



Motorcycle Service Manual

Quick Reference Guide

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

•Bend the pages back to match the black tab of the desired chapter number with the black tab on the edge at each table of contents page.

•Refer to the sectional table of contents for the exact pages to locate the specific topic required.



1400GTR ABS CONCOURS 14 ABS 1400GTR CONCOURS 14

Motorcycle Service Manual

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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	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)		

COUNTRY AND AREA CODES

AT	Austria	GB	United Kingdom
AU	Australia	MY	Malaysia
CA	Canada	SEA	Southeast Asia
CAL	California	US	United States
СН	Switzerland	WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Full Power)
DE	Germany	GB WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Left Side Traffic, Full Power)
EUR	Europe	WVTA (78.2 H)	WVTA Model with Honeycomb Catalytic Converter (78.2 Kw Power)

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 inlet 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 fuel injection system.

2. Exhaust Emission Control System

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

The exhaust system of this model motorcycle manufactured primarily for sale in California includes a catalytic converter system.

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 inlet 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 symbols, heed their instructions! Always follow safe operating and maintenance practices.

A DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

A WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

ACAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.

This manual contains four more symbols 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.
- Olndicates 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.

1

General Information

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1-2 GENERAL INFORMATION

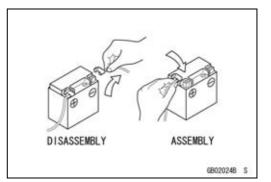
Before Servicing

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

Especially note the following.

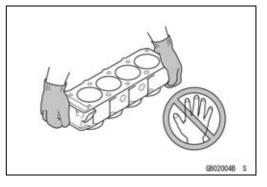
Battery Ground

Before completing any service on the motorcycle, disconnect the battery cables from the battery to prevent the engine from accidentally turning over. Disconnect the ground cable (–) first and then the positive (+). When completed with the service, first connect the positive (+) cable to the positive (+) terminal of the battery then the negative (–) cable to the negative terminal.



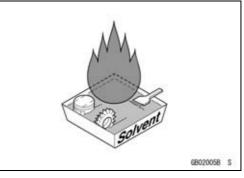
Edges of Parts

Lift large or heavy parts wearing gloves to prevent injury from possible sharp edges on the parts.



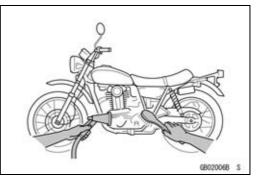
Solvent

Use a high-flush point solvent when cleaning parts. High -flush point solvent should be used according to directions of the solvent manufacturer.



Cleaning vehicle before disassembly

Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



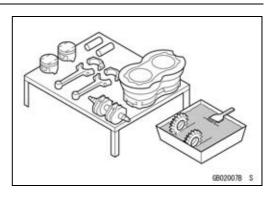
Before Servicing

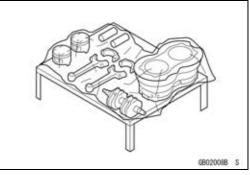
Arrangement and Cleaning of Removed Parts

Disassembled parts are easy to confuse. Arrange the parts according to the order the parts were disassembled and clean the parts in order prior to assembly.

Storage of Removed Parts

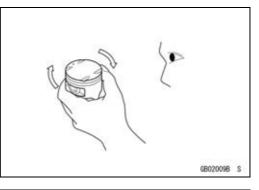
After all the parts including subassembly parts have been cleaned, store the parts in a clean area. Put a clean cloth or plastic sheet over the parts to protect from any foreign materials that may collect before re-assembly.





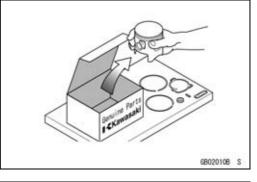
Inspection

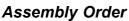
Reuse of worn or damaged parts may lead to serious accident. Visually inspect removed parts for corrosion, discoloration, or other damage. Refer to the appropriate sections of this manual for service limits on individual parts. Replace the parts if any damage has been found or if the part is beyond its service limit.



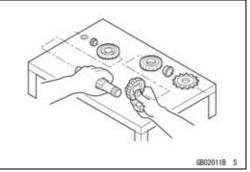
Replacement Parts

Replacement Parts must be KAWASAKI genuine or recommended by KAWASAKI. Gaskets, O-rings, oil seals, grease seals, circlips, cotter pins or self-locking nuts must be replaced with new ones whenever disassembled.





In most cases assembly order is the reverse of disassembly, however, if assembly order is provided in this Service Manual, follow the procedures given.



1-4 GENERAL INFORMATION

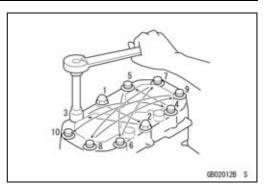
Before Servicing

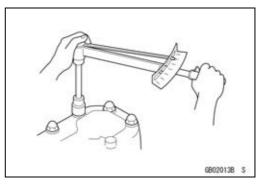
Tightening Sequence

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 according to the specified sequence to prevent case warpage or deformation which can lead to malfunction. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter turn and then remove them. If the specified tightening sequence is not indicated, tighten the fasteners alternating diagonally.

Tightening Torque

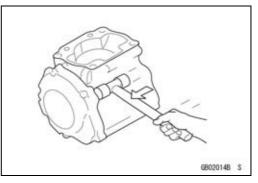
Incorrect torque applied to a bolt, nut, or screw may lead to serious damage. Tighten fasteners to the specified torque using a good quality torque wrench.





Force

Use common sense during disassembly and assembly, excessive force can cause expensive or hard to repair damage. When necessary, remove screws that have a non -permanent locking agent applied using an impact driver. Use a plastic-faced mallet whenever tapping is necessary.

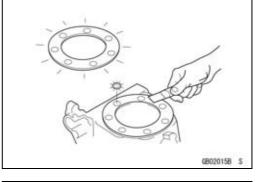


Gasket, O-ring

Hardening, shrinkage, or damage of both gaskets and O-rings after disassembly can reduce sealing performance. Remove the old gaskets and clean the sealing surfaces thoroughly so that no gasket material or other material remains. Install the new gaskets and replace the used O-rings when re-assembling

Liquid Gasket, Non-permanent Locking Agent

For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.





Before Servicing

Press

For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.

Ball Bearing and Needle Bearing

Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

Pressing the incorrect race can cause pressure between the inner and outer race and result in bearing damage.

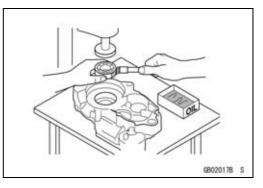
Oil Seal, Grease Seal

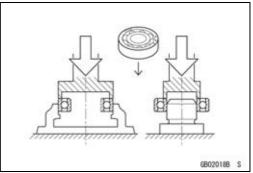
Do not remove pressed oil or grease seals unless removal is necessary. Replace with new ones whenever removed. Press new oil seals with manufacture and size marks facing out. Make sure the seal is aligned properly when installing.

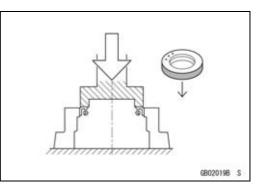
Apply specified grease to the lip of seal before installing the seal.

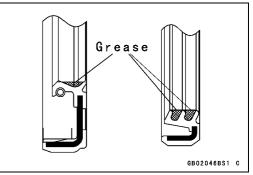
Circlips, Cotter Pins

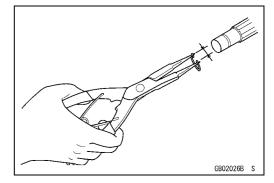
Replace the circlips or cotter pins that were removed with new ones. Take care not to open the clip excessively when installing to prevent deformation.









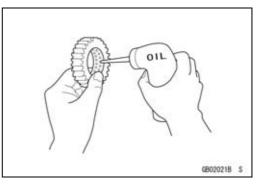


1-6 GENERAL INFORMATION

Before Servicing

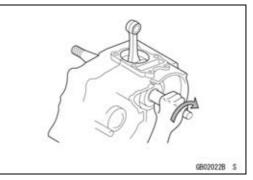
Lubrication

It is important to lubricate rotating or sliding parts during assembly to minimize wear during initial operation. Lubrication points are called out throughout this manual, apply the specific oil or grease as specified.



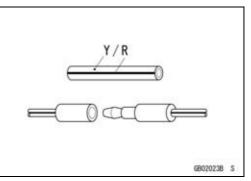
Direction of Engine Rotation

When rotating the crankshaft by hand, the free play amount of rotating direction will affect the adjustment. Rotate the crankshaft to positive direction (clockwise viewed from output side).



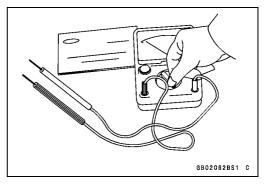
Electrical Wires

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



Instrument

Use a meter that has enough accuracy for an accurate measurement. Read the manufacture's instructions thoroughly before using the meter. Incorrect values may lead to improper adjustments.



Model Identification

ZG1400CAF Left Side View



ZG1400CAF Right Side View



 $\bigcirc The \ suddlebags \ at \ rear \ side \ are \ accessory \ parts.$ Frame Number



A. Frame Number

Engine Number



A. Engine Number

1-8 GENERAL INFORMATION

Model Identification

ZG1400CAF (US and CA) Left Side View



ZG1400CAF (US and CA) Right Side View



OThe suddlebags at rear side are accessory parts.

Model Identification

ZG1400DAF (US and CA) Left Side View



ZG1400DAF (US and CA) Right Side View



OThe suddlebags at rear side are accessory parts.

1-10 GENERAL INFORMATION

General Specifications

Items	ZG1400CAF ~ CBF, ZG1400DAF
Dimensions	
Overall Length	2 230 mm (87.80 in.)
Overall Width	790 mm (31.10 in.)
(with saddlebags)	1 000 mm (39.37 in.)
Overall Height/High Position	1 345 mm (52.95 in.)/1 465 mm (57.68 in.)
Wheelbase	1 520 mm (59.84 in.)
Road Clearance	125 mm (4.92 in.)
Seat Height	815 mm (32.09 in.)
Curb Mass:	
ZG1400C	304 kg (670 lb)
(with saddlebags)	312 kg (688 lb)
ZG1400D	300 kg (662 lb)
(with saddlebags)	308 kg (679 lb)
Front:	
ZG1400C	146 kg (322 lb)
(with saddlebags)	146 kg (322 lb)
ZG1400D	144 kg (318 lb)
(with saddlebags)	144 kg (318 lb)
Rear:	
ZG1400C	158 kg (348 lb)
(with saddlebags)	166 kg (366 lb)
ZG1400D	156 kg (344 lb)
(with saddlebags)	164 kg (362 lb)
Fuel Tank Capacity	22 L (5.8 US gal)
Performance	
Minimum Turning Radius	3.2 m (10.5 ft)
Engine	
Туре	4-stroke, DOHC, 4-cylinder
Cooling System	Liquid-cooled
Bore and Stroke	84.0 × 61.0 mm (3.3 × 2.4 in.)
Displacement	1 352 cm³ (82.5 cu in.)
Compression Ratio	10.7 : 1
Maximum Horsepower	114 kW (155 PS) @8 800 r/min (rpm), (AU) 115 kW (156 PS) @8 800 r/min (rpm), (WVTA (78.2 H)) 78.2 kW (106 PS) @8 000 r/min (rpm), (MY, SEA) 110 kW (150 PS) @8 000 r/min (rpm), (CA, CAL, US) – – –
Maximum Torque	136 N·m (13.9 kgf·m, 100 ft·lb) @6 200 r/min (rpm), (AU) 139 N·m (14.2 kgf·m, 103 ft·lb) @6 200 r/min (rpm), (WVTA (78.2 H)) 121 N·m (12.3 kgf·m, 89 ft·lb) @4 500 r/min (rpm), (CA, CAL, US) – – –
Carburetion System	FI (Fuel injection), MIKUNI 40EIDW × 4
Starting System	Electric starter
Ignition System	Battery and coil (transistorized)
Timing Advance	Electronically advanced (digital igniter in ECU)

General Specifications

Items	ZG1400CAF ~ CBF, ZG1400DAF
Ignition Timing	10° BTDC @1 100 r/min (rpm)
Spark Plug	NGK CR9EIA-9
Cylinder Numbering Method	Left to right, 1-2-3-4
Firing Order	1-2-4-3
Valve Timing:	
Inlet:	
Open	17° (BTDC)
Close	75° (ABDC)
Duration	272°
Exhaust:	
Open	52° (BBDC)
Close	22° (ATDC)
Duration	254°
Lubrication System	Forced lubrication (wet sump with cooler)
Engine Oil:	
Туре	API SG, SH, SJ, SL, or SM with JASO MA, MA1 or MA2
Viscosity	SAE10W-40
Capacity	4.7 L (5.0 US qt)
Drive Train	
Primary Reduction System:	
Туре	Gear
Reduction Ratio	1.556 (84/54)
Clutch Type	Wet multi disc
Transmission:	
Туре	6-speed, constant mesh, return shift
Gear Ratios:	
1st	3.333 (50/15)
2nd	2.412 (41/17)
3rd	1.900 (38/20)
4th	1.545 (34/22)
5th	1.292 (31/24)
6th	1.074 (29/27)
Final Drive System:	
Туре	Shaft drive
Reduction Ratio	2.036 (14/22 × 32/10)
Overall Drive Ratio	3.402 @Top gear
Final Gear Case Oil:	
Grade	API Service Classification: GL-5 hypoid gear oil
Viscosity	SAE90 (above 5°C), SAE80 (below 5°C)
Capacity	160 mL (5.41 US oz.)
Frame	
Туре	Press backbone
Caster (Rake Angle)	26.1°
Trail	112 mm (4.4 in.)

1-12 GENERAL INFORMATION

General Specifications

Items	ZG1400CAF ~ CBF, ZG1400DAF
Front Tire:	
Туре	Tubeless
Size	120/70 ZR17 M/C (58 W)
Rear Tire:	
Туре	Tubeless
Size	190/50 ZR17 M/C (73 W)
Rim Size:	
Front	17 × 3.50
Rear	17 × 6.00
Front Suspension:	
Туре	Telescopic fork (upside-down)
Wheel Travel	113 mm (4.4 in.)
Rear Suspension:	
Туре	Swingarm (uni-trak - tetra lever)
Wheel Travel	136 mm (5.3 in.)
Brake Type:	
Front	Dual discs
Rear	Single disc
Electrical Equipment	
Battery	12 V 14 Ah
Headlight:	
Туре	Semi-sealed beam
Bulb:	
High	12 V 60 W (quartz-halogen) × 2
Low	12 V 55 W (quartz-halogen) × 2
Tail/Brake Light	LED
Alternator:	
Туре	Three-phase AC
Rated Output	41.5 A/14 V @5 000 r/min (rpm)

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

Technical Information- KTRC (Kawasaki Traction Control)

Overview

As one of the various functions based on the concept of "smooth operation", "long distance touring potential", and "enhanced comfort", the ZG1400C model is equipped with the rider support system (KTRC) which detects rear wheelspin and limits it automatically to give the rider a more stable ride.

KTRC limits wheelspin when starting and riding on a slippery surface (e.g. dirt, gravel, cobblestone, grass, manhole covers or bridge joints) and also prevents wheelies.

However, KTRC is not able to limit rear wheel lock-up under engine braking, nor is the system designed to prevent lateral slides without rear wheelspin.

System Operation

When the ignition switch is in the ON position, the KTRC system is ON.

The pulse signals of the front and rear wheel rotation sensors enter the DFI ECU via the K-ACT ABS ECU. KTRC calculates the slip level of the rear wheel from the front and rear wheel speed.

When the slip level of the rear wheel exceeds the specified value, KTRC controls the engine output to limit rear wheelspin. When wheelies occur due to extreme acceleration, the engine output is controlled until the front wheel contacts the road surface.

Regulating ignition timing, fuel delivery, and airflow via the sub-throttle valve controls the engine output. It is the airflow control of the sub-throttle valve that enables KTRC's smooth operation.

Use the button on the left handlebar to switch KTRC on and off.

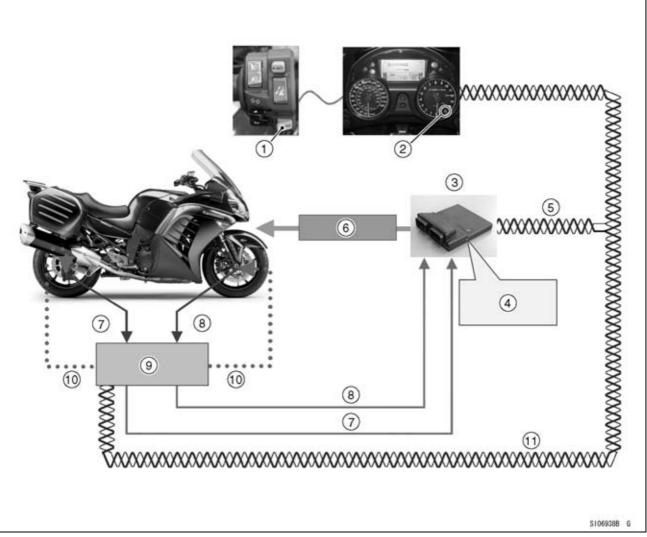
The KTRC on/off information is converted to CAN (Controller Area Network) signal via the meter unit and then enters the DFI ECU.

Based on the above-mentioned information, the DFI ECU directs the KTRC system to operate.

1-14 GENERAL INFORMATION

Technical Information- KTRC (Kawasaki Traction Control)

Construction and Function



1. KTRC Button

Hold the Button 1~3 seconds to switch KTRC System ON or OFF.

