



ZRX1200R
ZRX1200S
ZRX1200



Motorcycle Service Manual

Quick Reference Guide

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

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 Motorcycle dealer for the latest information on product improvements incorporated after this publication.

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

LIST OF ABBREVIATIONS

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

Read OWNER'S MANUAL before operating.

EMISSION CONTROL INFORMATION

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

1. Crankcase Emission Control System

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

2. Exhaust Emission Control System

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

3. Evaporative Emission Control System

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

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

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

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

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

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

Table of Contents

Before Servicing	1-2
Model Identification.....	1-5
General Specifications.....	1-9
Periodic Maintenance Chart (United States and Canada).....	1-12
Periodic Maintenance Chart (Other than United States and Canada).....	1-13
Technical Information-Immobilizer System	1-15
Torque and Locking Agent.....	1-17
Special Tools and Sealants	1-23
Cable, Wire, and Hose Routing	1-29

1-2 GENERAL INFORMATION

Before Servicing

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

Especially note the following:

(1) Dirt

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

(2) Battery Cables

Disconnect the negative (-) cable 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 leads from electrical parts, as well as damage to the electrical parts themselves. For reinstallation, first connect the positive cable to the positive (+) terminal of the battery.

(3) Installation, Assembly

Generally, installation or assembly is the reverse of removal or disassembly. But if this Service Manual has installation or assembly procedures, follow them. 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 as much as possible.

(4) Tightening Sequence

Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them evenly in a cross pattern. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter turn and then remove them. Where there is a tightening sequence indication in this Service Manual, the bolts, nuts, or screws must be tightened in the order and method indicated.

(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 removal of screws held by a locking agent) in order to avoid damaging the screw heads.

(7) Edges

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

(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 Stoddard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.

(9) Gasket, O-ring

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

(10) Liquid Gasket, Non-Permanent Locking Agent

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

(11) Press

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

(12) Ball Bearing and Needle Bearing

Before Servicing

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, as removal generally damages bearings. Install bearings with the marked side facing out applying pressure evenly with a suitable driver. Only press on the race that forms the press fit with the base component to avoid damaging the bearings. This prevents severe stress on the balls or needles and races, and prevent races and balls or needles from being dented. Press a ball bearing until it stops at the stopper in the hole or on the shaft.

(13)Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals. When pressing in a seal which has manufacturer's marks, press it in with the marks facing out. Seals should be pressed into place using a suitable driver, which contacts evenly with the side of seal, until the face of the seal is even with the end of the hole. Before a shaft passes through a seal, apply a little high temperature grease on the lips to reduce rubber to metal friction.

(14)Circlip, Retaining Ring, and Cotter Pin

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

(15)Lubrication

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

Don't use just any oil or grease. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended. This manual makes reference to molybdenum disulfide grease (MoS²) and molybdenum disulfide oil in the assembly of certain engine and chassis parts. The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1), which can be made in your work shop. Always check manufacturer recommendations before using such special lubricants.

(16)Direction of Engine Rotation

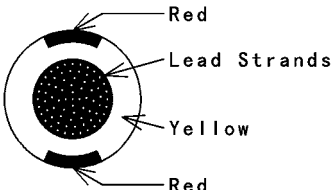

To rotate the crankshaft manually, make sure to do so in the direction of positive rotation. Positive rotation is counterclockwise as viewed from the left side of the engine. To carry out proper adjustment, it is furthermore necessary to rotate the engine in the direction of positive rotation as well.

(17)Replacement Parts

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

(18)Electrical Leads

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

Lead (cross-section)	Color Indicated on the Lead	Color Indicated on the Wiring Diagram
	<p>Yellow/Red</p>	

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

ZR1200-A1 (US, and Canada) Left Side View



ZR1200-A1 (US, and Canada) Right Side View



1-6 GENERAL INFORMATION

Model Identification

ZR1200-A1 (Europe) Left Side View



ZR1200-A1 (Europe) Right Side View



Model Identification

ZR1200-B1 (Europe) Left Side View



ZR1200-B1 (Europe) Right Side View



1-8 GENERAL INFORMATION

Model Identification

ZR1200-C1 (Europe) Left Side View



ZR1200-C1 (Europe) Right Side View



General Specifications

Items	ZR1200 -A1 ~ A3	ZR1200 -A4 ~, A6F ~	ZR1200 -B1 ~ B3	ZR1200 -B4	ZR1200 -C1 ~ C2	ZR1200 -C3
Dimensions						
Overall Length	2 120 mm (83.5 in.)					
Overall Width	780 mm (30.7 in.)					
Overall Height	1 150 mm (45.3 in.)	1 230 mm (48.4 in.)		1 095 mm (43.1 in.)		
Wheelbase	1 465 mm (57.7 in.)					
Road Clearance	135 mm (5.31 in.)					
Seat Height	790 mm (31.1 in.)					
Dry Mass	223 kg (492 lb)	224 kg (494 lb)	227 kg (501 lb)	228 kg (503 lb)	222 kg (490 lb)	223 kg (492 lb)
Curb Mass:						
Front	122 kg (269 lb)		126 kg (278 lb)		121 kg (267 lb)	
Rear	124 kg (273 lb) (A1 ~ A3, B1 ~ B3, C1 ~ C2), 125 kg (276 lb) (A4 ~, A6F ~, B4, C3)					
Fuel Tank Capacity	19.0 L (5.02 US gal)					
Performance						
Minimum Turning Radius	2.7 m (8.9 ft)					
Engine						
Type	4-stroke, DOHC, 4-cylinder, 4 valves per cylinder					
Cooling System	Liquid-cooled					
Bore and Stroke	79.0 × 59.4 mm (3.11 × 2.34 in.)					
Displacement	1 164 cm ³ (71.03 cu in.)					
Compression Ratio	10.1 : 1					
Maximum Horsepower	90 kW (122 PS) @8 500 r/min (rpm), WVTA (78.2 P) WVTA (78.2 H) 78.2 kW (106.3 PS) @8 000 r/min (rpm), (Formosa) 91 kW (124 PS) @8 500 r/min (rpm), (MY) 92 kW (125 PS) @8 500 r/min (rpm), (CA)(US) – – –					
Maximum Torque	112 N·m (11.4 kgf·m, 82.6 ft·lb) @7 000 r/min (rpm), WVTA (78.2 P) WVTA (78.2 H) 104 N·m (10.6 kgf·m, 76.7 ft·lb) @6 000 r/min (rpm), (FORMOSA) 113 N·m (11.5 kgf·m, 83.2 ft·lb) @7 000 r/min (rpm), (MY) 114 N·m (11.6 kgf·m, 84 ft·lb) @7 000 r/min (rpm), (CA)(US) – – –					
Carburetion System	Carburetors, Keihin CVK 36 × 4					
Starting System	Electric starter					
Ignition System	Battery and coil (transistorized)					
Timing Advance	Electronically advanced (digital)					
Ignition Timing	From 10° BTDC @1 100 r/min (rpm) and (CAL) 1 200 r/min (rpm) to 32.5° BTDC @4 600 r/min (rpm), NGK CR9EK or ND U27ETR					
Spark Plug	NGK CR9EK or ND U27ETR					
Cylinder Numbering Method	Left to right, 1-2-3-4					
Firing Order	1-2-4-3					

1-10 GENERAL INFORMATION

General Specifications

Items	ZR1200 -A1 ~ A3	ZR1200 -A4 ~, A6F ~	ZR1200 -B1 ~ B3	ZR1200 -B4	ZR1200 -C1 ~ C2	ZR1200 -C3
Valve Timing: Inlet: Open Close Duration Exhaust: Open Close Duration Lubrication System Engine Oil: Type (ZR1200A7F ~) Viscosity Capacity	35° BTDC 55° ABDC 270° 45° BBDC 25° ATDC 250° Forced lubrication (wet sump) API SE, SF or SG API SH or SJ with JASO MA API SE, SF or SG API SH, SJ or SL with JASO MA SAE10W-40 3.5 L (3.7 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 1.637 (95/58) Wet multi disc 5-speed, constant mesh, return shift 2.733 (41/15) 1.947 (37/19) 1.478 (34/23) 1.192 (31/26) 1.035 (29/28) Chain drive 2.470 (42/17) 4.191 @Top gear					
Frame Type Caster (rake angle) Trail Front Tire: Type Size	Tubular, double cradle 25° 106 mm (4.17 in) Tubeless 120/70 ZR17 (58W): A1 ~ A2, B1 ~ B2, C1 120/70 ZR17 M/C (58W): A3 ~, A6F ~ B3 ~, C2 ~					

General Specifications

Items	ZR1200 -A1 ~ A3	ZR1200 -A4 ~, A6F ~	ZR1200 -B1 ~ B3	ZR1200 -B4	ZR1200 -C1 ~ C2	ZR1200 -C3
Rear Tire:						
Type	Tubeless					
Size	180/55 ZR17 (73W): A1 ~ A2, B1 ~ B2, C1 180/55 ZR17 M/C (73W): A3 ~, A6F ~ B3 ~, C2 ~					
Rim Size:						
Front	17 × 3.50					
Rear	17 × 5.50					
Front Suspension:						
Type	Telescopic fork					
Wheel Travel	120 mm (4.72 in)					
Rear Suspension:						
Type	Swingarm					
Wheel Travel	123 mm (4.84 in)					
Brake Type:						
Front	Dual discs					
Rear	Single disc					
Electrical Equipment						
Battery	12 V 14 Ah (A1 ~ A3, B1~B3, C1~C2), 12 V 12 Ah (A4 ~, A6F ~, B4, C3)					
Headlight:						
Type	Semi-sealed beam					
Bulb (quartz-halogen)	12 V 60/55 W		12 V 60/55 W × 2		12 V 60/55 W	
Tail/brake Light:						
Bulb	12 V 21/5 W × 2					
Alternator:						
Type	Three-phase AC					
Rated Output	28.6 A/14 V @6 000 r/min (rpm)					

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

CAL: California Model

CA: Canada Model

MY: Malaysia Model

US: United States Model

WVT A (FULL H):

 WVTA Model with Honeycomb Catalytic Converter (Full Power)

GB WVT A (FULL H):

 WVTA Model with Honeycomb Catalytic Converter (Left Side Traffic Full Power)

WVT A (78.2 H)

 WVTA Model with Honeycomb Catalytic Converter (Restricted Power)

WVT A (FULL P)

 WVTA Model with Pipe Catalytic Converter (Full Power)

GB WVT A (FULL P):

 WVTA Model with Pipe Catalytic Converter (Left Side Traffic Full Power)

WVT A (78.2 P):

 WVTA Model with Pipe Catalytic Converter (Restricted Power)

1-12 GENERAL INFORMATION

Periodic Maintenance Chart (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 × 1 000 km (× 1 000 mile)						
		Whichever comes first ↓ Every	1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)
Throttle cable-inspect †		•		•		•		•
Idle speed-inspect †		•		•		•		•
Carburetor synchronization-inspect †				•		•		•
Air cleaner element-clean † #				•		•		•
Fuel hoses, connections-inspect †			•	•	•	•	•	•
Evaporative emission control system (CAL)-inspect		•	•	•	•	•	•	•
Coolant-change	2 years					•		
Radiator hoses, connections-inspect †		•						
Air suction valve-inspect †			•	•	•	•	•	•
Valve clearance-inspect †				•		•		•
Clutch slave cylinder fluid seal-replace	4 years							
Engine oil-change #	6 months	•	•	•	•	•	•	•
Oil filter-replace		•		•		•		•
Tire wear-inspect †			•	•	•	•	•	•
Drive chain slack-inspect † #	1 000 km	•	•	•	•	•	•	•
Drive chain wear-inspect † #			•	•	•	•	•	•
Drive chain-lubricate #	600 km		•	•	•	•	•	•
Brake/clutch fluid-change	2 years					•		
Caliper piston fluid and dust seal-replace	4 years							
Brake pad wear-inspect † #			•	•	•	•	•	•
Brake/clutch master cylinder cup and dust cover replace	4 years							
Brake/clutch fluid level-inspect †	month	•	•	•	•	•	•	•
Brake/clutch hoses, connections-inspect †			•	•	•	•	•	•
Front fork oil-change	2 years					•		
Front fork oil leak-inspect †				•		•		•
Rear shock absorber oil leak-inspect †				•		•		•
Swingarm pivot-lubricate				•		•		•
Steering-inspect †		•	•	•	•	•	•	•
Steering stem bearing-lubricate	2 years					•		
Spark plug-clean and gap - inspect †			•	•	•	•	•	•
Brake light switch-inspect †		•	•	•	•	•	•	•
General lubrication-perform				•		•		•
Nut, bolt, and fastener tightness-inspect †		•		•		•		•

1-14 GENERAL INFORMATION

Periodic Maintenance Chart (Other than United States and Canada)

FREQUENCY	Whichever comes first →								*Odometer Reading × 1 000 km (× 1 000 mile)
	↓ Every	1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	36 (24)	Remarks
OPERATION									
General lubrication-perform				•		•		•	
Nut, bolt, and fastener tightness-inspect †		•		•		•		•	

#: 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.

CAL: California Model

Technical Information-Immobilizer System

Overview

This system provides a theft proof device by means of matching a code between the inbuilt key transponder and the igniter. If this code does not match, O/I (Oil Pressure Warning/Immobilizer) indicator light blinks, and the ignition system will not operate and the engine will not start.

Related Parts and Function



- | | | |
|------------------------|--------------------------|--|
| 1. Transponder | 6. Ignition Switch | 11. Junction Box |
| 2. Master Key | 7. Immobilizer Amplifier | 12. Immobilizer/Kawasaki Diagnostic System Connector |
| 3. User Keys | 8. Starter Relay | |
| 4. O/I Indicator Light | 9. Battery | |
| 5. Immobilizer Antenna | 10. Igniter | |

Master Key (1 piece)

The master key (colored red) has an inbuilt transponder, containing a master key code. These codes are unique to each key. This code and an additional two user key codes must be registered in the igniter for the system to operate. The master key is necessary when registering user keys and should not be used as the main key to start the motorcycle except in emergencies (loss or damage of user keys). It should be kept in a safe place.

Transponder (in Keys)

The transponder (made by Texas Instruments, Inc.) has an integrated circuit with a unique code that also calculates data sent by the igniter. When the ignition switch is turned ON, the transponder is excited by the radio wave transmitted from the antenna and then transmits a unique code to the antenna.

User Key (2 pieces)

The user keys (colored black) should be used when riding the motorcycle. These keys have unique codes which differ from the master key. Up to a maximum of five user key codes can be stored by the igniter at any one time. These codes can not be registered to the igniter without firstly registering the master key code.

Antenna

The antenna transmits a radio wave to excite the transponder, and it receives the code from the transponder and then transmits the code to the igniter through the amplifier.

Ignition Switch

The ignition switch turns the main circuit ON and OFF.

1-16 GENERAL INFORMATION

Technical Information-Immobilizer System

Amplifier

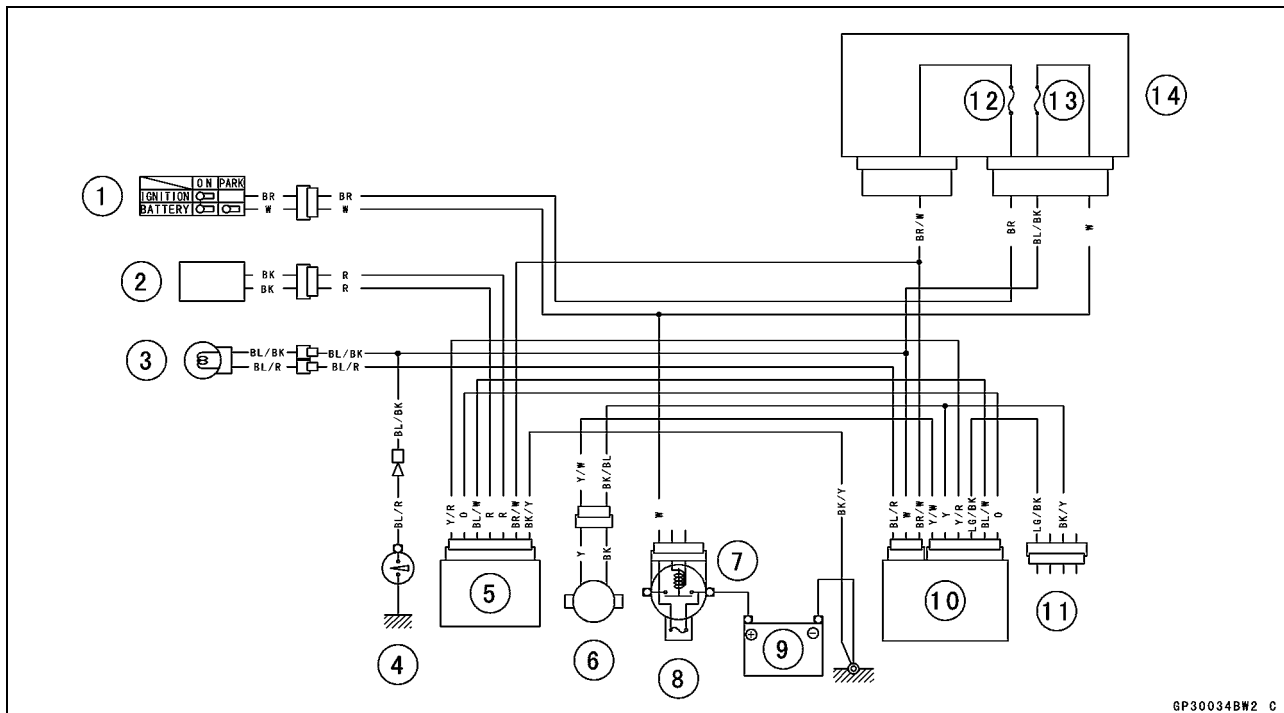
The amplifier (which is approximately the same size as a match box), amplifies signals from the antenna and the igniter.

Igniter

The igniter has the capacity to store a maximum of six key code memories (one master and five user keys). The owner can have a total of five user keys at any one time. The master key memory can not be rewritten after initial registration, whereas the user key memories can be rewritten as necessary. When the igniter communicates with the transponder, a cipher generator changes the code every time it is used to avoid cloning.

O/I (Oil Pressure Warning/Immobilizer) Indicator Light

The condition or the failure of the immobilizer system is indicated by various patterns of the O/I indicator light blinking.



GP30034BW2 C

1. Ignition Switch
2. Immobilizer Antenna
3. O/I (Oil Pressure Warning/Immobilizer) Indicator Light
4. Oil Pressure Switch
5. Immobilizer Amplifier
6. Throttle Sensor
7. Starter Relay
8. Main Fuse
9. Battery 12 V 12 Ah
10. Igniter
11. Immobilizer/Kawasaki Diagnostic System Connector
12. Ignition Fuse 10 A
13. Fan Fuse 10 A
14. Junction Box

Sequence of Operation

1. Turn ON the ignition switch, the igniter, amplifier and antenna start working, and O/I indicator light in the meter assembly lights up.
2. The transponder excited by radio waves transmitted from the antenna receives the ciphered code from the igniter.
3. The transponder transmits the calculated result from the key's unique code to the igniter.
4. The igniter compares this with its memorized code, and if they match, the engine can start. At this time, the O/I indicator light in the meter assembly is switched off.

Torque and Locking Agent

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

Letters used in the “Remarks” column mean:

EO: Apply engine oil to the threads.

G: Apply grease to the threads.

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

Lh: Left-hand threads.

MO: Apply molybdenum disulfide oil. The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1).

R: Replacement parts

S: Tighten the fasteners following the specified sequence.

se: Seating Surface

SS: Apply silicone sealant.

th: Threads

ws: Washer

Fuel System	Torque			Remarks	
	N·m	kgf·m	ft·lb		
Fuel System					
Fuel Tap Bolts	2.5	0.25	22 in·lb	with black washer	
	5.0	0.51	44 in·lb		
Fuel Tap Plate Screws	0.8	0.08	7 in·lb		
Fuel Tap Diaphragm Cover Screws	1.0	0.10	9 in·lb		
Fuel Tap Knob Screw	1.5	0.15	13 in·lb		
Fuel Level Sensor Bolts	6.9	0.70	61 in·lb		
Carburetor Holder Bolts	12	1.2	106 in·lb	L	
Cooling System					
Water Hose Clamp Screws	2.5	0.25	22 in·lb	L(1)	
Water Pipe Mounting Bolts	9.8	1.0	87 in·lb		
Water Pump Air Bleed Bolt	9.8	1.0	87 in·lb		
Thermostat Housing Air Bleeder	7.8	0.80	69 in·lb		
Coolant Drain Plug (water pipe)	7.8	0.80	69 in·lb		
Radiator Fan Switch	24	2.4	17		
Water Temperature Switch	7.8	0.80	69 in·lb	SS	
Water Pump Outlet Pipe Flange Bolt	9.8	1.0	87 in·lb	L	
Water Pump Inlet Pipe Bolt	9.8	1.0	87 in·lb		
Water Pump Mounting Bolts	9.8	1.0	87 in·lb		
Water Pump Cover Bolts	9.8	1.0	87 in·lb		
Engine Top End					
Spark Plugs	14	1.4	10	L	
Air Suction Valve Cover Bolts	9.8	1.0	87 in·lb		
Cylinder Head Cover Bolts	9.8	1.0	87 in·lb		
Chain Tensioner Mounting Bolts	9.8	1.0	87 in·lb		
Chain Tensioner Cap	20	2.0	14		
Camshaft Cap Bolts	12	1.2	106 in·lb		S
Camshaft Bracket Bolts	12	1.2	106 in·lb		S
Camshaft Sprocket Bolts	15	1.5	11		L
Upper Chain Guide Bolts	12	1.2	106 in·lb		L

1-18 GENERAL INFORMATION

Torque and Locking Agent

Fuel System	Torque			Remarks
	N·m	kgf·m	ft·lb	
Cylinder Water Pipe Mounting Bolts (front)	9.8	1.0	87 in·lb	L
Cylinder Water Pipe Mounting Bolts (rear)	9.8	1.0	87 in·lb	L (1, middle)
Water Hose Clamp Screws	2.5	0.25	22 in·lb	
Oil Hose Banjo Bolt	25	2.5	18	
Cylinder Head Bolts:				
ϕ 11 mm	57	5.8	42	S, MO (ws, se)
ϕ 10 mm	41	4.2	30	S, MO (ws, se)
ϕ 6 mm	9.8	1.0	87 in·lb	S
Cylinder Bolts ϕ 6 mm	15	1.5	11	S
Cylinder Coolant Drain Bolts	9.8	1.0	87 in·lb	
Rocker Shaft End Bolts	25	2.5	18	
Rear Camshaft Chain Guide Bolt	20	2.0	14	L
Camshaft Chain Plate Bolts	9.8	1.0	87 in·lb	lower, L
Carburetor Holder Bolts	12	1.2	106 in·lb	L
Exhaust Manifold Bolt	34	3.5	25	
Muffler Mounting Bolt and Nut	34	3.5	25	
Muffler Body Mounting Nuts	25	2.5	18	
Clutch				
Clutch Lever Pivot Bolt	1.0	0.10	9 in·lb	
Clutch Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Clutch Slave Cylinder Bleed Valve	7.8	0.80	69 in·lb	
Clutch Slave Cylinder Bolts	–	–	–	L (2)
Clutch Hose Banjo Bolt	25	2.5	18	
Clutch Pipe Banjo Bolt	25	2.5	18	
Clutch Reservoir Cap Screws	1.5	0.15	13 in·lb	
Clutch Master Cylinder Clamp Bolts	9.8	1.0	87 in·lb	S
Starter Lockout Switch Screw	1.0	0.10	9 in·lb	
Clutch Cover Bolts	9.8	1.0	87 in·lb	L (4)
Clutch Cover Damper Bolts	9.8	1.0	87 in·lb	L
Clutch Cover Oil Pipe Banjo Bolt	12	1.2	106 in·lb	
Clutch Cover Oil Pipe Mounting Screw	5.9	0.60	52 in·lb	
Clutch Spring Bolts	11	1.1	97 in·lb	
Clutch Hub Nut	135	13.8	100	R
Engine Lubrication System				
Oil Filler Cap	1.5	0.15	13 in·lb	
Engine Oil Drain Plug	20	2.0	14	
Oil Filter Bolt	20	2.0	14	EO
Oil Pan Bolts	15	1.5	11	L (6)
Oil Pressure Relief Valve	15	1.5	11	L
Oil Pressure Switch Terminal Screw	1.6	0.16	14 in·lb	
Oil Pressure Switch	15	1.5	11	SS
Oil Pump Mounting Bolts	12	1.2	106 in·lb	L
Oil Pump Drive Gear Holder Screws	5.2	0.53	46 in·lb	L

Torque and Locking Agent

Fuel System	Torque			Remarks	
	N·m	kgf·m	ft·lb		
Oil Pipe Banjo Bolts	25	2.5	18	Oil pan	
Oil Hose Banjo Bolts	25	2.5	18		
Return Oil Pipe Banjo Bolts (14 mm)	34	3.5	25		
Oil Pump Bracket Bolts	9.8	1.0	87 in·lb		
Main Oil Passage Plug	18	1.8	13		
Oil Pan Plug PT 1/8	15	1.5	11		L
Oil Screen Holder Screws	5.0	0.50	44 in·lb		
Oil Separator Screws	5.1	0.52	45 in·lb		
Crankcase Breather Cover Bolts	9.8	1.0	87 in·lb		
Engine Removal/Installation					
Downtube Bolts	44	4.5	33		
Engine Mounting Bolts and Nuts	44	4.5	33		
Front Engine Bracket Bolt (left) ϕ 8 mm	29	3.0	21		
Rear Bracket Bolts (lower/front) ϕ 8 mm	25	2.6	19		
Battery Ground Cable Bolt	15	1.5	11		
Crankshaft/Transmission					
Lower Crankcase Plug ϕ 25 mm	18	1.8	13		
Crankcase Bolts:					
ϕ 9 mm	32	3.3	24	S	
ϕ 8 mm	27	2.8	20	S	
ϕ 7 mm	18	1.8	13	S	
ϕ 6 mm	15	1.5	11	S	
Main Oil Passage Plug	18	1.8	13		
Connecting Rod Big End Nuts	in the text	←	←	MO (th, se)	
Main Bearing Cap Bolts	32	3.3	24		
Balancer Shaft Lever Bolt	9.8	1.0	87 in·lb	L	
Balancer Shaft Plate Bolt	9.8	1.0	87 in·lb	L	
Balancer Shaft Clamp Bolt	9.8	1.0	87 in·lb		
Alternator Shaft Nut	59	6.0	43		
Alternator Shaft Bolt	25	2.5	18		
Alternator Chain Tensioner Bolt	9.8	1.0	87 in·lb	L	
Alternator Chain Sprocket Bolt	25	2.5	18		
Alternator Chain Guide Bolt	9.8	1.0	87 in·lb	L	
Starter Motor Clutch Bolts	12	1.2	106 in·lb	L	
Timing Rotor Bolt	25	2.5	18		
External Shift Mechanism Cover Bolts	9.8	1.0	87 in·lb	L (4)	
Shift Shaft Return Spring Pin (bolt)	30	3.1	22	L	
Neutral Switch	15	1.5	11		
Shift Drum Bearing Holder Bolts	13	1.3	113 in·lb	L	
Shift Drum Cam Screw	–	–	–	L	
Bearing Holder Bolts	9.8	1.0	87 in·lb		
Transmission Oil Pipe Holder Bolt	9.8	1.0	87 in·lb		
Gear Set Lever Nuts	9.8	1.0	87 in·lb		

1-20 GENERAL INFORMATION

Torque and Locking Agent

Fuel System	Torque			Remarks
	N·m	kgf·m	ft·lb	
Crankcase Breather Cover Bolts	9.8	1.0	87 in·lb	
Oil Separator Screws	5.1	0.52	45 in·lb	
Wheels/Tires				
Front Axle Clamp Bolts	20	2.0	14	
Front Axle Nut	127	13	94	
Rear Axle Nut	98	10	72	
Final Drive				
Chain Adjuster Clamp Bolts	39	4.0	29	
Torque Link Nut (front)	34	3.5	25	
Torque Link Nut (rear)	25	2.5	18	
Engine Sprocket Nut	127	13	94	MO (th, se, ws)
Rear Sprocket Nuts	59	6.0	43	
Rear Sprocket Studs	–	–	–	L
Rear Axle Nut	98	10	72	
Brakes				
Caliper Bleed Valves	7.8	0.8	69 in·lb	
Brake Hose Banjo Bolts	25	2.5	18	
Brake Hose Joint Bolts	6.9	0.70	61 in·lb	
Brake Lever Pivot Bolt	1.0	0.10	9 in·lb	
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Front Brake Reservoir Cap Screws	1.5	0.15	13 in·lb	
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Front Master Cylinder Clamp Bolts	8.8	0.9	78 in·lb	G, S
Front Caliper Mounting Bolts	34	3.5	25	
Rear Caliper Mounting Bolts	25	2.5	18	
Front Caliper Assembly Bolts	22	2.2	16	
Rear Caliper Assembly Bolts	32	3.3	24	
Front Brake Pad Spring Bolts	2.9	0.30	26 in·lb	
Brake Disc Mounting Bolts	27	2.8	20	L
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Rear Master Cylinder Push Rod Locknut	18	1.8	13	
Suspension				
Front Fork Clamp Bolts (Upper)	29	3.0	22	
Front Fork Clamp Bolts (Lower)	21	2.1	15	
Front Fork Top Plug	23	2.3	17	
Piston Rod Nut	15	1.5	11	
Front Fork Bottom Allen Bolts	39	4.0	29	L
Front Axle Clamp Bolts	20	2.0	14	S
Rear Shock Absorber Upper Mounting Bolts	59	6.0	44	hook
Rear Shock Absorber Lower Mounting Bolts	34	3.5	25	
Swingarm Pivot Nut	98	10	72	

Torque and Locking Agent

Fuel System	Torque			Remarks
	N·m	kgf·m	ft·lb	
Steering				
Steering Stem Head Nut	44	4.5	33	
Steering Stem Nut	4.9	0.5	43 in·lb	see the text
Handlebar Holder Bolts	25	2.5	18	
Handlebar Holder Nuts	34	3.5	25	lower
Handlebar Weight Screws	–	–	–	L
Handlebar Switch Housing Screws	3.4	0.35	30 in·lb	
Front Fork Clamp Bolts (Upper)	29	3.0	22	
Front Fork Clamp Bolts (Lower)	21	2.1	15	
Frame				
Wind Shield Screws	0.40	0.041	3.5 in·lb	
Downtube Bolts	44	4.5	33	
Sidestand Bolt	44	4.5	33	
Front Footpeg Holder Bolts	34	3.5	25	
Front Footpeg Stay Bolts	25	2.5	18	
Rear Footpeg Stay Bolts	25	2.5	18	
Electrical System				
Spark Plugs	14	1.4	10	
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	L
Crankshaft Sensor Cover Bolts	11	1.1	95 in·lb	L (2)
Timing Rotor Bolt	25	2.5	18	
Alternator Mounting Bolts	25	2.5	18	L
Alternator Cover Nuts	4.5	0.46	40 in·lb	
Alternator Coupling Bolt	12	1.2	106 in·lb	
Alternator Bearing Retainer Screws	2.6	0.27	23 in·lb	
Alternator Studs	8.8	0.90	78 in·lb	
Starter Motor Terminal Locknut	11	1.1	95 in·lb	
Starter Motor Terminal Nut	4.9	0.50	43 in·lb	
Starter Relay Terminal Bolts	4.9	0.50	43 in·lb	
Starter Motor Assembly Bolts	4.9	0.50	43 in·lb	
Starter Motor Mounting Bolts	11	1.1	95 in·lb	
Turn Signal Light Lens Screws	1.0	0.10	9 in·lb	
Handlebar Switch Housing Screws	3.4	0.35	30 in·lb	
Radiator Fan Switch	24	2.4	17	
Water Temperature Switch	7.8	0.80	69 in·lb	SS
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Screw	1.5	0.15	13 in·lb	
Neutral Switch	15	1.5	11	
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
Front Brake Light Switch Screw	1.2	0.12	10 in·lb	
Starter Lockout Switch Screw	1.2	0.12	10 in·lb	
Taillight Nuts	5.9	0.60	52 in·lb	

1-22 GENERAL INFORMATION

Torque and Locking Agent

Fuel System	Torque			Remarks
	N·m	kgf·m	ft·lb	
Rear Turn Signal Light Nuts	5.9	0.60	52 in·lb	
Fuel Level Sensor Mounting Bolts	6.9	0.70	61 in·lb	

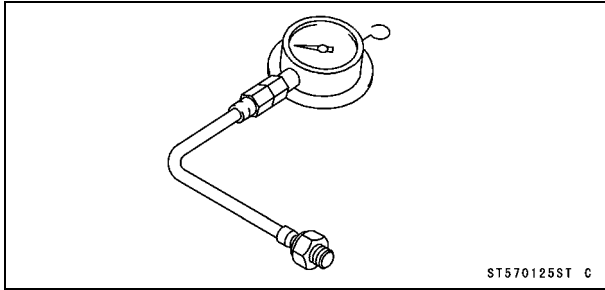
The table below, relating tightening torque to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. All of the values are for use with dry solvent-cleaned threads.

Basic Torque for General Fasteners

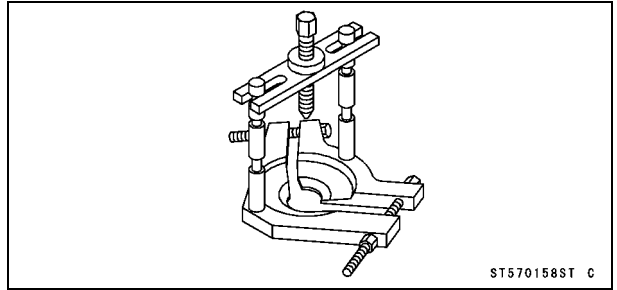
Threads dia. (mm)	Torque		
	N·m	kgf·m	ft·lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in·lb
6	5.9 ~ 7.8	0.60 ~ 0.80	52 ~ 69 in·lb
8	14 ~ 19	1.4 ~ 1.9	10.0 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19.0 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17.0 ~ 23.0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

Special Tools and Sealants

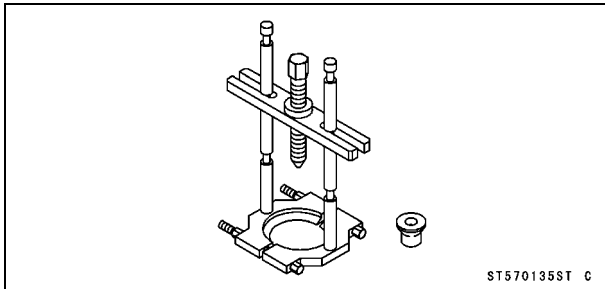
Oil Pressure Gauge, 5 kgf/cm²:
57001-125



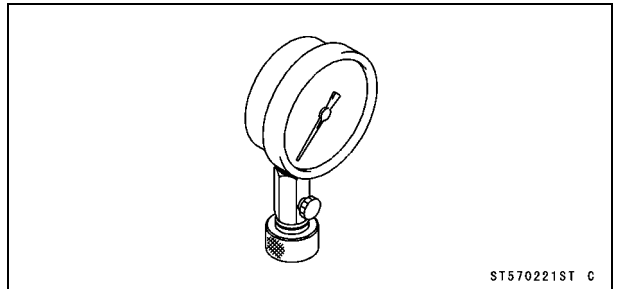
Bearing Puller:
57001-158



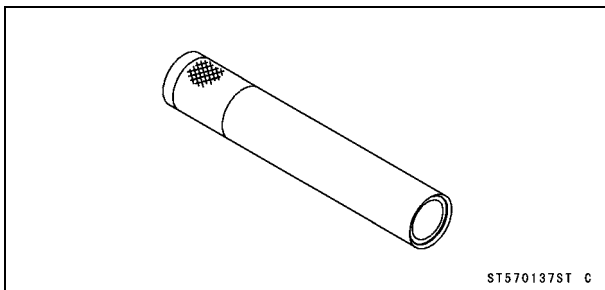
Bearing Puller:
57001-135



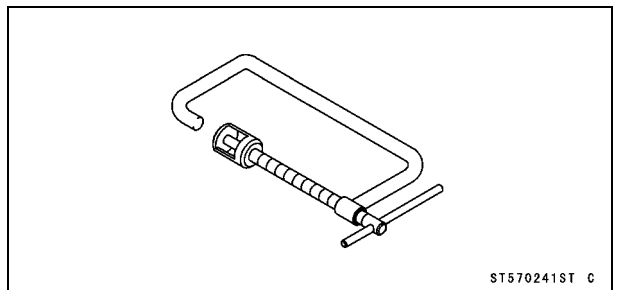
Compression Gauge, 20 kgf/cm²:
57001-221



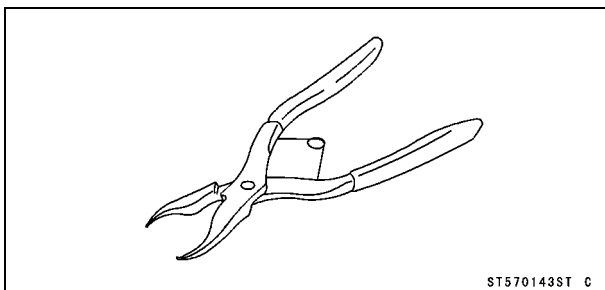
Steering Stem Bearing Driver:
57001-137



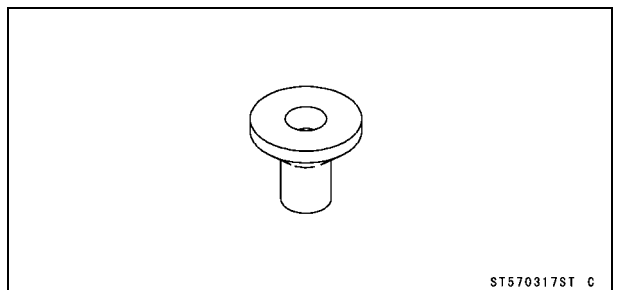
Valve Spring Compressor Assembly:
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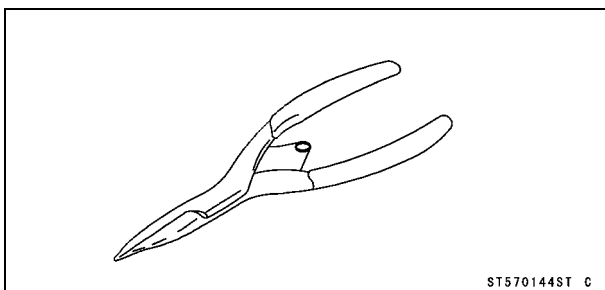
Inside Circlip Pliers:
57001-143



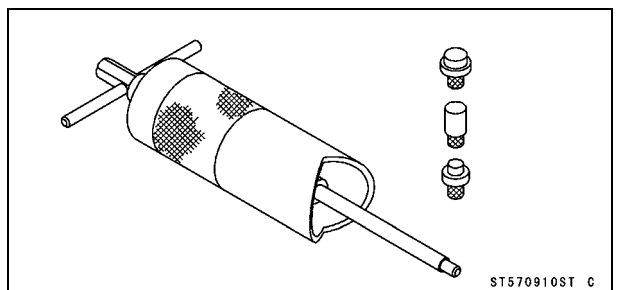
Bearing Puller Adapter:
57001-317



Outside Circlip Pliers:
57001-144



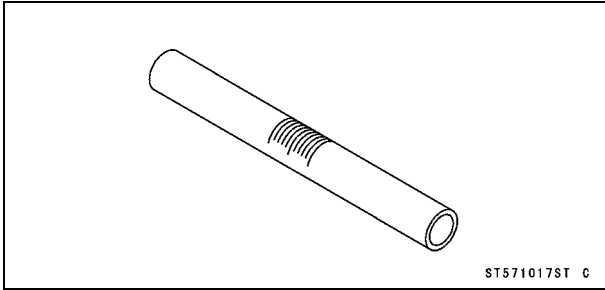
Piston Pin Puller Assembly:
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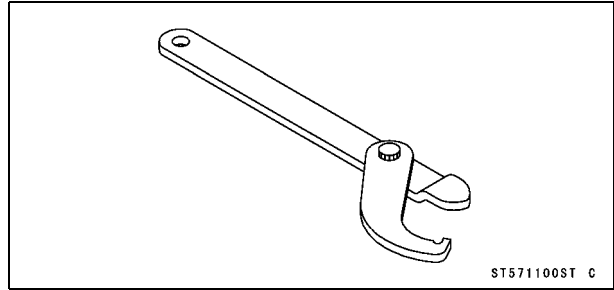
1-24 GENERAL INFORMATION

Special Tools and Sealants

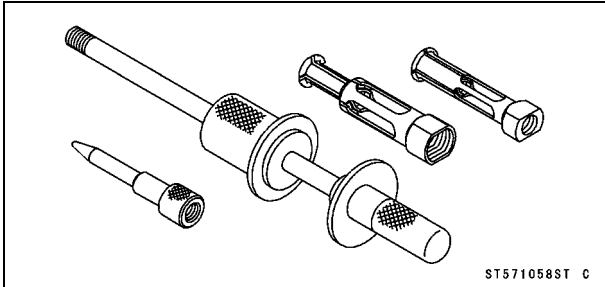
Fuel Level Gauge:
57001-1017



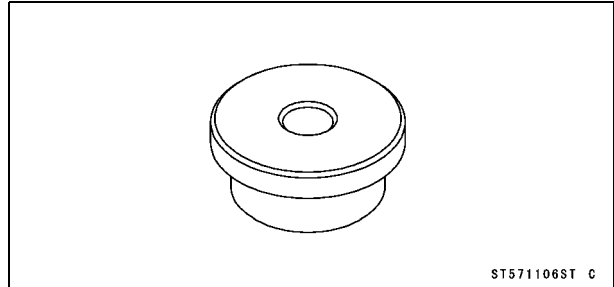
Steering Stem Nut Wrench:
57001-1100



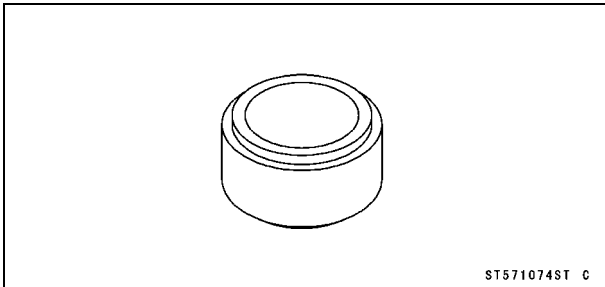
Oil Seal & Bearing Remover:
57001-1058



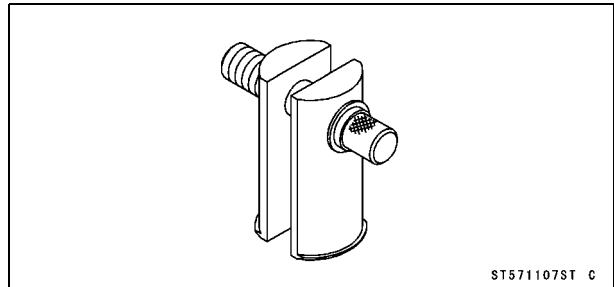
Head Pipe Outer Race Driver, $\phi 46.5$:
57001-1106



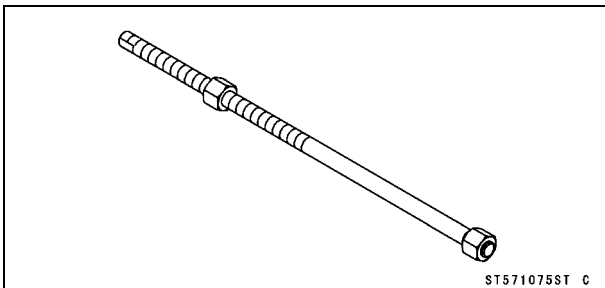
Steering Stem Bearing Driver Adapter, $\phi 34.5$:
57001-1074



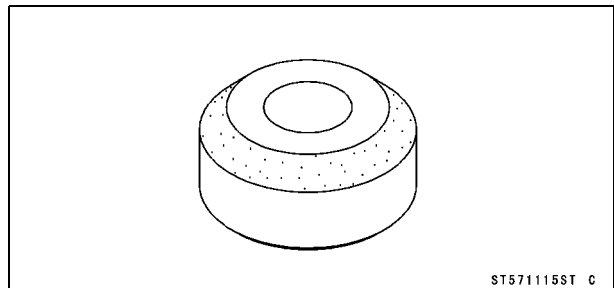
Head Pipe Outer Race Remover ID > 37 mm:
57001-1107



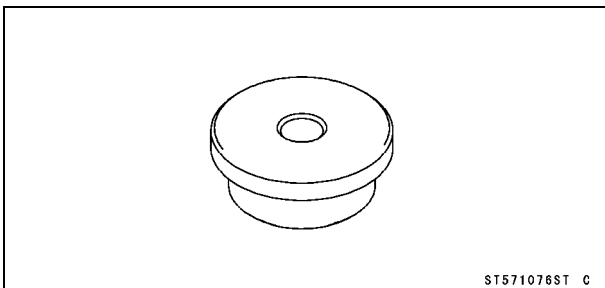
Head Pipe Outer Race Press Shaft:
57001-1075



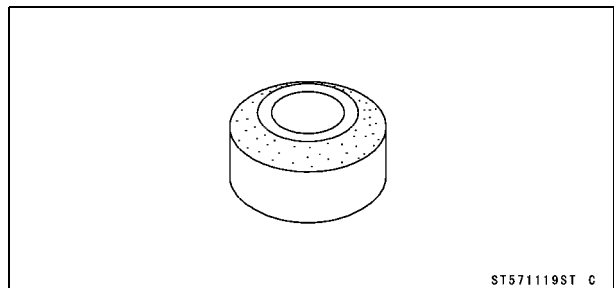
Valve Seat Cutter, $45^\circ - \phi 32$:
57001-1115



Head Pipe Outer Race Driver, $\phi 51.5$:
57001-1076

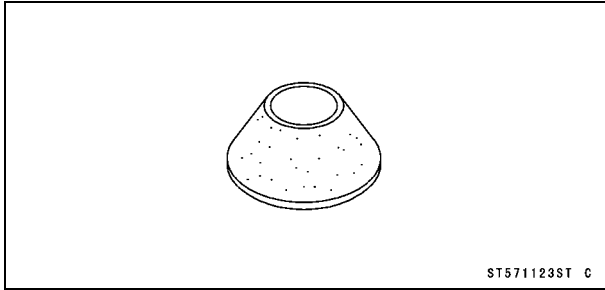


Valve Seat Cutter, $32^\circ - \phi 28$:
57001-1119

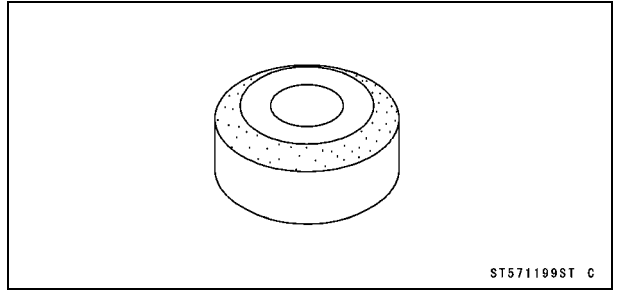


Special Tools and Sealants

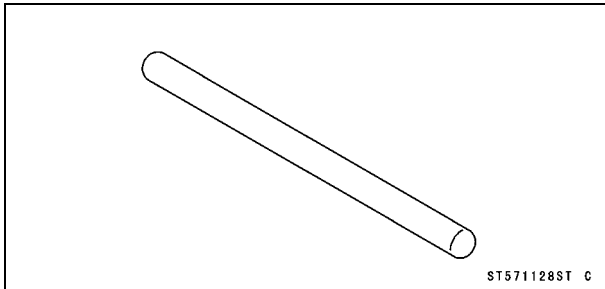
Valve Seat Cutter, 60° - $\phi 30$:
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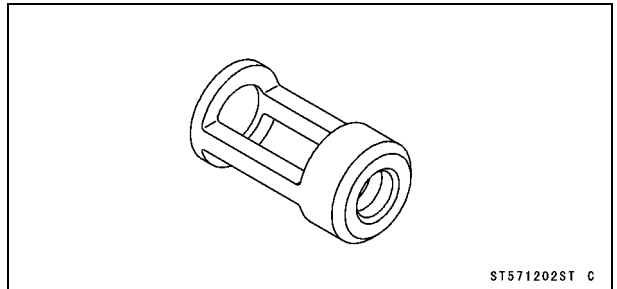
Valve Seat Cutter, 32° - $\phi 33$:
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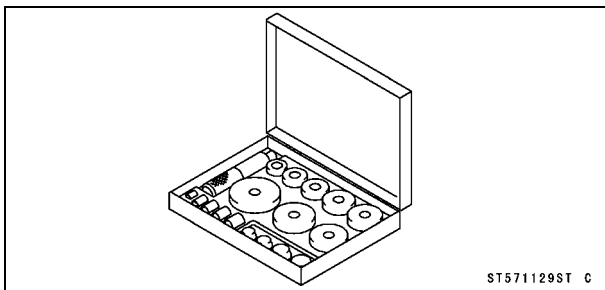
Valve Seat Cutter Holder Bar:
57001-1128



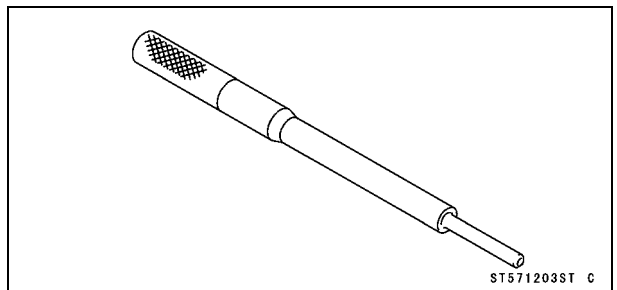
Valve Spring Compressor Adapter, $\phi 22$:
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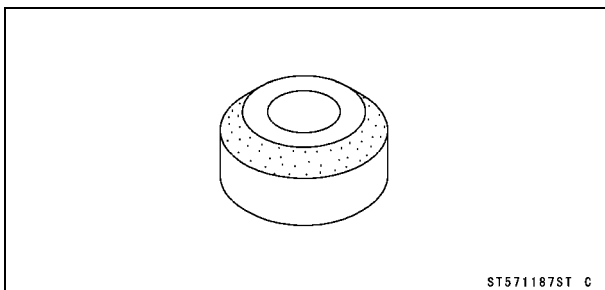
Bearing Driver Set:
57001-1129



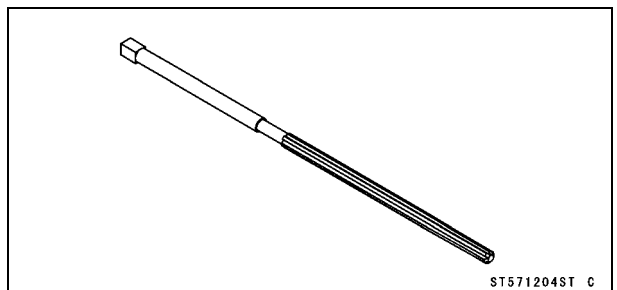
Valve Guide Arbor, $\phi 5$:
57001-1203



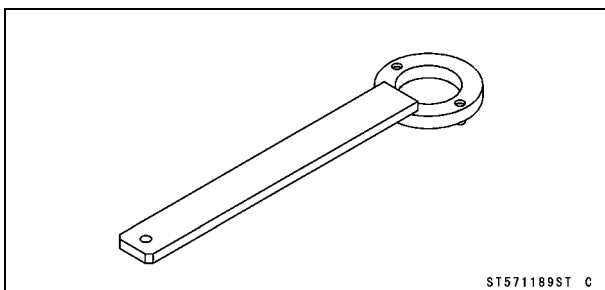
Valve Seat Cutter, 45° - $\phi 30$:
57001-1187



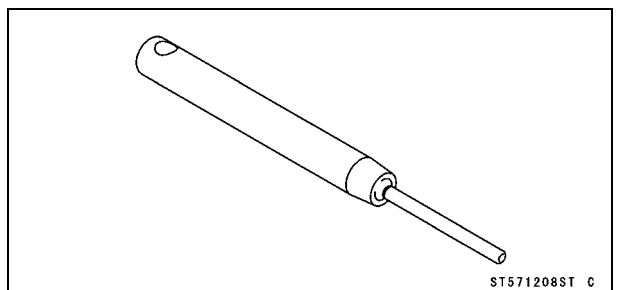
Valve Guide Reamer, $\phi 5$:
57001-1204



Coupling Holder:
57001-1189



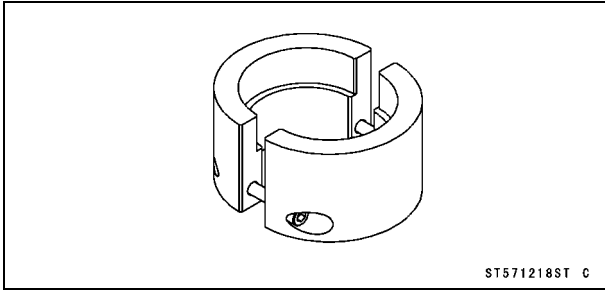
Valve Seat Cutter Holder, $\phi 5$:
57001-1208



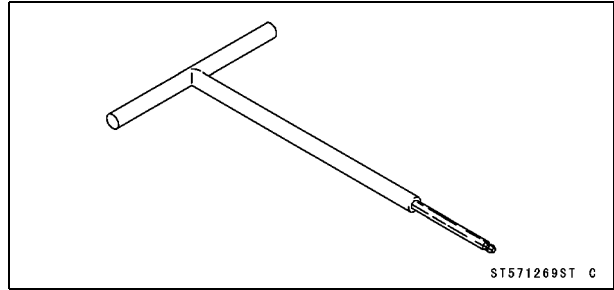
1-26 GENERAL INFORMATION

Special Tools and Sealants

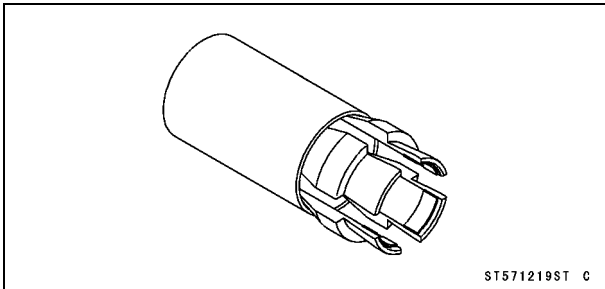
Fork Outer Tube Weight:
57001-1218



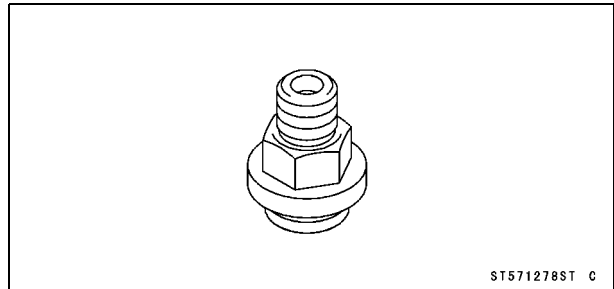
Carburetor Drain Plug Wrench, Hex 3:
57001-1269



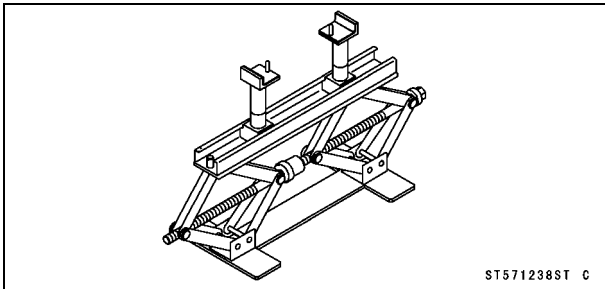
Front Fork Oil Seal Driver:
57001-1219



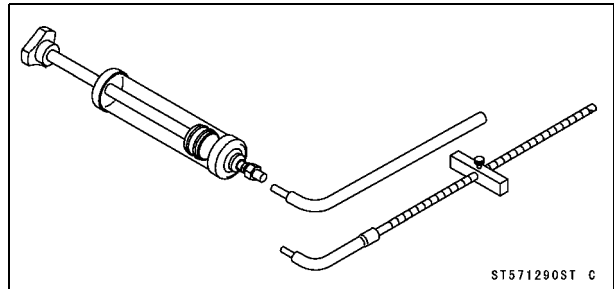
Oil Pressure Gauge Adapter, M18 x 1.5:
57001-1278



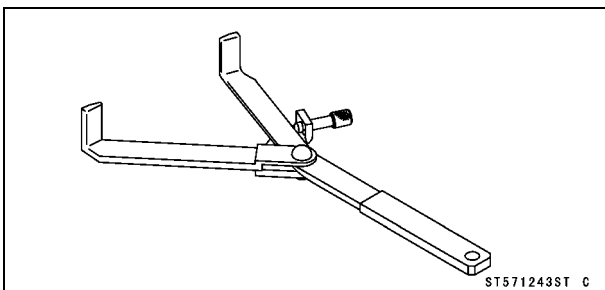
Jack:
57001-1238



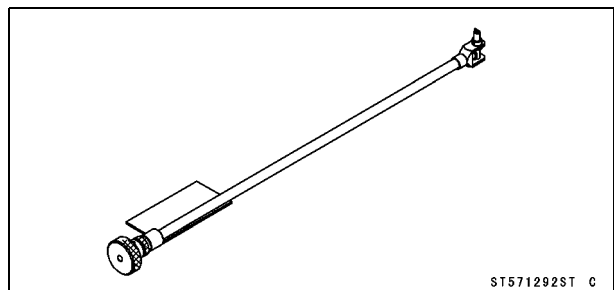
Fork Oil Level Gauge:
57001-1290



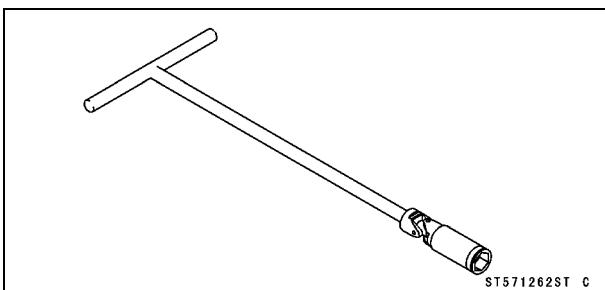
Clutch Holder:
57001-1243



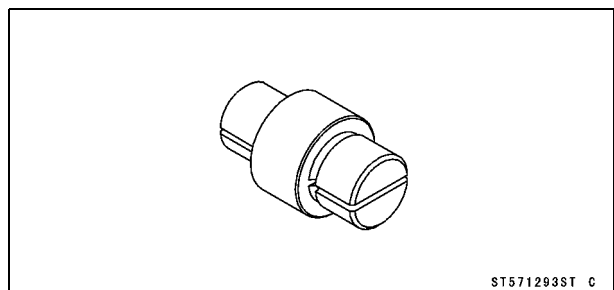
Pilot Screw Adjuster, C:
57001-1292



Spark Plug Wrench, Hex 16:
57001-1262

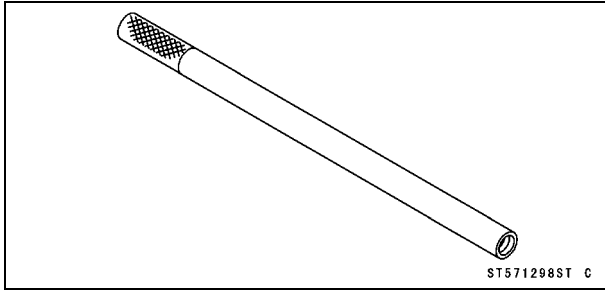


Bearing Remover Head, $\phi 20 \times \phi 22$:
57001-1293

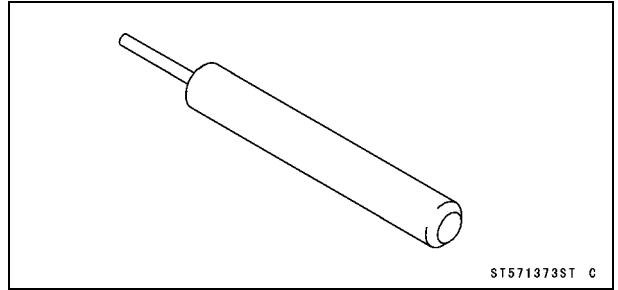


Special Tools and Sealants

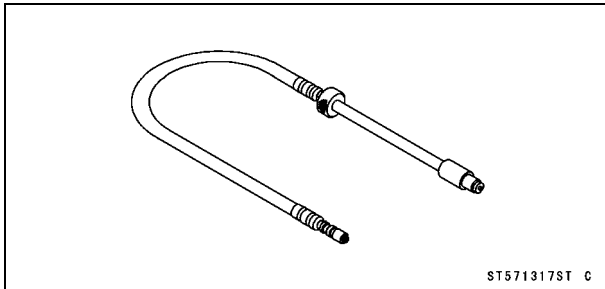
Fork Piston Rod Puller, M10 × 1.0:
57001-1298



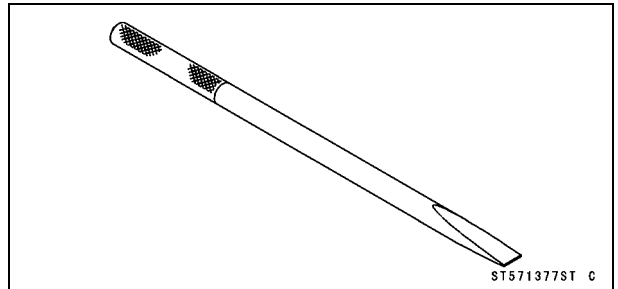
Pilot Screw Adjuster Driver:
57001-1373



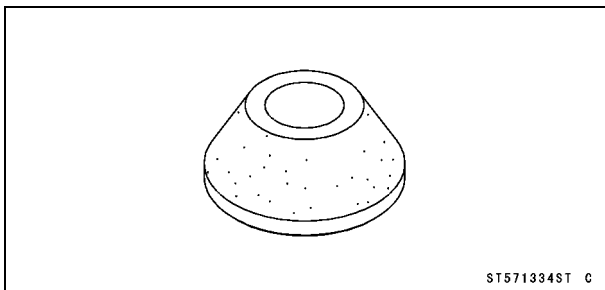
Compression Gauge Adapter, M10 × 1.0:
57001-1317



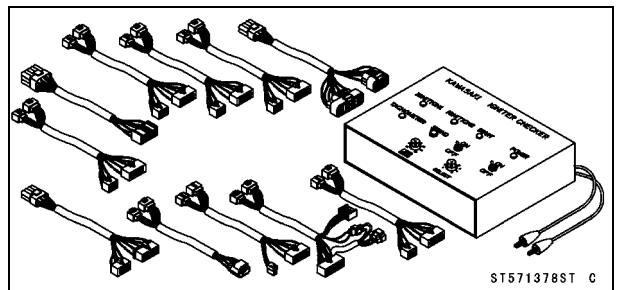
Bearing Remover Shaft, φ13:
57001-1377



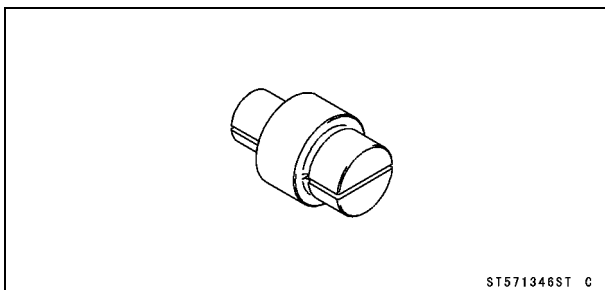
Valve Seat Cutter, 60° - φ33:
57001-1334



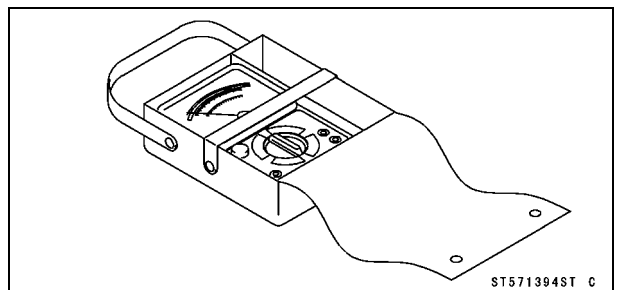
Igniter Checker Assembly:
57001-1378



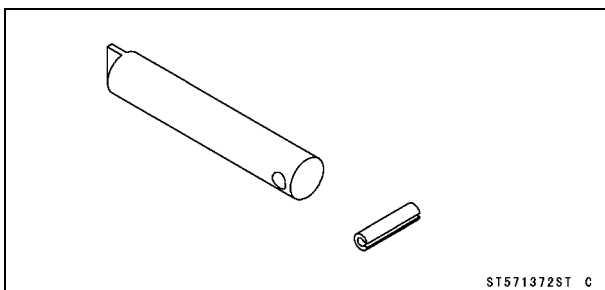
Bearing Remover Head, φ25 × φ28:
57001-1346



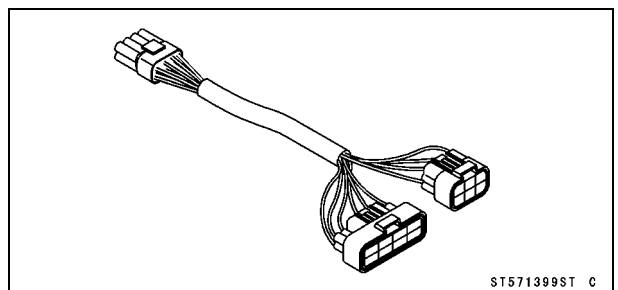
Hand Tester:
57001-1394



Pilot Screw Adjuster Adapter, φ5:
57001-1372



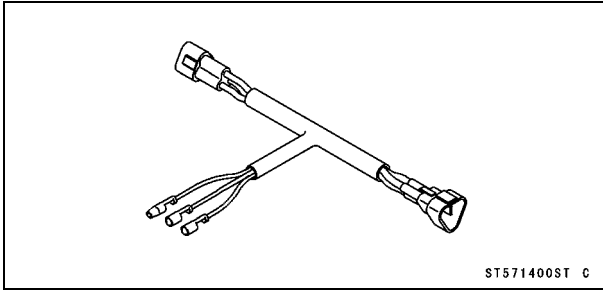
Harness Adapter #13:
57001-1399



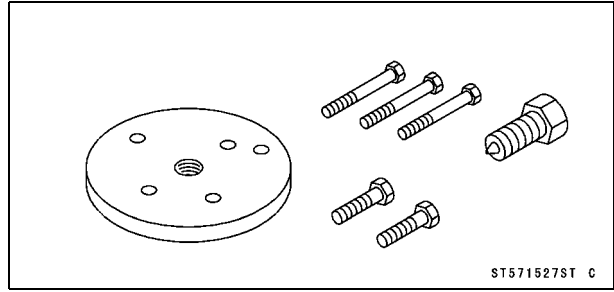
1-28 GENERAL INFORMATION

Special Tools and Sealants

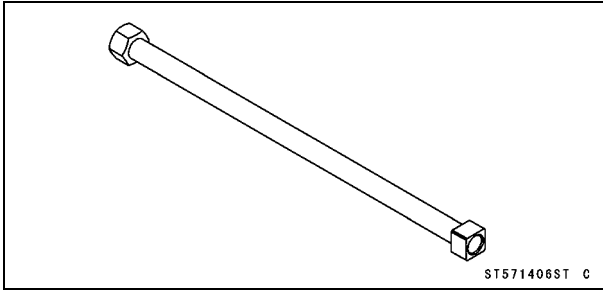
Throttle Sensor Setting Adapter #1:
57001-1400



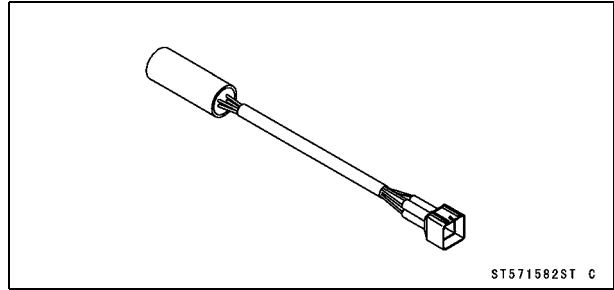
Alternator Frame Puller:
57001-1527



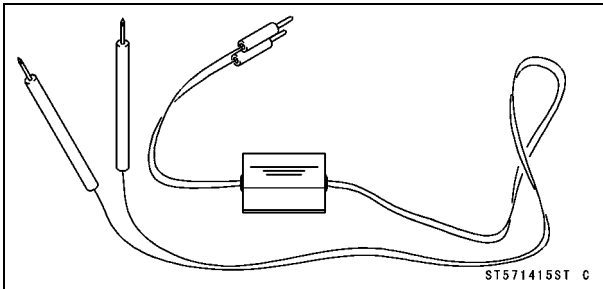
Fork Cylinder Holder, Hex 24 × □19.5:
57001-1406



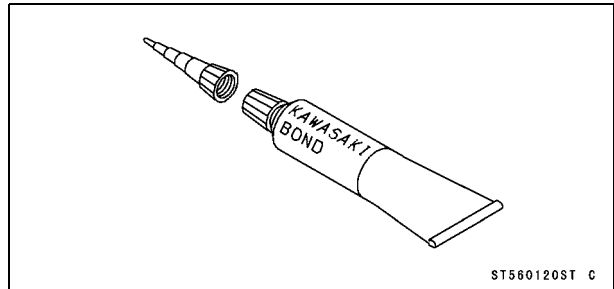
Key Registration Unit:
57001-1582



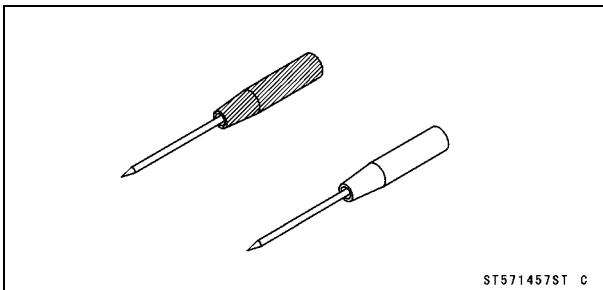
Peak Voltage Adapter:
57001-1415



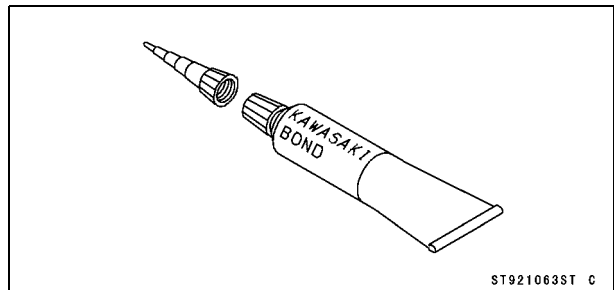
Kawasaki Bond (Silicone Sealant):
56019-120



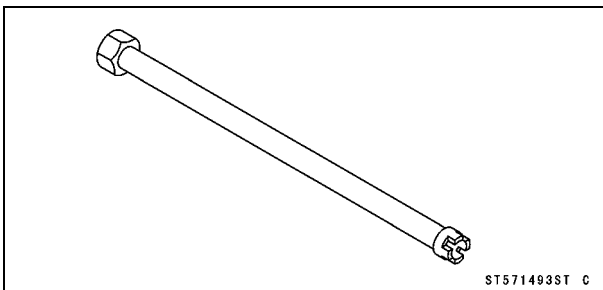
Needle Adapter Set:
57001-1457



Kawasaki Bond (Liquid Gasket - Gray):
92104-1063



Fork Cylinder Holder, Hex 24:
57001-1493

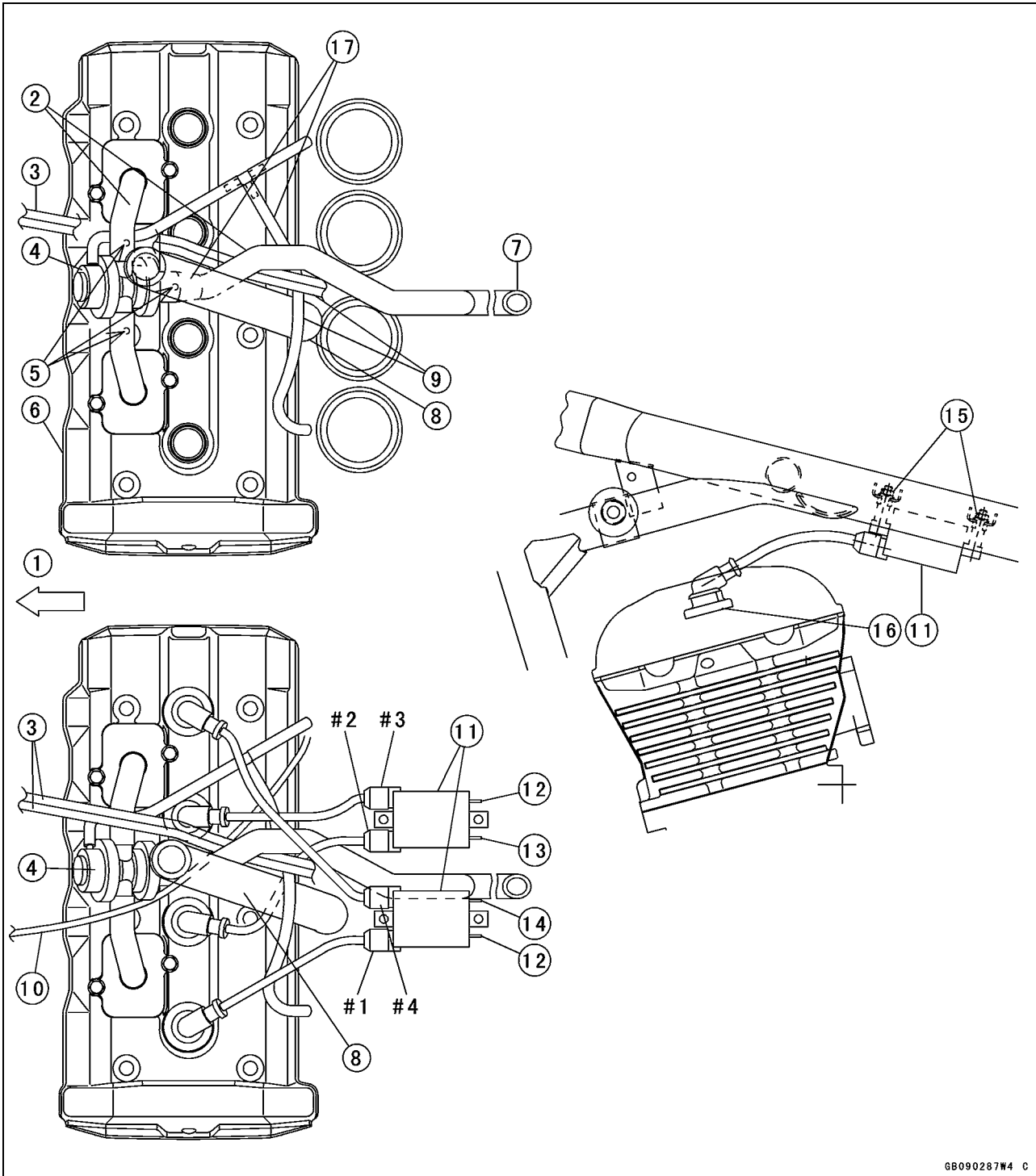


Cable, Wire, and Hose Routing

Dummy Page

1-30 GENERAL INFORMATION

Cable, Wire, and Hose Routing

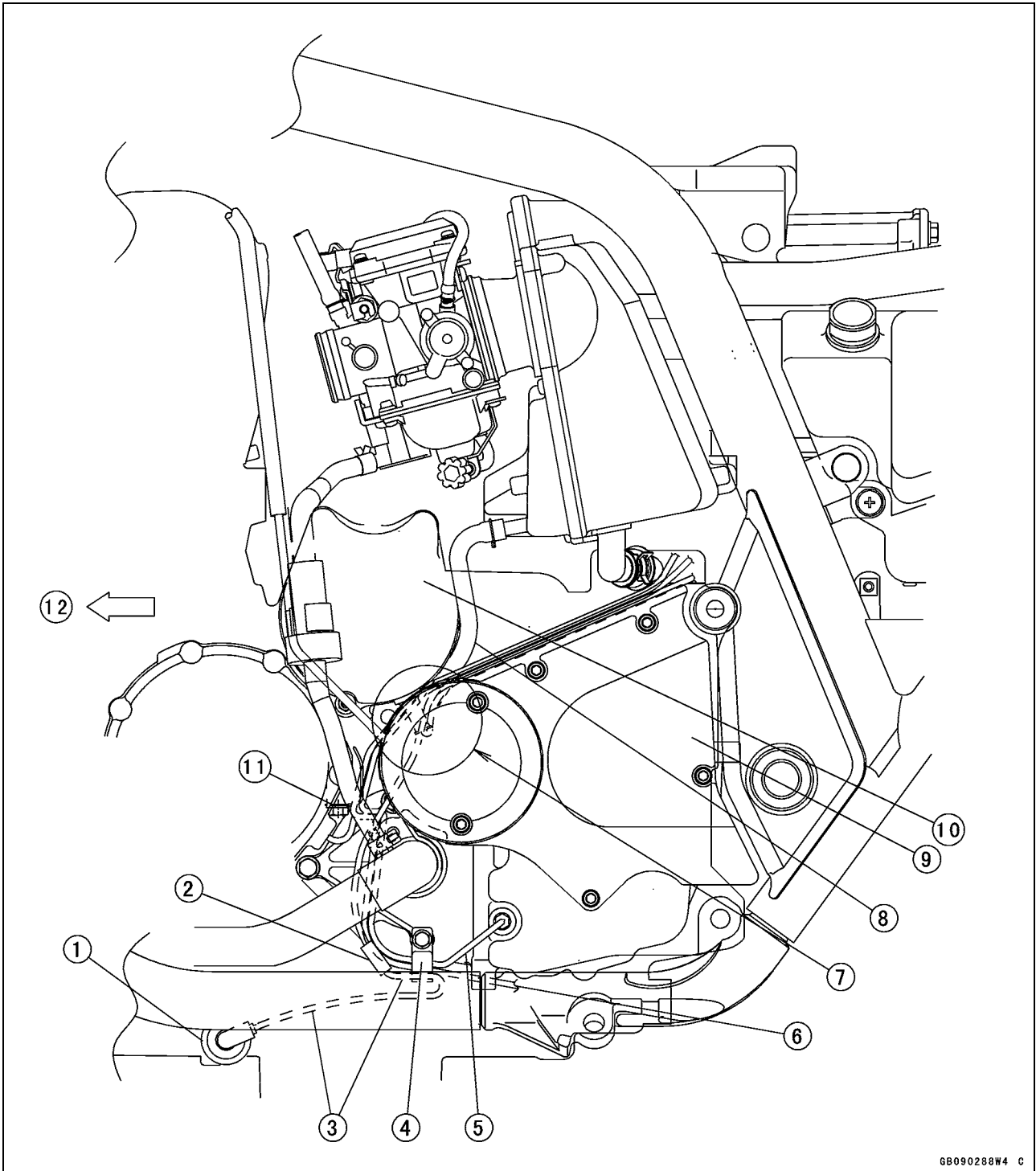


Cable, Wire, and Hose Routing

1. Front
2. Vacuum Switch Valve Hoses
3. Throttle Cable over the hose [2]
4. Vacuum Switch Valve
5. Raised Marks facing upwards
6. Cylinder Head Cover
7. Apply water to the end of the hose and fit it into the grommet of the front air cleaner housing.
8. Water Hose (outlet)
9. Run the hose [17] under the cables [3] and behind the hose [8].
10. Choke Cable
11. Ignition Coils
12. To Red Leads
13. To Green Lead
14. To Black Lead
15. Nuts
16. Plug Cap
17. Vacuum Hose under the hoses [2] and [8]

1-32 GENERAL INFORMATION

Cable, Wire, and Hose Routing

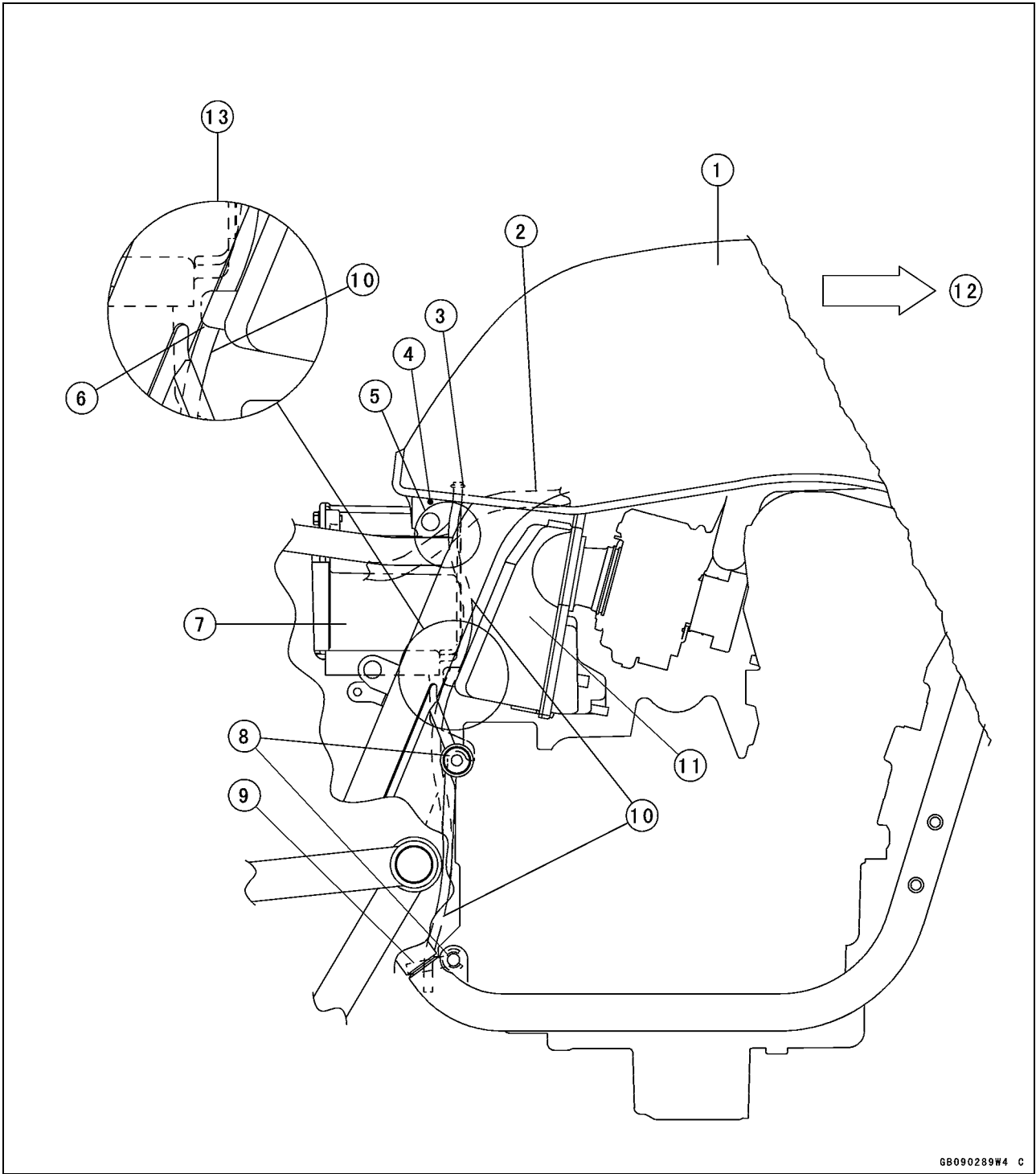


Cable, Wire, and Hose Routing

1. Oil Pressure Switch
2. Connector in front of the clamp [4]
3. Clamp the lead with a slack as little as possible.
4. Clamp the oil pressure switch, neutral switch and sidestand switch leads.
5. Neutral Switch Lead
6. Sidestand Switch Lead
7. Run these leads and the air cleaner drain hose [8] between the chain cover [9] and the alternator [10].
8. Air Cleaner Drain Hose
9. Chain Cover
10. Alternator
11. Clamp on the lower crankcase (crankshaft sensor leads)
12. Front

1-34 GENERAL INFORMATION

Cable, Wire, and Hose Routing

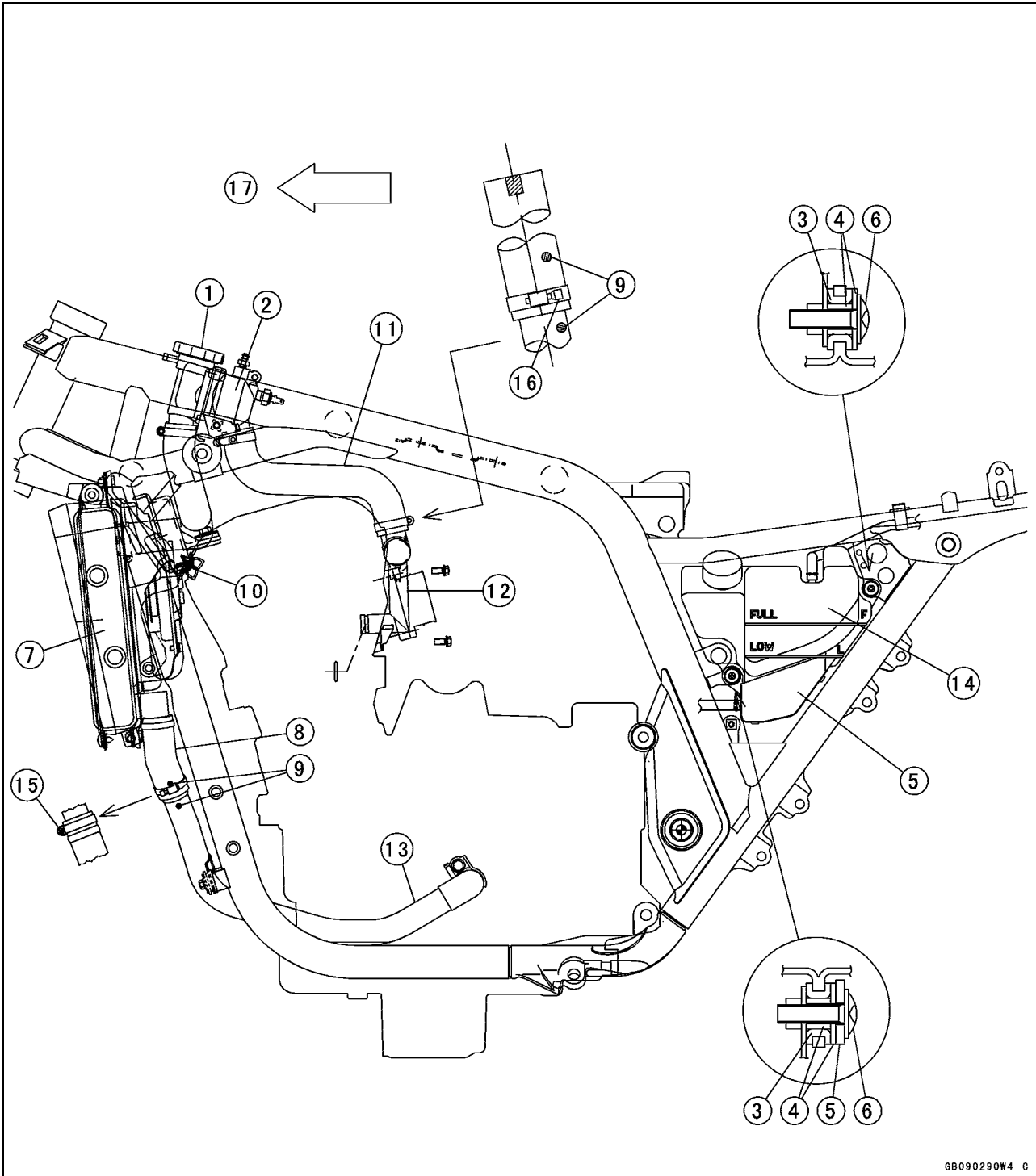


Cable, Wire, and Hose Routing

1. Fuel Tank
2. Main Harness
3. Clip
4. Fuel Tank Bracket
5. Run the filler drain hose [10] between the fuel tank bracket [4] and frame.
6. Air Cleaner Housing Pin
7. Rear Air Cleaner Housing
8. Engine Mounting Bolts
9. Clamp tightened by the engine mounting bolts [8].
10. Fuel Tank Filler Drain Hose
11. Front Air Cleaner Housing
12. Front
13. Run the filler drain hose [10] inside the air cleaner housing pin [6].

1-36 GENERAL INFORMATION

Cable, Wire, and Hose Routing

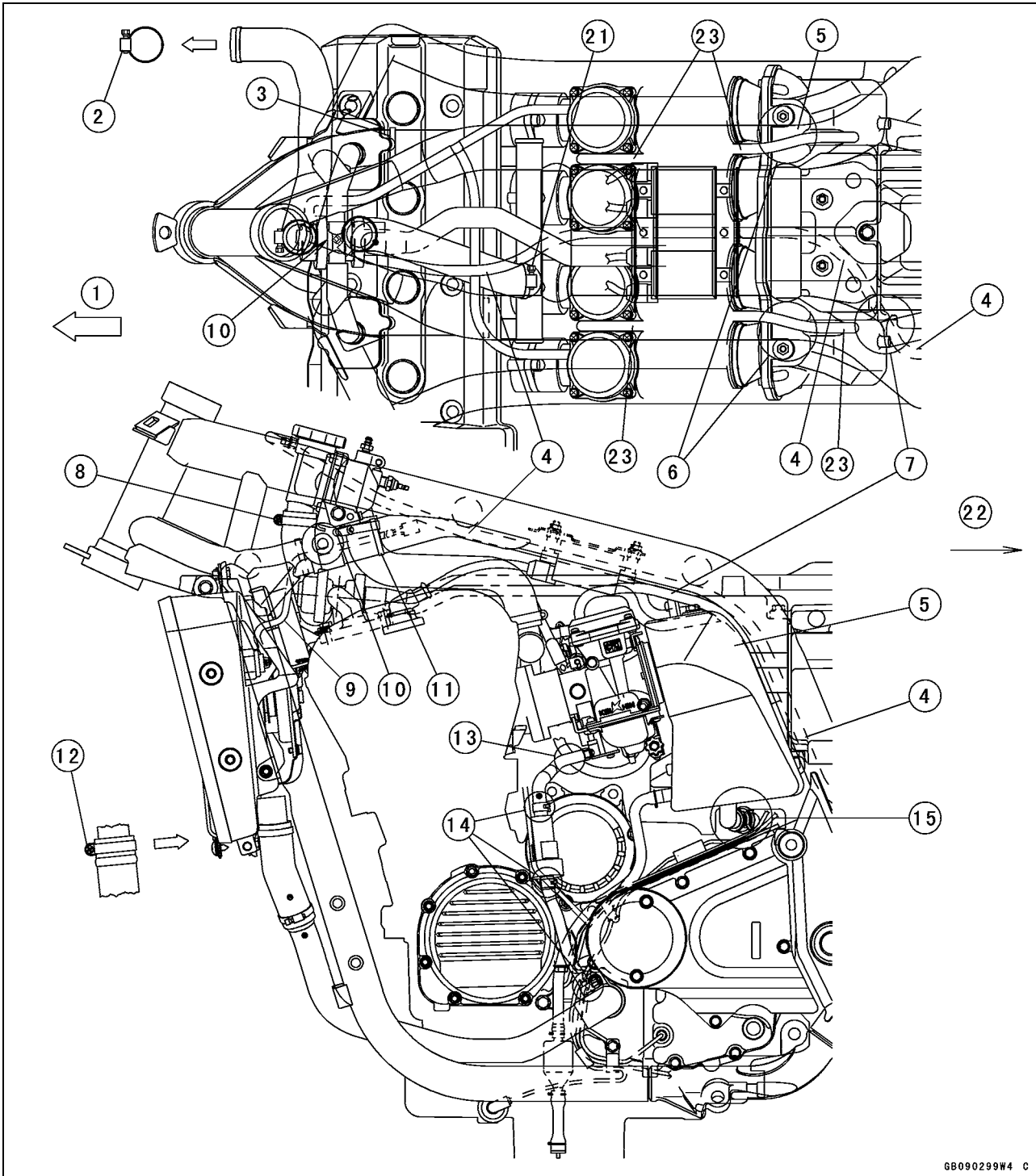


Cable, Wire, and Hose Routing

1. Radiator Cap
2. Thermostat Housing
3. Rubber Dampers
4. Collars
5. Reserve Tank Cover
6. Screws
7. Radiator
8. Radiator Outlet Hose (Apply water to the inside of each end when installing.)
9. Align these white marks.
10. Baffle
11. Water Hose (Apply water to the inside of each end when installing.)
12. Water Pipe (outlet)
13. Water Pipe (inlet)
14. Coolant Reserve Tank
15. Install the clamp with the screw head inwards.
16. Install the clamp with the screw head right.
17. Front

1-38 GENERAL INFORMATION

Cable, Wire, and Hose Routing

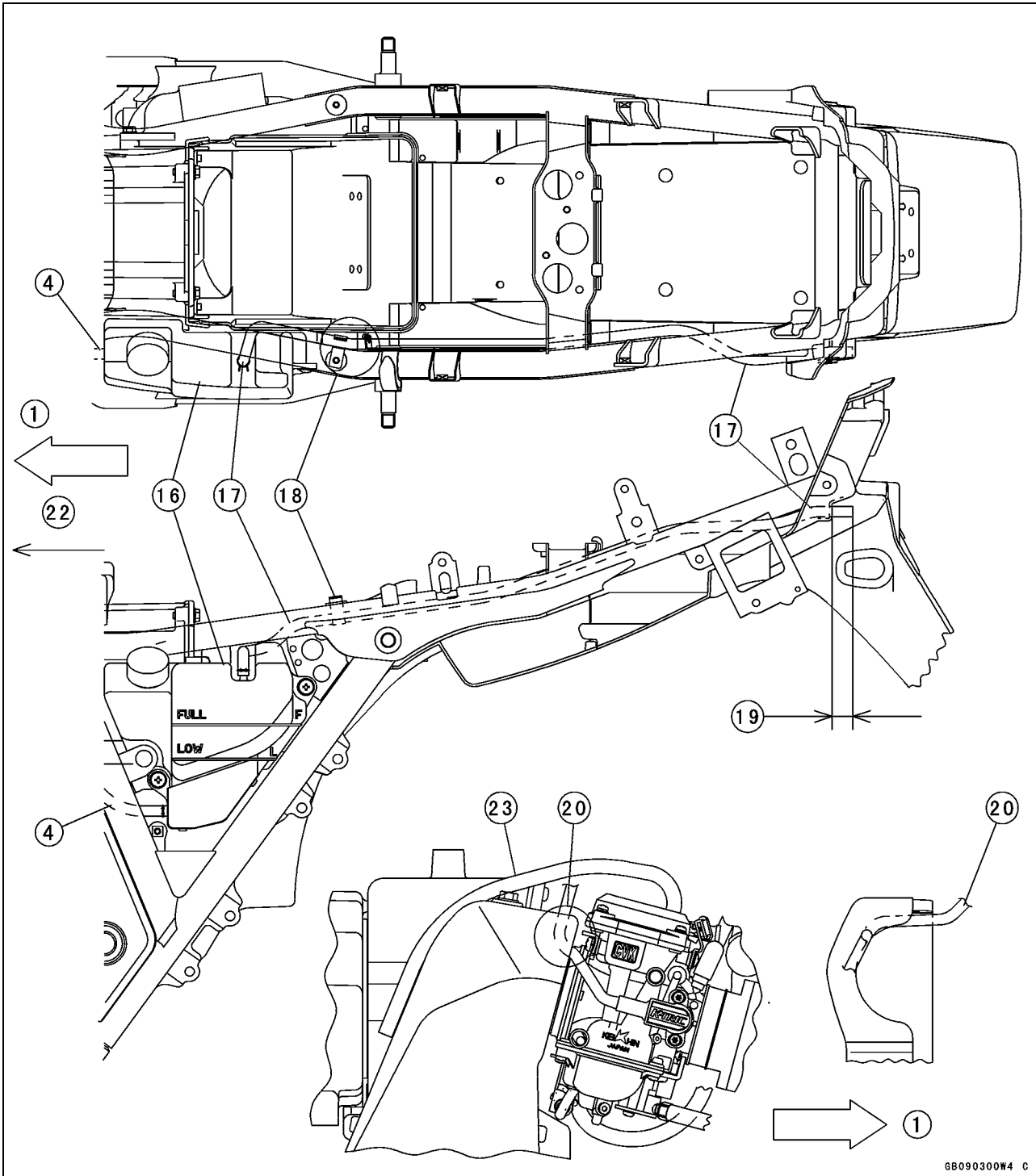


Cable, Wire, and Hose Routing

1. Front
2. Position the clamp screw down and the screw head right.
3. Strap the fan motor lead on the frame pipe.
4. Reserve Tank Hose: Run it on the left side of the radiator cap.
5. Front Air Cleaner Housing
6. Run the carburetor vent hoses inside the bosses and into the grooves of the housing [5].
7. Run the reserve tank hose [4] inside the boss and between the housing [5] and frame pipe without being pinched.
8. Position the clamp screw forwards and the screw head left.
9. Radiator Fan Switch Lead
10. Position the clamp screw forwards and the screw head tilted 45° left as shown.
11. Strap the radiator fan switch lead [9].
12. Position the screw inward and the screw head forwards.
13. Run the fuel hose inside the coolant hose.
14. Position the clamp tabs back and slightly outwards.
15. Position the clamp tabs back.
21. Position the clamp screw head right.
22. Continued
23. Carburetor Vent Hoses

1-40 GENERAL INFORMATION

Cable, Wire, and Hose Routing

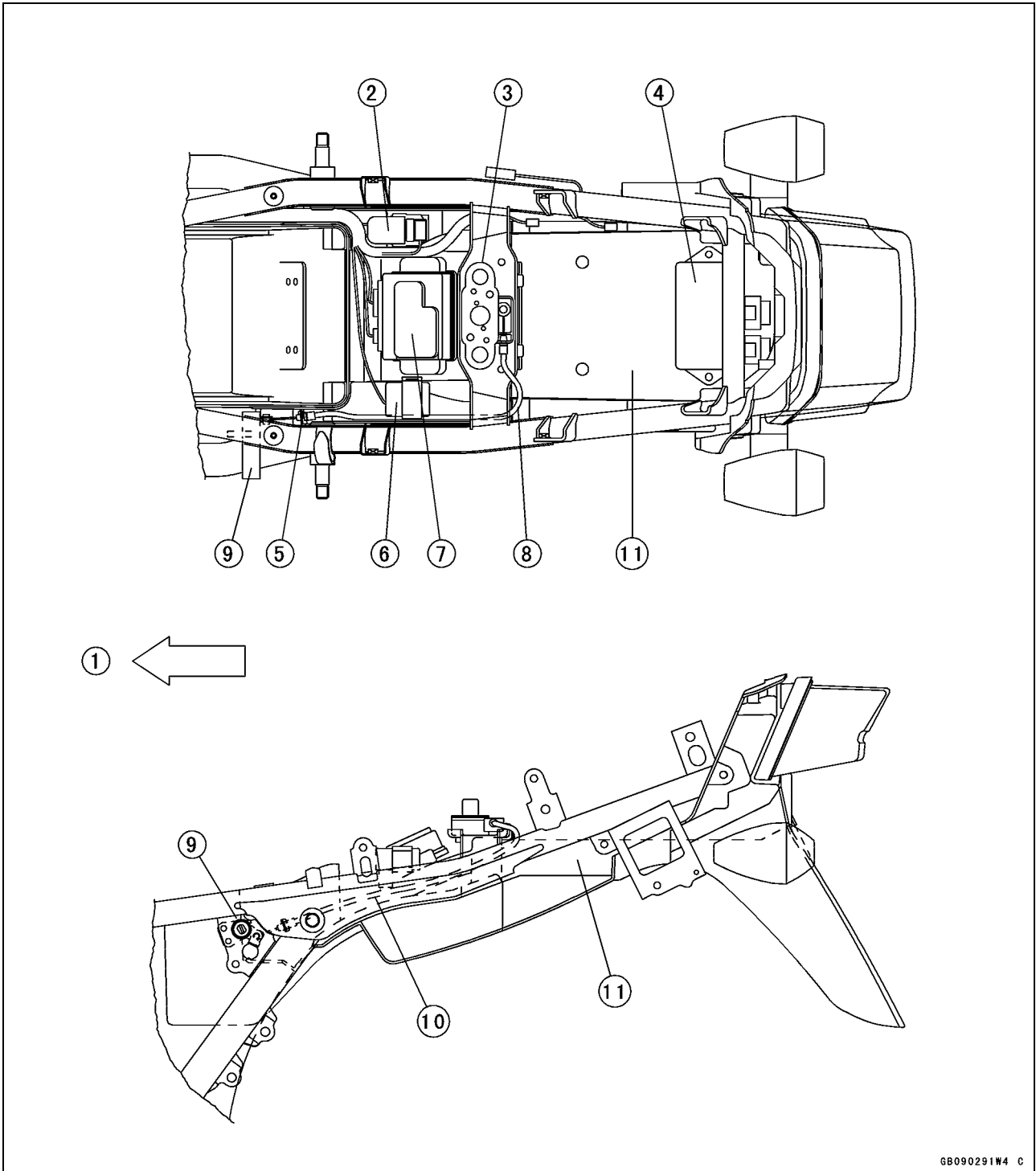


Cable, Wire, and Hose Routing

1. Front
4. Reserve Tank Hose: Run it on the left side of the radiator cap.
16. Coolant Reserve Tank
17. Reserve Tank Overflow Hose
18. Do not pinch the hose [17] with the seat lock cable.
19. About 30 mm (1.18 in.): Fit the end of the hose [17] into the hole of the rear fender so the hose end protrudes about 30 mm (1.18 in.). Otherwise the hose is pulled tight and it could be pinched with the seat cover.
20. Throttle Sensor Leads: Run the leads inside the right air cleaner cover.
22. Continued
23. Carburetor Vent Hoses

1-42 GENERAL INFORMATION

Cable, Wire, and Hose Routing

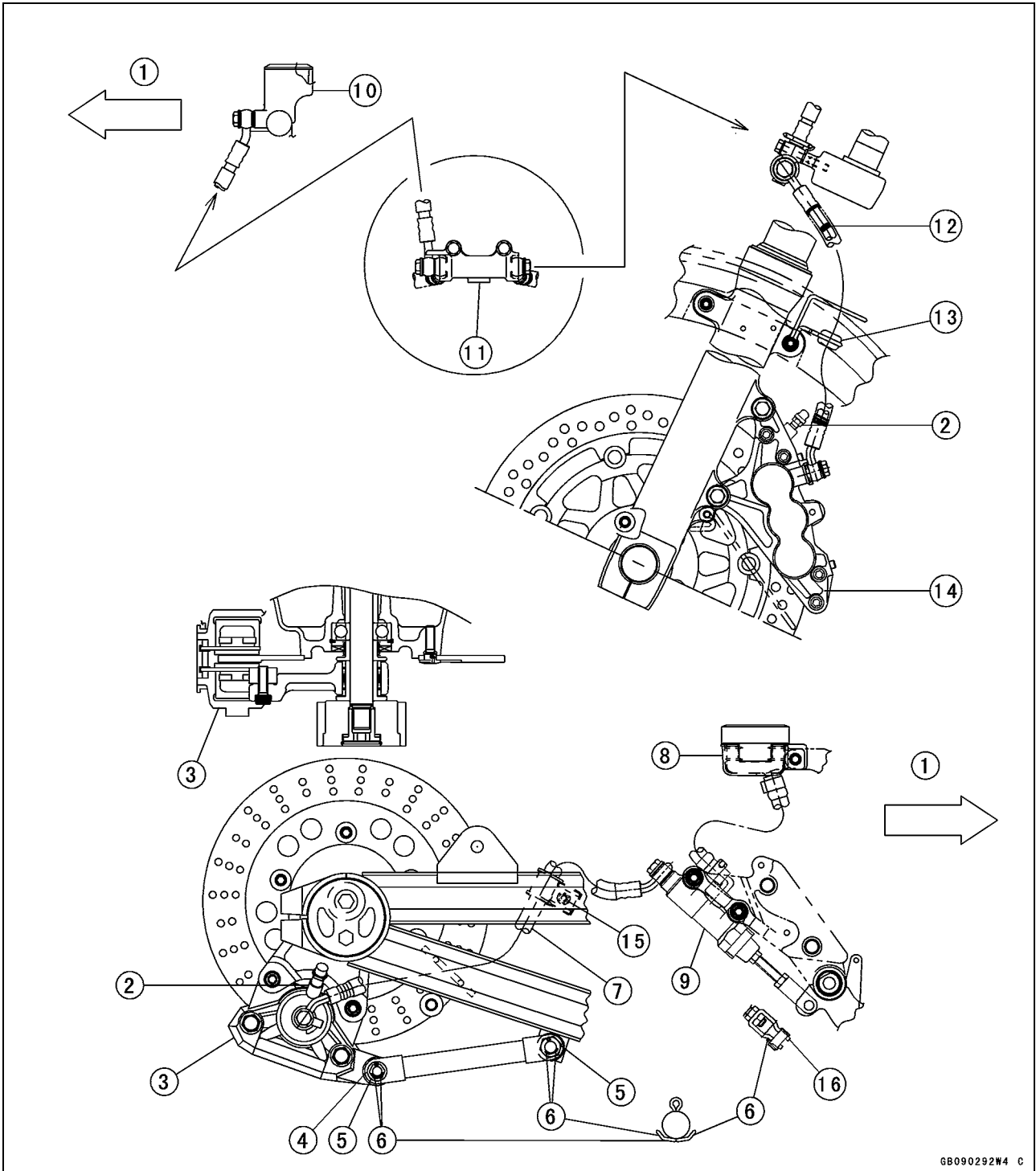


Cable, Wire, and Hose Routing

1. Front
2. Starter Relay
3. Seat Lock
4. Igniter
5. Welded Clamp
6. Headlight Relay (ZR1200B)
7. Junction Box
8. Seat Lock Cable
9. Seat Lock Key
10. Run the cable [8] so it doesn't get pinched between the rear fender [11] and the frame.
11. Rear Fender

1-44 GENERAL INFORMATION

Cable, Wire, and Hose Routing



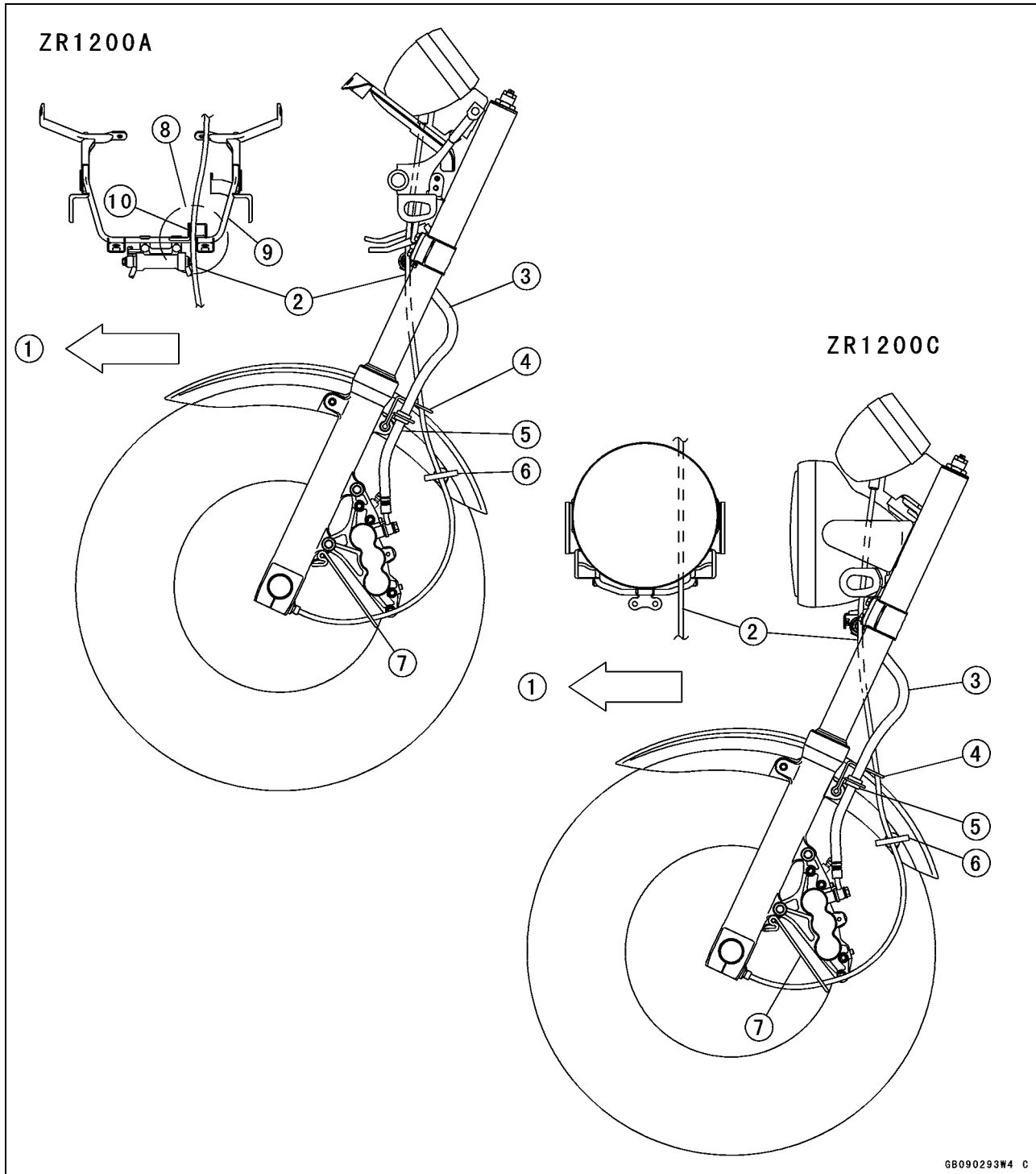
Cable, Wire, and Hose Routing

1. Front
2. Caliper Air Bleeders
3. Rear Caliper
4. Sleeve
5. Rubber Boots
6. Bend both ends of the cotter pins.
7. Rear Brake Hose
8. Rear Brake Reservoir
9. Rear Master Cylinder: Install the rear brake light switch spring from the frame inside (Open ends of the hook face the footpeg bracket) with the longer hook up.
10. Front Brake Reservoir
11. Brake Joint
12. Front Brake Hoses: left hose (blue paint mark), right hose (white paint mark)
13. Brake Hose Grommets
14. Front Brake Calipers
15. Clamp
16. Joint Pin

1-46 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-A1 ~ /C1 ~



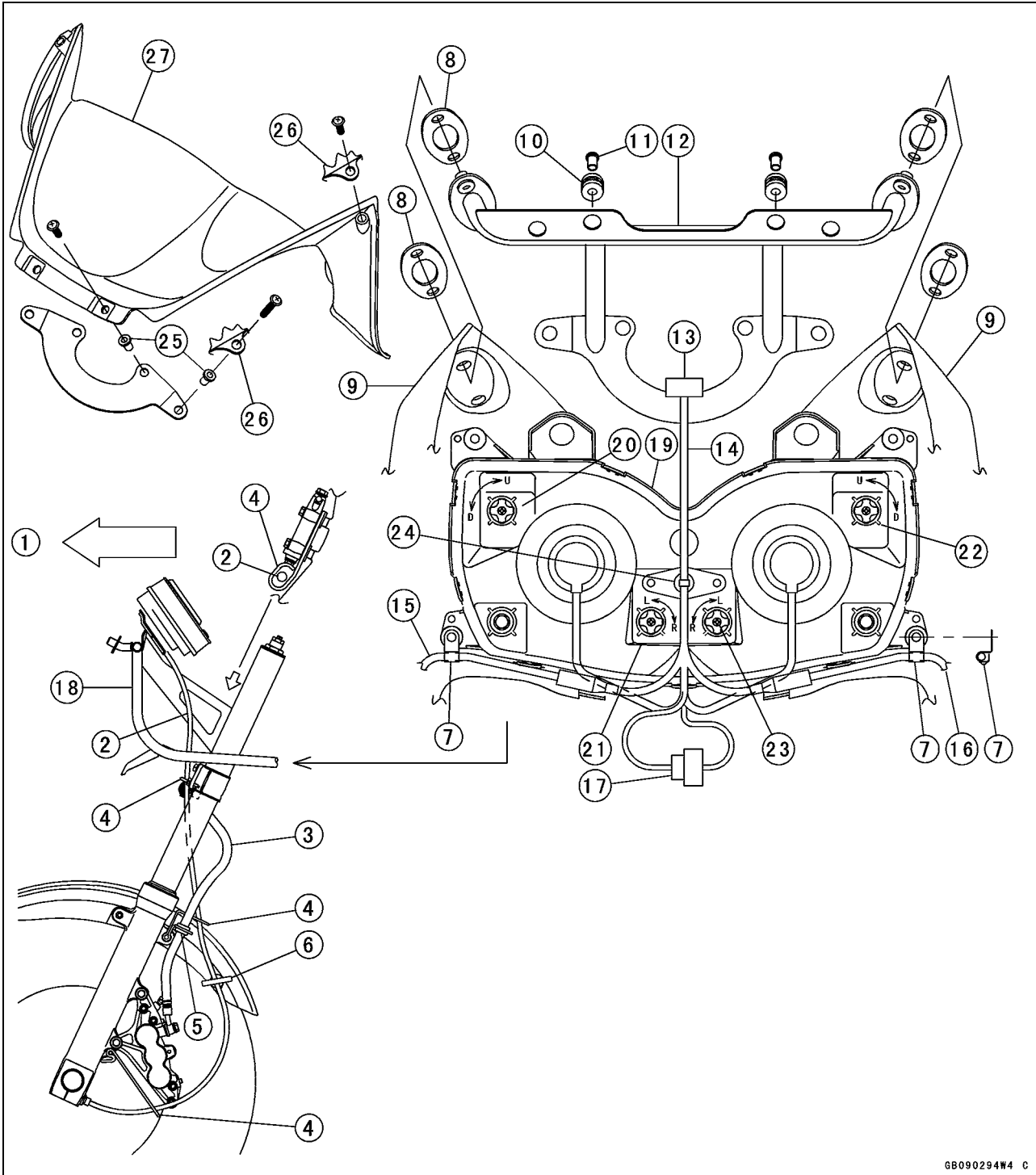
Cable, Wire, and Hose Routing

1. Front
2. Speedometer Cable
3. Front Brake Hose
4. Cable Holder
5. Rubber Grommet
6. Plastic Cable Holder
7. Cable Holder
8. Run the speedometer cable between the bracket [9] and the headlight adjuster bracket [10].
9. Fairing Bracket
10. Headlight Adjuster Bracket

1-48 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-B1 ~



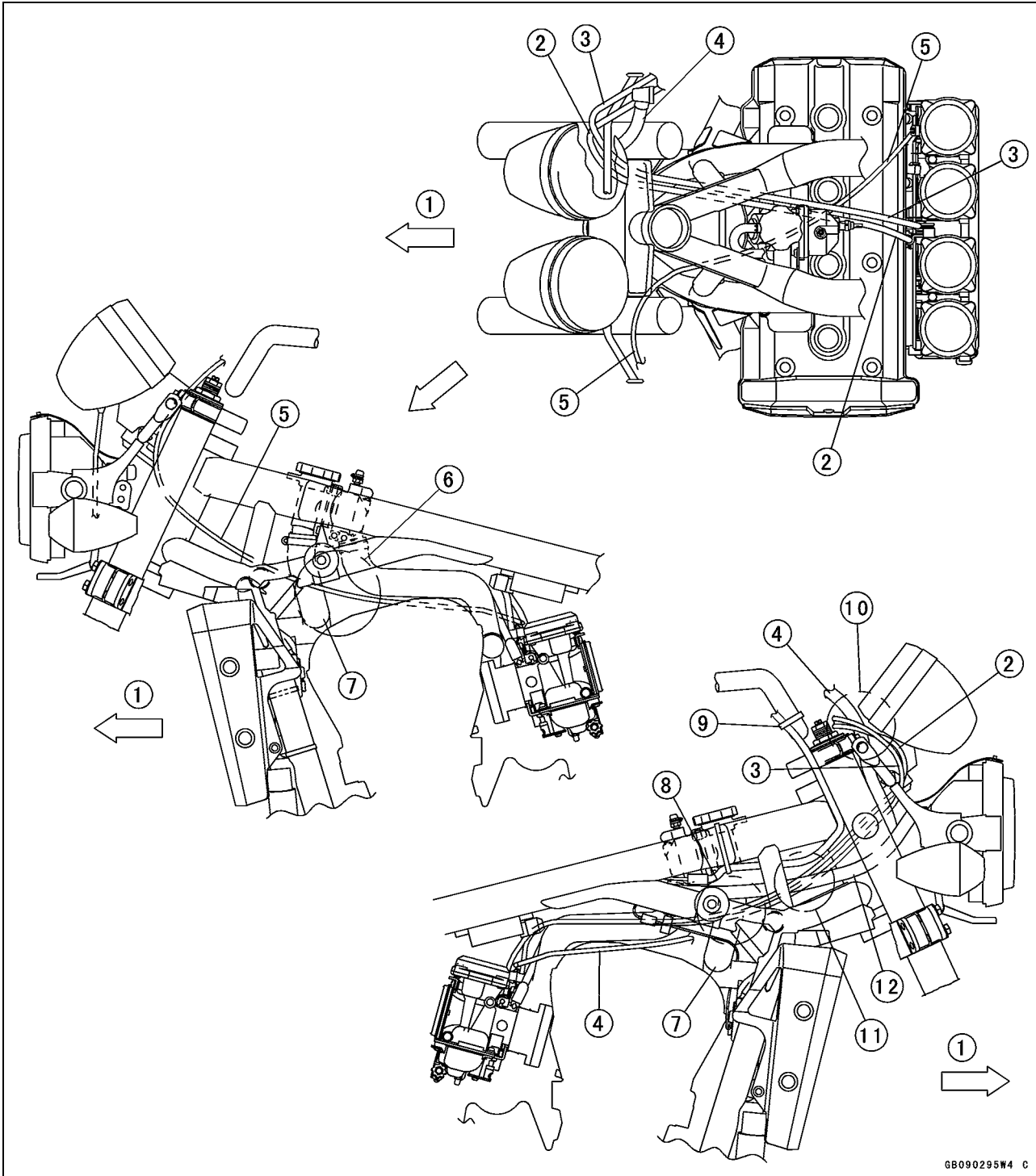
Cable, Wire, and Hose Routing

1. Front
2. Speedometer Cable
3. Front Brake Hose
4. Cable Holders
5. Rubber Grommet
6. Plastic Cable Holder
7. Clamps
8. Rubber Grommets
9. Fairing
10. Rubber Grommets
11. Collar
12. Rear View Mirror Bracket
13. Connector to Main Harness
14. Front Harness
15. Front Turn Signal Light Leads (left)
16. Front Turn Signal Light Leads (right)
17. City Light Connector (Europe Models)
18. Fairing Bracket
19. Headlight Unit: When installing the upper fairing, be careful not to pinch the connectors. Put them between the headlight and the upper fairing. unit bottom
20. Up-down Headlight Adjuster (left)
21. Right-left Headlight Adjuster (left)
22. Up-down Headlight Adjuster (left)
23. Right-left Headlight Adjuster (left)
24. Snap-on Strap
25. Well Nuts
26. Windshield
27. Upper Inner Cover

1-50 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-A1 ~ /C1 ~



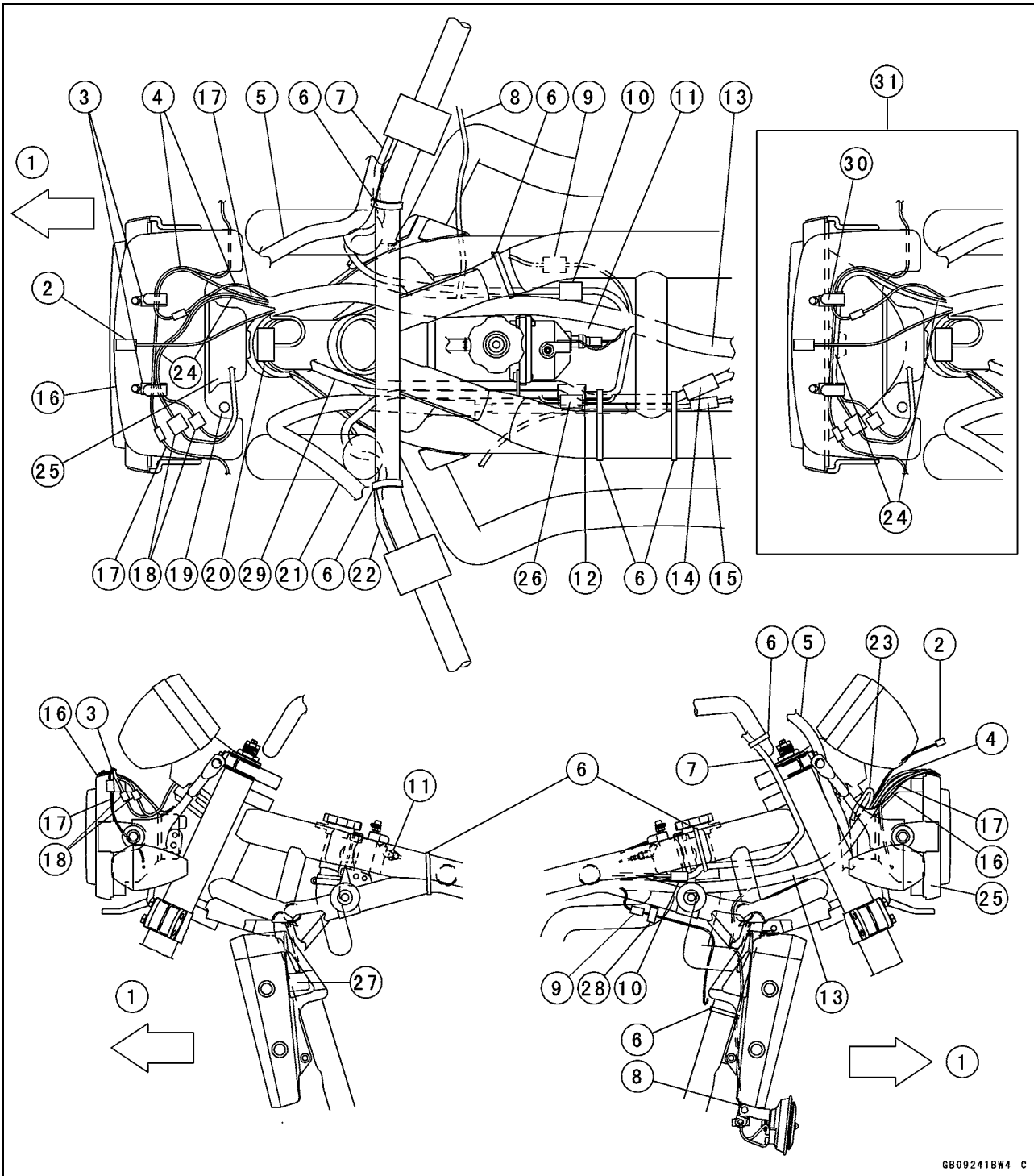
Cable, Wire, and Hose Routing

1. Front
2. Throttle Cable (decelerator)
3. Throttle Cable (accelerator)
4. Front Brake Hose
5. Choke Cable
6. Run the choke cable [5] on the left side of the hose [7].
7. Radiator Hose
8. Run the throttle cables on the right side of the hose [7].
9. Strap
10. Run the throttle cables on the outside of the hose [4].
11. Run the throttle cables inside the harness [12].
12. Main Harness

1-52 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-A1 ~



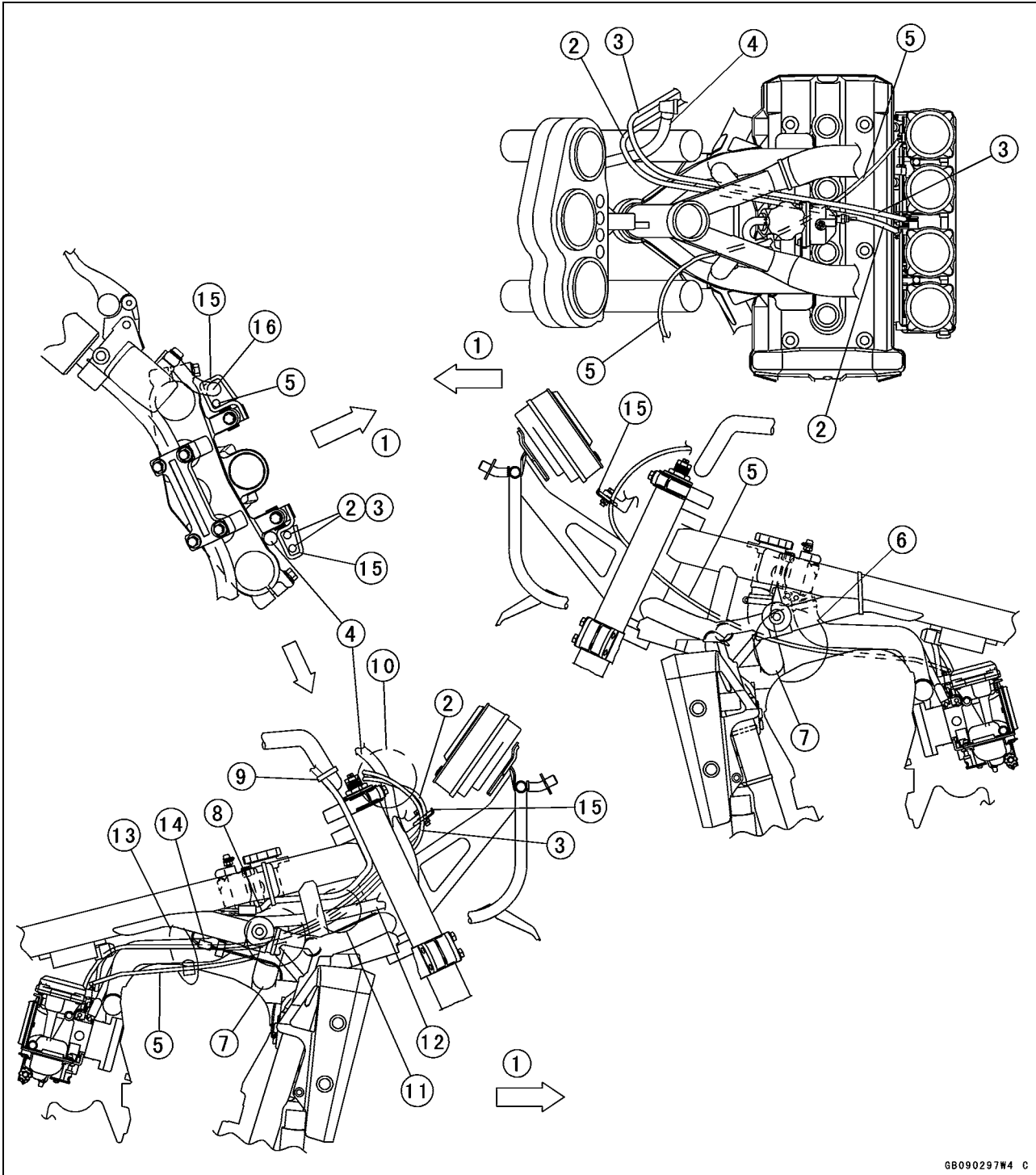
Cable, Wire, and Hose Routing

1. Front
2. City Light connector (Europe Models)
3. Clamps
4. Front Turn Signal Light Leads (right)
5. Front Brake Hose
6. Straps
7. Right Handlebar Switch Leads
8. Horn Harness: under the throttle cables
9. Radiator Fan Motor Connector
10. Connector of the leads [7]
11. Water Temperature Switch
12. Connector of Leads [22]
13. Main Harness
14. Ignition Switch Connector
15. Radiator Fan Switch Connector
16. Rubber Cover
17. Front Turn Signal Light Leads (left)
18. Meter Connectors: Run the harness outside the cable [19] from the meter.
19. Speedometer Cable
20. Headlight Connector
21. Clutch Hose
22. Left Handlebar Switch Leads
23. Headlight Leads
24. Meter Leads
25. Headlight Unit
26. Starter Lockout Switch Connector
27. Radiator Fan Switch
28. Snap-on Strap
29. Ignition Switch Lead
30. Clamp the lead at the white positioning tape.
31. ZR1200-A3 ~, A6F ~ Model

1-54 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-B1 ~



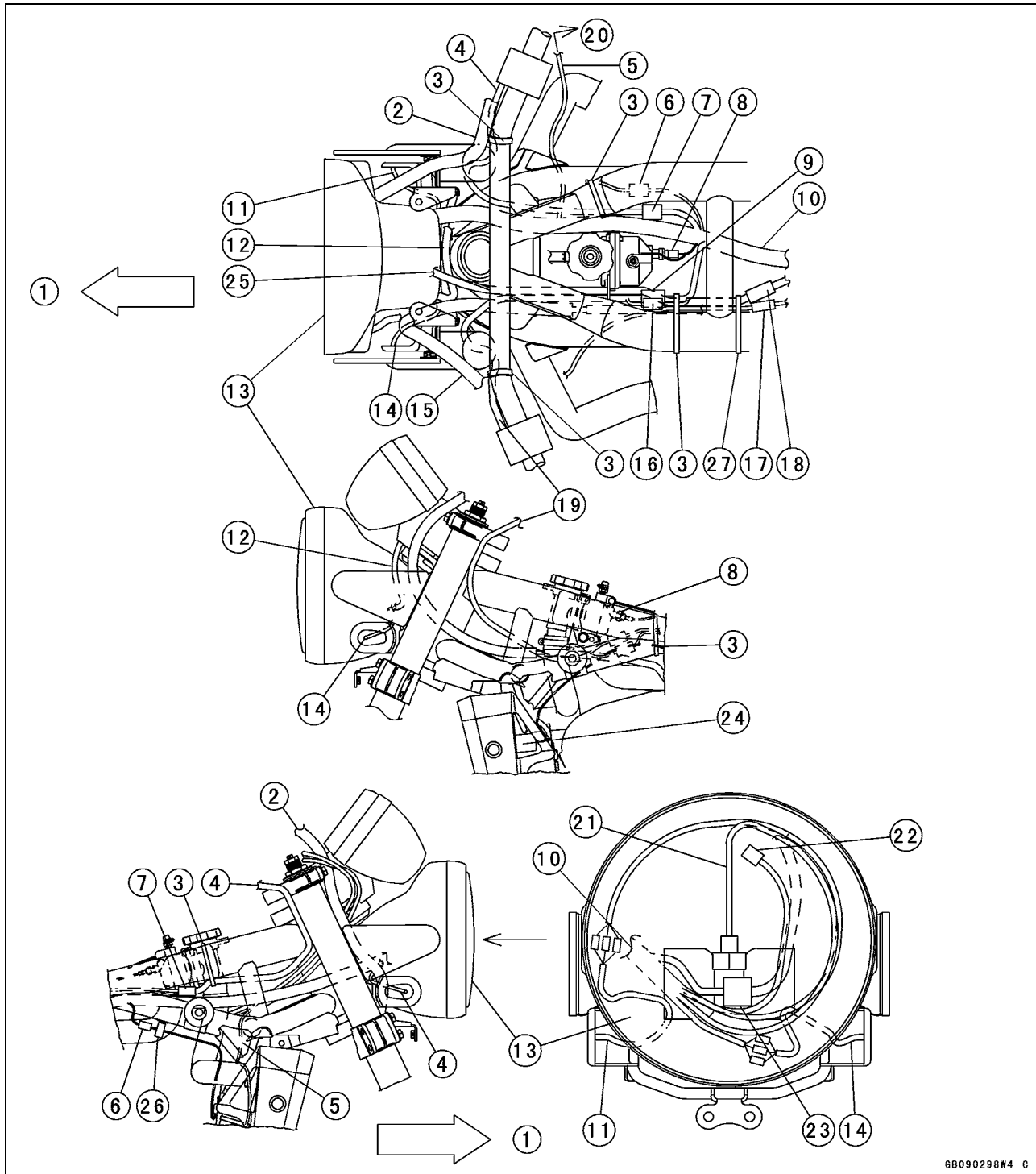
Cable, Wire, and Hose Routing

1. Front
2. Throttle Cable (decelerator)
3. Throttle Cable (accelerator)
4. Front Brake Hose
5. Choke Cable
6. Run the choke cable [5] on the left side of the radiator hose [7].
7. Radiator Hose
8. Run the throttle cables on the right side of the radiator hose [7].
9. Strap
10. Run the throttle cables on the right side of the hose [4].
11. Run the throttle cables on the inside of the harness [12].
12. Main Harness
13. Run the throttle cables and choke cable under the main harness.
14. Radiator Fan Motor Lead Connector
15. Holders
16. Clutch Hose

1-56 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-C1 ~



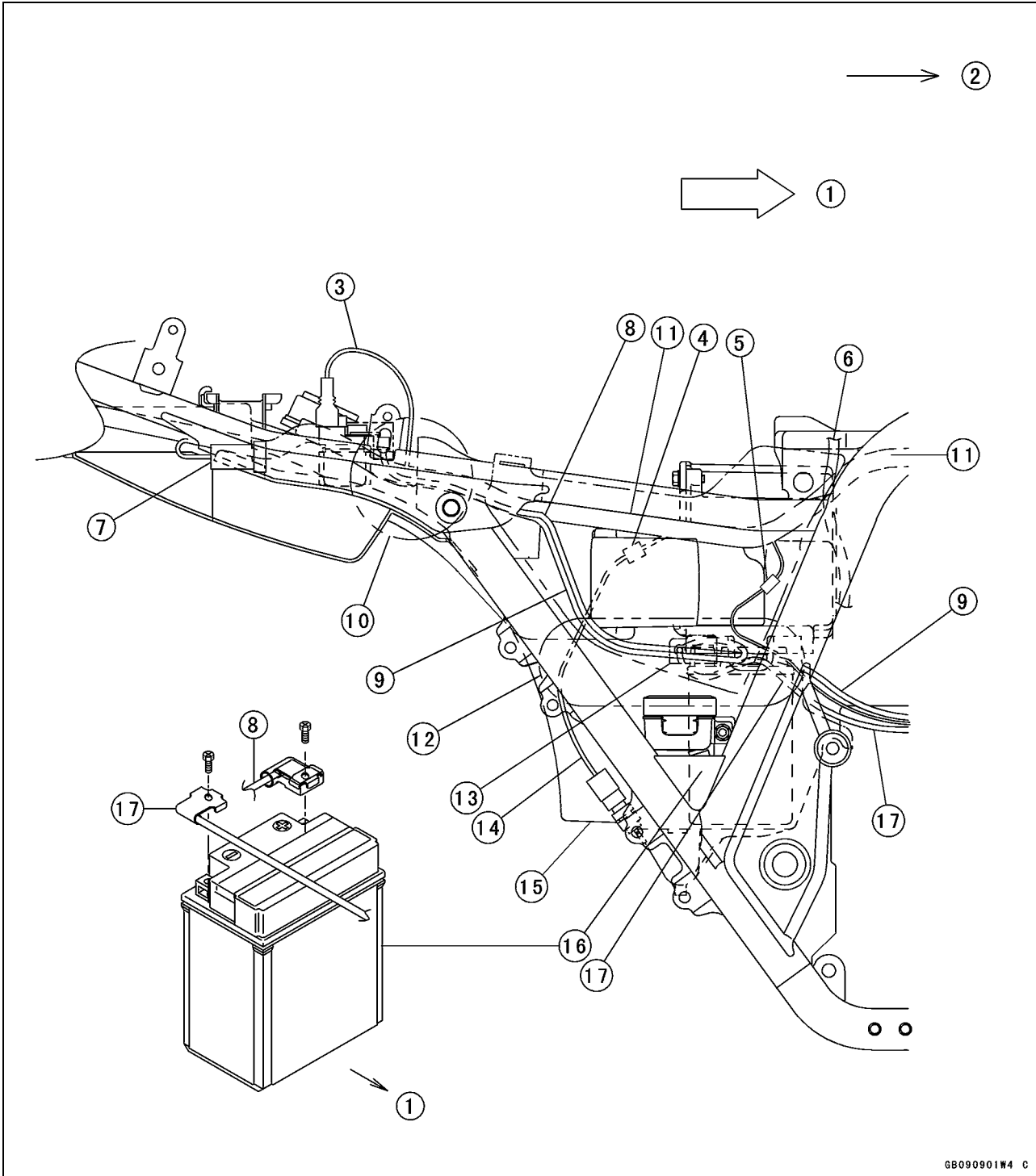
Cable, Wire, and Hose Routing

1. Front
2. Front Brake Hose
3. Straps (harness [19], leads from [16], [17], [18])
4. Right Handlebar Switch Lead
5. Horn Harness: under the throttle cables.
6. Radiator Fan Motor Connector
7. Connector of the lead [4]
8. Water Temperature Switch
9. Connector of Lead [19]
10. Main Harness
11. Front Turn Signal Light Lead (right) behind the hose [2]
12. Meter Lead
13. Headlight Unit
14. Front Turn Signal Light Leads (left)
15. Clutch Hose
16. Starter Lockout Switch Connector
17. Radiator Fan Switch Lead Connector
18. Ignition Switch Lead Connector
19. Left Handlebar Switch Lead
20. Horn
21. Headlight Leads
22. City Light Lead Connector (Europe Models)
23. Meter Lead Connector
24. Radiator Fan Switch
25. Ignition Switch Lead
26. Snap-on Strap
27. Strap (leads from [17], [18])

1-58 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-B1 ~



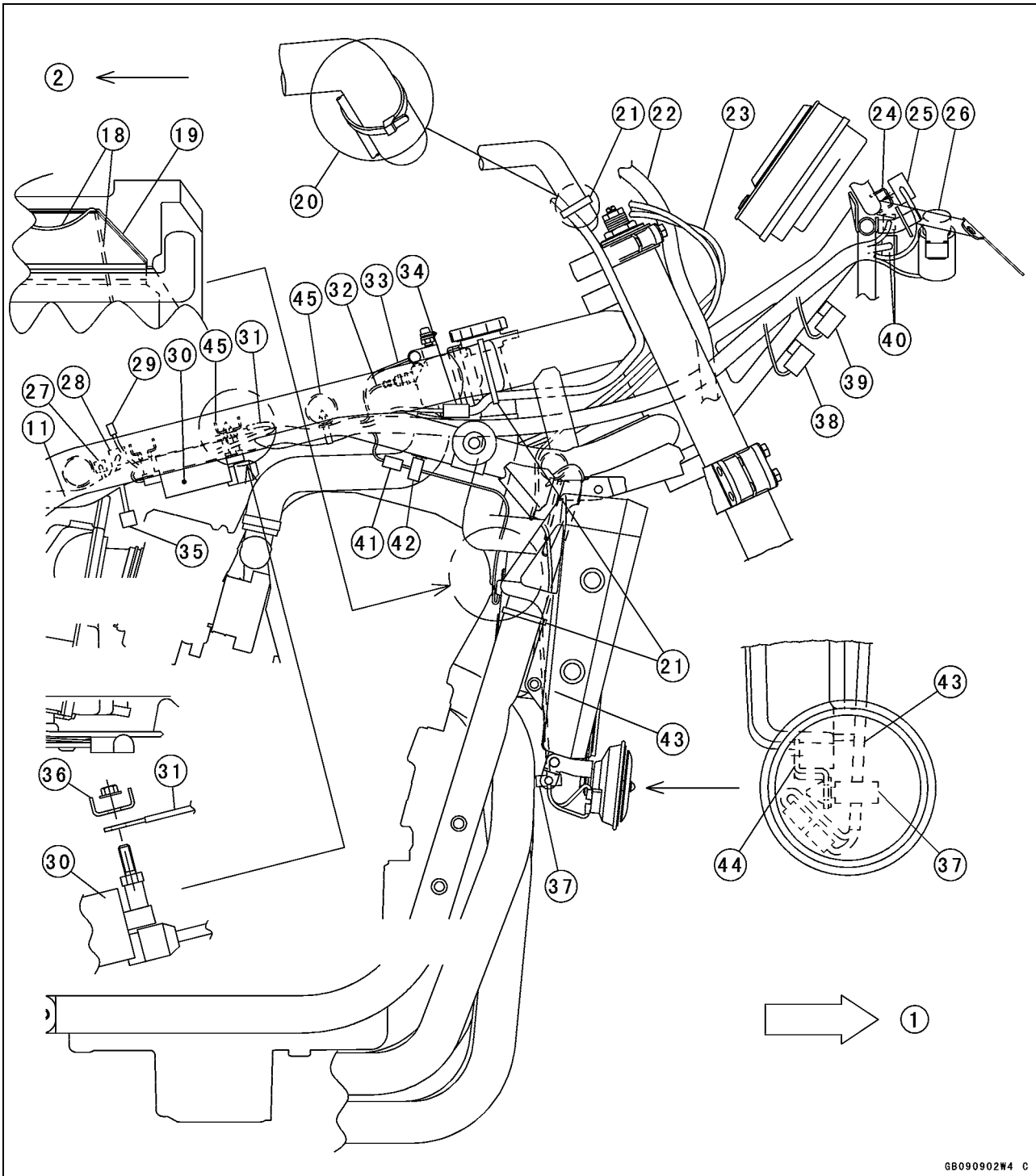
Cable, Wire, and Hose Routing

1. Front
2. Continued
3. Starter Relay Lead
4. Connector of the lead [14]
5. Battery (-) Lead Connector
6. Fuel Tank Filler Drain Hose
7. Headlight Fuse
8. Battery (+) Cable
9. Starter Motor Cable
10. Run the leads [8], [9] under the harness [11].
11. Main Harness
12. Run the leads [8], [9], [14] within the right side cover.
13. Battery Case Window (rear fender right side): Run the leads [8], [17] through the window.
14. Rear Brake Light Switch Lead: Install the rear brake light switch spring from the frame inside (Open ends of the hook face the footpeg bracket) with the longer hook up.
15. Rear Fender
16. Sealed Battery
17. Battery (-) Cable

1-60 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-B1 ~



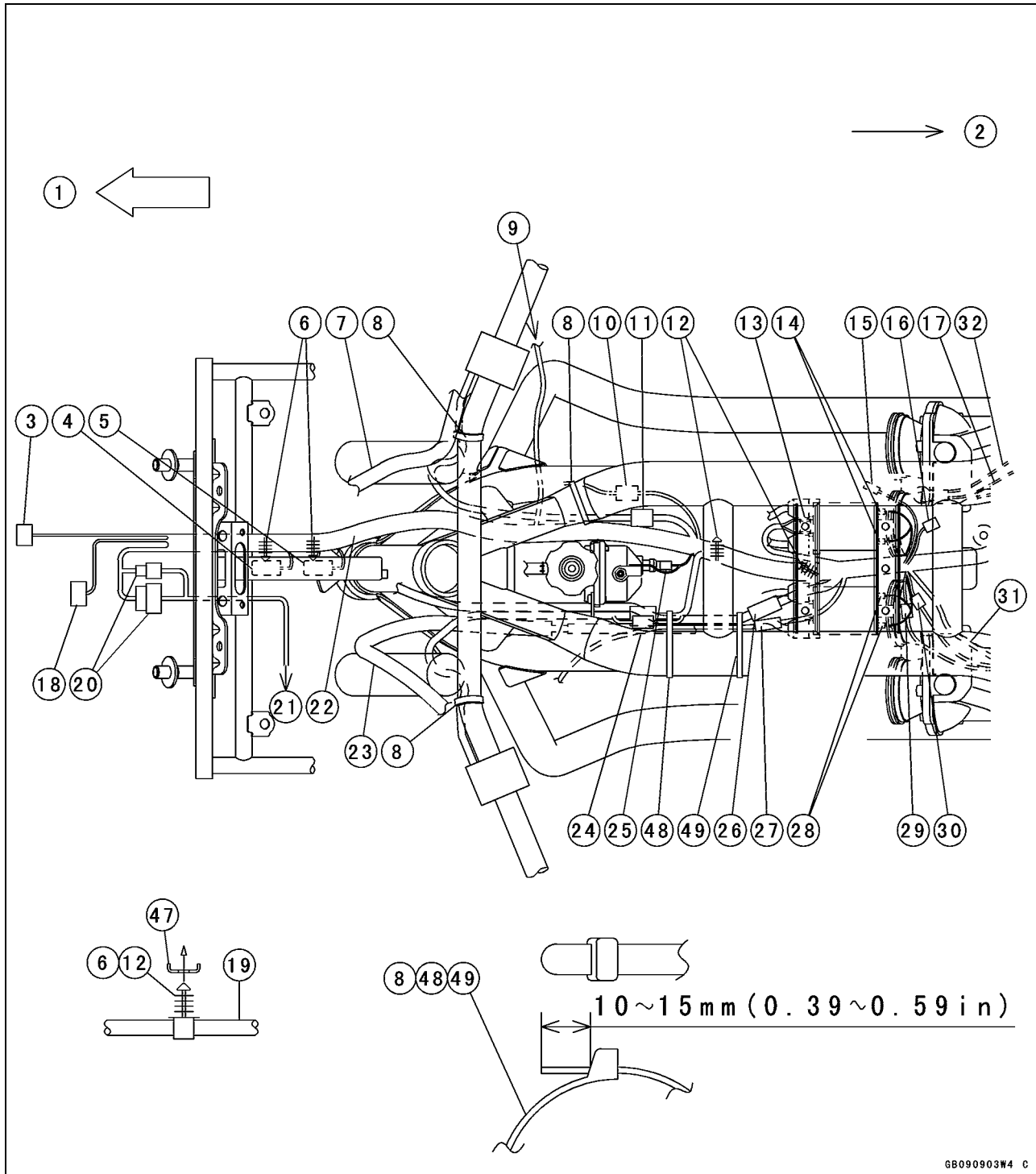
Cable, Wire, and Hose Routing

1. Front
2. Continued
11. Main Harness
18. Radiator Fan Leads
19. Right Side of Baffle
20. Wind the strap [21] counterclockwise.
21. Straps
22. Front Brake Hose
23. Throttle Cable (decelerator)
24. Rear View Mirror Bracket
25. Front Lead Connector
26. Headlight Ground Relay
27. Crankshaft Sensor Lead Connector
28. Alternator Lead Connector
29. Fuel Level Sensor Lead Connector
30. Ignition Coils
31. Frame Ground Lead
32. Water Temperature Sensor
33. Sensor Ground Lead
34. Right Handlebar Switch Lead Connector
35. Throttle Sensor Lead Connector
36. Frame Bracket
37. Snap-on Strap: Insert it from the inside to the outside of the bracket [44].
38. Low Beam Headlight Relay
39. High Beam Headlight Relay
40. Meter Lead Connectors
41. Radiator Fan Motor Lead Connector
42. Snap-on Strap
43. Horn Lead: Run it with a slack as little as possible, so it doesn't touch the exhaust pipes.
44. Horn Bracket
45. Positioning Straps

1-62 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-B1 ~



Cable, Wire, and Hose Routing

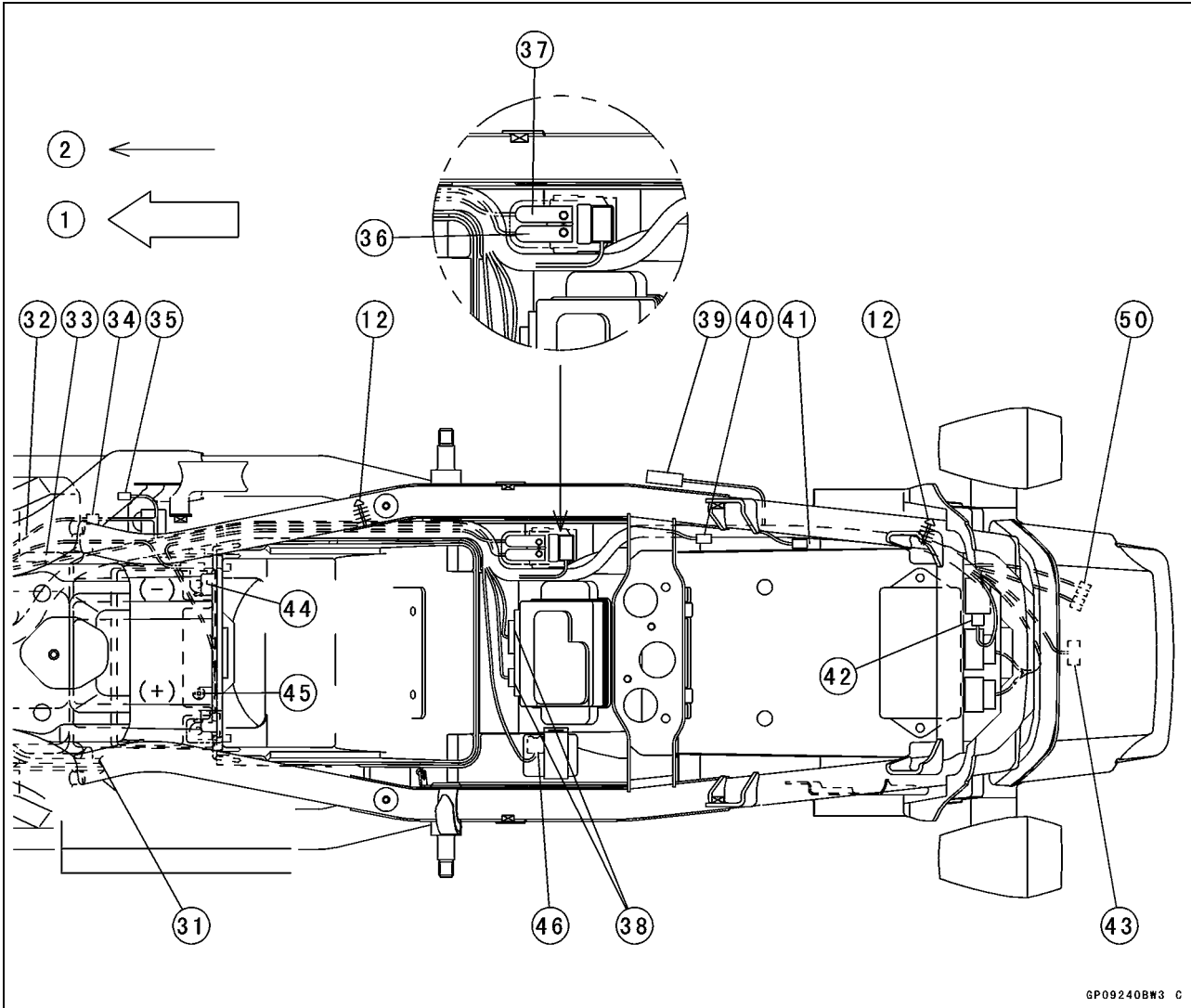
1. Front
2. Continued
3. Headlight Ground Relay (MY)
4. Headlight High Beam Relay
5. Headlight Low Beam Relay
6. Positioning Straps: Fit them in the frame upwards.
7. Front Brake Hose
8. Straps: Bind the leads and cut the end, leaving 10 ~ 15 mm (0.39 ~ 0.59 in) and rounding.
9. Horn Lead
10. Radiator Fan Motor Lead Connector
11. Right Handlebar Switch Lead Connector
12. Positioning Straps: Fit them in the frame upwards.
13. Frame Ground Terminal (under the bracket and through the ignition coil bolt)
14. Ignition Coil Primary Leads #2, #3
15. Throttle Sensor Lead Connector
16. Fuel Level Sensor Lead Connector
17. Starter Motor Lead
18. Front Lead Connector
19. Harness
20. Meter Lead Connectors
21. To Meter Unit
22. Main Harness
23. Clutch Hose

(MY): Malaysia Model

1-64 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-B1 ~



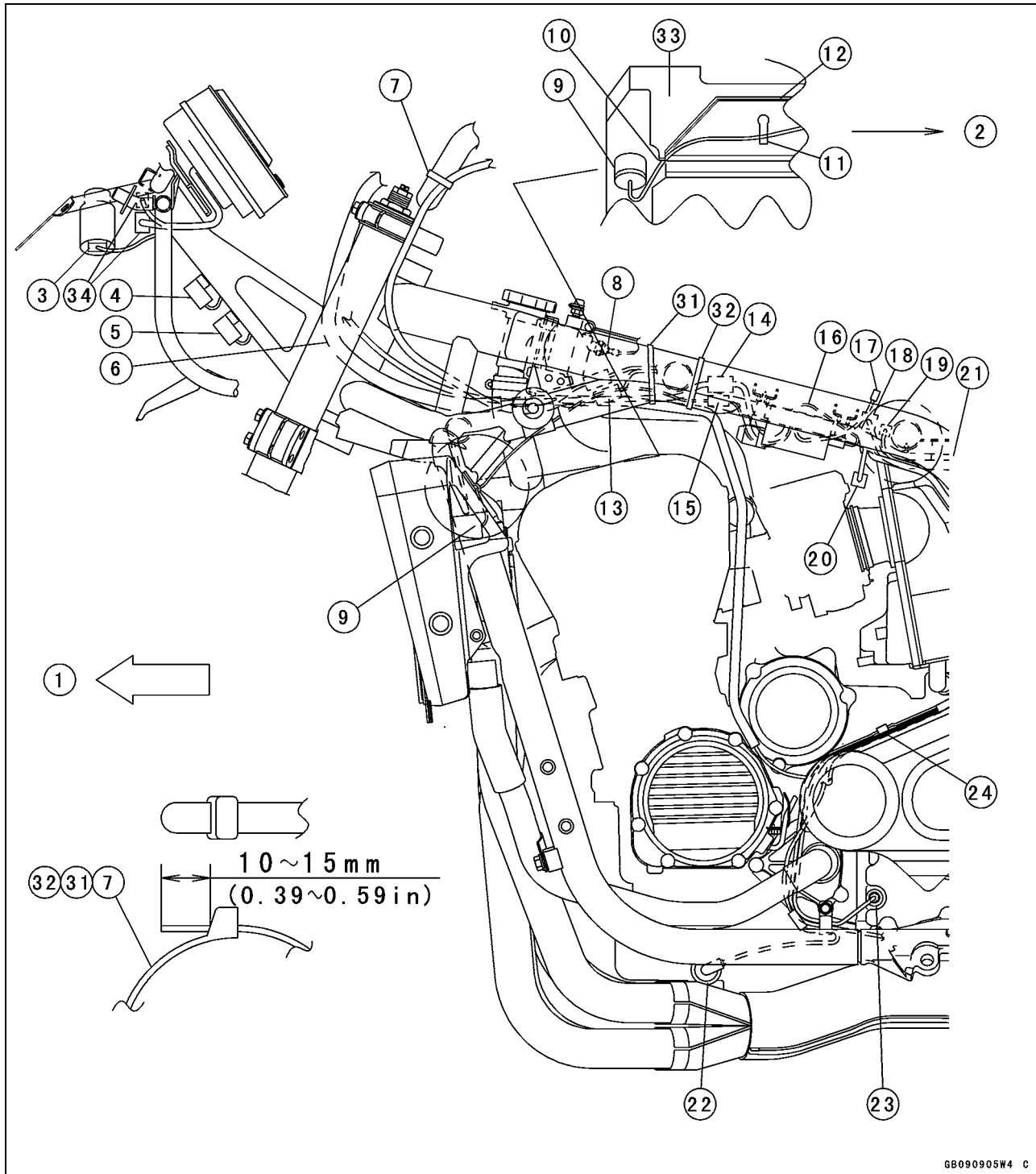
Cable, Wire, and Hose Routing

24. Starter Lockout Switch Lead Connector (smaller) and Left Handlebar Switch Connector (larger)
25. Water Temperature Sensor
26. Ignition Switch Lead Connector
27. Radiator Fan Switch Lead Connector
28. Ignition Coil Primary Leads #1, 4
29. Alternator Lead Connector
30. Crankshaft Sensor Lead Connector
31. Sidestand Switch, Neutral Switch, and Oil Pressure Switch Leads
32. Battery (-) Lead
33. Fuel Tank Filler Drain Hose
34. Battery (-) Lead Connector
35. Rear Brake Light Switch Lead Connector
36. Starter Motor Cable Terminal on Starter Relay
37. Battery (+) Cable Terminal on Starter Relay
38. Junction Box Connectors
39. Headlight Fuse Lead Connector
40. Rear Turn Signal Light Lead Connector (right)
41. Rear Turn Signal Light Lead Connector (left)
- 42.. Turn Signal Relay
43. Connector for Tail/Brake Light, and License Plate Light Leads
44. Battery (-) Terminal
45. Battery (+) Terminal
46. Headlight Relay (ZR1200B)
47. Frame Bracket or Pipe
48. Strap (leads from [24], [26], [27])
49. Strap (leads from [26], [27])
50. Accessory Lead Terminals (MY): ZR1200-B3 ~ Model
(MY): Malaysia Model

1-66 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-B1 ~



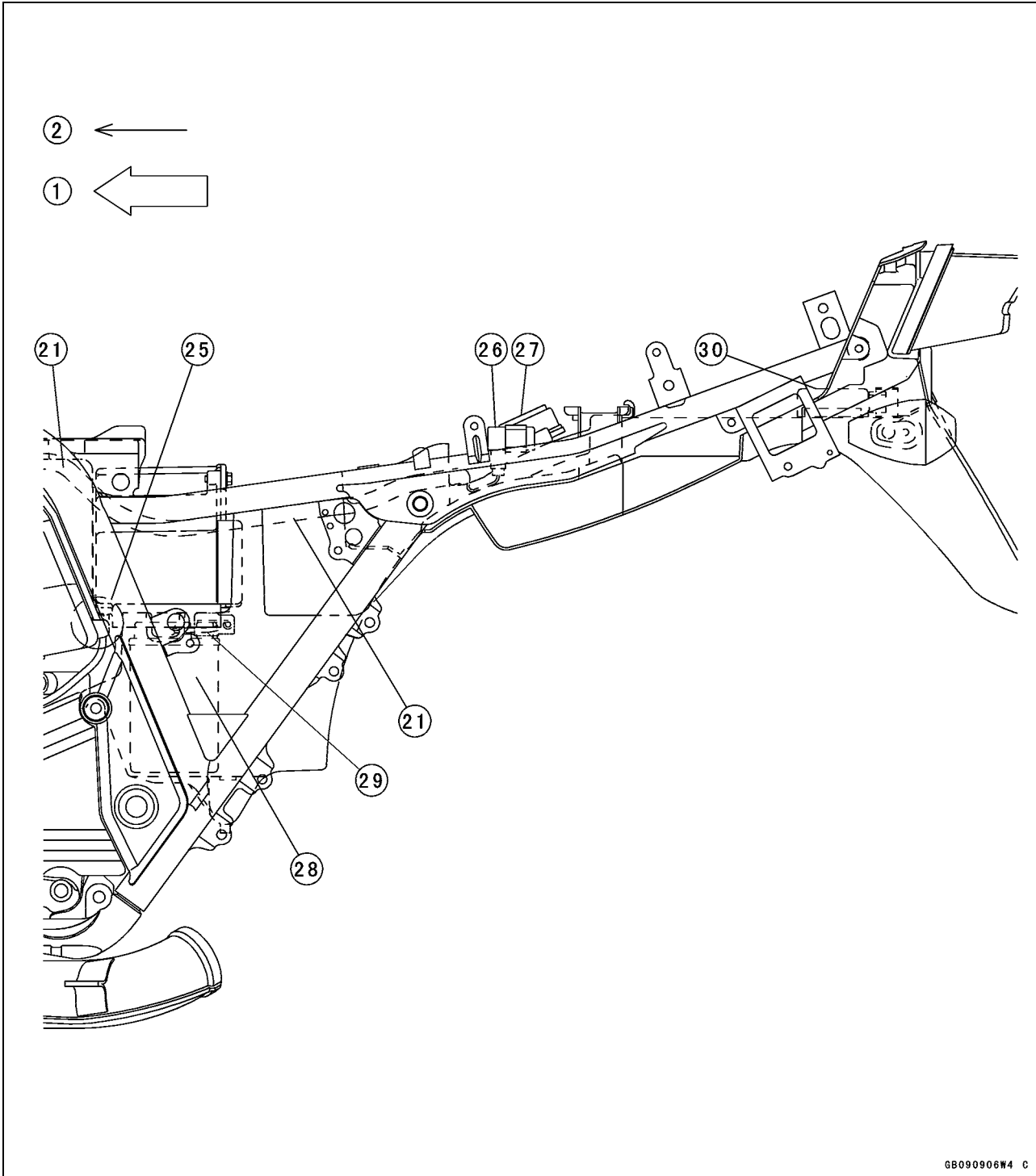
Cable, Wire, and Hose Routing

1. Front
2. Continued
3. Headlight Ground Relay
4. Headlight High Beam Relay
5. Headlight Low Beam Relay
6. Clutch Hose
7. Straps: Cut the end, leaving 10 ~ 15 mm (0.39 ~ 0.59 in) and rounding.
8. Water Temperature Sensor
9. Radiator Fan Switch
10. Run the lead between [12] and [33].
11. Snap-on Strap
12. Baffle Left Side
13. Left Handlebar Switch Lead Connector
14. Ignition Switch Lead Connector
15. Radiator Fan Switch Lead Connector
16. Ignition Coil Primary Leads #1, 4
17. Fuel Level Sensor Lead Connector (to fuel tank)
18. Alternator Lead Connector
19. Crankshaft Sensor Lead Connector
20. Throttle Sensor Lead Connector
21. Main Harness
22. Oil Pressure Switch
23. Neutral Switch
24. Sidestand Switch Lead Connector
31. Strap (leads from [9], [13], [14], [24])
32. Strap (leads from [9], [14])
33. Radiator Cover
34. Meter Lead Connectors

1-68 GENERAL INFORMATION

Cable, Wire, and Hose Routing

ZR1200-B1 ~



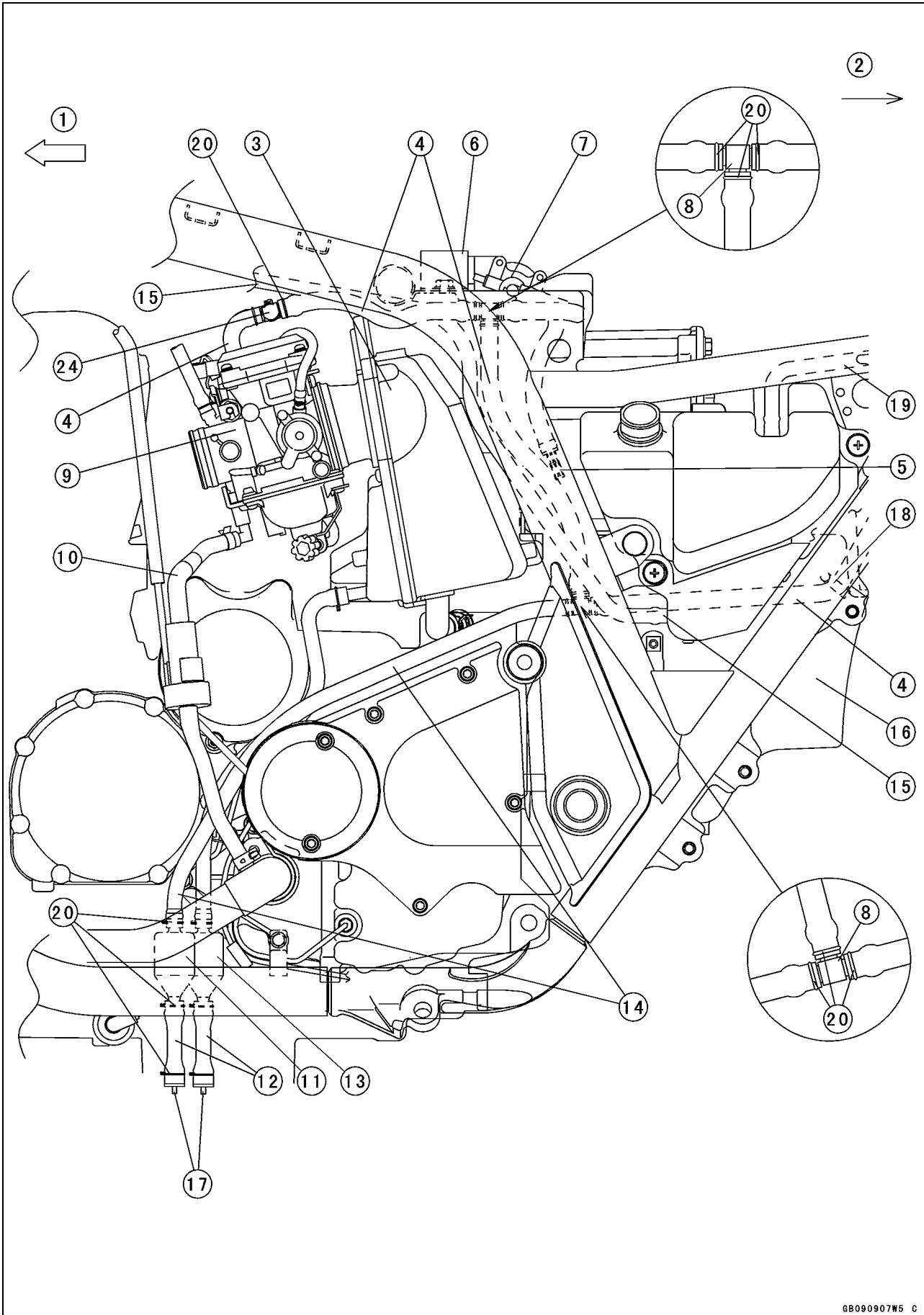
Cable, Wire, and Hose Routing

1. Front
2. Continued
21. Main Harness
25. Run the leads of the sidestand switch, [22], [23] inside the pin of the front air cleaner housing.
26. Headlight Relay (ZR1200B)
27. Junction Box
28. Sealed Battery
29. Battery (+) Lead Terminal
30. Igniter

1-70 GENERAL INFORMATION

Cable, Wire, and Hose Routing

California Evaporative Emission Control System (ZR1200-A1 ~)



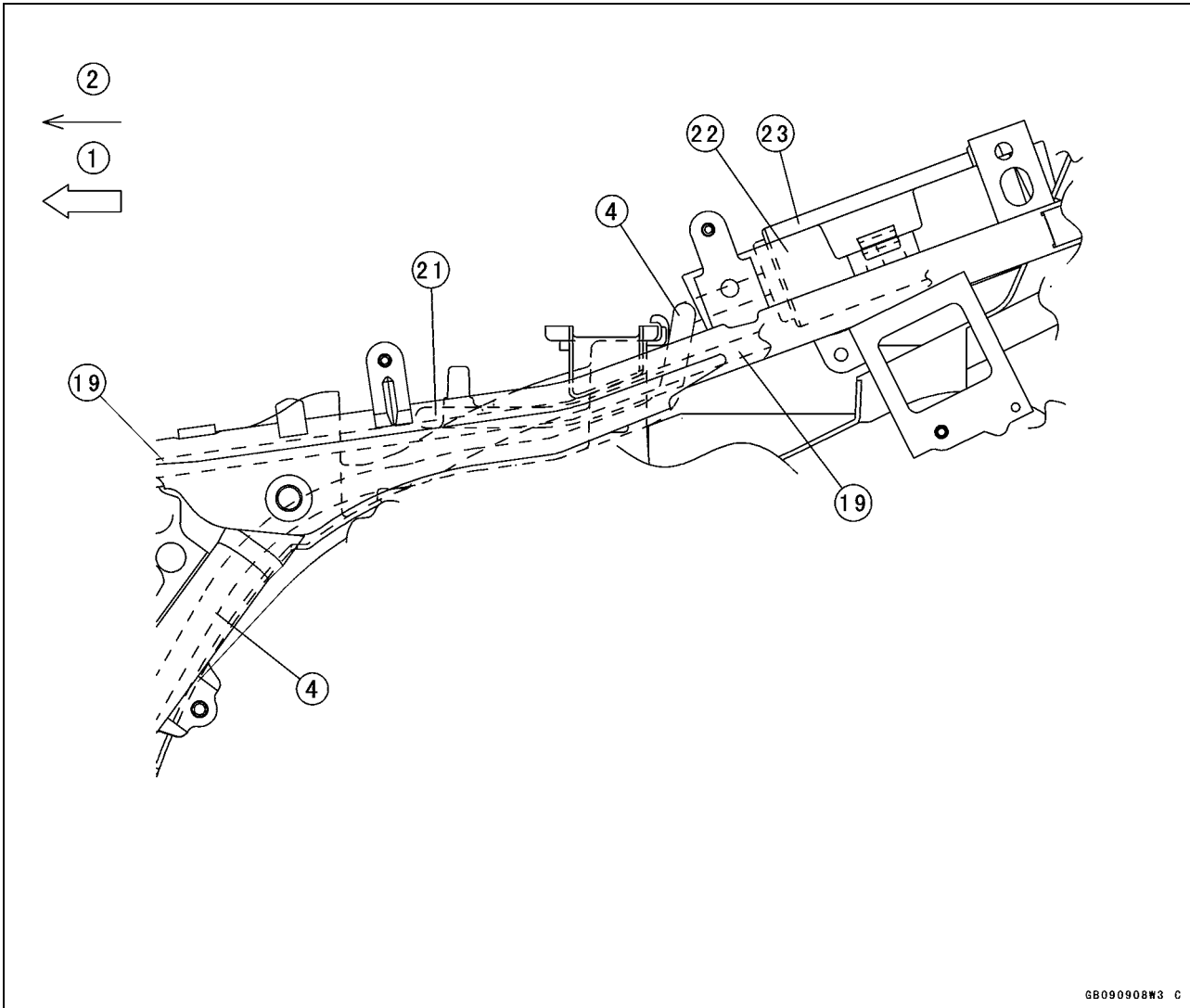
Cable, Wire, and Hose Routing

1. Front
2. Continued
3. Front Air Cleaner Housing
4. Carburetor Vent Hoses (yellow): Run the hose over the leads or harness.
5. Vacuum Valve Filter
6. Fuel Tank Bracket
7. Vacuum Valve
8. T-Joints
9. Carburetor Assembly
10. Coolant Hose to carburetor #1
11. Carburetor Vent Catch Tank
12. Catch Tank Drain Hoses
13. Air Cleaner Catch Tank
14. Carburetor Vent Drain Hose
15. Coolant Reserve Tank Hose
16. Rear Fender
17. Plugs
18. Clamp
19. Reserve Tank Overflow Hose
20. Clips
24. Y-Joint

1-72 GENERAL INFORMATION

Cable, Wire, and Hose Routing

California Evaporative Emission Control System (ZR1200-A1 ~)



