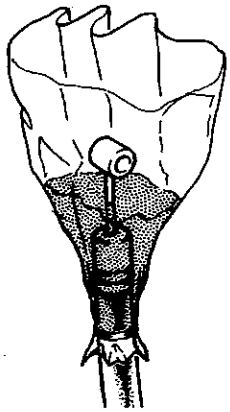
Whenever the throttle cable is removed, and in accordance with the Periodic Maintenance Chart (see General Information chapter), perform the following.
•Apply a thin coating of grease to the throttle cable lower end.



A. Apply grease.

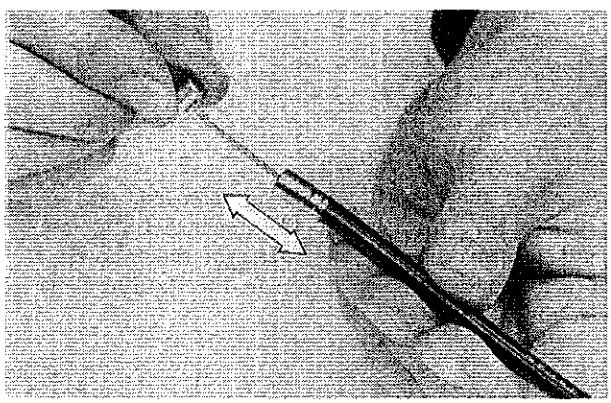
•Lubricate the throttle cable by seeping oil between the cable and cable housing.

Cable Lubrication



Throttle Cable Inspection

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



Choke Cable

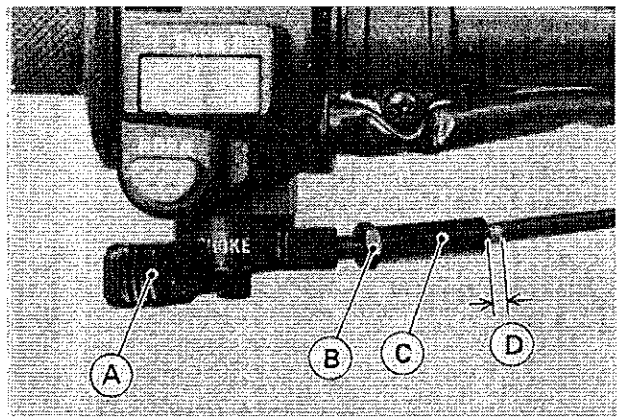
Choke Cable Free Play Inspection

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

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

●Push the choke lever back all the way to its released position.

●Determine the amount of choke cable play at the choke cable adjusting nut. Pull out and push in the cable housing; the amount of cable travel is the amount of cable free play.



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

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

Choke Cable Free Play

2 – 3 mm

Choke Cable Adjustment

●Loosen the locknut at the choke cable adjusting nut, and turn the adjusting nut until the cable has the proper amount of play.

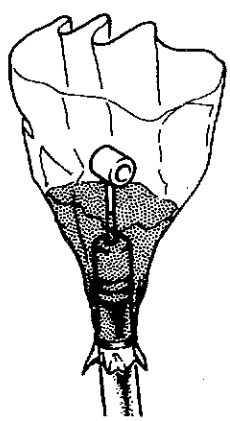
●Tighten the locknut after adjustment.

Choke Cable Lubrication

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

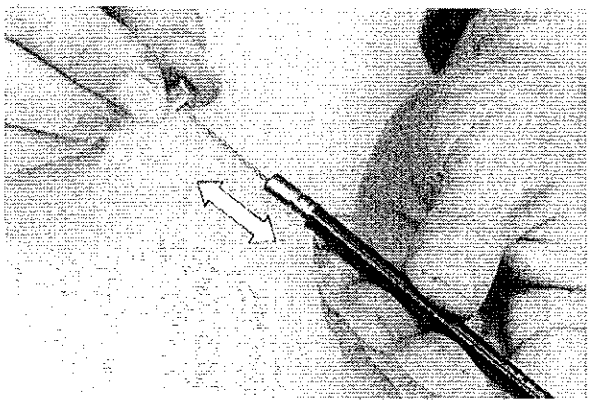
●Lubricate the choke cable by seeping oil between the cable and cable housing.

Cable Lubrication



Choke Cable Inspection

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



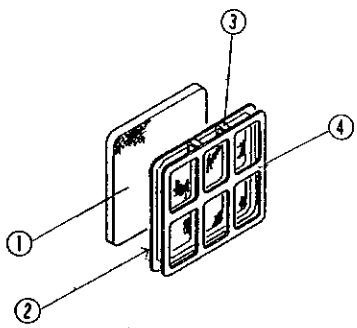
*If cable movement is not free after lubricating (see Choke Cable Lubrication), if the cable is frayed, or if the housing is kinked, replace the cable.

Air Cleaner

Element Installation

●Refer to p. 2-7 of the Base Manual noting the following exception.

○Install the element assembly so that the wire netting side faces forward and frame joint faces upward.

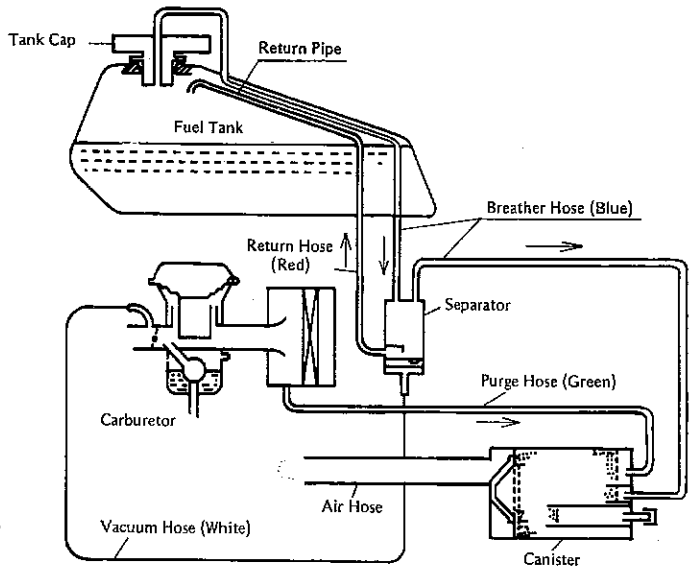


1. Element
2. Wire Netting Side
3. Frame Joint
4. Frame

Evaporative Emission Control System (California Model Only)

Refer to p. 2-10 of the Base Manual noting the following exception.

Evaporative Emission Control System



Cooling System

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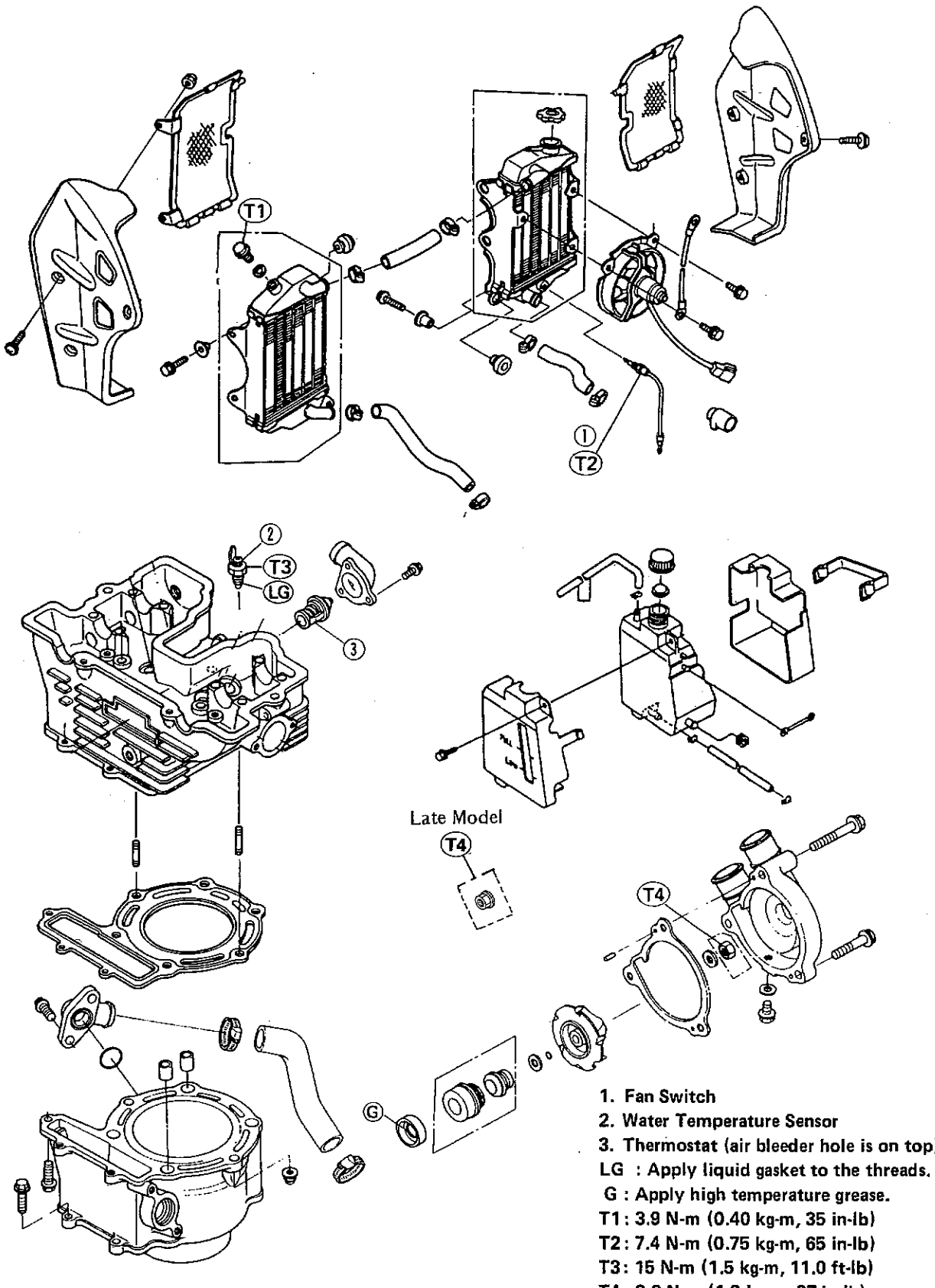
Exploded Views



1. Fan Switch
2. Water Temperature Sensor
3. Thermostat (air bleeder hole is on top).

LG : Apply liquid gasket to the threads.
G : Apply high temperature grease.
T1 : 3.9 N-m (0.40 kg-m, 35 in-lb)
T2 : 7.4 N-m (0.75 kg-m, 65 in-lb)
T3 : 15 N-m (1.5 kg-m, 11.0 ft-lb)
T4 : 9.8 N-m (1.0 kg-m, 87 in-lb)

Cooling System Specifications

Item		Standard
Coolant Provided when Shipped		
	Type	Permanent type antifreeze for aluminum engine and radiator
	Color	Green
	Mixed ratio	Soft water 50%, coolant 50%
	Freezing point	– 35°C (– 31°F)
	Total amount	1.5 L
Radiator Cap:	Relief pressure	93 – 123 kPa (0.95 – 1.25 kg/cm², 14 – 18 psi)
Thermostat:		
Valve opening temperature		69.5 – 72.5°C (157.1 – 162.5°F)
Valve full opening lift		more than 3 mm @85°C (185°F)

Coolant

Coolant Changing

Refer to p. 5-4 of the Base Manual noting the following exception.

- When the coolant is drained, remove the cooling fan switch from the bottom of the right hand radiator after removal of the drain plug.

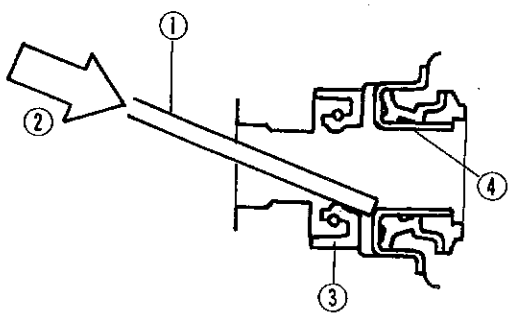
Water Pump

Water Pump Removal

Refer to p. 5-9 of the Base Manual noting the following exception.

- To remove the mechanical seal, insert a metal rod into the right engine cover from the inside, and tap evenly around the bottom of the seal.

Mechanical Seal Removal



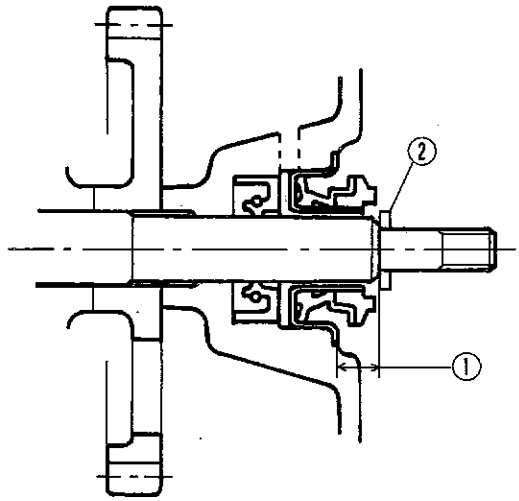
1. Metal Rod
2. Tap
3. Oil Seal
4. Mechanical Seal

Water Pump Installation

Refer to p. 5-10 of the Base Manual noting the following exception.

- When installing the impeller, measure the dimension A and select a shim according to the table below.

Impeller Installation



1. Dimension A
2. Shim

Impeller Shim Selection

Dimension A			Shim No.	Thickness
More than		Less than	92025	
6.07 mm	–	6.70 mm	-1507	t0.8 mm
6.71 mm	–	7.38 mm	-1508	t0.3 mm

Engine No. KL250DE009938 ~

Dimension A			Shim No.	Thickness
More than		Less than	92025	
5.57 mm	–	6.20 mm	-1506	t1.4 mm
6.21 mm	–	6.88 mm	-1507	t0.8 mm

Engine Top End

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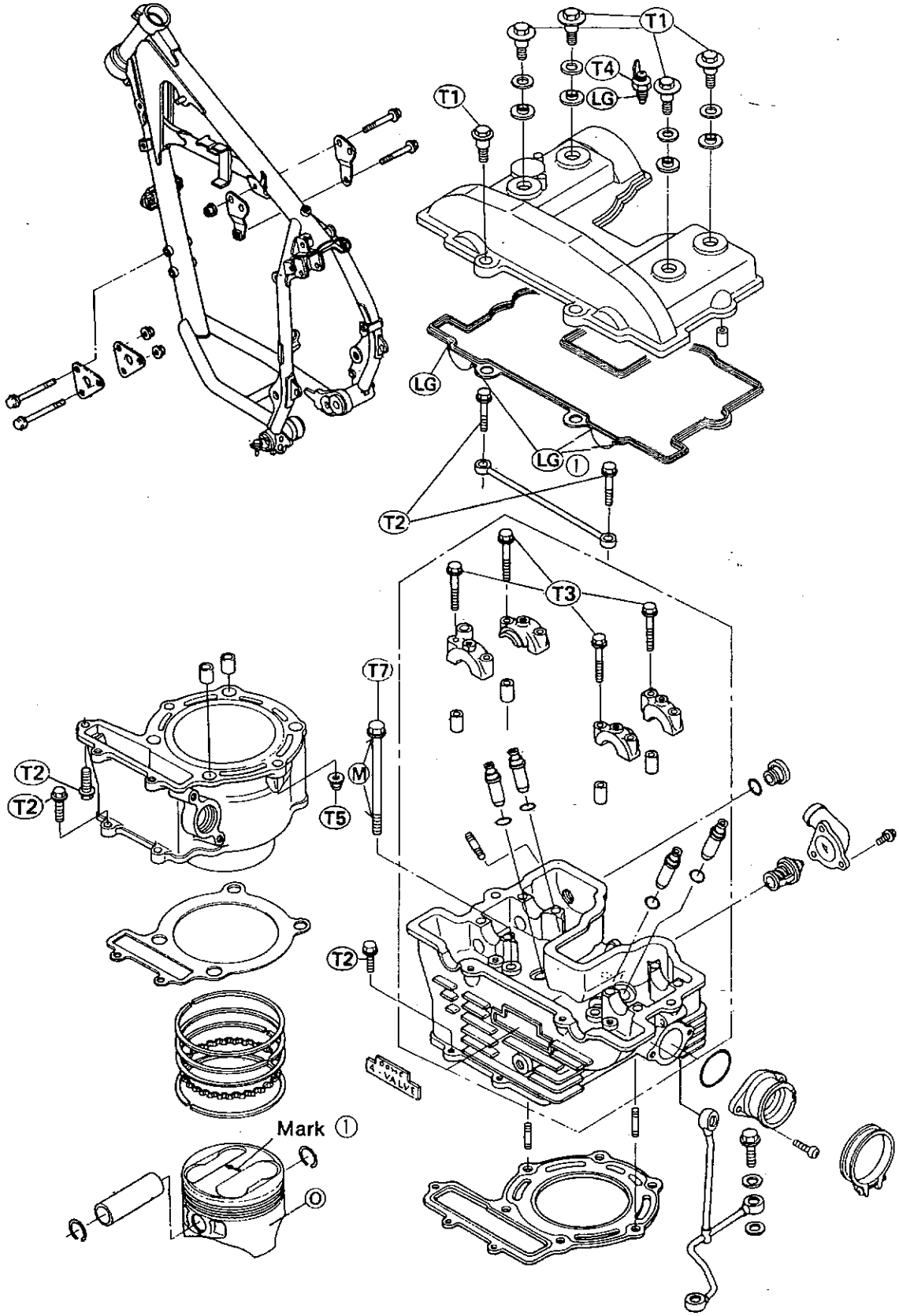
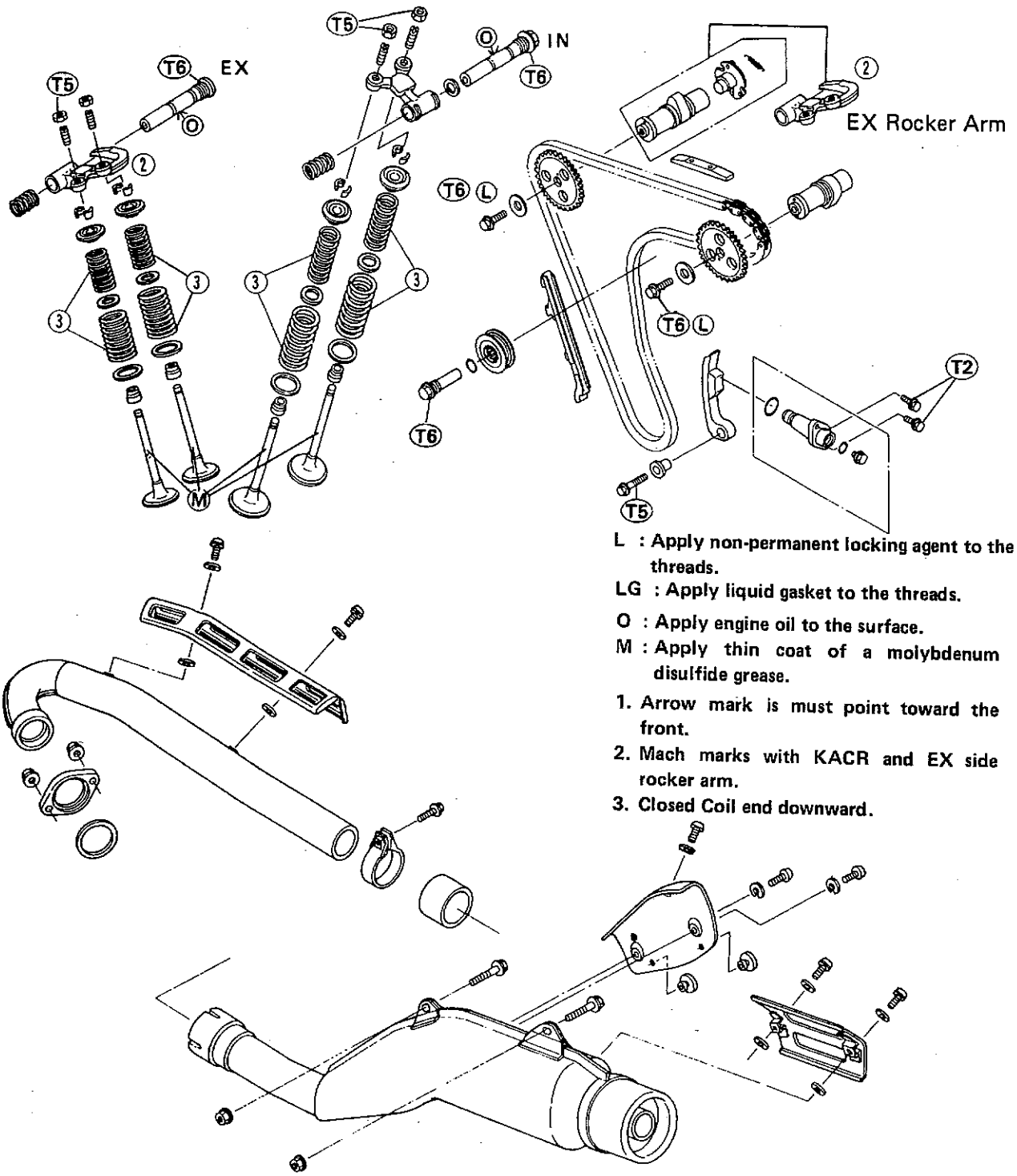
Exploded Views





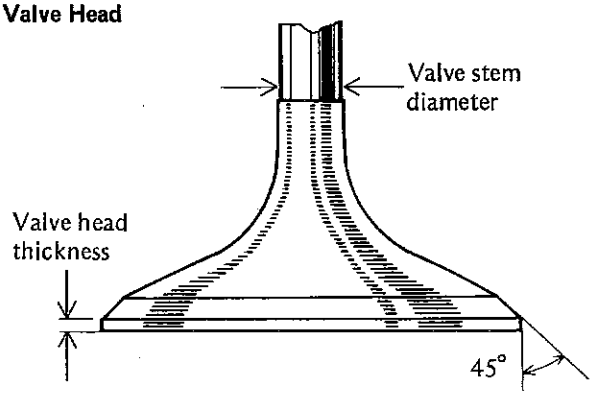
L : Apply non-permanent locking agent to the threads.
LG : Apply liquid gasket to the threads.
O : Apply engine oil to the surface.
M : Apply thin coat of a molybdenum disulfide grease.
1. Arrow mark is must point toward the front.
2. Mach marks with KACR and EX side rocker arm.
3. Closed Coil end downward.

T1 : 7.8 N-m (0.80 kg-m, 69 in-lb)
T2 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T3 : 12 N-m (1.2 kg-m, 104 in-lb)
T4 : 15 N-m (1.5 kg-m, 11.0 ft-lb)
T5 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T6 : 39 N-m (4.0 kg-m, 29 ft-lb)
T7 : 45 N-m (4.6 kg-m, 33 ft-lb)

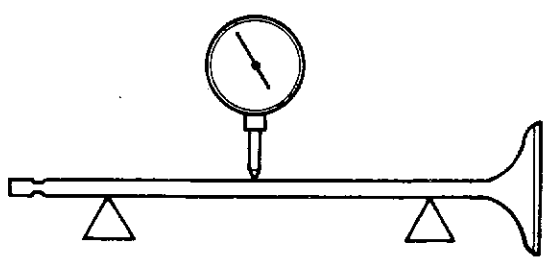
Engine Top End Specifications

Item		Standard	Service Limit
Cylinder Head, Valves:			
Valve clearance:	Inlet	0.20 – 0.24 mm	– – –
	Exhaust	0.20 – 0.24 mm	– – –
Cylinder head warp		– – –	0.05 mm
Valve head thickness:	Inlet	0.5 mm	0.25 mm
	Exhaust	1 mm	0.7 mm
Valve stem bend		Less than 0.02 mm TIR	0.05 mm TIR
Valve stem diameter:	Inlet	5.475 – 5.490 mm	5.46 mm
	Exhaust	5.455 – 5.470 mm	5.44 mm
Valve guide inside diameter:	Inlet	5.500 – 5.512 mm	5.58 mm
	Exhaust	5.500 – 5.512 mm	5.58 mm
Valve/valve guide clearance			
(wobble method):	Inlet	0.02 – 0.08 mm	0.24 mm
	Exhaust	0.06 – 0.12 mm	0.26 mm
Valve seating surface:			
Outside diameter	Inlet	28.3 – 28.5 mm	– – –
	Exhaust	24.0 – 24.2 mm	– – –
Width	Inlet	0.5 – 1.0 mm	– – –
	Exhaust	0.5 – 1.0 mm	– – –
Valve spring free length:	Inner	36.3 mm	35 mm
	Outer	39.2 mm	37.5 mm
Valve seat cutting angle:	Inlet, Exhaust	32°, 45°, 60°	– – –

Valve Head

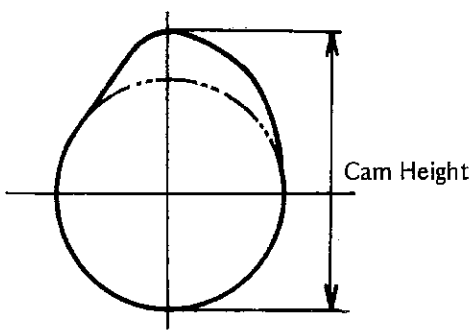


Valve Stem Bend



Item		Standard	Service Limit
Camshaft:			
Cam height:	Inlet	35.532 – 35.648 mm	35.43 mm
	Exhaust	35.649 – 35.765 mm	35.55 mm
Camshaft bearing oil clearance		0.045 – 0.073 mm	0.16 mm
Camshaft journal diameter		22.940 – 22.955 mm	22.91 mm
Camshaft bearing inside diameter		23.000 – 23.013 mm	23.07 mm
Camshaft chain 20-link length		127.00 – 127.36 mm	128.9 mm
Rocker arm inside diameter		12.500 – 12.518 mm	12.55 mm
Rocker shaft diameter		12.466 – 12.484 mm	12.44 mm
Cylinder Compression:		(usable range) 410 kPa – 785 kPa (4.9 – 8.0 kg/cm², 60 – 114 psi)	– – –
Cylinder Block, Piston:			
Cylinder inside diameter		74.000 – 74.012 mm	74.10 mm
Piston diameter		73.950 – 73.965 mm	73.81 mm
Piston/cylinder clearance		0.035 – 0.062 mm	– – –
Piston ring/groove clearance:	Top	0.03 – 0.07 mm	0.17 mm
	Second	0.02 – 0.06 mm	0.16 mm
Piston ring groove width:	Top	1.02 – 1.04 mm	1.12 mm
	Second	1.01 – 1.03 mm	1.12 mm
	Oil	2.51 – 2.53 mm	2.6 mm
Piston ring thickness:	Top	0.97 – 0.99 mm	0.9 mm
	Second	0.97 – 0.99 mm	0.9 mm
Piston ring end gap:	Top	0.2 – 0.35 mm	0.7 mm
	Second	0.2 – 0.35 mm	0.7 mm
	Oil	0.2 – 0.7 mm	1.0 mm

Cam Height Measurement



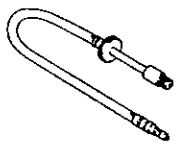
Special Tools

Compression Gauge: 57001-221

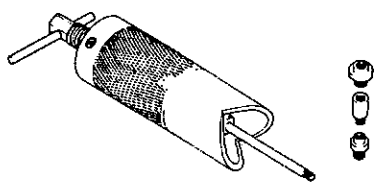
Valve Guide Arbor: 57001-1021

Valve Guide Reamer: 57001-1079

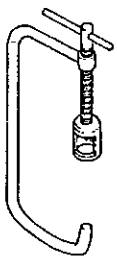
Adapter: 57001-1183



Piston Pin Puller: 57001-910



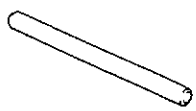
Valve Spring Compressor: 57001-241



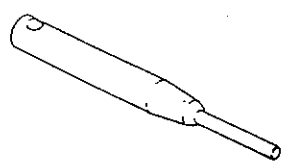
45° – ϕ27.5 Seat Cutter: 57001-1114
45° – ϕ32.0 Seat Cutter: 57001-1115
32° – ϕ28.0 Outside Cutter: 57001-1119
32° – ϕ30.0 Outside Cutter: 57001-1120
60° – ϕ30.0 Inside Cutter: 57001-1123

Adapter: 57001-1019

Bar: 57001-1128



Cutter Holder ϕ5.5 mm: 57001-1125



Camshaft Chain Tensioner

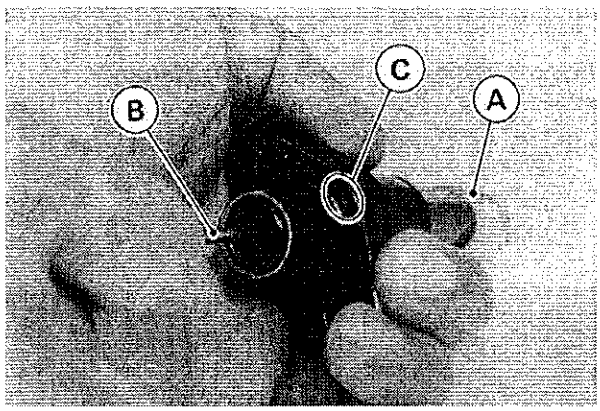
Chain Tensioner Installation

Refer to p. 3-6 of the Base Manual noting the following exception.

●When the chain tensioner is installed; pay attention to the following items.

○Remove the cap bolt and O-ring.

○While compressing the push rod, turn it clockwise with a suitable screwdriver until it stops.



A. Compress the rod
B. Screwdriver
C. Arrow

Camshafts, Camshaft Chain

Camshaft Removal Notes

●Position the crankshaft at TDC of compression stroke.

●Remove the following parts before camshaft removal.

○Cylinder head cover

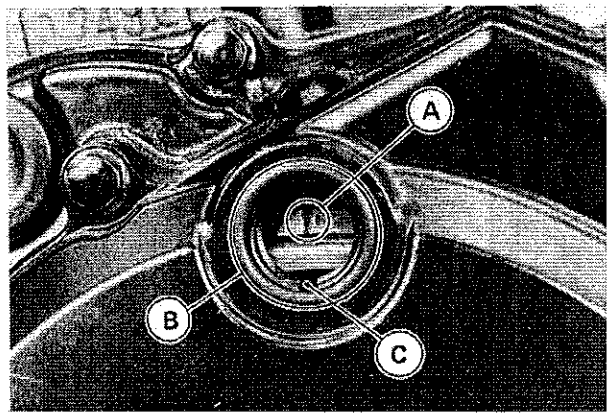
○Camshaft chain tensioner

○Camshaft caps

Camshaft Installation Notes

●Position the crankshaft at TDC.

○Turn the crankshaft until the "T" mark is aligned with the slit in the inspection window.



A. Timing Mark
B. Inspection Window
C. Slit

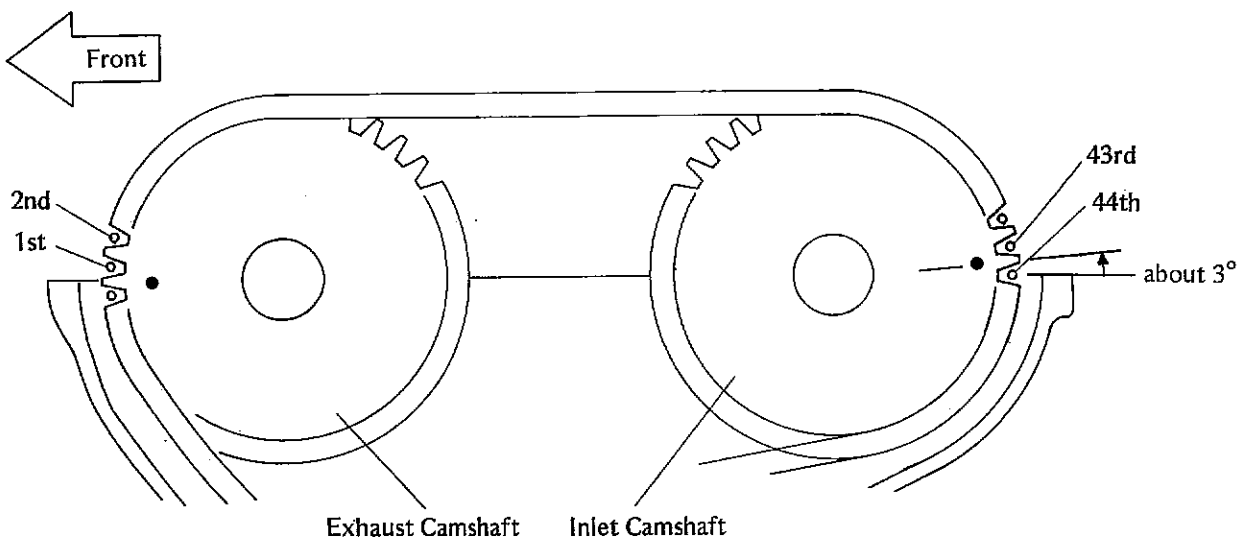
●When setting the camshaft chain timing, pay attention to the following items.

○Pull the exhaust side of the chain taut before fitting to the chain to the exhaust camshaft sprocket.

○The exhaust side timing mark must be aligned with the cylinder head upper surface.