2. KTRC Indicator Light

System Condition	KTRC Indicator Light
Normal (System ON)	OFF
KTRC working	Flashes quickly
Self diagnosis (beginning)	Flashes slowly
System OFF or failure	ON

- 3. DFI ECU
- 4. KTRC Function Programming
- 5. CAN Interface
- · OFF/ON Switch Input Signals
- · KTRC Indicator Light (LED) Control Signals
- · Warning Signals
- 6. KTRC Direction
- 7. Rear Wheel Rotation Pulses
- 8. Front Wheel Rotation Pulses

- 9. K-ACT ABS ECU
 - Since the KTRC system uses the equipment of the ABS system to gather information, the ZG1400D model (without ABS equipment) does not feature KTRC.
- 10. ABS Functions
- 11. ABS System Information
 - · System/sensor Problem
 - · Self-diagnosis

Technical Information- Economy Technology

Economical Riding

The economical riding indicator [A] appears on the multifunction meter to indicate favorable fuel consumption. Monitoring the economical riding indicator can help the rider maximize fuel efficiency.

Also, the fuel economy assistance mode is available to enable the user to select the economical riding mode depending on the situation.

Fuel Economy Assistance Mode

When selecting this mode, the DFI ECU controls the ignition timing, the fuel injection quantity, the injection timing and sub throttle valve opening. As a result, higher fuel-efficiency is achieved compared to normal riding.

NOTE

- The rider's input affects vehicle fuel efficiency. Fuel consumption may not change due to sudden start or quick acceleration.
- OActivating the fuel economy assistance mode decreases engine performance.

1. Mode Select Condition

- · Engine rpm is less than 6 000 rpm.
- Throttle opening position is less than 30%.
- \cdot Vehicle speed is less than 250 km/h (152 mph).
- · In any gear position

2. Mode ON or OFF

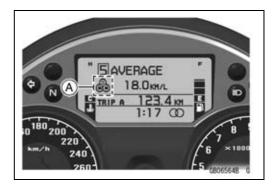
Pushing the meter mode button [A] of the left switch housing for more than one second but less than three seconds will turn the fuel economy assistance mode " ON/OFF".

3. Fuel Economy Assistance Indicator

When the fuel economy assistance mode function is effective, the indicator [A] appears on the multifunction meter.







1-16 GENERAL INFORMATION

Technical Information- K-ACT (Kawasaki Advanced Coactive-braking Technology Anti-lock Brake System)

Overview

The ZG1400C model is equipped with K-ACT ABS that distributes the front-rear braking force in an ideal balance to stabilize the motorcycle behavior during brake operation.

When applying the front brake lever, the left and right front brake calipers and the rear caliper are activated. When depressing the rear brake pedal, the rear brake caliper and right front brake caliper are activated.

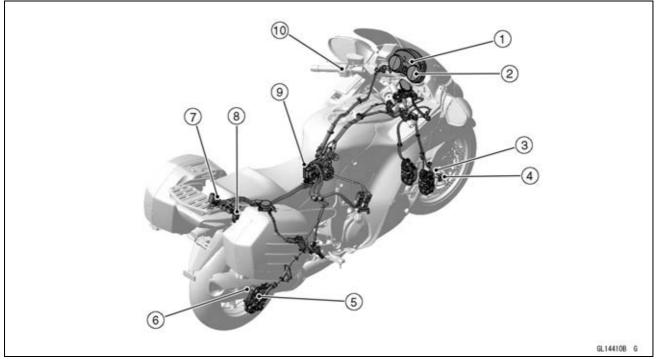
The "K-ACT ABS ECU^(*)" controls the coactive braking balance ideally in accordance with the braking input pressure and information from each sensor detecting the motorcycle speed.

On this model, the rider can choose from one of two modes with different link effect distribution to suit specific riding situations. Also, the low battery mode is set to maintain the ABS function when the battery charge is low.

The "K-ACT ABS ECU" controls the Anti-Lock Brake System (ABS). For maximum controllability in tight corners and when executing U-turns, K-ACT ABS's coactive function does not engage when braking is initiated at speeds below 20 km/h (12 mph). The ABS function is disengaged at speeds below 5 km/h (3.1 mph).

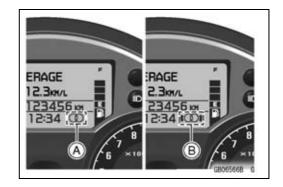
*: The K-ACT ABS ECU is built in the K-ACT ABS Hydraulic Unit.

Related Parts and Function



1. K-ACT ABS Symbols

Display the active mode as a symbol [A] Standard Mode Symbol (mode 1) [B] High Combined Mode (mode 2)



Technical Information- K-ACT (Kawasaki Advanced Coactive-braking Technology Anti-lock Brake System)

2. K-ACT ABS Indicator Light (LED) If a problem occurs with the K-ACT ABS, the K-ACT ABS indicator light (LED) [A] goes ON.



- 3. Front Wheel Rotation Sensor Rotor Rotates with the front wheel.
- 4. Front Wheel Rotation Sensor Detects the rotation speed of the front wheel.
- 5. Rear Wheel Rotation Sensor Detects the rotation speed of the rear wheel.
- Rear Wheel Rotation Sensor Rotor Rotates with the rear wheel.
- K-ACT ABS Fuse Box K-ACT ABS Motor Relay Fuse 30A and Solenoid Valve Relay Fuse 20A
- 8. K-ACT ABS Kawasaki Diagnostic System Connector
- 9. K-ACT ABS Hydraulic Unit [A] with ECU 1) K-ACT ABS ECU

Calculates the ideal braking balance in each mode and controls the pump motor and switching valves. Upon receiving the switching signal from the K-ACT ABS button, K-ACT ABS ECU switches to either mode (Standard Mode or High Combined Mode) and simultaneously sends the switching signal of the K-ACT ABS symbol to

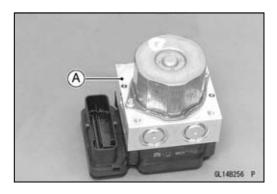
2) Pump Motor

the multifunction meter.

Applies hydraulic pressure to the brake calipers. 3) Input/Output Fluid Pressure Sensors Monitor brake input and output to the brake caliper

- Monitor brake input and output to the brake calipers.
- 10. K-ACT ABS Button

Pushing and holding the K-ACT ABS button [A] for more than one second, but less than three seconds, will switch between "mode 1" or "mode 2".





1-18 GENERAL INFORMATION

Technical Information- K-ACT (Kawasaki Advanced Coactive-braking Technology Anti-lock Brake System)

Standard Mode and High Combined Mode

1. Selecting the Mode

Rider can select the mode to suit riding situation. Front brake lever link effect on the rear brake is largely the same in both modes; link effect when actuating the rear brake is quite different between the two modes.

1) Standard Mode Symbol (mode 1)

Link effect on the front brake is reduced from the initial to mid rear brake pedal stroke, prioritizing the rider's brake control (the rider's intention) when riding on a winding road.

2) High Combined Mode (mode 2)

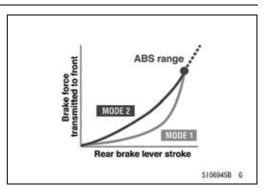
Link effect on the front/rear brake is heightened from the beginning of the rear brake pedal stroke, suitable for touring, tandem, and highway use.

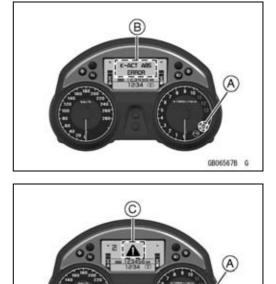
Low Battery Mode

Maintains the ABS function even in such low battery condition. In the low battery mode, the K-ACT ABS indicator light flashes. When entering the low battery mode, if the brake is applied, the system continues normal operation at first, but after that, the K-ACT function is suspended until the ignition switch is turned to OFF. When the battery voltage returns to the normal level, the K-ACT function is recovered by turning the ignition switch to ON. While the ABS function is maintained in the low battery mode, if the battery charge is reduced below a given amount, the K-ACT ABS indicator light goes on and the ABS function is suspended at the same time.

K-ACT ABS System Malfunction Warning

When failure occurs in the K-ACT ABS system, the K-ACT ABS indicator light (LED) [A] goes on and the message "K -ACT ABS ERROR" [B] and the symbol [C] are displayed alternately on the LCD to warn the user.

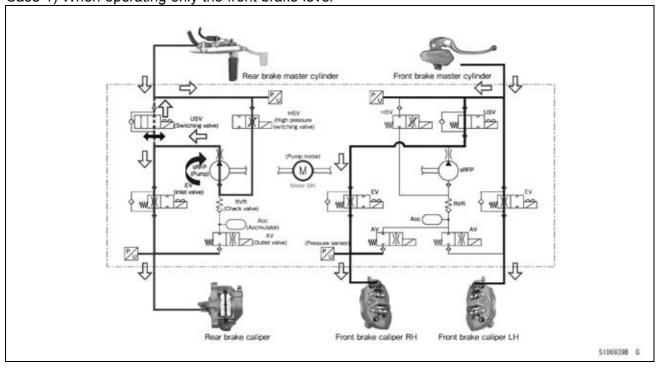




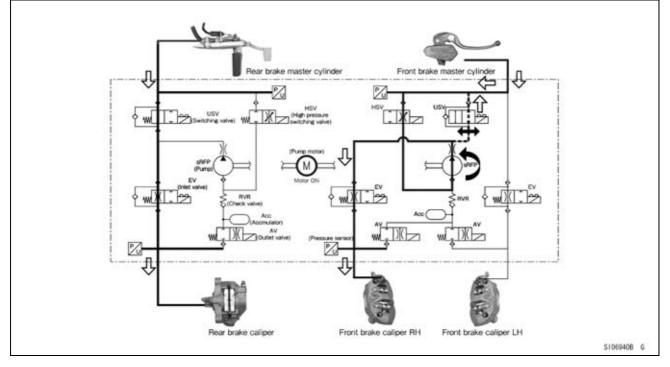
GB06568B G

Technical Information- K-ACT (Kawasaki Advanced Coactive-braking Technology Anti-lock Brake System)

Brake Fluid Flow Chart [When K-ACT Operates] Case 1) When operating only the front brake lever



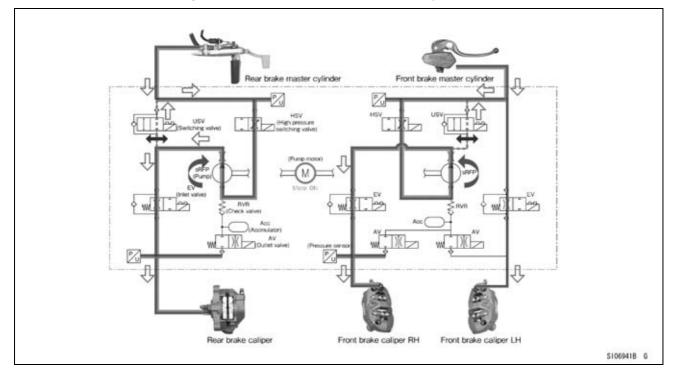
Case 2) When operating only the rear brake lever



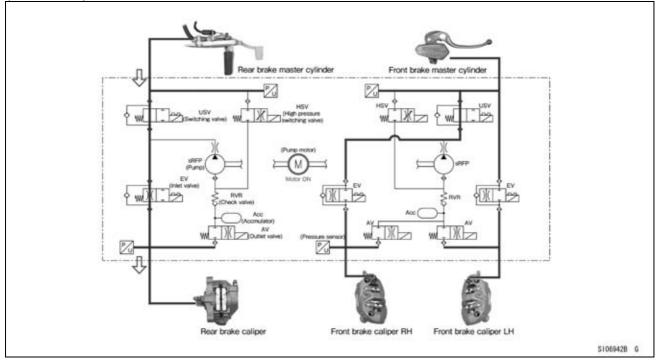
1-20 GENERAL INFORMATION

Technical Information- K-ACT (Kawasaki Advanced Coactive-braking Technology Anti-lock Brake System)

Case 3) When operating both the front brake lever and rear brake pedal Under some operating conditions, the K-ACT works on only the front brake or rear brake.

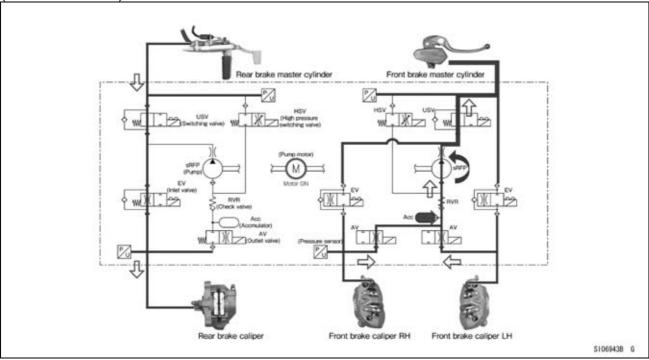


Case 4) When ABS system is activated (Hold Mode)

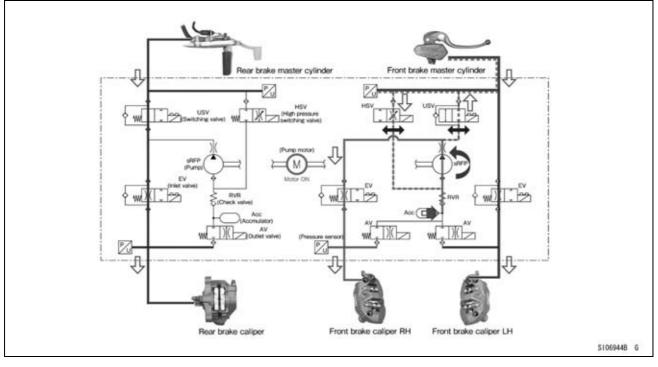


Technical Information- K-ACT (Kawasaki Advanced Coactive-braking Technology Anti-lock Brake System)





(Increased Mode)



1-22 GENERAL INFORMATION

Technical Information- Grip Warmer

Grip Warmer

ZG1400C/D models are equipped with temperature-adjustable grip warmers designed to heat the handlebar grips.

The temperature adjustment dial is stepless between LO and HI so the rider has a wide choice of temperature settings.

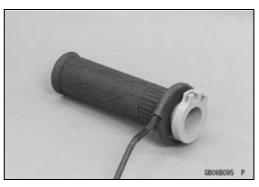
When the vehicle speed is 3 km/h or less, the dial unit repeats the following pattern until the vehicle speed is 15 km/h or more.

2 Minutes - ON $\leftarrow \rightarrow$ 4 Minutes - OFF

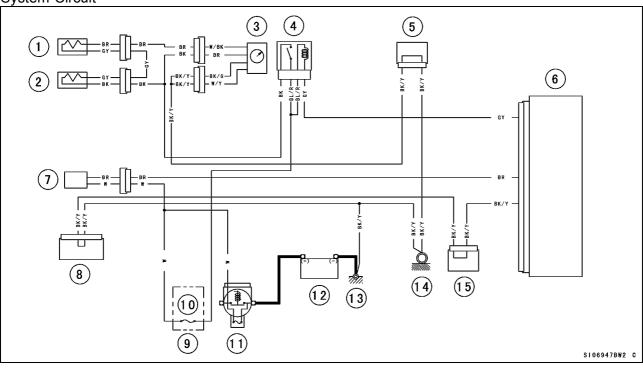


Temperature Adjustment Dial

System Circuit



Grip Warmer



- 1. Right Grip Warmer
- 2. Left Grip Warmer
- 3. Grip Warmer Temperature Adjustment Dial
- 4. Grip Warmer Relay
- 5. Joint Connector 10
- 6. DFI ECU
- 7. Ignition Switch

- 8. Joint Connector
- 9. Fuse Box 3
- 10. Grip Warmer Fuse 10 A
- 11. Main Fuse 30 A
- 12. Battery 12 V 14 Ah
- 13. Frame Ground
- 14. Frame Ground
- 15. Joint Connector 3

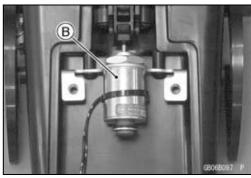
Technical Information- Storage Case

Storage Case

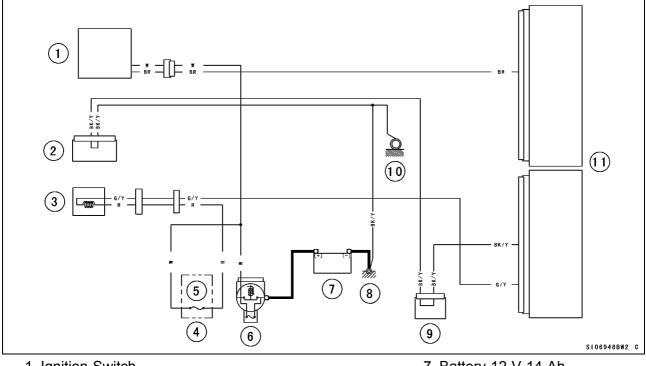
This storage case [A] is equipped with an electric lid lock. When the ignition switch is turned to "OFF" or "FSS", the lid is locked automatically. When the ignition switch is turned to "ON", the lid is unlocked automatically. Additionally, when vehicle speed reaches 40 km/h (25 mph) or more, the lid is locked automatically. When vehicle speed is slowed down to 3 km/h (2 mph) or less, the lid is unlocked automatically. This electric lock system is a solenoid type.

