



VULCAN800 CLASSIC

VN800 CLASSIC



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

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

LIST OF ABBREVIATIONS

A	ampere(s)	lb	pounds(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.

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 the 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.

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 Service 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

1

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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.

(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.

Before Servicing

(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

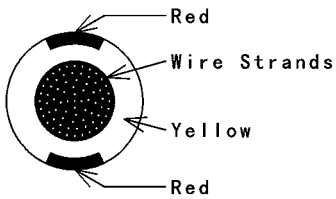

When there is a replacement instruction, replace these parts with new ones every time they are removed.

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.

Two-Color Electrical

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

1-4 GENERAL INFORMATION

Before Servicing

(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

VN800-B5 Left Side View:



VN800-B5 Right Side View:



1-6 GENERAL INFORMATION

Model Identification

VN800-B6 Left Side View:



VN800-B6 Right Side View:



General Specifications

Items	VN800-B1 ~ B4
Dimensions	
Overall Length	2 390 mm (94.1 in.), (CA) (US) (MY) 2 375 mm (93.5 in.)
Overall Width	940 mm (37.0 in.), (CA) (US) (MY) 930 mm (36.6 in.)
Overall Height	1 125 mm (44.3 in.), (CA) (US) (MY) 1 130 mm (44.5 in.)
Wheelbase	1 600 mm (63.0 in.)
Road Clearance	135 mm (5.3 in.)
Seat Height	705 mm (27.8 in.)
Dry Mass	235 kg (518 lb), (CA) (US) (MY) 234 kg (516 lb), (CAL) 234.5 kg (517 lb)
Curb Mass:	
Front	116 kg (255 lb), (CA) (US) (MY) 115 kg (254 lb)
Rear	138 kg (304 lb), (CAL) 138.5 kg (305 lb)
Fuel Tank Capacity	15.0 L (4.0 us gal)
Performance	
Minimum Turning Radius	2.9 m (9.5 ft)
Engine	
Type	4-Stroke, SOHC, V2-cylinder
Cooling System	Liquid-cooled
Bore and Stroke	88.0 × 66.2 mm (3.46 × 2.61 in.)
Displacement	805 cm ³ (49.1 cu in.)
Compression Ratio	9.5: 1
Maximum Horsepower	40.5 kW (55 PS) @7 000 r/min (rpm), (CA) (MY) 44.1 kW (60 PS) @7 500 r/min (rpm), (CH) 24.2 kW (33 PS) @6 000 r/min (rpm), (FR) 39.3 kW (53 PS) @7 000 r/min (rpm) (UTAC's norm), (US) – – –
Maximum Torque	64 N·m (6.5 kgf·m, 47.0 ft·lb) @3 300 r/min (rpm), (CA) (MY) 64.7 N·m (6.6 kg, 47.7 ft·lb) @3 500 r/min (rpm), (CH) 55 N·m (5.6 kgf·m, 40.5 ft·lb) @3 000 r/min (rpm), (FR) (GB) (US) – – –
Carburetion System	Carburetor, Keihin CVK36
Starting System	Electric starter
Ignition System	Battery and coil (transistorized)
Timing Advance	Electronically Advanced (digital igniter)
Ignition Timing	From 5.0° BTDC @1 000 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm)
Spark Plugs	NGK CR7E or ND U22ESR-N
Cylinder Numbering Method	Front to rear, 1-2
Firing order	2-1
Valve Timing:	
Inlet	
Open	19° BTDC
Close	71° ABDC
Duration	270°

1-8 GENERAL INFORMATION

General Specifications

Items	VN800-B1 ~ B4
Exhaust Open Close Duration Lubrication System Engine Oil: Grade Viscosity Capacity	69° BBDC 31° ATDC 280° Forced lubrication (wet sump) SE, SF or SG class SAE10W-40, 10W-50, 20W-40, 20W-50 3.2 L (3.4 US qt)
Drive Train Primary Reduction System: Type Reduction Ratio Clutch Type Transmission: Type Gear Ratios: 1st 2nd 3rd 4th 5th Final Drive System: Type Reduction Ratio Overall Drive Ratio	Gear 2.184 (83/38) Wet multi disc 5-speed, constant mesh, return shift 2.533 (38/15) 1.650 (33/20) 1.230 (32/26) 1.000 (29/29) 0.857 (24/28) Chain Drive 2.470 (42/17) 4.625 @Top gear
Frame Type Caster (Rake Angle) Trail Front Tire: Type Size Rear Tire: Type Size Front Suspension: Type Wheel Travel Rear Suspension: Type Wheel Travel Brake Type: Front	Tubular, double cradle 32° 122 mm (4.8 in.) Tube 130/90-16 67H Tube 140/90-16 71H Telescopic fork 150 mm (5.9 in.) Swingarm (uni-trak) 100 mm (3.9 in.) Single disc

General Specifications

Items	VN800-B1 ~ B4
Rear	Drum
Electrical Equipment	
Battery	12 V 12 Ah
Headlight:	
Type	Semi-sealed beam
Bulb	12 V 60/55 W (quartz-halogen)
Tail/brake Light	12 V 5/21 W × 2, (CA) (US) (MY) 12 V 8/27 W × 2
Alternator:	
Type	Three-phase AC
Rated Output	23.5 A × 14 V @8 000 r/min (rpm)

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

(CA): Canada Model

(CAL):California Model

(CH): Switzerland Model

(FR): France Model

(GB): United Kingdom Model

(MY): Malaysia Model

(US): United States Model

1-10 GENERAL INFORMATION

General Specifications

Items	VN800-B5	VN800-B6 ~ B7
Dimensions		
Overall Length	2 380 mm (93.7 in.), (CA) (US) (MY) 2 375 mm (93.5 in.)	
Overall Width	940 mm (37.0 in.), (CA) (US) (MY) 930 mm (36.6 in.)	
Overall Height	1 125 mm (44.3 in.), (CA) (US) (MY) 1 130 mm (44.5 in.)	
Wheelbase	1 600 mm (63.0 in.)	
Road Clearance	135 mm (5.3 in.)	
Seat Height	705 mm (27.8 in.)	
Dry Mass	235 kg (518 lb), (CA) (US) (MY) 234 kg (516 lb), (CAL) 234.5 kg (517 lb)	
Curb Mass:		
Front	116 kg (255 lb), (CA) (US) (MY) 115 kg (254 lb)	
Rear	138 kg (304 lb), (CAL) 138.5 kg (305 lb)	
Fuel Tank Capacity	15.0 L (4.0 us gal)	
Performance		
Minimum Turning Radius	2.9 m (9.5 ft)	
Engine		
Type	4-Stroke, SOHC, V2-cylinder	
Cooling System	Liquid-cooled	
Bore and Stroke	88.0 × 66.2 mm (3.46 × 2.61 in.)	
Displacement	805 cm³ (49.1 cu in.)	
Compression Ratio	9.5: 1	
Maximum Horsepower	40.5 kW (55 PS) @7 000 r/min (rpm), (CA) (MY) 44.1 kW (60 PS) @7 500 r/min (rpm), (CH) 24.2 kW (33 PS) @6 000 r/min (rpm), (US) – – –	
Maximum Torque	64 N·m (6.5 kgf·m, 47.0 ft·lb) @3 300 r/min (rpm), (CA) (MY) 64.7 N·m (6.6 kg, 47.7 ft·lb) @3 500 r/min (rpm), (CH) 55 N·m (5.6 kgf·m, 40.5 ft·lb) @3 000 r/min (rpm), (GB) (US) – – –	
Carburetion System	Carburetor, Keihin CVK36	
Starting System	Electric starter	
Ignition System	Battery and coil (transistorized)	
Timing Advance	Electronically Advanced (digital igniter)	
Ignition Timing	From 5.0° BTDC @1 000 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm) (CAL) From 5.0° BTDC @1 300 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm)	
Spark Plugs	NGK CR7E or ND U22ESR-N	
Cylinder Numbering Method	Front to rear, 1-2	
Firing order	2-1	
Valve Timing:		
Inlet		
Open	19° BTDC	
Close	71° ABDC	
Duration	270°	

General Specifications

Items	VN800-B5	VN800-B6 ~ B7
Exhaust		
Open	69° BBDC	
Close	31° ATDC	
Duration	280°	
Lubrication System	Forced lubrication (wet sump)	
Engine Oil:		
Grade	SE, SF or SG class	API SE, SF, or SG,
Viscosity	SAE 10W-40, 10W-50, 20W-40, or 20W-50	API SH or SJ with JASO MA SAE 10W-40
Capacity	3.2 L (3.4 US qt)	
Drive Train		
Primary Reduction System:		
Type	Gear	
Reduction Ratio	2.184 (83/38)	
Clutch Type	Wet multi disc	
Transmission:		
Type	5-speed, constant mesh, return shift	
Gear Ratios:		
1st	2.533 (38/15)	
2nd	1.650 (33/20)	
3rd	1.230 (32/26)	
4th	1.000 (29/29)	
5th	0.857 (24/28)	
Final Drive System:		
Type	Chain Drive	
Reduction Ratio	2.470 (42/17)	
Overall Drive Ratio	4.625 @Top gear	
Frame		
Type	Tubular, double cradle	
Caster (Rake Angle)	32°	
Trail	122 mm (4.8 in.)	
Front Tire:		
Type	Tube	
Size	130/90-16 67H	
Rear Tire:		
Type	Tube	
Size	140/90-16 71H	
Front Suspension:		
Type	Telescopic fork	
Wheel Travel	150 mm (5.9 in.)	
Rear Suspension:		
Type	Swingarm (uni-trak)	
Wheel Travel	100 mm (3.9 in.)	

1-12 GENERAL INFORMATION

General Specifications

Items	VN800-B5	VN800-B6 ~ B7
Brake Type: Front Rear	Single disc Drum	
Electrical Equipment Battery Headlight: Type Bulb Tail/brake Light	12 V 12 Ah Semi-sealed beam 12 V 60/55 W (quartz-halogen)	
	12 V 5/21 W × 2 (CA) (US) (MY) 12 V 8/27 W × 2	12 V 5/21 W × 2
Alternator: Type Rated Output	Three-phase AC 23.5 A @8 000 r/min (rpm), 14 V	

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

(CA): Canada Model

(CAL):California Model

(CH): Switzerland Model

(FR): France Model

(GB): United Kingdom Model

(MY): Malaysia Model

(US): United States Model

General Specifications

Items	VN800-B8 ~, B6F
Dimensions	
Overall Length	2 380 mm (93.7 in.), (CA) (US) 2 375 mm (93.5 in.)
Overall Width	940 mm (37.0 in.), (CA) (US) 930 mm (36.6 in.)
Overall Height	1 125 mm (44.3 in.), (CA) (US) 1 130 mm (44.5 in.)
Wheelbase	1 600 mm (63.0 in.)
Road Clearance	135 mm (5.3 in.)
Seat Height	705 mm (27.8 in.)
Dry Mass	235 kg (518 lb), (CA) (US) 234 kg (516 lb), (CAL) 234.5 kg (517 lb)
Curb Mass:	
Front	116 kg (255 lb), (CA) (US) 115 kg (254 lb)
Rear	138 kg (304 lb), (CAL) 138.5 kg (305 lb)
Fuel Tank Capacity	15.0 L (4.0 US gal)
Performance	
Minimum Turning Radius	2.9 m (9.5 ft)
Engine	
Type	4-Stroke, SOHC, V2-cylinder
Cooling System	Liquid-cooled
Bore and Stroke	88.0 × 66.2 mm (3.46 × 2.61 in.)
Displacement	805 cm ³ (49.1 cu in.)
Compression Ratio	9.5: 1
Maximum Horsepower	40.5 kW (55 PS) @7 000 r/min (rpm), (CA) 44.1 kW (60 PS) @7 500 r/min (rpm), (US) — — —
Maximum Torque	64 N·m (6.5 kgf·m, 47.0 ft·lb) @3 300 r/min (rpm), (CA) 64.7 N·m (6.6 kg, 47.7 ft·lb) @3 500 r/min (rpm), (US) — — —
Carburetion System	Carburetor, Keihin CVK36
Starting System	Electric starter
Ignition System	Battery and coil (transistorized)
Timing Advance	Electronically Advanced (digital igniter)
Ignition Timing	From 5.0° BTDC @1 000 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm) (CAL) From 5.0° BTDC @1 300 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm)
Spark Plugs	NGK CR7E or ND U22ESR-N
Cylinder Numbering Method	Front to rear, 1-2
Firing order	2-1
Valve Timing:	
Inlet	
Open	19° BTDC
Close	71° ABDC
Duration	270°
Exhaust	
Open	69° BBDC

1-14 GENERAL INFORMATION

General Specifications

Items	VN800-B8 ~, B6F
Close	31° ATDC
Duration	280°
Lubrication System	Forced lubrication (wet sump)
Engine Oil:	
Grade	API SE, SF, or SG,
Viscosity	API SH or SJ with JASO MA
	SAE 10W-40
Capacity	3.2 L (3.4 US qt)
Drive Train	
Primary Reduction System:	
Type	Gear
Reduction Ratio	2.184 (83/38)
Clutch Type	Wet multi disc
Transmission:	5-speed, constant mesh, return shift
Type	
Gear Ratios:	
1st	2.533 (38/15)
2nd	1.650 (33/20)
3rd	1.230 (32/26)
4th	1.000 (29/29)
5th	0.857 (24/28)
Final Drive System:	
Type	Chain Drive
Reduction Ratio	2.470 (42/17)
Overall Drive Ratio	4.625 @Top gear
Frame	
Type	Tubular, double cradle
Caster (Rake Angle)	32°
Trail	123 mm (4.8 in.)
Front Tire:	
Type	Tube
Size	130/90-16MC 67H
Rear Tire:	
Type	Tube
Size	140/90-16MC 71H
Front Suspension:	
Type	Telescopic fork
Wheel Travel	150 mm (5.9 in.)
Rear Suspension:	
Type	Swingarm (uni-trak)
Wheel Travel	100 mm (3.9 in.)
Brake Type:	
Front	Single disc
Rear	Drum

General Specifications

Items	VN800-B8 ~, B6F
Electrical Equipment	
Battery	12 V 12 Ah (VN800-B8 Model) 12 V 10 Ah (VN800-B9 ~ Model)
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	23.5 A @8 000 r/min (rpm), 14 V

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

(CA): Canada Model

(CAL):California Model

(US): United States Model

Unit Conversion Table

Prefix	Symbol	Power
mega	M	$\times 1\,000\,000$
kilo	k	$\times 1\,000$
centi	c	$\times 0.01$
milli	m	$\times 0.001$
micro	μ	$\times 0.000001$

N	×	0.1020	=	kg
N	×	0.2248	=	lb
kg	×	9.807	=	N
kg	×	2.205	=	lb

kW	×	1.360	=	PS
kW	×	1.341	=	HP
PS	×	0.7355	=	kW
PS	×	0.9863	=	HP

$$\frac{9(^{\circ}\text{C} + 40)}{5} - 40 = ^{\circ}\text{F}$$

$$\frac{5(^{\circ}\text{F} + 40)}{9} - 40 = ^{\circ}\text{C}$$

Fahrenheit (°F)	Celsius (°C)
-40	-40
-20	-17.8
0	4.4
20	26.7
60	100
80	120
100	160
120	180
140	200
160	220
176	240
180	248
200	280
212	284
220	300
240	320
248	320
260	320
280	320
284	320
300	320
320	320

Periodic Maintenance

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Periodic Maintenance Chart (United States and Canada)

[illegible][illegible]

PERIODIC MAINTENANCE 2-3

Periodic Maintenance Chart (United States and Canada)

FREQUENCY	OPERATION	Whichever comes first ↓ Every	* ODOMETER READING km × 1 000 (mile × 1 000)							
			0.8 (0.5)	5 (3)	10 (6)	15 (9)	20 (12)	25 (15)	30 (18)	See Page
	Swingarm pivot, uni-trak linkage-lubricate				●		●		●	P2-37
	General lubrication-perform			●	●	●	●	●	●	P2-39
	Nuts, bolts, and fasteners tightness-inspect * †		●		●		●		●	P2-40

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

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

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

CAL: California Model only

2-4 PERIODIC MAINTENANCE

Periodic Maintenance Chart (Other than United States and Canada)

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

OPERATION	FREQUENCY	* ODOMETER READING km × 1 000 (mile × 1 000)							
	Whichever comes first ↓ Every	1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	36 (24)	See Page
Spark plug-clean and gap †			•	•	•	•	•	•	P2-38
Valve clearance inspect†				•		•		•	P2-18
Air suction valve-inspect †			•	•	•	•	•	•	P2-18
Air cleaner element-clean† #				•		•		•	P2-15
Throttle grip play-inspect †		•		•		•		•	P2-13
Idle speed-Inspect *		•		•		•		•	P2-14
Fuel hoses, connections-inspect †			•	•	•	•	•	•	P2-13
Engine oil-change #	6 months	•	•	•	•	•	•	•	P2-23
Oil filter-replace		•		•		•		•	P2-24
Water hoses, connections-inspect †		•							P2-16
Coolant-change	2 years					•			P2-16
Clutch-Inspect		•	•	•	•	•	•	•	P2-22
Drive chain wear-inspect † #			•	•	•	•	•	•	P2-27
Drive chain-lubricate #	300 mm								P2-28
Drive chain slack-inspect † #	800 km								P2-26
Brake hoses, connections-inspect †			•	•	•	•	•	•	P2-35
Brake lining or pad wear-inspect † #			•	•	•	•	•	•	P2-29
Brake fluid level-inspect †	month	•	•	•	•	•	•	•	P2-31
Brake fluid-change	2 years					•			P2-32
Brake master cylinder cup and dust cover-replace	4 years								P2-34
Caliper fluid seal and dust seal-replace	4 years								P2-34
Brake play-inspect †		•	•	•	•	•	•	•	P2-30
Brake light switch-inspect †		•	•	•	•	•	•	•	P2-31
Brake cable-replace	2 years					•			—
Steering-inspect †		•	•	•	•	•	•	•	P2-37
Steering stem bearing-lubricate	2 years					•			P2-38
Front fork oil-change	2 years					•			P2-35
Front fork oil leak-inspect †				•		•		•	P2-36
Rear shock absorber oil leak-inspect †				•		•		•	P2-36
Tire wear-inspect †			•	•	•	•	•	•	P2-24
Spoke tightness and rim runout-inspect †		•	•	•	•	•	•	•	P2-25
Swingarm pivot, uni-trak linkage-lubricate				•		•		•	P2-37
General lubrication-perform				•		•		•	P2-39

PERIODIC MAINTENANCE 2-5

Periodic Maintenance Chart (Other than United States and Canada)

FREQUENCY	Whichever comes first ↓ Every	* ODOMETER READING km × 1 000 (mile × 1 000)							
		1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	36 (24)	See Page
OPERATION									
Nuts, bolts, and fastener tightness-inspect †		•		•		•		•	P2-40

#: 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.

2-6 PERIODIC MAINTENANCE

Torque and Locking Agent

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

Letters used in the "Remarks" column mean:

L: Apply a non-permanent locking agent to the threads.

MO: Apply molybdenum disulfide oil (mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10:1).

O: Apply an oil to the threads, seating surface, or washer.

S: Tighten the fasteners following the specified sequence.

SS: Apply silicone sealant.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System				
Fuel Tap Mounting Bolts	2.5	0.25	22 in·lb	with white washer
Fuel Tap Mounting Bolts	4.9	0.50	43 in·lb	with black washer
Carburetor Holder Plate Mounting Bolts	11	1.1	95 in·lb	
Air Cleaner Element Cover Mounting Nut	11	1.1	95 in·lb	
Air Cleaner Housing Mounting Bolts	11	1.1	95 in·lb	
Cooling System				
Water Pump Impeller Nut	11	1.1	95 in·lb	
Water Hose Fitting Bolts	11	1.1	95 in·lb	
Water Hose Clamp Screws	2.0	0.2	17 in·lb	
Radiator Fan Switch	18	1.8	13	SS
Water Temperature Sensor	7.8	0.8	69 in·lb	SS
Coolant Drain Plug	11	1.1	95 in·lb	
Engine Top End				
Cylinder Head Cover Bolts	12	1.2	104 in·lb	
Cylinder Head Nuts:				
10 mm	39	4.0	29	S
8 mm	25	2.5	18	S
Cylinder Head Bolts	12	1.2	104 in·lb	S
Cylinder Nuts	25	2.5	18	
Camshaft Cap Bolts	25	2.5	18	
Camshaft Sprocket Bolts	49	5.0	36	L
Camshaft Chain Tensioner Cap Bolts	20	2.0	14.5	
Camshaft Chain Guide Bolts	11	1.1	95 in·lb	L
Intake Manifold Bolts	12	1.2	104 in·lb	
Cylinder Head Cover Damper Plate Bolts	7.8	0.8	69 in·lb	L,S
Clutch				
Clutch Hub Nut	132	13.5	98	O
Clutch Spring Bolts	8.8	0.9	78 in·lb	
Right Engine Cover Bolts	12	1.2	104 in·lb	L (1)
Engine Lubrication System				
Engine Drain Plug	20	2.0	14.5	
Oil Pump Mounting Bolts	11	1.1	95 in·lb	L

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Oil Pump Drive Chain Guide Bolt	12	1.2	104 in·lb	L
Oil Filter	18	1.8	13	
Oil Filter Plate Mounting Bolts	7.8	0.8	69 in·lb	
Oil Screen Plug	20	2.0	14.5	
Oil Pressure Relief Valve	15	1.5	11	L
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Adapter	20	2.0	14.5	
Oil Pipe Mounting Bolts (Crankcase Inside)	11	1.1	95 in·lb	L
Oil Pipe Mounting Bolts (Crankcase Outside)	5.4	0.55	48 in·lb	L
Oil passage Cover Screws (Crankcase Outside)	5.4	0.55	48 in·lb	L
Engine Removal/Installation				
Engine Mounting Nuts	44	4.5	33	
Engine Mounting Bracket Bolts	25	2.5	18	
Down Tube Mounting Bolts	44	4.5	33	
Crankshaft/Transmission				
Crankcase Bolts				
10 mm	39	4.0	29	S
6 mm	11	1.1	95 in·lb	
Connecting Rod Big End Cap Nuts	46	4.7	34	MO
Primary Gear Bolt	157	16	116	O
Balancer Gear Bolt	69	7.0	51	L
Starter Motor Clutch Gear Bolt	69	7.0	51	L
Starter Motor Clutch Bolts	34	3.5	25	L
Output Shaft Bearing Stopper Bolts	12	1.2	104 in·lb	
Balancer Shaft Bearing Stopper Bolts	11	1.1	95 in·lb	
Shift Drum Bearing Stopper Bolts	11	1.1	95 in·lb	
Transmission Cover Bolts	11	1.1	95 in·lb	
External Shift Mechanism Cover Bolts	11	1.1	95 in·lb	
Shift Shaft Return Spring Pin	29	3.0	22	L
Shift Drum Position Lever Bolt	11	1.1	95 in·lb	
Neutral Switch	15	1.5	11	
Shift Pedal Pivot Bolt	29	3.0	22	
Shift Pedal Pivot Bolt Nut	29	3.0	22	
Shift Drum Cam Holder Screw	12	1.2	104 in·lb	L
Shift Lever Clamp Bolt	12	1.2	104 in·lb	
Wheels/Tires				
Front Axle Clamp Bolt	34	3.5	25	
Front Axle Nut	108	11	80	
Rear Axle Nut	98	10	72	
Spoke Nipples	4.9	0.5	43 in·lb	
Final Drive				
Engine Sprocket Nut	127	13	94	MO
Rear Sprocket Nuts	74	7.5	54	

2-8 PERIODIC MAINTENANCE

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Rear Sprocket Stud Bolts	-	-	-	L
Brakes				
Torque Link Nuts	34	3.5	25	L
Front Caliper Mounting Bolts	34	3.5	25	
Brake Disc Mounting Bolts	27	2.8	20	
Brake Hose Banjo Bolts	34	3.5	25	
Bleed Valve	7.8	0.8	69 in·lb	
Rear Brake Lever Clamp Bolt	25	2.5	18	
Front Master Cylinder Clamp Bolts	8.8	0.90	78 in·lb	
Brake Lever Pivot Bolt	1.0	0.1	9 in·lb	
Brake Lever Pivot Bolt Locknut	5.9	0.6	52 in·lb	
Reservoir Cap Screws	1.5	0.15	13 in·lb	
Front Brake Light Switch Screws	1.2	0.12	10 in·lb	
Suspension				
Front Fork Clamp Bolts:				L
upper	20	2.0	14.5	
lower	34	3.5	25	
Front Fork Bottom Allen Bolts	20	2.0	14.5	
Spacer Allen Bolt	4.4	0.45	39 in·lb	
Rear Shock Absorber Nuts	59	6.0	43	
Swingarm Pivot Shaft Nut	98	10	72	
Rocker Arm Pivot Shaft Nut	98	10	72	
Tie-Rod Nuts	59	6.0	43	
Fork Cover Bolts 5 mm	8	0.8	11 in·lb	
Fork Cover Bolts 6 mm	13	1.3	113 in·lb	
Steering				
Handlebar Holder Bolts	34	3.5	25	
Handlebar Holder Mounting Nuts	34	3.5	25	
Steering Stem Head Bolt	44	4.5	33	
Steering Stem Nut	4.9	0.5	43 in·lb	
Frame				
Side Stand Pivot Nut	44	4.5	33	
Rear Frame Mounting Bolts	44	4.5	33	
Muffler Bracket Mounting Bolts	25	2.5	18	
Hootpeg Holder Bolts	34	3.5	25	
Electrical System				
Alternator Cover Bolts	12	1.2	104 in·lb	L (1)
Timing Inspection Cover Screw	4.9	0.5	43 in·lb	
Alternator Rotor Bolt	157	16	115	O
Stator Coil Bolts	13	1.3	113 in·lb	
Pickup Coil Bolts	7.8	0.8	69 in·lb	
Alternator Lead Clamp Bolts	7.8	0.8	69 in·lb	
Spark Plugs	18	1.8	13	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Starter Motor Mounting Bolts	11	1.1	95 in·lb	L
Starter Motor Through Bolts	4.9	0.5	43 in·lb	
Starter Motor Terminal Nut	11	1.1	95 in·lb	
Starter Motor Cable Nuts	4.9	0.5	43 in·lb	
Side Stand Switch Mounting Bolt	3.9	0.4	35 in·lb	

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

Basic Torque for General Fasteners

Threads dia. (mm)	Torque		
	N·m	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

2-10 PERIODIC MAINTENANCE

Specifications

Item	Standard	Service Limit
Fuel System		— — —
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	
Idle Speed	1 000 ±50 r/min (rpm) (CH, CAL) 1 300 ±50 r/min (rpm)	
Air Cleaner Element	Polyurethane foam	
Cooling System		— — —
Coolant:		
Type (recommended)	Permanent type antifreeze	
Color	Green	
Mixed ratio	Soft water 50%, Coolant 50%	
Freezing point	−35°C (−31°F)	
Total amount	2.4 L (2.5 US qt.)	
Engine Top End		— — —
Valve Clearance:		
Inlet	0.10 ~ 0.15 mm (0.004 ~ 0.006 in.)	
Exhaust	0.20 ~ 0.25 mm (0.008 ~ 0.010 in.)	
Clutch		— — —
Clutch Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	
Engine Lubrication System		— — —
Engine Oil:		
Type	API SE, SF or SG API SH or SJ with JASO MA	
Viscosity	SAE 10W-40	
Capacity	2.7 L (2.9 US qt, when filter is not removed) 2.9 L (3.1 US qt, when filter is removed) 3.2 L (3.4 US qt, when engine is completely dry)	
Level	Between upper and lower level lines (Wait 2 ~ 3 minutes after idling or running)	
Tires		
Tread Depth:		
Front		
DUNLOP	4.5 mm (0.18 in.)	1 mm (0.04 in.)
BRIDGESTONE	4.8 mm (0.19 in.)	(DE, AT, CH) 1.6 mm (0.06 in.)
Rear		
DUNLOP	7.3 mm (0.29 in.)	Up to 130 km/h (80 mph): 2 mm (0.08 in.)
BRIDGESTONE	7.2 mm (0.28 in.)	Over 130 km/h (80 mph): 3 mm (0.12 in.)

Specifications

Item	Standard	Service Limit
Rim Runout (with tire installed)		
Radial	TIR 1.0 mm (0.04 in.) or less	TIR 2.0 mm (0.08 in.)
Axial	TIR 0.8 mm (0.03 in.) or less	TIR 2.0 mm (0.08 in.)
Final Drive		
Drive Chain Slack	25 ~ 35 mm (1.0 ~ 1.4 in.)	— — —
Drive Chain Wear (20-link length)	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	323 mm (12.7 in.)
Brakes		
Brake fluid:		
Grade	DOT4	— — —
Brake pad lining thickness:		
Inner	4.5 mm (0.18 in.)	1 mm (0.04 in.)
Outer	4.7 mm (0.19 in.)	1 mm (0.04 in.)
Brake light timing:		
Front	Pulled ON	— — —
Rear	ON after about 15 mm (0.6 in.) of pedal travel	— — —
Suspension		
Fork Oil:		
Viscosity	SHOWA SS8 or equivalent	— — —
Amount: When changing oil	approx. 265 mL (9.0 US oz)	— — —
disassembly and completely dry	310 ±4 mL (10.5 ±0.14 US oz)	— — —
Fork oil level: (fully compressed, without spring, below from the top of the inner tube)	286 ±2 mm (11.26 ±0.08 in.)	— — —
Electrical System		
Spark plug gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)	— — —

(AT): Austria Model

(CAL):California Model

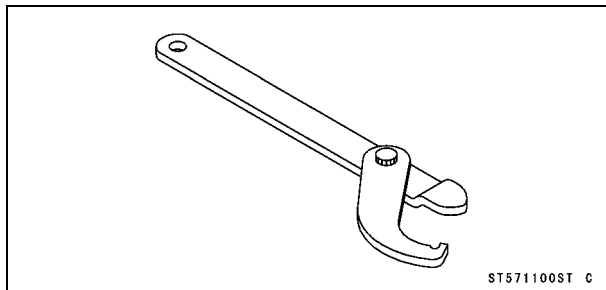
(CH): Switzerland Model

(DE): Germany Model

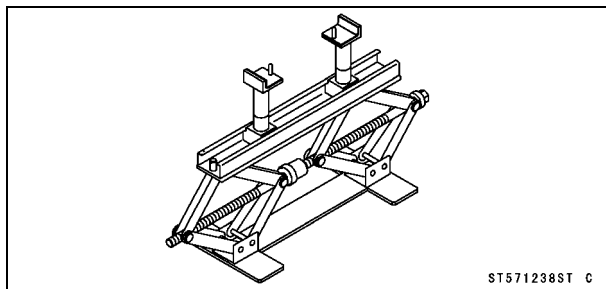
2-12 PERIODIC MAINTENANCE

Special Tools

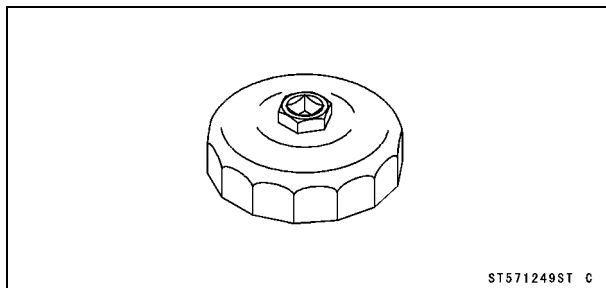
Steering Stem Nut Wrench:
57001-1100



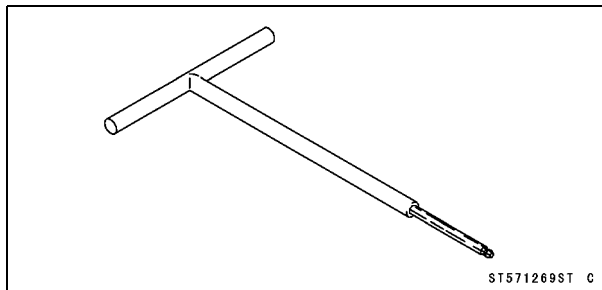
Jack:
57001-1238



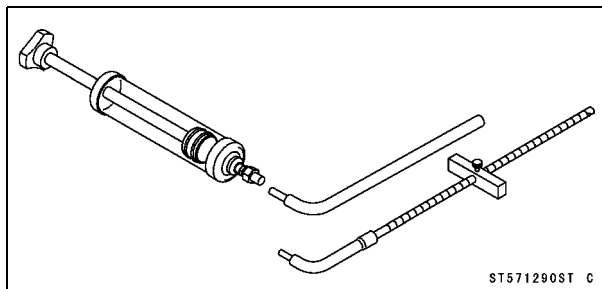
Oil Filter Wrench:
57001-1249



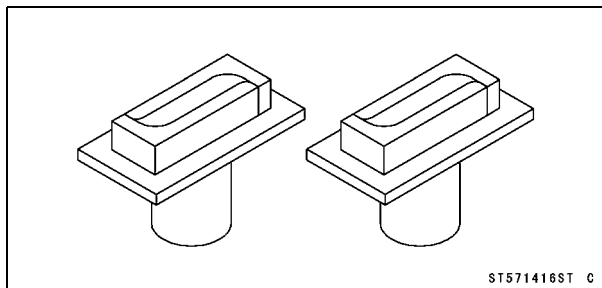
Carburetor Drain Plug Wrench, Hex 3:
57001-1269



Fork Oil Level Gauge:
57001-1290



Jack Attachment #3:
57001-1416



Maintenance Procedure

Fuel System

Fuel Hoses and Connections Inspection

○ The fuel hoses are designed to be used throughout the motorcycle's life without any maintenance, however, 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 (see Fuel System chapter) 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.

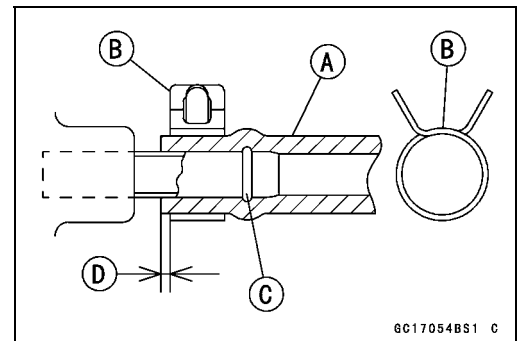
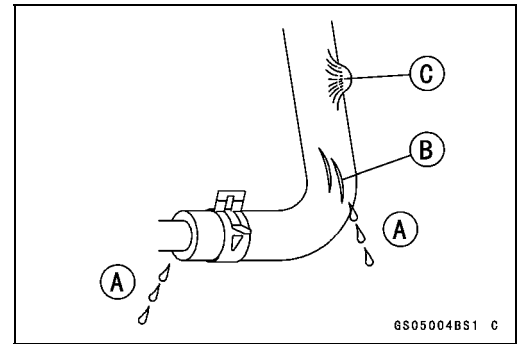
● When installing, route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.

● 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.

● Fit the fuel hose [A] onto the pipe fully and install the plate clamp [B] beyond the raised rib [C].

1 ~ 2 mm (0.04 ~ 0.08 in.) [D]



Throttle Grip Play Inspection

● Check the throttle grip free play [A].

✚ If the free play is incorrect, adjust the throttle cable.

Throttle Grip Free Play

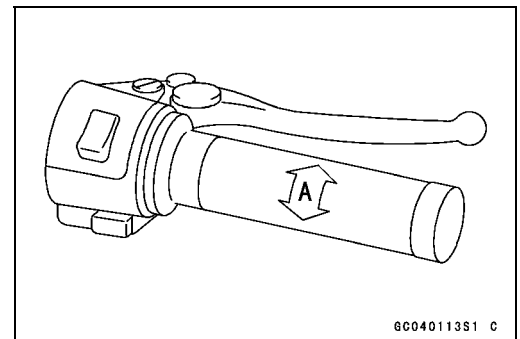
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)

● 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.

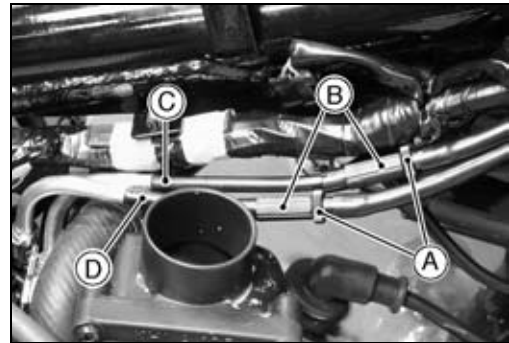
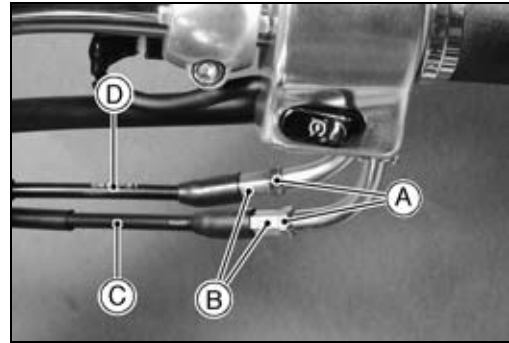
✚ If the idle speed increase, check the throttle cable free play and the cable routing.



2-14 PERIODIC MAINTENANCE

Maintenance Procedure

- ✚ If necessary, adjust the throttle cable as follows.
- Loosen the locknuts [A].
- Screw the adjusters [B] in completely so as to give the throttle grip plenty of play.
- Turn out the decelerator cable [C] adjuster until there is no play when the throttle grip is completely closed.
- Tighten the locknut.
- Turn the accelerator cable [D] adjuster until the proper amount of throttle grip free play is obtained.
- Tighten the locknut.
- ✚ If the proper amount of free play cannot be obtained by using the adjusters, use the adjusters middle of the throttle cables.
- First give the throttle grip plenty of play by turning the adjusters at the grip in fully.
- Remove the fuel tank (see Fuel Tank Removal).
- Loosen the locknuts [A].
- Turn the adjusters [B] fully at the middle of the throttle cables so as to give the throttle grip plenty of play.
- With the throttle grip completely closed, turn the decelerator cable [C] adjuster until the inner cable just becomes tight.
- Tighten the locknut.
- Turn the accelerator cable [D] adjuster until the correct throttle grip free play is obtain.
- Tighten the locknut.



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 cables may be improperly adjusted or incorrectly routed, or damaged. Be sure to correct any of these conditions before riding (see Cable, Wire, and Hose Routing section in the Appendix chapter).

⚠ 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.

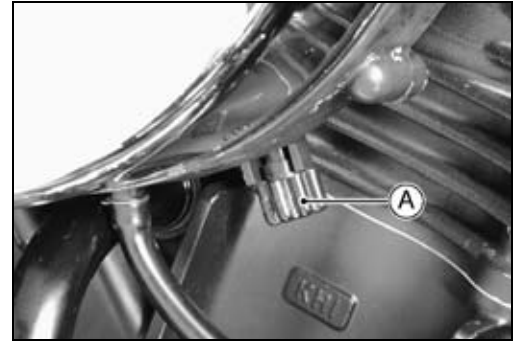
Idle Speed

Standard: 1 000 ±50 r/min (rpm)
1 300 ±50 r/min (rpm) (Switzerland,
California Model)

Maintenance Procedure

Idle Speed Adjustment

- start the engine and warm it up thoroughly.
- Turn the adjusting screw [A] until the 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.



Fuel System Cleanliness Inspection

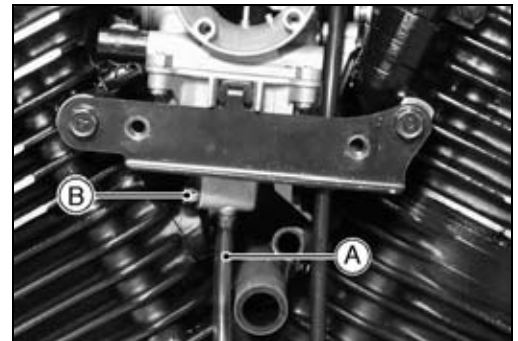
⚠ WARNING

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.

- Remove the fuel tank (see Fuel System chapter)
- Connect a suitable hose [A] to the fitting at the bottom of the carburetor float bowl.
- Run the lower end of the hose into a suitable container.
- Turn out the drain plug [B] a few turns and drain the float bowl.

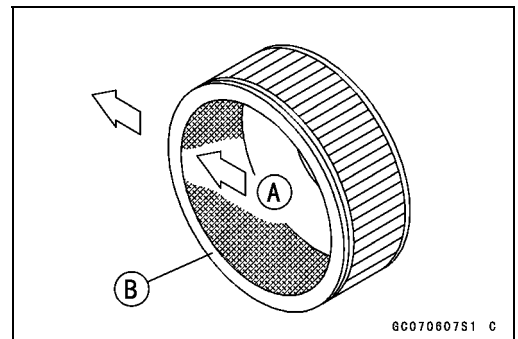
Special Tool - Carburetor Drain Plug Wrench, Hex 3: 57001-1269

- Check to see if water or dirt comes out.
- Tighten the drain plug.
- ⚠ If any water or dirt appears during the above inspection, clean the fuel system (see Carburetor Cleaning and Fuel Tank Cleaning in Fuel System Chapter).



Air Cleaner Element Clean

- Remove the air cleaner element (see Fuel System chapter).
- Clean the element by tapping it lightly to loosen dust.
- Blow away the remaining dust by applying compressed air [A] from the inside to the outside (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 has any tears or breaks, replace the element.



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2-16 PERIODIC MAINTENANCE

Maintenance Procedure

Evaporative Emission Control System Inspection

- Inspect the California canister as follows:
 - Remove the canister, and disconnect the hoses from the canister.
 - Visually inspect the canister for cracks for cracks and other damage.
 - ✚ If the canister has any cracks or bad damage, replace it with a new one.

NOTE

- *The canister is designed to work well through the motorcycle's life without any maintenance if it is used under normal conditions.*

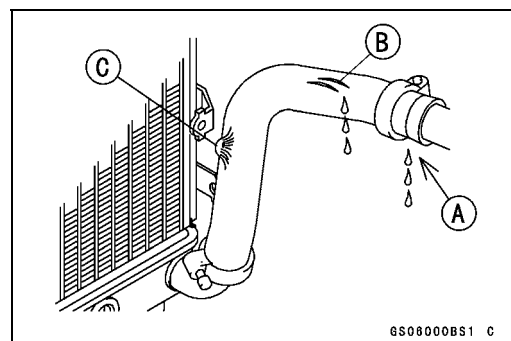
- Check the California liquid/vapor separator as follows:
 - Disconnect the hoses from the liquid/vapor separator, and remove the separator from the motorcycle.
 - Visually inspect the separator for cracks and other damage.
 - ✚ If the separator has any cracks or is badly damaged, replace it with a new one.
- Check the hoses of the California evaporative emission control system as follows:
 - Check that the hoses are securely connected and clips are in position.
 - Replace any kinked, deteriorated or damaged hoses.
 - Route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
 - When installing the hoses, avoid sharp bending, kinking, flattening or twisting, and route the hoses with a minimum of bending so that the emission flow will not be obstructed.

Cooling System

Water Hoses and Connections Inspection

- The high pressure inside the water 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 - Water Hose Clamp Screws: 2.0 N·m (0.20 kgf·m, 17 in·lb)



Coolant Change

⚠ WARNING

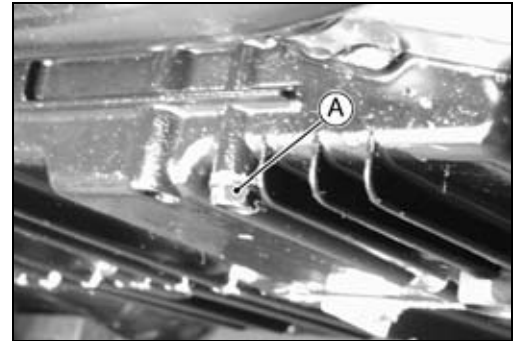
To avoid burns, do not remove the radiator cap or try to change the coolant when the engine is still hot. Wait until it cools down. Coolant on tires will make them slippery and can cause an accident and injury. Immediately wipe up or wash away any coolant that spills on the frame, engine, or other painted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

Maintenance Procedure

- Remove:
Meter Unit (see Electrical System chapter)
Radiator Cap [A]



- Place a container under the drain plug [A] at the bottom of the right crankcase.
- Drain the coolant from the radiator and engine by removing the drain plug.
- Remove the cap and pump out the coolant using a syringe or some other suitable device.



- Tighten:
Torque - Coolant Drain Plug: 11 N·m (1.1 kgf·m, 95 in·lb)
- Fill the radiator up to the radiator filler neck [A] with coolant, and install the radiator cap.



NOTE

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

- Fill the reserve tank up to the full ("F") level line with coolant, and install the cap.

CAUTION

Soft or distilled water must be used with the antifreeze (see below for antifreeze) in the cooling system.

If hard water is used in the system, it causes scales accumulation in the water passages, and considerably reduces the efficiency of the cooling system.

Water and Coolant Mixture Ratio (Recommended)

Soft Water:	50%
Coolant:	50%
Freezing Point:	-35°C (-31°F)
Total Amount:	2.4 L (2.1 US qt)

NOTE

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

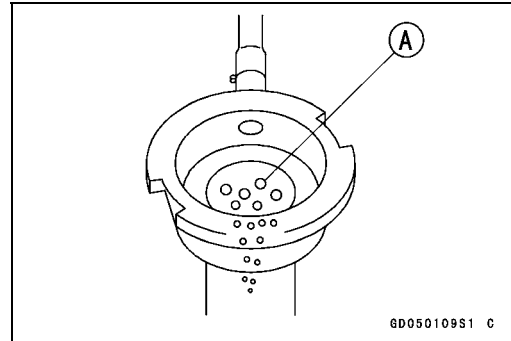
2-18 PERIODIC MAINTENANCE

Maintenance Procedure

- Bleed the air from the cooling system as follows.
 - 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 water hoses to force any air bubbles caught inside.
 - Stop the engine and add coolant up to the radiator filler neck.
- Install the radiator cap.
- Start the engine, warm it up thoroughly until the radiator fan turns on and then stop the engine.
- Check the coolant level in the reserve tank after the engine cools down.
- If the coolant level is lower than the low level line, add coolant to the full level line.

CAUTION

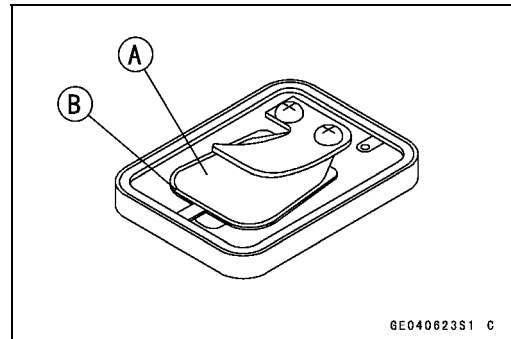
Do not add more coolant above the full level line.



Engine Top End

Air Suction Valve Inspection

- Visually inspect the reed [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 with a high flash-point solvent.



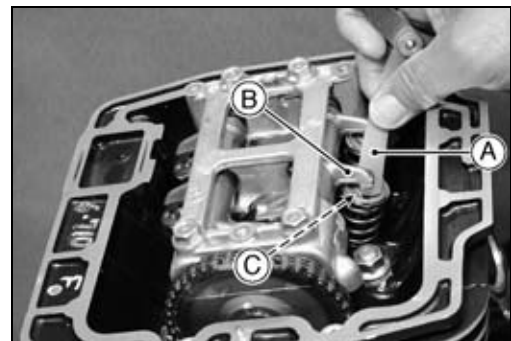
CAUTION

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

Valve Clearance Inspection

NOTE

- Valve clearance must be checked and adjusted when the engine is cold (at room temperature).
- Remove:
 - Cylinder Head Cover (see Engine Top End chapter)
 - Timing Inspection Cover (Engine Left Side)
- Set the front piston at TDC (see Engine Top End chapter).
- Using a thickness gauge [A], measure the valve clearance between the rocker arm [B] and the shim [C].



Maintenance Procedure

- Set the rear piston at TDC by turning the crankshaft counterclockwise 305° (see Engine Top End chapter).
- Using a thickness gauge, measure the valve clearance between the rocker arm and the shim.

Valve Clearance

Standard:

IN: 0.10~ 0.15 mm (0.0039 ~ 0.0059 in.)

EX: 0.20 ~ 0.25 mm (0.079 ~ 0.010 in.)

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

Valve Clearance Adjustment

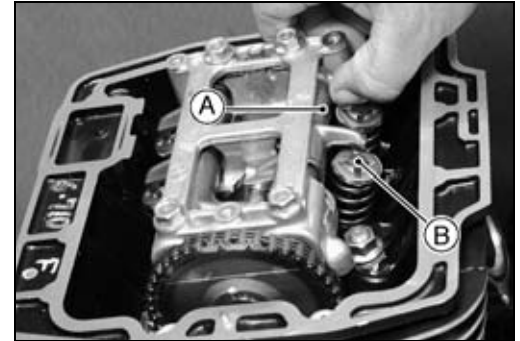
- To change the valve clearance, side the rocker arm [A] sideways and change the shim [B]. Replace the shim with one of a different thickness.

NOTE

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

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

- To select a new shim which brings the valve clearance within the specified range, refer to the Valve Clearance Adjustment Charts.
- Remeasure any valve clearance that was adjusted. Readjust if necessary.



CAUTION

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

Do not grind the shim. This may cause it to fracture, causing extensive engine damage.

Maintenance Procedure

	PRESENT SHIM																				Example
PART No. (92025 -)	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
MARK	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	00
THICKNESS (mm)	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00

[illegible]

- Example:** Present shim is **2.60 mm** (0.102 in.)
Measured clearance is **0.25 mm** (0.010 in.)
Replace **2.60 mm** (0.102 in.) shim with **2.70 mm** (0.106 in.) shim.
5. Remeasure the valve clearance and readjust if necessary.

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

Maintenance Procedure

VALVE CLEARANCE ADJUSTMENT CHART EXHAUST VALVE

	PRESENT SHIM																		Example			
PART No. (92025-)	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	
MARK	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	00	
THICKNESS (mm)	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	

VALVE CLEARANCE MEASUREMENT	Example	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75
		1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80
		1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85
		1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90
		SPECIFIED CLEARANCE/NO CHANGE REQUIRED																				
		2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00
		2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	
		2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00		
		2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00			
		2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00				
		2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00					
		2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00						
		2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00							
		2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00								
		2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00									
		2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00										
		2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00											
		2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00												
		2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00													
		2.70	2.75	2.80	2.85	2.90	2.95	3.00														
		2.75	2.80	2.85	2.90	2.95	3.00															
		2.80	2.85	2.90	2.95	3.00																
		2.85	2.90	2.95	3.00																	
		2.90	2.95	3.00																		
		2.95	3.00																			
		3.00																				

Parts No.	Thickness
92180-1208	1.95 mm
92180-1209	1.90 mm
92180-1210	1.85 mm
92180-1211	1.80 mm
92180-1212	1.75 mm
92180-1213	1.70 mm

The shim from 1.70 to 1.95 mm thick are also available.

INSTALL THE SHIM OF THIS THICKNESS (mm)

GE15040BW4 C

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

Example: Present shim is **2.55 mm** (0.100 in.)
Measured clearance is **0.50 mm** (0.020 in.)
Replace **2.55 mm** (0.100 in.) shim with **2.75 mm** (0.108 in.) shim.

5. Remeasure the valve clearance and readjust if necessary.

NOTE

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

2-22 PERIODIC MAINTENANCE

Maintenance Procedure

Clutch

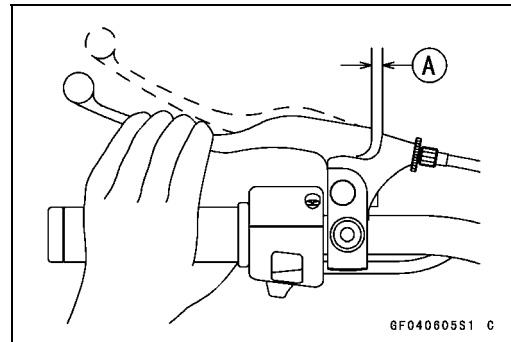
Clutch Inspection

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 it.

Clutch Lever Free Play

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

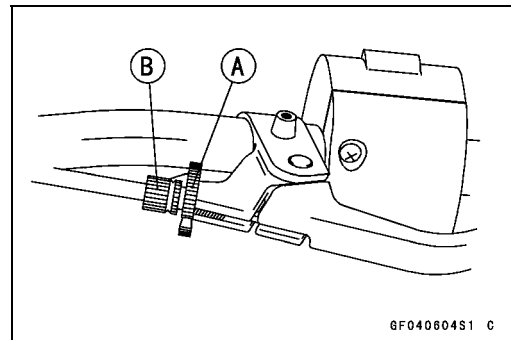


Clutch Lever Free Play Adjustment

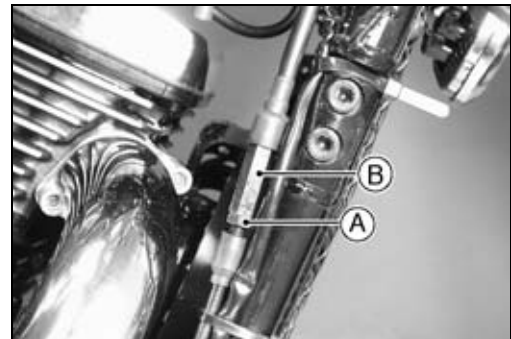
- Loosen the locknut [A] at the clutch lever.
- Turn the adjuster [B] until the proper amount of clutch lever free play is obtained.
- Tighten the locknut securely.
- ⚠ If it cannot be done, use the adjuster at the middle of the cable.

⚠ WARNING

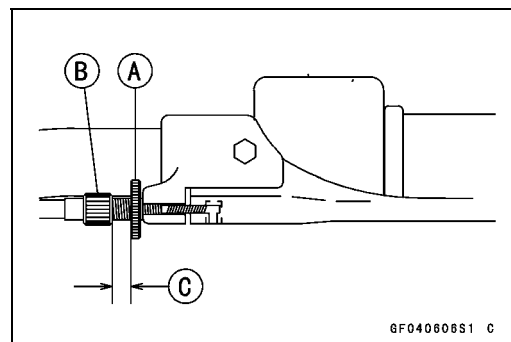
To avoid a serious burn, never touch the engine or exhaust pipe during clutch adjustment.



- Loosen the locknut [A] at the middle of the clutch cable.
- Turn the adjuster nut [B] until the proper amount of clutch lever free play is obtained.
- Tighten the locknut securely.
- ⚠ If it cannot be done, use the mounting nuts at the lower end of the cable.

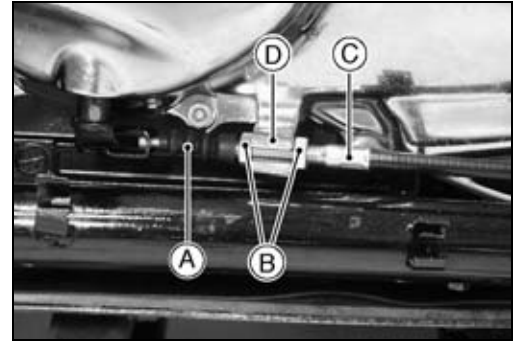


- Remove:
 - Front Right Foot Peg and Brake Petal (see Brakes chapter)
 - Front muffler (see Engine Top End chapter)
- Loosen the locknut [A] at the clutch lever.
- Turn the adjuster [B] so that 5 ~ 6 mm (0.20 ~ 0.24 in.) [C] of threads are visible



Maintenance Procedure

- Slide the dust cover [A] at the clutch cable lower end out of place.
- Loosen both adjusting nuts [B] at the clutch cover as far as they will go.
- Pull the clutch outer cable [C] tight and tighten the adjusting nuts against the bracket [D].
- Slip the rubber dust cover back onto place.
- Turn the adjuster at the clutch lever until the free play is correct.
- Tighten the knurled locknut at the clutch lever.



⚠ 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 place later, creating enough cable play to prevent clutch disengagement.

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

Engine Lubrication System

Engine Oil Change

- Situate the motorcycle so that it is vertical after warming up the engine.
- Remove the engine drain plug [A] to drain the oil.
- The oil in the oil filter can be drained by removing the filter (see Oil Filter Replacement).
- ✚ Replace the drain plug gasket [B] with a new one if it is damaged.
- Tighten the drain plug.

Torque - Engine Oil Drain Plug: 20 N·m (2.0 kgf·m, 14.5 ft·lb)

- Pour in the specified type and amount of oil.

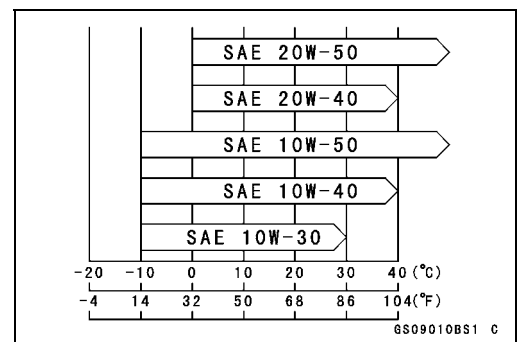
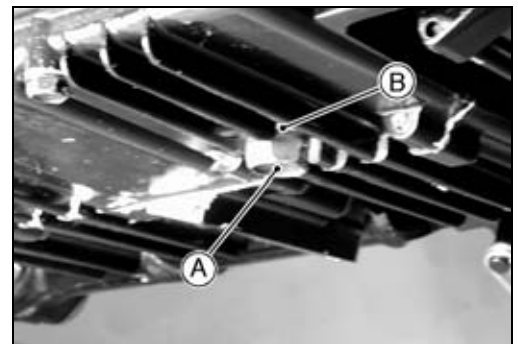
Recommended Engine Oil

Type: API SE, SF or SG

API SH or SJ with JASO MA

Viscosity: SAE 10W40

Capacity: 2.7 L (2.9 US qt) (when filter is not removed)
2.9 L (3.1 US qt) (when filter is removed)
3.2 L (3.4 US qt) (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.

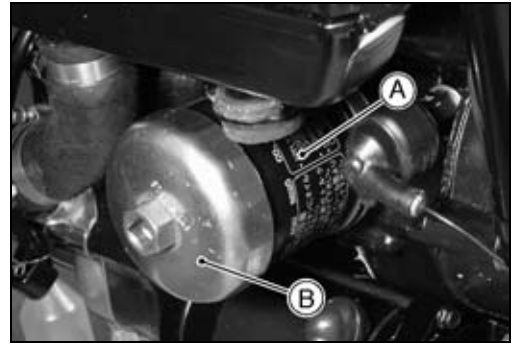
2-24 PERIODIC MAINTENANCE

Maintenance Procedure

Oil Filter Replacement

- Drain the engine oil (see Engine Oil Change).
- Remove the oil filter [A] with the oil filter wrench [B].

Special Tool - Oil Filter Wrench: 57001-1249



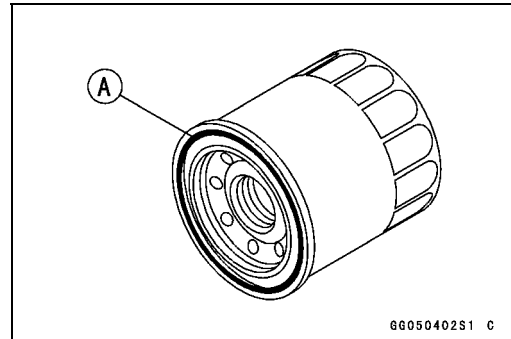
- Replace the filter with a new one.
- Apply engine oil to the gasket [A] before installation.
- Tighten the filter with the oil filter wrench.

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

NOTE

○ *Hand tightening of the oil filter can not be allowed since it does not reach to this tightening torque.*

- Pour in the specified type and amount of oil (see Engine Oil Change).



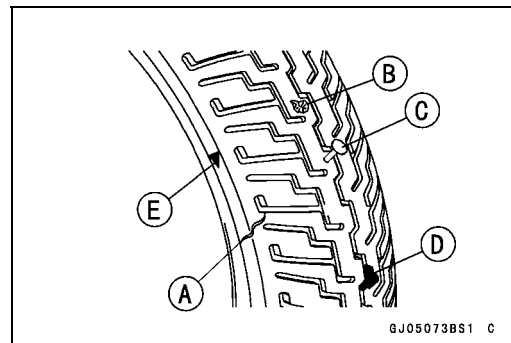
Wheels/Tires

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.

- Visually inspect the tire for cracks [A] and cuts [B], replacing the tire in case of damage. Swelling or high spots indicate internal damage, requiring tire replacement.
- Remove any imbedded stones [D], nail [C] or other foreign particles from the tread.

Wear Indicator Position Mark [E]



- 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.

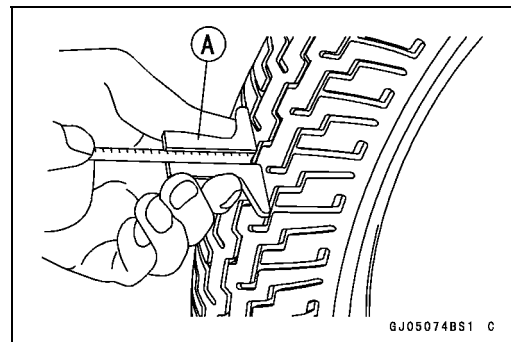
Tread Depth

Standard:

Front:	4.8 mm (0.19 in.) (BRIDGESTONE), 4.5 mm (0.18 in.) (DUNLOP)
Rear:	7.2 mm (0.28 in.) (BRIDGESTONE) 7.3 mm (0.29 in.) (DUNLOP)

Service Limit:

Front:	1 mm (0.04 in.)
Rear:	(DE, AT, CH) 1.6 mm (0.06 in.) 2 mm (0.08 in.) (Up to 130 km/h) 3 mm (0.12 in.) (Over 130 km/h)



Maintenance Procedure

Wear Indicator [A]

Wear Indicator Position Mark [B]

⚠ WARNING

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

NOTE

- *Most countries may have their own regulations a minimum tire tread depth: be sure to follow them.*
- *Check and balance the wheel when a tire is replaced with a new one.*

Spoke Tightness and Rim Runout Inspection

- Check that all the spokes are tightened evenly.
- ✚ If spoke tightness is uneven or loose, tighten the spoke nipples evenly.

Torque - Spoke Nipples: 4.9 N·m (0.5 kgf·m, 43 in·lb)

- Check the rim runout.

⚠ WARNING

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

- Raise the front/rear wheel off the ground.

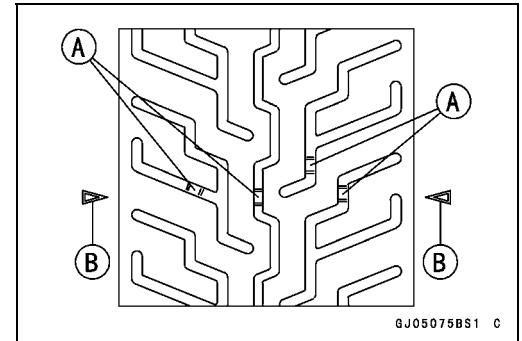
Special Tool - Jack: 57001-1238

Jack Attachment #3: 57001-1416

- Spin the wheel lightly, and check for roughness or binding.
- ✚ If roughness or binding is found, replace the hub bearings.
- Inspect the rim for small cracks, dents, bending, or warping.
- ✚ If there is any damage to the rim, it must be replaced.

NOTE

- *Avoid the curved part and the uneven part, and measure the rim runout on the side without the mark.*



2-26 PERIODIC MAINTENANCE

Maintenance Procedure

- Measure the axial [A] and radial [B] rim runout with a dial gauge.
- If rim runout exceeds the service limit, check the hub bearings first. Replace them if they are damaged. If the problem is not due to the bearings, correct the rim warp (runout). A certain amount of rim warp can be corrected by recentering the rim. Loosen some spokes and tighten others within the standard torque to change the position of different parts of the rim. If the rim is badly bent, however, it must be replaced.

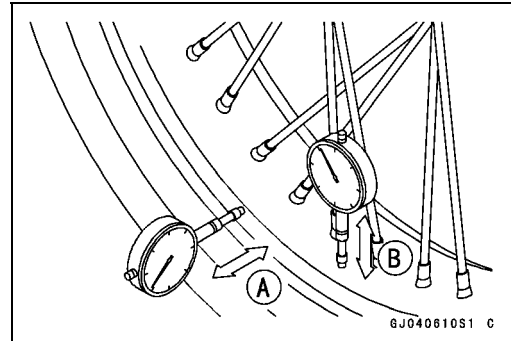
Rim Runout (with tire installed)

Standard:

Radial	TIR 1.0 mm (0.04 in.) or less
Axial	TIR 0.8 mm (0.03 in.) or less

Service Limit:

Radial	TIR 2.0 mm (0.08 in.)
Axial	TIR 2.0 mm (0.08 in.)



Final Drive

Drive Chain Slack Inspection

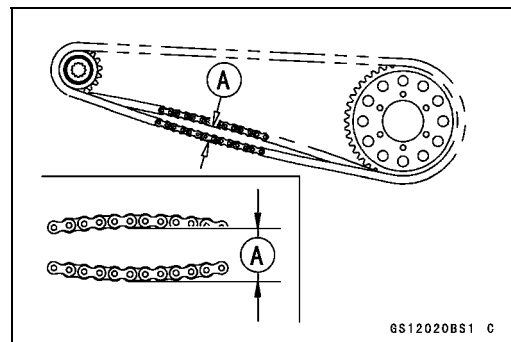
Drive Chain Slack Inspection

NOTE

- Check the slack with the motorcycle setting on its side stand.
- Clean the chain if it is dirty, and lubricate it if it appears dry.
- Check the wheel alignment (see Wheel Alignment Inspection/Adjustment section in Final Drive chapter).
- 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.

Drive Chain Slack Adjustment

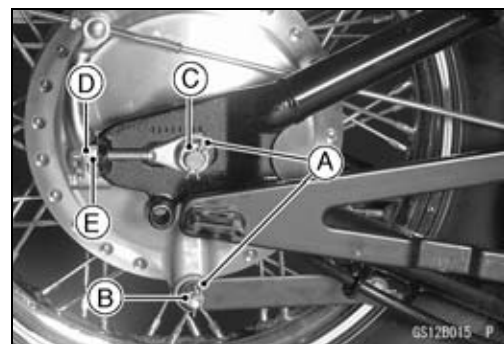
Standard: 25 ~ 35 mm (1.0 ~ 1.4 in.)



Maintenance Procedure

Drive Chain Slack Adjustment

- Remove:
 - Muffler (see Engine Top End chapter)
 - Clip [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.
- The right and left notches on the alignment indicators should point to the same marks or positions on the swingarm.



⚠ 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 (see Rear Wheel Installation section in Wheels/Tires chapter).

Torque - Rear Axle Nut: 98 N·m (10 kgf·m, 72 ft·lb)

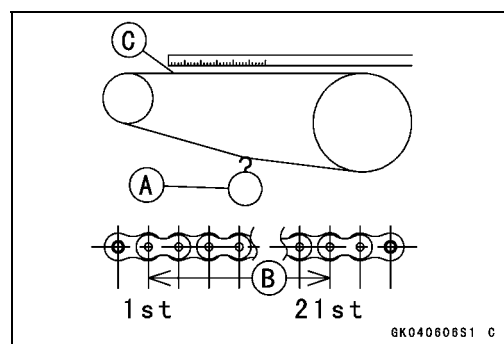
- Turn the wheel, measure the chain slack again at the tightest position, and readjust if necessary.
- Tighten:

Torque - Torque Link Nuts: 34 N·m (3.5 kgf·m, 25 in·lb)

- Install the clip to the rear axle and torque link bolt.
- Check the rear brake.

Drive Chain Wear Inspection

- Remove:
 - Chain Cover
- Rotate the rear wheel to inspect the drive chain for damaged rollers, and loose pins and links.
- ⚠ If there is any irregularity, replace the drive chain.
- ⚠ Lubricate the drive chain if it appears dry.
- Stretch the chain taut by hanging a 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.)

2-28 PERIODIC MAINTENANCE

Maintenance Procedure

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 safety, use only the standard chain.

Standard Chain

Make: ENUMA

Type: EK 50 MV-0, Endless

EK50 MV-X, (VN800-B6 ~, B6F)

Link: 112 Links

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.

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.

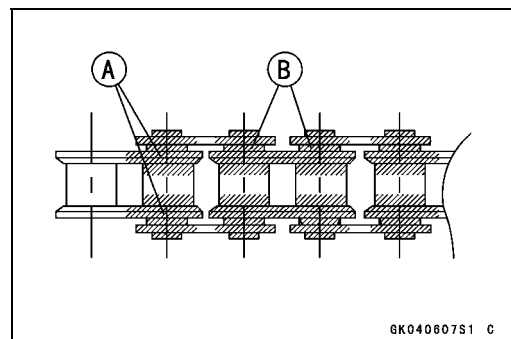
Use only kerosene or diesel oil for cleaning of the O-ring of the drive chain.

Any other cleaning solution such as gasoline or trichloroethylene will cause deterioration and swelling of the O-ring.

Immediately blow the chain dry with compressed air after cleaning.

Complete cleaning and drying the chain within 10 minutes.

- Apply oil to the sides of the rollers so that oil will penetrate to the rollers and bushings. Apply the oil to the O-rings so that the O-rings will be coated with oil.
- Wipe off any excess oil.
 - Oil Applied Areas [A]
 - O-ring [B]



Maintenance Procedure

Brakes

Brake Lining or Pad Wear Inspection

- Remove the brake shoes (see Brake Panel Disassembly).
- Measure the lining thickness [A].
- Use a 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 if the lining.
- Use a wire brush to remove any foreign particles from the lining.

Shoe Lining Thickness

Standard: 4.9 ~ 5.5 mm (0.19 ~ 0.22 in.)

Service Limit: 2.6 mm (0.10 in.)

- Wash off any oil or grease with an oilless cleaning fluid such as trichlorethylene or acetone.

⚠ WARNING

These cleaning fluid are usually highly flammable and harmful if breathed for prolonged periods. Be sure to heed the fluid manufacture's warnings.

- Remove the brake pad.
 - Inner Pad [A]
 - Outer Pad [B]
- Check the lining thickness [C] of the pads in each caliper.
- ✚ If the lining thickness of either pad is less than the service limit [D], replace both pads in the caliper as a set.

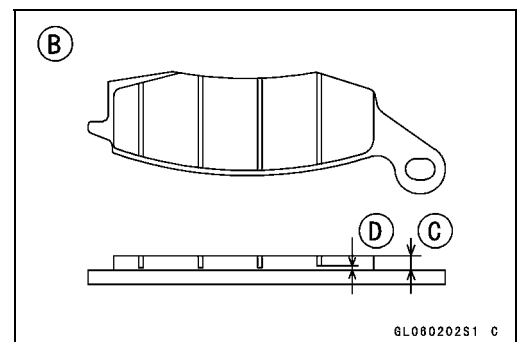
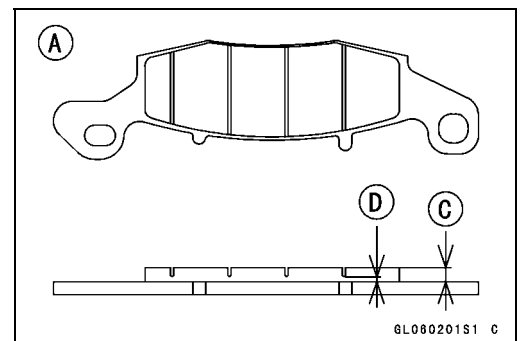
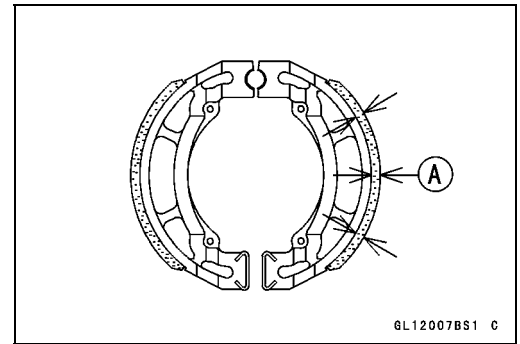
Pad Lining Thickness

Standard:

Inner Pad 4.5 mm (0.18 in.)

Outer Pad 4.7 mm (0.19 in.)

Service Limit: 1.0 mm (0.04 in.)



2-30 PERIODIC MAINTENANCE

Maintenance Procedure

Brake Play Inspection

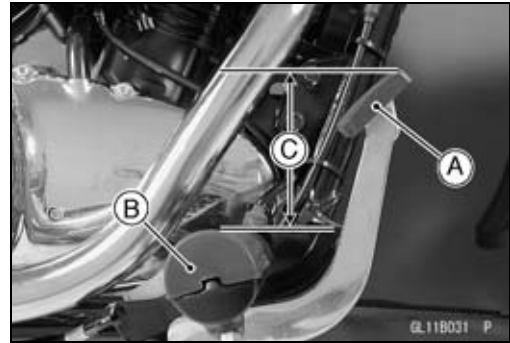
Brake Pedal Position Inspection

- Check that the brake pedal [A] is in the correct position.
[B] Footpeg

Pedal Position [C]

Standard: About 65 mm (2.6 in.) above footpeg top

- ⚠ If it is incorrect, adjust the brake pedal position.

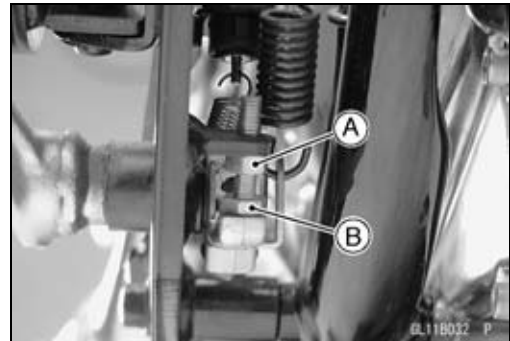


Brake Pedal Position Adjustment

- Loosen the locknut [A], and turn the adjusting bolt [B] until the brake pedal is correctly positioned.
- Tighten the locknut.
- Check:
 - Rear Brake Light Switch
 - Brake pedal Free Play

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 free play is incorrect, adjust it.

Pedal Free Play

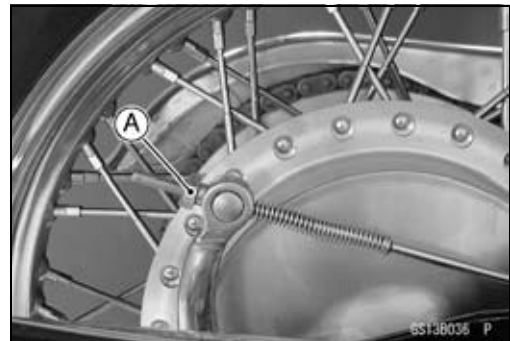
Standard: 20 ~ 30 mm (0.8 ~ 0.12 in.)

- ⚠ If the pedal has improper play, adjust it.



Brake Pedal Free Play Adjustment

- Turn the adjusting nut [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 wheels 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.



Maintenance Procedure

Brake Light Switch Inspection

- Turn on the ignition switch.
- Check the operation of the rear brake light switch by depressing the brake pedal.
- ✚ If it does not as specified, adjust the brake light timing.

Brake Light Timing

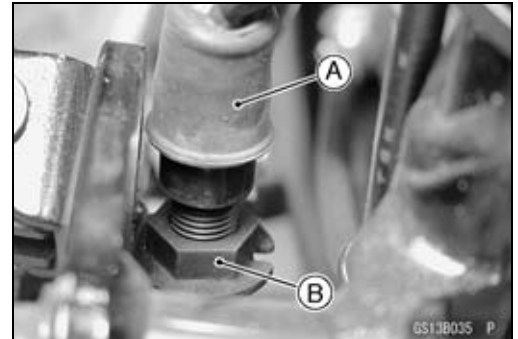
Standard: On after about 15 mm (0.6 in.) of pedal travel [A]



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].



CAUTION

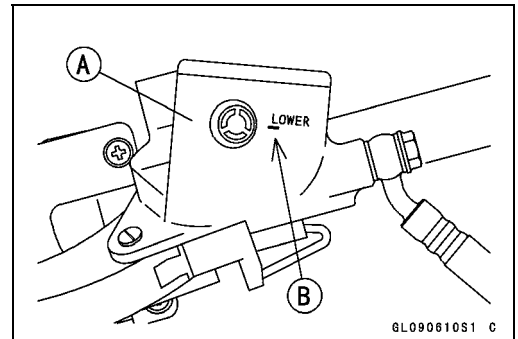
To avoid damaging the electrical connections inside the switch, be sure that the switch body does not turn during adjustment.

Brake Fluid Level Inspection

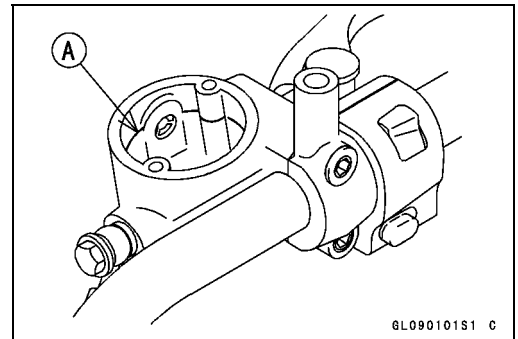
- Check that the brake fluid level in the front brake reservoir [A] is above the lower level line [B].

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].



⚠ 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

2-32 PERIODIC MAINTENANCE

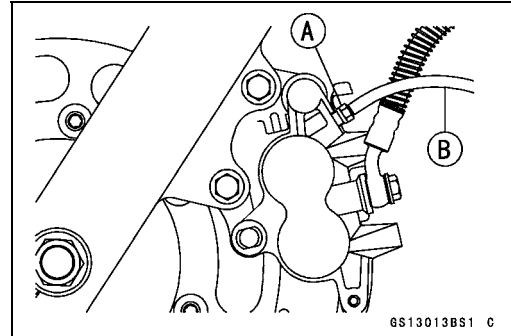
Maintenance Procedure

Brake Fluid Change

NOTE

○The procedure to change the front brake fluid is as follows.

- 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.
- Repeat this operation until fresh brake fluid comes out from the plastic hose or the color of the fluid changes.
 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].

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.

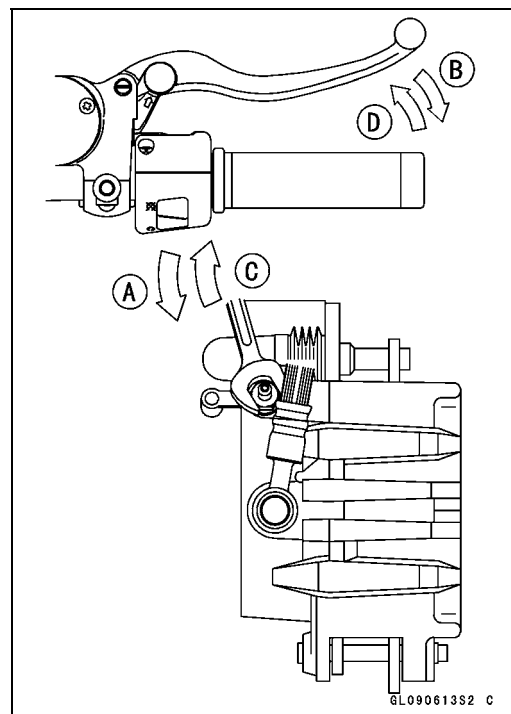
- Remove the clear plastic hose.
- Install the reservoir cap.
- Tighten:

Torque - Reservoir Cap Screw: 1.5 N·m (0.15 kgf·m, 13 in·lb)

- Tighten the bleed valve, and install the rubber cap.
- After changing the fluid, check the brake for good braking power, no brake drag, and no fluid leakage.

Torque - Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)

⚠If necessary, bleed the air from the lines.



Bleeding the Brake Line

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

⚠ WARNING

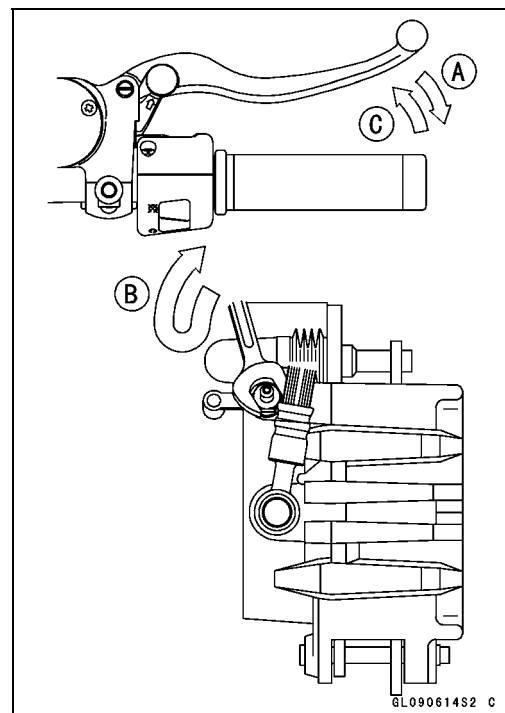
Be sure to bleed the air from the brake line whenever brake lever or pedal action feels soft or spongy after the brake fluid is changed, or whenever a brake line fitting has been loosened for any reason.

Maintenance Procedure

NOTE

○ *The procedure to bleed the front brake line is as follows.*

- 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.
- Install the reservoir cap.
- Remove the rubber cap from the bleed valve on the caliper.
- Attach a clear plastic hose to the bleed valve, and run the other end of the hose into a container.
- Bleed the brake line and the caliper.
- 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].



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 completely out any time during bleeding, 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 more complete bleeding.*

- Remove the clear plastic hose.
- Tighten:
 - Torque - Reservoir Cap Screw: 1.5 N·m (0.15 kgf·m, 13 in·lb)**
- Tighten the bleed valve, and install the rubber cap.
 - Torque - 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.

2-34 PERIODIC MAINTENANCE

Maintenance Procedure

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 the 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 LINE.**

Brake Master Cylinder Cup and Dust Cover Replacement

- Refer to the Master Cylinder section in the Brakes chapter for Master Cylinder Cup and Dust Cover Replacement.

Caliper Fluid and Dust Seals Replacement

- Refer to the Calipers section in the Brakes chapter for Caliper Fluid and Dust Seals Replacement.

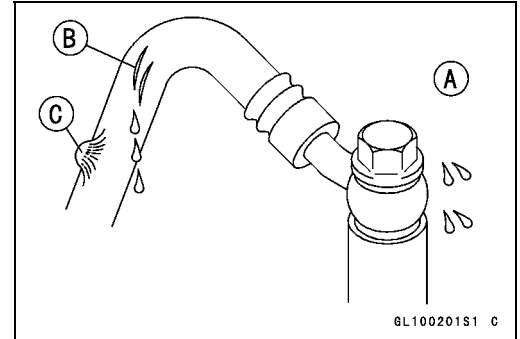
Brake Camshaft Lubricate

- Refer to the Brake Panel and Drum section in the Brakes chapter for the Brake Lubrication.

Maintenance Procedure

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.



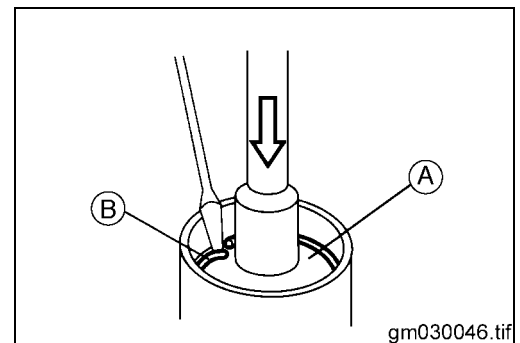
Brake Hose Replacement

- Refer to the Brake Hose Removal/Installation in the Brakes chapter.

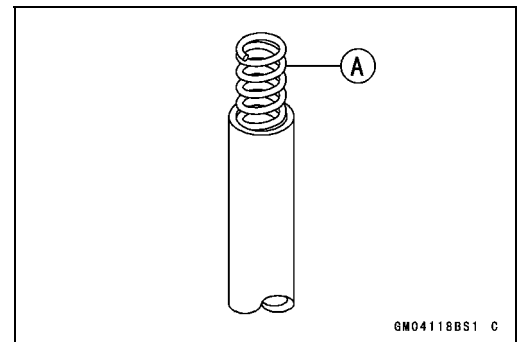
Suspension

Front Fork Oil Change

- Remove the front fork (see Front Fork Removal).
- Remove the top cap.
- Hold the outer tube vertically in a vise.
- Push the top plug [A] down to remove the plug retaining ring [B], and then remove the plug.



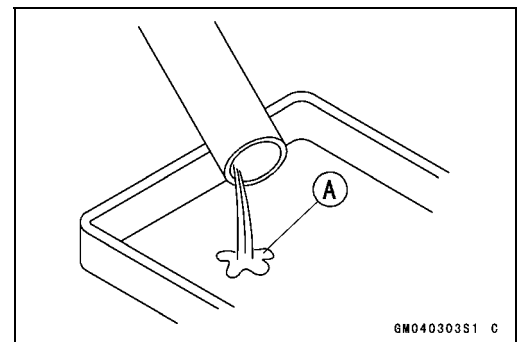
- Remove:
Fork Spring [A]



- Pour out the fork oil [A] with the fork upside down.
- Hold the outer tube vertically in a vise.
- Fill the front fork with the specified oil.

Fork Oil

Viscosity:	SHOWA SS8 or equivalent
Amount:	
When changing oil:	approx. 265 mL (9.0 US oz)
After disassembly and completely dry:	310 ±4 mL (10.5 ±0.14 US oz)



2-36 PERIODIC MAINTENANCE

Maintenance Procedure

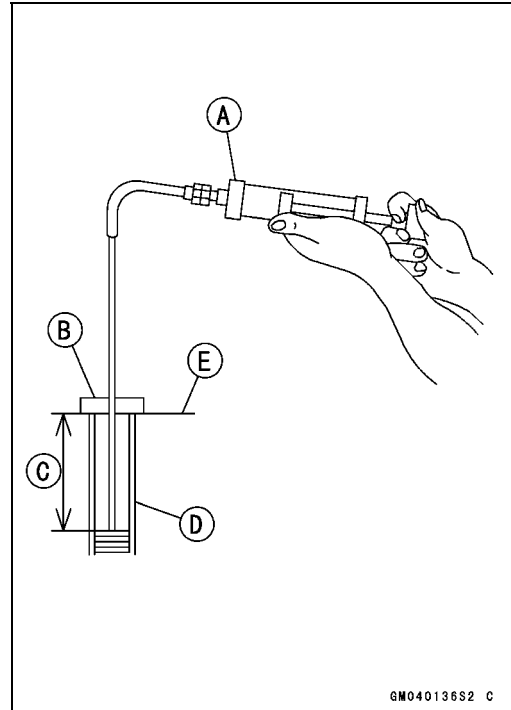
- Wait for about five minutes so that any suspended air bubbles can surface.
- Measure the oil level, using the fork oil level gauge [A].

Special Tool - Fork Oil level Gauge: 57001-1290

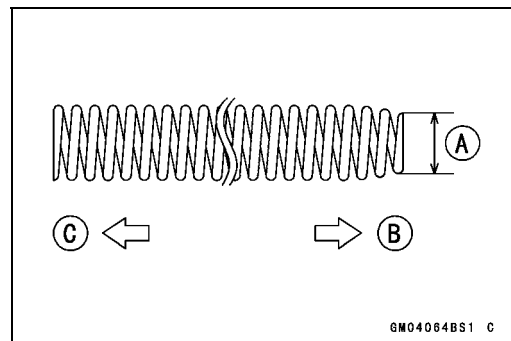
- Set the gauge stopper [B] so that its lower side shows the oil level distance specified [C].
- Insert the gauge tube into the inner tube [D] and position the stopper across the top of the inner tube [E].
- Pull the handle slowly to draw out the excess oil until no more oil comes up the tube.
- If no oil is drawn out from the beginning, 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: 286 ±2 mm (11.26 ±0.08 in.)



- Install the fork spring with the smaller end [A] facing downward [B].
Upward [C]



- Check the O-ring on the top plug and replace it with a new one if damaged.
- Push down the top plug to install the ring, and then fit the ring into the groove of the inner tube.
- Install the front fork (see Suspension chapter).

Front Fork Oil Leak Inspection

- Remove the front fork (see Suspension chapter).
- Visually inspect the front forks for oil leakage, scoring or scratches on the outer surface of the inner tubes.
- Replace or repair any defective parts, if necessary.

Rear Shock Absorber Oil Leak Inspection

- Visually inspect the shock absorbers [A] for oil leakage.
- If they are oil leaked, replace shock absorber.



Maintenance Procedure

Swingarm Pivot Lubrication

- Apply grease to the inner surface of the needle bearings in accordance with the Periodic Maintenance Chart.
- Apply a thin coat of grease to the lips of the grease seals.

Uni-trak Linkage Lubrication

- Apply grease to the inner surfaces of the needle bearings in accordance with the Periodic Maintenance Chart.
- For the rocker arm it has grease nipples on the rocker arm for lubrication. Force grease into the nipple until it comes out both sides of the rocker arm, and wipe off any excess.
- Apply a thin coat of grease to the lips of the grease seals.

Steering

Steering Inspection

Steering Inspection

- Lift the front wheel off the ground using the jack.

Special Tool - Jack: 57001-1238

Jack Attachment #3: 57001-1416

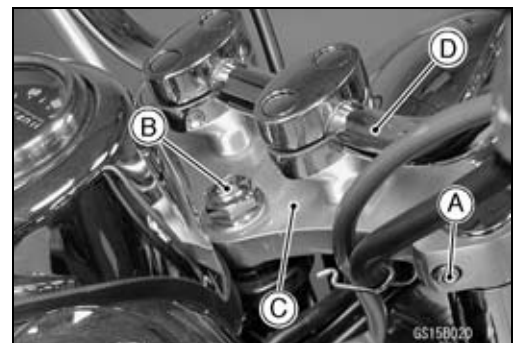
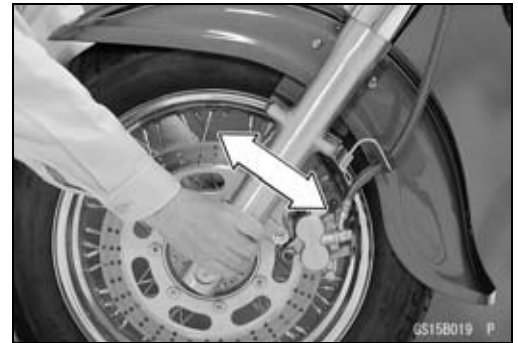
- With the front wheel pointing straight ahead, alternately tap each end of the handlebar. The front wheel should swing fully left and right from the force of gravity until the fork hits the stop.
- ⚠ If the wheel binds or catches before the stop, the steering is too tight.
- Feel for steering looseness by pushing and pulling 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

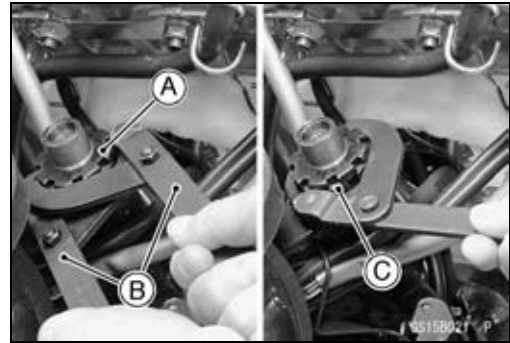
- Loosen:
Front Fork Clamp Bolts (upper) [A]
- Remove:
Steering Stem Head bolt [B]
Steering Stem Head [C] and Handlebar [D] as a set



2-38 PERIODIC MAINTENANCE

Maintenance Procedure

- Loosen:
 - Steering Stem Locknut [A].
- Adjust the steering.
 - Special Tool - Steering Stem Nut Wrench: 57001-1100 [B]**
 - ✚ If the steering too tight, loosen the stem nut [C] a fraction of a turn.
 - ✚ If the steering too loose, tighten the stem nut a fraction of a turn.



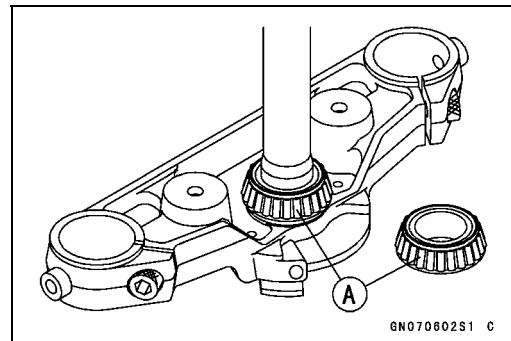
NOTE

○ Turn the steering stem nut 1/8 turn at a time maximum.

- Install the stem head.
- Tighten:
 - Torque - Steering Stem Head Bolt: 44 N·m (4.5 kgf·m, 33 ft·lb)**
 - Front Fork Clamp Bolts (Upper): 20 N·m (2.0 kgf·m, 14.5 ft·lb)**
- Install the handlebar assembly.
- Tighten:
 - Torque - Handlebar Holder Mounting Nuts: 34 N·m (3.5 kgf·m, 25 ft·lb)**
- Check the steering again.
- ✚ If the steering is still too tight or too loose, repeat the adjustment.

Steering Stem Bearing Lubrication

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



Electrical System

Spark Plug Cleaning and Inspection

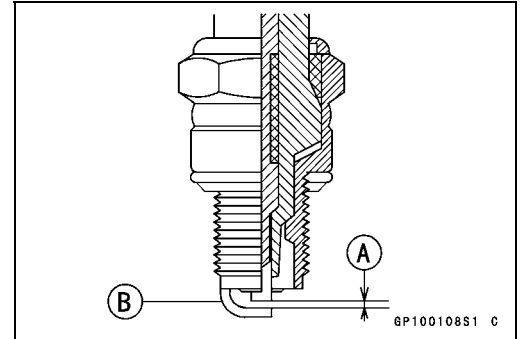
- Remove the spark plug (see Electrical System chapter), and visually inspect.
- Clean the spark plug, preferably in a sandblasting device, and then clean off any abrasive particles. The plug may also be cleaned using a high flash-point solvent and a wire brush or other suitable tool.
- ✚ If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard spark plug or its equivalent.

Maintenance Procedure

Spark Plug Gap Inspection

- Measure the gap [A] with a wire-type thickness gauge.
- ✚ If the gap is incorrect, carefully bend the side electrode [B] with a suitable tool to obtain the correct gap.

Spark Plug Gap: 0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)



General Lubrication

Lubrication

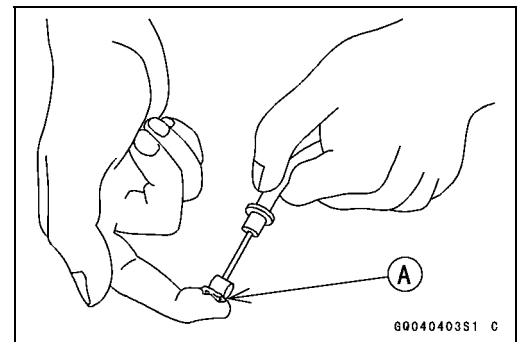
- Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.
- Lubricate the points listed below with indicated lubricant.

NOTE

○ Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure water spray, perform the general lubrication

Points: Lubricate with Grease.

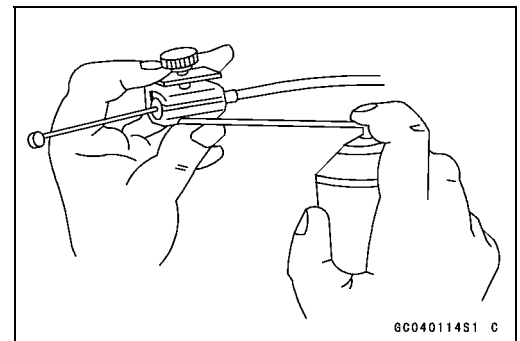
Clutch Lever Pivot Bolt
 Brake Lever Pivot Bolt
 Brake Pedal Pivot Bolt
 Side Stand Pivot Bolt
 Clutch Inner Cable Lower End [A]
 Throttle Inner Cable Upper Ends
 Speedometer Inner Cable
 Rear Brake Cable Joint
 Choke Cable Upper End



Cables: Lubricate with Rust Inhibiter

Choke Cable
 Throttle Cables
 Clutch Cable

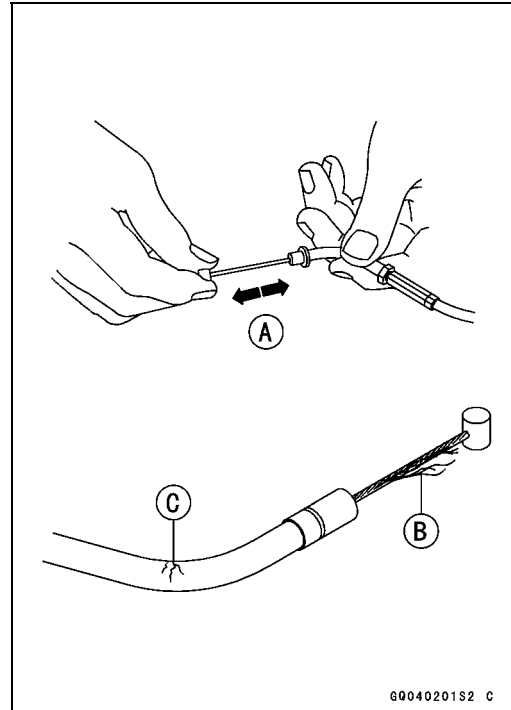
- Lubricate the cables by seeping the oil between the cable and housing.
- The cable may be lubricated by using a commercially available pressure cable lubricator with an aerosol cable lubricant.



2-40 PERIODIC MAINTENANCE

Maintenance Procedure

- 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, Bolts, and Fasteners Tightness Inspection

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:

- Front Master Cylinder Clamp Bolts
- Caliper Mounting Bolts
- Brake Lever Pivot Bolt Locknut
- Rear Brake Lever Clamp Bolt

Suspension:

- Front Fork Clamp Bolts
- Rear Shock Absorber Mounting Nuts
- Swingarm Pivot Shaft Nut
- Uni-Trak Link Nuts

Maintenance Procedure

Steering:

- Steering Stem Head Bolt
- Handlebar Holder Bolts
- Handlebar Holder Mounting Nut

Engine:

- Engine Mounting Bolts
- Engine Mounting Bracket Bolts
- Muffler Mounting Bolts
- Exhaust Pipe Holder Nuts
- Muffler Connecting Clamp Bolt
- Clutch Lever Pivot Nut
- Clutch Lever Holder Clamp Bolt

Others:

- Side Stand Pivot Nut
- Muffler Bracket Mounting Bolts
- Footpeg Holder Mounting Bolts
- Front Fender Mounting Screws

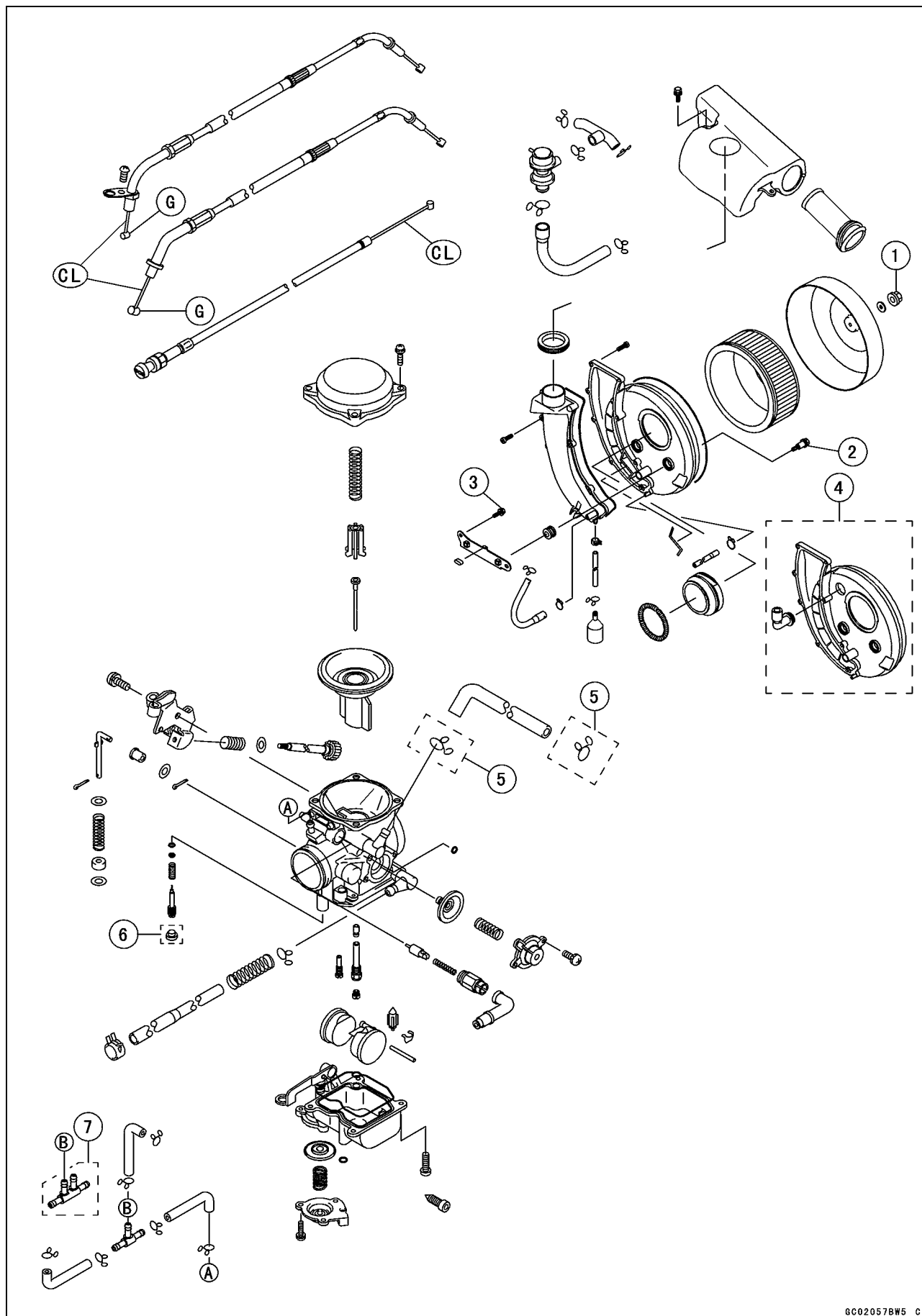
Fuel System

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3-2 FUEL SYSTEM

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Air Cleaner Element Cover Mounting Nut	5.9	0.6	52 in·lb	
2	Air Cleaner Housing Mounting Bolts	11	1.1	95 in·lb	
3	Carburetor holder Plate Mounting Bolts	11	1.1	95 in·lb	

4. Air Cleaner Case (California Model)

5. Clamps (California Model)

6. Plug (United States, Canada and Switzerland Models)

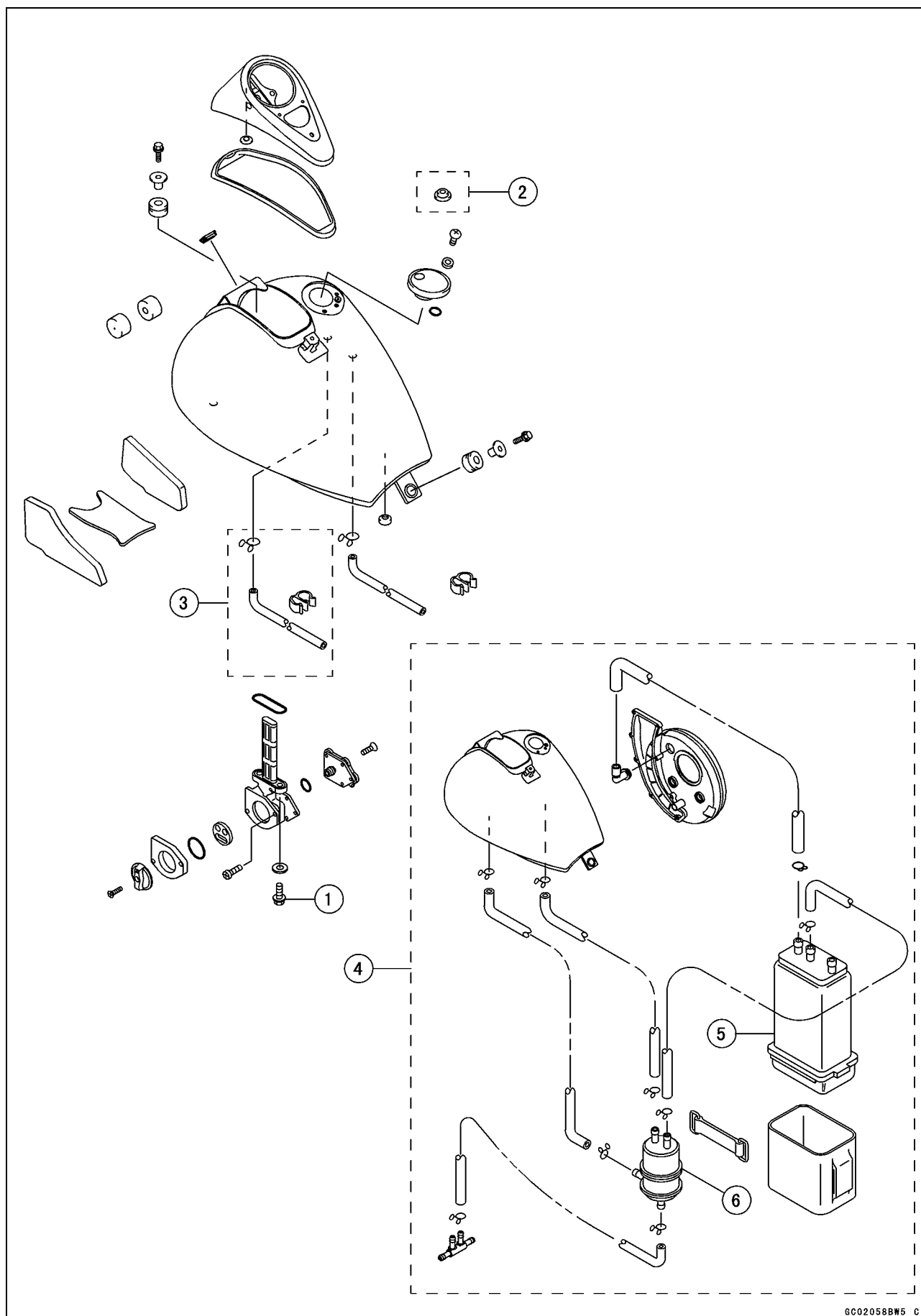
7. Fitting (California Model)

CL: Apply cable lubricant.

G: Apply grease.

3-4 FUEL SYSTEM

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Fuel Tap Mounting Bolts	2.5	0.25	22 in·lb	with white washer
	Fuel Tap Mounting Bolts	4.9	0.50	43 in·lb	with black washer

2. Fuel Tank Cap Seal (California Model)
3. Drain Hose (On and after VN800-B7, Other than California Model)
4. Evaporative Emission Control System (California Model)
5. Canister
6. Separator

3-6 FUEL SYSTEM

Specifications

Item	Standard	Service Limit
Carburetor		
Make, Type	Keihin, CVK36	-- --
Idle speed	1000 ±50 r/min (rpm)	-- --
	(CH) (CAL) 1300 ±50 r/min (rpm)	
Main Jet	#135	-- --
Main Air Jet	#100	-- --
Needle Jet	#6	-- --
Jet Needle	N2PE	-- --
	(PF) (PU) (CAL) NBZQ (VN800-B9 ~, B6F)	
Pilot Jet	#48	-- --
Pilot Air Jet	#70	-- --
	(PF) (PU) (CAL) #80 (VN800-B9 ~, B6F)	
Pilot Screw	1 3/4 turns out, (US) (CAL) –	-- --
	(PF) (PU) 2.0 turns out (VN800-B9 ~, B6F)	
starter Jet	#70	-- --
Service Fuel Level	2.0 ±1 mm (0.08 ±0.04 in.) above the float bowl mating surface	-- --
Float Height	16.5 ±2 mm (0.65 ±0.08 in.)	-- --
Optional Parts:		
Main Jet	#130, 132, 138, 140	-- --

(CAL):California Model

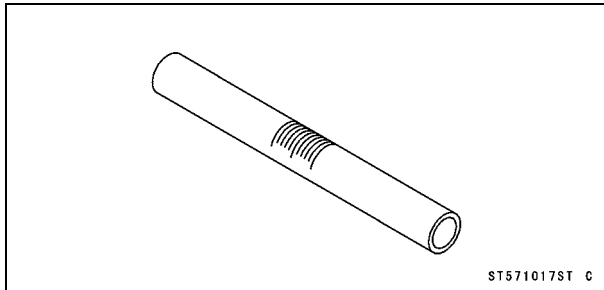
(CH): Switzerland Model

(PF): WVTA Approval Model with Pipe Catalytic Converter (Full Power Model)

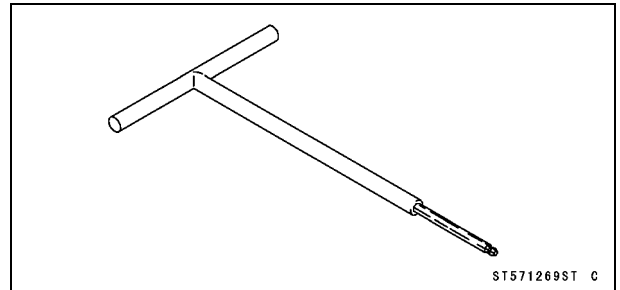
(PU): WVTA Approval Model with Pipe Catalytic Converter (Left side Traffic Full Power Model)

Special Tools

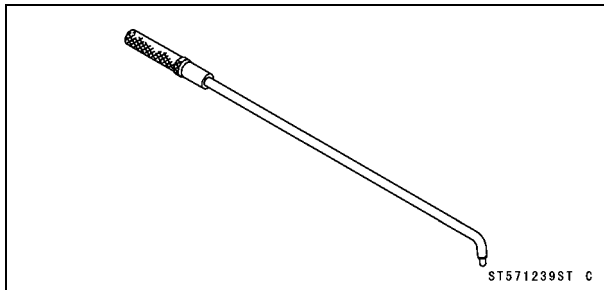
Fuel Level Gauge:
57001-1017



Carburetor Drain Plug Wrench, Hex 3:
57001-1269



Pilot Screw Adjuster, A:
57001-1239



3-8 FUEL SYSTEM

Throttle Grip and Cables

Throttle Grip Free Play Inspection

- Refer to the Throttle Grip Play Inspection in the Periodic Maintenance chapter.

