Kawasaki

ER-5

Motorcycle Service Manual

Quick Reference Guide

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

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

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Motorcycle Service Manual

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

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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)		

Read OWNER’S MANUAL before operating.

EMISSION CONTROL INFORMATION

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

1. Crankcase Emission Control System

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

2. Exhaust Emission Control System

This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this motorcycle. The fuel, ignition, and exhaust 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..."

NOTE

○ *The phrase "remove or render inoperative any device or element of design" has been generally interpreted as follows:*

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

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

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its 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 manual is designed primarily for use by trained mechanics in a properly equipped shop. However, it contains enough detail and basic information to make it useful to the owner who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily. Whenever the owner has insufficient experience or doubts his ability to do the work, all adjustments, maintenance, and repair should be carried out only by qualified mechanics.

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

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

To get the longest life out of your vehicle:

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

How to Use This Manual

In this manual, the product is divided into its major systems and these systems make up the manual's chapters.

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

For example, if you want ignition coil information, 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 ignition coil section.

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

⚠ WARNING

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

CAUTION

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

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

NOTE

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

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

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

General Information

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1-2 GENERAL INFORMATION

Before Servicing

Before starting to perform an inspection service or carry out a disassembly and reassembly operation on a motorcycle, read the precautions given below. To facilitate actual operations, notes, illustrations, photographs, cautions, and detailed descriptions have been included in each chapter wherever necessary. This section explains the items that require particular attention during the removal and reinstallation or disassembly and reassembly of general parts.

Especially note the following:

(1) Dirt

Before removal and disassembly, clean the motorcycle. Any dirt entering the engine will 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

Disconnect the ground (–) wire from the battery before performing any disassembly operations on the motorcycle. This prevents the engine from accidentally turning over while work is being carried out, sparks from being generated while disconnecting the wires from electrical parts, as well as damage to the electrical parts themselves. For reinstallation, first connect the positive wire to the positive (+) terminal of the battery

(3) Installation, Assembly

Generally, installation or assembly is the reverse of removal or disassembly. However, if installation or assembly sequence is given in this Service Manual, follow it. Note parts locations and cable, wire, and hose routing during removal or disassembly so they can be installed or assembled in the same way. It is preferable to mark and record the locations and routing whenever possible.

(4) Tightening Sequence

When installing bolts, nuts, or screws for which a tightening sequence is given in this Service Manual, make sure to follow the sequence. When installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit, thus ensuring that the part has been installed in its proper location. Then, tighten them to the specified torque in the tightening sequence and method indicated. If tightening sequence instructions are not given, tighten them evenly in a cross pattern. Conversely, to remove a part, first loosen all the bolts, nuts, or screws that are retaining the part a 1/4-turn before removing them.

(5) Torque

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

(6) 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 removing screws held by non-permanent locking agent) in order to avoid damaging the screw heads.

(7) Edges

Watch for sharp edges, as they could cause injury through careless handling, especially during major engine disassembly and assembly. Use a clean piece of thick cloth when lifting the engine or turning it over.

(8) High-Flash Point Solvent

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

(9) Gasket, O-ring

Replace a gasket or an O-ring with a new part when disassembling. Remove any foreign matter from the mating surface of the gasket or O-ring to ensure a perfectly smooth surface to prevent oil or compression leaks.

Before Servicing

(10)Liquid Gasket, Locking Agent

Clean and prepare surfaces where liquid gasket or non-permanent locking agent will be used. Apply them sparingly. Excessive amount may block engine oil passages and cause serious damage.

(11) Press

When using a press or driver to install a part such as a wheel bearing, apply a small amount of oil to the area where the two parts come in contact to ensure a smooth fit.

(12)Ball Bearing and Needle Bearing

Do not remove a ball bearing or a needle bearing unless it is absolutely necessary. Replace any ball or needle bearings that were removed with new ones. Install bearings with the manufacturer and size marks facing out, applying pressure evenly with a suitable driver. Apply force only to the end of the race that contacts the press fit portion, and press it evenly over the base component.

(13)Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals. Oil or grease seals should be pressed into place using a suitable driver, applying a force uniformly to the end of seal until the face of the seal is even with the end of the hole, unless instructed otherwise. When pressing in an oil or grease seal which has manufacturer's marks, press it in with the marks facing out.

(14)Circlip, Retaining Ring, and Cotter Pin

When installing circlips and retaining rings, take care to compress or expand them only enough to install them and no more. Install the circlip with its chamfered side facing load side as well.

Replace any circlips, retaining rings, and cotter pins that were removed with new ones, as removal weakens and deforms them. If old ones are reused, they could become detached while the motorcycle is driven, leading to a major problem.

(15)Lubrication

Engine wear is generally at its maximum while the engine is warming up and before all the sliding surfaces have an adequate lubricative film. During assembly, make sure to apply oil to any sliding surface or bearing that has been cleaned. Old grease or dirty oil could have lost its lubricative quality and may contain foreign particles that act as abrasives; therefore, make sure to wipe it off and apply fresh grease or oil. 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.

(16)Direction of Engine Rotation

To rotate the crankshaft manually, make sure to do so in the direction of positive rotation. Positive rotation is counterclockwise as viewed from the left side of the engine. To carry out proper adjustment, it is furthermore necessary to rotate the engine in the direction of positive rotation as well.

(17)Replacement Parts

When there is a replacement instruction, replace these parts with new ones every time they are removed.

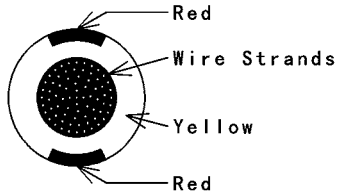
Replacement parts will be damaged or lose their original function once they are removed. Therefore, always replace these parts with new ones every time they are removed. Although the previously mentioned gasket, O-ring, ball bearing, needle bearing, grease seal, oil seal, circlip, and cotter pin have not been so designated in their respective text, they are replacement parts.

(18)Electrical Wires

All the electrical wires are either one-color or two-color. A two-color wire is identified first by the primary color and then the stripe 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. Unless instructed otherwise, electrical wires must be connected to wires of the same color.

Before Servicing

Two-Color Electrical

Wire(cross-section)	Color Indicated on the Wire	Color Indicated on the Wiring Diagram
	Yellow/Red	Y/R

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(19)Inspection

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

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

(20)Specifications

Specification terms are defined as follows:

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

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

Model Identification

ER500-C1, D1 Left Side View

ER500-C1, D1 Right Side View

General Specifications

Items	EN500-C1 ~ C2	EN500-C3 ~	EN500-D1
Dimensions			
Overall Length	2 070 mm (81.5 in.)	←	←
Overall Width	730 mm (28.74 in.)	←	←
Overall Height	1 070 mm (42.13 in.)	←	←
Wheelbase	1 430 mm (56.3 in.)	←	←
Road Clearance	125 mm (4.92 in.)	←	←
Seat Height	800 mm (31.5 in.)	←	←
Dry Weight	179 kg (395 lb.)	←	←
Curb Weight:			
Front	92 kg (203 lb.)	←	←
Rear	107 kg (236 lb.)	←	←
Fuel tank Capacity	17 L (4.5 US gal.)	←	←
Performance			
Minimum Turning Radius	2.5 m (8.2 ft.)	←	←
Engine			
Type	4-stroke, DOHC, 2-cylinder	←	←
Cooling System	Liquid-cooled	←	←
Bore and Stroke	74.0 × 58.0 mm (2.91 × 2.28 in.)	←	←
Displacement	498 mL (30.39 cu in.)	←	←
Compression Ratio	9.8:1	←	←
Maximum Horsepower	37 kW (50.3 PS) @9 000 r/min (rpm)	←	25 kW (34 PS) @8 000 r/min (rpm)
Maximum Torque	45 N·m (4.6 kgf·m, 33 ft·lb) @7 200 r/min (rpm)	←	37 N·m (3.8 kgf·m, 27 ft·lb) @4 500 r/min (rpm)
Carburetion System	Carburetors, Keihin CVK34 × 2	←	←
Starting System	Electric starter	←	←
Ignition System	Battery and coil (transistorized)	←	←
Timing Advance	Electronically Advanced (digital)	←	←
Ignition Timing	From 10° BTDC @1 200 r/min (rpm) to 37.5° BTDC @10 000 r/min (rpm)	←	←
Spark Plugs	NGK DR9EA or ND X27ESR-U	←	←
Cylinder Numbering Method	Left to right, 1-2	←	←
Firing Order	1-2	←	←
Valve Timing:			
Inlet			
Open	31° BTDC	←	←
Close	51° ABDC	←	←
DuRation	262°	←	←
Exhaust			
Open	56° BBDC	←	←
Close	26° ATDC	←	←
DuRation	262°	←	←

General Specifications

Items	EN500-C1 ~ C2	EN500-C3 ~	EN500-D1
Lubrication System	Forced lubrication	←	←
Engine Oil:			
Grade	API SE, SF, SG or API SH or SJ with JASO MA	←	←
Viscosity	SAE10W-40	←	←
Capacity	3.4 L (3.6 us at)	←	←
Drive Train			
Primary Reduction System:			
Type	Chain	←	←
Reduction Ratio	2.652 (61/23)	←	←
Clutch Type	Wet multi disc	←	←
Transmission:			
Type	6-speed constant mesh, return shift	←	←
Gear Ratios:			
1st	2.571 (36/14)	←	←
2nd	1.722 (31/18)	←	←
3rd	1.333 (28/21)	←	←
4th	1.125 (27/24)	←	←
5th	0.961 (25/26)	←	←
6th	0.851 (23/27)	←	←
Final Drive System:			
Type	Chain drive	←	←
Reduction Ratio	2.470 (42/17)	←	←
Overall Drive Ratio	5.581 @Top gear	←	←
Frame			
Type	Tubular, double cradle	←	←
Caster (rake angle)	27°	←	←
Trail	102 mm (4.02 in.)	←	←
Front Tire:			
Type	Tubeless	←	←
Size	110/70-17 54H	110/70-17 M/C 54H	110/70-17 54H
Rear Tire:			
Type	Tubeless	←	←
Size	130/70-17 62H	130/70-17 M/C 62H	130/70-17 62H
Front Suspension:			
Type	Telescopic fork	←	←
Wheel Travel	125 mm (4.92 in.)	←	←
Rear Suspension:			
Type	Swingarm	←	←
Wheel Travel	114 mm (4.49 in.)	←	←
Brake Type:			
Front	Single disc	←	←
Rear	Drum	←	←

General Specifications

Items	EN500-C1 ~ C2	EN500-C3 ~	EN500-D1
Electrical Equipment			
Battery	12 V 10 Ah	←	←
Headlight:			
Type	Semi-sealed beam	←	←
Bulb	12 V 60/55 W (quartz-halogen)	←	←
Tail/brake Light	12 V 5/21 W × 2	←	←
Alternator:			
Type	Three-phase AC	←	←
Rated output	17 A × 14 V @6 000 r/min (rpm)	←	←

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

Periodic Maintenance Chart

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

FREQUENCY / INSPECTION	Whichever comes first ➡ / ⬇ Every	* ODOMETER READING × 1 000 km (× 1 000 mile)							Remarks
		1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	36 (24)	
Throttle cable - inspect †		●		●		●		●	
Idle speed - inspect †		●		●		●		●	
Carburetor synchronization - inspect †				●		●		●	
Air cleaner element - clean† #				●		●		●	
Fuel hoses, connections - inspect †			●	●	●	●	●	●	
Coolant filter - clean	years								
Radiator hoses, connections - inspect †		●							
Air suction valve - inspect †			●	●	●	●	●	●	
Valve clearance - inspect †				●		●		●	before 2005 model
						●			after 2005 model
Clutch adjust - inspect †		●	●	●	●	●	●	●	
Tire wear - inspect †			●	●	●	●	●	●	
Drive chain wear - inspect †#			●	●	●	●	●	●	
Drive chain - lubricate #	600 km								
Drive chain slack - inspect †#	1000 km								
Brake Play - inspect †#		●	●	●	●	●	●	●	
Brake fluid level - inspect †	month	●	●	●	●	●	●	●	
Brake hoses, connections - inspect †			●	●	●	●	●	●	
Brake lining or pad wear - inspect †#			●	●	●	●	●	●	
Brake light switch - inspect †		●	●	●	●	●	●	●	
Front fork oil leak - inspect †				●		●		●	
Rear shock absorber oil leak - inspect †				●		●		●	
Swingarm pivot - lubricate				●		●		●	
Steering - inspect †		●	●	●	●	●	●	●	
Steering stem bearing - lubricate	2 years					●			
Spark plug - clean and gap †			●	●	●	●	●	●	
General lubrication - perform				●		●		●	
Nut, bolts, and fasteners tightness - inspect †		●		●		●		●	
Coolant - change	2 years					●			

Periodic Maintenance Chart

FREQUENCY / INSPECTION	Whichever comes first ➡ / ⬇ Every	* ODOMETER READING × 1 000 km (× 1 000 mile) 1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	36 (24)	Remarks
Engine oil - change #	year	●	●	●	●	●	●	●	
Oil filter - replace		●		●		●		●	
Brake fluid - change	2 years					●			
Brake master cylinder cup and dust seal - replace	4 years								
Caliper piston seal and dust seal - replace	4 years								
Front Fork oil - change	2 years					●			

#: Service more frequently when operating in severe conditions; dusty, wet, muddy, high speed, or frequent starting/stopping.

*: For higher odometer readings, repeat at the frequency interval established here.

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

Torque and Locking Agent

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

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

Letters used in the "Remarks" column mean:
- L: Apply a non-permanent locking agent to the threads.
- LG: Apply liquid gasket to the threads.
- Lh: Left-hand threads.
- M: Apply molybdenum disulfide grease.
- O: Apply an oil to the threads and seating surface.
- R: Replacement parts.
- S: Tighten the fasteners following the specified sequence.
- SS: Apply silicone sealant to the threads.
- St: Stake the fasteners to prevent loosening.

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

Basic Torque for General Fasteners

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

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System				
Fuel Tap Plate Screws	0.8	0.08	7 in·lb	
Fuel Tap Diaphragm Chamber Screws	1.0	0.10	9 in·lb	
Fuel Tap Mounting Bolts	2.5	0.25	22 in·lb	
Fuel Level Sensor Bolts	6.9	0.7	61 in·lb	
Cooling System				
Radiator Hose Clamp Screws	2.5	0.25	22 in·lb	
Fan Switch	18	1.8	13	
Thermostat Housing Bolts	11	1.1	95 in·lb	
Water Temperature Sensor	7.8	0.8	69 in·lb	SS
Water Pump Cover Bolts	11	1.1	95 in·lb	
Water Pump Shaft	25	2.5	18	Lh
Water Pump Impeller	9.8	1.0	87 in·lb	Lh

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Water Pipe Bolts	9.8	1.0	87 in·lb	L
Cylinder Head Jacket Plug	9.8	1.0	87 in·lb	L
Air Suction Valve Cover Bolts	11	1.1	95 in·lb	
Coolant Drain Plug	11	1.1	95 in·lb	
Engine Top End				
Spark Plugs	14	1.4	10	
Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	
Camshaft Cap Bolts	12	1.2	8.5	S
Rocker Shafts	39	4.0	29	
Valve Adjuster Locknuts	25	2.5	18	
Camshaft Sprocket Bolts	15	1.5	11	L
Cylinder Head Bolts (10 mm)	51	5.2	38	S
Cylinder Head Bolts (6 mm)	9.8	1.0	87 in·lb	S
Cam Chain Tensioner Mounting Bolts	11	1.1	95 in·lb	
Cam Chain Tensioner Cap Bolt	13	1.3	9.5	
Main Oil Pipe Upper Banjo Bolts M8	12	1.2	8.5	
Main Oil Pipe Lower Banjo Bolt M10	20	2.0	14.5	
Water Pipe Bolts	9.8	1.0	87 in·lb	L
Oil Pipe Bolts (in the cylinder head)	11	1.1	95 in·lb	
Oil Pipe Mounting Bolt	11	1.1	95 in·lb	
Clutch				
Oil Filler Plug	1.5	0.15	13 in·lb	
Clutch Hub Nut	132	13.5	98	
Clutch Spring Bolts	9.3	0.95	82 in·lb	
Clutch Cable Holder Bolt	11	1.1	95 in·lb	
Clutch Cover Bolts	11	1.1	95 in·lb	
Engine Lubrication System				
Oil Filler Plug	1.5	0.15	13 in·lb	
Oil Passage Plug	18	1.8	13	
Oil Filter Mounting Stud	25	2.5	18	L (Planted side)
Oil Filter (Cartridge Type)	17	1.75	12.5	
Oil Pipe for Balancer Shaft Banjo Bolt	20	2.0	14.5	
Oil Pipe for Drive Shaft Upper Banjo Bolt M6	7.8	0.8	69 in·lb	
Oil Pipe for Drive Shaft Lower Banjo Bolt M8	12	1.2	8.5	
Oil Pipe for Output Shaft Upper Banjo Bolt M6	7.8	0.8	69 in·lb	
Oil Pipe for Output Shaft Lower Banjo Bolt M8	12	1.2	8.5	
Oil Pipe for Output Shaft Mounting Bolt	11	1.1	95 in·lb	L
Oil Pump Pipe Mounting Bolts	11	1.1	95 in·lb	L
Relief Valve	15	1.5	11	L
Oil Pressure Switch Terminal Bolt	15	0.15	13 in·lb	
Oil Pressure Switch	15	1.5	11	SS

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Engine Oil Drain Plug	29	3.0	22	
Oil Pan Mounting Bolts	11	1.1	95 in·lb	
Oil Pump Mounting Bolts	11	1.1	95 in·lb	
Breather Body Bolt	5.9	0.6	52 in·lb	
Engine Removal/Installation				
Downtube Bolts	44	4.5	33	
Engine Mounting Bolts and Nuts	44	4.5	33	
Engine Mounting Bracket Bolts	25	2.5	18	
Crankshaft/Transmission				
Crankcase Bolts (8 mm)	27	2.8	20	S
Crankcase Bolts (6 mm)	12	1.2	8.5	S
Upper Primary Chain Guide Mounting Nut	11	1.1	95 in·lb	L
Lower Primary Chain Guide Mounting Bolt	11	1.1	95 in·lb	L
Connecting Rod Big End Nuts	36	3.7	27	
Return Spring Pin	20	2.0	14.5	L
Gear Positioning Lever Pivot Stud	–	–	–	L (planted side)
Gear Positioning Lever Nut	11	1.1	95 in·lb	
Shift Pedal Mounting Bolt	12	1.2	8.5	
Shift Drum Bearing Holder Bolts	11	1.1	95 in·lb	L
Shift Drum Cam Pin Plate Screw	–	–	–	L
Engine Sprocket Nut	127	13	94	O
External Shift Mechanism Cover Bolts	11	1.1	95 in·lb	
Neutral Switch	15	1.5	11	
Wheels/Tires				
Front Axle Nut	88	9.0	65	
Front Axle Clamp Bolt	20	2.0	14.5	
Rear Axle Nut	98	10	72	
Final Drive				
Torque Link Nuts	34	3.5	25	
Engine Sprocket Nut	127	13	94	O
Rear Sprocket Nuts	59	6.0	43	
Rear Coupling Studs	–	–	–	L (planted side)
Engine Axle Nut	98	10	72	
Drive Chain Guide Bolts	11	1.1	95 in·lb	
Brakes				
Brake Hose Banjo Bolts	25	2.5	18	
Reservoir Cap Screws	1.5	0.15	13 in·lb	
Brake Lever Pivot Bolt	1.0	0.10	9 in·lb	
Brake Lever Pivot Locknut	5.9	0.60	52 in·lb	
Master Cylinder Clamp Bolts	8.8	0.9	78 in·lb	S

Torque and Locking Agent

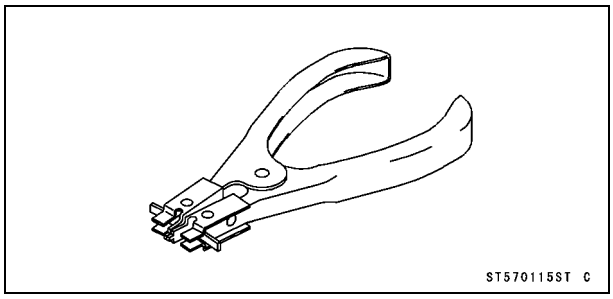
Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Front Brake Light Switch Mounting Screw	1.2	0.12	10 in·lb	
Caliper Mounting Bolts	34	3.5	25	
Caliper Bleed Valves	7.8	0.8	69 in·lb	
Brake Disc Mounting Bolts	27	2.8	20	L
Brake Pedal Bolt	8.8	0.9	78 in·lb	
Torque Link Nuts	34	3.5	25	
Brake Cam Lever Bolt	19	1.9	13.5	
Suspension				
Front Fork Upper Clamp Allen Bolts	20	2.0	14.5	
Front Fork Lower Clamp Allen Bolts	35	3.6	26	
Front Fork Bottom Allen Bolt	20	2.0	14.5	L
Front Axle Clamp Bolt	20	2.0	14.5	
Rear Shock Absorber Bolts and Nuts	34	3.5	25	
Swing Arm Pivot Nut	88	9.0	65	
Steering				
Handlebar Clamp Bolts	25	2.5	18	S
Handlebar Weight Allen Bolts	–	–	–	L
Handlebar Switch Housing Screws	3.4	0.35	30 in·lb	
Steering Stem Head Bolt	44	4.5	33	
Steering Stem Nut	Hand -Tighten (about 4.9)	Hand -Tighten (about 0.5)	Hand -Tighten (about 43 in·lb)	
Frame				
Tail Grip Bolts	25	2.5	18	
Footpeg Bracket Bolts	34	3.5	25	
Sidestand Bolt and Nut	44	4.5	33	
Center Stand Bolt and Nut	44	4.5	33	
Electrical System				
Pickup Coil Mounting Allen Bolts	8.3	0.85	74 in·lb	L
Timing Inspection Plug	2.5	0.25	22 in·lb	
Alternator Rotor Bolt Plug	1.5	0.15	13 in·lb	
Alternator Cover Bolts	11	1.1	95 in·lb	
Alternator Cover Allen Bolt	13	1.3	9.5	
Alternator Lead Clamp Screws	2.9	0.30	26 in·lb	
Spark Plug	14	1.4	10	
Alternator Stator Allen Bolts	12	1.2	8.5	
Alternator Rotor Bolt	69	7.0	51	
Starter Motor Mounting Bolts	11	1.1	95 in·lb	
Starter Chain Guide Screws	4.9	0.5	43 in·lb	L
Starter Motor Through Bolts	6.9	0.7	65 in·lb	
Starter Motor Terminal Nut	4.9	0.5	43 in·lb	
Starter Motor Lead Clamp Nut	4.9	0.5	43 in·lb	

Torque and Locking Agent

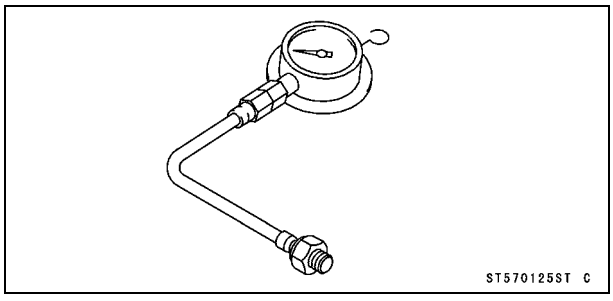
Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Starter Clutch Allen Bolts	34	3.5	25	L
Sidestand Switch Mounting Screw	3.9	0.4	35 in·lb	L
Sidestand Mounting Bolt	44	4.5	33	
Starter Motor Terminal Locknut	6.9	0.70	61 in·lb	
Starter Relay Terminal Bolt	4.9	0.50	43 in·lb	
Headlight Body Screws	2.9	0.30	26 in·lb	
Handlebar Switch Housing Screws	3.4	0.35	30 in·lb	
Radiator Fan Switch	18	1.8	13	
Meter Reset Knob Screw	–	–	–	L
Water Temperature Switch	7.8	0.80	69 in·lb	SS
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	
Oil Pressure Switch	15	1.5	11	SS
Neutral Switch	15	1.5	11	
Tail Light Mounting Nut	5.9	0.6	52 in·lb	

Special Tools and Sealants

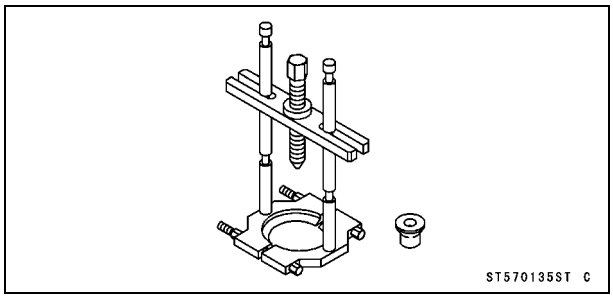
Piston Ring Pliers:
57001-115



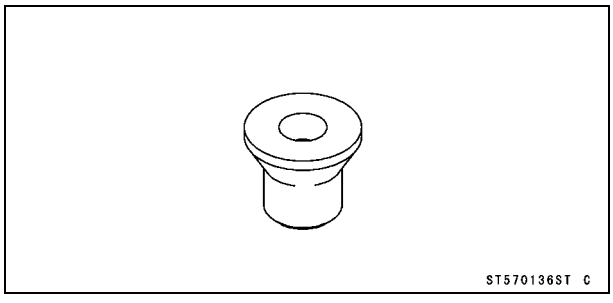
Oil Pressure Gauge, 5 kgf/cm²:
57001-125



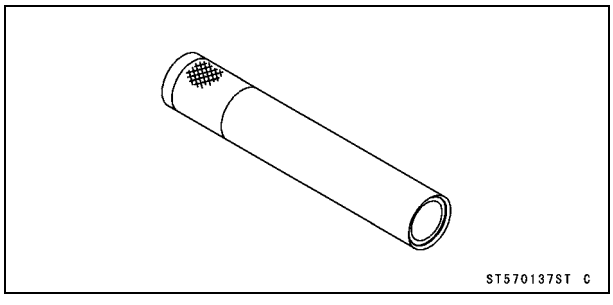
Bearing Puller:
57001-135



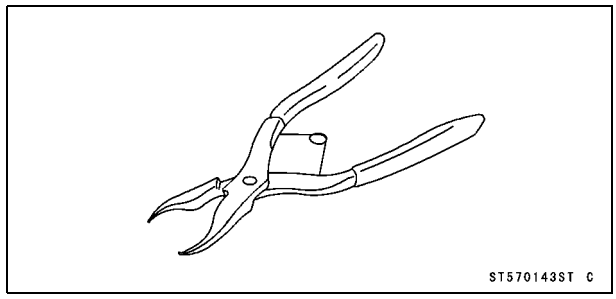
Bearing Puller Adapter:
57001-136



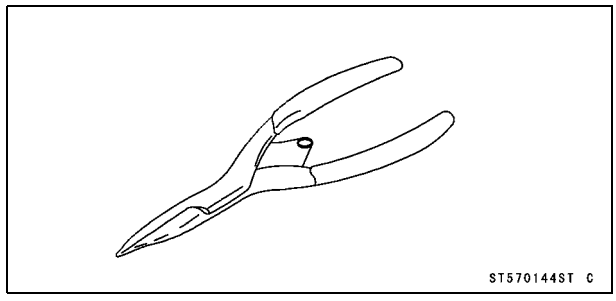
Steering Stem Bearing Driver:
57001-137



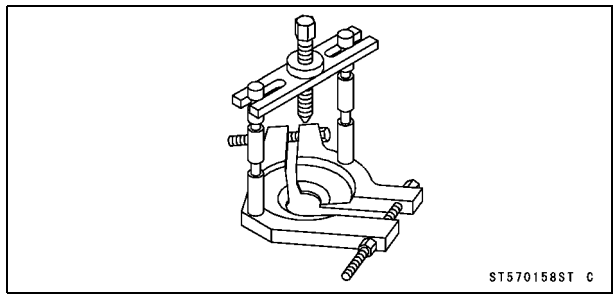
Inside Circlip Pliers:
57001-143



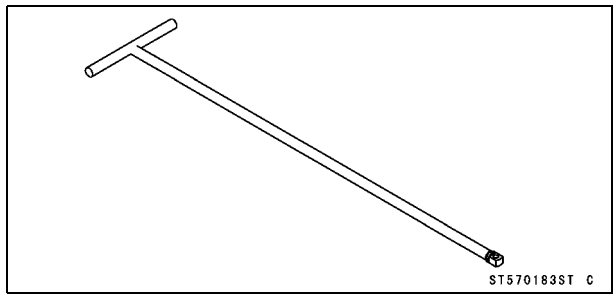
Outside Circlip Pliers:
57001-144



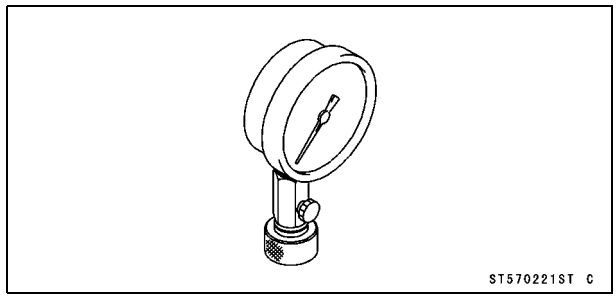
Bearing Puller:
57001-158



Fork Cylinder Holder Handle:
57001-183

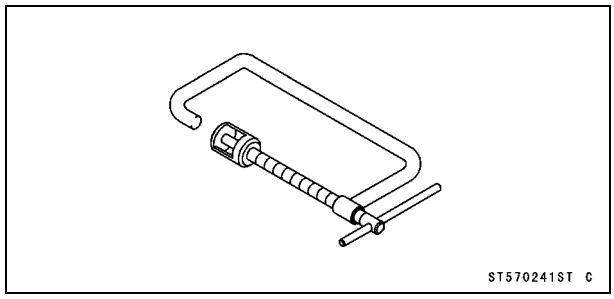


Compression Gauge, 20 kgf/cm²:
57001-221

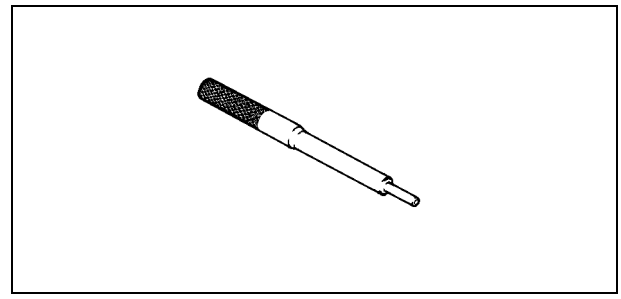


Special Tools and Sealants

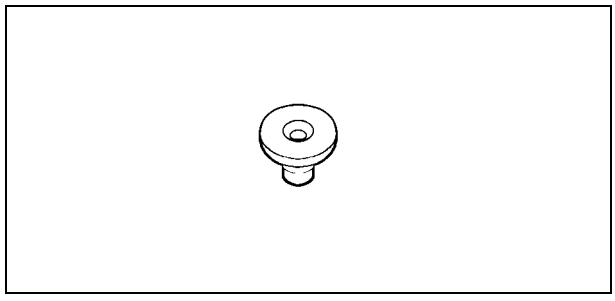
Valve Spring Compressor Assembly:
57001-241



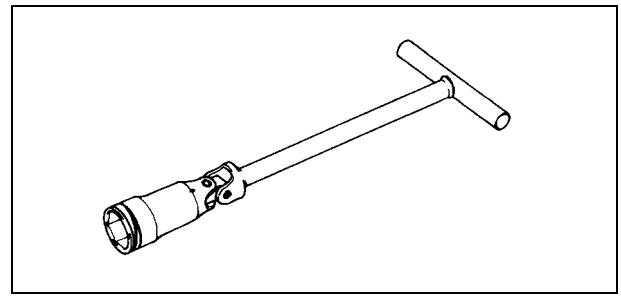
Valve Guide Arbor, ϕ5.5:
57001-1021



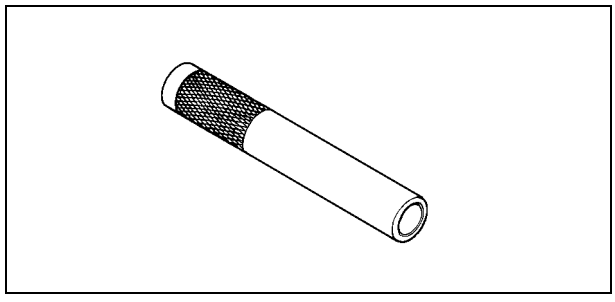
Bearing Puller Adapter:
57001-317



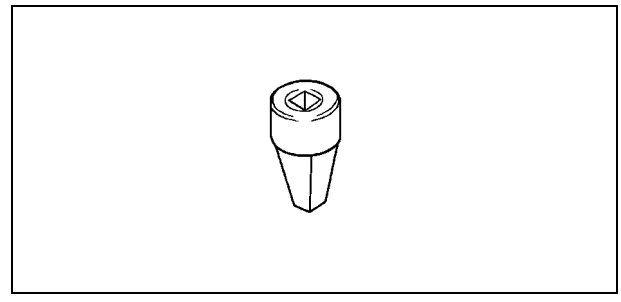
Spark Plug Wrench, Hex 18:
57001-1024



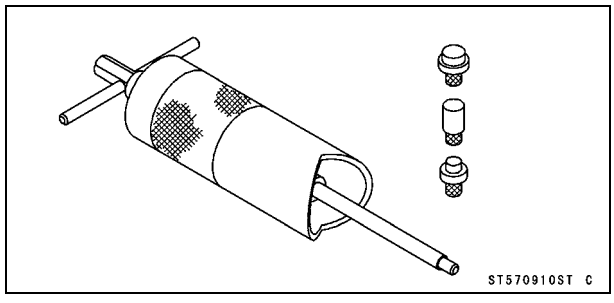
Bearing Driver, ϕ32:
57001-382



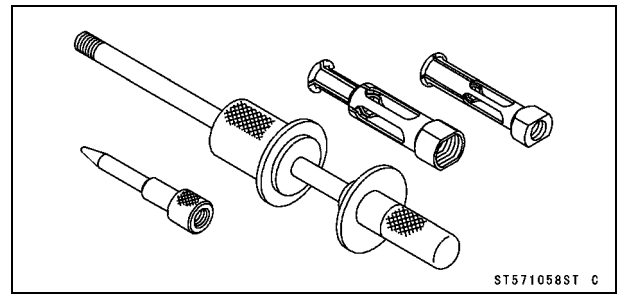
Fork Cylinder Holder Adapter:
57001-1057



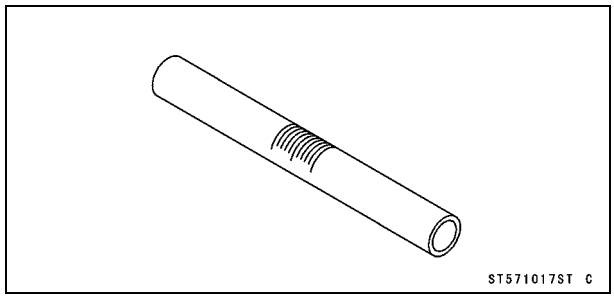
Piston Pin Puller Assembly:
57001-910



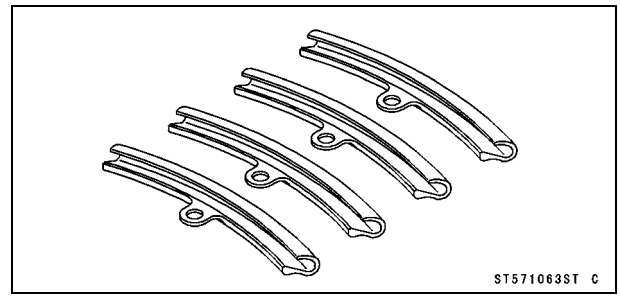
Oil Seal & Bearing Remover:
57001-1058



Fuel Level Gauge:
57001-1017

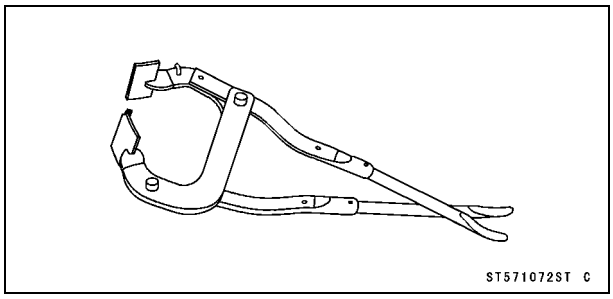


Rim Protector:
57001-1063

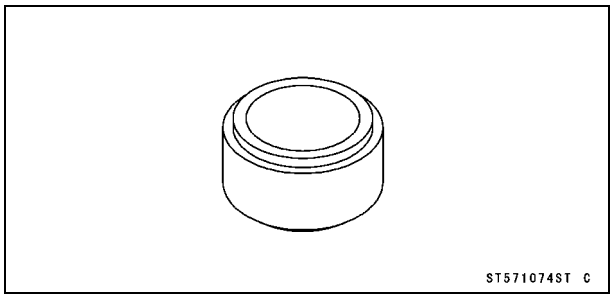


Special Tools and Sealants

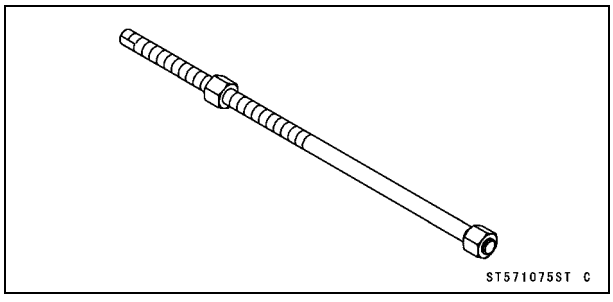
Bead Breaker Assembly:
57001-1072



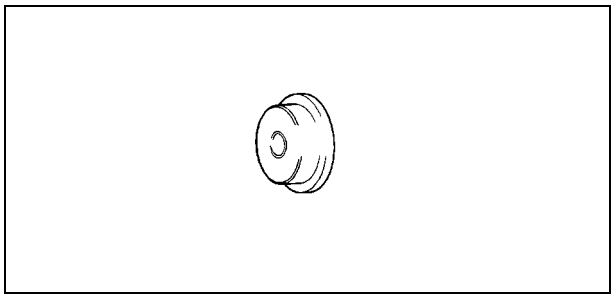
Steering Stem Bearing Driver Adapter, ϕ34.5:
57001-1074



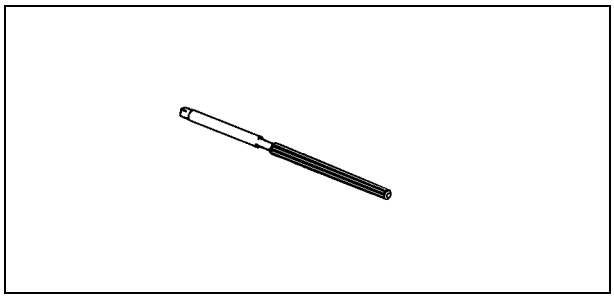
Head Pipe Outer Race Press Shaft:
57001-1075



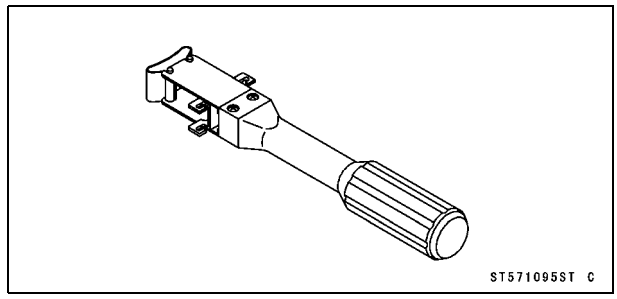
Head Pipe Outer Race Driver, ϕ51.5:
57001-1076



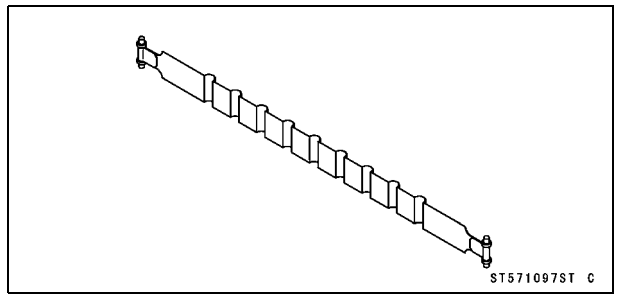
Valve Guide Reamer, ϕ5.5:
57001-1079



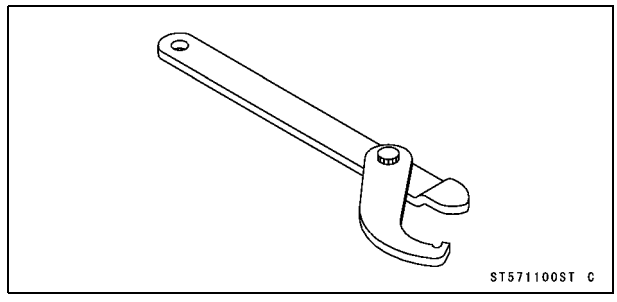
Piston Ring Compressor Grip:
57001-1095



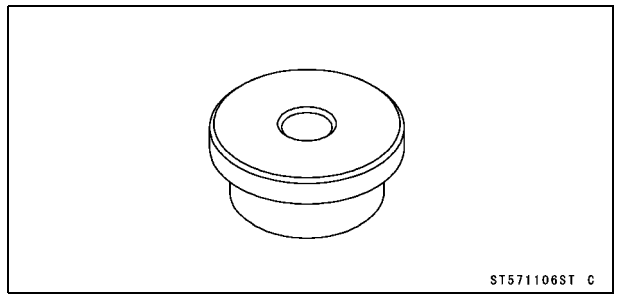
Piston Ring Compressor Belt, ϕ67 ~ ϕ79:
57001-1097



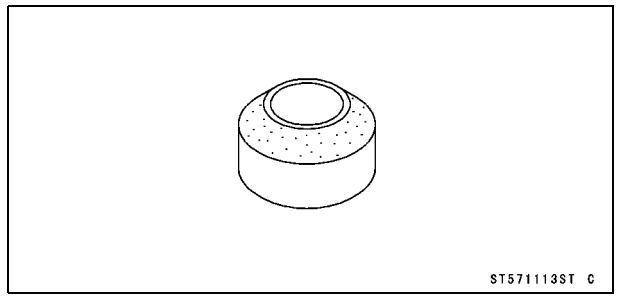
Steering Stem Nut Wrench:
57001-1100



Head Pipe Outer Race Driver, ϕ46.5:
57001-1106

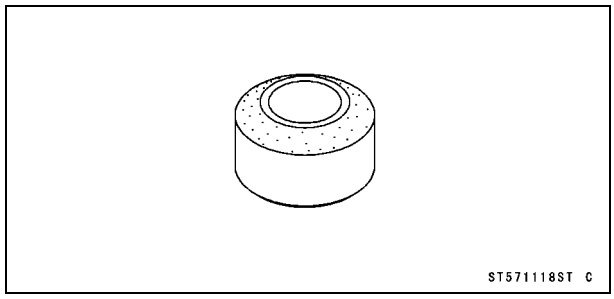


Valve Seat Cutter, 45° - ϕ24.5:
57001-1113

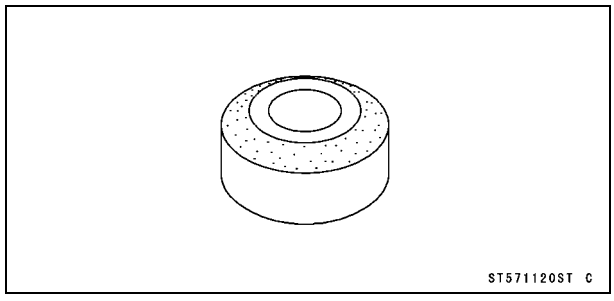


Special Tools and Sealants

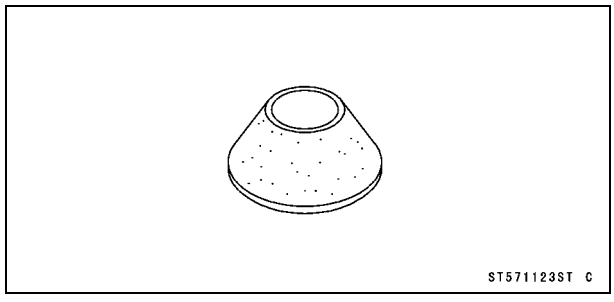
Valve Seat Cutter, 32° - ϕ25:
57001-1118



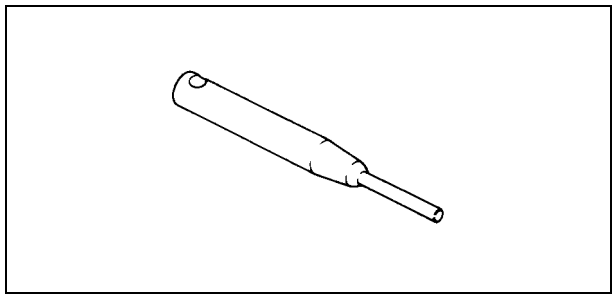
Valve Seat Cutter, 32° - ϕ30:
57001-1120



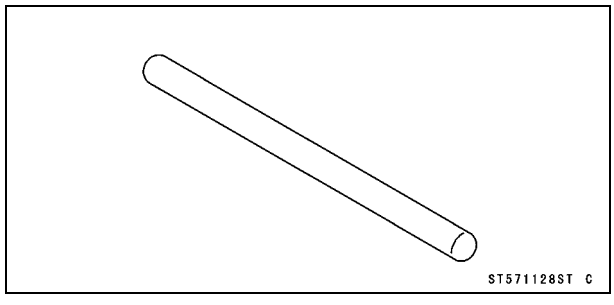
Valve Seat Cutter, 60° - ϕ30:
57001-1123



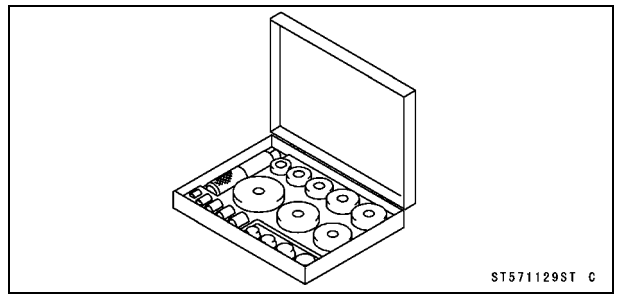
Valve Seat Cutter Holder, ϕ5.5:
57001-1125



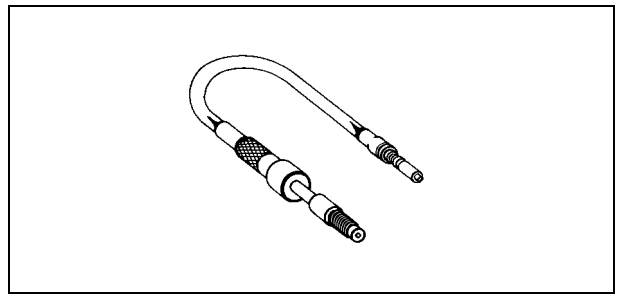
Valve Seat Cutter Holder Bar:
57001-1128



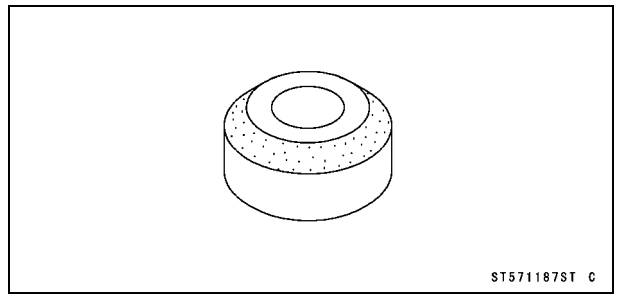
Bearing Driver Set:
57001-1129



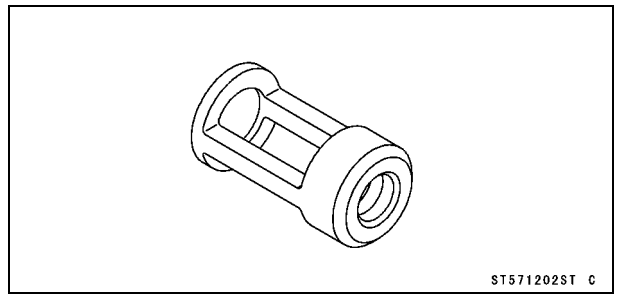
Compression Gauge Adapter, M12 × 1.25:
57001-1183



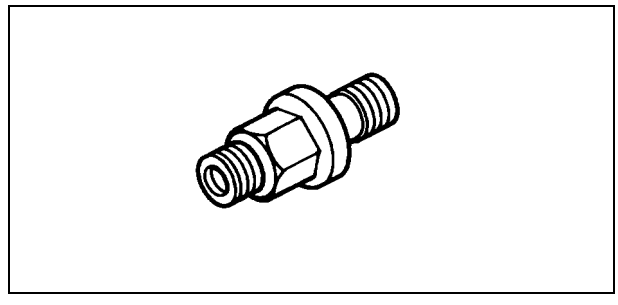
Valve Seat Cutter, 45° - ϕ30:
57001-1187



Valve Spring Compressor Adapter, ϕ22:
57001-1202

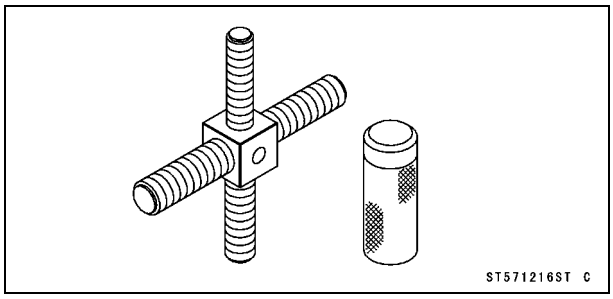


Oil Pressure Gauge Adapter, M14 × 1.5:
57001-1209

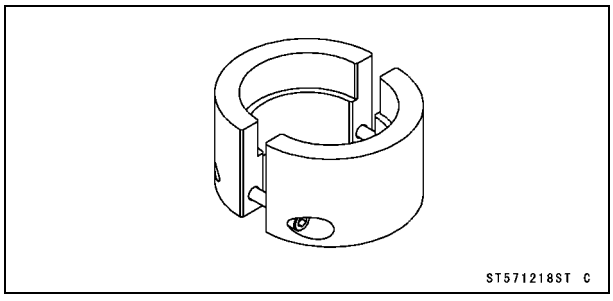


Special Tools and Sealants

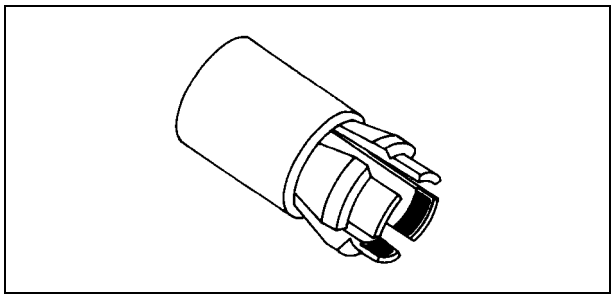
Rotor Puller, M16/M18/M20/M22 × 1.5:
57001-1216



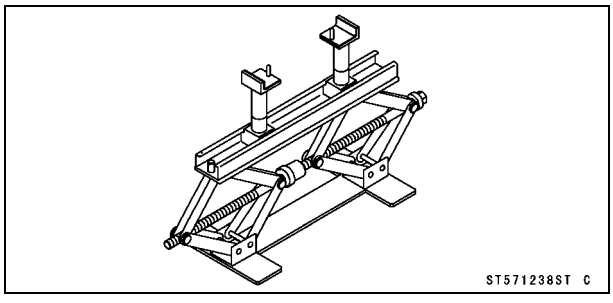
Fork Outer Tube Weight:
57001-1218



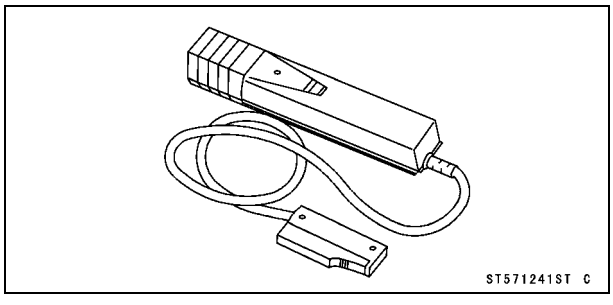
Front Fork Oil Seal Driver:
57001-1219



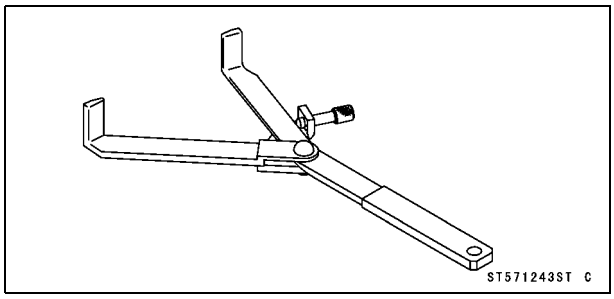
Jack:
57001-1238



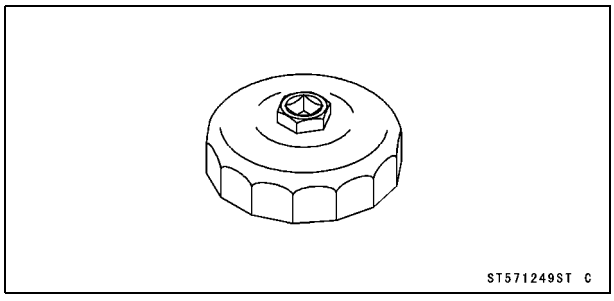
Timing Light:
57001-1241



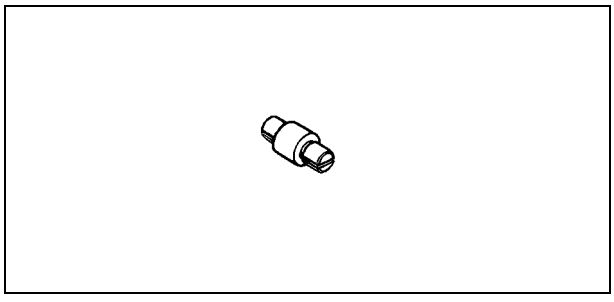
Clutch Holder:
57001-1243



Oil Filter Wrench:
57001-1249

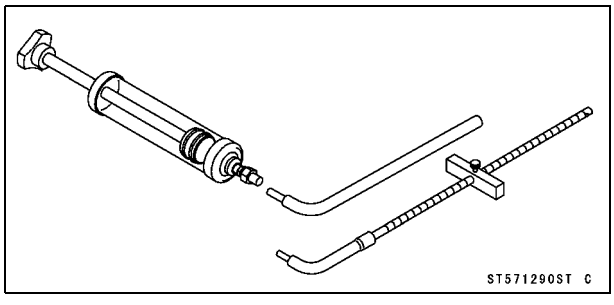


Bearing Remover Head, ϕ15 × ϕ17:
57001-1267

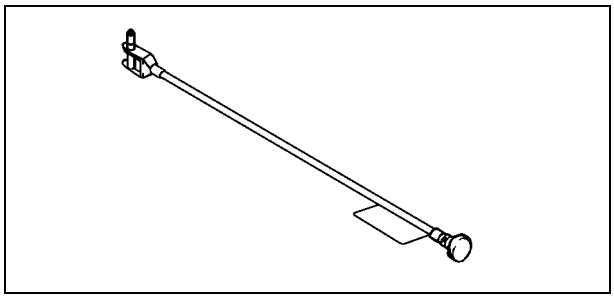


Carburetor Drain Plug Wrench, Hex 3:
57001-1269

Fork Oil Level Gauge:
57001-1290

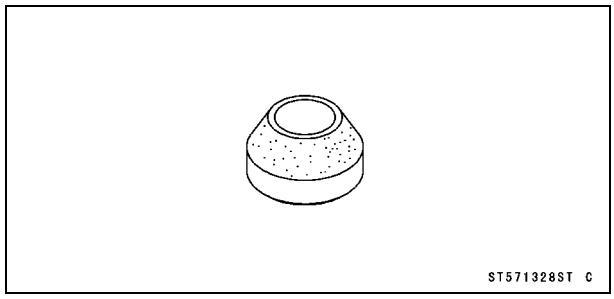


Pilot Screw Adjuster, C:
57001-1292

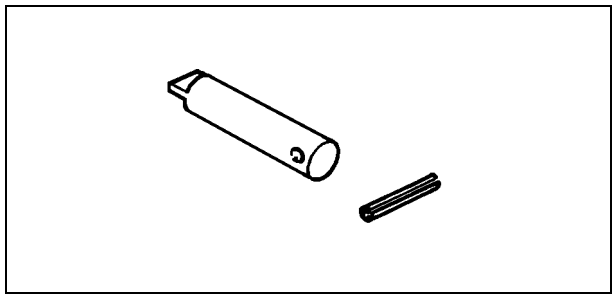


Special Tools and Sealants

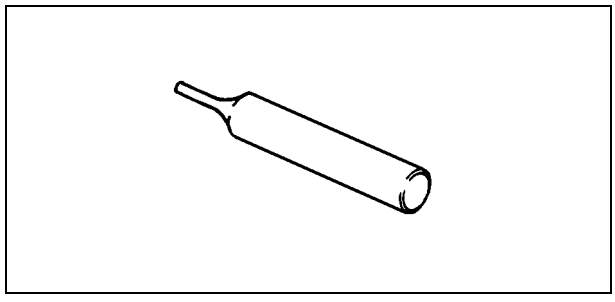
Valve Seat Cutter, 60° - ϕ25:
57001-1328



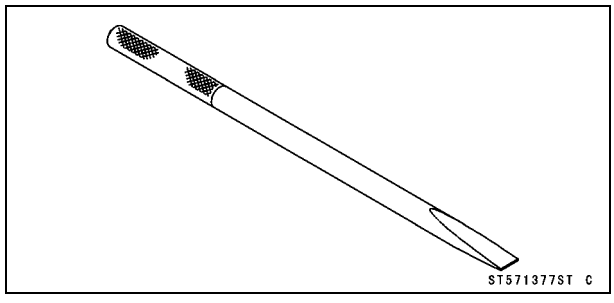
Pilot Screw Adjuster Adapter, ϕ5:
57001-1372



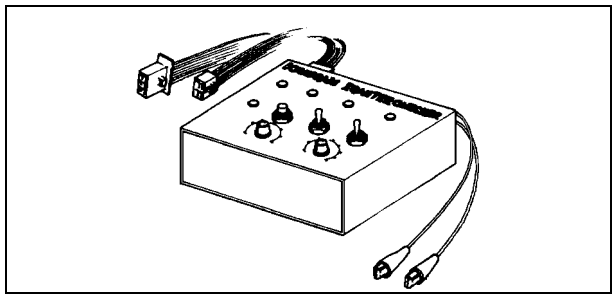
Pilot Screw Adjuster Driver:
57001-1373



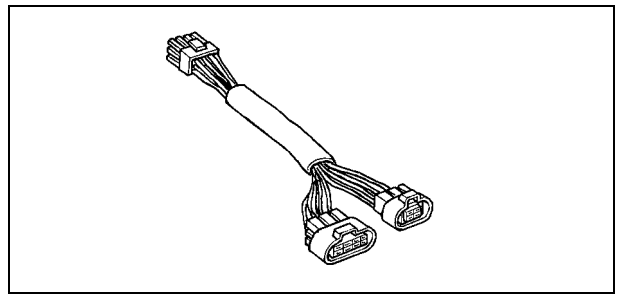
Bearing Remover Shaft, ϕ13:
57001-1377



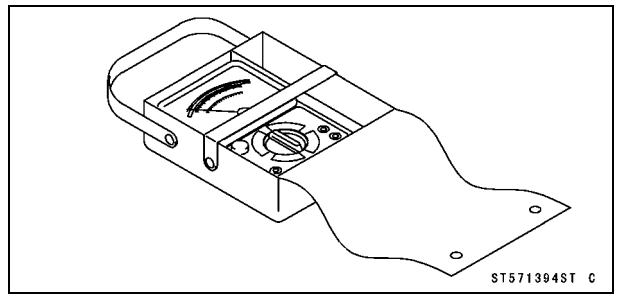
Igniter Checker Assembly:
57001-1378



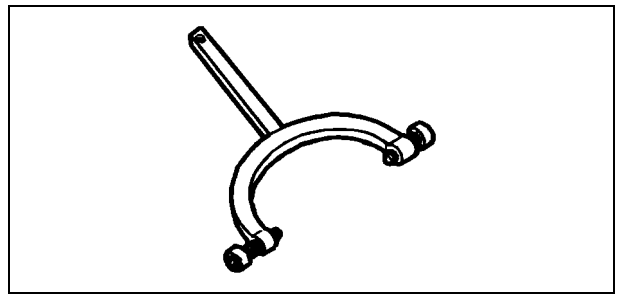
Harness Adapter #1:
57001-1381



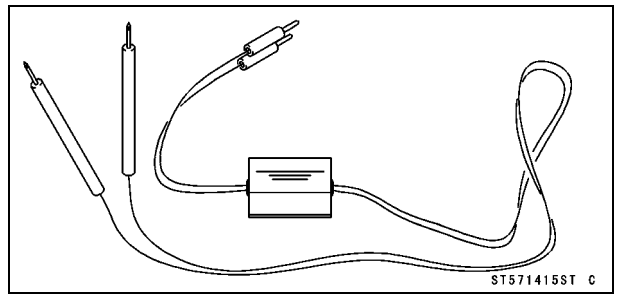
Hand Tester:
57001-1394



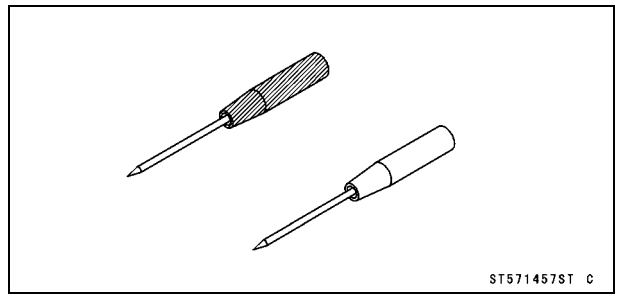
Flywheel Holder:
57001-1410



Peak Voltage Adapter:
57001-1415

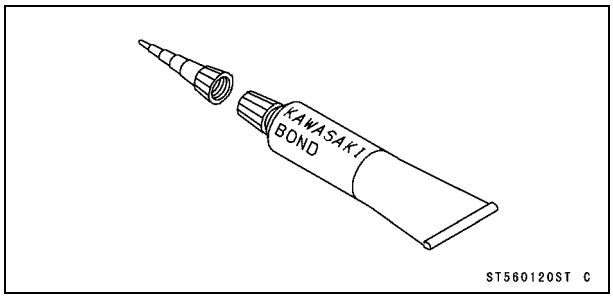


Needle Adapter Set:
57001-1457

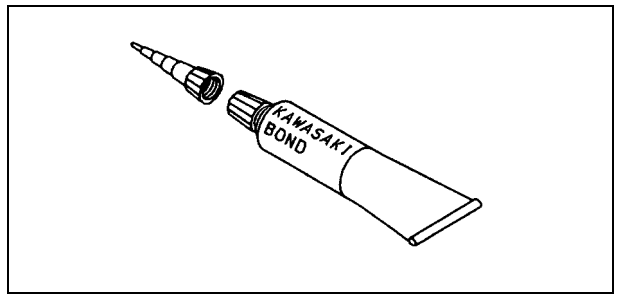


Special Tools and Sealants

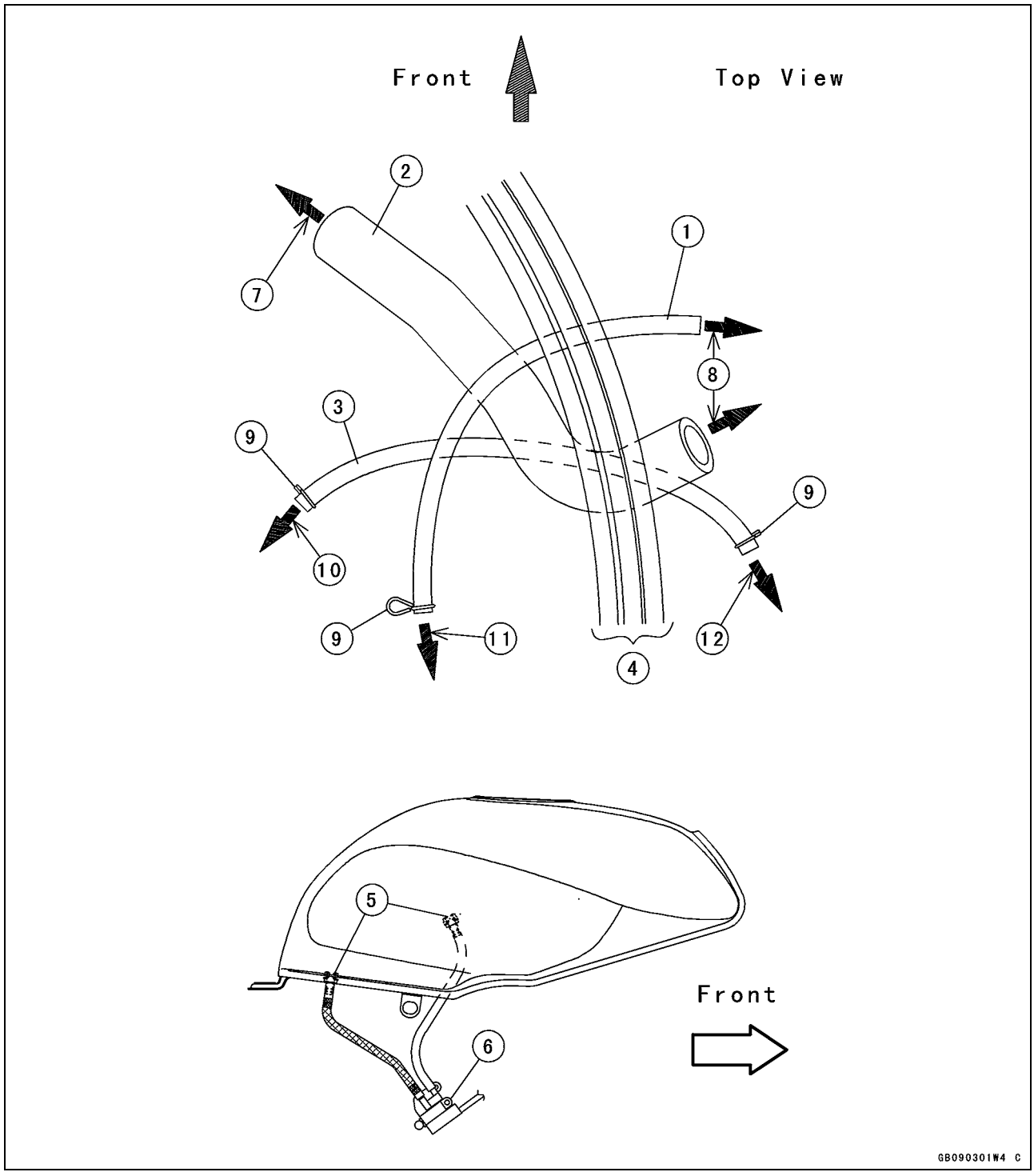
Kawasaki Bond (Silicone Sealant): 56019-120



Kawasaki Bond (Liquid Gasket - Black) TB1105: 92104-1003

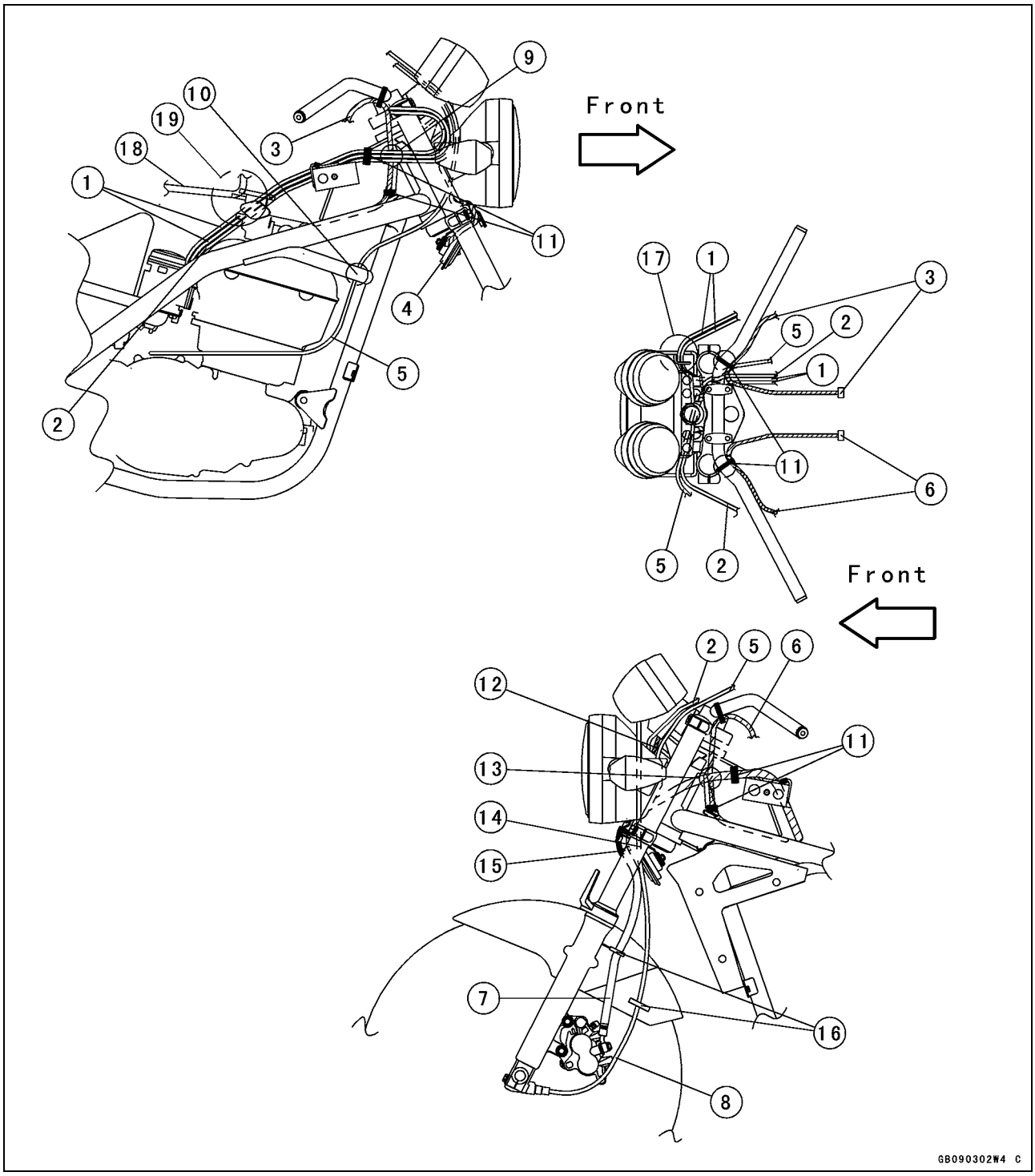


Cable, Wire, and Hose Routing



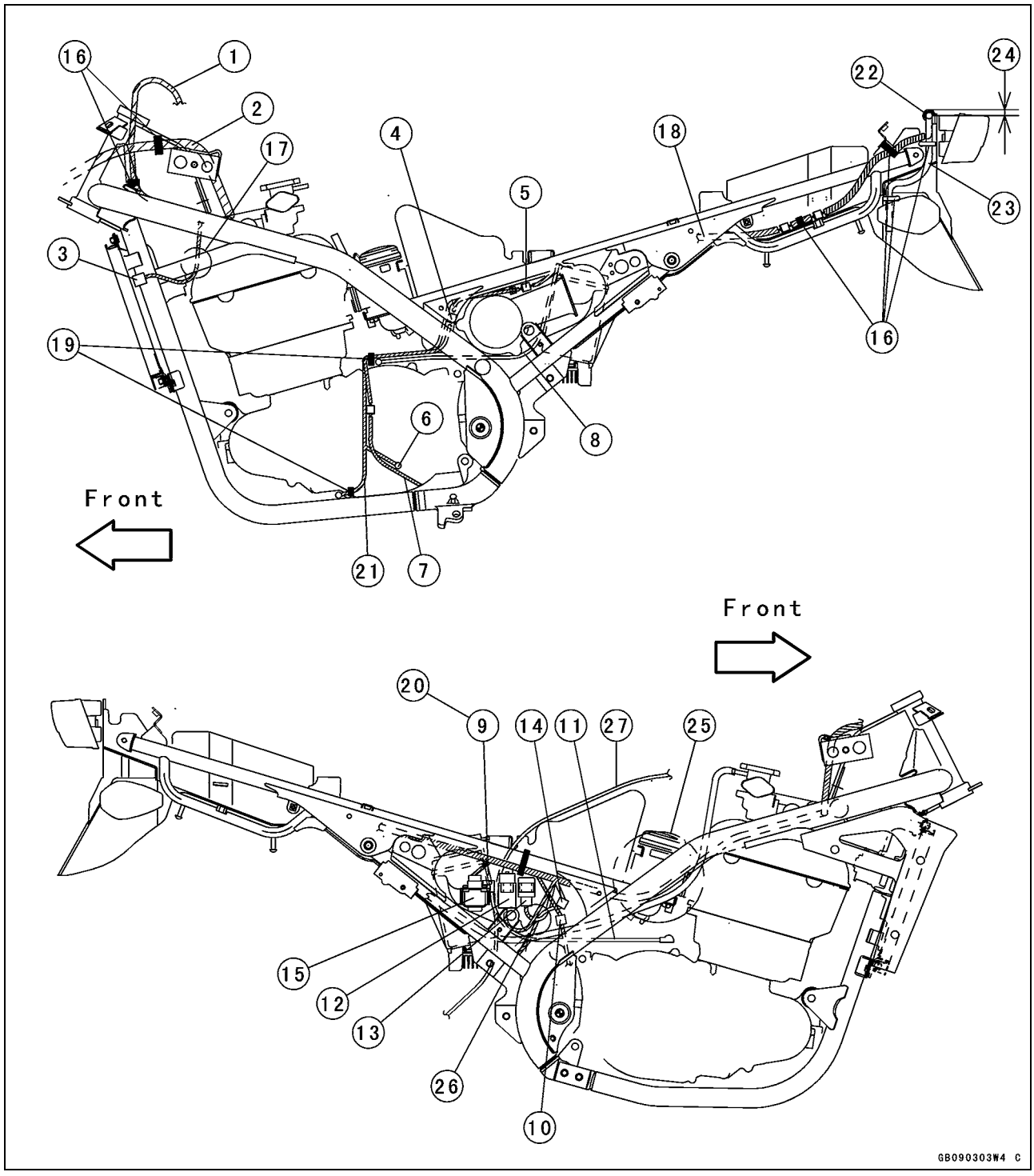
1. Vacuum Hose
2. Air Hose
3. Fuel Hose
4. Throttle and Choke Cables
5. Fuel Filters
6. Fuel Tap
7. To the air suction valve.
8. To the vacuum switch valve.
9. Clamp
10. To the fuel tap.
11. To the left carburetor.
12. To the right carburetor.

Cable, Wire, and Hose Routing



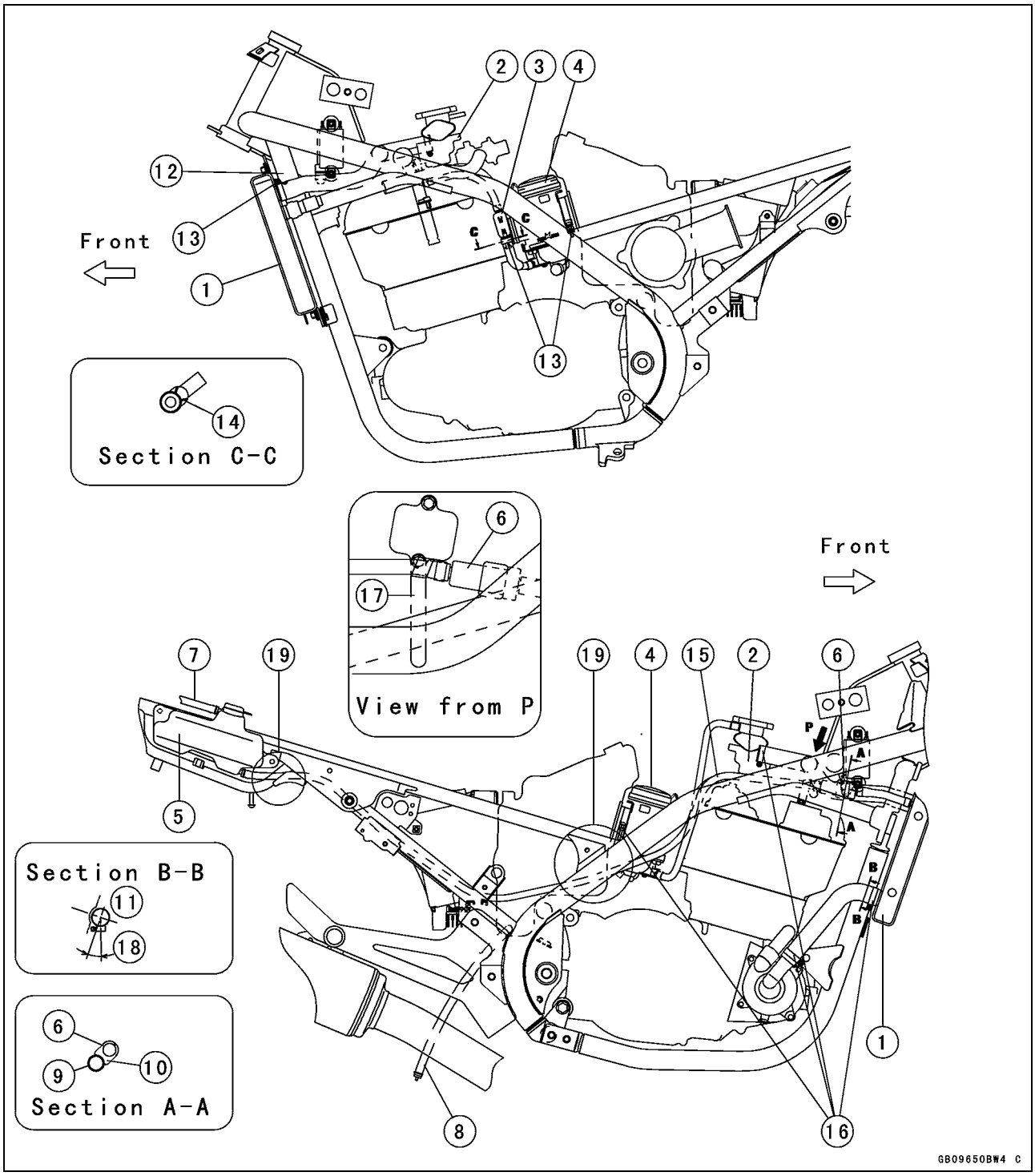
1. Throttle Cables
2. Choke Cable
3. Right Handlebar Switch Leads
4. Horn
5. Clutch Cable
6. Left Handlebar Switch Leads
7. Brake Hose
8. Speedometer Cable
9. Run the cables outside.
10. Run the clutch cable inside the cross pipe.
11. Bands
12. Run the ignition switch lead behind and then under the choke cable and above the clutch cable into the right hole of the headlight housing.
13. Run the main harness outside.
14. Run the meter cable inside the clamp
15. Clamp
16. Holders
17. Run the throttle cables through inside of the bracket.
18. Drain Hose
19. Run the drain hose above the throttle cable and choke cable at the fuel tank installation.

Cable, Wire, and Hose Routing



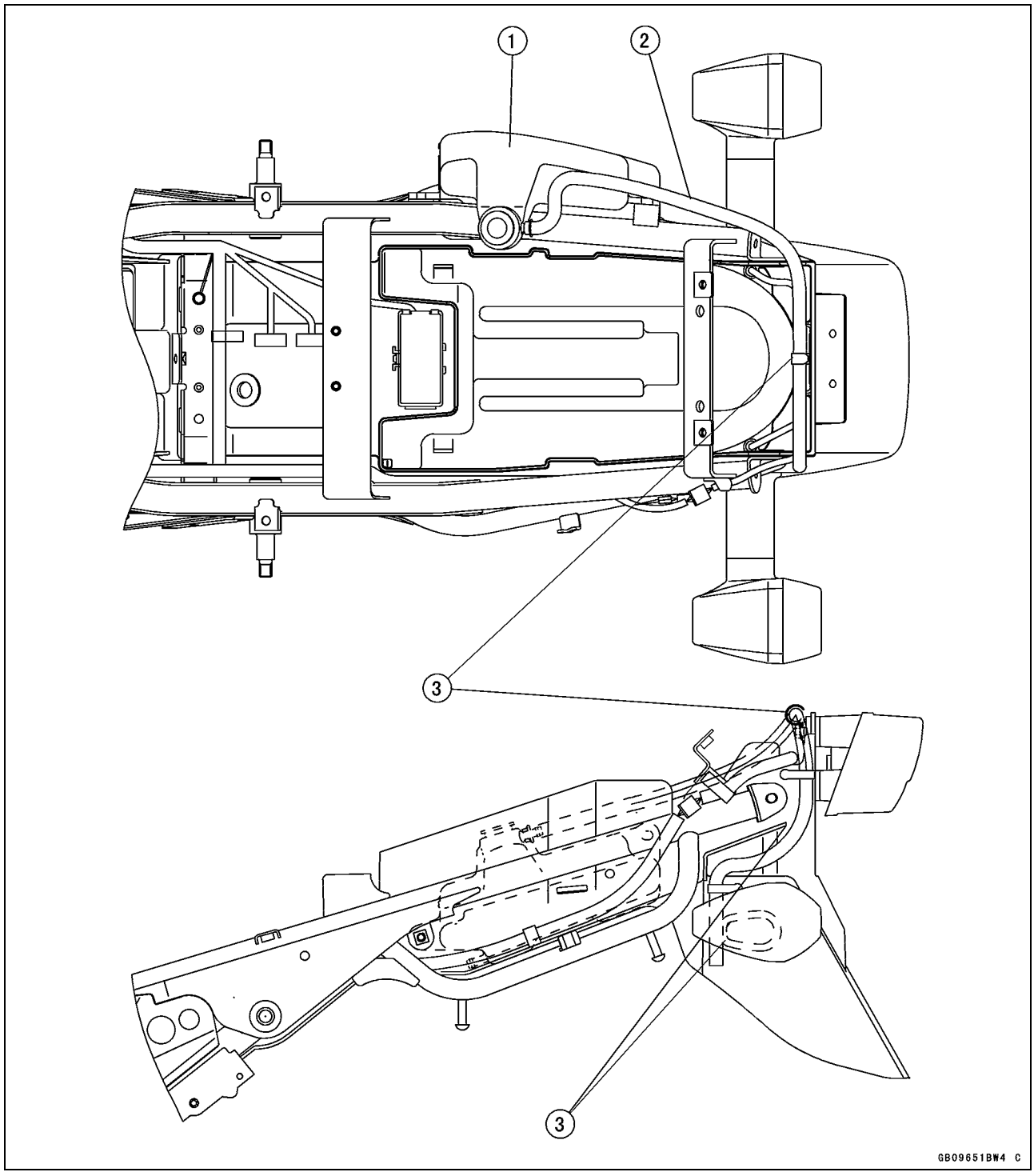
1. Handlebar Switch Harness
2. Main Harness
3. Radiator Fan Switch
4. Alternator Connector
5. Pickup Coil Connector
6. Neutral Switch Lead
7. Sidestand Switch Lead
8. Battery Negative Lead
9. Battery Positive Lead
10. Rear Brake Light Switch Connector
11. Starter Lead
12. Starter Circuit Relay
13. Turn Signal Relay
14. Regulator/rectifier Connector
15. Starter Relay
16. Bands
17. Run the leads inside the cross pipe.
18. Run the harness inside the frame.
19. Clamps
20. Run the lead under the starter lead.
21. Oil Pressure Switch Lead
22. Clamp
23. Radiator Reservoir Tank Hose
24. 5 mm (0.2 in.) or less
25. Run the harness over the cooling hose.
26. Run the regulator lead between the starter circuit relay lead and turn signal relay lead.
27. Cooling Hose

Cable, Wire, and Hose Routing



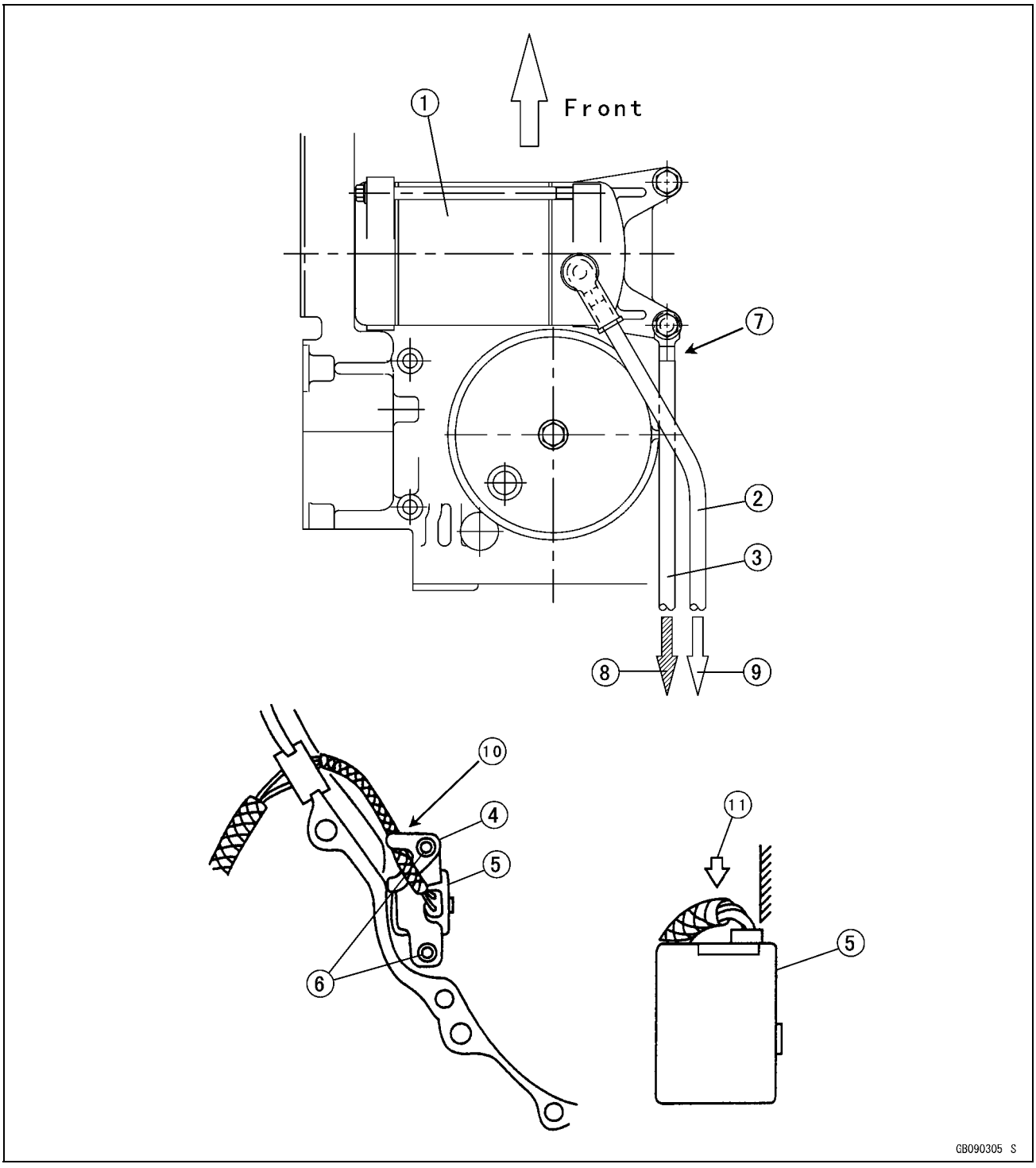
1. Radiator
2. Thermostat Housing
3. Coolant Filter
4. Carburetor
5. Reserve Tank
6. Coolant Valve
7. Reserve Tank Overflow Hose
8. Air Cleaner Drain Hose
9. Cross Pipe
10. Damper
11. Radiator Cover
12. Face the white mark upward and to the radiator.
13. Face the head of the clamp screw upward.
14. Place the clamp tab as shown.
15. Run the hose above the engine.
16. Face the head of the clamp screw as shown.
17. Clamp
18. About 20°
19. Run the hose inside of the frame.

Cable, Wire, and Hose Routing



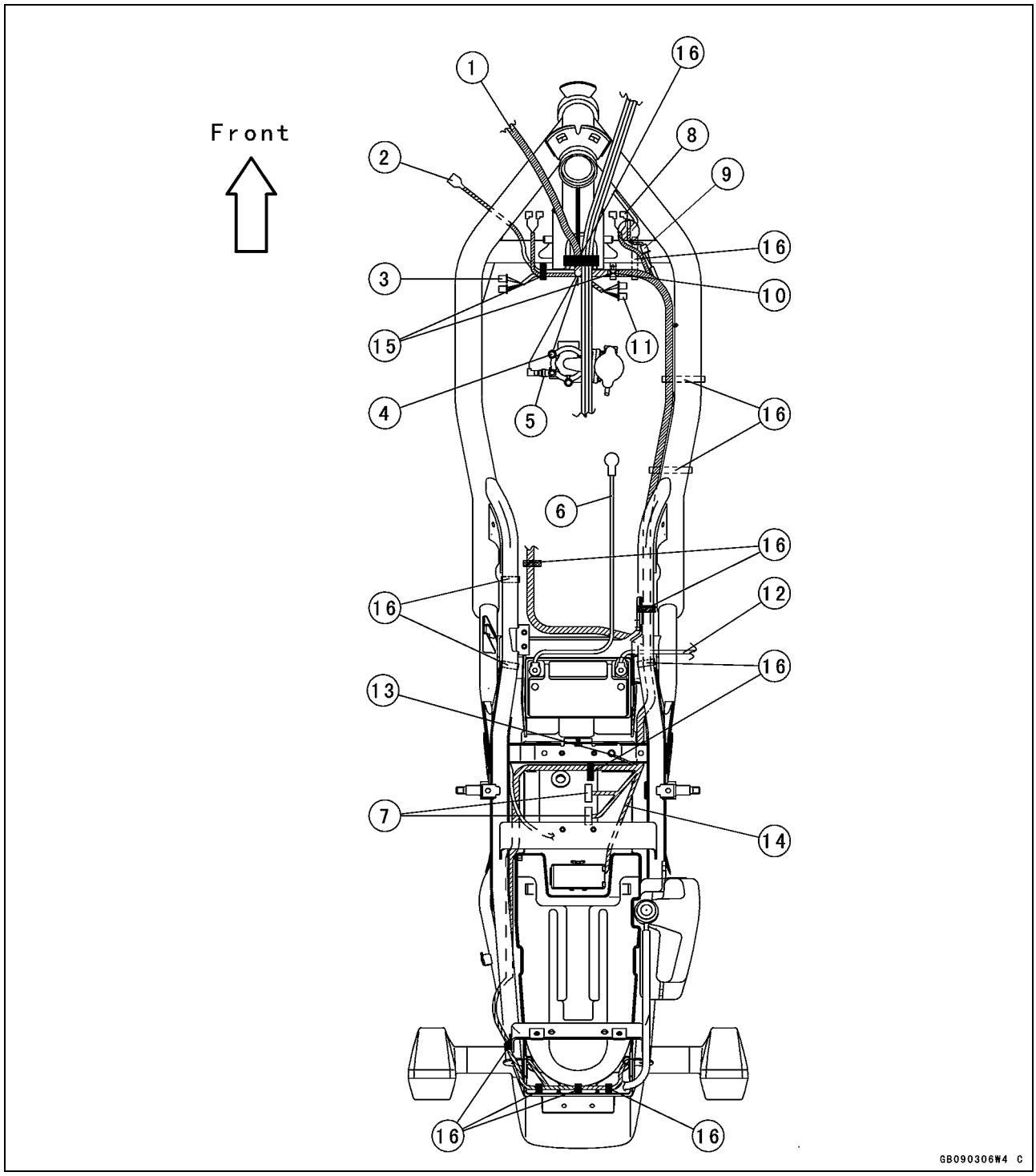
1. Reserve Tank
2. Reserve Tank Overflow Hose
3. Clamps

Cable, Wire, and Hose Routing



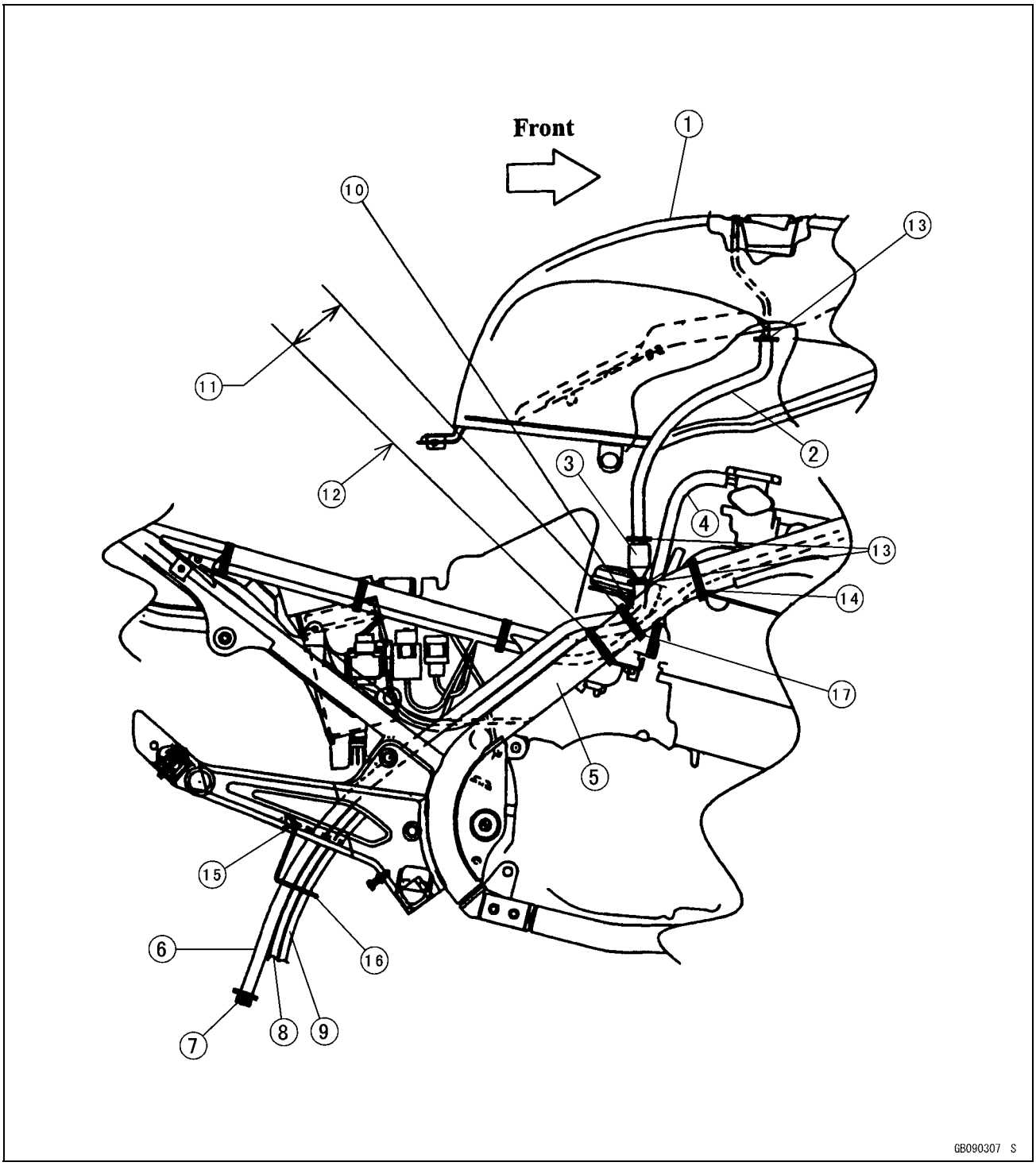
1. Starter Motor
2. Positive Lead
3. Negative Lead
4. Plate
5. Pickup Coil
6. Pickup Coil Mounting Bolts
7. Tighten the starter motor negative lead terminal with the rear starter mounting bolt.
8. To the battery negative terminal.
9. To the starter relay.
10. Hold the lead with the plate.
11. Bend and run the lead as shown so it does not touch the alternator rotor.

Cable, Wire, and Hose Routing



1. #1 Ignition Coil Connectors
2. Radiator Fan Switch Connector
3. Left Handlebar Switch Connectors
4. Water Temperature Switch Ground Terminal
5. Water Temperature Switch
6. Battery Negative Lead
7. Igniter Connectors
8. #2 Ignition Coil Connectors
9. Radiator Fan Connector
10. White Tape (position here)
11. Right Handlebar Switch Connectors
12. Battery Positive Lead
13. Ground Terminal
14. Fuse Box Lead
15. Fit the bands into gusset.
16. Bands

Cable, Wire, and Hose Routing



1. Fuel Tank
2. Fuel Tank Upper Drain Hose
3. Catch Tank
4. Reserve Tank Hose
5. Main Harness
6. Fuel Tank Lower Drain Hose
7. Plug
8. Reserve Tank Overflow Hose
9. Air Cleaner Drain Hose
10. Bind the edge of the hose bend
11. About 70 mm
12. Frame Corner
13. Clips
14. Band
15. Bolt
16. Holder
17. Bolt (Bind [4],[5],[6])

Fuel System

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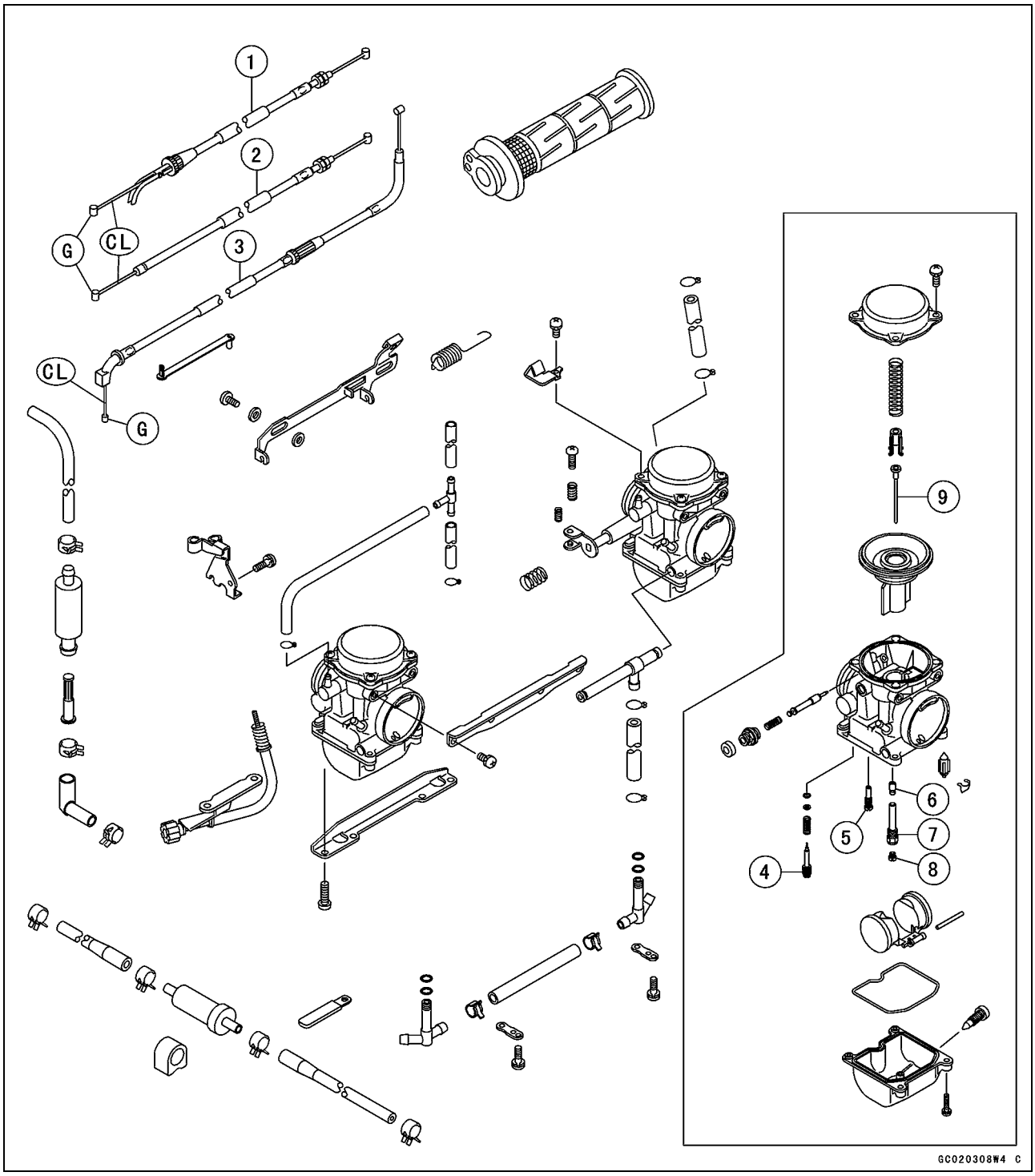
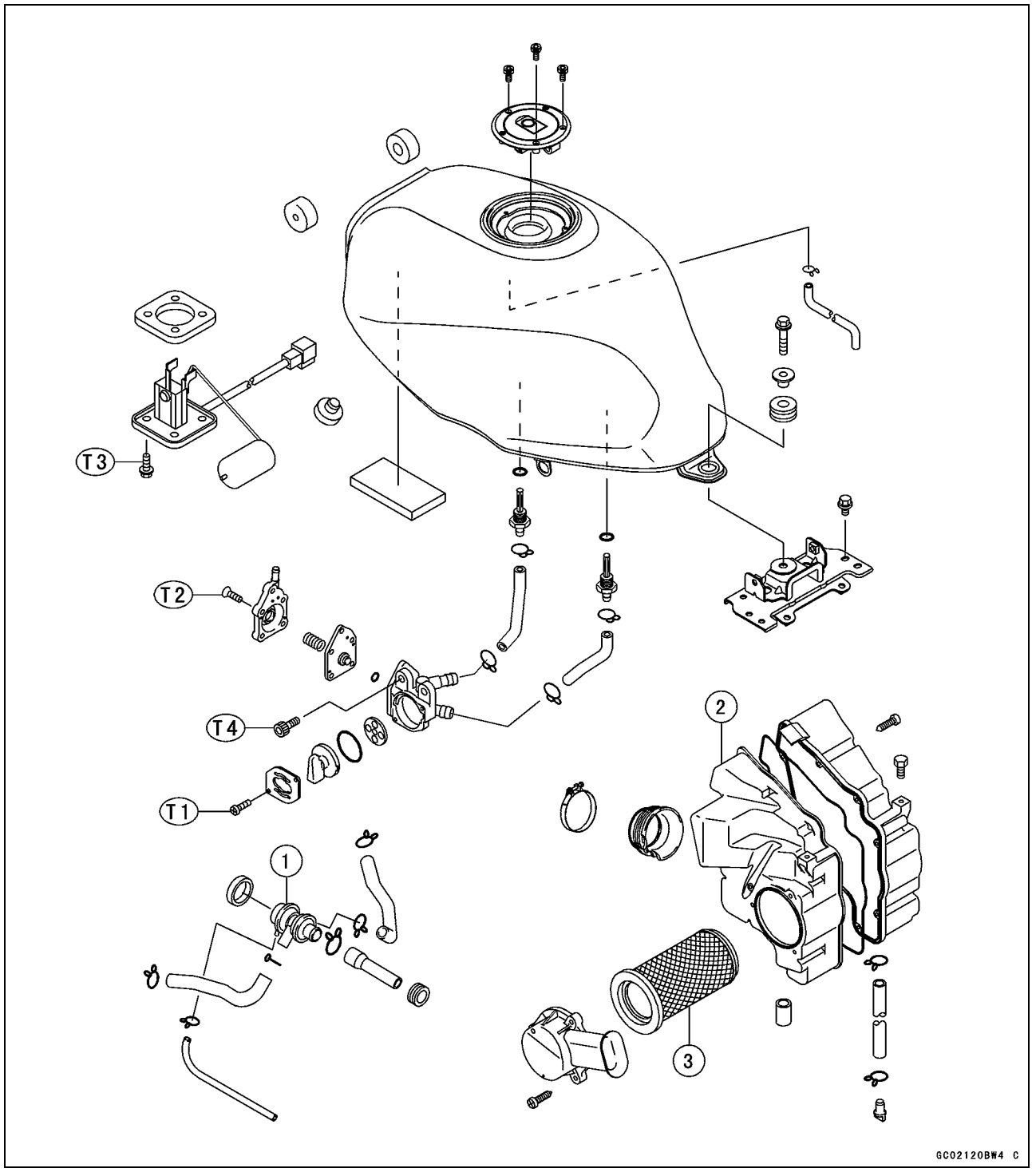
Exploded View



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

CL: Apply cable lubricant.
G: Apply grease.