Storage Case Solenoid [B]





System Circuit



- 1. Ignition Switch
- 2. Joint Connector
- 3. Storage Case Solenoid
- 4. Fuse Box 3
- 5. KIPASS Signal Relay Fuse 10 A
- 6. Main Fuse 30 A

- 7. Battery 12 V 14 Ah
- 8. Frame Ground
- 9. Joint Connector 3
- 10. Frame Ground
- 11. DFI ECU

1-24 GENERAL INFORMATION

Unit Conversion Table

Prefixes for Units

Prefix	Symbol	Power
mega	М	× 1 000 000
kilo	k	× 1 000
centi	С	× 0.01
milli	m	× 0.001
micro	μ	× 0.000001

Units of Mass

kg	×	2.205	=	lb
g	×	0.03527	=	οz

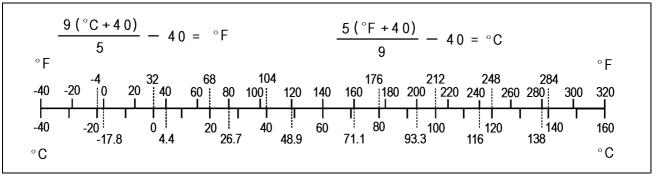
Units of Volume

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

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

Units of Temperature



m × 3.281 ft = 0.03937 mm × = in **Units of Torque** N∙m × 0.1020 kgf∙m = N∙m 0.7376 ft·lb × = N∙m 8.851 in·lb × = kgf∙m 9.807 N∙m × = kgf∙m × 7.233 = ft∙lb kgf∙m 86.80 × in·lb =

0.6214

=

mile

Units of Pressure

Units of Length

km

×

kPa	×	0.01020	=	kgf/cm ²
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cmHg
kgf/cm ²	×	98.07	=	kPa
kgf/cm ²	×	14.22	=	psi
cmHg	×	1.333	=	kPa

Units of Speed

km/h	×	0.6214	=	mph

Units of Power

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

Periodic Maintenance

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Periodic Maintenance Chart

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

F	Whichev comes	ver	-	-	* ODO	MET	ER REA	ADING 00 km		
		first	⇒					(× 1000		See
		₽	1	6	12	18	24	30	36	Page
ITEM		Every	(0.6)	(3.75)	(7.5)	(11.25)	(15)	(18.75)	(22.5)	
Fuel System		-		<u> </u>		<u> </u>		<u> </u>	<u> </u>	1
Throttle control system (p return, no drag) - inspect	lay, smooth	year	•		•		•		•	2-17
Engine vacuum synchron -inspect	ization				•		•		•	2-17
Idle speed-inspect			٠		•		٠		•	2-21
Fuel leak (fuel hose and p	ipe) - inspect	year	•		•		•		•	2-22
Fuel hose and pipe dama	ge-inspect	year	•		•		•		•	2-22
Fuel hose and pipe insta condition-inspect	llation	year	•		•		•		•	2-22
Evaporative emission con function - inspect (CAL a Models)	,		•	•	•	•	•	•	•	2-23
Cooling System										
Coolant level - inspect			•		•		٠		•	2-24
Coolant leak (radiator hos - inspect	se and pipe)	year	•		•		•		•	2-24
Radiator hose damage - i	nspect	year	•		•		•		•	2-24
Radiator hose installation inspect	condition -	year	•		•		•		•	2-24
Engine Top End										
Air suction system damag	je - inspect				•		•		•	2-25
Valve clearance - inspect	US, CA Model						•			
	Other than US, CA Model		Eve	ery 42 (000 k	m (26 2	:50 m	nile)		2-25
Clutch										
Clutch operation (play, disengagement, engagement) - inspect			•		•		•		•	2-29
Clutch fluid level - inspect		6 months	•	•	•	•	•	•	•	2-29
Clutch fluid leak (clutch hose and pipe) - inspect		year	•	•	•	•	•	•	•	2-29
Clutch hose and pipe damage - inspect		year	•	•	•	•	•	•	•	2-30
Clutch hose installation condition - inspect		year	•	•	•	•	•	•	•	2-30
Wheels and Tires					1		1	T	1	
Tire air pressure - inspect		year			•		•		•	2-30

2-4 PERIODIC MAINTENANCE

Periodic Maintenance Chart

FREQUENCY	Whichev comes first	ver ➡			* ODO	METI	ER REA × 100 (× 1000	00 km	See
	₽	1	6	12	18	24	30	36	Page
ITEM	Every	(0.6)	(3.75)	(7.5)	(11.25)	(15)	(18.75)	(22.5)	
Wheels/tires damage - inspect				•	,	•	,	•	2-30
Tire tread wear abnormal wear -				•		•			2-31
inspect				•		•		•	
Wheel bearing damage - inspect	year			•		•		•	2-31
Final Drive									
Final gear case oil level - inspect				•		•		•	2-32
Brakes		r		r	[1	r	
Brake fluid leak (brake hose and pipe) - inspect	year	•	•	٠	●	•	•	•	2-33
Brake hose and pipe damage - inspect	year	•	•	•	•	•	•	•	2-34
Brake hose installation condition - inspect	year	•	•	•	●	•	•	•	2-34
Brake operation (effectiveness, play, no drag) - inspect	year	•	•	•	•	•	•	•	2-34
Brake fluid level - inspect	6 months	•	•	•	•	•	•	•	2-34
Brake pad wear - inspect #			•	•	٠	•	•	•	2-35
Brake light switch operation - inspect		•	•	•	•	•	•	•	2-35
Suspension									
Front forks/rear shock absorber operation (damping and smooth stroke) - inspect				•		•		•	2-36
Front forks/rear shock absorber oil leak - inspect	year			٠		•		•	2-37
Rocker arm operation - inspect				•		•		•	2-37
Tie-rods operation - inspect				•		•		•	2-37
Steering									
Steering play - inspect	year	•		•		•		•	2-38
Steering stem bearings-lubricate	2 years					•			2-39
Electrical System									
Lights and switches operation - inspect	year			•		•		•	2-40
Headlight aiming - inspect	year			•		٠		•	2-42
Sidestand switch operation - inspect	year			•		٠		•	2-43
Engine stop switch operation - inspect	year			•		•		•	2-44
Others		1					1	<u>I</u>	
Chassis parts-lubricate	year			•		•		•	2-45
Bolts, nuts and fasteners tightness - inspect		•		•		•		•	2-46

#: 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.

Periodic Maintenance Chart

Periodic Replacement Parts

FREQUENCY	Whicheve come first	er 🌩			DDOME REAI × 100 × 1000	DING 0 km	See Page
	₩	1	12	24	36	48	
ITEM	Every	(0.6)	(7.5)	(15)	(22.5)	(30)	
Air cleaner element - replace #		Every	/ 18 00	0 km ((12 000	mile)	2-47
Fuel hose - replace	4 years					•	2-49
Coolant - change	3 years				•		2-50
Radiator hoses and O-rings - replace	3 years				•		2-53
Engine oil - change #	year	•	•	•	•	•	2-53
Oil filter - replace	year	•	•	•	•	•	2-54
Brake hose - replace	4 years					•	2-55
Brake fluid - cahnge	2 years			•		•	2-56
Rubber parts of brake master cylinder/caliper - replace	4 years					•	2-58
Clutch hose - replace	4 years					•	2-63
Rubber parts of clutch master cylinder/slave cylinder - replace	4 years					•	2-65
Clutch fluid - change	2 years			•		•	2-67
Spark plugs - replace			•	•	•	•	2-68
Final gear case oil - change		•	•	•	•	•	2-68

#: 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.

2-6 PERIODIC MAINTENANCE

Torque and Locking Agent

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

Letters used in the "Remarks" column mean:

- AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.
- G: Apply grease to the threads.
- L: Apply a non-permanent locking agent to the threads.
- LG: Apply liquid gasket.
- M: Apply molybdenum disulfide grease.
- MO: Apply molybdenum disulfide oil solution.
 - (mixture of engine oil and molybdenum disulfide grease in a weight ration is 10 : 1).
 - **R**: Replacement Parts
 - S: Tighten the fasteners following the specified sequence.
 - Si: Apply silicone grease (ex. PBC grease).

SS: Apply silicone sealant.

WL: Apply soap and water solution or rubber lubricant.

Fastanar		Torque			
Fastener	N∙m	kgf∙m	ft·lb	Remarks	
Fuel System					
Resonator Mounting Bolts	3.9	0.40	35 in·lb		
Front Air Inlet Duct Mounting Bolts	3.9	0.40	35 in·lb		
Air Inlet Duct Clamp Bolts	2.9	0.30	26 in·lb		
Rear Air Inlet Duct Mounting Bolts	9.8	1.0	87 in·lb	L	
Air Cleaner Element Holder Screws	6.9	0.70	61 in·lb		
Air Cleaner Element Cover Bolts	9.8	1.0	87 in·lb		
Duct Clamp Bolts	2.0	0.20	18 in·lb		
Speed Sensor Bolt	9.8	1.0	87 in·lb	L	
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	L	
Gear Position Switch Screws	2.9	0.30	26 in·lb	L	
Gear Position Switch Lead Clamp Bolt	9.8	1.0	87 in·lb		
Vehicle-down Sensor Bolts	5.9	0.60	52 in·lb		
Camshaft Position Sensor Bolts	9.8	1.0	87 in·lb		
Water Temperature Sensor	30	3.1	22		
Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb		
Throttle Body Assy Holder Bolts	9.8	1.0	87 in·lb	S	
Inlet Air Pressure Sensor Bracket Screws	3.5	0.36	31 in·lb		
Delivery Pipe Mounting Screws	5.0	0.51	44 in·lb		
Bypass Screws	0.2	0.02	1.8 in·lb		
Fuel Pump Bolts	9.8	1.0	87 in·lb	L, S	
Separator Bracket Bolt	9.8	1.0	87 in·lb		
Oxygen Sensors (Equipped Models)	25	2.5	18		
Fuel Level Sensor Bolts	6.9	0.70	61 in·lb	L	
Cooling System					
Water Hose Clamp Screws	3.0	0.31	27 in·lb		
Coolant Drain Plug	12	1.2	106 in·lb		
Water Pump Cover Bolts	9.8	1.0	87 in·lb		
Oil Cooler Mounting Bolts	12	1.2	106 in·lb	S	
Thermostat Housing Cover Bolts	5.9	0.60	52 in·lb		

PERIODIC MAINTENANCE 2-7

Torque Fastener Remarks ft·lb N∙m kgf∙m **Thermostat Housing Mounting Bolts** 9.8 1.0 87 in·lb **Coolant Fitting Bolt** 8.8 0.90 78 in·lb L 22 Water Temperature Sensor 30 3.1 **Coolant Reserve Tank Bolts** 3.9 0.40 35 in·lb L Cylinder Fitting Bolts 9.8 1.0 87 in·lb Radiator Stay Bolt 9.8 1.0 87 in·lb Radiator Lower Bolt 9.8 1.0 87 in·lb Radiator Upper Bolts 25 2.5 18 **Engine Top End** Air Suction Valve Cover Bolts 9.8 1.0 87 in·lb L Cylinder Head Cover Bolts 9.8 1.0 87 in·lb S Camshaft Cap Bolts S 12 1.2 106 in·lb Camshaft Chain Guide Bolts 12 1.2 106 in·lb S MO, S Cylinder Head Bolts (M11, First) 39 4.0 29 Cylinder Head Bolts (M11, Final) 47 MO, S 64 6.5 Cylinder Head Bolts (M6) 12 1.2 106 in·lb S 20 15 Water Passage Plugs 2.0 L S Throttle Body Assy Holder Bolts 9.8 1.0 87 in·lb 2.0 18 in·lb Throttle Body Assy Holder Clamp Bolts 0.20 **Camshaft Position Sensor Bolt** 9.8 1.0 87 in·lb Front Camshaft Chain Guide Bolt (Upper) 25 2.5 18 Front Camshaft Chain Guide Bolt (Lower) 12 1.2 106 in·lb Camshaft Chain Tensioner Mounting Bolts 9.8 1.0 87 in·lb Spark Plugs 13 1.3 115 in·lb Cam Sprocket Mounting Bolts 15 1.5 11 L MO. R Variable Valve Actuator Mounting Bolt 59 6.0 44 Engine Bracket Bolts (M8) 25 2.5 18 R, S Front Engine Mounting Bolts (M10) 59 44 R, S 6.0 Water Temperature Sensor 30 3.1 22 Subframe Bolts 23 2.3 17 R 25 Muffler Body Mounting Bolt (L = 58 mm) 34 3.5 Muffler Body Mounting Bolt (L = 60 mm) 34 25 3.5 Oxygen Sensors (Equipped Models) 25 2.5 18 Muffler Body Clamp Bolt 17 1.7 13 Exhaust Pipe Manifold Holder Nuts 17 1.7 13 **Exhaust Pipe Cover Bolts** 9.8 1.0 87 in·lb Clutch 8.9 in·lb Clutch Lever Pivot Bolt 1.0 0.10 Clutch Lever Pivot Bolt Locknut 5.9 0.60 52 in·lb 91 in·lb S **Clutch Master Cylinder Clamp Bolts** 10.3 1.1 Clutch Master Cylinder Bleed Valve 7.8 69 in·lb 0.80 **Clutch Slave Cylinder Bleed Valve** 7.8 0.80 69 in·lb **Clutch Slave Cylinder Bolts** 9.8 87 in·lb 1.0 L

2-8 PERIODIC MAINTENANCE

_ .	Torque			_ .
Fastener	N·m	kgf∙m	ft·lb	Remarks
Clutch Hose Banjo Bolt	25	2.5	18	
Clutch Cover Bolts	9.8	1.0	87 in·lb	L (1), S
Clutch Spring Bolts	11	1.1	97 in·lb	
Clutch Hub Nut	135	14	100	R
Sub Clutch Hub Bolts	25	2.5	18	L
Oil Filler Plug	_	-	_	Hand -tighten
Clutch Reservoir Cap Screws	1.5	0.15	13 in·lb	
Clutch Reservoir Bolt	7.9	0.81	70 in·lb	L
Clutch Reservoir Screw	1.3	0.13	11.5 in·lb	L
Starter Lockout Switch Screw	0.7	0.07	6.2 in·lb	L
Engine Lubrication System				
Engine Oil Drain Bolt	30	3.1	22	
Oil Filter	17	1.7	13	EO, R
Holder Mounting Bolt	35	3.6	26	L
Oil Pan Bolts	9.8	1.0	87 in·lb	
Oil Pressure Relief Valve	15	1.5	11	L
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	G
Oil Passage Plug	20	2.0	15	L
Oil Pump Cover Bolts	9.8	1.0	87 in·lb	
Oil Cooler Mounting Bolts	12	1.2	106 in·lb	S
Oil Pan Plate Bolts	9.8	1.0	87 in·lb	L
Oil Control Solenoid Valve Bolts	9.8	1.0	87 in·lb	
Oil Pipe Bolt (Upper)	9.8	1.0	87 in·lb	
Oil Pipe Bolt (Lower)	9.8	1.0	87 in·lb	L
Engine Removal/Installation				
Engine Mounting Bolts	15	1.5	11	S
Engine Bracket Bolts (M8)	25	2.5	18	R, S
Engine Mounting Nuts (M12)	59	6.0	44	R, S
Front Engine Mounting Bolts (M10)	59	6.0	44	R, S
Subframe Bolts	23	2.3	17	R
Crankshaft/Transmission				
Breather Cover Bolts (L = 25 mm)	9.8	1.0	87 in·lb	L
Breather Cover Bolts (L = 35 mm)	9.8	1.0	87 in·lb	
Breather Plate Screws	9.8	1.0	87 in·lb	L
Crankcase Bolts (M10, L = 90 mm)	47	4.8	35	MO, S
Crankcase Bolts (M10, L = 120 mm)	47	4.8	35	MO, S
Crankcase Bolt (M7, L = 110 mm)	20	2.0	15	S
Crankcase Bolt (M7, L = 85 mm)	20	2.0	15	S
Crankcase Bolts (M7, L = 60 mm)	20	2.0	15	S
Crankcase Bolt (M7, L = 50 mm)	20	2.0	15	S
Crankcase Bolts (M7, L = 45 mm)	20	2.0	15	S