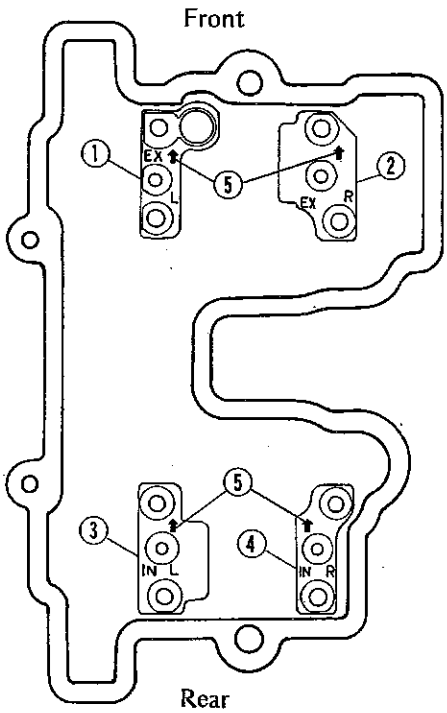
○The inlet side timing mark must be positioned upward about 3° from the cylinder head upper surface.

Camshaft Chain Timing (Lefthand View)



●Install the camshaft caps in the correct locations as shown in the figure.

Camshaft Cap Installation



1. Camshaft Cap (Exhaust, left)
2. Camshaft Cap (Exhaust, right)
3. Camshaft Cap (Inlet, left)
4. Camshaft Cap (Inlet right)
5. Mark: Must be faced forward

Camshafts Inspection

●Inspect the camshafts.

★If they are badly worn, replace them.

○Replacement exhaust camshafts from stock have the K.A.C.R. and rocker arm. When the new exhaust camshaft is installed, exchange the K.A.C.R. and rocker arm at the same time.

Camshaft Chain Removal

●Remove the following parts before camshaft chain removal.

○Camshafts
○Magneto flywheel
○Balancer chain
○Camshaft chain guide

Camshaft Bearing Oil Clearance Inspection

Refer to p. 3-10 of the Base Manual noting the following exception.

Camshaft Bearing Oil Clearance

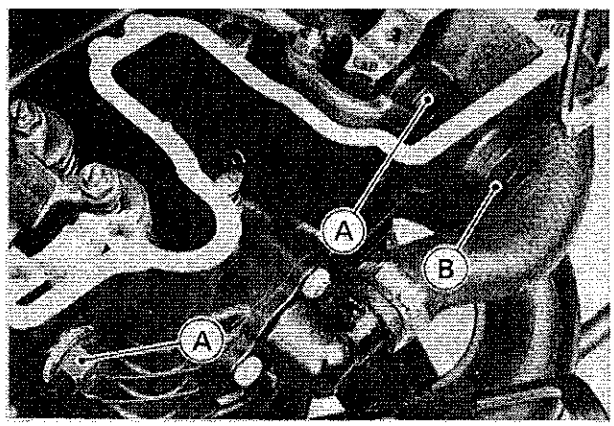
Standard	:	**0.045 – 0.073 mm**
Service Limit	:	**0.16 mm**

Rocker Arms, Rocker Shafts

Rocker Arms, and Rocker Shaft Removal

●Remove the following parts before removing the rocker arm and rocker shaft.

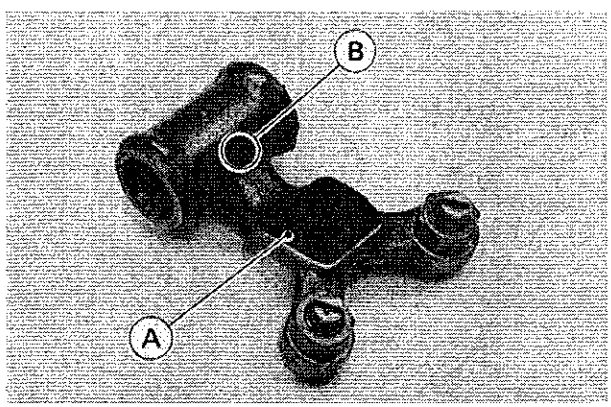
○Cylinder head cover
○Camshafts
○Rocker shaft plug (exhaust side)



A. Rocker Shaft B. Rocker Shaft Plug

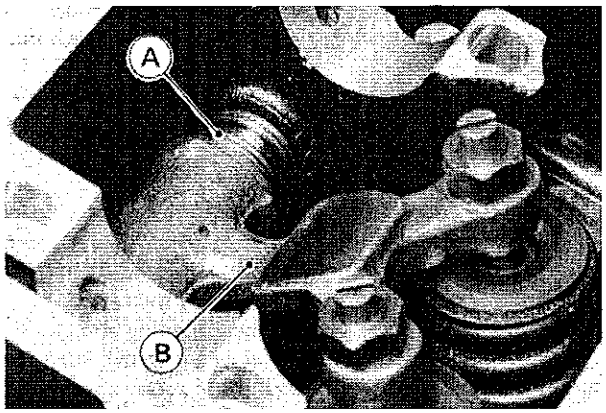
Rocker Arms and Rocker Shaft Installation Notes

●Blow the rocker arm oil passage clean with compressed air and apply oil to the rocker arm bore before installation.



A. Rocker Arm B. Oil Passage

●Install the retainer spring on each rocker arm so that the spring is on the other side of the rocker arm from the camshaft sprockets.



A. Retainer Spring B. Rocker Arm

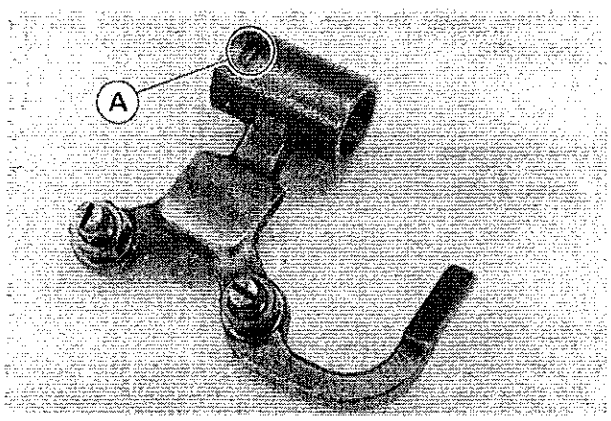
●Apply engine oil to the rocker shaft, and insert the shaft running it through the cylinder head, the rocker arms and springs.
●Tighten the rocker shaft and rocker shaft plug to the specified torque (see Exploded Views).

Rocker Arms and Rocker Shaft Inspection Note

●Inspect the rocker arms and rocker shafts.
★If they are badly worn, replace them.
○The exhaust side rocker arm has an A to D mark. When changing the rocker arm with new one, select the rocker arm with same mark as former.

NOTE

○*If the marks are not matched, it will affect the timing when the cam pushes down the rocker arm and therefore KACR will not operate properly.*



A. Mark

KACR (KAWASAKI Automatic Compression Release)

KACR Inspection

Refer to p. 3-10 of the Base Manual noting the exception.
★If the weight do not move smoothly, replace the KACR unit, camshaft and rocker arm as a set.

Cylinder Head

Compression Measurement

Refer to p. 3-17 of the Base Manual noting the following exception.

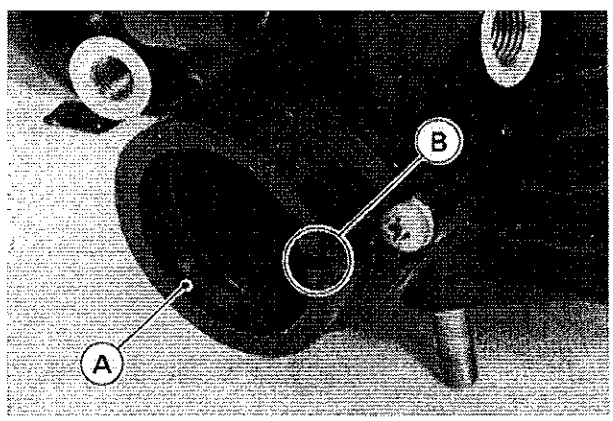
Cylinder Compression
Usable Range: 410 – 785 kPa (4.2 – 8.0 kg/cm², 60 – 114 psi)

Cylinder Head Removal

Refer to p. 3-17 of the Base Manual noting the following exception.
●Remove the following parts before cylinder head removal.
○Radiator hose
○Cylinder head bracket
○Cylinder head cover
○Camshaft chain tensioner
○Camshafts
○Oil pipe (under the left side of the camshafts)
○Exhaust pipe
○Carburetor
○Oil pipe (behind of the cylinder)

Cylinder Head Installation Note

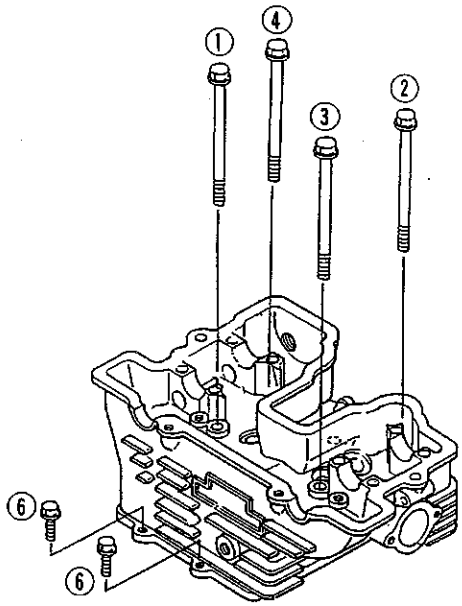
●When installing the carburetor holder, the projection faces to the right.

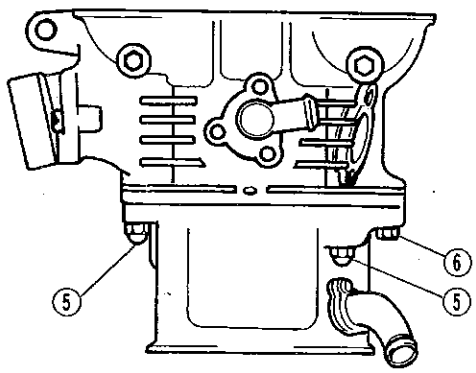


A. Carburetor Holder B. Projection Faces Rightwards

●Torque the cylinder head bolts and nuts following the tightening sequence.

Cylinder Head Bolts, Nuts Tightening Sequence





NOTE

o*Torque them first to about 15 N-m (1.5 kg-m, 11.0 ft-lb) of torque and then torque them to the specified torque.*

Cylinder Head Disassembly Note

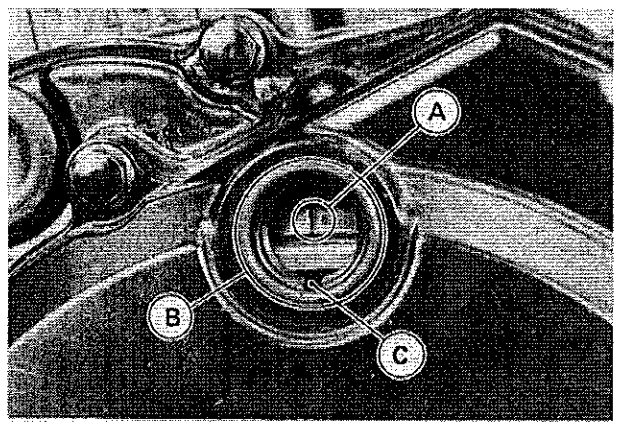
Refer to p. 3-18 of the Base Manual noting the following exception.

- Remove the cylinder head parts by using these special tools.
  - o57001-241: Valve spring compresser assembly
  - o57001-1019: Adapter
  - o57001-1021: Valve guide arbor
  - o57001-1079: Valve guide reamer

Valves

Valve Clearance Inspection

- Valve clearance must be checked when the engine is cold (room temperature).
- Remove the following parts before valve clearance inspection.
  - oFuel tank
  - oCylinder head bracket
  - oRadiator fan
  - oCylinder head cover
  - oMagneto cover upper and center plug
- Using a wrench on the crankshaft rotation bolt, turn the crankshaft counterclockwise while watching the movement of the inlet valves (valves to the rear).
- When the valves have just finished opening and closing (moving downwards and returning upwards), turn the crankshaft in the same direction for about another 1/3 turn until the "T" mark on the magneto flywheel is aligned with the slit in the inspection window in the magneto cover.



A. Timing Mark
B. Inspection Window
C. Slit

- Measure the clearance of each valve by inserting a thickness gauge between the adjusting screw and the valve stem.

Valve Clearance (when cold)

Inlet, Exhaust : 0.20 – 0.24 mm

Valve Clearance Adjustment

- ★If the valve clearance is incorrect, loosen the locknut and turn the adjusting screw until the correct clearance is obtained.
- Tighten the locknut.

Valve Seat Inspection

Refer to p. 3-16 of the Base Manual noting the exception.

Valve Seating Surface Width

Inlet, Exhaust : 0.5 – 1.0 mm

Valve Seating Surface Outside Diameter

Inlet : 28.3 – 28.5 mm
Exhaust : 24.3 – 24.5 mm

Valve Seat Repair

Refer to p. 3-16 of the Base Manual noting the exception.

- Follow the manufacturer's instructions for the use of the valve seat cutter set.

Valve Seat Cutter Set

Part Number : 57001-1110

Valve Cutters in Set

Inlet Valve

45° – φ32.0	**57001-1115**
32° – φ30.0	**57001-1120**
60° – φ30.0	**57001-1123**

Exhaust Valve

45° – φ27.5	**57001-1114**
32° – φ28.0	**57001-1119**
60° – φ30.0	**57001-1123**

Use this Holder and Bar

Holder – φ5.5	**57001-1125**
Bar	**57001-1128**

Cylinder, Piston

Cylinder Removal

- Remove the following parts before cylinder removal.
  - Cylinder head cover
  - Carburetor
  - Camshafts
  - Cylinder head
  - Radiator hose (Cylinder side)

Piston Removal Notes

- Wrap a clean cloth around the base of the piston to secure it in position for removal and so that no parts fall into the crankcase.
- To remove the piston pin, use a piston pin puller (special tool), if the pin is tihgt.

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

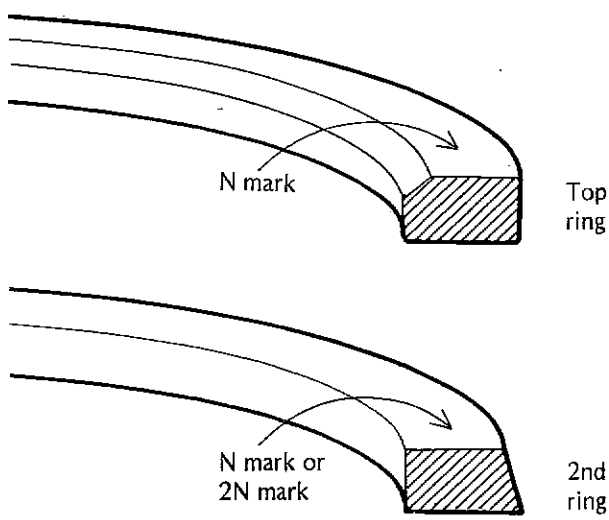
Piston, Cylinder Installation Note

CAUTION

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

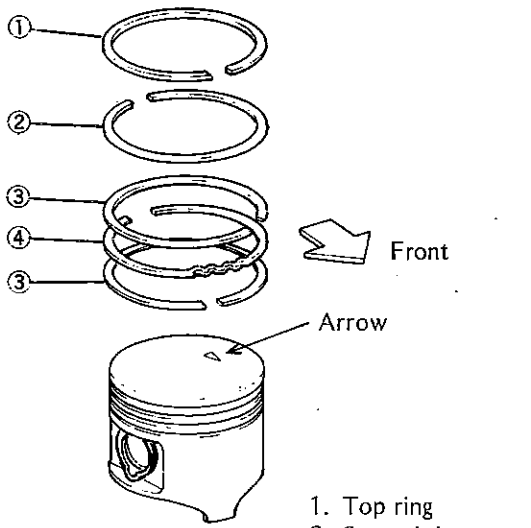
- Do not mix up the top and second ring.

Cross Section of Piston Rings



●Position each piston ring so that the opening in the top ring and oil ring steel rails are facing forwards, and the second ring and oil ring expander openings face the rear. The openings of the oil ring steel rails must be about 30 – 40° of angle from the opening of the top ring.

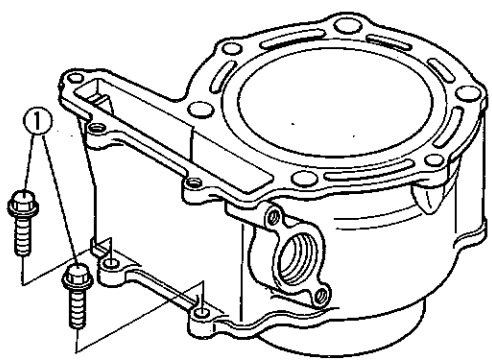
Piston Ring Openings
: Viewed from Front



1. Top ring
2. Second ring
3. Steel rail, oil ring
4. Expander, oil ring

●The arrow on the top of the piston must point toward the front.
●Install the cylinder and tighten the moutning bolts to the specified torque.

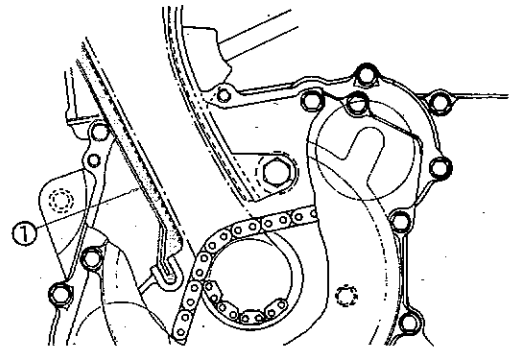
Cylinder



1. Cylinder Mounting Bolts

●After cylinder installation, install the chain guide as shown.

Chain Guide



1. Chain Guide

Piston Ring End Gap

Refer to p. 3-21 of the Base Manual noting the exception.

Piston Ring End Gap

	Standard	Serive Limit
Top, Second	**0.2 – 0.35 mm**	**0.7 mm**
Oil	**0.2 – 0.7 mm**	**1.0 mm**

Cylinder Inside Diameter

Refer to p. 3-21 of the Base Manual noting the following exception.

Cylinder Inside Diameter

Standard: 74.000 – 74.012 mm and less than 0.01 mm difference between any two measurements.

Service Limit: 74.10 mm, or more than 0.05 mm difference between any two measurements.

Piston Diameter

Refer to p. 3-21 of the Base Manual noting the following exception.

Piston Diameter

Standard : 73.950 – 73.965 mm
Service Limit : 73.81 mm

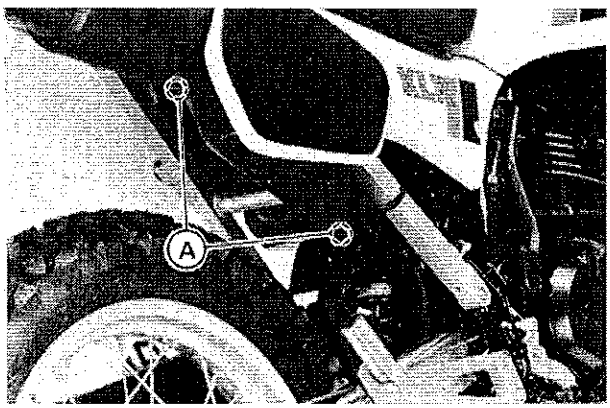
Muffler

Muffler Cleaning (U.S. model)

WARNING

oTo avoid burns, wear gloves while cleaning the muffler. Since the engine must be run during this procedure, the muffler will become hot.

•Remove the drain plugs from the muffler.



A. Drain Plugs

•In an open area away from combustible materials, start the engine with the transmission in neutral.
•Raise and lower engine speed while tapping on the muffler with a rubber mallet until carbon particles are purged from the muffler.

WARNING

oDo not run the engine in a closed area. Exhaust gases contain carbon monoxide, a colorless, odorless, poisonous gas. Breathing exhaust gas leads to carbon monoxide poisoning, asphyxiation, and death.

•Stop the engine.
•Install the drain plugs in the muffler.

Spark Arrester Cleaning (U.S. model)

This motorcycle is equipped with a spark arrester approved for off-road use by the U.S. Forest Service. It must be properly maintained to ensure its efficiency. In accordance with the Periodic Maintenance Chart, clean the spark arrester.

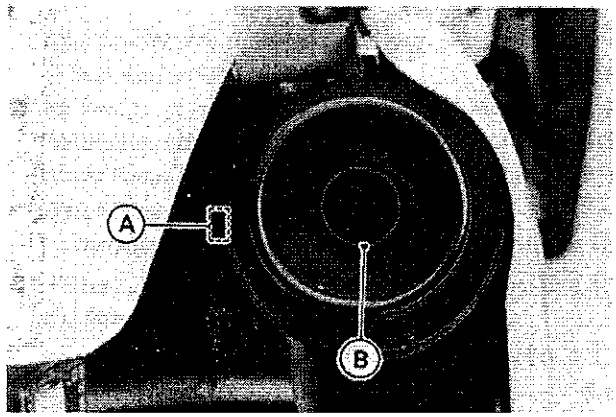
CAUTION

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

WARNING

oTo avoid burns, wear gloves while cleaning the spark arrester.

•Remove the spark arrester mounting screw from the muffler.
•Pull the spark arrester out of the muffler.



A. Screw B. Spark Arrester

•Scrape carbon deposits off the spark arrester and slide it back into the muffler.
•Install the mounting screw and tighten them securely.

WARNING

oNever run the engine with the spark arrester removed. Hot carbon particles may start a fire.

Engine Right Side/Left Side

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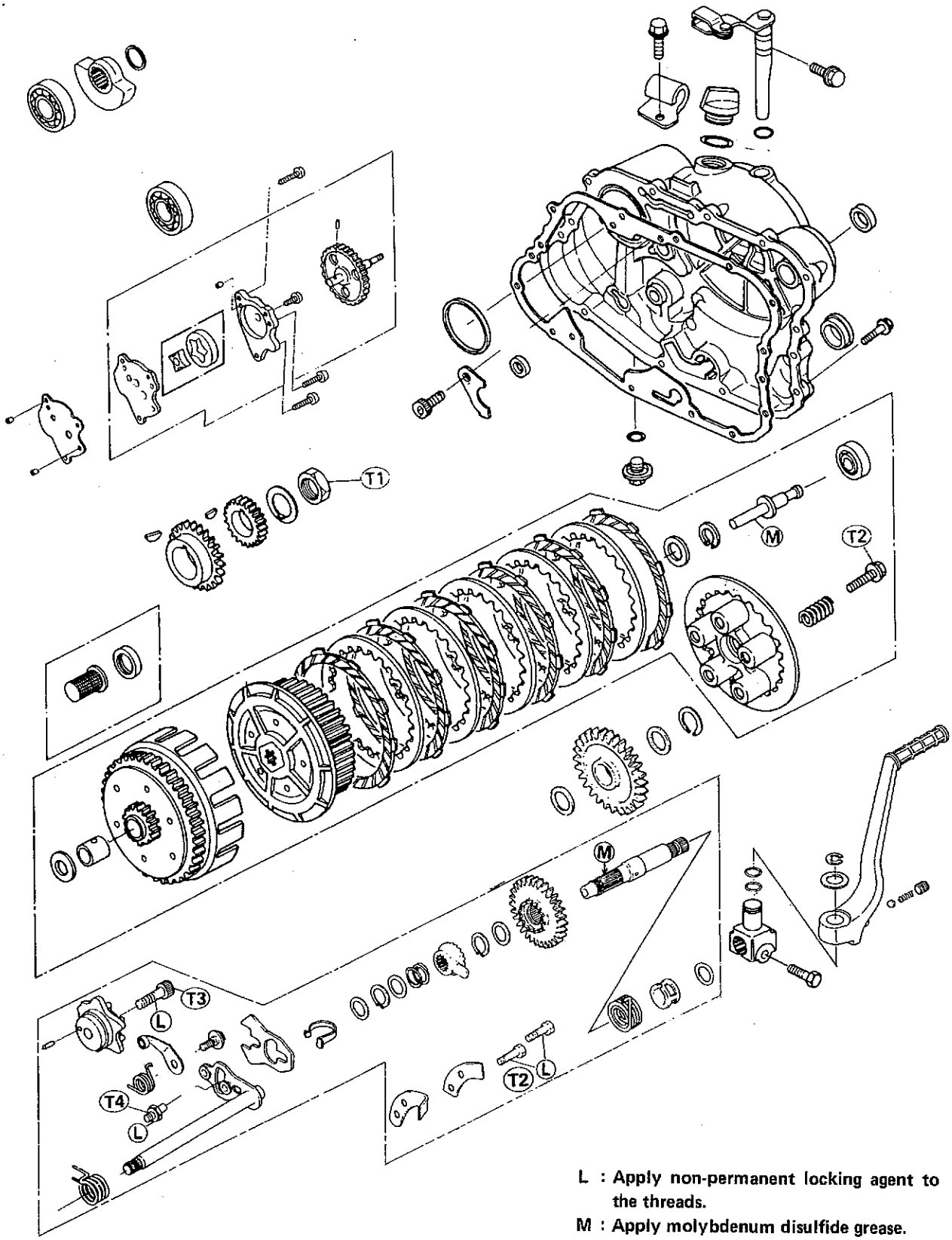
Exploded Views



L : Apply non-permanent locking agent to the threads.
M : Apply molybdenum disulfide grease.
T1: 59 N-m (6.0 kg-m, 43 ft-lb)
T2: 9.8 N-m (1.0 kg-m, 87 in-lb)
T3: 12 N-m (1.2 kg-m, 104 in-lb)
T4: 39 N-m (4.0 kg-m, 29 ft-lb)

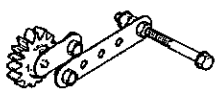
Engine Right Side Specifications

Item		Standard	Service Limit
Clutch:	Clutch lever play	2 – 3 mm	– – –
	Clutch spring free length	33.6 mm	32.3 mm
	Friction plate thickness	2.7 – 2.9 mm	2.5 mm
	Friction and steel plate warp	Less than 0.15 mm	0.3 mm
Primary Reduction:			
	Primary gear/clutch housing gear backlash	0 – 0.11 mm	0.13 mm

Special Tool

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

Gear Holder: 57001-1015



Oil Seal Guide: 57001-263

Oil Seal Guide: 57001-264

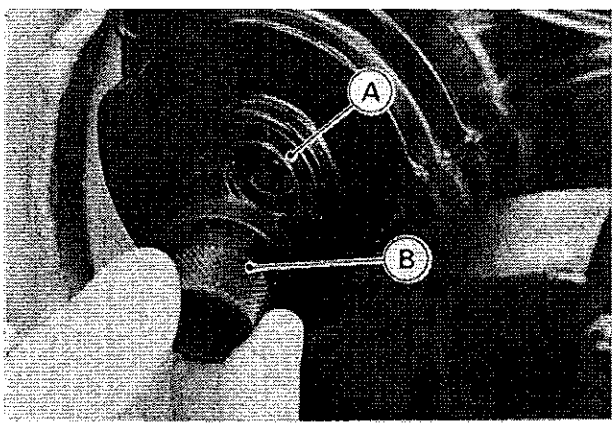
Right Engine Cover

Right Engine Cover Removal

- Drain the engine oil
- Remove the following part before removing the right engine cover.
  - Kick pedal
  - Lower end of the clutch cable
  - Clutch release shaft
  - Brake pedal and cable
  - Radiator hose (cover side)
  - Oil filter
  - Water pump impeller

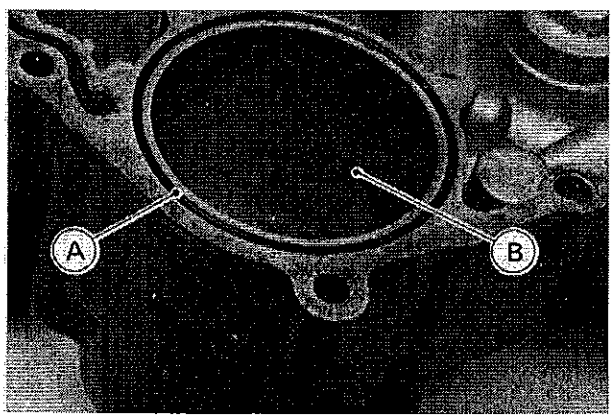
Right Engine Cover Installation Notes

- When installing the right engine cover, use a kick shaft oil seal guide (special tool) to avoid seal damage.



A. Kick Shaft Oil Seal B. Oil Seal Guide: 57001-263

- Check that the O-ring is in good condition. Fit the oil filter O-ring in place, being careful not to twist or damage it.



A. O-ring B. Oil Filter Hole

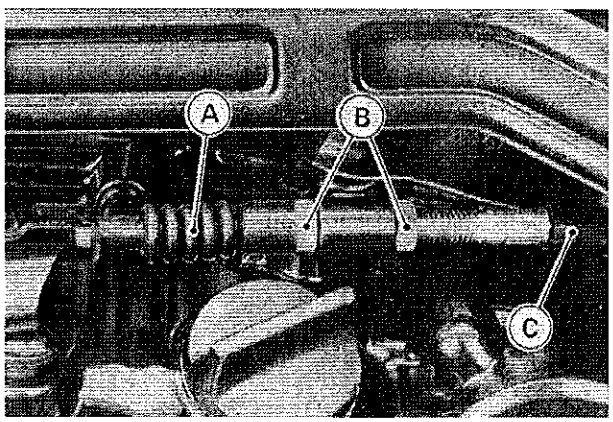
Clutch

Clutch Lever Play Adjustment

- Loosen the knurled locknut at the clutch lever, turn the adjuster to obtain the proper amount of lever play, and tighten the locknut.

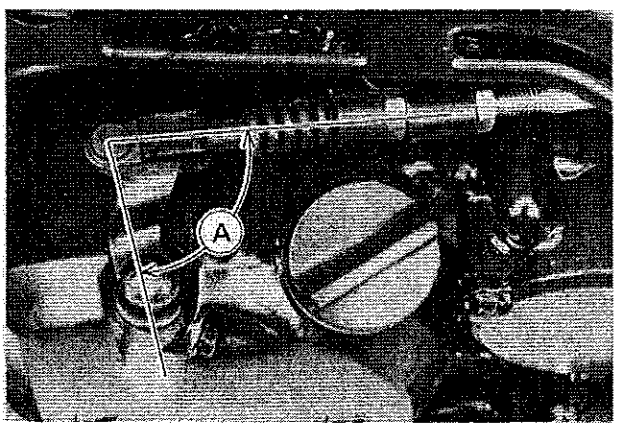
★If the upper cable adjuster has reached its limits, use the adjuster at the lower end of the clutch cable.

- Loosen the knurled locknut at the clutch lever, and screw in the adjuster.



A. Dust Boot C. Clutch Cable
B. Adjusting Nuts

- Slide the lower cable adjuster to give the cable plenty of play, and readjust the lever play.
- Turn the clutch release lever until it becomes hard to turn. At this time, check that the clutch release lever to clutch cable angle is 80 – 90°.



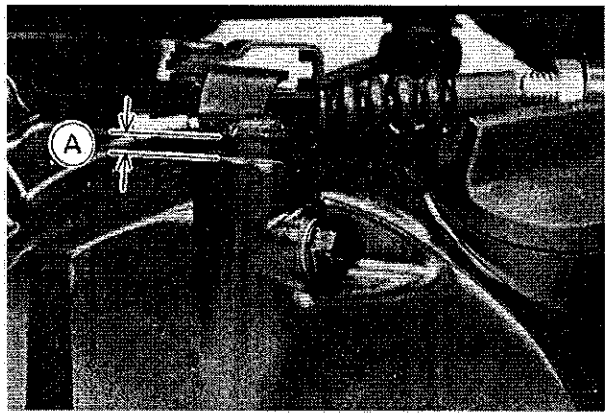
A. 80 – 90°

●Tighten the adjusting nut.

NOTE

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

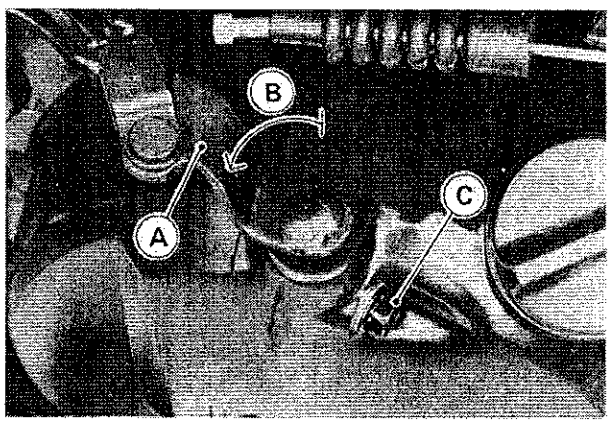
●After the adjustment is made, start the engine and check that the clutch does not slip and that it releases properly.