Exploded View



1. Vacuum Switch Valve
2. Air Cleaner Housing
3. Air Cleaner Element

T1: 0.8 N·m (0.08 kgf·m, 7 in·lb)
T2: 1.0 N·m (0.10 kgf·m, 9 in·lb)
T3: 6.9 N·m (0.7 kgf·m, 61 in·lb)
T4: 2.5 N·m (0.25 kgf·m, 22 in·lb)

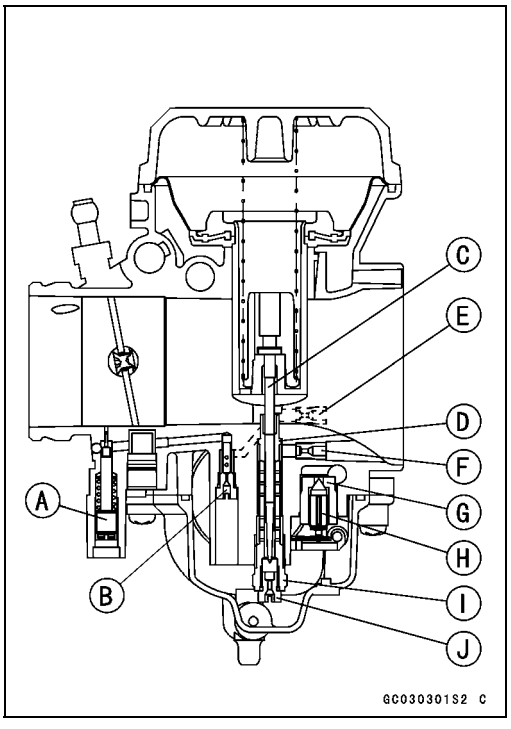
2-4 FUEL SYSTEM

Specifications

Item	Standard
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)
Choke Cable Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)
Carburetors	
Mark, Type	KEIHIN CVK34
Idle Speed	1 200 ±50 r/min (rpm)
Pilot Screw (Turns Out)	(1 1/4 ±1/4 for reference)
Synchronization Vacuum	2.7 kPa (2 cmHg) or less difference between two carburetors
Service Fuel Level	0.5 mm (0.02 in.) below ~ 1.5 mm (0.06 in.) above the float bowl mating surface
Float Height	17 ±2 mm (0.67 ±0.08 in.)
Main Jet	#102
Main Air Jet	#100
Needle Jet	–
Needle Jet Holder	–
Jet Needle Mark	N4BE, (ER500D) N96R
Pilot Jet (Slow Jet)	#35
Pilot Air Jet (Slow Air Jet)	#130
Starter Jet	#55
Throttle Valve Angle	11°

Special Tools - Pilot Screw Adjuster, C: 57001-1292
Pilot Screw Adjuster Adapter, ϕ5: 57001-1372
Pilot Screw Adjuster Driver: 57001-1373
Carburetor Drain Plug Wrench, Hex 3: 57001-1269
Fuel Level Gauge: 57001-1017

Pilot Screw [A]
Pilot Jet [B]
Jet Needle [C]
Needle Jet [D]
Pilot Air Jet [E]
Main Air Jet [F]
Valve Seat [G]
Float Valve [H]
Needle Jet Holder [I]
Main Jet [J]



Throttle Grip and Cables

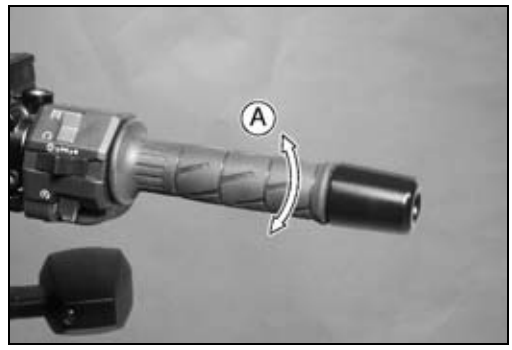
Throttle Cable Inspection

Throttle Grip Free Play Inspection

- Check throttle grip play [A] by lightly turning the throttle grip back and forth.

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

Throttle Grip Free Play
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)



- Check that the throttle grip moves smoothly from full open to close, and the throttle closes quickly and completely in all steering positions by the return spring.

★If the throttle grip does not return properly, check the throttle cable routing, grip free play, and cable damage. Then lubricate the throttle cable.

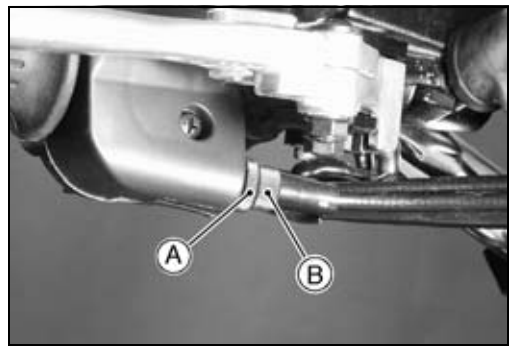
- Run the engine at the idle speed, and turn the handlebar all the way to the right and left to ensure that the idle speed does not change.

★If the idle speed increase, check the throttle cable free play and the cable routing.

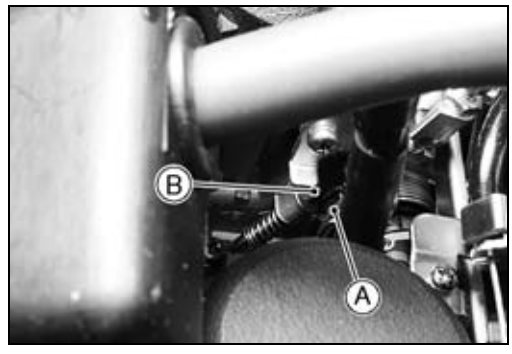
Throttle Grip Free Play Adjustment

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

- Tighten the locknut against the adjuster securely.



- Check that the throttle pulley [A] stops against the idle adjusting screw [B] with the throttle grip closed.



★If the play can not be adjusted by using the adjuster at the throttle grip, use the adjusting nuts [A] at the carburetors.

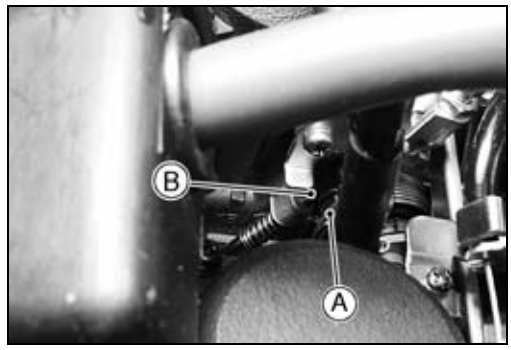
- Screw in the adjuster fully at the throttle grip and tighten the locknut.
- Remove the fuel tank (see this chapter).

○Make the necessary free play adjustment at the lower cable end.

Throttle Grip and Cables

- Check that the throttle pulley [A] stops against the idle adjusting screw [B], with the throttle grip released and stops against the carburetor stopper with the throttle grip opened.
- Turn the handlebar from side to side while idling the engine.

★If idle speed varies, the cable may be poorly routed or damaged.



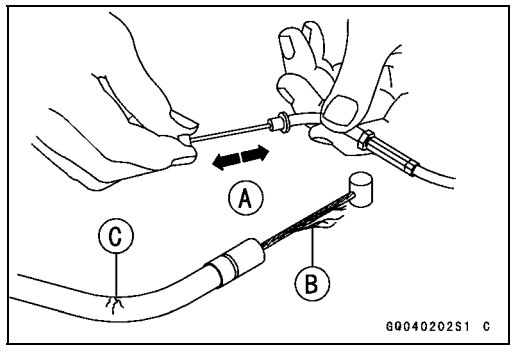
⚠ WARNING

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

Throttle Cable Inspection

- Remove both ends of the throttle cables.
- With the throttle cable disconnected at both ends, the cable should move freely [A] within the cable housing.

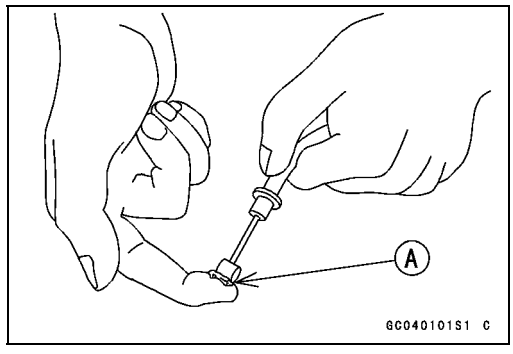
○If cable movement is not free after lubricating, if the cable is frayed [B], or if the cable housing is kinked [C], replace the cable.



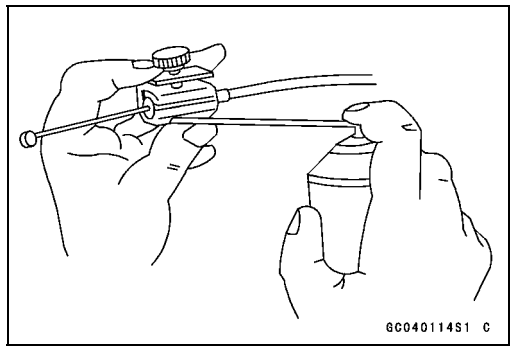
Throttle Cable Lubrication

Whenever the throttle cables are removed, lubricate the throttle cables as follows:

- Apply a thin coating of grease to the throttle cable lower ends [A].



- Lubricate the throttle cable with a penetrating rust inhibitor.



Choke Cable

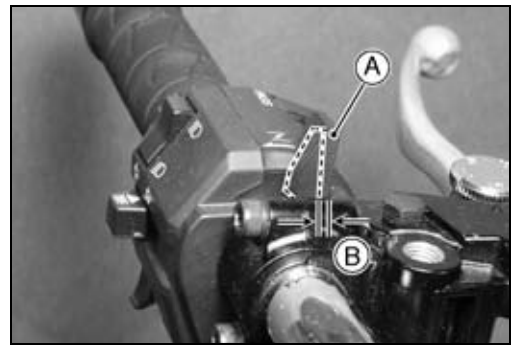
Free Play Inspection

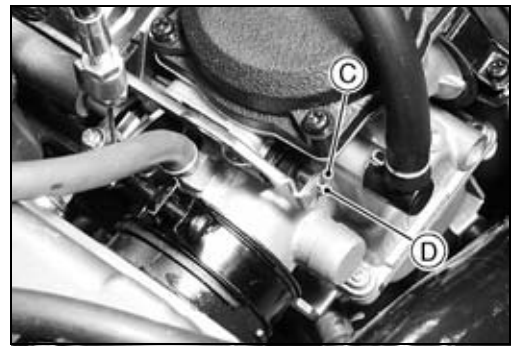
- Push the choke lever [A] all the way to the front.
- Check choke cable free play [B].

○Determine the amount of choke cable play at the choke lever. Pull the choke lever until the starter plunger lever [C] at the carburetor touches the starter plunger [D]; the amount of choke lever lower end travel is the amount of choke cable play.

★If the free play is incorrect, adjust the choke cable.

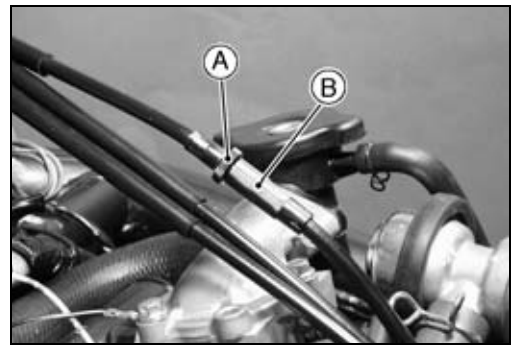
Choke Cable Free Play
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)





Free Play Adjustment

- Loosen the locknut [A], and turn the adjuster [B] until the cable has the proper amount of free play.
- Tighten the locknut securely.



Cable Installation

- Install the choke cable in accordance with Cable Routing section in General Information chapter.
- After installation, adjust the cable free play properly.

⚠ WARNING

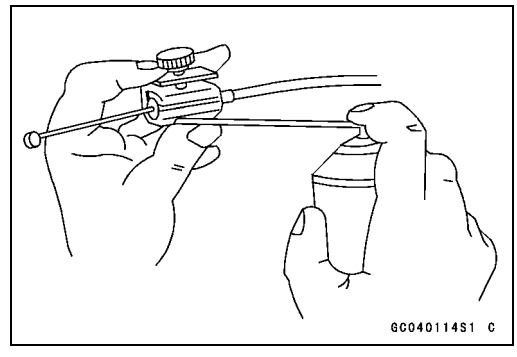
Operation with an incorrectly routed or improperly adjusted cable could result in an unsafe riding condition.

Cable Lubrication

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

- Apply a thin coating of grease to the cable upper end.
- Lubricate the cable with a penetrating rust inhibitor.
- Check that the choke inner cable slides smoothly by moving the choke lever to the front and rear.

★If there is any irregularity, check the choke cable and routing.



Carburetors

Idle Speed Inspection

Idle Speed Inspection

- Start the engine and warm it up thoroughly.
- With the engine idling, turn the handlebar to both sides.

★If handlebar movement changes the idle speed, the throttle cable may be improperly adjusted or incorrectly routed, or it may be damaged. Be sure to correct any of these conditions before riding.

⚠ WARNING

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

- Check idle speed.

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

Idle Speed
1 300 ±50 r/min (rpm)

Idle Speed Adjustment

- Start the engine and warm it up thoroughly.
- Turn the adjusting screw [A] until idle speed is correct.

○Open and close the throttle a few times to make sure that the idle speed is within the specified range. Readjust if necessary.

Carburetor Synchronization Inspection

Synchronization Inspection

- Situate the motorcycle so that it is perpendicular to the ground.
- Warm up the engine.
- Check idle speed and adjust if necessary.
- Pull the vacuum hoses off, and attach vacuum gauge [A] to the vacuum hose fittings on the carburetors.

Synchronization Adjustment

○The pilot screw is set at the factory and should not be removed. But if necessary, check the pilot screw opening as follows.

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

Special Tool - Pilot Screw Adjuster, C [A]: 57001-1292

NOTE

○*Each carburetor has different opening of the pilot screw. When setting the pilot screw, do not refer to the specifications which show mean opening of the pilot screws.*

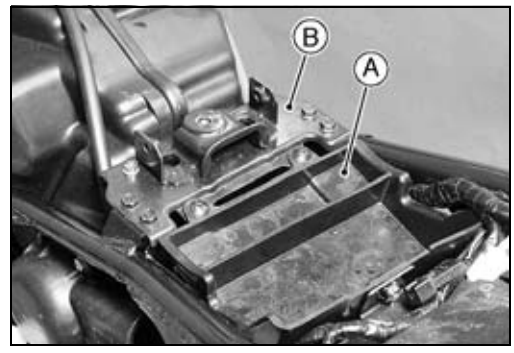
Carburetors

Carburetor Removal

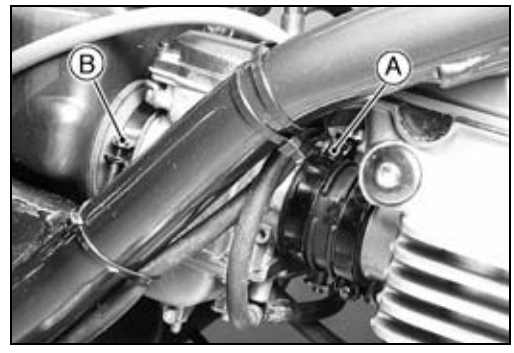
⚠ WARNING

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

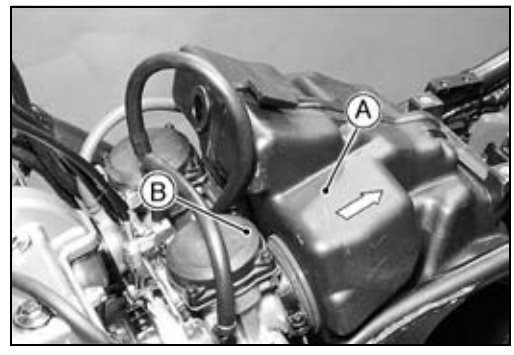
- Remove:
  Fuel Tank (see this chapter)
  Throttle Cable Lower Ends
  Choke Cable Lower End
  Battery Cover [A]
  Fuel Tank Bracket [B]
  Vacuum Switch Valve Hose
  Air Cleaner Element



- Loosen:
  Carburetor Clamp Screws [A]
  Air Cleaner Housing Clamp Screws [B]

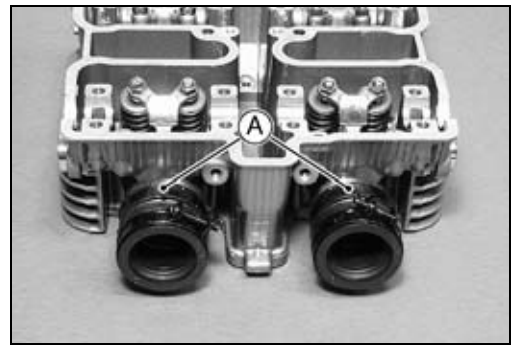


- Move back the air cleaner housing [A] and the carburetor [B], and remove the carburetor.



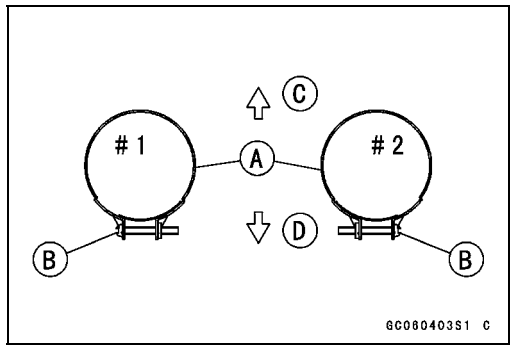
Carburetor Installation

- Installation is the reverse of removal.
- Install the carburetor holders with the projection [A] facing upwards.



Carburetors

- Install the holder clamps [A] as shown being careful of the screw position and the screw head [B] direction.



⚠ WARNING

Install the clamp screws horizontally as shown. Otherwise the screws could come in contact with the vacuum adjusting screws, resulting in an unsafe riding condition.

[C] Top
[D] Bottom

- Check fuel leakage from the carburetors.

⚠ WARNING

Fuel spilled from the carburetors is hazardous.

- Adjust the following items if necessary.
  Idle Speed
  Vacuum Synchronization
  Throttle Cables

Service Fuel Level Inspection

⚠ WARNING

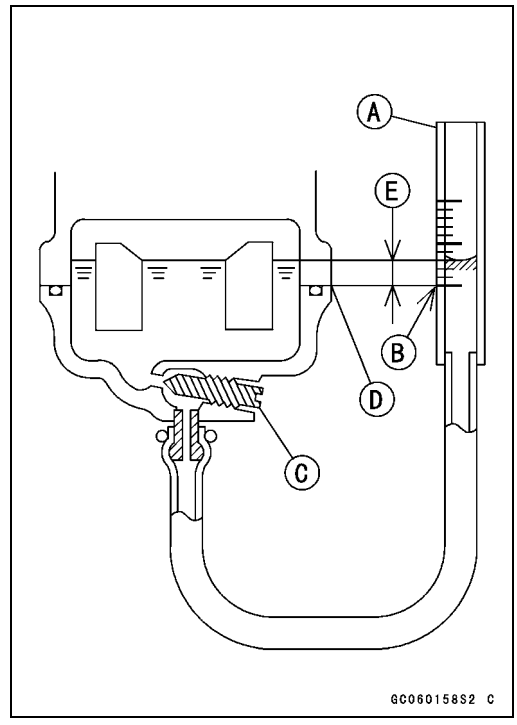
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light

- Situate the motorcycle so that it is perpendicular to the ground.
- Connect a suitable rubber hose (5 mm inside diameter and about 300 mm long) to the fitting at the bottom of each carburetor float bowl.

Carburetors

- Connect fuel level gauge [A] to the rubber hose.

Special Tool - Fuel Level Gauge: 57001-1017



- Hold the gauge vertically against the side of the carburetor body so that the "middle" line [B] is several millimeters higher than the bottom edge [D] of the carburetor body.
- Turn the fuel tap to the PRI position to feed fuel to the carburetor, then turn out the carburetor drain plug [C] a few turns.
- Wait until the fuel level [E] in the gauge settles.
- Keeping the gauge vertical, slowly lower the gauge until the "middle" line is even with the bottom edge of the carburetor body.

NOTE

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

- Read the fuel level in the gauge and compare it to the specification.
- Screw in the carburetor drain plug.

Fuel Level

1.5 mm (0.06 in.) above ~ 0.5 mm (0.02 in.) below the bottom edge of carburetor body

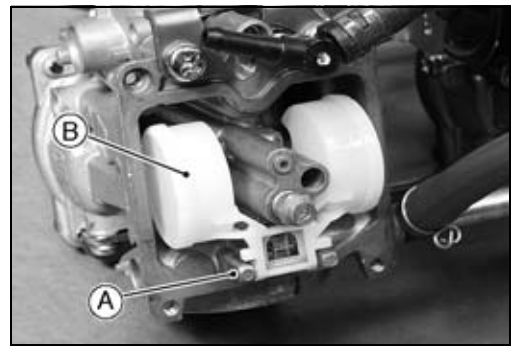
- Turn the fuel tap to the ON position and remove the fuel level gauge.
- Inspect the fuel level in another carburetor in the same manner.

★If the fuel level is incorrect, adjust it (see Service Fuel Level Adjustment).

Service Fuel Level Adjustment

⚠ WARNING

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

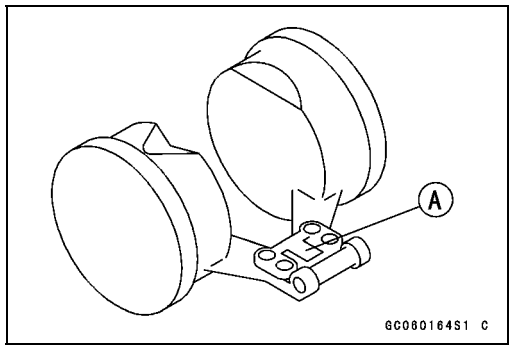


- Remove the carburetor, and drain the fuel into a suitable container.
- Remove the float bowl by taking out the screws with lockwashers.
- Slide out the pivot pin [A] and remove the float [B].

Carburetors

● Bend the tang [A] on the float arm very slightly to change the float height. Increasing the float height lowers the fuel level and decreasing the float height raises the fuel level.

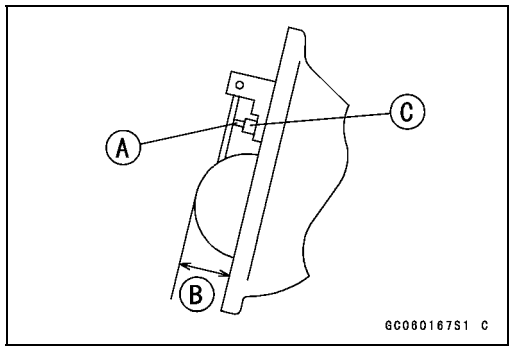
Float Height
17.0 ±2.0 mm (0.67 ±0.08 in.)



NOTE

○*Do not push the needle rod [A] in during the float height measurement [B].*

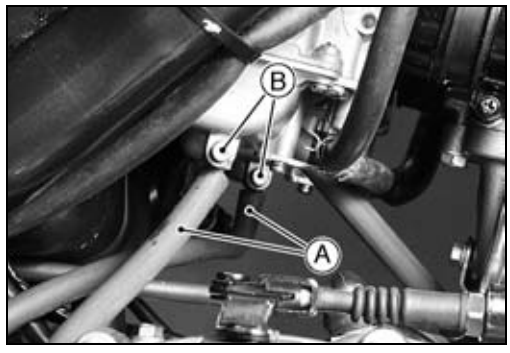
● Assemble the carburetor, and recheck the fuel level.
★If the fuel level cannot be adjusted by this method, the float or the float valve [C] is damaged.



Fuel System Cleanliness Inspection

⚠ WARNING

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



● Connect a suitable hose [A] to the fitting at the bottom of each carburetor float bowl.
● Run the lower ends of the hoses into a suitable container.
● Turn the fuel tap to the PRI position.
● Turn out each drain plug [B] a few turns and drain the fuel from the float bowls.
● Check to see if water or dirt comes out.
★If any water or dirt appears during the above inspection, clean the fuel system (see Carburetor Cleaning and Fuel Tank Cleaning).
● Tighten the drain plugs and turn the fuel tap to the ON position.

Carburetor Disassembly/Assembly

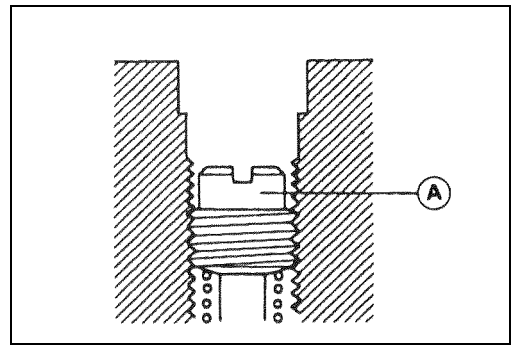
● Read the WARNINGS in the Carburetor Removal.
● Check the throttle bores at the butterfly valves and around them for carbon deposits by opening the valves.
○Punch a hole in the plug and pry it out with an awl or other suitable tool

Carburetors

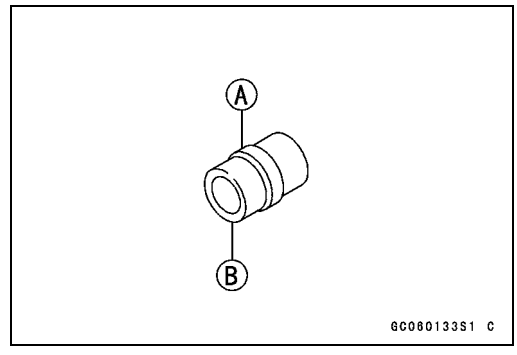
- Turn in the pilot screw and count the number of turns until it seats fully but not tightly, and then remove the screw. This is to set the screw to its original position when assembling.
- After installing the upper chamber cover, check that the vacuum piston slides up and down smoothly without binding in the carburetor bore.

CAUTION
During carburetor disassembly, be careful not to damage the diaphragm. Never use a sharp edge to remove the diaphragm.

- Turn in the pilot screw [A] fully but not tightly, and then back it out the same number of turns counted during disassembly.

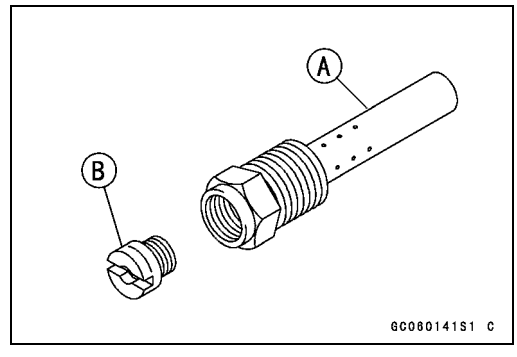


- Turn the carburetor body upside-down, and drop the needle jet [A] into place so that the smaller diameter end [B] of the jet goes in first.



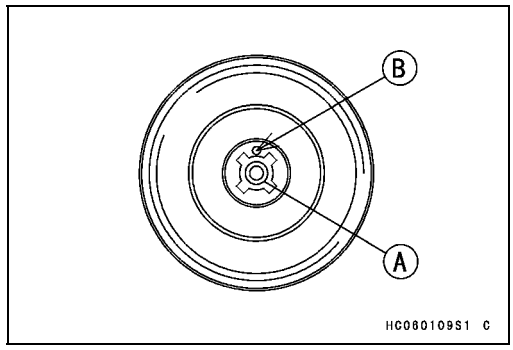
- Carefully screw in the needle jet holder. It will seat against the needle jet, pushing the end of the jet into the carburetor bore.

CAUTION
Do not force the needle jet holder [A] and main jet [B] or overtighten them. The needle jet or the carburetor body could be damaged requiring replacement.



Carburetors

● Slip the jet needle through the hole in the center of the vacuum piston, and put the spring seat [A] on the top of the needle. Turn the seat so that it does not block the hole [B] at the bottom of the vacuum piston.



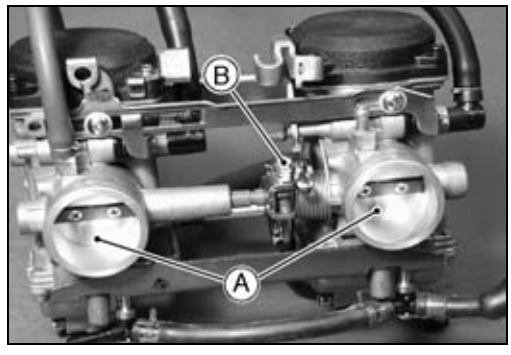
Carburetor Separation/Assembly

● Read the WARNINGS in the Carburetor Removal.
● The center lines of the carburetor bores must be parallel both horizontally and vertically. If they are not, loosen the mounting screws and align the carburetors on a flat surface. Retighten the mounting screws.
● After assembling the choke mechanism, check to see that the starter plunger lever slides from side to side smoothly without abnormal friction.

CAUTION

Fuel mixture trouble could result if the starter plunger does not seat properly in its rest position after the choke lever is returned.

● Visually synchronize the throttle (butterfly) valves.
○Check to see that the throttle valves open and close smoothly without binding when turning the pulley.
○Visually check the clearance [A] between the throttle valve and the carburetor bore in each carburetor.
★If there is a difference between the throttle valves, turn the balance adjusting screw [B] to obtain the same clearance. Do not remove the atmospheric pressure hose.



Carburetor Cleaning

⚠ WARNING

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

Carburetors

CAUTION

Do not use compressed air on an assembled carburetor, or the floats may be crushed by the pressure, and the vacuum piston diaphragms may be damaged. Remove as many rubber or plastic parts from the carburetor as possible before cleaning the carburetor with a cleaning solution. This will prevent damage to or deterioration of the parts. The carburetor body has plastic parts that cannot be removed. Do not use a strong carburetor cleaning solution which could attack these parts; instead, use a mild, high flash-point cleaning solution safe for plastic parts. Do not use wire or any other hard instrument to clean carburetor parts, especially jets, as they may be damaged.

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

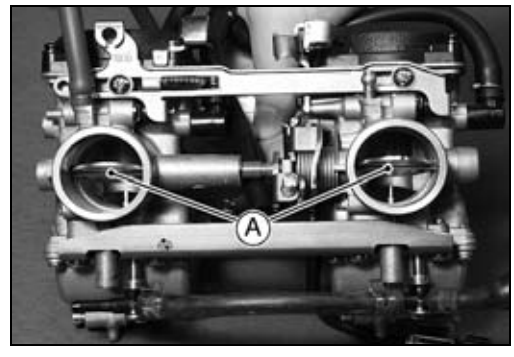
Carburetor Inspection

⚠ WARNING

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

- Remove the carburetors.
- Before disassembling the carburetors, check the fuel level (see Fuel Level Inspection).

★If the fuel level is incorrect, inspect the rest of the carburetor before correcting it.



- Move the starter plunger lever from side to side to check that the starter plungers move smoothly without abnormal friction.

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

- Turn the throttle cable bracket to check that the throttle butterfly valves [A] move smoothly and return with spring tension.

★If the throttle valves do not move smoothly, replace the carburetors.

Carburetors

- Disassemble the carburetors.
- Clean the carburetors.
- Check that the O-rings on the float bowl and drain plug and the diaphragm on the vacuum piston are in good condition.

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

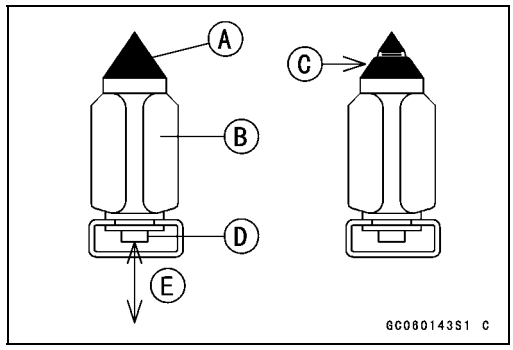
- Check the plastic tip [A] of the float valve needle [B]. It should be smooth, without any grooves, scratches, or tears.

★If the plastic tip is damaged [C], replace the needle.

- Push in the rod [D] in the other end of the float valve needle.

★If it does not spring out, replace the needle.

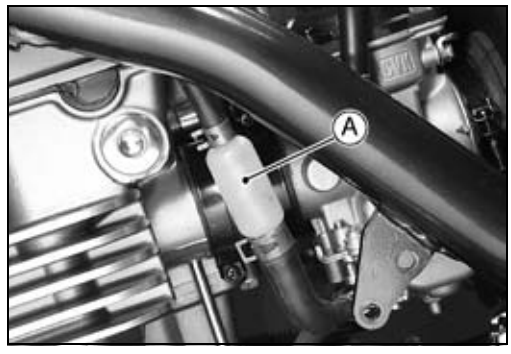
[E] Push and release



Coolant Filter Cleaning

○Before winter season starts, clean the coolant filter [A] in the carburetor system.

- Drain the coolant (see Cooling System chapter).
- Remove the coolant filter from the cooling hoses in the carburetor system.
- Blow dirt and sediment off the filter with compressed air.



Coolant Valve Inspection

- Drain the coolant (see Cooling System chapter).
- Remove the coolant valve on the engine right side.
- Inspect the coolant valve [A] at room temperature.

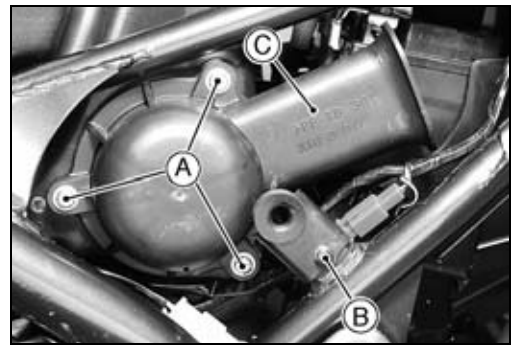
★If the valve is closed, replace the valve with a new one.

○To check valve opening, just blow through the valve.

Valve Closing Temperature (for reference)
Standard: 70°C (158°F) or more at 25 kPa (0.25 kgf/cm², 3.6 psi)

Air Cleaner

Element Removal



- Remove:
  Left Side Cover (see Frame chapter)
  Screws [A]
  Nut [B]
  Inlet Pipe [C]

- Remove the element [A].
- Push a clean, lint-free towel into the carburetor intake to keep dirt or other foreign material from entering.

⚠ WARNING

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

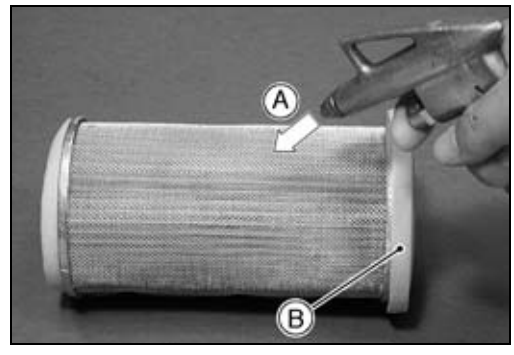
CAUTION

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

Element Cleaning and Inspection

NOTE

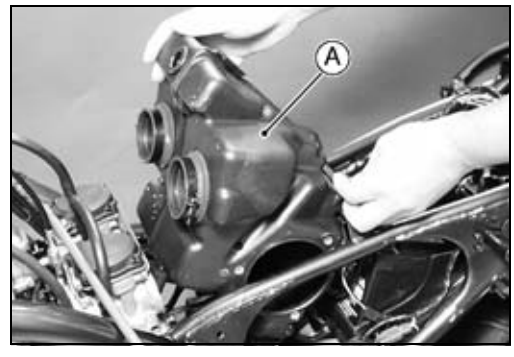
○*In dusty areas, the element should be cleaned more frequently than the recommended interval.*
○*After riding through rain or on muddy roads, the element should be cleaned immediately.*



- Remove the air cleaner element (see Element Removal).
- Clean the element tapping it lightly to loosen dust.
- Blow away the remaining dust by applying compressed air [A] from the outside to the inside (from the clean side to the dirty side).
- Visually check the element for tears or breaks and check the sponge gasket [B] also.

★If the element or gasket has any tears or breaks, replace the element.

Housing Removal



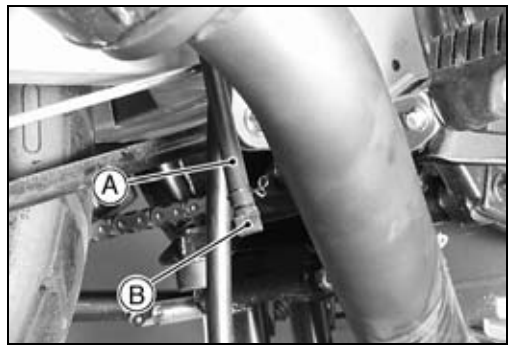
- Remove:
  Air Cleaner Element (see this chapter)
- Remove the air cleaner housing [A].

Air Cleaner

Air Cleaner Draining

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

- Check the drain hose.
- ★If any water or oil accumulates in the hose, drain it by taking off the drain plug [B] at the lower end of the drain hose.
- Be sure to install the plug firmly, or the air will be drawn in through it.



⚠ WARNING

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

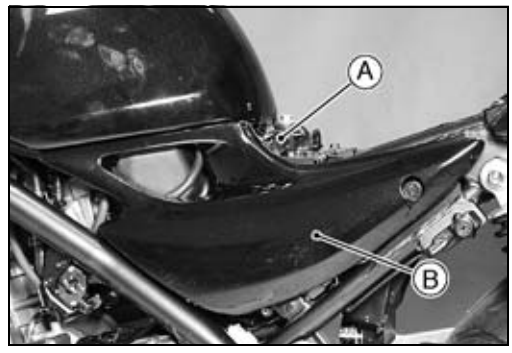
Fuel Tank

Fuel Tank Removal

⚠ WARNING

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

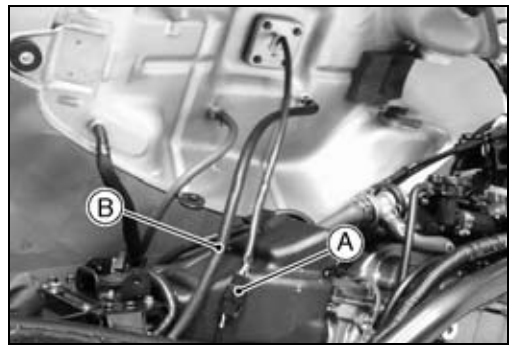
- Remove the seat (see Frame chapter).
- Remove the screws [A] and the side covers [B] on both sides.



- Turn the fuel tap to the On or RES position.
- Pull the hoses off the tap.
- Remove the fuel tank bolt [A].
- Remove the fuel tap bolts.

- Pull the fuel tap outlet hose [A] and vacuum hose [B] off the tap.

- Disconnect the fuel level sensor lead connector [A].
- Pull the overflow drain hose [B] off the fuel level sensor assembly.
- Pull the upper drain hose off the fuel tank.



Fuel Tank

- Remove the fuel tank [A].
- Drain the fuel tank.

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

Fuel Tank Installation

- Read the WARNING in the Fuel Tank Removal section.
- Check the rubber dampers [A].

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

- Route the hoses correctly (see General Information chapter).
- Be sure the hoses are clamped to the fuel tap to prevent leakage.

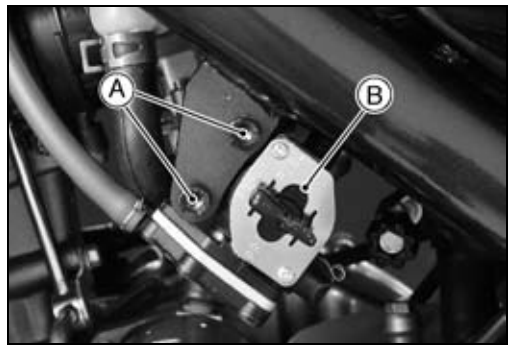
Fuel Tap Removal

⚠ WARNING

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

○Remove the fuel hose and drain the fuel into a suitable container.

- Remove the bolts [A] and take out the fuel tap [B].



Fuel Tap Installation

- Fuel tap installation is the reverse of removal. Note the following.

Torque - Fuel Tap Mounting Bolts: 2.5 N·m (0.25 kgf·m, 22 in·lb)

- Be sure to clamp the fuel hose to the tap to prevent leaks.

Fuel Tank

Fuel Tank and Tap Cleaning

- Remove the fuel tank and drain it.
- Pour some high flash-point solvent into the fuel tank and shake the tank to remove dirt and fuel deposits.

⚠ WARNING

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

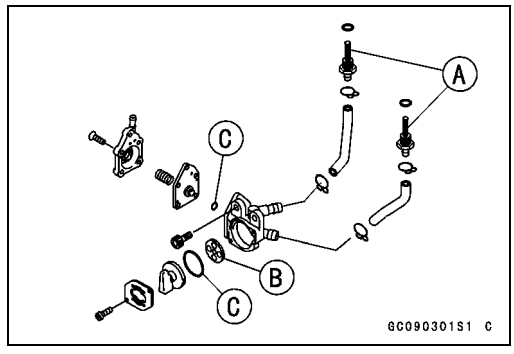
- Pour the solvent out of the tank.
- Remove the fuel tap from the tank by taking out the bolts with nylon washers.
- Clean the fuel tap filter screens in a high flash-point solvent.
- Pour high flash-point solvent through the tap in all lever position.
- Dry the tank and tap with compressed air.
- Install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

Fuel Tap Inspection

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

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

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



Fuel Tank and Cap Inspection

- Open the tank cap.
- Visually inspect the gaskets [A] on the tank cap for any damage.

★Replace the gaskets if they are damaged.

- Remove the drain pipes and check to see if the pipes in the tank do not clogged up. Check the tank cap breather also.

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

CAUTION

Do not apply compressed air to the air vent holes [B] in the tank cap. This could cause damage and clogging of the labyrinth in the cap.

Fuel Hose

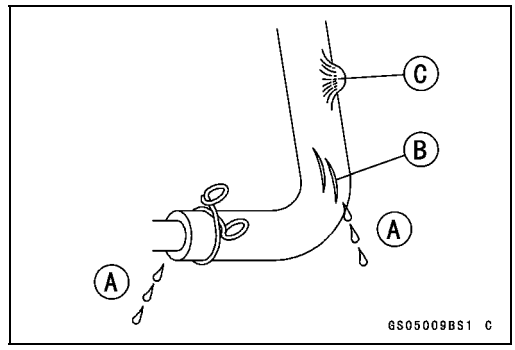
Fuel Hose and Connection Inspection

○Check the fuel hose periodically in accordance with the Periodic Maintenance Chart, and if the motorcycle is not properly handled, the inside the fuel line can cause fuel to leak [A] or the hose to burst. Remove the fuel tank and check the fuel hose.

★Replace the fuel hose if any fraying, cracks [B] or bulges [C] are noticed.

- Check that the hoses are securely connected and clamps are tightened correctly.
- When installing, route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- When installing the fuel hoses, avoid sharp bending, kinking, flattening or twisting, and route the fuel hoses with a minimum of bending so that the fuel flow will not be obstructed.

★Replace the hose if it has been sharply bent or kinked.



Cooling System

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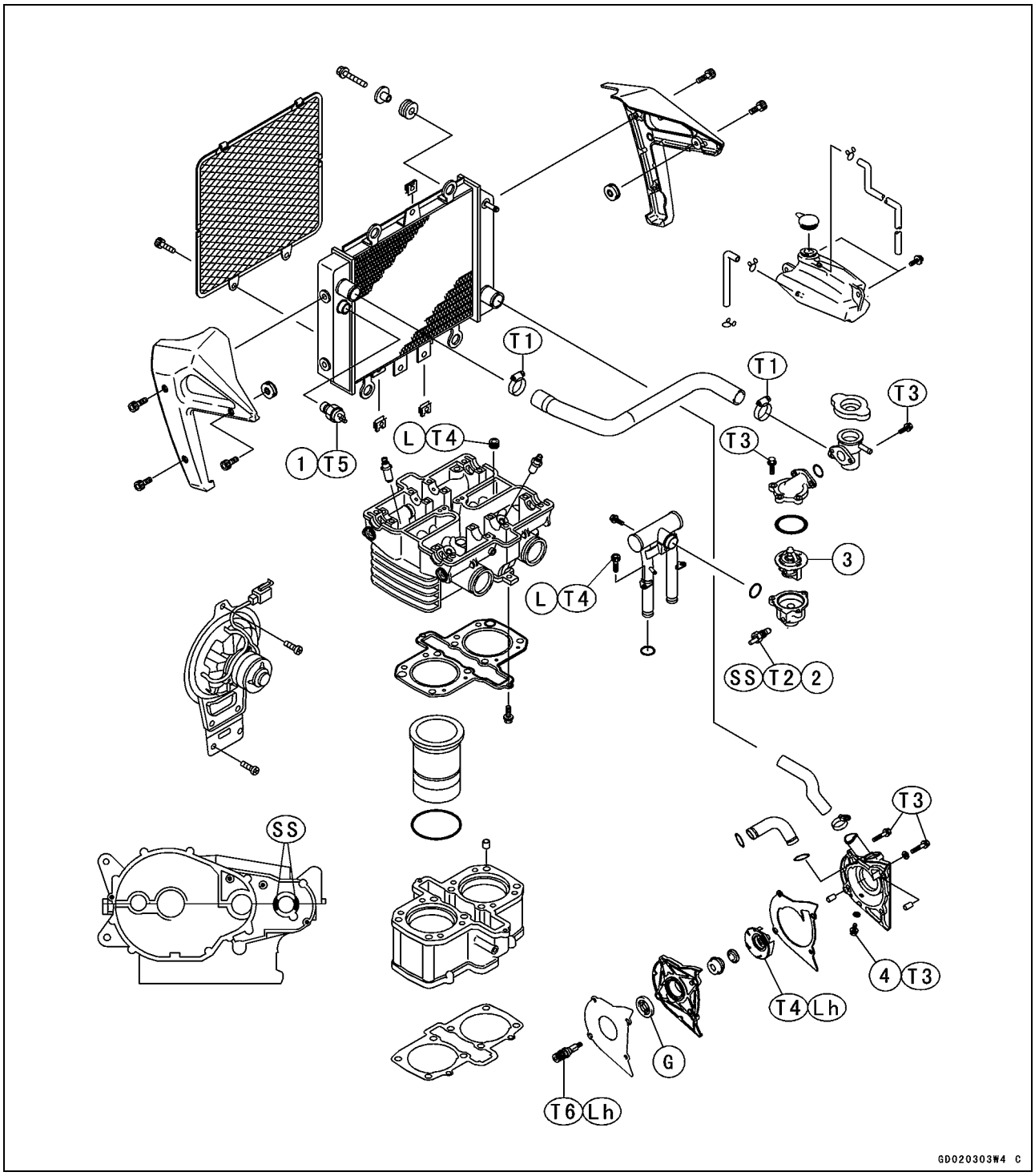
Exploded View



1. Radiator Fan Switch
2. Water Temperature Switch
3. Thermostat
4. Coolant Drain Plug

T1: 2.5 N·m (0.25 kgf·m, 22 in·lb)
T2: 7.8 N·m (0.8 kgf·m, 69 in·lb)
T3: 11 N·m (1.1 kgf·m, 95 in·lb)
T4: 9.8 N·m (1.0 kgf·m, 7.0 ft·lb)
T5: 18 N·m (1.8 kgf·m, 13.0 ft·lb)
T6: 25 N·m (2.5 kgf·m, 18.0 ft·lb)
G: Apply high temperature grease.
L: Apply a non-permanent locking agent.
Lh: Left-hand Threads
SS: Apply silicone sealant.

Specifications

Item	Standard
Coolant Provided when Shipping	
Type (recommended)	Permanent type antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)
Color	Green
Mixed Ratio	Soft water 50%, coolant 50%
Freezing Point	–35°C (–31°F)
Total Amount	1.7 L (1.8 US qt) (reserve tank full level including radiator and engine)
Radiator Cap	
Relief Pressure	93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi)
Thermostat	
Valve Opening Temperature	80.5 ~ 83.5°C (177 ~ 182°F)
Valve Full Opening Lift	8 mm (0.31 in.) or more @95°C (203°F)

Special Tool - Bearing Driver Set: 57001-1129

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

Coolant Flow Chart

Permanent type antifreeze is used as a coolant to protect the cooling system from rust and corrosion. When the engine starts, the water pump turns and the coolant circulates.

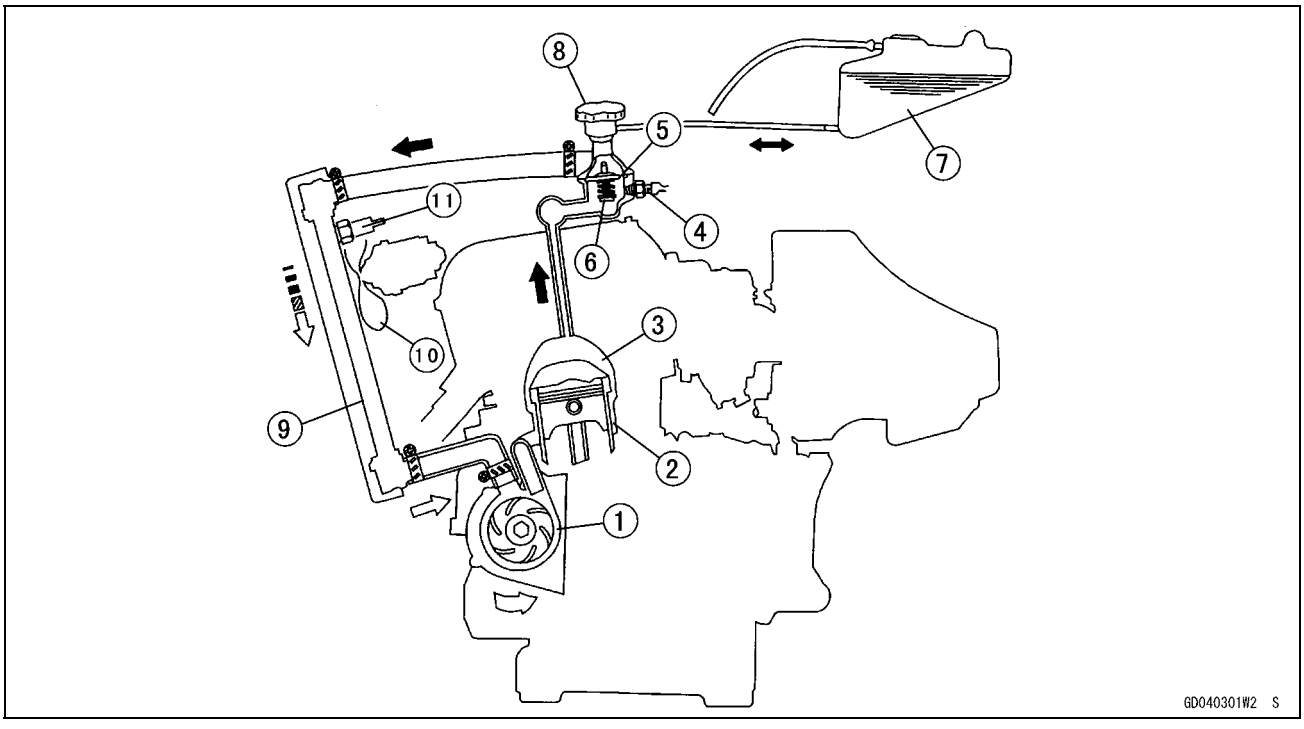
The thermostat is a wax pellet type which opens or closes with coolant temperature changes. The thermostat continuously changes its valve opening to keep the coolant temperature at the proper level. When coolant temperature is below 80.5 ~ 83.5°C (177 ~ 182°F), the thermostat closes so that the coolant flow is restricted through the air bleeder hole, causing the engine to warm up more quickly. When coolant temperature is more than 80.5 ~ 83.5°C, the thermostat opens and the coolant flows.

When the coolant temperature goes up beyond 93 ~ 103°C (199 ~ 217°F), the radiator fan switch conducts to operate the radiator fan. The radiator fan draws air through the radiator core when there is not sufficient air flow such as at low speeds. This increases up the cooling action of the radiator. When the temperature is below 91°C (196°F) ~ temperature less than ON temperature, the fan switch opens and the radiator fan stops.

In this way, this system controls the engine temperature within narrow limits where the engine operates most efficiently even if the engine load varies.

The system is pressurized by the radiator cap to suppress boiling and the resultant air bubbles which can cause engine overheating. As the engine warms up, the coolant in the radiator and the water jacket expands. The excess coolant flows through the radiator cap and hose to the reserve tank to be stored there temporarily. Conversely, as the engine cools down, the coolant in the radiator and the water jacket contracts, and the stored coolant flows back to the radiator from the reserve tank.

The radiator cap has two valves. One is a pressure valve which holds the pressure in the system when the engine is running. When the pressure exceeds 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi), the pressure valve opens and releases the pressure to the reserve tank. As soon as pressure escapes, the valve closes, and keeps the pressure at 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi). When the engine cools down, another small valve (vacuum valve) in the cap opens. As the coolant cools, the coolant contracts to form a vacuum in the system. The vacuum valve opens and allows the coolant from the reserve tank to enter the radiator.



1. Water Pump (driven by balancer shaft)
2. Cylinder Jacket
3. Cylinder Head Jacket
4. Water Temperature Switch
5. Air Bleeder Hole
6. Thermostat
7. Reserve Tank
8. Radiator Cap
9. Radiator
10. Radiator Fan
11. Radiator Fan Switch

Coolant

Coolant Deterioration Inspection

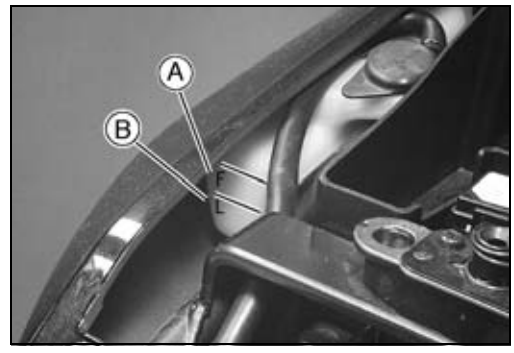
- Visually inspect the coolant in the reservoir tank.

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

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

Coolant Level Inspection

- Situate the motorcycle so that it is perpendicular to the ground.
- Check the level through the coolant level gauge on the reservoir tank. The coolant level should be between the "F" (Full) [A] and the "L" (Low) [B] level lines.



NOTE

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

★If the coolant level is lower than the "L" (Low) level line, add coolant to the "F" (Full) level line.

CAUTION

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

Coolant Draining

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

CAUTION

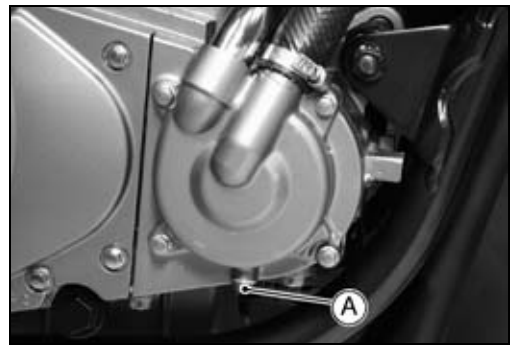
Use coolant containing corrosion inhibitors made specifically for aluminum engines and radiators in accordance with the instructions of the manufacturers (see Coolant Filling).

Coolant

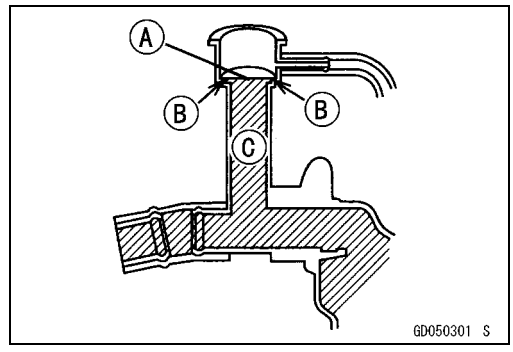
Coolant Filling

- Install the drain plug [A]. Always replace the gasket with a new one, if it is damaged.
- Tighten the drain plug.

Torque - Coolant Drain Plug: 11 N·m (1.1 kgf·m, 95 in·lb)



- Fill [A] the radiator up to the bottom of the radiator filler neck [B] with coolant [C], and install the cap turning it clockwise about 1/4 turn.



NOTE

○*Pour in the coolant slowly so that it can expel the air from the engine and radiator.*

○*The radiator cap must be installed in two steps. First turn the cap clockwise to the first stop. Then push down on it and turn it the rest of the way.*

CAUTION

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

Water and Coolant Mixture Ratio (when shipping)

Soft Water	**50%**
Coolant	**50%**
Freezing Point	**–35°C (–31°F)**
Total Amount	**1.7 L (1.8 US qt)**

NOTE

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

- Remove the fuel tank (see Fuel System chapter).
- Bleed the air from the cooling system while the engine is running.

○Start the engine with the radiator cap removed and run it until no more air bubbles [A] can be seen in the coolant.

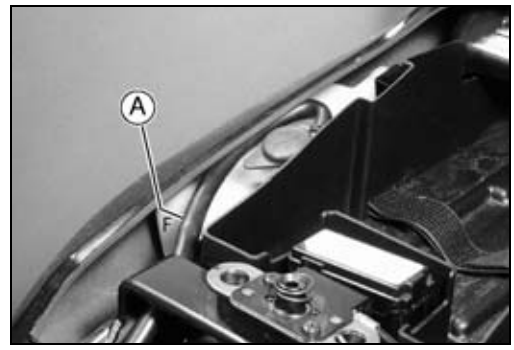
○Tap the radiator hoses to force any air bubbles caught inside.

○Stop the engine and add coolant up to the radiator filler neck.

- Install the radiator cap.

Coolant

- Remove the reserve tank cap.
- Fill the reserve tank up to the F level [A] with coolant and install the cap.



CAUTION
Do not add more coolant above the F level.

- Install the fuel tank.
- Install the seat.

Visual Leak Inspection

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

- Check the water pump body drainage outlet passage [A] for coolant leaks.

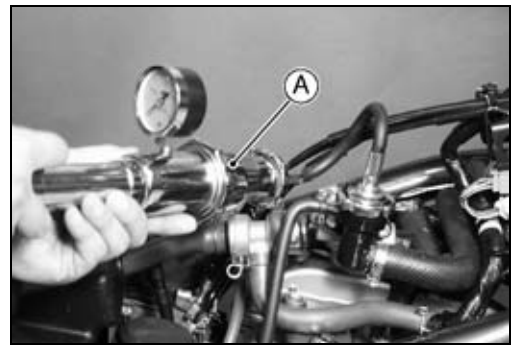
★If the mechanical seal is damaged, the coolant leaks through the seal and drains through the passage. Replace the mechanical seal.

★If there are no apparent leaks, pressure test the system.

Cooling System Pressure Testing

CAUTION
During pressure testing, do not exceed the pressure for which the system is designed. The maximum pressure is 123 kPa (1.25 kgf/cm², 18 psi).

- Remove the fuel tank (see the Fuel System chapter).
- Remove the radiator cap, and install a cooling system pressure tester [A] on the radiator filler neck.



NOTE

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

- Build up pressure in the system carefully until the pressure reaches 123 kPa (1.25 kgf/cm², 18 psi).
- Watch the gauge for at least 6 seconds. If the pressure holds steady, the system is all right.

★If the pressure drops and no external source is found, check for internal leaks. Droplets in the engine oil indicate internal leakage. Check the cylinder head gasket and the cylinder liner O-rings.

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

Coolant

Flushing

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

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

CAUTION
Avoid the use of a flushing compound which is harmful to the aluminum engine and radiator. Carefully follow the instructions supplied by the manufacturer of the cleaning product.

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

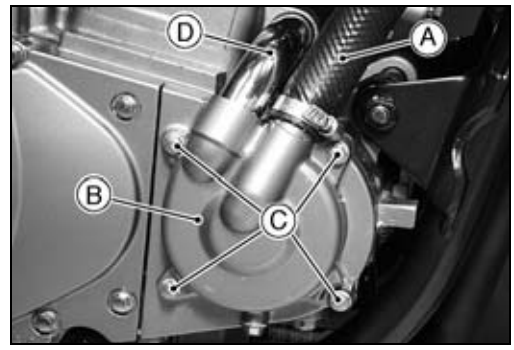
Coolant Filter Cleaning

- Refer to the section of carburetor in Fuel System chapter for the cleaning procedures.

Water Pump

Water Pump Removal

- Drain the coolant.
- Loosen the clamp and remove the radiator hose [A] from the water pump cover [B].
- Remove the four cover bolts [C].
- With the water pipe [D] attached, remove the water pump cover.

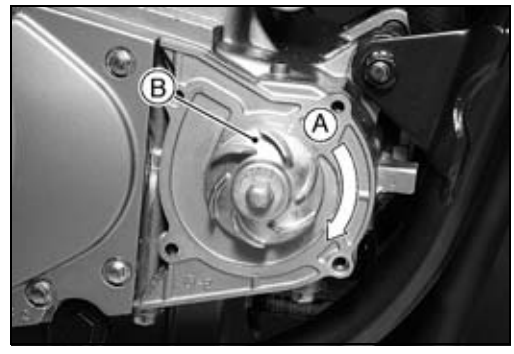


- Install the right footpeg assembly.

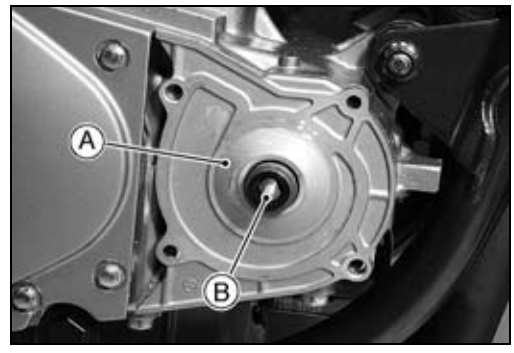
NOTE

○*The impeller and water pump shaft have a left-handed thread, therefore they must be turned clockwise [A] to remove.*

- Shift the transmission into 1st gear.
- While applying the rear brake, remove the impeller [B].



- Pull the water pump housing [A] and gasket out of the right crankcase.
- Turn the water pump shaft [B] clockwise, and remove it.



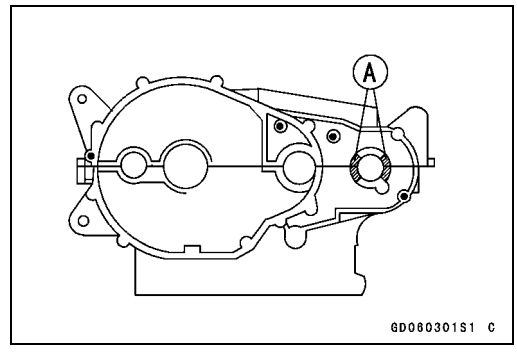
Water Pump Installation

- When installing the water pump shaft or impeller, shift the transmission into 1st gear and apply the rear brake.
- Apply silicone sealant to the area [A] where the mating surface of the crankcase contacts the water pump housing gasket.

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

- Apply high temperature grease to the lips of the water pump housing oil seal.
- Turn the water pump shaft or impeller counterclockwise, and tighten them.

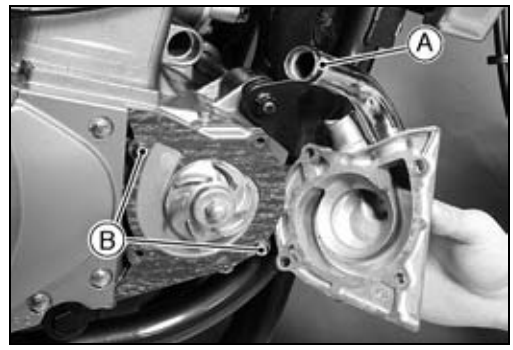
Torque - Water Pump Shaft: 25 N·m (2.5 kgf·m, 18 ft·lb)
Water Pump Impeller: 9.8 N·m (1.0 kgf·m, 87 in·lb)



Water Pump

- Be sure to install the water pipe O-rings [A], and apply high temperature grease to them.
- Install the water pump cover with the water pipe, being careful of the two knock pins [B].

Torque - Water Pump Cover Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)



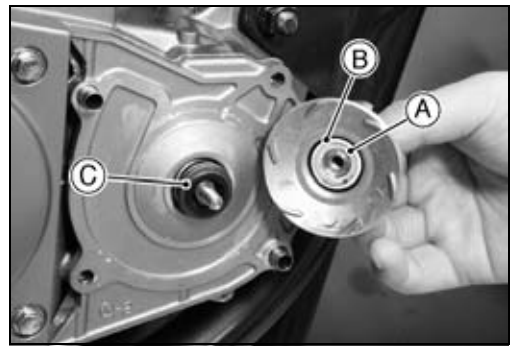
Mechanical Seal Inspection

- Visually inspect the mechanical seal.

★If any one of the parts is damaged, replace the mechanical seal as a unit.

○The sealing seat and rubber seal may be removed easily by hand.

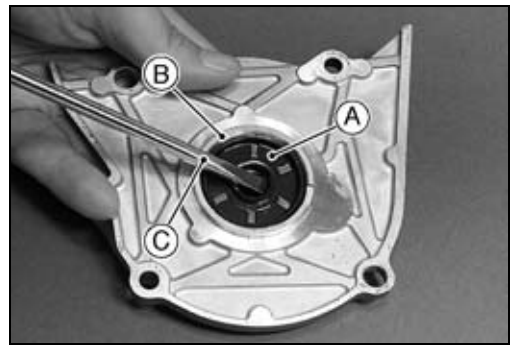
[A] Impeller Sealing Seat Surface
[B] Rubber Seal
[C] Mechanical Seal Diaphragm



Water Pump Housing Disassembly

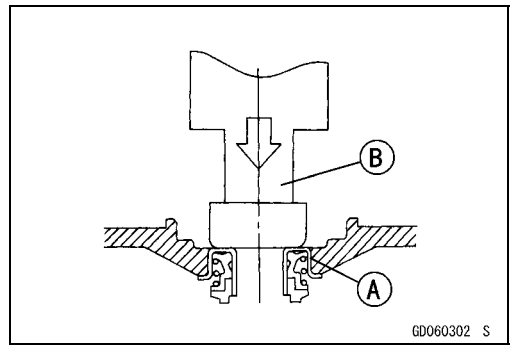
CAUTION
Be careful not to damage the sealing surface of the mechanical seal.

- Take the oil seal [A] out of the housing [B] with a hook [C].



- Press the mechanical seal [A] out of the housing with a bearing driver [B].

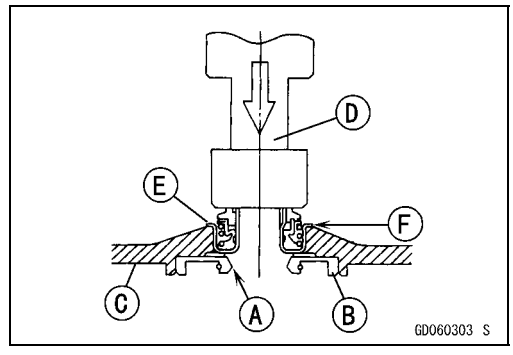
Special Tool - Bearing Driver Set: 57001-1129



Water Pump Housing Assembly

- Apply a high temperature grease [A] to the oil seal [B].
- Press the oil seal into the housing with a bearing driver until it stops at the bottom surface of the housing [C].
- Press the mechanical seal into the housing with a bearing driver [D] until its flange [E] touches the surface [F] of the housing.

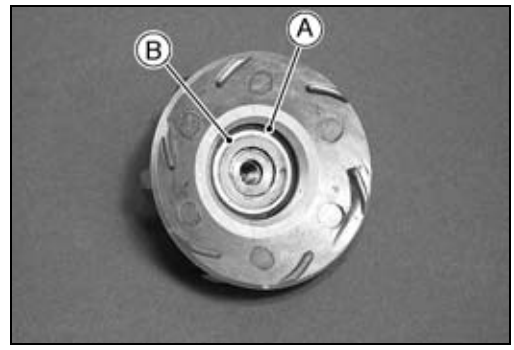
Special Tool - Bearing Driver Set: 57001-1129



Water Pump

Impeller Assembly

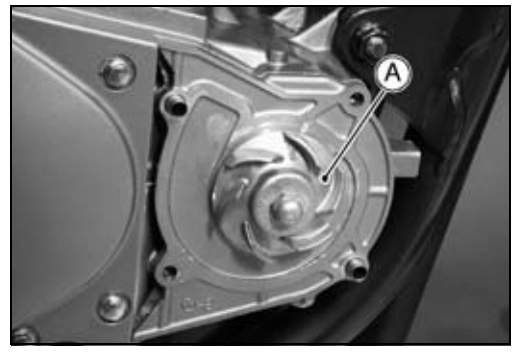
- Clean the sliding surface of the mechanical seal with a high flash-point solvent, and apply a little coolant to the sliding surface to give the mechanical seal initial lubrication.
- Apply coolant to the surfaces of the rubber seal [A] and sealing seat [B], and install the rubber seal and sealing seat into the impeller by pressing them by hand until the seat stops at the bottom of the hole.



Pump Impeller Inspection

- Visually check the impeller [A].

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



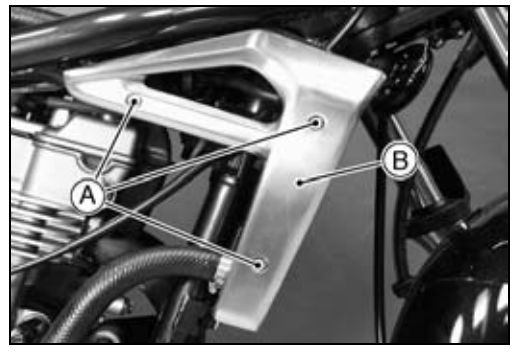
Radiator, Radiator Fan

⚠ WARNING

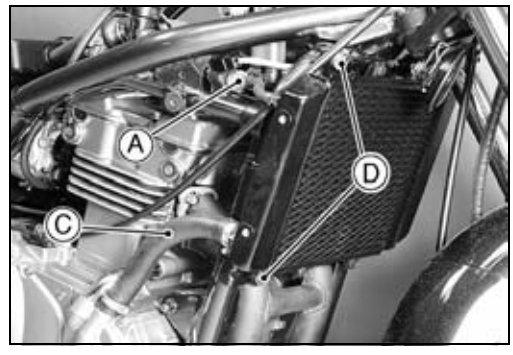
The radiator fan is connected directly to the battery. The radiator fan may start even if the ignition switch is off. NEVER TOUCH THE RADIATOR FAN UNTIL THE RADIATOR FAN CONNECTOR IS DISCONNECTED. TOUCHING THE FAN BEFORE THE CONNECTOR IS DISCONNECTED COULD CAUSE INJURY FROM THE FAN BLADES.

Radiator Removal

- Drain the coolant.
- Remove:
  Both Radiator Cover bolts [A] and Radiator Covers [B]

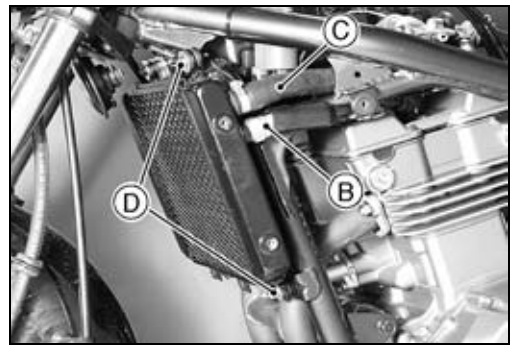


- Remove:
  Radiator Fan Connector [A]
  Radiator Fan Switch Connector [B]
  Radiator Hoses [C]
- Unscrew the radiator mounting bolts [D] and remove the radiator taking care not to damage the radiator core.



CAUTION

Do not touch the radiator core. This could damage the radiator fins, resulting in loss of cooling efficiency.

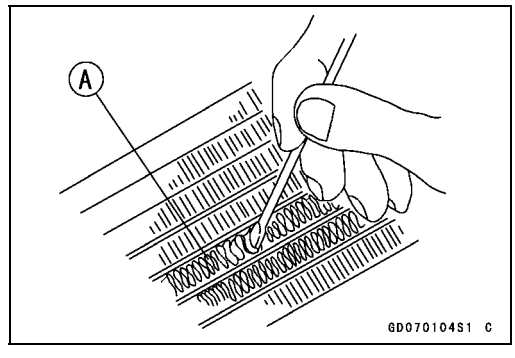


Radiator Inspection

- Check the radiator core.

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

★If the corrugated fins [A] are deformed, carefully straighten then with the blade of a thin screw driver.



CAUTION

Do not tear the radiator tubes while straightening the fins.

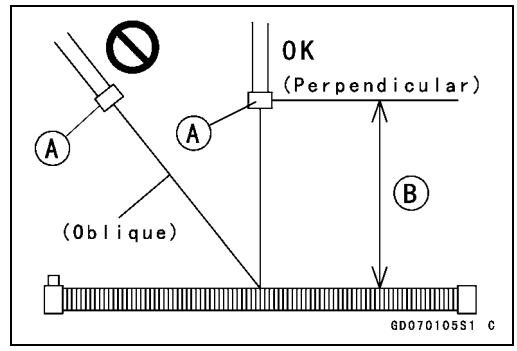
★If the air passages of the radiator core are blocked more than 20% by unremovable obstructions or irreparable deformed fins, replace the radiator with a new one.

Radiator, Radiator Fan

CAUTION

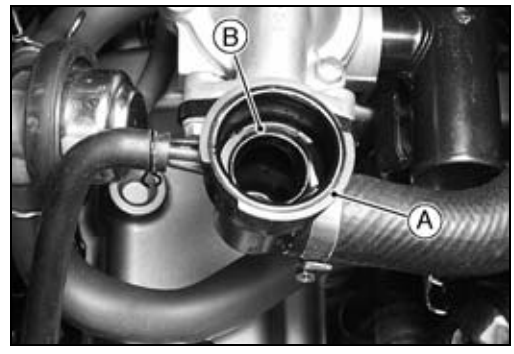
When cleaning the radiator with steam cleaner, be careful of the following to prevent radiator damage.

1) Keep the steam gun [A] away more than 0.5 m (20 in.) [B] from the radiator core.
2) Hold the steam gun perpendicular to the core surface.
3) Run the steam gun horizontally following the core fin direction. Running it vertically may damage the fin.



Filler Neck Inspection

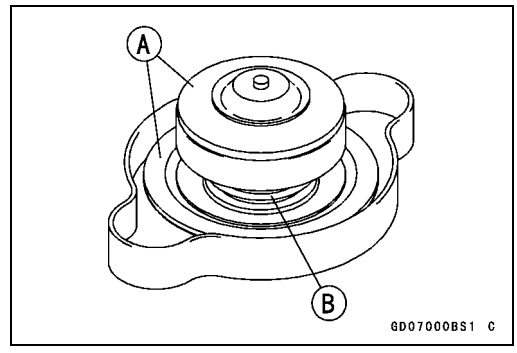
- Remove the fuel tank.
- Check the radiator filler neck for signs of damage.
- Check the condition of the top [A] and bottom sealing seats [B] in the filler neck. They must be smooth and clean for the radiator cap to function properly.



Radiator Cap Inspection

- Check the condition of the bottom and top valve seals [A], valve spring [B] of the radiator cap.

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



- Install the cap [A] on a cooling system pressure tester [B].

NOTE

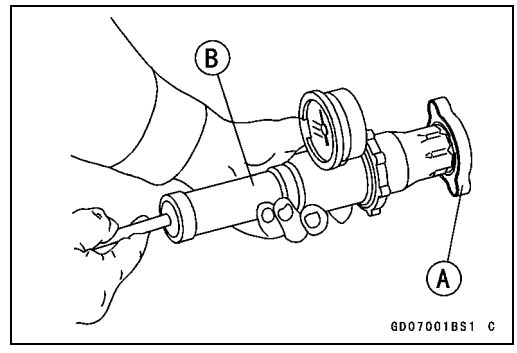
○*Wet the cap sealing surfaces with water or coolant to prevent pressure leaks.*

- Watching the pressure gauge, slowly pump the pressure tester to build up the pressure. The relief valve must open within the relief pressure range as shown below. The gauge hand must remain at least 6 seconds between the lowest relief pressure and the valve opened pressure.

Radiator Cap Relief Pressure

Standard: 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi)

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



Radiator, Radiator Fan

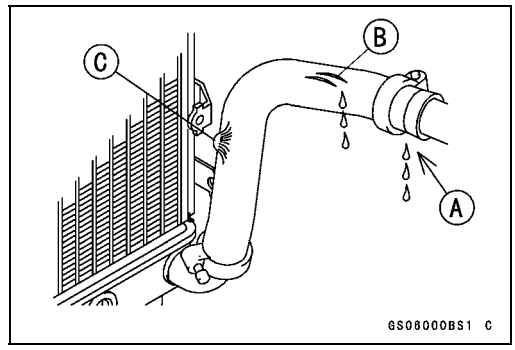
Radiator Hose and Connection Inspection

○The high pressure inside the radiator hose can cause coolant to leak [A] or the hose to burst if the line is not properly maintained. Visually inspect the hoses for signs of deterioration. Squeeze the hoses. A hose should not be hard and brittle, nor should it be soft or swollen.

★Replace the hose if any fraying, cracks [B] or bulges [C] are noticed.

● Check that the hoses are securely connected and clamps are tightened correctly.

Torque - Radiator Hose Clamp Screws: 2.5 N·m (0.25 kgf·m, 22 in·lb)



Radiator Hose, Pipe, Air Vent Hose, Reservoir Tank Hose Installation

● Install the radiator hoses. Avoid sharp bending, kinking, flattening, or twisting.

● Tighten the hose clamps securely.

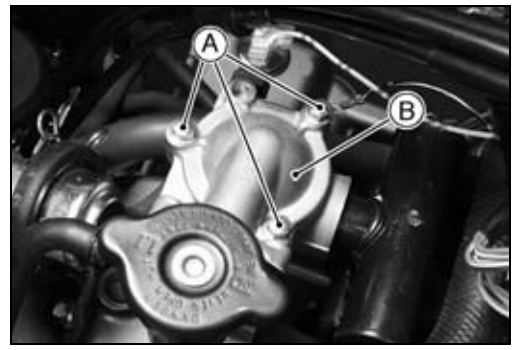
Torque - Radiator Hose Clamp Screws: 2.5 N·m (0.25 kgf·m, 22 in·lb)

● Route the air vent hose, radiator hoses, pipes and reservoir tank hose (see General Information chapter).

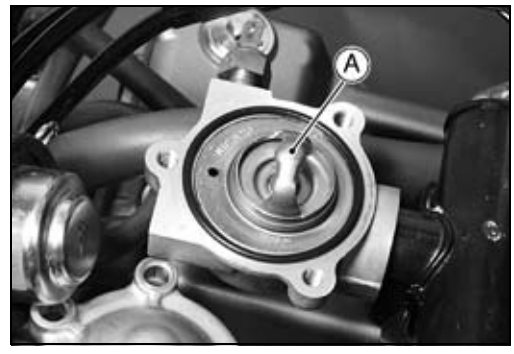
Thermostat

Thermostat Removal

- Remove:
  Coolant (Draining)
  Seat (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
- Unscrew the thermostat housing bolts [A].
- Separate the housing from the housing cover [B].

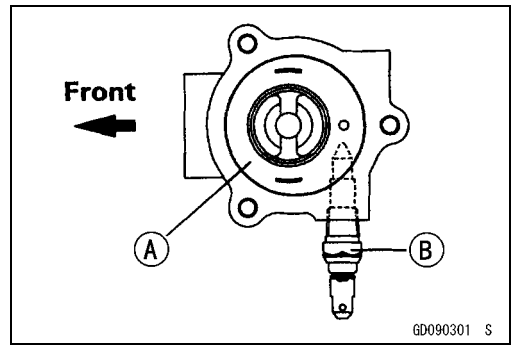


- Pull out the thermostat [A].



Thermostat Installation

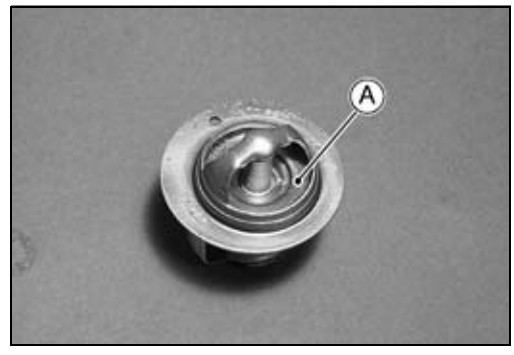
- Install the thermostat [A] into the thermostat housing so that the thermostat does not touch the water temperature switch [B] as shown.
- Be sure to install the O-ring on the thermostat housing cover.
- Fill the radiator with coolant.



Thermostat Inspection

- Remove the thermostat, and inspect the thermostat valve [A] at room temperature.

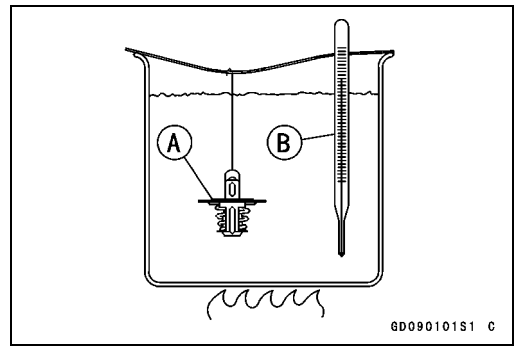
★If the valve is open, replace the valve with a new one.



- To check valve opening temperature, suspend the thermostat [A] in a container of water and raise the temperature of the water.
  [B] Thermometer

★If the measurement is out of the specified range, replace the thermostat with a new one.

Thermostat Valve Opening Temperature
80 ~ 84°C (176 ~ 183°F)



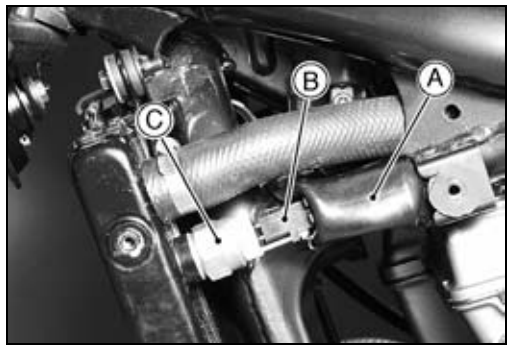
Radiator Fan Switch, Water Temperature Switch

CAUTION

The fan switch or the water temperature switch should never be allowed to fall on a hard surface. Such a shock to these parts can damage them.

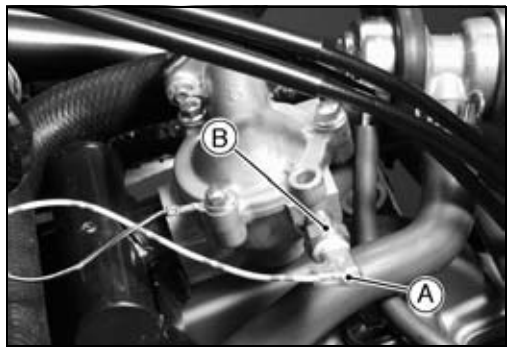
Radiator Fan Switch Removal

- Pull out the cover [A].
- Disconnect the fan switch connector [B].
- Remove the radiator fan switch [C].



Water Temperature Switch Removal

- Drain the coolant.
- Remove the fuel tank (see Fuel System chapter).
- Disconnect the lead [A] and remove the water temperature switch [B].



Radiator Fan Switch, Water Temperature Switch Installation

- Apply silicone sealant to the threads before mounting the water temperature switch.

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

○Do not apply silicone sealant to the radiator fan switch on the radiator.

- Tighten the water temperature switch and the fan switch.

Torque - Water Temperature Switch: 7.8 N·m (0.80 kgf·m, 69 in·lb)
Radiator Fan Switch: 18 N·m (1.8 kgf·m, 13.0 ft·lb)

Radiator Fan Switch, Water Temperature Switch Inspection

- Refer to the Electrical System chapter for these inspections.

Engine Top End

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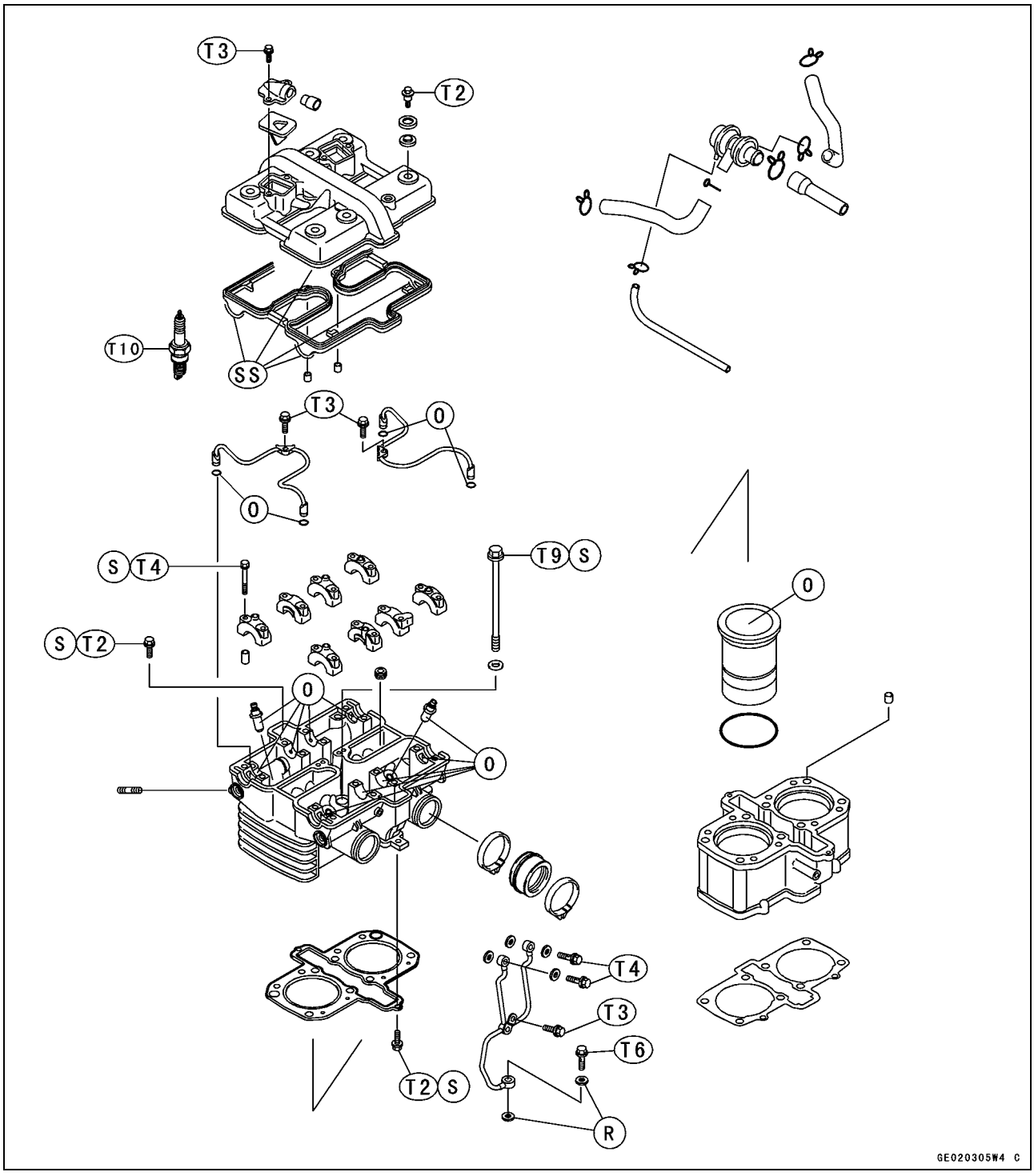
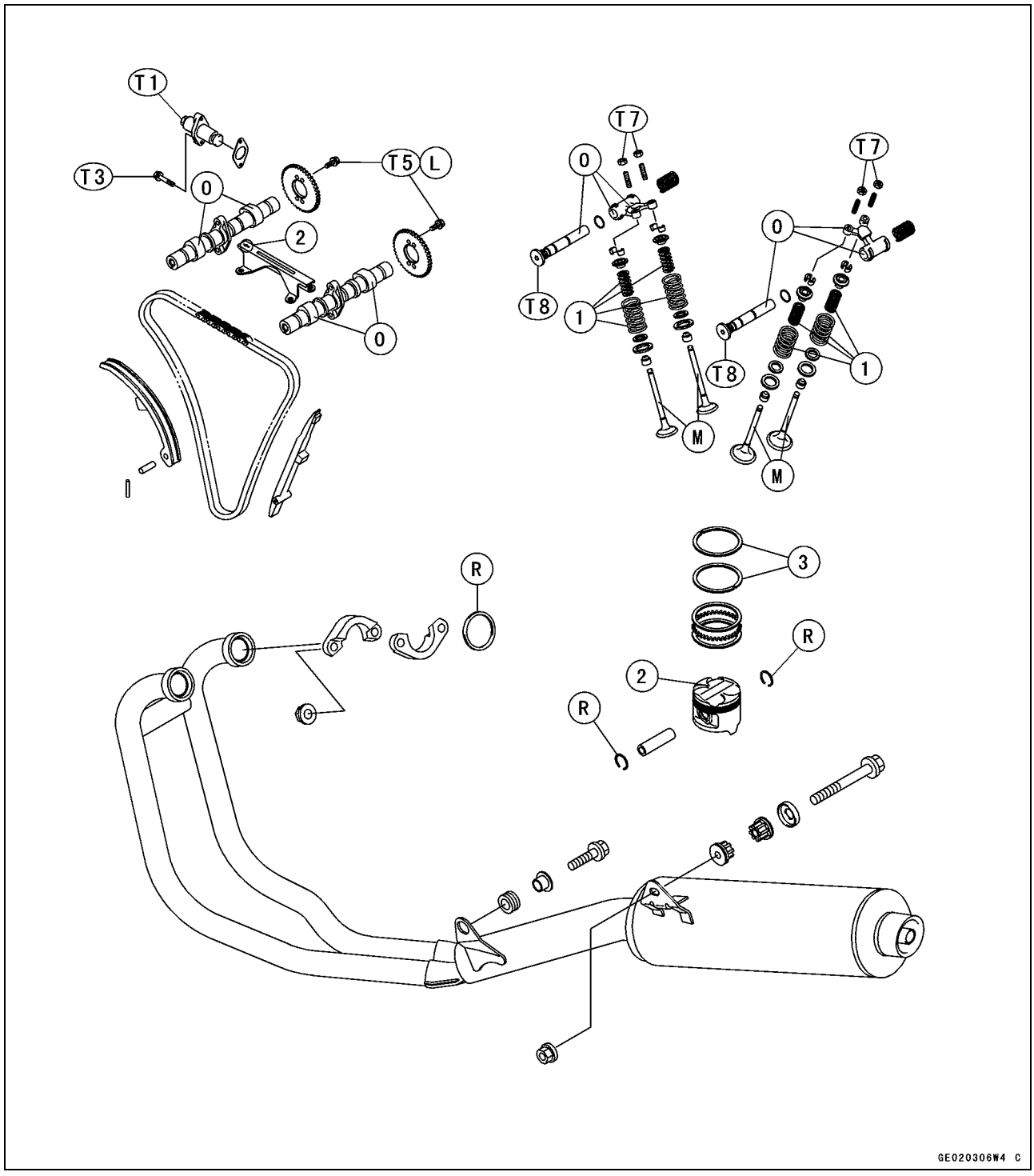
Exploded View



1. Closed coil end faces downward.
2. Arrow points to the front (ER500-C1 ~ C4).
   Install the piston so that the circle mark on the top of the piston come to front side of the engine (ER500-C5).
3. “N” marked side faces up.

L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
O: Apply engine oil.
R: Replacement Parts
S: Follow the specific tightening sequence.
SS: Apply silicone sealant.

Exploded View



T1: 13 N·m (1.3 kgf·m, 9.5 ft·lb)
T2: 9.8 N·m (1.0 kgf·m, 87 in·lb)
T3: 11 N·m (1.1 kgf·m, 95 in·lb)
T4: 12 N·m (1.2 kgf·m, 8.5 ft·lb)
T5: 15 N·m (1.5 kgf·m, 11.0 ft·lb)
T6: 20 N·m (2.0 kgf·m, 14.5 ft·lb)
T7: 25 N·m (2.5 kgf·m, 18.0 ft·lb)
T8: 39 N·m (4.0 kgf·m, 29 ft·lb)
T9: 51 N·m (5.2 kgf·m, 38 ft·lb)
T10: 14 N·m (1.4 kgf·m, 10.0 ft·lb)

Specifications

Item	Standard	Service Limit
Clean Air System		
Vacuum Switch Valve Closing Pressure	Open → Close 57 ~ 65 kPa (430 ~ 490 mmHg)	– – –
Camshafts		
Cam Height:		
Exhaust	35.475 ~ 35.591 mm (1.3967 ~ 1.4012 in.)	35.38 mm (1.3929 in.)
Inlet	35.474 ~ 35.590 mm (1.3966 ~ 1.4012 in.)	35.37 mm (1.3925 in.)
Camshaft, Camshaft Cap Clearance	0.030 ~ 0.071 mm (0.0012 ~ 0.0028 in.)	0.16 mm (0.006 in.)
Camshaft Journal Diameter	25.000 ~ 25.021 mm (0.9843 ~ 0.9851 in.)	25.08 mm (0.9874 in.)
Camshaft Bearing Inside Diameter	24.95 ~ 24.97 mm (0.9823 ~ 0.9831 in.)	24.92 mm (0.9811 in.)
Camshaft Runout	TIR 0.02 mm (0.0008 in.) or less	TIR 0.1 mm (0.004 in.)
Rocker Arm Inside Diameter	12.500 ~ 12.518 mm (0.4921 ~ 0.4928 in.)	12.55 mm (0.4941 in.)
Rocker Shaft Diameter	12.466 ~ 12.484 mm (0.4908 ~ 0.4915 in.)	12.44 mm (0.4898 in.)
Cylinder Head		
Cylinder Compression	(usable range)	
Electric Starter	960 ~ 1 470 kPa (9.8 ~ 15.0 kgf/cm², 139 ~ 213 psi) @450 r/min (rpm)	– – –
Cylinder Head Warp	– – –	0.05 mm (0.002 in.)
Valves		
Valve Clearance:		
Exhaust	0.18 ~ 0.23 mm (0.0070 ~ 0.0090 in.)	– – –
Inlet	0.13 ~ 0.18 mm (0.0051 ~ 0.0071 in.)	– – –
Valve Head Thickness:		
Exhaust	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in.)	0.7 mm (0.028 in.)
Inlet	0.4 ~ 0.6 mm (0.0157 ~ 0.0236 in.)	0.25 mm (0.01 in.)
Valve Stem Bend	TIR 0.01 mm (0.0004 in.) or less	TIR 0.05 mm (0.002 in.)
Valve Stem Diameter:		
Exhaust	5.455 ~ 5.470 mm (0.2148 ~ 0.2154 in.)	5.44 mm (0.2142 in.)
Inlet	5.475 ~ 5.490 mm (0.2156 ~ 0.2161 in.)	5.46 mm (0.2150 in.)
Valve Guide Inside Diameter:		
Exhaust	5.500 ~ 5.512 mm (0.2165 ~ 0.2170 in.)	5.58 mm (0.2197 in.)
Inlet	5.500 ~ 5.512 mm (0.2165 ~ 0.2170 in.)	5.58 mm (0.2197 in.)
Valve/valve Guide Clearance (wobble method):		
Exhaust	0.07 ~ 0.14 mm (0.0028 ~ 0.0055 in.)	0.27 mm (0.0106 in.)
Inlet	0.02 ~ 0.08 mm (0.0008 ~ 0.0032 in.)	0.22 mm (0.0087 in.)
Valve Seat Cutting Angle	45°, 32°, 60°	– – –
Valve Seat Surface:		
Width:		
Exhaust	0.5 ~ 1.0 mm (0.020 ~ 0.039 in.)	– – –
Inlet	0.5 ~ 1.0 mm (0.020 ~ 0.039 in.)	– – –

Specifications

Item	Standard	Service Limit
Outside diameter:		
Exhaust	24.0 ~ 24.2 mm (0.945 ~ 0.953 in.)	– – –
Inlet	28.3 ~ 28.5 mm (1.114 ~ 1.122 in.)	– – –
Valve spring free length:		
Inner	36.3 mm (1.429 in.)	35 mm (1.3780 in.)
Outer	40.4 mm (1.591 in.)	39 mm (1.5354 in.)
Cylinder, Piston		
Cylinder Inside Diameter	74.000 ~ 74.012 mm (2.9134 ~ 2.9139 in.)	74.11 mm (2.9177 in.)
Piston Diameter	73.942 ~ 73.957 mm (2.9111 ~ 2.9117 in.)	73.79 mm (2.9051 in.)
Piston/cylinder Clearance	0.043 ~ 0.070 mm (0.0017 ~ 0.0028 in.)	– – –
Oversize Piston and Rings	+0.5 mm (0.020 in.)	– – –
Piston Ring/groove Clearance:		
Top	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.)	0.17 mm (0.0067 in.)
Second	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)	0.16 mm (0.0063 in.)
Piston Ring Groove Width:		
Top	0.82 ~ 0.84 mm (0.0323 ~ 0.0331 in.)	0.92 mm (0.0362 in.)
Second	1.01 ~ 1.03 mm (0.0398 ~ 0.0406 in.)	1.11 mm (0.0437 in.)
Piston Ring Thickness:		
Top	0.77 ~ 0.79 mm (0.0303 ~ 0.0311 in.)	0.7 mm (0.0276 in.)
Second	0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)	0.90 mm (0.0354 in.)
Piston Ring End Gap:		
Top	0.20 ~ 0.35 mm (0.0079 ~ 0.0138 in.)	0.7 mm (0.0276 in.)
Second	0.20 ~ 0.35 mm (0.0079 ~ 0.0138 in.)	0.7 mm (0.0276 in.)
Oil	0.2 ~ 0.7 mm (0.008 ~ 0.028 in.)	1.0 mm (0.0394 in.)

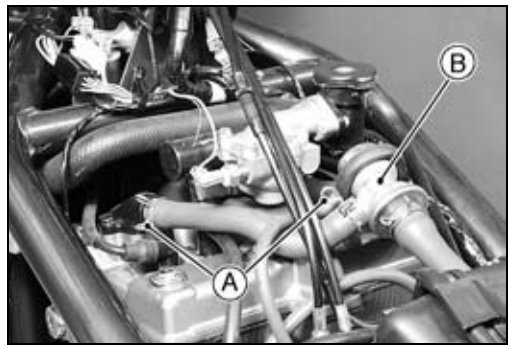
Special Tools - Piston Ring Pliers: 57001-115
Fork Oil Level Gauge: 57001-1290
Spark Plug Wrench, Hex 18: 57001-1024
Compression Gauge, 20 kgf/cm²: 57001-221
Compression Gauge Adapter, M12 × 1.25: 57001-1183
Valve Spring Compressor Assembly: 57001-241
Valve Spring Compressor Adapter, ϕ22: 57001-1202
Valve Guide Arbor, ϕ5.5: 57001-1021
Valve Guide Reamer, ϕ5.5: 57001-1079
Valve Seat Cutter Holder, ϕ5.5: 57001-1125
Valve Seat Cutter Holder Bar: 57001-1128
Valve Seat Cutter, 45° - ϕ30: 57001-1187
Valve Seat Cutter, 32° - ϕ30: 57001-1120
Valve Seat Cutter, 60° - ϕ30: 57001-1123
Valve Seat Cutter, 45° - ϕ24.5: 57001-1113
Valve Seat Cutter, 32° - ϕ25: 57001-1118
Valve Seat Cutter, 60° - ϕ25: 57001-1328
Piton Pin Puller Assembly: 57001-910
Piston Ring Compressor Grip: 57001-1095
Piston Ring Compressor Belt, ϕ67 ~ 79: 57001-1097

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

Clean Air System

Vacuum Switch Valve Removal

- Remove:
  Fuel Tank (see Fuel System chapter)
- Remove the clamps [A] and take off the vacuum switch valve [B].



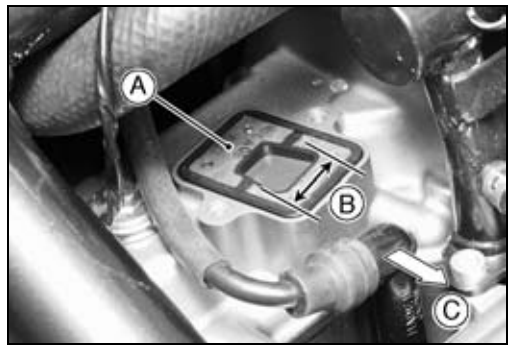
Vacuum Switch Valve Installation

- Install the vacuum switch valve so that the air hole [A] faces downwards.

Air Suction Valve Installation

- Replace the gasket with a new one.
- Install the air suction valve [A] so that its wider side [B] of the reed faces the rear [C].

Torque - Air Suction Valve Cap Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)



Air Suction Valve Inspection

The air suction valve is essentially a check valve which allows fresh air to flow from the air cleaner into the exhaust port. Any air that has passed the air suction valve is prevented from returning to the air cleaner.

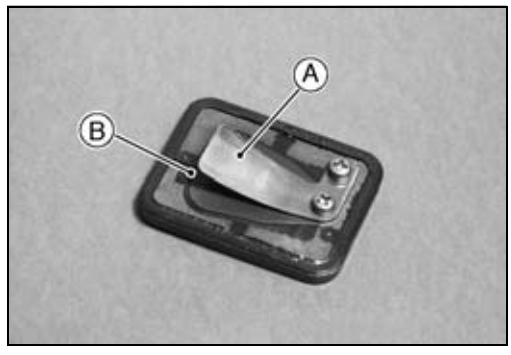
- Remove the air suction valves.
- Visually inspect the reeds [A] for cracks, folds, warps, heat damage, or other damage.

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

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

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

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



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

Clean Air System

Clean Air System Hose Inspection

- Be certain that all the hoses are routed without being flattened or kinked, and are connected correctly to the air cleaner housing, silencer, vacuum switch valve, carburetors, and air suction valve covers.

★If they are not, correct them. Replace them if they are damaged.

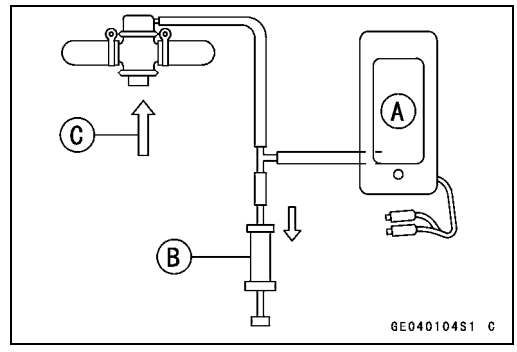
Vacuum Switch Valve Test

Using the vacuum gauge and a syringe, inspect the vacuum switch operation as follows.

- Remove a vacuum switch valve.
- Connect a vacuum gauge [A] and syringe [B] or fork oil level gauge to the vacuum hoses as shown.

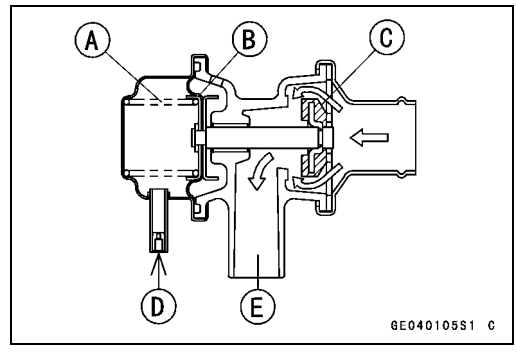
Air Flow [C]

Special Tool - Fork Oil Level Gauge: 57001-1290



- Gradually raise the vacuum (lower the pressure) applied to the vacuum switch valve, and check the valve operation. When the vacuum is low, the vacuum switch valve should permit air to flow. When the vacuum raises to the level shown below, the valve should stop air flow. When the vacuum is high enough, air cannot flow through the valve.

Spring [A]
Diaphragm [B]
Valve [C]
Low Vacuum [D]
Secondary Air Flow [E]



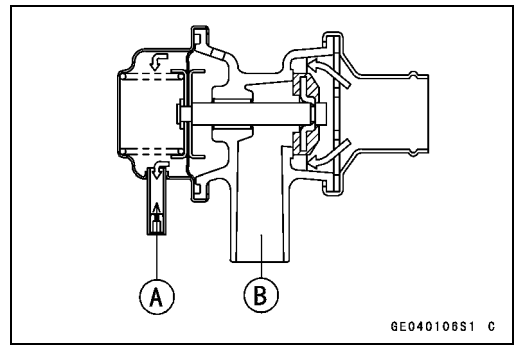
★If the vacuum switch valve does not operate as described, replace it with a new one.

NOTE

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

Vacuum Switch Valve Closing Pressure (open → close)
Standard: 57 ~ 65 kPa (430 ~ 490 mmHg)

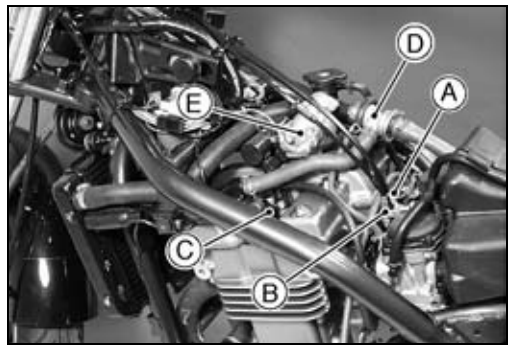
High Vacuum [A]
Secondary air cannot flow [B].



Cylinder Head Cover

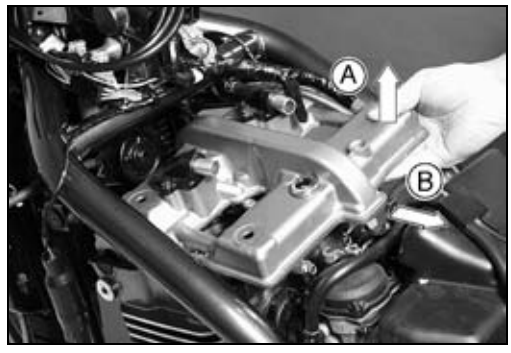
Cylinder Head Cover Removal

- Drain the coolant (see Cooling System chapter).
- Remove:
  Fuel Tank (see Fuel System chapter)
  Choke Cable Lower End [A]
  Throttle Cable Lower Ends [B]
  Spark Plug Caps [C]
  Vacuum Switch Valve [D]
  Thermostat Housing [E]



- Unscrew the cylinder head cover bolts [A].

- Tilt up the right side [A] of the head cover slightly, move the head cover back [B] and upward.
- Remove the cylinder head cover.



Cylinder Head Cover Installation

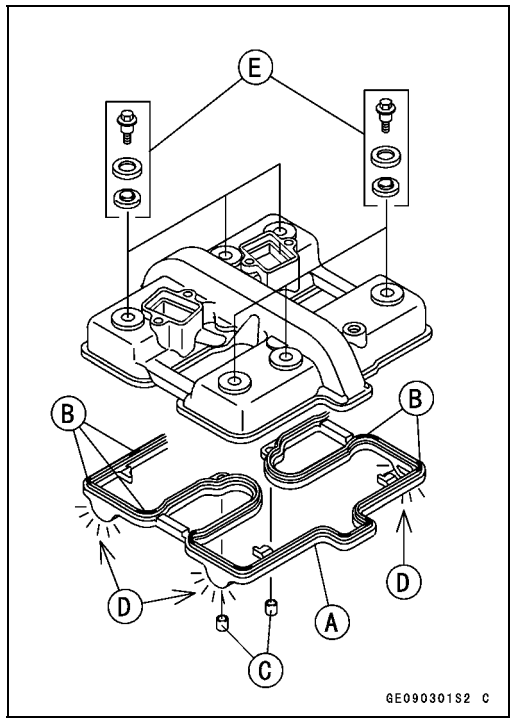
- Replace the head cover gasket [A] with a new one, if it is damaged.
- Stick the gasket to the cover with a liquid gasket [B] for installation convenience.
- Be sure to install the knock pins [C].
- Apply silicone sealant [D] as shown.

  Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

- Tighten the cover bolts [E].

  Torque - Cylinder Head Cover Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install the removed parts in reverse of removal.