PERIODIC MAINTENANCE 2-9

Fastanar		Torque		Domorko
Fastener	N∙m	kgf∙m	ft·lb	Remarks
Crankcase Bolts (M8, L = 80 mm)	27	2.8	20	S
Crankcase Bolts (M8, L = 70 mm)	27	2.8	20	S
Crankcase Bolts (M7, L = 65 mm)	20	2.0	15	S
Crankcase Bolt (M6, L = 65 mm)	12	1.2	106 in·lb	S
Crankcase Bolt (M6, L = 50 mm)	12	1.2	106 in·lb	S
Crankcase Bolts (M6, L = 40 mm)	12	1.2	106 in·lb	S
Crankcase Bolts (M6, L = 25 mm)	12	1.2	106 in·lb	S
Shift Drum Bearing Holder Screws	4.9	0.50	43 in·lb	L
Bearing Position Plate Screws	4.9	0.50	43 in·lb	L
Oil Passage Plug	20	2.0	15	L
Connecting Rod Big End Nuts	see the text	←	←	←
Timing Rotor Bolt	39	4.0	29	
Gear Position Switch Lead Clamp Bolt	9.8	1.0	87 in·lb	
Drive Shaft Cover Bolts	25	2.5	18	L
Balancer Shaft Clamp Bolts	9.8	1.0	87 in·lb	
Balancer Shaft Clamp Lever Bolts	25	2.5	18	
Starter Clutch Shaft Bolt	9.8	1.0	87 in·lb	L
Starter Clutch Shaft Plate Bolt	9.8	1.0	87 in·lb	L
Torque Limiter Bolt	25	2.5	18	L
Shift Drum Cam Holder Bolt	12	1.2	106 in·lb	L
Gear Position Switch Screws	2.9	0.30	26 in·lb	L
Gear Positioning Lever Bolt	12	1.2	106 in·lb	
Shift Shaft Return Spring Pin	29	3.0	21	L
Shift Pedal Mounting Bolt	25	2.5	18	
Piston Oil Jets	2.9	0.30	26 in·lb	
Shift Lever Bolt	6.9	0.70	61 in·lb	
Tie-rod Locknut (Front)	6.9	0.70	61 in·lb	Lh
Tie-rod Locknut (Rear)	6.9	0.70	61 in·lb	
Wheels/Tires				
Front Axle Clamp Bolts	20	2.0	15	AL
Front Axle Nut	127	13	94	
Front Tire Pressure Measurement Sensor	4.5	0.46	40 in·lb	
Rear Axle Nut	127	13	94	
Rear Tire Pressure Measurement Sensor	4.5	0.46	40 in·lb	
Final Drive				
Adjuster Locknut	40	4.1	30	L
Bearing Retainer	540	55.1	398	Lh
Bearing Retainer Bolts	8.8	0.90	78 in·lb	L
Bearing Retainer Screw	7.0	0.71	62 in·lb	L
Damper Cam Nut	210	21.4	155	MO, R
Driven Gear Assy Mounting Bolts	25	2.5	18	
Driven Gear Bolt	130	13.3	95.9	MO

2-10 PERIODIC MAINTENANCE

Factorian		Torque		Remarks
Fastener	N∙m	kgf∙m	ft·lb	Remarks
Drive Gear Nut	380	38.7	280	MO, R, S
Filler Plug	2.0	0.20	18 in·lb	
Final Gear Case Cover Bolts (M10)	34	3.5	25	L
Final Gear Case Cover Bolts (M8)	24	2.4	18	L
Final Gear Case Outer Cover Bolts	9.8	1.0	87 in·lb	
Front Gear Case Bolt (L = 50 mm)	20	2.0	15	
Front Gear Case Bolts (L = 95 mm)	29	3.0	21	L (1)
Front Gear Case Bolts (L = 92 mm)	29	3.0	21	
Front Gear Case Bolts (L = 35 mm)	20	2.0	15	L (1)
Final Gear Case Oil Drain Bolt	8.8	0.90	78 in·lb	
Lock Pin	16	1.6	12	L
Torque Rod Nut	59	6.0	44	R
Final Gear Case Locknut	98	10	72	R
Oil Nozzles	2.9	0.30	26 in·lb	
Pinion Gear Assembly Nut	130	13.3	95.9	
Speed Sensor Bolt	9.8	1.0	87 in·lb	L
Brakes				
Bleed Valves	7.8	0.80	69 in·lb	
Caliper Bracket Bolt	64	6.5	47	
Brake Hose Banjo Bolts	25	2.5	18	
Brake Lever Pivot Bolt	1.0	0.10	8.9 in·lb	Si
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Brake Pedal Bolt	8.8	0.90	78 in·lb	L
Brake Pipe Joint Nuts	18	1.8	13	
Brake Reservoir Bolt	7.8	0.80	69 in·lb	L
Brake Reservoir Screw	1.3	0.13	12 in·lb	L
Front Brake Disc Mounting Bolts	27	2.8	20	L
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Front Brake Pad Pins	17.2	1.8	13	
Front Brake Reservoir Cap Screws	1.5	0.15	13 in·lb	
Front Caliper Assembly Bolts	27	2.8	20	L
Front Caliper Mounting Bolts	34	3.5	25	
Front Master Cylinder Bleed Valve	7.8	0.80	69 in·lb	
Front Master Cylinder Clamp Bolts	11	1.1	97 in·lb	S
Rear Brake Disc Mounting Bolts	27	2.8	20	L
Rear Brake Pad Pin	17.2	1.8	13	
Rear Caliper Assembly Bolts	37	3.8	27	L
Rear Caliper Mounting Bolts	25	2.5	18	
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Rear Master Cylinder Push Rod Locknut	17.2	1.8	13	
Suspension				
Axle Bracket Locknut	98	10	72	R
Final Gear Case Locknut	98	10	72	R

Torque Fastener Remarks ft·lb N∙m kgf∙m Front Axle Clamp Bolts 20 2.0 15 AL Front Fork Bottom Allen Bolts 23 2.3 17 L 30 22 AL Front Fork Clamp Bolts (Lower) 3.1 Front Fork Clamp Bolts (Upper) 20 2.0 15 Front Fork Top Plugs 23 2.3 17 Piston Rod Nuts 15 1.5 11 Rear Shock Absorber Nut (Lower) 34 3.5 25 R Rear Shock Absorber Nut (Upper) 34 3.5 25 R 3.5 25 R Rocker Arm Nut 34 Swingarm Pivot Collar Locknut 98 10 72 Swingarm Pivot Shaft 20 2.0 15 Swingarm Pivot Shaft Nut 108 11 80 **Tie-Rod Nuts** 59 6.0 44 R **Torque Rod Nuts** 59 R 6.0 44 Steering 30 22 AL Front Fork Clamp Bolts (Lower) 3.1 Front Fork Clamp Bolts (Upper) 20 2.0 15 Handlebar Bolts 34 3.5 25 L Handlebar Holder Bolts 25 2.5 18 31 in·lb Left Switch Housing Screws 3.5 0.36 **Right Switch Housing Screws** 3.5 0.36 31 in·lb Steering Stem Head Bolt 108 11 80 Steering Stem Nut 25 2.5 18 Frame Carrier Bracket Bolts (M10) 34 3.5 25 Carrier Bracket Bolts (M8) 25 2.5 18 L Center Stand Bolts 44 4.5 32 Frame Side Bracket Bolts 25 2.5 18 1.2 11 in·lb Front Fender Cover Screws 0.12 Front Footpeg Bracket Bolts 25 2.5 18 Hook Bracket Bolts 25 2.5 18 L **Rear Footpeg Bracket Bolts** 34 3.5 25 **Rear Frame Bolts** 44 32 4.5 L Seat Lock Screws 1.2 0.12 11 in·lb Sidestand Bolt 44 4.5 32 36 Sidestand Bracket Bolts 49 5.0 L Sidestand Switch Bolt 78 in·lb 8.8 0.90 L **Upper Fairing Bracket Nuts** 25 2.5 18 Storage Case Screws 0.7 0.07 6.2 in·lb **Electrical System** Adjuster Knob Bracket Screws 1.2 0.12 11 in·lb 1.2 11 in·lb **Aiming Bracket Screws** 0.12 Alternator Cover Bolts 9.8 1.0 87 in·lb

2-12 PERIODIC MAINTENANCE

F or the second	Torque			Domorika	
Fastener	N∙m	kgf∙m	ft·lb	Remarks	
Alternator Lead Holding Plate Bolts	8.3	0.85	73 in·lb	L	
Alternator Rotor Bolt	155	15.8	114	S	
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	L	
Crankshaft Sensor Cover Bolts	9.8	1.0	87 in·lb	L (1)	
Exhaust Camshaft Position Sensor Bolts	9.8	1.0	87 in·lb		
Front Brake Light Switch Screw	1.2	0.12	11 in·lb		
Front Turn Signal Light Mounting Screws	1.2	0.12	11 in·lb		
Fuel Level Sensor Bolts	6.9	0.70	61 in·lb	L	
Gear Position Switch Lead Clamp Bolts	9.8	1.0	87 in·lb		
Gear Position Switch Screws	2.9	0.30	26 in·lb	L	
Headlight Beam Adjuster Bolts	1.5	0.15	13 in·lb		
Inlet Camshaft Position Sensor Bolts	9.8	1.0	87 in·lb		
Left Switch Housing Screws	3.5	0.36	31 in·lb		
License Plate Light Cover Mounting Screws	0.90	0.09	8 in·lb		
License Plate Light Mounting Screws	1.2	0.12	11 in·lb		
Oil Control Solenoid Valve Bolts	9.8	1.0	87 in·lb		
Oil Pressure Switch	15	1.5	11	SS	
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	G	
Oxygen Sensors (Equipped Models)	25	2.5	18		
Rear Turn Signal Light Mounting Screws	1.2	0.12	11 in·lb		
Regulator/Rectifier Bolts	9.8	1.0	87 in·lb		
Right Switch Housing Screws	3.5	0.36	31 in·lb		
Sidestand Switch Bolts	8.8	0.90	78 in·lb	L	
Speed Sensor Bolt	9.8	1.0	87 in·lb	L	
Spark Plugs	13	1.3	115 in·lb		
Starter Clutch Shaft Bolt	9.8	1.0	87 in·lb	L	
Starter Clutch Shaft Plate Bolt	9.8	1.0	87 in·lb	L	
Starter Lockout Switch Screw	0.70	0.07	6.2 in·lb	L	
Starter Motor Cable Mounting Bolts	3.9	0.40	35 in·lb		
Starter Motor Cable Terminal Nut	5.9	0.60	52 in·lb		
Starter Motor Terminal Locknut	6.9	0.70	61 in·lb		
Starter Motor Mounting Bolts	9.8	1.0	87 in·lb		
Starter Motor Through Bolts	3.4	0.35	30 in·lb		
Stator Coil Bolts	12	1.2	106 in·lb		
Tail Light Cover Bracket Bolts	1.2	0.12	11 in·lb		
Tail Light Screws	1.2	0.12	11 in·lb		
Timing Rotor Bolt	39	4.0	29		
Torque Limiter Bolt	25	2.5	18	L	
Upper Fairing Damper Bracket Screws	1.2	0.12	11 in·lb		
Water Temperature Sensor	30	3.1	22		
Storage Case Screws	0.7	0.07	6.2 in·lb		

Torque and Locking Agent

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.

Threads		Torque	
diameter (mm)	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

Basic Torque for General Fasteners

2-14 PERIODIC MAINTENANCE

Specifications

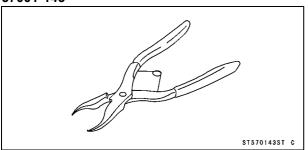
ltem	Standard	Service Limit
Fuel System		
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	
Idle Speed	1 100 ±50 r/min (rpm)	
Throttle Body Vacuum	34.7 ±1.33 kPa (260 ±10 mmHg) at idle speed	
Air Cleaner Element	Viscous paper element	
Cooling System		
Coolant:		
Type (Recommended)	Permanent type antifreeze	
Color	Green	
Mixed Ratio	Soft water 50%, coolant 50%	
Freezing Point	–35°C (–31°F)	
Total Amount	3.4 L (3.6 US qt)	
Engine Top End		
Valve Clearance:		
Exhaust	0.19 ~ 0.24 mm (0.0075 ~ 0.0094 in.)	
Inlet	0.12 ~ 0.17 mm (0.0047 ~ 0.0067 in.)	
Clutch		
Clutch Fluid:		
Grade	DOT4	
Clutch Lever Free Play	Non-adjustable	
Engine Lubrication System		
Engine Oil:		
Туре	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2	
Viscosity	SAE 10W-40	
Capacity	4.0 L (4.2 US qt) (when filter is not removed)	
	4.4 L (4.7 US qt) (when filter is removed)	
	4.7 L (5.0 US qt) (when engine is completely dry)	
Level	Between upper and lower level lines (Wait 2 ~ 3 minutes after idling or running)	
Wheels/Tires		
Tread Depth:		
Front	4.8 mm (0.19 in.)	1 mm (0.04 in.), (AT, CH, DE) 1.6 mm (0.06 in.)
Rear	6.2 mm (0.24 in.)	Up to 130 km/h (80 mph): 2 mm (0.08 in.), Over 130 km/h (80 mph): 3 mm (0.12 in.)
Air Pressure (when Cold):		
Front	Up to 228 kg (503 lb) load: 290 kPa (2.90 kgf/cm², 42 psi)	
Rear	Up to 228 kg (503 lb) load: 290 kPa (2.90 kgf/cm², 42 psi)	

Specifications

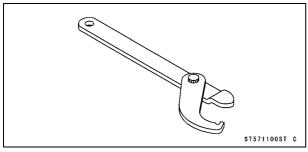
Item	Standard	Service Limit
Final Drive		
Final Gear Case Oil	hypoid gear oil	
Grade	API Service Classification: GL-5	
Viscosity	When above 5°C (41°F) SAE90 When below 5°C (41°F) SAE80	
Oil Level	Filler opening top	
Amount	about 160 mL (5.41 US oz)	
Brakes		
Brake Fluid:		
Grade	DOT4	
Brake Pad Lining Thickness:		
Front	4.0 mm (0.16 in.)	1 mm (0.04 in.)
Rear	5.0 mm (0.20 in.)	1 mm (0.04 in.)
Brake Light Timing:		
Front	Pulled ON	
Rear	On after about 10 mm (0.39 in.) of pedal travel	
Electrical System		
Spark Plug:		
Туре	NGK CR9EIA-9	
Gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in.)	

Special Tools and Sealant

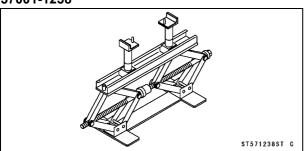
Inside Circlip Pliers: 57001-143



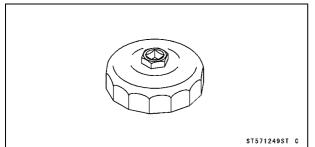
Steering Stem Nut Wrench: 57001-1100



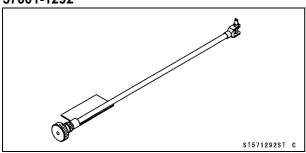
Jack: 57001-1238



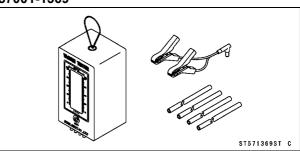
Oil Filter Wrench: 57001-1249



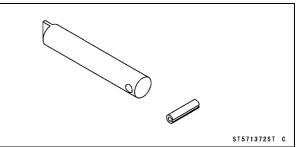
Pilot Screw Adjuster, C: 57001-1292



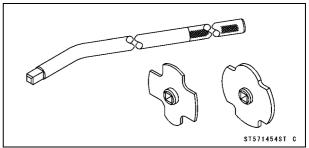
Vacuum Gauge: 57001-1369



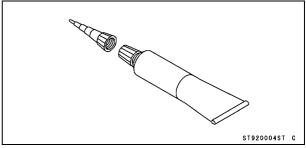
Pilot Screw Adjuster Adapter, ϕ 5: 57001-1372



Filler Cap Driver: 57001-1454



Liquid Gasket, TB1211F: 92104-0004



Fuel System (DFI)

Throttle Control System Inspection

- Check the throttle grip free play [A].
- \star 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 [B] moves smoothly from full open to close, and the throttle closes quickly and completely by the return spring in all steering positions.
- ★ If the throttle grip does not return properly, check the throttle cables routing, grip free play, and cable damage. Then lubricate the throttle cable.
- Run the engine at the idle speed, and turn the handlebar all the way to the right and left to ensure that the idle speed does not change.
- ★ If the idle speed increases, check the throttle cable free play and the cable routing.
- \star If necessary, adjust the throttle cable as follows.
- Loosen the locknuts [A] [B].
- Screw both throttle cable adjusters [C] [D] to give the throttle grip plenty of play.
- Turn the decelerator cable adjuster [C] until 2 ~ 3 mm (0.08 ~ 0.12 in.) of throttle grip play is obtained.
- Tighten the locknut [A].
- Turn the accelerator cable adjuster [D] until 2 ~ 3 mm (0.08 ~ 0.12 in.) of throttle grip play is obtained.
- Tighten the locknut [B].
- ★ If the free play cannot be adjusted with the adjusters, replace the cable.

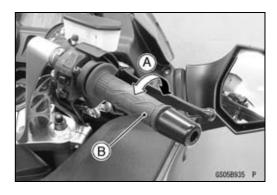
Engine Vacuum Synchronization Inspection

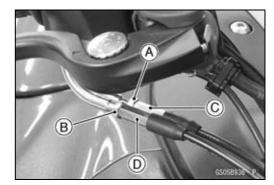
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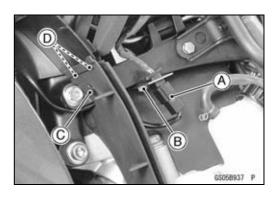
- These procedures are explained on the assumption that the inlet and exhaust systems of the engine are in good condition.
- Situate the motorcycle so that it is vertical.
- Remove:

Left and Right Rear Middle Fairings (see Rear Middle Fairing Removal in the Frame chapter) Connector [A] Bracket Bolt [B] Quick Rivet [C]

• Pull down the left inner rubber cover from the ribs [D].



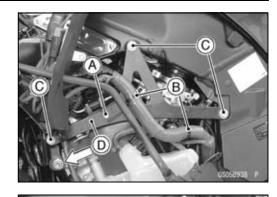


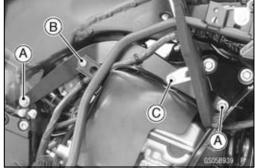


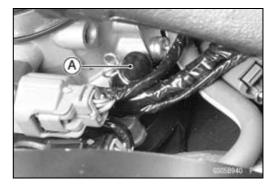
2-18 PERIODIC MAINTENANCE

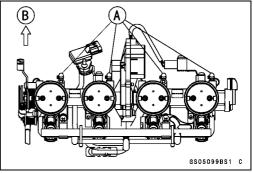
Maintenance Procedure

- Remove: Fairing Stay Bolt [A] Bands [B] Subframe Bolts [C] and Washer
- Move the subframe [D] forward.
- Remove: Subframe Bolts [A] and Washer Right Fairing Stay Bolt [B] Bracket Bolt [C]
- Pull off the rubber caps [A] from the fittings of each throttle body.
- OFor the rubber cap #2, remove the air cleaner duct. Front [B]

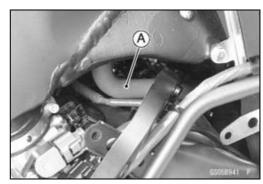








- Pull off the air switching valve hose [A] from the air cleaner housing.
- Plug the air switching valve hose end and air cleaner housing hole.