A. 1 – 3 mm

Clutch Release Lever Removal

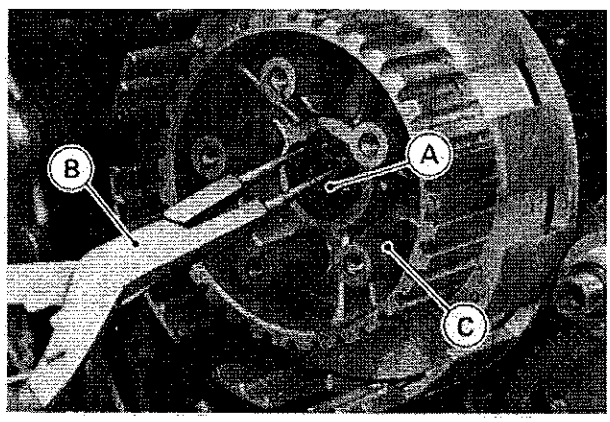
●Remove the following parts before removing the clutch release lever.
  ○Clutch cable upper end (from clutch lever)
  ○Clutch cable lower end (from release lever)
  ○Positioning bolt
●Turn the release lever counterclockwise about 90°, and then pull out the release lever and shaft assembly.



A. Release Lever
B. Turn about 90°
C. Positioning Bolt

Clutch Removal

●Remove the right engine cover before removing the clutch.
●Remove the clutch spring bolts, washers, and springs; then take off the clutch spring plate.
●Remove the circlip with circlip pliers (special tool), and pull off the clutch hub, plates, and housing.



A. Circlip
B. Circlip Pliers: 57001-144
C. Clutch Hub

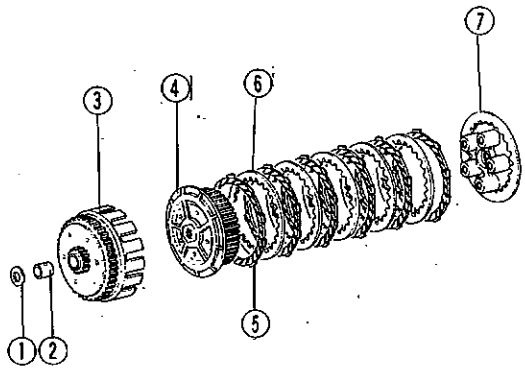
Clutch Release Lever Installation Notes

●Release lever and shaft assembly installation is the reverse of removal.
●Check the clearance between the release lever and the right engine cover, and install the positioning bolt.

Clutch Installation Notes

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

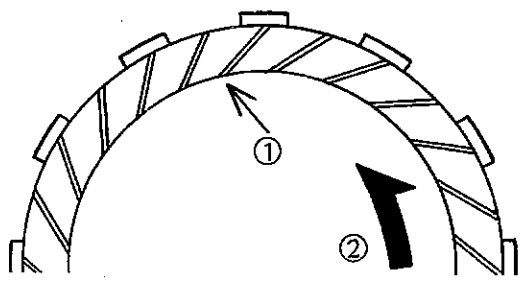
Clutch



1. Washer
2. Bush
3. Clutch Housing
4. Clutch Hub
5. Friction Plate
6. Steel Plate
7. Spring Plate

oThe grooves on the friction plate surfaces are cut tangentially and radially; install the friction plates so that the grooves run toward the center in the direction of clutch housing rotation (couterclockwise viewed from the engine right side).

Friction Plate Installation

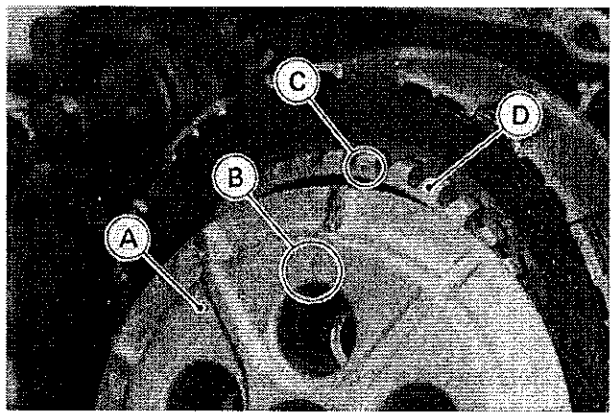


1. Oil Groove
2. Direction of Rotation

CAUTION

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

•Apply a molybdenum disulfide grease to the rod before clutch spring plate pusher installation.
•Fit the spring plate into place, aligning the mark on the plate with the mark on the clutch hub.



A. Spring Plate
B. Arrow Mark
C. Mark
D. Clutch Hub

Friction Plate Wear, Damage Inspection

Refer to p. 4-10 of the Base Manual noting the following exception.

Friction Plate Thickness

Standard	:	**2.7 – 2.9 mm**
Service Limit	:	**2.5 mm**

Friction and Steel Plate Warp Inspection

Refer to p. 4-10 of the Base Manual noting the following exception.

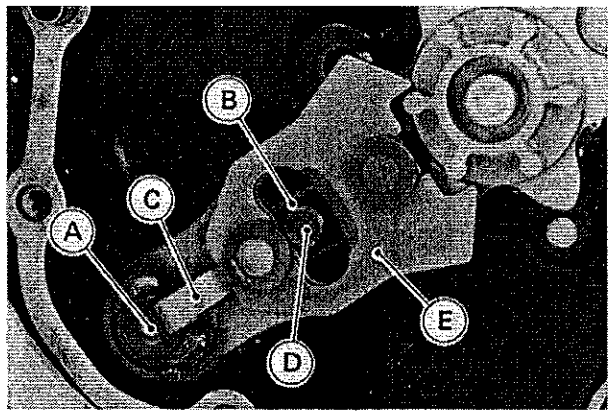
Friction and Steel Plate Warp

Standard	:	**Less than 0.15 mm**
Service Limit	:	**0.3 mm**

External Shift Mechanism

External Shift Mechanism Removal

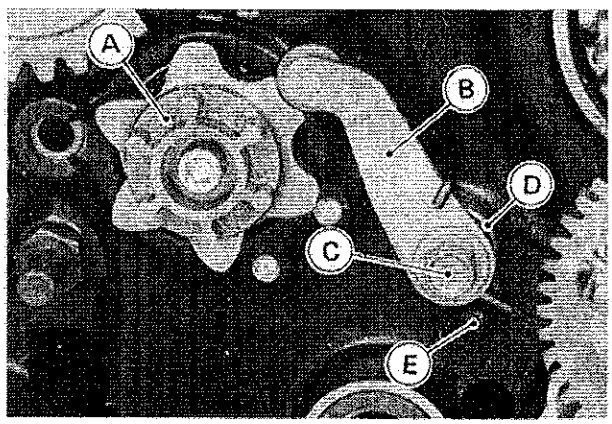
●Loosen the footpeg mounting nut and rotate the right hand footpeg downward.
●Remove the following parts before shift mechanism removal.
  ○Shift pedal
  ○Right engine cover
  ○Clutch housing
●Pull out the shift shaft.
●Remove the bolt and the gear positioning lever.



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

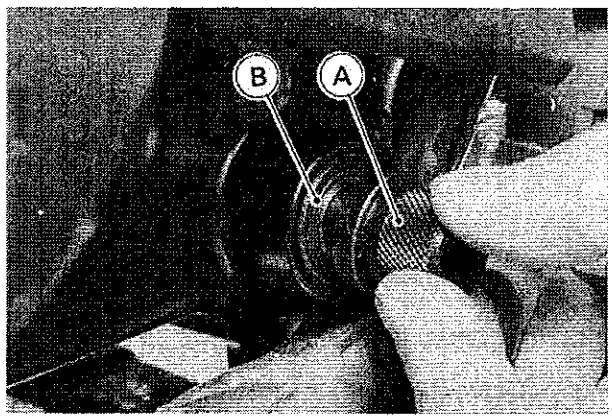
External Shift Mechanism Installation Note

●If the gear positioning lever was removed, install it as shown below.



A. Operating Plate
B. Gear Positioning Lever
C. Bolt
D. Spring
E. Stopper

●Fit the shift shaft oil seal guide (special tool) in the oil seal in the left crankcase half, and insert the shift shaft into the crankcase.



A. Shift Shaft Oil Seal Guide: 57001-264
B. Shift Shaft Oil Seal

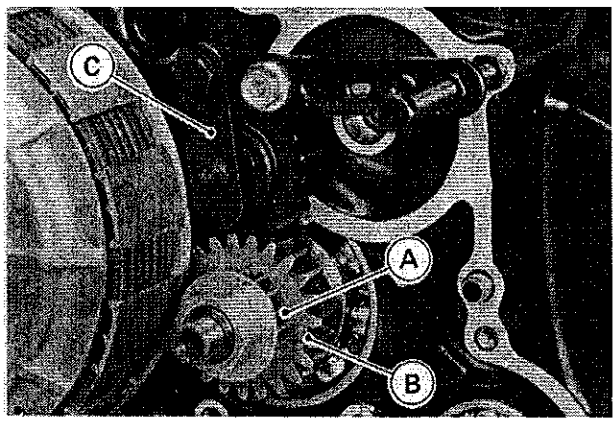
External Shift Mechanism Inspection

●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, repalce the shaft.
○Check the return spring and arm spring for breaks 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 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 (see Exploded Veiw).

Primary Gear

Primary Gear Removal

●Remove the following parts before primary gear removal.
  ○Right engine cover
  ○Oil Pump
●Using the gear holder (special tool) to prevent the clutch and primary gear from rotating, loosen the primary gear nut.
●Remove the clutch housing and oil pump drive gear, then remove the primary gear.



A. Oil pump Driver Gear C. Gear Holder: 57001-1015
B. Primary Gear

Primary Gear Installation Note

●Replace the lockwasher with a new one, and tighten the primary gear nut to the specified torque.

Kick Starter

Kick Starter Removal

●Remove the following parts before kick starter removal.
- ○Kick pedal
- ○Right engine cover
- ○Kick spring lower end
- ○Spring guide
- ○Kick spring

●Remove the kick shaft assembly by twisting it to the left.

Kick Starter Installation Note

Refer to p. 4-11 of the Base Manual noting the following exception.

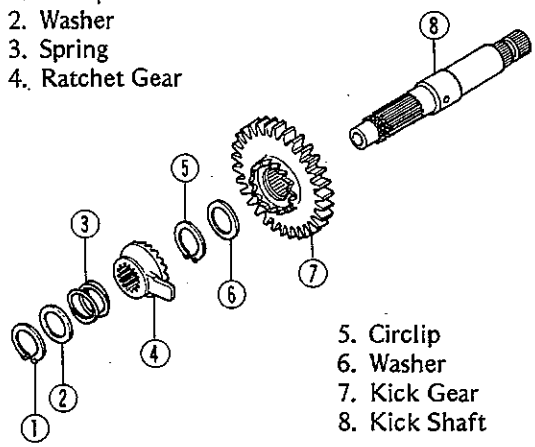
●Put the thrust washer on the kick shaft end, and fit the kick shaft assembly to the right crankcase.

Kick Starter Disassembly and Assembly Note

Refer to p. 4-12 of the Base Manual.

Kickstarter

1. Circlip
2. Washer
3. Spring
4. Ratchet Gear



5. Circlip
6. Washer
7. Kick Gear
8. Kick Shaft

Kick Starter Idle Gear Removal and Installation Notes

●Remove the right engine cover and clutch housing before idle gear removal.

●There is a washer on either side of the idle gear.

Engine Lubrication System

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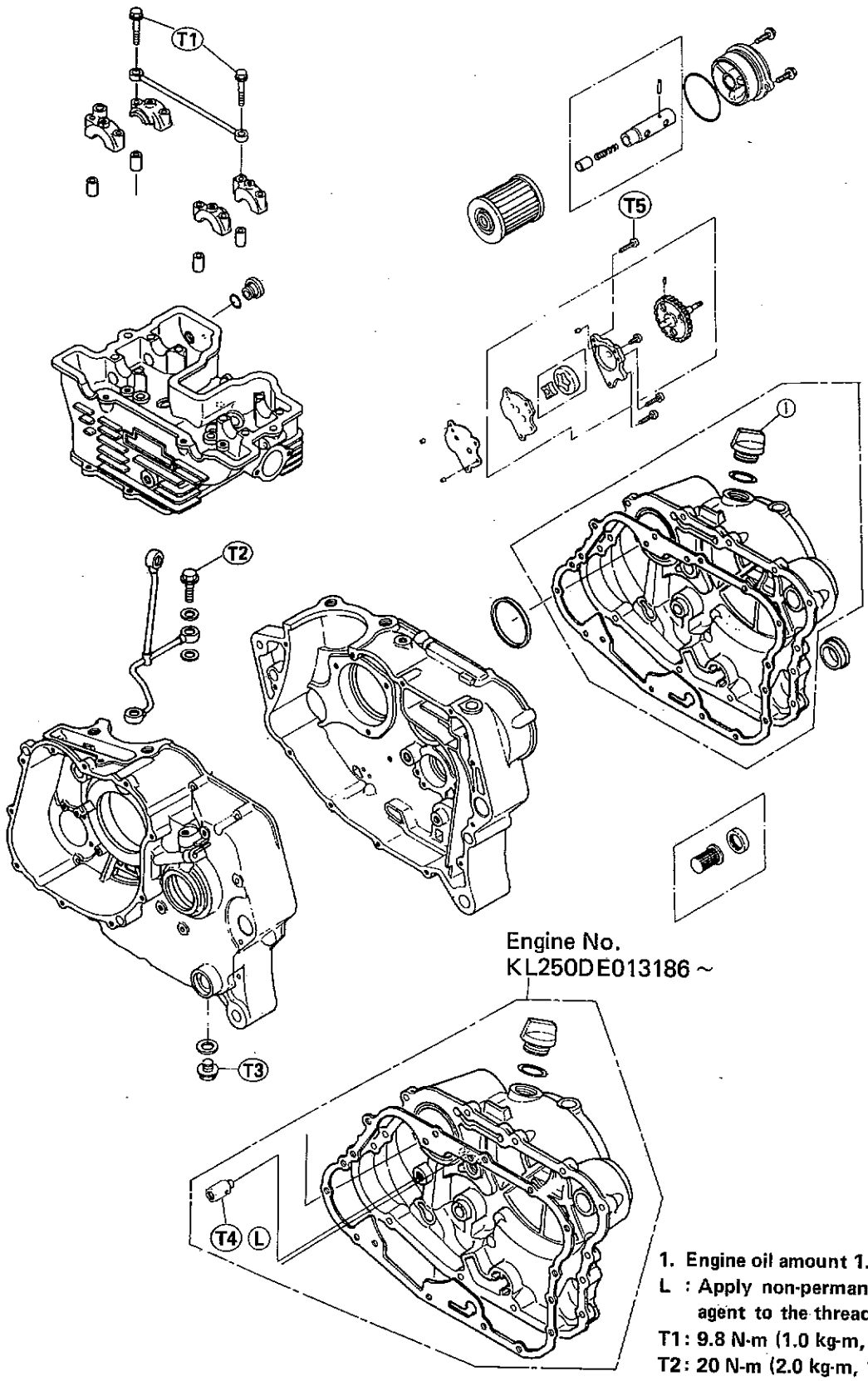
Exploded Views



1. Engine oil amount 1.5 L
L : Apply non-permanent locking agent to the threads.
T1: 9.8 N-m (1.0 kg-m, 87 in-lb)
T2: 20 N-m (2.0 kg-m, 14.5 ft-lb)
T3: 23 N-m (2.3 kg-m, 16.5 ft-lb)
T4: 15 N-m (1.5 kg-m, 11.0 ft-lb)
T5: 5.9 N-m (0.5 kg-m, 43 in-lb)

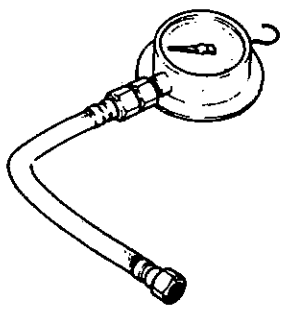
Engine Lubrication System Specifications

Item		Standard
Engine oil:	Grade	SE or SF class
	Viscosity	SAE 10W40
	Amount	1.2 L (when filter is not changed) 1.5 L (when filter is changed) Engine No. KL250DE013186 ~ : 1.7 L (when filter is not changed) 2.0 L (when filter is changed)
	Level	Between upper and lower level lines
Oil pressure @4,000 r/min (rpm), oil temp. 90°C (194°F)		More than 98 kPa (1.0 kg/cm², 14 psi)

Special Tools

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

Oil Pressure Gauge: 57001-164



Oil Pressure Gauge Adapter: 57001-1188

NOTE

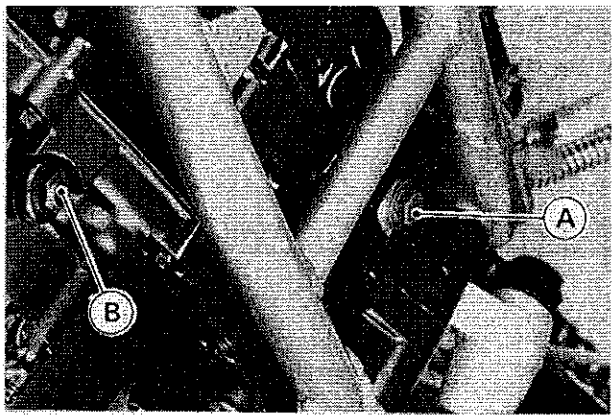
○ *The oil pressure gauge adapter (57001-1278) can be used instead of the oil pressure gauge adapter (57001-1188).*

Engine Oil

Engine Oil Change

Refer to p. 4-12 of the Base Manual noting the following exception.

- Remove the engine drain plug and oil passage plug, and let the oil drain completely.



A. Drain Plug B. Oil Passage Plug

Engine Oil

Grade : SE or SF class

Viscosity : SAE 10W40, 10W50, 20W40, or 20W50

Required Amount

When filter is not changed : 1.2 L

When filter is changed : 1.5 L

Engine No. KL250DE013186 ~

When filter is not changed : 1.7 L

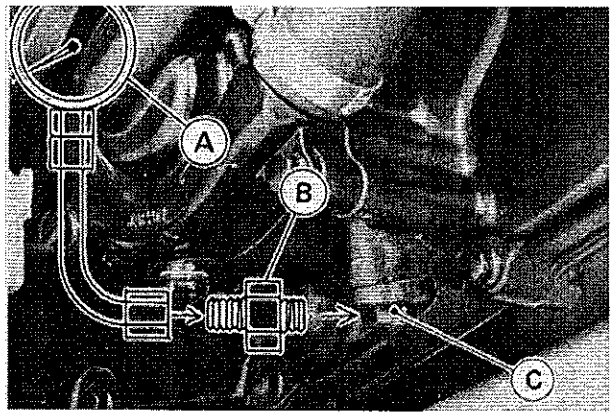
When filter is changed : 2.0 L

Oil Pressure

Oil Pressure Measurement

Refer to p. 4-14 of the Base Manual noting the following exception.

- Install an oil pressure gauge with an adapter (special tools) at the oil passege.



A. Oil Pressure Gauge: 57001-164
B. Adapter: 57001-1188

Oil Pressure

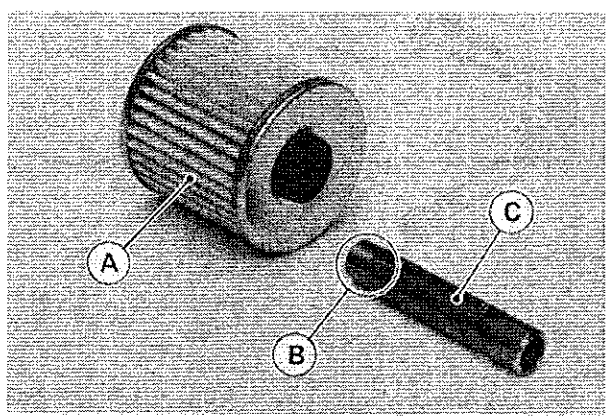
More than 98 kPa (1.0 kg/cm^2, 14 psi) @4,000 r/min (rpm), 90°C (194°F) oil temp.

Oil Filter

Oil Filter Removal and Installation Note

Refer to p. 4-13 of the Base Manual noting the following exception.

- When installing the oil filter, put the mounting pin into the filter so that the smaller diameter end is inward.

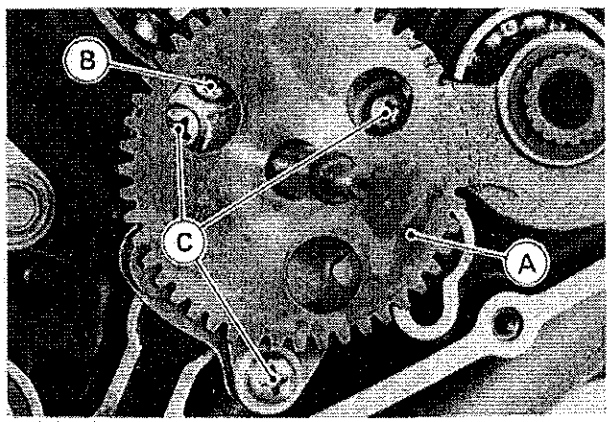


A. Oil Filter C. Mounting Pin
B. Smaller End

Oil Pump

Oil Pump Removal

- Remove the following parts before oil pump removal.
  - Right engine cover
  - Magneto cover center plug
  - Primary gear nut
  - Oil pump drive gear
- Remove the oil pump screws(3), and remove the pump.



A. Oil Pump Gear
B. Oil Pump Cover Screw: removal is not required
C. Oil Pump Screws

Oil Pump Installation Note

Refer to the p. 4-14 of the Base Manual noting the following exception.

- Before installing the oil pump, install the oil pump drive gear.

Oil Pump Disassembly

- Remove the oil pump.
- Remove the oil pump cover screw, and take off the pump cover.
- Take out the inner and outer rotor.
- Take out the pin, and pull off the oil pump gear and shaft.

Oil Pump Assembly Note

- Before installing the oil pump, be sure the shaft and rotors turn freely.

Engine Removal/Installation

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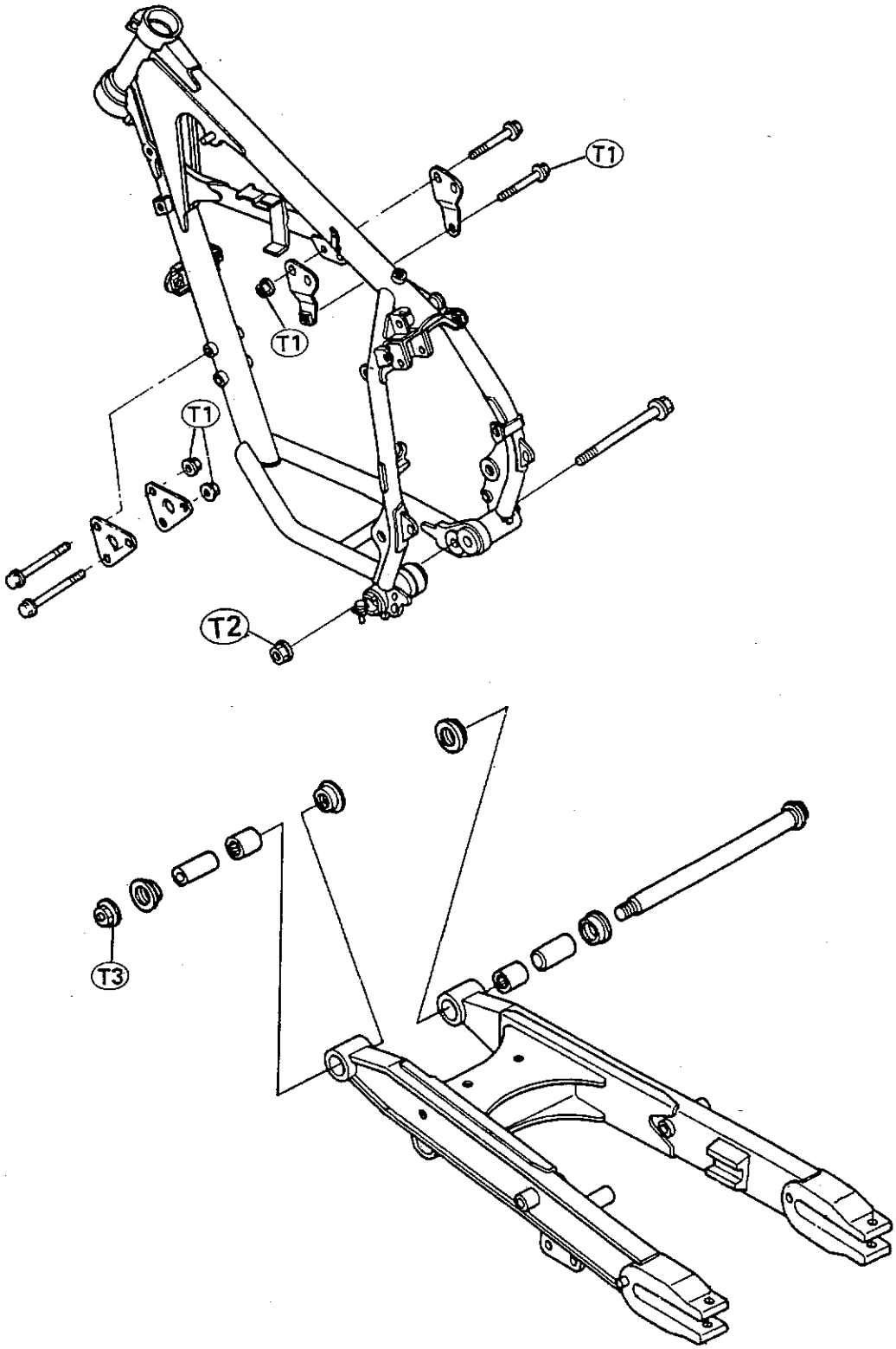
Exploded Views

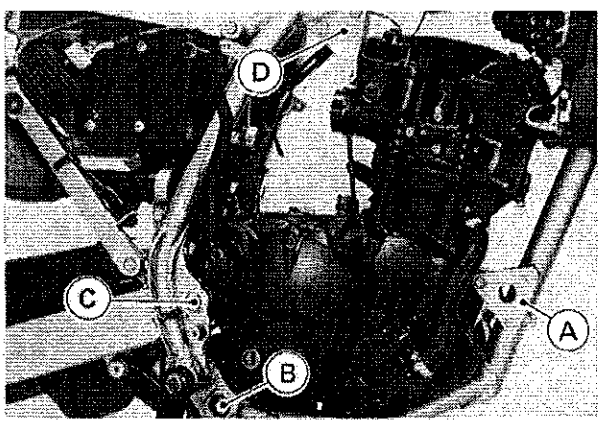


T1 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T2 : 54 N-m (5.5 kg-m, 40 ft-lb)
T3 : 98 N-m (10.0 kg-m, 72 ft-lb)

Engine Removal, Installation

Engine Removal

- Drain the engine oil.
- Drain the coolant.
- Remove the following parts.
  - Side covers
  - Seat
  - Fuel tank
  - Ignition coil
  - Exhaust pipe
  - Radiator sub tank
  - Throttle cable
  - Choke cable
  - Carburetor
  - Lower end of the clutch cable
  - Radiator hoses
  - Breather hose
  - Brake pedal
  - Rear wheel
  - Drive chain and engine sprocket
  - Skid plate
- Disconnect the wiring connectors from the engine.
  - Magneto lead
  - Neutral switch lead
  - Pickup coil lead
  - Water temperature sensor lead
- Place a stand under the frame to raise the rear wheel off the ground.
- Remove the engine brackets.
  - Engine bracket
  - Engine mounting bolt
  - Swing arm pivot shaft
  - Cylinder head bracket
- Pull the swing arm backward.
- Remove the left side footpeg.
- Remove the engine to the left.



A. Engine Bracket
B. Engine Mounting Bolt
C. Swing Arm Pivot Shaft
D. Cylinder Head Bracket

Engine Installation

- Engine Installation is the reverse of removal.
- Tighten the engine mounting bolts to the specified torque.
- Fill the engine with the specified engine oil.
- Fill the reservoir tank up to the FULL mark with coolant.
- Adjust the following items
  - Throttle cable
  - Choke cable
  - Drive chain
  - Rear Brake

Crankshaft/Transmission

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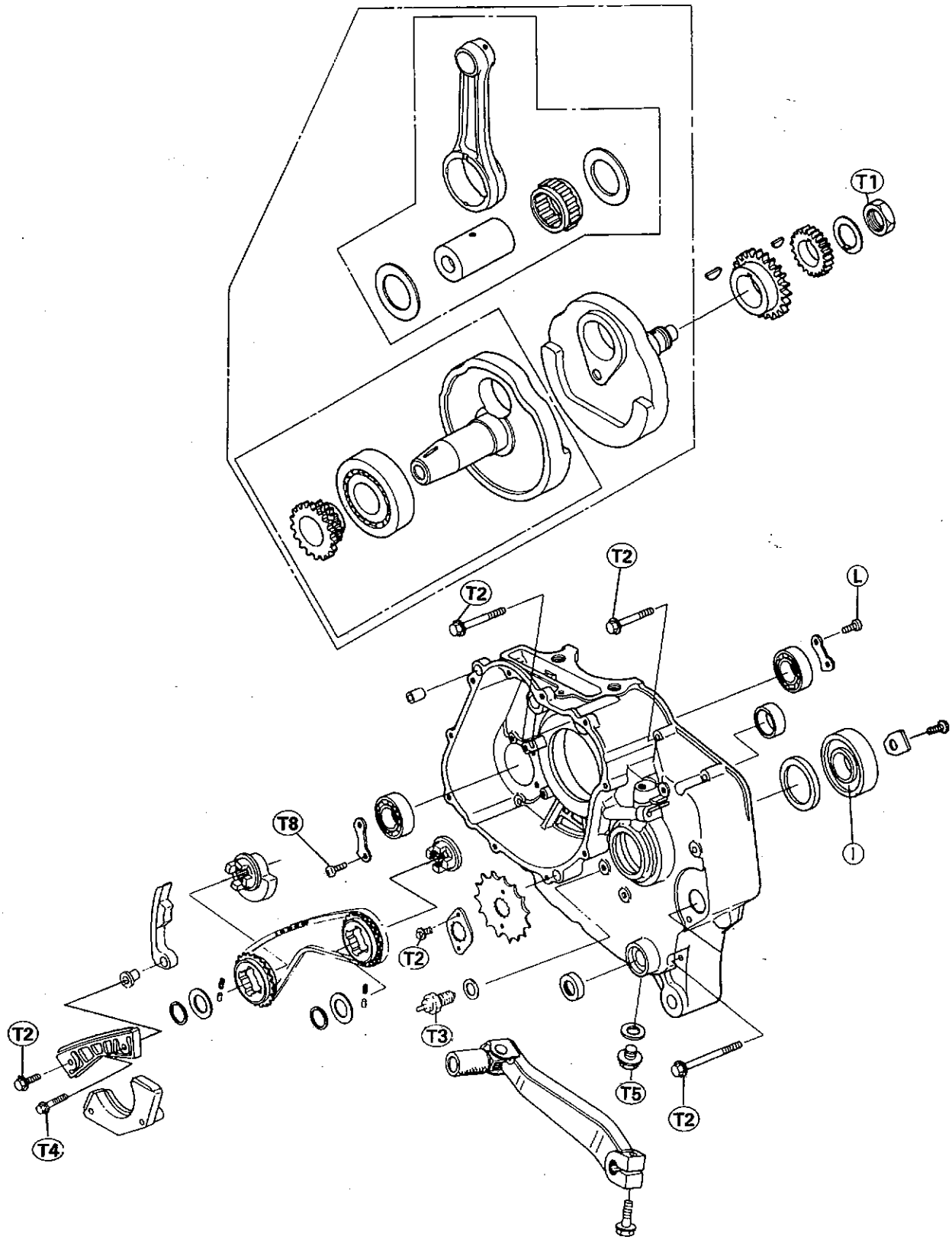
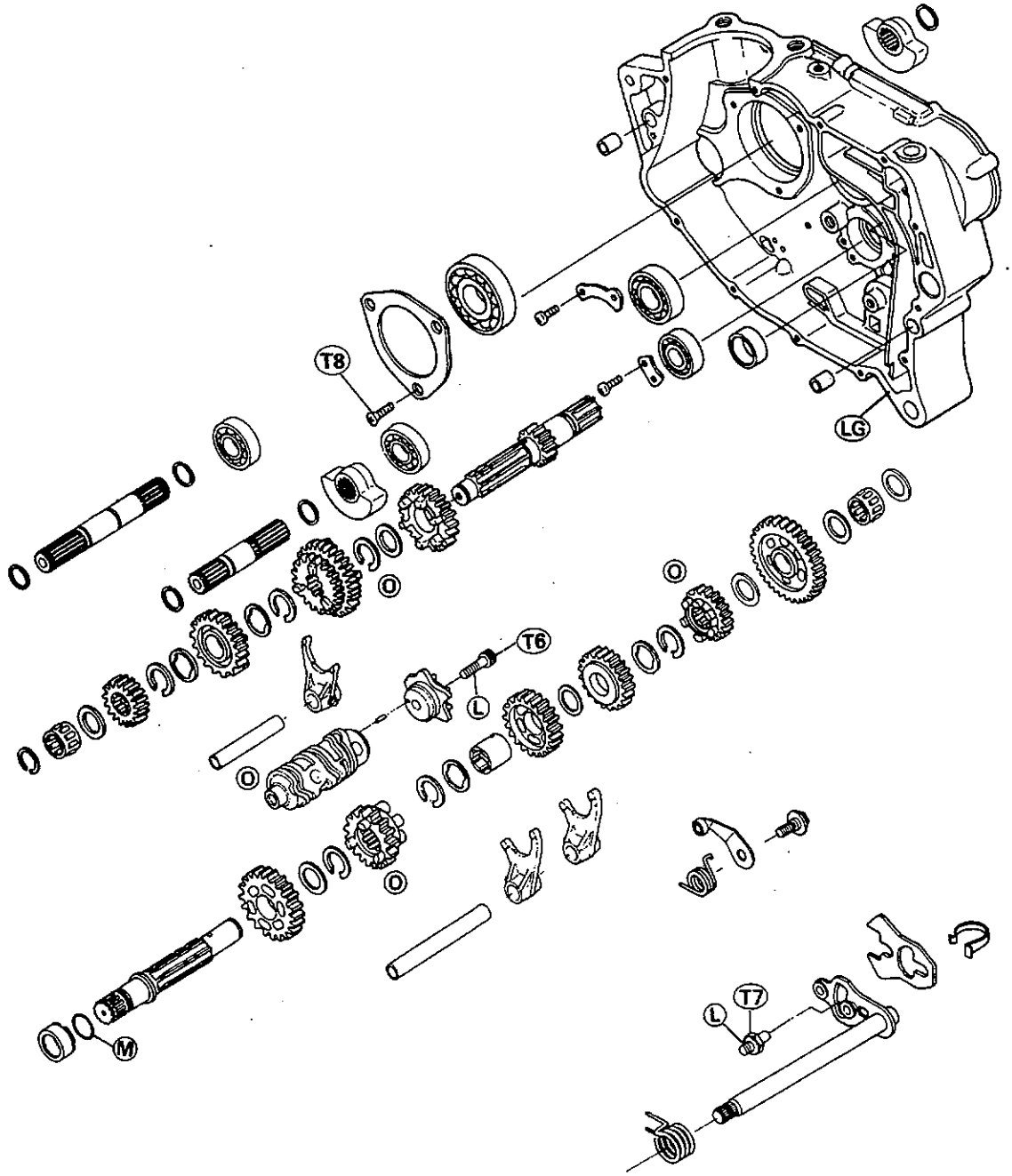
Exploded Views





1. Shielded side faces out
M : Apply molybdenum disulfide grease.
O : Apply engine oil transmission gears and shift forks.
LG : Apply liquid gasket to the crankcase mating surface.
L : Apply non-permanent locking agent to the threads.