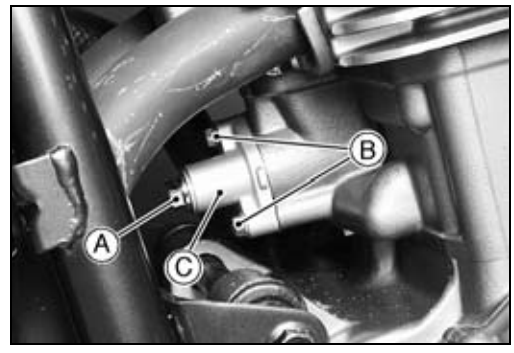
Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

CAUTION

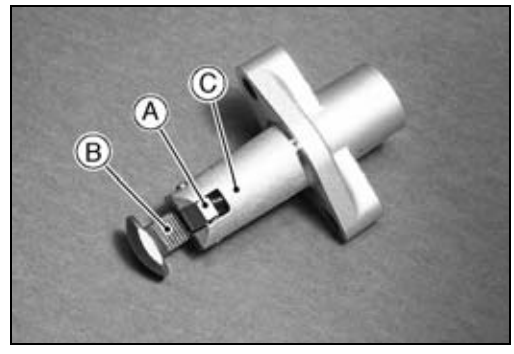
This is a non-return type cam chain tensioner. The push rod does not return to its original position once it moves out to take up cam chain slack. Observe all the rules listed below:
When removing the tensioner, do not take out the mounting bolts only halfway. Retightening the mounting bolts from this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

- Loosen the cap bolt [A] before tensioner removal for later disassembly convenience.
- Unscrew the mounting bolts [B] and remove the camshaft chain tensioner [C].



Camshaft Chain Tensioner Installation

- Release the stopper [A] and push the rod [B] into the tensioner body [C].

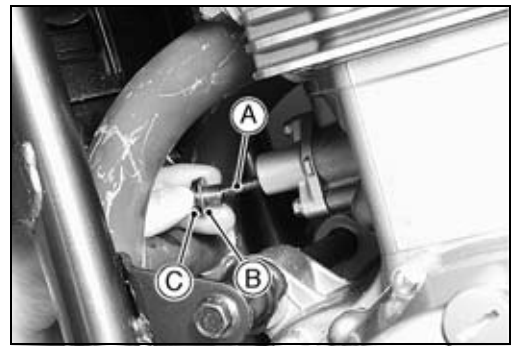


- Replace the gasket with a new one.
- Tighten the mounting bolts.

Torque - Camshaft Chain Tensioner Mounting Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

- Install the spring [A], washer [B], and tighten the cap bolt [C].

Torque - Camshaft Chain Tensioner Cap Bolt: 13 N·m (1.3 kgf·m, 9.5 ft·lb)

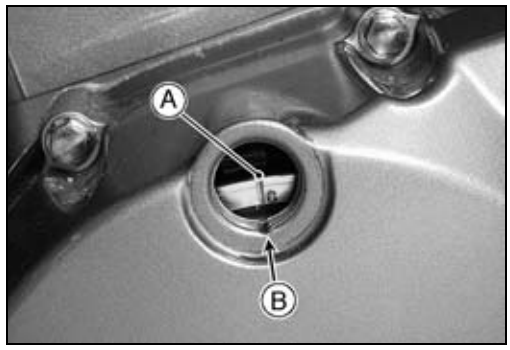


Camshaft, Camshaft Chain

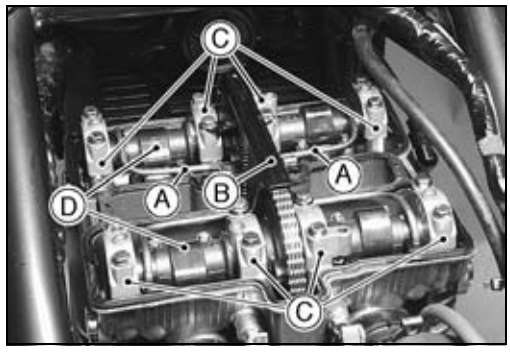
Camshaft Removal

- Remove the cylinder head cover.
- Position the crankshaft at #2 piston TDC.

○Using a wrench on the crankshaft rotation bolt turn the crankshaft clockwise until the "C" mark line [A] on the rotor is aligned with the notch [B] in the edge of the upper hole in the alternator cover.



- Remove:
  Camshaft Chain Tensioner (see Camshaft Chain Tensioner Removal)
  Cylinder Head Oil Pipes [A]
  Top Chain Guide [B]
  Camshaft Caps [C]
  Camshafts [D]
- Stuff a clean cloth into the chain tunnel to keep any parts from dropping into the crankcase.



CAUTION

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

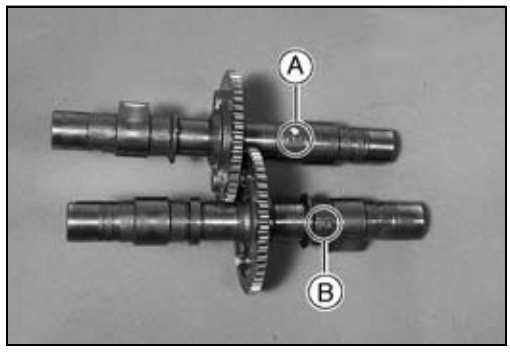
Camshaft Installation

- Apply engine oil to all cam parts and journals.
- If the camshaft(s) and/or cylinder head are replaced with new ones, apply a thin coat of a molybdenum disulfide grease on the new cam part surfaces.

NOTE

○*The Exhaust camshaft has an EX mark [A] and the inlet camshaft has an IN mark [B]. Be careful not to mix up these shafts.*

○*Be sure to operate from the engine left side.*



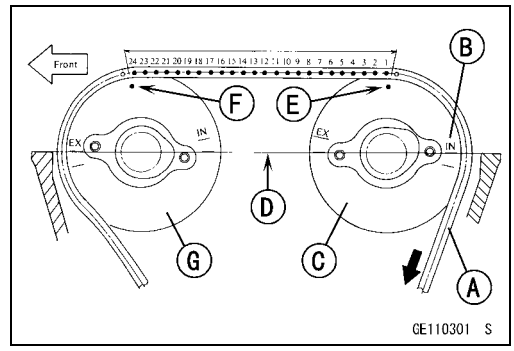
- Position the crankshaft at #2 piston TDC (see Camshaft Removal).

CAUTION

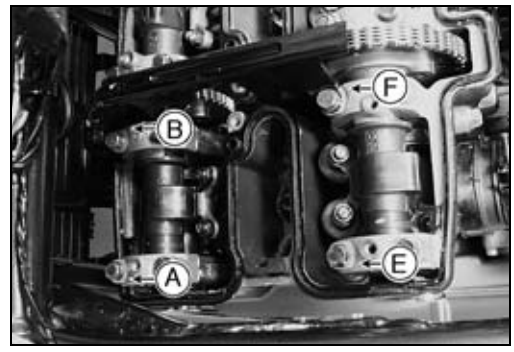
The crankshaft may be turned while the camshafts are removed. Always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower (crankshaft) sprocket. A kinked chain could damage both the chain and the sprocket.

Camshaft, Camshaft Chain

● Engage the camshaft chain with the camshaft sprockets.
○Pull the tension side [A] (inlet side) of the chain taut to install the chain.
○The timing marks [B] on the inlet sprocket [C] must be aligned with the cylinder head upper surface [D].
● Pull the chain taut and fit it onto the camshaft sprocket.
● Starting with the punch mark [E] on the top of the inlet sprocket, count to the 24th pin. Feed the inlet camshaft through the chain and align the 24th pin with the punch mark [F] on the exhaust camshaft sprocket [G].



● Be sure to install the knock pins.
● Install the camshaft caps and top chain guide in the correct locations as shown. Location alphabets are marked on the cylinder head and each cap.

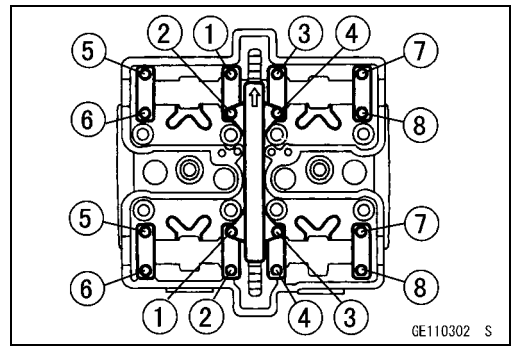


CAUTION

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

● First tighten down the two camshaft cap bolts (#1 and #2 bolts in the figure) evenly to seat the camshafts in place, then tighten all bolts following the specified tightening sequence.

Torque - Camshaft Cap Bolts: 12 N·m (1.2 kgf·m, 8.5 ft·lb)



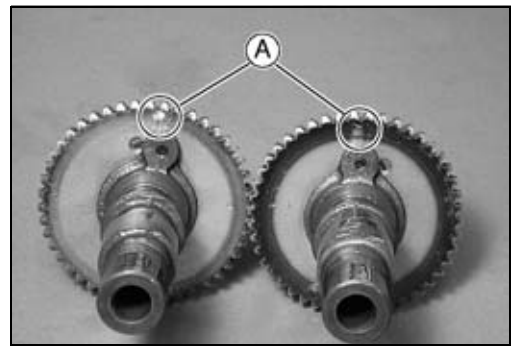
● Install the head oil pipes.

Torque - Oil Pipe Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

● Install the camshaft chain tensioner (see Camshaft Chain Tensioner Installation).
● Check the chain timing.

Camshaft and Sprocket Assembly

○The inlet and exhaust sprockets are identical.
● Install the sprockets so that the marked [A] ("IN" and "EX") side faces to the left side.



CAUTION

Inlet sprocket must use "I" marked bolt holes.
Exhaust sprocket must use "E" marked bolt holes.

● Apply a non-permanent locking agent to the camshaft sprocket bolts and tighten them.

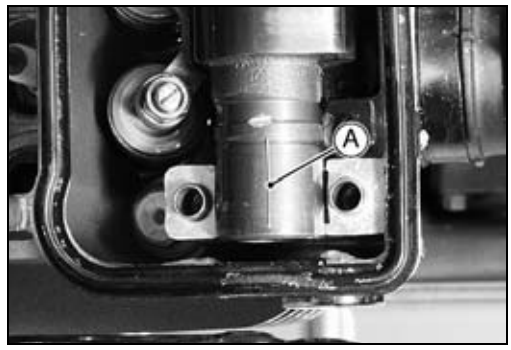
Torque - Camshaft Sprocket Bolts: 15 N·m (1.5 kgf·m, 11.0 ft·lb)

★If a new camshaft is to be used, apply a thin coat of a molybdenum disulfide grease to the cam surfaces.

Camshaft, Camshaft Chain

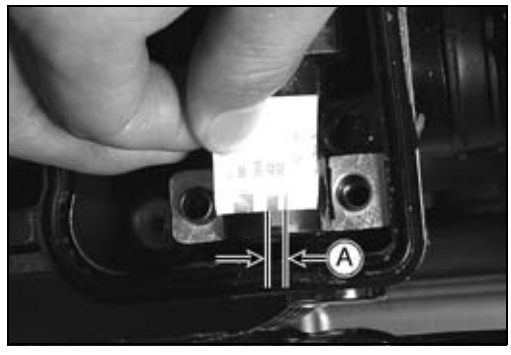
Camshaft, Camshaft Cap Wear

The journal wear is measured using plastigage (press gauge), which is inserted into the clearance to be measured. The plastigage indicates the clearance by the amount it is compressed and widened when the parts are assembled.



- Cut strips of plastigage to journal width. Place a strip on each journal parallel to the camshaft with the camshaft installed in the correct position and so that the plastigage will be compressed between the journal and camshaft cap.

  [A] Plastigage Strip



- Install the camshaft caps, tightening the bolts in the correct sequence.

Torque - Camshaft Cap Bolts: 12 N·m (1.2 kgf·m, 8.5 ft·lb)

NOTE

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

- Remove the camshaft caps again, and measure the plastigage width [A] to determine the clearance between each journal and camshaft cap. Measure the widest portion of the plastigage.

★If any clearance exceeds the service limit, measure the camshaft journal diameter and the camshaft bearing inside diameter.

★If any of the measurements is beyond the service limit, replace the worn part and check the clearance again.

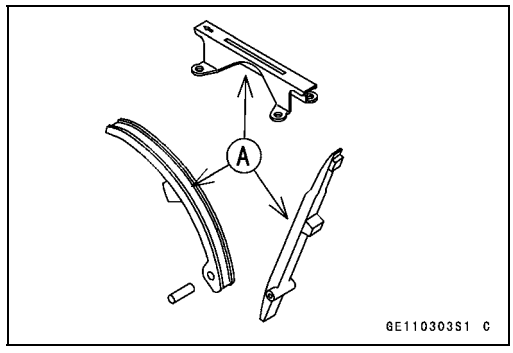
Camshaft Journal, Camshaft Cap Clearance

Standard:	**0.030 ~ 0.071 mm (0.0012 ~ 0.0028 in.)**
Service Limit:	**0.16 mm (0.006 in.)**

Camshaft Chain Guide Wear

- Visually inspect the rubber [A] on the guides.

★If the rubber is damaged or cut, replace the guides.

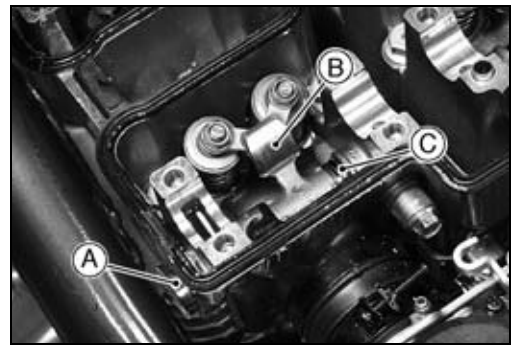


Rocker Shaft, Rocker Arm

Rocker Shaft, Rocker Arm Removal

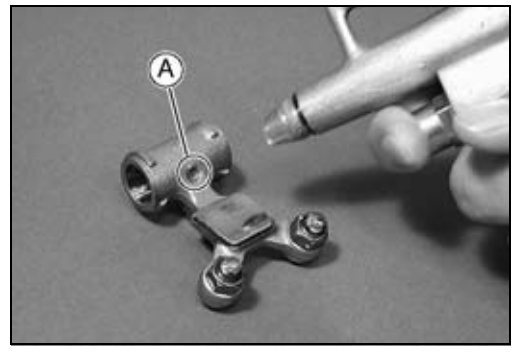
- Remove the camshafts (see Camshaft Removal).
- Unscrew the rocker shafts [A] and remove the rocker arms [B] and springs [C].

○Mark and record the rocker arm locations so that the rocker arm can be reinstalled in their original positions.



Rocker Shaft, Rocker Arm Installation

- Blow the rocker arm oil passage [A] clean with compressed air.
- Apply engine oil to all the rocker arms and the rocker shafts.



- Install the retainer spring [A] on each rocker arm so that the spring is placed to the camshaft chain side.
- Check that the O-rings are in good condition and install the O-rings onto the rocker shafts.
- Insert the shaft running it through the cylinder head, rocker arms and springs.
- Tighten the rocker shafts.

Torque - Rocker Shafts: 39 N·m (4.0 kgf·m, 29 ft·lb)

- Install the camshaft (see Camshaft Installation).
- Check the chain timing.

Oil Pipe

Cylinder Head Oil Pipe Removal

- Remove the oil pipe mounting bolts [A] and pull the oil pipes [B] and O-rings out of the cylinder head.

Cylinder Head Oil Pipe Installation

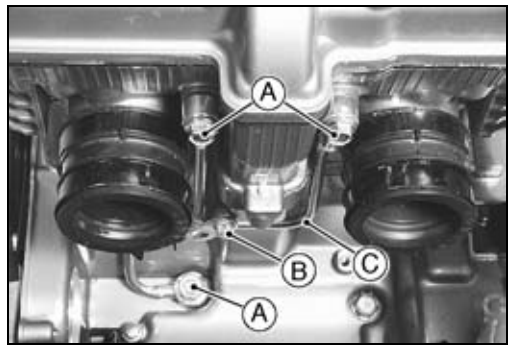
- Flush out the oil pipes with a high flash-point solvent.
- Check that the O-rings are in good condition.

★If they are damaged, replace them with new ones.

- Apply a small amount of oil to the O-rings.
- Fix the oil pipes properly into the cylinder head oil passage holes by pushing both ends at the same time.
- Install the oil pipe mounting bolts.

Main Oil Pipe Removal

- Remove:
  Carburetor (see Fuel System chapter)
  Starter Motor (see Electrical chapter)
- Unscrew the banjo bolts [A] and mounting bolt [B].
- Remove the oil pipe [C].



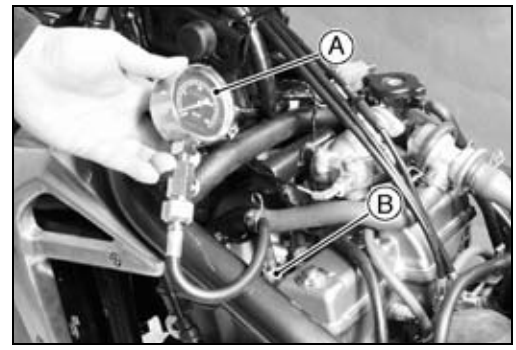
Main Oil Pipe Installation

- Flush out the oil pipes with a high flash-point solvent.
- Discard the used gaskets and install new gaskets on each side of the pipe fittings.
- Tighten the banjo bolts and mounting bolt to a snug fit, and then tighten them to the specified torque.

Torque - Main Oil Pipe Upper Banjo Bolts: 12 N·m (1.2 kgf·m, 8.5 ft·lb)
Main Oil Pipe Lower Banjo Bolt: 20 N·m (2.0 kgf·m, 14.5 ft·lb)
Main Oil Pipe Mounting Bolt: 11 N·m (1.1 kgf·m, 95 in·lb)

Cylinder Head

Compression Measurement



- Remove the seat (see Frame chapter).
- Thoroughly warm up the engine so that the engine oil between the piston and cylinder wall will help seal compression as it does during normal running.
- Stop the engine, remove the fuel tank, ignition coil and spark plugs, and attach the compression gauge firmly into the spark plug hole.

Special Tools - Compression Gauge, 20 kgf/cm²: 57001-221 [A]
Compression Gauge Adapter, M12 × 1.25: 57001-1183 [B]

- Measure the cylinder compression.
- Using the starter motor, turn the engine over with the throttle fully open until the compression gauge stops rising; the compression is the highest reading obtainable.

NOTE

○*Be sure the battery is fully charged.*
○*Be sure no air leaks out of the cylinder head gasket.*

Cylinder Compression (Usable Range)
960 ~ 1 470 kPa (9.8 ~ 15.0 kgf/cm², 139 ~ 213 psi) @410 r/min (rpm)

- Repeat the measurement for the other cylinder.

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

1. Carbon build-up on the piston head and cylinder head. - clean off any carbon on the piston head and cylinder head.
2. Cylinder head gasket, cylinder base gasket - use only the proper gaskets for the cylinder head and base. The use of gaskets of the incorrect thickness will change the compression.
3. Valve stem oil seals and piston rings - rapid carbon accumulation in the combustion chambers may be caused by damaged valve stem oil seals and/or damaged piston oil rings. This may be indicated by white exhaust smoke.

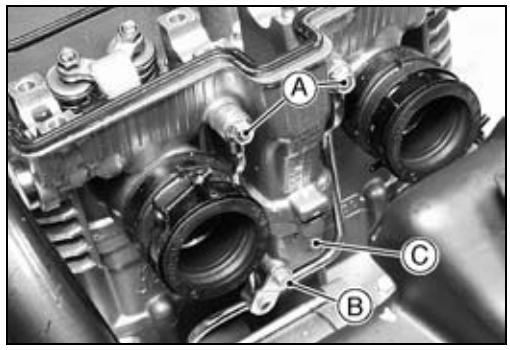
★If cylinder compression is lower than the usable range, check the following:

1. Gas leakage around the cylinder head - replace the damaged gasket and check the cylinder head for warping.
2. Condition of the valve seating.
3. Valve clearance - if a valve requires an unusually large adjustment to obtain proper clearance, the valve may be bent, and not seating completely.
4. Piston/cylinder clearance, piston seizure.
5. Piston ring, piston ring groove.

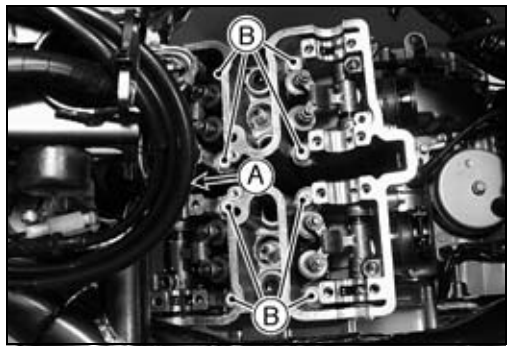
Cylinder Head

Cylinder Head Removal

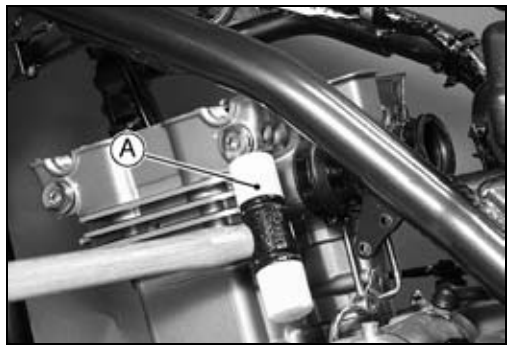
- Remove:
  Cylinder Head Cover (see Cylinder Head Cover Removal)
  Exhaust Pipes and Mufflers (see Crankshaft/Transmission chapter)
  Cam Chain Tensioner (see Chain Tensioner Removal)
  Camshafts (see Camshaft Removal)
  Carburetors (see Fuel System chapter)
- Remove the main oil pipe banjo bolts [A].
- Loosen the main oil pipe mounting bolt [B].
- Remove the rear 6 mm cylinder head bolt [C].



- Remove the front 6 mm cylinder head bolt [A] first, then remove the 10 mm cylinder head bolts [B] This prevents excessive stress on the small bolts.

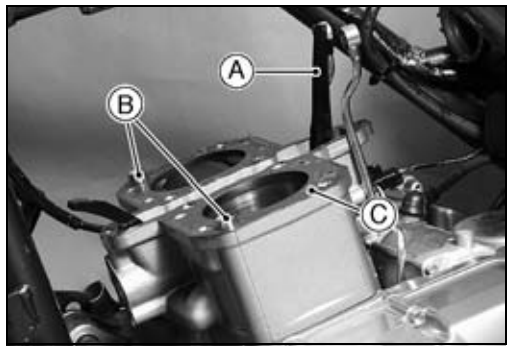


- Tap in the places shown with a mallet [A] to remove the cylinder head.



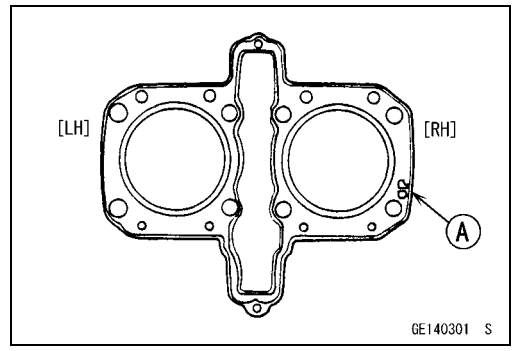
Cylinder Head Installation

- Install the rear chain guide [A], knock pins [B] and gasket [C].



Cylinder Head

● Install a new cylinder head gasket with "UP" [A] marked side positioning to the right.

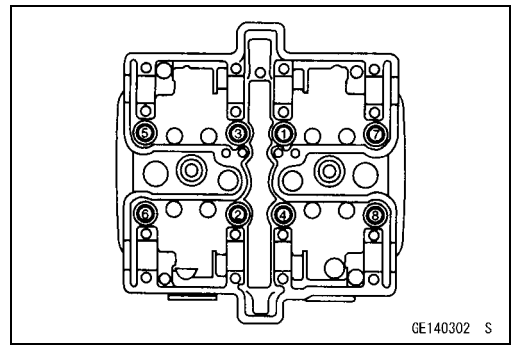


NOTE

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

● Tighten the 10 mm cylinder head bolts following the tightening sequence. Tighten them first to about one half of the specified torque.

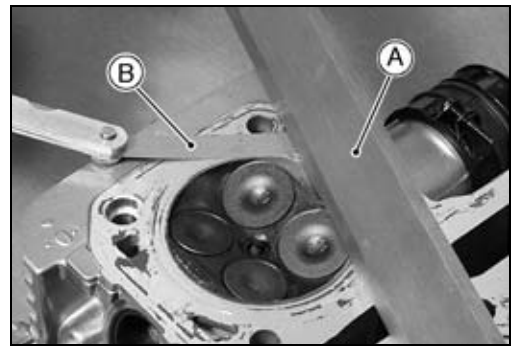
Torque - Cylinder Head Bolts 10 mm: 51 N·m (5.2 kgf·m, 38 ft·lb)
Cylinder Head Bolts 6 mm: 9.8 N·m (1.0 kgf·m, 87 in·lb)



● Tighten the 6 mm cylinder bolts.
● Install the camshafts, camshaft caps and top chain guide.
● Install the head oil pipes.

Cylinder Head Warp

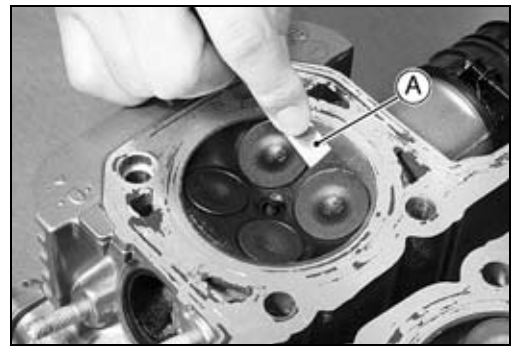
● Clean the cylinder head (see Cylinder Head Cleaning).
● Lay a straightedge [A] across the lower surface of the head at several different points, and measure warp by inserting a thickness gauge [B] between the straightedge and the head.
★If warp exceeds the service limit, repair the mating surface. Replace the cylinder head if the mating surface is badly damaged.



Cylinder Head Warp
Service Limit: 0.05 mm (0.002 in.)

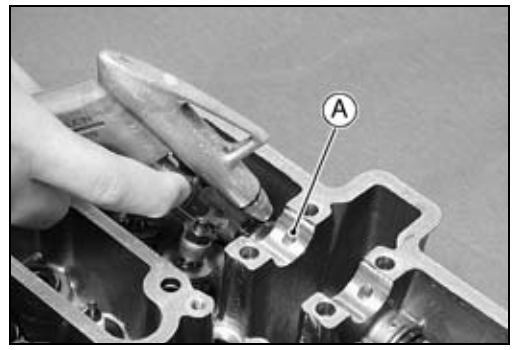
Cylinder Head Cleaning

● Remove the cylinder head (see Cylinder Head Removal).
● Remove the valves (see Valve Removal).
● Wash the head with a high-flash point solvent.
● Scrape [A] the carbon out of the combustion chamber and exhaust port with a suitable tool.



Cylinder Head

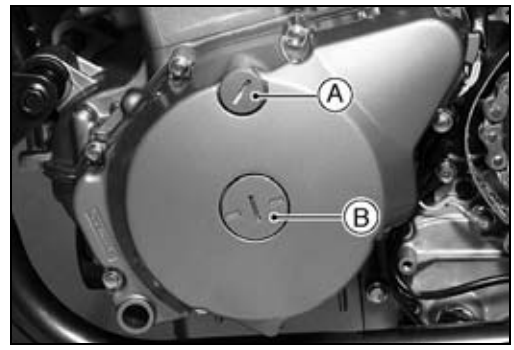
- Using compressed air, blow out any particles which may obstruct the oil passage [A] in the cylinder head.
- Install the valves (see Valve Installation).



Valves

Valve Clearance Inspection

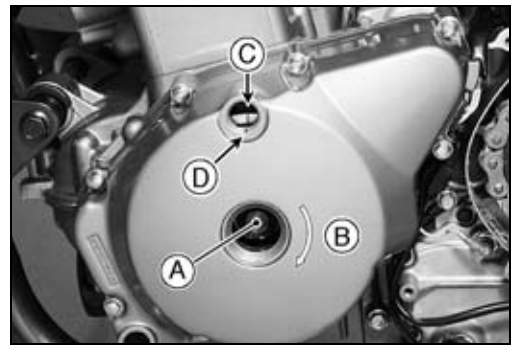
Valve Clearance Inspection



NOTE

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

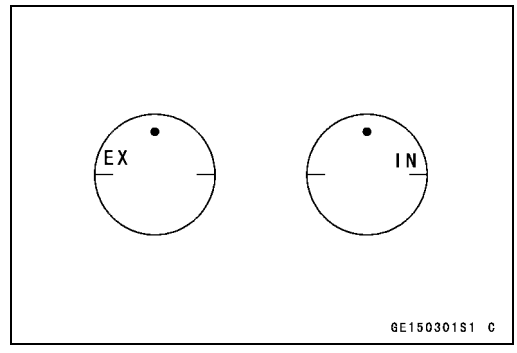
- Remove the cylinder head cover (see Cylinder Head Cover Removal).
- Remove the cylinder head oil pipes (see Cylinder Head Oil Pipe Removal).
- Unscrew the upper [A] and lower [B] caps on the alternator cover.



- Check the valve clearance when the pistons are at TDC.

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

- Using a wrench on the crankshaft rotation bolt [A], turn the crankshaft clockwise [B] until the "C" mark [C] on the rotor is aligned with the notch [D] in the edge of the upper hole in the alternator cover for #2 piston and "T" mark for #1 piston.



○Measure the valve clearance of the valves for which the cam lobe is pointing away from the rocker arm.

- Each piston has two inlet and two exhaust valves. Measure these two inlet or exhaust valves at the same crankshaft position.

Valve Clearance Measuring Position

#2 Piston TDC at End of Compression Stroke →

Inlet valve clearances of #2 piston, and

Exhaust valve clearances of #2 piston

NOTE

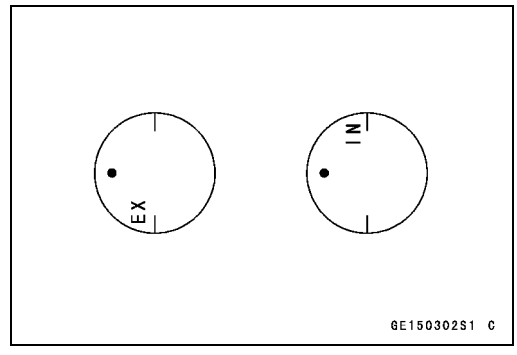
○*Check the valve clearance using this method only. Checking the clearance at any other cam position may result in improper valve clearance.*

Valve Clearance Measuring Position

#1 Piston TDC at End of Compression Stroke →

Inlet valve clearances of #1 piston, and

Exhaust valve clearances of #1 piston

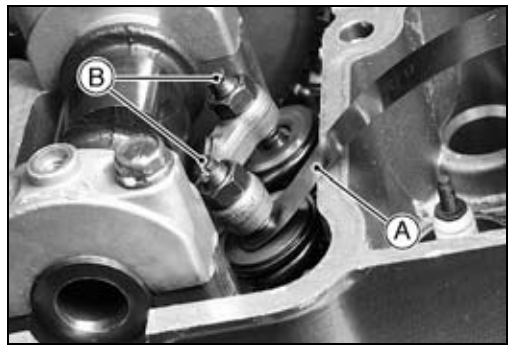


Valves

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

Valve Clearance (when cold)

Inlet	**0.13 ~ 0.18 mm (0.0051 ~ 0.0071 in.)**
Exhaust	**0.18 ~ 0.23 mm (0.0070 ~ 0.0090 in.)**



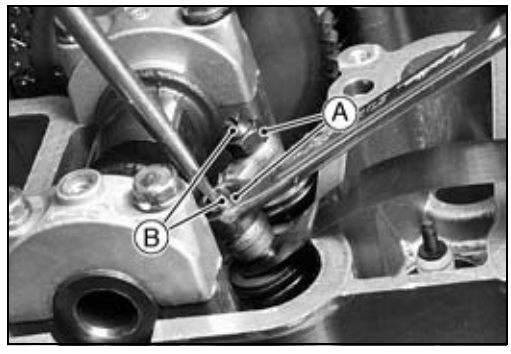
Valve Clearance Adjustment

★If the valve clearance is incorrect, loosen the locknut [A] and turn the adjusting screw [B] until the correct clearance is obtained.

- Tighten the locknut.

Torque - Valve Adjuster Locknuts: 25 N·m (2.5 kgf·m, 18 ft·lb)

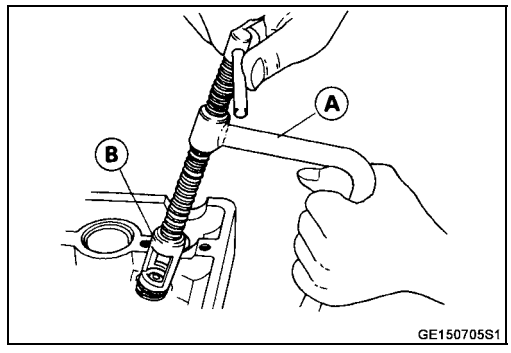
- Install the two caps on the alternator cover.



Valve Removal

- Remove the cylinder head (see Cylinder Head Removal).
- Use a valve spring compressor assembly to press down the valve spring retainer, and remove the split keepers.

Special Tools - Valve Spring Compressor Assembly: 57001 -241 [A]
Valve Spring Compressor Adapter, ϕ22: 57001-1202 [B]



Valve Installation

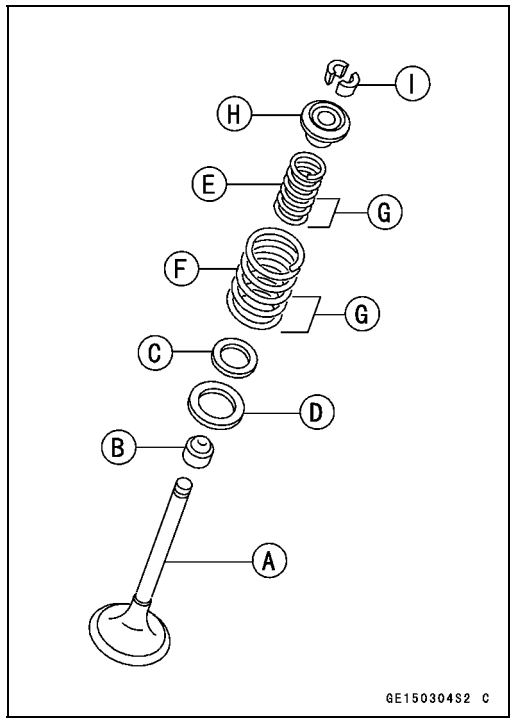
- Check to see that the valve [A] moves smoothly up and down in the guide.
- Check to see that the valve seats properly in the valve seat. If it does not, repair the valve seat.
- Replace the oil seal [B] with a new one.
- Apply a thin coat of molybdenum disulfide engine assembly grease to the valve stem before valve installation.
- Be sure to install the inner [C] and outer [D] spring seats under the inner [E] and outer [F] springs.

○Install the springs so that the closed coil end [G] is facing toward the valve seat (downwards).

- Install the spring retainer [H], press it down with the valve spring compressor assembly, and fit the split keepers [I] into place.

Special Tools - Valve Spring Compressor Assembly: 57001 -241
Valve Spring Compressor Adapter, ϕ22: 57001-1202

- Install the other removed parts.

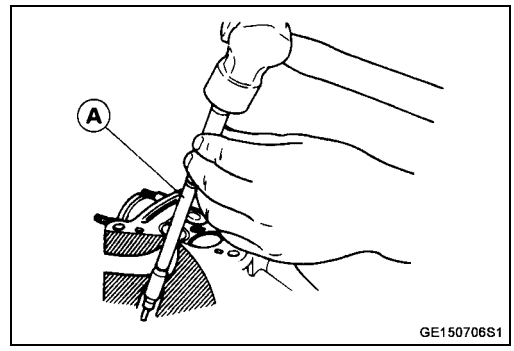


Valves

Valve Guide Removal

- Remove:
  Valve (see Valve Removal)
  Oil Seal
  Spring Seats
- Heat the area around the valve guide to about 120 ~ 150°C (248 ~ 302°F), and hammer lightly on the valve guide arbor [A] to remove the guide from the top of the head.

Special Tool - Valve Guide Arbor, ϕ5.5: 57001-1021



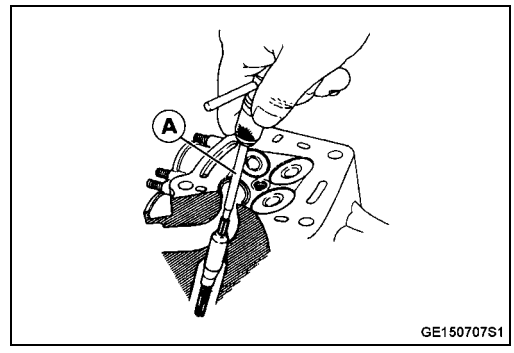
Valve Guide Installation

- Apply oil to the valve guide outer surface before installation.
- Heat the area around the valve guide hole to about 120 ~ 150°C (248 ~ 302°F).
- Drive the valve guide in from the top of the head using the valve guide arbor. The flange stops the guide from going in too far.

Special Tool - Valve Guide Arbor, ϕ5.5: 57001-1021

- Ream the valve guide with a valve guide reamer [A] even if the oil guide is reused.

Special Tool - Valve Guide Reamer, ϕ5.5: 57001-1079



Valve Seat Inspection

- Remove the valve (see Valve Removal).
- Check the valve seating surface [A] between the valve [B] and valve seat [C].

○Coat the valve seat with machinist's dye.
○Push the valve into the guide.
○Rotate the valve against the seat with a lapping tool.
○Pull the valve out, and check the seating pattern on the valve head. It must be the correct width and even all the way around.

- Measure the outside diameter [D] of the seating pattern on the valve seat.

★If the outside diameter of the valve seating pattern is too large or too small, repair the seat (see Valve Seat Repair).

Valve Seating Surface Outside Diameter

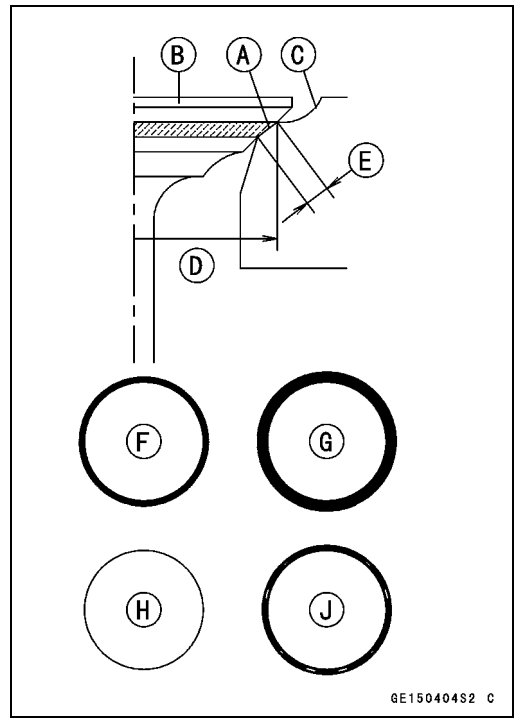
Inlet	**28.3 ~ 28.5 mm (1.114 ~ 1.122 in.)**
Exhaust	**24.0 ~ 24.2 mm (0.945 ~ 0.953 in.)**

NOTE

○*The valve stem and guide must be in good condition, or this check will not be valid.*

★If the valve seating pattern is not correct, repair the seat (see Valve Seat Repair).

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



Valves

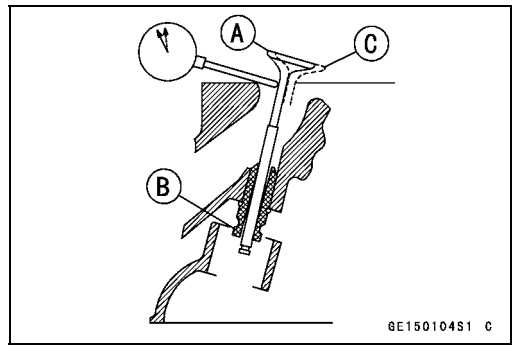
★If the width is too wide, too narrow or uneven, repair the seat (see Valve Seat Repair).
[F] Good
[G] Too Wide
[H] Too Narrow
[J] Uneven

Valve Seating Surface Width

Inlet	**0.5 ~ 1.0 mm (0.020 ~ 0.039 in.)**
Exhaust	**0.5 ~ 1.0 mm (0.020 ~ 0.039 in.)**

Measuring Valve-to-guide Clearance (Wobble method)

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



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

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

NOTE

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

Valve/Valve Guide Clearance (Wobble Method)

Standard:	
Inlet	**0.02 ~ 0.08 mm (0.0008 ~ 0.0032 in.)**
Exhaust	**0.07 ~ 0.14 mm (0.0028 ~ 0.0055 in.)**
Service Limit:	
Inlet	**0.22 mm (0.0087 in.)**
Exhaust	**0.27 mm (0.0106 in.)**

Valve Seat Repair

- Repair the valve seat with the valve seat cutters.

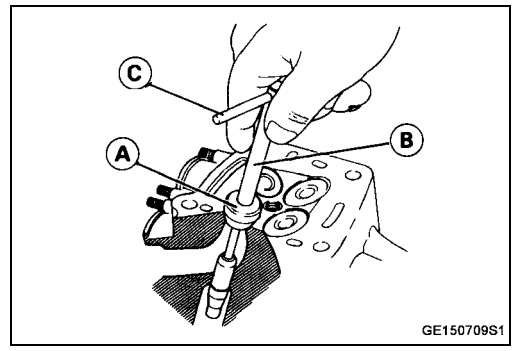
Special Tools -

Inlet Valve		
Seat Cutter	**45°-ϕ30.0**	**57001-1187**
Seat Cutter	**32°-ϕ30.0**	**57001-1120**
Seat Cutter	**60°-ϕ30.0**	**57001-1123**
Exhaust Valve		
Seat Cutter	**45°-ϕ24.5**	**57001-1113**
Seat Cutter	**32°-ϕ25.0**	**57001-1118**
Seat Cutter	**60°-ϕ25.0**	**57001-1328**
Valve Seat Cutter Holder - ϕ5.5		**57001-1125**
Valve Seat Cutter Holders Bar		**57001-1128**

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

Valves

Seat Cutter Operating Cares



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

NOTE

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

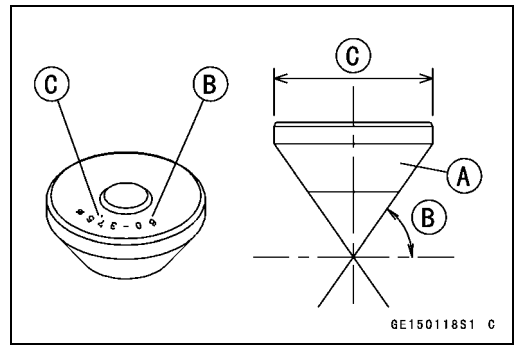
4. Setting the valve seat cutter holder [A] in position, operate the cutter [B] in one hand [C]. Do not apply too much force to the diamond portion.

NOTE

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

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

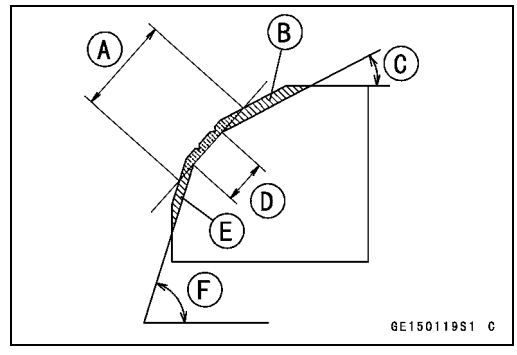
Marks Stamped on the Cutter



- The marks stamped on the back of the cutter [A] represent the following.

60° ..... Cutter angle [B]
37.5ϕ ..... Cuter diameter of cutter [C]

Operating Procedures



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

CAUTION

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

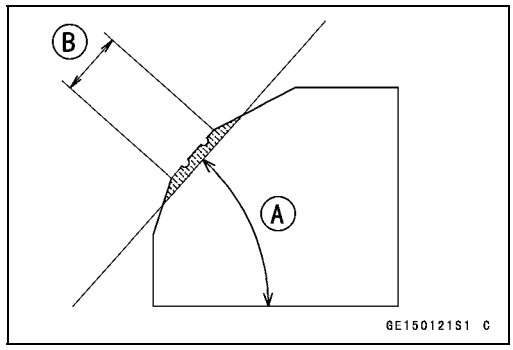
[A] Grind the seat at a 45° angle to enlarge the width of the seating surface.
[B] 32° cut
[C] 32°
[D] Specified seating surface width
[E] 60° cut
[F] 60°

Valves

● Measure the outside diameter (O.D.) of the seating surface with a vernier caliper.

★If the outside diameter of the seating surface is too small, repeat the 45° grind [A] until the diameter is within the specified range.

Original Seating Surface [B]



NOTE

○*Remove all pittings of flaws from 45° ground surface.*

○*After grinding with 45° cutter, apply thin coat of machinist's dye to seating surface. This makes seating surface distinct and 32° and 60° grinding operation easier.*

○*When the valve guide is replaced, be sure to grind with 45° cutter for centering and good contact.*

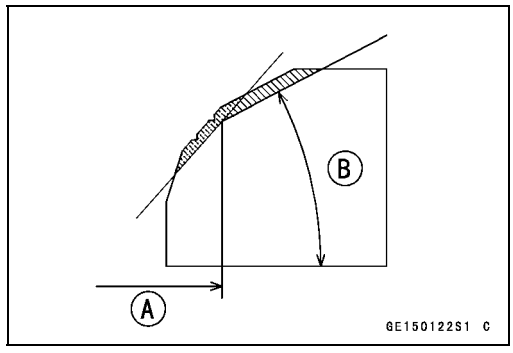
★If the outside diameter of the seating surface is too large, make the 32° grind described below.

★If the outside diameter [A] of the seating surface is within the specified range, measure the seat width as described below.

● Grind the seat at a 32° angle [B] until the seat O.D. is within the specified range.

○To make the 32° grind, fit a 32° cutter to the holder, and slide it into the valve guide.

○Turn the holder one turn at a time while pressing down very lightly. Check the seat after each turn.



CAUTION

The 32° cutter removes material very quickly. Check the seat outside diameter frequently to prevent overgrinding.

○After making the 32° grind, return to the seat O.D. measurement step above.

● To measure the seat width, use a vernier caliper to measure the width of the 45° angle portion of the seat at several places around the seat.

★If the seat width is too narrow, repeat the 45° grind until the seat is slightly too wide, and then return to the seat O.D. measurement step above.

★If the seat width is too wide, make the 60° [A] grind described below.

★If the seat width is within the specified range, lap the valve to the seat as described below.

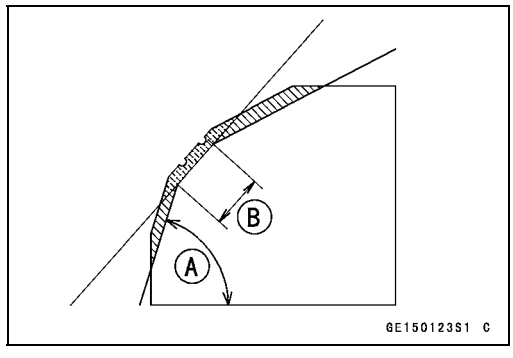
● Grind the seat at a 60° angle until the seat width is within the specified range.

○To make the 60° grind, fit a 60° cutter to the holder, and slide it into the valve guide.

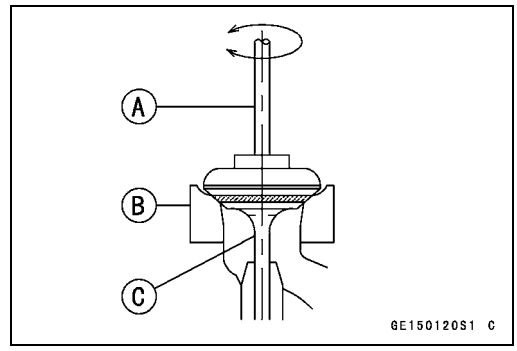
○Turn the holder, while pressing down lightly.

○After making the 60° grind, return to the seat width measurement step above.

Correct Width [B]



Valves



- Lap the valve to the seat, once the seat width and O.D. are within the ranges specified above.

○Put a little coarse grinding compound on the face of the valve in a number of places around the valve head.

○Spin the valve against the seat until the grinding compound produces a smooth, matched surface on both the seat and the valve.

○Repeat the process with a fine grinding compound.

[A] Lapper
[B] Valve Seat
[C] Valve

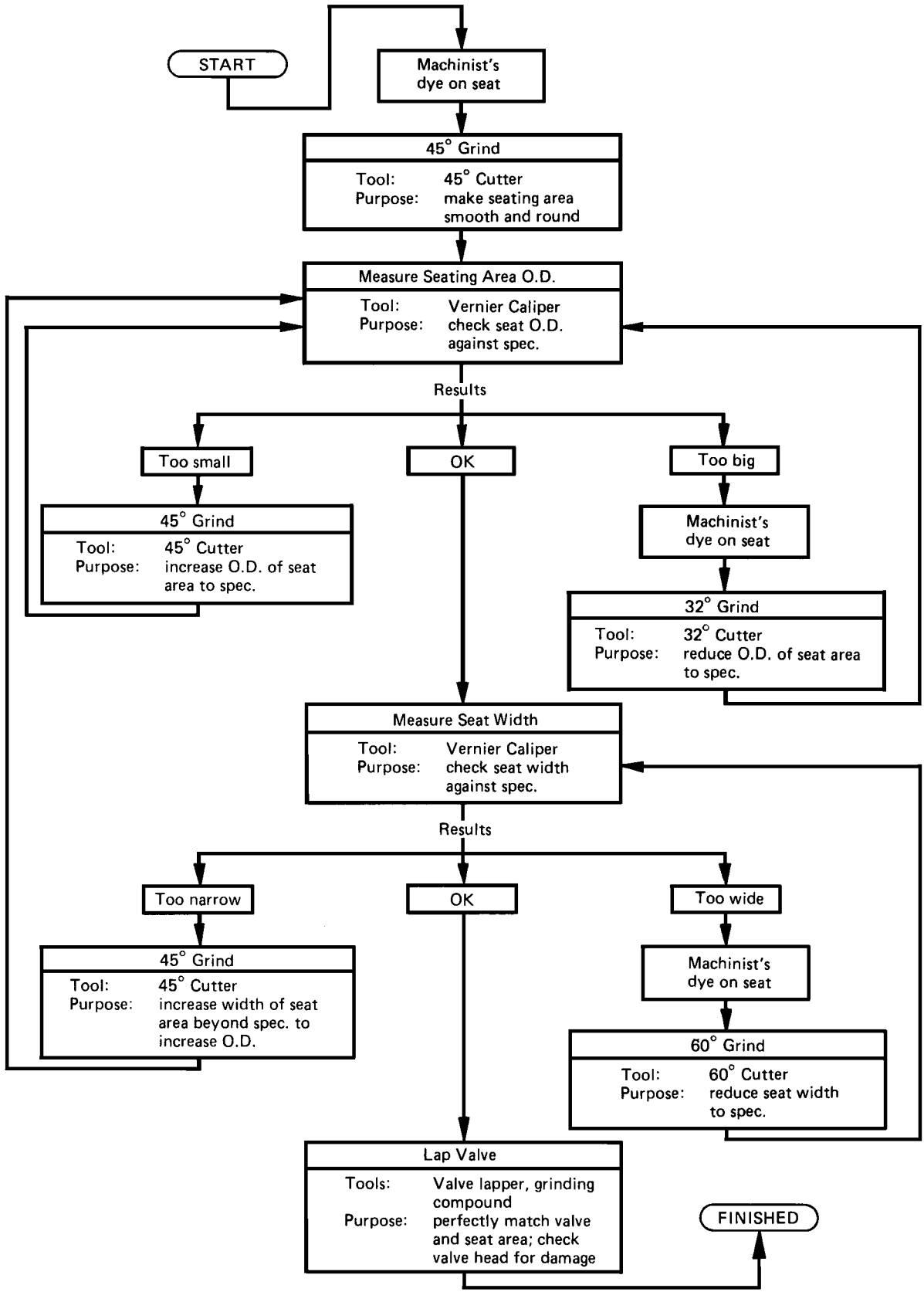
- The seating area should be marked about in the middle of the valve face.

★If the seat area is not in the right place on the valve, check to be sure the valve is the correct part. If it is, it may have been refaced too much; replace it.

- Be sure to remove all grinding compound before assembly.
- When the engine is assembled, be sure to adjust the valve clearance (see Valve Clearance Adjustment).

Valves

Valve Seat Repair

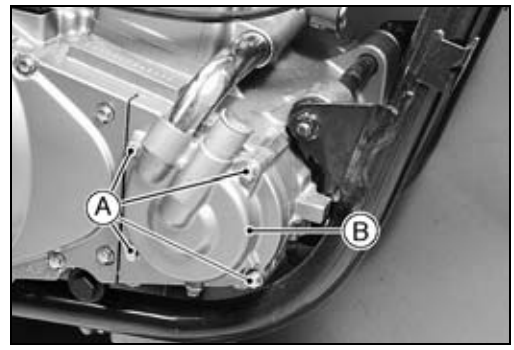


GE150308 S

Cylinder, Piston

Cylinder Removal

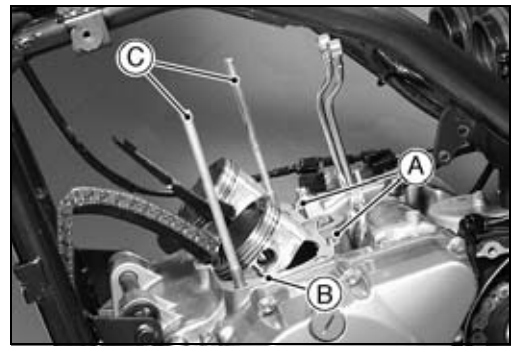
- Remove the cylinder head (see Cylinder Head Removal).
- Remove the main oil pipe mounting bolt.
- Remove the bolts [A] and pull out the water pipe with water pump cover [B] (see Cooling System chapter).
- Take out the cylinder block so as not to damage the main oil pipe.



Cylinder Installation

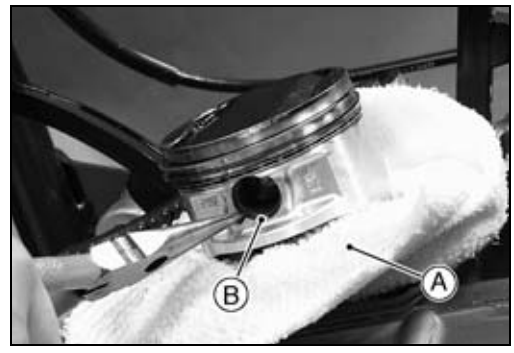
- Install:
  Dowel Pins [A]
  New Cylinder Base Gasket [B]
- Apply engine oil to the cylinder bore.
- Prepare two auxiliary head bolts with their heads cut.
- Install the two bolts [C] diagonally in the crankcase.
- Position the crankshaft so that all the piston heads are almost level.
- Install the cylinder block.

○Insert the piston rings with your thumbs.



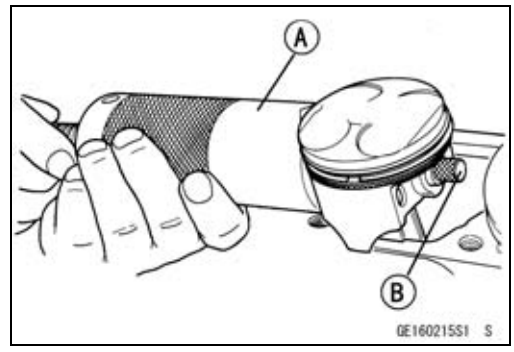
Piston Removal

- Remove the cylinder (see Cylinder Removal).
- Wrap a clean cloth [A] around the base of each piston to secure it in position for removal and so that no parts and dirt will fall into the crankcase.
- Remove the piston pin snap rings [B] from the outside of each piston.



- Remove the piston by pushing its piston pin puller out the side from which the snap ring was removed. Use a piston pin puller, if the pin is tight.

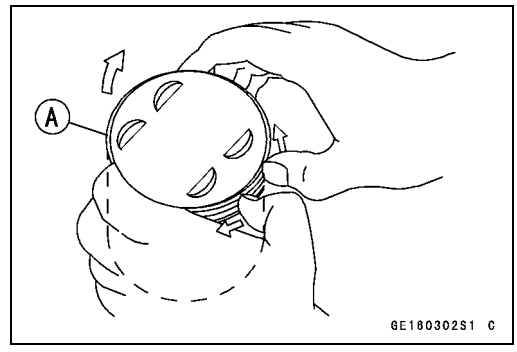
Special Tool - Piston Pin Puller Assembly: 570001-910 [A]



- Remove the top and second rings with piston ring pliers.

Special Tool - Piston Ring Pliers: 57001-115

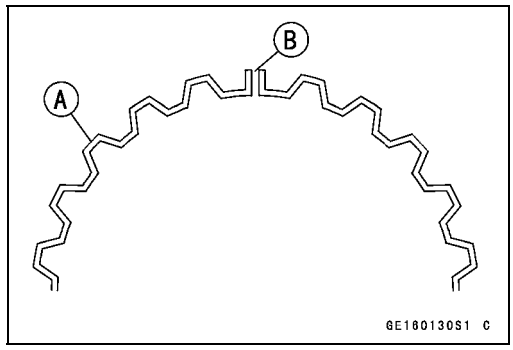
- If the special tool is not available, carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring [A] to remove it.
- Remove the 3-piece oil ring with your thumbs in the same manner.



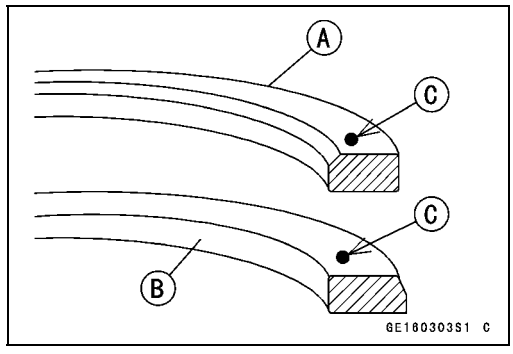
Cylinder, Piston

Piston Installation

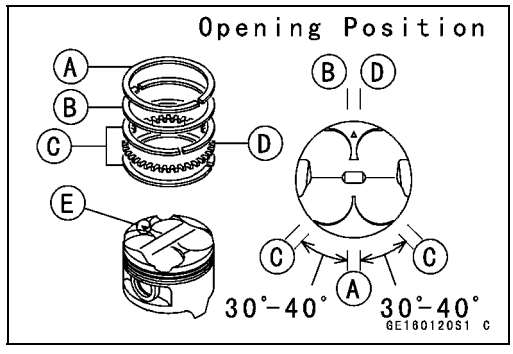
- Install the oil ring expander [A] in the piston oil ring groove so that the expander ends [B] butt together, never overlap.
- Install the upper and lower steel rails. There is no UP or Down to the rails. They can be installed either way.



- Do not mix up the top ring and second ring.
- Install the top ring [A] and the second ring [B] so that the "N" mark [C] faces up.



- Position each piston ring so that the openings 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.
  [A] Top Ring
  [B] Second Ring
  [C] Oil Ring Steel Rails
  [D] Oil Ring Expander
  [E] Arrow (ER500-C1 ~ C4)
  Circle (ER500-C5)

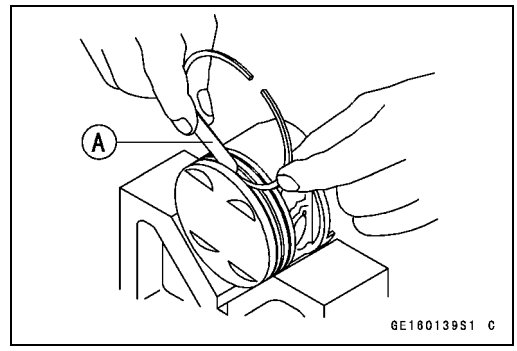


- The arrow on the top of the piston must point toward the front of the engine (ER500-C1 ~ C4).
- Install the piston so that the circle mark on the top of the piston come to front side of the engine (ER500-C5).
- When installing a piston pin snap ring, compress it only enough to install it and no more.

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

Cylinder, Piston

Piston Ring, Piston Ring Groove Wear



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

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

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

Piston Ring/Groove Clearance

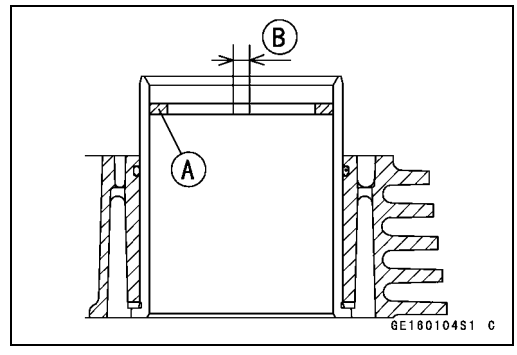
Standard:

Top	**0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.)**
Second	**0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)**

Service Limit:

Top	**0.17 mm (0.0067 in.)**
Second	**0.16 mm (0.0063 in.)**

Piston Ring End Gap



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

Piston Ring End Gap

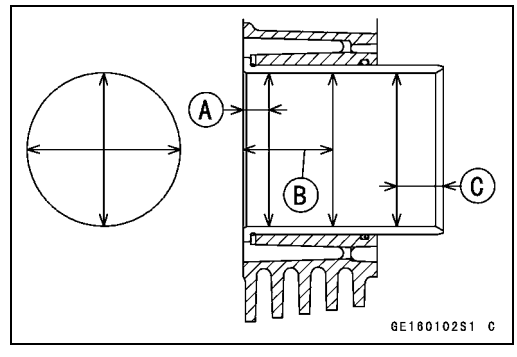
Standard:

Top	**0.20 ~ 0.35 mm (0.0079 ~ 0.0138 in.)**
Second	**0.20 ~ 0.35 mm (0.0079 ~ 0.0138 in.)**
Oil	**0.2 ~ 0.7 mm (0.008 ~ 0.028 in.)**

Service Limit:

Top	**0.7 mm (0.0276 in.)**
Second	**0.7 mm (0.0276 in.)**
Oil	**1.0 mm (0.0394 in.)**

Cylinder Inside Diameter



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

★If any of the cylinder inside diameter measurements exceeds the service limit, the cylinder will have to be bored to oversize and then honed.

[A] 10 mm
[B] 60 mm
[C] 20 mm

Piston Diameter

Standard:	**74.000 ~ 74.012 mm (2.9134 ~ 2.9139 in.)**
Service Limit:	**74.11 mm (2.9177 in.)**

Cylinder, Piston

Piston Diameter

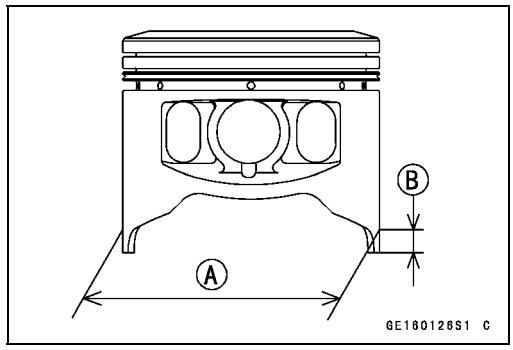
- Measure the outside diameter [A] of each piston 5 mm [B] up from the bottom of the piston at a right angle to the direction of the piston pin.

★If the measurement is under the service limit, replace the piston.

Piston Diameter

Standard: 73.942 ~ 73.957 mm (2.9111 ~ 2.9117 in.)

Service Limit: 73.79 mm (2.9051 in.)



Boring, Honing

When boring and honing a cylinder, note the following:

○There is one oversize piston available. Oversize pistons require oversize rings. Oversize pistons and rings available are **0.5 mm** larger than standard.

○Before boring a cylinder, first measure the exact diameter of the oversize piston, and then, according to the standard clearance in the Service Data Section, determine the rebore diameter. However, if the amount of boring necessary would make the inside diameter greater than **0.5 mm** oversize, the cylinder block must be replaced.

○Cylinder inside diameter must not vary more than **0.01 mm** at any point.

○Be wary of measurements taken immediately after boring since the heat affects cylinder diameter.

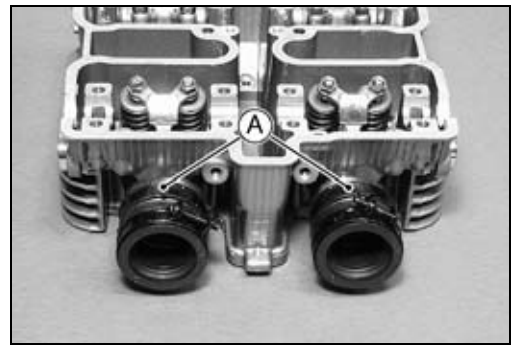
○In the case of a rebored cylinder and oversize piston, the service limit for the cylinder is the diameter that the cylinder was bored to plus **0.1 mm** and the service limit for the piston is the oversize piston original diameter minus **0.15 mm.** If the exact figure for the rebored diameter is unknown, it can be roughly determined by measuring the diameter at the base of the cylinder.

○Never separate the liner from the cylinder, because the top surface of cylinder and liner is machined at the factory as an assembly.

Carburetor Holder

Carburetor Holder Installation

- Install the carburetor holders. The projection [A] faces upwards.

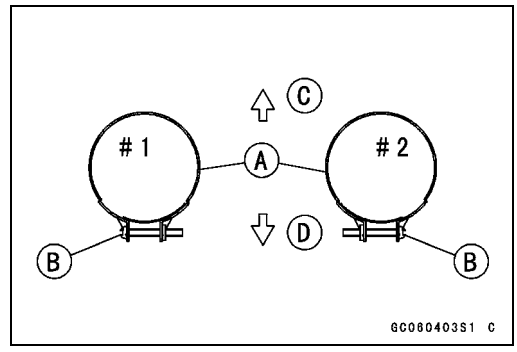


- Install the holder clamps [A] as shown being careful of the screw position and the screw head [B] direction.

⚠ WARNING

Install the clamp screws horizontally. Otherwise the screws could come in contact with the vacuum adjusting screws, resulting in an unsafe riding condition.

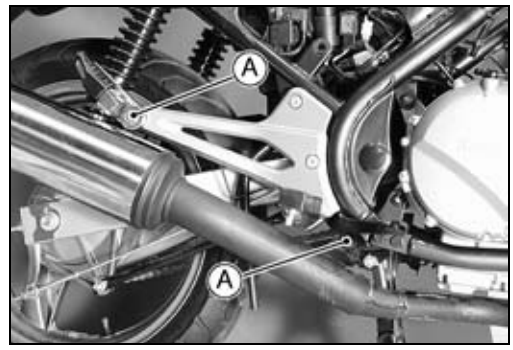
[C] Top
[D] Bottom



Muffler

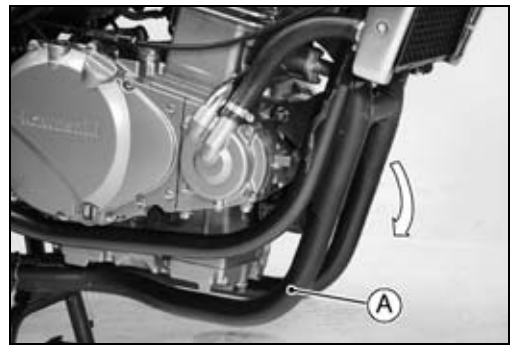
Muffler Removal

- Unscrew the muffler mounting bolt and nut [A].



- Remove the exhaust pipe holder nuts [A].

- Take off the muffler [A].



Muffler Installation

- Replace the exhaust pipe holder gaskets with new ones.
- First, all the bolts and nuts to a snag fit.
- Secondary, tighten the exhaust pipe holder nuts evenly to avoid exhaust leaks.
- Finally, tighten the rest of the mounting bolt and nut securely.
- Thoroughly warm up the engine, wait until the engine cools down, and retighten all the bolts and nuts.

Clutch

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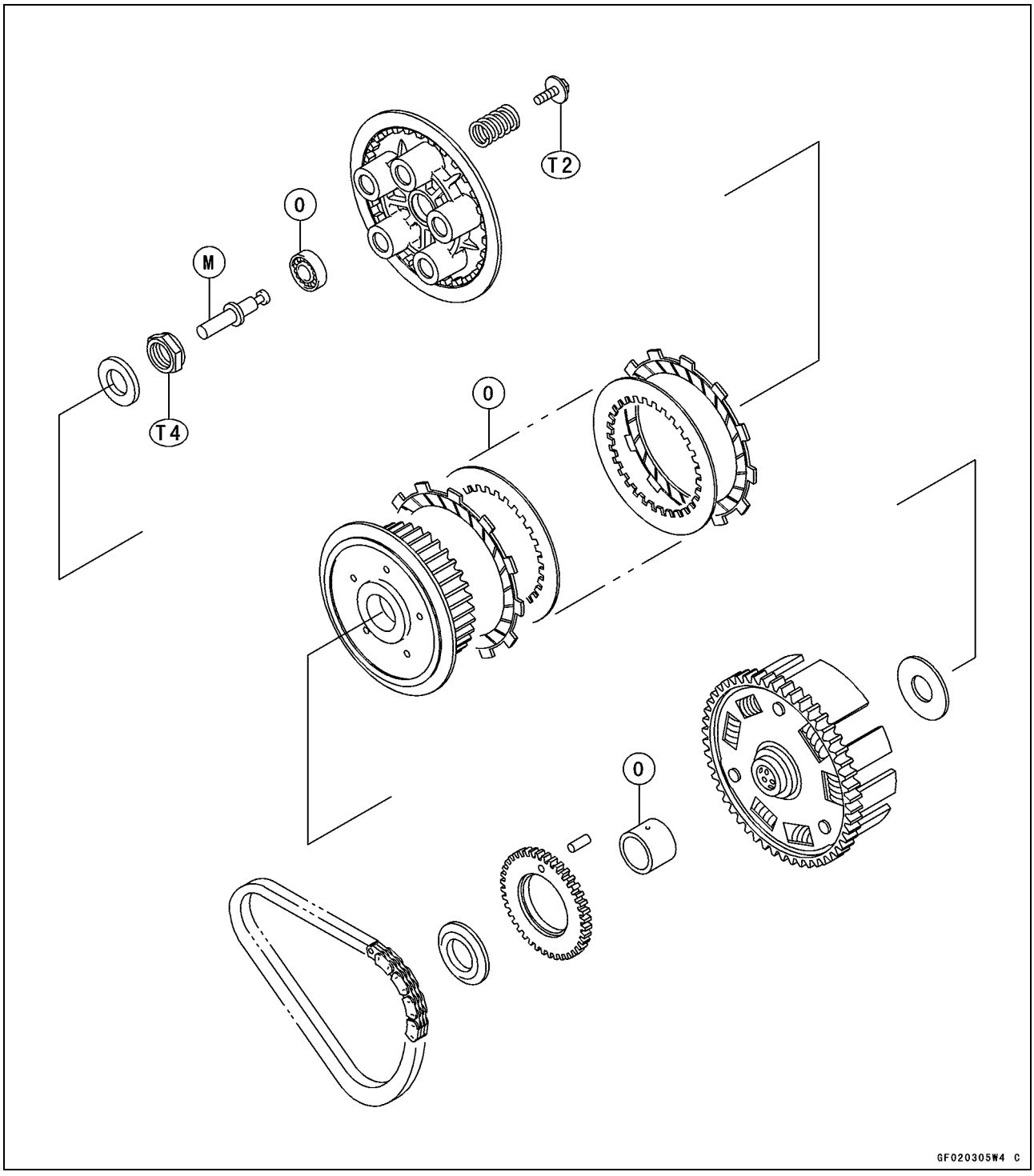
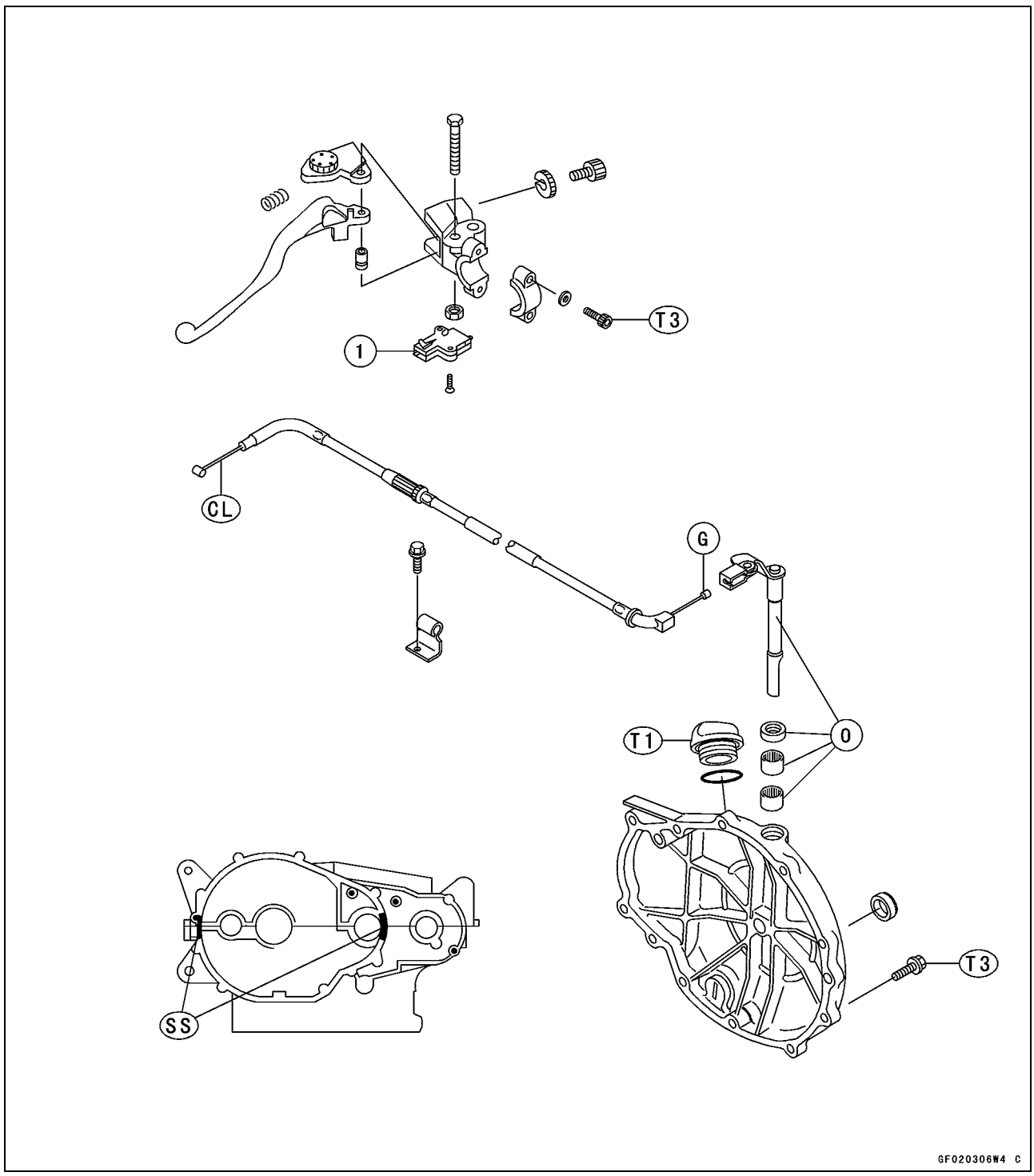
Exploded View



1. Starter Lockout Switch
CL: Apply cable lubricant.
G: Apply high temperature grease.
M: Apply molybdenum disulfide grease.
O: Apply engine oil.
SS: Apply silicone sealant.

Exploded View



T1: 1.5 N·m (0.15 kgf·m, 13 in·lb)
T2: 9.3 N·m (0.95 kgf·m, 82 in·lb)
T3: 11 N·m (1.1 kgf·m, 95 in·lb)
T4: 132 N·m (13.5 kgf·m, 98 ft·lb)

5-4 CLUTCH

Specifications

Item	Standard	Service Limit
Clutch Lever Position	Non-adjustable	– – –
Clutch Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	– – –
Clutch		
Friction Plate Thickness	2.9 ~ 3.1 mm (0.114 ~ 0.122 in.)	2.75 mm (0.1082 in.)
Friction and Steel Plate Warp	0.2 mm (0.008 in.) or less	0.3 mm (0.012 in.)
Clutch Spring Free Length	34.2 mm (1.346 in.)	33.1 mm (1.303 in.)

Special Tool - Clutch Holder: 57001-1243

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

Clutch Lever and Cable

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

⚠ WARNING

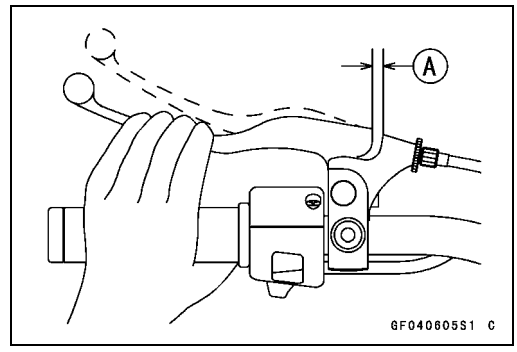
To avoid a serious burn, never touch the engine or exhaust pipe during clutch adjustment.

Clutch Adjustment

Clutch Lever Free Play Inspection

- Pull the clutch lever just enough to take up the free play [A].
- Measure the gap between the lever and the lever holder.

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

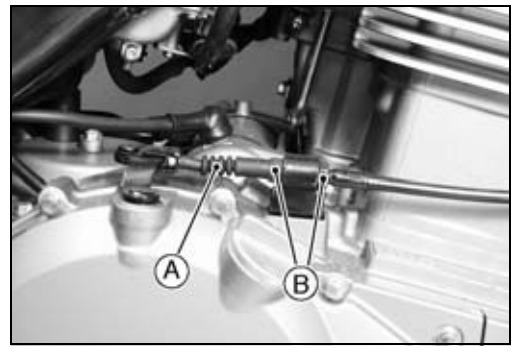


Clutch Lever Free Play

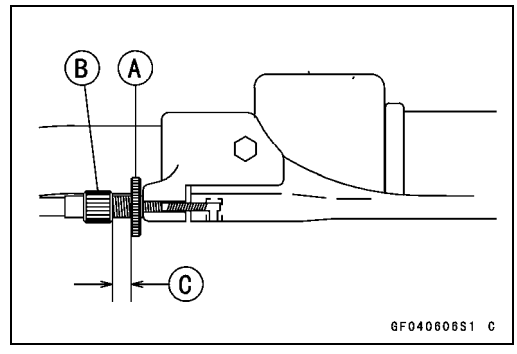
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)

Clutch Lever Free Play Adjustment

- Slide back the dust cover [A].
- Loosen both adjuster nuts [B] at the right hand crankcase as far as they will go.



- Loosen the knurled locknut [A] at the clutch lever.
- Turn the adjuster [B] so that 5 ~ 6 mm (0.20 ~ 0.24 in.) [C] of threads are visible.



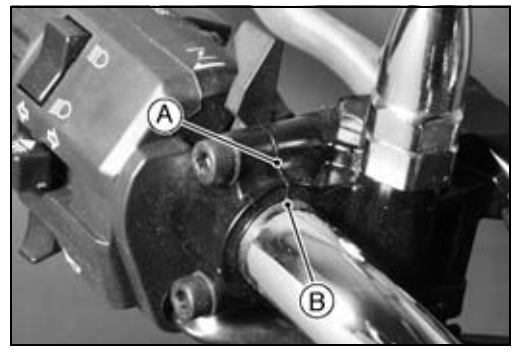
⚠ WARNING

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

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

Clutch Lever Installation

- Install the clutch lever so that the mating surface [A] of the lever holder is aligned with the punch mark [B] on the handlebar.

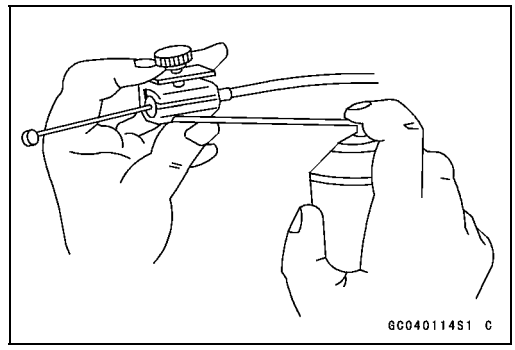


Clutch Lever and Cable

Cable Lubrication

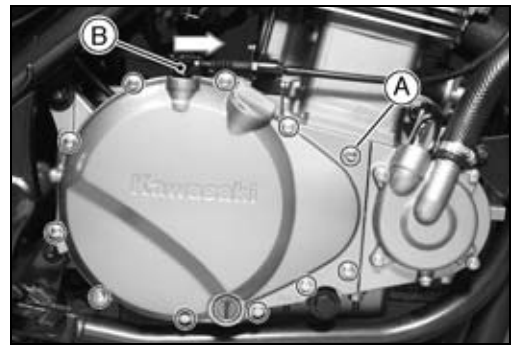
Whenever the clutch cable is removed, lubricate the clutch cable as follows.

- Apply a thin coating of grease to the cable upper and lower ends.
- Lubricate the cable with a penetrating rust inhibitor.



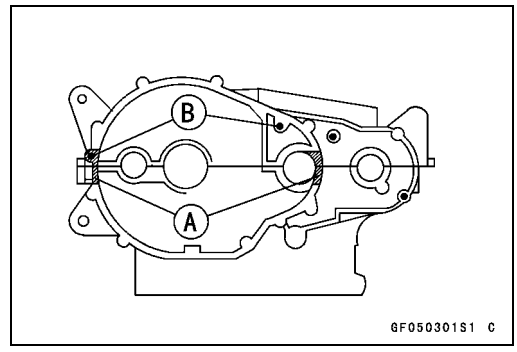
Right Engine Cover

Clutch Cover Removal



- Drain the engine oil (see Engine Lubrication System chapter).
- Remove:
  Clutch Cable
  Right Footpeg Assembly
  Clutch Cover Bolts [A]
- Turn the release lever [B] toward the front as shown, and remove the clutch cover.

Clutch Cover Installation



- Apply silicone sealant to the area [A] where the mating surface of the crankcase touches the clutch cover gasket.

  Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

- Install the knock pins [B], and replace the cover gasket with a new one.
- Tighten the cover bolts.

  Torque - Clutch Cover Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

Clutch Release Removal

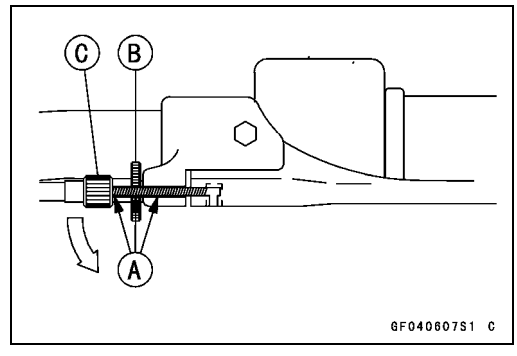
NOTE

○*Do not pull out the clutch release shaft for clutch cover removal.*

CAUTION

Clutch release shaft removal damages the oil seal in the clutch cover necessitating the oil seal replacement.

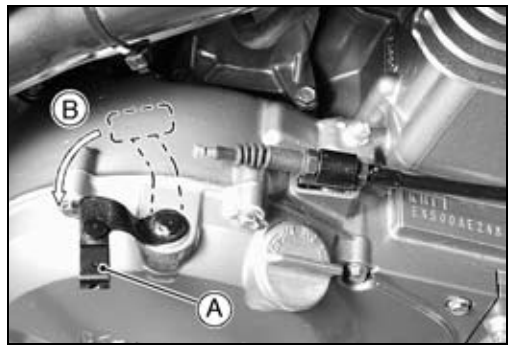
- Slide the dust cover at the clutch cable lower end out of place.
- Loosen the nuts, and slide the lower end of the clutch cable to give the cable plenty of play.



- Loosen the knurled locknut [B] at the clutch lever, and screw in the adjuster [C].
- Line up the slots [A] in the clutch lever, knurled locknut, and adjuster, and then free the cable from the lever.

Right Engine Cover

- Free the clutch inner cable tip from the clutch release lever [A].
- Turn the release lever toward the rear [B] as shown in the figure.
- Pull the lever and shaft assembly out of the clutch cover.



Clutch Release Installation

CAUTION

Always install a new oil seal when the clutch release shaft is removed.

- Apply high temperature grease to the oil seal lips in the clutch cover.
- Apply oil to the bearings in the hole of the clutch cover.
- Apply oil to the release shaft.
- Turning the release lever toward the rear, insert the release shaft straight into the hole of the clutch cover.

CAUTION

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

- Install the clutch inner cable tip in the release lever.
- Turn the release lever clockwise until it becomes hard to turn.

○The release lever should have proper clearance and angle as shown.

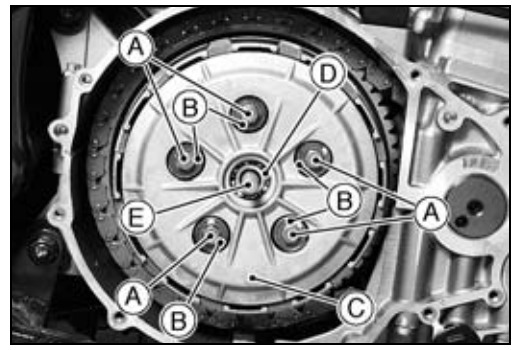
[A] 1 ~ 3 mm

[B] 80° ~ 90°

Clutch

Clutch Removal

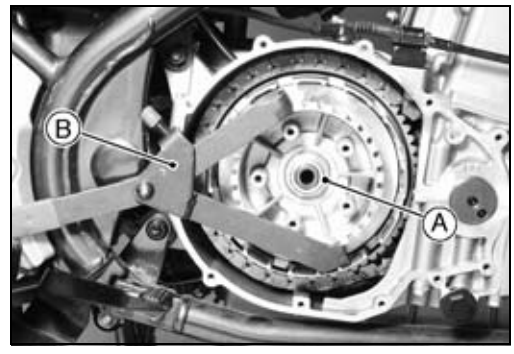
- Drain the engine oil (see Engine Lubrication System chapter).
- Remove the clutch cover (see Clutch Cover Removal).
- Remove the clutch spring bolts [A], washers [B] and springs.
- Remove the clutch spring plate [C] with the thrust ball bearing [D] and pusher [E].
- Remove the friction plates and steel plates.



- When loosening the clutch hub self-locking nut [A], use the clutch holder [B] to keep the clutch hub from turning as shown.

  Special Tool - Clutch Holder: 57001-1243

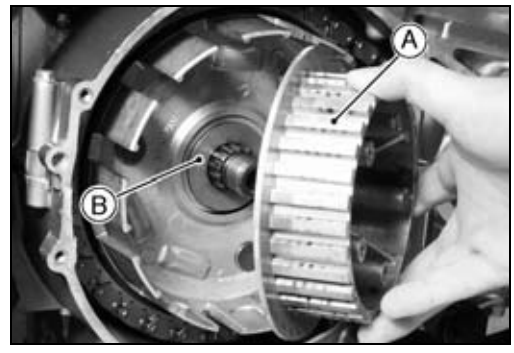
- Remove the clutch hub self-locking nut and washer.



- Pull out the clutch hub [A] and thrust washer [B].

NOTE

○*The clutch housing can not be removed without major disassembly work (see Crankshaft/Transmission chapter).*



Clutch Installation

- Install the thrust washer and clutch hub.
- Install the washer.
- Discard the used clutch hub self-locking nut, and install a new self-locking nut with the projected side facing outward.
- Install the clutch holder to keep the clutch hub from turning and tighten the clutch hub self-locking nut.

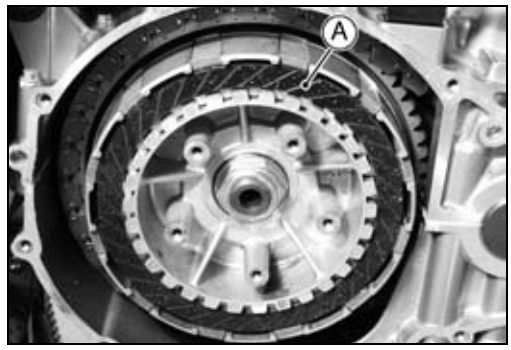
  Special Tool - Clutch Holder: 57001-1243

  Torque - Clutch Hub Nut: 132 N·m (13.5 kgf·m, 98 ft·lb)

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

Clutch

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



CAUTION

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

- Apply engine oil to the thrust ball bearing.
- Apply molybdenum disulfide grease to the rubbing portion of clutch spring plate pusher.
- Tighten the clutch spring bolts.

Torque - Clutch Spring Bolts: 9.3 N·m (0.95 kgf·m, 82 in·lb)

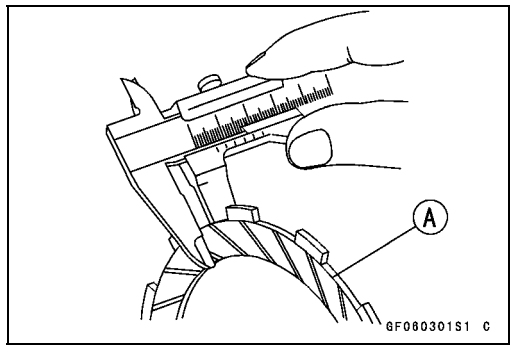
Clutch Plate Wear, Damage Inspection

- Visually inspect the friction and steel plates for signs of seizure, overheating (discoloration), or uneven wear.

★If any plates show signs of damage, replace the friction plates and steel plates as a set.

- Measure the thickness of the friction plate [A] at several points.

★If any of the measurements is less than the service limit, replace the friction plate.



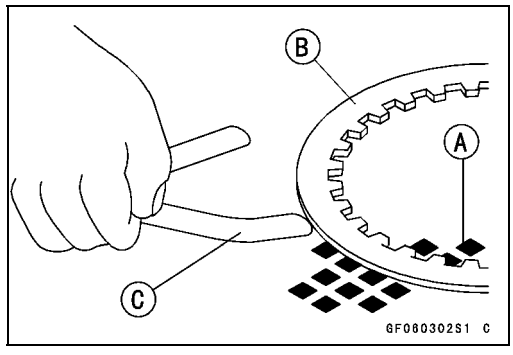
Friction Plate Thickness

Standard:	**2.9 ~ 3.1 mm (0.114 ~ 0.122 in.)**
Service Limit:	**2.75 mm (0.1082 in.)**

Clutch Plate Warp Inspection

- Place each friction plate or steel plate on a surface plate, and measure the gap between the surface plate [A] and each friction plate or steel plate [B] with a thickness gauge [C] The gap is the amount of friction or steel plate warp.

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



Friction and Steel Plate Warp

Standard:	**less than 0.2 mm (0.008 in.)**
Service Limit:	**0.3 mm (0.012 in.)**

Clutch

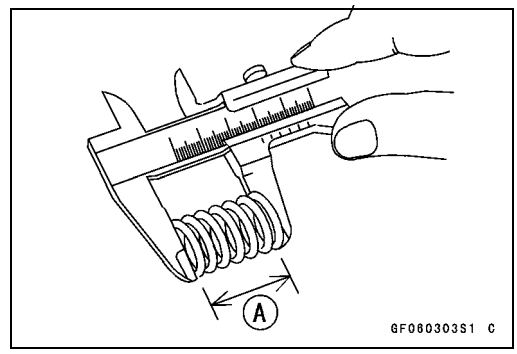
Clutch Spring Free Length Measurement

- Measure the free length of the clutch spring [A].

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

Clutch Spring Free Length

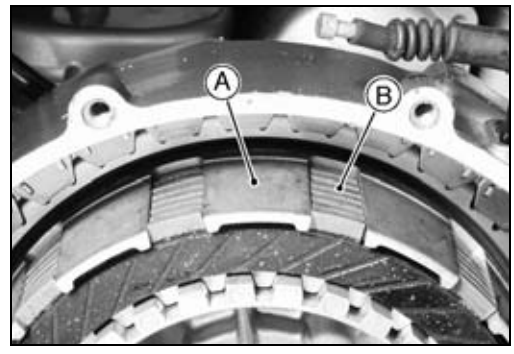
Standard:	**34.2 mm (1.346 in.)**
Service Limit:	**33.1 mm (1.303 in.)**



Clutch Housing Finger Inspection

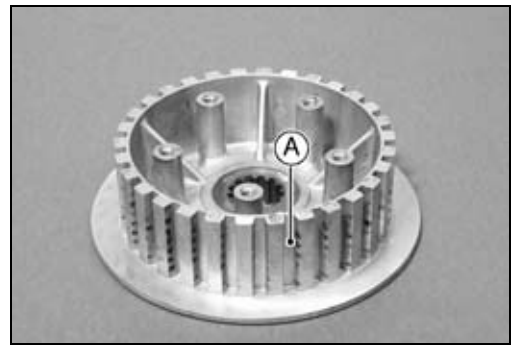
- Visually inspect the fingers [A] of the clutch housing where the tangs [B] of the friction plates hit them.

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



Clutch Hub Spline Inspection

- Visually inspect where the teeth on the steel plates wear against the splines [A] of the clutch hub
- If there are notches worn into the splines, replace the clutch hub. Also, replace the steel plates if their teeth are damaged.



Engine Lubrication System

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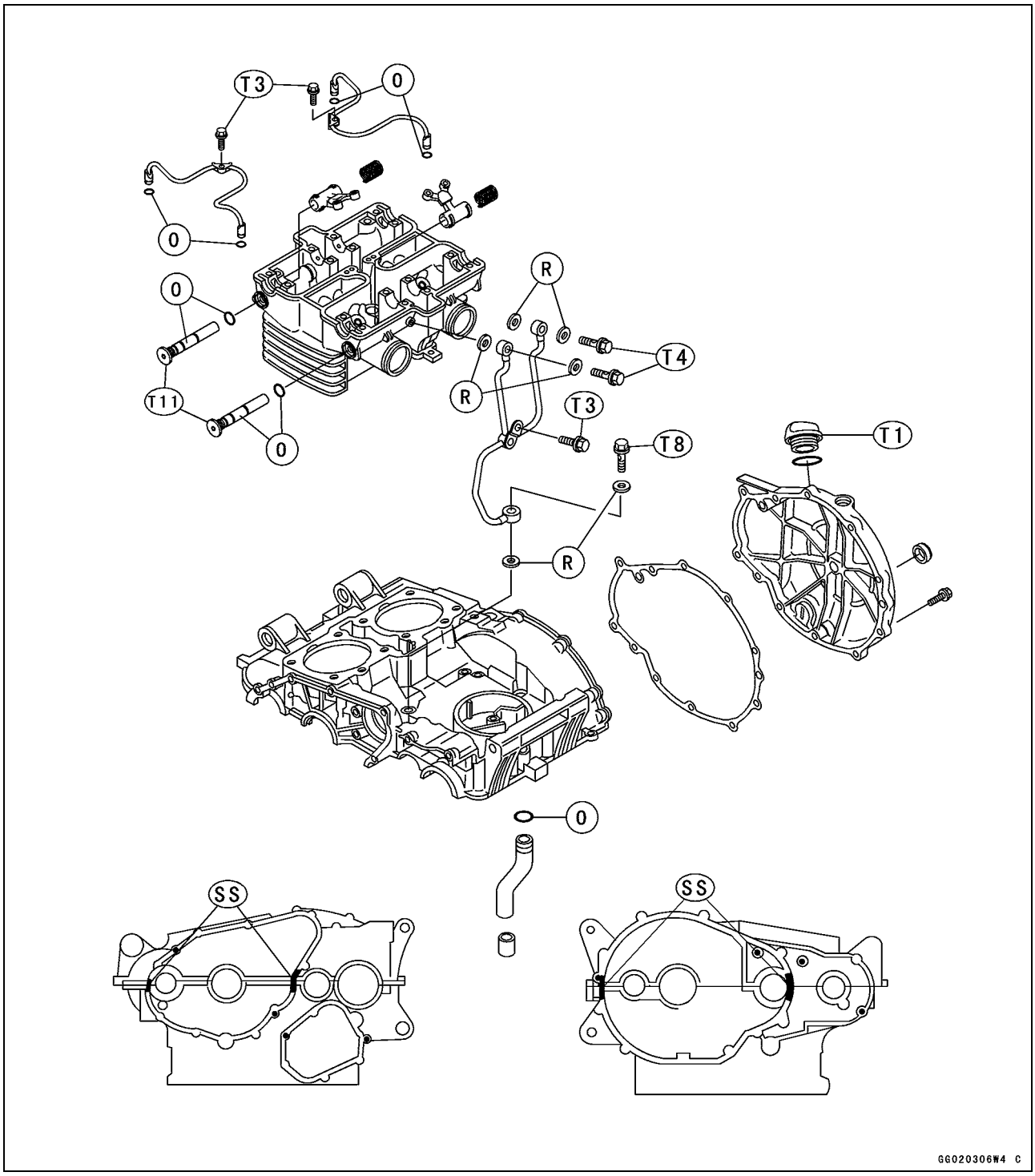
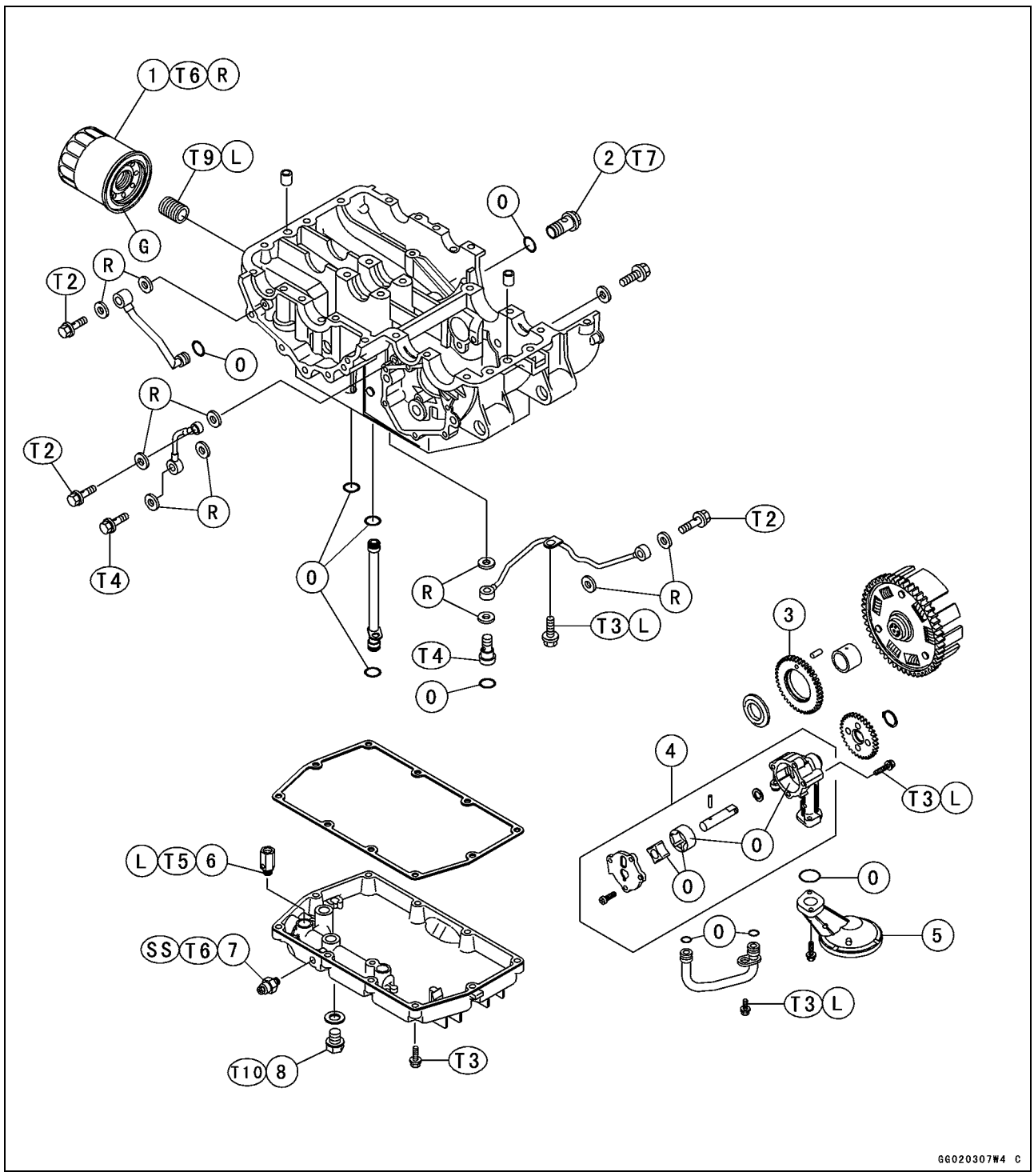
6-2 ENGINE LUBRICATION SYSTEM

Exploded View



1. Oil Filter
2. Main Oil Passage Plug
3. Oil Pump Drive Gear
4. Oil Pump
5. Oil Screen
6. Oil Pressure Relief Valve
7. Oil Pressure Switch
8. Engine Oil Drain Plug

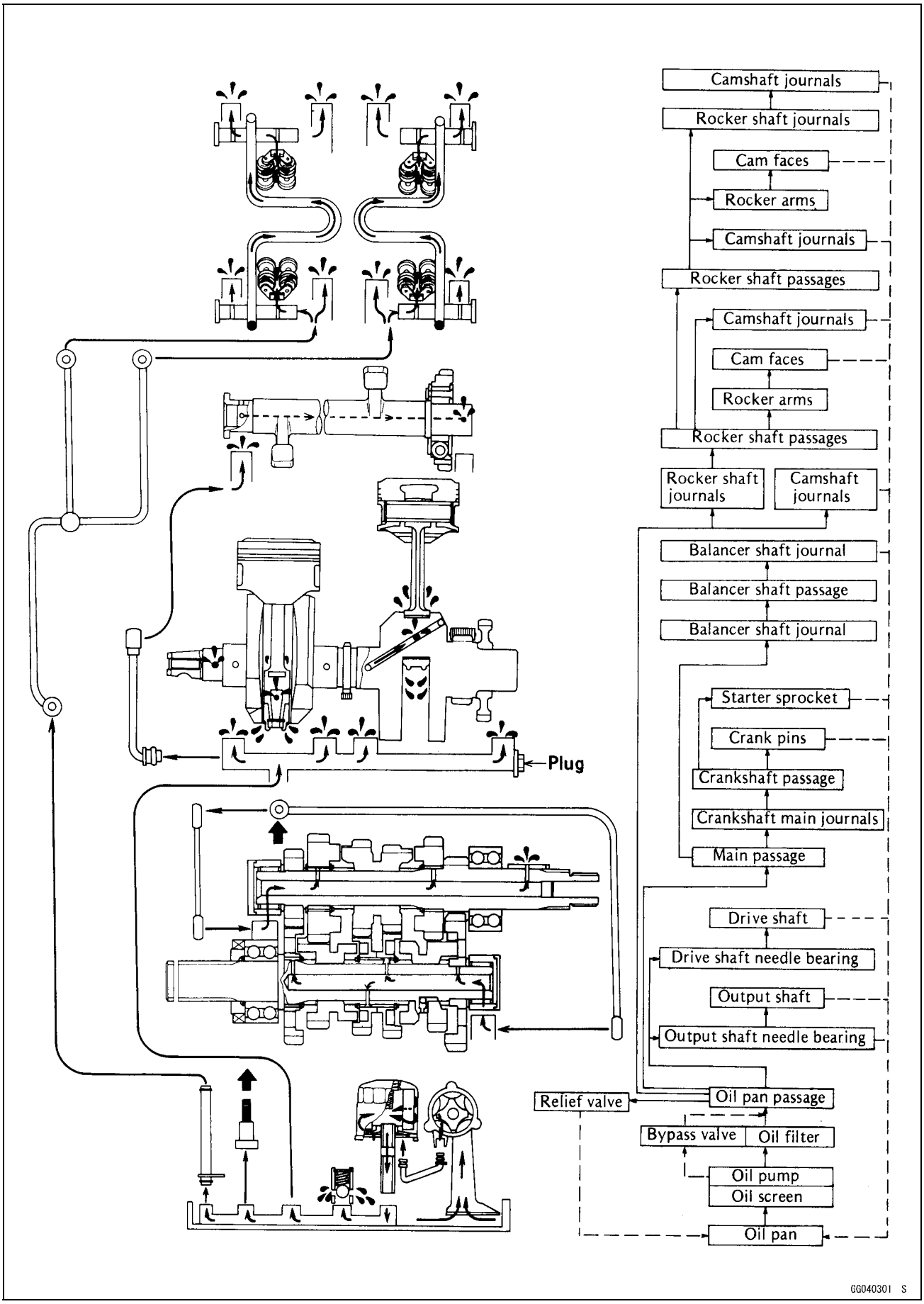
Exploded View



T1: 1.5 N·m (0.15 kgf·m, 13 in·lb)
T2: 7.8 N·m (0.80 kgf·m, 69 in·lb)
T3: 11 N·m (1.1 kgf·m, 95 in·lb)
T4: 12 N·m (1.2 kgf·m, 8.5 ft·lb)
T5: 15 N·m (1.5 kgf·m, 11.0 ft·lb)
T6: 17 N·m (1.75 kgf·m, 12.5 ft·lb)
T7: 18 N·m (1.8 kgf·m, 13 ft·lb)
T8: 20 N·m (2.0 kgf·m, 14.5 ft·lb)
T9: 25 N·m (2.5 kgf·m, 18.0 ft·lb)
T10: 29 N·m (3.0 kgf·m, 22 ft·lb)
T11: 39 N·m (4.0 kgf·m, 29 ft·lb)

G: Apply high temperature grease.
L: Apply a non-permanent locking agent.
O: Apply engine oil.
R: Replacement Parts.
SS: Apply silicone sealant.

Engine Oil Flow Chart



Specifications

Item	Standard
Engine Oil	
Grade	API SE, SF, SG or API SH or SJ JASO MA
Viscosity	SAE 10W-40
Capacity	2.8 L (when filter is not removed) 3.0 L (when filter is removed) 3.4 L (when engine is completely dry)
Level	Between upper and lower level lines
Oil Pressure Measurement	
Oil pressure @4 000 r/min (rpm), oil temperature 90°C (194°F)	275 ~ 335 kPa (2.8 ~ 3.4 kgf/cm², 40 ~ 48 psi)

Special Tools - Oil Pressure Gauge, 5 kgf/cm²: 57001-125
Oil Pressure Gauge Adapter, M14 × 1.5: 57001-1209
Oil Filter Wrench: 57001-1249

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

Engine Oil and Oil Filter

⚠ WARNING

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

Engine Oil Level Inspection

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

CAUTION

Racing the engine before the oil reaches every part can cause engine seizure.