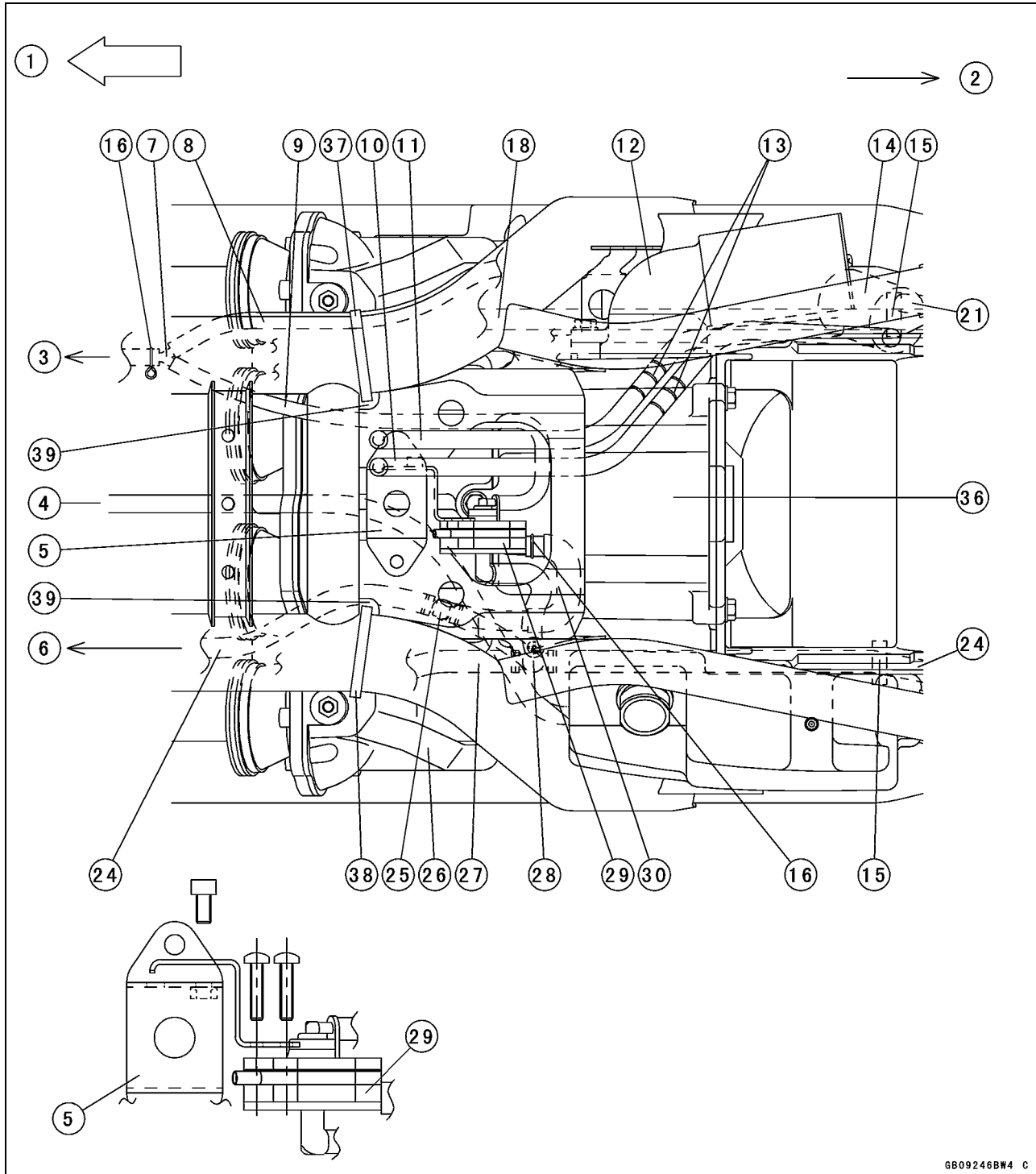
Cable, Wire, and Hose Routing

1. Front
2. Continued
4. Carburetor Vent Hoses (yellow): Run the hose over the leads or harness.
19. Reserve Tank Overflow Hose
21. Separator Breather Hose (blue)
22. Tool Box
23. Canister

1-74 GENERAL INFORMATION

Cable, Wire, and Hose Routing

California Evaporative Emission Control System (ZR1200-A1 ~)



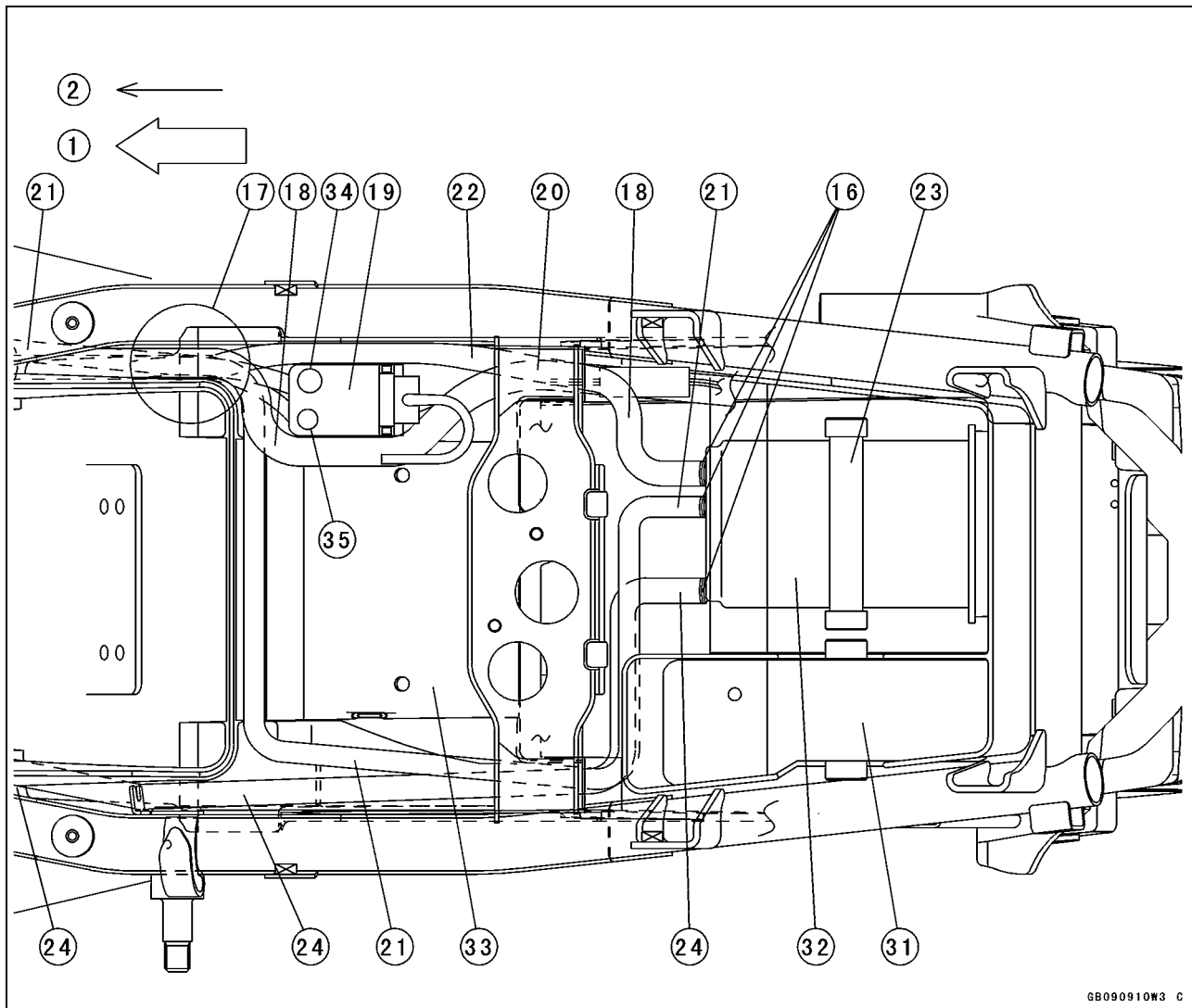
Cable, Wire, and Hose Routing

1. Front
2. Continued
3. Carburetor #3
4. Coolant Reserve Tank Hose to Radiator Cap
5. Fuel Tank Bracket
6. Carburetor Assembly
7. Y-Joint
8. Separator Vacuum Hose (white)
9. Vacuum Valve Vacuum Hose (white)
10. Fuel Tank Breather Hose (blue) (→ fuel tank pipe-blue)
11. Fuel Tank Return Hose (red) (→ fuel tank pipe-red)
12. Air Cleaner Inlet
13. Joints
14. Separator
15. Hose Clamps
16. Clips
18. Canister Purge Hose (green, front air cleaner housing ↔ canister)
21. Separator Breather Hose (blue)
24. Carburetor Vent Hose (yellow)
25. T-Joint (upper)
26. Front Air Cleaner Housing
27. Carburetor Vent Drain Hose to catch tank
28. T-Joint (lower)
29. Vacuum Valve
30. Yellow Tape
36. Rear Air Cleaner Housing
37. Strap (separator vacuum hose and vacuum valve vacuum hose)
38. Strap (Carburetor vent hose)
39. Strap Holes (through the [37], [38])

1-76 GENERAL INFORMATION

Cable, Wire, and Hose Routing

California Evaporative Emission Control System (ZR1200-A1 ~)

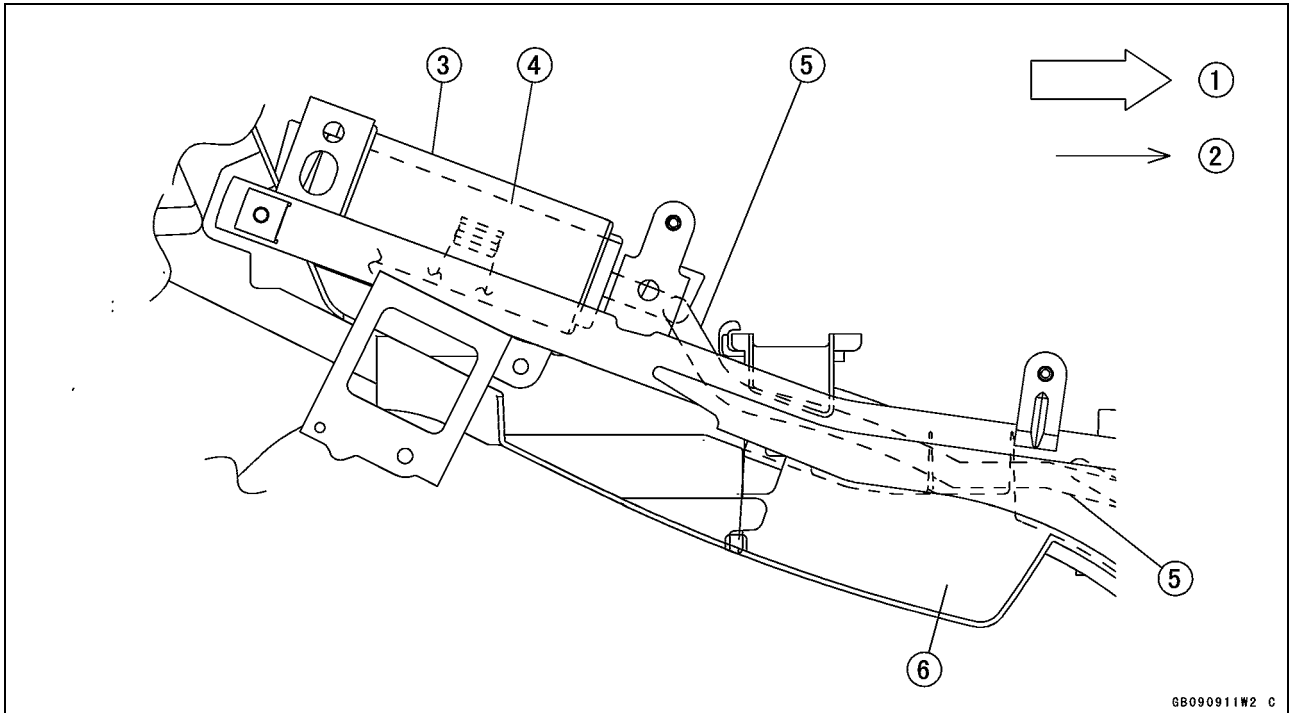


GB090910W3 C

1. Front
2. Continued
16. Clips
17. Run the main harness [22], starter motor lead, battery leads, hoses [18], and [21] in descending order of position.
18. Canister Purge Hose (green, front air cleaner housing ↔ canister)
19. Starter Relay
20. Run the hose [18] over the main harness [22].
21. Separator Breather Hose (blue)
22. Main Harness
23. Rubber Band
24. Carburetor Vent Hose (yellow)
31. Tool Box
32. Canister
33. Rear Fender
34. Battery (+) Cable Terminal
35. Starter Motor Cable Terminal

Cable, Wire, and Hose Routing

California Evaporative Emission Control System (Right Side View)

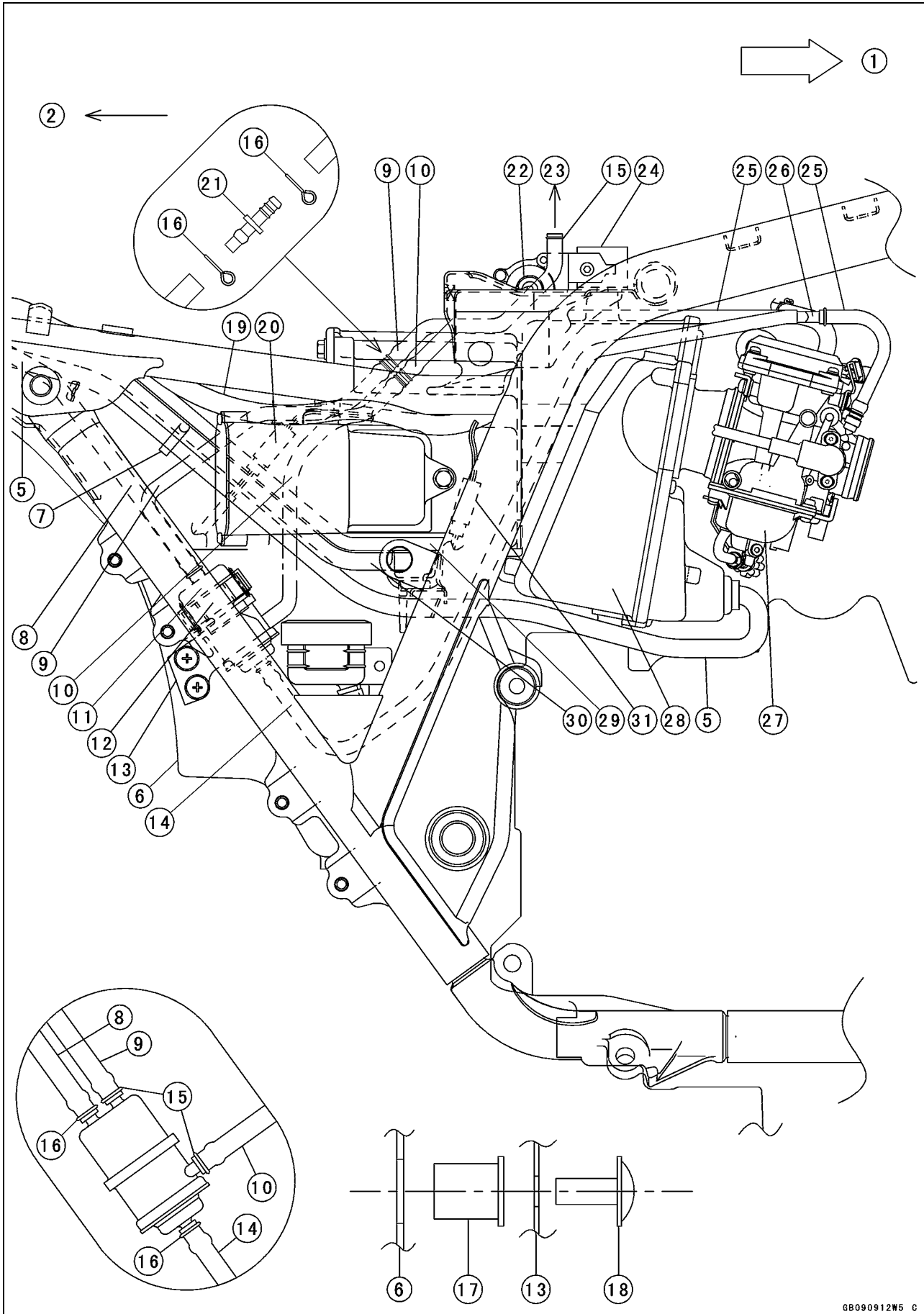


1. Front
2. Continued
3. Canister
4. Tool Box
5. Canister Purge Hose (green, canister \longleftrightarrow front air cleaner housing)
6. Rear Fender

1-78 GENERAL INFORMATION

Cable, Wire, and Hose Routing

California Evaporative Emission Control System (ZR1200-A1 ~)



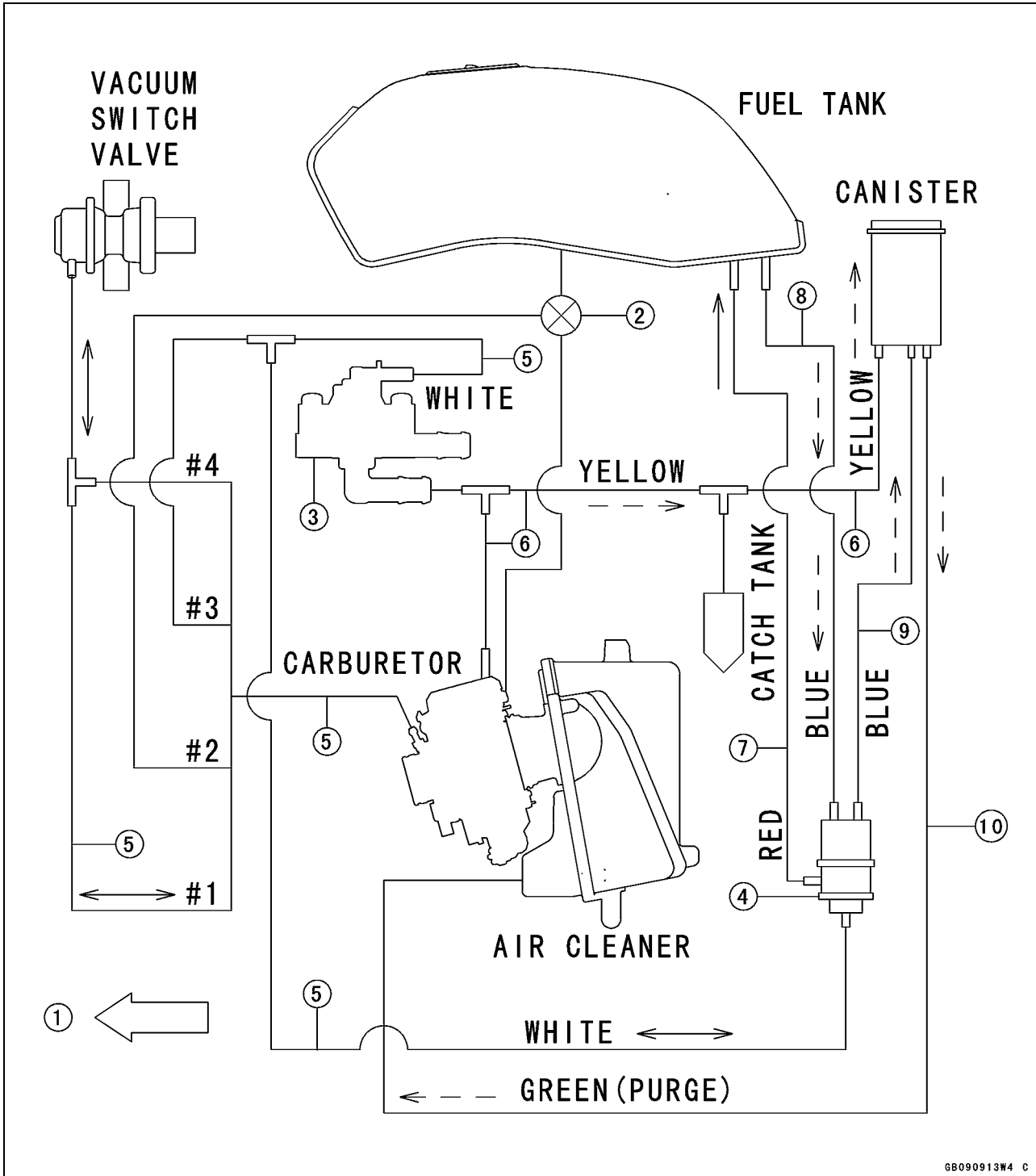
Cable, Wire, and Hose Routing

1. Front
2. Continued
5. Canister Purge Hose (green, canister \longleftrightarrow front air cleaner housing)
6. Rear Fender
7. Positioning Strap
8. Separator Breather Hose (blue)
(\rightarrow canister)
9. Fuel Tank Breather Hose (blue)
(\rightarrow fuel tank pipe-blue, left): Run the hose inside the hose [5], leads [29] and [30].
10. Fuel Tank Return Hose (red)
(\rightarrow fuel tank pipe-red, right): Run the hose inside the hose [5], leads [29] and [30].
11. Separator
12. Rubber Band
13. Bracket
14. Separator Vacuum Hose (white)
15. Clips (inside diameter ϕ 10 mm)
16. Clips (inside diameter ϕ 9 mm)
17. Well Nuts
18. Separator Bracket Screws
19. Main Harness
20. Rear Brake Light Switch Connector: Run the rear brake switch lead inside the hoses.
21. Joints
22. Vacuum Valve
23. Fuel Tank Pipes
24. Fuel Tank Bracket
25. Vacuum Valve Vacuum Hose (white)
(\rightarrow carburetor #3)
26. Y-Joint
27. Carburetor
28. Front Air Cleaner Housing: Behind the bottom of this air cleaner housing, run the following hoses and leads in the order from the outside to the inside of the frame. Hose [5] \rightarrow Fuel Tank Drain Hose \rightarrow Hose [14] \rightarrow Lead [29]
29. Starter Motor Cable
30. Battery (+) Cable
31. Battery (-) Lead Connector

1-80 GENERAL INFORMATION

Cable, Wire, and Hose Routing

California Evaporative Emission Control System (ZR1200-A1 ~)



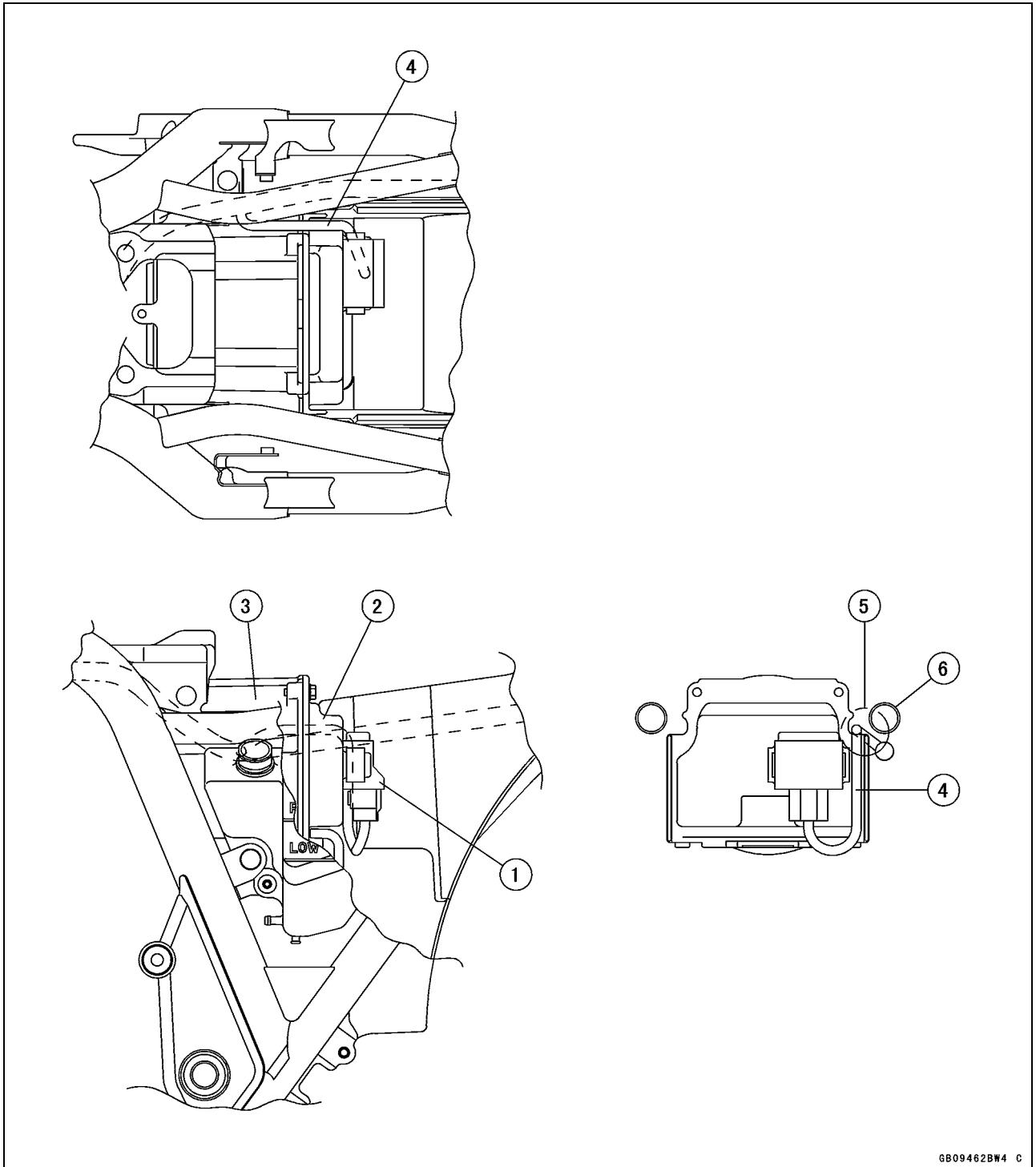
GB090913W4 C

- ->: Vapor Flow
- >: Fuel Flow
- ↔: Vacuum Pulsation Flow

1. Front
2. Fuel Tap
3. Vacuum Valve
4. Separator
5. Vacuum Hoses (white)
6. Carburetor Vent Hoses (yellow)
7. Fuel Tank Return Hose (red, right)
8. Fuel Tank Breather Hose (blue, left)
9. Breather Hose
10. Purge Hose

Cable, Wire, and Hose Routing

ZR1200-A4 ~, A6F ~ (Malaysia Model)



1. Immobilizer Amplifier: Insert it on the air cleaner cap.
2. Air Cleaner Cap
3. Air Cleaner Housing
4. Immobilizer Amplifier Lead
5. Run the immobilizer amplifier lead between the air cleaner housing and the frame.
6. Frame

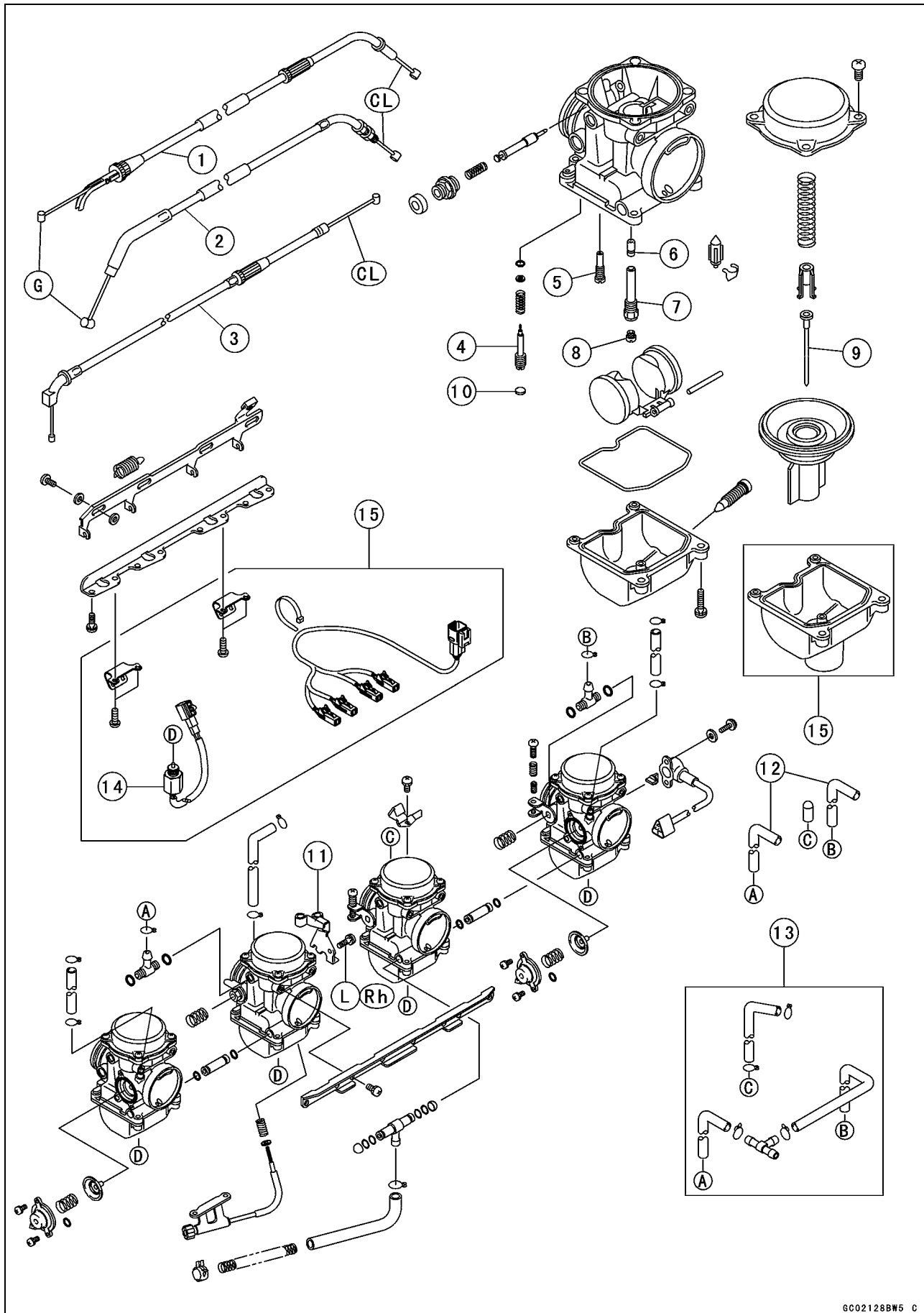
Fuel System

Table of Contents

Exploded View (US, CA, CAL, Formosa)	2-2	Air Cleaner.....	2-28
Exploded View (Other than US, CA, CAL, Formosa)	2-4	Element Removal.....	2-28
Exploded View	2-6	Element Removal (Malaysia model, ZR1200-A4).....	2-28
Specifications	2-9	Element Installation	2-29
Throttle Grip and Cables, Choke Cable	2-11	Element Cleaning and Inspection	2-29
Throttle Cable Inspection	2-11	Air Cleaner Draining.....	2-29
Choke Cable Inspection.....	2-11	Front Air Cleaner Housing Removal.....	2-30
Cable Removal/Installation	2-12	Front Air Cleaner Housing Installation	2-31
Cable Lubrication and Inspection	2-12	Rear Air Cleaner Housing Removal	2-31
Carburetors.....	2-13	Rear Air Cleaner Housing Installation	2-32
Idle Speed Inspection	2-13	Fuel Tank.....	2-33
High Altitude Performance Adjustment	2-13	Fuel Tank Removal	2-33
Carburetor Synchronization Inspection.....	2-14	Fuel Tank Installation	2-33
Service Fuel Level Inspection	2-15	Fuel Tank Inspection	2-33
Fuel System Cleanliness Inspection	2-16	Fuel Tank Cleaning	2-34
Pilot Screw Setting.....	2-17	Fuel Tap Removal	2-34
Coasting Enricher Removal/Installation.....	2-18	Fuel Tap Installation	2-34
Carburetor Removal	2-18	Fuel Tap Inspection.....	2-34
Carburetor Installation.....	2-20	Evaporative Emission Control System (CAL)	2-35
Carburetor Disassembly/Assembly.....	2-21	Parts Removal/Installation	2-35
Carburetor Separation	2-23	Hose Inspection (Periodic Inspection).....	2-35
Carburetor Joining	2-24	Carburetor Vent Hose Draining....	2-36
Carburetor Cleaning.....	2-25	Separator Inspection (Periodic Inspection).....	2-36
Carburetor Inspection	2-25	Separator Operation Test.....	2-36
Coolant Filter Installation	2-26	Canister Inspection (Periodic Inspection).....	2-37
Coolant Filter Cleaning	2-27	Vacuum Valve Inspection.....	2-37
Coolant Valve Inspection	2-27		

2-2 FUEL SYSTEM

Exploded View (US, CA, CAL, Formosa)



Exploded View (US, CA, CAL, Formosa)

1. Throttle Cable (accelerator)
2. Throttle Cable (decelerator)
3. Choke Cable
4. Pilot (Slow) Screw
5. Pilot (Slow) Jet
6. Needle Jet
7. Needle Jet Holder
8. Main Jet
9. Jet Needle
10. Plug (CAL)
11. Throttle Cable Holder: Do not remove the holder just for carburetor disassembly.
12. Carburetor Vent Hoses
13. Evaporative Emission Related Parts (CAL)
14. Fuel Cut Valve
15. ZR1200-A4 ~ A5 (CAL) A4 ~, A6F~ (Formosa)

CL: Apply cable lubricant.

G: Apply grease.

L: Apply a non-permanent locking agent.

Rh: Right-hand Thread

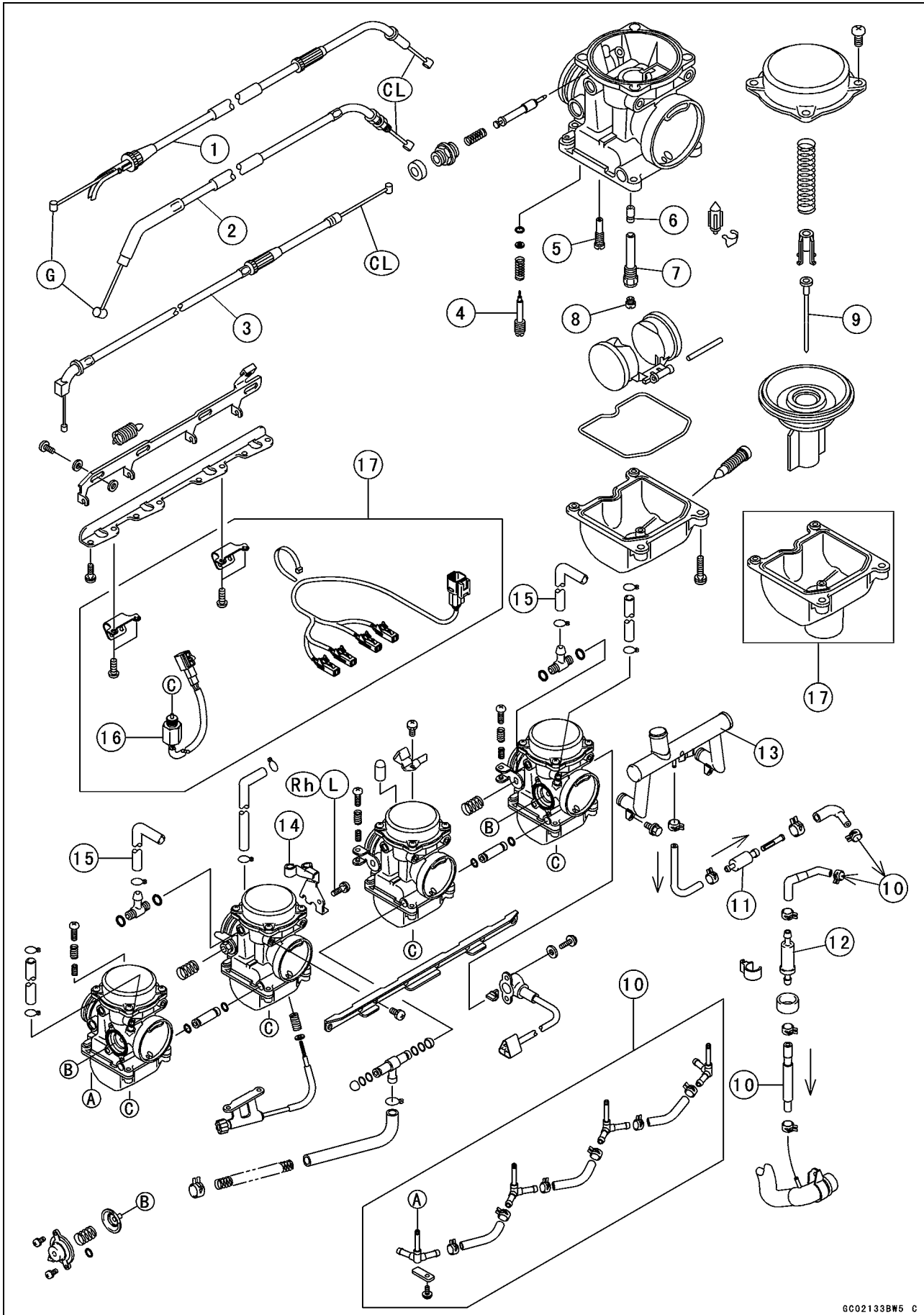
CA: Canada Model

CAL: California Model

US: United States Model

2-4 FUEL SYSTEM

Exploded View (Other than US, CA, CAL, Formosa)



Exploded View (Other than US, CA, CAL, Formosa)

1. Throttle Cable (accelerator)
2. Throttle Cable (decelerator)
3. Choke Cable
4. Pilot (Slow) Screw
5. Pilot (Slow) Jet
6. Needle Jet
7. Needle Jet Holder
8. Main Jet
9. Jet Needle
10. Carburetor Coolant Hoses
11. Coolant Filter
12. Coolant Valve
13. Water Pipe on the Cylinder Head Back
14. Throttle Cable Holder: Do not remove the holder just for carburetor disassembly.
15. Carburetor Vent Hoses
16. Fuel Cut Valve
17. ZR1200-A4 ~, A6F ~/ZR1200-B4 WVTA (FULL H)/GB WVTA (FULL H)/WVTA (78.2 H)/ZR1200 -C3 WVTA (FULL H)/WVTA (78.2 H)

CL: Apply cable lubricant.

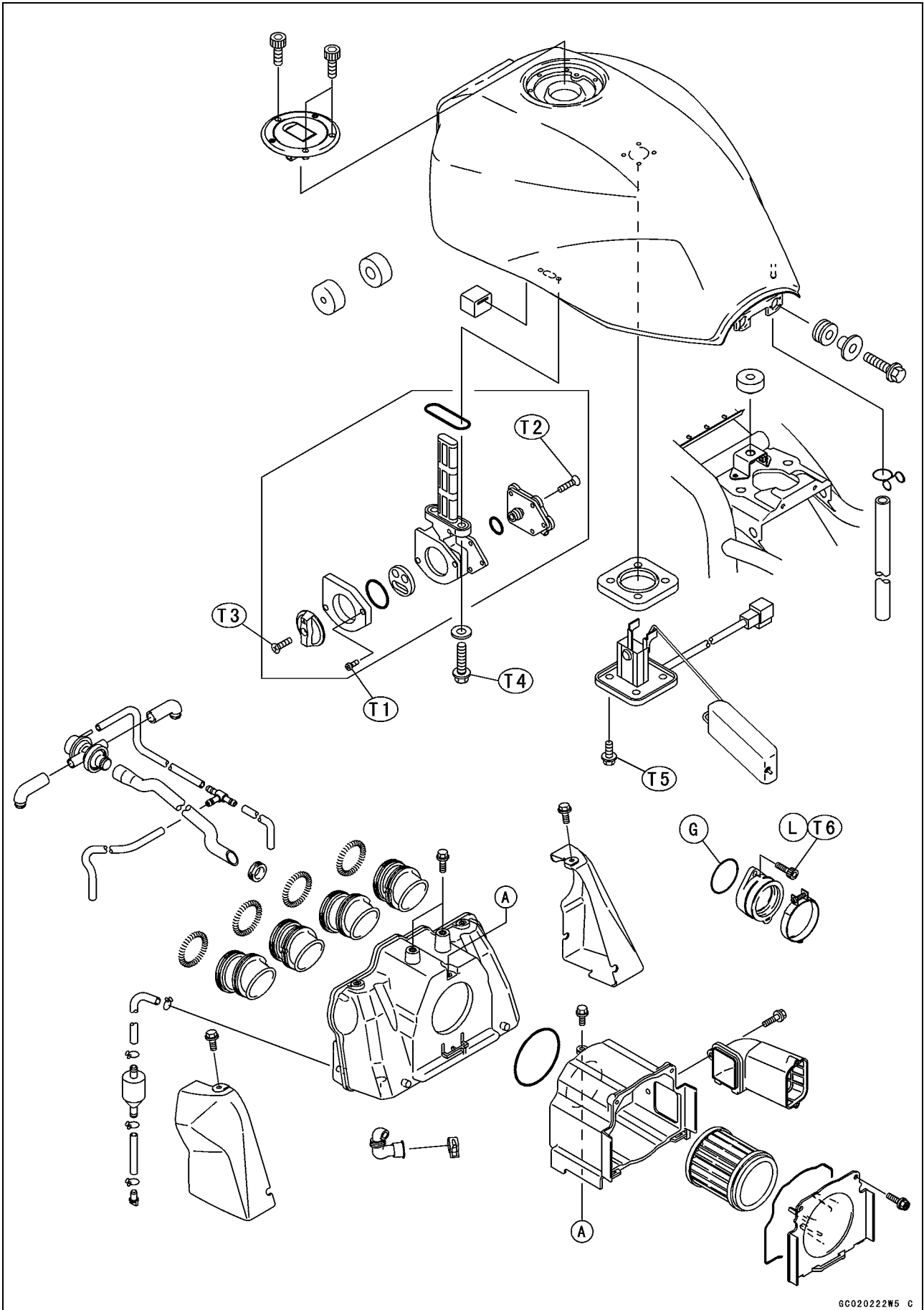
G: Apply grease.

L: Apply a non-permanent locking agent.

Rh: Right-hand Thread

2-6 FUEL SYSTEM

Exploded View



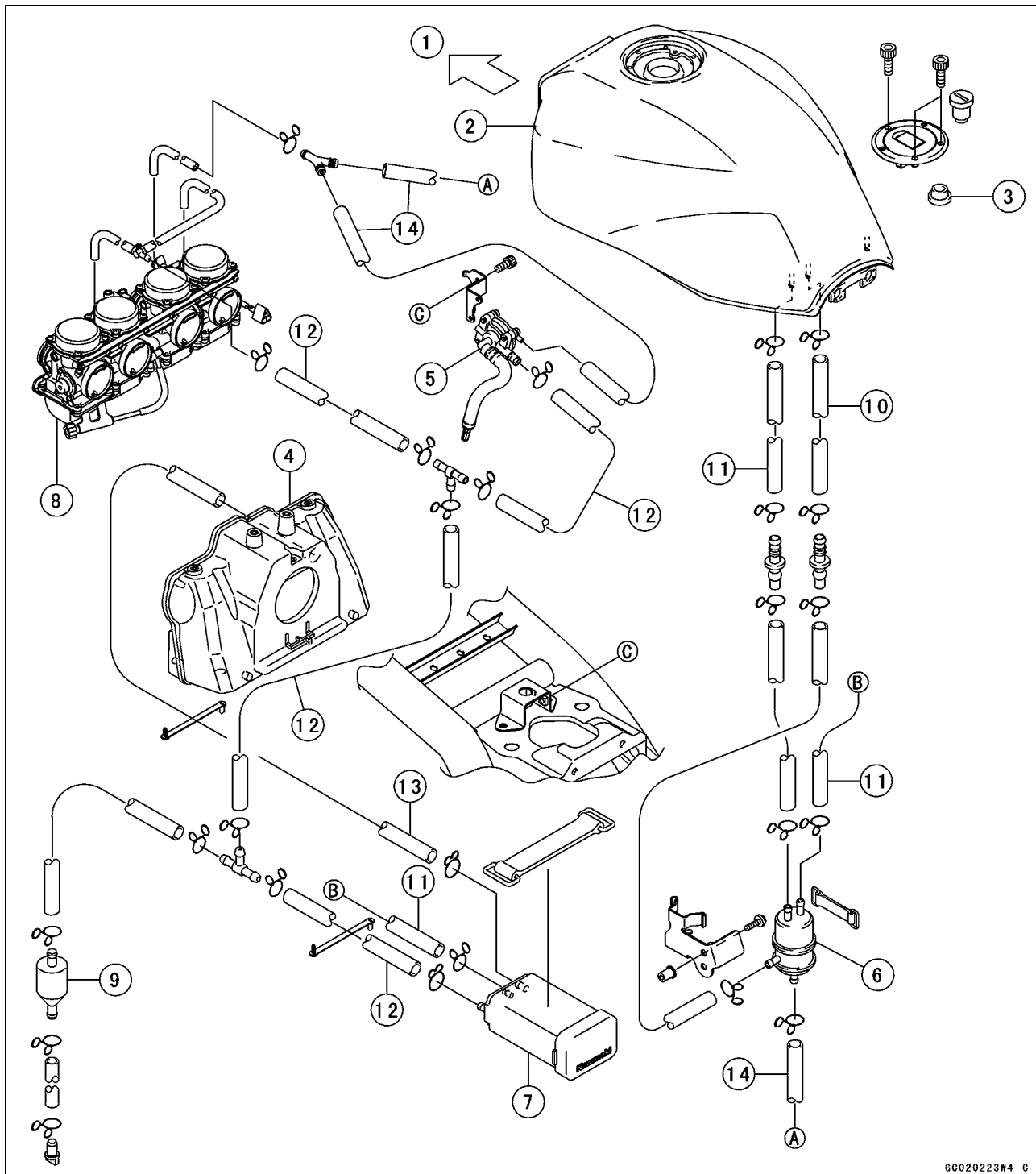
Exploded View

- T1: 0.8 N·m (0.08 kgf·m, 7 in·lb)
- T2: 1.0 N·m (0.10 kgf·m, 9 in·lb)
- T3: 1.5 N·m (0.15 kgf·m, 13 in·lb)
- T4: 2.5 N·m (0.25 kgf·m, 22 in·lb)
5.0 N·m (0.51 kgf·m, 44 in·lb) with Black Washer
- T5: 6.9 N·m (0.70 kgf·m, 61 in·lb)
- T6: 12 N·m (1.2 kgf·m, 106 in·lb)
- G: Apply grease.
- L: Apply a non-permanent locking agent.

2-8 FUEL SYSTEM

Exploded View

California Evaporative Emission Control System



GC020223W4 C

1. Front
2. Fuel Tank
3. Fuel Tank Cap Seal
4. Front Air Cleaner Housing
5. Vacuum Valve
6. Separator
7. Canister
8. Carburetor Assembly
9. Carburetor Vent Hose Catch Tank
10. Red Hose (fuel tank right)
11. Blue Hose (fuel tank left)
12. Yellow Hoses
13. Green Hose
14. White Hoses

Specifications

Item	Standard
Throttle Grip and Cables	
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)
Choke Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)
Carburetors	
Make, Type	KEIHIN CVK36
Idle Speed	1 100 ±50 r/min (rpm),
Pilot Screw (turns out)	2 ±1/4, (CAL) (CA) (US)- (WVTA (FULL H)/GB WVTA (FULL H)/ WVTA (78.2 H) Formosa) 1 5/8 ±1/4 ZR1200A4 ~, A6F ~, B4, C3
Synchronization Vacuum	2.7 kPa (2 cmHg, 0.39 psi) or less difference between any two carburetors
Service Fuel Level	1.5 mm (0.059 in) below ~ 0.5 mm (0.020 in.) above the float bowl mating surface
Float Height	18.5 ±2 mm (0.728 ±0.078 in.)
Main Jet	#92 (1, 4 cab.), #95 (2, 3 cab.) (WVTA (FULL H)/GB WVTA (FULL H)/ WVTA (78.2 H) Formosa) #95 (1, 4 cab.), #98 (2, 3 cab.) ZR1200-A4 ~, A6F ~, B4, C3
Main Air Jet	#80
Jet Needle Mark	NAGZ (1, 4 cab.), NAGU (2,3 cab.)
Pilot Jet (slow jet)	#35
Pilot Air Jet (slow air jet)	#90 (WVTA (FULL H)/GB WVTA (FULL H)/ WVTA (78.2 H) Formosa) #150 ZR1200-A4 ~, A6F ~, B4, C3
Starter Jet	#52
Throttle Valve Angle	11°
High Altitude Carburetor Specifications (US, CA):	
Pilot Jet	#32 (92064-1117)
Main Jets	#88 (92063-1024, #1,4 cab.) #92 (92063-1004, #2,3 cab.)
Air Cleaner	
Element	Paper filter

cab.: Carburetor, ex. 1,4 cab.: No.1 carburetor (leftmost) and No.4 carburetor (rightmost)

CAL: California Model

CA: Canada Model

US: United States Model

Special Tools - Pilot Screw Adjuster, C: 57001-1292

Pilot Screw Adjuster Adapter, φ5: 57001-1372

Pilot Screw Adjuster Driver: 57001-1373

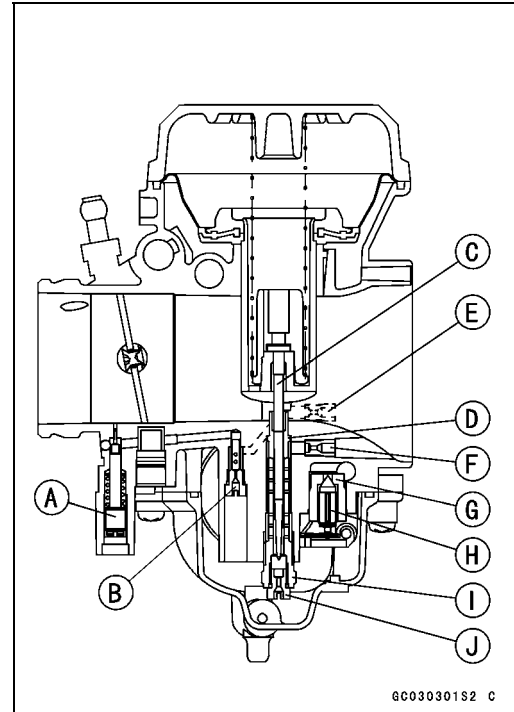
Carburetor Drain Plug Wrench, Hex 3: 57001-1269

Fuel Level Gauge: 57001-1017

2-10 FUEL SYSTEM

Specifications

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



Throttle Grip and Cables, Choke Cable

Throttle Cable Inspection

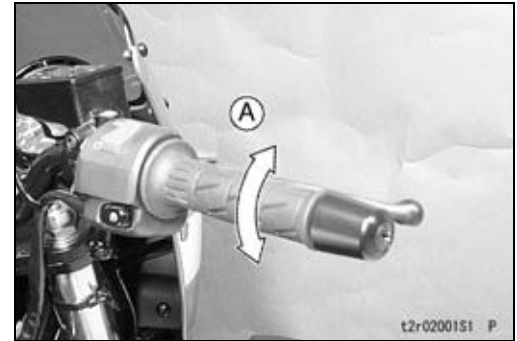
Throttle Grip Free Play Inspection

- Check the throttle grip free play [A] (rear-right view).
- ★ If the free play is incorrect, adjust the throttle cables.

Throttle Grip Free Play

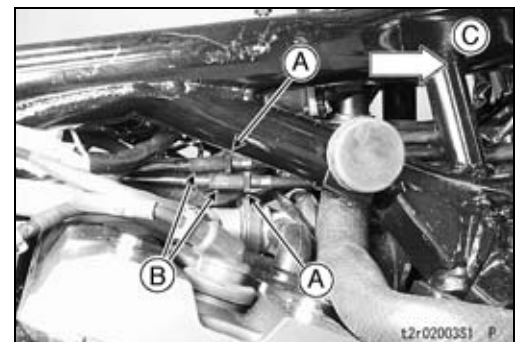
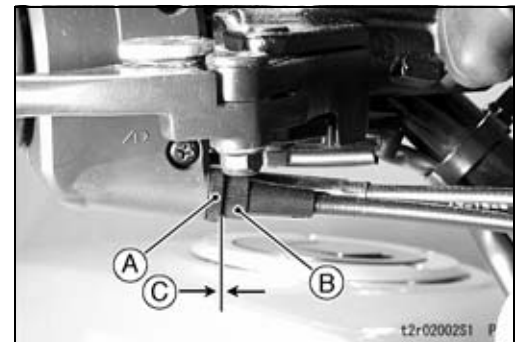
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)

- Check that the throttle grip moves smoothly from close to full open, and the throttle closes quickly and completely in all steering positions by the return spring.
- ★ If the throttle grip doesn't return properly, check the throttle cable routing, grip free play, and cable damage. Then lubricate the throttle cables.
- 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 doesn't change.
- ★ If the idle speed increases, check the throttle grip free play and the cable routing.



Throttle Grip Free Play Adjustment

- Loosen the locknut [A].
- Turn the adjuster [B] until the proper amount of free play can be obtained.
- Tighten [C] the locknut against the adjuster securely.
- ★ If the throttle grip free play cannot be adjusted with the adjuster, use the adjusters in the middle of the throttle cables.
- Loosen the locknut, and screw the adjuster at the upper end of the accelerator cable all the way in.
- Tighten the locknut against the adjuster securely.
- Remove the fuel tank (see Fuel Tank Removal).
- Loosen the locknuts [A], and turn the lower adjusters [B] until the proper amount of throttle grip free play is obtained.
- Tighten the locknuts against the adjusters securely.
- Front [C]
- ★ If the throttle grip free play cannot be adjusted with the lower adjusters, use the adjuster at the upper end of the cable again.



Choke Cable Inspection

Choke Lever Free Play Inspection

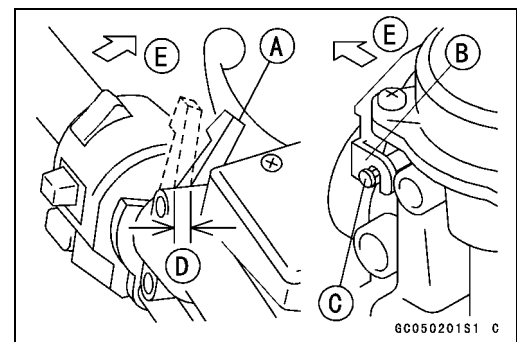
- Push the choke lever [A] all the way to the front and check the choke lever free play [D]: choke lever end travel.
- To determine the choke lever free play precisely, measure the choke lever end travel when the starter plunger lever [B] is retracted and then touches the starter plunger [C] at the carburetor #1.

Front [E]

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

Choke Lever Free Play

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

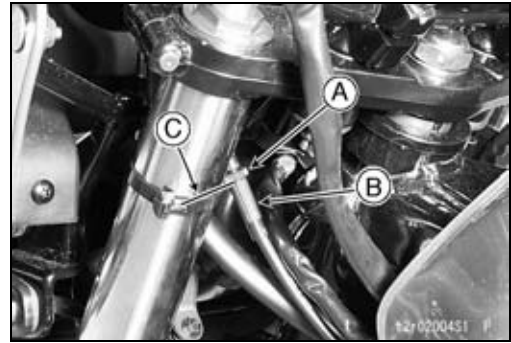


2-12 FUEL SYSTEM

Throttle Grip and Cables, Choke Cable

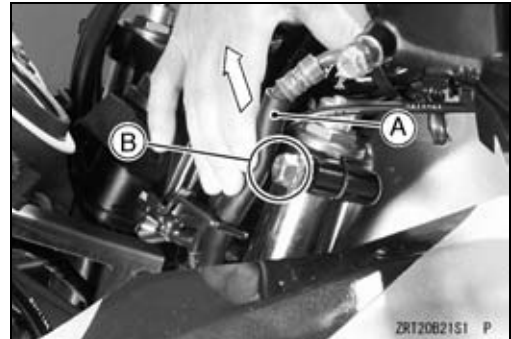
Choke Lever Free Play Adjustment

- Loosen the locknut [A], and turn the adjuster [B] until the cable has the proper amount of free play.
- Tighten [C] the locknut against the adjuster securely (left-rear view).



Cable Removal/Installation

- For throttle cable removal/installation, refer to Carburetor Removal and Installation in this chapter.
- For choke cable removal, do the following:
 - Remove the lower end of the choke cable from the carburetor (see Carburetor Removal).
 - Remove the clutch master cylinder and left switch housing.
 - Remove the upper end of the choke cable from the clutch housing.
 - After installing the choke cable upper end, install the left switch housing, fitting the pin into the handlebar hole.
 - Install the clutch master cylinder or the handlebar, so the clutch hose [A] doesn't touch the front fork upper clamp bolt [B] or the meter unit (see Clutch chapter).
- Install the cables in accordance with the Cable, Wire, and Hose Routing section in the General Information chapter.
- After installation, adjust each cables properly.

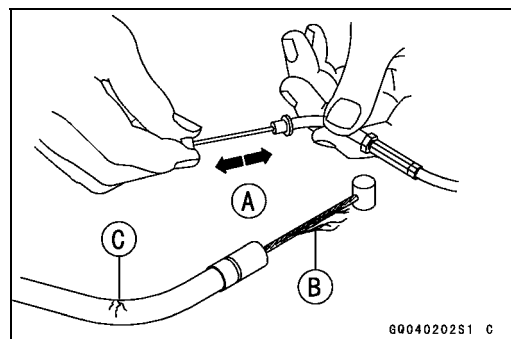
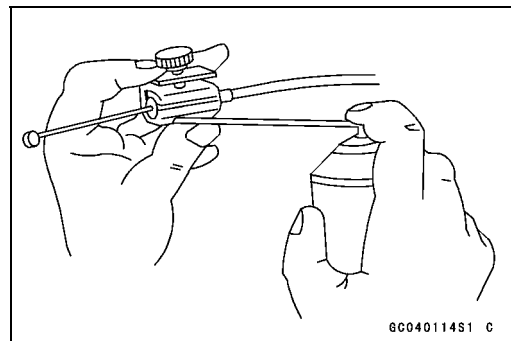


⚠ WARNING

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

Cable Lubrication and Inspection

- Whenever the choke cable or the throttle cables are removed, or in accordance with the Periodic Maintenance Chart, lubricate these cables.
 - Lubricate the cables by seeping oil between the cable and housing.
 - The cable may be lubricated by using a commercially available pressure cable lubricator with an aerosol cable lubricant.
- With the cable disconnected at both ends, the cable should move freely [A] within the cable housing.
- ★ If cable movement is not free after lubricating, if the cable is frayed [B] or if the cable housing is kinked [C], replace the cable.



Carburetors

Idle Speed Inspection

Idle Speed Inspection

- In accordance with the Periodic Maintenance Chart, inspect the idle speed and adjust it if necessary.
- 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 General Information 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

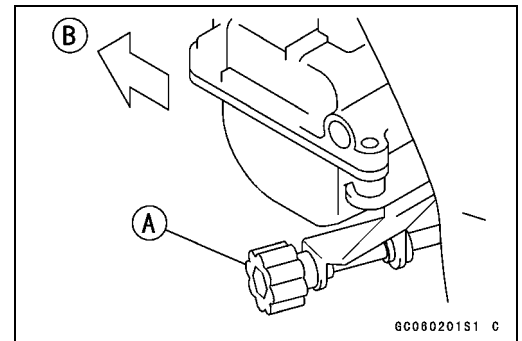
Standard: 1 100 ±50 r/min (rpm), (CAL) (PR) 1200 ±50 r/min (rpm)

CAL: California Model

PR: WVTA Models (restricted model)

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.
- Front [B]



High Altitude Performance Adjustment

- To improve the EMISSION CONTROL PERFORMANCE of US and CAL models operated above **4 000 feet**, Kawasaki recommends the following Environmental Protection Agency (EPA) approved modification.
- At high altitude, the standard carburetor air-fuel mixture will be excessively rich. Performance will decrease, and fuel consumption will increase. High altitude performance can be improved by installing a smaller diameter main jet in the carburetor.
- Change the main jet and pilot jet for high altitude use.

High Altitude Carburetor Specifications

Pilot Jet: #32 (92064-1117)

Main Jets: #88 (92063-1024) for #1, 4 Carburetors

#92 (92063-1004) for #1, 4 Carburetors

2-14 FUEL SYSTEM

Carburetors

Carburetor Synchronization Inspection

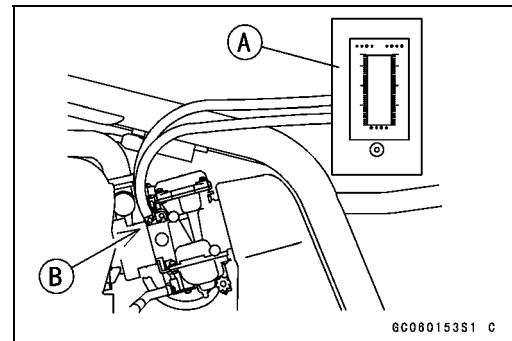
Synchronization Inspection

- In accordance with the Periodic Maintenance Chart, inspect the synchronization.
- Situate the motorcycle so that it is vertical.
- Start the engine and warm it up thoroughly.
- Check idle speed. Check the engine speed, using an accurate commercially available tachometer.
- ★ If the engine speed is out of the specified, adjust it.

- Remove the fuel tank (see Fuel Tank Removal).
- Supply fuel to the carburetors with an auxiliary fuel tank.
- Pull the vacuum hoses off, and attach a commercially available vacuum gauge [A] to the fittings [B] on the carburetors (left view).
- Start the engine and let it idle to measure each carburetor inlet vacuum.
- ★ If the vacuum is incorrect, adjust the synchronization (see this section).

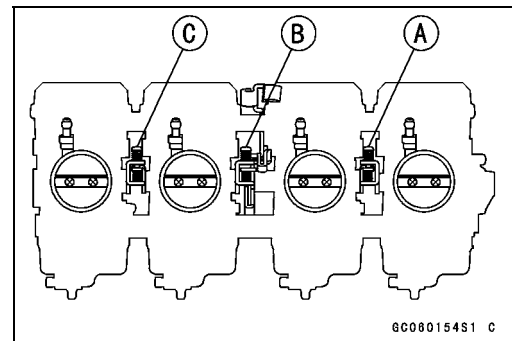
Carburetor Synchronization Vacuum

Standard: 2.7 kPa (2 cmHg, 0.39 psi) or less difference between any two carburetors.



Synchronization Adjustment

- While idling the engine, turn the balance adjusting screws on the levers to synchronize the carburetors.
- First synchronize the left two and then the right two carburetors by means of the left and right adjusting screws [A], [C]. Then synchronize the left two carburetors and the right two carburetors using the center balance adjusting screw [B].
- ★ If the carburetor synchronization cannot be obtained by using the balance adjusting screws, check the carburetor for dirt or blockage, and then check the pilot screw settings (see Pilot Screw Setting).



CAUTION

Do not turn the pilot screws carelessly during synchronization. You may cause poor running at low engine speed.

- Check the carburetor synchronization again.
- Check the idle speed.
- Connect the vacuum hoses to their original positions.

Carburetors

Service Fuel Level Inspection
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.

- Remove the carburetors (see Carburetor Removal), and hold them upright on a stand.
- Prepare an auxiliary fuel tank and connect the fuel hose to the carburetors.
- Prepare a fuel hose (6 mm in diameter and about 300 mm long) and 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 middle line [B] is several millimeters higher than the float bowl mating surface [C].
- Turn the fuel tap to feed fuel to the carburetor and gauge, then turn the carburetor drain plug a few turns.

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

- Wait until the fuel level [E] in the gauge settles.
- Keeping the gauge vertical, slowly lower the gauge until the middle line is even with the float bowl mating surface.

NOTE

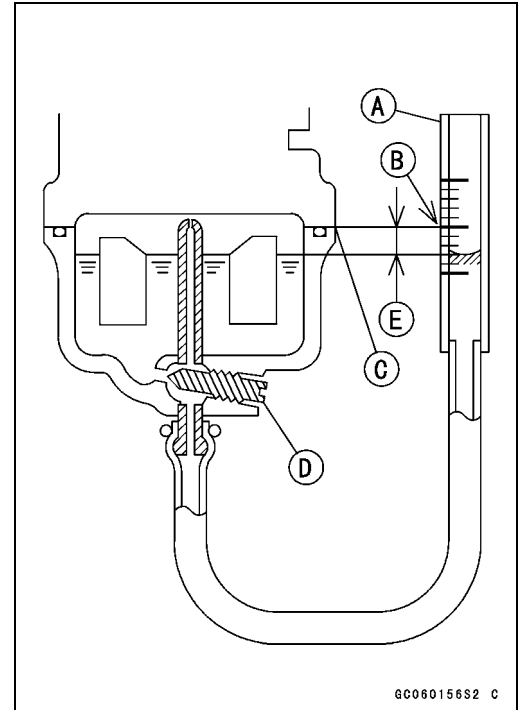
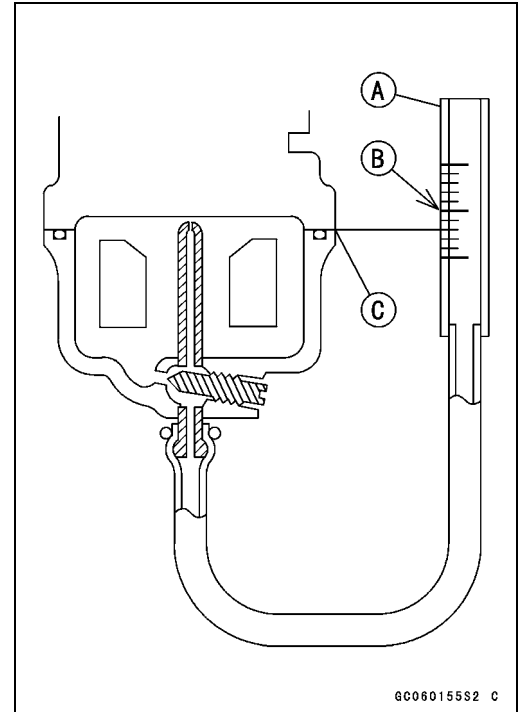
○Do not lower the middle line below the float bowl mating surface. If the gauge is lowered and then raised again, the fuel level measured shows somewhat higher than the actual fuel level. If the gauge is lowered too far, dump the fuel out of it into a suitable container and start the procedure over again.

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

Service Fuel Level

Standard: 1.5 mm (0.059 in) below ~ 0.5 mm (0.020 in) above the float bowl mating surface

- Repeat the same procedure for the other carburetors.



2-16 FUEL SYSTEM

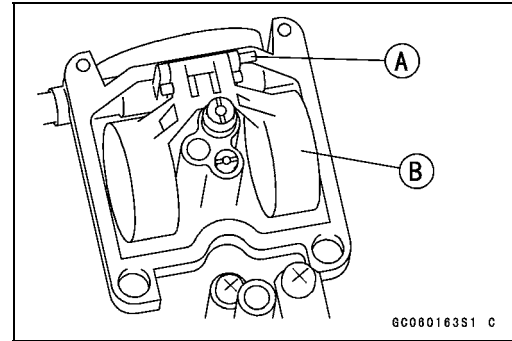
Carburetors

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

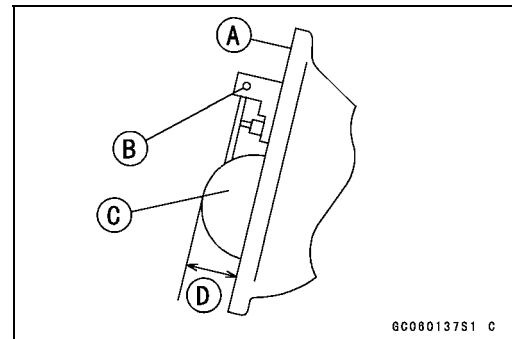
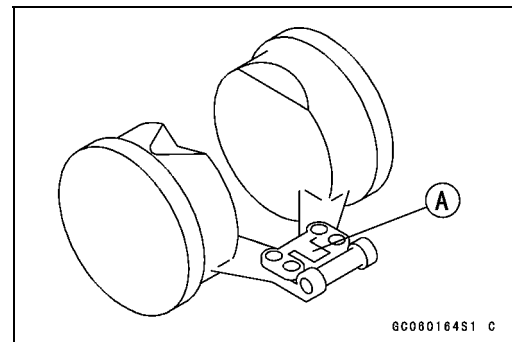
Standard: 18.5 ± 2 mm (0.728 ± 0.078 in)

Float Bowl Mating Surface [A]

Float Valve Needle Rod (contacted but unloaded) [B]

Float [C]

Float Height [D]



NOTE

○ Do not push the needle rod in during float height measurement.

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

Fuel System Cleanliness Inspection

⚠ WARNING

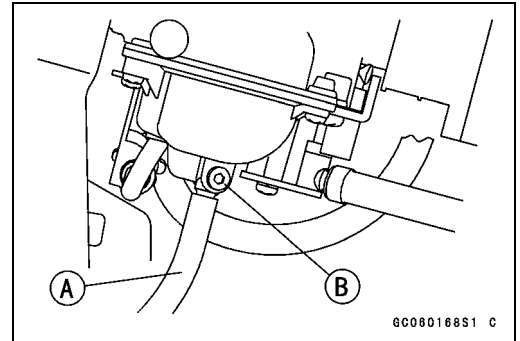
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

Carburetors

- Connect a suitable hose [A] to the fitting at the bottom of each carburetor float bowl (right side view).
- Run the lower end of the hose into a suitable container.
- Turn the fuel tap to the PRI position.
- Turn out each 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 and turn the fuel tap to the ON position.
- Repeat the same procedure for the other carburetors.
- ★ If any water or dirt appears during above inspection, clean the fuel system (see Carburetor Cleaning and Fuel Tank Cleaning).



Pilot Screw Setting

CAUTION

Do not turn the pilot screws carelessly during carburetor synchronization. You may cause poor running at low engine speed.

- 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 seats fully but not tightly.
- The pilot screw adjusters (special tools) may be used for other than California model with the carburetor assembly installed on the engine.

Special Tools - Pilot Screw Adjuster, C: 57001-1292

Pilot Screw Adjuster Adapter, φ5: 57001-1372

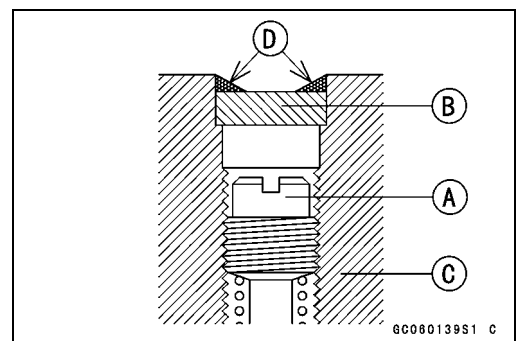
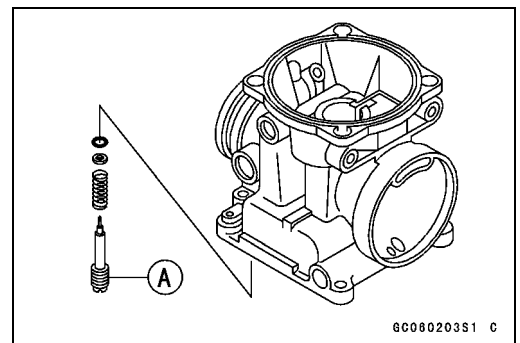
Pilot Screw Adjuster Drive: 57001-1373

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

NOTE

○ A carburetor has different “turns out” of the pilot screw for each individual unit. When setting the pilot screw, use the “turns out” determined during disassembly. Use the specifications in this manual only if the original number is unknown.

- For California model, set the pilot screw [A] as follows:
 - Remove the carburetor assembly (see this chapter).
 - With the carburetor assembly upside down, punch a hole in the plug [B] and pry it out with an awl or other suitable tool
 - Set the pilot screw, using a screwdriver in the same manner as described above.
 - Install a new plug in the pilot screw hole of the carburetor body [C], and apply a little bonding agent [D] to the circumference of the plug to fix the plug.



2-18 FUEL SYSTEM

Carburetors

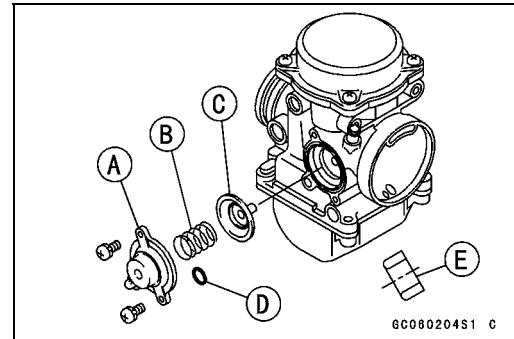
CAUTION

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

- Repeat the same procedure for the other carburetors.

Coasting Enricher Removal/Installation

- Remove the coasting enricher cover [A] from the carburetor #1. Slowly remove the cover, being careful not to pop the spring [B] out.
- Remove the diaphragm [C] and the O-ring [D].
- Install the O-ring with its flat end [E] inward.
- When installing, be careful not to get dirt or dust on these parts. Carburetor malfunction will occur.

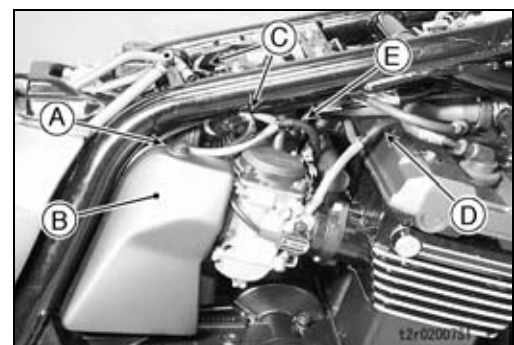


Carburetor Removal

⚠ WARNING

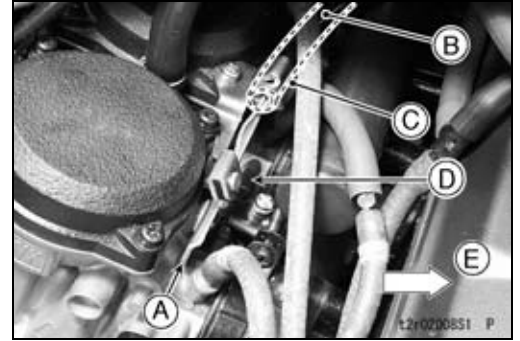
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Remove:
 - Fuel Tank (see Fuel Tank Removal)
 - Bolt [A] and Front Air Cleaner Side Cover [B]
 - Right and Left Coolant Hoses (from the water pump inlet and water pipe)
 - Fuel Cut Valve Connectors (ZR1200-A4 ~, A6F/B4/C3)
- Plug the coolant hoses immediately and wash away any coolant that spills on the engine.
- Remove:
 - Bolt [A] and Front Air Cleaner Side Cover [B]
 - Throttle Sensor and Alternator Lead Connectors [C]
 - Vacuum Hose [D] for Vacuum Switch Valve
 - Vacuum Hose [E] for California Vacuum Valve and Separator

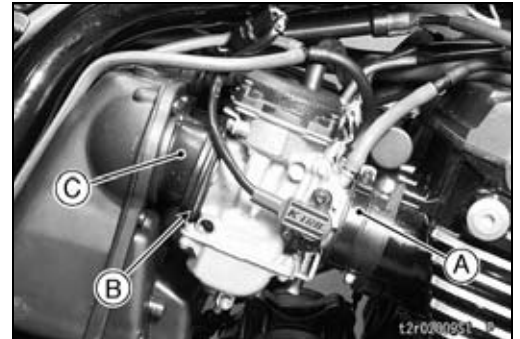


Carburetors

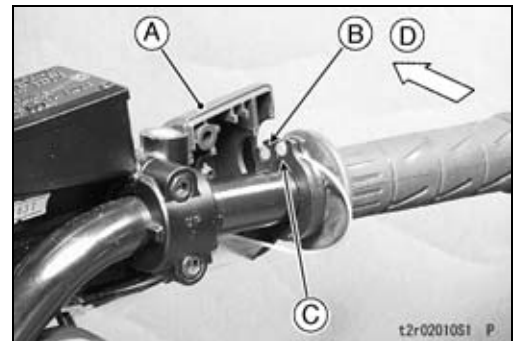
- Push the choke lever on the handlebar forward to give the choke cable plenty of play.
- Push [A] the starter plunger lever and pull out the choke cable housing [B] from the holder [C] on the carburetor #4.
- Remove the choke cable lower end [D] from the starter plunger lever.
Front [E]



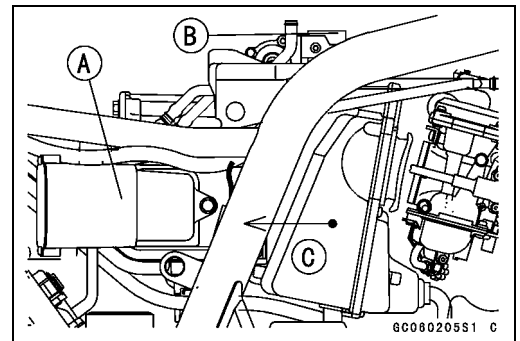
- Loosen the carburetor holder clamps [A].
- Move back the spring bands [B] and peel the air cleaner ducts [C] off from each carburetor inlet.



- Loosen the locknuts and screw in the throttle cable adjusters fully to give the cables plenty of play.
- Remove the right handlebar switch housing [A] and take out the accelerator cable upper end [B] and the decelerator cable upper end [C].
Front [D]



- Remove:
 - Right Side Cover
 - Air Cleaner Inlet [A]
 - Fuel Tank Bracket [B] and Two Bolts
 - Carburetor Hoses
 - Upper Main Harness, Leads, and Connectors (move them left)
 - Hoses (between the front air cleaner housing and frame pipe)
- Move the air cleaner housings backwards [C].



- Pull [A] the carburetor assembly out of the carburetor holders.
- Slide the carburetor assembly right and remove it from the vehicle right side.
- Remove the throttle cable lower ends [B] to complete carburetor assembly removal.
Front [C]
- Stuff pieces of lint-free clean cloth into the carburetor holders and the air cleaner ducts to keep dirt out of the engine and air cleaner.



2-20 FUEL SYSTEM

Carburetors

⚠ 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.

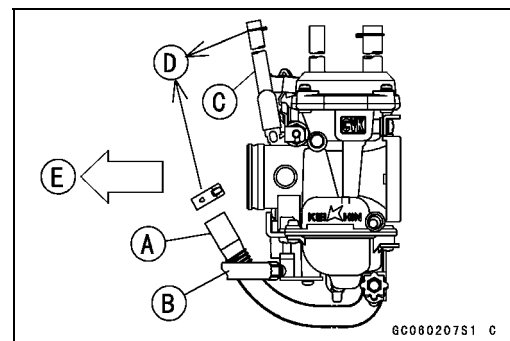
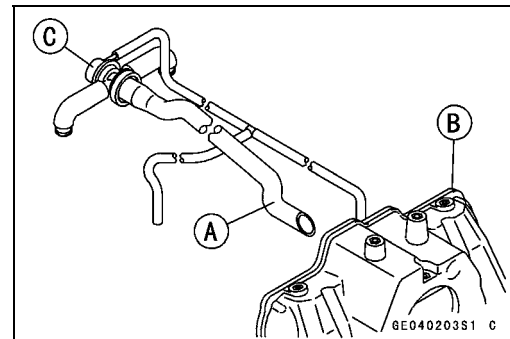
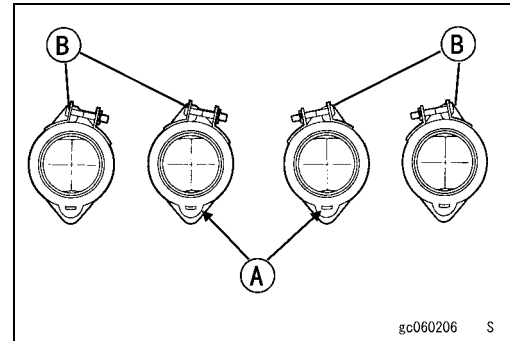
Carburetor Installation

- Fit the clamp nails into the slits [A] of the carburetor holders with each screw head [B] outside and declined as shown.
- Apply:
Non-permanent Locking Agent - Carburetor Holder Bolts
- Tighten:
Torque - Carburetor Holder Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

⚠ WARNING

Be sure to install the holder clamp screws in the direction shown. Or, the screws could come in contact with the throttle linkage resulting in unsafe riding condition.

- Run the carburetor vent hose and fuel hose as shown in the Cable, Wire, and Hose Routing section of the General Information chapter.
- Check that the vacuum switch valve hose [A] is fitted into the front air cleaner housing [B].
Vacuum Switch Valve [C]
- Run the fuel hose [A] under the carburetor assembly and inside the coolant hose [B] as shown.
- Install the carburetor assembly from the vehicle right side.
- Connect the vacuum hose [C] and then the fuel hose to the fuel tap [D].
Front [E]



Carburetors

- Fit the accelerator cable end [A] and the decelerator cable end [B] into the throttle pulley (front view of the carburetor).
- Check fuel leakage from the carburetors.

⚠ WARNING

Fuel spilled from the carburetors is hazardous.

- Check the following items and adjust them if necessary.
 - Throttle Cables
 - Choke Cable
 - Idle Speed
 - Carburetor Synchronization

Carburetor Disassembly/Assembly

- Remove the carburetor assembly (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.

NOTE

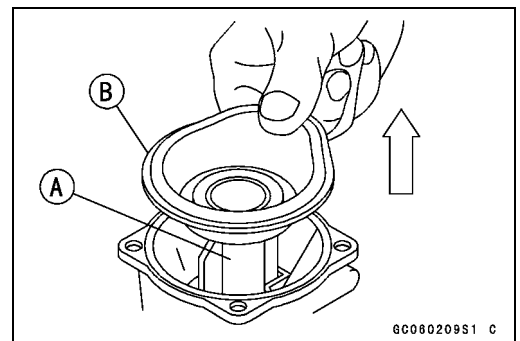
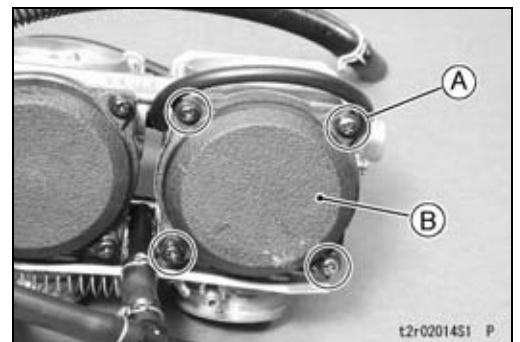
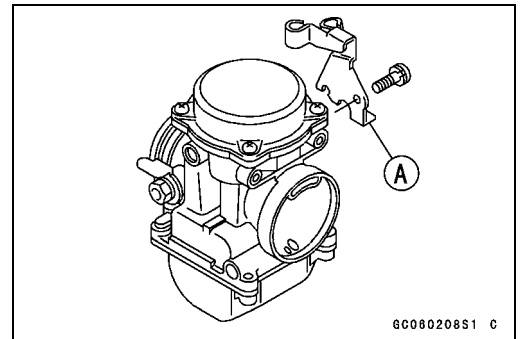
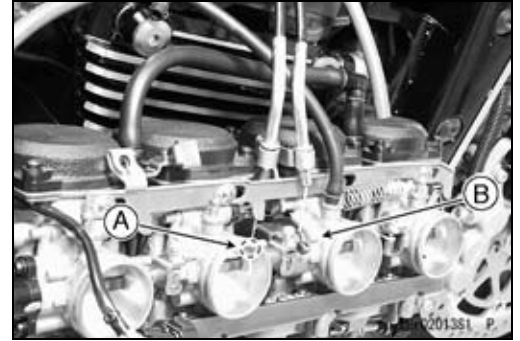
- Each carburetor unit can be disassembled and assembled in the joined state.
- Do not remove the throttle cable holder [A], just for disassembling carburetors.
- Disassemble the upper end of the carburetor as follows:
 - Unscrew the cover screws [A] and remove the upper chamber cover [B] slowly. Be careful not to pop the spring out.

- Remove the vacuum piston [A] and diaphragm [B] along with the jet needle.

CAUTION

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

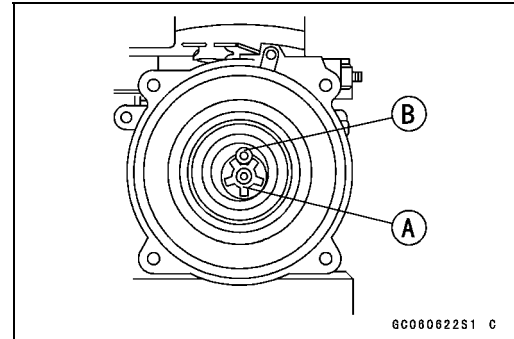
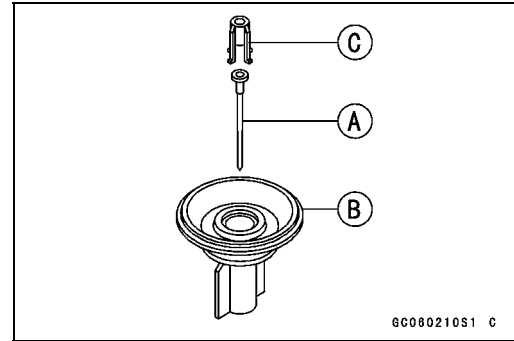
- Check the vacuum piston and diaphragm (see Carburetor Inspection).
- Clean the carburetor parts (see Carburetor Cleaning).



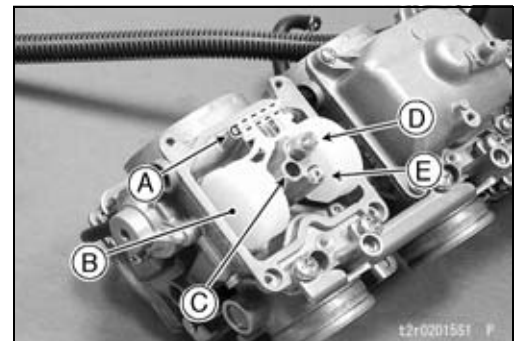
2-22 FUEL SYSTEM

Carburetors

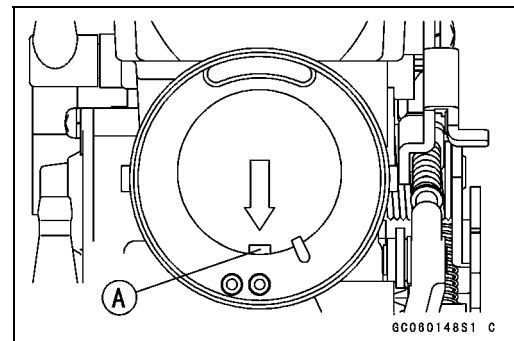
- Assemble the upper end of the carburetor as follows:
 - Slip the jet needle [A] through the hole in the center of the vacuum piston [B], and put the spring seat [C] on the top of the needle.
 - Turn the spring seat [A] so that it does not block the hole [B] at the bottom of the vacuum piston.
 - After installing the upper chamber cover, check that the vacuum piston slides up and down smoothly without binding in the carburetor bore.



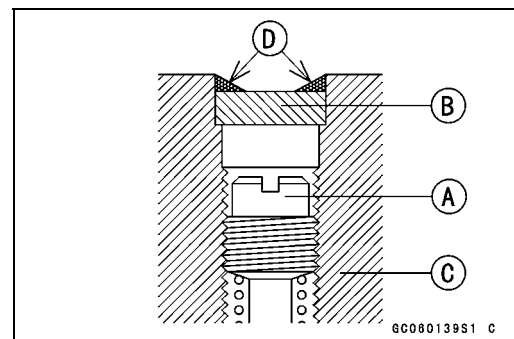
- Disassemble the lower end of the carburetor as follows:
 - Remove the float bowl and O-ring by taking out the screws.
 - Slide out the float pivot pin [A] and remove the floats [B]. The float needle valve will come out together.
 - Remove:
 - Pilot Jet [C]
 - Main Jet [D] and Needle Jet Holder
 - Starter Jet [E]



- Push the needle jet [A] out from the carburetor bore with your finger.
- Check the following parts (see Carburetor Inspection):
 - Float Valve Needle
 - Pilot Screw
- Clean the carburetor parts (see Carburetor Cleaning).



- 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 Formosa 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.

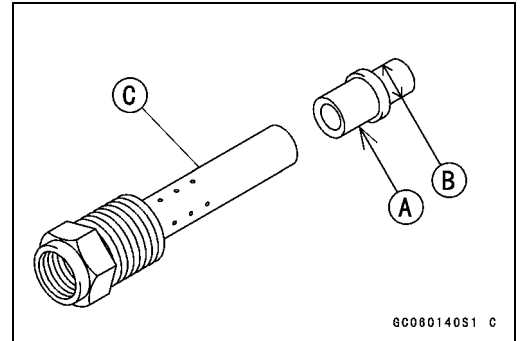


CAUTION

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

Carburetors

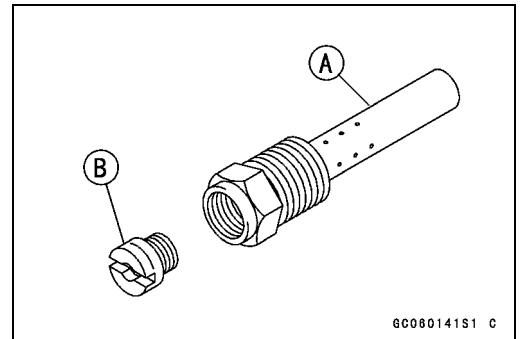
- Assemble the lower end of the carburetor as follows:
 - Turn the carburetor body upside down, and drop the needle jet [A] into place so that the smaller diameter end [B] of the jet goes in first.
 - Carefully screw in the needle jet holder [C]. It will seat against the needle jet, pushing the end of the jet into the carburetor bore.
 - Carefully screw in the main jet.



CAUTION

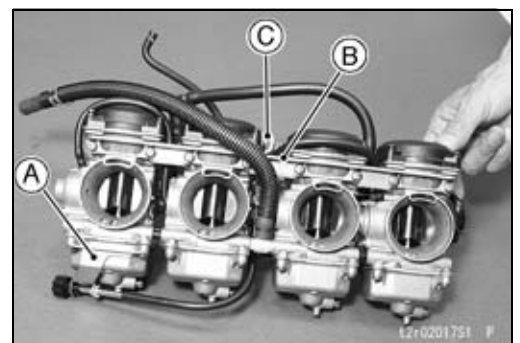
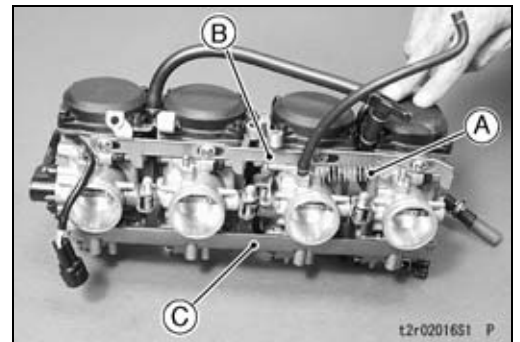
Do not force the needle jet holder [A] and main jet [B] or overtighten them. They could be damaged requiring replacement.

- After assembling the carburetors, check:
 - Fuel Level (see Fuel Level Inspection)
 - Starter Plunger Lever (see Carburetor Inspection)



Carburetor Separation

- Remove the carburetor assembly (see Carburetor Removal).
- Read the WARNING in the Carburetor Disassembly/Assembly.
- Mark the carburetor locations (#1, #2, #3, and #4) so that the carburetors can be installed in their original positions.
- Remove (front view):
 - Choke Return Spring [A]
 - Starter Plunger Lever [B]
 - Bracket [C]
 - Coolant Hoses
- Remove (rear view):
 - Idle Adjusting Screw Holder and Screws [A]
 - Bracket [B] and Screws
- Separate the carburetors.
- Do not remove the throttle holder [C] if the holder is not damaged.
- Do not remove the throttle valves.

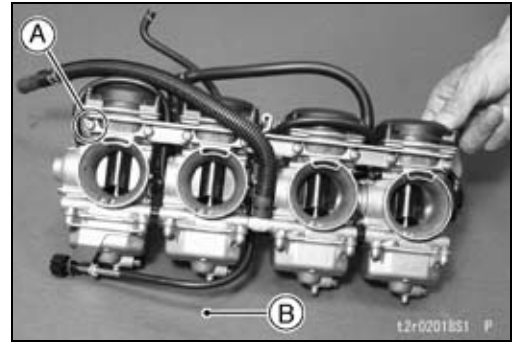


2-24 FUEL SYSTEM

Carburetors

Carburetor Joining

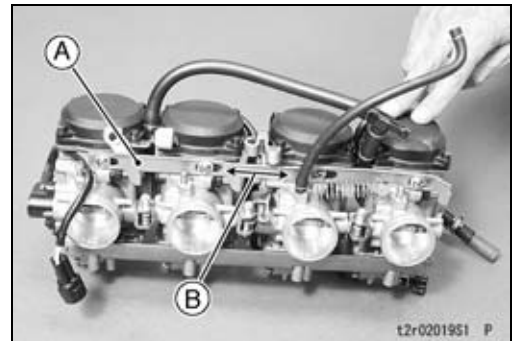
- The carburetor bores must be parallel both horizontally and vertically.
- Loosen the mounting screws [A] and align the carburetors with the outlet ends placed on a flat surface [B].
- Retighten the mounting screws.



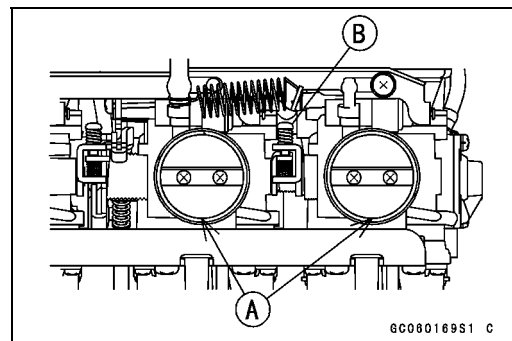
- After installing the choke mechanism, check to see that the starter plunger lever [A] slides right to left [B] smoothly without abnormal friction.

CAUTION

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



- Visually synchronize the throttle (butterfly) valves.
- Check to see that all throttle valves open and close smoothly without binding when turning the pulley.
- Visually check the clearance [A] between the throttle valve and the carburetor bore in each carburetor.
- ★ If there is a difference between any two carburetors, turn the balance adjusting screw [B] to obtain the same clearance.
- Install the carburetors (see Carburetor Installation).
- Adjust the synchronization (see Synchronization Adjustment).



Carburetors

Carburetor Cleaning

⚠ WARNING

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

CAUTION

Do not use compressed air on an assembled carburetor, or the floats may be crushed by the pressure, and the vacuum piston diaphragms may be damaged.

Remove as many rubber or plastic parts from the carburetor as possible before cleaning the carburetor. 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.

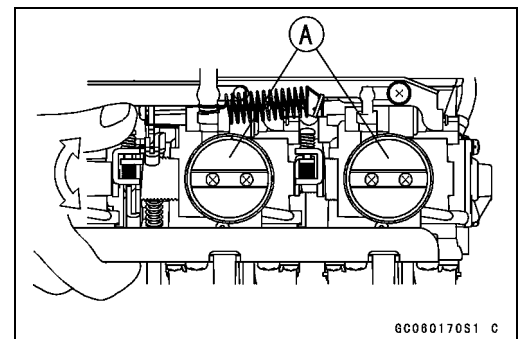
- Disassemble the carburetor (see this chapter).
- Immerse all the metal parts in a mild carburetor cleaning solution.
- Rinse the parts in water.
- When the parts are cleaned, dry them with compressed air.
- Blow through the air and fuel passages with compressed air.
- Assemble the carburetor (see this chapter).

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.

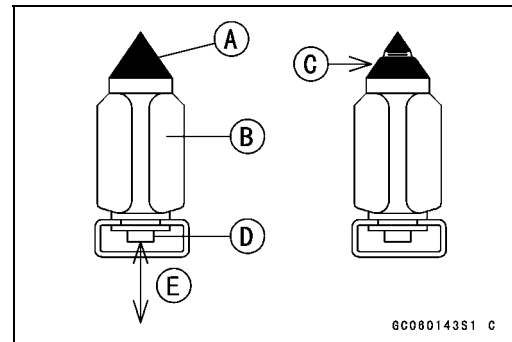
- Slide the starter plunger lever right to left to check that the starter plungers move smoothly and return with spring force.
- ★ If the starter plungers do not work properly, replace the plungers, lever and/or the carburetors.
- Turn the throttle cable pulley to check that the throttle valves [A] move smoothly and return by spring force.
- ★ If the throttle valves do not move smoothly, replace the carburetor assembly.



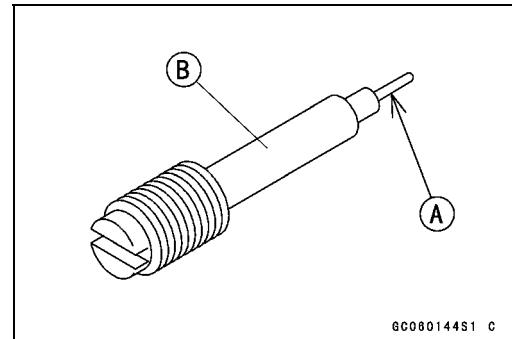
2-26 FUEL SYSTEM

Carburetors

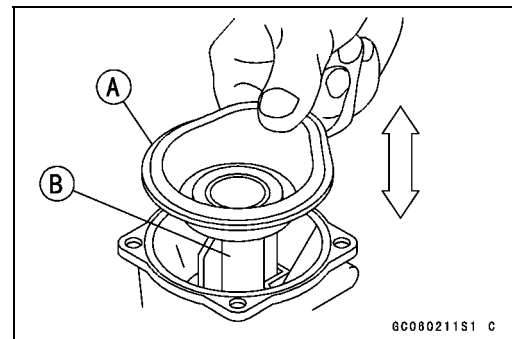
- Disassemble the carburetors (see this section).
- Check the plastic tip [A] of the float valve needle [B]. It should be smooth, without any grooves, scratches or tears.
- ★ If the plastic tip is damaged [C], replace the needle.
- Push the rod [D] in the other end of the float valve needle, and then release it [E].
- ★ If the rod does not spring out, replace the float valve 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.



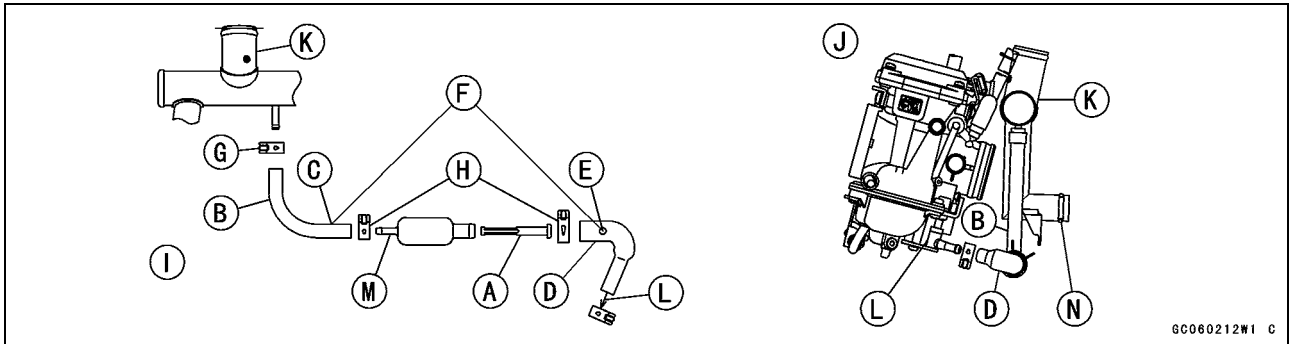
- Check that the diaphragm [A] of the vacuum piston is in good condition.
- ★ If the diaphragm is not in good condition, replace it.
- Check that the vacuum piston [B] moves smoothly in the carburetor body. The surface of the piston must not be excessively worn.
- ★ If the vacuum piston does not move smoothly, or if it is very loose in carburetor body, replace the piston and/or the carburetor.



Coolant Filter Installation

- Install the coolant filter [A] (except for CAL, CA, US) in the direction shown.
 - CAL: California Model
 - CA: Canada Model
 - US: United States Model
- Apply water to the inside of both ends of the coolant hoses.
- Install the coolant hose [B] with the white mark [C] upwards and the coolant hose [D] with the raised mark [E] upwards.
- Align [F] the white mark with the raised mark.
- Install the clamp [G] with the tab left.
- Install the clamps [H] with the tabs upwards.

Carburetors



- Rear View [I]
- Right Side View [J]
- Water Pipe [K] (behind the cylinder head)
- Carburetor No. 4 [L] (rightmost)
- Coolant Filter Case [M]
- Grease the O-ring [N]

Coolant Filter Cleaning

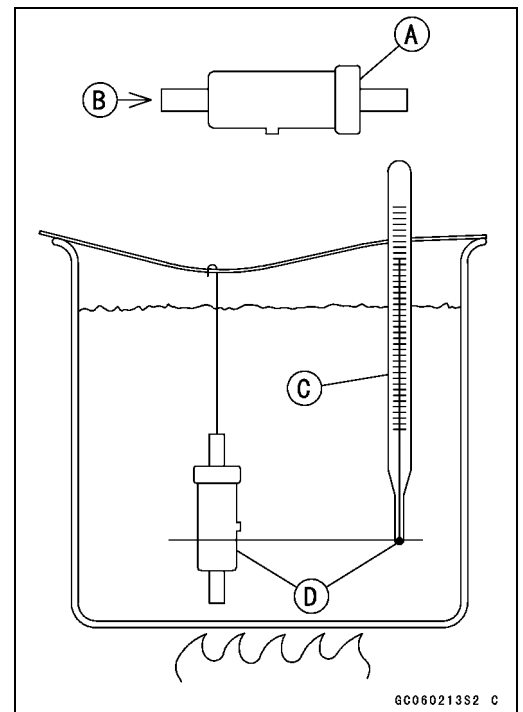
- Before winter season starts, or in accordance with the Periodic Maintenance Chart, clean the coolant filter [A] in the carburetor system (except for CAL, CA, and US).
- Remove the coolant filter from the coolant hoses in the carburetor system.
- Plug the coolant hose immediately and wash away any coolant that spills on the engine.
- Blow dirt and sediment off the filter with compressed air.

Coolant Valve Inspection

- Remove the coolant valve on the engine left side (except for CAL, CA, and US).
- Inspect the coolant valve [A] at room temperature.
- ★ If the valve is open, the valve is normal.
- ★ If the valve is closed, replace the valve with a new one.
- To check valve opening, just blow through the valve in the direction shown [B].
- The valve closes at about 70°C (158°F). This is to prevent vapor lock in the fuel hoses and percolation in the float bowls.
- To check valve closing temperature roughly, suspend the coolant valve [A] and a thermometer [C] in a container of water with the heat-sensitive portions [D] in almost the same depth.
- Gradually raise the temperature of the water and wait about 5 minutes while stirring the water gently for even temperature.

Valve Closing Temperature

Standard: about 70° (158°F) or more

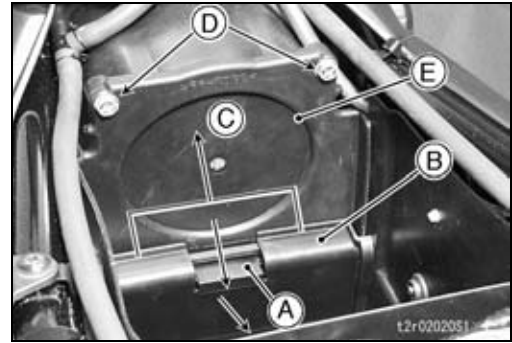


2-28 FUEL SYSTEM

Air Cleaner

Element Removal

- Remove the seat (see Frame chapter).
- While pushing on the tab [A], pull the holder [B] back to unlatch and pull it upwards [C].
- Remove the screws [D] and pull the element cover [E] out.

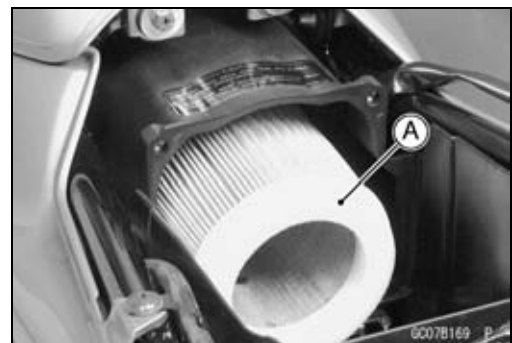
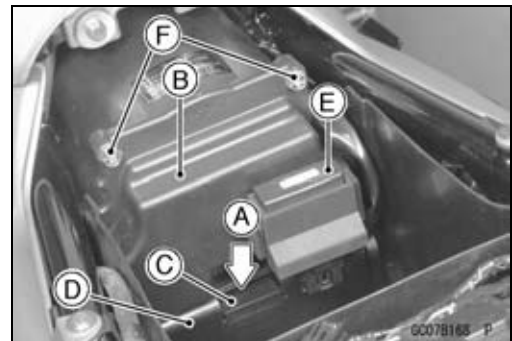


- Pull out the air cleaner element [A].
- Push a clean, lint-free towel into the air cleaner housing to keep dirt or other foreign material from entering.



Element Removal (Malaysia model, ZR1200-A4)

- Remove the seat (see Frame chapter).
- Push down [A] on the tab [C] at the upper end of the battery holder [D] to separate the battery holder from the air cleaner element cover [B], and remove the battery holder by pulling it rearward.
- Remove the amplifier [E] from the air cleaner element cover by pulling it rearward.
- Remove the air cleaner Element Cover by taking off the bolts [F].
- Take out the paper element [A].
- Put a clean, lint-free towel over the air cleaner housing to keep dirt or other foreign material from entering.



⚠ WARNING

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

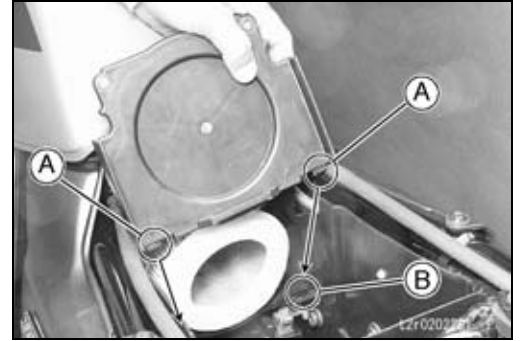
CAUTION

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

Air Cleaner

Element Installation

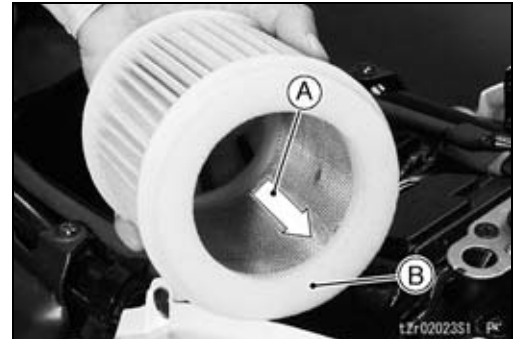
- Fit the tabs [A] into the slits [B] in the rear air cleaner housing.



Element Cleaning and Inspection

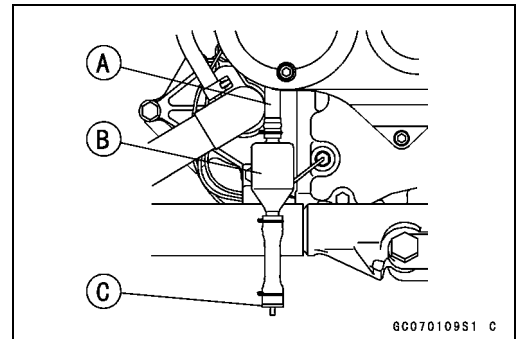
NOTE

- In accordance with the Periodic Maintenance Chart, clean the element.
- In dusty areas, the element should be cleaned more frequently than the recommended interval.
- After riding through rain or on muddy roads, the element should be cleaned immediately.
- Remove the air cleaner element (see Element Removal).
- Clean the element 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 or gasket has any tears or breaks, replace the element.



Air Cleaner Draining

- A drain hose [A] is connected to the bottom of the front air cleaner housing to drain water or oil accumulated at the bottom of the housing.
- Visually check the catch tank [B] at the same time when changing oil or sometimes check if the water or oil accumulates in the tank.
- ★ If any water or oil accumulates in the tank, drain it by taking off the drain plug [C] at the lower end of the drain hose.
- After draining, be sure to install the plug firmly, or the air will be drawn in through it.



⚠ WARNING

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

2-30 FUEL SYSTEM

Air Cleaner

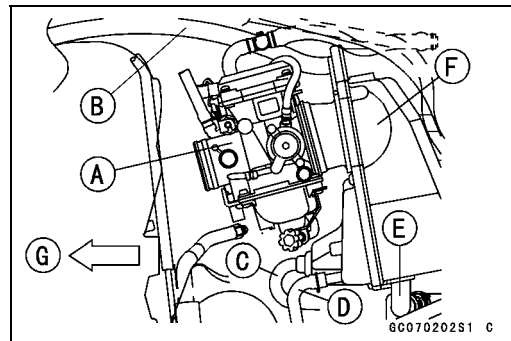
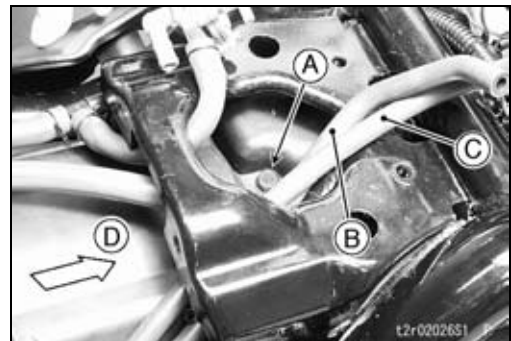
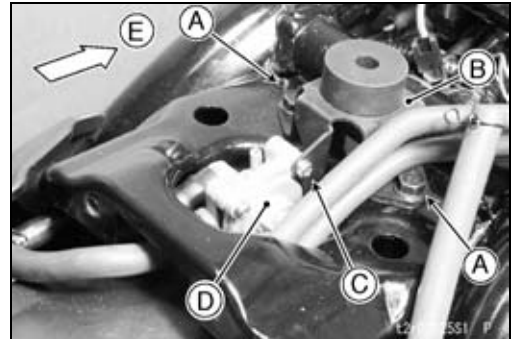
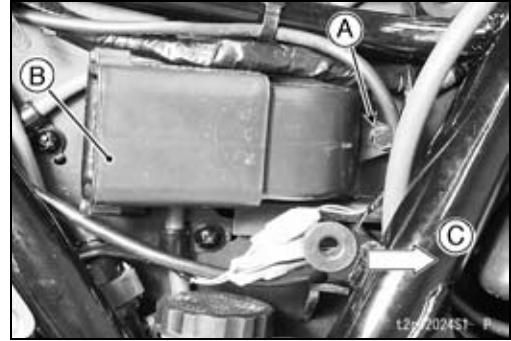
Front Air Cleaner Housing Removal

- Remove:
 - Right Side Cover (see Frame chapter)
 - Bolt [A] and Air Cleaner Inlet [B]
 - Front [C]

- Remove:
 - Seat (see Frame chapter)
 - Fuel Tank (see this chapter)
 - Bolts [A] and Fuel Tank Bracket [B]
 - Screws [C] and California Vacuum Valve [D]
 - Front [E]

- Remove:
 - Fuel Tank Filler Drain Hose
 - Front-Rear Air Cleaner Upper Bolt [A]
 - Fuel Tank Breather Hose [B] (blue, left, CAL)
 - Fuel Tank Return Hose [C] (red, right, CAL)
 - Front [D]
 - (CAL): California Model

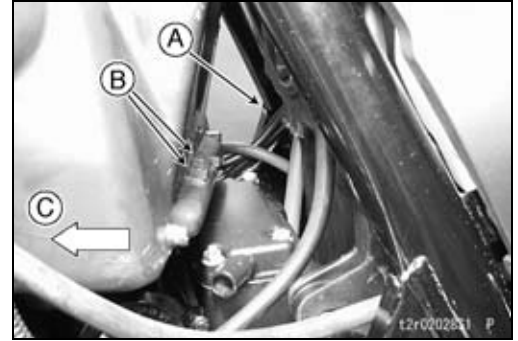
- Remove:
 - Carburetor Assembly [A] (see this chapter)
 - Vacuum Switch Valve Hose [B]
 - California Purge Hose [C]
 - Front Air Cleaner Drain Hose [D]
 - Crankcase Breather Hose [E]
- Put the upper harness and leads on the left.
- Put the alternator, crankshaft sensor, and throttle sensor connectors on the frame top to prevent them sticking on the air cleaner housing.
- Disengage the front air cleaner housing [F] from the rear air cleaner housing and remove it from the vehicle right side.
 - Front [G]



Air Cleaner

Front Air Cleaner Housing Installation

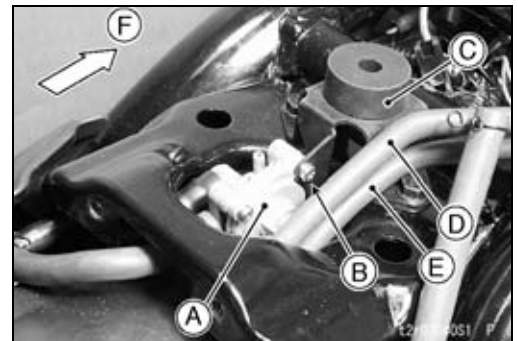
- Install the front air cleaner housing from the vehicle right side.
- Fit the rear air cleaner housing hooks [A] into the grooves [B] of the front air cleaner housing.
 - Front [C]
- Tighten:
 - Front-Rear Air Cleaner Upper Bolt



- Fit the tabs [A] of the air cleaner inlet into the slits of the rear air cleaner housing.
- Install:
 - California Vacuum Switch Hose
 - California Purge Hose
 - Crankcase Breather Hose
 - Air Cleaner Drain Hose



- Install:
 - California Vacuum Valve [A] and Screws [B]
 - Fuel Tank Bracket [C]
- Run the California Evaporative Emission Control hoses on the right side of the fuel tank bracket as shown.
- Connect:
 - Fuel Tank Breather Hose [D] (blue, left) → Left Fuel Tank Pipe with blue mark
 - Fuel Tank Return Hose [E] (red, right) → Right Fuel Tank Pipe with red mark
 - Front [F]



Rear Air Cleaner Housing Removal

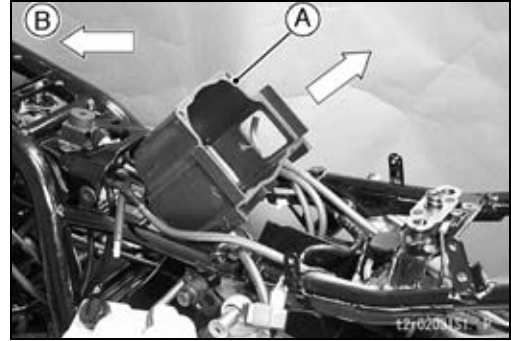
- Remove:
 - Carburetor Assembly (see this chapter)
 - Air Cleaner Inlet [A]
 - Right Side Hoses and Clamps [B]
 - Front Air Cleaner Housing (see this chapter)
 - Coolant Reserve Tank (see Cooling System chapter)
 - Battery and Leads (see Electrical System chapter)
- Put the battery lead terminals outside the frame.
- Remove the seat cover and rear fender (see Frame chapter).
- Unscrew the screws and just separate the rear fender from the frame (Do not remove the rear wheel).
- Be careful that the hoses and leads are not caught between the rear fender and the frame.



2-32 FUEL SYSTEM

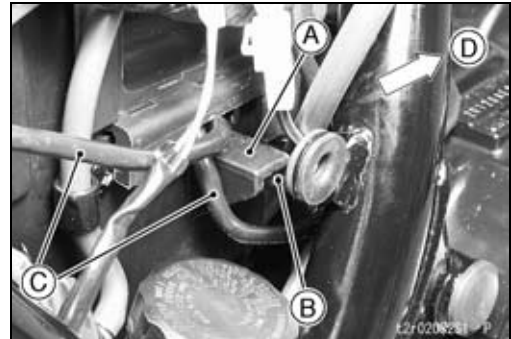
Air Cleaner

- Take the rear air cleaner housing [A] out of the frame.
Front [B]

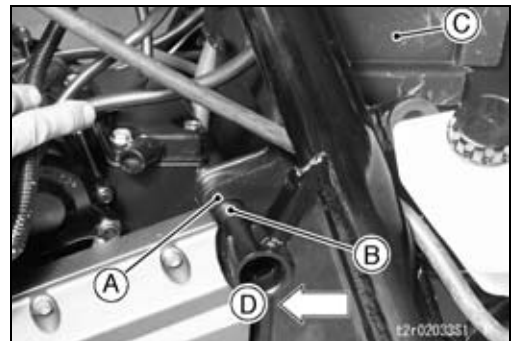


Rear Air Cleaner Housing Installation

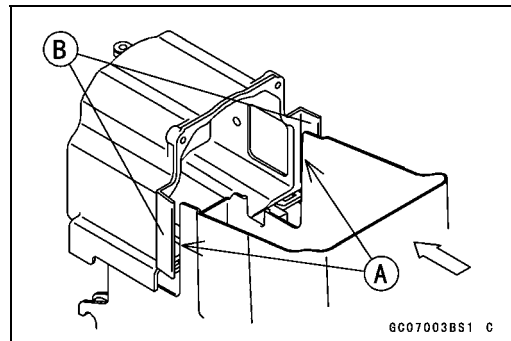
- Install the rear fender in the original position:
 - Be careful not to pinch the hoses and leads with the rear fender.
 - Put the rear fender tab [A] onto the frame bracket [B].
 - Run the battery leads [C] into the battery case of the rear fender.Front [D]



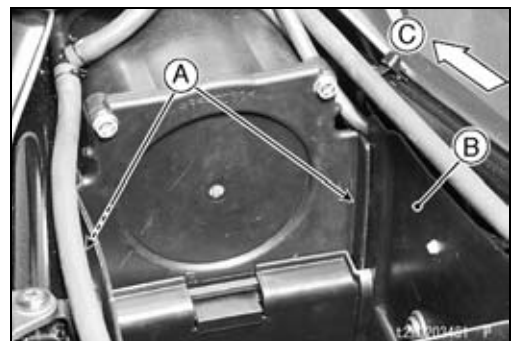
- Put the hook [A] of the rear fender onto the collar [B] of the rear engine mounting bolt.
- Tighten the rear fender screws.
- Install the rear air cleaner housing [C].
Front [D]



- Fit both front tabs [A] of the rear fender inside the tails [B] of the rear air cleaner housing.



- Fit both tails [A] of the element cover inside the rear fender [B].
Front [C]
- Install the front air cleaner housing (see this chapter).
- Tighten:
 - Front-Rear Air Cleaner Upper Bolt
 - Front Air Cleaner Upper Bolts (2)
- Install the removed parts:
 - Battery (see Electrical System chapter)



Fuel Tank

Fuel Tank Removal

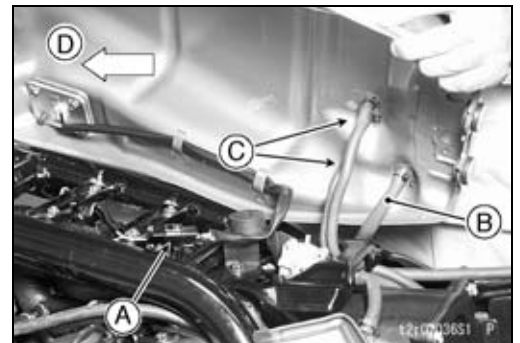
⚠ WARNING

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

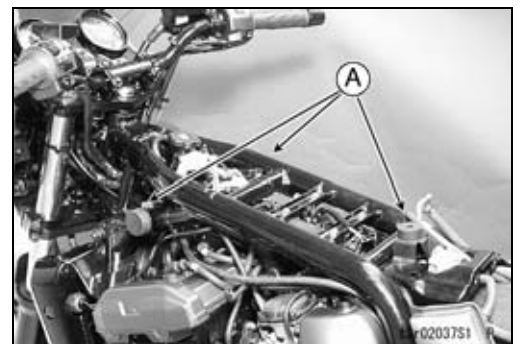
For California model, if gasoline, solvent, water or any other liquid enters the canister, the canister's vapor absorbing capacity is greatly reduced. If the canister does become contaminated, replace it with a new one.

- Turn the fuel tap to the ON or RES position.
- Remove:
 - Seat (see Frame chapter)
 - Fuel Hose [A]
 - Fuel Tap Vacuum Hose [B]
 - Fuel Tank Bolts [C]
- Raise the fuel tank.
- Disconnect the fuel level sensor lead connector [A].
- Remove:
 - Fuel Tank Filler Drain Hose [B]
 - California Breather and Return Hoses [C]
 - Front [D]
- Remove the fuel tank from the frame.



Fuel Tank Installation

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

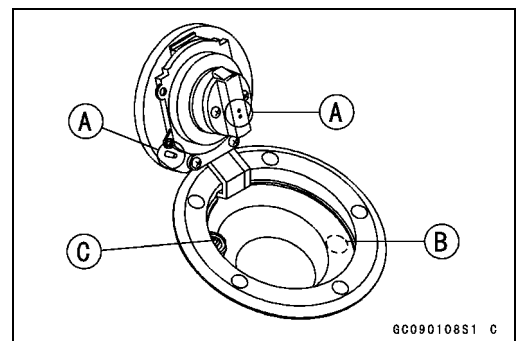


Fuel Tank Inspection

- Open the tank cap (front view).
- Check to see if the filler drain pipe [B], the California breather pipe [C] in the tank is not clogged.
- ★ If they are clogged, remove the tank and drain it, and then blow the pipes free with compressed air.

CAUTION

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



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2-34 FUEL SYSTEM

Fuel Tank

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 the solvent out of the tank.
- Remove the fuel tap from the tank (see Fuel Tap Removal).
- Clean the fuel tap filter screens [A] in a high-flash point solvent.
- Dry the tank and fuel tap with compressed air.
- Install the fuel tap on the tank.
- Install the fuel tank (see Fuel Tank Installation).

Fuel Tap Removal

- Remove the fuel tank and drain it (see this chapter).
- Remove:
 - Fuel Tap Bolts [A]
 - Flat Washers [B]
 - Fuel Tap [C]

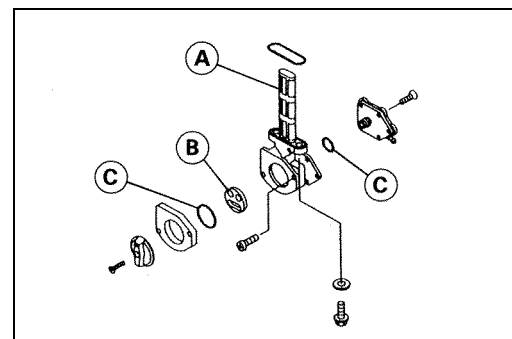
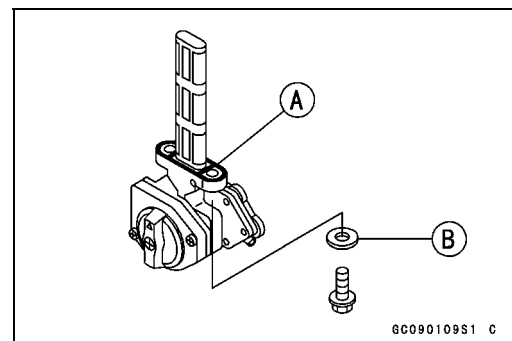
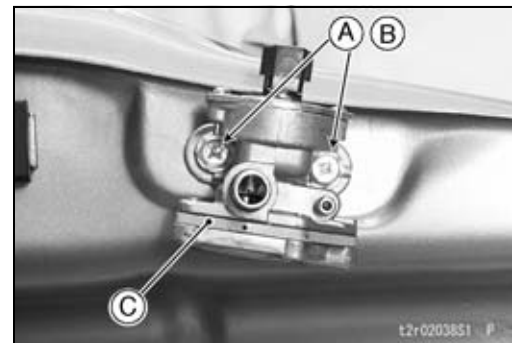
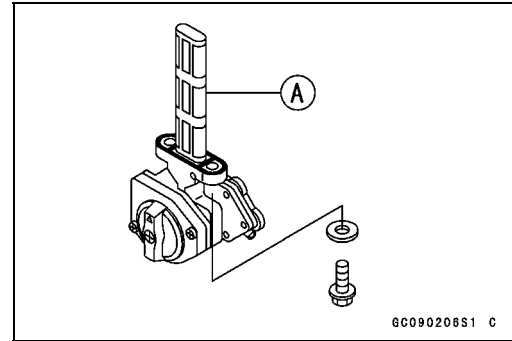
Fuel Tap Installation

- Be sure the O-ring [A] is in good condition to prevent leaks.
- Be sure the 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)
5.0 N·m (0.51 kgf·m, 44 in·lb)
with Black Washers [B]**

Fuel Tap Inspection

- Remove the fuel tap.
- Check the fuel tap filter screen [A] for any breaks or deterioration.
- ★ If the screens have any breaks or are deteriorated, they may allow dirt to reach the carburetor, causing poor running. Replace the fuel tap.
- ★ If the fuel tap leaks, or allows fuel to flow when it is at OFF position, replace the damaged gasket [B] or O-rings [C].



Evaporative Emission Control System (CAL)

The Evaporative Emission Control System for California models (CAL) 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 in position in the frame.
- Connect the hoses according to the diagram of the system (see Cable, Wire, and Hose Routing section in the General Information chapter). 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 breather and return pipes to prevent fuel spilling before fuel tank removal.

WARNING

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

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

Hose Inspection (Periodic Inspection)

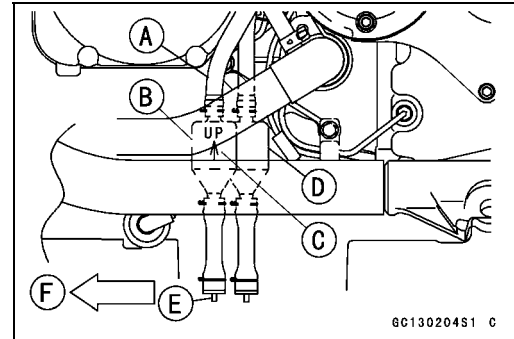
- Check that the hoses are securely connected.
- Replace any kinked, deteriorated or damaged hoses.

2-36 FUEL SYSTEM

Evaporative Emission Control System (CAL)

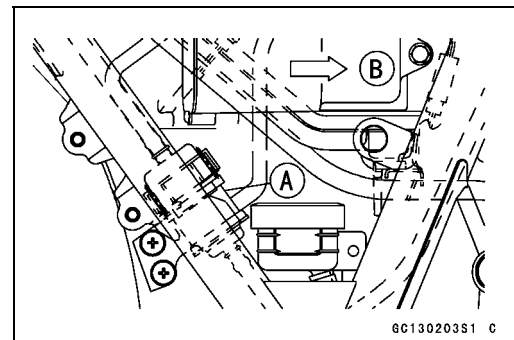
Carburetor Vent Hose Draining

- A drain hose [A] and a catch tank [B] are connected to the bottom of the carburetor vent hose. The catch tank should be installed with the arrow mark [C] pointing upwards.
- Visually check the catch tank along with the air cleaner catch tank [D]. To check the air cleaner catch tank, see Air Cleaner Draining in the Air Cleaner section of this chapter.
- ★ If any fuel accumulates in the tank, drain it by taking off the drain plug [E] at the lower end of the drain hose. Front [F]
- After draining, be sure to install the plug firmly or the fuel vapor will escape.



Separator Inspection (Periodic Inspection)

- Remove the right side cover (see Frame chapter).
- Disconnect the hoses from the liquid/vapor separator, and remove the separator [A] from the motorcycle. Front [B]
- 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.

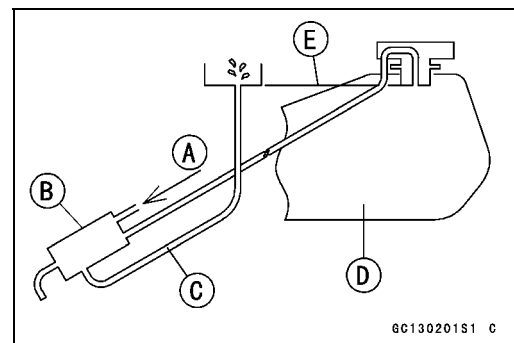


Separator Operation Test

⚠ 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.

- Remove the right side cover (see Frame chapter).
- Disconnect the breather hose (blue) from the separator in the frame and inject about **20 mL** of gasoline [A] into the separator [B] through the hose fitting.
- Disconnect the fuel return hose (red) [C] from the fuel tank [D].
- Run the open end of the return hose into the container level with 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.



Evaporative Emission Control System (CAL)

Canister Inspection (Periodic Inspection)

- Remove the seat (see Frame chapter).
- Remove the canister [A]
 - Front [B]
- Visually inspect the canister for cracks and other damage.
- ★ If the canister has any cracks or bad damage, replace it with a new one.

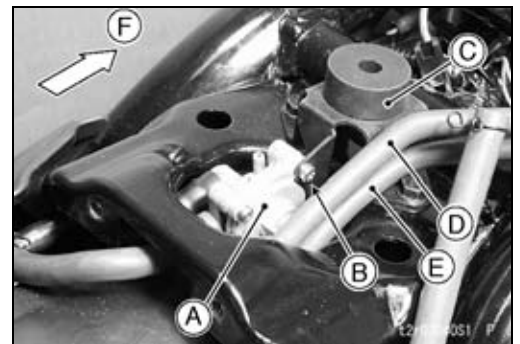
NOTE

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



Vacuum Valve Inspection

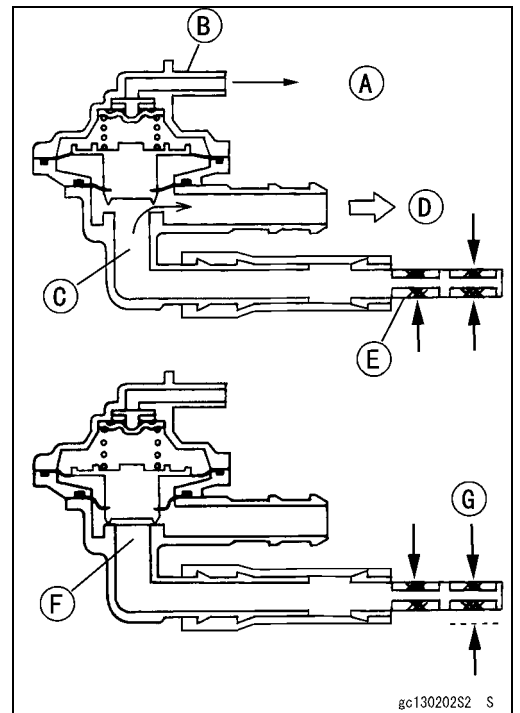
- Remove the seat (see Frame chapter).
- Remove the fuel tank (see this chapter).
- Remove:
 - Fuel Tank Bracket [C]
 - Vacuum Valve [A] and Screws [B]
- Put the California breather hose (blue) [D] and return hose (red) [E] right.
 - Front [F]



- Using the fork oil level gauge (special tool) and a commercial vacuum gauge, inspect the vacuum valve operation.

Special Tool - Fork Oil Level Gauge: 57001-1290

- When applying vacuum (2 cmHg, 0.39 psi) [A] to the vacuum sensing fitting [B], using the fork oil level gauge, the valve is opened [C] and air flows [D] through the filter [E] to the carburetor float chamber fitting.
- When stopping to apply vacuum, the valve is closed [F] and air does not flow [G].
- ★ If the vacuum valve does not operate as described, replace the valve.



CAUTION

Do not use compressed air for valve check or the vacuum valve may be damaged.

NOTE

- *To check air flow through the vacuum valve, just blow through the air hose.*
- *The vacuum valve is opened in order to apply atmospheric pressure to the carburetor float chambers when the engine is running, and closed to store the vapors from the float chambers in the canister when the engine is stopped.*

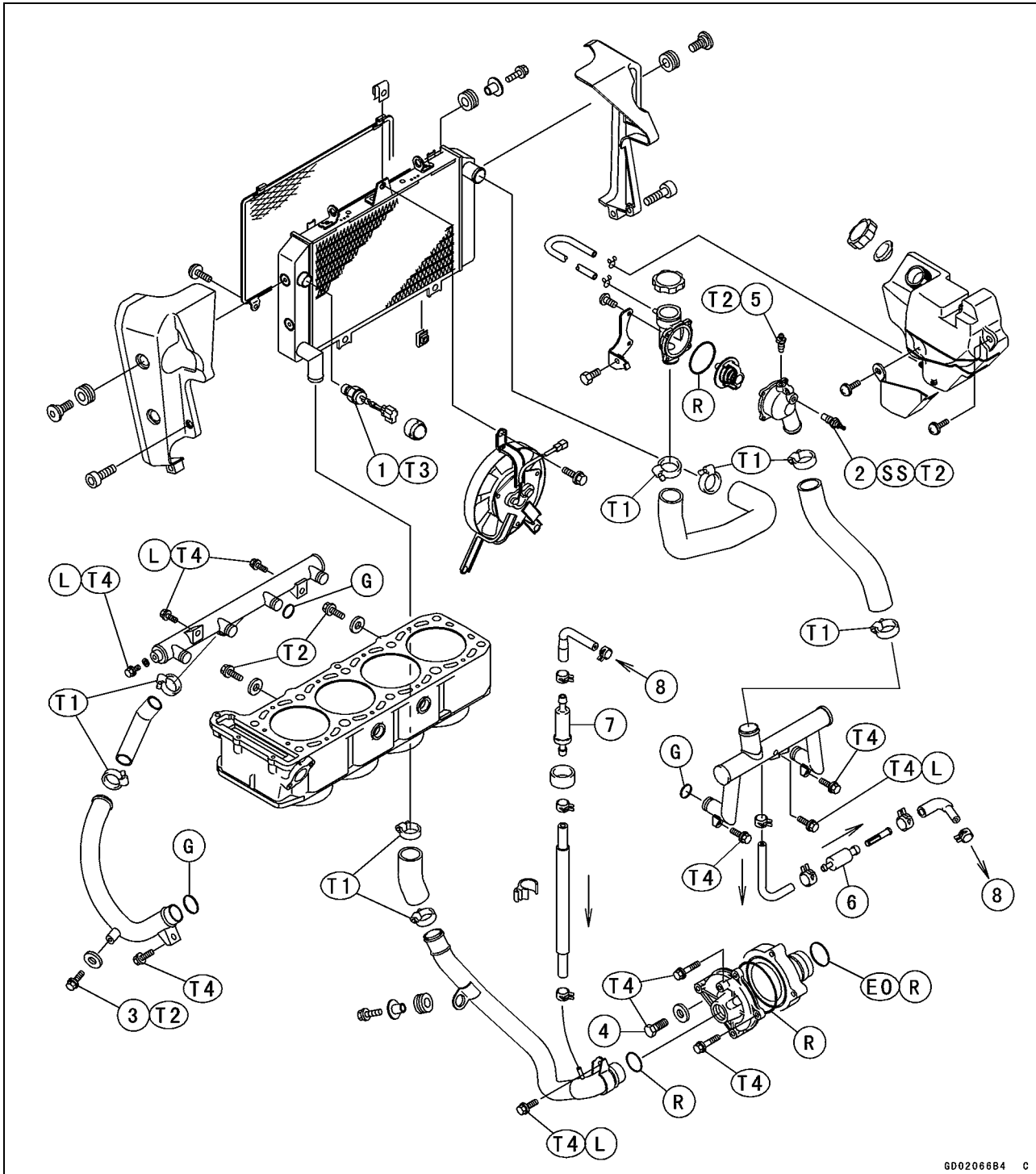
Cooling System

Table of Contents

Exploded View	3-2
Specifications	3-3
Coolant Flow Chart	3-4
Coolant	3-6
Coolant Deterioration Inspection	3-6
Coolant Level Inspection	3-6
Coolant Draining	3-6
Coolant Filling	3-7
Pressure Testing	3-9
Cooling System Flushing	3-9
Coolant Filter Cleaning	3-9
Water Pump	3-10
Water Pump Removal	3-10
Water Pump Installation	3-10
Water Pump Inspection	3-11
Radiator	3-12
Radiator Removal	3-12
Radiator Inspection	3-13
Radiator Cap Inspection	3-13
Radiator Filler Neck Inspection	3-14
Thermostat	3-15
Thermostat Removal	3-15
Thermostat Installation	3-15
Thermostat Inspection	3-15
Hoses and Pipes	3-17
Hose Installation	3-17
Hose Inspection	3-17

3-2 COOLING SYSTEM

Exploded View



G00206684 C

1. Radiator Fan Switch
2. Water Temperature Switch, (ZR1200B) Water Temperature Sensor
3. Coolant Drain Plug
4. Water Pump Air Bleed Bolt
5. Thermostat Housing Air Bleed
6. Coolant Filter
7. Coolant Valve
8. to Carburetor

- T1: 2.5 N·m (0.25 kgf·m, 22 in·lb)
 T2: 7.8 N·m (0.80 kgf·m, 69 in·lb)
 T3: 24 N·m (2.4 kgf·m, 17 ft·lb)
 T4: 9.8 N·m (1.0 kgf·m, 87 in·lb)

EO: Apply engine oil.

G: Apply grease.

L: Apply a non-permanent locking agent.

R: Replacement Parts

SS: Apply silicone sealant.

Specifications

Item	Standard
<p>Coolant provided when shipping</p> <p>Type (recommended)</p> <p>Color</p> <p>Mixed Ratio</p> <p>Freezing Point</p> <p>Total Amount</p>	<p>Permanent type of anitifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)</p> <p>Green</p> <p>Soft water 50%, coolant 50%</p> <p>-35°C (-31°F)</p> <p>3 L (3.2 US qt., reserve tank full level including radiator and engine)</p>
<p>Radiator Cap</p> <p>Radiator cap relief pressure</p>	<p>93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi)</p>
<p>Thermostat</p> <p>Valve opening temperature</p> <p>Valve full opening lift</p>	<p>80 ~ 84°C (176 ~ 183°F)</p> <p>8 mm (0.3 in) or more @95°C (203°F)</p>

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

3-4 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 (coupled with the oil 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 77.5°C (172°F), the thermostat closes so that the coolant flow is restricted through the air bleeder hole, causing the engine to warm up more quickly. When coolant temperature is more than $80 \sim 84^{\circ}\text{C}$ ($176^{\circ}\text{F} \sim 183^{\circ}\text{F}$), the thermostat opens and the coolant flows.

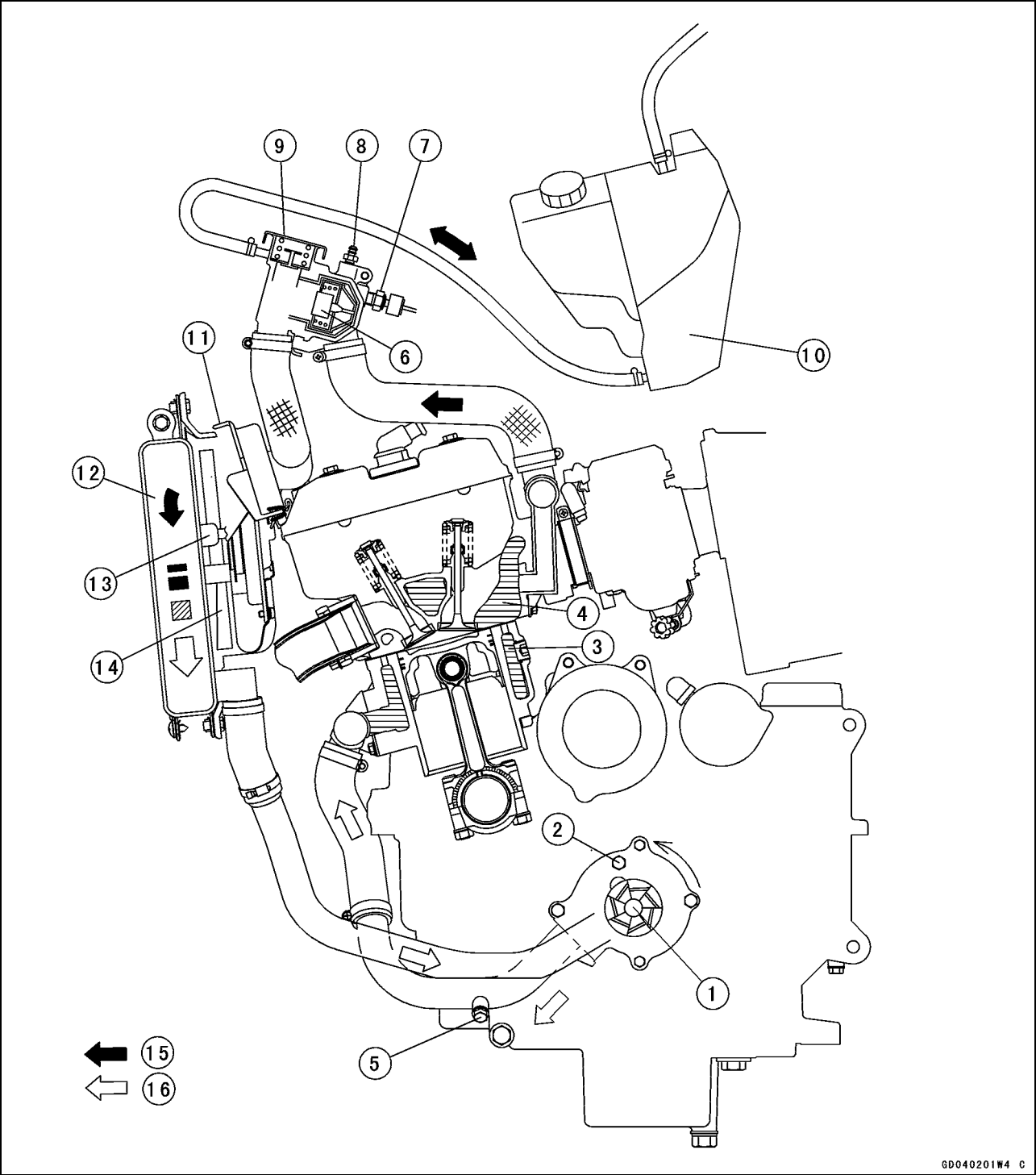
When the coolant temperature goes up beyond $95 \sim 101^{\circ}\text{C}$ ($203 \sim 214^{\circ}\text{F}$), the radiator fan switch conducts to operate the radiator fan. The radiator fan draws air through the radiator core when there is not sufficient air flow such as at low speeds. This increases up the cooling action of the radiator. When the temperature is below 90°C (194°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 $93 \sim 123 \text{ kPa}$ ($0.95 \sim 1.25 \text{ kgf/cm}^2$, $14 \sim 18 \text{ psi}$) 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 $93 \sim 123 \text{ kPa}$ ($0.95 \sim 1.25 \text{ kgf/cm}^2$, $14 \sim 18 \text{ psi}$). 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



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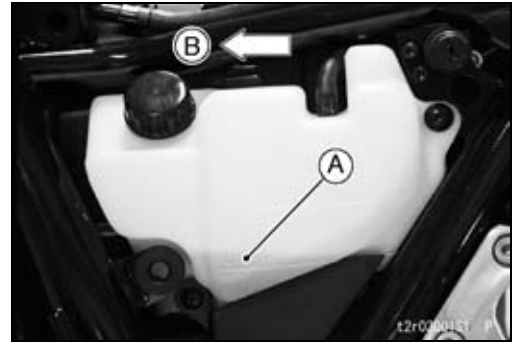
- 1. Water Pump
- 2. Water Pump Air Bleed Bolt
- 3. Cylinder Jacket
- 4. Cylinder Head Jacket
- 5. Coolant Drain Plug
- 6. Thermostat
- 7. Water Temperature Switch, (ZR1200B) Water Temperature Sensor
- 8. Thermostat Housing Air Bleeder
- 9. Radiator Cap
- 10. Reserve Tank
- 11. Baffle
- 12. Radiator
- 13. Radiator Fan Switch
- 14. Radiator Fan
- 15. Hot Coolant
- 16. Cold Coolant

3-6 COOLING SYSTEM

Coolant

Coolant Deterioration Inspection

- Remove the left side cover (see frame chapter).
- Visually inspect the coolant [A] in the reserve tank.
Front [B]
- ★ 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.

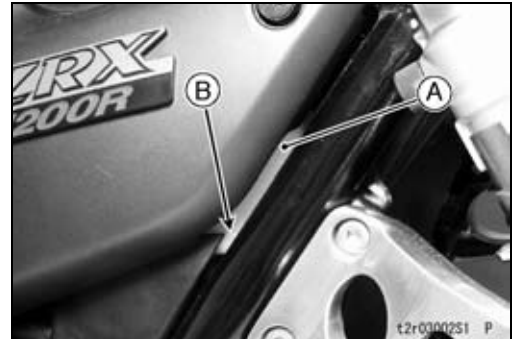


Coolant Level Inspection

NOTE

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

- Check the coolant level in the reserve tank [A] with the motorcycle held upright.
- ★ If the coolant level is lower than the LOW level line [B], remove the left side cover.
- Remove the reserve tank cap [A] and add the coolant to the FULL level line [B].



CAUTION

For refilling, add the specified mixture of coolant and soft water. Adding water alone dilutes the coolant and degrades its anticorrosion properties. The diluted coolant can attack the aluminum engine parts. In an emergency, soft water can be added, but the diluted coolant must be returned to the correct mixture ratio within a few days. If coolant must be added often or the reserve tank has run completely dry, there is probably leakage in the cooling system. Check the system for leaks. Coolant ruins painted surfaces. Immediately wash away any coolant that spills on the frame, engine, wheels, or other painted parts.

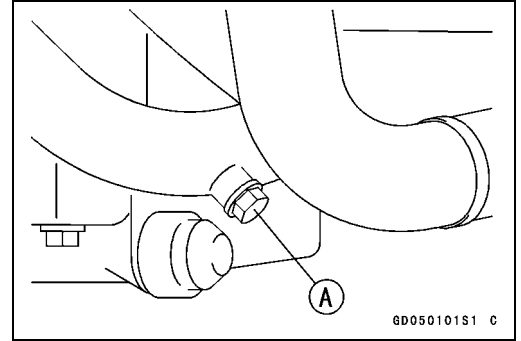
Coolant Draining

⚠ WARNING

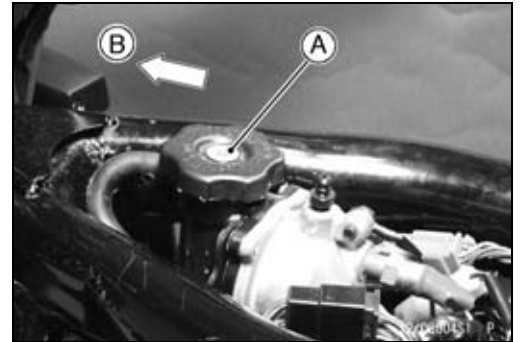
To avoid burns, do not remove the radiator cap or try to change the coolant when the engine is still hot. Wait until it cools down. Coolant on tires will make them slippery and can cause an accident and injury. Immediately wash away any coolant that spills on the wheels. Since coolant is harmful to the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

Coolant

- Remove the fuel tank (see Fuel System chapter).
- Place a container under the drain plug [A], then remove the drain plug (left-front view).



- Remove the radiator cap [A] in two steps. First turn the cap counterclockwise to the first stop. Then push and turn it further in the same direction and remove the cap.
Front [B]
- The coolant will drain from the radiator and engine.



- Remove:
 - Left Side Cover (see Frame chapter)
 - Reserve Tank Screws
- Turn over the reserve tank, remove the hose [A], and pour the coolant into a suitable container.



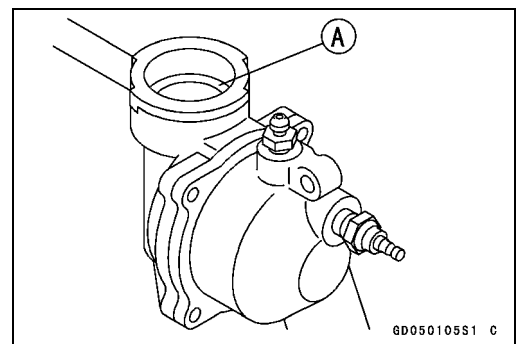
Coolant Filling

- Tighten the Coolant drain plug.
Torque - Coolant Drain Plug: 7.8 N·m (0.80 kgf·m, 69 in·lb)
- Fill the radiator up to the 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 level line with coolant, and install the cap.



CAUTION

Soft or distilled water must be used with the antifreeze (see Specifications in this chapter) in the cooling system.

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

3-8 COOLING SYSTEM

Coolant

Water and Coolant Mixture Ratio (when shipping)

- Soft water: 50%
- Coolant: 50%
- Freezing Point: -35°C (-31°F)
- Total Amount: 3 L (3.2 US qt., reserve tank, engine, and radiator)

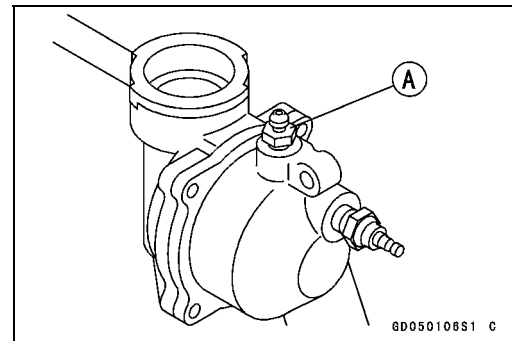
NOTE

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

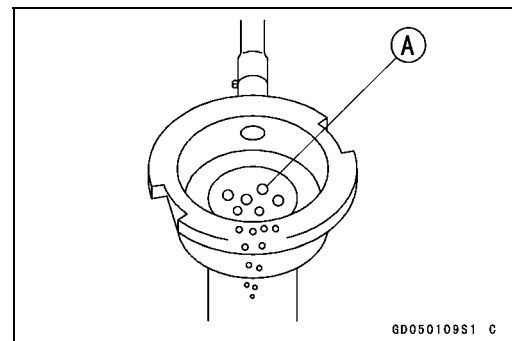
- Bleed the air from the cooling system using following the air bleeder and bolts in the order listed.
- Remove the slave cylinder cover (see Water Pump Removal in this chapter).
- Remove the fuel tank (see Fuel System chapter).
- Loosen the air bleeder and air bleed bolt until the coolant begins to flow out the air bleed hole (that is, until all the remaining air has been forced out).
- Tighten the air bleed bolt and air bleeder.

Torque - Water Pump Air Bleed Bolt [A]: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Torque - Thermostat Housing Air Bleeder [A]: 7.8 N·m (0.80 kgf·m, 69 in·lb)



- Bleed the air from the cooling system as follows.
- Supply fuel to the carburetors with an auxiliary fuel tank.
- Start the engine with the radiator cap removed and run it until no more air bubbles [A] can be seen in the coolant.
- Tap the radiator hoses to force any air bubbles caught inside.
- Stop the engine and add coolant up to the radiator filler neck.
- Install the radiator cap.
- 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.

- Install the left side cover.

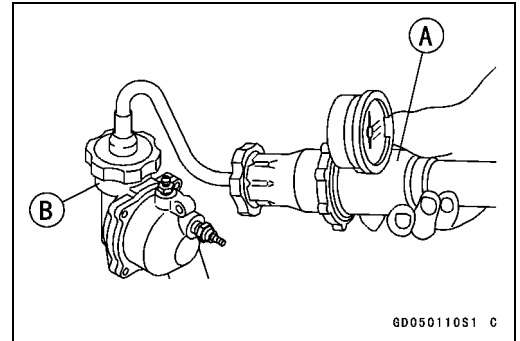
Coolant

Pressure Testing

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

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 kg/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 kg/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, the cylinder base gasket and the water pump.
- Remove the pressure tester, replenish the coolant, and install the radiator cap.

Cooling System Flushing

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

- Drain the cooling system (see Coolant Draining).
- Fill the cooling system with fresh water mixed with a flushing compound.

CAUTION

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

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

Coolant Filter Cleaning

Refer to the Fuel System chapter for the cleaning procedures.

3-10 COOLING SYSTEM

Water Pump

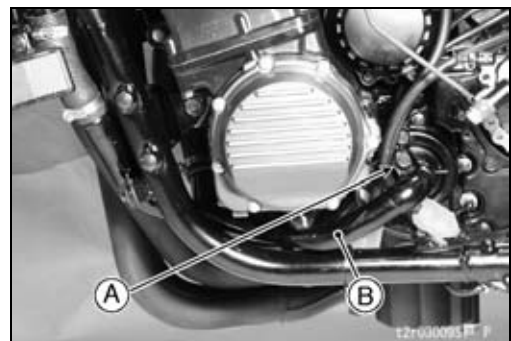
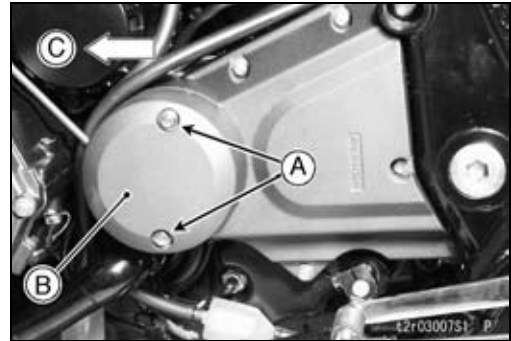
Water Pump Removal

- Drain the coolant (see Coolant Draining).
- Remove:
 - Bolts [A]
 - Slave Cylinder Cover [B]
 - Front [C]

- Remove:
 - Coolant Hose from Carburetor Assembly
 - Bolts [A]
 - Engine Sprocket Cover [B]

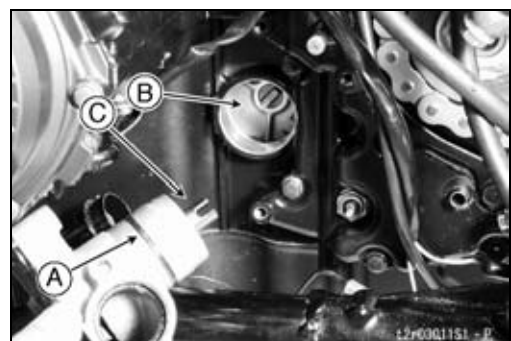
- Remove the pump inlet pipe bolt [A] and pull out the pump inlet pipe [B].

- Unscrew the flange bolt [A] and remove the water outlet pipe [B].
- Unscrew the two water pump mounting bolts [C], and pull out the water pump unit.



Water Pump Installation

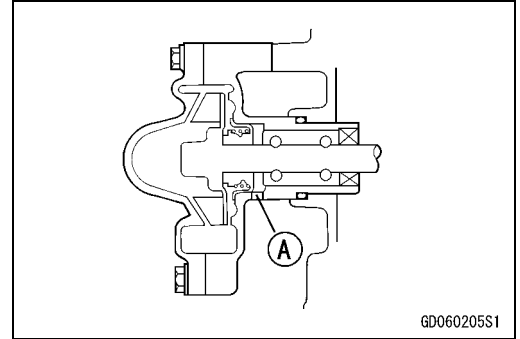
- Apply engine oil to the O-ring [A].
- Note the position of the oil pump shaft tang [B] and turn the water pump shaft so that the tang fits into the slot [C].
- **Non-permanent Locking Agent -
Water Pump Inlet Bolt**
- Tighten:
 - **Torque - Water Pump Mounting Bolts and Water Pump Inlet
Pipe Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)**



Water Pump

Water Pump Inspection

- Check the drainage outlet passage [A] at the bottom of the water pump for coolant leakage.
- ★ If the mechanical seal is damaged, the coolant leaks through the seal and drains through the passage. Replace the water pump unit.



GD060205S1

- Pull out the pump inlet pipe [A] (see Water Pump Removal).
- Unscrew the four bolts [B] and take off the water pump cover [C].



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- Visually inspect the impeller [A].
- ★ If the surface is corroded, or if the blades are damaged, replace the water pump unit.
- Replace the O-rings with new ones.

**Non-permanent Locking Agent -
Water Pump Inlet Bolt**

Torque - Water Pump Mounting Bolts, Water Pump Cover Bolts, and Water Pump Inlet Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)



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3-12 COOLING SYSTEM

Radiator

Radiator Removal

⚠ WARNING

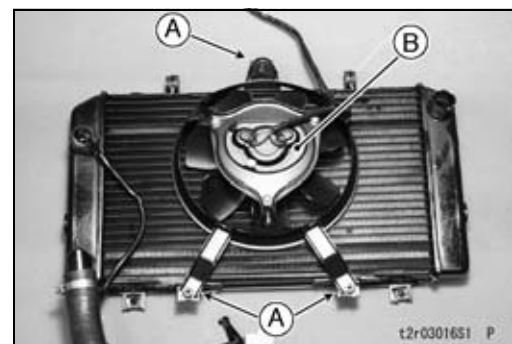
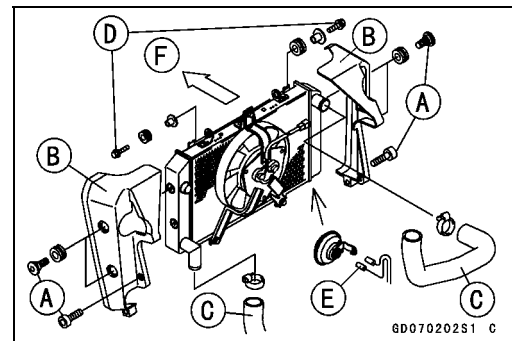
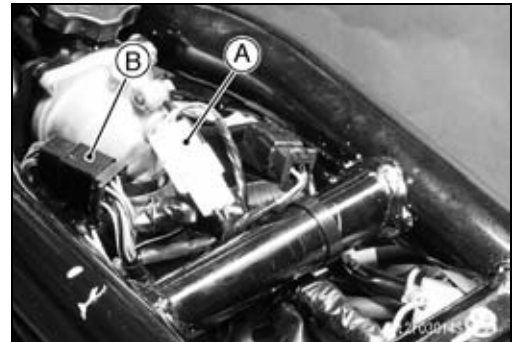
The radiator fan is connected directly to the battery. The radiator fan may start even if the ignition switch is off. **NEVER TOUCH THE RADIATOR FAN UNTIL THE RADIATOR FAN CONNECTOR IS DISCONNECTED. TOUCHING THE FAN BEFORE THE CONNECTOR IS DISCONNECTED COULD CAUSE INJURY FROM THE FAN BLADES.**

- Remove:
 - Fairing (ZR1200B, see Frame chapter)
 - Fuel Tank (see Fuel System chapter)
 - Coolant (drain)
 - Radiator Fan Switch Lead Connector [A]
 - Radiator Fan Lead Connector [B]
- Remove the following on both sides:
 - Bolts [A] and Radiator Covers [B]
 - Radiator Hoses [C]
 - Radiator Mounting Bolts [D]
- Disconnect the horn lead connectors [E] on the right side. Front [F]

CAUTION

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

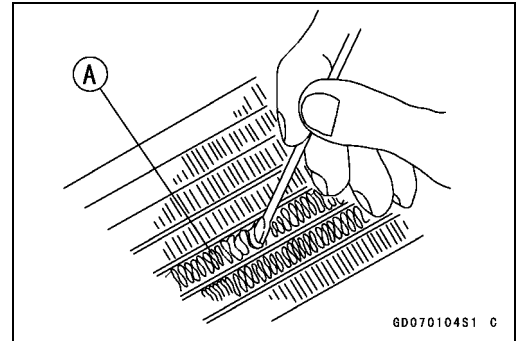
- ★ If necessary, remove:
 - Bolts [A] and Radiator Fan [B]



Radiator

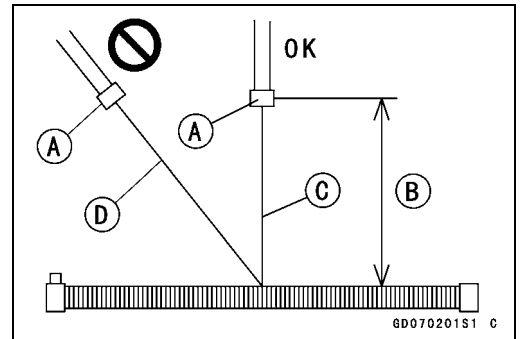
Radiator Inspection

- 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.



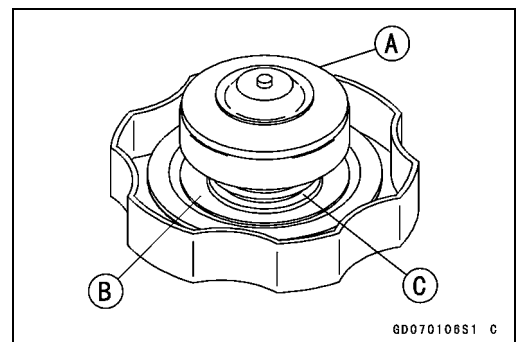
CAUTION

When cleaning the radiator with a steam cleaner, be careful of the following to prevent radiator damage:
Keep the steam gun [A] away more than 0.5 m [B] from the radiator core.
Hold the steam gun perpendicular [C] (not oblique [D]) to the core surface.
Run the steam gun following the core fin direction.



Radiator Cap Inspection

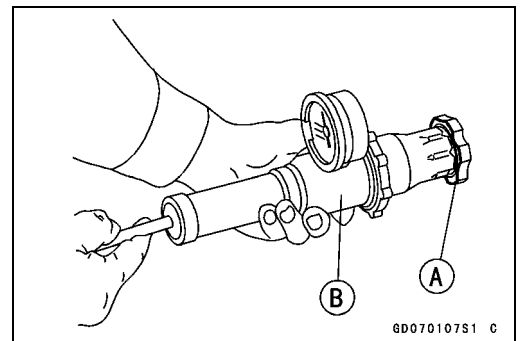
- Check the condition of the top and bottom valve seals of the radiator cap.
- ★ If any one of them shows visible damage, replace the cap.
 - Bottom Valve Seal [A]
 - Top Valve Seal [B]
 - Valve Spring [C]



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

NOTE

- *Wet the cap sealing surfaces with water or coolant to prevent pressure leaks.*
- Watching the pressure gauge, pump the pressure tester to build up the pressure until the relief valve opens: the gauge needle 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 needle 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.

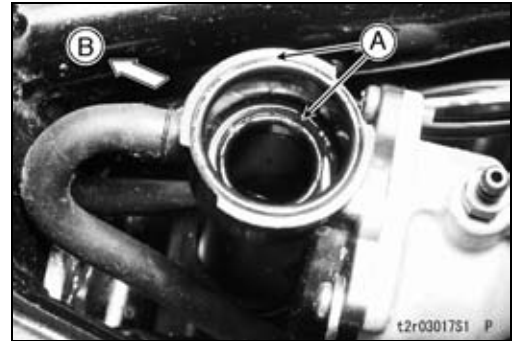
3-14 COOLING SYSTEM

Radiator

Radiator Filler Neck Inspection

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

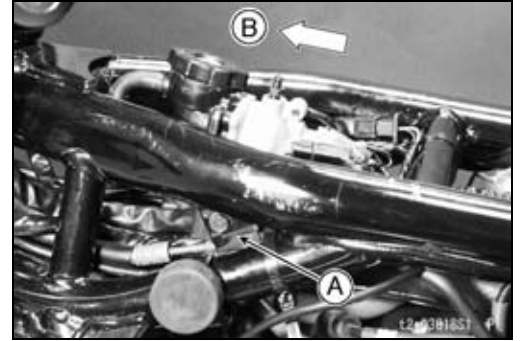
Front [B]



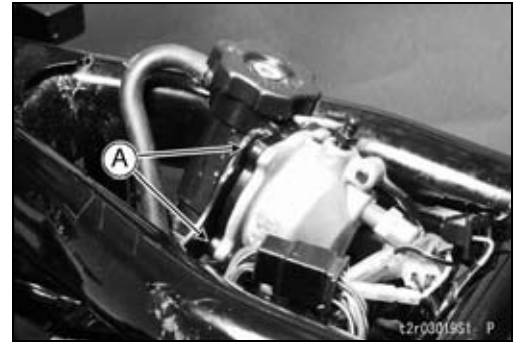
Thermostat

Thermostat Removal

- Remove:
 - Fuel Tank (see Fuel System chapter)
 - Coolant (drain about 200 mL)
 - Water Temperature Switch or Sensor Connector
 - Bracket Bolt [A]
 - Front [B]

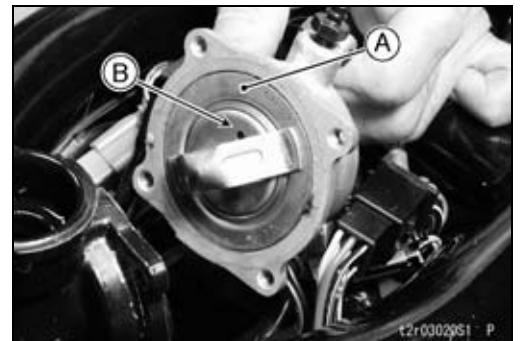


- Remove:
 - Four Housing Screws [A]
 - Thermostat



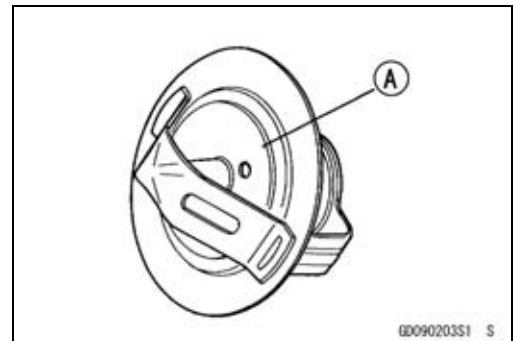
Thermostat Installation

- Install the thermostat [A] in the housing so that the air bleeder hole [B] is on top.
- Install a new O-ring into the housing.
- Fill the radiator with coolant (see Coolant Filling).



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.

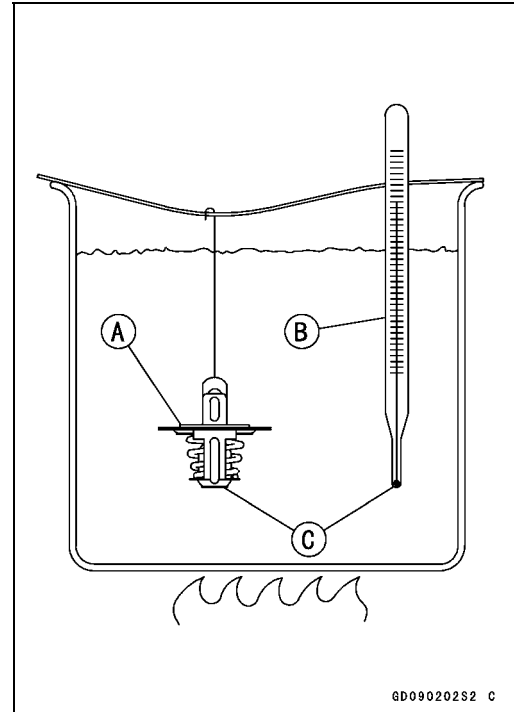


3-16 COOLING SYSTEM

Thermostat

- 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.
- Gradually raise the temperature of the water while stirring the water gently for even temperature.
- ★ If the measurement is out of the range, replace the thermostat with a new one.

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



Hoses and Pipes

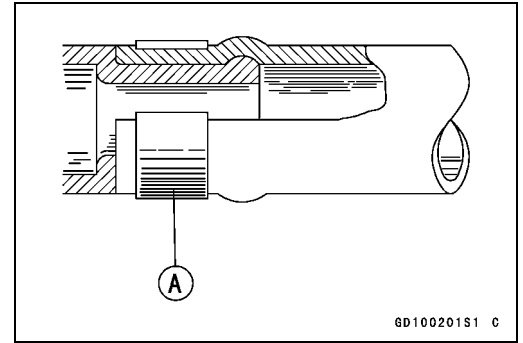
Hose Installation

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

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

Hose Inspection

- Whenever the radiator or water hoses are removed or in accordance with the Periodic Maintenance Chart, check the radiator or water hoses and their connections.
- 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 any damaged hoses.