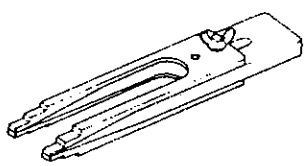
T1 : 60 N-m (6.0 kg-m, 43 ft-lb)
T2 : 10 N-m (1.0 kg-m, 7.0 ft-lb)
T3 : 15 N-m (1.5 kg-m, 11 ft-lb)
T4 : 25 N-m (2.5 kg-m, 18 ft-lb)
T5 : 23 N-m (2.25 kg-m, 16.5 ft-lb)
T6 : 10 N-m (1.2 kg-m, 8.5 ft-lb)
T7 : 40 N-m (4.0 kg-m, 29 ft-lb)
T8 : 4.9 N-m (0.5 kg-m, 43 in-lb)

Crankshaft/Transmission Specifications

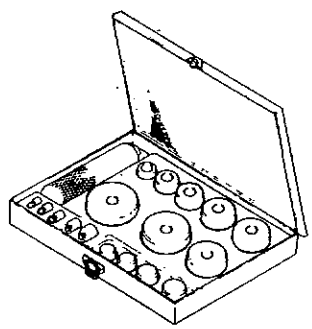
Item	Standard	Service Limit
Crankshaft, Connecting Rods:		
Connecting rod Bend	0.05/100 mm	0.2/100 mm
Connecting rod twist	– – –	0.2/100 mm
Connecting rod big end radial clearance	0.004 – 0.018 mm	0.10 mm
	D4 and after model:	
	0.008 – 0.020 mm	0.07 mm
Connecting rod big end side clearance	0.25 – 0.35 mm	0.06 mm
Crankshaft runout	L : 0.025 mm	0.06 mm TIR
	R : 0.04 mm	0.10 mm TIR
Cold-fitting tolerance between crankpin and flywheels	0.077 – 0.112 mm	– – –
Transmission:		
Gear shift fork groove width	5.05 – 5.15 mm	5.3 mm
Shift fork ear thickness	4.9 – 5.0 mm	4.8 mm
Shift fork guide pin diameter	5.9 – 6.0 mm	5.8 mm
Shift drum groove width	6.05 – 6.20 mm	6.3 mm

Special Tools

Crankshaft Installing Jig: 57001-1174



Bearing Driver Set: 57001-1129



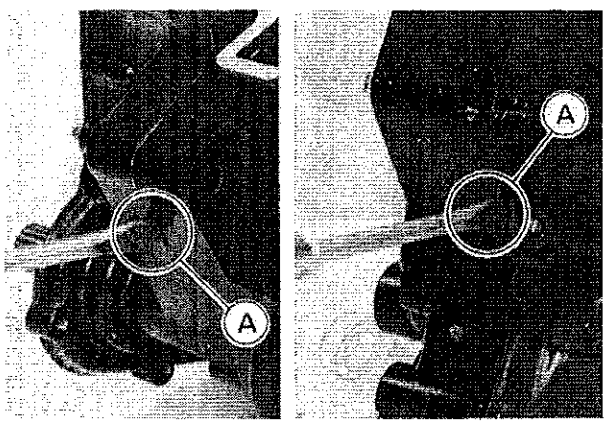
Crankcase Splitting

Crankcase Splitting

●Remove the following parts after engine removal.
- ○Cylinder head cover
- ○Camshaft chain tensioner
- ○Camshaft
- ○Cylinder head
- ○Cylinder, piston
- ○Right engine cover
- ○Clutch
- ○External shift mechanism
- ○Kick starter
- ○Water pump
- ○Oil pump
- ○Balancer
- ○Flywheel magneto

●Remove the left crankcase half bolts

●Pry at the points indicated in the figure to split the two crankcase halves apart, and them pull off the left crankcase half.



A. Pry Points

○Tap the output shaft end lightly with a mallet if necessary.

○Remove the collar at the output shaft from the left crankcase half.

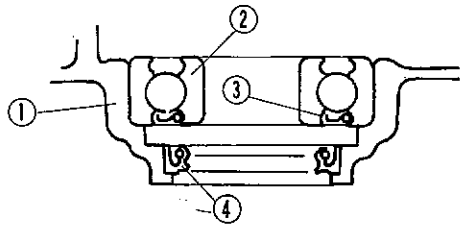
Crankcase Assembly

●Crankcase assembly is the reverse of disassembly. Pay attension to the following.

○Apply high temperature grease to the lips of the new oil seals.

○Install the output shaft oil seal and bearing into the left crankcase half as shown.

Output Oil Seal, Ball Bearing Installation



1. Crankcase
2. Ball Bearing
3. Shield sides face out
4. Oil Seal

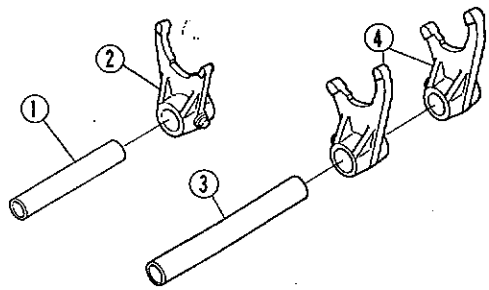
○Any oil seal that is removed is damaged and must be replaced with a new one.

○Install the ball bearings and oil seals using a press and the bearing driver set (special tool).

○Apply liquid gasket to the mating surface of the left crankcase half.

○When installing the transmission, insert the shift rods into the shift forks (see *Transmission installation Notes*).

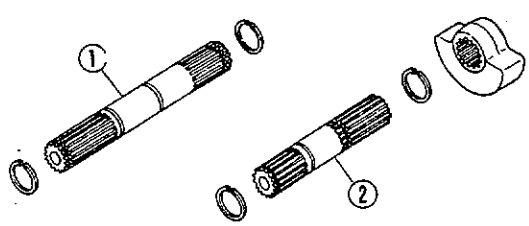
Shift Rod and Shift Fork



1. Shift Rod (Drive Shaft)
2. Shift Fork (Drive Shaft)
3. Shift Rod (Output Shaft)
4. Shift Fork (Output Shaft)

○Set the balancer shafts correctly.

Balancer Shaft



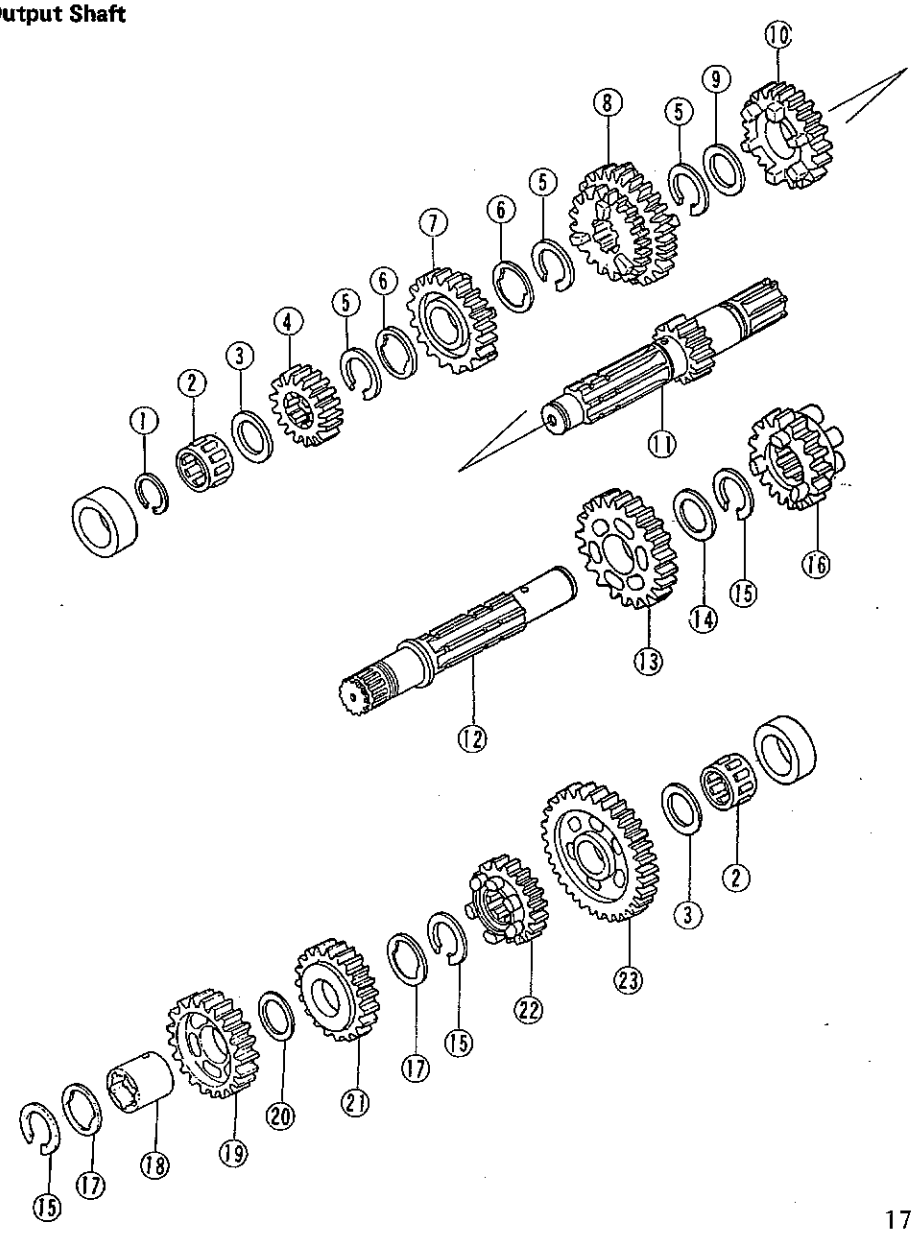
1. Front Balancer Shaft
2. Rear Balancer Shaft

Transmission

Transmission Removal

●Remove the following parts from the inside of the crankcase.
- ○Shift rods(2)
- ○Shift forks(3)
- ○Drive shaft and output shaft assemblies
- ○Shift drum (if necessary)

Drive Shaft, Output Shaft

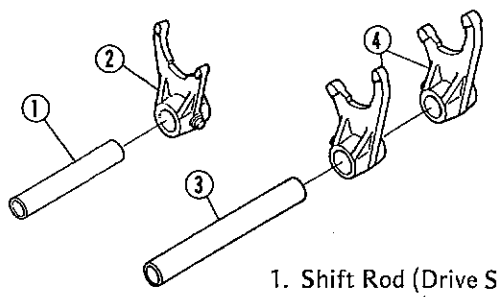


1. Circlip
2. Needle Bearing
3. Washer
4. 2nd Gear (D)
5. Circlip
6. Splined Washer
7. Top Gear (D)
8. 3rd, 4th Gear (D)
9. Washer
10. 5th Gear (D)
11. Drive Shaft
12. Output Shaft
13. 2nd Gear (O)
14. Washer
15. Circlip
16. Top Gear (O)
17. Splined Washer
18. Bushing
19. 3rd Gear (O)
20. Washer
21. 4th Gear (O)
22. 5th Gear (O)
23. 1st Gear (O)
24. Collar
25. O-ring

Transmission Installation Notes

•Installation is the reverse of removal.
•Be careful of the following items.
○Apply a little engine oil to the transmission gears, needle bearings, and shaft journals.
○Apply a little engine oil to the shift fork fingers, and fit each shift fork into its gear groove.
○Apply a little engine oil to the shift rods, and insert the short shift rod, running it through the drive shaft shift fork. Insert the long shift rod, running it through the output shaft forks.

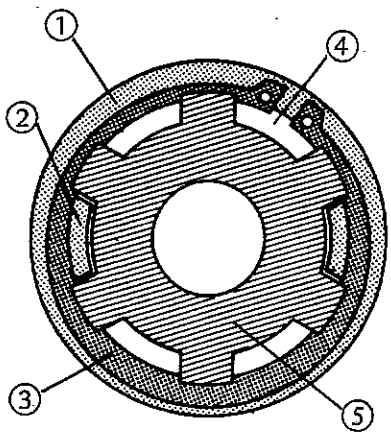
Shift Rod and Shift Fork



1. Shift Rod (Drive Shaft)
2. Shift Fork (Drive Shaft)
3. Shift Rod (Output Shaft)
4. Shift Fork (Output Shaft)

○Replace any circlips that were removed with new ones.
○Install the circlip so that its opening coincides with one of the splined grooved in the transmission shaft.
○Install the splined washers so that their teeth do not coincide with the circlip openings.

Circlip, Splined Washer Installation



1. Splined Washer
2. Tooth
3. Circlip
4. Groove
5. Shaft

○When assembling the output shaft 3rd gear bushing to the shaft, align the oil hole with the hole in the shaft.
○Fit the O-ring to the groove at the left side of the output shaft, and apply a little grease to the O-ring.
○When installing the output shaft collar to the shaft, apply a little grease to the inside of the collar and push the collar with hand.

Crankshaft

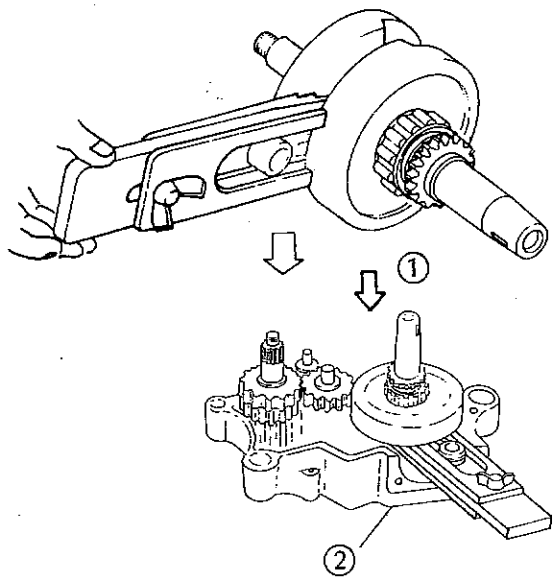
Crankshaft Removal

•Split the crankcase.
•Remove the transmission.
•Remove the crankshaft from the right crankcase half with the press.

Crankshaft Installation Notes

•Fit the crankshaft assembly into the right crankcase using a crankshaft installing jig inserted between the flywheels opposite the connecting rod big end.
•This special tool is easily adjustable to fit in any gap between the flywheels. Install the crankshaft as follows.

Crankshaft Installing Jig: 57001-1174



•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.
•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.

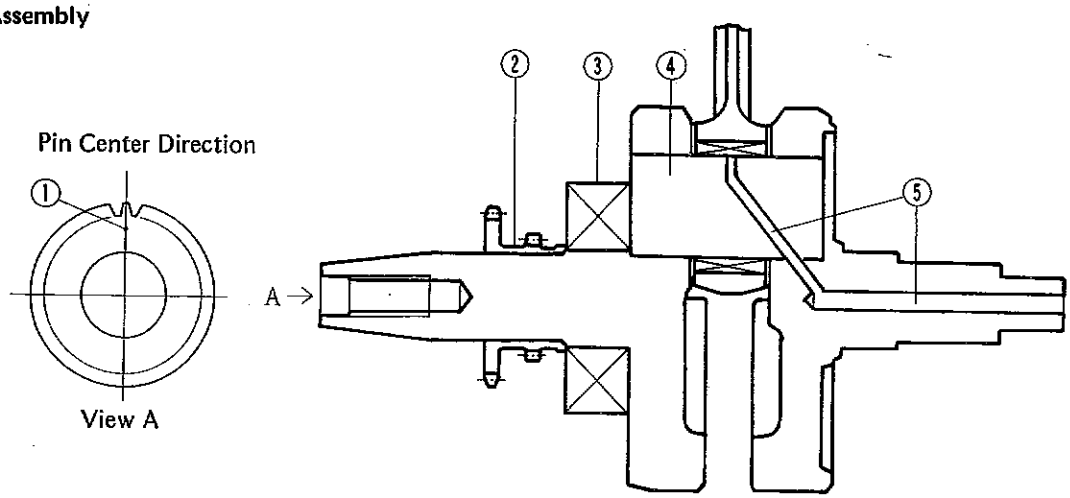
Crankshaft Disassembly and Assembly

Refer to p. 7-8 of the Base Manual noting the following exception.

Crankshaft Maintenance

Refer to p. 7-9 of the Base Manual noting the following exception.

Crankshaft Assembly



1. Sprocket Mark
2. Camshaft Chain Sprocket
3. Left Hand Main Bearing
4. Crank Pin
5. Oil Passage

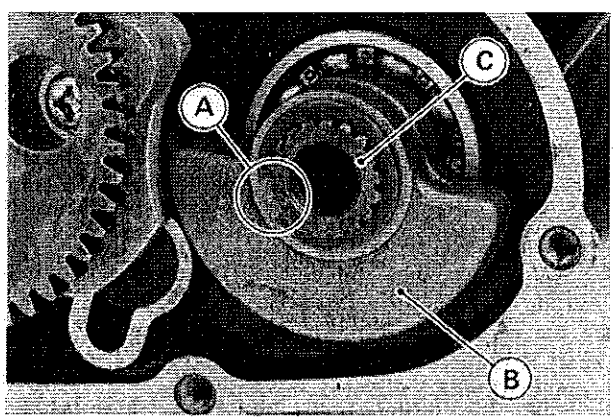
Balancer Mechanism

Front Right Side Balancer Removal

- Remove the right engine cover before balancer removal.
- Remove the circlip and washer, and the take the balancer weight off the right end of the balancer shaft.

Front Right Side Balancer Installation

- The balancer shaft and weight have punch marks. When installing the weight, align the marks on the shaft and weight.



A. Align the Marks
B. Balancer Weight
C. Balancer Shaft

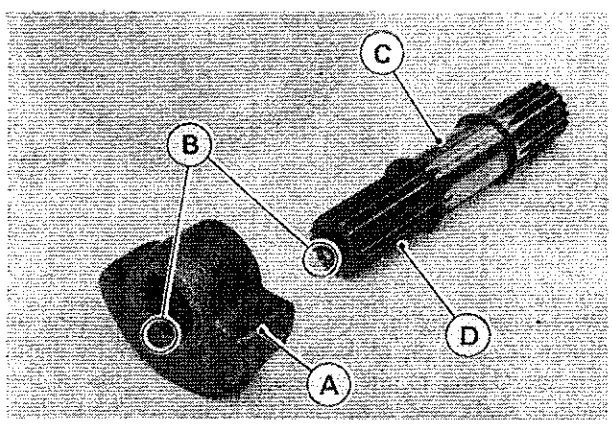
Rear Balancer Removal

- Split the crankcase.
- Remove the rear balancer assembly, and then separate it.

Rear Balancer Installation Note

- Align the rear balancer weight punch mark with the balancer shaft punch mark.

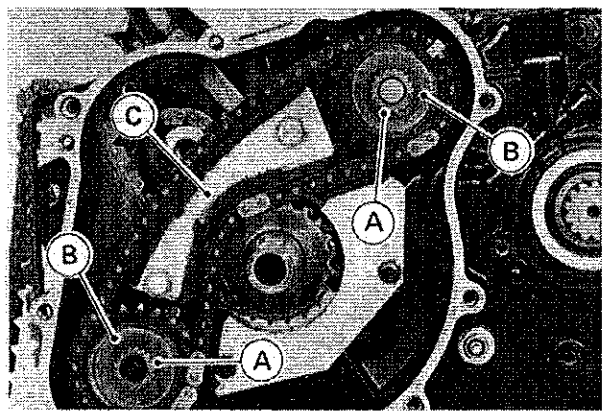
Balancer weight – Symmetry on either side.
Balancer shaft – The longer serration side toward the weight.



A. Balancer Weight
B. Align the Marks
C. Balancer Shaft
D. Longer Serration Side

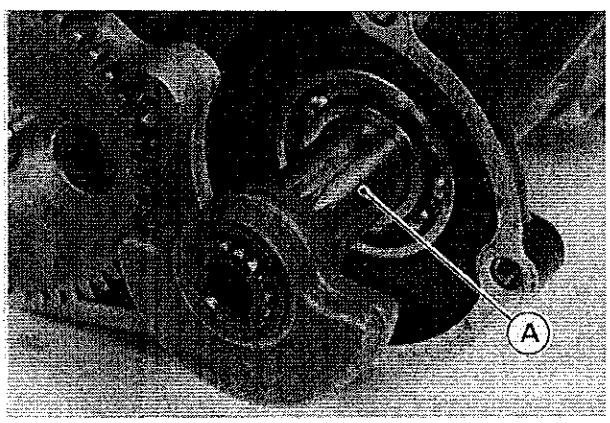
Front Left Side Balancer, Balancer Chain Removal

- Remove the following parts before balancer and balancer chain removal.
  - Magneto cover
  - Flywheel magneto
  - Left engine cover
  - Right engine cover
- Remove the circlip and washer from the front left side balancer sprocket.



A. Circlip
B. Washer
C. Balancer Chain Guide

- Pull the front balancer shaft toward the right until it is stopped by the right side of the crankcase.

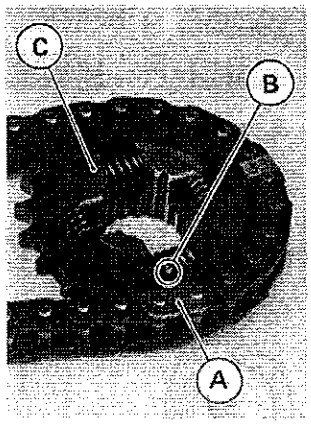


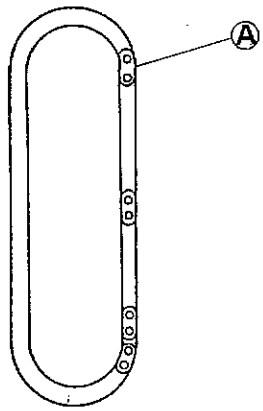
A. Balancer Shaft

- Remove the balancer chain guide.
- Remove the balancer sprockets with the balancer chain.

Front Left Side Balancer, Balancer Chain Installation (Including Chain Timing Procedure)

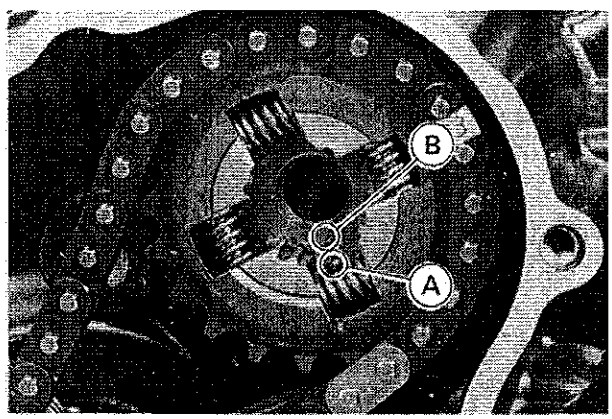
- Position the crankshaft at **TDC**.
- Engage the rear balancer sprocket punch mark with the balancer chain single plated link.





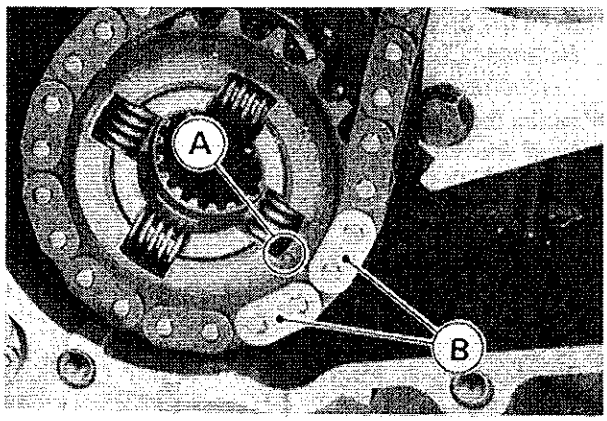
A. Single Plated Link
B. Punch Mark
C. Balancer Sprocket

- Align the rear balancer sprocket coupling punch mark with the balancer shaft punch mark.



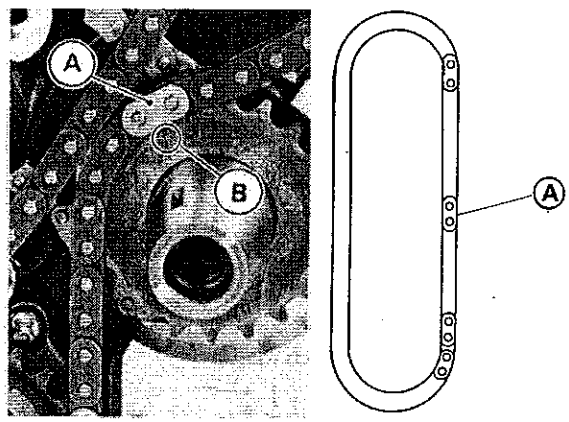
A. Coupling Punch Mark
B. Shaft Punch Mark

- Engage the front balancer sprocket punch mark with the balancer chain paired plated links.



A. Sprocket Punch Mark B. Paired Plated Links

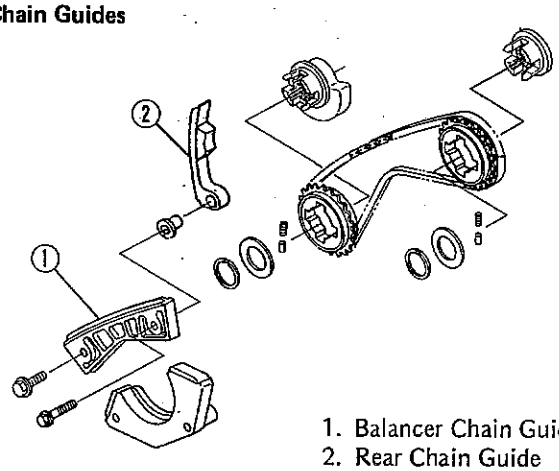
•Fit the punch maked tooth on the crankshaft sprocket into the single plate link.



A. Single Plated Link B. Punch Mark

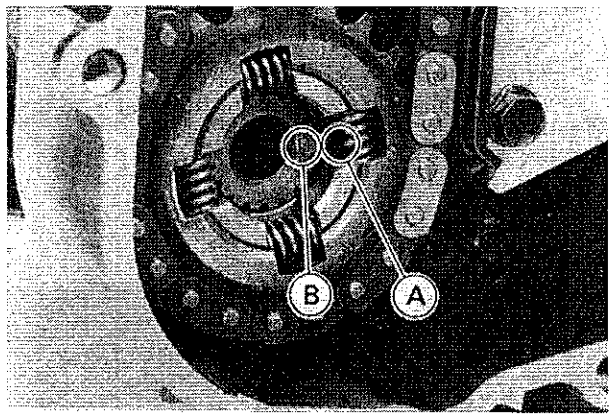
•Install the rear chain guide and balancer chain guides as shown.

Chain Guides



1. Balancer Chain Guide
2. Rear Chain Guide

•Align the punch mark on the front balancer sprocket coupling with the balancer shaft punch mark.

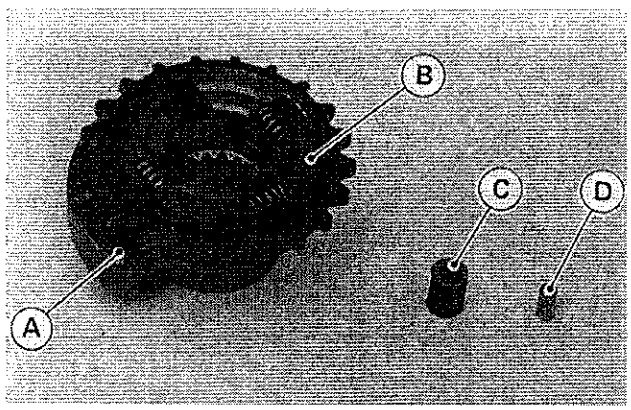


A. Coupling Punch Mark B. Shaft Punch Mark

•Push the front balancer shaft toward the inside, and insert the shaft into the front balancer sprocket coupling.
•Install the washers and circlips on the left end of the balancer shaft.

Balancer Sprocket Removal Note

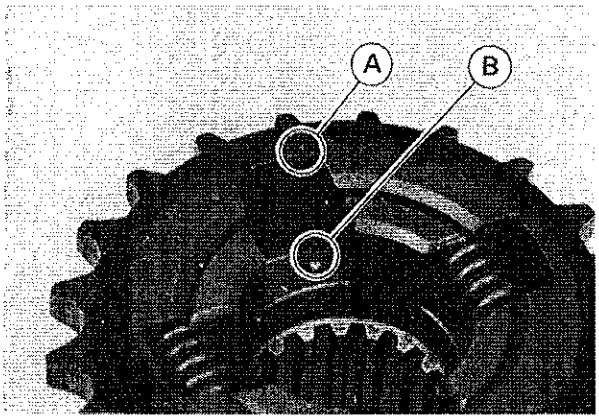
•Remove the spring and pin, then separate the sprocket and weight.



A. Balancer Weight C. Spring
B. Sprocket D. Pin

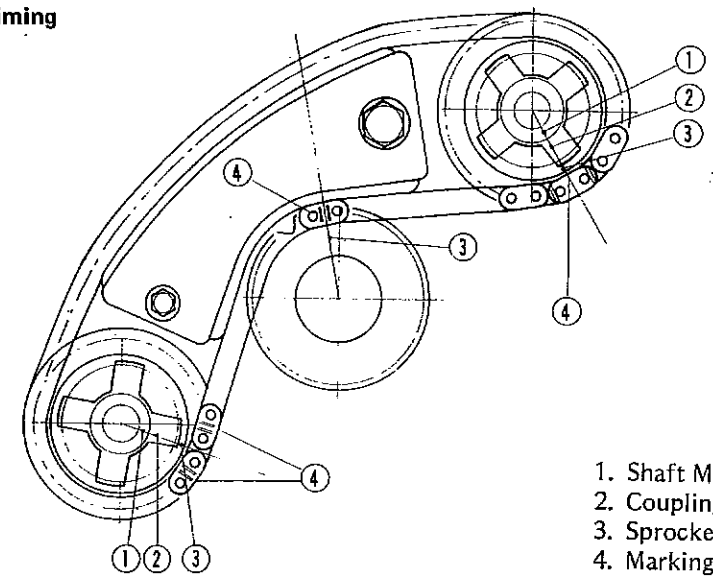
Balancer Sprocket Installation Note

•Align the sprocket punch mark with the sprocket coupling punch mark.