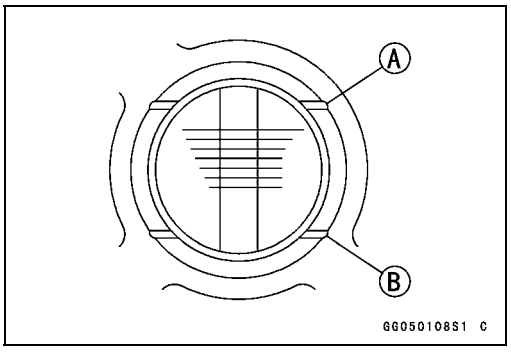
- If the motorcycle has just been used, wait several minutes for all the oil to drain down.

- Situate the motorcycle so that it is perpendicular to the ground, and check the engine oil level through the oil level gauge.

★The oil level should come up between the upper [A] and lower level lines [B].

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

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



NOTE

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

CAUTION

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

Engine Oil Change

- Warm up the engine so that the oil will pick up any sediment and drain easily. Then stop the engine.
- Support the motorcycle perpendicular to the ground, and place an oil pan beneath the engine.
- Remove the engine drain plug [A], and let the oil drain completely.
- If the oil filter is to be changed, replace it with a new one.
- Check the gasket at the drain plug for damage.

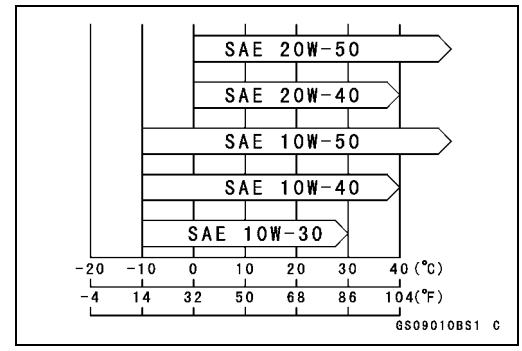
★Replace the gasket with a new one if it is damaged.

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

Torque - Engine Drain Plug: 29 N·m (3.0 kgf·m, 22 ft·lb)

Engine Oil and Oil Filter

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



Engine Oil

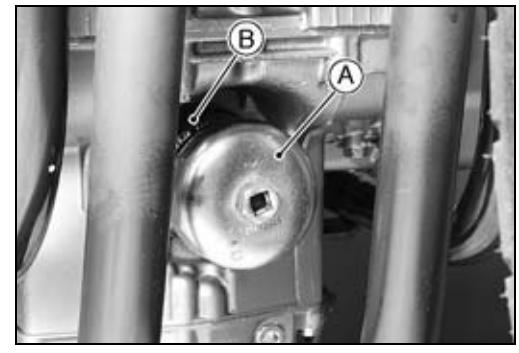
Grade:	**API SE, SF, SG or**
	API SH or SJ with JASO MA
Viscosity:	**SAE 10W40**
Capacity:	**2.8 L (When filter is not removed)**
	3.0 L (When filter is removed)
	3.4 L (When engine is completely dry)

NOTE

○*Although 10W-40 engine oil is the recommended oil for most conditions, the oil viscosity may need to be changed to accommodate atmospheric conditions in your riding area.*

Oil Filter Replacement

- Support the motorcycle perpendicular to the ground.
- Drain the engine oil (see Engine Oil Change).
- Using an oil filter wrench [A] on the oil filter [B], unscrew it.



Special Tool - Oil Filter Wrench: 57001-1249

- Replace the oil filter with a new one.
- Apply engine oil to the gasket before screwing on.
- Tighten the oil filter with an oil filter wrench or tighten it with hands about 3/4 turns after gasket touches the mounting surface of the engine.

Torque - Oil Filter: 17 N·m (1.75 kgf·m, 12.5 ft·lb)

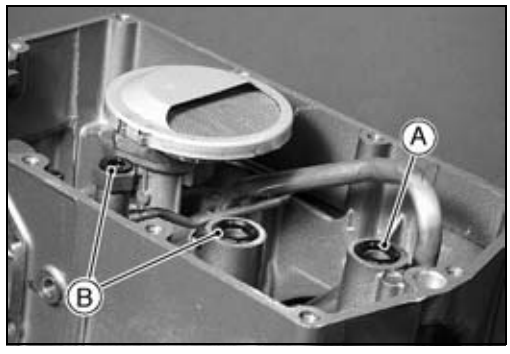
- Pour in the specified type and amount of oil (see Engine Oil Change).
- Thoroughly warm up the engine and check for oil leakage.

Oil Pan and Relief Valve

Oil Pan Removal

- Drain the engine oil (see Engine Oil Change).
- Disconnect the oil pressure switch lead.
- Remove the oil pan mounting bolts [A] and the oil pan from the crankcase.

Oil Pan Installation



- Check that the O-rings for the outlet side [A] and inlet side [B] are in good condition.

★If they are damaged, replace them with new ones.

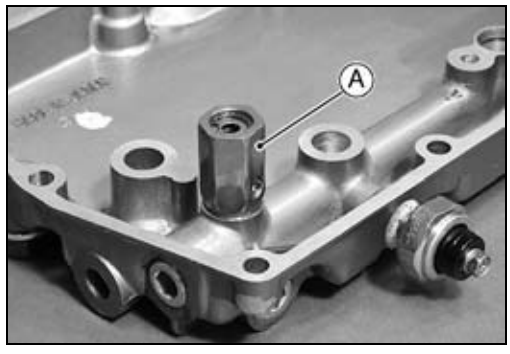
○The O-rings between the oil pan and the lower case oil passage must be installed so that flat side faces the lower case oil passage.

- Apply a small amount of oil to the O-rings.
- Install the oil pan and tighten its mounting bolts.

Torque - Oil Pan Mounting Bolts: 11 N·m (1.1 kgf·m, 95 ft·lb)

- Connect the oil pressure switch lead.
- Fill the engine with the specified oil.

Relief Valve Removal



- Remove the oil pan (see Oil Pan Removal).
- Remove the relief valve [A] from the oil passage on the oil pan.

Relief Valve Installation

- Apply a non-permanent locking agent to the threads of the relief valve, and tighten it.

Torque - Relief Valve: 15 N·m (1.5 kgf·m, 11 ft·lb)

CAUTION
Do not over apply a non-permanent locking agent to the threads. This may block the oil passage.

- Install the oil pan.

Oil Pan and Relief Valve

Relief Valve Inspection

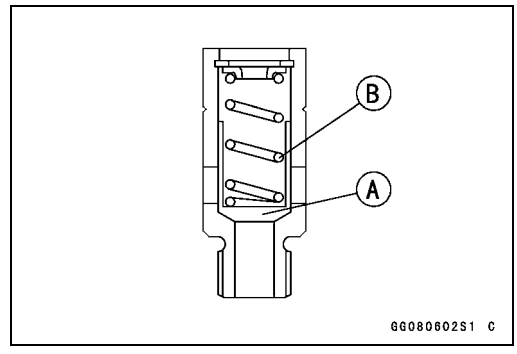
- Remove the relief valve.
- Check to see if the steel ball inside the valve slides smoothly when pushing it in with a wooden or other soft rod, and see if it comes back to its seat by valve spring pressure.

NOTE

○*Inspect the valve in its assembled state. Disassembly and assembly may change the valve performance.*

- If any rough spots are found during above inspection, wash the valve clean in a high flash-point solvent and blow out any foreign particles that may be in the valve with compressed air.

[A] Valve
[B] Spring



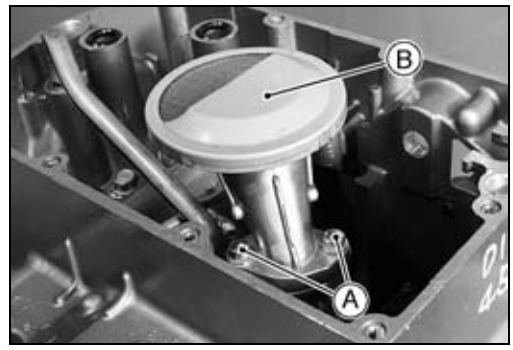
⚠ WARNING

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

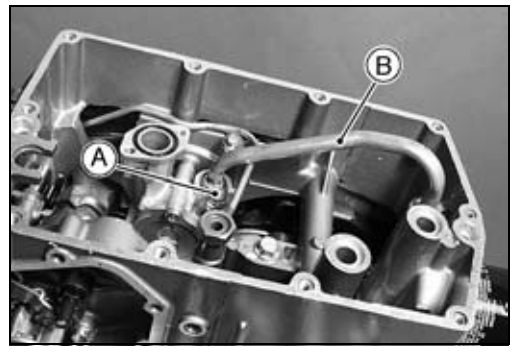
★If cleaning does not solve the problem, replace the relief valve as an assembly. The relief valve is precision made with no allowance for replacement of individual parts.

Oil Pump

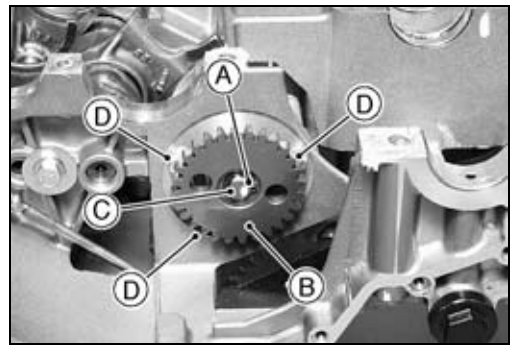
Oil Pump Removal



- Drain the coolant (see Cooling System chapter).
- Drain the engine oil (see Engine Oil Change).
- Remove the engine (see Engine Removal/Installation chapter).
- Remove:
  Water Pump (see Cooling System chapter)
  Clutch Cover (see Clutch chapter)
  Alternator Cover with Gear Change Link and Pedal (see Electrical System chapter)
  Chain Guide (see Crankshaft/Transmission chapter)
  Starter Motor (see Electrical System chapter)
  Upper Case Mounting Bolts
- Turn the engine upside down and remove the following:
  Oil Pan (see Oil Pan Removal)
  Oil Screen Bolts [A]
  Oil Screen [B]

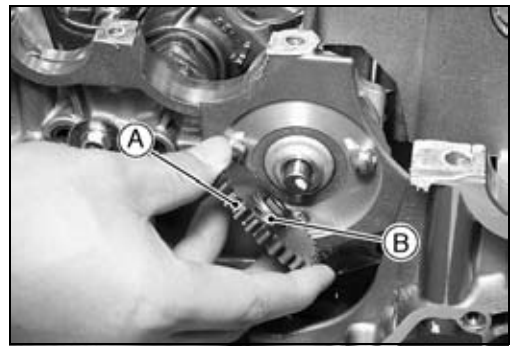


  Oil Pump Outer Oil Pipe Bolt [A]
  Oil Pump Outer Oil Pipe [B]
  Lower Case Mounting Bolts
  Lower Case



- Remove the circlip [A] that holds the oil pump gear [B] on the oil pump shaft [C].
- Remove the oil pump gear.
- Take off the oil pump mounting screws [D].
- Remove the oil pump from the lower case.

Oil Pump Installation



- Fill the pump with engine oil turning the pump shaft before installation.
- Apply a non-permanent locking agent to the threads of the oil pump mounting bolts and tighten them.

  Torque - Oil Pump Mounting Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

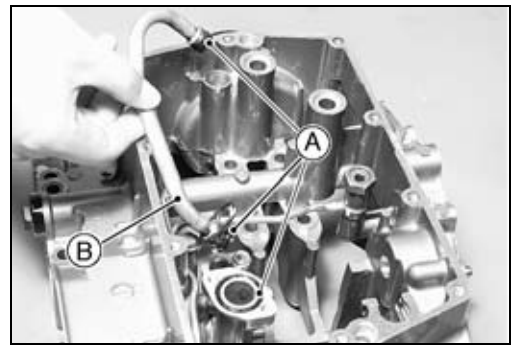
- Install the oil pump gear [A] so that the projection [B] side faces inward.
- Install a new circlip.

Oil Pump

- Be sure to install the oil pump and outer oil pipe O-rings [A], and apply engine oil to them.
- Install the oil pump outer oil pipe [B] and oil screen.

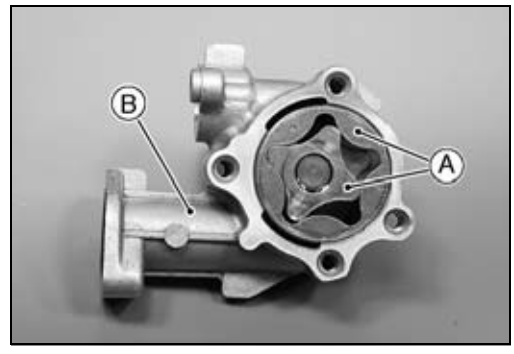
○Apply a non-permanent locking agent to the oil pipe bolt and tighten it.

Torque - Oil Pump Outer Oil Pipe Bolt: 11 N·m (1.1 kgf·m, 95 in·lb)

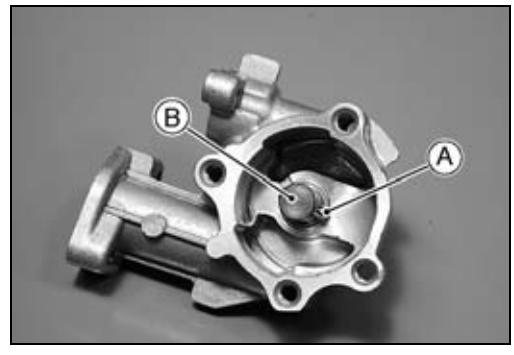


Oil Pump Disassembly

- Remove the oil pump from the lower case.
- Take off the oil pump cover screws.
- Remove the oil pump cover.
- Drop the rotors [A] out of the oil pump body [B].



- Pull the pin [A] out of the pump shaft.
- Pull the oil pump shaft [B] out of the body.
- Remove the washer.



Oil Pump Assembly

- Assembly of the oil pump is the reverse of disassembly.
- Before installing the oil pump, be sure the shaft and rotors turn freely.

Oil Screen Cleaning and Inspection

- Clean the oil pump screen with high flash-point solvent and remove any particles stuck to it.

⚠ WARNING

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

NOTE

○*While cleaning the screen, check for any metal particles that might indicate internal engine damage.*

- Check the screen carefully for any damage: holes and broken wires.

★If the screen is damaged, replace the oil screen assembly.

Oil Pressure Measurement

Oil Pressure Measurement

NOTE

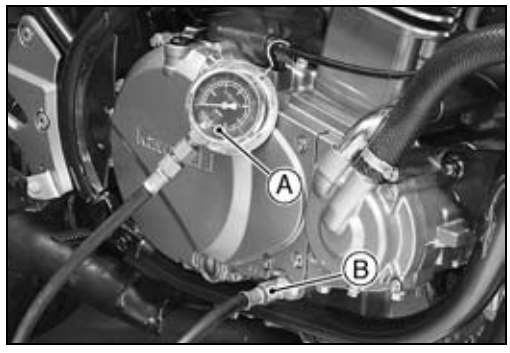
○*Measure the oil pressure after the engine is warmed up.*

● Remove:
Right Footpeg Assembly
Oil Passage Plug

⚠ WARNING

If the oil passage plug is removed while the engine is warm, hot engine oil will drain through the oil passage; take care against burns.

● Attach the oil pressure gauge [A] and adapter [B] to the oil passage hole.



Special Tools - Oil Pressure Gauge, 5 kgf/cm²: 57001-125
Oil Pressure Gauge Adapter, M14 × 1.5: 57001-1209

● Run the engine at the specified speed, and read the oil pressure gauge.
★If the oil pressure is significantly below the specification, inspect the oil pump and relief valve.
★If the oil pump and relief valve are not at fault, inspect the rest of the lubrication system.

Oil Pressure
275 ~ 335 kPa (2.8 ~ 3.4 kgf/cm², 40 ~ 48 psi) @4 000 r/min (rpm), 90°C (194°F) of oil temp.

● Stop the engine.
● Remove the oil pressure gauge and adapter.
● Install the oil passage plug and tighten it.

Torque - Oil Passage Plug: 18 N·m (1.8 kgf·m, 13 ft·lb)

● Install the right footpeg assembly.

NOTE

○*When binding the brake switch lead with the plastic clamp, make sure it does not touch the exhaust pipe.*

⚠ WARNING

To avoid a serious burn, never touch the hot exhaust pipe.

Engine Removal/Installation

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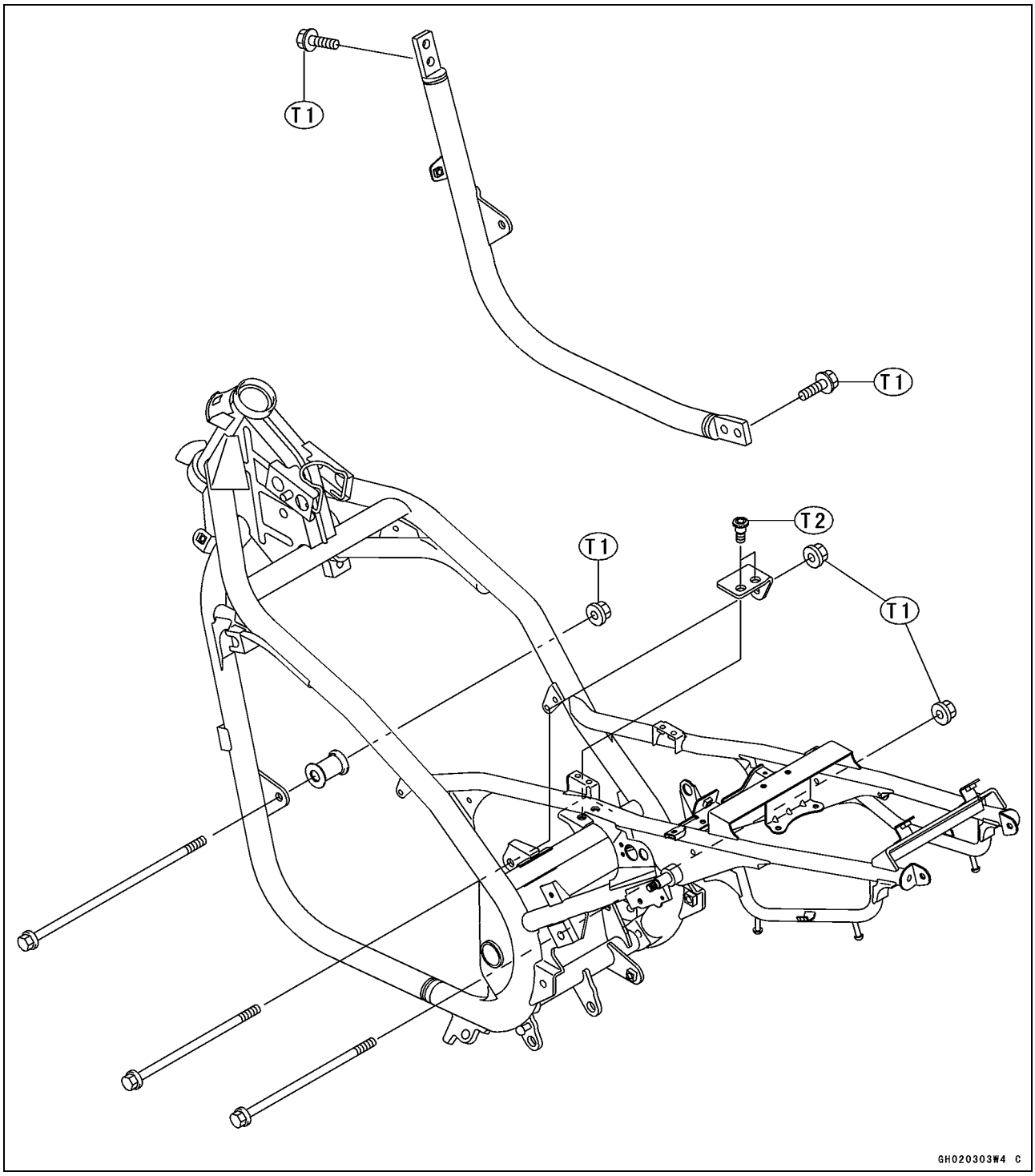
Exploded View



T1: 44 N·m (4.5 kgf·m, 33 ft·lb)
T2: 25 N·m (2.5 kgf·m, 18 ft·lb)

Engine Removal/Installation

Engine Removal

- Set the motorcycle up on its center stand.
- Squeeze the brake lever slowly and hold it with a band [A].

⚠ WARNING

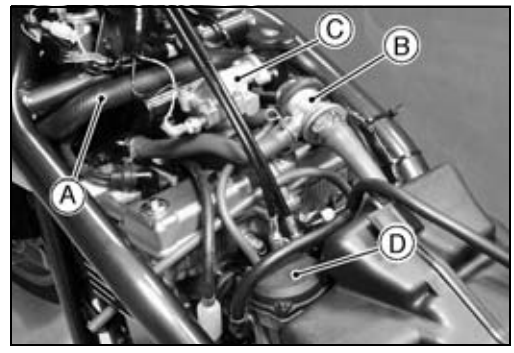
Be sure to hold the front brake when removing the engine, or the motorcycle may fall over. It could cause an accident and injury.

CAUTION

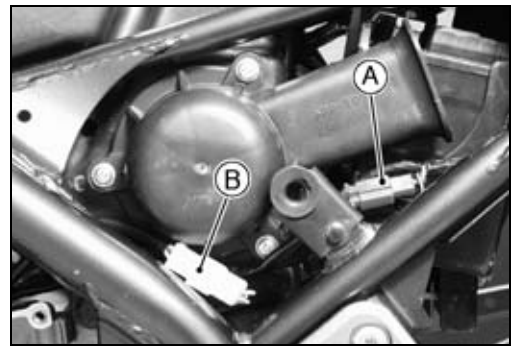
Be sure to hold the front brake when removing the engine, or the motorcycle may fall over. The engine or the motorcycle could be damaged.

- Drain:
  Coolant (see Cooling System chapter)
  Engine Oil (see Engine Lubrication System chapter)

- Remove:
  Seat (see Frame chapter)
  Side Covers (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
  Water Hoses [A] over the Cylinder Head Cover
  Radiator (see Cooling System chapter)
  Vacuum Switch Valve and Hoses [B] (see Engine Top End chapter)
  Thermostat Housing [C]
  Spark Plug Leads
  Muffler (see Engine Top End chapter)
  Carburetors [D] (see Fuel System chapter)
  Air Cleaner Housing (see Fuel System chapter)
  Engine Sprocket (see Final Drive chapter)
  Shift Pedal
  Clutch Cable (see Clutch chapter)

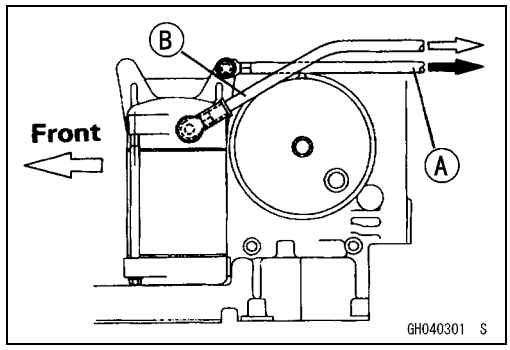


- Pull off the connectors from the engine and free the wiring from the straps.
  Pickup Coil Lead Connector [A]
  Alternator Lead Connector [B]

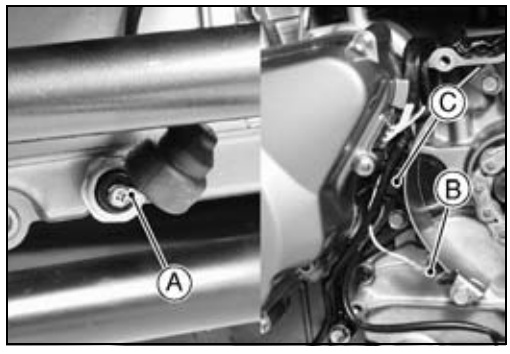


Engine Removal/Installation

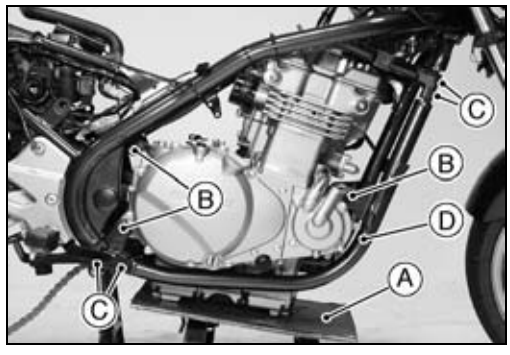
- Remove:
  Battery Negative Lead [A]
  Starter Motor Lead [B]



- Remove:
  Oil Pressure Switch Lead [A]
  Neutral Switch Lead [B]
  Sidestand Switch Lead Connector [C]



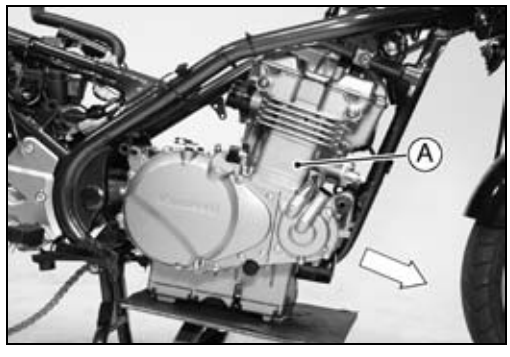
- Support the engine with a stand or jack [A].
- Remove the engine mounting bolts [B].
- Remove the downtube bolts [C] and take off the downtube [D].



NOTE

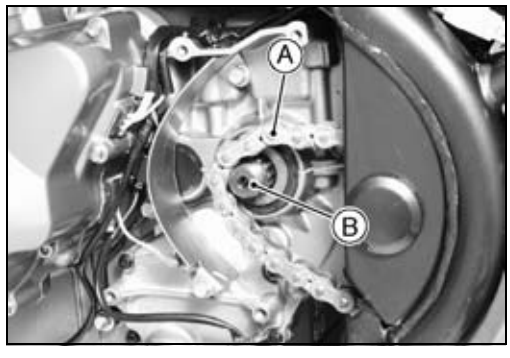
○*The drive chain will be removed from the output shaft when removing the engine.*

- Lift up the engine and move it right to free the output shaft from the drive chain.
- Remove the engine [A] from the vehicle right side.



Engine Installation

- Hang the drive chain [A] over the output shaft [B] just before moving the engine into its final position in the frame.



Engine Removal/Installation

- Insert the rear mounting bolts from the left side of the engine.
- Tighten the rear engine upper mounting bolt and nut first to eliminate the gap between the engine and frame bracket, and then the rear engine lower mounting bolt and nut.
- Tighten the engine mounting bracket bolts after tightening the rear engine upper mounting bolt and nut.

Torque - Engine Mounting Bolts and Nuts: 44 N·m (4.5 kgf·m, 33 ft·lb)
Engine Mounting Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Downtube Bolts: 44 N·m (4.5 kgf·m, 33 ft·lb)

- Install the engine sprocket (see Final Drive chapter).
- Run the leads, cables, and hoses correctly (see Cable, Wire, and Hose Routing section in the General Information chapter).
- Install the removed parts (see appropriate chapters).
- Adjust:
  Throttle Cables (see Fuel System chapter)
  Choke Cable (see Fuel System chapter)
  Clutch Cable (see Clutch chapter)
  Drive Chain (see Final Drive chapter)
- Fill the engine with engine oil (see Engine Lubrication System chapter).
- Fill the engine with coolant and bleed the air from the cooling system (see Cooling System chapter).
- Adjust the idling (see Fuel System chapter).

Crankshaft/Transmission

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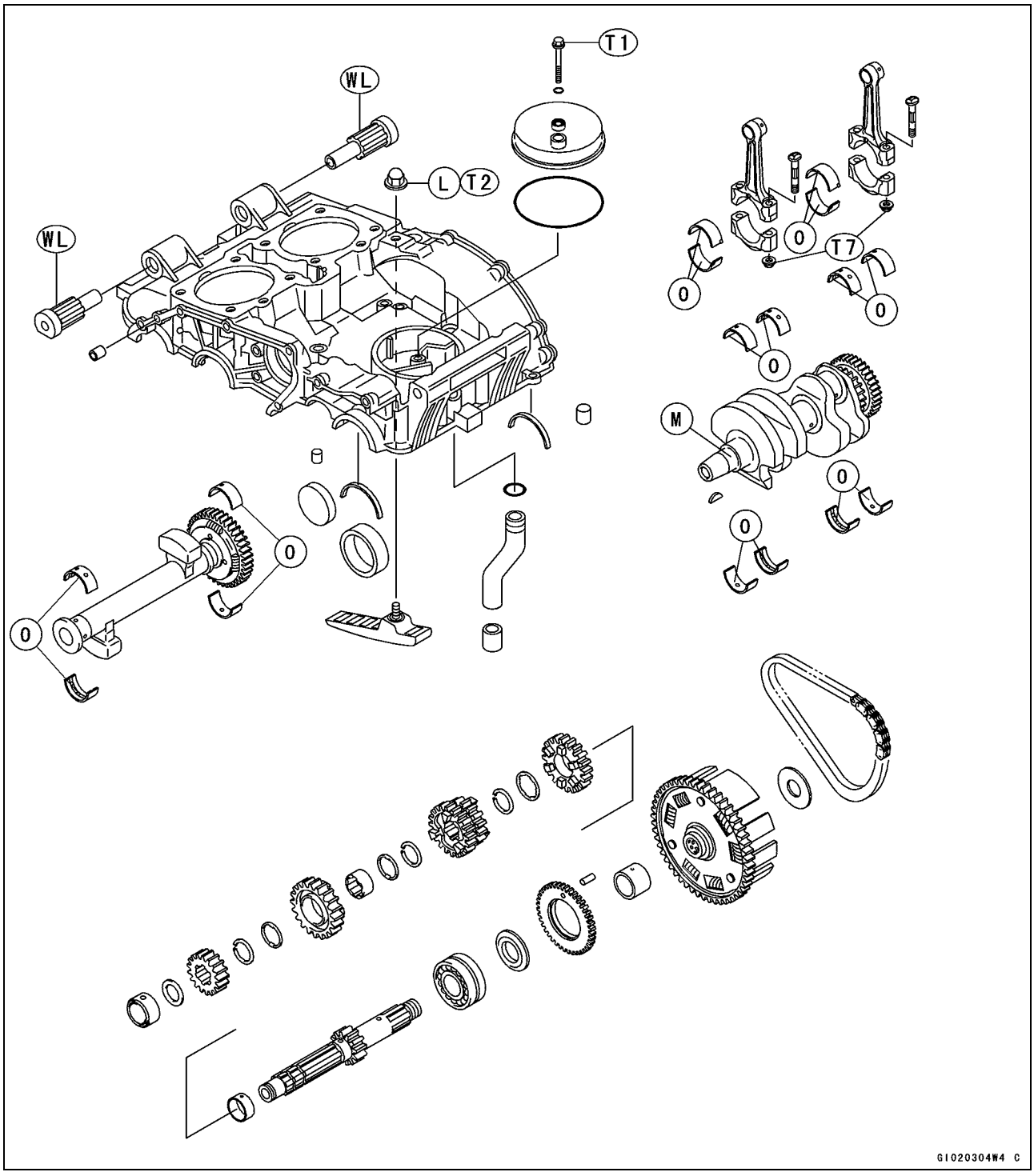
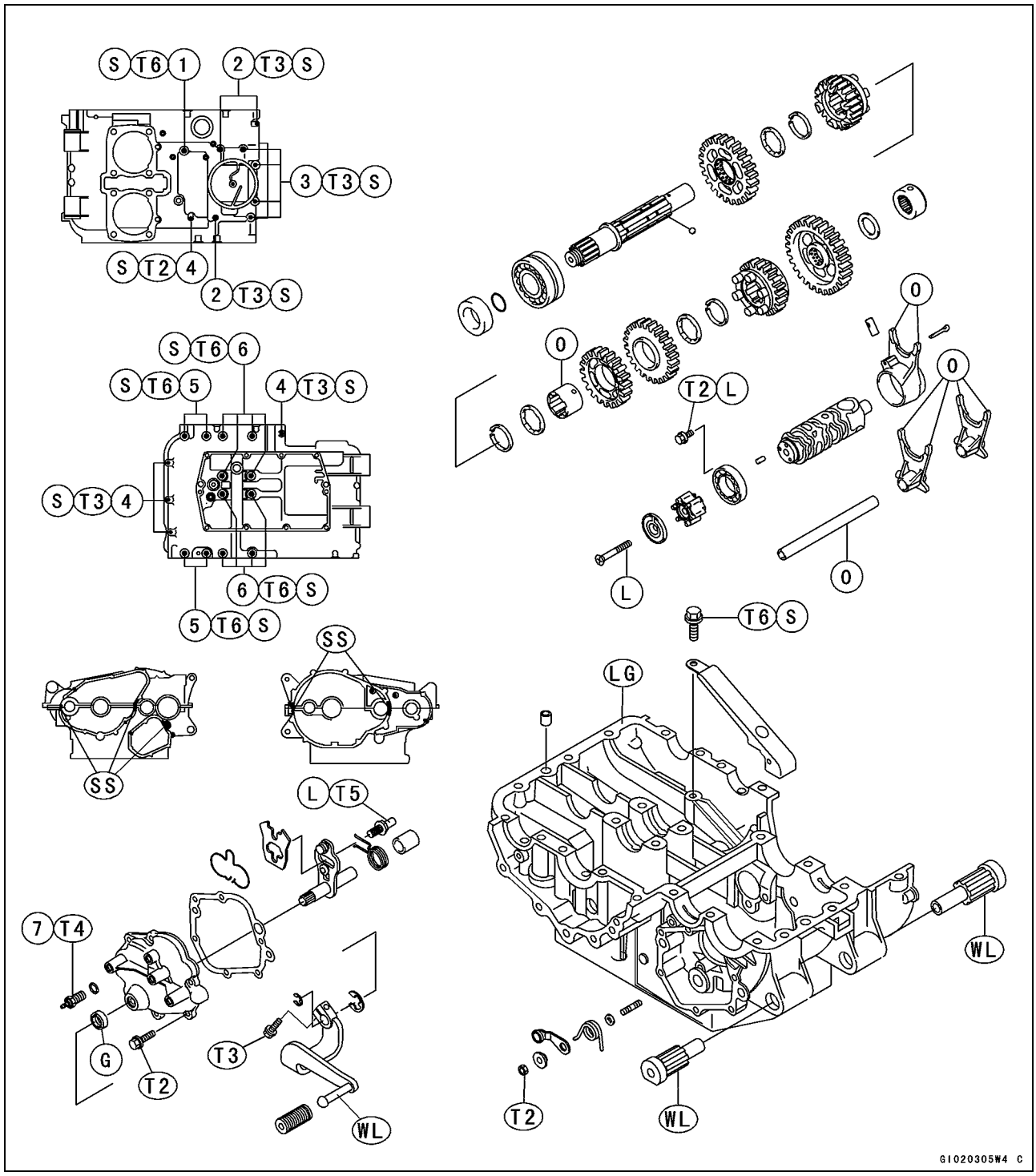
Exploded View



1. 8 mm Bolt (55 mm l.)
2. 6 mm Bolts (60 mm l.)
3. 6 mm Bolts (80 mm l.)
4. 6 mm Bolts (40 mm l.)
5. 8 mm Bolts (80 mm l.)
6. 8 mm Bolts (40 mm l.)
7. Neutral Switch

T1: 8.8 N·m (0.9 kgf·m, 78 in·lb)
T2: 11 N·m (1.1 kgf·m, 95 in·lb)
T3: 12 N·m (1.2 kgf·m, 8.5 ft·lb)
T4: 15 N·m (1.5 kgf·m, 11 ft·lb)
T5: 20 N·m (2.0 kgf·m, 14.5 ft·lb)
T6: 27 N·m (2.8 kgf·m, 20 ft·lb)
T7: 36 N·m (3.7 kgf·m, 27 ft·lb)

Exploded View



G: Apply high temperature grease.
L: Apply a non-permanent locking agent.
LG: Apply liquid gasket-black.
M: Apply a thin coat of molybdenum disulfide grease.
O: Apply engine oil.
S: Follow the specific tightening sequence.
SS: Apply silicone sealant.
WL: Apply soap water solution or rubber lubricant.

Specifications

Item		Standard	Service Limit
Crankshaft, Connecting Rods			
Connecting Rod Bend		– – –	0.2/100 mm (0.0079/4 in.)
Connecting Rod Twist		– – –	0.2/100 mm 0.0079/4 in.)
Connecting Rod Big End Side Clearance		0.13 ~ 0.38 mm (0.0051 ~ 0.0150 in.)	0.50 mm (0.02 in.)
Connecting Rod Big End Bearing Insert/crankpin Clearance		0.036 ~ 0.066 mm (0.0014 ~ 0.0026 in.)	0.10 mm (0.0039 in.)
Crankpin Diameter:		37.984 ~ 38.000 mm (1.4954 ~ 1.4961 in.)	37.97 mm (1.4949 in.)
Marking	None	37.984 ~ 37.994 mm (1.4954 ~ 1.4958 in.)	– – –
	○	37.995 ~ 38.000 mm (1.4959 ~ 1.4961 in.)	– – –
Connecting Rod Big End Bore Diameter:		41.000 ~ 41.016 mm (1.6142 ~ 1.6145 in.)	– – –
Marking	None	41.000 ~ 41.008 mm (1.6142 ~ 1.6145 in.)	– – –
	○	41.009 ~ 41.016 mm (1.6145 ~ 1.6148 in.)	– – –
Connecting Rod Big End Bearing Insert Thickness:			
	Brown	1.474 ~ 1.479 mm (0.0580 ~ 0.0582 in.)	– – –
	Black	1.479 ~ 1.484 mm (0.0582 ~ 0.0584 in.)	– – –
	Blue	1.484 ~ 1.489 mm (0.0584 ~ 0.0586 in.)	– – –

Connecting rod big end bearing insert selection:

Con-rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert	
		Size Color	Part Number
None	○	Brown	92028-1350
○	○	Black	92028-1349
None	None		
○	None	Blue	92028-1348

Crankshaft Runout		less than 0.02 mm (0.0008 in.) TIR	0.05 mm (0.0020 in.) TIR
Crankshaft Side Clearance		0.05 ~ 0.20 mm (0.0020 ~ 0.0079 in.)	0.40 mm (0.0157 in.)
Crankshaft Main Bearing Insert/journal Clearance		0.020 ~ 0.044 mm (0.0008 ~ 0.0017 in.)	0.08 mm (0.0032 in.)
Crankshaft Main Journal Diameter:		35.984 ~ 36.000 mm (1.4167 ~ 1.4173 in.)	35.96 mm (1.4157 in.)
Marking	None	35.984 ~ 35.992 mm (1.4167 ~ 1.4170 in.)	– – –
	1	35.993 ~ 36.000 mm (1.4170 ~ 1.4173 in.)	– – –
Crankshaft Main Bearing Bore Diameter:		39.000 ~ 39.016 mm (1.5354 ~ 1.5361 in.)	– – –
Marking	○	39.000 ~ 39.008 mm (1.5354 ~ 1.5357 in.)	– – –
	None	39.009 ~ 39.016 mm (1.5358 ~ 1.5361 in.)	– – –

Specifications

Item	Standard	Service Limit
Crankshaft Main Bearing Insert Thickness:		
Brown	1.490 ~ 1.494 mm (0.0587 ~ 0.0588 in.)	– – –
Black	1.494 ~ 1.498 mm (0.0588 ~ 0.0590 in.)	– – –
Blue	1.498 ~ 1.502 mm (0.0590 ~ 0.0591 in.)	– – –

Crankshaft main bearing insert selection:

Crankcase Main Bearing Bore Diameter Marking	Crankshaft Main Journal Diameter Marking	Bearing Insert*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	92028-1102	2, 3
			92028-1274	1, 4
○	None	Black	92028-1101	2, 3
None	1		92028-1273	1, 4
None	None	Blue	92028-1100	2, 3
			92028-1272	1, 4

Balancer Shaft			
Balancer Shaft Bearing Insert/journal Clearance		0.020 ~ 0.050 mm (0.0008 ~ 0.0020 in.)	0.09 mm (0.0035 in.)
Balancer Shaft Journal Diameter:		27.987 ~ 28.000 mm (1.1019 ~ 1.1024 in.)	27.96 mm (1.1008 in.)
Marking	None	27.987 ~ 27.993 mm (1.1019 ~ 1.1021 in.)	– – –
	○	27.994 ~ 28.000 mm (1.1021 ~ 1.1024 in.)	– – –
Crankcase Bearing Bore Diameter:		31.008 ~ 31.024 mm (1.2208 ~ 1.2214 in.)	– – –
Marking	○	31.008 ~ 31.016 mm (1.2208 ~ 1.2211 in.)	– – –
	None	31.017 ~ 31.024 mm (1.2211 ~ 1.2214 in.)	– – –
Balancer Shaft Bearing Insert Thickness:			
	Brown	1.495 ~ 1.499 mm (0.0589 ~ 0.0590 in.)	– – –
	Black	1.499 ~ 1.503 mm (0.0590 ~ 0.0592 in.)	– – –
	Blue	1.503 ~ 1.507 mm (0.0592 ~ 0.0593 in.)	– – –

Balancer Shaft Bearing Insert Selection:

Crankcase Bearing Bore Diameter Marking	Balancer Shaft Journal Diameter Marking	Bearing Insert*		
		Size Color	Part Number	
			L. H.	R. H.
○	○	Brown	92028-1497	92028-1692
○	None	Black	92028-1496	92028-1691
None	○			
None	None	Blue	92028-1495	92028-1690

Transmission		
Gear Shift Fork Groove Width	5.05 ~ 5.15 mm (0.1988 ~ 0.2028 in.)	5.3 mm (0.2087 in.)

Specifications

Item	Standard	Service Limit
Shift Fork Ear Thickness	4.9 ~ 5.0 mm (0.193 ~ 0.197 in.)	4.8 mm (0.189 in.)
Shift Fork Guide Pin Diameter	7.900 ~ 8.000 mm (0.3110 ~ 3150 in.)	7.8 mm (0.307 in.)
Shift Fork Dowel Pin Diameter	7.985 ~ 8.000 mm (0.3144 ~ 0.3150 in.)	7.8 mm (0.307 in.)
Shift Drum Groove Width	8.05 ~ 8.20 mm (0.3169 ~ 0.3228 in.)	8.3 mm (0.327 in.)

*: The bearing inserts for Nos. 2 and 3 journals have oil grooves.

Special Tools - Outside Circlip Pliers: 57001-144
Bearing Driver, ϕ32: 57001-382
Bearing Puller: 57001-135
Bearing Puller Adapter: 57001-317

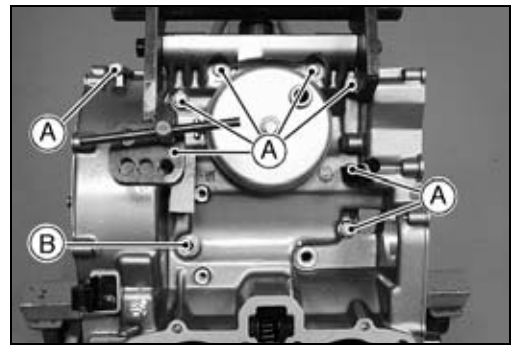
Sealant - Kawasaki Bond (Liquid Gasket - Black) TB1105: 92104-1003

Crankcase Splitting

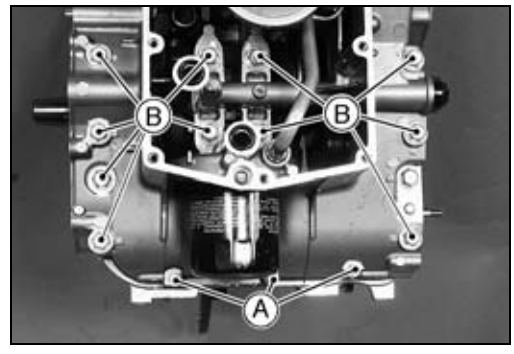
Crankcase Splitting

- Remove the engine (see Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove:
  Shift Lever (see External Shift Mechanism Removal)
  Starter Motor (see Electrical System chapter)
  Water Pump (see Cooling System chapter)
  Clutch Cover (see Clutch chapter)
- Remove the following parts only if the crankshaft is to be removed.
  Cylinder Head, Cylinder and Pistons (see Engine Top End chapter)
  Starter Clutch Sprocket (see Electrical System chapter)
  Clutch (see Clutch chapter)

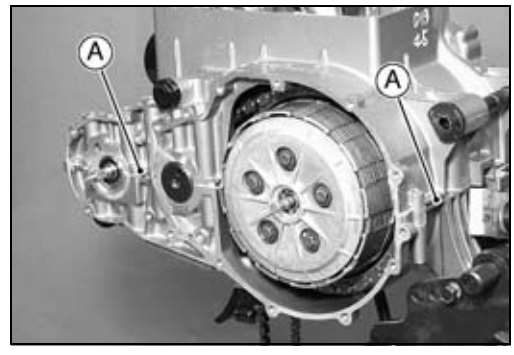
- Remove the 6 mm upper crankcase-half bolts [A] first, and then the 8 mm bolt [B].



- Turn the engine upside down and remove the following parts:
  Oil Pan (see Engine Lubrication System chapter)
  Oil Pump Outer Pipe (see Engine Lubrication System chapter)
  Main Oil Pipe Connecting Pipe
- Remove the 6 mm lower crankcase-half bolts [A] first, and then the 8 mm bolts [B] in the reverse order of installation sequence (see Crankcase Assembly).

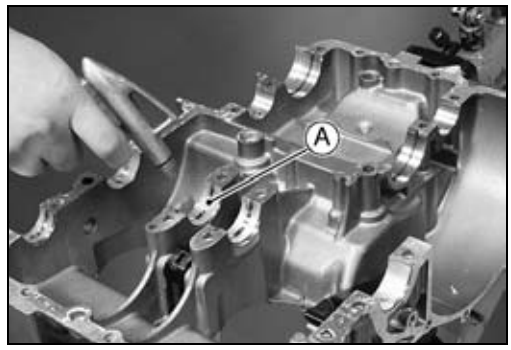


- Pull the breather return pipe out of the crankcase and leave it in place temporarily.
- Pry the points [A] indicated in the figure to split the crankcase halves apart, and remove the lower crankcase half. There are two knock pins at the front and rear of the cases.



Crankcase Splitting

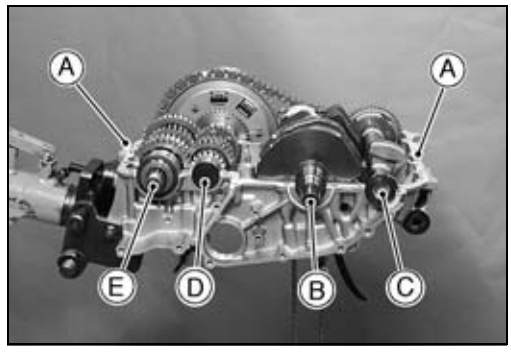
Crankcase Assembly



CAUTION

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

- Using compressed air, blow out the oil passages [A] in the crankcase halves.
- With a high flash-point solvent, clean off the mating surfaces of the crankcase halves and wipe dry.
- Before fitting the lower case on the upper case, check the following.

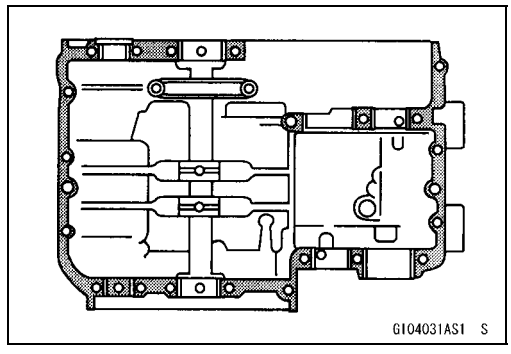


○Check to see that the following parts are in place on the upper crankcase half.
[A] Knock Pins
[B] Crankshaft Assembly
[C] Balancer Shaft Assembly
[D] Drive Shaft Assembly and Clutch Housing
[E] Output Shaft Assembly

○Check to see that the shift drum and transmission gears are in the neutral position.

- Apply liquid gasket to the mating surface of the lower crankcase half.

Sealant - Kawasaki Bond (Liquid Gasket - Black) TB1105: 92104-1003

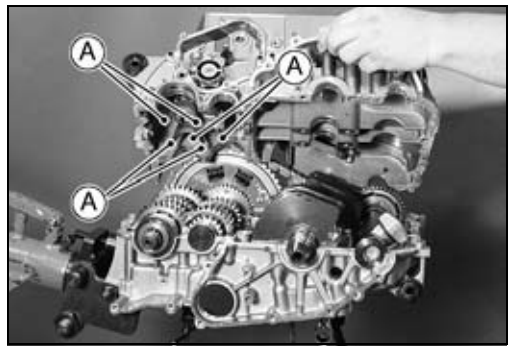


CAUTION

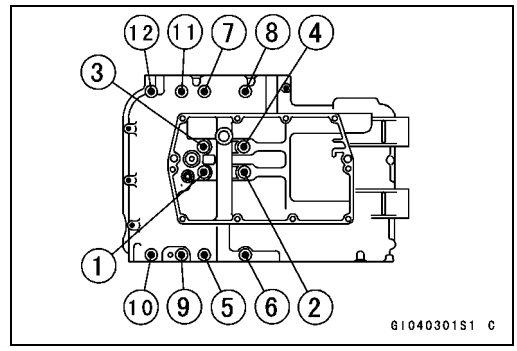
Do not apply liquid gasket [A] around the crankshaft main bearing inserts and balancer shaft inserts.

- Fit the lower crankcase half on the upper crankcase half observing the following.

○Set the shift forks so that the ears [A] of each fork fit into the grooves of the gears.



Crankcase Splitting



- Tighten the lower crankcase-half bolts using the following 3 steps:

○Tighten all lower crankcase-half bolts to a snug fit.

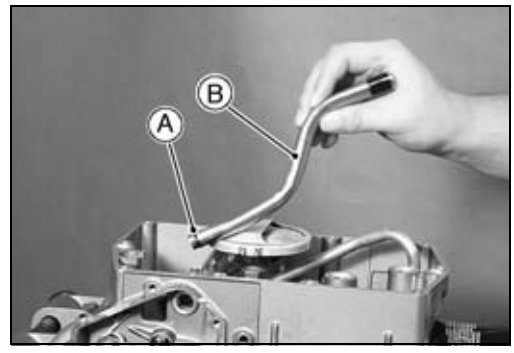
Following the sequence numbers on the lower crankcase half, torque the 8 mm bolts first to about one half of the specification, and finally to the specification in the same sequence.

Torque Value for 8 mm Bolts

First	**14 N·m (1.4 kgf·m, 10.0 ft·lb)**
Final	**27 N·m (2.8 kgf·m, 20 ft·lb)**

○Tighten the 6 mm bolts.

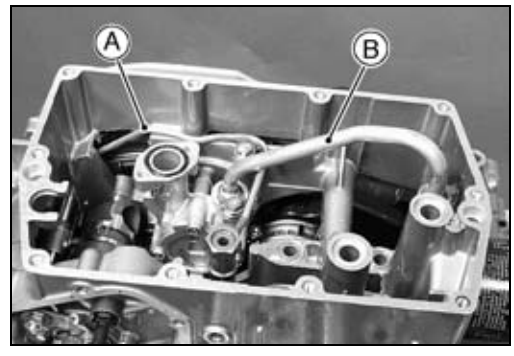
Torque - Crankcase 6 mm Bolts: 12 N·m (1.2 kgf·m, 8.5 ft·lb)



- Check that the O-ring [A] of the breather return pipe is in good condition.

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

- Apply a small amount of oil to the O-ring.
- Fit the breather return pipe [B] into the passage in the upper crankcase half.



- Install the main oil pipe connecting pipe [A] and oil pump outer pipe [B].

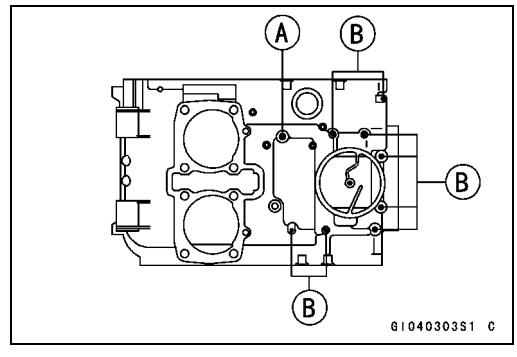
○Check that the O-rings are in good condition.

★If they are damaged, replace them with new ones.

○Apply a small amount of oil to the O-rings. The positioning hole in the connecting pipe must fit to the boss on the lower case.

○Apply a non-permanent locking agent to the threads of the oil outer pipe mounting bolt.

- Install the oil screen.
- Install the oil pan (see Engine Lubrication chapter).



- Turn the engine over so it is upright.
- Put the 8 mm bolts [A], and the 6 mm bolts [B] into the upper crankcase half as shown in the figure, torque the 8 mm bolt first, then the other bolts in the sequence shown.

Torque - Crankcase 8 mm Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)
Crankcase 6 mm Bolts: 12 N·m (1.2 kgf·m, 8.5 ft·lb)

- After tightening all crankcase bolts, check the following items:

○Drive shaft and output shaft turn freely.

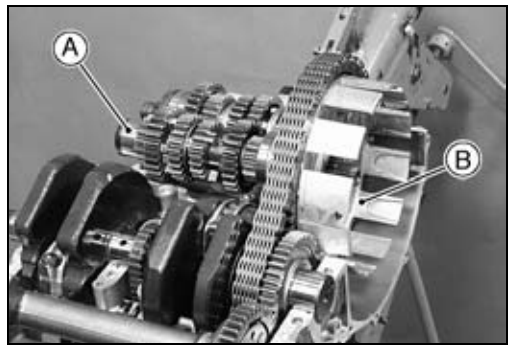
○While spinning the output shaft, gears shift smoothly from the 1st to 6th gear, and 6th to 1st.

○When the output shaft stays still, the gear can not be shifted to 2nd gear or other higher gear positions.

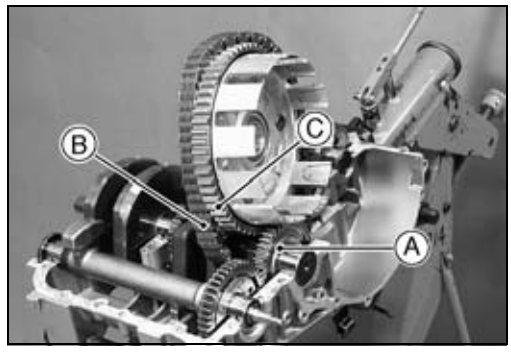
Clutch Housing/Primary Chain

Clutch Housing/Primary Chain Removal

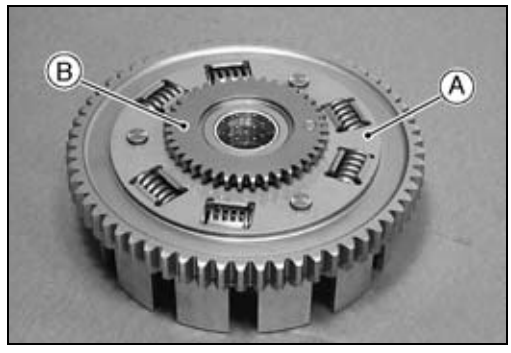
- Remove the engine.
- Remove:
  Cylinder Head, Cylinder and Pistons (see Engine Top End chapter)
  Starter Clutch Sprocket (see Electrical System chapter)
  Clutch (except the Clutch Housing)
- Split the crankcase.
- Lift up the transmission drive shaft assembly [A], and pull the shaft out of the clutch housing [B].



- Place the clutch housing on the balancer drive gear [A], slack off the primary chain [B] as much as possible and slip the primary chain off the clutch housing sprocket [C].

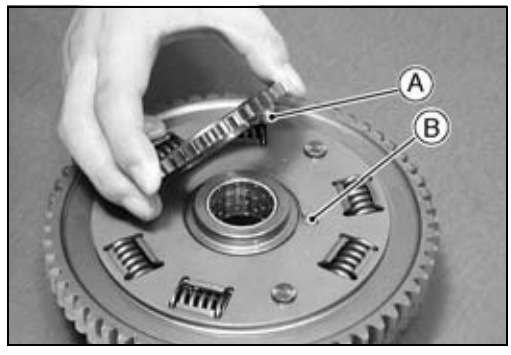


- Remove the clutch housing [A].
- Pull off the oil pump drive gear [B] from the clutch housing.
- Lift up the crankshaft, and remove the primary chain.

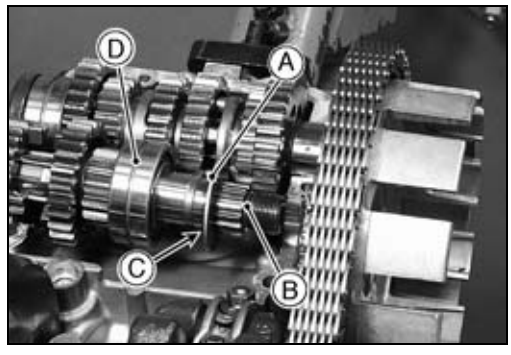


Clutch Housing/Primary Chain Installation

- Install the primary chain on the sprocket of the crankshaft.
- Install the oil pump drive gear fitting its pin [A] to the groove [B] of the clutch housing sprocket.



- Install the spacer [A] onto the drive shaft [B], facing the chamfered side [C] to the ball bearing [D].
- Install the clutch housing in the reverse order of removal.



Primary Chain Guide Wear

- Visually inspect the rubber on the guides.
- If the rubber is cut or damaged in any way, replace the guide.

Crankshaft/Connecting Rods

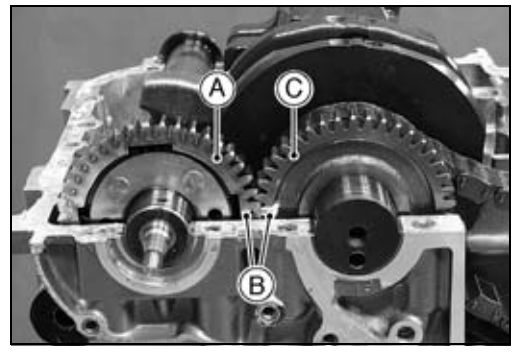
Crankshaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the clutch housing and the primary chain.
- Remove the crankshaft with the camshaft chain and primary chain.

Crankshaft Installation

CAUTION

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



- Apply engine oil to the crankshaft bearing inserts.
- Install the camshaft and primary chains on the crankshaft.
- Align the timing mark on the balancer gear [A] with the timing mark [B] on the balancer drive gear [C] of the crankshaft.
- Assemble the crankcase (see Crankcase Assembly).

Connecting Rod Removal

- Remove the crankshaft (see Crankshaft Removal).

NOTE

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

- Remove the connecting rod big end cap nuts, and take off the rod and cap with the bearing inserts from the crankshaft.

CAUTION

To prevent damage to the crankpin surfaces, do not allow the big end cap bolts to bump against them.

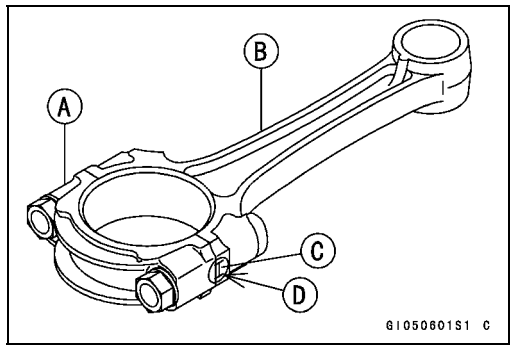
Connecting Rod Installation

CAUTION

The connecting rod and the connecting rod big end cap are machined at the factory in the assembled state, so they must be replaced together as a set. To minimize vibration, the connecting rods should have the same weight mark. The weight mark is indicated by a capital letter, and is stamped on the connecting rod big end. If the connecting rods, bearing inserts, or crankshaft are replaced with new ones, select the bearing insert and check clearance with plastigage before assembling engine to be sure the correct bearing inserts are installed.

Crankshaft/Connecting Rods

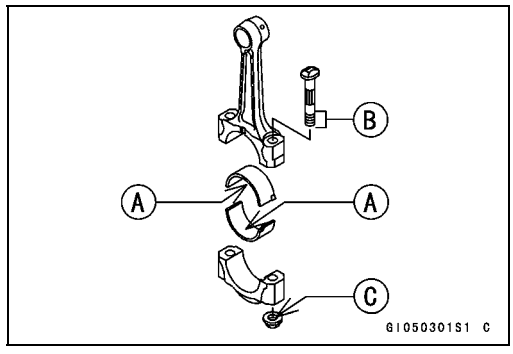
Big End Cap [A]
Connecting Rod [B]
Weight Mark, Alphabet [C]
Diameter Mark [D]



- Apply engine oil to the inner surface of the upper and lower bearing inserts [A].
- Apply a small amount of engine oil to the threads [B] and seating surface [C] of the connecting rod big end cap nuts.
- Tighten the cap nuts.

Torque - Connecting Rod Big End Cap Nuts: 36 N·m (3.7 kgf·m, 27 ft·lb)

- Install the crankshaft (see Crankshaft Installation).



Crankshaft/Connecting Rod Cleaning

- After removing the connecting rods from the crankshaft clean them with a high flash-point solvent.
- Blow the crankshaft oil passages with compressed air to remove any foreign particles or residue that may have accumulated in the passages.

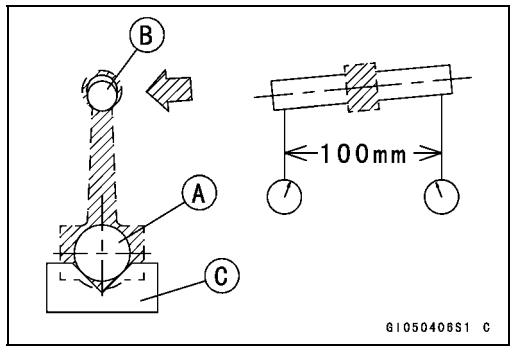
Connecting Rod Bend/Twist

- Measure the connecting rod bend.

○Remove the connecting rod big end bearing inserts, and reinstall the connecting rod big end cap.
○Select an arbor [A] of the same diameter as the connecting rod big end, and insert the arbor through the connecting rod big end.
○Select an arbor of the same diameter as the piston pin and at least 100 mm (4 in.) long, and insert the arbor [B] through the connecting rod small end.
○On a surface plate, set the big-end arbor on V blocks [C].
○With the connecting rod held vertical, use a height gauge to measure the difference in the height of the arbor above the surface plate over a 100 mm (4 in.) length to determine the amount of connecting rod bend.

★If connecting rod bend exceeds the service limit, the connecting rod must be replaced.

Connecting Rod Bend
Service Limit: 0.2/100 mm (0.0079/4 in.)

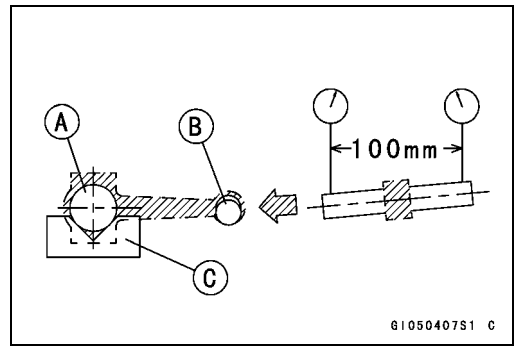


Crankshaft/Connecting Rods

● Measure the connecting rod twist.

○With the big-end arbor [A] still on V blocks [C], hold the connecting rod horizontal and measure the difference in the height of the arbor [B] above the surface plate over a 100 mm (4 in.) length of the arbor to determine the amount of connecting rod twist.

★If the connecting rod twist exceeds the service limit, the connecting rod must be replaced.

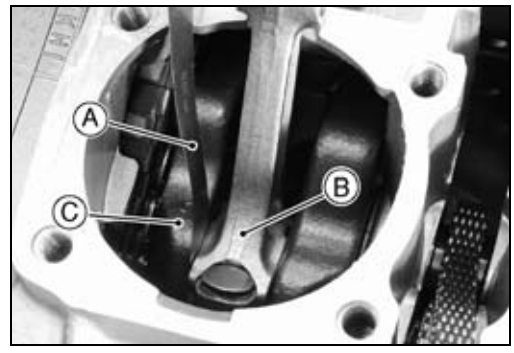


Connecting Rod Twist
Service Limit: 0.2/100 mm (0.0079/4 in.)

Connecting Rod Big End Side Clearance

● Measure the connecting rod big end side clearance.

○Insert a thickness gauge [A] between the big end [B] and either crank web [C] to determine the clearance.



Connecting Rod Big End Side Clearance
Standard: 0.13 ~ 0.38 mm (0.0051 ~ 0.0150 in.)
Service Limit: 0.50 mm (0.02 in.)

★If the clearance exceeds the service limit, replace the connecting rod with a new one and then check the clearance again. If the clearance is too large after connecting rod replacement, the crankshaft must be replaced.

Connecting Rod Big End Bearing Insert/Crankpin Clearance

● Measure the bearing insert/crankpin clearance using a plastigage.

○Remove the connecting rod big end caps and wipe each bearing insert and crankpin surface clean of oil.

○Cut strips of plastigage to bearing insert width, and place a strip on the crankpin for each connecting rod parallel to the crankshaft so that the plastigage will be compressed between the crankpin and the bearing insert.

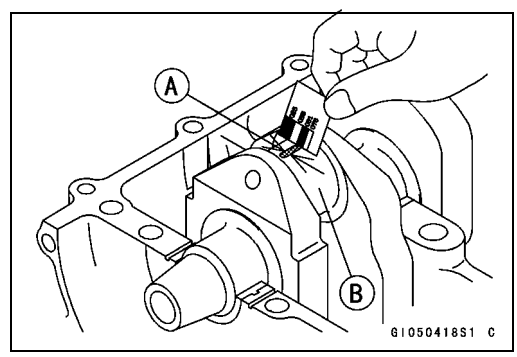
Install the connecting rod big end caps and tighten the big end cap nuts to the specified torque.

Torque - Connecting Rod Big End Cap Nuts: 36 N·m (3.7 kgf·m, 27 ft·lb)

NOTE

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

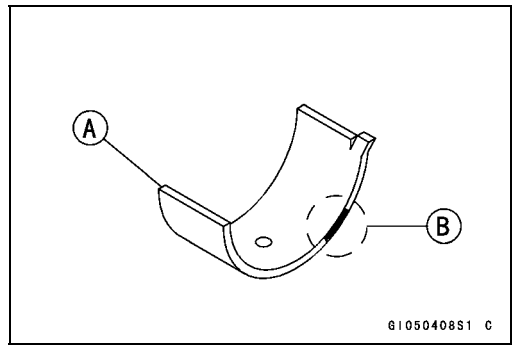
○Remove the connecting rod big end caps, and measure the plastigage width [A] to determine the bearing insert/crankpin [B] clearance.



Connecting Rod Big End Bearing Insert/Crankpin Clearance
Standard: 0.036 ~ 0.066 mm (0.0014 ~ 0.0026 in.)
Service Limit: 0.10 mm (0.0039 in.)

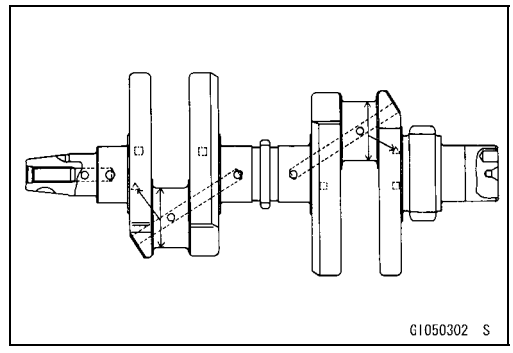
Crankshaft/Connecting Rods

★If the clearance is within the standard, no bearing insert replacement is required.
★If the clearance is between 0.066 mm and the service limit (0.10 mm, 0.0039 in.), replace the bearing inserts [A] with inserts painted blue [B] Check insert/crankpin clearance with a plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.
★If the clearance exceeds the service limit, measure the diameter of the crankpins.



Crankpin Diameter
Standard: 37.984 ~ 38.000 mm (1.4954 ~ 1.4961 in.)
Service Limit: 37.97 mm (1.4949 in.)

★If any crankpin has worn past the service limit, replace the crankshaft with a new one.
★If the measured crankpin diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, write new marks on it.



Crankpin Diameter Marks
None: 37.984 ~ 37.994 mm (1.4954 ~ 1.4958 in.)
○: 37.995 ~ 38.000 mm (1.4959 ~ 1.4961 in.)
Δ: Crankpin Diameter Marks, "○" mark or no mark.

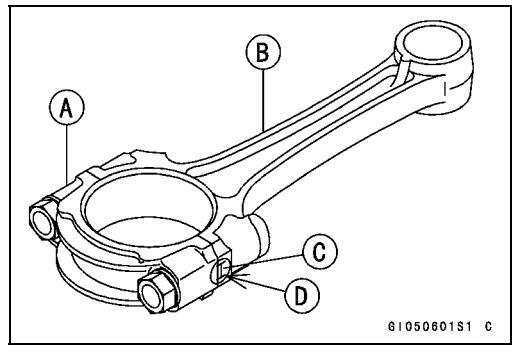
● Put the connecting rod big end caps on the rods and tighten the nuts to the specified torque.

Torque - Connecting Rod Big End Cap Nuts: 36 N·m (3.7 kgf·m, 27 ft·lb)

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

NOTE

○*The mark already on the big end should almost coincide with the measurement.*



Connecting Rod Big End Bore Diameter Marks
None: 41.000 ~ 41.008 mm (1.6142 ~ 1.6145 in.)
○: 41.009 ~ 41.016 mm (1.6145 ~ 1.6148 in.)

[A] Big End Cap
[B] Connecting Rod
[C] Weight Mark, Alphabet
[D] Diameter Mark (around Weight Mark): "○" or no mark

Crankshaft/Connecting Rods

- Select the proper bearing insert in accordance with the combination of the connecting rod and crankshaft coding.
- Install the new insert in the connecting rod and check insert/journal clearance with a plastigage.

Connecting Rod Big End Bearing Insert Selection

Con-rod Bore Diameter Mark	Crankpin Diameter Mark	Bearing Insert	
		Size Color	Part Number
○	○	Black	92028-1349
None	None		
○	None	Blue	92028-1348
None	○	Brown	92028-1350

Crankshaft Runout

- Measure the crankshaft runout.

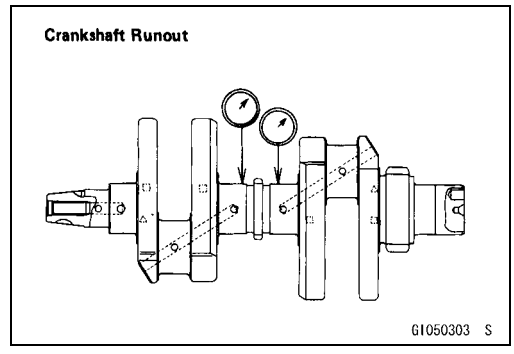
○Set the crankshaft in a flywheel alignment jig or on V blocks.

○Set a dial gauge against the points indicated.

○Turn the crankshaft slowly to measure the runout. The difference between the highest and lowest dial gauge readings (TIR) is the amount of runout.

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

Crankshaft Runout
Service Limit: 0.05 mm (0.0020 in.) TIR



Crankshaft Main Bearing Insert/Journal Clearance

- Measure the bearing insert/journal clearance using a plastigage.

○Split the crankcase and wipe each bearing insert and journal surface clean of oil.

○Cut strips of plastigage to bearing insert width, and place a strip on each journal parallel to the crankshaft so that the plastigage will be compressed between the journal and the bearing insert.

○Install the lower crankcase half, and tighten the case bolts to the specified torque.

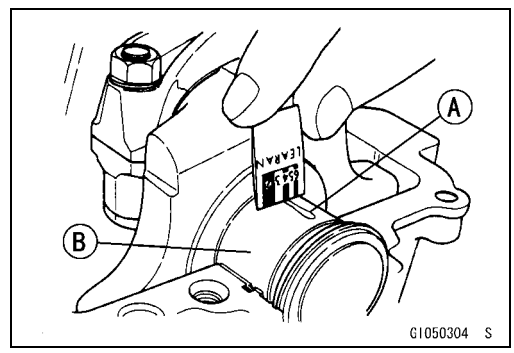
Torque - Crankcase 8 mm Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)
Crankcase 6 mm Bolts: 12 N·m (1.2 kgf·m, 8.5 ft·lb)

NOTE

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

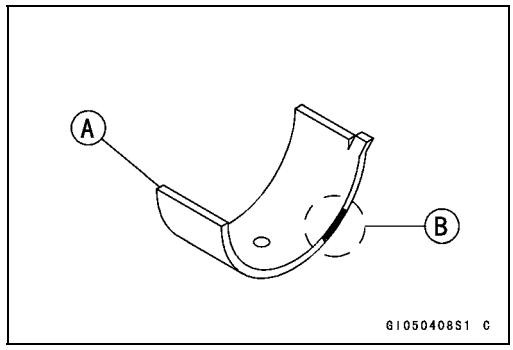
○Remove the lower crankcase half and measure the plastigage width [A] to determine the bearing insert/journal [B] clearance.

Crankshaft Main Bearing Insert/Journal Clearance
Standard: 0.020 ~ 0.044 mm (0.0008 ~ 0.0017 in.)
Service Limit: 0.08 mm (0.0032 in.)



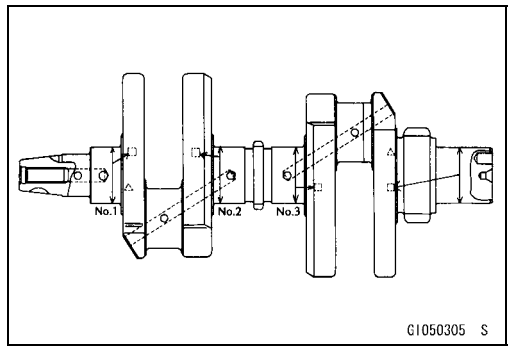
Crankshaft/Connecting Rods

★If the clearance is within the standard, no bearing insert replacement is required.
★If the clearance is between 0.044 mm and the service limit (0.08 mm), replace the bearing inserts [A] with inserts painted blue [B] Check insert/journal clearance with a plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.
★If the clearance exceeds the service limit, measure the diameter of the crankshaft main journal.



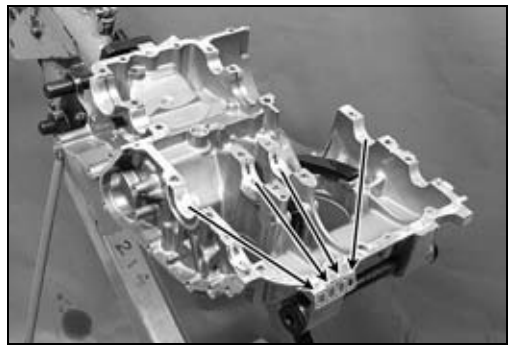
Crankshaft Main Journal Diameter
Standard: 35.984 ~ 36.000 mm (1.4167 ~ 1.4173 in.)
Service Limit: 35.96 mm (1.4157 in.)

★If any journal has worn past the service limit, replace the crankshaft with a new one.
★If the measured journal diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, write a new mark on it.



Crankshaft Main Journal Diameter Marks
None: 35.984 ~ 35.992 mm (1.4167 ~ 1.4170 in.)
1: 35.993 ~ 36.000 mm (1.4170 ~ 1.4173 in.)
□: Crankshaft Main Journal Diameter Marks, "1" mark or no mark.

● Put the lower crankcase half on the upper crankcase half without bearing inserts, and tighten the case bolts to the specified torque and sequence (see Crankcase Assembly).
● Measure the crankcase main bearing bore diameter, and mark the upper crankcase half in accordance with the bore diameter.



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

Crankcase Main Bearing Bore Diameter Marks
○: 39.000 ~ 39.008 mm (1.5354 ~ 1.5357 in.)
None: 39.009 ~ 39.016 mm (1.5358 ~ 1.5361 in.)
□□ □□: Crankcase Main Bearing Bore Diameter Marks, "○" mark or no mark.

● Select the proper bearing insert in accordance with the combination of the crankcase and the crankshaft coding.
● Install the new inserts in the crankcase halves and check insert/journal clearance with a plastigage.

Crankshaft/Connecting Rods

Crankshaft Main Bearing Insert Selection

Crankcase Main Bearing Bore Diameter Mark	Crankshaft Main Journal Diameter Mark	Bearing Insert*		
		Size Color	Part Number	Journal Nos
○	1	Brown	92028-1102	2, 3
			92028-1274	1, 4
None	None	Blue	92028-1100	2, 3
			92028-1272	1, 4
○	None	Black	92028-1101	2, 3
None	1		92028-1273	1, 4

*: The bearing inserts for Nos. 2 and 3 journals have oil grooves.

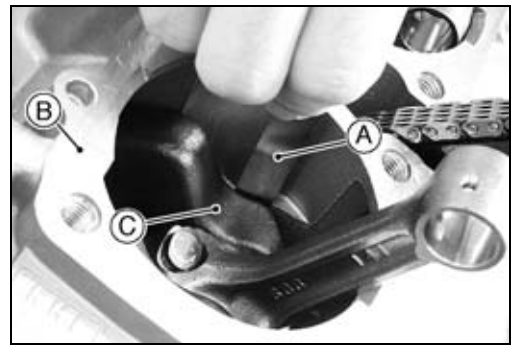
Crankshaft Side Clearance

● Measure the crankshaft side clearance.

○Install the lower crankcase half on the upper crankcase half, and turn the crankcase upside down.

○Insert a thickness gauge [A] between the upper crankcase [B] and the crank web [C] at the No.2 and No.3 journals to determine clearance.

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



CAUTION

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

Crankshaft Side Clearance

Standard: 0.05 ~ 0.20 mm (0.0020 ~ 0.0079 in.)

Service Limit: 0.40 mm (0.0157 in.)

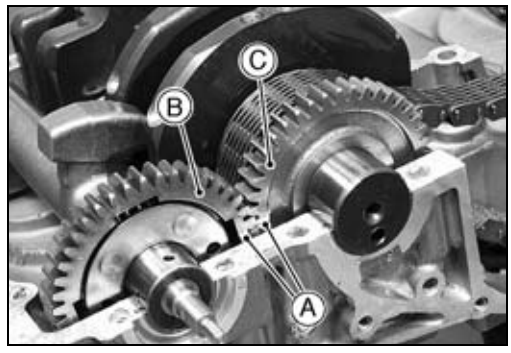
Balancer

Balancer Removal

- Split the crankcase (see Crankcase Splitting).
- Pull the balancer shaft with the balancer gear out of the crankcase.

Balancer Installation

- Apply oil to the inside of the balancer shaft bearing insert.
- Align the timing mark [A] on the balancer gear [B] with the timing mark on the balancer drive gear [C] of the crankshaft.
- Assemble the crankcase (see Crankcase Assembly).



Balancer Shaft Bearing Insert/Journal Clearance

- Measure the bearing insert/journal clearance using a plastigage.

○Split the crankcase and wipe each bearing insert and journal surface clean of oil.

○Cut strips of plastigage to bearing insert width, and place a strip on each journal parallel to the balancer shaft so that the plastigage will be compressed between the journal and the bearing insert.

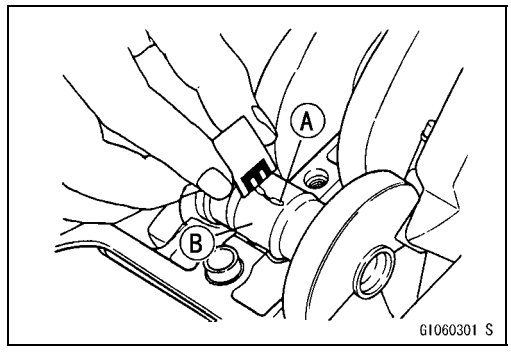
○Install the lower crankcase half, and tighten the case bolts to the specified torque.

Torque - Crankcase 8 mm Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)
Crankcase 6 mm Bolts: 12 N·m (1.2 kgf·m, 8.5 ft·lb)

NOTE

○*Do not turn the balancer shaft during clearance measurement.*

○Remove the lower crankcase half and measure the plastigage width [A] to determine the bearing insert/journal [B] clearance.

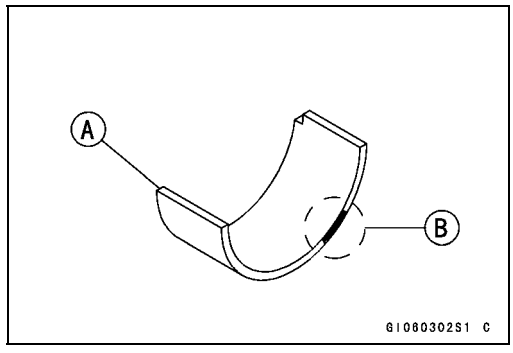


Balancer Shaft Bearing Insert/Journal Clearance
Standard: 0.020 ~ 0.050 mm (0.0008 ~ 0.0020 in.)
Service Limit: 0.09 mm (0.0035 in.)

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

★If the clearance is between 0.050 mm and the service limit (0.09 mm), replace the bearing inserts [A] with inserts painted blue [B] Check insert/journal clearance with a plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.

★If the clearance exceeds the service limit, measure the diameter of the balancer shaft journal.

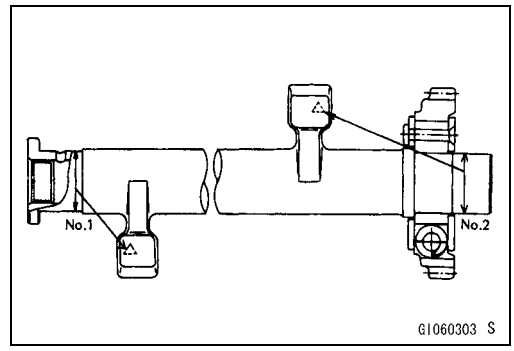


Balancer Shaft Journal Diameter
Standard: 27.987 ~ 28.000 mm (1.1019 ~ 1.1024 in.)
Service Limit: 27.96 mm (1.1008 in.)

Balancer

★If either journal has worn past the service limit, replace the balancer shaft with a new one.

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



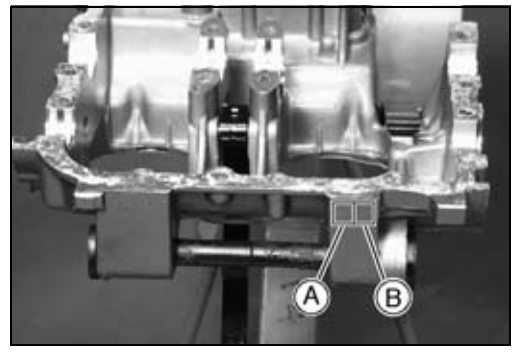
Balancer Shaft Diameter Marks

None: 27.987 ~ 27.993 mm (1.1019 ~ 1.1021 in.)

○: 27.994 ~ 28.000 mm (1.1021 ~ 1.1024 in.)

Δ: Balancer Shaft Journal Diameter Marks, "○" mark or no mark.

- Put the lower crankcase half on the upper crankcase half without bearing inserts, and tighten the case bolts to the specified torque and sequence (see Crankcase Assembly).
- Measure the crankcase bearing bore diameter for the balancer shaft, and mark the upper crankcase half in accordance with the bore diameter.



NOTE

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

Crankcase Bearing Bore Diameter Marks

○: 31.008 ~ 31.016 mm (1.2208 ~ 1.2211 in.)

None: 31.017 ~ 31.024 mm (1.2211 ~ 1.2214 in.)

□□: Crankcase Bearing Bore Diameter Marks, "○" mark or no mark.

[A] No. 1 Journal
[B] No. 2 Journal

- Select the proper bearing insert in accordance with the combination of the crankcase and the balancer shaft coding.
- Install the new inserts in the crankcase and check insert/journal clearance with a plastigage.

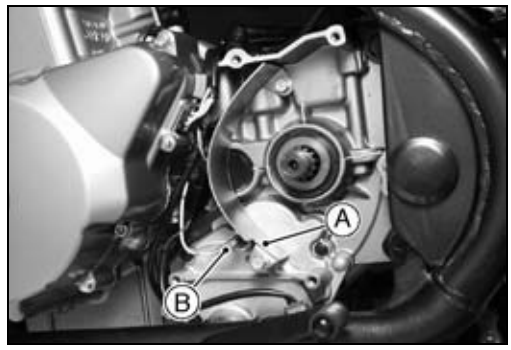
Balancer Shaft Bearing Insert Selection

Crankcase Main Bearing Bore Diameter Mark	Crankshaft Main Journal Diameter Mark	Bearing Insert*		
		Size Color	Part Number	
			L.H.	R.H.
○	○	Brown	92028-1497	92028-1692
None	None	Blue	92028-1495	92028-1690
○	None	Black	92028-1496	92028-1691
None	○			

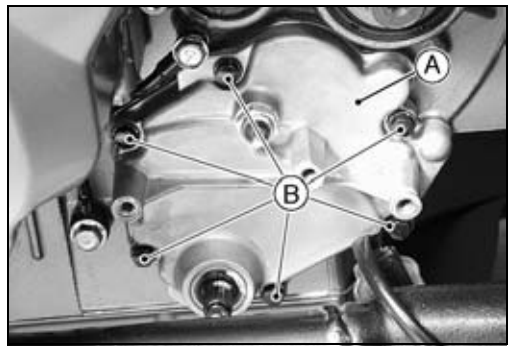
Transmission

External Shift Mechanism Removal

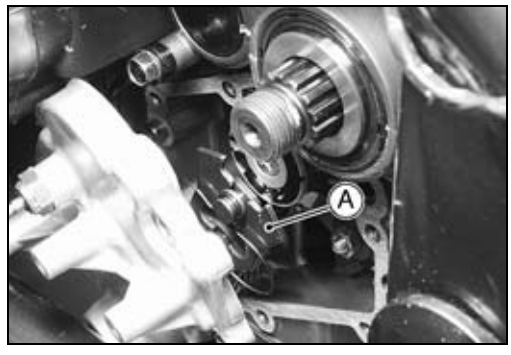
- Remove:
  Engine Sprocket (see Final Drive chapter)
  Chain Guard [A]
  Neutral Switch Lead Connector [B]



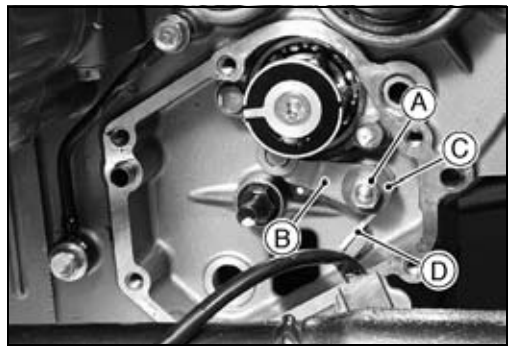
- Place an oil pan beneath the external shift mechanism cover [A].
- Remove the external shift mechanism cover bolts [B].



- Pull the cover.
- Remove the cover with the shift shaft assembly while pushing the shift mechanism arm [A].



- Remove the nut [A] and take off the gear positioning lever [B] The lever has a collar [C], spring [D], and washer.



External Shift Mechanism Installation

○The small diameter side of the collar in the gear positioning lever must face toward the crankcase.

- Tighten the positioning lever nut [A].

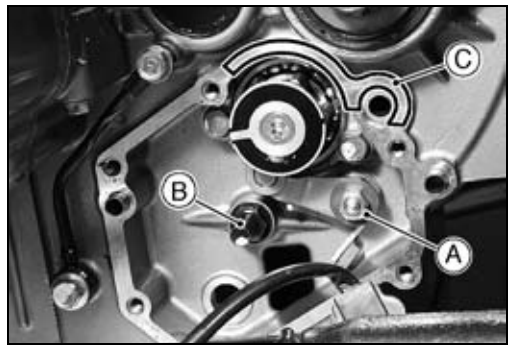
Torque - Gear Positioning Lever Nut: 11 N·m (1.1 kgf·m, 95 in·lb)

- Check that the return spring pin [B] is not loose.

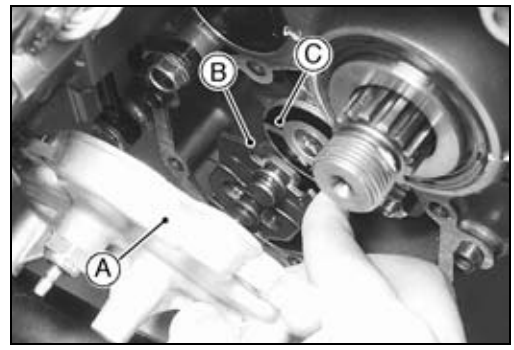
★If it is loose, remove it, apply a non-permanent locking agent to the threads, and tighten it.

Torque - Return Spring Pin: 20 N·m (2.0 kgf·m, 14.5 ft·lb)

- Apply silicone sealant to the area [C].
- Replace the cover gasket with a new one.



Transmission

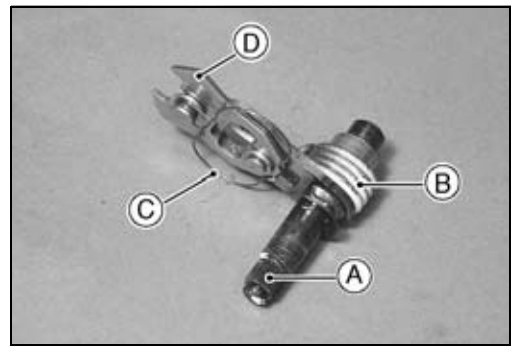


- Apply high temperature grease to the seal lips.
- Insert the shift shaft into the cover [A], and then fit the shift mechanism arm [B] to the shift drum [C].
- Tighten the cover bolts.

Torque - External Shift Mechanism Cover Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

- Check:
  Engine Oil Level (see Engine Lubrication System chapter)
  Drive Chain Slack (see Final Drive chapter)

External Shift Mechanism Inspection



- Examine the shift shaft for any damage.

○Check the shift shaft for bending or damage to the splines [A].

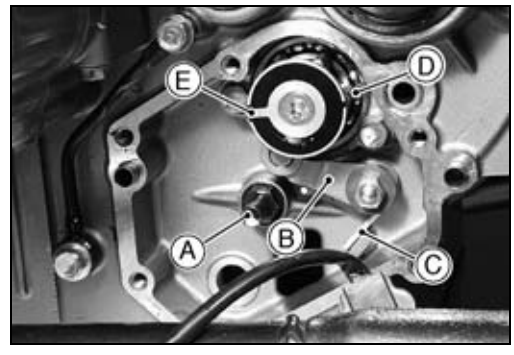
★If the shaft is bent, straighten or replace it. If the splines are damaged, replace the shaft.

○Check the return spring [B] and arm spring [C] for breaks or distortion.

★If the springs are damaged in any way, replace them.

○Check the shift mechanism arm [D] for distortion.

★If the shift mechanism arm is damaged in any way, replace the arm.



- Check that the return spring pin [A] is not loose.

★If it is loose, unscrew it, apply a non-permanent locking agent to the threads, and tighten it.

Torque - Return Spring Pin: 20 N·m (2.0 kgf·m, 14.5 ft·lb)

- Check the gear positioning levers [B], and their springs [C] for break or distortion.

★If the levers or springs are damaged in any way, replace them.

- Visually inspect the shift drum cam [D] and pin plate [E].

★If they are badly worn or if they show any damage, replace them.

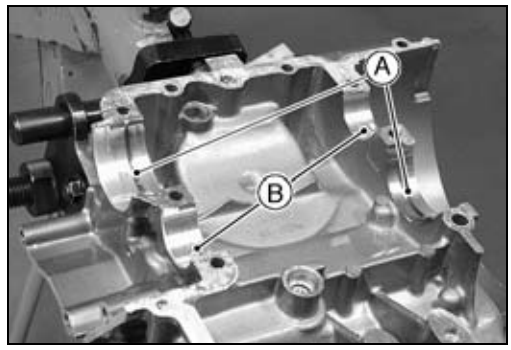
Transmission Shaft Removal

- Remove the engine (see Engine Removal/Installation chapter).
- Split the crankcase (see Crankcase Splitting).
- Take out the output shaft assembly.
- Lift up the drive shaft assembly, and pull the shaft assembly out of the clutch housing. Leave the clutch housing and primary chain in place.

Transmission

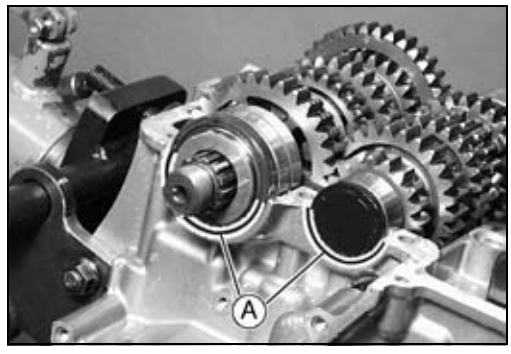
Transmission Shaft Installation

- With a high flash-point solvent, clean off the outer circumferences of the transmission ball bearings and needle bearings, and their bearing housings, and wipe dry.
- Check to see that the set rings [A] and set pins [B] are in place in the transmission bearing housings.



- Lift up the clutch housing and primary chain, insert the drive shaft assembly into the clutch housing, and install the drive shaft assembly in the upper crankcase half.
- Install the output shaft assembly in the upper crankcase half.

○The bearing set pins and rings must match properly with the holes or grooves in the bearing outer races. When they match properly, there is no clearance [A] between the crankcase and the bearing outer races.



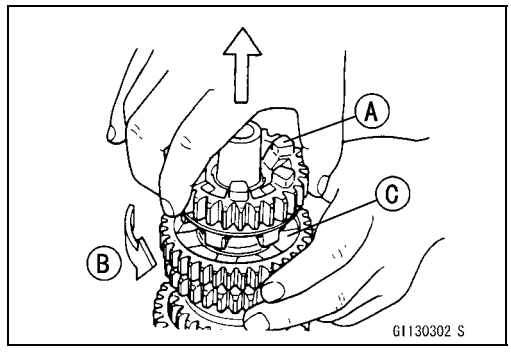
- Assemble the crankcase.
- Install the engine.

Transmission Shaft Disassembly

- Remove the transmission shaft.
- Using the outside circlip pliers to remove the circlips, disassemble the transmission shafts.

Special Tool - Outside Circlip Pliers: 57001-144

- The 5th gear [A] on the output shaft has three steel balls assembled into it for the positive neutral finder mechanism. To remove this gear from the shaft, quickly spin [B] the shaft in a vertical position while holding the 3rd gear [C], and pull off the 5th gear upwards.

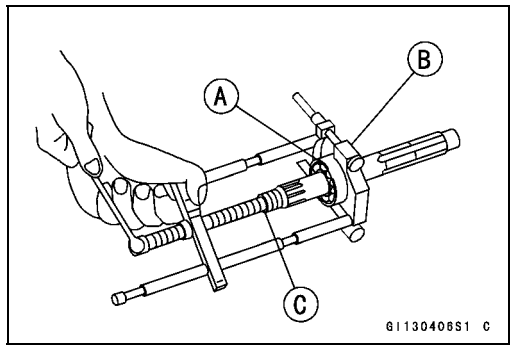


- The ball bearings and collar are press-fit on the transmission shafts. To remove the bearings [A], use a press or the bearing puller [B] and bearing puller adapter [C].

Special Tools - Bearing Puller: 57001-135
Bearing Puller Adapter: 57001-317

○The output shaft ball bearing, O-ring and collar ought to be removed together.

○No need for the bearing puller adapter at output shaft.

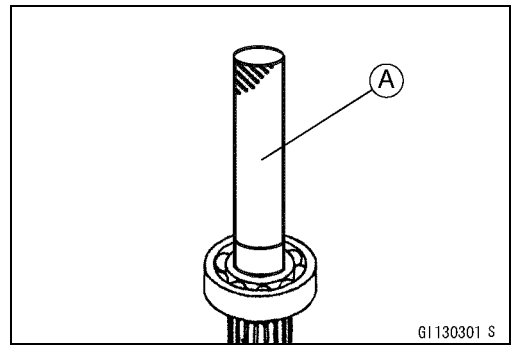


Transmission

Drive Shaft Assembly

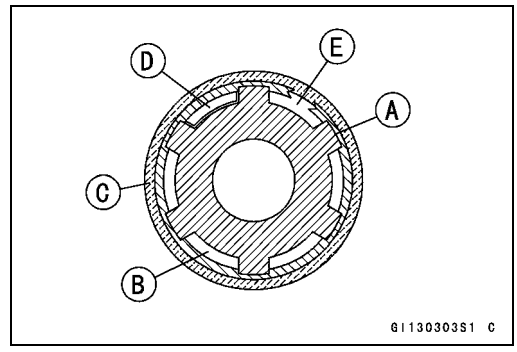
- Apply engine oil liberally to the drive shaft, gears, bearings and bushing.
- Install the drive shaft ball bearing using the bearing driver [A].

Special Tool - Bearing Driver, ϕ32: 57001-382

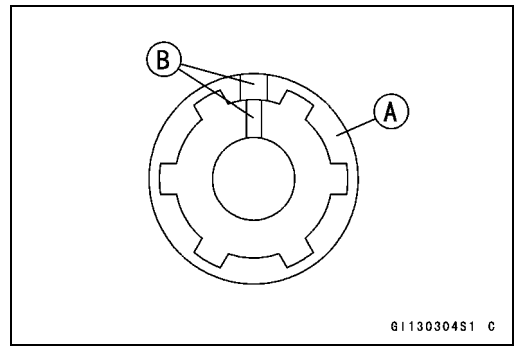


- Replace any circlips that were removed with new ones.

○Always install circlips [A] so that the opening is aligned with a spline groove [B], and install toothed washers [C] so that the teeth [D] are not aligned with the circlip opening [E]. To install a circlip without damage, fit the circlip onto the shaft expanding it just enough to install it, and use a suitable gear to push the circlip into place.

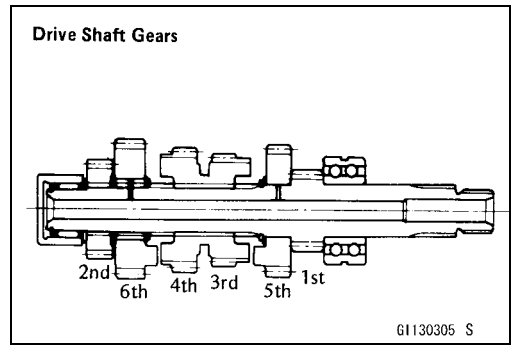


- When assembling the drive shaft 6th gear bushing [A] onto the shaft, align its oil hole [B] with the hole in the shaft.



- The drive shaft gears can be identified by size: the smallest diameter gear is 1st gear, and the largest is 6th. Be sure that all parts are put back in the correct sequence, facing the proper direction, and all circlips and washers are properly in place.
- Proper sequence starting with 1st gear (part of drive shaft) is: 1st gear, 5th gear (face the flat side of the gear to the right), washer, circlip, 3rd/4th gear (face 3rd gear side to the right), circlip, toothed washer, bushing (align the oil hole with the hole in the shaft), 6th gear (face the dogs to the right), toothed washer, circlip, 2nd gear, spacer, needle bearing, needle bearing outer race, and plug.

○The toothed washer before the bushing has slightly smaller teeth than the last one.



- Install the spacer onto the drive shaft, facing the chamfered side to the ball bearing.
- Check that each gear spins or slides freely on the drive shaft without binding.

Transmission

Output Shaft Assembly

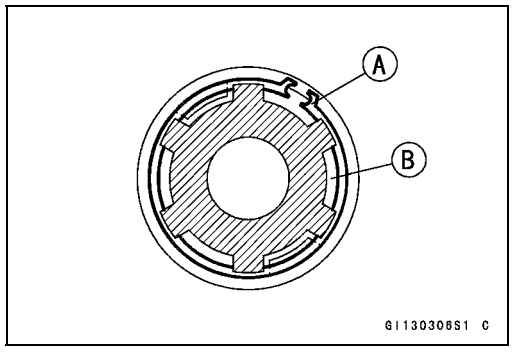
- Assembly is the reverse of disassembly. Note the following.
- Apply engine oil liberally to the output shaft, gears, bearings, bushing and O-ring.
- Install the output shaft ball bearing, O-ring and collar using the bearing driver.

Special Tool - Bearing Driver, ϕ32: 57001-382

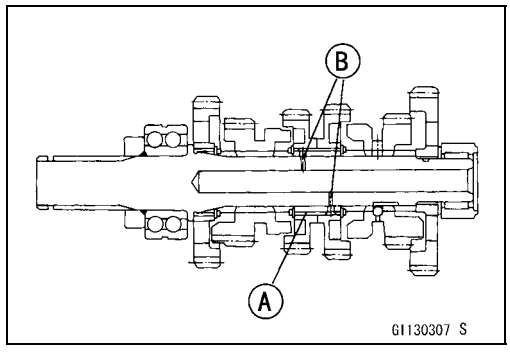
○The ball bearing, O-ring and collar ought to be installed individually.

- Replace any circlips that were removed with new ones.

○Always install circlips so that the opening is aligned with a spline groove. To install a circlip without damage, fit the circlip onto the shaft expanding it only enough to install it, and use a suitable gear to push the circlip into place.
[A] Circlip
[B] Toothed Washer



- When assembling the output shaft 3rd/4th gear bushing [A] to the shaft, align its oil holes [B] with the holes in the shaft.

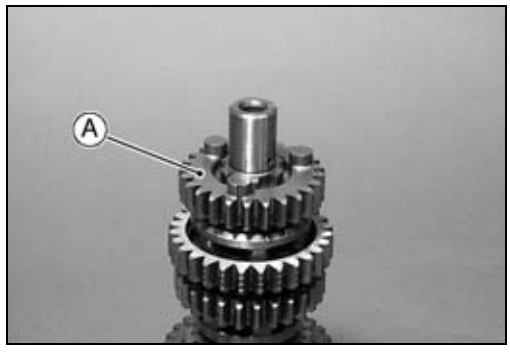


CAUTION

When installing the 5th gear and steel balls on the output shaft, do not apply grease to the balls to hold them in place. This will cause the positive neutral finder mechanism to malfunction.

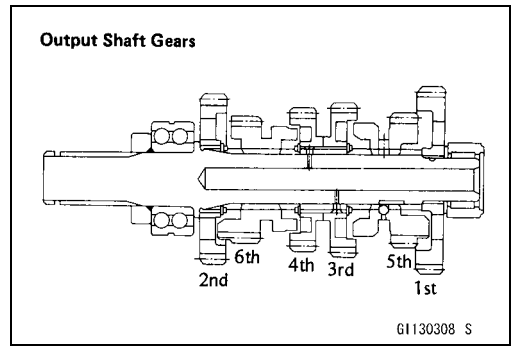
- Check the effect of ball-locking, after assembling the 5th gear and steel balls on the output shaft.

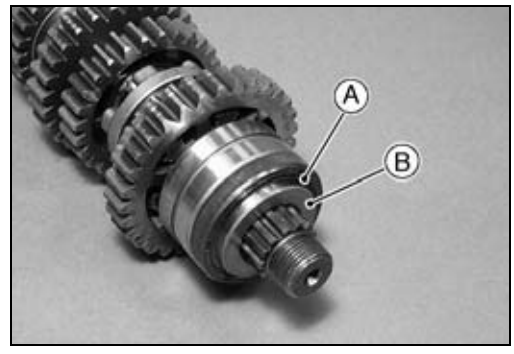
○Check that the 5th gear [A] does not come out of the output shaft when moving it up and down by hand.



Transmission

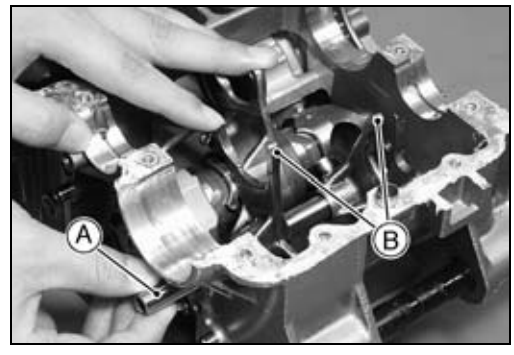
- The output shaft gears can be identified by size: the largest diameter gear is 1st gear, and the smallest is 6th. Be sure that all parts are put back in the correct sequence and facing the proper direction, and that all circlips and washers are properly in place.
- Proper sequence starting with 2nd gear is: 2nd gear (face the flat side of the gear to the left), toothed washer, circlip, 6th gear (face the fork groove side to the right), circlip, toothed washer, bushing (align the oil holes with the holes in the shaft), 4th gear (face the side with the dog recesses to the left), 3rd gear (face the side with the dog recesses to the right), toothed washer, circlip, 5th gear (face the fork groove side to the left) with steel balls (3), 1st gear (face the flat side of the gear to the right), spacer, needle bearing, and needle bearing outer race.
- Press the oil seal [A] onto the collar [B] so it is flush with the end of collar.
- Check that each gear spins or slides freely on the output shaft without binding.



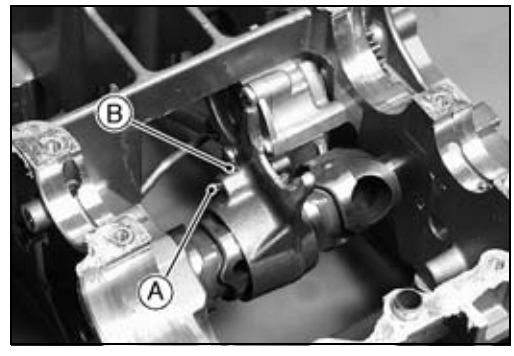


Shift Drum and Fork Removal

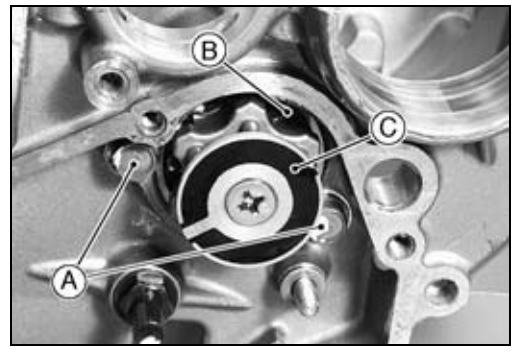
- Remove:
  Lower Crankcase Half (see Crankcase Splitting)
  External Shift Mechanism (see External Shift Mechanism Removal)
- Pull out the shift rod [A], and remove the two shift forks [B] in the lower crankcase half.



- Remove the cotter pin [A], and pull out the 3rd/4th shift fork guide pin [B].