Throttle Grip Free Play Adjustment

- Refer to the Throttle Grip Play Inspection in the Periodic Maintenance chapter.

Throttle Cable Installation

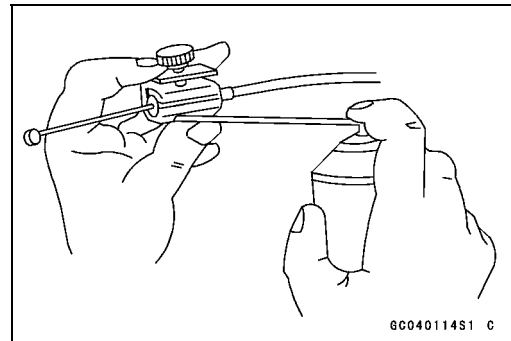
- Install the throttle cables in accordance with Cable, Wire, and Hose Routing section in Appendix chapter.
- Install the lower ends of the throttle cables in the cable bracket on the carburetor after installing the upper ends of the throttle cables in the grip.
- After installation, adjust each cable properly.

⚠ WARNING

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

Throttle Cable Lubrication and Inspection

- Whenever the cables are removed, or in accordance with the Periodic Maintenance Chart, lubricate the throttle cables (see General Lubrication in the Periodic Maintenance chapter).
- Apply a thin coating of grease to the cable upper ends.
- Use a commercially available pressure cable lubricator to lubricate the cables.
- With the cable disconnected at both ends, the cable should move freely in the cable housing.



Choke Cable

Choke Free Play Inspection

- Check that the choke inner cable slides smoothly by moving the choke knob [A] to the push and pull.
- ✚ If there is any irregularity, replace the choke cable.



Choke Cable Installation

- Install the choke cable in accordance with the Cable, Wire, and Hose Routing section in the Appendix chapter.
- After installation, adjust the cable properly.

⚠ WARNING

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

Choke Cable Lubrication and Inspection

- Whenever the cable is removed, or in accordance with the Periodic Maintenance Chart, lubricate the choke cable (see General Lubrication in the Periodic Maintenance chapter).
- Apply a thin coating of grease to the cable lower end.
- Use a commercially available pressure cable lubricator to lubricate the cable.
- With the cable disconnected at both ends, the cable should move freely in the cable housing.

3-10 FUEL SYSTEM

Carburetor

Idle Speed Inspection

- Refer to the Idle Speed Inspection in the Periodic Maintenance chapter.

Idle Speed Adjustment

- Refer to the Idle Speed Adjustment in the Periodic Maintenance chapter.

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.
- Remove the fuel tank and air cleaner (see Fuel Tank Removal, Air Cleaner Housing Removal).
- Prepare an auxiliary fuel tank and connect the fuel hose to the carburetor.
- Prepare a suitable fuel hose.
- Connect the fuel level gauge [A] to the carburetor float bowl with the fuel hose.

Special Tool - Fuel Level Gauge: 57001-1017

- Hold the gauge vertically against the side of the carburetor body so that the "zero" line [B] is slightly higher than the float bowl mating surface [C].
- Feed fuel to the carburetor, then turn the carburetor drain plug [D] out a few turns.
- Wait until the fuel level in the gauge settles.
- Keeping the gauge vertical, slowly lower the gauge until the "zero" line is even with the float bowl mating surface.

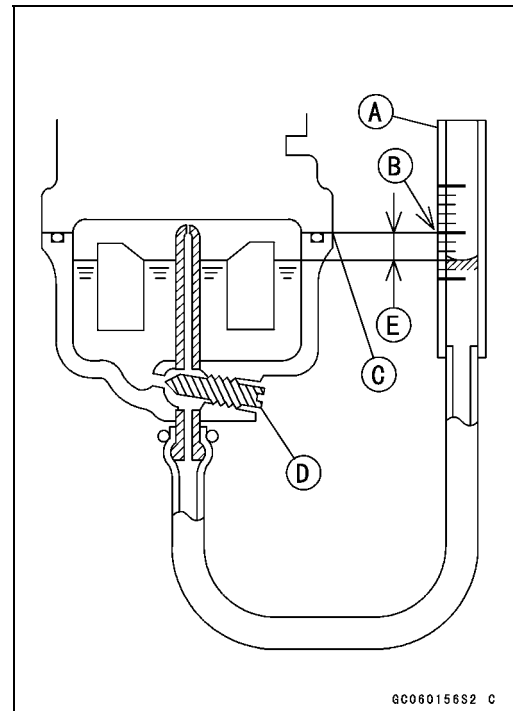
NOTE

○ Do not lower the "zero" line below the float bowl mating surface. 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 into a suitable container and start the procedure over again.

- Read the fuel level [E] in the gauge and compare to the specification.
- Screw in the carburetor drain plug.
- Stop feeding and remove the fuel level gauge.
- If the fuel level is incorrect, adjust it (see Service Fuel Level Adjustment).

Service Fuel Level (above the float bowl mating surface)

Standard: 2.0 ±1 mm (0.08 ±0.04 in.)



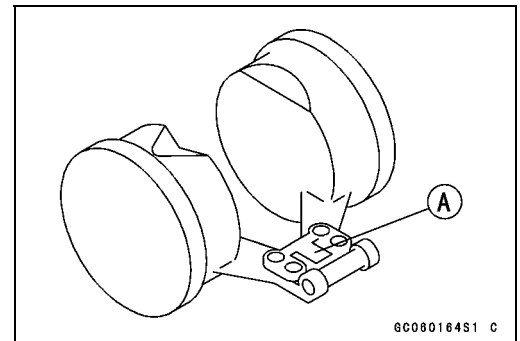
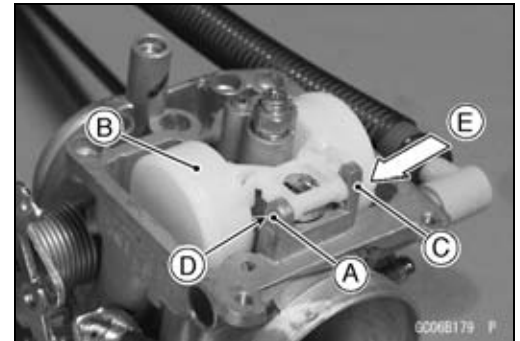
Carburetor

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.
- Remove the pin [A] and take out the float [B].
- When removing and installing the pin, note the following.
 - Be careful not to snap the pin holder leg [C].
 - When removing it, tap [D] the left end of the pin.
 - When installing it, press [E] the right end of the pin.
- Bend the tang [A] on the float arm very slightly to change the float height.



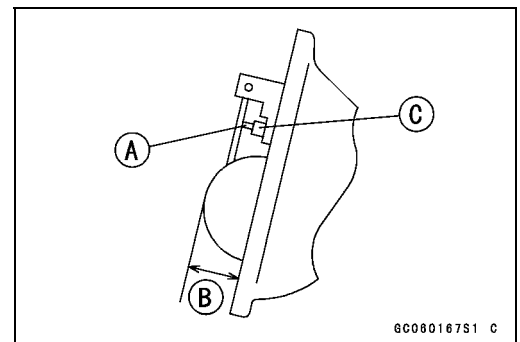
- Measure the float height tilting the carburetor so that the tang on the float just touches the needle rod in the float valve.
- Increasing the float height lowers the fuel level and decreasing the float height raises the fuel level.

Float Height

Standard: 16.5 ±2 mm (0.65 ±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

- Refer to the Fuel System Cleanliness Inspection in the Periodic Maintenance chapter

3-12 FUEL SYSTEM

Carburetor

Pilot Screw Setting

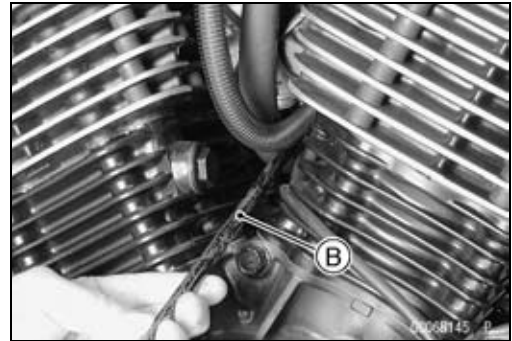
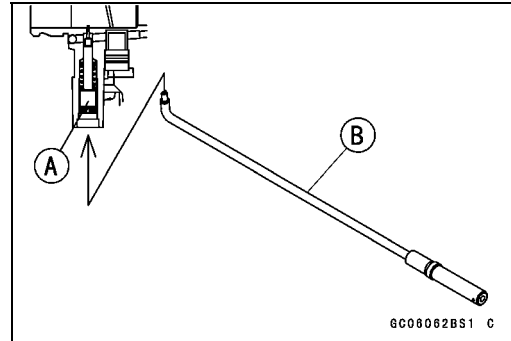
- The pilot screw [A] is set at the factory and should not be adjusted. But if necessary set the pilot screw as follows.
- Turn in the pilot screw and count the number of turns until it seat fully but not tightly.
- The pilot screw adjuster [B] may be used with the carburetor assembly instated on the engine.

Special Tool - Pilot Screw Adjuster: 57001-1239

- Back out the same number of turns counted when turned in. This is to set the screw to its original portion.

NOTE

- When setting the pilot screw use the "turn out" determined during disassembly. Use the specifications in this manual only if the original number is unknown.

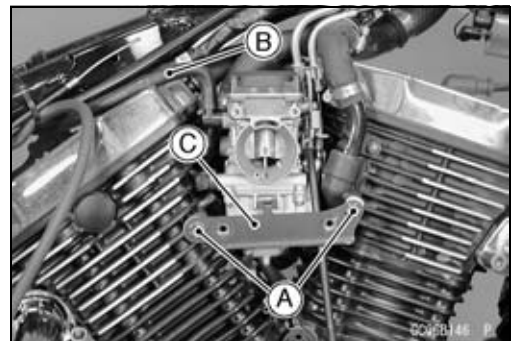


Carburetor Removal

WARNING

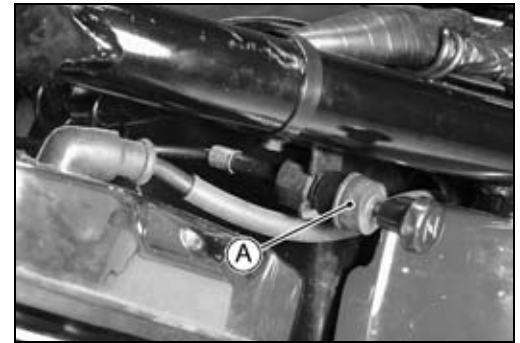
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Remove:
 - Seats (see Frame chapter)
 - Fuel Tank (see Fuel Tank Removal)
 - Air Cleaner Housing (see Air Cleaner Housing Removal)
- Bolts [A]
- Carburetor Air vent Hose [B]
- Carburetor Holder Plate [C]



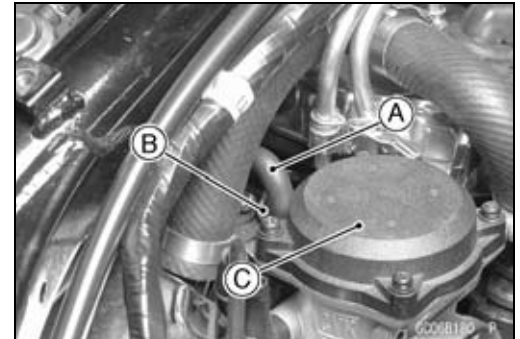
Carburetor

Choke Cable [A]



- Loosen the carburetor clamp screw [B].
- Remove the throttle cable ends from the handlebar switch side.
- Remove the carburetor [C].
- Stuff piece of lint-free, clean cloth into the carburetor holder to keep dirt out of the engine.

Vacuum Hose [A]



⚠ WARNING

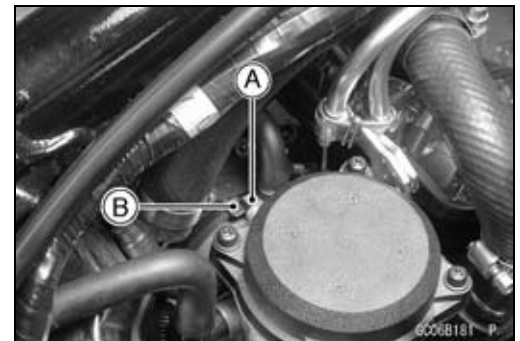
If dirt or dust is allowed to pass through into the carburetor, the throttle may become stuck, possibly causing an accident.

CAUTION

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

Carburetor Installation

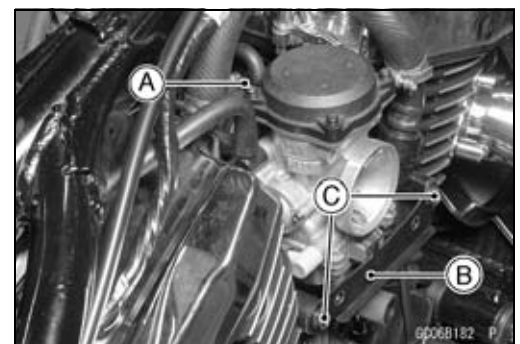
- Fit the vacuum fitting boss [A] of the carburetor to the projection [B] of the clamp.



- Tighten the clamp bolt [A].
- Install the carburetor holder plate [B] and tighten the bolts [C].

Torque - Carburetor Holder Plate Mounting Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

- Route the cables, harness, and hoses correctly (see Appendix chapter).
- Check fuel leakage from the carburetor.



3-14 FUEL SYSTEM

Carburetor

⚠ WARNING

Fuel spilled from the carburetors is hazardous.

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

Carburetor Disassembly

- Remove the carburetor (see 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.

- The pilot screw is set at the factory and should not be removed. But if necessary, remove the pilot screw 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. Use this number of turns to set the screw to its original position during assembly.
- For the United States, Canada and Switzerland models, remove the pilot screw plug as follows:
 - Punch a hole in the plug and pry it out with an awl or other suitable tool.

CAUTION

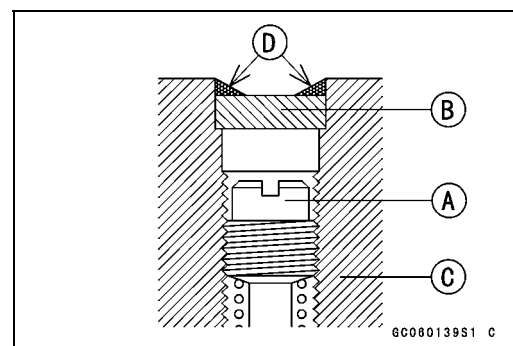
During carburetor disassembly, be careful not to damage the diaphragm. Never use a sharp edge to remove the diaphragm.

Carburetor Assembly

- Turn in the pilot screw [A] fully but not tightly, and then back it out the same number of turns counted during disassembly.
- For the United States, Canada and Switzerland models, install the pilot screw plug as follows:
 - Install a new plug [B] in the pilot screw hole of the carburetor body [C], and apply a small amount of a bonding agent [D] to the circumference of the plug to fix the plug.

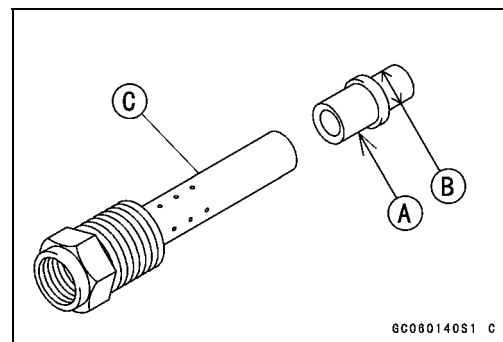
CAUTION

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



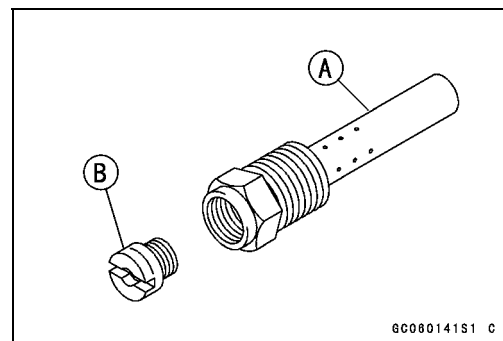
Carburetor

- 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 [C]. It will seat against the needle jet, pushing the end of the jet into the carburetor bore.

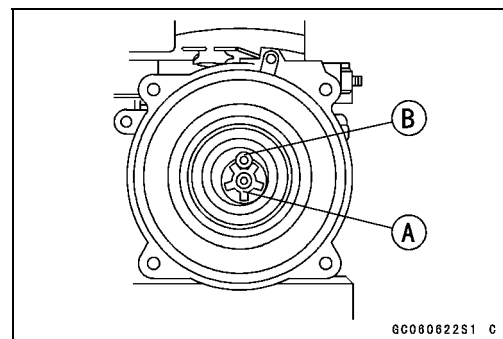


CAUTION

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



- 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.
- After installing the upper chamber cover, check that the vacuum piston slides up and down smoothly without binding in the carburetor bore.



Carburetor Cleaning

⚠ WARNING

Clean the carburetor in a well-ventilated area, and take care that there is 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 carburetor.

3-16 FUEL SYSTEM

Carburetor

CAUTION

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

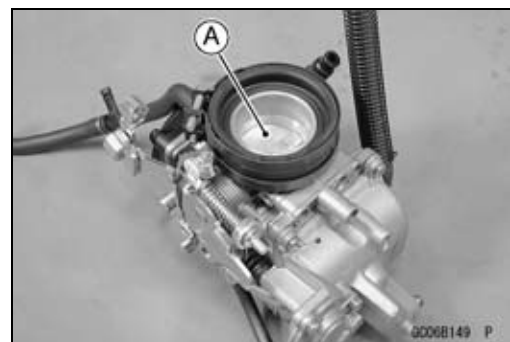
- Disassemble the carburetor.
- Immerse all the metal parts in a carburetor cleaning solution.
- Rinse the parts in water.
- When the parts are clean, dry them with compressed air.
- Blow through the air and fuel passages with compressed air.
- Assemble the carburetor.

Carburetor Inspection

⚠ WARNING

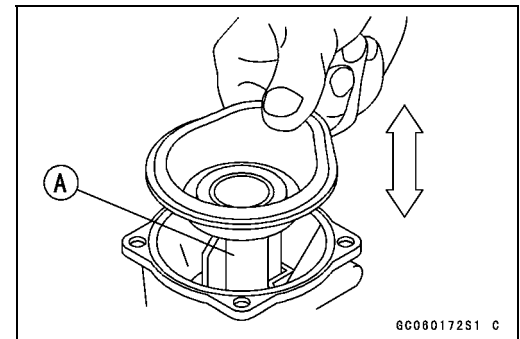
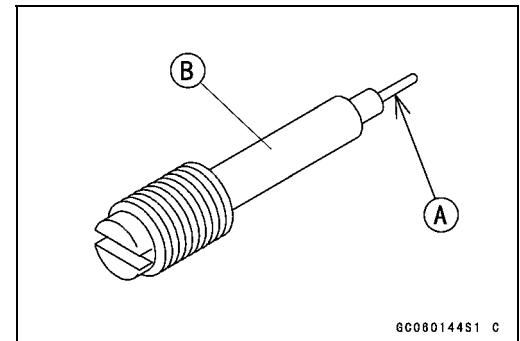
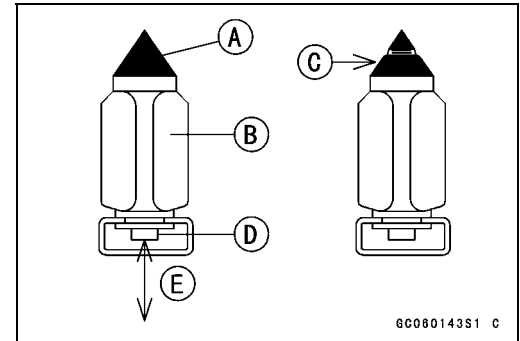
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Before disassembling the carburetor, check the fuel level (see Fuel Level Inspection).
- If the fuel level is incorrect, inspect the rest of the carburetor before correcting it.
- Remove the carburetor.
- Turn the throttle cable pulley to check that the throttle butterfly valve [A] move smoothly and return by spring tension.
- If the throttle valve do not move smoothly, replace the carburetor.



Carburetor

- Disassemble the carburetor.
- Clean the carburetor.
- Check that the O-rings on the float bowl and pilot screw 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 the rod [D] in the other end of the float valve needle, and then release it [E].
- ✚ If the rod does not spring out, replace the needle.
- Check the tapered portion [A] of the pilot screw [B] for wear or damage.
- ✚ If the pilot screw is worn or damaged on the tapered portion, it will prevent the engine from idling smoothly. Replace it.
- Check that the vacuum piston [A] moves smoothly in the carburetor body. The surface of the piston must not be excessively worn.
- ✚ If the vacuum piston does not move smoothly, or if it is very loose in carburetor body, replace the carburetor.

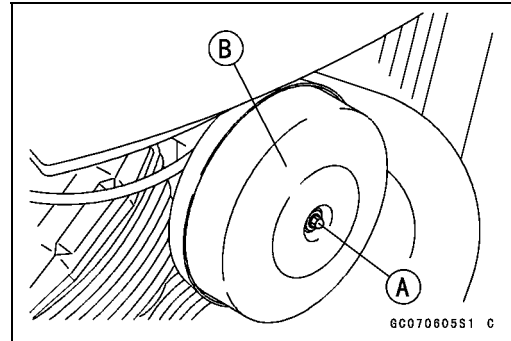


3-18 FUEL SYSTEM

Air Cleaner

Element Removal

- Remove:
 - Nut [A] and Washer
 - Air Cleaner Cover [B]

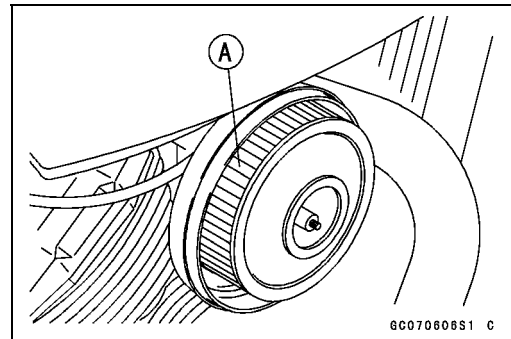


Element [A]

- 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 carburetors, the throttle may become stuck, possibly causing an accident.



CAUTION

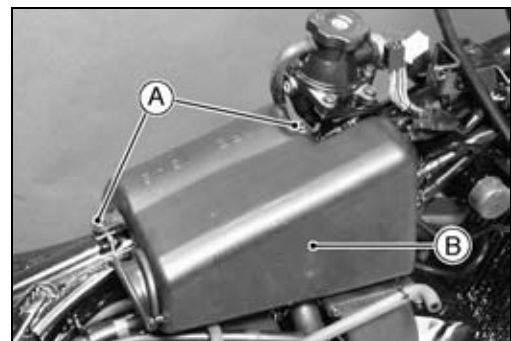
If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.

Element Cleaning and Inspection

- Refer to the Air Cleaner Element Clean in the Periodic Maintenance chapter.

Air Cleaner Housing Removal

- Remove:
 - Seat (see Frame chapter)
 - Fuel Tank (see Fuel Tank Removal)
 - Mounting Bolts [A] and Surge Tank [B]

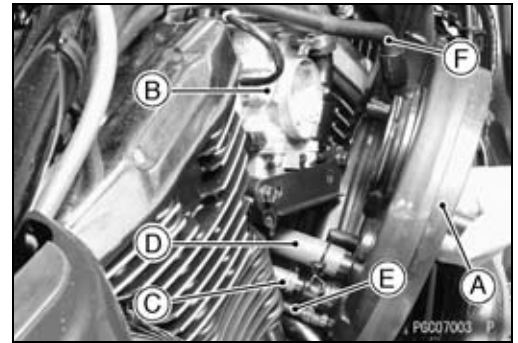


Air Cleaner Element (see Air Cleaner Element Removal)
Mounting Bolts [A]



Air Cleaner

- Remove the air cleaner housing [A] from the carburetor [B].
- Disconnect the engine breather hose [C], vacuum switch valve hose [D] and drain hose [E].
Evaporative Emission Hose [F] (for California Model)

*Air Cleaner Housing Installation*

- Tighten:
**Torque - Air Cleaner Element Cover Mounting Nut: 11 N·m
(1.1 kgf·m, 95 in·lb)**
**Air Cleaner Housing Mounting Bolts: 11 N·m (1.1
kgf·m, 95 in·lb)**

3-20 FUEL SYSTEM

Fuel Tank

Fuel Tank Removal

⚠ WARNING

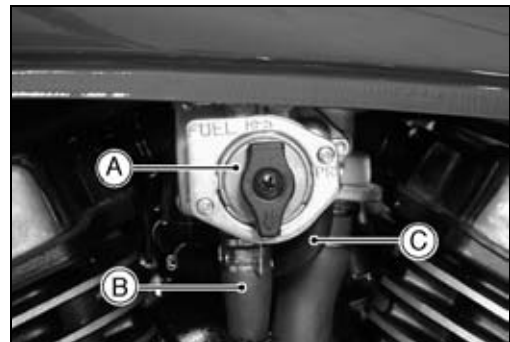
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

CAUTION

For California model, if gasoline, solvent, water or any other liquid enters the canister, the canister's vapor absorbing capacity is greatly reduced. If the canister does become contaminated, replace it with a new one.

- Turn the fuel tap [A] to the ON or RES position.
- Remove:
 - Fuel Hose [B]
 - Fuel Tap Vacuum Hose [C]
- Remove:
 - Seat (see Frame chapter)
 - Mounting Bolt [A] and Meter Unit [B] (see Electrical System chapter)

Fuel Tank Mounting Bolts [A]
Fuel Tank
Evaporative Emission Hoses (for California Model).



Fuel Tank Installation

- Read the WARNING mentioned in Fuel Tank removal.
- Route the hoses correctly (see Appendix chapter).
- Be sure the hoses are clamped securely to prevent leaks.
- Check the rubber dampers.
- If any damper is damaged or deteriorated, replace it.

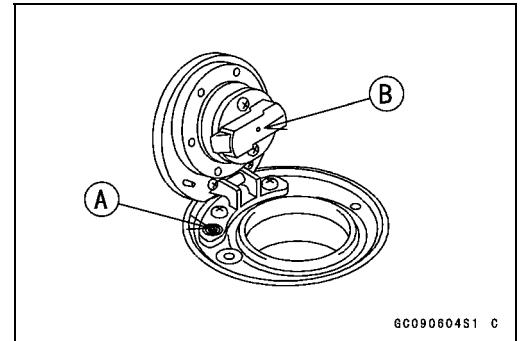
Fuel Tank

Fuel Tank Inspection

- Remove the fuel tank and drain it.
- Check to see if the breather pipe [A] (also the fuel return pipe for the California model) in the tank is not clogged. Check the tank cap breather also.
- ✚ If the breather pipe is clogged, blow the pipe free with compressed air.
- ✚ If the tank cap breather is clogged, replace the tank cap.

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 Tank Cleaning

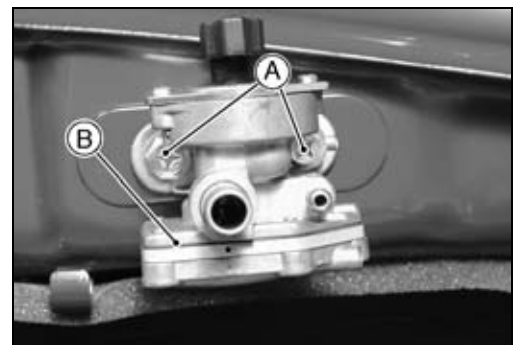
⚠ WARNING

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

- 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.
- Pour high flash-point solvent through the tap in all lever positions.
- Pour the solvent out of the tank.
- Remove the fuel tap from the tank (see Fuel Tap Removal).
- Clean the fuel tap filter screens in a high flash-point solvent.
- Dry the tank and screens with compressed air.
- Install the tank filters in the tank.
- Install the fuel tank (see Fuel Tank Installation).

Fuel Tap Removal

- Remove the Fuel Tap Position Lever (see Fuel Tank Removal).
- Remove the fuel tank and drain it.
- Remove:
 - Bolts [A] and Nylon Flat Washers
 - Fuel Tap [B]



3-22 FUEL SYSTEM

Fuel Tank

Fuel Tap Installation

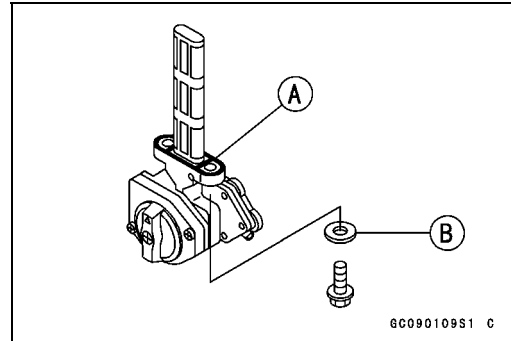
- Be sure the O-rings [A] is in good condition to prevent leaks.
- Be sure the nylon flat washers [B] are in good condition to prevent leaks.
- Do not use steel washers in place of the nylon flat washers, because they will not seal the bolts properly and fuel will leak.
- Be sure to clamp the fuel hoses to the tap to prevent leaks.

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

Fuel Tap Bolts: 4.9 N·m (0.50 kgf·m, 43 in·lb) (with black washer)

NOTE

- Be sure to use the black coating washers when the fuel tap shall be reinstalled.



Evaporative Emission Control System (California Model Only)

The Evaporative Emission Control System routes fuel vapors from the fuel system into the running engine or stores the vapors in a canister when the engine is stopped. Although no adjustments are required, a thorough visual inspection must be made at the intervals specified by the Periodic Maintenance Chart.

Parts Removal/Installation

WARNING

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

CAUTION

If gasoline, solvent, water or any other liquid enters the canister, the canister's vapor absorbing capacity is greatly reduced. If the canister does become contaminated, replace it with a new one.

- To prevent the gasoline from flowing into or out of the canister, hold the separator perpendicular to the ground.
- Connect the hoses according to the diagram of the system. Make sure they do not get pinched or kinked.
- Route hoses with a minimum of bending so that the air or vapor will not be obstructed.
- Be sure to plug the return hose to prevent fuel spilling before fuel tank removal.

WARNING

When removing the fuel tank, be careful not to spill the gasoline through the return hose. Spilled fuel is hazardous.

- ⚠ If liquid gasoline flows into the breather hose, remove the hose and blow it clean with compressed air.

Hose Inspection

- Refer to the Evaporative Emission Control System in the Periodic Maintenance chapter.

Separator Inspection

- Refer to the Evaporative Emission Control System in the Periodic Maintenance chapter.

3-24 FUEL SYSTEM

Evaporative Emission Control System (California Model Only)

Separator Operation Test

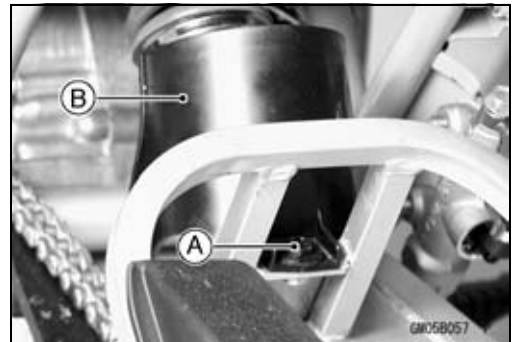
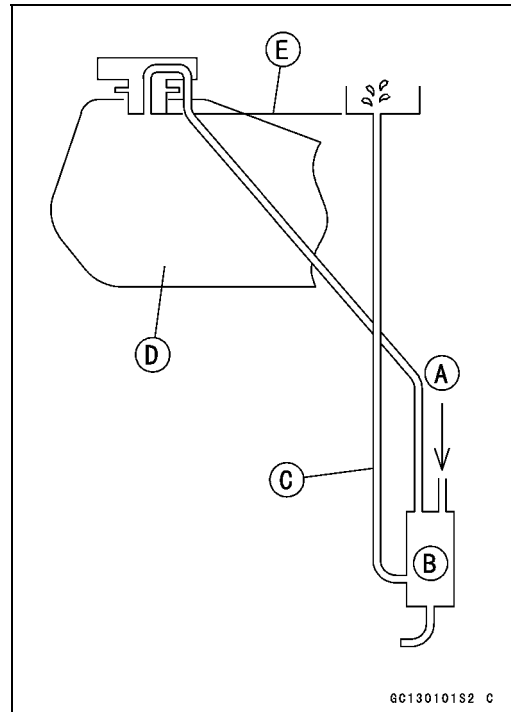
⚠ WARNING

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 the hoses to the separator, and install the separator on the motorcycle.
- Disconnect the breather hose from the separator, and inject about 20 mL of gasoline [A] into the separator [B] through the hose fitting.
- Disconnect the fuel return hose [C] from the fuel tank [D].
- Place the open end of the return hose into the container and hold it with the same level of the tank top [E].
- start the engine, and let it idle.
- If the gasoline in the separator comes out of the hose, the separator works well. If it does not, replace the separator with a new one.

Canister Inspection

- Refer to the Evaporative Emission Control System in the Periodic Maintenance chapter.

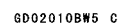


Cooling System

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Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Water Pump Impeller Nut	11	1.1	95 in·lb	
2	Water Hose Fitting Bolts	11	1.1	95 in·lb	
3	Radiator Hose Clamp Screws	2.0	0.2	17 in·lb	
4	Radiator Fan Switch	18	1.8	13	SS
5	Water Temperature Sensor	7.8	0.8	69 in·lb	SS
6	Coolant Drain Plug	11	1.1	95 in·lb	

G: Apply grease.

SS: Apply silicone sealant.

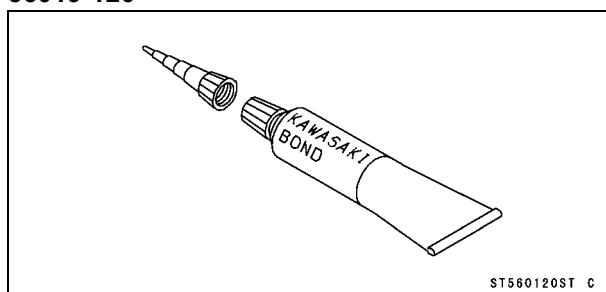
4-4 COOLING SYSTEM

Specifications

Item	Standard	Service Limit
Coolant provided when shipping		
Type	Permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)	— — —
Color	Green	— — —
Mixed Ratio	Soft water 50%, coolant 50%	— — —
Freezing Point	−35°C (−31°F)	— — —
Total Amount	2.4 L (2.5 US qt) (reserve tank full level including radiator and engine)	— — —
Radiator cap		
Relief Pressure	93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm ² , 14 ~ 18 psi)	— — —
Thermostat		
Valve Opening Temperature	58 ~ 62°C (136 ~ 144°F)	— — —
Valve Full Opening Lift	8 mm (0.31 in.) or more @75°C (167°F)	— — —

Special Tools

Kawasaki Bond (Silicone Sealant):
56019-120



4-6 COOLING SYSTEM

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 55°C (131°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 58 ~ 62°C (136 ~ 144°F), the thermostat opens and the coolant flows.

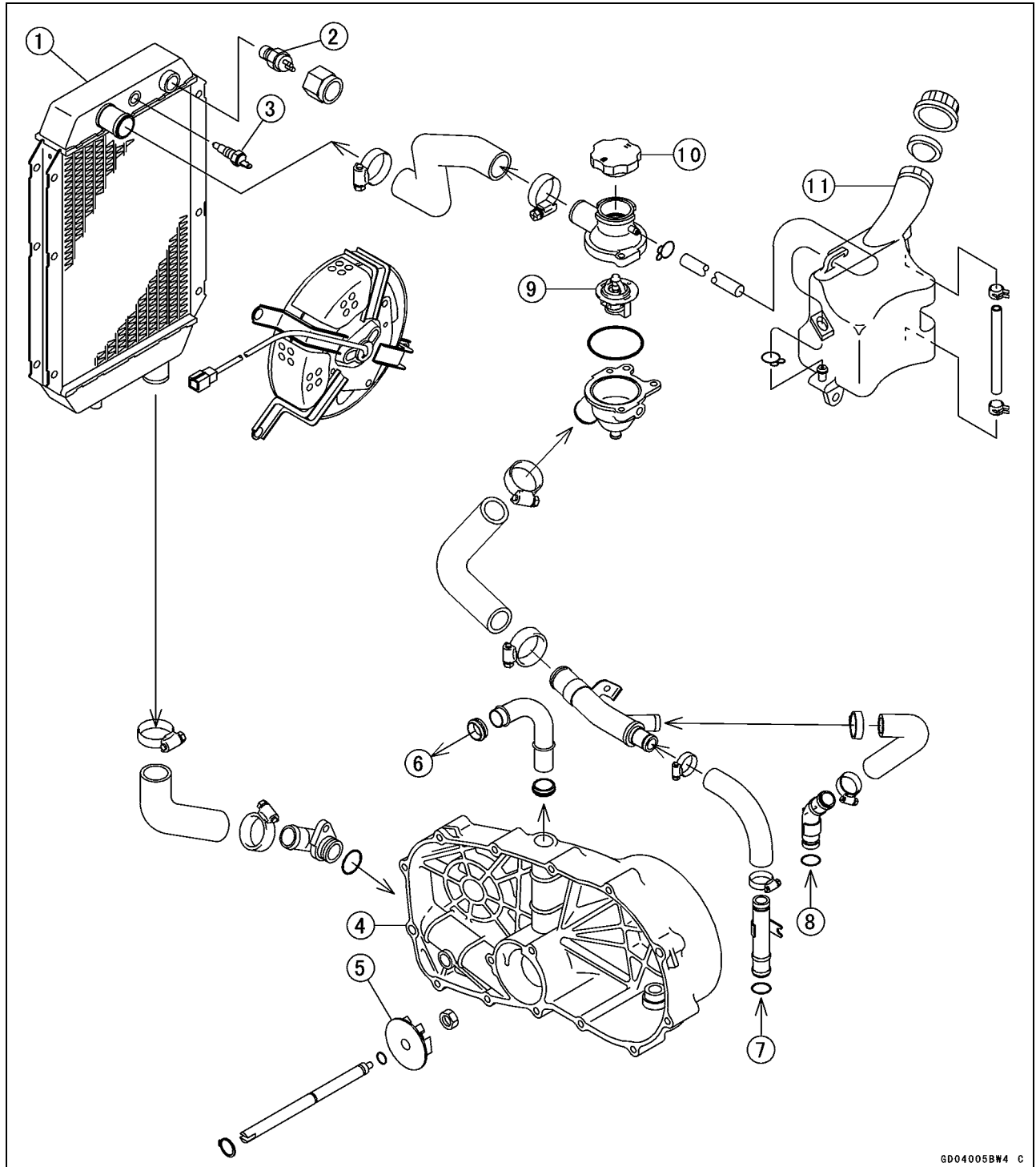
When the coolant temperature goes up beyond 96 ~ 100°C (205 ~ 212°F), the radiator fan switch conducts to operate the radiator fan. The radiator fan draws air through the radiator core when there is not sufficient air flow such as at low speeds. This increases up the cooling action of the radiator. When the temperature is below 91°C (196°F), 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.

Coolant Flow Chart



GD04005BW4 C

- | | |
|-----------------------------|-----------------------------|
| 1. Radiator | 5. Water Pump Impeller |
| 2. Fan Switch | 6. To Crankcase |
| 3. Water Temperature Sensor | 7. From Rear Cylinder Head |
| 4. Right Engine Cover | 8. From Front Cylinder Head |

9. Thermostat

When the engine is cold, the thermostat is closed so that the coolant flow is restricted through the air bleeder hole, causing the engine to warm up more quickly.

10. Radiator Cap

11. Reserve Tank

When the engine is very hot, the pressure valve in the radiator cap allows air and vapor to escape into the reserve tank. When the engine cools down, the pressure drop draws the vacuum valve (another small valve) open, admitting coolant from the reserve tank into the radiator.

4-8 COOLING SYSTEM

Coolant

Coolant Deterioration Inspection

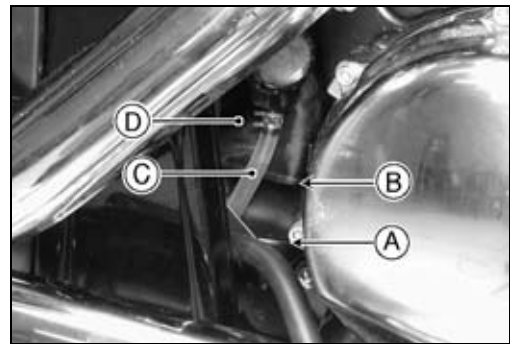
- Visually inspect the coolant in the reserve tank.
- ✚ If whitish cotton-like wafts are observed, aluminum parts in the cooling system are corroded. If the coolant is brown, iron or steel parts are rusting. In either case, flush the cooling system.
- ✚ If the coolant gives off an abnormal smell, check for a cooling system leak. It may be caused by exhaust gas leaking into the cooling system.

Coolant Level Inspection

NOTE

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

- Check the coolant level in the reserve tank with the motorcycle held perpendicular.
- ✚ If the coolant level is lower than the low ("L") level line [A], add coolant to the full ("F") level line [B].
Level Gauge [C]
Reserve Tank [D]



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 reserve tank has run completely dry, there is probably leakage in the cooling system. Check the system for leaks.

Coolant Draining

- Refer to the Coolant Change in the Periodic Maintenance chapter.

Coolant Filling

- Refer to the Coolant Change in the Periodic Maintenance chapter.

Coolant

Pressure Testing

- Remove the meter unit (see Electrical System chapter).
- Remove the radiator cap, and install a cooling system pressure tester [A] on the 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).

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).

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

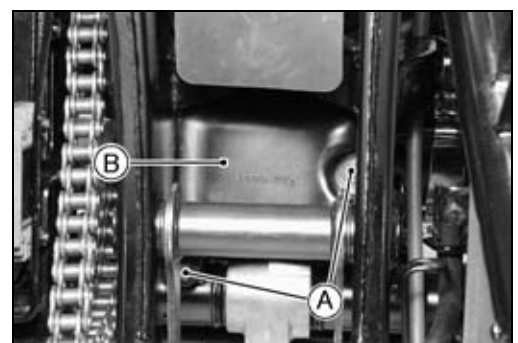
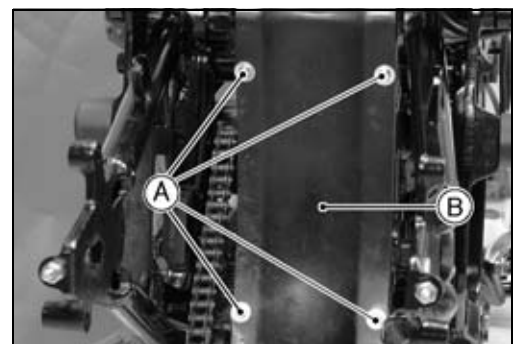
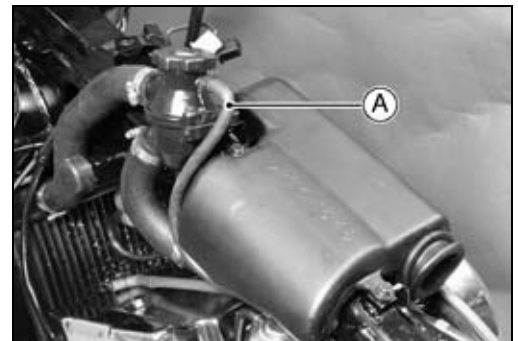
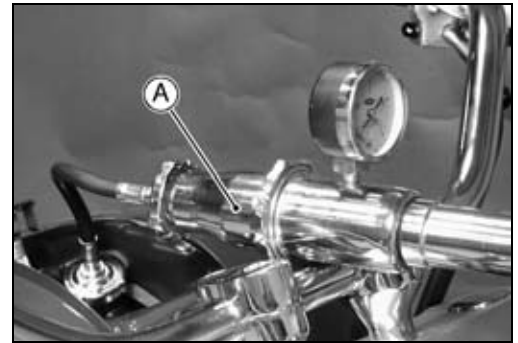
Reserve Tank Removal

- Remove:
 - Seat (see Frame chapter)
 - Fuel Tank (see Fuel System chapter)
 - Coolant Hose [A]

Muffler (see Engine Top End chapter)
 Rear Fender (see Frame chapter)
 Rear Wheel (see Wheels/Tires chapter)
 Rear Shock Absorber (see Suspension chapter)
 Bolts [A] and Rear Wheel Mud Guard [B]

Bolts [A] and Reserve Tank [B]

- ✚ If necessary, remove the reserve tank mounting bracket.

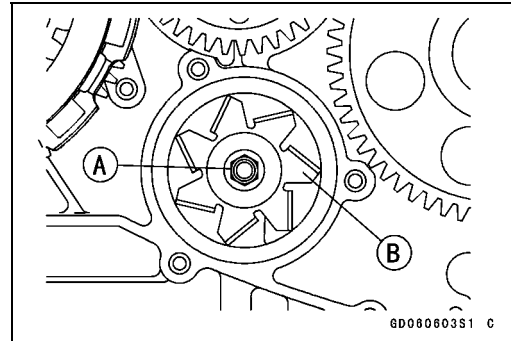


4-10 COOLING SYSTEM

Water Pump

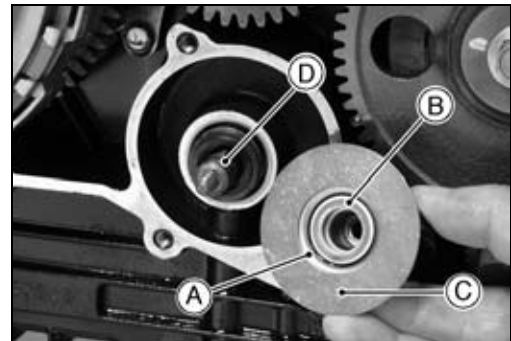
Water Pump Impeller Removal

- Drain:
 - Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)
 - Coolant (see Coolant Draining in the Periodic Maintenance chapter)
- Remove:
 - Right Engine Cover (see Clutch chapter)
 - Nut [A]
 - Impeller [B]



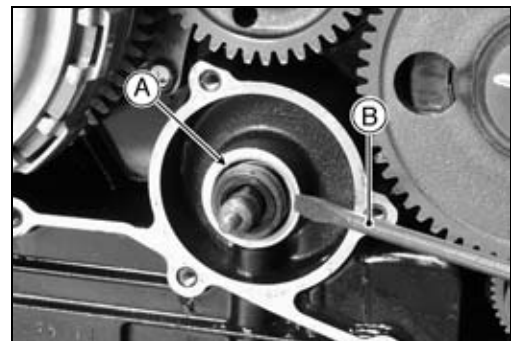
Water Pump Impeller Installation

- Be sure to install the rubber seal [A] and sealing seat [B] into the impeller [C] by hand until the seat bottoms out.
- Apply a little coolant to the sealing seat to give the seal initial lubrication.
- Be sure to install a new O-ring [D] on the shaft.
- Tighten:
 - Torque - Water Pump Impeller Nut: 11 N·m (1.1 kgf·m, 95 in·lb)**

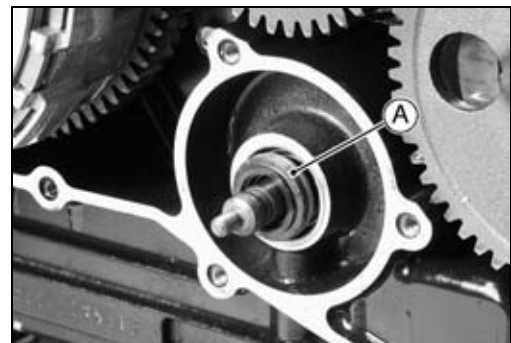


Mechanical Seal Replacement

- Remove
 - Water Pump Impeller (see Water Pump Impeller Removal)
 - O-ring
- Pry the mechanical seal flange [A] off with a small chisel [B].



- Pull the mechanical seal [A] out of the crankcase with pliers.



CAUTION

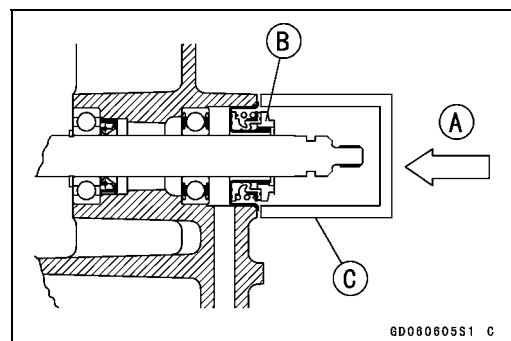
Be careful not to damage the water pump shaft and the inner sealing surface of the crankcase.

- Discard the mechanical seal.

NOTE

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

- Press [A] the new mechanical seal [B] into the hole by using a suitable socket [C] until it bottoms out.



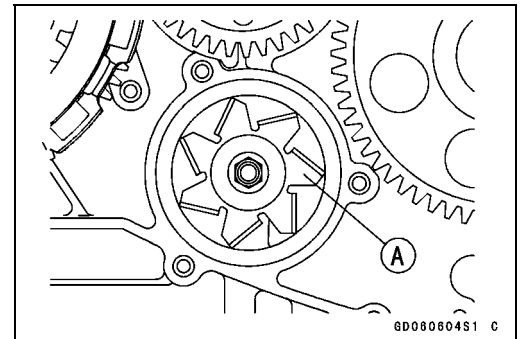
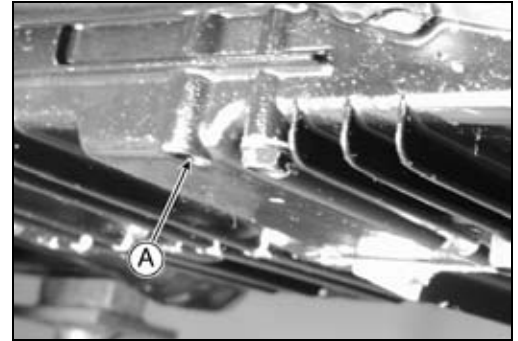
CAUTION

Be careful not to damage the water pump shaft and mechanical seal.

Water Pump

Water Pump Inspection

- Check the drainage outlet passage [A] at the bottom of the right crankcase for coolant leaks.
- ✚ If the mechanical seal is damaged, the coolant leaks through the seal and drains through the passage. Replace the mechanical seal with a new one.
- Visually inspect the impeller [A].
- ✚ If the surface is corroded, or if the blades are damaged, replace the impeller.



4-12 COOLING SYSTEM

Radiator, Radiator Fan

Radiator and Radiator Fan Removal

⚠ 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.**

- Remove:
 - Coolant (see Coolant Draining in the Periodic Maintenance chapter)
 - Seat (see Frame chapter)
 - Fuel Tank (see Fuel System chapter)
 - Surge Tank (see Fuel system chapter)
 - Horn Lead Connectors [A]
 - Bolts [B] and Horn [C]

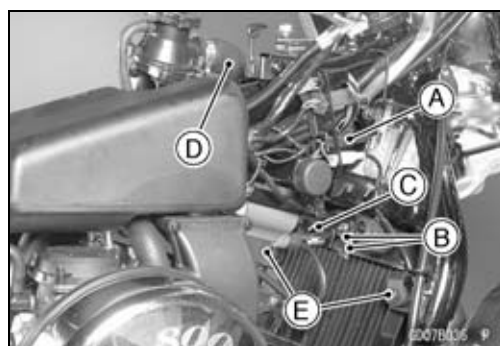
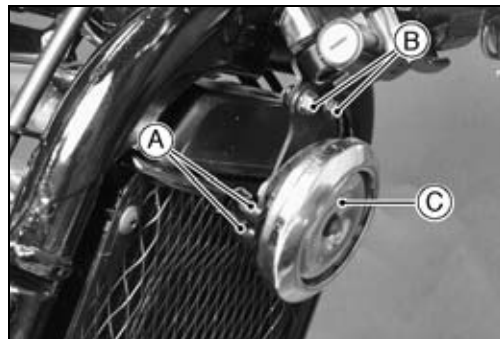
Water Hose [A]

Radiator Fan Connector [A]
Fan Switch Lead Connectors [B]
Water Temperature Sensor Lead Connector [C]
Water Hose [D]
Radiator Mounting Bolts [E]
Radiator

Radiator Fan Mounting Bolts [A]
Radiator Fan [B]

CAUTION

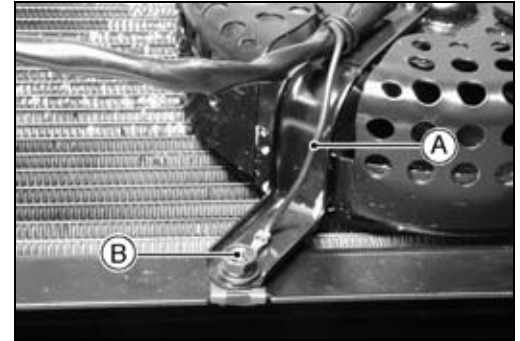
Do not touch the radiator core. This could damage the radiator fins, resulting in loss of cooling efficiency.



Radiator, Radiator Fan

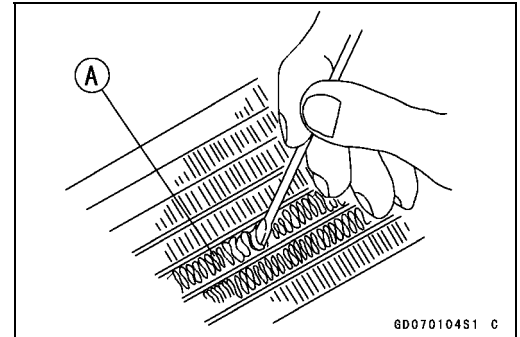
Radiator Fan Installation

- Be sure to attach the ground lead [A] to the fan mounting bolt [B].

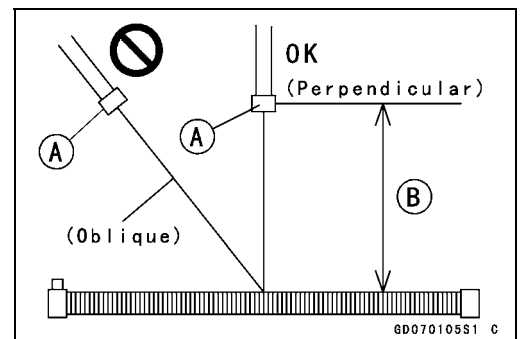


Radiator Inspection

- Check the radiator core.
- ✚ If there are obstructions to air flow, remove them.
- ✚ If the corrugated fins [A] are deformed, carefully straighten them.
- ✚ If the air passages of the radiator core are blocked more than 20% by unremovable obstructions or irreparably deformed fins, replace the radiator with a new one.

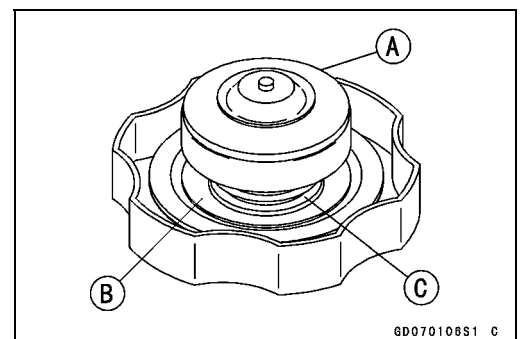


CAUTION
<p>When cleaning the radiator with steam cleaner, be careful of the following to prevent radiator damage. Keep the steam gun [A] away more than 0.5 m (1.6 ft) [B] from the radiator core. Hold the steam gun perpendicular to the core surface. Run the steam gun following the core fin direction.</p>



Radiator Cap Inspection

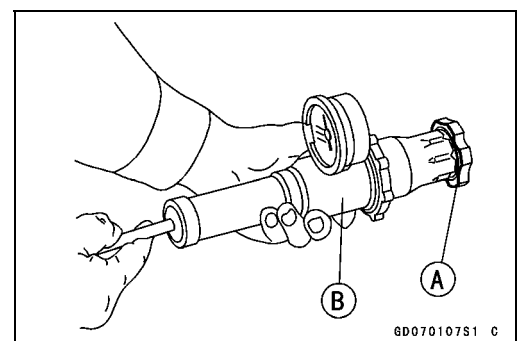
- Check the condition of the top [A] and bottom [B] valve seals and valve spring [C].
- ✚ If any one of them shows visible damage, replace the cap with a new one.



- 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.



4-14 COOLING SYSTEM

Radiator, Radiator Fan

- Watching the pressure gauge, pump the pressure tester to build up the pressure until the relief valve opens: the gauge hand flicks downward. Stop pumping and measure leak time at once. The relief valve must open within the specified range in the table below and the gauge hand must remain within the same range at least 6 seconds.

Radiator Cap Relief Pressure

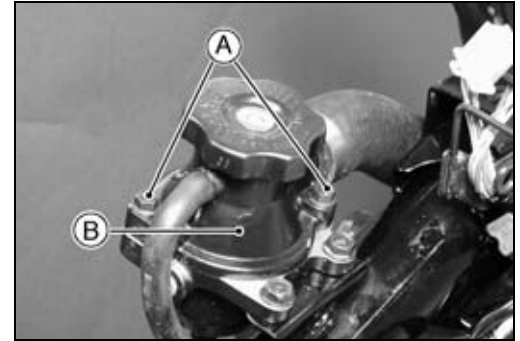
Standard: 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi)

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

Thermostat

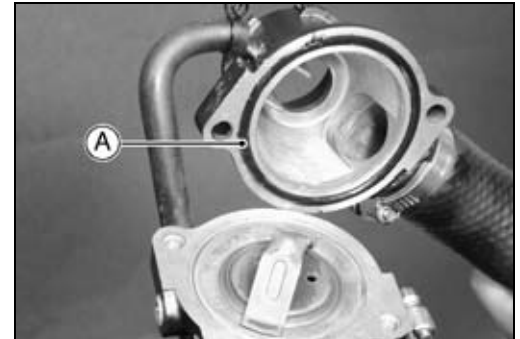
Thermostat Removal

- Remove:
 - Coolant (see Coolant Draining in the Periodic Maintenance chapter)
 - Seat (see Frame chapter)
 - Fuel Tank (see Fuel System chapter)
 - Thermostat Housing Cover Bolts [A]
 - Thermostat Housing Cover [B]
 - Thermostat



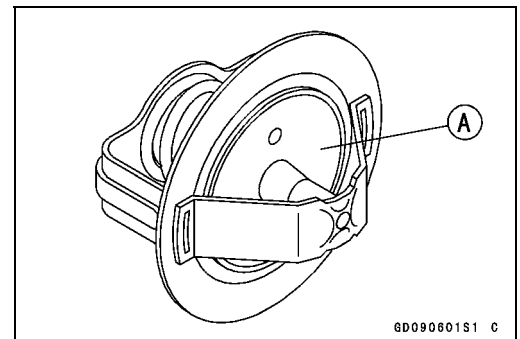
Thermostat Installation

- Install a new O-ring [A] into the housing.
- Install:
 - Thermostat
 - Thermostat Housing Cover
- Fill the radiator with coolant (see Cooling System in the Periodic Maintenance chapter).



Thermostat Inspection

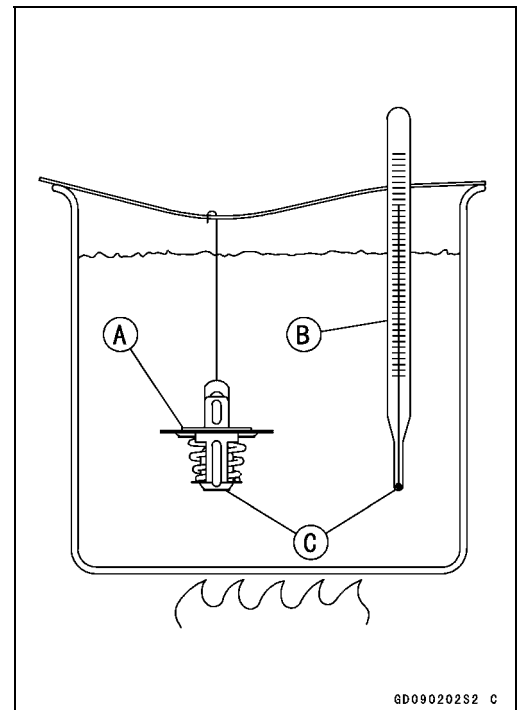
- Remove the thermostat, and inspect the thermostat valve [A] at room temperature.
- ✚ If the valve is open, replace the thermostat with a new one.



- To check valve opening temperature, suspend the thermostat [A] in a container of water and raise the temperature of the water.
- The thermostat must be completely submerged and must not touch the container sides or bottom. Suspend an accurate thermometer [B] in the water so that the heat sensitive portions [C] are located in almost the same depth. It must not touch the container, either.
- ✚ If the measurement is out of the specified range, replace the thermostat with a new one.

Thermostat Valve Opening Temperature

58 ~ 62°C (136 ~ 144°F)



4-16 COOLING SYSTEM

Hose and Pipes

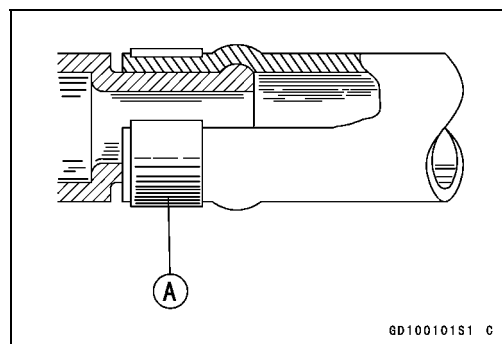
Hose Installation

- Install the hoses and pipes being careful to follow bending direction or diameter. Avoid sharp bending, kinking, flattening, or twisting.
- Install the clamps [A] as near as possible to the hose end to clear the raised rib or the fitting. This will prevent the hoses from working loose.
- The clamp screws should be positioned correctly to prevent the clamps from contacting anything.

Torque - Water Hose Clamp Screws: 2.0 N·m (0.2 kgf·m, 17 in·lb)

Hose Inspection

- Refer to the Water Hose and Connection Inspection in the Periodic Maintenance chapter



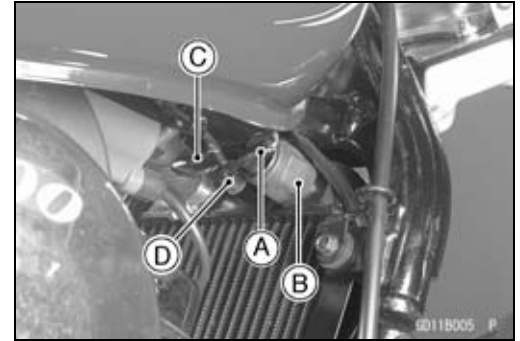
Radiator Fan Switch, Water Temperature Sensor

Radiator Fan Switch, Water Temperature Sensor Removal

CAUTION

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

- Drain the coolant (see Coolant Draining in the Periodic Maintenance chapter).
- Remove:
 - Fuel Tank and Surge Tank (see Fuel System chapter)
 - Radiator Fan Switch Lead Connector [A]
 - Cover [B] and Radiator Fan Switch
 - Water Temperature Sensor Lead Connector [C]
 - Water Temperature Sensor [D]



Radiator Fan Switch, Water Temperature Sensor Installation

- Apply silicone sealant to the threads of the fan switch and water temperature sensor.
- Sealant - Kawasaki Bond (Silicone Sealant): 56019-120**
- Tighten the fan switch and water temperature sensor.
 - Torque - Radiator Fan Switch: 18 N·m (1.8 kgf·m, 13.0 ft·lb)**
 - Water Temperature Sensor: 7.8 N·m (0.80 kgf·m, 69 in·lb)**
- Fill the coolant and bleed the air from cooling system (see Coolant Filling in the Periodic Maintenance chapter).

Radiator Fan Switch, Water Temperature Sensor Inspection

- Refer to Electrical System chapter for these inspections.

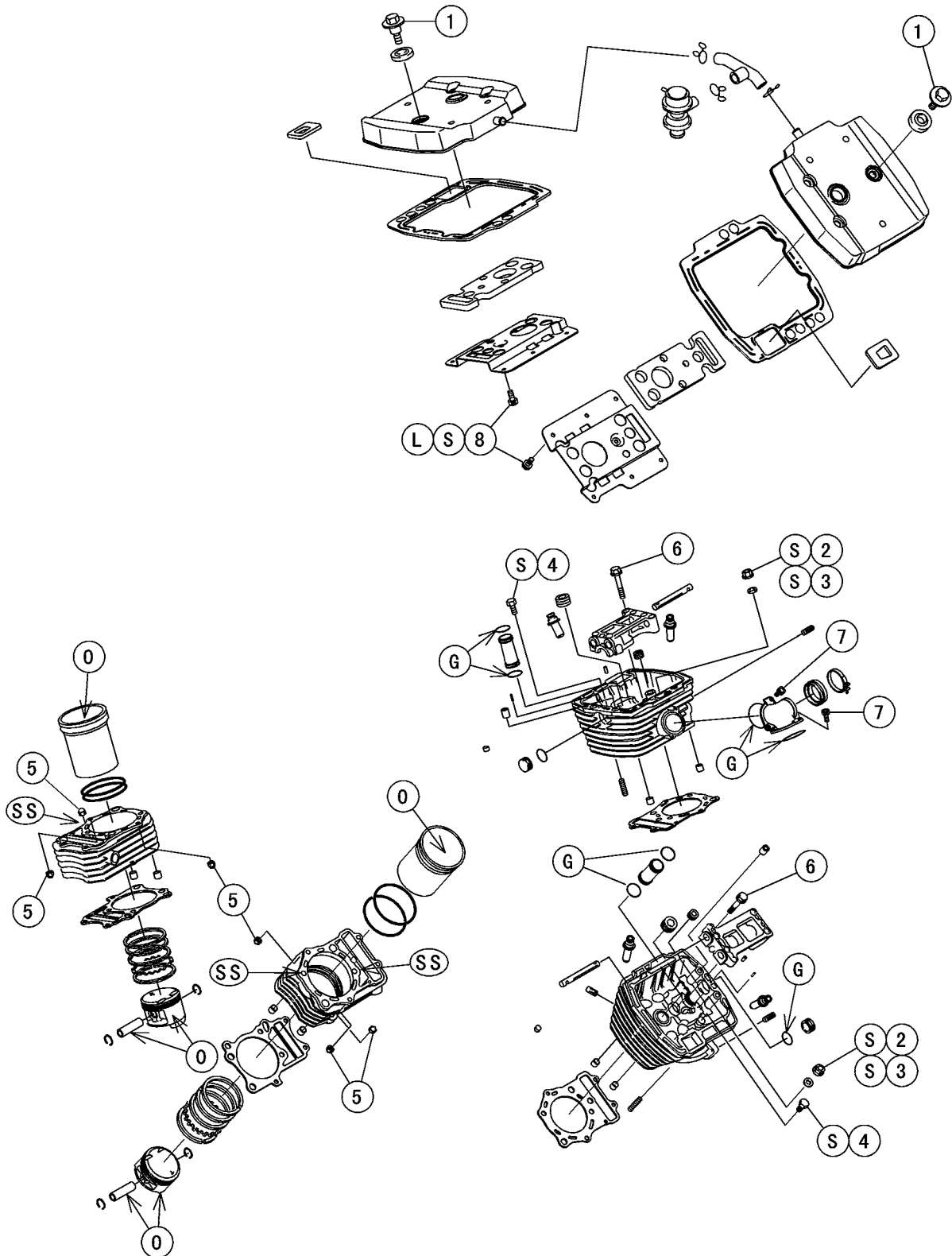
Engine Top End

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5-2 ENGINE TOP END

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Cylinder Head Cover Bolts	12	1.2	104 in·lb	
2	Cylinder Head Nuts (10 mm)	39	4.0	29	S
3	Cylinder Head Nuts (8 mm)	25	2.5	18.0	S
4	Cylinder Head Bolts	12	1.2	104 in·lb	S
5	Cylinder Nuts	25	2.5	18.0	
6	Camshaft Cap Bolt	25	2.5	18.0	
7	Intake Manifold Bolts	12	1.2	104 in·lb	
8	Cylinder Head Cover Damper Plate Bolts	7.8	0.8	69 in·lb	L, S

G: Apply grease.

L: Apply a non-permanent locking agent.

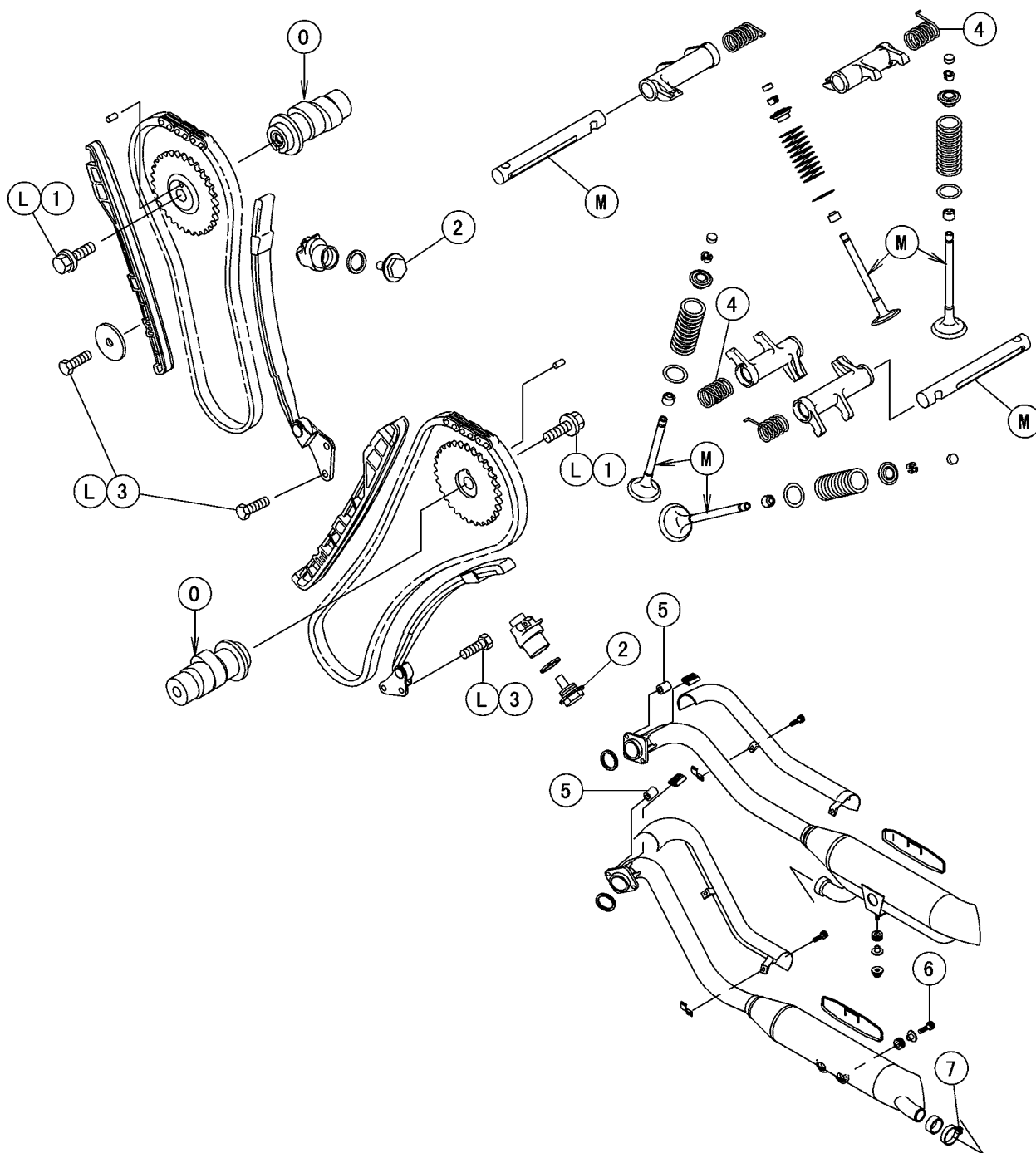
O: Apply oil.

S: Follow specified tightening sequence.

SS: Apply silicone sealant.

5-4 ENGINE TOP END

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Camshaft Sprocket Bolts	49	5.0	36	L
2	Camshaft Chain Tensioner Cap Bolts	20	2.0	14.5	
3	Camshaft Chain Guide Bolts	11	1.1	95 in·lb	L

4. Rocker Arm Spring (Intake), (Red Paint mark)

5. Exhaust Pipe Holder Nuts

6. Muffler Mounting Bolts

7. Muffler Connecting Clamp Bolt

L: Apply a non-permanent locking agent.

M: Apply molybdenum

O: Apply oil.

5-6 ENGINE TOP END

Specifications

Item	Standard	Service Limit
Clean Air System		
Vacuum Switch Valve Closing Pressure	Open → Close 57 ~ 65 kPa (430 ~ 490 mmHg)	— — —
Camshafts		
Cam Height:		
Inlet	35.305 ~ 35.413 mm (1.3900 ~ 1.3942 in.)	35.21 mm (1.386 in.)
Exhaust	35.033 ~ 35.141 mm (1.3792 ~ 1.3835 in.)	34.93 mm (1.375 in.)
Camshaft Journal, Camshaft Cap Clearance	0.028 ~ 0.071 mm (0.0011 ~ 0.0028 in.)	0.16 mm (0.006 in.)
Camshaft Journal Diameter	26.950 ~ 26.972 mm (1.0610 ~ 1.0619 in.)	26.92 mm (1.060 in.)
Camshaft Bearing Inside Diameter	27.000 ~ 27.021 mm (1.0630 ~ 1.0638 in.)	27.08 mm (1.066 in.)
Camshaft Runout	TIR 0.02 mm (0.0008 in.) or less	TIR 0.1 mm (0.004 in.)
Rocker Arm Inside Diameter	16.000 ~ 16.018 mm (0.6300 ~ 0.6306 in.)	16.05 mm (0.632 in.)
Rocker Shaft Diameter	15.965 ~ 15.984 mm (0.6285 ~ 0.6293 in.)	15.94 mm (0.628 in.)
Cylinder Head		
Cylinder Compression	(usable range) 855 ~ 1 315 kPa (8.7 ~ 13.4 kgf/cm ² , 124 ~ 191 psi) @470 r/min (rpm)	— — —
Cylinder Head Warp	— — —	0.05 mm (0.002 in.)
Valves		
Valve Head Thickness:		
Inlet	0.5 mm (0.02 in.)	0.3 mm (0.01 in.)
Exhaust	0.8 mm (0.03 in.)	0.5 mm (0.02 in.)
Valve Stem Bend	TIR 0.01 mm (0.0004 in.) or less	TIR 0.05 mm (0.002 in.)
Valve Stem Diameter:		
Inlet	4.975 ~ 4.990 mm (0.1959 ~ 0.1965 in.)	4.96 mm (0.195 in.)
Exhaust	4.955 ~ 4.970 mm (0.1951 ~ 0.1957 in.)	4.94 mm (0.194 in.)
Valve Guide Inside Diameter	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in.)	5.07 mm (0.200 in.)
Valve/valve Guide Clearance (wobble method):		
Inlet	0.03 ~ 0.12 mm (0.001 ~ 0.005 in.)	0.26 mm (0.010 in.)
Exhaust	0.10 ~ 0.18 mm (0.004 ~ 0.007 in.)	0.32 mm (0.013 in.)
Valve Seat Cutting Angle	45°, 32°, 60°	— — —
Valve Seat Surface:		
Width	0.5 ~ 1.0 mm (0.02 ~ 0.04 in.)	— — —
Outside Diameter:		
Inlet	30.9 ~ 31.1 mm (1.216 ~ 1.224 in.)	— — —
Exhaust	26.9 ~ 27.1 mm (1.059 ~ 1.067 in.)	— — —
Valve Spring Free Length	40.5 mm (1.59 in.)	38.6 mm (1.52 in.)
Cylinder, Piston		
Cylinder Inside Diameter	88.000 ~ 88.012 mm (3.4646 ~ 3.4650 in.)	88.11 mm (3.468 in.)
Piston Diameter	87.975 ~ 87.990 mm (3.4636 ~ 3.4642 in.)	87.83 mm (3.458 in.)

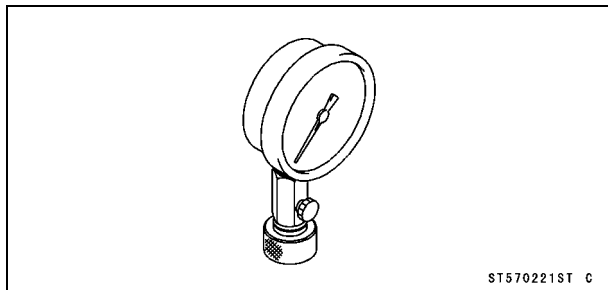
Specifications

Item	Standard	Service Limit
Piston/Cylinder Clearance	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in.)	— — —
Oversize Pistons and Rings	+0.5 mm (0.02 in.)	— — —
Piston Ring/Groove Clearance:		
Top	0.03 ~ 0.07 mm (0.001 ~ 0.003 in.)	0.17 mm (0.007 in.)
Second	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)	0.16 mm (0.006 in.)
Piston Ring Groove Width:		
Top	1.02 ~ 1.04 mm (0.0402 ~ 0.0409 in.)	1.12 mm (0.0441 in.)
Second	1.01 ~ 1.03 mm (0.0397 ~ 0.0406 in.)	1.11 mm (0.0437 in.)
Piston Ring Thickness:		
Top and Second	0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)	0.90 mm (0.035 in.)
Piston Ring End Gap:		
Top	0.25 ~ 0.40 mm (0.010 ~ 0.016 in.)	0.7 mm (0.03 in.)
Second	0.40 ~ 0.55 mm (0.016 ~ 0.022 in.)	0.9 mm (0.04 in.)

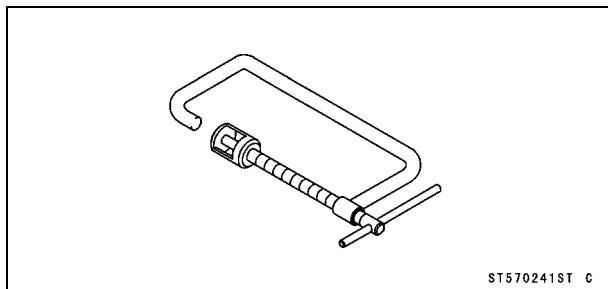
5-8 ENGINE TOP END

Special Tools

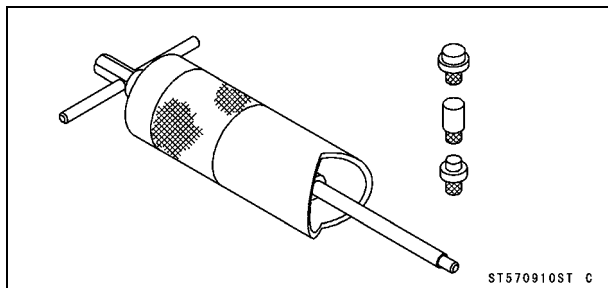
**Compression Gauge, 20 kgf/cm²:
57001-221**



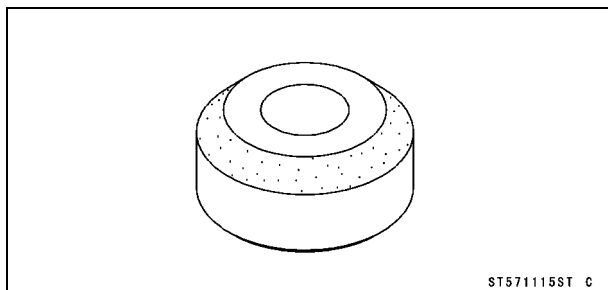
**Valve Spring Compressor Assembly:
57001-241**



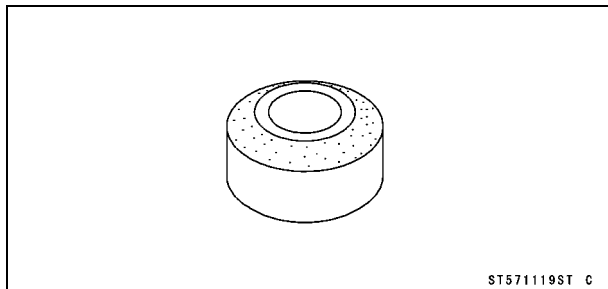
**Piston Pin Puller Assembly:
57001-910**



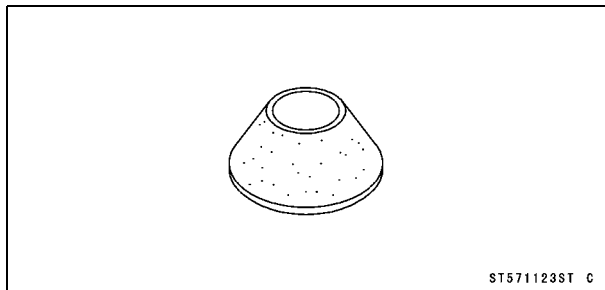
**Valve Seat Cutter, 45° - \varnothing 32:
57001-1115**



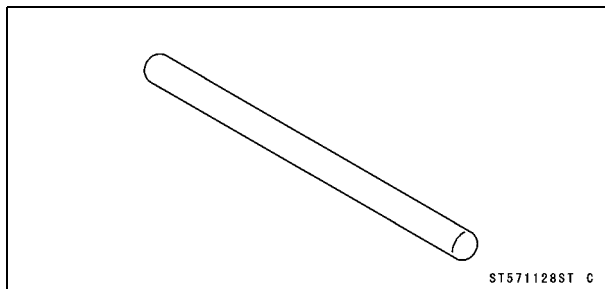
**Valve Seat Cutter, 32° - \varnothing 28:
57001-1119**



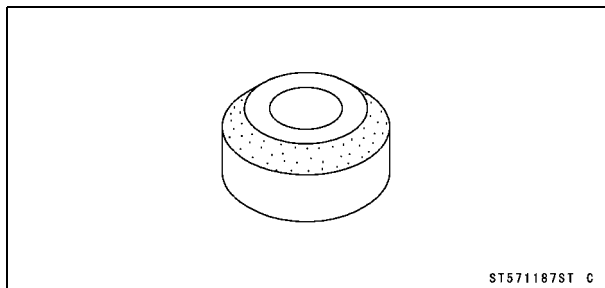
**Valve Seat Cutter, 60° - \varnothing 30:
57001-1123**



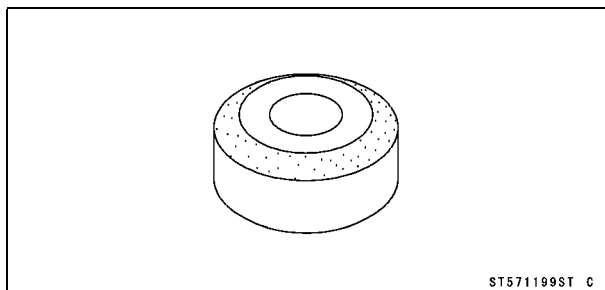
**Valve Seat Cutter Holder Bar:
57001-1128**



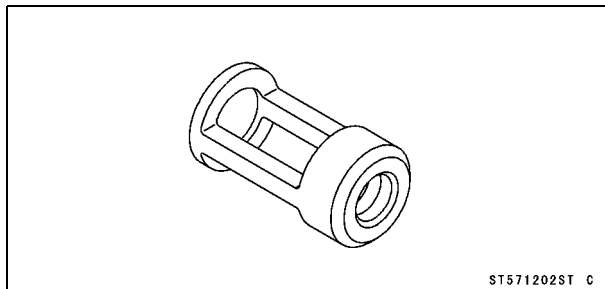
**Valve Seat Cutter, 45° - \varnothing 30:
57001-1187**



**Valve Seat Cutter, 32° - \varnothing 33:
57001-1199**

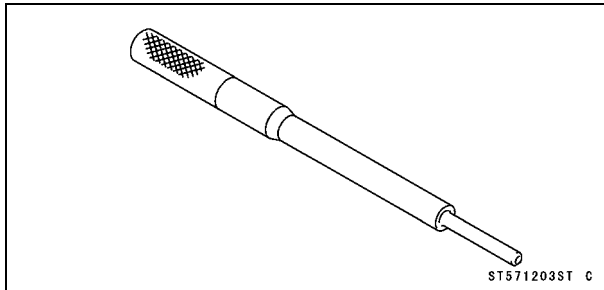


**Valve Spring Compressor Adapter, \varnothing 22:
57001-1202**

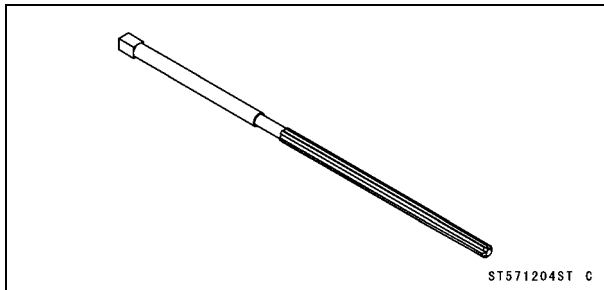


Special Tools

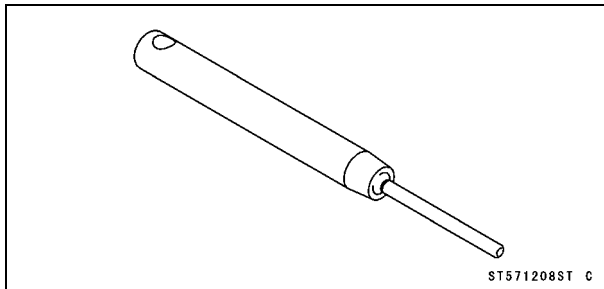
Valve Guide Arbor, 5:
57001-1203



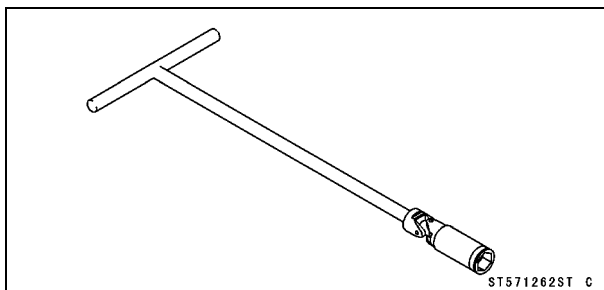
Valve Guide Reamer, 5:
57001-1204



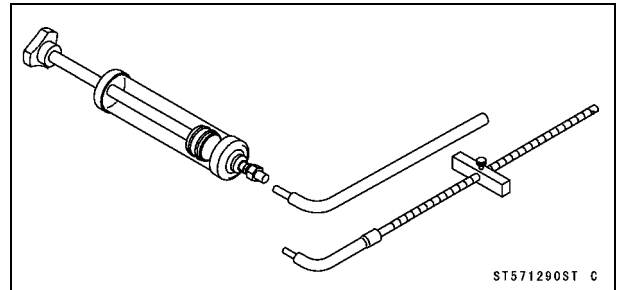
Valve Seat Cutter Holder, 5:
57001-1208



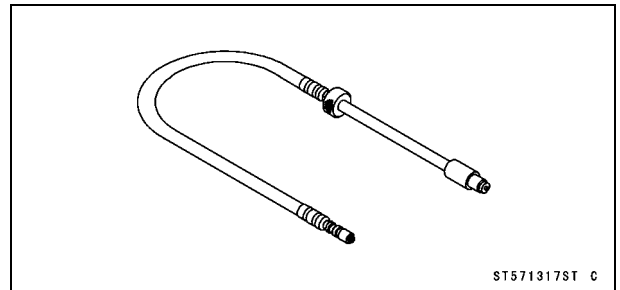
Spark Plug Wrench, Hex 16:
57001-1262



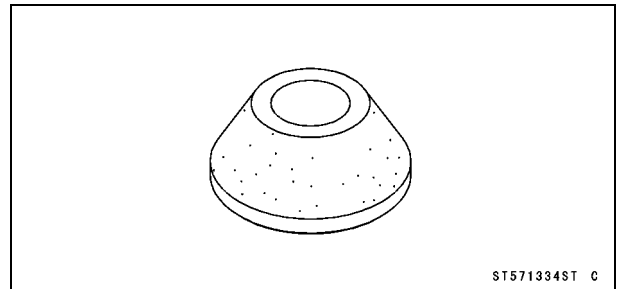
Fork Oil Level Gauge:
57001-1290



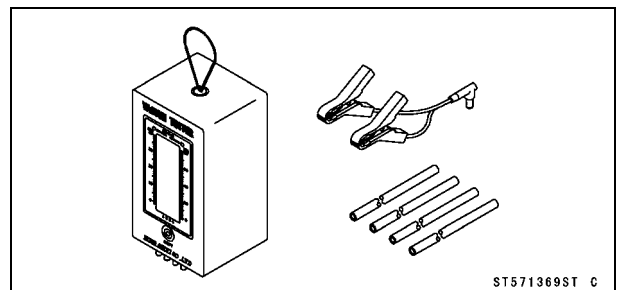
Compression Gauge Adapter, M10 × 1.0:
57001-1317



Valve Seat Cutter, 60° - 33:
57001-1334



Vacuum Gauge KEK-55-5:
57001-1369



NOTE

○The following valve seat cutters can be used instead of the above tools.

Inlet Valves:

Valve Seat Cutter, 55° - 35: 57001-1247
(instead of Valve Seat Cutter: 60° - 33: 57001-1334)

Exhaust Valves:

Valve Seat Cutter, 45° - 32: 57001-1115
(instead of Valve Seat Cutter: 45° - 30: 57001-1187)

Valve Seat Cutter, 32° - 30: 57001-1120
(instead of Valve Seat Cutter: 32° - 28: 57001-1119)

5-10 ENGINE TOP END

Clean Air System

Air Suction Valve Removal

- Refer:
Cylinder Head Cover Removal

Air Suction Valve Installation

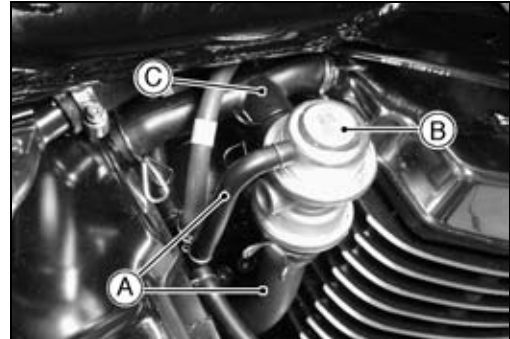
- Refer:
Cylinder Head Cover Installation

Air Suction Valve Inspection

- Refer to the Air Suction Valve Inspection in the Periodic Maintenance chapter.

Vacuum Switch Valve Removal

- Remove:
Seat (see Frame chapter)
Fuel Tank and Surge Tank (see Fuel System chapter)
- Pull off the hoses [A] and take out vacuum switch valve [B] with the hose [C].



Vacuum Switch Valve Installation

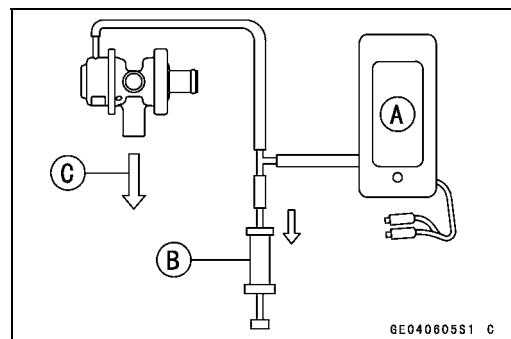
- Install the vacuum switch valve.
- Route the hoses correctly (see Appendix chapter).

Vacuum Switch Valve Test

- Remove the vacuum switch valve. (see Vacuum Switch Valve Removal).
- Connect the vacuum gauge [A] and syringe [B] or fork oil level gauge to the vacuum hoses as shown.

Special Tool - Vacuum Gauge KEK-55-5: 57001-1369
Fork Oil Level Gauge: 57001-1290

Air Flow [C]



- 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 valve closing pressure, it should stop air flow.

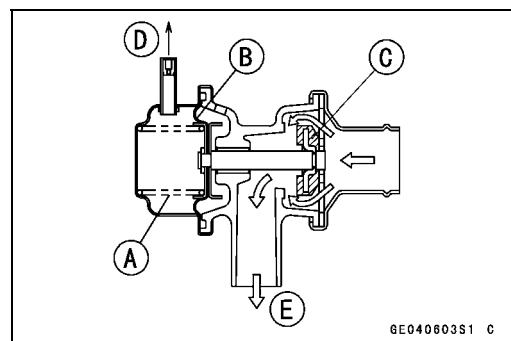
Spring [A]

Diaphragm [B]

Valve [C]

Low Vacuum [D]

Secondary Air Flow [E]



Clean Air System

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

NOTE

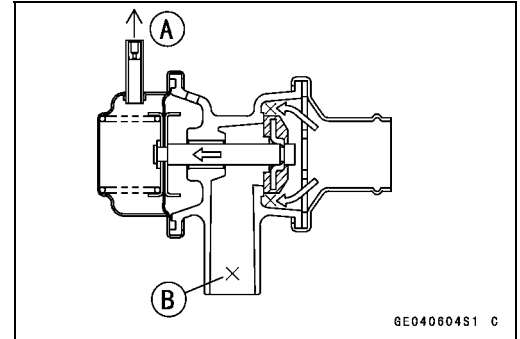
- To check air flow through the vacuum switch valve, just blow through the air cleaner hose.

Vacuum Switch Valve Closing Pressure (Open → Close)

Standard: 57 ~ 65 kPa (430 ~ 490 mmHg)

High Vacuum [A]

Secondary air cannot flow [B]



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, vacuum switch valve, carburetor body, and cylinder head covers.
- ✚ If they are not, correct them. Replace them if they are damaged.

5-12 ENGINE TOP END

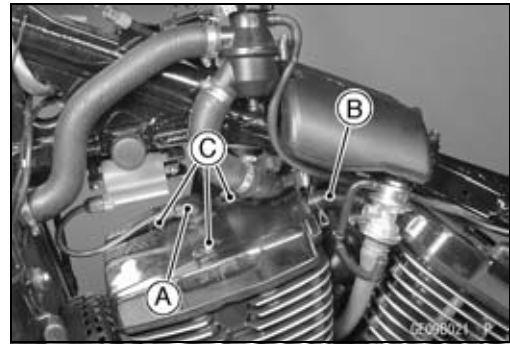
Cylinder Head Cover

Cylinder Head Cover Removal

- Remove:
 - Seat (see Frame chapter)
 - Fuel Tank (see Fuel System chapter)

(1) For Front Head Cover

- Remove:
 - Air Cleaner Housing (see Fuel System chapter)
 - Spark Plug Cap [A]
 - Vacuum Switch Valve Hose [B]
 - Cover Bolts [C]

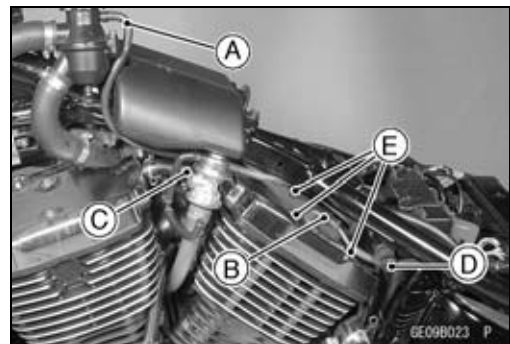


Cylinder Head Cover [A]
Air Suction Valve
Head Cover Gasket

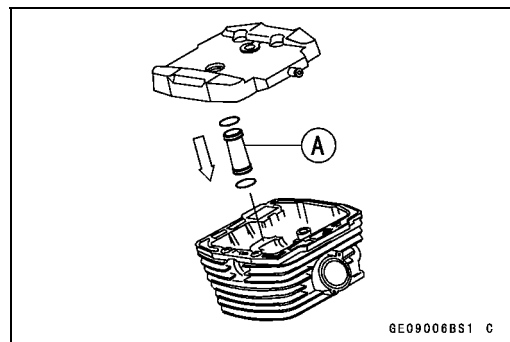


(2) For Rear Head Cover

- Disconnect the Coolant hose [A].
- Remove:
 - Spark Plug Cap [B]
 - Vacuum Switch Valve Hose [C]
 - Choke Cable [D]
 - Cover Bolts [E]

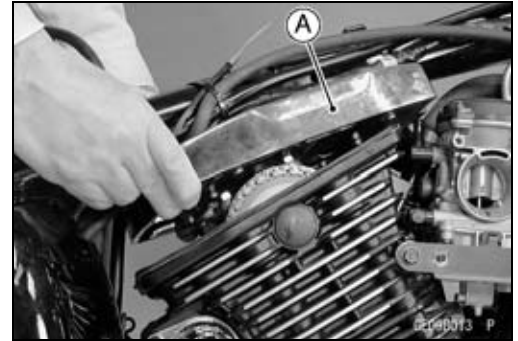


- Just move everything that is between the cylinder head cover and the frame out of the way to make room. Then as a lift the cover up, make sure the spark plug pipe [A] stays all the way down in the head. If the pipe comes up with the cover.



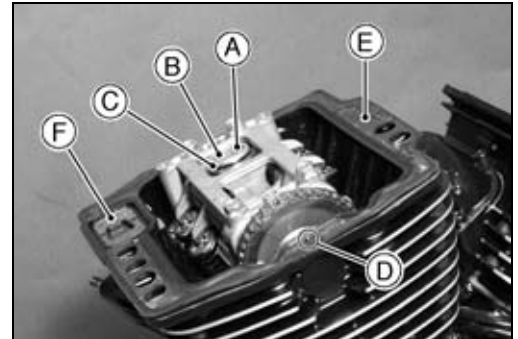
Cylinder Head Cover

- Remove:
 - Cylinder Head Cover [A]
 - Air Suction Valve
 - Head Cover Gasket

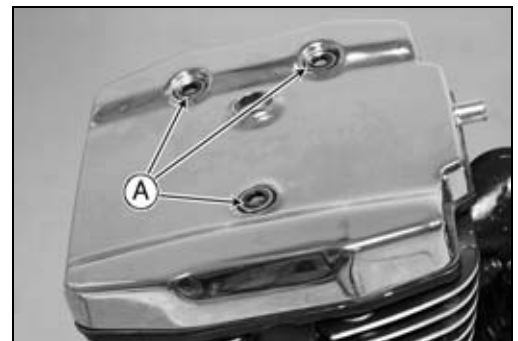


Cylinder Head Cover Installation

- If the plug pipe [A] was removed, install it with the chamfered side [B] faces upward, and apply grease to the O-ring [C].
- Install:
 - Pin [D]
 - Head Cover Gasket [E]
 - Air Suction Valve [F] (as shown)



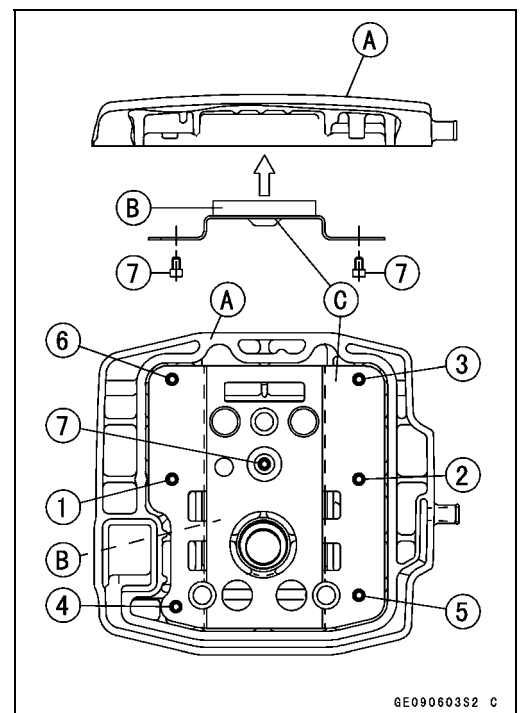
- Install the washer with the metal side [A] faces upward.
- Tighten:
 - Torque - Cylinder Head Cover Bolts: 12 N·m (1.2 kgf·m, 104 in·lb)**



Cylinder Head Cover Assembly

- Apply a non-permanent locking agent to the threads of the damper plate bolts [1 ~ 7], and tighten them to the tightening sequence.
 - [A] Cylinder Head Cover
 - [B] Damper
 - [C] Damper Plate

Torque - Cylinder Head Cover Damper Plate Bolts: 7.8 N·m (0.8 kgf·m, 69 in·lb)



5-14 ENGINE TOP END

Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

- Remove:
 - Engine (see Engine Removal/installation chapter)
 - Camshaft (see Camshaft Removal)
 - Cylinder Head (see Cylinder Head Removal)
- Remove the camshaft chain tensioner body from the cylinder.

Camshaft Chain Tensioner Installation

- Refer:
 - Cylinder Head Installation
 - Camshaft Installation

Camshaft, Camshaft Chain

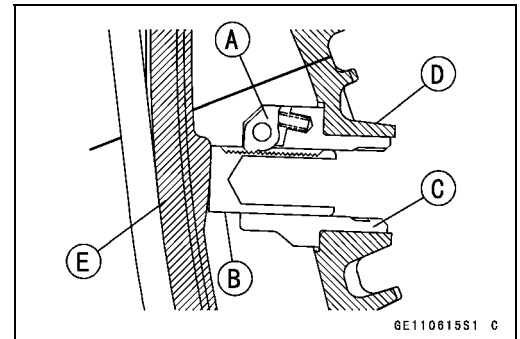
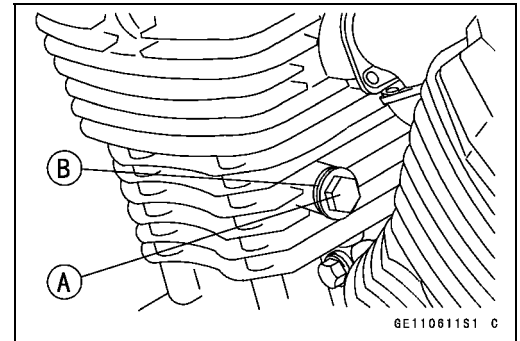
Camshaft Removal

- Remove:
 - Cylinder Head Cover (see Cylinder Head Cover Removal)
 - Tensioner Cap Bolt [A], Washer [B] and Spring

CAUTION

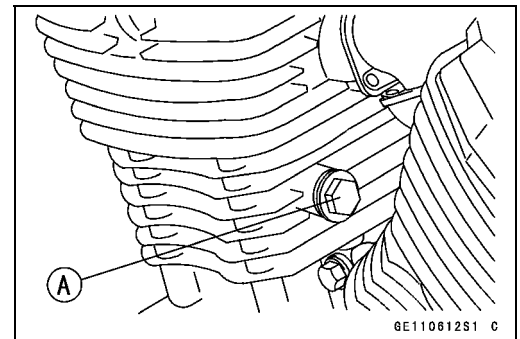
Do not turn over the crankshaft while the tensioner cap bolt is removed. The tensioner body is loose from the cylinder while the cap bolt is removed. Turning the crankshaft could damage the tensioner body and/or cylinder, and also the valves because upsetting the camshaft chain timing.

- Release the stopper [A] and push the push rod [B] into the tensioner body [C].
 - [D] Cylinder
 - [E] Camshaft Chain Guide



NOTE

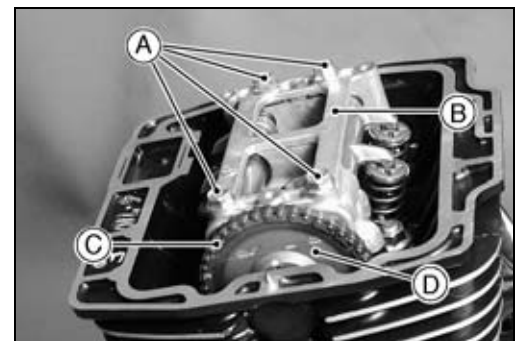
- *Temporary, install the tensioner cap bolt [A] only to prevent the tensioner body from falling into the crankcase.*



- Remove:
 - Camshaft Cap Bolts [A]
 - Camshaft Cap [B]
- Disengage the camshaft chain [C] from the camshaft sprocket [D], and remove the camshaft.
- 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 camshaft is 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.



5-16 ENGINE TOP END

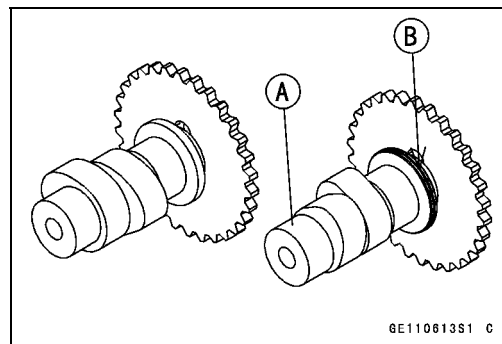
Camshaft, Camshaft Chain

Camshaft Installation

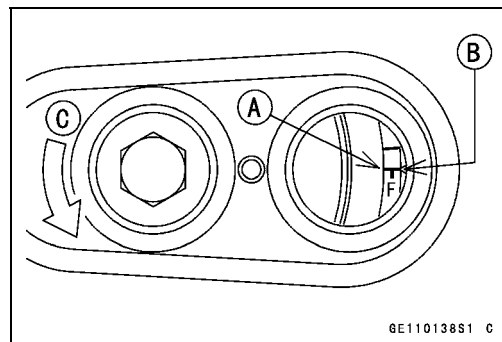
- Apply engine oil to all cam parts and journals.

NOTE

- The front and rear camshafts are different. The rear camshaft [A] has a groove [B].

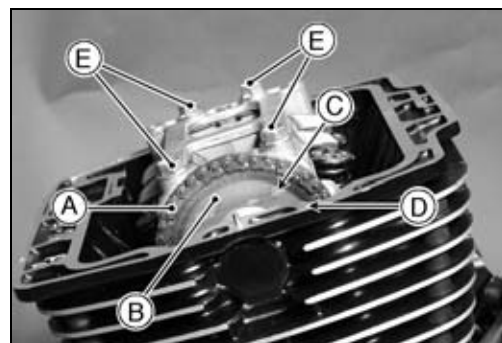


- Set the front piston at TDC.
- Align the front piston TDC mark [A] and timing mark [B] by turning the crankshaft counterclockwise [C] (left side view).



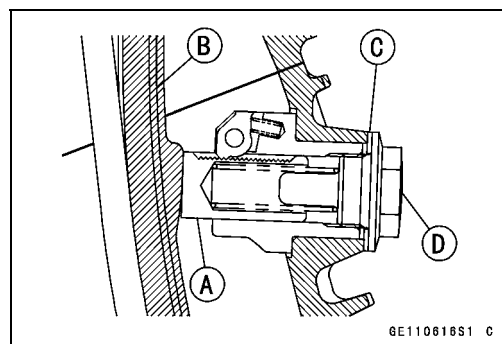
- Engage the camshaft chain [A] with the camshaft sprocket [B].
- Align the timing mark line [C] on the camshaft sprocket with the cylinder head upper surface [D].
- Install the camshaft cap and tighten the cap bolts [E].

Torque - Camshaft Cap Bolts: 25 N·m (2.5 kgf·m, 18.0 ft·lb)



- Install the front camshaft chain tensioner as follows:
 - Remove the cap bolt installed temporarily.
 - Hold the tensioner body and push the push rod [A] until the rod touches to the chain guide [B] lightly.
 - Install the spring, washer [C] and cap bolt [D].