• Connect a vacuum gauge and hoses [A] to the fittings on the throttle body.

Special Tool - Vacuum Gauge: 57001-1369

- Connect a highly accurate tachometer [B] to one of the stick coil primary leads.
- Start the engine and warm it up thoroughly.
- Check the idle speed, using a highly accurate tachometer [A].
- ★ If the idle speed is out of the specified range, adjust it with the adjust screw.

NOTICE

Do not measure the idle speed by the tachometer of the meter unit.

• While idling the engine, inspect the throttle body vacuum, using the vacuum gauge [B].

Throttle Body Vacuum

```
Standard: 34.7 ±1.33 kPa (260 ±10 mmHg) at Idle
Speed 1 100 ±50 r/min (rpm)
```

★ If any vacuum is not within specifications, first synchronize the balance of the left (#1, #2 throttle valves) and right (#3, #4 throttle valves) assemblies.

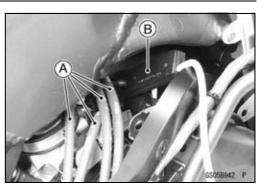
Example:

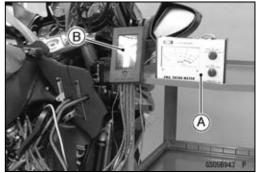
- #1: 240 mmHg
- #2: 250 mmHg
- #3: 230 mmHg
- #4: 240 mmHg
- With the engine at the correct idle speed, equalize higher vacuum of #1 or #2 (for example 250 mmHg) to higher vacuum of #3 or #4 (for example 240 mmHg) by turning the center adjusting screw [A].

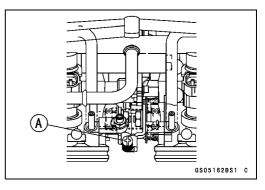
Special Tools - Pilot Screw Adjuster, C [B]: 57001-1292 Pilot Screw Adjuster Adapter, ϕ 5: 57001 -1372

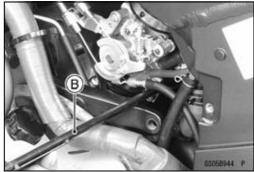
NOTE

- ○After adjustment, the final vacuum measurement between the highest throttle valves may not be 250 mmHg (for example). The goal is to have the highest two vacuums between the left (#1 and #2) and right (#3 and #4) banks be the same and be within the service limits.
- Open and close the throttle after each measurement, and adjust the idle speed as necessary.
- Once the throttle valves have been synchronized, inspect output voltage of the main throttle sensor to ensure proper operation (procedure is explained at the end of this section).









2-20 PERIODIC MAINTENANCE

Maintenance Procedure

★If a value of measured vacuum pressure is out of the specified range after synchronization, adjust the bypass screws [A].

Special Tools - Pilot Screw Adjuster, C: 57001-1292 Pilot Screw Adjuster Adapter, ϕ 5: 57001

- -1372
- Adjust lower vacuum between #1 and #2 to higher vacuum of #1 and #2.
- Adjust the lower vacuum between #3 and #4 to higher vacuum of #3 and #4.
- Open and close the throttle valves after each measurement, and adjust the idle speed as necessary.
- Check the vacuums as before.
- ★ If all vacuums are within the specification range, finish the engine vacuum synchronization.
- ★ If any vacuum cannot be adjusted within the specification, remove the bypass screws #1 ~ #4 and clean them.
- Turn in the bypass screw [A] with counting the number of turns until it seals fully but not tightly. Record the number of turns.

Torque - Bypass Screw: 0.2 N·m (0.02 kgf·m, 1.8 in·lb)

NOTICE

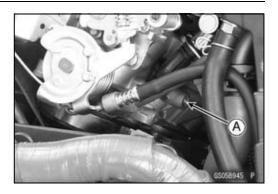
Do not over tighten them. They could be damaged, requiring replacement.

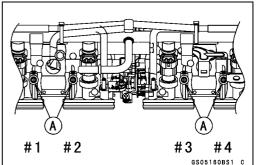
Remove:

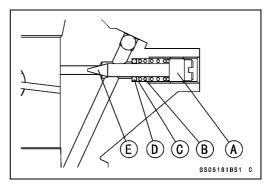
Bypass Screw Spring [B] Washer [C] O-ring [D]

- Check the bypass screw and its hole for carbon deposits.
- ★ If any carbons accumulate, wipe the carbons off from the bypass screw and the hole, using a cotton pad penetrated with a high-flash point solvent.
- Replace the O-ring with a new one.
- Check the tapered portion [E] of the bypass screw for wear or damage.
- ★ If the bypass screw is worn or damaged, replace it.
- Turn in the bypass screw until it seats fully but not tightly.

Torque - Bypass Screw: 0.2 N·m (0.02 kgf·m, 1.8 in·lb)







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

NOTE

- ○A throttle body has different "turns out" of the bypass screw for each individual unit. On setting the bypass screw, use the "turns out" determined during disassembly.
- Repeat the same procedure for other bypass screws.
- Repeat the synchronization.
- ★ If the vacuums are correct, check the output voltage of the main throttle sensor (see Output Voltage Inspection in the Main Throttle Sensor Section).

Main Throttle Sensor Output Voltage Connections to ECU

Meter (+) \rightarrow Y/W lead (terminal 54) Meter (–) \rightarrow BR/BK lead (terminal 60)

Standard: DC 0.61 ~ 0.63 V (at idle throttle opening)

- ★ If the output voltage is out of the range, check the throttle input voltage of the main throttle sensor (see Input Voltage Inspection in the Main Throttle Sensor Section).
- Remove the vacuum gauge hoses and install the rubber caps on the original position.
- For the CAL and SEA Models, install the vacuum hoses. ORoute the vacuum hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter. Refer to the diagram of the evaporative emission control system in the Fuel System (DFI) chapter too.

Idle Speed Inspection

- Start the engine and warm it up thoroughly.
- With the engine idling, turn the handlebar to both sides [A].
- ★ If handlebar movement changes the idle speed, the throttle cables may be improperly adjusted or incorrectly routed, or damaged. Be sure to correct any of these conditions before riding (see Cable, Wire, and Hose Routing section in the Appendix chapter).

A WARNING

Operation with improperly adjusted, incorrectly routed or damaged cables could result in an unsafe riding condition. Follow the service manual to be make sure to correct any of these conditions.

• Check the idle speed.

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

Idle Speed Standard: 1 100 ±50 r/min (rpm)



2-22 PERIODIC MAINTENANCE

Maintenance Procedure

Idle Speed Adjustment

- Start the engine and warm it up thoroughly.
- Turn the adjusting screw [A] until the idle speed is correct.
- OOpen and close the throttle a few times to make sure that the idle speed is within the specified range. Readjust if necessary.

Fuel Hose Inspection (fuel leak, damage, installation condition)

- Olf the motorcycle is not properly handled, the high pressure inside the fuel line can cause fuel to leak [A] or the hose to burst.
- Remove:

Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)

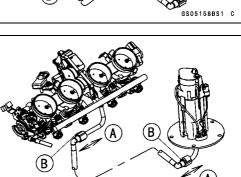
Left Rear Middle Fairing (see Rear Middle Fairing Removal in the Frame chapter)

- Check the fuel hose.
- ★Replace the fuel hose if any fraying, cracks [B] or bulges [C] are noticed.
- Check that the hoses are routed according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- ★Replace the hose if it has been sharply bent or kinked. Hose Joints [A]

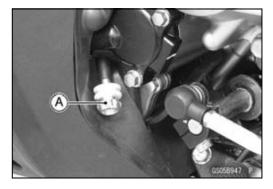
Fuel Hose [B]

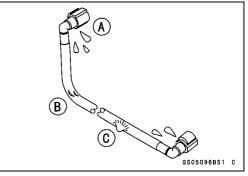
Check that the hose joints are securely connected.
 ○Push and pull [A] the hose joint [B] back and forth more than two times, and make sure it is locked.
 ★ If it does not locked, reinstall the hose joint.

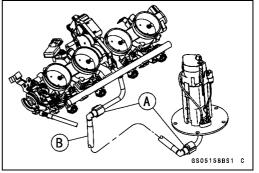
Leaking fuel can cause a fire or explosion resulting in serious burns. Make sure the hose joint is installed correctly on the delivery pipe by sliding the joint.



GS05159BS1 C







Evaporative Emission Control System Inspection (CAL and SEA Models)

• Remove:

Right Rear Middle Fairing (see Rear Middle Fairing Removal in the Frame chapter) Band [A]

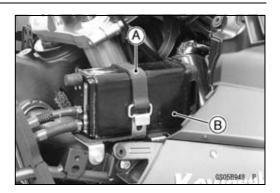
Canister [B]

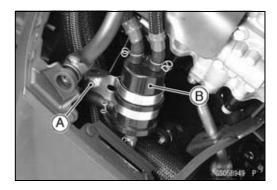
- Disconnect the hoses from the canister.
- Visually inspect the canister for cracks or other damage.
- ★ If the canister has any cracks or bad damage, replace it with a new one.

NOTE

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

- Remove the bolt [A].
- Disconnect the hoses from the separator [B].
- Remove the separator.
- Visually inspect the separator for cracks and other damage.
- ★ If the separator has any cracks or damage, replace it with a new one.
- To prevent the gasoline from flowing into or out of the canister, hold the separator perpendicular to the ground.
- Check the hoses of the evaporative emission control system as follows.
- OCheck that the hoses are securely connected and clips are in position.
- OReplace any kinked, deteriorated or damaged hoses.
- ORoute the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter. Refer to the diagram of the evaporative emission control system in the Fuel System (DFI) chapter too.
- OWhen installing the hoses, avoid sharp bending, kinking, flattening or twisting, and route the hoses with a minimum of bending so that the emission flow will not be obstructed.





2-24 PERIODIC MAINTENANCE

Maintenance Procedure

Cooling System Coolant Level Inspection

NOTE

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

- Check the coolant level in the reserve tank [A] with the motorcycle held perpendicular (Do not use the sidestand).
- ★ If the coolant level is lower than the "L" level line [B], unscrew the reserve tank cap and add coolant to the "F" level line [C].
 - "L": Low
 - "F": Full

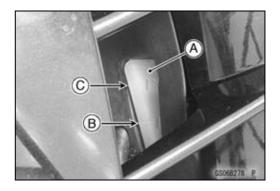
NOTICE

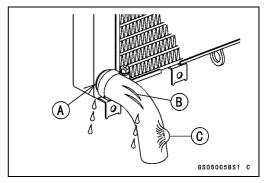
For refilling, add the specified mixture of coolant and soft water. Adding water alone dilutes the coolant and degrades its anticorrosion properties. The diluted coolant can attack the aluminum engine parts. In an emergency, soft water alone can be added. But the diluted coolant must be returned to the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

Radiator (Water) Hose Inspection (coolant leak, damage, installation condition)

- OThe high pressure inside the water hose can cause coolant to leak [A] or the hose to burst if the line is not properly maintained.
- Visually inspect the hoses for signs of deterioration. Squeeze the hoses. A hose should not be hard and brittle, nor should it be soft or swollen.
- ★Replace the hose if any fraying, cracks [B] or bulges [C] are noticed.
- OApply soap and water solution to the inside of the water hoses before installation.
- Check that the hoses are securely connected and clamps are tightened correctly.

Torque - Water Hose Clamp Screws: 3.0 N·m (0.31 kgf·m, 27 in·lb)





Engine Top End

Air Suction System Damage Inspection

- Remove the right subframe (see Right Subframe Removal in the Frame chapter).
- Pull the air switching valve hose [A] out of the frame.
- Start the engine and run it at idle speed.
- Plug [A] the air switching valve hose end 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 air switching valve (see Air Switching Valve Unit Test in the Electrical System chapter) or air suction valve (see Air Suction Valve Inspection in the Engine Top End chapter).

Valve Clearance Inspection

NOTE

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

• Remove:

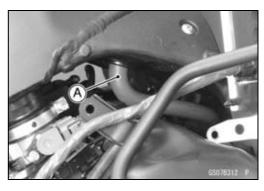
Crankshaft Sensor Cover (see Crankshaft Sensor Removal in the Electrical System chapter) Cylinder Head Cover (see Cylinder Head Cover Removal in the Engine Top End chapter)

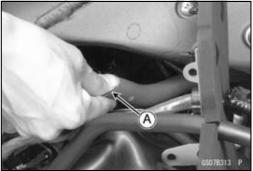
 Position the crankshaft at 1, 4 piston TDC. TDC Mark [A] for #1, 4 Pistons Timing Mark [B] (crankcase halves mating surface)

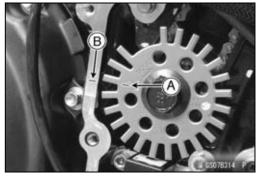
• Using a thickness gauge [A], measure the valve clearance between the cam and the valve lifter.

Valve Clearance Standard:

Exhaust	0.19 ~ 0.24 mm (0.0075 ~ 0.0094 in.)
Inlet	0.12 ~ 0.17 mm (0.0047 ~ 0.0067 in.)









2-26 PERIODIC MAINTENANCE

Maintenance Procedure

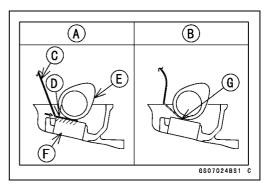
NOTE

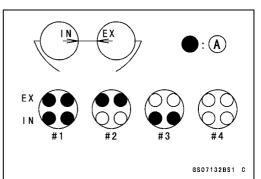
OThickness gauge is horizontally inserted on the valve lifter.

Appropriateness [A] Inadequacy [B] Thickness Gauge [C] Horizontally Inserts [D] Cam [E] Valve Lifter [F] Hits the Valve Lifter Ahead [G]

OWhen positioning #1 piston TDC at the end of the compression stroke:

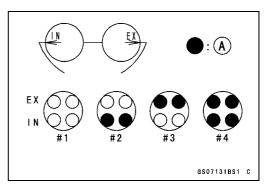
Inlet Valve Clearance of #2 and #4 Cylinders Exhaust Valve Clearance of #3 and #4 Cylinders Measuring Valve [A]





OWhen positioning #4 piston TDC at the end of the compression stroke:

Inlet Valve Clearance of #1 and #3 Cylinders Exhaust Valve Clearance of #1 and #2 Cylinders Measuring Valve [A]



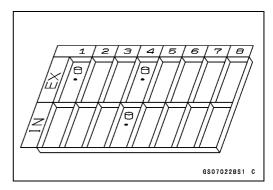
★ If the valve clearance is not within the specified range, first record the clearance, and then adjust it.

Valve Clearance Adjustment

• To change the valve clearance, remove the camshaft chain tensioner, camshafts and valve lifters. Replace the shim with one of a different thickness.

NOTE

OMark and record the locations of the valve lifters and shims so that they can be reinstalled in their original positions.



- Clean the shim to remove any dust or oil.
- Measure the thickness of the removed shim [A].
- Select a new shim thickness calculation as follows.
 - a + b c = d
 - [a] Present Shim Thickness
 - [b] Measured Valve Clearance
 - [c] Specified Valve Clearance (Mean Value = 0.125 mm
 - (Exhaust), 0.145 mm (Inlet))
 - [d] Replace Shim Thickness

Example (Inlet):

2.300 + 0.31 - 0.145 = 2.465 mm

OExchange the shim for the 2.475 size shim.

NOTICE

Don't use the shims for another models. This could cause wear of the valve stem end, and valve stem damage.

NOTICE

Be sure to remeasure the clearance after selecting a shim according to the table. If the clearance is out of the specified rage, use the additional shim.

Olf there is no valve clearance, use a shim that is a few sizes smaller, and remeasure the valve clearance.

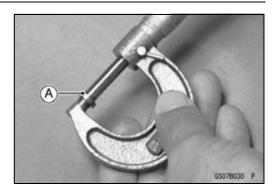
• When installing the shim, face the marked side toward the valve lifter. At this time, apply engine oil to the shim or the valve lifter to keep the shim in place during camshaft installation.

NOTICE

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.

- Apply engine oil to the valve lifter surface and install the lifter.
- Install the camshaft (see Camshaft Installation in the Engine Top End chapter).
- Recheck the valve clearance and readjust if necessary.
- Install the removed parts (see appropriate chapters).