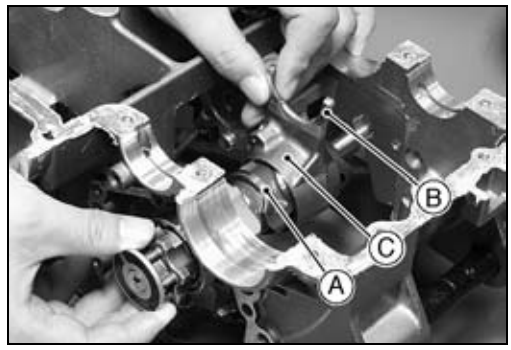
- Remove the bolts [A] holding the shift drum ball bearing [B].
- Pull out the shift drum [C] slightly, and remove the 3rd/4th shift fork. Pull the shift drum free from the crankcase.



Transmission

Shift Drum and Fork Installation

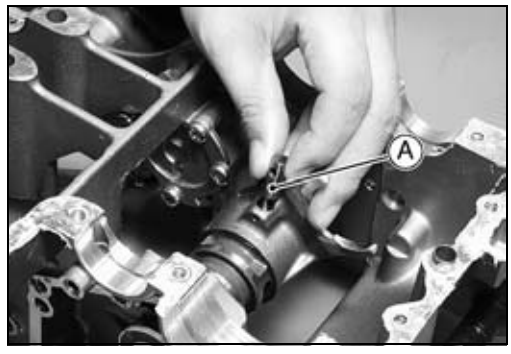
- Insert the shift drum [A] into the crankcase part way, install the 3rd/4th shift fork [B] with the longer side [C] facing the neutral switch, i.e., the longer side goes onto the drum first.



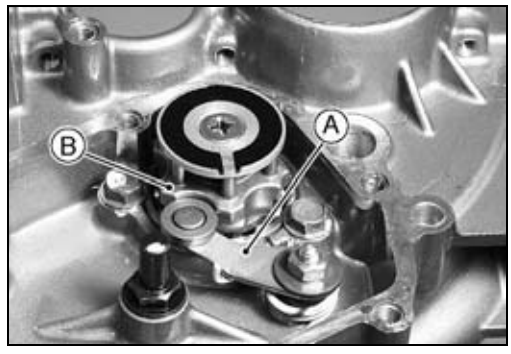
- Push the shift drum in the rest of the way.
- Apply a non-permanent locking agent to the threads of the holding bolts, and tighten them.

Torque - Shift Drum Bearing Holding Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

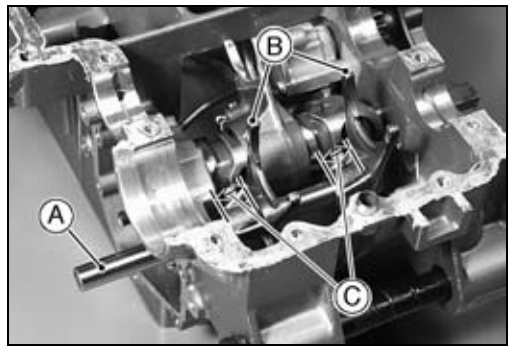
- Put the shift fork guide pin [A] with the pin hole upward into the 3rd/4th shift fork. The guide pin rides in the middle groove of the three shift drum grooves.
- Insert a new cotter pin through the 3rd/4th shift fork and guide pin from the shorter side of the shift fork, and spread the cotter pin longer side.



- Install the washer, spring, gear positioning lever, collar and nut.
- Set the shift drum in the neutral position, that is, fit the gear positioning lever [A] into the detent on the shift drum cam [B].



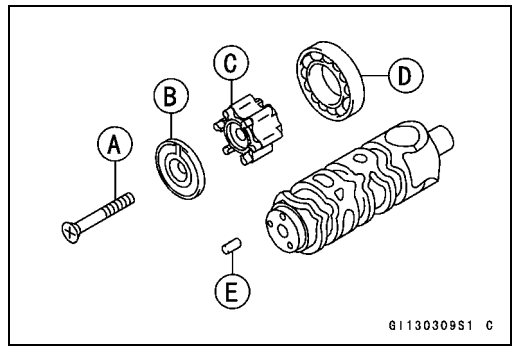
- Install the shift shaft.
- Apply a little engine oil to the shift rod and shift fork ears. Insert the shift rod [A], running it through the shift forks [B], fitting each shift fork guide pin into the shift drum groove. The shift forks are identical, and must be installed with their longer sides [C] facing toward the external shift mechanism.



Transmission

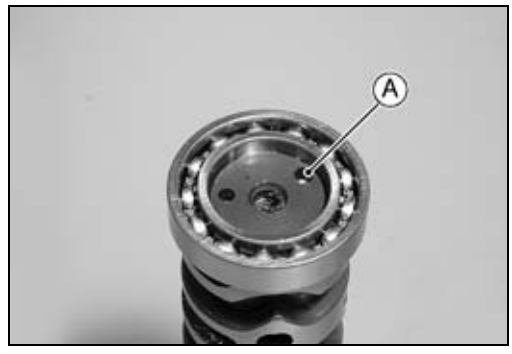
Shift Drum Disassembly

- Remove the screw [A] and the pin plate [B].
- Pull out the shift drum cam [C].
- Take off the ball bearing [D].
- Pull off the dowel pin [E].

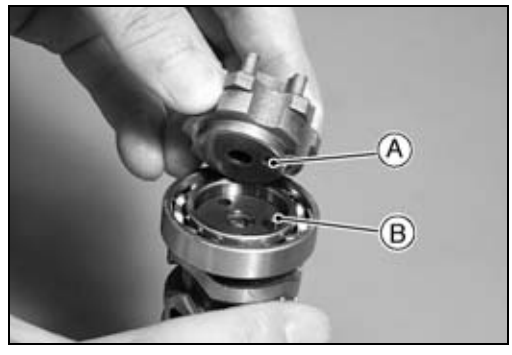


Shift Drum Assembly

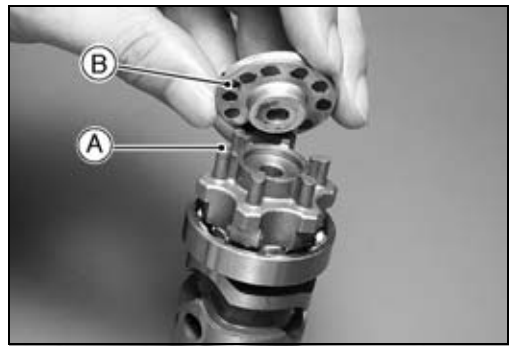
- Set the dowel pin into larger hole of the two which is the farthest hole [A] from the center.



- Install the shift drum cam aligning its groove [A] with the dowel pin [B].



- There are six points on the shift drum cam. The highest point [A] must be fitted into the back of the pin plate [B]. If these parts are assembled in the wrong position, the neutral indicator light will not light when the gears are in neutral.
- Apply a non-permanent locking agent to the threads of the pin plate screw.
- Tighten the pin plate screw.



Transmission

Ball and Needle Bearing Wear

- Check the following ball bearings: shift drum LH, drive shaft RH, and output shaft LH.

○Since the ball bearings are made to extremely close tolerances, the wear must be judged by feel rather than measurement. Clean each bearing in a high flash-point solvent, dry it (do not spin the bearing while it is dry), and oil it with engine oil.

○Spin the bearing by hand to check its condition.

★If the bearing is noisy, does not spin smoothly, or has any rough spots, replace it.

- Check the following needle bearings: drive shaft LH and output shaft RH.

○The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.

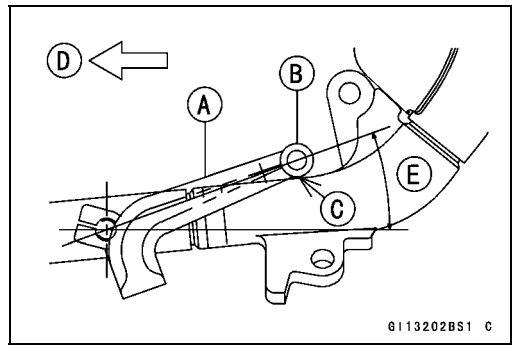
★If there is any doubt as to the condition of a needle bearing, replace it.

Shift Pedal Installation

- Be sure to use new circlips.
- Install the shift lever [A], noting the damper [B] position as shown.

Torque - Shift Pedal Mounting Bolt: 12 N·m (1.2 kgf·m, 8.5 ft·lb)

C: Approximately, the lower position of pedal shall align with the upper surface of the down tube.
D: Front
E: Approx. 20°



Wheels/Tires

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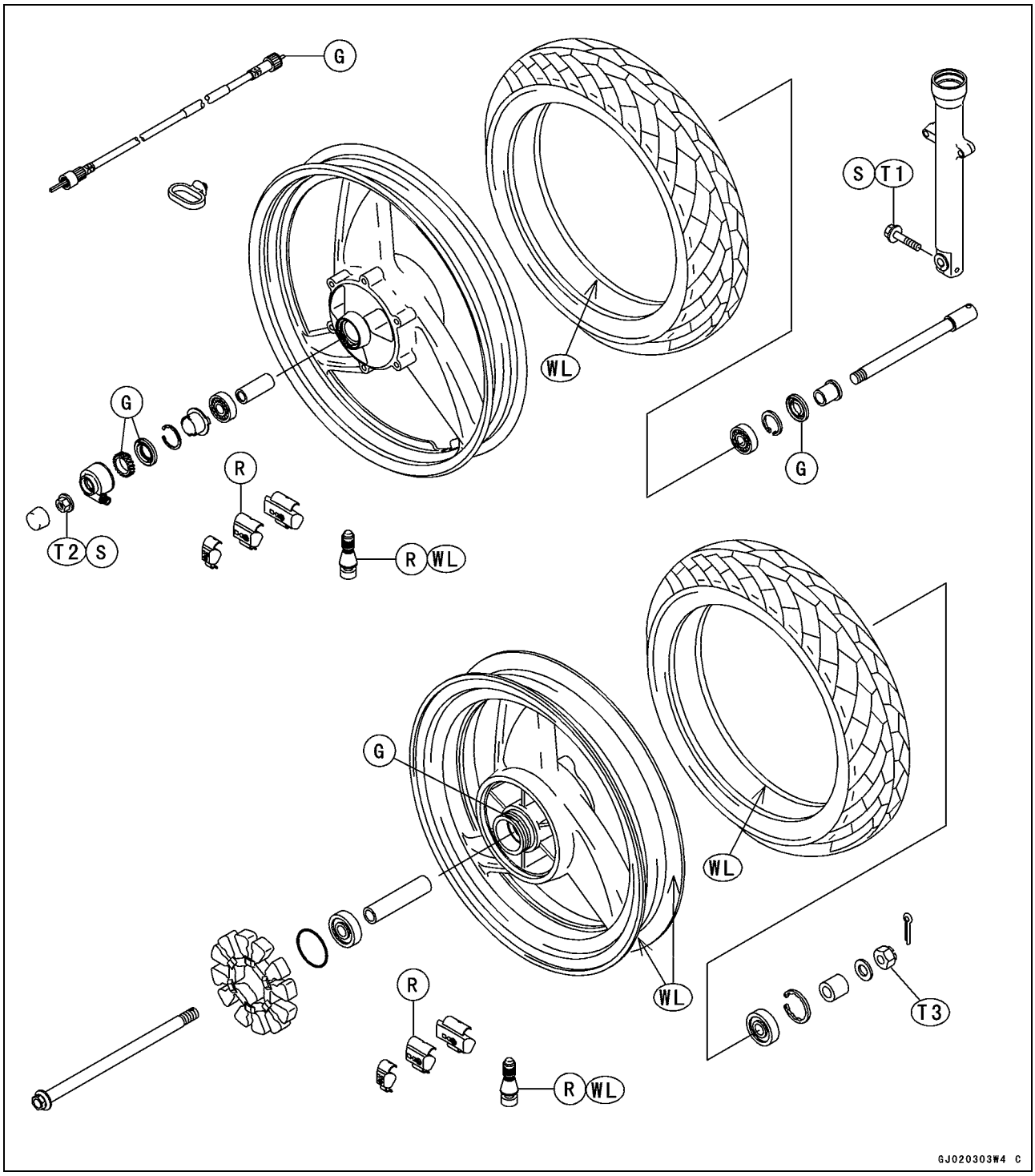
Exploded View



T1: 20 N·m (2.0 kgf·m, 14.5 ft·lb)
T2: 88 N·m (9.0 kgf·m, 65 ft·lb)
T3: 98 N·m (10.0 kgf·m, 72 ft·lb)
G: Apply grease.
R: Replacement Parts
S: Follow the specific tightening sequence.
WL: Apply soap and water solution or rubber lubricant.

Specifications

Item	Standard		Service Limit
	EN500-C1 ~ C2, D1	EN500-C3 ~	
Wheels (Rims)			
Rim Runout:			
Radial	– – –	– – –	0.5 mm (0.02 in.)
Axial	– – –	– – –	0.8 mm (0.03 in.)
Axle Runout/100 mm (3.94 in.)	0.1 mm (0.004 in.) or less	←	0.2 mm (0.008 in.)
Wheel Balance	10 g (0.35 US oz) or less	←	– – –
Balance Weights	10 g (0.35), 20 g (0.71), 30 g (1.06); (US oz)	←	– – –
Tires			
Air pressure: (when cold)			
Front			
Up to 181 kg (400 lb) load	225 kPa (2.25 kgf/cm², 32 psi)	←	– – –
Rear			
Up to 97.5 kg (215 lb) load	250 kPa (2.50 kgf/cm², 36 psi)	←	– – –
97.5 kg (215 lb) ~ 181 kg (400 lb) load	280 kPa (2.80 kgf/cm², 41 psi)	←	– – –
Tread depth:			
Front	4.5 mm (0.18 in.)	←	1 mm (0.04 in.)
Rear	7.4 mm (0.29 in.)	←	Up to 130 km/h (80 mph): 2 mm (0.08 in.) Over 130 km/h (80 mph): 3 mm (0.12 in.)
Standard Tires:			
Front			
Make, Type	DUNLOP, GT501FG (tubeless)	←	– – –
Size	110/70-17 54H	110/70-17 M/C 54H	– – –
Rear			
Make, Type	DUNLOP, GT501G (tubeless)	←	– – –
Size	130/70-17 M/C 62H	130/70-17 M/C 62H	– – –

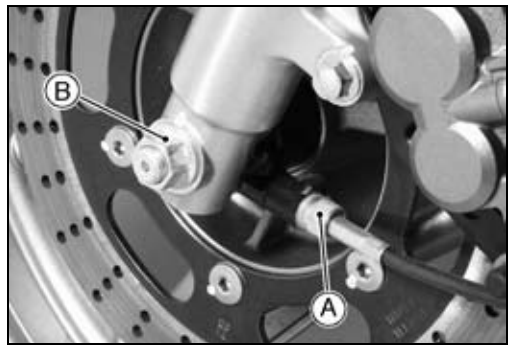
Special Tools - Inside Circlip Pliers: 57001-143
Rim Protector: 57001-1063
Bead Breaker Assembly: 57001-1072
Bearing Driver Set: 57001-1129
Jack: 57001-1238
Bearing Remover Shaft: 57001-1377
Bearing Remover Head, ϕ15 × ϕ17: 57001-1267

Wheels (Rims)

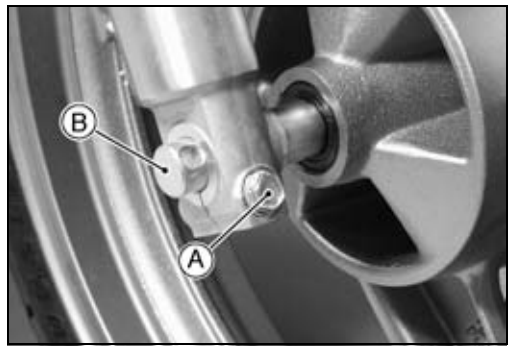
Front Wheel Removal

- Remove the speedometer cable lower end [A].
- Loosen the front axle nut [B].
- Raise the front wheel off the ground.

Special Tool - Jack: 57001-1238



- Loosen the axle clamp bolt [A].
- Pull out the axle [B] to the right, and remove the front wheel, speedometer gear housing, and collars.

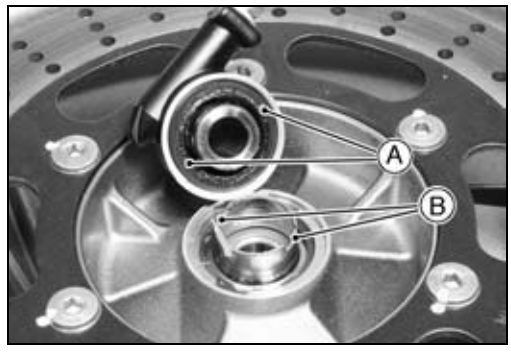


CAUTION

Do not lay the front 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

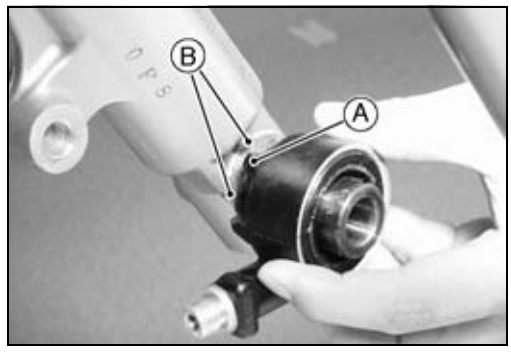
- Install the speedometer gear housing so that its projections [A] fit into the gear drive notches [B] in the wheel hub.
- Fit the collar on the right hand side of the hub.



- Fit the speedometer gear housing stop [A] to the fork leg stop [B].

Tighten the axle nut and axle clamp bolt.

Torque - Front Axle Nut: 88 N·m (9.0 kgf·m, 65 ft·lb)
Front Axle Clamp Bolt: 20 N·m (2.0 kgf·m, 14.5 ft·lb)



- Install the speedometer cable lower end.

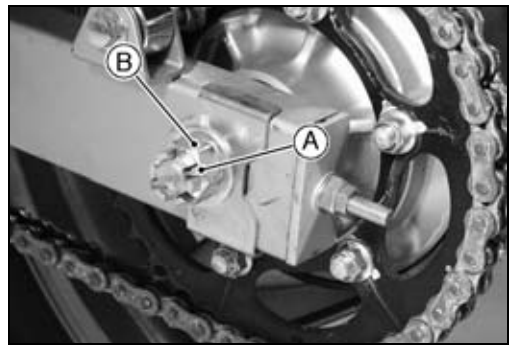
Check the front brake.

⚠ WARNING

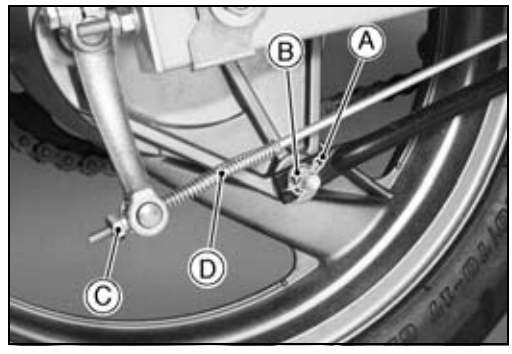
Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brake will not function on the first application of the lever if this is not done.

Wheels (Rims)

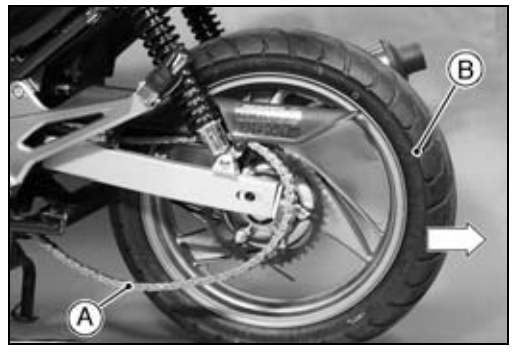
Rear Wheel Removal



- Remove:
  Cotter Pin [A]
  Rear Axle Nut [B] (loosen)



- Raise the rear wheel off the ground using the center stand.
- Remove:
  Cotter Pin [A]
  Torque Link Nut and Bolt [B]
  Adjuster [C] and Brake Rod [D]
  Rear Axle Nut



- Pull out the rear axle to the right and drop the rear wheel.
- Remove the drive chain [A] from the rear sprocket toward the left.
- Move the rear wheel [B] back and remove it.

Rear Wheel Installation

- Engage the drive chain with the rear sprocket.
- Insert the axle from the right side of the wheel.
- To prevent a soft, or "spongy feeling" of the brake, center the brake panel assembly in the brake drum as follows:

○Tighten the axle nut lightly.
○Install the torque link bolt and nut.
○Spin the wheel, and apply the rear brake, and then tighten the axle nut to the specified torque.

Torque - Rear Axle Nut: 98 N·m (10.0 kgf·m, 72 ft·lb)

- Check the drive chain slack and adjust it if necessary.
- Install the removed parts.

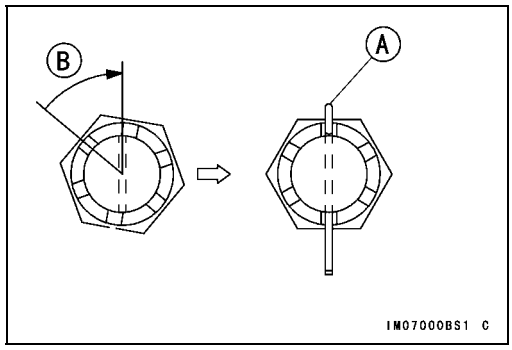
Torque - Torque Link Nuts: 34 N·m (3.5 kgf·m, 25 ft·lb)

Wheels (Rims)

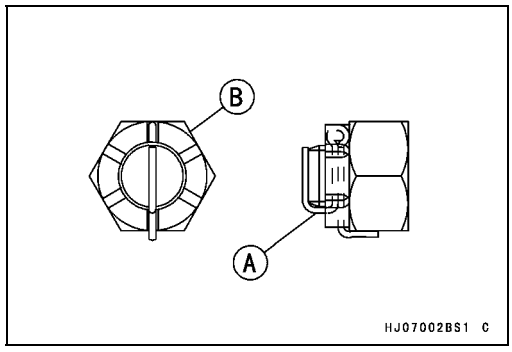
● Insert a new cotter pin [A].

NOTE

○*When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axel, tighten the nut clockwise [B] up to next alignment.*
○*It should be within 30 degree.*
○*Loosen once and tighten again when the slot goes past the nearest hole.*



● Bend the cotter pin [A] over the nut [B].



● Check the rear brake effectiveness.
● Check the rear brake light switch timing, and adjust it if necessary.

Wheel Inspection

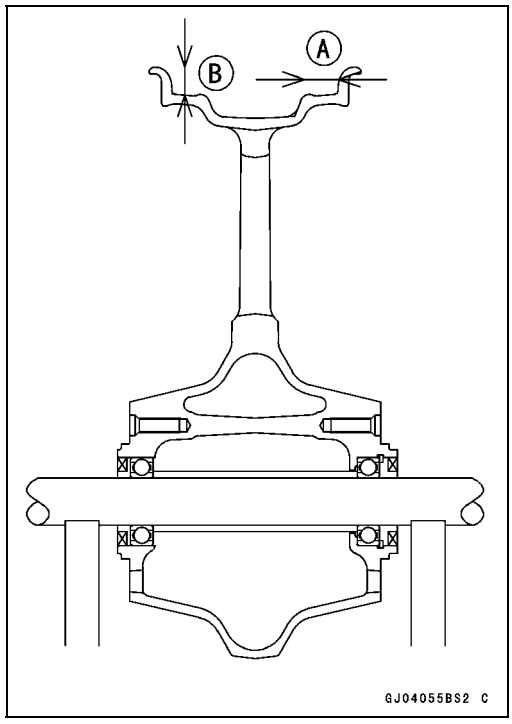
● Raise the front/rear wheel off the ground.

Special Tool - Jack: 57001-1238

● Spin the wheel lightly, and check for roughness or binding.
★If roughness or binding is found, replace the hub bearings.
● Inspect the wheel for small cracks, dents, bending, or warp.
★If there is any damage to the wheel, replace the wheel.
● Remove the wheel, and support it without the tire by the axle.
● Measure the radial [A] and axial [B] rim runout with a dial gauge.
★If rim runout exceeds the service limit, check the hub bearings.
★If the problem is not due to the bearings, replace the wheel.

Rim Runout
Service Limit:

Axial	**0.5 mm (0.02 in.)**
Radial	**0.8 mm (0.03 in.)**

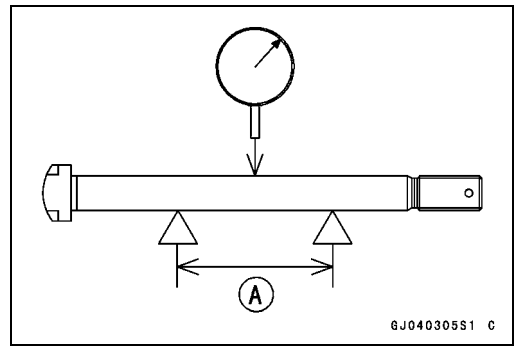


⚠ WARNING

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

Wheels (Rims)

Axle Inspection



- Visually inspect the front and rear axle for damages.

★If the axle is damaged or bent, replace it.

- Measure the axle runout with a dial gauge.

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

Axle Runout/100 mm (3.94 in.)

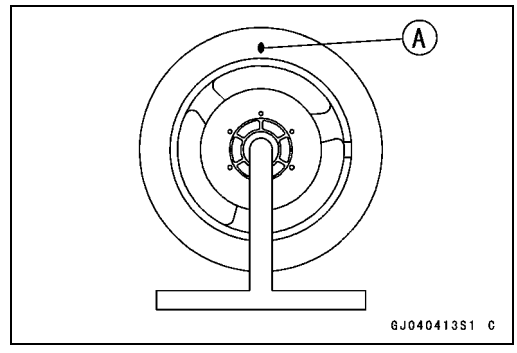
Standard:	**less than 0.1 mm (0.004 in.)**
Service Limit:	**0.2 mm (0.008 in.)**

Wheel Balance

To improve stability and decrease vibration at high speed, the front and rear wheels must be kept balanced.

Check and balance the wheels when required, or when a tire is replaced with a new one.

Balance Inspection

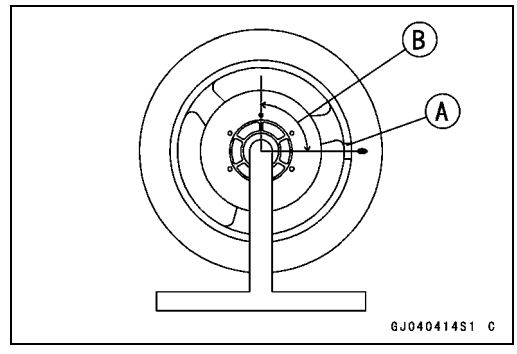


- Remove the wheel.
- Support the wheel so that it can be spun freely.
- Spin the wheel lightly, and mark [A] the wheel at the top when the wheel stops.

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

★If the wheel always stops in one position, adjust the wheel balance.

Balance Adjustment



- If the wheel always stops in one position, provisionally attach a balance weight [A] on the rim at the marking using adhesive tape.
- Rotate the wheel 1/4 turn [B], and see whether or not the stops in this position. If it does, the correct balance weight is being used.

★If the wheel rotates and the weight goes up, replace the weight with the next heavier size. If the wheel rotates and the weight goes down, replace the weight with the next lighter size. Repeat these steps until the wheel remains at rest after being rotated 1/4 turn.

- Rotate the wheel another 1/4 turn and then another 1/4 turn to see if the wheel is correctly balanced.

Wheels (Rims)

- Repeat the entire procedure as many times as necessary to achieve correct wheel balance.
- Permanently install the balance weight.

Balance Weight

Part Number	Weight: g (US oz)
41075-1059	10 (0.35)
41075-1060	20 (0.71)
41075-1061	30 (1.06)

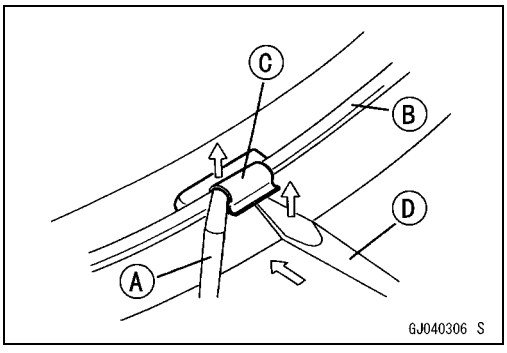
NOTE

○*Balance weights are available from Kawasaki dealers in 10, 20 g (0.35, 0.71 US oz), and 30 g (1.06 US oz) sizes. An imbalance of less than 10 grams will not usually affect running stability.*

○*Do not use four or more balance weight (more than 90 gram). If the wheel requires an excess balance weight, disassemble the wheel to find the cause.*

Balance Weight Removal

- Insert a standard screwdriver [A] between the rib [B] and the clip [C] as shown.
- Insert another screwdriver [D] under the clip end.
- Pry the clip with two screwdrivers and remove the balance weight.



CAUTION

When removing the balance weight, do not touch the brake disc. The disc could be damaged.
Do not tap the screwdrivers. The rim could be damaged.

Balance Weight Installation

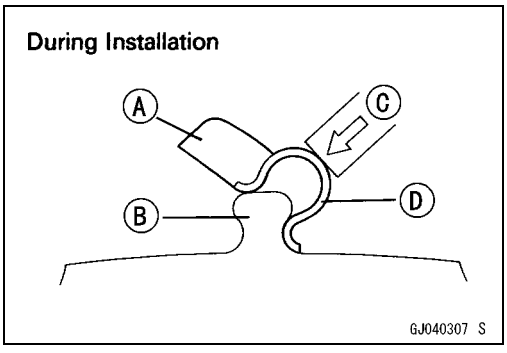
- Check if the weight portion has any play on the clip plate.

★If it does, discard it.

- Slip the balance weight [A] onto the rib [B] by pushing or lightly hammering [C] the clip [D].

CAUTION

When installing the balance weight, do not touch the brake disc. The disc could be damaged.

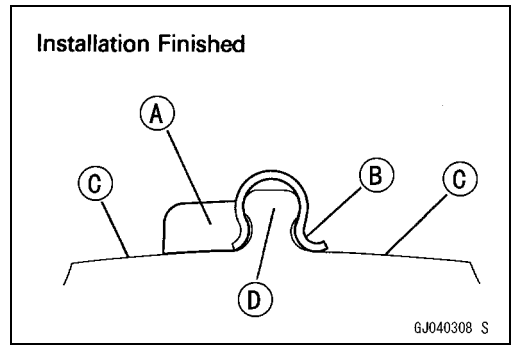


Wheels (Rims)

- Check that the weight [A] and clip [B] are fully seated on the rim [C] and that the clip is hooked over the rib [D].

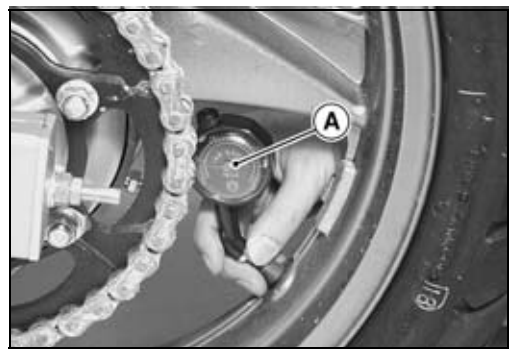
⚠ WARNING

If the balance weight has any play on the rim, the clip of the weight has been stretched. Replace the loose balance weight.
Do not reuse balance weight.
Unbalanced wheels can create an unsafe riding condition.



Tires

Air Pressure Inspection/Adjustment



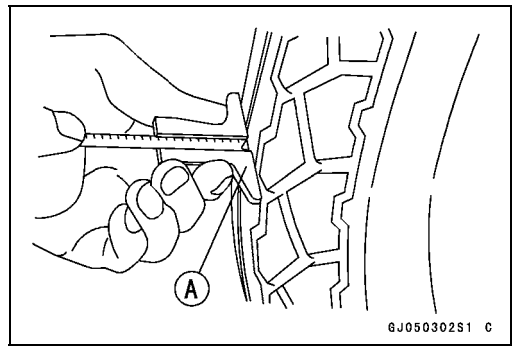
- Measure the tire air pressure with an air pressure gauge [A] when the tires are cold (that is, when the motorcycle has not been ridden more than a mile during the past 3 hours).

★Adjust the tire air pressure according to the specifications if necessary.

Air Pressure (when cold)

Front	up to 181 kg (400 lb) load	225 kPa (2.25 kgf/cm², 32 psi)
Rear	up to 97.5 kg (215 lb) load	250 kPa (2.50 kgf/cm², 36 psi)
	97.5 kg (215 lb) ~ 181 kg (400 lb) load	280 kPa (2.80 kgf/cm², 41 psi)

Tire Wear Inspection



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

- Remove any imbedded stones or other foreign particles from the tread.
- Visually inspect the tire for cracks and cuts, replacing the tire in case of damage. Swelling or high spots indicate internal damage, requiring tire replacement.
- Measure the tread depth at the center of the tread with a depth gauge [A]. Since the tire may wear unevenly, take measurement at several places.

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

Tread Depth

Front:	**DUNLOP**
Standard:	**4.5 mm (0.18 in.)**
Service Limit:	**1 mm (0.04 in.)**
Rear:	**DUNLOP**
Standard:	**7.4 mm (0.29 in.)**
Service Limit:	**2 mm (0.08 in.)(Up to 130 km/h (80 mph))**
	3 mm (0.12 in.)(Over 130 km/h (80 mph))

⚠ WARNING

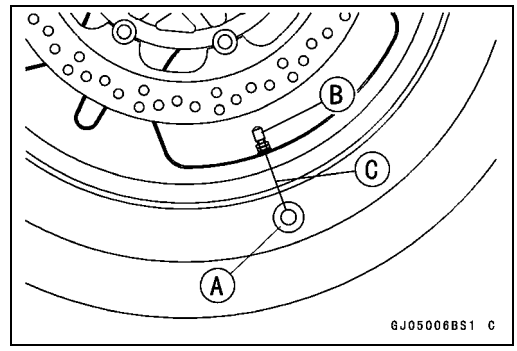
To ensure safe handling and stability, use only the recommended standard tires for replacement, inflated to the standard pressure.
Use the same manufacturer's tires on both front and rear wheels.

NOTE

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

Tires

Tire Removal



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

- Remove the wheel.
- To maintain wheel balance, mark the valve stem position on the tire with chalk so that the tire can be reinstalled in the same position.
  Chalk Mark or Yellow Mark [A]
  Air Valve [B]
  Align [C]

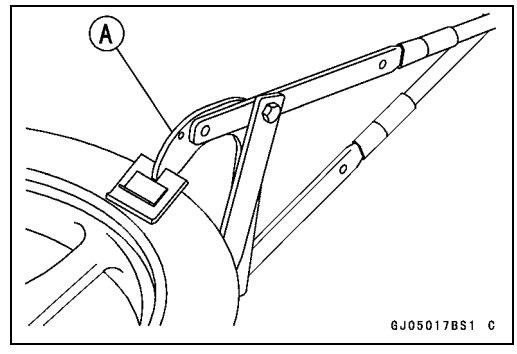
○When handling the rim, be careful not to damage the rim flanges.

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

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

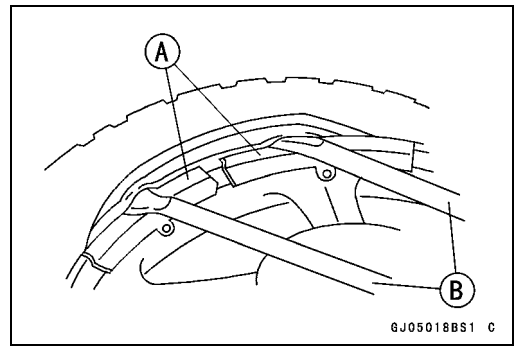
- Break the beads away from both sides of the rim with the bead breaker [A].

  Special Tool - Bead Breaker Assembly: 57001-1072



- Step on the side of the tire opposite valve stem, and pry the tire off the rim with the tire iron [B] of the bead breaker protecting the rim with rim protectors [A].

  Special Tools - Rim Protector: 57001-1063
  Bead Breaker Assembly: 57001-1072



CAUTION
Take care not to insert the tire irons so deeply that the tube gets damaged.

- Remove the tube when one side of the tire is pried off.
- Pry the tire off the rim.

Tires

Tire Installation

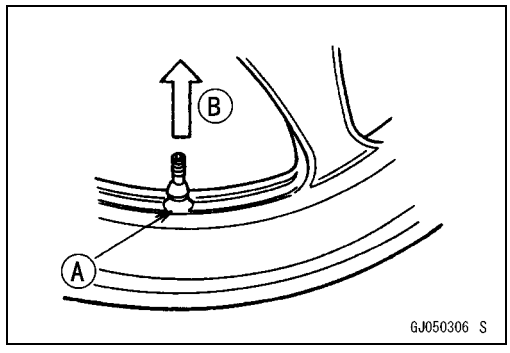
- Inspect the rim and the tire, and replace them if necessary.
- Clean the sealing surfaces of the rim and tire, and smooth the sealing surfaces of the rim with a fine emery cloth if necessary.
- Remove the air valve and discard it.

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

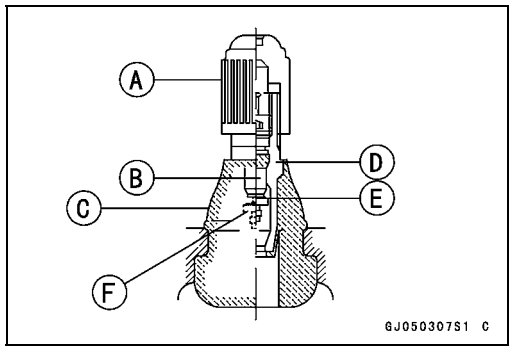
- Install a new valve in the rim.

○Remove the valve cap, lubricate the stem seal [A] with a soap and water solution or rubber lubricant, and pull [B] the valve stem through the rim from the inside out until it snaps into place.

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

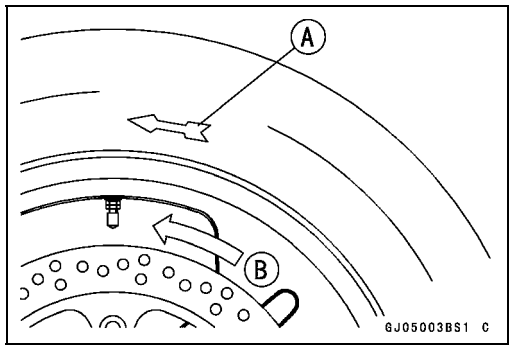


Valve Cap [A]
Stem Core [B]
Stem Seal [C]
Valve Stem [D]
Valve Seat [E]
Valve Opened [F].

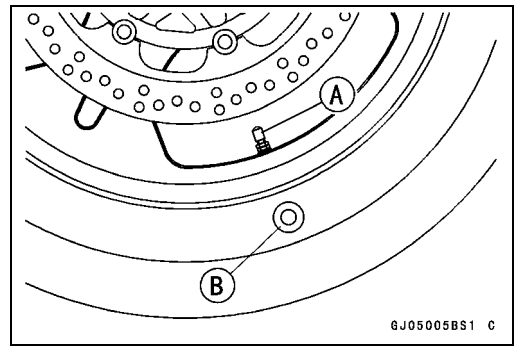


- Check the tire rotation mark on the front and rear tires and install them on the rim accordingly.

Rotation Direction [A]
Tire Rotation Mark [B]



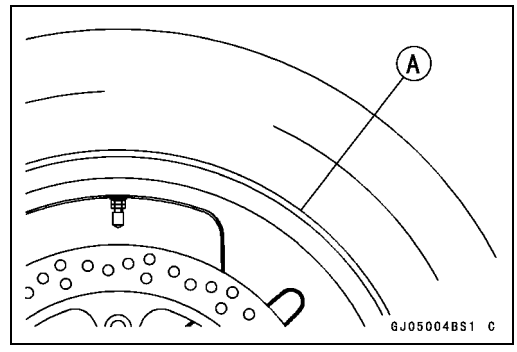
Tires



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

⚠ WARNING

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



- Check to see that the rim lines [A] on both sides of the tire sidewalls are parallel with the rim flanges.

★If the rim flanges and tire sidewall rim lines are not parallel, remove the valve core.

- Lubricate the rim flanges and tire beads.
- Install the valve core and inflate the tire again.
- After the tire beads seat in the rim flanges, check for air leakage.

○Inflate the tire slightly above standard inflation.

○Use a soap and water solution or submerge the tire, and check for bubbles that would indicate leakage.

- Adjust the air pressure to the specified pressure (see Tire Inspection).
- Install the air valve cap.
- Install the brake disc(s) so that the marked side faces out (see Brakes chapter).
- Adjust the wheel balance.

Tire Repair

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

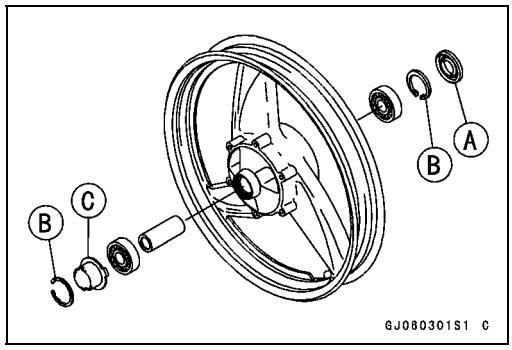
Hub Bearing

Hub Bearing Removal

● Remove the wheel, and take out the following.

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.



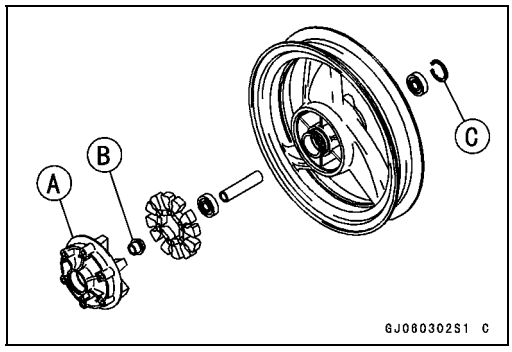
Front

Grease Seal [A]
Circlips [B]
Speedometer Gear Drive [C]

Special Tool - Inside Circlip Pliers: 57001-143

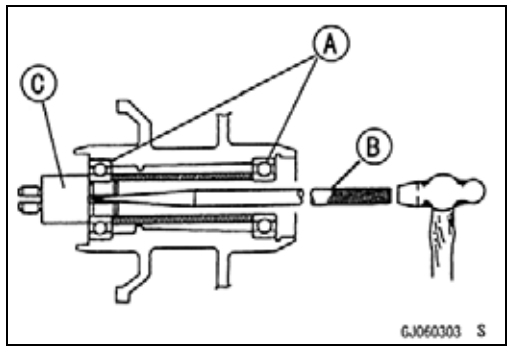
Rear

Coupling [A]
Collar [B]
Brake Panel Circlip [C]



● Take the bearings [A] out of the hub, using the bearing remover.

Special Tools - Bearing Remove Shaft: 57001-1377 [B]
Bearing Remover Head, ϕ15 × ϕ17: 57001 -1267 [C]



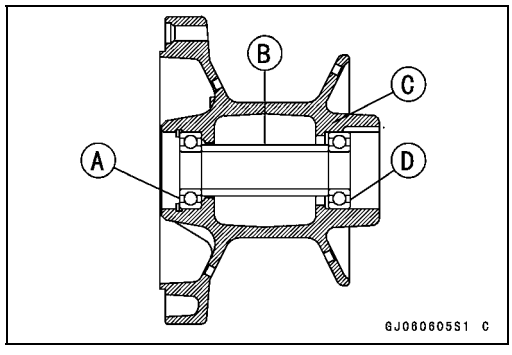
Hub Bearing Installation

● Before installing the hub bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.
● Replace the bearings with new ones.
● Install the front bearings in the following sequence.
○Press in the left side bearing [A] until it is bottomed.

Special Tool - Bearing Driver Set: 57001-1129

○Insert the collar [B] in the hub [C].
○Press in the right side bearing [D] until it is bottomed.
● Press in the rear bearings until they are bottomed.

Special Tool - Bearing Driver Set: 57001-1129



NOTE

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

Hub Bearing

● Replace the circlips with new ones.

Special Tool - Inside Circlip Pliers: 57001-143

● Replace the grease seal with new ones.
● Press in the grease seals so that the seal surface flush with the end of the hole.
○Apply high temperature grease to the grease seal lips.

Special Tool - Bearing Driver Set: 57001-1129

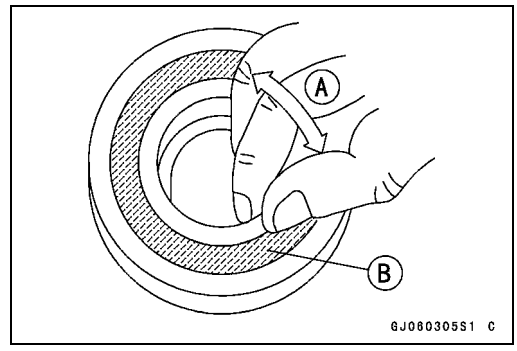
Hub Bearing Inspection

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

NOTE

○*Do not remove any bearings for inspection. If any bearings are removed, they will need to be replaced with new ones.*

● Turn each bearing in the hub back and forth [A] while checking for plays, roughness, or binding.
★If bearing play roughness, or binding is found, replace the bearing.
● Examine the bearing seal [B] for tears or leakage.
★If the seal is torn or is leaking, replace the bearing.



Hub Bearing Lubrication

NOTE

○*Since the front and rear hub bearings are packed with grease and sealed, lubrication is not required.*

Speedometer Gear

Disassembly and Assembly

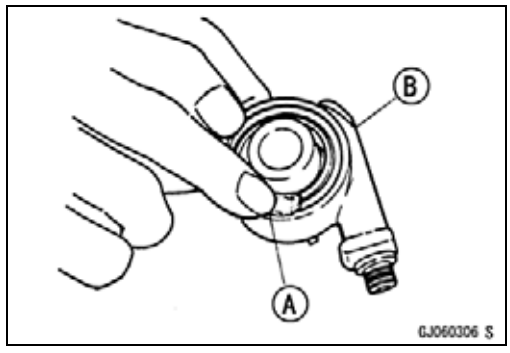
NOTE

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

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

Lubrication

- Clean and grease [A] the speedometer gear housing [B] in accordance with the Periodic Maintenance Chart.



Final Drive

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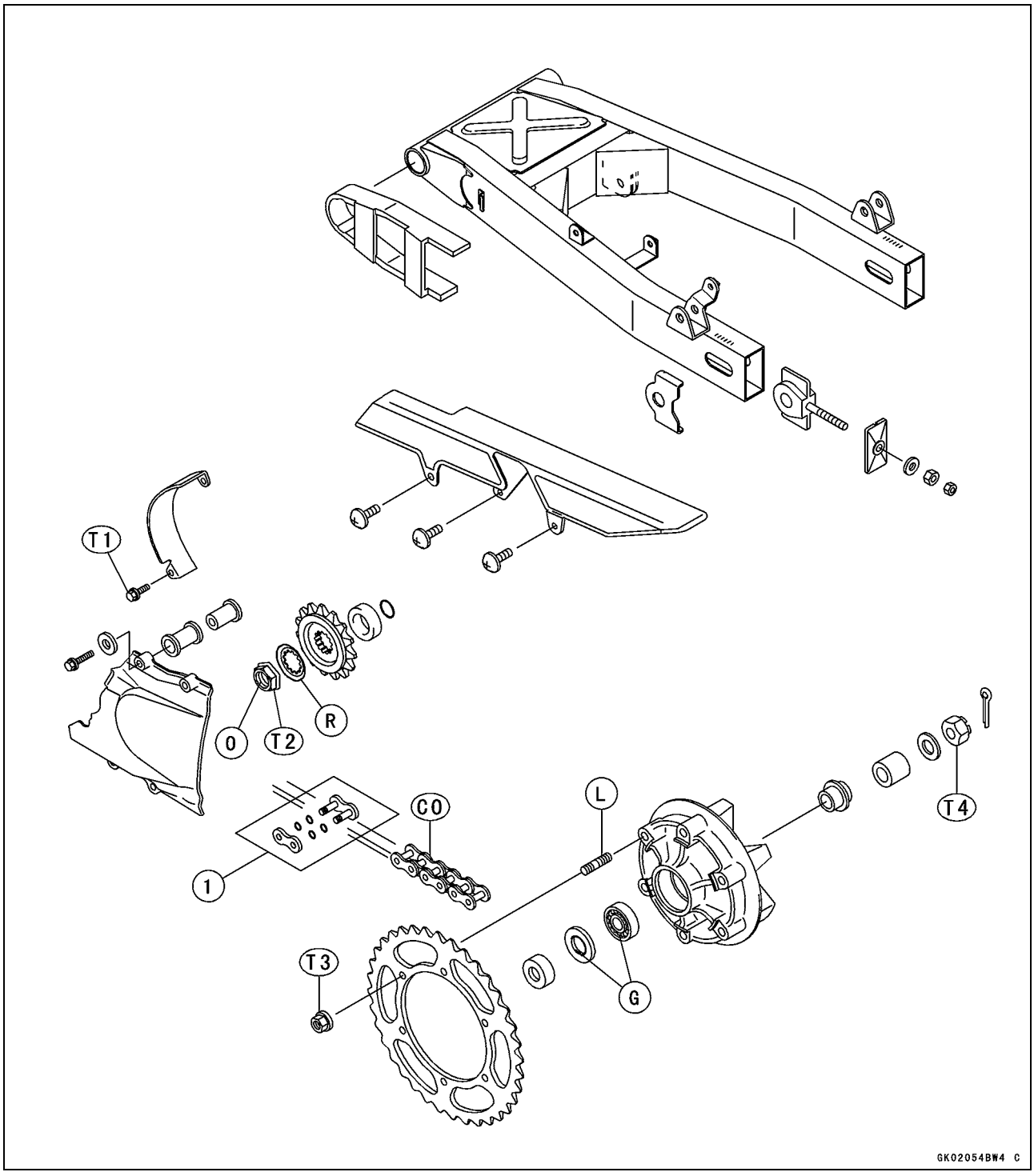
Exploded View



1. Drive Chain Joint (ER500-C4 ~)
T1: 11 N·m (1.1 kgf·m, 95 in·lb)
T2: 127 N·m (13.0 kgf·m, 94 ft·lb)
T3: 59 N·m (6.0 kgf·m, 43 ft·lb)
T4: 98 N·m (10.0 kgf·m, 72 ft·lb)
CO: Apply chain oil.
G: Apply grease.
L: Apply non-permanent locking agent.
O: Apply oil.
R: Replacement Parts

Specifications

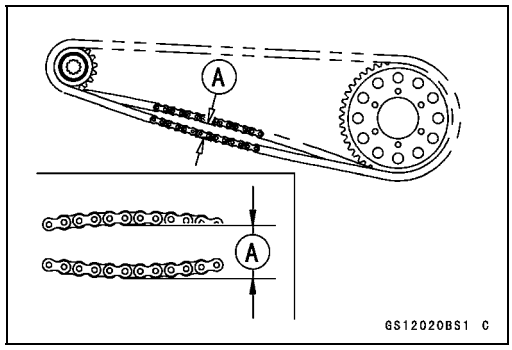
Item	Standard	Service Limit
Drive Chain		
Chain Slack	35 ~ 40 mm (1.4 ~ 1.6 in.)	– – –
20-link Length	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	323 mm (12.7 in.)
Standard Chain		
Make	Enuma	– – –
Type	EK520SX-O, Endless	– – –
	EK520MVXL (ER500-C4 ~)	
Link	106 links	– – –
Sprockets		
Rear Sprocket Warp	0.4 mm (0.016 in.) or less	0.5 mm (0.020 in.)

Special Tools - Inside Circlip Pliers: 57001-143
Bearing Driver Set: 57001-1129

Drive Chain

Drive Chain Slack Inspection

Drive Chain Slack Inspection



NOTE

○*Check the slack with the motorcycle setting on its center stand.*

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

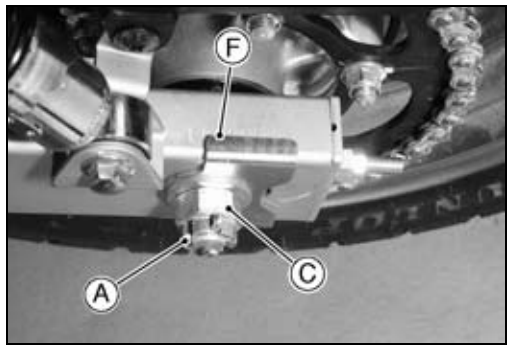
- Check the wheel alignment (see Wheel Alignment Inspection).
- Rotate the rear wheel to find the position where the chain is tightest.
- Measure the vertical movement (chain slack) [A] midway between the sprockets.

★If the chain slack exceeds the standard, adjust it.

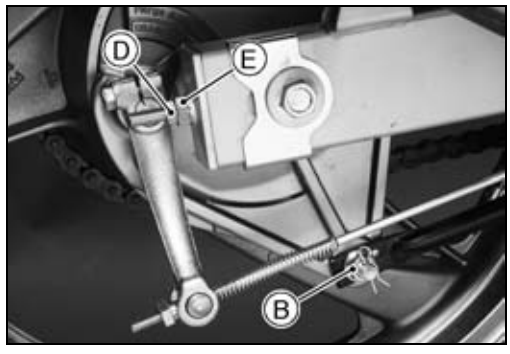
Chain Slack

Standard: 35 ~ 40 mm (1.4 ~ 1.6 in.)

Drive Chain Slack Adjustment



- Remove:
  Cotter Pin [A]
- Loosen:
  Rear Torque Link Nut [B]
  Axle Nut [C]
  Chain Adjuster Locknuts [D] (both sides)
- Turn the chain adjusting nuts [E] forward or rearward until the drive chain has the correct amount of chain slack. To keep the chain and wheel properly aligned, the left rear position [F] of the hole should align with the same graduation that the right rear position aligns with.

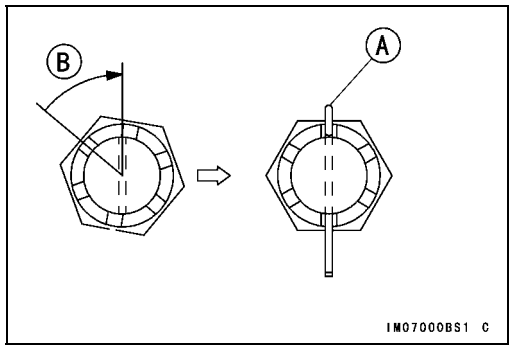


⚠ WARNING

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

- Tighten both chain adjuster locknuts securely.
- Tighten the axle nut (Wheels/Tires chapter).

Torque - Rear Axle Nut: 98 N·m (10.0 kgf·m, 72 ft·lb)



- Insert a the new cotter pin [A].

NOTE

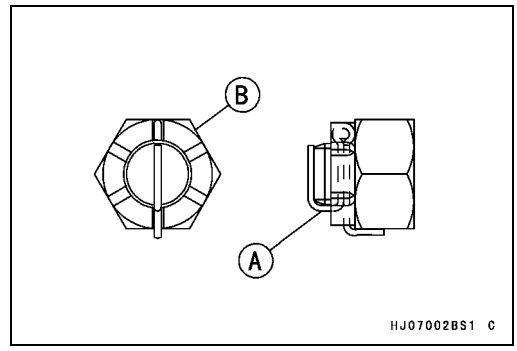
○*When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle shaft, tighten the nut clockwise [A] up to next alignment.*

○*It should be within 30 degree.*

○*Loosen once and tighten again when the slot goes past the nearest hole.*

Drive Chain

- Bend the cotter pin [A] over the nut [B].



- Turn the wheel, measure the chain slack again at the tightest position, and readjust if necessary.
- Tighten the torque link nut.

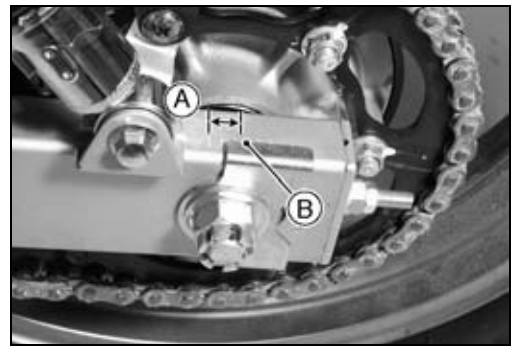
Torque - Torque Link Nut: 34 N·m (3.5 kgf·m, 25 ft·lb)

- Install a new cotter pin to the rear axle.
- Check the rear brake.

Wheel Alignment Inspection/Adjustment

- Check that the right rear end [A] of the hole should align with the same graduation [B] that the left rear end aligns with.

★If they do not, adjust the chain slack and align the wheel alignment.



NOTE

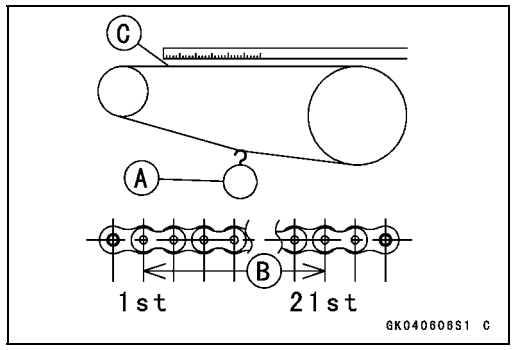
○*Wheel alignment can also be checked using the straightedge or string method.*

⚠ WARNING

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

Drive Chain

Drive Chain Wear Inspection



- Remove:
  Chain Cover
- Rotate the rear wheel to inspect the drive chain for damaged rollers, loose pins and links.

★If there is any irregularity, replace the drive chain.

★Lubricate the drive chain if it appears dry.

- Stretch the chain taut by hanging a 98 N (10 kg, 20 lb) weight [A] on the chain.
- Measure the length of 20 links [B] on the straight part [C] of the chain from the pin center of the 1st pin to the pin center of the 21st pin. Since the chain may wear unevenly, take measurements at several places.

★If any measurements exceed the service limit, replace the chain. Also, replace the front and rear sprockets when the drive chain is replaced.

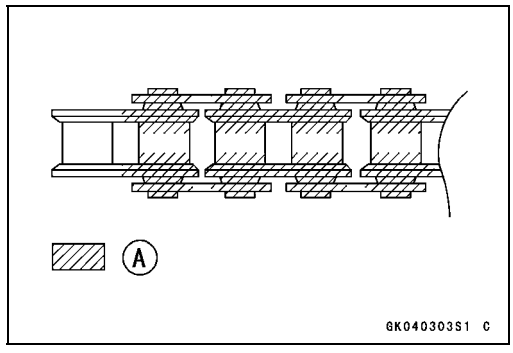
Drive Chain 20-link Length

Standard:	**317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)**
Service Limit:	**323 mm (12.7 in.)**

⚠ WARNING

If the drive chain wear exceeds the service limit, replace the chain or an unsafe riding condition may result. A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control.
For safely, use only the standard chain. It is an endless type and should not be cut for installation.

Drive Chain Lubrication



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

[A] Apply oil

Drive Chain

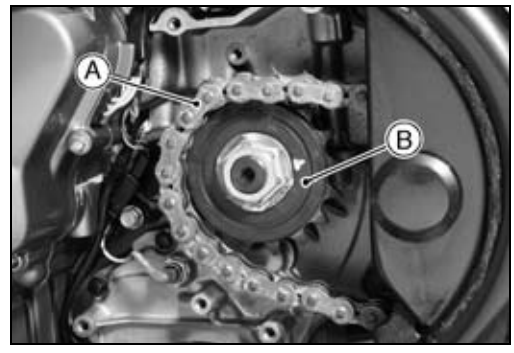
CAUTION

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

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

Drive Chain Removal

- Remove:
  Rear Wheel (see Wheels/Tires chapter)
  Swingarm (see Suspension chapter)
  Engine Sprocket Cover (see Engine Sprocket Cover Removal)
  Chain Guard
- Disengage the drive chain [A] from the engine sprocket [B], and take it off the chassis.



Drive Chain Installation

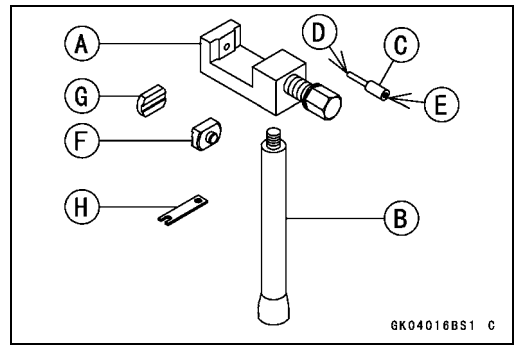
- Engage the drive chain with the engine sprocket.
- Install:
  Swingarm (see Suspension chapter)
  Rear Wheel (see Wheels/Tires chapter)
  Engine Sprocket Cover (see Engine Sprocket Cover Installation)
- Adjust the chain slack after installing the chain (see Slack Adjustment).

Drive Chain Replacement

- Remove:
  Chain Cover (see Drive Chain Removal)
  Engine Sprocket Cover (see Engine Sprocket Removal)

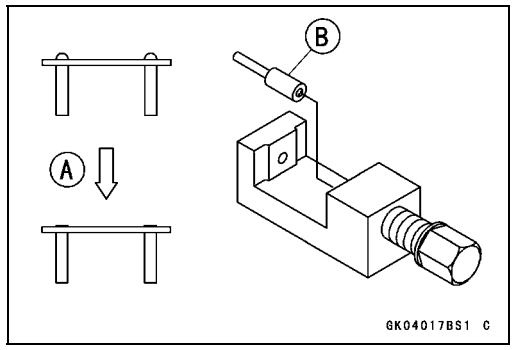
Recommended Tool - Type: EK JOINT TOOL #50
Brand: ENUMA CHAIN

Body [A]
Handlebar [B]
Cutting and Riveting Pin [C]
For Cutting [D]
For Riveting [E]
Plate Holder (A) [F]
Plate Holder (B) [G]
Gauge [H]

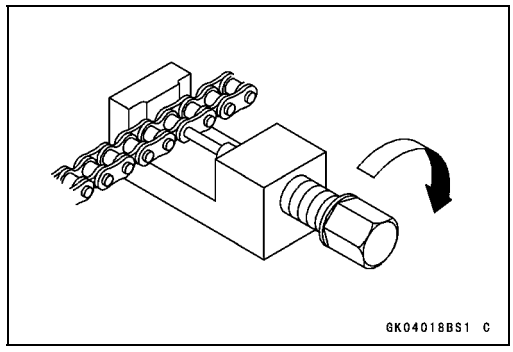


Drive Chain

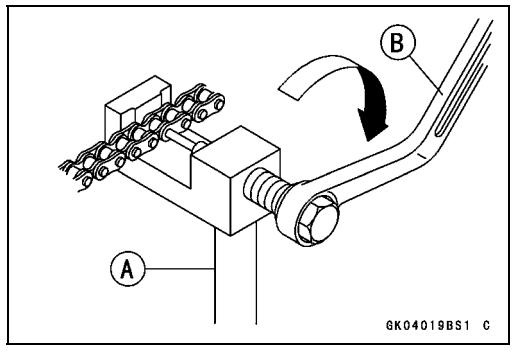
- Grind [A] pin head to make it flat.
- Set cutting and rivetting pin [B] as shown.



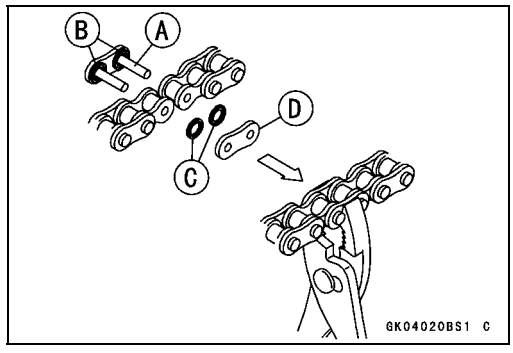
- Screw pin holder until it touches the link pin.
- Be sure that the cutting pin hits center of the link pin.



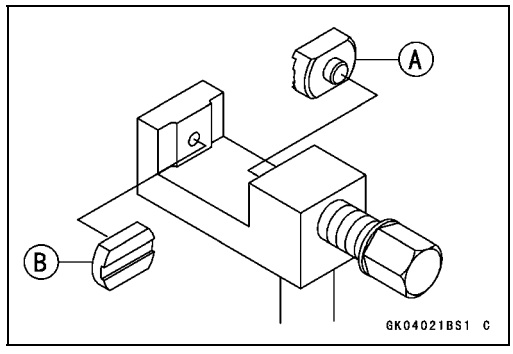
- Screw the handlebar [A] into the body.
- Turn the pin holder with the wrench [B] clockwise to extract the link pin.



- Replace the link pin, link plate and grease seals.
- Apply grease to the link pins [A] and grease seals [B] [C].
- Engage the drive chain on the engine and rear sprockets.
- Insert the link pins in the drive chain ends.
- Install the grease seals [C].
- Install the link plate [D] so that the mark faces out.
- Push the link plate by hand or plier to fix it.
- Be sure to set grease seals correctly.

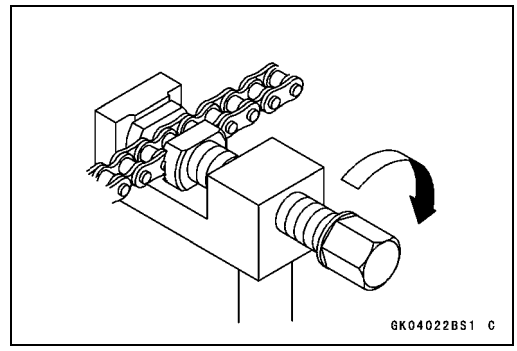


- Set the plate holder (A) [A] and plate holder (B) [B] on the body.

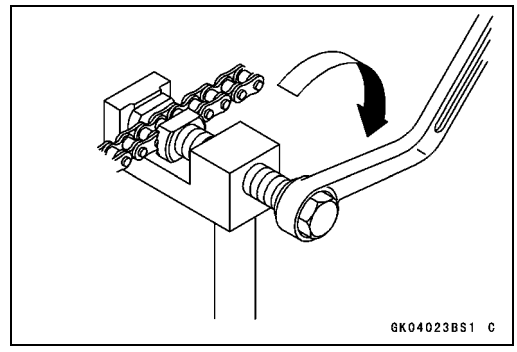


Drive Chain

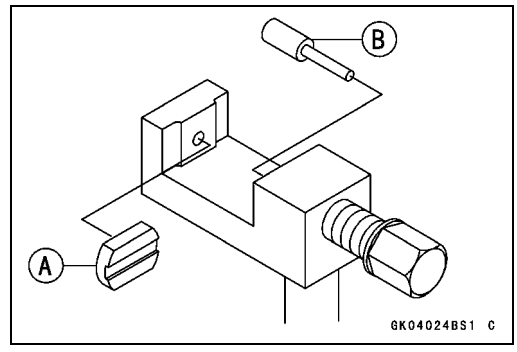
- Fit the plate holder (A) to the link plate.
- Turn the pin holder by hand until the plate holder (B) touches the other link plate.



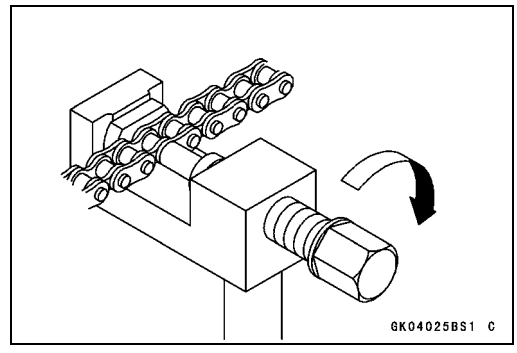
- Turn the pin holder by a wrench clockwise until two pins of link come into groove of the plate holder (A).
- Take off the plate holder.



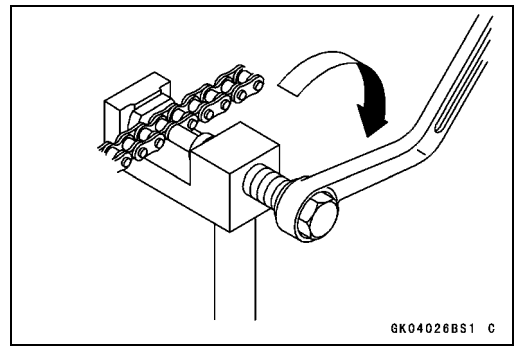
- Set the plate holder (B) [A] and cutting and rivetting pin [B] as shown.



- Turn the pin holder until the rivetting pin touches the link pin.



- Turn the wrench clockwise until the tip of rivetting pin contact with the link pin.
- Rivet it.
- Repeat the same procedure for the other link pin.

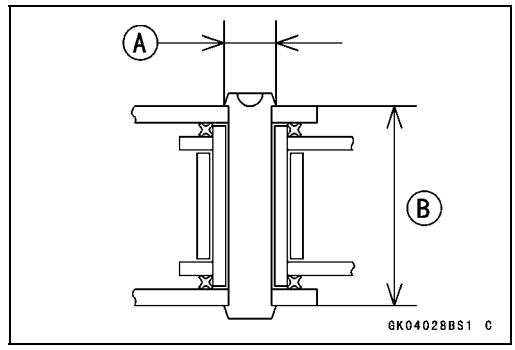


Drive Chain

- After staking, check the staked area of the link pin for cracks.
- Measure the outside diameter [A] of the link pin and link plates width [B].

Link Pin Outside Diameter
Standard: 5.6 ~ 6.0 mm (0.22 ~ 0.24 in.)

Link Plates Outside Width
Standard: 17.45 ~ 17.60 mm (0.687 ~ 0.693 in.)



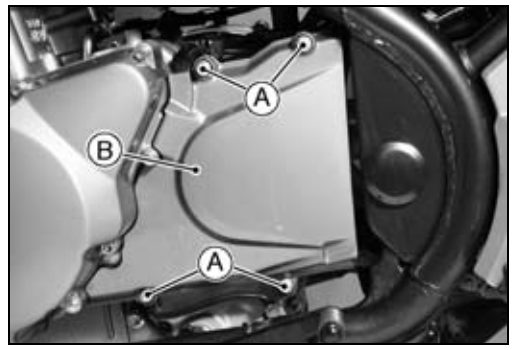
★If the reading exceeds the specified length, cut and rejoin the chain again.

- Check:
  Movement of the Rollers
- Adjust the drive chain slack after installing the chain.

Sprocket, Coupling

Engine Sprocket Removal

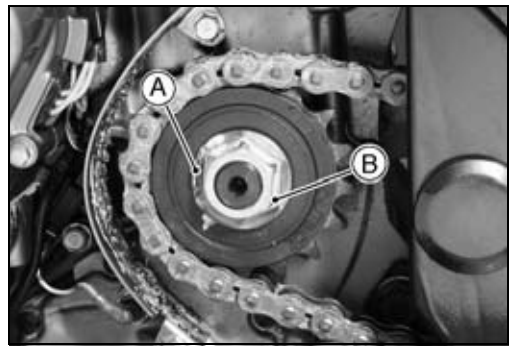
- Remove the bolts [A].
- Pull the engine sprocket cover [B].



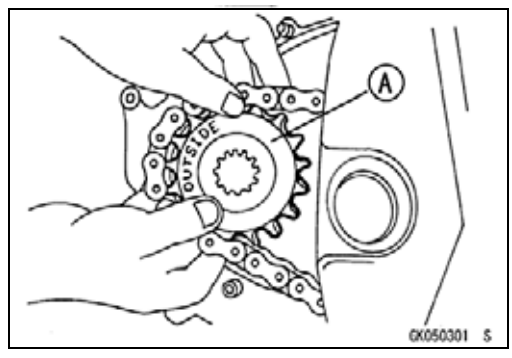
- Flatten out the bended washer [A].
- Remove the engine sprocket nut [B] and washer.

NOTE

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

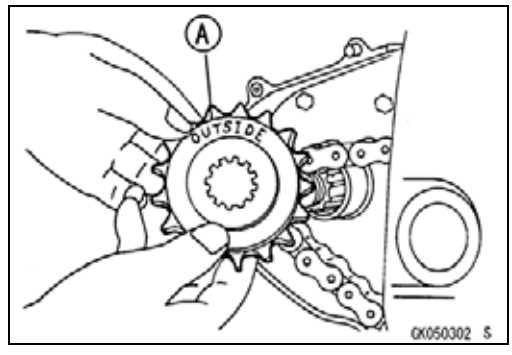


- Loosen the drive chain (see Slack Adjustment).
- Pull the engine sprocket [A] off the output shaft along with the chain.
- Remove the engine sprocket.



Engine Sprocket Installation

- Replace the sprocket washer with a new one.
- Install the engine sprocket so that the "OUTSIDE" mark [A] faces out.
- Be sure to fit the sprocket washer onto the output shaft splines.

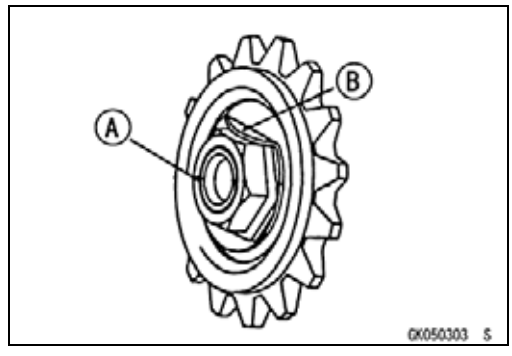


- Apply oil to the threads of the output shaft and the seating surface of the engine sprocket nut.
- After torquing the engine sprocket nut [A], bend the one side [B] of the washer over the nut.

NOTE

○*Tighten the nut while applying the rear brake.*

Torque - Engine Sprocket Nut: 127 N·m (13.0 kgf·m, 94 ft·lb)

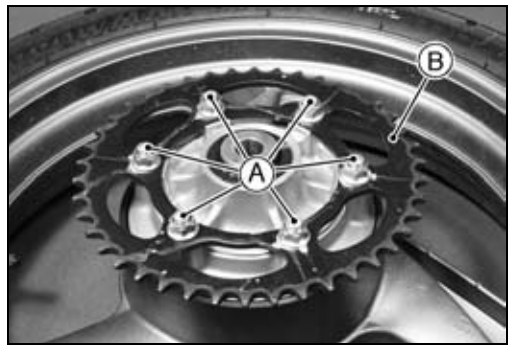


- Install the engine sprocket cover.
- Adjust the drive chain slack after installing the sprocket (see Slack Adjustment).

Sprocket, Coupling

Rear Sprocket Removal

- Remove the rear wheel (see Wheel/Tires chapter).
- Remove the rear sprocket nuts [A].
- Remove the rear sprocket [B].

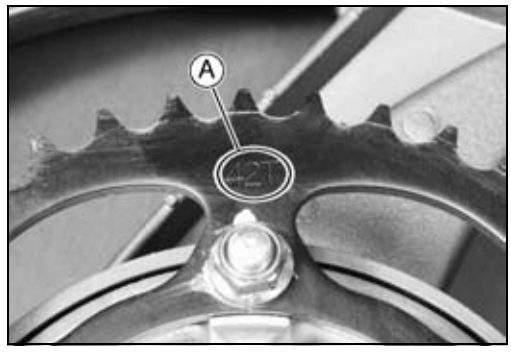


Rear Sprocket Installation

- Install the sprocket facing the tooth number marking [A] outward.
- Tighten the rear sprocket nuts.

Torque - Rear Sprocket Nuts: 59 N·m (6.0 kgf·m, 43 ft·lb)

- Install the rear wheel (see Wheels/Tires chapter).
- Adjust the drive chain slack after installing the sprocket (see Slack Adjustment).

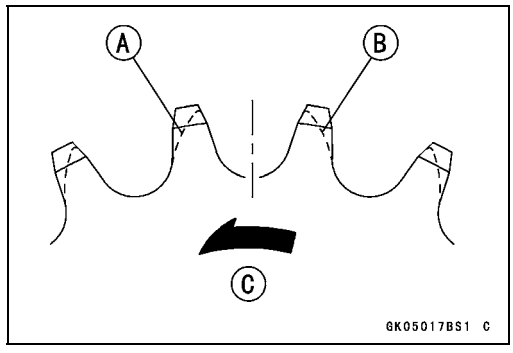


Sprocket Wear Inspection

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

★If the teeth are worn as illustrated, replace the sprocket with a new one, and inspect the drive chain wear (see Drive Chain Wear Inspection).

[A] Worn Tooth (Engine Sprocket)
[B] Worn Tooth (Rear Sprocket)
[C] Direction of Rotation



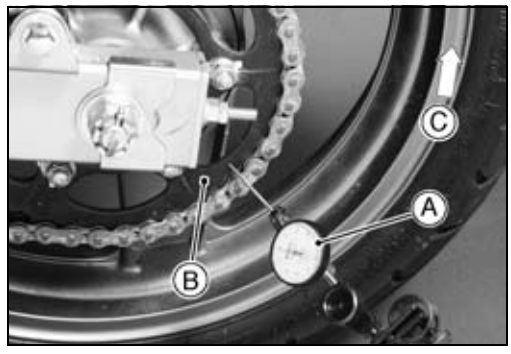
NOTE

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

Rear Sprocket Warp Inspection

- Raise the rear wheel off the ground so that it will turn freely.
- Set a dial gauge [A] against the rear sprocket [B] near the teeth as shown, and rotate [C] the rear wheel to measure the sprocket runout (warp). 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.



Rear Sprocket Warp

Standard:	**less than 0.4 mm (0.016 in.)**
Service Limit:	**0.5 mm (0.020 in.)**

Sprocket, Coupling

Coupling Bearing Removal

- Remove:
  Coupling
  Grease Seal [A]

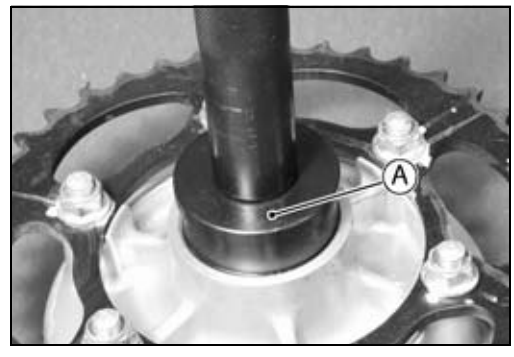
- Remove the bearing by tapping from the brake drum side.
  Special Tool - Bearing Driver Set: 57001-1129 [A]

Coupling Bearing Installation

- Replace the bearing with a new one.
- Press in the bearing until it is bottomed.
  Special Tool - Bearing Driver Set: 57001-129 [A]
- Pack the bearing with high temperature grease.
- Replace the circlip with a new one.
  Special Tool - Inside Circlip Pliers: 57001-143

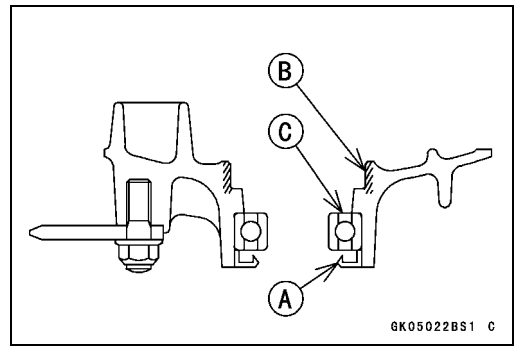
- Replace the grease seal with a new one.
- Press in the grease seal so that the seal surface is flush with the end of the hole.

○Apply high temperature grease to the grease seal lips.
Special Tool - Bearing Driver Set: 57001-1129 [A]



Coupling Installation

- Grease the following and install the coupling.
  Coupling Grease Seal [A]
  Coupling Internal Surface [B]
  Ball Bearing [C]



Sprocket, Coupling

Coupling Bearing Inspection and Lubrication

NOTE

○*It is not necessary to remove the coupling bearing for inspection and lubrication. If the bearing is removed, it will need to be replaced with a new one.*

- Spin the bearing by hand to check its condition.

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

- Examine the bearing seal for tears or leakage.

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

- Pack the bearing with good quality bearing grease. Turn the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing.

Brakes

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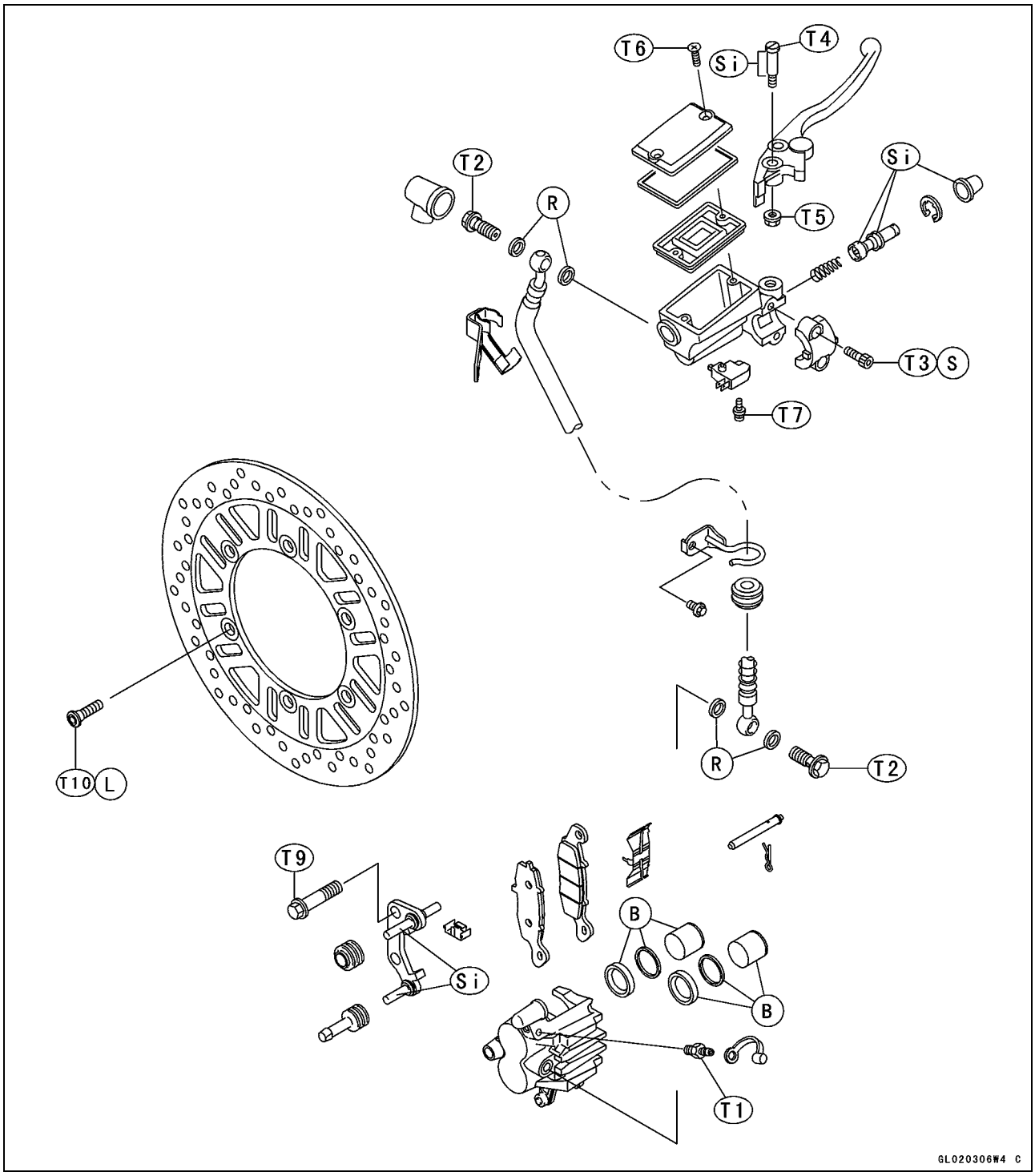
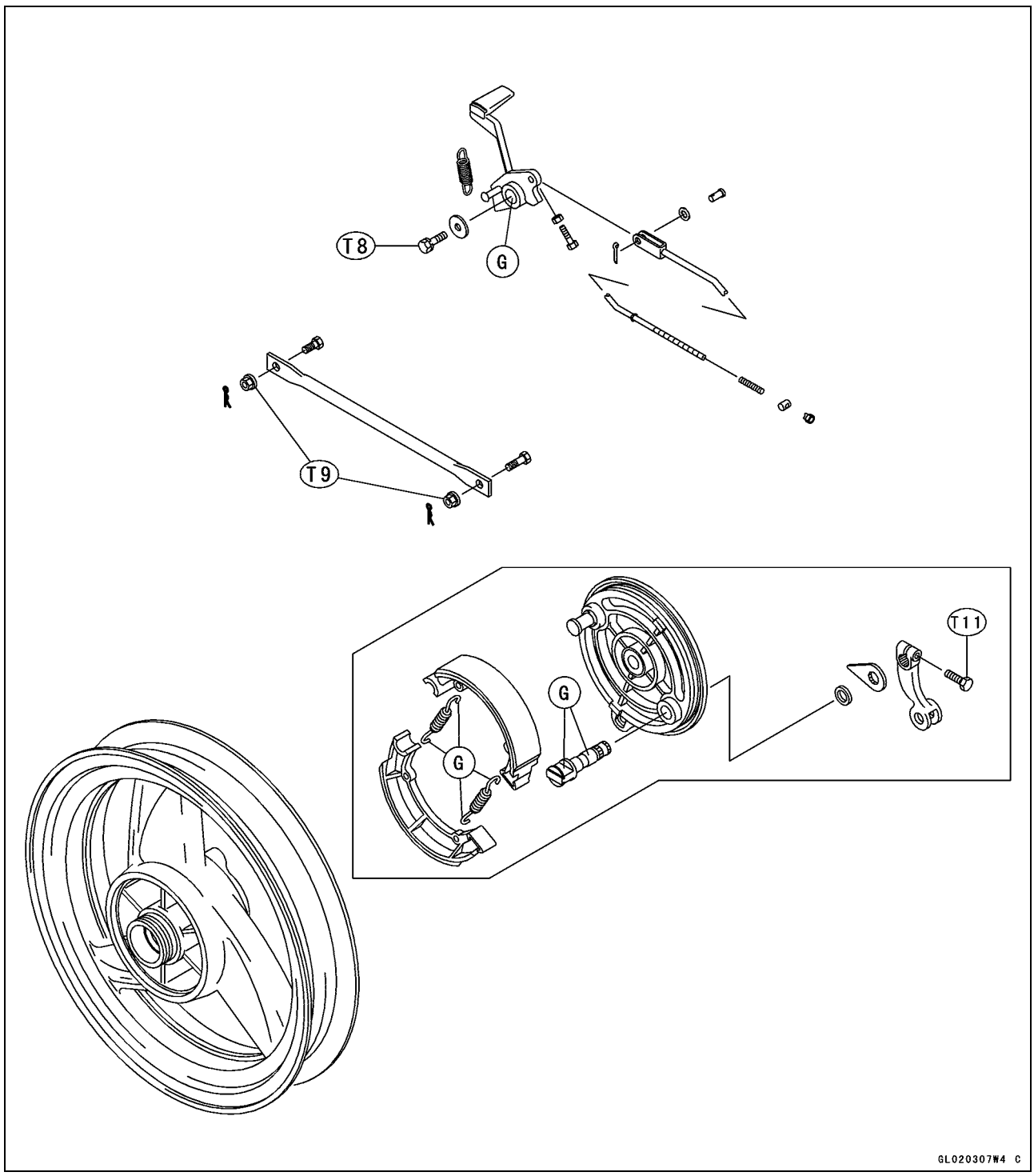
Exploded View



T1: 7.8 N·m (0.80 kgf·m, 69 in·lb)
T2: 25 N·m (2.5 kgf·m, 18.0 ft·lb)
T3: 11 N·m (1.1 kgf·m, 95 in·lb)
T4: 1.0 N·m (0.10 kgf·m, 9 in·lb)
T5: 5.9 N·m (0.60 kgf·m, 52 in·lb)
T6: 1.5 N·m (0.15 kgf·m, 13 in·lb)
T7: 1.2 N·m (0.12 kgf·m, 10 in·lb)
T8: 8.8 N·m (0.90 kgf·m, 78 in·lb)
T9: 34 N·m (3.5 kgf·m, 25 ft·lb)
T10: 27 N·m (2.8 kgf·m, 20 ft·lb)
T11: 19 N·m (1.9 kgf·m, 13.5 ft·lb)
B: Apply brake fluid.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement parts.
S: Follow the specific tightening sequence.
Si: Apply silicone grease, or PBC grease.

Exploded View



Specifications

Item	Standard	Service Limit
Front Brake		
Brake Lever Position	4-way adjustable (to suit rider) 5-way adjustable (to suit rider): ER500-C4 ~	– – –
Brake Lever Free Play	Non-adjustable	– – –
Pad Lining Thickness	4.5 mm (0.177 in.)	1 mm (0.04 in.)
Disc Thickness	4.8 ~ 5.2 mm (0.189 ~ 0.205 in.)	4.5 mm (0.18 in.)
Disc Runout	Not more than 0.2 mm (0.008 in.)	0.3 mm (0.012 in.)
Brake Fluid:		
Grade	DOT4	– – –
Rear Brake		
Brake Pedal Position	About 20 mm (0.79 in.) below footpeg top	– – –
Cam Lever Angle	80 ~ 90°	– – –
Brake Pedal Free Play	20 ~ 30 mm (0.79 ~ 1.18 in.)	– – –
Brake Maintenance		
Brake Drum Inside Diameter	160.00 ~ 160.16 mm (6.299 ~ 6.305 in.)	160.75 mm (6.329 in.)
Brake Shoe Lining Thickness	3.65 ~ 3.85 mm (0.144 ~ 0.152 in.)	1.9 mm (0.075 in.)
Camshaft Diameter	16.957 ~ 16.984 mm (0.6676 ~ 0.6687 in.)	16.84 mm (0.663 in.)
Camshaft Hole Diameter	17.00 ~ 17.07 mm (0.669 ~ 0.672 in.)	17.15 mm (0.675 in.)

Special Tool - Inside Circlip Pliers: 57001-143

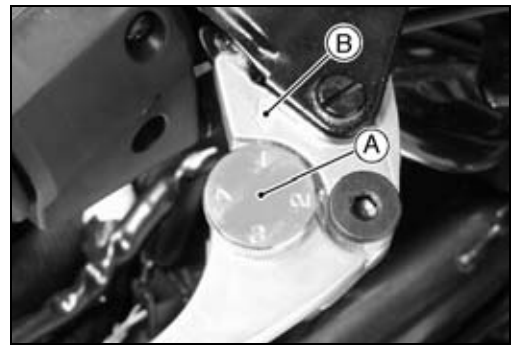
Brake Lever

Lever Position Adjustment

The adjuster has 4 positions so that the brake lever position can be adjusted to suit the operator's hand.

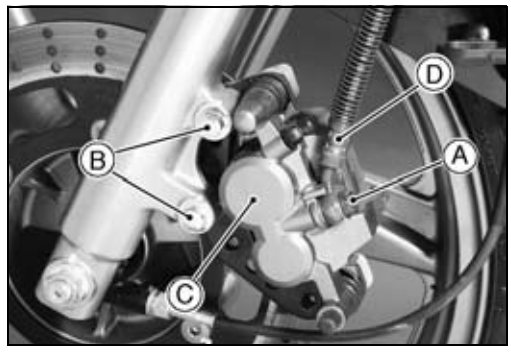
- Push the lever forward and turn the adjuster [A] to align the number with the Arrow mark [B] on the lever holder.

○The distance from the grip to the released lever is minimum at Number 4 and maximum at Number 1.



Caliper

Caliper Removal



- Drain the brake fluid.
- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B], and detach the caliper [C] from the disc.
- Unscrew the banjo bolt and remove the brake hose [D] from the caliper.

NOTE

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

○*Remove the pads (see Pad Removal).*

○*Pump the brake lever to remove the caliper piston.*

CAUTION

Immediately wash away any brake fluid that spills.

Caliper Installation

- Install the caliper and brake hose lower end.

○Replace the washers that are on each side of hose fitting with new ones.

- Tighten the caliper mounting bolts and banjo bolt.

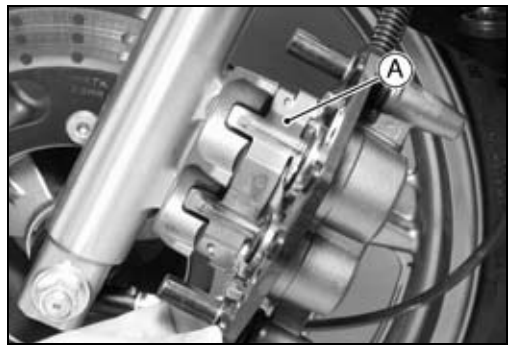
Torque - Caliper Mounting Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)
Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Check the fluid level in the brake reservoir, and bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠ WARNING

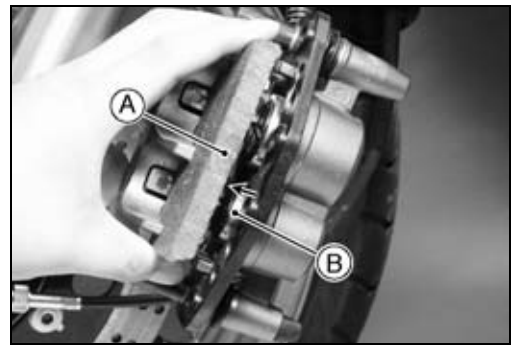
Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brakes will not function on the first application of the lever if this is not done.

Caliper Disassembly



- Loosen the banjo bolt at the brake hose lower end, and tighten it loosely.
- Remove the caliper by taking off the mounting bolts.
- Remove the pads spring [A]

Caliper



- Insert a wooden board [A] 5 mm thick inside the caliper opening.
- Pump the brake lever until the pistons [B] push the wooden board.
- Remove the wooden board and pull out the piston by hand.
- Remove the other parts of the caliper.

- The pistons can be removed by compressed air as follows.

○Remove the banjo bolt and take off the caliper.
○Remove the pads and spring (see Pad Removal).
○Insert a wooden board 5 mm thick inside the caliper opening.
○Lightly apply compressed air to the hose joint opening until the pistons hit the wooden board.
○Remove the board and pull out the pistons by hand.

⚠ WARNING

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

CAUTION

Immediately wash away any brake fluid that spills.

Caliper Assembly

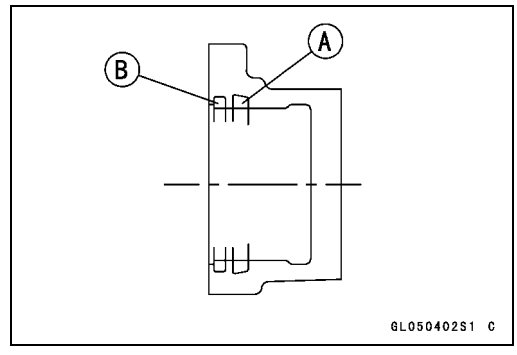
- Clean the caliper parts except for the pads.

CAUTION

For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

- Install the bleed valve and rubber cap.

Torque - Caliper Bleed Valve: 7.8 N·m (0.8 kgf·m, 69 in·lb)



- Replace the fluid seal [A] with a new ones.

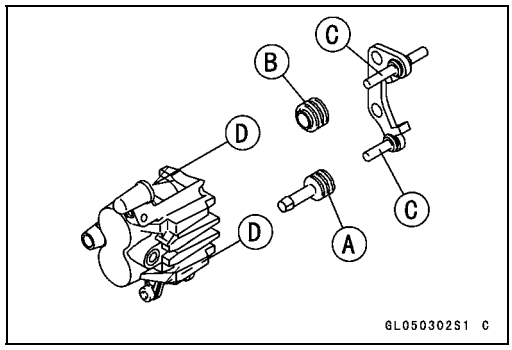
○Apply brake fluid to the fluid seal, and install it into the cylinder by hand.

- Replace the dust seal [B] with a new one if it is damaged.

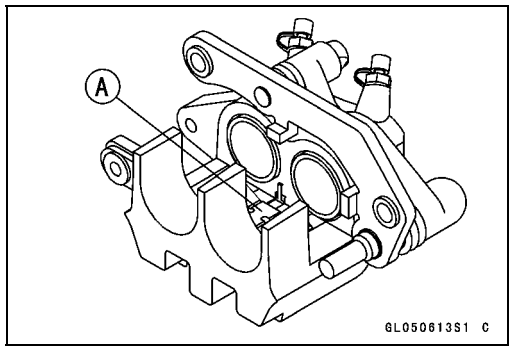
○Apply brake fluid to the dust seal, and install it into the cylinder by hand.

Caliper

- Apply brake fluid to the outside of the piston, and push the piston into the cylinder by hand. Take care that neither the cylinder nor the piston skirt get scratched.
- Replace the shaft rubber friction boot [A] and dust cover [B] with new ones if they are damaged.
- Apply a thin coat of PBC (Poly Butyl Cuprysil) grease to the caliper holder shafts [C] and holder holes [D] (PBC is a special high temperature, water-resistant grease).



- Install the anti-rattle spring [A] in the caliper body as shown.
- Install the piston insulator.
- Install the pads.
- Wipe up any spilled brake fluid on the caliper with wet cloth.



Caliper Piston Seal and Dust Seal Inspection

Fluid Seal Damage

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

- Replace the fluid seal under any of the following conditions:

○Fluid leakage around the pad.
○Brakes overheat.
○There is a large difference in left and right pad wear.
○The seal is stuck to the piston.

★If the fluid seal is replaced, replace the dust seal as well.

Dust Seal and Cover Damage

- Check that the dust seal and covers are not cracked, worn, swollen, or otherwise damaged.

★If they show any damage, replace them.

Piston and Cylinder Damage

- Visually inspect the piston and cylinder surfaces.

★Replace the cylinder and piston if they are badly scored or rusty.

Caliper Holder Shaft Wear

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

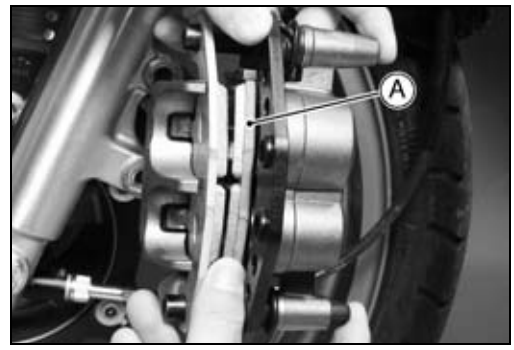
- Check to see if the caliper holder shafts are not badly worn or stepped, or rubber friction boot are not damaged.

★If the shafts and rubber friction boot are damaged, replace the rubber friction boot and the caliper holder.

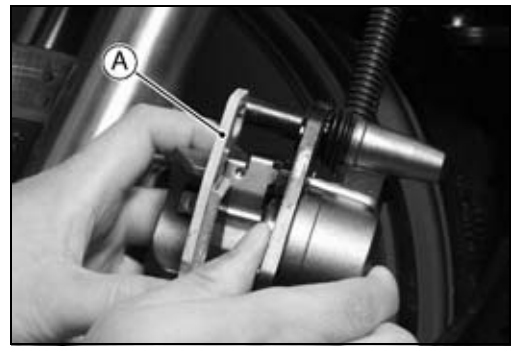
Brake Pads

Brake Pad Removal

- Remove the caliper with the hose installed.
- Remove the clip and take off the pad pin.
- Remove:
  Piston Side Pad [A]



- Remove the other pad [A].



Brake Pad Installation

- Push the caliper piston in by hand as far as it will go.
- Install the anti-rattle spring in place.
- Install the brake pads.
- Be sure to install the pad pin clip.
- Install the caliper (see Caliper Installation).

⚠ WARNING

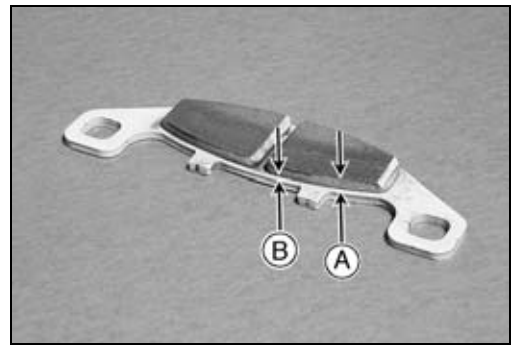
Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brake will not function on the first application of the lever if this is not done.

Brake Pad Lining Wear

In accordance with the Periodic Maintenance Chart, inspect the brake pads for wear.

- Remove the pads.
- Check the lining thickness [A] of the pads in the caliper.

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

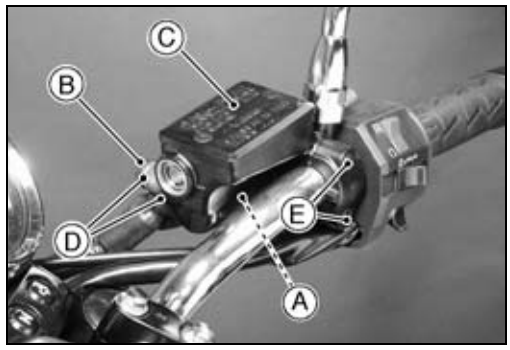


Pad Lining Thickness

Standard:	**4.5 mm (0.177 in.)**
Service Limit:	**1 mm (0.04 in.)**

Master Cylinder

Master Cylinder Removal

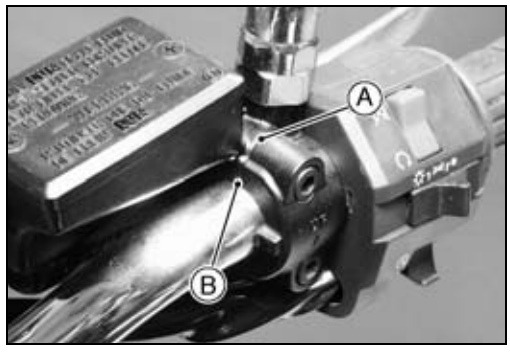


- Disconnect the front brake switch wires [A].
- Remove the banjo bolt [B] to disconnect the upper brake hose end from the master cylinder [C]. There is a flat washer [D] on each side of the hose fitting.
- Remove the clamp bolts [E] and take off the master cylinder as an assembly with the reservoir, brake lever, and brake switch installed.

CAUTION

Immediately wipe up any brake fluid that spills.

Master Cylinder Installation



- Apply grease to the extreme end of the clamp bolts.
- Install the master cylinder clamp so that the upper mating surface [A] of the clamp is aligned with the punch mark [B] on the handlebar.
- Tighten the upper clamp bolt first, and then the lower clamp bolt. There will be a gap at the lower part of the clamp after tightening.

Torque - Master Cylinder Clamp Bolts: 8.8 N·m (0.9 kgf·m, 78 in·lb)

- Use a new flat washer on each side of the brake hose fitting.
- Tighten the banjo bolt.

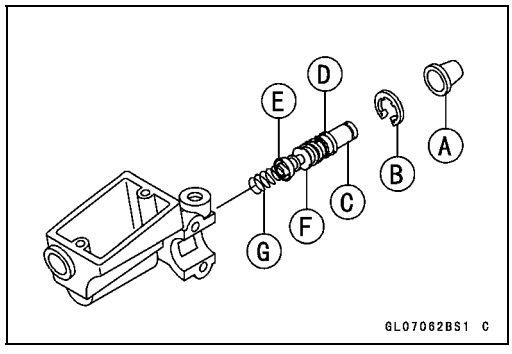
Torque - Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

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

⚠ WARNING

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

Master Cylinder Disassembly



- Remove the master cylinder from the handlebar.
- Remove the reservoir cap and diaphragm, and pour the brake fluid into a container.
- Remove the locknut and pivot bolt, and remove the brake lever.
- Push the dust cover [A] out of place, and remove the circlip [B].

Special Tool - Inside Circlip Pliers: 57001-143

- Pull out the piston assembly [C] and return spring [G].
  Piston [D]
  Secondary Cup [E]
  Primary Cup [F]

CAUTION

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

Master Cylinder

Master Cylinder Assembly

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

CAUTION

Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol, for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely, and will eventually deteriorate the rubber used in the disc brake.

- Apply brake fluid to the removed parts and to the inner wall of the cylinder.
- Take care not to scratch the piston or the inner wall of the cylinder.
- Tighten the brake lever pivot bolt and locknut.

Torque - Brake Lever Pivot Bolt: 1.0 N·m (0.1 kgf·m, 9 in·lb)
Brake Lever Pivot Nut: 5.9 N·m (0.60 kgf·m, 52 in·lb)

Master Cylinder Inspection (Visual Inspection)

- Disassemble the master cylinder (see Master Cylinder Disassembly).
- Check that there are no scratches, rust or pitting on the inner wall of the master cylinder [A] and on the outside of the piston [B].

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

- Inspect the primary [C] and secondary [D] cups.

★If a cup is worn, damaged, softened (rotted), or swollen, the piston assembly should be replaced to renew the cups.

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

- Check the dust cover [E] for damage.

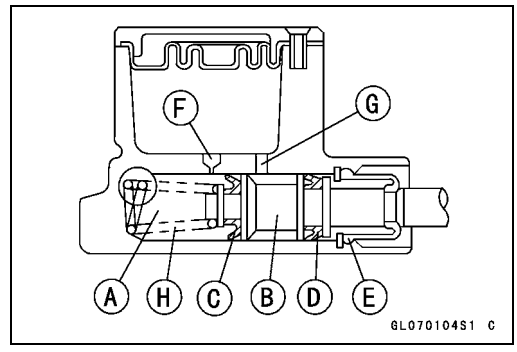
★If it is damaged, replace it.

- Check that the relief [F] and supply [G] ports are not plugged.

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

- Check the piston return spring [H] for any damage.

★If the spring is damaged, replace it.



Brake Disc

Brake Disc Removal

- Remove the wheel (see Wheels/Tires chapter).
- Unscrew the mounting Allen bolts [A], and take off the disc [B].

Brake Disc Installation

- Install the brake disc on the wheel so that the marked side [A] faces out.
- Tighten the mounting Allen bolts.

Torque - Brake Disc Mounting Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)

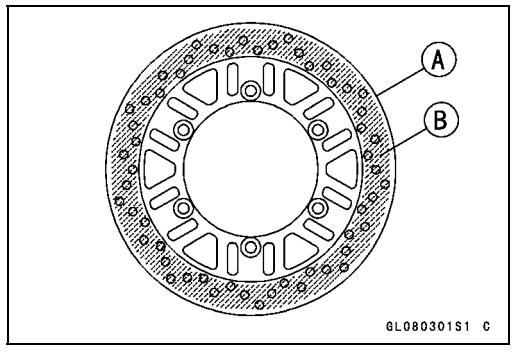
Brake Disc Wear

- Measure the thickness of the disc at the point where it has worn the most.

★Replace the disc [A] if it has worn past the service limit.
[B] Measuring Area

Disc Thickness

Standard:	**4.8 ~ 5.2 mm (0.189 ~ 0.205 in.)**
Service Limit:	**4.5 mm (0.18 in.)**



Brake Disc Warp

- Jack up the motorcycle so that the front wheel is off the ground.