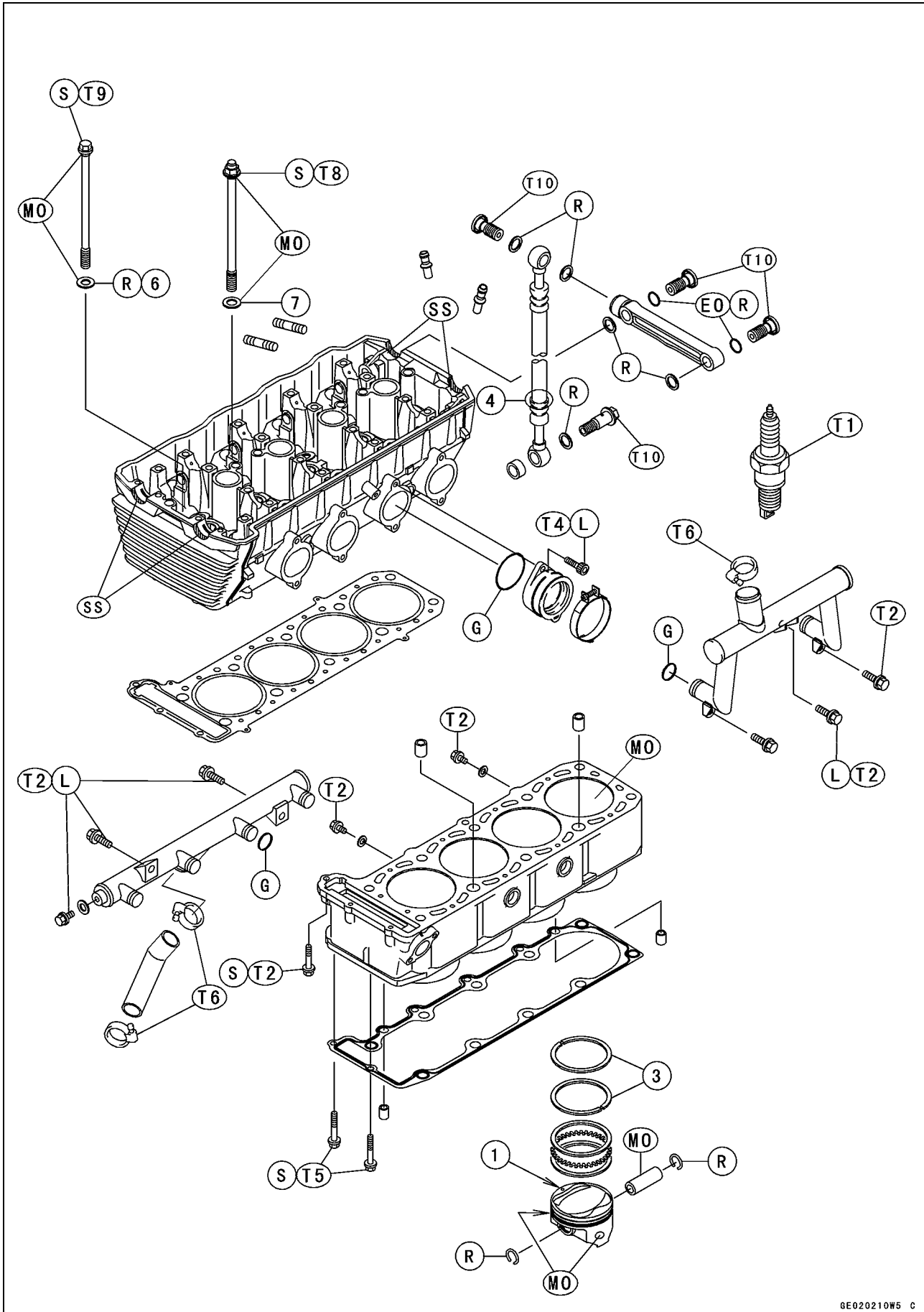
Engine Top End

Table of Contents

Exploded View.....	4-2	Cylinder Compression Measurement	4-23
Exhaust System Identification	4-6	Cylinder Head Removal	4-24
Specifications	4-9	Cylinder Head Installation	4-24
Clean Air System.....	4-13	Carburetor Holder Installation	4-25
Vacuum Switch Valve Removal ...	4-13	Cylinder Head Warp Inspection ...	4-26
Vacuum Switch Valve Installation	4-13	Cylinder Head Cleaning	4-26
Vacuum Switch Valve Operation Test.....	4-13	Valves	4-27
Vacuum Switch Valve Unit Test....	4-14	Valve Clearance Inspection	4-27
Air Suction Valve Removal.....	4-14	Valve Removal	4-34
Air Suction Valve Installation.....	4-14	Valve Installation	4-34
Air Suction Valve Inspection	4-15	Valve Guide Removal	4-34
Clean Air System Hose Inspection.....	4-15	Valve Guide Installation	4-34
Cylinder Head Cover	4-16	Valve Guide Wear Inspection (Wobble Method).....	4-35
Cylinder Head Cover Removal ...	4-16	Valve Seat Inspection	4-36
Cylinder Head Cover Installation .	4-16	Valve Seat Repair	4-36
Camshaft Chain Tensioner	4-17	Cylinder, Pistons.....	4-41
Camshaft Chain Tensioner Removal	4-17	Cylinder Removal.....	4-41
Camshaft Chain Tensioner Installation	4-17	Cylinder Installation.....	4-41
Camshafts	4-18	Piston Removal.....	4-42
Camshaft Removal	4-18	Piston Installation.....	4-43
Camshaft Installation	4-18	Cylinder Wear Inspection.....	4-44
Camshaft/Camshaft Cap Wear Inspection.....	4-20	Piston Wear Inspection	4-44
Camshaft Runout Inspection.....	4-21	Piston/Cylinder Clearance Inspection.....	4-45
Cam Wear Inspection	4-21	Piston Ring, Piston Ring Groove Wear Inspection	4-45
Camshaft Chain Removal.....	4-21	Piston Ring Groove Width Inspection.....	4-45
Camshaft and Sprocket Assembly.....	4-21	Piston Ring Thickness Inspection	4-46
Rocker Shafts, Rocker Arms	4-22	Piston Ring End Gap Inspection ..	4-46
Rocker Shaft, Rocker Arm Removal	4-22	Muffler.....	4-47
Rocker Shaft, Rocker Arm Installation	4-22	Muffler Removal.....	4-47
Cylinder Head	4-23	Muffler Installation.....	4-47
		Muffler Body Removal.....	4-47
		Muffler Body Installation.....	4-47

4-2 ENGINE TOP END

Exploded View

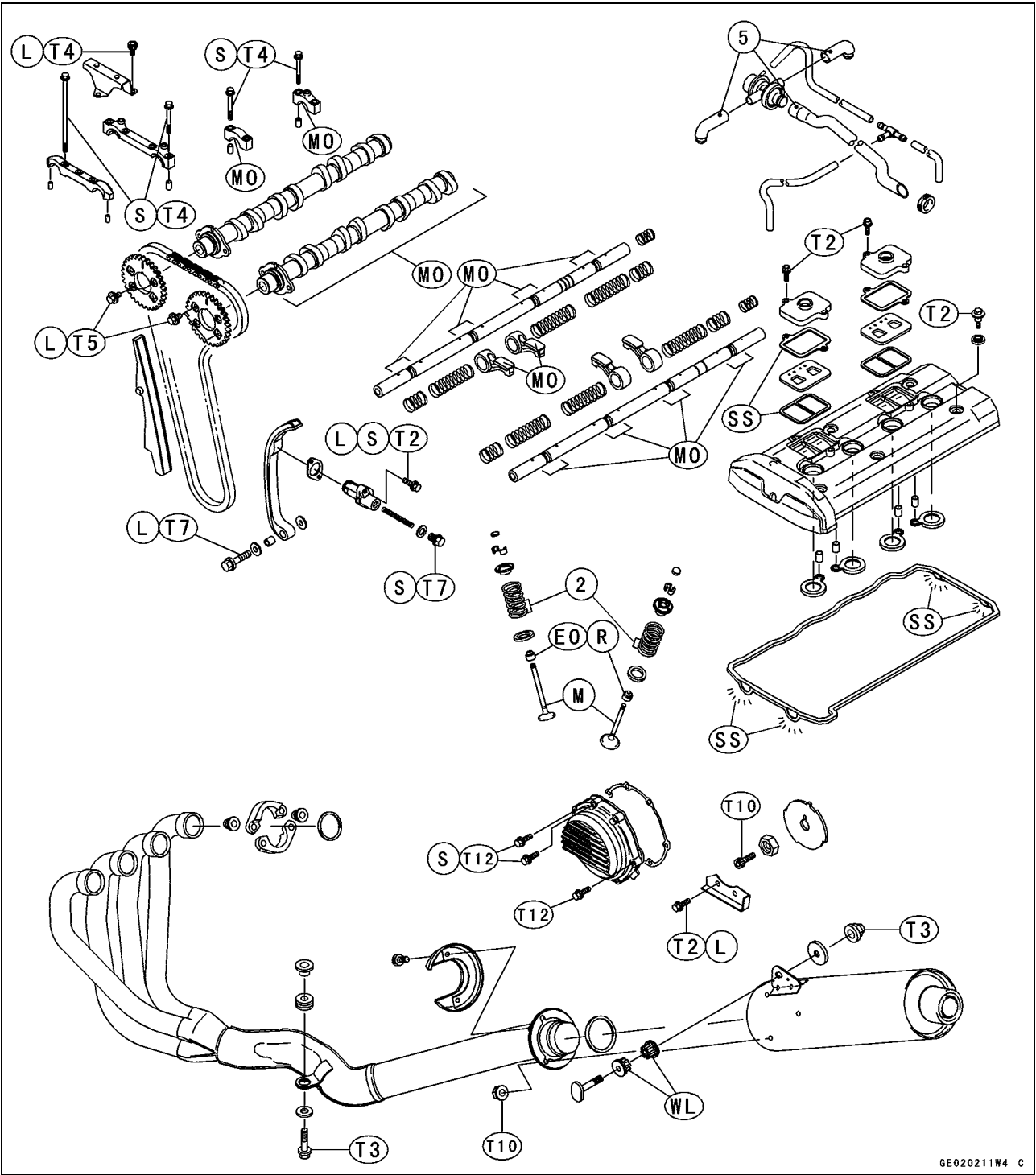


Exploded View

1. Round mark (○) is on the front side.
 3. "R" marked side faces upward.
 4. White mark faces forwards.
 6. Copper-Plated Steel Washers
 7. EO: Apply engine oil
- T1: 14 N·m (1.4 kgf·m, 10 ft·lb)
T2: 9.8 N·m (1.0 kgf·m, 87 in·lb)
T4: 12 N·m (1.2 kgf·m, 106 in·lb)
T5: 15 N·m (1.5 kgf·m, 11 ft·lb)
T6: 2.5 N·m (0.25 kgf·m, 22 in·lb)
T8: 57 N·m (5.8 kgf·m, 42 ft·lb)
T9: 41 N·m (4.2 kgf·m, 30 ft·lb)
T10: 25 N·m (2.5 kgf·m, 18 ft·lb)
- EO: Apply engine oil
G: Apply grease.
L: Apply a non-permanent locking agent.
MO: Apply molybdenum disulfide oil: a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1)
R: Replacement Parts
S: Follow the specific tightening sequence.
SS: Apply silicone sealant (Kawasaki Bond: 56019-120).

4-4 ENGINE TOP END

Exploded View



Exploded View

- 2. Closed coil end faces downward.
- 5. White marks face upwards.
- T2: 9.8 N·m (1.0 kgf·m, 87 in·lb)
- T3: 34 N·m (3.5 kgf·m, 25 ft·lb)
- T4: 12 N·m (1.2 kgf·m, 106 in·lb)
- T5: 15 N·m (1.5 kgf·m, 11 ft·lb)
- T7: 20 N·m (2.0 kgf·m, 14 ft·lb)
- T10: 25 N·m (2.5 kgf·m, 18 ft·lb)
- T12: 11 N·m (1.1 kgf·m, 95 in·lb)
- EO: Apply engine oil
 - L: Apply a non-permanent locking agent.
 - M: Apply molybdenum disulfide grease.
 - MO: Apply molybdenum disulfide oil: a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1)
 - R: Replacement Parts
 - S: Follow the specific tightening sequence.
 - SS: Apply silicone sealant (Kawasaki Bond: 56019-120).
 - WL: Apply a soap and water solution or rubber lubricant.

4-6 ENGINE TOP END

Exhaust System Identification

MANIFOLD	MUFFLER BODY	SPECIFICATION	MODEL
Pipe Type Catalyst <hr/> P/No. 39178-1325 Mark : KHI M 077	Non-Catalyst <hr/> P/No. 18090-1875 Mark : EPA 426 EPA Noise Emission Control Information	U.S.A. (California)	ZR1200-A1L ~ A3L ZR1200-B1L
		Formosa	ZR1200-A3L
	Non-Catalyst <hr/> P/No. 18090-1874 Mark : EPA 425	WVTA (FULL P)	ZR1200-A1P ~ A3P ZR1200-B1P ~ B3P ZR1200- C2P
		GB WVTA (FULL P)	ZR1200-A1P ~ A3P ZR1200-B1P ~ B3P
		WVTA (78.2 P)	ZR1200-A1P ~ A3P ZR1200-B1P ~ B3P ZR1200-C1P ~ C2P

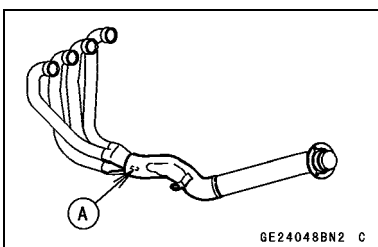
GE24043B F

FULL: Full Power

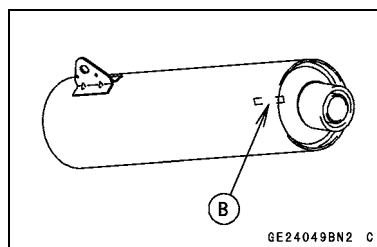
P: Pipe Type Catalyst

78.2: Hose Power 78.2 Kw (106.3 ps)

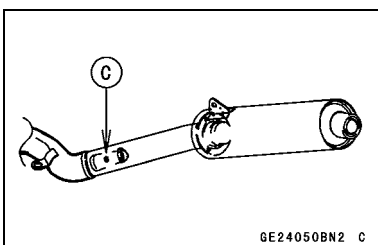
Manifold Mark Position [A]



Muffler Body Mark Position [B]



Pipe Type Catalyst Position [C]



Exhaust System Identification

MANIFOLD	MUFFLER BODY	SPECIFICATION	MODEL
<div style="border: 1px solid black; padding: 5px;"> <p>P/No. 39178-0035 Mark : KHI M 095</p> <hr style="border-top: 1px dashed black;"/> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Pipe Type Catalyst</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Honeycomb Type Catalyst</p> </div> </div>	<div style="border: 1px solid black; padding: 5px;"> <p>Non-Catalyst</p> <hr style="border-top: 1px dashed black;"/> <p>P/No. 18091-0078 Mark : KHI K471 EPA Noise Emission Control Information</p> </div>	U.S.A (California) WVTA (FULL H)	ZR1200-A5L ZR1200-A4H ~ /A6F ZR1200-B4H ZR1200-C3H
		GB WVTA (FULL H)	ZR1200-A4H ~ /A6F ZR1200-B4H
		WVTA (78.2 H)	ZR1200-A4H ~ /A6F ZR1200-B4H ZR1200-C3H
		Formosa	ZR1200-A4H ~ /A6F

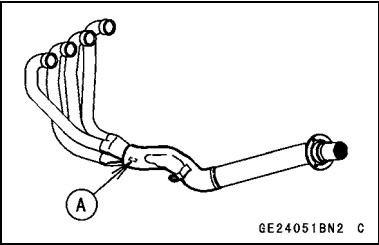
GE24044B F

FULL: Full Power

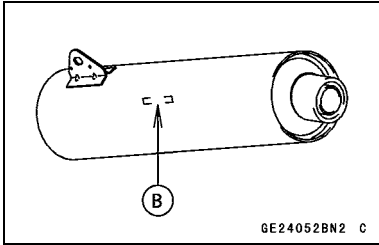
H: Honeycomb Type Catalyst

78.2: Hose Power 78.2 Kw (106.3 ps)

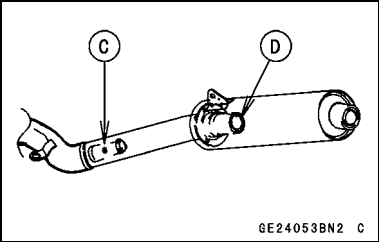
Manifold Mark Position [A]



Muffler Body Mark Position [B]



Pipe Type [C] Honeycomb Type [D] Catalyst Position



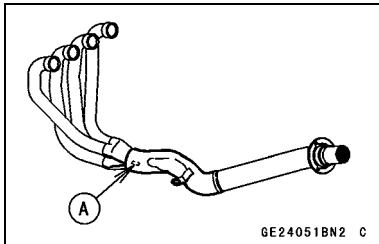
4-8 ENGINE TOP END

Exhaust System Identification

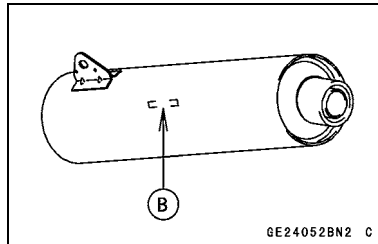
MANIFOLD	MUFFLER BODY	SPECIFICATION	MODEL
<p>Honeycomb Type Catalyst</p> <hr/> <p>P/No. 39178-0056 Mark : KHI M 078</p>	<p>Non-Catalyst</p> <hr/> <p>P/No. 18091-0078 Mark : KHI K 471 EPA Noise Emission Control Information</p>	Australia	ZR1200-A6F ~

GE24045B F

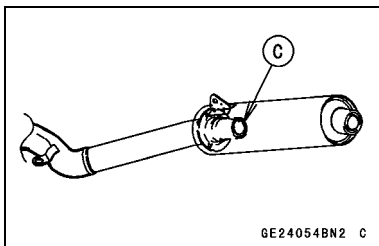
Manifold Mark Position [A]



Muffler Body Mark Position [B]



Honeycomb Type Catalyst Position [C]



Specifications

Item	Standard	Service Limit
Clean Air System		
Vacuum Switch Valve Closing Pressure	Open → Close 45.3 ~ 53.3 kPa (367 ~ 400 mmHg)	— — —
Camshafts		
Cam Height:		
Exhaust	35.918 ~ 36.034 mm (1.4141 ~ 1.4187 in.)	35.82 mm (1.4102 in.)
Inlet	36.239 ~ 36.355 mm (1.4267 ~ 1.4313 in.)	36.14 mm (1.4228 in.)
Camshaft/camshaft Cap Clearance:		
#1, #2, #5	0.040 ~ 0.081 mm (0.00158 ~ 0.0032 in.)	0.17 mm (0.0067 in.)
#3, #4	0.070 ~ 0.111 mm (0.0028 ~ 0.0044 in.)	0.20 mm (0.0079 in.)
Camshaft Journal Diameter:		
#1, #2, #5	24.94 ~ 24.96 mm (0.9819 ~ 0.9827 in.)	24.91 mm (0.9807 in.)
#3, #4	24.91 ~ 24.93 mm (0.9807 ~ 0.9815 in.)	24.88 mm (0.9795 in.)
Camshaft Bearing Inside Diameter	25.000 ~ 25.021 mm (0.9843 ~ 0.9851 in.)	25.08 mm (0.9874 in.)
Camshaft Runout	TIR 0.02 mm (0.00079 in.) or less	TIR 0.1 mm (0.004 in.)
Rocker Arm Inside Diameter	12.000 ~ 12.018 mm (0.4724 ~ 0.4735 in.)	12.06 mm (0.4748 in.)
Rocker Shaft Diameter	11.966 ~ 11.984 mm (0.4711 ~ 0.4718 in.)	11.94 mm (0.4701 in.)
Cylinder Head		
Cylinder Compression	(Usable range) 910 ~ 1 400 kPa (9.3 ~ 14.3 kgf/cm ² , 132 ~ 203 psi) @320 r/min (rpm) with electric starter	— — —
Cylinder Head Warp	— — —	0.05 mm (0.002 in.)
Valves		
Valve Clearance:		
Exhaust	0.18 ~ 0.24 mm (0.0071 ~ 0.0095 in.)	— — —
Inlet	0.13 ~ 0.19 mm (0.0051 ~ 0.0075 in.)	— — —
Valve Head Thickness:		
Exhaust	0.7 ~ 0.9 mm (0.028 ~ 0.035 in.)	0.5 mm (0.020 in.)
Inlet	0.4 ~ 0.6 mm (0.0158 ~ 0.024 in.)	0.25 mm (0.0098 in.)
Valve Stem Bend	TIR 0.01 mm (0.0004 in.) or less	TIR 0.05 mm (0.0020 in.)
Valve Stem Diameter:		
Exhaust	4.955 ~ 4.970 mm (0.19508 ~ 0.19567 in.)	4.94 mm (0.1945 in.)
Inlet	4.975 ~ 4.990 mm (0.19587 ~ 0.19646 in.)	4.96 mm (0.1953 in.)
Valve Guide Inside Diameter	5.000 ~ 5.012 mm (0.19685 ~ 0.19732 in.)	5.08 mm (0.200 in.)
Valve-to-guide Clearance (wobble method):		
Exhaust	0.10 ~ 0.19 mm (0.0039 ~ 0.0075 in.)	0.41 mm (0.161 in.)
Inlet	0.03 ~ 0.12 mm (0.00118 ~ 0.0047 in.)	0.34 mm (0.0134 in.)
Valve Seat Surface		
Valve Seat Cutting Angle	45°, 32°, 60°	— — —

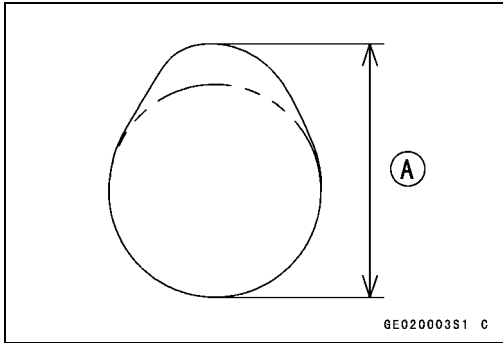
4-10 ENGINE TOP END

Specifications

Item	Standard	Service Limit
Valve Seat Surface:		
Outside Diameter:		
Exhaust	26.3 ~ 26.5 mm (1.035 ~ 1.043 in.)	— — —
Inlet	30.8 ~ 31.0 mm (1.213 ~ 1.220 in.)	— — —
Width:		
Exhaust	0.8 ~ 1.2 mm (0.032 ~ 0.047 in.)	— — —
Inlet	0.5 ~ 1.0 mm (0.0197 ~ 0.0394 in.)	— — —
Valve Spring Free Length	41.2 mm (1.622 in.)	39.6 mm(1.559 in.)
Cylinders, Pistons		
Cylinder Inside Diameter	78.994 ~ 79.006 mm (3.1099 ~ 3.1105 in.)	79.10 mm (3.1142 in.)
Piston Diameter	78.969 ~ 78.984 mm (3.1090 ~ 3.1096 in.)	78.82 mm (3.1031 in.)
Piston/cylinder Clearance	0.010 ~ 0.037 mm (0.00039 ~ 0.00146 in.)	— — —
Piston Ring/groove Clearance:		
Top	0.04 ~ 0.08 mm (0.00157 ~ 0.0032 in.)	0.18 mm (0.0071 in.)
Second	0.03 ~ 0.07 mm (0.0012 ~ 0.003 in.)	0.17 mm (0.0067 in.)
Piston Ring Groove Width:		
Top	0.93 ~ 0.95 mm (0.0366 ~ 0.0374 in.)	1.03 mm (0.0406 in.)
Second	0.82 ~ 0.84 mm (0.032 ~ 0.033 in.)	0.92 mm (0.036 in.)
Piston Ring Thickness:		
Top	0.87 ~ 0.89 mm (0.034 ~ 0.035 in.)	0.80 mm (0.032 in.)
Second	0.77 ~ 0.79 mm (0.030 ~ 0.031 in.)	0.70 mm (0.028 in.)
Piston ring End Gap:		
Top	0.20 ~ 0.30 mm (0.0079 ~ 0.0118 in.)	0.6 mm (0.024 in.)
Second	0.30 ~ 0.45 mm (0.0118 ~ 0.0177 in.)	0.75 mm (0.0295 in.)
Oil	0.20 ~ 0.70 mm (0.0079 ~ 0.028 in.)	1.0 mm (0.039 in.)

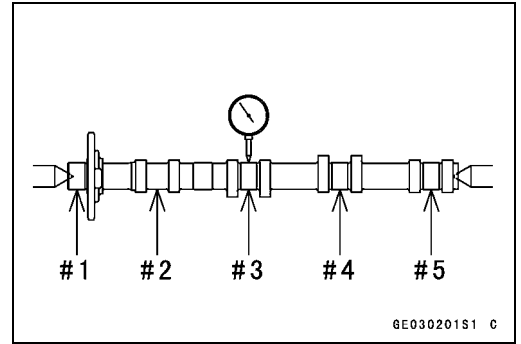
Specifications

Cam Height



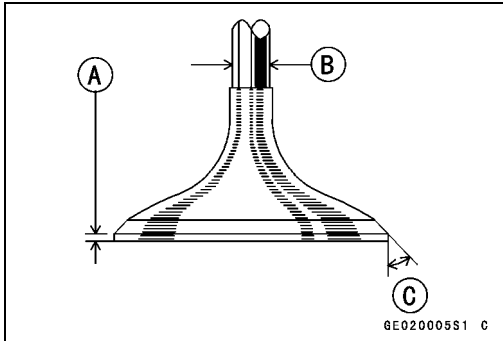
Cam Height (maximum) [A]

Camshaft Journals and Runout



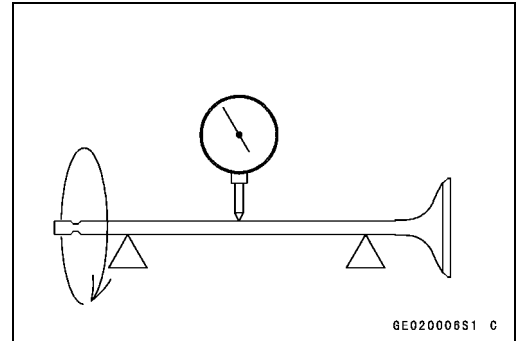
#1: left #5: right

Valve Head Thickness



Valve Head Thickness [A]
Valve Stem Diameter [B]
45° [C]

Valve Stem Bend



4-12 ENGINE TOP END

Specifications

Special Tools - Compression Gauge, 20 kgf/cm²: 57001-221
Valve Spring Compressor Assembly: 57001-241
Valve Seat Cutter, 45° - ϕ 32: 57001-1115
Valve Seat Cutter, 32° - ϕ 28: 57001-1119
Valve Seat Cutter, 60° - ϕ 30: 57001-1123
Valve Seat Cutter Holder Bar: 57001-1128
Valve Seat Cutter, 45° - ϕ 30: 57001-1187
Valve Seat Cutter, 32° - ϕ 33: 57001-1199
Valve Spring Compressor Adapter, ϕ 22: 57001-1202
Valve Guide Arbor, ϕ 5: 57001-1203
Valve Guide Reamer, ϕ 5: 57001-1204
Valve Seat Cutter Holder, ϕ 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° - ϕ 33: 57001-1334
Piston Pin Puller Assembly: 57001-910

○Two of above valve seat cutters can be substituted for following seat cutters.

Valve Seat Cutter

57001-1119 (32° - ϕ 28) → 57001-1120 (32°- ϕ 30)

Valve Seat Cutter

57001-1115 (45° - ϕ 32) → 57001-1116 (45°- ϕ 35)

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

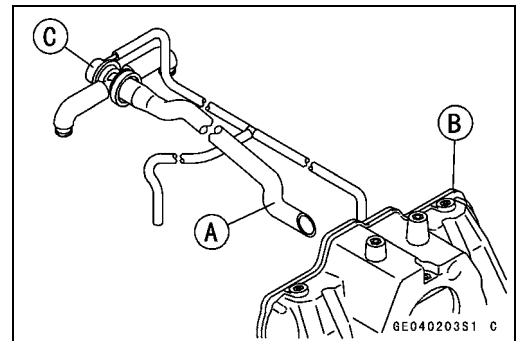
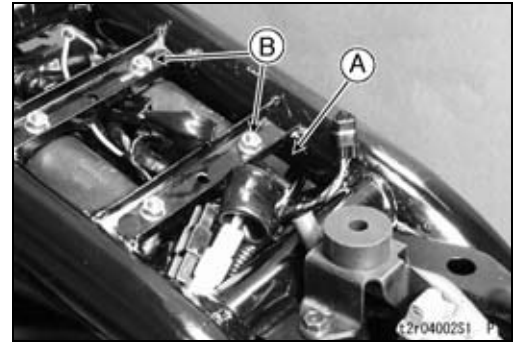
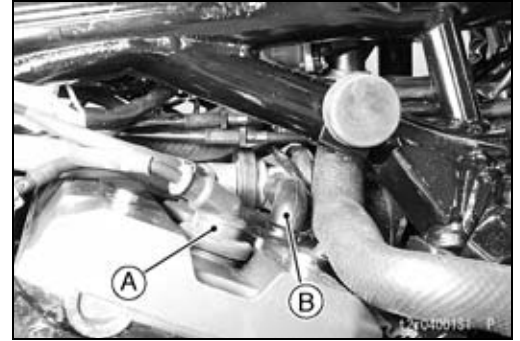
Clean Air System

Vacuum Switch Valve Removal

- Remove:
 - Fuel Tank (See Fuel System Chapter)
 - Spark Plug Caps [A]
 - Vacuum Switch Valve Hose Ends [B] (from the cylinder head cover)

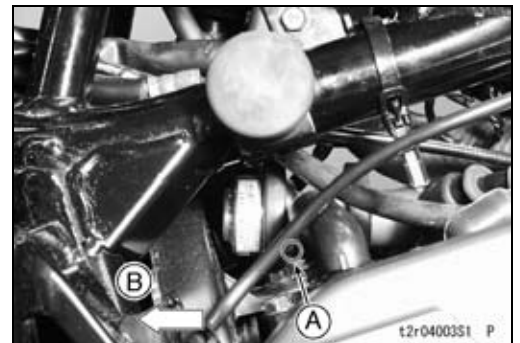
- Disconnect:
 - Alternator, Pickup Coil, and Throttle Sensor Connectors [A]
 - Ignition Coil Primary Lead Connectors (see Electrical System chapter)
- Unscrew the ignition coil mounting nuts [B], and remove the ignition coils with the second leads left installed for the access to the vacuum switch valve hose end.

- Pull out the vacuum switch hose end [A] from the front air cleaner housing [B].
- Remove the vacuum switch valve [C] from the vehicle with the hoses installed.



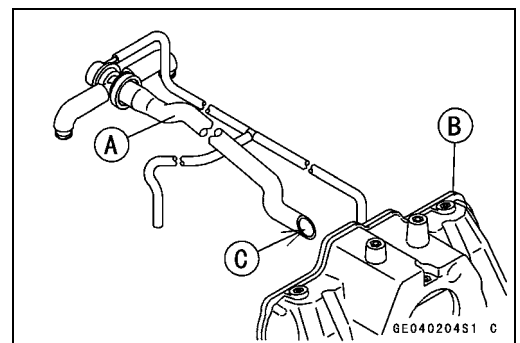
Vacuum Switch Valve Installation

- Install the vacuum switch valve so that the air hole [A] faces downwards.
 - Front [B]
- Apply water or rubber lubricant to the end of the vacuum switch hose and insert the hose into the front air cleaner housing.
- Install the ignition coils (see Electrical System chapter).
- Route the hoses correctly (see General Information chapter).



Vacuum Switch Valve Operation Test

- Pull the vacuum switch hose [A] out of the front air cleaner housing [B] (see Vacuum Switch Valve Removal).
 - Do not remove the vacuum switch valve itself.
 - Tape the hole of the front air cleaner housing.
 - Supply fuel to the carburetors with an auxiliary fuel tank.
 - Start the engine and run it at idle speed.
- Plug the vacuum switch hose end [C] with your finger and feel vacuum pulsing in the hose.
- ★ If there is no vacuum pulsation, check the hose line for leak. If there is no leak, check the vacuum switch valve (see Vacuum Switch Valve Unit Test).
- Apply water or rubber lubricant to the end of the vacuum switch hose and put the hose into the front air cleaner housing.

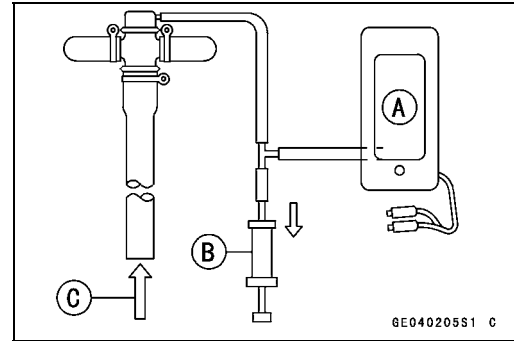


4-14 ENGINE TOP END

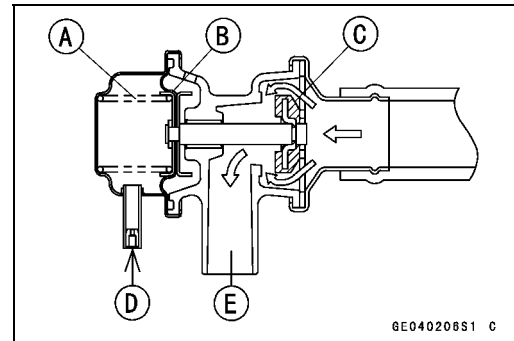
Clean Air System

Vacuum Switch Valve Unit Test

- Remove:
 - Fuel Tank (see Fuel System chapter)
 - Vacuum Switch Valve (see Vacuum Switch Valve Removal)
 - Connect a vacuum gauge [A] and syringe [B] or fork oil level gauge to the vacuum hoses as shown.
- Special Tool - 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 is raised to valve closing pressure, the valve should stop air flow.
- Spring [A]
Diaphragm [B]
Valve [C]
Low Vacuum [D]
Secondary Air Flow [E]



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

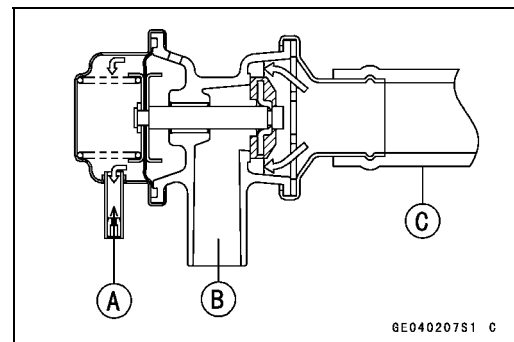
NOTE

○ To check air flow through the vacuum switch valve, just blow through the vacuum switch hose [C].

Vacuum Switch Valve Closing Pressure (Open → Close)

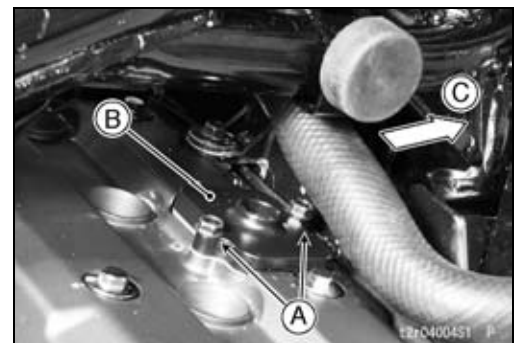
Standard: 45.3 ~ 53.3 kPa (367 ~ 400 mmHg)

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



Air Suction Valve Removal

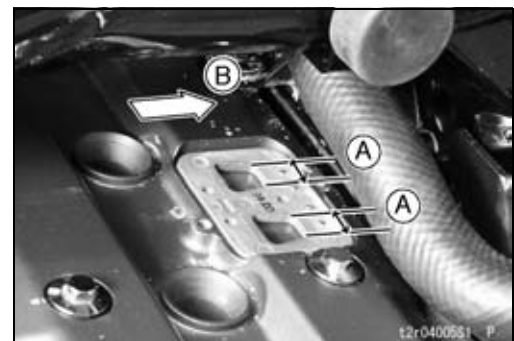
- Remove:
 - Fuel Tank (See Fuel System Chapter)
 - Vacuum Switch Valve Hose Ends (from the cylinder head cover)
 - Put the vacuum switch valve aside.
 - Unscrew the bolts [A] and remove the air suction valve covers [B].
- Front [C]



Air Suction Valve Installation

- Replace the gaskets with new ones.
- Apply Kawasaki Bond (Silicone Sealant: 56019-120) to both sides of the gasket sparingly.
- Install the air suction valve so that its narrower sides [A] of the reed face the front [B].

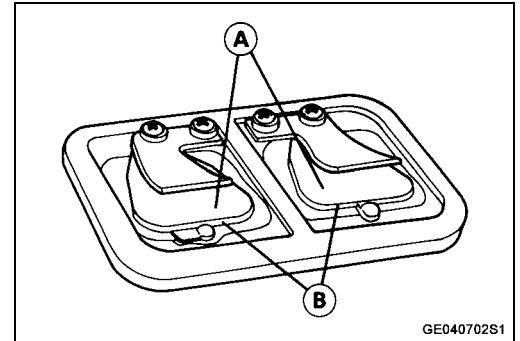
Torque - Air Suction Valve Cover Bolts : 9.8 N·m (1.0 kgf·m, 87 in·lb)



Clean Air System

Air Suction Valve Inspection

- Visually inspect the reeds [A] for cracks, folds, warps, heat damage, or other damage.
- ★ If there is any doubt as to the condition of the reed, replace the air suction valve as an assembly.
- Check the reed contact areas [B] of the valve holder for grooves, scratches, any signs of separation from the holder, or heat damage.
- ★ If there is any doubt as to the condition of the reed contact areas, replace the air suction valve as an assembly.
- If any carbon or other foreign particles have accumulated between the reed and the reed contact area, wash the valve assembly with a high-flash point solvent.



CAUTION

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

Clean Air System Hose Inspection

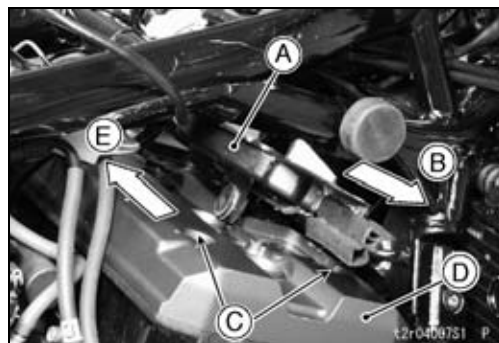
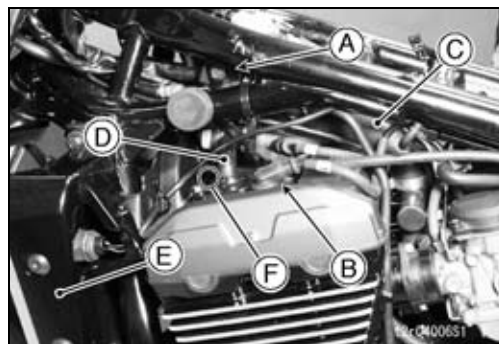
- Be certain that all the hoses are routed without being flattened or kinked, and are connected correctly to the air cleaner housing, vacuum switch valve, carburetor assembly and air suction valve covers (see Cable, Wire, and Hose Routing section in the General Information chapter).
- ★ If they are not, correct them. Replace them if they are damaged.

4-16 ENGINE TOP END

Cylinder Head Cover

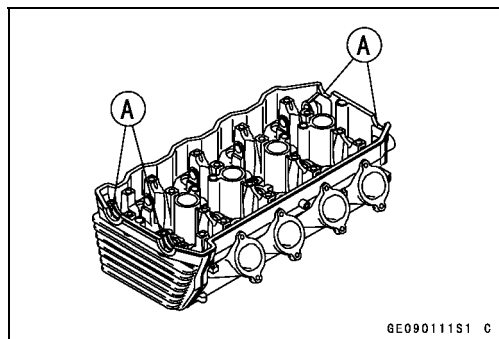
Cylinder Head Cover Removal

- Remove the fairing (ZR1200B, see frame chapter) and the fuel tank (see Fuel System chapter).
- Drain the coolant (see Cooling System chapter)
- Remove:
 - Lead Connectors (above the Cylinder Head)
 - Thermostat Bracket Bolt [A]
 - Spark Plug Caps [B]
 - Water Hoses [C] (over the cylinder head cover)
 - Vacuum Switch Valve and Hoses [D] (see Vacuum Switch Valve Removal)
 - Radiator Side Covers [E]
 - Baffle Bolt [F] (center bolt)
- Remove the baffle [A] from the motorcycle right side [B]
- Unscrew the bolts [C] and remove the cylinder head cover [D] from the left side [E].

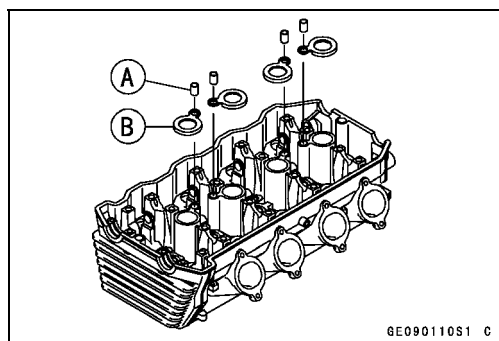


Cylinder Head Cover Installation

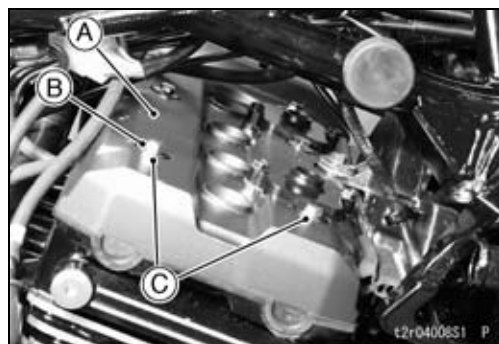
- Visually inspect the head cover gasket. If damaged, replace the head cover gasket with a new one.
- Apply silicone sealant [A] to the cylinder head as shown.
Sealant - Kawasaki Bond (Silicone Sealant): 56019-120



- Install:
 - Dowel Pins [A]
 - Plug Hole Gaskets [B] (with the flat side up)



- Install the cylinder head cover [A].
- Install the washers [B] with the metal side upwards.
- Tighten:
Torque - Cylinder Head Cover Bolts [C]: 9.8 N·m (1.0 kgf·m, 87 in·lb)



Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

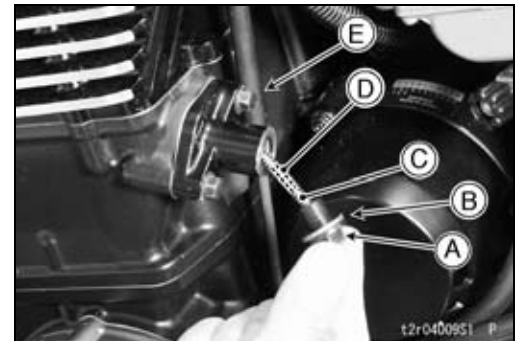
CAUTION

This is a non-return type cam chain tensioner. The push rod does not return to its original position once it moves out to take up camshaft chain slack. Observe all the rules listed below:

When removing the tensioner, do not take out the mounting bolts only halfway. Retightening the mounting bolts from this position could damage the tensioner and the camshaft chain. Once the bolts are loosened, the tensioner must be removed and reset as described in "Camshaft Chain Tensioner Installation."

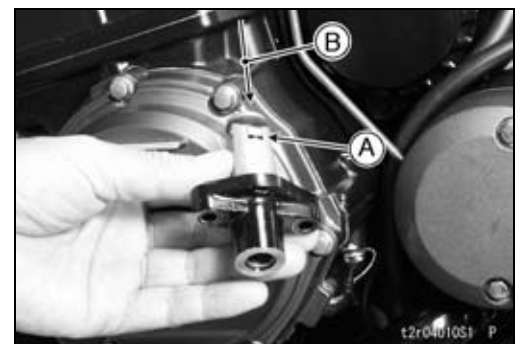
Do not turn over the crankshaft while the tensioner is removed. This could upset the cam chain timing, and damage the valves.

- Remove:
 - Crankshaft Sensor Cover (see Valve Clearance Inspection).
 - Chain Tensioner Cap [A]
 - Washer [B]
 - Spring [C] and Pin [D]
 - Tensioner Mounting Bolts [E]
- Take the camshaft chain tensioner off the cylinder.



Camshaft Chain Tensioner Installation

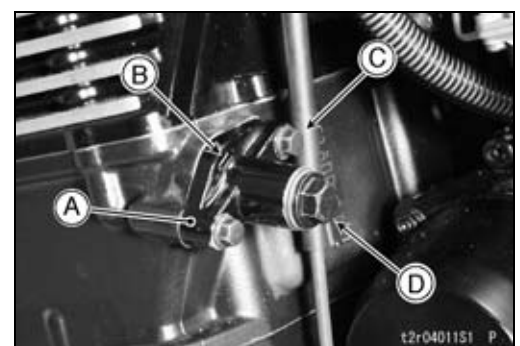
- Push the stopper [A] to release the ratchet and push [B] the push rod into the tensioner body.



- Install the tensioner body [A] with the arrow mark [B] pointing upwards.

Non-permanent Locking Agent - Chain Tensioner Mounting Bolts

- Tighten:
 - Torque - Chain Tensioner Mounting Bolts [C]: 9.8 N·m (1.0 kgf·m, 87 in·lb)
- Install the pin, spring, and washer.
- Tighten:
 - Torque - Chain Tensioner Cap [D]: 20 N·m (2.0 kgf·m, 14 ft·lb)
- Turn the crankshaft 2 turns counterclockwise to allow the tensioner to expand.
- Install the crankshaft sensor cover (see Valve Clearance Adjustment).

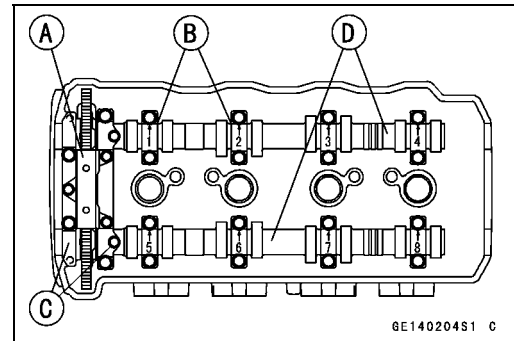
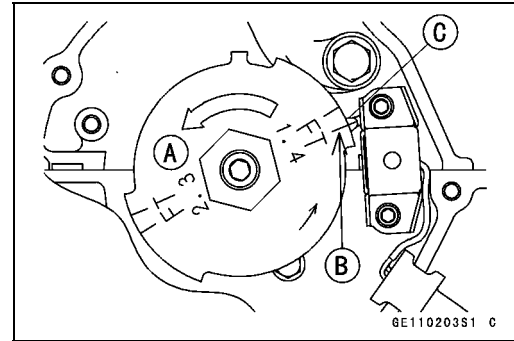


4-18 ENGINE TOP END

Camshafts

Camshaft Removal

- Remove:
 - Cylinder Head Cover (see Cylinder Head Cover Removal)
 - Crankshaft Sensor Cover
- Turn the crankshaft counterclockwise [A] and set the crankshaft at #1, 4 piston TDC.
 - TDC Mark [B] for #1, 4 Pistons
 - Crankcase Mark [C]
- Remove:
 - Camshaft Chain Tensioner (see Camshaft Chain Tensioner Removal)
 - Upper Chain Guide [A]
 - Camshaft Caps [B]
 - Camshaft Brackets [C]
 - Camshafts [D]
- Stuff a clean cloth into the chain tunnel to keep any parts from dropping into the crankcase.

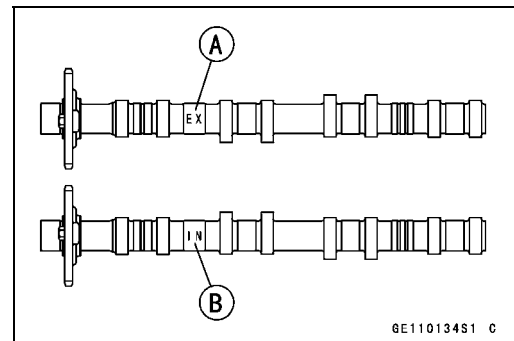


CAUTION

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

Camshaft Installation

- If a new camshaft is to be used, apply a thin coat of molybdenum disulfide grease to the cam surfaces.
- Apply molybdenum disulfide oil to all cam parts, left steps, and journals. The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1).
- The exhaust camshaft has an EX mark [A] and the inlet camshaft has an IN mark [B]. Be careful not to mix up these shafts.
- Position the crankshaft at #1, #4 piston TDC.

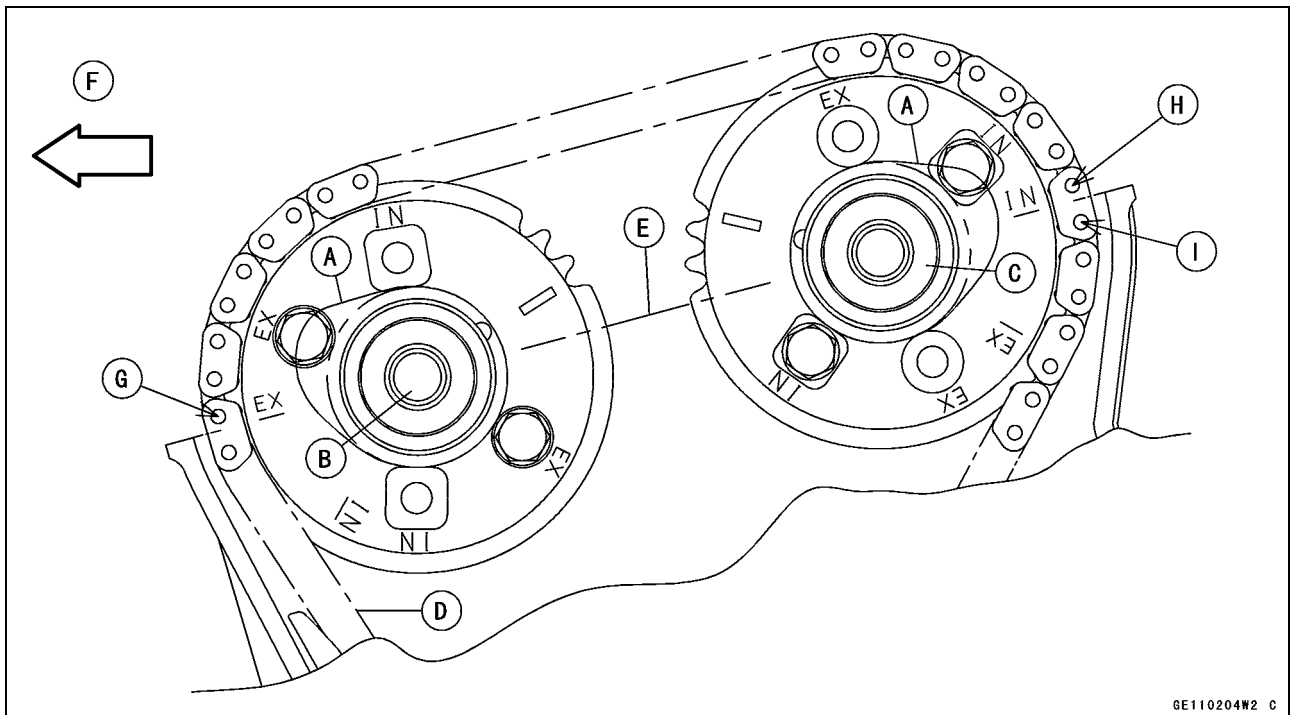


CAUTION

The crankshaft may be turned while the camshafts are removed, but 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.

Camshafts

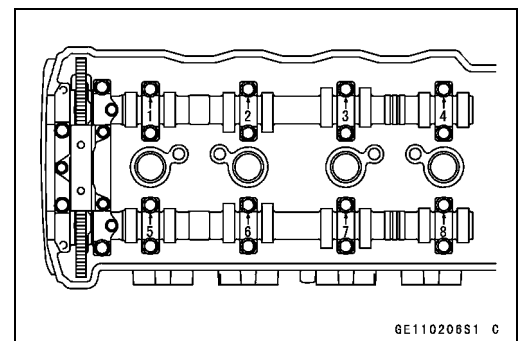
- Install the camshafts in the order listed.
- Install these camshafts so the #4 cams [A] point away from the locker arm for easy timing.
 Exhaust Camshaft [B] and Caps (time the camshaft)
 Inlet Camshaft [C] and Caps (time the camshaft)
- Pull the tension side (exhaust side) of the chain taut [D] to install the chain.
- Engage the camshaft chain with the camshaft sprockets so that the timing marks on the sprockets are positioned as shown.
- The timing marks must be aligned with the cylinder head upper surface [E] and positioned respectively as shown after the camshaft chain slack is taken up by the tensioner.
- Front [F]
- 1st Pin [G]
- 30th Pin [H]
- 31st Pin [I]



- Install the camshaft caps in the correct positions shown.
- The camshaft cap locations are numbered and the arrow mark must point forward.

CAUTION

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



4-20 ENGINE TOP END

Camshafts

- Tighten the camshaft cap and bracket bolts in the order numbered.

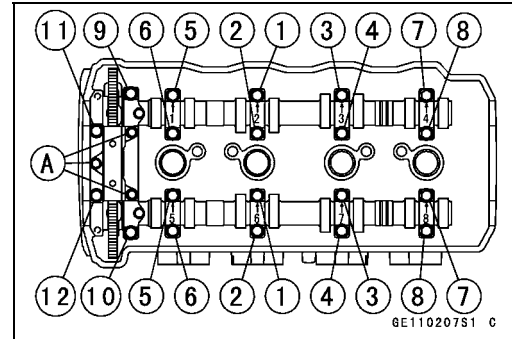
Torque - Camshaft Cap and Bracket Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

- Tighten:

**Non-permanent Locking Agent -
Upper Chain Guide Bolts**

Torque - Upper Chain Guide Bolts [A]: 12 N·m (1.2 kgf·m, 106 in·lb)

- Install the camshaft chain tensioner (see this chapter). Turn the crankshaft 2 turns counterclockwise to allow the tensioner to expand and recheck the camshaft chain timing.
- Install the crankshaft sensor cover (see Valve Clearance Adjustment).



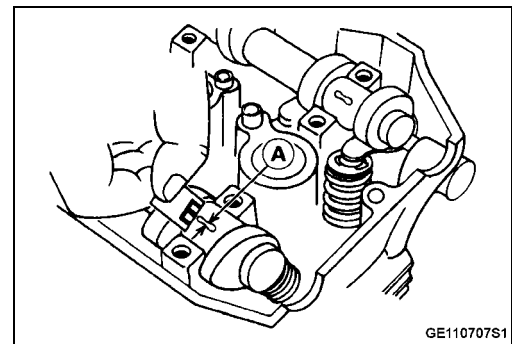
Camshaft/Camshaft Cap Wear Inspection

- Cut strips of plastigage to journal width. Place a strip on each journal parallel to the camshaft installed in the correct position.
 - Measure each clearance between the camshaft journal and the camshaft cap using plastigage [A].
- Tighten:

Torque - Camshaft Cap Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

NOTE

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



Camshaft/Camshaft Cap Clearance

#1, #2, #5 Journals

Standard: 0.040 ~ 0.081 mm (0.00158 ~ 0.0032 in.)

Service Limit: 0.17 mm (0.0067 in.)

#3, #4 Journals

Standard: 0.070 ~ 0.111 mm (0.0028 ~ 0.0044 in.)

Service Limit: 0.20 mm (0.0079 in.)

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

Camshaft Journal Diameter

#1, #2, #5 Journals

Standard: 24.94 ~ 24.96 mm (0.9819 ~ 0.9827 in)

Service Limit: 24.91 mm (0.9807 in)

#3, #4 Journals

Standard: 24.91 ~ 24.93 mm (0.9807 ~ 0.9815 in)

Service Limit: 24.88 mm (0.9795 in)

- ★ If the camshaft journal diameter is less than the service limit, replace the camshaft with a new one and measure the clearance again.
- ★ If the clearance still remains out of the limit, replace the cylinder head unit.

Camshafts

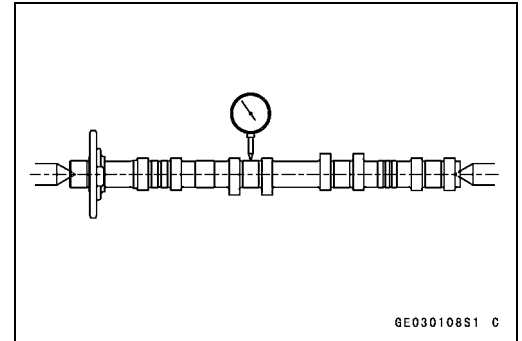
Camshaft Runout Inspection

- Set the camshaft in a camshaft alignment jig or on V blocks.
- Measure runout with a dial gauge at the middle journal of the camshaft.
- ★ If the runout exceeds the service limit, replace the shaft.

Camshaft Runout

Standard: TIR 0.02 mm (0.00079 in.) or less

Service Limit: TIR 0.1 mm (0.004 in.)



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Cam Wear Inspection

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

Cam Height

Standard:

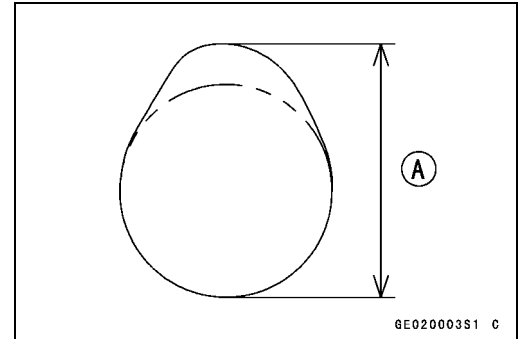
Exhaust 35.918 ~ 36.034 mm (1.4141 ~ 1.4187 in.)

Inlet 36.239 ~ 36.355 mm (1.4267 ~ 1.4313 in.)

Service Limit:

Exhaust 35.82 mm (1.4102 in.)

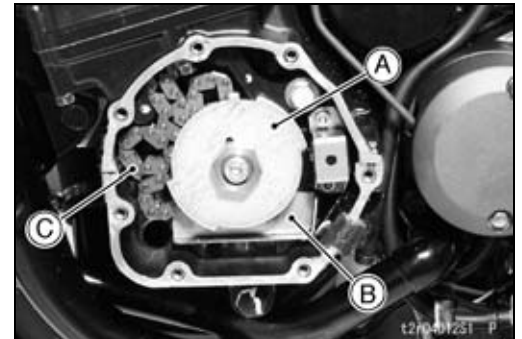
Inlet 36.14 mm (1.4228 in.)



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Camshaft Chain Removal

- Remove:
 - Crankshaft Sensor Cover Timing Rotor [A]
 - Chain Guide Plate [B]
 - Camshafts (see Camshaft Removal)
- Remove the camshaft chain [C] from the crankshaft sprocket.

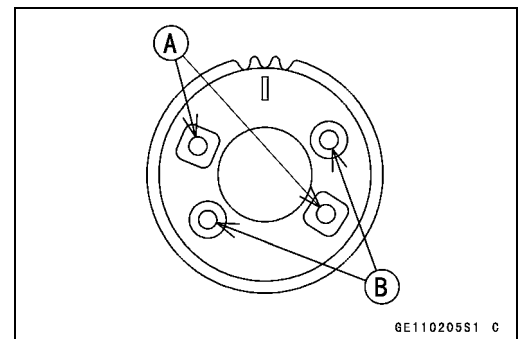


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Camshaft and Sprocket Assembly

- Since the inlet and exhaust camshaft sprockets are the same, they have a set of bolt holes for the exhaust camshaft and another for the inlet.
 - Bolt Holes for the Inlet Camshaft [A]
 - Bolt Holes for the Exhaust Camshaft [B]
- Install the sprockets so that the marked side faces outwards.
- Apply a non-permanent locking agent to the camshaft sprocket bolts and tighten them.

Torque - Camshaft Sprocket Bolts: 15 N·m (1.5 kgf·m, 11 ft·lb)



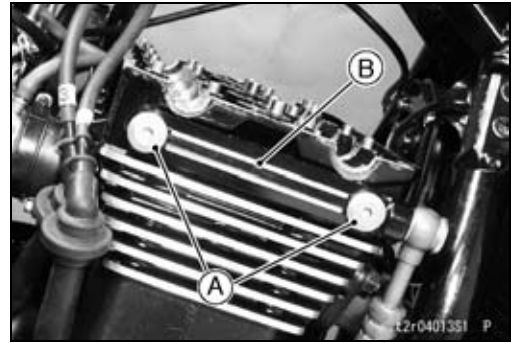
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4-22 ENGINE TOP END

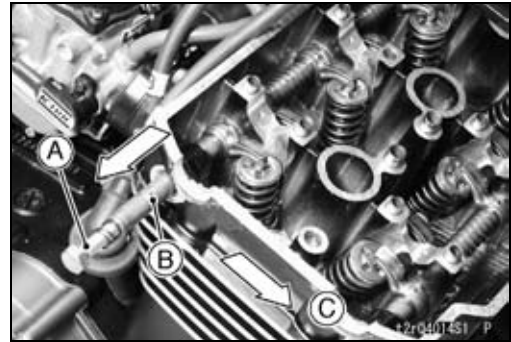
Rocker Shafts, Rocker Arms

Rocker Shaft, Rocker Arm Removal

- Remove:
 - Camshafts (see Camshaft Removal)
 - Rocker Shaft End Bolts [A]
 - Oil Hose Fitting [B]

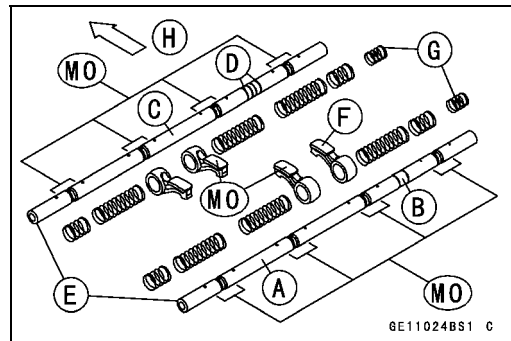


- Using a bolt (M8 P1.25 ~ more than 20 mm long) [A], pull the rocker shaft [B] out.
 - Front [C]
- The rocker arms and springs come off with the rocker shaft.
- Mark and record the rocker arm locations so that the rocker arm can be reinstalled in their original positions.



Rocker Shaft, Rocker Arm Installation

- Apply molybdenum disulfide oil [MO] to rocker arms and the rocker shafts as shown.
- The inlet rocker shaft [A] has a blue paint mark [B] and the exhaust rocker shaft [C] a red paint mark [D]. Be careful not to mix up the inlet and exhaust rocker shafts.
- Install the rocker shaft from the right side of the cylinder head so that the non-threaded end [E] goes in first.
- Install the rocker arms [F] in their original positions in order to keep valve clearances correct.
- Install the spring [G] as shown.
 - Front [H]
- Push the rocker shaft all the way in.
- Tighten:



Torque - Rocker Shaft End Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

Cylinder Head

Cylinder Compression Measurement

NOTE

○ Use the battery which is fully charged

- Warm up the engine thoroughly.
- Stop the engine.
- Remove:
 - 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 (left side view).
- 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 Tools - Compression Gauge, 20 kgf/cm²: 57001-221
Compression Gauge Adapter, M10 × 1.0: 57001-1317

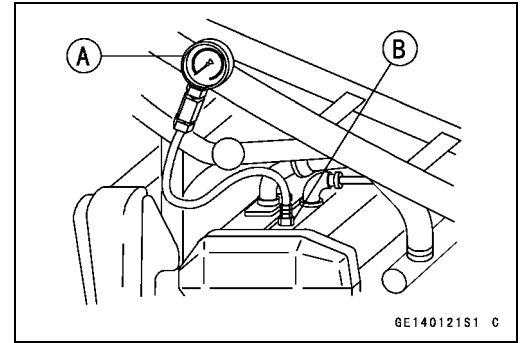
Cylinder Compression

Standard: 910 ~ 1400 kPa (9.3 ~ 14.3 kgf/cm², 132 ~ 203 psi) @320 r/min (rpm)

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

Torque - Spark Plugs: 14 N·m (1.4 kgf·m, 10 ft·lb)

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



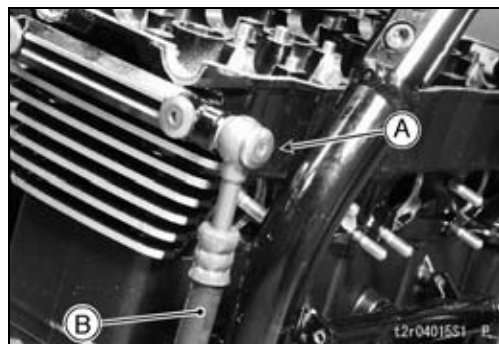
Problem	Diagnosis	Remedy (Action)
Cylinder compression is higher than usable range	Carbon buildup on piston and in combustion chamber possibly due to damaged valve stem, valve guide Stem oil seal and/or damaged piston oil rings (This may be indicated by white exhaust smoke).	Remove the carbon deposits 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 seats, valves, and valve spring	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 or 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.

4-24 ENGINE TOP END

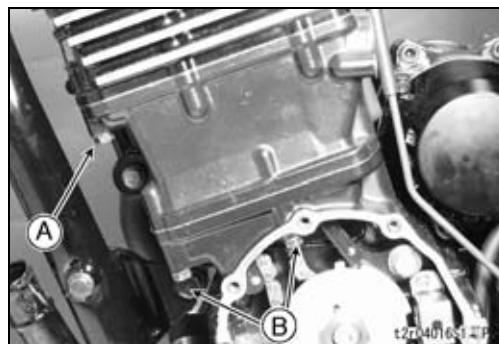
Cylinder Head

Cylinder Head Removal

- Remove the fairing (ZR1200B, see Frame chapter) and the fuel tank (see Fuel System chapter).
- Drain the coolant (see Cooling System chapter).
- Remove:
 - Radiator (see Cooling System chapter)
 - Muffler Assembly (see Muffler Removal)
 - Carburetor Assembly (see Fuel System chapter)
 - Cylinder Head Cover (see Cylinder Head Cover Removal)
 - Camshaft Chain Tensioner and Camshafts (see Camshaft Chain Tensioner, Camshaft Removal)
 - Oil Hose Banjo Bolt [A] and Oil Hose [B]
- The camshaft chain comes off.



- Remove the 6 mm cylinder head bolt [A] first, loosen the 6 mm cylinder bolts [B], and then remove the 10 and 11 mm cylinder head bolts. This prevents excessive stress on the 6 mm bolts.



- Tap lightly up the cylinder head with a plastic mallet [A] to separate from the cylinder.
- Remove the cylinder head gasket.



Cylinder Head Installation

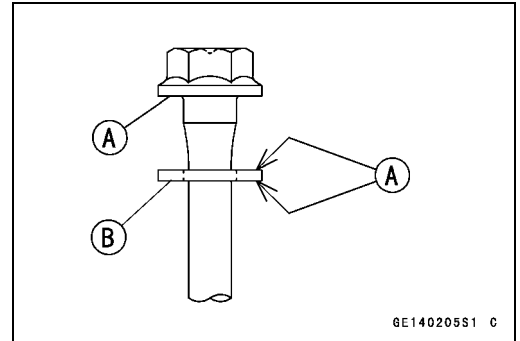
NOTE

- The camshaft caps are machined with the cylinder head, so if a new cylinder head is installed, use the caps that are supplied with the new head.
- Install:
 - Dowel Pins [A]
 - New Cylinder Head Gasket [B]
- Install the cylinder head on the cylinder [C].

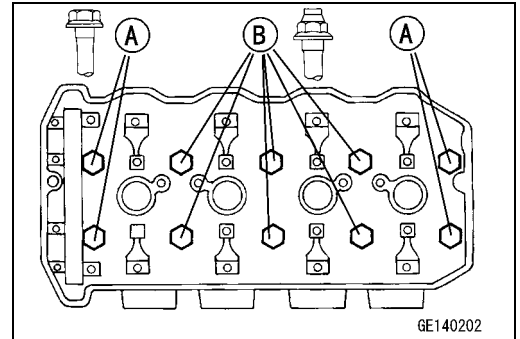


Cylinder Head

- To ensure proper oil seal and uniform tightening torque, replace all the 10 mm cylinder head bolt washers with new ones.
- The 10 mm cylinder head bolt washers are copper-plated, and they could leak oil if reused.
- Apply molybdenum disulfide oil [A] to the 10 mm and 11 mm cylinder head bolt seating surfaces and both sides of washers [B].



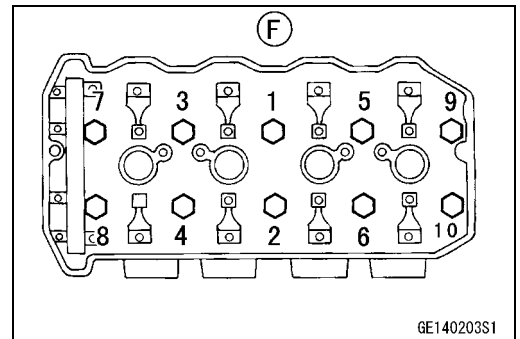
- Install the cylinder head bolts and washers as shown.
 10 mm Bolts [A] and New Copper-Plated Steel Washers
 11 mm Bolts [B] and Steel Washers



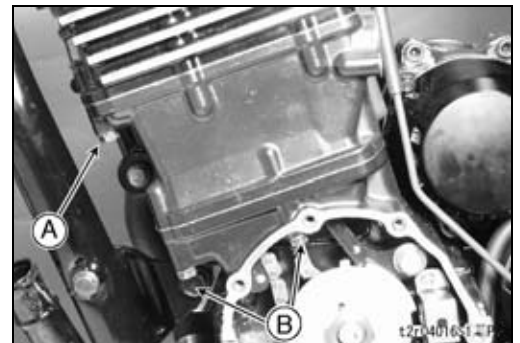
- Tighten the cylinder head bolts (11, 10 mm), following the tightening sequence.
 Front [F]

Torque - Cylinder Head Bolts:

- First** 20 N·m (2.0 kgf·m, 14 ft·lb)
- Final** 11 mm: 57 N·m (5.8 kgf·m, 42 ft·lb)
- 10 mm: 41 N·m (4.2 kgf·m, 30 ft·lb)



- Tighten:
Torque - Cylinder Head Bolt [A] (6 mm): 9.8 N·m (1.0 kgf·m, 87 in·lb)
Cylinder Bolts [B] (6 mm): 15 N·m (1.5 kgf·m, 11 ft·lb)
Oil Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

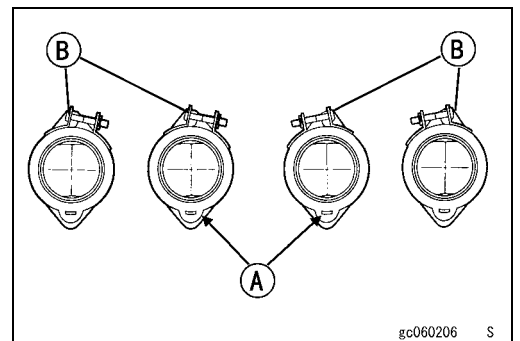


Carburetor Holder Installation

- Fit the clamp nails into the slits [A] of the carburetor clamps with each screw head [B] outside and declined as shown.

Non-permanent Locking Agent - Carburetor Holder Bolts

- Torque - Carburetor Holder Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)**



⚠ WARNING

Be sure to install the holder clamp screws in the direction shown. Or, the screws could come in contact with the throttle linkage resulting in unsafe riding condition.

4-26 ENGINE TOP END

Cylinder Head

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 straight edge [B] and the head.

Cylinder Head Warp

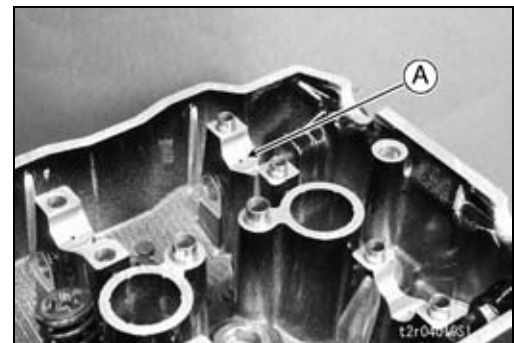
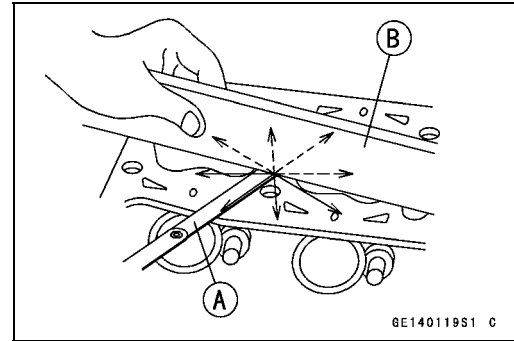
Standard: ---

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).

Cylinder Head Cleaning

- Remove the cylinder head (see Cylinder Head Removal).
- Remove the valves (see Valve Removal).
- Wash the head with a high-flash point solvent.
- Scrape the carbon out of the combustion chamber and exhaust port with a suitable tool.
- Using compressed air, blow out [A] any particles which may obstruct the oil passage in the cylinder head.
- Install the valves (see Valve Installation).



Valves

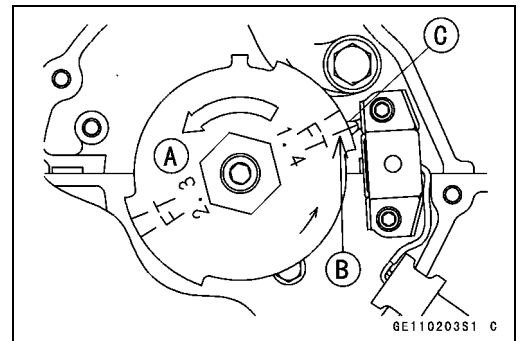
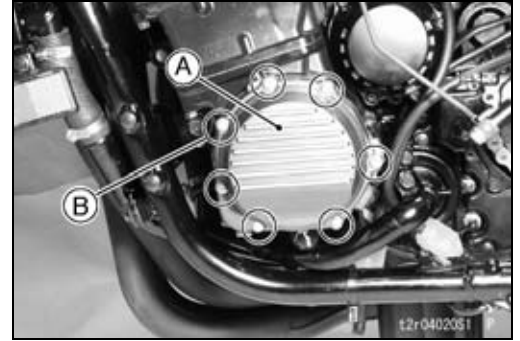
Valve Clearance Inspection

Valve Clearance Inspection

NOTE

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

- Remove the fairing (ZR1200B, see Frame chapter) and the fuel tank (see Fuel System chapter).
- Drain the coolant (see Cooling System chapter).
- Remove:
 - Coolant Hoses (over the cylinder head cover)
 - Cylinder Head Cover (see Cylinder Head Cover Removal)
 - Crankshaft Sensor Cover [A] and Bolts [B]
- Turn the crankshaft counterclockwise [A] and set the crankshaft at 1,4 piston TDC.
 - TDC Mark [B] #1, 4 Pistons
 - Crankcase Mark [C]



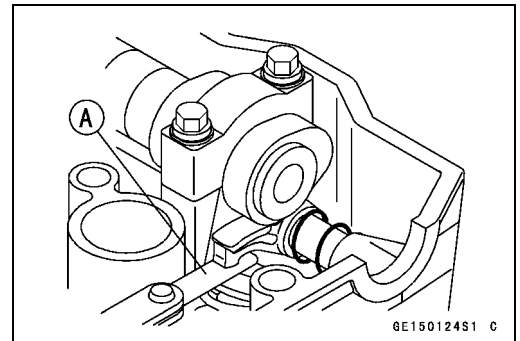
- Using a thickness gauge [A], measure the valve clearance between the rocker arm and the shim.

Valve Clearance

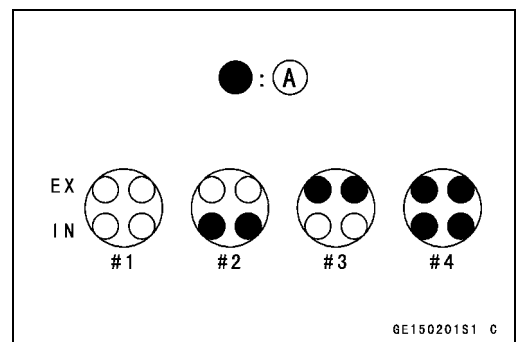
Standard:

Exhaust 0.18 ~ 0.24 mm (0.0071 ~ 0.0095 in)

Inlet 0.13 ~ 0.19 mm (0.0051 ~ 0.0075 in)



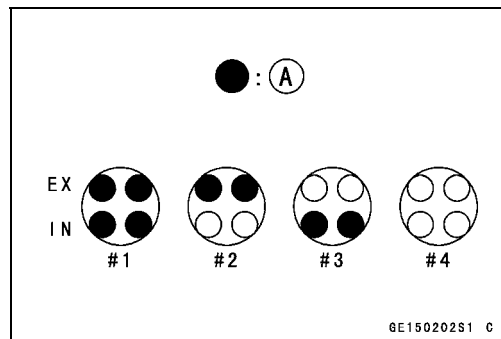
- When positioning #4 piston TDC at the end of the compression stroke, measure the following valves [A]:
 - Exhaust valve clearance of #3 and #4 cylinders
 - Inlet valve clearance of #2 and #4 cylinders



4-28 ENGINE TOP END

Valves

- When positioning #1 piston TDC at the end of the compression stroke measure the following valves [A]:
Exhaust valve clearance of #1 and #2 cylinders.
Inlet valve clearance of #1 and #3 cylinders
- ★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, slide the rocker arm [A] sideways and change the shim [B]. Replace the shim with one of a different thickness.

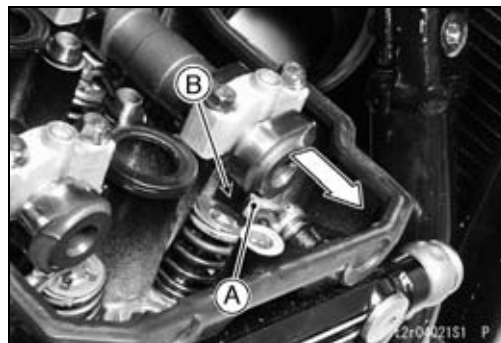
NOTE

- Mark and record the shim locations so that the shims can be reinstalled in their original positions.
- Besides the standard shims in the valve clearance adjustment charts, the following additional shims may be used.

Additional Shims

Parts Nos.	Thickness
92025-1982	2.425 mm
92025-1983	2.475 mm
92025-1984	2.525 mm
92025-1985	2.575 mm
92180-1058	2.375 mm
92180-1059	2.625 mm

- To select a new shim which brings the valve clearance within the specified range, refer to the Valve Clearance Adjustment Charts.
- Apply a thin coat of molybdenum disulfide oil to the rocker arms.
- Remeasure any valve clearance that was adjusted. Readjust if necessary.



CAUTION

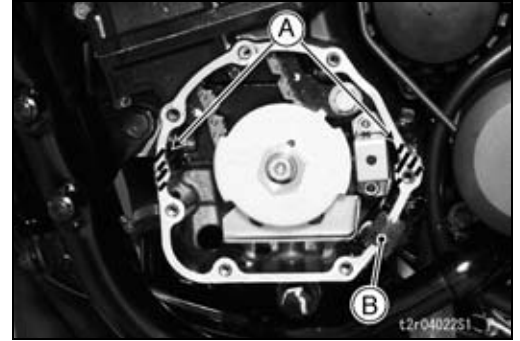
Do not put shim stock under the shim. This may cause the shim to pop out at high rpm, causing extensive engine damage.

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

Valves

- Apply silicone sealant to the crankcase halves mating surface [A] on the front and rear sides of the pickup coil cover mount.
- Apply silicone sealant to the crankshaft sensor lead grommet [B] and fit the grommet securely in the notch of the crankcase.

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



- Apply a non-permanent locking agent to the two bolts [A] shown.
- Tighten:

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



4-30 ENGINE TOP END

Valves

EXHAUST- VALVE CLEARANCE ADJUSTMENT CHART

	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 (mm)	Specified Clearance / No Change Required																								
	0.00 ~ 0.03	0.04 ~ 0.08	0.09 ~ 0.13	0.14 ~ 0.17	0.18 ~ 0.24	0.25 ~ 0.29	0.30 ~ 0.34	0.35 ~ 0.39	0.40 ~ 0.44	0.45 ~ 0.49	0.50 ~ 0.54	0.55 ~ 0.59	0.60 ~ 0.64	0.65 ~ 0.69	0.70 ~ 0.74	0.75 ~ 0.79	0.80 ~ 0.84	0.85 ~ 0.89	0.90 ~ 0.94	0.95 ~ 0.99	1.00 ~ 1.04	1.05 ~ 1.09	1.10 ~ 1.14	1.15 ~ 1.19	1.20 ~ 1.24
Example	—	—	—	—	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
	—	—	2.00	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		
	—	2.00	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																								

Install the shim of this thickness (mm).

Valves

1. Measure the clearance [A] (with engine cold) between the rocker arm [B] and shim [C].

Front [D]

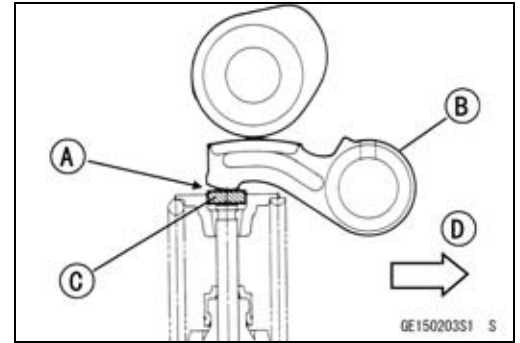
2. Check present shim size.
3. Match clearance in vertical column with present shim size in horizontal column.
4. Install the shim specified where the lines intersect. This shim will give the proper clearance.

Example: Present shim is **2.60 mm**.

Measured clearance is **0.30 mm**.

Replace **2.60 mm** shim with **2.70 mm** shim

5. Remeasure the valve clearance and readjust if necessary.



CAUTION

Be sure to remeasure the clearance after selecting a shim according to the table. The clearance can be out of the specified range because of the shim tolerance.

NOTE

- *If the valve clearance is smaller (larger) than the standard, select a thinner (thicker) shim and then measure the clearance again.*

4-32 ENGINE TOP END

Valves

INLET- VALVE CLEARANCE ADJUSTMENT CHART

	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 (mm)	0.00 ~ 0.03	—	—	—	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
	0.04 ~ 0.08	—	—	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
	0.09 ~ 0.12	—	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
	0.13 ~ 0.19	Specified Clearance / No Change Required																				
	0.20 ~ 0.24	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	
	0.25 ~ 0.29	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		
	0.30 ~ 0.34	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			
	0.35 ~ 0.39	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				
	0.40 ~ 0.44	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					
	0.45 ~ 0.49	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						
	0.50 ~ 0.54	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							
	0.55 ~ 0.59	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								
	0.60 ~ 0.64	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00									
	0.65 ~ 0.69	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00										
	0.70 ~ 0.74	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00											
	0.75 ~ 0.79	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00												
0.80 ~ 0.84	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00														
0.85 ~ 0.89	2.70	2.75	2.80	2.85	2.90	2.95	3.00															
0.90 ~ 0.94	2.75	2.80	2.85	2.90	2.95	3.00																
0.95 ~ 0.99	2.80	2.85	2.90	2.95	3.00																	
1.00 ~ 1.04	2.85	2.90	2.95	3.00																		
1.05 ~ 1.09	2.90	2.95	3.00																			
1.10 ~ 1.14	2.95	3.00																				
1.15 ~ 1.19	3.00																					

Install the shim of this thickness (mm).

Valves

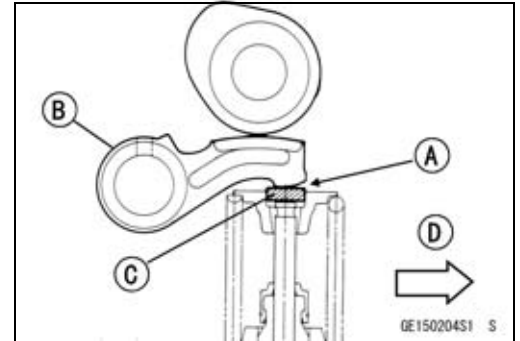
1. Measure the clearance [A] (with engine cold) between the rocker arm [B] and shim [C].
Front [D]
2. Check present shim size.
3. Match clearance in vertical column with present shim size in horizontal column.
4. Install the shim specified where the lines intersect. This shim will give the proper clearance.

Example: Present shim is **2.55 mm**.

Measured clearance is **0.35 mm**.

Replace **2.55 mm** shim with **2.75 mm** shim

5. Remeasure the valve clearance and readjust if necessary.



CAUTION

Be sure to remeasure the clearance after selecting a shim according to the table. The clearance can be out of the specified range because of the shim tolerance.

NOTE

- *If the valve clearance is smaller (larger) than the standard, select a thinner (thicker) shim and then measure the clearance again.*

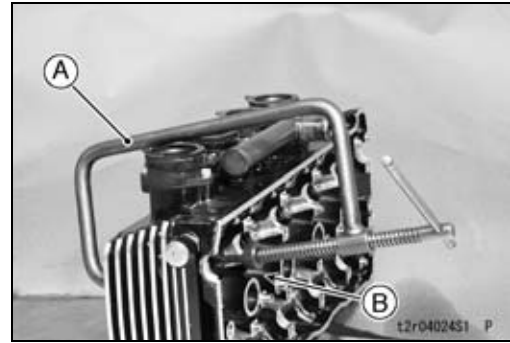
4-34 ENGINE TOP END

Valves

Valve Removal

- Remove the cylinder head (see Cylinder Head Removal).
- Swing open the rocker arms, 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.

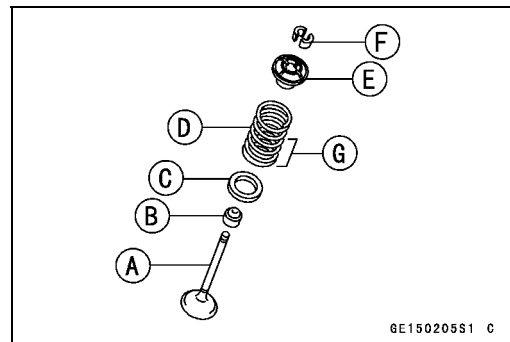
Special Tools - Valve Spring Compressor Assembly [A]:
57001-241
Valve Spring Compressor Adapter, $\phi 22$ [B]
: 57001-1202



Valve Installation

- Replace the stem oil seal with a new one.
- Apply a thin coat of molybdenum disulfide grease to the valve stem before valve installation.
- Install the springs so that the closed coil end faces downwards.

Valve Stem [A]
Stem Oil Seal [B]
Spring Seat [C]
Valve Spring [D]
Retainer [E]
Split Keepers [F]
Closed Coil End [G]



Valve Guide Removal

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

CAUTION

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

Special Tool - Valve Guide Arbor, $\phi 5$: 57001-1203

Valve Guide Installation

- Apply engine 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) in engine oil.
- 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.

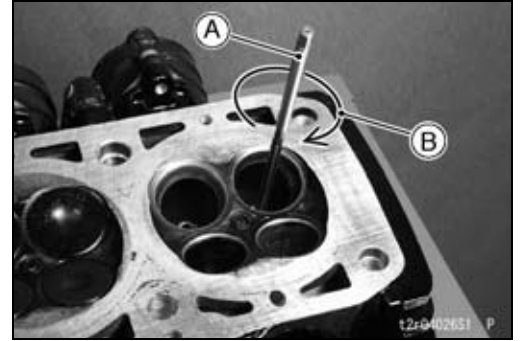
Special Tool - Valve Guide Arbor, $\phi 5$: 57001-1203



Valves

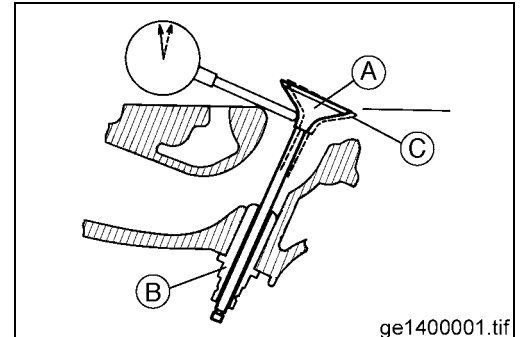
- Wait until the cylinder head cools down and then ream the valve guide with the valve guide reamer [A] even if the old guide is reused.
- Turn the reamer in a clockwise direction [B] until the reamer turns freely in the guide. Never turn the reamer counterclockwise or it will be dulled.
- Once the guides are reamed, they must be cleaned thoroughly.

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



Valve Guide Wear Inspection (Wobble Method)

- If a small bore gauge is not available, inspect the valve guide wear by measuring the valve-to-guide clearance with the wobble method as indicated below. The reading is not actual valve-to-guide clearance because the measuring point is above the guide.
- 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-to-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.



Valve-to-Guide Clearance (Wobble Method)

Standard:

Exhaust	0.10 ~ 0.19 mm (0.0039 ~ 0.0075 in)
Inlet	0.03 ~ 0.12 mm (0.00118 ~ 0.0047 in)

Service Limit:

Exhaust	0.41 mm (0.0161 in.)
Inlet	0.34 mm (0.0134 in.)

4-36 ENGINE TOP END

Valves

Valve Seat Inspection

- Remove the valve (see Valve Removal).
- Check the valve seat 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 Seat Surface Outside Diameter

Standard:

Exhaust 26.3 ~ 26.5 mm (1.035 ~ 1.043 in)

Inlet 30.8 ~ 31.0 mm (1.213 ~ 1.220 in)

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

Good [F]

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

Valve Seat Surface Width (or Seat Width)

Standard:

Exhaust 0.8 ~ 1.2 mm (0.032 ~ 0.047 in.)

Inlet 0.5 ~ 1.0 mm (0.0197 ~ 0.0394 in.)

Valve Seat Repair

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

Special Tools - Valve Seat Cutter Holder, ϕ 5 [B]: 57001-1208

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

[For Exhaust Valve Seat]

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

Valve Seat Cutter, 32° - ϕ 28: 57001-1119 (or - ϕ 30: 57001-1120)

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

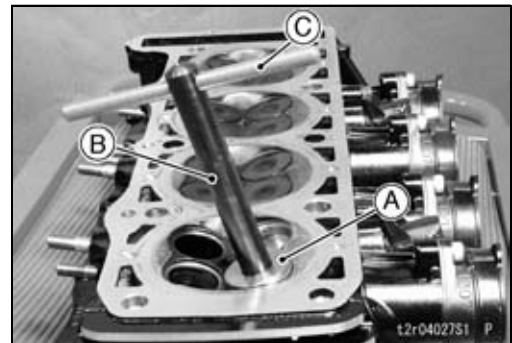
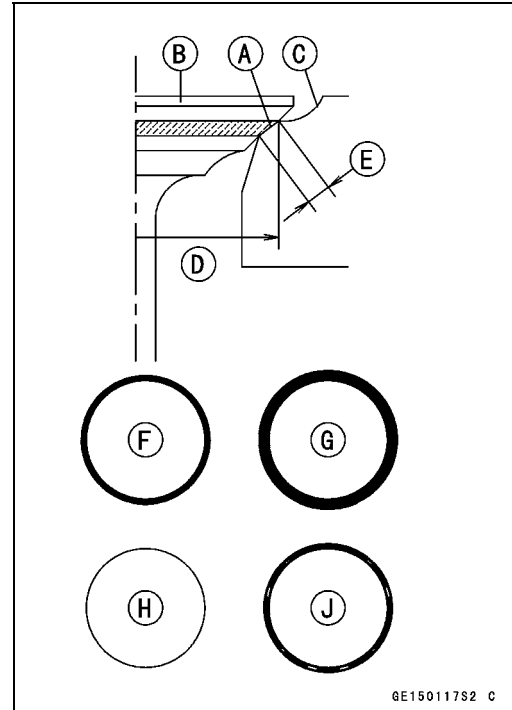
[For Inlet Valve Seat]

Valve Seat Cutter, 45° - ϕ 32: 57001-1115 (or - ϕ 35: 57001-1116)

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

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

- ★ 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.

CAUTION

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

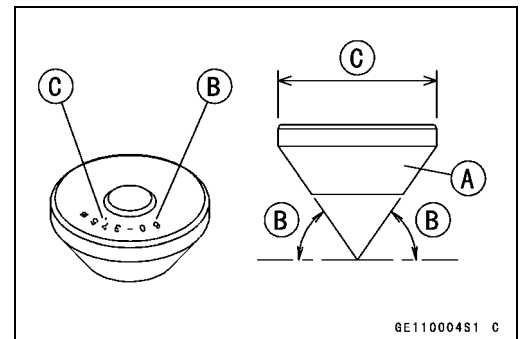
○Prior to grinding, apply engine oil to the cutter. During operation, wash off any ground particles sticking to the cutter with washing oil.

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

Marks Stamped on the Cutter

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

- 60° Cutter Angle [B]
- 37.5 φ Outer Diameter of Cutter [C]

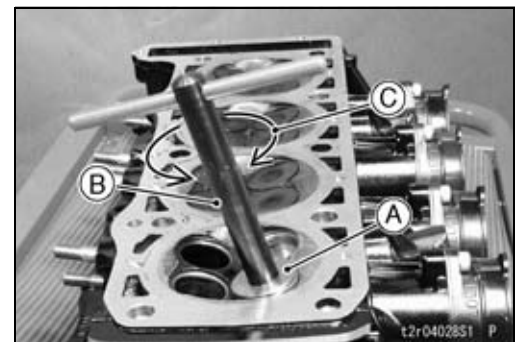


Operating Procedures

- Clean the seat area carefully.
- Coat the seat with machinist's dye.
- Fit a 45° cutter [A] into the holder [B] and slide it into the valve guide.
- Press down lightly on the handle and turn it right or left [C]. Grind the seat 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.



4-38 ENGINE TOP END

Valves

- Measure the outside diameter [A] of the seat surface (seat outside diameter) with vernier calipers.
- ★ If the seat outside diameter is too small, repeat the 45° grind [B] until the diameter is within the specified range.
Ground Volume [C]

NOTE

- Remove all pittings or flaws from 45° ground surface.
 - After grinding with 45° cutter, apply thin coat of machinist's dye to seat surface. This makes seat 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 seat outside diameter is too large, make the 32° grind described below.

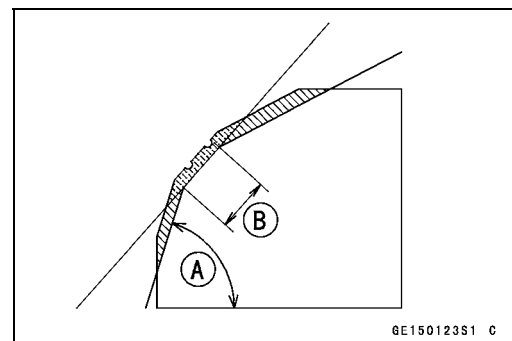
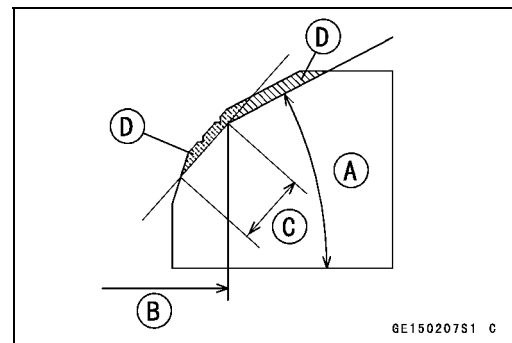
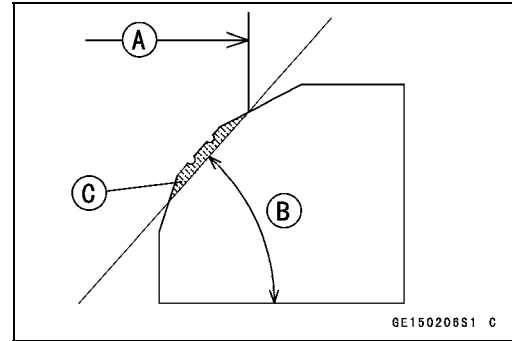
- To make the 32° grind, fit a 32° cutter into the holder, and slide it into the valve guide.
- Turn the holder one turn at a time while pressing down very lightly. Check the seat after each turn.

CAUTION

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

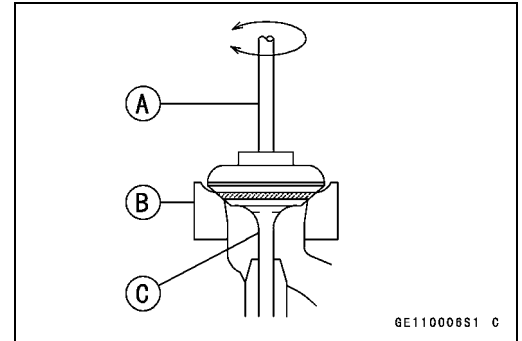
- Grind the seat at a 32° angle [A] until the seat outside diameter [B] is within the specified range.
- ★ If the seat outside diameter is within the specified range, measure the seat width as described below.
- To measure the seat width, use vernier calipers to measure the width [C] of the 45° angle portion of the seat at several places around the seat.
Ground Volume [D]
- ★ If the seat width is too narrow, repeat the 45° grind until the seat is slightly too wide, and then measure the seat outside diameter.

- ★ If the seat width is too wide, make the 60° grind described below.
- 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.
- Grind the seat at a 60° angle [A] until the seat width [B] is within the specified range.
- ★ If the seat width is within the specified range, lap the valve to the seat as described below.



Valves

- Lap the valve to the seat, once the seat width and outside diameter 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]

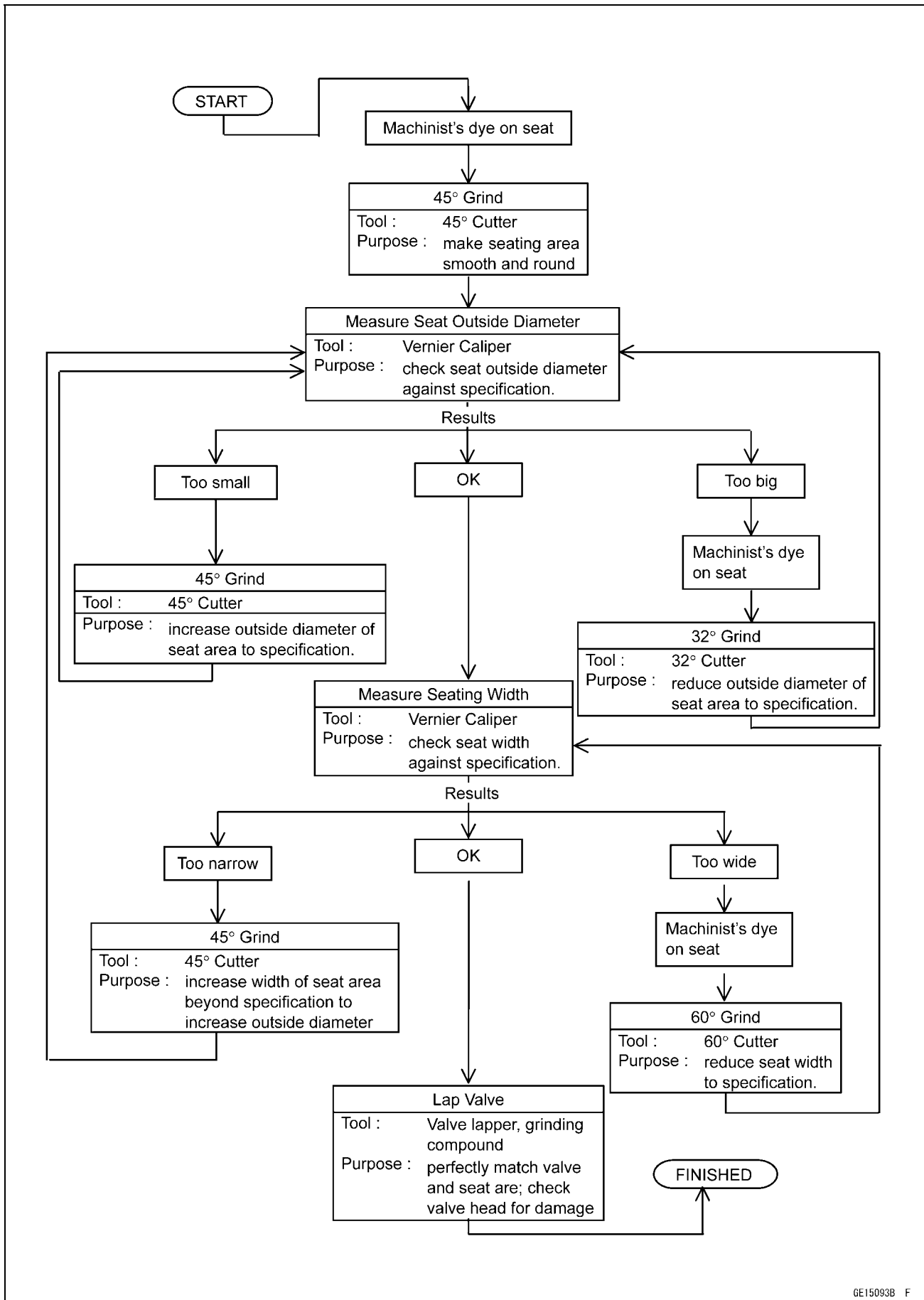


- The seat area should be marked about in the middle of the valve face.
- ★ If the seat area is not in the right place on the valve, check to be sure the valve is the correct part. If it is, it may have been refaced too much; replace it.
- Be sure to remove all grinding compound before assembly.
- When the cylinder or the cylinder head is installed, be sure to adjust the valve clearance (see Valve Clearance Adjustment).

4-40 ENGINE TOP END

Valves

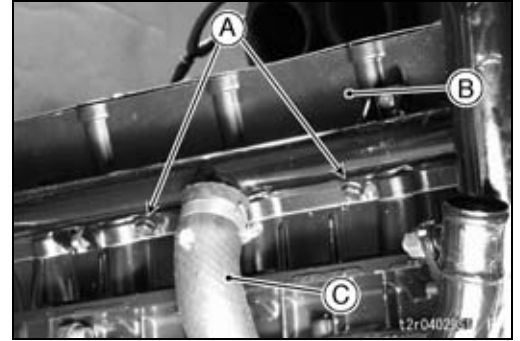
Valve Seat Repair



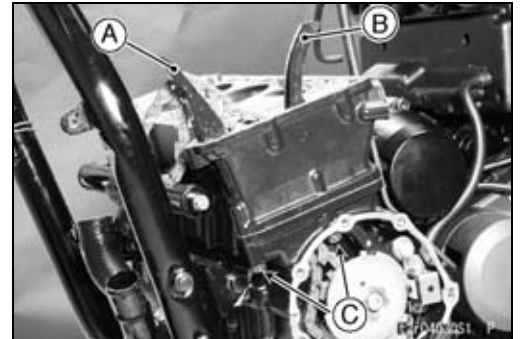
Cylinder, Pistons

Cylinder Removal

- Remove the cylinder head (see Cylinder Head Removal).
- Remove the coolant drain plugs [A] and drain the coolant from the cylinder [B].
- Remove the coolant hose [C].



- Remove:
 - Front Camshaft Chain Guide [A] (pull it out)
 - Rear Camshaft Chain Guide [B] (if necessary)
 - Cylinder Bolts [C]
- Tap lightly up the cylinder with a plastic mallet to separate from the crankcase.
- Remove the cylinder and base gasket.

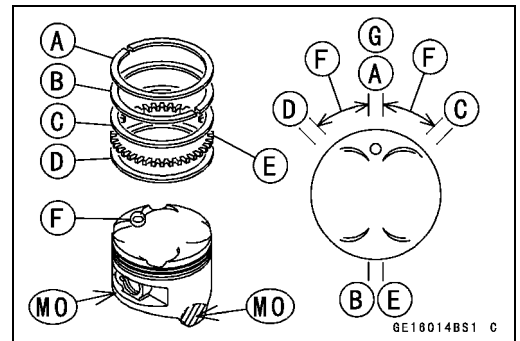


Cylinder Installation

NOTE

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

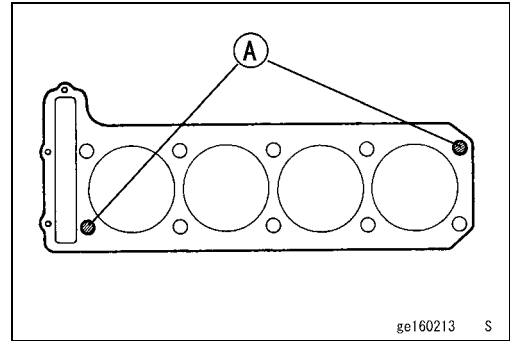
- Install:
 - Dowel Pins [A]
 - New Cylinder Base Gasket [B]
- The piston ring openings must be positioned as shown in the figure. The openings of the oil ring steel rails must be about 30 ~ 40° [F] of angle from the opening of the top ring.
 - Top Ring [A]
 - Second Ring [B]
 - Upper Oil Ring Steel Rail [C]
 - Lower Oil Ring Steel Rail [D]
 - Oil Ring Expander [E]
 - Round Mark [F] (must be on the front side)
 - Opening Positions [G]
- Apply molybdenum disulfide oil [MO] to the front and the rear of the piston skirts.



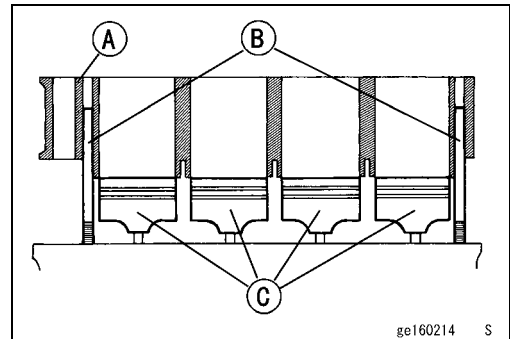
4-42 ENGINE TOP END

Cylinder, Pistons

- Apply molybdenum disulfide oil to the cylinder bore.
- Prepare two auxiliary head bolts with their head cut.
- Install the two bolts [A] diagonally in the crankcase.
- Apply molybdenum disulfide oil to the front and the rear of the piston skirts.



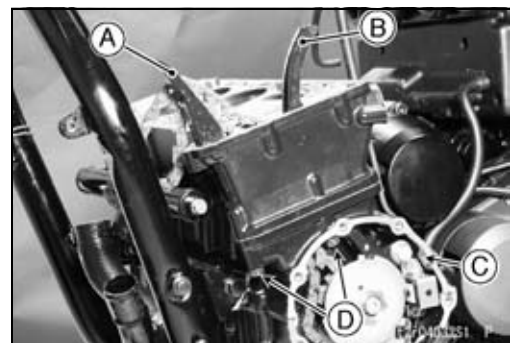
- Position the crankshaft so that all the piston heads are almost level.
- Install the cylinder block [A].
Auxiliary Head Bolts [B]
Pistons [C]
- Insert the piston rings with your thumbs.



- Insert the front camshaft chain guide [A]. Push the guide all the way down.
- If the rear camshaft chain guide [B] is removed, install it.
- Apply a non-permanent locking agent to the threads of the rear camshaft chain guide bolt [C] and tighten it.

Torque - Rear Camshaft Chain Guide Bolt: 20 N·m (2.0 kgf·m, 14 ft·lb)

- Check that the chain guide swings smoothly by hand.
- Install the cylinder bolts (6 mm) [D] and tighten them temporarily (these cylinder bolts are tightened to the specified torque after cylinder head installation).
- Turn the crankshaft counterclockwise and check that the pistons reciprocate smoothly.



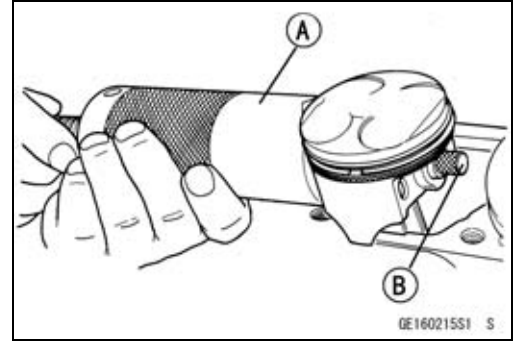
Piston Removal

- Remove the cylinder (see Cylinder Removal).
- Place a clean cloth under the pistons and remove the piston pin snap ring [A] from the outside of each piston.

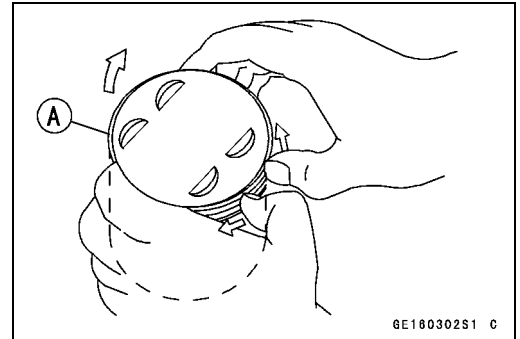


Cylinder, Pistons

- Remove the piston pins.
 - Special Tools - Piston Pin Puller Assembly: 57001-910 [A]
 - Piston Pin Puller Adapter [B]
- Remove the piston.



- 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.

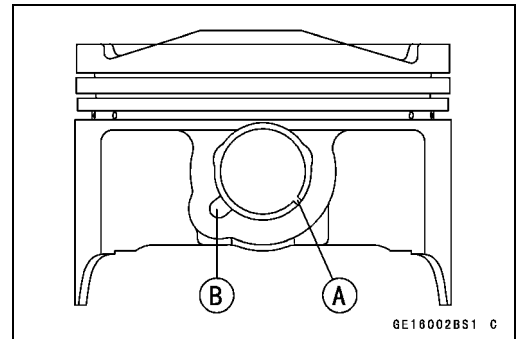


Piston Installation

NOTE

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

- The front mark (○) on the piston head must be on the front side of the engine.
- Apply molybdenum disulfide oil to the outer circumference of the piston pins.
- 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.



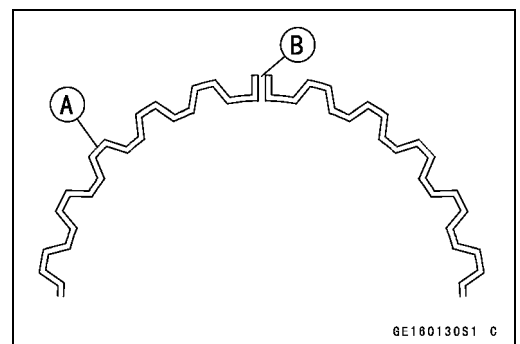
CAUTION

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

NOTE

○The oil ring rails have no "top" or "bottom".

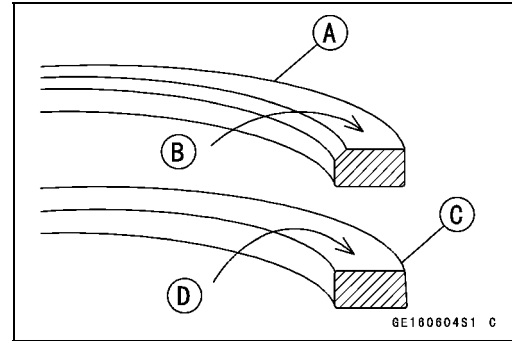
- Install the oil ring expander [A] in the bottom piston ring groove so the ends [B] butt together.
- Install the oil ring steel rails, one above the expander and one below it.
- Spread the rail with your thumbs, but only enough to fit the rail over the piston.
- Release the rail into the bottom piston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



4-44 ENGINE TOP END

Cylinder, Pistons

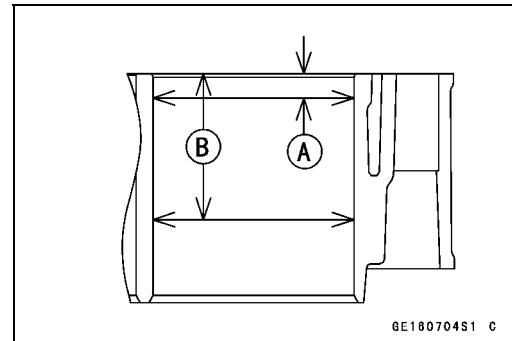
- Do not mix up the top ring and second ring.
- Install the top ring [A] so that the "R" mark [B] faces up.
- Install the second ring [C] so that the "R" mark [D] faces up.



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 two locations (total of four measurements) shown in the figure.
- ★ If any of the cylinder inside diameter measurements exceeds the service limit, replace the cylinder.

10 mm (0.39 in) [A]
60 mm [B] (2.36 in)



Cylinder Inside Diameter

Standard: 78.994 ~ 79.006 mm (3.1099 ~ 3.1105 in.) and less than 0.01 mm (0.00039 in.) difference between any two measurements.

Service Limit: 79.10 mm (3.1142 in.) or 0.05 mm (0.00197 in.) difference between any two measurements.

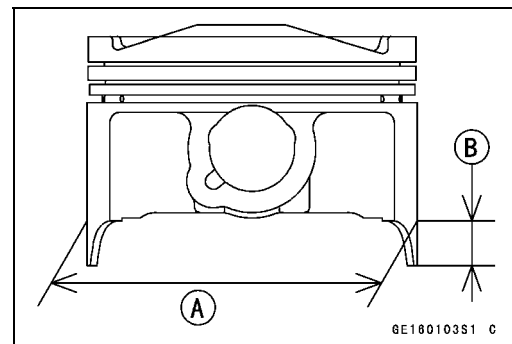
Piston Wear Inspection

- Measure the outside diameter [A] of each piston 5 mm [B] up from the bottom of the piston at a right angle to the direction of the piston pin.
- ★ If the measurement is under the service limit, replace the piston.

Piston Diameter

Standard: 78.969 ~ 78.984 mm (3.1090 ~ 3.1696 in.)

Service Limit: 78.82 mm (3.1031 in.)



Cylinder, Pistons

Piston/Cylinder Clearance Inspection

- The piston/cylinder clearance is measured whenever a piston or cylinder is replaced with a new one. The standard piston/cylinder clearance must be adhered to whenever the cylinder is replaced.
- Subtract the piston diameter from the cylinder inside diameter to get the piston/cylinder clearance.

Piston/Cylinder Clearance

Standard: 0.010 ~ 0.037 mm (0.00039 ~ 0.00146 in)

- ★ If the piston/cylinder clearance is less than the specified range, use a smaller piston made within the standard diameter or increase the cylinder inside diameter within the standard diameter by honing.
- ★ If the piston/cylinder clearance is greater than the specified range, use a larger piston made within the standard diameter.
- ★ 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.

Piston Ring, Piston Ring Groove Wear Inspection

- Check for uneven groove wear by inspecting the ring seat.
- ★ 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 0.04 ~ 0.08 mm (0.00157 ~ 0.0032 in.)

Second 0.03 ~ 0.07 mm (0.0012 ~ 0.003 in.)

Service Limit:

Top 0.18 mm (0.0071 in.)

Second 0.17 mm (0.0067 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 vernier calipers at several points around the piston.

Piston Ring Groove Width

Standard:

Top 0.93 ~ 0.95 mm (0.0366 ~ 0.0374 in.) [A]

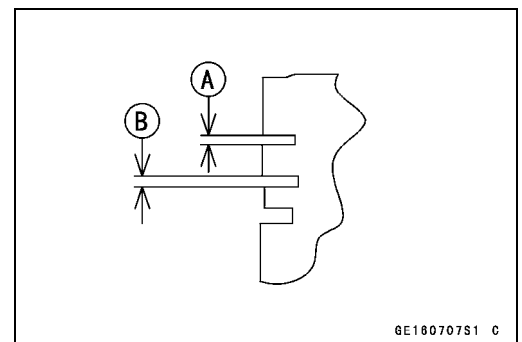
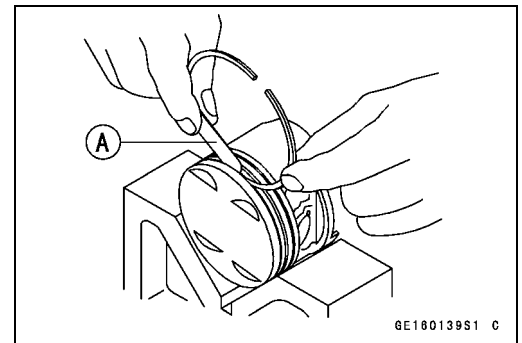
Second 0.82 ~ 0.84 mm (0.032 ~ 0.033 in.) [B]

Service Limit:

Top 1.03 mm (0.0406 in.)

Second 0.92 mm (0.036 in.)

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



4-46 ENGINE TOP END

Cylinder, Pistons

Piston Ring Thickness Inspection

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

Piston Ring Thickness

Standard:

Top	0.87 ~ 0.89 mm (0.034 ~ 0.035 in) [A]
Second	0.77 ~ 0.79 mm (0.030 ~ 0.031 in) [B]

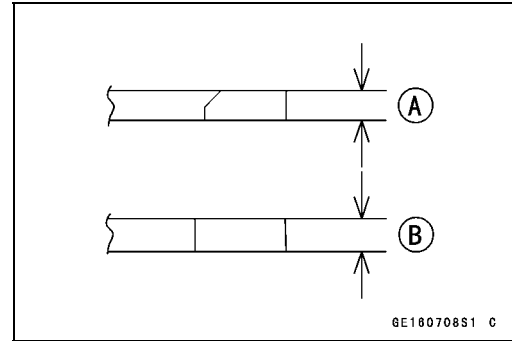
Service Limit:

Top	0.80 mm (0.032 in)
Second	0.70 mm (0.028 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 cylinder upside down.
- 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 [C].

Piston Ring End Gap

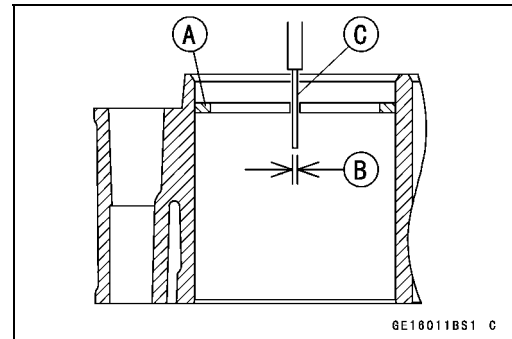
Standard:

Top	0.20 ~ 0.30 mm (0.0079 ~ 0.0118 in.)
Second	0.30 ~ 0.45 mm (0.0118 ~ 0.0177 in.)
Oil	0.20 ~ 0.70 mm (0.0079 ~ 0.028 in.)

Service Limit:

Top	0.6 mm (0.024 in.)
Second	0.75 mm (0.0295 in.)
Oil	1.0 mm (0.039 in.)

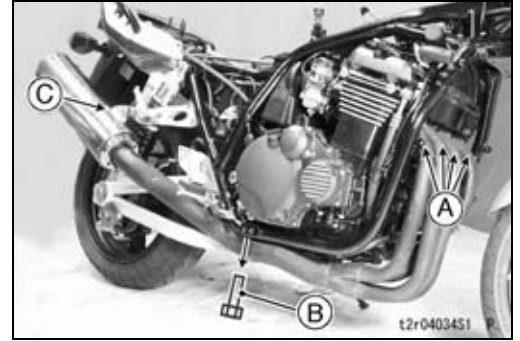
- ★ If the end gap of either ring is greater than the service limit, replace all the rings.



Muffler

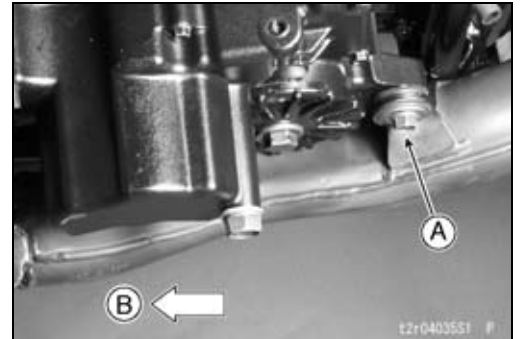
Muffler Removal

- Remove the fairing (ZR1200B, see Frame chapter) and the fuel tank (see Fuel System chapter).
- Drain the coolant (see Cooling System chapter).
- Remove:
 - Radiator (see Cooling System chapter)
 - Exhaust Holder Nuts [A]
 - Muffler Clamp Bolt [B]
 - Muffler Mounting Bolt and Nut [C]
- Remove the muffler assembly.



Muffler Installation

- First install the muffler body clamp bolt and nut to hold the muffler assembly on the frame.
- Tighten:
 - Torque - Exhaust Manifold Bolt [A]: 34 N·m (3.5 kgf·m, 25 ft·lb)**
 - Muffler Mounting Bolt and Nut: 34 N·m (3.5 kgf·m, 25 ft·lb)**
- Front [B]
- Fill the engine with coolant and bleed the air from the cooling system (see Cooling System chapter).
- Thoroughly warm up the engine, wait until the engine cools down, and retighten all the bolts and nuts.



Muffler Body Removal

- Remove:
 - Muffler Flange Cover
 - Muffler Body Mounting Nuts [A]
 - Muffler Mounting Bolt and Nut [B]
- Remove the muffler body [C] backwards.



Muffler Body Installation

- Tighten:
 - Torque - Muffler Body Mounting Nuts: 25 N·m (2.5 kgf·m, 18 ft·lb)**
 - Muffler Mounting Bolt and Nut: 34 N·m (3.5 kgf·m, 25 ft·lb)**
- Thoroughly warm up the engine, wait until the engine cools down, and retighten all the bolts and nuts.

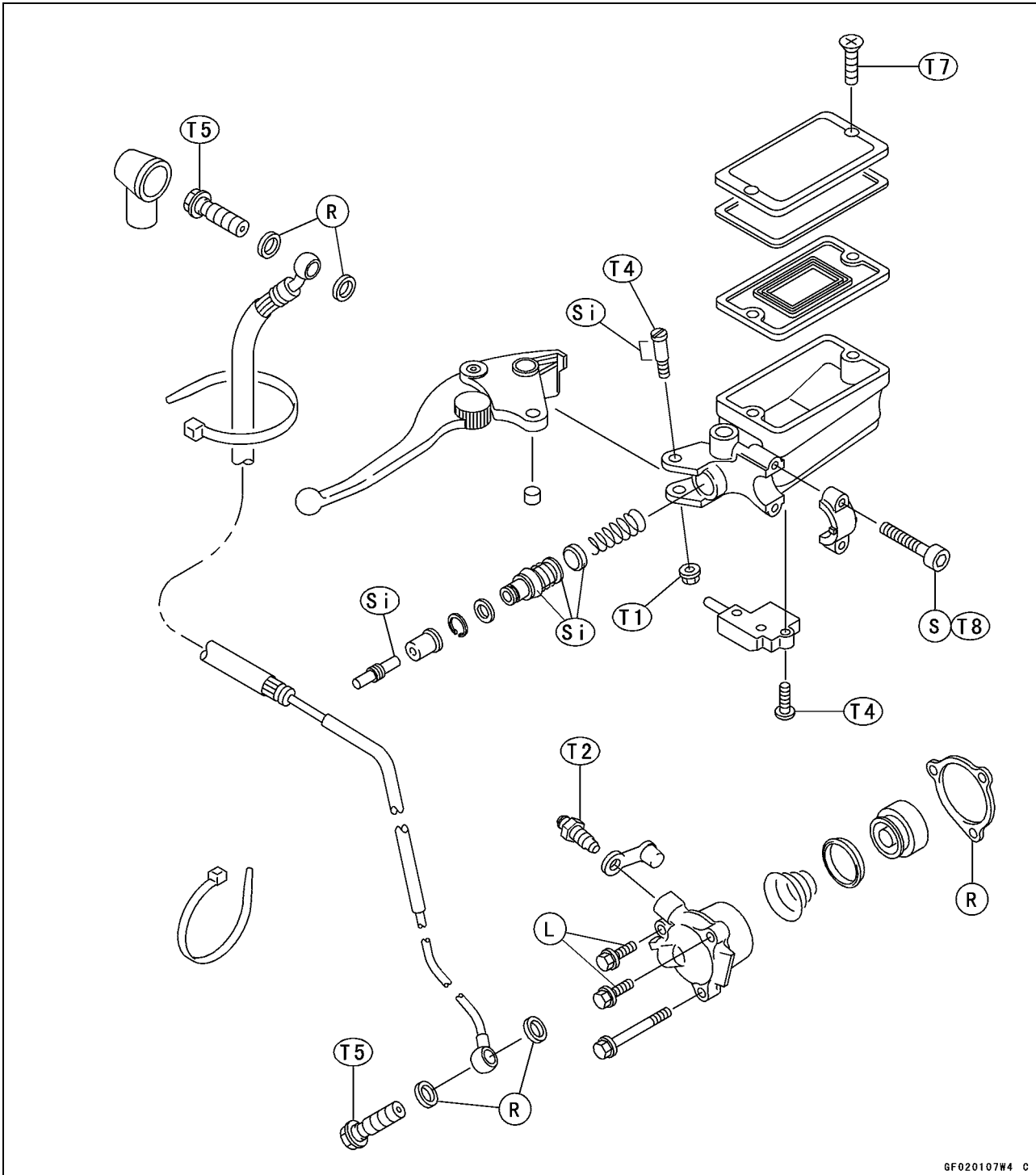
Clutch

Table of Contents

Exploded View	5-2
Specifications	5-4
Clutch Lever Adjuster	5-5
Lever Position Adjustment	5-5
Clutch Fluid.....	5-6
Fluid Level Inspection	5-6
Clutch Fluid Change	5-6
Bleeding the Clutch Line	5-7
Clutch Hose Removal/Installation	5-7
Clutch Hose or Pipe Inspection.....	5-8
Clutch Master Cylinder	5-9
Clutch Master Cylinder Removal	5-9
Clutch Master Cylinder Installation	5-9
Clutch Master Cylinder Disassembly	5-10
Clutch Master Cylinder Assembly	5-11
Clutch Master Cylinder Inspection	5-11
Clutch Slave Cylinder	5-12
Clutch Slave Cylinder Removal	5-12
Clutch Slave Cylinder Installation	5-12
Clutch Slave Cylinder Disassembly	5-13
Clutch Slave Cylinder Assembly	5-13
Clutch	5-14
Clutch Removal.....	5-14
Clutch Installation.....	5-15
Clutch Hub Disassembly (ZR1200-A1 ~ A3/ ZR1200-B1 ~ B3/ZR1200-C1 ~ C2).....	5-16
Friction or Steel Plate Damage, Wear Inspection	5-17
Friction or Steel Plate Warp Inspection.....	5-17
Clutch Spring Free Length Measurement.....	5-17
Clutch Housing Finger Inspection	5-18
Clutch Hub Spline Inspection.....	5-18
Cam Damper Inspection (ZR1200-A1 ~ A3/ZR1200-B1 ~ B3/C1 ~ C2).....	5-18

5-2 CLUTCH

Exploded View

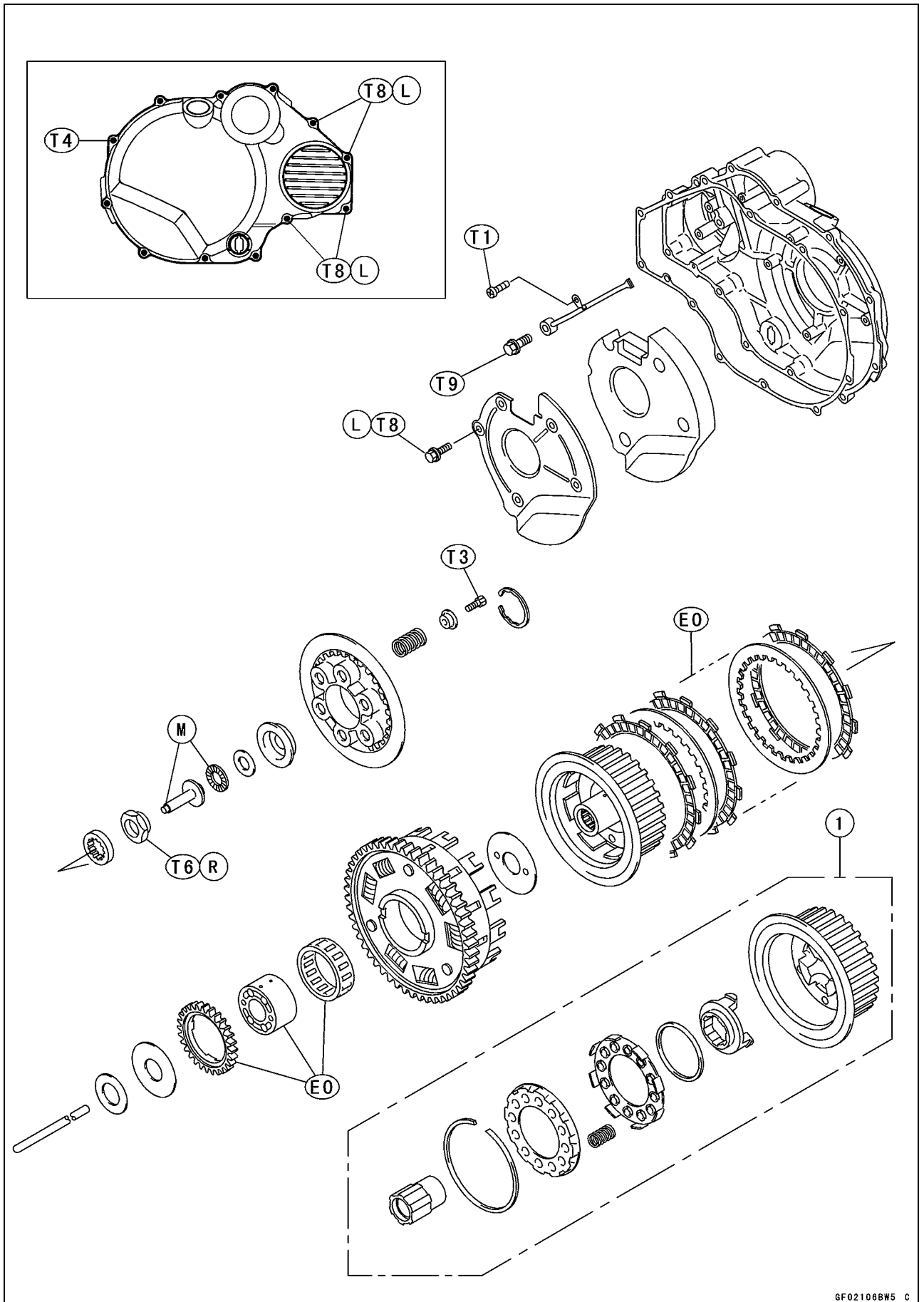


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1. ZR1200-A1 ~ A3/B1 ~ B3/C1 ~C2
 T1: 5.9 N·m (0.60 kgf·m, 52 in·lb)
 T2: 7.8 N·m (0.80 kgf·m, 69 in·lb)
 T3: 11 N·m (1.1 kgf·m, 95 in·lb)
 T4: 1.0 N·m (0.10 kgf·m, 9 in·lb)
 T5: 25 N·m (2.5 kgf·m, 18 ft·lb)
 T6: 135 N·m (13.8 kgf·m, 100 ft·lb)
 T7: 1.5 N·m (0.15 kgf·m, 13 in·lb)

- T8: 9.8 N·m (1.0 kgf·m, 87 in·lb)
 T9: 12 N·m (1.2 kgf·m, 106 in·lb)
 EO: Apply engine oil.
 L: Apply a non-permanent locking agent.
 M: Apply molybdenum disulfide grease.
 R: Replacement Parts
 S: Follow the specified tightening sequence.
 Si: Apply silicone grease.

Exploded View



5-4 CLUTCH

Specifications

Item	Standard	Service Limit
Clutch Fluid Grade	DOT4 (provided when shipping)	— — —
Clutch Lever Clutch Lever Position Clutch Lever Free Play	4-way adjustable (to suit rider) Non-adjustable	— — — — — —
Clutch Friction Plate Thickness Friction or Steel Plate Warp Clutch Spring Free Length	2.9 ~ 3.1 mm (0.114 ~ 0.122 in.) 0.2 mm (0.008 in.) or less 42.9 mm (1.689 in.)	2.8 mm (0.110 in.) 0.3 mm (0.012 in.) 40.8 mm (1.606 in.)

Special Tools - Inside Circlip Pliers: 57001-143

Clutch Holder: 57001-1243

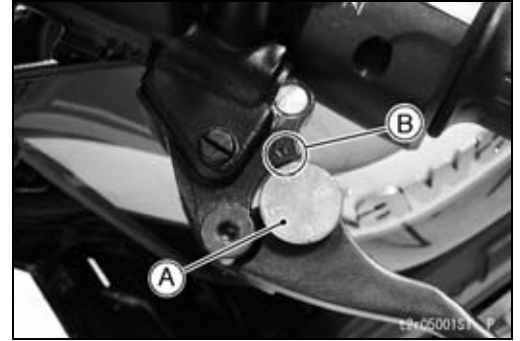
Bearing Driver Set: 57001-1129

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

Clutch Lever Adjuster

Lever Position Adjustment

- The adjuster has 4 positions so that the clutch lever position can be adjusted to suit the operator's hand.
- Push the lever forward and turn the adjuster [A] to align the number with the triangular mark [B] on the lever holder (front view).
- The distance from the grip to the lever is minimum at Number 4 and maximum at Number 1.



5-6 CLUTCH

Clutch Fluid

Fluid Level Inspection

- Check that the clutch fluid level in the clutch reservoir is between the lower [A] and the upper [B] level lines.

NOTE

○ Hold the reservoir horizontal when checking clutch fluid level.

- ★ If the fluid level is lower than the lower level line, fill the reservoir to the upper level line in the reservoir.

⚠ WARNING

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

NOTE

○ Since the clutch fluid is the same as the brake fluid, refer to Brake Fluid Section in Brakes chapter for further details.

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

Clutch Fluid Change

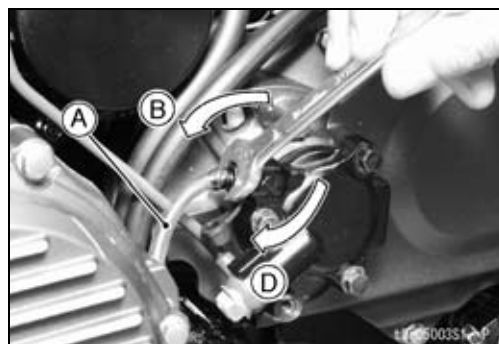
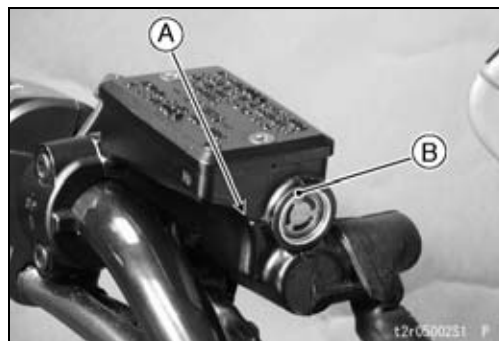
- Remove the clutch slave cylinder cover (see Clutch Slave Cylinder Removal).
- Level the clutch fluid reservoir and remove the reservoir cap.
- Remove the rubber cap from the bleed valve on the clutch slave cylinder.
- Attach a clear plastic hose [A] to the bleed valve and run the other end of the hose into a container.
- Fill the reservoir with fresh fluid.
- Change the clutch fluid as follows:
 - Open the bleed valve [B], using a wrench.
 - Pump the clutch lever and hold it [C].
 - Close the bleed valve [D].
 - Release the clutch lever [E].
- Repeat this operation until fresh fluid comes out from the plastic hose or the color of the fluid changes.
- Check the fluid level in the reservoir often, replenishing it as necessary.

NOTE

○ If the fluid in the reservoir runs completely out any time during fluid changing, the bleeding operation must be done over again from the beginning since air will have entered the line.

⚠ WARNING

Do not mix different grades and brands of fluid.



Clutch Fluid

- After changing the fluid, check the clutch for good clutch power and no fluid leakage.
- ★ If necessary, bleed the air from the lines (see Bleeding the Clutch Line).
- Remove the clear plastic hose.
- Install the reservoir cap.
- Tighten the bleed valve, and install the rubber cap.

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

Clutch Slave Cylinder Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)

Bleeding the Clutch Line

- With the reservoir cap off, slowly pump the clutch lever several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir. This bleeds the air from the master cylinder end of the line.

NOTE

- Tap the clutch hose lightly going from the lower end to the upper end and bleed the air off at the reservoir.

- Attach a clear plastic hose [A] to the bleed valve on the clutch slave cylinder, and run the other end of the hose into a container.
- Bleed the clutch line as follows:
 - Pump the clutch lever a few times until it becomes hard and then hold it applied [B].
 - Quickly open and close the bleed valve [C].
 - Release the clutch lever [D].
 - Check the fluid level in the reservoir often, replenishing it as necessary.

NOTE

- 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.
- Repeat this operation until no more air can be seen coming out into the plastic hose.

⚠ WARNING

Do not mix different grades and brands of fluid.

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

Clutch Slave Cylinder Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)

Clutch Hose Removal/Installation

- Since the clutch hose is the same as the brake hose, refer to Brake Hoses section in the Brakes chapter for clutch hose removal or installation.



5-8 CLUTCH

Clutch Fluid

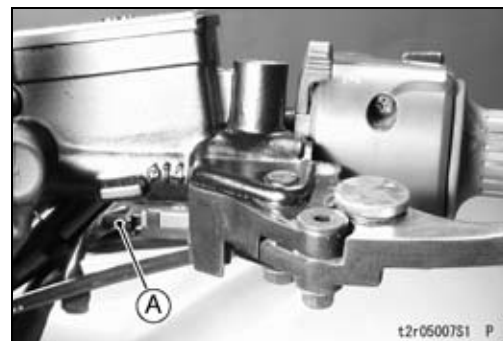
Clutch Hose or Pipe Inspection

- Whenever the clutch hose or pipe is removed or in accordance with the Periodic Maintenance Chart, check the clutch hose or pipe and their connections.
- Since the clutch hose is the same as the brake hose, refer to Brake Hoses section in the Brakes chapter for clutch hose or pipe inspection.

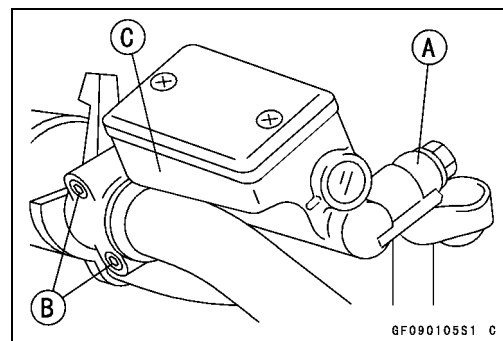
Clutch Master Cylinder

Clutch Master Cylinder Removal

- Disconnect the starter lockout switch connector [A] (front view).
- Drain the clutch fluid from the reservoir (see Clutch Fluid Change).



- Remove the banjo bolt [A] to disconnect the clutch hose from the master cylinder (rear view).
- Unscrew the clamp bolts [B], and take off the master cylinder [C] as an assembly with the clutch reservoir, clutch lever, and starter lockout switch installed.

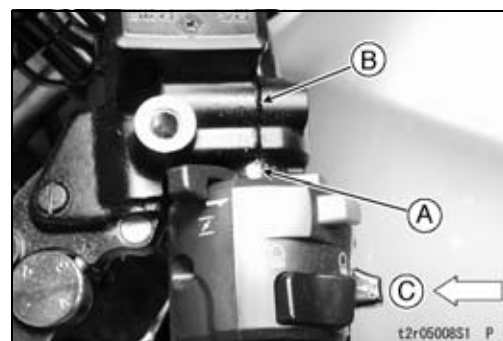


CAUTION

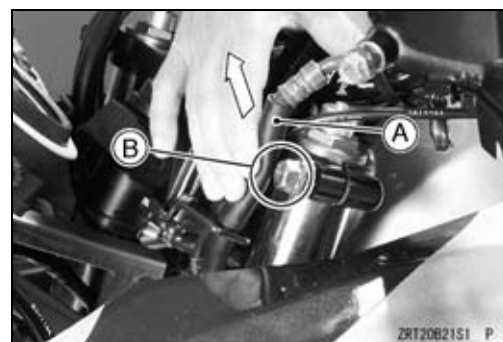
Clutch fluid quickly ruins painted surface; any spilled fluid should be completely washed away immediately.

Clutch Master Cylinder Installation

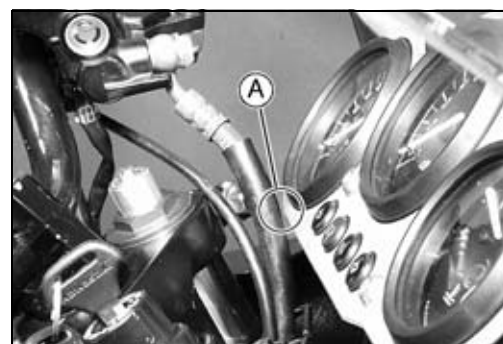
- Align the punch mark [A] on the handlebar with the mating surface [B] of the master cylinder clamp (left view).
Front [C]



- Check that the clutch hose [A] doesn't touch the front fork upper clamp bolt [B].



- And for the ZR1200B, check that the clutch hose [A] doesn't touch the meter unit either when the steering is turned right.



5-10 CLUTCH

Clutch Master Cylinder

★ If the clutch hose touches the clamp bolt or the meter unit, first move the clutch master cylinder about 5 mm (0.2 in.) inwards from the punch mark [A]. Move the clutch master cylinder along the extension through the punch mark and mating surface.

★ If the problem is not solved, adjust the handlebar clamping angle slightly.

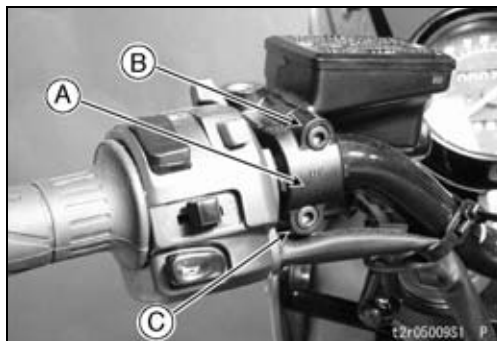


- Install the master cylinder clamp with the triangular mark [A] up.
- Tighten the upper clamp bolt [B] first, and then the lower clamp bolt [C]. There will be a gap at the lower part of the clamp after tightening.

Torque - Clutch Master Cylinder Clamp Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Use a new flat washer on each side of the clutch hose fitting.

Torque - Clutch Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)



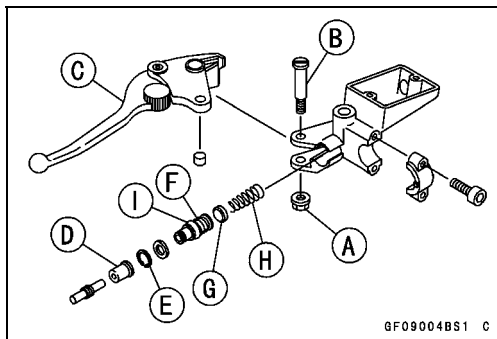
- Replenish the clutch fluid into the reservoir and bleed the clutch line (See Bleeding the Clutch Line).
- Check that the clutch line has proper fluid pressure and no fluid leakage.

Clutch Master Cylinder Disassembly

- Remove the master cylinder.
- Remove the reservoir cap and diaphragm, and pour the clutch fluid into a container.
- Unscrew the locknut [A] and pivot bolt [B], and remove the clutch lever [C].
- Pull the dust cover [D] out of place, and remove the circlip [E].

Special Tool - Inside Circlip Pliers: 57001-143

- Pull out the piston [F] with secondary cup [I], primary cup [G], and return spring [H].



CAUTION

Do not remove the secondary cup [I] from the piston since removal will damage it.

Clutch Master Cylinder

Clutch Master Cylinder Assembly

- Before assembling, clean all parts including the master cylinder with clutch fluid or alcohol.

CAUTION

Use only disc brake fluid, isopropyl alcohol, or ethyl alcohol, for cleaning parts. Do not use any other fluid for cleaning these parts. Gasoline, motor oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely, and will eventually deteriorate the rubber used in the cylinder.

- Apply clutch fluid to the parts removed and to the inner wall of the cylinder.
- Take care not to scratch the piston or the inner wall of the cylinder.
- Install the push rod with the dust seal fitted into the groove.
- The push rod round end must be faced inwards.

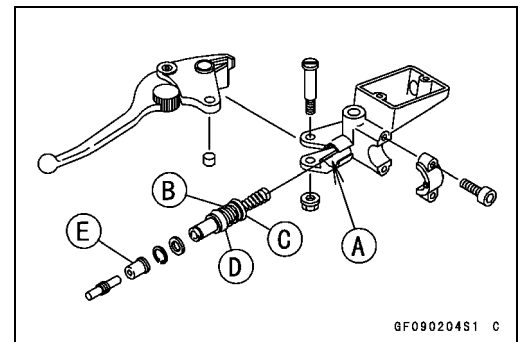
Torque - Clutch Lever Pivot Bolt: 1.0 N·m (0.10 kgf·m, 9 in·lb)

Clutch Lever Pivot Bolt Locknut: 5.9 N·m (0.60 kgf·m, 52 in·lb)

- Install the clutch master cylinder (see Clutch Master Cylinder Installation).

Clutch Master Cylinder Inspection

- Disassemble the clutch master cylinder.
- Check that there are no scratches, rust or pitting on the inside of the master cylinder [A] and on the outside of the piston [B].
- ★ If the master cylinder or piston shows any damage, replace them.
- Inspect the primary 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 cup.
- If fluid leakage is noted at the clutch lever, the piston assembly should be replaced to renew the cup.
- Check the dust cover [E] for damage.
- If it is damaged, replace it.
- Check that the relief and supply ports are not plugged.
- ★ If the small relief port becomes plugged, the clutch will drag. Blow the ports clean with compressed air.
- Check the piston return spring for any damage.
- ★ If the spring is damaged, replace it.

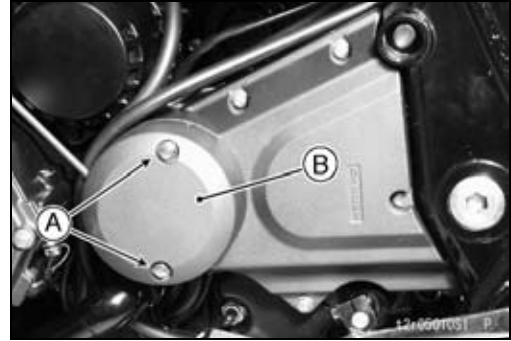


5-12 CLUTCH

Clutch Slave Cylinder

Clutch Slave Cylinder Removal

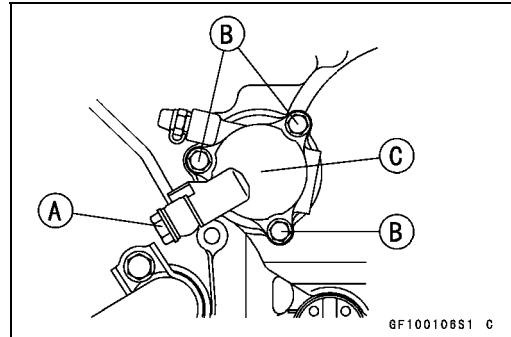
- Remove:
 - Bolts [A] and Clutch Slave Cylinder Cover [B]



Banjo Bolt [A]
Clutch Slave Cylinder Bolts [B]
Slave Cylinder [C]

CAUTION

Immediately wash away any clutch fluid that spills. It may damage painted surfaces.

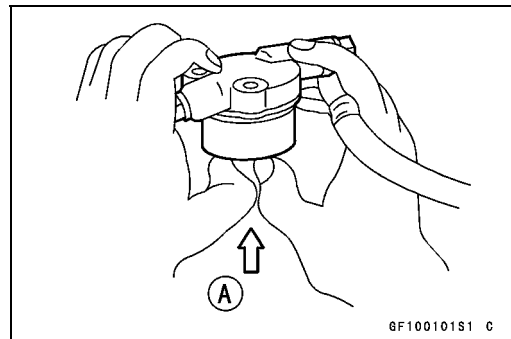


- Perform the following if the clutch slave cylinder is to be removed but not disassembled.

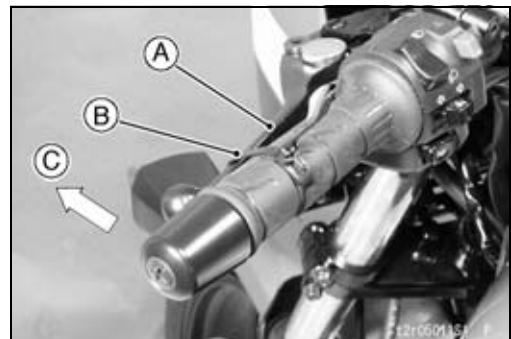
CAUTION

If the clutch slave cylinder is removed and left alone, the piston will be pushed out by spring force and the clutch fluid will drain out.

- Remove the clutch slave cylinder from the engine with the pipe installed. Push [A] the piston into the cylinder as far as it will go.



- Apply the clutch lever [A] slowly and hold it with a band [B].
Front [C]

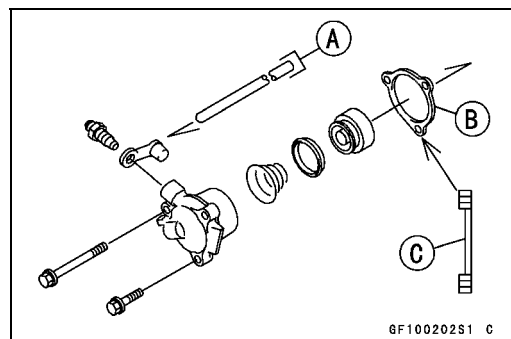


NOTE

- *Holding the clutch lever keeps the piston from coming out.*

Clutch Slave Cylinder Installation

- Apply molybdenum disulfide grease to either end [A] of the push rod, and install the push rod so that the greased end faces in.
- Replace the spacer [B] of the clutch slave cylinder with a new one.
- Install the spacer so that the stepped side [C] faces outward.

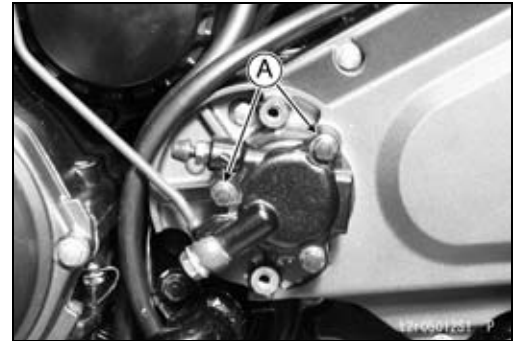


Clutch Slave Cylinder

- Apply a non-permanent locking agent to the threads of the two shorter slave cylinder bolts [A] shown.
- Finger tighten the clutch slave cylinder bolts.
- Remove the band from the clutch lever and release the clutch lever.
- Tighten the slave cylinder bolts.
- Replace the washer on each side of the clutch hose fitting with new one.
- Tighten the banjo bolt to the specified torque.

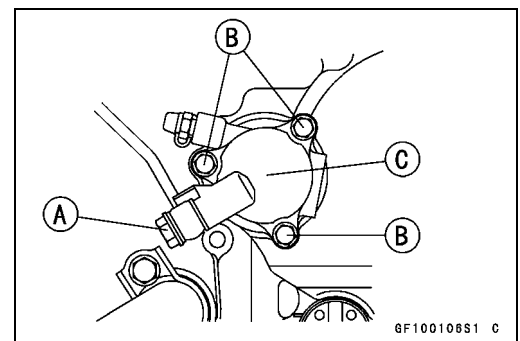
Torque - Clutch Pipe Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Check the fluid level in the master cylinder reservoir, and bleed the air in the clutch line.
- Check the clutch operation.



Clutch Slave Cylinder Disassembly

- Loosen the banjo bolt [A] at the slave cylinder, and tighten it loosely.
- Unscrew the slave cylinder bolts [B] and detach the slave cylinder with the pipe installed from the engine.
- Pump the clutch lever until the piston comes out of the cylinder.
- Unscrew the banjo bolt and remove the slave cylinder [C].



CAUTION

Immediately wash away any clutch fluid that spills. It may damage painted surfaces.

NOTE

○If the clutch slave cylinder is removed and left alone, the piston will be pushed out by spring force.

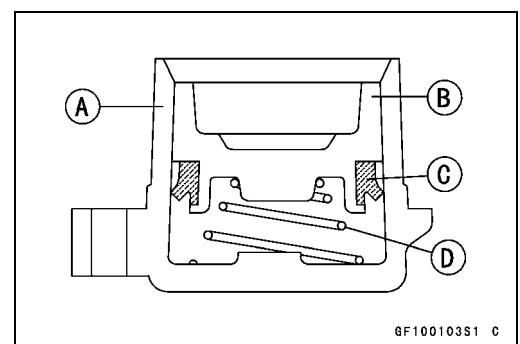
- Remove:
Spring
Fluid Seal .

Clutch Slave Cylinder Assembly

CAUTION

Replace the fluid seal with a new one if it was removed from the piston.

- Apply clutch fluid to the outside of the piston and the fluid seal.
- Install the fluid seal as shown.
Cylinder [A]
Piston [B]
Fluid Seal [C]
Spring [D]



5-14 CLUTCH

Clutch

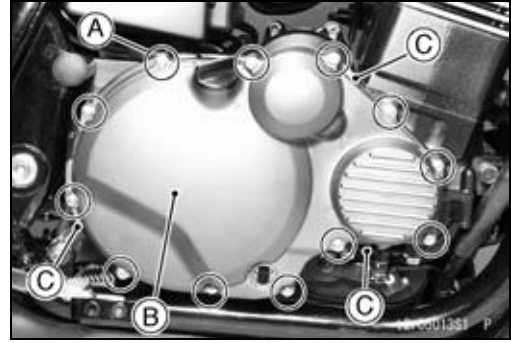
Clutch Removal

- Drain the engine oil (see Engine Lubrication System chapter).

- Remove:

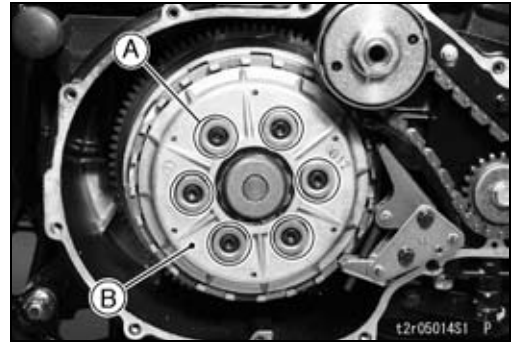
- Twelve Clutch Cover Bolts [A]
- Clutch Cover [B]

- Use the three pry points [C] to take off the cover.



- Remove:

- Clutch Spring Bolts [A]
- Clutch Springs
- Clutch Spring Plate [B] (with thrust bearing and clutch pusher).

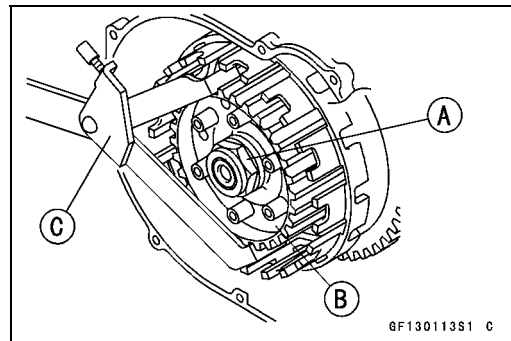


- Remove:

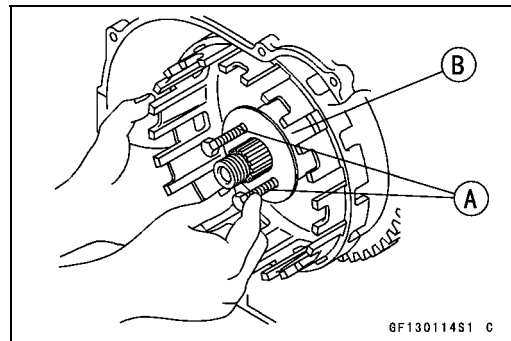
- Friction Plates, and Steel Plates
- Clutch Hub Nut [A]

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

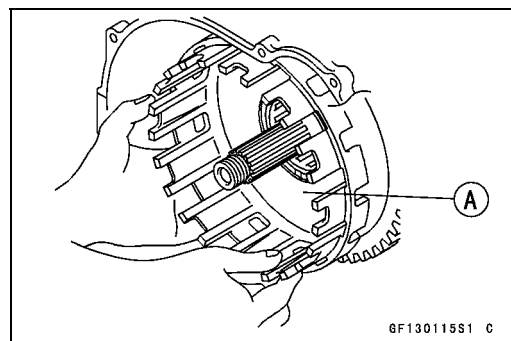
- Special Tool - Clutch Holder: 57001-1243 [C]**



- Using the two 6 mm × p 1.0 mm bolts [A], pull out the washer and the sleeve [B].
- Remove the needle bearing from the clutch housing.



- Remove the clutch housing [A].



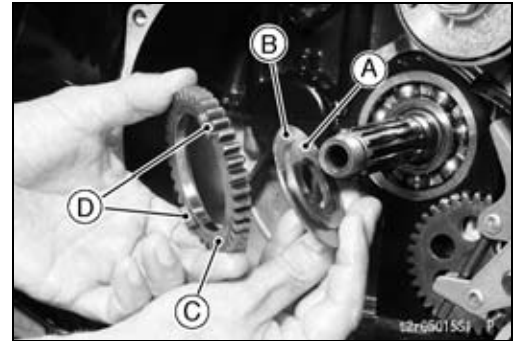
- Remove:

- Oil Pump Drive Gear
- Smaller Spacer and Larger Spacer

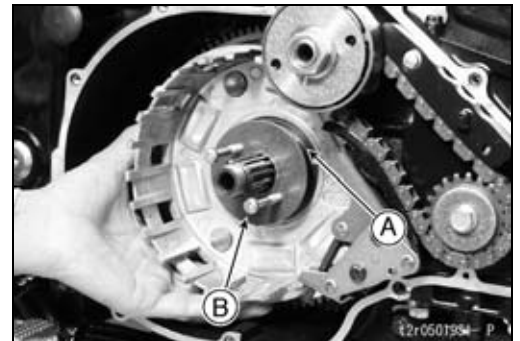
Clutch

Clutch Installation

- Install the smaller spacer [A] first, then install the larger one [B].
- Install the oil pump drive gear [C] with the dogs [D] facing outward.
- Install the clutch housing, meshing the dogs.



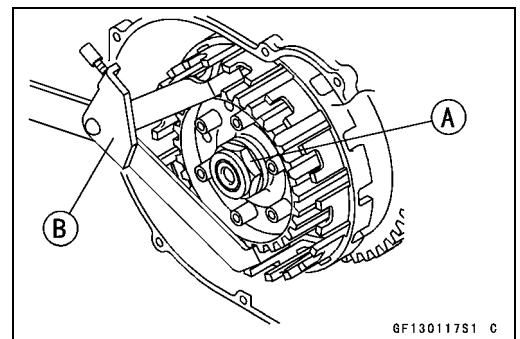
- Install the needle bearing [A] into the clutch housing.
- Install the sleeve with the tapped side [B] facing outward.
- Install the washer.



- Discard the used clutch hub nut, and install a new nut.
- Tighten the clutch hub nut [A], while holding the clutch hub with the clutch holder [B].

Special Tool - Clutch Holder: 57001-1243

Torque - Clutch Hub Nut: 135 N·m (13.8 kgf·m, 100 ft·lb)

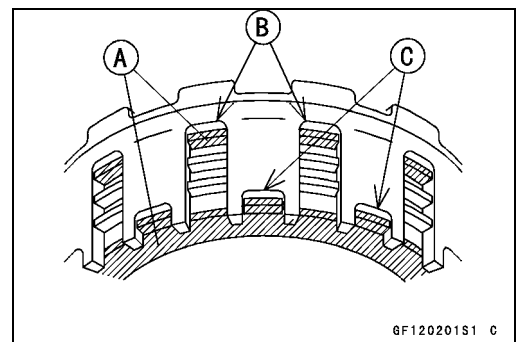


- There are two brown friction plates of cork [A], which should be installed on the outermost and the innermost positions of the clutch hub. Do not confuse them with the other yellowish friction plates.

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.

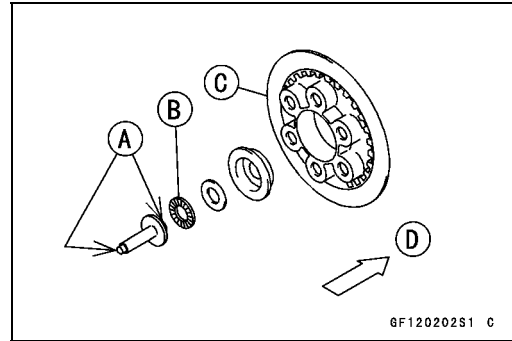
- First, install the brown friction plate fitting the tangs in the deeper grooves [B].
- Secondly, install the steel plates, and then the yellowish friction plates alternately, fitting their tangs in the same grooves.
- Finally, install the another brown friction plate, fitting the tangs in the shallower grooves [C].



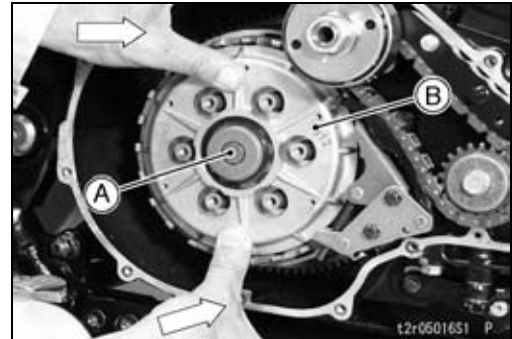
5-16 CLUTCH

Clutch

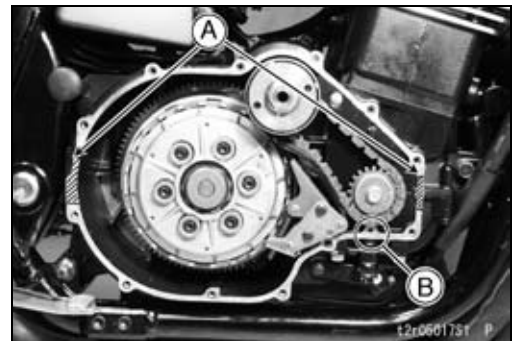
- Apply molybdenum disulfide grease to the ends [A] of the clutch pusher and the thrust bearing [B] and install them.
- Install the clutch spring plate [C].
Right Side (outside) [D]



- Check that the clutch pusher [A] is in the retracted position.
- ★ If not, push the spring plate [B] in by hands.
- Tighten:
Torque - Clutch Spring Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)



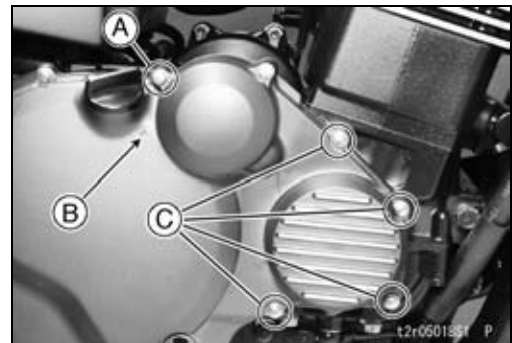
- Apply silicone sealant to the crankcase mating surfaces [A] on the front and rear cover mounts.
Sealant - Kawasaki Bond (Silicone Sealant): 56019-120



CAUTION

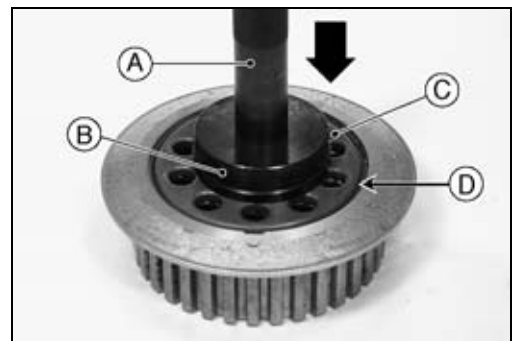
Do not apply silicone sealant to the area [B] around the oil passage.

- First install the clutch cover bolt [A] next to the triangular mark [B] to set the cover in place.
- Apply a non-permanent locking agent to the four clutch cover bolts [C] shown.
- Tighten the cover bolts in a criss cross pattern.
Torque - Clutch Cover Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)



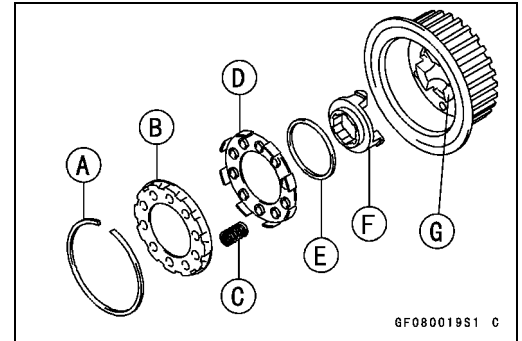
Clutch Hub Disassembly (ZR1200-A1 ~ A3/ ZR1200-B1 ~ B3/ZR1200-C1 ~ C2)

- Using a press [A], and a bearing driver [B], push the damper spring holder [C] to remove the retaining ring [D].
Special Tool - Bearing Driver Set: 57001-1129



Clutch

- Remove:
 - Retaining Ring [A]
 - Spring Holder [B]
 - Damper Spring [C]
 - Spring Holder [D]
 - Spacer [E]
 - Damper Cam [F]
 - Clutch Hub [G]

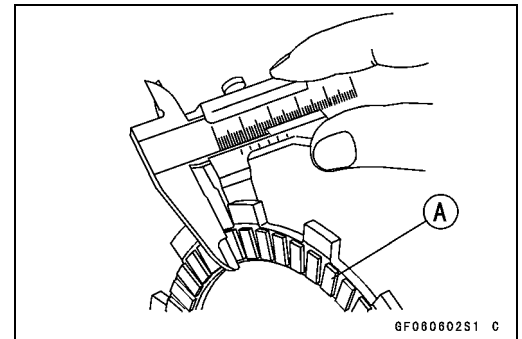


Friction or Steel Plate Damage, Wear Inspection

- Visually inspect the friction and steel plates for signs of seizure, overheating (discoloration) or uneven wear.
- Measure the thickness of the friction plates [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 (0.110 in.)

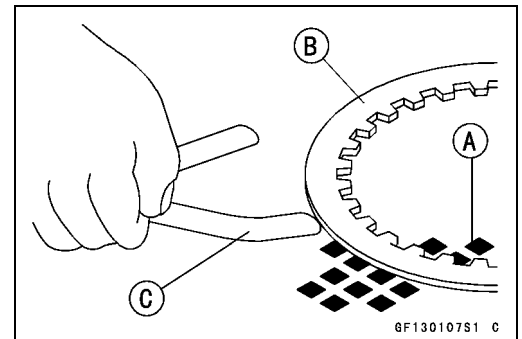


Friction or Steel Plate Warp Inspection

- Place each friction plate or steel plate on a surface plate, and measure the gap between the surface plate [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 or Steel Plate Warp

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

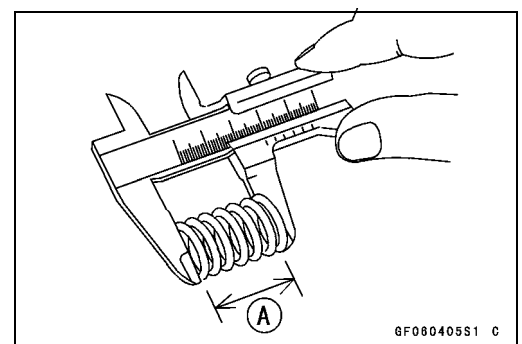


Clutch Spring Free Length Measurement

- 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:** 42.9 mm (1.689 in.)
- Service Limit:** 40.8 mm (1.606 in.)

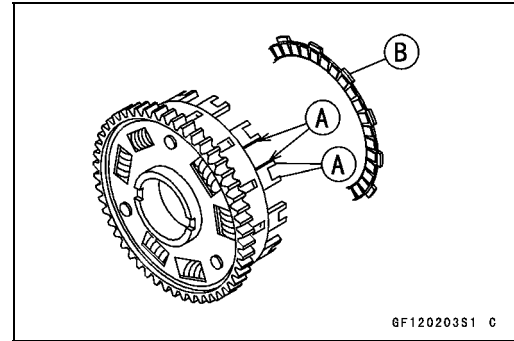


5-18 CLUTCH

Clutch

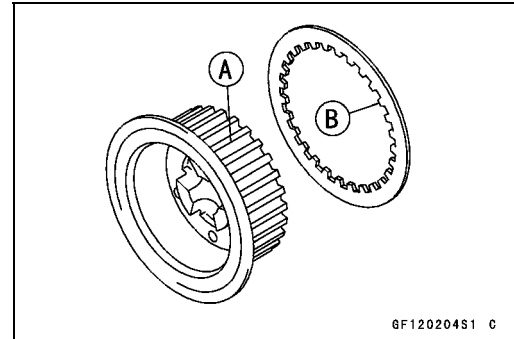
Clutch Housing Finger Inspection

- Visually inspect the clutch housing fingers [A] where the friction plate tangs [B] hit them.
- ★ If they are badly worn or if there are groove cuts where the tangs hit, replace the housing. Also, replace the friction plates if their tangs are damaged.



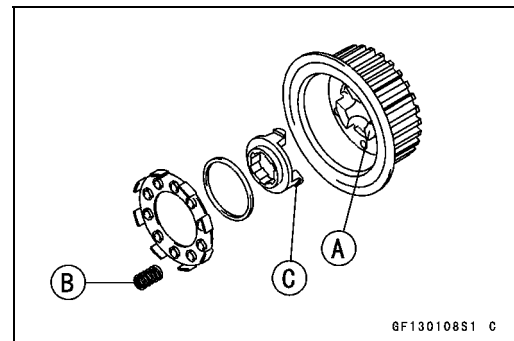
Clutch Hub Spline Inspection

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



Cam Damper Inspection (ZR1200-A1 ~ A3/ZR1200-B1 ~ B3/C1 ~ C2)

- Disassemble the clutch hub. (see this chapter).
- Visually inspect the damper cams [A], damper springs [B], and cam follower [C].
- ★ Replace any part that appears damaged.



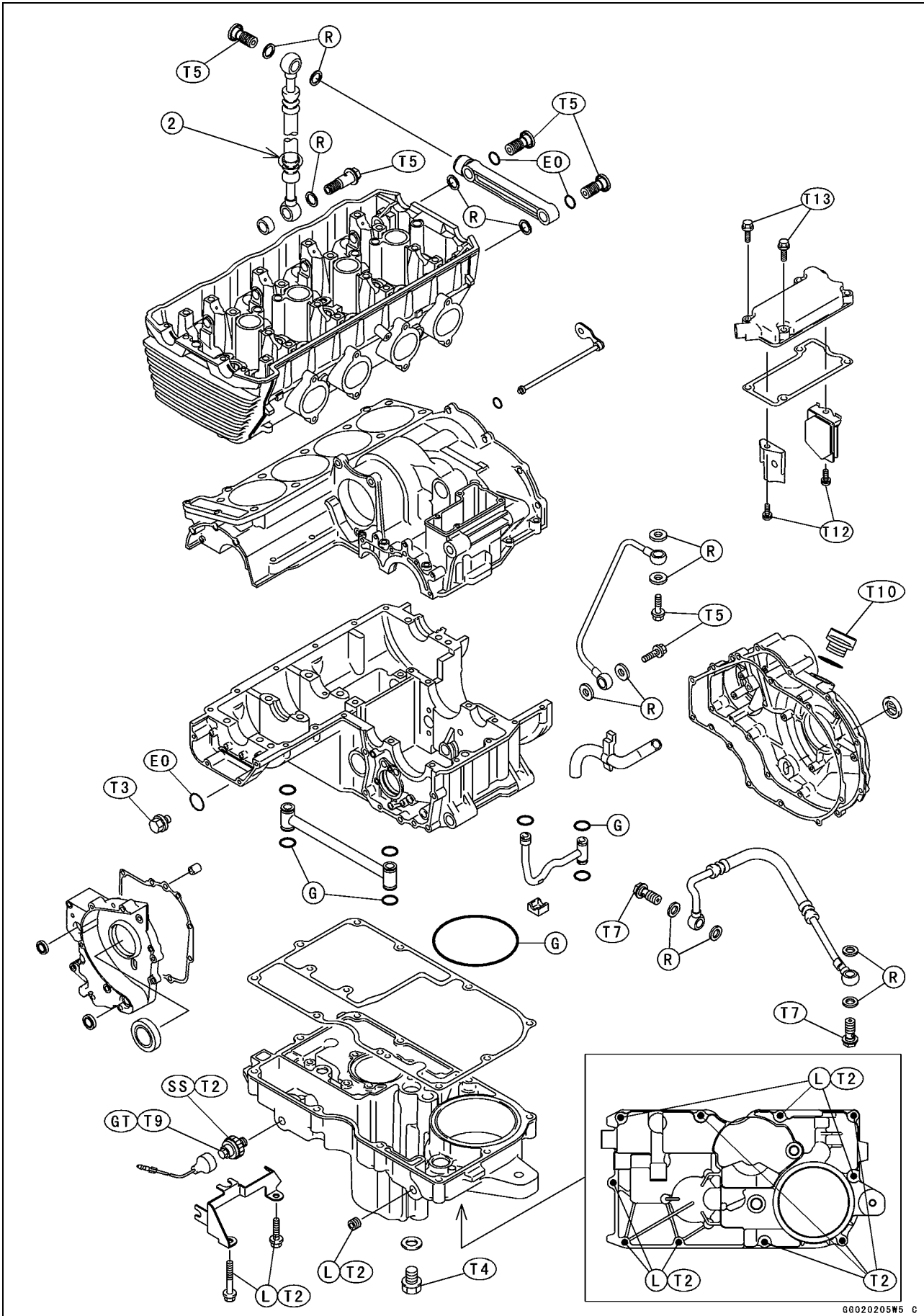
Engine Lubrication System

Table of Contents

Exploded View.....	6-2
Engine Oil Flow Chart.....	6-6
Rear View	6-6
Specifications	6-9
Engine Oil and Oil Filter.....	6-10
Oil Level Inspection.....	6-10
Engine Oil Change.....	6-10
Oil Filter Replacement	6-11
Oil Pan.....	6-13
Oil Pan Removal.....	6-13
Oil Pan Installation.....	6-13
Oil Pump.....	6-15
Oil Pump Removal.....	6-15
Oil Pump Installation.....	6-15
Oil Pump Disassembly.....	6-16
Oil Pump Assembly.....	6-16
Oil Pump Inspection.....	6-16
Oil Pump Drive Gear Removal.....	6-17
Oil Pump Drive Gear Installation.....	6-17
Relief Valve Inspection.....	6-17
Oil Pressure.....	6-18
Oil Pressure Measurement	6-18
Oil Pressure Switch Removal	6-18
Oil Pressure Switch Installation	6-19
Oil Hose and Pipes.....	6-20
Breather Removal/Installation.....	6-20
Blowby Gas System Inspection	6-20

6-2 ENGINE LUBRICATION SYSTEM

Exploded View

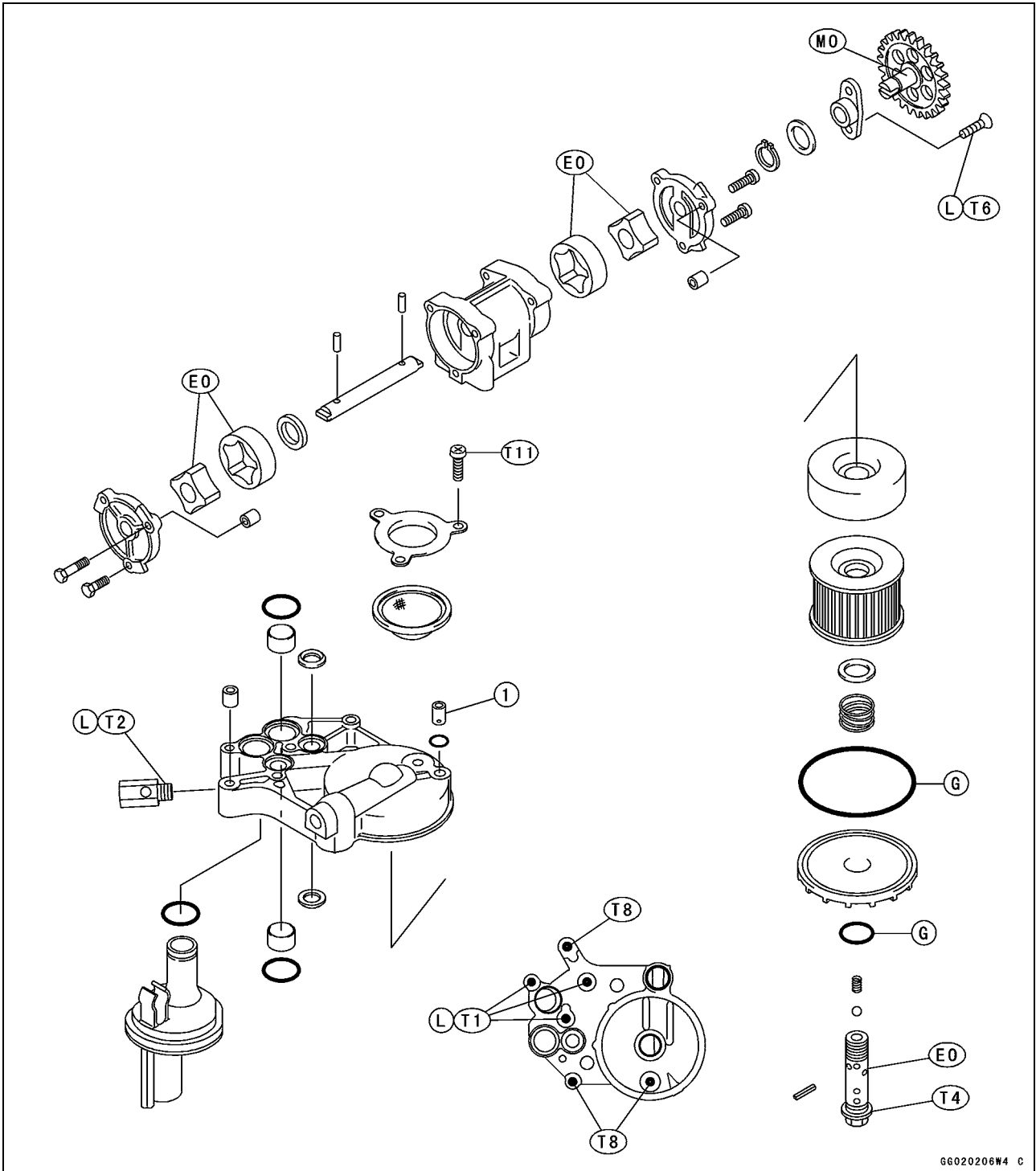


Exploded View

- 2. White Mark (Face the mark forward).
- T2: 15 N·m (1.5 kgf·m, 11 ft·lb)
- T3: 18 N·m (1.8 kgf·m, 13 ft·lb)
- T4: 20 N·m (2.0 kgf·m, 14 ft·lb)
- T5: 25 N·m (2.5 kgf·m, 18 ft·lb)
- T7: 34 N·m (3.5 kgf·m, 25 ft·lb)
- T9: 1.6 N·m (0.16 kgf·m, 14 in·lb)
- T10: 1.5 N·m (0.15 kgf·m, 13 in·lb)
- T12: 5.1 N·m (0.52 kgf·m, 45 in·lb)
- T13: 9.8 N·m (1.0 kgf·m, 87 in·lb)
- EO: Apply engine oil.
- G: Apply grease.
- GT: Apply a little grease to the switch terminal for rust prevention.
- L: Apply a non-permanent locking agent.
- R: Replacement Parts
- SS: Apply silicone sealant.