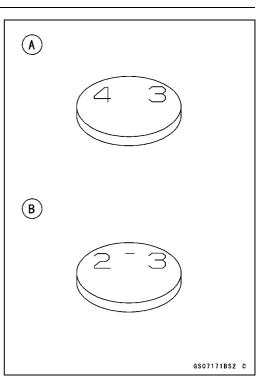


2-28 PERIODIC MAINTENANCE

Maintenance Procedure

Adjustment Shims

Thickness	Part Number	Mark
1.750	92180-1212	-25
1.775	92180-0221	-23
1.800	92180-1211	-20
1.825	92180-0222	-18
1.850	92180-1210	-15
1.875	92180-0223	-13
1.900	92180-1209	-10
1.925	92180-0224	-8
1.950	92180-1208	-5
1.975	92180-0225	-3
2.000	92025-1870	0
2.025	92180-0209	3
2.050	92025-1871	5
2.075	92180-0210	8
2.100	92025-1872	10
2.125	92180-0211	13
2.150	92025-1873	15
2.175	92180-0212	18
2.200	92025-1874	20
2.225	92180-0213	23
2.250	92025-1875	25
2.275	92180-0214	28
2.300	92025-1876	30
2.325	92025-0215	33
2.350	92025-1877	35
2.375	92025-1058	38
2.400	92025-1878	40
2.425	92025-1982	43
2.450	92025-1879	45
2.475	92025-1983	48
2.500	92025-1880	50
2.525	92025-1984	53
2.550	92025-1881	55
2.575	92025-1985	58
2.600	92025-1882	60
2.625	92180-1059	63
2.650	92025-1883	65
2.675	92180-1194	68
2.700	92025-1884	70
2.725	92180-1195	73
2.750	92025-1885	75



NOTE

OThere are two kinds of marks [A] [B] in the shim.

Clutch

Clutch Operation Inspection

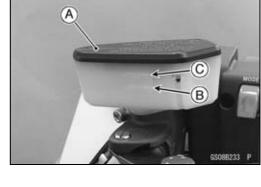
- Start the engine and check that the clutch does not slip and that it releases properly.
- ★ If the clutch operation is insufficiency, inspect the clutch system.

A WARNING

When test riding the vehicle, be aware of surrounding traffic for your safety.

Clutch Fluid Level Inspection

- Hold the clutch fluid reservoir [A] horizontal.
- Check that the clutch fluid level of the clutch reservoir is between the lower [B] and the upper [C] level lines.
- ★ If the fluid level is lower than the lower level line, fill the reservoir to the upper level line in the reservoir.
- OSince the clutch fluid is the same as the brake fluid, refer to the Brake Fluid section in the Brake chapter for further details.

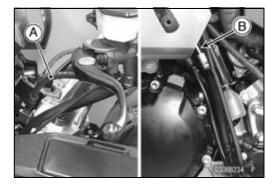


A WARNING

Mixing brands and types of hydraulic fluid lowers the fluid's boiling point, cause rubber part to deteriorate and can reduce the hydraulic clutch system's effectiveness and cause an accident resulting in injury or death. Do not mix two brands of brake fluid. Change the fluid in the hydraulic clutch system completely if the fluid must be refilled but the type and brand of the hydraulic fluid that is already in the reservoir are unidentified.

Clutch Fluid Leak Inspection

- Apply the clutch lever and inspect the clutch fluid leak from the clutch hose [A], pipe [B] and fittings.
- ★ If the clutch fluid leaked from any position, inspect or replace the problem part.



2-30 PERIODIC MAINTENANCE

Maintenance Procedure

Clutch Hose Damage and Installation Condition Inspection

- Inspect the clutch hoses and fittings for deterioration, cracks, corrosion and signs of leakage.
- OThe high pressure inside the clutch 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 fraying, cracks [B] or bulges [C] are noticed.
- Check that the hoses are securely connected and banjo bolts are tightened correctly.

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

- Inspect the clutch hose routing.
- ★ If any clutch hose routing is incorrect, run the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- ★ Replace the hose if the hose been sharply bent or kinked.

Wheels/Tires

Air Pressure Inspection

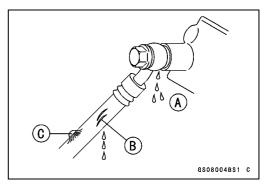
- Remove the air valve cap.
- Measure the tire air pressure with an air pressure gauge [A] when the tires are cold (that is, when the motorcycle has not been ridden more than a mile during the past 3 hours).
- Install the air valve cap.
- ★ Adjust the tire air pressure according to the specifications if necessary.

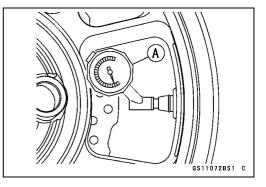
Air Pressure (when Cold)

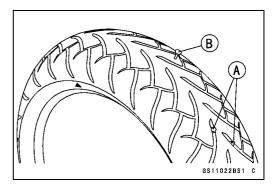
- Front: Up to 228 kg (503 lb) load 290 kPa (2.90 kgf/cm², 42 psi)
- Rear: Up to 228 kg (503 lb) load 290 kPa (2.90 kgf/cm², 42 psi)

Wheel/Tire Damage Inspection

- Remove any imbedded stones [A] or other foreign particles [B] from tread.
- Visually inspect the tire for cracks and cuts, and replace the tire if necessary. Swelling or high spots indicate internal damage, requiring tire replacement.
- Visually inspect the wheel for cracks, cuts and dents damage.
- \star If any damage is found, replace the wheel if necessary.



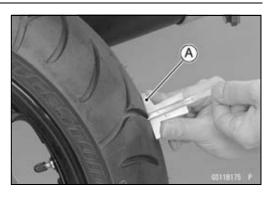




Tire Tread Wear Inspection

As the tire tread wears down, the tire becomes more susceptible to puncture and failure. An accepted estimate is that 90% of all tire failures occur during the last 10% of tread life (90% worn). So it is false economy and unsafe to use the tires until they are bald.

- 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 (see Tire Removal/Installation in the Wheels/Tires chapter).



Tread Depth

Standard:

Front	4.8 mm (0.19 in.)
Rear	6.2 mm (0.24 in.)

Service Limit:

Front

Front	1 mm (0.04 m.)
	(AT, CH, DE) 1.6 mm (0.06 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

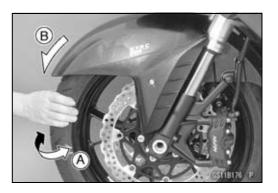
Some replacement tires may adversely affect handling and cause an accident resulting in serious injury or death. To ensure proper handling and stability, use only the recommended standard tires for replacement, inflated to the standard pressure.

NOTE

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

Wheel Bearing Damage Inspection

- Raise the front wheel off the ground with the jack (see Front Wheel Removal in the Wheels/Tires chapter).
- Turn the handlebar all the way to the right or left.
- Inspect the roughness of the front wheel bearing by moving the wheel to left and right side [A].
- Spin [B] the front wheel lightly, and check for smoothly turn, roughness, binding or noise.
- ★ If roughness, binding or noise is found, remove the front wheel and inspect the wheel bearing (see Hub Bearing Inspection in the Wheels/Tires chapter).



2-32 PERIODIC MAINTENANCE

Maintenance Procedure

- Raise the rear wheel off the ground with the center stand (see Rear Wheel Removal in the Wheels/Tires chapter).
- Spin [A] the rear wheel lightly, and check for smoothly turn, roughness, binding or noise.
- ★ If roughness, binding or noise is found, remove the rear wheel and inspect the wheel bearing (see Hub Bearing Inspection in the Wheels/Tires chapter) and coupling (see Coupling Bearing Inspection in the Final Drive chapter).



Final Drive

Oil Level Inspection

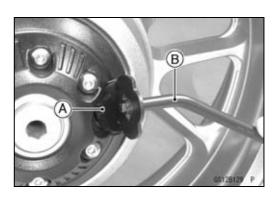
A WARNING

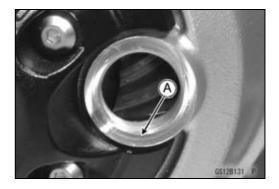
Vehicle operation with insufficient, deteriorated, or contaminated gear oil will cause accelerated wear and may result in pinion and ring gears seizure, accident, and injury. Check the oil level before each use and change the oil according to the periodic maintenance chart.

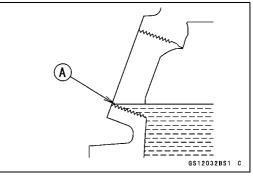
- Support the motorcycle perpendicular to the ground.
- Unscrew the filler plug [A], using the driver-filler cap [B].

Special Tool - Driver-Filler Cap: 57001-1454

- The oil level [A] should come to the top of the filler opening.
- ★ If it is low, first check the final gear case for oil leakage, remedy it if necessary, and add oil through the filler opening. Use the same type and brand of oil that is already in the final gear case.
- Install the filler plug.
- Tighten:







Torque - Filler Plug: 2.0 N·m (0.20 kgf·m, 18 in·lb)

Brakes

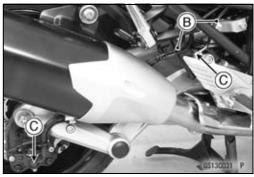
Brake Fluid Leak (Brake Hose and Pipe) Inspection

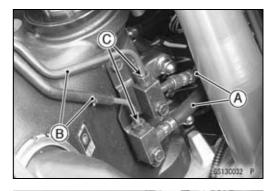
- Apply the brake lever or pedal and inspect the brake fluid leak from the brake hoses [A], pipes (ABS equipped models) [B] and fittings [C].
- ★ If the brake fluid leaked from any position, inspect or replace the problem part.
- For ABS equipped models; note the following.
- Remove:

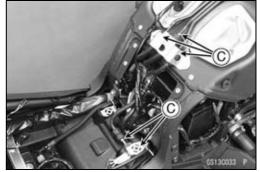
Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)

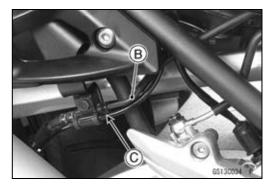
Battery Back Cover (see K-ACT ABS Hydraulic Unit Removal in the Brakes chapter)











2-34 PERIODIC MAINTENANCE

Maintenance Procedure

Brake Hose and Pipe Damage and Installation Condition Inspection

- For ABS equipped models; note the following.
- Remove:

Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)

Battery (see Battery Removal in the Electrical System chapter)

- Inspect the brake hoses and fittings for deterioration, cracks and signs of leakage.
- OThe high pressure inside the brake line can cause fluid to leak [A] or the hose, pipes (ABS equipped models) to burst if the line is not properly maintained. Bend and twist the rubber hose while examining it.
- ★ Replace the hose and pipe (ABS equipped models) if any crack [B], bulge [C] or leakage is noticed.
- \star Tighten any brake hose banjo bolts.

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

- Inspect the brake hose routing.
- ★ If any brake hose and pipe (ABS equipped models) routing is incorrect, route the brake hose and pipe according to Cable, Wire, and Hose Routing section in the Appendix chapter.

Brake Operation Inspection

- Inspect the operation of the front and rear brake by running the vehicle on the dry road.
- ★ If the brake operation is insufficiency, inspect the brake system.

🛦 WARNING

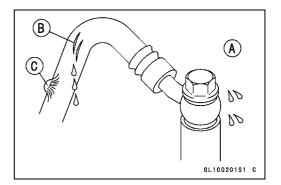
When test riding the vehicle, be aware of surrounding traffic for your safety.

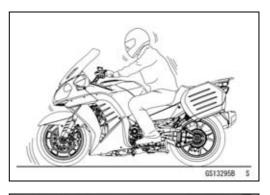
Brake Fluid Level Inspection

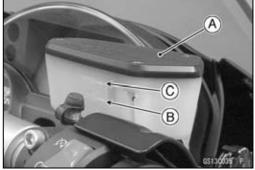
• Check that the brake fluid level in the front brake reservoir [A] is above the lower level line [B].

NOTE

- OHold 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 [C].







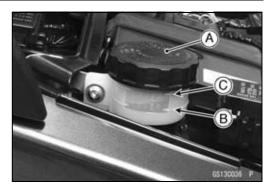
- Remove the seat (see Seat Removal in the Frame chapter).
- Check that the brake fluid level in the rear brake reservoir [A] is above the lower level line [B].
- ★ If the fluid level is lower than the lower level line, fill the reservoir to the upper level line [C].

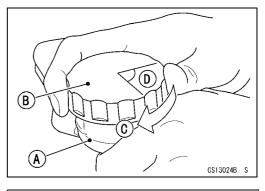
🛦 WARNING

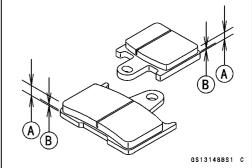
Mixing brands and types of brake fluid can reduce the brake system's effectiveness and cause an accident resulting in injury or death. Do not mix two brands of brake fluid. Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified.

Recommended Disc Brake Fluid Grade: DOT4

- Follow the procedure below to install the rear brake fluid reservoir cap correctly.
- OFirst, tighten the rear brake fluid reservoir cap [B] clockwise [C] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body, then tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir body [A].









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.

in.) in.)

Pad Lining Thickness

Standard:	
Front	4.0 mm (0.16
Rear	5.0 mm (0.20

Service Limit: 1 mm (0.04 in.)

Brake Light Switch Operation Inspection

- Push and turn the key knob to ON.
- The brake light [A] should go on when the brake lever is applied or after the brake pedal is depressed about 10 mm (0.39 in.).

2-36 PERIODIC MAINTENANCE

Maintenance Procedure

★ If it does not, adjust the brake light switch.

• While holding the switch body, turn the adjusting nut to adjust the switch.

Switch Body [A] Adjusting Nut [B] Light sooner as the body rises [C] Light later as the body lowers [D]

NOTICE

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

★ If it does not go on, inspect or replace the following items. Battery (see Charging Condition Inspection in the Electrical System chapter)

Brake Light (see Tail/Brake Light Removal in the Electrical System chapter)

Main Fuse 30 A and Taillight Fuse 10 A (see Fuse Inspection in the Electrical System chapter)

Front Brake Light Switch [A] (see Switch Inspection in the Electrical System chapter)

Rear Brake Light Switch (see Switch Inspection in the Electrical System chapter)

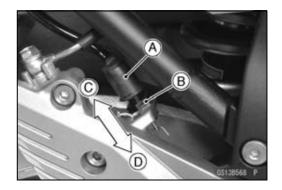
Steering Lock Unit (see Steering Lock Unit Inspection in the Electrical System chapter)

Harness (see Wiring Inspection in the Electrical System chapter)

Suspension

Front Forks/Rear Shock Absorber Operation Inspection

- Pump the forks down and up [A] 4 or 5 times, and inspect the smooth stroke.
- ★ If the forks do not smoothly or noise is found, inspect the fork oil level or fork clamps (see Front Fork Oil Change in the Suspension chapter).
- Remove the saddlebags (see Saddlebag Removal in the Frame chapter).
- Pump the seat down and up [A] 4 or 5 times, and inspect the smooth stroke.
- ★If the shock absorber does not smoothly stroke or noise is found, inspect the oil leak (see Rear Shock Absorber Oil Leak Inspection).









Front Fork Oil Leak Inspection

◆ Visually inspect the front forks [A] for oil leakage.
 ★ Replace or repair any defective parts, if necessary.

Rear Shock Absorber Oil Leak Inspection

- Visually inspect the shock absorber [A] for oil leakage.
- ★ If the oil leakage is found on it, replace the shock absorber with a new one.

Rocker Arm Operation Inspection

- Pump the seat down and up 4 or 5 times, and inspect the smooth stroke.
- ★ If the rocker arm [A] does not smoothly stroke or noise is found, inspect the fasteners and bearings (see Rocker Arm/Tie-Rod Bearing, Sleeve Inspection in the Suspension chapter).

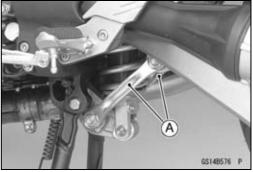
Tie-Rod Operation Inspection

- Pump the seat down and up 4 or 5 times, and inspect the smooth stroke.
- ★ If the tie-rods [A] do not smoothly stroke or noise is found, inspect the fasteners and tie-rod bearings (see Rocker Arm/Tie-Rod Bearing, Sleeve Inspection in the Suspension chapter).









2-38 PERIODIC MAINTENANCE

Maintenance Procedure

Steering

Steering Play Inspection

• Raise the front wheel off the ground with the jack.

Special Tools - 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 the forks.
- \star 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.
- OBe sure the leads and cables are properly routed.
 OThe bearings must be in good condition and properly lubricated in order for any test to be valid.

Steering Play Adjustment

• Remove:

Storage Compartment Cover (see Storage Compartment Removal in the Frame chapter)

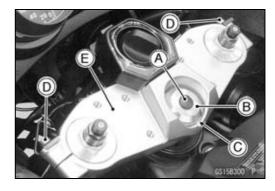
Handlebar Holders (see Handlebar Removal in the Steering chapter)

Plug [A]

Stem Head Nut [B] and Washer [C] Upper Fork Clamp Bolts [D] (Loosen) Stem Head [E]

- Bend the claws [A] of the claw washer straighten.
- Remove the steering stem locknut [B] and lock washer.









• Adjust the steering.

Special Tool - Steering Stem Nut Wrench [A]: 57001-1100

- ★ 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 time maximum.

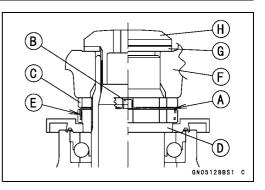
- Install the lock washer [A] so that its bent side [B] faces upward, and engage the bent claws with the grooves of stem locknut [C].
- Hand tighten the stem locknut until it touches the claw washer.
- Tighten the stem locknut clockwise until the claws are aligned with the grooves (ranging from 2nd to 4th) of stem nut [D], and bend the 2 claws downward [E].
- Install the stem head [F].
- Install the washer [G], and tighten the stem head nut [H].
- Tighten:
 - Torque Steering Stem Head Bolt: 108 N·m (11 kgf·m, 80 ft·lb)

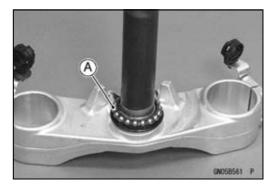
Front Fork Clamp Bolts (Upper): 20 N·m (2.0 kgf·m, 15 ft·lb)

- Check the steering again.
- ★ If the steering is still too tight or too loose, repeat the adjustment.
- Install the handlebars (see Handlebar Installation in the Steering chapter).