Special Tool - Jack: 57001-1238

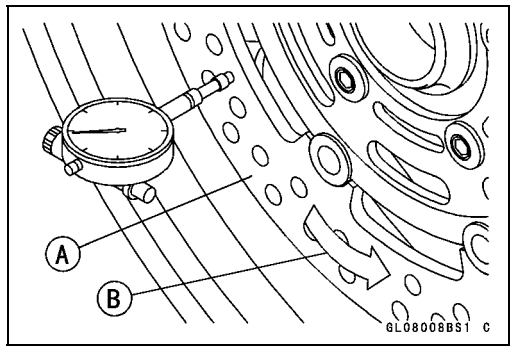
- Turn the handlebar fully to one side.
- Set up a dial gauge against the disc [A] as shown and measure disc runout.

[B] Turn the wheel by hand.

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

Disc Runout

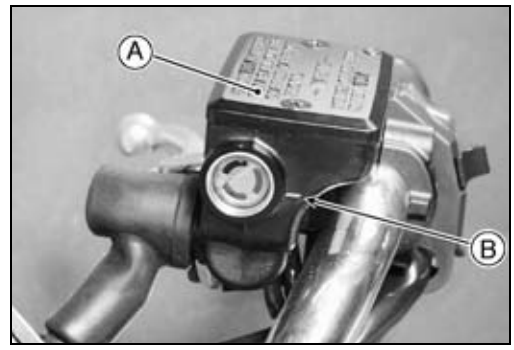
Standard:	**Less than 0.2 mm (0.008 in.)**
Service Limit:	**0.3 mm (0.012 in.)**



Brake Fluid

Level Inspection

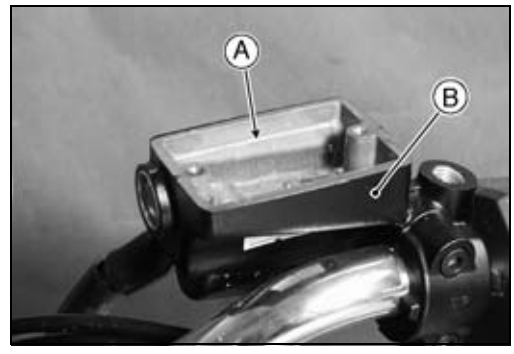
- Check that the brake fluid level in the front brake reservoir [A] is above the lower level line [B].



NOTE

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

★If the fluid level is lower than the lower level line, fill the reservoir to the upper level line [A] in the reservoir [B].



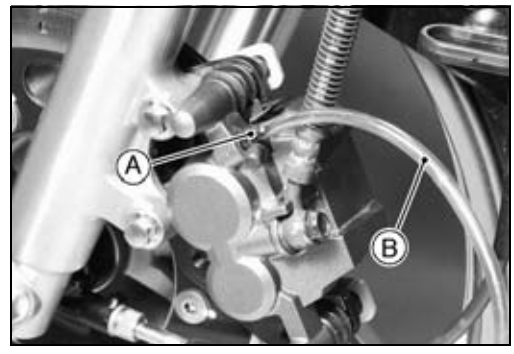
⚠ WARNING

Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified. After changing the fluid, use only the same type and brand of fluid thereafter.

Recommended Disc Brake Fluid
Grade: DOT4

Brake Fluid Change

- Level the brake fluid reservoir.
- Remove the reservoir cap.
- Remove the rubber cap from the bleed valve [A] on the caliper.
- Attach a clear plastic hose [B] to the bleed valve, and run the other end of the hose into a container.
- Fill the reservoir with fresh specified brake fluid.

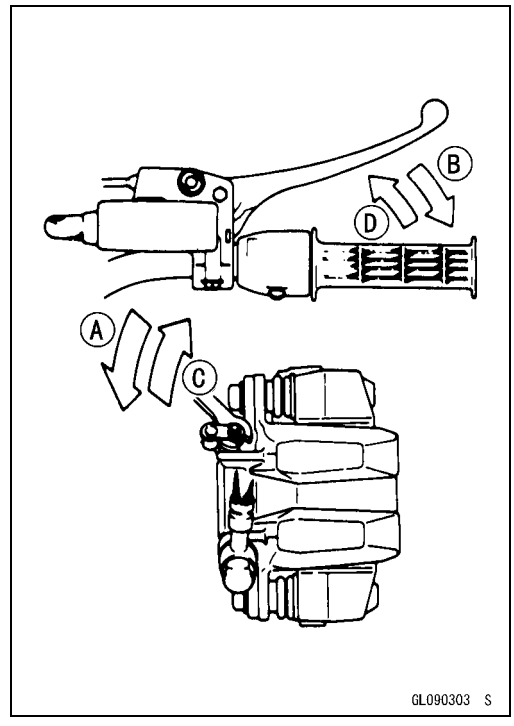


- Change the brake fluid as follows:
- Repeat this operation until fresh brake fluid comes out from the plastic hose or the color of the fluid changes.

NOTE

○*The fluid level must be checked often during the changing operation and replenished with fresh brake fluid. If the fluid in the reservoir runs out any time during the changing operation, the brakes will need to be bled since air will have entered the brake line.*

1. Open the bleed valve [A].
2. Apply the brake and hold it [B].
3. Close the bleed valve [C].
4. Release the brake [D].



- Remove the clear plastic hose.
- Tighten the bleed valve to the specified torque, and install the rubber cap.

Torque - Caliper Bleed Valve: 7.8 N·m (0.8 kgf·m, 69 in·lb)

- After changing the fluid, check the brake for good braking power, no brake drag, and no fluid leakage.

★If necessary, bleed the air from the lines.

Brake Fluid

Bleeding the Brake Line

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

⚠ WARNING

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

- Remove the reservoir cap, and fill the reservoir with fresh brake fluid to the upper level line in the reservoir.
- With the reservoir cap off, slowly pump the brake lever several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir.

○Bleed the air completely from the master cylinder by this operation.

NOTE

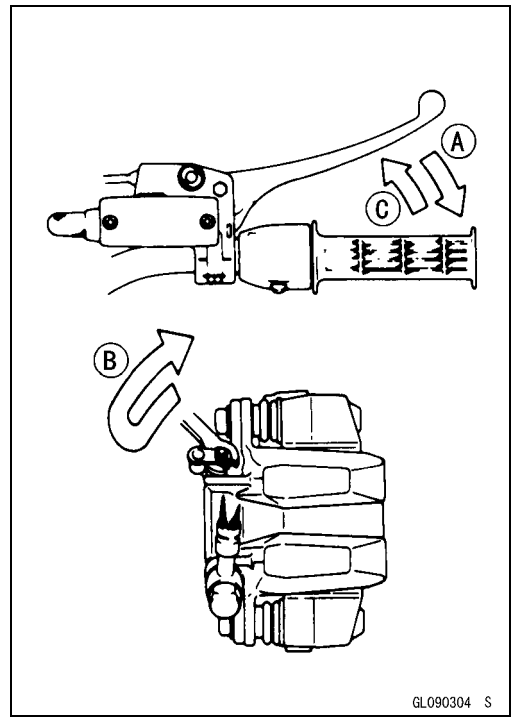
○*The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. If the fluid in the reservoir runs almost out any time during bleeding operation, the bleeding operation must be done over again from the beginning since air will have entered the line.*

○*Tap the brake hose lightly from the caliper to the reservoir for easier bleeding.*

Brake Fluid

- Install the reservoir cap.
- Remove the rubber cap from the bleed valve on the caliper.
- Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
- Bleed the air from the caliper as follows:
- Repeat this operation until no more air can be seen coming out into the plastic hose.
  1. Pump the brake lever until it becomes hard, and apply the brake and hold it [A].
  2. Quickly open and close [B] the bleed valve while holding the brake applied.
  3. Release the brake [C].
- Detach the clear plastic hose from the bleed valve.
- Tighten the bleed valve to the specified torque, and install the rubber cap.

  Torque - Caliper Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)
- Check the fluid level.
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.



Brake Fluid

⚠ WARNING

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

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

Brake Hose

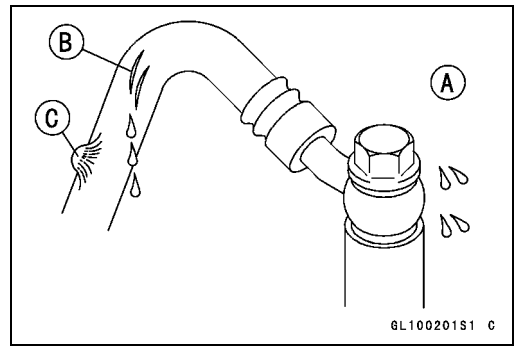
Brake Hoses and Connections Inspection

- Inspect the brake hose and fittings for deterioration, cracks and signs of leakage.

○The high pressure inside the brake line can cause fluid to leak [A] or the hose to burst if the line is not properly maintained. Bend and twist the rubber hose while examining it.

★Replace the hose if any cracks [B] or bulges [C] are noticed.

★Tighten any loose fittings.



Brake Hose Replacement

CAUTION

Brake fluid quickly ruins painted or plastic surfaces; any spilled fluid should be completely wiped up immediately with wet cloth.

- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hose, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.
- There are washers on each side of the brake hose fitting. Replace them with new ones when installing.
- When installing the hose, avoid sharp bending, kinking, flattening or twisting, and route the hose according to Hose Routing section in General Information chapter.
- Tighten the banjo bolts to the specified torque.

Torque - Brake Hose Banjo bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Bleed the brake line after installing the brake hose.

Brake Pedal and Cable

Brake Play Inspection

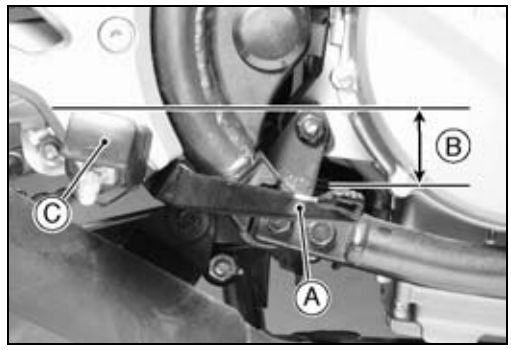
Brake Pedal Position Inspection

- With the brake pedal [A] in the correct position, inspect the brake pedal position [B] as shown.
  Footpeg [C]

Pedal Position

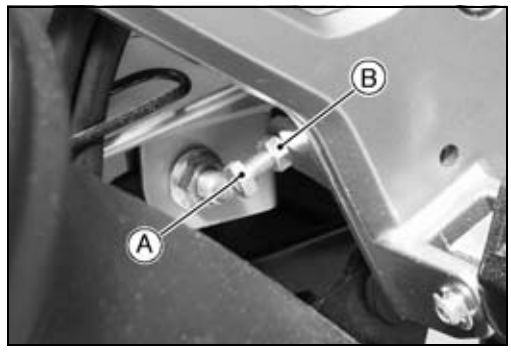
Standard: About 20 mm (0.79 in.) below footpeg (from Top of the footpeg to Top of the brake Pedal)

★If it is incorrect, adjust the brake pedal position.



Brake Pedal Position Adjustment

- Loosen the locknut [B], and turn in or turn out the adjusting bolt [A] to adjust the brake pedal position.
- Tighten the locknut.
- After adjusting brake pedal position, check brake pedal free play and rear brake light switch timing, and adjust them if necessary.



NOTE

○*If the pedal position cannot be adjusted by turning the adjusting bolt, the brake pedal may be deformed or incorrectly installed.*

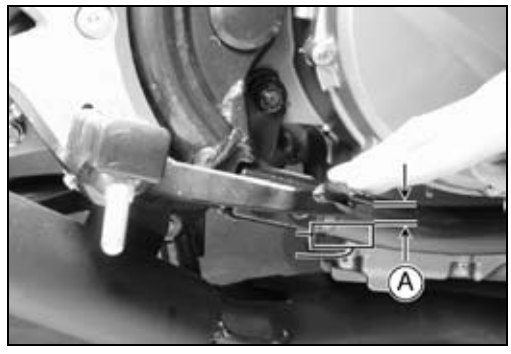
Brake Pedal Free Play Inspection

- Check the brake pedal free play [A].
- Depress the rear brake pedal lightly by hand until the brake is applied.

★If the rear brake pedal free play is incorrect, adjust it.

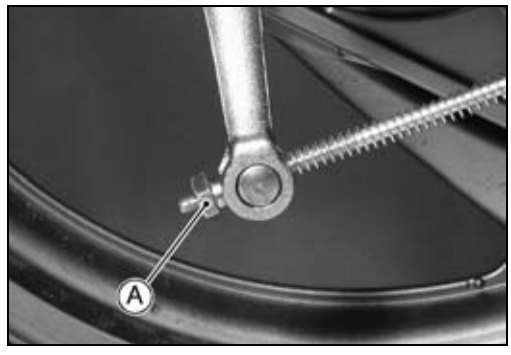
Brake Pedal Free Play

Standard: 20 ~ 30 mm (0.79 ~ 1.18 in.)



Brake Pedal Free Play Adjustment

- Turn the adjuster [A] at the rear brake until the brake pedal has the correct amount of play.



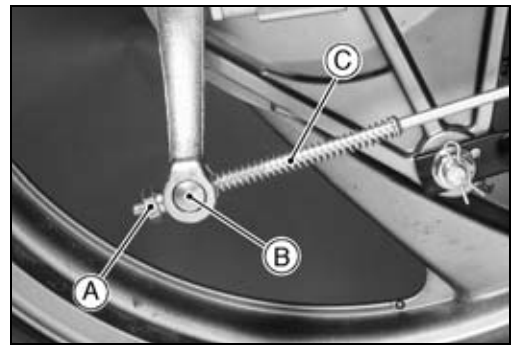
- Operate the pedal a few times to see that it returns to its rest position immediately upon release.
- Rotate the rear wheel to check for brake drag.
- Check braking effectiveness.

★If there is any doubt as to the conditions of the brake, check the brake parts for wear or damage.

Brake Pedal and Cable

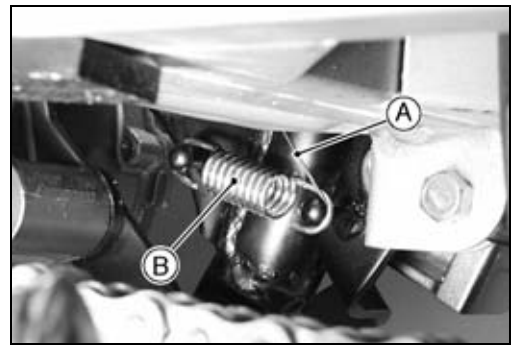
Brake Pedal Removal

- Remove:
  Adjuster [A]
  Clevis Pin [B]
  Return Spring [C]
- Remove the brake rod rear end.

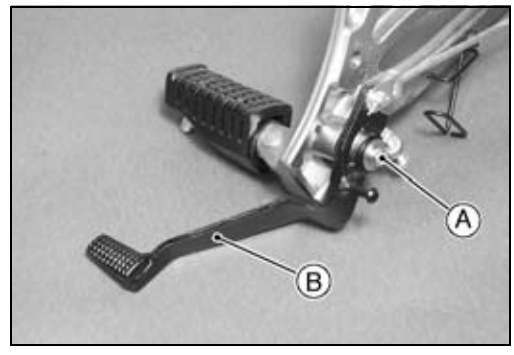


- Loosen the locknut and turn in the adjusting bolt to keep the pedal free from it.
- Unscrew the right footpeg bracket bolts [A].

- Remove
  Rear Brake Light Switch Return Spring [A]
  Brake Return Spring [B]
  Take off the footpeg bracket



- Unscrew the brake pedal bolt [A] and pull out the brake pedal [B].



Brake Pedal Installation

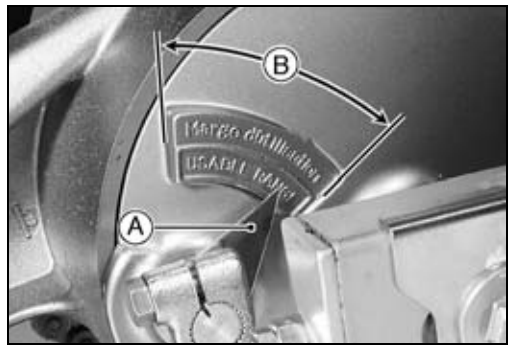
- Install the brake rod rear end.
- Grease the brake shaft.
- Tighten the brake pedal bolt.

  Torque - Brake Pedal Bolt: 8.8 N·m (0.90 kgf·m, 78 in·lb)

- Adjust the brake pedal position and free play (see this chapter).

Brake Panel and Drum

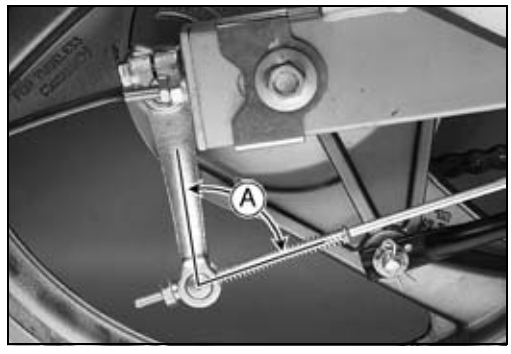
Brake Lining Wear Inspection



- Check that the brake lining wear indicator [A] points within the USABLE RANGE [B] when the rear brake is fully applied.

★If does not, the shoes must be immediately replaced and the other brake parts examined.

Cam Lever Angle Inspection



- Check that the rear brake cam lever comes to an 80° ~ 90° angle [A] with the rear brake rod when the rear brake is fully applied.

★If it does not, adjust the rear brake cam lever angle.

Cam Lever Angle
Standard: 80° ~ 90°

⚠ WARNING

Since a cam lever angle greater than 90° reduces braking effectiveness, cam lever angle adjustment should not be neglected.

Cam Lever Angle Adjustment

- Remove:
  Rear Wheel (see Wheels/Tires chapter)
  Cam Lever Bolt
  Cam Lever

○Before removing the brake cam lever, mark on the cam lever and camshaft at the same position.

- Mount the cam lever on the camshaft moving it one serration at a time from the original position so that the cam lever has the specified angle.

⚠ WARNING

When remounting the cam lever, be sure that the position of the wear indicator on the serrated shaft is not altered.
A change in cam lever angle is caused by wear of internal brake parts. Whenever the cam lever angle is adjusted, also check for drag and proper operation, taking particular note of the brake lining wear indicator position.
In case of doubt as to braking effectiveness, disassemble and inspect all internal brake parts. Worn parts could cause the brake to lock or fail.

- Install the rear wheel (see Wheels/Tires chapter).
- Adjust the rear brake pedal free play.

Brake Panel and Drum

Brake Panel Removal

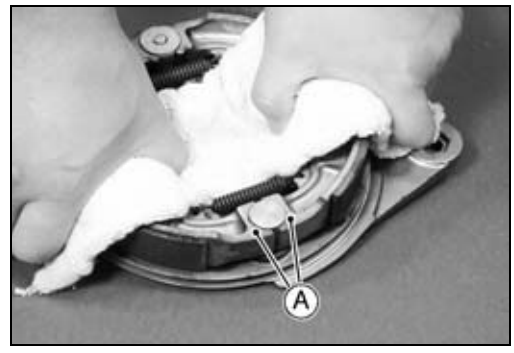
- Remove the rear wheel (see Wheels/Tires chapter).
- Separate the brake panel [A] from the wheel.

Brake Panel Installation

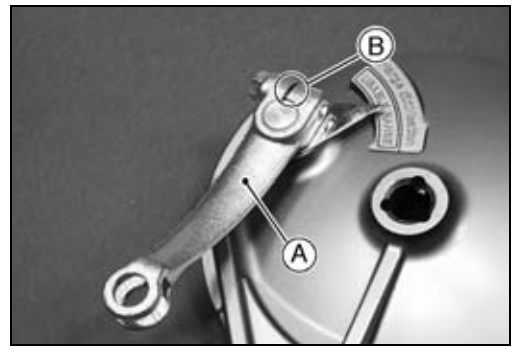
- Installation is the reverse of removal. Note the following.
- Adjust the brake pedal free play (see Brake Pedal Free Play Adjustment).

Brake Panel Disassembly

- Remove the brake panel (see Brake Panel Removal).
- Hold the brake shoes, one in each hand with a clean cloth to protect the linings from grease and dirt.
- Pull up on the shoes [A] to remove them from the panel.
- Remove the springs to separate the two shoes.



- Before removing the brake cam lever [A], mark [B] the position of the cam lever so that it can be installed later in the same position.
- Pull the brake cam shaft out from the inside. Do not lose the dust seal.



Brake Panel Assembly

- Clean the old grease from the camshaft and regrease it.

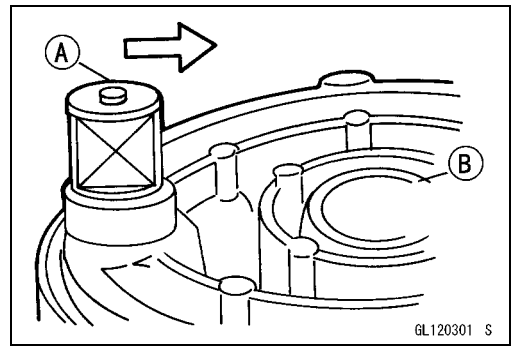
○Apply grease to the sliding surface of the shaft and very lightly on the cam surfaces. Do not overgrease.

- Push the camshaft into the panel.

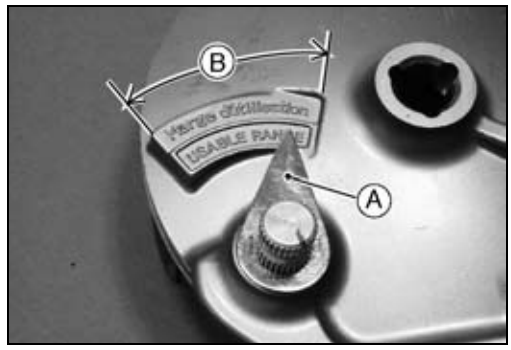
○The camshaft [A] has no triangular mark, so either side of the camshaft may point towards the boss [B] of the panel.

⚠ WARNING

Improper installation will cause ineffective braking.



Brake Panel and Drum



- Link the brake shoes together with the springs, and push them onto the panel in the reverse of removal.
- Put the dust seal over the end of the cam shaft.
- Install the return spring.
- Install the indicator [A] on the serration so that it points to the extreme right of the USABLE RANGE box [B].
- Fit the cam lever so that the marks aligns.
- Put in the cam lever bolt, and tighten securely.

Torque - Brake cam Lever Bolt: 19 N·m (1.9 kgf·m, 13.5 in·lb)

- Install the brake panel assembly (see Brake Panel Installation).

Brake Shoe Lining Wear

- Remove the brake shoes (see Brake Panel Disassembly).
- Measure the lining thickness [A] (see Specifications).

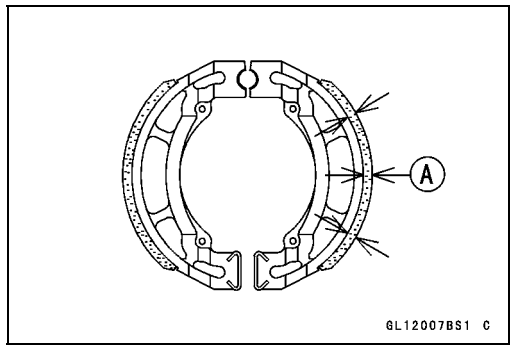
○Use a pair of calipers or scale, and measure at several points as shown.

★If any measurement is less than the service limit, replace both shoes as a set.

★If the lining thickness is greater than the service limit, do the following before installing the shoes.

○File or sand down any high spots on the surface of the lining.

○Use a wire brush to remove any foreign particles from the lining.



Shoe Lining Thickness

Standard:	**3.65 ~ 3.85 mm (0.144 ~ 0.152 in.)**
Service Limit:	**1.9 mm (0.075 in.)**

- Wash off any oil or grease with an oilless cleaning fluid such as trichloroethylene or acetone.

⚠ WARNING

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

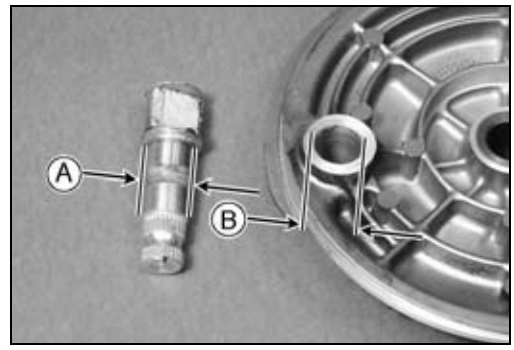
Brake Shoe Spring Inspection

- Visually inspect the brake shoe springs for breaks or distortion.

★If the springs are damaged in any way, replace them.

Brake Panel and Drum

Brake Camshaft and Camshaft Hole Wear



- Remove the brake camshaft (see Brake Panel Disassembly).
- Measure the shaft diameter [A].

○Use a micrometer at the point shown.

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

Camshaft Diameter

Standard: 16.957 ~ 16.984 mm (0.6676 ~ 0.6687 in.)

Service Limit: 16.84 mm (0.663 in.)

- Measure the inside diameter [B] of the camshaft hole in the brake panel.

○Use a small hole gauge in several directions inside the hole, and then measure the small hole gauge with a micrometer.

★If any measurement is larger than the service limit, replace the brake panel.

Camshaft Hole Diameter

Standard: 17.00 ~ 17.07 mm (0.669 ~ 0.672 in.)

Service Limit: 17.15 mm (0.675 in.)

Brake Drum Wear

- Remove the rear wheel (see Wheels/Tires chapter).
- Measure the inside diameter [A] of the drum.

○Use a pair of calipers and measure at several points.

★If any measurement is greater than the service limit, replace the wheel hub.

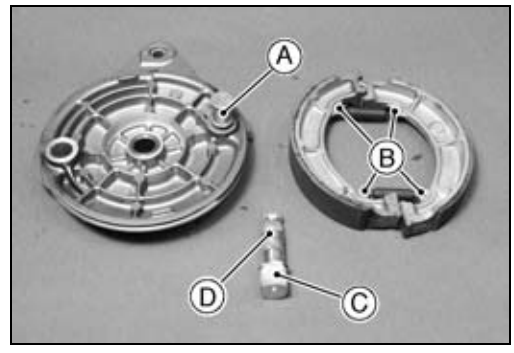
★If the drum is worn unevenly or scored, lightly turn the drum on a brake drum lathe or replace the wheel hub. Do not turn the drum beyond the service limit.

Drum Inside Diameter

Standard: 160.00 ~ 160.16 mm (6.299 ~ 6.305 in.)

Service Limit: 160.75 mm (6.329 in.)

Brake Lubrication

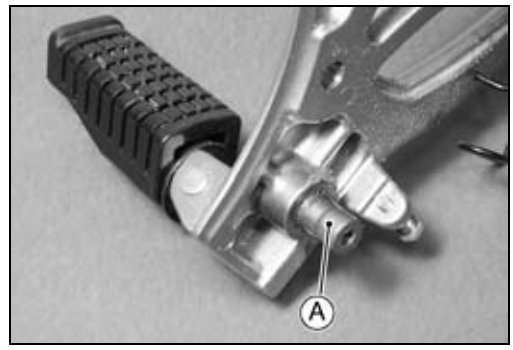


- Clean all old grease out of the brake parts with a cloth.
- Apply high-temperature grease to the following:

Brake Shoe Anchor Pin [A]
Spring Ends [B]
Cam Surfaces [C]
Camshaft Groove [D]

Brake Panel and Drum

- Lubricate the brake pedal by applying a multi-purpose grease to the brake shaft pivot groove [A].



- Clean any excess grease from the parts before assembly.
- Lubricate the brake cable (see Brake Cable Lubrication).

Suspension

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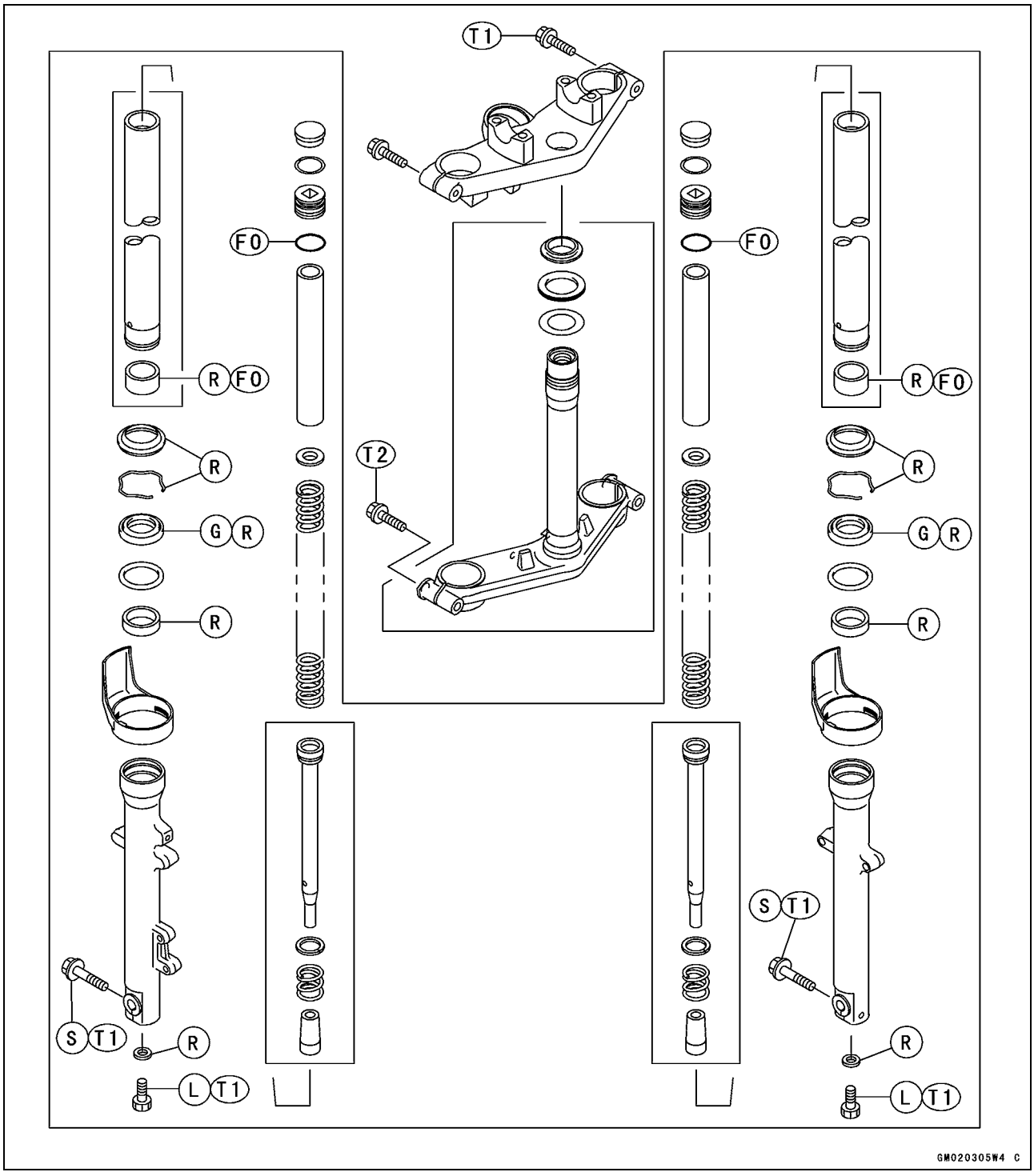
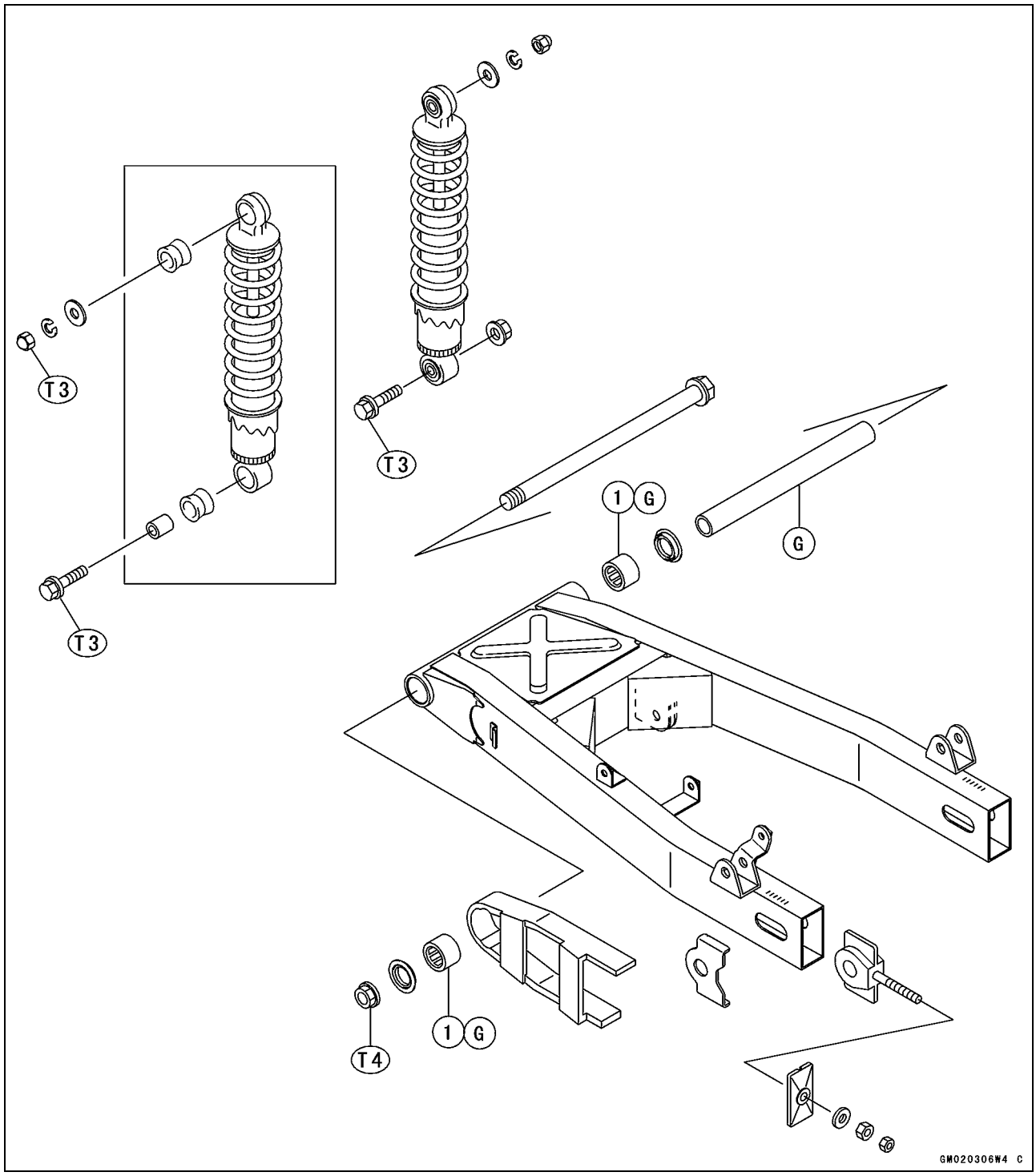
Swingarm Needle Bearing Lubrication 12-13

Exploded View



FO: Apply fork oil.
L: Apply a non-permanent locking agent.
R: Replacement Parts
S: Follow he specific tightening sequence.
T1: 20 N·m (2.0 kgf·m, 14.5 ft·lb)
T2: 35 N·m (3.6 kgf·m, 26 ft·lb)

Exploded View



1. Needle Bearings: Face the manufacturer's marks out.
T3: 34 N·m (3.5 kgf·m, 25 ft·lb)
T4: 88 N·m (9.0 kgf·m, 65 ft·lb)
G: Apply grease.

Specifications

Item	Standard	Service Limit
Front Fork (per one unit)		
Fork Inner Tube Diameter	ϕ37 mm (1.46 in.)	
Fork Spring Setting	Non-adjustable	
Air Pressure	Atmospheric pressure (Non-adjustable)	
Rebound Damper Setting	Non-adjustable	
Compression Damper Setting	Non-adjustable	
Fork Oil Viscosity	SHOWA SS-8 or equivalent	
Fork Oil Capacity:		
Completely Dry	346 ±2 mL (11.70 ±0.07 US oz.)	
	351 ±2 mL (11.87 ±0.07 US oz.): ER500-C4 ~	
When Changing Oil	approx. 295 mL (9.97 US oz.)	
	approx. 298 mL (10.08 US oz.): ER500-C4 ~	
Fork Oil Level	Fully compressed, without fork spring, below from inner tube top 127 ±2 mm (5.00 ±0.08 in.)	
	below from inner tube top 120 ±2 mm (4.72 ±0.08 in.): ER500-C4 ~	
Fork Spring Free Length	338.5 mm (13.33 in.)	332 mm (13.07 in.)
	438.5 mm (17.26 in.): ER500-C4 ~	430 mm (16.93 in.)
Rear Shock Absorber		
Rebound Damper Set	Non-adjustable	
Compression Damper Set	Non-adjustable	
Spring Setting Position	No. 1 of 5 positions	
Gas Pressure	No gas	

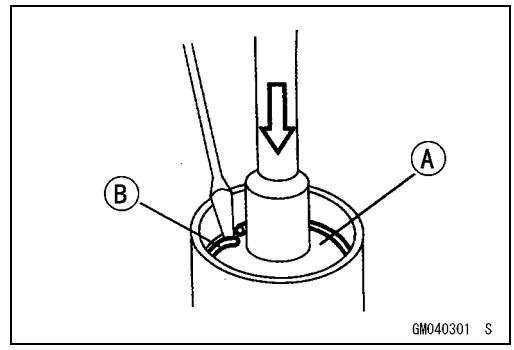
Special Tools - Fork Cylinder Holder Handle: 57001-183
Fork Cylinder Holder Adapter: 57001-1057
Fork Outer Tube Weight: 57001-1218
Front Fork Oil Seal Driver: 57001-1219
Fork Oil Level Gauge: 57001-1290
Oil Seal & Bearing Remover: 57001-1058
Bearing Driver Set: 57001-1129

Front Fork

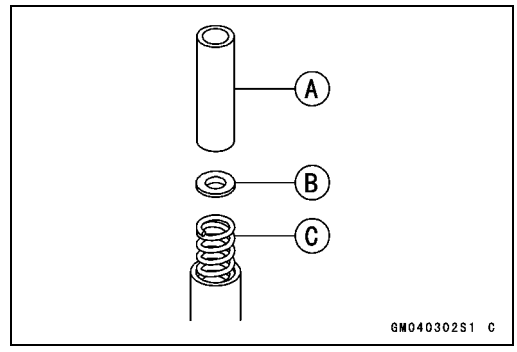
Fork Oil Change

The oil should be changed in accordance with the Periodic Maintenance Chart.

- Remove the front fork (see Fork Removal).
- Hold the outer tube vertically in a vise.
- Remove the cap.
- Push the top plug [A] down to remove the plug retaining ring [B], and then remove the plug.



- Remove:
  Spacer [A]
  Fork Spring Seat [B]
  Fork Spring [C]

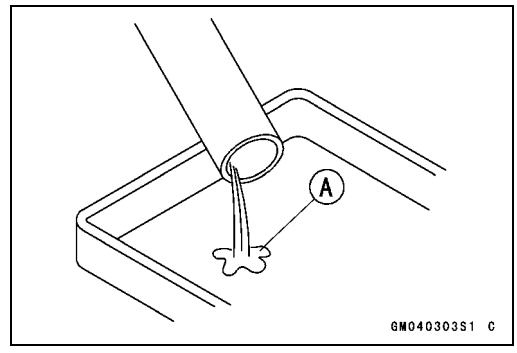


- Pour out the fork oil [A] with the fork upside down.
- Fill the front fork with the specified oil.

Fork Oil Viscosity: SHOWA SS-8 or equivalent

Fork Oil Capacity (when changing oil):

	Approx. mL (US oz.)
ER500-C1 ~ C3	**295 (9.97)**
ER500-C4 ~	**298 (10.08)**



- Wait for about five minutes so that any suspended air bubbles can surface.
- Measure the oil level, using the fork oil level [A].

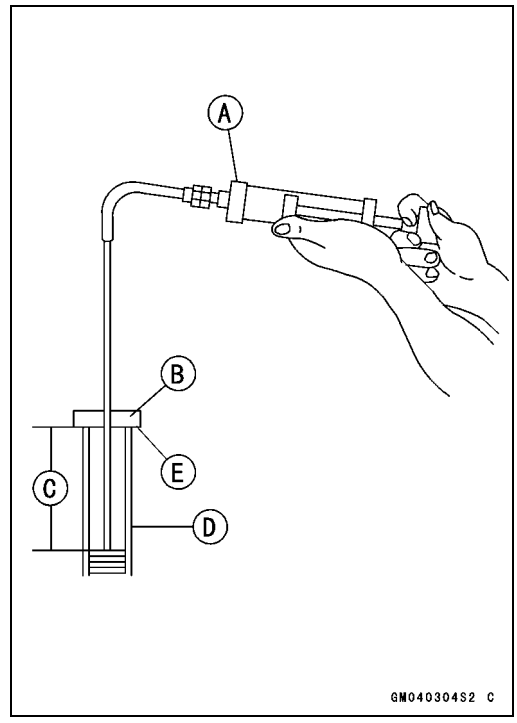
Special Tool - Fork Oil Level Gauge: 57001-1290

○Set the gauge stopper [B] so that its lower side shows the oil level distance specified [C].
○Insert the gauge tube into the inner tube [D] and position the stopper across the top of the inner tube [E].
○Pull the handle slowly to draw out the excess oil until no more oil comes up the tube.
★If no oil is drawn out, there is not enough oil in the fork. Pour in some more oil, then draw out the excess.

Front Fork Oil Level (Fully compressed without fork spring)

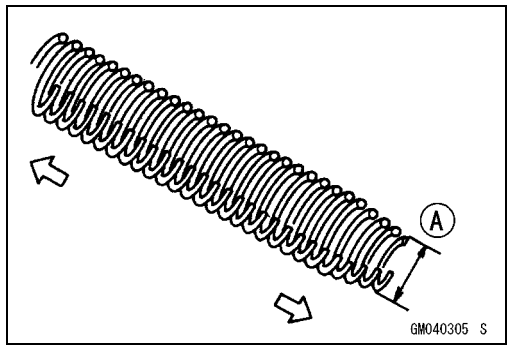
Standard:

ER500-C1 ~ C3	**127 ±2 mm (5.00 ±0.08 in.)**
ER500-C4 ~	**120 ±2 mm (4.72 ±0.08 in.)**



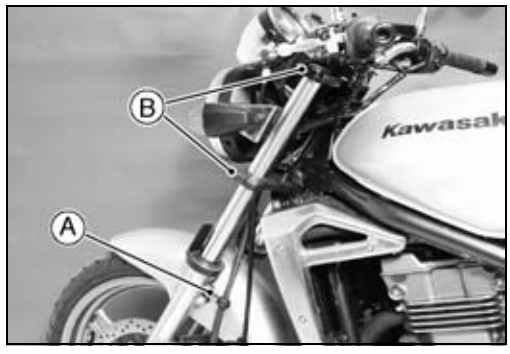
Front Fork

- Install the fork spring with the smaller diameter end [A] facing down.
- Install:
  Fork Spring Seat
  Spacer
- Install the front fork (see Front Fork Installation).
- Repeat the same procedure for another front fork.



Fork Removal

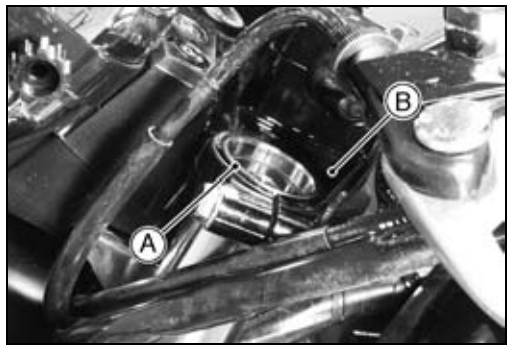
- Remove:
  Brake Hose Clamps [A] (Left Front Fork only)
  Front Wheel (see Wheels/Tires chapter)
  Front Fender (see Frame chapter)
- Loosen the upper and lower fork clamp bolts [B].
- With a twisting motion, work the fork leg down and out.



Fork Installation

- Install the fork tube so that the top of the fork inner tube [A] is aligned with the upper surface of the steering stem head [B].
- Run the cables, wires, and hoses as shown in the Cable, Wire and Hose Routing section of the General Information chapter.
- Install the front wheel (see Wheels/Tires chapter).

Torque - Upper Fork Clamp Bolts: 20 N·m (2.0 kgf·m, 14.5 ft·lb)
Lower Fork Clamp Bolts: 35 N·m (3.6 kgf·m, 26 ft·lb)
Brake Caliper Mounting Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)



- Check the front brake effectiveness after installation.

⚠ WARNING

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

Fork Disassembly

- Remove the front fork (see Front Fork Removal).
- Drain the fork oil (see Fork Oil Change).

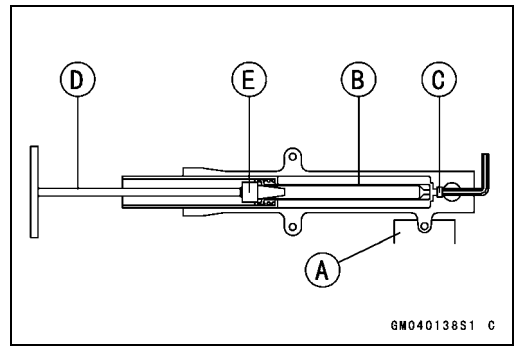
○The following parts are removed during draining the fork oil.
  Top Plug
  Spacer
  Fork Spring Seat
  Fork Spring

Front Fork

- Hold the front fork horizontally in a vise [A].
- Stop the cylinder unit [B] from turning by using the special tools.
- Unscrew the Allen bolt [C], and take the gasket out of the bottom of the outer tube.

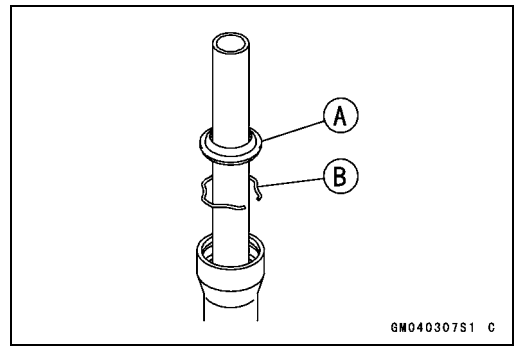
Special Tools - Fork Cylinder Holder Handle: 57001-183 [D]
Fork Cylinder Holder Adapter: 57001-1057 [E]

- Take the cylinder unit out of the inner tube.



- Separate the inner tube from the outer tubes as follows:

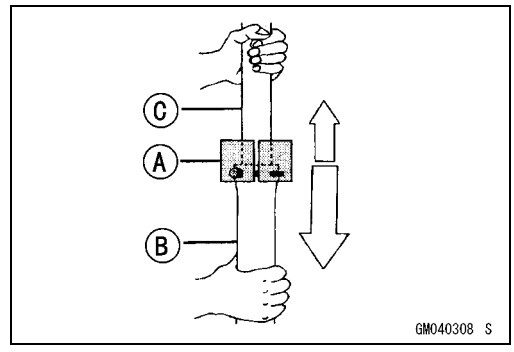
○Remove the dust seal [A] from the outer tube.
○Remove the retaining ring [B] from the outer tube.



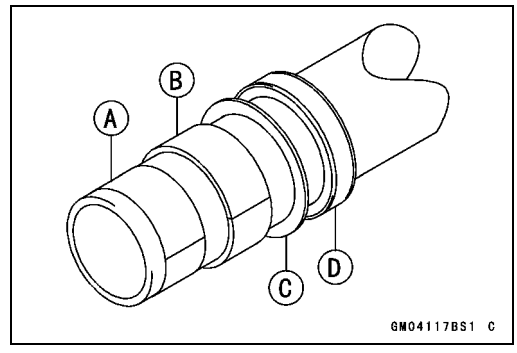
○Use the fork outer tube weight [A] to separate the outer tube [B] from the inner tube [C] Holding the inner tube by hand, pull the outer tube several times to pull out the inner tube.

Special Tool - Fork Outer Tube Weight: 57001-1218

○Take out the cylinder base out of the outer tube.

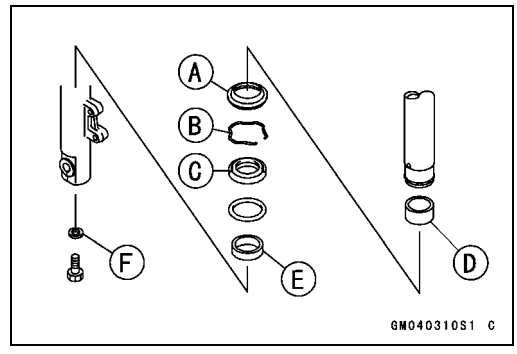


- Remove the guide bushings [A], outer tube guide bushing [B], washer [C], and oil seal [D] from the inner tube.



Fork Assembly

- Replace the following parts with new ones after removal.
  Dust Seal [A]
  Retaining Ring [B]
  Oil Seal [C]
  Inner Guide Bushing [D]
  Outer Guide Bushing [E]
  Bottom Allen Bolt Gasket [F]

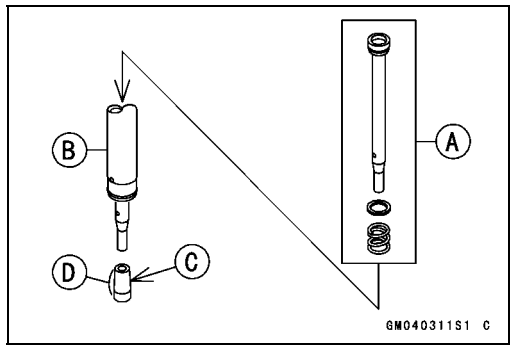


Front Fork

- Put the cylinder unit [A] with the spring into the inner tube [B] protruding from the inner tube, and install the cylinder base [C] onto the bottom end of the cylinder unit.

○Install the cylinder base with the tapered end [D] up.

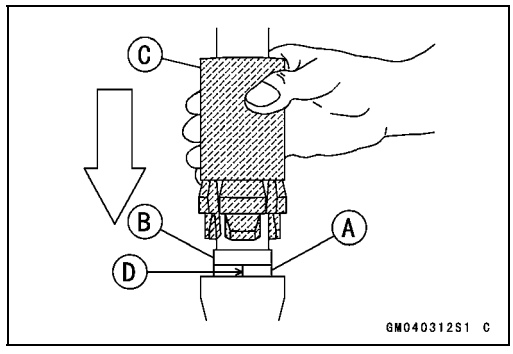
- Install the inner tube, cylinder unit, and cylinder base as a set into the outer tube.



- Install the new guide bushing [A] with a used guide bushing [B] on it by tapping the used guide bushing with the fork oil seal driver [C] until it stops.

○The split [D] of the bushing should face toward the side of the vehicle.

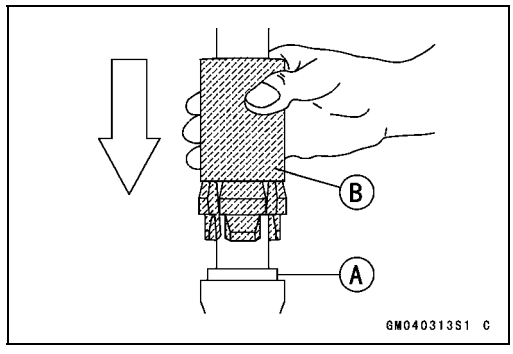
Special Tool - Front Fork Oil Seal Driver: 57001-1219



- Apply grease to the oil seal lips and install the washer and the oil seal [A] into the outer tube.

Special Tool - Front Fork Oil Seal Driver: 57001-1219 [B]

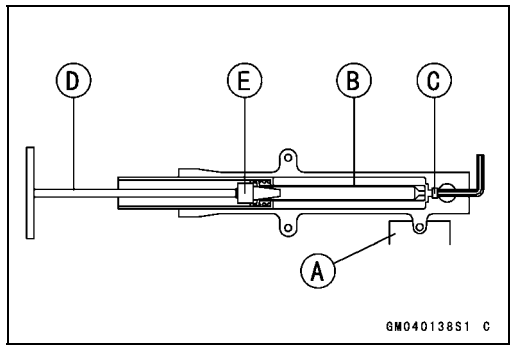
- Install:
  Retaining Ring
  Dust Seal



- Hold the front fork horizontally in a vise [A].
- Apply a non-permanent locking agent to the threads of the Allen bolt and screw the Allen bolt into the bottom of the outer tube.
- Hold the cylinder unit [B] with the special tools and tighten the Allen bolt [C].

Special Tools - Fork Cylinder Holder Handle: 57001-183 [D]
Fork Cylinder Holder Adapter: 57001-1057 [E]

Torque - Bottom Allen Bolt: 20 N·m (2.0 kgf·m, 14.5 ft·lb)



- Pour in the specified type of oil and install the parts removed (see Fork Oil Change).

Fork Oil Viscosity: SHOWA SS-8 or equivalent

Fork Oil Capacity (completely dry):

	mL (US oz.)
ER500-C1 ~ C3	346 ±2 mL (11.70 ±0.07 US oz.)
ER500-C4 ~	351 ±2 mL (11.87 ±0.07 US oz.)

Fork Oil Leak Inspection

- Visually inspect the front forks for oil leakage.

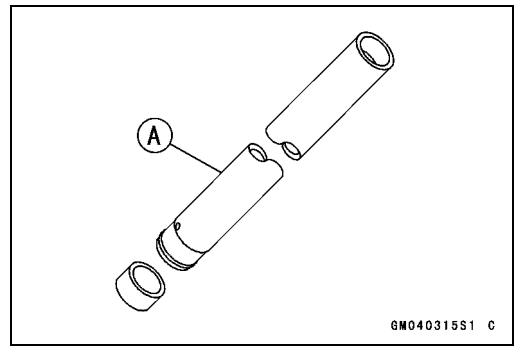
★If the oil leakage is found on it, replace or repair any defective parts.

Front Fork

Inner Tube, Outer Tube Inspection

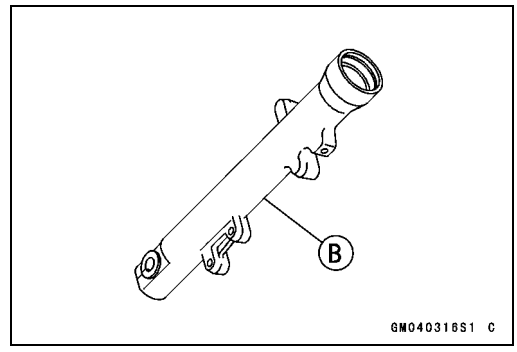
- Visually inspect the inner tube [A] for scoring or scratches on the outer surface of it and repair any damage.
- Nick or rust damage can sometimes be repaired by using a wet- stone to remove sharp edges or raised areas which cause seal damage.

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



CAUTION

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



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

★If you feel binding or catching, the inner and outer tubes must be replaced.

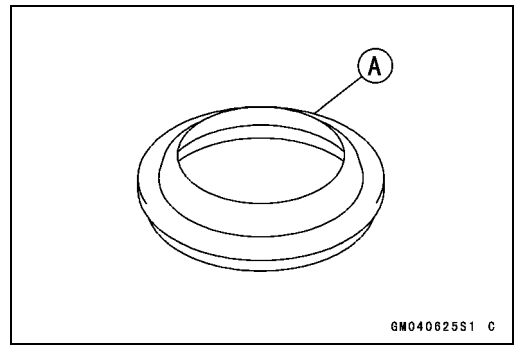
⚠ WARNING

A straightened inner or outer fork tube [B] may fail in use, possibly, causing an accident. Replace a badly bent or damaged inner or outer tube, and inspect the other tube carefully before reusing it.

Dust Seal Inspection

★Inspect the dust seal [A] for any signs of deterioration or damage.

★Replace them if necessary.

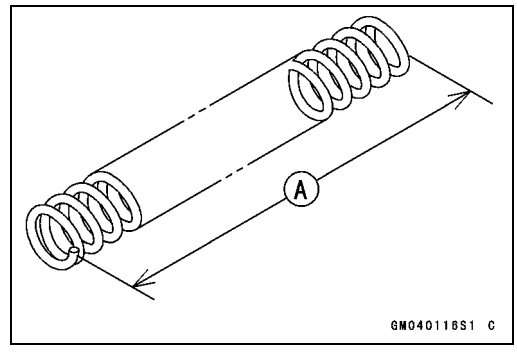


Spring Tension

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

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

★If the length of a replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the fork legs balanced for motorcycle stability.



Spring Free Length

Standard:

ER500-C1 ~ C3	**338.5 mm (13.33 in.)**
ER500-C4 ~	**438.5 mm (17.26 in.)**

Service Limit:

ER500-C1 ~ C3	**332 mm (13.07 in.)**
ER500-C4 ~	**430 mm (16.93 in.)**

Rear Shock Absorber

Spring Preload Adjustment

The spring preload adjuster on each rear shock absorber has 5 positions so that the spring tension can be adjusted for different road and loading conditions.

- Using the hook wrench [A], turn the adjuster to adjust the spring tension.

○The standard adjuster position for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is 2nd step from the weakest position.

★If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

Spring Preload Adjustment

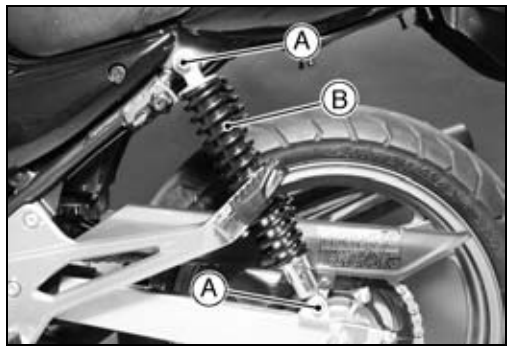
Position	Spring Force	Setting	Load	Road	Speed
1	Stronger	Soft	Light	Good	Low
2	¦	↑	↑	↑	↑
3	¦	¦	¦	¦	¦
4	¦	↓	↓	↓	↓
5	↓	Hard	Heavy	Bad	High

- Check to see that both adjusting sleeves are turned to the same relative position.

⚠ WARNING

If they are not adjusted to the same position, an unsafe riding condition may result.

Rear Shock Absorber Removal



- Set the motorcycle on its center stand and raise the rear wheel.
- Remove the seat (see Frame chapter).
- Remove the mounting bolts [A] and pull off the rear shock absorber [B].

Rear Shock Absorber Installation

- Tighten the mounting bolts.

Torque - Rear Shock Absorber Mounting Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)

- Adjust the rear shock absorber position (see Rear Shock Absorber Adjustment).

Rear Shock Absorber Wear

- Remove the rear shock absorbers (see Rear Shock Absorber Removal).
- Compress each rear shock absorber.
- Visually inspect the following items.

Compression Stroke
Oil Leakage
Other Damage

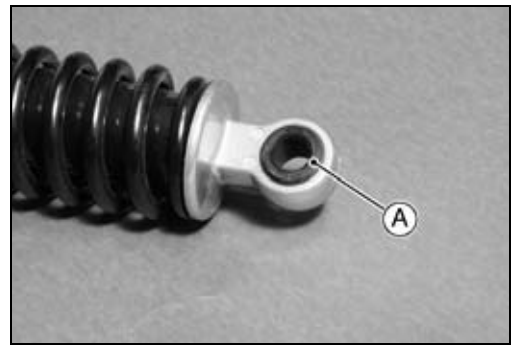
★If there is any damage to the rear shock absorber, or one unit feels weaker than the other, replace both shock absorbers as a set.

Rear Shock Absorber

Bushing Wear

● Visually inspect the rubber bushings [A].

★If they show any signs of damage, replace them.



Rear Shock Absorber Oil Leak Inspection

● Visually inspect the shock absorber for oil leakage.

★If the oil leakage is found on it, replace the shock absorber with a new one.

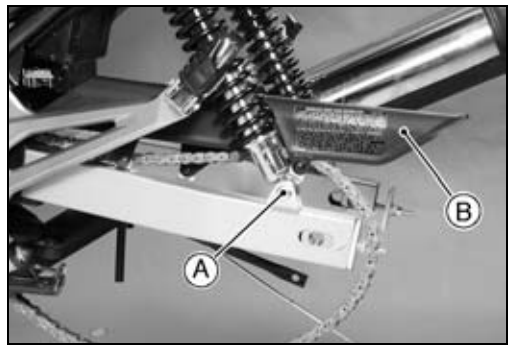
Swingarm

CAUTION

Do not tap the swingarm pivot shaft when removing or installing. Push or pull the pivot shaft while turning the shaft. Tapping on the shaft could damage the needle bearings in the swingarm.

Swingarm Removal

● Remove:
Rear Wheel (see Wheels/Tires chapter)
Rear Shock Absorber Lower Mounting Bolts and Nut [A].
Chain Cover [B].
Pivot Shaft Caps

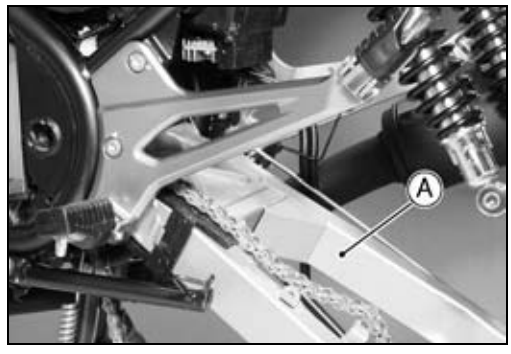


● Remove the pivot shaft nut [A], and pull out the pivot shaft.

● Move back the swingarm [A] and take off the swingarm.

NOTE

○*Make sure the swingarm dose not catch the Rear Brake Switch.*



Swingarm Sleeve and Needle Bearing Wear

CAUTION

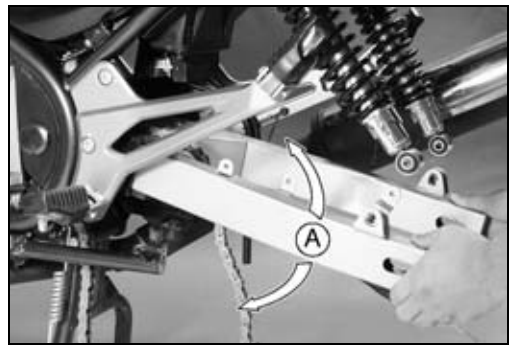
Do not remove the bearings for inspection. Removal may damage them.

● The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing in the swingarm for abrasion, color change, or other damage.

★If there is any doubt as to the condition of any of the needle bearings or sleeve, replace the sleeve, and needle bearing as a set.

Swingarm

Swingarm Installation



- Installation is the reverse of removal.
- Tighten the pivot shaft nut.

Torque - Swingarm Pivot Nut: 88 N·m (9.0 kgf·m, 65 ft·lb)

- Tighten the torque link nut.

Torque - Torque Link Nut: 34 N·m (3.5 kgf·m, 25 ft·lb)

- Move the swingarm up and down [A] to check for abnormal friction.

Swingarm Disassembly/Assembly

- Remove the needle bearing using the oil seal and bearing remover.

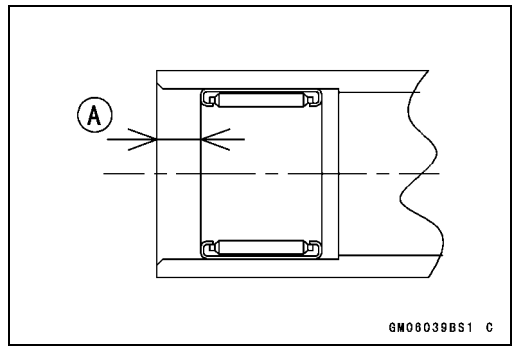
Special Tool - Oil Seal & Bearing Remover: 57001-1058

- Insert the needle bearing using the bearing driver set so that the marked side faces outside.

Special Tool - Bearing Driver Set: 57001-1129

- Apply a thin coat of a the grease to the lips of the grease seals.

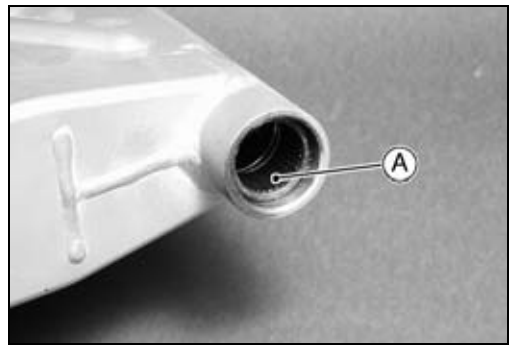
Swingarm Bearing Installation



- Apply plenty of grease to the new needle bearings, and sleeve.
- Be sure to install the needle bearings so that the manufacturer's marks are faced out. This prevents bearing damage.
- Position the bearings as shown, using a suitable bearing driver in the bearing driver set.
  7 mm (0.28 in.) [A]

Special Tool - Bearing Driver Set: 57001-1129

Swingarm Needle Bearing Lubrication



- Apply a thin coat of the grease to the inner surfaces [A] of the needle bearings.

Steering

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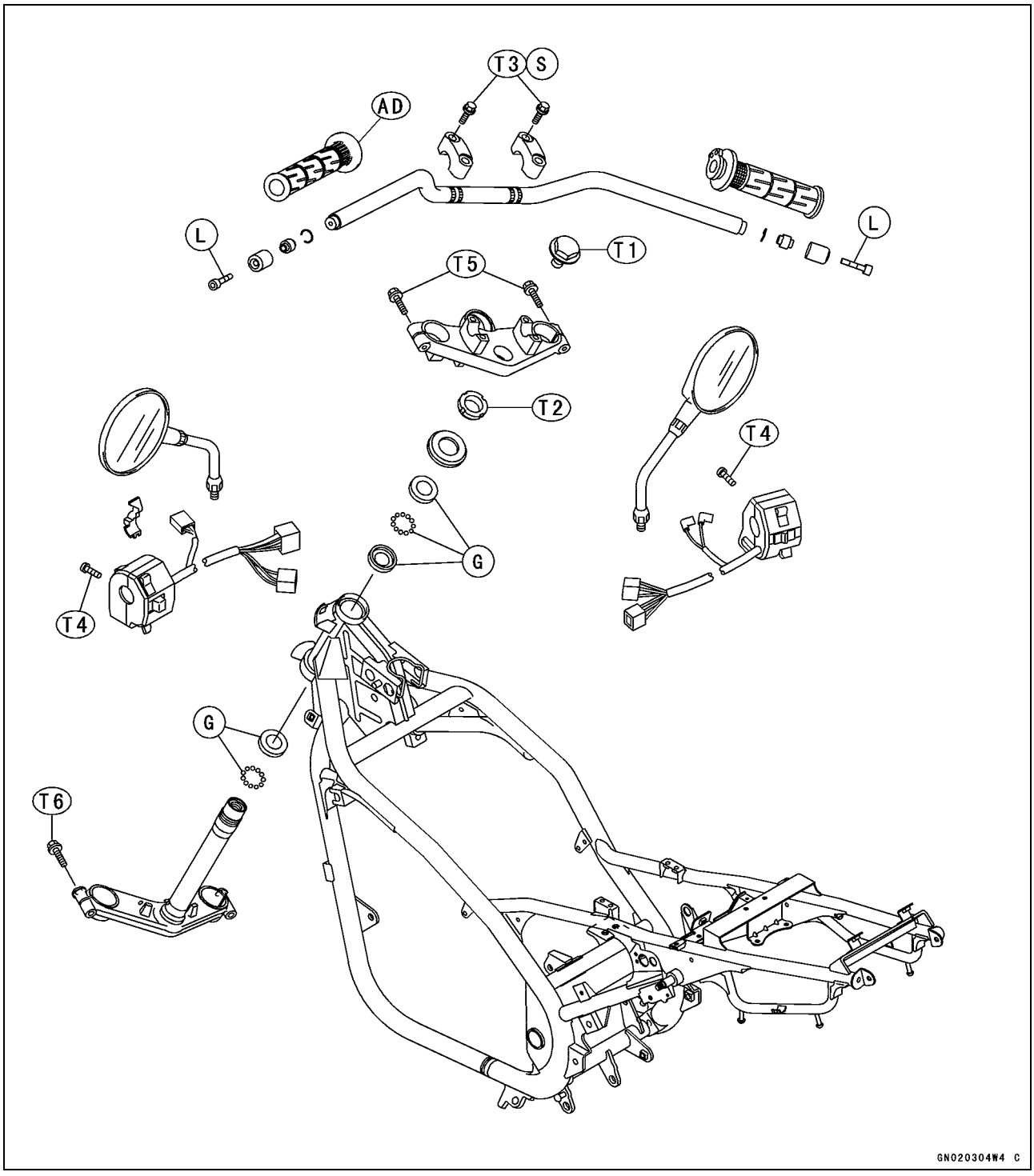
Exploded View



T1: 44 N·m (4.5 kgf·m, 33 ft·lb)
T2: Hand-tight
T3: 25 N·m (2.5 kgf·m, 18 ft·lb)
T4: 3.4 N·m (0.35 kgf·m, 30 in·lb)
T5: 20 N·m (2.0 kgf·m, 14.5 ft·lb)
T6: 29 N·m (3.0 kgf·m, 22 ft·lb)
AD: Apply adhesive.
G: Apply grease.
L: Apply a non-permanent locking agent.
S: Follow the specific tightening sequence.

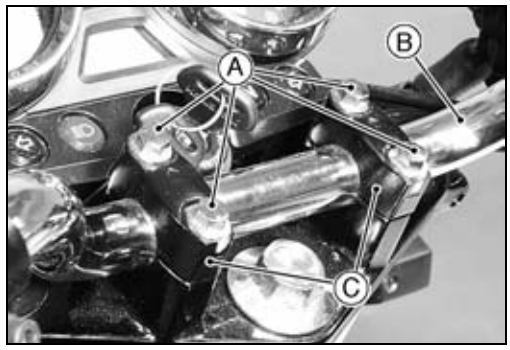
Specifications

Special Tools - Jack: 57001-1238
Steering Stem Wrench: 57001-1100
Head Pipe Outer Race Press Shaft: 57001-1075
Bearing Puller: 57001-158
Head Pipe Outer Race Driver, ϕ46.5: 57001-1106
Head Pipe Outer Race Driver, ϕ51.5: 57001-1076
Steering Stem Bearing Driver: 57001-137
Steering Stem Bearing Driver Adapter, ϕ34.5: 57001-1074
Bearing Puller Adapter: 57001-136

Handlebar

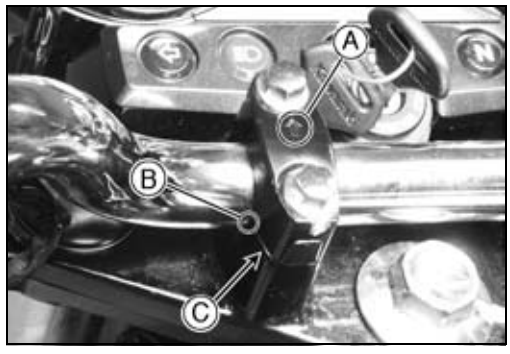
Handlebar Removal

- Remove:
  Clutch Cable Upper End
  Right and Left Handlebar Switch Housing
  Throttle Grip
  Brake Master Cylinder
- Unscrew the handlebar mounting bolts [A] and remove the handlebar [B] and clamp [C].



Handlebar Installation

- Install the handlebar clamps so that the arrow [A] on the clamp points to the front.
- Set the handlebar to match its punched mark [B] to the lower mating face [C] of the clamp rear part.



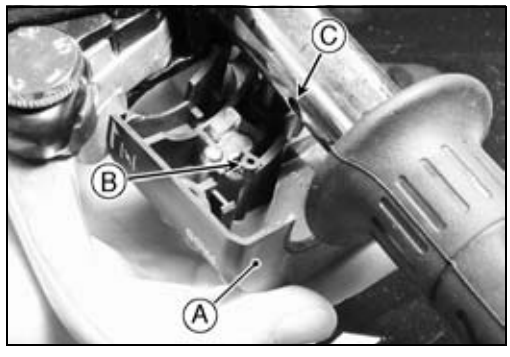
- Tighten the front clamp bolts first, and then the rear clamp bolts. There will be a gap [A] at the rear part of the clamp after tightening.

Torque - Handlebar Clamp Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- The front half of the right and left switch housings [A] has a small projection [B]. Fit the projection into the small hole [C] in the handlebar.
- Install the handlebar switch housing.

Torque - Handlebar Switch Housing Screws: 3.4 N·m (0.35 kgf·m, 30 ft·lb)

- Install:
  Front Master Cylinder (see Brakes chapter)

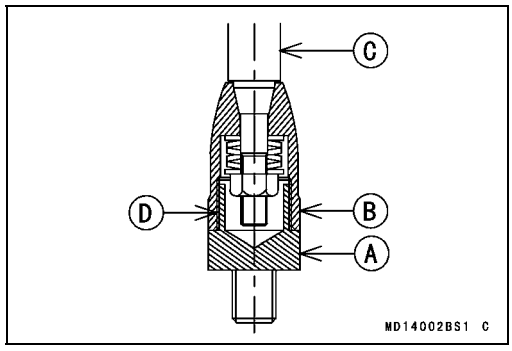


Rear View Mirror Removal

- Loosen the lower hexagonal area [A] for tightening to remove the rear view mirror from the holder.

CAUTION

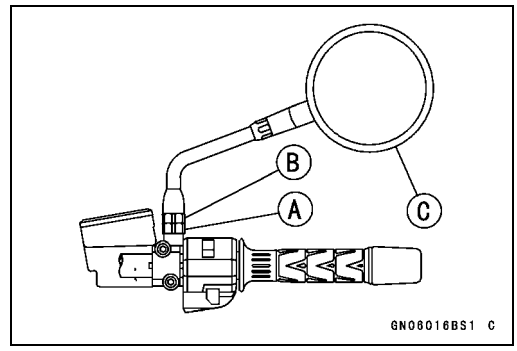
Do not force to tighten and/or loosen the upper hexagonal area (Adapter) [B] with a pair of spanners. Disassembly of this area is Not Available. Non-permanent locking agent [D] is already applied to the threads of this inner area. Forcible loosening may damage the adapter and/or the turning mechanism of the stay [C].



Handlebar

Rear View Mirrors (Left and Right) Installation

- Screw the mounting area of the right rear view mirror into the holder all the way, and tighten the lower hexagonal area for tightening securely.
  [A] Lower Hexagonal Area for Tightening
  [B] Upper Hexagonal Area (Adapter)
  [C] Rear View Mirror (Right)



Steering

Steering Inspection

Steering Inspection

● Check the steering.

○Lift the front wheel off the ground using the jack.

Special Tool - Jack: 57001-1238

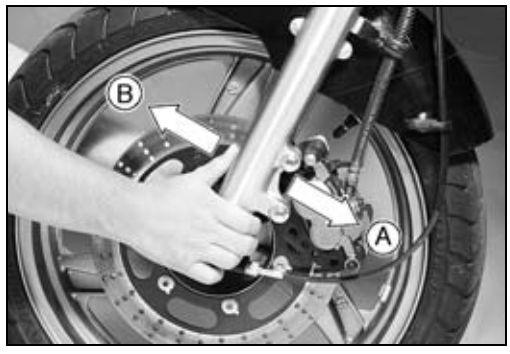
○With the front wheel pointing straight ahead, alternately tap each end of the handlebar. The front wheel should swing fully left and right from the force of gravity until the fork hits the stop.

★If the wheel binds or catches before the stop, the steering is too tight.

● Stand in front of the motorcycle and grasp the lower ends of fork near the axle.

● Feel for steering looseness by pushing [A] and pulling [B] the forks.

★If you feel looseness, the steering is too loose.



NOTE

○*The cables and wiring will have some effect on the motion of the fork which must be taken into account. Be sure the wires and cables are properly routed.*

○*The bearings must be in good condition and properly lubricated in order for any test to be valid.*

Steering Adjustment

★Adjust the steering if necessary.

● Remove:
Handlebar (see Handlebar Removal)
Side Cover (see Frame chapter)

● The Fuel Tank is moved a little backward.

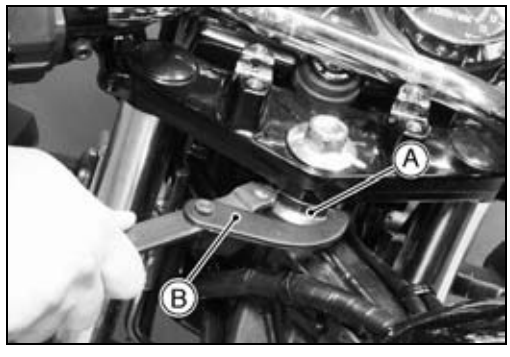
● Loosen:
Both Fork Lower Clamp Bolts [A].
Stem Head Bolt [B].

● Adjust the steering.

★If the steering is too tight, loosen the stem nut [A] a fraction of a turn.

★If the steering is too loose, tighten the stem nut a fraction of a turn.

Special Tool - Steering Stem Nut Wrench: 57001-1100 [B].



NOTE

○*Turn the stem nut 1/8 turn at a time maximum.*

Torque - Steering Stem Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb, for reference)

Steering

- Tighten the steering stem head bolt [A] and fork lower clamp bolts [B].

Torque - Steering Stem Head Bolt: 44 N·m (4.5 kgf·m, 33 ft·lb)
Fork Lower Clamp Bolts: 29 N·m (3.0 kgf·m, 22 ft·lb)

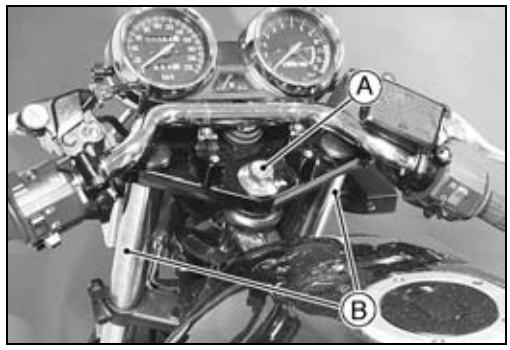
- Check the steering again.

★If the steering is still too tight or too loose, repeat the adjustment.

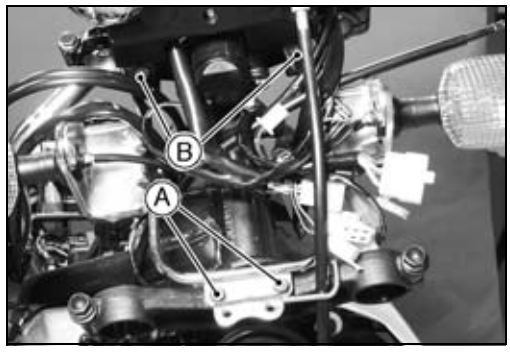
Steering Stem

Steering Stem Removal

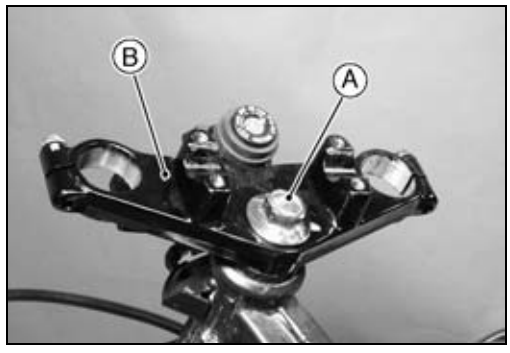
- Remove the handlebar.
  Loosen the stem head bolt [A]
  Remove the Front Fork [B] (see Suspension chapter)



- Remove:
  Headlight
  Turn Signal Light Bracket Bolts [A]
  Headlight Housing Bolts [B]
  Meter Unit



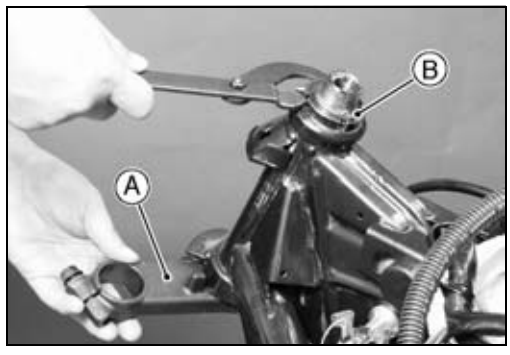
- Remove the stem head bolt [A] and lift up the steering stem head [B].



- Push up on the steering stem base [A], and remove the steering stem nut [B], then remove the steering stem base.

  Special Tool - Steering Stem Nut Wrench: 57001-1100

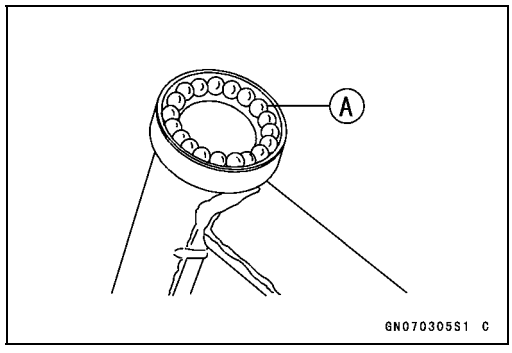
- As the stem is removed, some of the steel balls will drop out of the lower outer race. Remove the remaining balls. There are 20 steel balls in the lower outer race.
- Remove the steering stem cap, the upper inner race, and the upper steel balls (19).



Steering Stem Installation

- Route the cables, wires, and hoses as shown in the Cable, Wire, and Hose Routing section of the General Information chapter.
- Install the stem through the head pipe, the upper race, and the steel balls while pushing up on the stem base.

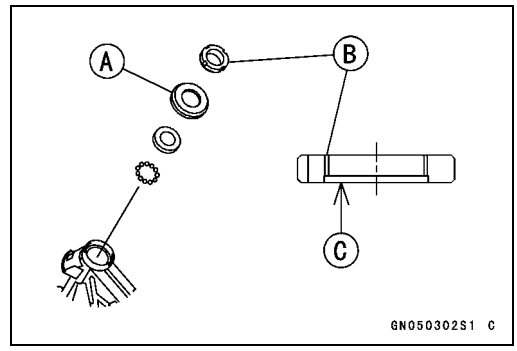
○There are 20 steel balls in the lower outer race and 19 steel balls [A] in the upper outer race.



Steering Stem

● Install the stem cap [A], and hand tighten the stem nut [B].

Torque - Steering Stem Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb, for reference)



NOTE

○*Install the steering stem nut so that the recess side [C] faces down.*

● Install the front fork (see Suspension chapter).

NOTE

○*Tighten the fork upper champ bolts first, next the stem head bolt, last the fork lower clamp bolts.*

Torque - Front Fork Upper Clamp Bolts: 20 N·m (2.0 kgf·m, 14.5 ft·lb)
Steering Stem Hand Bolt: 44 N·m (4.5 kgf·m, 33 ft·lb)
Front Fork Lower Clamp Bolts: 35 N·m (3.6 kgf·m, 26 ft·lb)

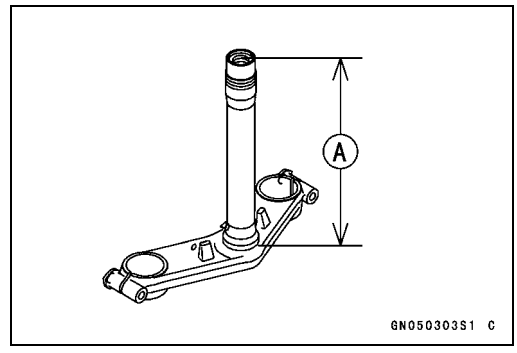
● Install:
Front Wheel (see Wheels/Tires chapter)
● Check and adjust the following items after installation.
Steering
Throttle Cables (see Fuel System chapter)
Choke Cable
Headlight Aim
Rear View Mirrors
● Check the front brake effectiveness.

⚠ WARNING

Do not attempt to ride 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.

Steering Stem Warp

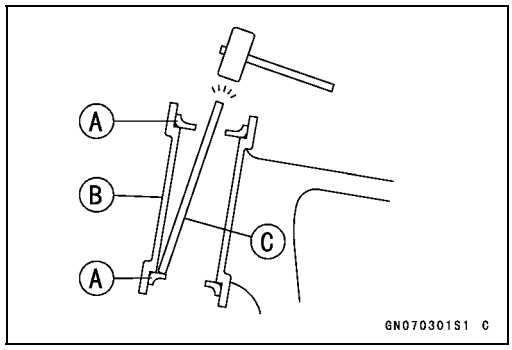
● Whenever the steering stem is removed, or if the steering cannot be adjusted for smooth action, check the steering stem for straightness.
★If the steering stem shaft [A] is bent, replace the steering stem.



Steering Stem Bearing

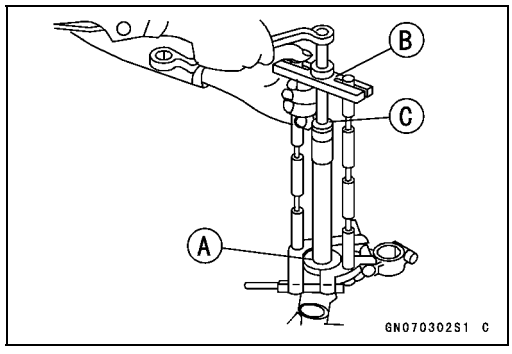
Stem Bearing Removal

- Remove the steering stem (see this chapter).
- To remove the outer races [A] pressed in the head pipe [B], insert a bar [C] into the head pipe, and hammer evenly around the circumference of the opposite race to drive it out.



- Remove the lower inner race [A] (with its grease seal) which is pressed onto the steering stem, with the steering stem bearing puller [B] and adapter [C].

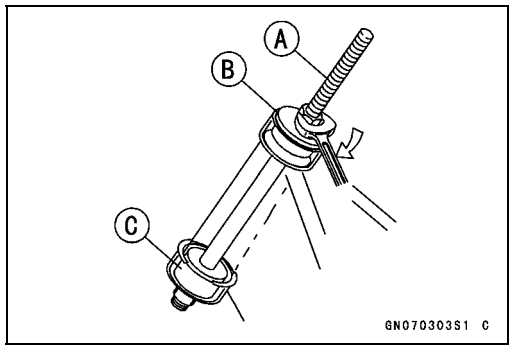
Special Tools - Bearing Puller: 57001-158
Bearing Puller Adapter: 57001-136



Stem Bearing Installation

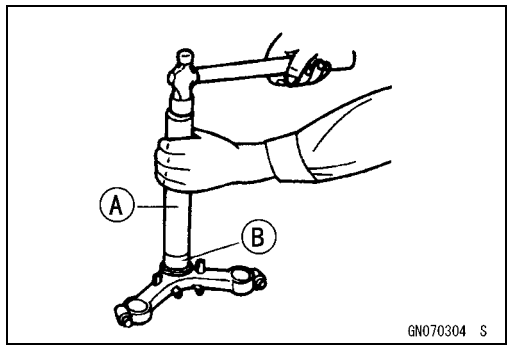
- Replace the outer races with new ones.
- Apply grease to the outer race, and drive them into the head pipe using the drivers and press shaft [A].

Special Tools - Head Pipe Outer Race Press Shaft: 57001-1075 [A]
Head Pipe Outer Race Driver, ϕ46.5: 57001-1106 [B]
Head Pipe Outer Race Driver, ϕ51.5: 57001-1076 [C]

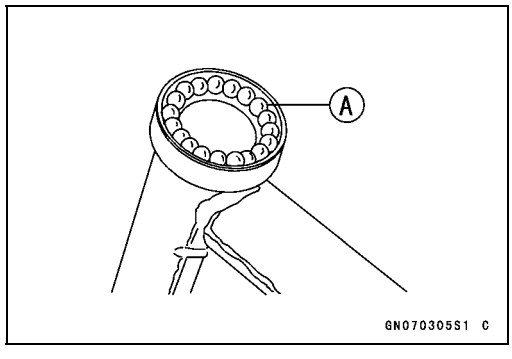


- Replace the inner races with new ones.
- Apply grease to the lower inner race, and drive it onto the stem using the driver and adapter.

Special Tools - Steering Stem Bearing Driver: 57001-137 [A]
Steering Stem Bearing Driver Adapter, ϕ34.5: 57001-1074 [B]



- Apply grease to the upper and lower outer races in the head pipe so that the steel balls will stick in place during stem insertion. Install the upper steel balls (19) and lower steel balls (20). All the steel balls [A] are the same size.
- Put on the upper inner race and steering stem cap and insert the steering stem into the head pipe.
- Install the steering stem nut so that the recess side faces down.



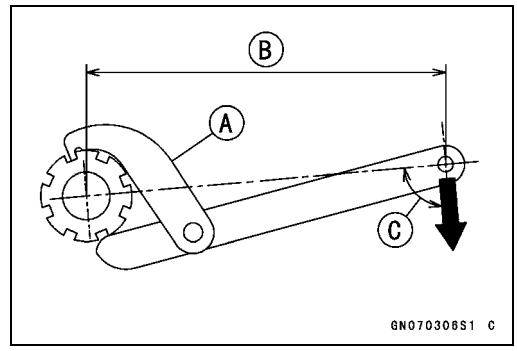
Steering Stem Bearing

● Settle the inner races in place as follows.

○Using the steering stem nut wrench, tighten the stem nut **20 N·m (2.0 kgf·m, 14.5 ft·lb)** of torque. To tighten the steering stem nut to the specified torque, hook the wrench on the stem nut, and pull the wrench at the hole by **110 N (11.1 kgf, 24.5 lb)** of force in the direction shown.

Special Tool - Steering Stem Nut Wrench: 57001-1100 [A]

180 mm [B]
90° [C]



○Back out the stem nut a fraction of a turn until it turns lightly.

○Adjust the steering stem (see Steering Adjustment).

○Hand tighten the steering stem nut.

Torque - Steering Stem Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb, for reference)

Stem Bearing Lubrication

● Remove the steering stem.

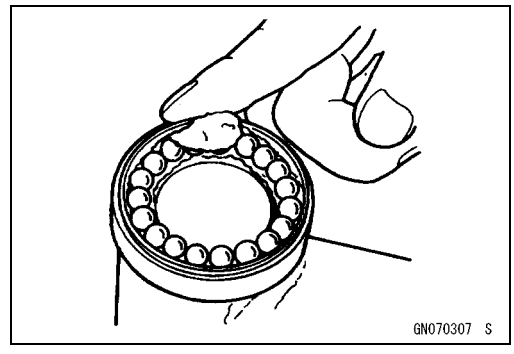
● Wipe all the old grease off the races and steel balls, washing them in a high-flash point solvent.

● Visually check the races and the balls.

★Replace the bearing assemblies if they show wear or damage.

● Pack the upper and lower races with grease, and stick the balls in place with grease.

● Install the steering stem, and adjust the steering.



Stem Bearing Wear, Damage

● Using a high-flash point solvent, wash the bearings clean of grease and dirt, and examine the races and steel balls.

● Visually check the balls or races.

★If the balls or races are worn, or if either race is dented, replace both races and all the balls for that bearing as a set.

Frame

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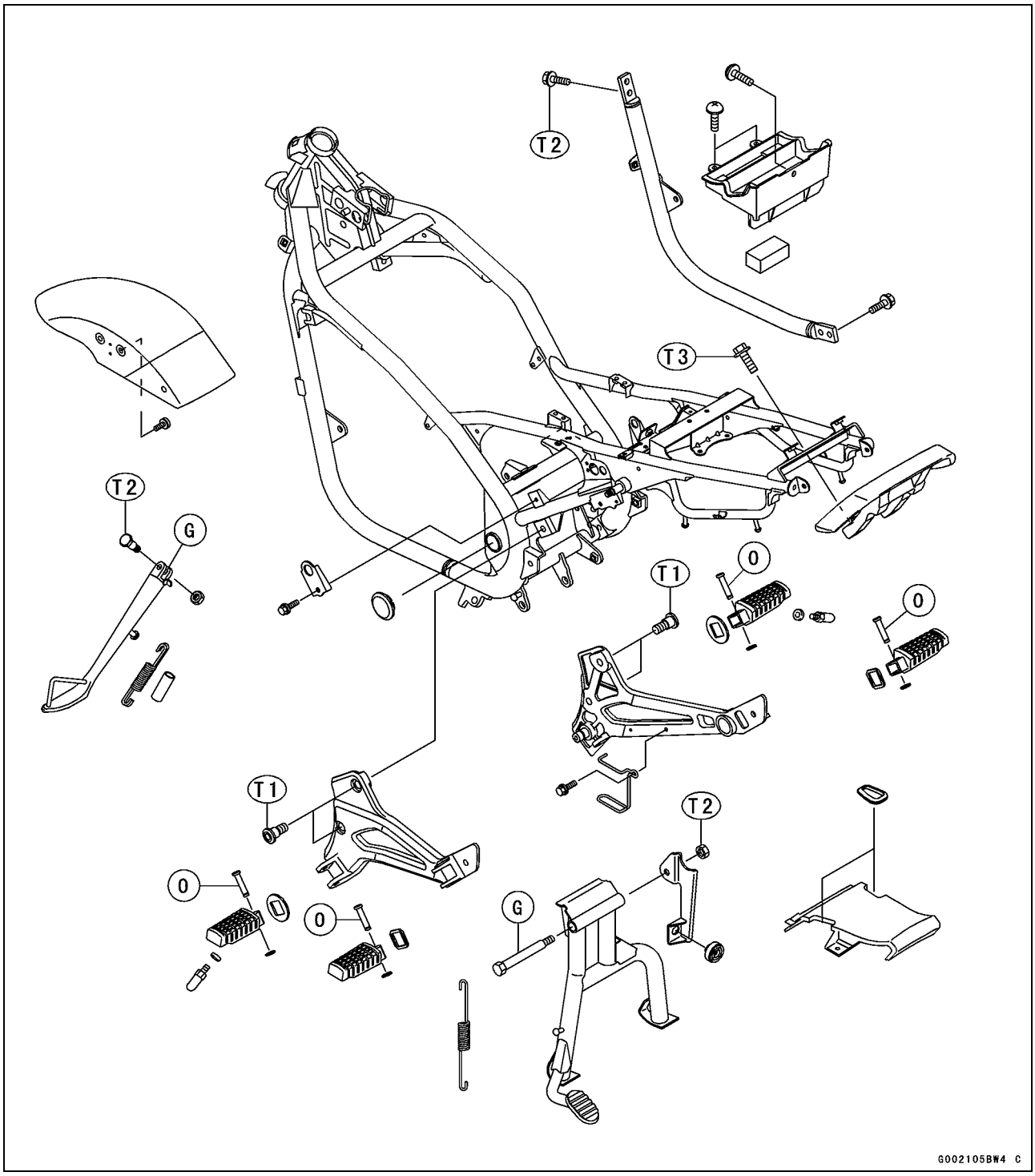
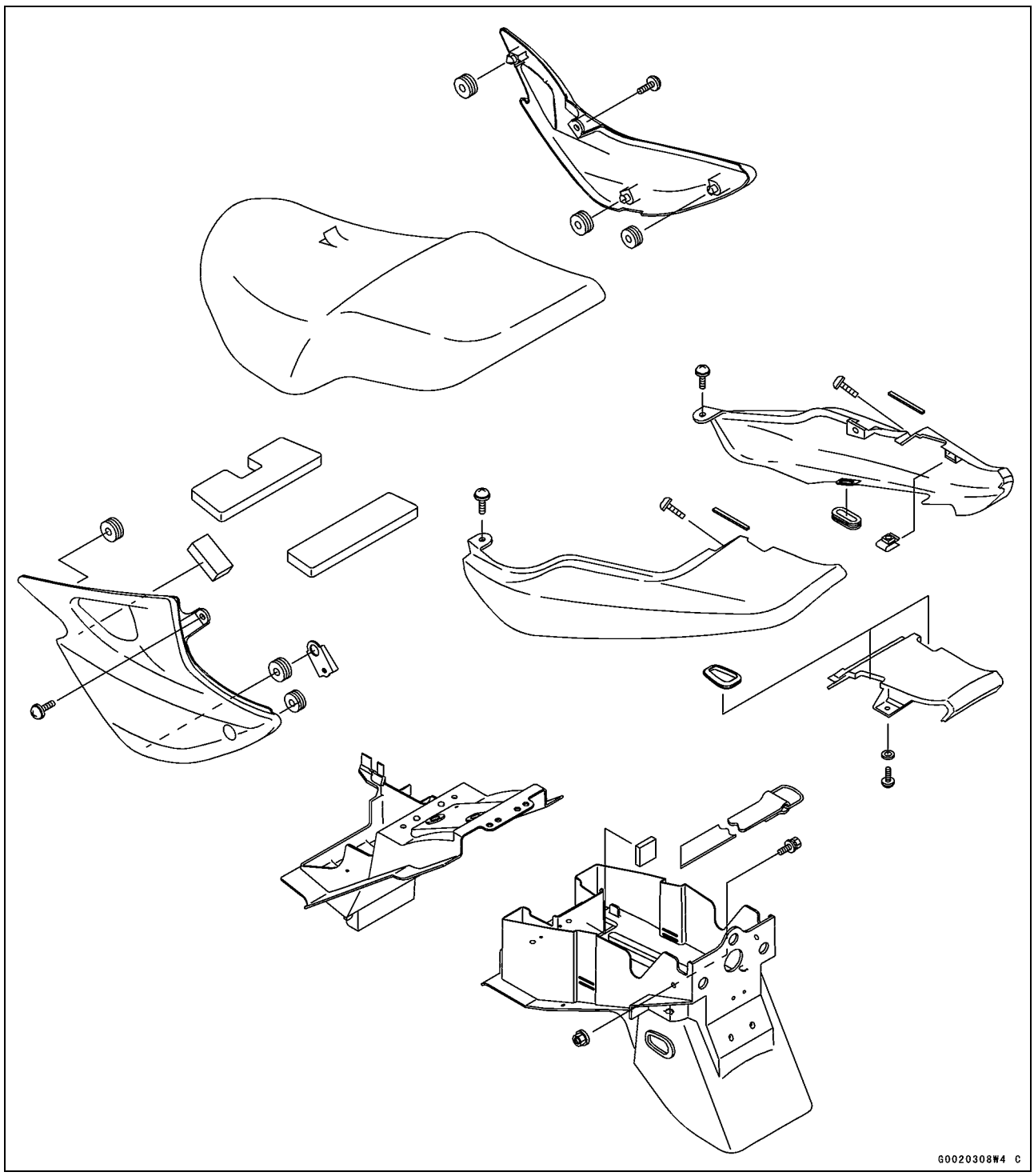
Exploded View



T1: 34 N·m (3.5 kgf·m, 25 ft·lb)
T2: 44 N·m (4.5 kgf·m, 33 ft·lb)
T3: 25 N·m (2.5 kgf·m, 18 ft·lb)
O: Apply oil.
G: Apply grease.

Exploded View



Specifications

Special Tool - Jack: 57001-1238

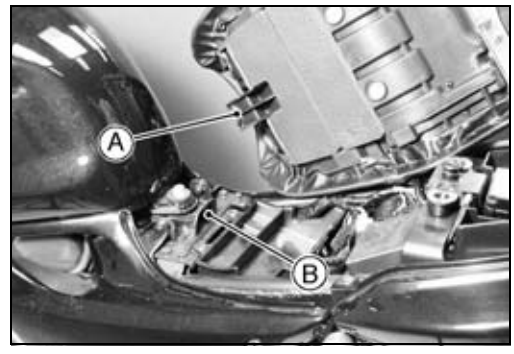
Seat

Seat Removal

- Insert the ignition switch key [A] into the seat lock.
- Turn the ignition switch key clockwise.
- Swing open the seat and remove it.

Seat Installation

- Slip the hook [A] of the seat under the brace [B] on the fuel tank.

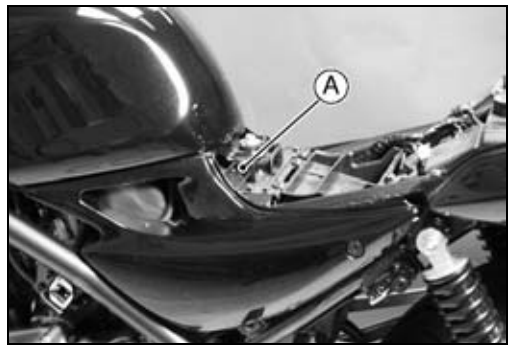


- Push down [A] the rear part of the seat until the lock clicks.

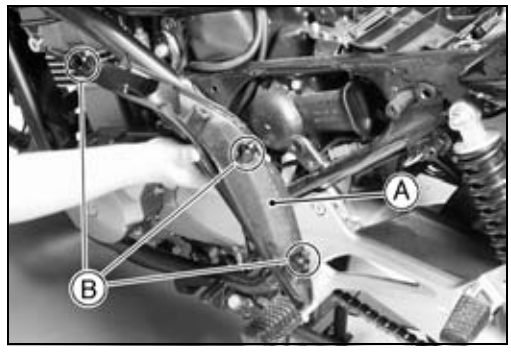
Side Covers

Side Cover Removal

- Remove the seat (see this chapter).
- Remove the screw [A].



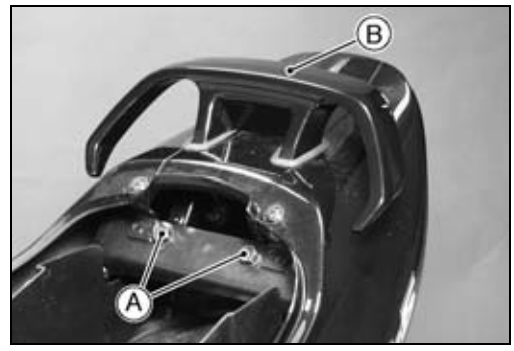
- Pull the rear part and front part of the side cover [A] evenly outward to clear the stoppers [B].
- Remove the side cover.
- Remove the other side cover in the same manner.



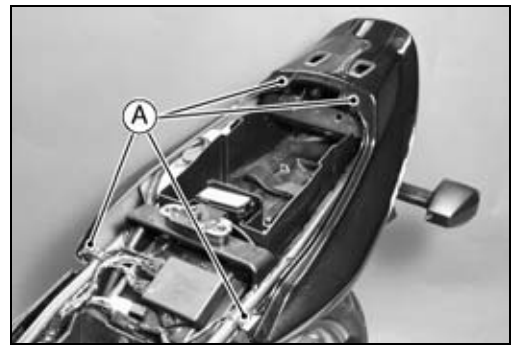
Seat Cover

Seat Cover Removal

- Remove the seat (see this chapter).
- Remove both side covers (see this chapter).
- Unscrew the mounting bolts [A] and remove the tail grip [B].



- Remove the screws [A].



- With the tail of the seat covers joined, bend open the seat cover [A] and pull them out backward.

CAUTION

Be careful not to scratch the painted surface during removal or installation.

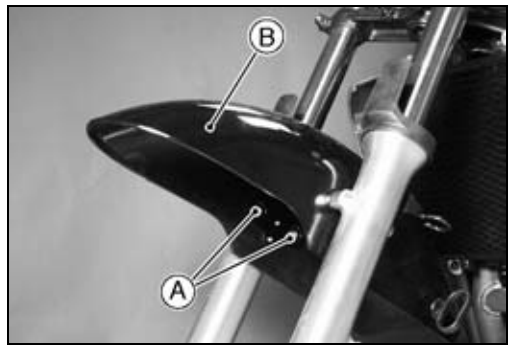
NOTE

○*The projection part under the cover is noted at detaching and the installation.*

Fenders

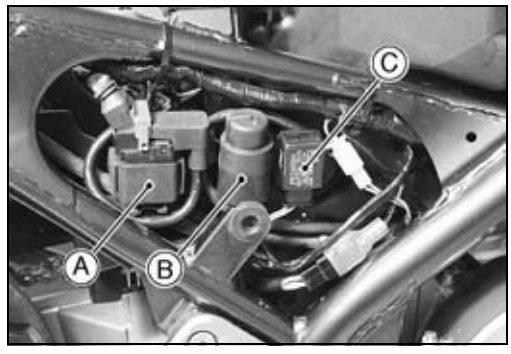
Front Fender Removal

- Remove the front wheel (see Wheels/Tires chapter).
- Remove the bolts [A] and take off the front fender [B] rearward.

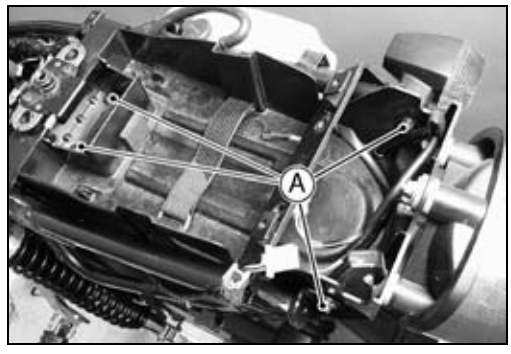


Rear Fender Removal

- Remove:
  Seat (see Frame chapter)
  Battery (see Electrical System chapter)
  Regulator/Rectifier (see Electrical System chapter)
  Igniter (see Electrical System chapter)
  Fuse Box (see Electrical System chapter)
  Side Covers (see Side Cover Removal)
  Starter Relay [A]
  Starter Circuit Relay [B]
  Turn Signal Relay [C]
  Seat Cover (see Frame chapter)



- Remove:
  Right and Left Rear Shock Lower Ends
  Rear Fender Bolts and Nuts [A]
- Move back the rear fender and remove it.



Frame

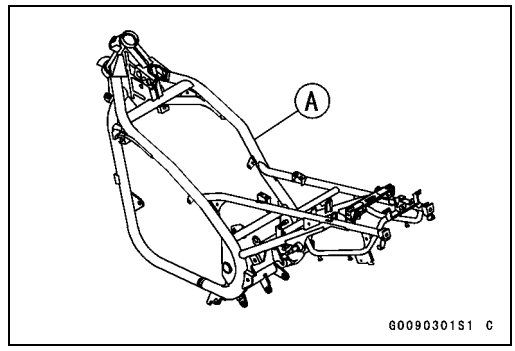
Frame Inspection

- Visually inspect the frame [A] for cracks, dents, bending, or warp.

★If there is any damage to the frame, replace it.

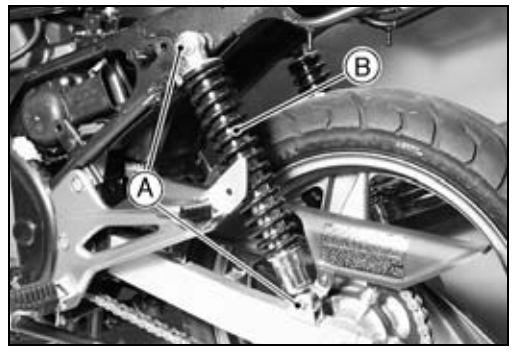
⚠ WARNING

A repaired frame may fail in use, possibly causing an accident. If the frame is bent, dented, cracked, or warped, replace it.