A. Sprocket Punch Mark B. Coupling Punch Mark

Balancer Chain Timing



1. Shaft Mark
2. Coupling Mark
3. Sprocket Mark
4. Marking Plate

Wheels/Tires

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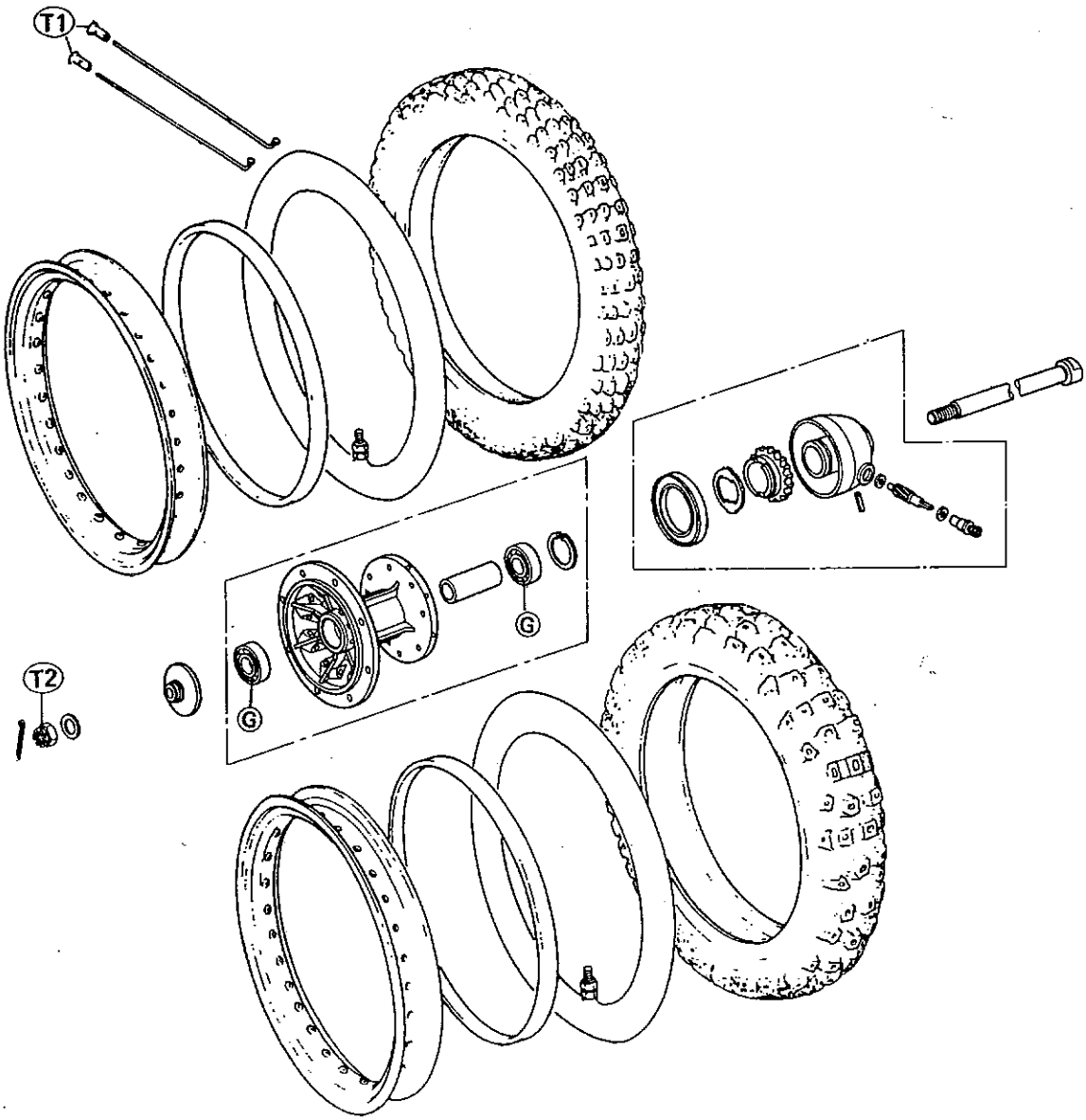
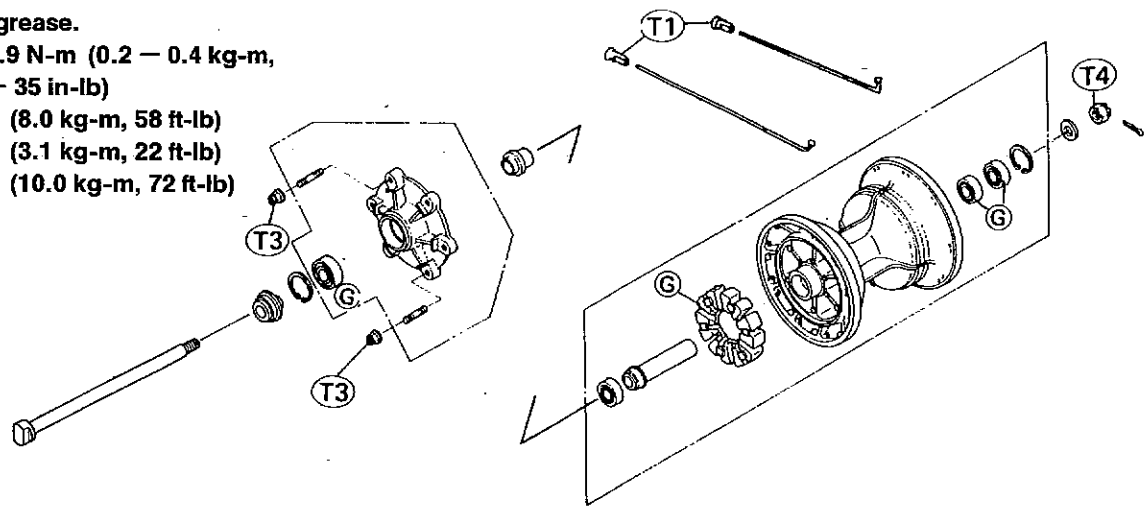
Exploded Views



G : Apply grease.
T1 : 2.0 — 3.9 N-m (0.2 — 0.4 kg-m, 17 — 35 in-lb)
T2 : 78 N-m (8.0 kg-m, 58 ft-lb)
T3 : 30 N-m (3.1 kg-m, 22 ft-lb)
T4 : 98 N-m (10.0 kg-m, 72 ft-lb)



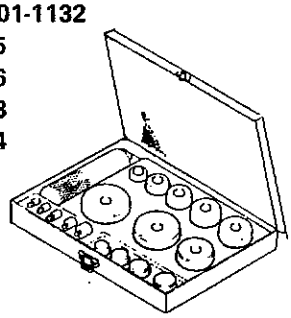
Wheels/Tires Specification

Item			Standard	Service Limit
Wheels:				
Tire tread depth:		Front	8.8 mm	2 mm
		Rear	10.5 mm	2 mm
Standard tire:		Front	3.00-21 4PR DUNLOP K750A Ⓐ DUNLOP TRAIL MAX (D6 ~)	– – – – – –
		Rear	4.60-17 4PR DUNLOP K750A/K150 Ⓐ DUNLOP TRAIL MAX (D6 ~)	– – – – – –
			Load	Air Pressure (when cold)
Tire air pressure	US and Canadian Model	Front	———	147 kPa (1.5 kg/cm², 21 psi)
		Rear	Up to 956 N (97.5 kg, 215 lb)	147 kPa (1.5 kg/cm², 21 psi)
			956 – 1,471 N (97.5 – 150 kg, 215 – 331 lb)	172 kPa (1.75 kg/cm², 25 psi)
	Other than US and Canadian Model	Front	———	147 kPa (1.5 kg/cm², 21 psi)
		Rear	Up to 1,471 N (150 kg, 331 lb)	147 kPa (1.5 kg/cm², 21 psi)
			1,471 – 1,824 N (150 – 186 kg, 331 – 410 lb)	172 kPa (1.75 kg/cm², 25 psi)
Rim runout:		Axial	– – –	2 mm
		Radial	– – –	2 mm
Axle runout/100 mm:			Less than 0.05 mm	0.2 mm

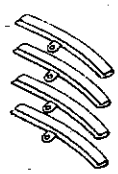
Ⓐ: Australian Model

Special Tools

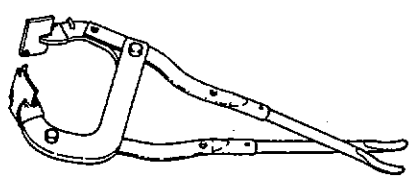
Bearing Driver Set: 57001-1129
Use the following tools in the set.
Bearing Driver Holder: 57001-1132
Bearing Driver: 57001-1135
Bearing Driver: 57001-1136
Bearing Driver: 57001-1143
Bearing Driver: 57001-1144



Rim Protector: 57001-1063



Bead Breaker Assembly : 57001-1072



Wheels

Front Wheel Removal

●Remove the speedometer cable lower end before front wheel removed.

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.**

Front Wheel Installation

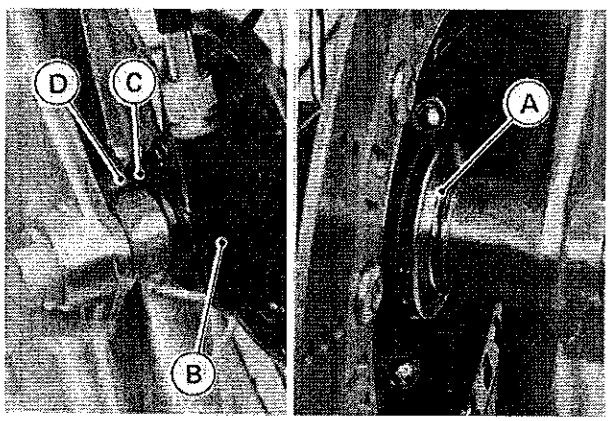
●When installing the front wheel, be careful of the following items.

○Installation is the reverse of removal.

NOTE

○*Install the speedometer gear housing so that it fits in the speedometer gear drive notches.*

○*Fit the speedometer gear housing stop to the fork leg stop, and check that the collar is on the right side of the hub.*



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

○Tighten the axle nut to the specified torque and install the new cotter pin.

○Check the front brake.

WARNING

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

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

Rear Wheel Removal

●Remove or loosen the following parts before rear wheel removal.

○Cotter pin

○Axle nut (loosen)

○Drive chain (fully loosen)

○Axle nut and axle (remove)

●Pull the drive chain toward the left, and remove the rear wheel.

Rear Wheel Installation

●When installing the rear wheel, be careful of the following items.

○Installation is the reverse of removal.

○Adjust the drive chain after installation (see Drive Chain Adjustment in Final Drive chapter).

○Tighten the axle nut to the specified torque and install the new cotter pin.

○Check the rear brake.

WARNING

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

Axle Inspection

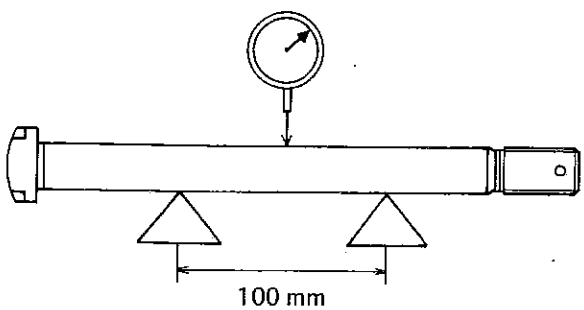
●To measure axle runout, remove the axle, place it in V blocks that are 100 mm apart, and set a dial gauge on the axle at a point halfway between the blocks. Turn the axle to measure the runout. The amount of runout is the amount of dial variation.

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

Axle Runout/100 mm

Service Limit: 0.2 mm

Axle Runout



Tires

Tire Air Pressure Measurement

Refer to p. 8-4 of the Base Manual noting the following exception.

●Check the tire pressure when the tires are cold.

Tire Air Pressure (when cold)

		Load	Air Pressure
US and Canadian Model	Front	———	147 kPa (1.5 kg/cm², 21 psi)
	Rear	Up to 956 N (97.5 kg, 215 lb)	147 kPa (1.5 kg/cm², 21 psi)
		956 – 1,471 N (97.5 – 150 kg, 215 – 331 lb)	172 kPa (1.75 kg/cm², 25 psi)
Other than US and Canadian Model	Front	———	147 kPa (1.5 kg/cm², 21psi)
	Rear	Up to 1,471 N (150 kg, 331 lb)	147 kPa (1.5 kg/cm², 21 psi)
		1,471 – 1,824 N (150 – 186 kg, 331 – 410 lb)	172 kPa (1.75 kg/cm², 25 psi)

Tire Wear Inspection

Refer to p. 8-5 of the Base Manual noting the following exception.

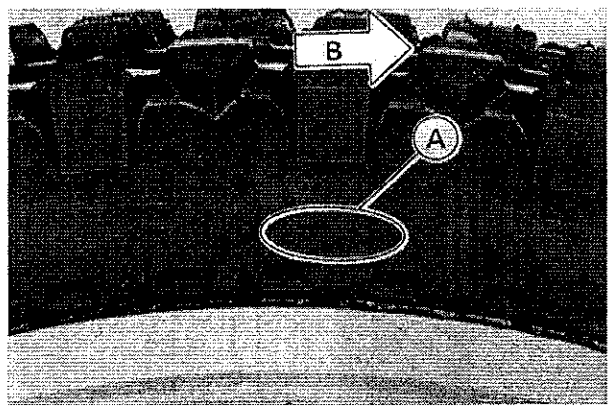
Tire Tread Depth

Front	**Standard**	**8.8 mm**
	Service Limit	**2 mm**
Rear	**Standard**	**10.5 mm**
	Service Limit	**2 mm**

Standard Tire

Front	**Size**	**3.00-21 4PR**
	Make, Type	**DUNLOP K750A**
		Ⓐ DUNLOP TRAIL MAX (D6 ~)
Rear	**Size**	**4.60-17 4PR**
	Make, Type	**DUNLOP K750A/K150**
		Ⓐ DUNLOP TRAIL MAX (D6 ~)

Ⓐ : Australian Model



A. Arrow Mark B. Wheel Rotation

Tire Removal and Installation

Refer to p. 8-4 of the Base Manual noting the following exception.

●Check the tire rotation mark on the front and rear tires.

NOTE

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

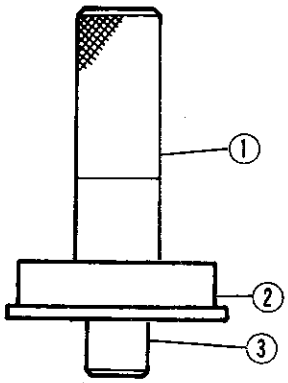
Wheel Bearings

Wheel Bearing Installation Note

Refer to p. 8-7 of the Base Manual noting the following exception.

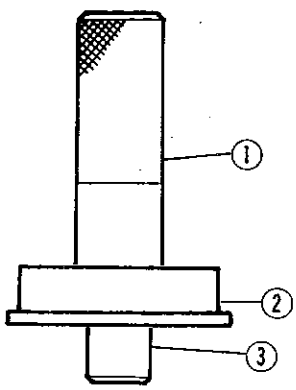
●Press each bearing into the hub with a bearing driver (special tool).

Front



1. Bearing Driver Holder: 57001-1132
2. Bearing Driver
   Disc Side: 57001-1144
   Speedometer Gear Side: 57001-1143
3. Bearing Driver
   Disc Side: 57001-1136
   Speedometer Gear Side: 57001-1135

Rear

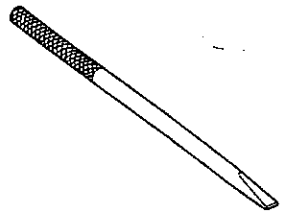


1. Bearing Driver Holder: 57001-1132
2. Bearing Driver: 57001-1143
3. Bearing Driver: 57001-1136

Special Tools (Addition)

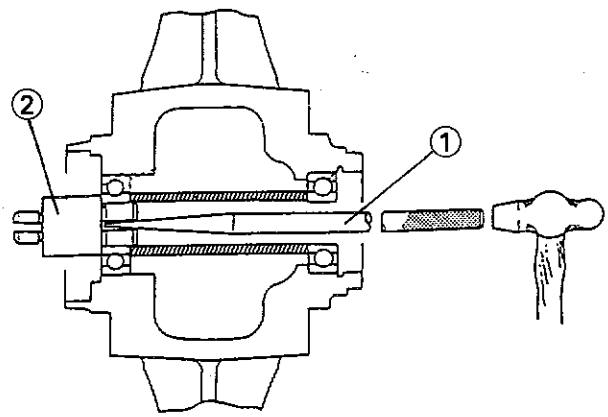
The following special tools are newly available.

Bearing Remover Shaft: 57001-1265



Bearing Remover Head: 57001-1267

- The bearing remover shaft and head (special tools) can be used to remove the hub bearings.



1. Bearing Remover Shaft: 57001-1265
2. Bearing Remover Head: 57001-1267

Final Drive

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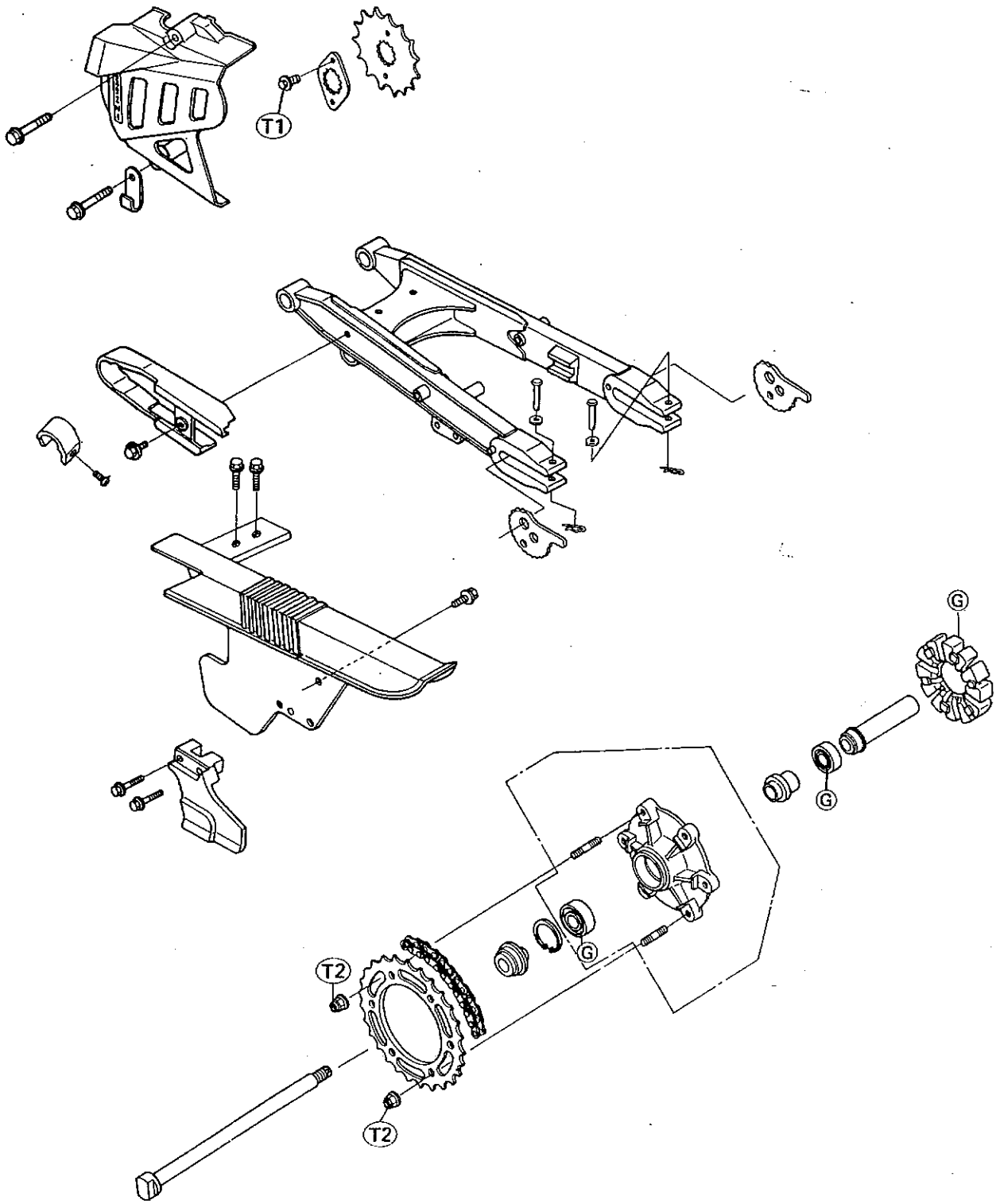


G : Apply grease.
T1 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T2 : 30 N-m (3.1 kg-m, 22 ft-lb)

Final Drive Specifications

Item	Standard	Service Limit
Drive Chain:		
Standard chain		
Make	ENUMA CHAIN	- - -
Type	Endless EK520 L-O	- - -
Link	104 links	- - -
Chain slack	0 ~ 5 mm (space between chain and swing arm)	- - -
	Reference: 20 ~ 35 mm (midway between sprockets)	Too tight: less than 20 mm Too loose: more than 40 mm
20-link length	317.5 ~ 318.2 mm	323 mm
Sprockets:		
Engine sprocket diameter	65.58 ~ 65.78 mm	64.9 mm
Rear sprocket diameter	212.42 ~ 212.92 mm/44T	212.2 mm
	※ 202.32 ~ 202.82 mm/42T	202.0 mm
Rear sprocket warp	Less than 0.4 mm	0.5 mm

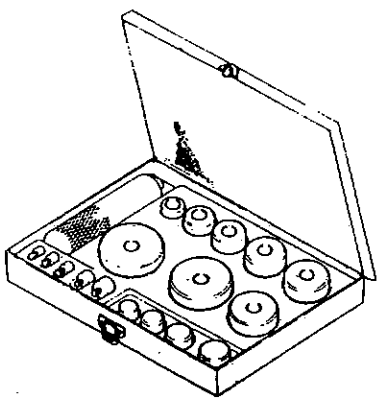
※ : Australian Model D6 ~, European and German Models D7 ~, Swedish Model D8 ~

Special Tools

Bearing Driver Set: 57001-1129

Use following tools in the set.

Bearing Driver Holder: 57001-1132
Bearing Driver: 57001-1136
Bearing Driver: 57001-1145



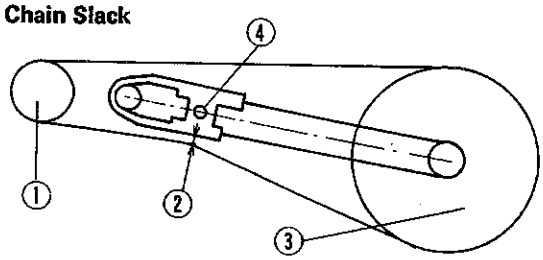
Drive Chain

Drive Chain Slack Inspection

Refer to p. 9-3 of the Base Manual noting the following exception.

- To measure the chain slack, pull up the lower run of the drive chain.
- The space between the chain and swing arm at the swing arm protector mounting bolt is the chain slack.

Chain Slack



1. Engine Sprocket
2. Space (Chain and Swing Arm)
3. Rear Sprocket
4. Protector Mounting Bolt

Drive Chain Slack

Standard:	**0 – 5 mm**
Reference (vertical movement midway between sprockets)	
Standard:	**20 – 35 mm**
Too Tight:	**Less than 20 mm**
Too Loose:	**More than 40 mm**

★If the drive chain is too tight or too loose, adjust it so that the chain slack will be within the standard value.

Drive Chain Slack Adjustment

- Remove the cotter pin, and loosen the rear axle nut.
- Rotate the chain adjuster at each end of the swing arm to obtain the specified chain slack.
- Make sure both adjusters are set to the same position for correct wheel alignment.
- Center the brake panel assembly in the brake drum. This is done by tightening the axle lightly, spinning the wheel, and depressing the brake pedal forcefully. The partially tightened axle allows the brake panel assembly to center itself in the brake drum.

NOTE

○*This procedure can prevent a soft, or "spongy feeling" brake.*

- Tighten the axle nut to the specified torque.
- Rotate the wheel, measure the chain slack again at the tightest position, and readjust if necessary.
- Insert a new cotter pin through the axle nut and axle, and spread its ends.

WARNING

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

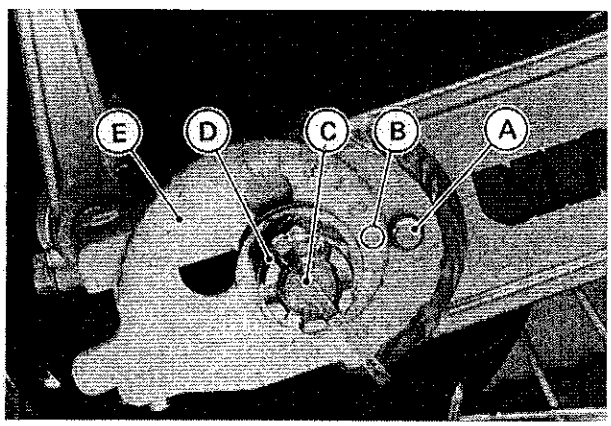
- Check the rear brake. (see the Brakes section).

Wheel Alignment Adjustment

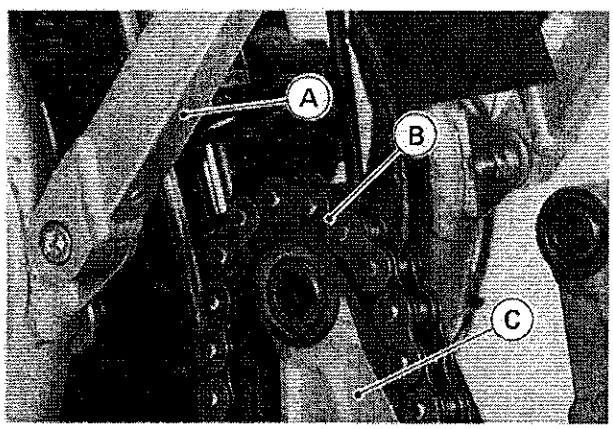
See drive chain adjustment.

Drive Chain Removal

- Remove the following parts before drive chain removal.
  - ○Rear wheel
  - ○Footpeg
  - ○Brake pedal
  - ○Swing arm pivot shaft
  - ○Engine sprocket
- Lift the front part of the swing arm, and take out the drive chain between the rear frame and swing arm.



A. Swing Arm Pin
B. Chain Adjuster Mark
C. Cotter Pin
D. Rear Axle Nut
E. Chain Adjuster



A. Rear Frame
B. Swing Arm
C. Drive Chain

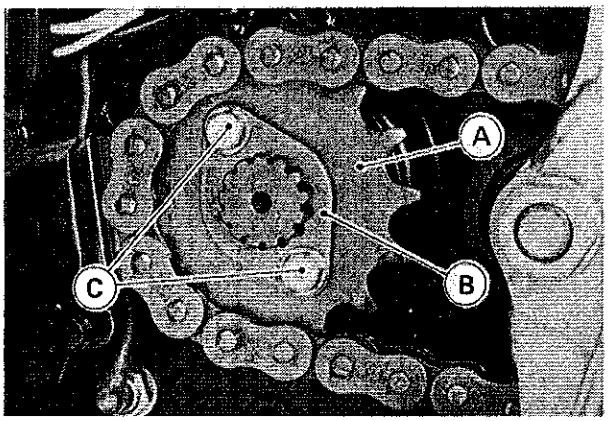
Drive Chain Installation

- When installing the drive chain, be careful of the following items.
  - Installation is the reverse of removal.
  - Adjust the drive chain after installation.
  - Tighten the pivot shaft nut to the specified torque.
  - Adjust the rear brake after installation.

Sprocket, Coupling

Engine Sprocket Removal

- Remove the engine sprocket cover.
- Unscrew the engine sprocket bolts while applying the rear brake, and take off the holding plate.



A. Engine Sprocket
B. Holding Plate
C. Sprocket Bolts

- Remove the rear axle.
- Remove the engine sprocket with drive chain.
- Remove the sprocket from the drive chain.

Engine Sprocket Installation

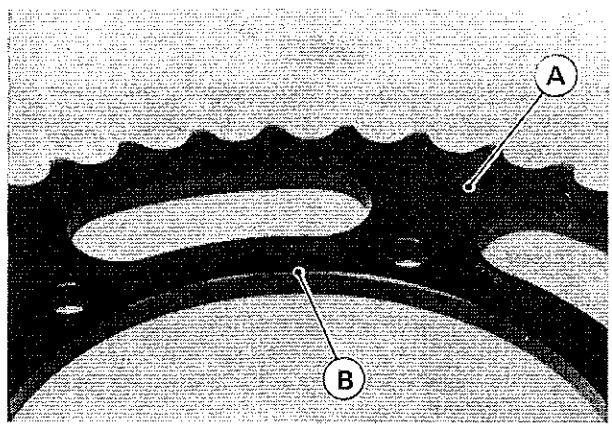
- Engine the sprocket with the drive chain so that the shoulder faces inside.
- Install the sprocket onto the output shaft, and finger tighten the sprocket bolts.
- Install the rear axle, and adjust the chain slack.
- Tighten the sprocket bolts to the specification, while applying the rear brake.
- Install the engine sprocket cover.

Rear Sprocket, Coupling Removal

- Remove the rear wheel (see rear wheel removal in Wheels/Tires chapter).
- Remove the coupling from the wheel.
- Pull out the coupling collar from the left, and the coupling sleeve from the right.
- Install the rubber damper and wheel coupling temporarily on the rear hub to aid in rear sprocket removal.
- Remove the rear sprocket nuts (6) to separate the rear sprocket from the wheel coupling.
- Remove the coupling from the rear wheel.

Rear Sprocket, Coupling Installation

- When installating the rear sprocket and coupling be careful of the following items.
  - Installation is the reverse of removal.
  - Replace the grease seal with a new one using suitable driver. Press the seal in until the face of the seal is level with the end of the grease seal hole. Apply a little grease to the grease seal lip.
  - Install the rear sprocket with the chamfered side facing toward the hub.



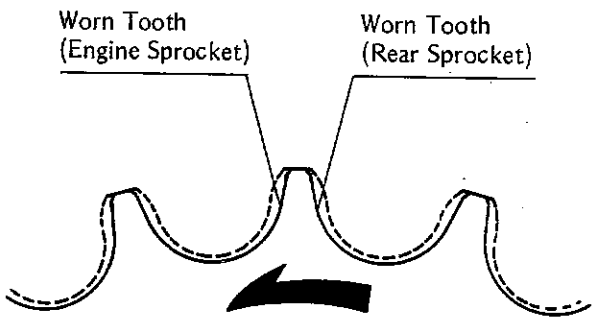
A. Rear Sprocket
B. Chamfered Side

  - Tighten the rear sprocket nuts to the specified torque, then loosen them and tighten them to the specified torque again.

Sprocket Wear

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

Sprocket Teeth



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 Sprocket

Standard	**65.58 – 65.78 mm**
Service Limit	**64.9 mm**

Rear Sprocket

Standard:	**212.42 – 212.92 mm/44 T**
	※ 202.32 – 202.82 mm/42 T
Service Limit:	**212.1 mm**
	※ 202.0 mm

※: Refer to Final Drive Specifications

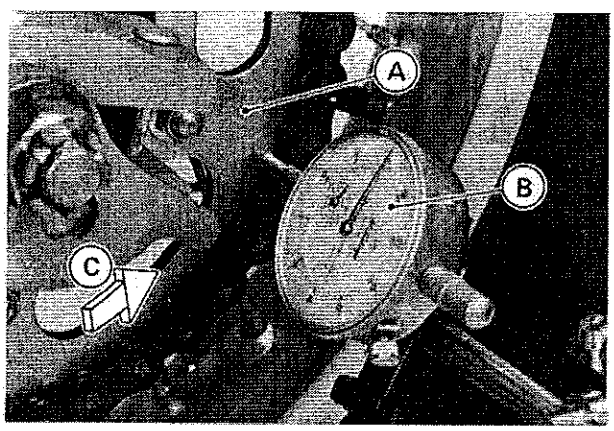
NOTE

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

Sprocket Warp

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.



A. Rear Sprocket
B. Dial Gauge
C. Turn

Rear Sprocket Warp

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

Coupling Bearing Removal

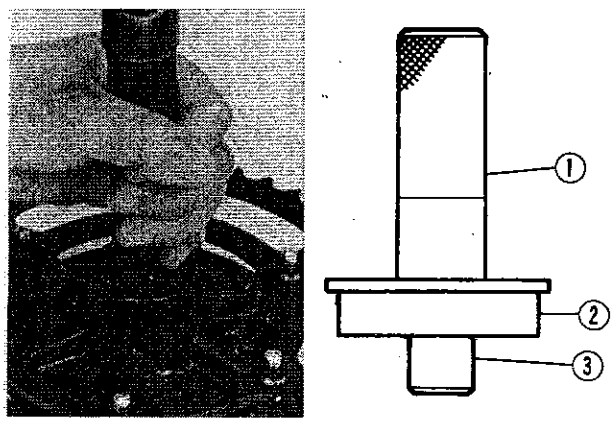
- Using a hook, pull out the grease seal and remove the circlip.
- Using bearing driver and driver holder (special tools) or some other suitable tool, remove the bearing by tapping from the wheel side.

Coupling Bearing Installation

- When installing the coupling bearing be careful of the following items.

○Installation is the reverse of removal.

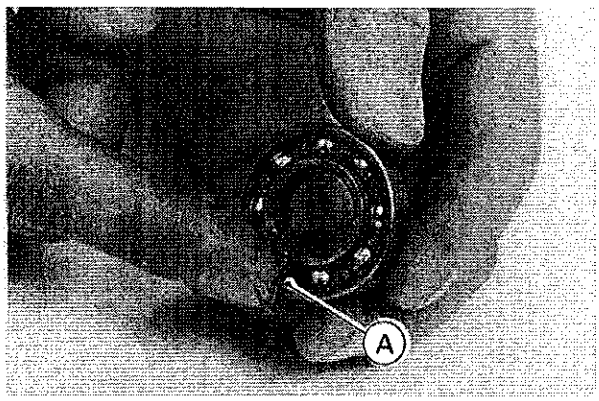
○Inspect the bearing, and replace if necessary (see Coupling Bearing Inspection). Lubricate it, and then install it using the wheel bearing driver and the bearing driver holder (special tools).