6-4 ENGINE LUBRICATION SYSTEM

Exploded View



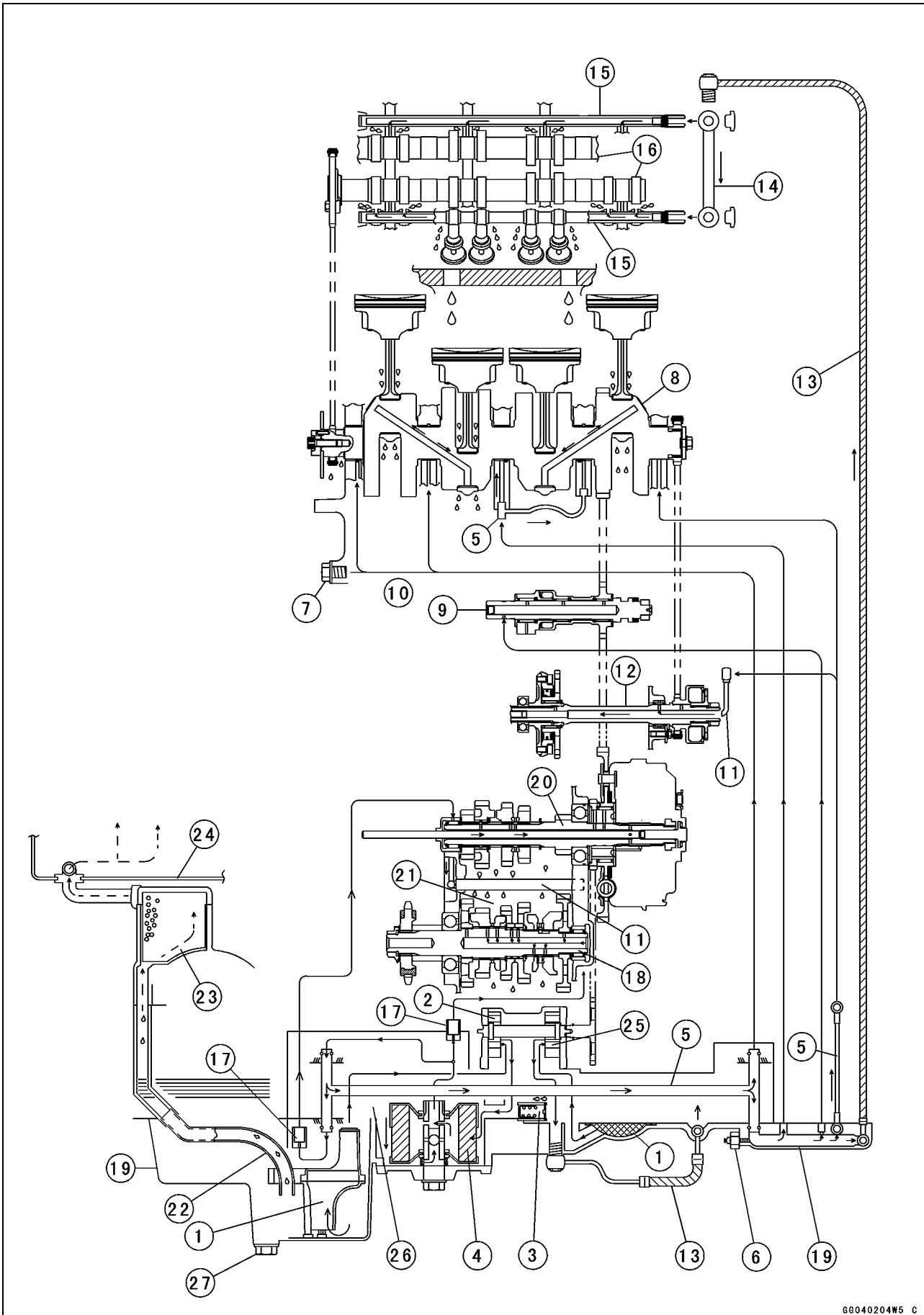
Exploded View

- 1. Small hole faces down.
- T1: 12 N·m (1.2 kgf·m, 106 in·lb)
- T2: 15 N·m (1.5 kgf·m, 11.0 ft·lb)
- T4: 20 N·m (2.0 kgf·m, 14 ft·lb)
- T6: 5.2 N·m (0.53 kgf·m, 46 in·lb)
- T8: 9.8 N·m (1.0 kgf·m, 87 in·lb)
- T11: 5.0 N·m (0.50 kgf·m, 44 in·lb)
- EO: Apply engine oil.
- G: Apply grease.
- L: Apply a non-permanent locking agent.
- MO: Apply molybdenum disulfide oil: a mixture of oil and molybdenum disulfide grease with a weight ratio (10 : 1)

6-6 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart

Rear View



Engine Oil Flow Chart

- <—: Oil flow
<- -: Blowby Gas
1. Oil Screens
 2. Left Side Oil Pump
 3. Relief Valve
 4. Oil Filter
 5. Oil Pipes
 6. Oil Pressure Switch
 7. Main Oil Passage Plug
 8. Crankshaft
 9. Balancer Shaft
 10. Crankcase and Balancer Chamber
 11. Nozzles
 12. Alternator Shaft
 13. Oil Hoses
 14. Oil Hose Fitting
 15. Rocker Shafts
 16. Camshafts
 17. Orifices
 18. Output Shaft
 19. Oil Pan
 20. Drive Shaft
 21. Transmission Chamber
 22. Oil Return Pipe
 23. Oil Separator
 24. Front Air Cleaner Housing
 25. Right Side Oil Pump
 26. Oil Pump Bracket
 27. Engine Drain Plug

The engine lubrication system has dual oil pumps with the left side pump [2] feeding oil to the transmission, the top end, crank, and balancer. The right side pump [25] reduces oil stirring loss by keeping the oil from collecting in the crankshaft and balancer chamber below the crankshaft and balancer shaft.

This two-pump system helps ensure reliable lubrication by avoiding drops in oil pressure during extreme riding conditions.

ENGINE LUBRICATION SYSTEM 6-9

Specifications

Item	Standard
Engine Oil	
Type	API SE, SF or SG API SH or SJ with JASO MA
(ZR1200A7F ~)	API SE, SF or SG API SH, SJ or SL with JASO MA
Viscosity	SAE 10W-40
Capacity	2.7 L (2.9 US qt) (when filter is not removed) 3.0 L (3.2 US qt) (when filter is removed) 3.5 L (3.7 US qt) (when engine is completely dry)
Level (after idling or running)	Between upper and lower level lines
Oil Pressure Measurement	
Oil pressure @engine speed 4 000 r/min (rpm), oil temp. 90°C (194°F)	200 ~ 290 kPa (2.0 ~ 3.0 kgf/cm ² , 28 ~ 43 psi)

Special Tools - Outside Circlip Pliers: 57001-144

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

Oil Pressure Gauge Adapter, M18 × 1.5: 57001-1278

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

6-10 ENGINE LUBRICATION SYSTEM

Engine Oil and Oil Filter

⚠ WARNING

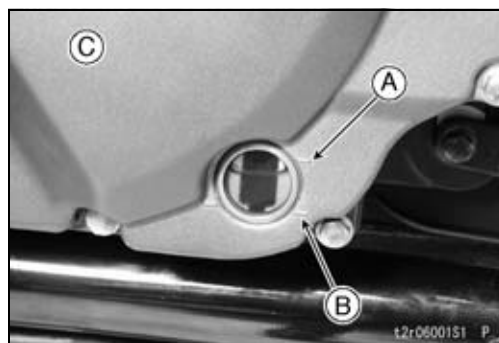
Motorcycle operation with insufficient, deteriorated or contaminated engine oil will cause accelerated wear and may result in engine or transmission seizure, accident, and injury.

Oil Level Inspection

- Situate the motorcycle so that it is vertical.
- Check that the engine oil level is between the upper [A] and lower [B] levels in the gauge of the clutch cover [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 idle speed, stop the engine immediately and find the cause.

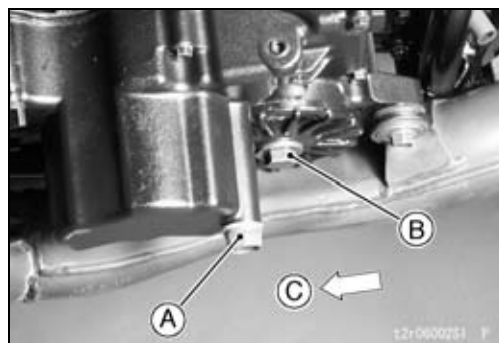
- ★ If the oil level is too high, remove the excess oil, using a syringe or some other suitable device.
- ★ If the oil level is too low, add the correct amount of oil through the oil filler opening. Use the same type and make of oil that is already in the engine.

NOTE

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

Engine Oil Change

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



Engine Oil and Oil Filter

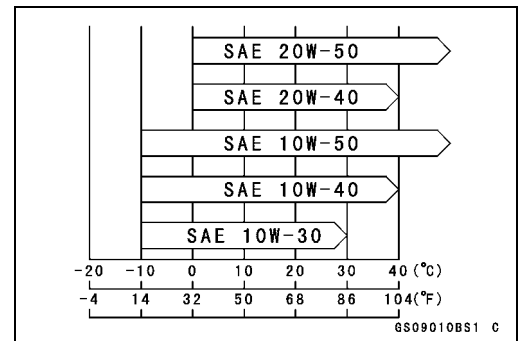
- Tighten:
 - Torque - Engine Oil Drain Plug: 20 N·m (2.0 kgf·m, 14 ft·lb)
 - Oil Filter Bolt: 20 N·m (2.0 kgf·m, 14 ft·lb)
- Pour in the specified type and amount of oil.

Recommended Engine Oil

Type	API SE, SF or SG API SH or SJ with JASO MA (ZR1200A7F ~) API SE, SF or SG API SH, SJ or SL with JASO MA
Viscosity	SAE 10W-40
Capacity	2.7 L (2.9 US qt) (when filter is not removed) 3.0 L (3.2 US qt) (when filter is removed) 3.5 L (3.7 US qt) (when engine is completely dry)

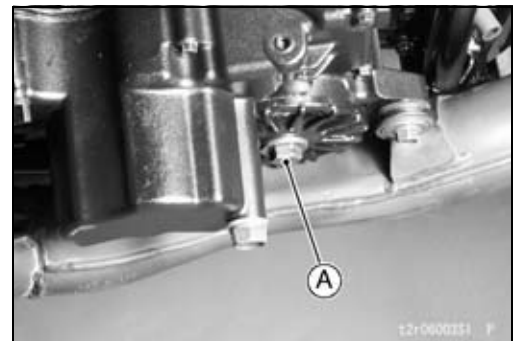
NOTE

○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.



Oil Filter Replacement

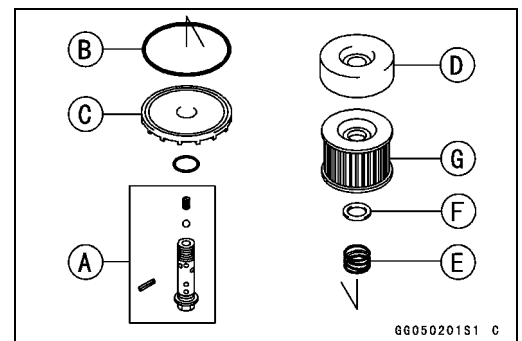
- Drain the engine oil (see Engine Oil Change).
- Remove the oil filter bolt [A] and take off the filter assembly.



NOTE

○The oil filter bypass valve is assembled in the filter bolt.

- Filter Bolt [A]
- O-ring [B]
- Filter Cover [C]
- Oil Fence [D]
- Spring [E]
- Washer [F]
- Filter [G]



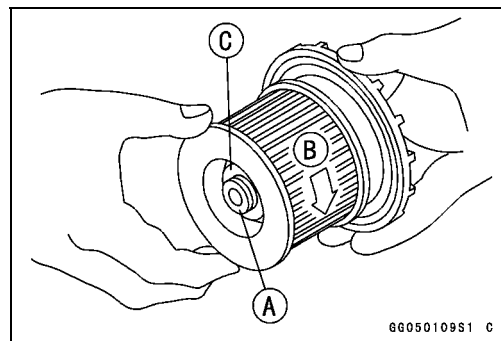
6-12 ENGINE LUBRICATION SYSTEM

Engine Oil and Oil Filter

- Replace the filter with a new one.
- Apply engine oil to the filter bolt [A], and turn [B] the filter or the filter bolt to work the filter into place. Be careful that the filter grommets [C] do not slip out of place.
- Install the oil fence over the filter and install the oil filter assembly.
- Tighten the filter bolt.

Torque - Oil Filter Bolt: 20 N·m (2.0 kg·m, 14 ft·lb)

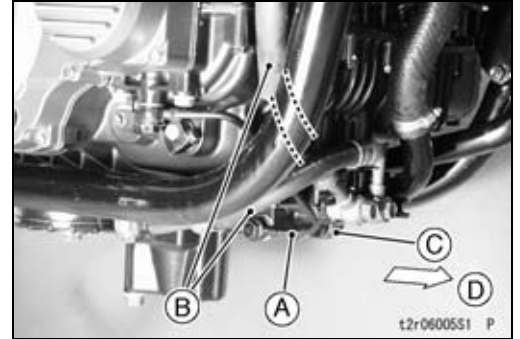
- Pour in the specified type and amount of oil (see Engine Oil Change).



Oil Pan

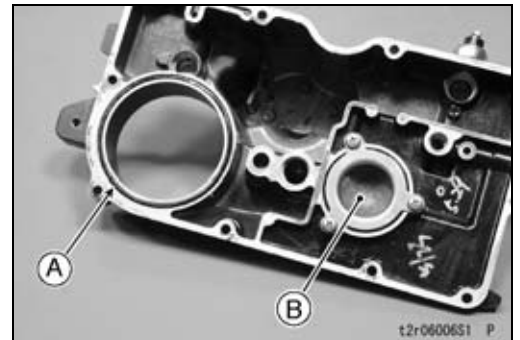
Oil Pan Removal

- Drain:
 - Coolant (see Cooling System chapter)
 - Engine Oil (see Oil Change)
- Remove:
 - Radiator (see Cooling System chapter)
 - Muffler Assembly (see Engine Top End Chapter)
 - Oil Pipe [A] and Oil Hoses [B]
 - Oil Pressure Switch Lead Terminal and Screw
 - Oil Filter
- Remove the oil pan bolts and take off the oil pan [C].
Front [D]



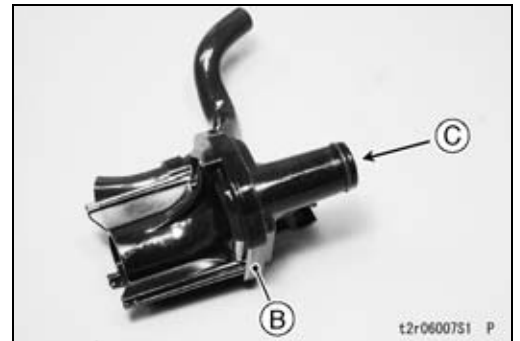
Oil Pan Installation

- Replace the O-ring [A] in the oil pan.
- Remove the oil screen units [B] and clean these oil screens with a high-flash point solvent and remove any particles stuck to them.
- Blow away the particles by applying compressed air [C] from the inside to the outside (from the clean side to the dirty side).



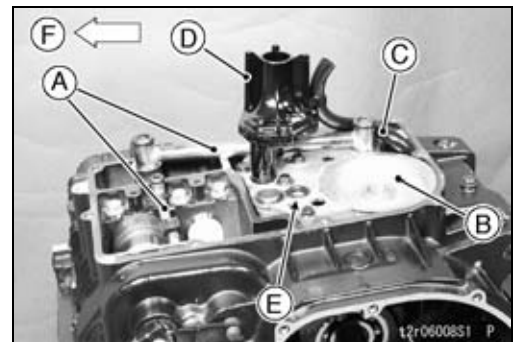
⚠ WARNING

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



NOTE

- While cleaning the screens, check for any metal particles that might indicate internal engine damage.
- Check the screens carefully for any damage: holes and broken wires.
- ★ If the screen is damaged, replace the unit.
- The crankcase bottom is shown.
- Use a new flat washer on each side of the oil hose or oil pipe banjo bolt.
- Replace the oil pan gasket with a new one.
- Replace the O-rings of the oil pipes [A] and the oil pump bracket [B] with new ones.
- While inserting the oil return pipe [C] into the lower crankcase, install the plastic oil filter unit [D].
- Install the pump outlet side O-ring [E] with the flat side facing to the bracket.
- Front [F]



6-14 ENGINE LUBRICATION SYSTEM

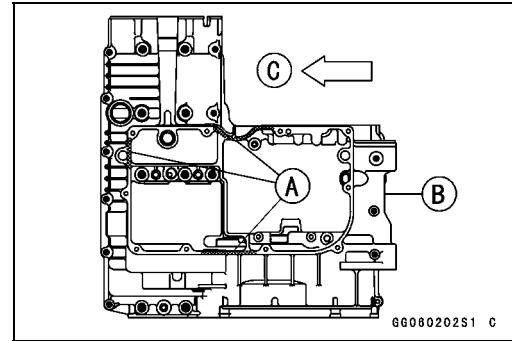
Oil Pan

- Apply silicone sealant to three areas [A] shown.

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

Bottom [B] of Lower Crankcase

Front [C]

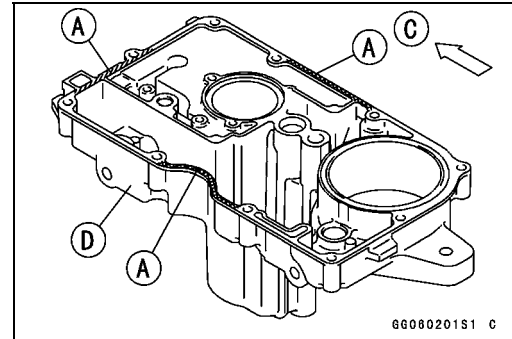


- Apply silicone sealant to three areas [A] shown.

Front [C]

Oil Pan [D]

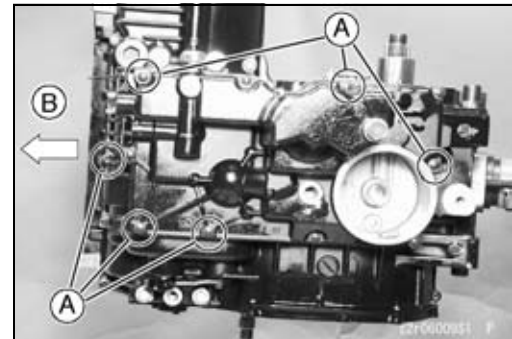
Sealant - Kawasaki Bond (Silicone Sealant): 56019-120



- Apply a non-permanent locking agent to the threads of the six oil pan bolts [A] on the oil pan.
- Tighten the oil pan bolts.

Torque - Oil Pan Bolts: 15 N·m (1.5 kgf·m, 11 in·lb)

Front [B]

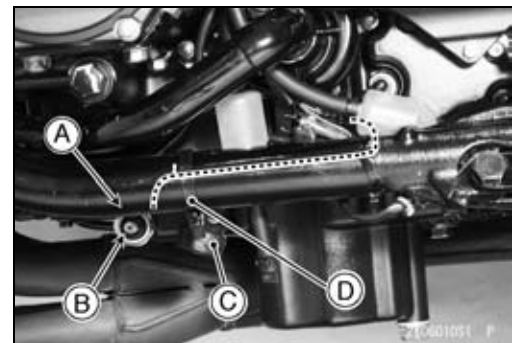


- If the oil pressure switch [A] has been removed, apply silicone sealant to threads and tighten it to the specified torque.

Torque - Oil Pressure Switch: 15 N·m (1.5 kgf·m, 18 ft·lb)

Oil Pressure Switch Terminal Screw [B]: 1.6 N·m (0.16 kgf·m, 13 in·lb)

- Install the rubber cap [C].
- Secure the switch lead with the strap [D].



- Tighten the oil hose banjo bolt [A] so that the damper [B] contacts the stopper [C] on the bottom of the oil pan.

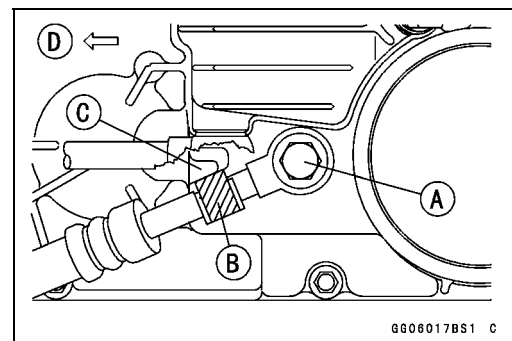
Front [D]

- Tighten:

Torque - Oil Pipe Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

Oil Hose Banjo Bolts (12 mm): 25 N·m (2.5 kgf·m, 18 ft·lb)

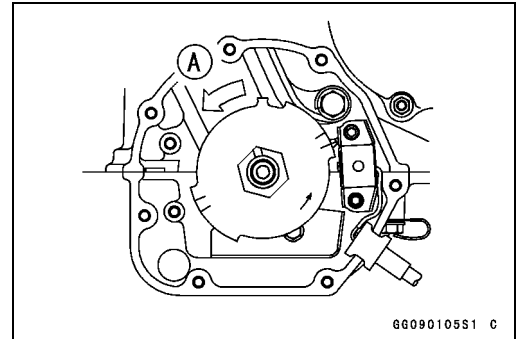
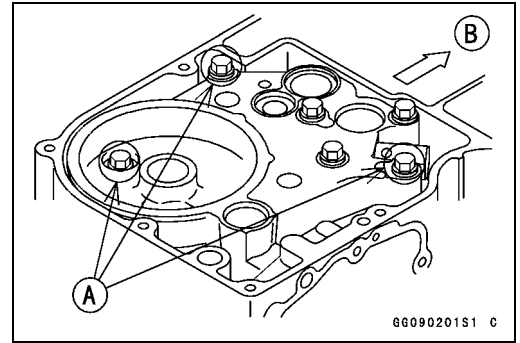
Return Oil Hose Banjo Bolts (14 mm): 34 N·m (3.5 kgf·m, 25 ft·lb)



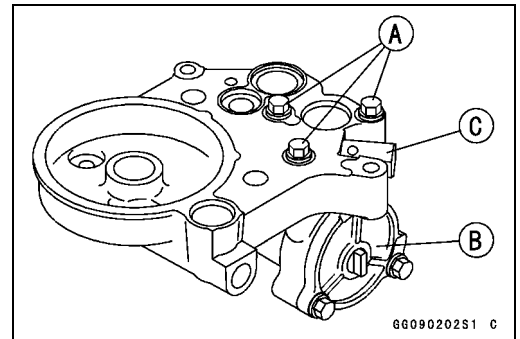
Oil Pump

Oil Pump Removal

- The crankcase bottom is shown.
- Remove:
 - Oil Pan (see Oil Pump Removal)
 - Plastic Oil Screen Unit
 - Oil Pipe
 - Three Oil Pump Bracket Bolts [A] (Do not remove the other bolts)
 - Pickup Coil Cover
 - Front [B]
- Turn [A] the crankshaft counterclockwise until the oil pump shaft tang and oil pump gear slot are vertical and the oil pump bracket can be removed.
- Pull out the oil pump bracket with the pump left installed.



- Remove the oil pump mounting bolts [A] and separate the pump [B] from the oil pump bracket.
- Unscrew the relief valve [C] if necessary.

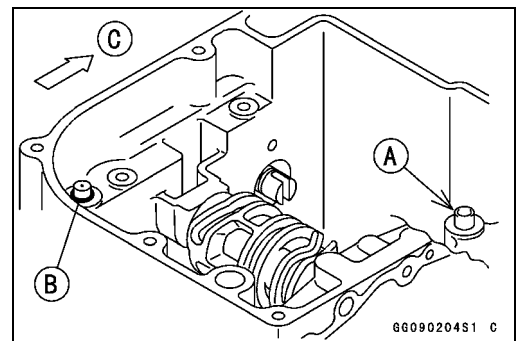
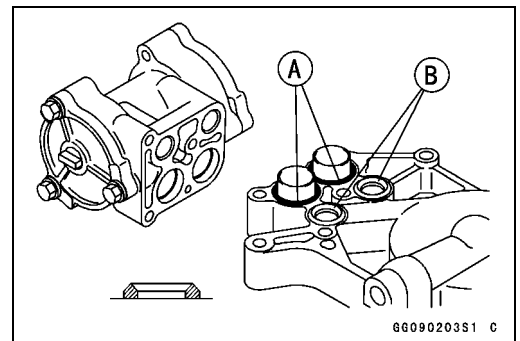


Oil Pump Installation

- Fill the pump with engine oil before installation.
- Check that the collars and O-rings [A] are in place.
- Install the pump outlet side O-rings [B] with the flat side facing the bracket.
- Check that the oil pump shaft turns freely.
- Apply a non-permanent locking agent to the threads of the oil pump mounting bolts, and tighten them.

Torque - Oil Pump Mounting Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

- Check that the dowel pin [A], orifice and its O-ring [B] are in place. The small hole of the orifice must face the oil pump bracket.
- Front [C]



6-16 ENGINE LUBRICATION SYSTEM

Oil Pump

- Turn the oil pump shafts so that the tang [A] and slot [B] are both vertical.
- Install the oil pump bracket and tighten the bolts.

Torque - Oil Pump Bracket Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

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

CAUTION

Do not apply too much non-permanent locking agent to the threads of the relief valve. This may block the oil passage.

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

Oil Pump Disassembly

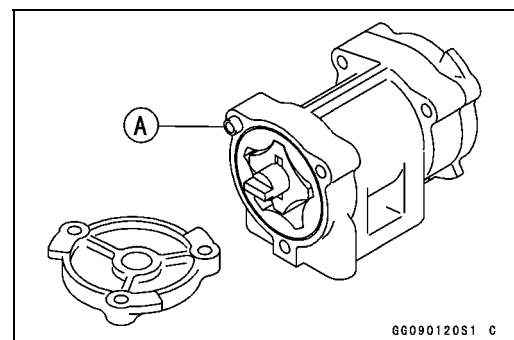
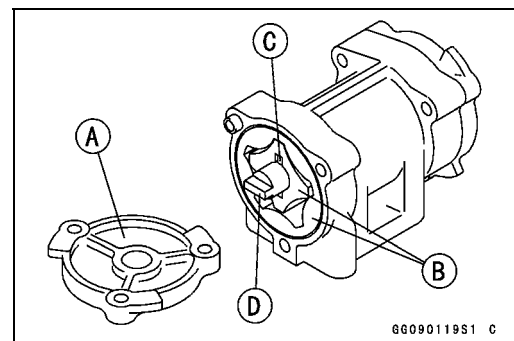
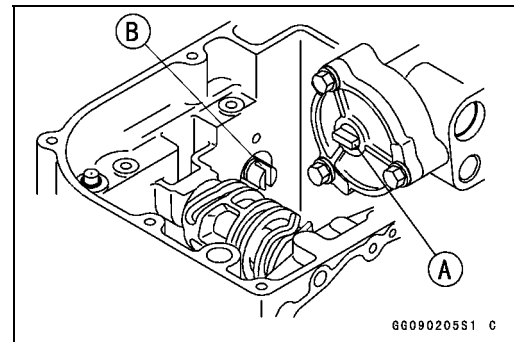
- Remove:
 - Oil Pump (see Oil Pump Removal)
 - Oil Pump Cover Screws
 - Oil Pump Cover [A]
- Take the rotors [B] out of the pump body.
- Pull the pin [C] off the pump shaft.
- Remove the rotors from the other side of the pump in the same manner.
- Pull the oil pump shaft [D] out of the body.

Oil Pump Assembly

- Be sure the dowel pin [A] is in place in the pump body.
- Apply engine oil to the rotors.
- Check that the pump shaft turns freely after assembling.

Oil Pump Inspection

- Disassemble the oil pump.
- Visually inspect the oil pump body, outer and inner rotors and covers.
- ★ If there is any damage or uneven wear, replace the rotors or the oil pump assembly.

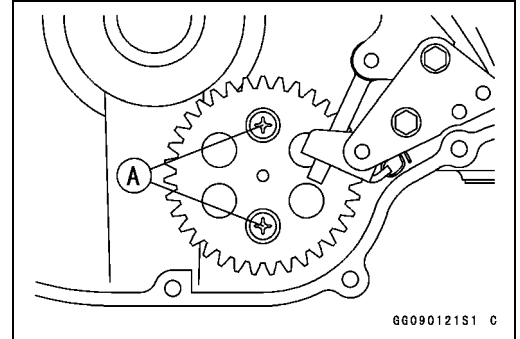


Oil Pump

Oil Pump Drive Gear Removal

- Remove the clutch (see Clutch chapter).
- Turn the oil pump gear so that the gear holder screws [A] can be removed through the pump gear holes.
- Take out the screws and remove the oil pump gear with the holder.
- Remove the circlip and separate the gear from the holder.

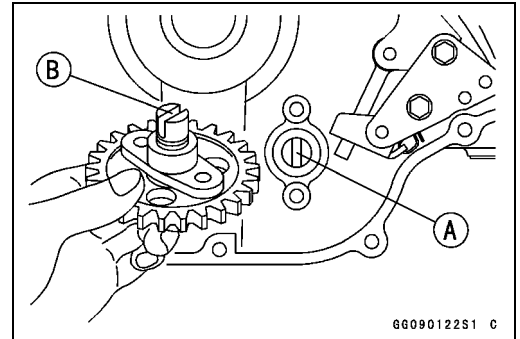
Special Tool - Outside Circlip Pliers: 57001-144



Oil Pump Drive Gear Installation

- When installing the oil pump gear, note the position of the oil pump shaft tang and turn the gear so that the tang [A] fits into the slot [B] of the shaft.
- Apply a non-permanent locking agent to the threads of the holder screws, and tighten them.

Torque - Oil Pump Drive Gear Holder Screws: 5.2 N·m (0.53 kgf·m, 46 in·lb)



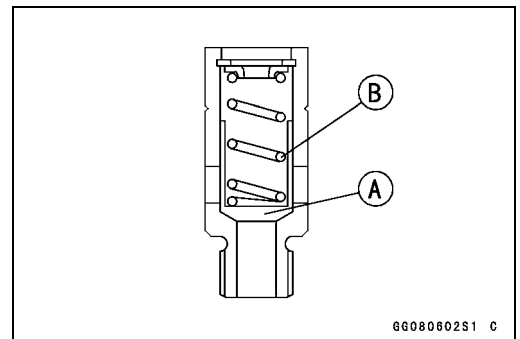
Relief Valve Inspection

- Remove the oil pump and then remove the oil pressure relief valve.
- Check to see if the valve [A] slides smoothly when pushing it in with a wooden or other soft rod, and see if it comes back to its seat by spring [B] pressure.

NOTE

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

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



⚠ WARNING

Clean the relief valve 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 a low-flash point solvent.

- ★ 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.

6-18 ENGINE LUBRICATION SYSTEM

Oil Pressure

Oil Pressure Measurement

- Remove the main oil passage plug [A].



- Attach the gauge [A] and adapter [B] to the plug hole.

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

**Oil Pressure Gauge Adapter, M18 × 1.5:
57001-1278**

- Start the engine and warm up the engine.
- Run the engine at the specified speed, and read the oil pressure gauge.
- ★ If the oil pressure is much lower than the standard, check the oil pump, oil pump relief valve, crankshaft bearing insert wear, and con-rod big end bearing insert wear immediately.
- ★ If the reading is much higher than the standard, check the oil screens first, and then the oil passages for dirt or clogging.



Oil Pressure

**Standard: 200 ~ 290 kPa (2.0 ~ 3.0 kgf/cm², 28 ~ 43 psi)
@4 000 r/min (rpm), Oil temperature. 90°C
(194°F)**

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

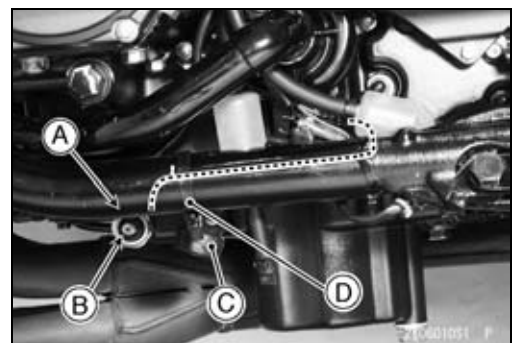
⚠ WARNING

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

- Install the oil passage plug.
Torque - Main Oil Passage Plug: 18 N·m (1.8 kgf·m, 13 ft·lb)

Oil Pressure Switch Removal

- Remove:
Engine Oil (drain, see Engine Oil Change)
Strap [D]
Rubber Switch Cover [C]
Switch Terminal Screw [B]
Oil Pressure Switch [A]



Oil Pressure

Oil Pressure Switch Installation

- Apply silicone sealant to 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 ft·lb)

- Tighten:

Torque - Oil Pressure Switch Terminal Screw: 1.6 N·m (0.16 kgf·m, 14 in·lb)

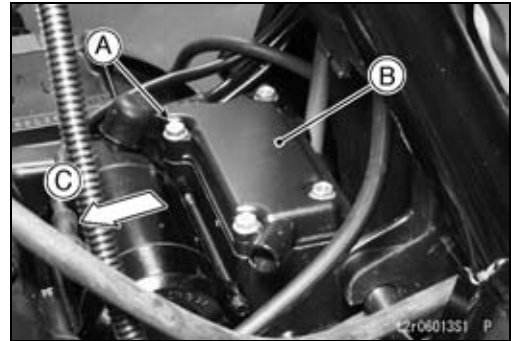
- Apply a little grease to the terminal for rust protection.
- Install the rubber cover.

6-20 ENGINE LUBRICATION SYSTEM

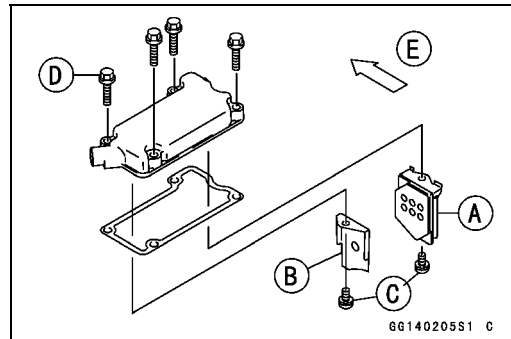
Oil Hose and Pipes

Breather Removal/Installation

- Remove the front air cleaner (see Fuel System Chapter).
- Unscrew the bolts [A] and take off the crankcase breather cover [B] along with the oil separator.
Front [C]

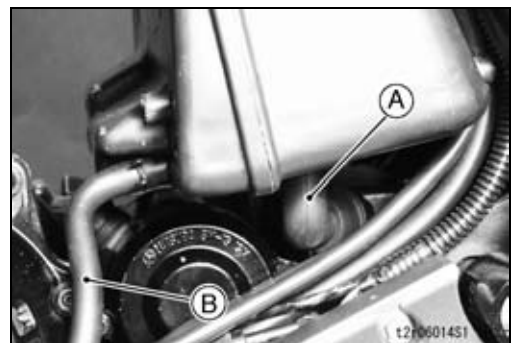


- Install:
 - Oil Separator [A]
 - Breather Plate [B]
- Torque - Oil Separator Screws [C]: 5.1 N·m (0.52 kgf·m, 45 in·lb)**
- Crankcase Breather Cover Bolts [D]: 10 N·m (1.0 kgf·m, 89 in·lb)**
- Front [E]

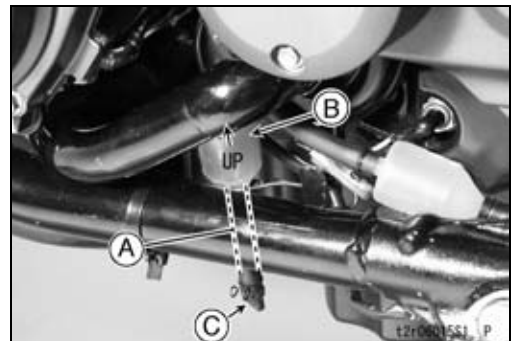


Blowby Gas System Inspection

- Be certain that the breather hose [A] and air cleaner drain hose [B] are routed without being flattened or kinked, and are connected correctly to the crankcase breather cover and front air cleaner housing.
- ★ If they are not, correct them.
- Inspect these hoses for damage or signs of deterioration. Squeeze the hoses. These hoses should not be hard and brittle, nor should be soft or swollen.
- ★ Replace any damaged hoses.
- Check that the hoses are securely connected.



- A catch tank [A] is provided beneath the air cleaner drain hose from the front air cleaner housing. The tank should be installed with the arrow mark [B] pointing upward.
- The catch tank catches the water or breather oil from the bottom of the air cleaner housing. Usually water or oil does not collect at the bottom of the housing. In the event that rain water is drawn in through the air cleaner or if engine oil is blown back, drain the housing.
- Visually check the catch tank, especially when changing engine oil, whether the water or oil accumulates in the tank.
- ★ If any water or oil accumulates in the tank, drain it by taking off the drain plug [C] at the lower end of the drain hose.
- Be sure to install the plug firmly or the air will be drawn in through it.



⚠ WARNING

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

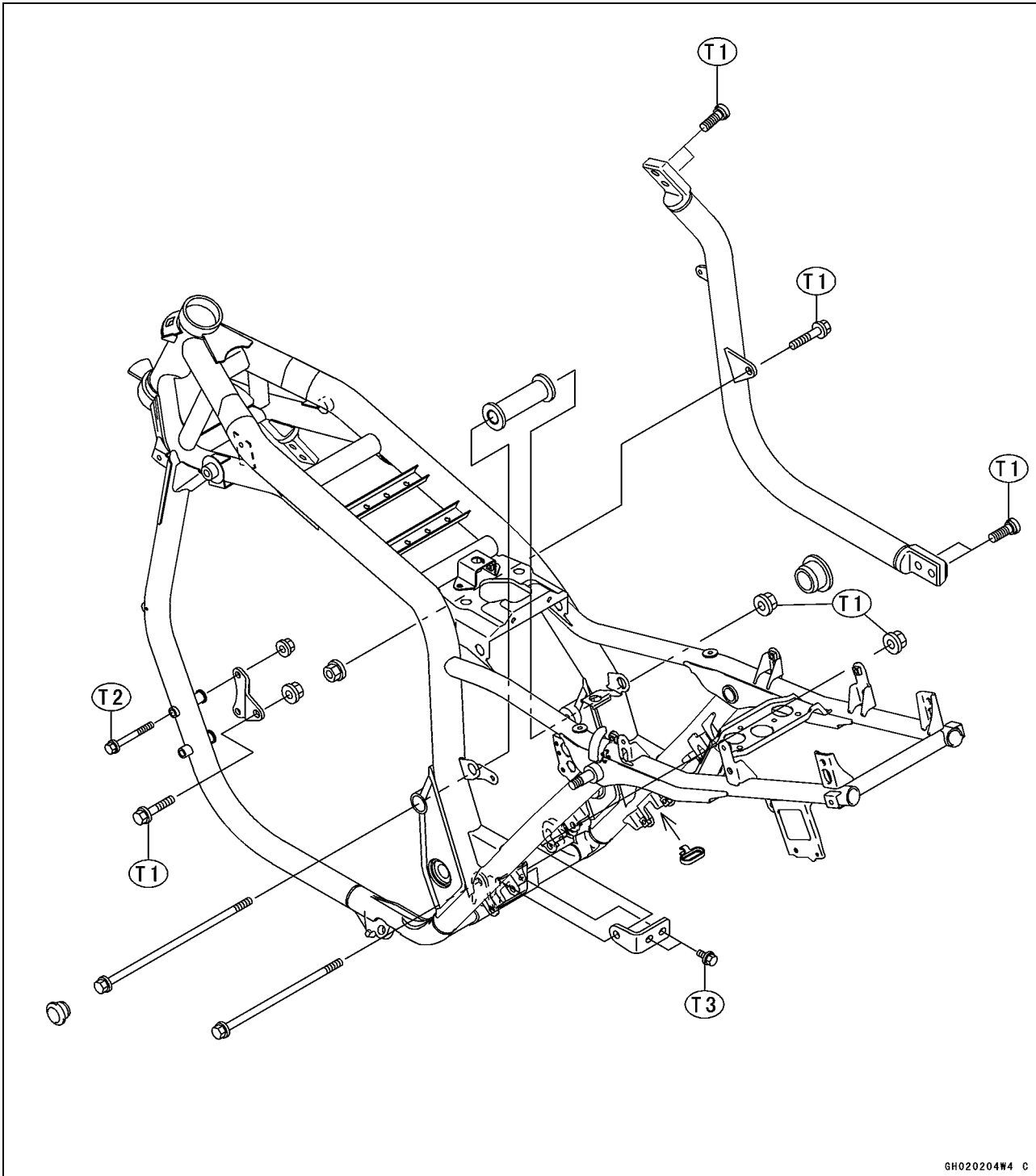
Engine Removal/Installation

Table of Contents

Exploded View.....	7-2
Engine Removal/Installation.....	7-3
Engine Removal.....	7-3
Engine Installation.....	7-5

7-2 ENGINE REMOVAL/INSTALLATION

Exploded View

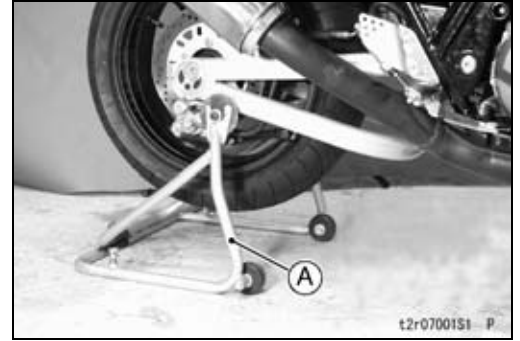


- T1: 44 N·m (4.5 kgf·m, 33 ft·lb)
- T2: 29 N·m (3.0 kgf·m, 21 ft·lb)
- T3: 25 N·m (2.6 kgf·m, 19 ft·lb)

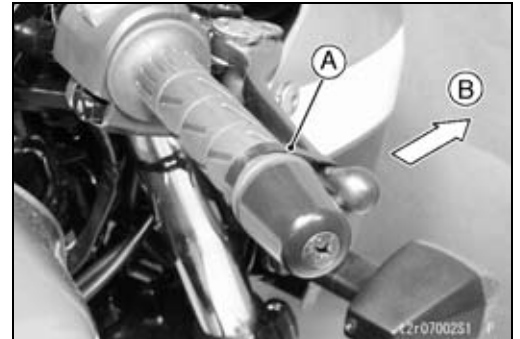
Engine Removal/Installation

Engine Removal

- Support the frame with a commercially available stand [A].



- Squeeze the brake lever slowly and hold it with a band [A].
Front [B]



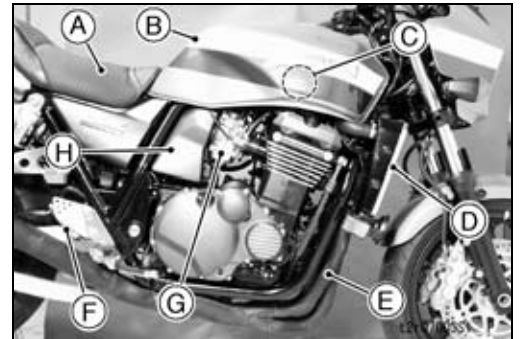
⚠ WARNING

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.

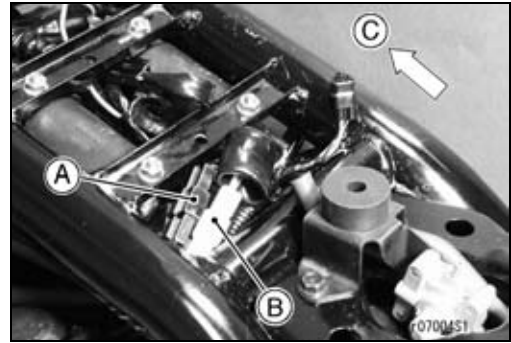
- Remove:
 - Fairing (ZR1200B, see Frame chapter)
 - Seat [A] (see Frame chapter)
 - Battery Negative Terminal (see Electrical System chapter)
 - Fuel Tank [B] (see Fuel System chapter)
- Drain:
 - Coolant (see Cooling System chapter)
 - Engine Oil (see Engine Lubrication System chapter)
- Remove:
 - Thermostat Housing [C] (see Cooling System chapter)
 - Radiator [D] (see Cooling System chapter)
 - Muffler Assembly [E] (see Engine Top End chapter)
 - Rear Master Cylinder [F] (with the brake pedal and the hose left installed)
 - Carburetor Assembly [G] (see Fuel System chapter)
 - Front Air Cleaner Housing [H] (see Fuel System chapter)
 - Spark Plug Caps
 - Vacuum Switch Valve and Hoses
 - Clutch Slave Cylinder (with the pipe left installed)
 - Shift Pedal
 - Water Pump (see Cooling System chapter)
 - Engine Sprocket (see Final Drive chapter)



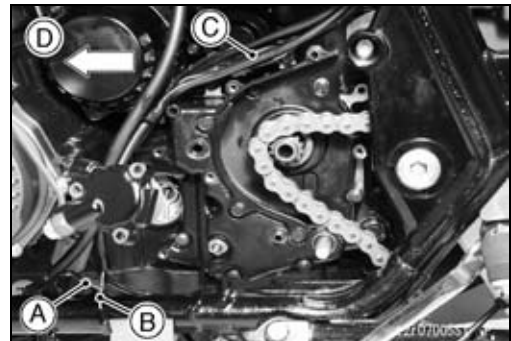
7-4 ENGINE REMOVAL/INSTALLATION

Engine Removal/Installation

- Pull off the connectors and free the wiring from the frame.
Crankshaft Sensor Coil Lead Connector [A]
Alternator Lead Connector [B]
Front [C]



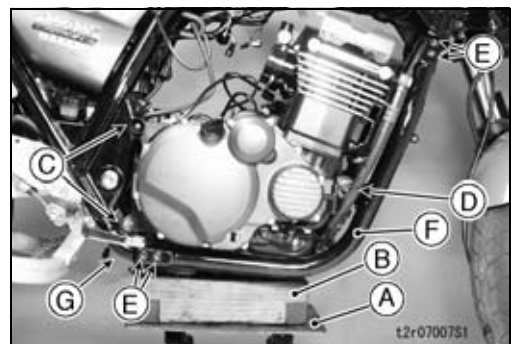
- Free from the frame:
Oil Pressure Switch Lead [A] (from the switch terminal)
Neutral Switch Lead [B] (from the pin of the switch)
Sidestand Switch Lead Connector [C] (disconnect)
Front [D]



- Disconnect:
Engine Ground Lead Terminal [A]
Starter Motor Lead Terminal [B]
Front [C]



- Support the engine with a stand or jack [A] along with a wooden block [B].
- Remove the rear bracket bolts [G].
- Remove the rubber caps for the upper rear engine mount bolt.
- Remove the rear upper, lower engine mounting bolts [C], rear bracket and collar.
- Remove the front engine mounting bolt and left engine bracket [D].
- Remove the downtube bolts [E] and take off the downtube [F].

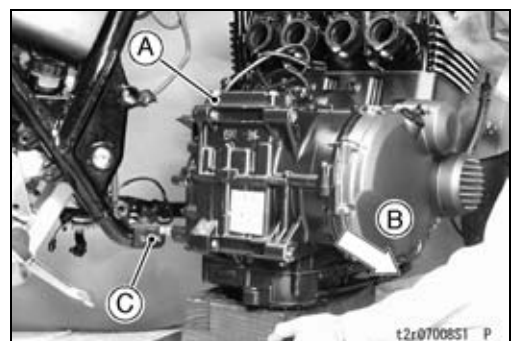


- Lift up the engine [A] and move it right [B] to free the output shaft from the drive chain.

NOTE

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

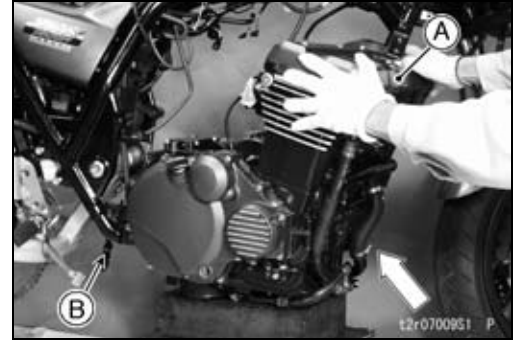
- Remove the engine from the vehicle right side. Clear the lower frame bracket [C], while twisting the engine unit.



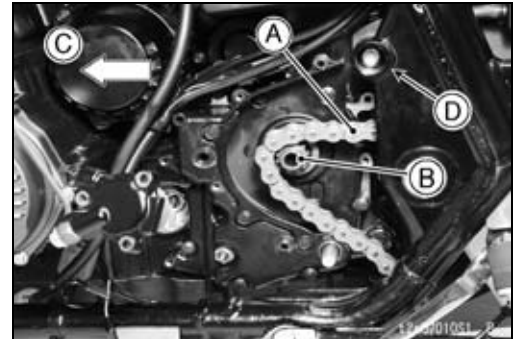
Engine Removal/Installation

Engine Installation

- Move the engine [A] into the frame from the left top and twist the engine to clear the lower bracket [B].



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

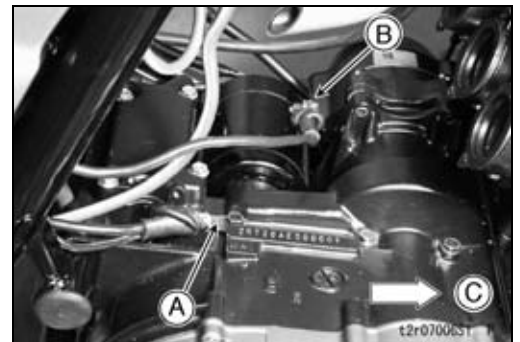


- Insert the rear mounting bolts [D] from the left side of the engine.
- Install the collar on the rear upper mounting bolt.
- Tighten:

- Torque - Downtube Bolts: 44 N·m (4.5 kgf·m, 33 ft·lb)
- Front Engine Bracket Bolts: 29 N·m (3.0 kgf·m, 21 ft·lb)
- Rear Engine Bracket Bolts: 25 N·m (2.6 kgf·m, 19 ft·lb)
- Engine Mounting Bolts and Nuts: 44 N·m (4.5 kgf·m, 33 ft·lb)
- Rear Master Cylinder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Install the removed parts (see appropriate chapters).

- Torque - Battery Ground Cable Bolt [A]: 15 N·m (1.5 kgf·m, 11 ft·lb)
- Starter Motor Terminal Nut [B]: 4.9 N·m (0.50 kgf·m, 43 in·lb)



Front [C]

- Run the leads, cables and hoses correctly (see Cable, Wire and Hose Routing section in the General Information chapter).

○ Run the oil hose [A] outside the engine bracket [B].

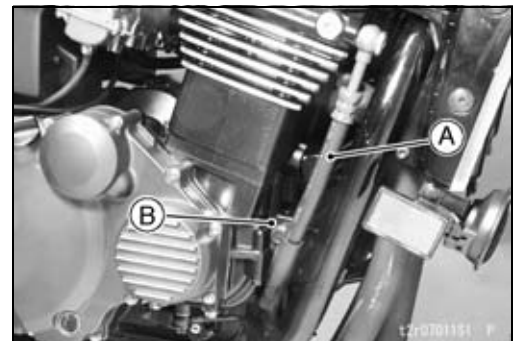
- Adjust:

Throttle Cables (see Fuel System chapter)

Choke Cable (see Fuel System chapter)

Drive Chain (see Final Drive chapter)

- Fill the engine with engine oil (see Engine Lubrication System Chapter).
- Fill the engine with coolant and bleed the air from the cooling system (see Cooling System Chapter).



7-6 ENGINE REMOVAL/INSTALLATION

Engine Removal/Installation

- Check the clutch operation.
- Check the brake effectiveness.

WARNING

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

Crankshaft/Transmission

Table of Contents

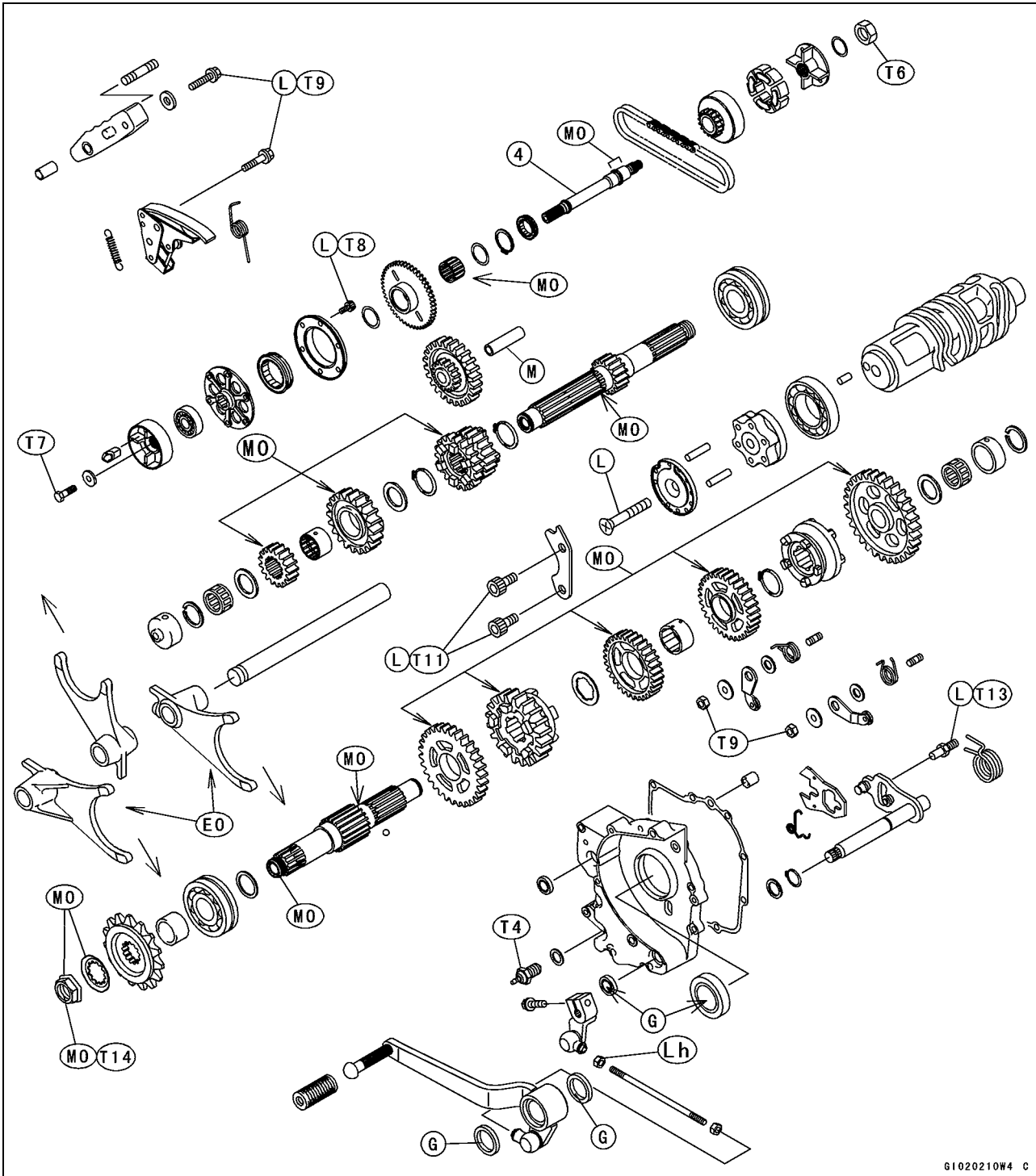
Exploded View	8-2	Starter Motor Clutch Inspection ...	8-28
Specifications	8-6	Starter Motor Clutch Disassembly	8-29
Crankcase	8-9	Starter Motor Clutch Assembly ...	8-29
Crankcase Splitting	8-9	Transmission	8-30
Crankcase Assembly	8-10	Shift Pedal Removal	8-30
Crankshaft and Connecting Rods.....	8-13	Shift Pedal Installation	8-30
Crankshaft Removal	8-13	Shift Lever Assembly	8-30
Crankshaft Installation	8-13	External Shift Mechanism	
Connecting Rod Removal	8-13	Removal	8-30
Connecting Rod Installation	8-14	External Shift Mechanism	
Crankshaft, Connecting Rod		Installation	8-32
Cleaning	8-17	External Shift Mechanism	
Connecting Rod Bend Inspection	8-18	Inspection	8-32
Connecting Rod Twist Inspection.	8-18	Transmission Shaft Removal	8-33
Connecting Rod Big End Side		Transmission Shaft Installation ...	8-33
Clearance Inspection	8-18	Transmission Shaft Disassembly .	8-34
Connecting Rod Big End Bearing		Transmission Shaft Assembly	8-34
Wear Inspection	8-18	Shift Drum and Fork Removal.....	8-37
Crankshaft Side Clearance		Shift Drum and Fork Installation...	8-37
Inspection	8-20	Shift Drum Disassembly	8-37
Crankshaft Runout Inspection.....	8-20	Shift Drum Assembly	8-37
Crankshaft Main Bearing Wear		Shift Fork Bending Inspection	8-37
Inspection	8-20	Shift Fork/Gear Groove Wear	
Balancer	8-23	Inspection	8-38
Balancer Removal	8-23	Shift Fork Guide Pin/Drum	
Balancer Installation	8-23	Groove Wear	8-38
Balancer Damper Inspection	8-25	Gear Dog and Gear Dog Hole	
Alternator Shaft, Starter Motor Clutch	8-26	Damage Inspection	8-38
Alternator Chain and Tensioner		Ball Bearing, Needle Bearing, and Oil	
Removal	8-26	Seal	8-39
Alternator Chain and Tensioner		Ball Bearing Replacement	8-39
Installation	8-26	Ball and Needle Bearing Wear	
Alternator Shaft Removal	8-27	Inspection	8-39
Alternator Shaft Installation	8-28	Oil Seal Inspection	8-39
Coupling Damper Inspection	8-28		
Alternator Chain Guide Wear			
Inspection	8-28		

Exploded View

1. Do not apply any grease or oil.
 2. Upper Crankcase
 3. Lower Crankcase
 5. Face the mass mark forward with the rod pointing the engine top.
 6. ZR1200-A3 ~, A6F ~/B3 ~ B4/C2 ~C3 Models
- T1: 18 N·m (1.8 kgf·m, 13 ft·lb)
T2: 32 N·m (3.3 kgf·m, 24 ft·lb)
T3: 27 N·m (2.8 kgf·m, 20 ft·lb)
T4: 15 N·m (1.5 kgf·m, 11 ft·lb)
T5: see the text.
T7: 25 N·m (2.5 kgf·m, 18 ft·lb)
T9: 9.8 N·m (1.0 kgf·m, 87 in·lb)
T12: 5.1 N·m (0.52 kgf·m, 45 in·lb)
- EO: Apply engine oil.
G: Apply grease.
L: Apply a non-permanent locking agent.
LG: Apply liquid gasket (Kawasaki Bond: 92104-1063).
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil: a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1).
R: Replacement Parts
S: Follow the specific tightening sequence.

8-4 CRANKSHAFT/TRANSMISSION

Exploded View



Exploded View

4. Alternator Shaft

T4: 15 N·m (1.5 kgf·m, 11 ft·lb)

T6: 59 N·m (6.0 kgf·m, 43 ft·lb)

T7: 25 N·m (2.5 kgf·m, 18 ft·lb)

T8: 12 N·m (1.2 kgf·m, 106 in·lb)

T9: 9.8 N·m (1.0 kgf·m, 87 in·lb)

T11: 13 N·m (1.3 kgf·m, 113 in·lb)

T13: 30 N·m (3.1 kgf·m, 22 ft·lb)

T14: 127 N·m (13 kgf·m, 94 ft·lb)

EO: Apply engine oil.

G: Apply grease.

L: Apply a non-permanent locking agent.

Lh: Left-hand threads

M: Apply molybdenum disulfide grease.

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

8-6 CRANKSHAFT/TRANSMISSION

Specifications

Item		Standard	Service Limit																						
Crankshaft, Connecting Rods																									
Connecting Rod Bend		---	TIR 0.2/100 mm (0.08/3.94 in.)																						
Connecting Rod Twist		---	TIR 0.2/100 mm (0.08/3.94 in.)																						
Connecting Rod Big End Side Clearance		0.13 ~ 0.38 mm (0.0051 ~ 0.0150 in.)	0.58 mm (0.023 in.)																						
Connecting Rod Big End Bearing Insert/crankpin Clearance		0.042 ~ 0.070 mm (0.00165 ~ 0.0028 in.)	0.11 mm (0.0043 in.)																						
Crankpin Diameter:		35.984 ~ 36.000 mm (1.41669 ~ 1.41732 in.)	35.97 mm (1.4161 in.)																						
Marking	None	35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in.)	---																						
	○	35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in.)	---																						
Connecting Rod Big End Inside Diameter:		39.000 ~ 39.016 mm (1.53543 ~ 1.53606 in.)	---																						
Marking	None	39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in.)	---																						
	○	39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in.)	---																						
Connecting Rod Big End Bearing Insert Thickness:		1.475 ~ 1.480 mm (0.05807 ~ 0.05827 in.)	---																						
	Black	1.480 ~ 1.485 mm (0.05827 ~ 0.05846 in.)	---																						
	Blue	1.485 ~ 1.490 mm (0.05846 ~ 0.05866 in.)	---																						
	White																								
Connecting Rod Big End Bearing Insert Selection:																									
<table border="1"> <thead> <tr> <th rowspan="2">Con-rod Big End Inside Diameter Markings</th> <th rowspan="2">Crankpin Diameter Markings</th> <th colspan="2">Bearing Inserts</th> </tr> <tr> <th>Size Color</th> <th>Part Number</th> </tr> </thead> <tbody> <tr> <td>None</td> <td>○</td> <td>Black</td> <td>92028-1679</td> </tr> <tr> <td>None</td> <td>None</td> <td>Blue</td> <td>92028-1680</td> </tr> <tr> <td>○</td> <td>○</td> <td></td> <td></td> </tr> <tr> <td>○</td> <td>None</td> <td>White</td> <td>92028-1681</td> </tr> </tbody> </table>				Con-rod Big End Inside Diameter Markings	Crankpin Diameter Markings	Bearing Inserts		Size Color	Part Number	None	○	Black	92028-1679	None	None	Blue	92028-1680	○	○			○	None	White	92028-1681
Con-rod Big End Inside Diameter Markings	Crankpin Diameter Markings	Bearing Inserts																							
		Size Color	Part Number																						
None	○	Black	92028-1679																						
None	None	Blue	92028-1680																						
○	○																								
○	None	White	92028-1681																						
Crankshaft Side Clearance		0.05 ~ 0.20 mm (0.0020 ~ 0.0079 in.)	0.40 mm (0.0158 in.)																						
Crankshaft Runout		TIR 0.02 mm (0.0008 in.) or less	TIR 0.05 mm (0.0020 in.)																						
Crankshaft Main Bearing Insert/journal Clearance		0.020 ~ 0.044 mm (0.00079 ~ 0.00173 in.)	0.08 mm (0.0032 in.)																						

CRANKSHAFT/TRANSMISSION 8-7

Specifications

Item	Standard	Service Limit
Crankshaft Main Journal Diameter:	35.984 ~ 36.000 mm (1.41669 ~ 1.41732 in.)	35.96 mm (1.4158 in.)
Marking None	35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in.)	- - -
1	35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in.)	- - -
Crankcase Main Bearing Bore Diameter:	39.000 ~ 39.016 mm (1.53543 ~ 1.53606 in.)	- - -
Marking ○	39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in.)	- - -
None	39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in.)	- - -
Crankshaft Main Bearing Insert Thickness:		
Brown	1.490 ~ 1.494 mm (0.05866 ~ 0.05822 in.)	- - -
Black	1.494 ~ 1.498 mm (0.05822 ~ 0.05898 in.)	- - -
Blue	1.498 ~ 1.502 mm (0.05898 ~ 0.05913 in.)	- - -
Crankshaft Main Bearing Insert Selection:		
Crankcase Main Bearing Bore Diameter Marking	Crankshaft Main Journal Diameter Marking	Bearing Inserts*
○	1	Size Color Part Number Journal Nos.
		Brown 92028-1274 1, 3, 5
		92028-1102 2, 4
None	1	Black 92028-1273 1, 3, 5
○	None	92028-1101 2, 4
None	None	Blue 92028-1272 1, 3, 5
		92028-1100 2, 4
*The bearing inserts for Nos. 2 and 4 journals have an oil groove, respectively.		
Transmission		
Shift Fork Ear Thickness	4.9 ~ 5.0 mm (0.193 ~ 0.197 in.)	4.8 mm (0.189 in.)
Gear Groove Width	5.05 ~ 5.15 mm (0.1988 ~ 0.203 in.)	5.25 mm (0.207 in.)
Shift Fork Guide Pin Diameter	7.9 ~ 8.0 mm (0.311 ~ 0.315 in.)	7.8 mm (0.307 in.)
Shift Drum Groove Width	8.05 ~ 8.20 mm (0.317 ~ 0.323 in.)	8.3 mm (0.327 in.)

8-8 CRANKSHAFT/TRANSMISSION

Specifications

Special Tools - Coupling Holder: 57001-1189

Outside Circlip Pliers: 57001-144

Bearing Puller Adapter: 57001-317

Bearing Puller: 57001-135

Steering Stem Bearing Driver: 57001-137

Bearing Driver Set: 57001-1129

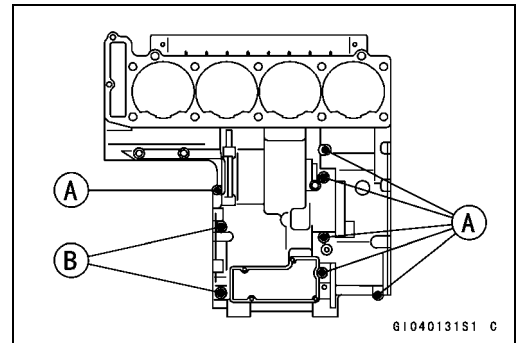
Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

Kawasaki Bond (Liquid Gasket - Gray): 92104-1063

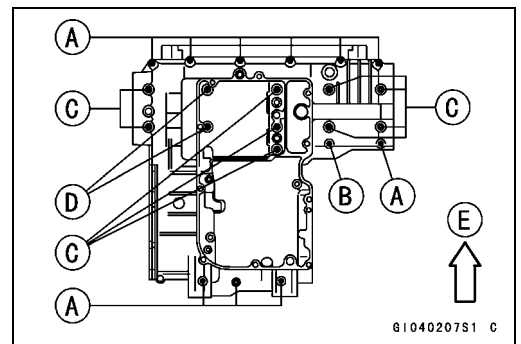
Crankcase

Crankcase Splitting

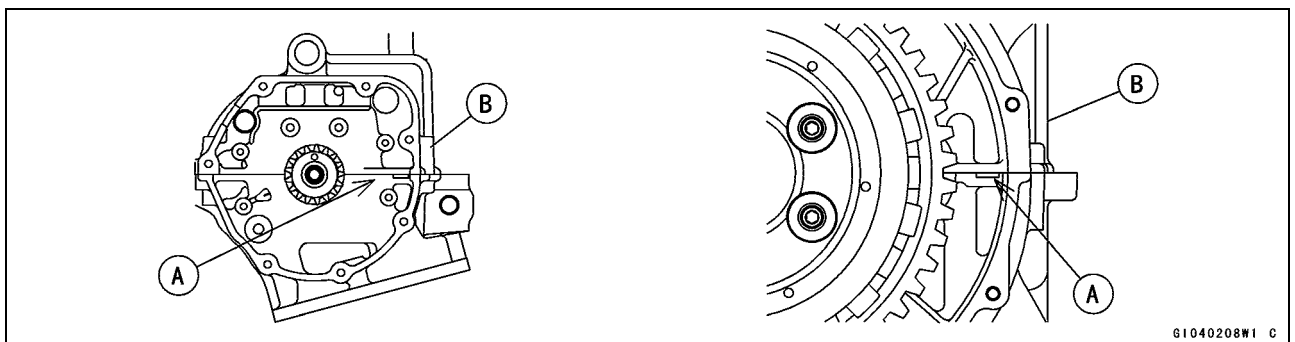
- Remove the engine (see Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove the following parts from the engine.
 - Starter Motor
 - Alternator
 - Clutch Cover
 - External Shift Mechanism (see External Shift Mechanism Removal)
- ★ If the crankshaft is to be removed, remove the following:
 - Cylinder and Pistons (see Engine Top End chapter)
 - Alternator Chain, Coupling and Sprocket (see Alternator Chain and Tensioner Removal)
- ★ If the transmission drive shaft is to be removed, remove the clutch (see Clutch chapter).
- Remove the upper crankcase bolts in the order listed.
 - 6 mm Bolts [A]
 - 8 mm Bolts [B]



- Turn the engine upside down, and remove:
 - Oil Pan (See Engine Lubrication System Chapter)
 - Oil Pump along with Bracket
- Remove the lower crankcase bolts in the order listed.
 - 6 mm Bolts [A]
 - 7 mm Bolt [B]
 - 9 mm Bolts [C]
- Do not remove the main bearing cap bolts [D] if the crankshaft is not to be removed.
 - Front [E]



- Pry the points [A] shown to split the crankcase halves apart, and remove the lower crankcase half. [B]
- Tap lightly around the crankcase joint with a plastic mallet, and split the crankcase. Take care not to damage the crankcase.



8-10 CRANKSHAFT/TRANSMISSION

Crankcase

Crankcase Assembly

NOTE

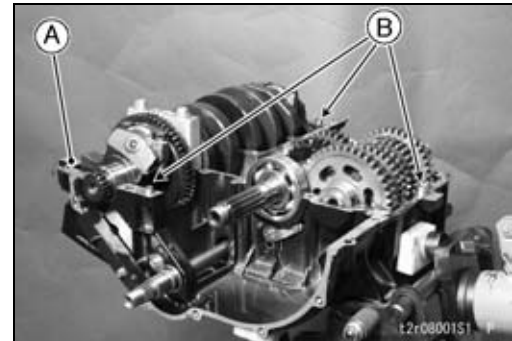
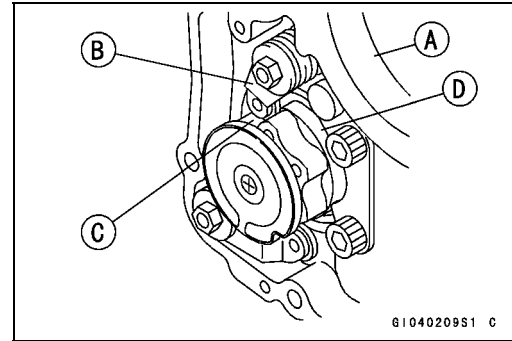
○ The upper crankcase half, the lower crankcase half, and the crankshaft main bearing cap are machined at the factory in the assembled state, so the crankcase halves and the main bearing cap must be replaced together as a set.

- Install the shift drum and forks into the upper crankcase (see Transmission section in this chapter).
- In the upper crankcase [A], set the shift drum in the neutral position (the neutral set lever [B] fits into the detent [C] of the neutral cam [D]).
- With a high-flash point solvent, clean off the mating surface of the upper crankcase half [A] and wipe dry.
- Check that the dowel pins [B] are in place.
- Install (see this chapter):
 - Alternator Shaft (upper crankcase)
 - Transmission (upper crankcase)
 - Crankshaft (upper crankcase)
 - Balancer Shaft (lower crankcase)

- With a high-flash point solvent, clean off the mating surface of the lower crankcase half [A] and wipe dry.
- Apply liquid gasket [B] to the mating surface of the lower crankcase half. Finish applying gasket in five minutes.

Sealant - Kawasaki Bond (Liquid Gasket - Gray): 92104-1063

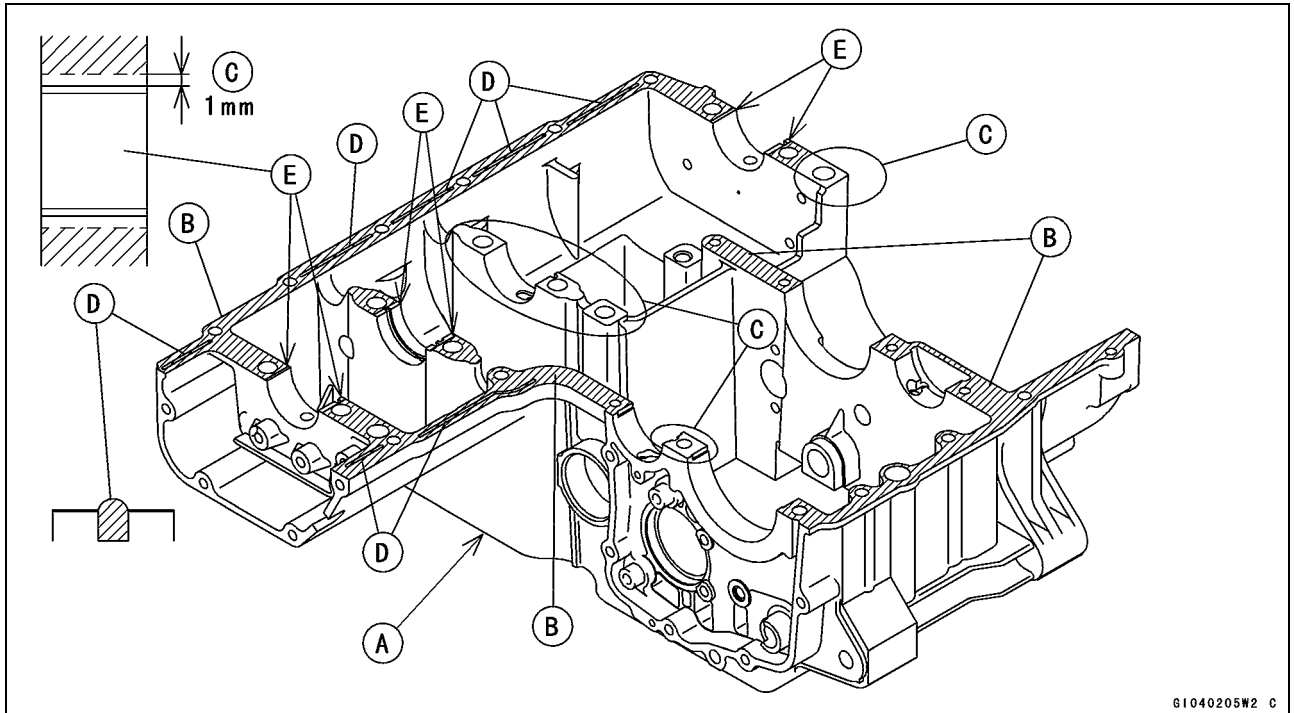
- Fill the grooves [D] with the gasket, so its surface swells a little to prevent leakage.



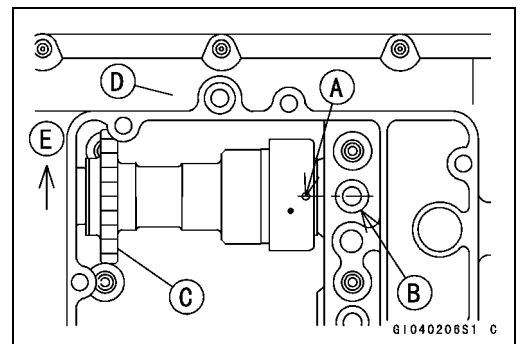
CAUTION

Do not apply the liquid gasket to the areas [C], around the bearing inserts [E], and oil passages.

Crankcase



- Temporarily, install the timing rotor and nut, and then position the crankshaft at #1, 4 piston TDC.
- Hold the balancer so that the punch mark [A] on the balancer mass aligns with the center of the oil passage hole [B].
- Mesh the balancer gear [C] with the crankshaft gear and install the lower crankcase [D] on the upper crankcase. Front [E]

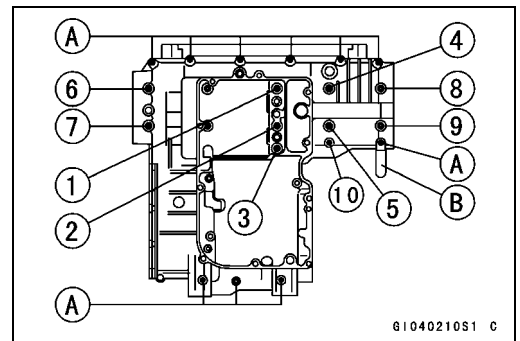


- Tighten the lower crankcase bolts using the following steps.
- The three 9 mm bolts (No. 1 ~ 3) have a flat washer, respectively.
- First, tighten the 9 mm bolts.

Torque - 9 mm Bolts (No. 1 ~ 9)
First: 9.8 N·m (1.0 kgf·m, 87 in·lb)
Final: 32 N·m (3.3 kgf·m, 24 ft·lb)

- Secondly, tighten the 7 mm bolt.
- Torque - 7 mm Bolt (No. 10): 18 N·m (1.8 kgf·m, 13 ft·lb)**
- Finally, tighten the 6 mm bolts evenly along with a clamp [B].

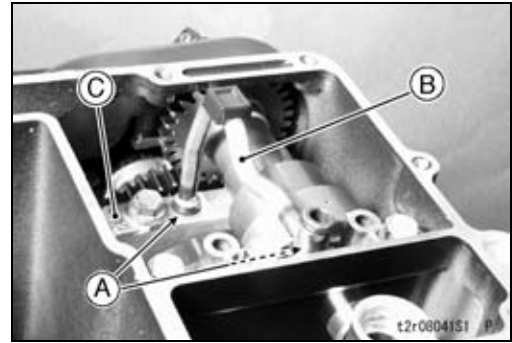
Torque - 6 mm Bolts [A]: 15 N·m (1.5 kgf·m, 11 ft·lb)



8-12 CRANKSHAFT/TRANSMISSION

Crankcase

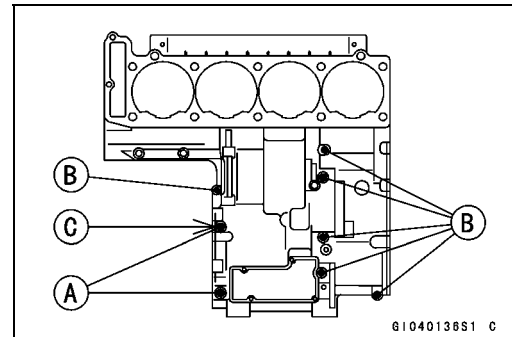
- Apply grease to the O-rings [A] and install the oil pipe [B] into the main bearing cap [C] and lower crankcase bearing housing.
- Install (see Engine Lubrication System chapter):
 - Oil Pump along with Pump Bracket
 - Oil Pan



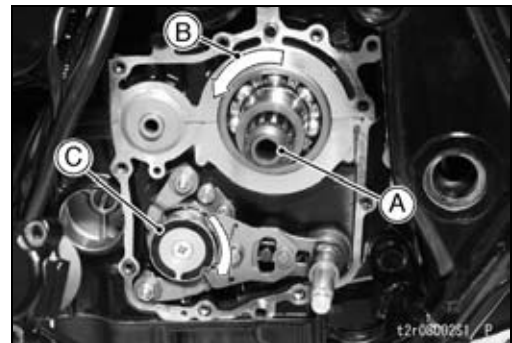
- Tighten the upper crankcase bolts in the order listed.
- The 8 mm bolt shown [C] has a copper washer.

Torque - 8 mm Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb) [A]

6 mm Bolts: 15 N·m (1.5 kgf·m, 11 ft·lb) [B]



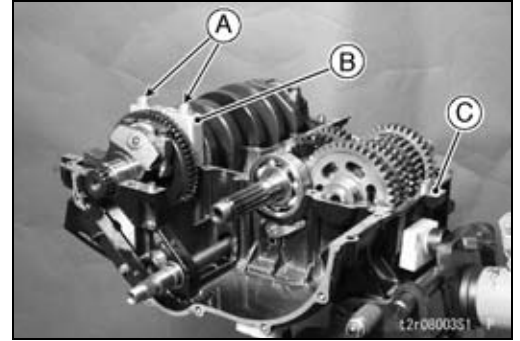
- After tightening all crankcase bolts, check the following items.
 - Check that the drive shaft and output shaft [A] turn freely.
 - Check that the positive neutral finder operates properly: while spinning [B] the output shaft fast using an air impact wrench, gears shift smoothly from the 1st, 2nd . . . 5th gear, and 5th, 4th . . . 1st. When the output shaft stays still, the gear can be shifted to only the 1st gear or neutral. It should not be shifted to the 2nd gear or other higher gear positions.
- Shift Drum [C]



Crankshaft and Connecting Rods

Crankshaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the main bearing cap bolts [A] with flat washers, and take off the cap [B] from the upper crankcase [C].
- Remove the crankshaft.



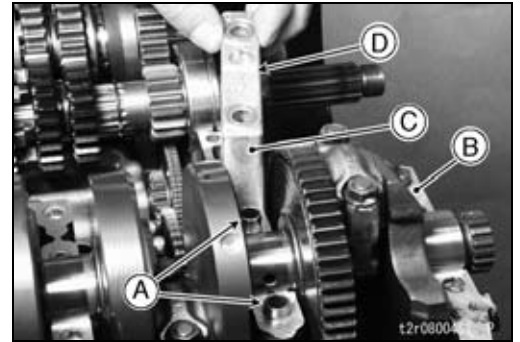
Crankshaft Installation

CAUTION

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

- Check that the dowel pins [A] are in the upper crankcase [B].
- Install the main bearing cap [C] with the arrow mark [D] on it pointing forward.
- Tighten the main bearing cap bolts.

Torque - Main Bearing Cap Bolts: 32 N·m (3.3 kgf·m, 24 ft·lb)



Connecting Rod Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the connecting rod nuts [A].
- Remove the crankshaft [B].

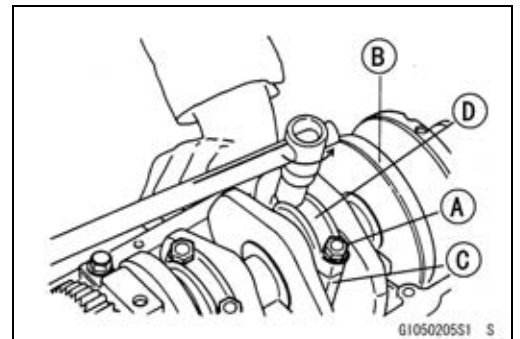
NOTE

○ Mark and record the locations of the connecting rods [C] and their big end caps [D] so that they can be re-assembled in their original positions.

- Remove the connecting rods from the crankshaft.

CAUTION

Discard the connecting rod bolts.
To prevent damage to the crankpin surfaces, do not allow the connecting rod bolts bump against the crankpins.



8-14 CRANKSHAFT/TRANSMISSION

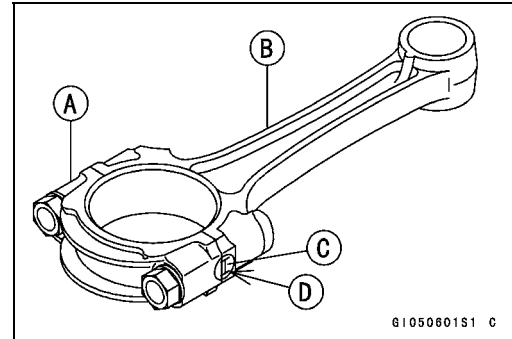
Crankshaft and Connecting Rods

Connecting Rod Installation

CAUTION

To minimize vibration, a pair of connecting rods (left two rods or right two) should have the same mass mark. The left two rods are a pair and the right two rods are a pair.

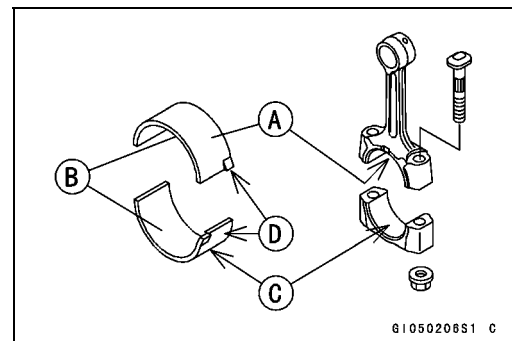
- Big End Cap [A]
- Connecting Rod [B]
- Mass Mark (alphabet) [C]
- Diameter Mark [D] (around weight mark):
"O" or no mark



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.

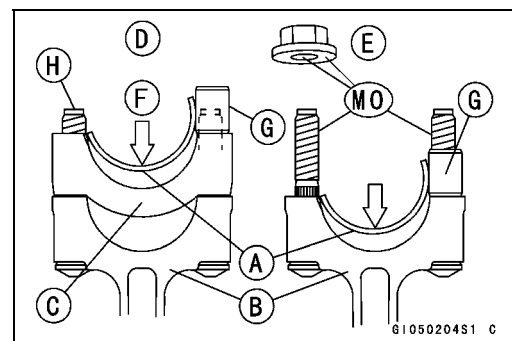
- Apply molybdenum disulfide grease [A] to the outer surface of the upper insert and the inner surface of the connecting rod big end.
- Apply molybdenum disulfide oil [B] to the inner surfaces of upper and lower bearing inserts.
- Do not apply any grease or oil [C] to the cap inside and cap insert outside.
- Install the inserts so that their nails [D] are on the same side and fit them into the recess of the connecting rod and cap.



CAUTION

Wrong application of oil and grease could cause bearing damage.

- The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10:1).
- When installing the inserts [A], be careful not to damage the insert surface with the edge of the connecting rod [B] or the cap [C]. One way to install inserts is as follows:
 - Installation [D] to Cap
 - Installation [E] to Connecting Rod
 - Push [F]
 - Dowel Pin [G]
 - Connecting Rod Bolts [H]
- Install the cap on the connecting rod, aligning the mass and diameter marks.
- Remove debris and clean the surface of inserts.
- Apply molybdenum disulfide oil [MO] to the threads and seating surfaces of the big end nuts and bolts.



Crankshaft and Connecting Rods

- Install the crankshaft (see Crankshaft Installation).
- Install each connecting rod on its original crankpin so the mass mark [A] (alphabet) faces the engine front [B] with the rod through the cylinder hole [C].

CAUTION

The connecting rods must be installed as shown to prevent the bolt heads from hitting the crankcase possibly while the engine is running.

- The connecting rod big end is bolted using the “plastic region fastening method”.
- This method precisely achieves the needed clamping force without exceeding it unnecessarily, allowing the use of thinner, lighter bolts further decreasing connecting rod mass.
- There are two types of the plastic region fastening. One is a bolt length measurement method and other is a rotation angle method. Observe one of the following two, but the bolt length measurement method is preferable because this is a more reliable way to tighten the big end nuts.

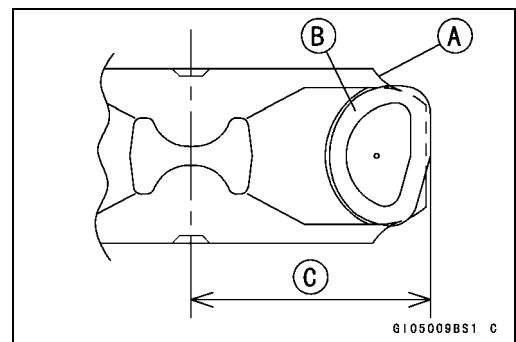
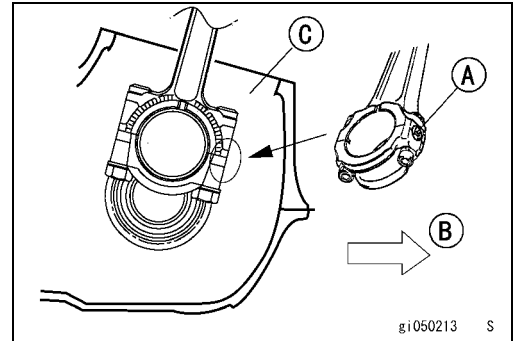
CAUTION

The connecting rod bolts are designed to stretch when tightened. Never reuse the connecting rod bolts. See the table below for correct bolt and nut usage.

CAUTION

Be careful not to overtighten the nuts. Do not turn the connecting rod bolts during nut tightening. The bolts must be positioned correctly to prevent the bolt heads from hitting the crankcase while the engine is running.

Connecting Rod Big End Shoulder [A]
 Protrusion [C] of the bolt head must be 32 mm (1.26 in) or less



8-16 CRANKSHAFT/TRANSMISSION

Crankshaft and Connecting Rods

(1) Bolt Length Measurement Method

- Be sure to clean the bolts, nuts, and connecting rods thoroughly with a high-flash point solvent, because the new connecting rods, bolts, and nuts are treated with an anti-rust solution.

⚠ WARNING

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

CAUTION

**Immediately dry the bolts and nuts with compressed air after cleaning.
Clean and dry the bolts and nuts completely.**

- Install new bolts in reused connecting rods.
- Dent both bolt head and bolt tip with a punch as shown.
- Before tightening, use a point micrometer [A] to measure the length of new connecting rod bolts and record the values to find the bolt stretch.

Connecting Rod [B]

Mark here with a punch [C].

Nuts [D]

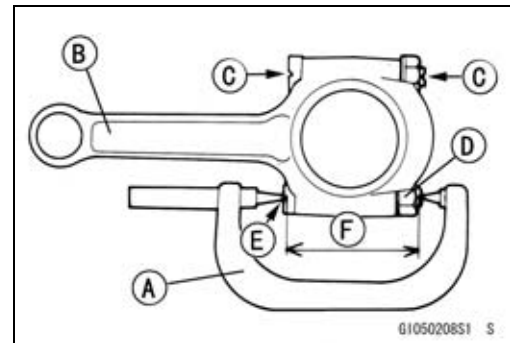
Fit micrometer pins into punch marks [E].

- Apply a small amount of molybdenum disulfide oil to the following: Threads of Nuts and Bolts.

Seating Surfaces of Nuts and Con-rods.

- Tighten the big end nuts until the bolt elongation reaches the length specified in the table.
- Check the length [F] of the connecting rod bolts.
- ★ If the stretch is more than the usable range, the bolt has stretched too much. An overelongated bolt may break in use.

$$\text{Bolt Length after tightening} - \text{Bolt Length before tightening} = \text{Bolt Stretch}$$



Connecting Rod Assy	Bolt	Nut	Usable Range of Connecting Rod Bolt Stretch
New	Use the bolts attached to new con-rod	Attached to new con-rod	0.22 ~ 0.30 mm (0.0087 ~ 0.0118 in)
		New	
Used	Replace the bolts with new ones.	Used	0.22 ~ 0.30 mm (0.0087 ~ 0.0118 in)
		New	

Crankshaft and Connecting Rods

(2) Rotation Angle Method

- ★ If you don't have a point micrometer, you may tighten the nuts using the "Rotation Angle Method".
- Be sure to clean the bolts and nuts thoroughly with a high-flash point solvent, because the new bolts and nuts are treated with an anti-rust solution.

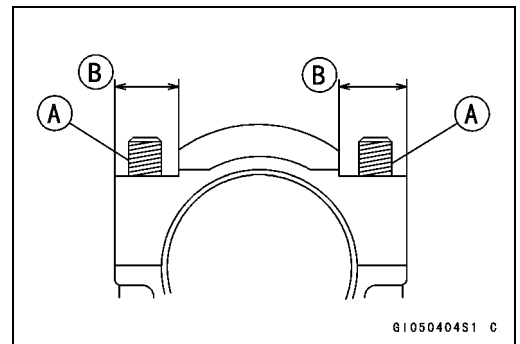
⚠ WARNING

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

CAUTION

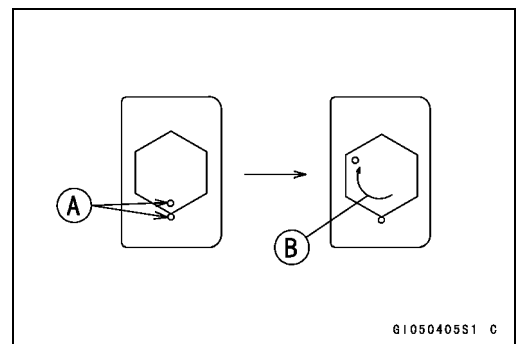
Immediately dry the bolts and nuts with compressed air after cleaning. Clean and dry the bolts and nuts completely.

- Install new bolts in reused connecting rods.
- Apply a small amount of molybdenum disulfide oil to the following: Threads [A] of Nuts and Bolts. Seating Surfaces [B] of Nuts and Con-rods.



- First, tighten the nuts to the specified torque. See the table below.
- Next, tighten the nuts **120° ±5°**.
- Mark [A] the connecting rod big end caps and nuts so that nuts can be turned 120° [B] properly.
- Tighten the hexagon nut by 2 corners.

Connecting Rod	Bolt	Nut	Torque + Angle N·m (kg·m, ft·lb)
New	Use the bolts attached to new con-rod	Attached to new con-rod	ALL 15 ±1 (1.5 ±0.1, 11 ±0.7) + 120° ±5°
		New	
Used	Replace the bolts with new ones	Used	
		New	



Crankshaft, Connecting Rod Cleaning

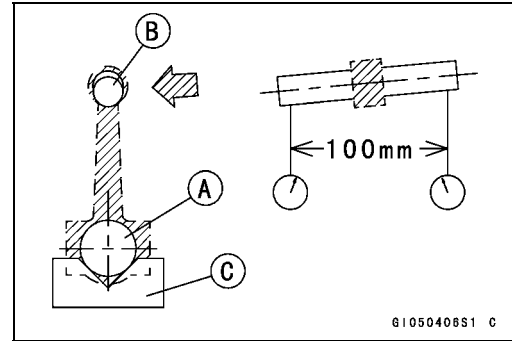
- After removing the connecting rods from the crankshaft, clean them with a high-flash point solvent.
- Blow the crankshaft oil passages with compressed air to remove any foreign particles or residue that may have accumulated in the passages.

8-18 CRANKSHAFT/TRANSMISSION

Crankshaft and Connecting Rods

Connecting Rod Bend Inspection

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

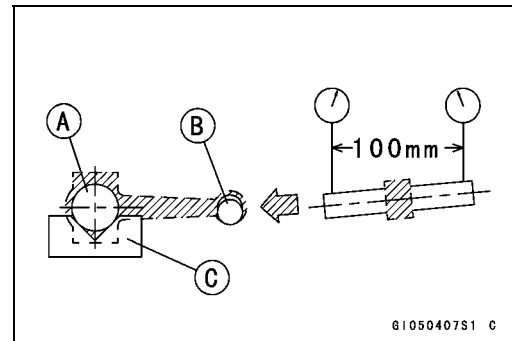


Connecting Rod Bend

Service Limit: TIR 0.2/100 mm (0.08/3.94 in.)

Connecting Rod Twist Inspection

- With the big-end arbor [A] still on V blocks [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 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 (0.08/3.94 in.)

Connecting Rod Big End Side Clearance Inspection

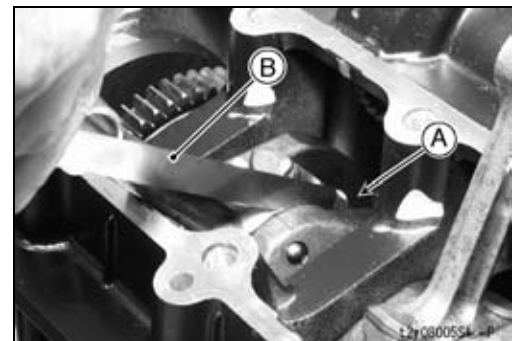
- Measure connecting rod big end side clearance [A].
- Insert a thickness gauge [B] between the big end and either crank web to determine clearance.

Connecting Rod Big End Side Clearance

Standard: 0.13 ~ 0.38 mm (0.0051 ~ 0.0150 in.)

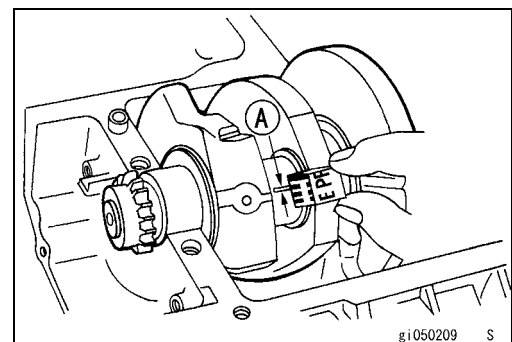
Service Limit: 0.58 mm (0.023 in.)

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



Connecting Rod Big End Bearing Wear Inspection

- Measure the bearing insert/crankpin clearance with a plastigage [A].
- Tighten the big end nuts to the specified torque.
- Do not move the connecting rod and crankshaft during clearance measurement.



CAUTION

After measurement, replace the connecting rod bolts.

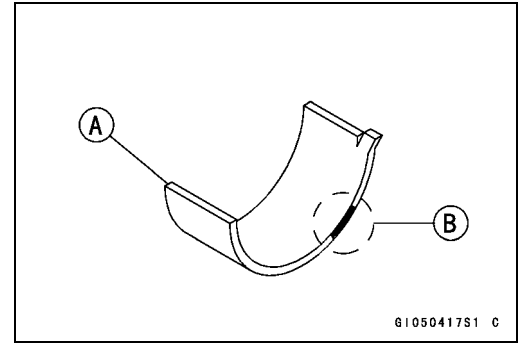
Crankshaft and Connecting Rods

Connecting Rod Big End Bearing Insert/Crankpin Clearance

Standard: 0.042 ~ 0.070 mm (0.00165 ~ 0.00275 in.)

Service Limit: 0.11 mm (0.0043 in.)

- ★ If the clearance is within the standard, no bearing replacement is required.
- ★ If the clearance is between 0.071 mm (0.00279 in) and the service limit (0.11 mm, 0.0043 in.), replace the bearing inserts [A] with inserts painted white [B]. Check insert/crankpin clearance with a plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.
- ★ If the clearance exceeds the service limit, measure the diameter of the crankpins.

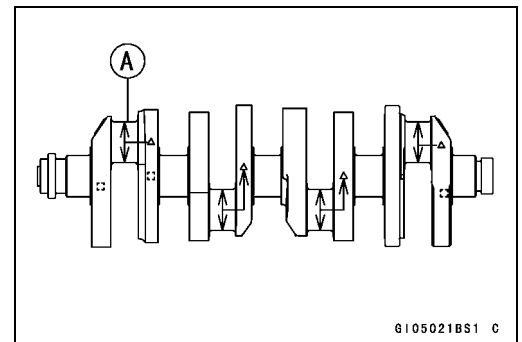


Crankpin Diameter

Standard: 35.984 ~ 36.000 mm (1.41669 ~ 1.41732 in.)

Service Limit: 35.97 mm (1.4161 in)

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



Crankpin Diameter Marks

None 35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in.)

○ 35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in.)

Δ: Crankpin Diameter Marks, “○” mark or no mark.

- Measure the connecting rod big end inside diameter, and mark each connecting rod big end in accordance with the inside diameter.

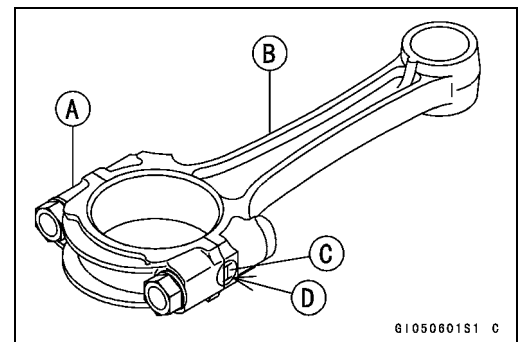
Big End Cap [A]

Connecting Rod [B]

Mass Mark, alphabet [C]

Diameter Mark (around mass mark) [D]: “○” or no mark

- Tighten the connecting rod big end nuts to the specified torque (see Connecting Rod Installation).
- The mark already on the big end should almost coincide with the measurement.



Connecting Rod Big End Inside Diameter

None 39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in.)

○ 39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in.)

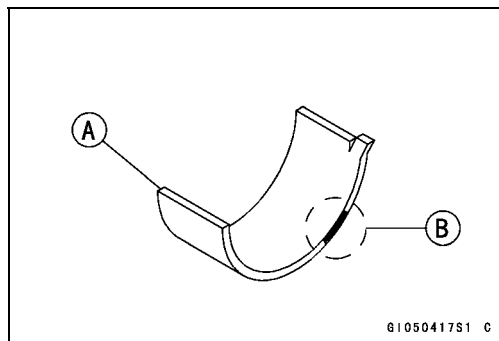
8-20 CRANKSHAFT/TRANSMISSION

Crankshaft and Connecting Rods

- Select the proper bearing insert [A] identified by the size color [B] in accordance with the combination of the connecting rod and crankshaft coding.
- Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.

Big End Bearing Insert Selection

Con-rod Big End Inside Diameter Marking	Crankpin Diameter Marking	Bearing Insert	
		Size Color	Part Number
None	○	Black	92028-1679
None	None	Blue	92028-1680
○	○		
○	None	White	92028-1681

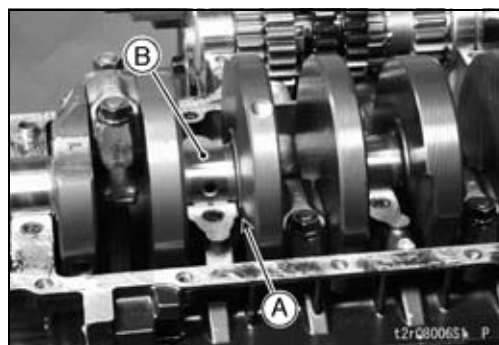


Crankshaft Side Clearance Inspection

- Insert a thickness gauge [A] between the upper crankcase main bearing and the crank web at the No. 2 journal [B] to determine clearance.
- ★ If the clearance exceeds the service limit, replace the crankcase halves and main bearing cap as a set.

NOTE

○ The upper crankcase half, lower crankcase half, and main bearing cap are machined at the factory in the assembled state, so they must be replaced as a set.



Crankshaft Side Clearance

Standard: 0.05 ~ 0.20 mm (0.0020 ~ 0.0079 in.)

Service Limit: 0.40 mm (0.0158 in.)

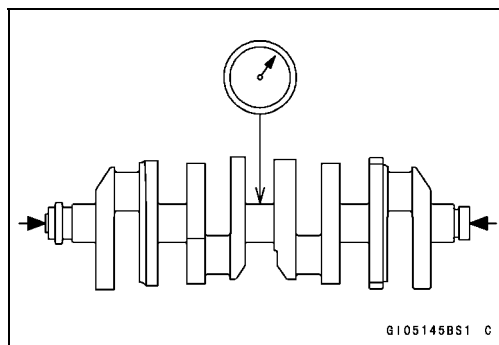
Crankshaft Runout Inspection

- 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 (0.0020 in.)

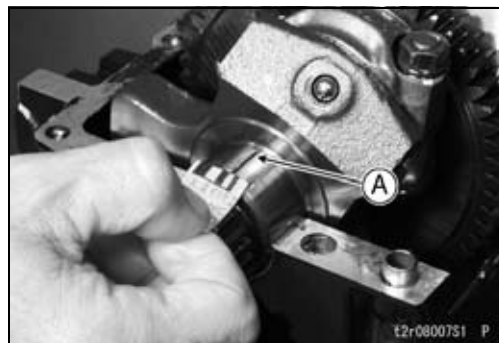


Crankshaft Main Bearing Wear Inspection

- Using a plastigage (press gauge) [A], measure the bearing insert/journal clearance.

NOTE

- Tighten the crankcase bolts and main bearing cap bolts to the specified torque (see Crankcase Assembly).
- Do not turn the crankshaft during clearance measurement.
- Journal clearance less than 0.025 mm (0.00098 in.) can not be measured by plastigauge, however, using genuine parts maintain the minimum standard clearance.



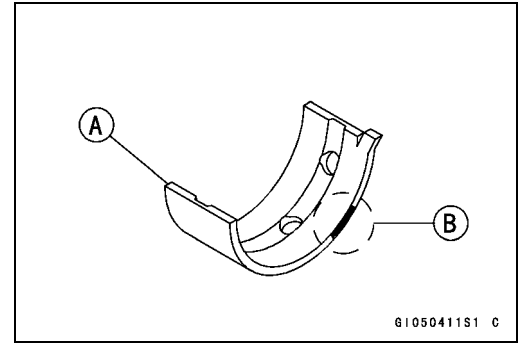
Crankshaft Main Bearing Insert/Journal Clearance

Standard: 0.020 ~ 0.044 mm (0.00079 ~ 0.00173 in.)

Service Limit: 0.08 mm (0.0032 in.)

Crankshaft and Connecting Rods

- ★ If the clearance is within the standard, no bearing replacement is required.
- ★ If the clearance is between 0.045 mm (0.00177 in) and the service limit (0.08 mm, 0.0032 in), replace the bearing inserts [A] with inserts painted blue [B]. Check the insert/journal 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 crankshaft main journal.

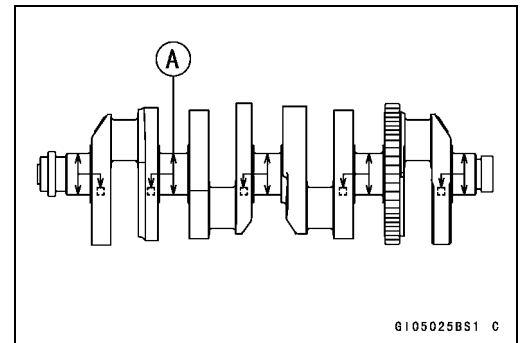


Crankshaft Main Journal Diameter

Standard: 35.984 ~ 36.000 mm (1.4669 ~ 1.41732 in.)

Service Limit: 35.96 mm (1.4158 in.)

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



Crankshaft Main Journal Diameter Marks

None 35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in.)

1 35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in.)

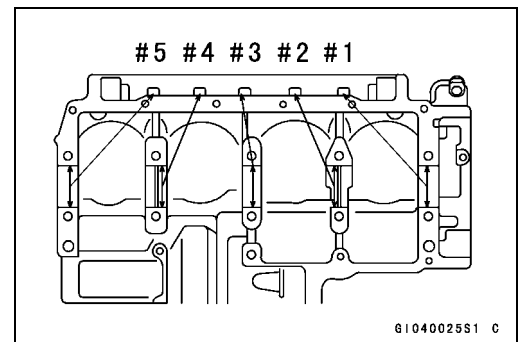
□: Crankshaft Main Journal Diameter Marks, "1" mark or no mark

- Measure the main bearing bore diameter, and mark the upper crankcase half in accordance with the bore diameter.

Bore Diameter Mark: "○" or no mark

NOTE

- Tighten the crankcase bolts and main bearing cap bolts to the specified torque (see Crankcase Assembly).
- The mark already on the upper crankcase half should almost coincide with the measurement.



Crankcase Main Bearing Bore Diameter

○ 39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in.)

None 39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in.)

- Select the proper bearing insert in accordance with the combination of the crankcase and crankshaft coding.
- Install the new inserts in the crankcase halves and cap and check insert/journal clearance with a plastigage.

8-22 CRANKSHAFT/TRANSMISSION

Crankshaft and Connecting Rods

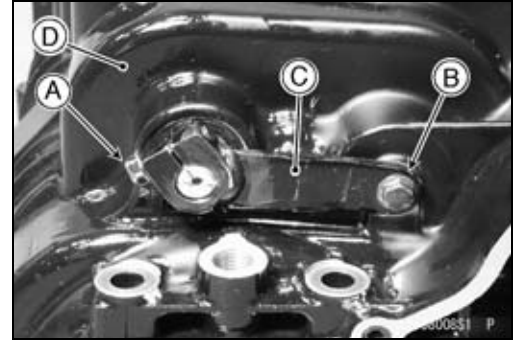
Crankcase Main Bearing Bore Diameter Markings	Crankshaft Main Journal Diameter Markings	Bearing Inserts*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	92028-1274	1, 3, 5
			92028-1102	2, 4
None	1	Black	92028-1273	1, 3, 5
○	None		92028-1101	2, 4
None	None	Blue	92028-1272	1, 3, 5
			92028-1100	2, 4

*The bearing inserts for Nos. 2 and 4 journals have an oil groove, respectively.

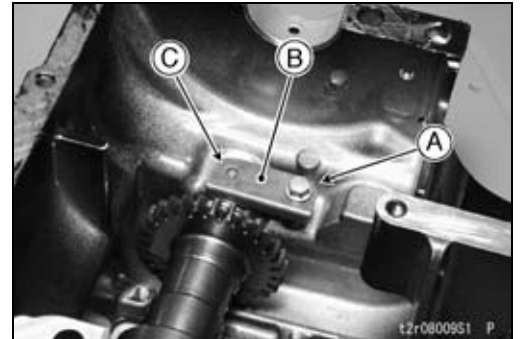
Balancer

Balancer Removal

- Split the crankcase (see Crankcase Splitting).
- The oil pan is removed.
- Unscrew the balancer shaft clamp bolt [A], and balancer lever bolt [B], and pull off the balancer lever [C] from the lower crankcase half [D].



- Unscrew the balancer shaft plate bolt [A], and take off the plate [B] and guide pin [C] from the upper side of the lower crankcase.

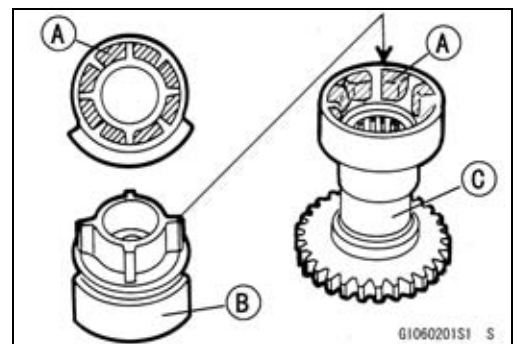


- Push [A] the balancer shaft [B] with the oil seal installed out of the crankcase. The balancer mass and balancer gear [C] come off from the balancer shaft.

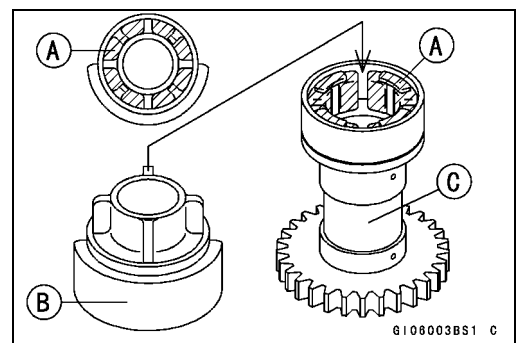


Balancer Installation

- Check that the rubber dampers [A] are in place as shown.
- Install the balancer mass [B] into the balancer gear [C].
- Any engagement of the vanes will do.



ZR1200-A3 ~, A6F ~/B3/C2 Models

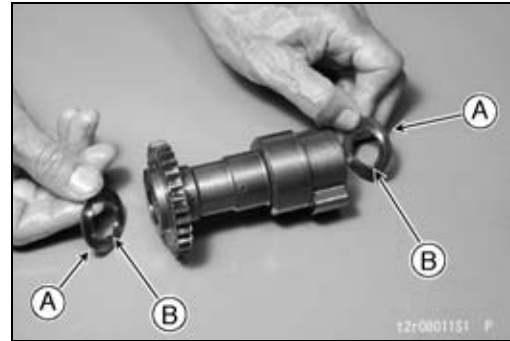


8-24 CRANKSHAFT/TRANSMISSION

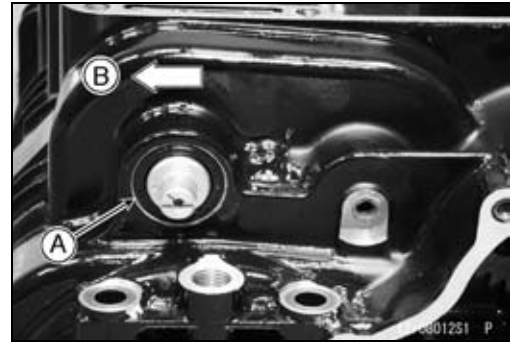
Balancer

- Fit the copper washers [A] on both ends of the mass and gear assembly. The projected sides [B] face inward.
- Install the mass and gear assembly.
- Install the balancer shaft plate and guide pin.
- Apply a non-permanent locking agent to the threads of the plate bolt, and tighten it.

Torque - Balancer Shaft Plate Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)



- Turn the balancer shaft, so the punch mark [A] is toward the front [B]. And then install the balancer lever.



- Apply a non-permanent locking agent to the threads of the balancer lever bolt [A] and tighten it.

Torque - Balancer Lever Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)

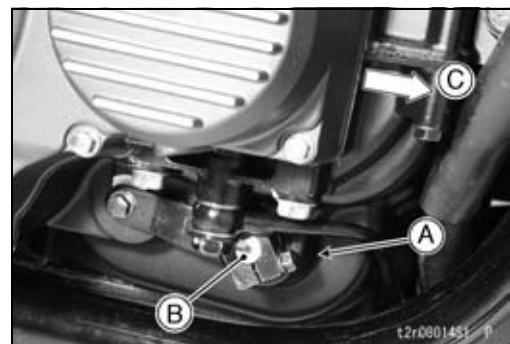
- Tighten the balancer shaft clamp bolt [B] temporarily.



- Assemble the engine and install it.
- Adjust the balancer gear backlash with the engine idling. The amount of backlash can be changed by turning the balancer shaft which has eccentric journals.
- Start the engine and let it idle.
- Loosen the clamp bolt [A] and turn the balancer shaft [B] counterclockwise until the balancer gear makes a noise.
- Turn the shaft clockwise until the balancer gear noise lowers the most, and tighten the clamp bolt.

Front [C]

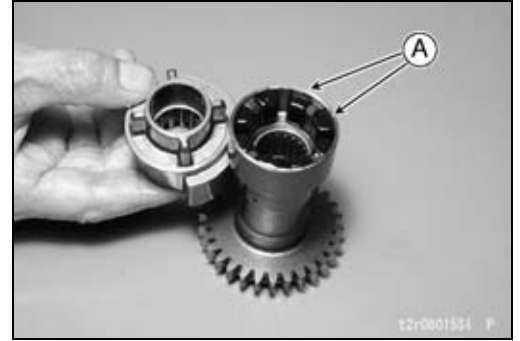
Torque - Balancer Shaft Clamp Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)



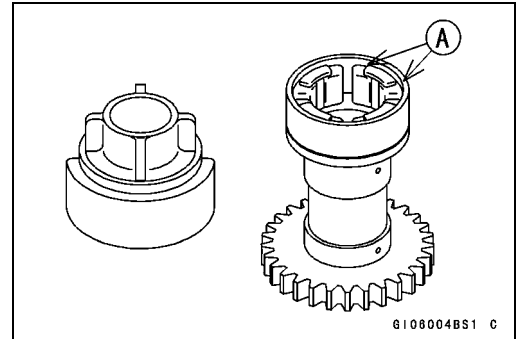
Balancer

Balancer Damper Inspection

- Remove the balancer shaft and take out the balancer gear and mass.
- Visually inspect the rubber dampers [A].
- ★ If they appear damaged or deteriorated, replace the dampers.



ZR1200-A3, A6F ~/B3/C2 Models



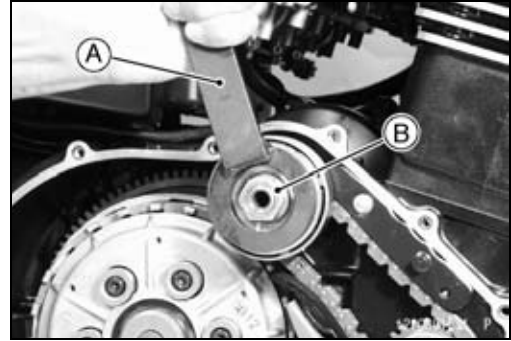
8-26 CRANKSHAFT/TRANSMISSION

Alternator Shaft, Starter Motor Clutch

Alternator Chain and Tensioner Removal

- Remove the clutch cover (see Clutch chapter).
- Holding the right alternator coupling with the coupling holder [A], loosen the alternator shaft nut [B].

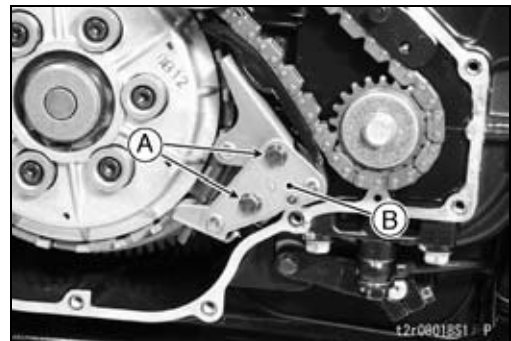
Special Tool - Coupling Holder: 57001-1189



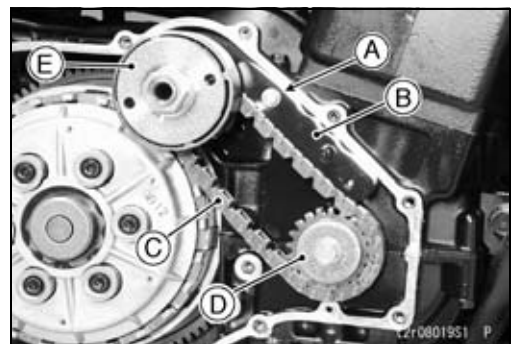
- With the right alternator coupling held with the coupling holder, loosen the alternator sprocket bolt [A] of the crankshaft.



- Remove:
 - Alternator Chain Tensioner Bolts [A]
 - Alternator Chain Tensioner [B]



- Remove:
 - Alternator Chain Guide Bolt [A]
 - Alternator Chain Guide [B]
 - Alternator Chain Sprocket Bolt
 - Alternator Shaft Nut
- Pull off the alternator chain [C], sprocket [D], and right coupling [E] as a set.



Alternator Chain and Tensioner Installation

- Tighten the alternator shaft nut and alternator chain sprocket bolt.

Special Tool - Coupling Holder: 57001-1189

**Non-permanent Locking Agent -
Alternator Chain Guide Bolt**

**Torque - Alternator Shaft Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)
Alternator Chain Sprocket Bolt: 25 N·m (2.5 kgf·m,
18.0 ft·lb)
Alternator Chain Guide Bolt: 9.8 N·m (1.0 kgf·m,
87 in·lb)**

Alternator Shaft, Starter Motor Clutch

- To install the alternator chain tensioner, lock the tensioner as follows:
 - Push the tensioner guide [A] and the rod stop lever [B] so that the stop lever keeps the rod [C] from returning.

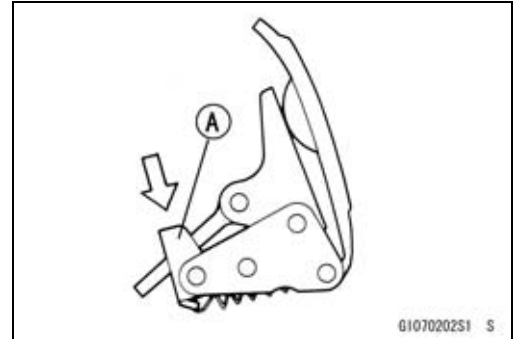
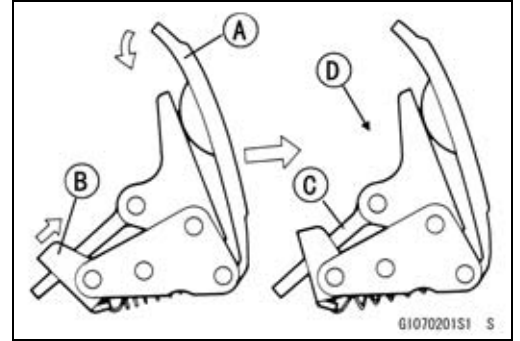
Lock Position [D]

- Install the chain tensioner.

**Non-permanent Locking Agent -
Alternator Chain Tensioner Bolts**

Torque - Alternator Chain Tensioner Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Free the tensioner by tapping the rod stop lever [A] lightly with a screwdriver.



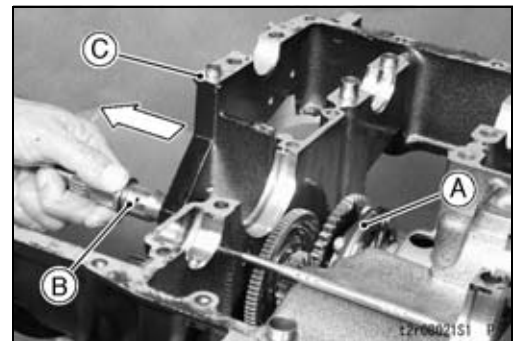
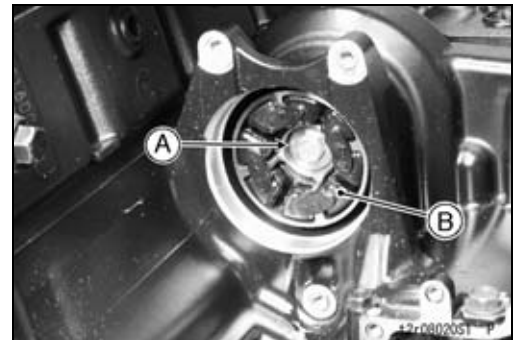
Alternator Shaft Removal

- Remove the alternator chain (see this section).
- Remove the alternator (see Electrical System chapter).
- Holding the right alternator coupling with the coupling holder (special tool), remove the alternator shaft bolt [A] and left coupling [B].

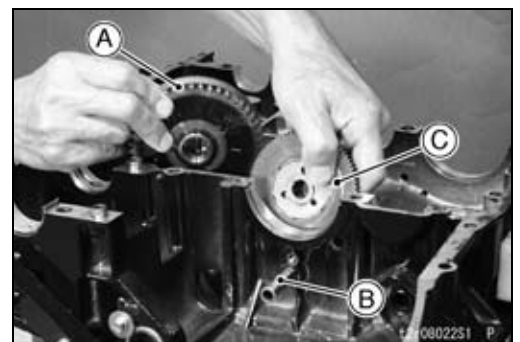
Special Tool - Coupling Holder: 57001-1189

- Split the crankcase (see this chapter) and remove the crankshaft from the upper crankcase.

- Holding the starter motor clutch [A], pull the alternator shaft [B] off the upper crankcase [C].



- Remove:
 - Starter Motor Clutch [A]
 - Idle Gear Shaft [B] and Starter Motor Idle Gear [C]



8-28 CRANKSHAFT/TRANSMISSION

Alternator Shaft, Starter Motor Clutch

Alternator Shaft Installation

- Install the starter motor idle gear [A] as shown.

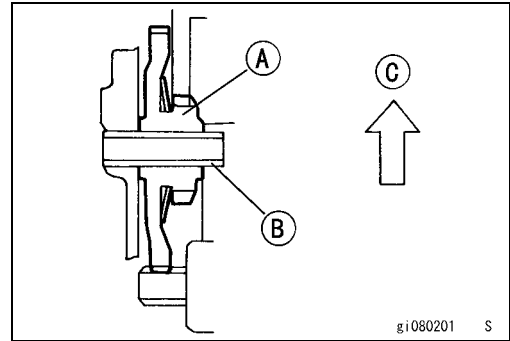
Molybdenum Disulfide Grease- Idle Gear Shaft [B]

Front [C]

- Tighten the alternator shaft bolt.

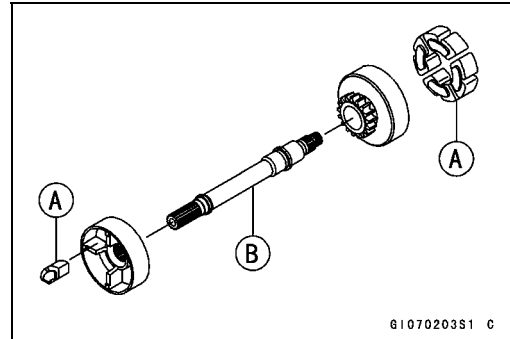
Special Tool - Coupling Holder: 57001-1189

Torque - Alternator Shaft Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)



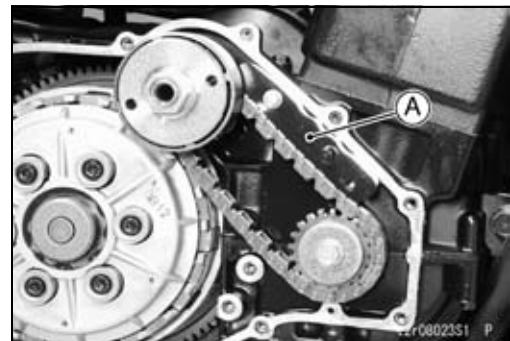
Coupling Damper Inspection

- Visually inspect the rubber dampers [A] in the couplings at both ends of the alternator shaft [B].
- ★ If they appear damaged or deteriorated, replace the dampers.



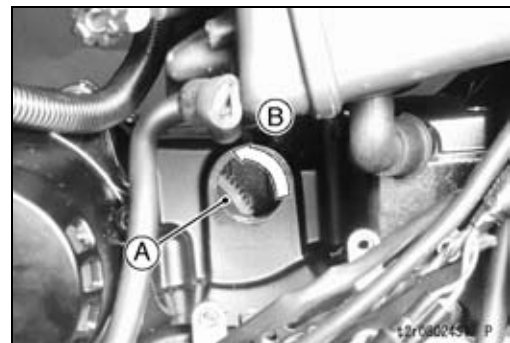
Alternator Chain Guide Wear Inspection

- Visually inspect the rubber [A] on the guide.
- ★ If the rubber is cut or damaged in any way, replace the guide.



Starter Motor Clutch Inspection

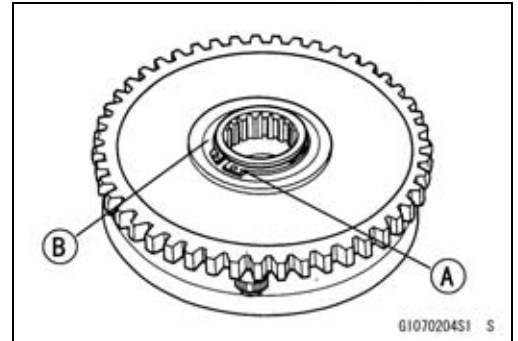
- Remove the starter motor (see Electrical System chapter).
- Turn the starter motor idle gear [A] by hand. When viewed from the left side of the engine, the idle gear should turn counterclockwise freely [B], but should not turn clockwise.
- ★ If the starter motor clutch does not operate as it should or if it makes noise, go to the next step.
- Disassemble the starter motor clutch, and visually inspect the clutch parts.
- If there is any worn or damaged part, replace it.
- Examine the starter motor clutch gear as well. Replace the clutch gear if it is worn or damaged.



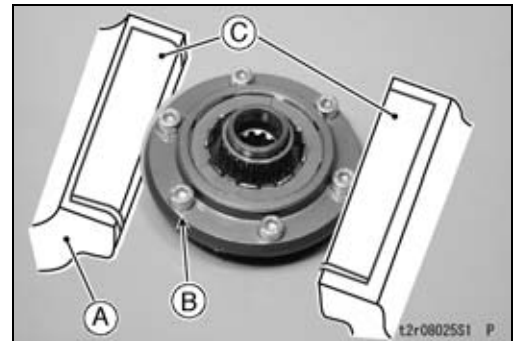
Alternator Shaft, Starter Motor Clutch

Starter Motor Clutch Disassembly

- Remove the circlip [A] and flat washer [B].
Special Tool - Outside Circlip Pliers: 57001-144
- Pull the starter motor clutch gear and take off the needle bearing and flat washer.



- Holding the starter motor clutch assembly in a vise [A], remove the starter motor clutch bolts [B] and take off the one-way clutch. Use rubber or aluminum plates [C] to prevent damage to the clutch assembly.

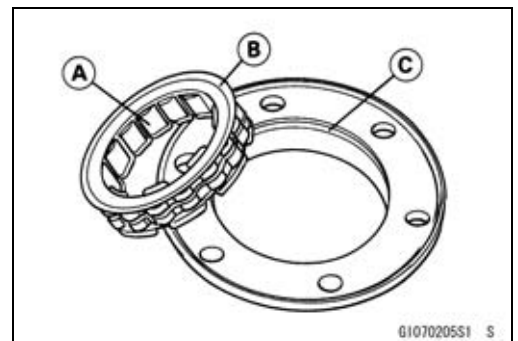


Starter Motor Clutch Assembly

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

Torque - Starter Motor Clutch Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

Special Tool - Outside Circlip Pliers: 57001-144

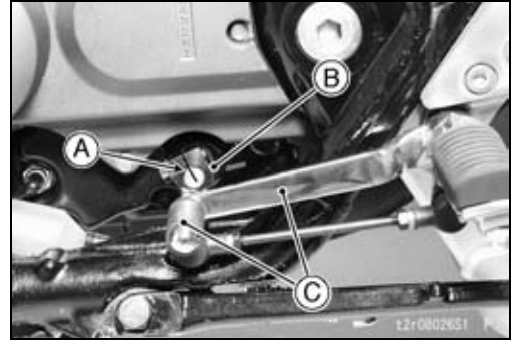


8-30 CRANKSHAFT/TRANSMISSION

Transmission

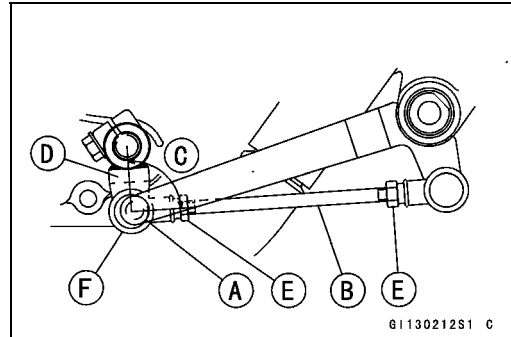
Shift Pedal Removal

- Mark [A] the position of the shift lever [B] on the shift shaft so that it can be installed later in the same position
- Remove the shift lever and shift pedal [C].



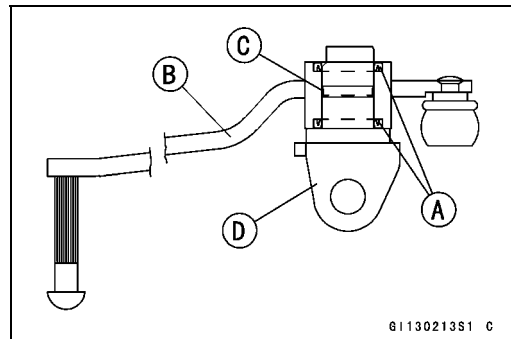
Shift Pedal Installation

- Install the shift pedal [A] so that the shift rod [B] is at a right angle (90°) [C] to the shift lever [D].
- Loosen the front and rear rod locknuts [E].
- The front locknut has left-hand threads.
- Turn the rod to adjust the pedal position. Note the relative position to the rod end [F].
- Tighten the locknuts securely.



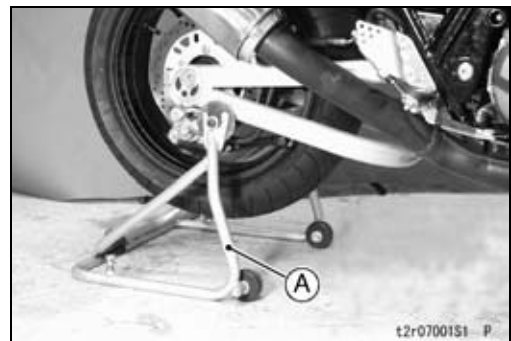
Shift Lever Assembly

- Install the oil seals [A] in both sides of the boss of the shift lever [B] with the lips inward.
- Apply grease to the lips of the oil seal.
- Apply grease to the stem [C] of the front peg.
- Install the shift lever assembly onto the stem of the front peg holder [D].

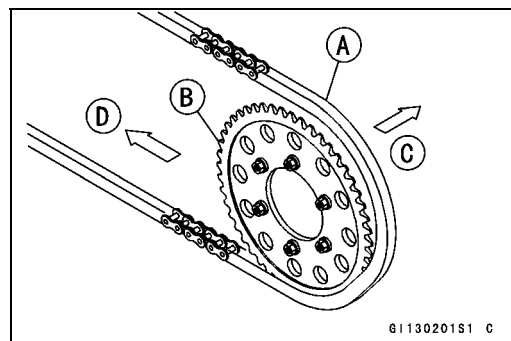


External Shift Mechanism Removal

- Support the frame with a commercially available stand [A] to raise the rear wheel off the ground (see Engine Removal in Engine Removal/Installation chapter).
- Drain the engine oil (see Engine Lubrication System chapter).

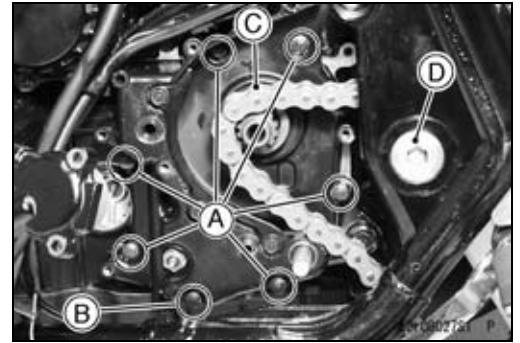


- Remove:
 - Drive Chain Cover
 - Rear Axle Shaft (see Wheels/Tires chapter)
 - Engine Sprocket (see Final Drive chapter)
- Disengage the drive chain [A] from the rear sprocket [B] towards the right [C].
- Remove:
 - Water Pump
 - Shift Pedal and Lever
 - Oil Pressure Switch Lead Terminal
 - Sidestand Switch Lead Connector
 - Lead Connector from Neutral Switch



Transmission

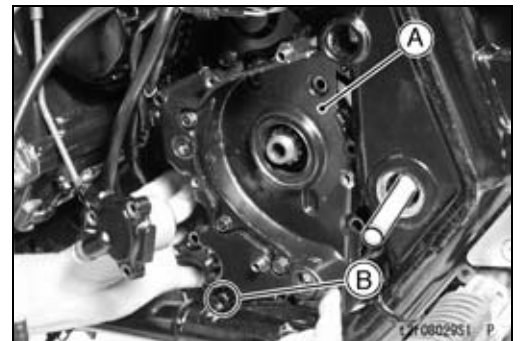
- Place an oil pan beneath the external shift mechanism cover.
- Remove the cover bolts [A].
- Just loosen the bolt [B] shown.
- Disengage the drive chain [C] from the output shaft.
- Remove the swingarm pivot nut [D].



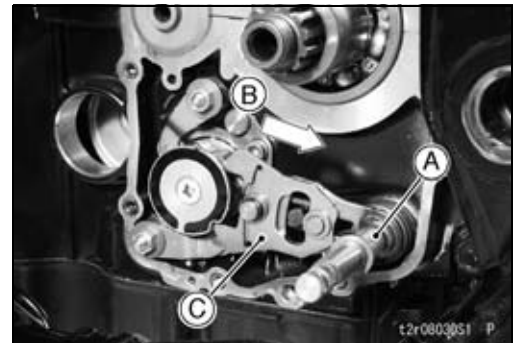
- Unscrew the pivot shaft, and pull it out while turning the shaft.
- Insert a thinner bar [A] than the pivot shaft into the pivot to avoid the swingarm falling down.
- Move back the swingarm [B] for the drive chain [C] to clear the boss [D].



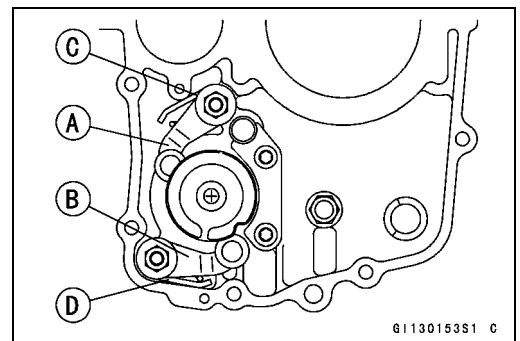
- Remove the external shift mechanism cover [A] along with one of the cover bolt [B].



- Remove the shift shaft [A], while pushing [B] the shift mechanism arm [C] toward the shaft.



- Remove:
 - Neutral Set Lever [A]
 - Gear Set Lever [B]
 - Return Spring [C]
 - Return Spring [D]



8-32 CRANKSHAFT/TRANSMISSION

Transmission

External Shift Mechanism Installation

- The gear set lever [A] has a white mark and its return spring [B] has a blue mark.
- The neutral set lever [C] has no mark and its return spring [D] has a green mark.
- Be careful not to mix up these springs and levers.

Shift Drum [E]

**Torque - Gear Set Lever Nut, Neutral Set Lever Nut: 9.8 N·m
(1.0 kgf·m, 87 in·lb)**

- Apply silicone sealant [A] to the crankcase halves mating surface on the front and rear sides of the external shift mechanism cover mount.

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

- Be sure to install the washer [B].
- Make sure that dowel pins [C] are in place.

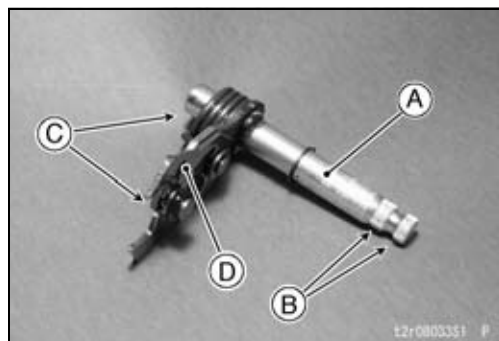
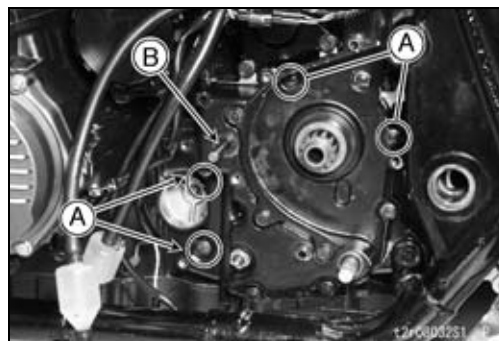
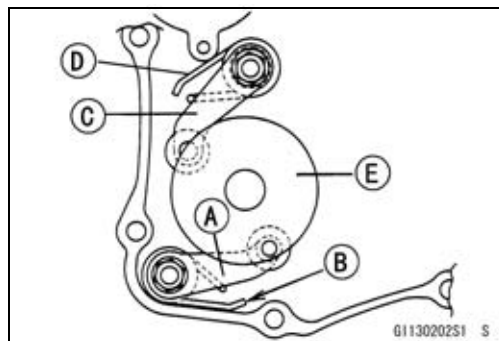
- Replace the cover gasket with a new one.
- Apply high temperature grease to the lips of cover oil seals.
- Install the cover and tighten the cover bolts.
- Apply a non-permanent locking agent to the cover bolts [A] shown.

**Torque - External Shift Mechanism Cover Bolts: 9.8 N·m
(1.0 kgf·m, 87 in·lb)**

- Apply molybdenum disulfide grease to either end of the clutch push rod [B], install it with the greased end going first.
- Install:
 - Water Pump (see Cooling System chapter)
 - Engine Sprocket (see Final Drive chapter)
 - Drive Chain
 - Swingarm (see Suspension chapter)
- Adjust the shift pedal position (see Shift Pedal Installation).
- Fill:
 - Engine Oil (see Engine Lubrication System chapter)
 - Coolant (see Cooling System chapter)

External Shift Mechanism Inspection

- Remove the external shift mechanism cover (see this chapter).
- Examine the shift shaft [A] for any damage.
- ★ If the shaft is bent, straighten or replace it.
- ★ If the serrations [B] are damaged, replace the shaft.
- ★ If the springs [C] are damaged in any way, replace them.
- ★ If the shift mechanism arm [D] is damaged in any way, replace the arm.

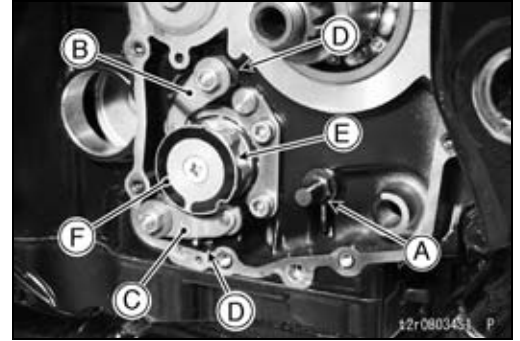


Transmission

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

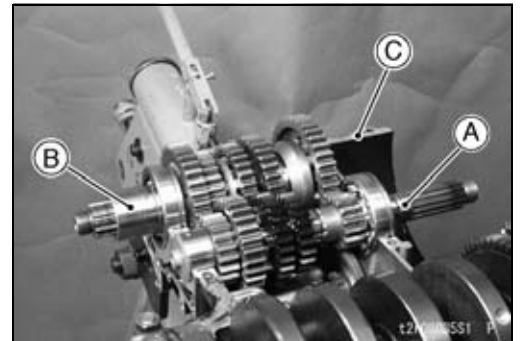
Torque - Shift Shaft Return Spring Pin: 30 N·m (3.1 kgf·m, 22 ft·lb)

- Check the neutral set lever [B], the gear set lever [C], and their springs [D] for breaks or distortion.
- ★ If the levers or springs are damaged in any way, replace them.
- Visually inspect the shift drum pins [E], and pin holder [F].
- ★ If they are badly worn or if they show any damage, replace them.



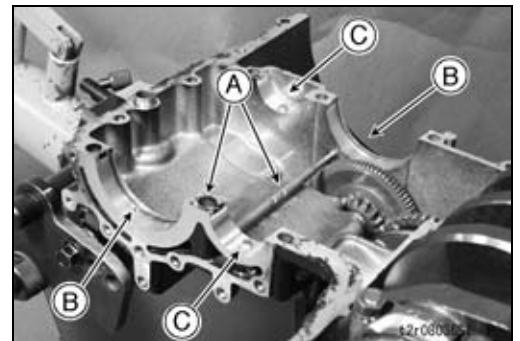
Transmission Shaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the drive shaft assembly [A] and output shaft assembly [B] from the upper crankcase [C].



Transmission Shaft Installation

- Blow the oil passages [A] clean with compressed air.
- Check to see that the set rings [B] and set pins [C] are in place in the transmission bearing housings.



- Install the drive shaft and output shaft assemblies into the upper crankcase half.
- Apply molybdenum disulfide oil to the sliding surfaces of the gears and bearings.
- The bearing set pins and rings must match properly with the holes or grooves in the bearing outer races. When they are properly matched, there is no clearance between the crankcase and the bearing outer races [A].



8-34 CRANKSHAFT/TRANSMISSION

Transmission

Transmission Shaft Disassembly

- Remove the transmission shafts.
- Remove the circlips and disassemble the transmission shafts.

Special Tool - Outside Circlip Pliers: 57001-144

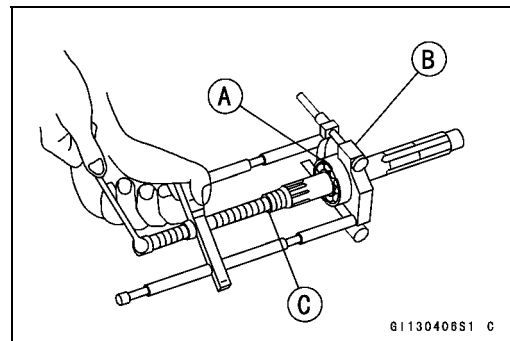
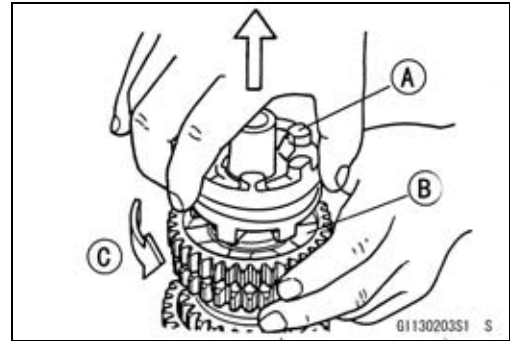
- The shifter [A] on the output shaft has three steel balls assembled into it for the positive neutral finder mechanism.
- Remove the shifter as follows.
 - Set the output shaft in a vertical position holding the 3rd gear [B].
 - Spin [C] the shifter quickly and pull it off upward.

- Remove the ball bearing [A] from each shaft.

Special Tools - Bearing Puller: 57001-135 [B]

Bearing Puller Adapter: 57001-317 [C]

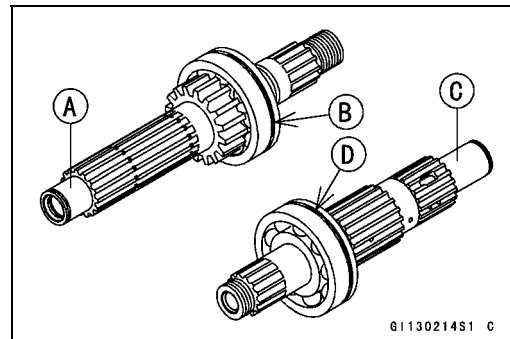
- Discard the bearing.



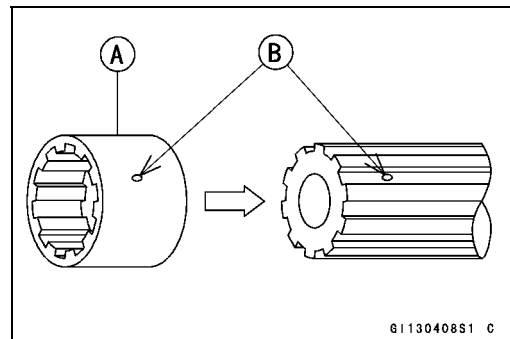
Transmission Shaft Assembly

- Install the ball bearing on the drive shaft [A] with the groove [B] toward the clutch side using the steering stem bearing driver (special tool).
- Install the ball bearing on the output shaft [C] with the groove [D] away from the engine sprocket side.

Special Tool - Steering Stem Bearing Driver: 57001-137

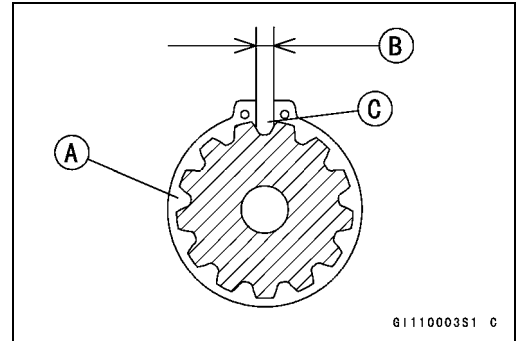


- Apply molybdenum disulfide oil to the gear-sliding surfaces on the shafts.
- Install the 5th gear bushing [A] onto the drive shaft with their holes [B] aligned.

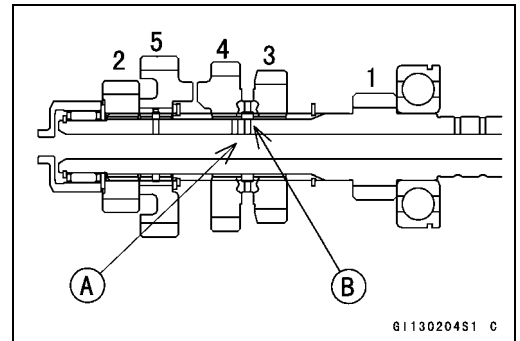


Transmission

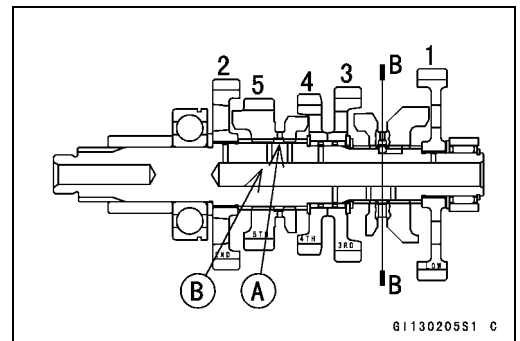
- Replace any circlips removed with new ones.
- Install the circlips [A] so that the opening [B] is aligned with a spline groove [C].



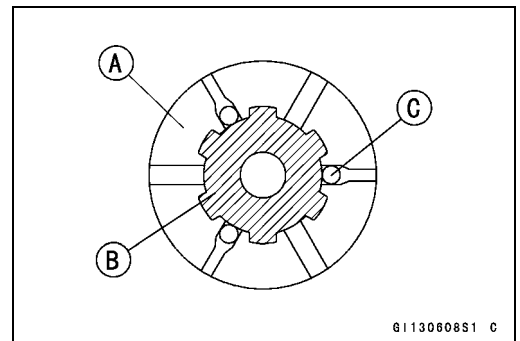
- The drive shaft gears can be recognized by size: the gear with the smallest diameter is 1st gear, and the largest one is 5th gear. Be sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.
- Install the 3rd/4th gear onto the drive shaft with their holes [A] and [B] aligned.



- The output shaft gears can be recognized by size: the gear with the largest diameter is 1st gear, and the smallest one is 5th gear. Be sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.
- Install the 5th gear onto the output shaft with their holes [A] and [B] aligned as shown.



- Fit the steel balls into the shifter holes in the output shaft as shown (see Section BB in the output shaft illustration).
 Shifter [A]
 Output Shaft [B]
 Steel Balls [C]



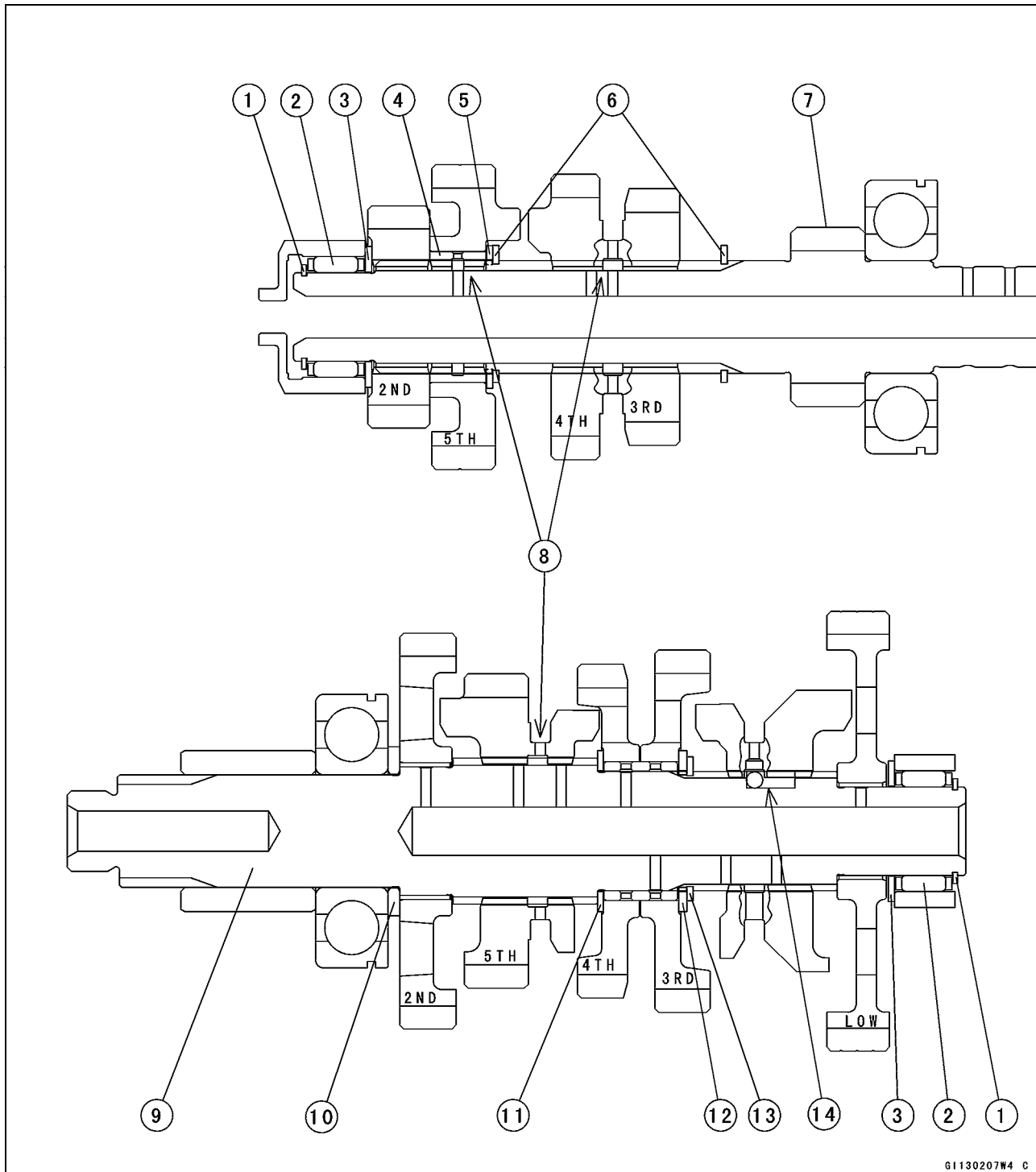
CAUTION

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

- After assembling the shifter with steel balls in place on the output shaft, check the ball-locking effect that the shifter does not come out of the output shaft when moving it up and down by hand.
- Check that each gear spins or slides freely on the transmission shafts without binding after assembly.

8-36 CRANKSHAFT/TRANSMISSION

Transmission



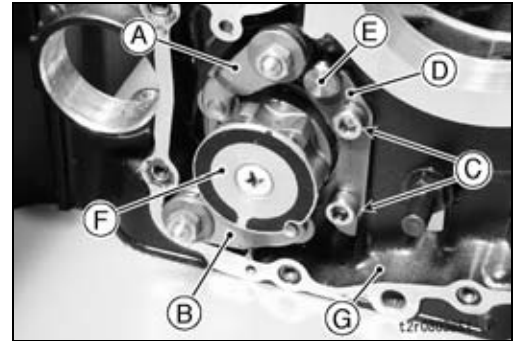
61130207W4 C

1. Two Washers, $\phi 20 \times 25.5 \times t 1.2$ mm ($\phi 0.78 \times 1.004 \times t 0.047$ in)
2. Two Needle Bearings
3. Two Washers, $\phi 22.3 \times 35 \times t 1.6$ mm ($\phi 0.878 \times 1.38 \times t 0.063$ in)
4. Bushing (5th gear)
5. Washer, $\phi 28.5 \times 35.5 \times t 1.5$ mm ($\phi 1.122 \times 1.398 \times t 0.059$ in)
6. Circlip for $\phi 28$ mm ($\phi 1.10$ in)
7. Low Gear (drive shaft)
8. Align the gear or bushing hole(s) with the shaft hole(s).
9. Output Shaft
10. Washer, $\phi 28.3 \times 42 \times t 2.9$ mm ($\phi 1.114 \times 1.65 \times t 0.114$ in)
11. Washer, $\phi 29.9 \times 40 \times t 1.5$ mm ($\phi 1.008 \times 1.57 \times t 0.059$ in)
12. Washer, $\phi 30.3 \times 40 \times t 1.5$ mm ($\phi 1.193 \times 1.57 \times t 0.059$ in)
13. Circlip for $\phi 29$ ($\phi 1.14$ in)
14. Steel Balls

Transmission

Shift Drum and Fork Removal

- Remove:
 - Lower Crankcase Half (see Crankcase Splitting)
 - Neutral Set Lever [A] and Gear Set Lever [B]
 - Bolts [C] and Shift Drum Bearing Holder [D]
- Pull out the shift rod [E], and take off the shift forks.
- Pull out the shift drum [F] from the upper crankcase [G].

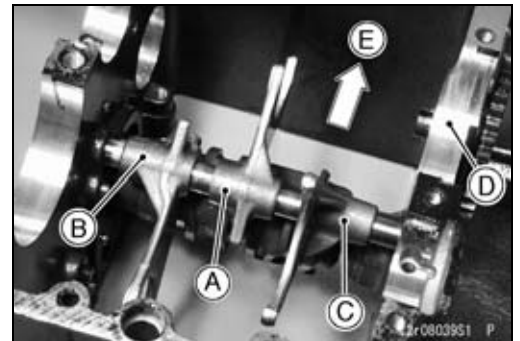


Shift Drum and Fork Installation

- Apply a non-permanent locking agent to the shift drum bearing holder bolts, and tighten them.

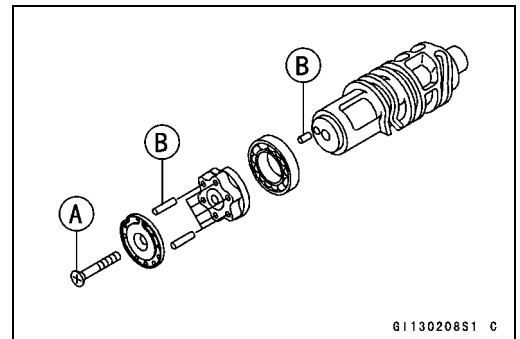
Torque - Shift Drum Bearing Holder Bolts: 13 N·m (1.3 kgf·m, 113 in·lb)

- The shift forks can be identified by their shape. Install them noting the direction shown.
 - Drive Shaft Fork marked with "96" [A]
 - Output Shaft Fork marked with "97" [B]
 - Output Shaft Fork marked with "98" [C]
 - Upper Crankcase [D]
 - Front [E]



Shift Drum Disassembly

- Remove the shift drum (see Shift Drum and Fork Removal).
- While holding the shift drum with a vise, remove the shift drum cam screw.
 - Shift Drum Cam Screw [A]
 - Shift Drum Pins (Dowel Pins) [B]

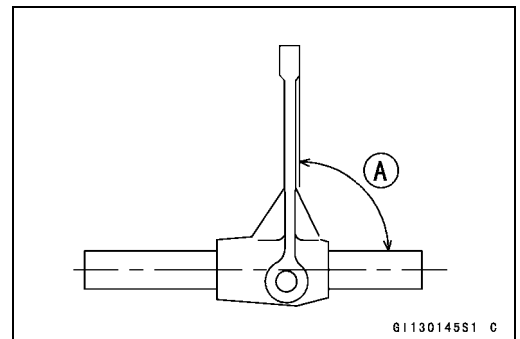


Shift Drum Assembly

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

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 under power.
 - 90° [A]



8-38 CRANKSHAFT/TRANSMISSION

Transmission

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 (0.189 in.)

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

Shift Fork Ear Thickness

Standard: 5.05 ~ 5.15 mm (0.1988 ~ 0.203 in.)

Service Limit: 5.25 mm (0.207 in.)

Shift Fork Guide Pin/Drum Groove Wear

- 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: 7.9 ~ 8.0 mm (0.311 ~ 0.315 in.)

Service Limit: 7.8 mm (0.307 in.)

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

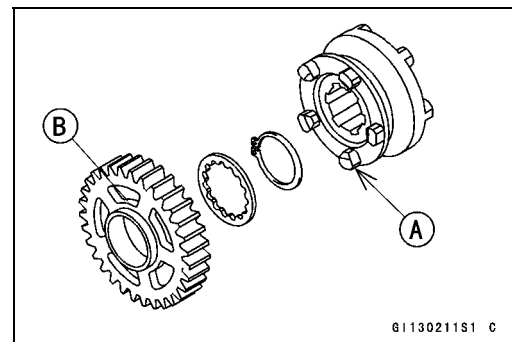
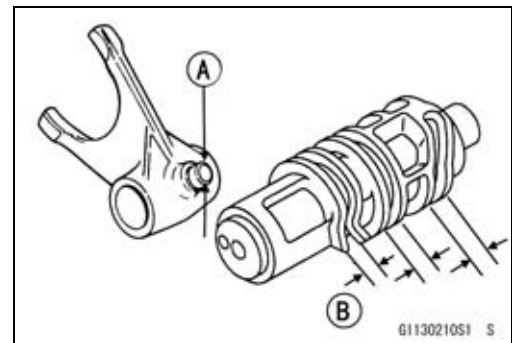
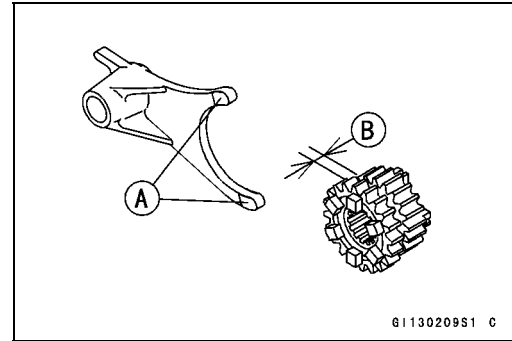
Shift Drum Groove Width

Standard: 8.05 ~ 8.20 mm (0.317 ~ 0.323 in.)

Service Limit: 8.3 mm (0.327 in.)

Gear Dog and Gear Dog Hole Damage Inspection

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



Ball Bearing, Needle Bearing, and Oil Seal

Ball Bearing Replacement

CAUTION
Do not remove the ball bearings unless it is necessary. Removal may damage them.

- Using a press or puller, remove the ball bearing.

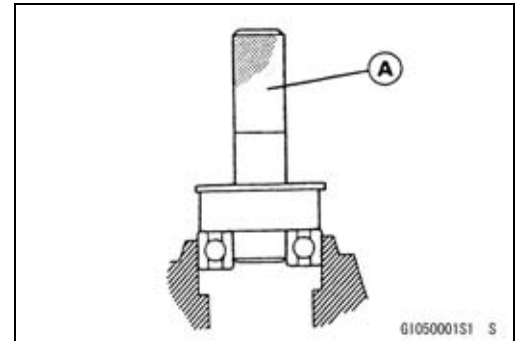
NOTE

○ *In the absence of the above mentioned tools, satisfactory results may be obtained by heating the case with engine oil to approximately 93°C (200°F) max., and tapping the bearing in or out.*

CAUTION
Do not heat the case with a blowtorch. This will warp the case. Soak the case in engine oil and heat the oil.

- Using a press and the bearing driver [A], install the new bearing until it stops at the bottom of its housing.

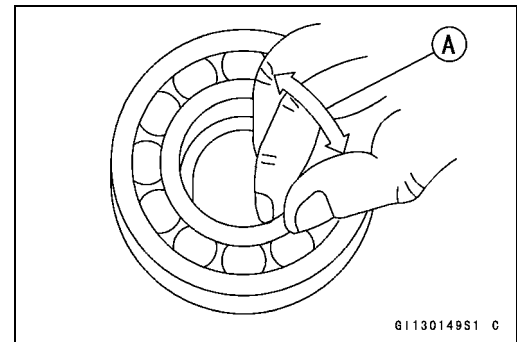
Special Tool - Bearing Driver Set: 57001-1129



Ball and Needle Bearing Wear Inspection

CAUTION
Do not remove the ball bearings for inspection. Removal may damage them.

- Check the ball bearings.
 - Since the ball bearings are made to extremely close tolerances, the wear must be judged by feel rather than measurement. Clean each bearing in a high-flash point solvent, dry it (do not spin the bearing while it is dry), and oil it with engine oil.
 - Spin [A] the bearing by hand to check its condition.
 - ★ If the bearing is noisy, does not spin smoothly, or has any rough spots, replace it.
- Check the needle bearings [A].
 - The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.
 - ★ If there is any doubt as to the condition of a needle bearing, replace it.



Oil Seal Inspection

- Inspect the oil seals.
 - ★ Replace it if the lips are misshapen, discolored (indicating that the rubber has deteriorated), hardened or otherwise damaged.

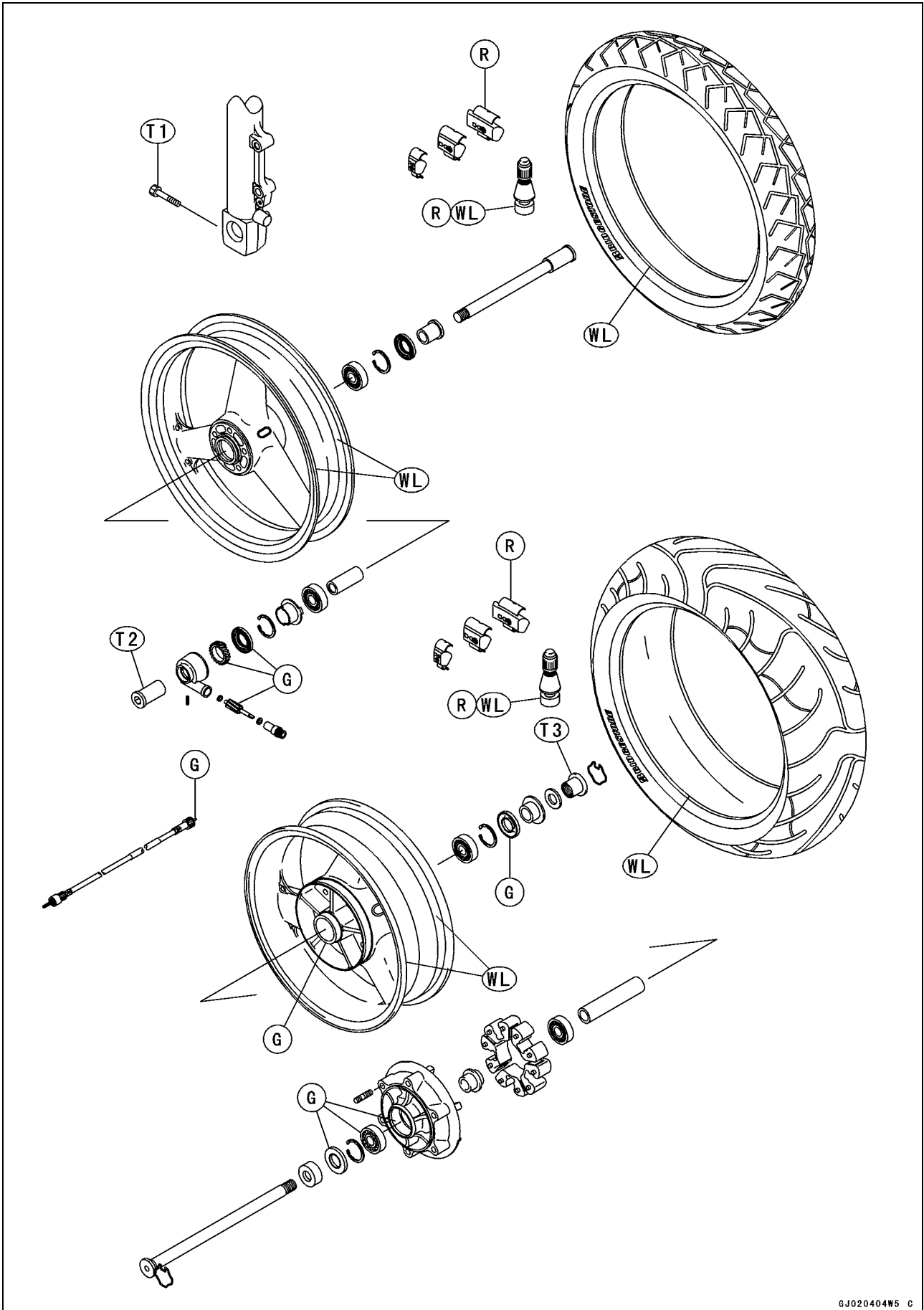
Wheels/Tires

Table of Contents

Exploded View	9-2
Specifications	9-4
Wheels (Rims).....	9-5
Front Wheel Removal	9-5
Front Wheel Installation	9-5
Rear Wheel Removal	9-6
Rear Wheel Installation	9-7
Wheel Inspection	9-7
Axle Inspection.....	9-8
Balance Inspection.....	9-8
Balance Weight Removal.....	9-8
Balance Weight Installation	9-9
Tires	9-11
Air Pressure Inspection/Adjustment	9-11
Tire Inspection	9-11
Tire Removal.....	9-12
Tire Installation	9-12
Tire Repair	9-14
Hub Bearings (Wheel Bearings)	9-15
Hub Bearing Removal	9-15
Hub Bearing Installation	9-15
Hub Bearing Inspection.....	9-16
Speedometer Gear Housing	9-17
Disassembly/Assembly.....	9-17
Lubrication	9-17

9-2 WHEELS/TIRES

Exploded View



Exploded View

T1: 20 N·m (2.0 kgf·m, 14 ft·lb)

T2: 127 N·m (13 kgf·m, 94 ft·lb)

T3: 98 N·m (10 kgf·m, 72 ft·lb)

G: Apply grease.

R: Replacement Parts

WL: Apply soap and water solution or rubber lubricant.