Steering Stem Bearing Lubrication

- Remove the steering stem (see Stem, Stem Bearing Removal in the Steering chapter).
- Using a high-flash point solvent, wash the upper and lower ball bearings in the cages, and wipe the upper and lower outer races, which are press-fitted into the frame head pipe, clean off grease and dirt.
- Visually check the outer races and the ball bearings.
- ★Replace the bearing assemblies if they show wear or damage.
- Pack the upper and lower ball 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 (see Stem, Stem Bearing Installation in the Steering chapter).
- Adjust the steering (see Steering Play Adjustment).





2-40 PERIODIC MAINTENANCE

Maintenance Procedure

Electrical System

Lights and Switches Operation Inspection First Step

- Push and turn the key knob to ON.
- The following lights should go on according to below table.

City Lights [A]	goes on
Taillight [B]	goes on
License Plate Light [C]	goes on
Meter Panel Illumination Light (LED) [D]	goes on
Meter Panel LCD [E]	goes on
Warning/Immobilizer Indicator Light (LED) [F]	goes on (for 5 seconds)
Neutral Indicator Light (LED) [G]	goes on
Oil Pressure Warning Indicator Light (LED) [H]	goes on
ABS Indicator Light (LED) [I] (Equipped Models)	goes on
KTRC Indicator Ligiht (LED) [J]	flash
All Turn Signal Lights [K] and Indicator Lights (LED) [L]	flash two times

★ If the light does not go on, inspect or replace the following item.

Battery (see Charging Condition Inspection in the Electrical System chapter)

Applicable Bulb (see Wiring Diagram in the Electrical System chapter)

Meter Unit (see Meter Unit Inspection in the Electrical System chapter)

ECU (see ECU Power Supply Inspection in the Fuel System (DFI) chapter)

Main Fuse 30 A, KIPASS Signal Relay Fuse 10 A and Taillight Fuse 10 A (see Fuse Inspection in the Electrical System chapter)

Steering Lock Unit (see Steering Lock Unit Inspection in the Electrical System chapter)

Gear Position Switch (see Gear Position Switch Inspection in the Electrical System chapter)

KIPASS Signal Relay (see KIPASS Signal Relay Inspection in the Electrical System chapter)

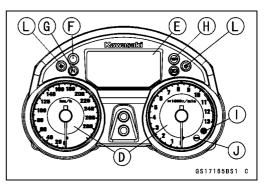
Harness (see Wiring Inspection in the Electrical System chapter)

- Turn the key knob to OFF.
- All turn signal lights and indicator light (LED) flash one time then all lights should go off.

 \star If the light does not go off, replace the steering lick unit.







PERIODIC MAINTENANCE 2-41

Maintenance Procedure

Second Step

- Push and turn the key knob to ON.
- Turn on the turn signal switch [A] (left or right position).
- The left or right turn signal lights [B] (front and rear) according to the switch position should flash.
- The either of turn signal indicator lights (LED) [C] in the meter unit should flash.
- ★If the each light does not flash, inspect or replace the following item.

Turn Signal Light Bulb (see Turn Signal Light Bulb Replacement in the Electrical System chapter)

Meter Unit for Turn Signal Indicator Light (LED) (see Meter Unit Inspection in the Electrical System chapter)

Turn Signal Relay Fuse 10 A (see Fuse Inspection in the Electrical System chapter)

Turn Signal Switch (see Switch Inspection in the Electrical System chapter)

Turn Signal Relay (see Turn Signal Relay Inspection in the Electrical System chapter)

Harness (see Wiring Inspection in the Electrical System chapter)

- Push the turn signal switch.
- The turn signal lights and indicator light (LED) should go off.
- ★ If the light does not go off, inspect or replace the following item.

Turn Signal Switch (see Switch Inspection in the Electrical System chapter)

Turn Signal Relay (see Turn Signal Relay Inspection in the Electrical System chapter)

Third Step

- Set the dimmer switch [A] to low beam position.
- Start the engine.
- The low beam headlights [B] should go on.
- ★If the low beam headlight does not go on, inspect or replace the following item.

Headlight Bulb (see Headlight Bulb Replacement in the Electrical System chapter)

Headlight Fuse (Low) 15 A (see Fuse Inspection in the Electrical System chapter)

Headlight Relay Fuse 10 A (see Fuse Inspection in the Electrical System chapter)

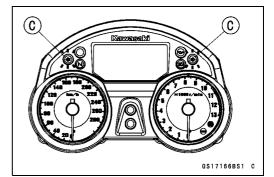
Headlight Circuit Relay in Relay Box (see Relay Circuit Inspection in the Electrical System chapter)

Headlight Relay (Low) (see Headlight Relay Inspection in the Electrical System chapter)

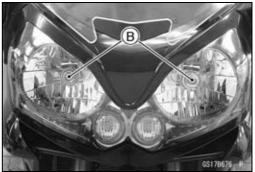
Harness (see Wiring Inspection in the Electrical System chapter)











2-42 PERIODIC MAINTENANCE

Maintenance Procedure

- Push the passing button [A] or set the dimmer switch to high beam position.
- The high beam headlights should go on.
- The high beam indicator light (LED) [B] should go on.

★ If the high beam headlight and/or high beam indicator light (LED) does not go on, inspect or replace the following item.

Headlight Bulb (see Headlight Bulb Replacement in the Electrical System chapter)

Headlight Fuse (High) 15 Å (see Fuse Inspection in the Electrical System chapter)

Headlight Relay Fuse 10 A (see Fuse Inspection in the Electrical System chapter)

Passing Button (see Switch Inspection in the Electrical system chapter)

Dimmer Switch (see Switch Inspection in the Electrical System chapter)

Headlight Circuit Relay in Relay Box (see Relay Circuit Inspection in the Electrical System chapter)

Headlight Relay (High) (see Headlight Relay Inspection in the Electrical System chapter)

Harness (see Wiring Inspection in the Electrical System chapter)

- Turn off the engine stop switch [A].
- The low beam or high beam headlights should stay going on.
- ★ If the headlights and high beam indicator light (LED) go off, inspect or replace the following item.
 Headlight Circuit Polay in Polay Pox (see Polay Circuit

Headlight Circuit Relay in Relay Box (see Relay Circuit Inspection in the Electrical System chapter)

- Turn the key knob to OFF.
- The headlights or high beam indicator light (LED) should go off.

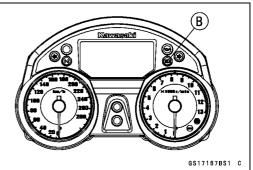
Headlight Aiming Inspection

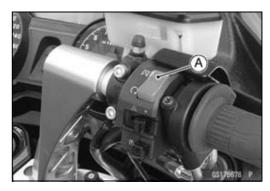
- Inspect the headlight beam for aiming.
- ★If the headlight beam points to one side rather than straight ahead, adjust the horizontal beam.

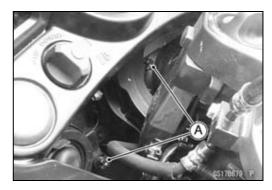
Headlight Beam Horizontal Adjustment

- Turn the horizontal adjuster [A] in both headlights in or out until the beam points straight ahead.
- ★If the headlight beam points too low or high, adjust the vertical beam.









Headlight Beam Vertical Adjustment

• Turn the vertical adjuster [A] in both headlights 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.
- OFor 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 [D]

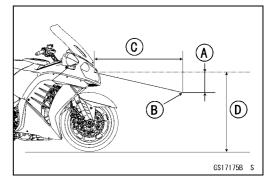
Sidestand Switch Operation Inspection

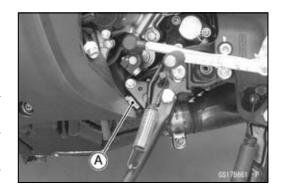
• Inspect the sidestand switch [A] operation accordance to table the below.

Sidestand Switch Operation						
Sidestand	Gear Position	Clutch Lever	Engine Start	Engine Run		
Up	Neutral	al Pulled in Starts		Continue running		
Up	Neutral			Pulled in Starts		Continue running
Up	In Gear			Continue running		
Up	In Gear	Pulled in	Starts	Continue running		
Down	Neutral	Released	Starts	Continue running		
Down	Neutral	Pulled in	Starts	Continue running		
Down	In Gear	Released	Doesn't start	Stops		
Down	In Gear	Pulled in	Doesn't start	Stops		

Sidestand Switch Operation







2-44 PERIODIC MAINTENANCE

Maintenance Procedure

★ If the sidestand switch operation does not work, inspect or replace the following item. Battery (see Charging Condition Inspection in the Elec-

Battery (see Charging Condition Inspection in the Electrical System chapter)

Main Fuse 30 A (see Fuse Inspection in the Electrical System chapter)

ECU Fuse 30 Å (see Fuse Inspection in the Electrical System chapter)

Ignition Fuse 15 A (ZG1400C), 10 A (ZG1400D) (see Fuse Inspection in the Electrical System chapter)

Steering Lock Unit (see Steering Lock Unit Inspection in the Electrical System chapter)

Sidestand Switch (see Switch Inspection in the Electrical System chapter)

Starter Lockout Switch (see Switch Inspection in the Electrical System chapter)

Engine Stop Switch (see Switch Inspection in the Electrical System chapter)

Starter Button (see Switch Inspection in the Electrical System chapter)

Gear Position Switch (see Gear Position Switch Inspection in the Electrical System chapter)

Starter Relay (see Starter Relay Inspection in the Electrical System chapter)

Relay Box (see Relay Circuit Inspection in the Electrical System chapter)

Starter Circuit Relay (see Relay Circuit Inspection in the Electrical System chapter)

Harness (see Wiring Inspection in the Electrical System chapter)

 \star If the all parts are in good condition, replace the ECU.

Engine Stop Switch Operation Inspection First Step

- Push and turn the key knob to ON.
- Set the neutral position.
- Turn the engine stop switch to stop position [A].
- Push the starter button.
- The engine does not start.
- ★ If the engine starts, inspect or replace the following item. Engine Stop Switch (see Switch Inspection in the Electrical System chapter)

Second Step

- Push and turn the key knob to ON.
- Set the neutral position.
- Turn the engine stop switch to run position [A].
- Push the starter button and run the engine.
- Turn the engine stop switch to stop position.
- Immediately the engine should be stop.
- ★ If the engine does not stop, inspect or replace the following item.

Engine Stop Switch (see Switch Inspection in the Electrical System chapter)





Others

Chassis Parts Lubrication

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

NOTE

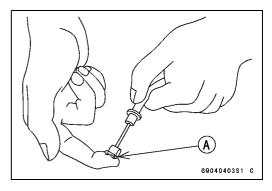
OWhenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure water spray, perform the general lubrication.

Pivots: Lubricate with Grease.

Brake Lever Brake Pedal Clutch Lever Center Stand Rear Brake Joint Pin Sidestand

Points: Lubricate with Grease.

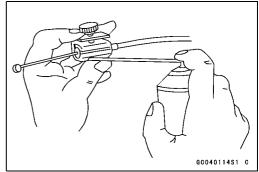
Throttle Inner Cable Upper and Lower Ends [A]



Cables: Lubricate with Rust Inhibitor.

Throttle Cables

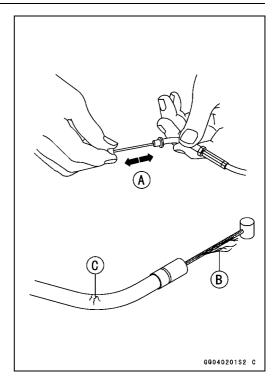
- Lubricate the cables by seeping the oil between the cable and housing.
- OThe cable may be lubricated by using a commercially available pressure cable lubricator with an aerosol cable lubricant.



2-46 PERIODIC MAINTENANCE

Maintenance Procedure

- With the cable disconnected at both ends, the inner 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.



Bolts, Nuts and Fasteners Tightness Inspection

• Check the tightness of the bolts and nuts listed here. Also, check to see that each cotter pin is in place and in good condition.

NOTE

○For the engine fasteners, check the tightness of them when the engine is cold (at room temperature).

- ★ If there are loose fasteners, retorque them to the specified torque following the specified tightening sequence. Refer to the appropriate chapter for torque specifications. If torque specifications are not in the appropriate chapter, see the Standard Torque Table. For each fastener, first loosen it by 1/2 turn, then tighten it.
- ★ If cotter pins are damaged, replace them with new ones.

Bolt, Nut and Fastener to be checked Engine: Clutch Lever Pivot Bolt Locknut Engine Mounting Bolts and Nut Muffler Clamp Bolts Exhaust Pipe Manifold Holder Nuts Muffler Body Mounting Bolts Wheels: Front Axle Clamp Bolts Front Axle Clamp Bolts Front Axle Nut Rear Axle Nut Rear Axle Nut Cotter Pin Final Gear Case Lower and Axle Bracket Locknuts Brakes: Brake Lever Pivot Nut Brake Pedal Bolt Brake Rod Joint Cotter Pin Caliper Mounting Bolts Front Master Cylinder Clamp Bolts Rear Master Cylinder Mounting Bolts Suspension: Front Fork Clamp Bolts Rear Shock Absorber Mounting Nuts Swingarm Pivot Shaft Nut Uni-Trak Link Nuts Torque Rod Locknuts
Rear Shock Absorber Mounting Nuts Swingarm Pivot Shaft Nut Uni-Trak Link Nuts
Torque Rod Locknuts Steering: Handlebar Bolts Handlebar Holder Bolts Steering Stem Head Bolt Others:
Center Stand Bolts Footpeg Bracket Bolts Sidestand Bolt

Replacement Parts

Air Cleaner Element Replacement

NOTE

OIn dusty areas, the element should be replaced more frequently than the recommended interval.

A WARNING

If dirt or dust is allowed to pass through into the throttle body assy, the throttle may become stuck, possibly causing accident. Replace the air cleaner element according to the maintenance chart.

NOTICE

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

2-48 PERIODIC MAINTENANCE

Maintenance Procedure

• Remove:

Left Rear Middle Fairing (see Rear Middle Fairing Removal in the Frame chapter) Connectors [A]

• Remove the bolts [A].

- Remove:
 - Air Cleaner Element Cover Bolts [A] Air Cleaner Element Cover [B]

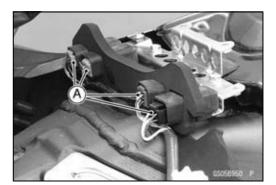
- Pull out the air cleaner element.
- Install a new element [A] so that screen side [B] faces upward.

NOTICE

Use only the recommended air cleaner element (Kawasaki part number 11013-0014). Using another air cleaner element will wear the engine prematurely or lower the engine performance.

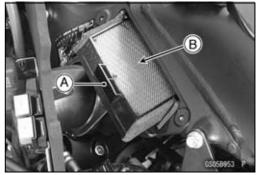
- Install the air cleaner element cover [A] so that arrow mark [B] faces forward.
- Tighten:

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











Fuel Hose Replacement

• Remove:

Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter) Subframe (see Subframe Removal in the Frame chap-

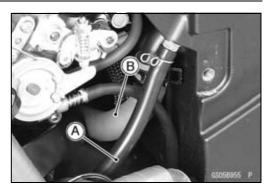
ter) Air Cleaner Drain Hose [A] Breather Hose [B]

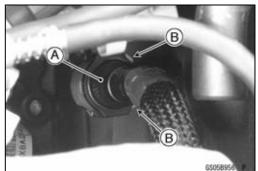
- Be sure to place a piece of cloth around the fuel hose joint [A].
- Push the joint lock claws [B] with the thin blade screw driver.
- Pull the joint lock [A] fully as shown in the figure.
- Pull the fuel hose [B] out of the delivery pipe.

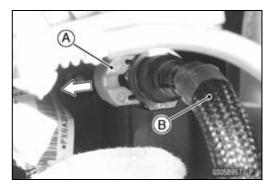
- Remove: Bolts [A] Bracket [B]
- Pull out the fuel hose [C] to forward.

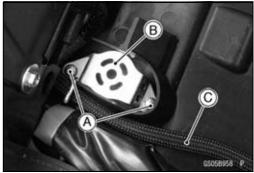
A WARNING

Fuel is flammable and explosive under certain conditions and can cause severe burns. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately. When the fuel hose is disconnected, fuel spills out from the hose and the pipe. Cover the hose connection with a clean shop towel to prevent fuel spillage.









2-50 PERIODIC MAINTENANCE

Maintenance Procedure

- Install the new fuel hose so that the white mark [A] side faces upward.
- Run the fuel hose correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Pull the joint lock [B] fully as shown in the figure.
- Insert the fuel hose joint [A] straight onto the delivery pipe until the hose joint clicks.
- Push [B] the joint lock [C] until the hose joint clicks.

• Push and pull the fuel hose joint [A] back and forth [B] more than two times and make sure it is locked and doesn't come off.

WARNING

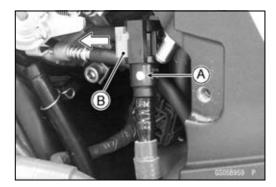
Leaking fuel can cause a fire or explosion resulting in severe burns. Make sure the fuel hose joint is installed correctly on the delivery pipe and that it doesn't leak.