1. Bearing Driver Hodler: 57001-1132
2. Bearing Driver: 57001-1145
3. Bearing Driver: 57001-1136

Coupling Bearing Inspection and Lubrication

Since the coupling bearings are made to extremely close tolerances, the clearance cannot normally be measured. 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 same bearing is to be used again, re-wash it with a high flash-point solvent, dry it, and pack it with good quality bearing grease before installation. Turn the bearing by hand a few times to make sure the grease is distributed uniformly inside the bearing, and wipe the old grease out of the bearing housing before installation. Grease the wheel bearings in accordance with the Periodic Maintenance Chart.



A. Grease

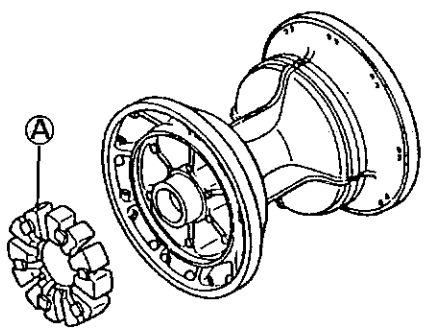
Grease Seal Inspection and Lubrication

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 the seal is removed for greasing the bearing, the seal should be replaced. The seals are generally damaged upon removal.

Damper Inspection

Remove the rear wheel coupling, and inspect the rubber damper.

Replace the damper if it appears damaged or deteriorated.



A. Rubber Damper

Brakes

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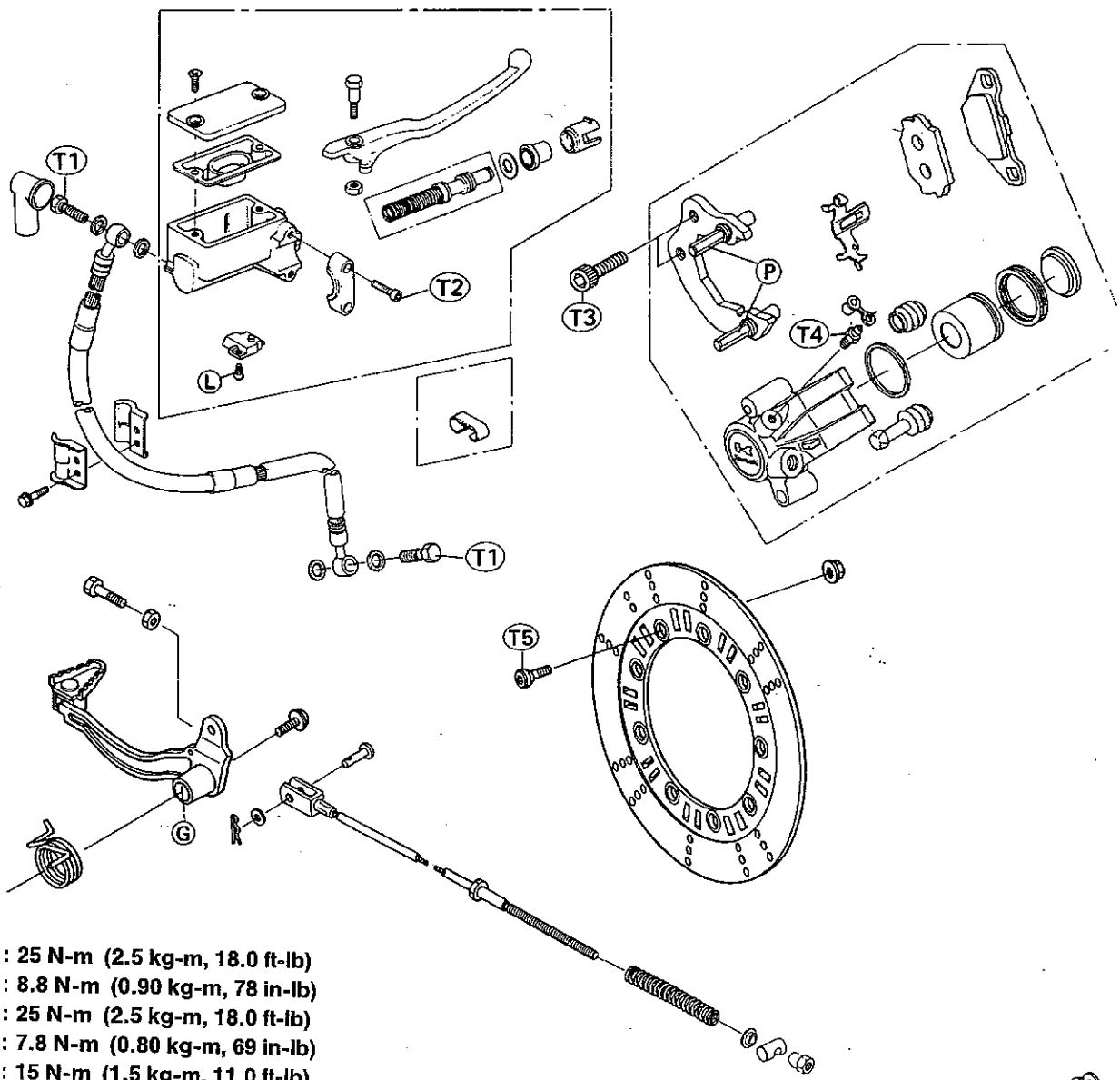
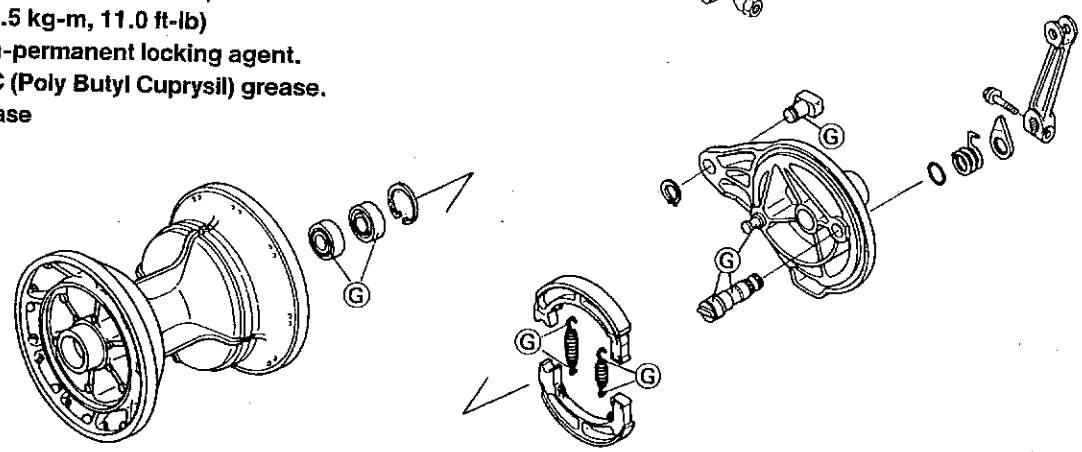


T1 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T2 : 8.8 N-m (0.90 kg-m, 78 in-lb)
T3 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T4 : 7.8 N-m (0.80 kg-m, 69 in-lb)
T5 : 15 N-m (1.5 kg-m, 11.0 ft-lb)
L : Apply non-permanent locking agent.
P : Apply PBC (Poly Butyl Cuprysil) grease.
G : Apply grease



Brakes Specifications

Item	Standard	Service Limit
Brakes:		
Pad lining thickness:	4.5 mm	1 mm
Brake fluid grade:	D.O.T.3 or 4	– – –
Brake pedal position:	0 – 30 mm	– – –
Brake pedal play:	20 – 30 mm	– – –
Disc runout:	Less than 0.15 mm	0.3 mm
Disc thickness:	2.8 – 3.1 mm	2.5 mm
Drum brake cam lever angle	80 – 90°	– – –
Drum inside diameter	120.00 – 120.14 mm	120.75 mm
Brake shoes thickness	wear indicator within the USABLE RANGE	wear indicator beyond the USABLE RANGE

Recommended Brake Fluid (D.O.T.3)

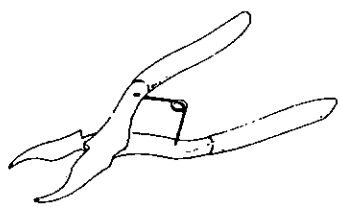
Atlas Extra Heavy Duty
Shell Super Heavy Duty
Texaco Super Heavy Duty
Wagner Lockheed Heavy Duty
Castrol Girling-Universal
Castrol GT (LMA)
Castrol Disc Brake Fluid

Recommended Brake Fluid (D.O.T.4)

Castrol Girling-Universal
Castrol GT (LMA)
Castrol Disc Brake Fluid
Check Shock Premium Heavy Duty

Special Tool

Circlip Pliers: 57001-143



Rear Brake Disassembly/Assembly

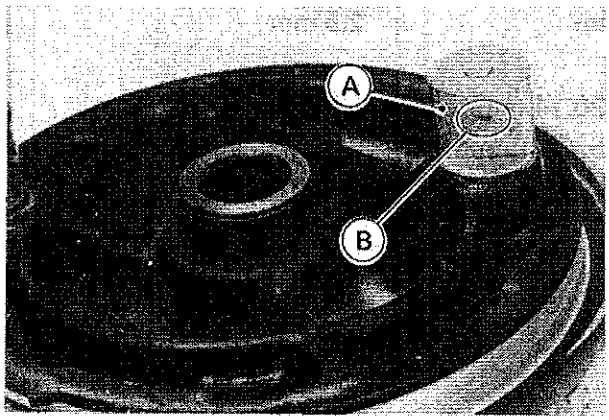
Assembly Note

Refer to p. 10-10 of the Base Manual noting the following exception.

- The camshaft must be installed so that the triangular mark on the cam surface points toward the center of the panel.

WARNING

○Improper cam installation will cause ineffective braking.

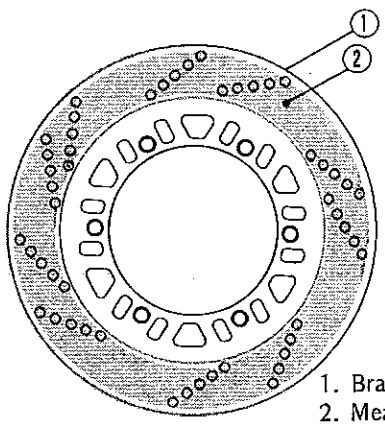


A. Brake Cam Shaft B. Triangular Mark

Brake Maintenance

Disc Wear

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



1. Brake Disc
2. Measuring Points

Disc Thickness

Standard	**2.8 – 3.1 mm**
Service Limit	**2.5 mm**

Disc Cleaning

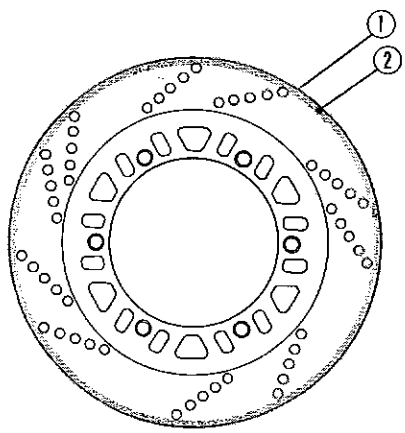
Poor braking can be caused by oil on the disc. Oil on the disc must be cleaned off with an oil-less cleaning fluid such as trichloroethylene or acetone.

WARNING

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

Disc Runout

Jack up the motorcycle so that the front wheel is off the ground, and turn the handlebar fully to one side. Set up a dial gauge against the front disc as illustrated, and measure disc runout. Remove the jack, set the motorcycle up on its center stand, and then measure the rear disc runout. If runout exceeds the service limit, replace the disc.



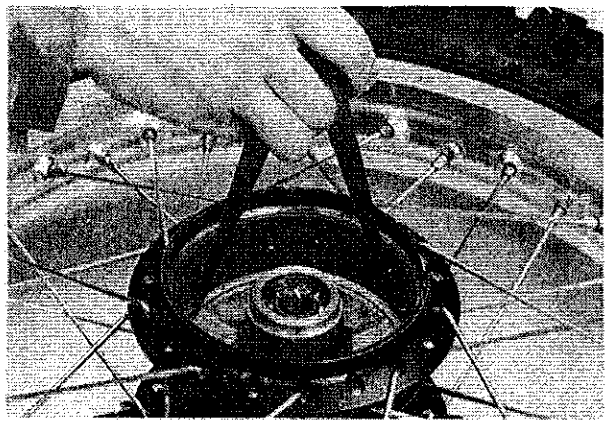
1. Brake Disc
2. Measuring Points

Disc Runout

Standard	**Under 0.1 mm**
Service Limit	**0.3 mm**

Brake Drum Wear

Measure the inside diameter of the brake drum with calipers to determine wear. Since uneven drum wear will decrease braking effectiveness, take measurement at a minimum of two places. If the drum is worn unevenly or if it is scored, turn the drum down on a brake drum lathe or replace the hub. If any diameter measurement exceeds the service limit, replace the hub.



Brake Drum Inside Diameter

Standard	**120.00 – 120.14 mm**
Service Limit	**120.75 mm**

Suspension

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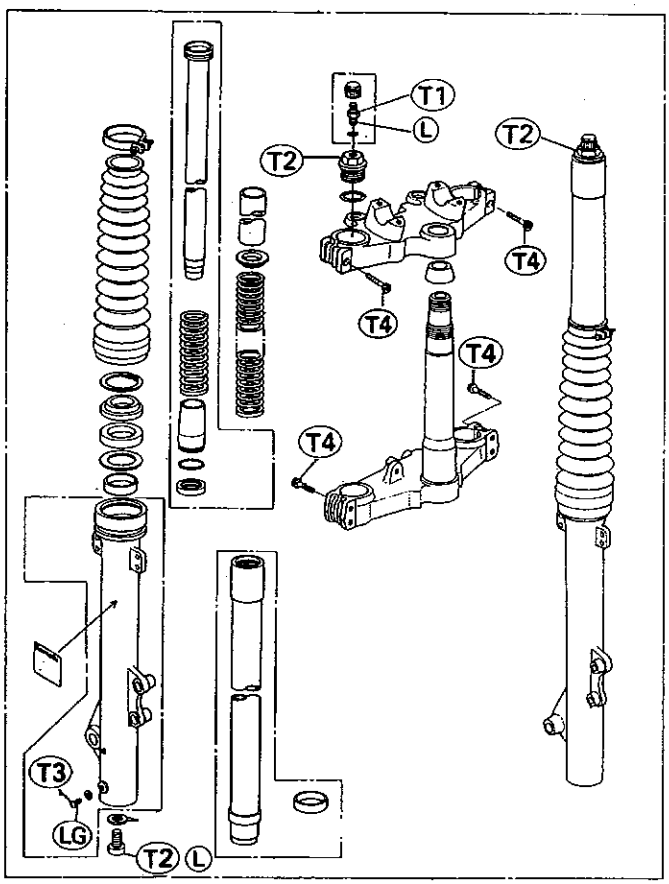
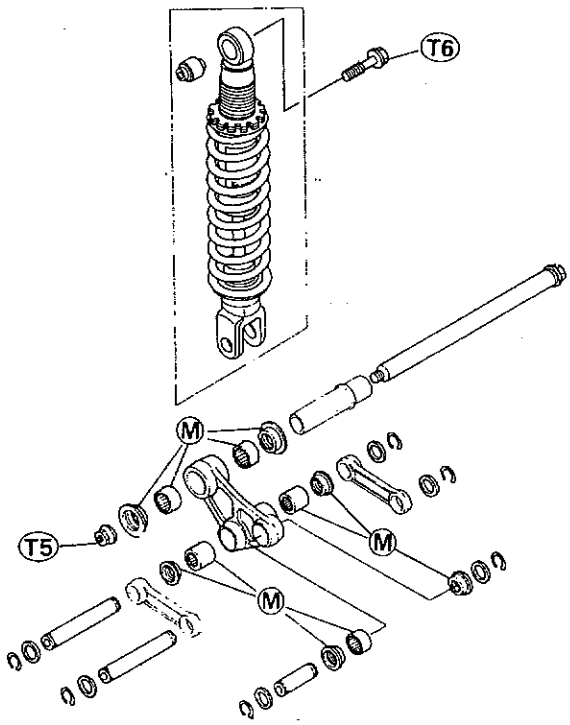
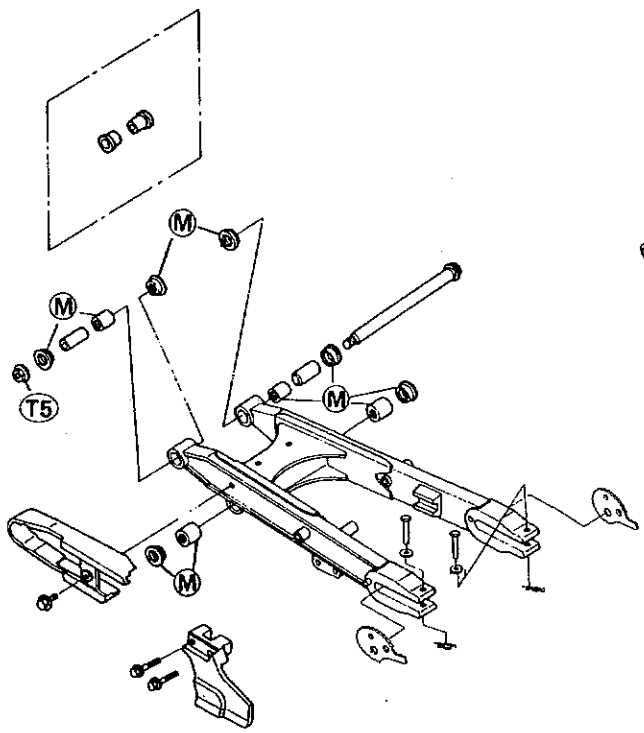






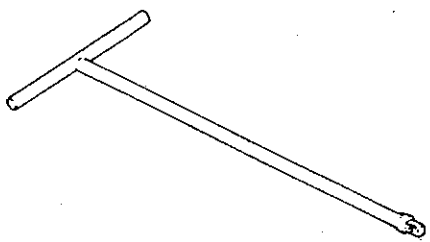
L : Apply non-permanent locking agent.
M : Apply molybdenum disulfide grease.
LG : Apply liquid gasket.
T1 : 12 N-m (1.2 kg-m, 104 in-lb)
T2 : 29 N-m (3.0 kg-m, 22 ft-lb)
T3 : 1.5 N-m (0.15 kg-m, 13 in-lb)
T4 : 21 N-m (2.0 kg-m, 15.0 ft-lb)
T5 : 98 N-m (10.0 kg-m, 72 ft-lb)
T6 : 59 N-m (6.0 kg-m, 43 ft-lb)

Suspension Specifications

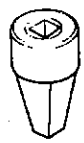
Item	Standard	Service Limit
Front Fork:		
Oil type	SAE 10W20	– – –
Oil capacity	321 – 329 mL (approx. 270 mL at oil change)	– – –
Oil level	190 ±2 mm (Fully Compressed)	– – –
Air Pressure	On road: 0 kg/cm² (atm.)	– – –
	Rough road: 0.2 – 0.3 kg/cm²	– – –
Fork spring free length	421.5 mm	413 mm
Rear Shock Absorbers:		
Spring preload adjustment	On road: 32 mm	– – –
	Rough road: 37 – 42 mm	– – –

Special Tools

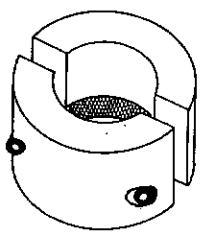
Front Fork Cylinder Holder Handle: 57001-183



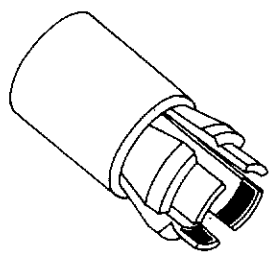
Front Fork Cylinder Holder Adapter: 57001-1057



Fork Outer Tube Weight: 57001-1218



Fork Oil Seal Driver: 57001-1219



Front Fork

Air Pressure Adjustment

●Raise the front wheel off the ground using a jack or suitable stand under the engine.

NOTE

○*Atmospheric air pressure is for riding on pavament, but it should be increased for riding on rough roads.*

Front Fork Air Pressure

On Pavement	**Atmospheric Pressure**
On Rough Roads	**20 – 29 kPa**
	(0.2 – 0.3 kg/cm², 2.8 – 4.3 psi)

CAUTION

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

WARNING

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

Fork Oil Level

Refer to p. 11-9 of the Base Manual noting the following exception.

Fork Oil Level
Standard: **188 – 192 mm below the top end of the inner tube.**

Fork Oil Change

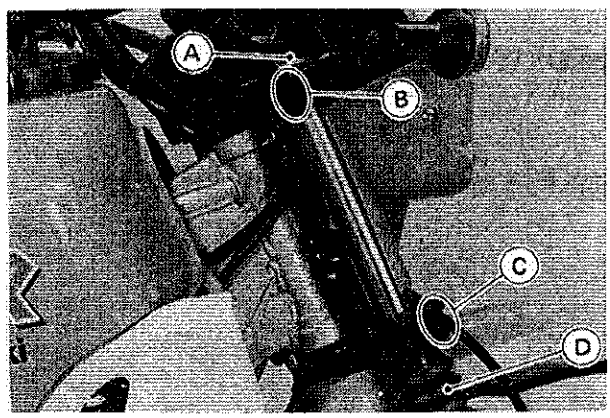
Refer to p. 11-9 of the Base Manual noting the following exception.

Front Fork Oil

Viscosity	**SAE 10W**
Amount per side	
When changing oil:	**about 270 mL**
After disassembly and completely dry:	**321 – 329 mL**

Front Fork Removal

●Remove the following parts before front fork removed.
○Release the air at the fork
○Cable clamps (Speedometer, brake hose)
○Holder (Speedometer lower end)
○Caliper (from the fork leg)
○Front wheel
○Fork top plug (loosen)
●Loosen the upper and lower fork clamp bolts.



A. Top Plug
B. Upper Clamp Bolt
C. Lower Clamp Bolt
D. Rubber Boot

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

Front Fork Installation

●When installing the fork leg, be careful of the following items.
○If the fork leg was disassembled, check the fork oil level.
○Tighten the lower and upper clamp bolts to the specified torque.
○Tighten the caliper mounting bolts to the specified torque.
○Check the front brake after installation.

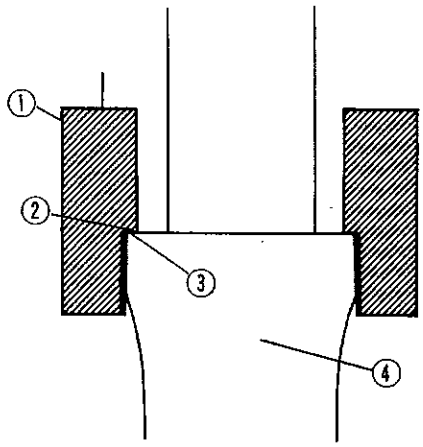
Front Fork Disassembly

See the Base Manual, noting the following.

oUse the weight (special tool) to separate the inner tube from the outer tube.

oMount the 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.

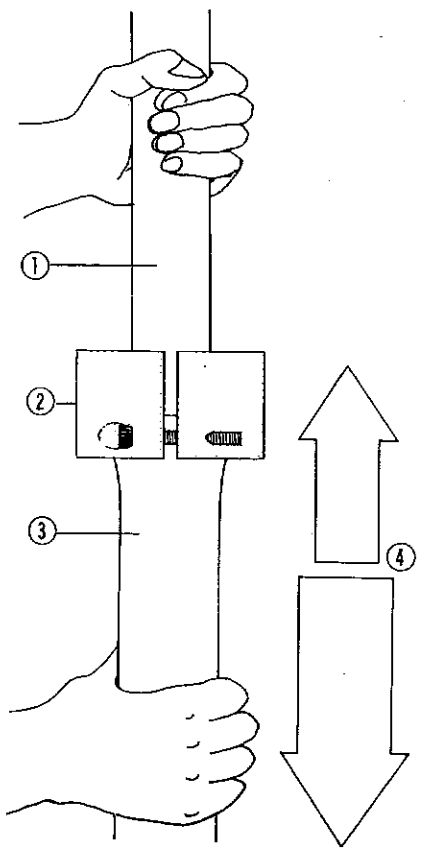
Weight Mounting



1. Fork Outer Tube Weight: 57001-1218
2. Step
3. Corner
4. Outer Tube

oHolding the inner tube by hand in a vertical position, stroke the outer tube several times and pull it down.

Front Fork Separation



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

NOTE

o*Front Fork Oil Seal Driver: 57001-1091 can be used.*

Front Fork Assembly

●Fork assembly is the reverse of diassembly. Pay attention to the following items.

oCheck the top plug O-rings for damage. Replace them with new ones if damaged.

oReplace the oil seal with a new one.

oInspect the guide bushes (see Guide Bush Inspection), and replace them with new ones if necessary.

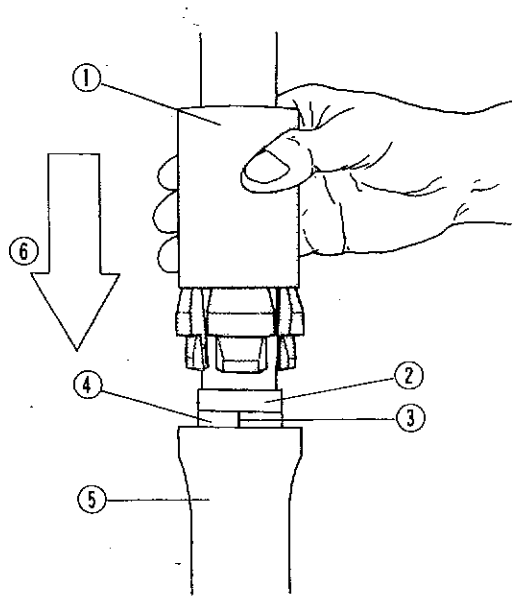
oInsert the cylinder unit into the inner tube, and put on the washers and the stop.

oInsert the inner tube and cylinder into the outer tube.

oApply liquid gasket to both sides of the gasket, and apply a non-permanent locking agent to the Allen bolt. Tighten the Allen bolt to the specified torque, using the front fork cylinder holder handle and holder adapter (special tools) to stop the cylinder from turning.

oInstall the guide bush by placing a used guide bush on top of it and them tapping the used guide bush with the driver (special tool) until it stops. The slit of the bush must faced toward the left or right side of the vehicle.

Guide Bush Installation



1. Driver: 57001-1219
2. Used Guide Bush
3. Slit
4. New Guide Bush
5. Outer Tube
6. Tap

NOTE

o*Front Fork Oil Seal Driver: 57001-1091 can be used.*

oInstall the oil seal with the driver (special tool) after washer installation.

oInstall the dust seal with the driver (special tool), then install the retainer.

oIf the drain screw was removed, check the gasket for damage. Replace a damaged gasket with a new one. Before installing the drain screw, apply a liquid gasket to the threads of the screw, and tighten the screw securely.
oPour in the type and amount of fork oil specified (see Specifications), and adjust the oil level.
oTighten the top plug to the specified torque after fork installation.

Rear Shock Absorber

Damper Adjustment

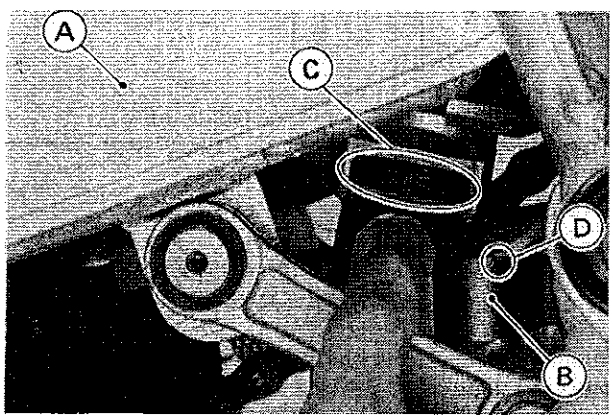
Refer to p. 11-12 of the Base Manual noting the following exception.

NOTE

o*The damping force can be left soft for average riding. But it should be adjusted harder for rough road riding, or riding with a passenger. If the damping feels too soft or too stiff, adjust it in accordance with the following table:*

Damper Adjuster

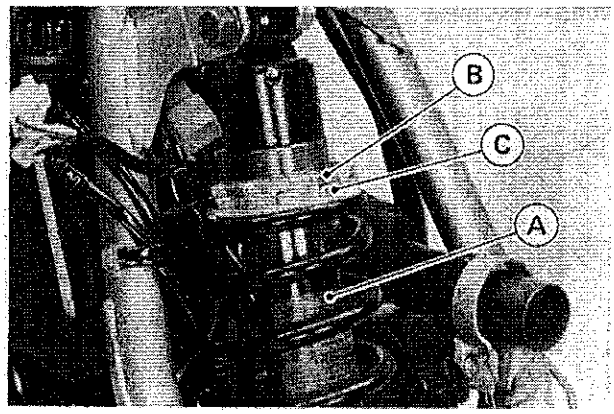
Adjuster Position	Damping Force	Setting	Load	Road	Speed
I	Stronger	Soft	Light	Good	Low
II	↓	↑↓	↑↓	↑↓	↑↓
III					
IIII		Hard	Heavy	Bad	High



A. Swing Arm
B. Dust Cover
C. Damper Adjuster
D. Arrow Mark to Upward

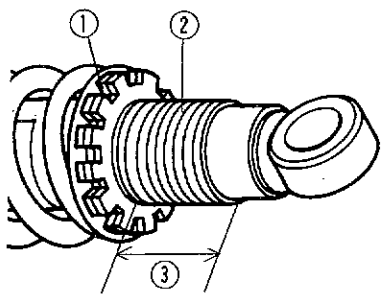
Spring Preload Adjustment

●Remove the rear frame.
●Loosen the locknut using the hook wrenches, and turn the adjusting nut as required.
oTurning the adjusting nut down makes the spring preload stronger.