9-4 WHEELS/TIRES

Specifications

Item	Standard	Service Limit
Wheels (Rims)		
Rim Size:		
Front	17 × 3.50	- - -
Rear	17 × 5.50	- - -
Rim Runout (with tire installed):		
Axial	TIR 0.5 mm (0.02 in.) or less	TIR 1.0 mm (0.04 in.)
Radial	TIR 0.8 mm (0.03 in.) or less	TIR 1.0 mm (0.04 in.)
Axle Runout/100 mm (3.94 in)	TIR 0.1 mm (0.004 in.) or less	TIR 0.2 mm (0.008 in.)
Wheel Balance	10 g (0.35 oz.) or less	- - -
Balance Weights	10 g (0.35 oz.), 20 g (0.71 oz.), 30 g (1.1 oz.)	- - -
Tires		
Air Pressure (when cold):		
Front	250 kPa (2.5 kgf/cm ² , 36 psi)	- - -
Rear	250 kPa (2.5 kgf/cm ² , 36 psi)	- - -
Tread Depth:		
Front	4.3 mm (0.17 in.)	1 mm (0.04 in.) (DE,AT,CH) 1.6 mm (0.062 in.)
Rear	7 mm (0.28 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	
Front:		
ZR1200A/C	BRIDGESTONE BATTLAX BT020F RADIAL L, tubeless	120/70 ZR17 (58W) 120/70 ZR17 M/C (58W) (ZR1200-A3 ~, A6F ~/C2 ~)
ZR1200B	BRIDGESTONE BATTLAX BT020F RADIAL W, tubeless	120/70 ZR17 M/C (58W) (ZR1200-B3 ~)
Rear:		
ZR1200A/C	BRIDGESTONE BATTLAX BT020R RADIAL L, tubeless	180/55 ZR17 (73W) 180/55 ZR17 M/C (73W) (ZR1200-A3 ~, A6F ~/C2 ~)
ZR1200B	BRIDGESTONE BATTLAX BT020R RADIAL W, tubeless	180/55 ZR17 M/C (73W) (ZR1200-B3 ~)

DE: Germany Model

AT: Austria Model

CH: Switzerland Model

Special Tools - Inside Circlip Pliers: 57001-143

Jack: 57001-1238

Bearing Driver Set: 57001-1129

Bearing Remover Shaft, $\phi 9$: 57001-1265

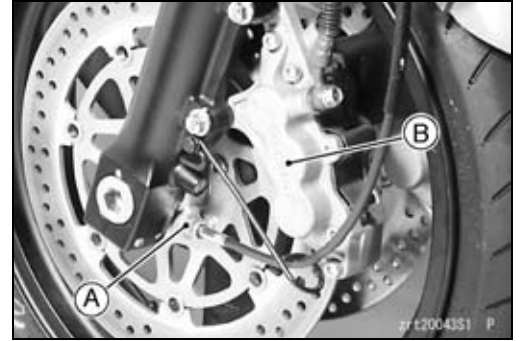
Bearing Remover Head, $\phi 20 \times \phi 22$: 57001-1293

Bearing Remover Head, $\phi 25 \times \phi 28$: 57001-1346

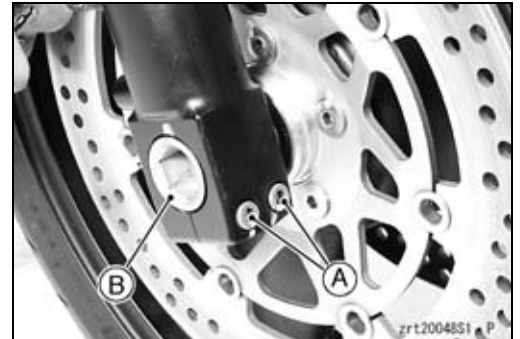
Wheels (Rims)

Front Wheel Removal

- Remove the speedometer cable lower end [A]
- Remove both brake calipers [B] with the hoses installed.



- Loosen:
Right Side Axle Clamp Bolts [A]
Front Axle [B]



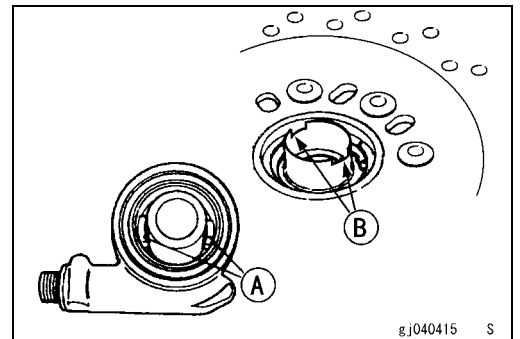
- Raise the front wheel off the ground, using the jack.
Special Tools - Jack: 5700-1238
- Pull out the axle to the right and drop the front wheel out of the forks.

CAUTION

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

Front Wheel Installation

- Install the speedometer gear housing so that the projections [A] fit in the drive notches [B].



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9-6 WHEELS/TIRES

Wheels (Rims)

- Fit the collar on the right side of the hub.
- Fit the speedometer gear housing stop [A] between the fork leg stops [B].
- Tighten the axle and right axle clamp bolts.

Torque - Front Axle: 127 N·m (13 kgf·m, 94 ft·lb)

Front Axle Clamp Bolts: 20 N·m (2.0 kgf·m, 14 ft·lb)

NOTE

○ Tighten the two clamp bolts alternately two times to ensure even tightening torque.

- Install the front brake calipers (see Brakes chapter).
- Check the front brake effectiveness.

⚠ WARNING

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

Rear Wheel Removal

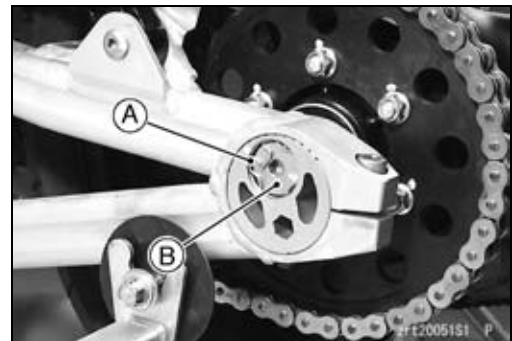
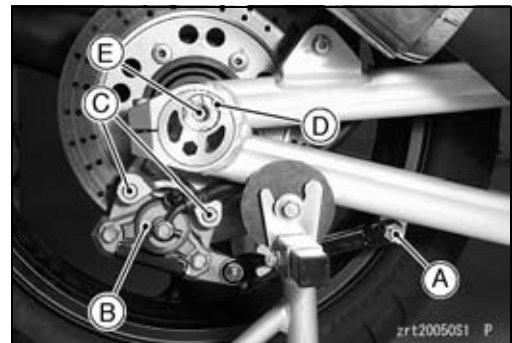
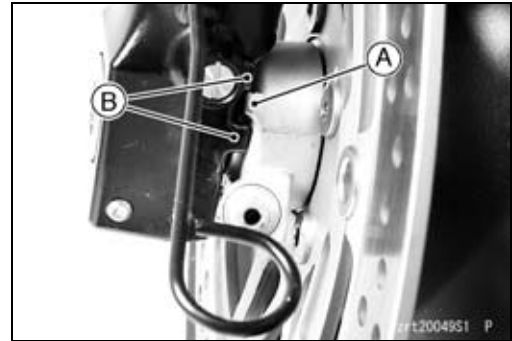
- Raise the rear wheel off the ground, using the stand.
- Loosen the front torque link nut [A].
- Remove:
 - Rear Brake Caliper Bolts [B]
 - Rear Brake Caliper [C]
 - Retaining Ring [D]
 - Axle Nut [E]

Retaining Ring [A]
Rear Axle [B]

- Disengage the drive chain from the rear sprocket toward the left and remove the rear wheel.

CAUTION

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



Wheels (Rims)

Rear Wheel Installation

- Engage the drive chain with the rear sprocket, and install the rear wheel.
- Insert the axle from the left side of the wheel, and tighten the axle nut.

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

- Adjust the drive chain slack after installation (see Final Drive chapter).
- Check the rear brake effectiveness.

⚠ WARNING

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

Wheel Inspection

- Raise the front/rear wheel off the ground.

Special Tool - Jack: 57001-1238

- Spin the wheel lightly, and check for roughness or binding.
 - ★ If roughness or binding is found, replace the hub bearings.
- Inspect the wheel for small cracks, dents, bending, or warp.
 - ★ If there is any damage to the wheel, replace the wheel.
- Measure the axial [A] and radial [B] rim runout with a dial gauge.
 - ★ If rim runout exceeds the service limit, check the hub bearings.
 - ★ If the problem is not due to the bearings, replace the wheel.

Rim Runout (with tire installed)

Standard:

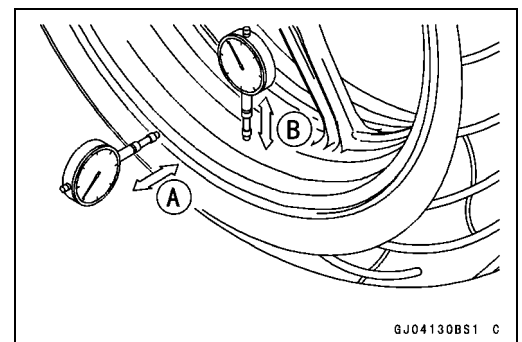
Axial	TIR 0.5 mm (0.02 in.) or less
Radial	TIR 0.8 mm (0.03 in.) or less

Service Limit:

Axial	TIR 1.0 mm (0.04 in.)
Radial	TIR 1.0 mm (0.04 in.)

⚠ WARNING

Never attempt to repair a damaged wheel. If there is any damage besides wheel bearings, the wheel must be replaced to insure safe operational condition.



9-8 WHEELS/TIRES

Wheels (Rims)

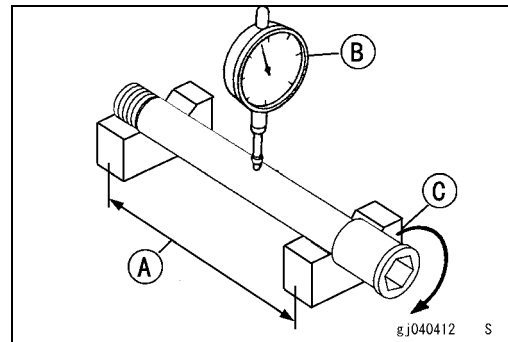
Axle Inspection

- Visually inspect the front or 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: TIR 0.1 mm (0.004 in.) or less

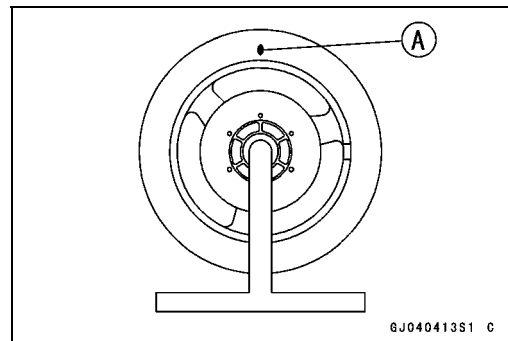
Service Limit: TIR 0.2 mm (0.008 in.)



Balance Inspection

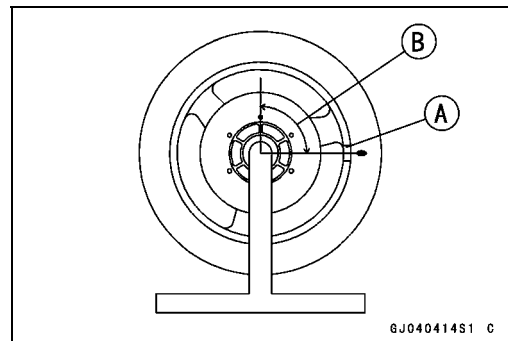
Balance Inspection

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



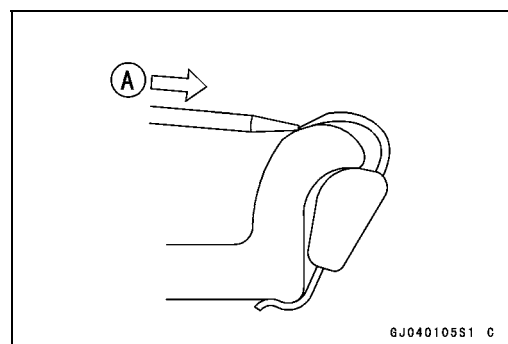
Balance Adjustment

- If the wheel always stops in one position, provisionally attach a balance weight [A] on the rim at the marking using adhesive tape.
- Rotate the wheel 1/4 turn [B], and see whether or not the wheel stops in this position. If it does, the correct balance weight is being used.
- ★ If the wheel rotates and the weight goes up, replace the weight with the next heavier size. If the wheel rotates and the weight goes down, replace the weight with the next lighter size. Repeat these steps until the wheel remains at rest after being rotated 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.
- Permanently install the balance weight.



Balance Weight Removal

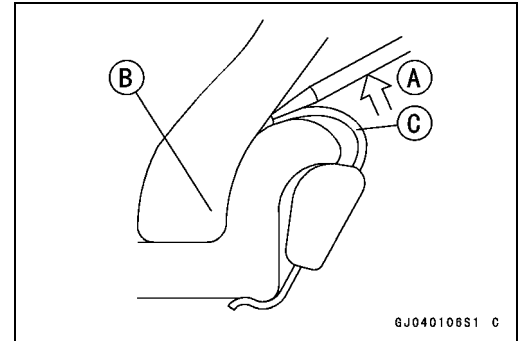
- (a) When the tire is not on the rim.
- Push [A] the blade portion toward the outside with a regular tip screwdriver, and slip the weight off the rim flange. Discard the used balance weight.



Wheels (Rims)

(b) When the tire is on the rim.

- Pry [A] the balance weight off the rim flange using a regular tip screwdriver, as shown in the figure.
- Insert a tip of the screwdriver between the tire bead [B] and weight blade [C] until the end of the tip reaches the end of the weight blade.
- Push the driver grip toward the tire so that the balance weight slips off the rim flange.
- Discard the used balance weight.



Balance Weight Installation

- Check if the weight portion has any play on the blade and clip.
- ★ If it does, discard it.

⚠ WARNING

If the balance weight has any play on the rim, the blade and/or clip of the weight has been stretched. Replace the loose balance weight. Do not reuse used balance weight. Unbalanced wheels can create an unsafe riding condition.

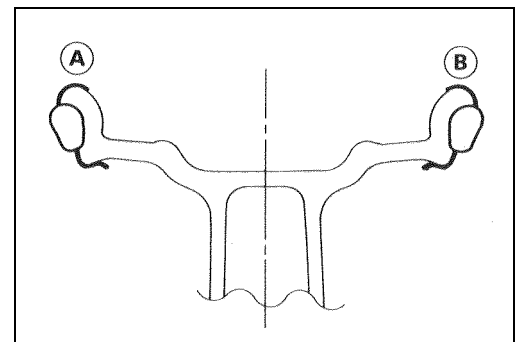
- Lubricate the balance weight blade, tire bead, and rim flange with a soap and water solution or rubber lubricant. This helps the balance weight slip onto the rim flange.

CAUTION

Never lubricate with engine oil or petroleum distillates because they will deteriorate the tire.

- When installing the balance weight 20 g (0.71 oz.) or more, install the balance weights at both sides of rim flange as shown.

Required Total Weight	Weight selection	
	One Side [A]	Other Side [B]
10 g (0.35 oz.)	10 g (0.35 oz.)	-
20 g (0.71 oz.)	10 g (0.35 oz.)	10 g (0.35 oz.)
30 g (1.1 oz.)	20 g (0.71 oz.)	10 g (0.35 oz.)
40 g (1.4 oz.)	20 g (0.71 oz.)	20 g (0.71 oz.)
50 g (1.8 oz.)	30 g (1.1 oz.)	20 g (0.71 oz.)
60 g (2.1 oz.)	30 g (1.1 oz.)	30 g (1.1 oz.)
70 g (2.5 oz.)	20 g (0.71 oz.) + 20 g (0.71 oz.)	30 g (1.1 oz.)
80 g (2.8 oz.)	20 g (0.71 oz.) + 20 g (0.71 oz.)	20 g (0.71 oz.) + 20 g (0.71 oz.)
90 g (3.2 oz.)	20 g (0.71 oz.) + 30 g (1.1 oz.)	20 g (0.71 oz.) + 20 g (0.71 oz.)



9-10 WHEELS/TIRES

Wheels (Rims)

Balance Weight

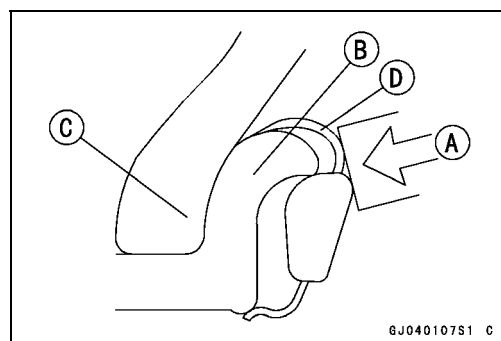
Part Number	Weight (grams)
41075-1014	10 (0.35 oz.)
41075-1015	20 (0.71 oz.)
41075-1016	30 (1.1 oz.)

NOTE

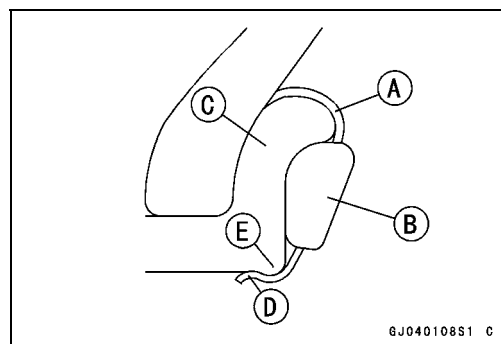
○Balance weights are available from Kawasaki dealers in 10, 20, and 30 gram (0.35, 0.71 and 1.1 ounce) sizes. An imbalance of less than 10 grams will not usually affect running stability.

○Do not use four or more balance weight (more than 90 gram 3.2 ounce). If the wheel requires an excess balance weight, disassemble the wheel to find the cause.

- Install the balance weight on the rim.
- Slip the weight on the rim flange by pushing or lightly hammering the weight in the direction shown in the figure.
 - Push or Hammer [A]
 - Rim Flange [B]
 - Tire Bead [C]
 - Blade [D]



- Check that the blade [A] and weight [B] seat fully on the rim flange [C], and that the clip [D] is hooked over the rim ridge [E] and reaches rim flat portion.



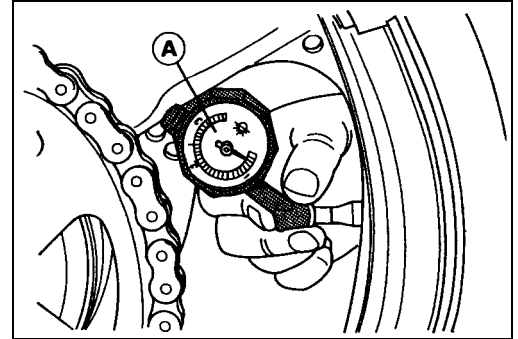
Tires

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)

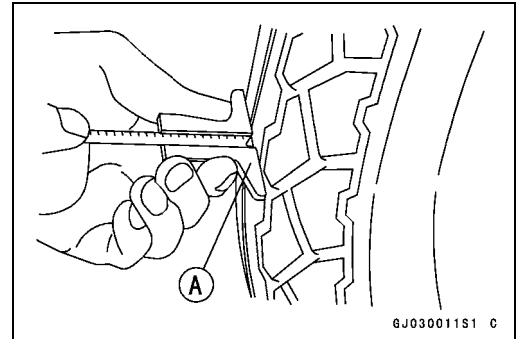
- Front 250 kPa (2.5 kgf/cm², 36 psi)
- Rear 250 kPa (2.5 kgf/cm², 36 psi)



Tire Inspection

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

- Remove any imbedded stones or other foreign particles from the tread.
- Visually inspect the tire for cracks and cuts, replacing the tire in case of damage. Swelling or high spots indicate internal damage, requiring tire replacement.
- Measure the tread depth at the center of the tread with a depth gauge [A]. Since the tire may wear unevenly, take measurement at several places.
- ★ If any measurement is less than the service limit, replace the tire.



Tread Depth

Standard:

- Front 4.3 mm (0.17 in.)
- Rear 7 mm (0.28 in.)

Service Limit:

- Front 1 mm (0.04 in.)
(DE, AT, CH) 1.6 mm (0.062 in.)
- Rear 2 mm (0.08 in.) (up to 130 km/h, 80 mph)
3 mm (0.12 in.) (Over 130 km/h, 80 mph)

⚠ WARNING

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

NOTE

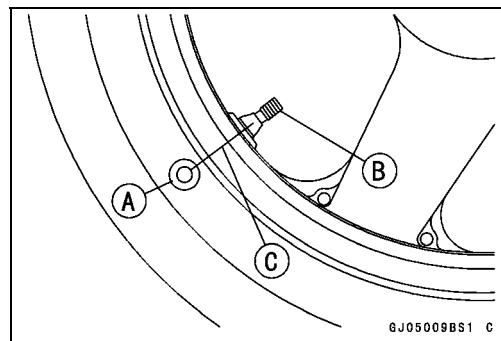
- Most countries may have their own regulations requiring a minimum tire tread depth; be sure to follow them.
- Check and balance the wheel when a tire is replaced with a new one.

9-12 WHEELS/TIRES

Tires

Tire Removal

- Remove:
 - Wheel (see this chapter)
 - Disc(s)
 - Valve Core (let out the air)
- To maintain wheel balance, mark the air valve position on the tire with chalk so that the tire can be reinstalled in the same position.
 - Chalk Mark or Yellow Mark [A]
 - Air Valve [B]
 - Align [C]
- 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.

- Remove the tire from the rim using a suitable commercially available tire changer.

NOTE

○ *The tires cannot be removed with hand tools because they fit the rims too tightly.*

Tire Installation

⚠ WARNING

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

- Inspect the rim and tire, and replace them if necessary.
- Clean the sealing surfaces of the rim and tire, and smooth the sealing surfaces of the rim with a fine emery cloth if necessary.
- Remove the air valve and discard it.

CAUTION

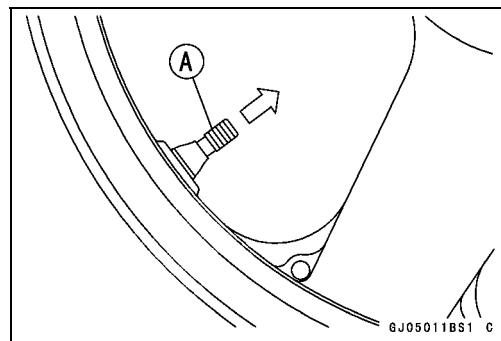
Replace the air valve whenever the tire is replaced. Do not reuse the air valve.

- Install a new valve in the rim.
 - Remove the valve cap, lubricate the stem seal [A] with a soap and water solution or rubber lubricant, and pull the air valve through the rim from the inside out until it snaps into place.

CAUTION

Do not use engine oil or petroleum distillates to lubricate the stem because they will deteriorate the rubber.

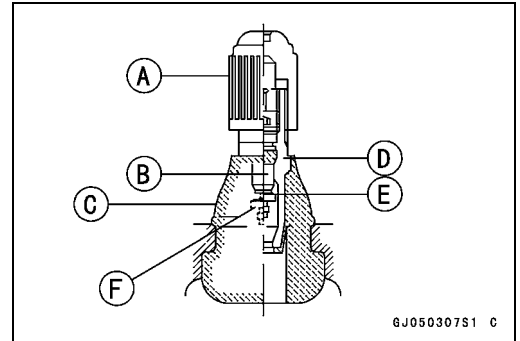
- Apply a soap and water solution, or rubber lubricant to the rim fringe and tire beads.



Tires

○The air valve is shown in the figure.

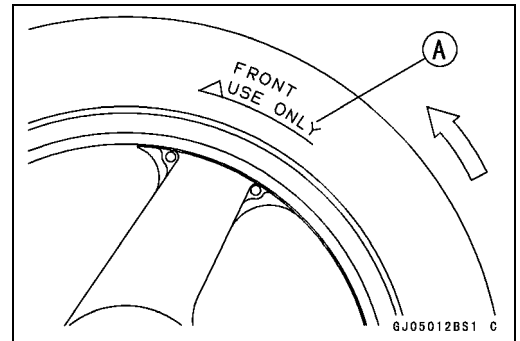
- Valve Cap [A]
- Valve Core [B]
- Stem Seal [C]
- Valve Stem [D]
- Valve Seat [E]
- Valve Opened [F]



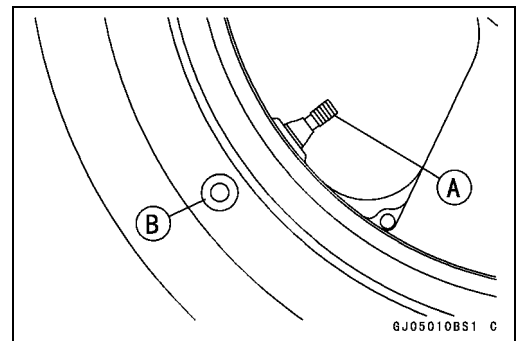
- Check the tire rotation mark on the front and rear tires and install them on the rim accordingly.

NOTE

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



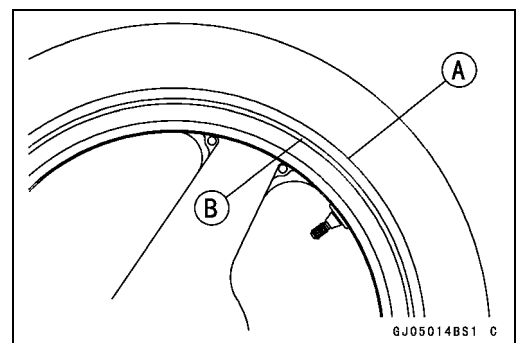
- Position the tire on the rim so that the air valve [A] is at the tire balance mark [B] (the chalk mark made during removal, or the yellow paint mark on a new tire).
- Install the tire bead over the rim flange using a suitable commercially available tire changer.
- Lubricate the tire beads and rim flanges with a soap and water solution or rubber lubricant to help seat the tire beads in the sealing surfaces of the rim while inflating the tire.
- Center the rim in the tire beads, and inflate the tire with compressed air until the tire beads seat in the sealing surfaces.



⚠ WARNING

Be sure to install the valve core whenever inflating the tire, and do not inflate the tire to more than 400 kPa (4.0 kgf/cm², 57 psi). Overinflation can explode the tire with possibility of injury and loss of life.

- Check to see that the rim lines [A] on both sides of the tire sidewalls are parallel with the rim flanges [B].
- ★ If the rim flanges and tire sidewall rim lines are not parallel, remove the valve core.
- Lubricate the rim flanges and tire beads.
- Install the valve core and inflate the tire again.
- After the tire beads seat in the rim flanges, check for air leakage.
- Inflate the tire slightly above standard inflation.
- Use a soap and water solution or submerge the tire, and check for bubbles that would indicate leakage.



9-14 WHEELS/TIRES

Tires

- Adjust the air pressure to the specified pressure (see Tire Inspection).
- Install the air valve cap.
- Install the brake disc(s) so that the marked side faces out (see Brakes chapter).
- Adjust the wheel balance.

Tire Repair

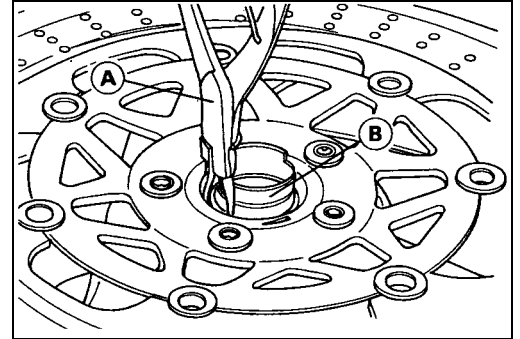
Currently two types of repair for tubeless tires have come into wide use. One type is called a temporary (external) repair which can be carried out without removing the tire from the rim, and the other type is called permanent (internal) repair which requires tire removal. It is generally understood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

Hub Bearings (Wheel Bearings)

Hub Bearing Removal

- Remove the wheel, and take out the following.
 - Collars
 - Coupling (out of rear hub)
 - Grease Seals
 - Circlips

Special Tool - Inside Circlip Pliers: 57001-143 [A]
 Speedometer Gear Drive [B] (out of front hub)

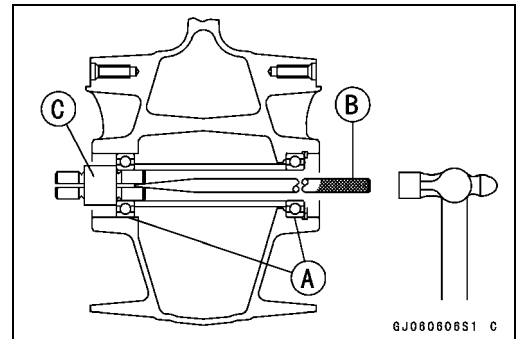


- Use the bearing remover to remove the hub bearings [A]

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.

Special Tools - Bearing Remover Shaft, $\phi 9$: 57001-1265 [B]
Bearing Remover Head, $\phi 20 \times \phi 22$: 57001-1293 [C]
Bearing Remover Head, $\phi 25 \times \phi 28$: 57001-1346 [C]



Hub Bearing Installation

- Before installing the wheel 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.

NOTE

○ Install the bearings so that the marked side faces out.

- Install the bearings by using the bearing driver set which does not contact the bearing inner race.
- Press in each right bearing [A] until it bottoms out.

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

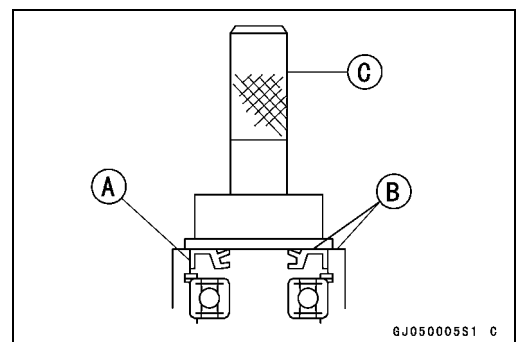
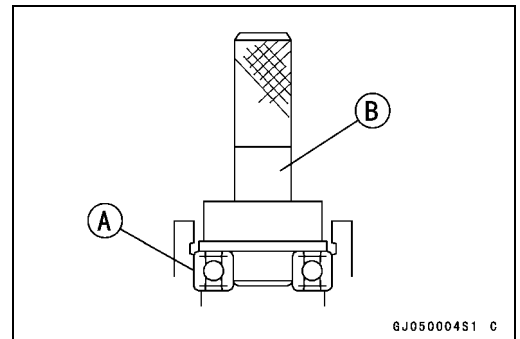
- Replace the circlips with new ones.

Special Tool - Inside Circlip Pliers: 57001-143

- Replace the grease seals with new ones.
- Press in the grease seals [A] so that 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]



9-16 WHEELS/TIRES

Hub Bearings (Wheel Bearings)

- Put the speedometer gear drive [A] onto the front wheel hub notches [B], then install the circlip.

Special Tool - Inside Circlip Pliers: 57001-143



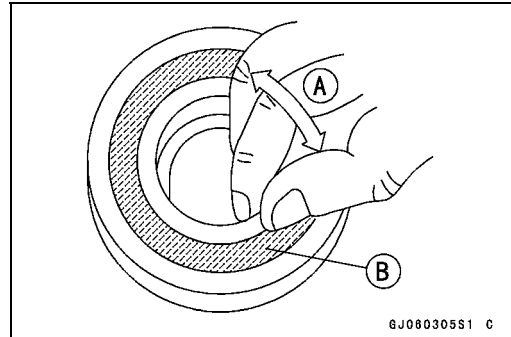
Hub Bearing Inspection

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

NOTE

○Do not remove any bearings for inspection. If any bearings are removed, they will need to be replaced with new ones.

- Turn each bearing in the hub back and forth [A] while checking for plays, roughness, or binding.
- ★ If bearing play, roughness, or binding is found, replace the bearing.
- Examine the bearing seal [B] for tears or leakage.
- ★ If the seal is torn or is leaking, replace the bearing.



Speedometer Gear Housing

Disassembly/Assembly

- Pull out the grease seal [A] using a thin-bladed screwdriver.
- Pull out the speedometer gear [B].

NOTE

○ It is recommended that the speedometer unit be replaced rather than attempting to replace the bushing [C], pinion [D], and washers [E]. However, if you wish, replace them as follows.

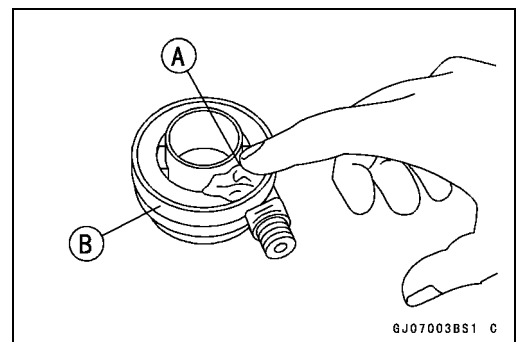
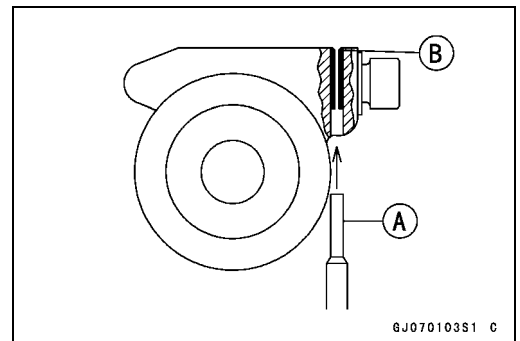
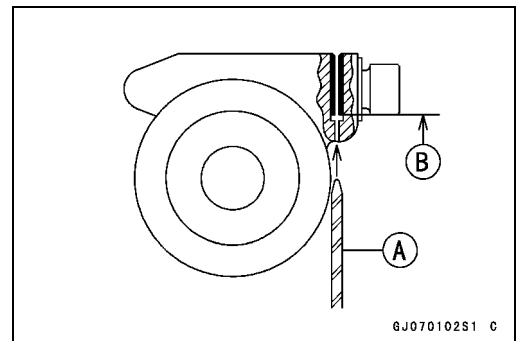
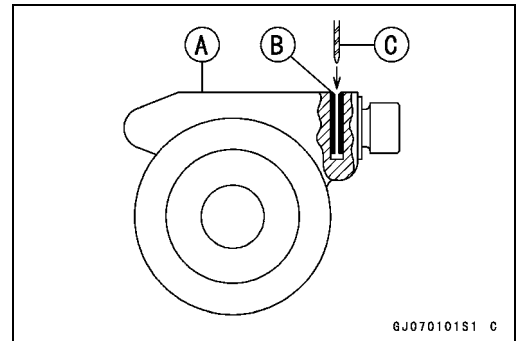
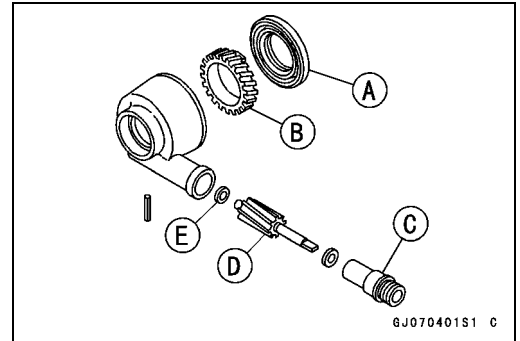
- First, drill the inner hole of the spring pin [B] in the housing [A] using a 1.0 to 1.5 mm (0.04 ~ 0.059 in.) drill bit [C].

- Drill the housing from the opposite side to the pin end [B], using a 3.0 to 3.5 mm (0.12 ~ 0.14 in.) drill bit [A].

- Using a 3 mm (0.12 in.) rod [A], tap the pin [B] out, and then pull out the speedometer cable bushing, pinion, and washers.
- Apply grease to the gear, pinion, grease seal, and washers (see Exploded View).
- After inserting a new spring pin, stake the housing hole to secure the pin in place.
- Replace the grease seal.
- Press in the grease seal so that the seal end is flush with the end of the hole.
- Apply high temperature grease to the seal lips.

Lubrication

- Clean and grease [A] the speedometer gear housing [B].



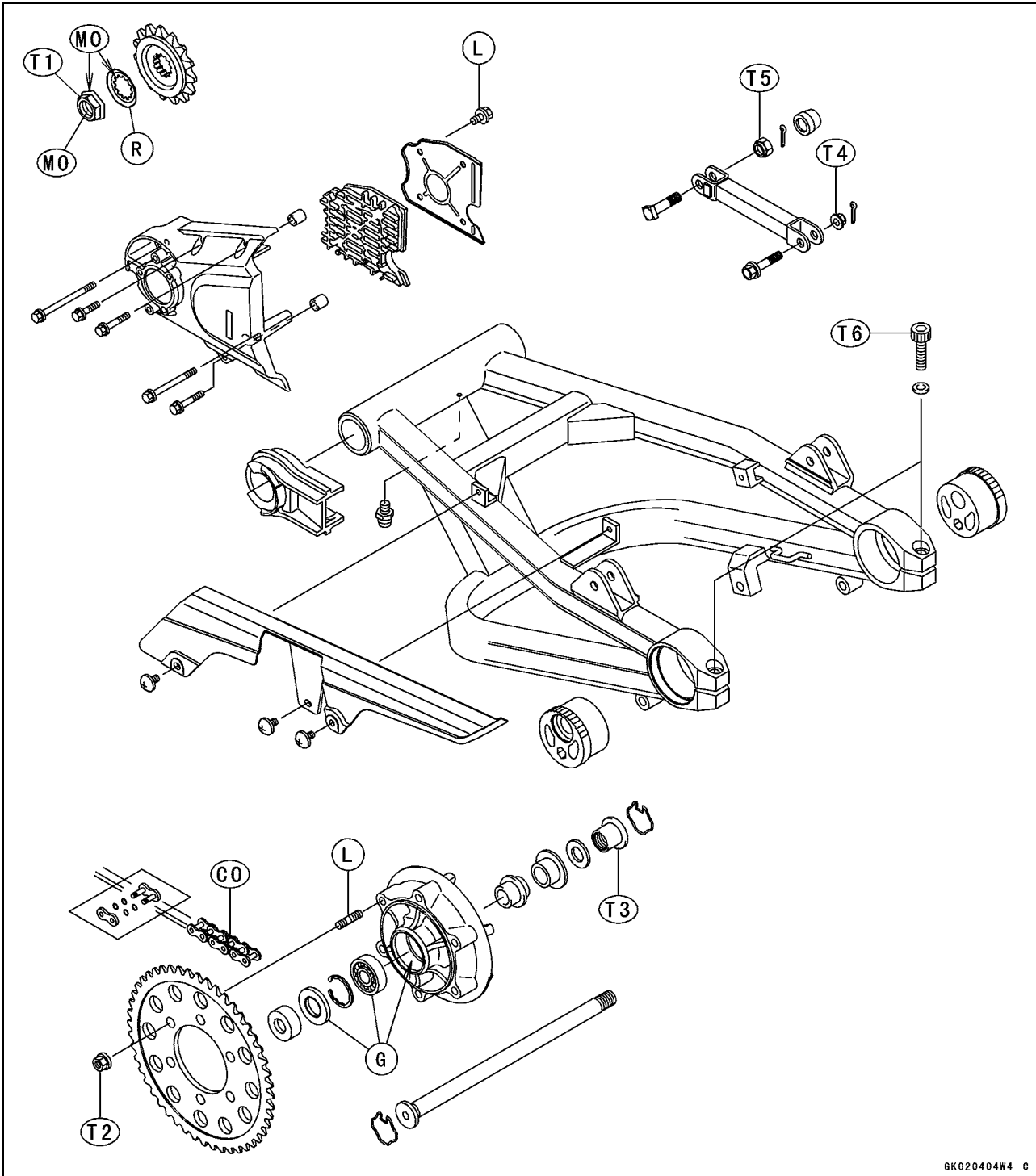
Final Drive

Table of Contents

- Exploded View 10-2
- Specifications 10-4
- Drive Chain 10-5
 - Drive Chain Slack Inspection 10-5
 - Wheel Alignment Inspection 10-5
 - Drive Chain Wear Inspection 10-6
 - Drive Chain Lubrication 10-7
 - Drive Chain Removal 10-7
 - Drive Chain Installation 10-8
- Sprocket, Coupling 10-10
 - Engine Sprocket Removal 10-10
 - Engine Sprocket Installation 10-10
 - Rear Sprocket Removal 10-11
 - Rear Sprocket Installation..... 10-11
 - Coupling Installation..... 10-11
 - Coupling Bearing Removal 10-11
 - Coupling Bearing Installation 10-12
 - Coupling Bearing Inspection 10-12
 - Coupling Bearing Lubrication..... 10-12
 - Coupling Damper Inspection..... 10-12
 - Sprocket Wear Inspection..... 10-12
 - Rear Sprocket Warp Inspection 10-13

10-2 FINAL DRIVE

Exploded View



Exploded View

T1: 127 N·m (13 kgf·m, 94 ft·lb)

T2: 59 N·m (6.0 kgf·m, 43 ft·lb)

T3: 98 N·m (10 kgf·m, 72 ft·lb)

T4: 25 N·m (2.5 kgf·m, 18 ft·lb)

T5: 34 N·m (3.5 kgf·m, 25 ft·lb)

T6: 39 N·m (4.0 kgf·m, 29 ft·lb)

CO: Apply chain oil.

G: Apply grease.

L: Apply a non-permanent locking agent.

MO: Apply molybdenum disulfide oil. The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10:1).

R: Replacement Parts

10-4 FINAL DRIVE

Specifications

Item	Standard	Service Limit
Drive Chain		
Standard Chain:		
Make	DAIDO	- - -
Type	DID 50ZV2 Joint Endless (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)	- - -
	DID 50VA8 Joint Endless (ZR1200-A4 ~, A6F ~/B4/C3)	- - -
Link	110 links	- - -
Chain Slack	15 ~ 25 mm (0.6 ~ 1.0 in.)	- - -
Chain 20-link Length	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	323 mm (12.7 in.)
Link Pin Outside Diameter	5.50 ~ 5.80 mm (0.22 ~ 0.23 in.)	- - -
Link Plates Outside Width	22.3 ~ 22.5 mm (0.88 ~ 0.89 in.) (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)	- - -
	21.4 ~ 21.6 mm (0.84 ~ 0.85 in.) (ZR1200-A4 ~, A6F ~/B4/C3)	- - -
Sprockets		
Rear Sprocket Runout	TIR 0.4 mm (0.016 in.) or less	TIR 0.5 mm (0.020 in.)

Special Tools - Inside Circlip Pliers: 57001-143

Bearing Driver Set: 57001-1129

Drive Chain

Drive Chain Slack Inspection

Drive Chain Slack Inspection

NOTE

- Check the slack with the motorcycle setting on its side stand.
- Clean the chain if it is dirty, and lubricate it if it appears dry.
- Check the wheel alignment (see Wheel Alignment Inspection).
- Rotate the rear wheel to find the position where the chain is tightest.
- Measure the vertical movement (chain slack) [A] midway between the sprockets.
- ★ If the chain slack exceeds the standard, adjust it.

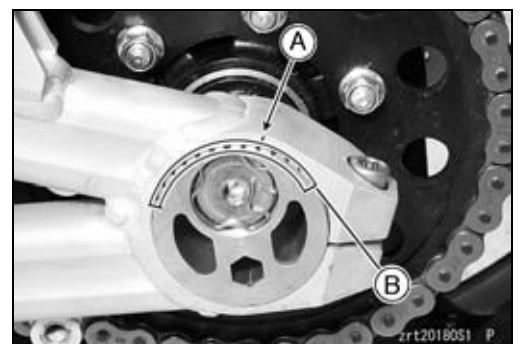
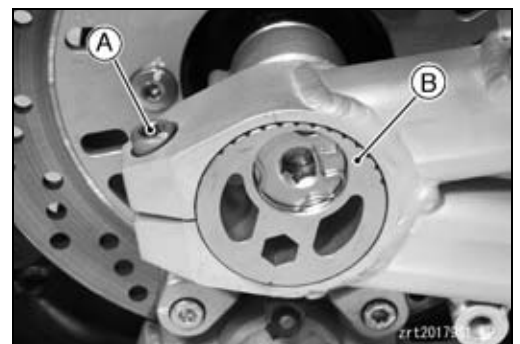
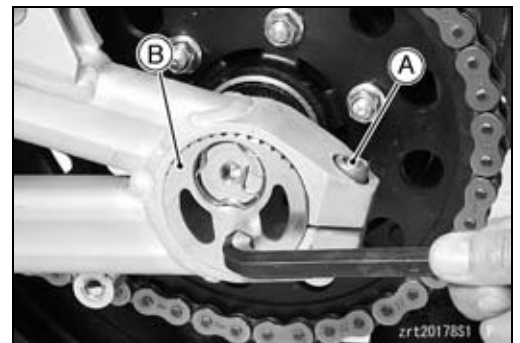
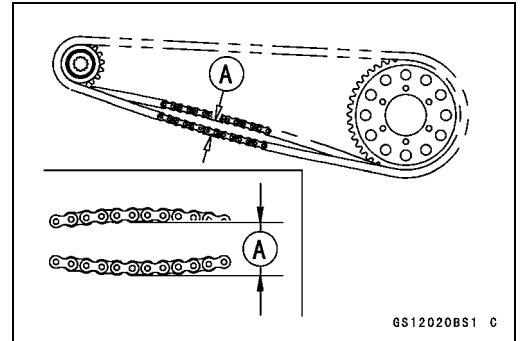
Chain Slack

Standard: 15 ~ 25 mm (0.6 ~ 1.0 in.)

Drive Chain Slack Adjustment

- Loosen the left and right chain adjuster clamp bolts [A].
- Using an Allen wrench, turn the adjusters [B] forward or rearward until the drive chain has the correct amount of chain slack.
- Tighten the chain adjuster clamp bolts.

Torque - Chain Adjuster Clamp Bolts: 39 N·m (4.0 kgf·m, 29 ft·lb)



Wheel Alignment Inspection

Wheel Alignment Inspection

- Check that the left and right notches [A] the swingarm should point to the same marks or positions [B] on the left and right adjuster.
- ★ If they do not, adjust the chain slack and align the wheel alignment (see slack Adjustment).

⚠ WARNING

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

10-6 FINAL DRIVE

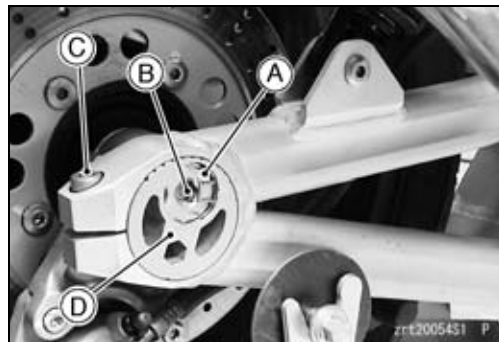
Drive Chain

Wheel Alignment Adjustment

- Remove the right retaining ring [A] from the axle shaft.
- Loosen the axle nut [B].
- Loosen the right chain adjuster clamp bolt [C], and turn the right chain adjuster [D] so that the left and right notches on the swingarm may point to the same marks or positions on the left and right adjusters.
- Tighten:

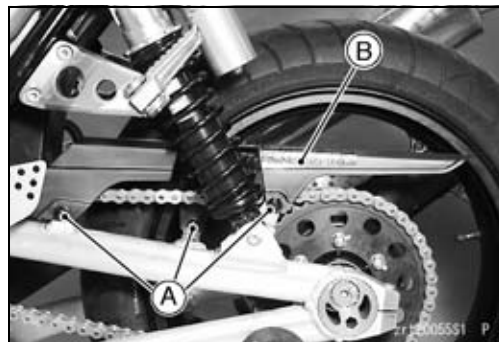
Torque - Chain Adjuster Clamp Bolt: 39 N·m (4.0 kgf·m, 29 ft·lb)

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

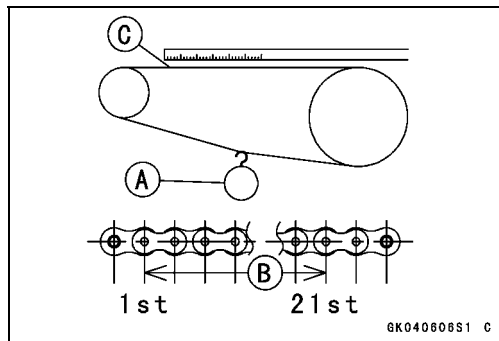


Drive Chain Wear Inspection

- Remove:
 - Mounting Screws [A]
 - Drive Chain Cover [B]



- 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, 22 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 engine and rear sprockets when the drive chain is replaced.



Drive Chain 20-link Length

Standard: 317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)

Service Limit: 323 mm (12.7 in.)

⚠ WARNING

If the drive chain wear exceeds the service limit, replace the chain or an unsafe riding condition may result. A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control.
For safety, use only the standard chain.

Standard Chain

Make DAIDO

Type DID 50ZV2 (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)

DID 50VA8 (ZR1200-A4 ~, A6F ~/B4/C3)

Link 110 Links

Drive Chain

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 is especially dirty, clean it before lubrication.

CAUTION

The grease seals between the side plates seal in the lubricant between the pin and the bushing. To avoid damaging the grease seals and resultant loss of lubricant, observe the following rules.

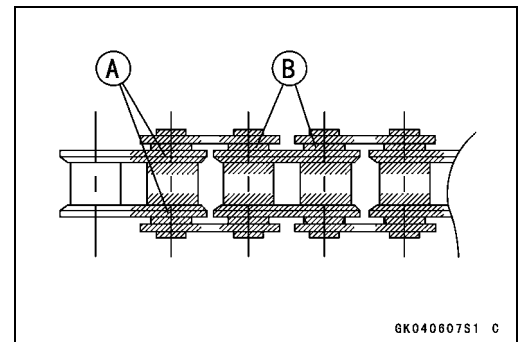
Use only kerosene or diesel oil for cleaning an grease seals drive chain.

Any other cleaning solution such as gasoline or trichloroethylene will cause deterioration and swelling of the grease seals.

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 grease seals so that the grease seals will be coated with oil.
- Wipe off any excess oil.
 - Oil Applied Areas [A]
 - Grease Seal [B]



Drive Chain Removal

NOTE

- Since the drive chain is installed through the swingarm, the chain cannot be removed other than by cutting it. Prepare the new link pin, link plate, O-ring, and tools for rejoining the chain.
- Remove the chain cover (see Drive Chain Wear Inspection).

10-8 FINAL DRIVE

Drive Chain

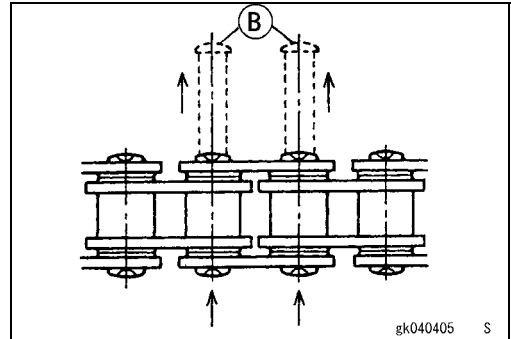
- Using the chain joint “ZJ” tool [A], cut the drive chain by removing the link pins [B]

Recommended Tool

DID Chain Joint “ZJ”

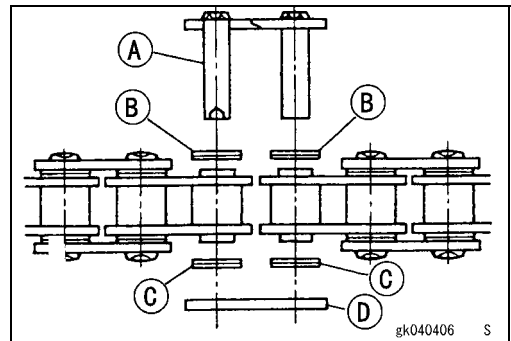
Type DID KASHIMARU

Make DAIDO KOGYO

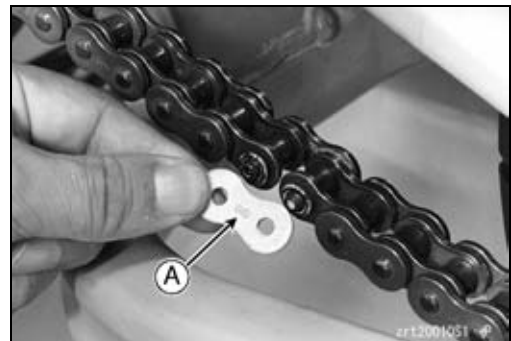


Drive Chain Installation

- Replace the link pin, link plate and grease seals.
- Apply grease to the link pins [A] and grease seals.
- Engage the drive chain on the engine and rear sprockets through the swingarm.
- Install the grease seals [B] on the link pins.
- Insert the link pins in the drive chain ends.
- Install:
 - Grease Seals [C]
 - Link Plate [D]



- Install the link plate so that the mark [A] faces out.



- Using the chain joint “ZJ” tool [A], press in the link plate to the link pins.



Drive Chain

- Using the chain joint “ZJ” tool [A], stake the link pin ends projecting from the plate.



- After staking, measure the outside diameter [A] of the link pin and link plates width [B].

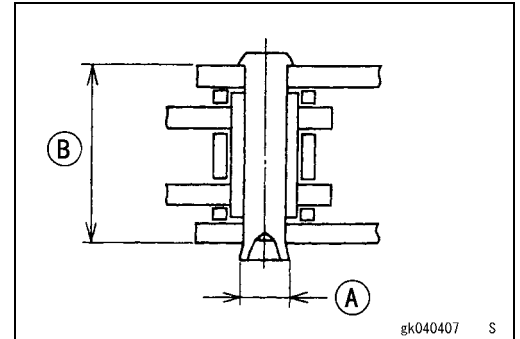
Link Pin Outside Diameter

Standard: 5.50 ~ 5.80 mm (0.22 ~ 0.23 in.)

Link Plates Outside Width

Standard: 22.3 ~ 22.5 mm (0.88 ~ 0.89 in.) (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)

21.4 ~ 21.6 mm (0.84 ~ 0.85 in.) (ZR1200-A4 ~, A6F/B4/C3)



- ★ If the reading exceeds the specified length, cut and rejoin the chain again.

- Check:
 - Movement of the Rollers
- Adjust the chain slack after installing the chain (See Slack Adjustment).

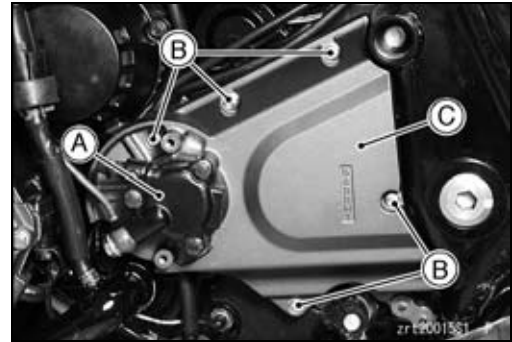
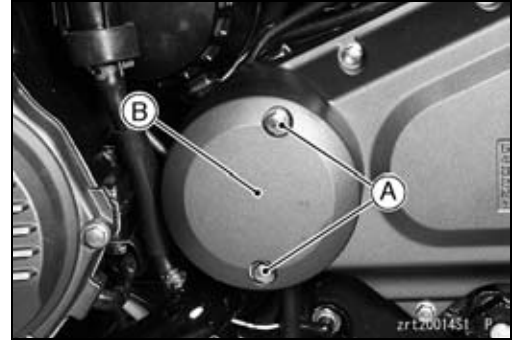
10-10 FINAL DRIVE

Sprocket, Coupling

Engine Sprocket Removal

- Remove:
 - Bolts [A]
 - Clutch Slave Cylinder Cover [B]

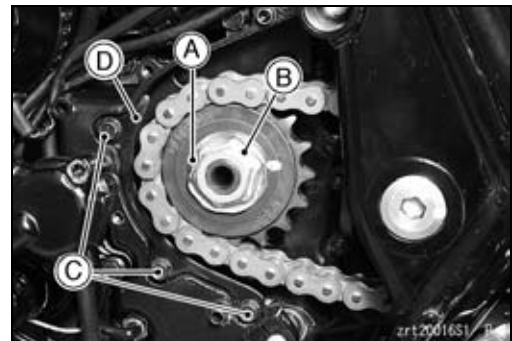
- Remove:
 - Clutch Slave Cylinder [A] (see Clutch chapter)
 - Engine Sprocket Cover Bolts [B]
 - Engine Sprocket Cover [C]



- Flatten out the bent washer [A].
- Remove:
 - Engine Sprocket Nut [B] and Washer
 - Chain Guide Bolts [C] and Chain Guide [D]

NOTE

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



- Raise the rear wheel off the ground.
- Loosen the drive chain (see Drive Chain Slack Adjustment).
- Remove the drive chain [A] from the engine sprocket toward in.
- Pull the engine sprocket [B] off the output shaft.

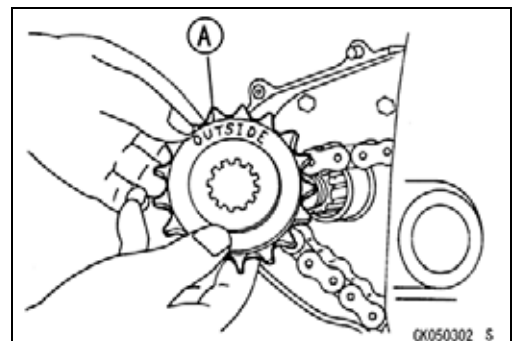


Engine Sprocket Installation

- Replace the engine sprocket washer.
- Install the engine sprocket so that the "OUTSIDE" mark [A] faces out.
- Apply molybdenum disulfide oil to the threads of the output shaft and the seating surface of the engine sprocket nut, and tighten the engine sprocket nut.

Torque - Engine Sprocket Nut: 127 N·m (13 kgf·m, 94 ft·lb)

- Bend the one side of the washer over the nut.
- Adjust the chain slack after installing the sprocket (see Drive Chain Slack Adjustment).



Sprocket, Coupling

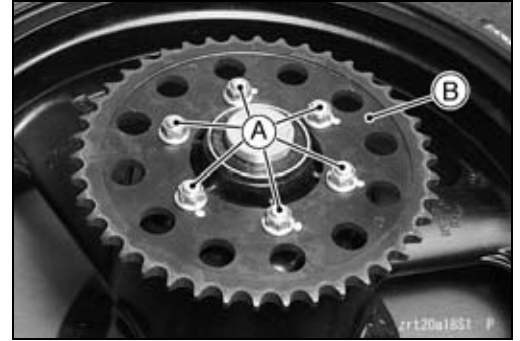
Rear Sprocket Removal

- Remove the rear wheel (see Wheels/Tires chapter).

CAUTION

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

- Remove the rear sprocket nuts [A].
- Remove the rear sprocket [B].



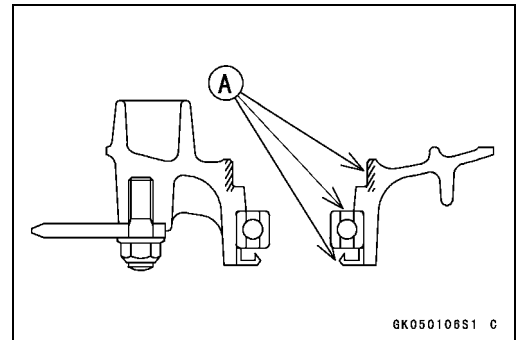
Rear Sprocket Installation

- Install the sprocket facing the tooth number marking [A] outward.
- Tighten the rear sprocket nuts.
- Torque - Rear Sprocket Nuts: 59 N·m (6.0 kgf·m, 43 ft·lb)
- Install the rear wheel (see Wheels/Tires chapter)



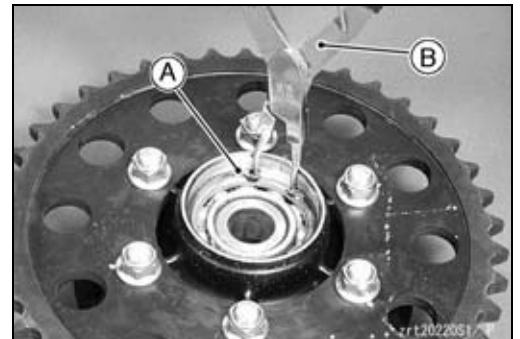
Coupling Installation

- Grease [A] the following and install the coupling.
 - Ball Bearing
 - Grease Seal
 - Coupling Internal Surface

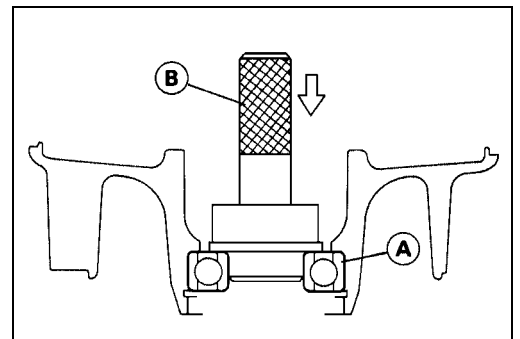


Coupling Bearing Removal

- Remove:
 - Coupling
 - Grease Seal
 - Circlip [A]
- Special Tool - Inside Circlip Pliers: 57001-143 [B]



- Remove the bearing [A] by tapping from the wheel side.
- Special Tool - Bearing Driver Set: 57001-1129 [B]



10-12 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]

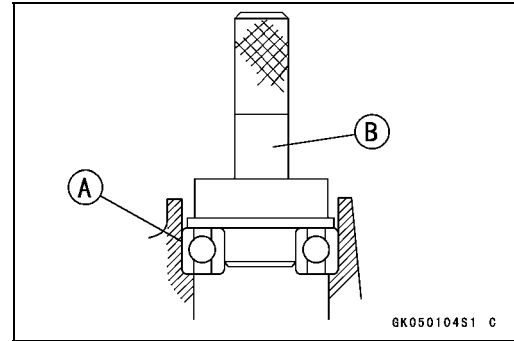
- Pack the bearing with high temperature grease.
- Replace the circlip with a new one.

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 lip.

Special Tool - Bearing Driver Set: 57001-1129



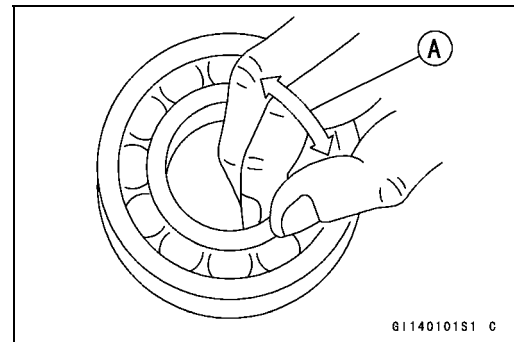
Coupling Bearing Inspection

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.



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 damper [A].
- Replace the damper if it appears damaged or deteriorated.



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).

[A] Worn Tooth (Engine Sprocket)

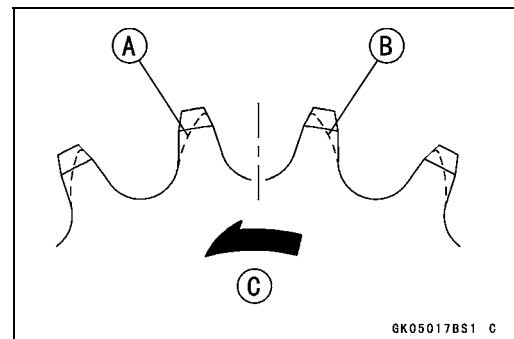
[B] Worn Tooth (Rear Sprocket)

[C] Direction of Rotation

NOTE

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

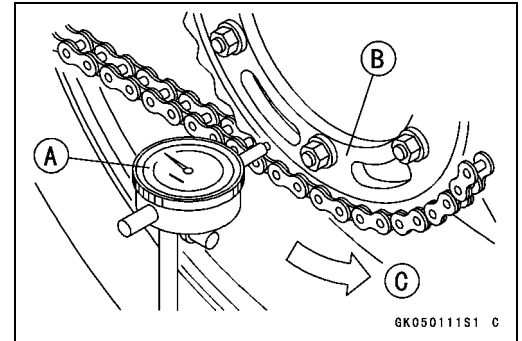
When replacing a sprocket, inspect the chain.



Sprocket, Coupling

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 Runout

Standard: TIR 0.4 mm (0.016 in.) or less

Service Limit: TIR 0.5 mm (0.020 in.)

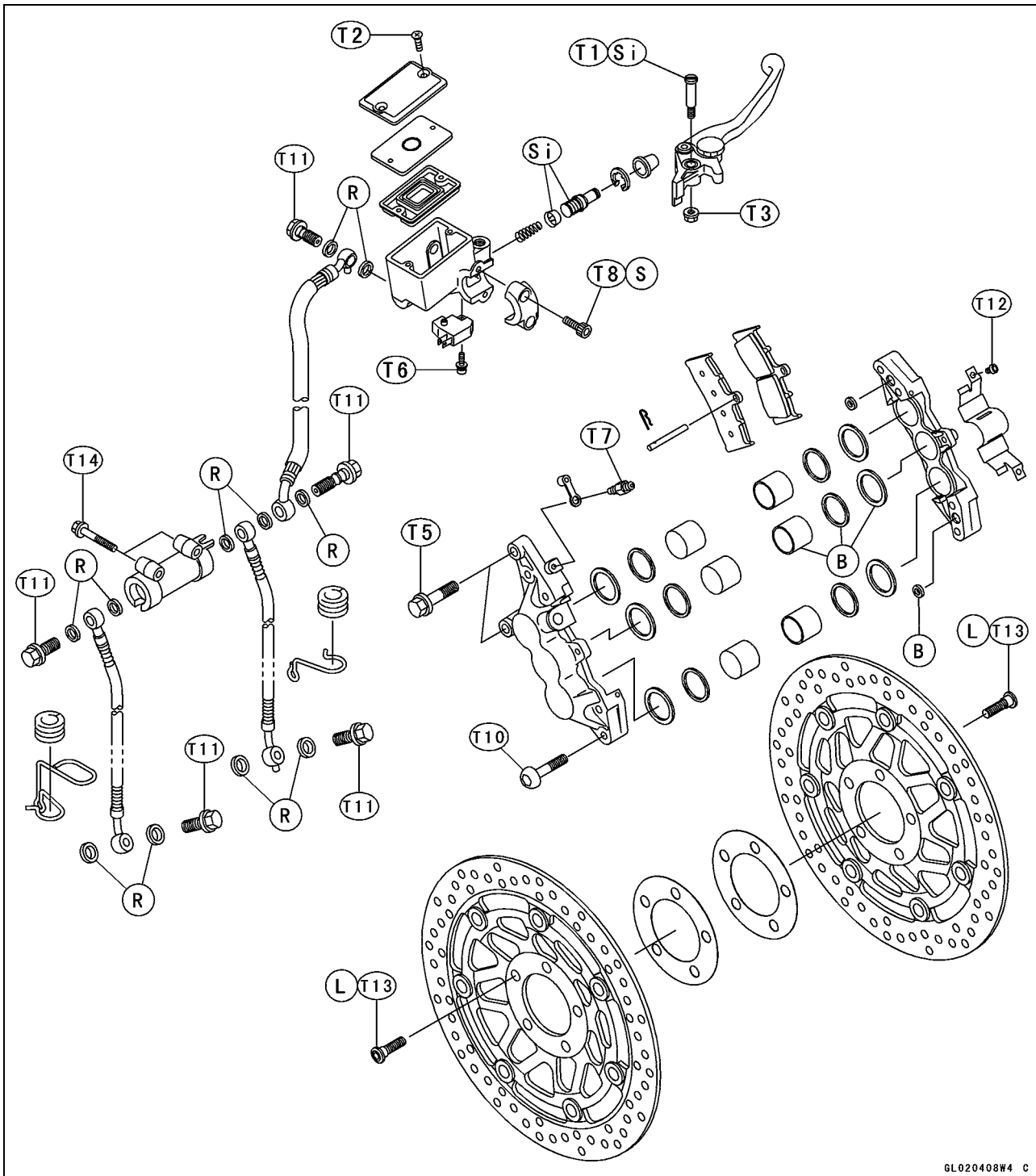
Brakes

Table of Contents

Exploded View	11-2	Front Master Cylinder Removal ..	11-12
Specifications	11-4	Front Master Cylinder Installation	11-12
Brake Pedal, Brake Lever.....	11-5	11-12
Brake Lever Position Adjustment.	11-5	Rear Master Cylinder Removal ...	11-13
Brake Pedal Position Inspection .	11-5	Rear Master Cylinder Installation	11-13
Brake Pedal Position Adjustment	11-5	Front Master Cylinder	11-14
Calipers	11-6	Disassembly	11-14
Front Caliper Removal.....	11-6	Rear Master Cylinder	11-15
Rear Caliper Removal	11-6	Disassembly.....	11-15
Caliper Installation	11-6	Master Cylinder Assembly	11-15
Front Caliper Disassembly.....	11-7	Master Cylinder Inspection (Visual	11-16
Rear Caliper Disassembly	11-8	Inspection)	11-16
Caliper Assembly	11-8	Brake Disc	11-17
Caliper Fluid Seal Damage	11-9	Brake Disc Removal	11-17
Inspection.....	11-9	Brake Disc Installation	11-17
Caliper Dust Seal Damage	11-9	Brake Disc Wear Inspection.....	11-17
Caliper Piston and Cylinder	11-9	Brake Disc Warp Inspection.....	11-17
Damage Inspection	11-9	Brake Fluid	11-18
Brake Pads	11-10	Brake Fluid Level Inspection	11-18
Front Brake Pad Removal	11-10	Brake Fluid Change	11-18
Front Brake Pad Installation	11-10	Bleeding the Brake Line	11-19
Rear Brake Pad Removal	11-10	Brake Hose	11-22
Rear Brake Pad Installation	11-11	Brake Hose Removal/Installation.	11-22
Brake Pad Wear Inspection	11-11	Brake Hose Inspection	11-22
Master Cylinder	11-12		

11-2 BRAKES

Exploded View

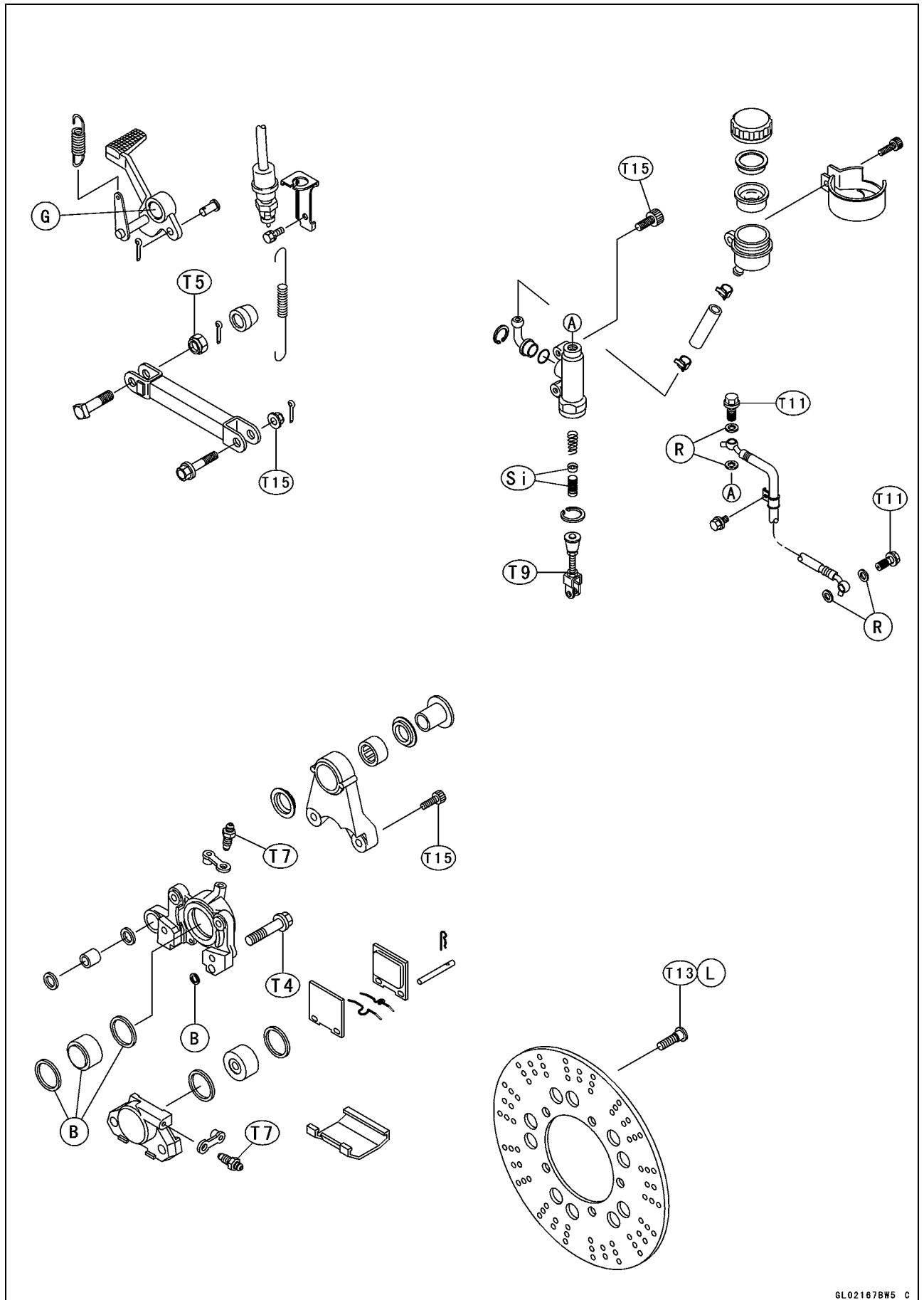


GL020408W4 C

- T1: 1.0 N·m (0.10 kgf·m, 9 in·lb)
- T2: 1.5 N·m (0.15 kgf·m, 13 in·lb)
- T3: 5.9 N·m (0.60 kgf·m, 52 in·lb)
- T4: 32 N·m (3.3 kgf·m, 24 ft·lb)
- T5: 34 N·m (3.5 kgf·m, 25 ft·lb)
- T6: 1.2 N·m (0.12 kgf·m, 10 in·lb)
- T7: 7.8 N·m (0.8 kgf·m, 69 in·lb)
- T8: 8.8 N·m (0.9 kgf·m, 78 in·lb)
- T9: 18 N·m (1.8 kgf·m, 13 ft·lb)
- T10: 22 N·m (2.2 kgf·m, 16 ft·lb)
- T11: 25 N·m (2.5 kgf·m, 18 ft·lb)

- T12: 2.9 N·m (0.30 kgf·m, 26 in·lb)
- T13: 27 N·m (2.8 kgf·m, 20 ft·lb)
- T14: 6.9 N·m (0.70 kgf·m, 61 ft·lb)
- T15: 25 N·m (2.5 kgf·m, 18 ft·lb)
- B: Apply brake fluid.
- G: Apply grease.
- L: Apply a non-permanent locking agent.
- R: Replacement Parts
- S: Follow the specific tightening sequence.
- Si: Apply silicone grease (ex. PBC grease).

Exploded View



11-4 BRAKES

Specifications

Item	Standard	Service Limit
Brake Lever, Brake Pedal		
Brake Lever Position	5-way adjustable (to suit rider)	- - -
Brake Lever Free Play	Non-adjustable	- - -
Pedal Free Play	Non-adjustable	- - -
Pedal Position	About 44 mm (1.73 in.) below footpeg top	- - -
Recommended Disc Brake Fluid		
Grade	DOT4	- - -
Brake Pads		
Pad Lining Thickness:		
Front	4 mm (0.16 in.)	1 mm (0.04 in.)
Rear	4 mm (0.16 in.)	1 mm (0.04 in.)
Brake Discs		
Thickness:		
Front	4.8 ~ 5.2 mm (0.19 ~ 0.20 in.)	4.5 mm (0.18 in.)
Rear	5.8 ~ 6.2 mm (0.23 ~ 0.24 in.)	5.5 mm (0.22 in.)
Runout	TIR 0.15 mm (0.0059 in.) or less	TIR 0.3 mm (0.0118 in.)

Special Tools - Inside Circlip Pliers: 57001-143

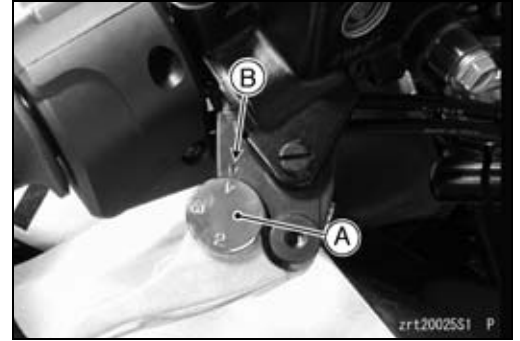
Jack: 57001-1238

Brake Pedal, Brake Lever

Brake Lever Position Adjustment

The brake lever adjuster has 4 positions so that the brake lever position can be adjusted to suit the operator's hand.

- Push the lever forward and turn the adjuster [A] to align the number with the arrow mark [B] on the lever holder.
- The distance from the grip to the lever is minimum at number 5 and maximum at number 1.



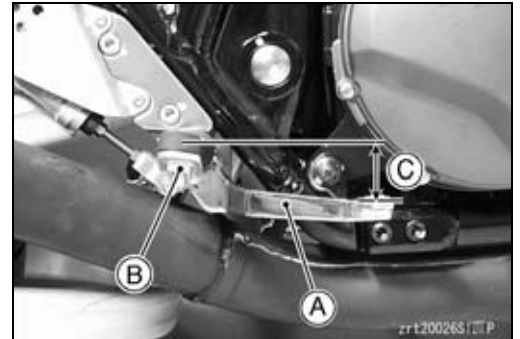
Brake Pedal Position Inspection

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

Pedal Position

Standard: About 44 mm (1.73 in.) [C] below top of footpeg

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

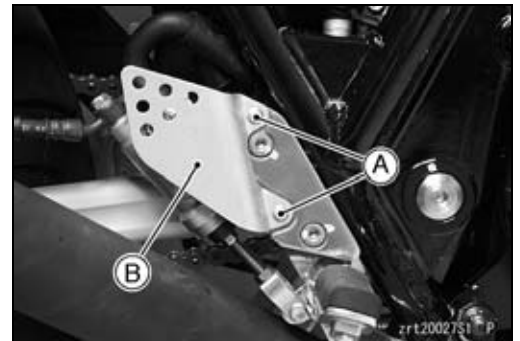


Brake Pedal Position Adjustment

NOTE

○ Usually it is not necessary to adjust the pedal position, but always adjust it when the push rod locknut has been loosened.

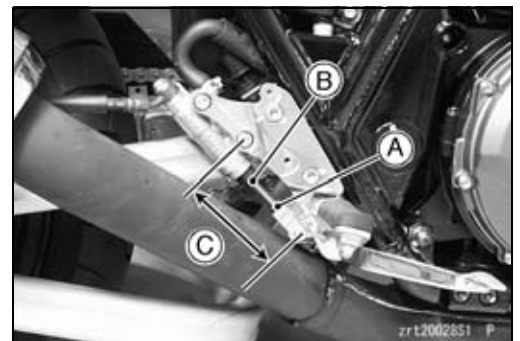
- Remove the bolts [A] and rear master cylinder cover [B].



- Loosen the locknut [A] and turn the push rod with the hex head [B] to achieve the correct pedal position.
- ★ If the length [C] shown is 100.5 ± 1 mm (3.957 ± 0.04 in.), the pedal position will be within the standard range.
- Tighten:

Torque - Rear Master Cylinder Push Rod Locknut: 18 N·m (1.8 kgf·m, 13 ft·lb)

- Check the brake light switch operation (see Electrical System chapter).



11-6 BRAKES

Calipers

Front 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.

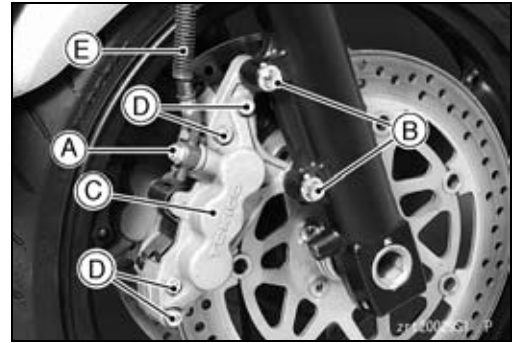
CAUTION

Do not loosen the caliper assembly bolts [D]. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper assembly bolts will cause brake fluid leakage.

- Unscrew the banjo bolt and remove the brake hose [E] from the caliper (see Brake Hose Removal/Installation).

CAUTION

Immediately wash away any brake fluid that spills.



Rear Caliper Removal

- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Remove the cotter pin, rear torque link nut and bolt [B].
- Unscrew the caliper mounting bolts [C], and detach the caliper [D] from the disc.

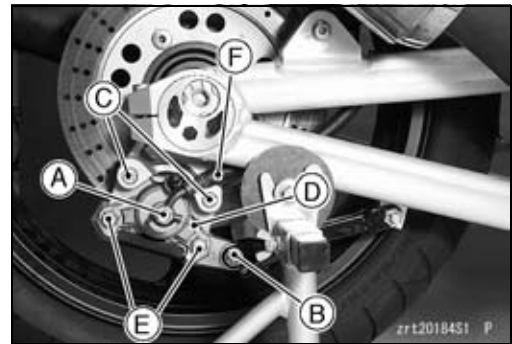
CAUTION

Do not loosen the caliper assembly bolts [E]. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper assembly bolts will cause brake fluid leakage.

- Unscrew the banjo bolt and remove the brake hose [F] from the caliper (see Brake Hose Removal/Installation).

CAUTION

Immediately wash away any brake fluid that spills.



Caliper Installation

- Install the caliper and brake hose lower end.
- Replace the washers on each side of hose fitting with new ones.
- Tighten:
 - Torque - Front Caliper Mounting Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)**
 - Rear Caliper Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)**
 - Torque Link Nut (Rear): 25 N·m (2.5 kgf·m, 18 ft·lb)**
 - Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)**
- Install a new cotter pin on the rear torque link bolt.
- Make sure Spread the cotter pin ends.
- Check the fluid level in the brake reservoirs.

Calipers

- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠ WARNING

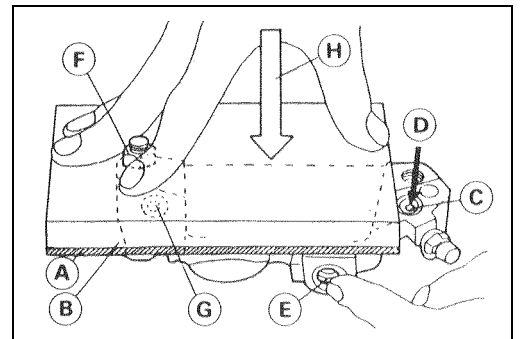
Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brakes will not function on the first application of the lever or pedal if this is not done.

Front Caliper Disassembly

- Loosen the front caliper assembly bolts [A], and banjo bolt [B], and tighten them loosely.
- Remove:
 - Front Caliper (see Caliper Removal) [C]
 - Brake Pads (see Brake Pad Removal)
 - Front Caliper Assembly Bolts
 - O-rings



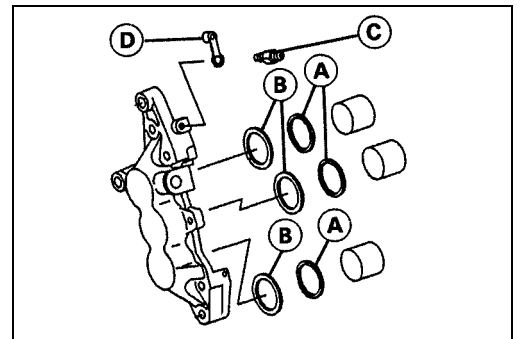
- Using compressed air, remove the pistons. One way to remove the pistons is as follows.
 - Install a rubber gasket [A] and a wooden board [B] more than 10 mm thick on the caliper half, and fasten them together with a suitable bolt and nut as shown. Leave one of the oil passages [C] open.
 - Lightly apply compressed air [D] to the oil passage until the pistons hit the rubber gasket. Block the hose joint opening [E] during this operation if the caliper half has the opening.
- [F] Bolt and Nut
 [G] Oil Passage sealed by Rubber Gasket.
 [H] Push down.



⚠ WARNING

To avoid serious injury, never place your fingers or palm in front of the piston. If you apply compressed air into the caliper, the piston may crush your hand or fingers.

- Pull out the pistons by hand.
- Remove the dust seals [A] and fluid seals [B].
- Remove the bleed valve [C] and rubber cap [D].
- Repeat the previous step to remove the pistons from the other side of the caliper body.

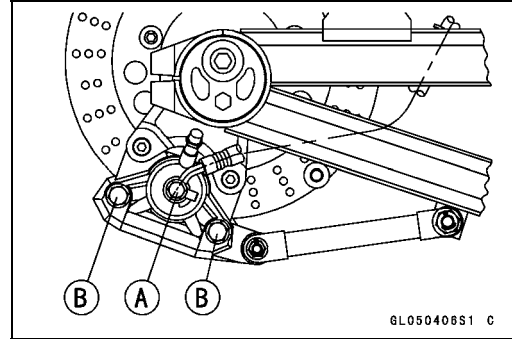


11-8 BRAKES

Calipers

Rear Caliper Disassembly

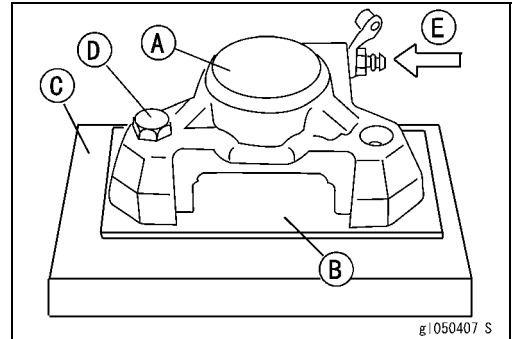
- Loosen the banjo bolt [A] and rear caliper assembly bolts [B], and tighten them loosely.
- Remove:
 - Rear Caliper (see Caliper Removal)
 - Brake Pads (see Brake Pad Removal)
 - Rear Caliper Assembly Bolts
 - O-rings



- Remove the pistons as follows:

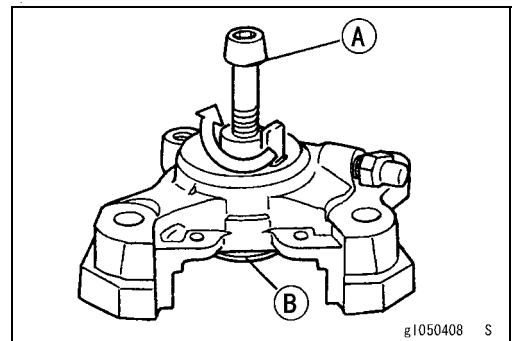
Left Side Piston

- Removal of the left side piston is the same as for the front caliper (see Front Caliper Disassembly).
 - [A] Left Side Caliper
 - [B] Rubber Gasket
 - [C] Wooden Board
 - [D] Bolt and Nut
 - [E] Apply compressed air



Right Side Piston

- Using the rear caliper assembly bolt [A], remove the piston [B] as shown.



- Remove the dust seal and fluid seal.
- Remove the bleed valve and rubber cap.

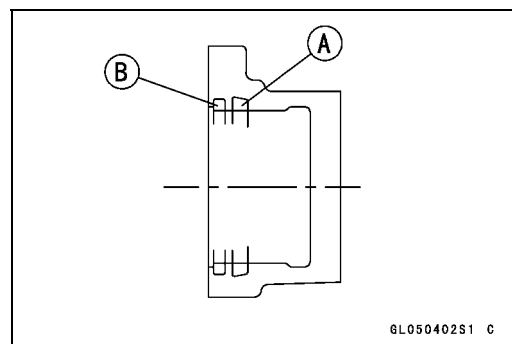
Caliper Assembly

- Clean the caliper parts except for the pads.

CAUTION

For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

- Install the bleed valve and rubber cap.
 - Torque - Bleed Valves: 7.8 N·m (0.8 kgf·m, 69 in·lb)**
- Replace the fluid seals [A] with new ones.
 - Apply brake fluid to the fluid seals, and install them into the cylinders by hand.
- Replace the dust seals [B] with new ones if they are damaged.
 - Apply brake fluid to the dust seals, and install them into the cylinders by hand.



Calipers

- Replace the O-rings [A] if they are damaged.
- Apply brake fluid to the outside of the pistons, and push them into each cylinder by hand.
- Be sure to install the O-rings.
- Tighten the caliper assembly bolts.

Torque - Front Caliper Assembly Bolts: 22 N·m (2.2 kgf·m, 16 ft·lb)

Rear Caliper Assembly Bolts: 32 N·m (3.3 kgf·m, 24 ft·lb)

- Install the pads (see Brake Pad Installation).
- Wipe up any spilled brake fluid on the caliper with wet cloth.

Caliper Fluid Seal Damage Inspection

The fluid seals [A] around the piston [C] maintain the proper pad/disc clearance. If the seals are not satisfactory, pad wear will increase, and constant pad drag on the disc will raise brake and brake fluid temperature.

- Replace the fluid seals under any of the following conditions; (a) fluid leakage around the pad; (b) brakes over-heat (c) there is a large difference in inner and outer pad wear; (d) the seal is stuck to the piston

★ If the fluid seal is replaced, replace the dust seal as well. Also, replace all seals every other time the pads are changed.

Front Caliper [D]

Caliper Dust Seal Damage

- Check that the dust seals [B] is not cracked, worn, swollen, or otherwise damaged.
- If it show any damage, remove the caliper bracket and replace it.

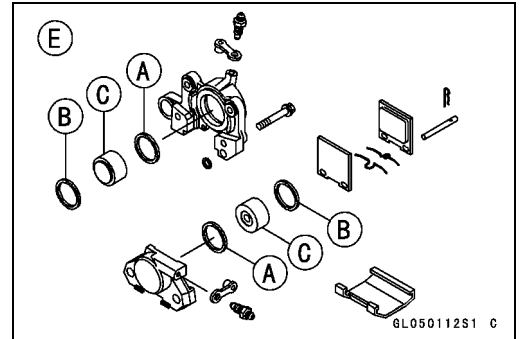
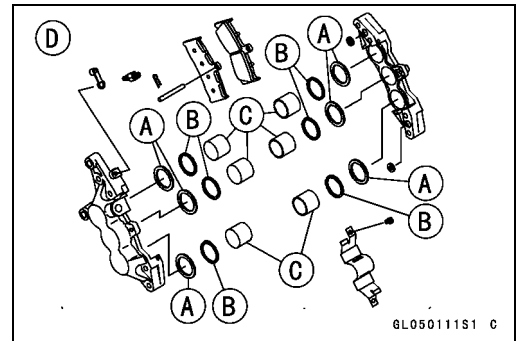
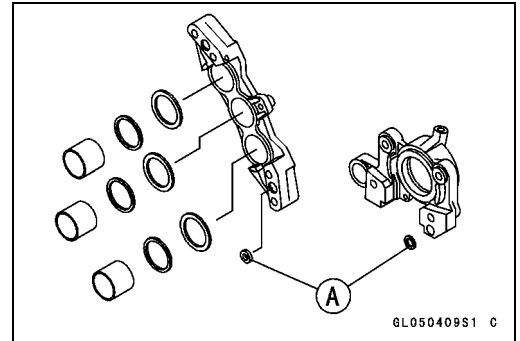
Rear Caliper [E]

Caliper Piston and Cylinder Damage Inspection

- Visually inspect the piston [C] and cylinder surfaces.
- ★ Replace the caliper if the cylinder and piston are badly scores or rusty.

Front Caliper [D]

Rear Caliper [E]

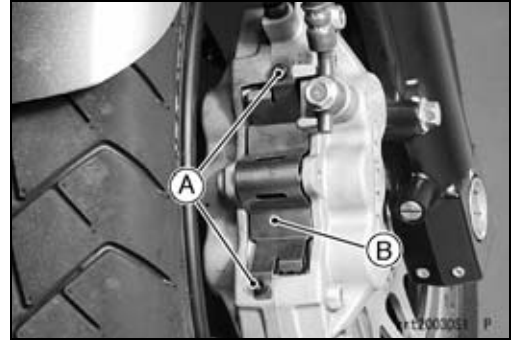


11-10 BRAKES

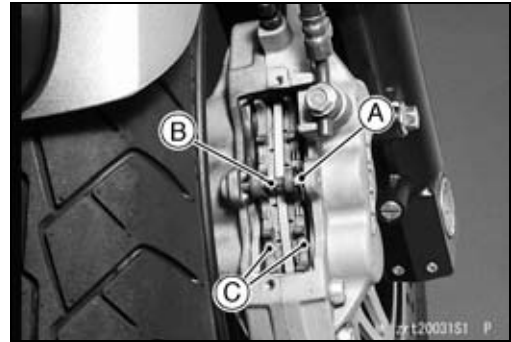
Brake Pads

Front Brake Pad Removal

- Remove:
 - Pad Spring Bolts [A]
 - Pad Spring [B]



- Clip [A]
- Pad Pin [B]
- Brake Pads [C]



Front Brake Pad Installation

- Push the caliper pistons in by hand as far as they will go.
- Install the brake pads.
- Install the pad pin and clip. The clip must be "outside" of the pads.
- Install the pad spring and tighten the pad spring bolts.

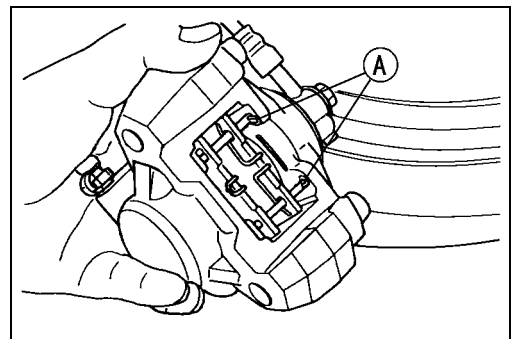
Torque - Front Brake Pad Spring Bolts: 2.9 N·m (0.30 kgf·m, 26 in·lb)

⚠ 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.

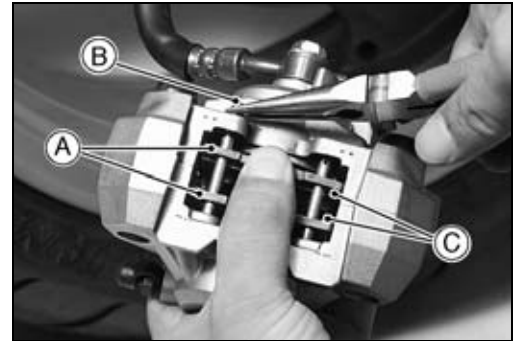
Rear Brake Pad Removal

- Unscrew the caliper mounting bolts.
- Detach the caliper from the disc.
- Remove the piston pad cover [A].
- Draw out the clips [B] upward.



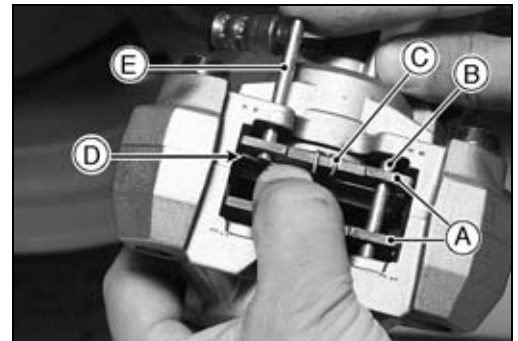
Brake Pads

- Pushing either ends [A] of the pads lightly and then take off the push side pin [B].
- Remove the pad springs [C] and brake pads.



Rear Brake Pad Installation

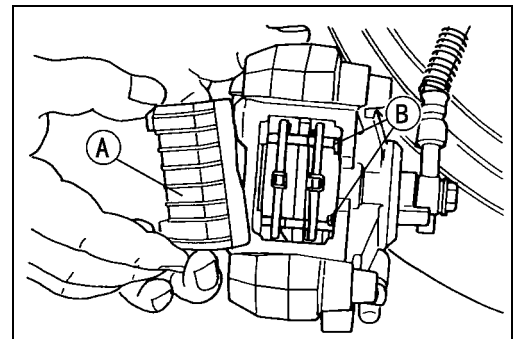
- Push the caliper piston in by hand as far as it will go.
- Put the pads [A] in the caliper, using pin [B].
- Install the anti-rattle spring [C] in place.
- Push the spring end [D], and insert the pin [E].
- Install other side anti-rattle spring.



- Insert the clips [A]. The clip must be "outside" of the pads.
- Install the caliper (see Caliper Installation).

⚠ WARNING

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



Brake Pad Wear Inspection

- Check the lining thickness [A] of the pads in each caliper.
- ★ If the lining thickness of either pad is less than the service limit [B], replace both pads in the caliper as a set.

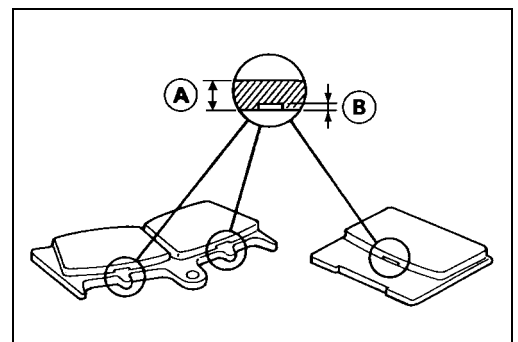
Pad Lining Thickness

Standard:

Front 4 mm (0.16 in.)

Rear 4 mm (0.16 in.)

Service Limit: 1 mm (0.04 in.)



11-12 BRAKES

Master Cylinder

Front 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.

Front Master Cylinder Installation

- Set the front master cylinder to match its mating surface [B] to the punch mark [A] of the handlebar.

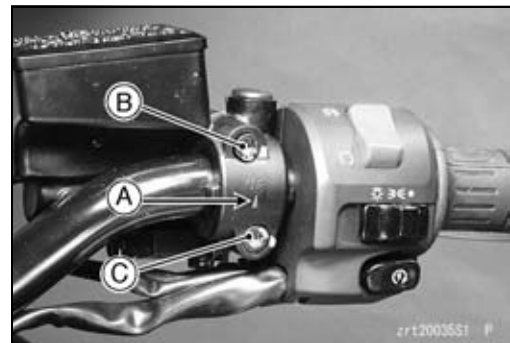
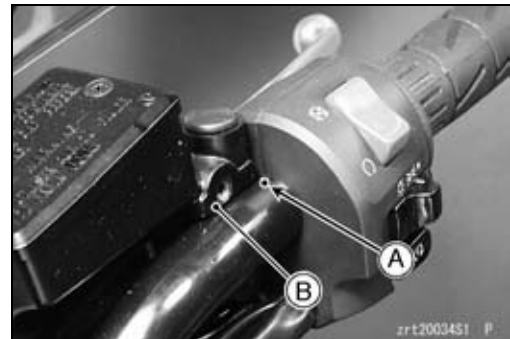
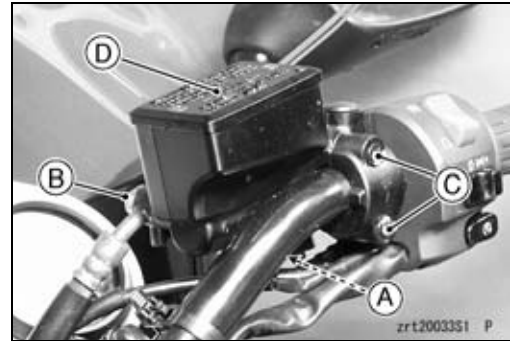
- The master cylinder clamp must be installed with the arrow mark [A] upward.
- Tighten the upper clamp bolt [B] first, and then the lower clamp bolt [C]. There will be a gap at the lower part of the clamp after tightening.

Torque - Front Master Cylinder Clamp Bolts: 8.8 N·m (0.9 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: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.



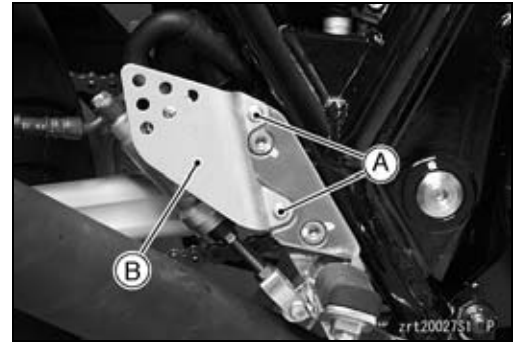
⚠ WARNING

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

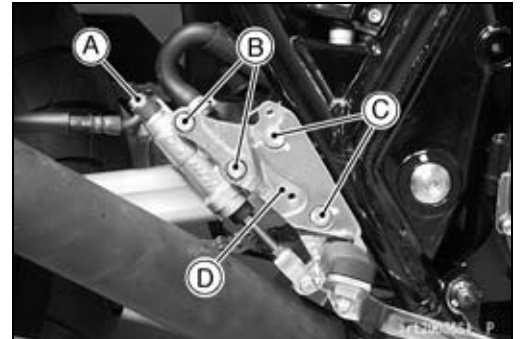
Master Cylinder

Rear Master Cylinder Removal

- Remove the bolts [A] and rear master cylinder cover [B].



- Unscrew the brake hose banjo bolt [A] on the master cylinder (see Brake Hose Removal/Installation).
- Loosen the master cylinder mounting bolts [B].
- Unscrew the footpeg stay bolts [C] and remove the stay [D].

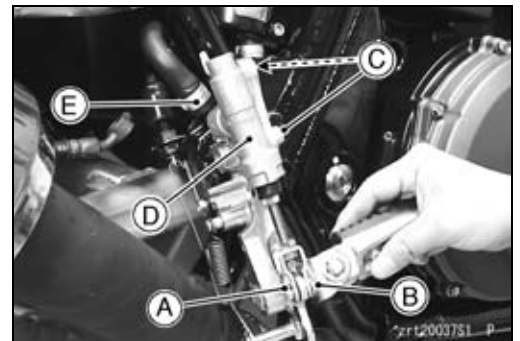


- Remove the cotter pin [A] and joint pin [B].

NOTE

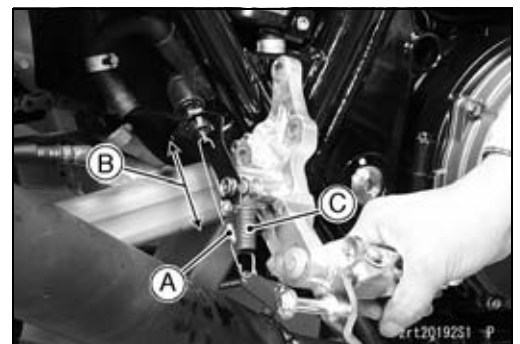
○ Pull off the joint pin while pressing down the brake pedal.

- Unscrew the master cylinder mounting bolts [C], and take off the master cylinder [D].
- Pull off the reservoir hose lower end [E], and drain the brake fluid into a container.



Rear Master Cylinder Installation

- If the rear brake light switch spring [A] was removed, install the spring direction as shown. Longer Side [B]
- If the brake pedal return spring [C] was removed, install the spring direction as shown.



11-14 BRAKES

Master Cylinder

- Replace the cotter pin with a new one.
- Insert the cotter pin [A] to the hole of the joint pin [B] and separate [C] the cotter pin ends.
- Replace the washers that are on each side of hose fitting with new ones.
- Tighten:

Torque - Front Footpeg Stay Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

Rear Master Cylinder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

▲ WARNING

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

Front Master Cylinder Disassembly

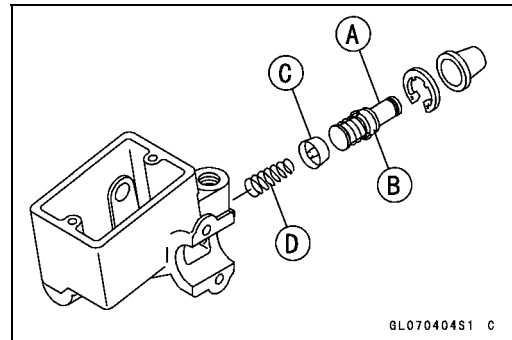
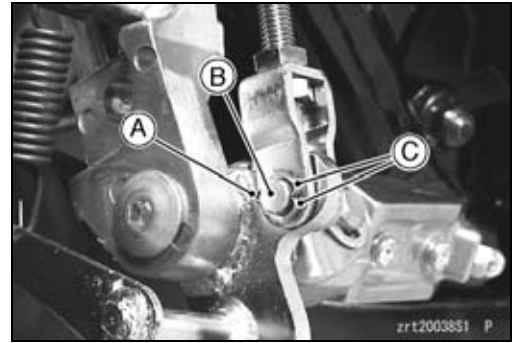
- Remove the front master cylinder (see Front Master Cylinder Removal).
- Remove the reservoir cap and diaphragm, and pour the brake fluid into a container.
- Unscrew the locknut and pivot bolt, and remove the brake lever.
- Pull the dust cover out of place, and remove the circlip.

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

Rear Master Cylinder Disassembly

NOTE

○ Do not remove the push rod clevis for master cylinder disassembly since removal requires brake position adjustment.

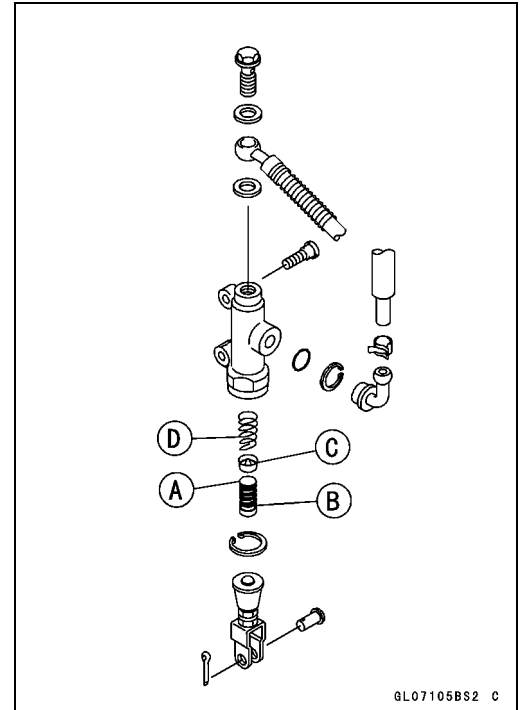
- Remove the rear master cylinder (see Rear Master Cylinder Removal).
- Slide the dust cover on the push rod out of place, and remove the circlip.

Special Tool - Inside Circlip Pliers: 57001-143

- Pull out the push rod with the piston stop.
- Take off the piston [A], with 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.



GL07105BS2 C

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 Pilot Bolt
 - Brake Lever Pilot Contact
 - Push Rod Contact
 - Dust Covers
- Tighten the brake lever pivot bolt and the locknut.

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 (0.6 kgf·m, 52 in·lb)

11-16 BRAKES

Master Cylinder

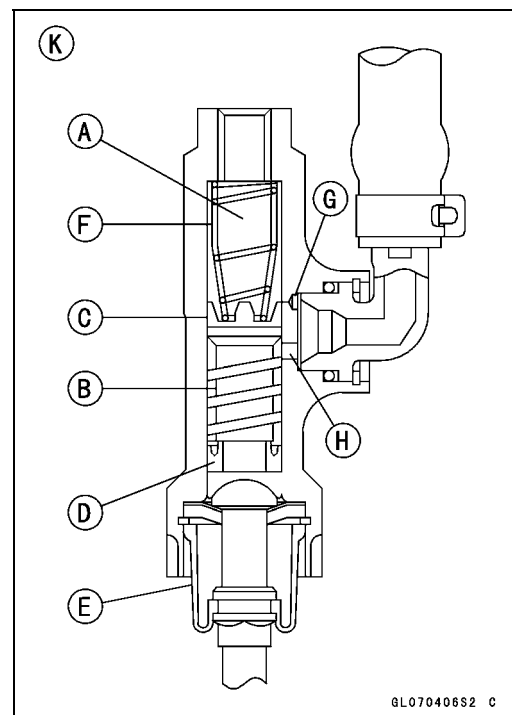
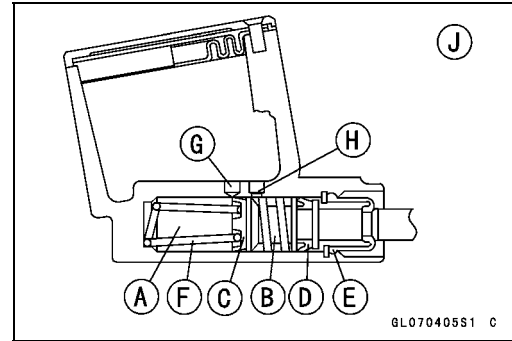
Master Cylinder Inspection (Visual Inspection)

- Disassemble the front and rear master cylinders.
- Check that there are no scratches, rust or pitting on the inner wall [A] of each master cylinder and on the outside of each piston [B].
- ★ If a master cylinder or piston shows any damage, replace them.
- Inspect the primary cap [C] and secondary cap [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.

Front Master Cylinder [J]

- Check the dust covers [E] for damage.
- ★ If they are damaged, replace them.
- Check the piston return spring [F] for any damage.
- ★ If the spring 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.

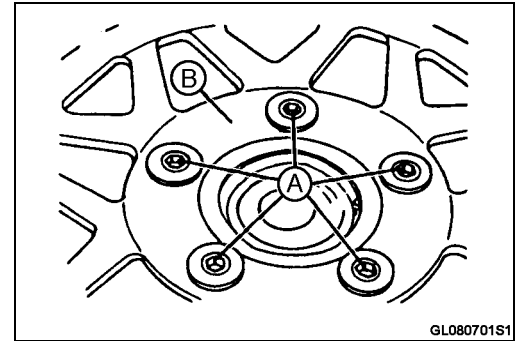
Rear Master Cylinder [K]



Brake Disc

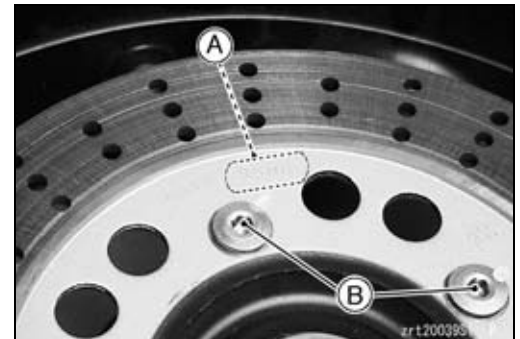
Brake Disc Removal

- Remove the wheel (see Wheels/Tires chapter).
- Unscrew the mounting bolts [A], and take off the disc [B].



Brake Disc Installation

- Install the disc on the wheel so that the marked side [A] faces out.
- Apply a non-permanent locking agent to the threads of the brake disc bolts [B].
- Tighten:
 - Torque - Brake Disc Mounting bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)**



Brake Disc Wear Inspection

- Measure the thickness of each 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

Front Disc Thickness

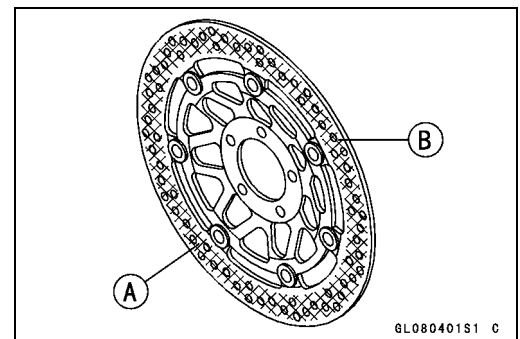
Standard: 4.8 ~ 5.2 mm (0.19 ~ 0.20 in.)

Service Limit: 4.5 mm (0.18 in.)

Rear Disc Thickness

Standard: 5.8 ~ 6.2 mm (0.23 ~ 0.24 in.)

Service Limit: 5.5 mm (0.22 in.)

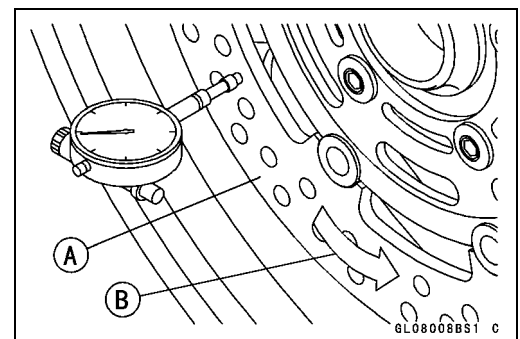


Brake Disc Warp Inspection

- Jack up the motorcycle so that the wheel is off the ground (see Wheels/Tires chapter).

Special Tool - Jack: 57001-1238

- 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: TIR 0.15 mm (0.0059 in.) or less

Service Limit: TIR 0.3 mm (0.0118 in.)

11-18 BRAKES

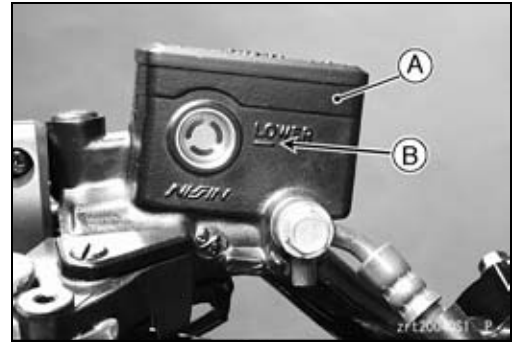
Brake Fluid

Brake Fluid Level Inspection

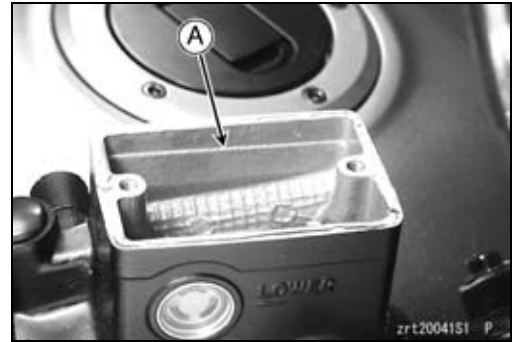
- Check that the brake fluid level in the front brake reservoir [A] is above the lower level line [B].

NOTE

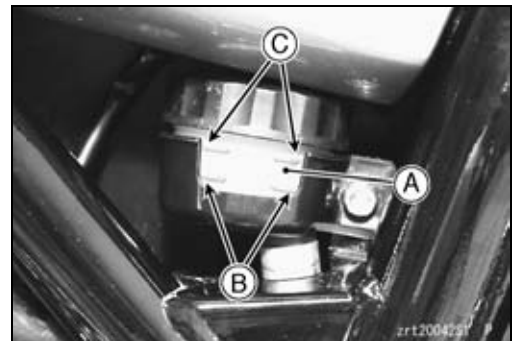
○ Hold the reservoir horizontal by turning the handlebar when checking brake fluid level.



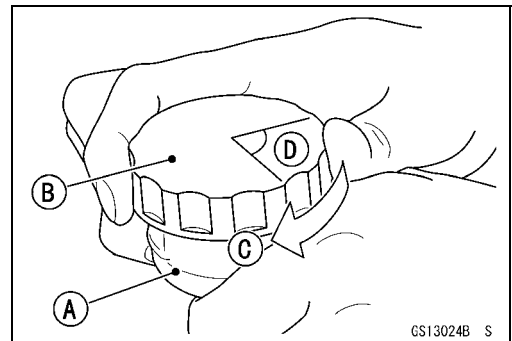
- ★ If the fluid level is lower than the lower level line, fill the reservoir to the upper level line [A].



- Check that the brake fluid level in the rear brake reservoir [A] is above the lower level line [B].
- ★ If the fluid level is lower than the lower level line, remove the side cover and fill the reservoir to the upper level line [C].



- Follow the procedure below to install the rear brake fluid reservoir cap correctly.
- First, tighten the rear brake fluid reservoir cap [B] clockwise [C] by hand until the resistance is felt fully; then, tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir [A] body.



⚠ WARNING

Do not mix two brands of fluid. Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified. After changing the fluid, use only the same type and brand of fluid thereafter.

**Recommended Disc Brake Fluid
Grade: DOT4**

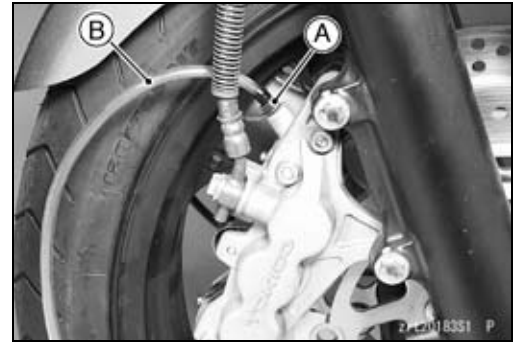
Brake Fluid Change

NOTE

○ The procedure to change the front brake fluid is as follows. Changing the rear brake fluid is the same as for the front brake.

Brake Fluid

- 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.*
- *Front Brake: Repeat the above steps for the other caliper.*
- *Rear Brake: Repeat the above steps for the other bleed valve.*
- Remove the clear plastic hose.
- Install the reservoir cap.
- Tighten the bleed valve, and install the rubber cap.

Torque - Caliper Bleed Valves: 7.8 N·m (0.8 kgf·m, 69 in·lb)

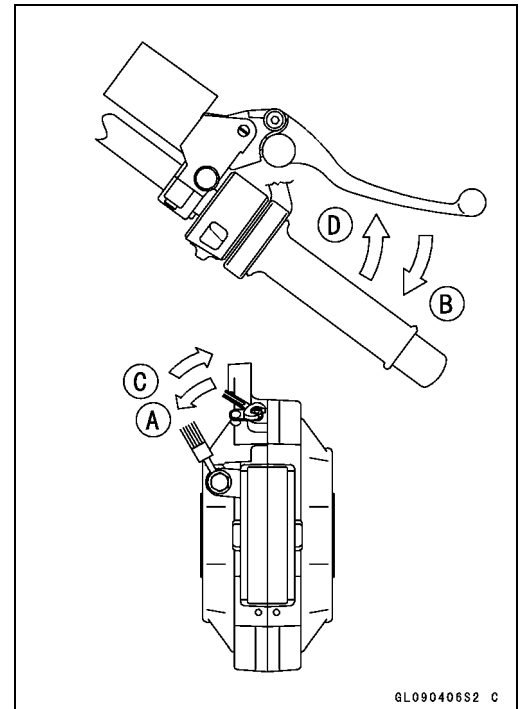
- After changing the fluid, check the brake for good braking power, no brake drag, and no fluid leakage.
- ★ If necessary, bleed the air from the lines.

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.



11-20 BRAKES

Brake Fluid

NOTE

○ *The procedure to bleed the front brake line is as follows. Bleeding the rear brake line is the same as for the front brake.*

- 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.

- Follow the procedure below to install the rear brake fluid reservoir cap correctly.
- First, tighten the rear brake fluid reservoir cap [B] clockwise [C] by hand until the resistance is felt fully; then, tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir [A] body.
- 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

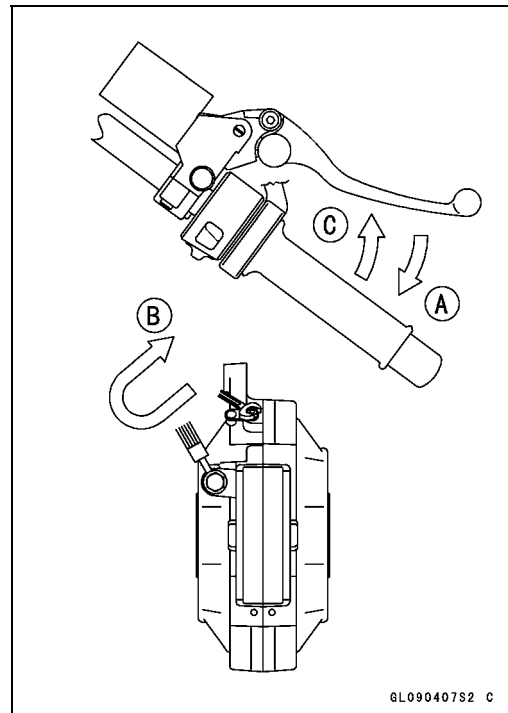
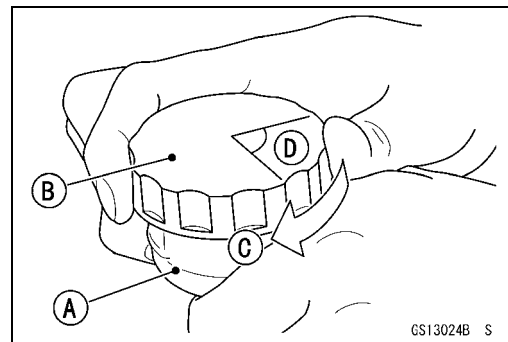
○ *The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.*

○ *Tap the brake hose lightly from the caliper to the reservoir for more complete bleeding.*

○ *Front Brake: Repeat the above steps for the other caliper.*

○ *Rear Brake: Repeat the above steps for the other bleed valve.*

- Remove the clear plastic hose.
- Tighten the bleed valve, and install the rubber cap.
Torque - Caliper Bleed Valves: 7.8 N·m (0.8 kgf·m, 69 in·lb)
- Check the fluid level.
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.



Brake Fluid

⚠ WARNING

When working with the disc brake, observe the precautions listed below

1. Never reuse old brake fluid.
2. Do not use fluid from a container that has been left unsealed or that has been open for a long time.
3. Do not mix two types and brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.
4. Don't leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid.
5. Don't change the fluid in the rain or when a strong wind is blowing.
6. Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely and will eventually deteriorate the rubber used in the disc brake.
7. When handling the disc pads or disc, be careful that no disc brake fluid or any oil gets on them. Clean off any fluid or oil that inadvertently gets on the pads or disc with a high-flash point solvent. Do not use one which will leave an oily residue. Replace the pads with new ones if they cannot be cleaned satisfactorily.
8. Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely wiped up immediately.
9. If any of the brake line fittings or the bleed valve is opened at any time, the **AIR MUST BE BLED FROM THE BRAKE LINE.**

11-22 BRAKES

Brake Hose

Brake Hose Removal/Installation

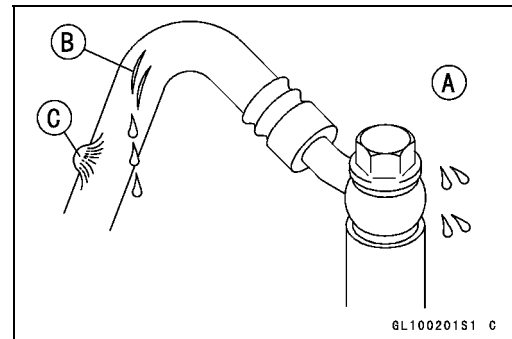
CAUTION

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: 25 N·m (2.5 kgf·m, 18 ft·lb)
- Bleed the brake line after installing the brake hose (see Bleeding the Brake Line).

Brake Hose Inspection

- The high pressure inside the brake line can cause fluid to leak [A] or the hose to burst if the line is not properly maintained. Bend and twist the rubber hose while examining it.
- ★ Replace it if any cracks [B] or bulges [C] are noticed.



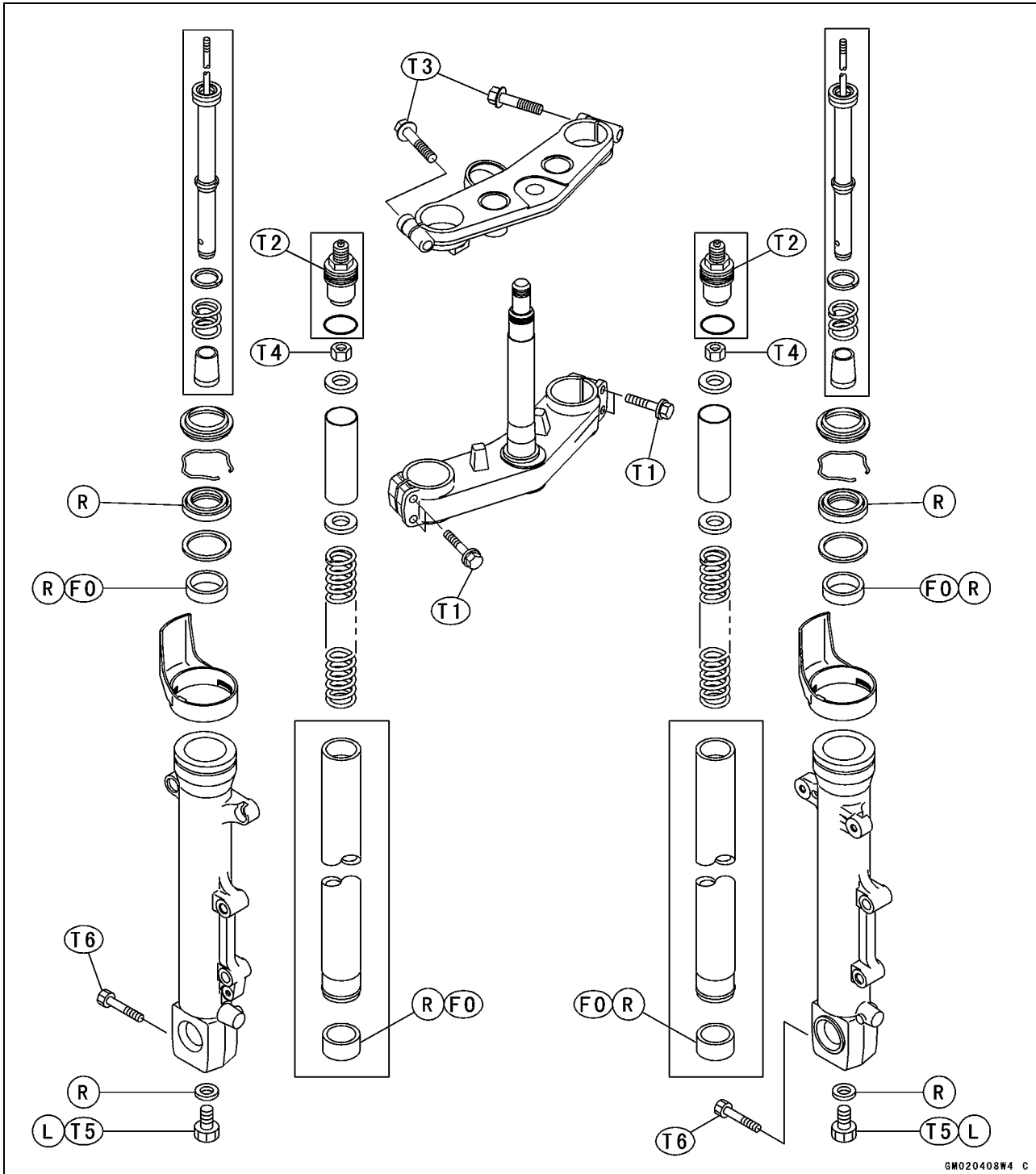
Suspension

Table of Contents

Exploded View	12-2
Specifications	12-4
Front Fork	12-6
Rebound Damping Force Adjustment	12-6
Compression Damping Force Adjustment	12-6
Spring Preload Adjustment	12-7
Front Fork Removal (each fork leg)	12-7
Front Fork Installation	12-8
Fork Oil Change	12-8
Front Fork Disassembly	12-11
Front Fork Assembly	12-12
Inner Tube, Outer Tube Inspection	12-13
Dust Seal Inspection	12-14
Spring Tension Inspection.....	12-14
Rear Shock Absorber	12-15
Rebound Damping Force Adjustment	12-15
Compression Damping Force Adjustment	12-15
Spring Preload Adjustment	12-15
Rear Shock Absorber Removal	12-16
Rear Shock Absorber Installation	12-16
Rear Shock Absorber Inspection	12-16
Rear Shock Absorber Scrapping	12-16
Swingarm	12-17
Swingarm Removal	12-17
Swingarm Installation	12-17
Swingarm Bearing Removal	12-17
Swingarm Bearing Installation	12-18
Swingarm Bearing Sleeve Inspection	12-18
Swingarm Lubrication	12-18
Chain Slider Inspection.....	12-18

12-2 SUSPENSION

Exploded View



1. Needle Bearing: Face the manufacturer's marks out.

T1: 21 N·m (2.1 kgf·m, 15 ft·lb)

T2: 23 N·m (2.3 kgf·m, 17 ft·lb)

T3: 29 N·m (3.0 kgf·m, 22 ft·lb)

T4: 15 N·m (1.5 kgf·m, 11 ft·lb)

T5: 39 N·m (4.0 kgf·m, 29 ft·lb)

T6: 20 N·m (2.0 kgf·m, 14 ft·lb)

T7: 59 N·m (6.0 kgf·m, 44 ft·lb)

T8: 34 N·m (3.5 kgf·m, 25 ft·lb)

T9: 98 N·m (10 kgf·m, 72 ft·lb)

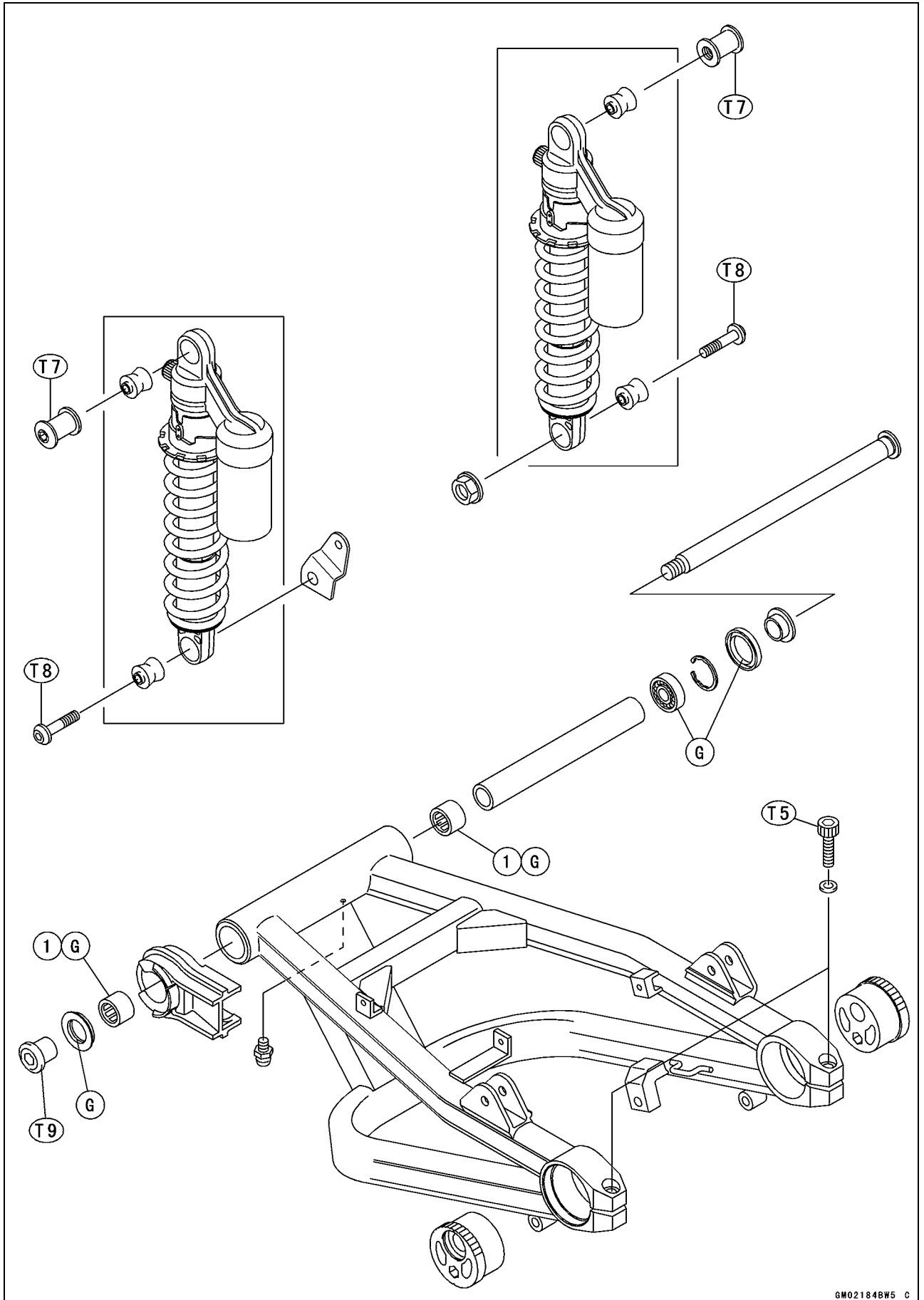
FO: Apply fork oil.

G: Apply high-temperature grease.

L: Apply a non-permanent locking agent.

R: Replacement Parts

Exploded View



12-4 SUSPENSION

Specifications

Item	Standard	Adjustable Range
Front Fork (per one unit)		
Fork Inner Tube Diameter:	φ43 mm (1.69 in.)	— — —
Air Pressure	Atmospheric pressure (Non-adjustable)	
Rebound Damper (upper) Setting:	6th click from the first click of the fully clockwise position (ZR1200-A1 ~ A2/B1 ~ B2/C1)	1 ~ 12 clicks
	1 1/2 turns backward from the fully tightened position (ZR1200-A3/B3/C2)	1 ~ 12 clicks
	7th click from the first click of the fully clockwise position (ZR1200-A4 ~, A6F ~/B4/C3)	— — —
Compression Damper (lower) Setting:	7th click from the first click of the fully clockwise position (ZR1200-A1 ~ A2/B1 ~ B2/C2)	1 ~ 10 clicks
	1 3/4 turns out backward from the fully tightened position (ZR1200-A3/B3/C2)	1 ~ 16 clicks
	8th click from the first click of the fully clockwise position (ZR1200-A4 ~, A6F ~/B4/C3)	— — —
Fork Spring Preload Length:	14 mm (0.55 in.)	5 ~ 20 mm (0.196 ~ 0.787 in.)
Fork Oil Viscosity:	KHL 34-G10 (KAYABA) or equivalent	— — —
Fork Oil Capacity:	470 ±4 mL (15.89 ±0.14 US oz.) (ZR1200-A1 ~ A3/B1 ~ B3/C1)	— — —
	506 ±4 mL (17.11 ±0.14 US oz.) (ZR1200-A4 ~, A6F ~/B4/C3)	— — —
	(completely dry) approx.	
	400 mL (13.52 US oz.) (ZR1200-A1 ~ A3/B1 ~ B3/C1)	— — —
	430 mL (14.54 US oz.) (ZR1200-A4 ~, A6F ~/B4/C3)	— — —
	(when changing oil)	
Fork Oil Level:	(fully compressed, without main spring, below from tube top)	— — —
	129 ±2 mm (5.08 ±0.08 in.) (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)	
	117 ±2 mm (4.61 ±0.08 in.) (ZR1200-A4 ~, A6F ~/B4/C3)	
Fork Spring Free Length:	286.8 mm (11.29 in.) (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)	281 mm (11.06 in.)
	307 mm (12.09 in.) (ZR1200-A4 ~, A6F ~/B4/C3)	301 mm (11.85 in.)
Rear Shock Absorber		
Rebound Damping Setting:	No. 2	No. 1 ~ 4
Compression Damping Setting:	Mark II	I ~ IV
Spring Preload Setting:	2nd step from the weakest position	1st ~ 5th steps

Specifications

Special Tools - Inside Circlip Pliers: 57001-143
Fork Cylinder Holder, Hex 24 × □19.5: 57001-1406
Oil Seal & Bearing Remover: 57001-1058
Bearing Driver Set: 57001-1129
Fork Outer Tube Weight: 57001-1218
Front Fork Oil Seal Driver: 57001-1219
Jack: 57001-1238
Fork Piston Rod Puller, M10 × 1.0: 57001-1298
Fork Oil Level Gauge: 57001-1290
Fork Cylinder Holder: 57001-1493

12-6 SUSPENSION

Front Fork

Rebound Damping Force Adjustment

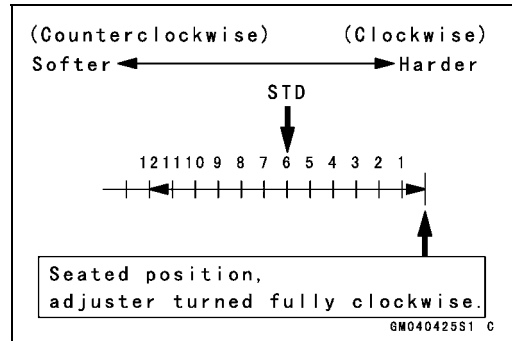
- To adjust the rebound damping force, turn the rebound damping adjuster [A] until you feel a click.
- The standard adjuster setting for the average-build rider of 68 kg (150 lb) with no passenger and no accessories is the **following** from the 1st click of the fully clockwise position.

- 6th clicks (ZR1200-A1 ~ A2/B1 ~ B2/C1)
- 1 1/2 turns backward (ZR1200-A3/B3/C2)
- 7th clicks (ZR1200-A4 ~, A6F ~/B4/C3)



⚠ WARNING
If both adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.

- The damping force can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the damping feels too soft or too stiff, adjust it in accordance with the following table.



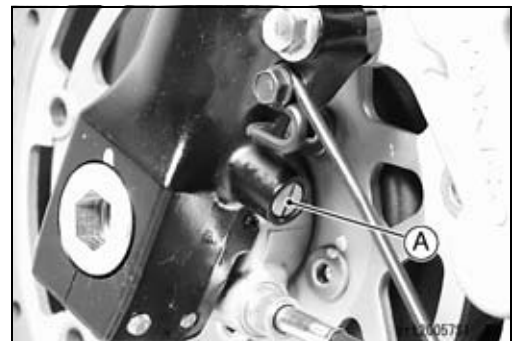
Rebound Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
12	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
1	Strong	Hard	Heavy	Bad	High

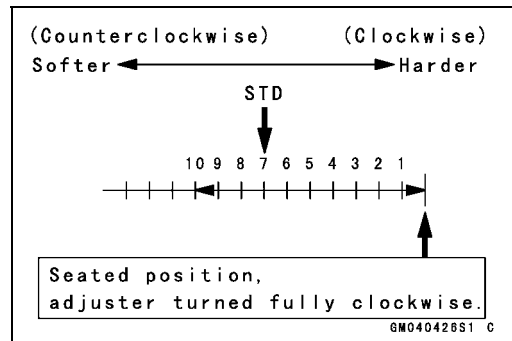
Compression Damping Force Adjustment

- To adjust the compression damping force, turn the compression damping adjuster [A] until you feel a click.
- The standard adjuster setting for the average-build rider of 68 kg (150 lb) with no passenger and no accessories is the **following** from the 1st click of the fully clockwise position.

- 7th clicks (ZR1200-A1 ~ A2/B1 ~ B2/C1)
- 1 3/4 turns backward (ZR1200-A3/B3/C2)
- 8th clicks (ZR1200-A4 ~, A6F ~/B4/C3)



⚠ WARNING
If both adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.



Front Fork

○The damping force can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the damping feels too soft or too stiff, adjust it in accordance with the following table.

Compression Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
10	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
1	Strong	Hard	Heavy	Bad	High

Spring Preload Adjustment

- Turn the spring preload adjuster [A] to change spring preload setting.
- The standard adjuster setting for the average-build rider of 68 kg (150 lb) with no passenger and no accessories is the 14 mm [B] from top as shown.

Adjuster Protrusion (from top)

- Standard: 14 mm (0.55 in.)
- Service Limit: 5 ~ 20 mm (0.196 ~ 0.787 in.)



⚠ WARNING

If both adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.

○The spring preload can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

Spring Action

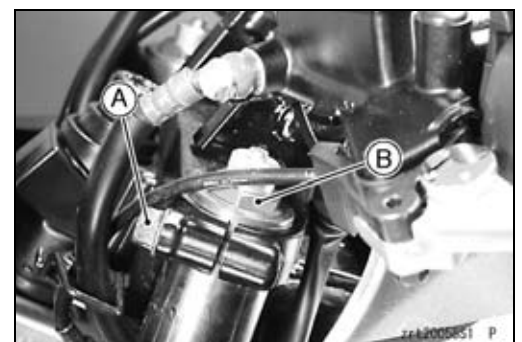
Adjuster Position	Damping Force	Setting	Load	Road	Speed
20	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
5	Strong	Hard	Heavy	Bad	High

Front Fork Removal (each fork leg)

- Remove:
 - Front Wheel (see Wheels/Tires chapter)
 - Front Fender (see Frame chapter)
- ★ Loosen the upper fork clamp bolt [A], and fork top plug [B] before-hand if the fork leg is to be disassembled.

NOTE

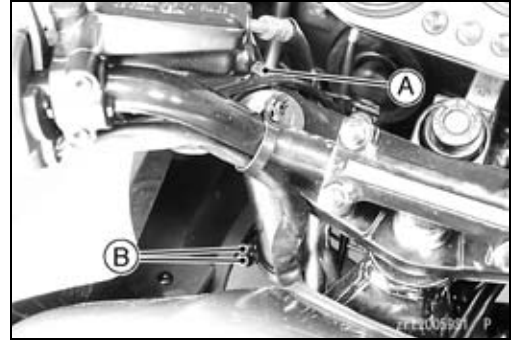
○Loosen the top plug after loosening the upper fork clamp bolt.



12-8 SUSPENSION

Front Fork

- Loosen the upper fork clamp bolt [A], and lower fork clamp bolts [B].
- With a twisting motion, work the fork leg down and out.



Front Fork Installation

- Install the fork so that the top end [A] of the inner tube is flush with the upper surface [B] of the steering stem head.
- Tighten:
 - Torque - Front Fork Clamp Bolt (Lower): 21 N·m (2.1 kgf·m, 15 ft·lb)**
 - Front Fork Top Plug: 23 N·m (2.3 kgf·m, 17 ft·lb)**

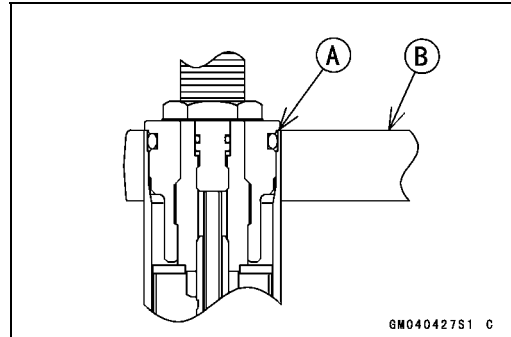
NOTE

- Tighten the two clamp bolts alternately two times to ensure even tightening torque.
- Tighten the top plug before tightening the upper fork clamp bolt.

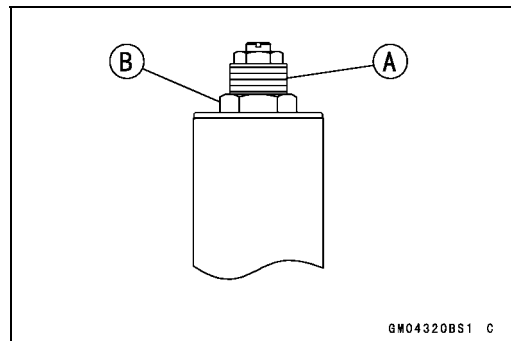
- Tighten:
 - Torque - Front Fork Clamp Bolt (Upper): 29 N·m (3.0 kgf·m, 22 ft·lb)**
- Adjust the spring preload and the damping force.

Fork Oil Change

- Remove the front fork (see Front Fork Removal).
- Turn the spring preload adjuster [A] counterclockwise until the fully position.
- Remove the top plug [B] from the inner tube.

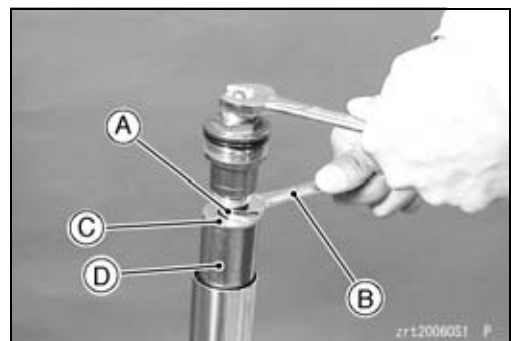


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GM04320BS1 C

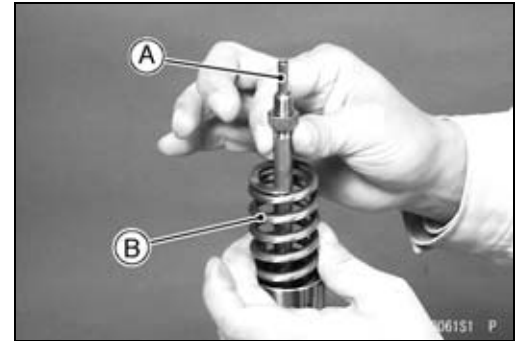
- Holding the piston rod nut [A] with a wrench [B], remove the top plug from the piston rod.
- Remove:
 - Washer [C]
 - Spacer [D]



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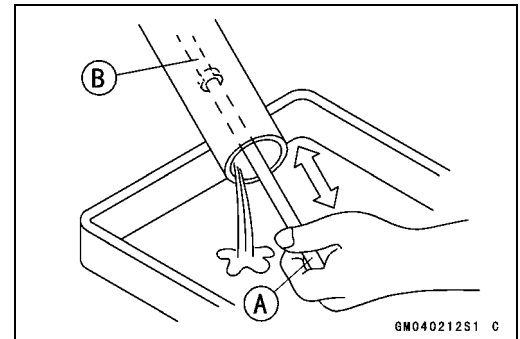
Front Fork

- Remove:
 - Washer
 - Rebound Damping Adjuster Rod [A]
 - Fork Spring [B]



- Drain the fork oil into a suitable container.
- Using the piston rod puller [A], pump the piston rod [B] up and down at least ten times to expel the oil from the fork.

Special Tool - Fork Piston Rod Puller, M10 × 1.0: 57001-1298



- Hold the fork tube upright, press the inner tube [A] and the piston rod all the way down.
- Pour in the type and amount of fork oil specified.

Fork Oil

Viscosity: KHL 34-G10 (KAYABA) or equipment

Amount (per side)

When changing oil:

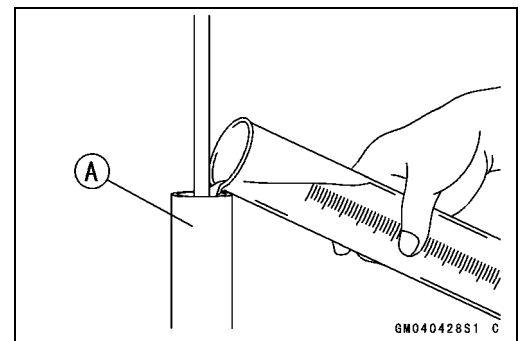
approx. 400 mL (13.52 US oz.) (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)

approx. 430 mL (14.54 US oz.) (ZR1200-A4 ~, A6F ~/B4/C3)

After disassembly and completely dry:

470 ±4 mL (15.89 ±0.14 US oz.) (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)

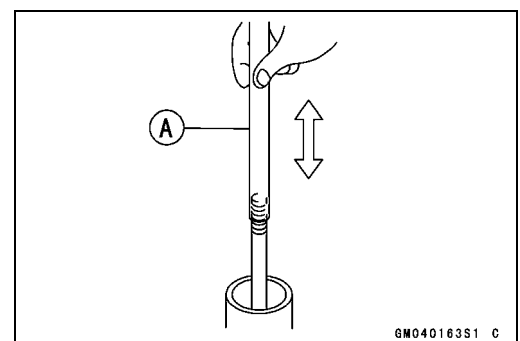
506 ±4 mL (15.89 ±0.14 US oz.) (ZR1200-A4 ~, A6F ~/B4/C3)



★ If necessary, measure the oil level as follows.

- Hold the outer tube vertically in a vise.
- Pump the inner tube several times to expel air bubbles.
- Using the piston rod puller [A], move the piston rod up and down more than ten times in order to expel all the air from the fork oil.

Special Tool - Fork Piston Rod Puller, M10 × 1.0: 57001-1298



12-10 SUSPENSION

Front Fork

- Wait until the oil level settles.
- With the fork fully compressed and the piston rod fully pushed in, insert a tape measure or rod into the inner tube, and measure the distance from the top of the inner tube of the oil.

Oil Level (fully compressed, without spring)

Standard: 129 ±2 mm (5.08 ±0.08 in.)

(ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)

117 ±2 mm (4.61 ±0.08 in.)

(ZR1200-A4 ~ /B4/C3)

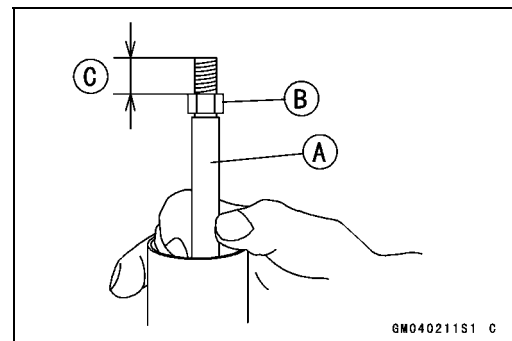
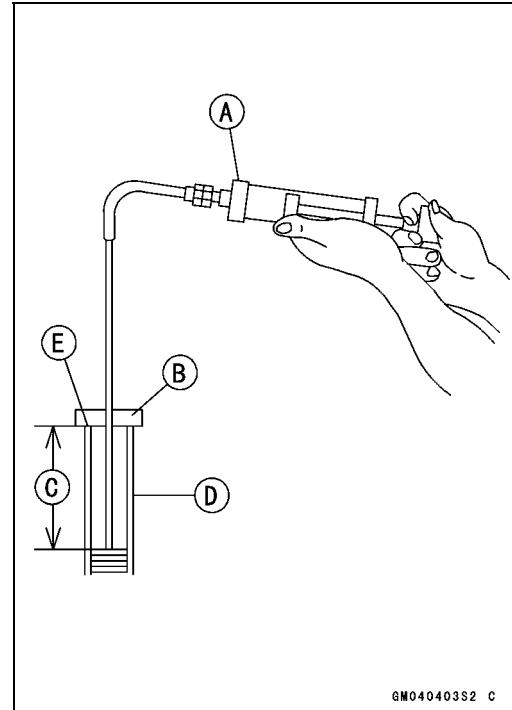
(from the top of the inner tube)

NOTE

- Fork oil level may also be measured using the fork oil level gauge.

Special Tool - Fork Oil Level Gauge: 57001-1290 [A]

- With the fork fully compressed and without fork spring, insert the gauge tube into the inner tube [D] and position the stopper across the top end [E] of the inner tube.
- Set the gauge stopper [B] so that its lower side shows the oil level distance specified [C].
- Pull the handle slowly to pump out the excess oil until the oil no longer comes out.
- ★ If no oil is pumped out, there is insufficient oil in the inner tube. Pour in enough oil, then pump out the excess oil as shown above.
- Pull the piston rod [A] up above the inner tube top.
- Screw the rod nut [B] on to the piston rod with the chamfered side down.
- Check that the visible thread length is at least 11 mm [C].



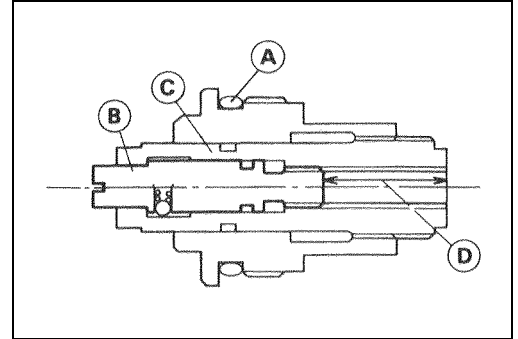
- Insert the rebound damping adjuster rod into the piston rod.
- Screw the fork piston rod puller onto the end of the rod.

Special Tool - Fork Piston Rod Puller, M10 × 1.0: 57001-1298

- Install:
 - Washer
 - Spacer
 - Washer

Front Fork

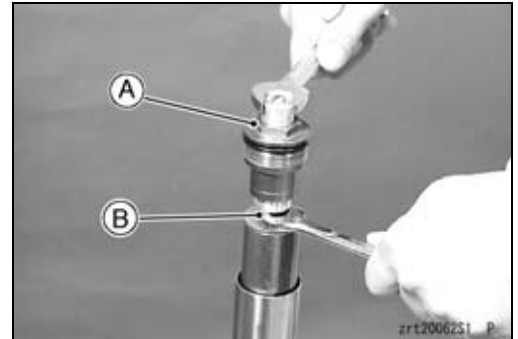
- Check the O-ring [A] on the top plug and replace it with a new one if damaged.
- Screw in the damper adjuster [B] of the top plug so that the distance between the adjuster bottom and the spring adjuster [C] end is 25 mm [D].



- Holding the top plug [A] with a wrench, tighten the piston rod nut [B] against the top plug.

Torque - Piston Rod Nut: 15 N·m (1.5 kgf·m, 11 ft·lb)

- Raise the inner tube and screw the top plug into it.
- Install the front fork (see Front Fork Installation).



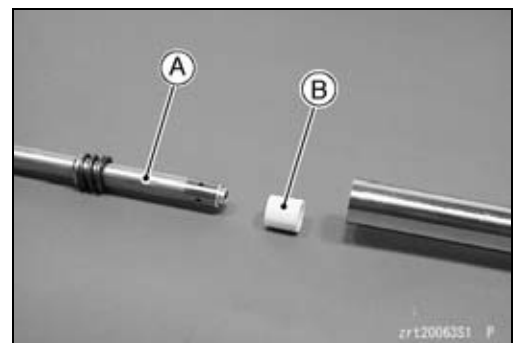
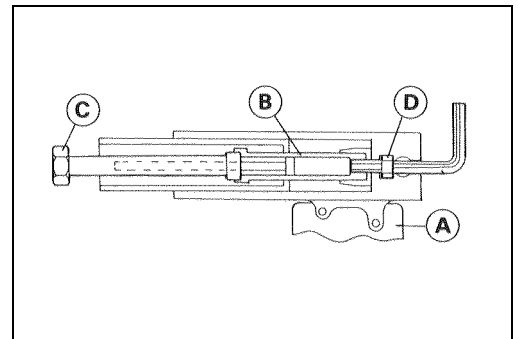
Front Fork Disassembly

- Remove the front fork (see Front Fork Removal).
- Drain the fork oil (see Fork Oil Change).
- Hold the front fork in a vise [A].
- Stop the cylinder [B] from turning by using the fork cylinder holder [C].

Special Tools - Fork Cylinder Holder: 57001-1493 (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)

Fork Cylinder Holder, Hex 24 × □19.5: 57001-1406 (ZR1200-A4 ~, A6F ~/B4/C3)

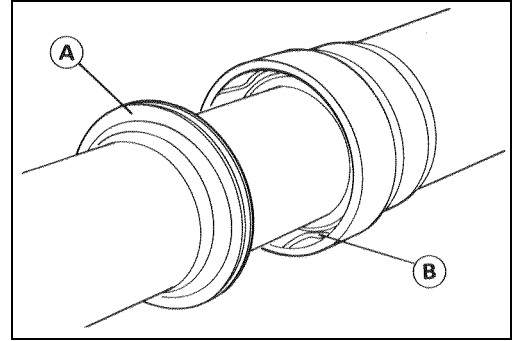
- Unscrew the Allen bolt [D], then take the bolt and gasket out of the bottom of the outer tube.
- Take the piston cylinder unit [A] and cylinder base [B].
○Do not disassemble the cylinder unit.



12-12 SUSPENSION

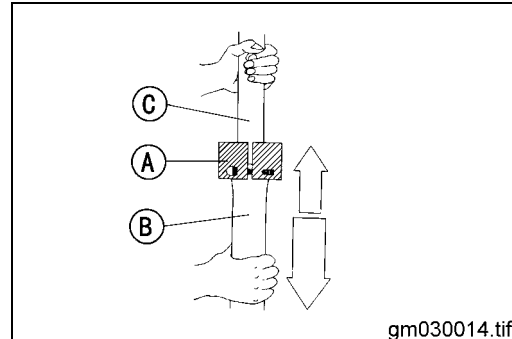
Front Fork

- 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.



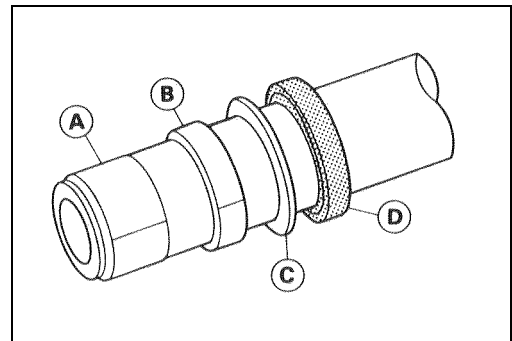
- Grasp the inner tube [C] and stroke the outer tube up and down several times. The shock to the fork seal separates the inner tube from the outer tube [B].
- ★ If the tubes are tight, use a fork outer tube weight [A].

Special Tool - Fork Outer Tube Weight: 57001-1218



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- 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.

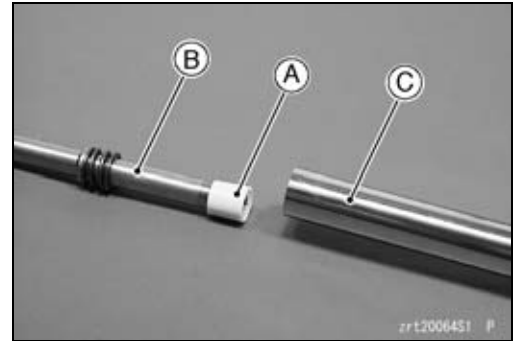


Front Fork Assembly

- Replace the following parts with new ones.
 - 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

Front Fork

- Install the cylinder base [A] on the cylinder unit.
- Insert the cylinder unit [B] into the inner tube [C].



- Insert the inner tube, cylinder unit, cylinder base as a set into the outer tube [A].
- Replace the bottom Allen bolt gasket with a new one.
- Stop the cylinder [B] from turning by using the fork cylinder holder [C].

Special Tools - Fork Cylinder Holder: 57001-1493 (ZR1200 -A1 ~ A3/B1 ~ B3/C1 ~ C2)

Fork Cylinder Holder, Hex 24 × □19.5: 57001-1406 (ZR1200-A4 ~, A6F ~/B4/C3)

- Apply a non-permanent locking agent to the Allen bolt [D] and tighten it.

Torque - Front Fork Bottom Allen Bolt: 39 N·m (4.0 kgf·m, 29 ft·lb)

- Fit the new outer guide bush [A] into the outer tube.

NOTE

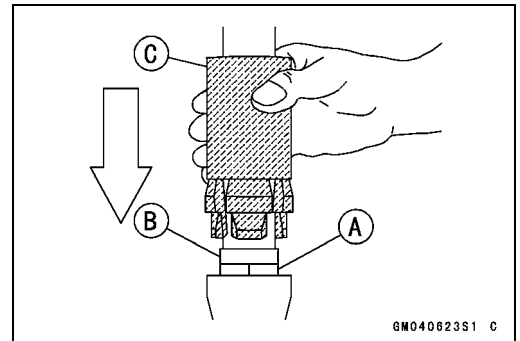
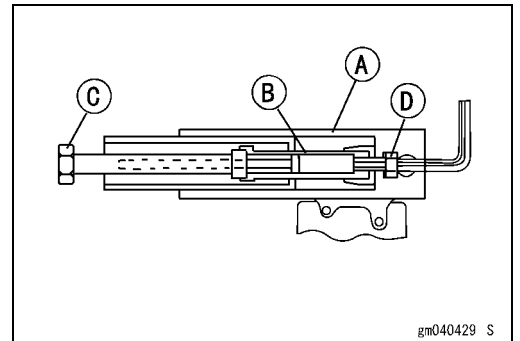
○When assembling the new outer tube guide bushing, hold the used guide bushing [B] against the new bushing and tap the used guide bushing with the fork oil seal driver [C] until it stops.

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.
- Pour in the specified type of oil (see Fork Oil Change).

Inner Tube, Outer Tube Inspection

- Visually inspect the inner tube and repair any damage.
- Nick or rust damage can sometimes be repaired by using a wet-stone to remove sharp edges or raised areas which cause seal damage.
- ★ If the damage is not repairable, replace the inner tube. Since damage to the inner tube damages the oil seal, replace the oil seal whenever the inner tube is repaired or replaced.



CAUTION

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

12-14 SUSPENSION

Front Fork

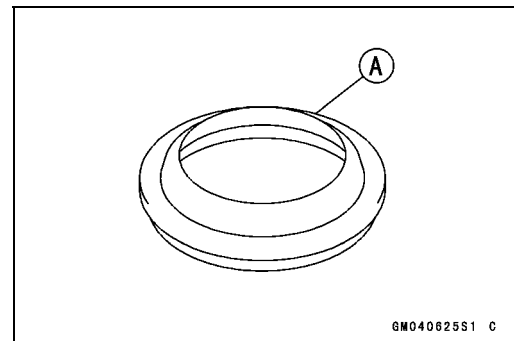
- Temporarily assemble the inner and outer tubes, and pump them back and forth manually to check smooth operation.
- ★ If you feel binding or catching, the inner and outer tubes must be replaced.

⚠ 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

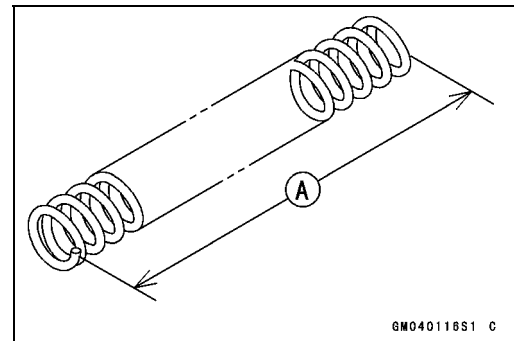
- Inspect the dust seal [A] for any signs of deterioration or damage.
- ★ Replace it if necessary.



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Spring Tension Inspection

- 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.



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Fork Spring Free Length

Standard: 286.8 mm (11.29 in.) (ZR1200
-A1~A3/B1~B3/C1~C2)

307 mm (12.07 in.) (ZR1200-A4 ~,
A6F/B4/C3)

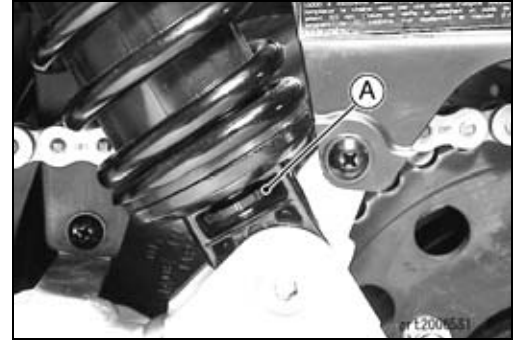
Service Limit: 281 mm (11.06 in.) (ZR1200
-A1~A3/B1~B3/C1~C2)

301 mm (11.85 in.) (ZR1200-A4 ~, A6F
~/B4/C3)

Rear Shock Absorber

Rebound Damping Force Adjustment

- To adjust the rebound damping force, turn the lower damping adjuster [A] to the desired position until you feel a click.
- The standard adjuster setting for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is mark II.



Rebound Damping Adjustment

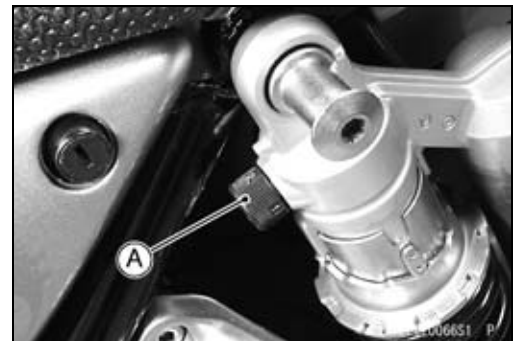
Adjuster Position	Damping Force	Setting	Load	Road	Speed
I	Weak	Soft	Light	Good	Low
II	↑	↑	↑	↑	↑
III	↓	↓	↓	↓	↓
IIII	Strong	Hard	Heavy	Bad	High

⚠ WARNING

If a pair of lower adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.

Compression Damping Force Adjustment

- To adjust the compression damping force, turn the upper damping adjuster [A] to the desired number aligning it with the mark.
- The standard adjuster setting for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is number 2.



Compression Damping Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
1	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
4	Strong	Hard	Heavy	Bad	High

⚠ WARNING

If a pair of upper adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.

Spring Preload Adjustment

- To adjust the spring force, turn the adjuster [A] on each shock absorber to the desired position.
- The standard adjuster position for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is 2nd step from the weakest position.



Spring Preload Adjustment

Adjust Position	1	2	3	4	5
Spring Tension	→ Stronger				

12-16 SUSPENSION

Rear Shock Absorber

⚠ WARNING

If a pair of adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.

Rear Shock Absorber Removal

- Raise the rear wheel off the ground.
Special Tools - Jack: 57001-1238
- Unscrew the lower mounting bolt [A], and lift the shock absorber lower end out of the mounting bracket.

NOTE

○ Pull off the mounting bolt while freeing stress on the bolt by lifting the swingarm (rear wheel) slightly.

- Unscrew the upper mounting nut [B], and remove the rear shock absorber [C].

Rear Shock Absorber Installation

- Fit the shock absorber onto the upper mounting bolt and the lower mounting bracket, and fasten it with the mounting nut and bolt.

Torque - Rear Shock Absorber Upper Mounting Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)

Rear Shock Absorber Lower Mounting Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)

Rear Shock Absorber Inspection

- Remove the rear shock absorbers.
- Visually inspect the following items.
 - Smooth Stroke
 - Oil Leakage
 - Crack or Dent
- ★ If there is any damage to the rear shock absorber, one unit feels weaker than the other, replace both shock absorber as a set.
- ★ Visually inspect the rubber bushings.
- ★ If they show any signs of damage, replace them.

Rear Shock Absorber Scrapping

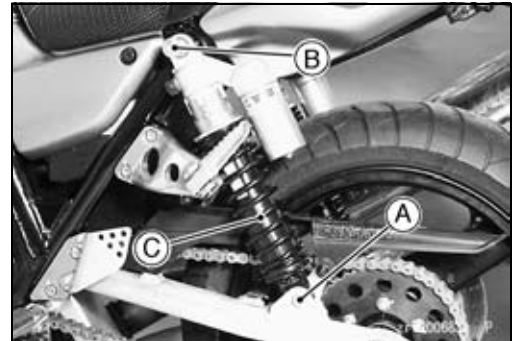
⚠ WARNING

Since the reservoir tank of the rear shock absorber contains nitrogen gas, do not incinerate the reservoir tank without first releasing the gas or it may explode.

- Remove the valve cap [A] and release the nitrogen gas completely from the gas reservoir.
- Drill the bottom of the reservoir using a 2 ~ 3 mm (0.08 ~ 0.12 in.) drillbit.

⚠ WARNING

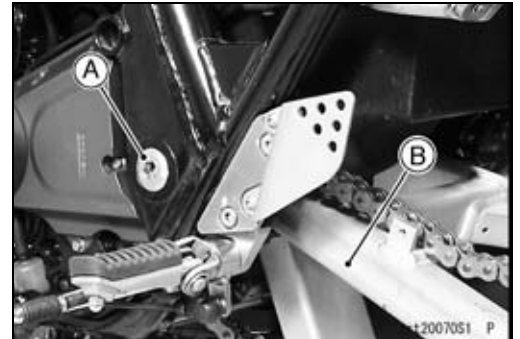
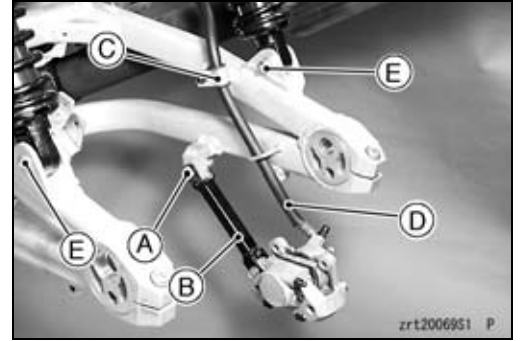
Since the high pressure gas is dangerous, do not point the drill toward your face body.



Swingarm

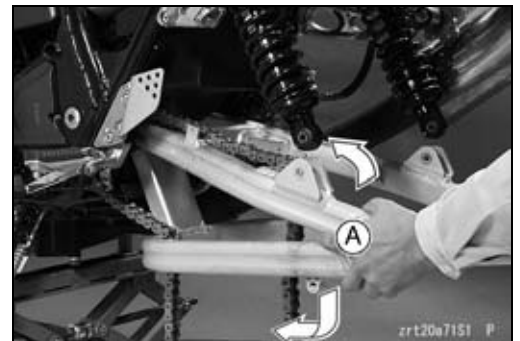
Swingarm Removal

- Remove:
 - Chain Cover (see Final Drive chapter)
 - Drive Chain (cut, see Final Drive chapter)
 - Rear Wheel (see Wheels/Tires chapter)
 - Torque Link Front Mounting Bolt [A]
 - Rear Brake Caliper with Torque Link [B]
 - Brake Hose Clamp [C]
 - Rear Brake Hose [D]
 - Rear Shock Absorber Lower Mounting Bolts [E]
- Unscrew the swingarm pivot nut [A].
- Pull off the swingarm pivot shaft, and remove the swingarm [B].



Swingarm Installation

- Apply plenty of a high temperature grease to the ball bearing and the inside of the needle bearings, and grease seals.
- Tighten:
 - Torque - Swingarm Pivot Nut: 98 N·m (10 kgf·m, 72 ft·lb)**
- Move the swingarm up and down [A] to check for abnormal friction.
- Install the other removed parts.

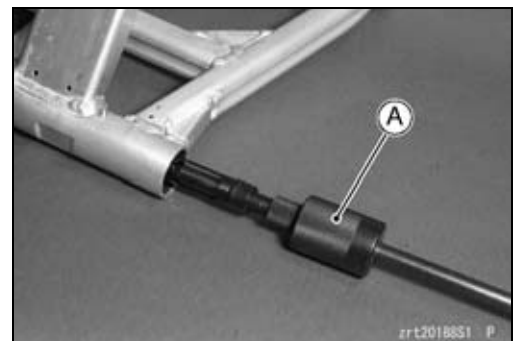


Swingarm Bearing Removal

- Remove:
 - Swingarm
 - Collar
 - Grease Seals
 - Circlip [A]
- Special Tool - Inside Circlip Pliers: 57001-143 [B]**



- Remove the ball bearing and needle bearings.
 - Special Tool - Oil Seal & Bearing Remover: 57001-1058 [A]**



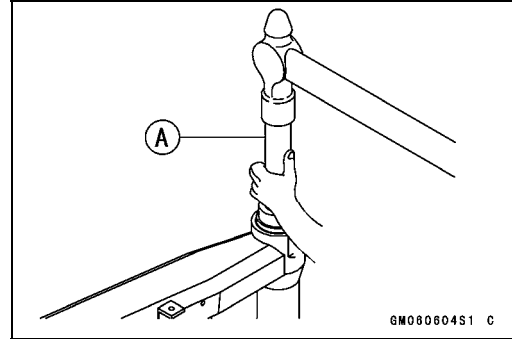
12-18 SUSPENSION

Swingarm

Swingarm Bearing Installation

- Apply plenty of high-temperature grease to the ball bearing and the inside of the needle bearings, and grease seals.
- Install the ball bearing, needle bearings, circlip, and grease seals.
- For all bearings, face the marked side out.

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

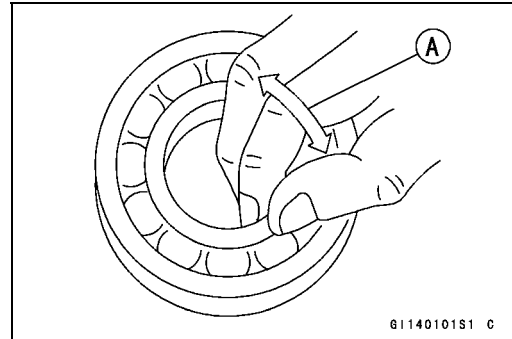


Swingarm Bearing Sleeve Inspection

CAUTION

Do not remove the bearings for inspection. Remove may damage them.

- Check the ball bearing.
- Since the ball bearing is made to extremely close tolerances, the wear must be judged by feel rather than measurement.
- Turn [A] the bearing in the swingarm back and forth while checking for plays, roughness, or binding. If bearing play, roughness, or binding is found, replace the bearing.
- 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 seat.