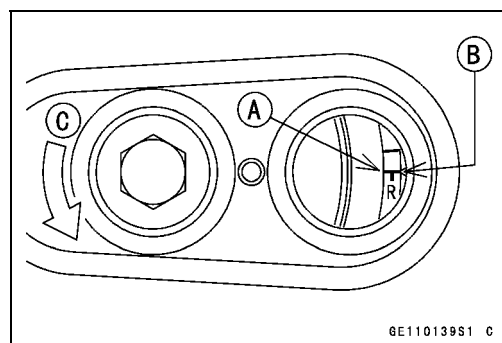
Torque - Camshaft Chain Tensioner Cap Bolt: 20 N·m (2.0 kgf·m, 14.5 ft·lb)



NOTE

- Installing the rear camshaft is the same as for the front camshaft. But noting the following.

- Set the rear piston at TDC.
- Align the rear piston TDC mark [A] and timing mark [B] by turning the crankshaft counterclockwise [C] 305° (left side view).



Camshaft, Camshaft Chain

Camshaft, Camshaft Cap Wear Inspection

- Measure each clearance between the camshaft journal and the camshaft cap using plastigage (press gauge) [A].
- Tighten:

Torque - Camshaft Cap Bolts: 25 N·m (2.5 kgf·m, 18.0 ft·lb)

NOTE

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

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

Camshaft Journal, Camshaft Cap Clearance

Standard: 0.028 ~ 0.071 mm (0.0011 ~ 0.0028 in.)

Service Limit: 0.16 mm (0.006 in.)

- ✚ If the camshaft journal diameter is less than the service limit, replace the camshaft with a new one and measure the clearance again.

Camshaft Journal Diameter

Standard: 26.950 ~ 26.972 mm (1.0610 ~ 1.0619 in.)

Service Limit: 26.92 mm (1.060 in.)

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

Camshaft Runout Inspection

- Remove the camshaft.
- Set the camshaft in a camshaft alignment jig or on V blocks.
- Measure runout with a dial gauge at the specified place as shown.
- ✚ If the runout exceeds the service limit, replace the shaft.

Camshaft Runout

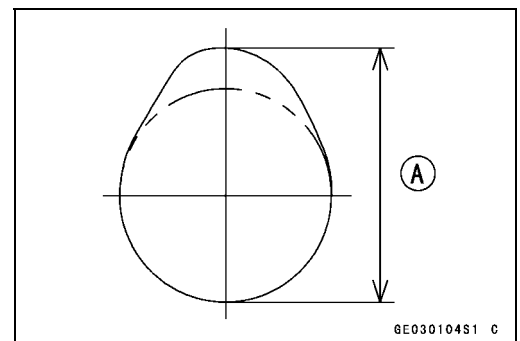
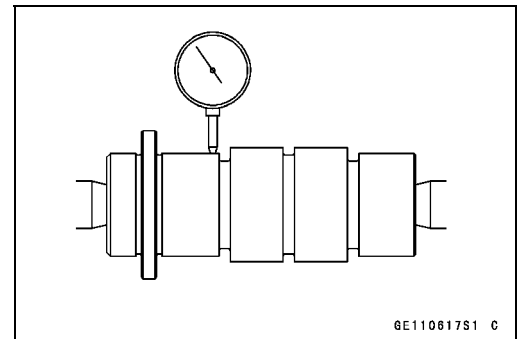
Service Limit: TIR 0.1 mm (0.004 in.)

Cam Wear Inspection

- Remove the camshaft.
- Measure the height [A] of each cam with a micrometer.
- ✚ If the cams are worn down past the service limit, replace the camshaft.

Cam Height

	Standard	Service Limit
Inlet	35.305 ~ 35.413 mm (1.3900 ~ 1.3942 in.)	35.21 mm (1.386 in.)
Exhaust	35.033 ~ 35.141 mm (1.3792 ~ 1.3835 in.)	34.93 mm (1.375 in.)



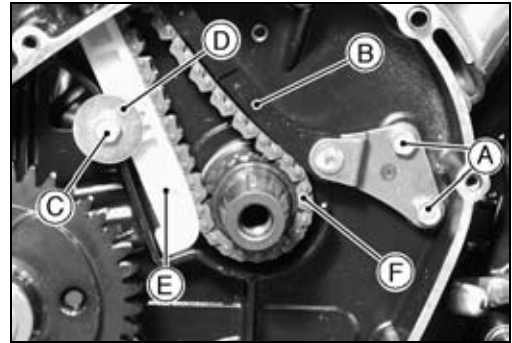
5-18 ENGINE TOP END

Camshaft, Camshaft Chain

Camshaft Chain Removal

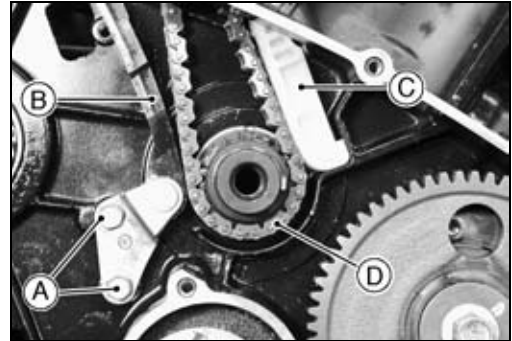
Front Camshaft Chain

- Remove:
 - Alternator Rotor (see Electrical System chapter)
 - Bolts [A] and Black Chain Guide [B]
 - Bolt [C], Washer [D] and White Chain Guide [E]
- Disengage the camshaft chain [F] from the crankshaft sprocket and then remove the chain.



Rear Camshaft Chain

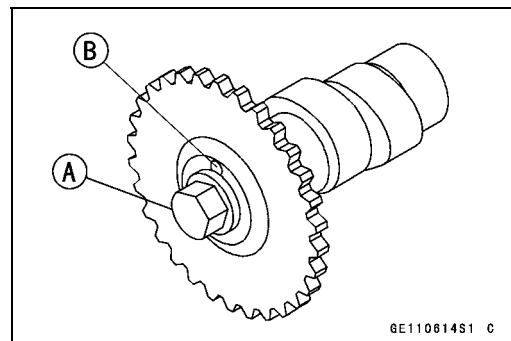
- Remove:
 - Primary Gear (see Crankshaft/Transmission chapter)
 - Clutch (see Clutch chapter)
 - Bolts [A] and Black Chain Guide [B]
 - White Chain Guide [C]
- Disengage the camshaft chain [D] from the crankshaft sprocket and then remove the chain.



Camshaft and Sprocket Assembly

- Clean the sprocket bolt [A] and threads of the camshaft.
- Be sure to install the pin [B].
- Apply a non-permanent locking agent to the threads of the bolt, and tighten it. The sprockets are identical.

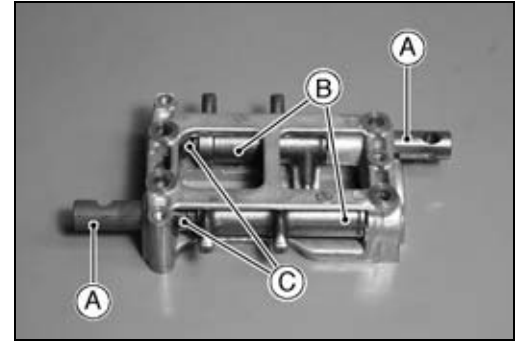
Torque - Camshaft Sprocket Bolts: 49 N·m (5.0 kgf·m, 36 ft·lb)



Rocker Shaft, Rocker Arm

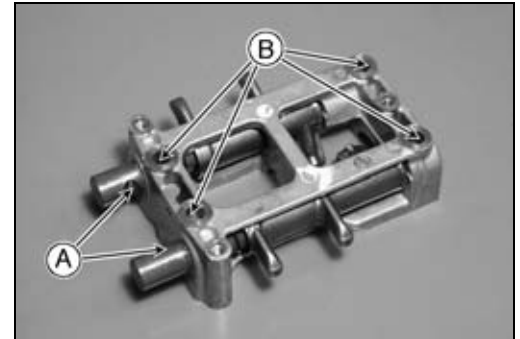
Rocker Shaft, Rocker Arm Removal

- Remove:
 - Cylinder Head Cover (cylinder Head Cover Removal)
 - Camshaft Cap
 - Rocker Shafts [A]
 - Rocker Arms [B] and Springs [C]



Rocker Shaft, Rocker Arm Installation

- Apply molybdenum disulfide grease to the rocker shaft.
- Insert the rocker shaft into the camshaft cap and rocker arm so that the notch side [A] faces to the spring side.
- Align the bolt holes [B] of the camshaft cap and rocker shaft.



5-20 ENGINE TOP END

Cylinder Head

Cylinder Compression Measurement

NOTE

○ Use the battery which is fully charged.

- Warm up the engine thoroughly.
- Stop the engine.
- Remove:
 - Seat (see Frame chapter)
 - Fuel Tank (see Fuel System chapter)
 - Spark Plugs

Special Tool - Spark Plug Wrench, Hex 16: 57001-1262

- Attach the compression gauge [A] and adapter [B] firmly into the spark plug hole.
- 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.

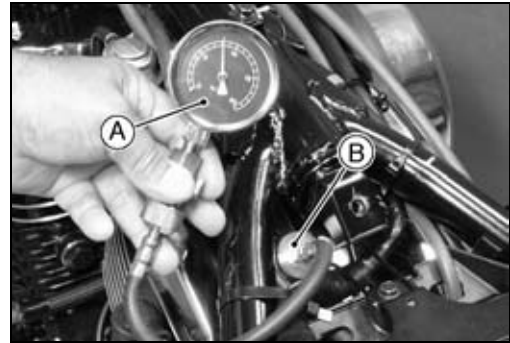
Special Tool - Compression Gauge, 20 kgf/cm²: 57001-221
Compression Gauge Adapter, M10 × 1.0: 57001-1317

Cylinder Compression

Usable Range: 855 ~ 1315 kPa (8.7 ~ 13.4 kgf/cm²,
121 ~ 191 psi) @470 r/min (rpm)

- Repeat the measurement for the other cylinders.
- Install the spark plugs.

Torque - Spark Plugs: 18 N·m (1.8 kgf·m, 13 ft·lb)



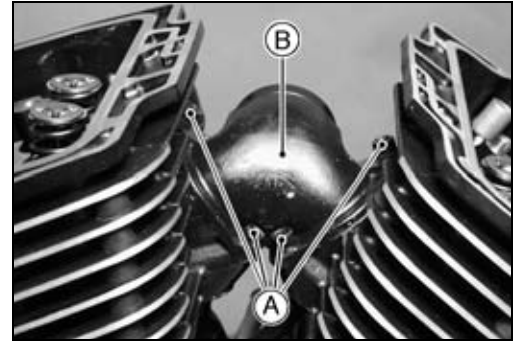
The following table should be consulted if the obtainable compression reading is not within the usable range.

Problem	Diagnosis	Remedy (Action)
Cylinder compression is higher than usable range	Carbon accumulation on piston and in combustion chamber possibly due to damaged valve stem oil seal and/or damaged piston oil rings (This may be indicated by white exhaust smoke).	Remove the carbon deposits and replace damaged parts if necessary.
	Incorrect cylinder head gasket thickness.	Replace the gasket with a standard part.
Cylinder compression is lower than usable range	Gas leakage around cylinder head	Replace damaged gasket and check cylinder head warp.
	Bad condition of valve seating	Repair if necessary.
	Incorrect valve clearance.	Adjust the valve clearance.
	Incorrect piston/cylinder clearance	Replace the piston and/or cylinder
	Piston seizure.	Inspect the cylinder and replace/repair the cylinder and/or piston as necessary.
	Bad condition of piston ring and/or piston ring grooves	Replace the piston and/or the piston rings.

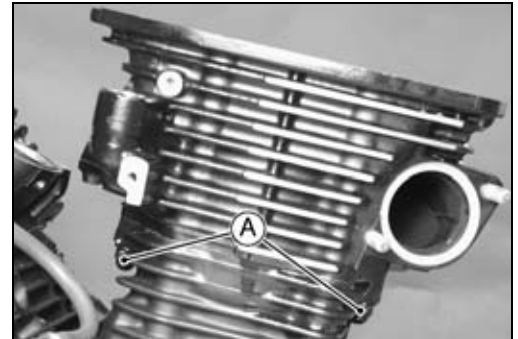
Cylinder Head

Cylinder Head Removal

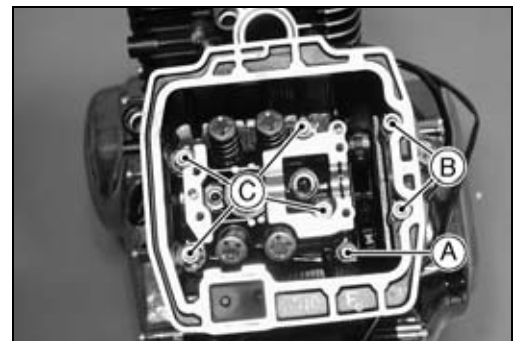
- Remove:
 - Engine (see Engine Removal/Installation)
 - Camshaft (see Camshaft Removal)
 - Bolts [A] and Intake Manifold [B]



8 mm Cylinder Head Nuts [A]



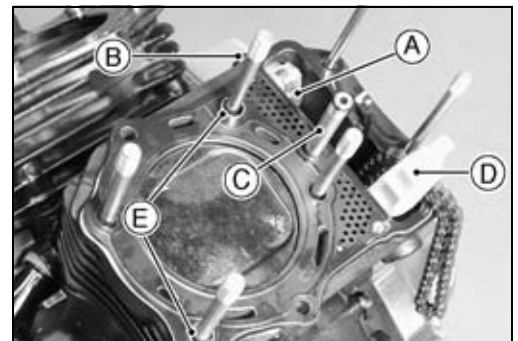
Cylinder Head Bolt [A]
 Cylinder Head Nuts [B]
 10 mm Cylinder Head Nuts [C]
 Cylinder Head



Cylinder Head Installation

NOTE

- The camshaft cap is machined with the cylinder head, so if a new cylinder head is installed, use the cap that is supplied with the new head.
- The rear cylinder head has a breather pipe fitting. Be careful not to mix up the front and rear heads.
- Release the stopper and push the push rod into the tensioner body [A], and tighten the cap bolt [B] only temporarily.
- Install:
 - Oil Pipe [C]
 - White Chain Guide [D]
 - Knock Pins [E]
 - New Cylinder Head Gasket



5-22 ENGINE TOP END

Cylinder Head

- Tighten the cylinder head nuts and bolt following the tightening sequence [1 ~ 7].

Torque - Cylinder Head Nuts:

10 mm [1 ~ 4]: 39 N·m (4.0 kgf·m, 29 ft·lb)

8 mm [5 ~ 6]: 25 N·m (2.5 kgf·m, 18 ft·lb)

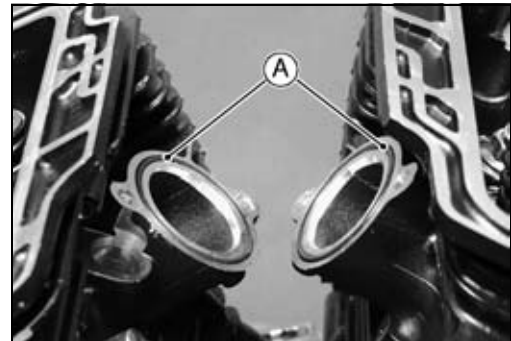
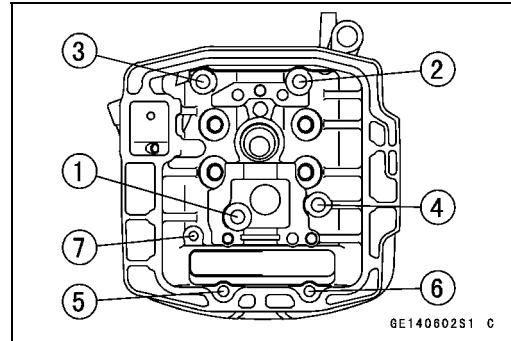
Cylinder Head Bolt [7]: 12 N·m (1.2 kgf·m, 104 in·lb)

Tighten the 8 mm cylinder head nuts.

Torque - Cylinder Head Nuts (8 mm): 25 N·m (2.5 kgf·m, 18 ft·lb)

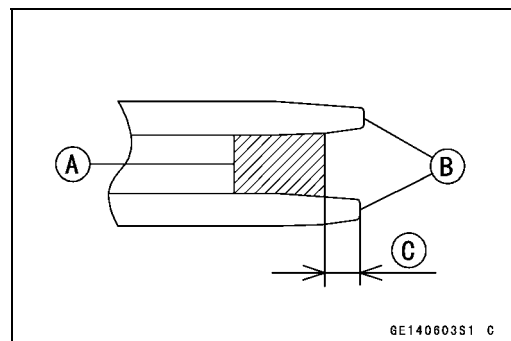
- Apply grease to the O-ring [A].
- Install the intake manifold, and tighten the bolts.

Torque - Intake Manifold Bolts: 12 N·m (1.2 kgf·m, 104 in·lb)



Cylinder Head Assembly

- Install the rubber dampers [A] between the fins [B] as shown.
- The end of the damper should be recessed 3 ~ 5 mm (0.12 ~ 0.20 in.) [C] inside the top of the lower fin.



Front Cylinder Head

[A] Rubber Dampers (16)

[B] 170 mm (6.69 in.)

[C] 165 mm (6.50 in.)

[D] 159 mm (6.26 in.)

[E] 154 mm (6.06 in.)

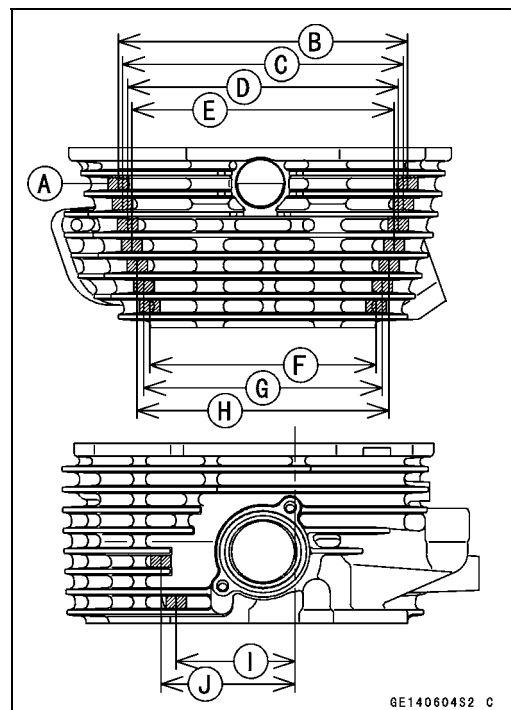
[F] 133 mm (5.24 in.)

[G] 140 mm (5.51 in.)

[H] 148 mm (5.83 in.)

[I] 70 mm (2.76 in.)

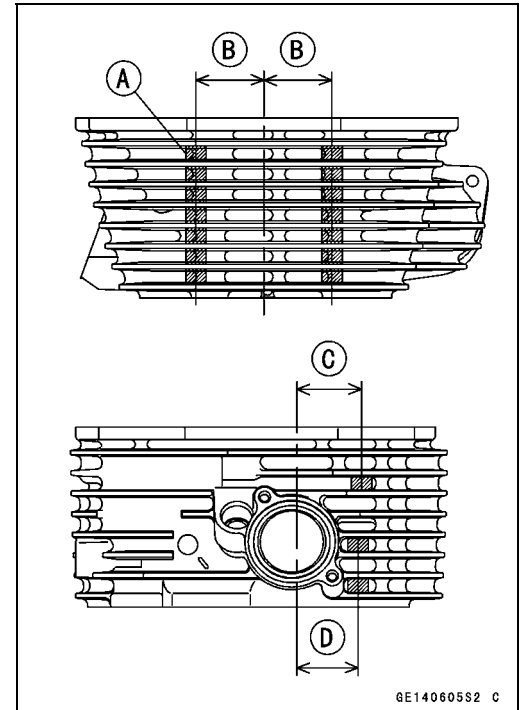
[J] 79 mm (3.11 in.)



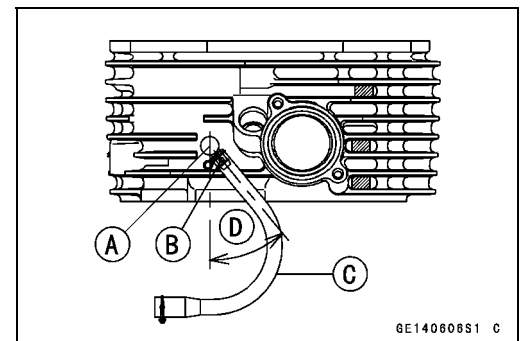
Cylinder Head

Rear Cylinder Head

- [A] Rubber Dampers (17)
- [B] 40 mm (1.57 in.)
- [C] 38 mm (1.50 in.)
- [D] 36 mm (1.42 in.)



- When installing the breather pipe fitting [A] in the rear cylinder head, align the fitting with the mark [B].
- [C] Fitting Hose
- [D] 37 ~ 43°



Cylinder Head Warp Inspection

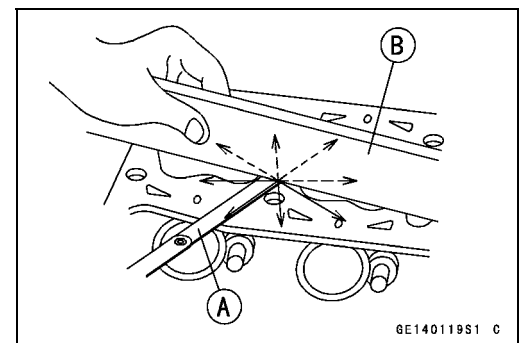
- Lay a straightedge across the lower surface of the cylinder head at several positions.
- Use a thickness gauge [A] to measure the space between the straightedge [B] and the head.

Cylinder Head Warp

Standard: — — —

Service Limit: 0.05 mm (0.002 in.)

- ✚ If the cylinder head is warped more than the service limit, replace it.
- ✚ If the cylinder head is warped less than the service limit, repair the head by rubbing the lower surface on emery paper secured to a surface plate (first No. 200, then No. 400)



5-24 ENGINE TOP END

Valves

Valve Clearance Inspection

- Refer to the Valve Clearance Inspection in the Periodic Maintenance chapter.

Valve Clearance Adjustment

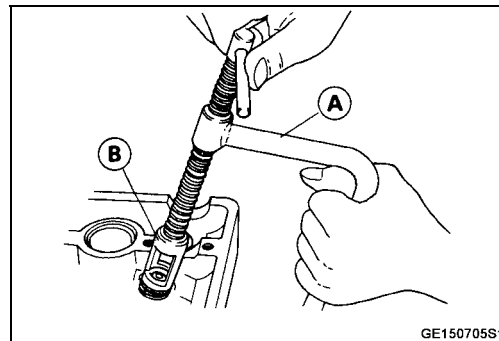
- Refer to the Valve Clearance Adjustment in the Periodic Maintenance chapter.

Valve Removal

- Remove the cylinder head (see Cylinder Head Removal).
- Swing open the rocker arm, and then remove the shims.
- Mark and record the shim locations so that the shims can be installed in their original positions.
- Using the valve spring compressor assembly, remove the valve.

Special Tools - Valve Spring Compressor Assembly: 57001-241 [A]

Valve Spring Compressor Assembly, #22: 57001-1202 [B]



Valve Installation

- Replace the oil seal with a new one.
- Apply a thin coat of molybdenum disulfide grease to the valve stem before valve installation.

[A] Valve Stem

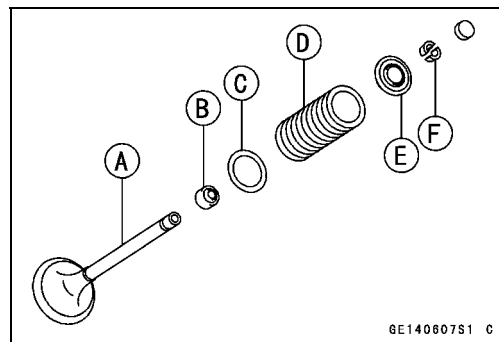
[B] Oil Seal

[C] Spring Seat

[D] Spring

[E] Retainer

[F] Split Keepers

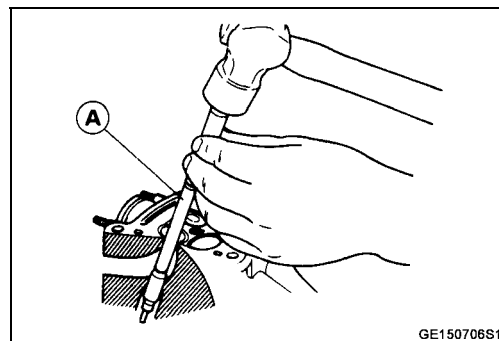


Valve Guide Removal

- Remove:
 - Valve (see Valve Removal)
 - Oil Seal
 - Spring Seat
- Heat the area around the valve guide to 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.

CAUTION

Do not heat the cylinder head with a torch. This will warp the cylinder head. Soak the cylinder head in oil and heat the oil.



Special Tool - Valve Guide Arbor, #5: 57001-1203

Valves

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) (see Valve Guide Removal).
- 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, #5: 57001-1203

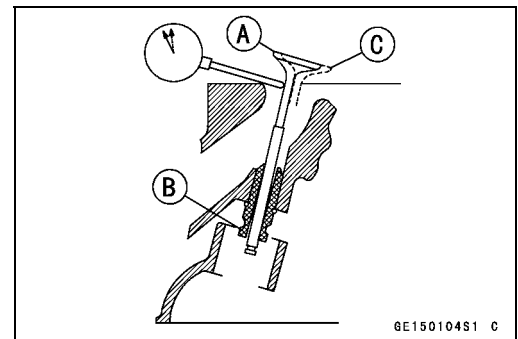
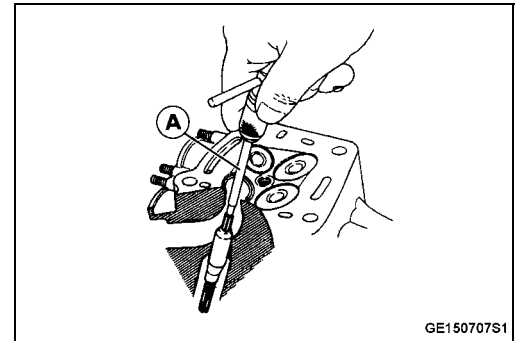
- Ream the valve guide with the valve guide reamer [A] even if the old guide is reused.

Special Tool - Valve Guide Reamer, #5: 57001-1204

Valve-to-Guide Clearance Measurement (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	0.03 ~ 0.12 mm (0.001 ~ 0.005 in.)
Exhaust	0.10 ~ 0.18 mm (0.04 ~ 0.007 in.)

Service Limit:

Inlet	0.26 mm (0.010 in.)
Exhaust	0.32 mm (0.013 in.)

5-26 ENGINE TOP END

Valves

Valve Seat Inspection

- Remove the valve (see Valve Removal).
- Check the valve seating surface [A] between the valve [B] and valve seat [C].
- Measure the outside diameter [D] of the seating pattern on the valve seat.
- ✚ If the outside diameter is too large or too small, repair the seat (see Seat Repair).

Valve Seating Surface Outside Diameter

Standard:

Inlet 30.9 ~ 31.1 mm (1.216 ~ 1.224 in.)

Exhaust 26.9 ~ 27.1 mm (1.059 ~ 1.067 in.)

- 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.

Good [F]

- ✚ If the width is too wide [G], too narrow [H] or uneven [J], repair the seat (see Valve Seat Repair).

Valve Seating Surface Width

Standard:

Inlet, Exhaust 0.5 ~ 1.0 mm (0.02 ~ 0.04 in.)

Valve Seat Repair

- Repair the valve seat with the valve seat cutters [A].

Special Tools -

Valve Seat Cutter Holder, ✚5: 57001-1208 [B]

Valve Seat Cutter Holder Bar: 57001-1128 [C]

[For Inlet Valve Seat]

Valve Seat Cutter, 45° - ✚32: 57001-1115

Valve Seat Cutter, 32° - ✚33: 57001-1199

Valve Seat Cutter, 60° - ✚33: 57001-1334

or Valve Seat Cutter, 55° - ✚35: 57001-1247

[For Exhaust Valve Seat]

Valve Seat Cutter, 45° - ✚30: 57001-1187

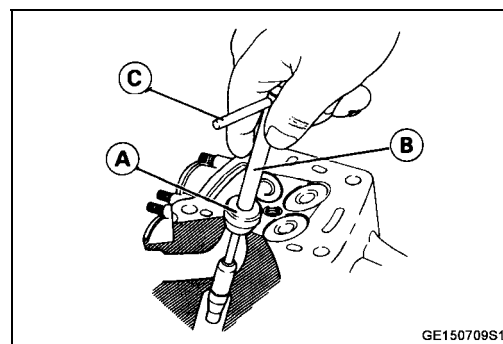
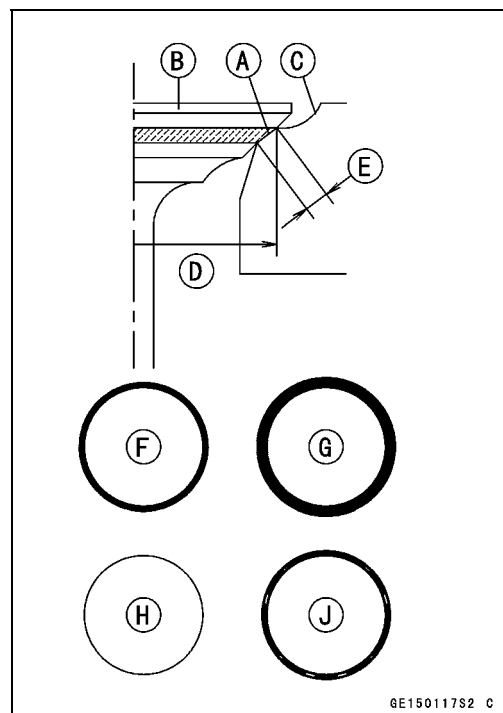
or Valve Seat Cutter, 45° - ✚32: 57001-1115

Valve Seat Cutter, 32° - ✚28: 57001-1119

or Valve Seat Cutter, 32° - ✚30: 57001-1120

Valve Seat Cutter, 60° - ✚30: 57001-1123

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



Valves

Seat Cutter Operation Care

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

NOTE

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

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

NOTE

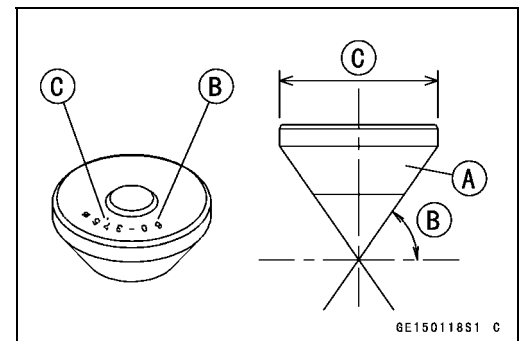
○Prior to grinding, apply engine oil to the cutter and during the operation, wash off any ground particles sticking to the cutter with washing oil.

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

Marks Stamped on the Cutter

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

- 60° Cutter angle [B]
 37.5 ■ Outer diameter of cutter [C]



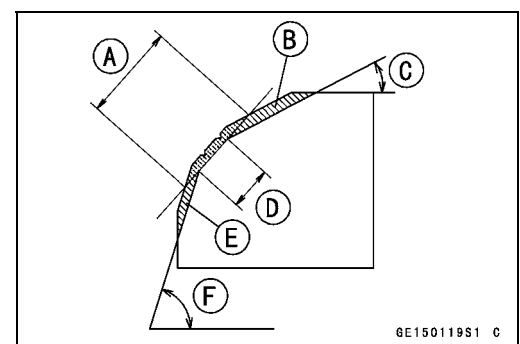
Operating Procedures

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

CAUTION

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

Widened Width [A] of engagement by machining with 45° cutter
 Ground Volume [B] by 32° cutter
 32° [C]
 Correct Width [D]
 Ground Volume [E] by 60° cutter
 60° [F]



5-28 ENGINE TOP END

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

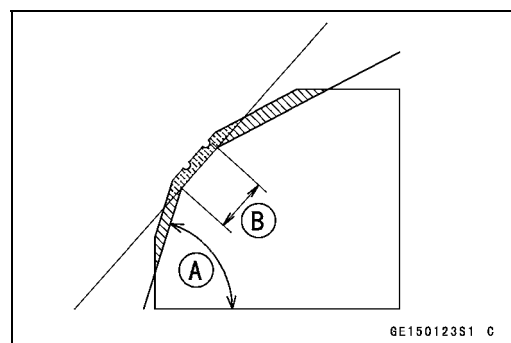
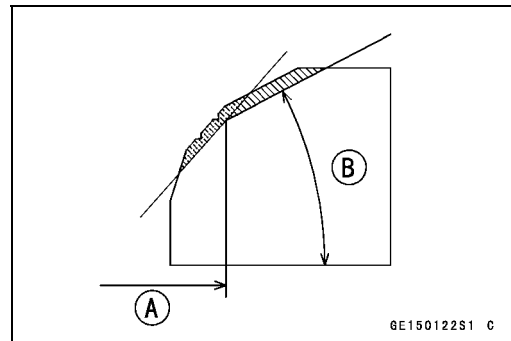
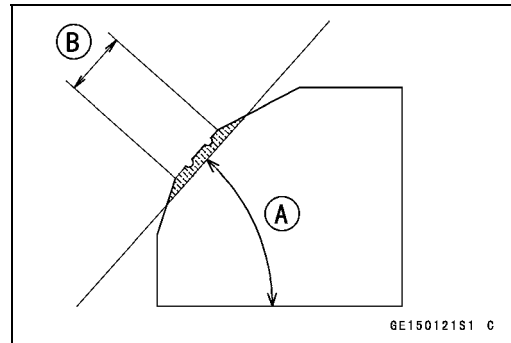
- Remove all pittings or flaws from 45° ground surface.
- After grinding with 45° cutter, apply thin coat of machinist's dye to seating surface. This makes seating surface distinct and 32° and 60° grinding operation easier.
- When the valve guide is replaced, be sure to grind with 45° cutter for centering 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 into the holder, and slide it into the valve guide.
- Turn the holder one turn at a time while pressing down very lightly. Check the seat after each turn.

CAUTION

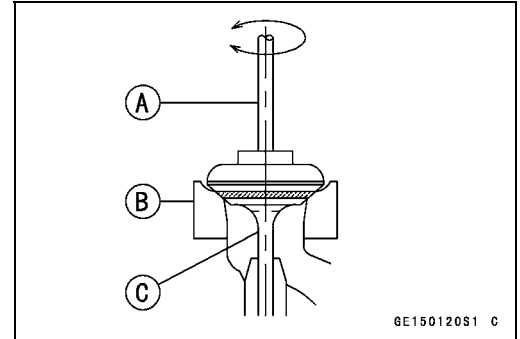
The 32° cutter removes material very quickly. Check the seat outside diameter frequently to prevent overgrinding.

- 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 60° cutter into 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

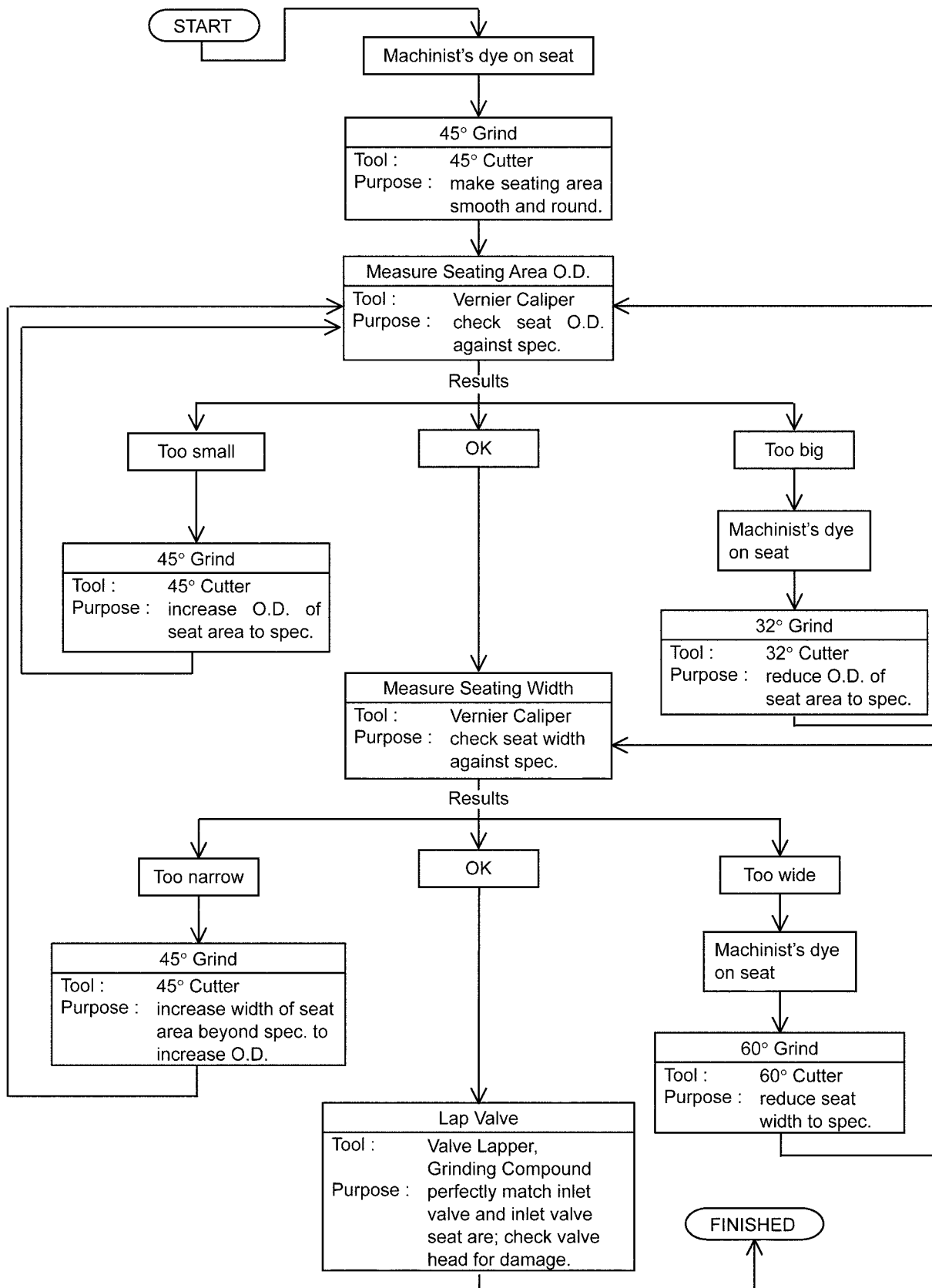
- Lap the valve to the seat, once the seat width and O.D. are within the ranges specified above.
- Put a little coarse grinding compound on the face of the valve in a number of places around the valve head.
- Spin the valve against the seat until the grinding compound produces a smooth, matched surface on both the seat and the valve.
- Repeat the process with a fine grinding compound.
 - Lapper [A]
 - Valve Seat [B]
 - Valve [C]
- 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 in the Periodic Maintenance chapter).



5-30 ENGINE TOP END

Valves

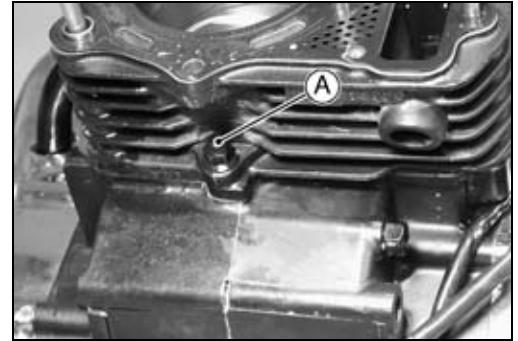
Valve Seat Repair



Cylinder, Pistons

Cylinder Removal

- Remove:
 - Cylinder Head (see Cylinder Head Removal)
 - Cylinder Nut [A]
 - Cylinder



Cylinder Installation

NOTE

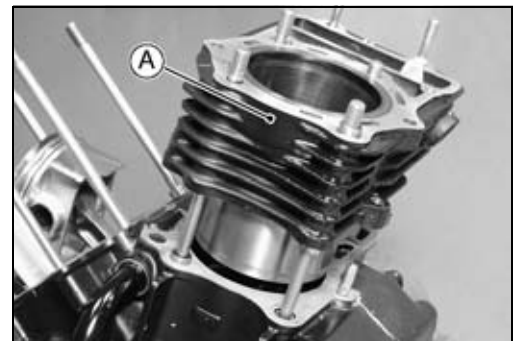
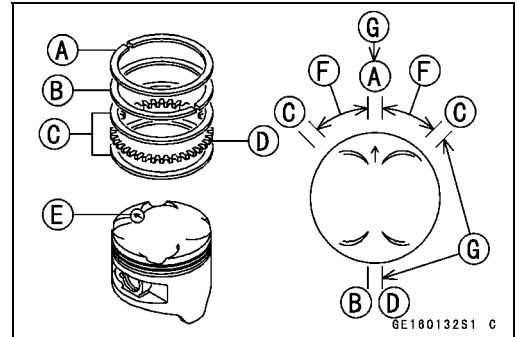
○ If a new cylinder is used, check piston to cylinder clearance (see Piston/Cylinder Clearance), and use new piston ring.

- Install the pin and new cylinder gasket.
- The piston ring openings must be positioned as shown in the figure. The openings of the oil ring steel rails must be about 30° ~ 45° [F] of angle from the opening of the top ring.

Top Ring [A]
 Second Ring [B]
 Oil Ring Steel Rails [C]
 Oil Ring Expander [D]
 Arrow [E]
 Opening Position [G]

- Apply engine oil to the cylinder bore and piston skirt.
- Install the cylinder [A] so that the tensioner mounting hole faces rearward.
- Tighten:

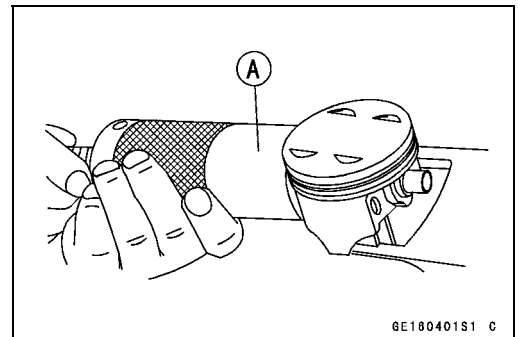
Torque - Cylinder Nuts: 25 N·m (2.5 kgf·m, 18.0 ft·lb)



Piston Removal

- Remove the cylinder (see Cylinder Removal).
- Place a clean cloth under the piston and remove the piston pin snap ring.
- Remove the piston pin.

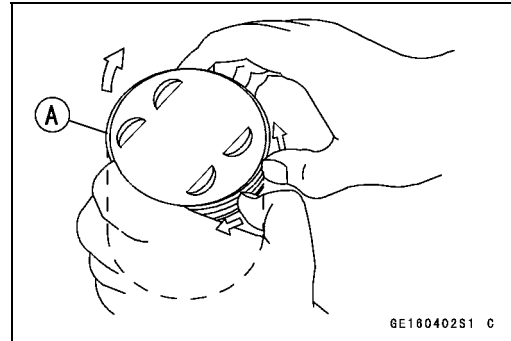
Special Tool - Piston Pin Puller Assembly: 57001-910 [A]



5-32 ENGINE TOP END

Cylinder, Pistons

- 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.

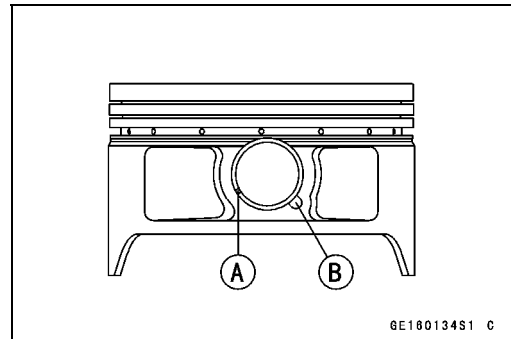


Piston Installation

NOTE

○ If a new piston is used, check piston to cylinder clearance (see *Piston/Cylinder Clearance*), and use new piston ring.

- The arrow on the piston head must point toward the exhaust side of the cylinder.
 - Fit a new piston pin snap ring into the side of the piston so that the ring opening [A] does not coincide with the slit [B] of the piston pin hole.
- When installing the piston pin snap ring, compress it only enough to install it and no more.



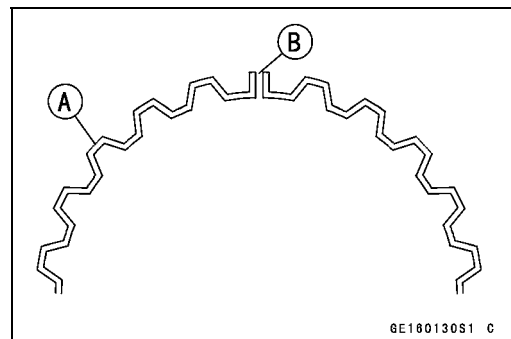
CAUTION

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

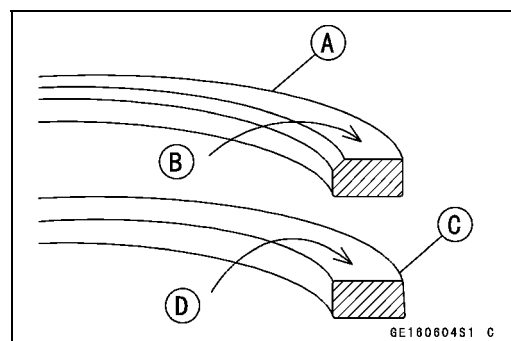
- Install the oil ring expander [A] in the bottom piston ring groove so the ends [B] butt together.
 - Install the oil ring steel rails, one above the expander and one below it.
- Spread the rail with your thumbs, but only enough to fit the rail over the piston.
- Release the rail into the bottom piston ring groove.

NOTE

○ The oil ring rails have no “top” or “bottom”.



- Do not mix up the top and second rings.
- Install the top ring [A] so that the “R” mark [B] faces up.
- Install the second ring [C] so that the “RN” mark [D] faces up.



Cylinder, Pistons

Cylinder Wear Inspection

- 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 (0.4 in.)

[B] 60 mm (2.4 in.)

[C] 20 mm (0.8 in.)

Cylinder Inside Diameter

Standard: 88.000 ~ 88.012 mm (3.4646 ~ 3.4650 in.)

Service Limit: 88.11 mm (3.468 in.)

Piston Wear Inspection

- Measure the outside diameter [A] of each piston 5 mm (0.2 in.) [B] up from the bottom of the piston at a right angle to the direction of the piston pin.

- ✚ If the measurement is under service limit, replace the piston.

Piston Diameter

Standard: 87.975 ~ 87.990 mm (3.4636 ~ 3.4642 in.)

Service Limit: 87.83 mm (3.458 in.)

Piston/Cylinder Clearance Inspection

- Subtract the piston diameter from the cylinder inside diameter to get the piston/cylinder clearance.

Piston/Cylinder Clearance

Standard: 0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in.)

- ✚ If the piston/cylinder clearance is less than the specified range, use a smaller piston or increase the cylinder inside diameter by honing.
- ✚ If the piston/cylinder clearance is greater than specified range, use a larger piston.
- ✚ If only a piston is replaced, the clearance may exceed the standard slightly. But it must not be less than the minimum in order to avoid piston seizure.

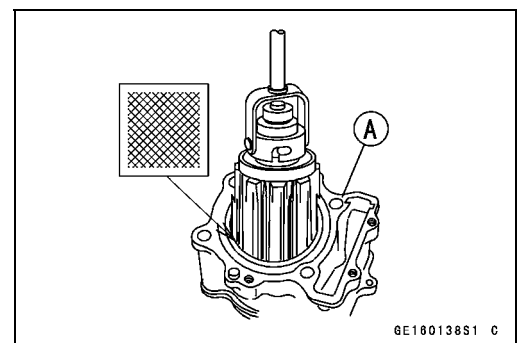
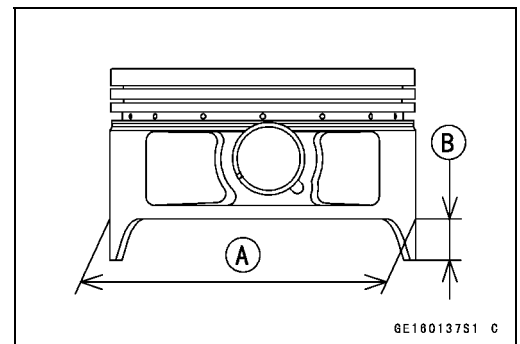
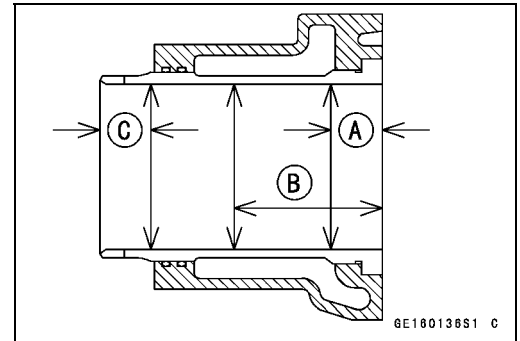
Cylinder Boring and Honing

- There is an oversize piston available. The oversize piston requires oversize rings.

Oversize Piston and Rings

0.5 mm (0.02 in.) Oversize

- Before boring a cylinder [A], first measure the exact diameter of the oversize piston, and then, according to the standard clearance in the Specifications, determine the rebore diameter. However, if the amount of boring necessary would make the inside diameter greater than **0.5 mm (0.02 in.)** the cylinder block must be replaced.



5-34 ENGINE TOP END

Cylinder, Pistons

- Cylinder inside diameter must not vary more than **0.01 mm** (0.0004 in.) at any point.
- Be wary of measurements taken immediately after boring since the heat affects cylinder diameter.
- In the case of rebored cylinder and oversize piston, the service limit for the cylinder is the diameter that the cylinder was bored to plus **0.1 mm** (0.004 in.) and the service limit for the piston is the oversize piston original diameter minus **0.15 mm** (0.006 in.) 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.

Piston Ring, Piston Ring Groove Wear Inspection

- Check for uneven groove wear by inspecting the ring seating.
- ✚ The rings should fit perfectly parallel to groove surfaces. If not, replace the piston and all the piston rings.
- 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 (0.007 in.)
Second	0.16 mm (0.006 in.)

- ✚ If the piston ring groove clearance is greater than the service limit, measure the ring thickness and groove width as follows to decide whether to replace the rings, the piston or both.

Piston Ring Groove Width Inspection

- Measure the piston ring groove width.
- Use a vernier caliper at several points around the piston.

Piston Ring Groove Width

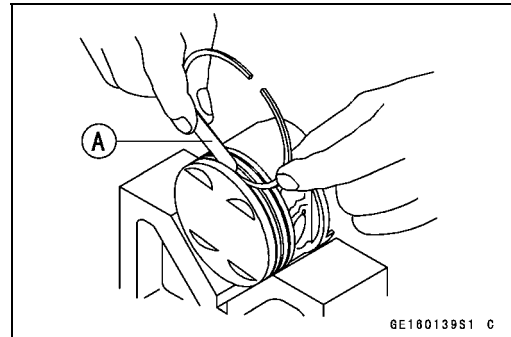
Standard:

Top	1.02 ~ 1.04 mm (0.0402 ~ 0.0409 in.)
Second	1.01 ~ 1.03 mm (0.0397 ~ 0.0406 in.)

Service Limit:

Top	1.12 mm (0.0441 in.)
Second	1.11 mm (0.0437 in.)

- ✚ If the width of any of the two grooves is wider than the service limit at any point, replace the piston.



Cylinder, Pistons

Piston Ring Thickness Inspection

- Measure the piston ring thickness.
- Use a micrometer to measure at several points around the ring.

Piston Ring Thickness

Standard:

Top and Second 0.97 ~ 0.99 mm 0.0382 ~ 0.0390 in.)

Service Limit:

Top and Second 0.90 mm 0.035 in.)

- ⚠ If any of the measurements is less than the service limit on either of the rings, replace all the rings.

NOTE

- When using new rings in a used piston, check for uneven groove wear. The rings should fit perfectly parallel to the groove sides. If not, replace the piston.

Piston Ring End Gap Inspection

- 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 0.25 ~ 0.40 mm (0.010 ~ 0.016 in.)

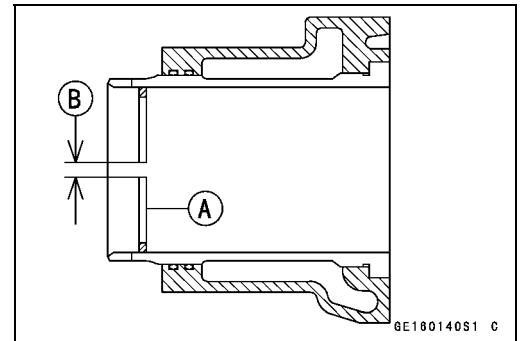
Second 0.40 ~ 0.55 mm (0.016 ~ 0.022 in.)

Service Limit:

Top 0.70 mm (0.03 in.)

Second 0.90 mm (0.04 in.)

- ⚠ If the end gap of either ring is greater than the service limit, replace all the rings.



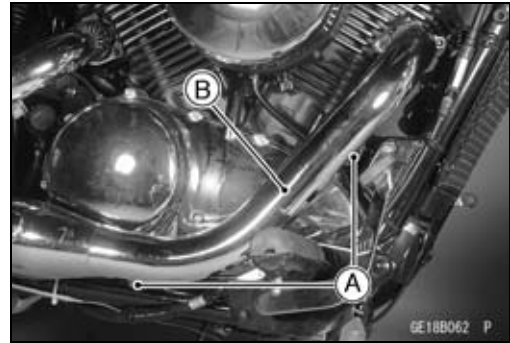
5-36 ENGINE TOP END

Muffler

Muffler Removal

Front Muffler

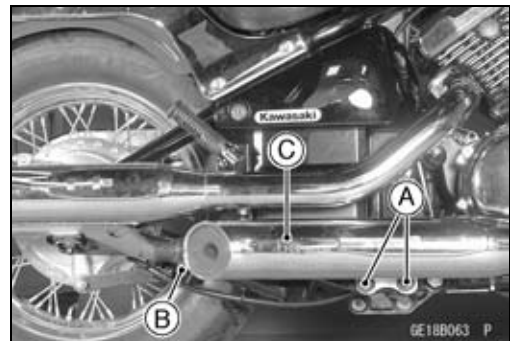
- Remove:
Clamp Bolts [A] and Front Exhaust Pipe Cover [B]



- Remove the exhaust pipe holder nuts [A]

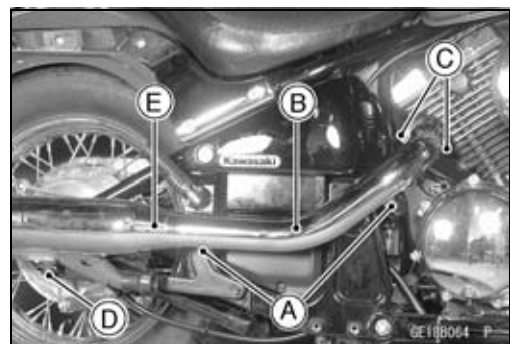


- Remove:
Muffler Bolts [A]
Clamp Bolts [B]
Front Muffler [C]



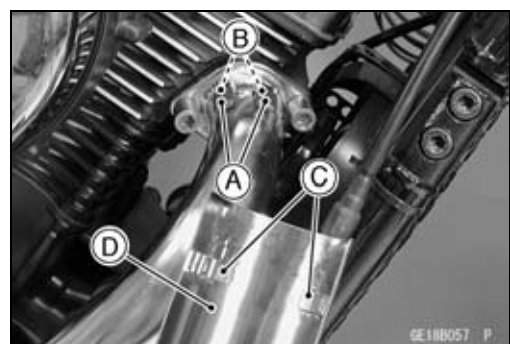
Rear Muffler

- Remove:
Front Muffler
Clamp Bolts [A] and Rear Exhaust Pipe Cover [B]
Exhaust Pipe Holder Nuts [C]
Bolt [D]
Rear Muffler [E]



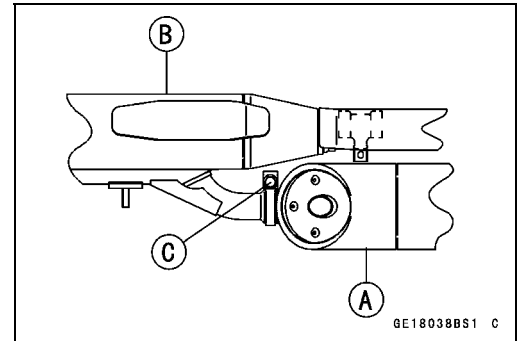
Muffler Installation

- Install the grommets [A] onto the hooks [B] on the exhaust pipe.
- Slip the hook into the brace [C] of the exhaust cover [D].



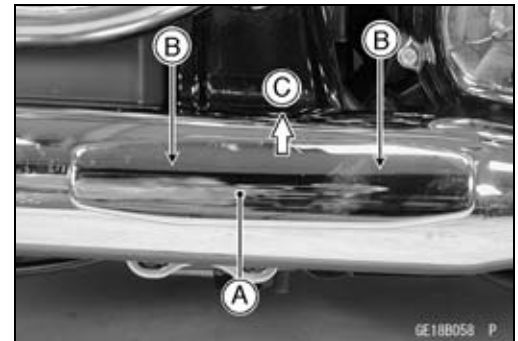
Muffler

- When the front muffler [A] shall be connected to the rear muffler [B], the position of clamp bolt head [C] faces outwards as shown.



Muffler Cover Removal

- Remove the muffler cover [A] from the muffler as follows:
 - Hold the both ends on the cover.
 - Push [B] the upper end of the cover and then slide up [C] the cover as shown.

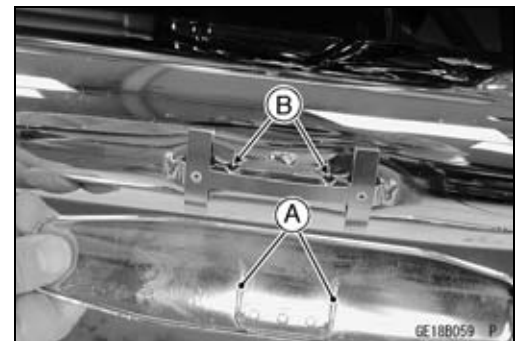


Muffler Cover Installation

- Insert the pins [A] of the muffler cover into the hose [B] on the muffler.

NOTE

- Do not move the muffler cover to the front and rear.



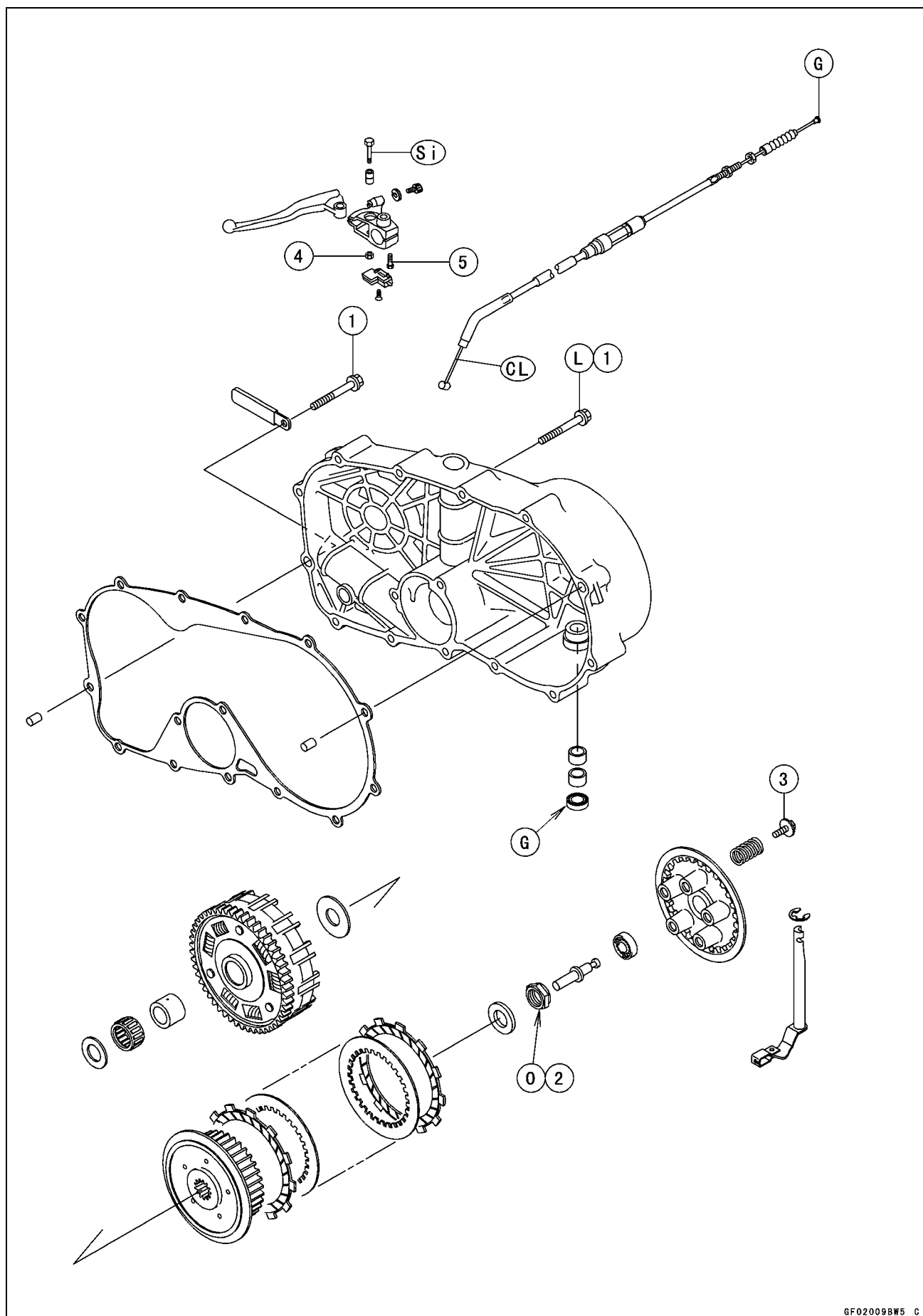
Clutch

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6-2 CLUTCH

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Right Engine Cover Bolts	12	1.2	104 in·lb	L (1)
2	Clutch Hub Nut	132	13.5	98	O
3	Clutch Spring Bolts	8.8	0.9	78 in·lb	

4. Clutch Lever Pivot Nut

5. Clutch Lever Holder Clamp Bolt

CL: Apply Cable Lubricant.

G: Apply grease.

L: Apply a non-permanent locking agent.

O: Apply oil.

Si: Apply Silicone Grease.

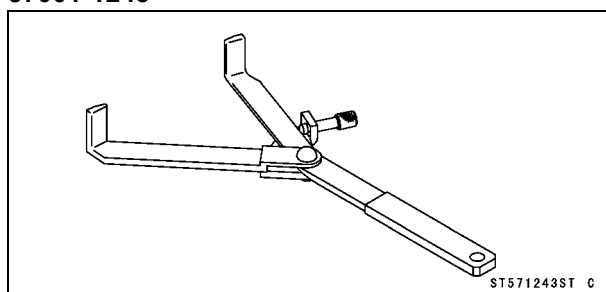
6-4 CLUTCH

Specifications

Item	Standard	Service Limit
Clutch		
Friction Plate Thickness	2.9 ~ 3.1 mm (0.114 ~ 0.122 in.)	2.8 mm (0.11 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 (1.35 in.)	33.1 mm (1.30 in.)
(On and after VN800-B7)	35.3 mm (1.39 in.)	34.1 mm (1.34 in.)

Special Tool

Clutch Holder:
57001-1243



6-6 CLUTCH

Clutch Lever and Cable

Lever Free Play Inspection

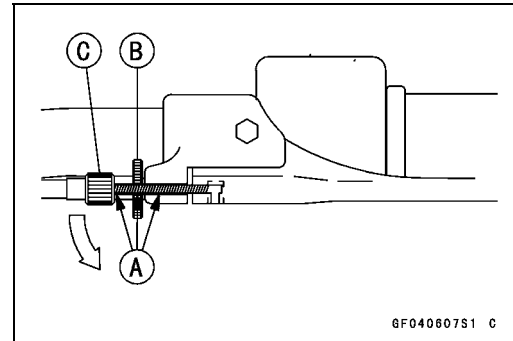
- Refer to the Clutch Inspection in the Periodic Maintenance chapter.

Lever Free Play Adjustment

- Refer to the Clutch Inspection in the Periodic Maintenance chapter.

Cable Removal

- Slide the dust cover at the clutch cable lower end out of place.
- Loosen the nuts, and slide the lower end of the clutch cable to give the cable plenty of play.
- Loosen the locknut at the clutch lever, and screw in the adjuster.
- Line up the slots [A] in the clutch lever, locknut [B], and adjuster [C], and then free the cable from the lever.
- Free the clutch inner cable tip from the clutch release lever.
- Push the release lever toward the front of the motorcycle and tape the release lever to the clutch cover to prevent the release shaft from falling out.
- Pull the clutch cable out of the frame.



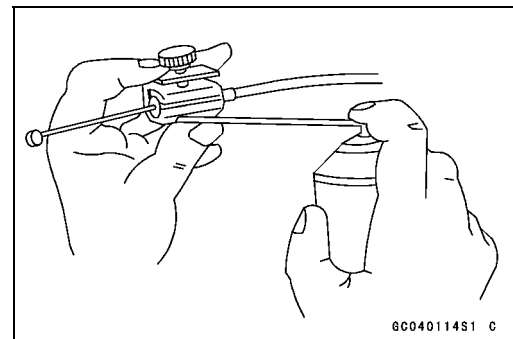
Cable Installation

- Run the clutch cable correctly (see Appendix chapter).
- Adjust the clutch cable (see Lever Free Play Adjustment in the Periodic Maintenance chapter).

Cable Lubrication

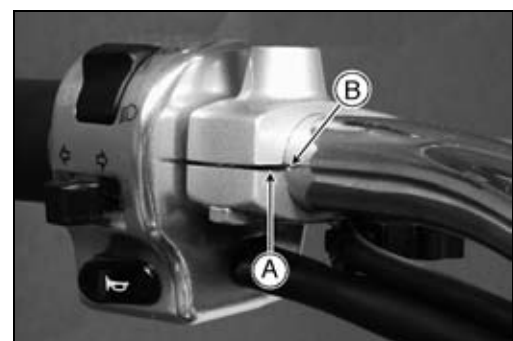
Whenever the clutch cable is removed, lubricate the clutch cable as follows.

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



Clutch Lever Installation

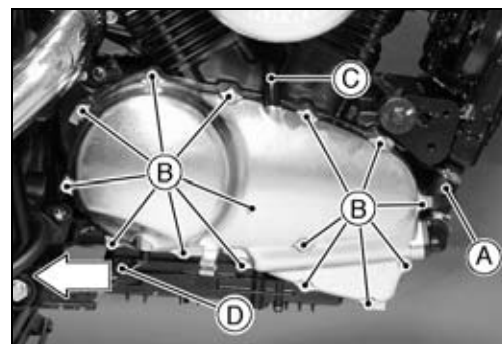
- Install the clutch lever so that the mating surface [A] of the lever holder is aligned with the punch mark [B] of the handlebar.



Right Engine Cover

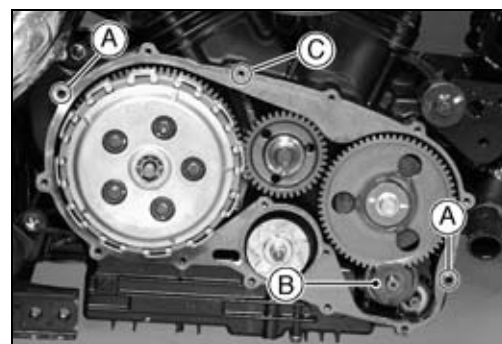
Right Engine Cover Removal

- Remove:
 - Engine Oil (drain, see Engine Lubrication System chapter)
 - Coolant (drain, see Cooling System chapter)
 - Front Right Foot Peg and Brake Pedal (see Brakes chapter)
 - Front Muffler (see Engine Top End chapter)
 - Clutch Cable
 - Down Tube (see Frame chapter)
 - Coolant Hose [A]
 - Clutch Cover Bolts [B]
 - Coolant Pipe [C] (from the engine)
- Turn the release lever [D] toward the rear as shown, and remove the right engine cover.



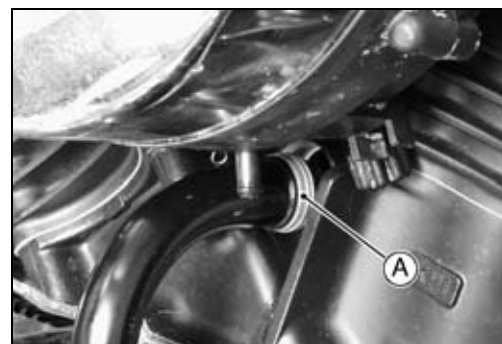
Right Engine Cover Installation

- Install the knock pins [A], and replace the cover gasket with a new one.
- Check to see that the washer [B] is in place.
- Apply a non-permanent locking agent to the threads of the right engine cover bolt [C].



- Apply a soap and water solution to the seal [A]. Do not apply a grease or oil to the seal.
- Tighten:

Torque - Right Engine Cover Bolts: 12 N·m (1.2 kgf·m, 104 in·lb)

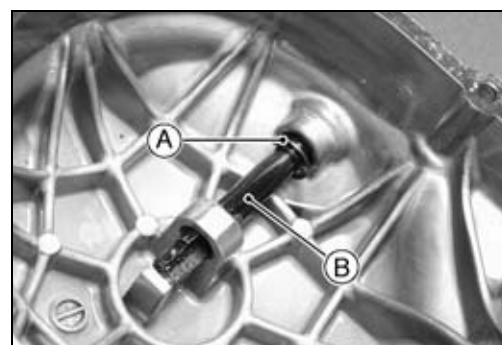


Release Shaft Removal

CAUTION

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

- Remove the right engine cover (see Right Engine Cover Removal).
- Remove the circlip [A] from the release shaft.
- Pull the lever and shaft assembly [B] out of the right engine cover.



6-8 CLUTCH

Right Engine Cover

Release Shaft Installation

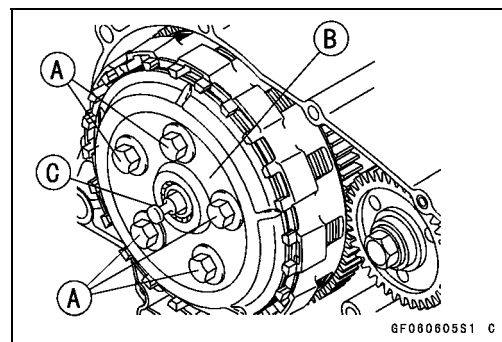
- Apply high-temperature grease to the oil seal lips on the lower ridge of the clutch cover.
- Apply oil to the bearing in the hole of the right engine cover.
- Insert the release shaft straight into the lower hole of the right engine cover.

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

Clutch

Clutch Removal

- Remove:
 - Right Engine Cover (see Right Engine Cover Removal)
 - Clutch Spring Bolts [A]
 - Clutch Springs
 - Clutch Spring Plate [B] (with thrust bearing and pusher [C])



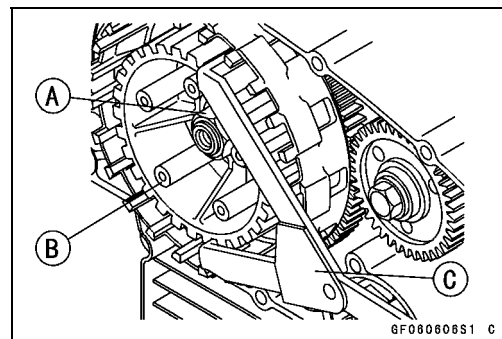
Friction Plates, Steel Plates

Clutch Hub Nut [A]

- Holding the clutch hub [B], remove the nut.

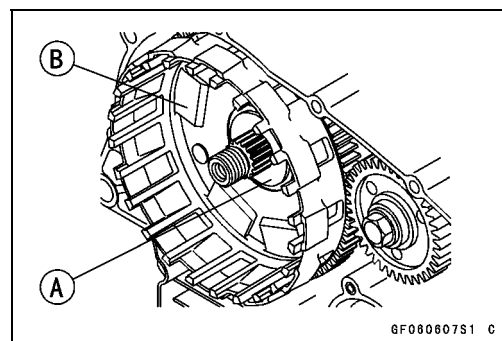
Special Tool - Clutch Holder: 57001-1243 [C]

- Remove:
 - Clutch Hub



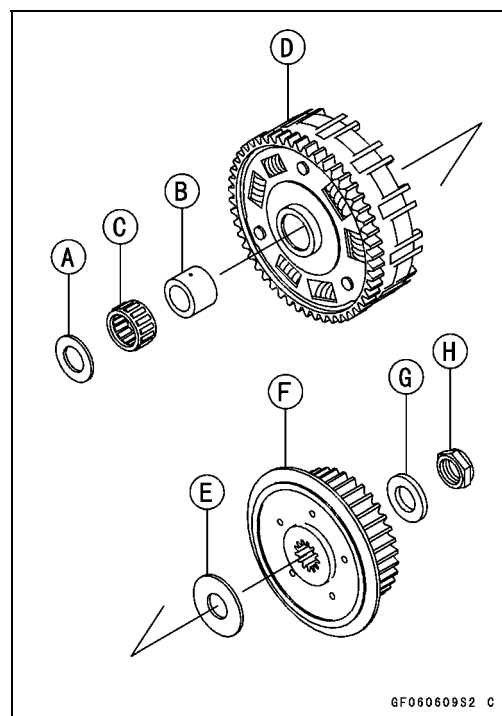
Spacer [A]

Clutch Housing [B], Needle Bearing and Bushing
Thrust Spacer



Clutch Installation

- Install the following parts on the drive shaft.
 - [A] Thrust Spacer
 - [B] Bushing
 - [C] Needle Bearing
 - [D] Clutch Housing
 - [E] Spacer
 - [F] Clutch Hub
 - [G] Washer
 - [H] Nut



6-10 CLUTCH

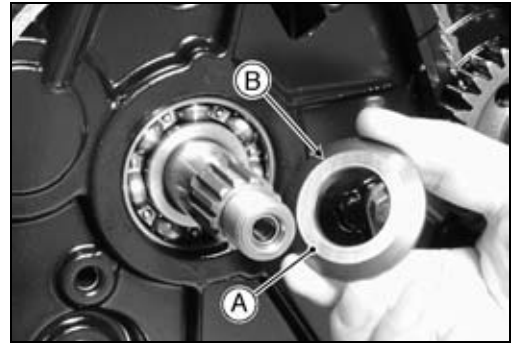
Clutch

- Install the thrust spacer [A] so that the stepped side [B] faces inward.
- Replace the clutch hub nut with a new one.
- Apply oil to the threads and seating surface of the hub nut.
- Holding the clutch hub, tighten the clutch hub 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.



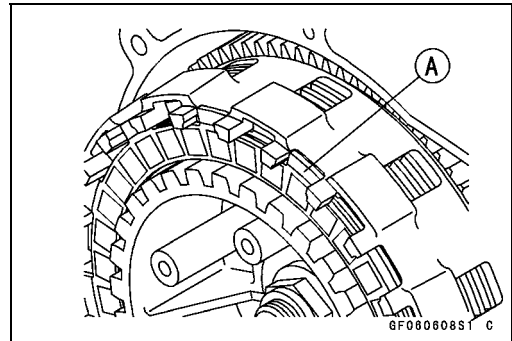
CAUTION

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

- Install the last friction plate [A] fitting the tangs in the grooves in the housing as shown.
- Install the clutch spring plate and spring, and tighten the clutch spring bolts.

Torque - Clutch Spring Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)

- Install the right engine cover (see Right Engine Cover Installation).



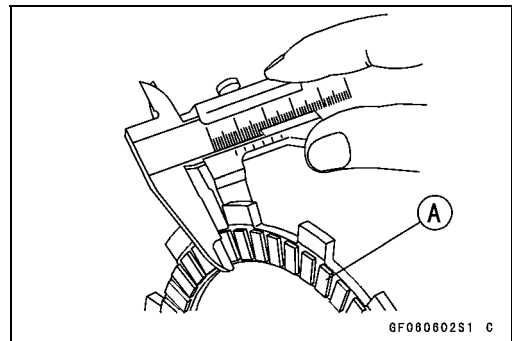
Clutch Plate, Wear, Damage Inspection

- Visually inspect the friction and steel plates for signs of seizure, overheating (discoloration), or uneven wear.
- Measure the thickness of each friction plate [A] at several points.
- If any plates show signs of damage, or if they have worn past the service limit, replace them with new ones.

Friction Plate Thickness

Standard: 2.9 ~ 3.1 mm (0.114 ~ 0.122 in.)

Service Limit: 2.8 mm (0.11 in.)



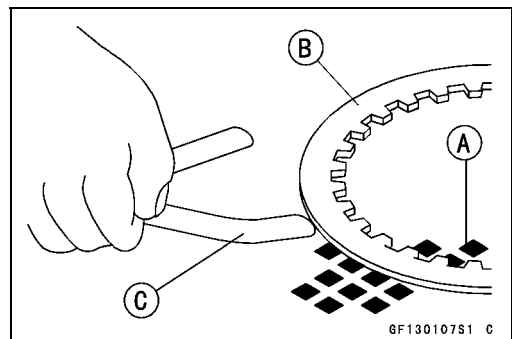
Clutch Plate Warp Inspection

- 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: 0.2 mm (0.008 in.) or less

Service Limit: 0.3 mm (0.012 in.)



Clutch

Clutch Spring Free Length Measurement

- Measure the free length of the clutch springs [A].
- ⚠ If any spring is shorter than the service limit, it must be replaced.

Clutch Spring Free Length

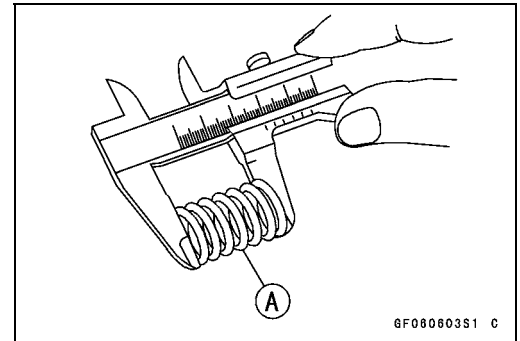
Standard: 34.2 mm (1.35 in.)

Service Limit: 33.1 mm (1.30 in.)

On and after VN800-B7 Model

Standard: 35.3 mm (1.39 in.)

Service Limit: 34.1 mm (1.34 in.)

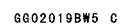


Engine Lubrication System

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Exploded View



ENGINE LUBRICATION SYSTEM 7-3

Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine Drain Plug	20	2.0	14.5	
2	Oil Pump Mounting Bolts	11	1.1	97 in·lb	L
3	Oil Pump Drive Chain Guide Bolt	12	1.2	104 in·lb	L
4	Oil Filter	18	1.8	13	
5	Oil Filter Plate Mounting Bolts	7.8	0.8	69 in·lb	
6	Oil Screen Plug	20	2.0	14.5	
7	Oil Pressure Relief Valve	15	1.5	11	L
8	Oil Pressure Switch	15	1.5	11	SS
9	Oil Pressure Switch Adapter	20	2.0	14.5	
10	Oil Pipe Mounting Bolts (RH Crankcase Inside)	11	1.1	95 in·lb	L
11	Oil Pipe Mounting Bolts (LH Crankcase Outside)	5.4	0.55	48 in·lb	L
12	Oil Pipe Mounting Bolts (LH Crankcase Inside)	11	1.1	95 in·lb	L
13	Oil Passage Cover Screws (Crankcase Outside)	5.4	0.55	48 in·lb	L

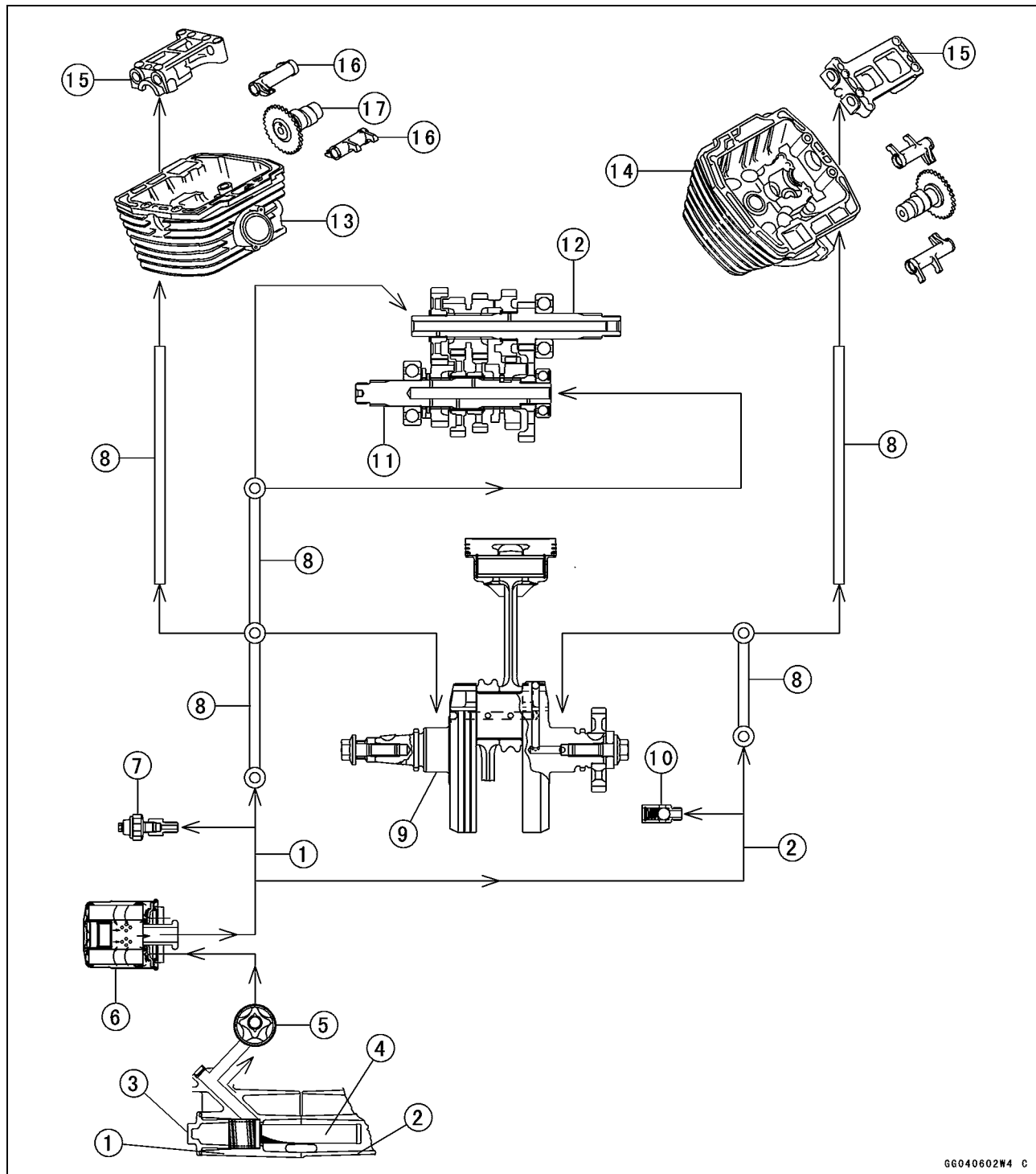
G: Apply grease.

L: Apply a non-permanent locking agent.

SS: Apply silicone sealant.

7-4 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart



ENGINE LUBRICATION SYSTEM 7-5

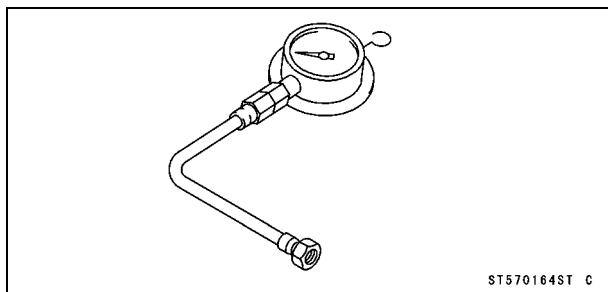
Specifications

Item	Standard	Service Limit
Engine Oil		
Type	SE, SF or SG class	— — —
(On and after VN800-B6)	API SE,SF,or SG	— — —
	API SH or SJ with JASO MA	— — —
Viscosity	SAE 10W-40, 10W-50, 20W-40, or 20W-50	— — —
(On and after VN800-B6)	SAE 10W-40	— — —
Capacity	2.7 L (2.9 us qt) (when filter is not removed)	— — —
	2.9 L (3.1 us qt) (when filter is removed)	— — —
	3.2 L (3.4 us qt) (when engine is completely dry)	— — —
Oil Pressure Measurement		
Oil pressure @4 000 r/min (rpm), oil temperature 100°C (212°F)	355 ~ 410 kPa (3.6 ~ 4.2 kgf/cm ² , 51~ 60 psi)	— — —

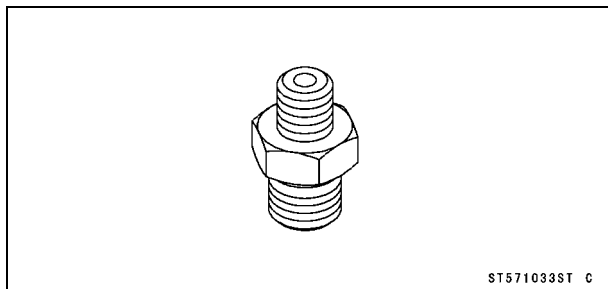
7-6 ENGINE LUBRICATION SYSTEM

Special Tool

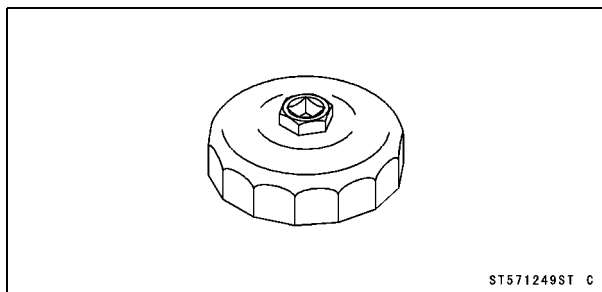
Oil Pressure Gauge, 10 kgf/cm²:
57001-164



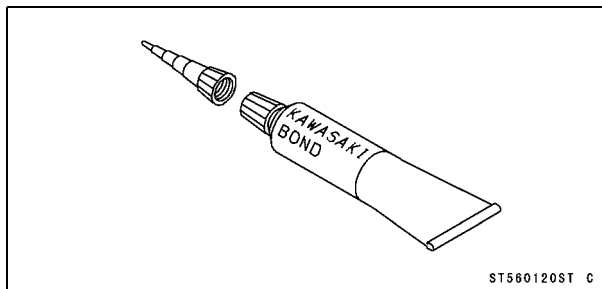
Oil Pressure Gauge Adapter, PT 1/8:
57001-1033



Oil Filter Wrench:
57001-1249



Kawasaki Bond (Silicone Sealant):
56019-120



Engine Oil and Oil Filter

⚠ WARNING

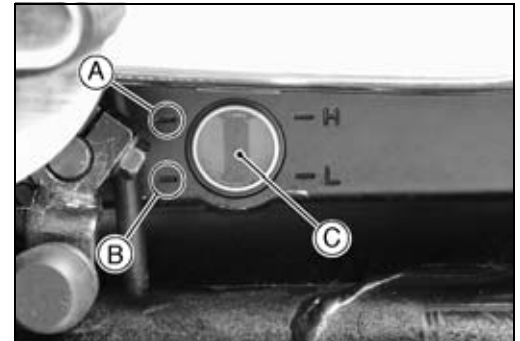
Motorcycle operation with insufficient, deteriorated, or contaminated engine oil will cause accelerated wear and may result in engine or transmission seizure, accident, and injury.

Oil Level Inspection

- Check that the engine oil level is between the upper [A] and lower [B] level lines next to the gauge [C].

NOTE

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



CAUTION

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

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

Engine Oil Change

- Refer to the Engine Oil Change in the Periodic Maintenance chapter.

Oil Filter Change

- Refer to the Oil Filter Replacement in the Periodic Maintenance chapter.

Oil Screen Cleaning

- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove the oil screen plug [A], spring and washer.



7-8 ENGINE LUBRICATION SYSTEM

Engine Oil and Oil Filter

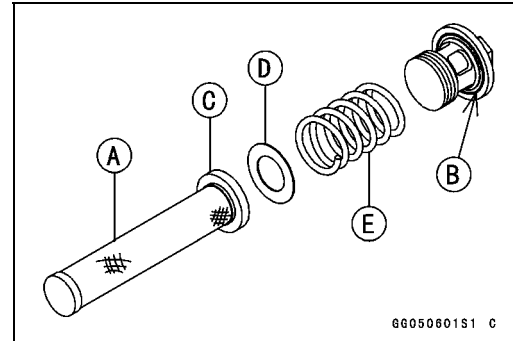
- Pull out the oil screen [A].
- Clean the screen with high flash-point solvent.

⚠ 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.

- Check the screen carefully for any damage.
 - If the screen is damaged, replace it with a new one.
 - Check the O-ring [B] the oil screen plug for damage.
 - If the O-ring is damaged, replace it with a new one.
 - Install:
 - Oil Screen and Rubber Gasket [C]
 - Washer [D]
 - Spring [E]
 - Apply grease to the O-ring, and tighten the plug.
- Torque - Oil Screen Plug: 20 N·m (2.0 kgf·m, 14.5 ft·lb)**

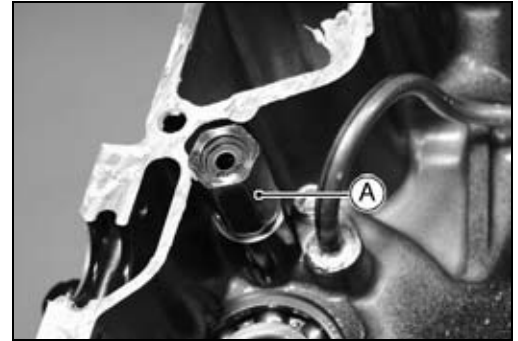


Oil Pressure Relief Valve

Oil Pressure Relief Valve Removal/Installation

- Split the crankcase (see Crankshaft/Transmission chapter).
- Remove the relief valve [A] from the right crankcase.
- Apply a non-permanent locking agent to the threads of the relief valve, and tighten it.

Torque - Oil Pressure Relief Valve: 15 N·m (1.5 kgf·m, 11.0 ft·lb)



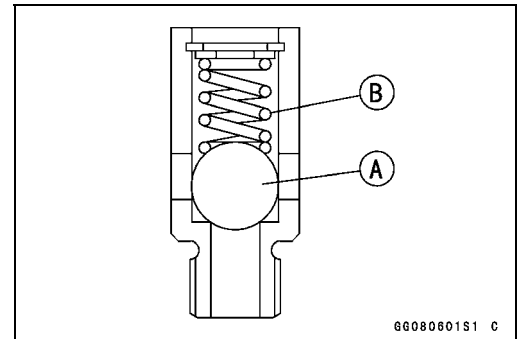
Oil Pressure Relief Valve Inspection

- Check to see if the steel ball [A] 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 [B].

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 with a high flash-point solvent and blow out any foreign particles that may be in the valve with compressed air.



WARNING

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

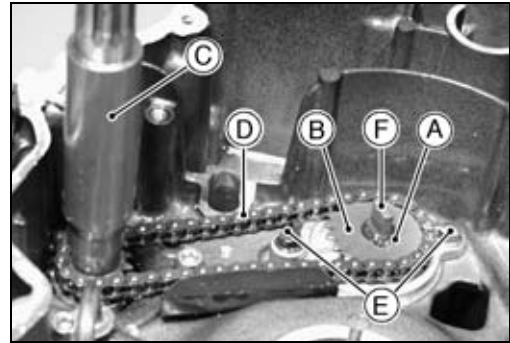
- ✚ If cleaning does not solve the problem, replace the relief valve as an assembly. The relief valve is precision made with no allowance for replacement of individual parts.

7-10 ENGINE LUBRICATION SYSTEM

Oil Pump, Oil Pump Drive Chain

Oil Pump Removal

- Split the crankcase (see Crankshaft/Transmission chapter).
- Remove:
 - Crankshaft
 - Circlip [A]
- Remove the sprocket [B] and balancer shaft [C] along with the oil pump chain [D].
- Remove:
 - Oil Pump Mounting Bolts [E]
 - Oil Pump Shaft [F], Pump Body, and Rotors



Oil Pump Installation

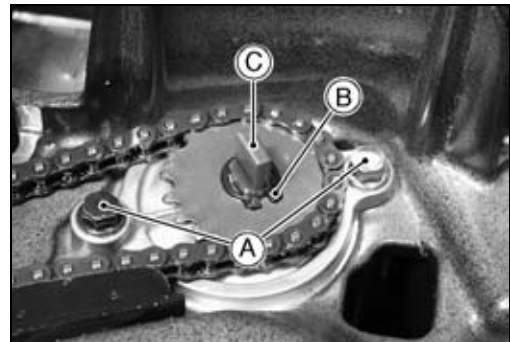
- Check that the knock pin [A] is in place.
- Apply grease to the O-ring [B] on the pump body.



- Apply a non-permanent locking agent to the threads of the mounting bolts [A], and tighten them.

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

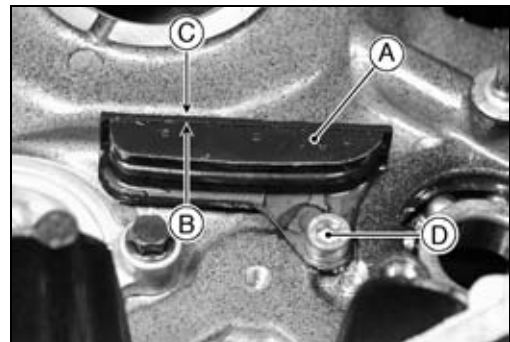
- Install a new circlip [B] on the shaft so that the sharp edge faces away from the sprocket and opening is on the shaft flat surface [C].



Oil Pump Drive Chain Guide Installation

- Install the chain guide [A] so that the upper surface [B] of the chain guide touches the flat surface [C] of the left crankcase.
- Apply a non-permanent locking agent to the threads of the chain guide bolt [D], and tighten it.

Torque - Oil Pump Drive Chain Guide Bolt: 12 N·m (1.2 kgf·m, 104 in·lb)



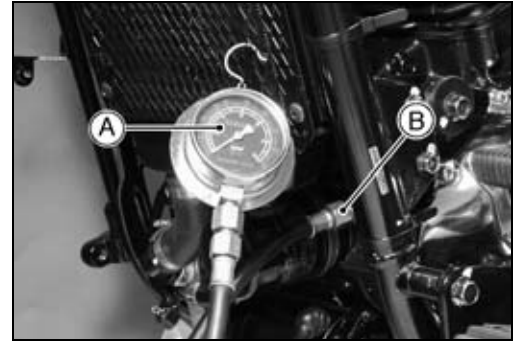
Oil Pressure Measurement

Oil Pressure Measurement

- Remove the oil pressure switch (see Oil Pressure Switch Removal) without draining the engine oil.
- Install the gauge and adapter.

Special Tool - Oil Pressure Gauge, 10 kgf/cm²: 57001-164 [A]

Oil Pressure Gauge Adapter, PT 1/8: 57001-1033 [B]



- 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

Standard: 355 ~ 410 kPa (3.6 ~ 4.2 kgf/cm², 51 ~ 60 psi) @4 000 r/min (rpm), oil temp. 100°C (212 °F)

- Stop the engine.
- Remove the oil pressure gauge and adapter.

⚠ WARNING

Take care against burns from hot engine oil that will drain through the oil passage when the gauge adapter is removed.

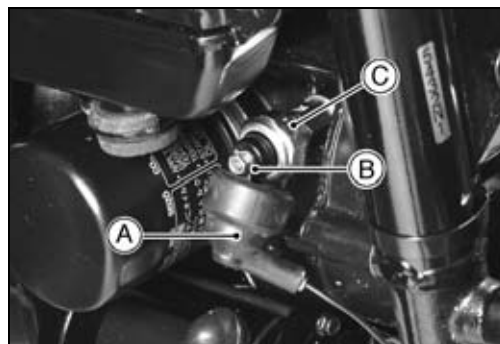
- Install the oil pressure switch (see Oil Pressure Switch Installation).

7-12 ENGINE LUBRICATION SYSTEM

Oil Pressure Switch

Oil Pressure Switch Removal

- Remove:
 - Engine Oil (drain, see Engine Oil Change in the Periodic Maintenance chapter)
 - Switch Cover [A]
 - Switch Lead Terminal [B]
 - Oil Pressure Switch [C]



Oil Pressure Switch Installation

- Apply silicone sealant to the threads of the oil pressure switch, and tighten it.

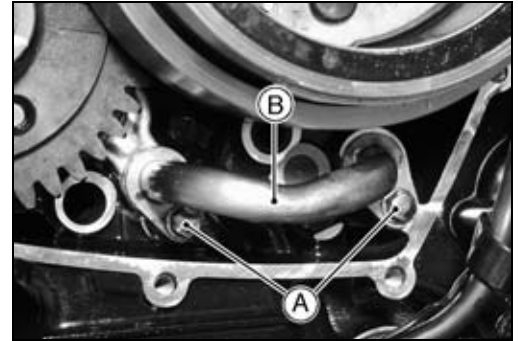
Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

Torque - Oil Pressure Switch: 15 N·m (1.5 kgf·m, 11.0 ft·lb)

Oil Pipe

Oil Pipe (Crankcase Outside) Removal

- Remove:
 - Alternator Cover (see Electrical System chapter)
 - Oil Pipe Mounting Bolts [A]
 - Oil Pipe [B]



Oil Pipe (Crankcase Outside) Installation

- Apply grease to the O-rings [A].
- Apply a non-permanent locking agent to the threads of the mounting bolts, and tighten them.

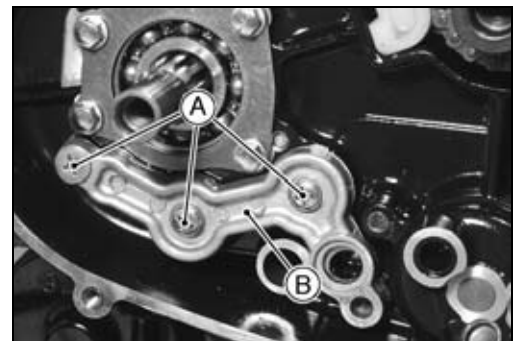
Torque - Oil Pipe Mounting Bolts (Crankcase Outside): 5.4 N·m (0.55 kgf·m, 48 in·lb)



Oil Passage Cover Removal/Installation

- Remove:
 - Oil Pipe (Crankcase Outside)
 - Alternator (see Electrical System chapter)
 - Left Balancer (see Crankshaft/Transmission chapter)
 - Oil Passage Cover Screws [A]
 - Oil Passage Cover [B]
- Install a new gasket.
- Apply a non-permanent locking agent to the threads of the cover screws, and tighten them.

Torque - Oil Passage Cover Screws: 5.4 N·m (0.55 kgf·m, 48 in·lb)

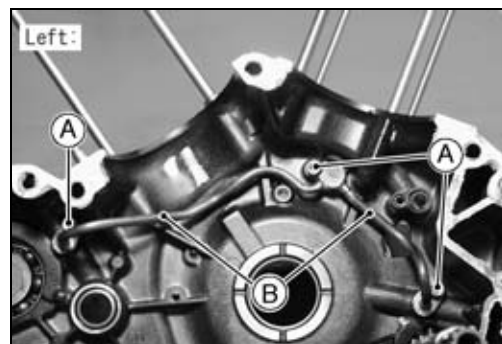
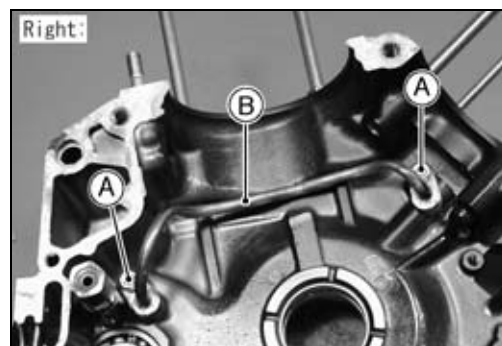


7-14 ENGINE LUBRICATION SYSTEM

Oil Pipe

Oil Pipe (Crankcase Inside) Removal

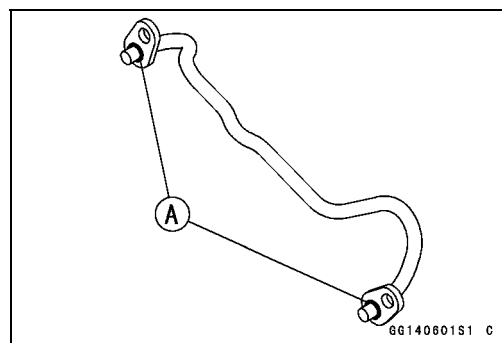
- Split the crankcase (see Crankshaft/Transmission chapter).
- Remove:
 - Oil Pipe Mounting Bolts [A]
 - Oil Pipes [B]



Oil Pipe (Crankcase Inside) Installation

- Apply grease to the O-rings [A].
- Apply a non-permanent locking agent to the threads of the mounting bolts, and tighten them.

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



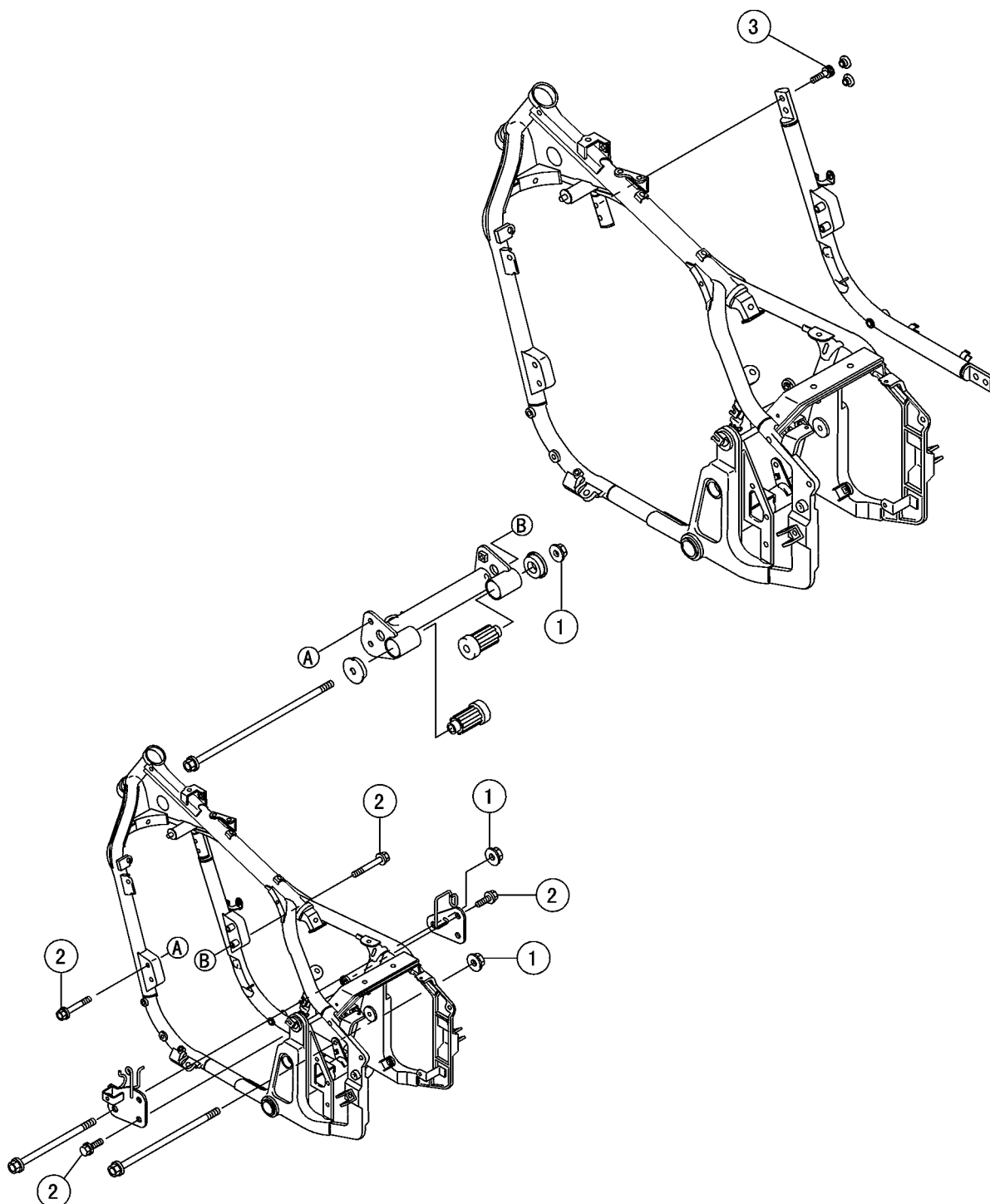
Engine Removal/Installation

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8-2 ENGINE REMOVAL/INSTALLATION

Exploded View



ENGINE REMOVAL/INSTALLATION 8-3

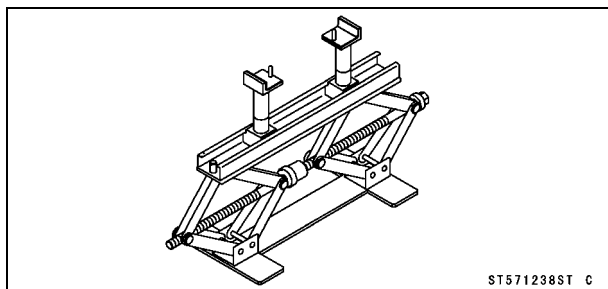
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine Mounting Nuts	44	4.5	32	
2	Engine Mounting Bracket Bolts	25	2.5	18	
3	Down Tube Mounting Bolts	44	4.5	32	

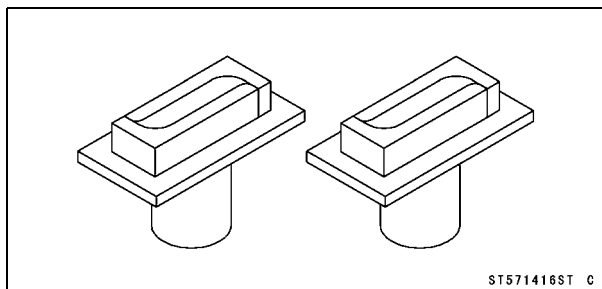
8-4 ENGINE REMOVAL/INSTALLATION

Special Tool

Jack:
57001-1238



Jack Attachment #3:
57001-1416



Engine Removal/Installation

Engine Removal

• Remove:

Engine Oil (drain, see Engine Lubrication System in the Periodic Maintenance chapter)
Coolant (drain, see Cooling System in the Periodic Maintenance chapter)
Seat (see Frame chapter)
Fuel Tank (see Fuel System chapter)
Left and Right Side Cover (see Frame chapter)
Muffler (see Engine Top End chapter)
Front Right Foot Peg and Brake Petal (see Brakes chapter)

Clutch Cable

Air Cleaner Housing (see Fuel System chapter)

Carburetor (see Fuel System chapter)

Vacuum Switch Valve

Radiator (see Cooling System chapter)

Thermostat Housing [A]

Water Hose Fitting Bolts [B] and Fittings

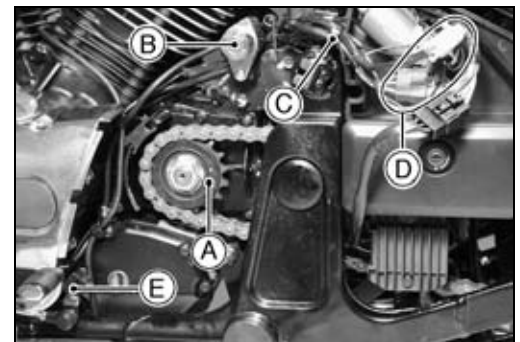
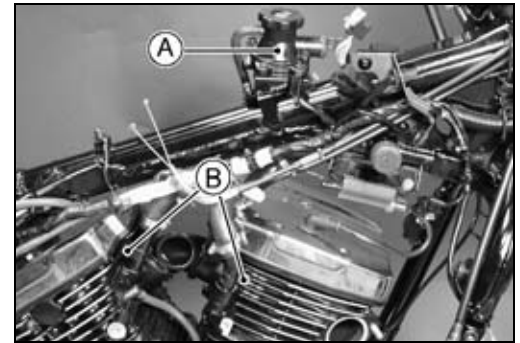
Engine Sprocket [A] (see Final Drive chapter)

Ignition Switch [B]

Clamp [C]

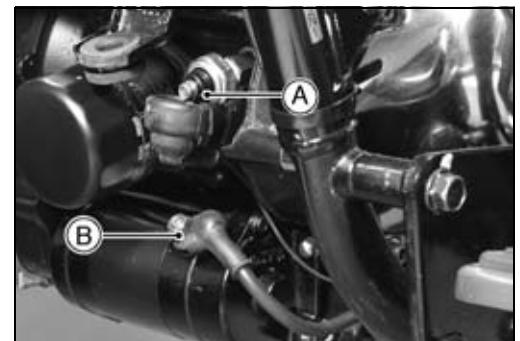
Connectors [D]

Shift Lever and Bolt [E]



Oil Pressure Switch Lead [A]

Starter Motor Lead [B]



Neutral Switch Lead Connector [A]

Negative Lead (-) [B]



8-6 ENGINE REMOVAL/INSTALLATION

Engine Removal/Installation

- Support the frame with the jack.
Special Tool - Jack: 57001-1238
Jack Attachment #3: 57001-1416
- 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.