A. Rear Shock Absorber
B. Locknut
C. Adjusting Nut

Preload Adjustment



1. Adjusting Nut
2. Rear Shock Absorber
3. Adjusting Range

Spring Preload Setting

Adjusting Nut Position:	
On Pavement	**32 mm**
On Rough Roads	**37 – 42 mm**

Steering

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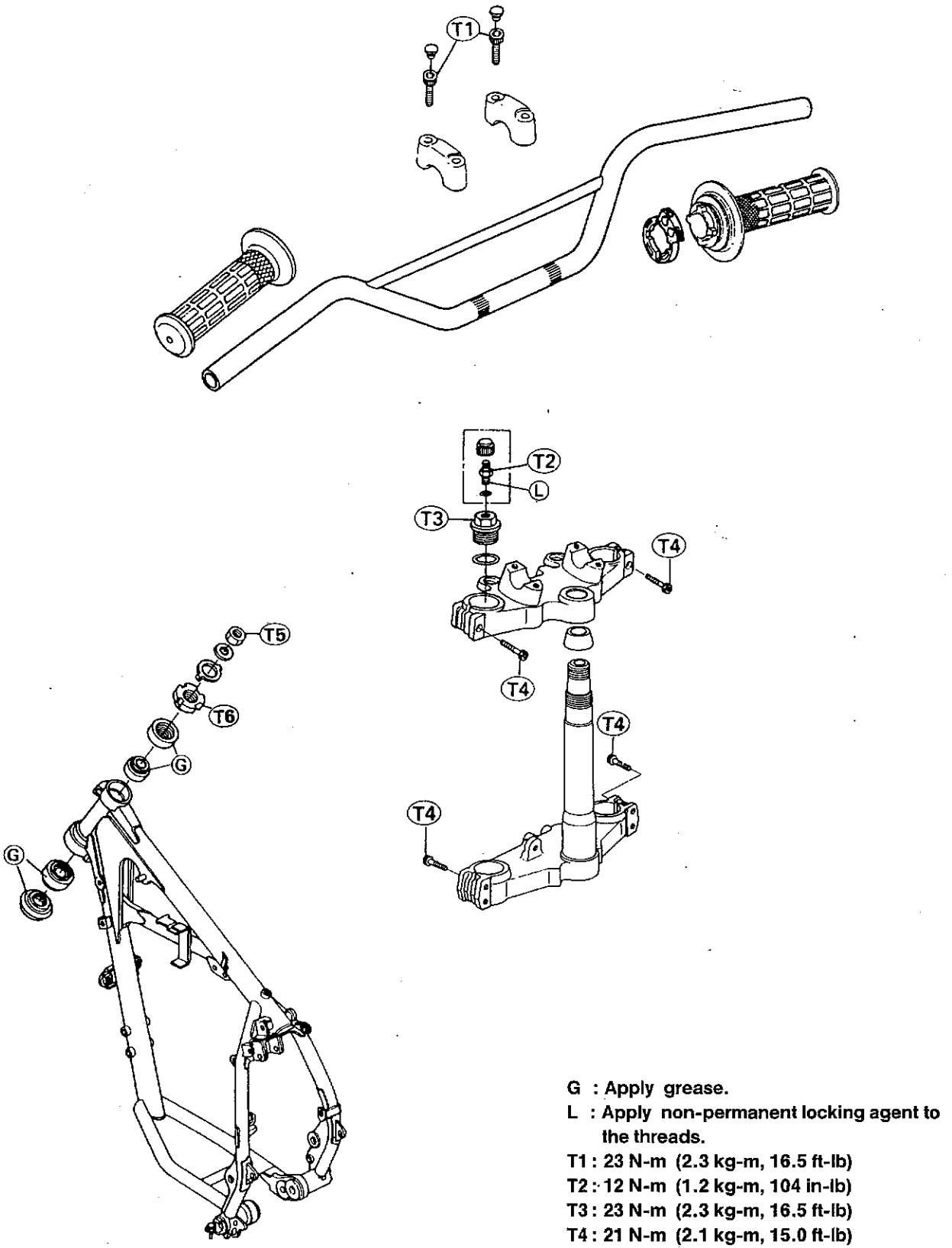
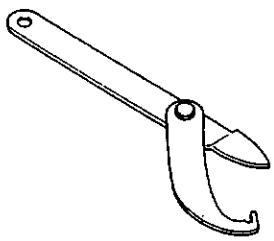


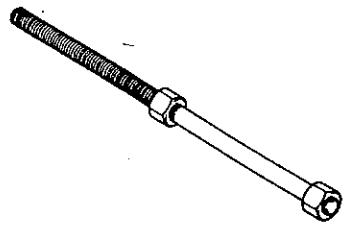
G : Apply grease.
L : Apply non-permanent locking agent to the threads.
T1 : 23 N-m (2.3 kg-m, 16.5 ft-lb)
T2 : 12 N-m (1.2 kg-m, 104 in-lb)
T3 : 23 N-m (2.3 kg-m, 16.5 ft-lb)
T4 : 21 N-m (2.1 kg-m, 15.0 ft-lb)
T5 : 39 N-m (4.0 kg-m, 29 ft-lb)
T6 : 4.9 N-m (0.50 kg-m, 43 in-lb)

Special Tools

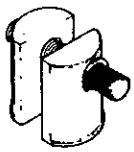
Stem Nut Wrench: 57001-1100



Driver Press Shaft: 57001-1075

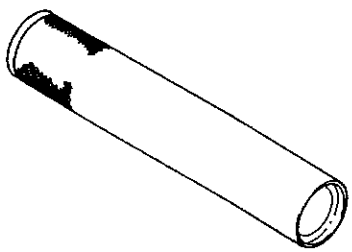


Stem Bearing Remover: 57001-1107



Driver: 57001-1106

Stem Bearing Driver: 57001-137



Driver: 57001-1076

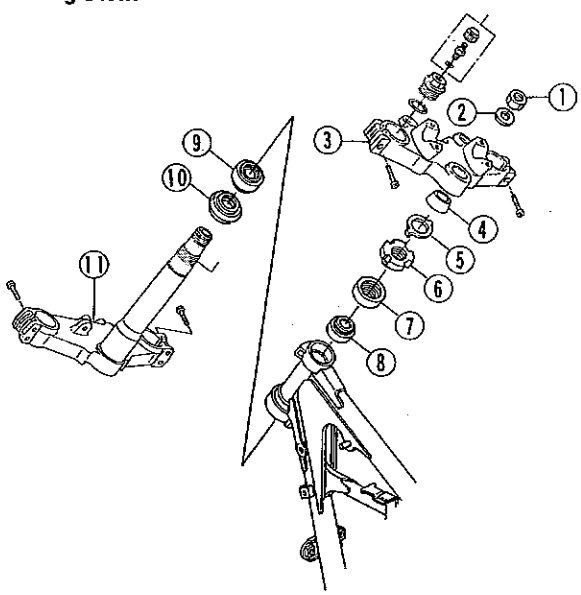
Adapter: 57001-1074

Steering Removal, Installation

Steering Stem Removal

- Remove the following parts before steering stem removal.
  - Fuel tank
  - Front wheel
  - Front fender
  - Master cylinder clamp
  - Handlebar
  - Caliper mounting bolts
  - Headlight cover
  - Front fork
- Remove the steering stem head nut and flat washer.
- Remove the lower mounting bolt at the meter bracket.
- Remove the connectors (4) and wiring leads from the meter bracket.
- Remove the stem head and meter bracket assembly.
- Remove the collar and lockwasher.
- Hold the stem base toward the bottom, remove the stem locknut using the stem nut wrench.
- Remove the stem base, and then take off the stem cap and upper stem bearing.

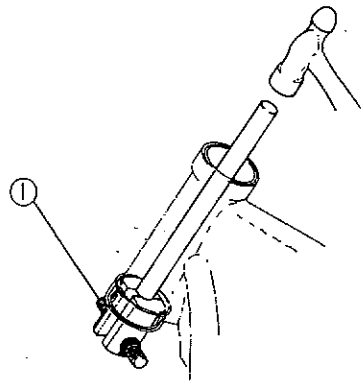
Steering Stem



1. Stem Head Nut
2. Flat Washer
3. Stem Head
4. Collar
5. Lockwasher
6. Stem Locknut
7. Stem Cap (Grease Seal)
8. Stem Bearing (Set)
9. Stem Bearing (Set)
10. Grease Seal
11. Stem Base

- To remove the outer races pressed into the head pipe, install a stem bearing remover as shown below, and the hammer the stem bearing remover to drive the race out.

Outer Race Removal



1. Stem Bearing Remover: 57001-1107

- Remove the lower inner race, which is pressed onto the steering stem, with a chisel.

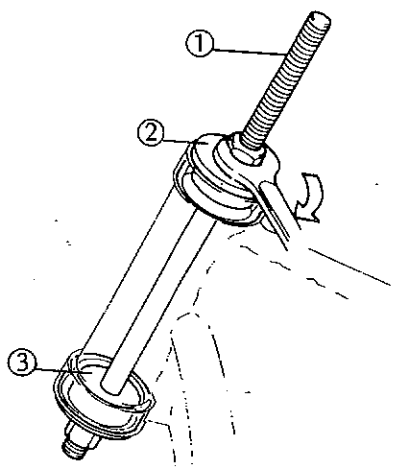
NOTE

If any steering stem bearing is damaged, it is recommended that all the bearings and the steering stem should be replaced with new ones.

Steering Stem Installation

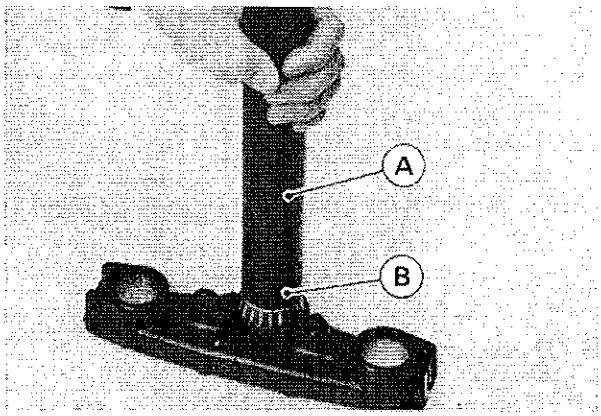
- Apply grease to the outer races, and then drive them into the head pipe using a beairng driver and driver press shaft (special tool). Be sure to press them in until they stop at the step in the head pipe.

Outer Race Installation



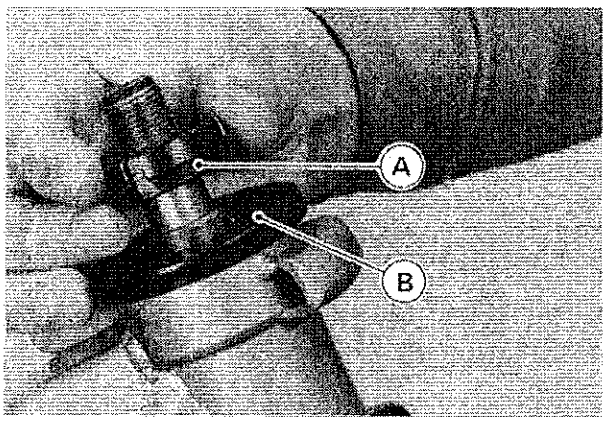
1. Driver Press Shaft: 57001-1075
2. Driver: 57001-1106
3. Driver: 57001-1076

- Install the lower grease seal on the stem being careful of the installation direction (see Exploded Views). The lower grease seal has a bigger diamter than the stem cap.
- Apply grease to the steering stem bearing, and drive it onto the steering stem using the bearing driver (special tool).



A. Bearing Driver: 57001-137
B. Adapter: 57001-1074

- Lubricate the upper stem bearings with grease.
- Install the stem cap, and then install the stem locknut so that the notched side faces down.



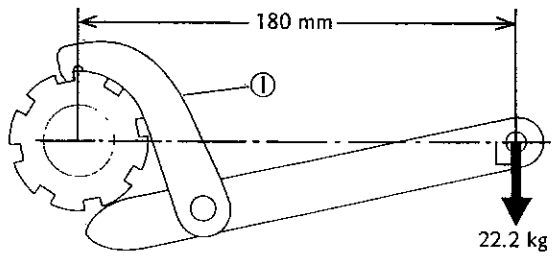
A. Notched Side B. Stem Cap

- Install the lockwasher and collar.
- Install the connectors (4), and route the wiring leads correctly.
- Install the meter bracket assembly, stem head, washer, and nut. Loosely install the nut at this time.
- If a new steering bearing is installed, or if the removed bearing is reinstalled, seat the bearing according to the following.
  - Tighten the stem locknut to **39** N-m (**4.0** kg-m, **29** ft-lb).
  - Check that there is no play and that the steering stem turns smoothly without rattling. If the steering stem does not turn smoothly, the bearings may be damaged.
  - Loosen the steering stem locknut a little until it turns lightly.
  - Turn the steering stem locknut lightly clockwise until it just becomes hard to turn. Do not overtighten, or the steering will be too tight.

NOTE

o Tightening the stem locknut to 39 N-m (4.0 kg-m, 29 ft-lb) of torque is only to seat the bearing. After seating the bearing, loosen and handtighten the locknut.
o To torque the locknut with steering stem nut wrench (special tool), hook the wrench on the stem locknut, and pull the wrench at the hole with 218 N (22.2 kg) force in the direction shown.

Torquing Stem Locknut



1. Stem Nut Wrench: 57001-1100

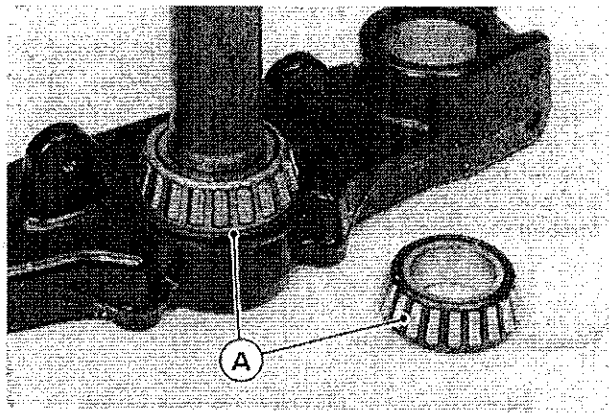
- Adjust the steering.
- Reinstall the parts removed.
- Route the cables and wiring harnesses correctly. The cables and harnesses must not hinder handlebar movement.
- Check and adjust the following items.
  - Front brake
  - Clutch
  - Throttle cables
  - Rear view mirrors
  - Headlight aim

Steering Maintenance

Steering Stem Bearing Lubrication

In accordance with the Periodic Maintenance Chart, the steering stem bearings should be relubricated.

- Remove the steering stem.
- Using a high flash-point solvent, wash the upper and lower bearings in the cages, and wipe the upper and lower outer races (which are press-fitted into the frame head pipe) clean of grease and dirt.
- Visually check the outer races and the bearing rollers.
- ★Replace the bearing assemblies if they show wear or damage.
- Pack the upper and lower caged roller bearings with grease, and apply a light coat of grease to the upper and lower outer races.
- Install the steering stem, and adjust the steering.



A. Bearings

Bearing Wear, Damage

- Using a high flash-point solvent, wash the upper and lower rollers in their cages, and wipe the upper and lower outer races (which are press-fitted into the frame head pipe) clean of grease and dirt.
- Visually check the outer races and the beairng rollers.

★Replace the bearing assemblies if the show damage.

Stem Cap (Grease Seal) Deterioration, Damage

- Inspect the stem cap on the upper bearing for any signs of deterioration or damage.

★Replace the stem cap if necessary.

Frame

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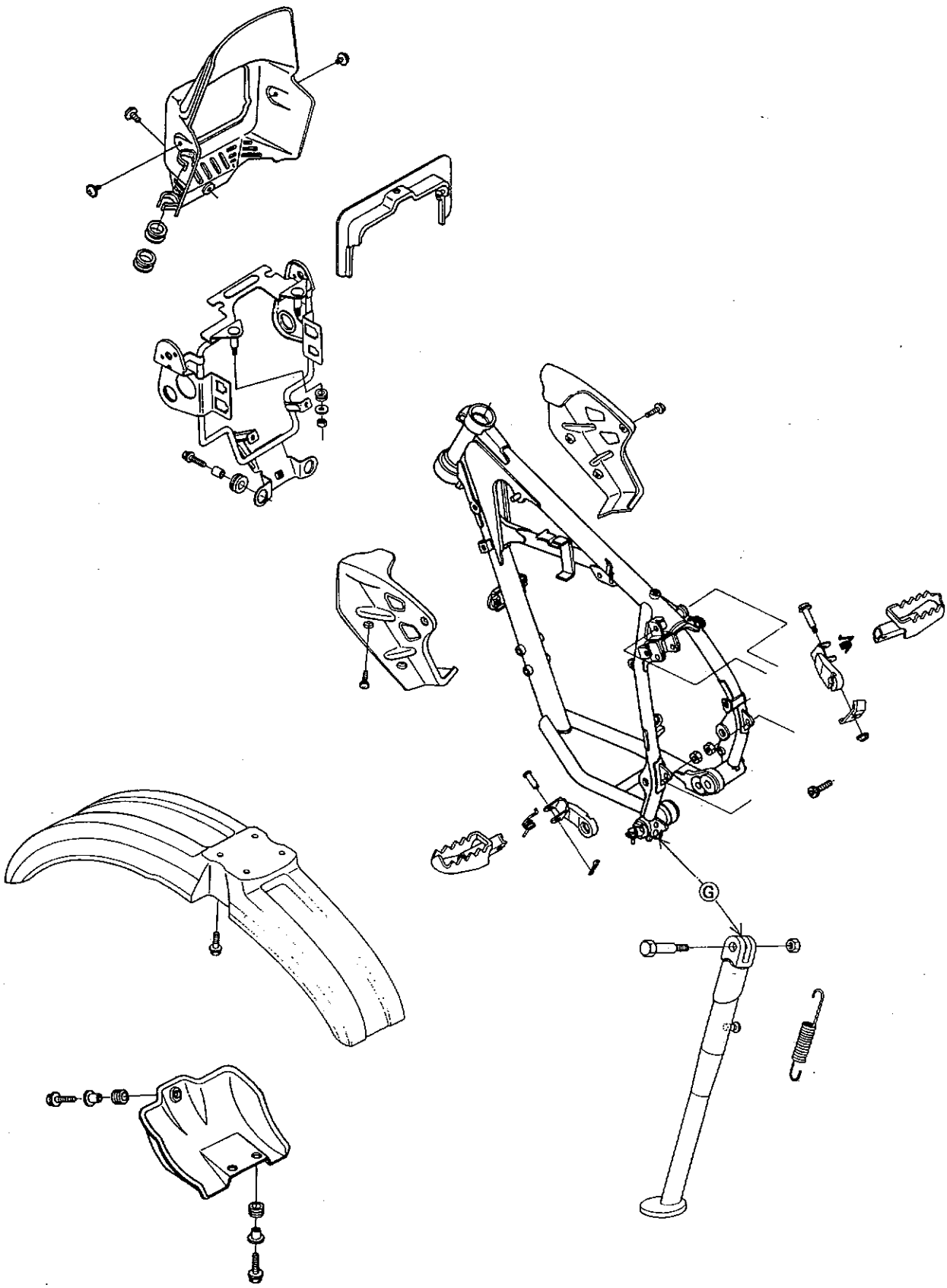
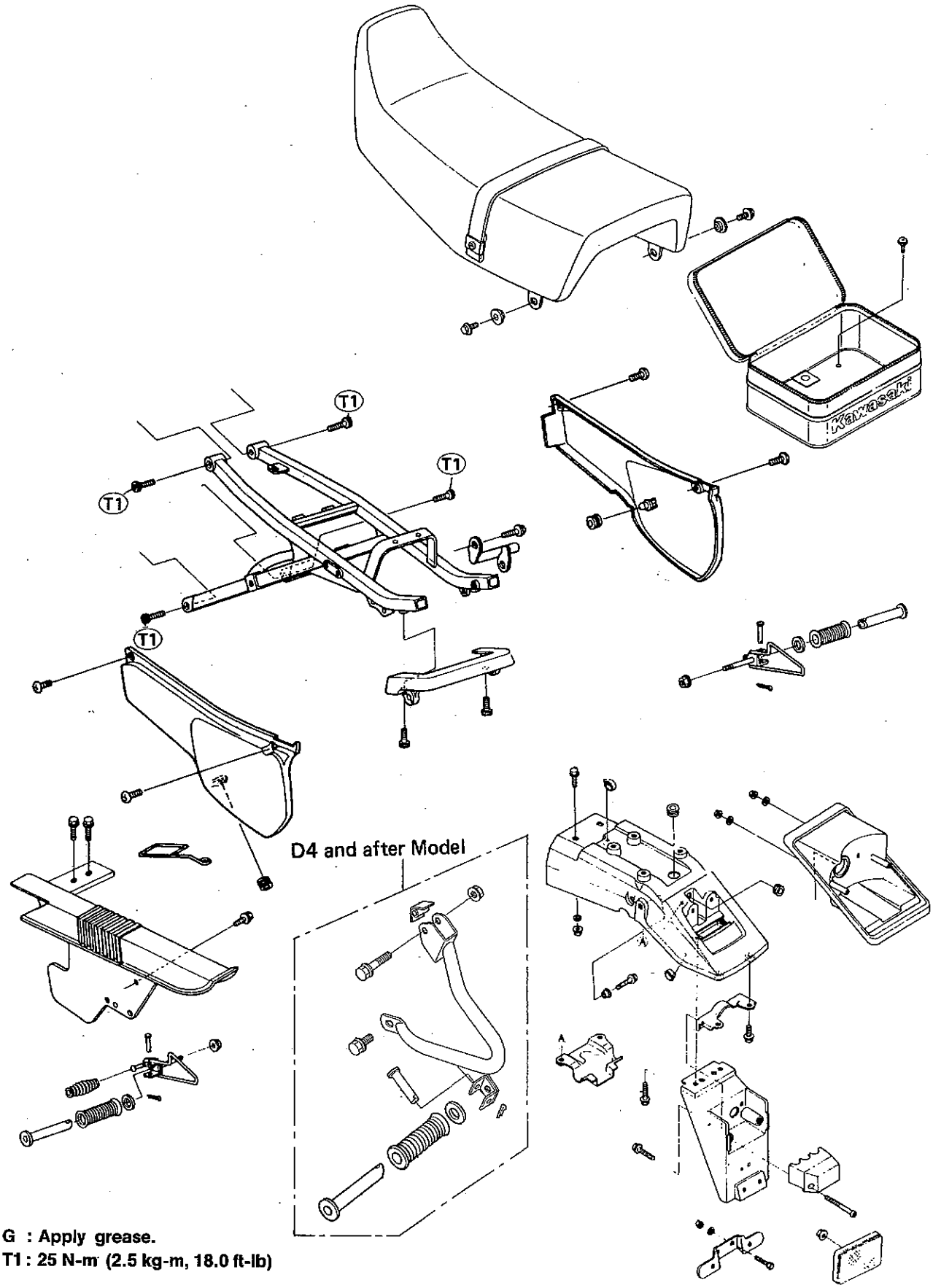
Exploded Views





G : Apply grease.
T1 : 25 N-m (2.5 kg-m, 18.0 ft-lb)

Frame

Rear Frame Removal

●Remove the following parts before rear frame removal.
- ○Side Covers
- ○Seat
- ○Muffler
- ○Battery
- ○Connector at the regulator/rectifier (right side of the frame)
- ○Connector at the brake light switch (right side of the frame)
- ○Brake light switch spring (right side of the frame)
- ○Connector at the main harness (left side of the frame)
- ○Rear frame mounting bolts, nuts

●Remove the rear frame.

Rear Frame Installation

●Rear frame installation is the reverse of removal.

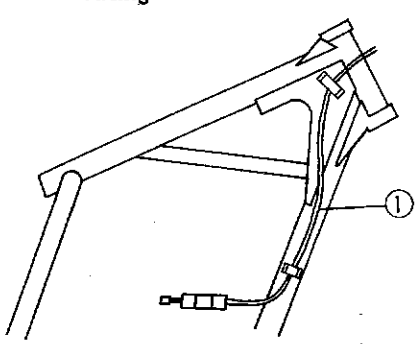
Suggested Cable or Hose Routing

●For later installation convenience, note and record how and where cables, wires, and hoses are routed. They should not be allowed sharp bends, kinking, or twisting.

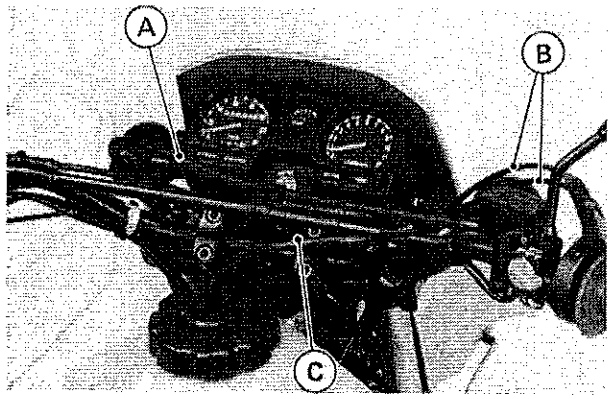
WARNING

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

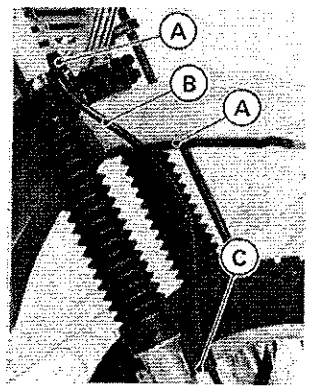
Clutch Cable Routing



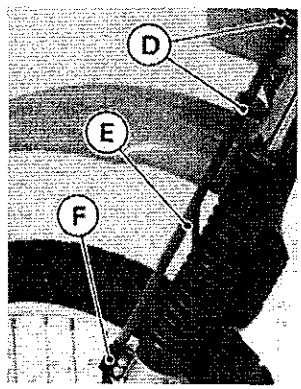
1. Clutch Cable



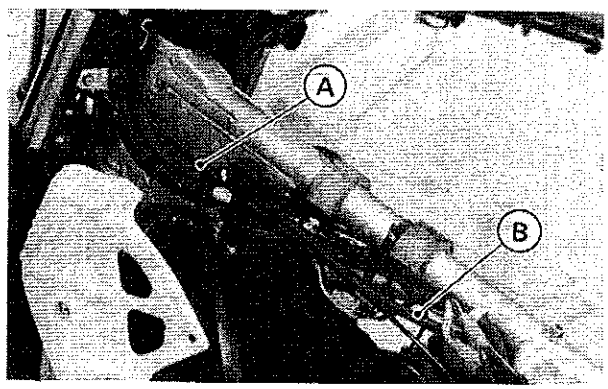
A. Front Brake Hose
B. Throttle Cables
C. Breather Tube



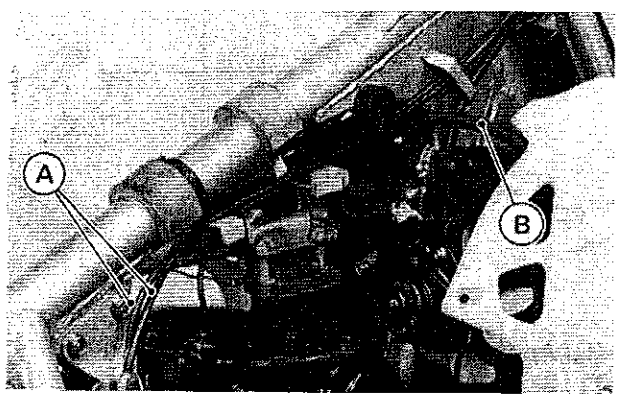
A. Cable Guide
B. Front Brake Cable
C. Cable Clump



D. Cable Guides
E. Front Brake Hose
F. Hose Clump



A. Choke Cable
B. Reserver Tank Hose



A. Throttle Cables
B. Reserver Tank Hose

Electrical System

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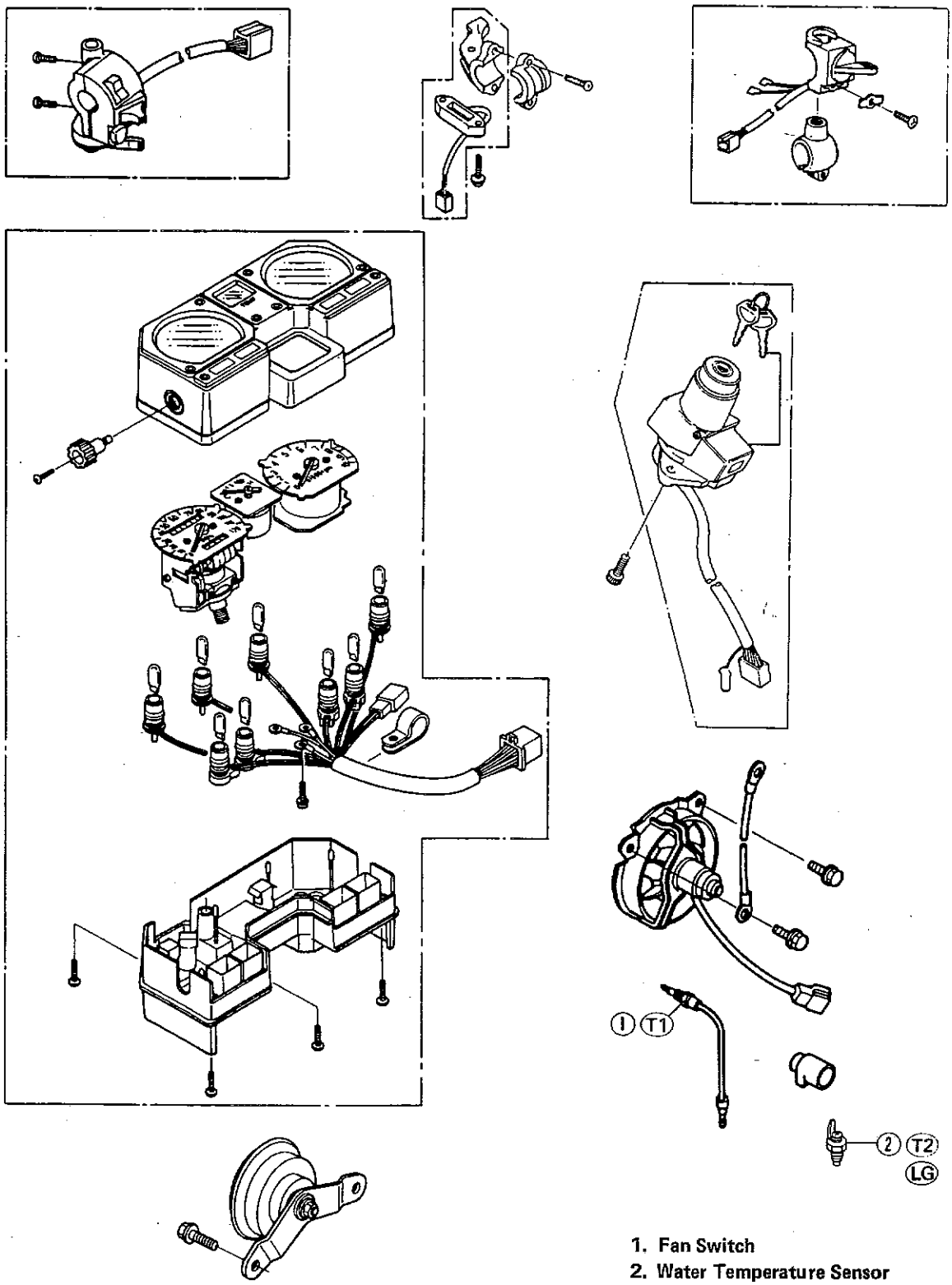
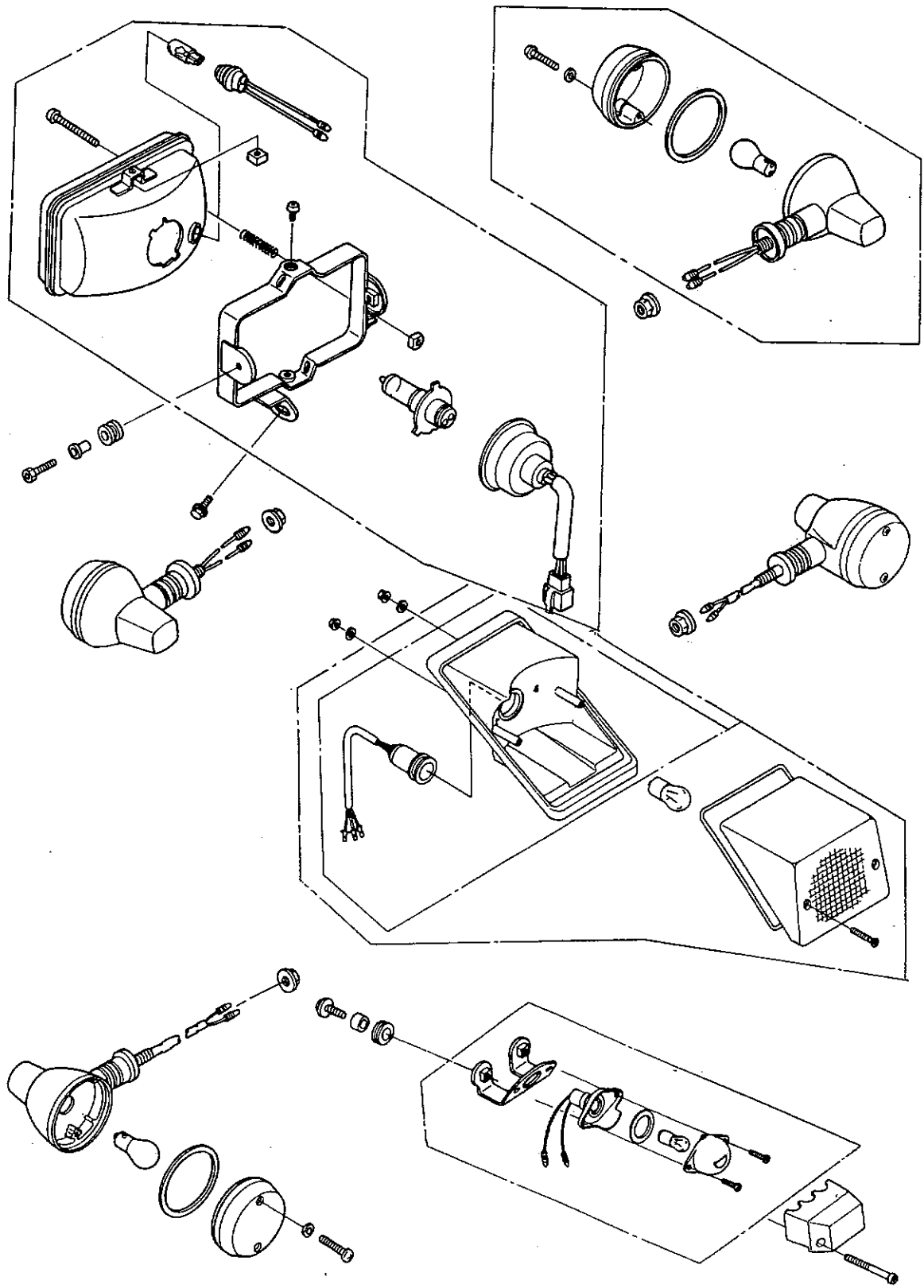
* : See Base Manual p. 14-16 for '85 Model
See p. 15-13 for other than '85 Model