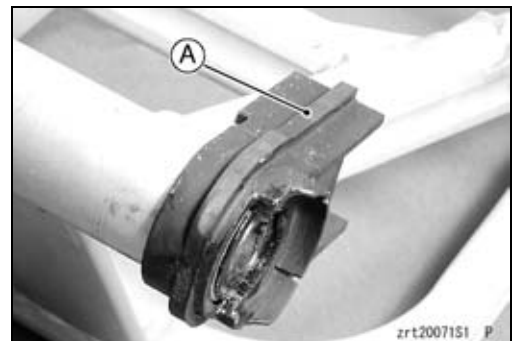
Swingarm Lubrication

- Lubricate the swing arm pivot with molybdenum disulfide grease through the grease nipple [A] using a grease gun according to the Periodic Maintenance Chart (see General Information chapter). It is normal for a small amount of grease to seep out around the grease seals.
- If the swing arm pivot is disassembled, wipe all the old grease off the bearings, sleeves, and grease seals, then grease them.



Chain Slider Inspection

- Visually inspect the chain slider [A].
- ★ Replace the chain slider if it shows any signs of abnormal wear or damage.



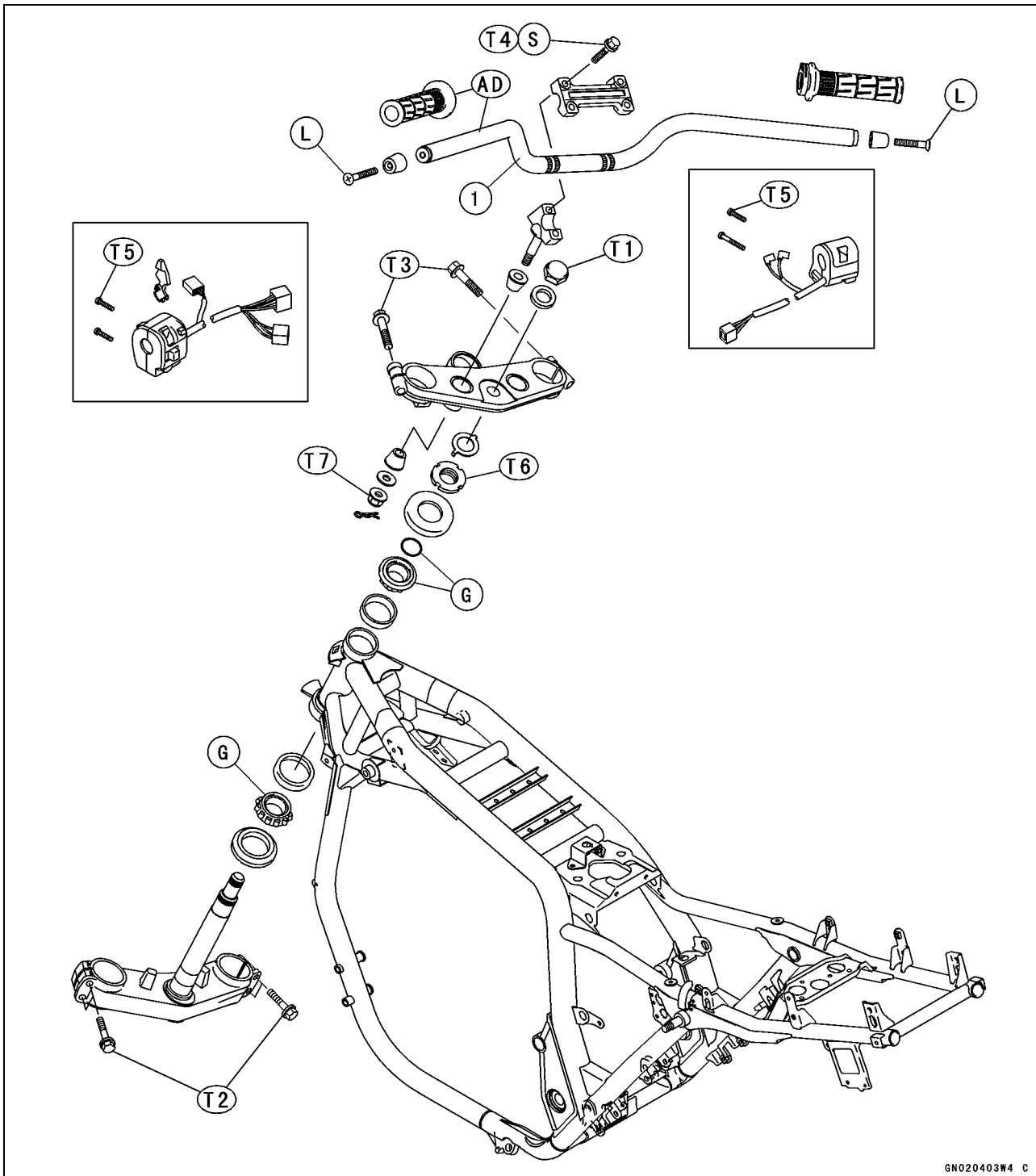
Steering

Table of Contents

- Exploded View 13-2
- Steering 13-4
 - Steering Inspection 13-4
 - Steering Adjustment 13-4
- Steering Stem 13-5
 - Stem, Stem Bearing Removal 13-5
 - Stem, Stem Bearing Installation 13-6
 - Stem Bearing Lubrication 13-8
 - Steering Stem Warp Inspection 13-8
- Handlebar 13-9
 - Handlebar Removal 13-9
 - Handlebar Installation 13-9

13-2 STEERING

Exploded View



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1. Align the punch mark with the gap between the handlebar lower holder and upper holder.

T1: 44 N·m (4.5 kgf·m, 33 ft·lb)

T2: 21 N·m (2.1 kgf·m, 15 ft·lb)

T3: 29 N·m (3.0 kgf·m, 22 ft·lb)

T4: 25 N·m (2.5 kgf·m, 18 ft·lb)

T5: 3.4 N·m (0.35 kgf·m, 30 in·lb)

T6: 4.9 N·m (0.50 kgf·m, 43 ft·lb) see the text.

T7: 34 N·m (3.5 kgf·m, 25 ft·lb)

AD: Apply adhesive.

G: Apply grease.

L: Apply a non-permanent locking agent.

S: Follow the specific tightening sequence.

Exploded View

Special Tools - Steering Stem Bearing Driver: 57001-137
Bearing Puller: 57001-158
Bearing Puller Adapter: 57001-317
Steering Stem Nut Wrench: 57001-1100
Head Pipe Outer Race Driver: 57001-1106
Head Pipe Outer Race Remover: 57001-1107
Steering Stem Bearing Driver Adapter: 57001-1074
Head Pipe Outer Race Press Shaft: 57001-1075
Head Pipe Outer Race Driver: 57001-1076
Jack: 57001-1238

13-4 STEERING

Steering

Steering Inspection

- Lift the front wheel off the ground using the jack.
Special Tool - Jack: 57001-1238
- With the front wheel pointing straight ahead, alternately tap each end of the handlebar. The front wheel should swing fully left and right from the force of gravity until the fork hits the stop.
- ★ If the wheel binds or catches before the stop, the steering is too tight.
- Feel for steering looseness by pushing and pulling [A] 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

- Remove:
 - Fuel Tank (see Fuel System chapter)
 - Handlebar (place on one side with cables, harnesses and hoses installed)
 - Stem Head Nut
 - Steering Stem Head Bracket (see Steering Stem Bearing Removal)
- Remove the lock washer and reinstall the stem head bracket [A].
- Tighten the upper fork clamp bolts [B]
Torque - Front Fork Clamp Bolts (Upper): 29 N·m (3.0 kgf·m, 22 ft·lb)
- Loosen:
 - Lower Fork Clamp Bolts (both sides)
- Adjust the steering.
Special Tool - Steering Stem Nut Wrench: 57001-1100 [C]
- ★ If the steering is too tight, loosen the stem nut a fraction of a turn.
- ★ If the steering is too loose, tighten the stem nut a fraction of a turn.

NOTE

- Turn the stem nut 1/8 turn at a time maximum.
- Install the lock washer (see Steering Bearing Installation).
- Tighten:
Torque - Steering Stem Head Nut: 44 N·m (4.5 kgf·m, 33 ft·lb)
Front Fork Clamp Bolts (Lower): 21 N·m (2.1 kgf·m, 15 ft·lb)

NOTE

- Tighten the two clamp bolts alternately two times to ensure even tightening torque.
- Check the steering again.
- ★ If the steering is still too tight or too loose, repeat the adjustment.



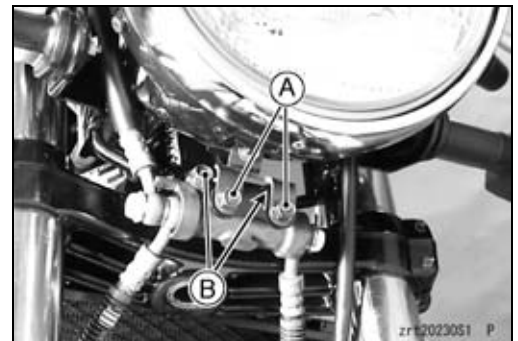
Steering Stem

Stem, Stem Bearing Removal

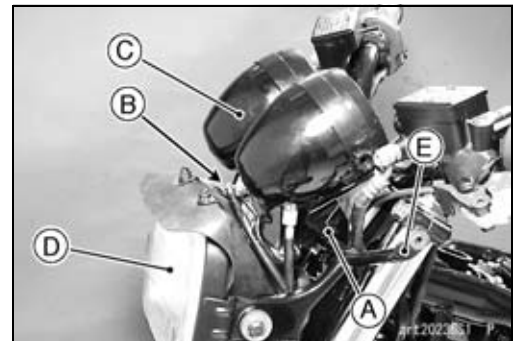
- Remove:
 - Fuel Tank (see Fuel System Chapter)
 - Fairing (ZR1200A, see Frame chapter)
 - Handlebar (place on one side with cables, harnesses and hoses installed)
 - Brake Joint Bolts [A]



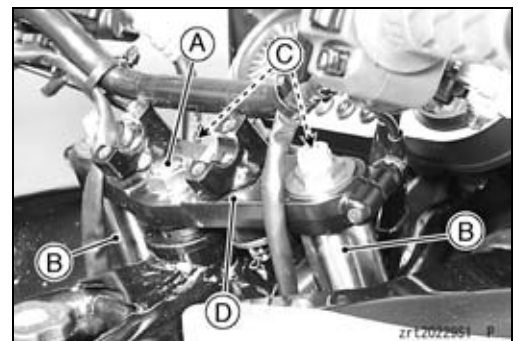
- Remove (ZR1200C):
 - Headlight Vertical Adjuster Bolts [A]
 - Brake Joint Bolts [B]



- Remove (ZR1200A/C):
 - Upper Bracket Nuts [A]
 - Connectors [B]
 - Meter Unit [C]
 - Headlight Unit [D]
 - Fairing Bracket [E] (Headlight Bracket as for ZR1200C)



- Remove:
 - Steering Stem Head Nut [A]
 - Front Wheel (see Wheels/Tires chapter)
 - Front Fork [B] (see Suspension chapter)
 - Clamp Bolts [C] (ZR1200B)
 - Steering Stem Head [D]



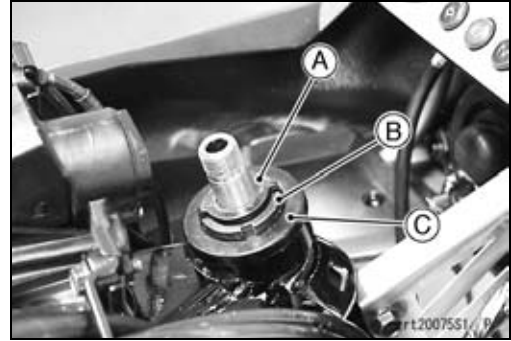
13-6 STEERING

Steering Stem

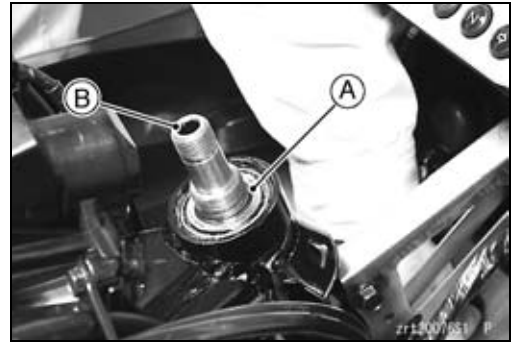
- Pushing up the stem base, and remove the following parts.

Lock Washer [A]
Stem Nut [B]

Special Tool - Steering Stem Nut Wrench: 57001-1100
Stem Cap [C]



O-ring [A]
Steering Stem [B]

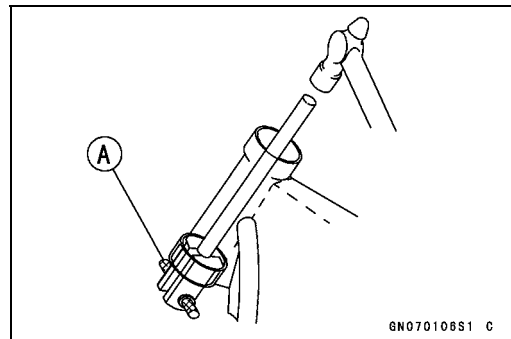


- Drive out the bearing outer races from the head pipe.

Special Tool - Head Pipe Outer Race Remover: 57001-1107 [A]

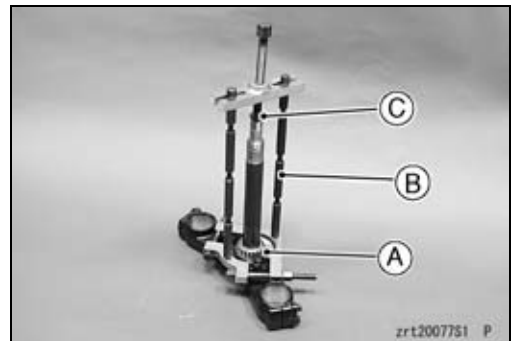
NOTE

○If either steering stem bearing is damaged, it is recommended that both the upper and lower bearings (including outer races) be replaced with new ones.



- Remove the lower bearing inner race [A] from the stem.

Special Tools - Bearing Puller: 57001-158 [B]
Bearing Puller Adapter: 57001-317 [C]



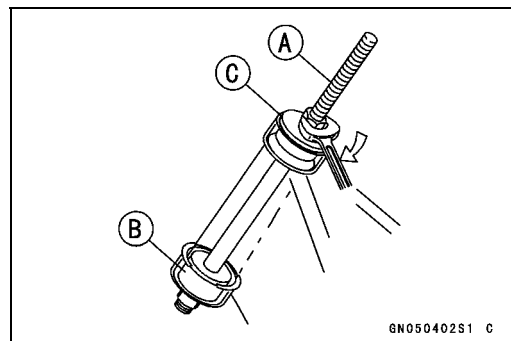
Stem, Stem Bearing Installation

- 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 Tools - Head Pipe Outer Race Press Shaft: 57001-1075 [A]

Head Pipe Outer Race Driver: 57001-1076 [B]

Head Pipe Outer Race Driver: 57001-1106 [C]

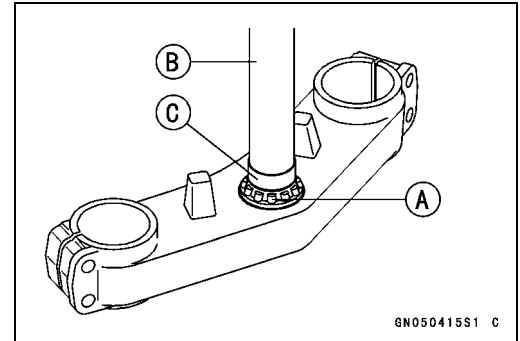


Steering Stem

- Replace the bearing inner races with new ones.
- Apply grease to the lower bearing inner race [A], and drive it onto the stem.

Special Tools - Steering Stem Bearing Driver: 57001-137 [B]

Steering Stem Bearing Adapter: 57001-1074 [C]



- Apply grease to the upper bearing inner race, and install it in the head pipe.
- Apply grease to the O-ring.
- Install the stem through the head pipe and the upper bearing inner race, and install the O-ring on the stem shaft while pushing up on stem base.
- Install the stem cap, and hand tighten the stem nut.

NOTE

○ *Install the stem nut so that the stepped side faces down.*

- Settle the bearings in place as follows:
 - Tighten the stem nut to 39 N·m (4.0 kgf·m, 29 ft·lb) of torque. (To tighten the stem nut to the specified torque, hook the wrench on the stem nut, and pull the wrench at the hole by 220 N (22.2 kg, 49 lb) [A] force in the direction shown.

Special Tool - Steering Stem Nut Wrench: 57001-1100 [B]

- Check that there is no play and the steering stem turns smoothly without rattles. If not, the steering stem bearings may be damaged.
- Again back out the stem nut a fraction of a turn until it turns lightly.
- Turn the stem nut 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)

- Install the lock washer.
- Install the stem head.
- Install the washer, and tighten the stem head nut.
- Install the front fork (see Suspension chapter).

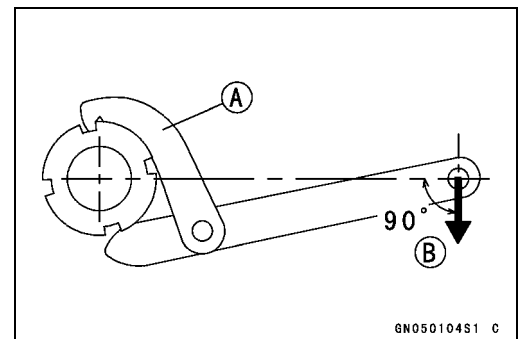
NOTE

○ *Tighten the fork upper clamp bolts first, next the stem head nut, last the fork lower clamp bolts.*

Torque - Front Fork Clamp Bolts (Upper): 29 N·m (3.0 kgf·m, 22 ft·lb)

Steering Stem Head Nut: 44 N·m (4.5 kgf·m, 33 ft·lb)

Front Fork Clamp Bolts (Lower): 21 N·m (2.1 kgf·m, 15 ft·lb)



13-8 STEERING

Steering Stem

NOTE

- Tighten the two clamp bolts alternately two times to ensure even tightening torque.

⚠ WARNING

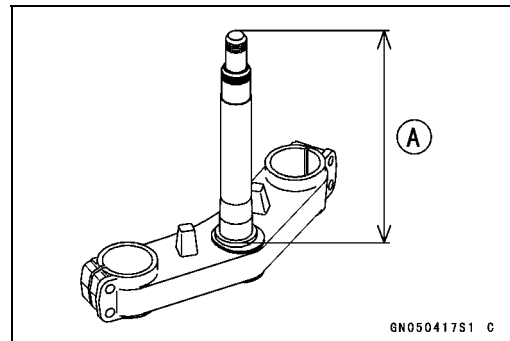
Do not impede the handlebar turning by routing the cables, harnesses and hoses improperly (see General Information chapter).

Stem Bearing Lubrication

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

Steering Stem Warp Inspection

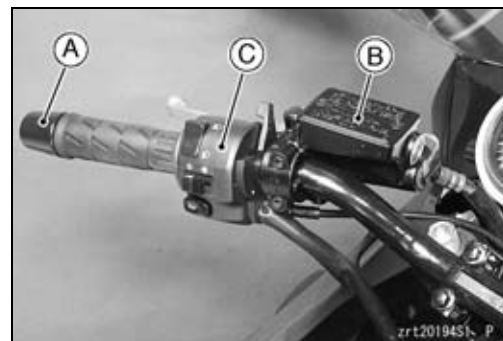
- Whenever the steering stem is removed, or if the steering cannot be adjusted for smooth action, check the steering stem for straightness.
- ★ If the steering stem [A] is bent, replace the steering stem.



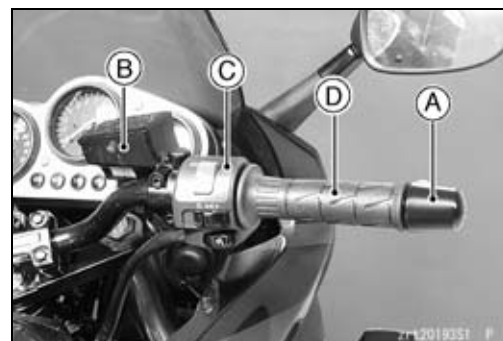
Handlebar

Handlebar Removal

- Remove:
 - Handlebar Weight [A]
 - Clutch Lever Assy [B]
 - Left Switch Housing [C]



- Handlebar Weight [A]
- Front Brake Master Cylinder [B]
- Right Switch Housing [C]
- Throttle Grip [D]

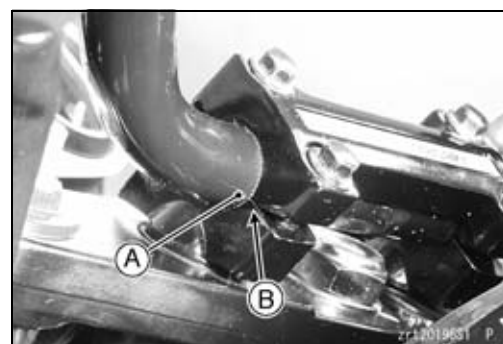


- Remove the handlebar clamp bolts [A].
- Remove the handlebar clamp [B] and take out the handlebar [C].



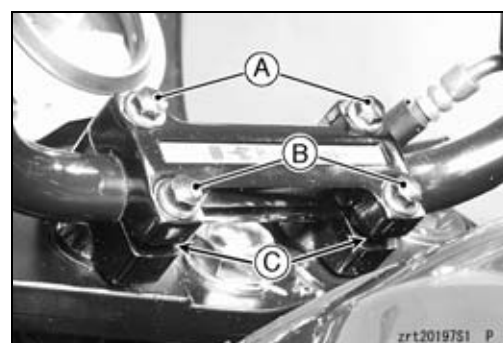
Handlebar Installation

- Align the punch mark [A] on the handlebar with the gap [B] between the left holder and the left clamp.



- First tighten the front clamp bolts [A]. Then, tighten the rear clamp bolts [B]. After tightening the bolts, a clearance [C] will be created behind the clamps.

Torque - Handlebar Holder Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)



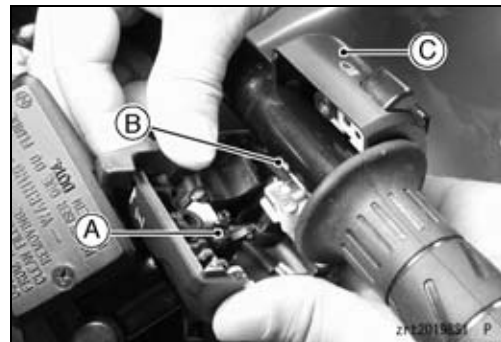
13-10 STEERING

Handlebar

- The front half of the right and left switch housings [A] has a small protrusion [B]. Engage this protrusion with the hole [C] in the handlebar.
- Install the handlebar switch housings.

Torque - Handlebar Switch Housing Screws: 3.4 N·m (0.35 kgf·m, 30 in·lb)

- Install the clutch lever holder (see Clutch chapter).
- Install the front master cylinder (see Brake chapter).
- Install the throttle and left grip.
- Apply a non-permanent locking agent to the threads of the weight screws and tighten it.



Frame

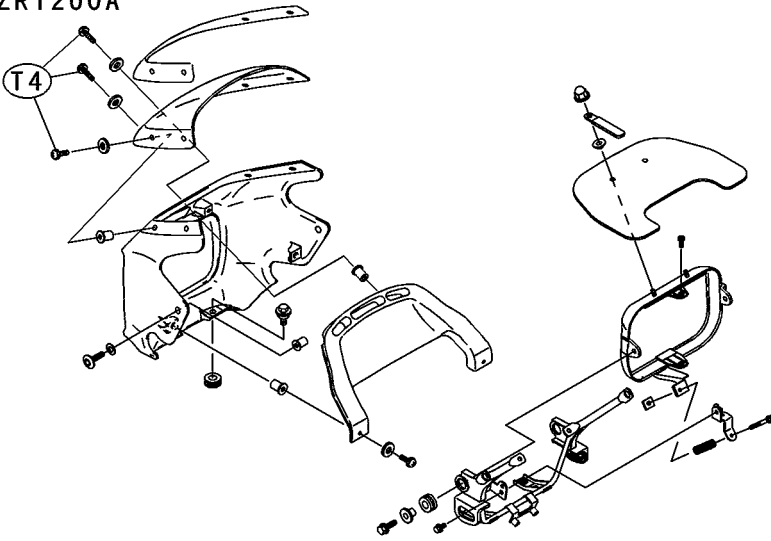
Table of Contents

Exploded View	14-2
Specifications	14-6
Seat	14-7
Seat Removal	14-7
Seat Installation	14-7
Seat Lock Cable Lubrication and Inspection	14-7
Fairing (ZR1200A)	14-8
Wind Shield Removal	14-8
Wind Shield Installation.....	14-8
Fairing Removal	14-8
Fairing (ZR1200B).....	14-9
Wind Shield Removal.....	14-9
Wind Shield Installation.....	14-9
Fairing Removal	14-9
Fairing Installation.....	14-9
Fairing Disassembly.....	14-10
Fairing Installation.....	14-10
Fairing Lower Inner Cover Removal	14-11
Side Covers.....	14-12
Side Cover Removal	14-12
Side Cover Installation	14-12
Seat Cover.....	14-13
Seat Cover Removal	14-13
Fenders	14-14
Front Fender Removal	14-14
Rear Fender Rear Removal	14-14
Rear Fender Rear Installation.....	14-14
Rear Fender Front Removal	14-14
Rear Fender Front Installation	14-15
Frame	14-16
Frame Inspection	14-16
Fairing Bracket Removal (ZR1200B).....	14-16
Fairing Bracket Removal (ZR1200A/C)	14-16
Sidestand Installation.....	14-16

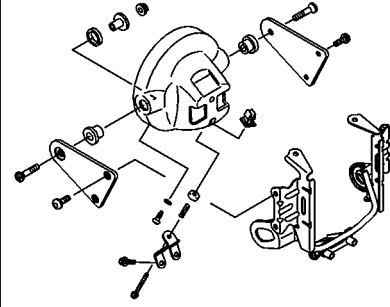
14-2 FRAME

Exploded View

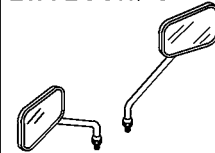
ZR1200A



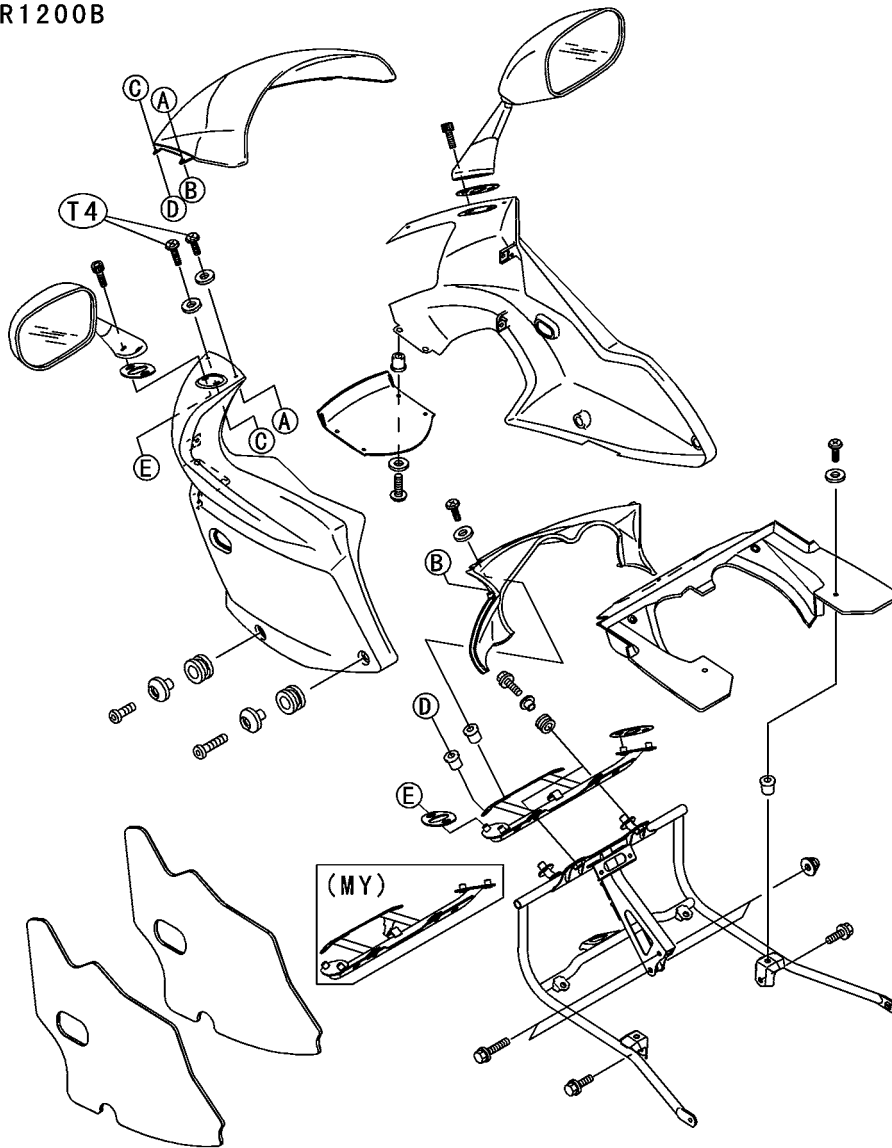
ZR1200C



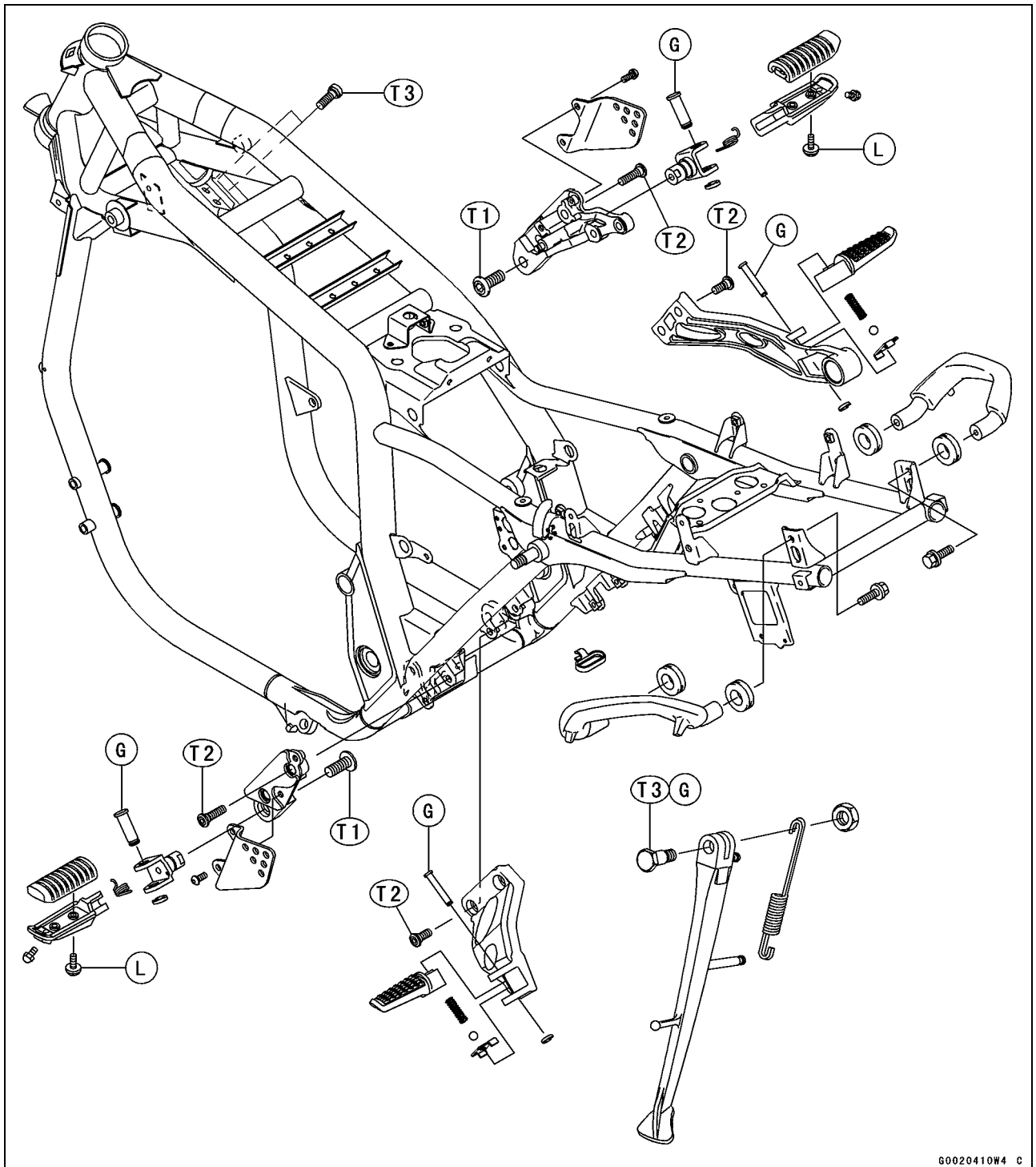
ZR1200A/C



ZR1200B



Exploded View



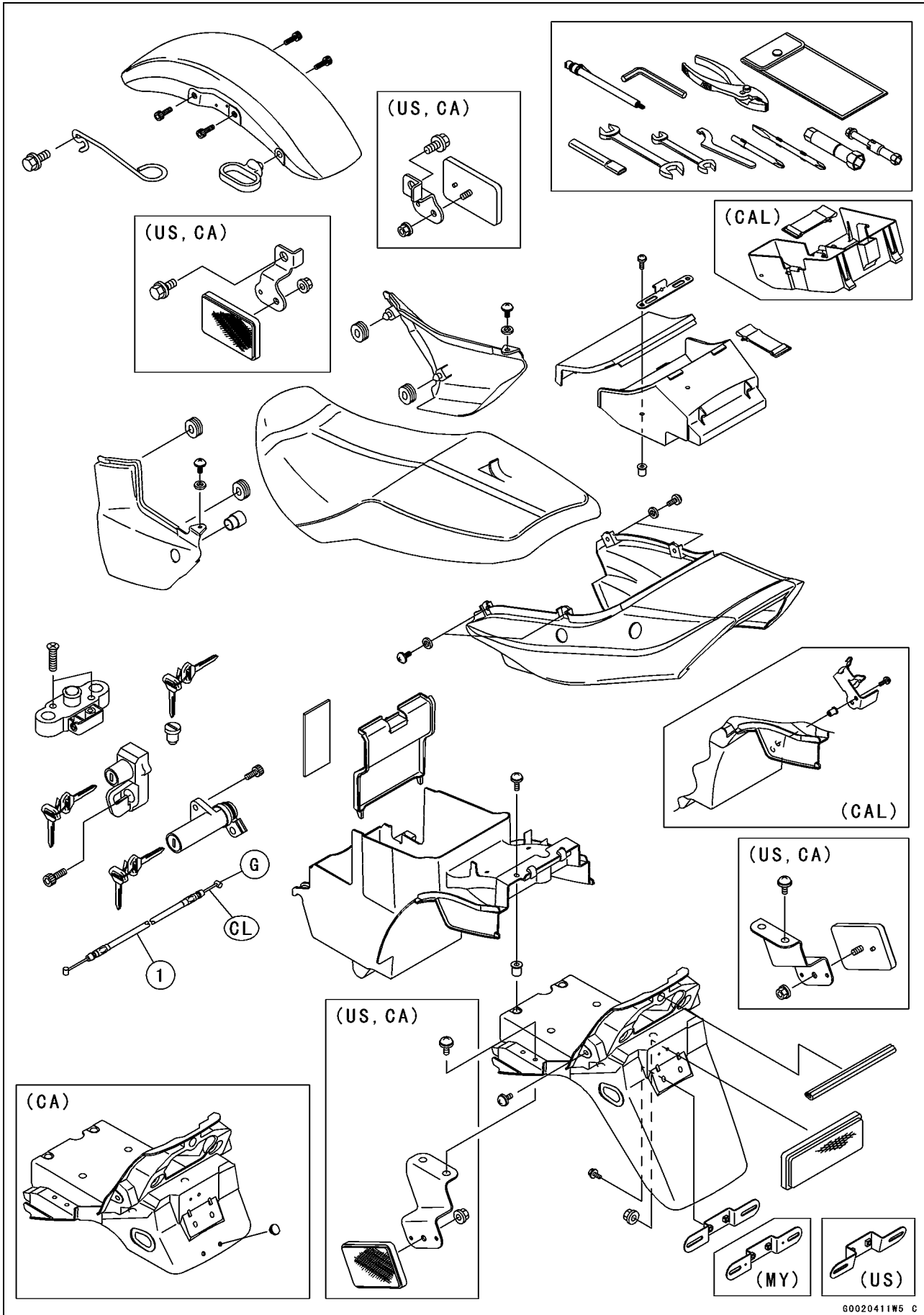
G0020410W4 C

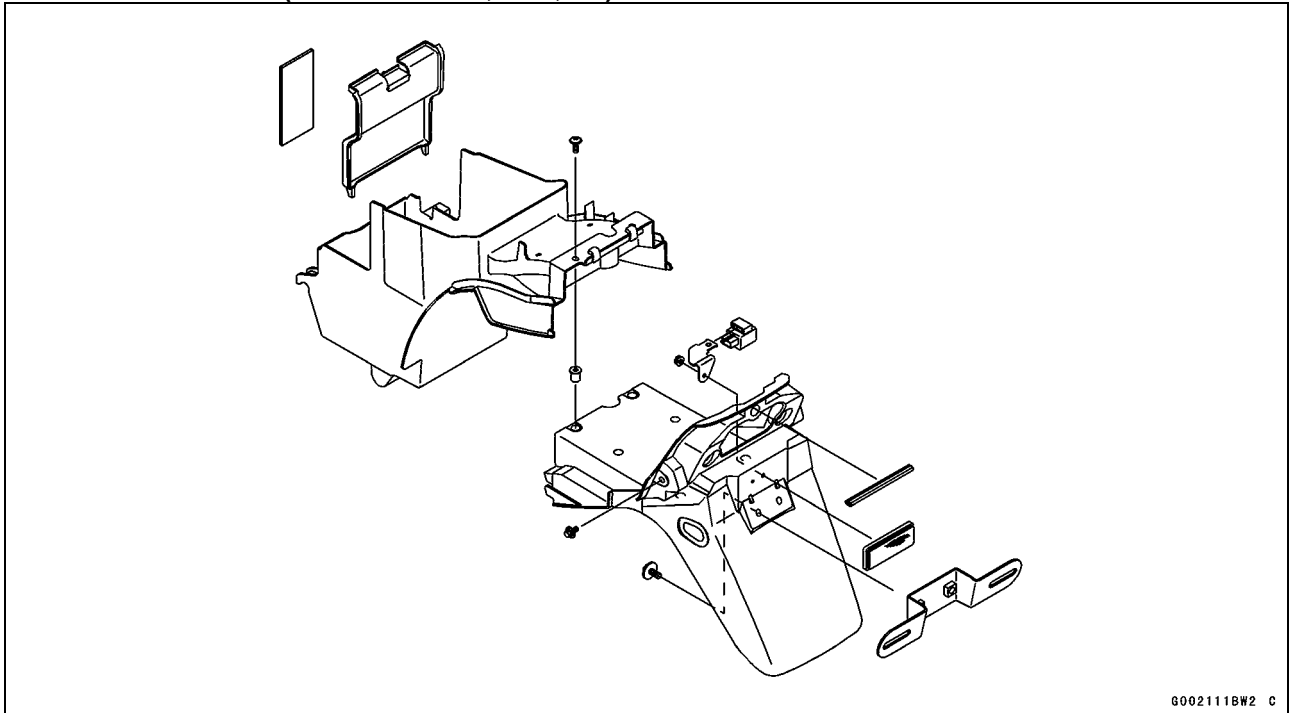
- T1: 34 N·m (3.5 kgf·m, 25 ft·lb)
- T2: 25 N·m (2.5 kgf·m, 18 ft·lb)
- T3: 44 N·m (4.5 kgf·m, 33 ft·lb)
- T4: 0.4 N·m (0.04 kgf·m, 3.5 in·lb)
- G: Apply grease.
- L: Apply a non-permanent locking agent.

MY: Malaysia Model

14-4 FRAME

Exploded View



Exploded View**ZR1200A4 ~ /B4/C3 (other than US,CAL,AU)**

1. Seat Lock Cable

CL: Apply cable lubricant.

G: Apply grease.

AU: Australia Model

CA: Canada Model

CAL: California Model

MY: Malaysia Model

US: United States Model

14-6 FRAME

Specifications

Special Tool - Jack: 57001-1238

Seat

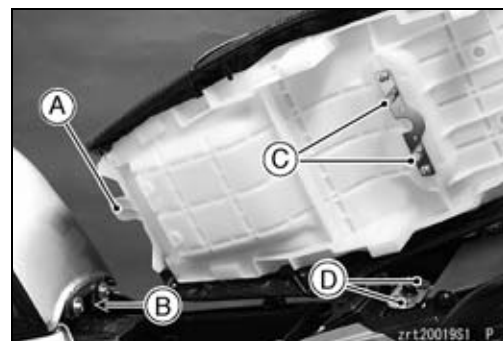
Seat Removal

- Insert the ignition switch key into the seat lock [A], turning the key counterclockwise, pulling up on the rear of the seat, and pulling the seat backward.



Seat Installation

- Slip the seat hook [A] under the brace [B] on the fuel tank bracket.
- Insert the seat pins [C] into the latch holes [D].
- Push down the rear part of the seat until the lock clicks.



Seat Lock Cable Lubrication and Inspection

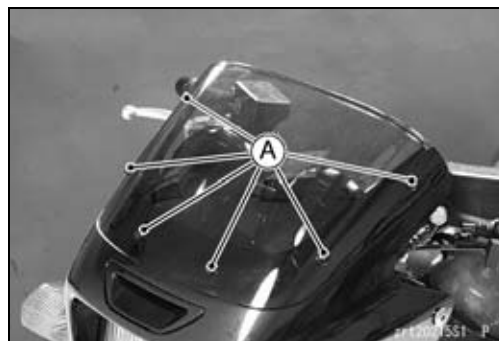
- Whenever the seat lock cable is removed, or in accordance with the Periodic Maintenance Chart, lubricate the cable (see General Lubrication in the Appendix chapter).
- Apply a thin coating of grease to the cable ends.
- Use the pressure cable luber to lubricate the cable.
- With the cable disconnected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

14-8 FRAME

Fairing (ZR1200A)

Wind Shield Removal

- Remove:
 - Screws [A]
 - Wind Shield [B]



Wind Shield Installation

- Tighten:
 - Torque - Wind Shield Screws: 0.4 N·m (0.04 kgf·m, 3.5 in·lb)

Fairing Removal

- Remove:
 - Bolts [A]
 - Bolts [B] (both sides)
 - Fairing [C]



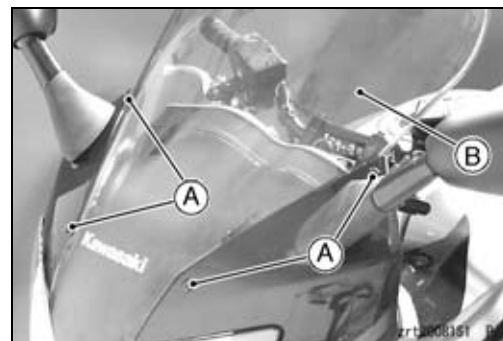
- For European models; Remove the city light [A] from the fairing.



Fairing (ZR1200B)

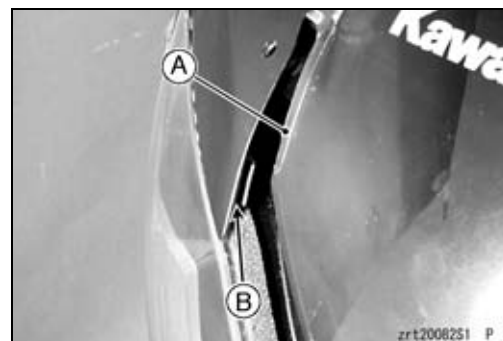
Wind Shield Removal

- Remove:
 - Screws [A]
- Pull the wind shield [B] up ward and remove the shield.



Wind Shield Installation

- Put the both side edges [A] of the shield in the grooves [B] of the fairing.
- Torque - Wind Shield Screws: 0.4 N·m (0.04 kgf·m, 3.5 in·lb)**

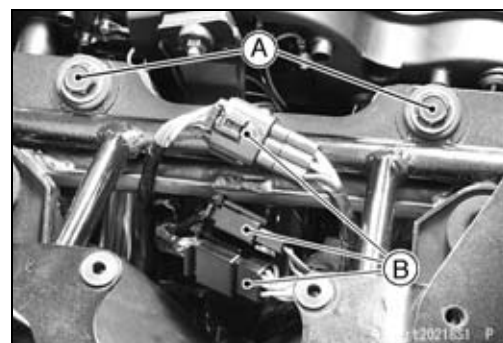
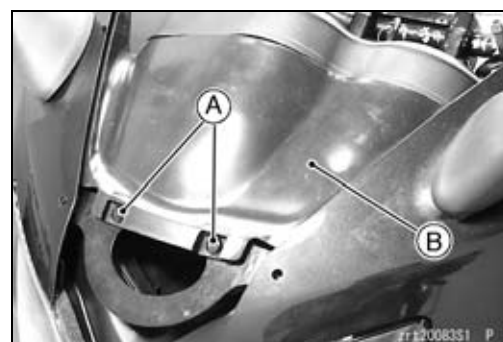


Fairing Removal

CAUTION

Be careful not to scratch the painted surface during removal or installation.

- Remove:
 - Wind Shield
 - Screws [A]
 - Upper Inner Cover [B]
- Remove:
 - Bolts [A] (both sides)
 - Connector [B]
- Pull the fairing assembly forward.



Fairing Installation

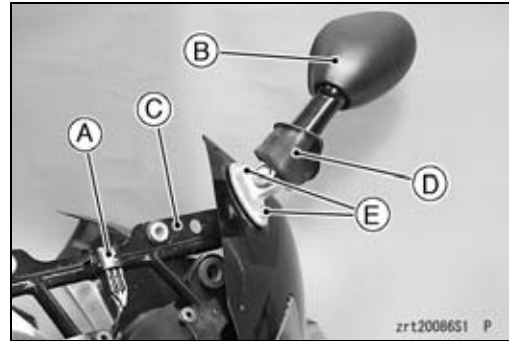
- Fairing installation is the reverse of removal.

14-10 FRAME

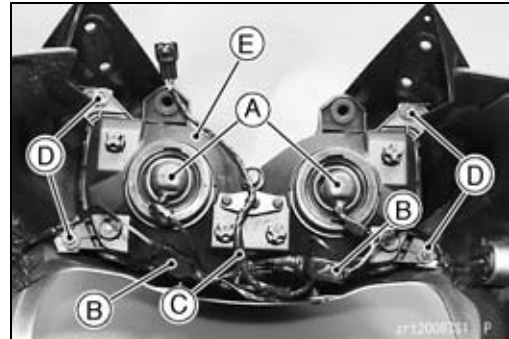
Fairing (ZR1200B)

Fairing Disassembly

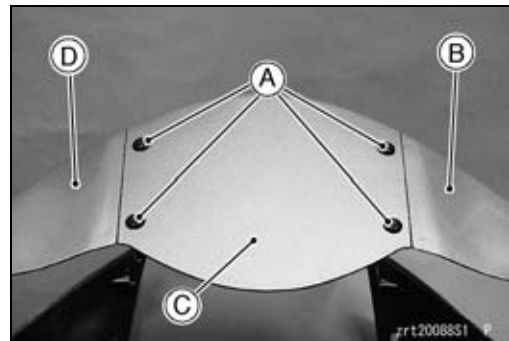
- Remove the connector [A].
- Remove the rear view mirrors [B] and bracket [C].
- Slide the rubber covers [D] and unscrew the bolts [E].



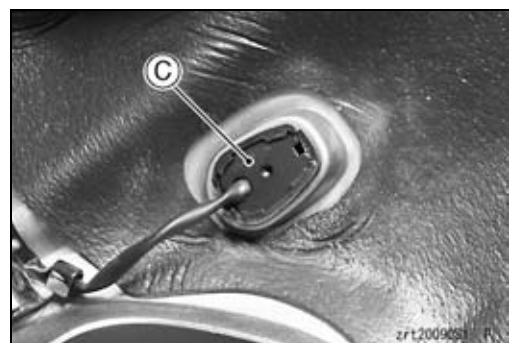
- Disconnect:
 - Headlight Connectors [A]
 - City Light (European Model, see Electrical System chapter)
 - Turn Signal Light Connectors [B]
- Remove:
 - Headlight/Turn Signal Light harness [C]
 - Bolts [D]
 - Headlight Unit [E]



- Remove:
 - Screws [A]
- Separate the right fairing [B], joint covers [C] and left fairing [D].



- Remove:
 - Screw [A]
- Remove the turn signal outer holder [B] and pull out the inner holder [C].
- Remove the turn signal.



Fairing Installation

- Fairing assembly is the reverse of disassembly.

Fairing (ZR1200B)

Fairing Lower Inner Cover Removal

- Remove:
 - Meter Unit (see Electrical System chapter)
 - Fairing Bracket (see Fairing Bracket Removal)
 - Screws [A]
 - Lower Inner Cover [B]



14-12 FRAME

Side Covers

Side Cover Removal

- Remove the seat.
- Remove the screw [A], and pull the front parts of the side cover outward to clear the stoppers [B].



Side Cover Installation

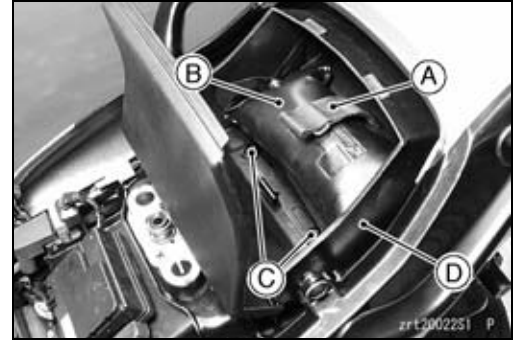
- Tighten the left side cover screw together with the hose clamp [A].



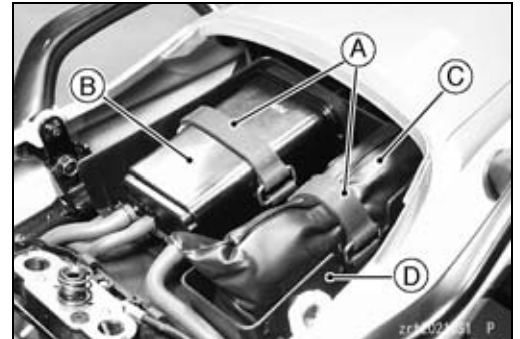
Seat Cover

Seat Cover Removal

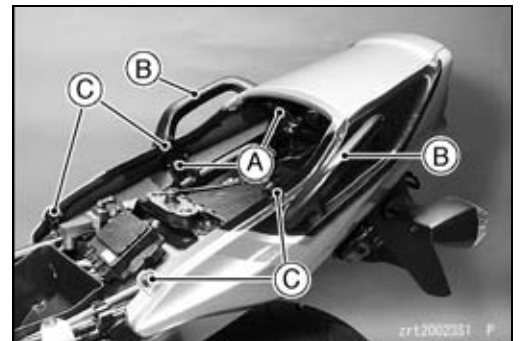
- Remove:
 - Seat (see Seat Removal)
 - Band [A]
 - Tool Kit Case [B]
 - Screws [C] and Tool Kit Compartment [D]



- For California model, remove the bands [A], canister [B], tool kit case [C], screws, and compartment [D].



- Remove:
 - Bolts [A] and Grab Rails [B]
 - Screws [C]



- Pull the seat cover [A] backward.

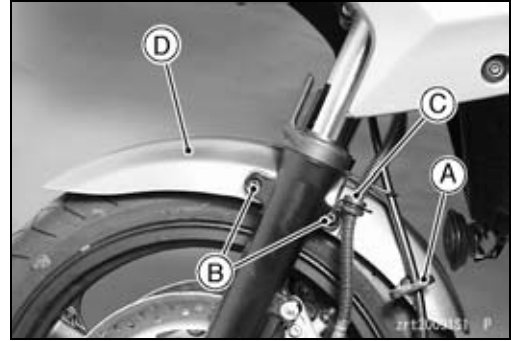


14-14 FRAME

Fenders

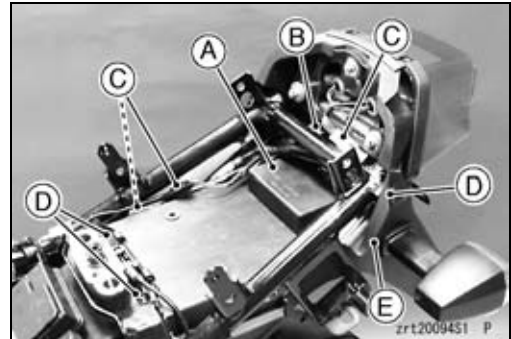
Front Fender Removal

- Remove:
 - Speedometer Cable Clamp [A]
 - Bolts [B] (both sides)
 - Brake Hose Clamps [C] (both sides)
 - Front Fender [D]



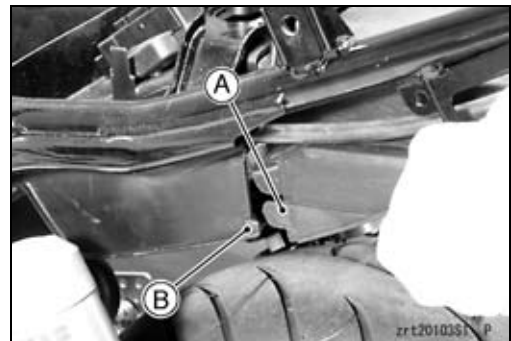
Rear Fender Rear Removal

- Remove:
 - Seat (see Seat Removal)
 - Seat Cover (see Seat Cover Removal)
 - IC Igniter [A]
 - Turn Signal Relay [B]
 - Connectors [C]
 - Screws [D]
 - Rear Fender Rear [E]



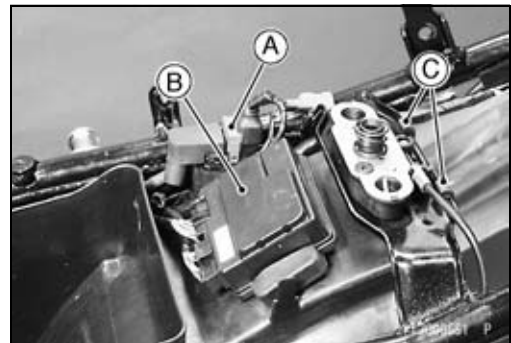
Rear Fender Rear Installation

- Engage the engaging part [A] of the rear fender contact portion and its counter [B]



Rear Fender Front Removal

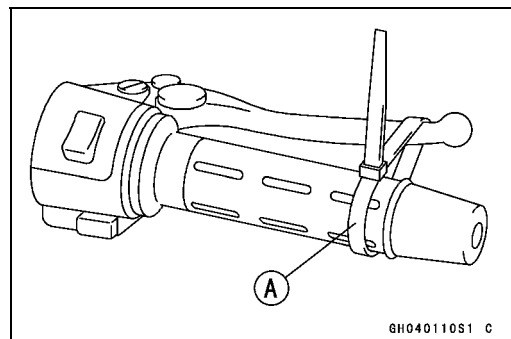
- Remove:
 - Starter Relay with Main Fuse [A]
 - Junction Box [B]
 - Battery (see Electrical System chapter)
 - Hooks [C]
- Pull the battery negative lead and positive lead from the rear fender rear.



- Squeeze the brake lever slowly and hold it with a band [A].

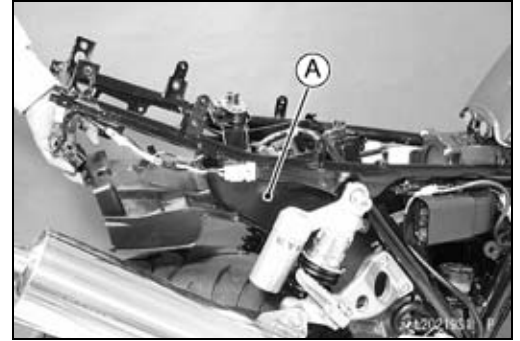
WARNING

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



Fenders

- Raise the rear wheel off the ground.
Special Tool - Jack: 57001-1238
- Remove the rear shock absorber lower mounting bolts on both sides.
- Raise the frame using the jack until the rear fender front [A] removes out of the frame as shown.

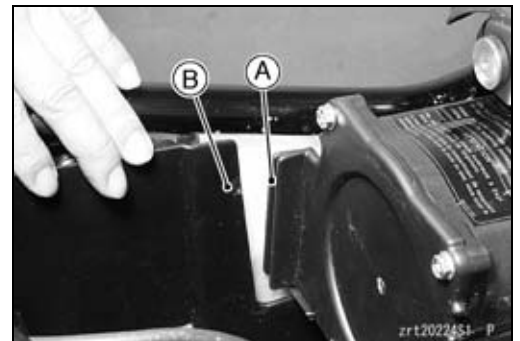


Rear Fender Front Installation

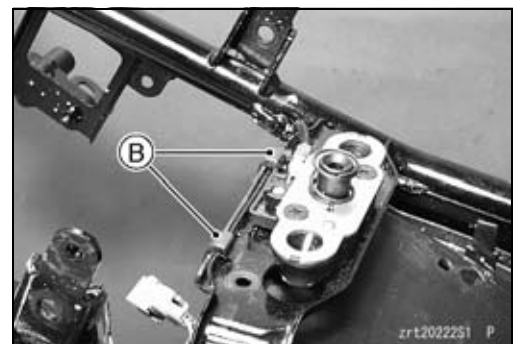
- Be sure to fit the following hooks and fitting.
 Front Left Side Hook [A]



Grooves [A]
 Edges [B]



Rear Hooks [B]



14-16 FRAME

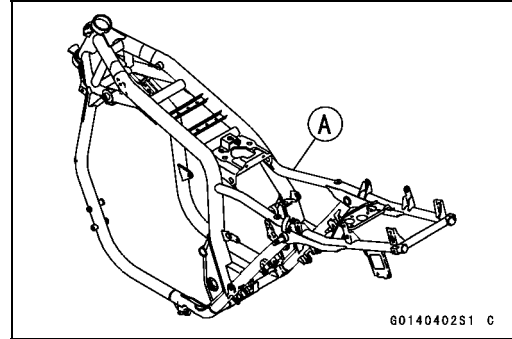
Frame

Frame Inspection

- Visually inspect the frame [A] for cracks, dents, bending, or warp.
★ If there is any damage to the frame, replace it.

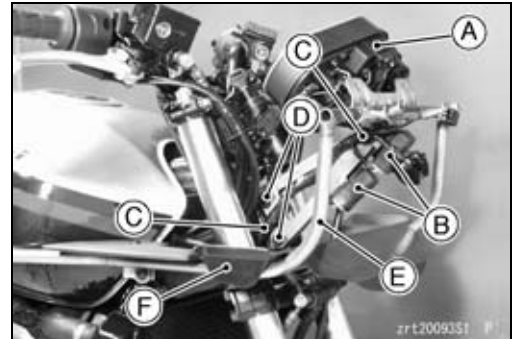
⚠ WARNING

A repaired frame may fail in use, possibly causing an accident. If the frame is bent, dented, cracked, or warped, replace it.



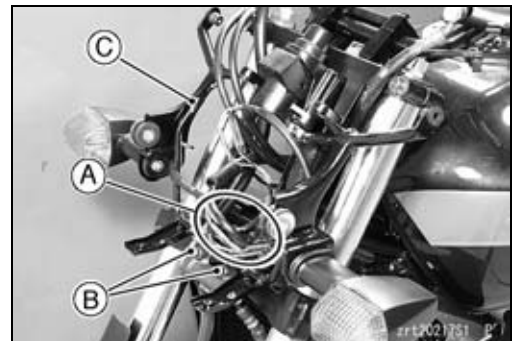
Fairing Bracket Removal (ZR1200B)

- Remove:
 - Fairing (see Fairing Removal)
 - Meter Unit [A] (see Electrical System chapter)
 - Headlight Relays [B]
 - Main Harness Clamps [C]
 - Bolts [D]
 - Fairing Bracket [E] with Fairing Lower Inner Cover [F]



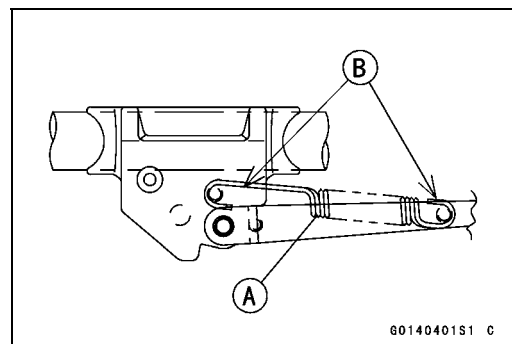
Fairing Bracket Removal (ZR1200A/C)

- Remove:
 - Fairing (ZR1200A, see Fairing Removal)
 - Meter Unit (see Electrical System chapter)
 - Headlight (see Electrical System chapter)
 - Headlight Body (ZR1200C)
 - Turn Signal Light Connector [A]
 - Bolts [B]
 - Fairing Bracket [C] (Headlight Bracket as for ZR1200C)



Sidestand Installation

- Tighten:
 - Torque - Sidestand Bolt: 44 N·m (4.5 kgf·m, 32 ft·lb)**
- Install the sidestand spring [A], noting the direction of the hooks [B].



Electrical System

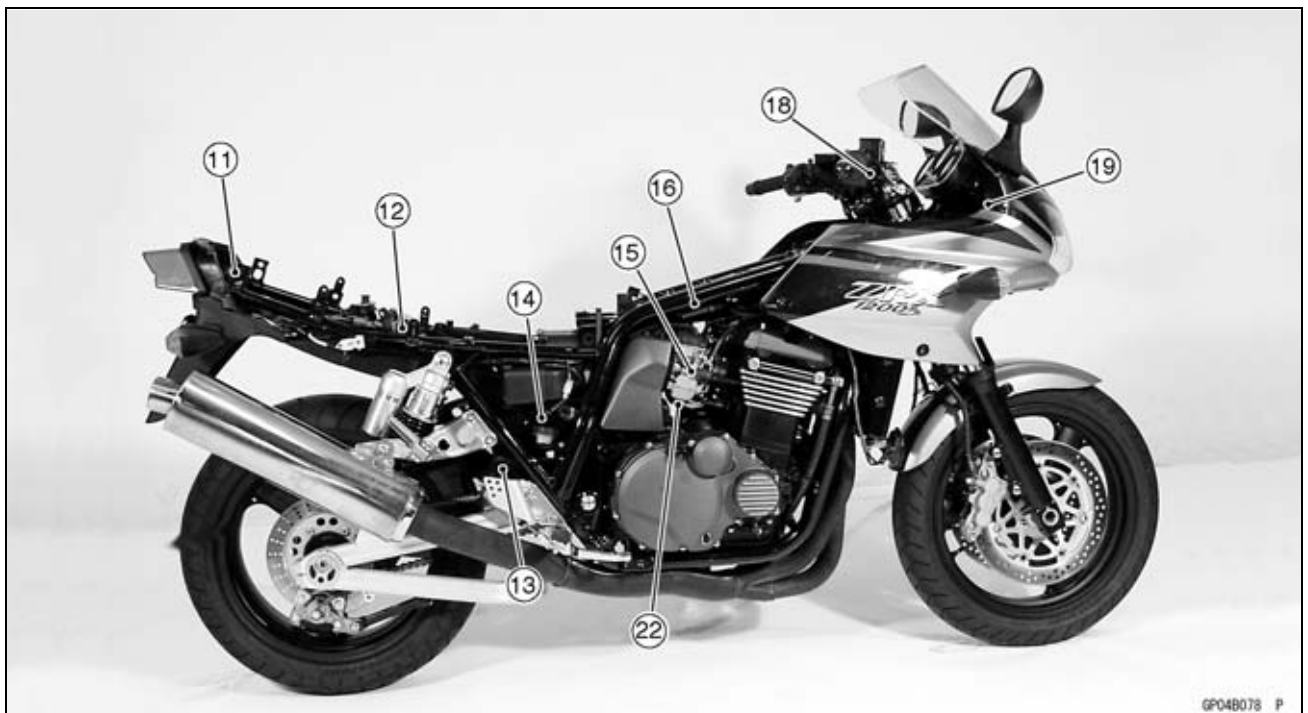
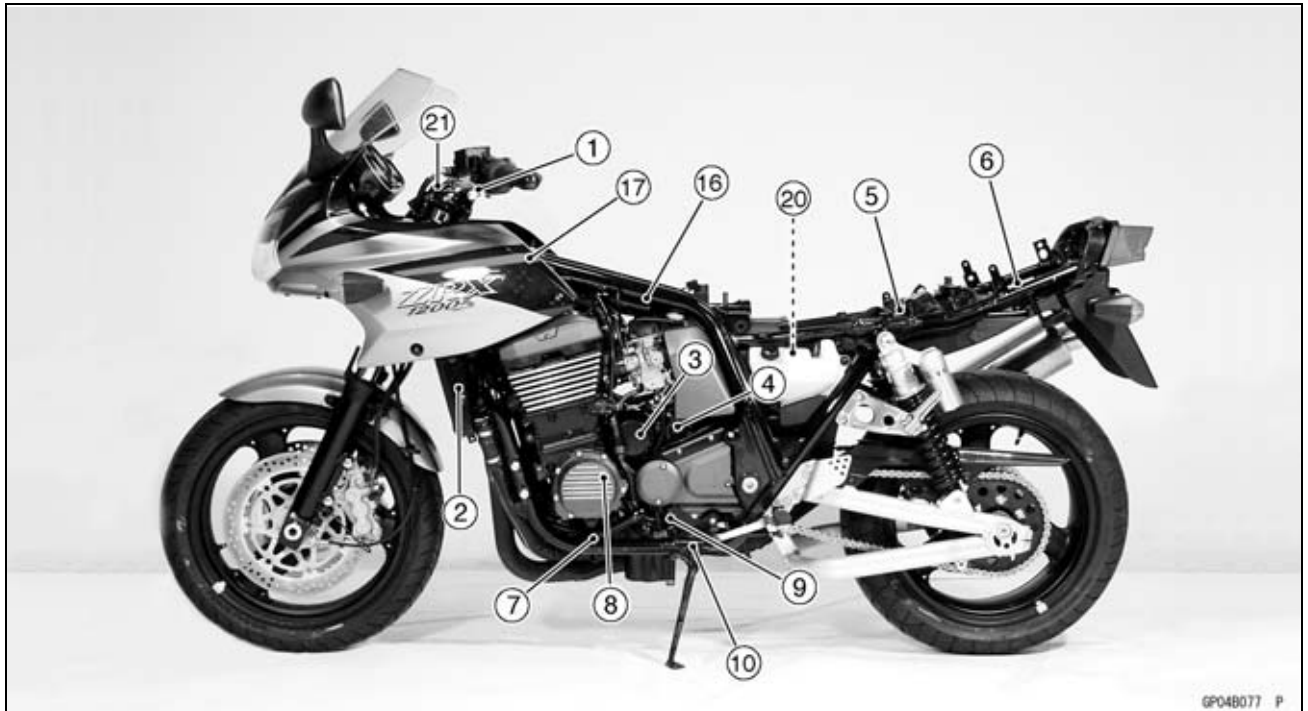
Table of Contents

Parts Location.....	15-3	Spark Plug Cleaning and Inspection.....	15-38
Exploded View.....	15-4	Spark Plug Gap Inspection	15-38
Specifications	15-10	IC Igniter Inspection	15-38
Precautions.....	15-12	Electrical Starter System	15-43
Electrical Wiring	15-14	Starter Motor Removal	15-43
Wiring Inspection	15-14	Starter Motor Installation	15-43
Battery	15-15	Starter Motor Disassembly	15-44
Battery Removal	15-15	Starter Motor Assembly	15-44
Battery Removal (Malaysia model, ZR1200-A4 ~, A6F ~)	15-15	Brush Inspection	15-45
Battery Installation	15-16	Commutator Cleaning and Inspection	15-45
Electrolyte Filling	15-16	Armature Inspection	15-46
Initial Charge	15-17	Brush Lead Inspection	15-46
Precautions.....	15-18	Brush Plate and Terminal Bolt Inspection	15-46
Interchange.....	15-18	Starter Relay Inspection	15-46
Charging Condition Inspection....	15-19	Lighting System.....	15-48
Refreshing Charge	15-19	Headlight Beam Horizontal Adjustment.....	15-48
Charging System.....	15-21	Headlight Beam Vertical Adjustment.....	15-49
Alternator Removal	15-21	Headlight Bulb Replacement	15-50
Alternator Installation	15-21	City Light Bulb Replacement (European Model)	15-51
Alternator Disassembly	15-21	Headlight Removal/Installation	15-52
Alternator Assembly	15-24	Headlight Relay Inspection	15-53
Operational Inspection	15-26	Headlight Relay Unit Inspection (ZR1200B).....	15-54
Stator Coil Inspection	15-27	Tail/Brake Light Bulb Replacement	15-60
Rotor Coil Inspection.....	15-28	Turn Signal Light Bulb Replacement.....	15-61
Slip Ring Cleaning	15-28	Turn Signal Relay Inspection	15-62
Slip Ring Diameter Inspection.....	15-28	Radiator Fan System	15-64
Carbon Brush Length Inspection .	15-28	Fan System Circuit Inspection	15-64
Rectifier Inspection	15-29	Fan Motor Inspection	15-64
Regulator Inspection	15-29	Meters, Gauges, Indicator Unit.....	15-65
Alternator Ball Bearing Inspection	15-30	Meter Unit Removal	15-65
Ignition System.....	15-32	Meter, Gauge Disassembly.....	15-66
Ignition System Troubleshooting..	15-32	Meter Unit Assembly.....	15-69
Crankshaft Sensor Removal	15-33	Meter Bulb Replacement	15-71
Crankshaft Sensor Installation	15-34	Tachometer Inspection.....	15-71
Crankshaft Sensor Inspection	15-34	Fuel Level Sensor Inspection.....	15-72
Crankshaft Sensor Peak Voltage Inspection.....	15-35	Water Temperature Gauge Inspection (ZR1200B)	15-74
Ignition Coil Removal	15-35		
Ignition Coil Installation.....	15-35		
Ignition Coil Inspection.....	15-36		
Ignition Coil Primary Peak Voltage	15-36		
Spark Plug Removal	15-37		
Spark Plug Installation	15-38		

15-2 ELECTRICAL SYSTEM

Switch and Sensors.....	15-76	Immobilizer System Inspection	15-106
Brake Light Timing Inspection.....	15-76	Antenna Resistance Inspection ...	15-106
Brake Light Timing Adjustment	15-76	Amplifier Input Voltage Inspection	15-107
Switch Inspection.....	15-76	User Key Inspection.....	15-107
Radiator Fan Switch Inspection ...	15-77	Wiring Diagram (ZR1200-A1 ~ A3	
Water Temperature Switch		Australia).....	15-108
Inspection (ZR1200A/C).....	15-77	Wiring Diagram (ZR1200-A1 ~ A2/C1	
Water Temperature Sensor		Europe).....	15-110
Inspection (ZR1200B).....	15-78	Wiring Diagram (ZR1200-A3 WVTA	
Fuel Level Sensor Inspection.....	15-78	(FULL P)/GB WVTA (FULL	
Throttle Position Sensor		P)/WVTA (78.2 P)/C2).....	15-112
Removal/Installation.....	15-79	Wiring Diagram (ZR1200-A1~A3	
Throttle Position Sensor		Malaysia).....	15-114
Inspection.....	15-79	Wiring Diagram (ZR1200-A United	
Throttle Position Sensor Position		States and Canada).....	15-116
Adjustment.....	15-80	Wiring Diagram (ZR1200-B1~B3	
Diode (Rectifier) Inspection.....	15-80	Australia).....	15-118
Junction Box.....	15-81	Wiring Diagram (ZR1200-B1~B2	
Junction Box Fuse Circuit		Europe).....	15-120
Inspection.....	15-81	Wiring Diagram (ZR1200-B3 WVTA	
Starter Circuit/Headlight Relay		(FULL P)/GB WVTA (FULL	
Inspection.....	15-81	P)/WVTA (78.2 P)).....	15-122
Diode Circuit Inspection.....	15-82	Wiring Diagram (ZR1200-B1~B3	
Fuse.....	15-84	Malaysia).....	15-124
30 A Main Fuse Removal.....	15-84	Wiring Diagram (ZR1200-A4 ~	
20 A Headlight Fuse Removal		California/ZR1200-A4 ~, A6F ~	
(ZR1200B).....	15-84	Formosa).....	15-126
Junction Box Fuse Removal.....	15-84	Wiring Diagram (ZR1200-A4 ~, A6F,	
Fuse Installation.....	15-84	WVTA (FULL H)/GB WVTA (FULL	
Fuse Inspection.....	15-84	H)/WVTA (78.2 H)).....	15-128
Fuel Cut Valve.....	15-85	Wiring Diagram (ZR1200-A4 ~, A6F	
Fuel Cut Valve Removal.....	15-85	~ Australia).....	15-130
Fuel Cut Valve Installation.....	15-85	Wiring Diagram (ZR1200-A4 ~, A6F	
Fuel Cut Valve Inspection.....	15-86	~ Malaysia).....	15-132
Immobilizer System (Equipped		Wiring Diagram (ZR1200-B4 WVTA	
Models).....	15-88	(FULL H)/GB WVTA (FULL	
Operational Cautions.....	15-88	H)/WVTA (78.2 H)).....	15-134
Key Registration.....	15-88	Wiring Diagram (ZR1200-C3 WVTA	
Immobilizer System Parts		(FULL H)/WVTA (78.2 H)).....	15-136
Replacement.....	15-104		

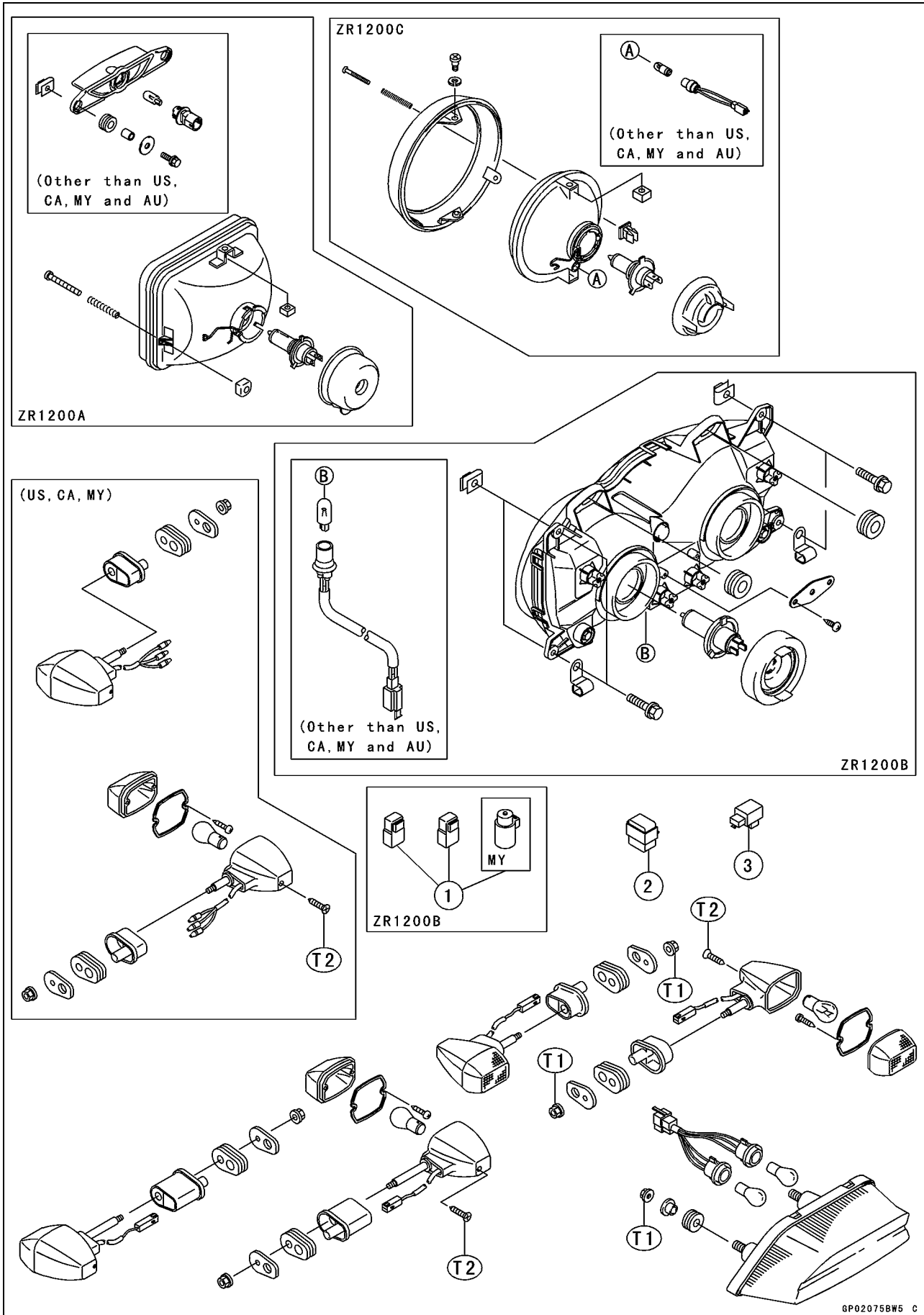
Parts Location



- | | |
|--|--|
| 1. Starter Lockout Switch | 14. Battery |
| 2. Radiator Fan Switch | 15. Throttle Sensor |
| 3. Alternator, Regulator and Rectifier | 16. Ignition Coils |
| 4. Starter Motor | 17. Water Temperature Switch |
| 5. Junction Box | 18. Front Brake Light Switch |
| 6. IC Igniter | 19. Headlight Relays (B Type) |
| 7. Oil Pressure Switch | 20. Immobilizer Amplifier
(ZR1200-A4 ~, A6F ~ Malaysia) |
| 8. Crankshaft Sensor | 21. Immobilizer Antenna
(ZR1200-A4 ~, A6F ~ Malaysia) |
| 9. Neutral Switch | 22. Fuel Cut Valve (ZR1200-A4 ~ California,
(Europe) A4 ~, A6F ~) |
| 10. Sidestand Switch | |
| 11. Turn Signal Relay | |
| 12. Starter Relay and Main Fuse | |
| 13. Rear Brake Light Switch | |

15-4 ELECTRICAL SYSTEM

Exploded View



Exploded View

1. Headlight Relays (ZR1200B)
 2. Headlight Relay (Other than ZR1200–A1 ~ A2/C1 Europe, Malaysia, B1 ~ B2 Europe)
 3. Turn Signal Light Relay
- T1: 5.9 N·m (0.60 kgf·m, 52 in·lb)
T2: 1.0 N·m (0.10 kgf·m, 9 in·lb)

AU: Australia Model

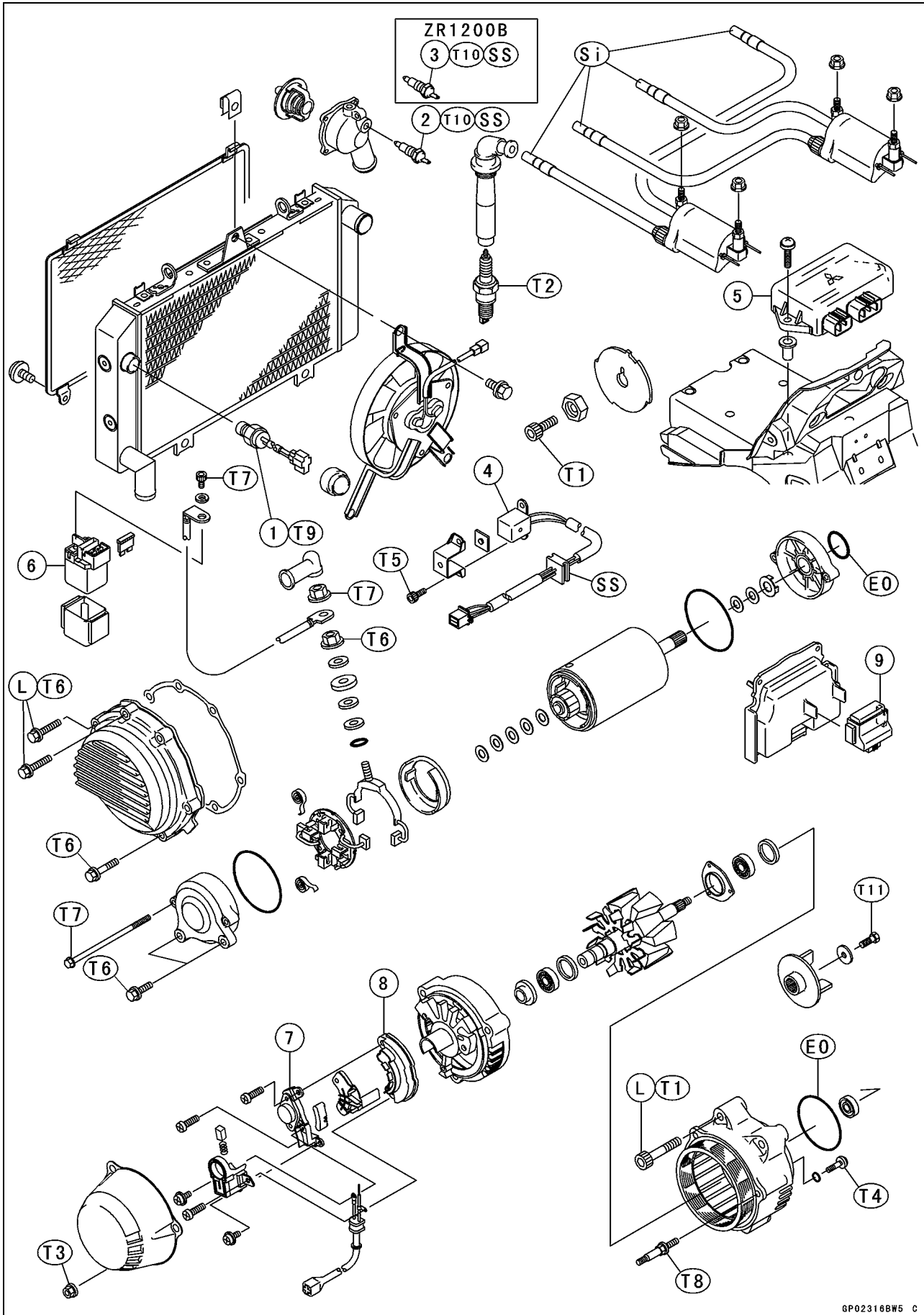
CA: Canada Model

MY: Malaysia Model

US: United States Model

15-6 ELECTRICAL SYSTEM

Exploded View

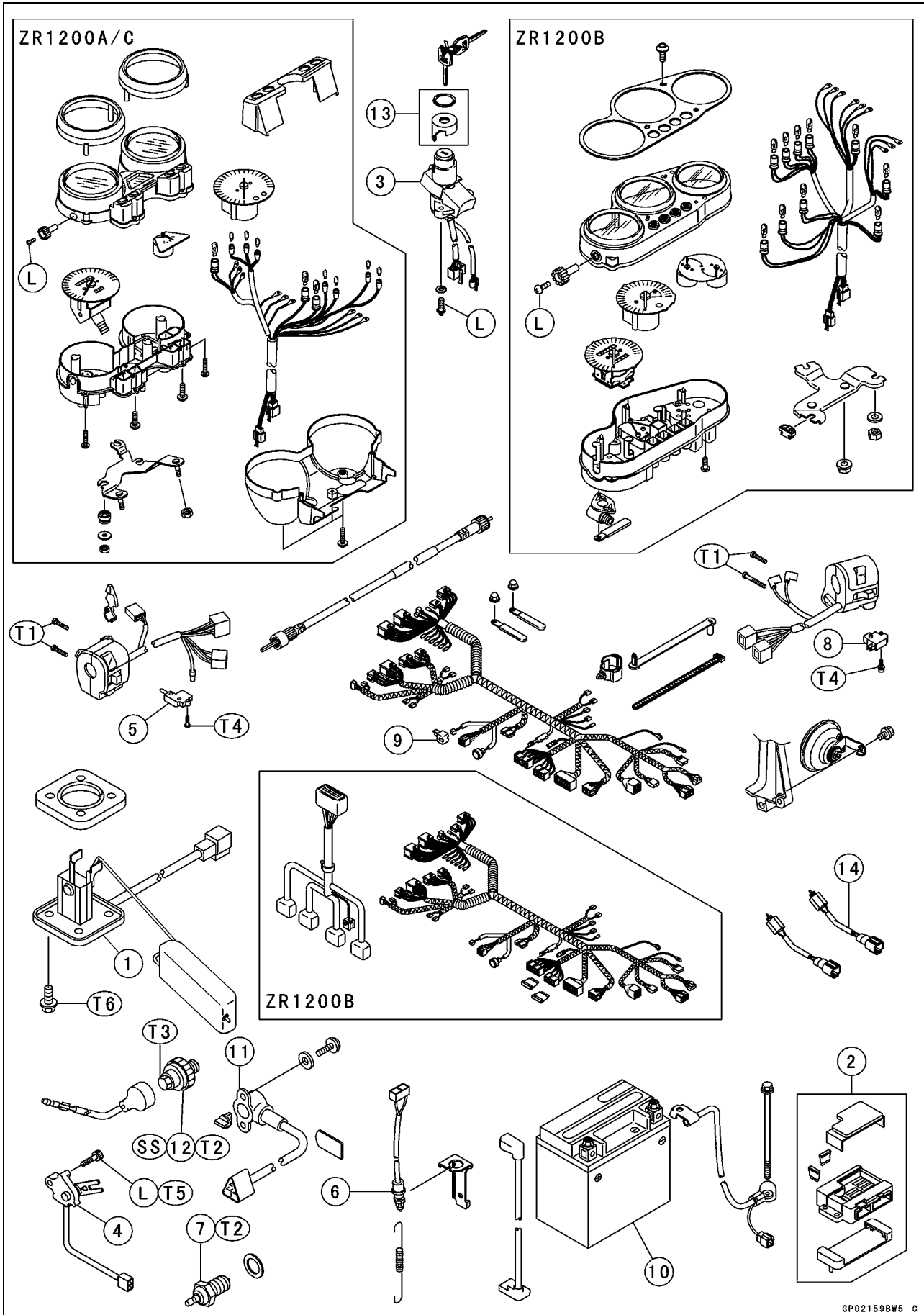


Exploded View

1. Radiator Fan Switch
 2. Water Temperature Switch
 3. Water Temperature Sensor
 4. Crankshaft Sensor
 5. IC Igniter
 6. Starter Relay
 7. Regulator
 8. Rectifier
 9. Immobilizer Amplifier (ZR1200-A4 ~) (MY)
- T1: 25 N·m (2.5 kgf·m, 18 ft·lb)
T2: 14 N·m (1.4 kgf·m, 10 ft·lb)
T3: 4.5 N·m (0.46 kgf·m, 40 in·lb)
T4: 2.6 N·m (0.27 kgf·m, 23 in·lb)
T5: 5.9 N·m (0.60 kgf·m, 52 in·lb)
T6: 11 N·m (1.1 kgf·m, 95 in·lb)
T7: 4.9 N·m (0.50 kgf·m, 43 in·lb)
T8: 8.8 N·m (0.90 kgf·m, 78 in·lb)
T9: 24 N·m (2.4 kgf·m, 17 ft·lb)
T10: 7.8 N·m (0.80 kgf·m, 69 in·lb)
T11: 12 N·m (1.2 kgf·m, 106 in·lb)
- EO: Apply engine oil.
L: Apply a non-permanent locking agent.
Si: Apply silicone grease.
SS: Apply Silicone sealant (Kawasaki Bond: 56019-120)

15-8 ELECTRICAL SYSTEM

Exploded View



Exploded View

1. Fuel Level Sensor
 2. Junction Box
 3. Ignition Switch
 4. Sidestand Switch
 5. Starter Lockout Switch
 6. Rear Brake Light Switch
 7. Neutral Switch
 8. Front Brake Light Switch
 9. Diode
 10. Battery 12 V 14 Ah (ZR1200-A1 ~ A3/B1 ~ B3/C1), 12 V 12 Ah (ZR1200-A4 ~, A6F ~/B4/C3)
 11. Throttle Position Sensor
 12. Oil Pressure Switch
 13. Immobilizer Antenna (ZR1200-A4 ~, A6F ~) (MY)
 14. Fuel Cut Valve (ZR1200-A4 ~, A6F/B4/C3) (CAL), WVTA (FULL H)/GB WVTA (FULL H)/WVTA (78.2 H)/A4 ~, A6F ~ (Formosa)
- T1: 3.4 N·m (0.35 kgf·m, 30 in·lb)
T2: 15 N·m (1.5 kgf·m, 11 t·lb)
T3: 1.5 N·m (0.15 kgf·m, 13 in·lb)
T4: 1.2 N·m (0.12 kgf·m, 10 in·lb)
T5: 8.8 N·m (0.90 kgf·m, 78 in·lb)
T6: 6.9 N·m (0.70 kgf·m, 61 in·lb)
- L: Apply a non-permanent locking agent.
SS: Apply silicone sealant (Kawasaki Bond: 56019-120).

15-10 ELECTRICAL SYSTEM

Specifications

Item	Standard	Service Limit
Battery		
Type	Sealed Battery	---
Capacity	12 V 14 Ah (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)	---
	12 V 12 Ah (ZR1200-A4 ~, A6F ~/B4/C3)	---
Voltage	12.6 V or more	---
Alternator (Charging System)		
Type	Three-phase AC (built-in regulator/rectifier)	---
Charging Voltage	14.2 ~ 14.8 V @4 000 r/min (rpm)	---
Stator Coil Resistance	1.0 Ω or less	---
Rotor coil resistance	2.3 ~ 3.5 Ω	---
Slip Ring Diameter	14.4 mm (0.57 in.)	14.0 mm (0.55 in.)
Carbon Brush Length	10.5 mm (0.41 in.)	4.5 mm (0.18 in.)
Ignition System		
Crankshaft Sensor Resistance	380 ~ 570 Ω	---
Ignition Coil:		
3 Needle Arcing Distance	6 mm (0.24 in.) or more	---
Primary Winding Resistance	2.3 ~ 3.5 Ω	---
Secondary Winding Resistance	12 ~ 18 k Ω	---
Type	NGK CR9EK or ND U27ETR	---
Gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)	---
IC Igniter Inspection	in the text	---
Electric Starter System		
Starter Motor:		
Brush Length	12 ~ 12.5 mm (0.47 ~ 0.49 in.)	7 mm (0.28 in.)
Commutator Diameter	28 mm (1.1 in.)	27 mm (1.06 in.)
Switch and Sensor		
Rear Brake Light Switch Timing	ON after about 10 mm (0.39 in.) pedal travel	---
Engine Oil Pressure Switch Connections	When engine is stopped: ON When engine is running: OFF	---
Fan Switch:		
Rising Temperature	From OFF to ON @95 ~ 101°C (203 ~ 214°F)	---
Falling Temperature	From ON to OFF @90 ~ 96°C (194 ~ 205°F)	---
Resistance	ON: Less than 0.5 Ω OFF: More than 1 M Ω	---
Water Temperature Sensor Internal Resistance	in the text (ZR1200B)	---
Water Temperature Switch:	in the text (ZR1200A/C)	
Rising Temperature	From OFF to ON @112 ~ 118°C (236 ~ 238°F)	---
Falling Temperature	From ON to OFF @above 108	---
Resistance	ON: Less than 0.5 Ω OFF: More than 1 M Ω	---

Specifications

Item	Standard	Service Limit
Fuel Level Sensor Resistance:		
Full Position	4 ~ 10 Ω	---
Empty Position	90 ~ 100 Ω	---
Throttle Sensor Output Voltage	When engine is idling: 0.9 ~ 1.1 V	---
	When grip is fully opened: 4.06 ~ 4.26 V	---

Special Tools - Bearing Driver Set: 57001-1129**Spark Plug Wrench, Hex 16: 57001-1262****Carburetor Drain Plug Wench, Hex 3: 57001-1269****Igniter Checker Assembly: 57001-1378****Hand Tester: 57001-1394****Harness Adapter #13: 57001-1399****Throttle Sensor Setting Adapter: 57001-1400****Peak Voltage Adapter: 57001-1415****Alternator Frame Puller: 57001-1494****Needle Adapter Set: 57001-1457****Key Registration Unit: 57001-1582****Sealant - Kawasaki Bond (Silicone Sealant): 56019-120**

15-12 ELECTRICAL SYSTEM

Precautions

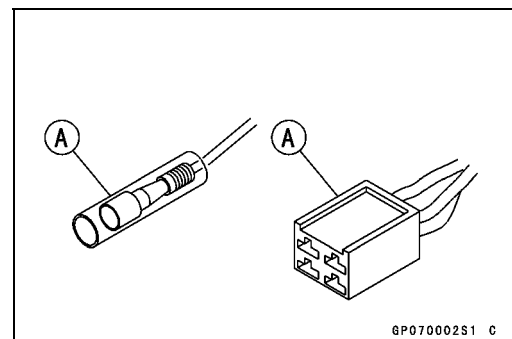
There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

- 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 too must be repaired or replaced, or the new replacement will soon fail again.
- Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.
- Measure coil and winding resistance when the part is cold (at room temperature).

○ Color Codes:

BK: Black	G: Green	P: Pink
BL: Blue	GY: Gray	PU: Purple
BR: Brown	LB: Light blue	R: Red
CH: Chocolate	LG: Light green	W: White
DG: Dark green	O: Orange	Y: Yellow

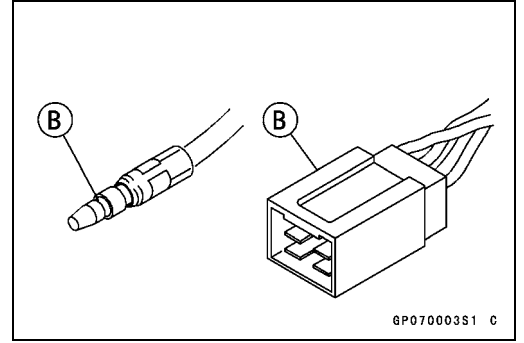
○ Electrical Connectors
Connectors [A]



GP070002S1 C

Precautions

Connectors [B]



15-14 ELECTRICAL SYSTEM

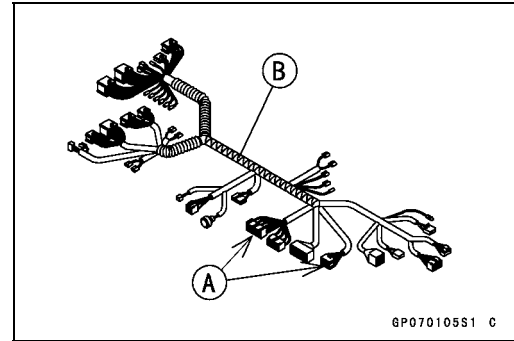
Electrical Wiring

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

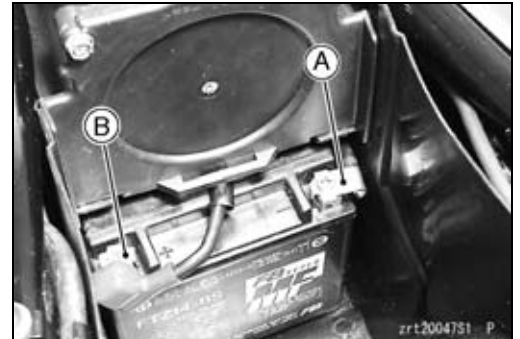
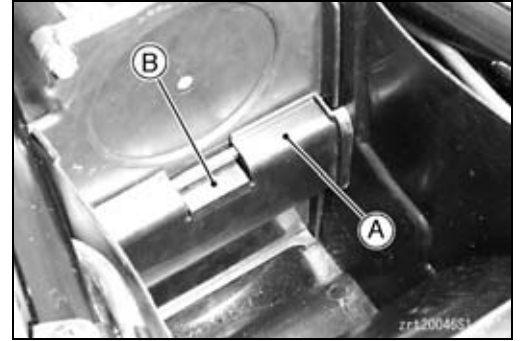
- Set the tester to the $\times 1 \Omega$ range, and read the tester.
- ★ If the tester does not read 0Ω , the lead is defective. Replace the lead or the wiring harness [B] if necessary.



Battery

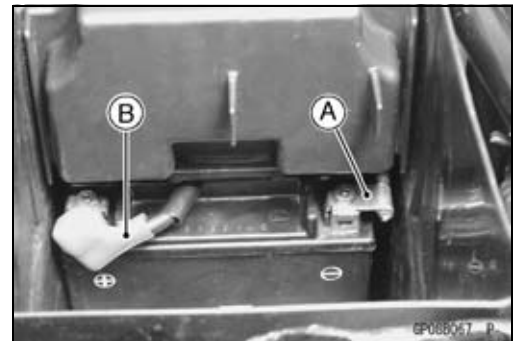
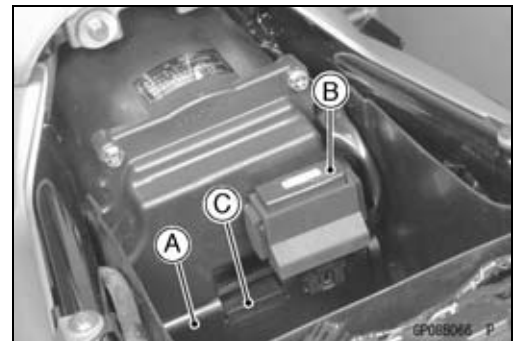
Battery Removal

- Remove:
 - Seat (see Frame Chapter)
 - Battery Holder [A]
 - While pushing on the tab [B] at the upper end of the battery holder, pull the holder rearward to unlatch it, then pull it up.
-
- Pull out the battery halfway.
 - Disconnect the negative (-) cable [A] and then positive (+) cable [B].



Battery Removal (Malaysia model, ZR1200-A4 ~, A6F ~)

- Remove:
 - Seat (see Frame chapter)
 - Battery Holder [A]
 - Immobilizer Amplifier [B]
 - While pushing on the tab [C] at the upper end of the battery holder, pull the holder rearward to unlatch it, and then pull it up.
-
- Pull out the battery halfway.
 - Disconnect the leads from the battery, first from the negative (-) cable [A] and then positive cable [B].



CAUTION

Be sure to disconnect the negative (-) cable first.
--

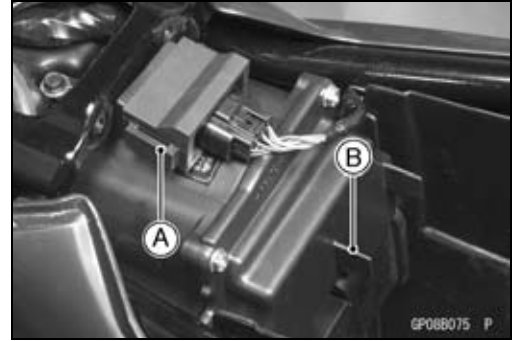
- Remove the battery.

15-16 ELECTRICAL SYSTEM

Battery

Battery Installation

- Apply a light coat of grease on the terminals to prevent corrosion.
- Cover the (+) terminal with the cap.
- Push the immobilizer amplifier [A] into the amplifier holder [B] surely (Malaysia model, ZR1200-A4 ~, A6F ~).



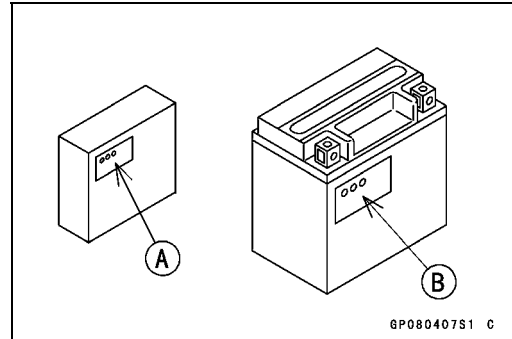
Electrolyte Filling

- Make sure that the model name [A] of the electrolyte container matches the model name [B] of the battery. These names must be the same.

Battery Model Name:

FTZ14-BS (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)

FTX14-BS (ZR1200-A4 ~, A6F ~/B4/C3)



CAUTION

Be sure to use the electrolyte container with the same model name as the battery since the electrolyte volume and specific gravity vary with the battery type. This is to prevent overfilling of the electrolyte, shorting the battery life, and deterioration of the battery performance.

- 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.

CAUTION

Do not remove the aluminum seal sheet [A] sealing the filler ports [B] until just before use.

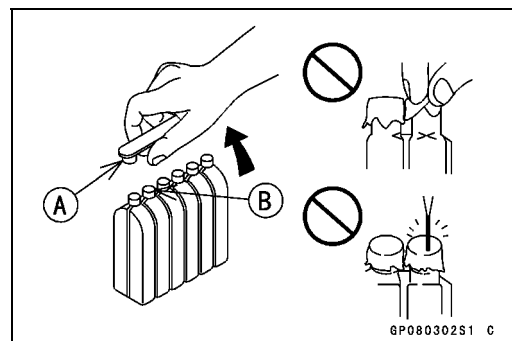
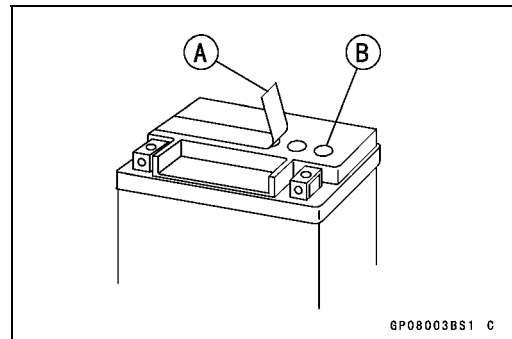
NOTE

○A battery whose seal sheet has any peeling, tears, holes, or from which the air-sucking sound was not heard 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.

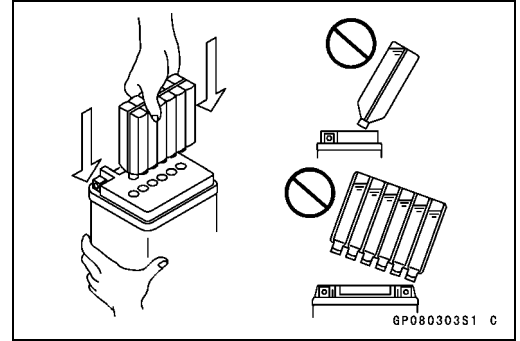


Battery

- Place the electrolyte container upside down aligning the six seals with the six battery filler ports.
- Push the container down strongly enough to break the seals. Now the electrolyte should start to flow into the battery.

NOTE

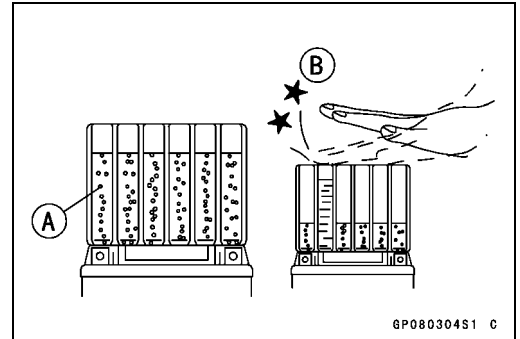
- Do not tilt the container as the electrolyte flow may be interrupted.



- Make sure air bubbles [A] are coming up from all six filler ports.
- Leave the container this way for 5 minutes or longer.

NOTE

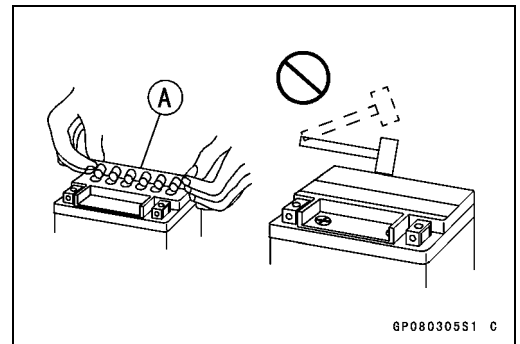
- If no air bubbles are coming up from a filler port, tap [B] the bottom of the bottle two or three times. Never remove the container from the battery.



CAUTION

Fill the electrolyte into the battery until the container is completely emptied.

- Be certain that all the electrolyte has flowed out.
- Tap the bottom the same way as above if there is any electrolyte left in the container.
- Now pull the container gently out of the battery.
- Let the battery sit for **20** minutes. During this time, the electrolyte permeates the special separators and the gas generated by chemical reaction is released.
- Fit the seal caps [A] tightly into the filler ports until the seal caps are at the same level as the top of the battery.



NOTE

- Do not hammer. Press down evenly with both hands.

CAUTION

Once you installed the seal caps after filling the battery, never remove it, nor add any water or electrolyte.

Initial Charge

While an 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 12.6 V after 10 minutes of filling (Note 1), no initial charge is necessary.

15-18 ELECTRICAL SYSTEM

Battery

Condition requiring initial charge	Charging method
At low temperatures (lower than 0°C)	1.4 A × 2 ~ 3 hours (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2) 1.2 A × 2 ~ 3 hours (ZR1200-A4 ~ /B4/C3)
Battery has been stored in high temperature and humidity. Seal has been removed, or broken - peeling, tear or hole. (If you did not hear the air-sucking sound "Shoosh" as you removed the seal.)	1.4 A × 15 ~ 20 hours (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)
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>99</u> <u>T1</u> Day Month Year Mfg. location	1.2 A × 15 ~ 20 hours (ZR1200-A4 ~ /B4/C3)

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 sealing plug to add water is very dangerous. Never do that.

2) Refreshing charge

If an engine will not start, a horn sounds weak, or lamps are dim, it indicates the battery has been discharged. Give refresh charge for 5 to 10 hours with charge current shown in the specification (see the Electrical System 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 caps 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

An Sealed battery can fully display its performance only when combined with a proper vehicle electrical system. Therefore, replace an Sealed battery only on a motorcycle which was originally equipped with an Sealed battery.

Battery

Be careful, if an 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 battery (see Battery Removal).

CAUTION

Be sure to disconnect the negative (-) lead first.

- Measure the battery terminal voltage.

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: 12.6 V or more

Terminal Voltage (V) [A]

Battery Charge Rate (%) [B]

Refresh charge is required [C]

Good [D]

Refreshing Charge

- Remove the battery [A] (see Battery Removal).
- Refresh-charge by following method according to the battery terminal voltage.

⚠ WARNING

This battery is sealed type. Never remove seal sheet [B] even at charging. Never add water. Charge with current and time as stated below.

Terminal Voltage: 11.5 ~ less than 12.6 V

Standard Charge

1.4 A × 5 ~ 10 h (see diagram) (ZR1200-A1 ~ /B1 ~ B4/C1 ~ C3)

Quick Charge

7.0 A × 1.0 h

6.0 A × 1.0 h (ZR1200-A4 ~, A6F/B4/C3)

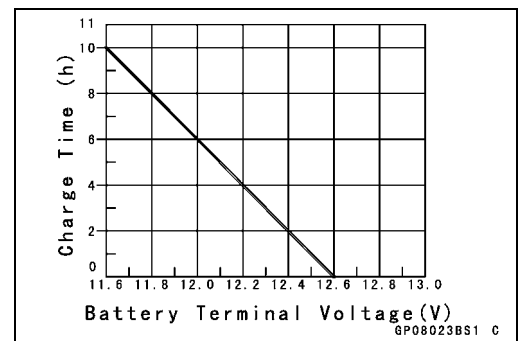
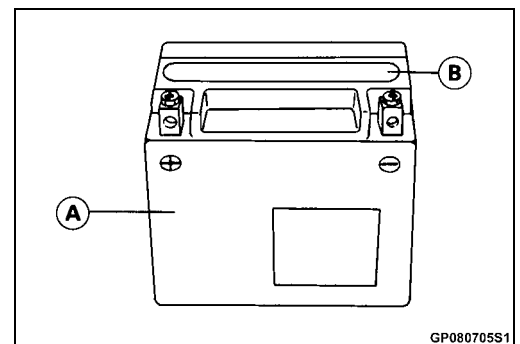
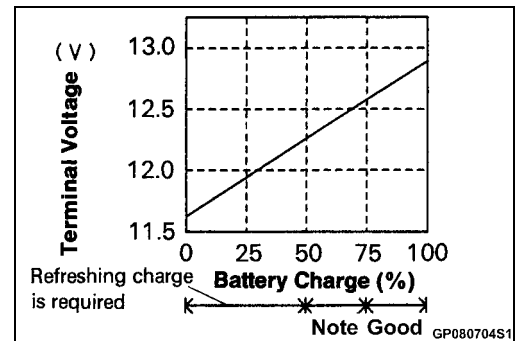
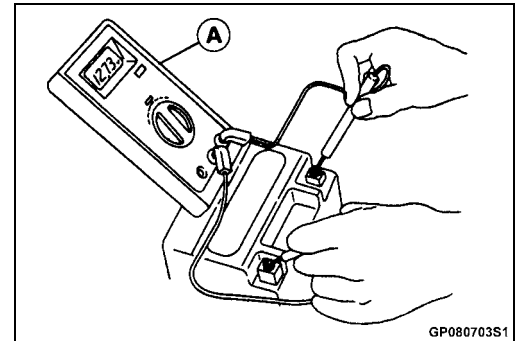
CAUTION

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 (ZR1200-A1 ~ A3/B1 ~ B3/C1 ~ C2)

1.2 A × 20 h (ZR1200-A4 ~, A6F/B4/C3)



15-20 ELECTRICAL SYSTEM

Battery

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 5 minutes at the increased voltage then check if the battery is drawing current [D]. 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.

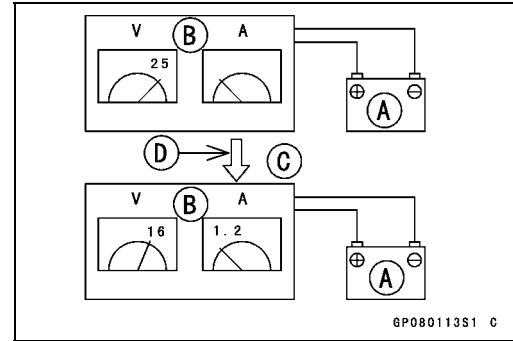
Battery [A]

Battery Charger [B]

Standard Value [C]

- 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
12.6 V or higher	Good
12.0 ~ 12.6 V or lower	Charge insufficient → Recharge.
12.0 V or lower	Unserviceable → Replace



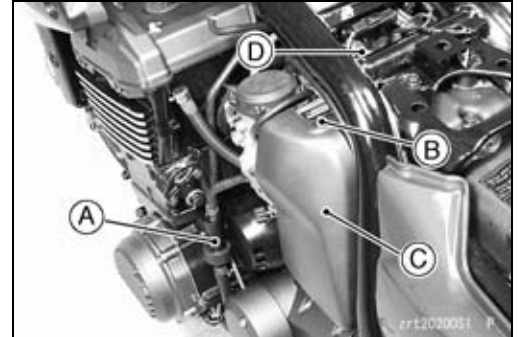
Charging System

NOTE

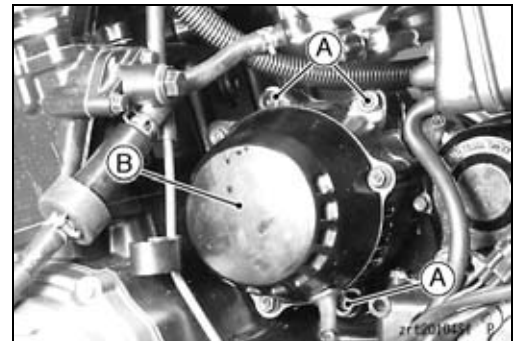
○Do not remove the alternator to remove the rectifier, regulator, and carbon brush assembly. They can be removed after removing the alternator cover.

Alternator Removal

- Remove:
 - Fuel Tank (see Fuel System chapter)
 - Coolant (drain, other than US and Canada)
 - Coolant Valve Hose [A] (other than US and Canada)
 - Engine Sprocket Cover (see Final Drive System chapter)
 - Bolts [B]
 - Air Cleaner Left Side Cover [C]
 - Alternator Lead Connector [D]



- Remove the alternator mounting bolts [A]
- Remove the alternator [B].



Alternator Installation

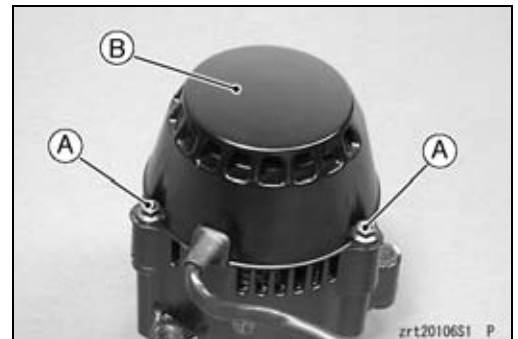
- Replace the O-ring [A] with the new one and apply a small amount of engine oil to the O-ring.
- Clean the alternator legs and crankcase where the alternator is grounded [B].
- Apply a non-permanent locking agent to the threads of the alternator mounting bolts.
- Tighten:

Torque - Alternator Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)



Alternator Disassembly

- Remove the alternator (see this chapter).
- Remove:
 - Alternator Nuts [A] and Cover [B]



15-22 ELECTRICAL SYSTEM

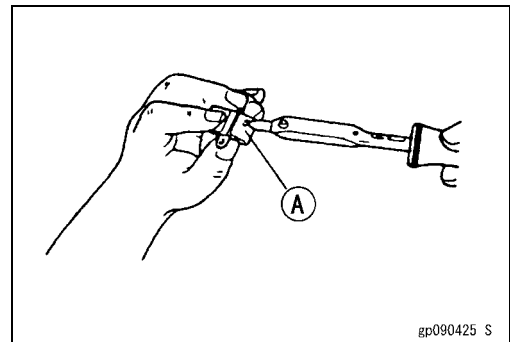
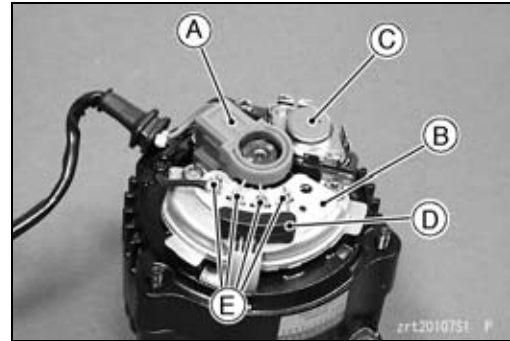
Charging System

- Remove:
 - Brush Assembly [A]
 - Rectifier [B]
 - Regulator [C]
 - Rubber Holder [D]
- Unsolder the leads [E] on the rectifier.

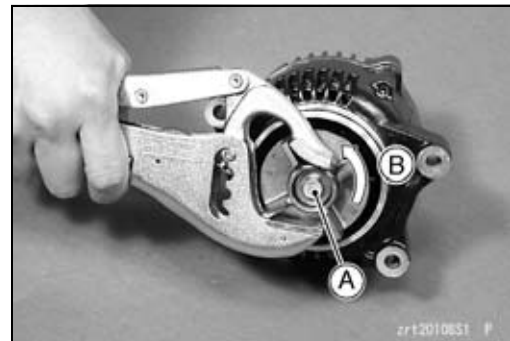
CAUTION

When unsoldering the alternator leads on the rectifier terminals, do it quickly. If high temperatures are applied for more than a few seconds, the rectifier's diodes may be damaged.

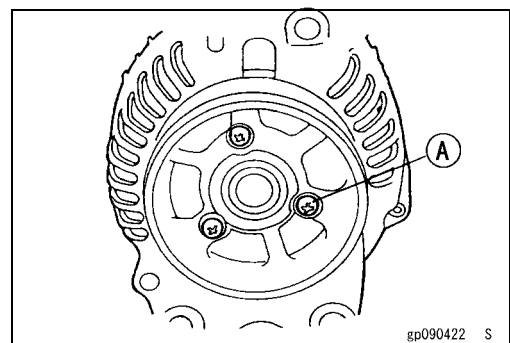
- If it is necessary to remove the carbon brush, unsolder the brush lead [A].



- Remove the alternator coupling to disassemble the rest of the parts as follows.
 - Hold the alternator with a vise and unscrew the coupling bolt [A].
 - The coupling bolt has right-hand threads and turn the bolt counterclockwise [B].
 - Remove the coupling bolt and coupling.



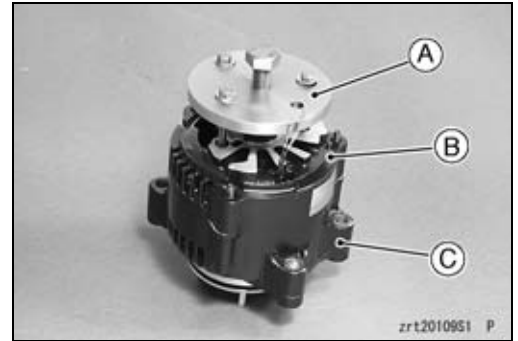
- Do not remove the alternator bearing retainer screws [A] yet.



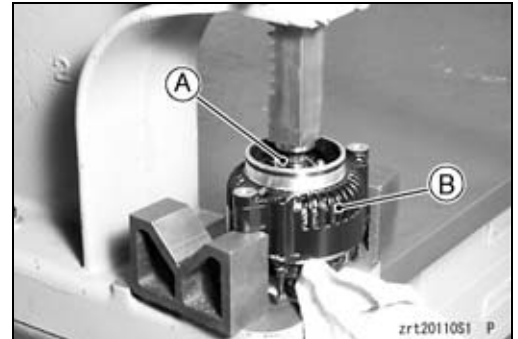
Charging System

- Using the frame puller [A], separate the alternator frame [B] from the alternator housing [C].

Special Tool - Alternator Frame Puller: 57001-1494



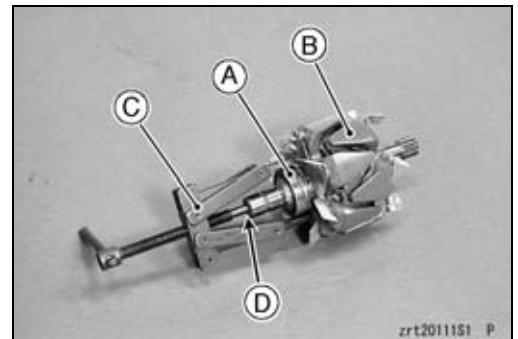
- Press out the alternator rotor [A] from the alternator housing [B].



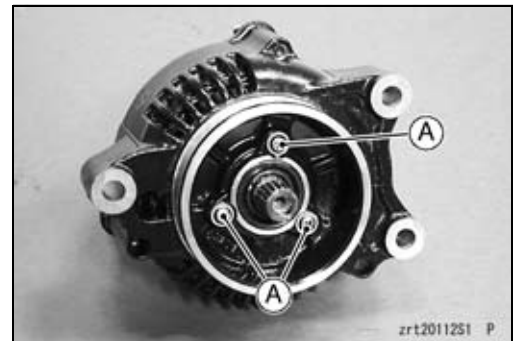
- Remove the frame ball bearing [A] from the alternator rotor [B], using a suitable bearing puller [C].

CAUTION

Do not damage the insulator [D] on the alternator rotor end.



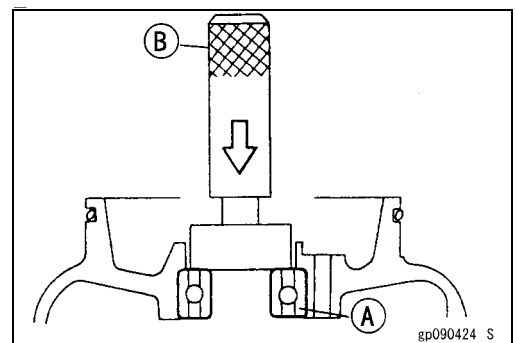
- Remove the alternator bearing retainer screws [A] and the bearing retainer.



- Pry the oil seal out, using a screwdriver.
- Remove the alternator housing bearing [A], using the bearing driver set [B].

Special Tool - Bearing Driver Set: 57001-1129

- Discard the bearings and the oil seal.



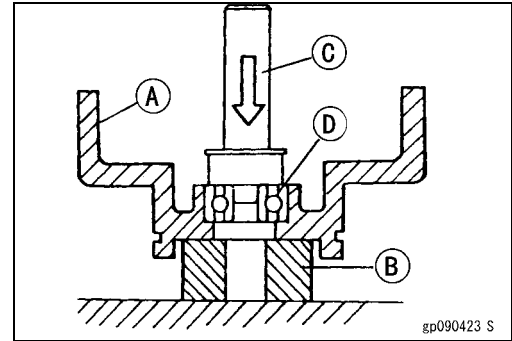
15-24 ELECTRICAL SYSTEM

Charging System

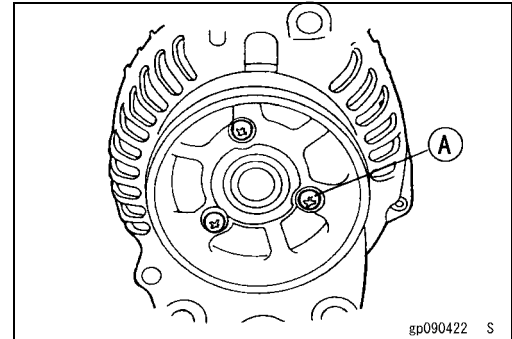
Alternator Assembly

- Position the alternator housing [A] on a suitable press fixture [B].
- Press [C] the new housing ball bearing [D] into the alternator housing with bearing driver set.

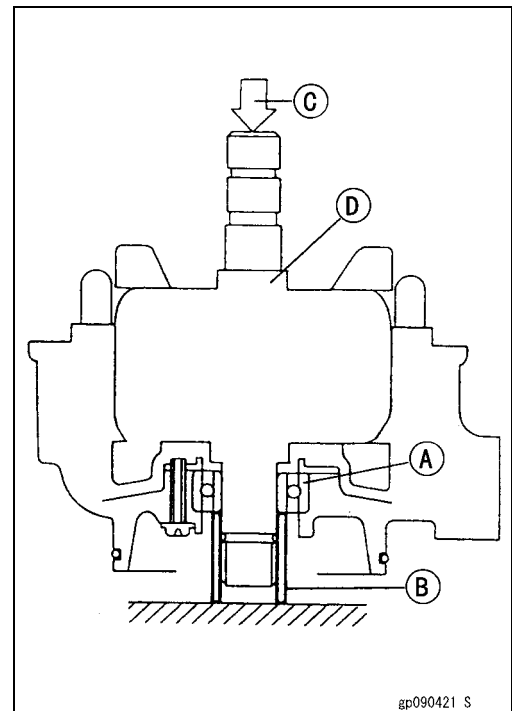
Special Tool - Bearing Driver Set: 57001-1129



- Install the bearing retainer with its screws [A].

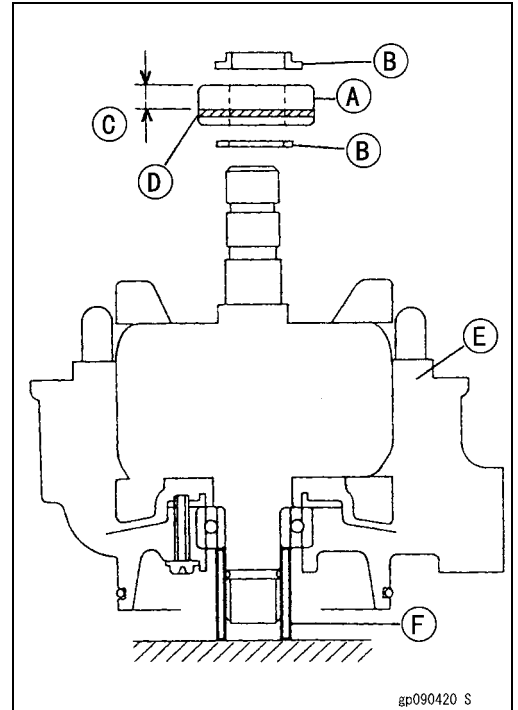


- Position the housing ball bearing [A] so that the inner race is seated on a suitable press fixture [B].
- Press [C] the alternator rotor [D] into the housing ball bearing.

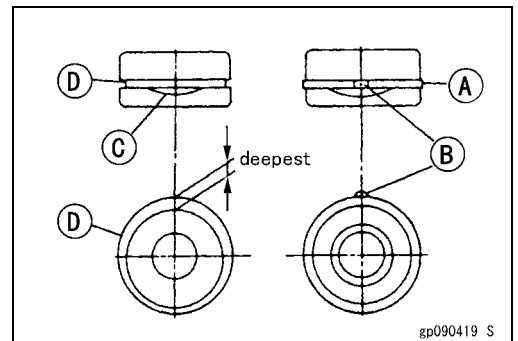


Charging System

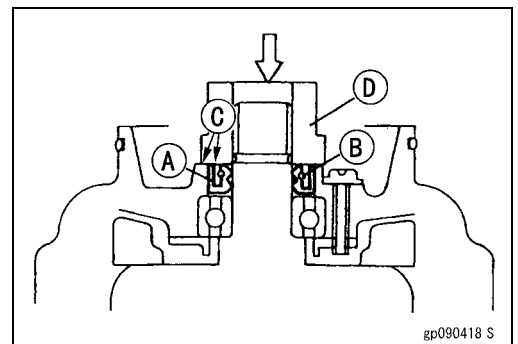
- Press the new frame ball bearing [A] and bearing covers [B] onto the rotor shaft. The wider band [C] on the outer race goes up.
 Ring [D]
 Alternator Housing [E]
 Press Fixture [F]



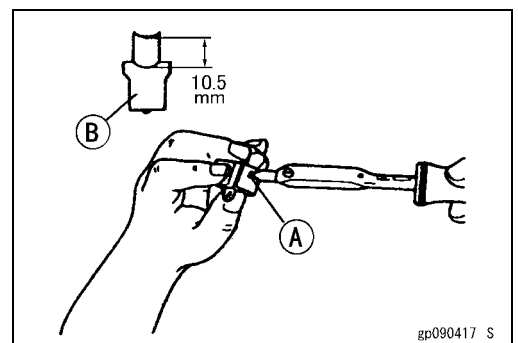
- Position the frame ball bearing ring [A] so that the ring projection [B] almost aligns with the groove chamfer [C] where the groove is the deepest. This eases alternator frame installation.
 Eccentric Ring Groove [D]



- Apply high temperature grease to the oil seal lips.
- Press in the oil seal [A] so that the spring band [B] faces out and the seal end is flush [C] with the end of the hole.
Special Tool - Bearing Driver Set: 57001-1129 [D]
- Install the alternator frame on the alternator rotor.



- Solder the carbon brush lead [A] with the brush holder [B] as shown.



15-26 ELECTRICAL SYSTEM

Charging System

- Run the rectifier leads [A] into the grooves as shown.

CAUTION

When soldering the alternator leads to the rectifier terminals, do it quickly. If high temperatures are applied for more than a few seconds, the rectifier's diodes may be damaged.

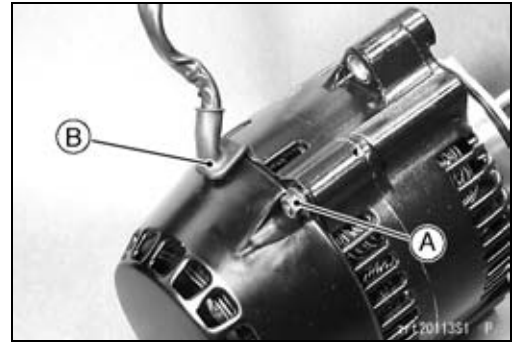


- Install the alternator cover and tighten the alternator cover nuts [A].

○ Fit the grommet [B] into the cover groove.

Torque - Alternator Cover Nuts: 4.5 N·m (0.46 kgf·m, 40 in·lb)

Alternator Coupling Bolt: 12 N·m (1.2 kgf·m, 106 in·lb)



Operational Inspection

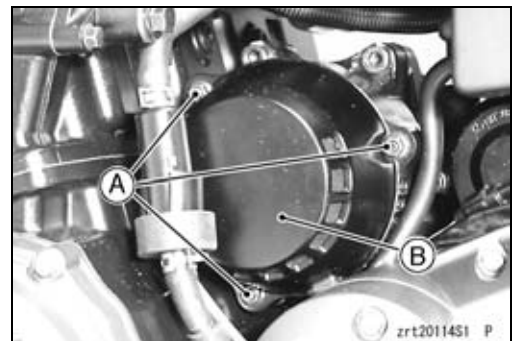
For any charging system problems, always check the charging system wiring first (see Wiring Inspection), and then check the system with the following tests shown in the troubleshooting guide.

Troubleshooting Guide

Test No.	Trouble	Symptoms
1	Battery discharged	Starter not rotating
2	Battery overcharged	Electrolyte level lowering quickly
3	Noise	Alternator or alternator chain noise

Test No. 1-Battery Discharged

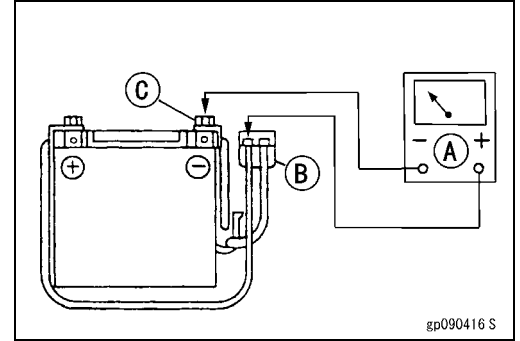
- Remove the alternator cover nuts [A], and take off the cover [B].
- Check that the alternator leads and connectors are in good condition.
- ★ If not, repair or replace the damaged parts.
- Replace the discharged battery with a good battery.



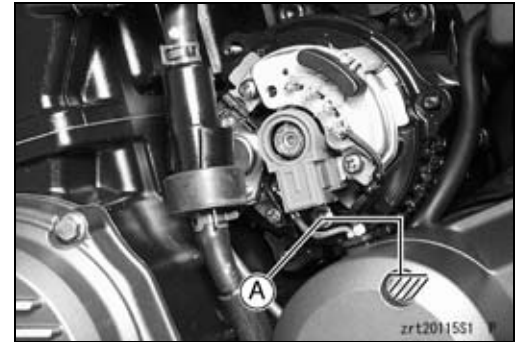
Charging System

- Connect the hand tester [A] to the battery leads as shown.
Starter Relay [B] Battery Negative Terminal [C]
- Check charging voltage with the engine running.
- ★ If the charging voltage is higher than 13.5 V, the charging system is in good condition.
- ★ If the charging voltage is lower than 13.5 V, go to the next test.

Charging Voltage 14.2 ~ 14.8 V @4 000 r/min (rpm)



- Ground the F terminal [A] of the regulator to the engine with an auxiliary wire.
- Start the engine, and check the charging voltage with the engine running.
- ★ If the charging voltage is higher than 13.5 V, check the regulator.
- ★ If the charging voltage is lower than 13.5 V, check the following.
 - Alternator Output Voltage
 - Stator Coil
 - Rotor Coil
 - Slip Rings
 - Carbon Brushes
 - Rectifier



Test No. 2-Battery Overcharged

- Check the regulator and/or rotor.
- ★ Repair or replace the damaged parts.

Test No. 3-Noise

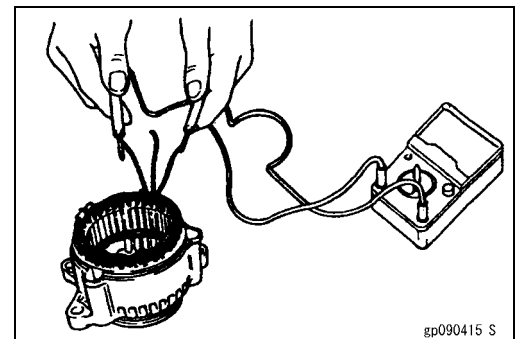
- Check the alternator chain slack and replace the chain if necessary (see Crankshaft/Transmission chapter).
- Check the alternator shaft ball bearings if they make a noise.
- Check the alternator ball bearings, stator coil, and/or rectifier if the alternator makes a noise.
- ★ Repair or replace the damaged parts.

Stator Coil Inspection

- Connect the hand tester ($\times 1 \Omega$ range) between the coil leads and read the tester.
- ★ If the tester does not read as specified, replace the alternator frame.

Stator Coil Resistance: 1.0 Ω or less

- Using the highest hand tester range, measure the resistance between the stator coil core and each of the coil windings.
- ★ If there is any reading at all, the stator coil winding has a short and the alternator frame must be replaced.



15-28 ELECTRICAL SYSTEM

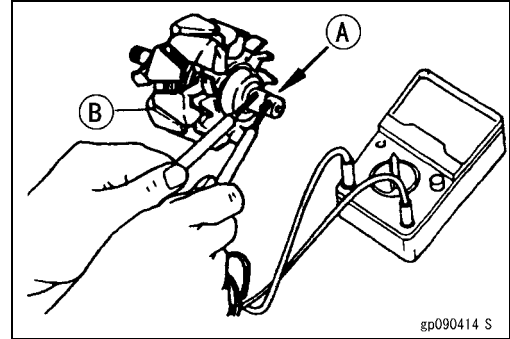
Charging System

Rotor Coil Inspection

- Connect the hand tester ($\times 1 \Omega$ range) between the slip rings [A] and read the tester.
- ★ If the tester does not read as specified, replace the rotor [B].

Rotor Coil Resistance: 2.3 ~ 3.5 Ω

- Using the highest tester range, measure the resistance between the rotor shaft and each of the slip rings.
- ★ If there is any reading at all, the rotor coil has a short and must be replaced.



Slip Ring Cleaning

- Visually inspect the slip ring for dirt or pitting.
- ★ If necessary, smooth the slip ring with No. 300 ~ No. 500 emery cloth.

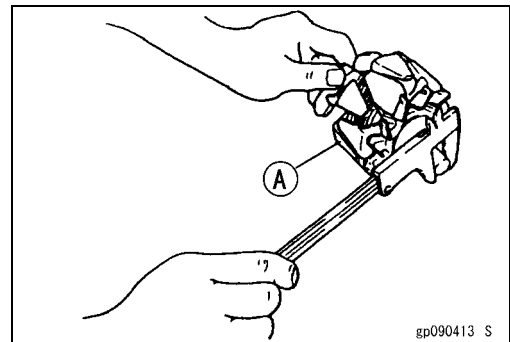
Slip Ring Diameter Inspection

- ★ If the measurement is less than the service limit, replace the rotor [A].

Slip Ring Diameter

Standard: 14.4 mm (0.566 in.)

Service Limit: 14.0 mm (0.551 in.)



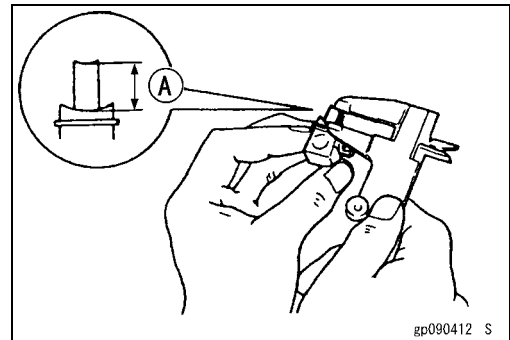
Carbon Brush Length Inspection

- Measure the length [A] both carbon brushes that stick out of the holder.
- ★ If either one is worn down to less than the service limit, replace it.

Carbon Brush Length (projected portion)

Standard: 10.5 mm (0.413 in.)

Service Limit: 4.5 mm (0.18 in.)



Charging System

Rectifier Inspection

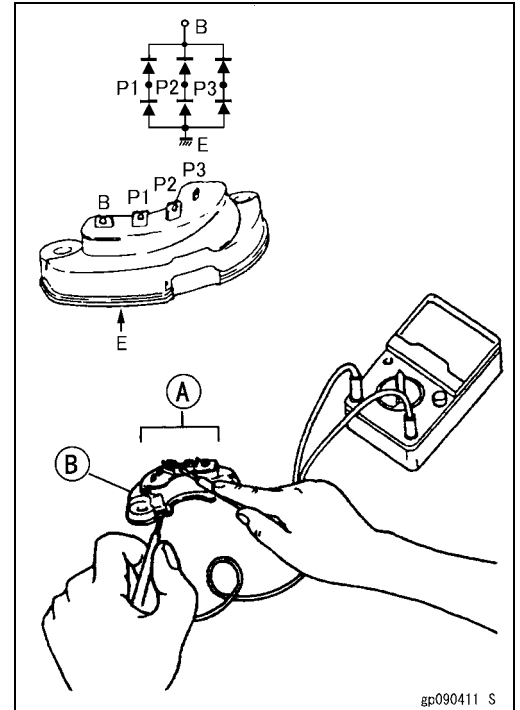
- Set the hand tester to the 1 kΩ range.
- Zero the hand tester, and connect it to each terminal [A] to check the resistance in both directions.
- The resistance should be low in one direction and more than ten times as much in the other direction. If the rectifier [B] shows low or high in both directions, the rectifier is defective and the 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.

CAUTION

If a megger or a meter with a large-capacity battery is used, the rectifier will be damaged.



Regulator Inspection

- Prepare testing tools.

Test light: Bulb rated 12 V 3.4 W

Batteries: Two 12 V batteries

Test wires: Three auxiliary wires

CAUTION

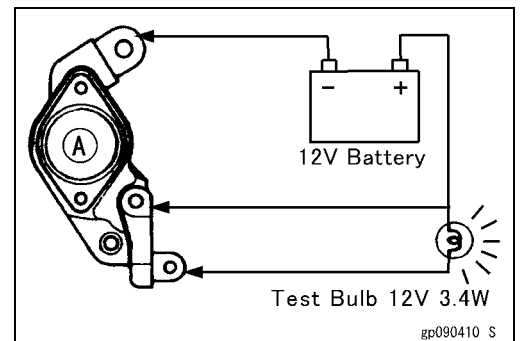
The test light works as an indicator and also a current limiter to protect the regulator from excessive current. Do not use an ammeter instead of a test light.

- Connect the test light and the 12 V battery to the regulator [A] as shown.
- The test light should go on at this time.

CAUTION

Do not contact the regulator metal case with the wires from the battery (+) or (-) terminal during the test.

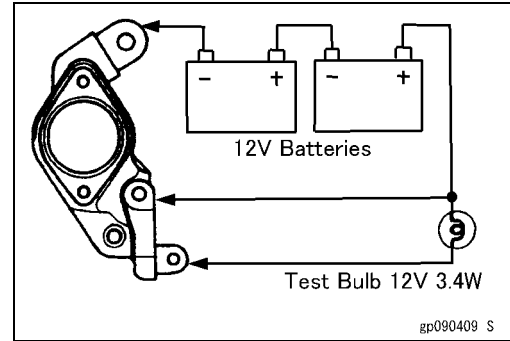
- ★ If the test light does not go on, the regulator is damaged and must be replaced.



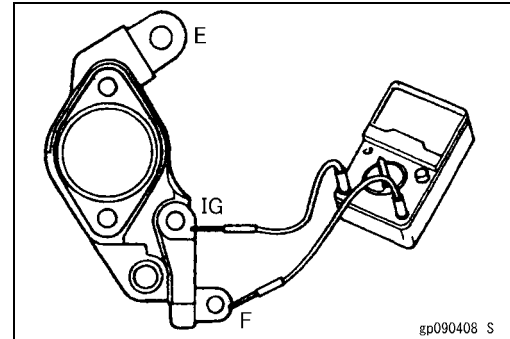
15-30 ELECTRICAL SYSTEM

Charging System

- Connect the test light and two 12 V batteries to the regulator as shown.
- The test light should not go on at this time.
- ★ If the test light goes on, the regulator is damaged and must be replaced.



- Set the hand tester to the 1 k Ω range.
- Check the resistance between IG and F terminals in both directions.
- ★ If the reading shows zero or infinity (no reading) in both directions, the regulator is defective and must be replaced.



Alternator Ball Bearing Inspection

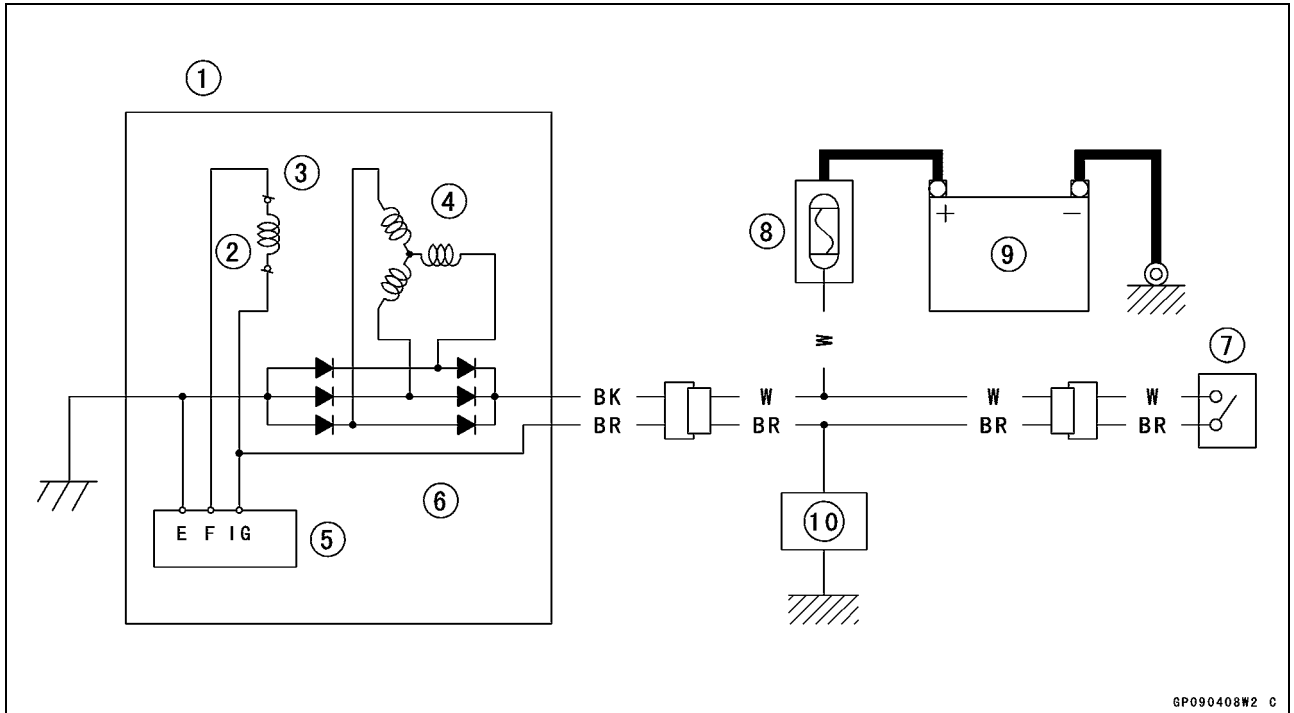
CAUTION

Do not disassemble the alternator for bearing inspection since disassembling the alternator damages the bearings.

- Turn the alternator rotor shaft back and forth while checking for plays, roughness or binding of bearings.
- ★ If bearing play, roughness, or binding is found, disassemble the alternator and replace the bearings.

Charging System

Charging System Circuit



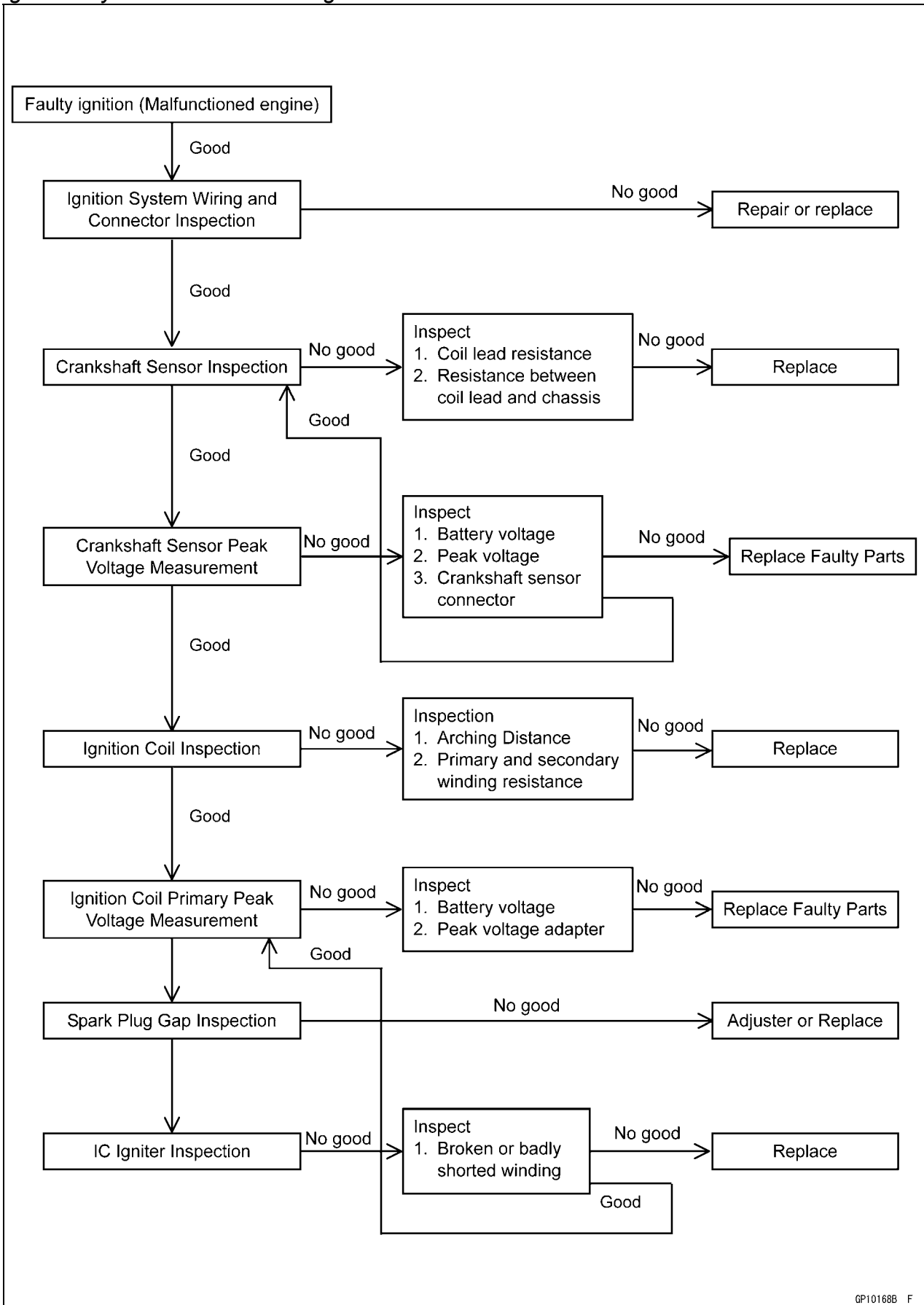
GP090408W2 C

1. Alternator
2. Rotor
3. Carbon Brush
4. Stator Coil
5. Regulator
6. Rectifier
7. Ignition Switch
8. Main Fuse 30 A
9. Battery 12 V
10. Load

15-32 ELECTRICAL SYSTEM

Ignition System

Ignition System Troubleshooting



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.

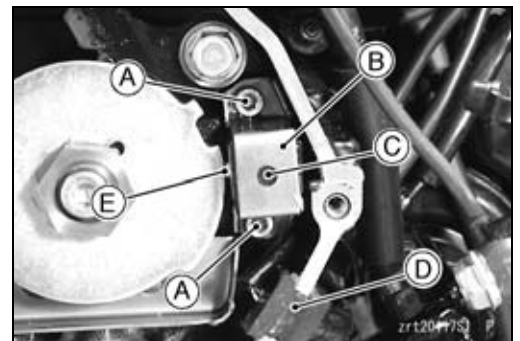
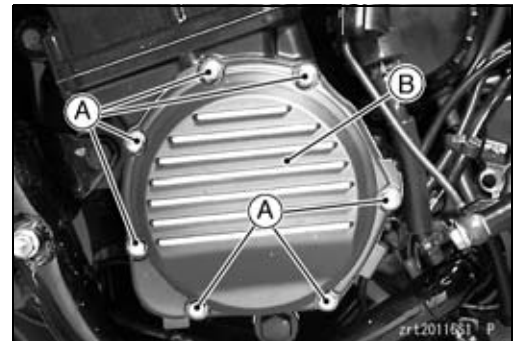
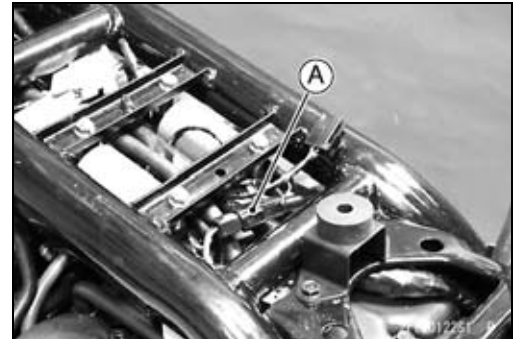
This is to prevent damage to the diodes and IC igniter.

Crankshaft Sensor Removal

- Remove:
 - Fuel Tank (see Fuel System chapter)
 - Crankshaft Sensor Lead Connector [A]
 - Air Cleaner Housing Cover

- Bolts [A]
- Crankshaft Sensor Cover [B]
- Engine Sprocket Cover (see Final Drive chapter)

- Remove:
 - Crankshaft Sensor Bolts [A]
 - Holder [B]
 - Damper [C]
 - Grommet [D]
 - Crankshaft Sensor [E]



15-34 ELECTRICAL SYSTEM

Ignition System

Crankshaft Sensor Installation

- Route the crankshaft sensor lead correctly (see Cable, Wire, and Hose Routing in the General Information chapter).
- Apply a non-permanent locking agent to the threads of the crankshaft sensor bolts.
- Install the crankshaft sensor and tighten the crankshaft sensor bolts.

Torque - Crankshaft Sensor Bolts: 5.9 N·m (0.60 kgf·m, 52 in·lb)

- Apply silicone sealant to the crankcase halves mating surface [A] on the front and rear sides of the crankshaft sensor cover mount.
- Apply silicone sealant to the crankshaft sensor lead grommet [B] and set the grommet securely in the notch of the crankcase.

Sealant Kawasaki Bond (Silicone Sealant): 56019-120

-

- Apply a non-permanent locking agent to the two crankshaft sensor cover bolts [A] shown and tighten them.

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



Crankshaft Sensor Inspection

- Remove:
 - Fuel Tank (see Fuel System chapter)
 - Crankshaft Sensor Lead Connector [A]
- Set the hand tester to the $\times 100 \Omega$ range and connect it to the crankshaft sensor lead connector.

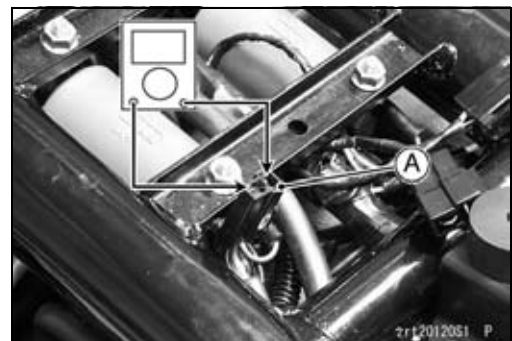
Special Tools - Hand Tester: 57001-1394

Needle Adapter Set: 57001-1457

- ★ If there is more resistance than the specified value, the sensor has an open lead and must be replaced. Much less than this resistance means the sensor is shorted, and must be replaced.

Crankshaft Sensor Resistance: 380 ~ 570 Ω

- Using the highest resistance range of the tester, measure the resistance between the crankshaft sensor leads and chassis ground.
- ★ Any tester reading less than infinity (∞) indicates a short, necessitating replacement of the crankshaft sensor assembly.



Ignition System

Crankshaft Sensor Peak Voltage Inspection

NOTE

- Be sure the battery is fully charged.
- Using the peak voltage adapter is a more reliable way to determine the condition of the crankshaft sensor than crankshaft sensor internal resistance measurements.

- Remove:
 - Fuel Tank (see Fuel System chapter)
 - Crankshaft Sensor Lead Connector
- Set the Hand Tester [A] to the $\times 25$ V DC range, and connect it a commercially available Peak Voltage Adapter [B] as shown in the diagram.
- Connect the black lead of the Adapter to black/white and red lead to yellow lead in the crankshaft sensor connector [C].
- Turn the ignition switch and engine stop switch on.
- Pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission gear in neutral to measure the crankshaft sensor peak voltage.
- Repeat the measurement 5 or more times.

Crankshaft Sensor Peak Voltage

Standard: 1.6 V or more

Special Tools - Hand Tester: 57001-1394

Peak Voltage Adapter: 57001-1415

Type: KEK-54-9-B

Needle Adapter Set: 57001-1457

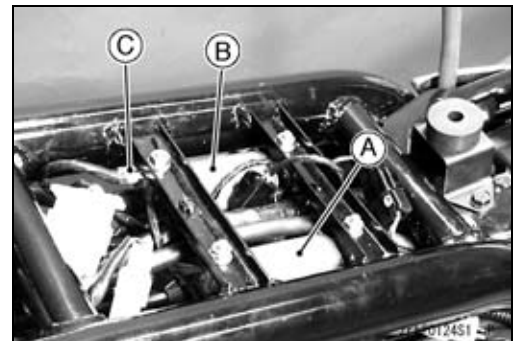
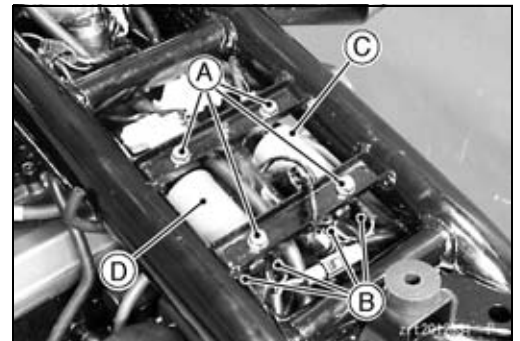
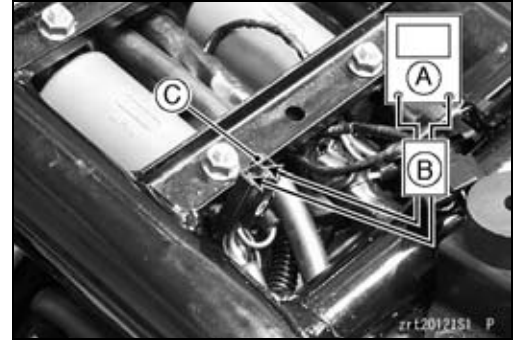
- ★ If the tester reading is not specified one, check the crankshaft sensor.

Ignition Coil Removal

- Remove:
 - Fuel Tank (see Fuel System chapter)
 - Spark Plug Caps
 - Mounting Nuts [A]
 - Primary Lead Connectors [B]
 - Ignition Coil #2, 3 [C]
 - Ignition Coil #1, 4 [D]

Ignition Coil Installation

- Install the ignition coils.
- Connect the primary winding leads to the ignition coil terminals.
 - Black Lead → to #1, #4 Coil [A]
 - Green Lead → to #2, #3 Coil [B]
 - Red Leads → to both Coils
- Tighten the chassis ground lead [C] with the #2, #3 coil.



15-36 ELECTRICAL SYSTEM

Ignition System

Ignition Coil Inspection

- Remove the ignition coils (see this chapter).
- 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: 6 mm or more

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the coil body or high tension 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 cap.
- ★ If the coil tester is not available, the coil can be checked for a broken or badly shorted winding with the hand tester.

Special Tool - Hand Tester: 57001-1394

NOTE

○ *The hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.*

- Measure the primary winding resistance 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 as follows.
- Remove the plug caps by turning them counterclockwise.
- Connect the tester between the spark high tension leads.
- Set the tester to the $\times 1 \text{ k}\Omega$ range and read the tester.

Measure primary winding resistance [A]

Measure secondary winding resistance [B]

Ignition Coil [C]

Ignition Coil Winding Resistance

Primary Windings: 2.3 ~ 3.5 Ω

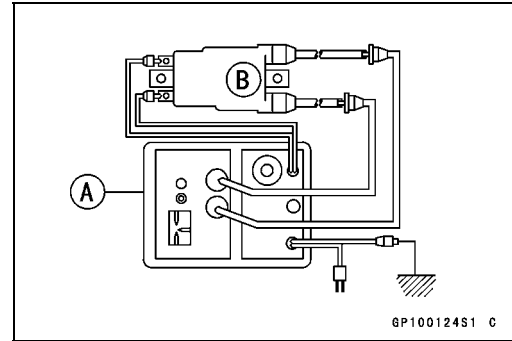
Secondary Windings: 12 ~ 18 $\text{k}\Omega$

- ★ If the tester does not read as specified, replace the coil.
- To install the plug cap, turn it clockwise.

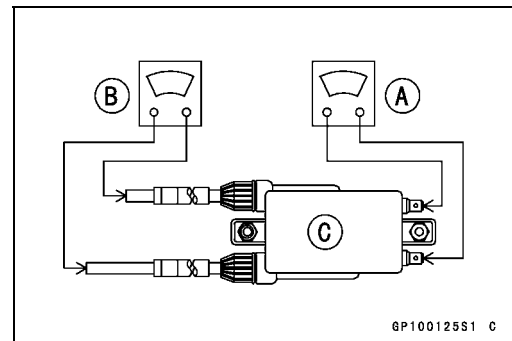
Ignition Coil Primary Peak Voltage

NOTE

○ *Be sure the battery is fully charged.*



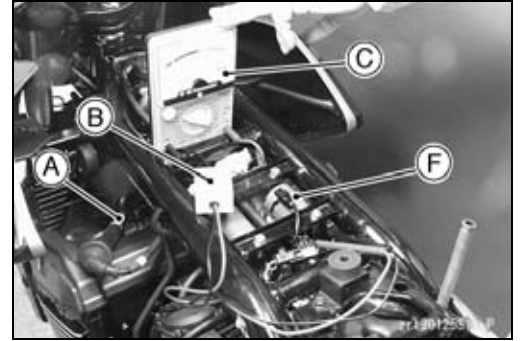
GP100124S1 C



GP100125S1 C

Ignition System

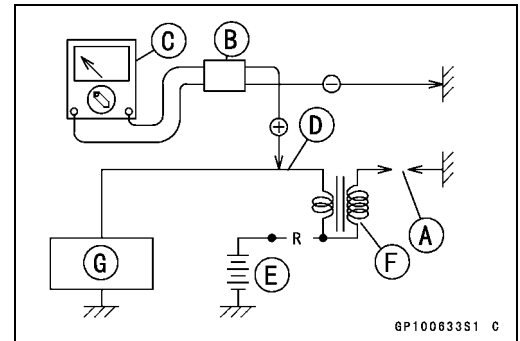
- Remove the spark plug caps (see this chapter), but do not remove the spark plugs.
 - Measure the primary peak voltage as follows.
 - Install the new spark plug [A] into each spark plug cap, and ground them onto the engine.
 - Connect a commercially peak voltage adapter [B] into the hand tester [C] which is set to the $\times 1\ 000\ \text{V DC}$ range.
 - Connect the adapter between the ignition coil primary lead terminal [D] and the engine ground with the primary lead left connected.
- IC igniter [G]
 Battery [E]
 Ignition coil [F]



Special Tools - Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B
Hand Tester: 57001-1394
Needle Adapter Set: 57001-1457

Primary Lead Connection

	Adapter (R, +)	Adapter (BK, -)
Ignition Coil #1, 4	BK	R or Ground
Ignition Coil #2, 3	G	R or 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 times for one ignition coil.

Ignition Coil Primary Peak Voltage

Standard: 280 V or more

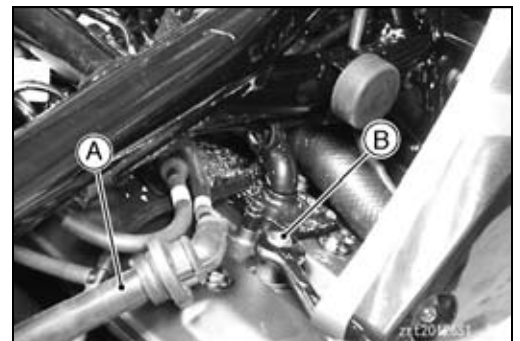
- Repeat the test for the other ignition coil.
- ★ If the reading is less than the specified value, check the following.
 - Ignition Coils (see Ignition Coil Inspection)
 - Crankshaft Sensor (see Crankshaft Sensor Inspection)
 - IC Igniter (see IC Igniter Inspection)

Spark Plug Removal

- Remove:
 - Fuel Tank (see Fuel System chapter)
- Take out the spark plug cap [A] and remove the spark plug.

Owner's Tool - Spark Plug Wrench: 92110-1132 [B]

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



15-38 ELECTRICAL SYSTEM

Ignition System

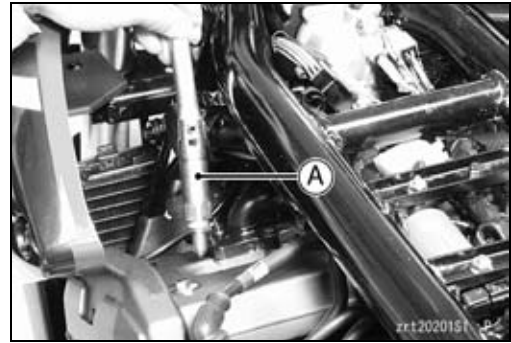
Spark Plug Installation

- Insert the spark plug vertically into the plug hole with the plug installed in the plug wrench [A].

Owner's Tool - Spark Plug Wrench: 92110-1132

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

- Tighten the plugs.
 - Torque - Spark Plugs: 14 N·m (1.4 kgf·m, 10 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.



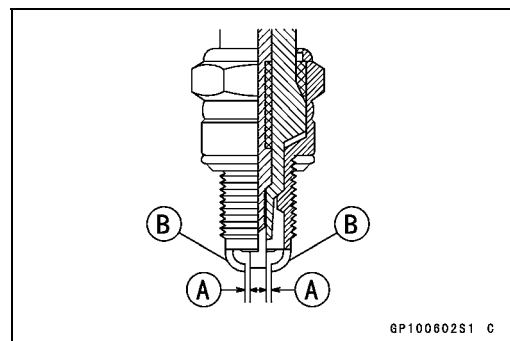
Spark Plug Cleaning and Inspection

- Remove the spark plug, 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.

Spark Plug Gap Inspection

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

Spark Plug Gap: 0.7 ~ 0.8 mm (0.027 ~ 0.031 in.)



IC Igniter Inspection

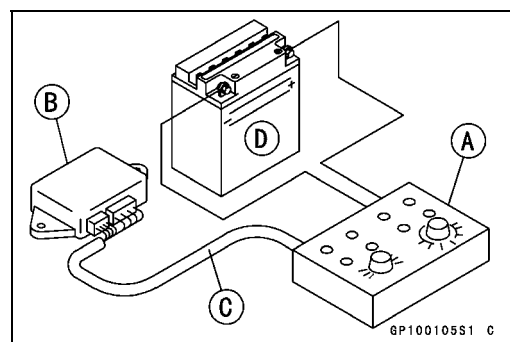
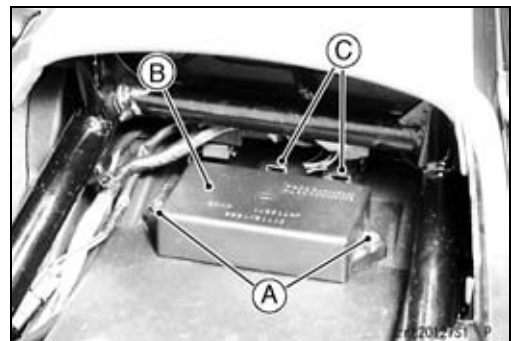
- Remove:
 - Seat (Frame chapter)
 - Tool Kit Compartment (see Frame chapter)
 - Canister (California Model only)
 - Screws [A]
 - IC Igniter [B]
 - Connectors [C]
- To check the condition of the IC igniter, connect the igniter checker [A] to the IC igniter [B] as shown.

Special Tools - Igniter Checker Assembly: 57001-1378

Harness Adapter #13: 57001-1399 [B]

Battery [D]

- Turn the select knob to "A" position.



Ignition System

NOTE

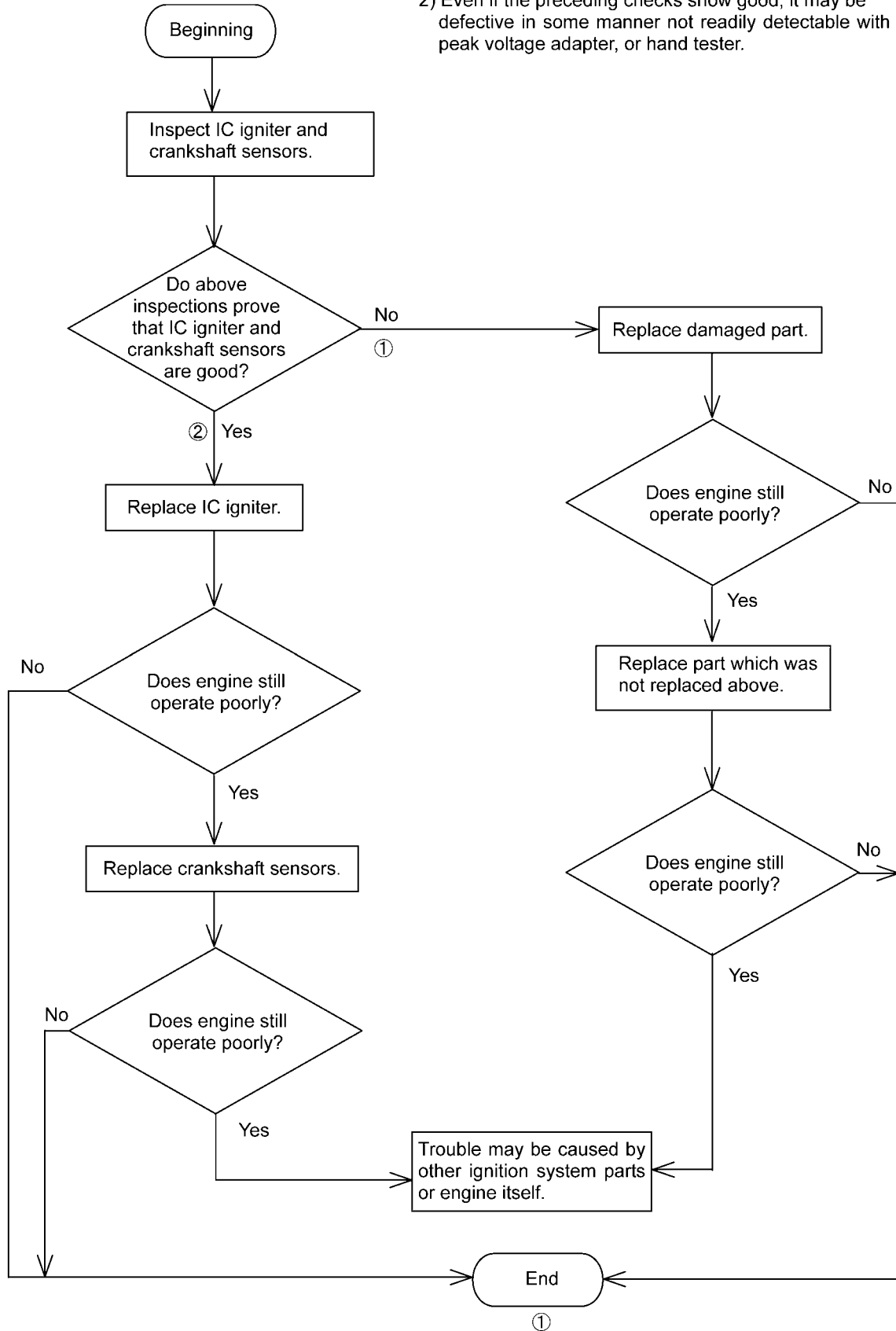
- *When using the igniter checker, refer to the manufacturer's instructions.*
 - *The igniter checker can detect the simulated dynamic characteristics: igniter response to r.p.m., interlock circuit signal, tachometer signal and engine overspeed limiter signal.*
 - *The igniter checker cannot inspect 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, replace the IC igniter with a new one and check ignition coil primary peak voltage again. If the peak voltage is abnormal as before, the trouble is not with the IC igniter. If the peak voltage is now normal, the trouble is with the IC igniter.

15-40 ELECTRICAL SYSTEM

Ignition System

IC igniter Troubleshooting

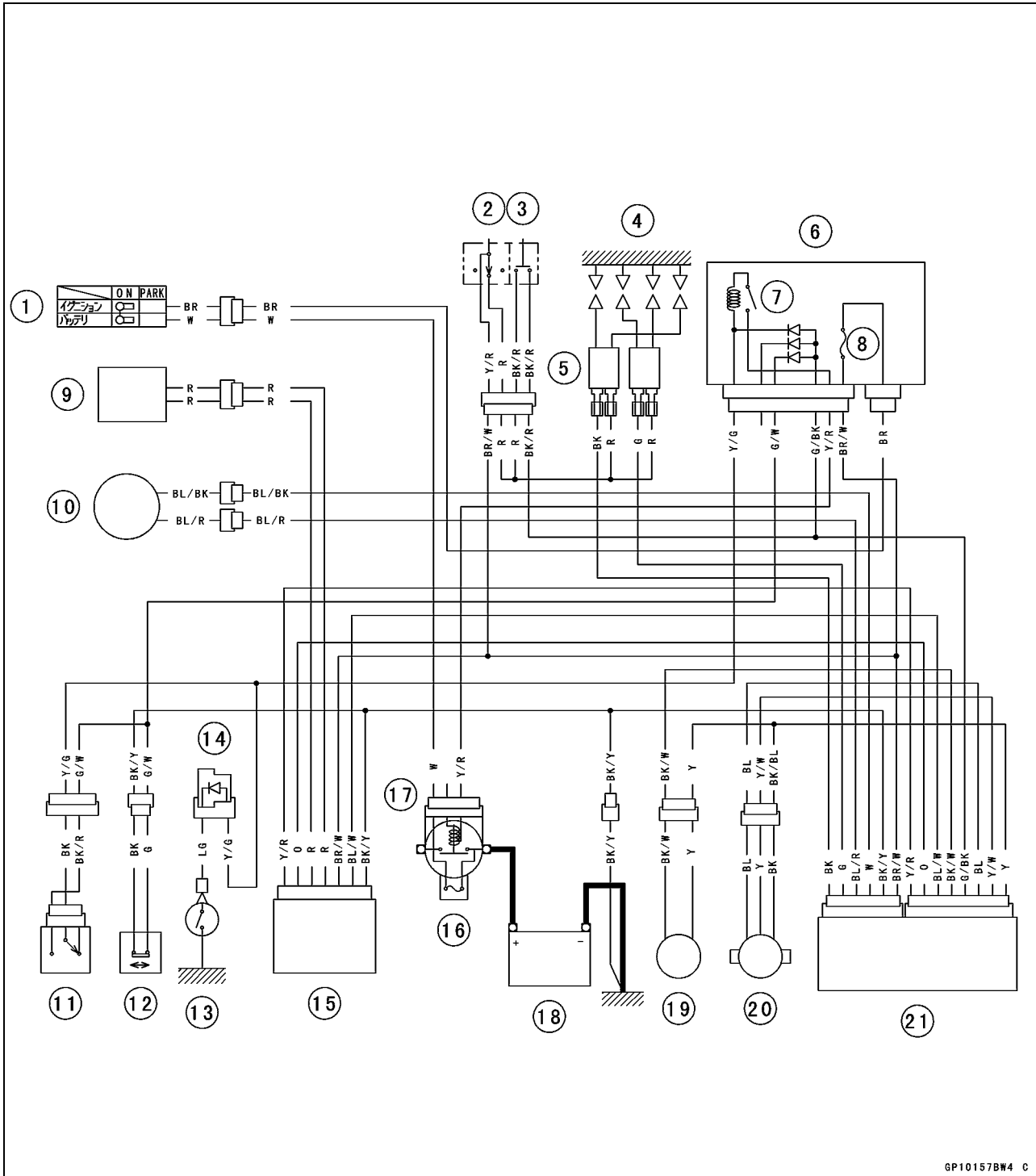
- 1) IC igniter or crankshaft sensor is damaged.
- 2) Even if the preceding checks show good, it may be defective in some manner not readily detectable with peak voltage adapter, or hand tester.