- Support the engine with a suitable stand [A].
- Remove:
 - Down Tube [B] (see Frame chapter)
 - Engine Mounting Bolts [C] and Nuts
 - Engine Mounting Brackets [D].
- Using the stand, take out the engine to the right.

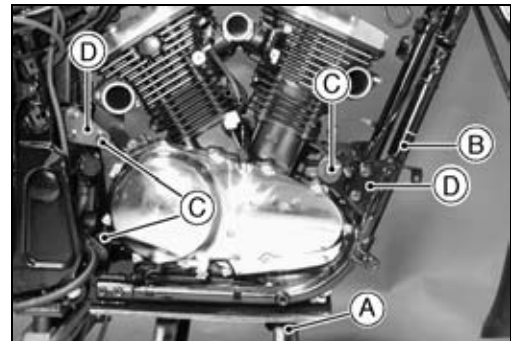
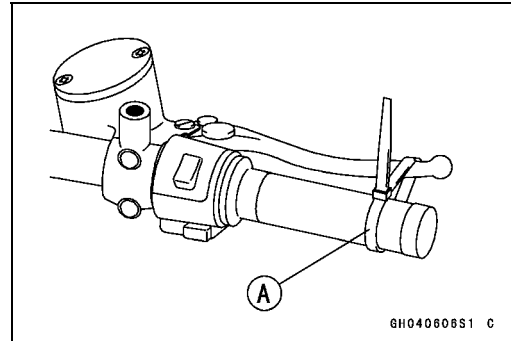
Engine Installation

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

CAUTION

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

- Install the engine mounting bracket and down tube.
- Tighten:
 - Torque - Engine Mounting Bracket Bolt: 25 N·m (2.5 kgf·m, 18.0 ft·lb)**
 - Down Tube Mounting Bolts: 44 N·m (4.5 kgf·m, 33 ft·lb)**
 - Engine Mounting Nuts: 44 N·m (4.5 kgf·m, 33 ft·lb)**
- Run the leads, cables and hoses correctly (see Cable, Wire and Hose Routing in the Appendix chapter).
- Install the removed parts (see appropriate chapters).
- Adjust:
 - Throttle Cables (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 in the Periodic Maintenance chapter)
- Fill the engine with coolant and bleed the air from the cooling system (see Cooling System in the Periodic Maintenance chapter).



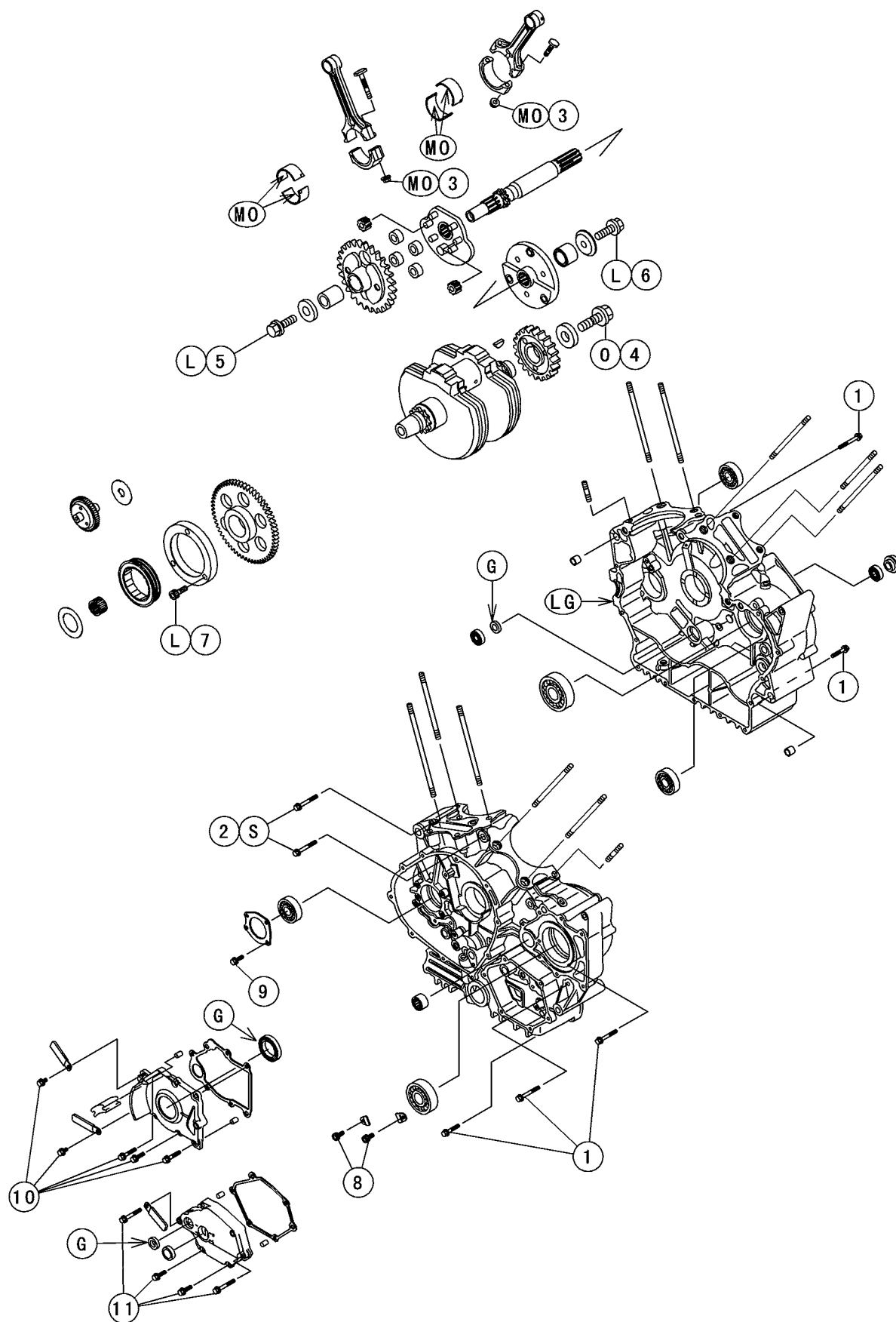
Crankshaft/Transmission

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9-2 CRANKSHAFT/TRANSMISSION

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Crankcase Bolts (6 mm)	11	1.1	95 in·lb	
2	Crankcase Bolts (10 mm)	39	4.0	29	S
3	Connecting Rod Big End Cap Nuts	46	4.7	34	MO
4	Primary Gear Bolt	157	16	116	O
5	Balancer Gear Bolt	69	7.0	51	L
6	Starter Motor Clutch Gear Bolt	69	7.0	51	L
7	Starter Motor Clutch Bolts	34	3.5	25	L
8	Output Shaft Bearing Stopper Bolts	12	1.2	104 in·lb	
9	Balancer Shaft Bearing Stopper Bolts	11	1.1	95 in·lb	
10	Transmission Cover Bolts	11	1.1	95 in·lb	
11	External Shift Mechanism Cover Bolts	11	1.1	95 in·lb	

G: Apply grease.

L: Apply a non-permanent locking agent.

LG: Apply liquid gasket.

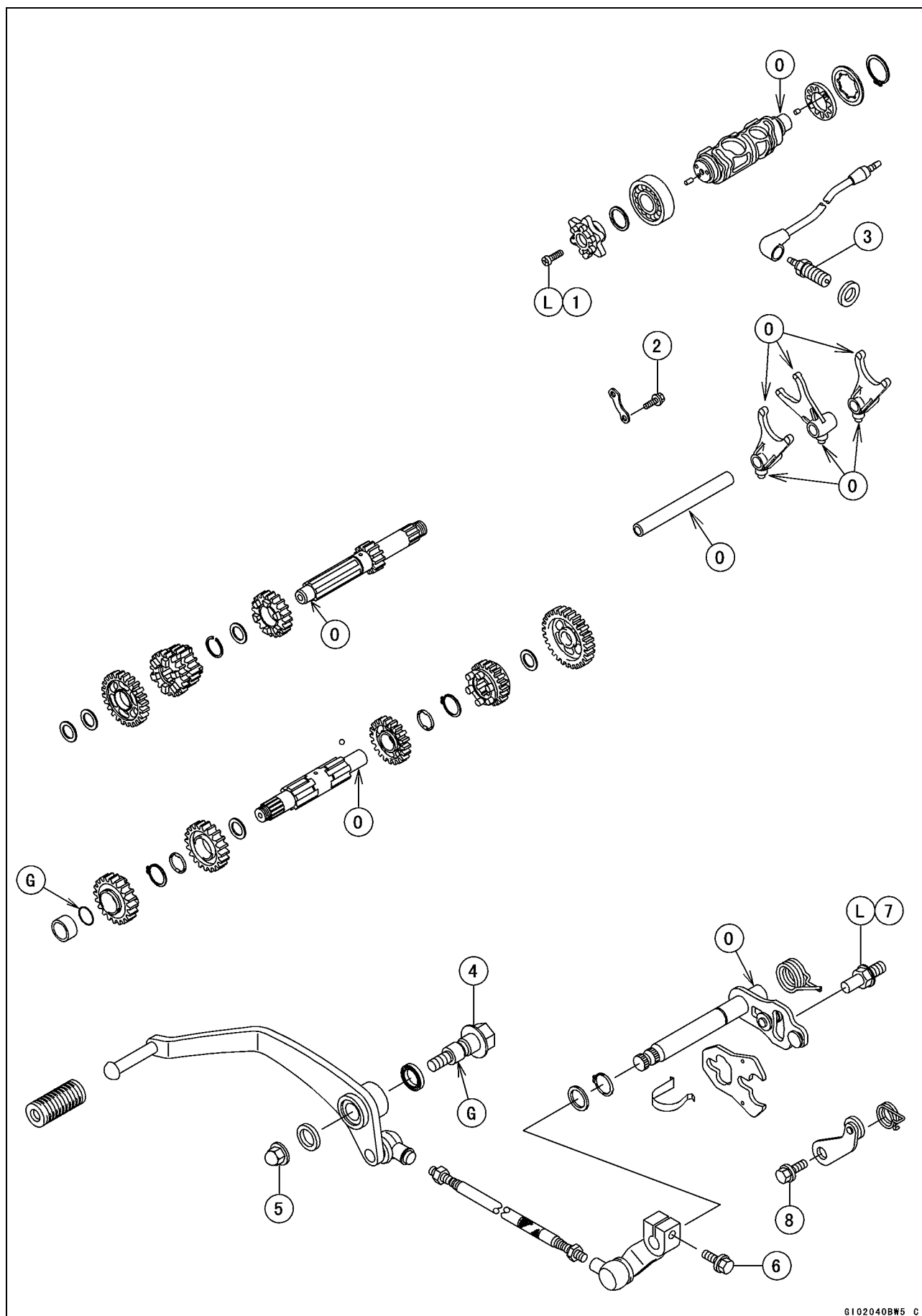
MO: Apply molybdenum disulfide oil.

O: Apply Oil.

S: Follow specified tightening sequence.

9-4 CRANKSHAFT/TRANSMISSION

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Shift Drum Cam Holder Screw	12	1.2	104 in·lb	L
2	Shift Drum Bearing Stopper Bolts	11	1.1	95 in·lb	
3	Neutral Switch	15	1.5	11	
4	Shift Pedal Pivot Bolt	29	3.0	22	
5	Shift Pedal Pivot Bolt Nut	29	3.0	22	
6	Shift Lever Clamp Bolt	12	1.2	104 in·lb	
7	Shift Shaft Return Spring Pin	29	3.0	22	L
8	Shift Drum Position Lever Bolt	11	1.1	95 in·lb	

G: Apply grease.

L: Apply a non-permanent locking agent.

O: Apply Oil.

9-6 CRANKSHAFT/TRANSMISSION

Specifications

Item		Standard	Service Limit
Crankshaft, Connecting Rods			
Connecting Rod Big End Side Clearance		0.16 ~ 0.46 mm (0.006 ~ 0.018 in.)	0.70 mm (0.028 in.)
Connecting Rod Big End Bearing Insert/Crankpin Clearance		0.026 ~ 0.054 mm (0.0010 ~ 0.0021 in.)	0.09 mm (0.0035 in.)
Crankpin Diameter:		42.984 ~ 43.000 mm (1.6923 ~ 1.6929 in.)	42.97 mm (1.692 in.)
Marking	None	42.984 ~ 42.992 mm (1.6923 ~ 1.6926 in.)	— — —
	1	42.993 ~ 43.000 mm (1.6926 ~ 1.6929 in.)	— — —
Connecting Rod Big End Bore Diameter:		46.000 ~ 46.020 mm (1.8110 ~ 1.8118 in.)	— — —
Marking	None	46.000 ~ 46.010 mm (1.8110 ~ 1.8114 in.)	— — —
	■	46.011 ~ 46.020 mm (1.8115 ~ 1.8118 in.)	— — —
Connecting Rod Big End Bearing Insert Thickness:			
	Brown	1.483 ~ 1.487 mm (0.5839 ~ 0.5854 in.)	— — —
	Black	1.487 ~ 1.491 mm (0.5854 ~ 0.5870 in.)	— — —
	Blue	1.491 ~ 1.495 mm (0.5870 ~ 0.5886 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	1	Brown	13034-1059
None	None	Black	13034-1058
■	1		
■	None	Blue	13034-1057
Connecting Rod Bend		— — —	0.2/100 mm (0.008/3.94 in.)
Connecting Rod Twist		— — —	0.2/100 mm (0.008/3.94 in.)
Crankshaft Side Clearance		0.05 ~ 0.55 mm (0.002 ~ 0.022 in.)	0.75 mm (0.030 in.)
Crankshaft Web Length		96.85 ~ 96.95 mm (38.130 ~ 38.169 in.)	96.6 mm (3.80 in.)
Crankshaft Runout		TIR 0.02 mm (0.0008 in.) or less	TIR 0.05 mm (0.002 in.)

CRANKSHAFT/TRANSMISSION 9-7

Specifications

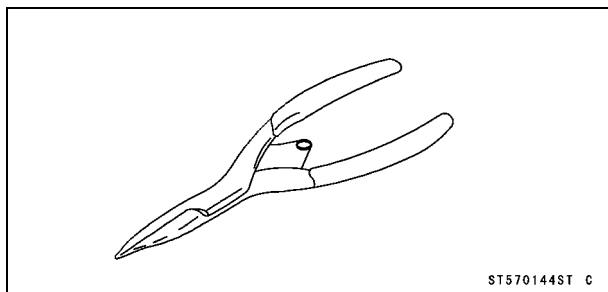
Item	Standard	Service Limit
Crankshaft Main Journal Diameter	42.984 ~ 43.000 mm (1.6923 ~ 1.6929 in.)	42.96 mm (1.691 in.)
Crankcase Main Bearing Bore Diameter	43.025 mm ~ 43.041 mm (1.6939 ~ 1.6945 in.)	43.09 mm (1.696 in.)
Transmission		
Shift Fork Ear Thickness	4.9 ~ 5.0 mm (0.193 ~ 0.197 in.)	4.8 mm (0.19 in.)
Gear Shift Fork Groove Width	5.05 ~ 5.15 mm (0.199 ~ 0.203 in.)	5.2 mm (0.20 in.)
Shift Fork Guide Pin Diameter	5.9 ~ 6.0 mm (0.232 ~ 0.236 in.)	5.8 mm (0.23 in.)
Shift Drum Groove Width	6.05 ~ 6.20 mm (0.238 ~ 0.244 in.)	6.3 mm (0.25 in.)

9-8 CRANKSHAFT/TRANSMISSION

Special Tool

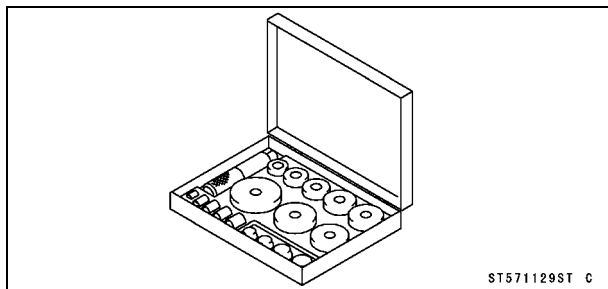
Outside Circlip Pliers:

57001-144



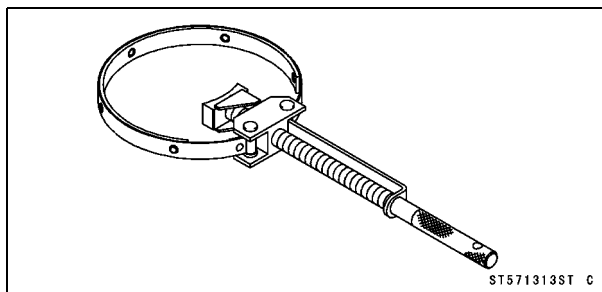
Bearing Driver Set:

57001-1129



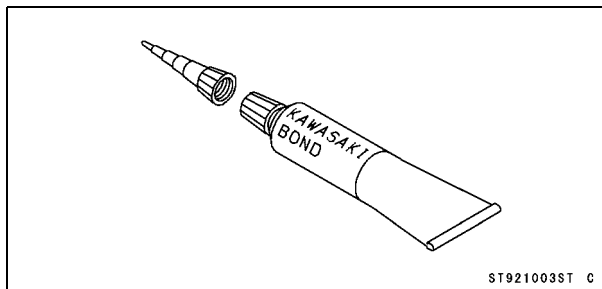
Flywheel Holder:

57001-1313



Kawasaki Bond (Liquid Gasket - Black) TB1105:

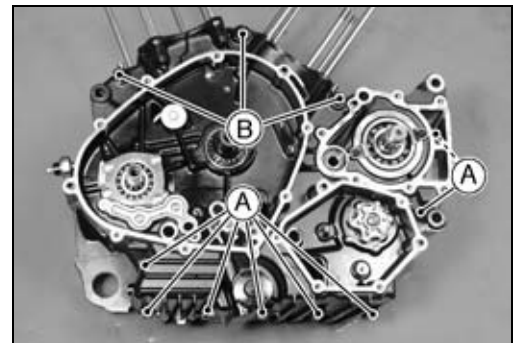
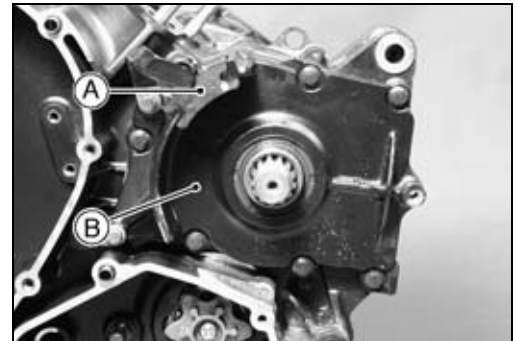
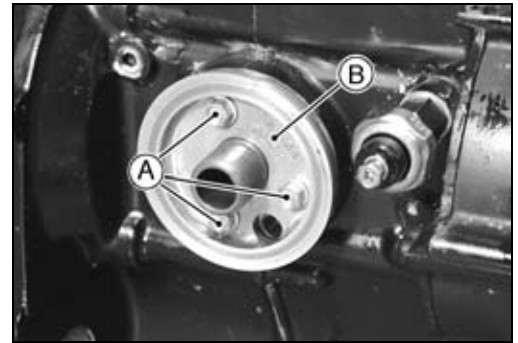
92104-1003



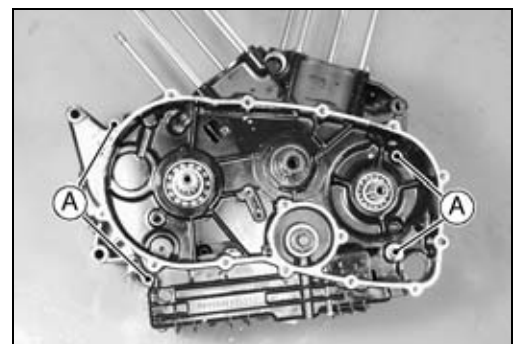
Crankcase Splitting

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:
 - Starter Motor (see Electrical System chapter)
 - Oil Filter (see Engine Lubrication System in the Periodic Maintenance chapter)
 - Plate Bolts [A]
 - Oil Filter Plate [B] and O-rings (2)
 - Clutch (see Clutch chapter)
 - Primary Gear (see Primary Gear Removal)
 - Right Balancer (see Right Balancer, starter Clutch Removal)
 - Torque Limiter
 - Water Pump Impeller (see Cooling System chapter)
 - Left Balancer (see Left Balancer Removal)
 - Alternator Rotor (see Electrical System chapter)
 - External Shift Mechanism (see External Shift Mechanism Removal)
 - Damper [A] and Transmission Cover [B]
 - Cylinder Heads, Cylinders, and Pistons (see Engine Top End chapter)
- Remove the left crankcase bolts in the order listed.
 - 6 mm Bolts [A]
 - 10 mm Bolts [B]



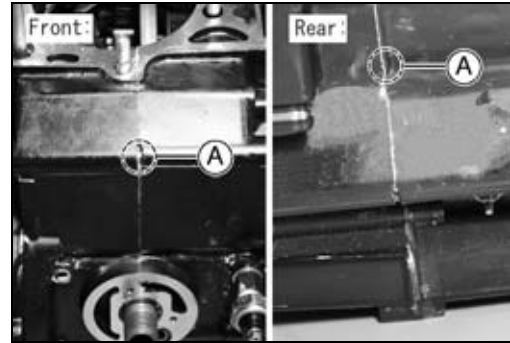
- Remove the right crankcase bolts:
 - 6 mm Bolts [A]



9-10 CRANKSHAFT/TRANSMISSION

Crankcase Splitting

- Put the engine so that the left crankcase is down.
- Pry the points [A] to split the crankcase halves apart, and remove the right crankcase half.
- Tap lightly around the crankcase joint with a plastic mallet, and split the crankcase. Take care not to damage the crankcase.



Crankcase Assembly

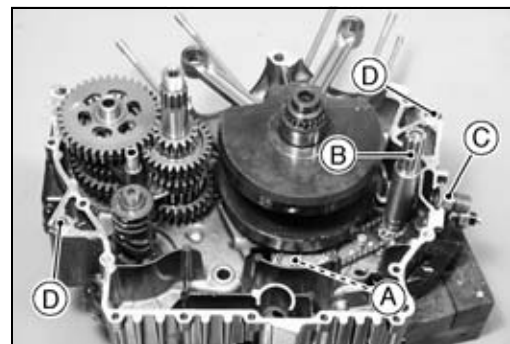
NOTE

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

- With a high-flash point solvent, clean off the mating surfaces of the crankcases halves and wipe dry.
- Using compressed air, blow out the oil passages in the crankcase halves.
- Check to see that the following parts are in place.

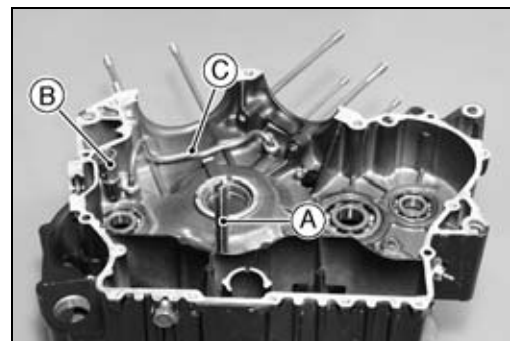
Left Crankcase

Oil Pipe (Crankcase Inside)
Oil Pump [A]
Balancer Shaft [B]
Shift Drum
Transmission Shafts and Gears
Shift Forks and Shift Rods
Crankshaft and Connecting Rods
Oil Filter Adapter Bolt [C]
Knock Pins [D]



Right Crankcase

Water Pump Shaft [A]
Relief Valve [B]
Oil Pipe (Crankcase Inside) [C]

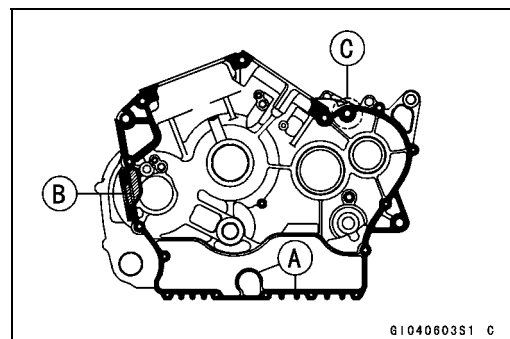


- Apply liquid gasket [A] to the mating surface of the right crankcase half.

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

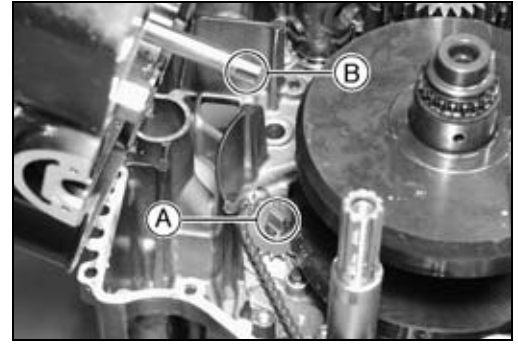
CAUTION

Do not apply liquid gasket to the oil passage [B] and hole [C].



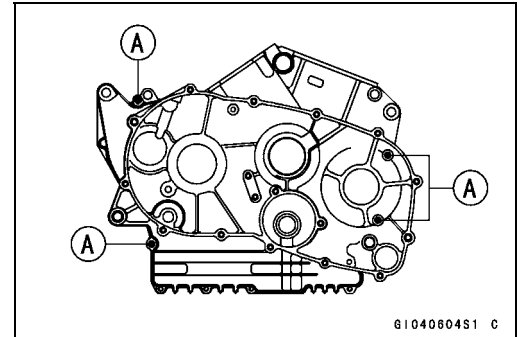
Crankcase Splitting

- Install the right crankcase, fitting the oil pump shaft projection [A] into the water pump shaft slot [B].



- Tighten the right crankcase half 6 mm bolts [A].

Torque - Crankcase Bolts (6 mm): 11 N·m (1.1 kgf·m, 95 in·lb)



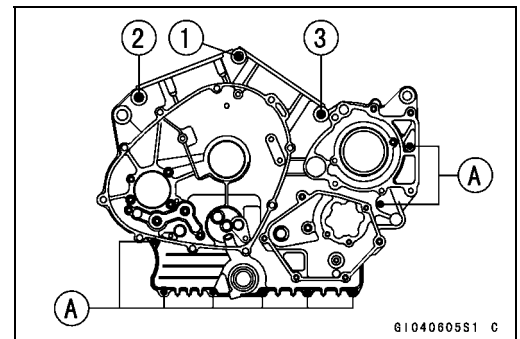
- Tighten the left crankcase half 10 mm bolts [1 ~ 3] to the tightening sequence, and then tighten the 6 mm bolts [A].

Torque - Crankcase Bolts (10 mm): 39 N·m (4.0 kgf·m, 29 ft·lb)

Crankcase Bolts (6 mm): 11 N·m (1.1 kgf·m, 95 in·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 5th gear, and 5th to 1st.
- When the output shaft stays still, the gear can not be shifted to 2nd gear or other higher gear positions.



9-12 CRANKSHAFT/TRANSMISSION

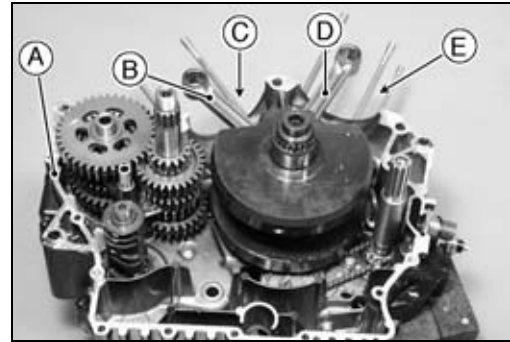
Crankshaft/Connecting Rods

Crankshaft Removal

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

Crankshaft Installation

- Insert the crankshaft tapered end in to the left crankcase [A].
- Install the left connecting rod [B] into the rear cylinder opening [C], and right connecting rod [D] into the front cylinder opening [E].



Connecting Rod Removal

- Remove the crankshaft (see Crankshaft Removal).

NOTE

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

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

Connecting Rod Installation

CAUTION

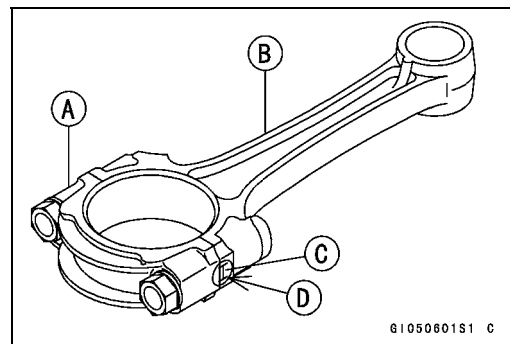
To minimize vibration, the connecting rods should have the same weight mark.

Big End Cap [A]

Connecting Rod [B]

Weight Mark, Alphabet [C]

Diameter Mark (Around Weight Mark) [D]: "O" or no mark.

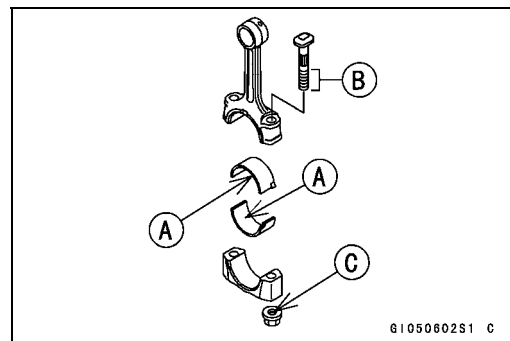


CAUTION

If the connecting rods, bearing inserts, or crankshaft are replaced with new ones, select the bearing insert and check clearance with a plastigage (press gauge) before assembling engine to be sure the correct bearing inserts are installed.

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

Torque - Connecting Rod Big End Cap Nuts: 46 N·m (4.7 kgf·m, 34 ft·lb)



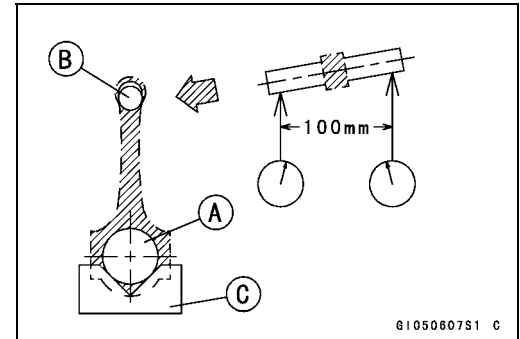
Crankshaft/Connecting Rods

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 Inspection

- Remove the connecting rod big end bearing insets, 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 (3.94 in.) long, and insert the arbor [B] through the connecting rod small end.
 - On a surface plate, set the big-end arbor on V block [C].
 - With the connecting rod held vertically, use a height gauge to measure the difference in the height of the arbor above the surface plate over a 100 mm (3.94 in.) length to determine the amount of connecting rod bend.
- ⚠ If connecting rod bend exceeds the service limit, the connecting rod must be replaced.

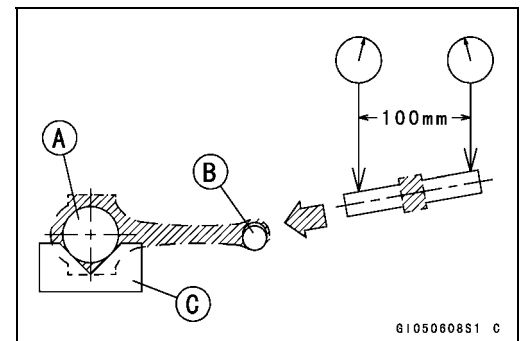


Connecting Rod Bend

Service Limit: TIR 0.2/100 mm (0.008/3.94 in.)

Connecting Rod Twist Inspection

- With the big-end arbor [A] still on V block [C], hold the connecting rod horizontally and measure the amount that the arbor [B] varies from being parallel with the surface plate over a 100 mm (3.94 in.) length of the arbor to determine the amount of connecting rod twist.
- ⚠ If connecting rod twist exceeds the service limit, the connecting rod must be replaced.



Connecting Rod Twist

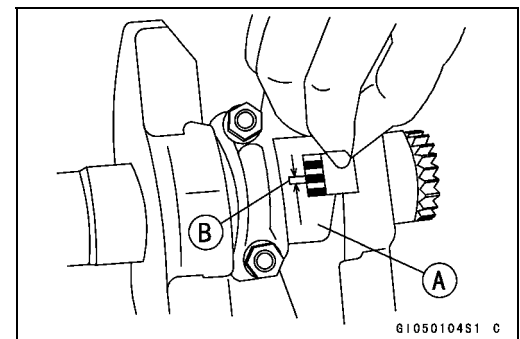
Service Limit: TIR 0.2/100 mm (0.008/3.94 in.)

Connecting Rod Big End Bearing Insert/Crankpin Wear Inspection

- Measure the bearing insert/crankpin [A] clearance with a plastigage [B].
- Tighten the connecting rod big end cap nuts to the specified torque (see Connecting Rod Installation).

NOTE

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



Connecting Rod Big End Bearing Insert/Crankpin Clearance

Standard: 0.026 ~ 0.054 mm (0.0010 ~ 0.0021 in.)

Service Limit: 0.09 mm (0.035 in.)

9-14 CRANKSHAFT/TRANSMISSION

Crankshaft/Connecting Rods

- ✚ If clearance is within the standard, no bearing replacement is required.
- ✚ If clearance is between 0.054 mm (0.0021 in.) and the service limit (0.09 mm, 0.35 in.), replace the bearing inserts [A] with inserts painted blue [B]. Check insert/crankpin clearance with the 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: 42.984 ~ 43.000 mm (1.6923 ~ 1.6929 in.)

Service Limit: 42.97 mm (1.692 in.)

- ✚ If any crankpin has worn past the service limit, replace the crankshaft with a new one.
- ✚ If the measured crankpin diameter [A] is not less than the service limit, but do not coincide with the original diameter marking on the crankshaft, make new mark on it.

Crankpin Diameter Mark

None 42.984 ~ 42.992 mm (1.6923 ~ 1.6926 in.)

1 42.993 ~ 43.000 mm (1.6926 ~ 1.6929 in.)

Crankpin Diameter Mark, "1" mark or no mark [B].

- Measure the connecting rod big end bore diameter, and mark each connecting rod big end in accordance with the bore diameter.
- Tighten the connecting rod big end cap nuts to the specified torque (see Connecting Rod Installation).

NOTE

- *The mark already on the big end should almost coincide with the measurement because of little wear.*

Connecting Rod Big End Bore Diameter Marks

None 46.000 ~ 46.010 mm (1.8110 ~ 1.8114 in.)

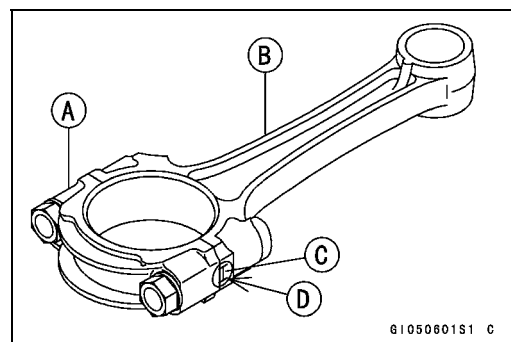
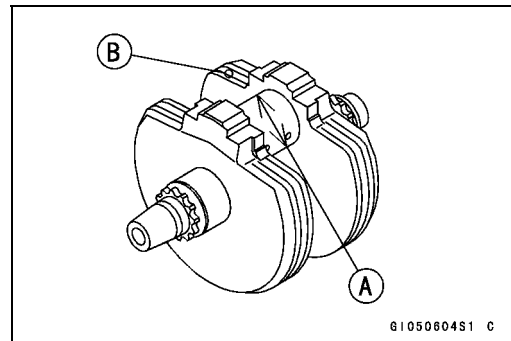
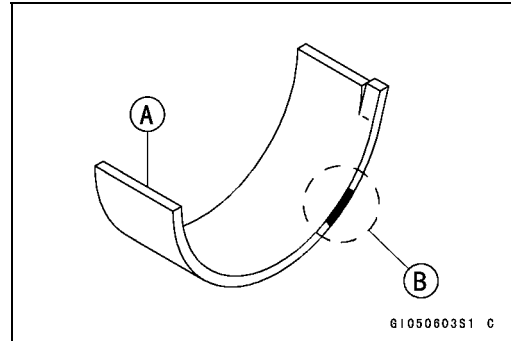
○ 46.011 ~ 46.020 mm (1.8115 ~ 1.8118 in.)

Big End Cap [A]

Connecting Rod [B]

Weight Mark, Alphabet [C]

Diameter Mark (Around Weight Mark) [D]: "○" or no mark



Crankshaft/Connecting Rods

- Select the proper bearing insert [A] in accordance with the combination of the connecting rod and crankshaft coding.
Size Color [B]

Connecting Rod Big End Bearing Insert Selection

Con-rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert	
		Size Color	Part Number
None	1	Brown	13034-1059
None	None	Black	13034-1058
○	1		
○	None	Blue	13034-1057

- Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.

Crankshaft Side Clearance Inspection

- Measure the crankshaft side clearance.

Crankshaft Side Clearance

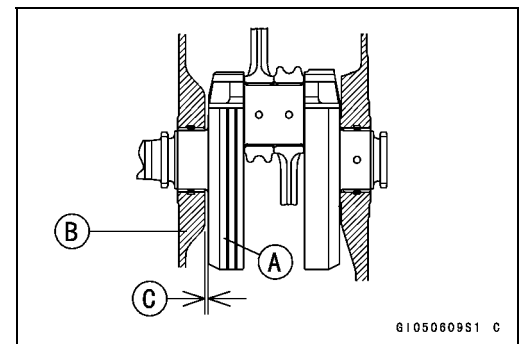
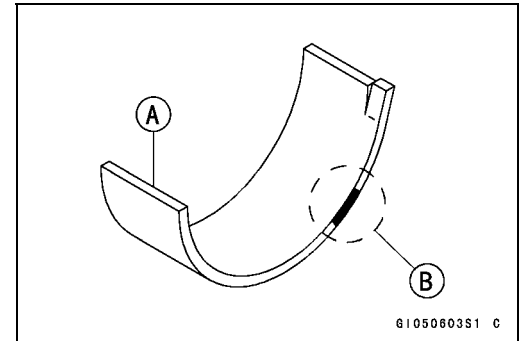
Standard: 0.05 ~ 0.55 mm (0.002 ~ 0.022 in.)

Service Limit: 0.75 mm (0.030 in.)

Crankshaft [A]

Crankcase [B]

Clearance [C]



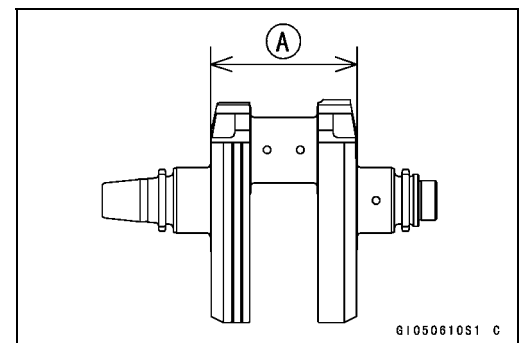
- ⚠ If the clearance exceeds the service limit, measure the crankshaft web length [A] to see whether the crankshaft or the crankcase is faulty.

Crankshaft Web Length

Standard: 96.85 ~ 96.95 mm (38.130 ~ 38.169 in.)

Service Limit: 96.6 mm (3.80 in.)

- ⚠ If the length measurement is smaller than the service limit, replace the crankshaft. Otherwise, replace the crankcase halves as a set.



NOTE

- The right and left crankcase halves are machined at the factory in the assembled state, so they must be replaced as a set.

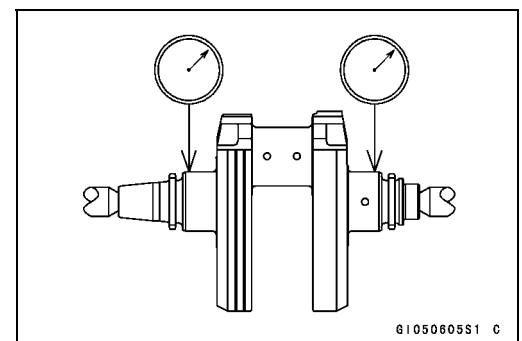
Crankshaft Runout Inspection

- Measure the crankshaft runout.
- ⚠ If the measurement exceeds the service limit, replace the crankshaft.

Crankshaft Runout

Standard: TIR 0.02 mm (0.0008 in.) or less

Service Limit: TIR 0.05 mm (0.002 in.)



9-16 CRANKSHAFT/TRANSMISSION

Crankshaft/Connecting Rods

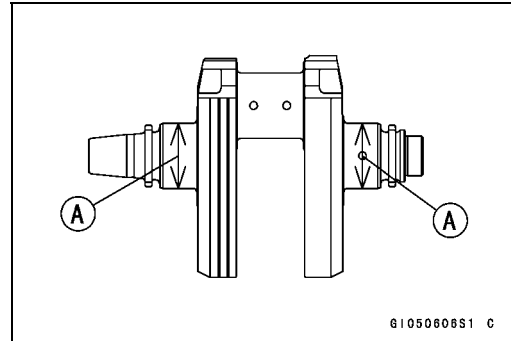
Crankshaft Main Bearing/Main Journal Wear Inspection

- Measure the diameter [A] of the crankshaft main journal.
- ⚠ If any journal has worn past the service limit, replace the crankshaft with a new one.

Crankshaft Main Journal Diameter

Standard: 42.984 ~ 43.000 mm (1.6923 ~ 1.6929 in.)

Service Limit: 42.96 mm (1.691 in.)



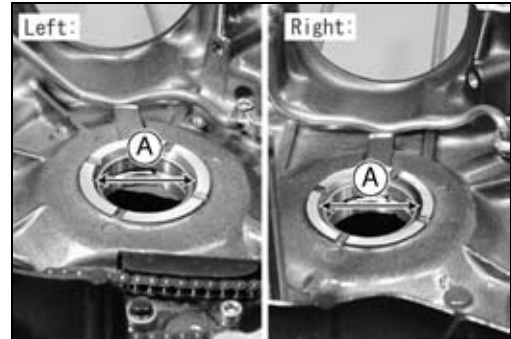
- Measure the main bearing bore diameter [A] in the crankcase halves.

Crankcase Main Bearing Bore Diameter

Standard: 43.025 ~ 43.041 mm (1.6939 ~ 1.6945 in.)

Service Limit: 43.09 mm (1.696 in.)

- ⚠ If the diameter exceeds the service limit, replace the crankcase halves as a set.



NOTE

- The right and left crankcase halves are machined at the factory in the assembled state, so they must be replaced as a set.

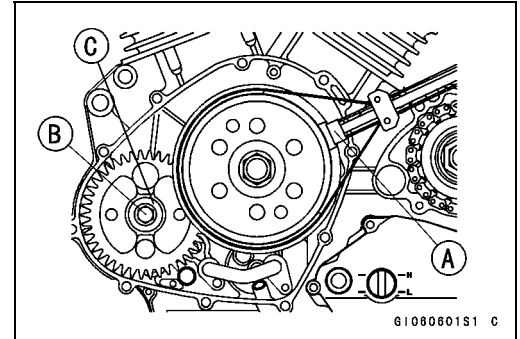
Balancer, Starter Motor Clutch

Left Balancer Removal

- Remove the alternator cover (see Electrical System chapter).
- Wipe oil off the outer circumference of the alternator rotor.
- Hold the alternator rotor steady with the flywheel holder [A], and remove the balancer bolt [B] and washer [C].

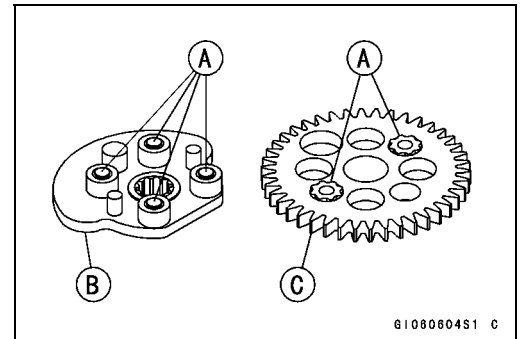
Special Tool - Flywheel Holder: 57001-1313

- Remove:
 - Alternator Rotor (see Electrical System chapter)
 - Collar, Balancer Gear, and Left Balancer
- ⚠ If the balancer is hard to remove, use a suitable puller.

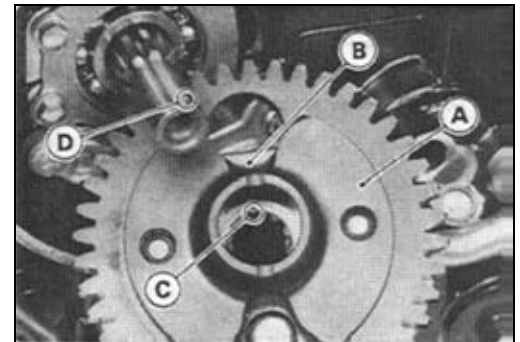


Left Balancer Installation

- Clean the balancer gear bolt and threads in the balancer shaft.
- Install the balancer dampers [A] on the balancer weight [B] and balancer gear [C] as shown.



- Assemble the gear [A] and balancer weight [B] being careful of the position as shown.
- Install the balancer assembly on the shaft, aligning the balancer weight punch mark [C] with the shaft punch mark [D].



- Install the collar [A].



9-18 CRANKSHAFT/TRANSMISSION

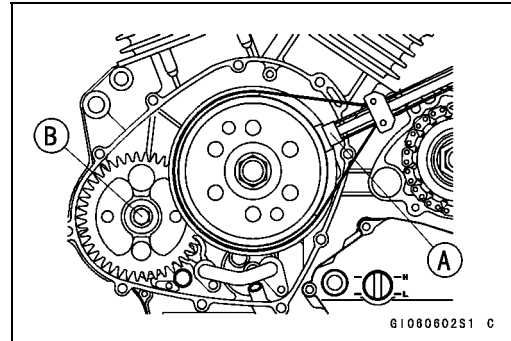
Balancer, Starter Motor Clutch

- Install the alternator rotor (see Electrical System chapter).
- Hold the alternator rotor steady with the flywheel holder [A].

Special Tool - Flywheel Holder: 57001-1313

- Apply a non-permanent locking agent to the threads of the balancer gear bolt [B], and tighten it.

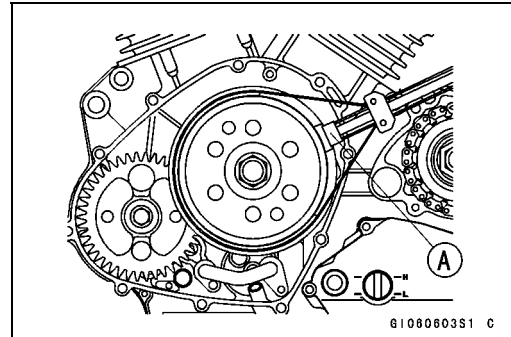
Torque - Balancer Gear Bolt: 69 N·m (7.0 kgf·m, 51 ft·lb)



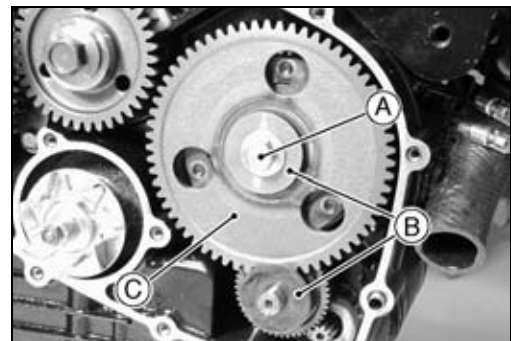
Right Balancer, Starter Motor Clutch Removal

- Remove:
 - Alternator Cover (see Electrical System chapter)
 - Right Engine Cover (see Clutch chapter)
- Wipe oil off the outer circumference of the alternator rotor.
- Hold the rotor steady with the flywheel holder [A].

Special Tool - Flywheel Holder: 57001-1313

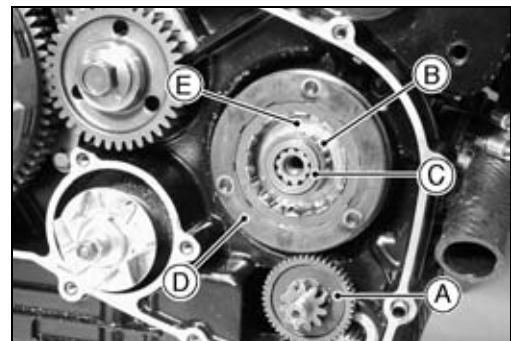


- Remove:
 - Starter Motor Clutch Gear Bolt [A]
 - Washers [B]
 - Starter Motor Clutch Gear [C]

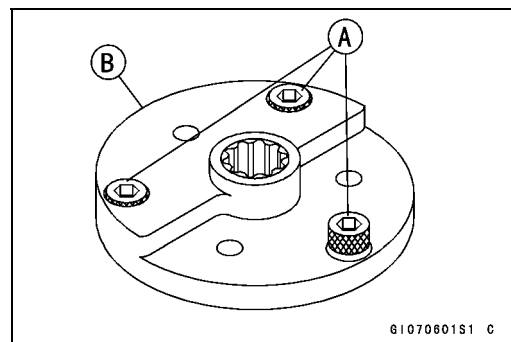


Torque Limiter [A]
Needle Bearing [B] and Collar [C]
Starter Motor Clutch Assembly [D] and Copper Washer [E]

- If the assembly is hard to remove, use a suitable puller.



- Remove the starter motor clutch bolts [A], and separate the right balancer [B] from the starter motor clutch.

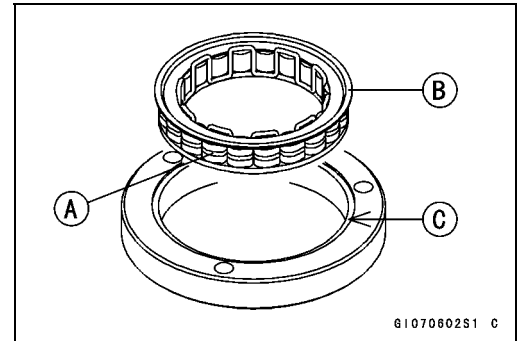


Balancer, Starter Motor Clutch

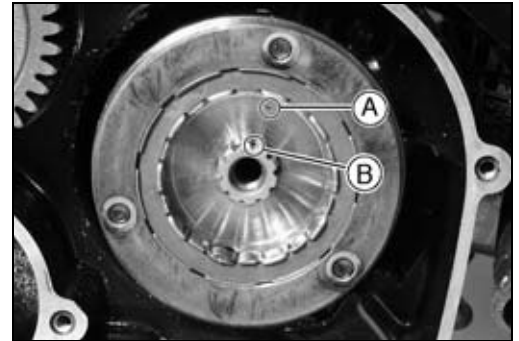
Right Balancer, Starter Motor Clutch Installation

- Be sure to install the one-way clutch [A] so that the flange [B] of it fits in the coupling recess [C].
- Apply a non-permanent locking agent to the threads of the starter clutch bolts, and tighten them.

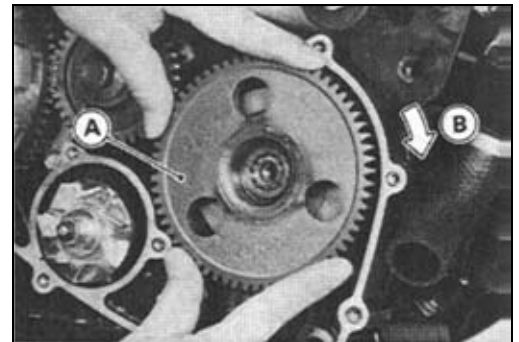
Torque - Starter Motor Clutch Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)



- Clean the starter motor clutch gear bolt and threads in the balancer shaft.
- Install the starter motor clutch assembly on the shaft, aligning the balancer weight punch mark [A] with the shaft punch mark [B].

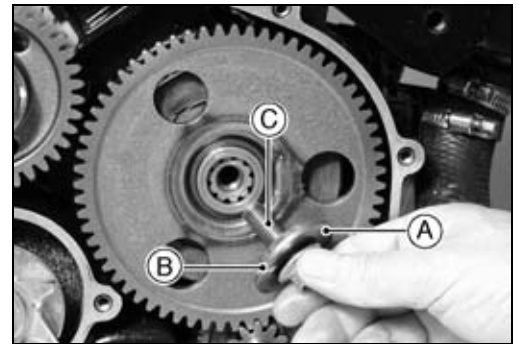


- Install:
 - Copper Washer
 - Collar and Needle Bearing
 - Torque Limiter
- Install the starter motor clutch gear [A] while turning [B] the gear.



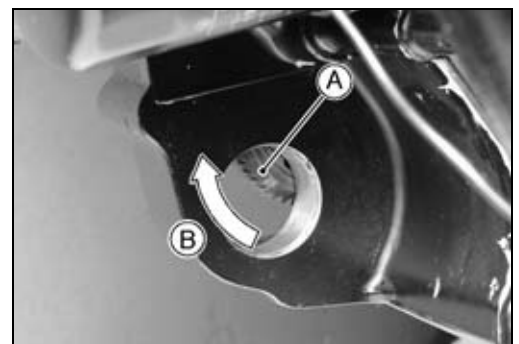
- Install the washer [A] so that the chamfered side [B] faces inward.
- Apply a non-permanent locking agent to the threads of the starter motor clutch gear bolt [C], and tighten it.

Torque - Starter Motor Clutch Gear Bolt: 69 N·m (7.0 kgf·m, 51 ft·lb)



Starter Motor Clutch Inspection

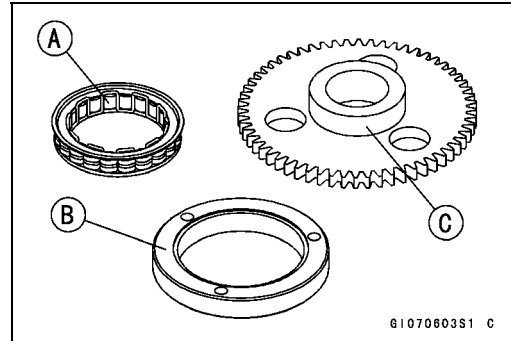
- Drain the engine oil (see Engine Lubrication System in the Periodic Maintenance chapter).
- Remove the starter motor (see Electrical System chapter).
- Turn the torque limiter gear [A] by hand. When viewed from the left side of the engine, the gear should turn clockwise freely [B], but should not turn counterclockwise.
- ✚ If the gear does not operate as it should or if it makes noise, go to the next step.



9-20 CRANKSHAFT/TRANSMISSION

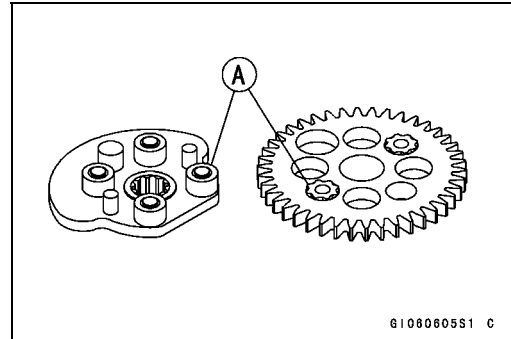
Balancer, Starter Motor Clutch

- Disassemble the starter motor clutch (see Right Balancer, Starter Motor Clutch Removal).
- Visually inspect:
 - One-way Clutch [A]
 - Coupling [B]
 - Starter Motor Clutch Gear Inner Race [C]
- ⚠ If there is any worn or damaged part, replace it.



Balancer Damper Inspection

- Remove the left balancer (see Left Balancer Removal).
- Visually inspect the rubber dampers [A].
- ⚠ If they appear damaged or deteriorated, replace them.



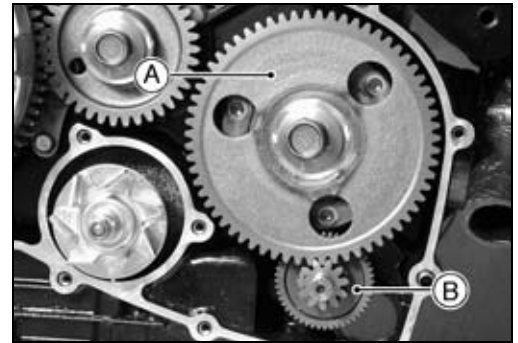
Torque Limiter

Torque Limiter Removal

- Remove:
 - Right Engine Cover (see Clutch chapter)
 - Starter Motor Clutch Gear [A] (see Right Balancer, Starter Motor Clutch Removal)
 - Torque Limiter [B]

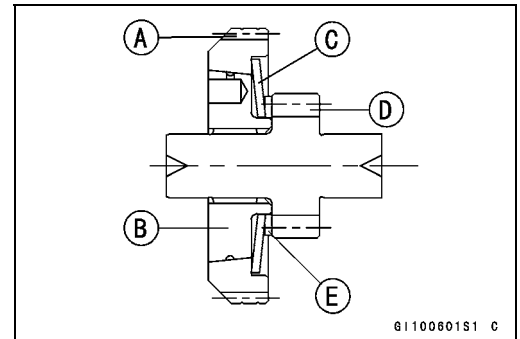
CAUTION

Do not disassemble the torque limiter. The torque limiter will not function if this is done.



Torque Limiter Inspection

- Remove the torque limiter and visually inspect it.
- ✚ If the limiter has wear, discoloration, or other damage, replace it as a set.
 - Gear [A]
 - Hub [B]
 - Spring [C]
 - Pinion [D]
 - Shim [E]



61100601S1 C

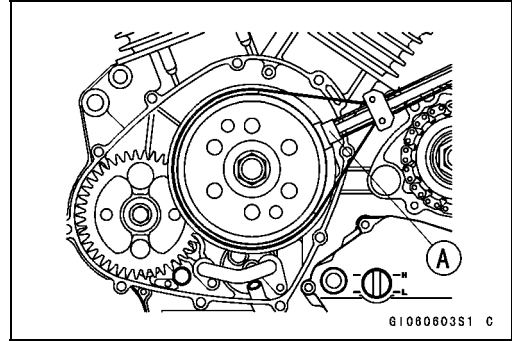
9-22 CRANKSHAFT/TRANSMISSION

Primary Gear

Primary Gear Removal

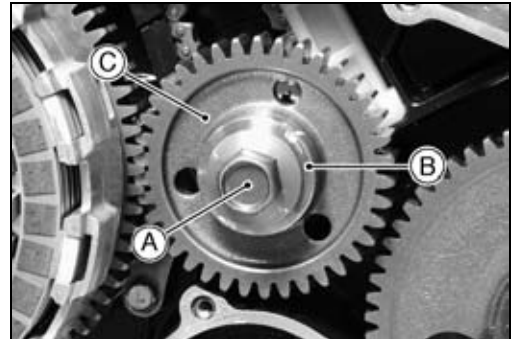
- Remove the alternator cover (see Electrical System chapter).
- Wipe oil off the outer circumference of the alternator rotor.
- Hold the alternator rotor steady with the flywheel holder [A].

Special Tool - Flywheel Holder: 57001-1313



- Remove the primary gear bolt [A], washer [B], and primary gear [C] from the crankshaft.

■ If necessary, remove the clutch (see Clutch chapter).



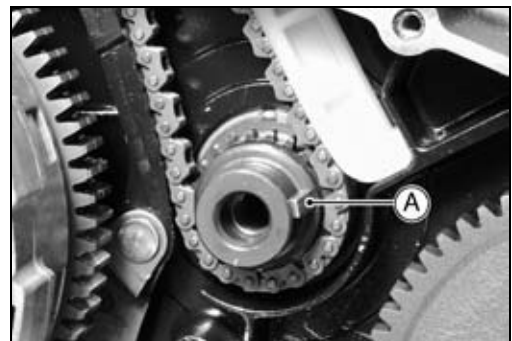
Primary Gear Installation

- Fit the woodruff key [A] securely in the slot in the crankshaft before installing the primary gear.
- Hold the alternator rotor steady with the flywheel holder.

Special Tool - Flywheel Holder: 57001-1313

- Apply oil to the threads and seating surface of the primary gear bolt, and tighten it.

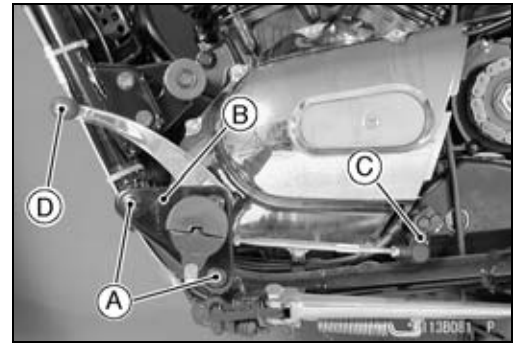
Torque - Primary Gear Bolt: 157 N·m (16 kgf·m, 116 ft·lb)



Transmission

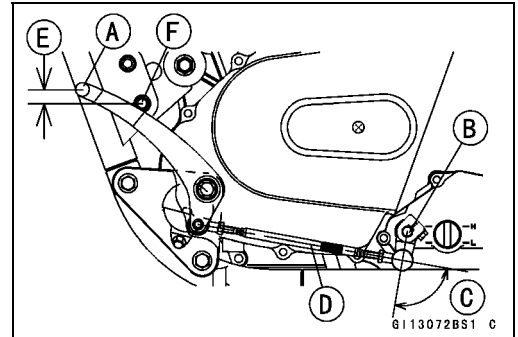
Shift Pedal Removal

- Mark the position of the shift lever on the shift shaft so that it can be installed later in the same position.
- Remove:
 - Bolts [A]
 - Footpeg Bracket [B]
 - Shift Lever [C]
 - Shift Pedal [D]



Shift Pedal Installation

- Install the shift pedal [A] so that the shift lever [B] positions at right angles [C] with the shift rod [D].
- At this time, the center of the shift pedal is about 4 mm (0.16 in.) [E] higher than the center of the engine bracket lower mounting bolt [F].



NOTE

○The locknut next to the knurled portion of the rod has left-hand threads.

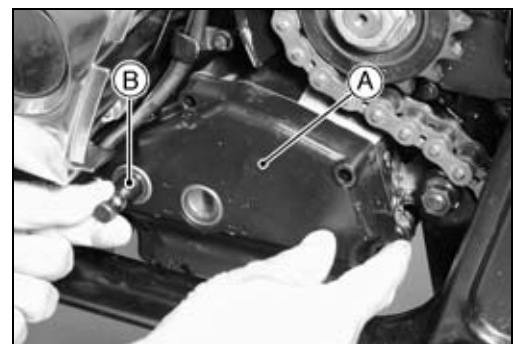
- ✚ If necessary, adjust the pedal position from the standard position to suit you as follows.
 - Loosen the front and rear rod locknuts.
 - Turn the rod to adjust the pedal position.
 - Tighten the locknuts securely.

External Shift Mechanism Removal

- Remove:
 - Engine Oil (drain, see Engine Lubrication System in the Periodic Maintenance chapter)
 - Shift Pedal (see Shift Pedal Removal)
 - Engine Sprocket Cover (see Final Drive chapter)
 - External Shift Mechanism Cover Bolts [A]



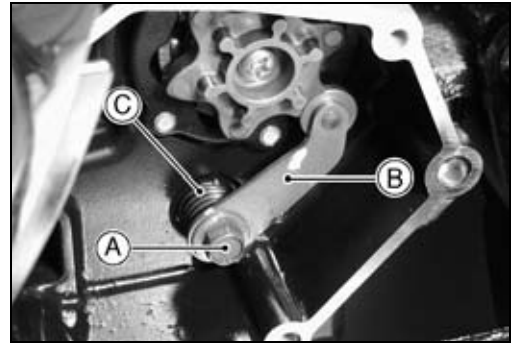
- Remove the external shift mechanism cover [A] with the shift shaft [B] from the crankcase.



9-24 CRANKSHAFT/TRANSMISSION

Transmission

- Remove:
 - Bolt [A]
 - Shift Drum Position Lever [B]
 - Spring [C]



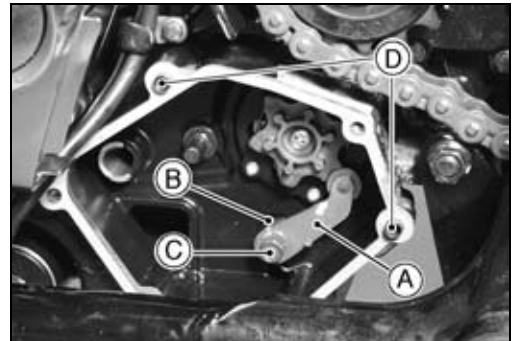
External Shift Mechanism Installation

- Install the shift drum position lever [A] and spring [B], and tighten the bolt [C].

Torque - Shift Drum Position Lever Bolt: 11 N·m (1.1 kgf·m, 95 in·lb)

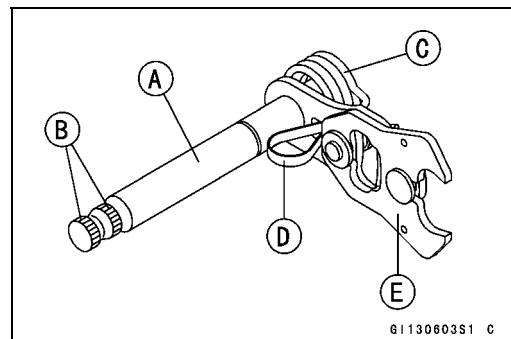
- Install the knock pins [D] and new cover gasket.
- Apply high temperature grease to the oil seal lips.
- Install the washer to the shift shaft, then insert the shaft into the cover.
- Install the cover with the shaft to the crankcase.
- Tighten:

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



External Shift Mechanism Inspection

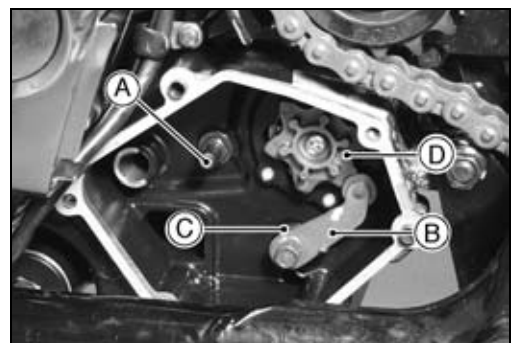
- Examine the shift shaft [A] for any damage.
- If the shaft is bent, straighten or replace it.
- If the splines [B] are damaged, replace the shaft.
- If the springs [C] [D] are damaged in any way, replace them.
- If the shift mechanism arm [E] is damaged in any way, replace it.



- Check 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 - Shift Shaft Return spring Pin: 29 N·m (3.0 kgf·m, 22 ft·lb)

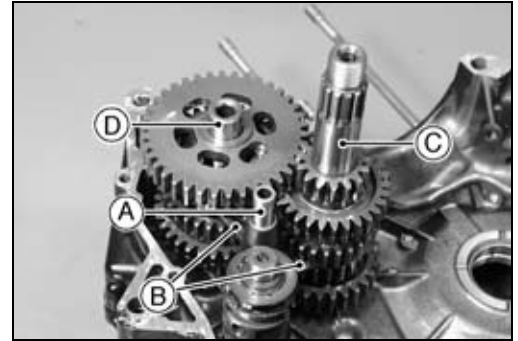
- Check the shift drum position lever [B] and spring [C] for breaks or distortion.
- If the lever or spring is damaged in any way, replace it.
- Visually inspect the shift drum cam [D].
- If it is badly worn or shows any damage, replace it.



Transmission

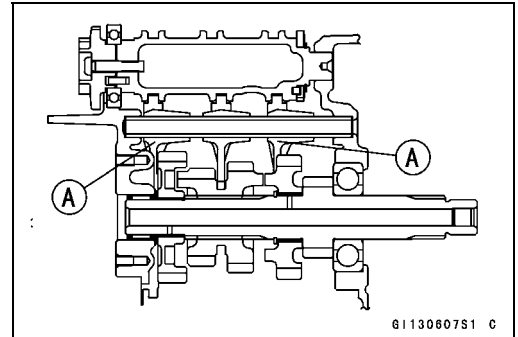
Transmission Shaft and Shift Fork Removal

- Split the crankcase (see Crankcase Splitting).
- Remove:
 - Shift Rod [A]
 - Shift Forks (2) [B]
- Take out the drive shaft [C] and output shaft [D] as a set, and remove the remainder shift fork.

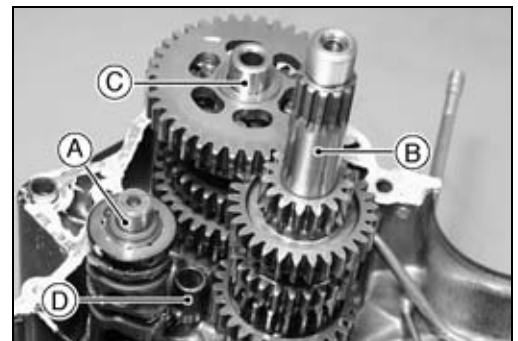


Transmission Shaft and Shift Fork Installation

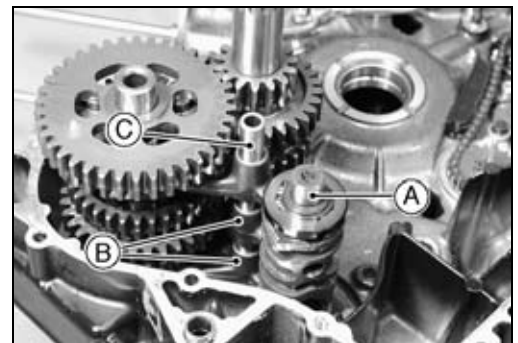
- Make the direction of the shift forks as shown.
- The two forks [A] on the output shaft are identical.



- Position the shift drum [A] as shown.
- Apply engine oil to the transmission shafts and shift fork.
- Install the drive shaft [B], output shaft [C], and shift fork [D] on the output shaft as a set.



- Set the shift drum [A] in the neutral position as shown.
- Apply engine oil to the shift forks [B] and shift rod [C], and install them.

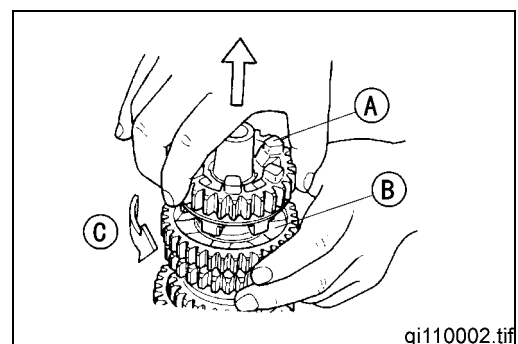


Transmission shaft Disassembly

- Remove the transmission shafts (see Transmission Shaft Removal).
- Using the circlips pliers (special tool), remove the circlips, and disassemble the transmission shaft.

Special Tool - Outside Circlip Pliers: 57001-144

- The 4th gear [A] on the output shaft has three steel balls for the positive neutral finder mechanism.
- Remove the 4th gear as follows.
 - Set the output shaft in a vertical position holding the 3rd gear [B].
 - Spin the 4th gear quickly [C] and pull it off upward.

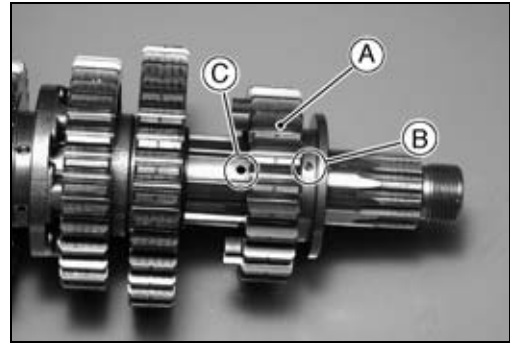


9-26 CRANKSHAFT/TRANSMISSION

Transmission

Transmission shaft Assembly

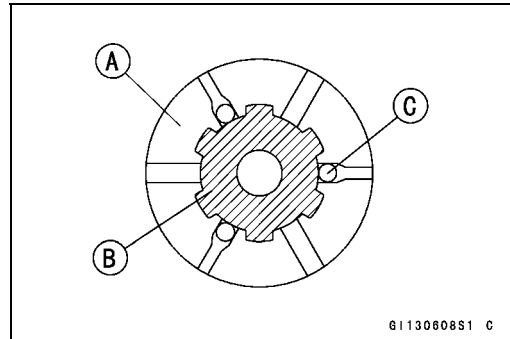
- Install the 5th gear [A] on the output shaft with its oil hole [B] aligned with the shaft oil hole [C].



- Fit the steel balls into the 4th gear holes as shown.

View A-A' (see the output shaft illustration)

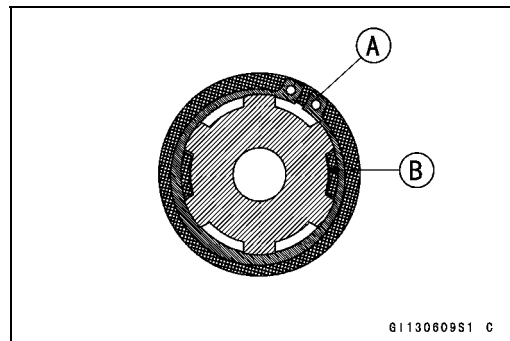
- [A] Gear (4th)
- [B] Shaft
- [C] Steel Balls



CAUTION

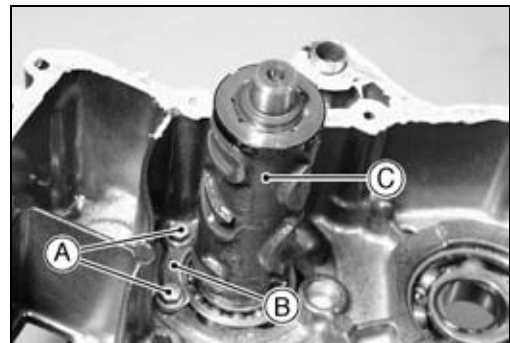
Do not apply grease to the steel balls to hold them in place. This will cause the positive neutral finder mechanism to malfunction.

- Replace any circlip that were removed with new ones.
- Install the circlips [A] so that the opening is aligned with a spline groove.
- [B] Toothed Washer
- Check that each gear springs or slides freely on the transmission shaft without binding after assembly.



Shift Drum Removal

- Remove:
 - Transmission Shafts (see Transmission Shaft Removal)
 - Bolts [A]
 - Bearing Stopper [B]
- While aligning the shift drum cam with the left crankcase hole, pull out the shift drum [C].

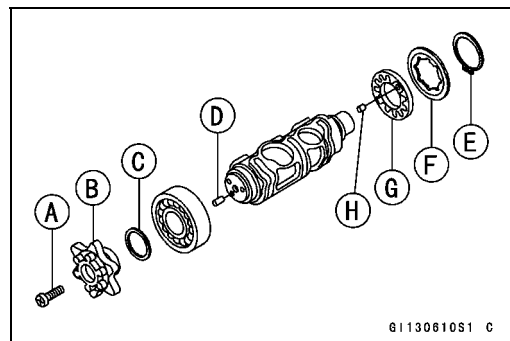


Shift Drum Disassembly

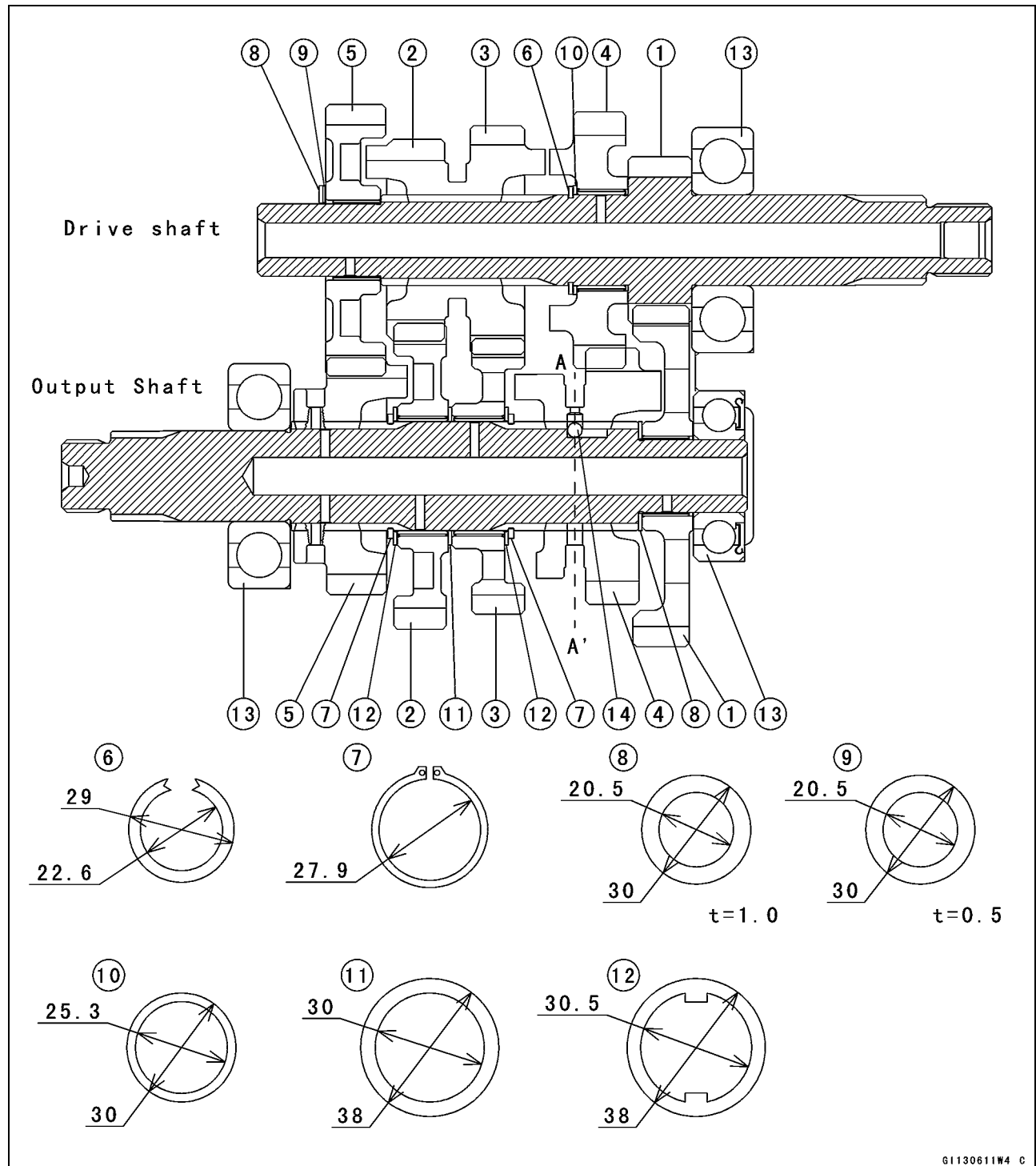
- Remove the shift drum (see Shift Drum Removal).
- While holding the shift drum with a vise, remove the shift drum cam holder bolt [A].
- [B] Shift Drum Cam
- [C] Washer
- [D] Knock Pin (longer)
- Remove the circlip [E].

Special Tool - Outside Circlip Pliers: 57001-144

- Remove:
 - [F] Spring
 - [G] Shift Drum Holder
 - [H] Knock Pin (shorter).



Transmission



1. 1st Gear
2. 2nd Gear
3. 3rd Gear
4. 4th Gear
5. 5th (Top) Gear
6. Circlip
7. Circlip

8. Thrust Washer (20.5 × 30 × 1.0)
9. Thrust Washer (20.5 × 30 × 0.5)
10. Thrust Washer (25.3 × 30 × 1.0)
11. Thrust Washer (30 × 38 × 1.0)
12. Toothed Washer
13. Ball Bearing
14. Steel Ball

9-28 CRANKSHAFT/TRANSMISSION

Transmission

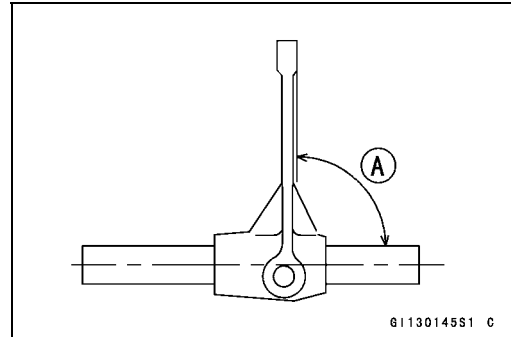
Shift Drum Assembly

- Be sure to install the dowel pin.
- Apply a non-permanent locking agent to the threads of the shift drum cam holder screw, and tighten it.

Torque - Shift Drum Cam Holder Screw: 12 N·m (1.2 kgf·m, 104 in·lb)

Shift Fork Bending Inspection

- Visually inspect the shift forks, and replace any fork that is bent. A bent fork could cause difficulty in shifting, or allow the transmission to jump out of gear when under power. 90° [A]



Shift Fork/Gear Groove Wear Inspection

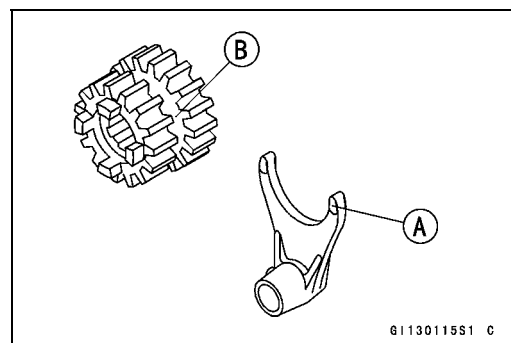
- Measure the thickness of the shift fork ears [A], and measure the width [B] of the gear grooves.
- ⚠ If the thickness of a shift fork ear is less than the service limit, the shift fork must be replaced.

Shift Fork Ear Thickness

Standard: 4.9 ~ 5.0 mm (0.193 ~ 0.197 in.)

Service Limit: 4.8 mm (0.19 in.)

- ⚠ If the gear groove is worn over the service limit, the gear must be replaced.



Gear Groove Width

Standard: 5.05 ~ 5.15 mm (0.199 ~ 0.203 in.)

Service Limit: 5.2 mm (0.20 in.)

Shift Fork Guide Pin/Drum Groove Wear Inspection

- Measure the diameter of each shift fork guide pin [A], and measure the width [B] of each shift drum groove.
- ⚠ If the guide pin on any shift fork is less than the service limit, the fork must be replaced.

Shift Fork Guide Pin Diameter

Standard: 5.9 ~ 6.0 mm (0.232 ~ 0.236 in.)

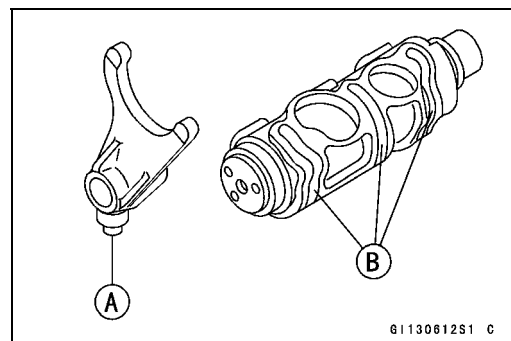
Service Limit: 5.8 mm (0.23 in.)

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

Shift Drum Groove Width

Standard: 6.05 ~ 6.20 mm (0.238 ~ 0.244 in.)

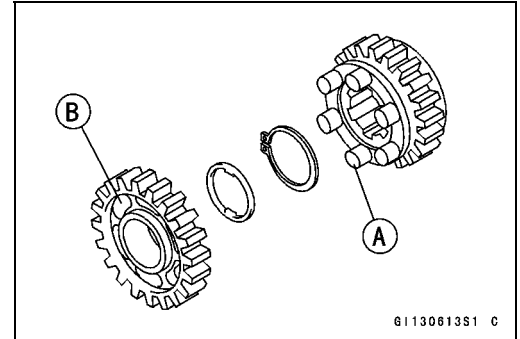
Service Limit: 6.30 mm (0.25 in.)



Transmission

Gear Dog and Gear Dog Hole Damage Inspection

- Visually inspect the gear dogs [A] and gear dog holes [B].
- ✚ Replace any damaged gears or gears with excessively worn dogs or dog holes.



9-30 CRANKSHAFT/TRANSMISSION

Ball Bearing, Needle Bearing, and Oil Seal

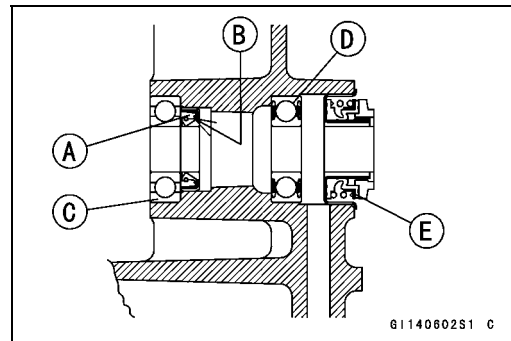
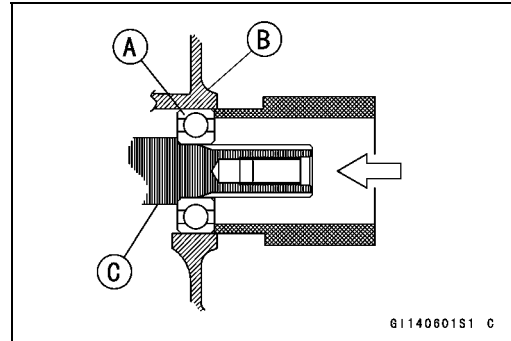
Bearing Oil Seal Installation

- When installing a bearing other than the following parts, press it in with the marked side facing out.

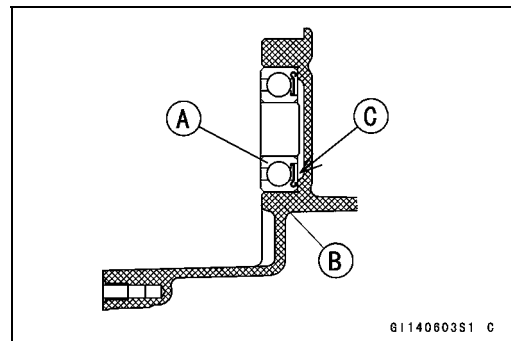
Special Tool - Bearing Driver Set: 57001-1129

Right Crankcase

- Install the right balancer bearing [A] as follows:
 - Temporarily press the bearing into the right crankcase until it is leveled with the outboard end of the bearing housing [B].
 - After installing the left balancer (see Left Balancer Installation), press the bearing until it stops at the shoulder of the balancer shaft [C].
- Install the water pump shaft bearing and seal as shown.
 - [A] Oil Seal
 - [B] Marked Side
 - [C] Ball Bearing (without seal)
 - [D] Ball Bearing (both sides seal)
 - [E] Mechanical Seal (see Cooling System chapter)

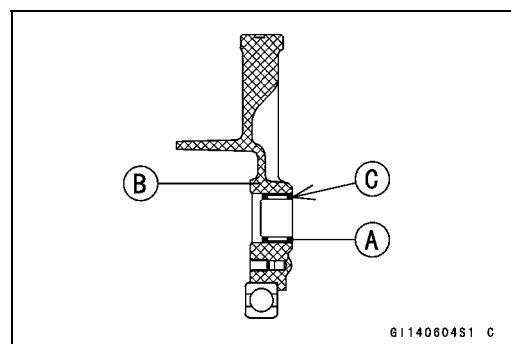


- Install the output shaft bearing [A] into the right crankcase [B] with the sealed side [C] facing the crankcase.



Left Crankcase

- Install the needle bearing [A] into the left crankcase [B] with the marked side [C] facing inside, and level the bearing with the outboard end of the bearing housing.



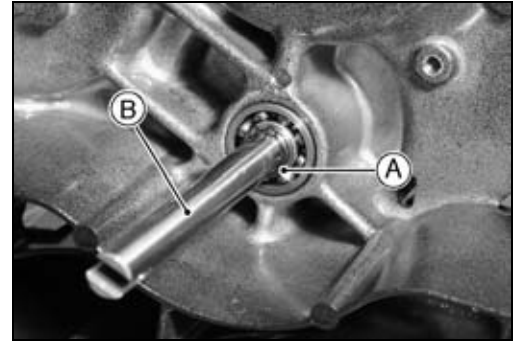
Water Pump Shaft

Water Pump Shaft Removal

- Split the crankcase (see Crankshaft/Transmission chapter).
- Remove the circlip [A] from the water pump shaft [B].

Special Tool - Outside Circlip Pliers: 57001-144

- Remove the shaft from the outside of the crankcase to the inside.



Water Pump Shaft Installation

- Insert the water pump shaft from outside of the crankcase to the inside.
- Install the circlip to the shaft.

Special Tool - Outside Circlip Pliers: 57001-144

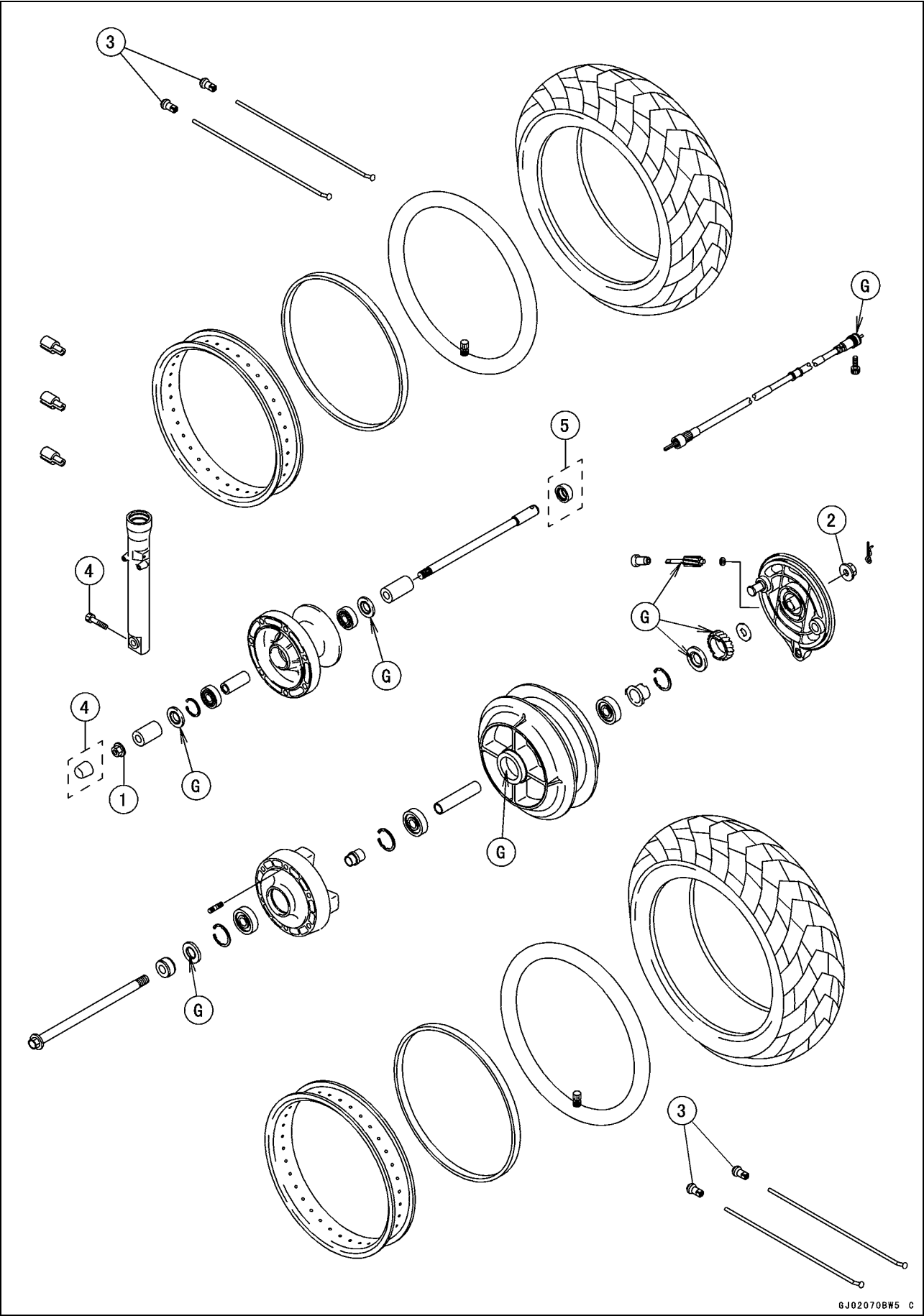
Wheels/Tires

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10-2 WHEELS/TIRES

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Axle Nut	108	11.0	80	
2	Rear Axle Nut	98	10.0	72	
3	Spoke Nipples	4.9	0.5	43 in·lb	
4	Front Axle Clamp Bolts	34	3.5	25	

5. Axle Nut Cap (VN800-B5 ~ B6, Germany Model) (On and after VN800-B7, Europe and United Kingdom Models)

G: Apply grease.

10-4 WHEELS/TIRES

Specifications

Item	Standard	Service Limit
Wheels (Rims)		
Rim Size:		— — —
Front	16 × 3.00	— — —
Rear	16 × 3.00	— — —
Rim Runout (with tire installed)		
Radial	TIR 1.0 mm (0.04 in.) or less	TIR 2.0 mm (0.08 in.)
Axial	TIR 0.8 mm (0.03 in.) or less	TIR 2.0 mm (0.08 in.)
Axle Runout/100 mm (3.94 in.)	less than 0.05 mm (0.002 in.)	0.2 mm (0.008 in.)
Wheel Balance	less than 10 g (0.35 oz)	— — —
Balance Weights	10 g (0.35 oz), 20 g (0.70 oz), 30 g (1.06 oz)	— — —
Tires		
Air Pressure (when cold):		
Front:		
Up to 181 kg (399 lb) load	200 kPa (2.00 kgf/cm ² , 28 psi)	— — —
Rear:		
Up to 97.5 kg (215 lb) load	200 kPa (2.00 kgf/cm ² , 28 psi)	— — —
97.5 kg ~ 181 kg load (215 lb ~ 399 lb)	225 kPa (2.25 kgf/cm ² , 32 psi)	— — —
Tread Depth:		
Front	BRIDGESTONE: 4.8 mm (0.19 in.) DUNLOP: 4.5 mm (0.18 in.)	1 mm (0.04 in.) (DE, AT, CH) 1.6 mm (0.06 in.)
Rear	BRIDGESTONE: 7.2 mm (0.28 in.) DUNLOP: 7.3 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	Make	Type	Size	
			VN800-B1 ~ B7	VN800-B8 ~, B6F
Front	BRIDGESTONE	EXEDRA G703	130/90-16 67H	130/90-16 M/C 67H
	DUNLOP	D404F	130/90-16 67H	130/90-16 M/C 67H
	Metzeler	MARATHON Front	130/90-16 67H	130/90-16 M/C 67H
		ML2 Plus Front	130/90-16 67H	130/90-16 M/C 73H
Rear	PIRELLI	MT66 Front	130/90-16 M/C 67H	
	BRIDGESTONE	EXEDRA G702	140/90-16 71H	140/90-16 M/C 71H
	DUNLOP	D404	140/90-16 71H	140/90-16 M/C 71H
	Metzeler	MARATHON ME 88	140/90-16 71H	140/90-16 M/C 71H
		MARATHON ML 2 Plus	140/90B-16 77H	140/90B-16 M/C 77H
	PIRELLI	MT 66	140/90-16 M/C 71H	

AT: Austria Model

CH: Switzerland Model

DE: Germany Model

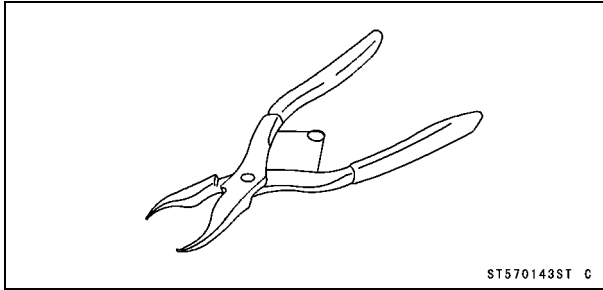
WARNING

Use the same manufacturer's tires on both front and rear wheels.

Special Tools

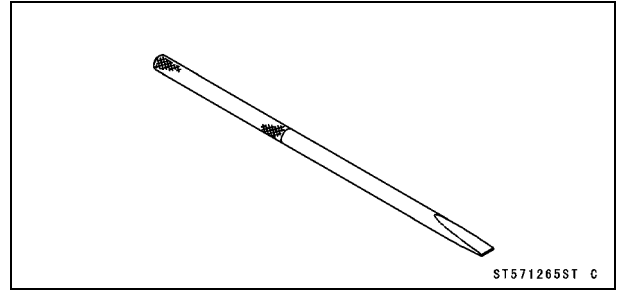
Inside Circlip Pliers:

57001-143



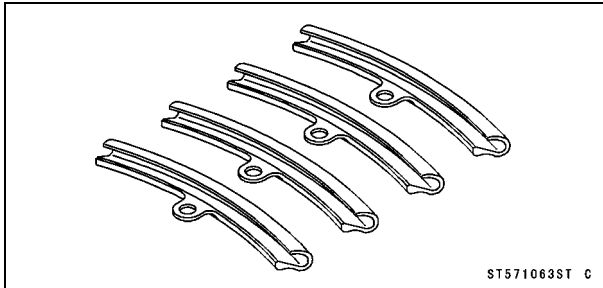
Bearing Remover Shaft, 9:

57001-1265



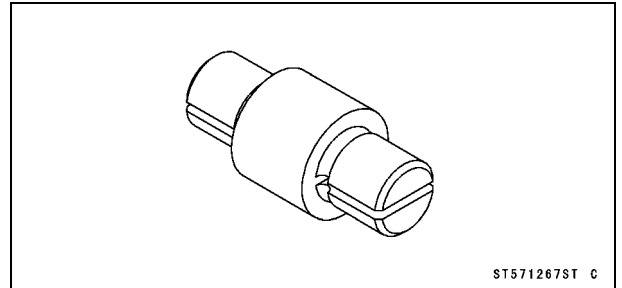
Rim Protector:

57001-1063



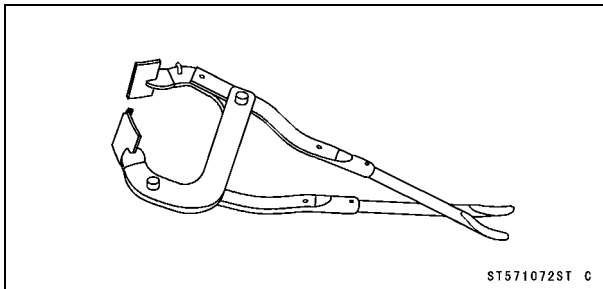
Bearing Remover Head, 15 × 17:

57001-1267



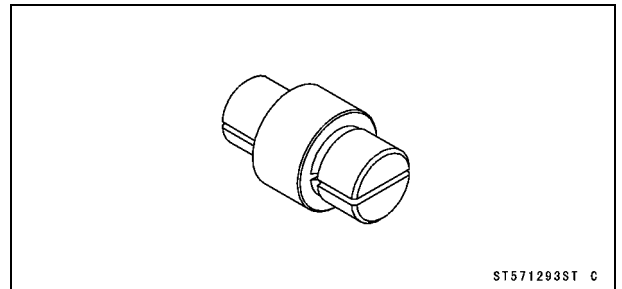
Bead Breaker Assembly:

57001-1072



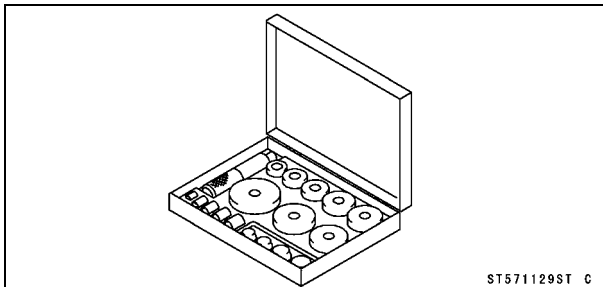
Bearing Remover Head, 20 × 22:

57001-1293



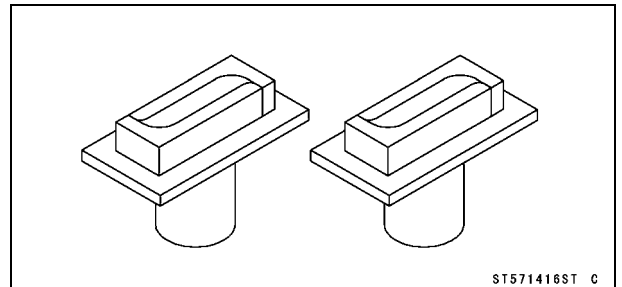
Bearing Driver Set:

57001-1129



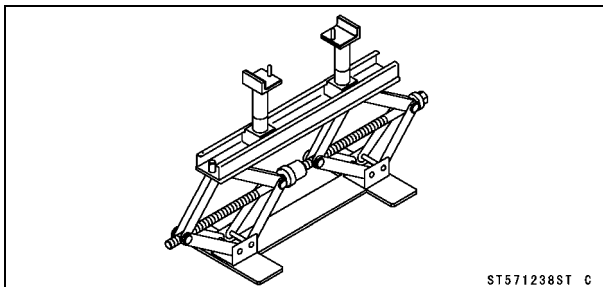
Jack Attachment #3:

57001-1416



Jack:

57001-1238



10-6 WHEELS/TIRES

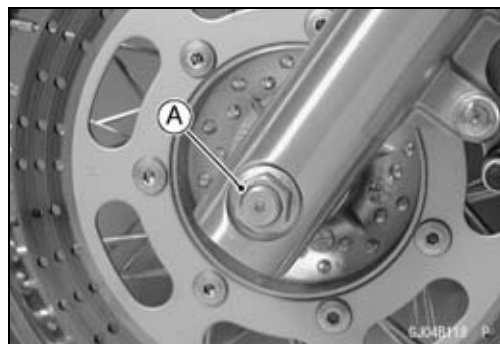
Wheels (Rims)

Front Wheel Removal

- Loosen the front axle nut [A].
- Raise the front wheel off the ground.

Special Tools - Jack: 57001-1238

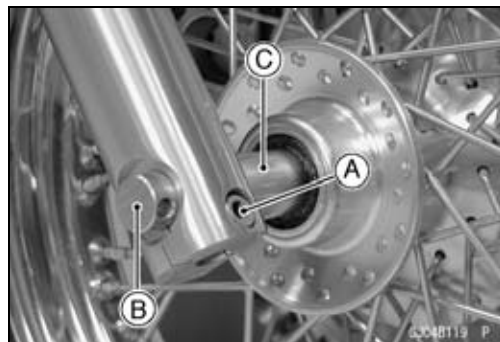
Jack Attachment #3: 57001-1416



- Loosen the axle clamp bolt [A].
- Pull out the axle [B] to the right, and remove the front wheel, and Collars [C].

CAUTION

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



Front Wheel Installation

- Tighten:
Torque - Front Axle Nut: 108 N·m (11 kgf·m, 80 ft·lb)
Front Axle Clamp Bolt: 34 N·m (3.5 kgf·m, 25 ft·lb)
- Check the front brake effectiveness. (see Brakes chapter)

⚠ WARNING

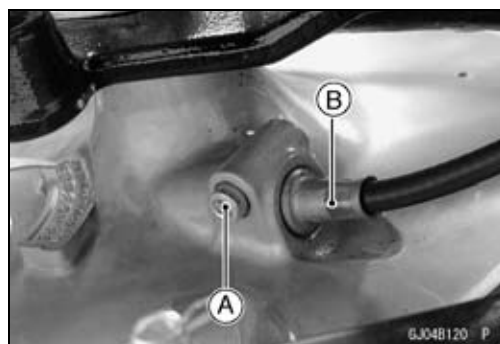
Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brake will not function on the first application of the lever if this is not done.

Rear Wheel Removal

- Remove:
Muffler (see Engine Top End chapter)
Bolt [A] and Speedometer Cable [B]
- Raise the rear wheel off the ground.

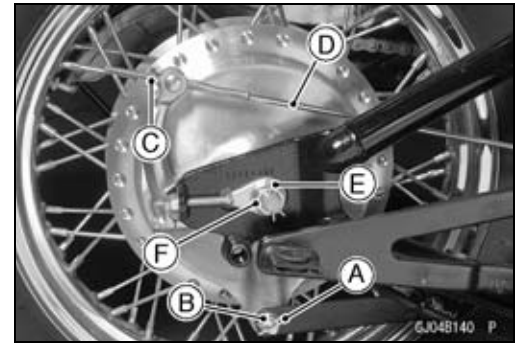
Special Tools - Jack: 57001-1238

Jack Attachment #3: 57001-1416



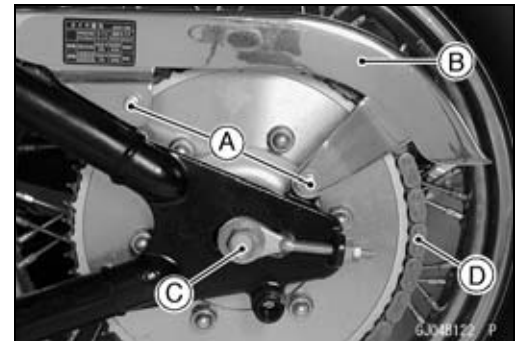
Wheels (Rims)

- Remove:
Clip [A], Torque Link Nut [B] and Bolt
Adjusting Nut [C] and Brake Rod [D]
Clip [E] and Axle Nut [F]



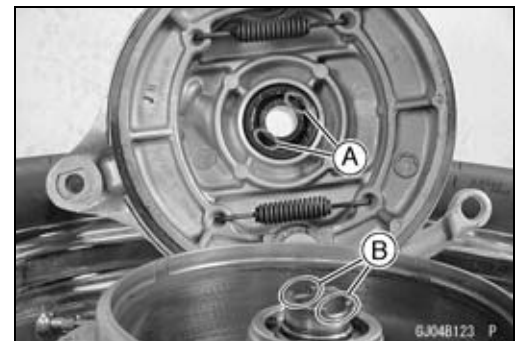
Bolts [A] and Chain Cover [B]
Axle [C]

- Remove the drive chain [D] from the rear sprocket toward the left.
- Remove the rear wheel.



Rear Wheel Installation

- Install the speedometer gear in the brake panel so that its projections [A] fit into the gear drive notches [B] in the wheel hub.
- Engage the drive chain with the rear sprocket.
- Insert the axle from the left side of the wheel.
- To prevent a soft, or "spongy feeling" 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)

- Install the clip in the rear axle.
- Adjust the drive chain slack (see Final Drive chapter).
- Install the removed parts.

Torque - Torque Link Nuts: 34 N·m (3.5 kgf·m, 25 ft·lb)

- Check the rear brake effectiveness.

Rim and Spokes Removal

- Remove the tire and tube.
- Remove the rubber band.
- Tape or wire all the spokes intersections so that the spokes don't get mixed up, and unscrew the nipples from all the spokes with a screwdriver, separate the rim from the spokes and hub.

10-8 WHEELS/TIRES

Wheels (Rims)

Rim and Spokes Installation

- If the rim has a mark, install it so that its mark faces smaller diameter of the drum.
- If the rim has an arrow mark, install it so that its mark points rotating direction.
- Tighten the spokes evenly so that the radial (out from the axle) and axial (side to side) runouts are less than the service limit. Make sure that the spokes are tightened evenly within the standard torque range.

Torque - Spoke Nipples: 4.9 N·m (0.5 kgf·m, 43 in·lb)

Spoke Inspection

- Refer to the Spoke Tightness and Rim Runout Inspection in the Periodic Maintenance chapter

Rim Inspection

- Refer to the Spoke Tightness and Rim Runout Inspection in the Periodic Maintenance chapter

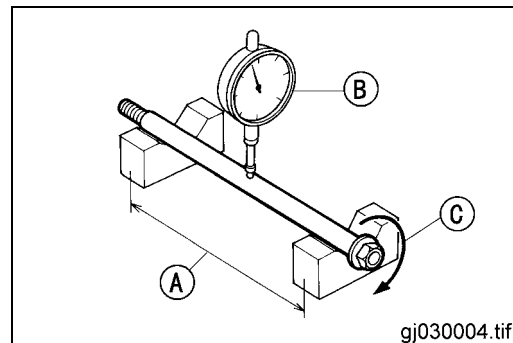
Axle Inspection

- Visually inspect the front and rear axle for damages.
- If the axle is damaged or bent, replace it.
- Place the axle in V blocks that are 100 mm (3.94 in.) [A] apart, and set a dial gauge [B] on the axle at a point halfway between the blocks. Turn [C] the axle to measure the runout. The difference between the highest and lowest dial readings is the amount of runout.
- If axle runout exceeds the service limit, replace the axle.