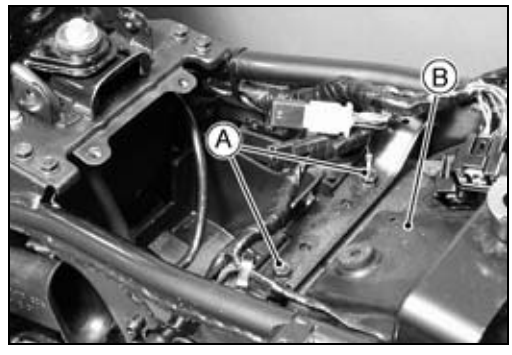


Battery case Removal

- Remove the Rear Fender (see Rear Fender Removal)
- Remove the mounting bolts [A] and pull off the rear shock absorber [B].

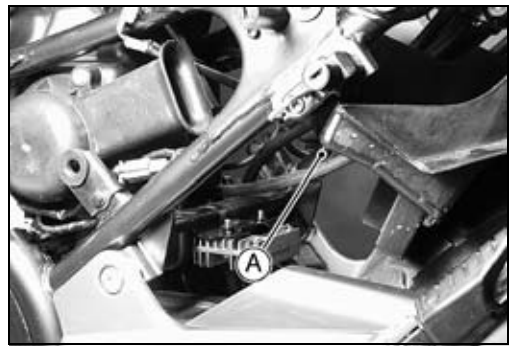


- Remove the mounting bolts [A] and Battery Case [B].



Battery Case Installation

- Insert the tab [A] into the hole.



Electrical System

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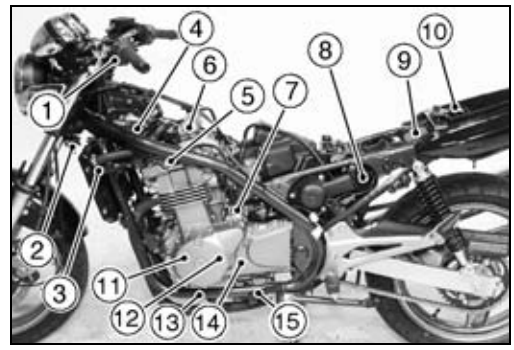
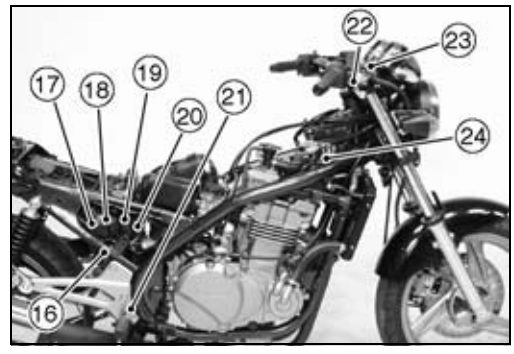
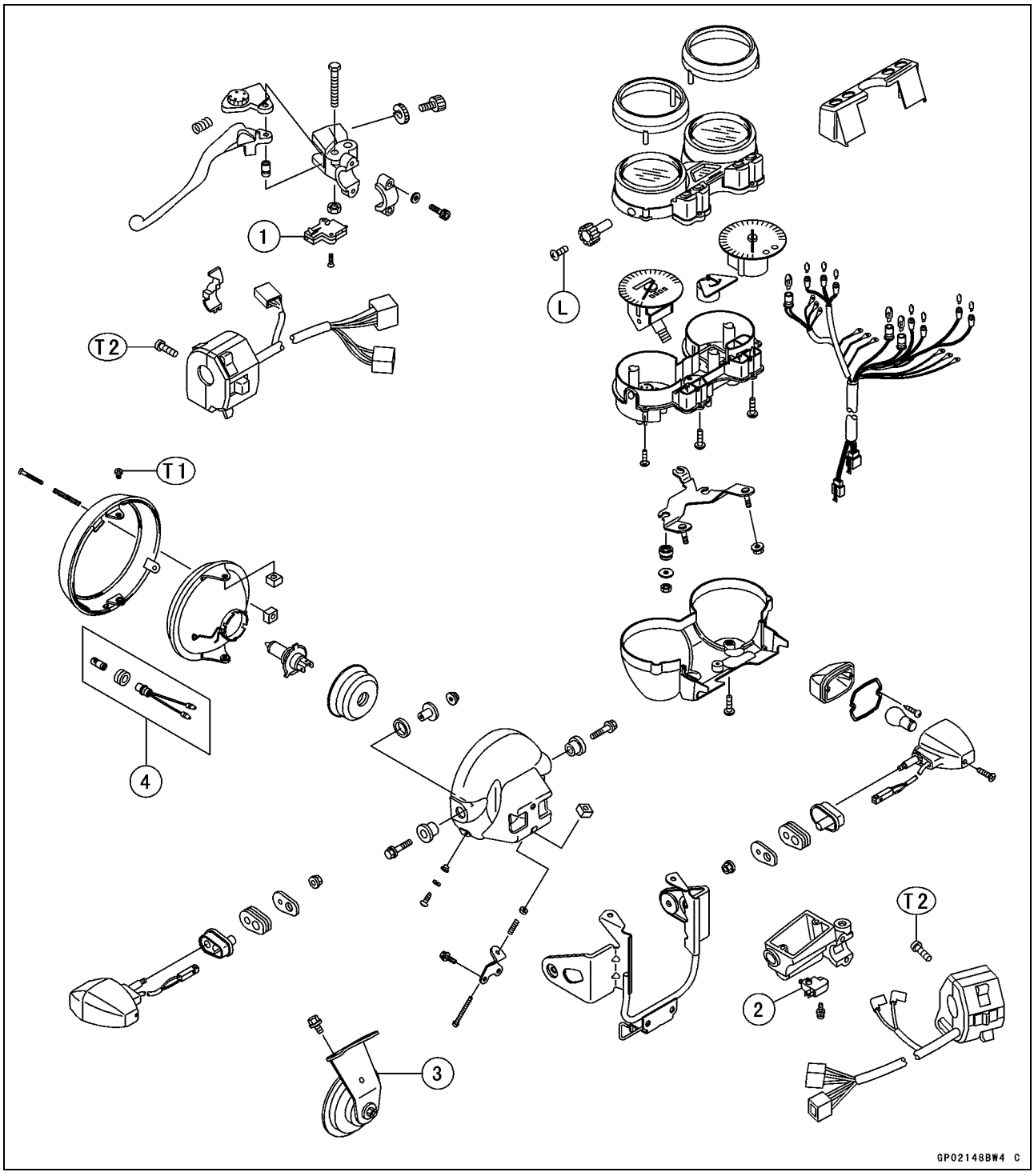
Parts Location

1. Starter Lockout Switch
2. Horn
3. Radiator Fan Switch
4. #1 Ignition Coil
5. Spark Plugs
6. Water Temperature Switch
7. Starter Motor
8. MF Battery
9. IC Igniter
10. Fuse Box
11. Alternator
12. Pickup Coil
13. Oil Pressure Switch
14. Neutral Switch
15. Sidestand Switch
16. Regulator/Rectifier
17. Main Fuse 30 A
18. Starter Relay
19. Starter Circuit Relay
20. Turn Signal Relay
21. Rear Brake Light Switch
22. Front Brake Light Switch
23. Ignition Switch
24. #2 Ignition Coil





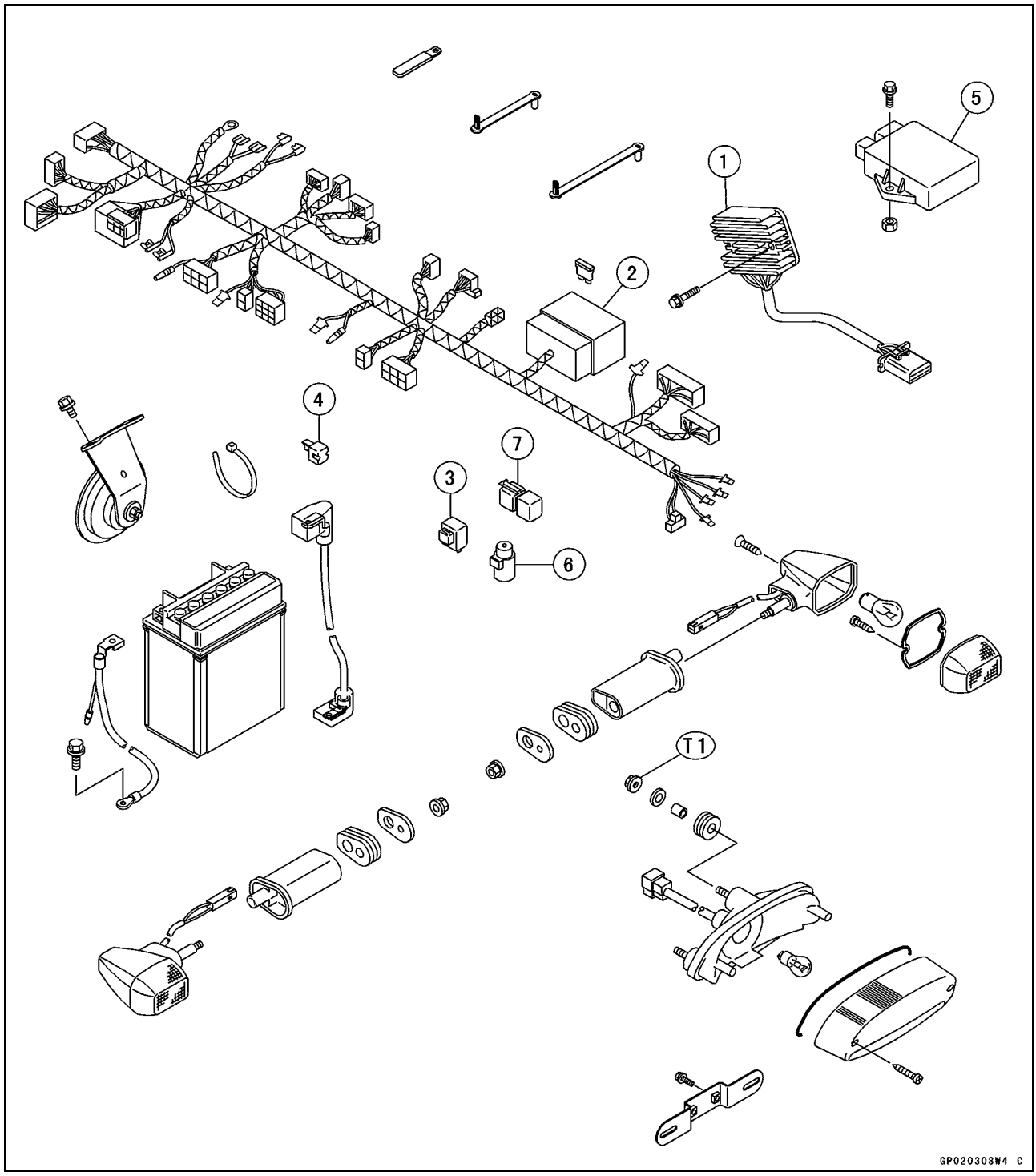
Exploded View



1. Starter Lockout Switch
2. Front Brake Light Switch
3. Horns
4. City Light (other than Australia)

T1: 1.2 N·m (0.12 kgf·m, 10 in·lb)
T2: 3.4 N·m (0.35 kgf·m, 30 in·lb)
L: Apply a non-permanent locking agent.

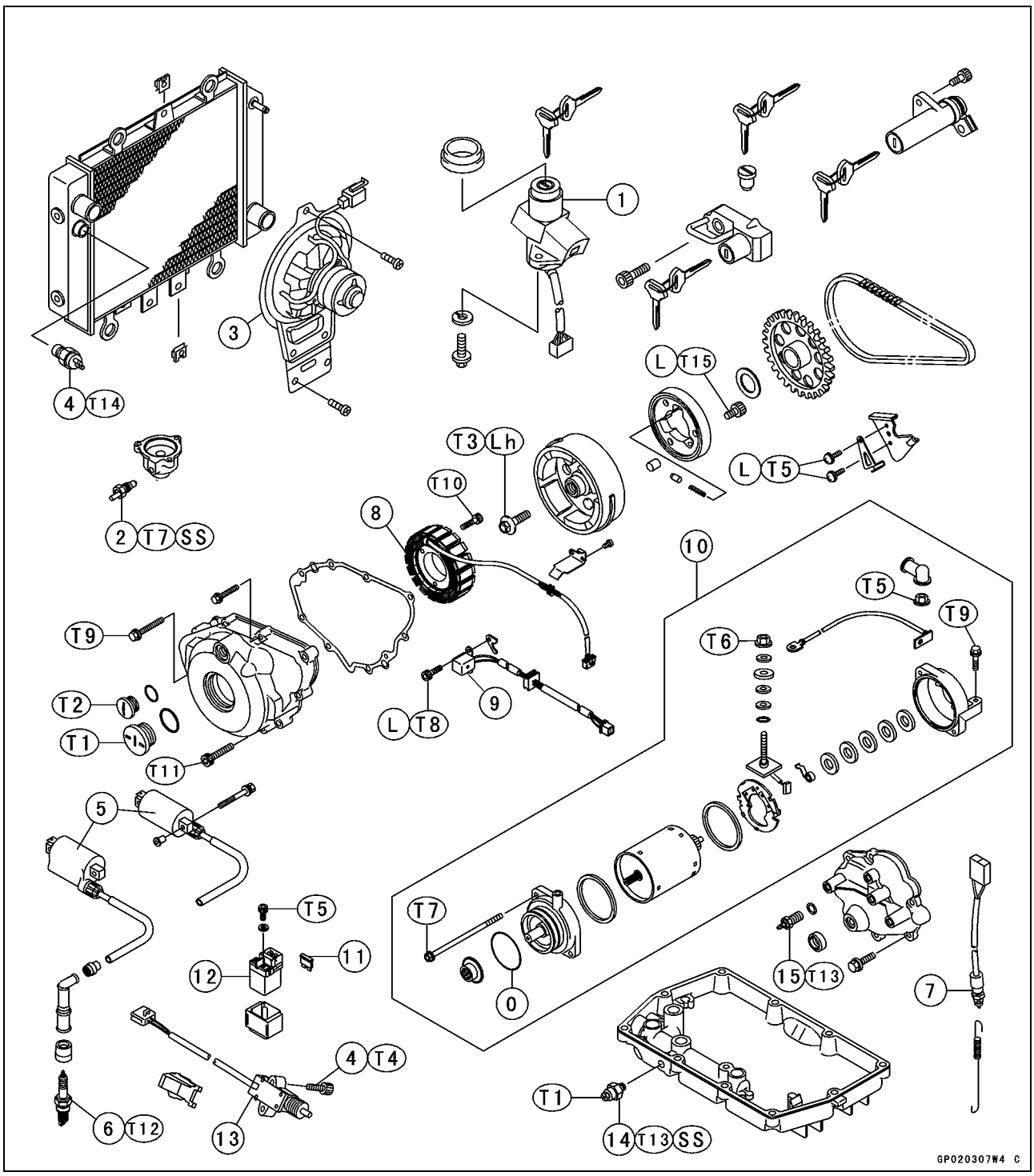
Exploded View



1. Regulator/Rectifier
2. Fuse Box
3. Turn Signal Relay
4. Rectifiers
5. IC Igniter
6. Starter Circuit Relay
7. Diode

T1: 5.9 N·m (0.6 kgf·m, 52 in·lb)

Exploded View



Exploded View

1. Ignition Switch
2. Water Temperature Switch
3. Radiator Fan
4. Radiator Fan Switch
5. Ignition Coils
6. Spark Plugs
7. Rear Brake Light Switch
8. Alternator Starter
9. Pickup Coil
10. Starter Motor
11. 30 A Main Fuse
12. Starter Relay
13. Sidestand Switch
14. Oil Pressure Switch
15. Neutral Switch

T1: 1.5 N·m (0.15 kgf·m, 13 in·lb)
T2: 2.5 N·m (0.25 kgf·m, 22 in·lb)
T3: 69 N·m (7.0 kgf·m, 51 in·lb)
T4: 3.9 N·m (0.40 kgf·m, 35 in·lb)
T5: 4.9 N·m (0.50 kgf·m, 43 in·lb)
T6: 6.9 N·m (0.70 kgf·m, 65 in·lb)
T7: 7.8 N·m (0.80 kgf·m, 69 in·lb)
T8: 8.3 N·m (0.85 kgf·m, 74 in·lb)
T9: 11 N·m (1.1 kgf·m, 95 in·lb)
T10: 12 N·m (1.2 kgf·m, 8.5 ft·lb)
T11: 13 N·m (1.3 kgf·m, 9.5 ft·lb)
T12: 14 N·m (1.4 kgf·m, 10.0 ft·lb)
T13: 15 N·m (1.5 kgf·m, 11.0 ft·lb)
T14: 18 N·m (1.8 kgf·m, 13.0 ft·lb)
T15: 34 N·m (3.5 kgf·m, 25 ft·lb)
Lh: Left-hand Threads
O: Apply oil.
SS: Apply silicone sealant.

Specifications

Item	Standard	Service Limit
Battery		
Type	Sealed Battery	
Capacity	12 V 10 Ah	
Voltage	12.6 V or more	
Charging System		
Alternator Type	Three-phase AC	
DC Battery Charging Voltage	14 ~ 15 V @4 000 r/min (rpm)	
Alternator Output Voltage	46 ~ 64 V @4 000 r/min (rpm)	
Stator Coil Resistance	0.3 ~ 0.6 Ω (× 1 Ω)	
Regulator/rectifier		
Type	Load dumping regulator with full-wave rectifier	
Resistance	in the text	
Ignition System		
Pickup Coil Air Gap	0.7 mm (0.28 in.) (Non-measurable and non-adjustable)	
Pickup Coil Resistance	360 ~ 540 Ω (× 100 Ω)	
Pickup Coil Peak Voltage	5 V or more	
Ignition Coil:		
3 Needle Arcing Distance	8 mm (0.32 in.) or more	
Primary Winding Resistance	2.3 ~ 3.5 Ω (×1 Ω)	
Secondary Winding Resistance	12 ~ 18 kΩ (× 1 kΩ)	
Primary Peak Voltage	100 V or more	
Spark Plug:		
Spark Plug Gap	0.6 ~ 0.7 mm (0.024 ~ 0.028 in.)	
Spark Plug Cap Resistance	3.75 ~ 6.25 kΩ (× 1 kΩ)	
Electric Starter System		
Starter Motor:		
Brush Length	12.0 ~ 12.5 mm (0.47 ~ 0.49 in.)	8.5 mm (0.34 in.)
Commutator Diameter	28 mm (1.10 in.)	27 mm (1.06 in.)
Switch and Sensor		
Rear Brake Light Switch Timing	ON after about 15 mm (0.59 in.) pedal travel	
Engine Oil Pressure Switch Connections	When engine is stopped: ON When engine is running: OFF	
Radiator Fan Switch connections:		
Rising Temperature	From OFF to ON @93 ~ 103°C (200 ~ 217°F)	
Falling Temperature	From ON to OFF @91°C (196°F) ~ temperature less than ON temperature	
	ON: less than 0.5 Ω	
	OFF: More than 1 MΩ	

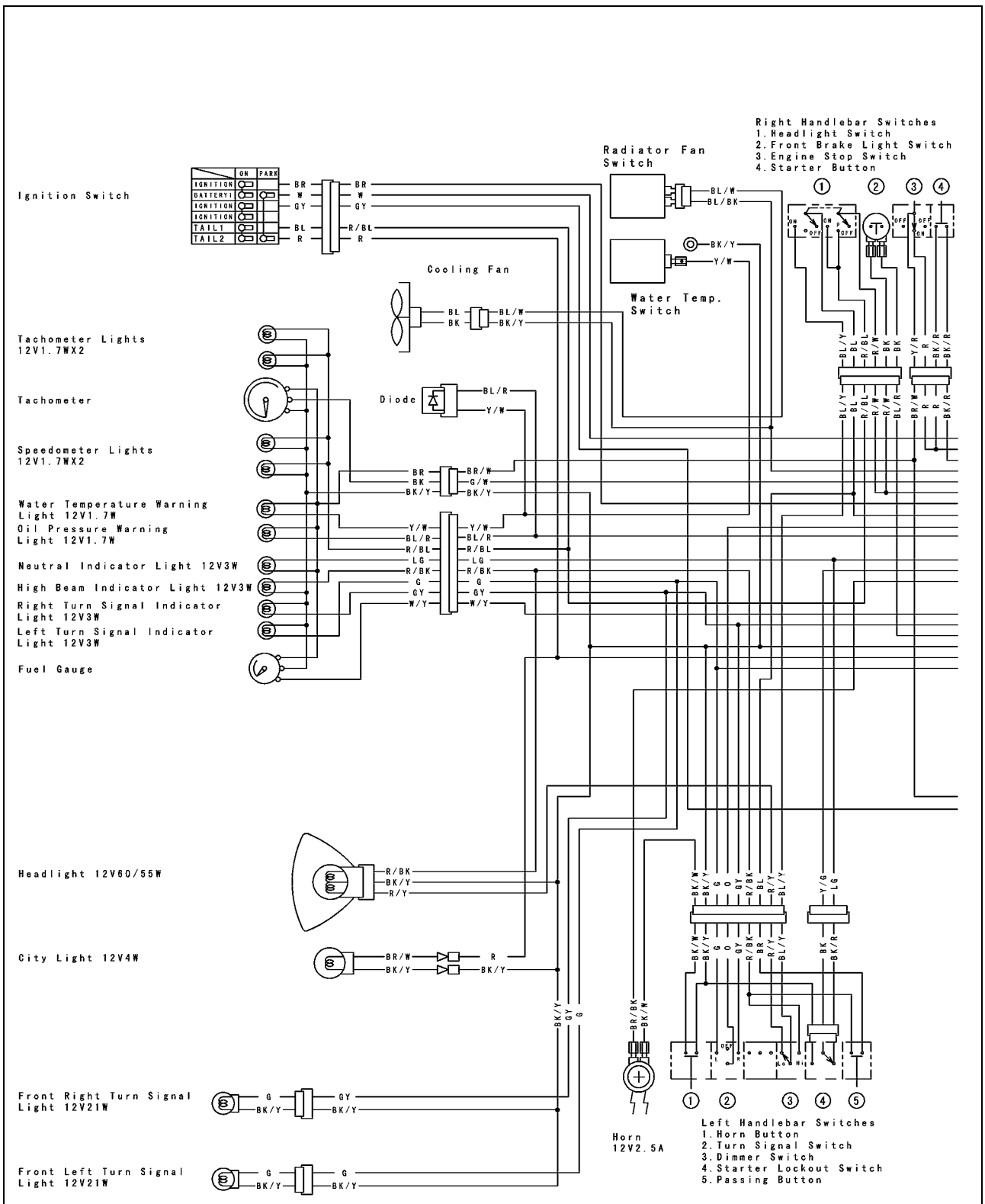
Specifications

Item	Standard	Service Limit
Water Temperature Switch Connections:		
Rising Temperature	From OFF to ON @110 ~ 120°C (230 ~ 248°F)	
Falling Temperature	From ON to OFF @108°C (226°F) ~ temperature less than ON	
	ON: Less than 0.5 Ω	
	OFF: More than 1 MΩ	

Special Tools - Hand Tester: 57001-1394
Spark Plug Wrench, Hex 18: 57001-1024
Timing Light: 57001-1241
Flywheel Holder: 57001-1313
Rotor Puller, M16/M18/M20/M22 × 1.5: 57001-1216
Igniter Checker Assembly: 57001-1378
Harness Adapter #1: 57001-1381
Needle Adapter Set: 57001-1457

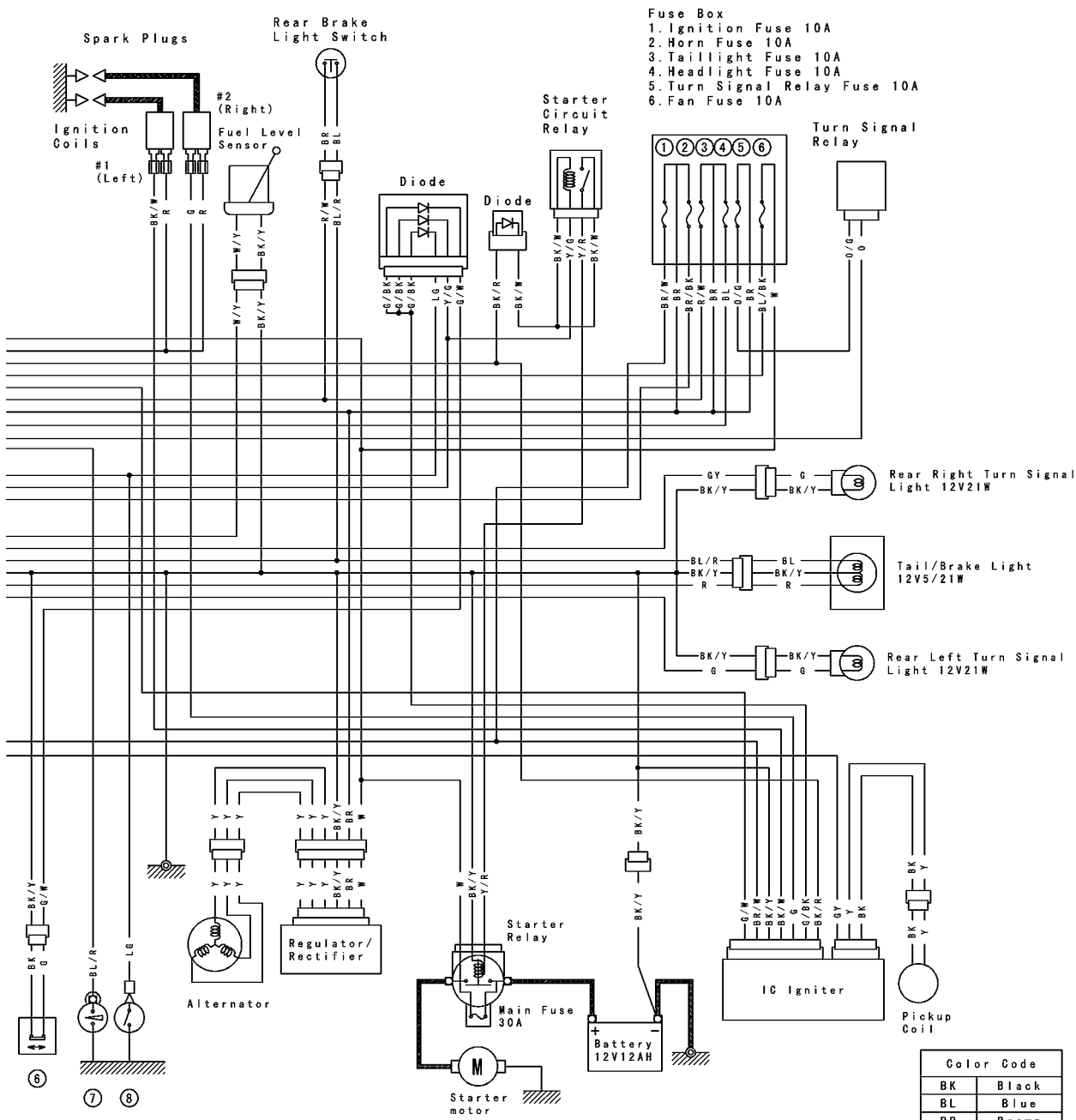
Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

ER500-C1 ~ C2, D1 Wiring Diagram (other than Australia)



LEFT HANDLEBAR SWITCH CONNECTIONS																	
Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch				Passing Button		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R	Color	R/BK	BR
Push	○	●	R		●		LO	○	●		Clutch Lever						
Released			OFF(Push)								Released		●	○	Push	○	●
			L	○	●		HI		●	○	Pulled in	○	●		Released		

ER500-C1 ~ C2, D1 Wiring Diagram (other than Australia)



IGNITION SWITCH CONNECTIONS						
	Ignition	Battery	Ignition	Ignition	Tail	Tail
Color	BR	W	GY	-	BL	R
OFF, LOCK						
ON	●	●	●		●	●
P(PARK)		●			●	●

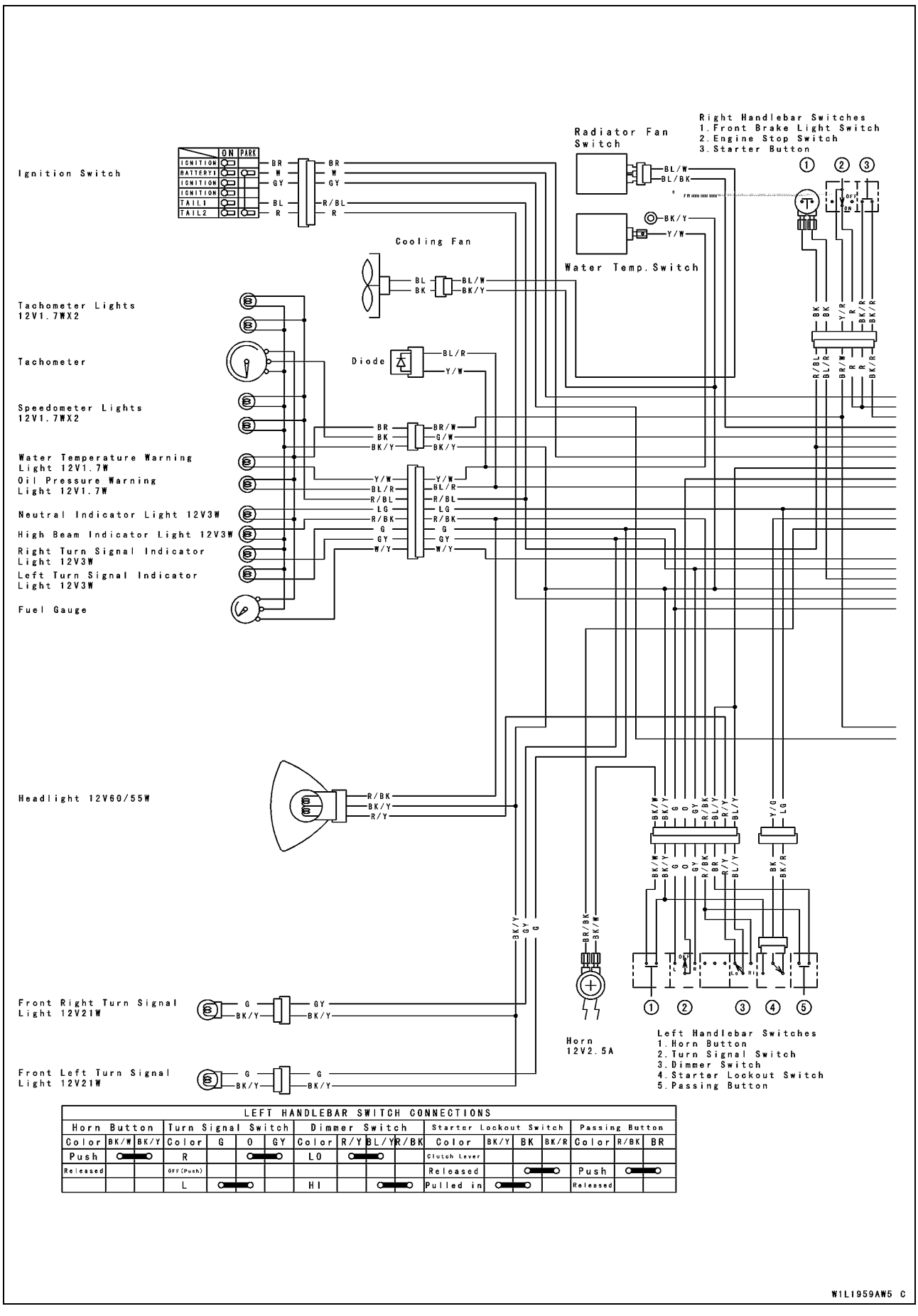
RIGHT HANDLEBAR SWITCH CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	R	Y/R	Color	BK/R	BK/R
Brake Lever			OFF			Push	●	
Pulled In	●					Released		
Released			RUN	●				

(98051-1956A)

Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

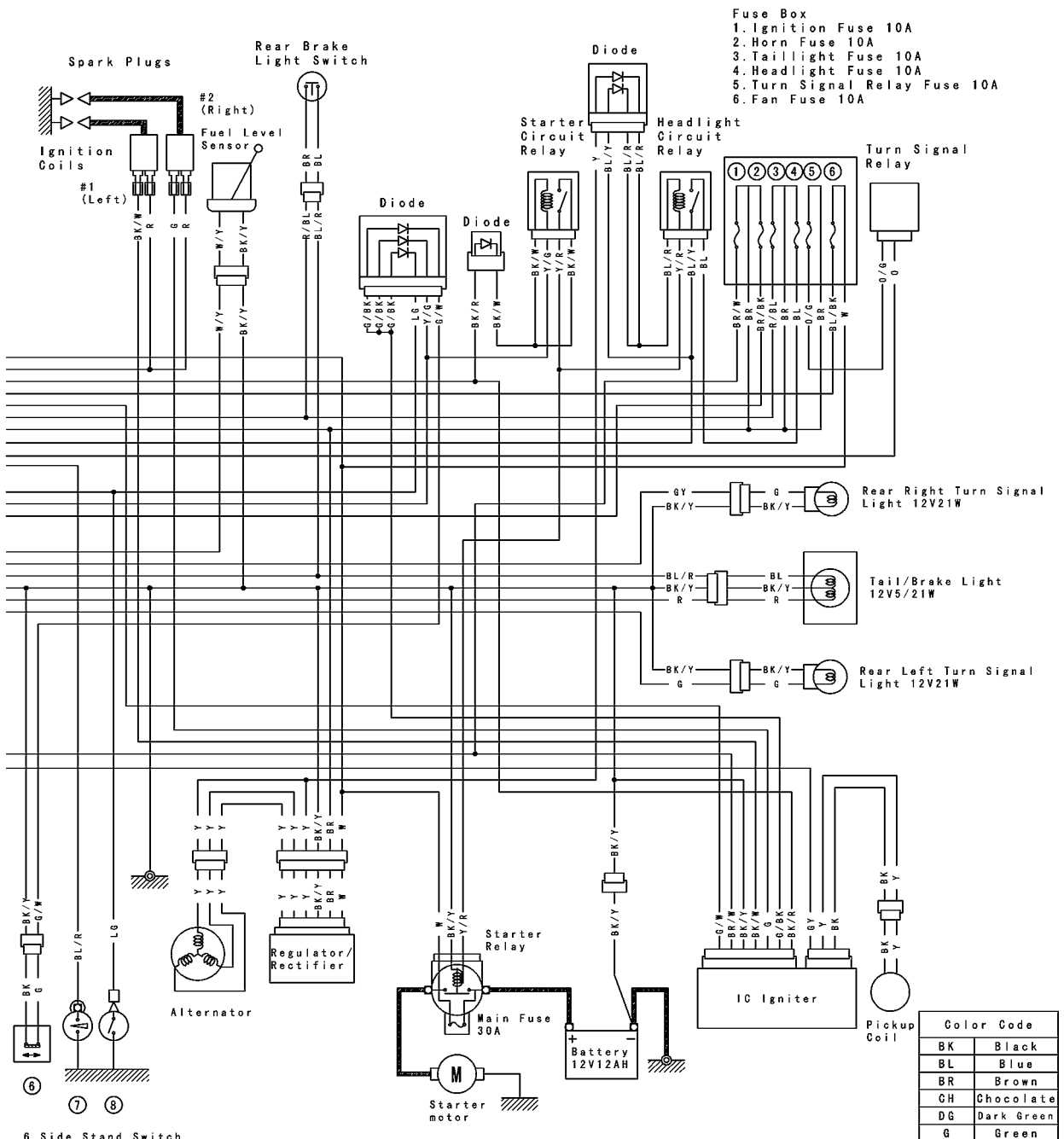
W1R1956AW5 C

ER500-C1 ~, D1 Wiring Diagram (Australia)



LEFT HANDLEBAR SWITCH CONNECTIONS																	
Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch				Passing Button		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R	Color	R/BK	BR
Push	○	●	R		●		LO	●			Clutch Lever						
Released			OFF (Push)								Released		●		Push	●	
			L	●			HI		●		Pulled in	●			Released		

ER500-C1 ~, D1 Wiring Diagram (Australia)



IGNITION SWITCH CONNECTIONS						
	Ignition	Battery	Ignition	Ignition	Tail1	Tail2
Color	BR	W	GY	–	BL	R
OFF, LOCK						
ON	●	●	●	●	●	●
P(PARK)		●	●	●	●	●

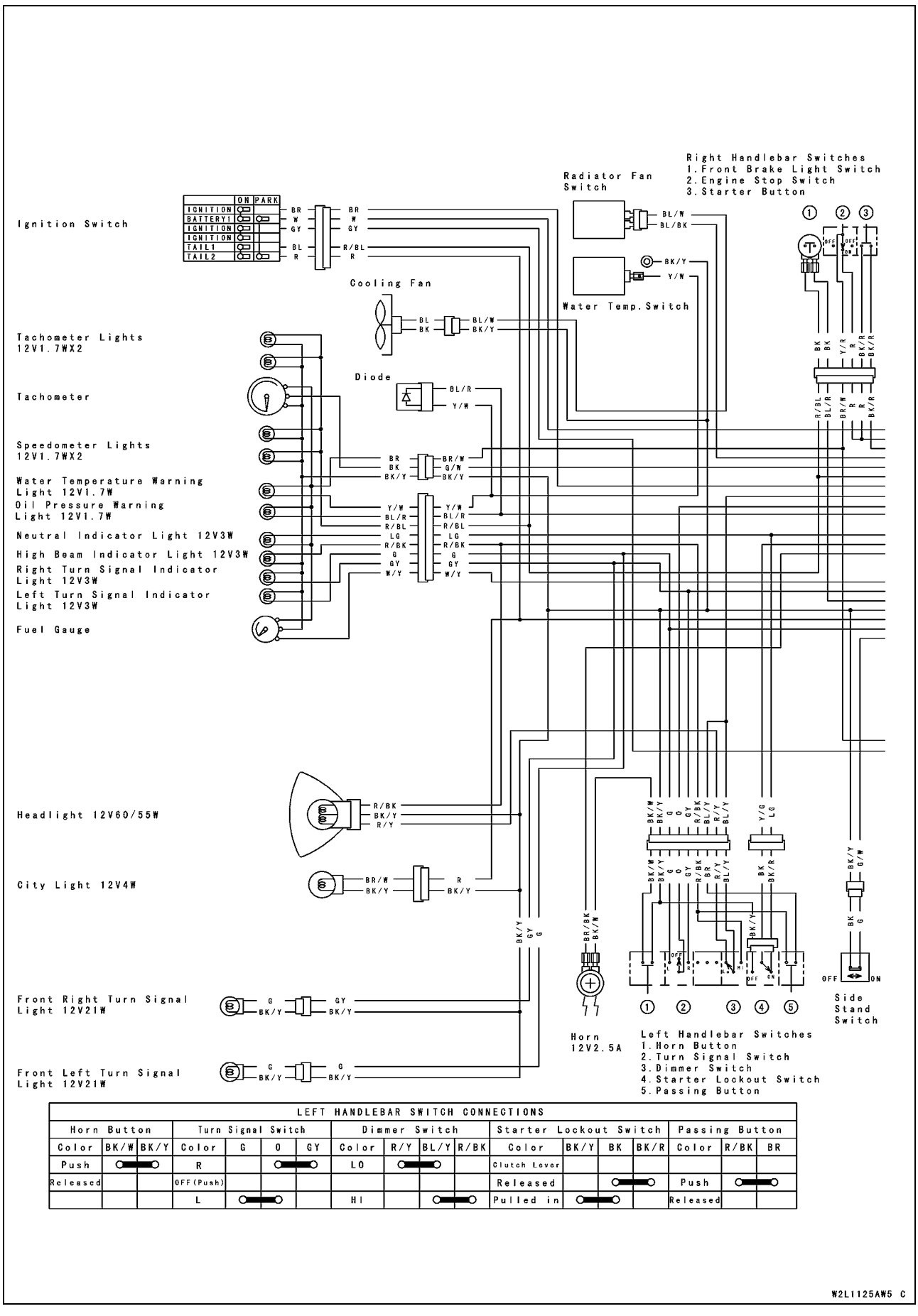
RIGHT HANDLEBAR SWITCH CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	R	Y/R	Color	BK/R	BK/R
Brake Lever			OFF			Push	●	●
Pulled In	●	●				Released		
Released			RUN	●	●			

Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

(98051-1959A)

W1R1959AW5 C

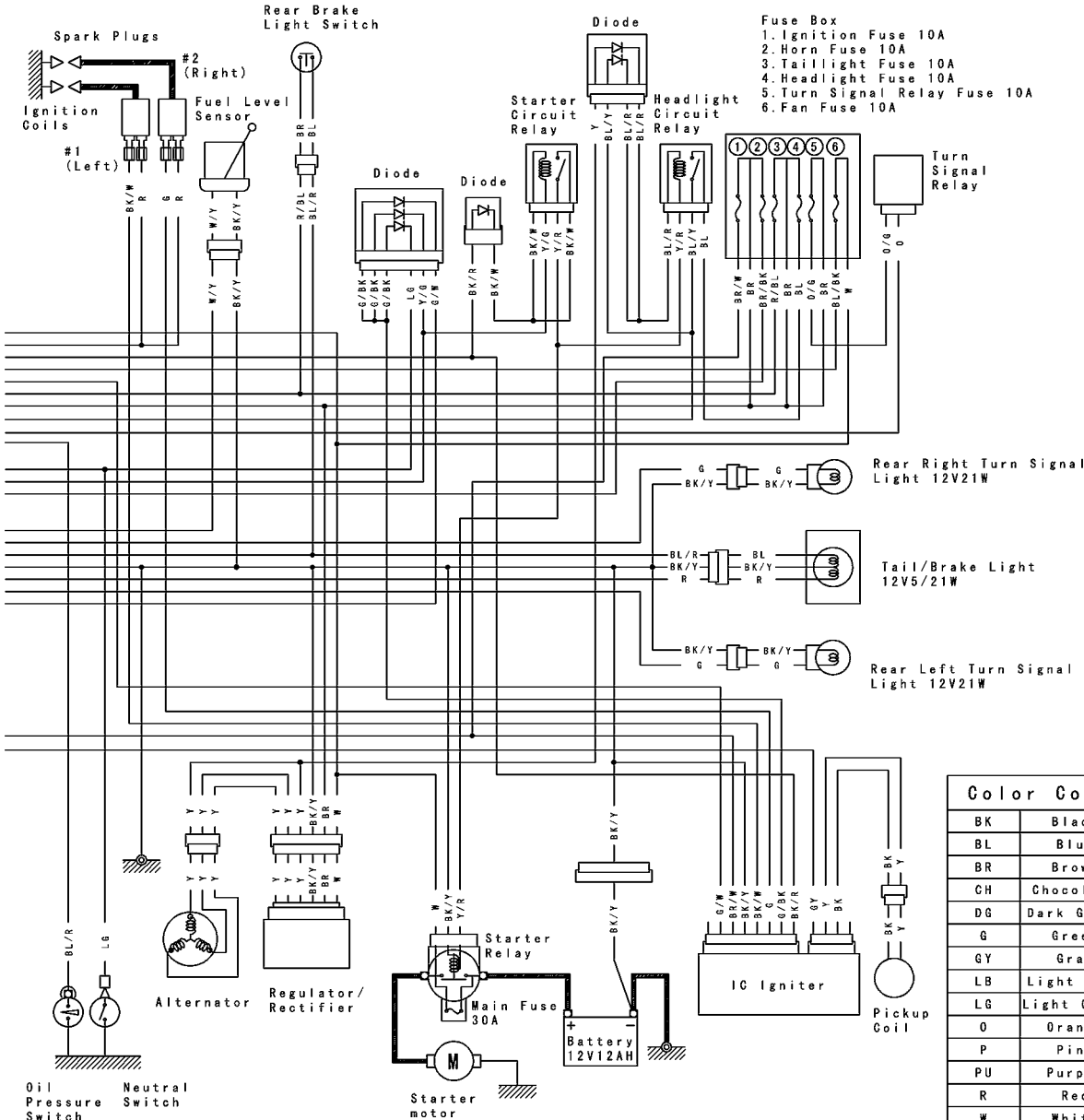
ER500-C3 ~ Wiring Diagram (other than Australia)



LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch				Passing Button		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R	Color	R/BK	BR
Push	○	●	R		●	○	LO	○	●		Clutch Lever						
Released			OFF(Push)								Released		●	○	Push	●	
			L	●		○	HI		●	○	Pulled in	●		○	Released		

ER500-C3 ~ Wiring Diagram (other than Australia)



Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

(98052-1125A)

IGNITION SWITCH CONNECTIONS						
	Ignition	Battery	Ignition	Ignition	Tail1	Tail2
Color	BR	W	GY	-	BL	R
OFF, LOCK						
ON	●	●	●	●	●	●
P(PARK)		●		●	●	●

RIGHT HANDLEBAR SWITCH CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	R	Y/R	Color	BK/R	BK/R
Brake Lever			OFF			Push	●	●
Pulled In	●	●				Released		
Released			RUN	●	●			

W2R1125AW5 C

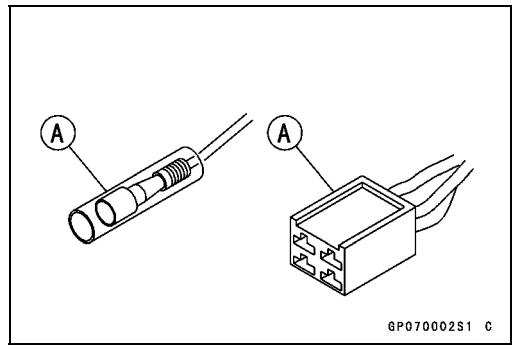
Precautions

There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

- Do not reverse the battery lead connections. This will burn out the diodes in the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- To prevent damage to electrical parts, do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running.
- Because of the large amount of current, never keep the starter button pushed when the starter motor will not turn over, or the current may burn out the starter motor windings.
- Do not use a meter illumination bulb rated for other than voltage or wattage specified in the wiring diagram, as the meter or gauge panel could be warped by excessive heat radiated from the bulb.
- Take care not to short the leads that are directly connected to the battery positive (+) terminal to the chassis ground.
- Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was caused by some other item or items, they too must be repaired or replaced, or the new replacement will soon fail again.
- Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.
- Measure coil and winding resistance when the part is cold (at room temperature).
- Color Codes

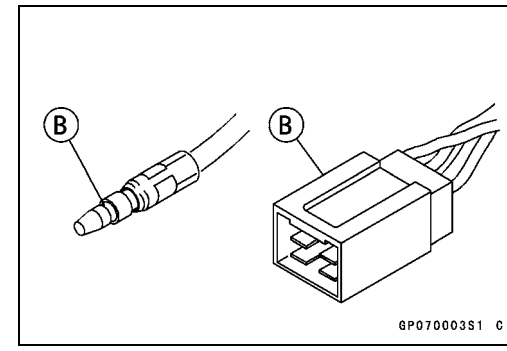
BK: Black	G: Green	P: Pink
BL: Blue	GY: Gray	PU: Purple
BR: Brown	LB: Light blue	R: Red
CH: Chocolate	LG: Light green	W: White
DG: Dark green	O: Orange	Y: Yellow

- Electrical Connectors
  Female Connectors [A]



Precautions

Male Connectors [B]



Electrical Wiring

Wiring Inspection

- Visually inspect the wiring for signs of burning, fraying, etc.

★If any wiring is in poor condition, replace the damaged wiring.

- Pull each connector [A] 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.

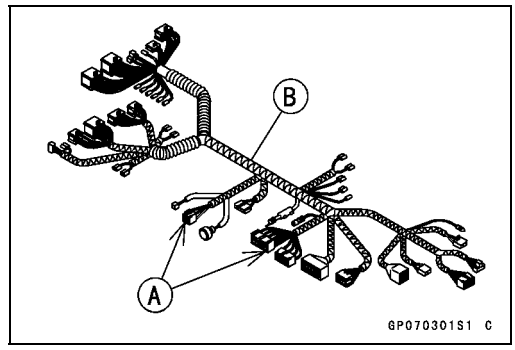
- Check the wiring for continuity.

○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 × 1 Ω range, and read the meter.

★If the meter does not read 0 Ω, the lead is defective. Replace the lead or the wiring harness [B] if necessary.

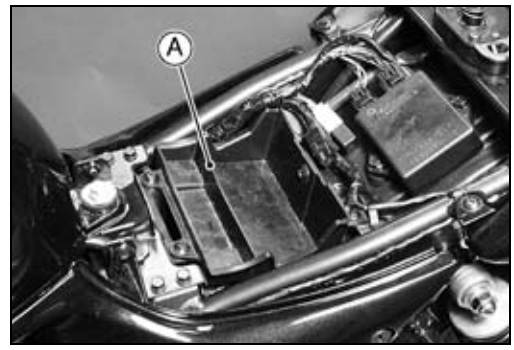


Battery

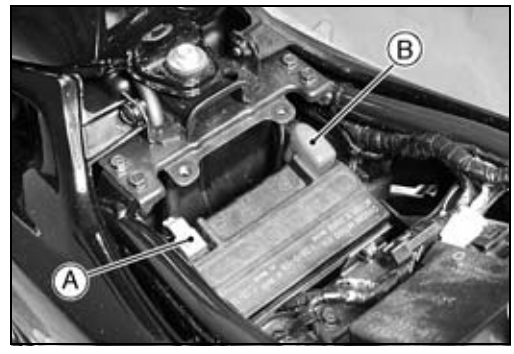
Battery Removal/Installation

● Remove:
Seat (see Frame Chapter)

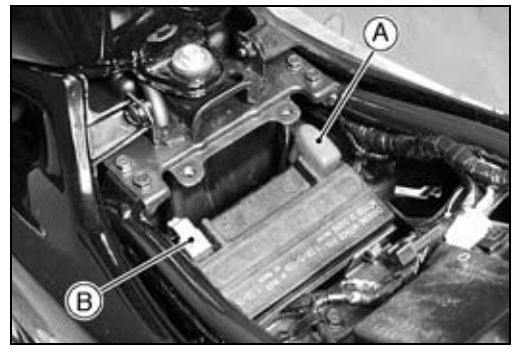
○Remove the battery cover [A] by taking off three screws.



● Remove the negative (–) lead [A] from the battery first.
● Remove the positive (+) lead [B] from the battery and pull out the battery.



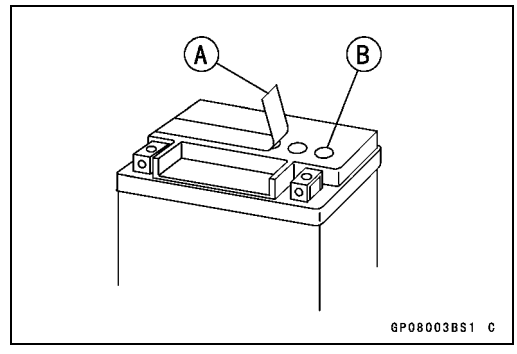
● When installing, connect the positive (+) lead first [A], then the negative (–) lead [B] to the battery.



Electrolyte Filling

CAUTION

Do not remove the seal sheet sealing the filler ports until just before use.
Be sure to use the dedicated electrolyte container for correct electrolyte volume.



● Check to see that there is no peeling, tears or holes in the sealing sheet on the top of the battery.
● Place the battery on a level surface.
● Remove the seal sheet [A].

○When removing, check to hear an air-sucking sound "Shoosh!" from filler ports [B].

NOTE

○*A battery whose sealing sheet has any peeling, tears, holes, or from which the air-sucking sound was not heard requires a refreshing charge (initial charge).*

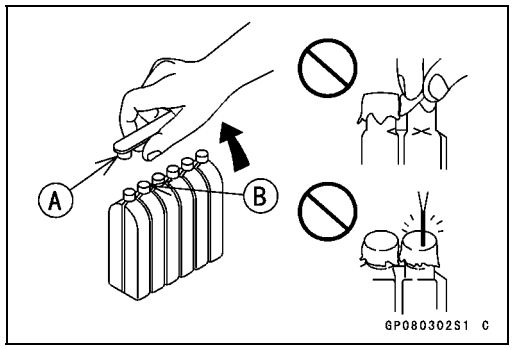
Battery

- Take the electrolyte container out of the vinyl bag.
- Detach the seal caps [A] from the container.

NOTE

○*Do not discard the seal cap because it is used as the battery plugs later.*

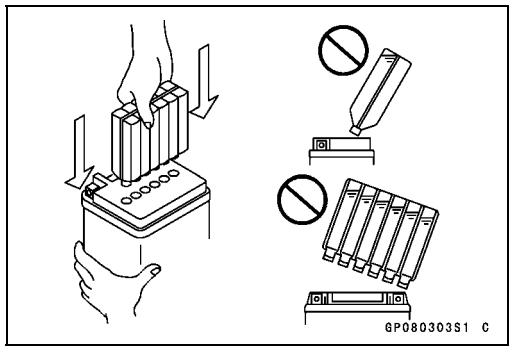
○*Do not peel back or pierce the seals [B] on the container.*



- Place the electrolyte container upside down aligning the six seals with the six battery filler ports.
- Push the container down strongly enough to break the seals. Now the electrolyte should start to flow into the battery.

NOTE

○*Do not tilt the container as the electrolyte flow may be interrupted.*

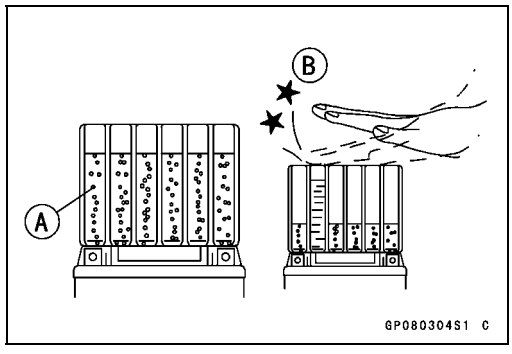


- Make sure air bubbles [A] are coming up from all six filler ports.

○Leave the container this way for 5 minutes or longer.

NOTE

○*If no air bubbles are coming up from a filler port, tap [B] the bottom of the container two or three times. Never remove the container from the battery.*



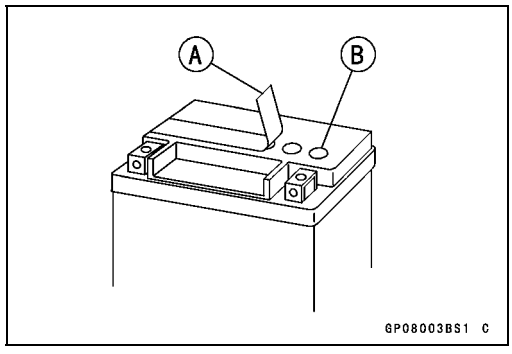
CAUTION

Fill the electrolyte into the battery until the container is completely emptied.

- Be certain that all the electrolyte has flowed out.
- Tap the bottom the same way as above if there is any electrolyte left in the container.
- Now pull the container gently out of the battery.
- Let the battery sit for **20** minutes. During this time, the electrolyte permeates the special separators and the gas generated by chemical reaction is released.
- Fit the seal caps [A] tightly into the filler ports until the seal cap is at the same level as the top of the battery.

NOTE

○*Do not hammer. Press down evenly with both hands.*



CAUTION

Once you installed the seal caps after filling the battery, never remove it, nor add any water or electrolyte.

Battery

Initial Charge

While a sealed battery can be used after only filling with electrolyte, a battery may not be able to sufficiently move a starter motor to start an engine in the cases shown in the table below, where an initial charge is required before use. However, if a battery shows a terminal voltage of higher than 12.8 V after 10 minutes of filling (Note 1), no initial charge is necessary.

Condition requiring initial charge	Charging method
At low temperatures (lower than 0°C)	1.2 A × 2 ~ 3 hours
Battery has been stored under high temperature and humidity.	1.2 A × 15 ~ 20 hours
Seal sheet has been removed, or broken - peeling, tear or hole.	
Battery as old as 2 years or more after manufacture. Battery manufacturing date is printed on battery top. Example) 12 (Day) 8 (Month) 99 (Year) T1 (Mfg. location)	

Note 1: Terminal voltage-To measure battery terminal voltage, use a digital voltmeter.

Precautions

1) No need of topping-up
   No topping-up is necessary in this battery until it ends its life under normal use. Forcibly prying off the seal cap to add water is very dangerous. Never do that.
2) Refreshing charge
   If an engine will not start, a horn sounds weak, or lamps are dim, it indicates the battery has been discharged. Give refresh charge for 5 to 10 hours with charge current shown in the specification (see the this chapter).
   When a fast charge is inevitably required, do it following precisely the maximum charge current and time conditions indicated on the battery.

CAUTION

This battery is designed to sustain no unusual deterioration if refresh-charged according to the method specified above.
However, the battery's performance may be reduced noticeably if charged under conditions other than given above.
Never remove the seal cap during refresh charge.
If by chance an excessive amount of gas is generated due to overcharging, the safety valve operates to keep the battery safe.

3) When you do not use the motorcycle for months:
   Give a refresh charge before you store the motorcycle and store it with the negative lead removed. Give a refresh charge once a month during storage.
4) Battery life:
   If the battery will not start the engine even after several refresh charges, the battery has exceeded its useful life. Replace it. (Provided, however, the vehicle's starting system has no problem.)

⚠ WARNING

Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.
No fire should be drawn near the battery, or no terminals should have the tightening loosened.
The electrolyte contains sulfuric acid. Be careful not to have it touch your skin or eyes. If touched, wash it off with liberal amount of water. Get medical attention if severe.

Battery

Interchange

The sealed battery can fully display its performance only when combined with a proper vehicle electric system. Therefore, replace the sealed battery only on a motorcycle which was originally equipped with the sealed battery.

Be careful, if a sealed battery is installed on a motorcycle which had an ordinary battery as original equipment, the sealed battery's life will be shortened.

Charging Condition Inspection

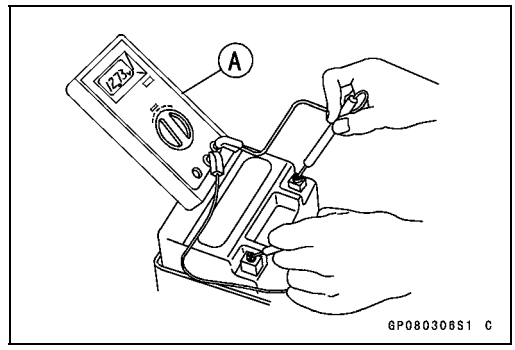
Battery charging condition can be checked by measuring battery terminal voltage.

- Remove the seat (see Frame chapter).
- Disconnect the battery terminals.

CAUTION

Be sure to disconnect the negative terminal first.

- Measure the battery terminal voltage.

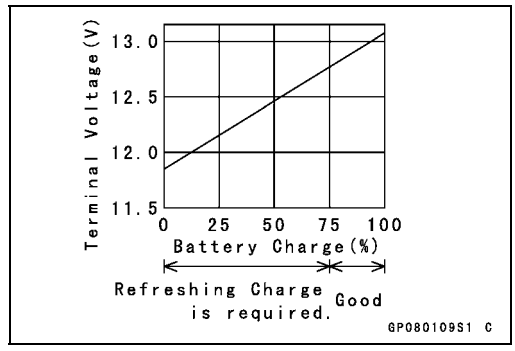


NOTE

○*Measure with a digital voltmeter [A] which can be read one decimal place voltage.*

★If the reading is below the specified, refreshing charge is required.

Battery Terminal Voltage
Standard: 12.8 V or more

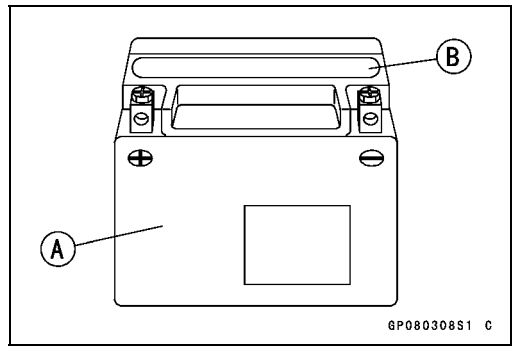


Refreshing Charge

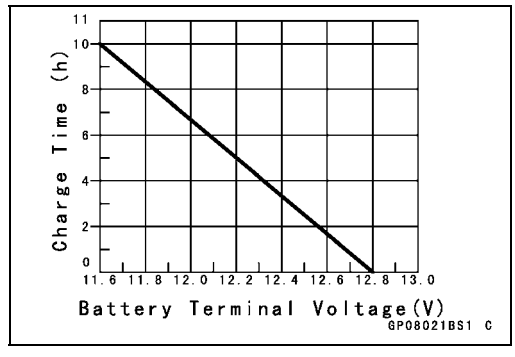
- Disconnect the battery terminals (see Charging Condition Inspection).
- Remove the battery [A].
- Do refresh-charge by following method according to the battery terminal voltage.

⚠ WARNING

This battery is sealed type. Never remove seal cap [B] even at charging. Never add water. Charge with current and time as stated below.



Terminal Voltage: 11.5 ~ less than 12.8 V
Standard Charge
1.2 A × 5 ~ 10 h (see following chart)
Quick Charge
5.0 A × 1.0 h



CAUTION

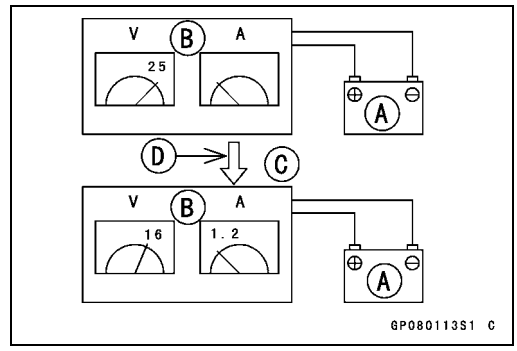
If possible, do not quick charge. If the quick charge is done due to unavoidable circumstances, do standard charge later on.

Terminal Voltage: less than 11.5 V
Charging Method 1.2 A × 20 h

Battery

NOTE

○*If the current does not flow when charging, raise the voltage initially (25 V as maximum), and let down the voltage to charge when the current starts to flow as a yardstick. If ammeter shows no change in current after 5 minutes, you need a new battery. The current, if it can flow into the battery, tends to become excessive. Adjust the voltage as often as possible to keep the current at standard value (1.2 A).*



Battery [A]
Battery Charger [B]
Standard Value [C]
Current starts to flow [D]

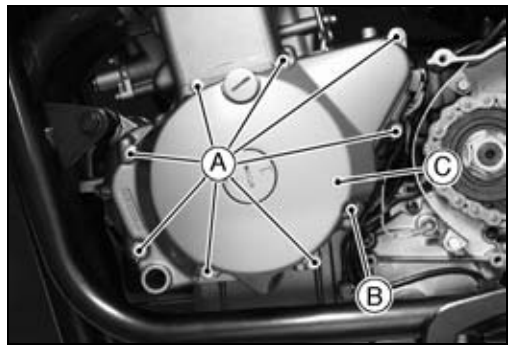
● Determine battery condition after refreshing charge.
○Determine the condition of the battery 30 minutes after completion of the charge by measuring the terminal voltage according to the table below.

Criteria	Judgement
12.8 V or higher	Good
12.0 ~ less than 12.8 V	Charge insufficient → Recharge.
less than 12.0 V	Unserviceable → Replace

Charging System

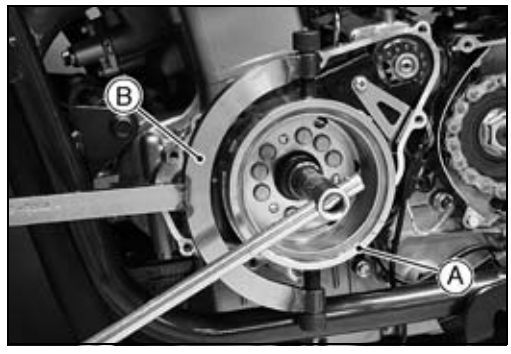
Alternator Rotor/Starter Clutch Removal

- Remove the engine sprocket cover (see Final Drive chapter).
- Loosen the left footpeg mounting bolt and let the footpeg hang down.
- Remove the shift pedal.
- Remove the circlip and washer from the shift shaft.
- Remove the left side cover.
- Slide the air cleaner housing.
- Disconnect the alternator lead connectors.
- Place an oil pan beneath the alternator cover.
- Remove the alternator cover bolts [A], Allen bolt [B] and pull off the alternator cover [C] and gasket. There are two knock pins in the cover mating surface.



- Hold the alternator rotor [A] steady with the flywheel holder [B], and remove the rotor bolt.

Special Tool - Flywheel Holder: 57001-1313

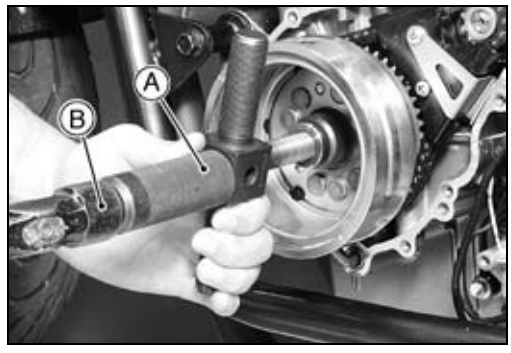


NOTE

○*The rotor bolt has left-handed threads, therefore it must be turned clockwise in removing.*

- Using the rotor puller [A], remove the alternator rotor and starter clutch assembly from the crankshaft. There is a spacer between the starter clutch sprocket and the alternator rotor. The woodruff key may come out with the alternator rotor and starter clutch assembly.

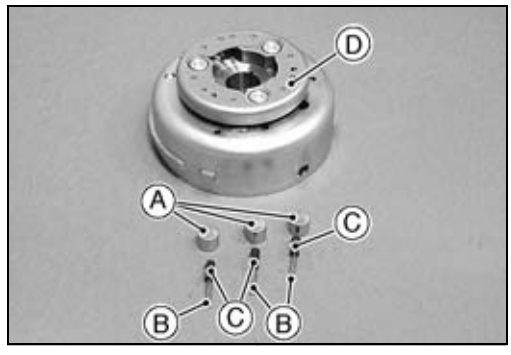
Special Tool - Rotor Pulier, M16/M18/M20/M22 × 1.5: 57001 -1216



CAUTION

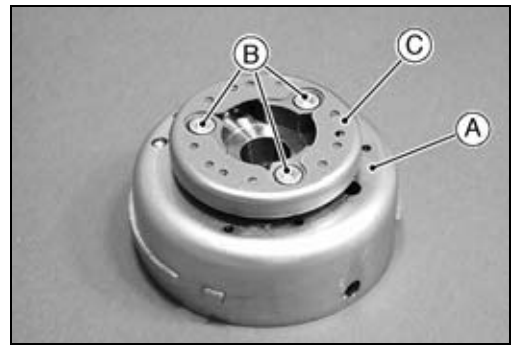
If the rotor is difficult to remove, turn the puller shaft using a wrench while tapping [B] the head of the puller shaft with a hammer. Do not attempt to strike the grab bar or the alternator rotor itself. Striking the bar or the rotor can cause the bar to bend or the magnets to lose their magnetism.

- Remove the rollers [A], springs [B], and spring caps [C] from the starter clutch [D].



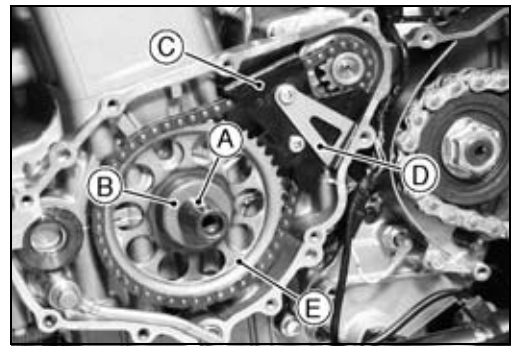
Charging System

● Holding the rotor [A] steady, remove the Allen bolts [B] to separate the rotor and starter clutch [C].



Starter Clutch Sprocket Removal

● Remove:
Alternator cover (see Alternator Rotor/Starter Clutch Removal)
Alternator rotor with Starter Clutch (see Alternator Rotor/Starter Clutch Removal)
● Remove the woodruff key [A] and spacer [B].
● Remove the starter chain guide [C] with the guide stay [D].
● Remove the starter clutch sprocket [E], starter motor sprocket and starter chain as a set.
● In case that the starter motor has been removed, do the following:
○Remove the starter motor sprocket.
○Remove the alternator rotor with the starter clutch, starter clutch sprocket and starter chain as a set.



Starter Clutch Sprocket Installation

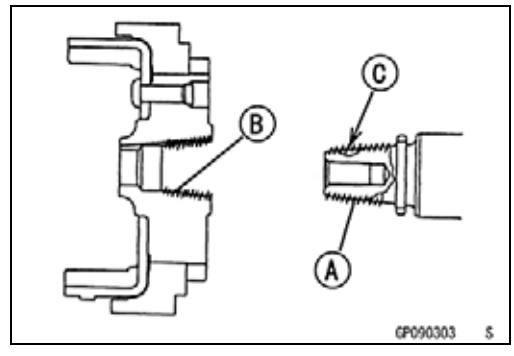
● Apply a thin coat of molybdenum disulfide grease to the frictional surface between the crankshaft and the starter clutch sprocket.
● If the starter motor has been removed, install it first.
● Install the starter clutch sprocket, starter motor sprocket and starter chain as a set.
● Install the alternator rotor with the starter clutch and alternator cover.

Alternator Rotor/Starter Clutch Installation

● Apply a non-permanent locking agent to the threads of the starter clutch Allen bolts, and tighten them to the specified torque in assembling the starter clutch onto the alternator rotor.

Torque - Starter Clutch Allen Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)

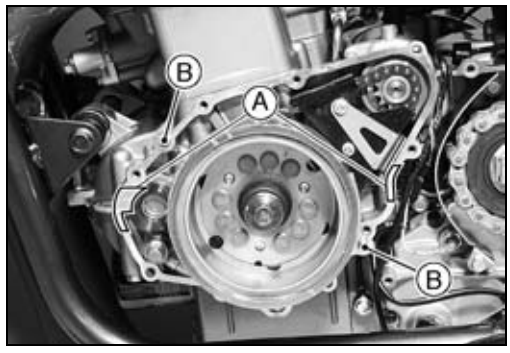
○Be careful that the rollers do not drop out of the starter clutch during assembly.
● Using a high flash-point solvent, clean off any oil or dirt that may be on the crankshaft taper [A] and rotor tapered hole [B].
● Fit the woodruff key securely in the slot [C] in the crankshaft before installing the rotor assembly on the crankshaft.



- Tighten the rotor bolt while holding the rotor steady with the flywheel holder, and turn the rotor bolt counterclockwise to install it.

Torque - Alternator Rotor Bolt: 69 N·m (7.0 kgf·m, 51 ft·lb)

Special Tool - Flywheel Holder: 57001-1313



- Apply silicone sealant to the area [A] where the mating surface ends of the crankcase touch the alternator cover gasket.
- Apply silicone sealant around the circumference of the wiring grommets before setting it in the notch in the alternator cover.
- Check that knock pins [B] are in place on the crankcase.

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

- Apply a non-permanent locking agent to the threads of the alternator cover Allen bolt.
- Tighten the alternator cover Allen bolt and bolts.

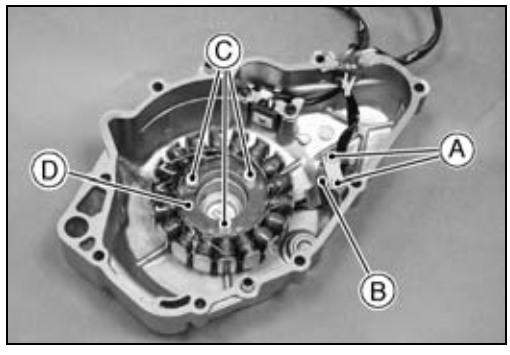
Torque - Alternator Cover Allen Bolt: 13 N·m (1.3 kgf·m, 9.5 ft·lb)
Alternator Cover Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

- Install the other removed parts.
- Check the engine oil level, and add if necessary (see Engine Lubrication System chapter).

Alternator Stator Removal

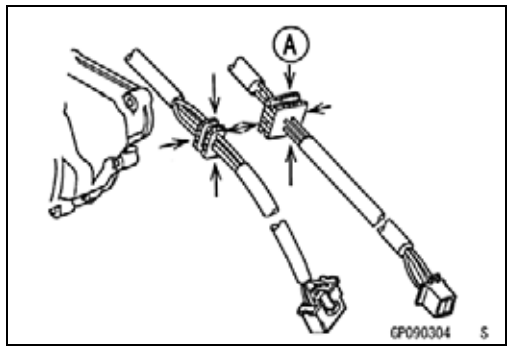
NOTE

○*To keep the loss of engine oil to a minimum, set the motorcycle vertically.*



- Remove the alternator cover (see Alternator Rotor and Starter Clutch Removal).
- Remove the screws [A] and the holding plate [B] for the stator wiring.
- Unscrew the Allen bolts [C] and remove the stator [D].
- Remove the grommet for the pick-up coil lead.

Alternator Stator Installation



- Apply silicone sealant [A] around the circumference of the wiring grommets before setting them in the notch in the alternator cover.
- Install the grommet for the stator wiring and pick-up coil lead in this order.

CAUTION

The stator wiring has to be installed along the alternator cover without rising away from its surface. If the wires touch the rotor, they will be damaged.

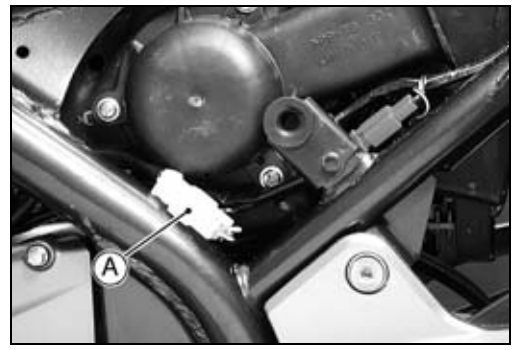
- Tighten the Allen bolts.

Torque - Alternator Stator Allen Bolts: 12 N·m (1.2 kgf·m, 8.5 ft·lb)

Charging System

Alternator Inspection

There are three types of alternator failures: short, open (wire burned out), or loss in rotor magnetism. A short or open in one of the coil wires will result in either a low output or no output at all. A loss in rotor magnetism, which may be caused by dropping or hitting the alternator, by leaving it near an electromagnetic field, or just by aging, will result in low output.



- To check the alternator output voltage, do the following procedures. Refer to the appropriate chapters and Charging System Wiring Diagram.

○Turn off the ignition switch.
○Remove the left side cover.
○Disconnect the alternator lead connector [A].
○Connect the hand tester as shown in the table 1.

Special Tool - Hand Tester: 57001-1394

○Start the engine.
○Run it at the rpm given in the table 1.
○Note the voltage readings (total 3 measurements).

Voltage

Tester Range	Connectings		Reading @4 000 rpm
	Tester (+) to	Tester (–) to	
250 V AC	One yellow lead	Another yellow lead	About 60 V

★If the output voltage shows the value in the table 1, the alternator operates properly and the regulator/rectifier is damaged. A much lower reading than that given in the table indicates that the alternator is defective.

- Check the stator coil resistance as follows:

○Stop the engine.
○Connect the hand tester as shown in the table 2.
○Note the readings (total 3 measurements).

Table 2 Stator Coil Resistance

Tester Range	Connectings		Reading
	Tester (+) to	Tester (–) to	
× 1Ω	One yellow lead (Connector 3)	Another yellow lead (Connector 3)	0.3 ~ 0.6 Ω

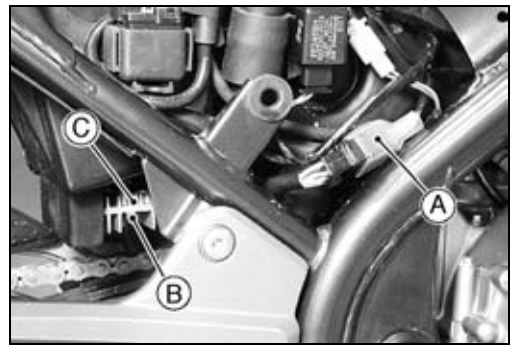
★If there is more resistance than shown in the table, or no meter reading (infinity) for any two leads, the stator has an open lead and must be replaced. Much less than this resistance means the stator is shorted, and must be replaced.

- Using the highest resistance range of the hand tester, measure the resistance between each of the yellow leads and chassis ground. Any hand tester reading less than infinity (∞) indicates a short, necessitating stator replacement.

★If the stator coil has normal resistance, but the voltage check shows the alternator to be defective; then the rotor magnets have probably weakened, and the rotor must be replaced.

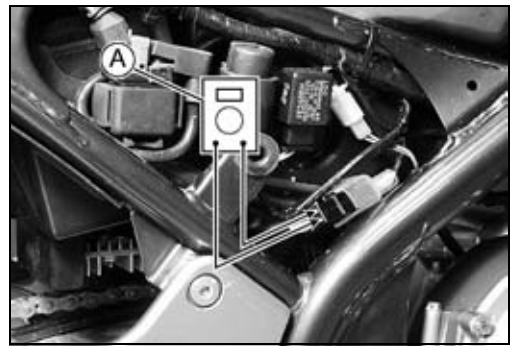
Charging System

Regulator/Rectifier Removal



- Remove the right side cover and disconnect the regulator/rectifier connector [A].
- Unscrew two mounting bolts [B] and remove the regulator/rectifier [C] from the battery case.

Regulator/Rectifier Output Voltage Inspection



- Check the battery condition (see Battery section).
- Warm up the engine to obtain actual alternator operating conditions.
- Remove the right side cover (see Frame chapter).
- Check that the ignition switch is turned off, and connect the hand tester [A] as shown in the table.
- Start the engine, and note the voltage readings at various engine speeds with the headlight turned on and then turned off. (To turn off the headlight of Australia model disconnect the headlight connector). The readings should show nearly battery voltage when the engine speed is low, and, as the engine speed rises, the readings should also rise. But they must be kept under the specified voltage.

Regulator/Rectifier Output Voltage

Tester Range	Connectings		Reading
	Tester (+) to	Tester (–) to	
25 V DC	White	Black/Yellow	Battery Voltage 14 ~ 15 V

- Turn off the ignition switch to stop the engine, and disconnect the hand tester.

★If the regulator/rectifier output voltage is kept between the values given in the table, the charging system is considered to be working normally.

★If the output voltage is much higher than the values specified in the table, the regulator/rectifier is defective or the regulator/rectifier leads are loose or open.

★If the battery voltage does not rise as the engine speed increases, the regulator/rectifier is defective or the alternator output is insufficient for the loads. Check the alternator and regulator/rectifier to determine which part is defective.

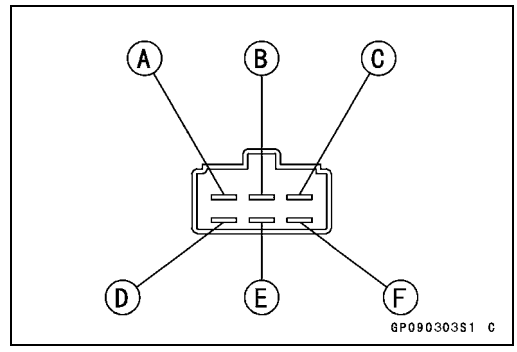
Charging System

Regulator/Rectifier Inspection

Rectifier circuit check

- Remove the right side cover (see Frame chapter).
- Disconnect the regulator/rectifier lead connector [A].

White Lead Terminal [A]
Brown Lead Terminal [B]
Black/Yellow Lead Terminal [C]
Yellow 1 Lead Terminal [D]
Yellow 2 Lead Terminal [E]
Yellow 3 Lead Terminal [F]



- Connect the hand tester to the regulator/rectifier as shown in the table, and measure the resistance of the respective diodes in both directions, in the sequence in the table.

★The measured resistance should be small in one direction and 10 or more times in the other direction. If the measured resistance of any of the two wires (White or Yellow) is small or large in both directions, the rectifier is damaged; therefore, replace the regulator/rectifier.

Rectifier Circuit Inspection

	Connecting terminal		Standard	Tester range
	Tester positive (+) terminal	Tester negative (–) terminal		
1	Y1	W	∞	× 10 Ω or × 100 Ω
2	Y2			
3	Y3			
4	Y1	BK/Y	Approximately 1/2 of the entire graduation	
5	Y2			
6	Y3			
7	W	Y1		
8		Y2		
9		Y3		
10	BK/Y	Y1	∞	
11		Y2		
12		Y3		

NOTE

○*The actual resistance measurement varies with the tester used and the individual diodes, Generally speaking, it is acceptable if the tester's indicator swings approximately halfway.*

Charging System

Regulator Circuit Check

- Prepare the following:
  Test Light Bulb: one 12 V 3.4 W bulb
  Batteries: three 12 V batteries
  Wires: five wires of appropriate lengths

CAUTION

The test light works as an indicator and also a current limiter to protect the regulator/rectifier from excessive current. Do not use an ammeter instead of a test light.

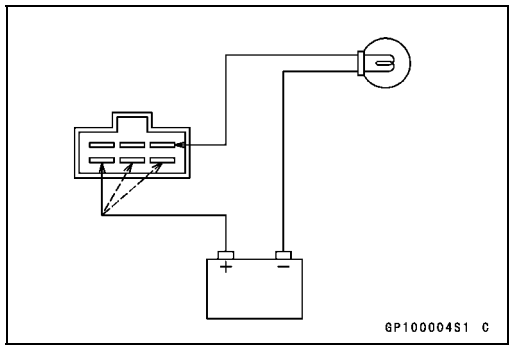
- Check to be sure the rectifier circuit is normal before continuing.

Regulator Circuit Test-1st Step:

- Connect the test light and the 12 V battery to the regulator/rectifier as shown.
- Check Y1, Y2, and Y3 terminal respectively.

★If the test light turns on, the regulator/rectifier is defective. Replace it.

★If the test light does not turn on, continue the test.

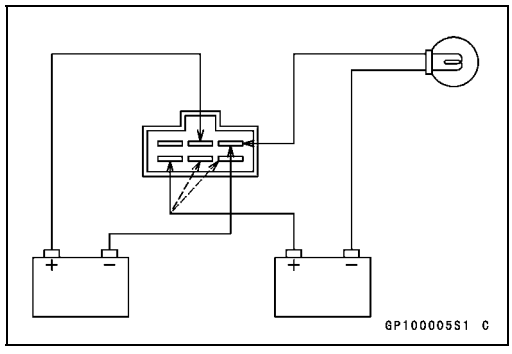


Regulator Circuit Test-2nd Step:

- Connect the test light and the 12 V battery in the same manner as specified in the "Regulator Circuit Test-1st Step".
- Apply 12 V to the BR (voltage monitoring) terminal.
- Check Y1, Y2, and Y3 terminal respectively.

★If the test light turns on, the regulator/rectifier is defective. Replace it.

★If the test light does not turn on, continue the test.



Regulator Circuit Test-3rd Step:

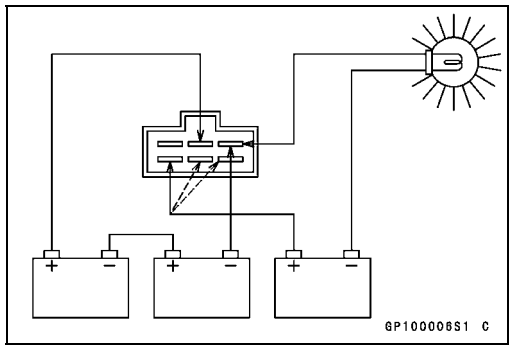
- Connect the test light and the 12 V battery in the same manner as specified in the "Regulator Circuit Test-1st Step".
- Momentarily apply 24 V to the BR terminal by adding a 12 V battery.
- Check Y1, Y2, and Y3 terminals respectively.

CAUTION

Do not apply more than 24 V to the regulator/rectifier and do not leave the 24 V applied for more than a few seconds, or the unit will be damaged.

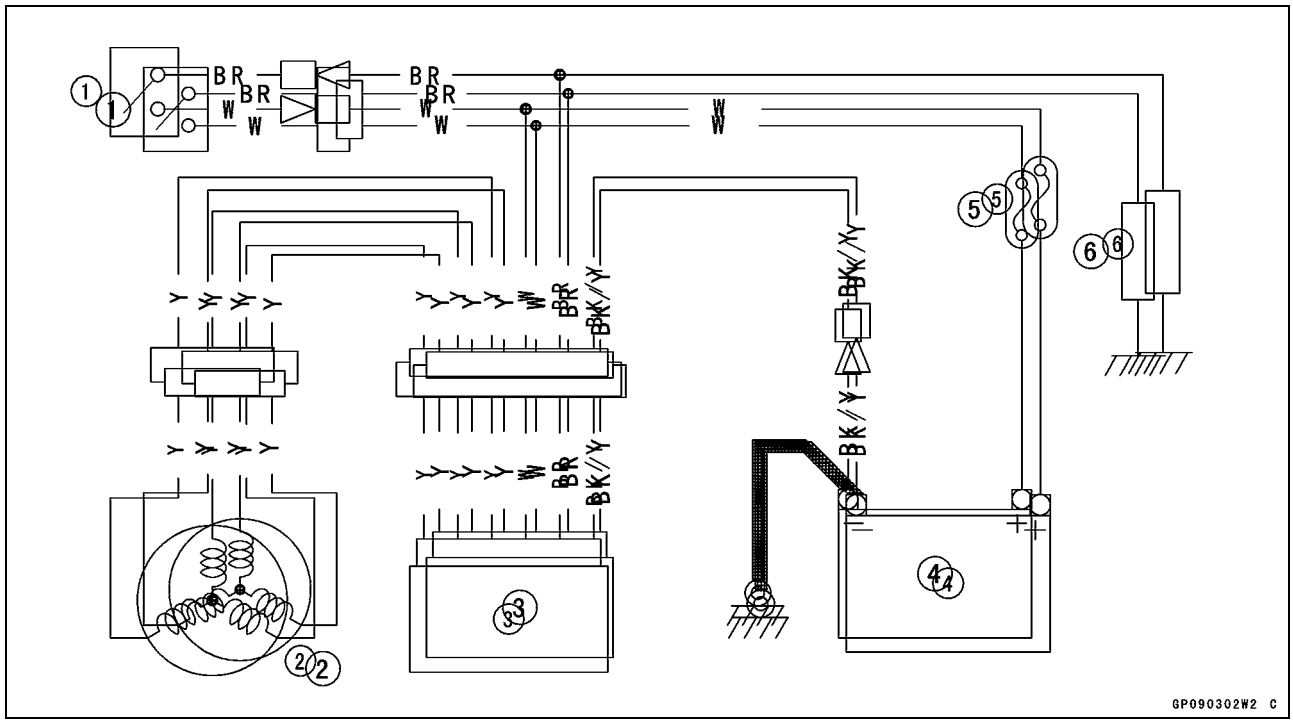
★If the test light did not light when the 24 V was applied momentarily to the BR terminal, the regulator/rectifier is defective. Replace it.

★If the regulator/rectifier passes all of the tests described, it may still be defective. If the charging system still does not work properly after checking all of the components and the battery, test the regulator/rectifier by replacing it with a known good unit.



Charging System

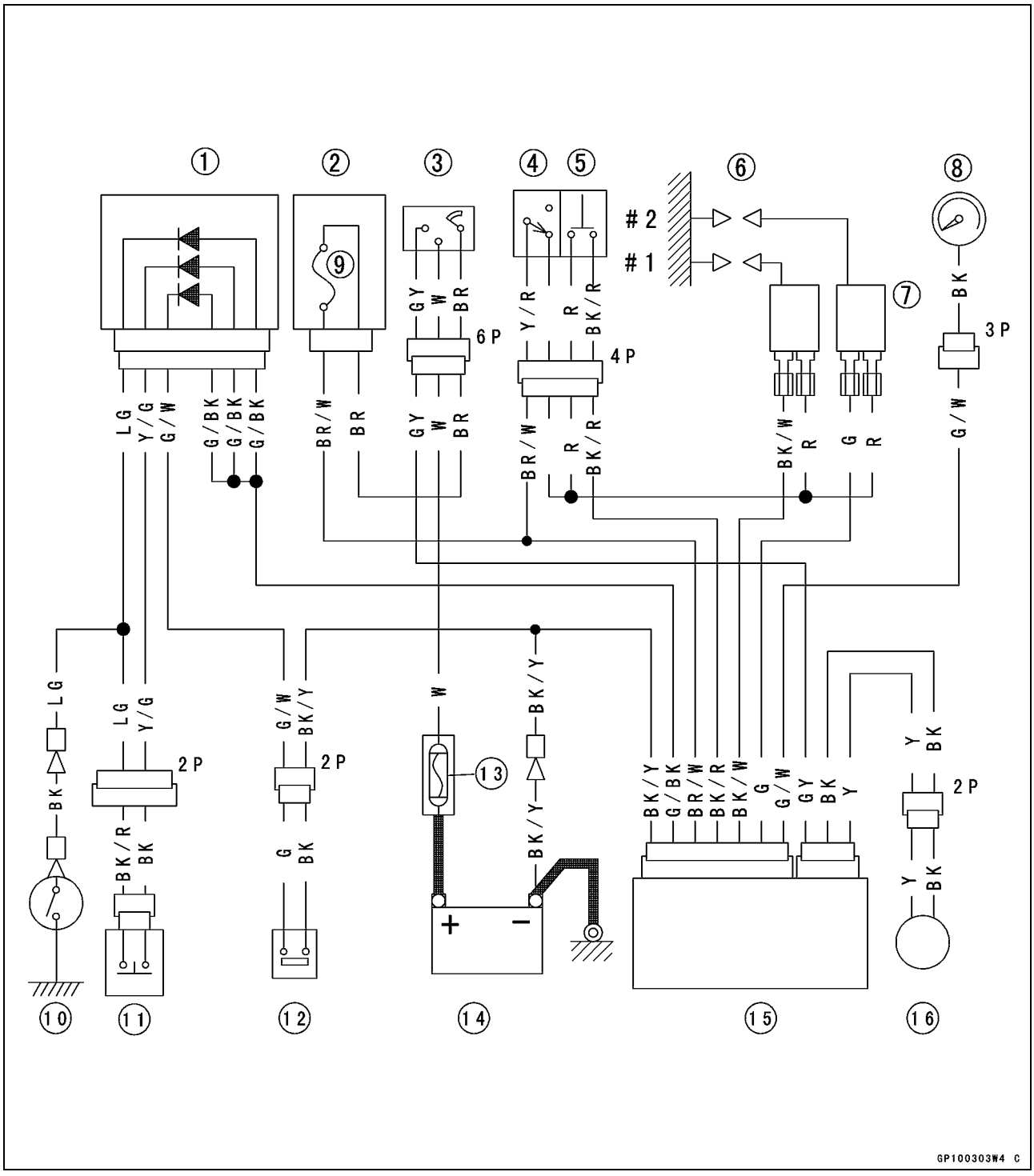
Charging System Circuit



1. Ignition Switch
2. Alternator
3. Regulator/Rectifier
4. Battery
5. Main Fuse 30 A
6. Load

Ignition System

Ignition System Circuit



1. Diode
2. Fuse Box
3. Ignition Switch
4. Engine Stop Switch
5. Starter Button
6. Spark Plugs
7. Ignition Coils
8. Tachometer
9. Ignition Fuse 10 A
10. Neutral Switch
11. Starter Lockout Switch
12. Sidestand Switch
13. Main Fuse 30 A
14. Battery
15. IC Igniter
16. Pickup Coil

Ignition System

⚠ WARNING

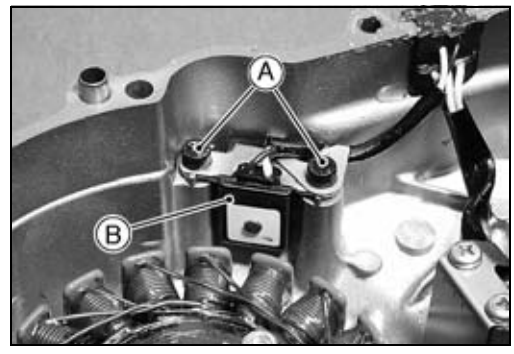
The ignition system produces extremely high voltage. Do not touch the spark plugs, ignition coils, or spark plug leads while the engine is running, or you could receive a severe electrical shock.

CAUTION

Do not disconnect the battery leads or any other electrical connections when the ignition switch is on or while the engine is running. This is to prevent IC igniter damage. Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and IC igniter

Pickup Coil Removal

- Remove:
  Alternator Cover (see Alternator Rotor/Starter Clutch Removal)
  Mounting Screws [A]
  Pickup Coil [B]



Pickup Coil Installation

- Tighten the pickup coil screws.

Torque - Pickup Coil Screws: 8.3 N·m (0.85 kgf·m, 74 in·lb)

- Install the pickup coil lead on the alternator cover (see Stator Coil Installation).

Pickup Coil Inspection

- Disconnect the pickup coil connector.
- Set the hand tester to the × 100 Ω range and connect it to the pickup coil leads.

★If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

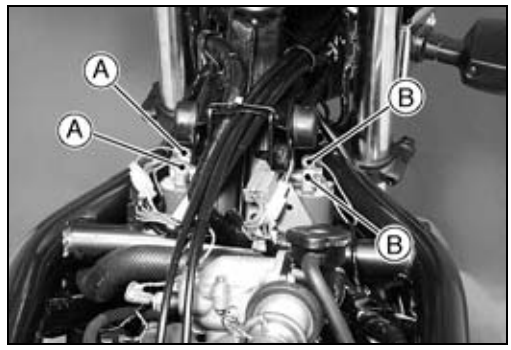
Pickup Coil Resistance
360 ~ 540 Ω

- Using the highest resistance range of the tester, measure the resistance between the pickup coil leads and chassis ground.

★Any tester reading less than infinity (∞) indicates a short, necessitating replacement of the pickup coil assembly.

Ignition System

Ignition Coil Removal/Installation



- Remove the fuel tank (see Fuel System chapter).
- Disconnect the leads and remove the ignition coils.
- Install the ignition coils. Note the following.

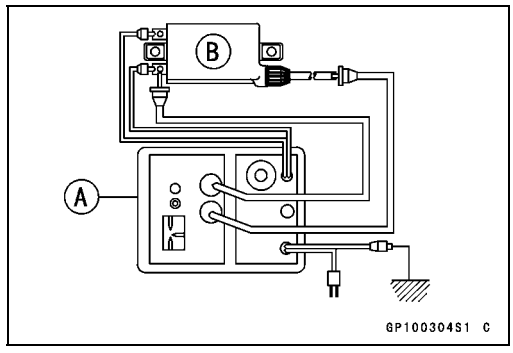
○Connect the primary winding leads to the ignition coiled terminals as shown.

R Lead → #1 Ignition Coil Terminal [A]
BK/W Lead → #1 Ignition Coil Terminal [A]

R Lead → #2 Ignition Coil Terminal [B]
G Lead → #2 Ignition Coil Terminal [B]

Ignition Coil Inspection

Measuring arcing distance



- Remove the ignition coil (see Ignition Coil Removal/Installation).
- Measure the arcing distance with a suitable commercially available coil tester [A] to check the condition of the ignition coil [B].
- Connect the ignition coil (with the spark plug cap left attached to each end of the spark plug lead) to the tester in the manner prescribed by the manufacturer and measure the arcing distance.

Ignition Coil Arcing Distance
8 mm (0.32 in.) or more

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the coil or lead.

★If the distance reading is less than the specified value, the ignition coil or spark plug cap is defective.

- To determine which part is defective, measure the arcing distance again with the spark plug cap removed from the ignition coil.

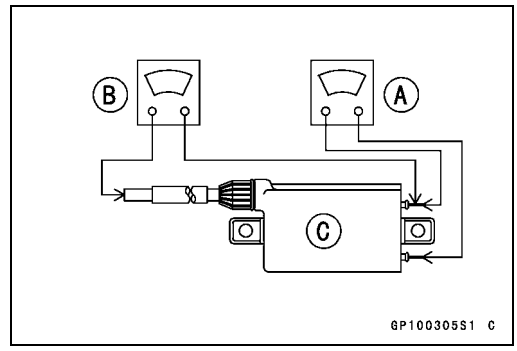
★If the arcing distance is subnormal as before, the trouble is with the ignition coil itself. If the arcing distance is now normal, the trouble is with the spark plug cap.

★If the arcing tester is not available, the coil can be checked for a broken or badly shorted winding with the hand tester.

Ignition System

NOTE

○*The hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.*



- Disconnect the primary leads from the coil terminals.
- Measure the primary winding resistance [A] as follows:

○Connect the hand tester between the coil terminals.
○Set the tester to the × 1Ω range, and read the tester.

- Measure the secondary winding resistance [B] as follows:

○Pull the spark plug cap off the lead.
○Connect the hand tester between the spark plug lead and black or green lead terminal.
○Set the tester to the × 1 kΩ range, and read the tester.

Ignition Coil Winding Resistance

Primary windings:	**2.3 ~ 3.5 Ω**
Secondary windings:	**12 ~ 18 kΩ**

★If the tester does not read as specified, replace the coil [C].
★If the tester reads as specified, the ignition coil windings are probably good. However, if the ignition system still does not perform as it should after all other components have been checked, test replace the coil with one known to be good.

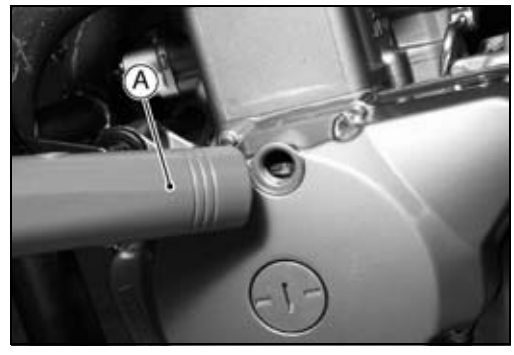
- Check the spark plug leads for visible damage.

★If any spark plug lead is damaged, replace the coil.

Ignition Timing Inspection

- Remove the ignition timing inspection plug.
- Attach the timing light [A] in the manner prescribed by the manufacturer.

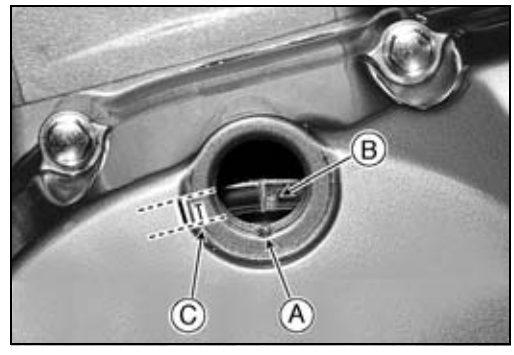
Special Tool - Timing Light: 57001-1241



- Start the engine and aim the timing light at the ignition timing mark on the alternator rotor.
- Run the engine at the speeds specified and note the alignment of the ignition timing marks.

Ignition Timing

Engine speed r/min (rpm)	Notch [A] aligns with:
1500 and below	F mark [B] on alternator rotor



NOTE

○*Do not mix up the ignition timing marks with the top mark "T" [C].*

★If the ignition timing is incorrect, inspect the IC igniter and the pickup coil.

Ignition System

Spark Plug Removal/Installation

- Remove the fuel tank (see Fuel System chapter).
- Carefully pull the spark plug cap from the spark plug and unscrew the spark plug.
- Using the 18 mm plug wrench [A].
- Tighten the spark plug.

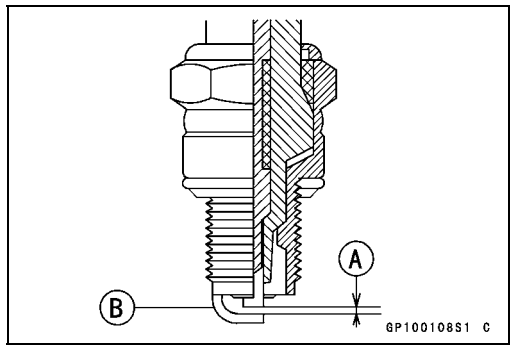
Torque - Spark Plug: 14 N·m (1.4 kgf·m, 10 ft·lb)

- Fit the plug cap securely.

Spark Plug Gap Inspection

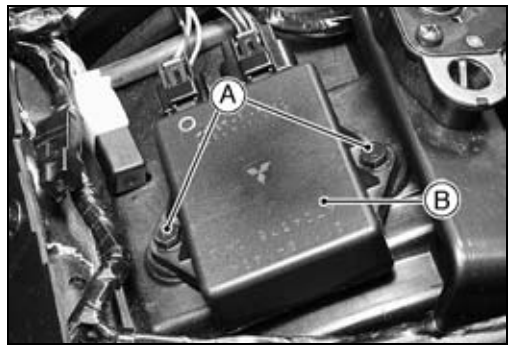
- Measure the gap [A] with a wire-type thickness gauge.
- If the gap is incorrect, carefully bend the side electrode with a suitable tool to obtain the correct gap.

Spark Plug Gap
0.6 ~ 0.7 mm (0.024 ~ 0.028 in.)



IC Igniter Removal

- Remove the seat (see Frame chapter).
- Unscrew the IC igniter bolts [A].
- Remove the IC igniter [B].
- Disconnect the IC igniter connectors.



IC Igniter Inspection

CAUTION

When inspecting the IC igniter [A], observe the following to avoid damage to the IC Igniter.
Do not disconnect the IC igniter with the ignition switch on. This may damage the IC igniter.
Do not disconnect the battery leads while the engine is running. This may damage the IC igniter.

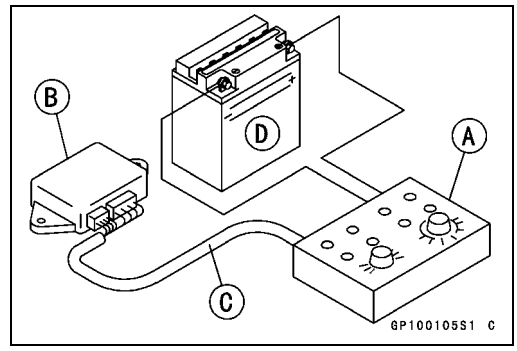
Ignition System

● To examine the condition of the igniter, connect the igniter checker to the igniter as shown.

Special Tools - Igniter Checker Set: 57001-1378 [A]
Wiring Harness Adapter, #14: 57001-1381 [C]

IC Igniter [B]
Battery [D]

○Set the select knob to position “A”.



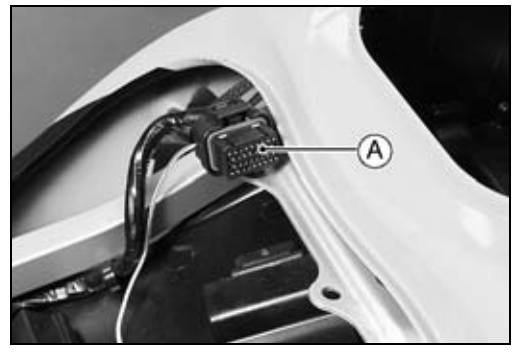
NOTE

○*Follow the instructions in the manufacturer’s operation manual for the proper procedure for operating the igniter checker.*
○*The igniter checker can perform inspections by simulating the following dynamic characteristics: the igniter response in relating to the engine speed, interlock circuit signals, tachometer signals, and engine overspeed limiter signals.*
○*The igniter checker cannot be used for inspecting the conditions of the CDI unit.*

★If the igniter is defective, replace it.

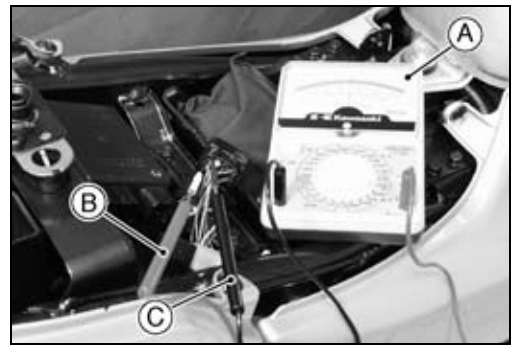
IC Igniter Operation Voltage Check

● Remove the seats (see Frame chapter).
● Disconnect the IC igniter connector [A].



● Set the Hand Tester [A] to the × 25 V DC range, and connect it to the connector come from harness side as follows.
Tester (+) terminal [B] → BR/W lead
Tester (–) terminal [C] → BK/Y lead

Special Tool - Hand Tester: 57001-1394
Needle Adapter Set: 57001-1457



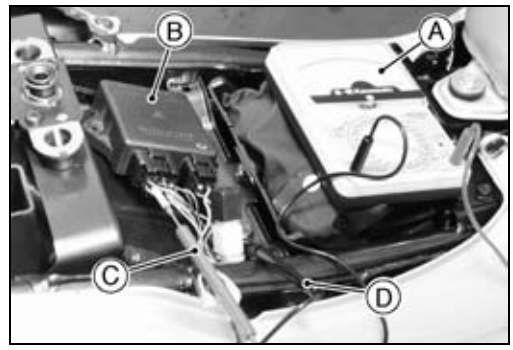
● Turn the ignition switch on , and read the voltage.

IC Igniter Operation Voltage: Battery Voltage

★If the tester reading is not specified one, check the battery voltage, ignition switch and ignition fuse.

Ignition System

Starter Button Operation Check



- Remove the seats (see Frame chapter).
- Set the Hand Tester [A] to the × 25 V DC range, connect it to the IC igniter [B] lead as follows.
  Hand Tester (+) Terminal [C] → BK/R Lead
  Hand Tester (–) Terminal [D] → Frame Ground

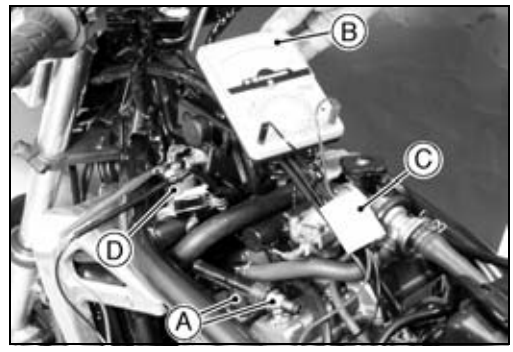
Special Tool - Hand Tester: 57001-1394
Needle Adapter Set: 57001-1457

- Turn the ignition switch on and push the starter button.
- Read the voltage.

Starter Button Voltage: Battery Voltage

★If the tester reading is not specified one, replace the IC igniter.

Ignition Coil Primary Peak Voltage Inspection



- Remove:
  Seat (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
- Remove the spark plug caps from the spark plugs.
- Attach a good spark plugs [A] to the removed spark plug caps and ground them to the engine.

NOTE

○*To obtain a correct measurement, the wires as well as the wire connections must be correct. Take the voltage measurement with the proper cylinder compression (with the spark plugs in the cylinder head). Without proper compression, a correct measurement cannot be obtained.*

- Set the tester to the DC 250 V range. Connect the peak voltage adapter [C] to the tester [B], and connect the adapter terminals to the respective terminals of the ignition coil [D].

○Keep the terminals connected.