15-42 ELECTRICAL SYSTEM

Ignition System

Ignition System Circuit (ZR1200-A4 ~, A6F ~ Malaysia)



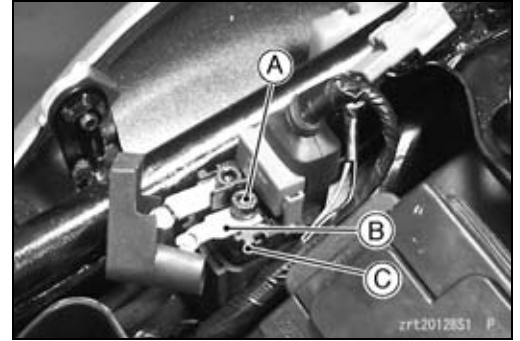
GP10157BW4 C

- | | |
|--|----------------------------|
| 1. Ignition Switch | 11. Starter Lockout Switch |
| 2. Engine Stop Switch | 12. Side Stand Switch |
| 3. Starter Button | 13. Neutral Switch |
| 4. Spark Plug | 14. Diode |
| 5. Ignition Coil | 15. Immobilizer Amplifier |
| 6. Junction Box | 16. Main Fuse 30 A |
| 7. Starter Circuit Relay | 17. Starter Relay |
| 8. Ignition Fuse 10 A | 18. Battery |
| 9. Immobilizer Antenna | 19. Crankshaft Sensor |
| 10. Oil Pressure Warning/Immobilizer Indicator Light | 20. Throttle Sensor |
| | 21. IC Igniter |

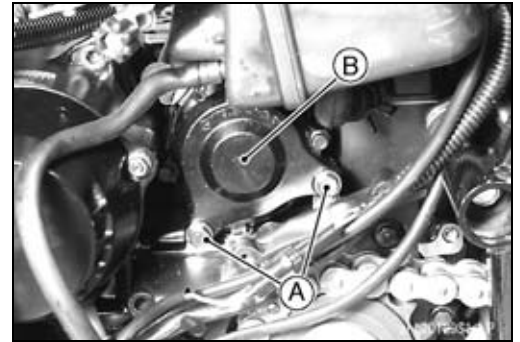
Electrical Starter System

Starter Motor Removal

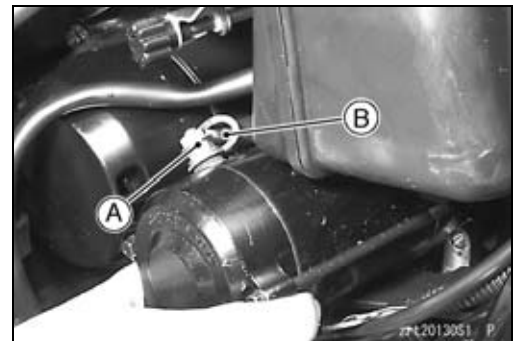
- Remove:
 - Seat (see Frame chapter)
 - Starter Relay Terminal Bolt [A]
- Remove the starter motor lead [B] from the starter relay [C].



- Remove:
 - Fuel Tank (see Fuel System chapter)
 - Air Cleaner Housing Cover
 - Engine Sprocket Cover (see Final Drive chapter)
 - Starter Motor Mounting Bolts [A]
 - Starter Motor [B]



- Remove the starter motor terminal nut [A] and starter motor lead [B] from the starter motor.



Starter Motor Installation

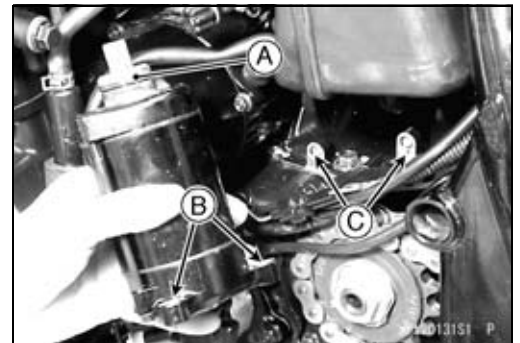
CAUTION

Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.

- Replace the O-ring [A] with a new one.
- Apply a small amount of engine oil to the O-ring.
- When installing the starter motor, clean the starter motor legs [B] and crankcase [C] where the starter motor is grounded.
- Tighten:

Torque - Starter Motor Terminal Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb)

Starter Motor Mounting Bolts: 11 N·m (1.1 kgf·m, 95 in·lb)

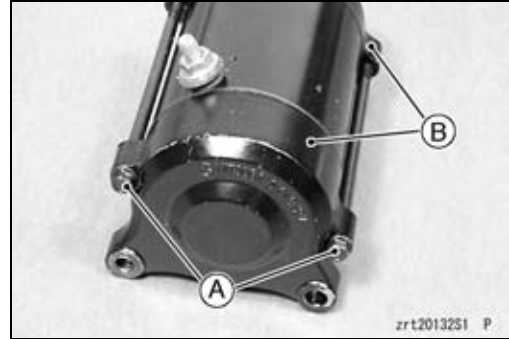


15-44 ELECTRICAL SYSTEM

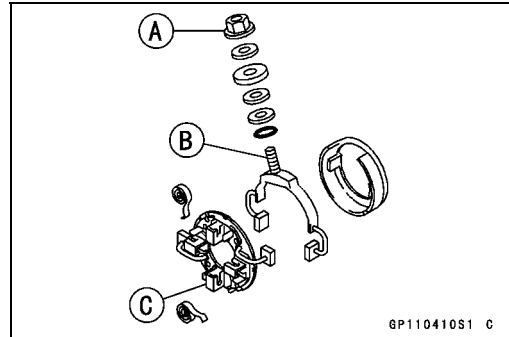
Electrical Starter System

Starter Motor Disassembly

- Remove the starter motor (see this section).
- Take off the starter motor assembly bolts [A] and remove both end covers [B] and pull the armature out of the yoke.

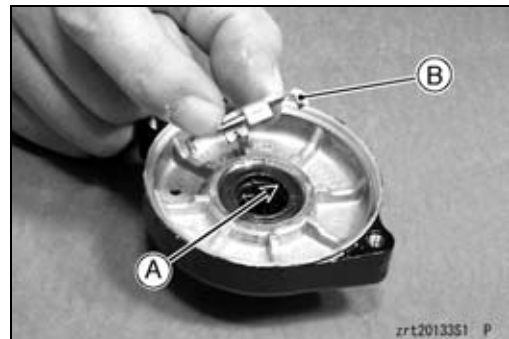


- Remove the terminal locknut [A] and terminal bolt [B], and then remove the brush with the brush plate [C] from the yoke.

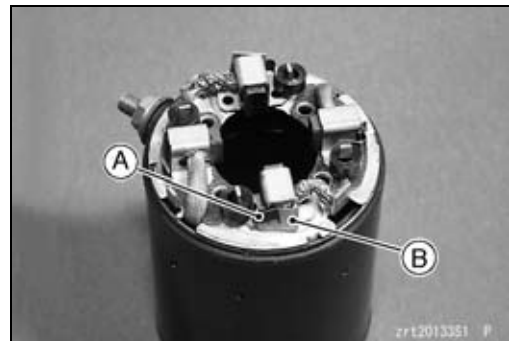


Starter Motor Assembly

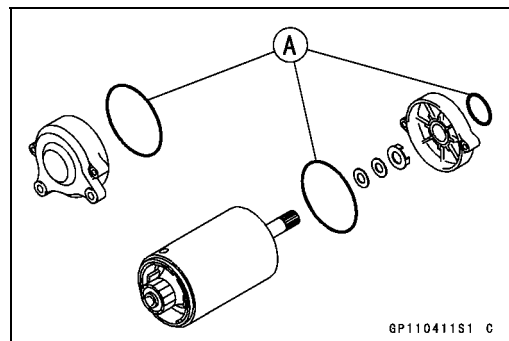
- Apply a thin coat of grease to the oil seal [A].
- Fit the toothed washer [B] into the end cover.



- Install the brush plate to the yoke.
- Tighten:
Torque - Terminal Locknut: 11 N·m (1.1 kgf·m, 95 in·lb)
- Holding the spring ends [A] with suitable washers [B], put the armature among the brushes.

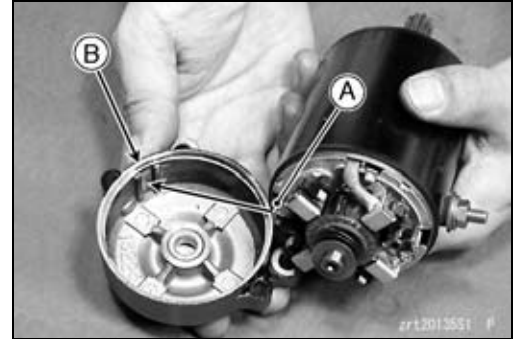


- Install the new O-rings [A] as shown.

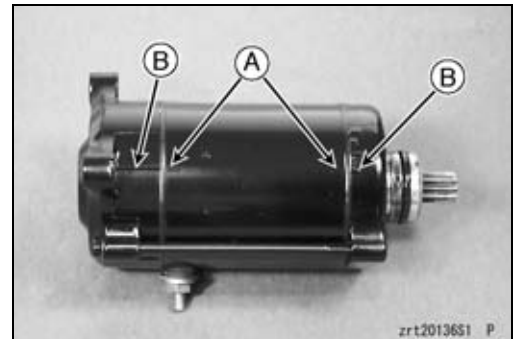


Electrical Starter System

- Fit the tongue [A] on the brush plate into the end cover groove [B].



- Align the lines [A] on the yoke with the lines [B] on the both end cover.
- Tighten:
Torque - Starter Motor Assembly Bolts: 4.9 N·m (0.50 kgf·m, 43 in·lb)



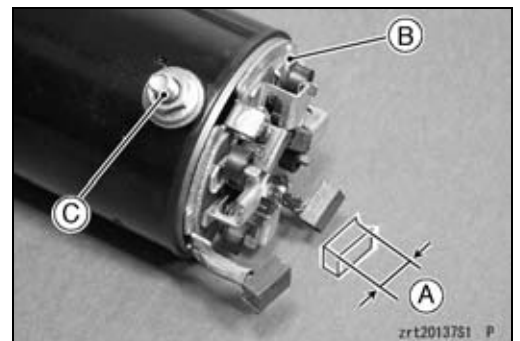
Brush Inspection

- Measure the length [A] of each brush.
- ★ If any is worn down to the service limit, replace the carbon brush holder assembly [B] and the terminal bolt assembly [C].

Starter Motor Brush Length

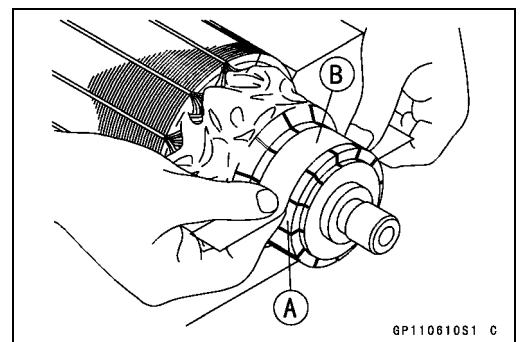
Standard: 12 ~ 12.5 mm (0.47 ~ 0.492 in.)

Service Limit: 7 mm (0.3 in.)



Commutator Cleaning and Inspection

- Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.

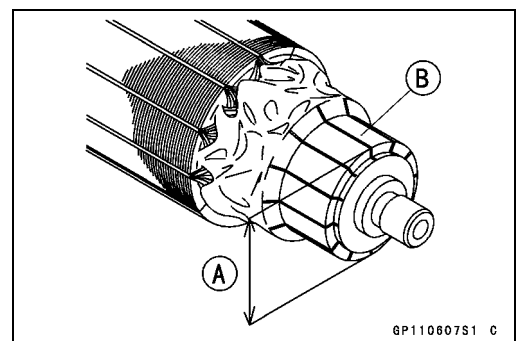


- Measure the diameter [A] of the commutator [B].
- ★ Replace the starter motor with a new one if the commutator diameter is less than the service limit.

Commutator Diameter

Standard: 28 mm (1.1 in.)

Service Limit: 27 mm (1.06 in.)



15-46 ELECTRICAL SYSTEM

Electrical Starter System

Armature Inspection

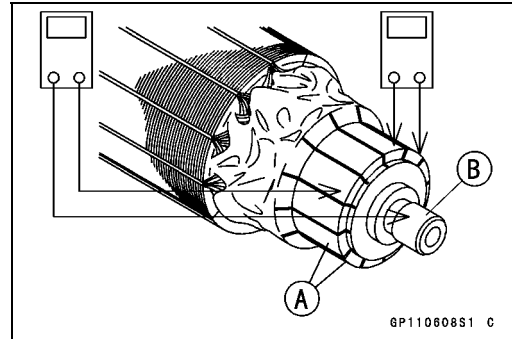
- Using the $\times 1 \Omega$ hand tester range, measure the resistance between any two commutator segments [A].

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 Lead Inspection

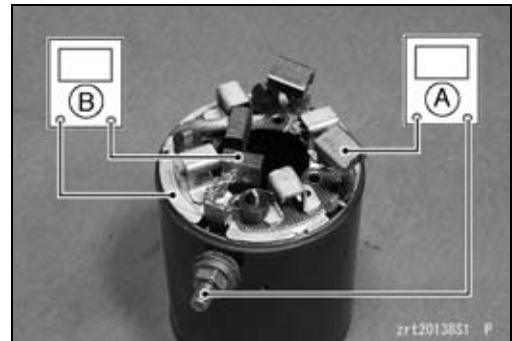
- Using the $\times 1 \Omega$ hand tester range, measure the resistance as shown.

[A] Terminal Bolt and Positive Brush

[B] Brush Plate and Negative Brush

Special Tool - Hand Tester: 57001-1394

- ★ If there is not close to zero ohms, the brush lead has an open. Replace the terminal bolt assembly and/or the brush holder assembly.



Brush Plate and Terminal Bolt Inspection

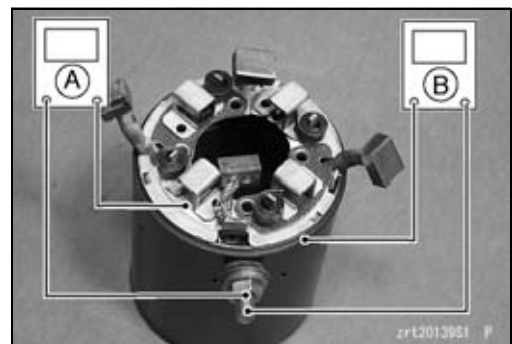
- Using the highest hand tester range, measure the resistance as shown.

[A] Terminal Bolt and Brush Plate

[B] Terminal Bolt and Yoke

Special Tool - Hand Tester: 57001-1394

- ★ If there is any reading, the brush holder assembly and/or terminal bolt assembly have a short. Replace the brush holder assembly and the terminal bolt assembly.



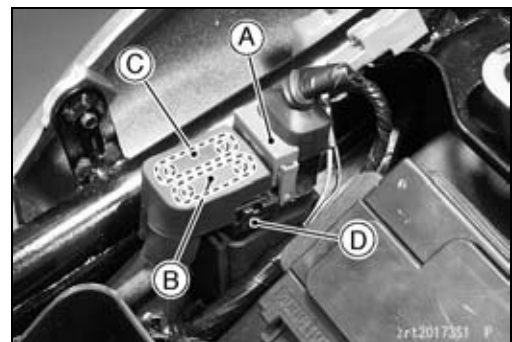
Starter Relay Inspection

- Remove the seat (see Frame chapter).
- Disconnect the connector [A].
- Disconnect the starter motor lead [B] and battery positive (+) lead [C] from the starter relay [D].

CAUTION

The battery positive (+) lead with the rubber cap is connected directly to the battery positive (+) terminal even when the ignition switch off, so take care not to short the removed lead to chassis ground.

- Remove the starter relay.



Electrical Starter System

- Connect the hand tester [A] and 12 V battery [B] to the starter relay [C] as shown.

Special Tool - Hand Tester: 57001-1394

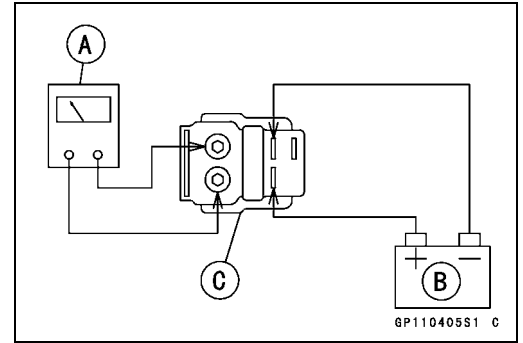
- ★ If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

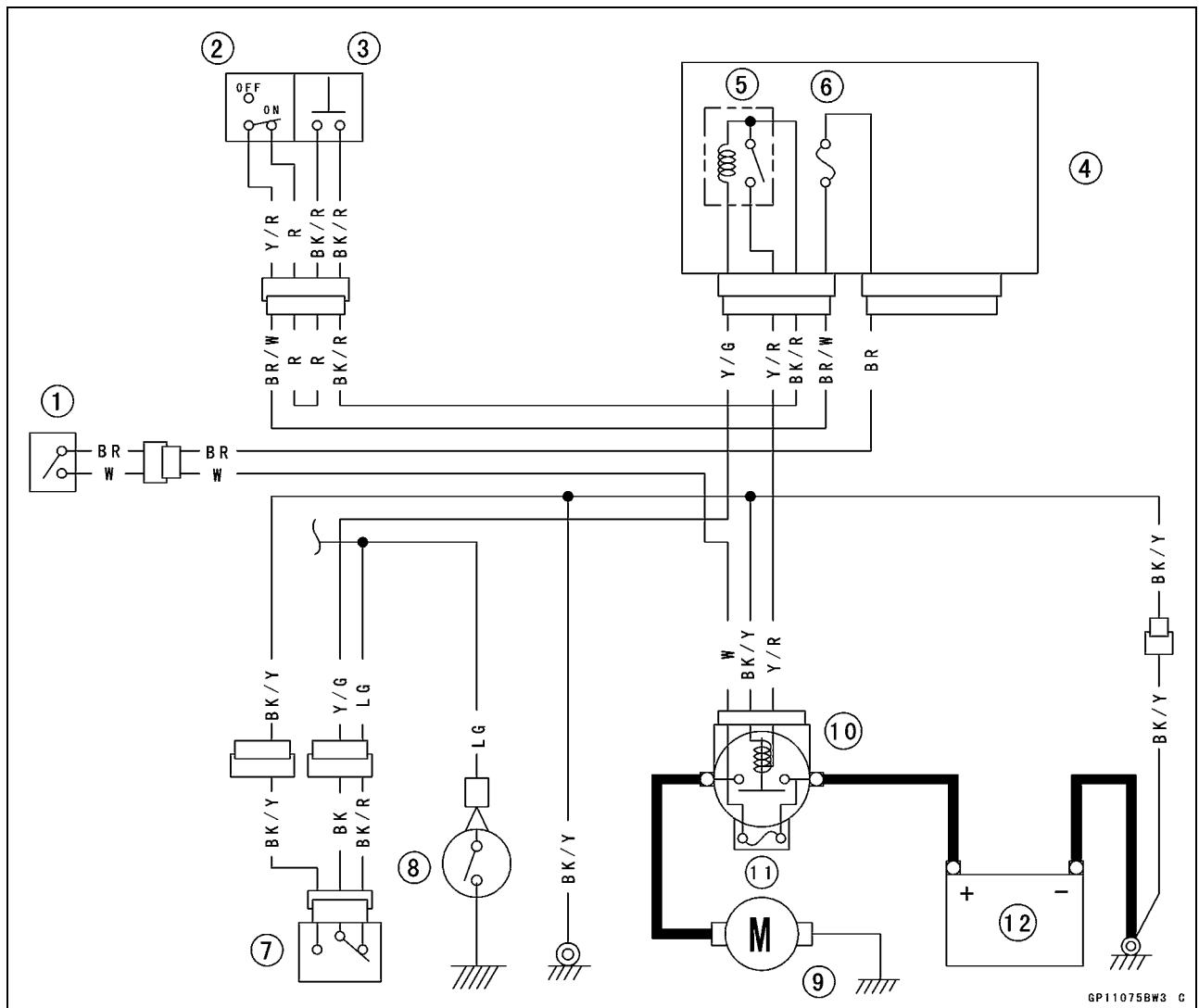
Tester Range: × 1 Ω range

Criteria: When battery is connected → 0 Ω

When battery is disconnected → ∞ Ω



Electrical Starter Circuit



1. Ignition Switch
2. Engine Stop Switch
3. Starter Button
4. Junction Box
5. Starter Circuit Relay
6. Ignition Fuse 10 A
7. Starter Lockout Switch
8. Neutral Switch
9. Starter Motor
10. Starter Relay
11. Main Fuse 30 A
12. Battery

15-48 ELECTRICAL SYSTEM

Lighting System

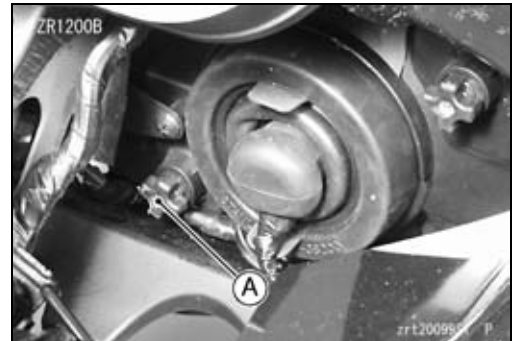
The US, Canada, Malaysia and Australia models adapt the daylight system and have a headlight relay and a headlight relay unit. In these models, the headlight does not go on when the ignition switch and the engine stop switch are first turned on. The headlight comes on after the starter button is released 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 with a screwdriver in or out until the beam points straight ahead.



- Turn the horizontal adjusters [A] on the headlight with a hand in or out until the beam points straight ahead.



Lighting System

Headlight Beam Vertical Adjustment

- Turn the vertical adjuster [A] on the headlight with a hand in or out to adjust the headlight vertically.



NOTE

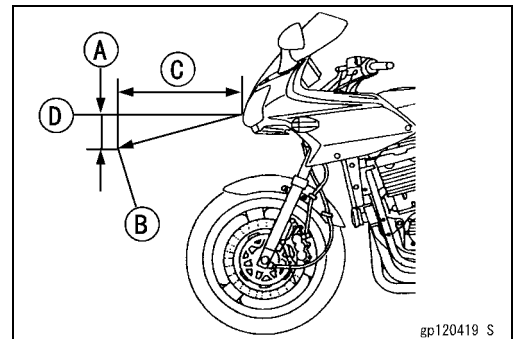
- On high beam, the brightest points should be slightly below horizontal with the motorcycle on its wheels and the rider seated. Adjust the headlight to the proper angle according to local regulations.
- For US model, the proper angle is 0.4 degrees below horizontal. This is 50 mm (2 in) drop at 7.6 m (25 ft) measured from the center of the headlight 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 from Ground [D]



15-50 ELECTRICAL SYSTEM

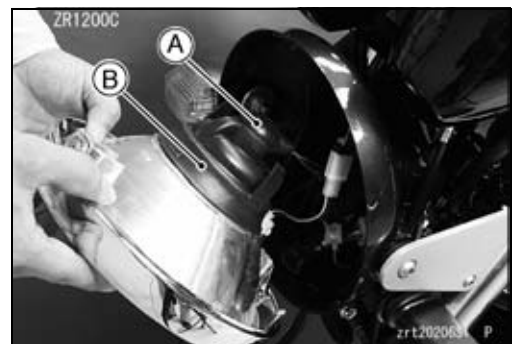
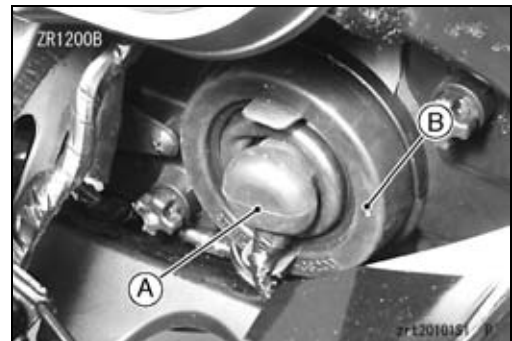
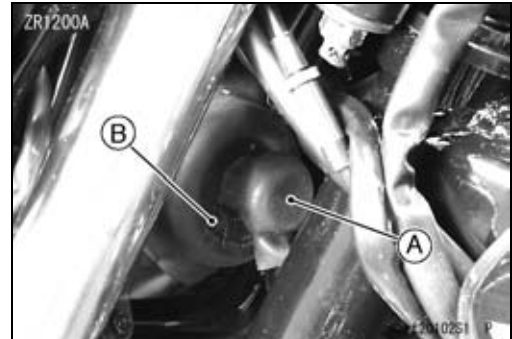
Lighting System

Headlight Bulb Replacement

- Remove: (ZR1200C)
 - Headlight Mounting Screws [A]
 - Headlight Unit [B]



- Remove:
 - Headlight Connector [A]
 - Headlight Bulb Dust Cover [B]



- Remove the hook [A].

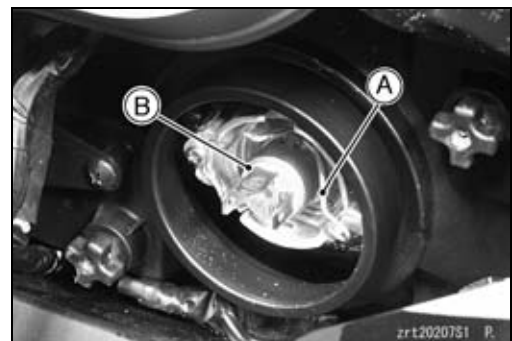
CAUTION

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

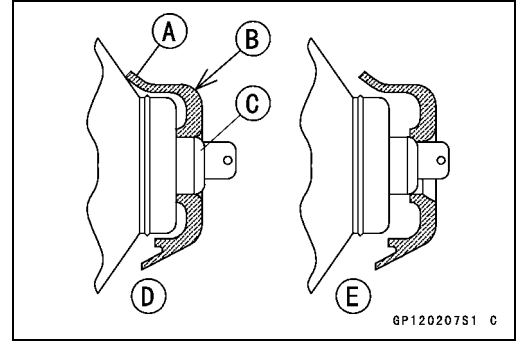
○Clean off any contamination that inadvertently gets on the bulb with alcohol or soap and water solution.

- Replace the headlight bulb [B].



Lighting System

- 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).

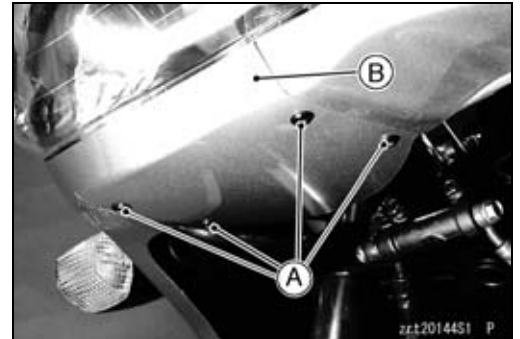


City Light Bulb Replacement (European Model)

- For ZR1200A, see Fairing Removal in the Frame chapter.

ZR1200B

- Remove:
 Screws [A]
 Joint Cover [B]

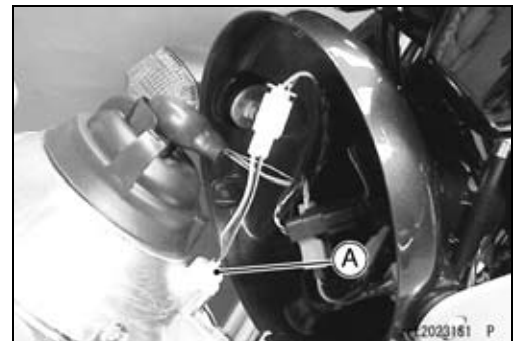


- Pull out the socket [A] together with the bulb.



ZR1200C

- Remove:
 Headlight (see Headlight Removal/Installation)
- Pull out the socket [A] together with the bulb.



- Pull the bulb [A] out of the socket [B] (ZR1200A/B/C).

CAUTION

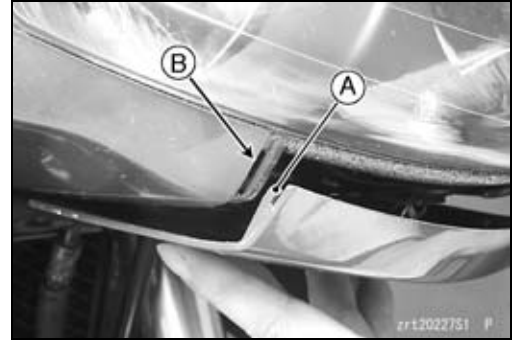
Do not turn the bulb. Pull the bulb out to prevent damage to the bulb. Do not use bulb rated for greater wattage than the specified value.



15-52 ELECTRICAL SYSTEM

Lighting System

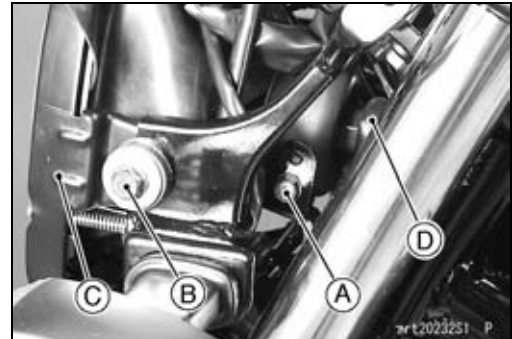
- For the ZR1200B Model, fit the tabs [A] of the joint cover into the grooves [B] of the fairings.



Headlight Removal/Installation

ZR1200A

- Remove:
 - Fairing (see Frame chapter)
 - Headlight Vertical Adjuster Bracket Bolt [A]
 - Headlight Mounting Bolts [B]
 - Headlight Unit [C]
 - Headlight Connector [D]

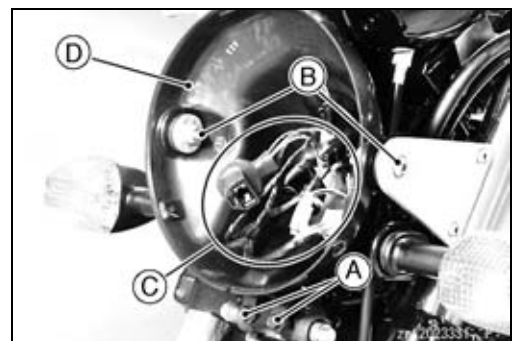
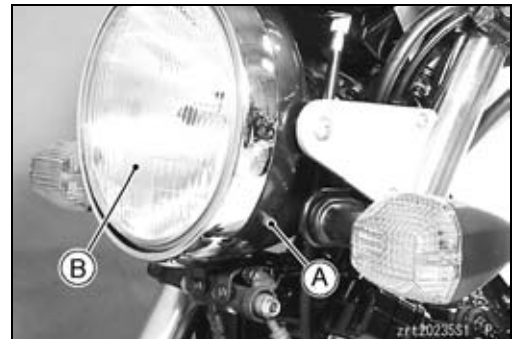


ZR1200B

- See Fairing Disassembly in the Frame chapter

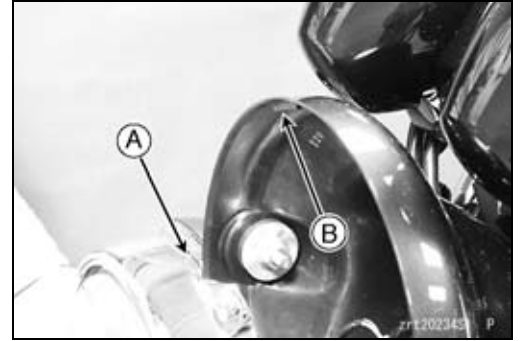
ZR1200C

- Remove:
 - Screws [A]
 - Headlight Unit [B]
 - Connectors
- Remove:
 - Headlight Vertical Adjuster Bracket Bolts [A]
 - Headlight Stay Bolts [B]
- Pull out the connector [C] from the hole of the headlight body [D].



Lighting System

- Fit the protrusion [A] on the headlight unit rim into the recess [B] of the headlight body.

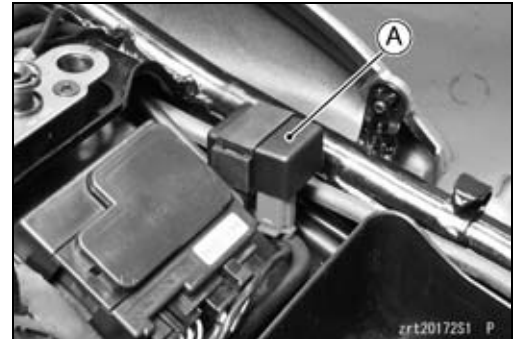


Headlight Relay Inspection

- Remove the seat (see Frame chapter).
- Take off the headlight relay [A].
- Set the hand tester to the $\times 1 \text{ k}\Omega$ range and make the measurements shown in the table.

Special Tool - Hand Tester: 57001-1394

- ★ If the tester readings are not as specified, replace the headlight relay.



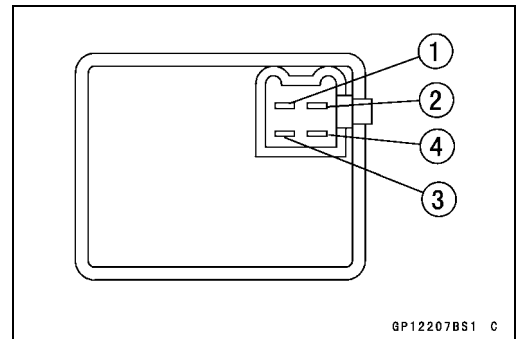
CAUTION

Use only Hand Tester 57001-1394 for this test. An ohmmeter other than the Kawasaki Hand Tester may show different readings. If a megger or a meter with a large-capacity battery is used, the headlight relay will be damaged.

Headlight Relay Internal Resistance

Range $\times 1 \text{ k}\Omega$	Tester (+) Lead Connection				
	1	2	3	4	
(-)*	1	—	∞	∞	∞
	2	∞	—	∞	∞
	3	∞	10 ~ 100	—	∞
	4	∞	20 ~ 200	1 ~ 5	—

(-)*: Tester (-) Lead Connection



15-54 ELECTRICAL SYSTEM

Lighting System

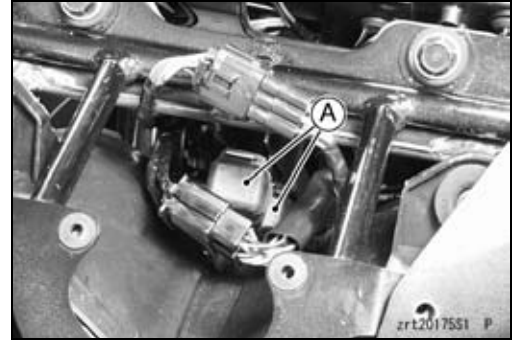
Headlight Relay Unit Inspection (ZR1200B)

- Remove the windshield and upper inner cover (see Frame chapter).
- Take off the headlight relay units [A].
- Set the hand tester to the $\times 1\Omega$ range and make the measurements shown in the figure.

12 V Battery [C]

Special Tool - Hand Tester: 57001-1394 [B]

- ★ If the tester readings are not as specified, replace the headlight relay unit.



CAUTION

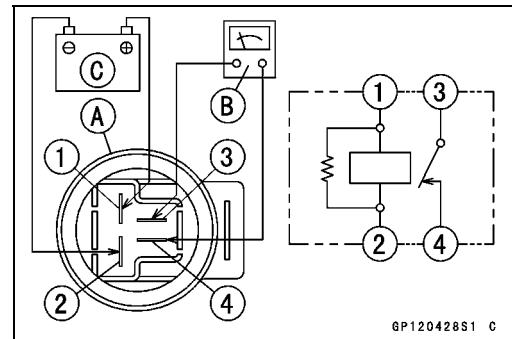
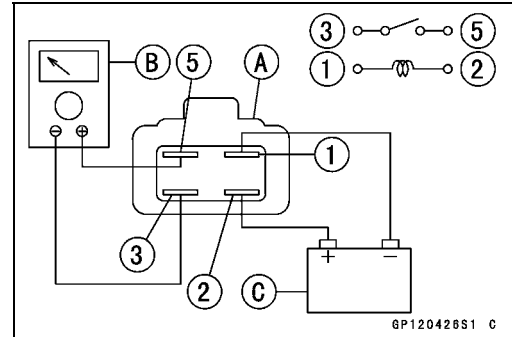
Use only Hand Tester 57001-1394 for this test. An ohmmeter other than the Kawasaki Hand Tester may show different readings. If a megger or a meter with a large-capacity battery is used, the headlight relay will be damaged.

Testing Relay

Criteria When battery is connected $\rightarrow 0\Omega$

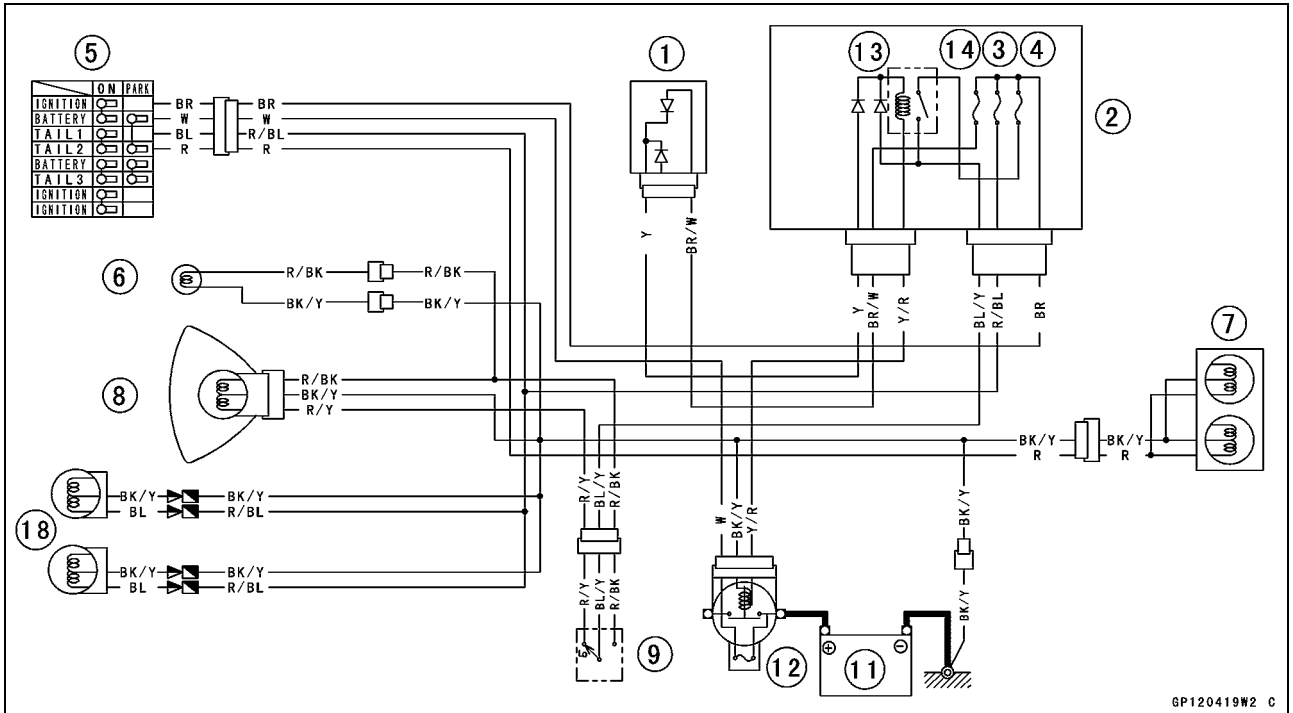
When battery is disconnected $\rightarrow \infty\Omega$

- For the Malaysian Model.



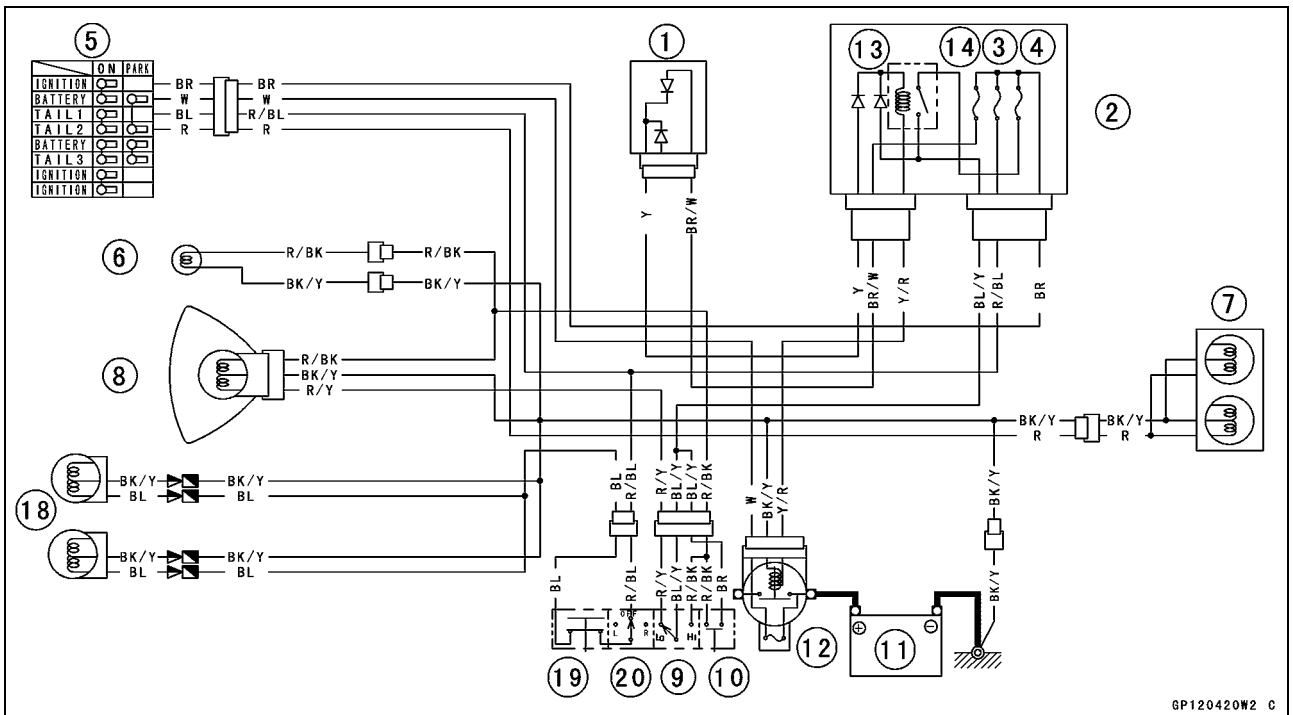
Lighting System

Headlight Circuit (ZR1200A: US and CA)



GP120419W2 C

Headlight Circuit (ZR1200A: MY)



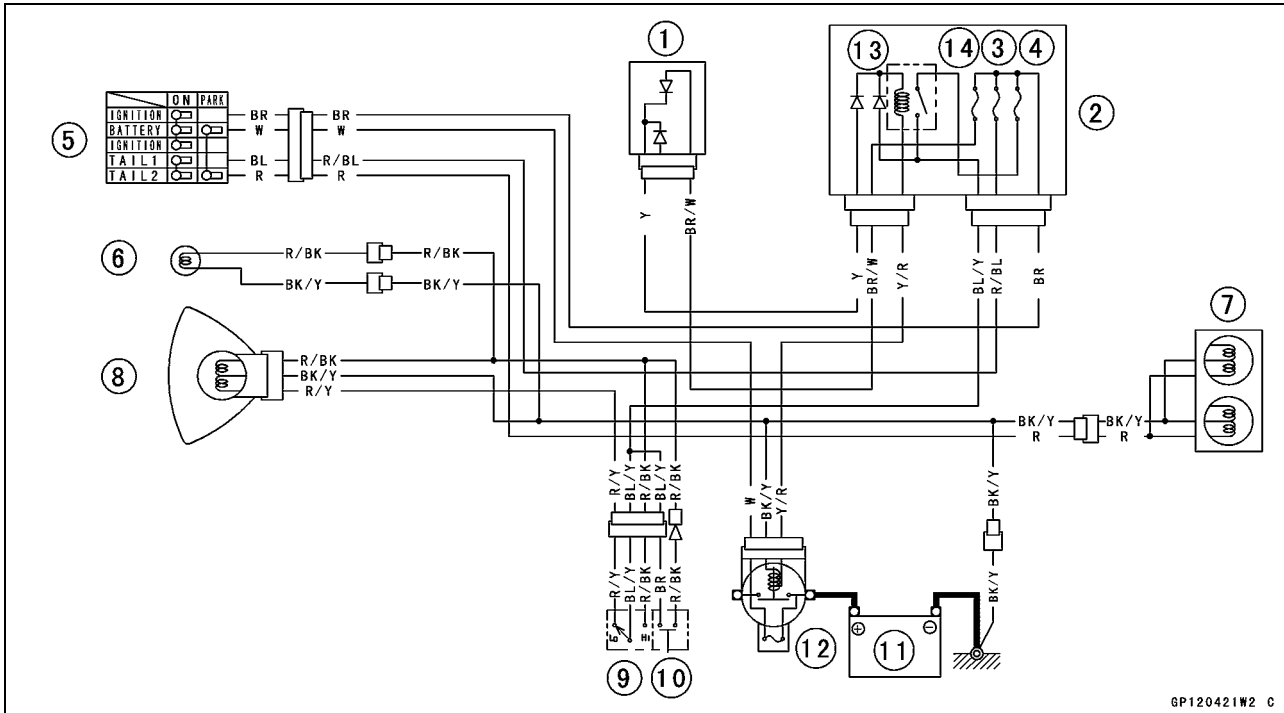
GP120420W2 C

- | | |
|------------------------------|---|
| 1. Headlight Relay | 11. Battery |
| 2. Junction Box | 12. Main Fuse 30 A |
| 3. Taillight Fuse 10 A | 13. Headlight Diodes |
| 4. Headlight Fuse 10 A | 14. Ignition Fuse 10 A |
| 5. Ignition Switch | 18. Turn Signal/Running Position Lights |
| 6. High Beam Indicator Light | 19. Hazard Switch |
| 7. Tail & Brake Lights | 20. Turn Signal Switch |
| 8. Headlight | |
| 9. Dimmer Switch | |
| 10. Passing Button | |
- US: United States Model
 CA: Canada Model
 MY: Malaysia Model

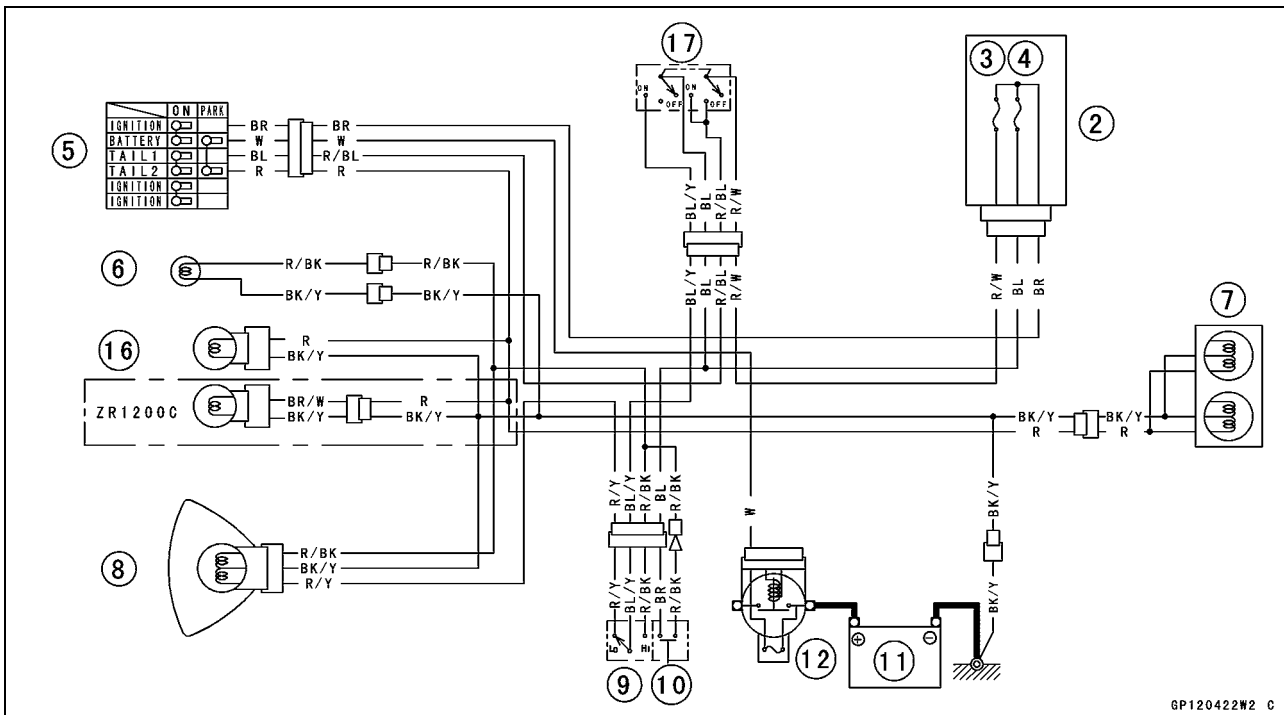
15-56 ELECTRICAL SYSTEM

Lighting System

Headlight Circuit (ZR1200A: AU)



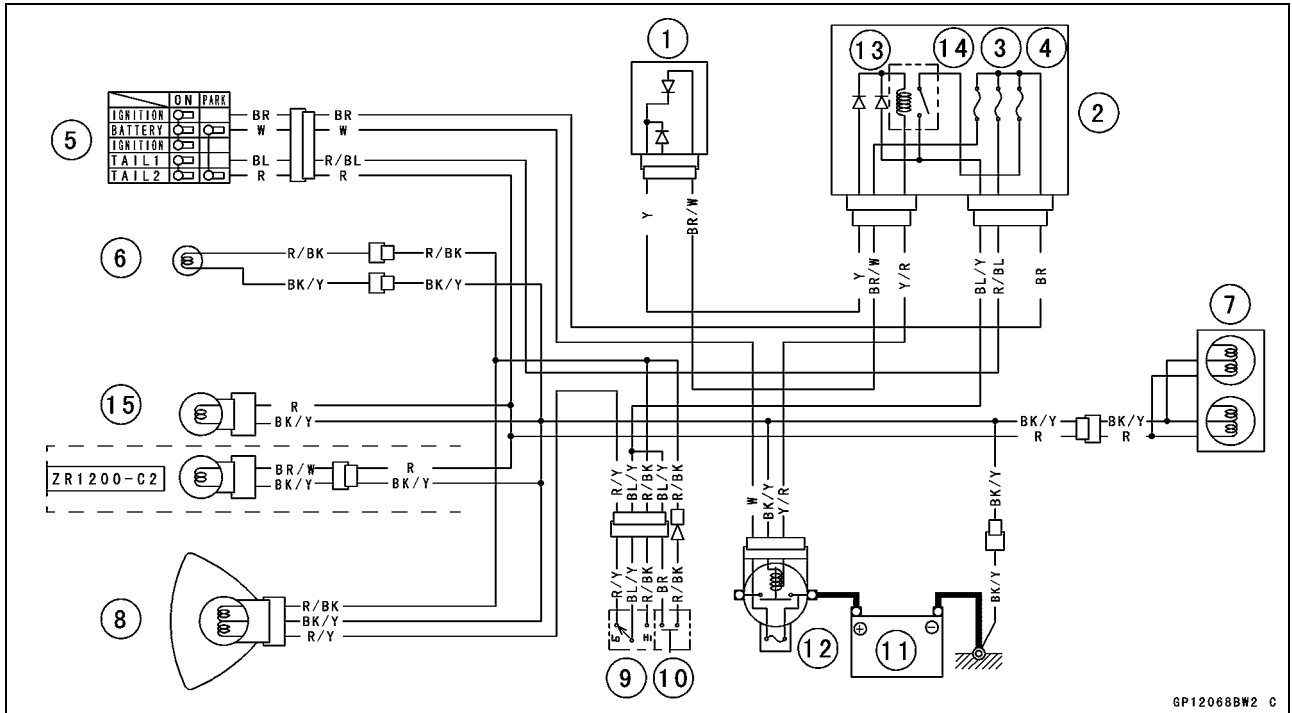
Headlight Circuit (ZR1200A/C: EUR)



- | | |
|------------------------------|------------------------|
| 1. Headlight Relay | 11. Battery |
| 2. Junction Box | 12. Main Fuse 30 A |
| 3. Taillight Fuse 10 A | 13. Headlight Diodes |
| 4. Headlight Fuse 10 A | 14. Ignition Fuse 10 A |
| 5. Ignition Switch | 16. City Light |
| 6. High Beam Indicator Light | 17. Headlight Switch |
| 7. Tail & Brake Light | |
| 8. Headlight | AU: Australia Model |
| 9. Dimmer Switch | EUR: Europe Model |
| 10. Passing Button | |

Lighting System

Headlight Circuit (ZR1200A3 ~ /C2 ~: Europe Models)



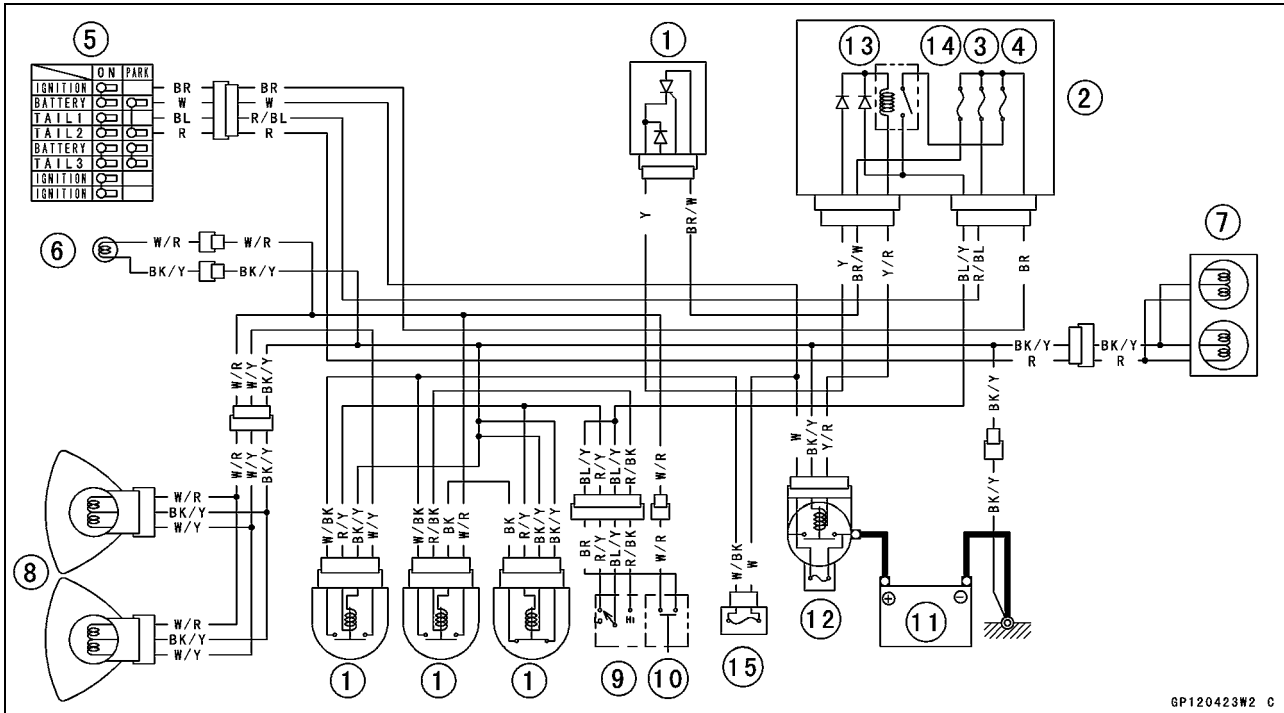
GP12068BW2 C

1. Headlight Relay
2. Junction Box
3. Taillight Fuse 10 A
4. Headlight Fuse 10 A
5. Ignition Switch
6. High Beam Indicator Light
7. Tail & Brake Light
8. Headlight
9. Dimmer Switch
10. Passing Button
11. Battery
12. Main Fuse 30 A
13. Headlight Diodes
14. Ignition Fuse 10 A
15. City Light

15-58 ELECTRICAL SYSTEM

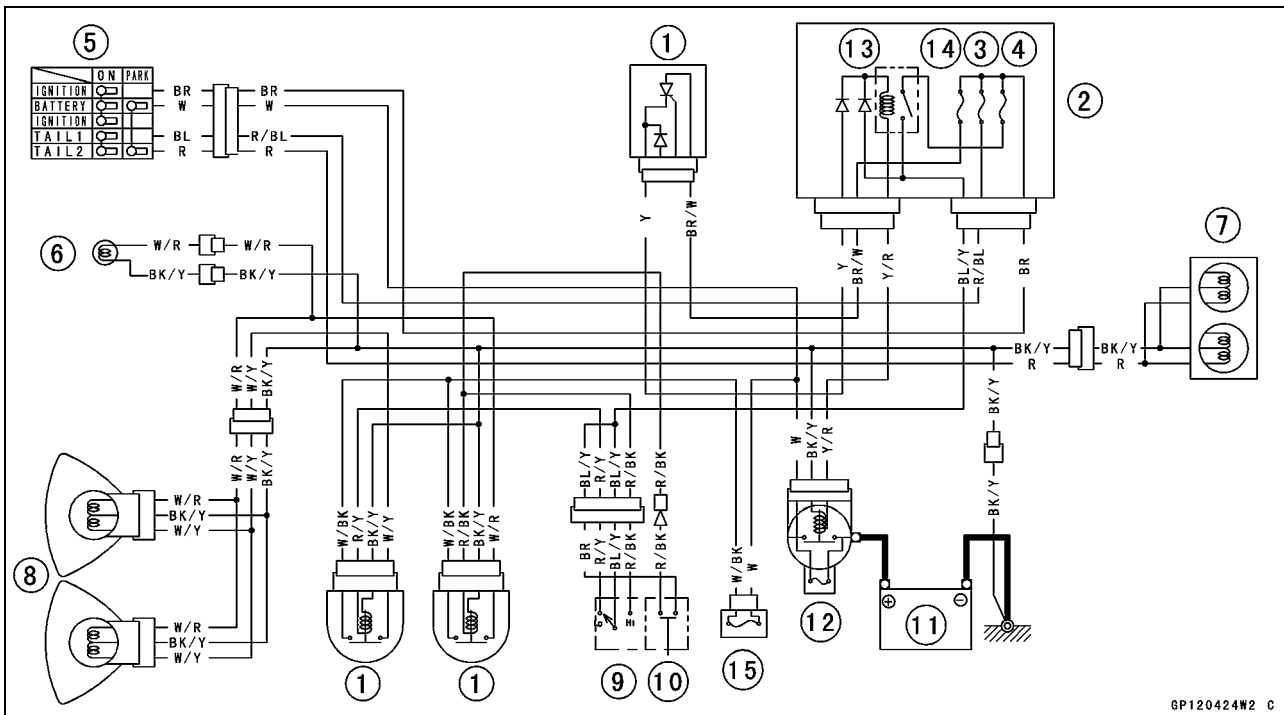
Lighting System

Headlight Circuit (ZR1200B: MY)



GP120423W2 C

Headlight Circuit (ZR1200B: AU)



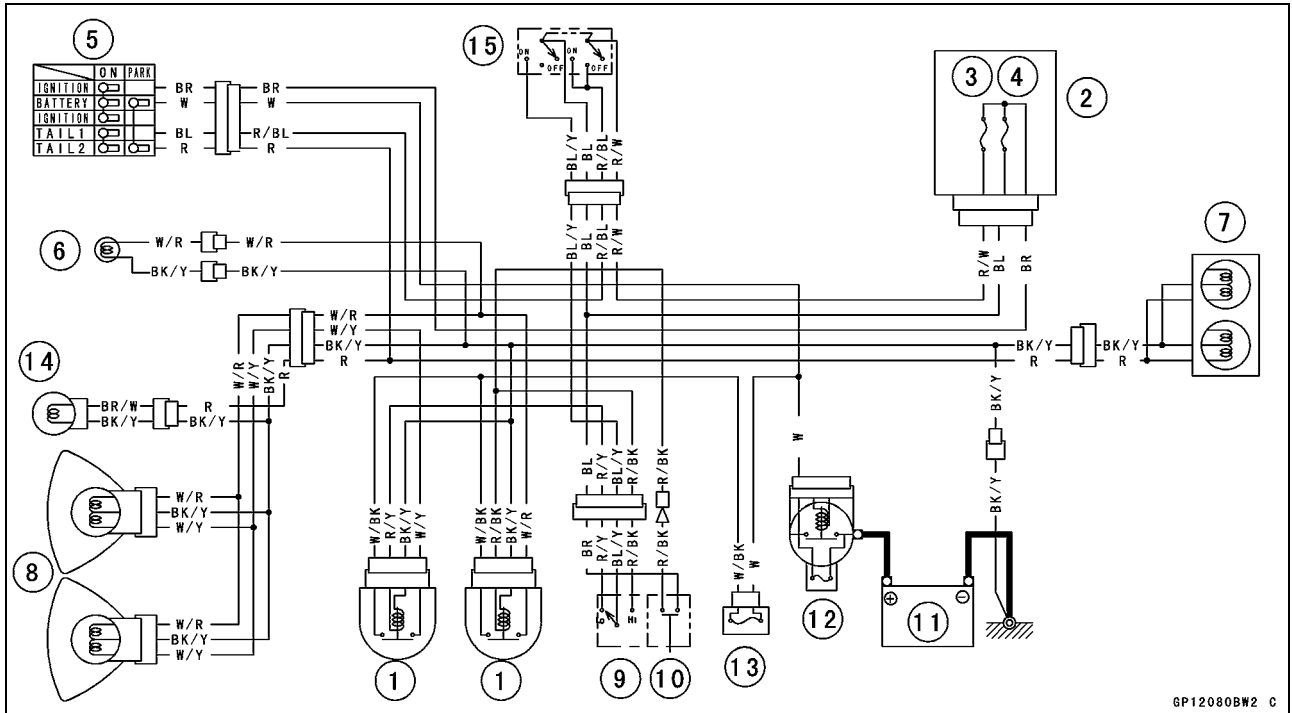
GP120424W2 C

- | | |
|------------------------------|-------------------------|
| 1. Headlight Relay | 11. Battery |
| 2. Junction Box | 12. Main Fuse 30 A |
| 3. Taillight Fuse 10 A | 13. Headlight Diodes |
| 4. Headlight Fuse 10 A | 14. Ignition Fuse 10 A |
| 5. Ignition Switch | 15. Headlight Fuse 10 A |
| 6. High Beam Indicator Light | |
| 7. Tail & Brake Light | |
| 8. Headlight | |
| 9. Dimmer Switch | |
| 10. Passing Button | |

MY: Malaysia Model
 AU: Australia Model

Lighting System

Headlight Circuit (ZR1200B: Europe Model)



GP12080BW2 C

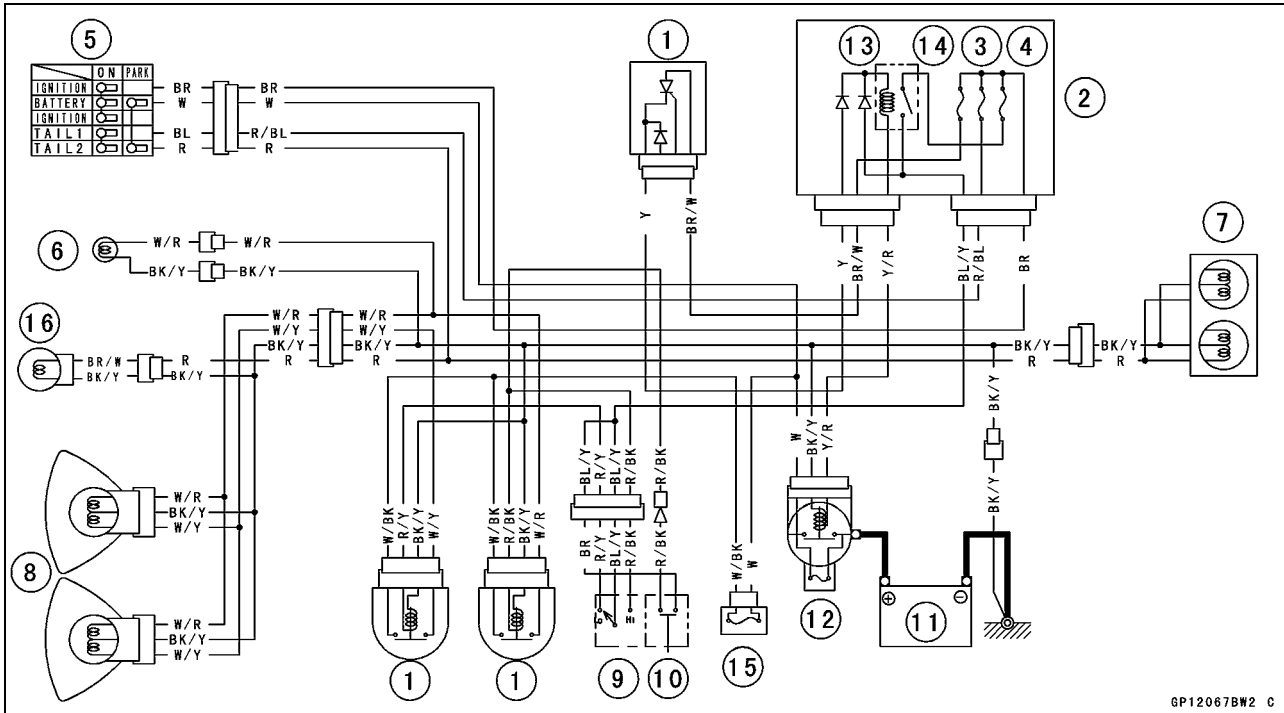
1. Headlight Relay
2. Junction Box
3. Taillight Fuse 10 A
4. Headlight Fuse 10 A
5. Ignition Switch
6. High Beam Indicator Light
7. Tail & Brake Light
8. Headlight
9. Dimmer Switch
10. Passing Button
11. Battery
12. Main Fuse 30 A
13. Headlight Fuse 10 A
14. City Light
15. Headlight Switch

EUR: Europe Model

15-60 ELECTRICAL SYSTEM

Lighting System

Headlight Circuit (ZR1200-B3~: Europe Models)

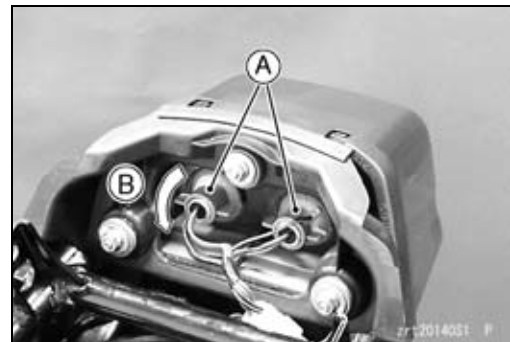


GP12067BW2 C

1. Headlight Relay
2. Junction Box
3. Taillight Fuse 10 A
4. Headlight Fuse 10 A
5. Ignition Switch
6. High Beam Indicator Light
7. Tail & Brake Light
8. Headlight
9. Dimmer Switch
10. Passing Button
11. Battery
12. Main Fuse 30 A
13. Headlight Diodes
14. Ignition Fuse 10 A
15. Headlight Fuse 10 A
16. City Light

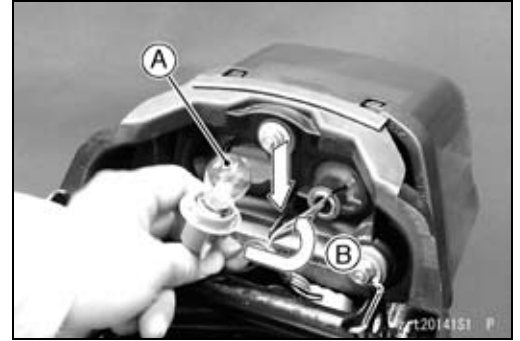
Tail/Brake Light Bulb Replacement

- Remove:
 - Seat and Seat Cover (see Frame chapter)
- Turn the socket counterclockwise [A] and remove the bulbs and sockets [B].

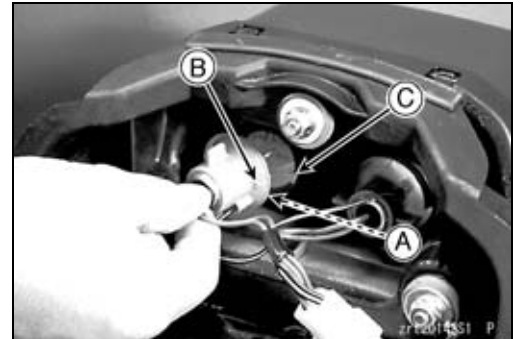


Lighting System

- Push the bulb [A] in the socket and turn the bulb counter-clockwise [B].



- Insert the new bulb in the socket and turn the bulb clockwise.
- Insert the socket by aligning the projection [A] on the triangular mark [B] with the notch [C] and turn the socket clockwise.

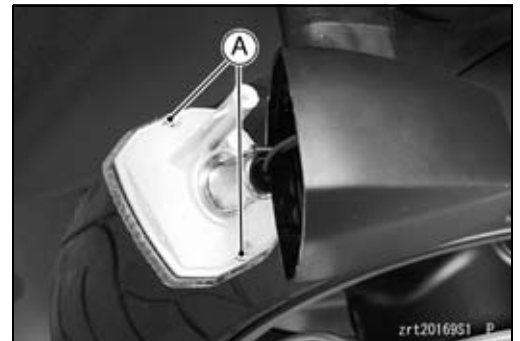


Turn Signal Light Bulb Replacement

- Unscrew the screw [A].



- Unscrew the screws [A].



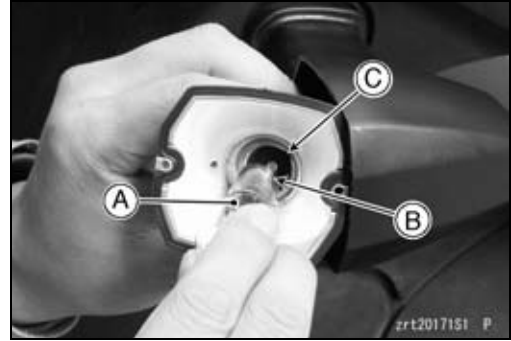
- Push and turn the bulb [A] counter clockwise and remove it.



15-62 ELECTRICAL SYSTEM

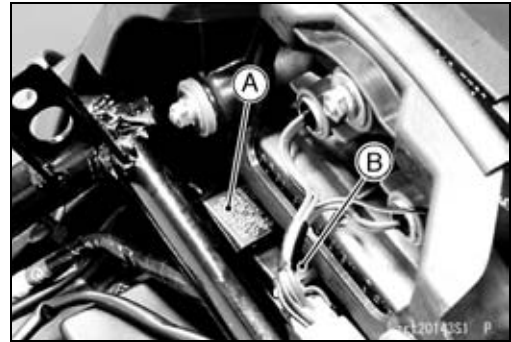
Lighting System

- Insert the new bulb [A] by aligning its upper pin [B] with the upper groove [C] in the socket, and turn the bulb clockwise.

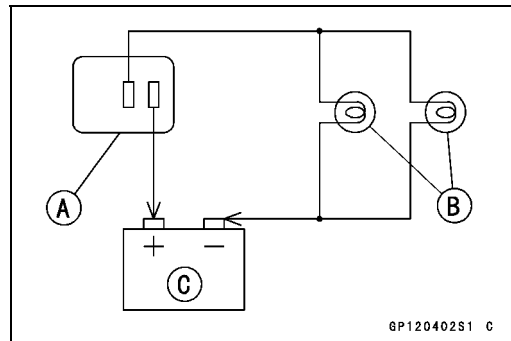


Turn Signal Relay Inspection

- Remove:
 - Seat and Seat Cover (see Frame chapter).
 - Turn Signal Relay [A]
- Disconnect:
 - Turn Signal Connector [B]



- 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

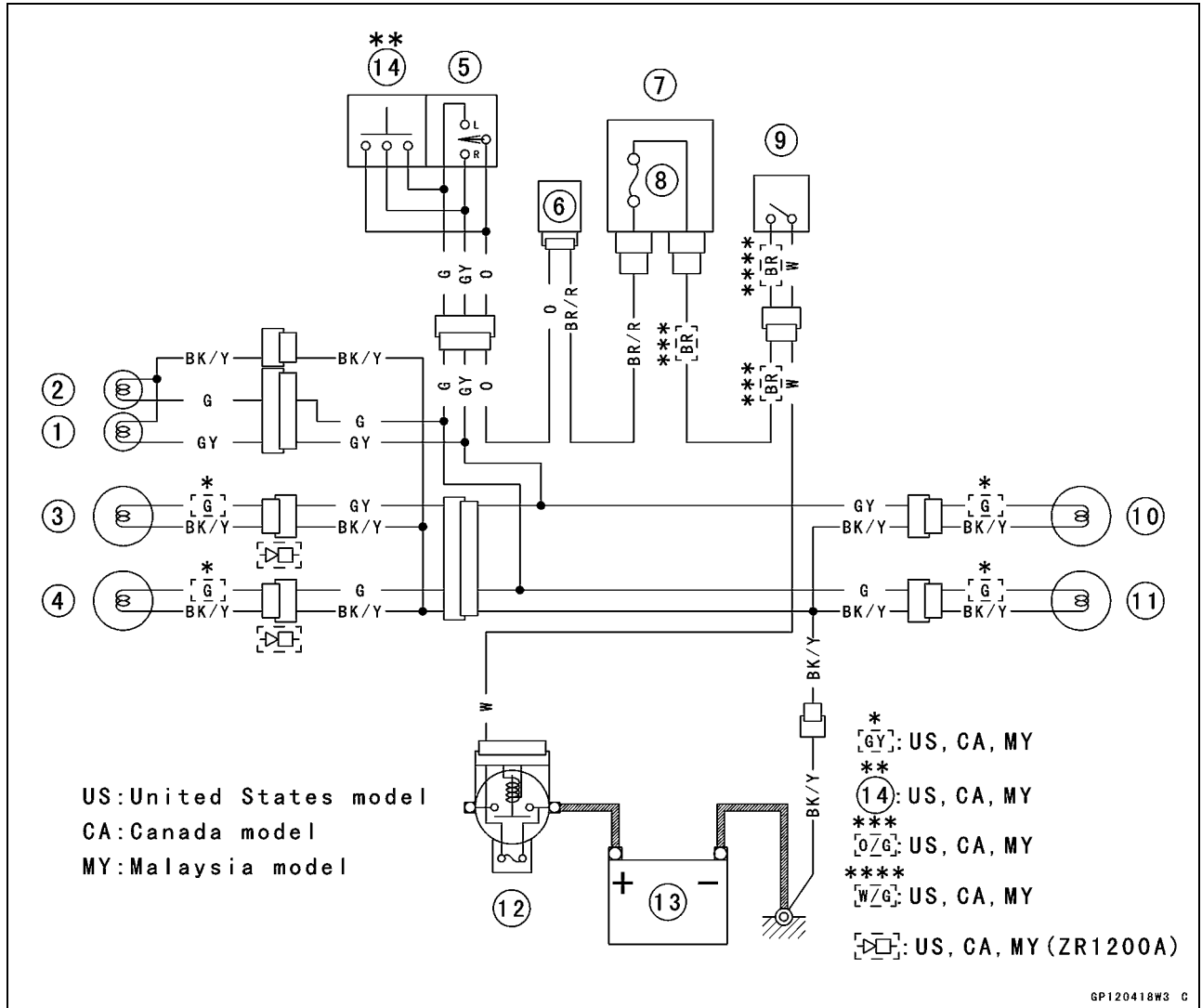
Load		Flashing times (c/m*)
The Number of Turn Signal Lights	Wattage (W)	
1**	21 or 23	140 ~ 250
2	42 or 46	75 ~ 95

(*): Cycle(s) per minute

(**): corresponds to "One light burned out".

Lighting System

Turn Signal Light Circuit



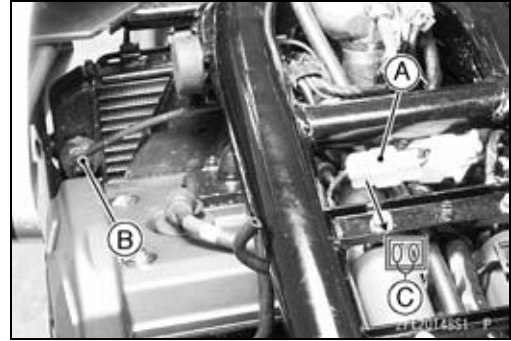
1. Right Turn Signal Indicator Light
2. Left Turn Signal Indicator Light
3. Front Right Turn Signal Light
4. Front Left Turn Signal Light
5. Turn Signal Switch
6. Turn Signal Relay
7. Junction Box
8. Turn Signal Fuse 10 A
9. Ignition Switch
10. Rear Right Turn Signal Light
11. Rear Left Turn Signal Light
12. Main Fuse 30 A
13. Battery
14. Hazard Button

15-64 ELECTRICAL SYSTEM

Radiator Fan System

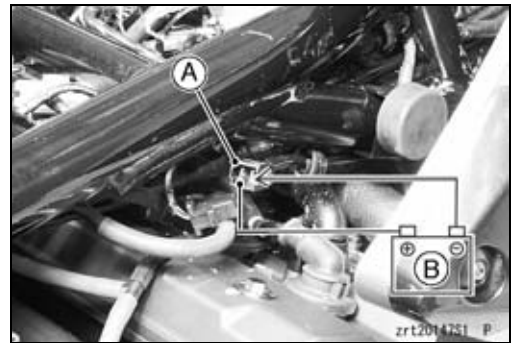
Fan System Circuit Inspection

- Remove the fuel tank (see Fuel System chapter).
- Disconnect the 2 pin connector [A] from the radiator fan switch [B].
- Using an auxiliary wire [C], connect the radiator fan switch leads of the main harness side.
- Turn the ignition switch ON.
- ★ 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

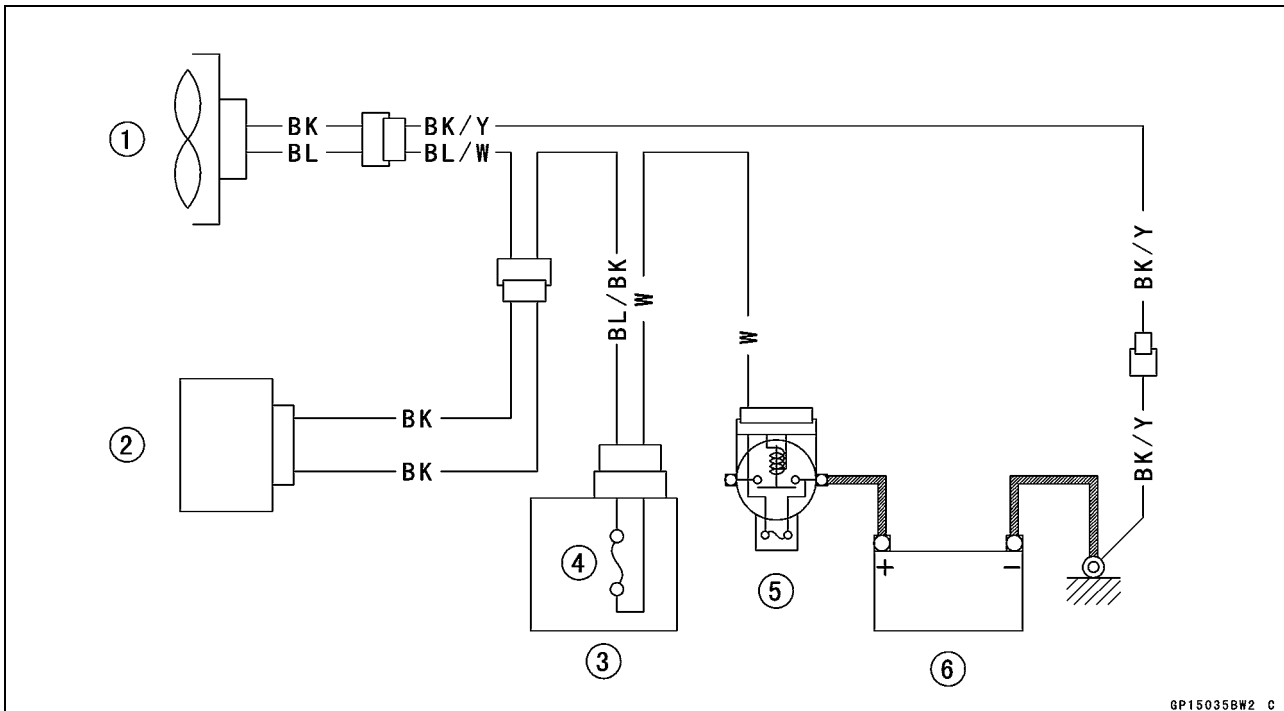


Fan Motor Inspection

- 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



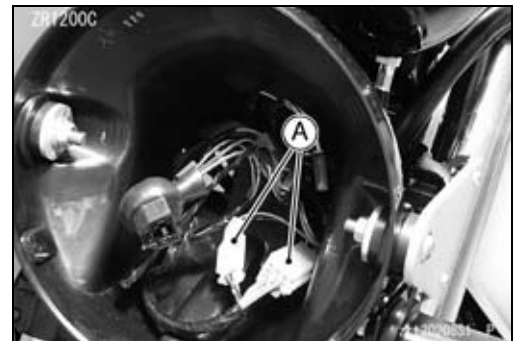
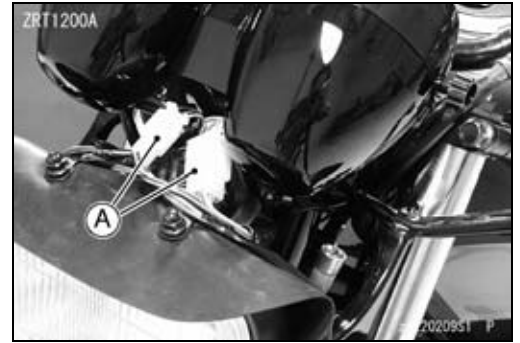
GP15035BW2 C

1. Radiator Fan
2. Radiator Fan Switch
3. Junction Box
4. Fan Fuse 10 A
5. Main Fuse 30 A
6. Battery

Meters, Gauges, Indicator Unit

Meter Unit Removal

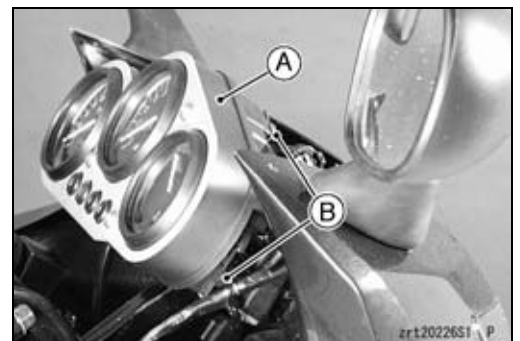
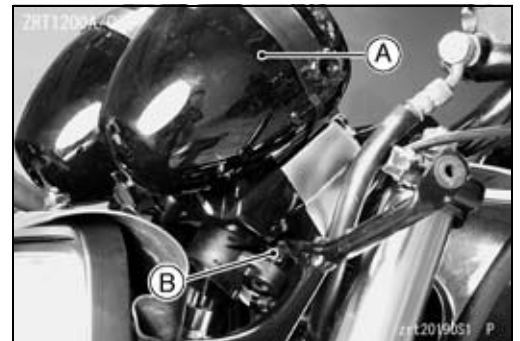
- Remove:
 - Fairing (ZR1200A, see Frame chapter)
 - Wind Shield and Cover (ZR1200B, see Frame chapter)
 - Headlight (ZR1200C, see Headlight Bulb Replacement)
 - Speedometer Cable Upper End
 - Meter Connectors [A]



- Remove the meter unit [A] by taking off the mounting nuts [B].

CAUTION

Place the meter or gauge so that the face is up. If a meter or gauge is left upside down or sideways for any length of time, it will malfunction.



15-66 ELECTRICAL SYSTEM

Meters, Gauges, Indicator Unit

Meter, Gauge Disassembly ZR1200A/C

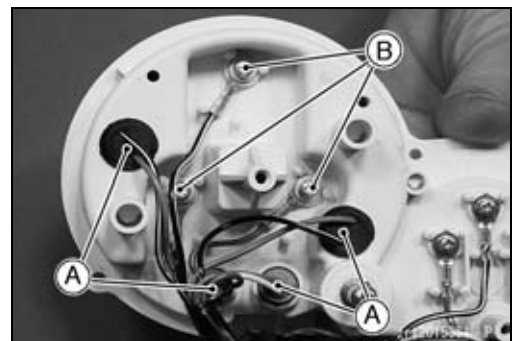
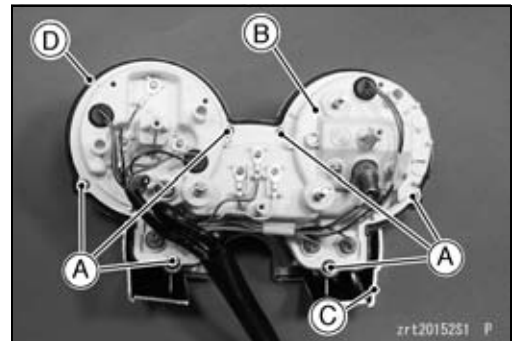
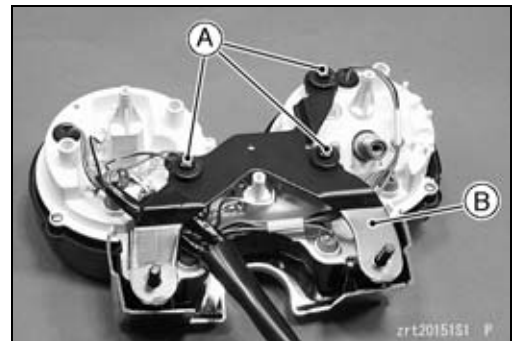
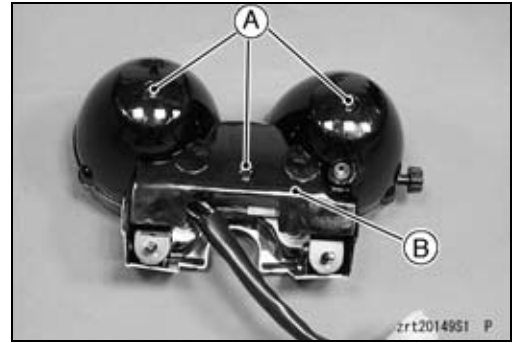
- Remove:
 - Meter Unit
 - Cover Screws [A]
 - Meter Unit Cover [B]

- Unscrew the screw and remove the trip meter knob [A].

- Remove:
 - Bracket Nuts [A]
 - Meter Unit Bracket [B]

- Unscrew the screw [A] and separate the meter assembly [B] indicator light cover [C] and upper meter cover [D].

- Pull the sockets [A] out from the lower meter cover.
- Unscrew the screws [B] and remove the tachometer.



Meters, Gauges, Indicator Unit

CAUTION

Do not fail to remove the screws while the meter faced up [A] when removing each meters. If the screws are removed while the meter faced down, the meter may come down, and the meter may be damaged.

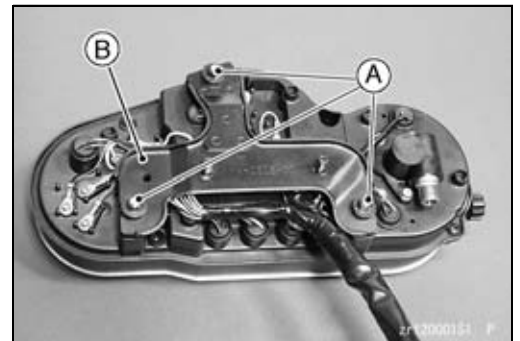
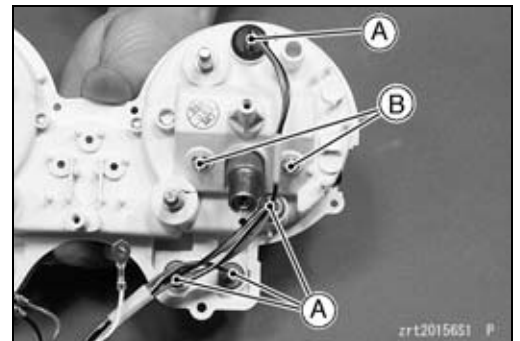
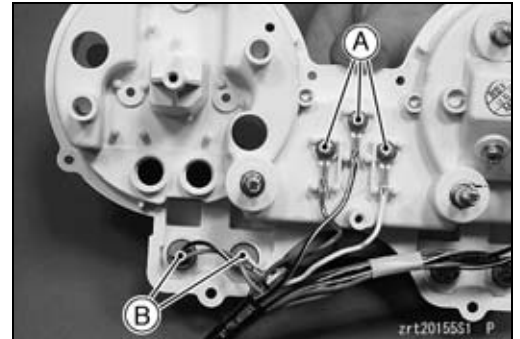
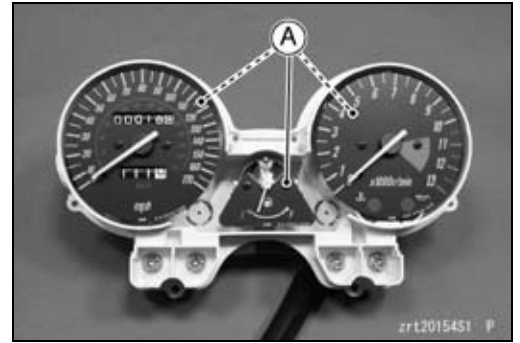
- Unscrew the screws [A] and remove the fuel gauge.
- Pull the sockets [B] out from the lower meter cover.

- Pull the sockets [A] from the lower meter cover.
- Unscrew the screw [B] and remove the speedometer.

ZR1200B

- Remove:
 - Meter Unit (see Meter Unit Removal)
 - Nuts [A]
 - Meter Unit Bracket [B]

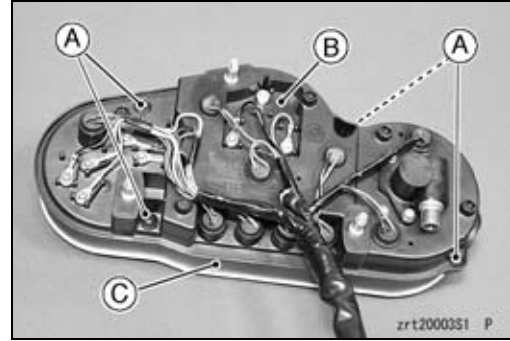
- Unscrew the trip meter knob screw and take off the trip meter knob [A].



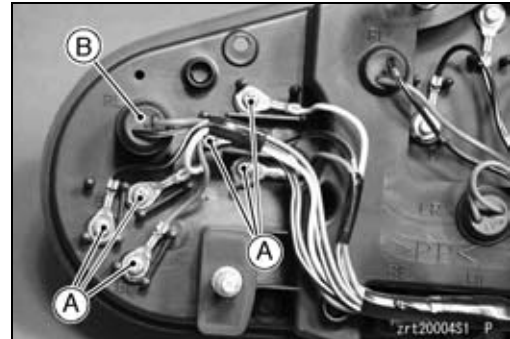
15-68 ELECTRICAL SYSTEM

Meters, Gauges, Indicator Unit

- Unscrew the screws [A] and separate the meter assembly [B] and upper meter cover [C].

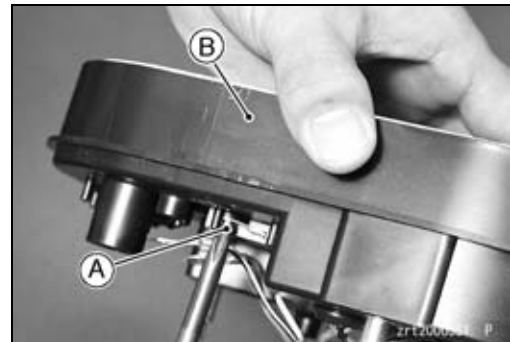


- Unscrew the screws [A] and remove the fuel/water temperature gauge.
- Pull the meter socket [B] out from the lower meter cover.

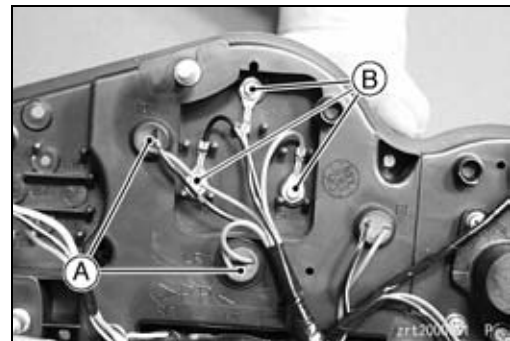


CAUTION

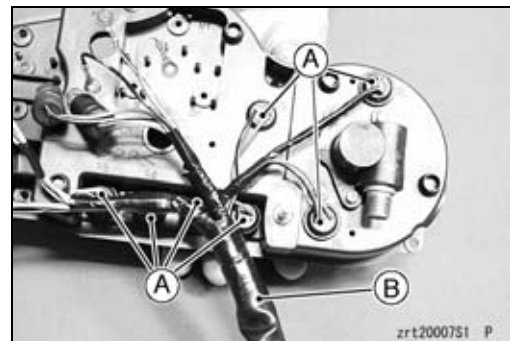
Do not fail to remove the screws [A] while the meter faced up [B] when removing each meters. If the screws are removed while the meter faced down, the meter may come down, and the meter may be damage.



- Pull the sockets [A] out from the lower meter cover.
- Unscrew the screws [B] and remove the tachometer.

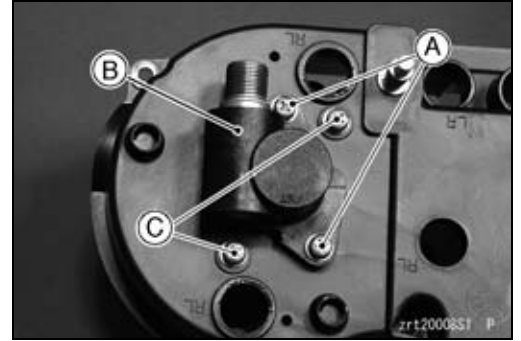


- Pull the sockets [A] out and take the meter harness [B].



Meters, Gauges, Indicator Unit

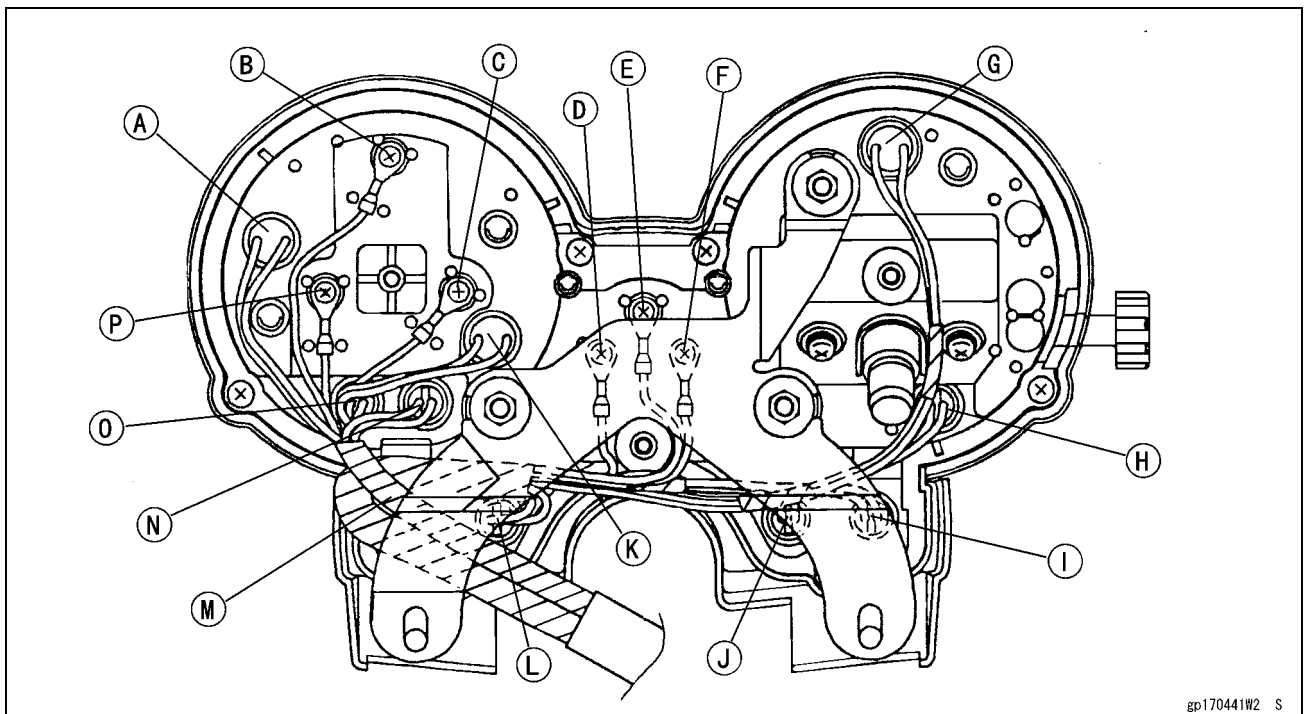
- Unscrew the screws [A] and remove the speedometer upper gear assembly [B].
- Unscrew the screws [C] and remove the speedometer.



Meter Unit Assembly

ZR1200A/C

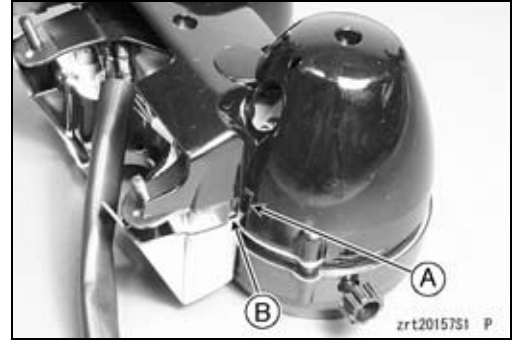
- Install the bulbs and wire terminals in the original positions.
 - R/BL and BK/Y [A]
 - BK/Y [B]
 - BR [C]
 - BR [D]
 - BK/Y [E]
 - W/Y [F]
 - R/BL and BK/Y [G]
 - R/BL and BK/Y [H]
 - G and BK/Y [I]
 - R/BK and BK/Y [J]
 - R/BL and BK/Y [K]
 - LG and BR [L]
 - GY and BK/Y [M]
 - Y/W and BR [N]
 - BL/R and BR [O]
 - W/Y [P]



15-70 ELECTRICAL SYSTEM

Meters, Gauges, Indicator Unit

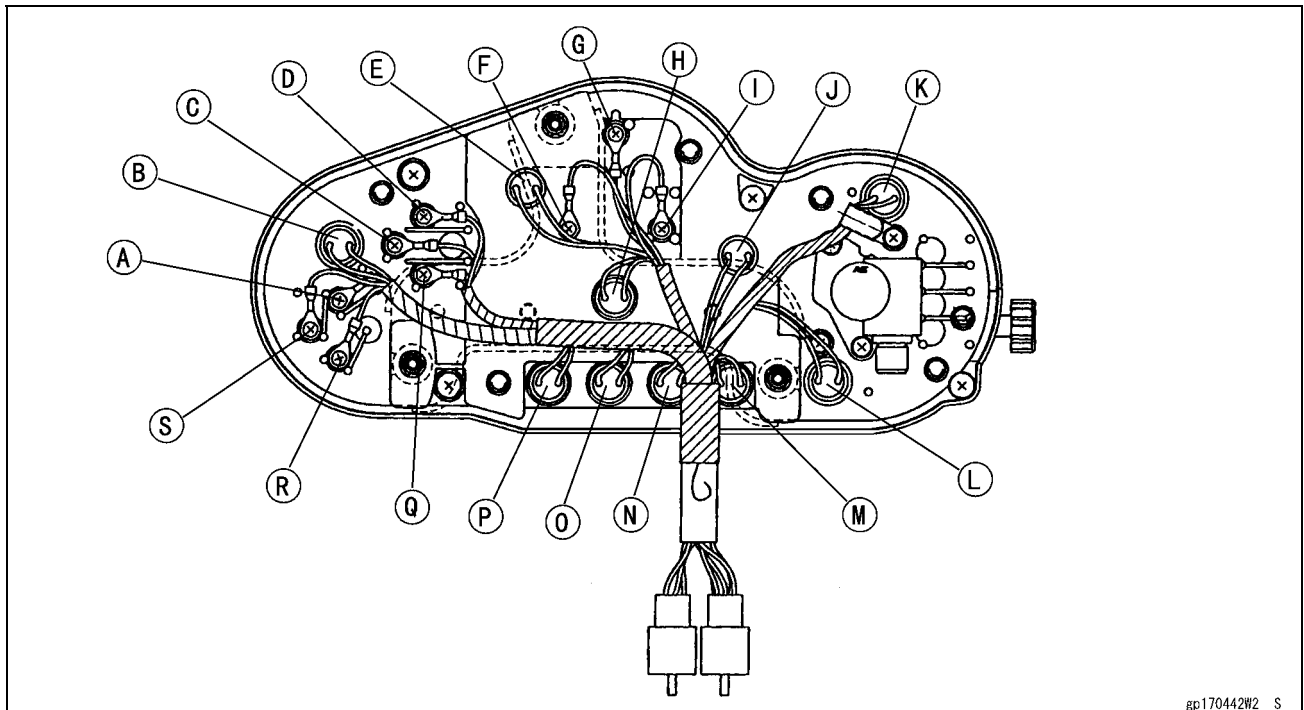
- Fit the slits [A] of the meter unit cover into the walls [B] of the indicator light cover.



ZR1200B

- Install the bulbs and wire terminals in the original positions.

- Y/W [A]
- R/BL and BK/Y [B]
- BK/Y [C]
- W/Y [D]
- R/BL and BK/Y [E]
- BK [F]
- BK/Y [G]
- BL/R and BK/Y [H]
- BR [I]
- R/BL and BK/Y [J]
- R/BL and BK/Y [K]
- R/BL and BK/Y [L]
- G and BK/Y [M]
- W/R and BK/Y [N]
- LG and BR [O]
- GY and BK/Y [P]
- BR [Q]
- BR [R]
- BK/Y [S]



Meters, Gauges, Indicator Unit

Meter Bulb Replacement

- Remove the meter Unit (see Meter Unit Removal).
- Pull the meter socket [A] out from the meter unit.
- To remove the wedge-base type bulb [B], pull the bulb out of the socket.

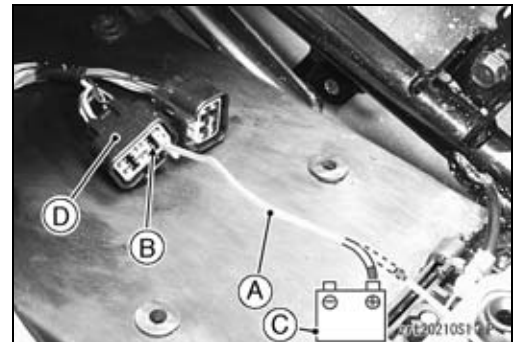
CAUTION

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.



Tachometer Inspection

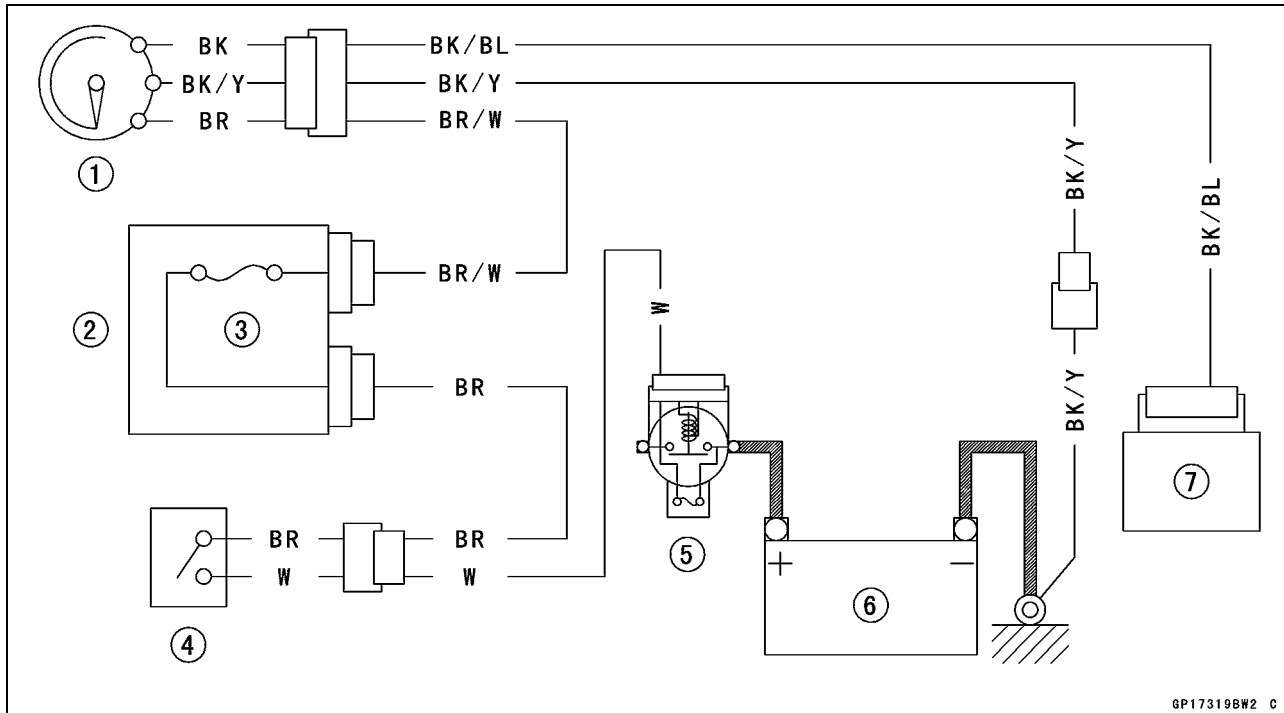
- Check the tachometer circuit wiring (see Wiring Inspection).
- ★ If all wiring and components other than the tachometer unit check out good, the unit is suspect. Check the unit as shown.
- Remove the IC igniter (see IC Igniter Inspection).
- Disconnect the connector.
- Turn the ignition switch ON.
- Using an auxiliary wire [A], open and connect the BK/BL lead terminal [B] to the battery (+) terminal [C] repeatedly. Main Harness Side Connected [D]
- Then the tachometer [A] needle should flick [B].
- Turn the ignition switch OFF.
- ★ If the hand does not flick, replace the tachometer unit.
- Install the IC igniter.



15-72 ELECTRICAL SYSTEM

Meters, Gauges, Indicator Unit

Tachometer Circuit



1. Tachometer
2. Junction Box
3. Ignition Fuse 10 A
4. Ignition Switch
5. Main Fuse 30 A
6. Battery
7. IC Igniter

Fuel Level Sensor Inspection

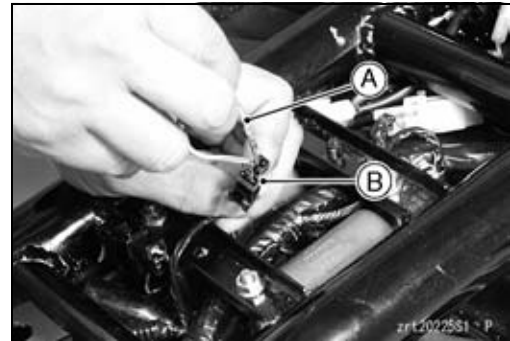
- Remove the fuel tank (see Fuel System chapter).
- Using auxiliary wire [A], short the terminals of the connect [B] on the main harness. At this time, check the movement of the fuel level sensor needle.

Fuel Level Sensor Operation Check

Ignition Switch Position: ON

Wire Location: Female 2-pin sensor connector (disconnected)

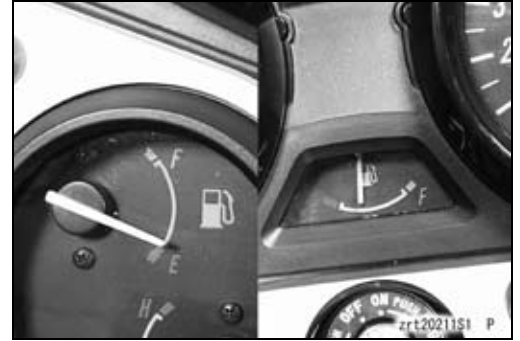
- Results:
- Sensor should read E when connector wires are opened.
 - Sensor should read F when connector wires are shorted.



Meters, Gauges, Indicator Unit

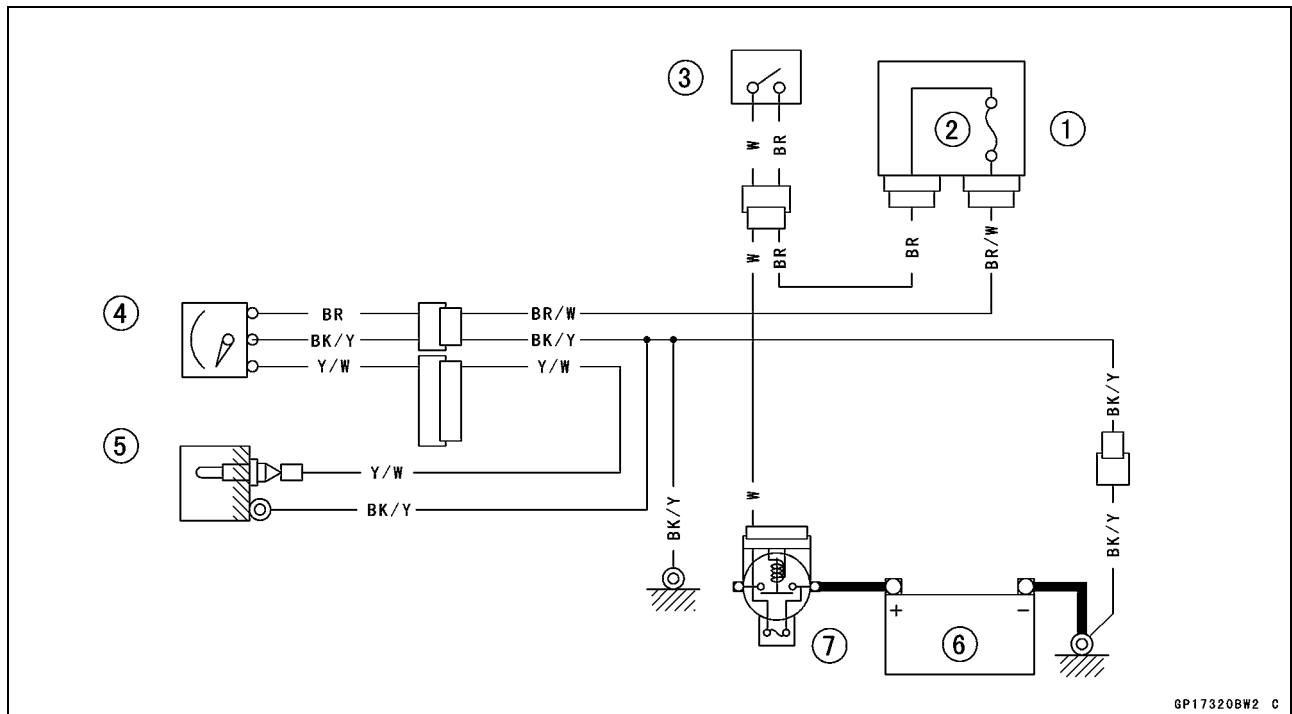
CAUTION

Do not short circuit the leads longer than necessary.
When the hand swings to the "F" position, stop short-circuiting.
Otherwise a good gauge could be damaged.



- ★ If the gauge readings are correct, the fuel level sensor is bad.
- ★ If these readings are not obtained, the trouble is with the gauge and/or wiring.
- Check the fuel level gauge circuit wiring (see Wiring Inspection).
- ★ If all wiring and components other than the fuel level gauge check out good, the gauge is defective.

Fuel Level Gauge Circuit



GP173208W2 C

1. Junction Box
2. Ignition Fuse 10 A
3. Ignition Switch
4. Fuel Level Gauge
5. Fuel Level Sensor
6. Battery
7. Main Fuse 30 A

15-74 ELECTRICAL SYSTEM

Meters, Gauges, Indicator Unit

Water Temperature Gauge Inspection (ZR1200B)

- Remove the fuel tank (see Fuel System chapter).
- Pull off the water temperature sensor connector [A].



- Prepare auxiliary wire [B], and check the operation of the gauge [C].

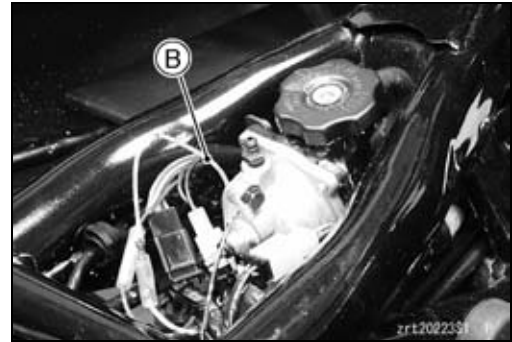
Water Temperature Gauge Operation check

Ignition Switch Position: ON

Wire Location: Female, Sensor Connector
(disconnected)

Results: Gauge should read C when connector
wire is opened.

Gauge should read H when connector
wire is grounded to engine.



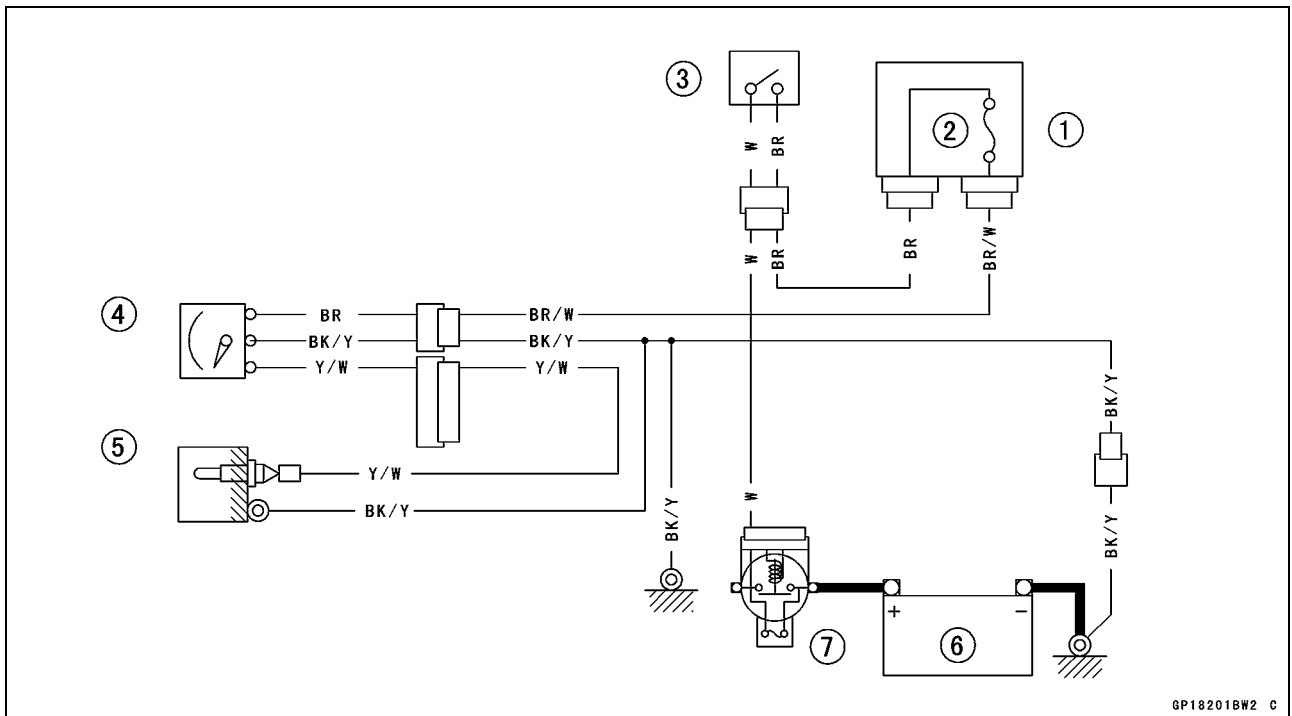
CAUTION

Do not ground the wiring longer than necessary. After the needle swings to the H position, stop the test. Otherwise the gauge could be damaged.

- ★ If the gauge readings are correct, the water temperature sensor is bad. If these readings are not obtained, the trouble is with the gauge/or wiring.
- Check the water temperature gauge circuit wiring (see Wiring Inspection).
- ★ If all wiring and components other than the water temperature gauge unit check out good, the unit is defective.

Meters, Gauges, Indicator Unit

Water Temperature Gauge Circuit (ZR1200B)



GP182018W2 C

1. Junction Box
2. Ignition Fuse 10 A
3. Ignition Switch
4. Water Temperature Gauge
5. Water Temperature Sensor
6. Battery
7. Main Fuse 30 A

15-76 ELECTRICAL SYSTEM

Switch and Sensors

Brake Light Timing 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 10 mm (0.39 in.) of pedal travel [A]



Brake Light Timing Adjustment

Brake light timing is adjusted by changing the position of the rear brake light switch.

- Adjust the position of the switch so that the brake light goes on after the specified pedal travel by turning the adjusting nut [A].



CAUTION

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

Switch Inspection

- Using a 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

	G	BK
When side stand is up	○ — ○	
When side stand is down		

Engine Oil Pressure Switch Connections*

	SW. Terminal	TTT
When engine is stopped	○ — ○	
When engine is running		

*: Engine lubrication system is in good condition

Switch and Sensors

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 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 in the connector 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.

Fan Switch Function and Resistance

- **Rising temperature:**
From OFF to ON @95 ~ 101°C (203 ~ 214°F)
- **Falling temperature:**
From ON to OFF @90 ~ 96°C (194 ~ 205°F)
- ON: Less than 0.5 Ω**
- OFF: More than 1 MΩ**

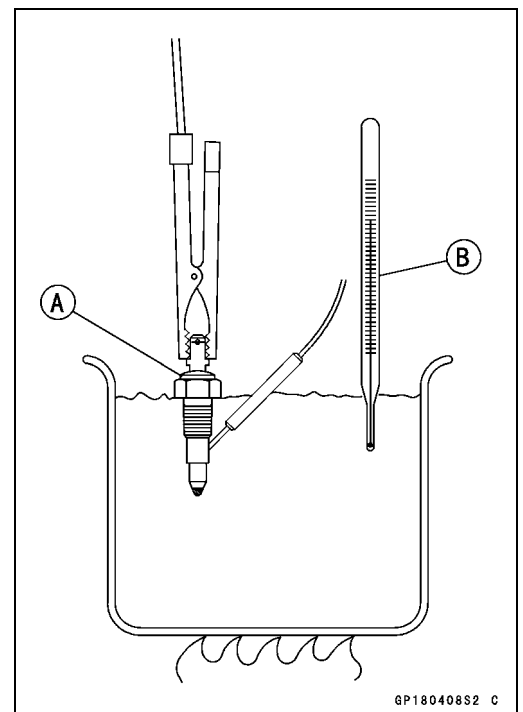
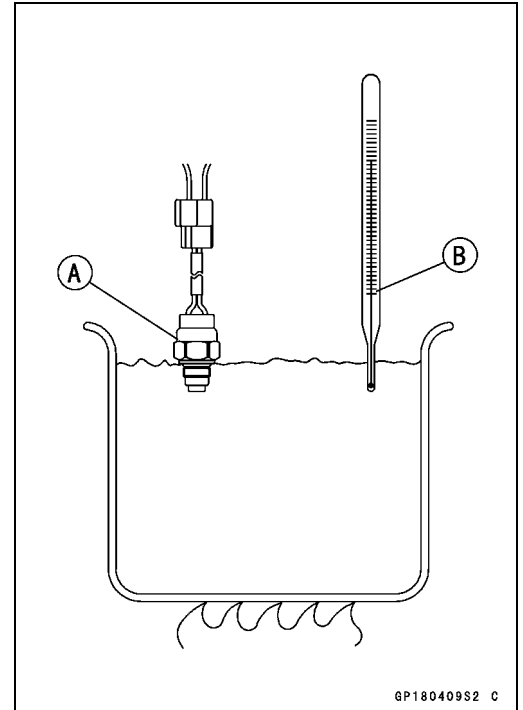
Water Temperature Switch Inspection (ZR1200A/C)

- Remove the 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 are located in almost the same depth.

NOTE

- *The switch 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 switch across the terminal and body at the temperatures shown in the table.

Special Tool - Hand Tester: 57001-1394



15-78 ELECTRICAL SYSTEM

Switch and Sensors

★ If the hand tester does not show the specified values, replace the switch.

Water Temperature Switch Function and Resistance

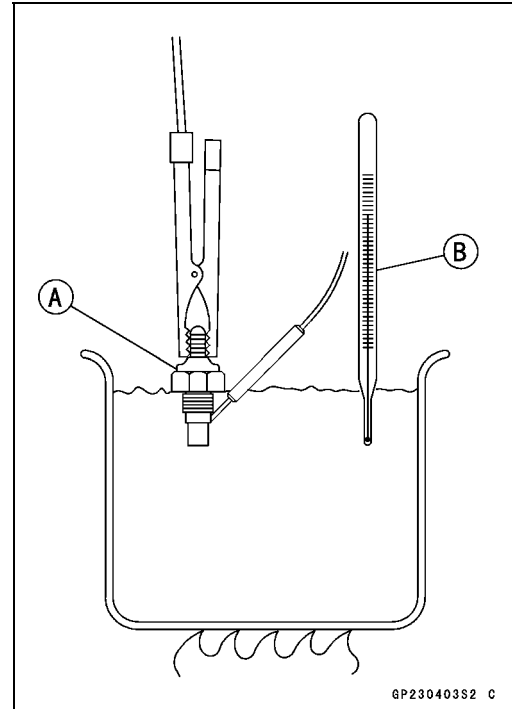
- Rising temperature:
From OFF to ON @112 ~ 118°C (236 ~ 238°F)
 - Falling temperature:
From ON to OFF @above 108 °C (above 227 °F)
- ON: Less than 0.5 Ω
OFF: More than 1 MΩ

Water Temperature Sensor Inspection (ZR1200B)

- Remove the water temperature sensor.
 - Suspend the sensor [A] in a container of water so that the temperature sensing projection and threaded portion are submerged. The sensor must not touch the container sides or bottom.
 - Suspend an accurate thermometer [B] in the water. It must not touch the container, either.
 - Place the container over a source of heat and gradually raise the temperature of the water while stirring the water gently.
 - Using an ohmmeter, measure the internal resistance of the sensor across the terminal and the body at the temperatures shown in the table.
- ★ If the ohmmeter does not show the specified values, replace the sensor.

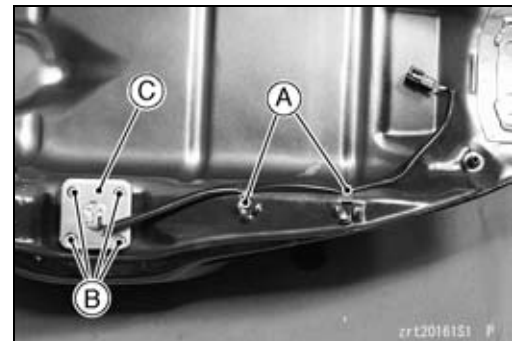
Internal Resistance of Water Temperature Sensor

- 80°C (176°F): About 52 Ω
100°C (212°F): About 27 Ω

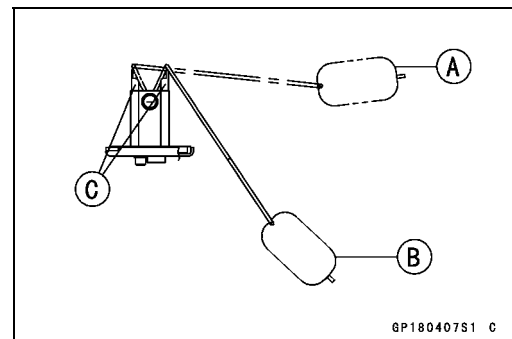


Fuel Level Sensor Inspection

- Remove the fuel tank (see Fuel System chapter).
- Open the clamps [A] and unscrew the bolts [B].
- Remove the fuel level sensor [C] from the fuel tank.



- Check that the float moves up and down smoothly without binding. It should go down under its own weight.
- ★ If the float does not move smoothly, replace the sensor.
- Float in Full Position [A]
Float in Empty Position [B]
Float Arm Stoppers [C]



Switch and Sensors

- Using the hand tester [A], measure the resistance across the terminals in the fuel level sensor [C] lead connector [B].

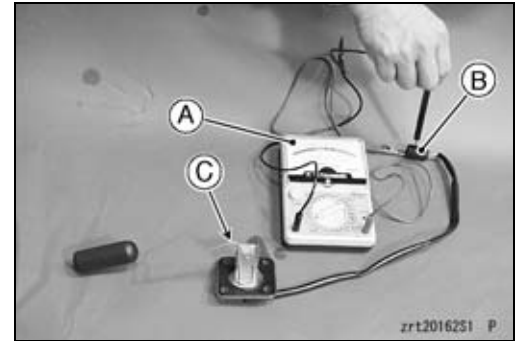
Special Tool - Hand Tester: 57001-1394

- ★ If the tester readings are not as specified, or do not change smoothly according as the float moves up and down, replace the sensor.

Fuel Level Sensor Resistance

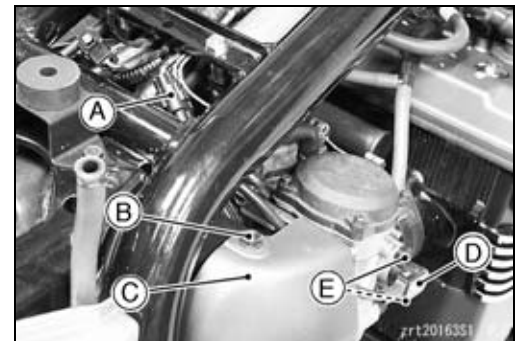
Standard: Full position: 4 ~ 10 Ω

Empty position [C]: 90 ~ 100 Ω



Throttle Position Sensor Removal/Installation

- Remove the fuel tank (see Fuel System chapter).
- Disconnect the throttle sensor connector [A].
- Unscrew the bolt [D] and remove the air cleaner housing cover [E].
- Remove the throttle position sensor [B] by unscrewing the mounting screws [C].
- Be sure to adjust the throttle position sensor when installing (See throttle Position Sensor Adjustment).



Throttle Position Sensor Inspection

NOTE

○ Be sure the battery is fully charged.

- Remove the fuel tank (see Fuel System chapter).
 - Prepare an auxiliary fuel tank and connect the fuel hose to the carburetor.
 - Start the engine and warm it up thoroughly.
 - Check idle speed and stop the engine.
 - ★ If the idle speed is out of the specified range, adjust it (see Fuel System chapter).
 - Disconnect the throttle position sensor connector and connect the setting adapter [A] between the sensor connector [B] and main harness connector [C].
 - Set the hand tester to the DC 25 V range and connect the hand tester [D] to the adapter.
- Hand Tester (+) → BL Lead (color of lead on the sensor)
Hand Tester (-) → BK Lead (color of lead on the sensor)

Special Tools - Throttle Sensor Setting Adapter: 57001-1400 [B]

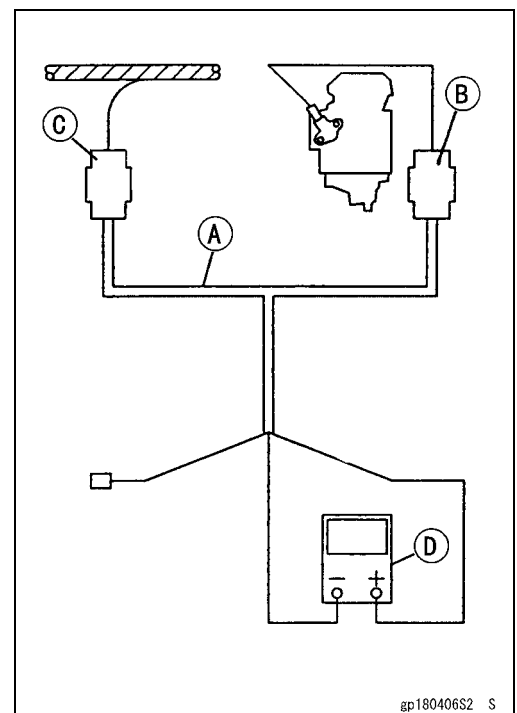
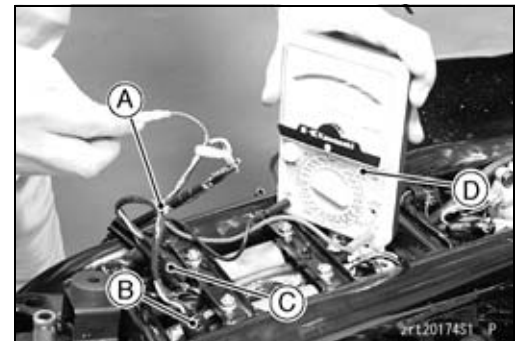
Hand Tester: 57001-1394

- Measure the sensor input voltage with the engine stopped, and with the connector joined.
- Turn the ignition switch ON.

Throttle Position Sensor Input Voltage

Standard: 4.75 ~ 5.25 V

- ★ If the reading is not within the specified range, check the wiring/or IC igniter.
- ★ If the reading is within the specified range, check the sensor output voltage.



15-80 ELECTRICAL SYSTEM

Switch and Sensors

- Connect the hand tester [D] to the adapter.
Hand Tester (+) → Y Lead (color of lead on the sensor)
Hand Tester (-) → BK Lead (color of lead on the sensor)
- Turn on the ignition switch.
- Measure the sensor output voltage with the engine stopped and with the idle throttle opening.

Throttle Position Sensor Output Voltage

Standard: 0.9 ~ 1.1 V (at idle throttle opening)

- ★ If the reading is not within the specified range, adjust the throttle sensor position (see Throttle Sensor Position Adjustment).
- ★ If the reading is within the specified range, check the sensor output voltage at full throttle opening.

Throttle Position Sensor Output Voltage

Standard: 4.06 ~ 4.26 V (at full throttle opening)

- ★ If the reading is not within the specified range, readjust the sensor.
- ★ If the throttle sensor cannot be adjusted, replace the sensor.

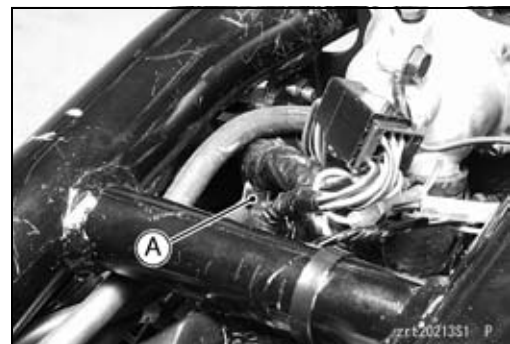
Throttle Position Sensor Position Adjustment

- Check the throttle sensor output voltage (see Throttle Sensor Inspection).
- If the output voltage is out of the range, adjust it as follows.
 - Loosen the throttle sensor mounting screws [A].
 - Adjust the position of the sensor until the output voltage is within the specified range (see Throttle Sensor Inspection).

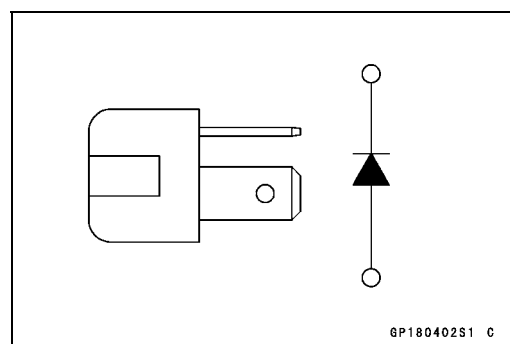


Diode (Rectifier) Inspection

- Remove the fuel tank (see Fuel System chapter).
- Disconnect the diode assemblies [A].



- Set the hand tester to the $\times 100\Omega$ range.
Special Tool - Hand Tester: 57001-1394
- Check the continuity between the diode terminals in both directions.
- ★ If there is continuity in one direction (forward direction) but no continuity (infinity) in the reverse direction, the diode is normal.
- ★ The diode is defective if there is continuity after changing the direction, or if it remains with no continuity.

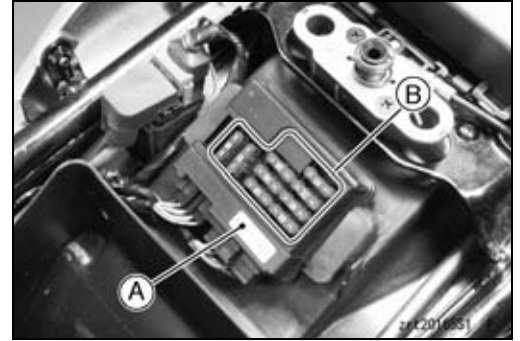


NOTE

- The actual resistance measurement in the forward direction varies with the tester used and the individual diodes. Generally speaking, it is acceptable if the tester's indicator swings approximately halfway.

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 seat (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 - 1 A	0	1 A - 8	∞
1-2	0	2-8	∞
3 A - 4	0	3 A - 8	∞
6-5	0	6-2	∞
6 -10	0	6 - 3 A	∞
6 - 7	0	17 - 3 A	∞
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

15-82 ELECTRICAL SYSTEM

Junction Box

Relay Circuit Inspection (with the battery disconnected)

	Tester Connection	Tester Reading (Ω)
Headlight Relay	7 - 8	∞
	7 - 13	∞
	(+) (-) 13 - 9	Not ∞ *
Starter Circuit Relay	9 - 11	∞
	12 - 13	∞
	(+) (-) 13 - 11	∞
	(+) (-) 12 - 11	Not ∞ *

(*): United States of America, Canadian, Australian, and Malaysian Models only

(**): 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 ∞ **

(*): United States of America, Canadian, Malaysian, and Australian Models only

(**): 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
-------------------	--

(*): United States of America, Canadian, Malaysian, and Australian Models only

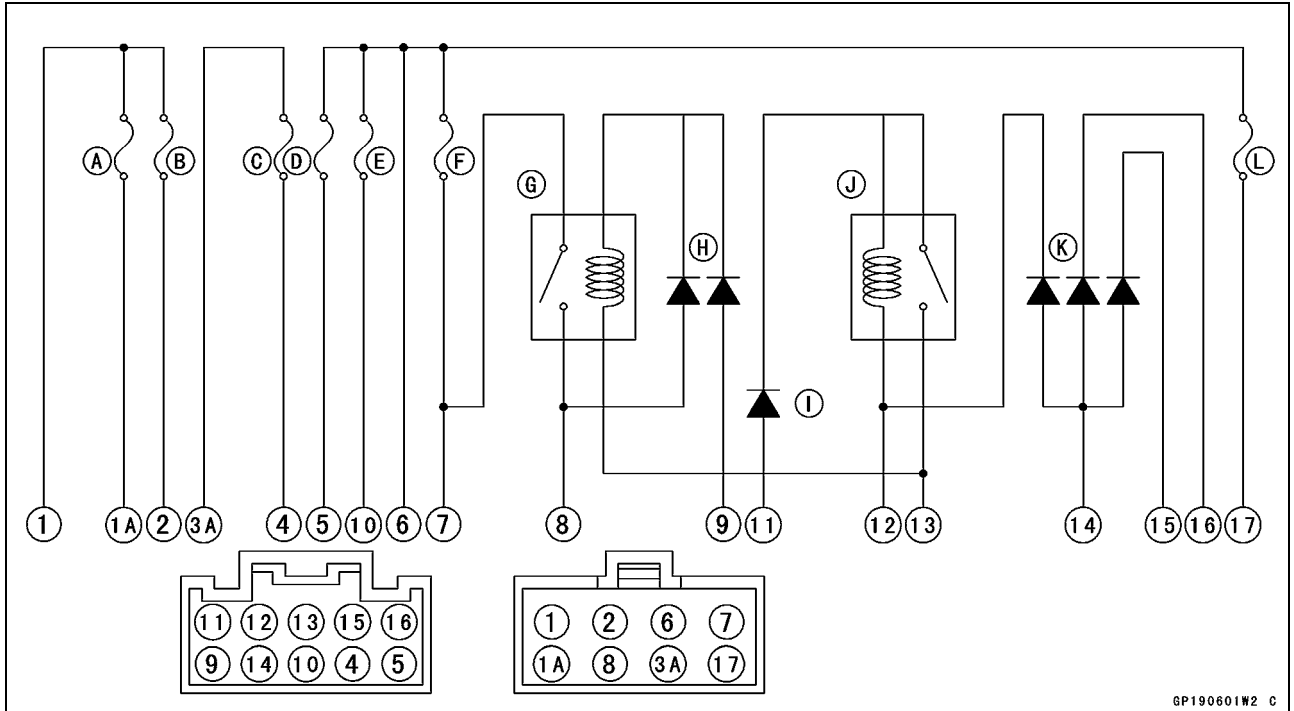
★ The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the junction box must be replaced.

NOTE

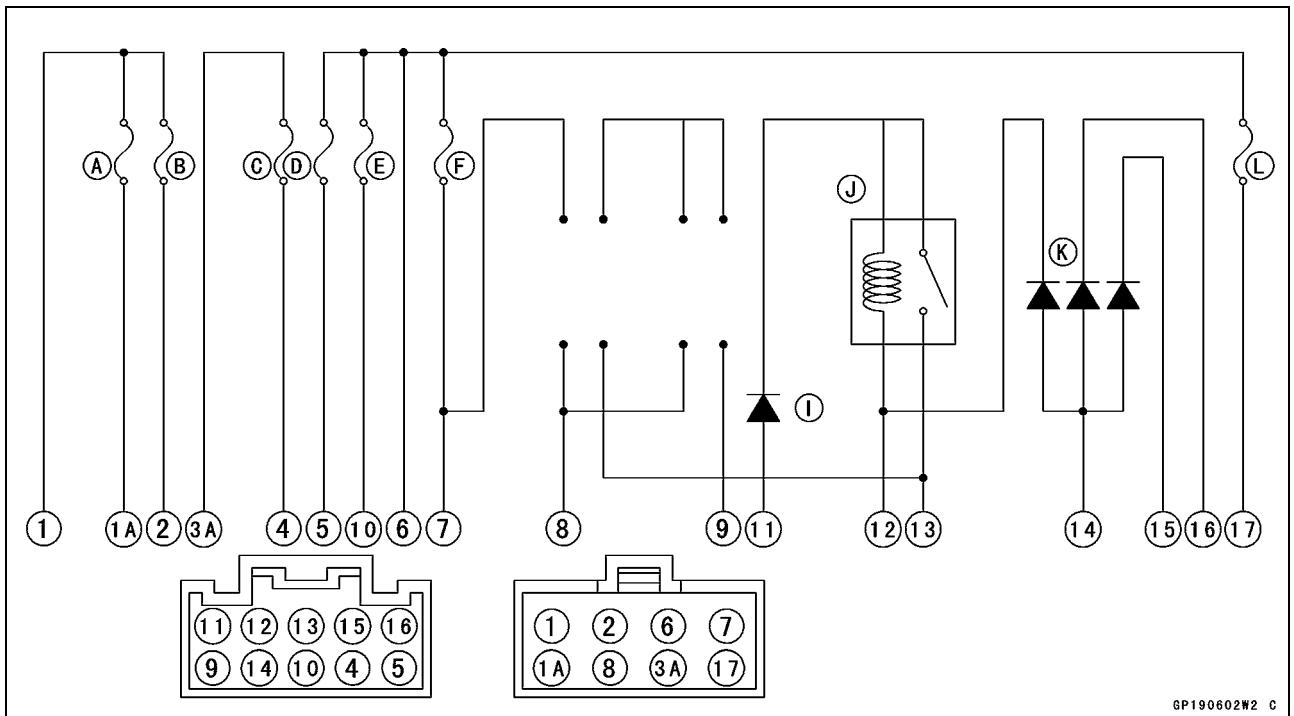
○ The actual meter reading varies with the meter used and the individual diodes, but generally speaking, the lower reading should be from zero to one half the scale.

Junction Box

Junction Box Internal Circuit (United States of America, Canada, Malaysia, and Australia/ZR1200-A3 ~, B4 ~, C2 ~ Models)



Junction Box Internal Circuit (other than United States of America, Canada, Malaysia, and Australia Models)



- A: Accessory Fuse 10 A
- B: Fan Fuse 10 A
- C: Turn Signal Fuse 10 A
- D: Horn Fuse 10 A
- E: Ignition Fuse 10 A
- F: Headlight Fuse 10 A

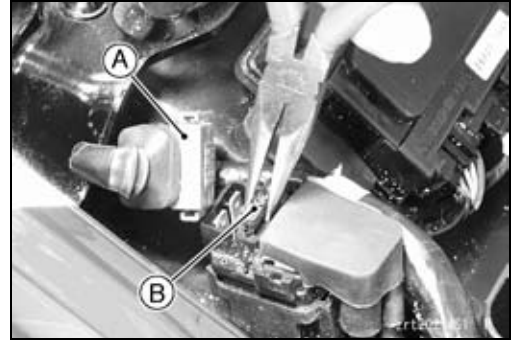
- G: Headlight Relay
- H: Headlight Diodes
- I: Starter Diode
- J: Starter Circuit Relay
- K: Interlock Diodes
- L: Taillight Fuse 10 A

15-84 ELECTRICAL SYSTEM

Fuse

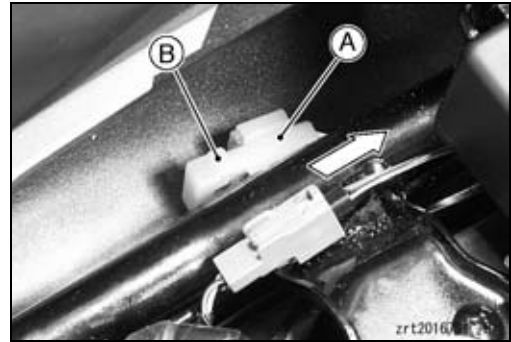
30 A Main Fuse Removal

- Remove:
 - Seat (see Frame chapter)
 - Starter Relay and 30 A Main Fuse Connector [A]
- Pull out the main fuse [B] from the starter relay with needle nose pliers.



20 A Headlight Fuse Removal (ZR1200B)

- Remove:
 - Seat (see Frame chapter)
 - 20 A Headlight Fuse Box [A]
- Unlock the hook [B] to pull the lid.
- Pull out the headlight fuse from the fuse box.



Junction Box Fuse Removal

- Remove the seat (see Frame chapter).
- 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

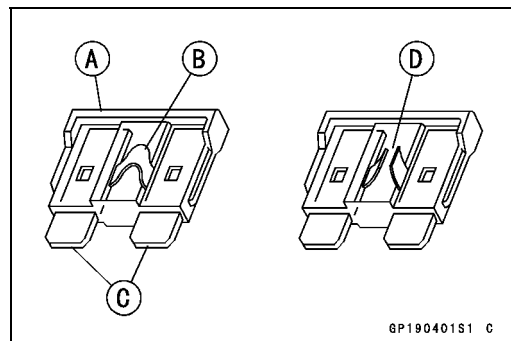
- Remove the fuse (see Fuse Removal).
- Inspect the fuse element.
- ★ If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

Housing [A]

Terminals [C]

Fuse Element [B]

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.

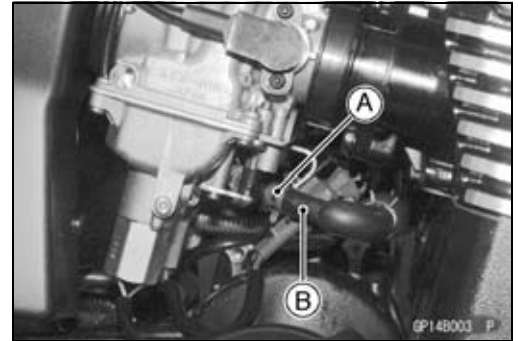
Fuel Cut Valve

Fuel Cut Valve 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.

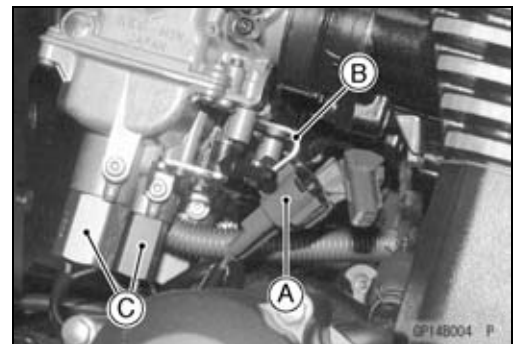
- Slide the clamp [A], and remove the coolant hose [B].



- Connect a suitable hose to the fitting at the bottom of each carburetor float bowl.
- Run the lower ends of the hoses into a suitable container.
- Turn out each drain plug a few turns and drain the float bowls.

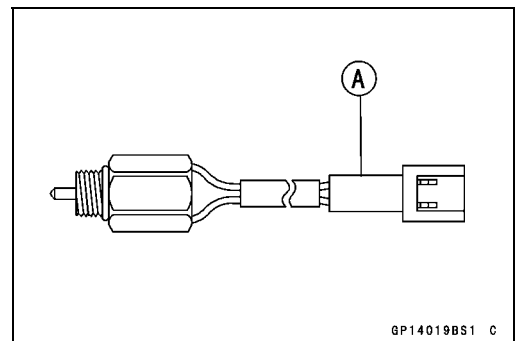
Special Tool - Carburetor Drain Plug Wrench, Hex 3: 57001-1269

- Disconnect the connectors [A] of the fuel cut valves.
- Remove the connectors from the bracket [B].
- Loosen the fuel cut valves [C] and remove them.



Fuel Cut Valve Installation

- Install the fuel cut valves with a gray color connector [A] on the #1, #4 carburetors.
- Install the fuel cut valves with a brown color connector [A] on the #2, #3 carburetors.
- Do not install the fuel cut valves on the wrong carburetors. The fuel cut valves will not work well.



GP14019BS1 C

15-86 ELECTRICAL SYSTEM

Fuel Cut Valve

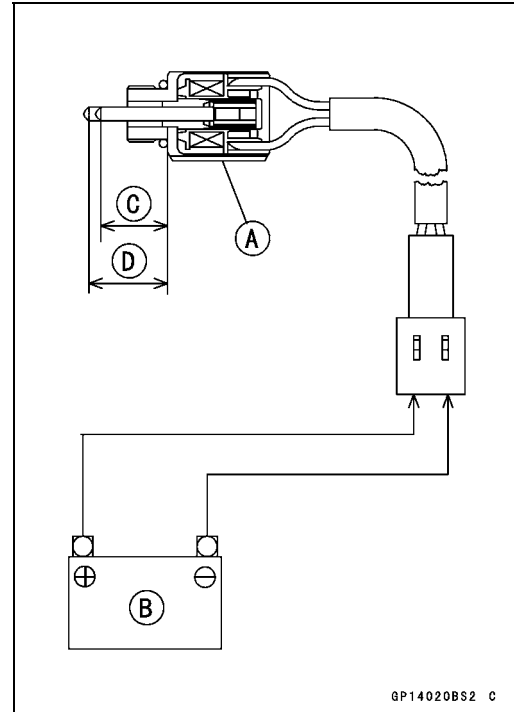
Fuel Cut Valve Inspection

- Remove the fuel cut valve [A].
- Connect and disconnect one 12 V battery [B] to the fuel cut valve connector as shown. The valve rod moves.
- ★ If the protrusion exceeds the standard (too long or too short), the valve is defective and must be replaced.

Testing Fuel Cut Valve

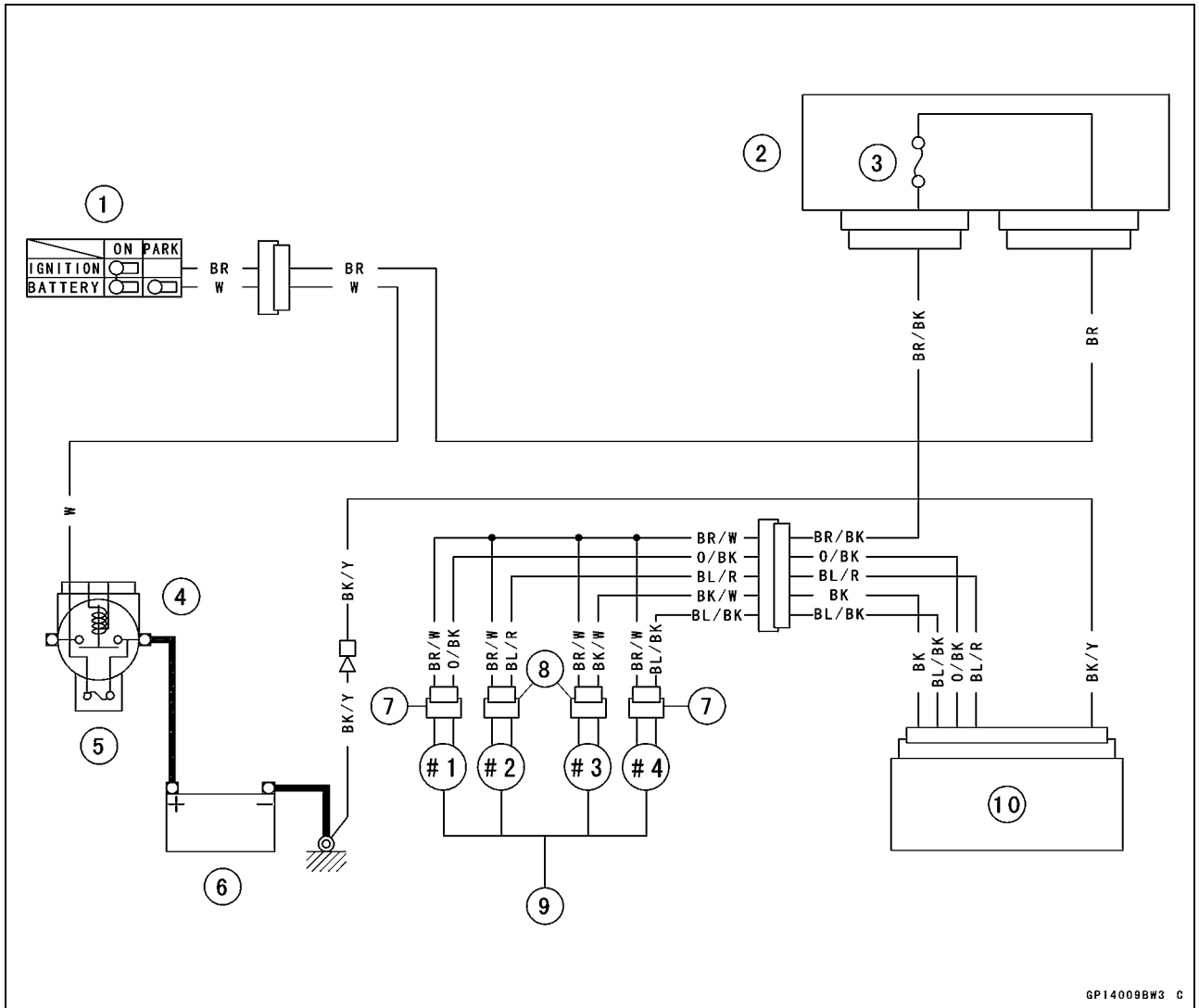
Standard Protrusion:

- When battery is disconnected → 16.6 mm (0.65 in.) [C]
- When battery is connected → 18.6 ~ 19.1 mm (0.73 ~ 0.75 in.) [D]



Fuel Cut Valve

Fuel Cut Valve Circuit



GP14008BW3 C

- 1. Ignition Switch
- 2. Junction Box
- 3. Horn Fuse 10 A
- 4. Starter Relay
- 5. Main Fuse 30 A

- 6. Battery
- 7. Gray Connector
- 8. Brown Connector
- 9. Fuel Cut Valve
- 10. IC Igniter

15-88 ELECTRICAL SYSTEM

Immobilizer System (Equipped Models)

This motorcycle is equipped with an immobilizer system to protect the motorcycle from theft. This system provides a theft proof device by means of matching a code between the inbuilt key transponder and igniter. If the code does not match, ignition system will not operate and the engine will not start.

Abstract

- Do not keep more than one immobilizer key of any system on a key ring. Jamming of the key code signal may occur and the operation of the system may be affected.
- The O/I indicator light illuminates for two seconds and then extinguishes when the ignition is first switched on. This shows the system is operating correctly.
- If the O/I indicator light illuminates when the ignition switch is turned to the ON position and stays illuminated, this shows a fault in the lubrication system.
- If the O/I indicator light flashes when the ignition switch is turned to the ON position this shows the immobilizer system has a fault. Refer to the immobilizer related parts inspection to identify the faulty component.
- If all coded keys (master key and user keys) are lost, the igniter and ignition switch will have to be replaced.
- The immobilizer system can not function until the master key code is registered in the igniter.
- A total of six keys can be registered in the igniter at any one time (one master key and five user keys).
- If the master key is lost, it is not possible to register new user keys.

Operational Cautions

1. Do not put two keys of any immobilizer system on the same key ring.
2. Do not submerge any key in water.
3. Do not expose any key to excessively high temperature.
4. Do not place any key close to magnet.
5. Do not place a heavy item on any key.
6. Do not grind any key or alter its shape.
7. Do not disassemble the plastic part of any key.
8. Do not drop the key and/or apply any shocks to the key.
9. When a user key is lost, the user should go to his dealer to invalidate the lost key registration in the igniter.
10. When the master key is lost, the user should go to his dealer and have a new igniter installed and register a new master key and user keys.

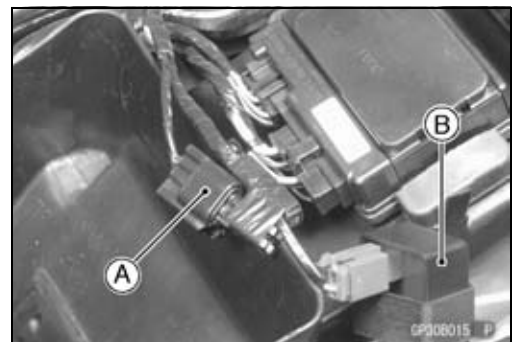
NOTE

○ No. 9 and 10 are strongly recommended to the customer to ensure security of the motorcycle.

Key Registration

Case 1: When the user key has been lost or additional spare user key is required.

- Prepare a new spare user key.
- Cut the key in accordance with the shape of the current user key.
- Remove:
 - Seat
- Disconnect the immobilizer/Kawasaki self-diagnosis system connector [A].
 - Turn Signal Relay [B]



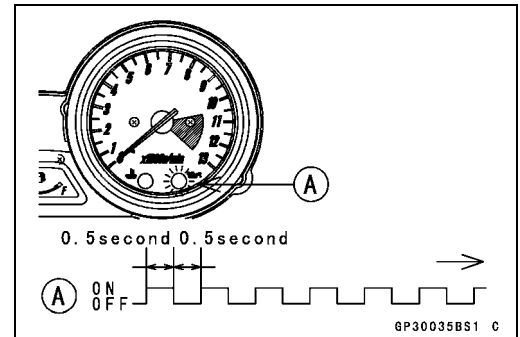
Immobilizer System (Equipped Models)

- Connect the key registration unit [A].
Special Tool - Key Registration Unit: 57001-1582



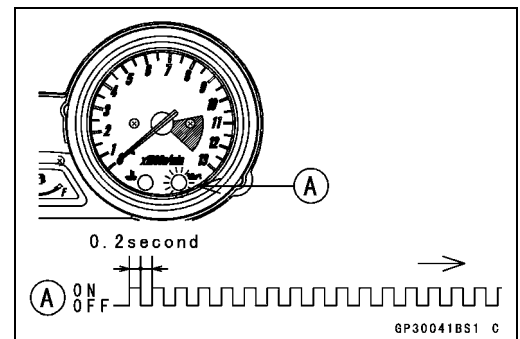
- Insert the master key to the ignition switch and turn it ON.
Verified

- The O/I indicator light [A] blinks to display the registration mode (go to the next step).

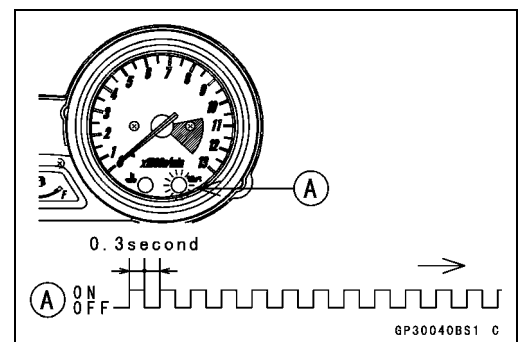


Not Verified

- The O/I indicator light [A] blinks to display the collation error (refer to the following failure illustrations).
Immobilizer Amplifier Failure



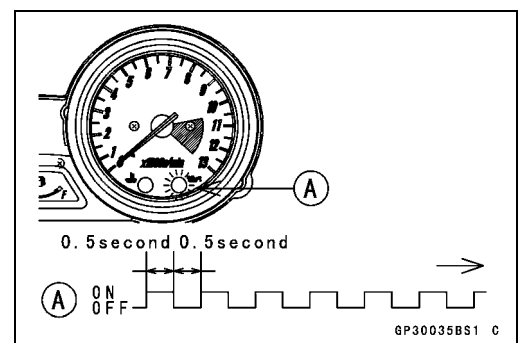
Master Key Collation Error



- Turn the master key OFF and remove the master key.
○The O/I indicator light [A] blinks continuously to display that the igniter is in the registration mode for 15 seconds.

NOTE

- Insert next key and turn ON within 15 seconds after previous key is turned off and removed otherwise registration mode will be ended and the O/I indicator light stops flashing.
- To return to the registration mode start the master key verification procedure. This applies to all user key registration.



15-90 ELECTRICAL SYSTEM

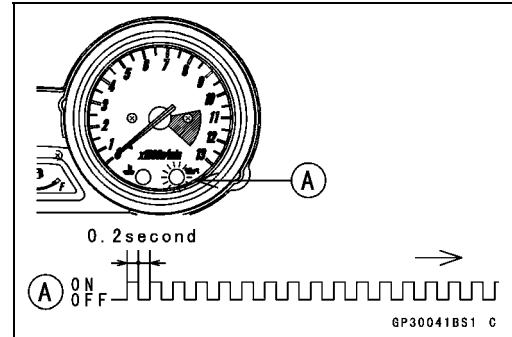
Immobilizer System (Equipped Models)

- Insert the user key 1 to the ignition switch and turn it ON.

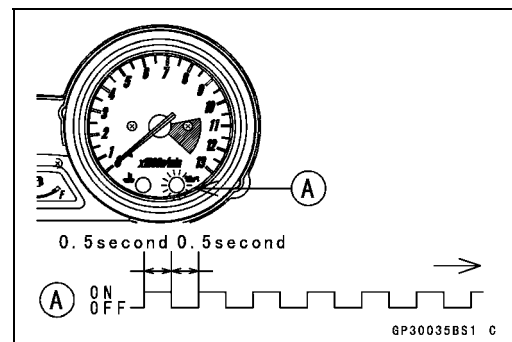
NOTE

○Keep the other user key away from the immobilizer antenna.

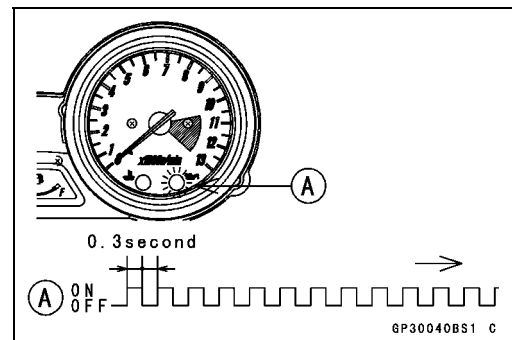
- If there is any problem in the registration, the O/I indicator light [A] blinks to display the collation error.
Immobilizer Amplifier Failure



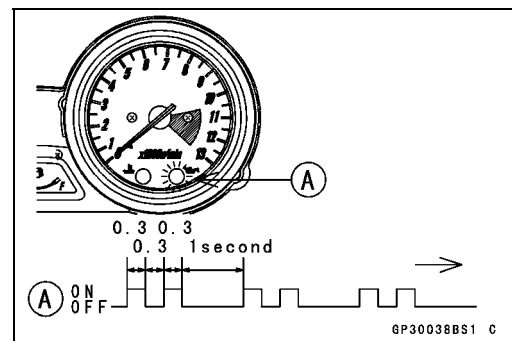
When Registered User Key is Inserted.



User Key Collation Error



- The user key 1 is successfully registered in the igniter.
- The O/I indicator light [A] blinks 2 times and stops for 1 second and then repeats this cycle.



Immobilizer System (Equipped Models)

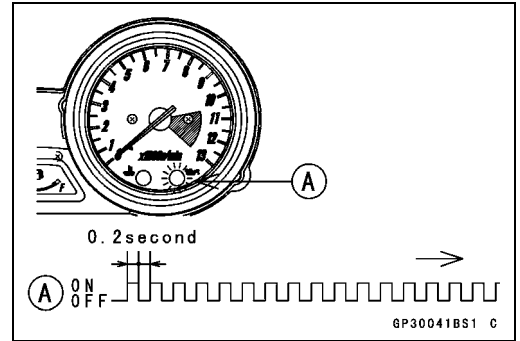
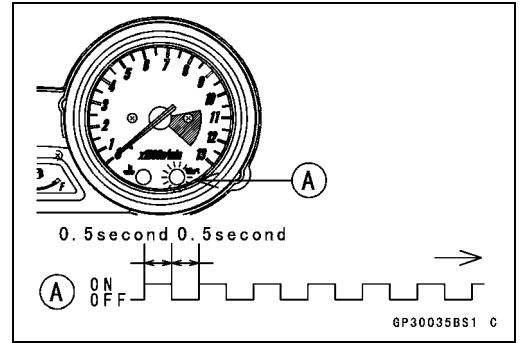
- Turn the user key 1 OFF and remove off the user key 1.
- The O/I indicator light [A] blinks to display the registration mode.

NOTE

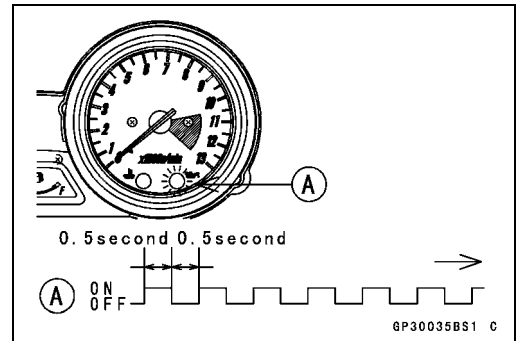
- Turn off the ignition switch and wait for the period of 15 seconds or more. The registration mode automatically finishes and the O/I indicator light will switch off.
- This procedure registered the master key and one user key.
- Continue with the procedure to register the second and later keys before the 15 seconds period has elapsed.

- Insert the user key 2 to the ignition switch and turn it ON.

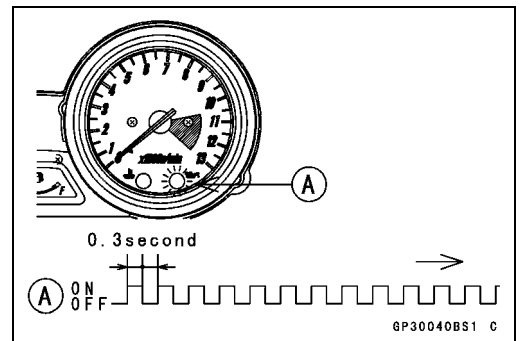
- If there is any problem in the registration, the O/I indicator light [A] blinks to display the collation error.
Immobilizer Amplifier Failure



When Registered User Key is Inserted.



User Key Collation Error



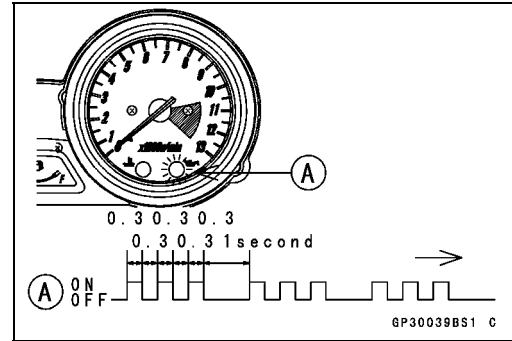
15-92 ELECTRICAL SYSTEM

Immobilizer System (Equipped Models)

- The user key 2 is registered in the igniter.
- The O/I indicator light [A] blinks 3 times and stops for 1 second and then repeats this cycle.
- This procedure has registered the master key and 2 user keys.
- Continue with the procedure to register an additional 3 user keys.

NOTE

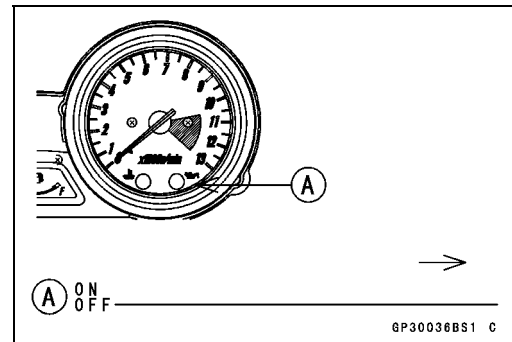
○ The igniter can store up the six key codes (master key × 1 and user key × 5).



User Key Indicator Flashes

	O/I Indicator Light Blinks	O/I Indicator Light Stop	Remarks
User Key 3	4 times	1 seconds	Repeat
User Key 4	5 times	1 seconds	Repeat
User Key 5	6 times	1 seconds	Repeat

- Turn OFF the ignition switch and wait for period of more than 15 seconds.
- The registration mode automatically ends.
- O/I indicator light goes off [A].



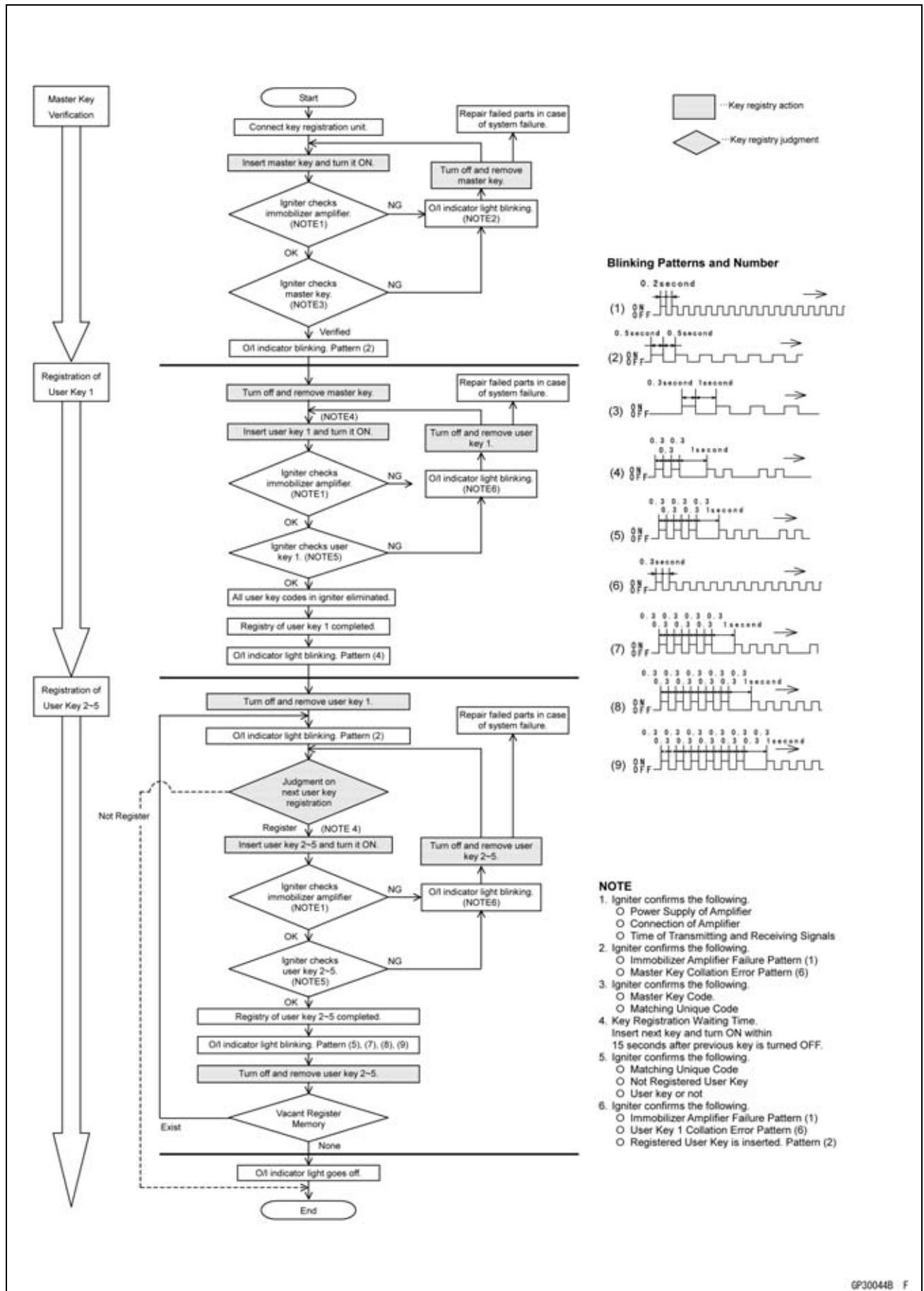
- Remove the key registration unit and connect the immobilizer Kawasaki self-diagnostic system connector.

NOTE

○ Turn the ignition switch ON with the registered user key.
 ○ Check that the engine can be started using all registered user keys.

Immobilizer System (Equipped Models)

Spare User Key Registration Flow Chart

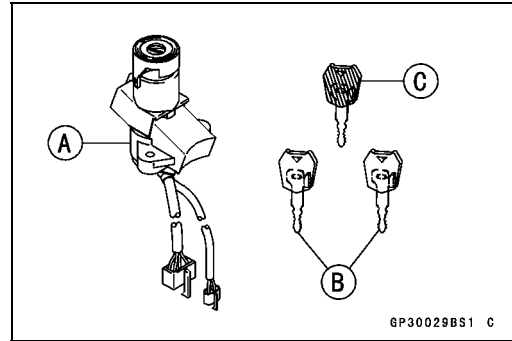


15-94 ELECTRICAL SYSTEM

Immobilizer System (Equipped Models)

Case 2: When the ignition switch is faulty and to be replaced.

- Prepare a new ignition switch [A] and two new user keys [B].
- These parts are available as a set. Prepare the current master key [C].