Axle Runout/100 mm (3.94 in.)

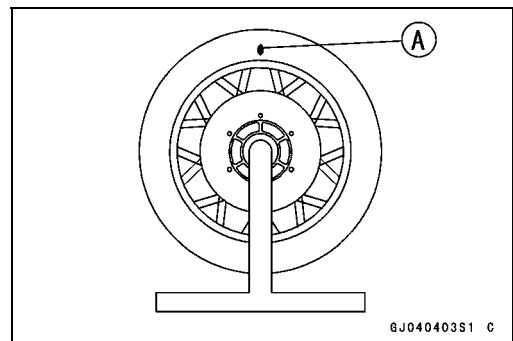
Standard: 0.05 mm (0.002 in.) or less

Service Limit: 0.2 mm (0.008 in.)



Balance Inspection

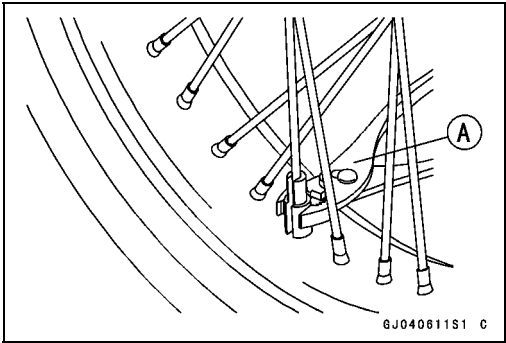
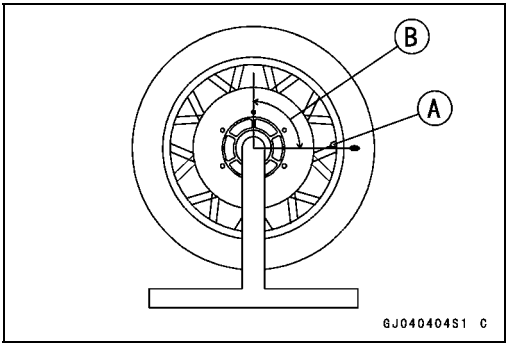
- Remove the wheel.
- Support the wheel so that it can be spun freely.
- Spin the wheel lightly, and mark [A] the wheel at the top when the wheel stops.
- Repeat this procedure several times. If the wheel stops of its own accord in various positions, it is well balanced.
- If the wheel always stops in one position, adjust the wheel balance.



Wheels (Rims)

Balance Adjustment

- If the wheel always stops in one position, provisionally attach a balance weight [A] on the wheel.
- Attach a balance weight loosely to the spoke under the marking.
- Rotate the wheel 1/4 turn [B], and see whether or not the wheel stops in this position. If it does, the correct balanceweight 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.
- Repeat the entire procedure as many times as necessary to achieve correct wheel balance.
- Install the balance weight firmly on the wheel.
- Clamp on the balance weight firmly using pliers [A].



Balance Weight

Part Number	Weight
41075-1017	10 g (0.35 oz)
41075-1008	20 g (0.70 oz)
41075-1009	30 g (1.06 oz)

10-10 WHEELS/TIRES

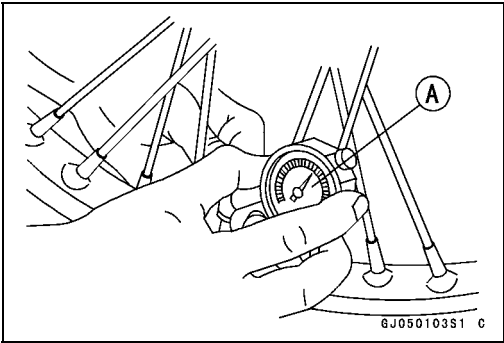
Tires

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 (399 lb)	200 kPa (2.00 kgf/cm ² , 28 psi)
Rear	Up to 97.5 kg (215 lb)	200 kPa (2.00 kgf/cm ² , 28 psi)
	97.5 ~ 181 kg (215 ~ 399 lb)	225 kPa (2.25 kgf/cm ² , 32 psi)



Tire Inspection

- Refer to the Tire Wear Inspection in the Periodic Maintenance chapter.

Tire Removal

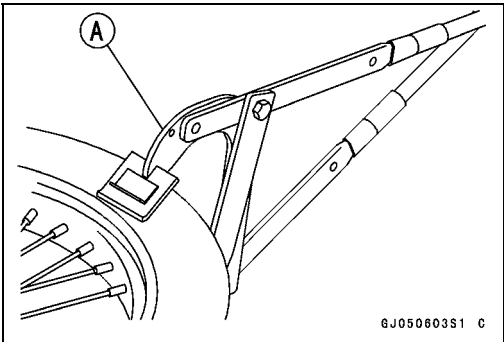
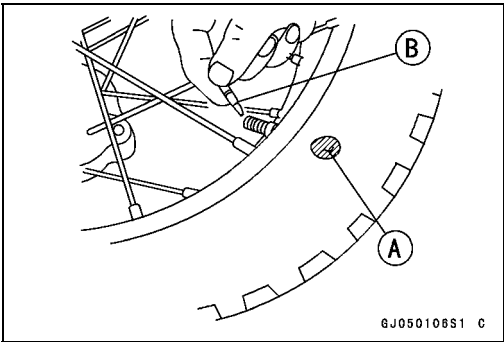
CAUTION
Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

- Remove the wheel.
- To maintain wheel balance, mark [A] the air valve position on the tire with chalk so that the tire can be reinstalled in the same position.
- Take out the valve core [B] to let out the air.

- 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**

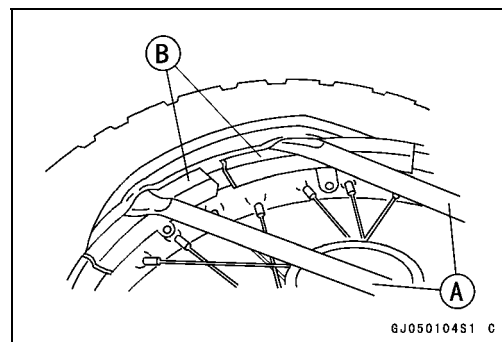


Tires

- Pry the tire off the rim with the tire iron [A] of the bead breaker protecting the rim with rim protectors [B].

Special Tool - Rim Protector: 57001-1063

Bead Breaker Assembly: 57001-1072



Tire Installation

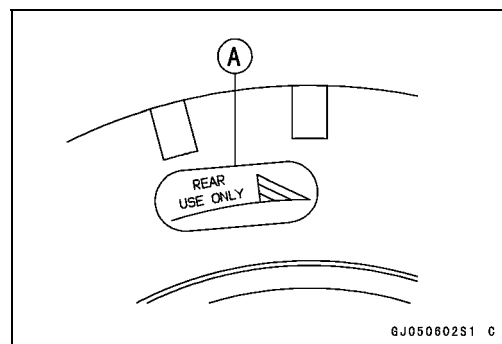
⚠ WARNING

Use the same manufacture's tires on both front and rear wheels.

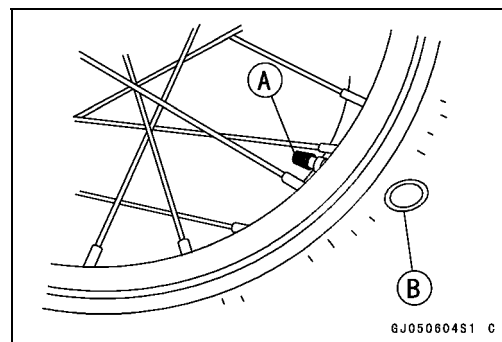
- Check the tire rotation mark [A] on the front/rear tire and install it on the rim accordingly.

NOTE

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



- Position the tire on the rim so that the air valve [A] is at the tire balance mark [B] (the chalk mark made during removal or the yellow paint mark on a new tire).
- Check and adjust the air pressure after installing.
- Install the air valve cap.



10-12 WHEELS/TIRES

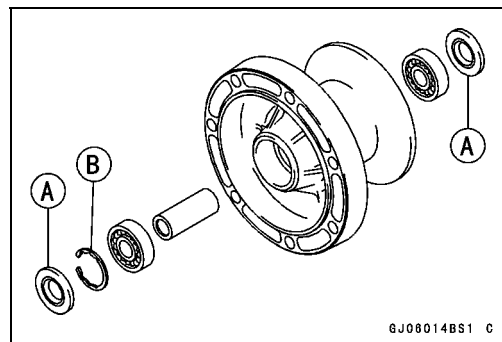
Hub Bearing

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]

Circlip [B]

Special Tool - Inside Circlip Pliers: 57001-143

Rear

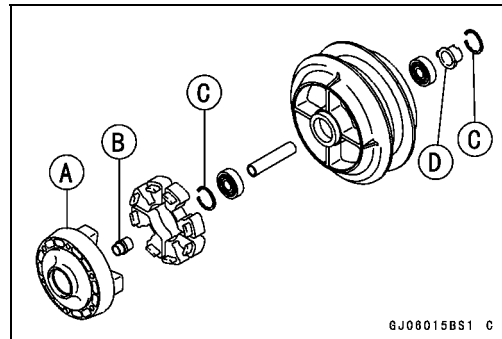
Coupling [A]

Collar [B]

Brake Panel

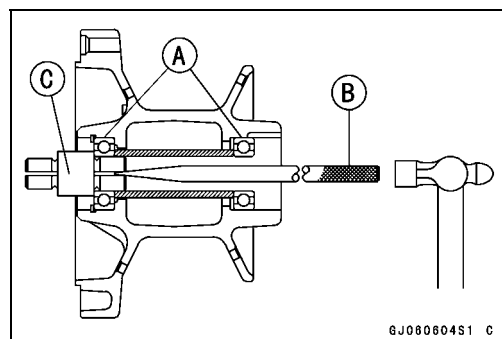
Circlips [C]

Speedometer Gear Drive [D]



- Take the bearings [A] out of the hub, using the bearing remover.

Special Tool - Bearing Remover Shaft: 57001-1265 [B]
Bearing Remover Head, 15 × 17: 57001-1267 [C]
Bearing Remover Head, 20 × 22: 57001-1293



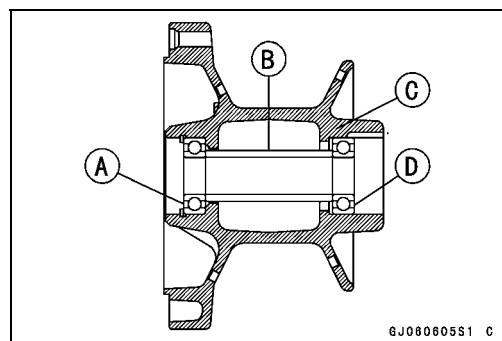
Hub Bearing Installation

- 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 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.

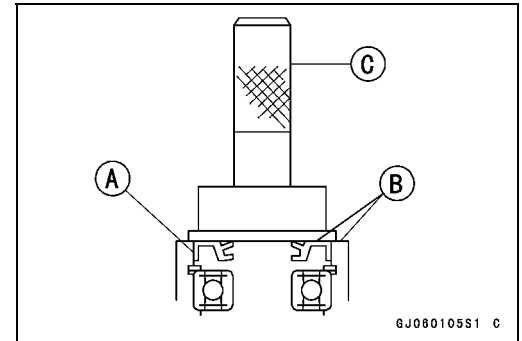
- Replace the circlips with new ones.

Special Tool - Inside Circlip Pliers: 57001-143

Hub Bearing

- Replace the grease seals with new ones.
- Press in the grease seal [A] so that the seal surface is flush [B] with the end of the hole.
- Apply high temperature grease to the grease seal lips.

Special Tool - Bearing Driver Set: 57001-1129 [C]



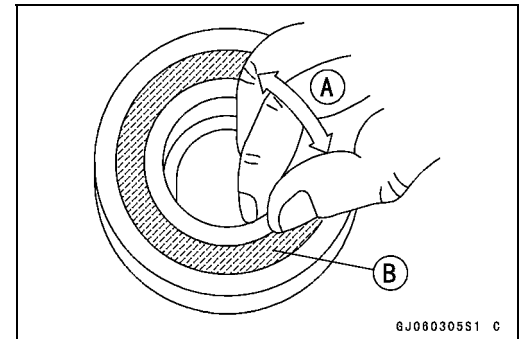
Hub Bearing Inspection

- Since the hub bearings are made to extremely close tolerances, the clearance can not 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

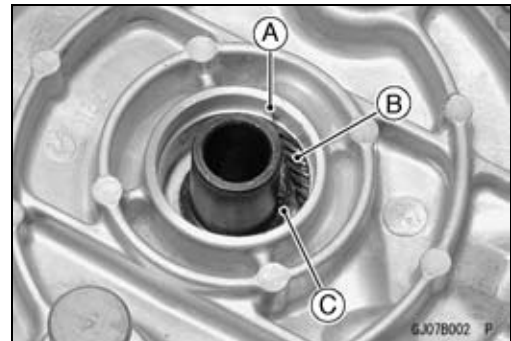
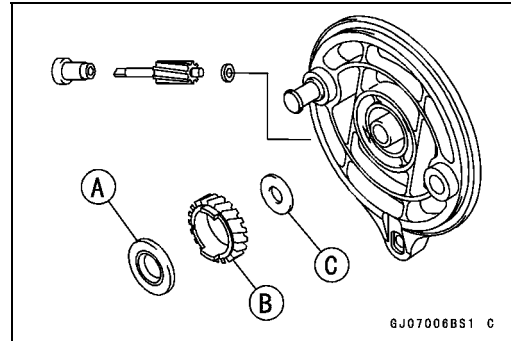
- *Since the hub bearings are packed with grease and sealed, lubrication is not required.*

10-14 WHEELS/TIRES

Speedometer Gear Housing

Disassembly and Assembly

- Remove:
 - Rear Wheel (see Rear Wheel Removal)
 - Brake Panel, Brake Shoe
 - Grease Seal [A]
 - Speedometer Gear [B]
 - Washer [C]
 - Tap the pinion washer [A], and remove the busing, pinion [B], and install the washer [C] facing the alloy surface of it to upwards.
- NOTE**
- *It is recommended that the assembly be replaced rather than attempting repair the components.*
- Press in the grease seal [A] until it is bottomed.
 - Apply high temperature grease to the grease seal lips.
- Special Tool - Bearing Driver Set: 57001-1129**
- Install the speedometer gear so that it fits in the speedometer gear drive notches (see Rear Wheel Installation).



Lubrication

- Clean and grease the pinion, speedometer gear, and gear drive.

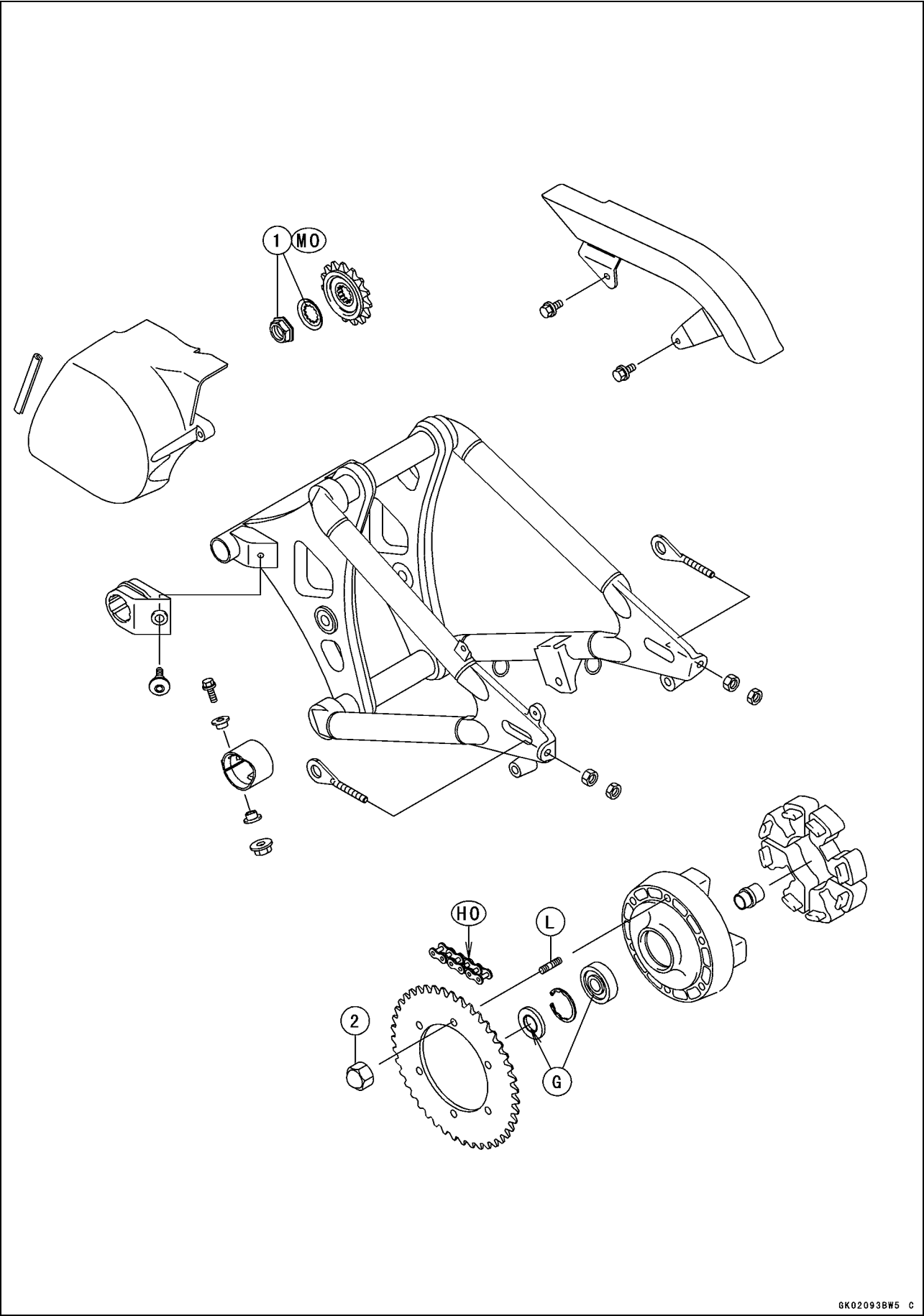
Final Drive

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11-2 FINAL DRIVE

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine Sprocket Nut	127	13	94	MO
2	Rear Sprocket Nut	74	7.5	54	

G: Apply grease.

HO: Apply heavy oil.

L: Apply a non-permanent locking agent.

MO: Apply molybdenum disulfide oil.

O: Apply oil.

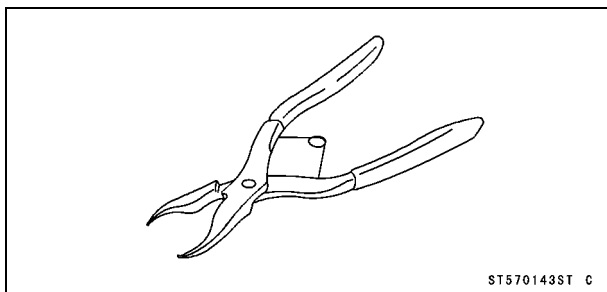
11-4 FINAL DRIVE

Specifications

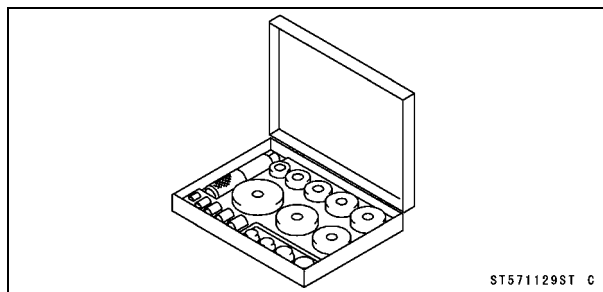
Item	Standard	Service Limit
Drive Chain		
Standard Chain		
Make	ENUMA	- - -
Type	EK50MV-O, Endless EK50MV-X (VN800-B6 ~, B6F)	- - -
Link	112 links	- - -
Sprockets		
Rear Sprocket Warp	Less-than 0.4 mm (0.015 in.)	0.5 mm (0.02 in.)

Special Tools

Inside Circlip Pliers:
57001-143



Bearing Driver Set:
57001-1129



11-6 FINAL DRIVE

Drive Chain

Drive Chain Slack Inspection

- Refer to the Drive Chain Slack Inspection in the Periodic Maintenance chapter.

Drive Chain Slack Adjustment

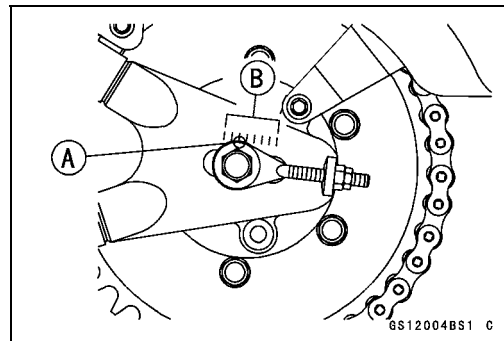
- Refer to the Drive Chain Slack Inspection in the Periodic Maintenance chapter.

Wheel Alignment Inspection/Adjustment

- Check that the left and right notches [A] on the chain adjuster should point to the same marks or points [B] on the left and right swingarm.
- If they do not, adjust the chain slack and align the wheel alignment (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).

NOTE

○ Wheel alignment can be also 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 Wear Inspection

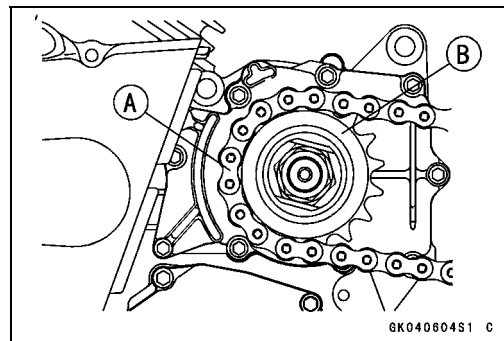
- Refer to the Drive Chain Wear Inspection in the Periodic Maintenance chapter.

Drive Chain Lubrication

- Refer to the Drive Chain Lubrication in the Periodic Maintenance chapter.

Drive Chain Removal

- Remove:
 - Rear Wheel (see Wheels/Tires chapter)
 - Swingarm (see Suspension chapter)
 - Engine Sprocket Cover (see Engine Sprocket Removal)
- 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 the Drive Chain Slack Adjustment in the Periodic Maintenance chapter).

Drive Chain

Drive Chain Replacement

CAUTION

For safety, if the drive chain shall be replaced, replace it using a recommended tool.

Recommended Tool - Type: EK JOINT Tool #50
Brand: ENUMA CHAIN

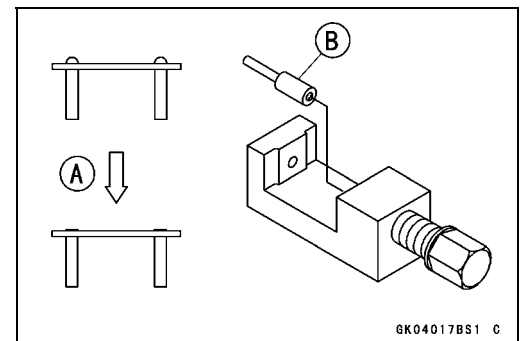
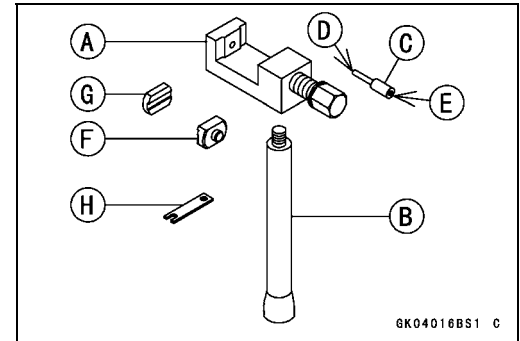
Body [A]
Handlebar [B]
Cutting and Rivetting Pin [C]
For Cutting [D]
For Rivetting [E]
Plate Holder (A) [F]
Plate Holder (B) [G]
Gauge [H]

Drive Chain Specifications

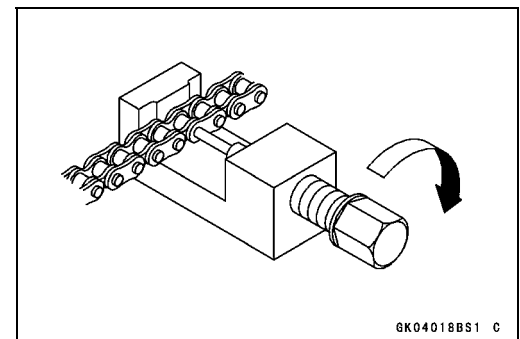
Type: EK50MV-X

Link: 112 link (MLJ)

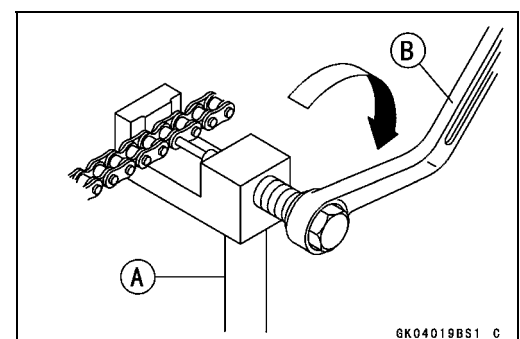
- Remove:
Engine Sprocket Cover (see Engine Sprocket Removal)
- Grind [A] the pin head to make it flat.
- Set the cutting and rivetting pin [B] as shown.



- Screw the pin holder until it touches the link pin.
- Be sure that the cutting pin hits center of the link pin.



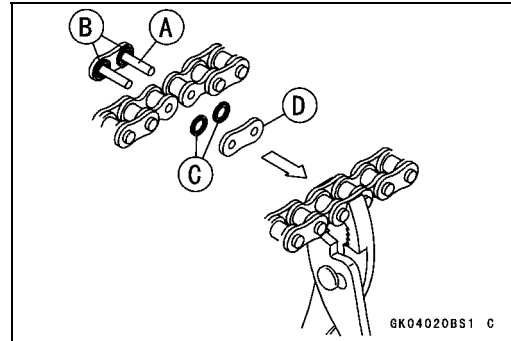
- Screw the handlebar [A] into the body.
- Turn the pin holder with the wrench [B] clockwise to extract the link pin.



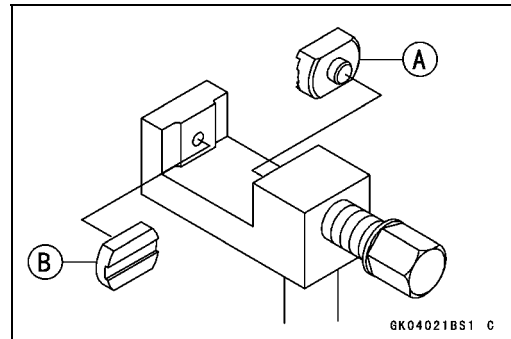
11-8 FINAL DRIVE

Drive Chain

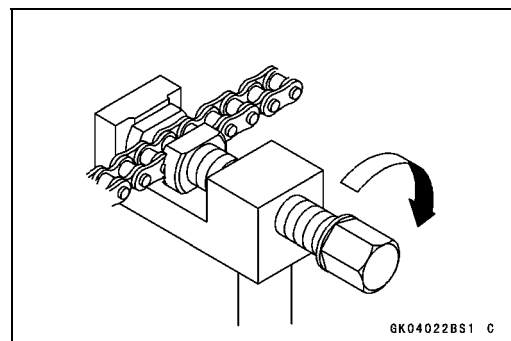
- Replace the link pin, link plate and grease seals.
- Apply grease to the link pins [A] and grease the seals [B] [C].
- Engage the drive chain on the engine and rear sprockets.
- Insert the link pins in the drive chain ends.
- Install the grease seals [C].
- Install the link plate [D] so that the mark faces out.
- Push the link plate by hand or plier to fix it.
- Be sure to set the grease seals correctly.



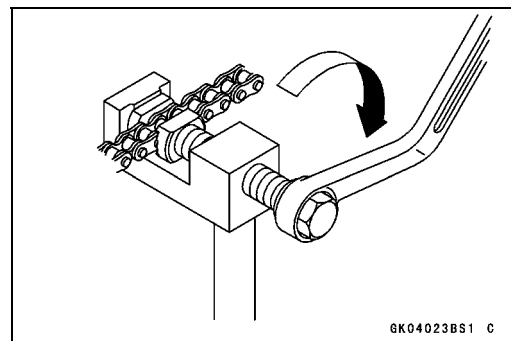
- Set the plate holder (A) [A] and plate holder (B) [B] on the body.



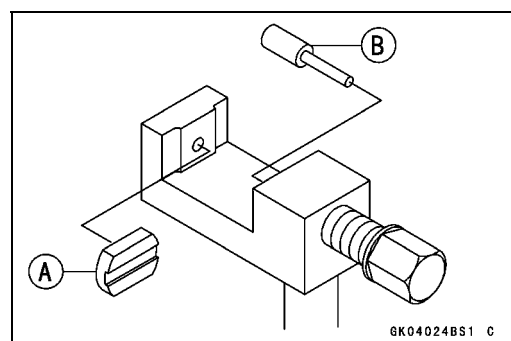
- Fit the plate holder (A) to the link plate.
- Turn the pin holder by hand until the plate holder (B) touches the other link plate.



- 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.

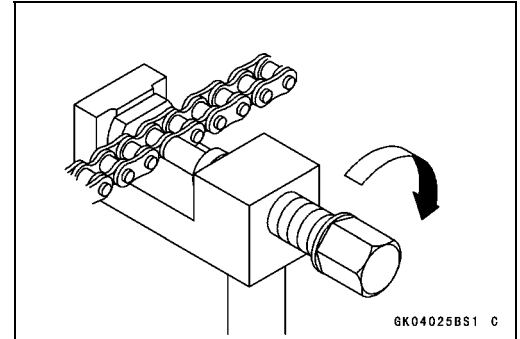


- Set the plate holder (B) [A] and the cutting and rivetting pin [B] as shown.

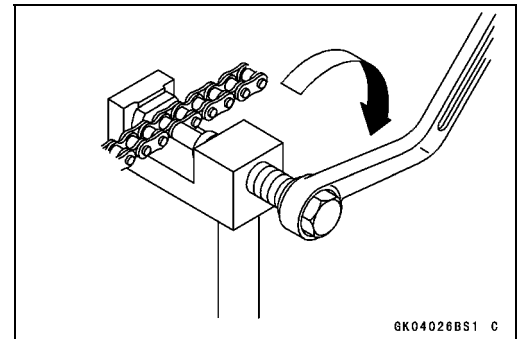


Drive Chain

- 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.



- 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

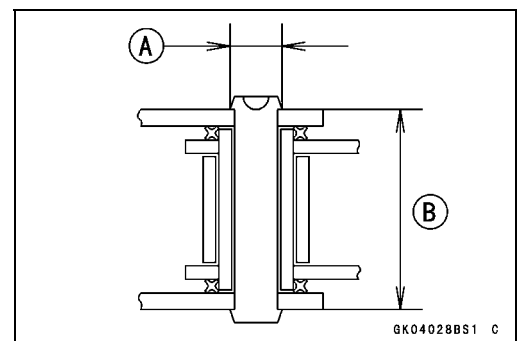
Standard: 21.45 ~ 21.60 mm (0.84 ~ 0.85 in.)

- ⚠ 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.

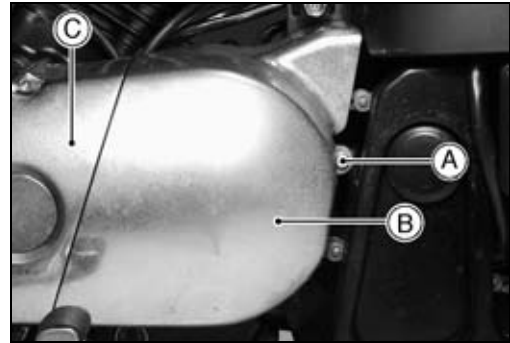


11-10 FINAL DRIVE

Sprocket, Coupling

Engine Sprocket Removal

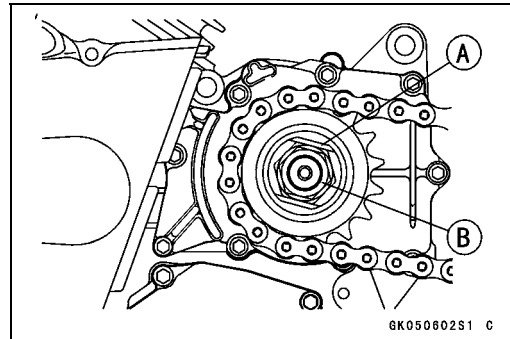
- Remove the bolt [A].
- Pull the engine sprocket cover [B] to the rear until the cover separates from the alternator cover [C], and remove it.



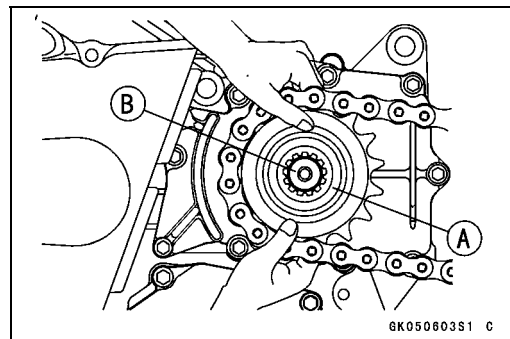
- Flatten out the bended washer [A].
- Remove:
Engine Sprocket Nut [B] and Washer

NOTE

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



- Loosen the drive chain (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).
- Remove the drive chain from the rear sprocket toward the right.
- Pull the engine sprocket [A] off the output shaft [B] along with the chain.
- Remove the engine sprocket.



Engine Sprocket Installation

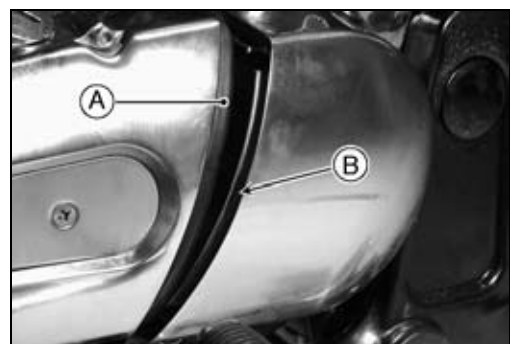
- Replace the sprocket washer.
- Install the engine sprocket onto the output shaft.
- Apply molybdenum disulfide oil to the threads of the output shaft and the seating surface of the engine sprocket nut.
- Engage the drive chain with the engine and rear sprocket.
- Tighten:

Torque - Engine Sprocket Nut: 127 N·m (13 kgf·m, 94 ft·lb)

NOTE

○Tighten the nut while applying the rear brake.

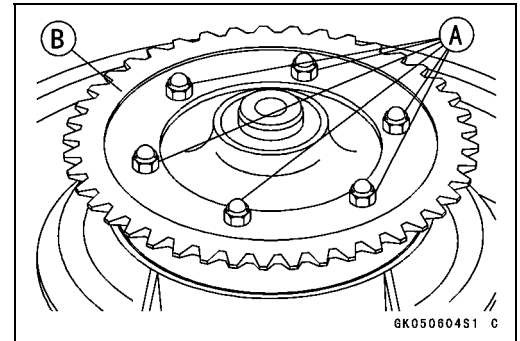
- Bend the one side of the washer over the nut.
- Install the trim [A] on the alternator cover end.
- Fit the groove [B] of the engine sprocket cover to the trim.
- Adjust the drive chain slack after installing the sprocket (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).



Sprocket, Coupling

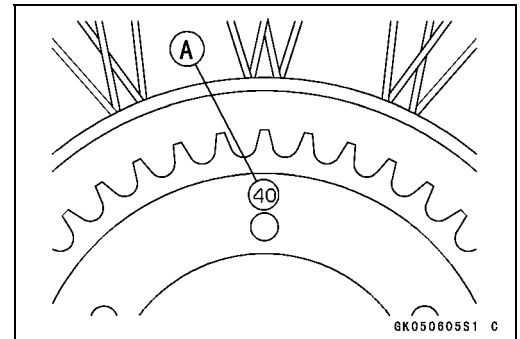
Rear Sprocket Removal

- Remove the rear wheel (see Wheel/Tires chapter).
- Remove the rear sprocket nuts [A].
- Remove the rear sprocket [B].



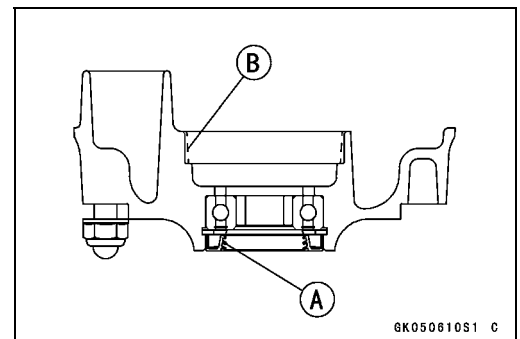
Rear Sprocket Installation

- Install the sprocket facing the tooth number marking [A] outward.
- Tighten:
 - Torque - Rear Sprocket Nuts: 74 N·m (7.5 kgf·m, 54 ft·lb)**
- Install the rear wheel (see Wheels/Tires chapter).



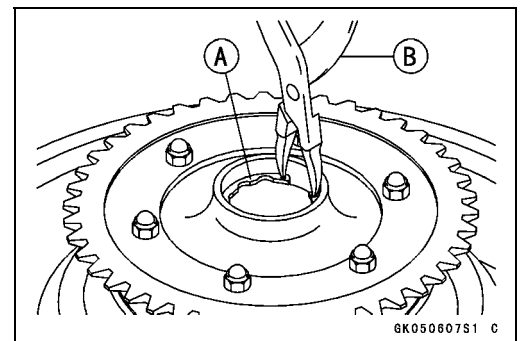
Coupling Installation

- Grease the following and install the coupling.
 - Grease Seal [A]
 - Coupling Internal Surface [B]

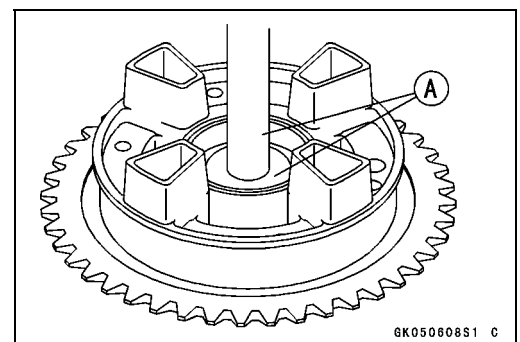


Coupling Bearing Removal

- Remove:
 - Coupling
 - Grease Seal
 - Circlip [A]
- Special Tool - Inside Circlip Pliers: 57001-143 [B]**



- Remove the bearing by tapping from the wheel side.
- Special Tool - Bearing Driver Set: 57001-1129 [A]**



11-12 FINAL DRIVE

Sprocket, Coupling

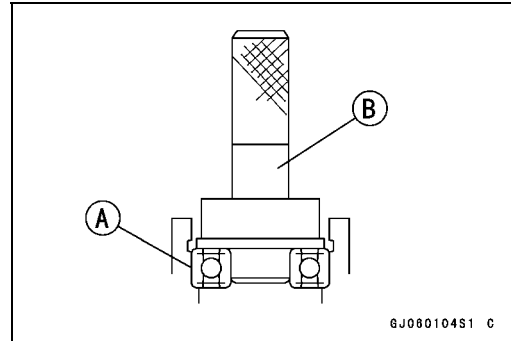
Coupling Bearing Installation

- Replace the bearing with a new one.
- Press in the bearing [A] until it is bottomed.

Special Tool - Bearing Driver Set: 57001-1129 [B]

- 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

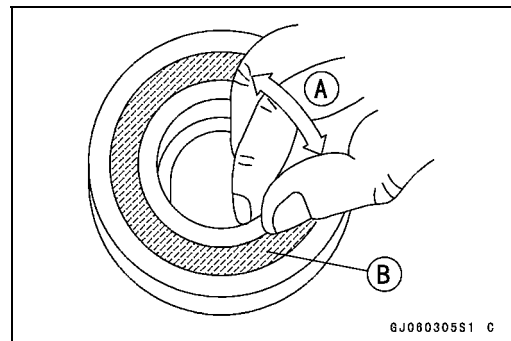
Coupling Bearing Inspection

Since the coupling bearing is made to extremely close tolerances, the clearance can not normally be measured.

NOTE

○ It is not necessary to remove the coupling bearing for inspection. If the bearing is removed, it will need to be replaced with a new one.

- Turn the bearing in the coupling 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.

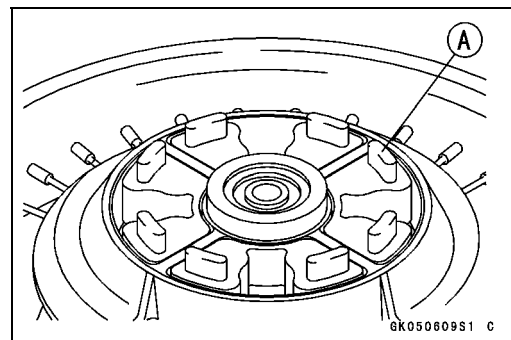


Coupling Bearing Lubrication

- 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.

Coupling Damper Inspection

- Remove the rear wheel coupling, and inspect the rubber dampers [A].
- Replace the damper if it appears damaged or deteriorated.



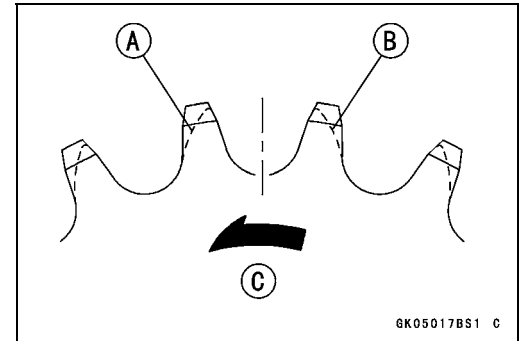
Sprocket, Coupling

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, and inspect the drive chain wear (see Drive Chain Wear Inspection in the Periodic Maintenance chapter).
 - [A] Worn Tooth (Engine Sprocket)
 - [B] Worn Tooth (Rear Sprocket)
 - [C] Direction of Rotation

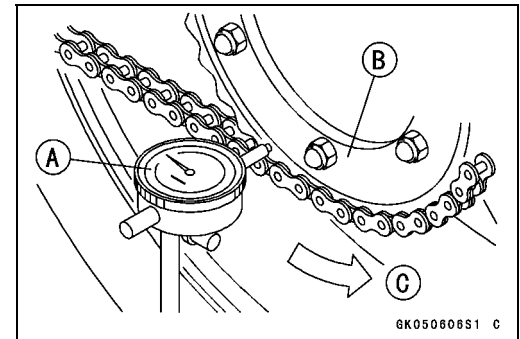
NOTE

○ 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 (see Wheels/Tires chapter) 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 (0.02 in.)

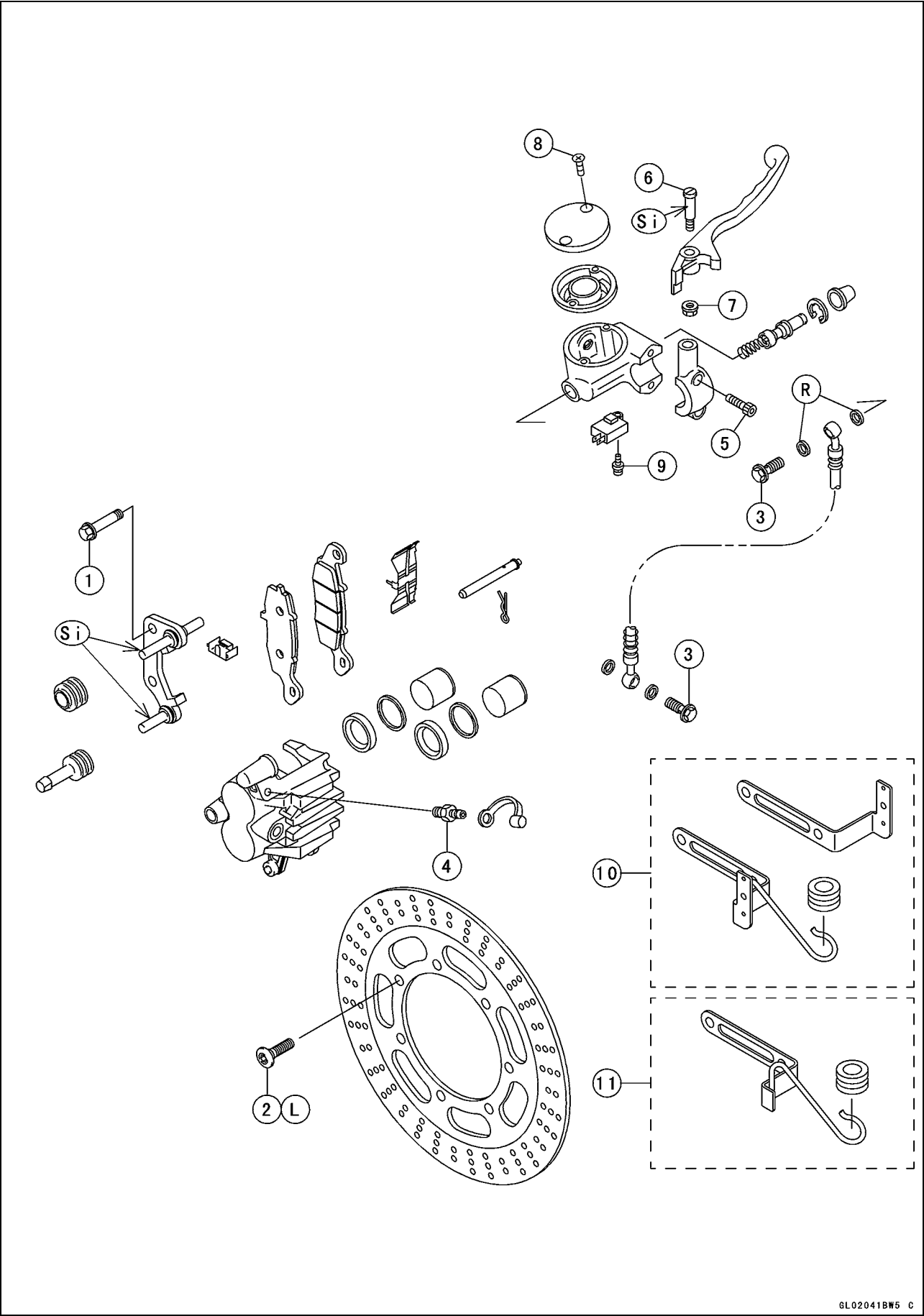
Brakes

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12-2 BRAKES

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Brake Caliper Mounting Bolts	34	3.5	25	
2	Brake Disc Mounting Bolts	27	2.8	20	L
3	Brake Hose Banjo Bolts	34	3.5	25	
4	Bleed Valve	7.8	0.8	69 in·lb	
5	Master Cylinder Clamp Bolts	8.8	0.90	78 in·lb	
6	Brake Lever Pivot Bolt	1.0	0.1	9 in·lb	
7	Brake Lever Pivot Bolt Locknut	5.9	0.6	52 in·lb	
8	Reservoir Cap Screws	1.5	0.15	13 in·lb	
9	Front Brake Light Switch Screw	1.2	0.12	10 in·lb	

10. Clamp (United States and Canada Models) (VN800-B1, Austria Model)

11. Clamp (Other than United States and Canada Model)

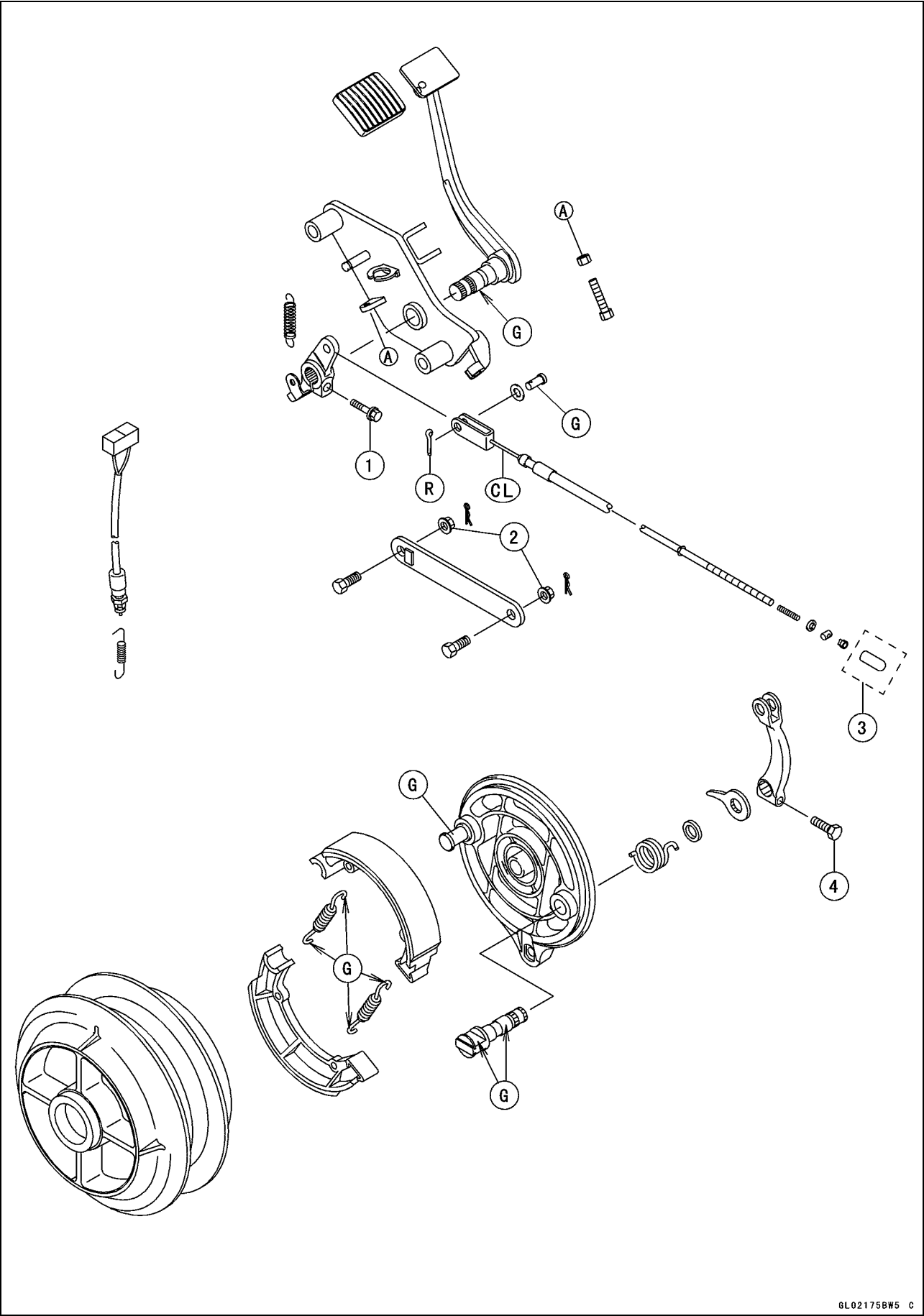
L: Apply a non-permanent locking agent

R: Replacement Parts.

Si: Apply silicone grease.

12-4 BRAKES

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear Brake Lever Clamp Bolt	25	2.5	18	
2	Torque Link Nuts	34	3.5	25	

3. Damper (VN800-B1 ~ B6, Germany Model)

4. Rear Brake Lever Clamp Bolt

CL: Apply Cable Lubricant.

G: Apply grease.

R: Replacement parts.

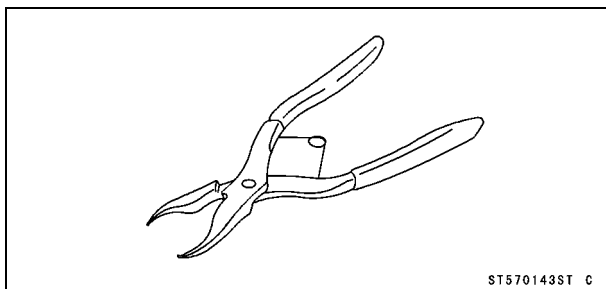
12-6 BRAKES

Specifications

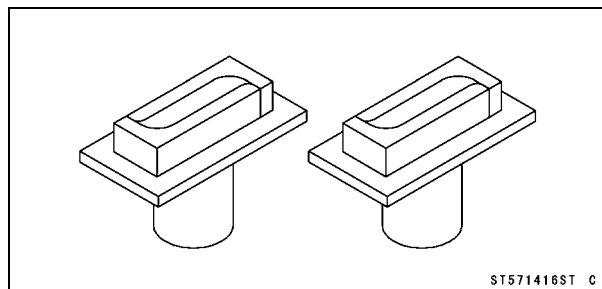
Item	Standard	Service Limit
Front Brake		
Brake Lever Position	Non-adjustable	— — —
Brake Lever Free Play	Non-adjustable	— — —
Brake Disc Thickness	5.8 ~ 6.2 mm (0.228 ~ 0.244 in.)	5.5 mm (0.21 in.)
Brake Disc Runout	Less than 0.15 mm (0.006 in.)	0.3 mm (0.012 in.)
Brake Fluid: Grade	DOT 4	— — —
Rear Brake		
Cam Lever Angle	80 ~ 90°	— — —
Drum Inside Diameter	180.00 ~ 180.16 mm (7.088 ~ 7.095 in.)	180.75 mm (7.118 in.)
Camshaft Diameter	16.957 ~ 16.984 mm (0.6678 ~ 0.6688 in.)	16.88 mm (0.665 in.)
Camshaft Hole Diameter	17.000 ~ 17.070 mm (0.6695 ~ 0.6722 in.)	17.15 mm (0.675 in.)

Special Tools

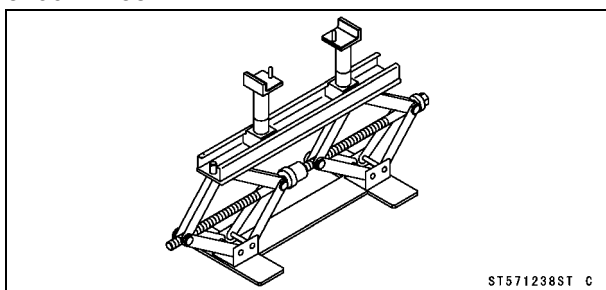
Inside Circlip Pliers:
57001-143



Jack Attachment #3:
57001-1416



Jack:
57001-1238



12-8 BRAKES

Caliper

Caliper Removal

- 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 (see Brake Hose Removal/Installation).

CAUTION

Immediately wash away any brake fluid that spills.

NOTE

○ If the caliper is to be disassembled after removal and if compressed air is not available, disassemble the caliper before the brake hose is removed (see Caliper Disassembly).

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:

Torque - Caliper Mounting Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)

Brake Hose Banjo Bolt: 34 N·m (3.5 kgf·m, 25 ft·lb)

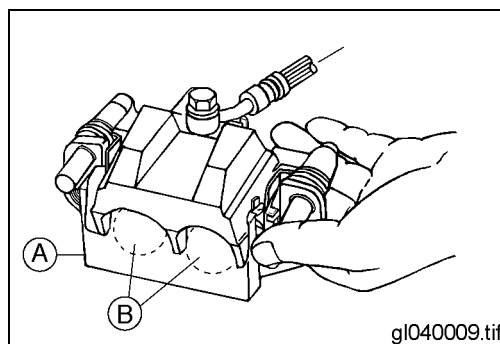
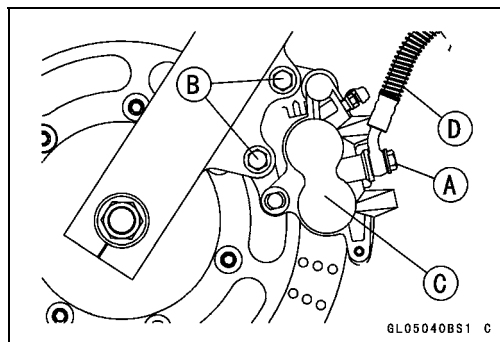
- Check the fluid level in the brake reservoir.
- Bleed the brake line (see Bleeding the Brake Line in the Periodic Maintenance chapter).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠ 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

- Remove the caliper (see Caliper Removal) with the hose installed.
- Remove the pads and spring (see Pad Removal).
- Insert a wooden board [A] 6 mm (0.24 in.) thick inside the caliper opening.
- Pump the brake lever until the piston [B] push the wooden board.



Caliper

- Remove the board and pull out the pistons [A] by hand.
- These pistons can also be removed by disconnecting the hose and applying compressed air to the hose joint opening using the same wooden board. But be careful not to put your fingers or palm inside the caliper opening during work.

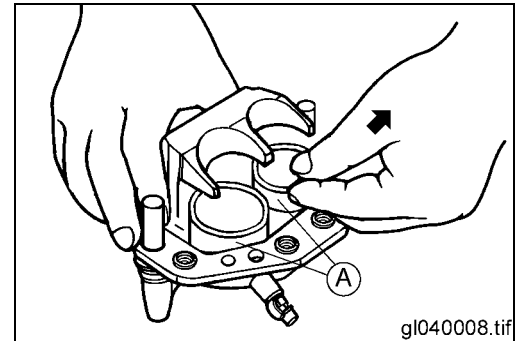
⚠ WARNING

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

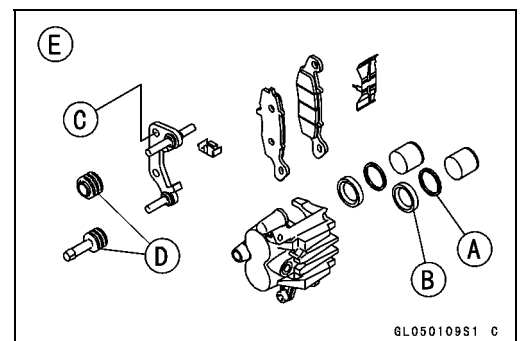
CAUTION

Immediately wash away any brake fluid that spills.

- Remove the dust seal(s) [A] and fluid seal(s) [B].
- Remove the caliper holder [C], and shaft rubber friction boots [D].
- Remove the bleed valve and rubber cap.
Front Caliper [E]



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Caliper Assembly

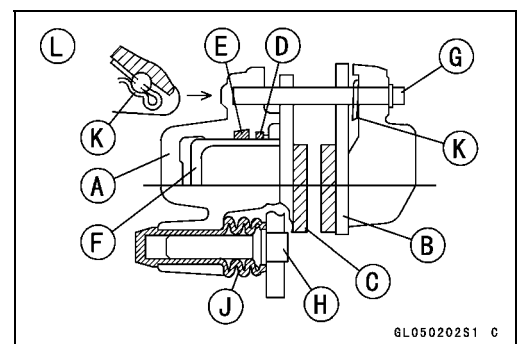
- Clean the caliper parts except for the pads.

CAUTION

For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

- Tighten:
Torque - Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)
- It is recommended that the fluid seal (piston seal) which is removed, be replaced with a new one.
- Replace the dust seals if they are damaged.
- Install the fluid seal. Either side of the seal may face out-board.
- Apply brake fluid to the cylinders, pistons, and fluid seals (piston seals), and push the pistons into the cylinders by hand. Take care that neither the cylinder nor the piston skirt gets scratched.

Caliper Body [A]
Outer Pad [B]
Inner pad [C]
Dust Seal [D]
Fluid Seal [E]
Piston [F]
Pad Pin [G]
Caliper Holder Shafts [H]
Rubber Boot [J]
Snap Pin [K]
Front Caliper [L]

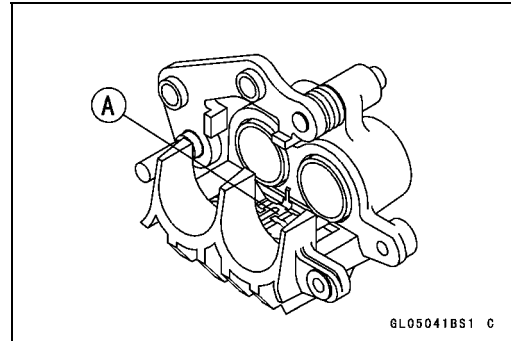


GL050202S1 C

12-10 BRAKES

Caliper

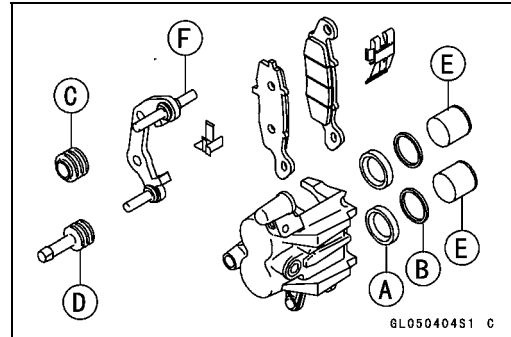
- Replace the caliper holder shaft rubber boot and dust cover if they are damaged.
 - Apply a thin coat of silicone grease to the caliper holder shafts and holder holes (Silicone grease is a special high temperature, water-resistant grease).
 - Install the anti-rattle spring in the caliper as shown.
 - Install the pads (see Brake Pad Installation).
- Anti-rattle Spring for Front Caliper [A]



Caliper Fluid Seal Damage Inspection

The fluid seal (piston seal) [A] is placed around the piston to maintain clearance between the pad and the disc. If the seal is in a poor condition, it could lead the pad to wear excessively or the brake to drag, which may cause the temperature of the discs or the brake fluid to increase.

- Replace the fluid seal if it exhibits any of the conditions listed below.
 - Brake fluid leakage around the pad.
 - Brakes overheat.
 - Considerable difference in inner and outer pad wear.
 - Seal and piston are stuck together.
- If the fluid seal is replaced, replace the dust seal [B] as well. Also, replace all seals every other time the pads are changed.



Caliper Dust Boot and Rubber Boot Damage Inspection

- Check that the dust boot [C] and rubber boot [D] are not cracked, worn, swollen, or otherwise damaged.
- If they show any damage, replace it.

Caliper Piston and Cylinder Damage Inspection

- Visually inspect the piston [E] and cylinder surfaces.
- Replace the caliper if the cylinder and piston are badly scored or rusty.

Caliper Holder Shaft Wear Inspection

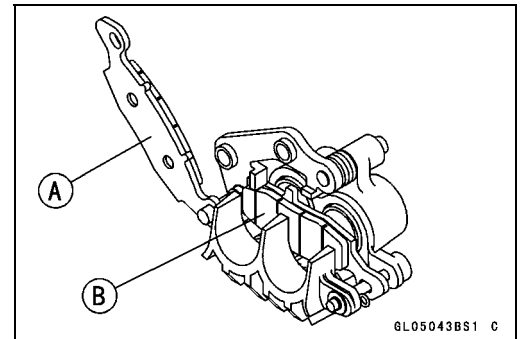
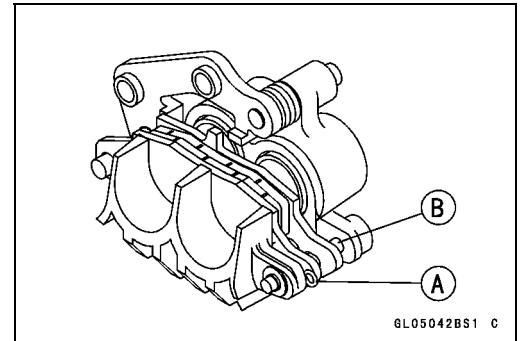
The caliper body must slide smoothly on the caliper holder shafts. If the body does not slide smoothly, one pad will wear more than the other, pad wear will increase, and constant drag on the disc will raise brake and brake fluid temperature.

- Check to see that the caliper holder shafts [F] are not badly worn or stepped, and that the rubber boots are not damaged.
- If the rubber boot is damaged, replace the rubber boot. To replace the rubber boot, remove the pads and the caliper bracket.
- If the caliper holder shaft is damaged, replace the caliper bracket.

Brake Pads

Brake Pad Removal

- Remove the caliper with the hose installed (see Caliper Removal.)
- Remove:
 - Snap Pin [A]
 - Pad Pin [B]
- Remove the outer pad [A], and then remove the piston side pad [B].

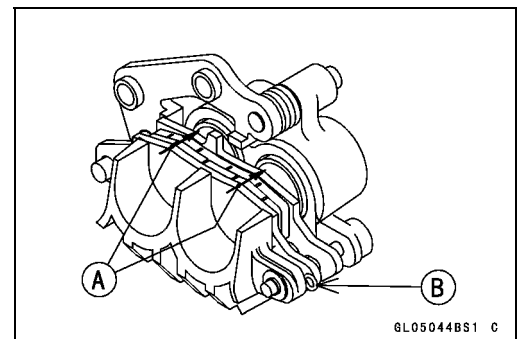


Brake Pad Installation

- Before installation, clean the pads with a high-flash point solvent.
- Push [A] the caliper pistons in by hand as far as they will go.
- Be sure to install the snap pin [B] for the caliper.

⚠ WARNING

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



Brake pad Wear Inspection

- Refer to the Brake Lining or Pad Wear Inspection in the Periodic Maintenance Chapter.

12-12 BRAKES

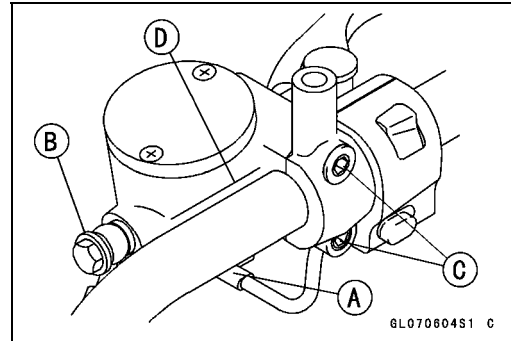
Master Cylinder

Master Cylinder Removal

- Disconnect the front brake light switch connectors [A].
- Remove the banjo bolt [B] to disconnect the brake hose from the master cylinder (see Brake Hose Removal/Installation).
- Unscrew the clamp bolts [C], and take off the master cylinder [D] as an assembly with the reservoir, brake lever, and brake switch installed.

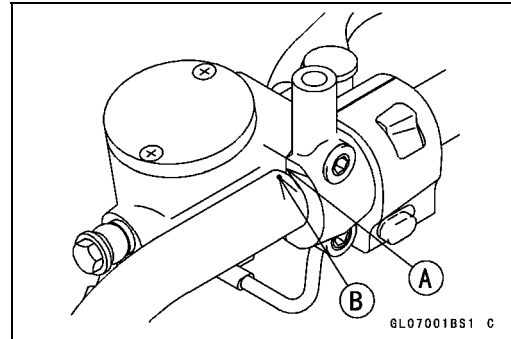
CAUTION

Immediately wash away any brake fluid that spills.



Master Cylinder Installation

- Set the front master cylinder to match its mating surface [A] to the punched mark [B] of 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 (0.90 kgf·m, 78 in·lb)

- Replace the washers that are on each side of the hose fitting with new ones.
- Tighten:

Torque - Brake Hose Banjo Bolt: 34 N·m (3.5 kgf·m, 25 ft·lb)

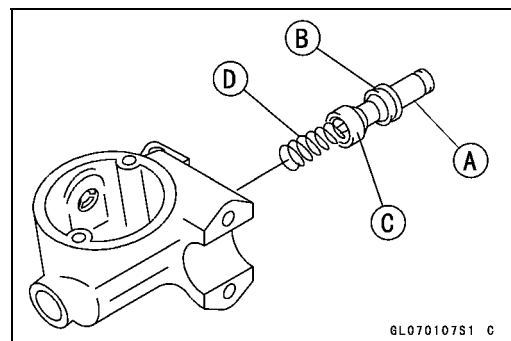
- Bleed the brake line (see Bleeding the Brake Line in the Periodic Maintenance chapter).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

Master Cylinder Disassembly

- Remove the master cylinder (see Master Cylinder Removal).
- Remove the reservoir cap and diaphragm, and pour the brake fluid into a container.
- Unscrew the pivot nut and pivot bolt, and remove the brake lever.
- Pull the dust cover out of place, and remove the circlip.

Special Tool - Inside Circlip Pliers: 57001-143

- Pull out the piston [A], secondary cup [B], primary cup [C], and return spring [D].



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.

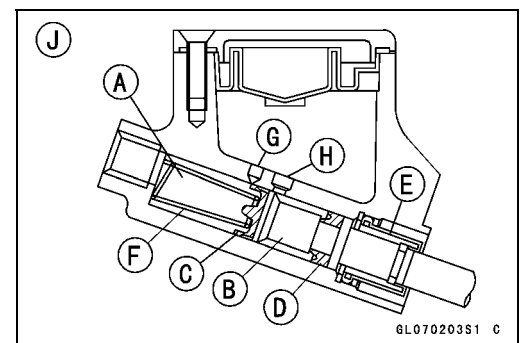
CAUTION

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.
- Apply silicone grease (ex. PBC grease)
 - Brake Lever Pivot Bolt
 - Brake Lever Pivot Contact
 - Push Rod Contact (Rear)
 - Dust Covers
- Tighten:
 - Torque - Brake Lever Pivot Bolt: 1.0 N·m (0.10 kgf·m, 9 in·lb)**
 - Brake Lever Pivot Bolt Locknut: 5.9 N·m (0.60 kgf·m, 52 in·lb)**

Master Cylinder Inspection (Visual Inspection)

- Remove the master cylinders (see Master Cylinder Removal).
 - Disassemble the front master cylinders.
 - Check that there are no scratches, rust or pitting on the inner wall [A] of each master cylinder and on outside of each piston [B].
 - ✚ If a master cylinder or piston shows any damage, replace them.
 - Inspect the primary cup [C] and secondary cup [D].
 - ✚ 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 covers [E] for damage.
 - ✚ If they are damaged, replace them.
 - Check the piston return spring [F] for any damage.
 - ✚ If the springs are damaged, replace them.
 - Check that relief port [G] and supply port [H] are not plugged.
 - ✚ If the relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.
- Front Master Cylinder [J]

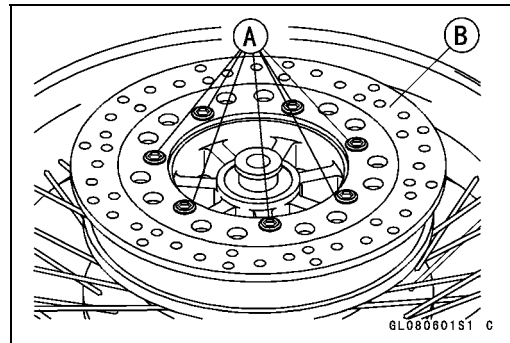


12-14 BRAKES

Brake Disc

Brake Disc Removal

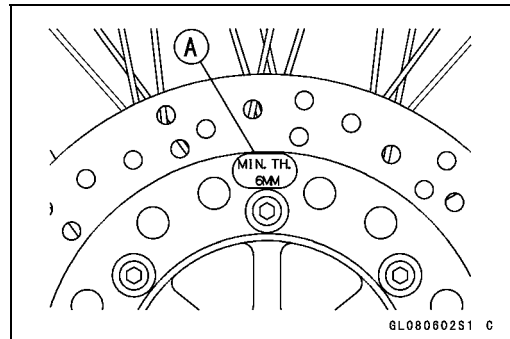
- Remove the wheel (see Wheels/Tires chapter).
- Unscrew the mounting bolts [A], and take off the disc [B].



Brake Disc Installation

- Install the brake disc on the wheel so that the marked side [A] faces out.
- Tighten:

Torque - Brake Disc Mounting Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)



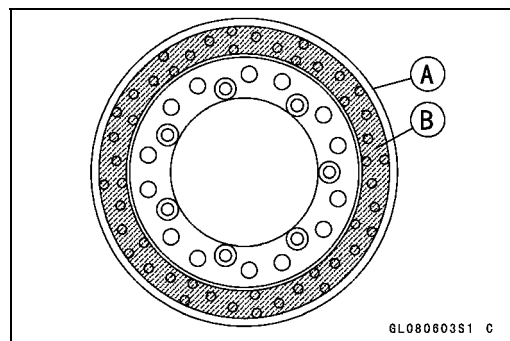
Brake Disc Wear Inspection

- Measure the thickness of the disc [A] at the point where it has worn the most.
 - If the disc has worn past the service limit, replace it.
- [B] Measuring Area

Disc Thickness

Standard: 5.8 ~ 6.2 mm (0.228 ~ 0.244 in.)

Service Limit: 5.5 mm (0.21 in.)



Brake Disc Warp Inspection

- Jack up the motorcycle so that the wheel is off the ground (see Wheels/Tires chapter).

Special Tool - Jack: 57001-1238

Jack Attachment #3: 57001-1416

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

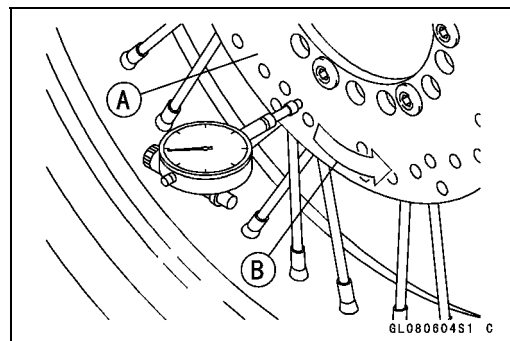
- Set up a dial gauge against the disc [A] as shown and measure disc runout, while turning [B] the wheel by hand.

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

Disc Runout

Standard: 0.15 mm (0.006 in.) or less

Service Limit: 0.3 mm (0.012 in.)



Brake Fluid

Level Inspection

- Refer to the Brake Fluid Level Inspection in the Periodic Maintenance chapter.

Brake Fluid Change

- Refer to the Brake Fluid Change in the Periodic Maintenance chapter.

Bleeding the Brake Line

- Refer to the Bleeding the Brake Line in the Periodic Maintenance chapter.

12-16 BRAKES

Brake Hose

Brake Hose Removal/Installation

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 hoses, avoid sharp bending, kinking, flattening or twisting, and route the hoses according to Cable, Wire and Hose Routing section in General Information chapter.
- Tighten:
Torque - Brake Hose Banjo Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)
- Bleed the brake line after installing the brake hose (see Bleeding the Brake Line).

Brake Hose Inspection

- Refer to the Brake Hoses and Connections Inspection in the Periodic Maintenance chapter.

Brake Pedal and Cable

Brake Pedal Position Inspection

- Refer to the Brake Play Inspection in the Periodic Maintenance chapter.

Brake Pedal Position Adjustment

- Refer to the Brake Play Inspection in the Periodic Maintenance chapter.

Brake Pedal Free Play Inspection

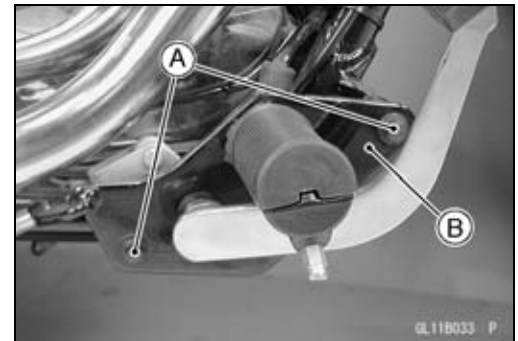
- Refer to the Brake Play Inspection in the Periodic Maintenance chapter.

Brake Pedal Free Play Adjustment

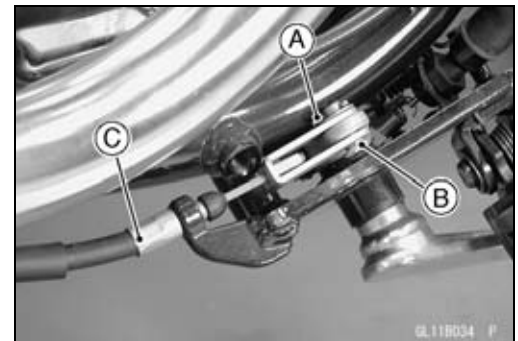
- Refer to the Brake Play Inspection in the Periodic Maintenance chapter.

Brake Pedal Removal

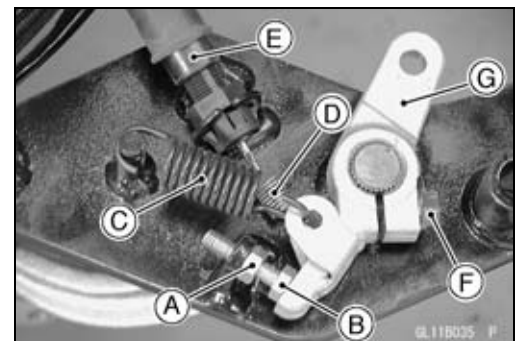
- Remove:
 - Bolts [A]
 - Footpeg Bracket [B]



Cotter Pin [A]
Joint Pin [B]
Brake Cable [C]



- Loosen the locknut [A] and adjusting bolt [B].
- Remove:
 - Brake Pedal Spring [C]
 - Brake Switch Spring [D]
 - Brake Switch [E]
 - Bolt [F] and Rear Brake Lever [G]
 - Brake Pedal

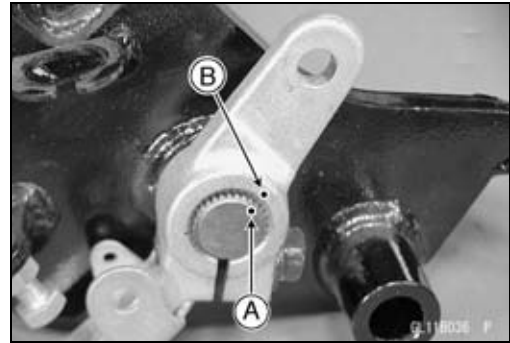


12-18 BRAKES

Brake Pedal and Cable

Brake Pedal Installation

- Align the punch mark [A] on the brake pedal shaft with the punch mark [B] on the brake pedal lever.
- Tighten:
Torque - Rear Brake Lever Clamp Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)
- Adjust the brake pedal free play.



Brake Cable Lubrication

- Refer to the General Lubrication in the Periodic Maintenance chapter.

Brake Panel and Drum

Cam Lever Angle Inspection

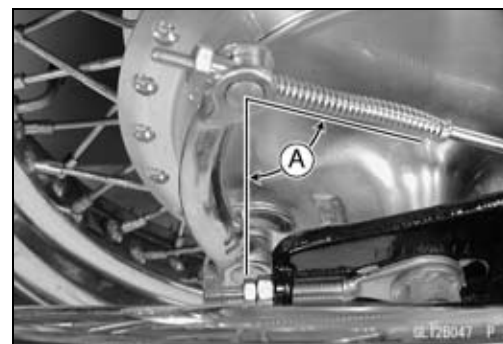
- Check that the rear brake cam lever comes to an 80° ~ 90° angle [A] with the rear brake rod when the rear brake is fully applied.
- If it does not, adjust the rear brake cam lever angle.

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 and Cam Lever
- Before removing the brake cam lever, mark the position of the cam lever.
- Mount the cam lever at a new position so that the cam lever moves one screw thread from the original position to the rear.

WARNING

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 fall.

- Install the rear wheel (see Wheels/Tires chapter).
- Adjust the rear brake play (see Brakes in the Periodic Maintenance chapter).

Brake Panel Removal

- Remove the rear wheel (see Wheels/Tires chapter).
- Separate the brake panel [A] from the wheel.



Brake Panel Installation

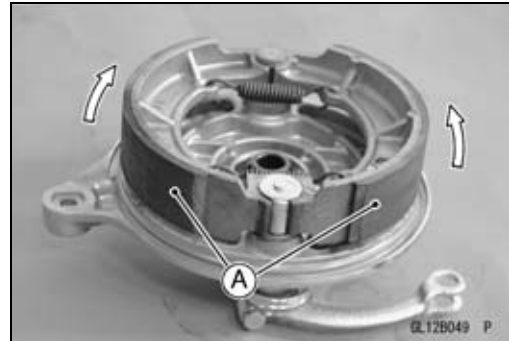
- Fit the brake panel to the rear wheel, and then install the rear wheel (see Wheels/Tires chapter).

12-20 BRAKES

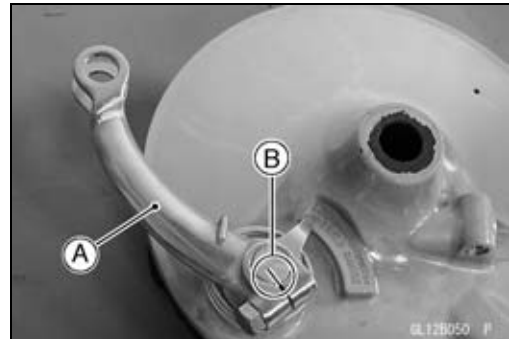
Brake Panel and Drum

Brake Panel Disassembly

- Remove the brake panel (see Brake Panel Removal).
- Using a clean cloth around the linings to prevent grease or oil from getting on them, remove the brake shoes [A] by pulling up on the center of the linings.

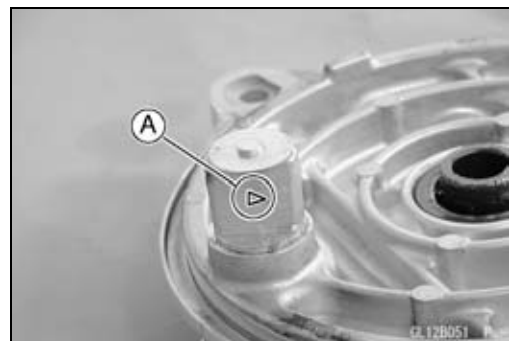


- Before removing the brake cam lever [A], mark [B] the position of the cam lever so that it can be installed later in the same position.



Brake Panel Assembly

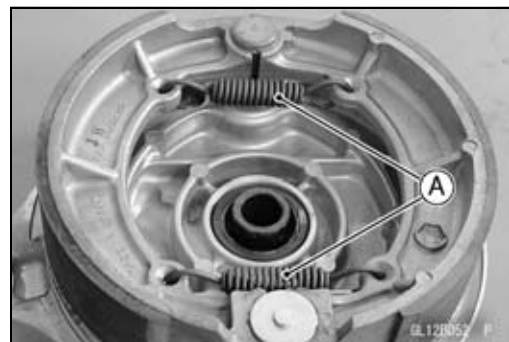
- Clean the old grease from the camshaft and regrease it.
- Apply grease to the center of shaft and very lightly on the cam surfaces. Do not overgrease.
- Push the camshaft into the panel so that the triangular mark [A] on the cam surface points toward the center of the panel.



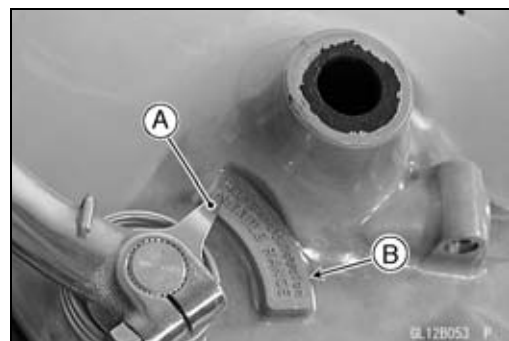
⚠ WARNING

Improper installation will cause ineffective braking.

- Fit the springs [A] onto the brake shoes as shown.
- The brake shoe springs are identical.
- Wrap a clean cloth around the linings to prevent grease or oil from getting on them, and install the shoes on the brake panel.



- Install the seal ring and fit the indicator [A] on the serration so that it points to the extreme left of the USABLE RANGE [B].
- Install the cam lever in its original position on the camshaft, and tighten its bolt.



Brake Panel and Drum

Brake Drum Wear Inspection

- Remove the rear wheel (see Wheels/Tires chapter).
- Measure the inside diameter [A] of the drum.
- Use 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: 180.00 ~ 180.16 mm (7.088 ~ 7.095 in.)

Service Limit: 180.75 mm (7.118 in.)



Brake Shoe Lining Wear Inspection

- Refer to the Brake Lining or Pad Wear Inspection in the Periodic Maintenance chapter.

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 Camshaft and Camshaft Hole Wear Inspection

- Remove the brake camshaft (see Brake Panel Disassembly).
- Measure the shaft diameter [A].
- ✚ If any measurement is less than the service limit, replace the camshaft.

Camshaft Diameter

Standard: 16.957 ~ 16.984 mm (0.6678 ~ 0.6688 in.)

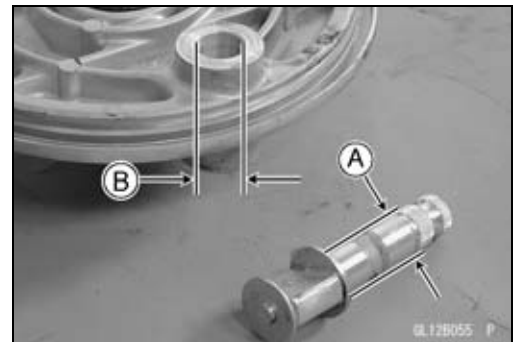
Service Limit: 16.88 mm (0.665 in.)

- Measure the inside diameter [B] of the camshaft hole in the brake panel.
- ✚ If any measurement is larger than the service limit, replace the brake panel.

Camshaft Hole Diameter

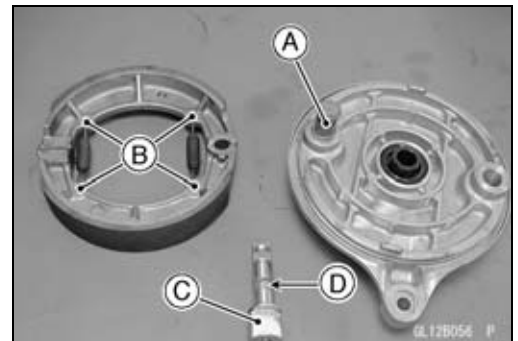
Standard: 17.000 ~ 17.070 mm (0.6695 ~ 0.6722 in.)

Service Limit: 17.15 mm (0.675 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]
- Lubricate the brake pedal by applying a multi-purpose grease to the pedal pivot shaft groove.
- Clean any excess grease from the parts before assembly.

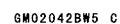


Suspension

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Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Fork Clamp Bolts (upper)	20	2.0	14.5	
2	Front Fork Clamp Bolts (lower)	34	3.5	25	
3	Front Fork Bottom Allen Bolts	20	2.0	14.5	L
4	Fork Cover Bolts 5 mm	8	0.8	11 in·lb	
5	Fork Cover Bolts 6 mm	13	1.3	113 in·lb	
6	Spacer Allen Bolt	4.4	0.45	39 in·lb	

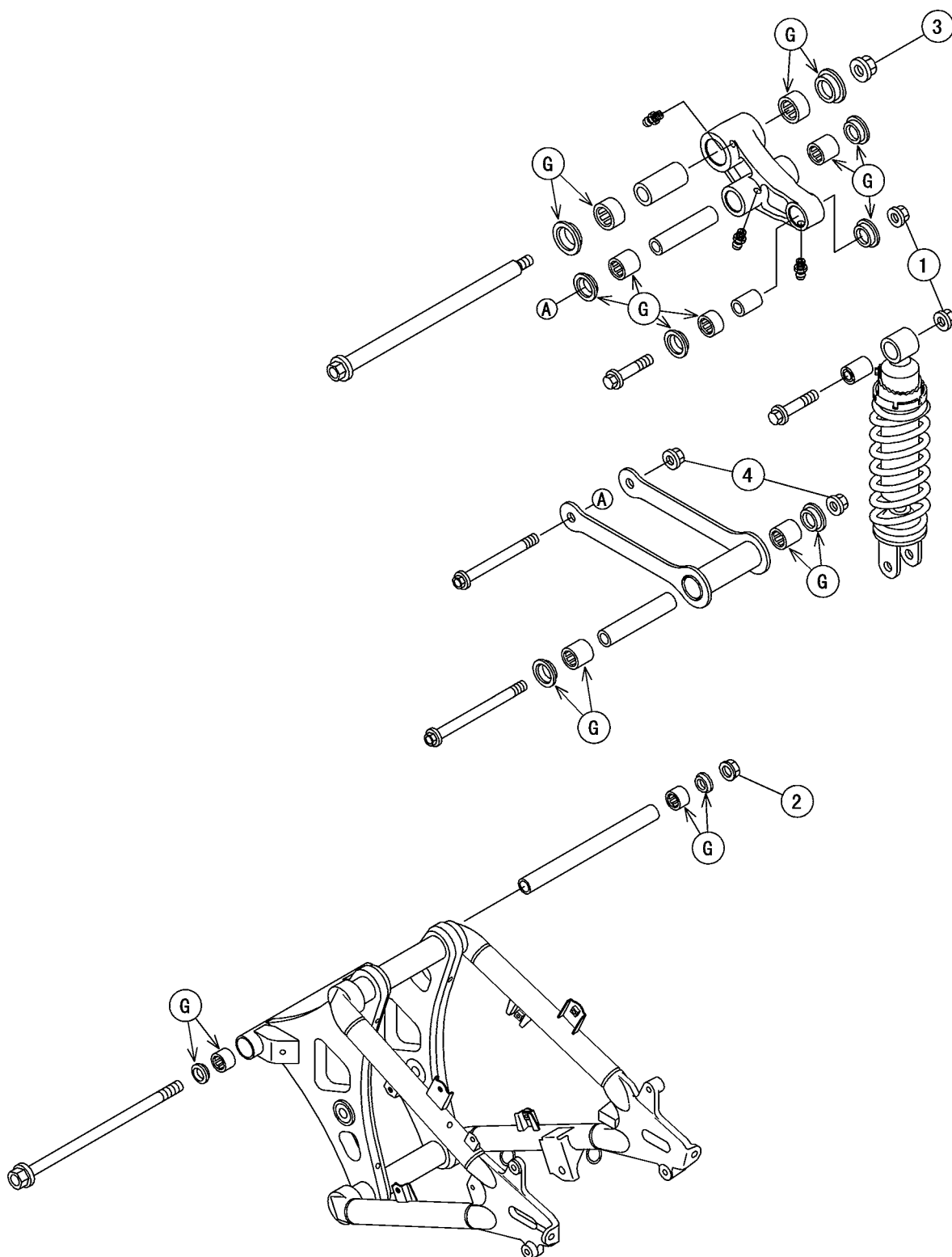
7. Lower Fork Covers (VN800-B1 ~ B7 Model)

8. Lower Fork Covers and Other Parts (VN800-B8 ~, B6F Model)

L: Apply a non-permanent Locking agent.

13-4 SUSPENSION

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear Shock Absorber Nuts	59	6.0	43	
2	Swing Arm Pivot Shaft Nut	98	10.0	72	
3	Rocker Arm Pivot Shaft Nut	98	10.0	72	
4	Tie-Rod Nuts	59	6.0	43	

G: Apply grease.

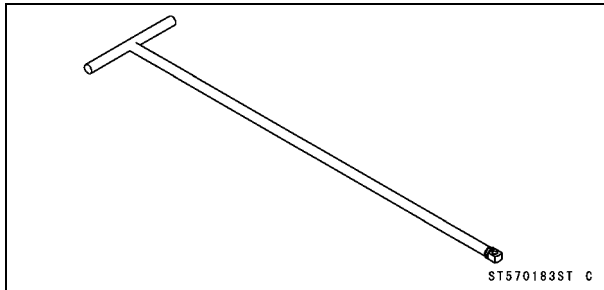
13-6 SUSPENSION

Specifications

Item	Standard	Service Limit
Front Fork		
Fork Oil:		
Viscosity	SHOWA SS8 or equivalent	— — —
Capacity (per side):		
When changing oil	Approx, 265 mL (9.0 US oz)	— — —
After disassembly and completely dry	310 ±4 mL (10.5 ±0.14 US oz)	— — —
Fork Spring Free Length	547.2 mm (21.54 in.)	536 mm (21.1 in.)
Rear Shock Absorber		(Adjustable Range)
Spring Preload	1st step	1st ~ 7th steps

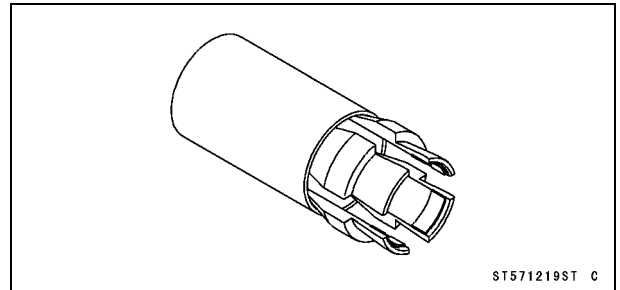
Special Tools

Fork Cylinder Holder Handle:
57001-183



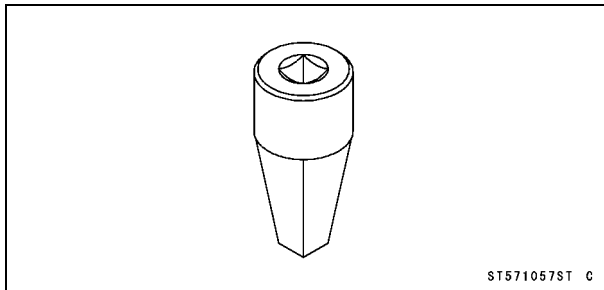
ST570183ST C

Front Fork Oil Seal Driver:
57001-1219



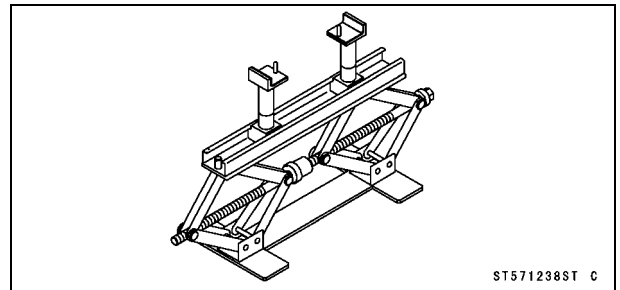
ST571219ST C

Fork Cylinder Holder Adapter:
57001-1057



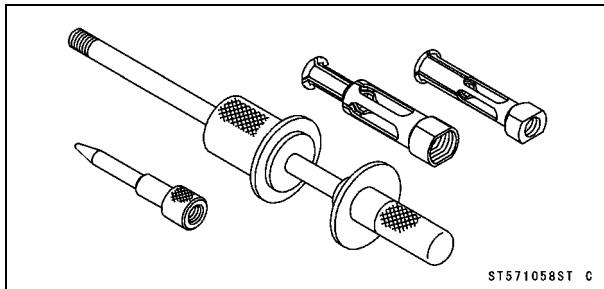
ST571057ST C

Jack:
57001-1238



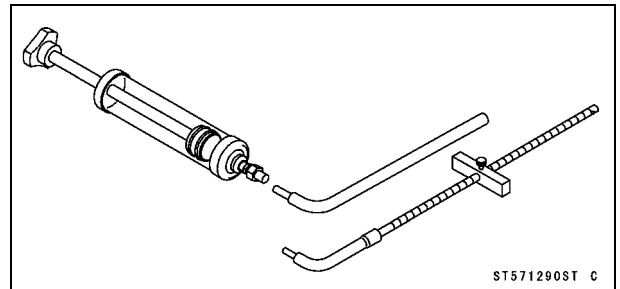
ST571238ST C

Oil Seal & Bearing Remover:
57001-1058



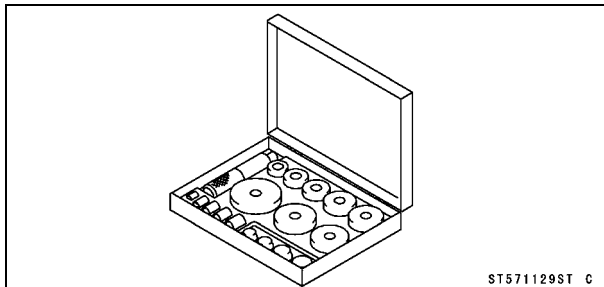
ST571058ST C

Fork Oil Level Gauge:
57001-1290



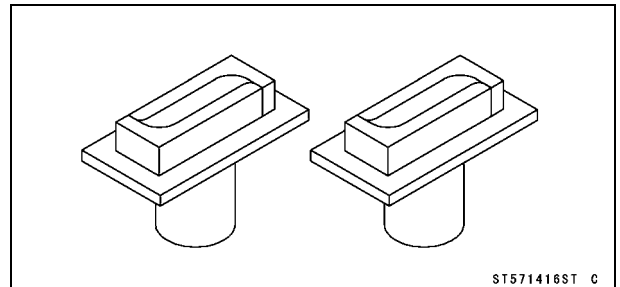
ST571290ST C

Bearing Driver Set:
57001-1129



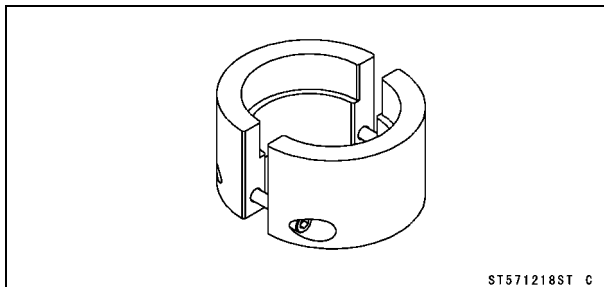
ST571129ST C

Jack Attachment #3:
57001-1416



ST571416ST C

Fork Outer Tube Weight:
57001-1218



ST571218ST C

13-8 SUSPENSION

Front Fork

Front Fork Removal (each fork leg)

- Loosen the front wheel axle nut (see wheels/Tires chapter)
- Raise the front wheel off the ground.

Special Tools - Jack: 57001-1238

Jack Attachment #3: 57001-1416

- Remove:
Caliper (for left fork only) (see Wheels/Tires chapter)

Front Fender (see Frame chapter)

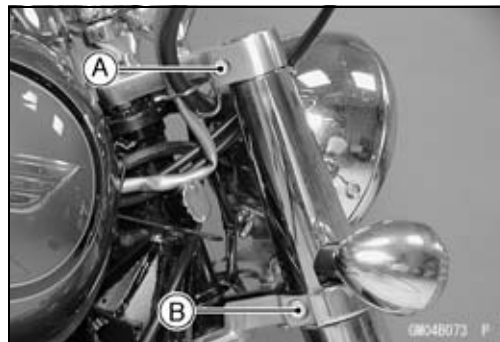
Front Fork Upper Clamp Bolt [A]

Front Fork Lower Clamp Bolt [B]

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

NOTE

○ If the fork is tight, tap lightly around the base of the stem head with a plastic mallet.



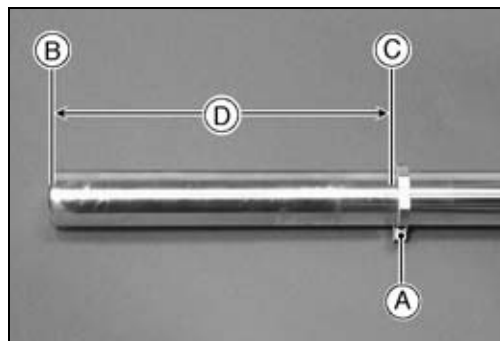
Front Fork Installation

- For VN800-B8 model, note the following procedure.

○ Install the spacer [A] so that the distance between the fork top end [B] and the upper surface [C] of the spacer is 249.6 mm (9.83 in.) [D].

Torque - Spacer Allen Bolt: 4.4 N·m (0.45 kgf·m, 39 in·lb)

○ Insert the washer, rubber seat and fork lower cover to the inner tube.



- Turn the clamp bolt (lower) clockwise posing the fork leg upward fully.
- Install the fork so that the top end [A] of the inner tube is flush with the upper surface of the steering stem head.
- Tighten:

Torque - Front Fork Clamp Bolt (Lower): 34 N·m (3.5 kgf·m, 25 ft·lb)

Front Fork Clamp Bolt (Upper): 20 N·m (2.0 kgf·m, 14.5 ft·lb)

- Install the removed parts (see appropriate chapters).



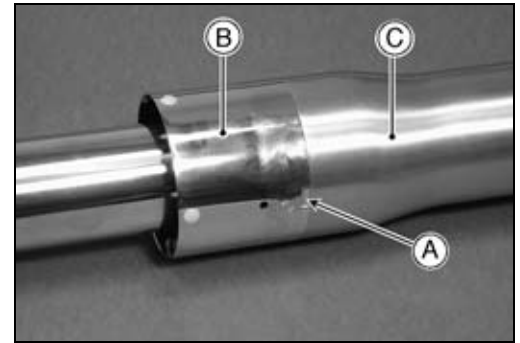
Fork Oil Change

- Refer to the Front Fork Oil Change in the Periodic Maintenance chapter.

Front Fork

Front Fork Disassembly

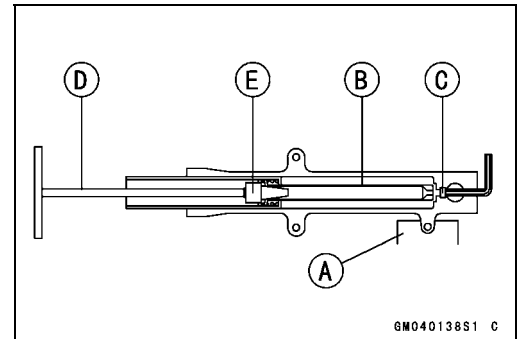
- Remove the front fork (see Front Fork Removal).
- Drain the fork oil (see Fork Oil Change in the Periodic Maintenance chapter).
- Tap the point [A] with a suitable tool to separate the dust seal cover [B] from the outer tube [C].



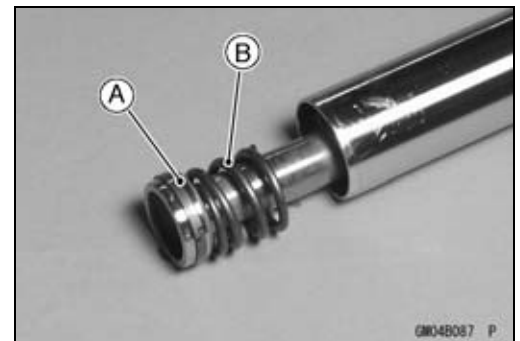
- Hold the front fork horizontally in a vise [A].
- Stop the cylinder unit [B] from turning by using the special tools.
- Unscrew the Allen bolt [C], and take the gasket out of the bottom of the outer tube.

Special Tool - Fork Cylinder Holder Handle: 57001-183 [D]
Fork Cylinder Holder Adapter: 57001-1057 [E]

- Take the cylinder unit out of the inner tube.
- Remove the cylinder unit [A] and short spring [B] from the inner tube.

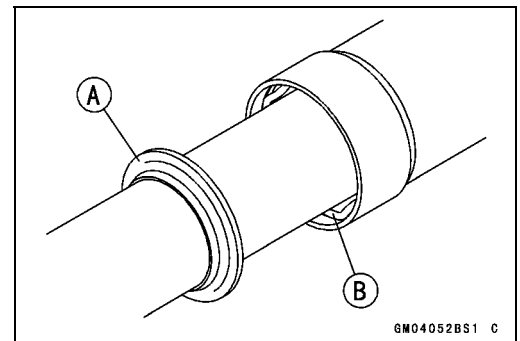


GM040138S1 C



GM048087 P

- Separate the inner tube from the outer tube as follows:
 - Slide up the dust seal [A].
 - Remove the retaining ring [B] from the outer tube.

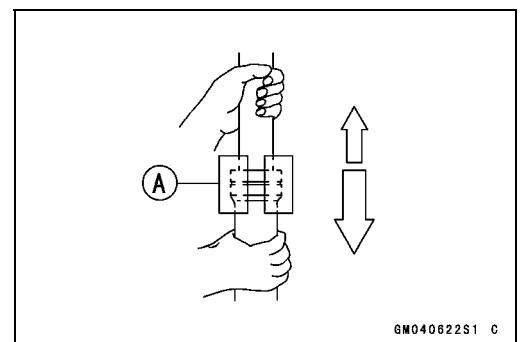


GM040528S1 C

- Grasp the inner tube and stroke the outer tube up and down several times. The shock to the fork seal separates the inner tube from the outer tube.

- If the tubes are tight, use a fork outer tube weight [A].

Special Tool - Fork Outer Tube Weight: 57001-1218

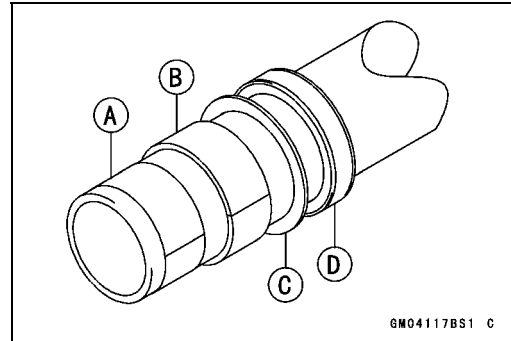


GM040622S1 C

13-10 SUSPENSION

Front Fork

- Remove the inner tube guide bushing [A], outer tube guide bushing [B], washer [C] and oil seal [D] from the inner tube.
- Remove the cylinder base from the bottom of the outer tube.



Front Fork Assembly

- Replace the following parts with new one.
 - Oil Seal
 - Guide Bushings
 - Bottom Allen Bolt Gasket
- Install the following parts onto the inner tube.
 - Dust Seal
 - Retaining Ring
 - Oil Seal
 - Washer
 - Outer Tube Guide Bushing
 - Inner Tube Guide Bushing
- Insert the cylinder unit [A] into the inner tube [B].
- Install the cylinder base [C] on the cylinder unit.
- Insert the inner tube, cylinder unit, cylinder base as a set into the outer tube [D].
- Replace the bottom Allen bolt gasket with a new one.
- Stop the cylinder from turning by using the fork cylinder holder.

Special Tool - Fork Cylinder Holder Handle: 57001-183
Fork Cylinder Holder Adapter: 57001-1057

- Apply a non-permanent locking agent to the Allen bolt and tighten it.

Torque - Front Fork Bottom Allen Bolt: 20 N·m (2.0 kgf·m, 14.5 ft·lb)

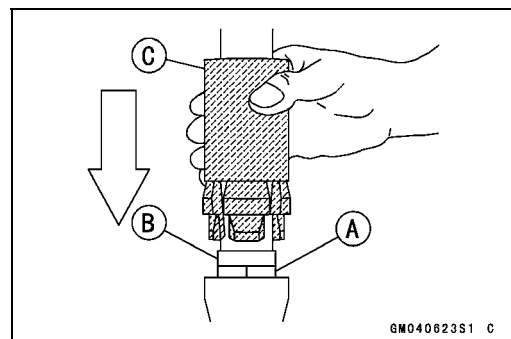
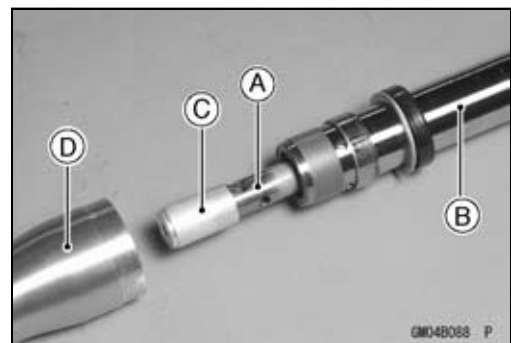
- Fit the new outer guide bushing [A] into the outer tube.

NOTE

○When assembling the new outer tube guide bushing, hold the used guide bushing [B] against the new bushing and tap the used guide bushing with the fork oil seal driver [C] until it stops.

Special Tool - Front Fork Oil Seal Driver: 57001-1219

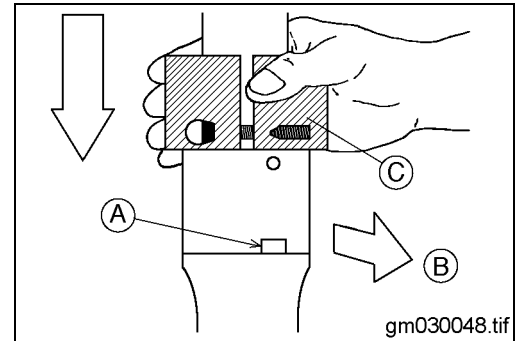
- After installing the washer, install the oil seal by using the fork oil seal driver.
- Install the retaining ring and dust seal by hand.



Front Fork

- Face the notch [A] of the dust seal cover rearward [B] and install the dust seal cover by tapping with the fork outer tube weight [C] until it stops.

Special Tool - Fork Outer Tube Weight: 57001-1218



- Stake [A] the dust seal cover with a punch.

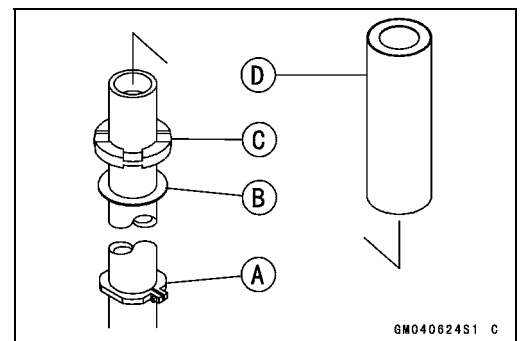


- For VN800-B8 model, note the following procedure.