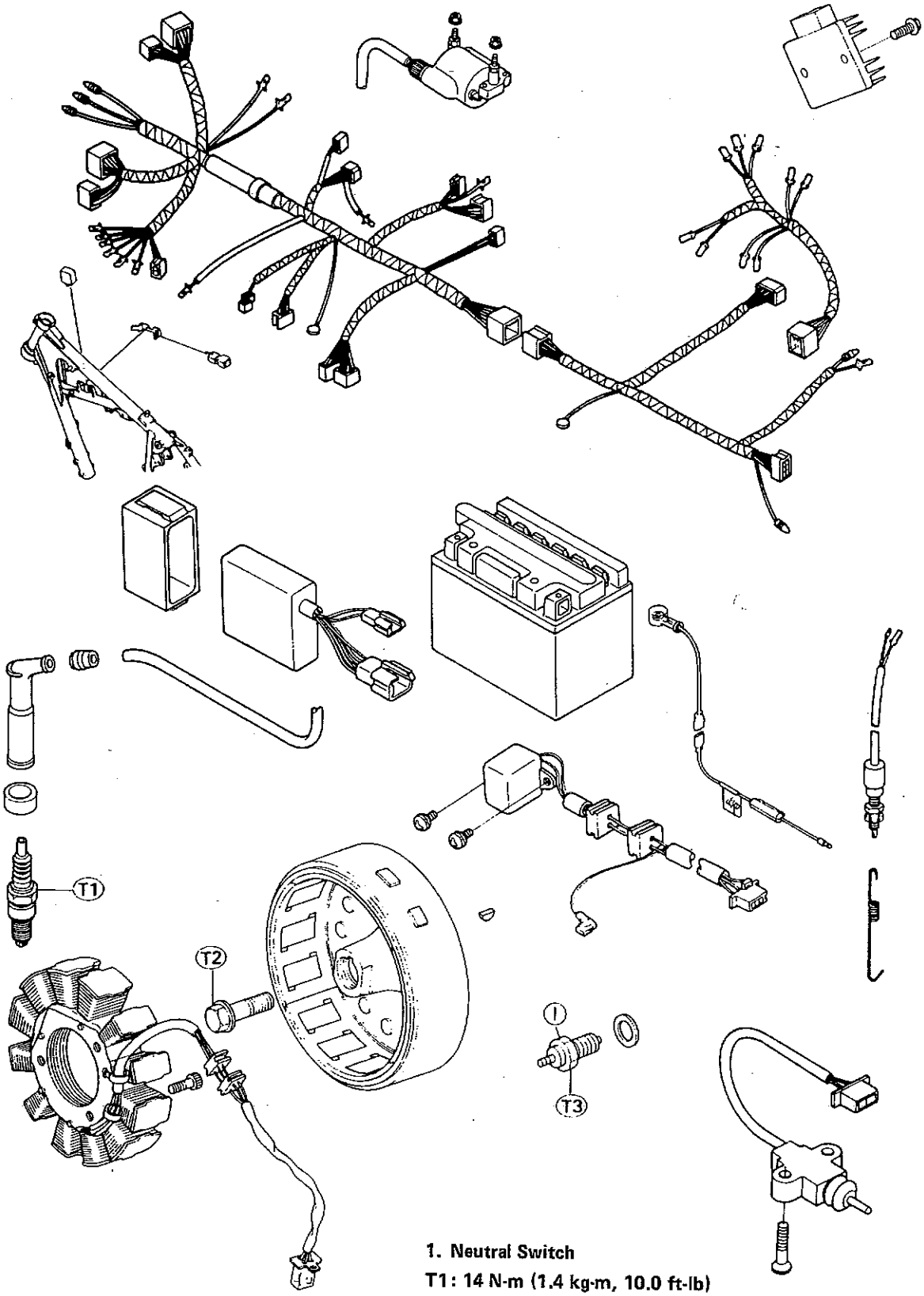
Exploded Views



1. Fan Switch
2. Water Temperature Sensor

LG : Apply liquid gasket to the threads.
T1 : 7.4 N-m (0.75 kg-m, 65 in-lb)
T2 : 15 N-m (1.5 kg-m, 11.0 ft-lb)

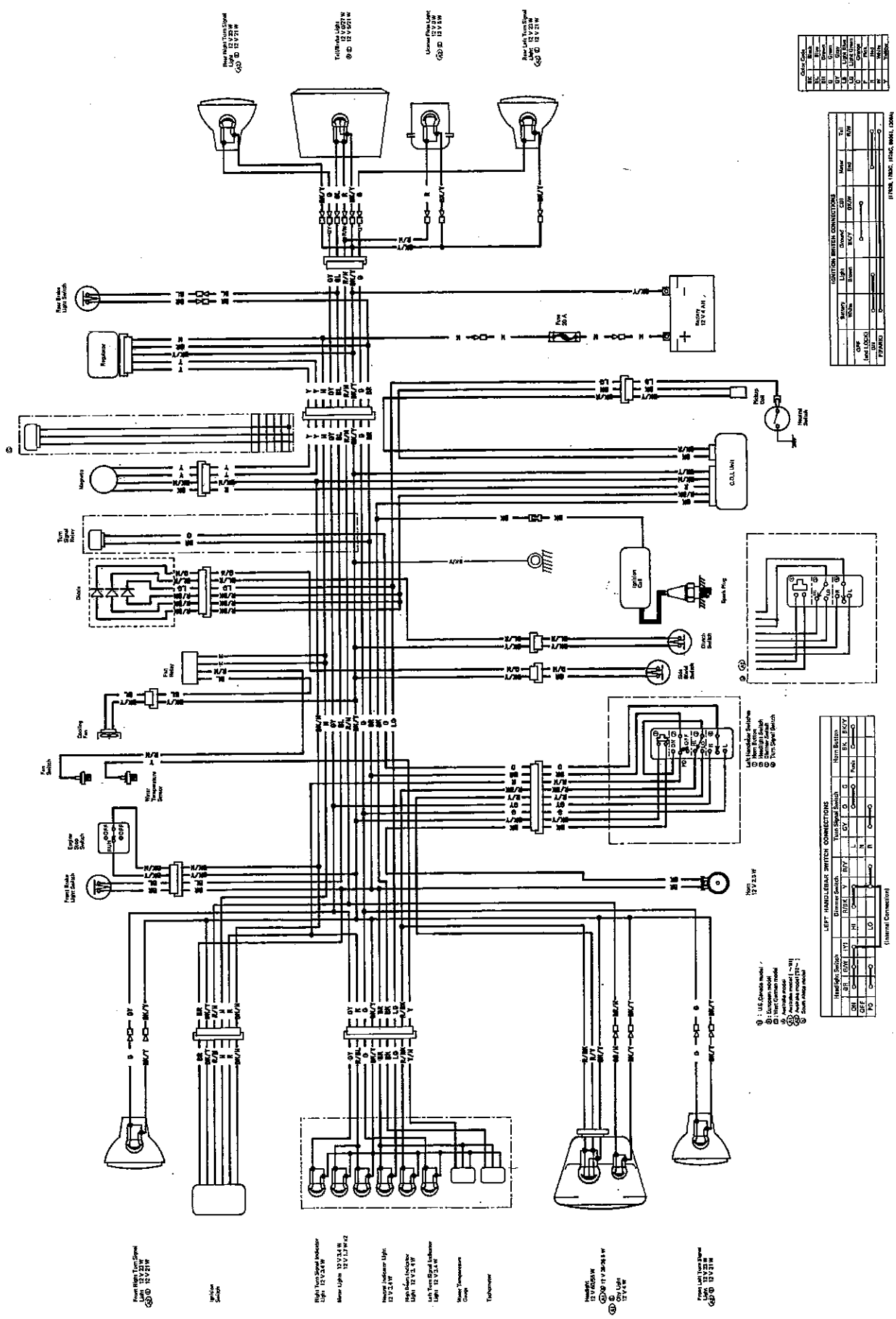




1. Neutral Switch

T1 : 14 N-m (1.4 kg-m, 10.0 ft-lb)
T2 : 120 N-m (12.0 kg-m, 87 ft-lb)
T3 : 15 N-m (1.5 kg-m, 11.0 ft-lb)

Wiring Diagram



Electrical System Specifications

Battery

Type:	12 V 4 Ah
Specific gravity:	1.280 @20°C (68°F)

Alternator

Type:	Single-phase AC
Rated output:	10.5 A @8,000 r/min (rpm), 14 V
Charging voltage:	12 – 15 V (with Headlight Switch ON if applicable)
Stator coil resistance:	Less than 0.1 – 0.7 Ω

Ignition System

Ignition timing:	10° BTDC @1,300 r/min (rpm) – 35° BTDC @3,000 r/min (rpm)
Exciter coil resistance:	61 – 114 Ω
Pickup coil resistance:	100 – 150 Ω
Pickup coil air gap:	0.7 mm
Ignition coil:	
3 needle arcing distnace:	7 mm or more
Primary winding resistance:	0.17 – 0.25 Ω
Secondary winding resistance:	3.2 – 4.8 kΩ
Spark plug gap:	0.8 – 0.9 mm

Spark Plug

	Standard	Option
US (~ D13) S. Africa Australia	DP9EA-9 or X27EP-U9	DP8EA-9 or X24EP-U9
Canada Europe D14 ~ : ※	DPR9EA-9 or X27EPR-U9	DPR8EA-9 or X24EPR-U9

※ : U.S. and California Models

Switches and Sensors

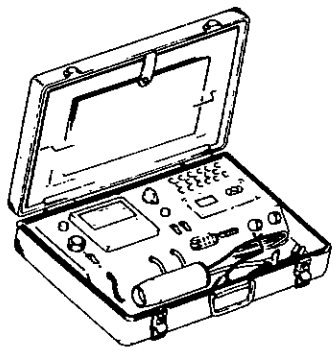
Rear brake light switch:	On after about 15 mm pedal travel	
Fan switch (97°C)	∞ → 0.5 Ω	94 – 100°C (201 – 212°F)
	0.5 → ∞ Ω	above 91°C (196°F)

Meter Unit

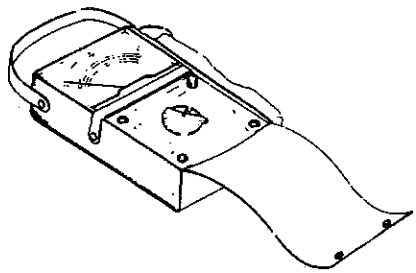
Tacometer resistance:	65 – 105 Ω	
Water temperature gauge resistance:		
	BK/Y ↔ W/Y	80 – 100 Ω
	BR ↔ W/Y	95 – 120 Ω
Water temperature sensor resistance:		
	80°C (176°F) about 130 Ω	
	100°C (212°F) about 70 Ω	

Special Tools

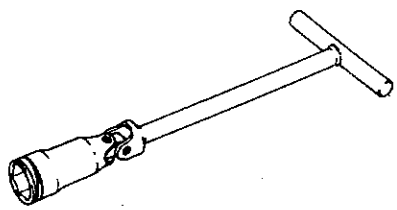
Electro Tester: 57001-980



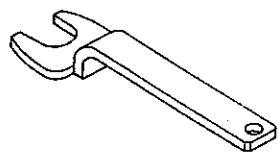
Hand Tester: 57001-983



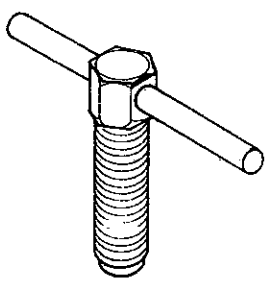
Spark Plug Wrench: 57001-1024



Flywheel Holder: 57001-1184



Flywheel Puller: 57001-1196



NOTE

- *The coil tester (57001-1242) can be used for servicing of the ignition coil instead of the electro tester (57001-980).*
- *The rotor puller (57001-1216) can be used instead of the flywheel puller (57001-1196).*

Battery

Precautions

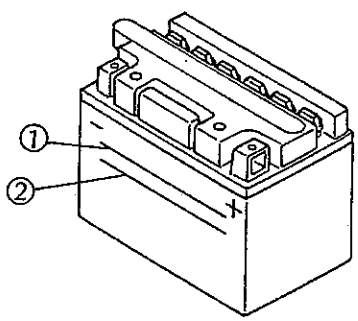
Following a few simple rules will greatly extend the life of the battery.

- When the level of the electrolyte in the battery is low, add only distilled water to each cell, until the level is at the upper level line marked on the outside of the battery. Ordinary tap water is not a substitute for distilled water and will shorten the life of the battery.
- Never add sulphuric acid solution to the battery. This will make the electrolyte solution too strong and will ruin the battery within a very short time.
- Avoid quick-charging the battery. A quick-charge will damage the battery plates.
- Never let a good battery stand for more than 30 days without giving it a supplemental charge, and never let a discharged battery stand without charging it. If a battery stands for any length of time, it slowly self-discharges. Once it is discharged, the plates sulphate (turn white), and the battery will no longer take a charge.
- Keep the battery well-charged during cold weather so that the electrolyte does not freeze and crack open the battery. The more discharged the battery becomes, the more easily it freezes.
- Always keep the battery vent hose free of obstruction, and make sure it does not get pinched, crimped, or melted shut by contact with the hot muffler. If battery gases cannot escape through this hose, they will explode the battery.
- DON'T INSTALL THE BATTERY BACKWARDS. The negative side is grounded.

Electrolyte Level Inspection

- Remove the battery.
- Visually check the electrolyte level in the battery.

Battery



1. Upper Level Line
2. Lower Level Line

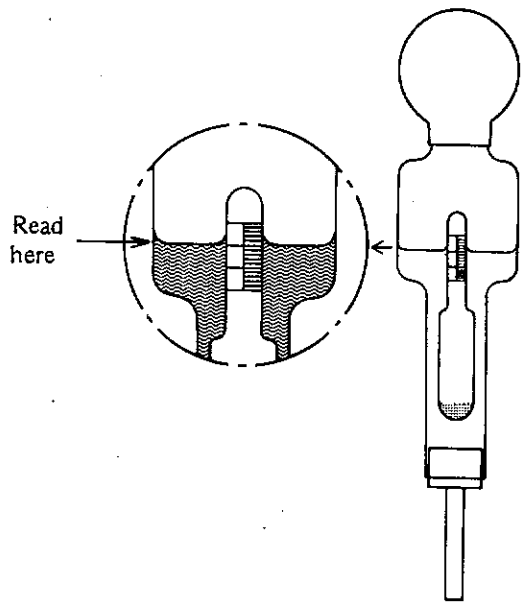
★If the level of electrolyte in any cell is below the lower level line on the battery case, add distilled water only to that cell.

- Install the battery.

Battery Condition

- Before charging, check battery condition by testing the specific gravity of the electrolyte in each cell.
- Draw a little fluid from the cell with a hydrometer.
- Read the level of the electrolyte on the floating scale. This is the specific gravity of the electrolyte.

Hydrometer



- Look for sediment and white sulfation inside the cells on the bottom of the plates.
- See the Battery Troubleshooting Guide in Battery Test Charging.

★If the specific gravity is below 1.280 the battery needs to be charged.

NOTE

- *The specific gravity of the electrolyte varies with changes in temperature, so the specific gravity reading must be corrected for the temperature of the electrolyte.*
- *Celsius: Add 0.007 points to reading for each 10°C above 20°C or subtract 0.007 points for each 10°C below 20°C.*
- *Fahrenheit: Add 0.004 points to reading for each 10°F above 68°F or subtract 0.004 points for each 10°F below 68°F.*

★If the specific gravity of any of the cells is more than 0.050 away from any other reading, the battery will probably not accept a charge. It is generally best to replace a battery in this condition.

★If the specific gravity of all the cells is 1.280 or more the battery is fully charged.

Battery Initial Charging

Before being placed in service, a new battery should be given an initial charging.

- Cut off the sealed end of the battery vent hose and remove the filler caps.
- Fill each cell to the upper lever line on the battery case with fresh electrolyte at a temperature of 30°C (86°F) or less. Let the battery stand for about 30 minutes before charging.

NOTE

o If the electrolyte level drops, add electrolyte to the upper level line before charging.

- Leaving the caps off the cells, connect the battery to a charger, set the charging rate at 1/10 the battery capacity, and charge it for 10 hours. The battery is rated at 4 Ah, and the recommended charging rate is 0.4 A.

WARNING

o Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

CAUTION

o Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat which can warp the plates and cause internal shorting. Higher-than-normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.

o If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

- Turn the charger off, then disconnect it from the battery.
- Check battery voltage. Battery voltage should be 12 – 13 V.
- Check the specific gravity of each cell with a hidrometer (see Battery Condition).

★ If the voltmeter or hydrometer readings are below those specified, additional charging is necessary before the battery can be installed.

Battery Ordinary Charging

- Remove the battery from the motorcycle.

CAUTION

o Always remove the battery from the motorcycle for charging. If the battery is charged while still installed, battery electrolyte may spill and corrode the frame or other parts of the motorcycle.

- Clean off the battery using a baking soda-and-water solution.

o Mix one heaping tablespoon of baking soda in one cup of water.

o Be careful not to get any of the cleaning solution in the battery.

o The terminals must be especially clean.

- If any of the cells are low, fill them to the LOWER level line with distilled water only. The electrolyte will expand during charging, and the level will rise.
- Connect a charger to the battery BEFORE plugging it in or turning it on.

WARNING

o Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

- Set the charge rate and time according to the battery condition, previously determined (see Battery Condition), using the table.

CAUTION

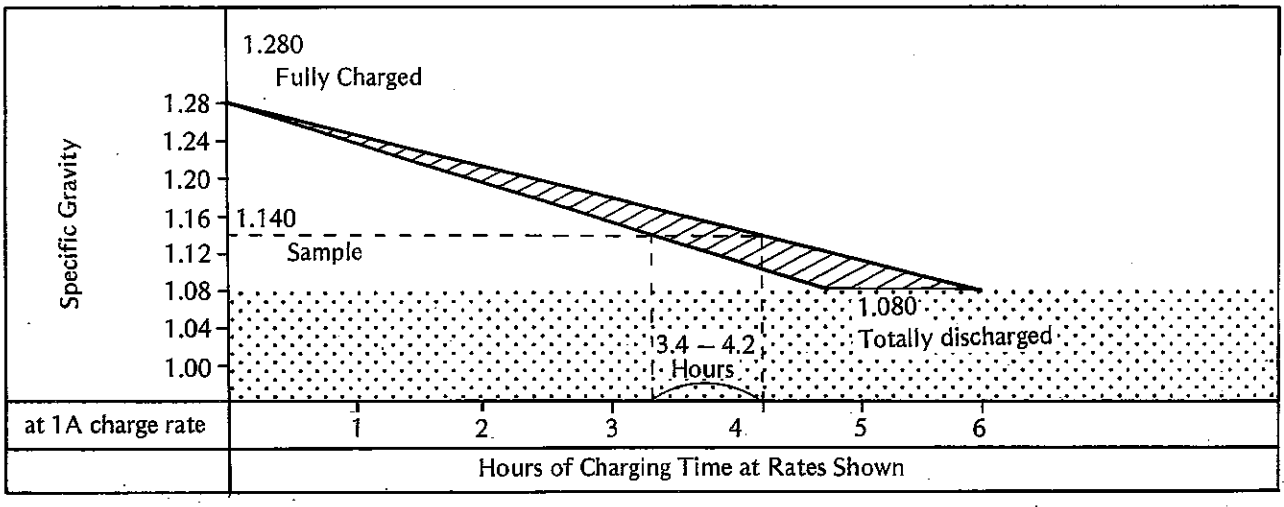
o Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat which can warp the plates and cause internal shorting. Higher-than-normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.

o If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

- Turn the charger off or unplug it, then disconnect it from the battery.
- Check battery condition (see Battery Condition).

★ If the battery condition indicates that it is not fully charged, additional charging time is necessary.

Battery Charging Rate/Time Table (12V 4Ah)



Battery Test Charging

- If the battery is suspected of being defective, sulfated, or unable to take a charge, consult the table.
- To test charge a battery, perform the ordinary charging procedure and monitor the battery voltage and other signs as mentioned below.

★If the battery voltage suddenly jumps to over 13 V just after the start of charging, the plates are probably sulfated. A good battery will rise to 12 V immediately and then gradually go up to 12.5 or 13 V in about 30 minutes to and hour after the start of charging.

★If one cell produces no gas bubbles or has a very low specific gravity, it is probably shorted.

★If there does not appear to be enough sediment in a cell to short the plates, but that cell has a very low specific gravity after the battery is fully charged, the trouble may be that there is not enough acid in that one cell. In this case only, sulfuric acid solution may be added to correct the specific gravity.

★If a fully charged battery not in use loses its charge after 2 to 7 days; or if the specific gravity drops markedly, the battery is defective. The self-discharge rate of a good battery is only about 1% per day.

Battery Vent Hose Routing

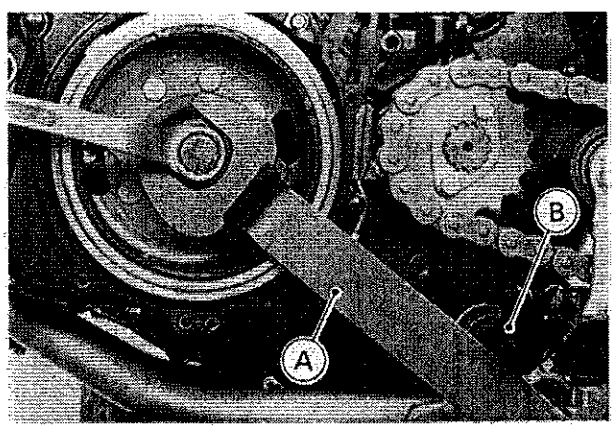
Refer to p. 14-5 of the Base Manual noting the following exception.

- Route the battery vent hose as shown on the label inside the left side cover.

Flywheel Magneto

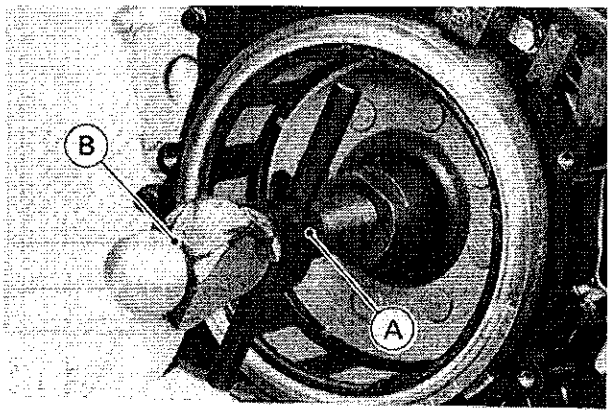
Flywheel Magneto Removal

- Remove the following parts before magneto removal.
  - Engine sprocket cover
  - Shift pedal
  - 4 pin connector
  - Magneto cover
- Hold the flywheel magneto steady with the flywheel holder (special tool), and remove the flywheel bolt.



A. Flywheel Holder: 57001-1184
B. Footpeg

●Screw in the flywheel puller until it stops, then turn the bar by hand, tapping the head of the puller shaft with a hammer.



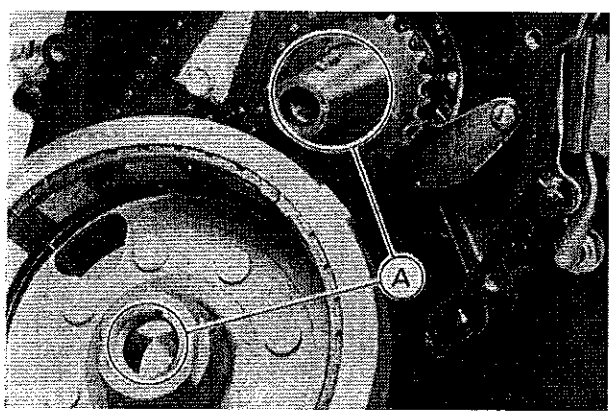
A. Flywheel Puller: 57001-1196
B. Hammer

CAUTION

○**Do not strike the bar to or the flywheel magneto itself. Striking the bar or the magneto can bend them or cause the magnets to lose their magnetism.**

Flywheel Magneto Installation

●Clean off any oil or dirt that may be on the crankshaft taper or magneto flywheel hub.

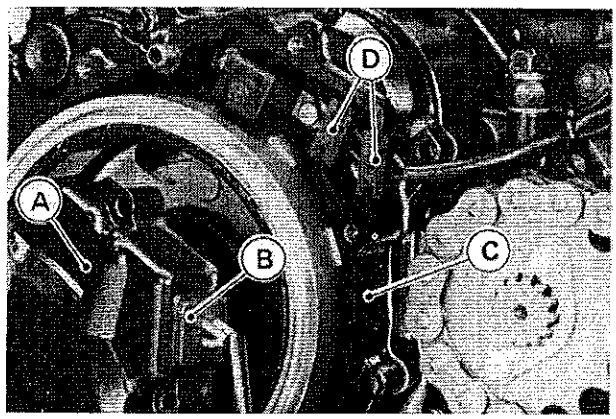


A. Clean off part

●Tighten the flywheel bolt to the specified torque with the flywheel holder.

Magneto Cover Installation Note

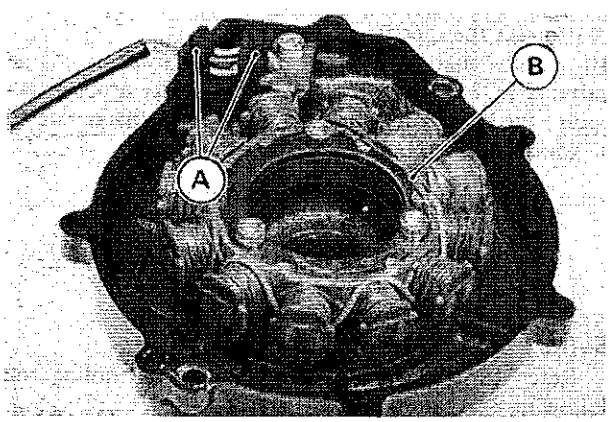
●Install the grommets between the magneto cover and left engine cover.



A. Magneto Cover
B. Magneto Lead Grommet
C. Left Engine Cover
D. Pickup Lead Grommet

Magneto Stator Installation Note

●Install the grommets, and fit the stator into place.
●Tighten the stator mounting bolts securely.



A. Stator
B. Grommet

Left Engine Cover Removal

●Remove the following parts before left engine cover removal.
- ○Magneto cover
- ○Pickup coil and grommet
- ○Flywheel magneto

Left Engine Cover Installation Note

●Replace the cover gasket with a new one.

Ignition System

Ignition Coil Removal and Installation Note

●When the ignition coil is installed, tighten the mounting nuts securely with the ground lead terminals from the wiring harness.

Spark Plug Cleaning and Gapping

Refer to p. 14-9 of the Base Manual noting the following exception.

Standard Spark Plug

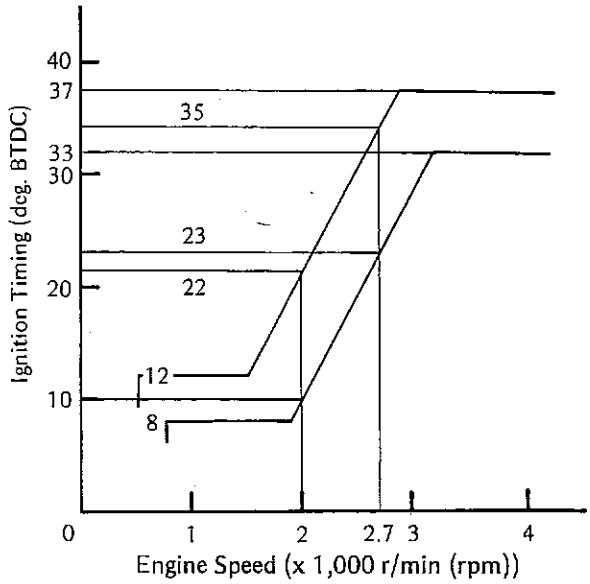
Plug Type: **NGK DP9EA-9 or X27EP-U9**
Ⓒ Ⓔ NGK DPR9EA-9 or X27EPR-U9
Plug Gap: **0.8 – 0.9 mm**

Ⓒ: Canadian Model **Ⓔ: European Model**

Ignition Timing Inspection (Dynamic)

Refer to p. 14-10 of the Base Manual noting the following exception.

Ignition Timing/Engine Speed Relationship



CDI Unit Inspection

●Inspection is the same as for the '85 model, except for the following.

CDI Unit Resistance Unit : kΩ

Range x 1 kΩ		Meter Positive (+) Lead Connection						
		W	R	BK	R/G	BL/R	BK/W	R/BK
Meter Negative (–) Lead Connection	W		∞	∞	∞	∞	∞	∞
	R	9 – 55		3 – 30	35 – 160	3 – 30	∞	3 – 15
	BK	2 – 9	2 – 9		10 – 45	0	∞	1 – 8
	R/G	∞	∞	∞		∞	∞	∞
	BL/G	2 – 9	2 – 9	0	10 – 45		∞	1 – 8
	BK/W	∞	∞	∞	∞	∞		∞
	R/BK	3 – 20	3 – 20	1 – 8	10 – 60	1 – 8	∞	

Switch and Sensors

Water Temperature Senosr Inspection

Refer to p. 14-22 of the Base Manual noting the following exception.

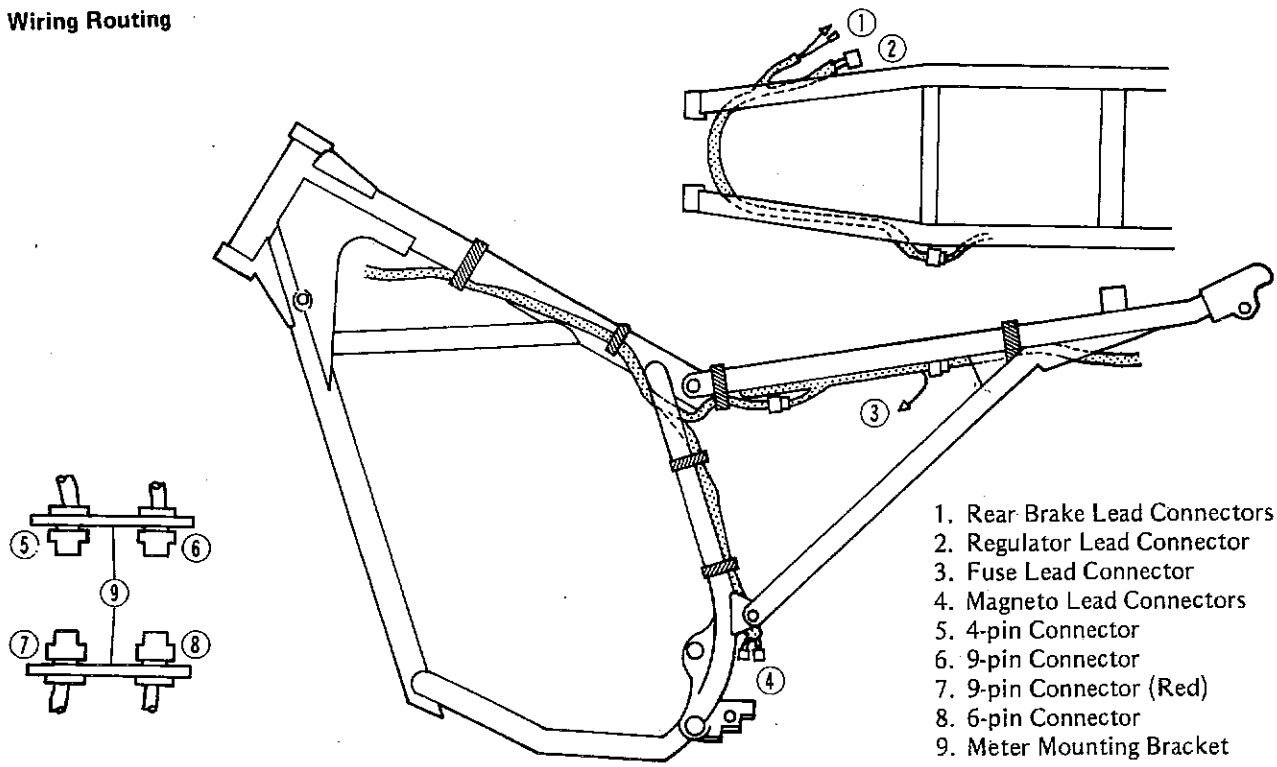
Internal Resistance of Water Temperature Sensor
80°C (176°F): About 130 Ω
100°C (212°F): About 70 Ω

Electrical Wiring

Wiring Inspection

●Visually inspect the wiring for signs of burning, fraying, etc.
★If any wiring is poor, replace the damaged wiring.
●Pull each connector apart and inspect it for corrosion, dirt, and damage.
★If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.
●Check the wiring for continuity.
○Use the wiring diagram to find the ends of the lead which is suspected of being a problem.
○Connect an ohmmeter between the ends of the leads.
○Set the meter to the x 1 Ω range, and read the meter.
★If the meter does not read 0 Ω, the lead is defective. Replace the lead or the wiring loom if necessary.

Wiring Routing



1. Rear Brake Lead Connectors
2. Regulator Lead Connector
3. Fuse Lead Connector
4. Magneto Lead Connectors
5. 4-pin Connector
6. 9-pin Connector
7. 9-pin Connector (Red)
8. 6-pin Connector
9. Meter Mounting Bracket

Appendix

Table of Contents

MODEL APPLICATION

Year	Model	Beginning Frame No.
1985	KL250-D2	JKALMD1□FA000001 or KL250D-000001
1986	KL250-D3	JKALMD1□GA010201 or KL250D-010201
1987	KL250-D4	JKALMD1□HA015001 or KL250D-015001
1988	KL250-D5	JKALMD1□JA019001 or KL250D-019001
1989	KL250-D6	JKALMD1□KA022301 or KL250D-022301
1990	KL250-D7	JKALMD1□LA026501 or KL250D-026501
1991	KL250-D8	JKALMD1□MA033001 or KL250D-033001
1992	KL250-D9	JKALMD1□NA040001 or KL250D-040001
1993	KL250-D10	JKALMD1□PA050001
1994	KL250-D11	JKALMD1□RA070001 or KL250D-070001
1995	KL250-D12	JKALMD1□SA080001
1996	KL250-D13	JKALMD1□TA085001
1997	KL250-D14	JKALMD1□VA088001

□: This digit in the frame number changes from one machine to another.

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