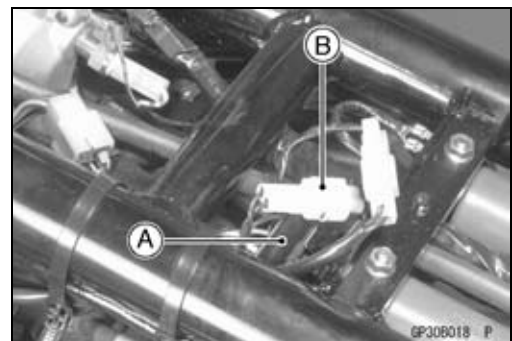
- Remove:
 - Ignition Switch and Immobilizer Antenna (see Immobilizer System Parts Replacement) Seat
 - Disconnect the immobilizer/Kawasaki self-diagnostic system connector.
 - Connect the key registration unit [A].
- Special Tool - Key Registration Unit: 57001-1582**



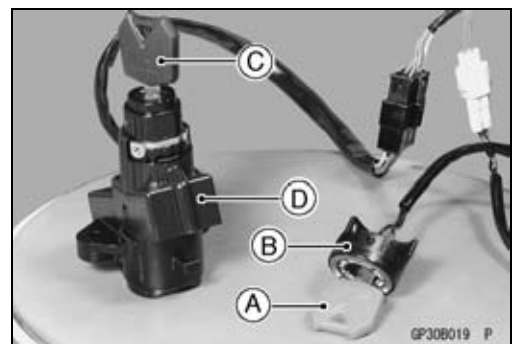
- Connect:
 - New Ignition Switch Lead Connector [A]
 - Immobilizer Antenna Lead Connector [B]

NOTE

○ Keep the antenna more than 15 cm from the ignition switch.

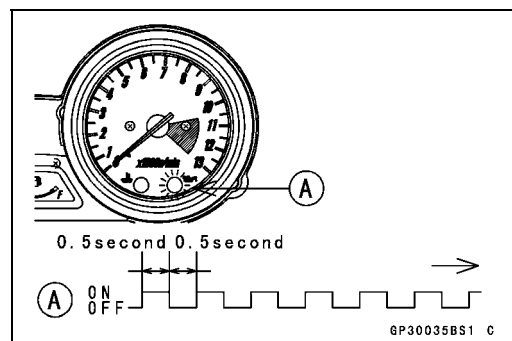


- Put the current master key [A] at the antenna [B]. Insert the new user key 1 [C] to the new ignition switch [D] and turn it ON.



Verified

- The O/I indicator light [A] blinks to display the igniter is in the registration mode (go to the next step).

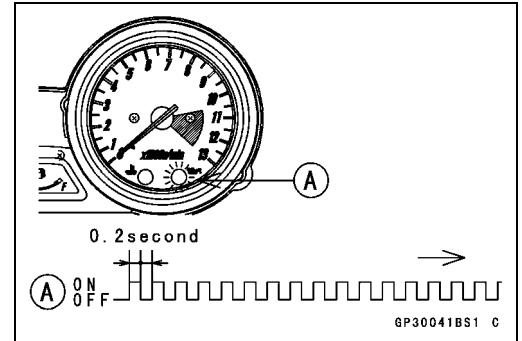


Immobilizer System (Equipped Models)

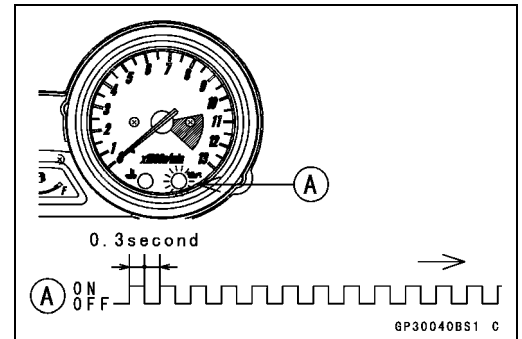
Not Verified

- The O/I indicator light [A] blinks to display the collation error.

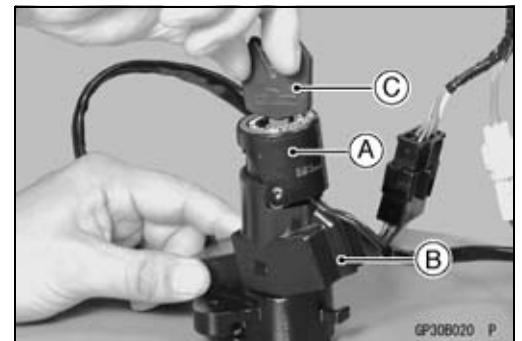
Immobilizer Amplifier Failure



Master Key Collation Error

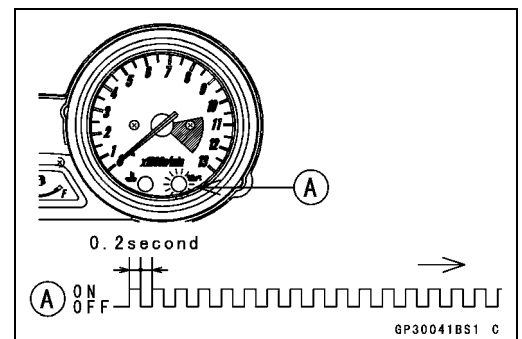


- Turn off and remove the new user key 1.
- Temporarily place the antenna [A] on the new ignition switch [B].
- Insert the user key 1 [C] again into the new ignition switch and turn it ON.



NOTE

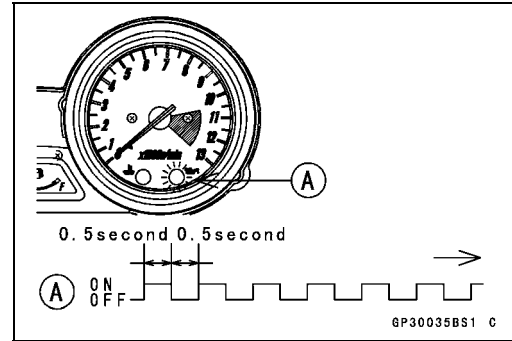
- Place the antenna on the ignition switch, insert the next key and turn ON within 15 seconds after previous key is turned off and removed otherwise registration mode will be ended and the O/I indicator light stops flashing.
 - To return to the registration mode start the master key verification procedure. This applies to all user key registration.
 - Keep other user keys away from the immobilizer antenna.
- If there is any problem in the registration, the O/I indicator light [A] blinks to display the collation error.
- Immobilizer Amplifier Failure



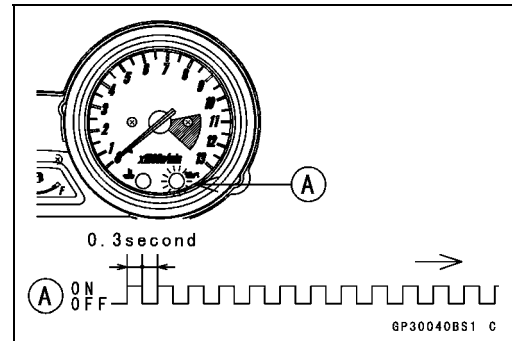
15-96 ELECTRICAL SYSTEM

Immobilizer System (Equipped Models)

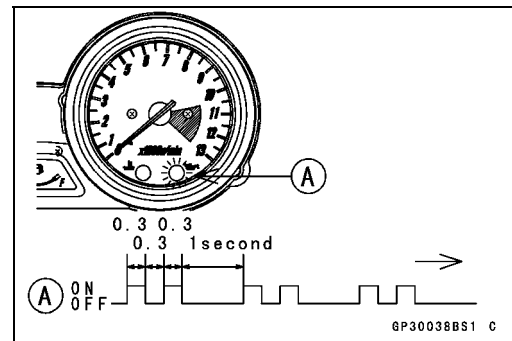
When Registered User Key is Inserted.



User Key Collation Error



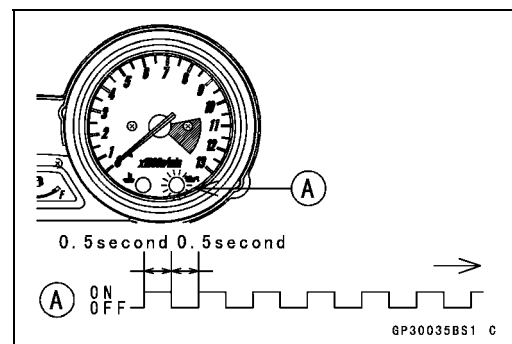
- The user key 1 is successfully registered in the igniter.
- The O/I indicator light [A] blinks 2 times and stops for 1 second and then repeats this cycle to indicate successful registering of user key 1.



- Turn off and remove user key 1.
- The O/I indicator light [A] blinks to display the registration mode.

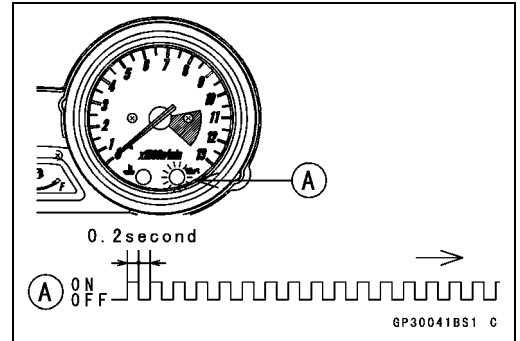
NOTE

- Turn off the ignition switch and wait for the period more than 15 seconds. The registration mode automatically ends and O/I indicator light goes off.
 - This procedure has registered the master key and one user key.
 - Continue the procedure to program the second and later keys.
- Insert the user key 2 to the ignition switch and turn it ON.

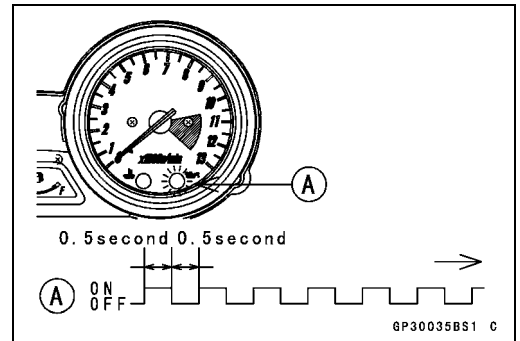


Immobilizer System (Equipped Models)

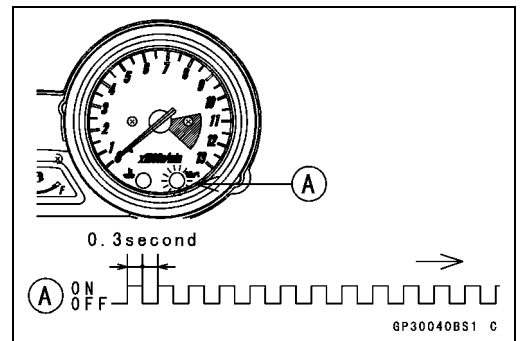
○If there is any problem in the registration, the O/I indicator light [A] blinks to display the collation error.
Immobilizer Amplifier Failure



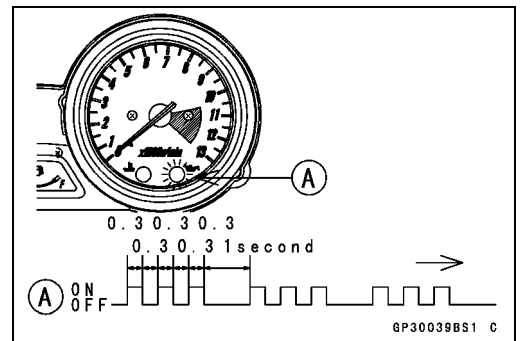
When Registered User Key is Inserted.



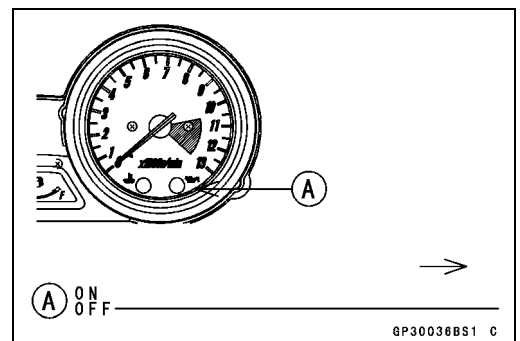
User Key Collation Error



- The user key 2 is successfully registered in the igniter.
- The O/I indicator light [A] blinks 3 times and stops for 1 second and then repeat this cycle to indicate successful programming of user key 2.
- Turn OFF the ignition switch and wait for period more than 15 seconds.
- The registration mode automatically ends.



- FI indicator light goes off [A].



15-98 ELECTRICAL SYSTEM

Immobilizer System (Equipped Models)

- Remove the key registration unit and connect the immobilizer/Kawasaki self-diagnostic system connector.

NOTE

- Turn the ignition switch ON with the registered user key.
- Check that the engine can be started using all registered user keys.

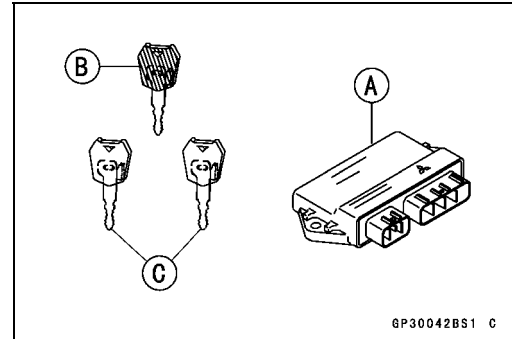
- Install the new ignition switch and antenna.

Case 3: When the igniter is faulty and has to be replaced.

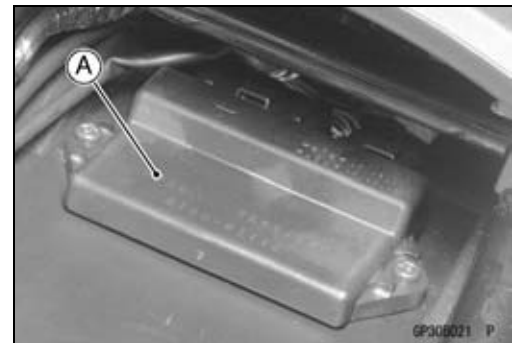
- Prepare a new igniter [A], current master key [B] and current user keys [C].

NOTE

- The key registration unit is not required.

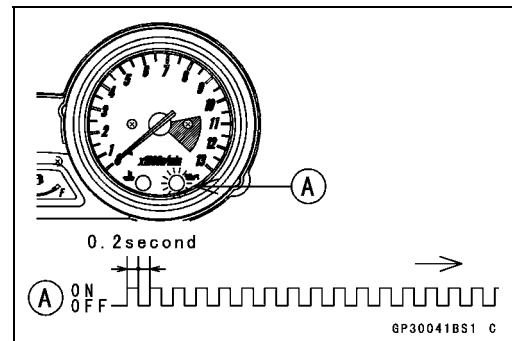


- Replace:
Igniter [A] (see Immobilizer System Parts Replacement)

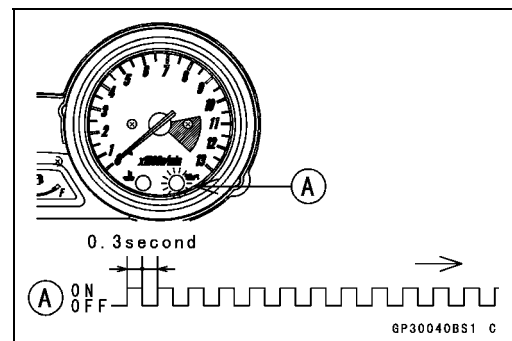


- Insert the current master key into the ignition switch and turn it ON.

- If there is any problem in the registration, the O/I indicator light [A] blinks to display the collation error.
Immobilizer Amplifier Failure

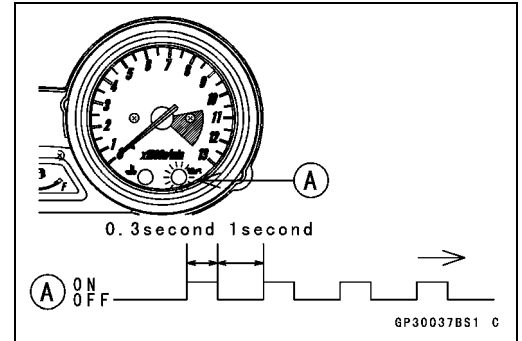


Master Key Collation Error



Immobilizer System (Equipped Models)

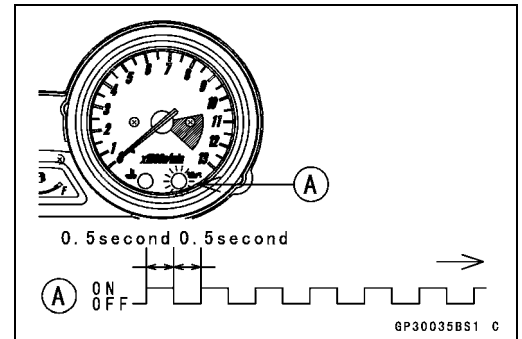
- The master key is registered in the igniter.
- The O/I indicator light [A] blinks 1 time and stops for 1 second and the repeats this cycle to indicate successful registration of the master key.



- Turn off the master key and remove it.
- The O/I indicator light [A] blinks to display the registration mode.

NOTE

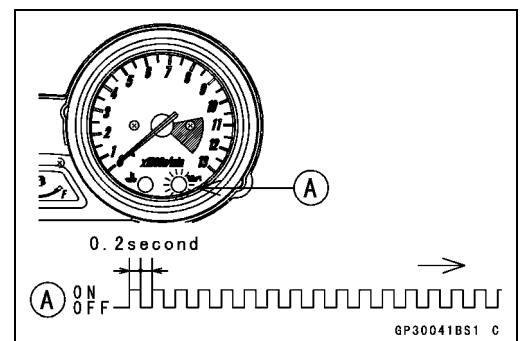
- Insert next key and turn ON within 15 seconds after previous key is turned off and removed otherwise registration mode will be ended and the O/I indicator light goes off.
- To return to the registration mode start the master key verification procedure. This applies to all user key registration.



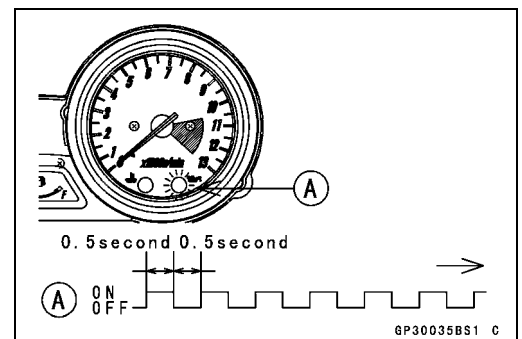
- Insert the user key 1 to the ignition switch and turn it ON.

NOTE

- Keep the other user keys away from the immobilizer antenna.
- If there is any problem in the registration, the O/I indicator light [A] blinks to display the collation error. Immobilizer Amplifier Failure



When Registered User Key is Inserted.

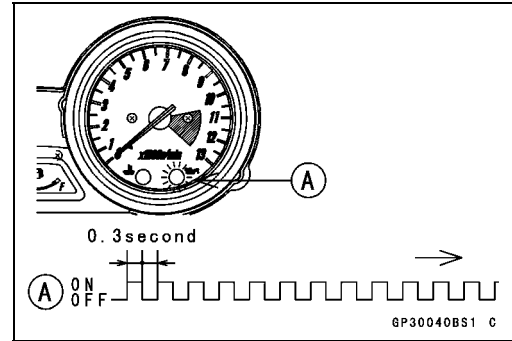


15-100 ELECTRICAL SYSTEM

Immobilizer System (Equipped Models)

User Key Collation Error

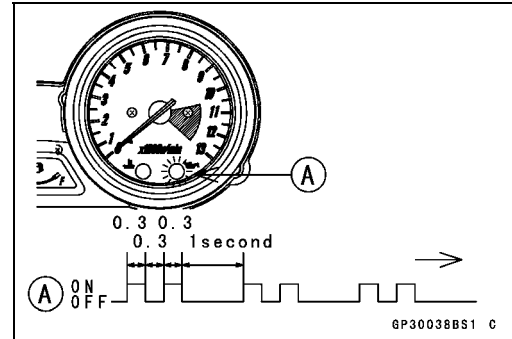
- The user key 1 is registered in the igniter.
- The O/I indicator light [A] blinks 2 times and stops for 1 second and then repeats this cycle to indicate successful registration of user key 1.



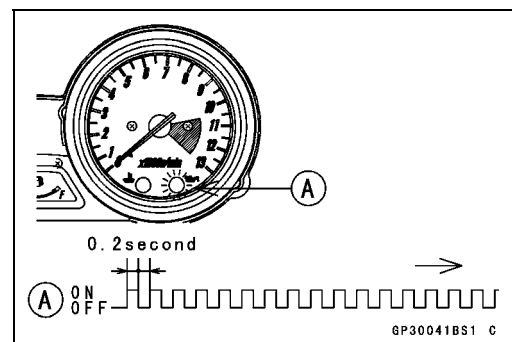
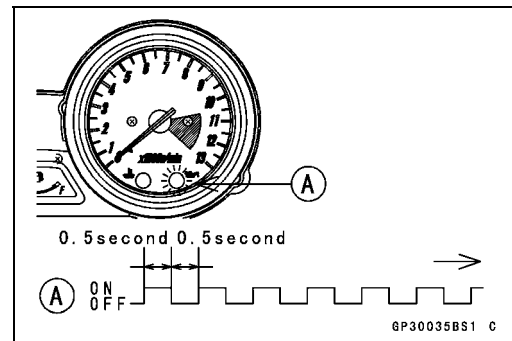
- Turn off and remove the user key 1.
- The O/I indicator light [A] blinks to display the registration mode codes.

NOTE

- Insert next key and turn ON within 15 seconds after previous key is turned off and removed otherwise registration mode will be ended and the O/I indicator light goes off.
- To return to the registration mode start the master key verification procedure. This applies to all user key registration.

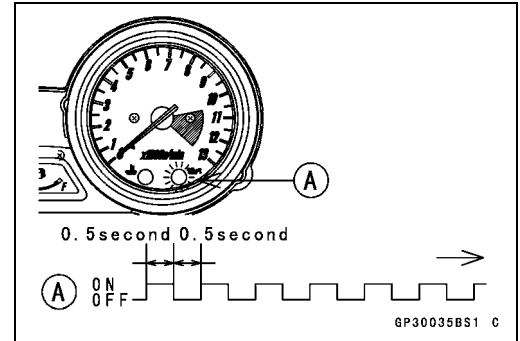


- Insert the user key 2 to the ignition switch and turn it ON.
- If there is any problem in the registration, the O/I indicator light [A] blinks to display the collation error code.
Immobilizer Amplifier Failure

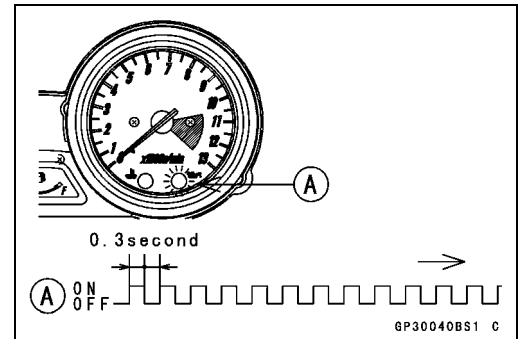


Immobilizer System (Equipped Models)

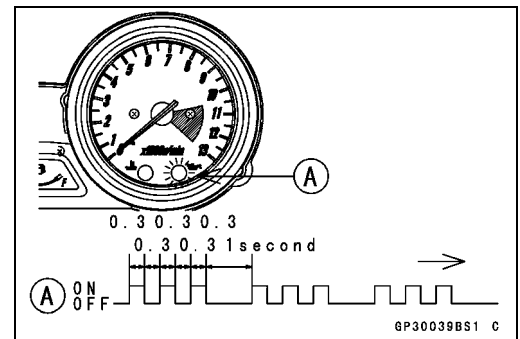
When Registered User Key is Inserted.



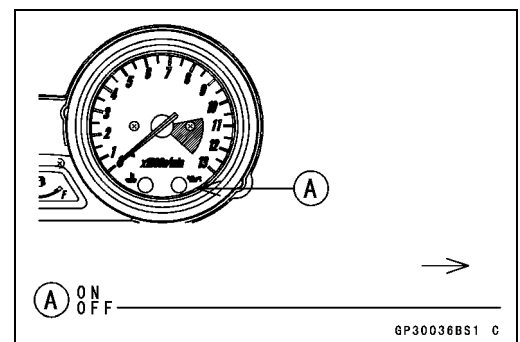
User Key Collation Error



- The user key 2 is registered in the igniter.
- The O/I indicator light [A] blinks 3 times and stops for 1 second and then repeats this cycle to indicate successful registration of user key 2.
- Turn OFF the ignition switch and wait for period more than 15 seconds.
- The registration mode automatically ends.



- O/I indicator light goes off [A].



NOTE

- Turn the ignition switch ON with the registered user key.
- Check that the engine can be started using all registered user keys.

Case 4: When master key is faulty or lost.

The master key replacement is considered very rare case. However if it is required, the following is necessary.

NOTE

- The igniter must be replaced with a new one because the master key code that is registered in the current igniter can not be rewritten.

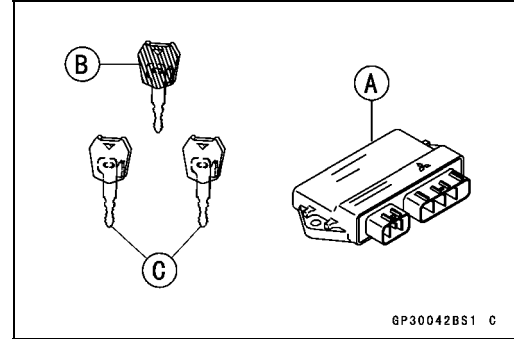
15-102 ELECTRICAL SYSTEM

Immobilizer System (Equipped Models)

- Prepare a new igniter [A], new master key [B] and current user keys [C].

NOTE

- *The key registration unit is not required.*
- *The key registration process is same as the igniter replacement.*



Case 5: When replacing the antenna.

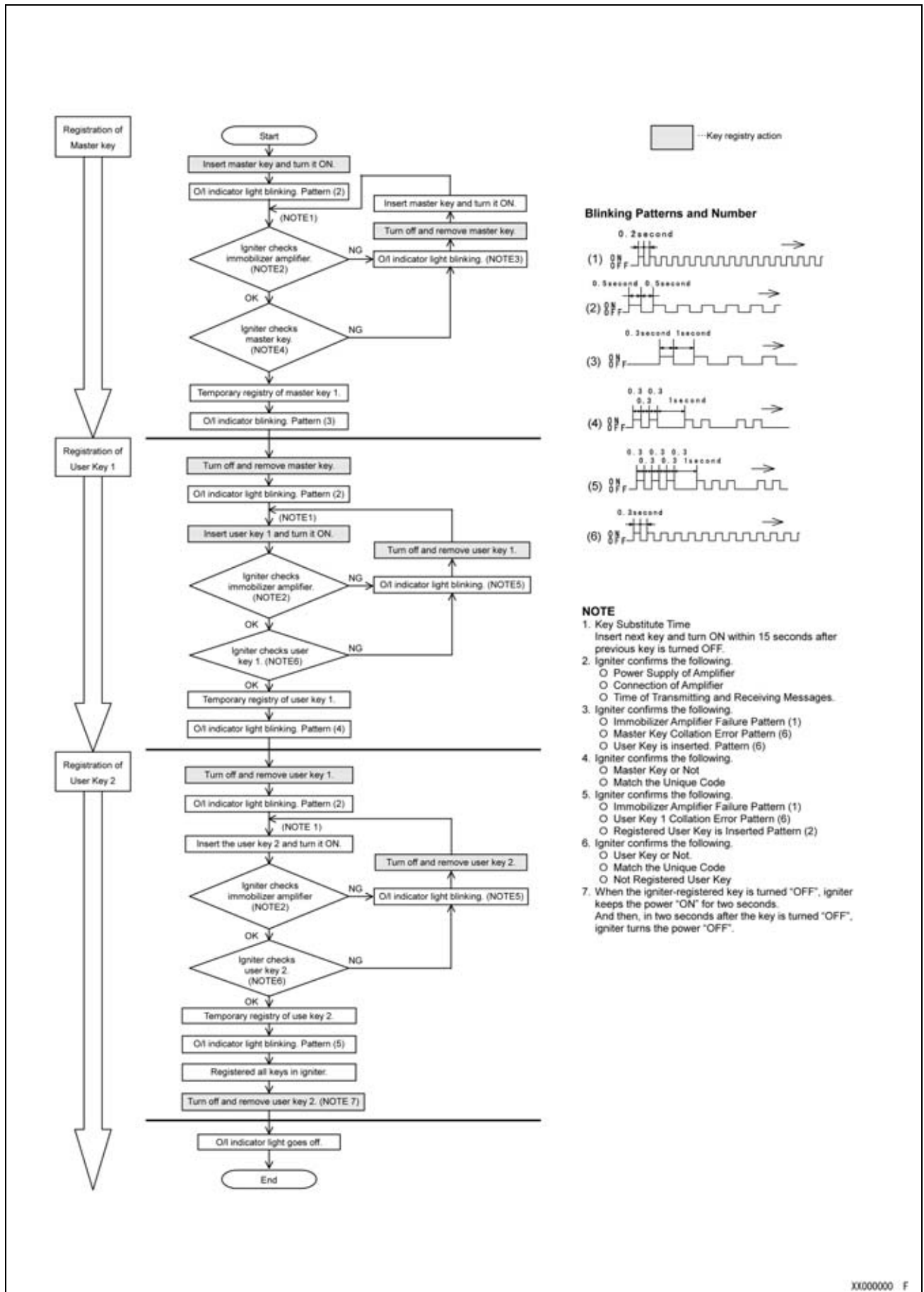
- Prepare a new antenna.
- Refer to the Immobilizer System Parts Replacement.

NOTE

- *The key registration unit is not required.*

Immobilizer System (Equipped Models)

All Keys Initial Registration Flow Chart



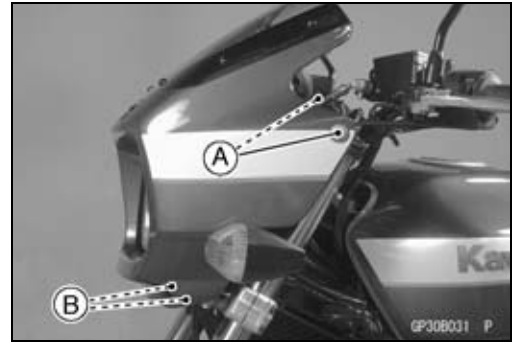
15-104 ELECTRICAL SYSTEM

Immobilizer System (Equipped Models)

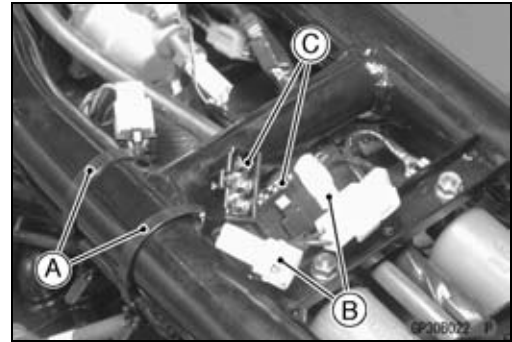
Immobilizer System Parts Replacement

Immobilizer Antenna Replacement

- Remove:
 - Seat
 - Fuel Tank (see Fuel System chapter)
- Remove the fairing mounting Allen bolts [A] and bolts [B].



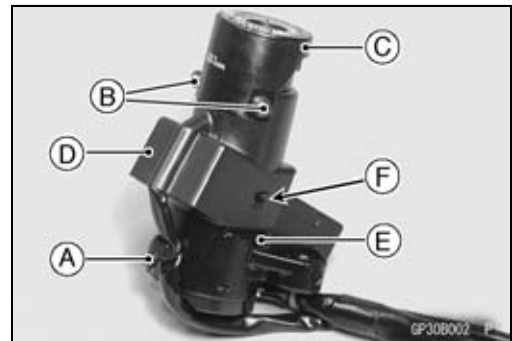
- Open the clamps [A].
- Disconnect the antenna lead connector [B] and ignition switch lead connector [C].



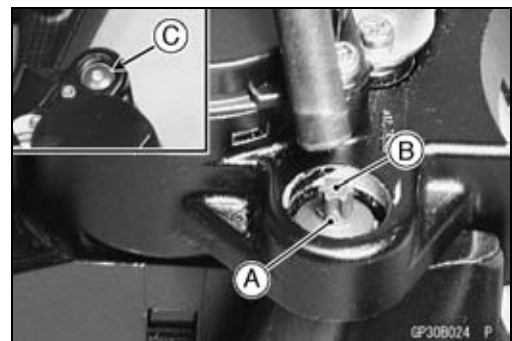
- Remove:
 - Steering Stem Head (see Steering chapter)
 - Handlebar (see Steering chapter)
- Using a small chisel [A] or punch, turn out the Torx bolts.



- Cut the band [A].
- Remove the screw [B].
- Remove the antenna [C] with the cover [D].
- Pull the lower parts [E] of the cover outside to clear the projection [F] of the ignition switch.



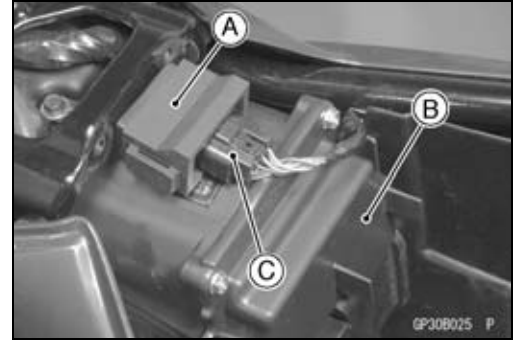
- Tighten a new Torx bolt [A] until the bolt head [B] is broken [C].
- Run the leads correctly.



Immobilizer System (Equipped Models)

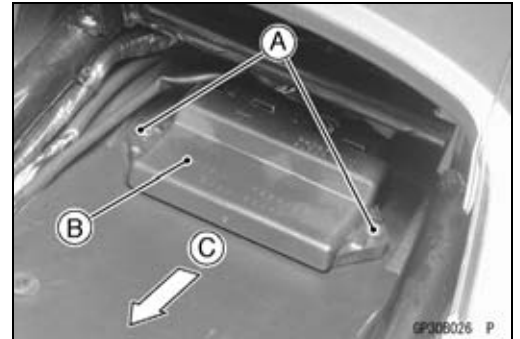
Immobilizer Amplifier Replacement

- Remove:
Seat
- Remove the amplifier [A] from the air cleaner element holder [B] by pulling it nearward.
- Disconnect the connector [C], and remove the amplifier.



Igniter Replacement

- Remove:
Seat
Tool and Tool Kit Compartment (see Frame chapter)
- Remove the igniter mounting screws [A] and pull the igniter [B] to forward [C].



- Disconnect the connectors [A] and remove the igniter.



Immobilizer Relational Parts Replacement Chart

		Failed or Lost Parts					
		Master Key (Red)	User Key (Black)	Ignition Switch	Antenna	Amplifier	Igniter
*	Master Key (Red)	●					
	User Key (Black)		●	○			
	Ignition Switch			●			
	Antenna				●		
	Amplifier					●	
	Igniter	○					●

*: Replacement Parts

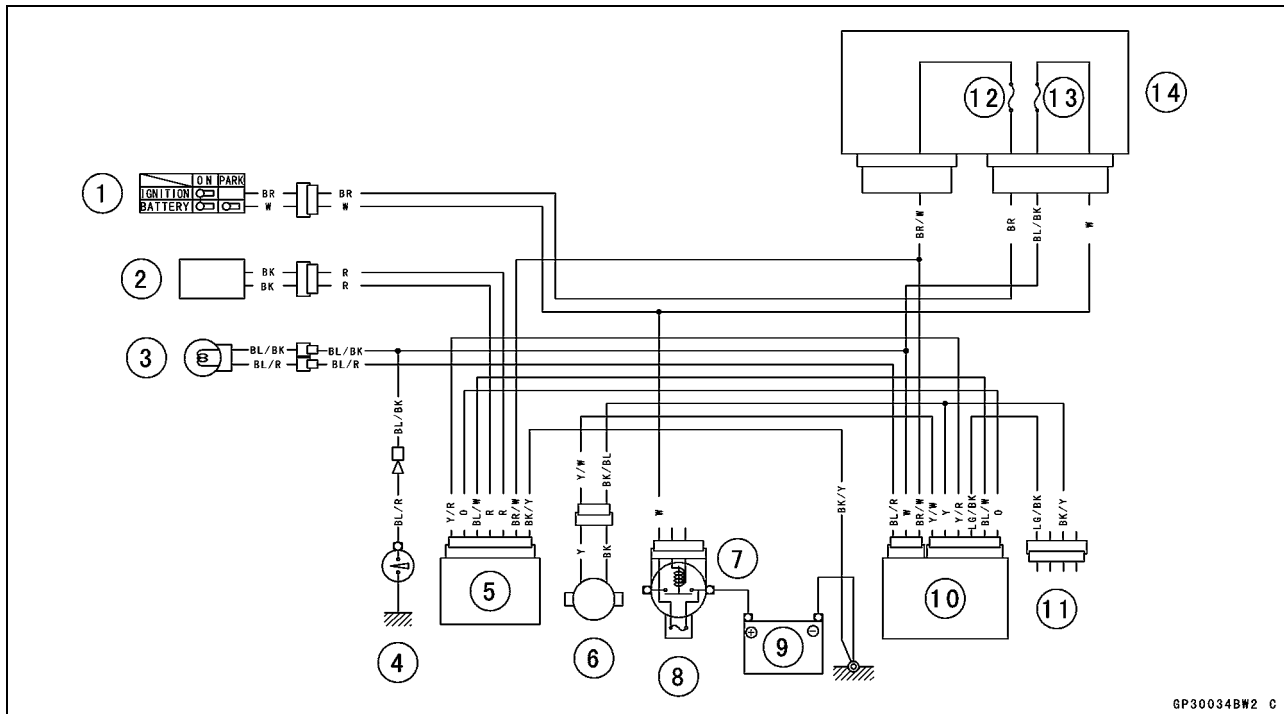
●: Main Replacement Parts

○: Additional Replacement Parts

15-106 ELECTRICAL SYSTEM

Immobilizer System (Equipped Models)

Immobilizer System Inspection Immobilizer System Circuit



GP30034BW2 C

1. Ignition Switch
2. Immobilizer Antenna
3. O/I (Oil Pressure Warning/Immobilizer) Indicator Light
4. Oil Pressure Switch
5. Immobilizer Amplifier
6. Throttle Sensor
7. Starter Relay
8. Main Fuse 30 A
9. Battery
10. Igniter
11. Immobilizer/Kawasaki Diagnostic System Connector
12. Ignition Fuse 10 A
13. Fan Fuse 10 A
14. Junction Box

Antenna Resistance Inspection

- Remove:
 - Seal
 - Fuel Tank (see Fuel System chapter)
- Disconnect:
 - Antenna Lead Connector [A]
- Measure the resistance of the antenna coil in the ignition switch as follows.

Connections to Antenna

Tester (+) → Black Lead

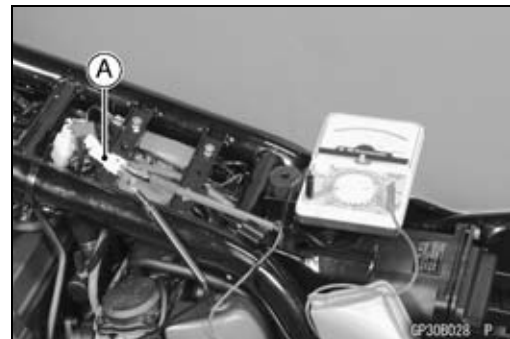
Tester (-) → Black Lead

Antenna Resistance

Standard: About 0.6 ~ 0.9 Ω

Special Tool - Hand Tester: 57001-1394

- ★ If the resistance is out of the standard range, replace the ignition switch.



Immobilizer System (Equipped Models)

Amplifier Input Voltage Inspection

NOTE

○ Be sure the battery is fully charged.

- Turn the ignition switch OFF.
- Remove:
 - Seat
 - Tool & Tool Kit Compartment (see Frame chapter)
- Connect the hand tester to the connectors, using the needle adapter set.

Special Tools - Needle Adapter Set: 57001-1457

Hand Tester: 57001-1394

Amplifier Input Voltage

Connections to Connectors

Tester (+) → BR/W Lead in Igniter Connector [A]

Tester (-) → BK/Y Lead in Amplifier Lead Connector [B]

- Measure the input voltage DC with the connectors joined.
- Turn the ignition switch ON.

Input Voltage

Standard: Battery Voltage

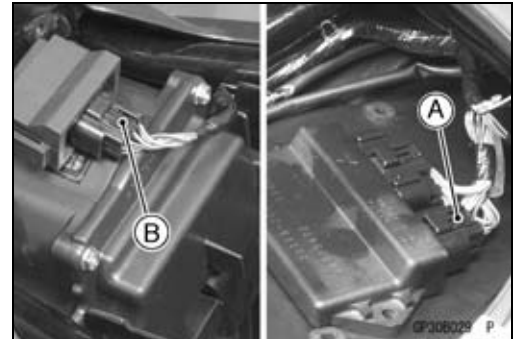
- Turn the ignition switch OFF.
- ★ If the reading is out of the range, check the wiring (see Appendix chapter).
- ★ If the reading and antenna resistance are good, replace the amplifier.

The blank key detection appears in the following conditions.

- The transponder [A] in the master and/or user key is malfunction.
- When the spare key of unregistration is used.
- When the master key is registered in the registered igniter. Therefore, the phenomena will disappear when the above issue is solved.

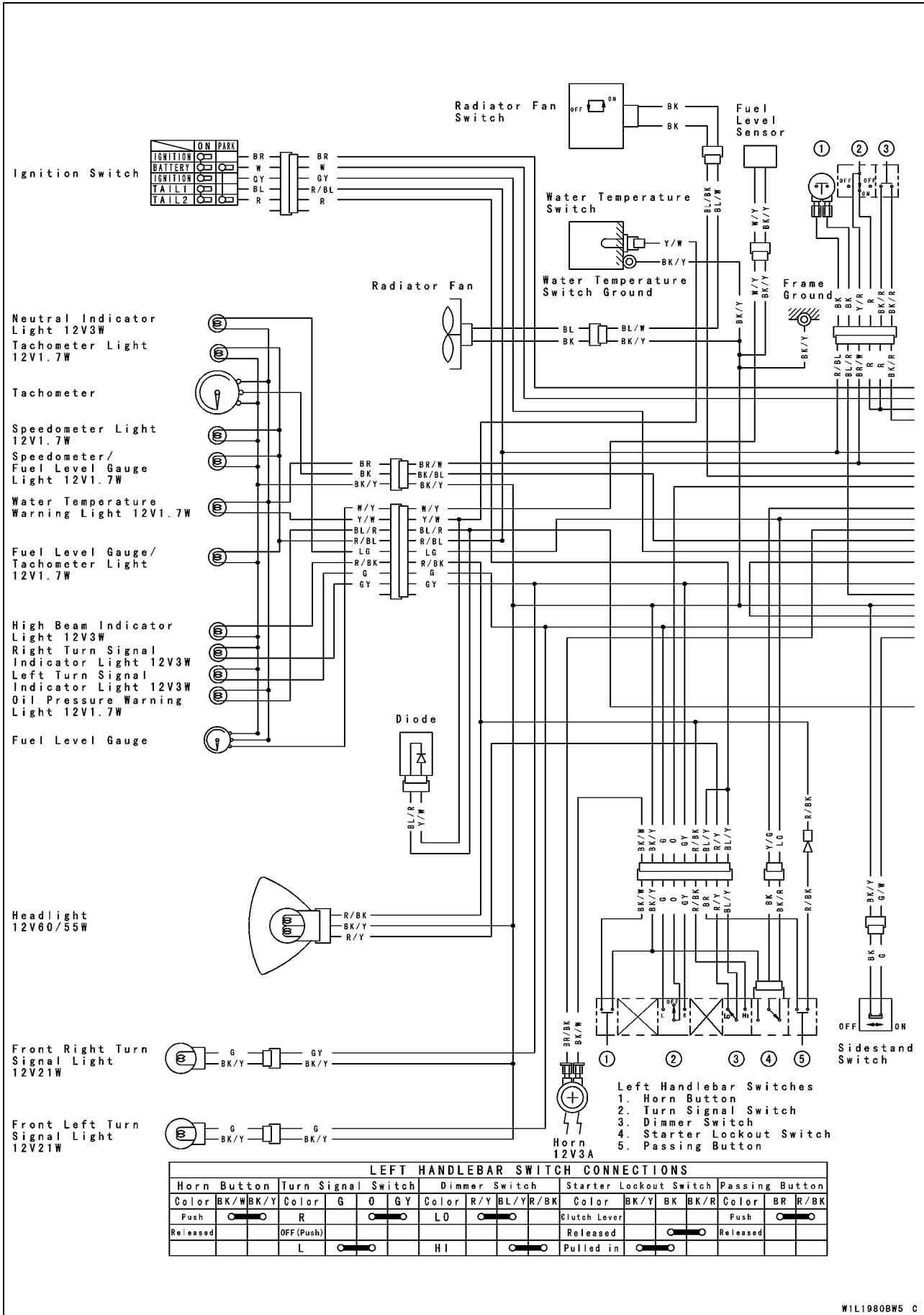
User Key Inspection

- Register the user key correctly (see Key Registration).
- ★ If the phenomena appears again, the transponder in the key is malfunction, replace it.

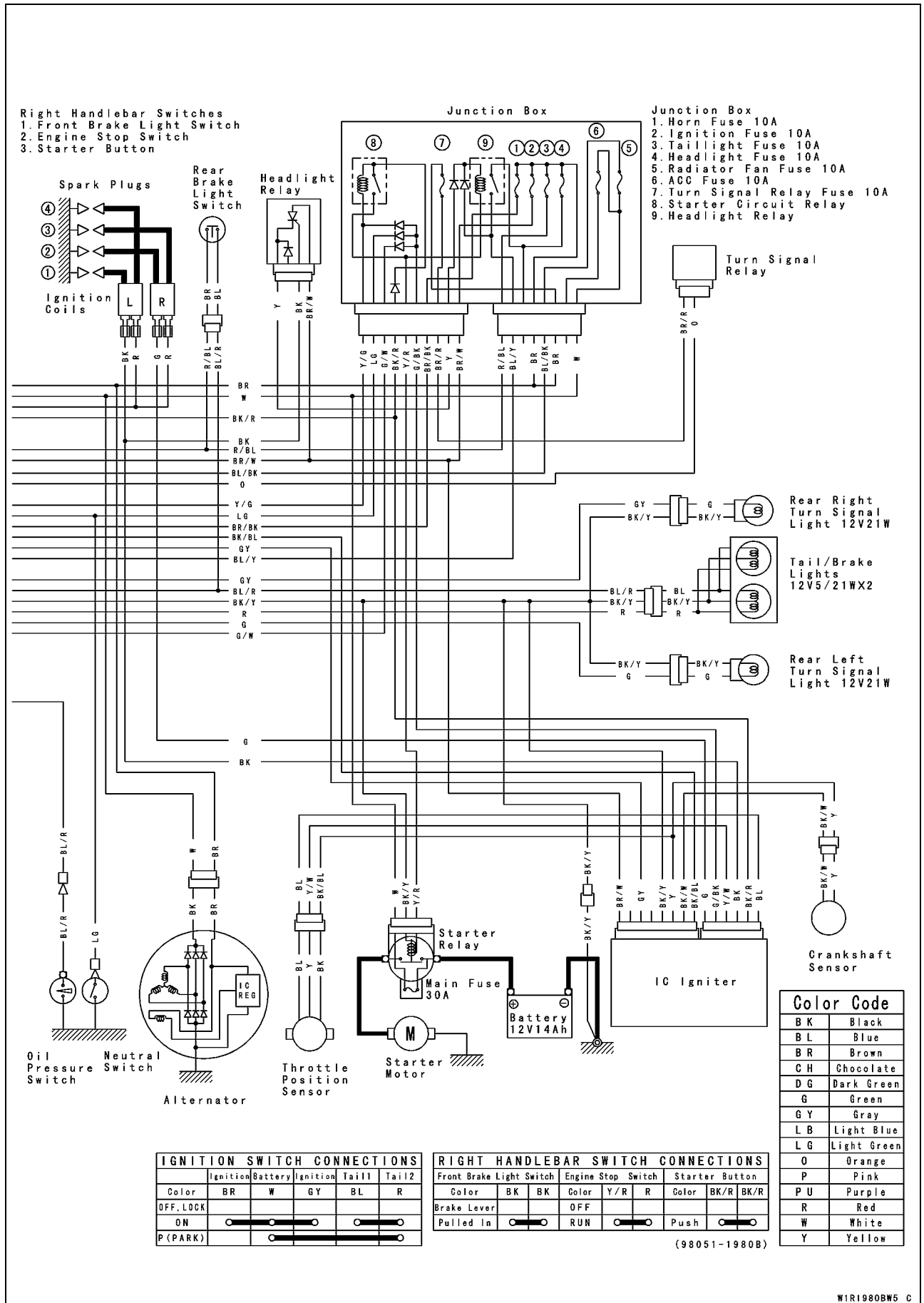


15-108 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-A1 ~ A3 Australia)

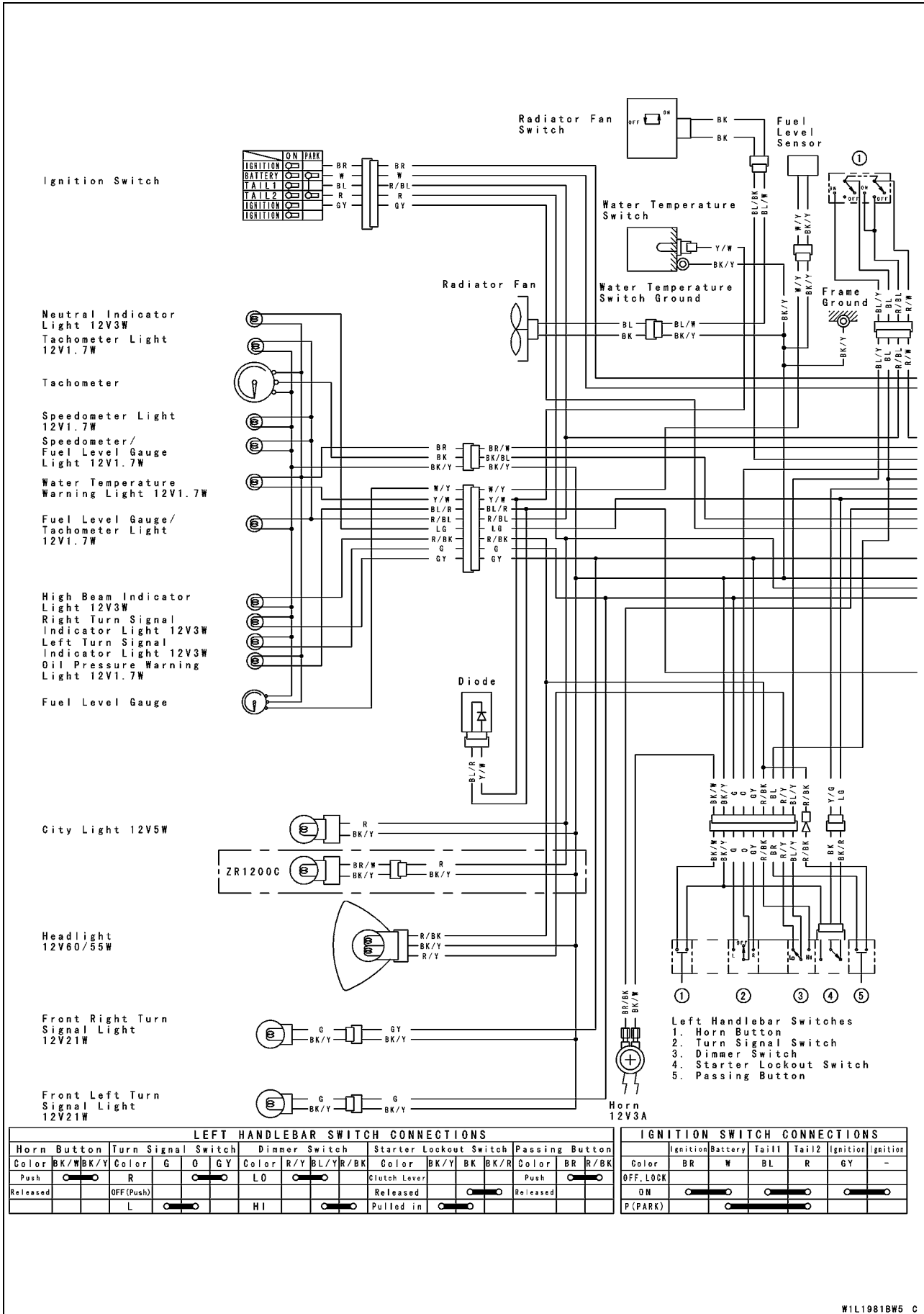


Wiring Diagram (ZR1200-A1 ~ A3 Australia)

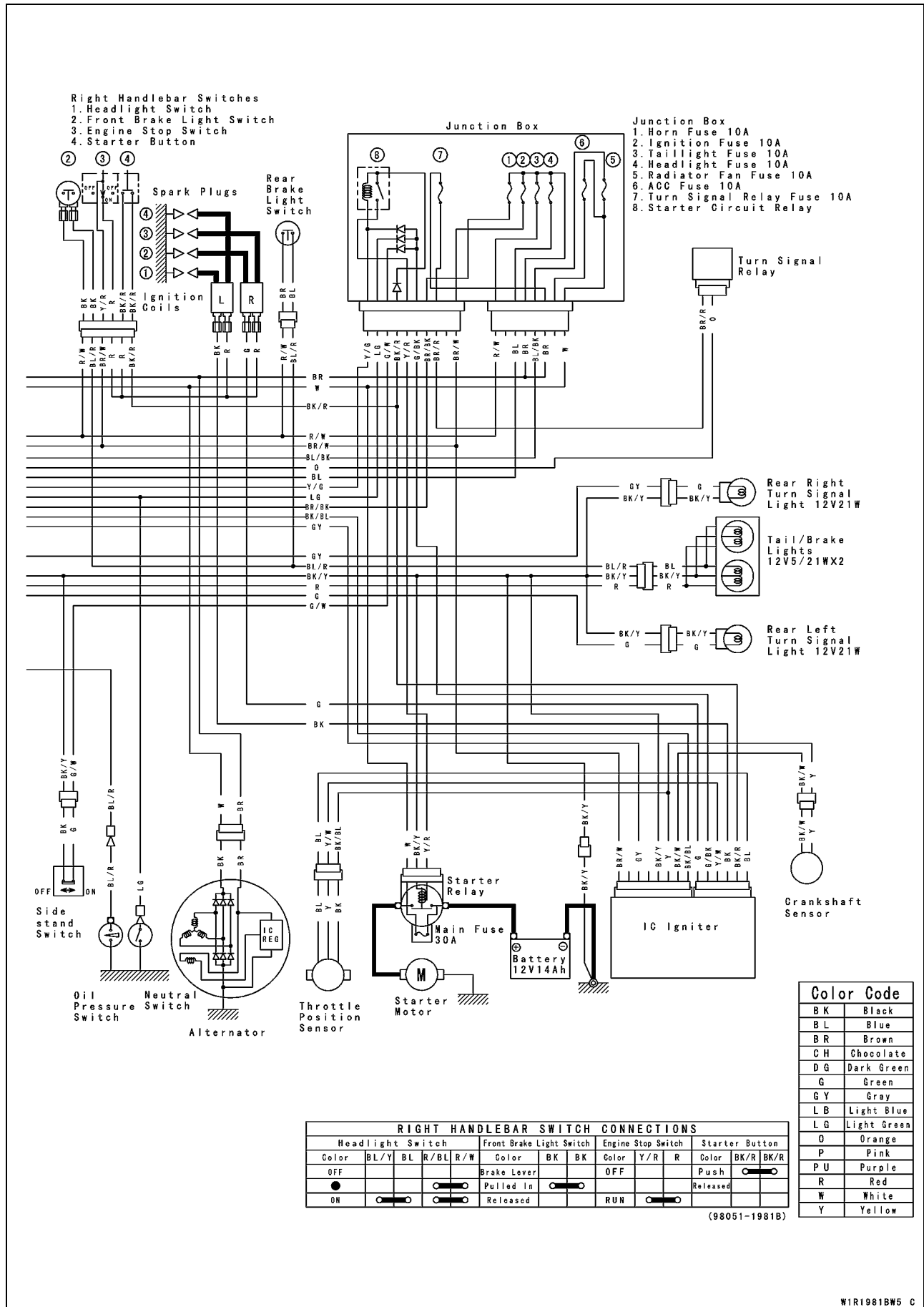


15-110 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-A1 ~ A2/C1 Europe)

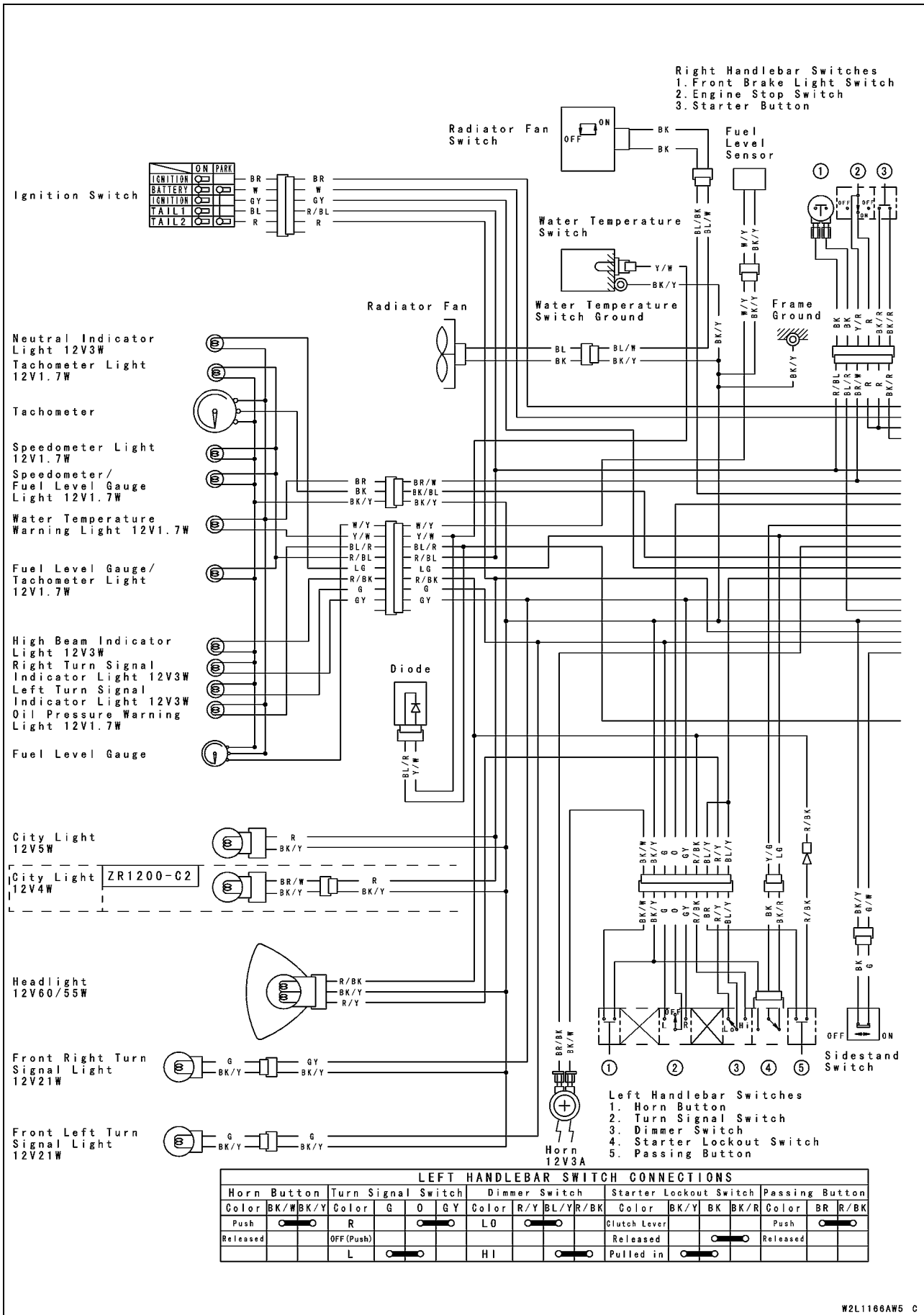


Wiring Diagram (ZR1200-A1 ~ A2/C1 Europe)

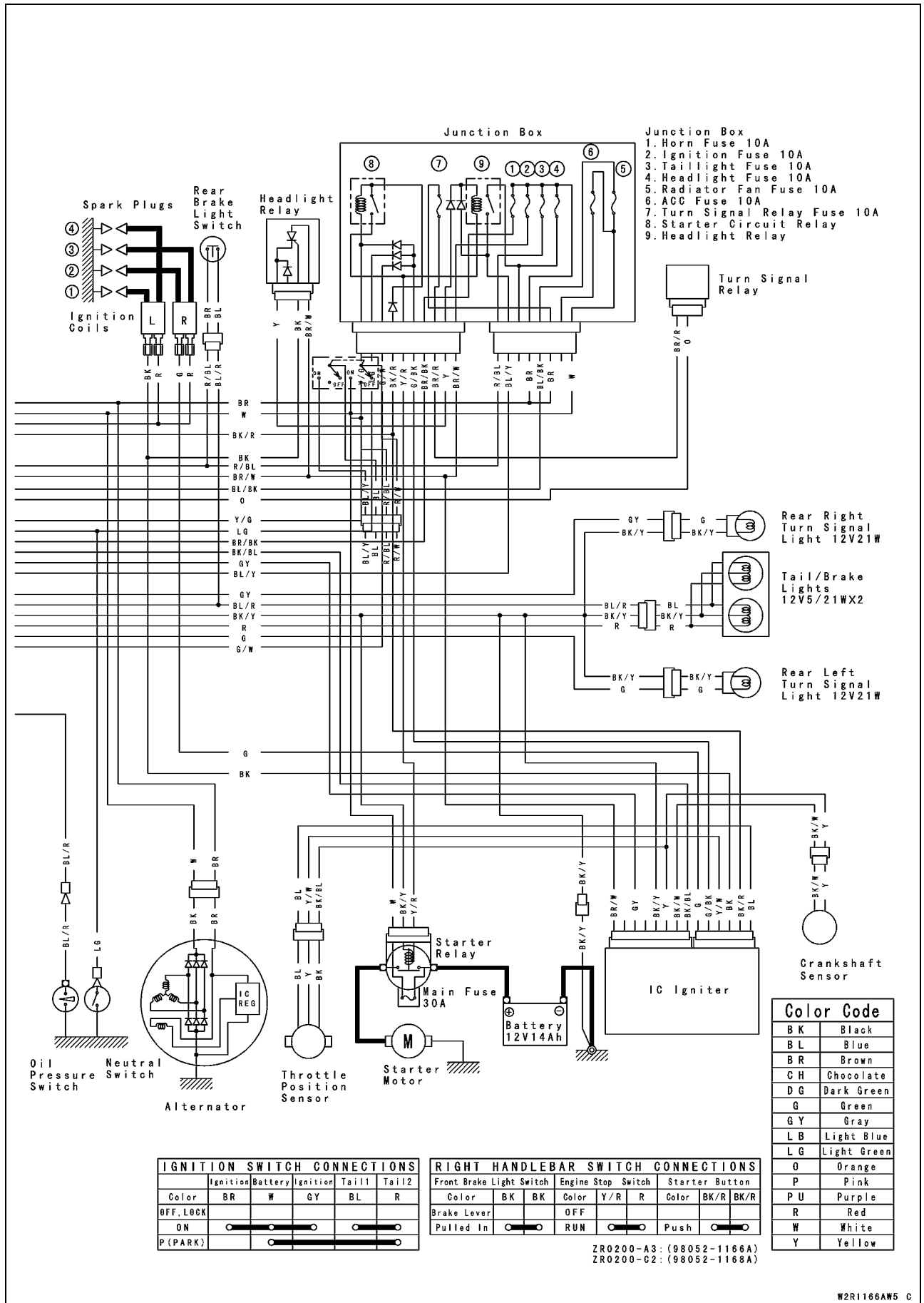


15-112 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-A3 WVTA (FULL P)/GB WVTA (FULL P)/WVTA (78.2 P)/C2)

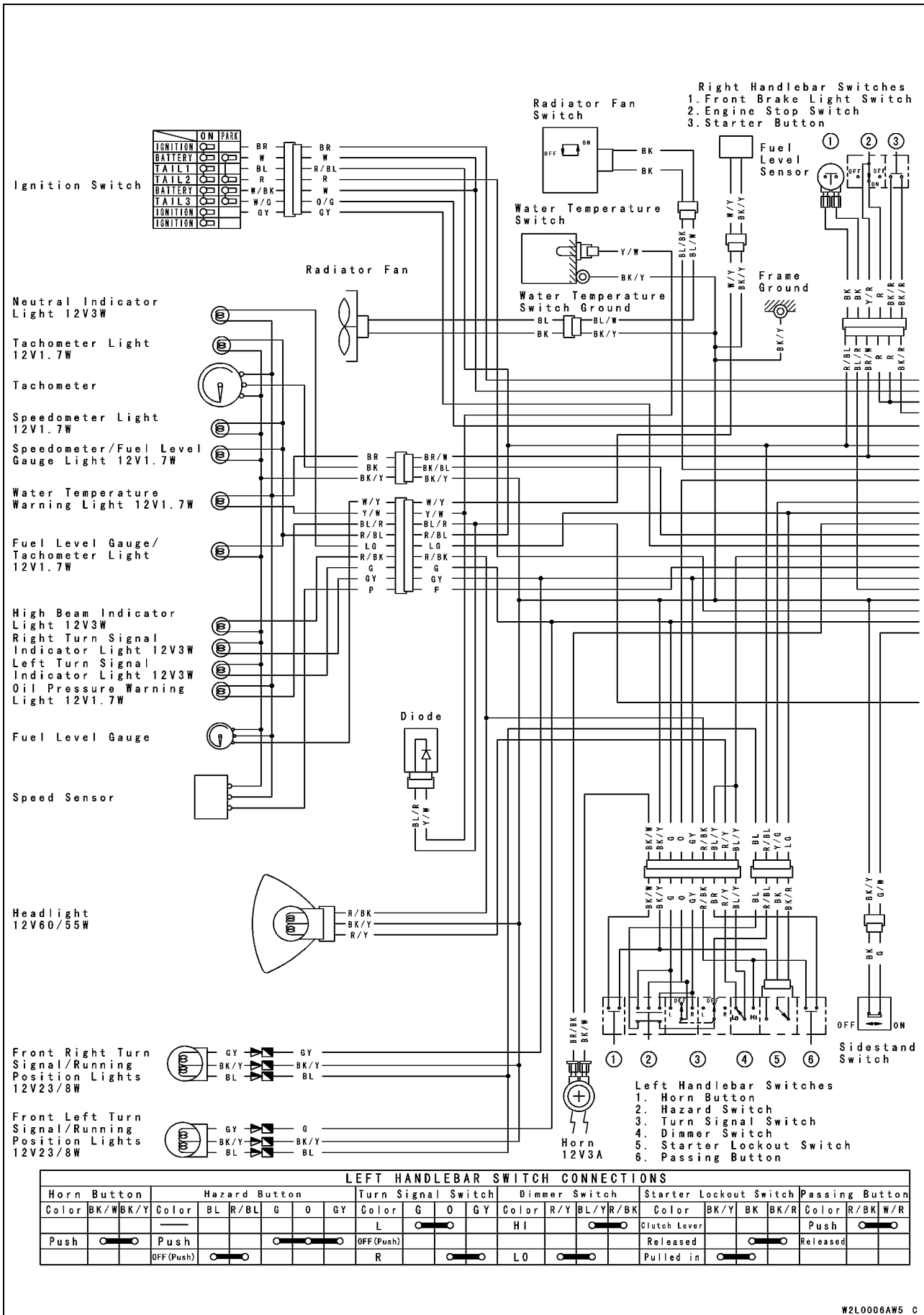


Wiring Diagram (ZR1200-A3 WVTA (FULL P)/GB WVTA (FULL P)/WVTA (78.2 P)/C2)

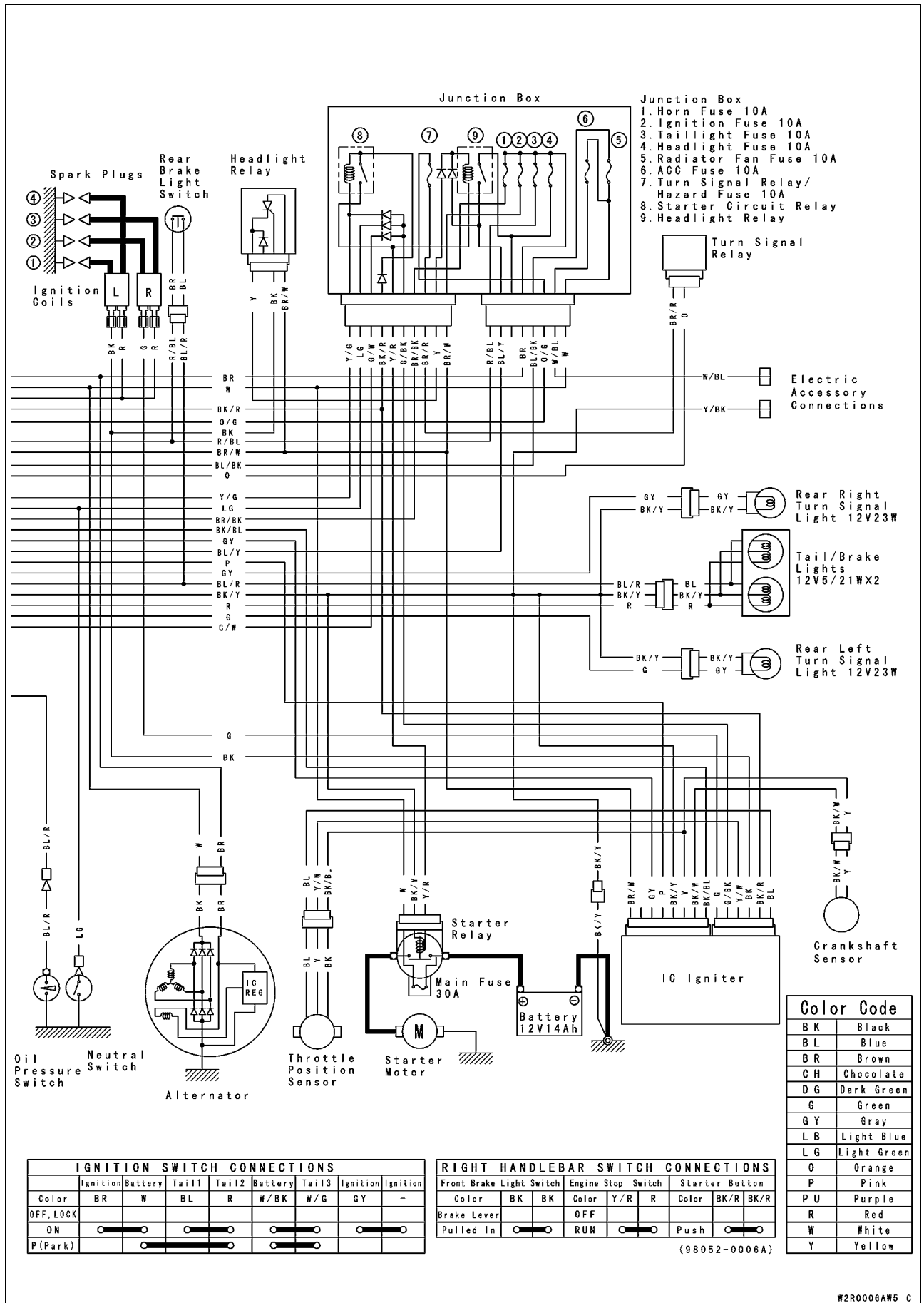


15-114 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-A1~A3 Malaysia)

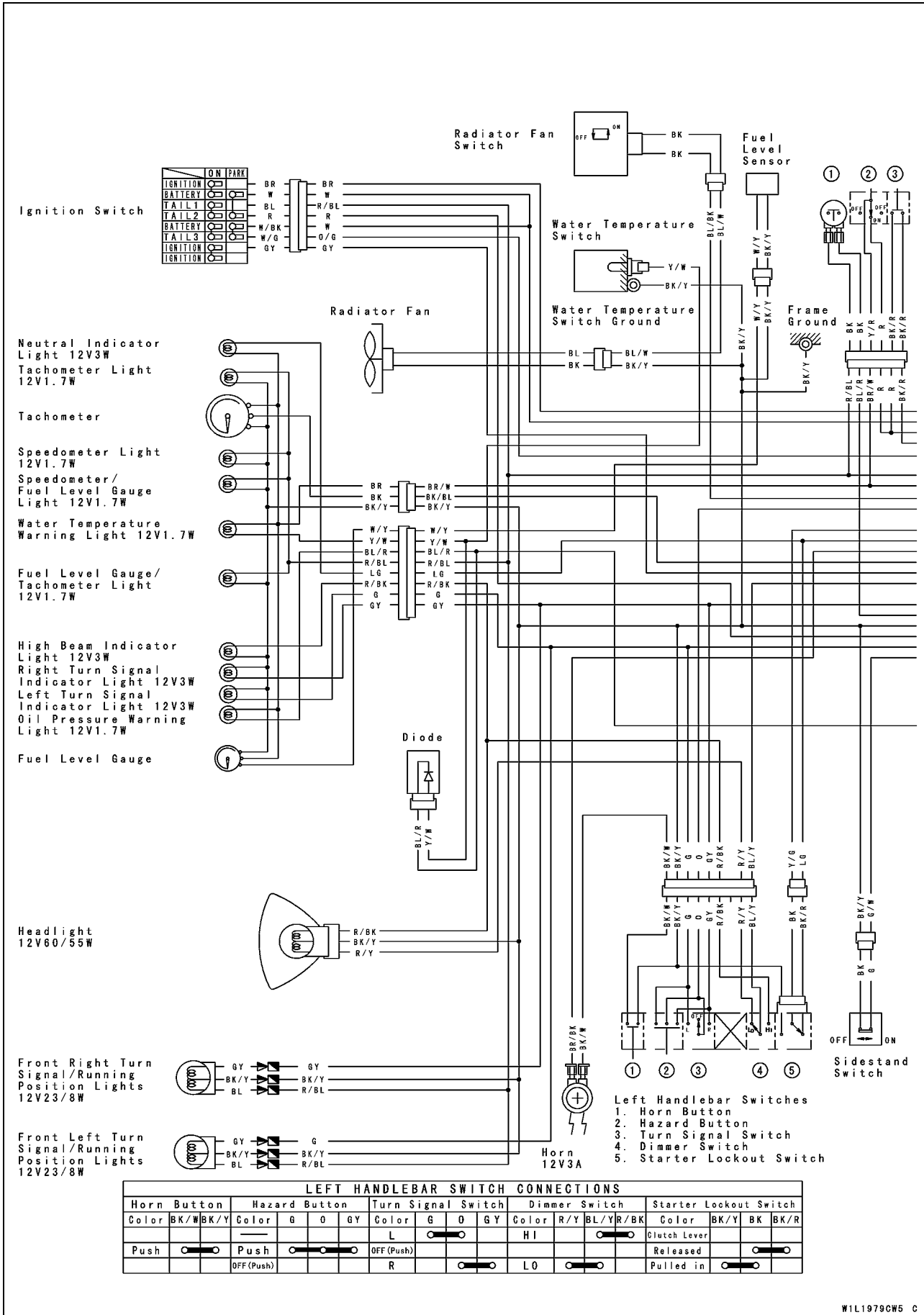


Wiring Diagram (ZR1200-A1~A3 Malaysia)

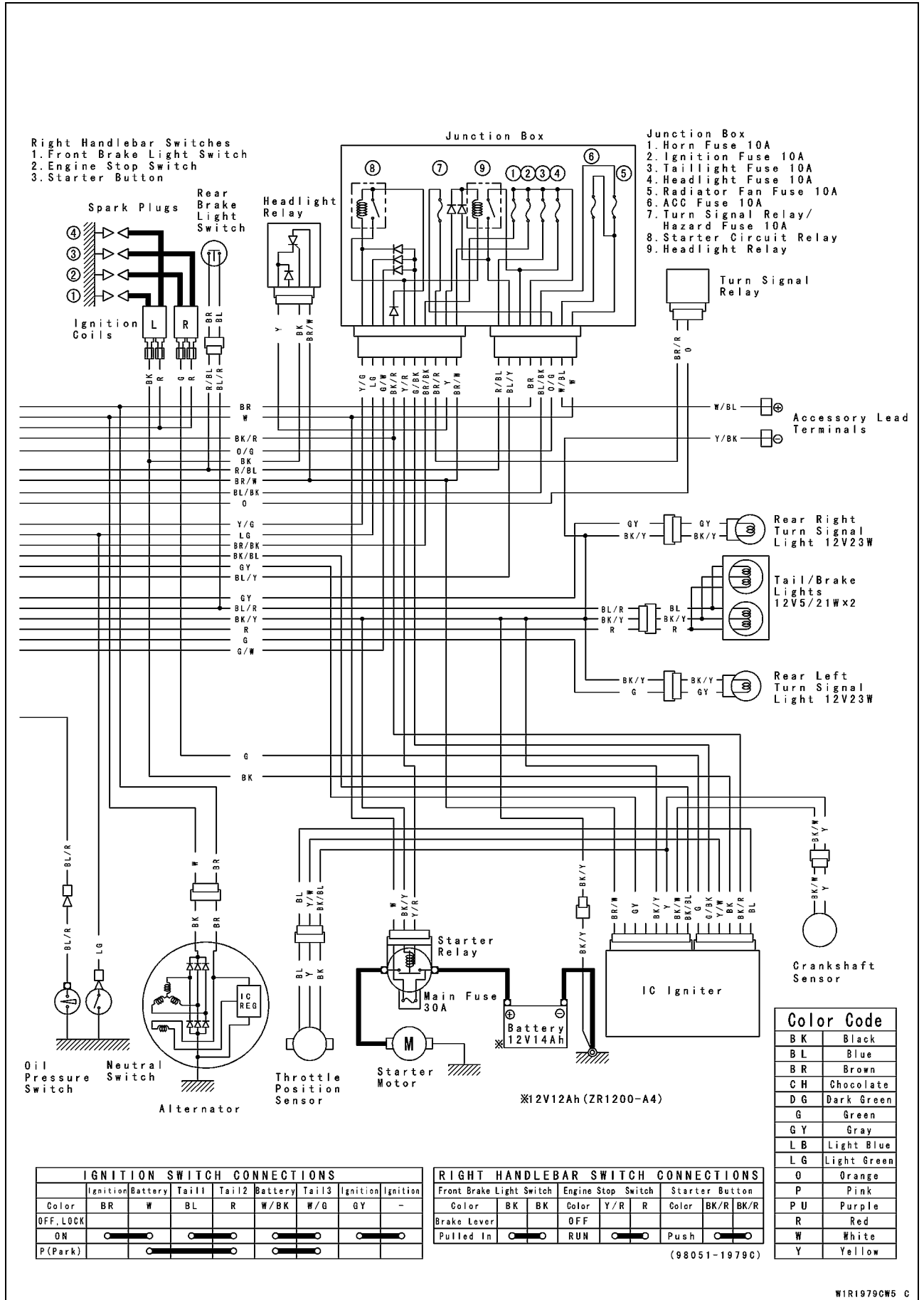


15-116 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-A United States and Canada)

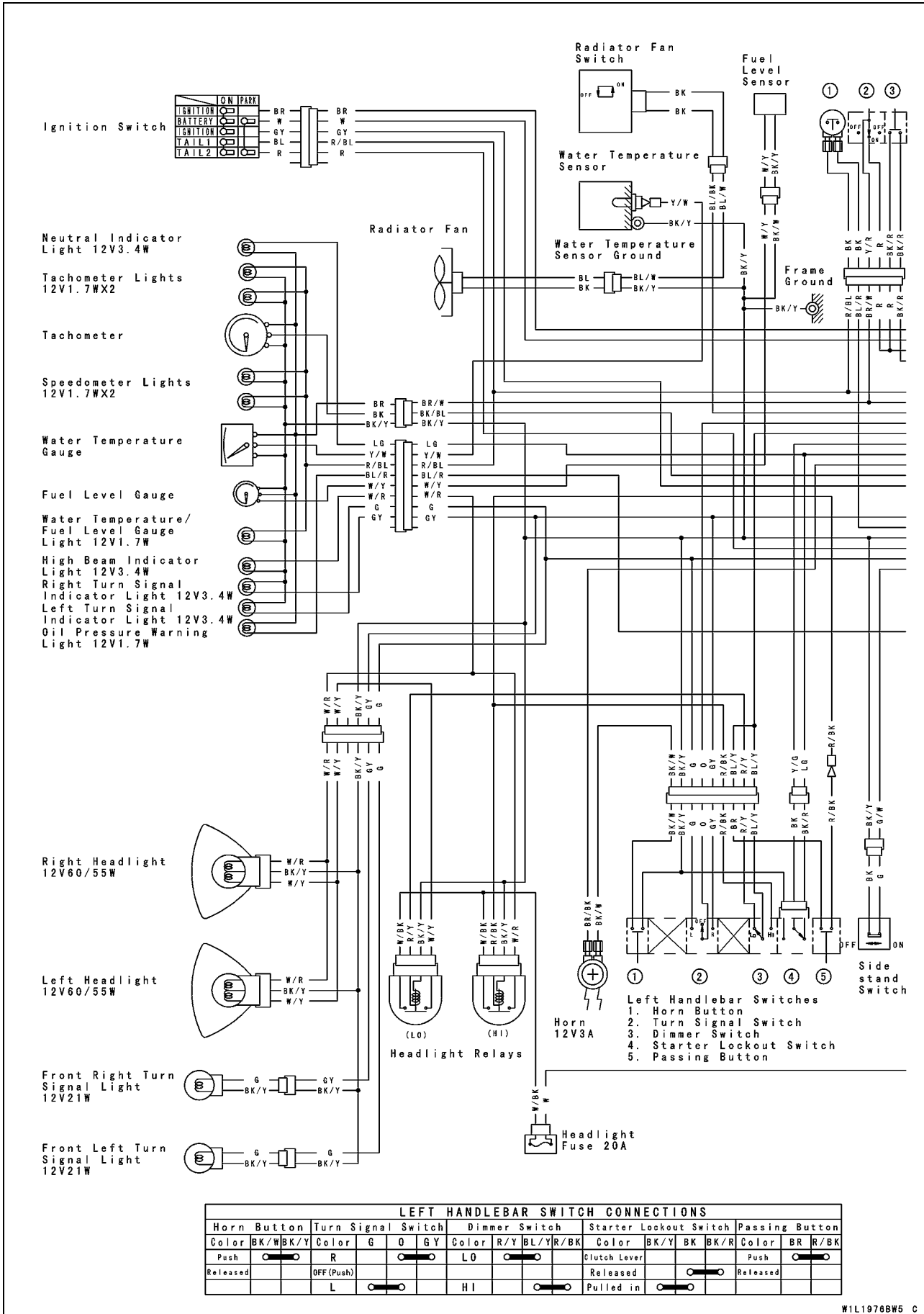


Wiring Diagram (ZR1200-A United States and Canada)

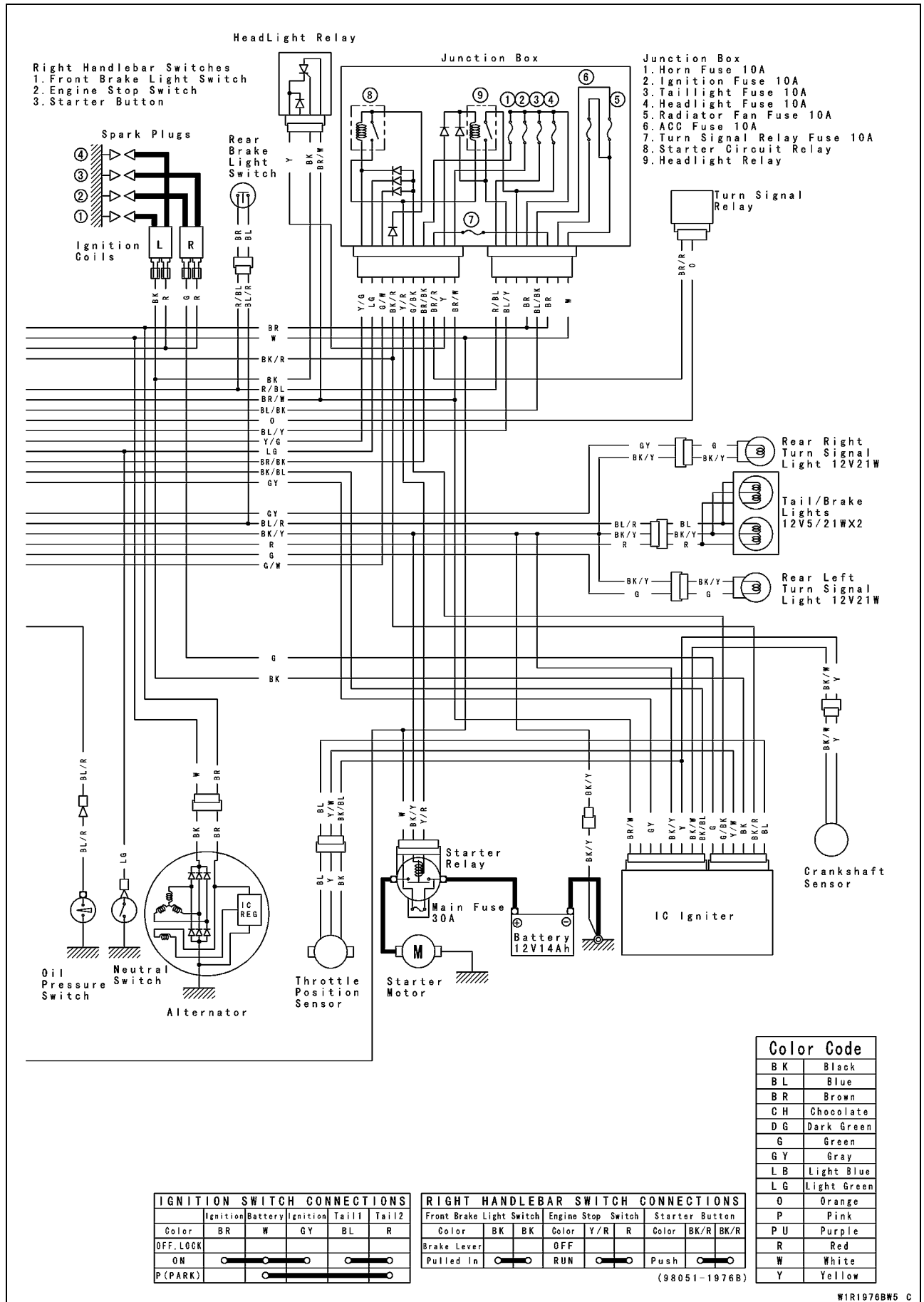


15-118 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-B1~B3 Australia)

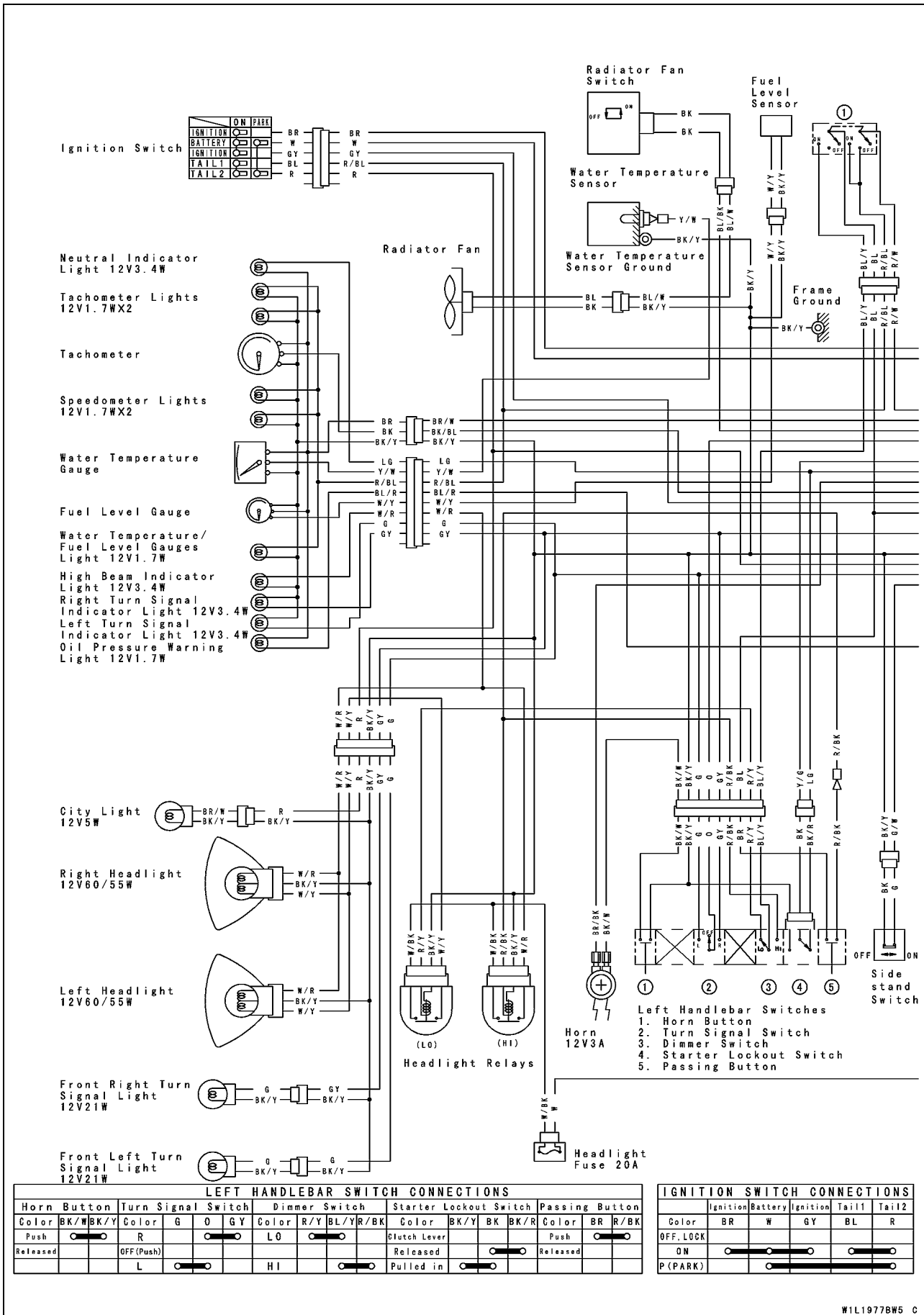


Wiring Diagram (ZR1200-B1~B3 Australia)



15-120 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-B1~B2 Europe)



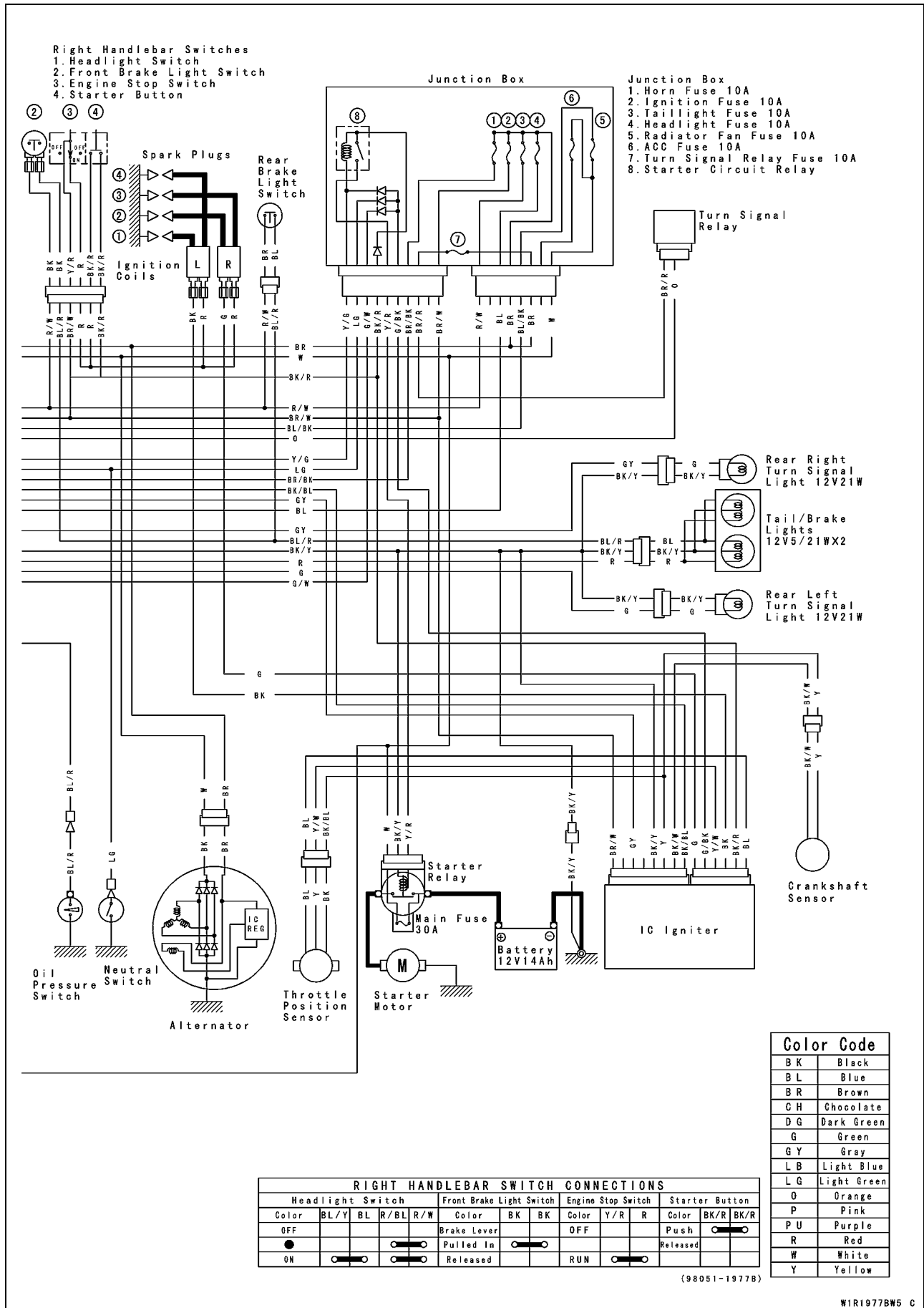
LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button		Turn Signal Switch		Dimmer Switch		Starter Lockout Switch			Passing Button		
Color	BK/WBK/Y	Color	G	O	GY	Color	R/Y	BL/YR/BK	Color	BR	R/BK
Push		R				LO		Clutch Lever	Push		
Released		OFF (Push)				HI		Released	Released		
		L						Pulled in			

IGNITION SWITCH CONNECTIONS

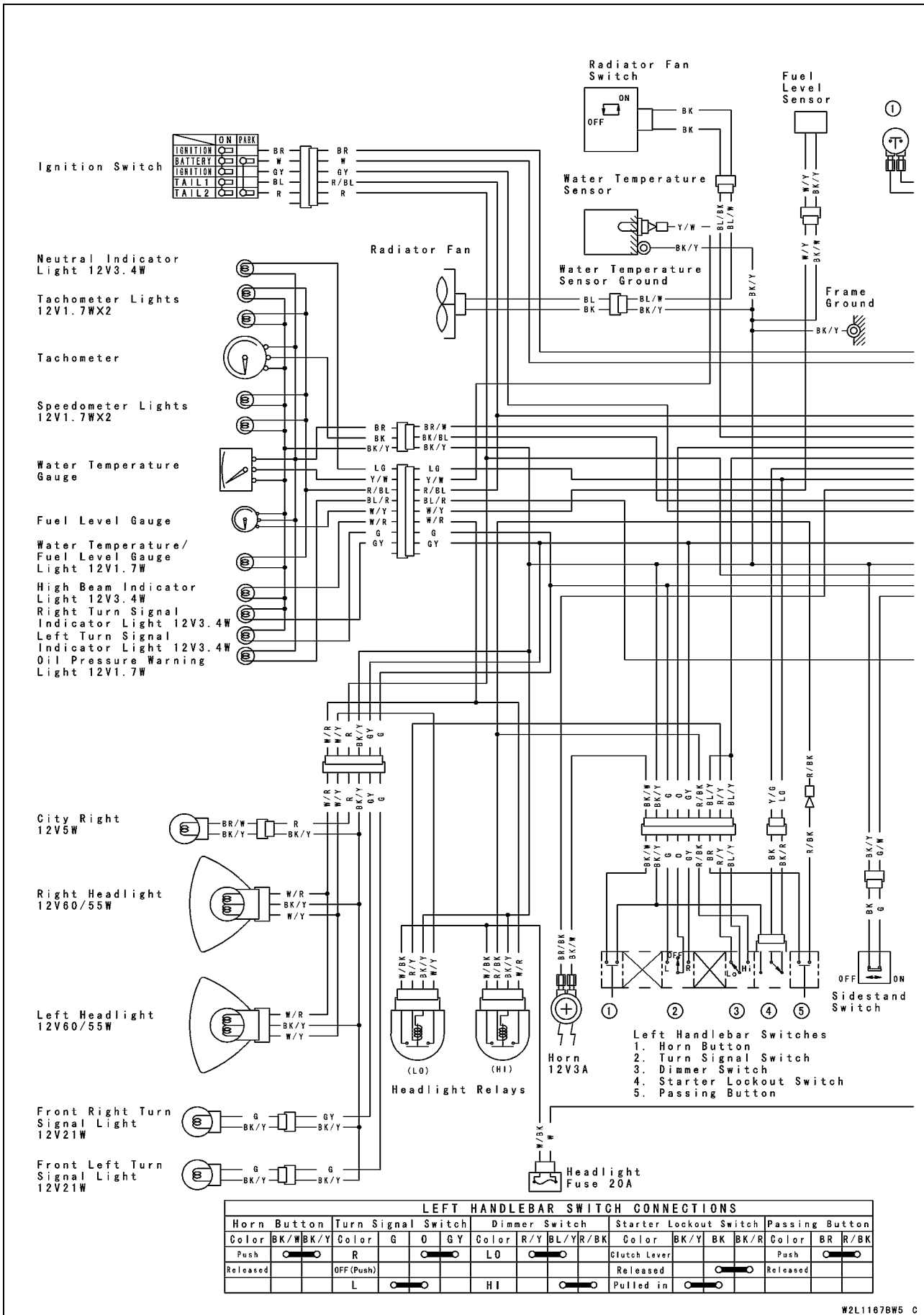
	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
OFF, LOCK					
ON					
P (PARK)					

Wiring Diagram (ZR1200-B1~B2 Europe)



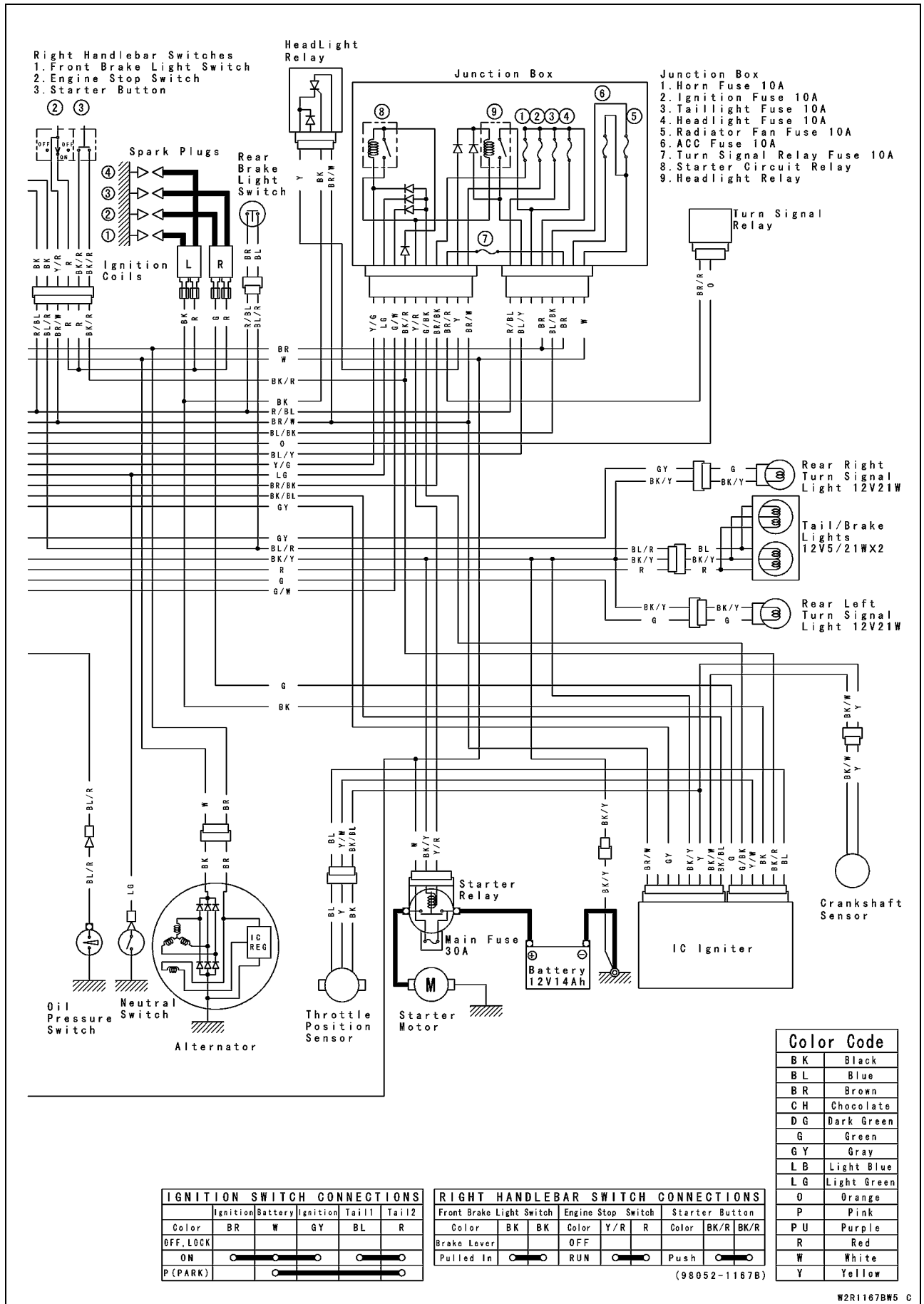
15-122 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-B3 WVTA (FULL P)/GB WVTA (FULL P)/WVTA (78.2 P))

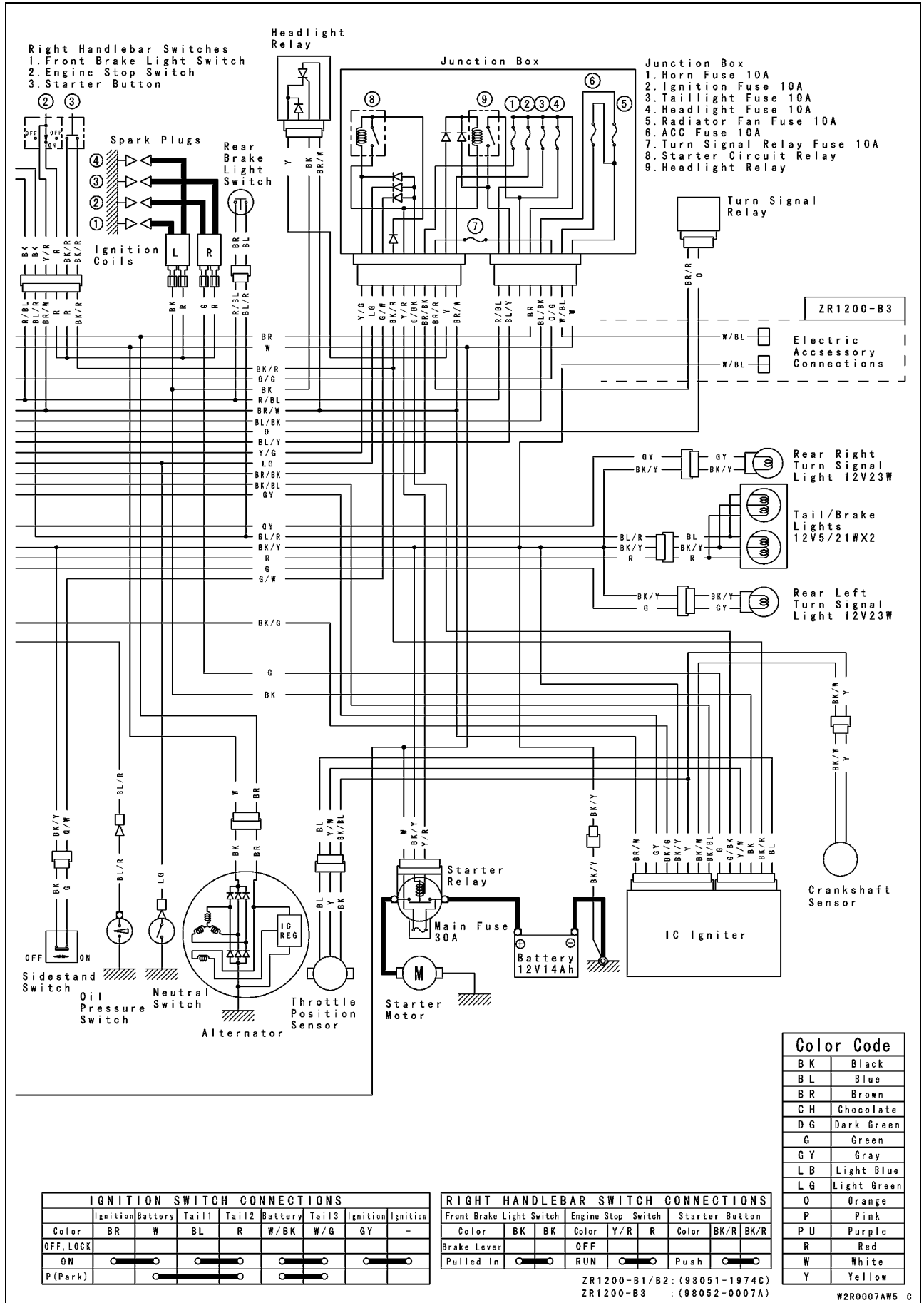


LEFT HANDLEBAR SWITCH CONNECTIONS																		
Horn Button	Turn Signal Switch	Dimmer Switch	Starter Lockout Switch	Passing Button														
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R	Color	BR	R/BK	
Push	○	R	○	G	○	GY	○	R/Y	○	R/BK	○	BK/Y	○	BK	○	BR	○	R/BK
Released		OFF (Push)	○	L	○		○		○		○	○	○	○	○			
			○				○		○		○	○	○	○	○			

Wiring Diagram (ZR1200-B3 WVTA (FULL P)/GB WVTA (FULL P)/WVTA (78.2 P))

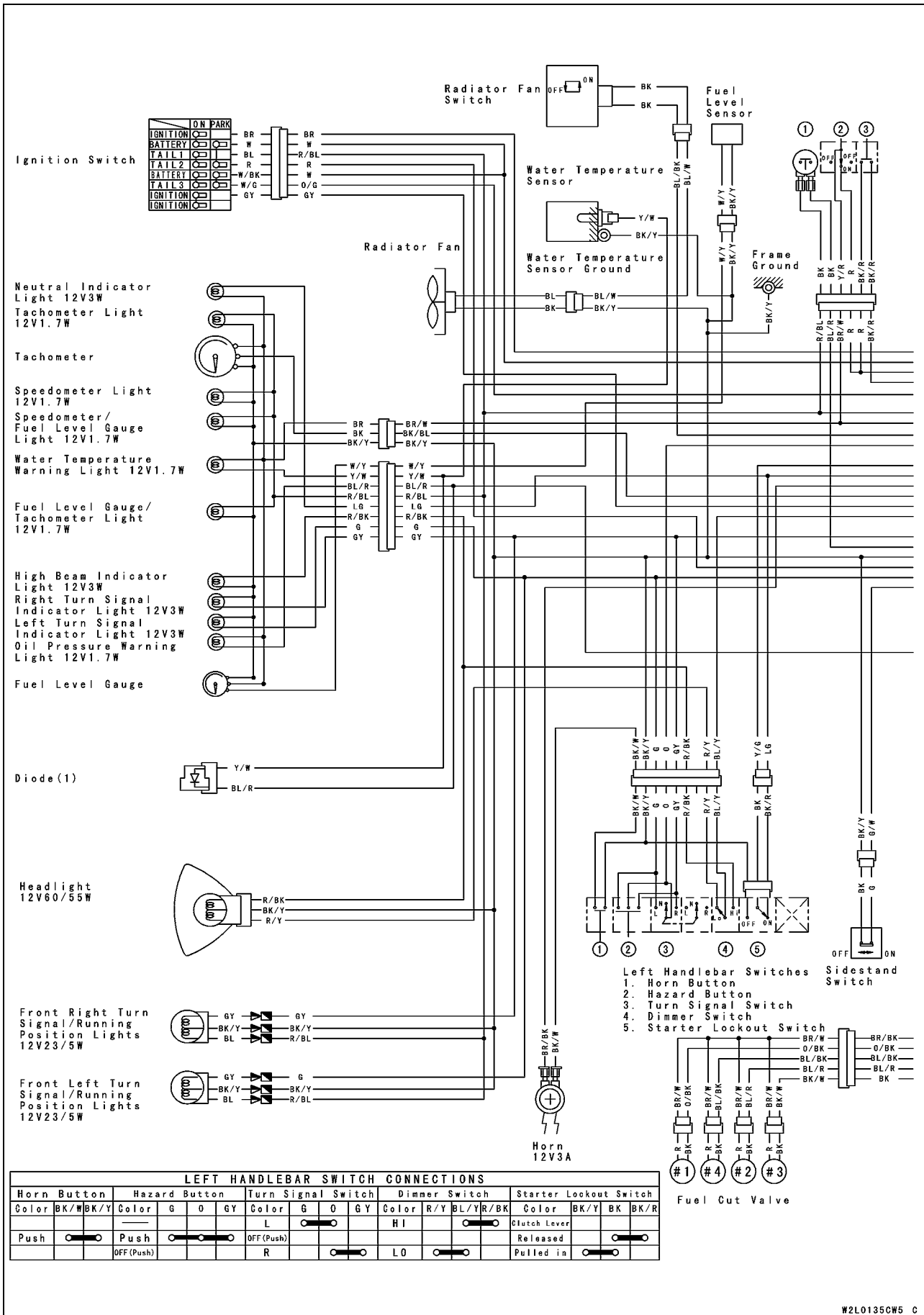


Wiring Diagram (ZR1200-B1~B3 Malaysia)

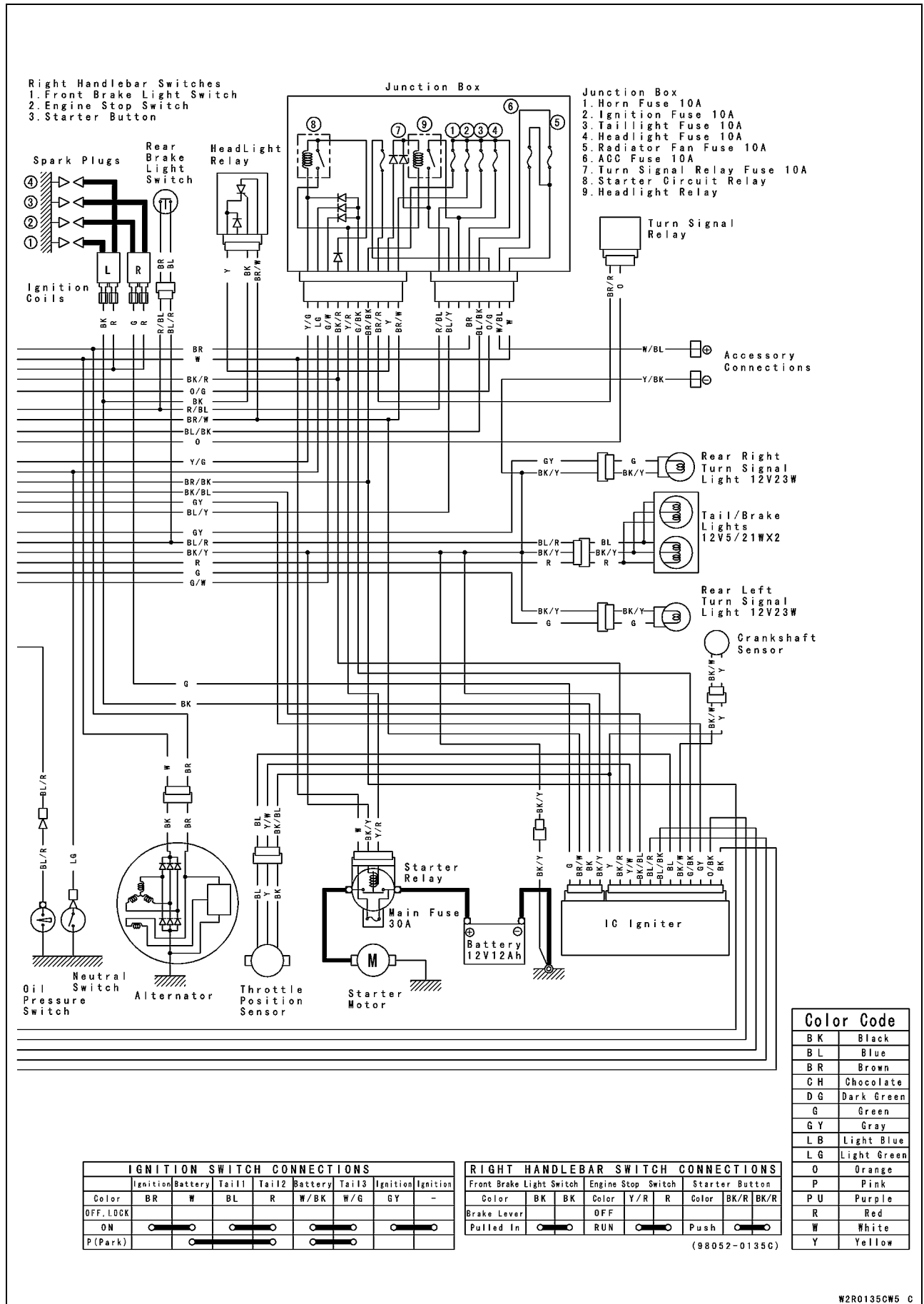


15-126 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-A4 ~ California/ZR1200-A4 ~, A6F ~ Formosa)

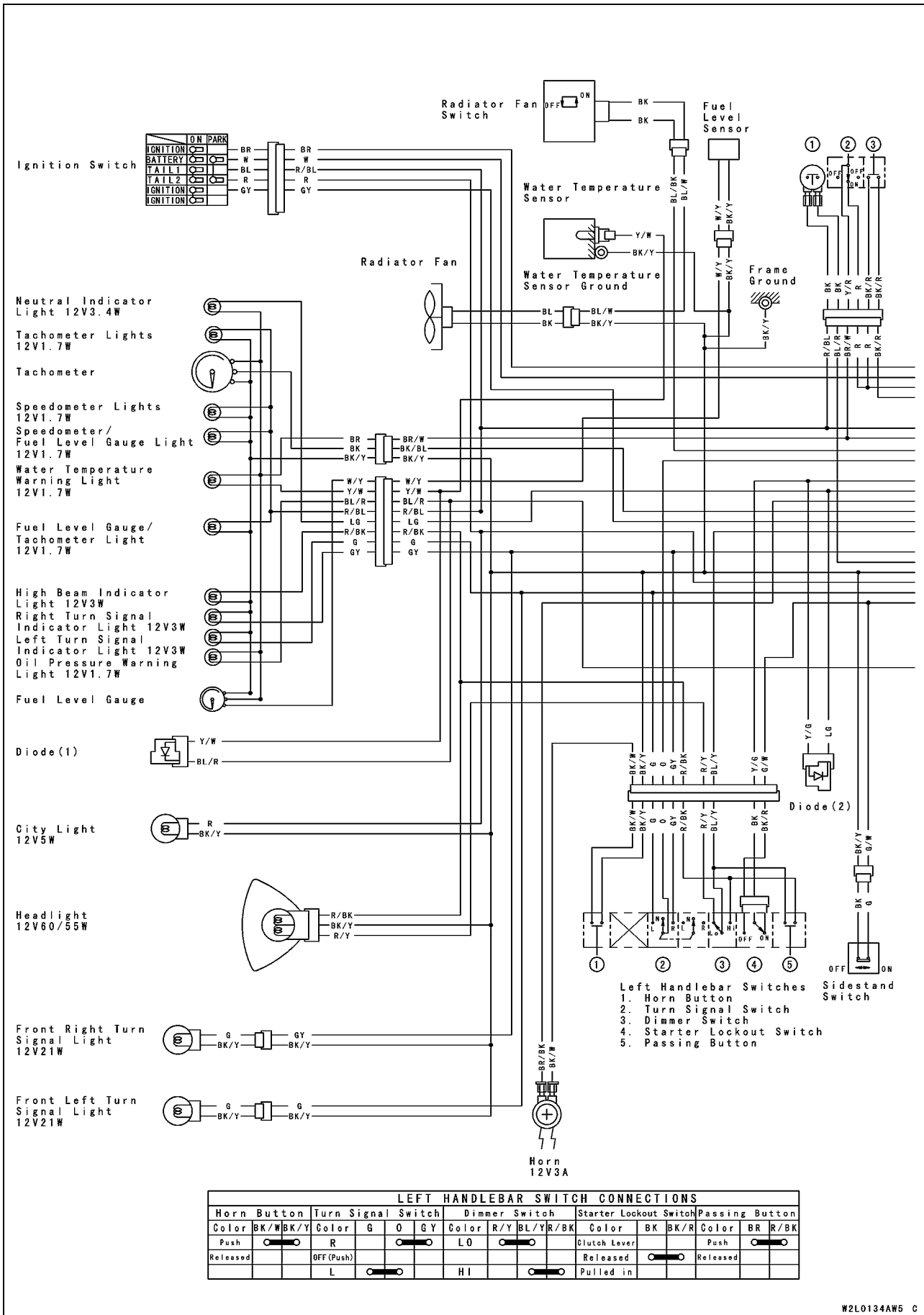


Wiring Diagram (ZR1200-A4 ~ California/ZR1200-A4 ~, A6F ~ Formosa)

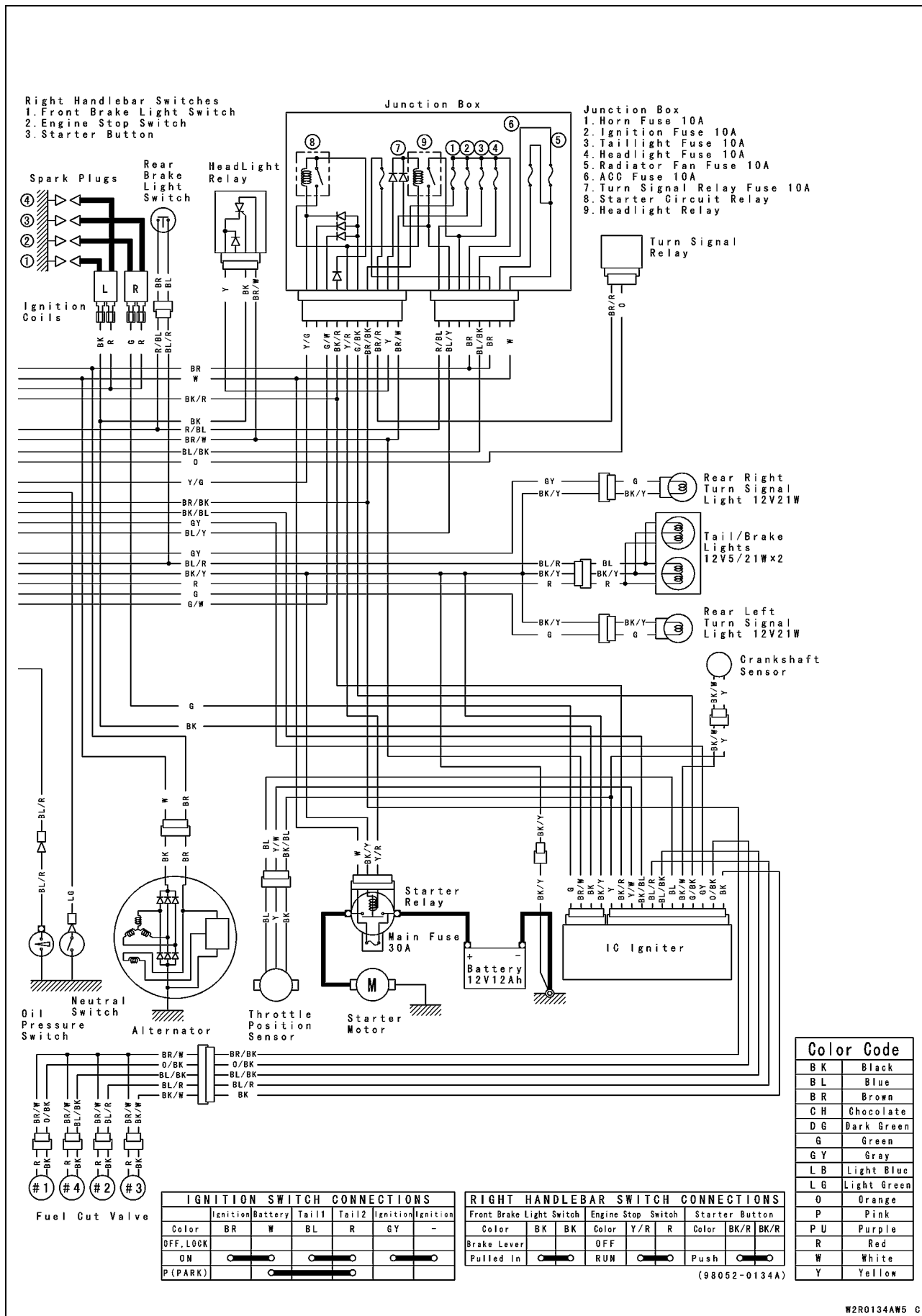


15-128 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-A4 ~, A6F, WVTA (FULL H)/GB WVTA (FULL H)/WVTA (78.2 H))

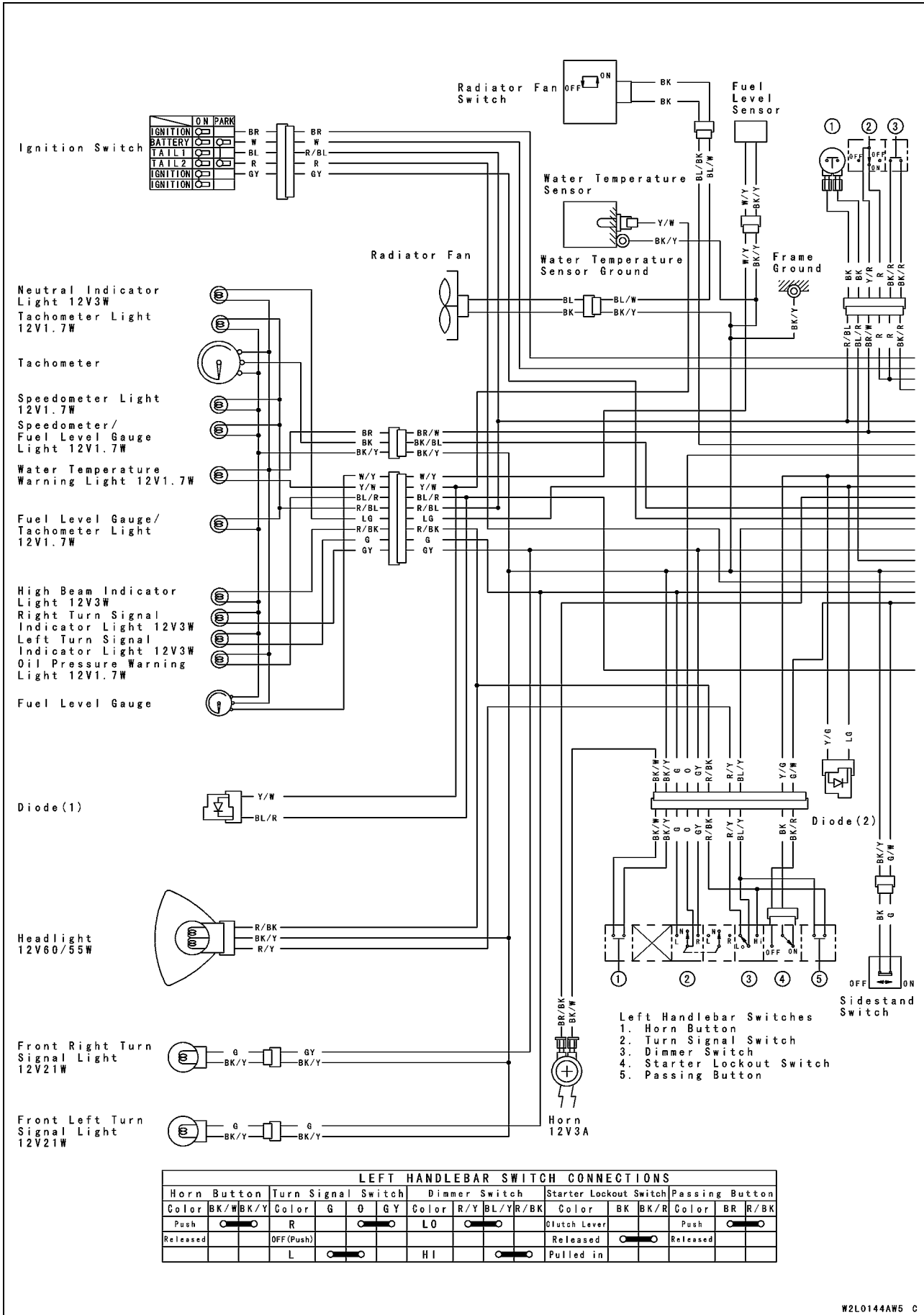


Wiring Diagram (ZR1200-A4 ~, A6F, WVTA (FULL H)/GB WVTA (FULL H)/WVTA (78.2 H))

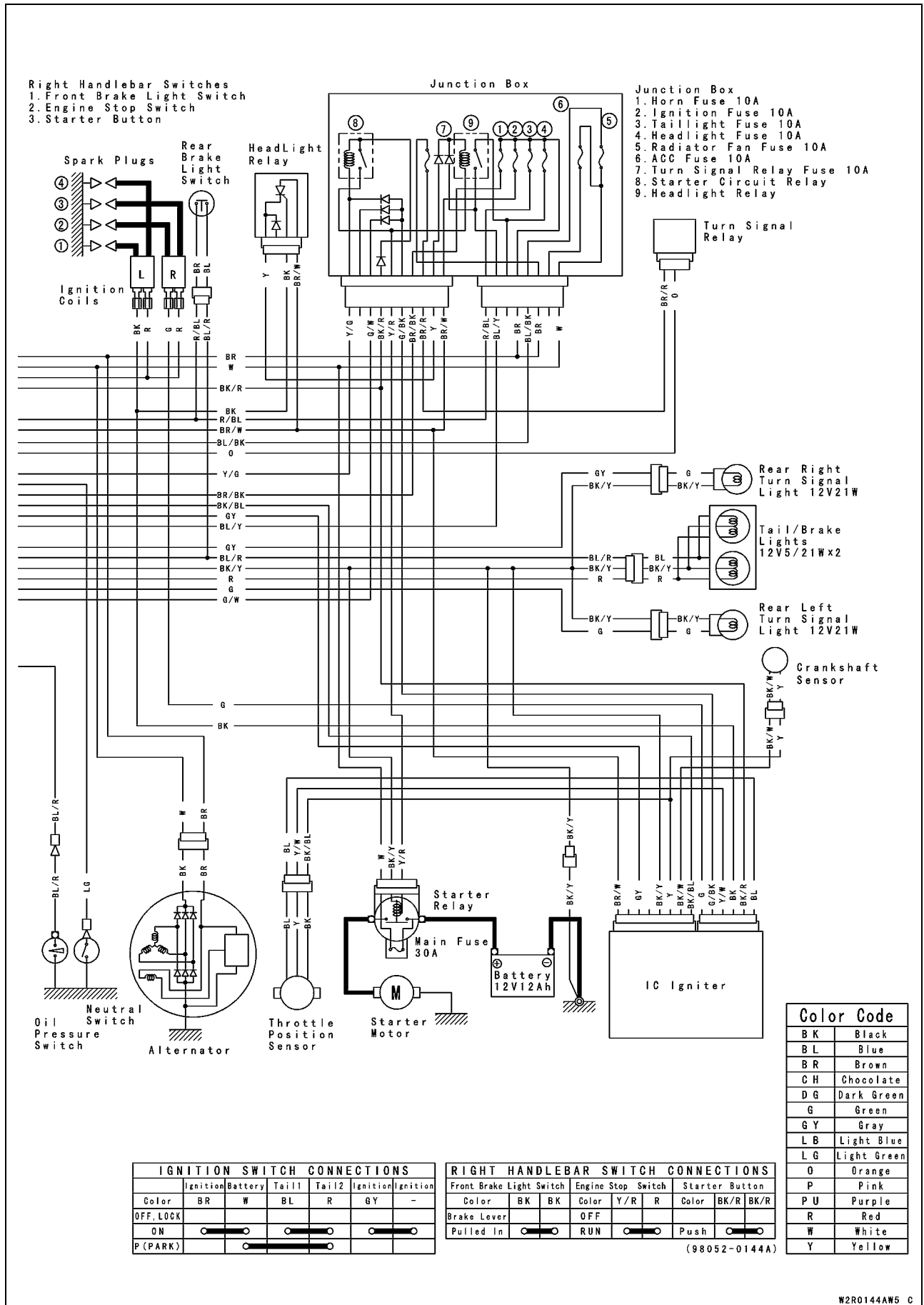


15-130 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-A4 ~, A6F ~ Australia)

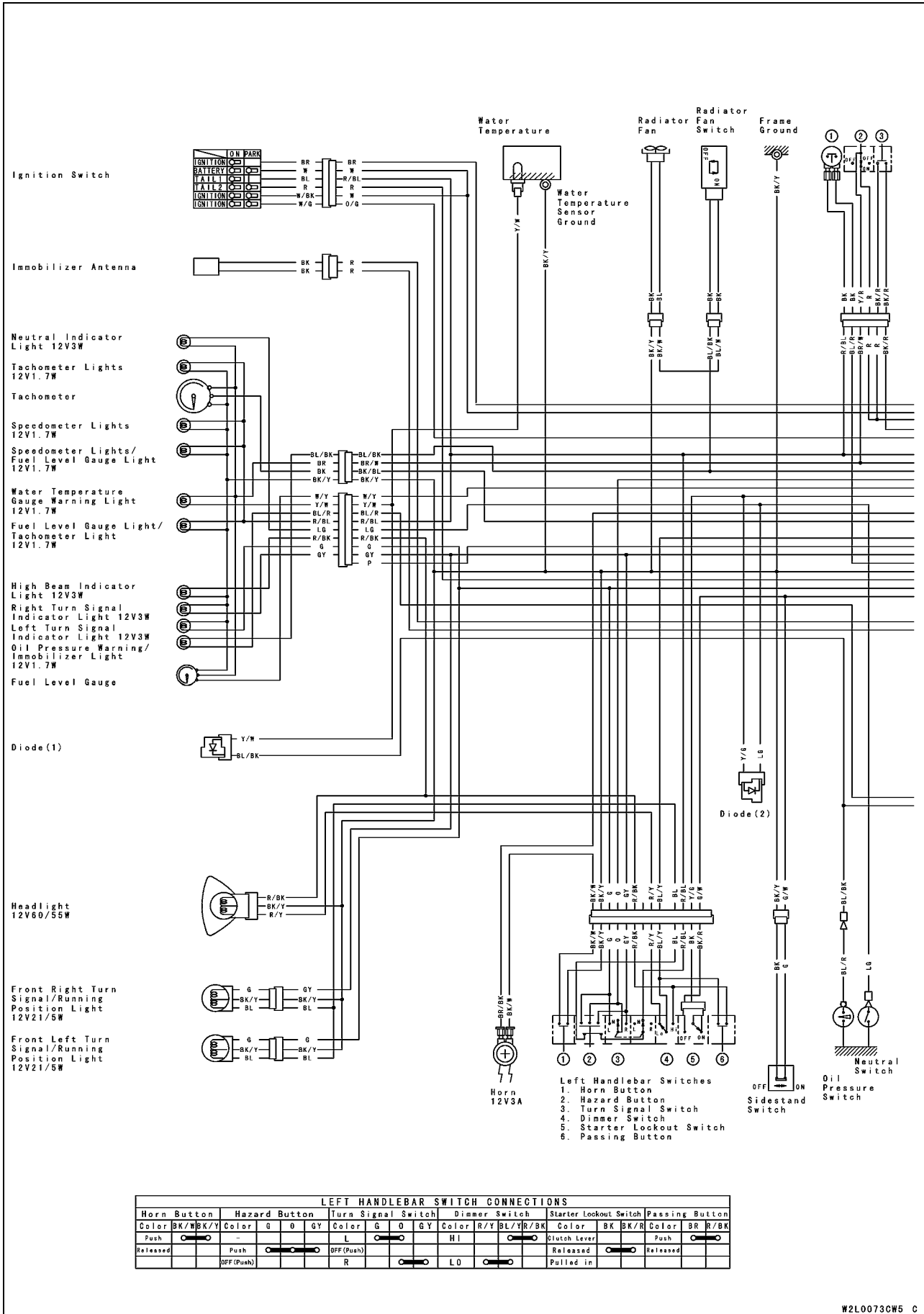


Wiring Diagram (ZR1200-A4 ~, A6F ~ Australia)



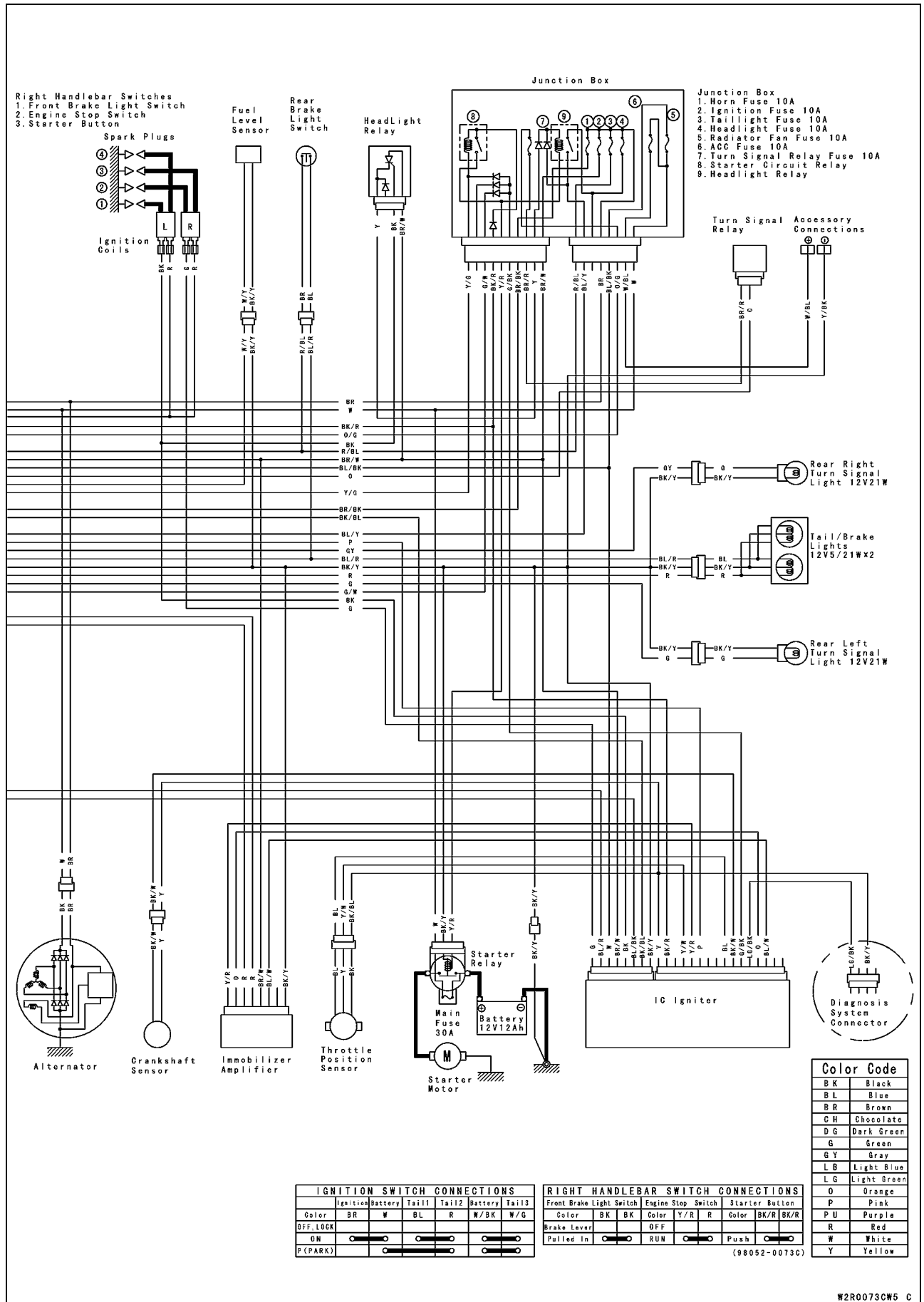
15-132 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-A4 ~, A6F ~ Malaysia)



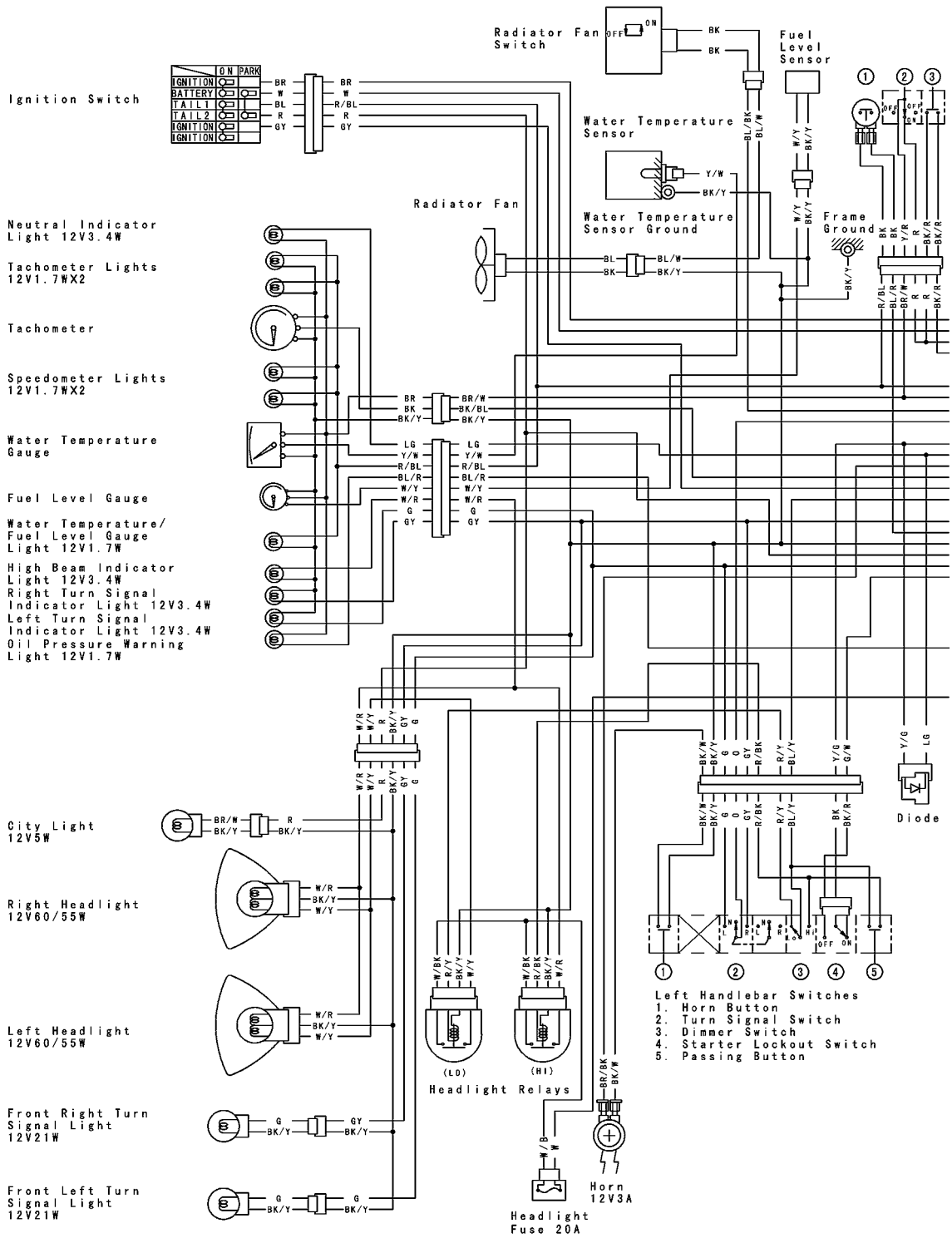
LEFT HANDLEBAR SWITCH CONNECTIONS																
Horn Button	Hazard Button		Turn Signal Switch			Dimmer Switch			Starter Lockout Switch		Passing Button					
Color	BK/W	BK/Y	Color	G	O	GY	Color	G	O	GY	Color	BK	BK/R	Color	BR	R/BK
Push	○	○		○	○	○	HI	○	○	○	Clutch Lever	○	○	Push	○	○
Released	○	○	OFF (Push)	○	○	○	LO	○	○	○	Released	○	○	Released	○	○
		OFF (Push)		○	○	○		○	○	○		○	○		○	○

Wiring Diagram (ZR1200-A4 ~, A6F ~ Malaysia)



15-134 ELECTRICAL SYSTEM

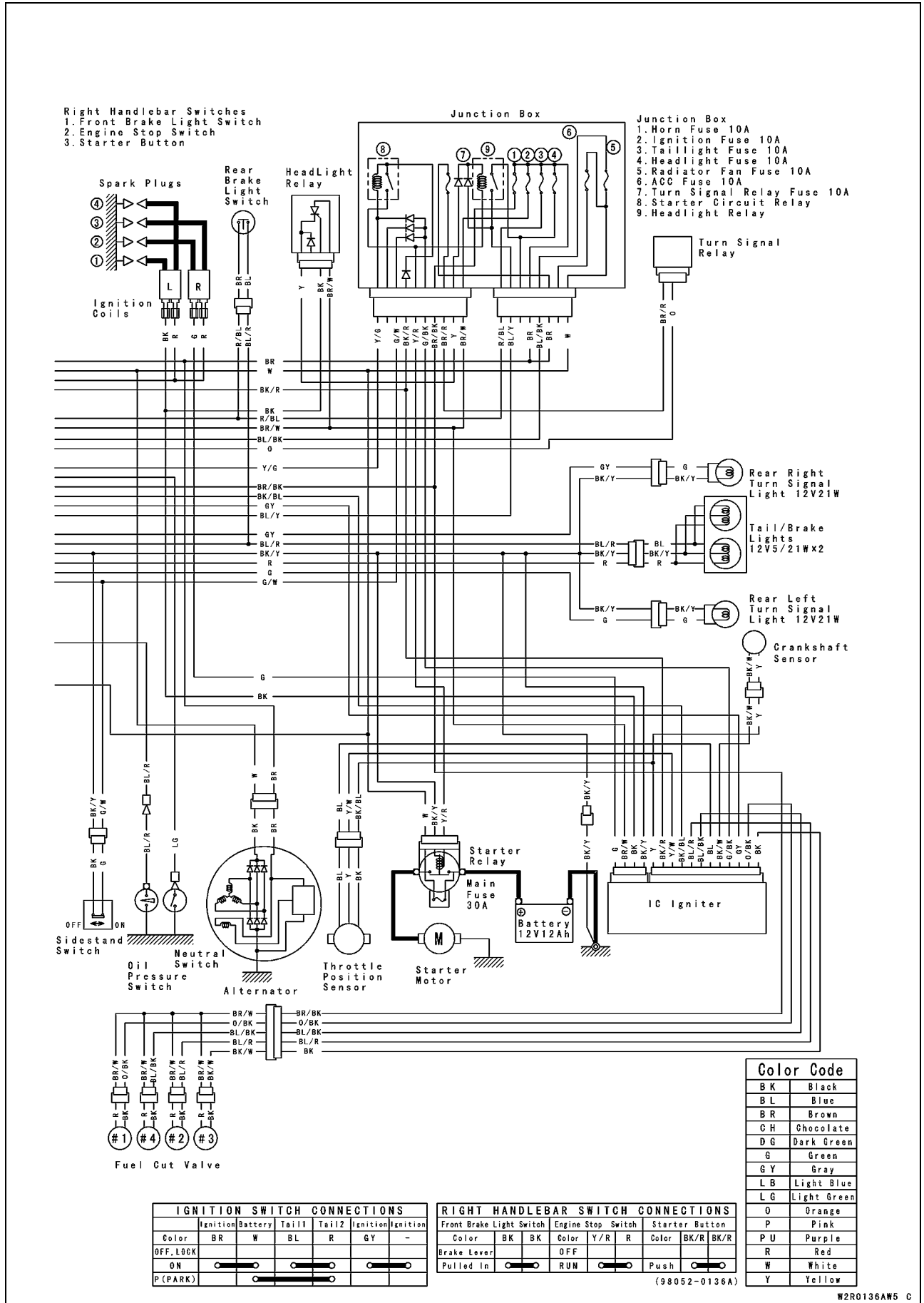
Wiring Diagram (ZR1200-B4 WVTA (FULL H)/GB WVTA (FULL H)/WVTA (78.2 H))



LEFT HANDLEBAR SWITCH CONNECTIONS																
Horn Button	Turn Signal Switch			Dimmer Switch			Starter Lockout Switch		Passing Button							
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK	BK/R	Color	BR	R/BK
Push	●	●	R	●	●	●	LO	●	●	●	Clutch Lever	●	●	Push	●	●
Released			OFF (Push)	●			HI	●	●	●	Released	●	●	Released	●	●
			L	●				●	●	●	Pulled in	●	●			

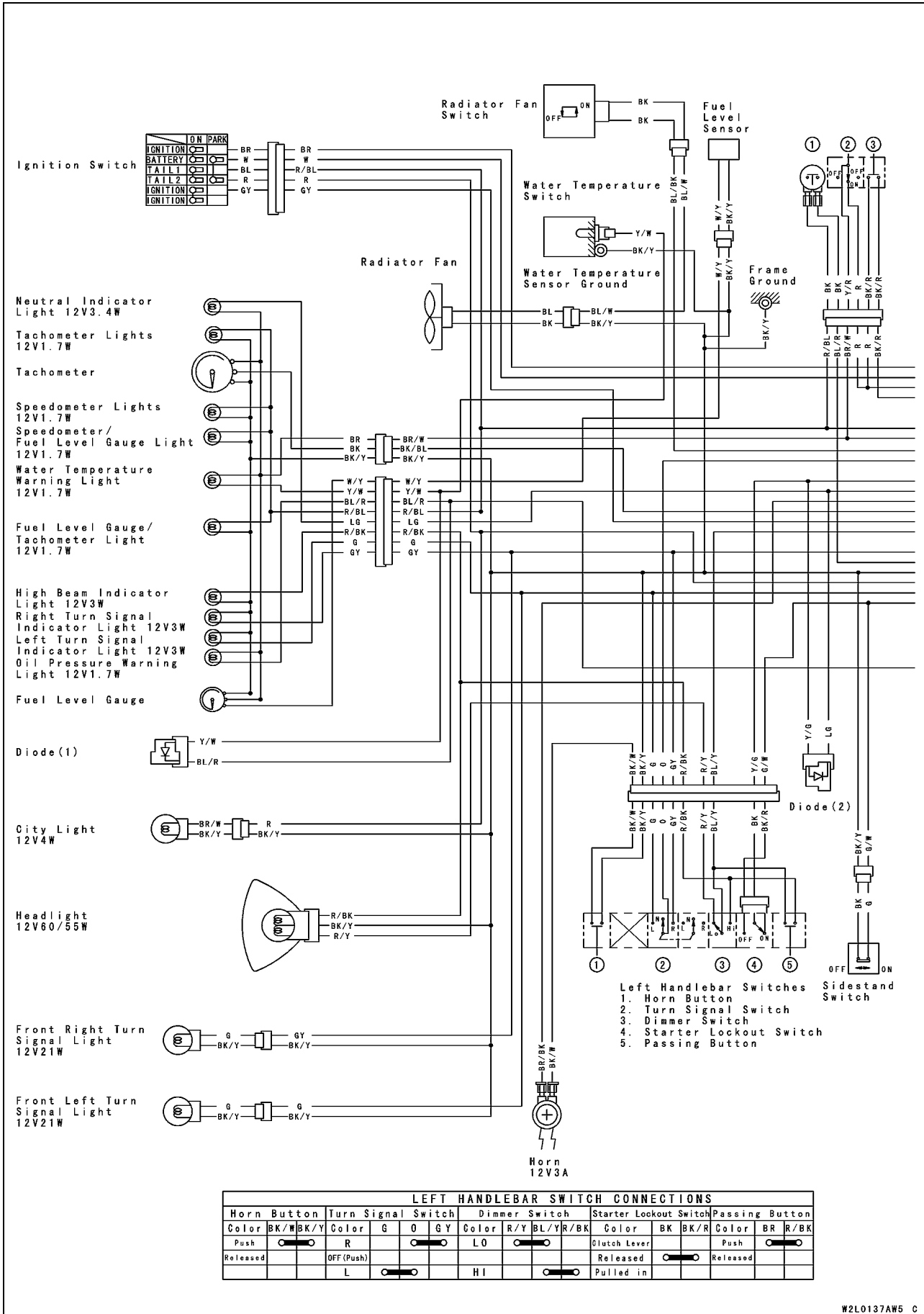
ELECTRICAL SYSTEM 15-135

Wiring Diagram (ZR1200-B4 WVTA (FULL H)/GB WVTA (FULL H)/WVTA (78.2 H))

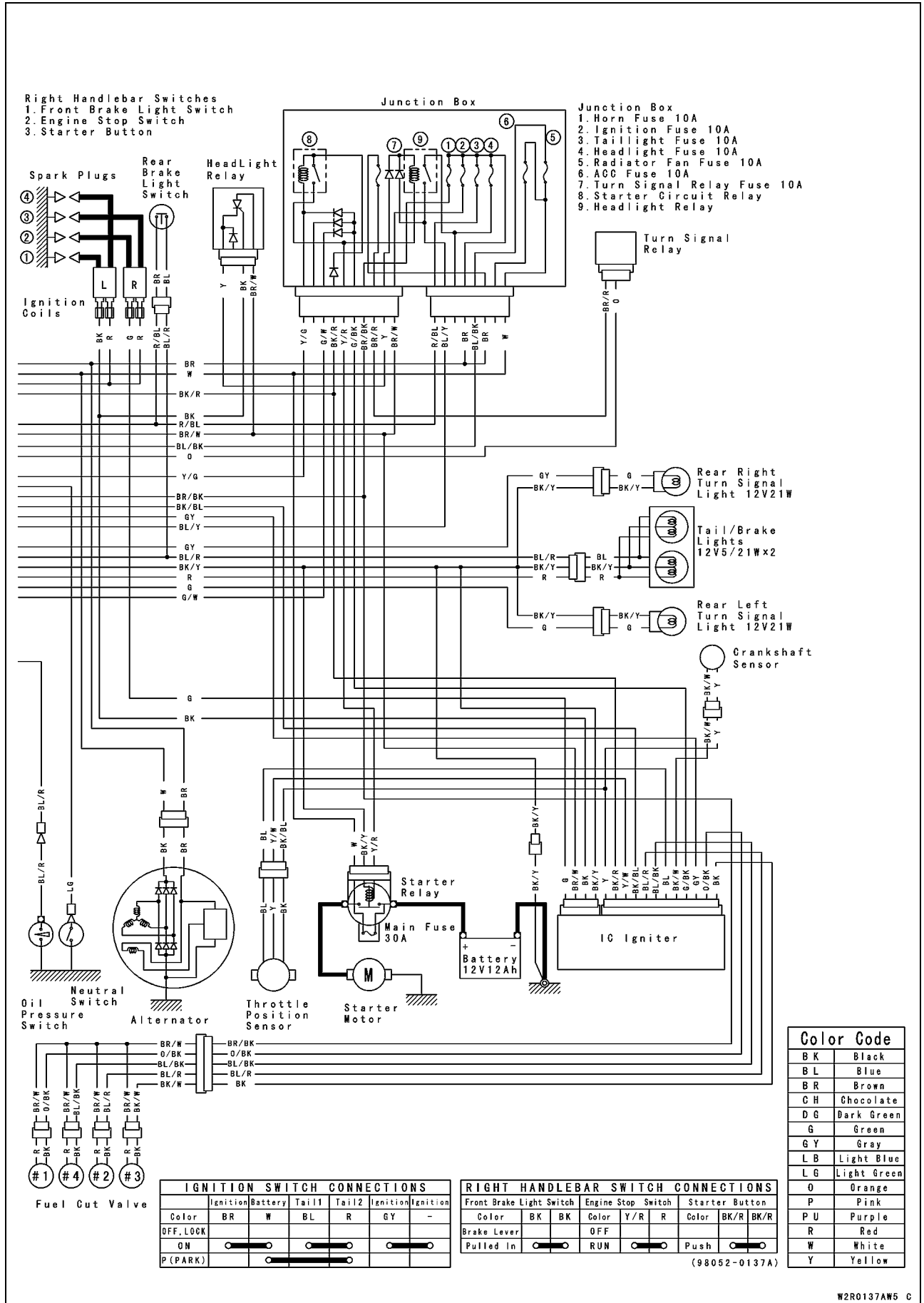


15-136 ELECTRICAL SYSTEM

Wiring Diagram (ZR1200-C3 WVTA (FULL H)/WVTA (78.2 H))



Wiring Diagram (ZR1200-C3 WVTA (FULL H)/WVTA (78.2 H))



Appendix

Table of Contents

Troubleshooting Guide	16-2
General Lubrication	16-7
Lubrication (Periodic Maintenance)	16-7
Nut, Bolt, and Fastener Tightness	16-8
Tightness Inspection (Periodic Inspection)	16-8
Unit Conversion Table	16-9

16-2 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 switch or neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Starter relays not contacting or operating
- Starter button not contacting
- Wiring open or shorted
- Ignition switch trouble
- Engine stop switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:

- Starter clutch trouble

Engine won't turn over:

- Valve seizure
- Rocker arm seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure
- Alternator shaft bearing seizure
- Starter idle gear seizure
- Balancer bearing seizure

No fuel flow:

- No fuel in tank
- Fuel tank air vent obstructed
- Fuel tap vacuum hose clogged
- Fuel tap clogged
- Fuel line clogged
- Carburetor float valve clogged

Engine flooded:

- Fuel level in carburetor float bowl too high
- Carburetor float valve worn or stuck open
- Starting technique faulty (When flooded, crank the engine with the throttle fully open to allow more air to reach the engine).

No spark; spark weak:

- Battery voltage low
- Ignition switch not on
- Engine stop switch turned off
- Clutch lever not pulled in or gear not in neutral
- 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 switch or sidestand 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 in 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 or needle jet clogged
- Pilot passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Choke plunger stuck open

Troubleshooting Guide

Fuel level in carburetor float bowl too high or too low

Fuel tank air vent obstructed

Carburetor holder loose

Air cleaner duct loose

Fuel tap clogged

Air cleaner O-ring damaged

Compression low:

Spark plug loose

Cylinder head not sufficiently tightened down

No valve clearance

Cylinder, piston worn

Piston ring bad (worn, weak, broken or sticking)

Piston ring/groove clearance excessive

Cylinder head warped

Cylinder head gasket damaged

Valve spring broken or weak

Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Other:

IC igniter trouble

Carburetors not synchronizing

Carburetor vacuum piston doesn't slide smoothly

Carburetor vacuum piston diaphragm damaged

Engine oil viscosity too high

Drive train trouble

Brake dragging

Engine overheating

Clutch slipping

Backfiring when deceleration: vacuum switch valve broken

Air suction valve trouble

Poor Running or No Power at High Speed:

Firing incorrect:

Spark plug dirty, broken or maladjusted

Spark plug cap or high tension wiring trouble

Spark plug cap shorted or not in good contact

Spark plug incorrect

IC igniter trouble

Pickup coil trouble

Ignition coil trouble

Fuel/air mixture incorrect:

Starter plunger stuck open

Main jet clogged or wrong size

Jet needle or needle jet worn

Air jet clogged

Fuel level in carburetor float bowl too high or too low

Air bleed pipe bleed holes or needle jet clogged

Air cleaner clogged, poorly sealed, or missing

Air cleaner duct loose

Air cleaner O-ring damaged

Fuel to carburetor insufficient

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 valves won't fully open

Carburetor vacuum piston doesn't slide smoothly

Carburetor vacuum piston diaphragm damaged

Brake dragging

Clutch slipping

Engine overheating

Engine oil level too high

Engine oil viscosity too high

Drive train trouble

Air suction valve trouble

Vacuum switch valve trouble

Balancer mechanism malfunctioning

Catalytic converter overheats and melts down due to misfire (KLEEN)

Overheating:

Firing incorrect:

Spark plug dirty, broken, or maladjusted

Spark plug incorrect

IC igniter trouble

16-4 APPENDIX

Troubleshooting Guide

Muffler overheating:

Advice to user on KLEEN: do not run the engine even if with only one cylinder misfiring or poor running (Request the nearest service facility to correct it)

Advice to user on KLEEN: do not push-start with a dead battery (Connect another full-charged battery with jumper cables, and start the engine using the electric starter)

Advice to user on KLEEN: do not start the engine under misfire due to spark plug fouling or poor connection of the spark plug

Advice to user on KLEEN: do not coast the motorcycle with the ignition switch off (Turn the ignition switch ON and run the engine)

Fuel/air mixture incorrect:

Main jet clogged or wrong size
Fuel level in carburetor float bowl too low
Carburetor holder loose
Air cleaner duct loose
Air cleaner poorly sealed or missing
Air cleaner O-ring damaged
Air cleaner clogged

Compression high:

Carbon built up in combustion chamber

Engine load faulty:

Clutch slipping
Engine oil level too high
Engine oil viscosity too high
Drive train trouble
Brake dragging

Lubrication inadequate:

Engine oil level too low
Engine oil poor quality or incorrect

Water temperature warning system incorrect (ZR1200A, C):

Water temperature warning light broken
Water temperature switch broken

Gauge incorrect (ZR1200B):

Water temperature gauge broken
Water temperature sensor broken

Coolant incorrect:

Coolant level too low
Coolant deteriorated
Wrong coolant mixed ratio

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:

Gauge incorrect (ZR1200B):

Water temperature gauge broken
Water temperature sensor broken

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 slave cylinder trouble
Clutch hub or housing unevenly worn
Clutch master cylinder 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 slave cylinder trouble
Clutch hub nut loose
Air in clutch fluid line
Clutch hub spline damaged
Clutch friction plate installed wrong
Clutch fluid leakage
Clutch fluid deteriorated
Clutch master cylinder primary or secondary cup damaged
Clutch master cylinder scratched inside

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 set lever binding
Neutral set lever binding
Shift return spring weak or broken
Shift return spring pin loose
Shift mechanism arm spring broken
Shift mechanism arm broken

Jumps out of gear:

Shift fork ear worn, bent
Gear groove worn
Gear dogs and/or dog holes worn
Shift drum groove worn
Gear set lever spring weak or broken
Shift fork guide pin worn
Drive shaft, output shaft, and/or gear splines worn

Overshifts:

Gear set lever spring weak or broken

Troubleshooting Guide

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:

Engine operated in red zone
Valve clearance incorrect
Valve spring broken or weak
Camshaft bearing portion 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
Catalytic converter melts down due to misfire (KLEEN)
Balancer gear worn or chipped
Balancer shaft position maladjusted
Balancer bearing worn
Balancer shaft coupling rubber damper damaged
Alternator coupling rubber damper damaged
Alternator chain tensioner trouble
Alternator chain, sprocket, guide worn

Abnormal Drive Train Noise:**Clutch noise:**

Clutch rubber damper weak or damaged
Clutch housing finger/friction plate tang clearance excessive
Clutch housing gear worn
Wrong installation of outermost friction plate

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

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
Master cylinder damaged

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 filter clogged
Engine oil viscosity too low
Camshaft bearing portion worn
Crankshaft bearings worn
Connecting rod big bearings worn
Oil pressure switch damaged
Oil pressure switch lead damaged
Relief valve stuck open
O-ring at the oil passage damaged

Exhaust Smokes Excessively:**White smoke:**

Piston oil ring worn
Cylinder worn
Valve stem oil seal damaged
Valve guide worn
Engine oil level too high

Black smoke:

Air cleaner clogged
Main jet too large or fallen off
Starter plunger stuck open or choke lever left pulled
Fuel level in carburetor float bowl too high

Brown smoke:

Main jet too small

16-6 APPENDIX

Troubleshooting Guide

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 nut 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 sleeves or pivot bearings worn
Wheel rim warped or not balanced
Wheel bearing worn
Handlebar clamp bolts loose
Handlebar holder nuts loose
Steering stem head nut loose
Front, rear axle runout excessive

Handlebar pulls to one side:

Frame bent
Swingarm bent or twisted
Swingarm pivot shaft bent
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
Front fork oil leaking
Rear shock absorber oil leaking

Brake Doesn't Hold:

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
Brake master cylinder scratched inside

Battery Trouble:

Battery discharged:

Charge insufficient
Battery faulty (too low terminal voltage)
Battery leads making poor contact
Load excessive (e.g., bulb of excessive wattage)
Ignition switch trouble
Alternator trouble
Wiring faulty

Battery overcharged:

Alternator trouble
Battery faulty (temperature rises, relief valve opens, terminal voltage lowers)

General Lubrication

Lubrication (Periodic Maintenance)

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

NOTE

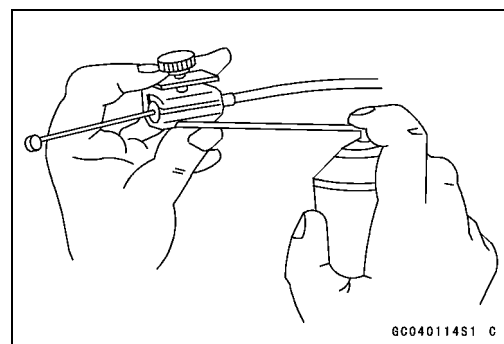
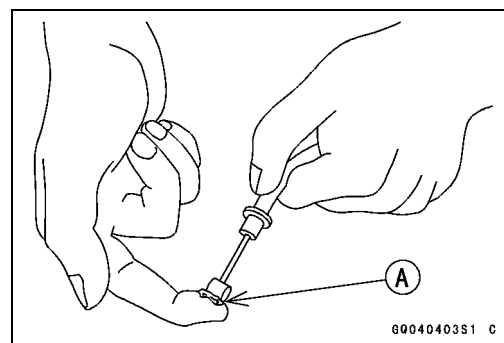
○ Perform the general lubrication in accordance with the *Periodic Maintenance Chart* or whenever the vehicle has been operated under wet or rainy conditions or especially after using a high-pressure water spray.

Pivots: Lubricate with Motor Oil.

Rear Brake Rod Joint

Points: Lubricate with Grease.

Throttle Inner Cable Upper Ends [A]
 Speedometer Inner Cable Lower End (Apply sparingly.)
 Sidestand
 Front and Rear Footpegs
 Clutch Lever (Apply silicone grease)
 Brake Lever (Apply silicone grease)

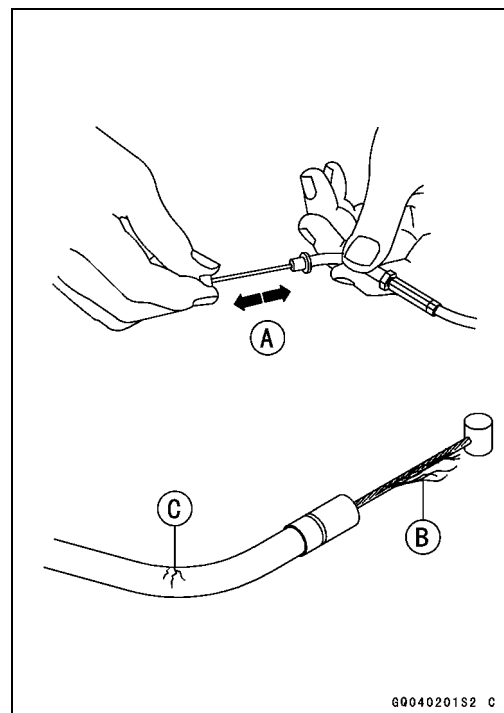


Cables: Lubricate with Cable Lubricant.

Choke Cable
 Throttle Cables
 Seat Lock Cable

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

- With the cable disconnected at both ends, the cable should move freely [A] within the cable housing.
- ★ If cable movement is not free after lubricating, if the cable is frayed [B] or if the cable housing is kinked [C], replace the cable.



16-8 APPENDIX

Nut, Bolt, and Fastener Tightness

Tightness Inspection (Periodic Inspection)

- Check the tightness of the bolts and nuts listed here in accordance with the Periodic Maintenance Chart. 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, retighten them to the specified torque, following the specified tightening sequence. Refer to the appropriate chapter or “Torque and Locking Agent” in the General Information chapter for torque specifications. If not specified in the text, see the Basic Torque for General Fasteners of “Torque and Locking Agent”. 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 Fender Mounting Bolts
- Front Axle Nut
- Front Axle Clamp Bolts
- Rear Axle Nut

Final Drive

- Chain Adjuster Clamp Bolts
- Rear Sprocket Nuts

Brakes:

- Front Master Cylinder Clamp Bolts
- Caliper Mounting Bolts
- Rear Master Cylinder Mounting Bolts
- Brake Lever Pivot Nut
- Brake Rod Joint Cotter Pins
- Torque Link Nuts and Cotter Pins

Suspension:

- Front Fork Clamp Bolts
- Rear Shock Absorber Mounting Bolts and Nuts
- Swingarm Pivot Nut

Steering:

- Stem Head Nut
- Handlebar Clamp Bolts

Engine:

- Throttle Cable Adjuster Locknut (upper)
- Choke Cable Adjuster Locknut
- Engine Mounting Bolts and Nuts
- Engine Mounting Bracket Bolts
- Shift Pedal Bolt
- Muffler Clamp Bolt
- Muffler Body Clamp Bolt and Nut
- Clutch Master Cylinder Clamp Bolts
- Clutch Lever Pivot Nut

Others:

- Sidestand Bolt and Nut
- Downtube Bolts
- Footpeg Bracket Bolts (rear)

Unit Conversion Table

Prefixes for Units

Prefix	Symbol	Power
mega	M	× 1 000 000
kilo	k	× 1 000
centi	c	× 0.01
milli	m	× 0.001
micro	μ	× 0.000001

Units of Mass

kg	×	2.205	=	lb
g	×	0.03527	=	oz

Units of Volume

L	×	0.2642	=	gal (US)
L	×	0.2200	=	gal (imp)
L	×	1.057	=	qt (US)
L	×	0.8799	=	qt (imp)
L	×	2.113	=	pint (US)
L	×	1.816	=	pint (imp)
mL	×	0.03381	=	oz (US)
mL	×	0.02816	=	oz (imp)
mL	×	0.06102	=	cu in

Units of Force

N	×	0.1020	=	kg
N	×	0.2248	=	lb

kg	×	9.807	=	N
kg	×	2.205	=	lb

Units of Length

km	×	0.6214	=	mile
m	×	3.281	=	ft
mm	×	0.03937	=	in

Units of Torque

N·m	×	0.1020	=	kg·m
N·m	×	0.7376	=	ft·lb
N·m	×	8.851	=	in·lb

kg·m	×	9.807	=	N·m
kg·m	×	7.233	=	ft·lb
kg·m	×	86.80	=	in·lb

Units of Pressure

kPa	×	0.01020	=	kg/cm ²
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cm Hg

kg/cm ²	×	98.07	=	kPa
kg/cm ²	×	14.22	=	psi
cm Hg	×	1.333	=	kPa

Units of Speed

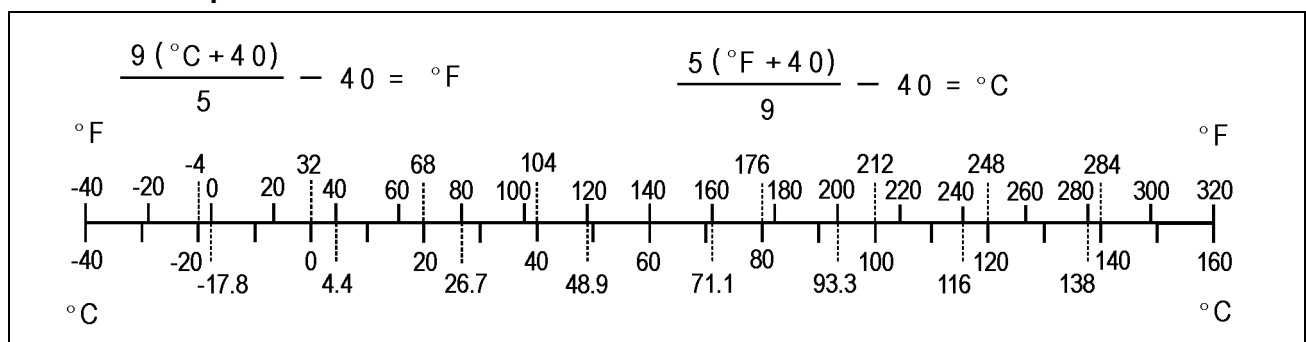
km/h	×	0.6214	=	mph
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Units of Power

kW	×	1.360	=	PS
kW	×	1.341	=	HP

PS	×	0.7355	=	kW
PS	×	0.9863	=	HP

Units of Temperature



MODEL APPLICATION

Year	Model	Beginning Frame No.
2001	ZR1200-A1	JKAZR9A1□1A000001, ZRT20A-000001 or JKAZRT20AAA000001
2001	ZR1200-B1	JKAZR9B1□1A000001, ZRT20A-000001 or JKAZRT20ABA000001
2001	ZR1200-C1	JKAZRT20ACA000001
2002	ZR1200-A2	JKAZR9A1□2A015001, ZT20A-015001 or JKAZRT20AAA015001
2002	ZR1200-B2	JKAZR9B1□2A005001, ZRT20A-005001 or JKAZRT20ABA005001
2003	ZR1200-A3	JKAZR9A1□3A025001 or JKAZRT20AAA025001
2003	ZR1200-B3	JKAZR9B1□3A008001
2003	ZR1200-C2	JKAZRT20ACA025001
2004	ZR1200-A4	JKAZR9A1□4A035001 or JKAZRT20AAA035001
2004	ZR1200-B4	JKAZRT20ABA035001
2004	ZR1200-C3	JKAZRT20ACA035001
2005	ZR1200-A5	JKAZR9A1□5A039001 or JKAZRT20AAA039001
2006	ZR1200A6F	JKAZR9A1□6A043001 JKAZRT20AAA039001 ZRT20A043001 JKAZRT20AAA043001
2007	ZR1200A7F	JKAZR9A1□7A048001 ZRT20A

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



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