○ Install the spacer [A] (see Front Fork Installation).

○ Insert:

- Washer [B]
- Rubber Seat [C]
- Lower Cover [D]



- Pour in the specified type and amount of oil (see the Front Fork Oil Change in the Periodic Maintenance chapter).
- Install the fork leg (see Front Fork Installation).

13-12 SUSPENSION

Front Fork

Inner Tube Inspection

- Visually inspect the inner tube, and repair any damage.
- Nicks or rust damage can sometimes be repaired by using a wet-stone to remove sharp edges or raised areas which cause seal damage.
- ✚ If the damage is not repairable, replace the inner tube. Since damage to the inner tube damages the oil seal, replace the oil seal whenever the inner tube is repaired or replaced.

CAUTION

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

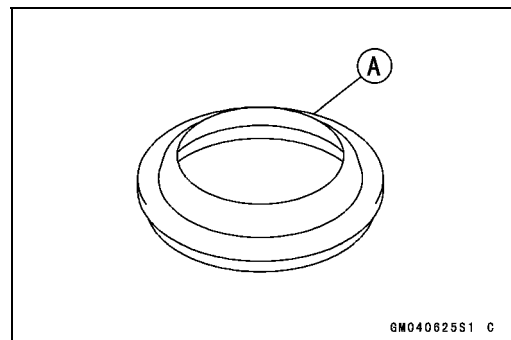
- Temporarily assemble the inner and outer tubes, and pump them back and forth manually to check for smooth operation.
- If you feel binding or catching, the inner and outer tubes must be replaced.

⚠ WARNING

A straightened inner or outer fork tube may fall 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 it if necessary.



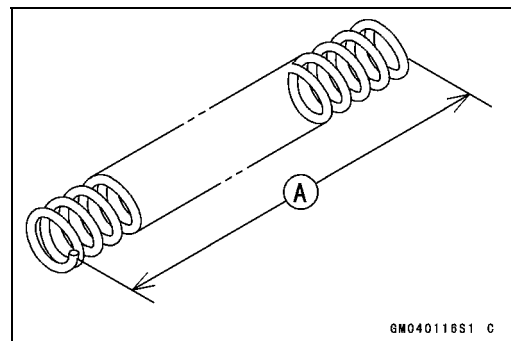
Spring Tension

- Since a 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.

Fork Spring Free Length

Standard: 547.2 mm (21.54 in.)

Service Limit: 536 mm (21.1 in.)



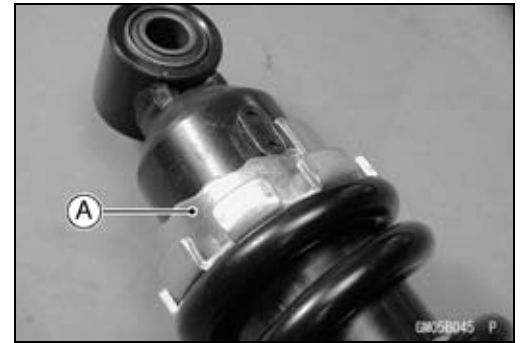
Rear Shock Absorber

Spring Preload Adjustment

- Remove the rear shock absorber from the frame (see Rear Shock Absorber Removal).
- To adjust the spring force, turn the adjusting sleeve [A] on the shock absorber to the desired position with the stem nut wrench.

Special Tool - Steering Stem Nut Wrench: 57001-1100

- The standard adjusting sleeve for an average-build of 68 kg (150 lb) with no passenger and no accessories is it step from the weakest position.

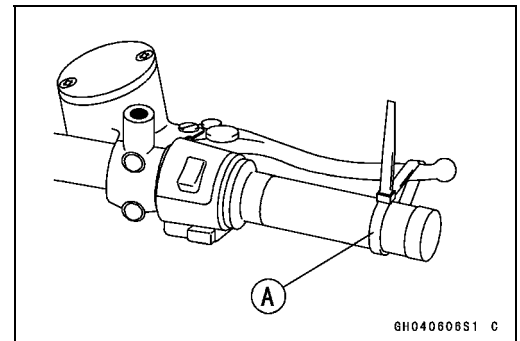


Spring Preload Adjustment

Adjuster Position	1	2	3	4	5	6	7
Spring Tension	Weakest	←	STD	→			Stronger

Rear Shock Absorber Removal

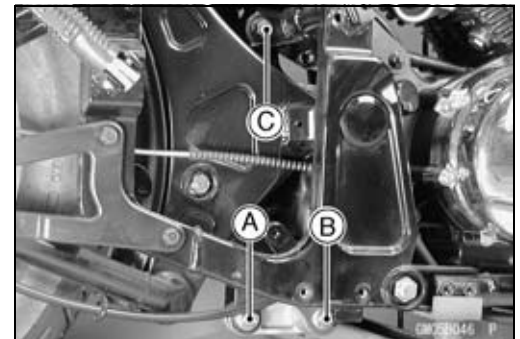
- Remove:
 - Muffler (see Engine Top End chapter)
 - Storage Box, Tool Kit Container (see Frame chapter)
- Using the jack, raise the rear wheel off the ground.
 - Special Tool - jack: 57001-1238**
 - Jack Attachment #3: 57001-1416**
- Squeeze the brake lever slowly and it with a band [A].



⚠ WARNING

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

- Remove:
 - Lower Shock Absorber Bolt [A]
 - Lower Tie-Rod Bolt [B]
 - Upper Shock Absorber Bolt [C]
 - Rear Shock Absorber



Rear Shock Absorber Installation

- Pack the rocker arm needle bearings with grease.
- Install the rear shock absorber so that the CAUTION label faces rearward.
- Tighten:
 - Torque - Rear Shock Absorber Nuts: 59 N·m (6.0 kgf·m, 43 ft·lb)**
 - Tie-Rod Nuts: 59 N·m (6.0 kgf·m, 43 ft·lb)**

13-14 SUSPENSION

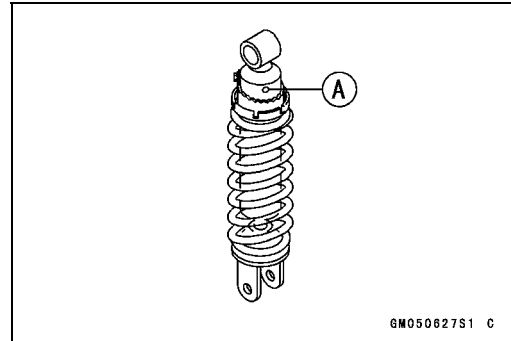
Rear Shock Absorber

Rear Shock Absorber Scrapping

⚠ WARNING

Since the rear shock absorber contains nitrogen gas, do not incinerate the rear shock absorber without first releasing the gas or it may explode.

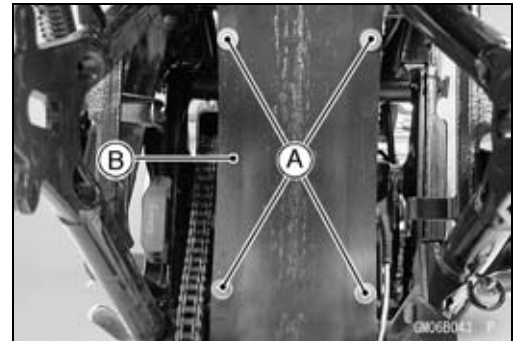
Before a rear shock absorber is scrapped, drill a hole at the point [A] shown to release the nitrogen gas completely. Wear safety glasses when drilling the hole, as the gas may blow out bits of drilled metal when the hole opens.



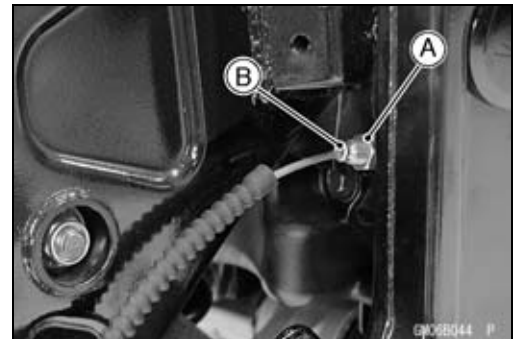
Swingarm

Swingarm Removal

- Remove:
 - Muffler (see Engine Top End chapter)
 - Rear Wheel (see Wheels/Tires chapter)
 - Upper Shock Absorber Bolt
 - Bolts [A] and Rear Wheel Mud Guard [B]



Nut [A] and Brake Cable [B]



Upper Tie-Rod Bolt [A]
Cap and Swingarm Pivot Nut [B]

- Pull off the pivot shaft and remove the swingarm.

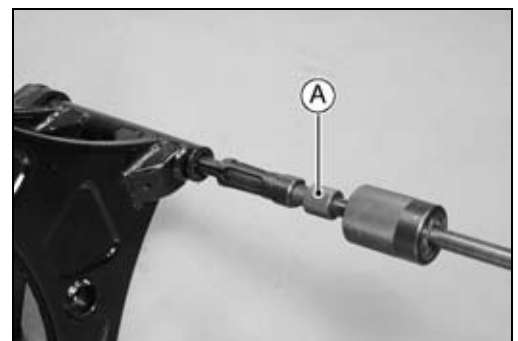


Swingarm Installation

- Apply plenty of grease to the needle bearings and grease seals.
- Tighten:
 - Torque - Swingarm Pivot Shaft Nut: 9.8 N·m (10.0 kgf·m, 72 ft·lb)**
 - Upper Tie-Rod Nut: 59 N·m (6.0 kgf·m, 43 ft·lb)**
 - Rear Shock Absorber Nut: 59 N·m (6.0 kgf·m, 43 ft·lb)**
- Install the removed parts (see appropriate chapters).

Swingarm Bearing Removal

- Remove:
 - Swingarm
 - Grease Seals
 - Sleeve
- Remove the needle bearings.
 - Special Tool - Oil Seal & Bearing Remover: 57001-1058 [A]**



13-16 SUSPENSION

Swingarm

Swingarm Bearing Installation

- Apply plenty of grease to the needle bearings.
- Install the bearings so that the manufacturer's marks face out.

Special Tool - Bearing Driver Set: 57001-1129

Swingarm Bearing, Sleeve Inspection

CAUTION

Do not remove the bearings for inspection. Remove may damage them.

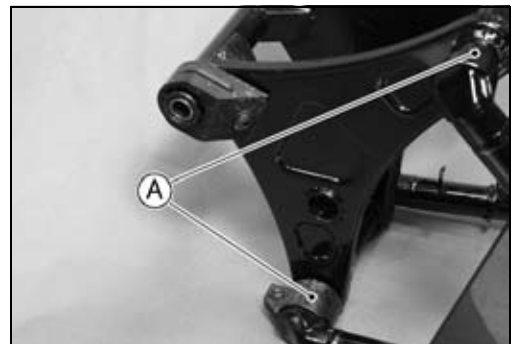
- Visually inspect the swingarm sleeves and needle bearings.
 - The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing in the swingarm for abrasion, color change, or other damage.
- If there is any doubt as to the condition of any of the needle bearings or sleeve, replace the sleeve, and needle bearings as a set.

Swingarm Lubrication

- Refer to the Swingarm Pivot Lubrication in the Periodic Maintenance chapter.

Drive Chain Slider Inspection

- Visually inspect the sliders [A].
- If they are damaged, cut or abnormal weared, replace them.



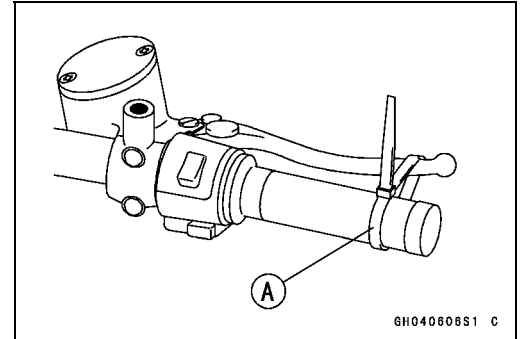
Tie-Rod, Rocker Arm

Tie-Rod Removal

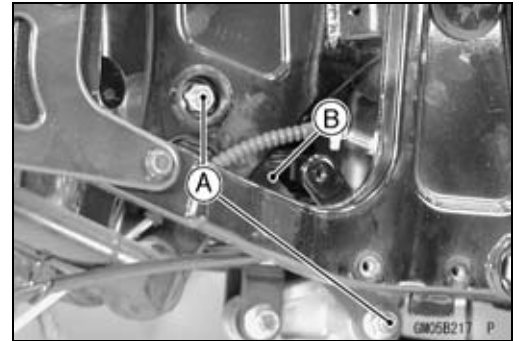
- Remove the muffler (see Engine Top End chapter).
- Squeeze the brake lever slowly and hold it with a band [A].
- Using the jack, raise the rear wheel off the ground.

Special Tool - Jack: 57001-1238

Jack Attachment #3: 57001-1416



- Remove:
 - Storage Box (see Frame chapter)
 - Regulator/Rectifier (see Electrical system chapter)
 - Upper and Lower Tie-Rod Bolts [A]
 - Tie-Rod [B]



Tie-Rod Installation

- Apply grease to the inside of the needle bearings and grease seals.
- Tighten:

Torque - Tie-Rod Nuts: 59 N·m (6.0 kgf·m, 43 ft·lb)

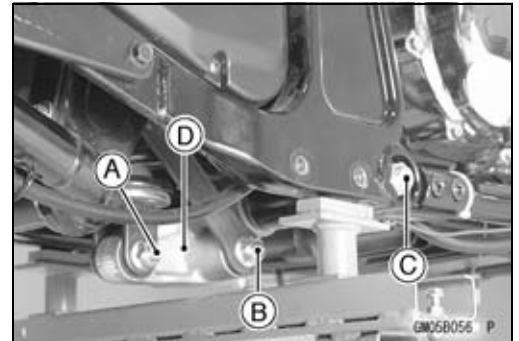
Rocker Arm Removal

- Remove the muffler (see Engine Top End chapter).
- Squeeze the brake lever slowly and hold it with a band.
- Using the jack, raise the rear wheel off the ground.

Special Tool - Jack: 57001-1238

Jack Attachment #3: 57001-1416

- Loosen the swingarm pivot shaft nut.
- Remove:
 - Lower Rear Shock Absorber Bolt and Nut [A]
 - Lower Tie-Rod Bolt and Nut [B]
 - Rocker Arm Pivot Shaft and Nut [C]
 - Rocker Arm [D]



Rocker Arm Installation

- Apply grease to the inside of the needle bearings and grease seals.
- Tighten:

Torque - Swingarm Pivot Shaft Nut: 98 N·m (10 kgf·m, 72 ft·lb)

Rocker Arm Pivot Shaft Nut: 98 N·m (10 kgf·m, 72 ft·lb)

Tie-Rod Nuts: 59 N·m (6.0 kgf·m, 43 ft·lb)

Rear Shock Absorber Nut: 59 N·m (6.0 kgf·m, 43 ft·lb)

13-18 SUSPENSION

Tie-Rod, Rocker Arm

Rocker Arm/Tie-Rod Bearing, Sleeve Inspection

CAUTION

Do not remove the bearings for inspection. Remove may damage them.

- Visually inspect the swingarm sleeves and needle bearings.
- The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.
- If there is any doubt as to the condition of any of the needle bearings or sleeve, replace the sleeve, and needle bearings as a set.

Rocker Arm/Tie-Rod Lubrication

- Refer to the Uni-Trak Linkage Lubrication in the periodic Maintenance chapter.

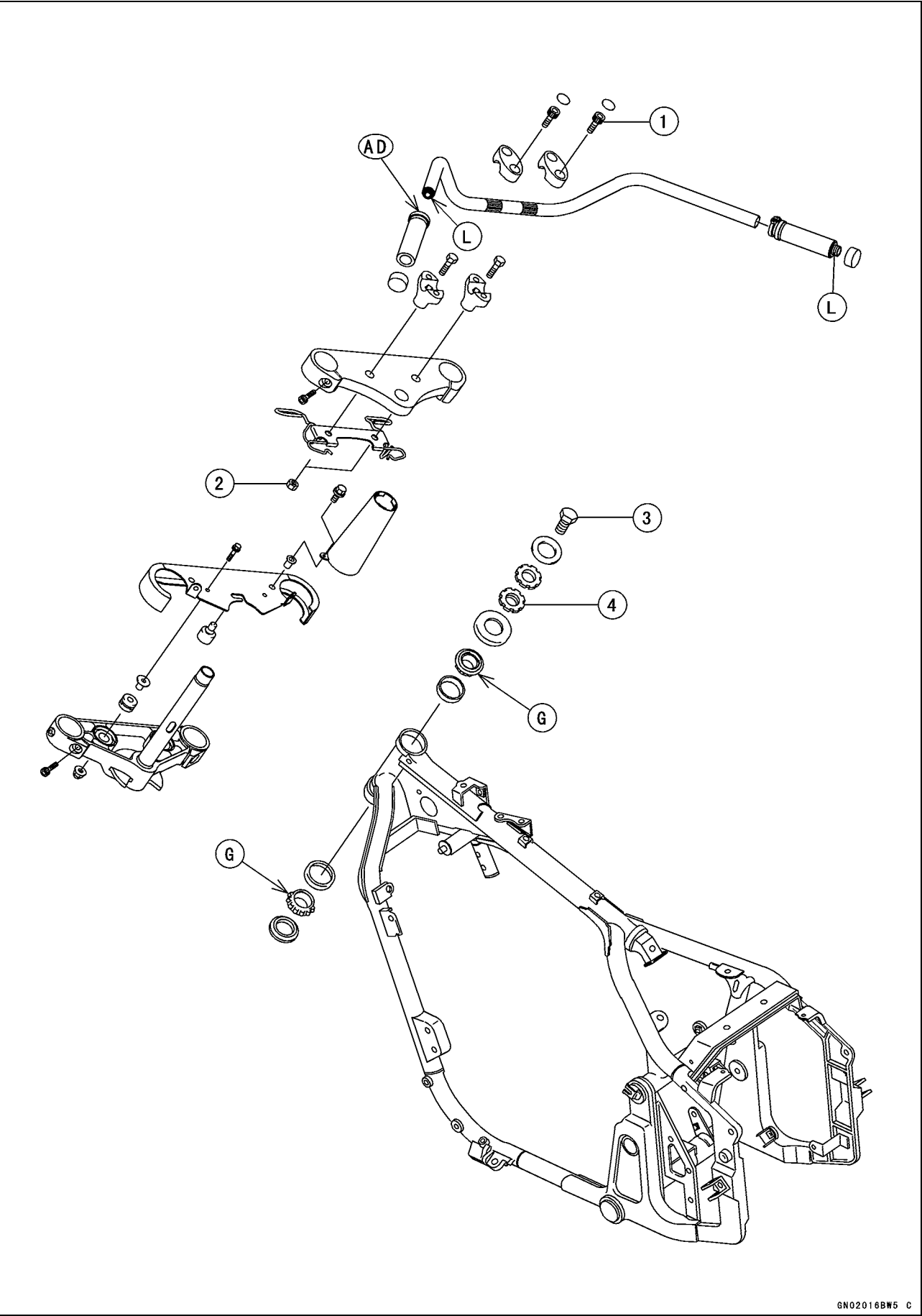
Steering

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Handlebar Removal	14-10
Handlebar Installation	14-10

14-2 STEERING

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Handlebar Holder Bolts	34	3.5	25	
2	Handlebar Holder Mounting Nuts	34	3.5	25	
3	Steering Stem Head Bolt	44	4.5	32	
4	Steering Stem Nut	4.9	0.5	43 in·lb	

AD: Apply adhesive agent.

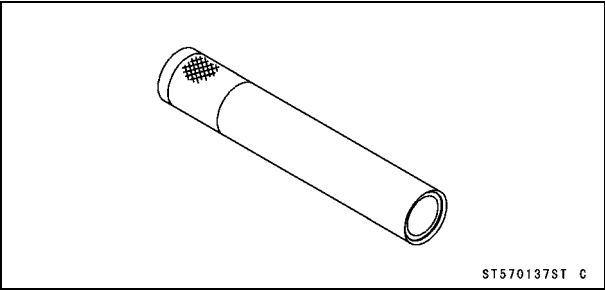
G: Apply grease.

L: Apply a non-permanent locking agent.

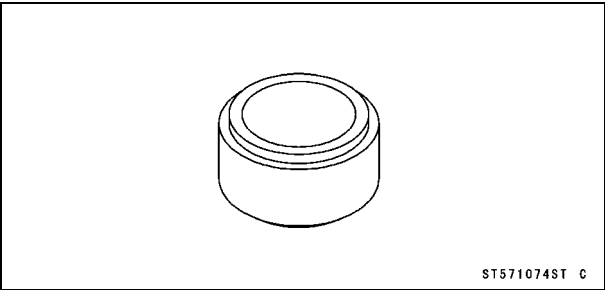
14-4 STEERING

Special Tools

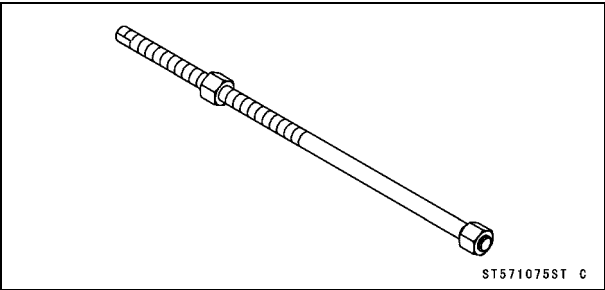
Steering Stem Bearing Driver:
57001-137



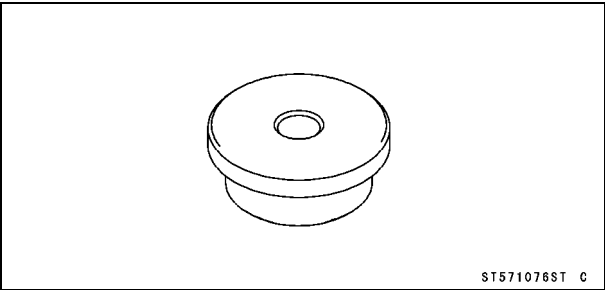
Steering Stem Bearing Driver Adapter, 46.5:
57001-1074



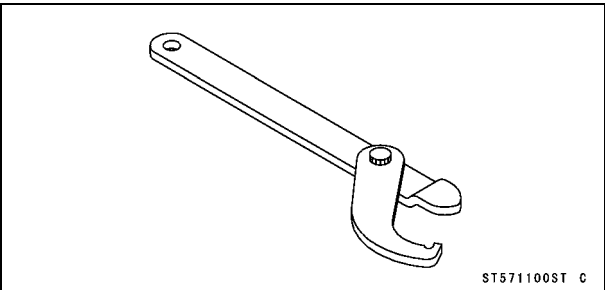
Head Pipe Outer Race Press Shaft:
57001-1075



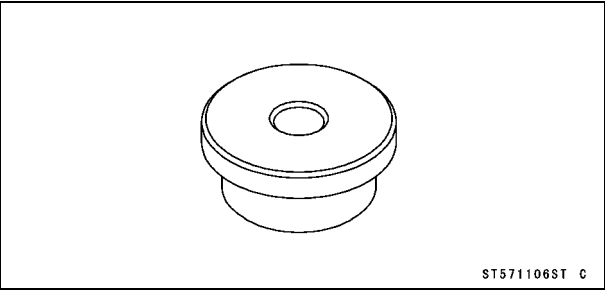
Head Pipe Outer Race Driver, 51.5:
57001-1076



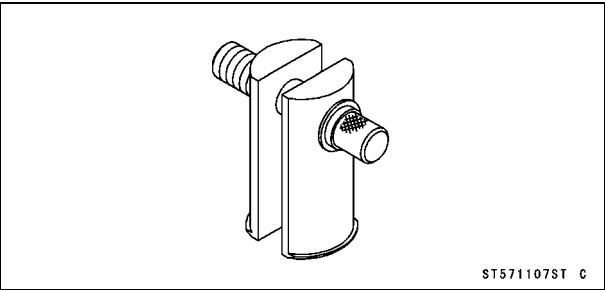
Steering Stem Nut Wrench:
57001-1100



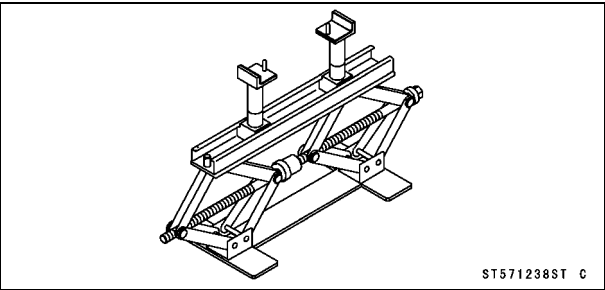
Head Pipe Outer Race Driver, 46.5:
57001-1106



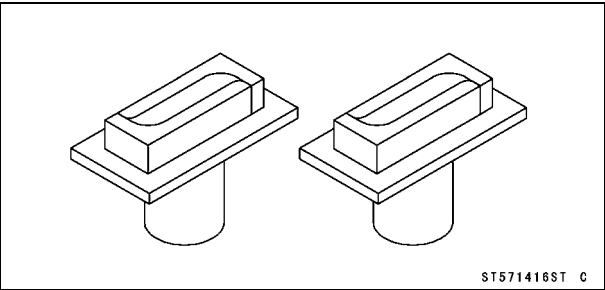
Head Pipe Outer Race Remover ID > 37 mm:
57001-1107



Jack:
57001-1238



Jack Attachment #3:
57001-1416



Steering

Steering Inspection

- Refer to the Steering Inspection in the Periodic Maintenance chapter.

Steering Adjustment

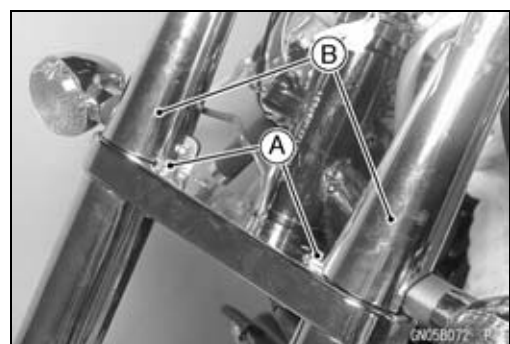
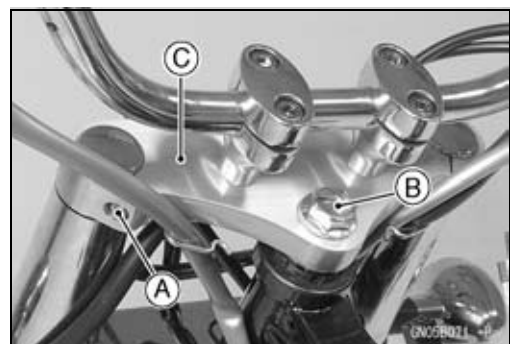
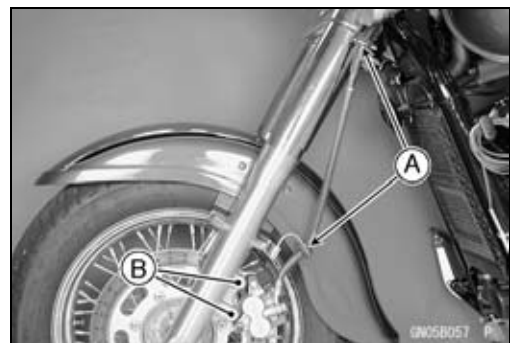
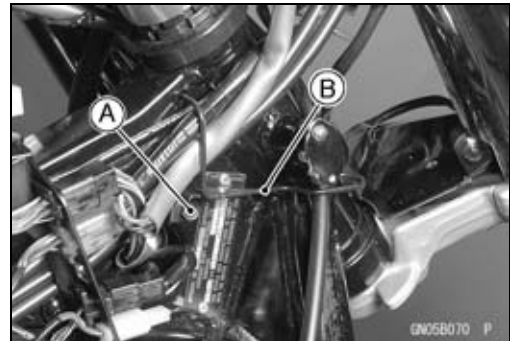
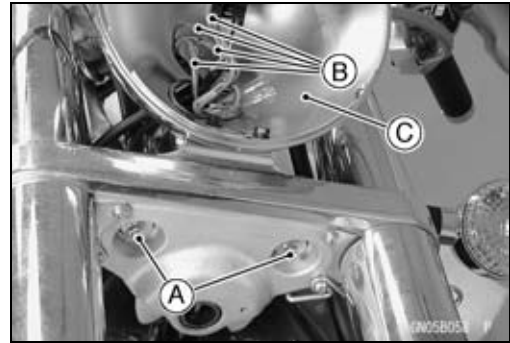
- Refer to the Steering Inspection in the Periodic Maintenance chapter.

14-6 STEERING

Steering Stem

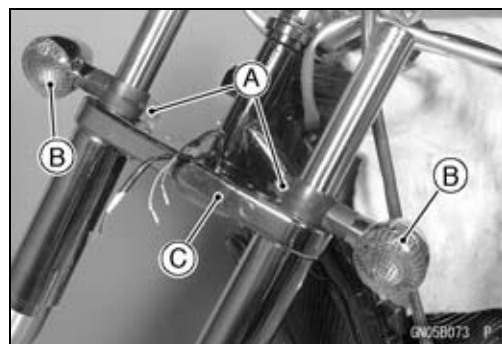
Steering Stem, Stem Bearing Removal

- Remove:
 - Seat (see Frame chapter)
 - Meter unit (see Electrical System chapter)
 - Fuel Tank (see Fuel System chapter)
 - Headlight Unit (see Electrical System chapter)
 - Headlight Mounting Bracket Bolts [A]
 - Disconnect the front turn signal lead connectors [B].
 - Remove the headlight body with bracket [C].
-
- Remove the cable clamp mounting bolt [A] and cable clamp [B] (both side).
-
- Remove:
 - Brake Hose Grommets [A]
 - Caliper Mounting Bolts [B]
 - Front Wheel (see Wheels/Tires chapter)
 - Front Fender (see Frame chapter)
-
- Loosen the front fork upper clamp bolts [A].
 - Remove:
 - Steering Stem Head Bolt [B]
 - Steering Stem Head [C] and Handlebar as a set
-
- Remove:
 - Bolts [A]
 - Upper Fork Covers [B]



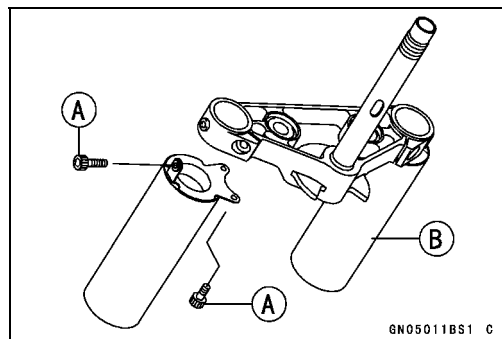
Steering Stem

- Remove:
 - Turn Signal Light Bracket Clamp Bolts [A]
 - Turn Signal Lights [B]
 - Steering Stem Base Cover [C]
- Loosen the front fork lower clamp bolts.
- Remove the front fork assembly.



- For VN800-B1 ~ B7 model, note the following procedure.

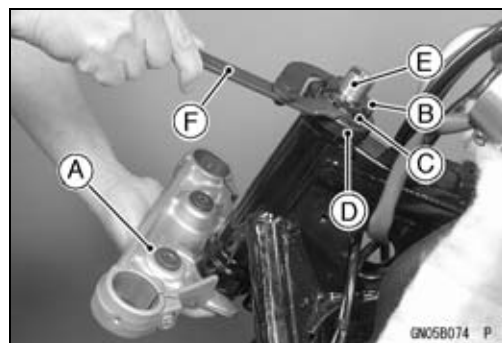
- Remove:
 - Lower Fork Cover Bolts [A]
 - Lower Fork Covers [B]



- Pushing up the steering stem base [A], and remove the steering stem locknut [B], steering stem nut [C] and steering stem cap [D], then remove the steering stem [E] and stem base.

Special Tool - Steering Stem Nut Wrench: 57001-1100 [F]

- Remove the upper stem bearing inner race.

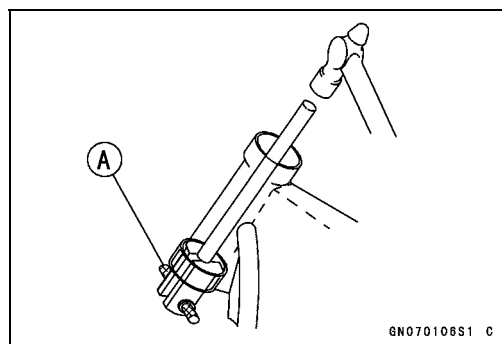


- Drive out the bearing outer races from the head pipe.

Special Tool - Head Pipe Outer Race Remover ID > 37 mm: 57001-1107 [A]

NOTE

○ If either steering stem bearing is damaged, it is recommended that both the upper and lower bearings (including outer races) should be replaced with new ones.



- Remove the lower bearing inner race (with its grease seal) which is pressed onto the steering stem with a suitable commercially available bearing puller.

14-8 STEERING

Steering Stem

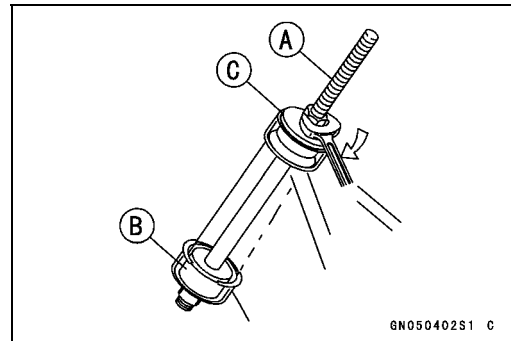
Steering Stem, Stem Bearing Installation

- Replace the bearing outer races with new ones.
- Apply grease to the outer races, and drive them into the head pipe at the same time.

Special Tool - Head Pipe Outer Race Press Shaft: 57001-1075 [A]

Head Pipe Outer Race Driver, 46.5: 57001-1106 [B]

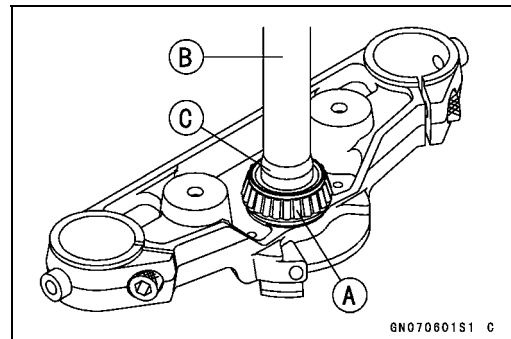
Head Pipe Outer Race Driver, 51.5: 57001-1076 [C]



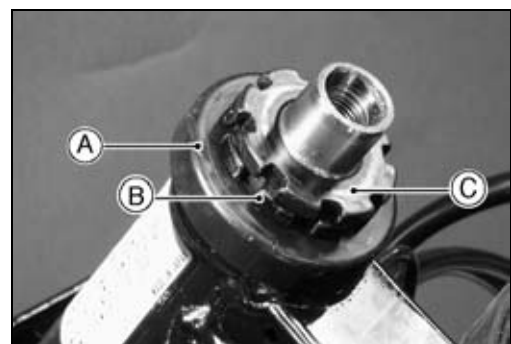
- Replace the bearing inner races with new ones.
- Apply grease to the lower bearing inner race [A], and drive it onto the steering stem.

Special Tool - Steering Stem Bearing Driver: 57001-137 [B]

Steering Stem Bearing Driver Adapter, 34.5: 57001-1074 [C]



- Apply grease to the upper bearing inner race, and install it in the head pipe.
- Insert the steering stem into the head pipe.
- Install steering stem cap [A] and steering stem nut [B] and hand tighten it and steering stem locknut [C].

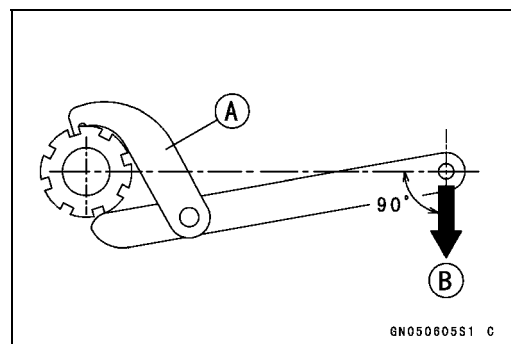


- Settle the inner races in place as follows:
 - Tighten the steering stem nut to 39 N·m (4.0 kgf·m, 29 ft·lb) of torque. (To tighten the steering stem nut to the specified torque, hook the wrench on the steering stem nut, and pull the wrench at the hole by 220 N (22.2 kg) [B] force in the direction shown.)

Special Tool - Steering Stem Nut Wrench: 57001-1100 [A]

- Check that there is no play and the steering stem turns smoothly without rattles. If not, steering stem bearings may be damaged.
- Again back out the stem locknut a fraction of a turn until it turns lightly.
- Turn the steering stem locknut lightly clockwise until it just becomes hard to turn. Do not overtighten, or the steering will be too tight.

Torque - Steering Stem Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb)



- installation is reverse of removal, note the following.
 - Lower Fork Covers
 - Each Fork Leg (see Suspension chapter)
 - Turn Signal Lights
 - Steering Stem Base Cover with Upper Fork Covers
 - Steering Stem Head and Handlebar as a set

Steering Stem

- For VN800-B1 ~ B7 model, note the following procedure.
- Tighten the lower fork cover bolts.

Torque - Lower Fork Cover Bolts (5 mm): 8 N·m (0.8 kgf·m, 71 in·lb)

Lower Fork Cover Bolts (6 mm): 13 N·m (1.3 kgf·m, 115 in·lb)

- Temporarily tighten the fork clamp bolts (upper).
- Check that the top end of the inner tube is flush with the upper surface of the steering stem head (see Suspension chapter).
- Tighten the fork clamp bolts (upper) and then the steering stem head bolt, and finally the fork clamp bolts (lower).

Torque - Fork Clamp Bolts (Upper): 20 N·m (2.0 kgf·m, 14 ft·lb)

Steering Stem Head Bolt: 44 N·m (4.5 kgf·m, 32 ft·lb)

Fork Clamp Bolts (Lower): 34 N·m (3.5 kgf·m, 25 ft·lb)

- Install the removed parts.
Front wheel (see Wheels/Tires chapter)
Front Calliper (see Breaks chapter)
- 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.

⚠ WARNING

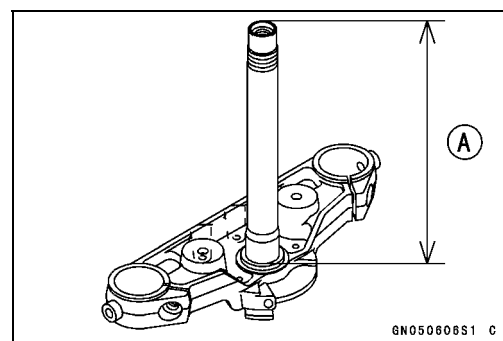
Do not impede the handlebar turning by routing the cables, harnesses and hoses improperly (see Appendix chapter).

Stem Bearing Lubrication

- Refer to the Steering Stem Bearing Lubrication in the Periodic Maintenance chapter.

Steering Stem Warp Inspection

- 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 [A] is bent replace the steering stem.



14-10 STEERING

Handlebar

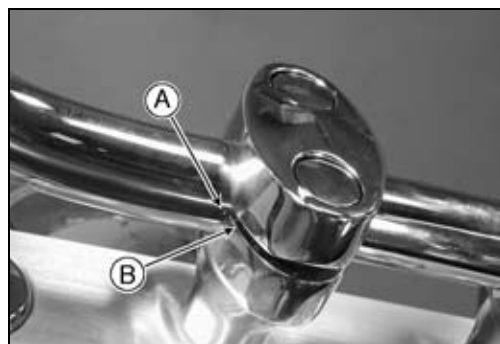
Handlebar Removal

- Remove:
 - Clutch Cable Upper End
 - Left Handlebar Switch Housing
 - Front Brake Master Cylinder
 - Right Handlebar Switch Housing
 - Throttle Grip
 - Handlebar Holder Bolts [A] and Handlebar Holder
- Remove the handlebar [B] from the steering stem head.



Handlebar Installation

- Set the handlebar to match its punched mark [A] to the lower mating surface [B] of the clamp rear part.

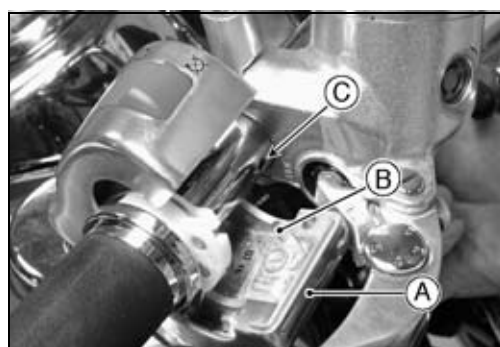


- Tighten the front holder bolts first, and then the rear holder bolts. There will be a gap [A] at the rear part of the clamp after tightening.

Torque - Handlebar Holder Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)



- The front half of the right handlebar switch housing [A] has a small projection [B]. Fit the projection into the small hole [C] in the handlebar.



- Set the left handlebar switch housing [A] to match its mating surface [B] to the punched mark [C] of the handlebar.
- Install the handlebar switch housings and tighten it.
- Install:
 - Clutch Cable (see Clutch chapter)
 - Front Master Cylinder (see Brakes chapter)
- Check and adjust the rear view mirrors.



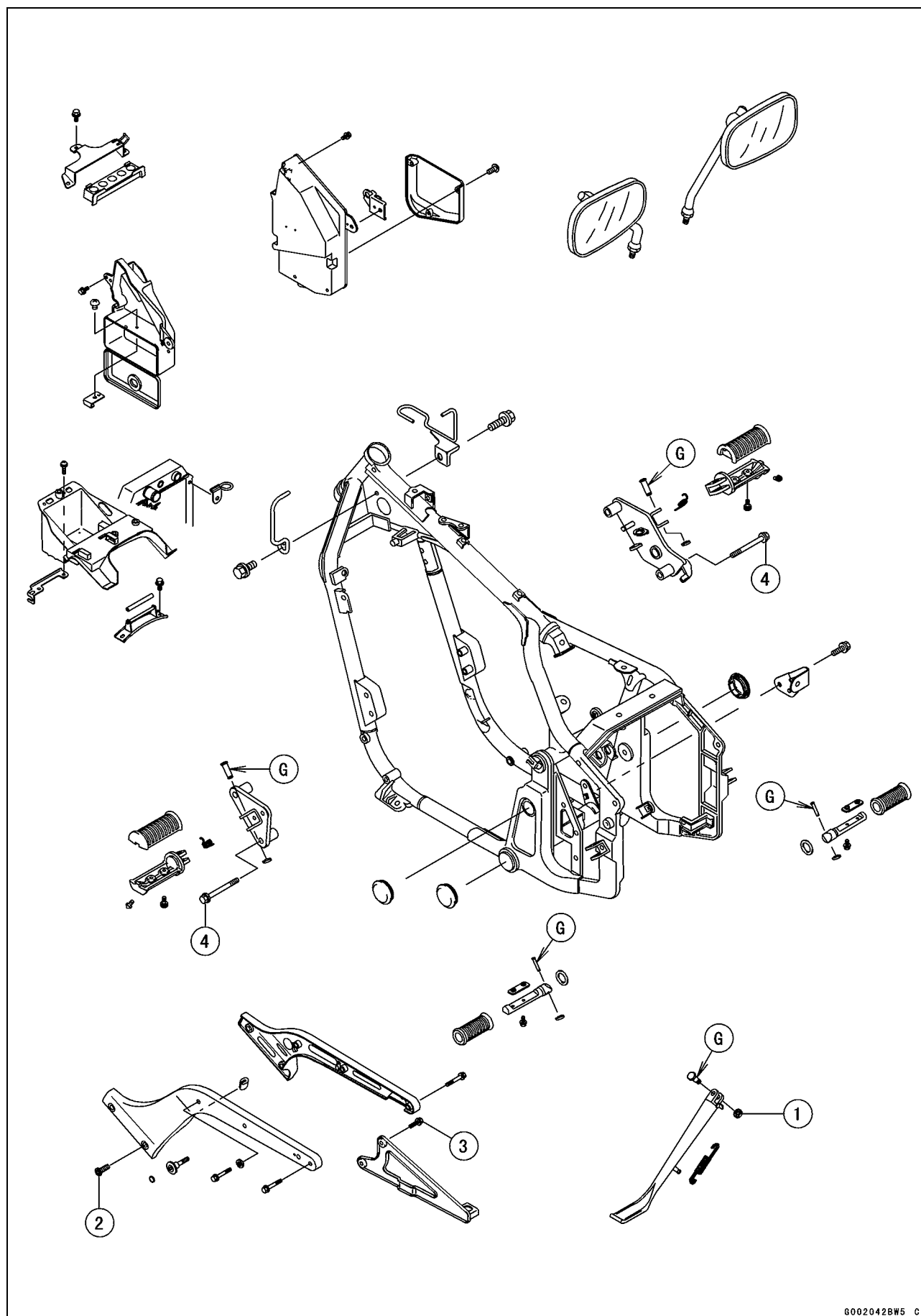
Frame

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15-2 FRAME

Exploded View



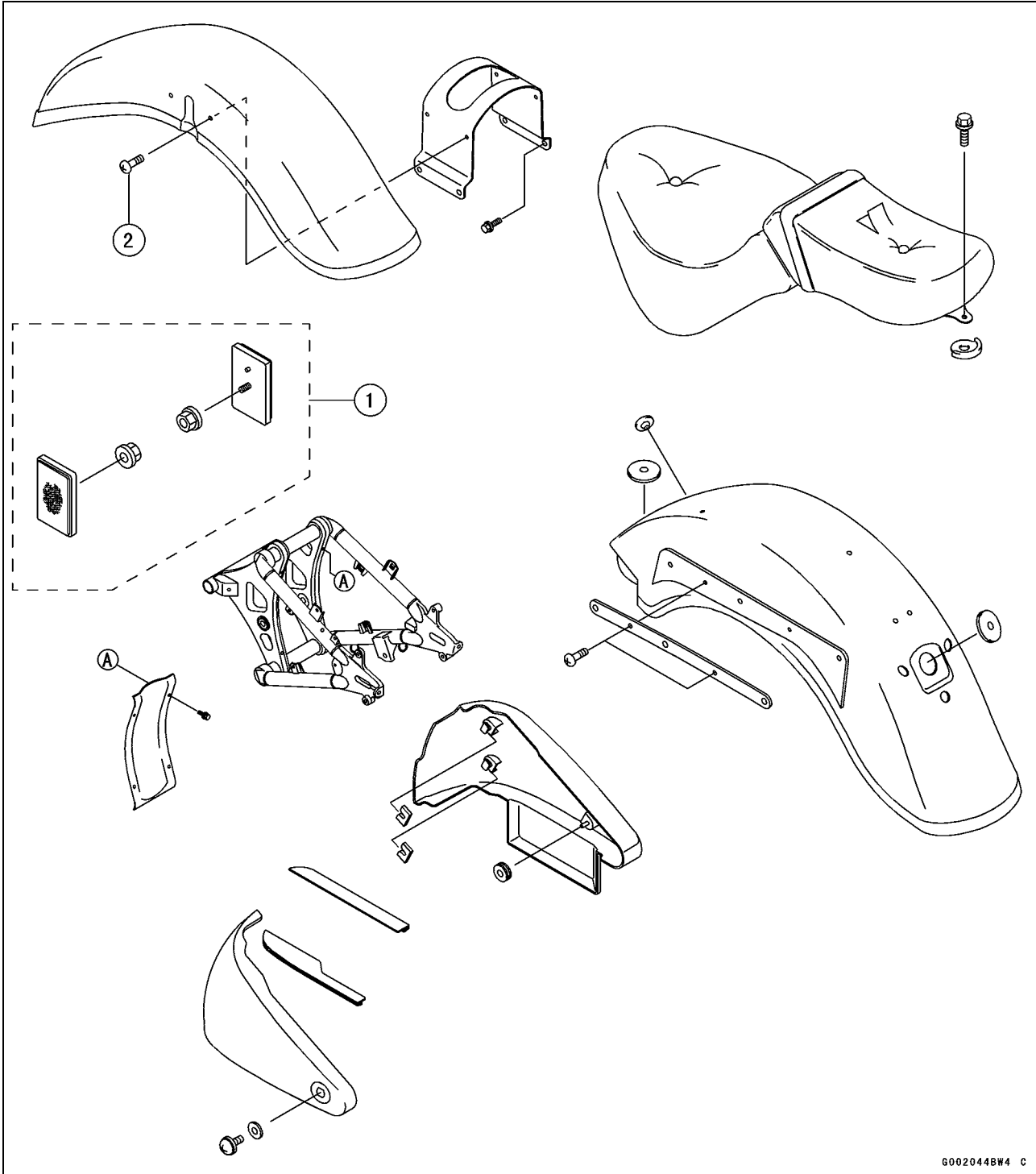
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Side Stand Pivot Nut	44	4.5	32	
2	Rear Frame Mounting Bolts	44	4.5	32	
3	Muffler Bracket Mounting Bolts	25	2.5	18	
4	Footpeg Holder Bolts	34	3.5	25	

G: Apply grease.

15-4 FRAME

Exploded View



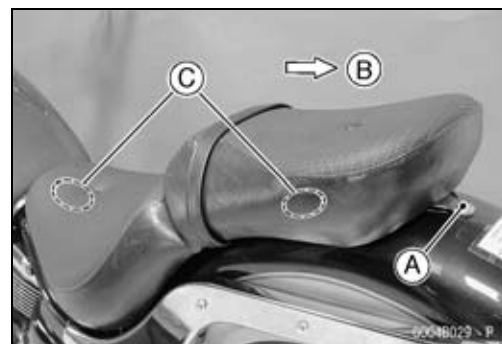
1. Reflector-Reflex, FR (United States and Canada Models)
2. Front Fender Mounting Screws

G002044BW4 C

Seat

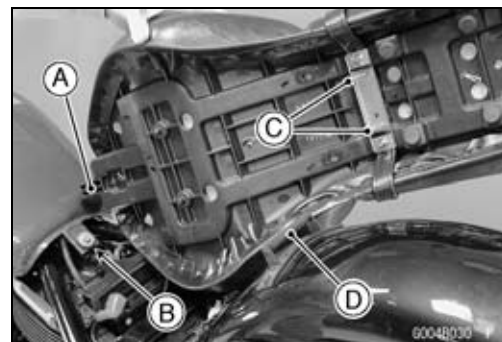
Seat Removal

- Remove the seat mounting bolt [A].
- Pull [B] the seat to unhook the front and rear hooks [C], and remove it.



Seat Installation

- Insert the front hook [A] into the brace [B] on the frame.
- Slip the rear hooks [C] under the loop [D] on the rear fender.

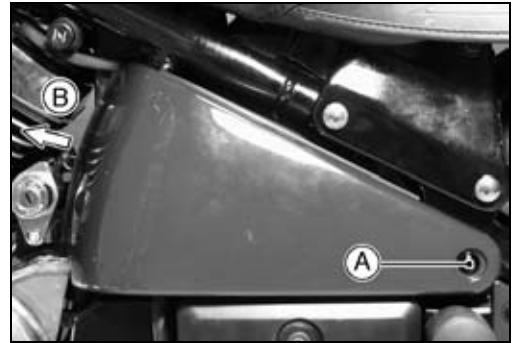


15-6 FRAME

Side Covers

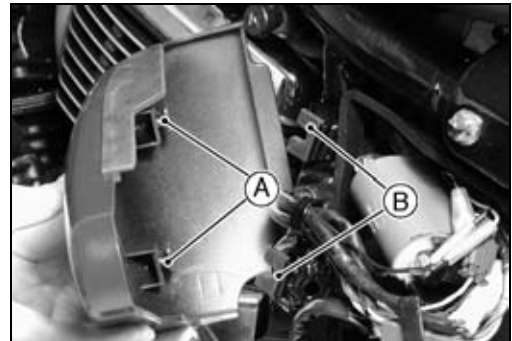
Left Side Cover Removal

- Remove the screw [A], and pull [B] the left cover forward.



Left Side Cover Installation

- Fit the projection [A] into the slot [B] on the frame, and tighten the screw.



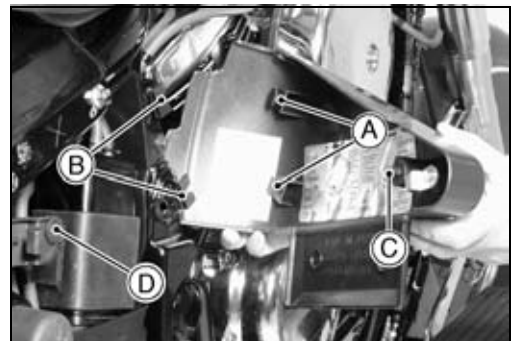
Right Side Cover Removal

- Insert the ignition switch key into the right side cover lock [A], turning the key counterclockwise, pulling out the rear of the cover, and remove it forward.



Right Side Cover Installation

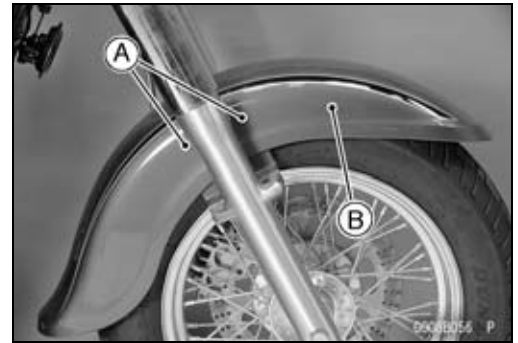
- Fit the front projections [A] into the slot [B] on the frame, and then fit the rear projection [C] into the hole [D] of the bracket.
- Lock the cover with the ignition switch key.



Fenders

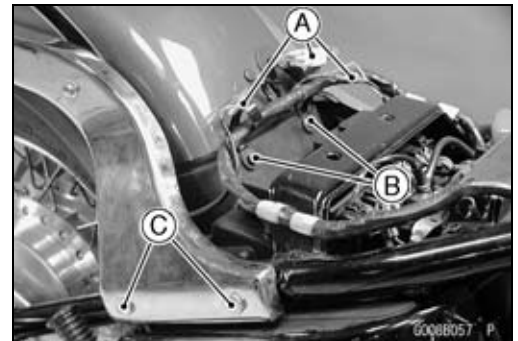
Front Fender Removal

- Raise the front wheel off the ground.
- Unscrew the bolts [A] and pull the front fender [B] to rear-wards.

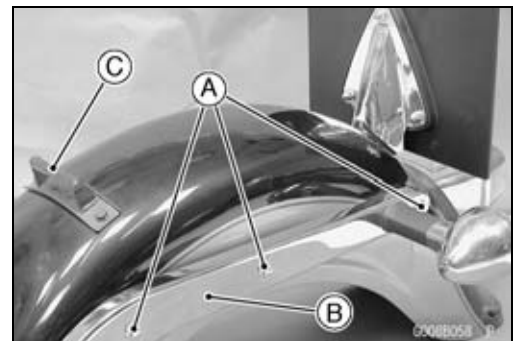


Rear Fender Removal

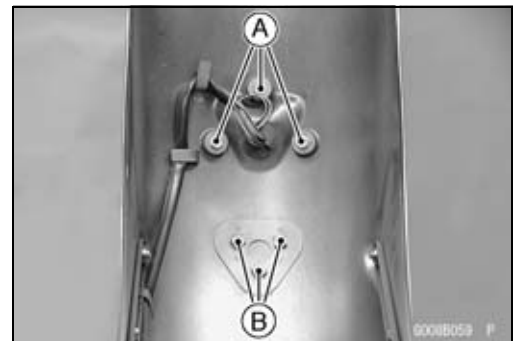
- Remove:
 - Seat (see Seat Removal)
 - Connectors [A]
 - Rear Fender Bolts [B]
 - Rear Frame Mounting Bolts [C] (both side)
 - Rear Fender Assembly.



- Remove:
 - Bolts [A] (both side)
 - Rear Frames [B] with Turn Signal Lights loop [C]



- Remove the following parts from the rear fender.
 - Bolts [A] and Tail/Brake Light Unit
 - Bolts [B] and License Plate Bracket



Rear Fender Installation

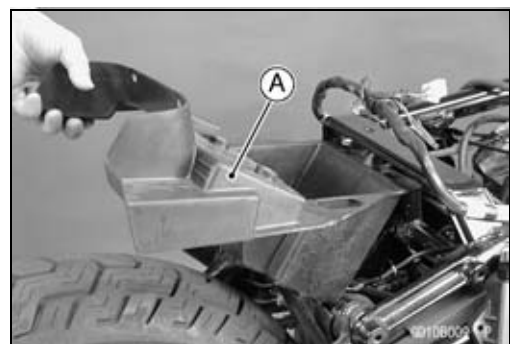
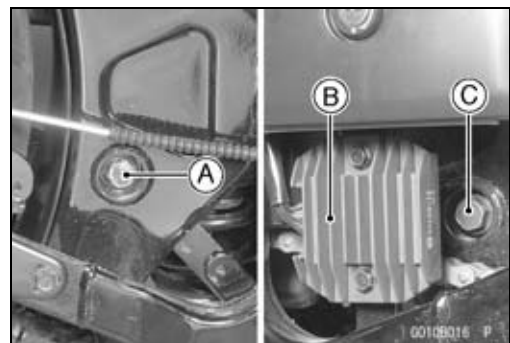
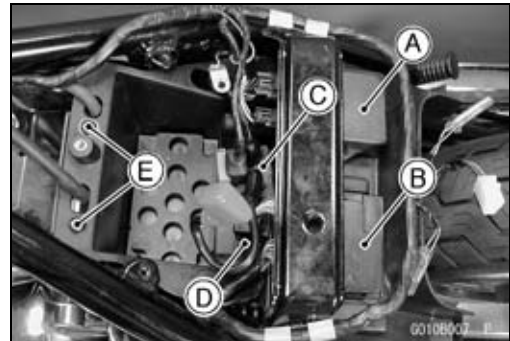
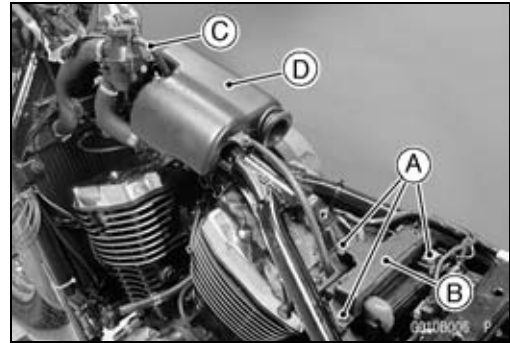
- Installation is reverse of removal, note the following.
 - Be sure the harness is in place (see Appendix chapter)
 - Tighten:
 - Torque - Rear Frame Mounting Bolts: 44 N·m (4.5 kgf·m, 32 ft·lb)**

15-8 FRAME

Battery Case

Battery Case Removal

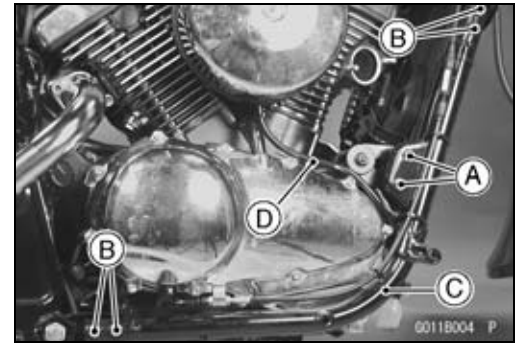
- Remove:
 - Seat (see Seat Removal)
 - Rear Fender (see Rear Fender Removal)
 - Fuel Tank (see Fuel System chapter)
 - Bolts [A] and Battery Cover [B]
 - Battery
 - Coolant Hose [C]
 - Surge Tank [D]
- Remove:
 - IC Igniter [A]
 - Junction Box [B]
 - Starter Relay, Main Fuse [C]
 - Turn Signal Relay [D]
 - Choke Cable Holder Screw [E]
 - Coolant Hose
 - Evapo, System Hoses (for California Model)
- Remove:
 - Right Side Cover
 - Storage Box
 - Upper Tie-Rod Nut [A]
 - Regulator/Rectifier [B]
- Take out the upper tie-rod bolt [C].
Special Tool - Jack: 57001-1238
- Remove the battery case [A] from the frame.



Down Tube

Down Tube Removal

- Remove:
 - Footpeg and Brake Pedal (see Brakes chapter)
 - Front Muffler (see Engine Top End chapter)
 - Clutch Cable Clamps
 - Engine Bracket Bolts [A]
 - Bolts [B] and Down Tube Assembly [C]
 - Air Cleaner Drain Hose [D]



Down Tube Installation

- Tighten:
 - Torque - Down Tube Mounting Bolts: 44 N·m (4.5 kgf·m, 33 ft·lb)**
- Tighten:
 - Torque - Engine Mounting Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)**

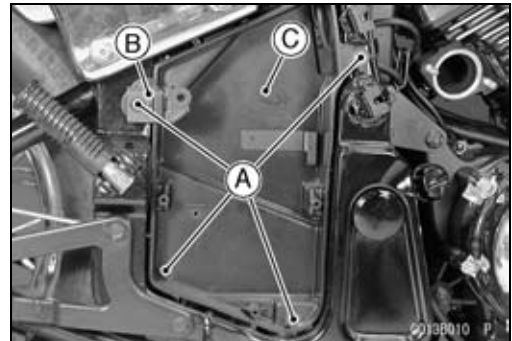
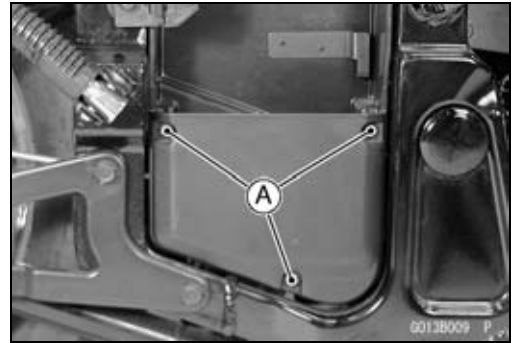
15-10 FRAME

Storage Box, Tool Kit Container

Storage Box Removal

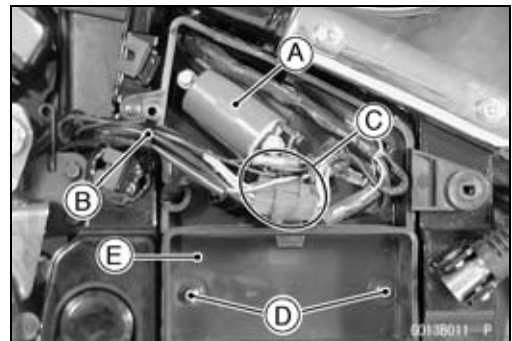
- Remove:
 - Muffler (see Engine Top End chapter)
 - Right Side Cover (see Right Side Cover Removal)
 - Screws [A] and Lower Cover
 - Canister and Separator (for California Model)

Bolts [A]
Bracket [B]
Storage Box Base [C]



Tool Kit Container Removal

- Remove the left side cover (see Left Side Cover Removal).
- Open the tool kit cover with the ignition switch key, and take out the tool kit.
- Remove:
 - Ignition Coil [A]
 - Clamp [B]
 - Connectors [C]
 - Bolts [D]
 - Tool Kit Container [E]



Electrical System

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16-2 ELECTRICAL SYSTEM

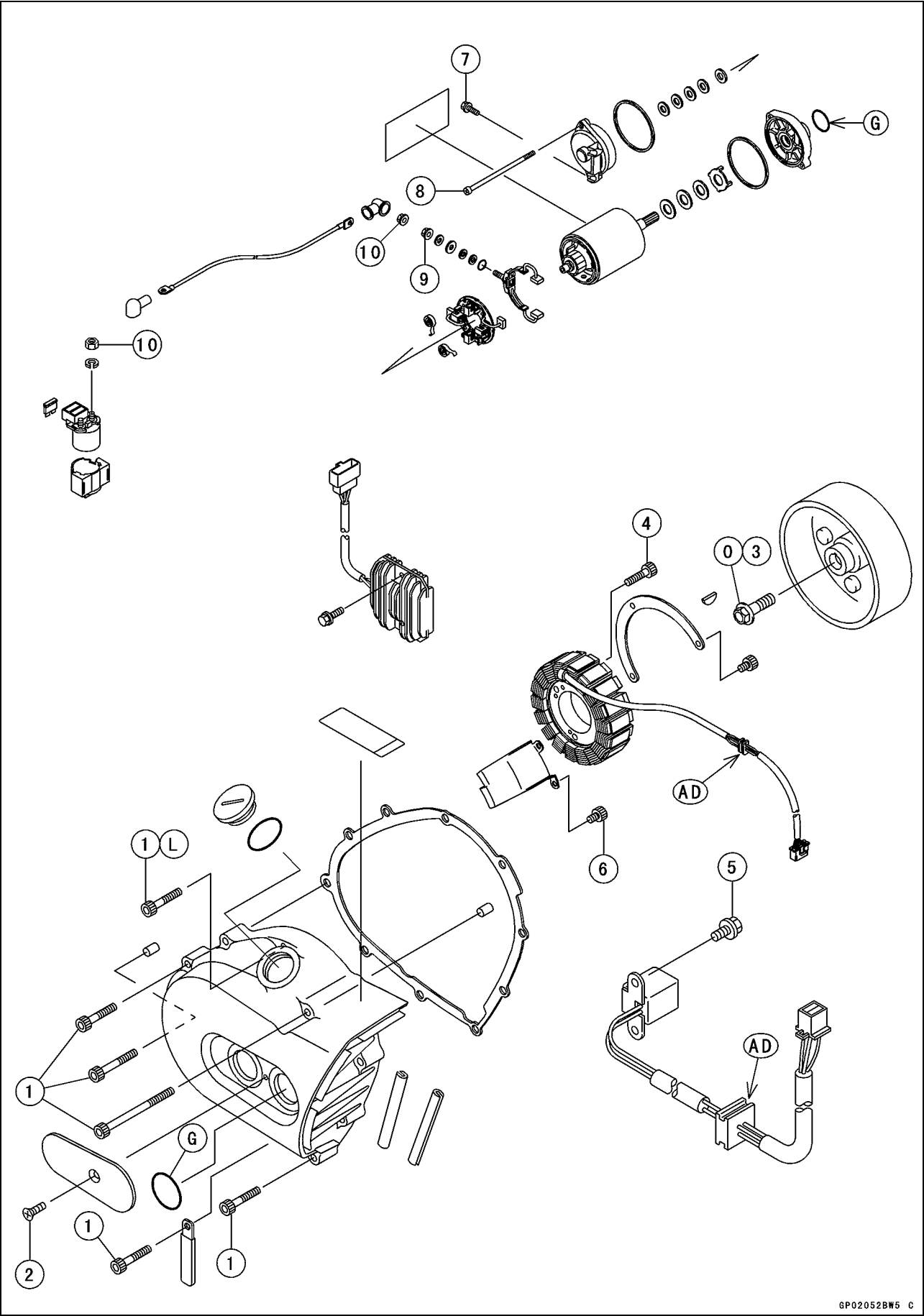
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Exploded View

Dummy Page

16-4 ELECTRICAL SYSTEM

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Alternator Cover Bolts	12	1.2	104 in·lb	L
2	Timing Inspection Cover Screw	4.9	0.5	43 in·lb	
3	Alternator Rotor Bolt	157	16	116	O
4	Stator Coil Bolts	13	1.3	115 in·lb	
5	Pickup Coil Bolts	7.8	0.8	69 in·lb	
6	Alternator Lead Clamp Bolts	7.8	0.8	69 in·lb	
7	Starter Motor Mounting Bolts	11	1.1	97 in·lb	
8	Starter Motor Through Bolts	4.9	0.5	43 in·lb	
9	Starter Motor Terminal Nut	11	1.1	97 in·lb	
10	Starter Motor Cable Nuts	4.9	0.5	43 in·lb	L

AD: Apply adhesive agent.

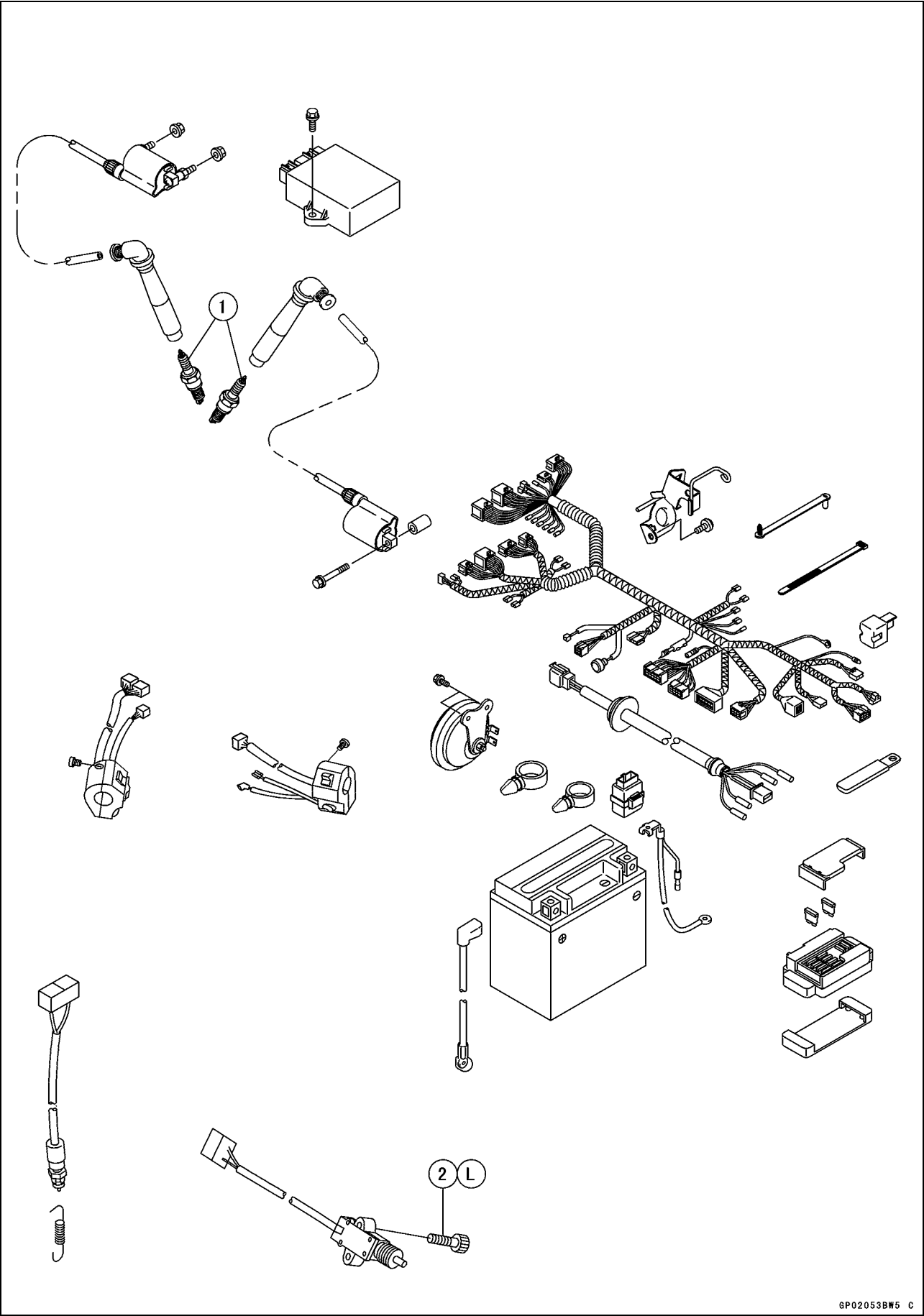
G: Apply grease.

L: Apply a non-permanent locking agent.

O: Apply oil.

16-6 ELECTRICAL SYSTEM

Exploded View



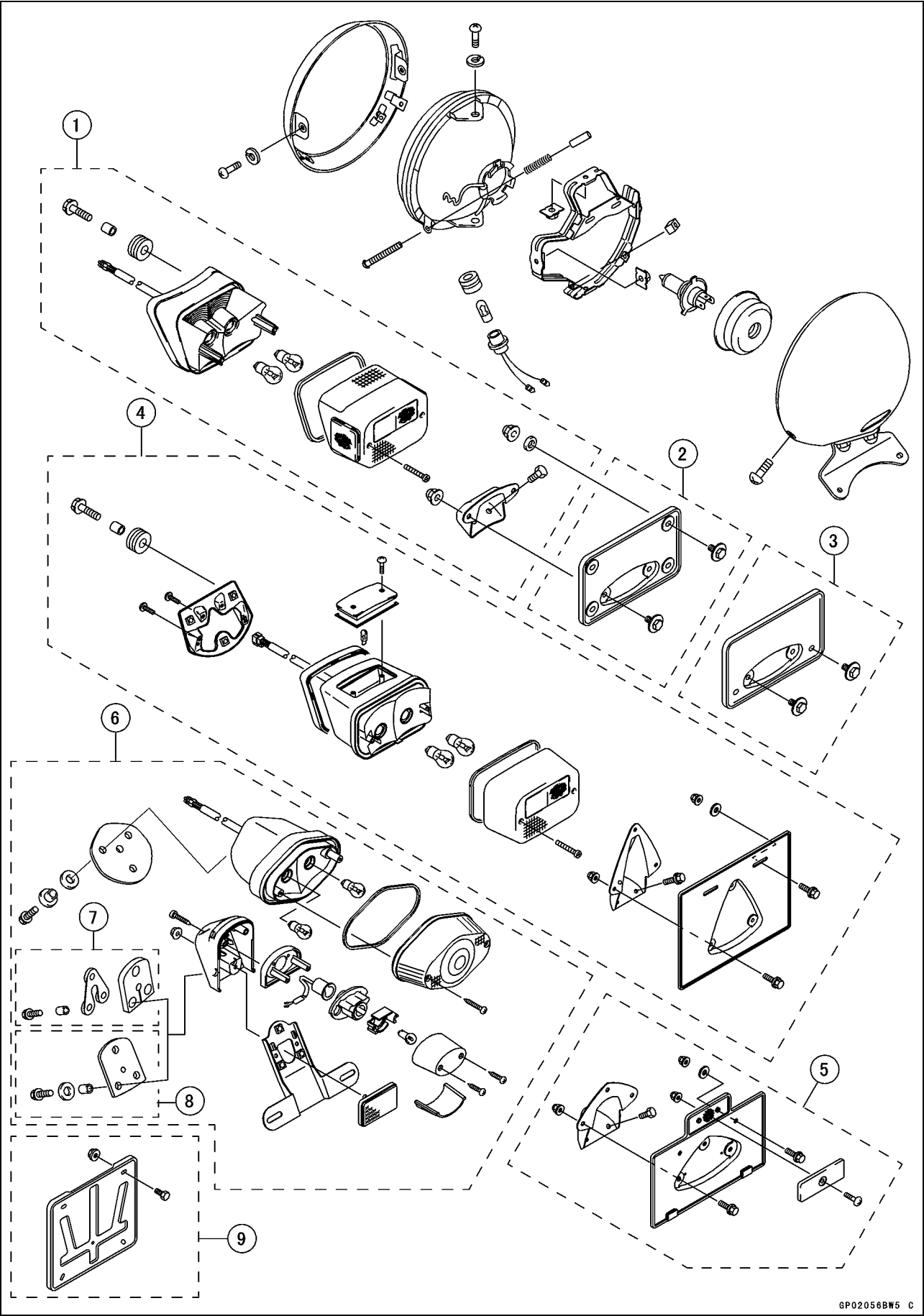
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Spark Plugs	18	18	13	
2	Side Stand Switch Mounting Bolts	3.9	0.4	35 in·lb	L

L: Apply a non-permanent locking agent.

16-8 ELECTRICAL SYSTEM

Exploded View

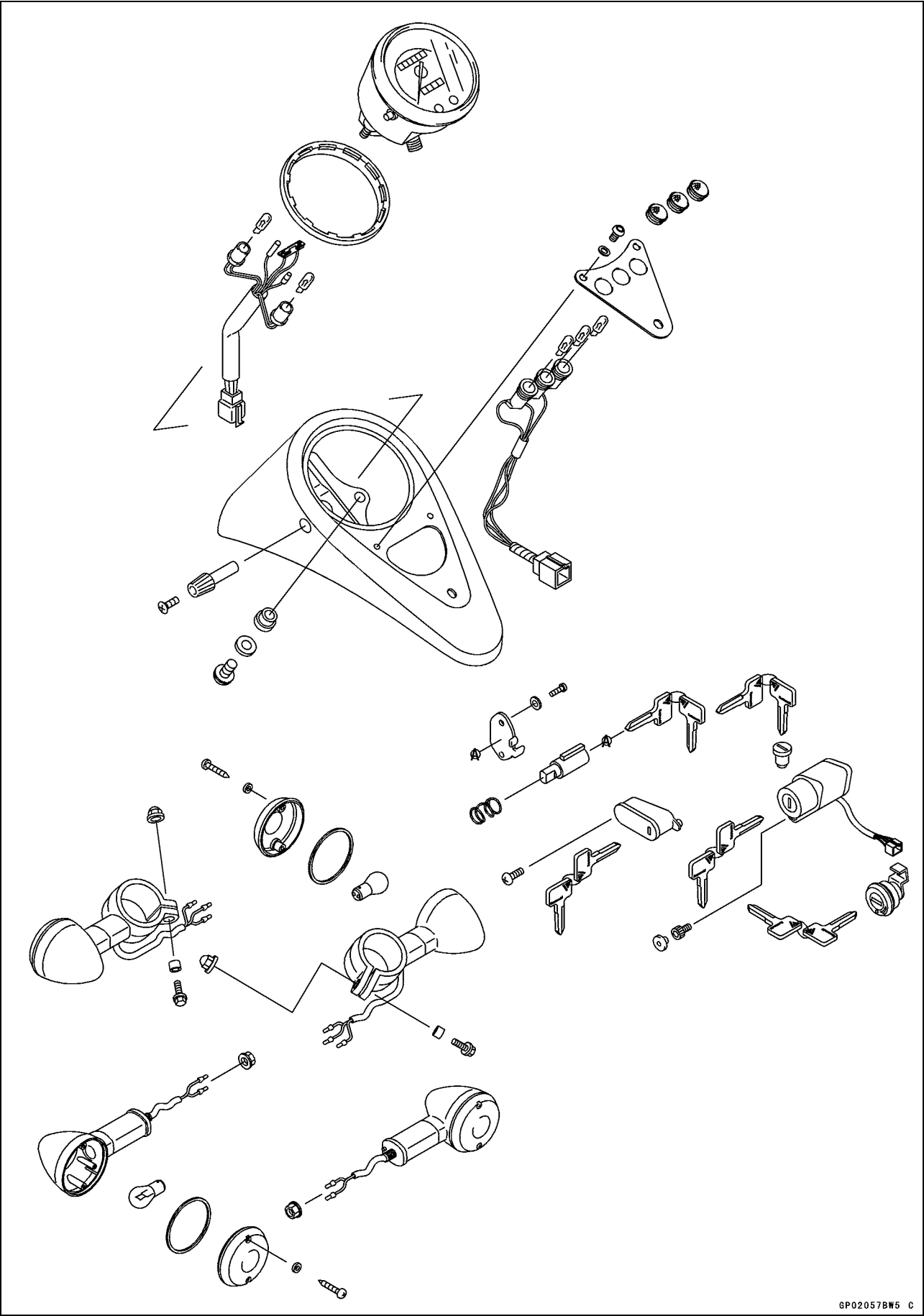


Exploded View

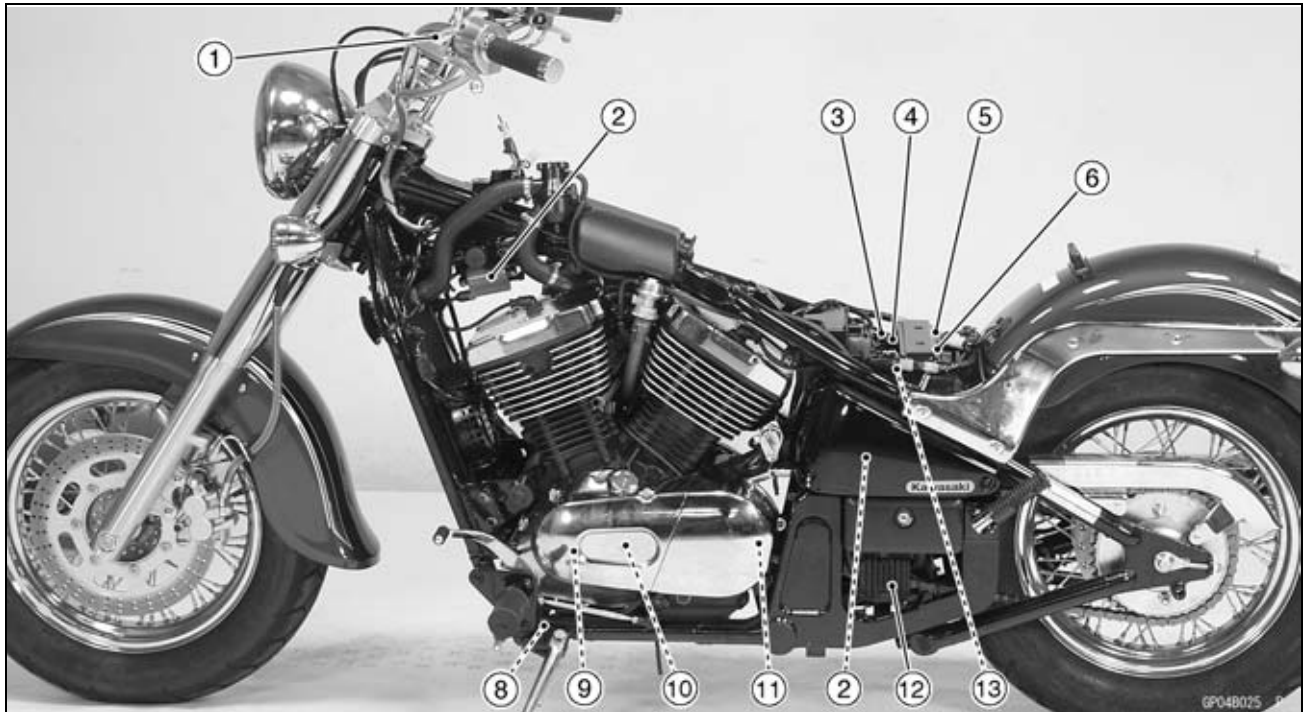
1. Tail Light (United States and Canada Models)
2. License Plate Holder (United States Model)
3. License Plate Holder (Canada Model)
4. Tail Light (On and after VN800-B5, Other than United States and Canada Models)
5. License Plate Holder (On and after VN800-B5, Australia Model)
6. Tail Light and License Lamp Assembly (VN800-B1 ~ B4, Other than United States and Canada Models)
7. License Light Damper (VN800-B3 ~ B4)
8. License Light Damper (VN800-B1~ B2)
9. License Plate Bracket (VN800-B1 ~ B3, Italy Model)

16-10 ELECTRICAL SYSTEM

Exploded View



Parts Location



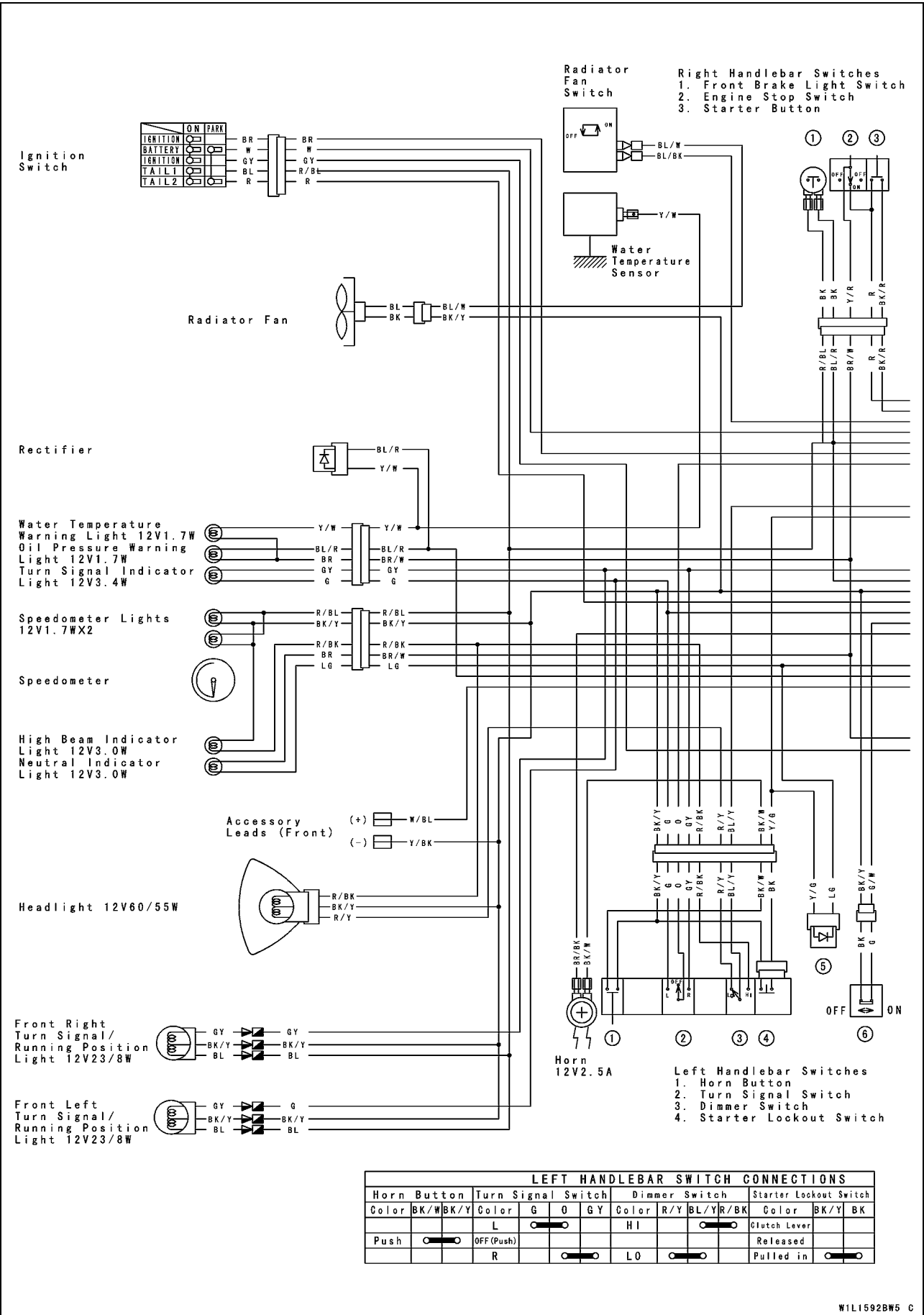
1. Starter Lockout Switch
2. Ignition Coils
3. Battery
4. Starter Relay and Main Fuse
5. IC Igniter
6. Junction Box

7. Oil Pressure Switch
8. Side Stand Switch
9. Pickup Coil
10. Alternator
11. Neutral Switch
12. Regulator/Rectifier
13. Turn Signal Relay

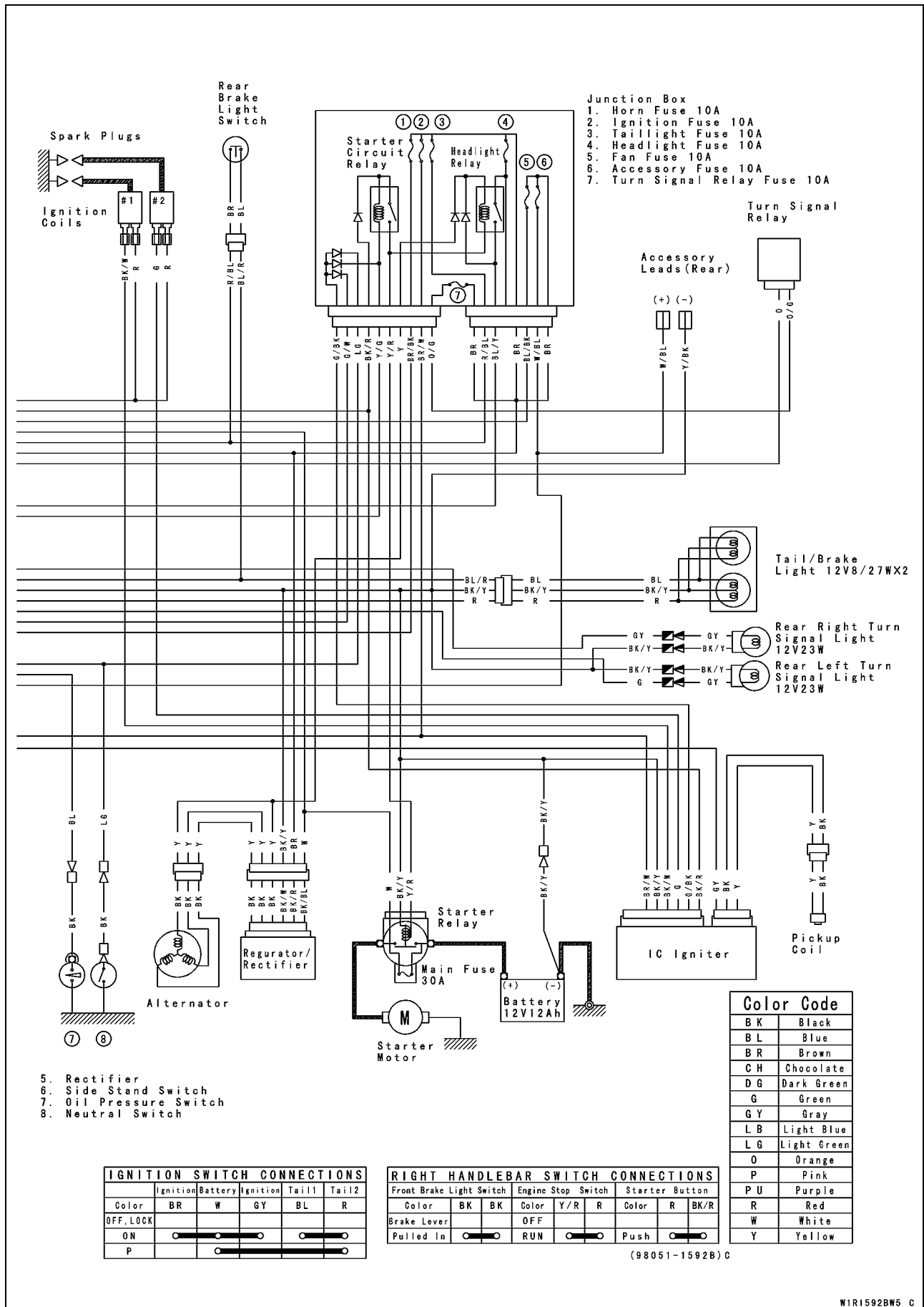
14. Front Brake Light Switch
15. Water Temperature Sensor
16. Radiator Fan Switch
17. Rear Brake Light Switch
18. Starter Motor

16-12 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B1 ~ B4, United States, and Canada)

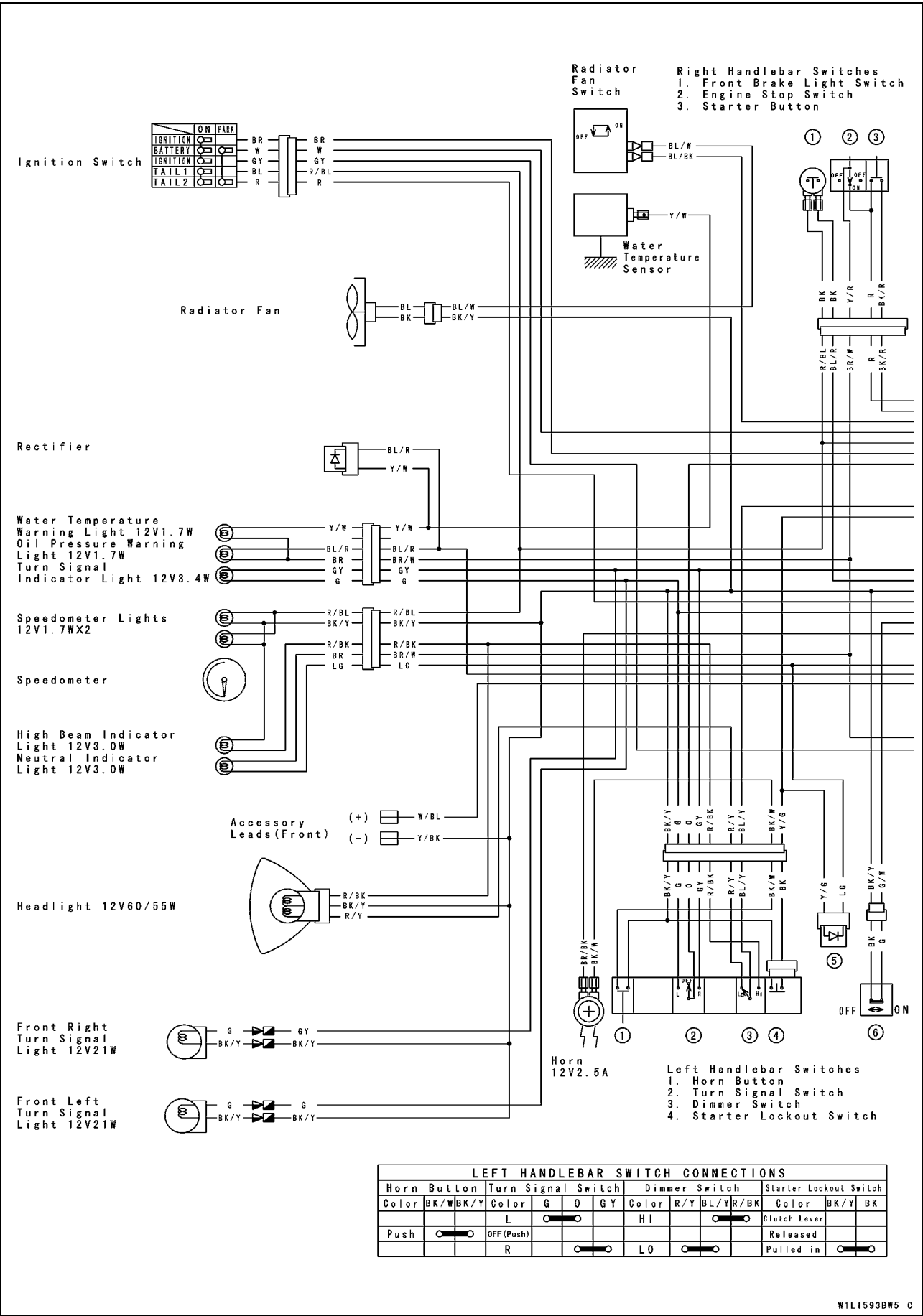


Wiring Diagram (VN800-B1 ~ B4, United States, and Canada)

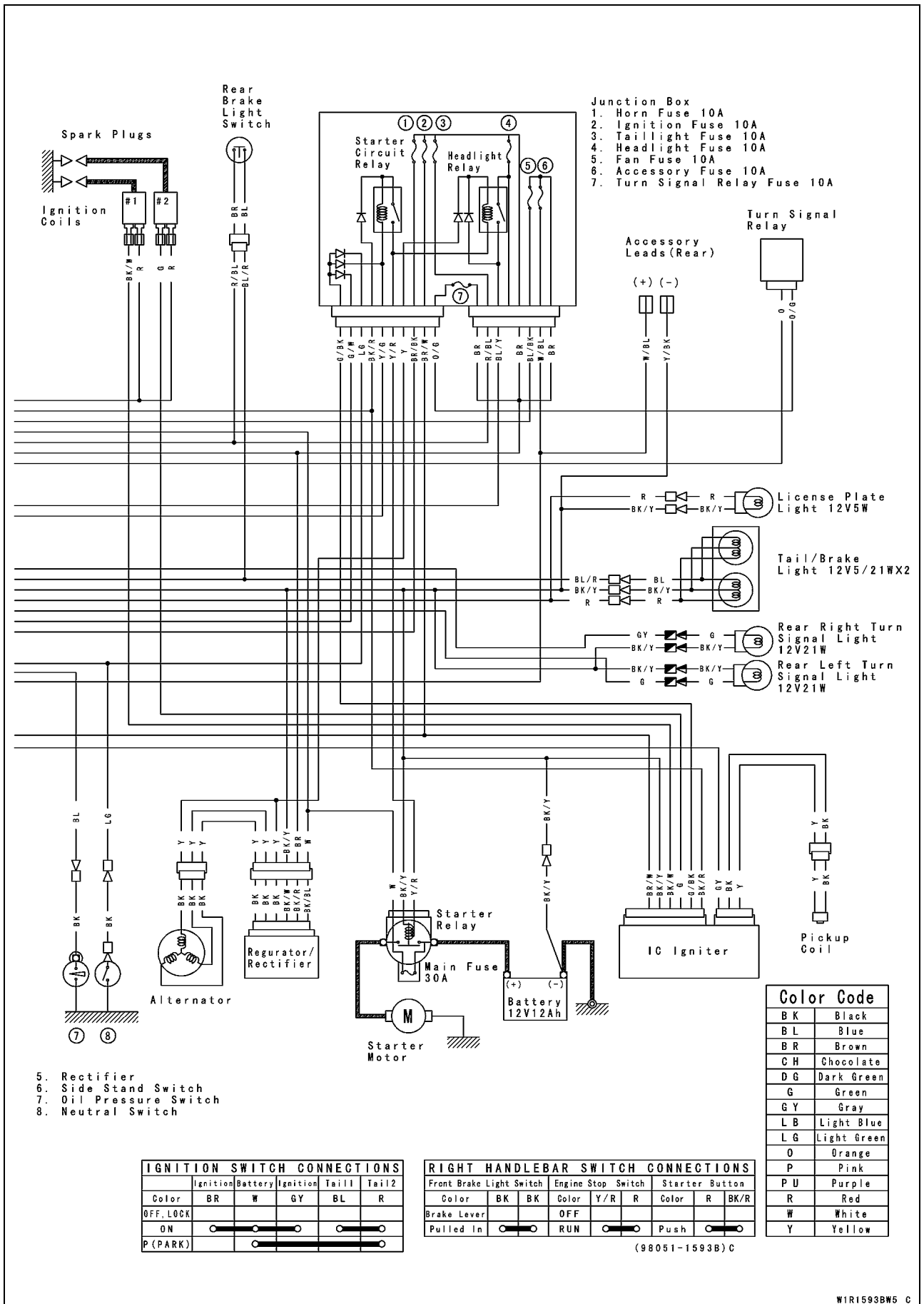


16-14 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B1 ~ B4, Australia)

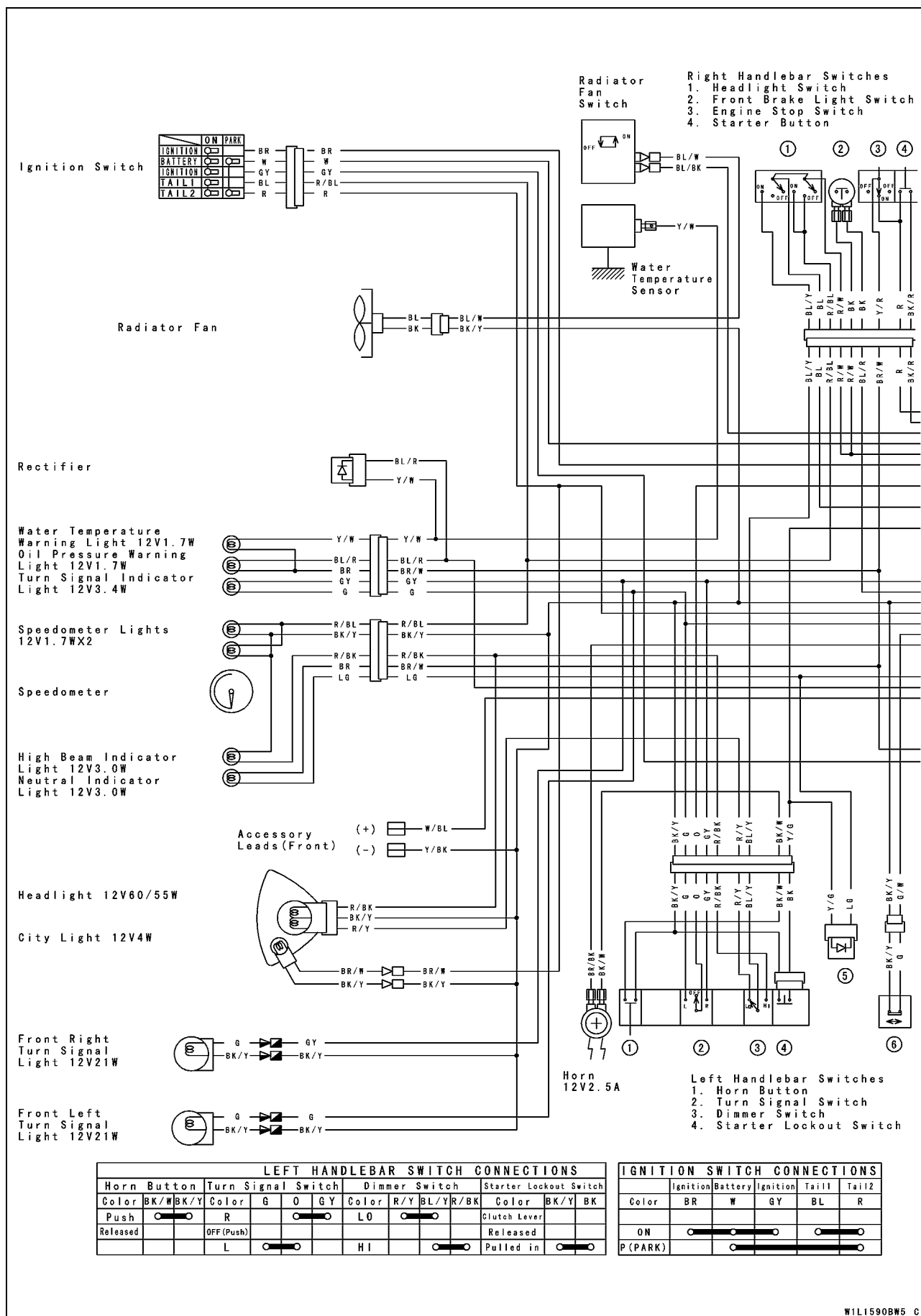


Wiring Diagram (VN800-B1 ~ B4, Australia)

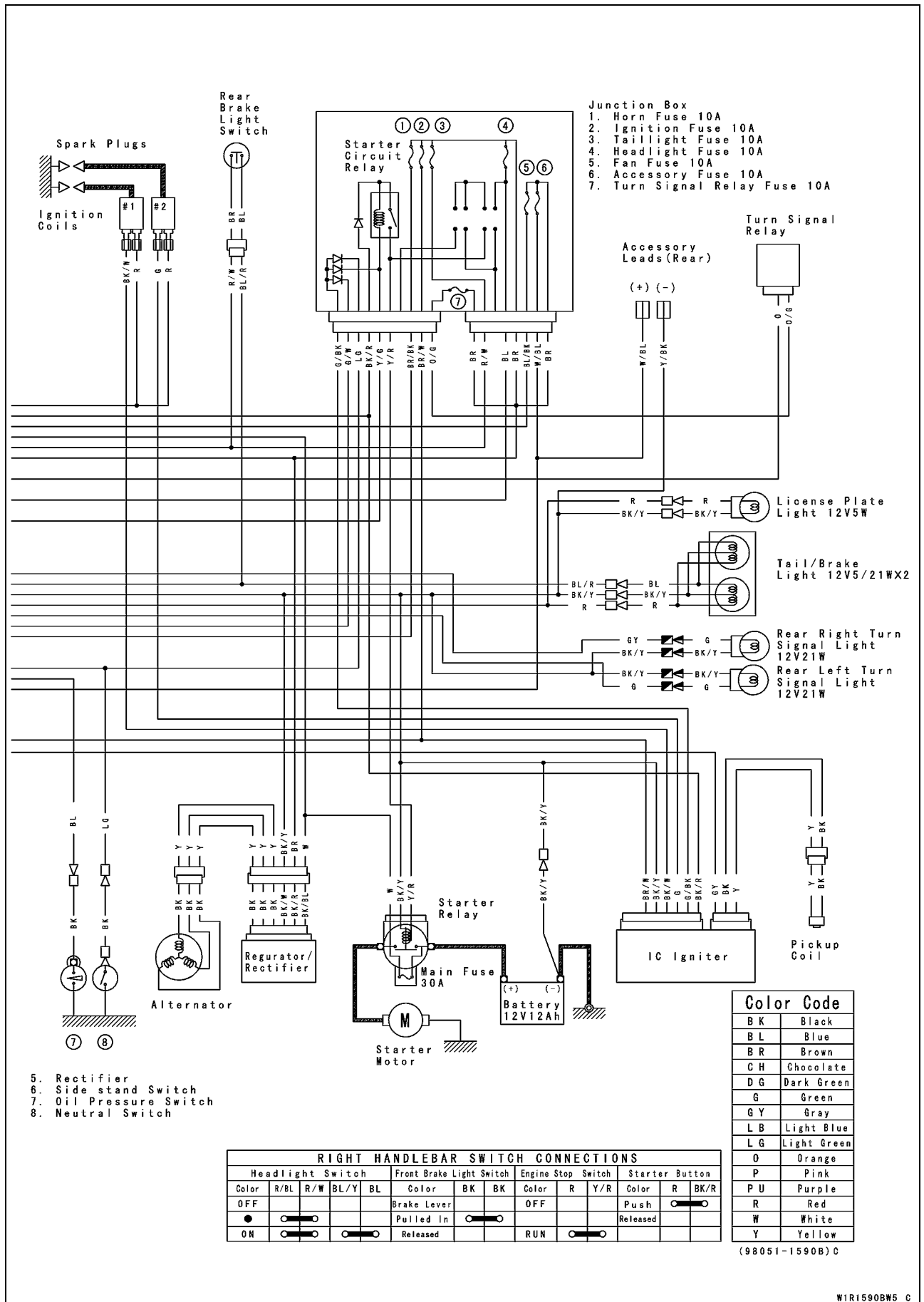


16-16 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B1 ~ B4, Europe and Others)

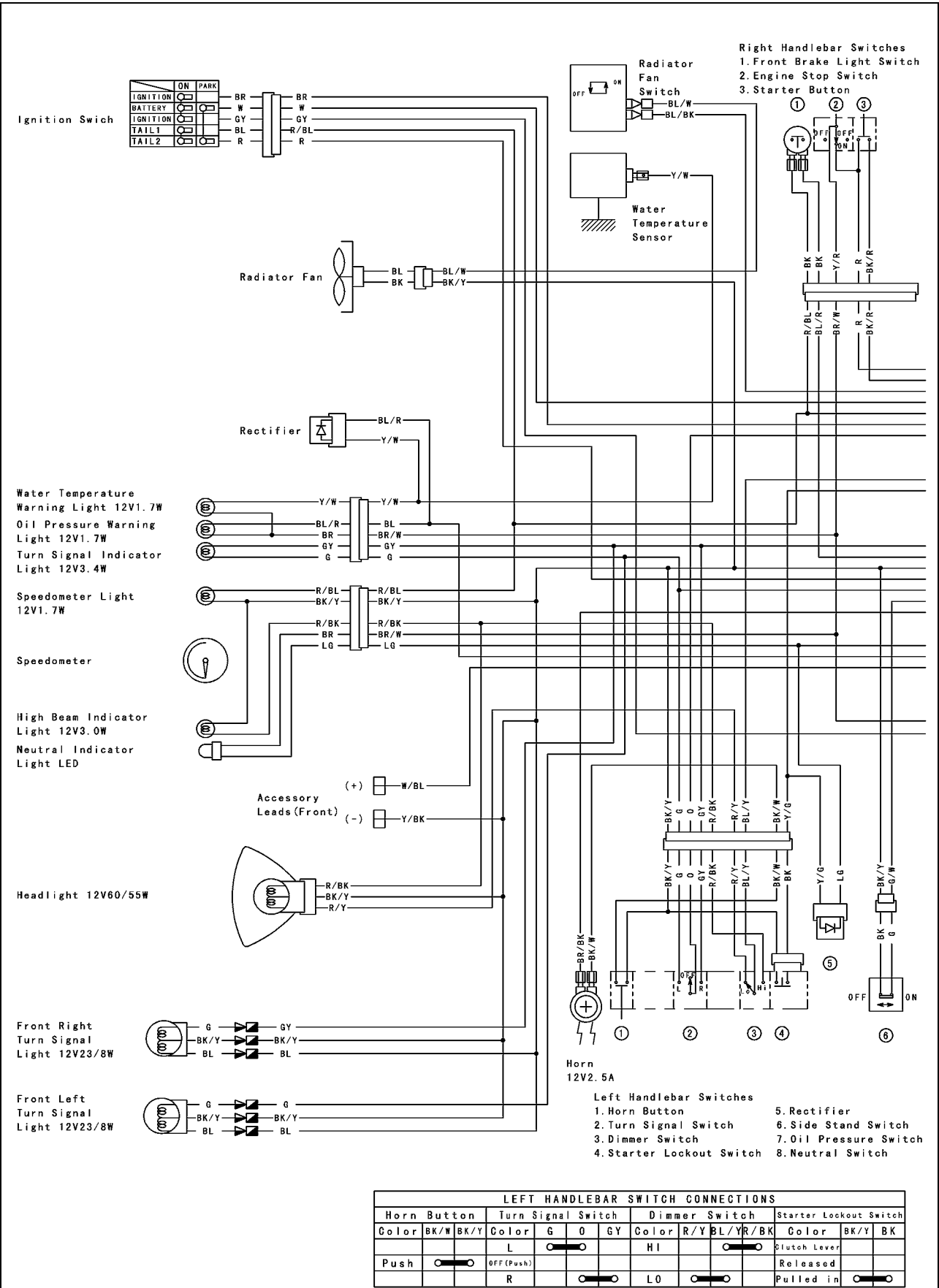


Wiring Diagram (VN800-B1 ~ B4, Europe and Others)