Special Tool - Kawasaki Hand Tester: 57001-1394
Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B

Connect
#1
Adapter's positive (+) → terminal black/white wire terminal [A]
Adapter's negative (–) → red wire terminal [B] terminal
#2
Adapter's positive (+) → green wire terminal terminal
Adapter's negative (–) → red wire terminal terminal

Ignition System

- Turn the ignition switch ON.
- Shift the gears to neutral, and run the engine stop switch.
- Turn the starter motor for several seconds and read the maximum value on the tester.

Ignition Coil Primary Peak Voltage
Standard: DC100 V or more

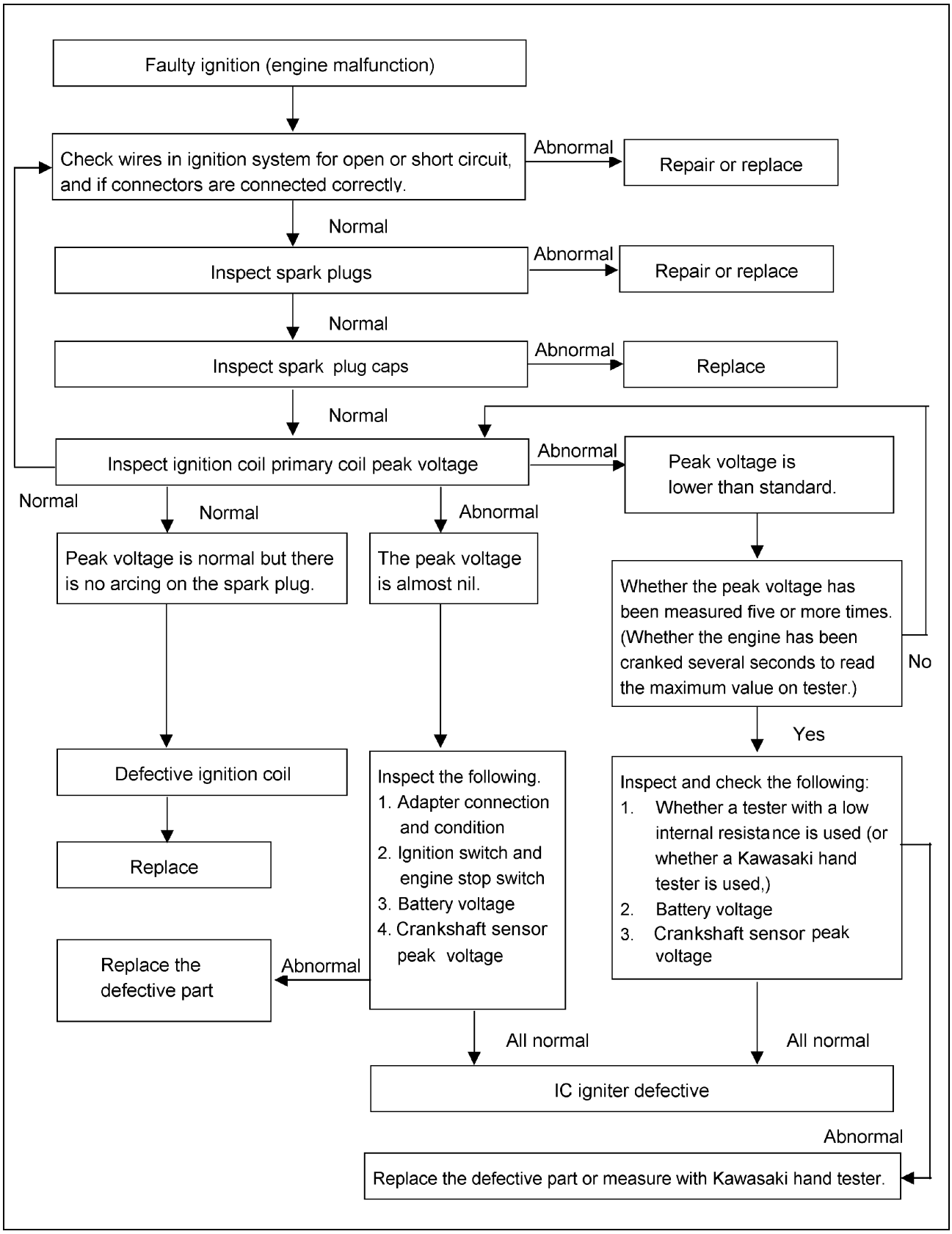
⚠ WARNING

To avoid high-voltage electrical shocks, do not touch the adapter terminals or leads.

★If the peak voltage is lower than the standard, refer to the next page.

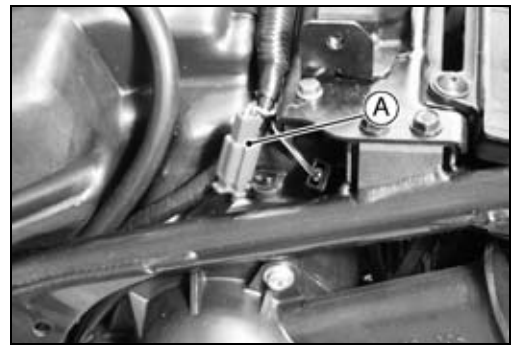
Ignition System

Troubleshooting



Ignition System

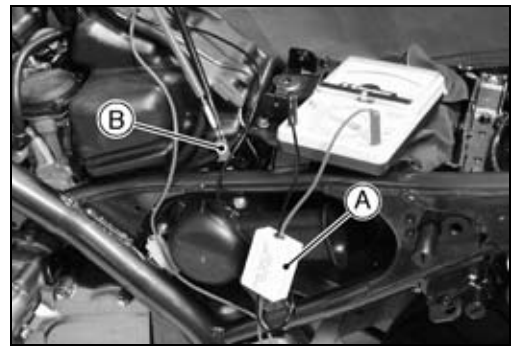
Pickup Coil Peak Voltage Inspection



● Measure the peak voltage of the pickup coil as follows:
○Remove the left side cover.
○Remove the pickup coil connector [A].

NOTE

○*To obtain a correct measurement, the wires as well as the wire connections must be correct. Take the voltage measurement with the proper cylinder compression (with the spark plugs in the cylinder head). Without proper compression, a correct measurement cannot be obtained.*



○Set the tester to the DC10 V range.
○Connect the peak voltage adapter [A] to the tester, and connect the adapter terminal to the pickup coil connector [B] terminal.

Special Tool - Kawasaki Hand Tester: 57001-1394
Needle Adapter Set: 57001-1457
Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B

Connect
Adapter's positive (+) terminal → yellow wire terminal
Adapter's negative (–) terminal → black wire terminal

○Turn the starter motor for several seconds and read the maximum value on the tester.

Pickup Coil Peak Voltage
Standard: DC 5 V or more

★If the peak voltage is lower than the standard, inspect the pickup coil.

Diodes Inspection

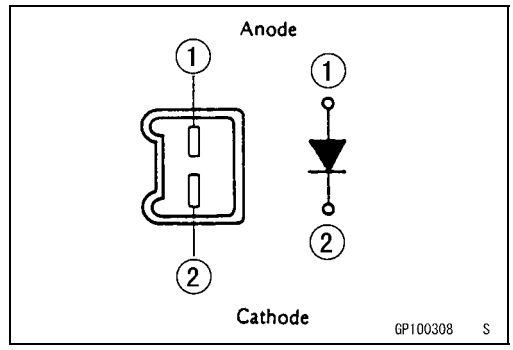
● Remove the Headlight Body.
● Disconnect the diode assembly [A].

● Remove the seat.
● Disconnect the diode assemblies [A].
● Zero the hand tester, and connect it to each diode terminal to check the resistance in both directions.
★The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the diode assembly must be replaced.

Ignition System

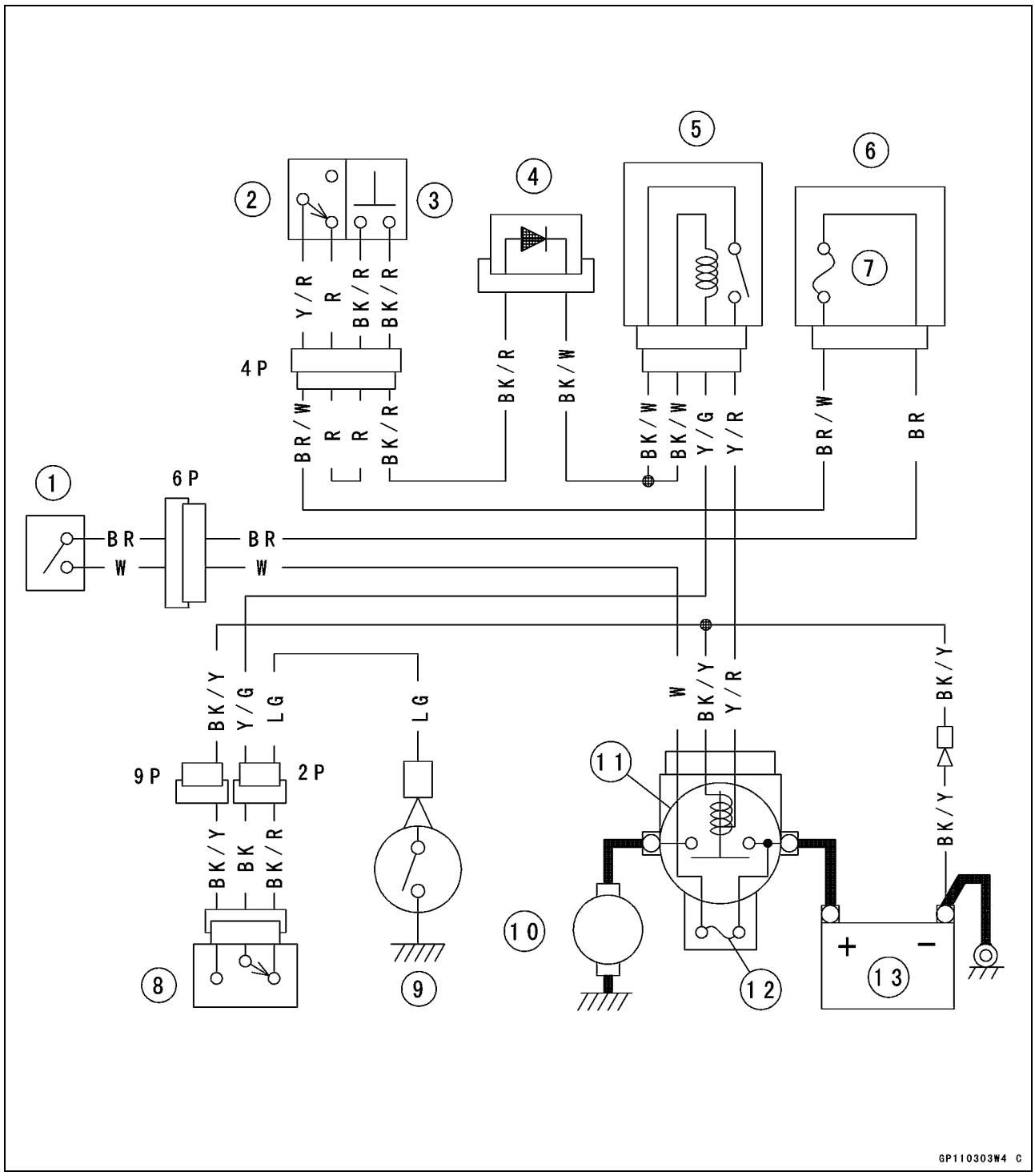
NOTE

○*The actual meter reading varies with the meter used and the individual diode, but, generally speaking, the lower reading should be from zero to one half the scale.*



Electric Starter System

Electric Starter Circuit

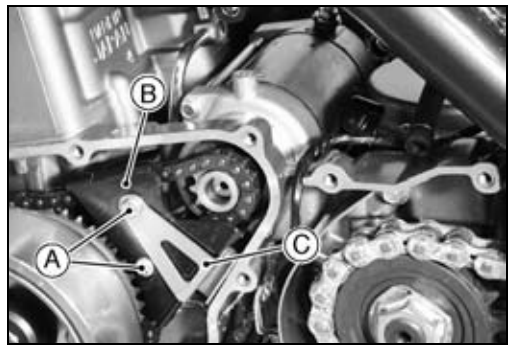


1. Ignition Switch
2. Engine Stop Switch
3. Starter Button
4. Starter Circuit Relay
5. Starter Circuit Relay
6. Fuse Box
7. Ignition Fuse 10 A
8. Starter Lockout Switch
9. Neutral Switch
10. Starter Motor
11. Starter Relay
12. Main Fuse 30 A
13. Battery

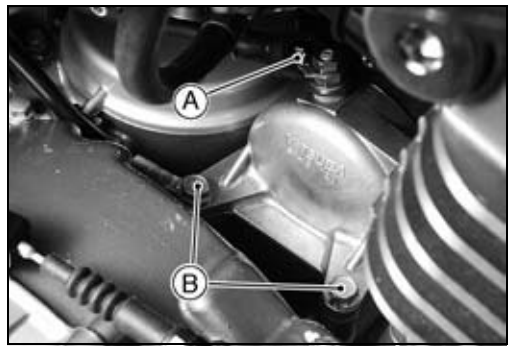
Electric Starter System

Starter Motor Removal

- Remove the alternator cover.
- Remove the starter chain guide screws [A] and remove the starter chain guide [B] with the guide stay [C].



- Disconnect the starter motor lead [A].
- Remove the starter motor mounting bolts [B].



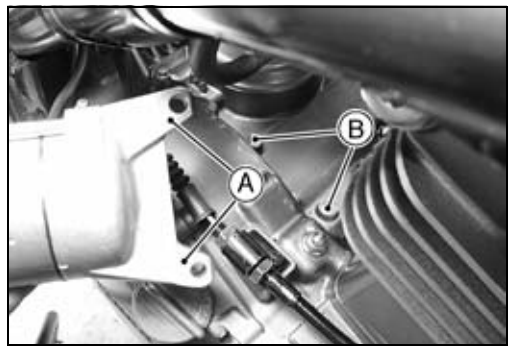
- Remove the starter motor [A].

Starter Motor Installation

- Install the starter motor in the reverse order of removal.
- Clean the starter motor lugs [A] and crankcase where the starter motor is grounded [B].
- Replace the O-ring with a new one, if it is deteriorated or damaged, and apply a little oil to it.
- Tighten the starter motor mounting bolts with the ground lead.

Torque - Starter Motor Mounting Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

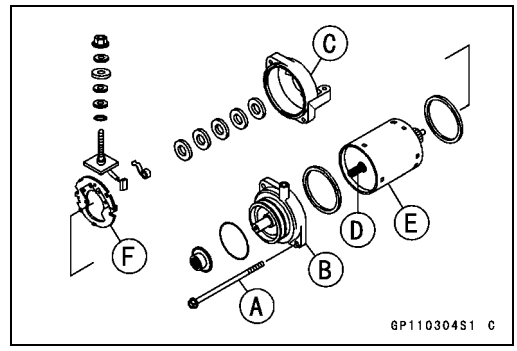
- Pour in the specified type and amount of oil (see Engine Lubrication chapter).



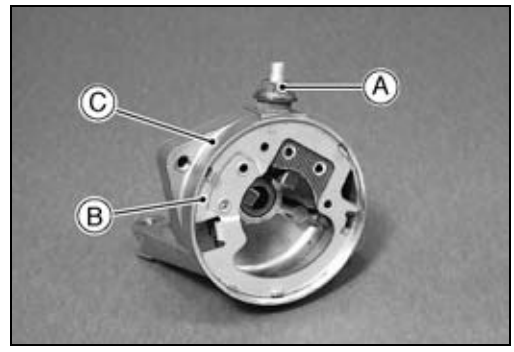
Electric Starter System

Starter Motor Disassembly

- Unscrew the starter motor through bolts [A] and pull off the gear cover [B] and the end cover [C].
- Pull the armature [D] out of the yoke housing [E], and remove the end bracket [F].



- Remove the terminal nut [A], and take the brush plate [B] off the end cover [C].

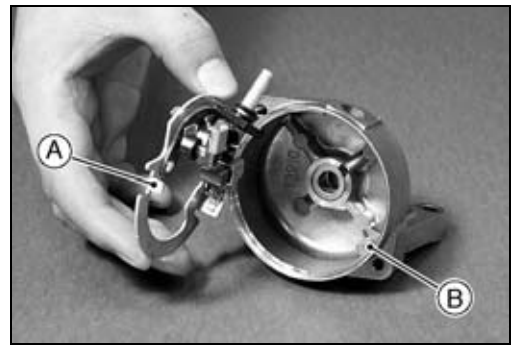


Starter Motor Assembly

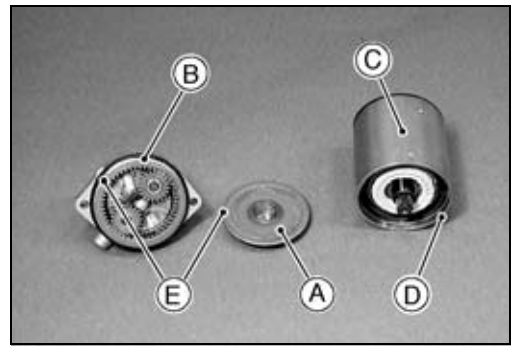
- Replace any O-ring removed with a new one.
- Install the terminal bolt.
- Tighten the terminal nut.

Torque - Starter Motor Terminal Nut: 6.9 N·m (0.7 kgf·m, 61 in·lb)

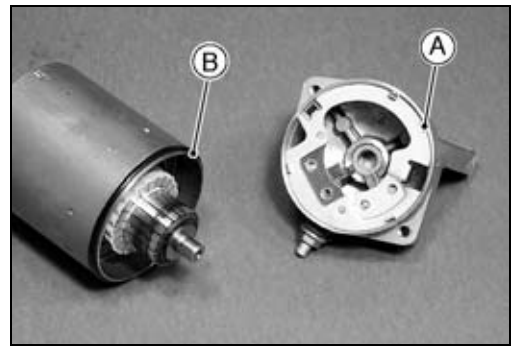
- Install the brush plate on the end cover, align the tab [A] on the plate with the slot [B] in the cover.



- Insert the armature into the yoke.
- Install the end bracket [A] and the gear cover [B] on the yoke housing [C], align the projection [D] on the housing with the notches [E] in the bracket and the cover.



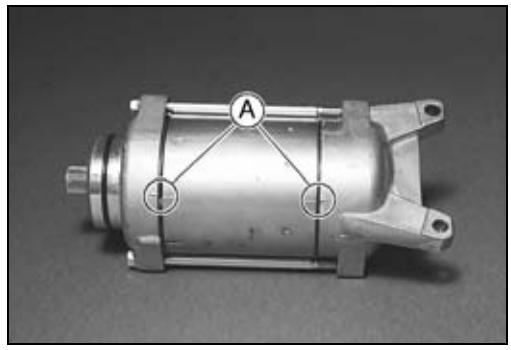
- Install the end cover on the yoke housing, align the short and wide tab [A] on the brush plate with the notch [B] in the housing.



Electric Starter System

- Make sure that the marks [A] on the covers and yoke housing align with each other.
- Tighten the through bolts.

Torque - Starter Motor Through Bolts: 6.9 N·m (0.7 kgf·m, 65 in·lb)



Starter Chain Wear

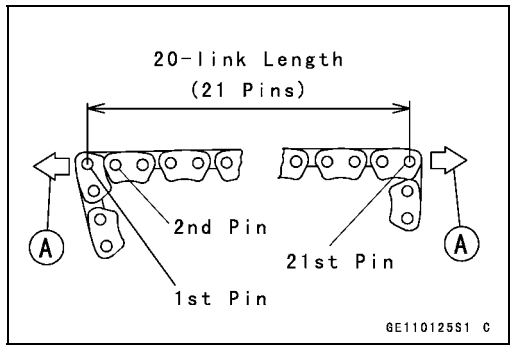
- Pull the starter chain tight.
- Measure the length of 20 links (21 pins) with a vernier caliper.

★If the 20 link length of the starter chain is greater than the service limit, replace it.

Starter Chain 20-link Length

Standard: 155.5 ~ 155.9 mm (6.12 ~ 6.14 in.)

Service Limit: 159 mm (6.26 in.)



Starter Chain Guide Wear

- Visually inspect the rubber on the guide.

★If the rubber is cut or damaged in any way, replace the guide.

Starter Relay Inspection

- Remove the left side cover (see Frame chapter).
- Remove the starter relay.
- Connect a hand tester [A] and one 12 V battery [B] to the starter relay [C] as shown.

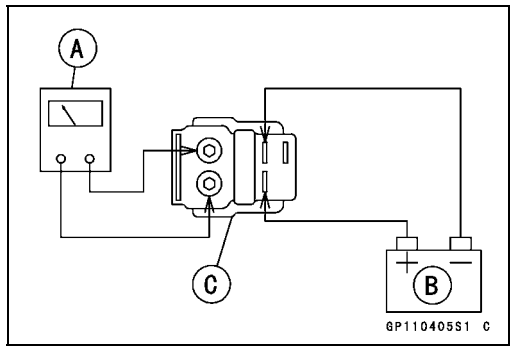
★If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

Meter range: × 1 Ω

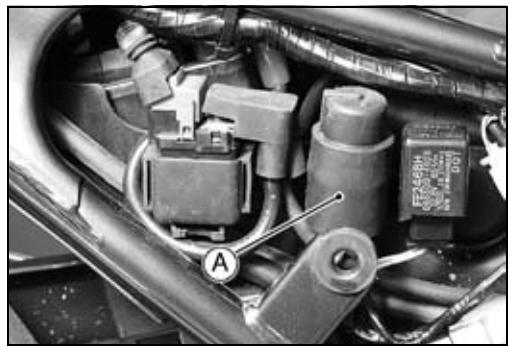
Criteria: When battery is connected → 0 Ω

When battery is disconnected → ∞ Ω



Starter Circuit Relay Inspection

- Remove the right side cover (see Frame chapter).
- Remove the starter circuit relay [A].



Electric Starter System

- Connect the hand tester [A] and 12 V battery [B] to the starter circuit relay [C] as shown.

★If the relay does not work as specified, the relay is defective. Replace the relay.

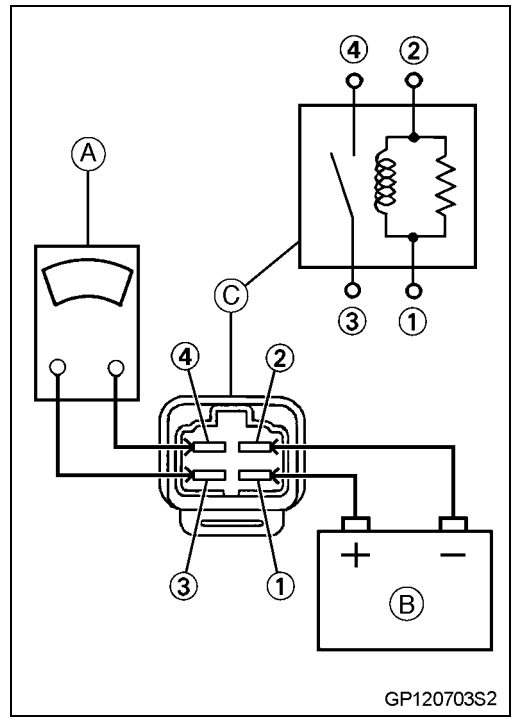
Testing Relay

Tester Range: × 1 Ω

Criteria: When battery is connected → 0 Ω

When battery is disconnected → ∞ Ω

Relay Coil Terminal [1] and [2]
Relay Switch Terminals [3] and [4]



Brush Inspection

- Measure the length [A] of each brush.

★If any is worn down to the service limit, replace the brush plate assembly [B].

Starter Motor Brush Length

Standard: 12.0 ~ 12.5 mm (0.47 ~ 0.49 in.)

Service Limit: 8.5 mm (0.34 in.)

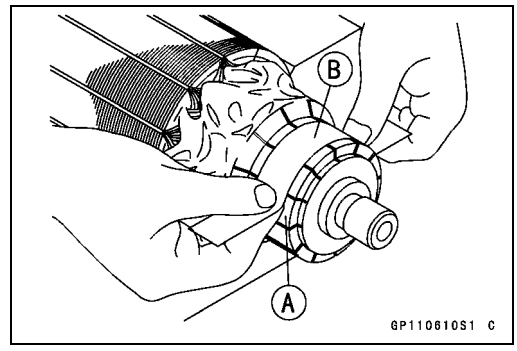
Brush Spring Inspection

- Check that the brush springs are in place and will snap the brushes firmly into place.

★If not, reinstall or replace the spring.

Commutator Cleaning and Inspection

- Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.

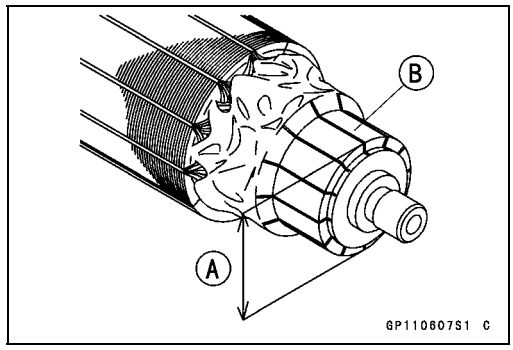


Electric Starter System

● Measure the diameter [A] of the commutator [B].
★Replace the starter motor with a new one if the commutator diameter is less than the service limit.

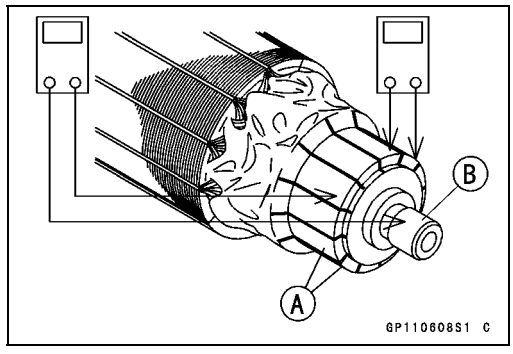
Commutator Diameter

Standard:	**28 mm (1.10 in.)**
Service Limit:	**27 mm (1.06 in.)**



Armature Inspection

● Using the × 1 Ω hand tester range, measure the resistance between any two commutator segments [A].
★If there is a high resistance or no reading (∞) between any two segments, a winding is open and the starter motor must be replaced.
● Using the highest hand tester range, measure the resistance between the segments and the shaft [B].
★If there is any reading at all, the armature has a short and the starter motor must be replaced.

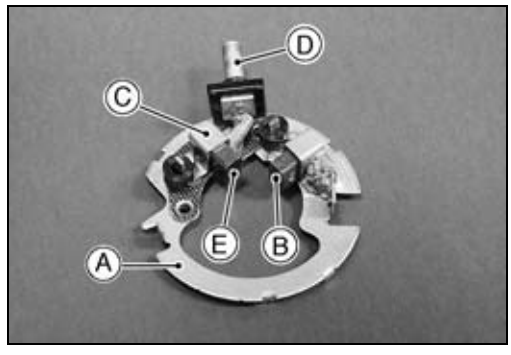


NOTE

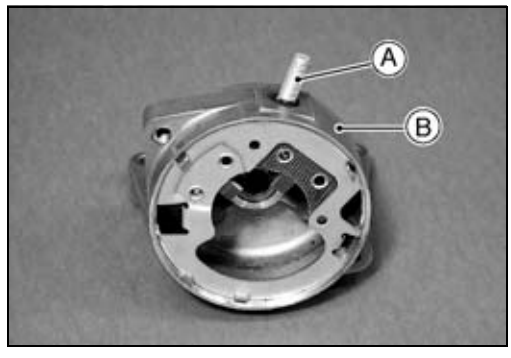
○*Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with the hand tester. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.*

Brush Plate Inspection

● Using the × 1 Ω hand tester range, measure the resistance between the brush plate [A] and the negative brush [B].
★If there is not close to zero ohm, the brush plate has an open. Replace the brush plate assembly.
● Using the highest hand tester range, measure the resistance between the brush plate and the positive brush holder [C].
★If there is any reading at all, the brush holder has a short. Replace the brush plate assembly.
● Using the × 1 Ω hand tester range, measure the resistance between the terminal bolt [D] and the positive brush [E].
★If there is a high resistance or no reading (∞), a lead is open and the brush plate must be replaced.

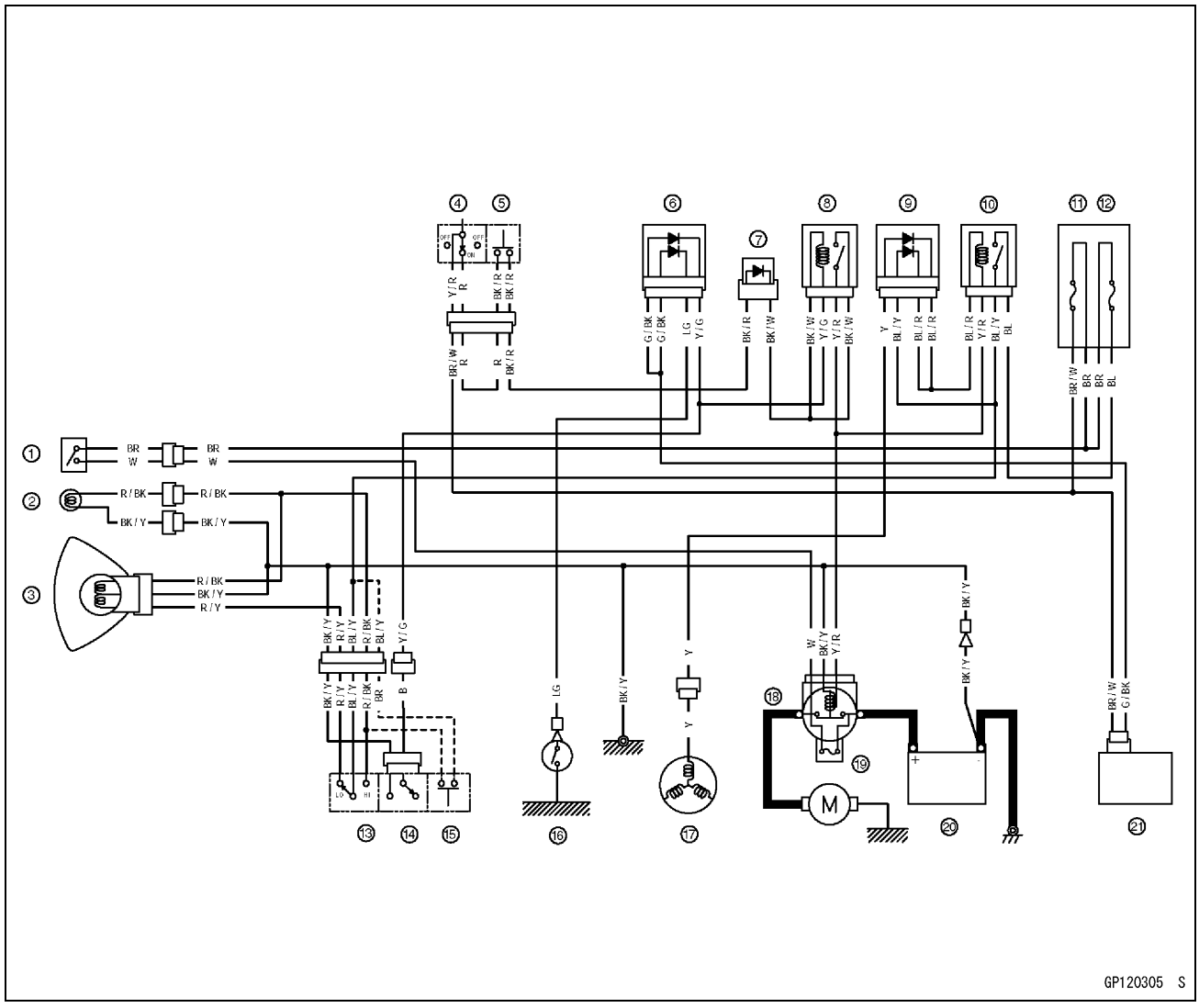


● Using the highest hand tester range, measure the resistance between the terminal bolt [A] and the end cover [B].
★If there is any reading at all, the insulation is faulty and the brush plate must be replaced. Replace the terminal assembly.



Lighting System

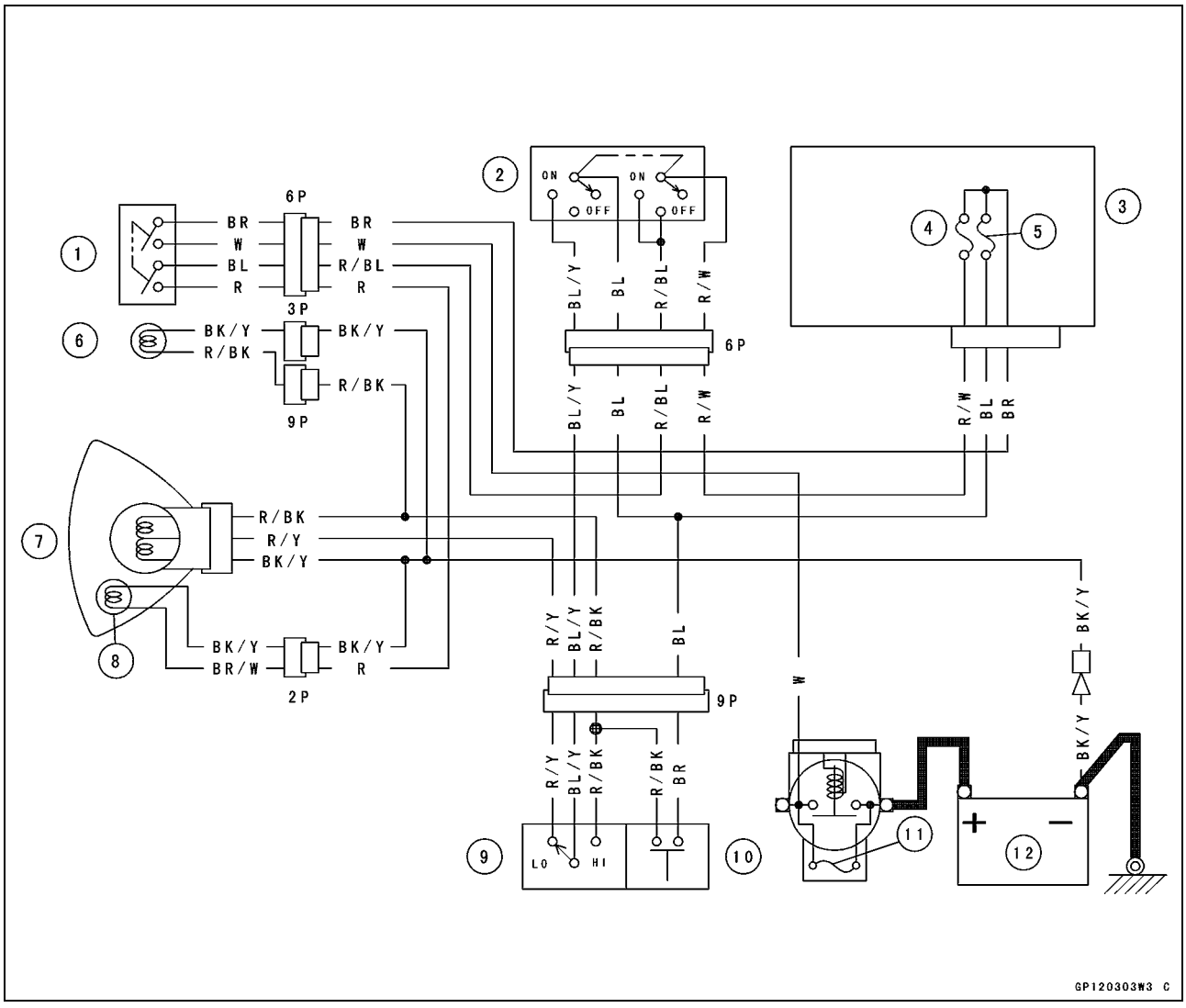
Headlight Circuit (Australia, ER500-C1 ~, D1)



1. Ignition Switch
2. High Beam Indicator Light
3. Headlight
4. Engine Stop Switch
5. Starter Button
6. Diode
7. Diode
8. Starter Circuit Relay
9. Diode
10. Headlight Circuit Relay
11. 10 A Ignition Fuse
12. 10 A Headlight Fuse
13. Dimmer Switch
14. Starter Lockout Switch
15. Passing Button
16. Neutral Switch
17. Alternator
18. Starter Relay
19. 30 A Main Fuse
20. Battery
21. IC Igniter

Lighting System

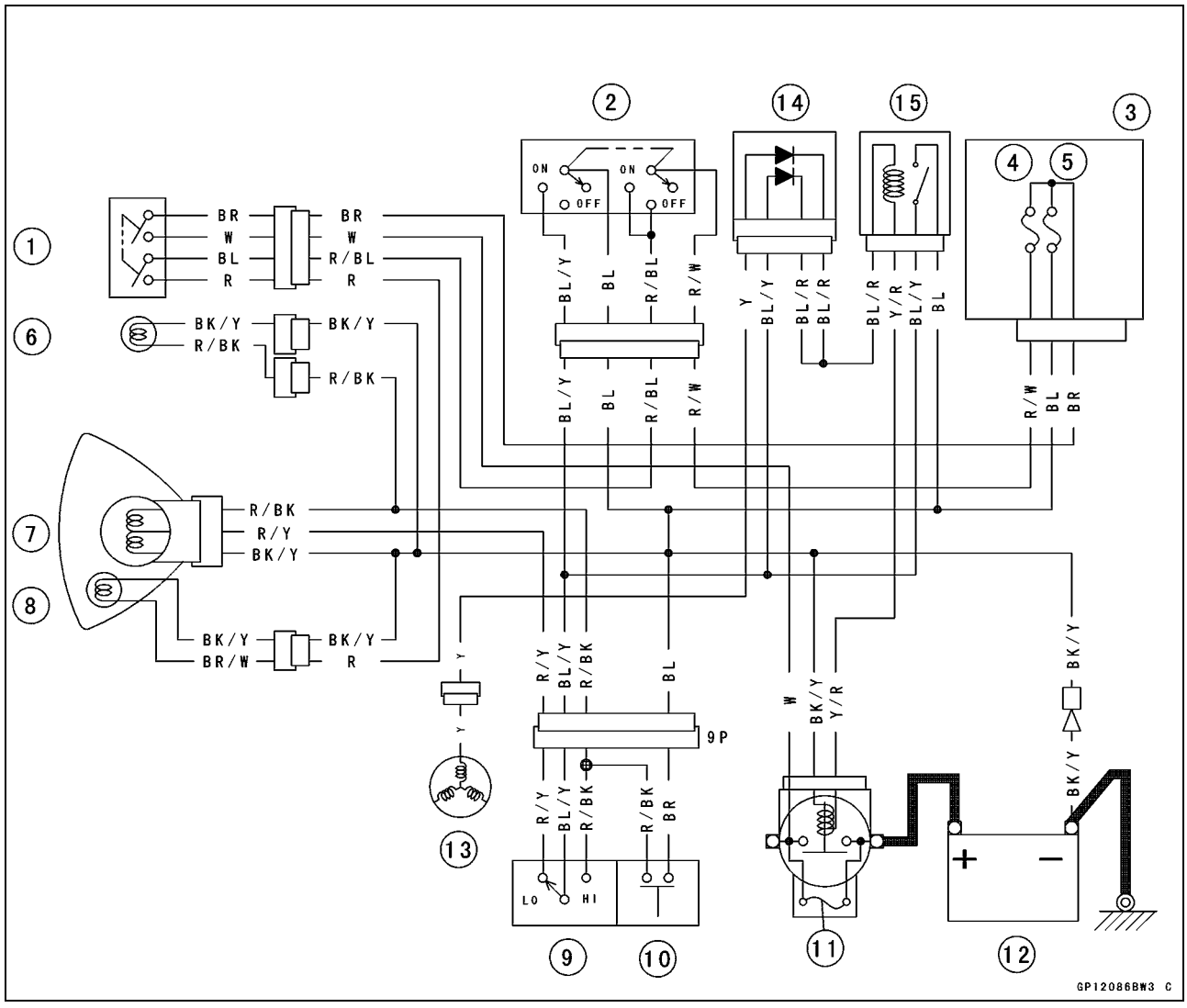
Headlight Circuit (Other than Australia, ER500-C1 ~ C2)



1. Ignition Switch
2. Headlight Switch
3. Fuse Box
4. Taillight Fuse 10 A
5. Headlight Fuse 10 A
6. High Beam Indicator Light
7. Headlight
8. City Light
9. Dimmer Switch
10. Passing Button
11. Main Fuse 30 A
12. Battery

Lighting System

Headlight Circuit (Other than Australia, ER500-C3 ~)



1. Ignition Switch
2. Headlight Switch
3. Fuse Box
4. Taillight Fuse 10 A
5. Headlight Fuse 10 A
6. High Beam Indicator Light
7. Headlight
8. City Light
9. Dimmer Switch
10. Passing Button
11. Main Fuse 30 A
12. Battery
13. Alternator
14. Diode
15. Headlight Circuit Relay

Headlight Circuit Relay Inspection (Australia)

- Remove:
  Seat (see Frame Chapter)
- Remove the Headlight Circuit Relay.

Lighting System

● Connect the hand tester [A] and 12 V battery [B] to the starter circuit relay [C] as shown.

★If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

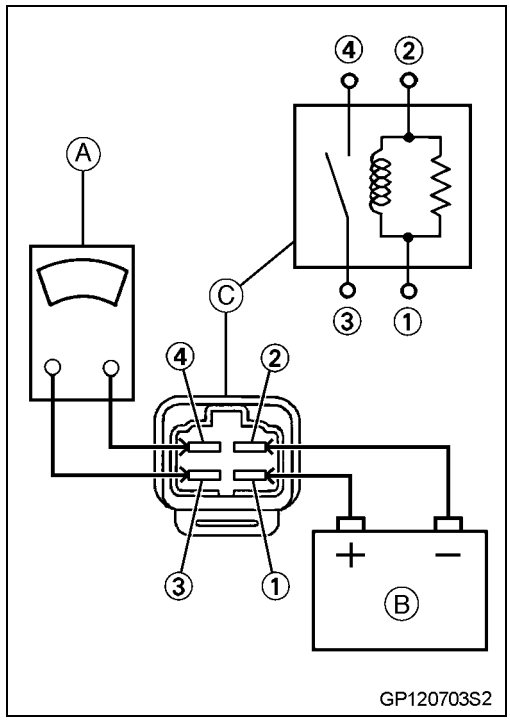
Tester Range: × 1 Ω

Criteria: When battery is connected → 0 Ω

When battery is disconnected → ∞ Ω

Relay Coil Terminal [1] and [2]
Relay Switch Terminal [3] and [4]

Special Tool - Hand Tester: 57001-1394



Headlight Beam Horizontal Adjustment

● Turn the horizontal adjuster [A] on the headlight rim in or nut until the beam points straight ahead. Turning the adjusting screw clockwise moves the headlight beam to the left.

Headlight Beam Vertical Adjustment

● Turn the vertical adjuster [B] on the headlight rim in or out to adjust the headlight vertically.

NOTE

○*On high beam, the brightest point should be slightly below horizontal with the motorcycle on its wheels and rider seated. Adjust the headlight to the proper angle according to local regulations.*

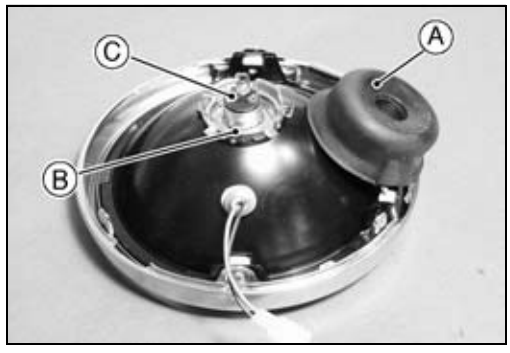
Headlight Bulb Replacement

● Remove:
Headlight Unit and Dust Cover [A]
Hook [B]

● Replace the headlight bulb [C].

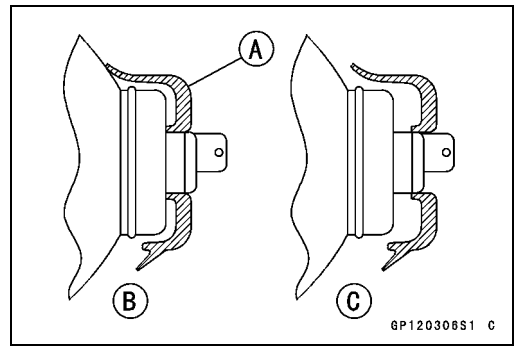
CAUTION

When handling the quartz-hologen bulb, never touch the glass portion with bare hands. Always use a clean cloth. Oil contamination from hands or dirty rags can reduce bulb life or cause the bulb to explode.



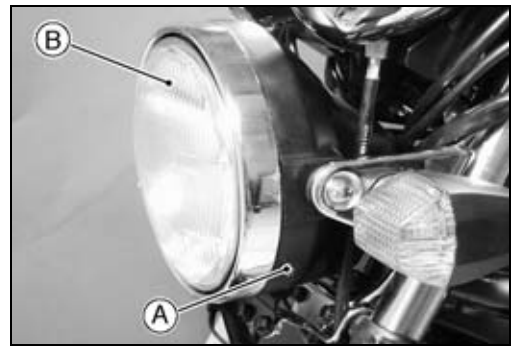
Lighting System

- Fit the dust cover [A] with the Top mark upward onto the bulb firmly as shown in the figure.
  Good [B]
  Bad [C]
- After installation, adjust the headlight aim.

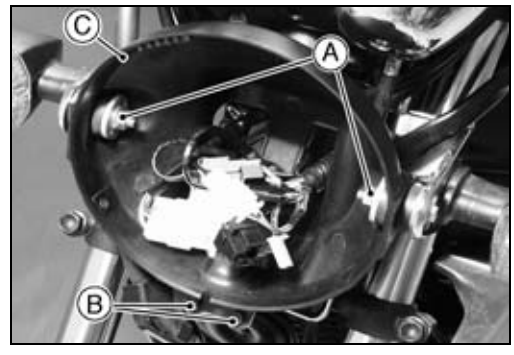


Headlight Unit/Housing Removal

- Remove the screws [A] on both sides.
- Take the headlight unit [B] out of the housing.



- Disconnect all the connectors in the headlight housing.
- Remove:
  Bolts and Nuts [A]
  Headlight Bracket Bolts [B]
- Remove the headlight housing [C].

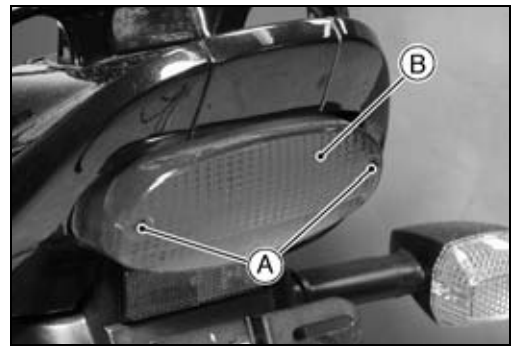


Headlight Unit Installation

- Install the headlight unit so that the "TOP" mark [A] on the lens points up.

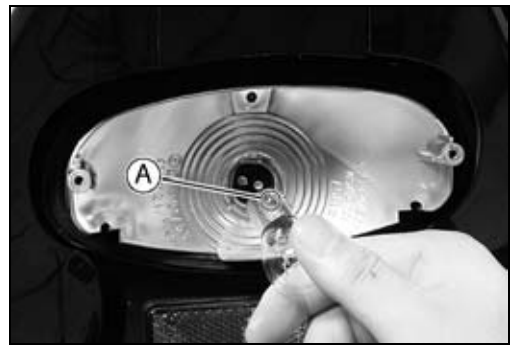
Tail/Brake Light Bulb Replacement

- Remove the tail/brake light lens screws [A] and lens [B].



Lighting System

● Insert the new bulb by aligning the pins with the grooves in the walls of the socket so that the pin closest to the bulb base [A] is to the upper right.



Tail/Brake Light Lens Removal/Installation

● Be careful not to overtighten the lens mounting screws.

Turn Signal Light Bulb Replacement

● Refer to the Tail/Brake Light Bulb Replacement section.

○Be careful not to overtighten the lens mounting screws.

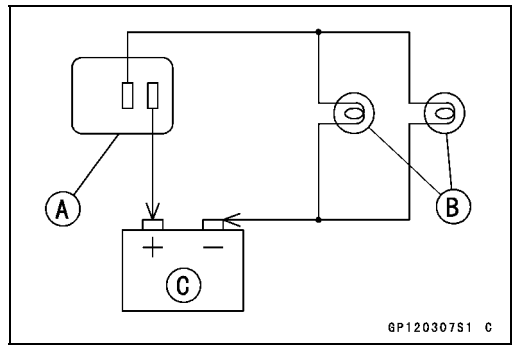
Turn Signal Relay Inspection

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

● Connect one 12 V battery and turn signal lights as indicated in the figure, and count how many times the lights flash for one minute.

Turn Signal Relay [A]
Turn Signal Lights [B]
12 V Battery [C]

★If the lights do not flash as specified, replace the turn signal relay.



Testing Turn Signal Relay

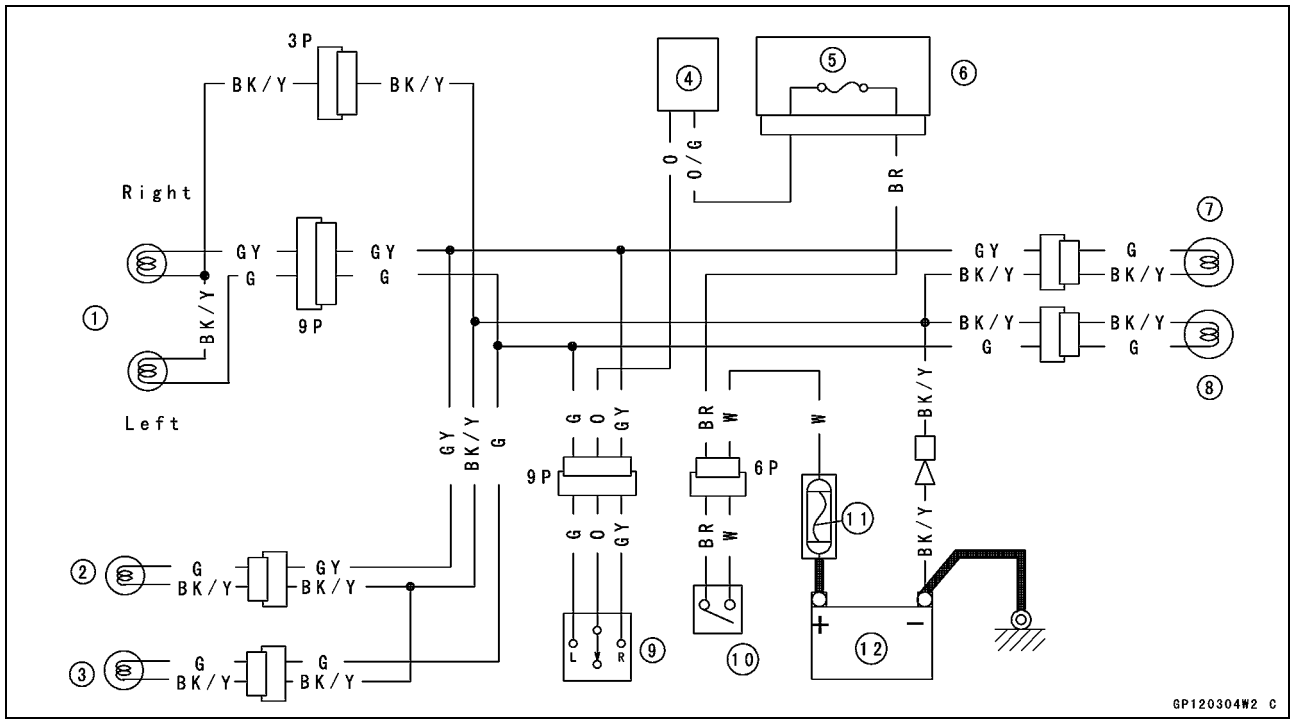
Load		Flashing times (c/m*)
The Number of Turn Signal Lights	Wattage (W)	
1**	21 - 23	Light stays on
2	42 - 46	75 - 95

*: Cycle(s) per minute

**: Corresponds to “light burned out”.

Lighting System

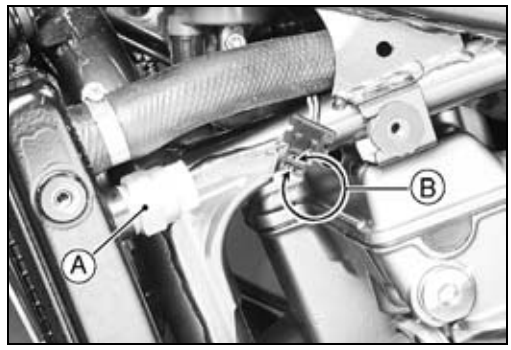
Turn Signal Light Circuit



1. Turn Signal Indicator Light
2. Front Right Turn Signal Light
3. Front Left Turn Signal Light
4. Turn Signal Relay
5. Turn Signal Fuse 10 A
6. Fuse Box
7. Rear Right Turn Signal Light
8. Rear Left Turn Signal Light
9. Turn Signal Switch
10. Ignition Switch
11. Main Fuse 30 A
12. Battery

Radiator Fan System

Fan System Circuit Inspection

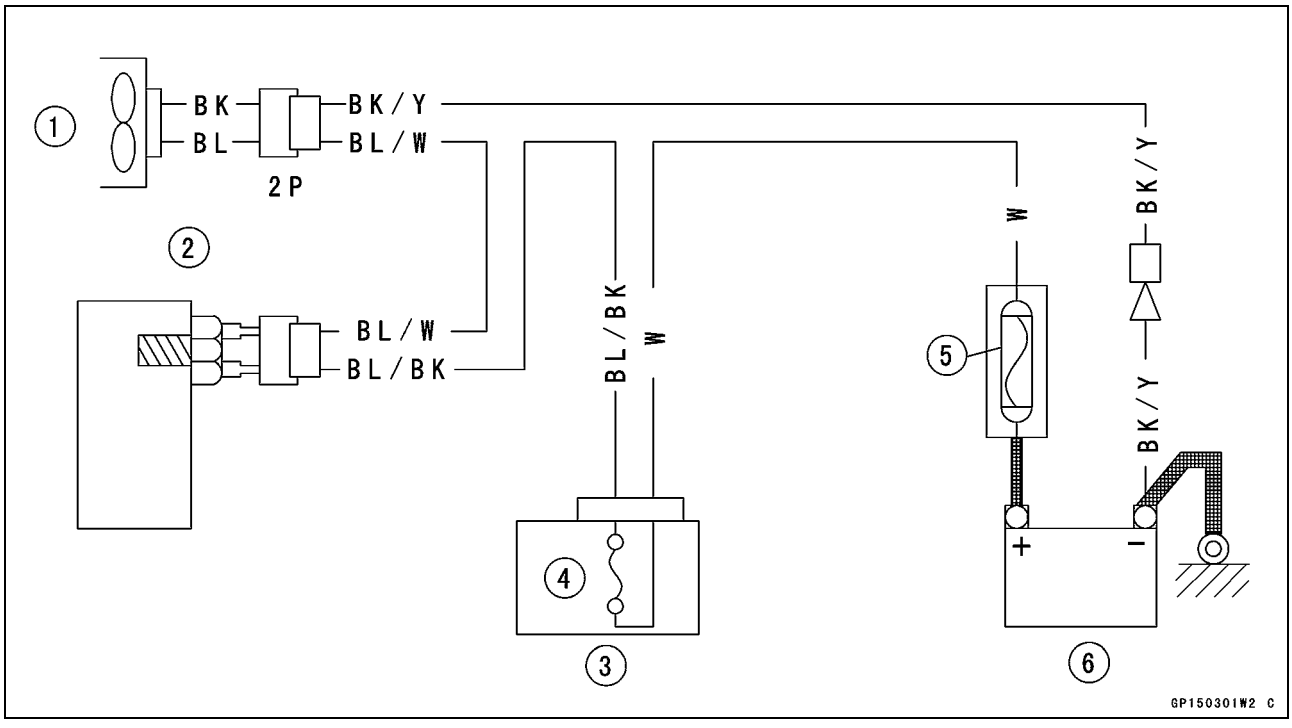


- Disconnect leads from the radiator fan switch [A].
- Using an auxiliary wire [B], connect the radiator fan switch leads.

★If the fan turns, inspect the fan switch.

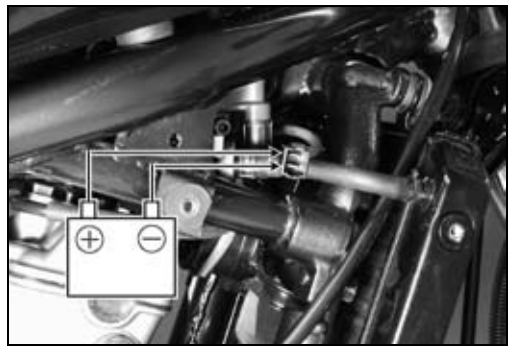
★If the fan does not turn, inspect the following.
Lead and Connectors
Main Fuse and Fan Fuse
Fan Motor

Radiator Fan Circuit



1. Radiator Fan
2. Radiator Fan Switch
3. Fuse Box
4. Fan Fuse 10 A
5. Main Fuse 30 A
6. Battery

Fan Motor Inspection



- Disconnect connector from the fan.
- Using two auxiliary wires, supply battery power to the fan.

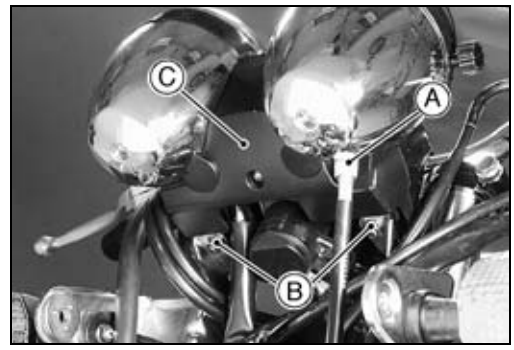
Wire Connectors
Blue Lead ←→ Battery (+)
Black Lead ←→ Battery (–)

★If the fan does not turn at this time, the fan is defective and must be replaced.

Meter Unit

Meter Unit Removal

- Remove the headlight unit and housing.
- Remove the speedometer cable upper end [A] and the mounting nuts [B].
- Disconnect the meter connectors and take off the meter unit [C].

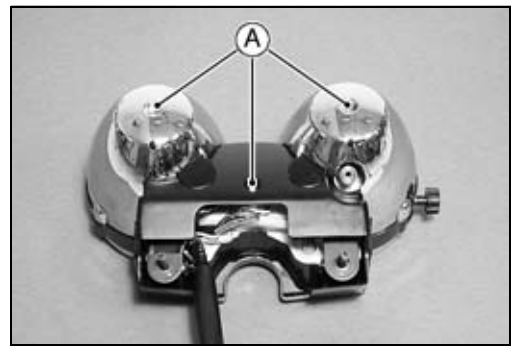


CAUTION

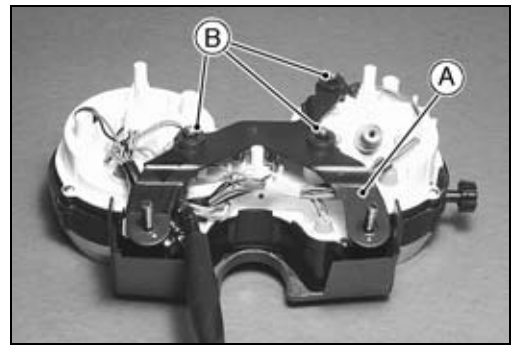
Place the meter unit so that the face is up. If a meter unit is left upside down or sideways for any length of time, it will malfunction.

Meter Unit Disassembly

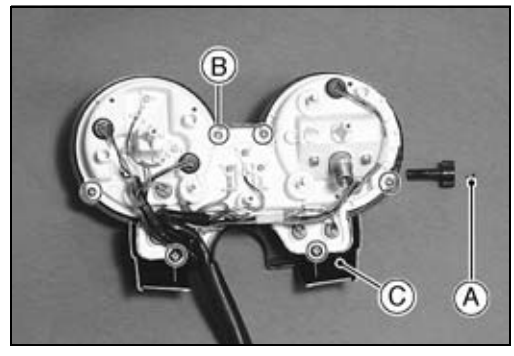
- Remove the meter unit (see this chapter).
- Remove three screws [A].



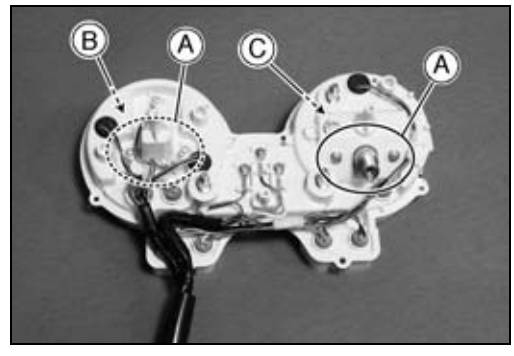
- Remove the bracket [A] by taking off three nuts [B].



- Unscrew the reset knob screw [A].
- Remove the screws [B] and take off the front cover [C].



- Remove the screws [A] for removal of each unit.
  Tachometer [B]
  Speedometer [C]



Meter Unit

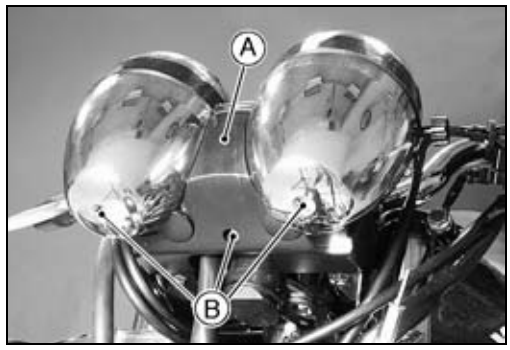
Tachometer Inspection

- Check the tachometer circuit wiring (see Wiring Inspection).

★If all wiring and components other than the tachometer unit check out good, the unit is suspect. Check the unit as shown.

○Remove the headlight body.

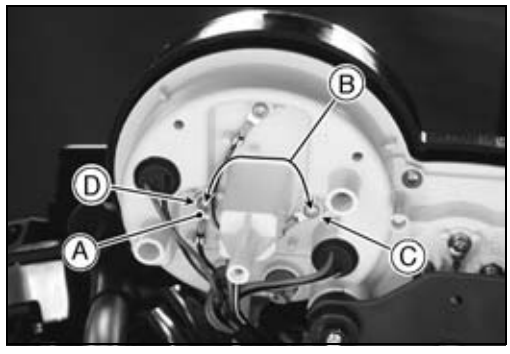
○Remove the meter under cover [A] by removing three screws [B].



○Remove the BK lead [A].

○Turn the ignition switch ON.

○Using an auxiliary wire [B], open and connect the BR lead terminal [C] to the BK lead terminal tap hole [D] repeatedly.



○Then the tachometer hand [A] should flick [B].

○Turn the ignition switch OFF.

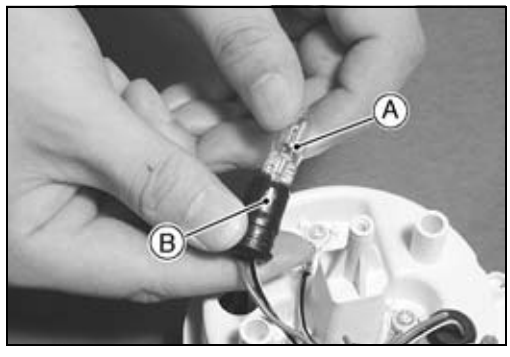
★If the hand does not flick, replace the tachometer unit.

Bulb Replacement

- To remove the wedge-base type bulb [A], pull the bulb out of the socket [B].

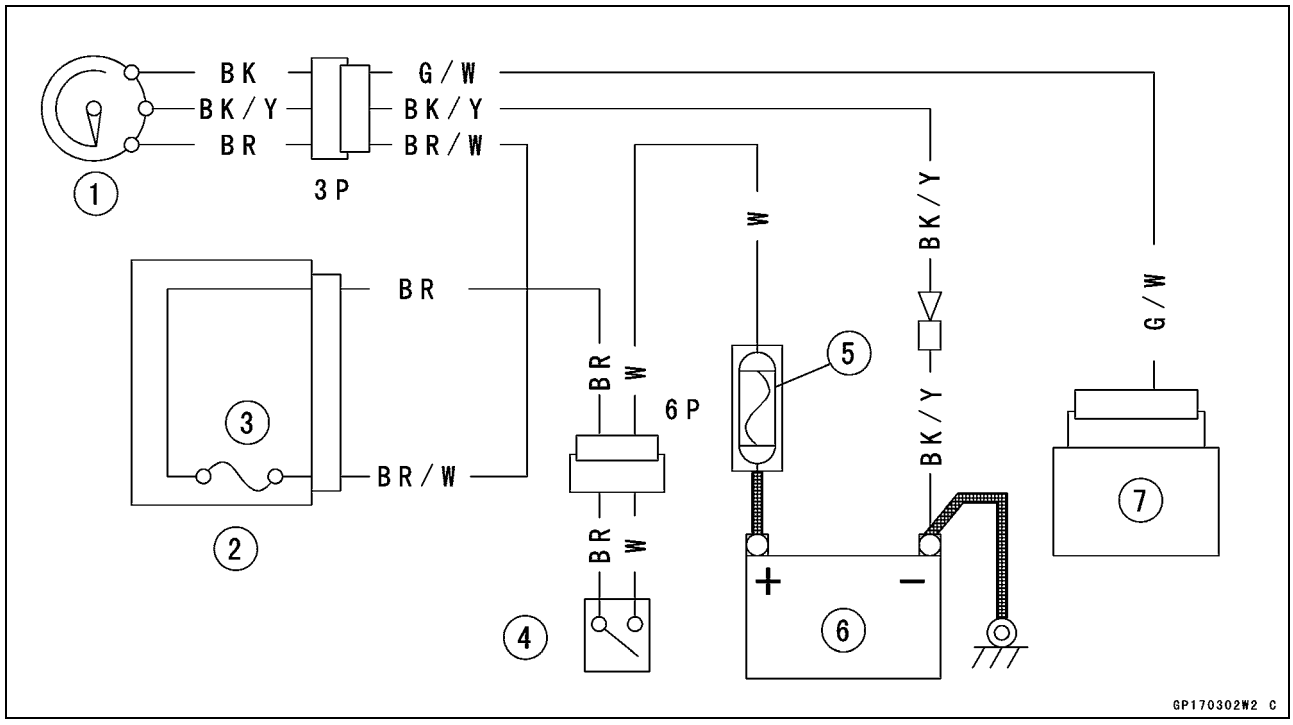
CAUTION

Do not turn the bulb. Pull the bulb out to prevent damage to the bulb. Do not use bulb rated for other than voltage or wattage specified in the wiring diagram.



Meter Unit

Tachometer Circuit



1. Tachometer
2. Fuse Box
3. Ignition Fuse 10 A
4. Ignition Switch
5. Main Fuse 30 A
6. Battery
7. IC Igniter

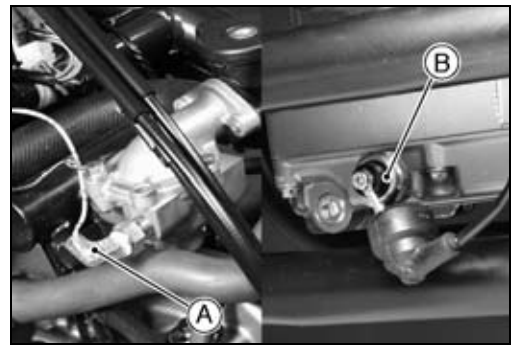
Water Temperature Warning System Inspection

The water temperature warning light goes on when the ignition switch is turned on and goes off soon after the engine starts running (oil pressure switch off) to ensure that its circuit functions properly. The warning light also goes on whenever the coolant temperature rises to **110 ~ 120°C (230 ~ 248°F)** when the motorcycles is in operation. If it stays on, stop the engine and check the coolant level in the reserve tank after the engine cools down.

- Inspect the water temperature warning light and the system wiring (see Wiring Inspection).
- Turn on the ignition switch.
- Disconnect the water temperature switch lead [A] and oil pressure switch lead, then ground them together to the frame or engine using auxiliary lead.

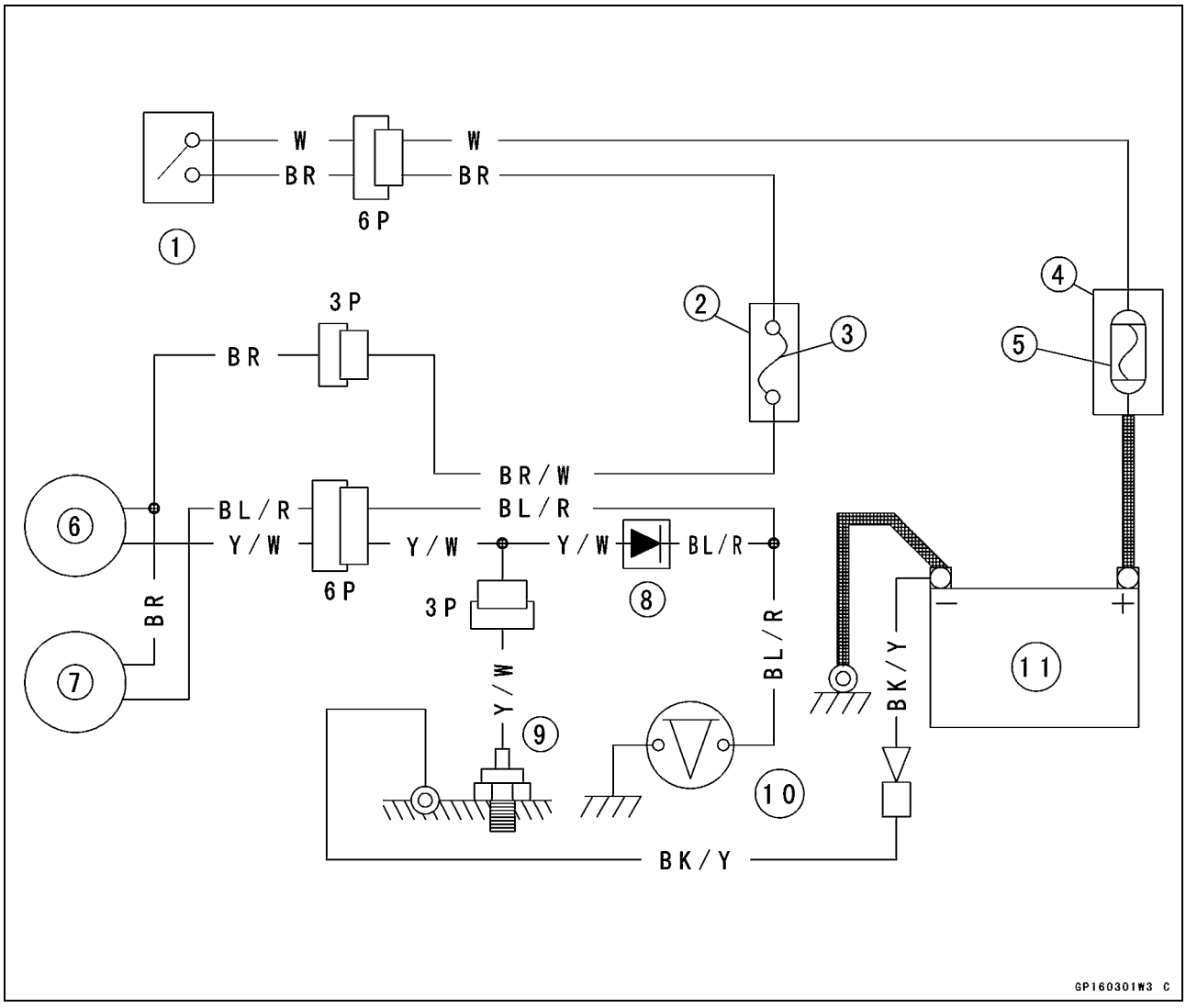
★If the warning light is lit, inspect the water temperature switch (see Specifications) and the oil pressure switch [B]. Replace any switch if damaged.

★If the warning light is not lit, check the warning light bulb.



Meter Unit

Water Temperature Warning System



1. Ignition Switch
2. Fuse Box
3. Ignition Fuse 10 A
4. Starter Relay
5. Main Fuse 30 A
6. Water Temperature Warning Light
7. Oil Pressure Warning Light
8. Rectifier
9. Water Temperature Switch
10. Oil Pressure Switch
11. Battery

Switches and Sensors

Brake Light Switch Ispection

Rear Brake Light Timing Inspection

- Turn on the ignition switch.
- Check the operation of the rear brake light switch by depressing the brake pedal. The brake light should go on as specified.

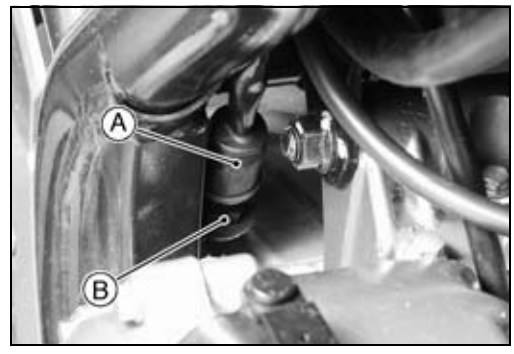
★If it does not, adjust the brake light timing.

Brake Light Timing

Standard: On after about 15 mm (0.59 in.) pedal travel [A]

Rear Brake Light Timing Adjustment

Brake light timing is adjusted by changing the position of the rear brake light switch [A].



- Adjust the position of the switch so that the brake light goes on after the specified pedal travel by turning the adjusting nut [B].

[C] Lights sooner.
[D] Lights later.

CAUTION
To avoid damaging the electrical connections inside the switch, be sure that the switch body does not turn during adjustment.

Switch Inspection

- Using the hand tester, check to see that only connections shown in the table have continuity (about zero ohm).

○For the handlebar switches and the ignition switch refer to the tables in the Wiring Diagram.

★If the switch has an open or short, repair it or replace it with a new one.

Special Tool - Hand Tester: 57001-1394

Neutral Switch Connections

	SW. Terminal	
When transmission is in neutral	○———	———○
When transmission is not in neutral		

Rear Brake Light Switch Connections

	BR	BL
When brake pedal is pushed down	○———	———○
When brake pedal is released		

Switches and Sensors

Oil Pressure Switch Connections*

	SW. Terminal	⏚
When engine is stopped	○———	———○
When engine is running		

*: Engine lubrication system is in good condition

Side Stand Switch Connections*

	BK/Y	G/W
When side stand is up	○———	———○
When side stand is down		

Radiator Fan Switch Inspection

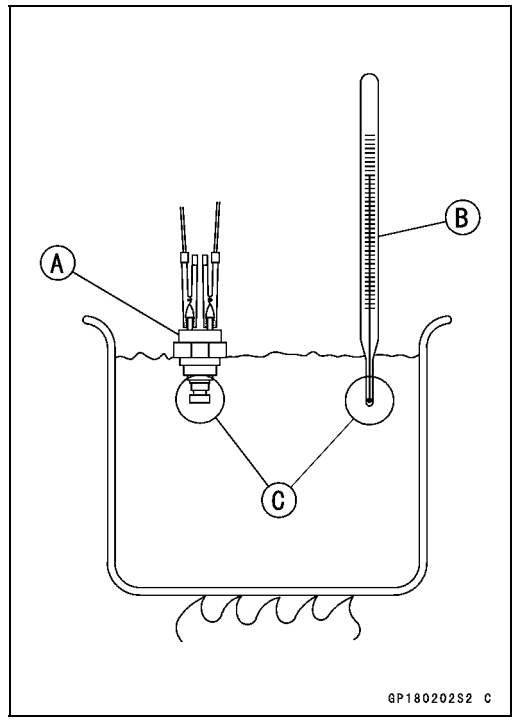
- Remove the fan switch (see Cooling System chapter).
- Suspend the switch [A] in a container of coolant so that the temperature-sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant so that the sensitive portions [C] are located in almost the same depth.

NOTE

○*The switch and thermometer must not touch the container sides or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the water while stirring the water gently.
- Using the hand tester, measure the internal resistance of the switch across the terminals at the temperatures shown in the table.

★If the hand tester does not show the specified values, replace the switch.



Fan Switch Resistance

Rising temperature:

From OFF to ON at 96 ~ 100°C (205 ~ 212°F)

Falling temperature:

From ON to OFF at 91°C (196°F)

Less than temperature at ON

ON: Less than 0.5 Ω

OFF: More than 1 MΩ

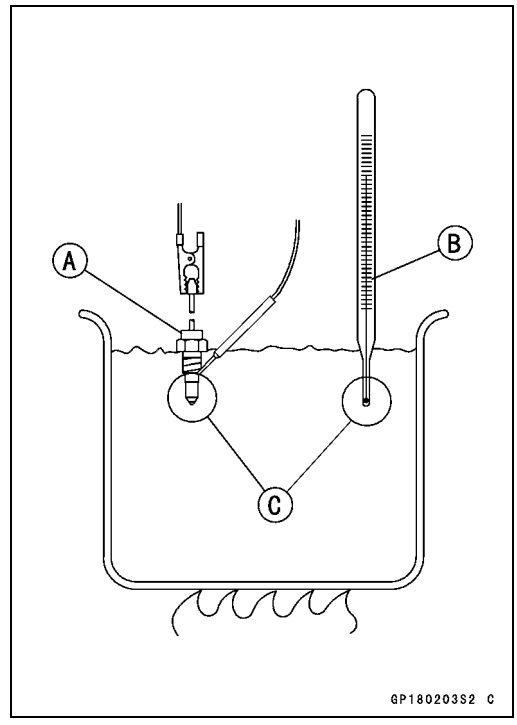
Switches and Sensors

Water Temperature Switch Inspection

- Remove the water temperature switch (see Cooling System chapter).
- Suspend the switch [A] in a container of coolant so that the temperature sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant so that the sensitive portions [C] are located in almost the same depth.

NOTE

○*The switch and thermometer must not touch the container sides or bottom.*



- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the switch across the terminal and the body at the temperatures shown in the table.

★If the hand tester does not show the specified values, replace the switch.

Water Temperature Switch Connections
Rising temperature:
From OFF to ON at 110 ~ 120°C (230 ~ 248°F)
Falling temperature:
From ON to OFF at 108°C (226°F) ~ temperature less than ON temperature
ON: Less than 0.5 Ω
OFF: More than 1 MΩ

Fuel Gauge Operation Inspection

- Remove the fuel tank, and disconnect the fuel level sensor lead connector.
- Turn the ignition switch ON.
- Open or short the terminals in the fuel level sensor lead connector from the main harness using an auxiliary lead. Then check the operation of the fuel gauge [A].

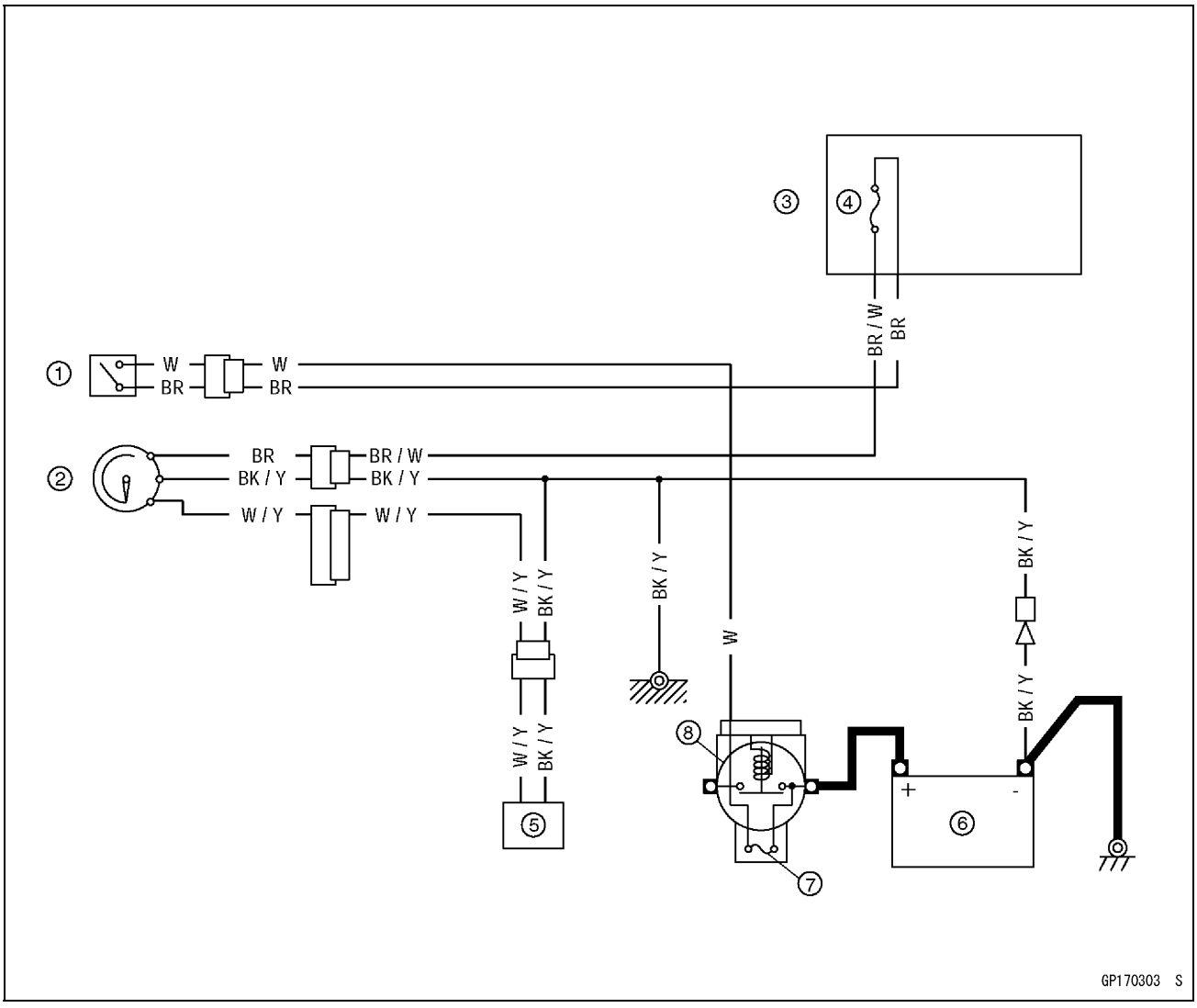
★If the gauge is not read (E) when opening and/or is not read (F) when shorting, the trouble is with the gauge and/or wiring.

- Check the fuel gauge circuit wiring.

★If all wiring and components other than the gauge are good, the gauge is defective, and replace the fuel gauge.

Switches and Sensors

Fuel Gauge Circuit



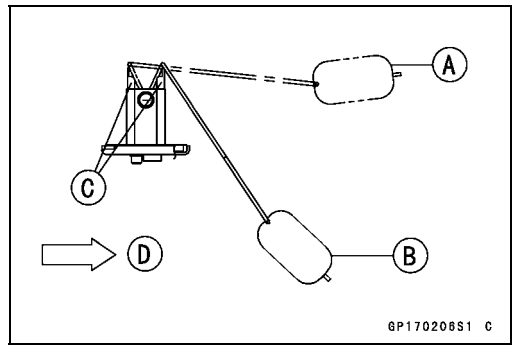
1. Ignition Switch
2. Fuel Gauge
3. Fuse Box
4. Ignition Fuse 10 A
5. Fuel Level Sensor
6. Battery
7. 30 A Main Fuse
8. Starter Relay

Fuel Level Sensor Inspection

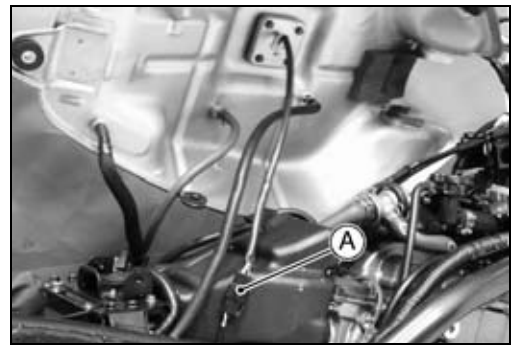
- Remove the fuel tank (see Fuel System chapter).
- Remove the fuel level sensor from the fuel tank.
- Check that the float moves up and down smoothly without binding. It should go down under its own weight.

★If the float does not move smoothly, replace the sensor.

[A] Float in Full Position
[B] Float in Empty Position
[C] Float Arm Stoppers
[D] Front



Switches and Sensors



- Using a hand tester, measure the resistance across the terminals in the fuel level sensor lead connector [A].

★If the tester reading are not as specified, or do not change smoothly according as the float moves up and down, replace the sensor.

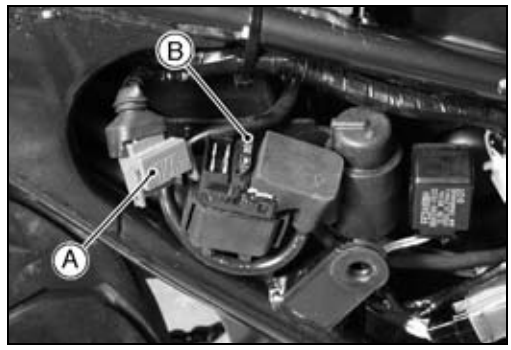
Fuel Level Sensor Resistance
Standard:

Full position:	**4 ~ 10 Ω**
Empty position:	**90 ~ 100 Ω**

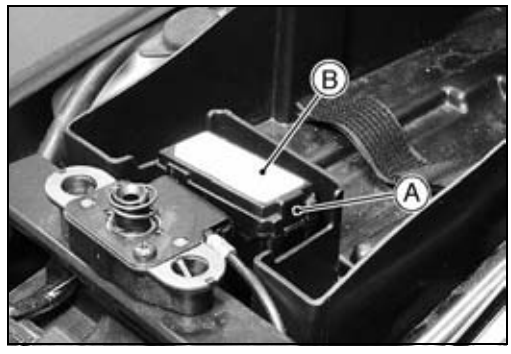
Special Tool - Hand Tester: 57001-1394

Fuses

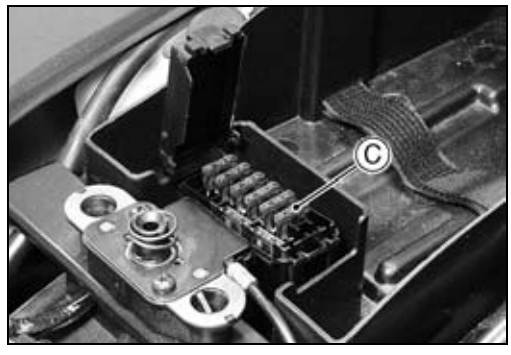
30 Ampere Fuse Removal
- Remove the left side cover (see Frame chapter).
- Disconnect the 30 ampere fuse connector [A].
- Pull out the main fuse [B] from the starter relay with a pair of needle nose pliers.



Fuse Box Fuse Removal
- Remove the seat (see Frame chapter).
- Unlock the hook [A] to lift up the lid [B].



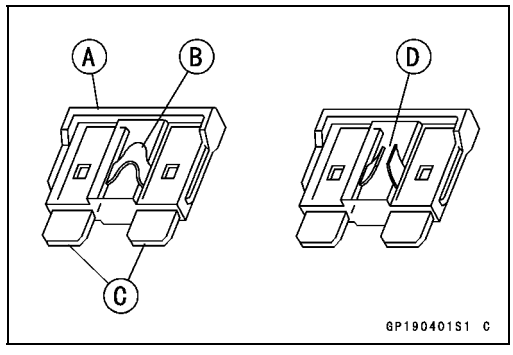
- Pull the fuse [C] straight out of the fuse box with needle nose pliers.



Fuse Installation
- If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of proper amperage.
- Install the fuse box fuses on the original position as specified on the lid.

Fuse Inspection
- Remove the fuse.
- Inspect the fuse element.
- If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

  Housing [A]
  Fuse Element [B]
  Terminals [C]
  Blown Element [D]



CAUTION

When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

Appendix

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Unit Conversion Table 16-9

Troubleshooting Guide

NOTE

○*This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.*

Engine Doesn't Start, Starting Difficulty:

Starter motor not rotating:
- Starter lockout or neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Starter relays not contacting or operating
- Starter button not contacting
- Wiring open or shorted
- Ignition switch trouble
- Engine stop switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:
- Starter clutch trouble

Engine won't turn over:
- Valve seizure
- Rocker arm seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure
- Balancer bearing seizure

No fuel flow:
- No fuel in tank
- Fuel tap vacuum hose clogged
- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded:
- Fuel level in carburetor float bowl too high
- Float valve worn or stuck open
- Starting technique faulty
- (When flooded, crank the engine with the throttle
- fully opened to allow more air to reach the engine.)

No spark; spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Neutral, starter lockout, or side stand switch trouble
- Pickup coil trouble
- Ignition coil trouble
- Ignition or engine stop switch shorted
- Wiring shorted or open
- Fuse blown

Fuel/air mixture incorrect:
- Pilot screw and/or idle adjusting screw maladjusted
- Pilot jet, or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter jet clogged

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Poor Running at Low Speed:

Spark weak:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Pilot screw maladjusted
- Pilot jet, or air passage clogged
- Air bleed pipe bleed holes clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter plunger stuck open
- Fuel level in carburetor float bowl too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner duct loose
- Air cleaner O-ring damaged

Compression low:
- Spark plug loose

Cylinder head not sufficiently tightened down
No valve clearance
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/groove clearance excessive
Cylinder head warped
Cylinder head gasket damaged
Valve spring broken or weak
Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Other:
IC igniter trouble
Carburetor vacuum piston doesn't slide smoothly
Carburetor vacuum piston diaphragm damage
Engine oil viscosity too high
Drive train trouble
Brake dragging
Air suction valve trouble
Vacuum switch valve trouble
Coasting enricher trouble

Poor Running or No Power at High Speed:

Firing incorrect:
Spark plug dirty, broken, or maladjusted
Spark plug cap or high tension wiring trouble
Spark plug cap shorted or not in good contact
Spark plug incorrect
IC igniter trouble
Pickup coil trouble
Ignition coil trouble

Fuel/air mixture incorrect:
Starter plunger stuck open
Main jet clogged or wrong size
Jet needle or needle jet worn
Air jet clogged
Fuel level in carburetor float bowl too high or too low
Bleed holes of needle jet holder or needle jet clogged
Air cleaner clogged, poorly sealed, or missing
Air cleaner duct loose
Air cleaner O-ring damaged
Water or foreign matter in fuel
Carburetor holder loose
Fuel tank air vent obstructed
Fuel tap clogged
Fuel line clogged

Compression low:
Spark plug loose
Cylinder head not sufficiently tightened down
No valve clearance
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/groove clearance excessive
Cylinder head gasket damaged
Cylinder head warped
Valve spring broken or weak
Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface.)

Knocking:
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Spark plug incorrect
IC igniter trouble

Miscellaneous:
Throttle valve won't fully open
Carburetor vacuum piston doesn't slide smoothly
Carburetor vacuum piston diaphragm damaged
Brake dragging
Clutch slipping
Overheating
Engine oil level too high
Engine oil viscosity too high
Drive train trouble
Air suction valve trouble
Vacuum switch valve trouble
Coasting enricher trouble
Balancer mechanism malfunctioning

Overheating:

Firing incorrect:
Spark plug dirty, broken, or maladjusted
Spark plug incorrect
IC igniter trouble

Fuel/air mixture incorrect:
Main jet clogged or wrong size
Fuel level in carburetor float bowl too low
Carburetor holder loose
Air cleaner duct loose
Air cleaner poorly sealed, or missing
Air cleaner O-ring damaged
Air cleaner clogged

Compression high:
Carbon built up in combustion chamber

Engine load faulty:
Clutch slipping
Engine oil level too high
Engine oil viscosity too high
Drive train trouble

Brake dragging
Lubrication inadequate:
Engine oil level too low
Engine oil poor quality or incorrect
Coolant incorrect:
Coolant level too low
Coolant deteriorated
Cooling system component incorrect:
Radiator fin damaged
Radiator clogged
Thermostat trouble
Radiator cap trouble
Radiator fan switch trouble
Fan motor broken
Fan blade damaged
Water pump not turning
Water pump impeller damaged

Over Cooling:

Cooling system component incorrect:
Radiator fan switch trouble
Thermostat trouble

Clutch Operation Faulty:

Clutch slipping:
Friction plate worn or warped
Steel plate worn or warped
Clutch spring broken or weak
Clutch hub or housing unevenly worn
No clutch lever play
Clutch inner cable trouble
Clutch release mechanism trouble
Clutch not disengaging properly:
Clutch plate warped or too rough
Clutch spring compression uneven
Engine oil deteriorated
Engine oil viscosity too high
Engine oil level too high
Clutch housing frozen on drive shaft
Clutch hub nut loose
Clutch hub spline damaged
Clutch friction plate installed wrong
Clutch lever play excessive
Clutch release mechanism trouble

Gear Shifting Faulty:

Doesn't go into gear; shift pedal doesn't return:
Clutch not disengaging
Shift fork bent or seized
Gear stuck on the shaft
Gear positioning lever binding
Shift return spring weak or broken
Shift return spring pin loose
Shift mechanism arm spring broken
Shift mechanism arm broken
Shift pawl broken
Jumps out of gear:
Shift fork ear worn, bent
Gear groove worn
Gear dogs and/or dog holes worn
Shift drum groove worn
Gear positioning lever spring weak or broken
Shift fork pin worn
Drive shaft, output shaft, and/or gear splines worn
Overshifts:
Gear positioning lever spring weak or broken
Shift mechanism arm spring broken

Abnormal Engine Noise:

Knocking:
IC igniter trouble
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Spark plug incorrect
Overheating
Piston slap:
Cylinder/piston clearance excessive
Cylinder, piston worn
Connecting rod bent
Piston pin, piston pin hole worn
Valve noise:
Valve clearance incorrect
Valve spring broken or weak
Camshaft bearing worn
Rocker arm worn
Rocker shaft worn
Other noise:
Connecting rod small end clearance excessive
Connecting rod big end clearance excessive
Piston ring worn, broken, or stuck
Piston seizure, damage
Cylinder head gasket leaking
Exhaust pipe leaking at cylinder head connection
Crankshaft runout excessive
Engine mounts loose
Crankshaft bearing worn
Primary chain worn
Camshaft chain tensioner trouble
Camshaft chain, sprocket, guide worn
Air suction valve damaged
Vacuum switch valve damaged
Alternator rotor loose
Balancer gear worn or chipped
Balancer shaft position maladjusted
Balancer bearing worn
Starter chain, sprocket, guide worn

Troubleshooting Guide

Abnormal Drive Train Noise:

Clutch noise:
- Clutch rubber damper weak or damaged
- Clutch housing/friction plate clearance excessive
- Clutch housing gear worn

Transmission noise:
- Bearings worn
- Transmission gears worn or chipped
- Metal chips jammed in gear teeth
- Engine oil insufficient

Drive line noise:
- Drive chain adjusted improperly
- Drive chain worn
- Rear and/or engine sprocket worn
- Chain lubrication insufficient
- Rear wheel misaligned

Abnormal Frame Noise:

Front fork noise:
- Oil insufficient or too thin
- Spring weak or broken

Rear shock absorber noise:
- Shock absorber damaged

Disc brake noise:
- Pad installed incorrectly
- Pad surface glazed
- Disc warped
- Caliper trouble

Drum brake noise:
- Brake linings overworn or worn unevenly
- Drum worn unevenly or scored
- Brake springs weak or broken
- Foreign matter in hub
- Brake not properly adjusted

Other noise:
- Bracket, nut, bolt, etc. not properly mounted or tightened

Oil Pressure Warning Light Goes On:

- Engine oil pump damaged
- Engine oil screen clogged
- Engine oil level too low
- Engine oil viscosity too low
- Camshaft bearing worn
- Crankshaft bearings worn
- Balancer bearings worn
- Oil pressure switch damaged
- Wiring faulty
- Relief valve stuck open
- O-ring at the oil passage in the crankcase damaged

Exhaust Smokes Excessively:

White smoke:
- Piston oil ring worn
- Cylinder worn
- Valve oil seal damaged
- Valve guide worn
- Cylinder head gasket damaged
- Engine oil level too high

Black smoke:
- Air cleaner clogged
- Main jet too large or fallen off
- Starter plunger stuck open
- Fuel level in carburetor float bowl too high

Brown smoke:
- Main jet too small
- Fuel level in carburetor float bowl too low
- Air cleaner duct loose
- Air cleaner O-ring damaged
- Air cleaner poorly sealed or missing

Handling and/or Stability Unsatisfactory:

Handlebar hard to turn:
- Cable routing incorrect
- Hose routing incorrect
- Wiring routing incorrect
- Steering stem locknut too tight
- Steering stem bearing damaged
- Steering stem bearing lubrication inadequate
- Steering stem bent
- Tire air pressure too low

Handlebar shakes or excessively vibrates:
- Tire worn
- Swingarm pivot bearings worn
- Rim warped, or not balanced
- Wheel bearing worn
- Handlebar clamp loose
- Steering stem head bolt loose

Handlebar pulls to one side:
- Frame bent
- Wheel misalignment
- Swingarm bent or twisted
- Steering maladjusted
- Front fork bent
- Right and left front fork oil level uneven

Shock absorption unsatisfactory:

(Too hard)
- Front fork oil excessive
- Front fork oil viscosity too high
- Rear shock absorber adjustment too hard
- Tire air pressure too high
- Front fork bent

(Too soft)
- Tire air pressure too low
- Front fork oil insufficient and/or leaking
- Front fork oil viscosity too low
- Rear shock adjustment too soft
- Front fork, rear shock absorber spring weak
- Rear shock absorber oil leaking

Troubleshooting Guide

Brake Doesn't Hold:

Disc brake:
- Air in the brake line
- Pad or disc worn
- Brake fluid leakage
- Disc warped
- Contaminated pad
- Brake fluid deteriorated
- Primary or secondary cup damaged in master cylinder
- Master cylinder scratched inside

Drum brake:
- Brake maladjusted
- Brake linings or drum worn
- Overheated
- Water in brake drum
- Brake cam, camshaft worn
- Oil on brake linings

Battery Trouble:

Battery discharged:
- Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte insufficient)
- Battery leads making poor contact
- Load excessive (e.g., bulb of excessive wattage)
- Ignition switch trouble
- Alternator trouble
- Wiring faulty
- Regulator/rectifier trouble

Battery overcharged:
- Regulator/rectifier trouble

General Lubrication

Lubrication (Periodic Maintenance)

- Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.
- Lubricate the points listed below with indicated lubricant.

NOTE

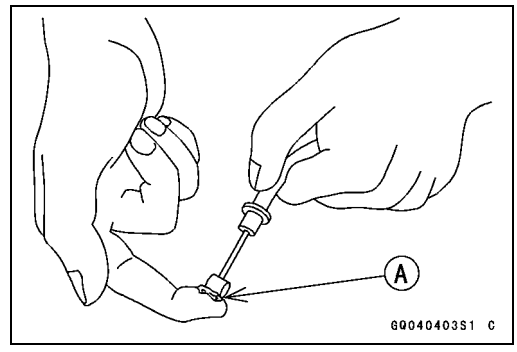
○*Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure water spray, perform the general lubrication.*

Pivots: Lubricate with Motor Oil.

Rear Brake Rod Joint

Points: Lubricate with Grease.

Clutch Inner Cable Upper and Lower Ends [A]
Throttle Inner Cable Upper and Lower Ends
Fast Idle Inner Cable Upper and Lower end
Clutch Lever Pivot (Apply silicone grease)
Brake Lever Pivot (Apply silicone grease)
Brake Pedal Pivot
Side Stand
Tie-Rod Pivot
Rocker Arm Pivot

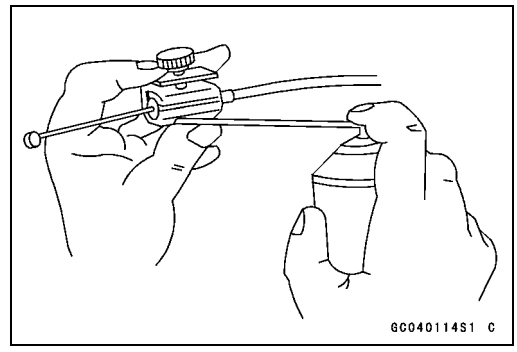


Cables: Lubricate with Cable Lubricant.

Fast Idle Cable
Throttle Cables
Clutch Cable

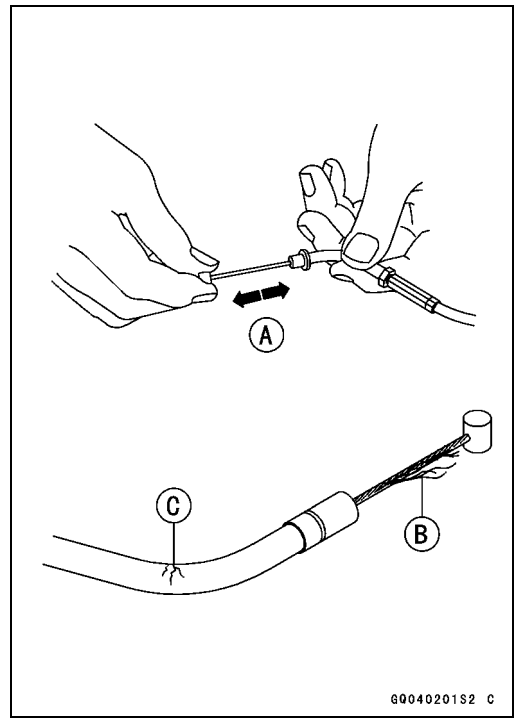
- Lubricate the cables by seeping the oil between the cable and housing.

○The cable may be lubricated by using a commercially available pressure cable lubricator with an aerosol cable lubricant.



- With the cable disconnected at both ends, the cable should move freely [A] within the cable housing.

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



Nut, Bolt, and Fastener Tightness

Tightness Inspection

● Check the tightness of the bolts and nuts listed here. Also, check to see that each cotter pin is in place and in good condition.

NOTE

○*For the engine fasteners, check the tightness of them when the engine is cold (at room temperature).*

★If there are loose fasteners, retorque them to the specified torque following the specified tightening sequence. Refer to the appropriate chapter for torque specifications. If torque specifications are not in the appropriate chapter, see the Standard Torque Table. For each fastener, first loosen it by 1/2 turn, then tighten it.

★If cotter pins are damaged, replace them with new ones.

Nut, Bolt and Fastener to be checked

Wheels:
- Front Axle Nut
- Front Axle Clamp Bolt
- Rear Axle Nut
- Rear Axle Nut Clip

Brakes:
- Master Cylinder Clamp Bolts
- Brake Lever Pivot Nut
- Caliper Mounting Bolts
- Brake Pedal Lever Clamp Bolt
- Cam Lever Clamp Bolt
- Brake Rod Joint Cotter Pin
- Torque Link Nuts
- Torque Link Nut Clips

Suspension:
- Front Fork Clamp Allen Bolts
- Front Fender Mounting Bolts
- Rear Shock Absorber Mounting Bolts
- Swingarm Pivot Shaft Nut

Steering:
- Stem Head Nut
- Handlebar Mounting Nuts

Engine:
- Engine Mounting Bolts and Nuts
- Shift Pedal Bolt
- Muffler Mounting Bolts and Nuts
- Exhaust Pipe Holder Nuts
- Muffler Connecting Clamp Bolt
- Clutch Lever Holder Clamp Bolt
- Clutch Lever Pivot Nut

Others:
- Side Stand Pivot Nut
- Front Footpeg Bracket Mounting Bolts
- Rear Frame Mounting Bolts

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol	Power
mega	M	× 1 000 000
kilo	k	× 1 000
centi	c	× 0.01
milli	m	× 0.001
micro	μ	× 0.000001

Units of Mass:

kg	×	2.205	=	lb
g	×	0.03527	=	oz

Units of Volume:

L	×	0.2642	=	gal (US)
L	×	0.2200	=	gal (imp)
L	×	1.057	=	qt (US)
L	×	0.8799	=	qt (imp)
L	×	2.113	=	pint (US)
L	×	1.816	=	pint (imp)
mL	×	0.03381	=	oz (US)
mL	×	0.02816	=	oz (imp)
mL	×	0.06102	=	cu in

Units of Force:

N	×	0.1020	=	kg
N	×	0.2248	=	lb
kg	×	9.807	=	N
kg	×	2.205	=	lb

Units of Length:

km	×	0.6214	=	mile
m	×	3.281	=	ft
mm	×	0.03937	=	in

Units of Torque:

N·m	×	0.1020	=	kgf·m
N·m	×	0.7376	=	ft·lb
N·m	×	8.851	=	in·lb
kgf·m	×	9.807	=	N·m
kgf·m	×	7.233	=	ft·lb
kgf·m	×	86.80	=	in·lb

Units of Pressure:

kPa	×	0.01020	=	kgf/cm²
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cm Hg
kgf/cm²	×	98.07	=	kPa
kgf/cm²	×	14.22	=	psi
cm Hg	×	1.333	=	kPa

Units of Speed:

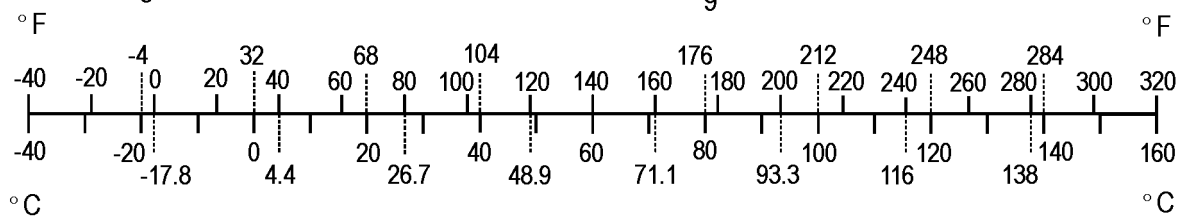
km/h	×	0.6214	=	mph

Units of Power:

kW	×	1.360	=	PS
kW	×	1.341	=	HP
PS	×	0.7355	=	kW
PS	×	0.9863	=	HP

Units of Temperature:

$$\frac{9(^\circ C + 40)}{5} - 40 = {}^\circ F \qquad \frac{5(^\circ F + 40)}{9} - 40 = {}^\circ C$$



MODEL APPLICATION

Year	Model	Beginning Frame No.
2001	ER500-C1	JKAER500ACA051001, or JKAERVC1□1A000001
2001	ER500-D1	JKAER500ADA051001
2002	ER500-C2	JKAERVC1□2A003001
2003	ER500-C3	JKAERVC1□3A005001, or JKAER500ACA067001
2004	ER500-C4	JKAERVC1□4A007001, or JKAER500ACA072001
2005	ER500-C5	JKAERVC1□5A009001, or JKAER500ACA082001

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

Kawasaki
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