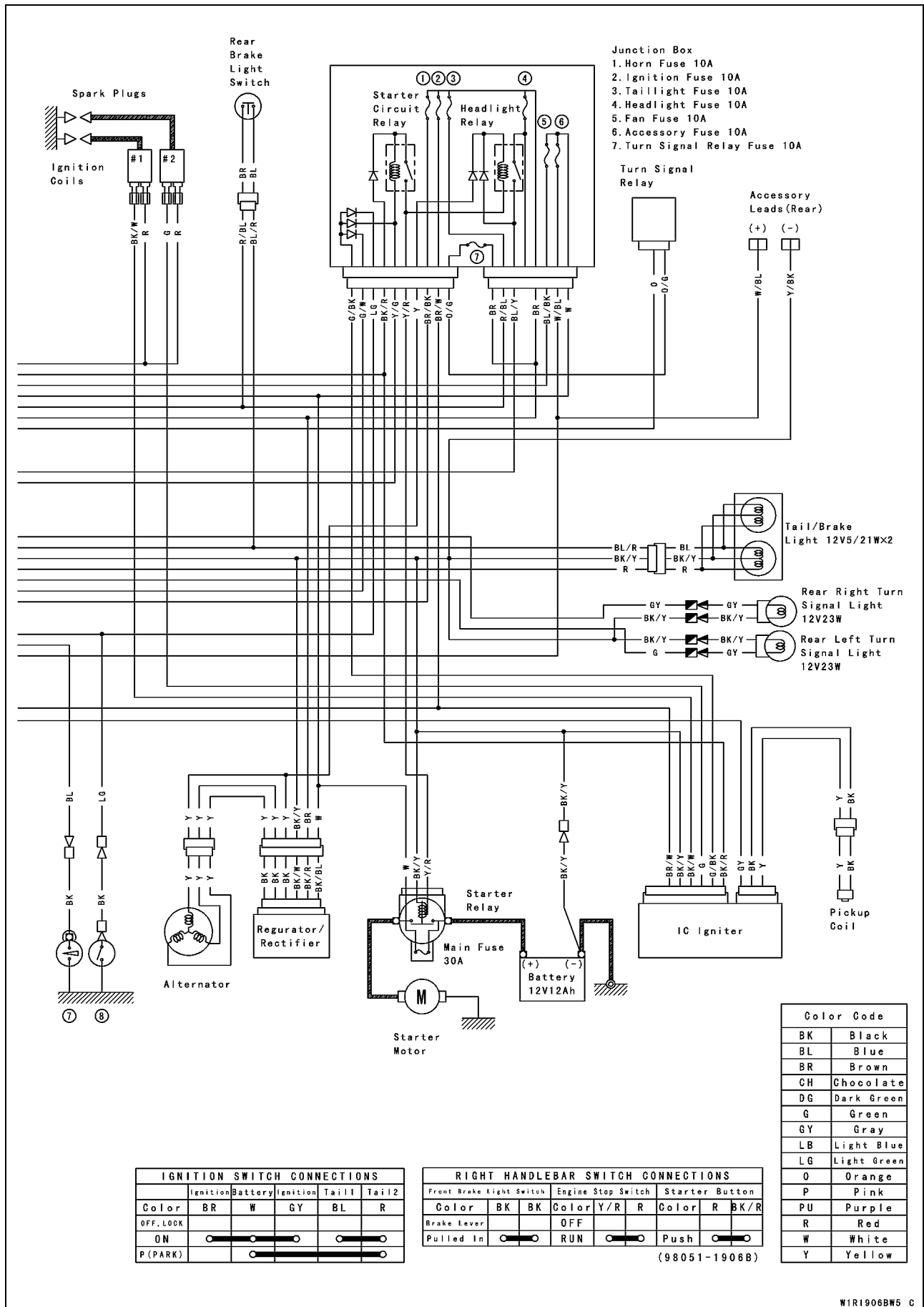


16-18 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B5 ~ B8, United States, and Canada)

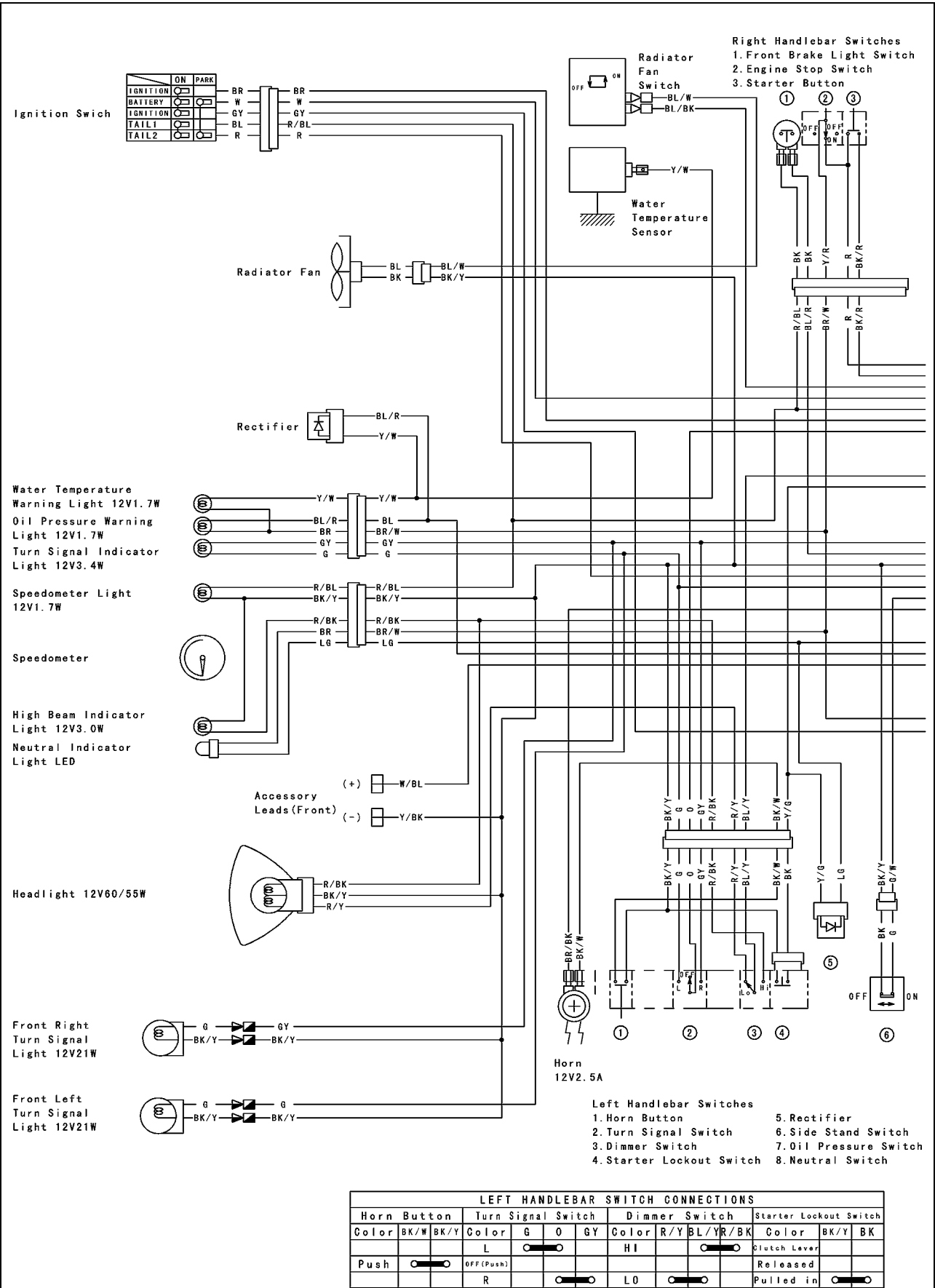


Wiring Diagram (VN800-B5 ~ B8, United States, and Canada)

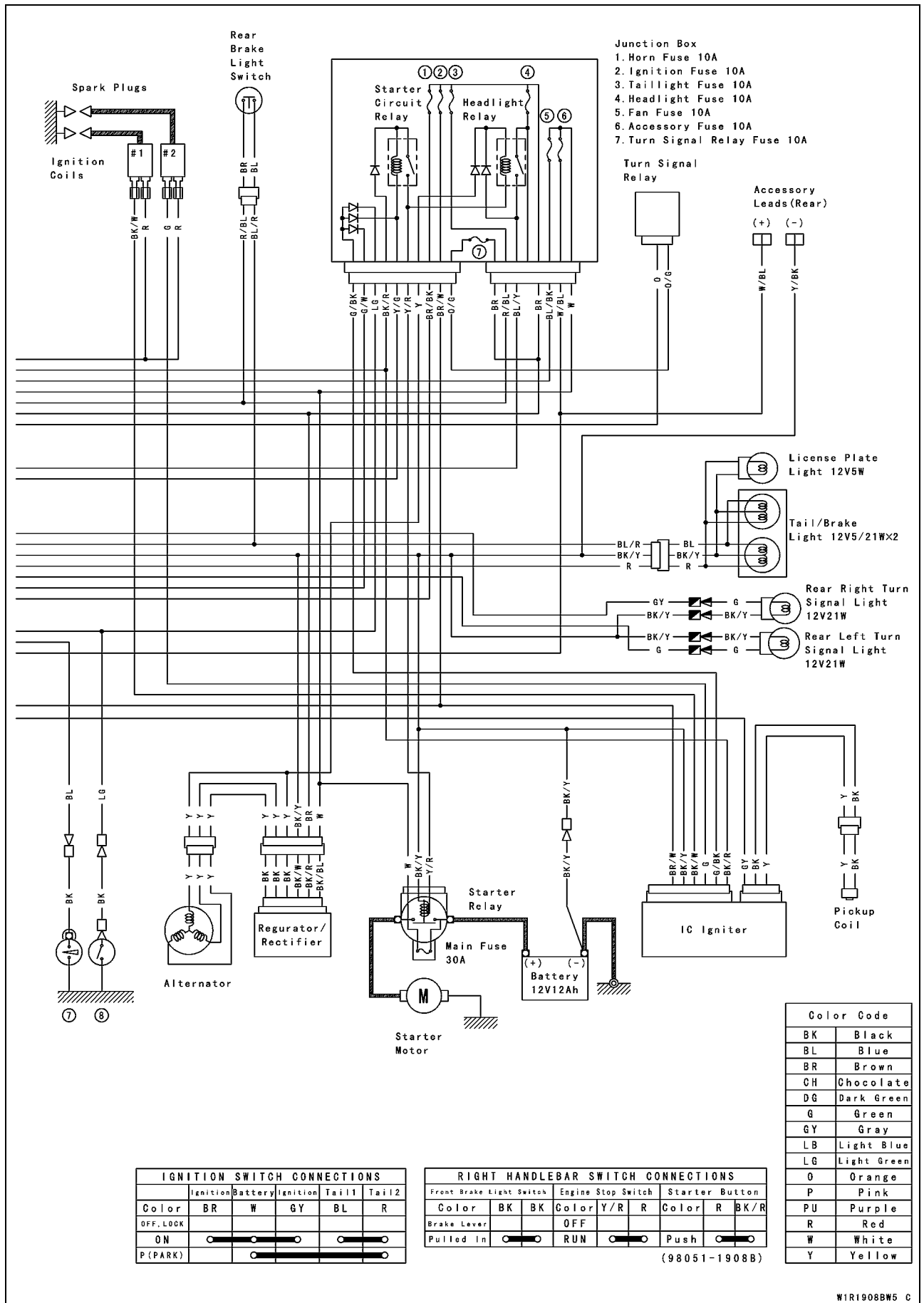


16-20 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B5 ~ B8, Australia)

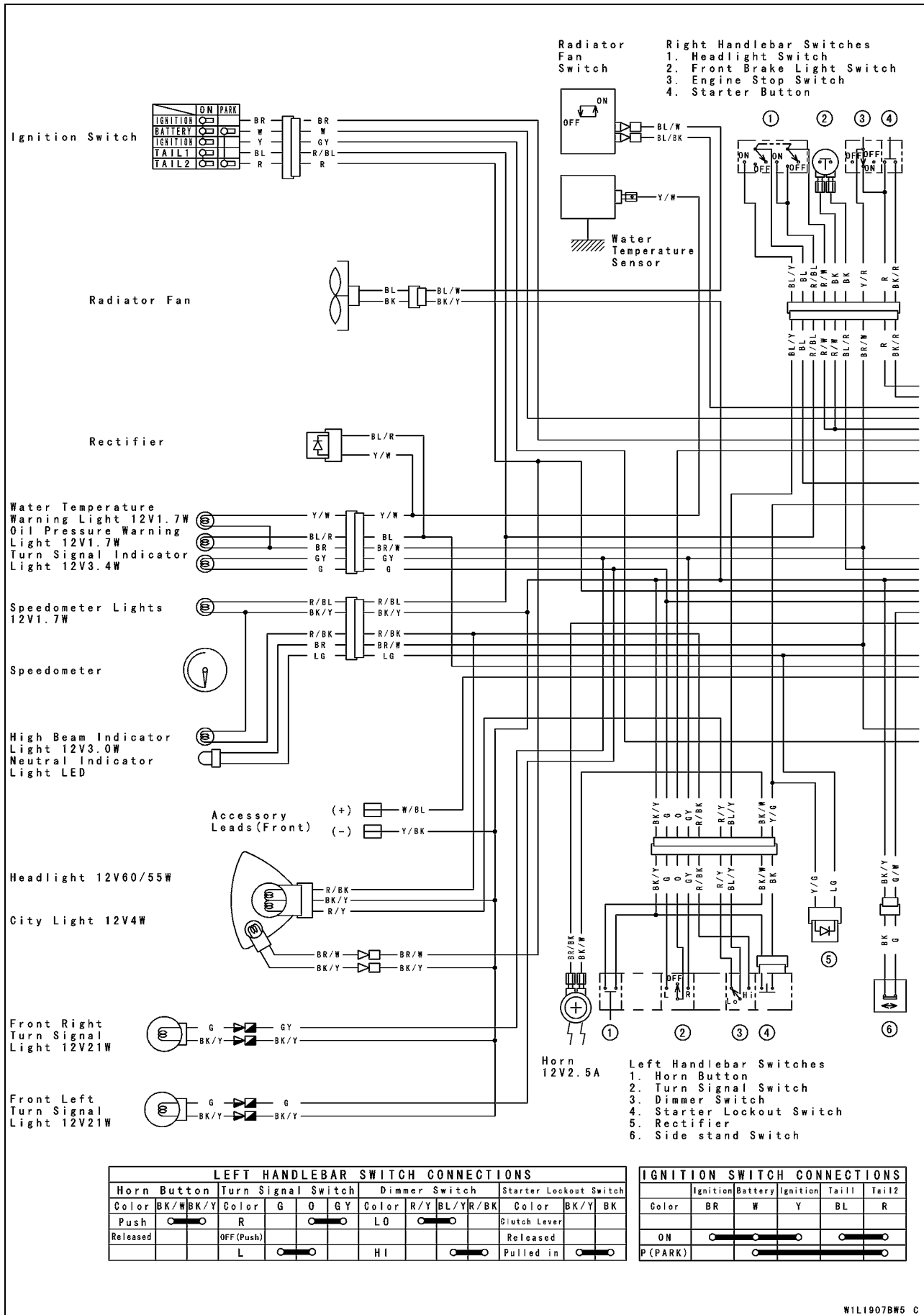


Wiring Diagram (VN800-B5 ~ B8, Australia)

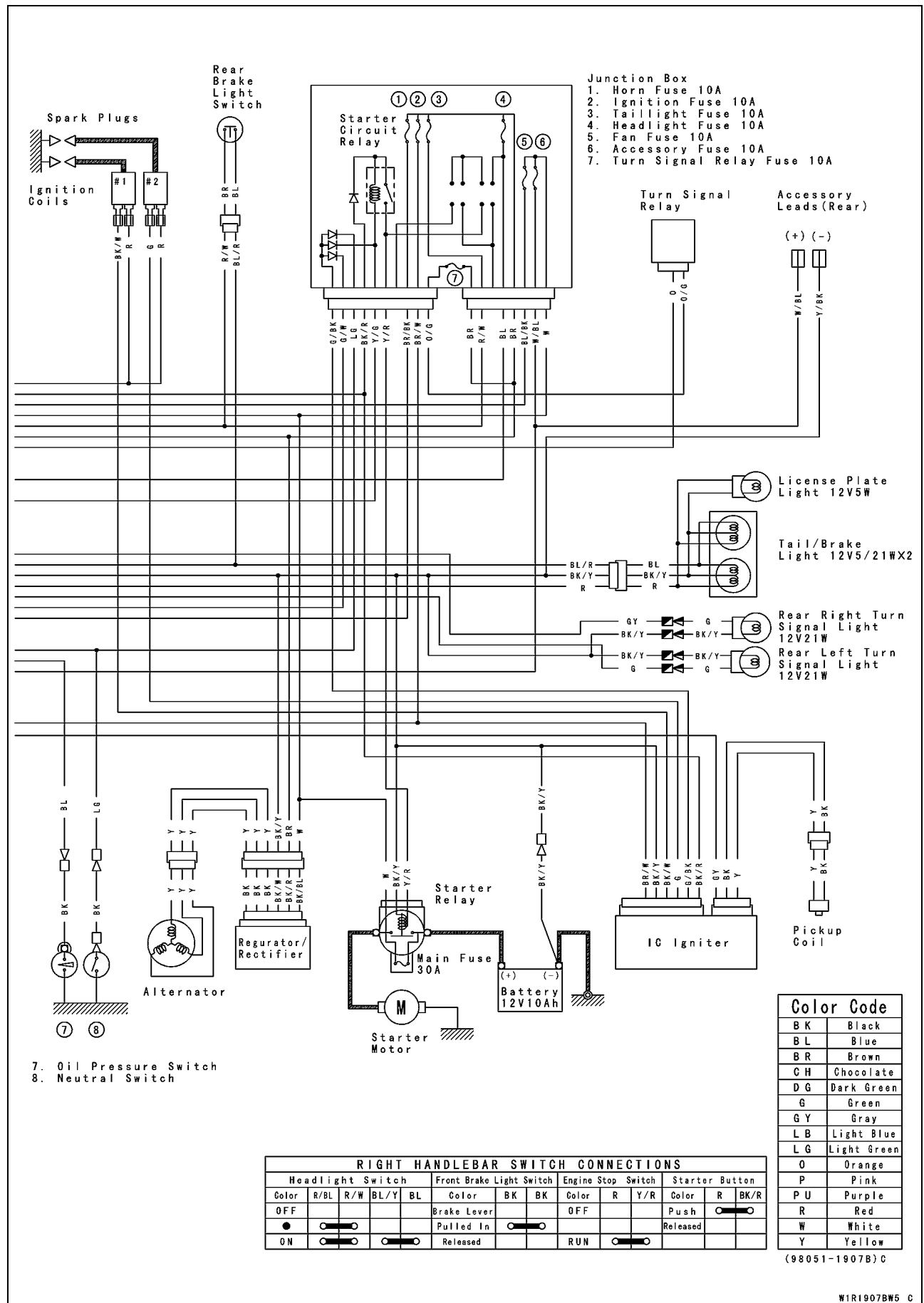


16-22 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B5 ~ B7, Europe and Others)

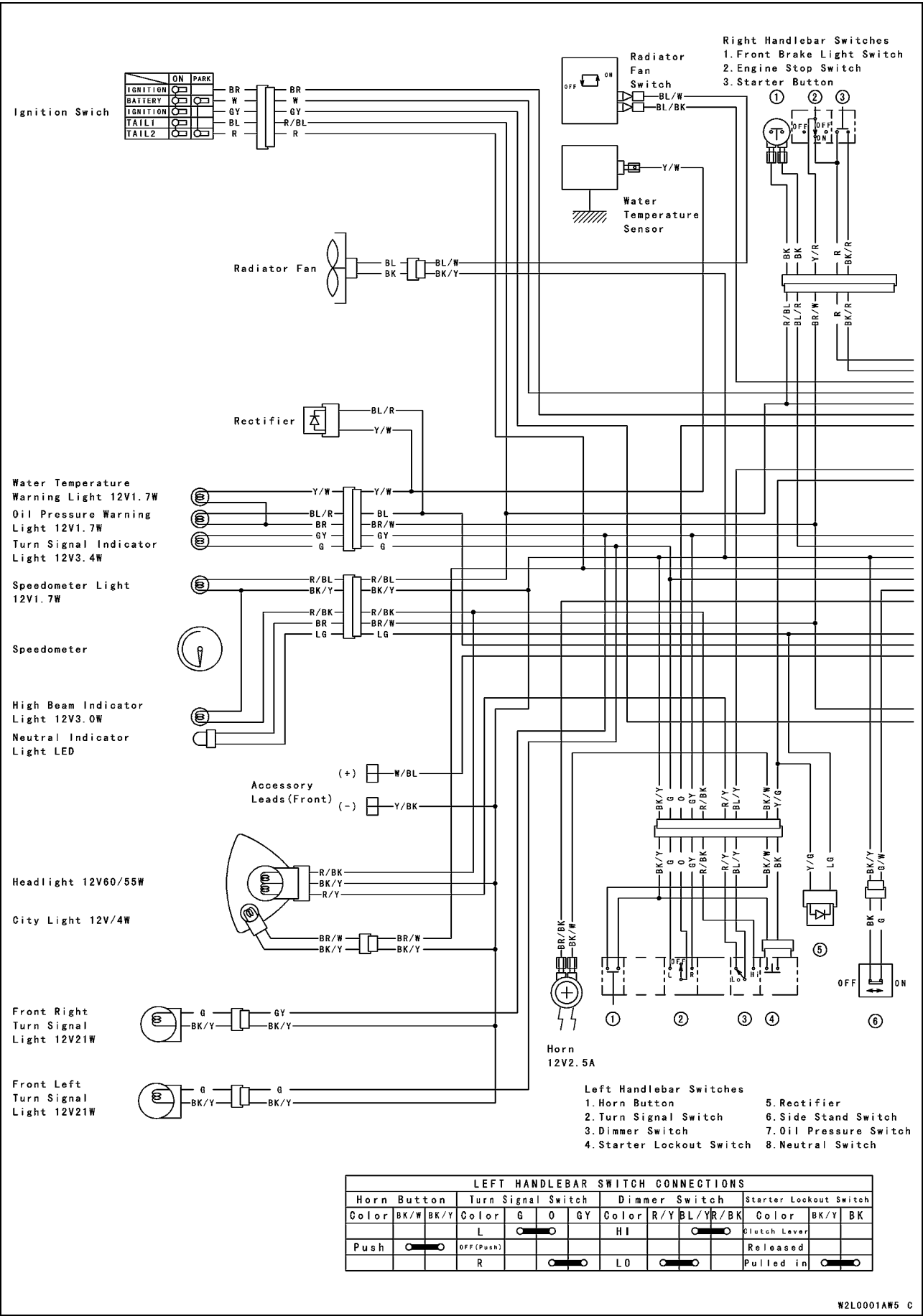


Wiring Diagram (VN800-B5 ~ B7, Europe and Others)

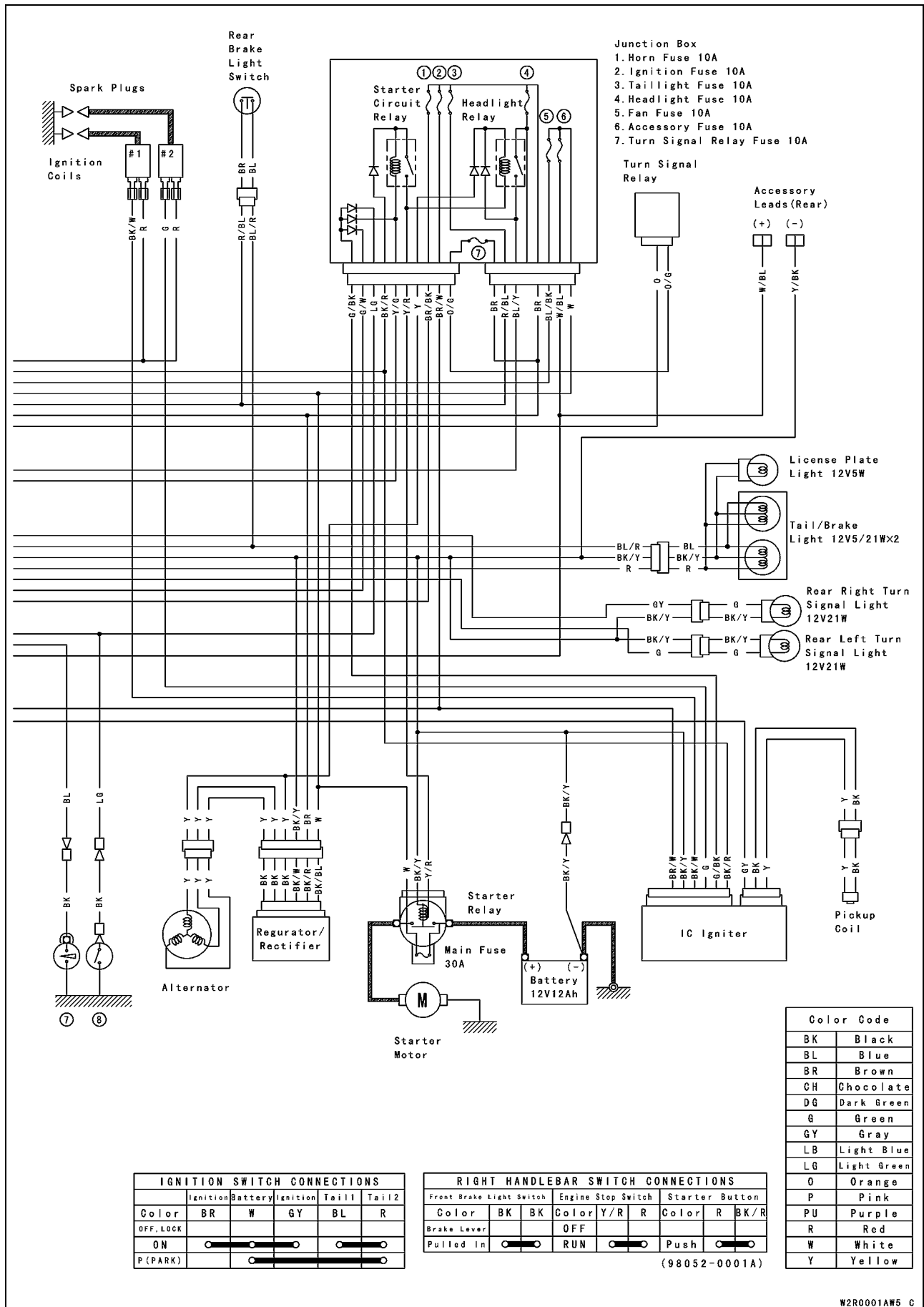


16-24 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B8, other than United States, Canada, and Australia)

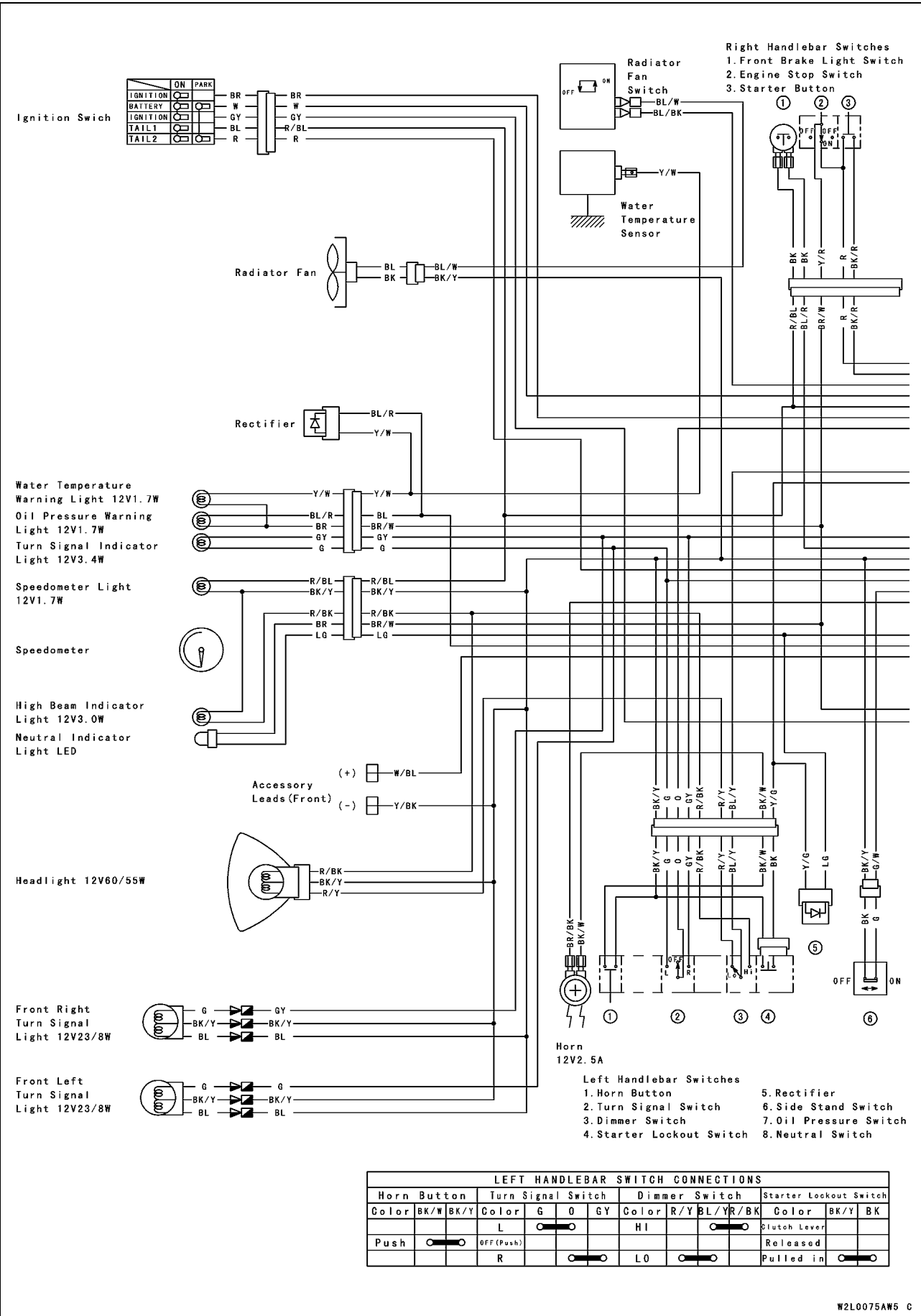


Wiring Diagram (VN800-B8, other than United States, Canada, and Australia)

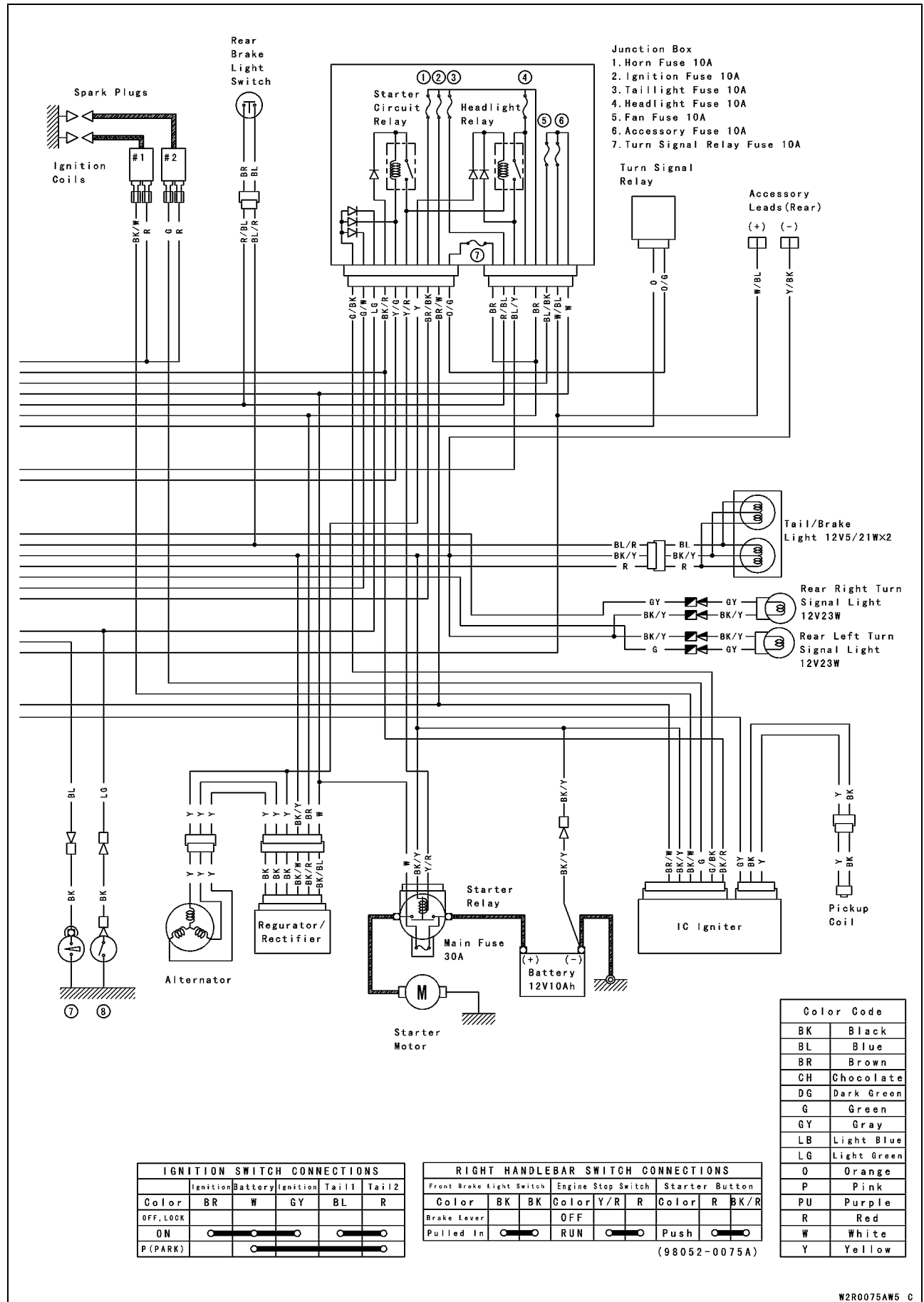


16-26 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B9 ~, B6F United States, and Canada)

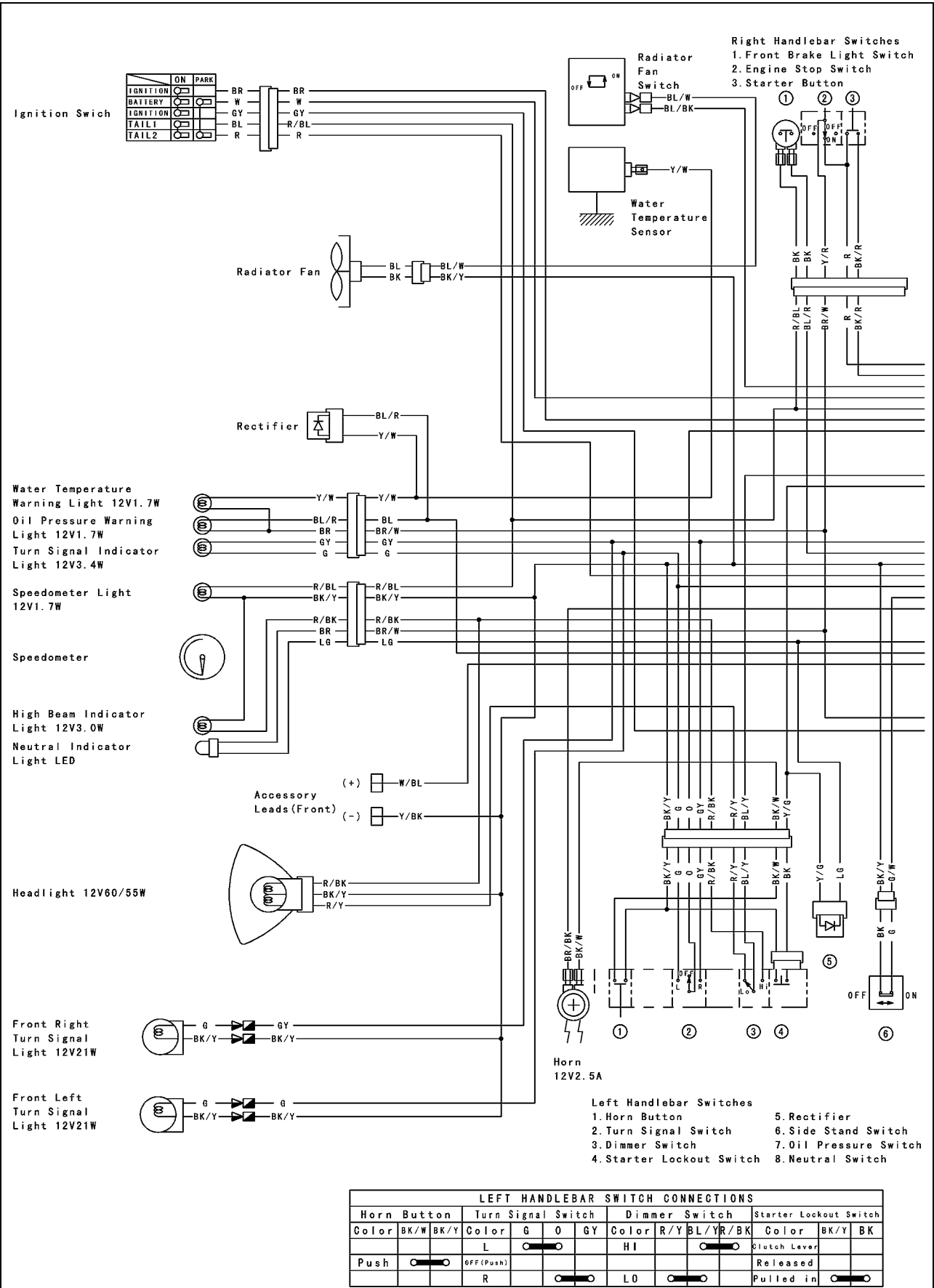


Wiring Diagram (VN800-B9 ~, B6F United States, and Canada)

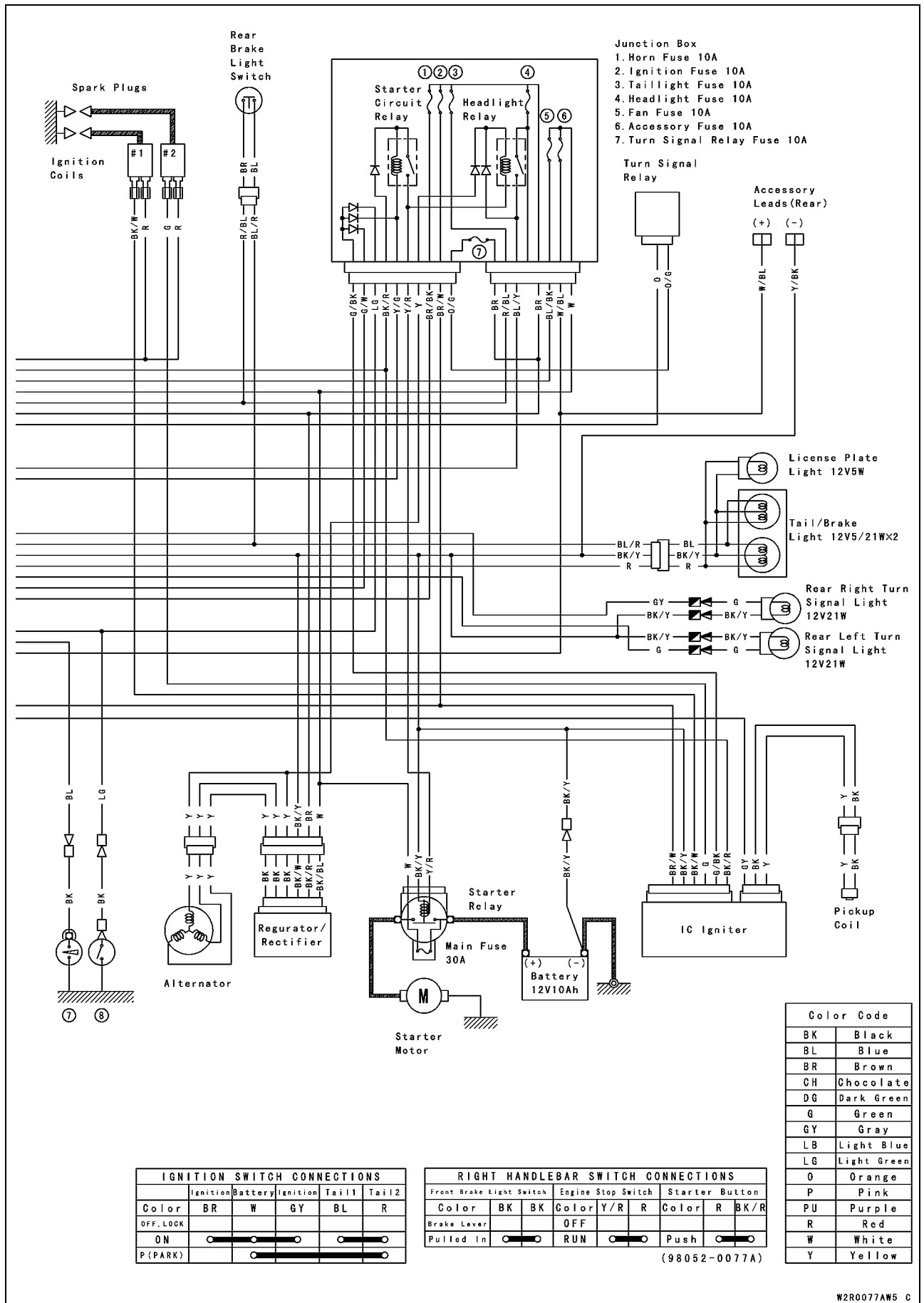


16-28 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B9 ~, B6F Australia)

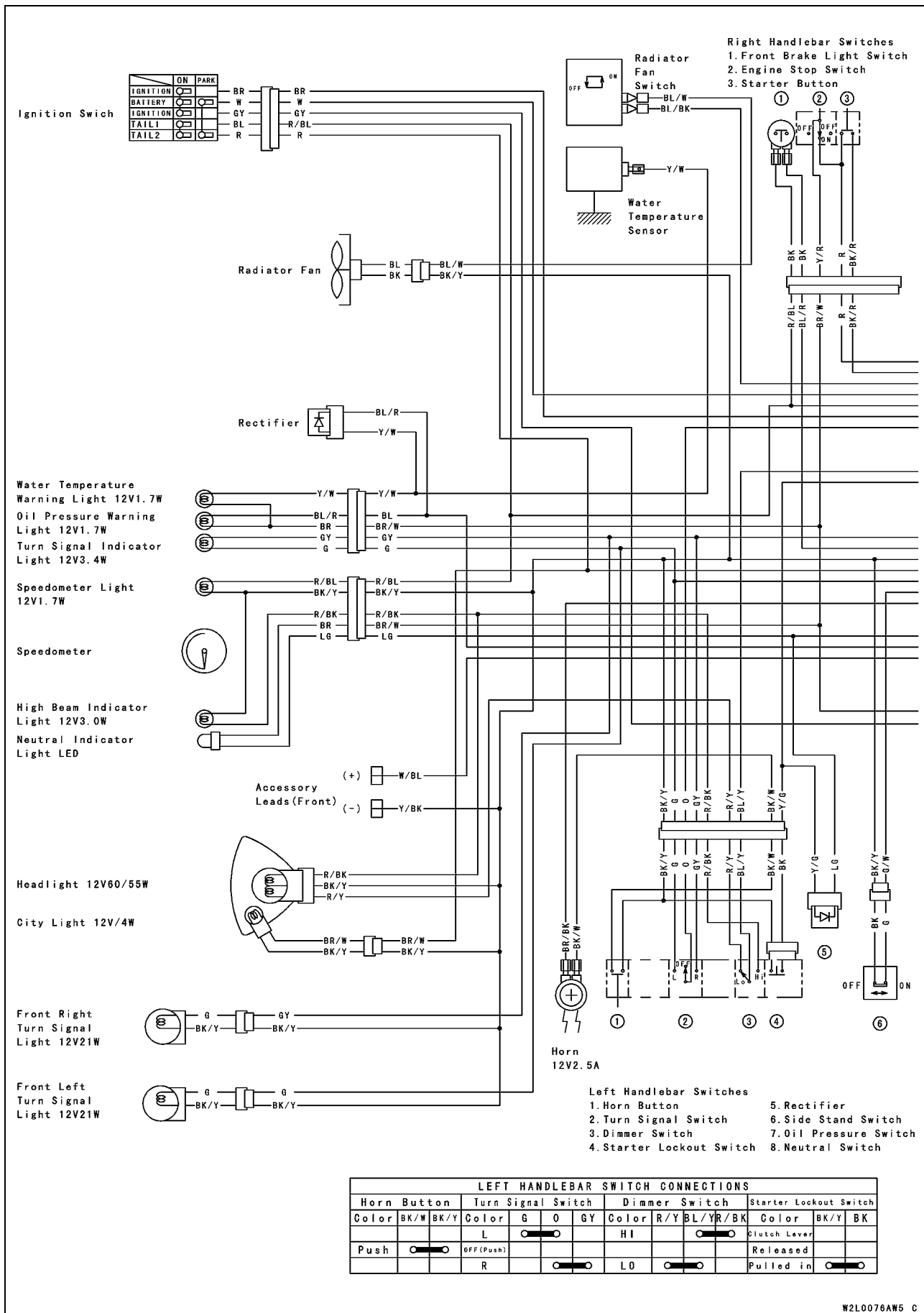


Wiring Diagram (VN800-B9 ~, B6F Australia)

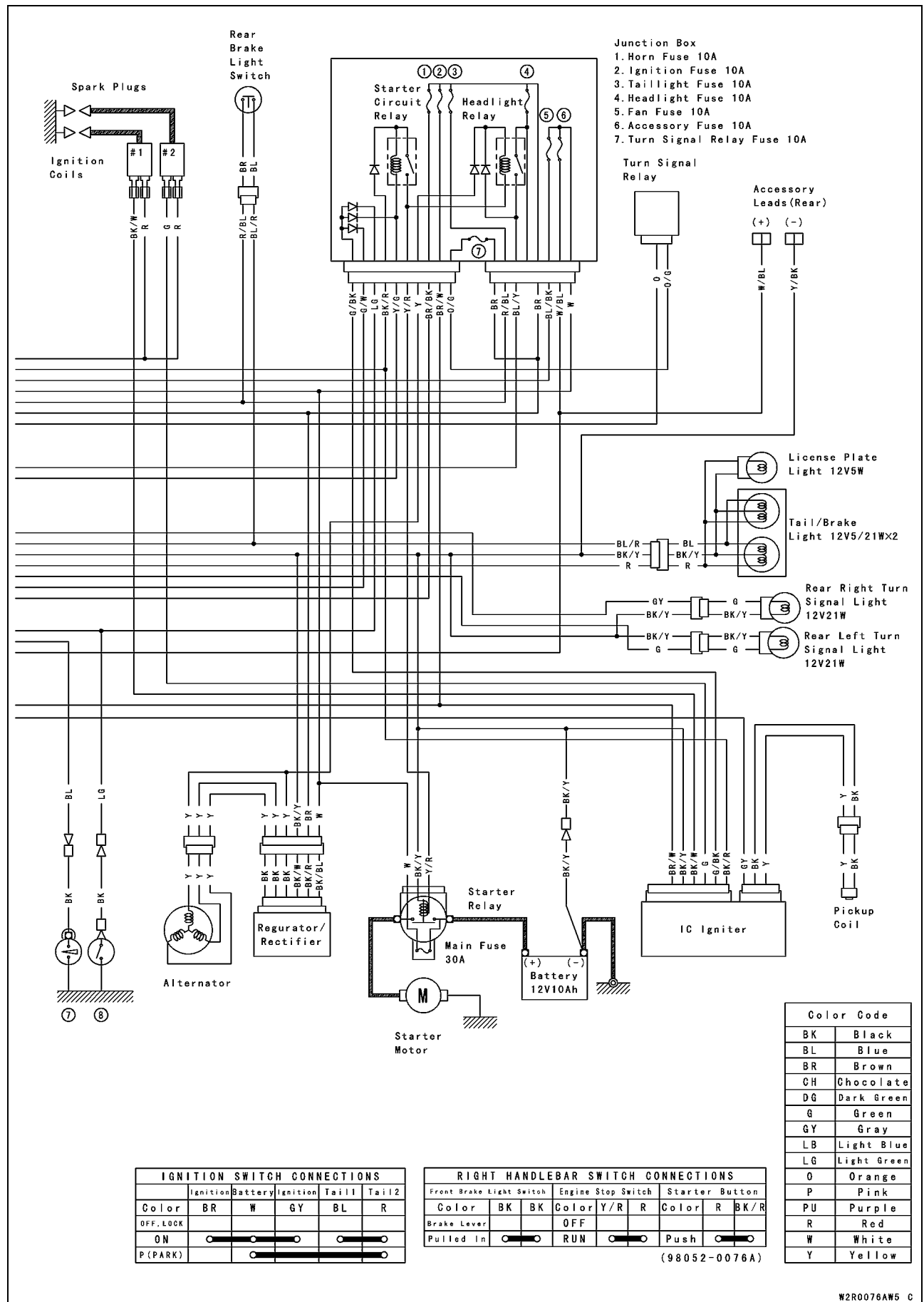


16-30 ELECTRICAL SYSTEM

Wiring Diagram (VN800-B9 ~, B6F other than United States, Canada, and Australia)



Wiring Diagram (VN800-B9 ~, B6F other than United States, Canada, and Australia)



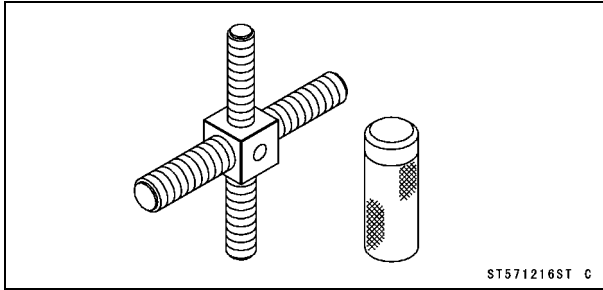
16-32 ELECTRICAL SYSTEM

Specifications

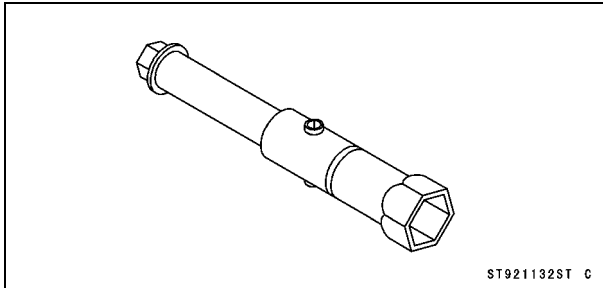
Item	Standard	Service Limit
Battery		
Type	Sealed Battery	— — —
Capacity	12 V 12 Ah (VN800-B1 ~ B8) 12 V 10 Ah (VN800-B9 ~, B6F)	— — —
Voltage	12.8 V or more	— — —
Charging System		
Type	Three-phase AC	— — —
Charging Voltage	14 ~ 15 V @4000 r/min (rpm), night	— — —
Alternator Output Voltage	50 ~ 80 V	— — —
Stator Coil Resistance	0.3 ~ 0.5 Ω	— — —
Ignition System		
Pickup Coil Resistance	380 ~ 570 Ω	— — —
Ignition Coil:		
3 Needle Arcing Distance	6 mm (0.24 in.) or more	— — —
Winding Resistance:		
Primary Windings	2.3 ~ 3.5 Ω	— — —
Secondary Windings	12.0 ~ 18.0 Ω	— — —
Spark Plug:		
Type	NGK CR7E or ND U22ESR-N	— — —
Gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)	
IC Igniter Inspection	in the text	
Electric Starter System		
Starter Motor:		
Carbon Brush Length	12.0 ~ 12.5 mm (0.47 ~ 0.49 in.)	5.5 mm (0.22 in.)
Commutator Diameter	28 mm (1.10 in.)	27 mm (1.06 in.)
Switch and Sensor		
Rear Brake Lights 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	— — — — — —
Fan Switch Connections:		
Rising Temperature	From OFF to ON @96 ~ 100°C (205 ~ 212°F)	— — —
Falling Temperature	From On to OFF @91°C (196°F) or less	— — —
Water Temperature Sensor Resistance:		
Rising Temperature	From OFF to ON @113 ~ 117°C (235 ~ 243°F)	— — —
Falling Temperature	From ON to OFF @108°C (226°F) or less	— — —

Special Tools

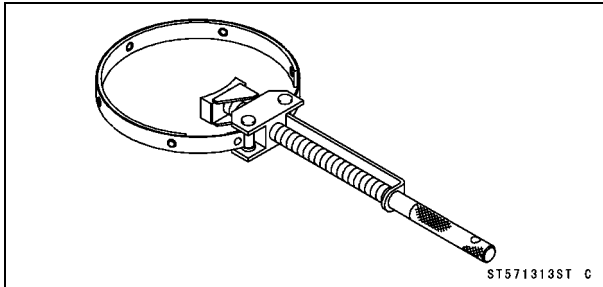
Rotor Puller, M16/M18/M20/M22 × 1.5:
57001-1216



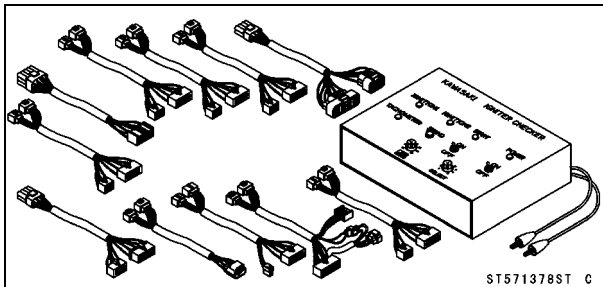
Spark Plug Wrench, 16 mm (Owner's Tool):
92110-1132



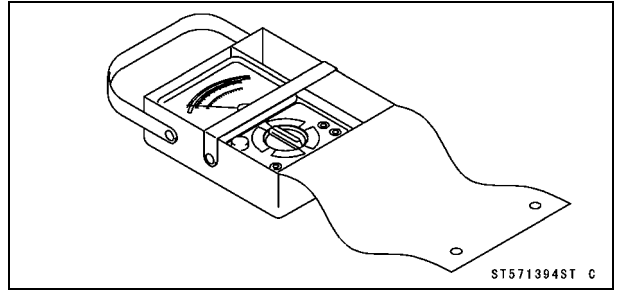
Flywheel Holder:
57001-1313



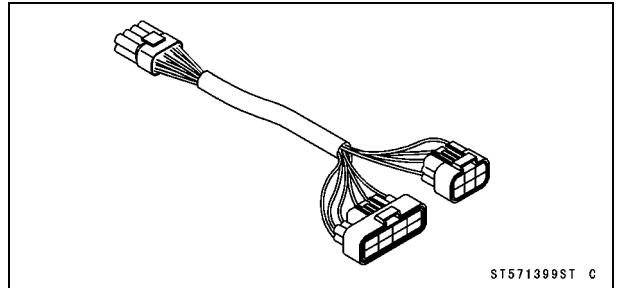
Igniter Checker Assembly:
57001-1378



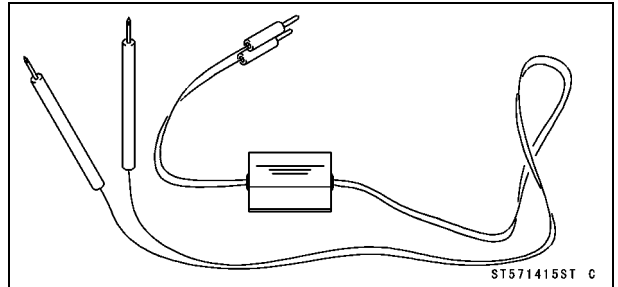
Hand Tester:
57001-1394



Harness Adapter #13:
57001-1399



Peak Voltage Adapter:
57001-1415



16-34 ELECTRICAL SYSTEM

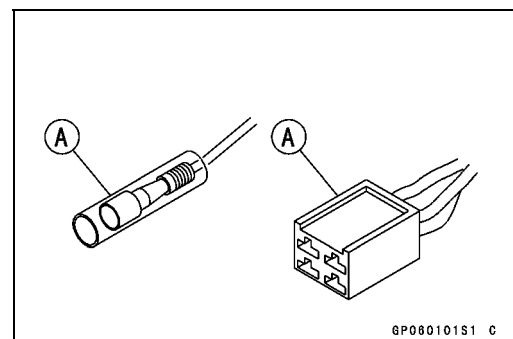
Precautions

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 on 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 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:

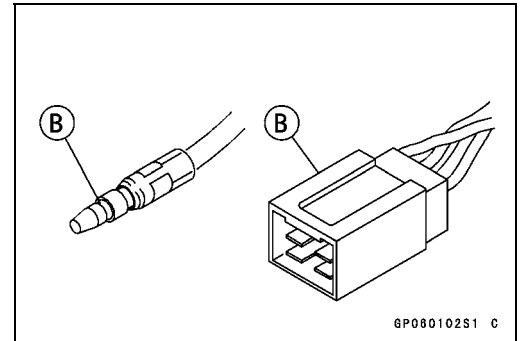
BK	Black	G	Green	P	Pink
BL	Blue	GY	Gray	PU	Purple
BR	Brown	LB	Light blue	R	Red
CH	Chocolate	LG	Light green	W	White
DG	Dark green	O	Orange	Y	Yellow

- Electrical Connectors
Female Connectors [A]



Precautions

Male Connectors [B]



16-36 ELECTRICAL SYSTEM

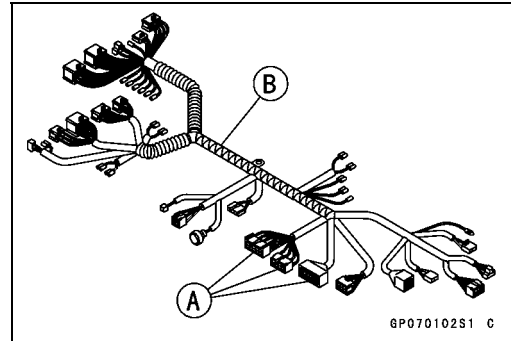
Electrical Wiring

Wiring Inspection

- Visually inspect the wiring for signs of burning, fraying, etc.
- If any wiring is poor, replace the damaged wiring.
- Pull each connector [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 the hand tester between the ends of the leads.

Special Tool - Hand Tester: 57001-1394

- Set the tester to the $\times 1 \Omega$ range, and read the tester.
- If the tester does not read 0Ω , the lead is defective. Replace the lead or the wiring harness [B] if necessary.



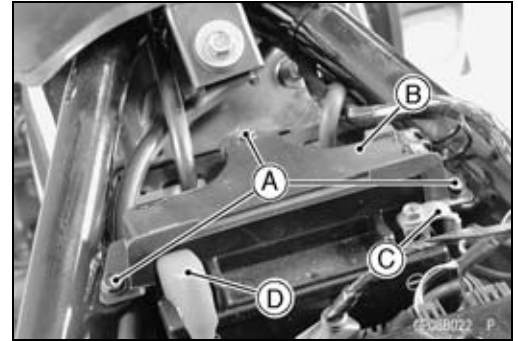
Battery

Battery Removal

- Remove:
 - Seats (see Frame Chapter)
 - Screws [A]
 - Battery Cover [B]
- Disconnect the negative (–) lead [C] and then positive (+) lead [D].

CAUTION

Be sure to disconnect the negative (–) lead first.

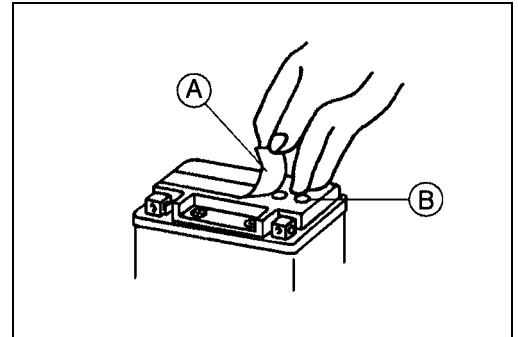


Electrolyte Filling

CAUTION

**Do not remove the aluminum seal sheet [A] sealing the filler ports [B] 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 seal sheet on the top of the battery.
- Place the battery on a level surface.
- Remove the seal sheet.



NOTE

○A battery whose seal sheet has any peeling, tears, or holes, requires a refreshing charge (initial charge).

- Take the electrolyte container out of the vinyl bag.
- Detach the seal caps [A] from the container.

NOTE

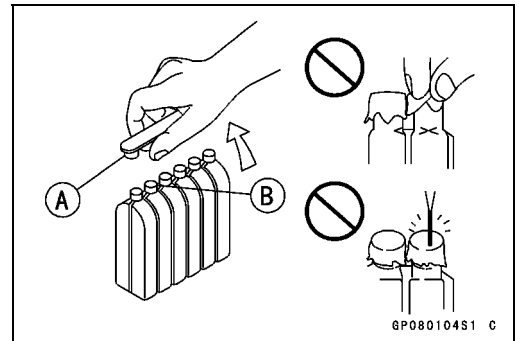
○Do not discard the seal caps because it is used as the battery plugs later.

○Do not peel back or pierce the seals [B] on the container.

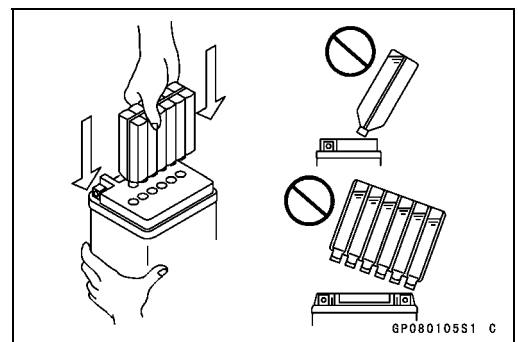
- Place the electrolyte container upside down aligning six seals with the six battery filler ports.
- Push the container down strongly enough to break the seals. Now the electrolyte should start to flow into the battery.

NOTE

○Do not tilt the container as the electrolyte flow may be interrupted.



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16-38 ELECTRICAL SYSTEM

Battery

- 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 battery until the container is completely emptied.

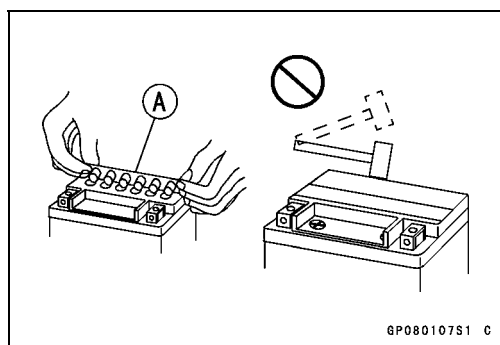
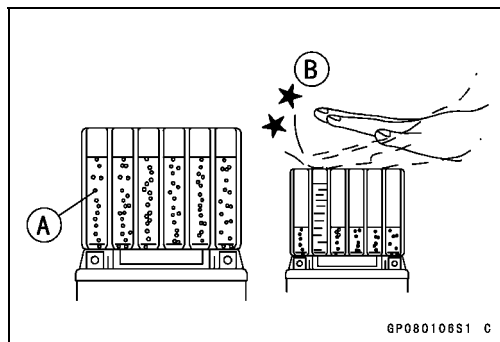
- Be certain that all the electrolyte has flowed out.
- Tap the bottom the same way as above if there is any electrolyte left in the container.
- Now pull the container gently out of the battery.
- Let the battery sit for **20** minutes. During this time, the electrolyte permeates the special separators 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 install the seal caps after filling the battery, never remove it, nor add any water or electrolyte.



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)	1.4 A × 2 ~ 3 hours (VN800-B1 ~ B8) 1.2 A × 2 ~ 3 hours
Battery has been stored in high temperature and humidity.	1.4 A × 15 ~ 20 hours (VN800-B1 ~ B8) 1.2 A × 15 ~ 20 hours
Seal 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) <u>12</u> <u>10</u> <u>93</u> <u>T1</u> Day Month Year 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

Battery

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.

Interchange

A sealed battery can fully display its performance only when combined with a proper vehicle electric system. Therefore, replace a sealed battery only on a motorcycle which was originally equipped with a 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

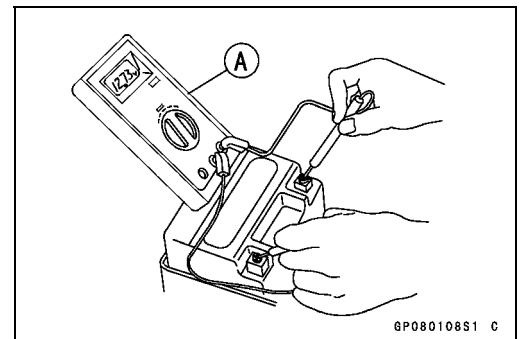
Battery charging condition can be checked by measuring battery terminal voltage.

- Remove the seat (see Frame chapter).
- Disconnect the battery terminal leads.

CAUTION

Be sure to disconnect the negative terminal (-) lead first.

- Measure the battery terminal voltage.



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16-40 ELECTRICAL SYSTEM

Battery

NOTE

○ Measure with a digital voltmeter [A] which can be read to 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 terminal leads (see Charging Condition Inspection).
- Remove the battery [A].
- Refresh-charge by following method according to the battery terminal voltage.

CAUTION

This battery is sealed type. Never remove seal caps [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

1.4 A × 5 ~ 10 h (VN800-B1 ~ B8)

1.2 A × 5 ~ 10 h

Quick Charge

6.0 A × 1.0 h (VN800-B1 ~ B8)

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: 1.4 A × 20 h (VN800-B1 ~ B8)

1.2 A × 20 h

NOTE

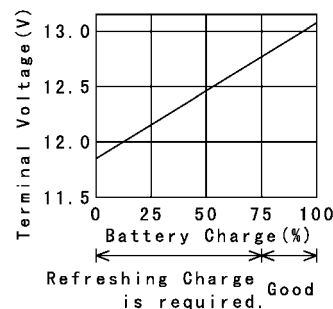
○ Increase the charging voltage to a maximum voltage of 25 V if the battery will not accept current initially. Charge for no more than five minutes at the increased voltage then check if the battery is drawing current. If the battery will accept current decrease the voltage and charge by the standard charging method described on the battery case. If the battery will not accept current after 5 minutes, replace the battery.

Battery [A]

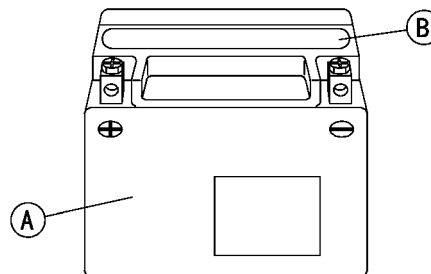
Battery Charger [B]

Standard Charging Amperage [C]

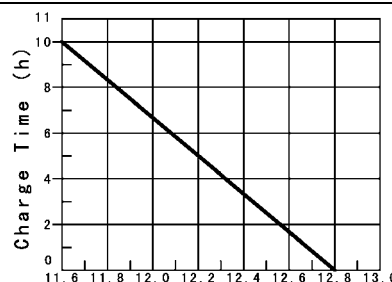
Current start to flow [D]



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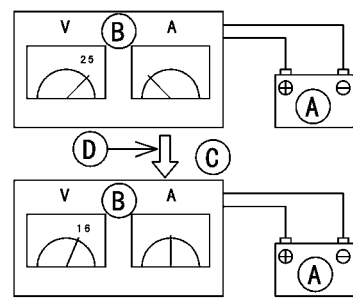


GP080110S1 C



Battery Terminal Voltage (V)

GP08021BS1 C



GP08022BS1 C

Battery

- 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 ~ 12.8 V or lower	Charge insufficient → Recharge.
12.0 V or lower	Unserviceable → Replace

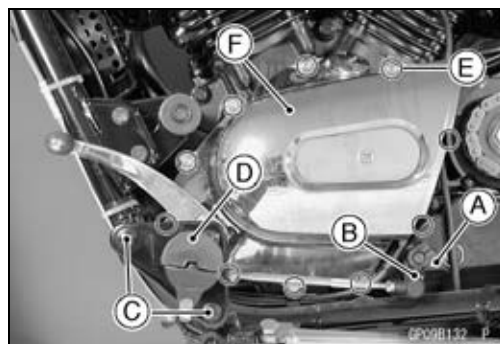
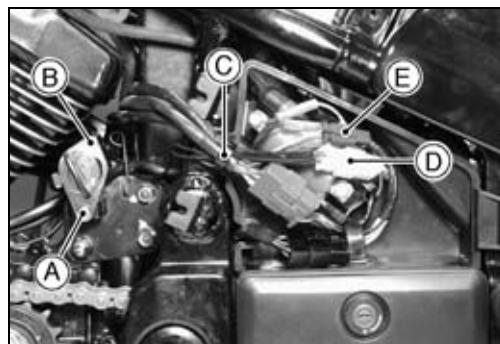
16-42 ELECTRICAL SYSTEM

Charging System

Alternator Cover Removal

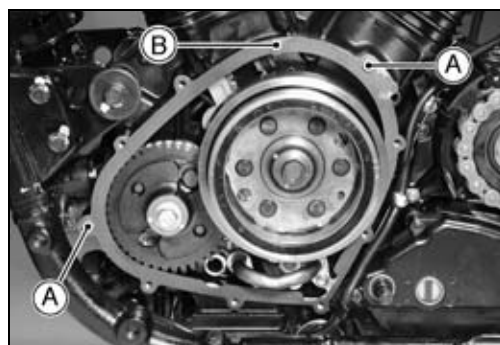
- Drain the engine oil (see Lubrication System chapter).
- Remove:
 - Engine Sprocket Cover (see Final Drive chapter)
 - Left Side Cover (see Frame chapter)
 - Bolt [A] and Ignition Switch [B]
 - Clamp [C]
 - Alternator Lead Connector [D]
 - Pickup Coil Lead Connector [E]

Bolt [A]
Shift Lever [B]
Bolts [C]
Footpeg [D] and Shift Pedal as a set.
Bolts [E]
Alternator Cover [F]



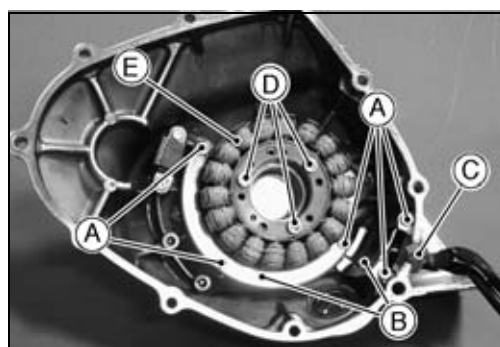
Alternator Cover Installation

- Check to see that the knock pins [A] are in place.
- Apply a non-permanent locking agent to the threads of the cover bolt [B].



Stator Coil Removal

- Remove:
 - Alternator Cover (see Alternator Cover Removal)
 - Bolts [A] and Clamps [B]
 - Pickup Coil and Alternator Lead Grommets [C]
 - Stator Coil Bolts [D]
- Remove the stator coil [E] from the alternator cover.



Stator Coil Installation

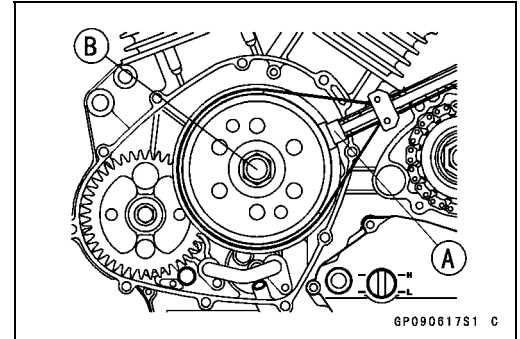
- Tighten:
 - Torque - Stator Coil Bolts: 13 N·m (1.3 kgf·m, 113 in·lb)**
- Apply adhesive agent to the circumference of the alternator lead and pickup coil lead grommets, and fit the grommets into the notch of the cover securely.
- First install the alternator lead grommet and then pickup coil lead grommet.
- Secure the alternator lead and pickup coil lead with clamps, and tighten the bolts.
- Torque - Alternator Lead Clamp Bolts: 7.8 N·m (0.80 kgf·m, 69 in·lb)**
- Install the alternator cover (see Alternator Cover Installation).

Charging System

Alternator Rotor Removal

- Remove:
 - Alternator Cover (see Alternator Cover Removal).
- Wipe oil off the outer circumference of the rotor.
- Hold the alternator rotor steady with the flywheel holder [A], and remove the rotor bolt [B].

Special Tool - Flywheel Holder: 57001-1313

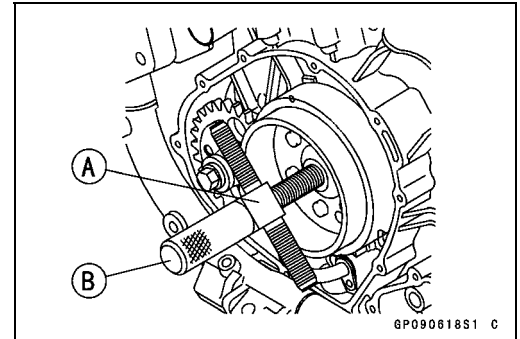


- Using the rotor puller [A], remove the alternator rotor from the crankshaft.

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

NOTE

- Screw in the puller while tapping the head [B] of the puller with a hammer.

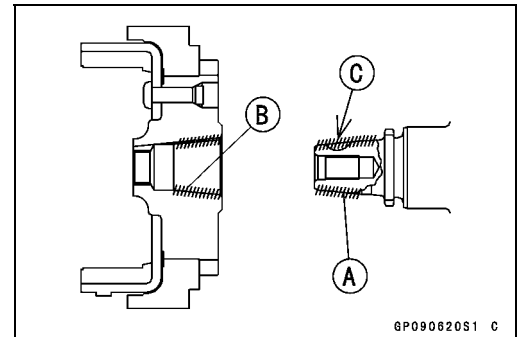


CAUTION

Do not attempt to strike the alternator rotor itself. Striking the rotor can cause the magnets to lose their magnetism.

Alternator Rotor Installation

- Using a cleaning fluid, clean off any oil or dirt on the following portions and dry them with a clean cloth.
 - [A] Crankshaft Tapered Portion
 - [B] Alternator Rotor Tapered Portion
- Fit the woodruff key securely in the slot [C] in the crankshaft before installing the alternator rotor.

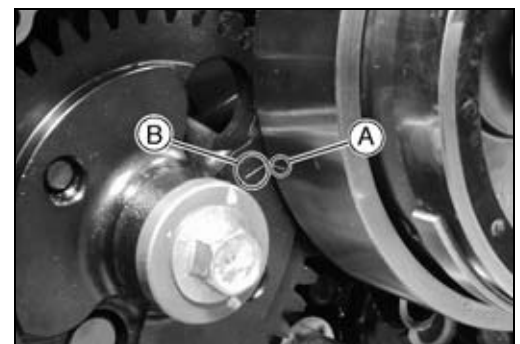


- When installing the alternator rotor, align the rotor mark [A] with the left balancer mark [B].
- Apply oil to the threads and seating surface of the alternator rotor bolt.
- Tighten the alternator rotor bolt while holding the alternator rotor steady with the flywheel holder.

Special Tool - Flywheel Holder: 57001-1313

Torque - Alternator Rotor Bolt: 157 N·m (16 kgf·m, 118 ft·lb)

- Install the alternator cover (see Alternator Cover Installation).



16-44 ELECTRICAL SYSTEM

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.
 - Turn off the ignition switch.
 - Remove the left side cover (see Frame chapter).
 - Disconnect the alternator lead connector [A].
 - Connect the hand tester as shown in the table 1.
 - Start the engine.
 - Run it at the rpm given in the table 1.
 - Note the voltage readings (total 3 measurements).



Table 1 Alternator Output Voltage

Tester Range	Connections		Reading @4 000 rpm
	Tester (+) to	Tester (–) to	
250 V AC	One Black lead	Another Black lead	50 ~ 80 V

✚ If the output voltage shows the value in the table, the alternator operates properly and the regulator/rectifier is damaged. A much lower reading than that given in the table indicates that the alternator is defective.

- Check the stator coil resistance as follows:
 - Stop the engine.
 - Connect the hand tester as shown in the table 2.
 - Note the readings (total 3 measurement).

Table 2 Stator Coil Resistance

Tester Range	Connections		Reading
	Tester (+) to	Tester (–) to	
$\times 1 \Omega$	One Black lead	Another Black lead	0.3 ~ 0.5 Ω

✚ If there is more resistance than shown in the table, or no hand tester reading (infinity) for any two leads, the stator has an open lead and must be replaced. Much less than this resistance means the stator is shorted, and must be replaced.

- Using the highest resistance range of the hand tester, measure the resistance between each of the black leads and chassis ground.

✚ Any hand tester reading less than infinity (∞) indicates a short, necessitating stator replacement.

✚ If the stator coils have normal resistance, but the voltage check showed the alternator to be defective; then the rotor magnets have probably weakened, and the rotor must be replaced.

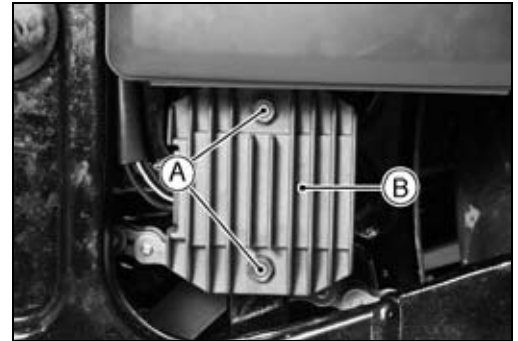
Special Tool - Hand Tester: 57001-1394

Charging System

Regulator/Rectifier Inspection

- Remove:
 - Left Side Cover (see Frame chapter)
 - Connector [A] (disconnect)
 - Tool Kit Container Bolts [B]

Bolts [A] and Regulator/Rectifier [B]



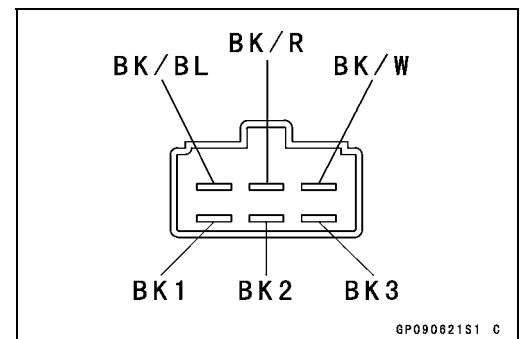
Rectifier Circuit Check

- Check the rectifier resistance as follows.
- Disconnect the regulator/rectifier connector.
- Connect the hand tester (special tool) to the regulator/rectifier as shown in the table, and check the resistance in both directions of each diode in the rectifier following the table.
- ✚ The resistance should be low in one direction and more than ten times as much in the other direction. If any two leads are low or high in both directions, the rectifier is defective and the regulator/rectifier must be replaced.

NOTE

○ The actual meter reading varies with the meter used and the individual rectifier, but, generally speaking the lower reading should be from zero to one half the scale.

No.	Connections		Reading	Tester Range
	Tester (+)	Tester (–)		
1	BK1	BK/BL	∞	$\times 10\Omega$ or $\times 100\Omega$
2	BK2			
3	BK3			
4	BK1	BK/W	$1/2$ scale or less	
5	BK2			
6	BK3			
7	BK/BL	BK1		
8		BK2		
9		BK3		
10	BK/W	BK1	∞	
11		BK2		
12		BK3		



16-46 ELECTRICAL SYSTEM

Charging System

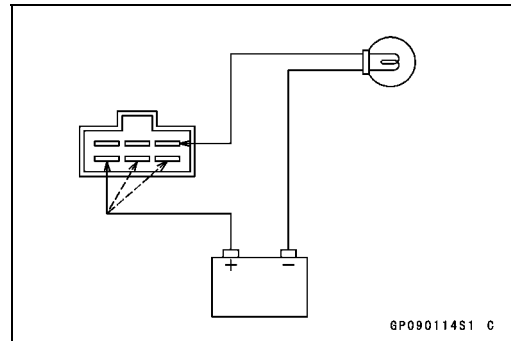
Regulator Circuit Check

To test the regulator out of circuit, use three 12 V batteries and a test light (12 V 3 ~ 6 W bulb in a socket with leads).

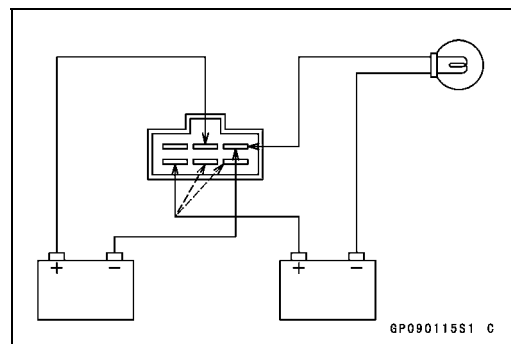
CAUTION

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.

- Do the 1st step regulator circuit test.
- Connect the test light and the 12 V battery to the regulator/rectifier as shown.
- Check BK1, BK2 and BK3 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.



- Do the 2nd step regulator circuit test.
- Connect the test light and the 12 V battery in the same manner as specified in the "1st step regulator circuit test".
- Apply 12 V to the BK/R terminal.
- Check BK1, BK2 and BK3 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.

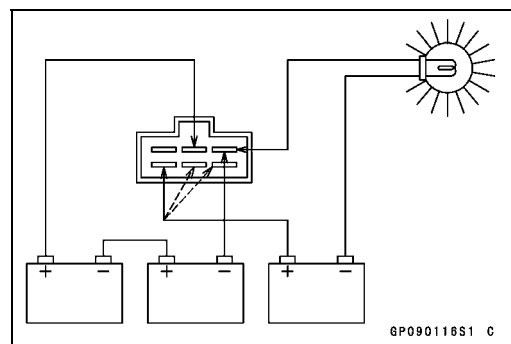


- Do the 3rd step regulator circuit test.
- Connect the test light and the 12 V battery in the same manner as specified in the "1st step regulator circuit test".
- Momentarily apply 24 V to the BK/R terminal by adding a 12 V battery.
- Check BK1, BK2, and BK3 terminals respectively.

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 BK/R 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 Voltage Inspection

- Check the battery condition (see Battery section).
- Warm up the engine to obtain actual alternator operating conditions.
- Remove the left side covers (see Frame chapter).
- Check that the ignition switch is turned off, and connect the hand tester [A] as shown in the table.

Special Tool - Hand Tester: 57001-1394

- 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 United States, Canada and Australia models, 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.



Charging Voltage

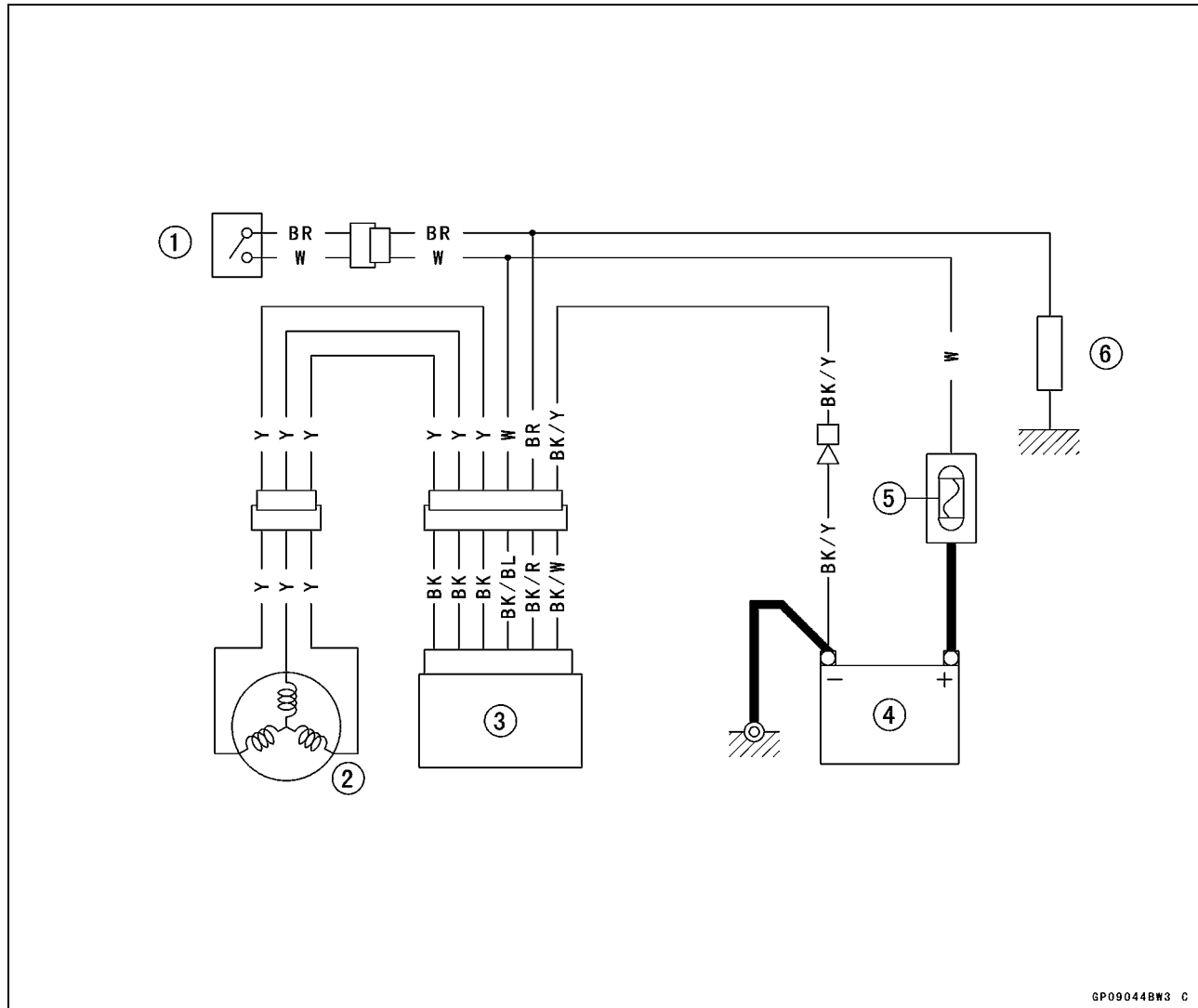
Tester Range	Connections		Reading
	Tester (+) to	Tester (-) to	
25 V DC	White	Black/Yellow	14 ~ 15 V

- Turn off the ignition switch to stop the engine, and disconnect the hand tester.
- ⚠ If the charging voltage is kept between the values given in the table, the charging system is considered to be working normally.
- ⚠ If the charging 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 charging voltage does not rise as the engine speed increases, then the regulator/rectifier is defective or the alternator output is insufficient for the loads. Check the alternator and regulator/rectifier to determine which part is defective.

16-48 ELECTRICAL SYSTEM

Charging System

Charging System Circuit

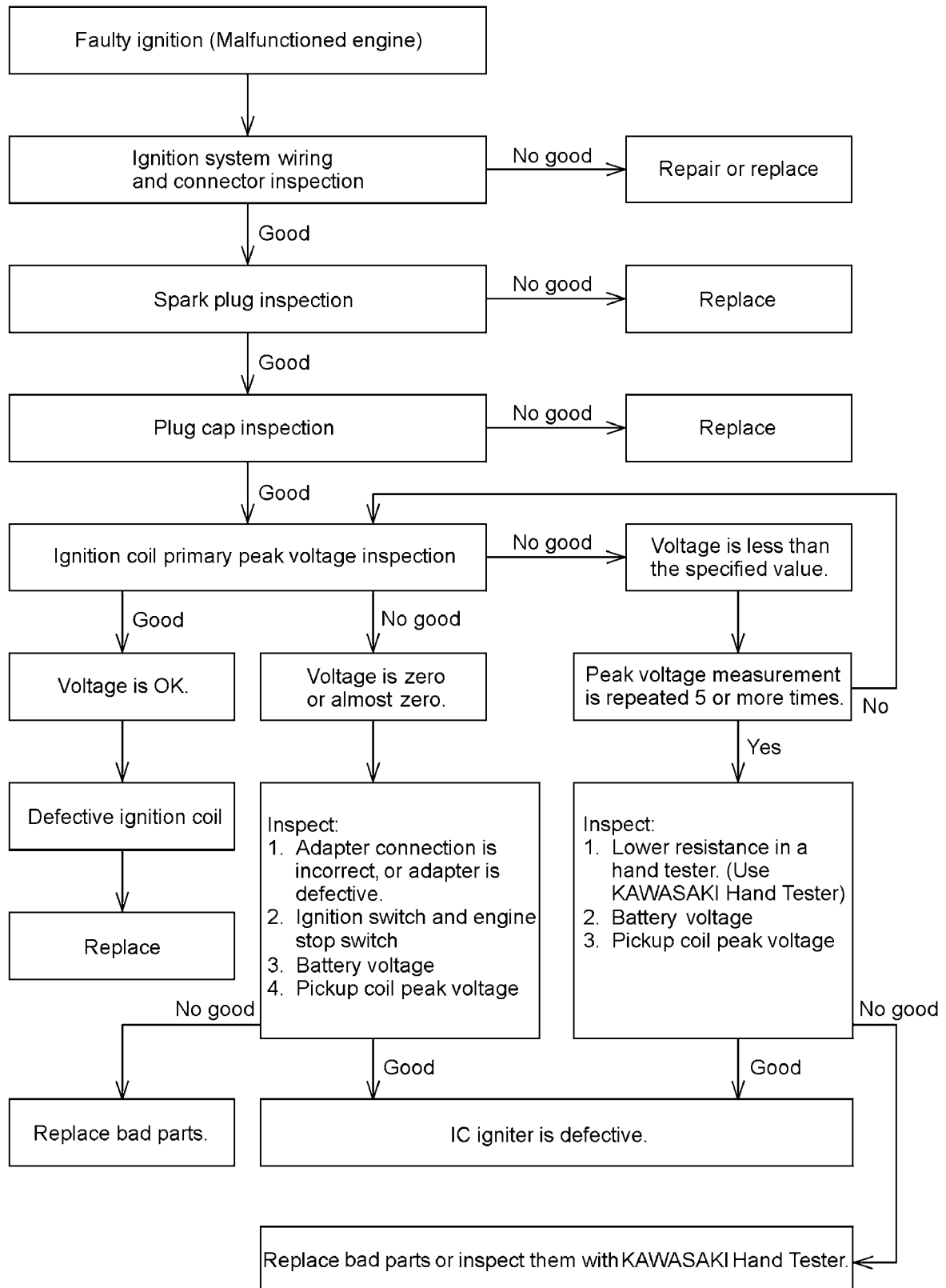


GP090448W3 C

1. Ignition Switch
2. Alternator
3. Regulator/Rectifier
4. Battery
5. Main Fuse 30 A
6. Load

Ignition System

Ignition System Troubleshooting



16-50 ELECTRICAL SYSTEM

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.

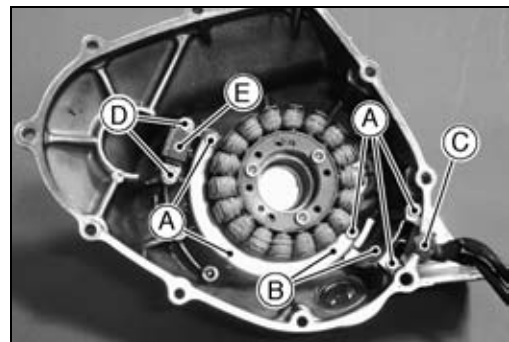
CAUTION

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 Cover Removal)
 - Bolts [A] and Clamps [B]
 - Pickup Coil Grommet [C]
 - Pickup Coil Bolt [D]
- Remove the pickup coil [E] from the alternator cover.



Pickup Coil Installation

- Tighten:
 - Torque - Pickup Coil Bolts: 7.8 N·m (0.80 kgf·m, 69 in·lb)**
- Install the pickup coil lead on the alternator cover (see Stator Coil Installation).

Pickup Coil Inspection

- Remove:
 - Left Side Cover (see Frame chapter)
 - Pickup Coil Lead Connector [A]
- Set the hand tester to the $\times 100 \Omega$ range and connect it between the terminals in the connector.

Special Tool - Hand Tester: 57001-1394

- ✚ 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

Standard: 380 ~ 570 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

Pickup Coil Peak Voltage Inspection

- Remove the left Side Cover (see Frame chapter).
- Remove all the spark plug caps but do not remove the spark plugs.
- Disconnect the pickup coil lead connector.
- Connect a commercially available peak voltage adapter [A] to the hand tester [B].

Special Tool - Peak Voltage Adapter: 57001-1415

Type: KEK-54-9-B

- Insert the adapter probes into the connector [C] of the pickup coil as shown.

Special Tool - Hand Tester: 57001-1394

Connections: **Adapter (R, +)** **Adapter (BK, -)**
Pickup Coil: **Y** ← → **BK**

NOTE

○ Be sure the battery is fully charged.

Hand Tester Range: × DC 10 V

- Turn the ignition switch and the engine stop switch ON.
- Pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission in neutral to measure the pickup coil peak voltage.
- Repeat the measurements 5 or more times.

Pickup Coil Peak Voltage

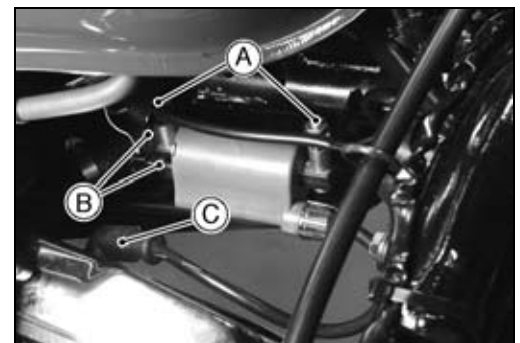
Standard: **2.5 V or more**

- ⚠ If the reading is less than the specified value, replace the pickup coil.
- ⚠ If the peak voltage adapter is not available, the coil can be checked for the broken or badly shorted winding with the hand tester (see Pickup Coil Inspection).

Ignition Coil Removal

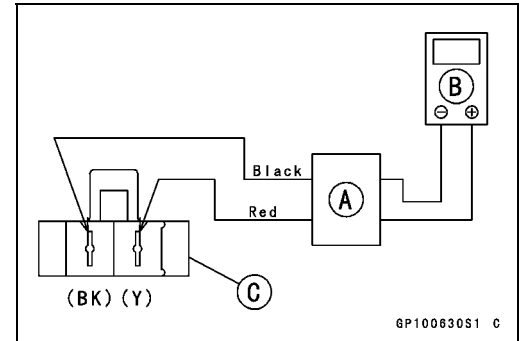
Front

- Remove:
 - Nuts [A]
 - Primary Lead Connectors [B]
 - Spark Plug Cap [C]
 - Ignition Coil



Rear

- Left Side Cover and Seat (see Frame chapter)
- Spark Plug Cap [A]
- Primary Lead Connectors [B]
- Bolts [C], Collars, and Ignition Coil



16-52 ELECTRICAL SYSTEM

Ignition System

Ignition Coil Inspection

- Remove the ignition coils (see Ignition Coil Removal).
- Measure the arcing distance with the 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 at the 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:

Standard: 6 mm (0.24 in.) or more

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the coil body or leads.

- ⚠ If the distance reading is less than the specified value, the ignition coil or spark plug caps are defective.
- To determine which part is defective, measure the arcing distance again with the spark plug caps removed from the ignition coil. Remove the caps by turning them counterclockwise.
- ⚠ If the arcing distance is subnormal as before, the trouble is with the ignition coil itself. If the arcing distance is now normal, the trouble is with the spark plug caps.
- ⚠ If the coil tester is not available, the coil can be checked for a broken or badly shorted winding with the hand tester.

NOTE

○ The hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.

- Measure the primary winding resistance [A] as follows.
- Connect the hand tester between the coil terminals.
- Set the tester to the $\times 1 \Omega$ range, and read the tester.
- Measure the secondary winding resistance [B] as follows.
- Remove the plug caps by turning them counterclockwise.

- Connect the tester between the spark plug leads.
- Set the tester to the $\times 1 \text{ k}\Omega$ range and read the tester.

Ignition Coil Winding Resistance

Primary Windings: 2.3 ~ 3.5 Ω

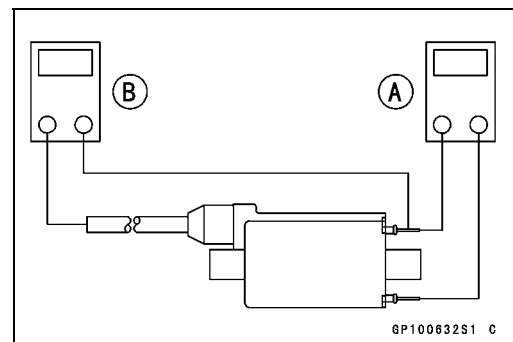
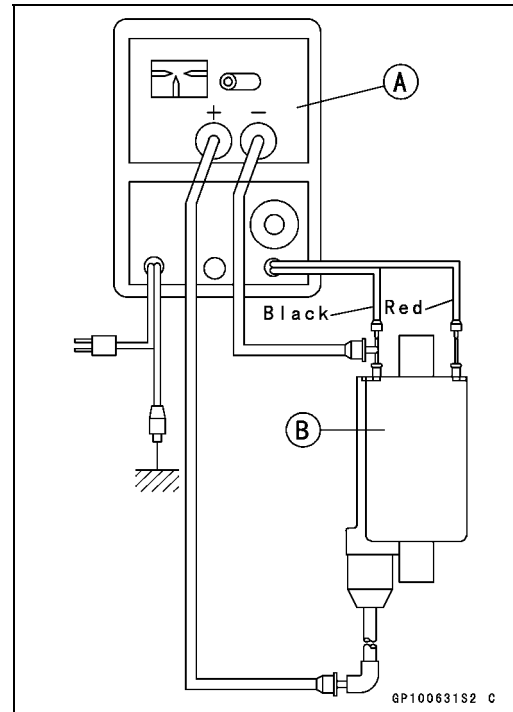
Secondary Windings: 12.0 ~ 18.0 $\text{k}\Omega$

- ⚠ If the tester does not read as specified, replace the coil.
- To install the plug cap, turn it clockwise.

Ignition Coil Primary Peak Voltage Inspection

NOTE

○ Be sure the battery is fully charged.



Ignition System

- Remove the fuel tank (see Fuel System chapter).
- Remove all the spark plugs caps but do not remove the spark plugs.
- Install new spark plugs [A] into all the spark plug caps, and ground them onto the engine.
- Install a commercially available peak voltage adapter [B] into the hand tester [C].

Special Tool - Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B

Special Tool - Hand Tester: 57001-1394

Hand Tester Range: × DC 250 V

- Connect the adapter between the ignition coil primary lead terminals [D] and ground.
 [E] Battery
 [F] Ignition Coil
 [G] IC igniter

Primary Lead Connection:

	Adapter (R, +)		Adapter (BK, -)
Front Ignition Coil	Green	↔	Ground
Rear Ignition Coil	Black/White	↔	Ground

WARNING

To avoid extremely high voltage shocks, do not touch the spark plugs or tester connections.

- Turn the ignition switch and the engine stop switch ON.
- Pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission in neutral to measure the primary peak voltage.
- Repeat the measurements 5 or more times for one ignition coil.

Ignition Coil Primary Peak Voltage

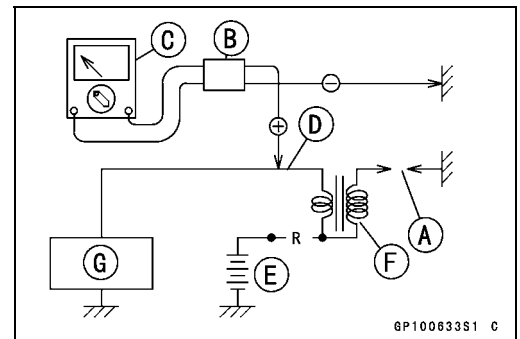
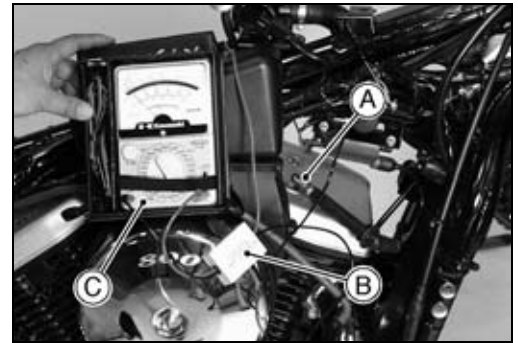
Standard: 120 V or more

- Repeat the test for the other ignition coil.
- ✚ If the reading is less than the specified value, check the following.
 - Ignition Coil (see Ignition Coil Inspection)
 - Pickup Coil (see Pickup Coil Inspection)
 - IC Igniter (see IC Inspection)

Spark Plug Removal

- Remove:
 - Seat (see Frame chapter)
 - Spark Plug Caps
- Remove the spark plugs using the 16 mm plug wrench [A].

Owner's Tool - Spark Plug Wrench, 16 mm: 92110-1132



16-54 ELECTRICAL SYSTEM

Ignition System

Spark Plug Installation

- Insert the spark plug vertically into the plug hole with the plug installed in the plug wrench.

Owner's Tool - Spark Plug Wrench, 16 mm: 92110-1132

- Tighten:

Torque - Spark Plugs: 18 N·m (1.8 kgf·m, 13 ft·lb)

- Fit the plug caps securely.
- Pull up the spark plug caps lightly to make sure of the installation of the spark plug caps.

Spark Plug Cleaning and Inspection

- Refer to the Spark Plug Cleaning and Inspection in the Periodic Maintenance chapter.

Spark Plug Gap Inspection

- Refer to the Spark Plug Gap Inspection in the Periodic Maintenance chapter.

IC Igniter Inspection

CAUTION

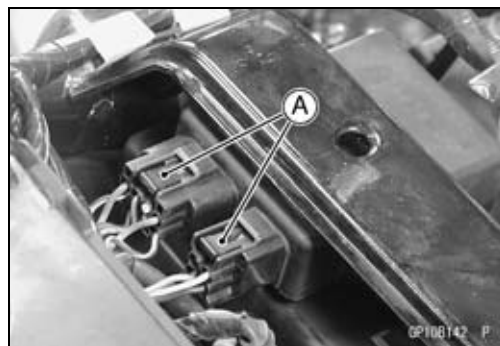
When inspecting the IC igniter observe the following to avoid damage to the IC Igniter.

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.

Igniter Input Voltage Check

- Remove:
Seat (see Frame chapter)
- Disconnect the igniter connectors [A] of the main harness.



- Set the tester to the DC25 V range, and connect it between the BR/W wire terminal [A] and BK/Y wire terminal [B].

Special Tool - Hand Tester: 57001-1394

Connection:

Tester Positive → **Brown/White Wire**

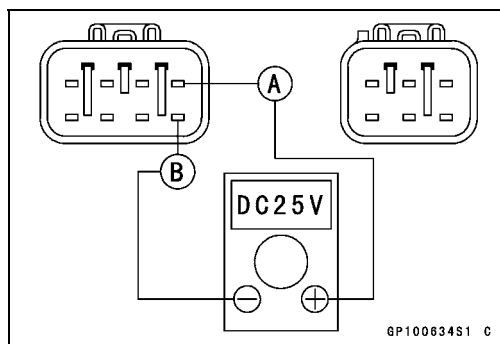
Tester Negative → **Black/Yellow Wire**

- Turn the ignition switch on.
- Read the voltage of the tester.

Igniter Input Voltage

Standard: Battery Voltage

- If it is none or low voltage, check the battery voltage, ignition switch and ignition fuse of the junction box.



Ignition System

Ignition Coil primary Peak Voltage Check

- Refer:
Ignition Coil Primary Peak Voltage Inspection

Pickup Coil Peak Voltage Check

- Refer:
Pickup Coil Peak Voltage Inspection

Emergency Engine Stop Function Check

- Remove:
Seat (see Frame chapter)

NOTE

○ Check the voltage of the emergency engine stop function with the motorcycle setting of its sidestand and its transmission being first gear position.

- Set the tester to the DC 25 V range, and connect it between the G/BK wire terminal [B] and frame ground [C].
Junction box [A].

Special Tool - Hand Tester: 57001-1394

Connection:

Tester Positive → **Green/Black Wire**
Tester Negative → **Frame Ground**

- Turn the ignition switch on.
- Push the starter button, and read the voltage of the tester.

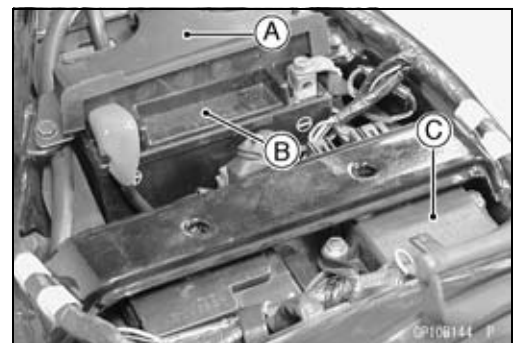
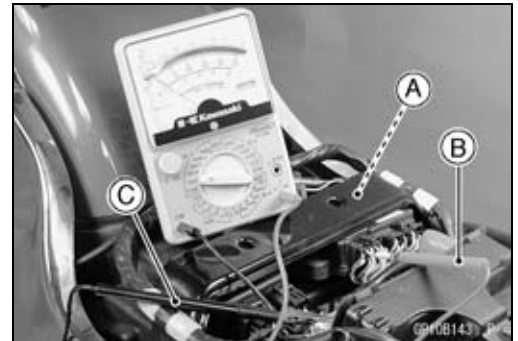
Emergency Engine Stop Voltage

Standard: About 6 ~ 13.4 V

- ✚ If it is within the specified voltage, the emergency engine stop voltage is normal.
- Next to grip the clutch lever and start the engine.
- The motorcycle setting on its sidestand and its transmission being first gear position.
- Slowly free the clutch lever then check the engine idling.
- ✚ If the engine does not stop, igniter is defective.

IC Igniter Checker Inspection

- Remove:
Seat (see Frame chapter).
Battery Cover [A]
Battery [B]
- Pull the connectors out of the IC igniter [C].



16-56 ELECTRICAL SYSTEM

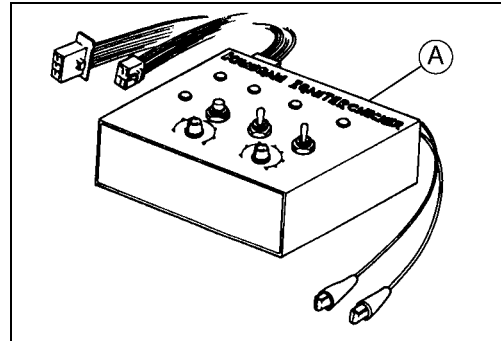
Ignition System

- To check the condition of the IC igniter, connect the igniter checker [A] to the IC igniter.

Special Tools - Igniter Checker Assembly: 57001-1378

Harness Adapter #12: 57001-1399

- Turn the select knob to "C" position.

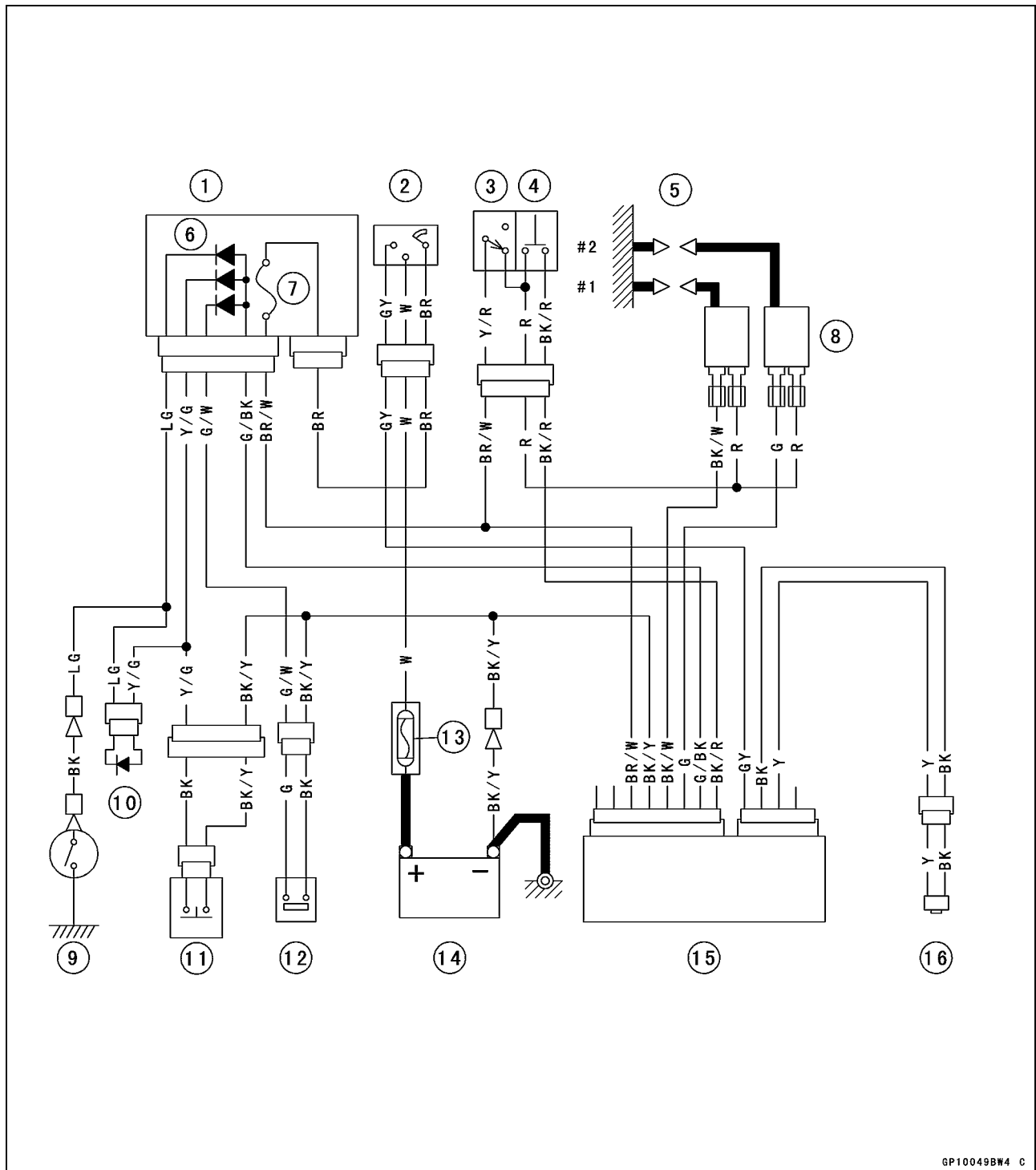


NOTE

- When using the igniter checker, refer to the manufacturer's instructions.
 - The igniter checker can detect the simulated dynamic characteristics; igniter response to r.p.m., interlock circuit signal, and engine overspeed limiter signal.
 - The igniter checker cannot inspect the condition of the CDI unit.
- If the condition of the IC igniter is abnormal, replace the IC igniter.
- If the igniter checker is not available, refer to IC igniter inspection.

Ignition System

Ignition System Circuit



GP10049BW4 C

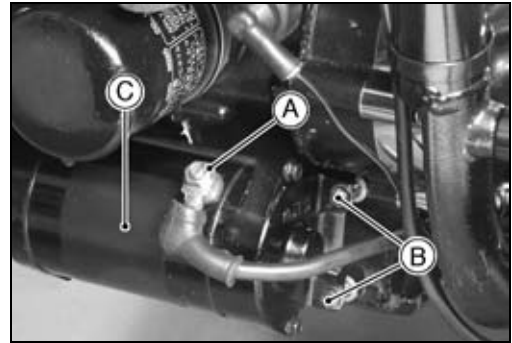
- | | | |
|-----------------------|----------------------------|-----------------------|
| 1. Junction Box | 7. Ignition Fuse 10 A | 12. Side Stand Switch |
| 2. Ignition Switch | 8. Ignition Coils | 13. Main Fuse 30 A |
| 3. Engine Stop Switch | 9. Neutral Switch | 14. Battery |
| 4. Starter Button | 10. Rectifier | 15. IC Igniter |
| 5. Spark Plugs | 11. Starter Lockout Switch | 16. Pickup Coil |
| 6. Diodes | | |

16-58 ELECTRICAL SYSTEM

Electric Starter System

Starter Motor Removal

- Drain the engine oil (see Lubrication System chapter).
- Remove the starter motor cable nut [A] and the mounting bolts [B].
- Pull out the starter motor [C].



Starter Motor Installation

CAUTION

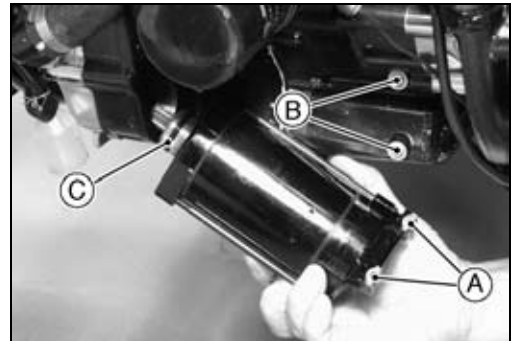
Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.

- When installing the starter motor, clean the starter motor legs [A] and crankcase [B] where the starter motor is grounded.
- Replace the O-ring [C] with the new one.
- Apply a small amount of grease to the O-ring.
- Tighten:

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

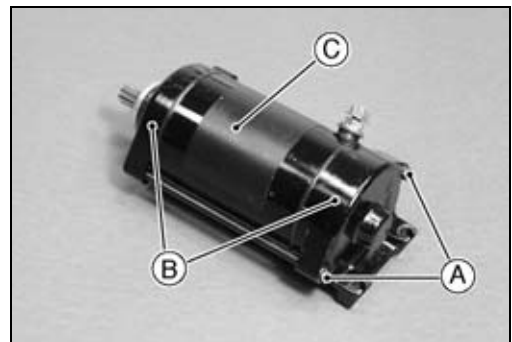
Starter Motor Cable Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb)

- Pour in the specified type and amount of oil (see Engine Lubrication System chapter).

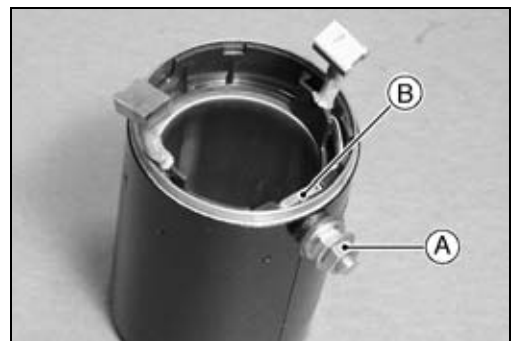


Starter Motor Disassembly

- Take off the starter motor through bolts [A] and remove both end covers [B] and pull the armature out of the yoke [C].



- Remove the terminal nut [A], and remove the terminal assembly [B] from the yoke.



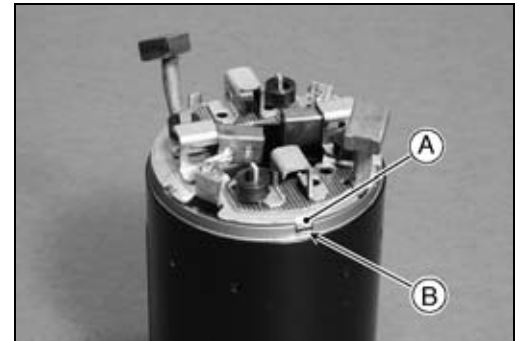
Electric Starter System

Starter Motor Assembly

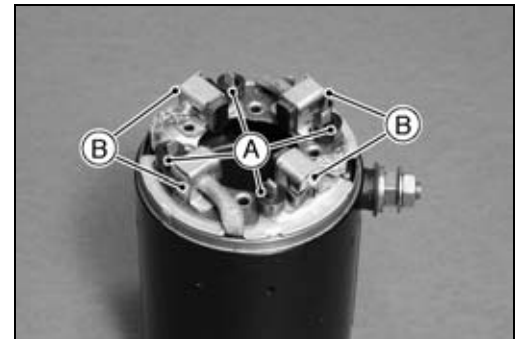
- Install the terminal assembly in the yoke.
- Tighten:

Torque - Starter Motor Terminal Nut: 11 N·m (1.1 kgf·m, 95 in·lb)

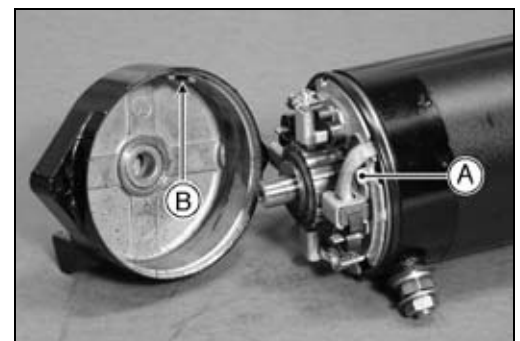
- Fit the projection [A] of the brush plate into the yoke notch [B].



- After holding the springs [A] with suitable washers [B], insert the brushes as shown.
- Insert the armature, and then pull out the washers to release the springs.



- Fit the long tongue [A] of the bush plate into the end cover groove [B].



- When the yoke, brush plate, and end covers are properly assembled, the lines [A] on the yoke and cover should be aligned.
- Tighten:

Torque - Starter Motor Through Bolts: 4.9 N·m (0.50 kgf·m, 43 in·lb)



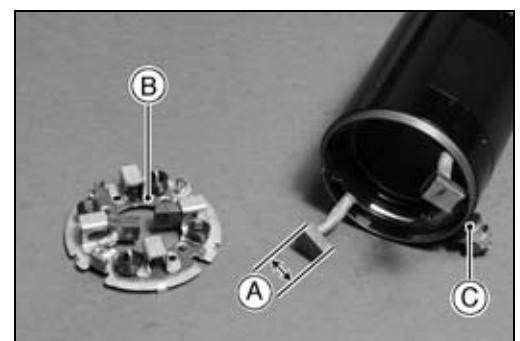
Brush Inspection

- Measure the length [A] of each brush.
- ✚ If any is worn down to the service limit, replace the brush plate [B] and the terminal assembly [C].

Starter Motor Brush Length

Standard: 12.0 ~ 12.5 mm (0.47 ~ 0.49 in.)

Service Limit: 5.5 mm (0.22 in.)

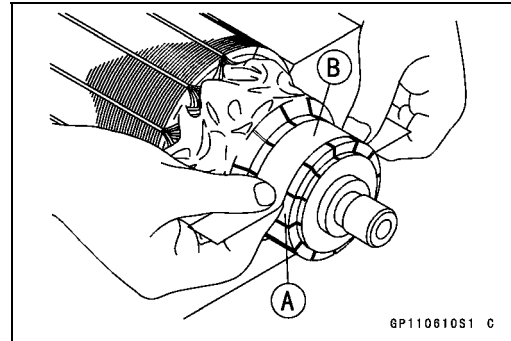


16-60 ELECTRICAL SYSTEM

Electric Starter System

Commutator Cleaning and Inspection

- Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.

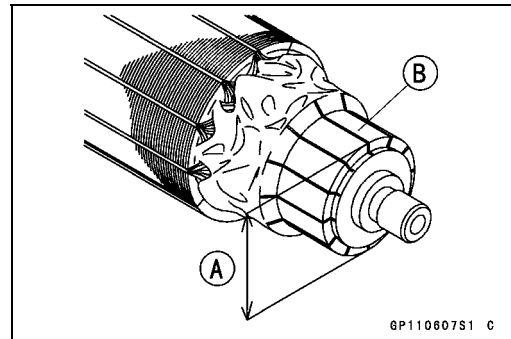


- Measure the diameter [A] of the commutator [B].
- Replace the starter motor with a new one if the commutator diameter is less than the service limit.

Commutator Diameter

Standard: 28 mm (1.10 in.)

Service Limit: 27 mm (1.06 in.)

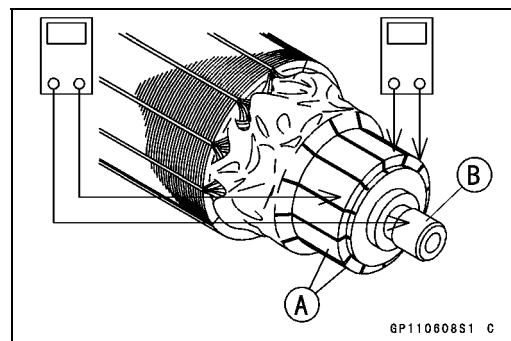


Armature Inspection

- Using the $\times 1 \Omega$ hand tester range, measure the resistance between any two commutator segments [A].

Special Tool - Hand Tester: 57001-1394

- 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

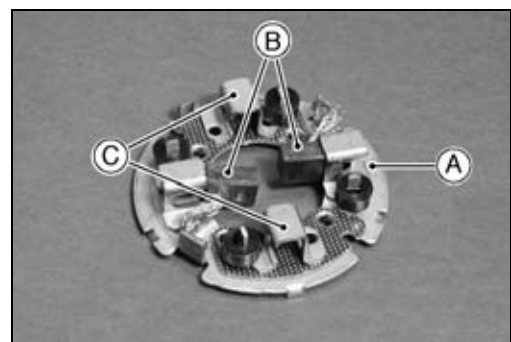
○ Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with the hand tester. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.

Brush Plate Inspection

- Using the $\times 1 \Omega$ hand tester range, measure the resistance between the brush plate [A] and the negative brushes [B].

Special Tool - Hand Tester: 57001-1394

- If there is not close to zero ohms, 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 holders [C].
- If there is any reading, the brush holder has a short. Replace the brush plate assembly.



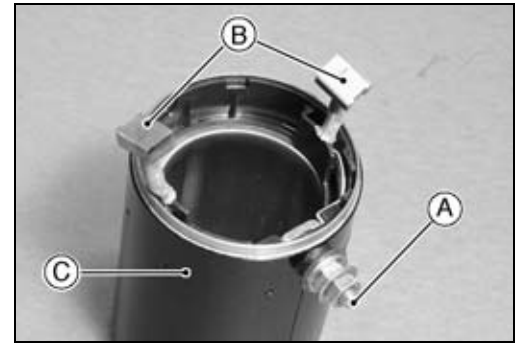
Electric Starter System

Terminal Inspection

- Using the $\times 1 \Omega$ hand tester range, measure the resistance between the terminal [A] and the positive brushes [B].

Special Tool - Hand Tester: 57001-1394

- ⚠ If there is not close to zero ohms, the terminal assembly has an open. Replace the terminal assembly.
- Using the highest hand tester range, measure the resistance between the terminal and the yoke [C].
- ⚠ If there is any reading, the terminal assembly has a short. Replace the terminal assembly.

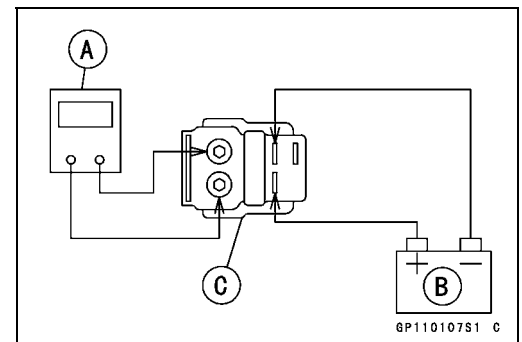


Starter Relay Inspection

- Remove:
 - Seat (see Frame chapter)
 - Stater Relay
- Connect the hand tester [A] and 12 V battery [B] to the starter relay [C] as shown.

Special Tool - Hand Tester: 57001-1394

- ⚠ If the relay does not work as specified, the relay is defective. Replace the relay.



Testing Relay

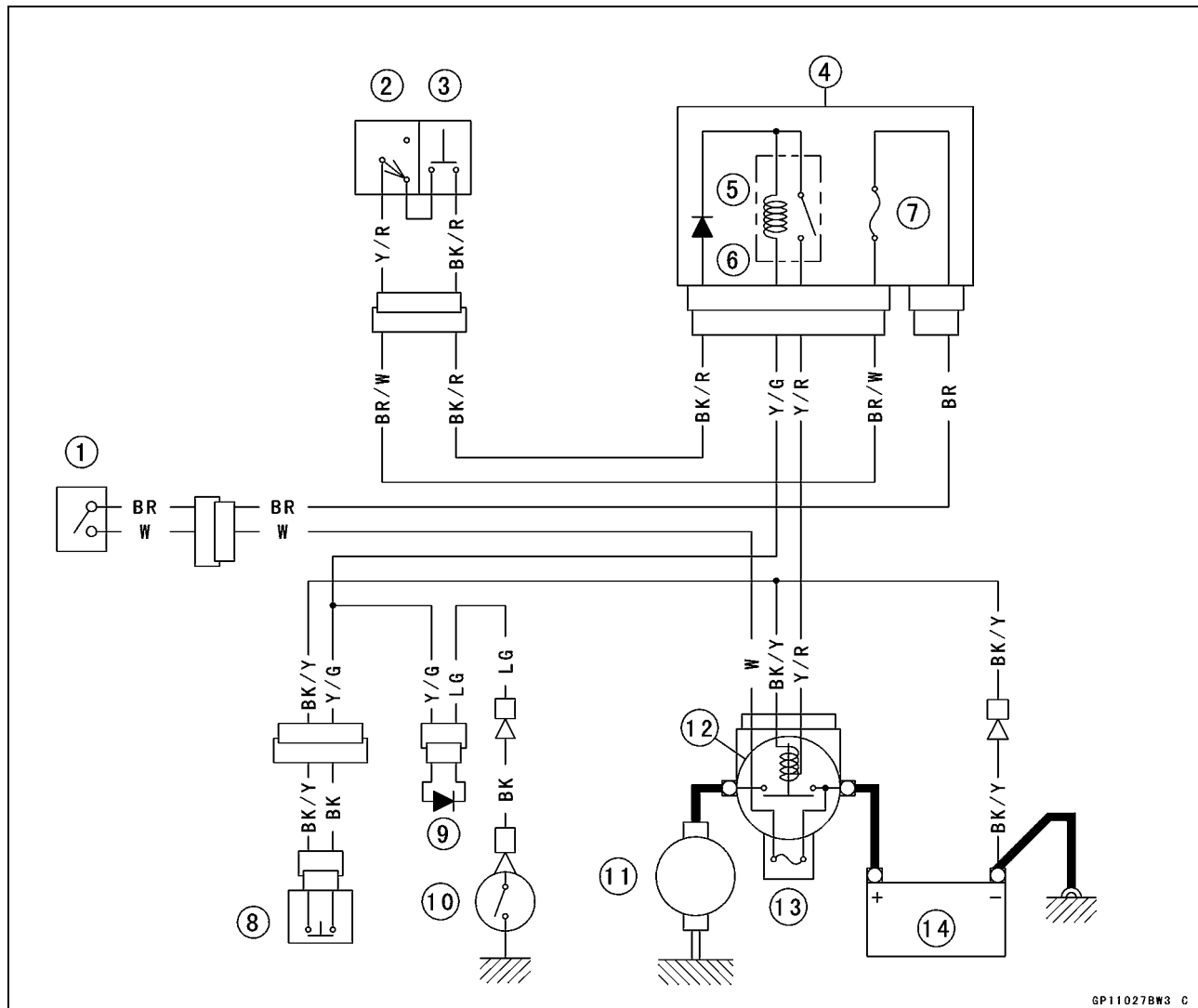
Tester Range: $\times 1 \Omega$ range

Criteria: When battery is connected $\rightarrow 0 \Omega$
 When battery is disconnected $\rightarrow \infty \Omega$

16-62 ELECTRICAL SYSTEM

Electric Starter System

Electric Starter Circuit



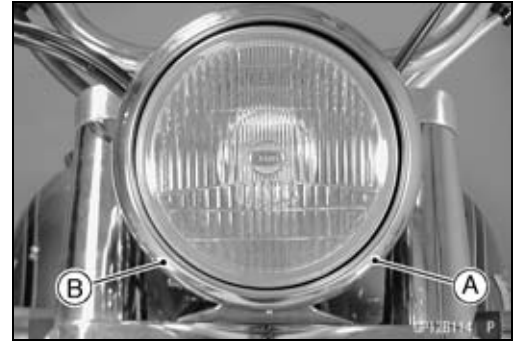
1. Ignition Switch
2. Engine Stop Switch
3. Starter Button
4. Junction Box
5. Diode
6. Starter Circuit Relay
7. Ignition Fuse 10 A
8. Starter Lockout Switch
9. Rectifier
10. Neutral Switch
11. Starter Motor
12. Starter Relay
13. Main Fuse 30 A
14. Battery

Lighting System

The United States, Canada, and Australia models adopt the daylight system and have a headlight relay in the junction box. In these models, the headlight does not go on when the ignition switch and the engine stop switch are first turned on. The headlight comes on after the starter button is released and stays on until the ignition switch is turned off. The headlight will go out momentarily whenever the starter button is pressed and come back on when the button is released.

Headlight Beam Horizontal Adjustment

- Turn the horizontal adjuster [A] on the headlight in or out until the beam points straight ahead.



Headlight Beam Vertical Adjustment

- Turn the vertical adjuster [B] on the headlight in or out to adjust the headlight vertically.

NOTE

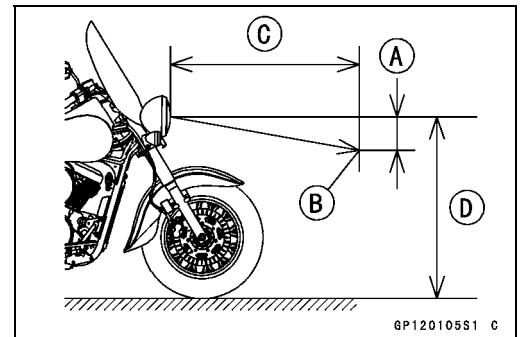
- On high beam, the brightest points should be slightly below horizontal with the motorcycle on its wheels and the rider seated. Adjust the headlight(s) to the proper angle according to local regulations.
- For United States model, the proper angle is 0.4 degrees below horizontal. This is 50 mm (2 in.) drop at 7.6 m (25 ft) measured from the center of the headlights with the motorcycle on its wheels and the rider seated.

50 mm (2 in.) [A]

Center of Brightest Spot [B]

7.6 m (25 ft) [C]

Height of Headlight Center [D]



16-64 ELECTRICAL SYSTEM

Lighting System

Headlight Bulb Replacement

- Remove:
 - Headlight Unit and Dust Cover [A]
 - Hook [B]
- Replace the headlight bulb [C].

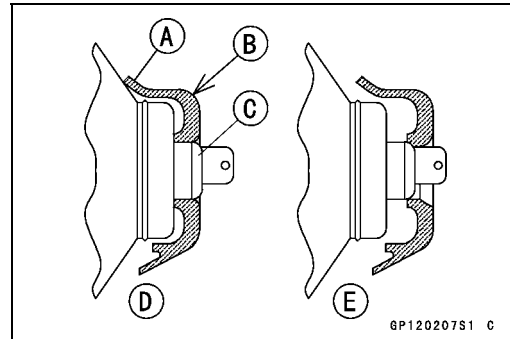
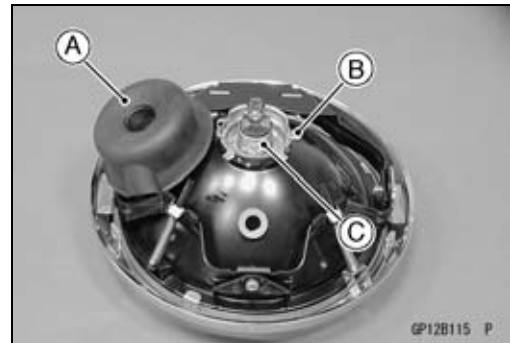
CAUTION

When handling the quartz-halogen bulb, never touch the glass portion with bare hands. Always use a clean cloth. Oil contamination from hands or dirty rags can reduce bulb life or cause the bulb to explode.

NOTE

○ Clean off any contamination that inadvertently gets on the bulb with alcohol or soap and water solution.

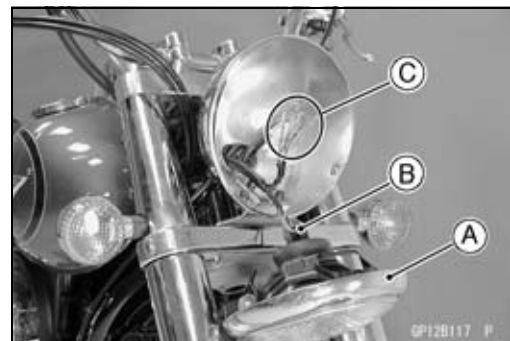
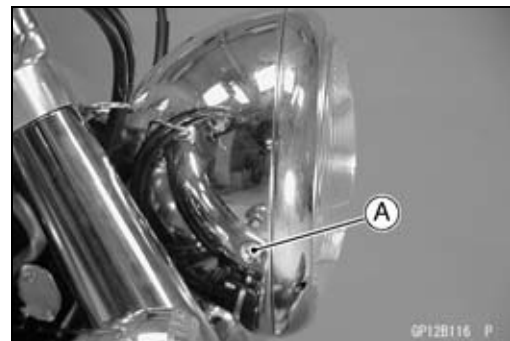
- Fit the dust cover [A] with the Top mark [B] upward onto the bulb [C] firmly as shown.
 - Good [D]
 - Bad [E]
- After installation, adjust the headlight aim (see this chapter).



Headlight Unit, Housing Removal

- Remove:
 - Screws [A] (both sides)

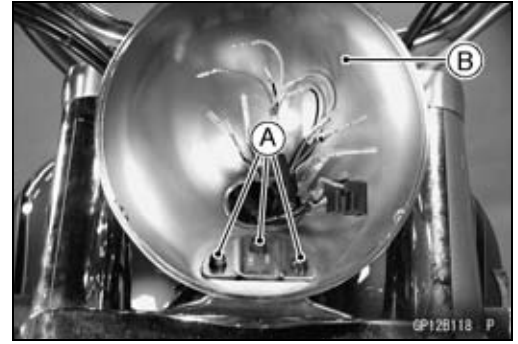
Headlight Unit [A]
Headlight Connector [B]
Turn Signal Light Lead Connectors [C]



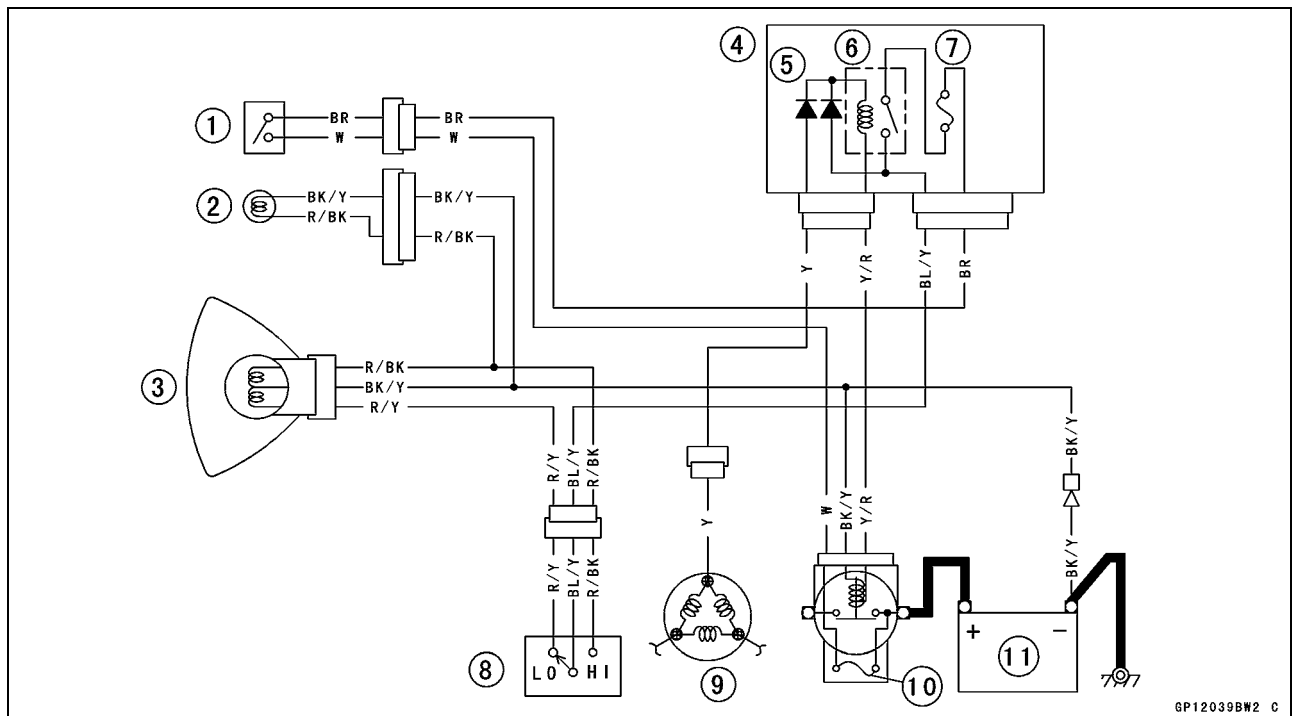
Lighting System

Bolts [A]

Headlight Housing [B]



Headlight Circuit (VN800-B1 ~, United States, Canada and Australia)

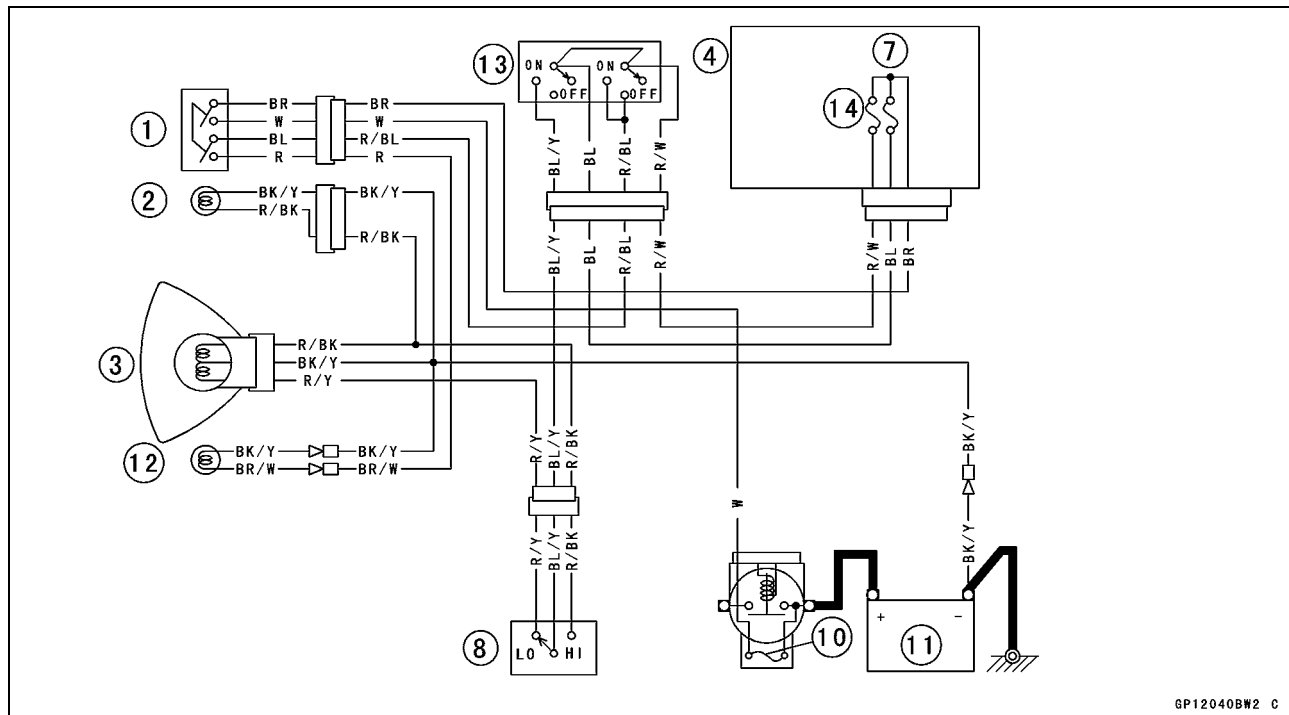


1. Ignition Switch
2. High Beam Indicator Light
3. Headlight
4. Junction Box
5. Diodes
6. Headlight Circuit Relay
7. Headlight Fuse 10 A
8. Dimmer Switch
9. Alternator
10. Main Fuse 30 A
11. Battery

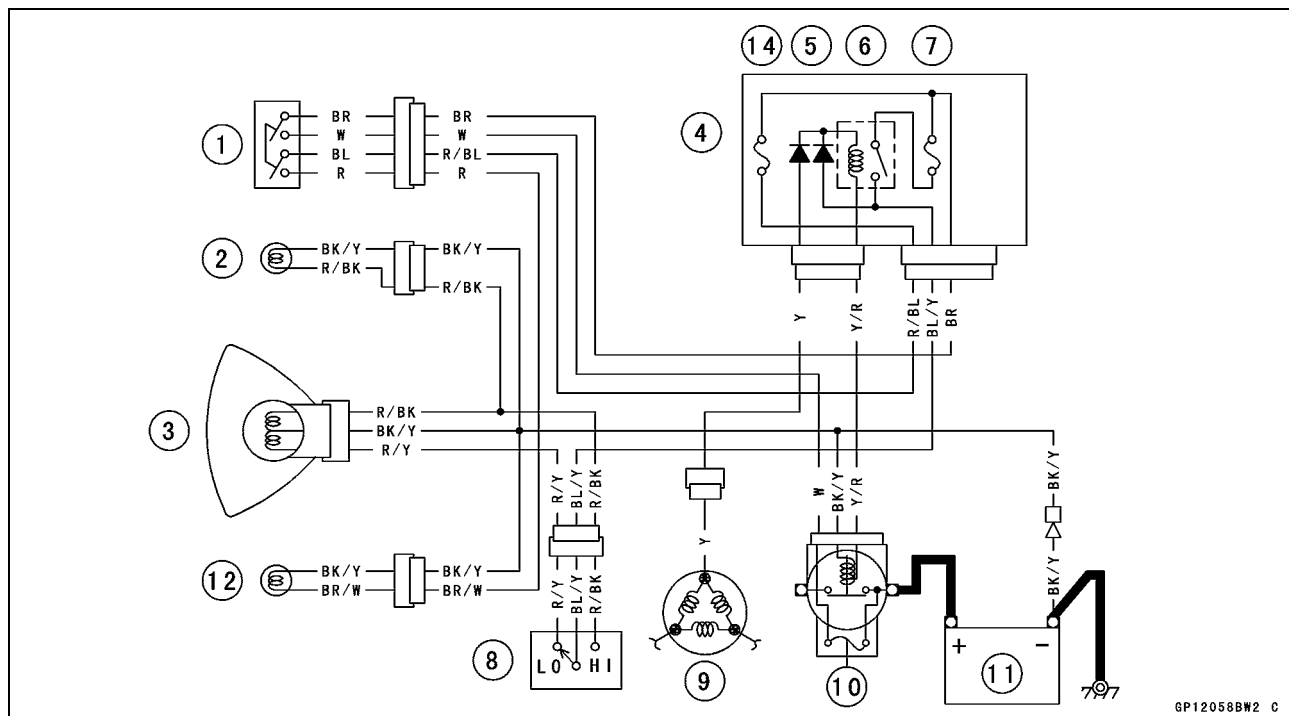
16-66 ELECTRICAL SYSTEM

Lighting System

Headlight Circuit (VN800-B1 ~ B7, Other than United States, Canada and Australia)



Headlight Circuit (VN800-B8 ~, B6F Other than United States, Canada and Australia)



1. Ignition Switch

2. High Beam Indicator Light

3. Headlight

4. Junction Box

5. Diodes

6. Headlight Circuit Relay

7. Headlight Fuse 10 A

8. Dimmer Switch

9. Alternator

10. Main Fuse 30 A

11. Battery

12. City Light

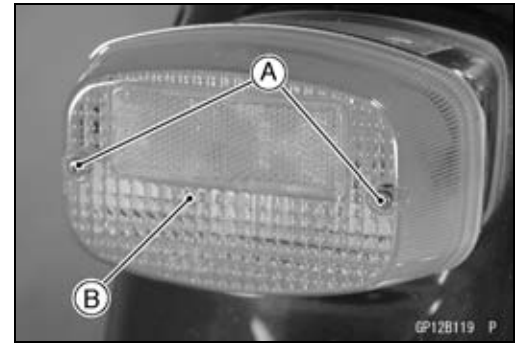
13. Headlight Switch

14. Taillight Fuse 10 A

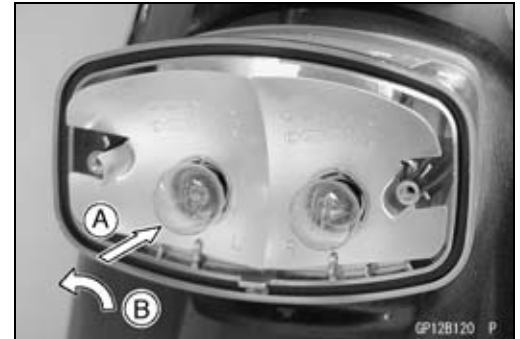
Lighting System

Tail/Brake Light Bulb Replacement

- Remove the tail/brake light lens screws [A] and take off the lens [B]



- Push the bulb [A] in the socket, turn it counter clockwise [B] and pull it out.

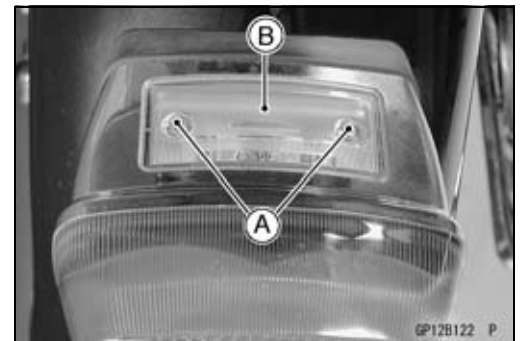


- With the front pin [A] up and the rear pin [B] down insert the new bulb by aligning the front pin with the groove in the walls of the socket [C].
- Push the bulb in, turn it clockwise and release it, it should lock in position.
- Tighten the lens screws be careful not to overtighten them.



License Plate Light Bulb Replacement

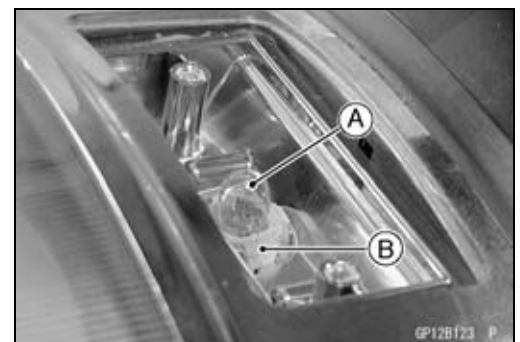
- Remove the license plate light lens screws [A] and take off the lens [B]



- To remove the wedge 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 greater wattage than the specified value.

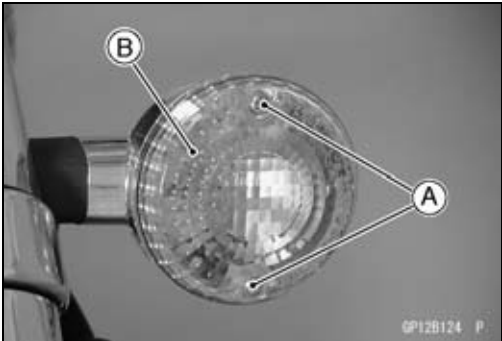


16-68 ELECTRICAL SYSTEM

Lighting System

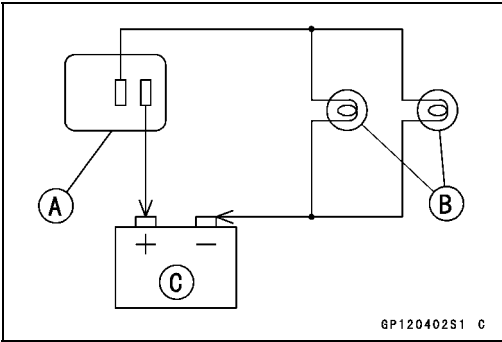
Turn Signal Light Bulb Replacement

- Remove the turn signal light lens screws [A] and remove the lens [B].
- Push the bulb [A] in the socket and turn the bulb counter-clockwise.
- Replace the bulb.



Turn Signal Relay Inspection

- Remove:
 - Seats (see Frame chapter)
 - Turn Signal Relay [A]
- 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.



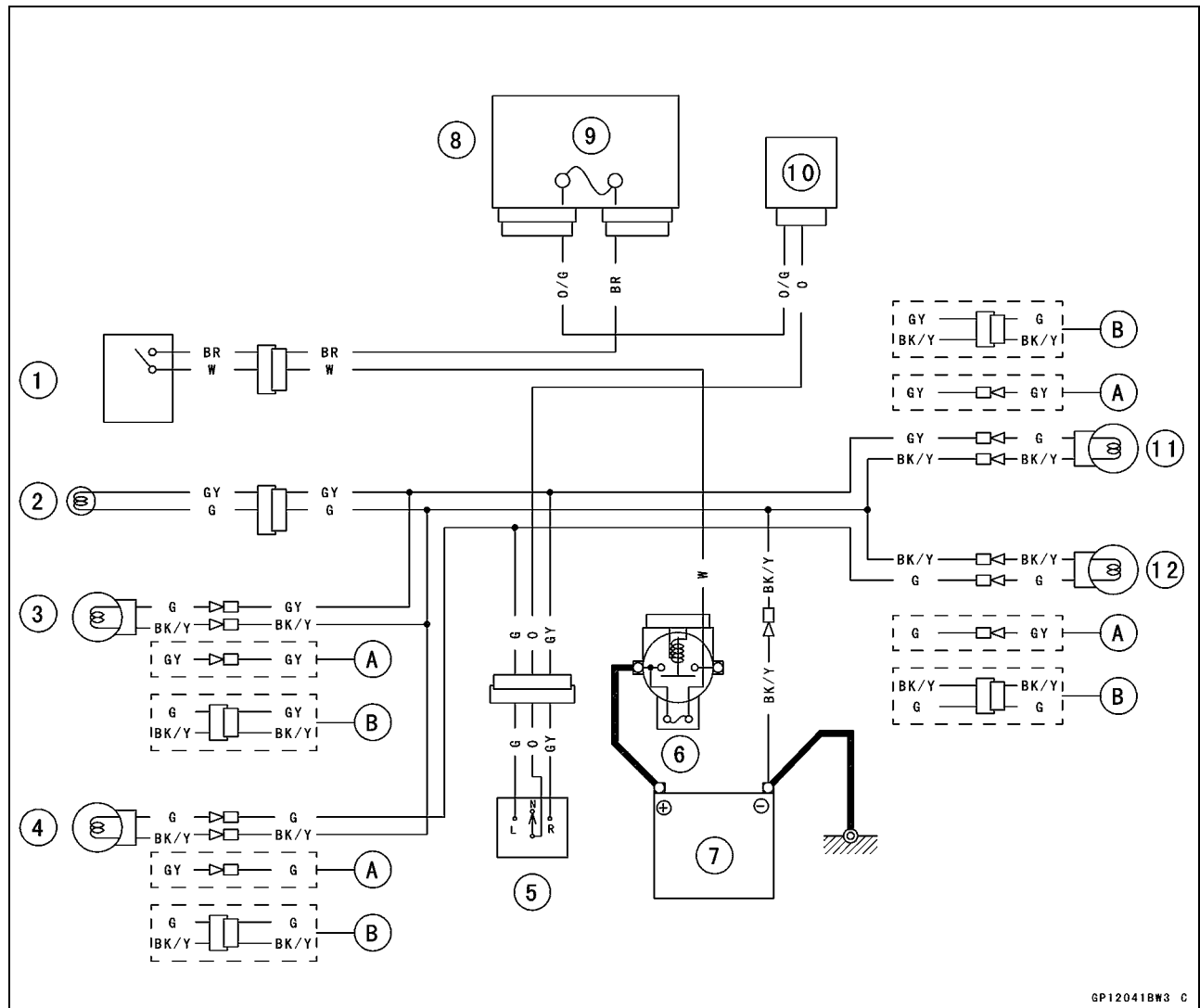
Testing Turn Signal Relay

Load		Flashing times (c/m*)
The Number of Turn Signal Lights	Wattage (W)	
1**	21 or 23	140-250
2	42 or 46	75-95

(*): Cycle(s) per minute
(**): Correspond to “one light burned out”

Lighting System

Turn Signal Light Circuit



A: United States and Canada Model

B: VN800-B8 ~, other than United States, Canada and Australia Model

1. Ignition Switch
2. Turn Signal Indicator
3. Front Right Turn Signal Light
4. Front Left Turn Signal Light
5. Turn Signal Switch
6. Main Fuse 30 A
7. Battery
8. Junction Box
9. Turn Signal Lights Fuse 10 A
10. Turn Signal Relay
11. Rear Right Turn Signal Light
12. Rear Left Turn Signal Light

16-70 ELECTRICAL SYSTEM

Radiator Fan System

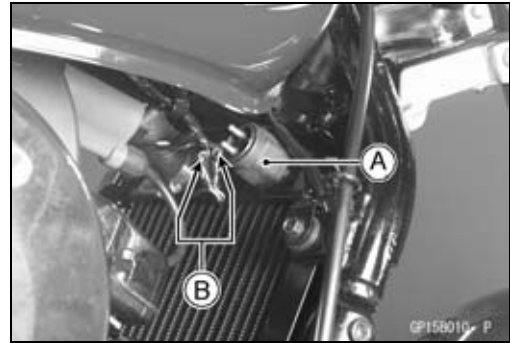
Fan System Circuit Inspection

- Remove the Fuel Tank (see Fuel System chapter).
- Turn on the ignition switch.
- Disconnect the leads from the radiator fan switch [A].
- Using an auxiliary wire [B], connect the radiator fan switch leads.

⚠ If the fan rotates, inspect the fan switch.

⚠ If the fan does not rotate, inspect the following.

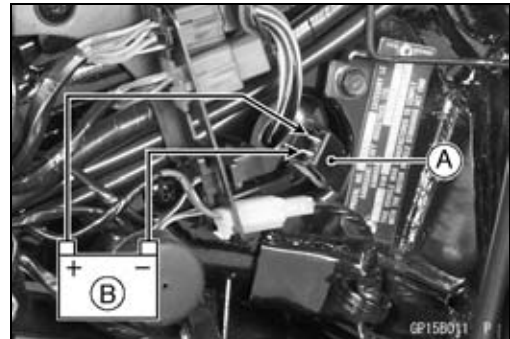
Leads and Connectors
Main Fuse and Fan Fuse
Fan Motor



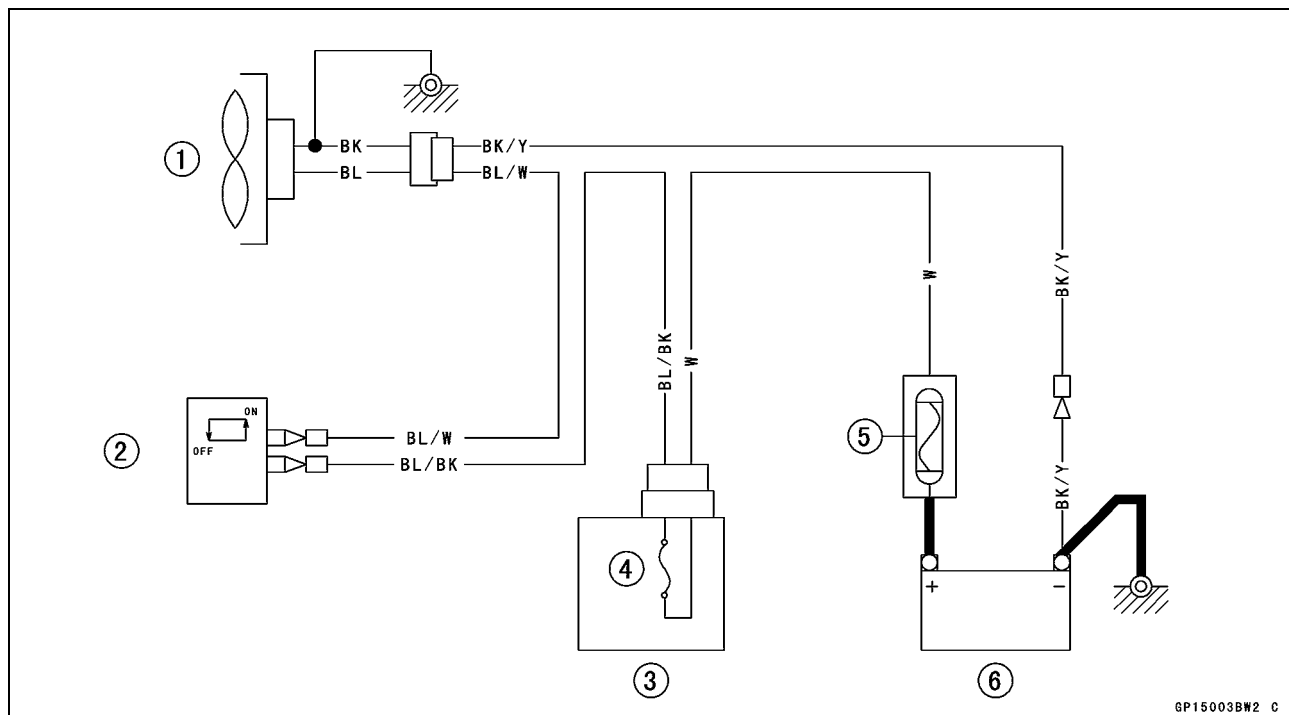
Fan Motor Inspection

- Remove the Fuel Tank (see Fuel System chapter).
- Disconnect the 2-pin connector [A] in the fan motor leads.
- Using two auxiliary wires, supply battery [B] power to the fan motor.

⚠ If the fan does not rotate, the fan motor is defective and must be replaced.



Radiator Fan Circuit



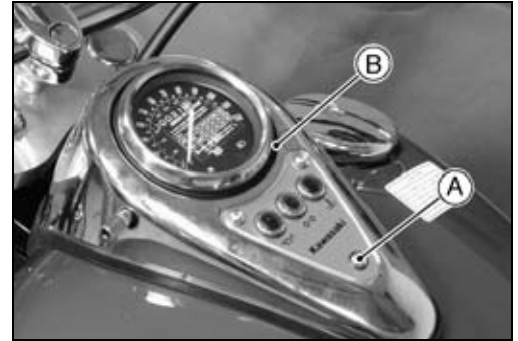
GP15003BW2 C

1. Radiator Fan
2. Radiator Fan Switch
3. Junction Box
4. Fan Fuse 10 A
5. Main Fuse 30 A
6. Battery

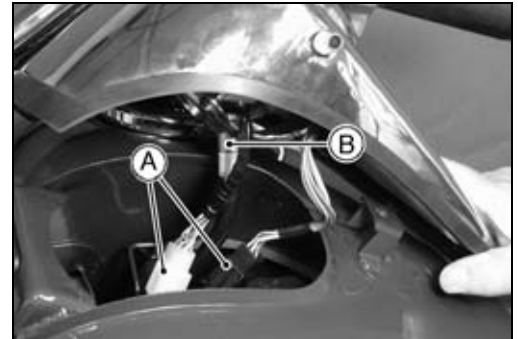
Meter Unit

Meter Unit Removal

- Remove the bolt [A], and separate the meter unit [B] from the fuel tank.



- Remove:
Connectors [A]
Speedometer Cable [B]

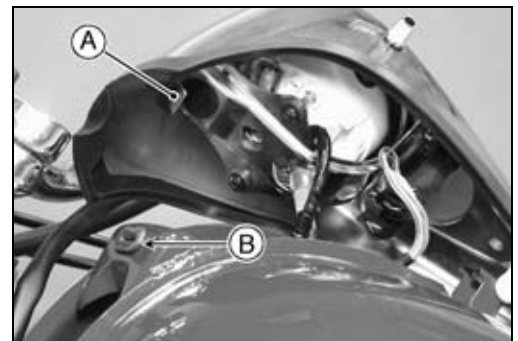


CAUTION

Place the meter so that the face is up. If a meter is left upside down or sideways for any length of time, it will malfunction.

Meter Unit Installation

- Insert the tongue [A] of the meter bracket into the damper slit [B] on the fuel tank.



Meter Units Disassembly

- Remove:
Meter Unit
Screw and Knob [A]
Screws [B]
Speedometer [C]

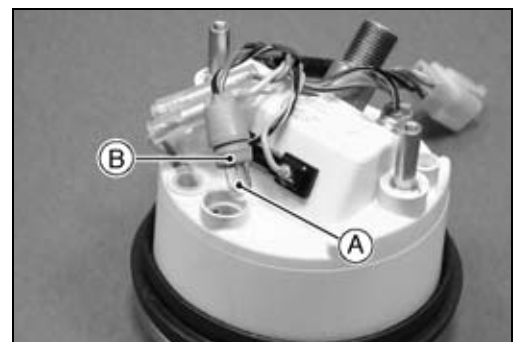


Bulb Replacement

- 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 greater wattage than the specified value.



16-72 ELECTRICAL SYSTEM

Switch and Sensor

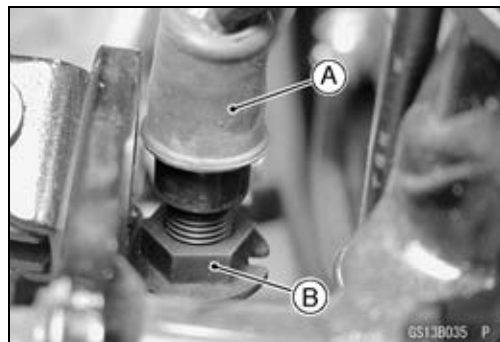
Brake Light Timing Inspection

- Refer to the Brake Light Switch Inspection in the Periodic Maintenance chapter



Brake Light Timing Adjustment

- Refer to the Brake Light Timing Adjustment in the Periodic Maintenance chapter



Switch Inspection

- Using the hand tester, check to see that only the connections shown in the table have continuity (about zero ohms).
- 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

Rear Brake Light Switch Connections

	BR	BL
When brake pedal is pushed down	○ — ○	
When brake pedal is released		

Side Stand Switch Connections

	G	BK
When side stand is up	○ — ○	
When side stand is down		

Neutral Switch Connections

	SW. Terminal	TTT
When transmission is in neutral	○ — ○	
When transmission is not in neutral		

Oil Pressure Switch Connections*

	SW. Terminal	TTT
When engine is stopped	○ — ○	
When engine is running		

*: Engine lubrication system is in good condition

Switch and Sensor

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 coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the switch across the terminals at the temperatures shown in the table.

Special Tool - Hand Tester: 57001-1394

- If the hand tester does not show the specified values, replace the switch.

Radiator Fan Switch Resistance

○ Rising temperature:

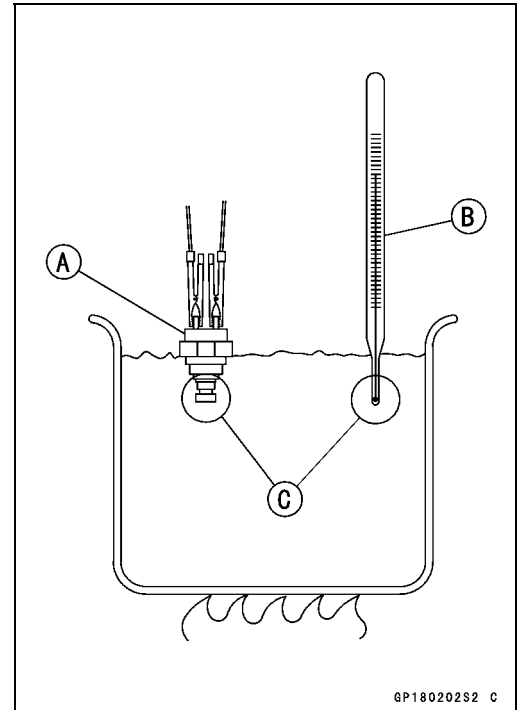
From OFF to ON at 96 ~ 100°C (205 ~ 212°F)

○ Falling temperature:

From ON to OFF at 91°C (196°F) or less

ON: Less than 0.5 Ω

OFF: More than 1 M Ω



16-74 ELECTRICAL SYSTEM

Switch and Sensor

Water Temperature Sensor Inspection

- Remove the water temperature sensor (see Cooling System chapter).
- Suspend the sensor [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 sensor and thermometer must not touch the container side 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 sensor across the terminal and the body at the temperatures shown in the table.

Special Tool - Hand Tester: 57001-1394

- If the hand tester does not show the specified values, replace the sensor.

Water Temperature Sensor Resistance

○ Rising temperature:

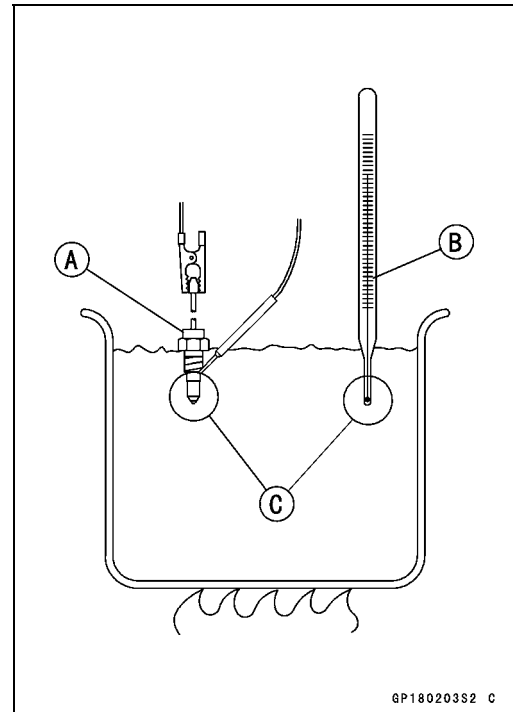
From OFF to ON at 113 ~ 117°C (235 ~ 243°F)

Falling temperature:

From ON to OFF at 108°C (226°F) or less

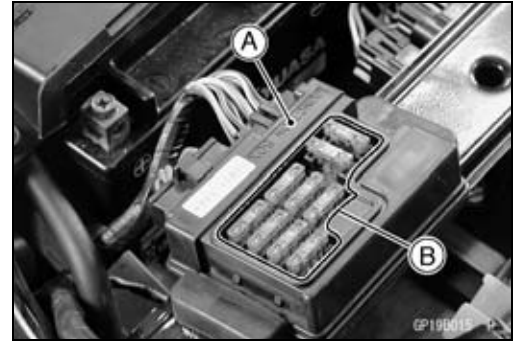
ON: Less than 0.5 Ω

OFF: More than 1 M Ω



Junction Box

The junction box [A] has fuses [B], relays, and diodes. The relays and diodes can not be removed.



Junction Box Fuse Circuit Inspection

- Remove the seats (see Frame chapter).
- Remove the junction box.
- Pull off the connectors from the junction box.
- Make sure all connector terminals are clean and tight, and none of them have been bent.
- ✚ Clean the dirty terminals, and straighten slightly-bent terminals.
- Check conductivity of the numbered terminals with the hand tester.
- ✚ If the tester does not read as specified, replace the junction box.

Special Tool - Hand Tester: 57001-1394

Fuse Circuit Inspection

Tester Connection	Tester Reading (Ω)	Tester Connection	Tester Reading (Ω)
1-1A	0	1A-8	∞
1-2	0	2-8	∞
3A-4	0	3A-8	∞
6-5	0	6-2	∞
6-10	0	6-3A	∞
6-7	0	17-3A	∞
6-17	0		

Starter Circuit/Headlight Relay Inspection

- Remove the junction box.
- Check conductivity of the following numbered terminals by connecting the hand tester and one 12 V battery to the junction box as shown.
- ✚ If the tester does not read as specified, replace the junction box.

Special Tool - Hand Tester: 57001-1394

16-76 ELECTRICAL SYSTEM

Junction Box

Relay Circuit Inspection (with the battery disconnected)

	Tester Connection	Tester Reading (Ω)		Tester Connection	Tester Reading (Ω)
Headlight Relay	*7-8	∞	Starter Circuit Relay	9-11	∞
	*7-13	∞		12-13	∞
	(+) (-) *13-9	Not ∞ **		(+) (-) 13-11	∞
				(+) (-) 12-11	Not ∞ **

(*): VN800-B1 ~ B7, United States, Canada and Australia Models
VN800-B8 ~, B6F All Model

(**): The actual reading varies with the hand tester used.

(+): Apply tester positive lead.

(-): Apply tester negative lead.

Relay Circuit Inspection (with the battery connected)

	Battery Connection (+) (-)	Tester Connection	Tester Reading (Ω)
Headlight Relay	*9-13	*7-8	0
Starter Circuit Relay	11-12	(+) (-) 13-11	Not ∞ **

(*): VN800-B1 ~ B7, United States, Canada and Australia Models

VN800-B8 ~, B6F All Model

(**): The actual reading varies with the hand tester used.

(+): Apply tester positive lead.

(-): Apply tester negative lead.

Diode Circuit Inspection

- Remove the junction box.
- Check conductivity of the following pairs of terminals.

Diode Circuit Inspection

Tester Connection	*13-8, *13-9, 12-11, 12-14, 15-14, 16-14
-------------------	--

(*): VN800-B1 ~ B7, United States, Canada and Australia Models

VN800-B8 ~, B6F All Model

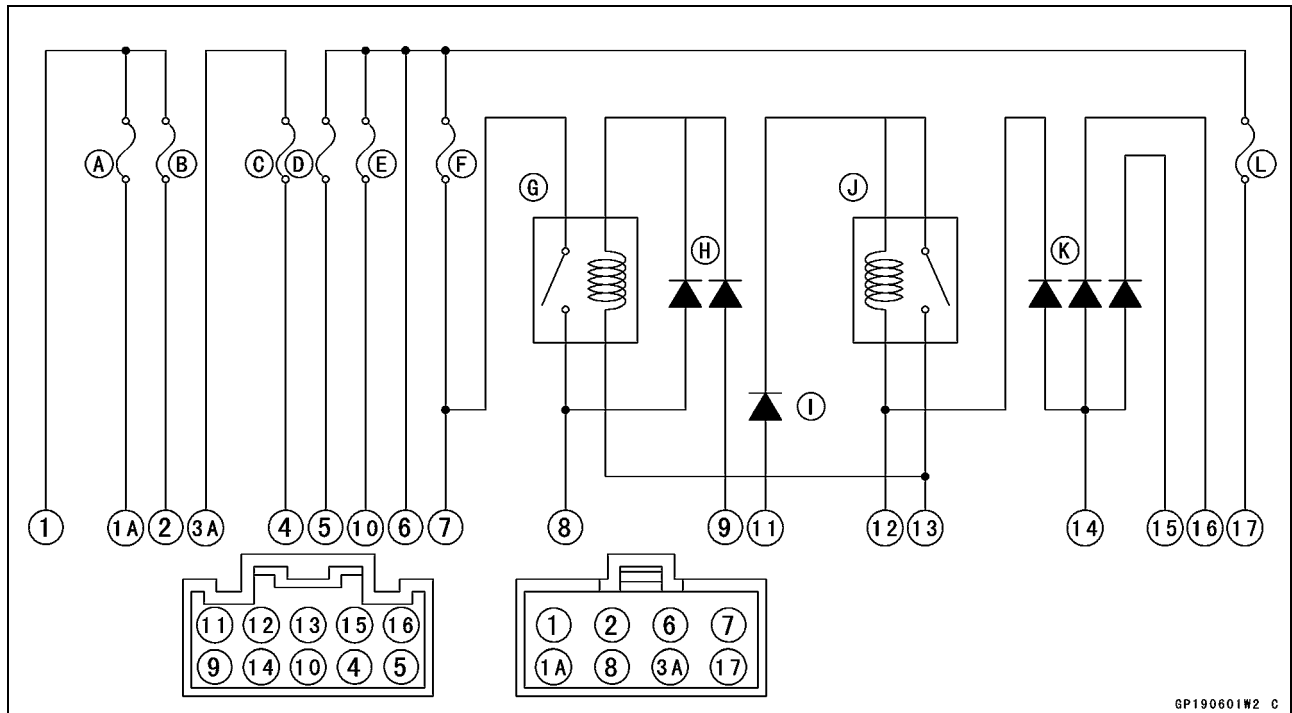
- ⚡ The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the junction box must be replaced.

NOTE

○ The actual meter reading varies with the meter used and the individual diodes, but, generally speaking, the lower reading should be from zero to one half the scale.

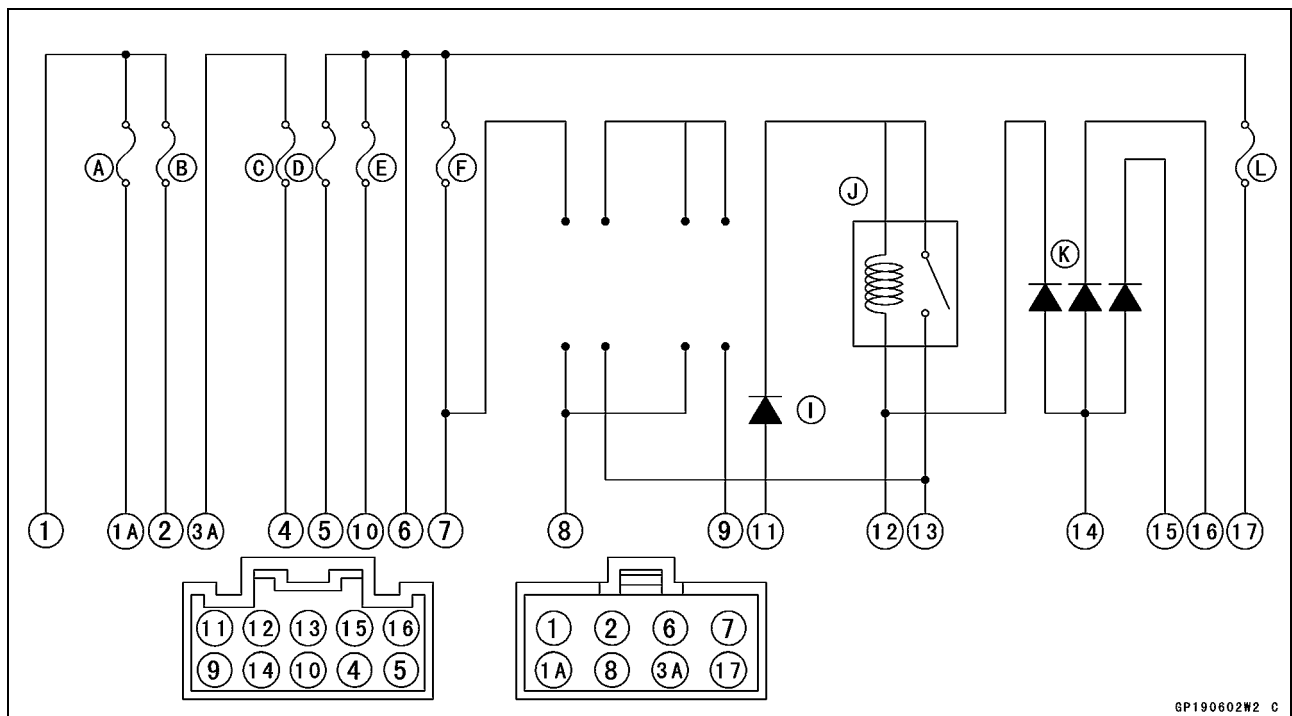
Junction Box

Junction Box Internal Circuit (VN800-B1~B7, United States, Canada and Australia) (VN800-B8, All Model)



GP190601W2 C

Junction Box Internal Circuit (VN800-B1 ~ B7, Other than United States, Canada and Australia)



GP190602W2 C

A. Accessory Fuse 10 A

B. Fan Fuse 10 A

C. Turn Signal Relay Fuse 10 A

D. Horn Fuse 10 A

E. Ignition Fuse 10 A

F. Headlight Fuse 10 A

G. Headlight Relay

H. Headlight Diodes

I. Starter Diode

J. Starter Circuit Relay

K. Interlock Diodes

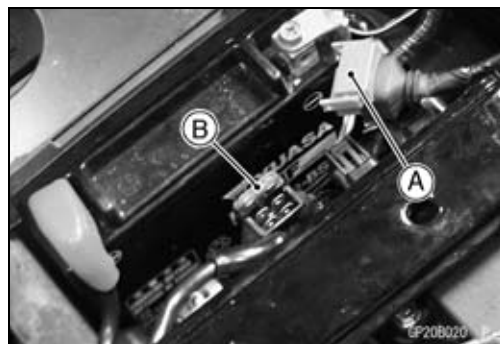
L. Taillight Fuse 10 A

16-78 ELECTRICAL SYSTEM

Fuses

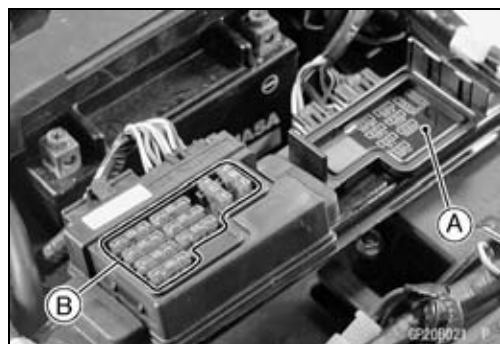
30 A Main Fuse Removal

- Remove:
 - Seat (see Frame chapter)
 - 30 A Main Fuse Connector [A]
- Pull out the main fuse [B] from the starter relay with needle nose pliers.



Junction Box Fuse

- Remove:
 - Seat (see Frame chapter)
 - Battery Leads
 - Junction Box
- Unlock the hook to lift up the lid [A].
- Pull the fuses [B] straight out of the junction box with needle nose pliers.

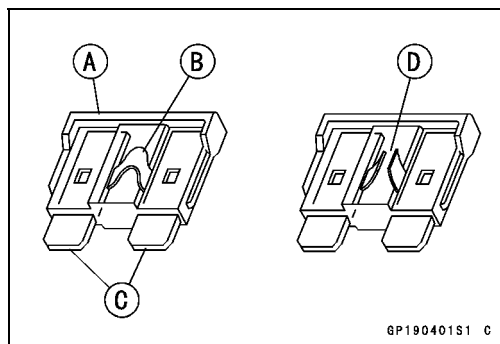


Fuse Installation

- 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 junction box fuses on the original position as specified on the lid.

Fuse Inspection

- Remove the fuse (see Fuse Removal).
- Inspect the fuse element.
- If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.
 - 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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Troubleshooting Guide	17-2
Cable, Wire, and Hose Routing	17-7

17-2 APPENDIX

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
- Torque limiter 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:

- Battery voltage low

- Spark plug dirty, broken, or maladjusted

- Spark plug cap or high tension wiring trouble

- Spark plug cap shorted or not in good contact

- Spark plug incorrect

- IC igniter trouble

- Pickup coil trouble

- Ignition coil trouble

Fuel/air mixture incorrect:

- Pilot screw maladjusted

- Pilot jet, or air passage clogged

- Air bleed pipe bleed holes clogged

- Air cleaner clogged, poorly sealed, or missing

- Choke 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

Troubleshooting Guide

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:

- Choke 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

17-4 APPENDIX

Troubleshooting Guide

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 catching

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 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 gear worn or chipped

Camshaft chain tensioner trouble

Camshaft chain, sprocket, guide worn

Air suction valve damaged

Vacuum switch valve damaged

Alternator rotor loose

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 chain 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 bearings worn
- Crankshaft 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

Engine oil level too high

Black smoke:

- Air cleaner clogged
- Main jet too large or fallen off
- Choke 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 holder 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

17-6 APPENDIX

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

Brake lining contaminated with oil

Battery Trouble:

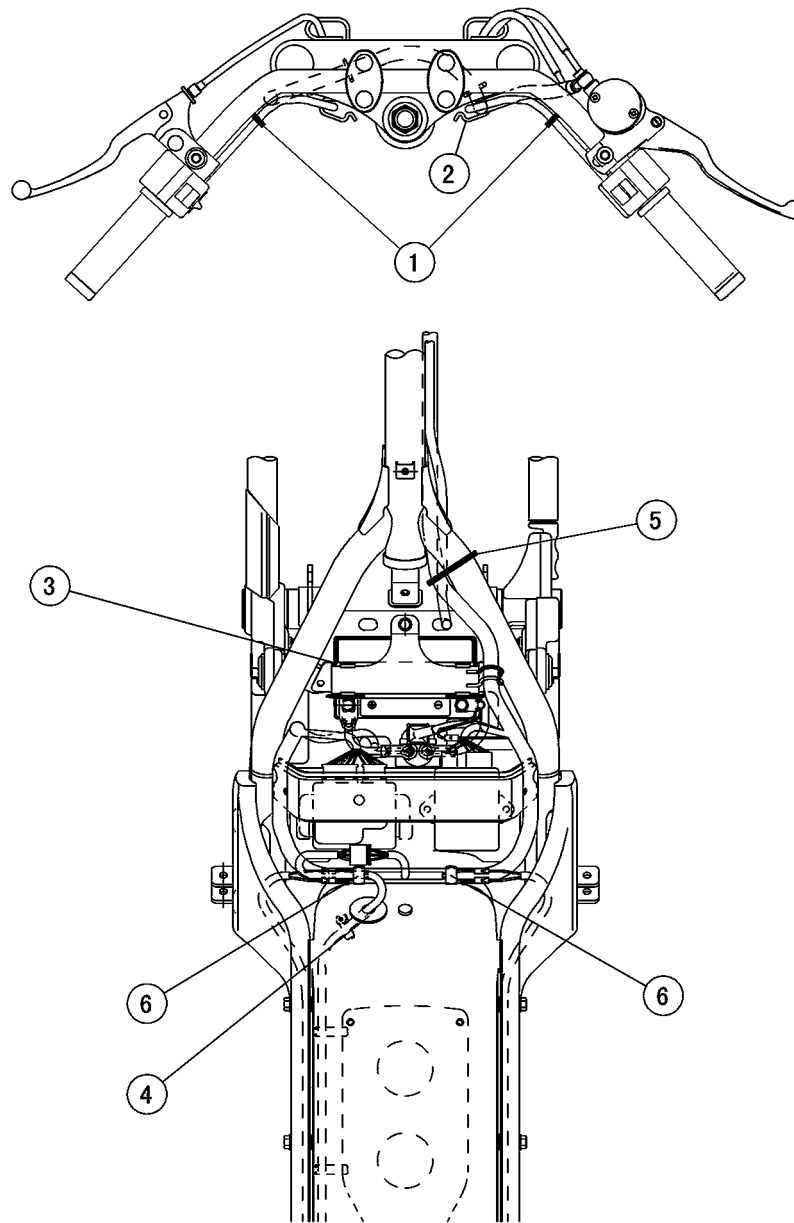
Battery discharged:

- 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
- Battery faulty

Cable, Wire, and Hose Routing

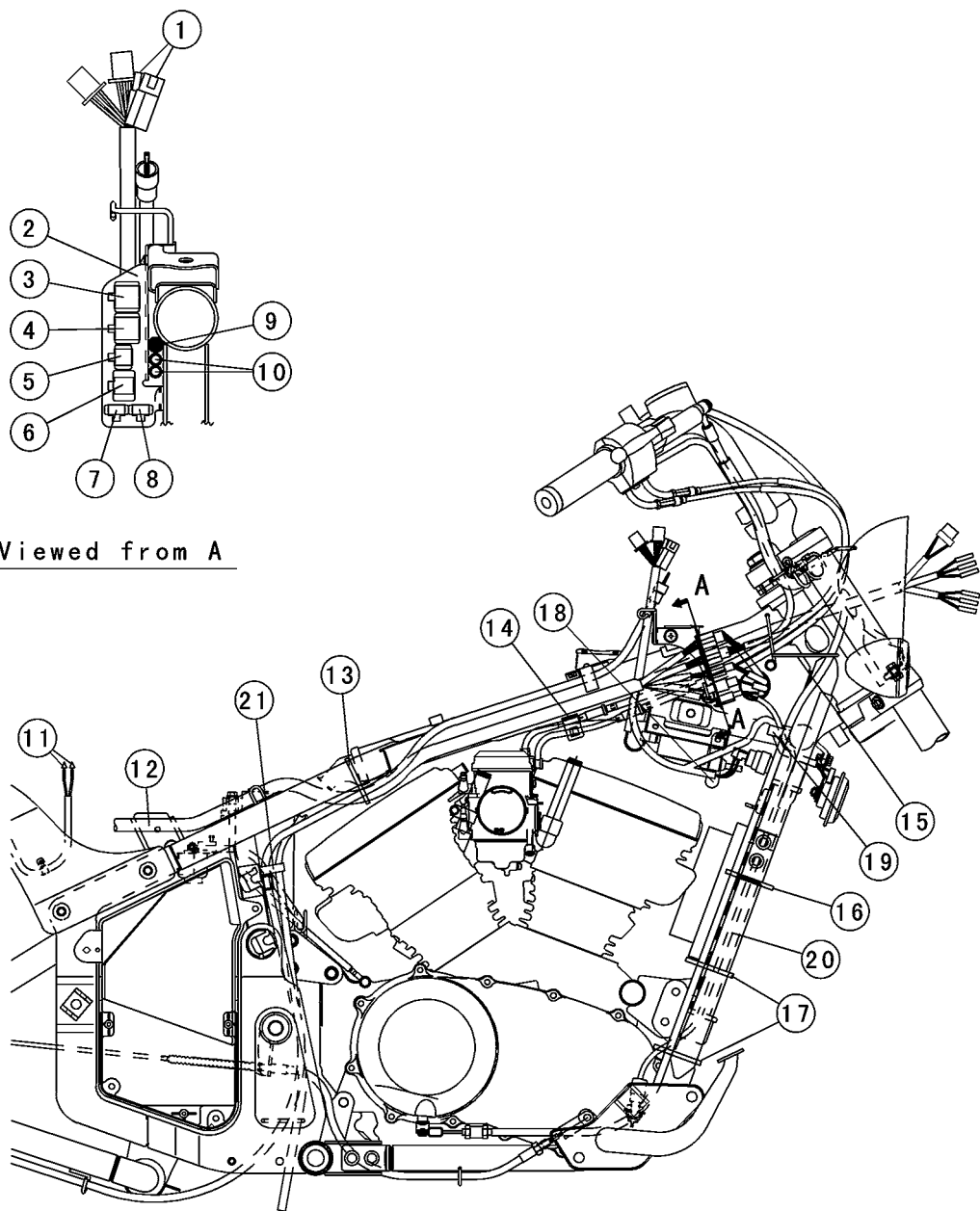


GB09208BW4 C

1. Clamp (Left and Right Handlebar Switch Leads)
2. Clamp (Brake Hose and Right Handlebar Switch Lead)
3. Damper (Install to the band)
4. Grommet
5. Strap (Air Vent Hose, Fuel Tank Drain Hose)
6. Clamp

17-8 APPENDIX

Cable, Wire, and Hose Routing

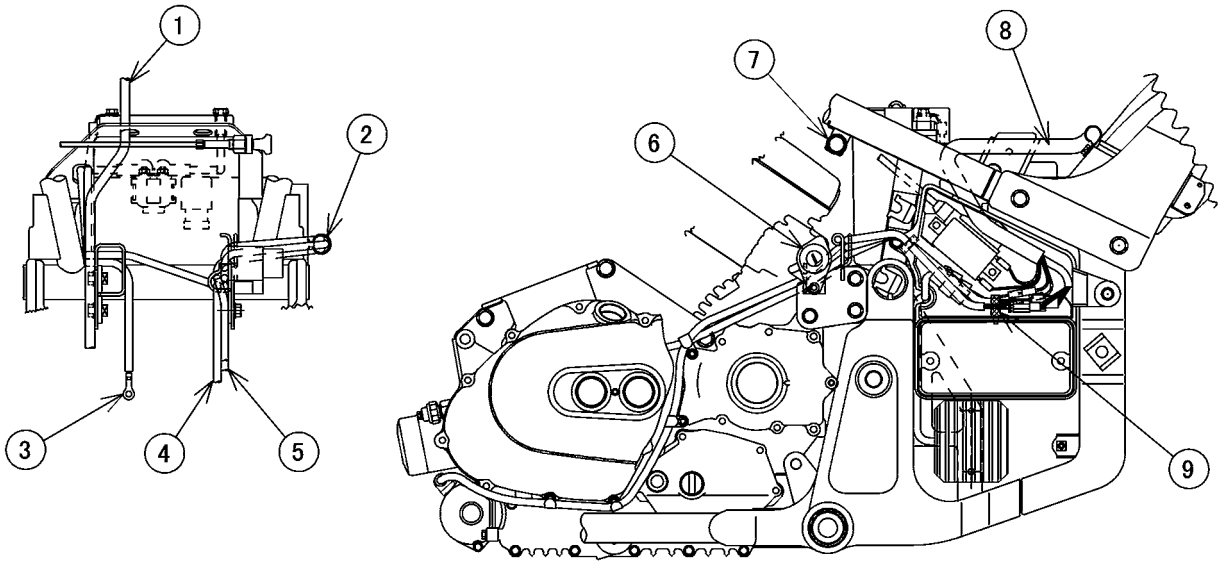


Cable, Wire, and Hose Routing

1. Rectifiers
2. Bracket
3. LH Switch Lead Connector
4. RH Switch Lead Connector
5. LH Switch Lead Connector
6. Radiator Fan Lead Connector
7. Rear Brake Light Switch Lead Connector
8. Side Stand Switch Lead Connector
9. Main Harness
10. Throttle Cables
11. Rear Turn Signal Light Leads
12. Insert the clamp to the hole on the frame.
13. Band
14. Insert the clamp to the hole on the frame.
15. Clamps (Left and Right)
16. Bands (Left: Side Stand Switch Leads, Radiator Fan Leads, Right: Rear Brake Light Switch Leads)
17. Bands (Right: Rear Brake Light Switch Leads, Clutch Cable, Left: Side Stand Switch Leads)
18. Clamp (Install it together with the front ignition coil installation bolt)
19. Clamp (Insert it into the frame gusset)
20. Run the leads between the frame and the radiator (Left: Side Stand Switch Leads and Radiator Fan Leads, Right: Rear Brake Light Switch Leads)
21. Clamp (Clamp the fuel tank drain hose and speedometer cable)

17-10 APPENDIX

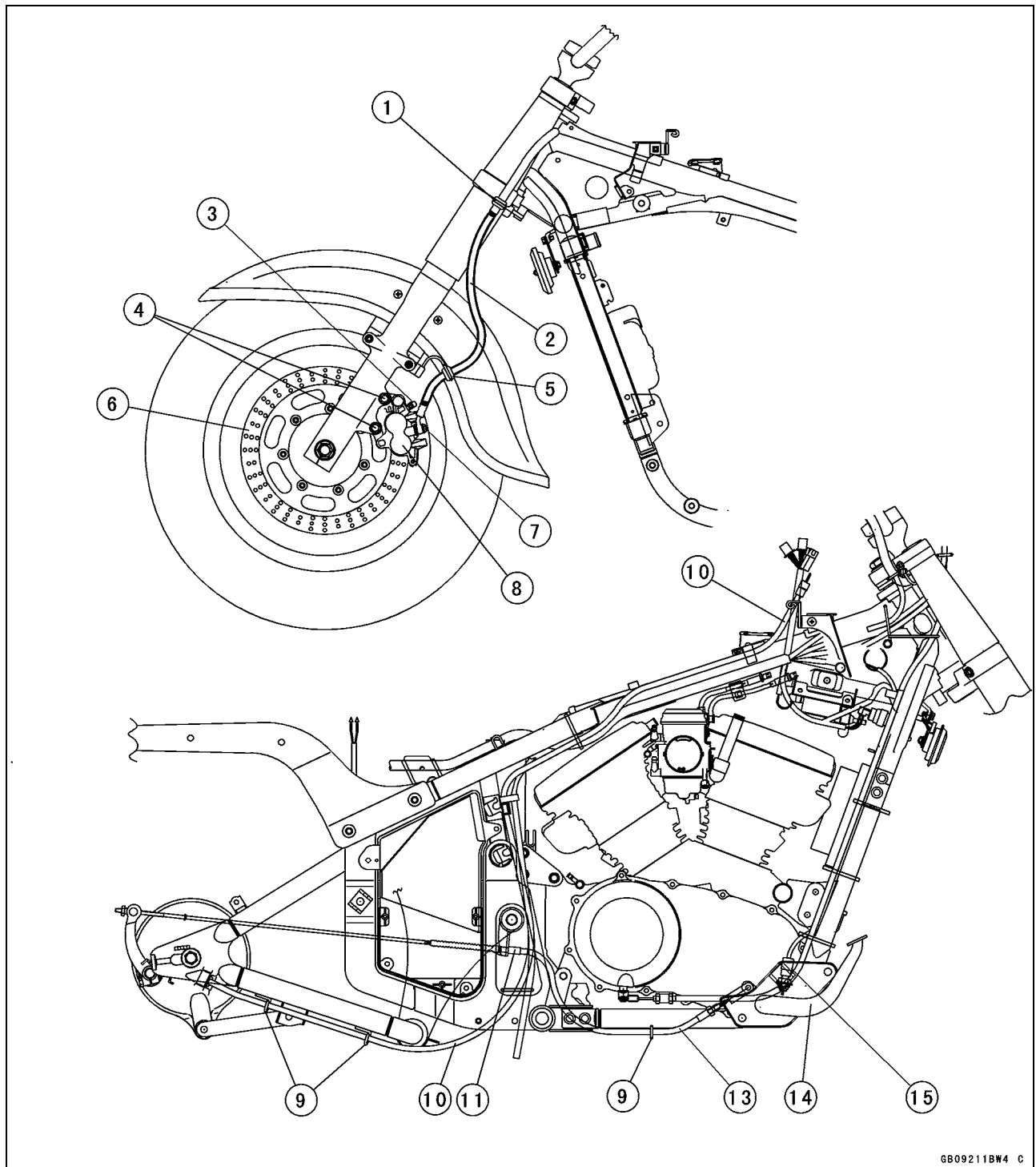
Cable, Wire, and Hose Routing



GB092108W3 C

1. Fuel Tank Drain Hose
2. Clamp
3. Tighten the lead to the crankcase.
4. Starter Motor Lead
5. Alternator Leads
6. Ignition Switch
7. Choke Knob
8. Insert the clamp into the hole on the frame.
9. Clamp

Cable, Wire, and Hose Routing

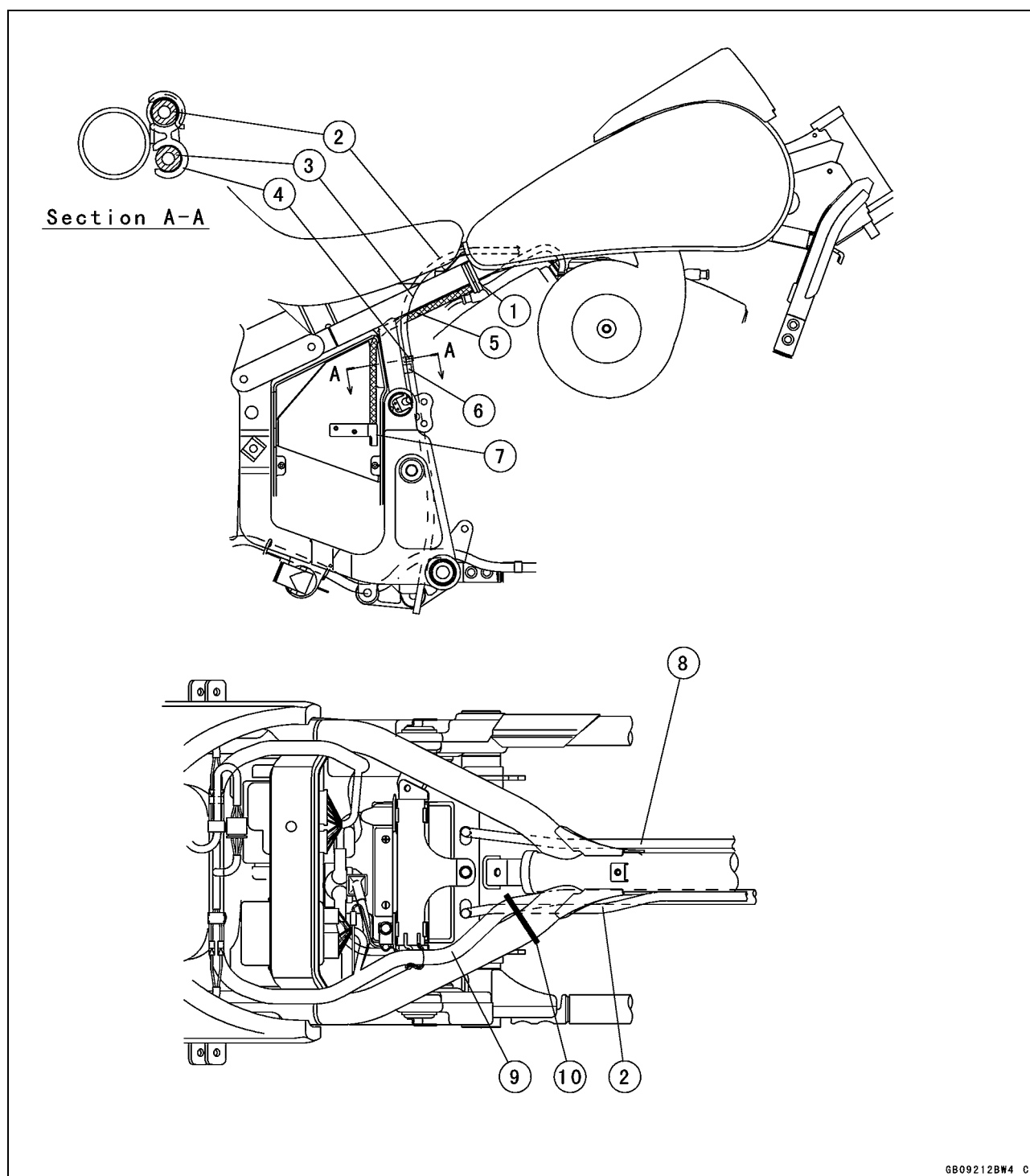


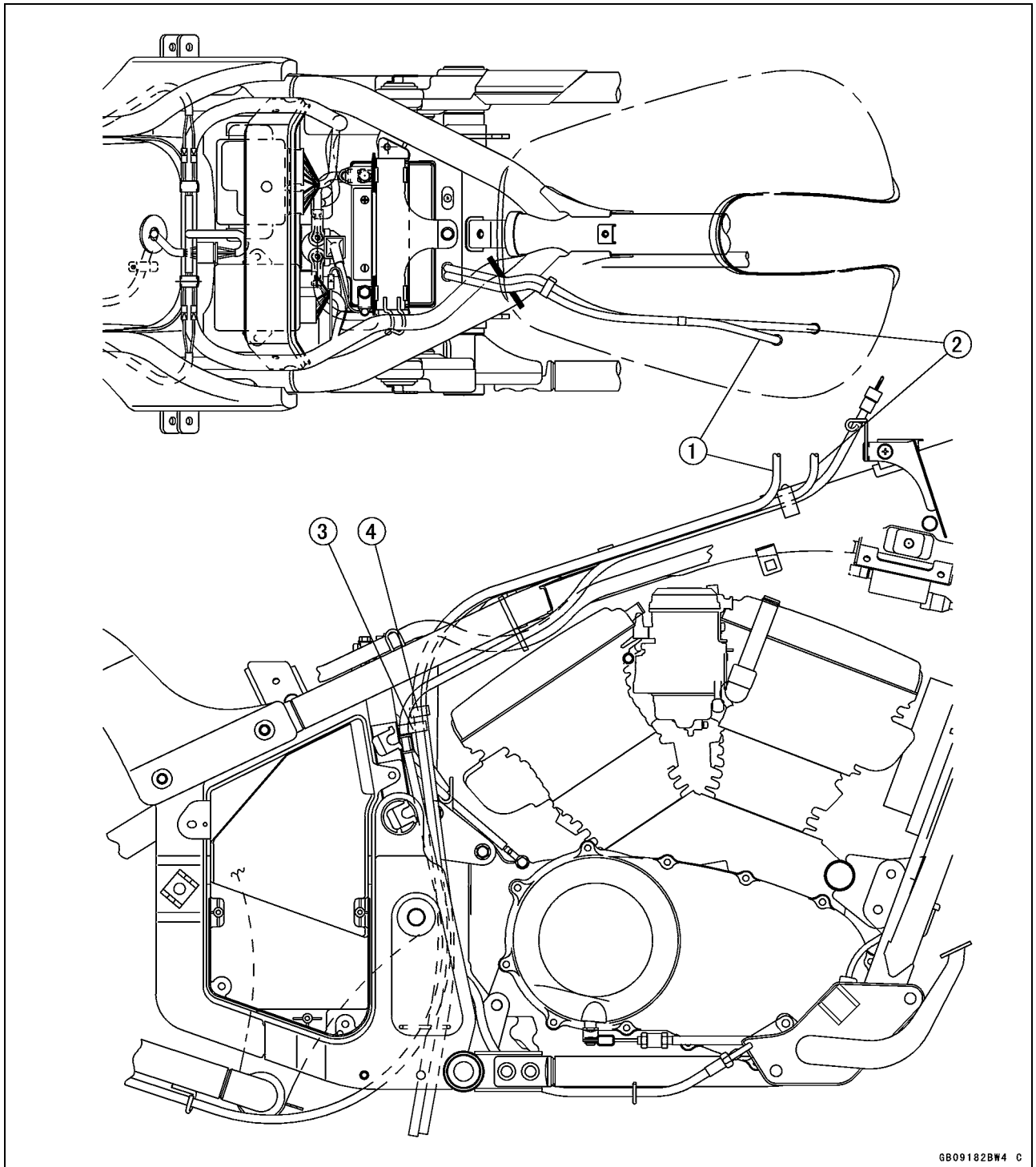
GB09211BW4 C

- | | |
|---------------------------------|-------------------------------|
| 1. Clamp (Attached rubber) | 9. Clamps (Speedometer Cable) |
| 2. Front Brake Hose | 10. Speedometer Cable |
| 3. Bleed Valve | 11. Brake Cable End Mount |
| 4. Front Caliper Mounting Bolts | 12. Clamp (Brake Cable) |
| 5. Clamp (Attached rubber) | 13. Brake Cable |
| 6. Brake Disc | 14. Brake Pedal |
| 7. Brake Hose Banjo Bolt | 15. Rear Brake Light Switch |
| 8. Front Brake Caliper | |

17-12 APPENDIX

Cable, Wire, and Hose Routing

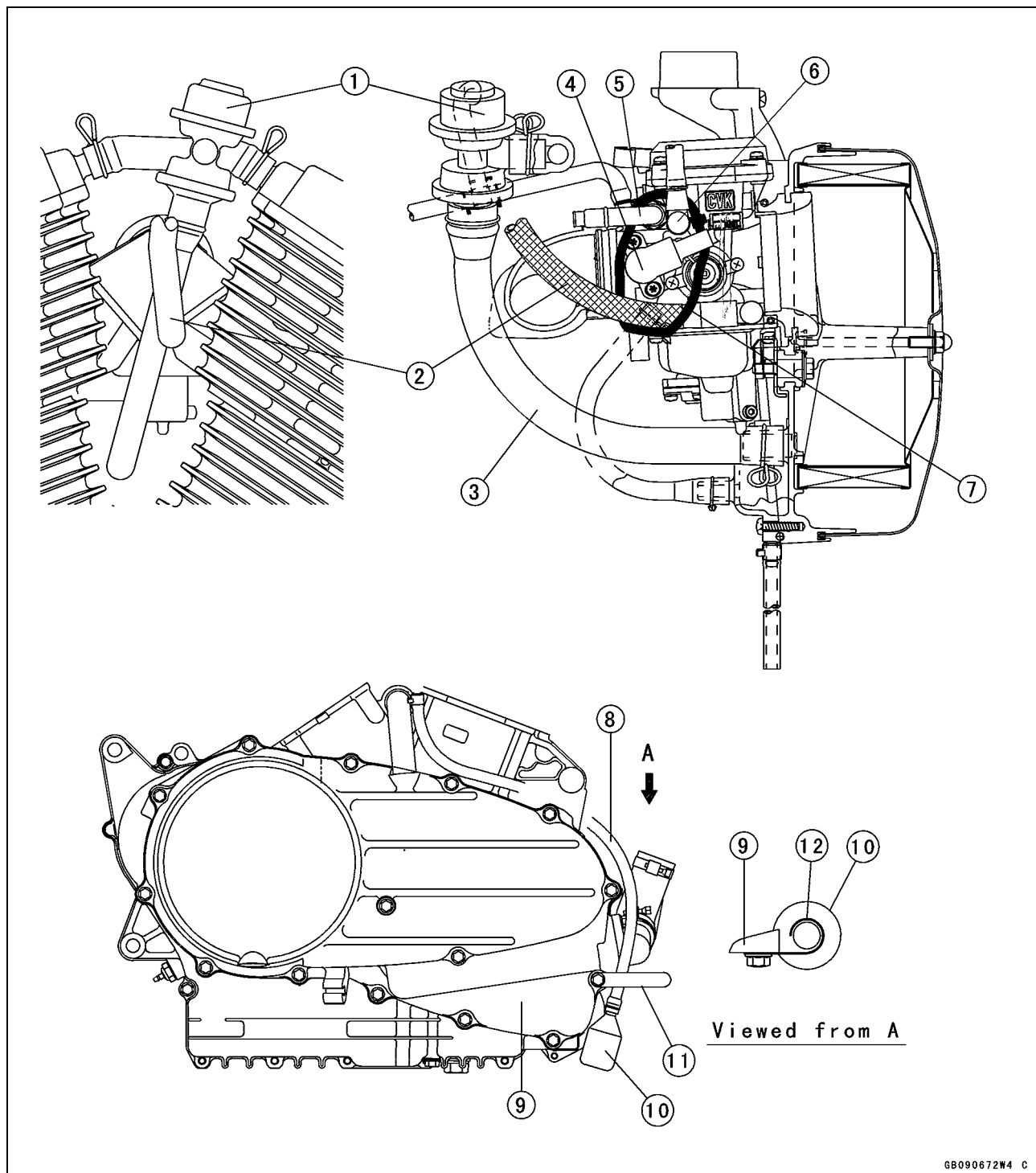


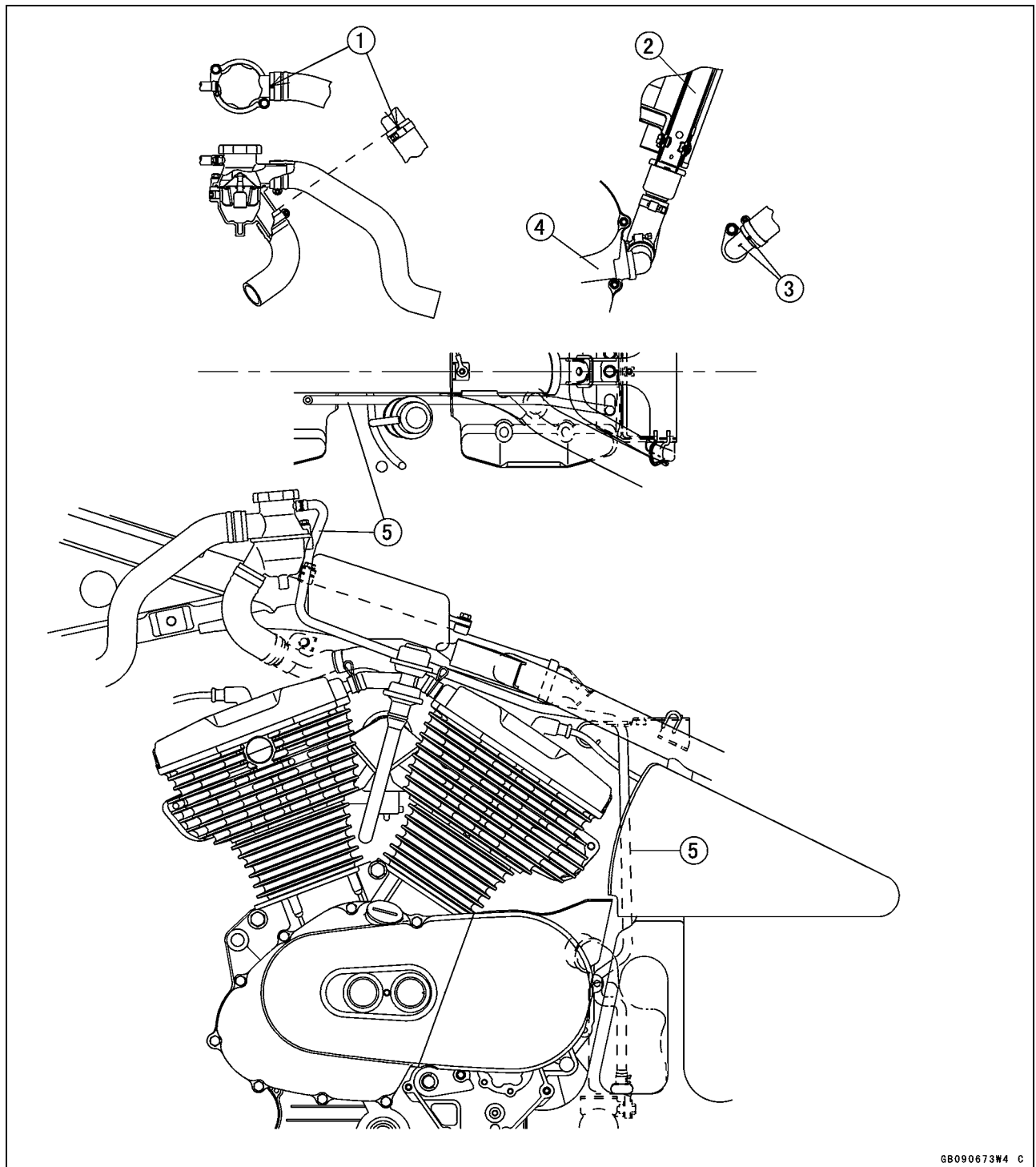
Cable, Wire, and Hose Routing**VN800-B7 ~ B8 Model**

1. Fuel Tank Drain Hose
2. Fuel Tank Breather Hose
3. Clamp (Fuel tank drain and speed meter cable)
4. Clamp (Speed meter cable and breather hose)

17-14 APPENDIX

Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

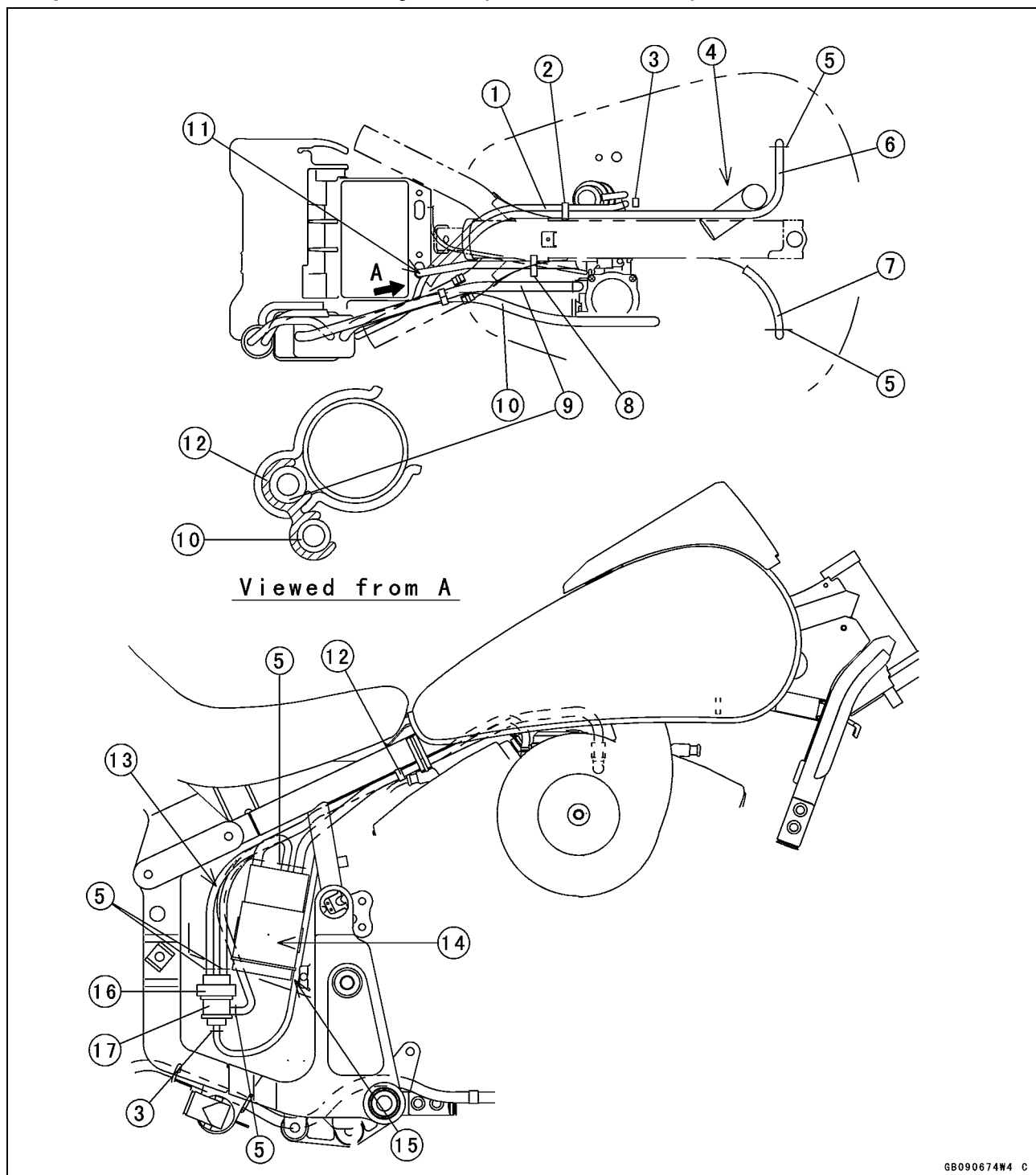
GB090673W4 C

1. Install the hose with the mark upside.
2. Radiator
3. Align the marks.
4. Right Engine Cover
5. Hose (between the thermostat and the reserve tank)

17-16 APPENDIX

Cable, Wire, and Hose Routing

Evaporative Emission Control System (California Model)



GB090674W4 C

- | | |
|---|---|
| 1. Vacuum Hose (White) | 10. Canister Purge Hose (Green) |
| 2. Clamp (Clamp the vacuum hose and the fuel return hose) | 11. Run the fuel tank breather hose through this hole |
| 3. Clamp | 12. Clamp |
| 4. Run the fuel return hose inside the water hose | 13. Hose (Blue, between the separator and the canister) |
| 5. Clamp | 14. Canister |
| 6. Fuel Return Hose (Red) | 15. Vacuum hose (White) |
| 7. Fuel Tank Breather Hose (Blue) | 16. Band |
| 8. Clamp | 17. Separator |
| 9. Vent Hose (Yellow) | |

MODEL APPLICATION

Year	Model	Beginning Frame No.
1996	VN800-B1	JKBVNCB1□TA030001, VN800A-030001, or VN800B-000001 (Germany)
1997	VN800-B2	JKBVNCB1□VA050001, VN800A-050001, or VN800B-005001 (Germany)
1998	VN800-B3	JKBVNCB1□WA063001, JKBVNCB1□WB50005, VN800A-063001, or VN800B-008001 (Germany)
1999	VN800-B4	JKBVNCB1□XA075001, JKBVNCB1□XB502701, or JKBVN800ABA075001
2000	VN800-B5	JKBVN800ABA083001, JKBVNCB1□YA083001, or JKBVNCB1□YB506101
2001	VN800-B6	JKBVNCB1□IA089001, JKBVNCB1□IB509801, JKBVNCB1□IB089001, or JKBVN800ABA089001
2002	VN800-B7	JKBVNCB1□2A095001, JKBVNCB1□2B513701, or JKBVN800ABA095001
2003	VN800-B8	JKBVNCB1□3A99001, JKBVNCB1□3B517301, or JKBVN800ABA99001
2004	VN800-B9	JKBVNCB1□4B520701, or JKBVNCB1□4A103001, or JKBVN800ABA103001
2005	VN800-B10	JKBVNCB1□5A109001, or JKBVNCB1□5B523901, or JKBVN800ABA109001
2006	VN800B6F	JKBVNCB1□6A114001, or JKBVN800ABA114001

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



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