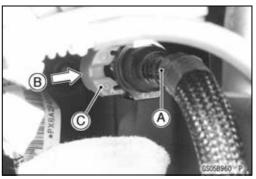
- \star If it comes off, reinstall the hose joint.
- Install the removed parts (see appropriate chapter).
- Start the engine and check the fuel hose for leaks.

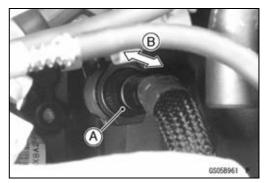
Coolant Change

A WARNING

Coolant can be extremely hot and cause severe burns, is toxic and very slippery. Do not remove the radiator cap or attempt to change the coolant when the engine is hot; allow it cool completely. Immediately wipe any spilled coolant from tires, frame, engine or other painted parts. Do not ingest coolant.







PERIODIC MAINTENANCE 2-51

Maintenance Procedure

Remove:

Right Front Middle Fairing (see Front Middle Fairing Removal in the Frame chapter) Radiator Cap Cover [A] Radiator Cap [B]

ORemove the radiator cap 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.

• Remove:

Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)

Left Rear Middle Fairing (see Rear Middle Fairing Removal in the Frame chapter)

- Place a container under the drain plug [A] at the bottom of the water pump cover.
- Drain the coolant from the radiator and engine by removing the drain plug.
- Remove:

Coolant Reserve Tank Bolts [A]

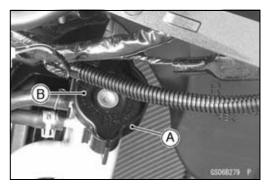
- Coolant Reserve Tank [B]
- Remove the cap [C] and pour the coolant into a container.
- Install the coolant reserve tank.
- Apply a non-permanent locking agent to the threads of the reserve tank bolts and tighten them.

Torque - Coolant Reserve Tank Bolts: 3.9 N·m (0.40 kgf·m, 35 in·lb)

• Tighten the drain plug with the washer.

OReplace the drain plug gasket with a new one.

Torque - Coolant Drain Plug: 12 N·m (1.2 kgf·m, 106 in·lb)







2-52 PERIODIC MAINTENANCE

Maintenance Procedure

• Fill the radiator up to the radiator filler neck [A] with coolant, and install the radiator cap and radiator cap cover.

NOTE

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

• Fill the reserve tank up to the "F" level line with coolant, and install the cap (see Coolant Level Inspection).

NOTICE

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

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

Water and Coolant Mixture Ratio (Recommended)

50%
50%
–35°C (–31°F)
3.4 L (3.6 US qt)

NOTE

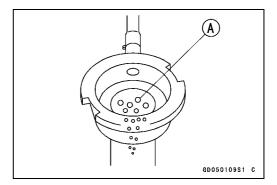
OChoose a suitable mixture ratio by referring to the coolant manufacturer's directions.

- Bleed the air from the cooling system as follows.
- OStart 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.
- OStop the engine and add coolant up to the radiator filler neck.
- Install the radiator cap and radiator cap cover.
- Start the engine, warm it up thoroughly until the radiator fan turns on and then stop the engine.
- Check the coolant level in the reserve tank after the engine cools down.
- ★ If the coolant level is lower than the "L" level line, add coolant to the "F" level line (see Coolant Level Inspection).



Do not add more coolant above the "F" level line.





Radiator (Water) Hose and O-ring Replacement

- Drain the coolant (see Coolant Change).
- Remove:

Lower Fairings (see Lower Fairing Removal in the Frame chapter)

Front Middle Fairings (see Front Middle Fairing Removal in the Frame chapter)

Oil Cooler (see Oil Cooler Removal in the Engine Lubrication System chapter)

Throttle Body Assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter)

Thermostat Housing [A]

Fitting [B]

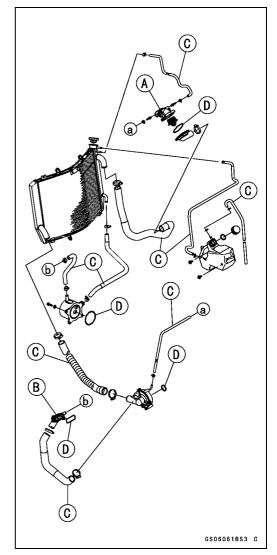
- Hoses [C]
- O-rings [D]
- Replace the O-rings with new ones and apply liquid gasket to them.

Sealant - Liquid Gasket, TB1211F: 92104-0004

• Instal the new hoses and tighten the clamps securely.

Torque - Water Hose Clamp Screws: 3.0 N·m (0.31 kgf·m, 27 in·lb)

- OApply soap and water solution to the inside of the water hoses before installation.
- Install the removed parts (see appropriate chapters).
- Fill the coolant (see Coolant Change).
- Check the cooling system for leaks.

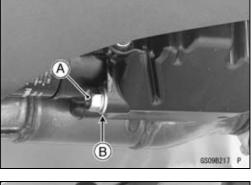


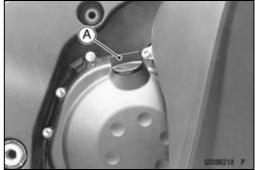


- Situate the motorcycle so that it is vertical after warming up the engine.
- Remove the engine oil drain bolt [A] to drain the oil.
- OThe oil in the oil filter can be drained by removing the filter (see Oil Filter Replacement).
- Replace the drain bolt gasket [B] with a new one.
- Tighten the drain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

Torque - Engine Oil Drain Bolt: 30 N·m (3.1 kgf·m, 22 ft·lb)

• Remove the oil filler plug [A].





2-54 PERIODIC MAINTENANCE

Maintenance Procedure

• Pour in the specified type and amount of oil.

Recommended Engine Oil

Type: API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2

Viscosity: SAE 10W-40 Capacity: 4.0 L (4.2 US qt) (when filter is not removed) 4.4 L (4.7 US qt) (when filter is removed) 4.7 L (5.0 US qt) (when engine is completely dry)

NOTE

ODo not add any chemical additive to the oil. Oils fulfilling the above requirements are fully formulated and provide adequate lubrication for both the engine and the clutch.

OAlthough 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.

- Replace the O-ring of the oil filler plug with a new one.
- Apply engine oil to the new O-ring.
- Install the oil filler plug.

Torque - Oil Filler Plug: Hand-tighten

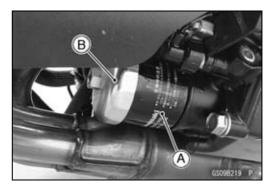
• Check the oil level (see Oil Level Inspection in the Engine Lubrication System chapter).

Oil Filter Replacement

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

Special Tool - Oil Filter Wrench: 57001-1249

SAE 20W-50 SAE 20W-40 SAE 10W-50 SAE 10W-40 SAE 10W-30 40 (°C) 10 20 -10 20 30 50 68 104(°F) 14 32 86 GS09010BS1 C





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

Torque - Oil Filter: 17 N·m (1.7 kgf·m, 13 ft·lb)

NOTE

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

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

 Contract

Brake Hose and Pipe Replacement

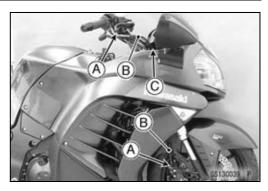
NOTICE

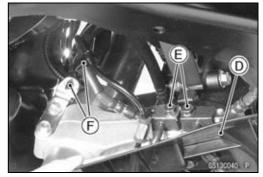
Brake fluid quickly ruins painted plastic surfaces; any spilled fluid should be completely washed away immediately.

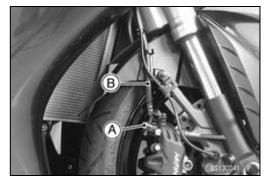
• Remove:

Inner Covers (see Inner Cover Removal in the Frame chapter) Upper Inner Fairing (see Upper Inner Fairing Removal in the Frame chapter) Brake Hose Banjo Bolts [A] Brake Hose [B] Brake Hose Clamp Bolts [C] Steering Stem Cover [D] (see Stem, Stem bearing Removal in the Frame chapter) Brake Hose Joint Bolts [E] Clamps [F]

- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- Immediately wash away any brake fluid that spills.









2-56 PERIODIC MAINTENANCE

Maintenance Procedure

• For ABS equipped models; note the following.

NOTE

OWhen removing the brake pipes and hoses on the hydraulic unit, remove them according to each assembly of the exploded view in the Brakes chapter.

• Remove:

Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)

Battery (see Battery Removal in the Electrical System chapter)

Upper Fairing (see Upper Fairing Removal in the Frame chapter)

Brake Pipe Joint Nuts [A]

Bolts [B]

Bracket [C]

Brake Hoses [D] (see K-ACT ABS Hydraulic Unit Removal in the Brakes chapter)

- There are washers on each side of the brake hose fitting. Replace them with new ones when installing.
- When installing the brake pipes and hoses on the hydraulic unit, refer to the K-ACT ABS Hydraulic Unit Installation in the Brakes chapter.
- Tighten:

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

Brake Pipe Joint Nuts: 18 N·m (1.8 kgf·m, 13 ft·lb)

- When installing the hoses, avoid sharp bending, kinking, flatting or twisting, and route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- Fill the brake line after installing the brake hose (see Brake Fluid Change).

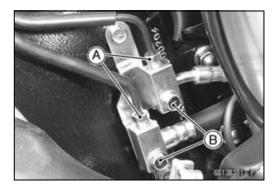
Brake Fluid Change

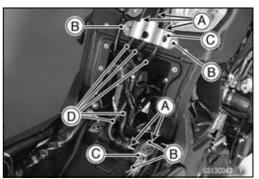
NOTE

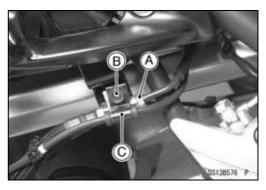
• The procedure to change the front brake fluid is as follows. Changing the rear brake fluid is the same as for the front brake.

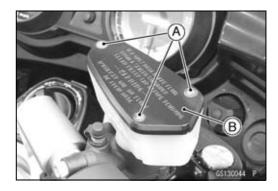
• Level the brake fluid reservoir.

 Remove: Screws [A] Reservoir Cap [B] Diaphragm









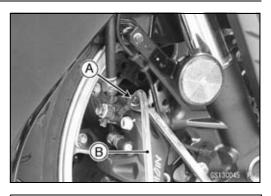
- Remove the rubber cap from the bleed valve [A] on the caliper.
- Attach a clear plastic hose [B] to the bleed valve, and run the other end of the hose into a container.
- Fill the reservoir with fresh specified brake fluid.
- Change the brake fluid.

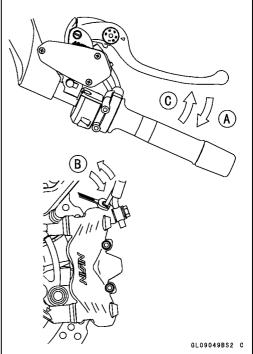
ORepeat this operation until fresh brake fluid comes out from the plastic hose or the color of the fluid changes.

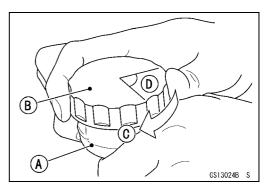
- 1. Pump the brake lever until it becomes hard, and apply the brake and hold it [A].
- 2. Quickly open and close [B] the bleed valve while holding the brake applied.
- 3. Release the brake [C].

NOTE

- The fluid level must be checked often during the 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.
- OFront Brake: Repeat the above steps for the other caliper.
- Remove the clear plastic hose.
- Install the diaphragm and reservoir cap.
- Follow the procedure below to install the rear brake fluid reservoir cap correctly.
- OFirst, tighten the reservoir cap [B] clockwise [C] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body, then tighten the cap an additional 1/6 turn [D] while holding the reservoir body [A].
- Tighten the bleed valve, and install the rubber cap.
 Torque Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)
- After changing the fluid, check the brake for good braking power, no brake drag, and no fluid leakage.
- \star If necessary, bleed the air from the lines.







2-58 PERIODIC MAINTENANCE

Maintenance Procedure

Master Cylinder Rubber Parts Replacement

- Front Master Cylinder Disassembly
- Remove the front master cylinder (see Front Master Cylinder Removal in the Brakes chapter).
- Remove:

Screws [A] Cap [B] Diaphragm Plate [C] Diaphragm [D] Float [E] Screw [F] Bolt [G]

- Pull out the fluid reservoir [H] and O-rings [I].
- Unscrew the locknut [J] and pivot bolt [K], and remove the brake lever.
- Remove the circlip [L].

Special Tool - Inside Circlip Pliers: 57001-143

- Pull out the piston assy [M].
- Replace:

Diaphragm [D] O-ring [I] Circlip [L] Piston Assy [M]

Rear Master Cylinder Disassembly

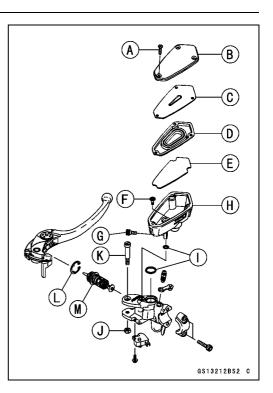
- Remove the rear master cylinder (see Rear Master Cylinder Removal in the Brakes chapter).
- Remove the circlip [A], connector [B] and O-ring [C].
 - Special Tool Inside Circlip Pliers: 57001-143
- Slide the dust cover [D] out of place, and remove the circlip [E].
- Pull out the push rod assy [F].
- Take off the piston assy [G] and return spring [H].

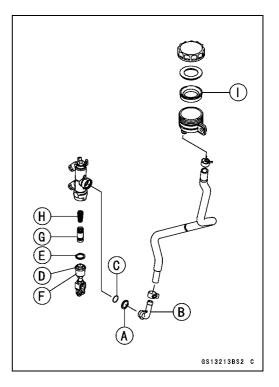
NOTICE

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

Replace:

Circlip [A] O-ring [C] Circlip [E] Push Rod Assy [F] Piston Assy [G] Diaphragm [I]





Master Cylinder Assembly

• Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

NOTICE

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 new parts and to the inner wall of the cylinder.
- Take care not to scratch the piston or the inner wall of the cylinder.
- For the front master cylinder, apply a non-permanent locking agent to the brake reservoir screw and bolt.
- Tighten:

Torque - Brake Reservoir Bolt: 7.8 N⋅m (0.80 kgf⋅m, 69 in⋅lb) Brake Reservoir Screw: 1.3 N⋅m (0.13 kgf⋅m, 12 in⋅lb)

- Apply silicone grease to the contact portion of the push rod and brake lever pivot bolt.
- Tighten:

Torque - Brake Lever Pivot Bolt: 1.0 N·m (0.10 kgf·m, 8.9 in·lb)

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

Caliper Rubber Parts Replacement Front Caliper Disassembly

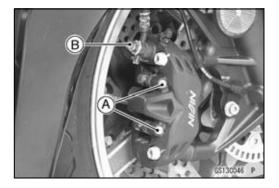
- Loosen the front caliper pad pins [A] and banjo bolt [B] and tighten them loosely.
- Remove:

Front Caliper (see Front Caliper Removal in the Brakes chapter)

Brake Pads (see Front Brake Pad Removal in the brakes chapter)

Front Caliper Assembly Bolts

O-ring



2-60 PERIODIC MAINTENANCE

Maintenance Procedure

- Using compressed air, remove the pistons. One way to remove the pistons is as follows.
- OInstall a rubber gasket [A] and a wooden board [B] more than 10 mm (0.4 in.) 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.
- OLightly apply compressed air [D] to the oil passage until the pistons hit the rubber gasket.
- OFor the hose joint side caliper half, block the hose joint opening during this operation if the caliper half has the opening.

Bolt [E] and Nut Push down [F].

A WARNING

The piston in the brake caliper can crush hands and fingers. Never place your hand or fingers in front of the piston.

OPull 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.

NOTE

- Olf compressed air is not available, do as follows for both calipers coincidentally, with the brake hose connected to the caliper.
- OPrepare a container for brake fluid, and perform the work above it.
- ORemove the pad springs and pads (see Front Brake Pad Removal in the Brakes chapter).
- OPump the brake lever until the pistons come out of the cylinders, and then disassemble the caliper.

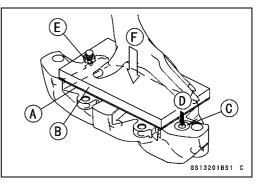
Front Caliper Assembly

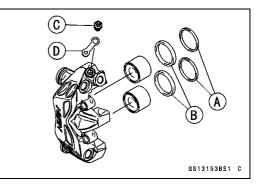
• Clean the caliper parts except for the pads.

NOTICE

For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

Install the bleed valve and rubber cap.
 Torque - Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)





PERIODIC MAINTENANCE 2-61

Maintenance Procedure

- Replace the fluid seals [A] with new ones.
- OApply silicone grease to the fluid seals, and install them into the cylinders by hand.
- Replace the dust seals [B] with new ones if they are damaged.
- OApply silicone grease to the dust seals, and install them into the cylinders by hand.
- Replace the O-ring [A].
- Apply brake fluid to the outside of the pistons, and push them into each cylinder by hand.
- Be sure to install the O-ring.
- Apply a non-permanent locking agent to the threads of the front caliper assembly bolts, and tighten them.

Torque - Front Caliper Assembly Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)

- Install the pads (see Front Brake Pad Installation in the Brakes chapter).
- Wipe up any spilled brake fluid on the caliper with wet cloth.

Rear Caliper Disassembly

- Loosen the rear caliper pad pin [A] and banjo bolt [B], and tighten them loosely.
- Remove:

Rear Caliper [C] (see Rear Caliper Removal in the Brakes chapter)

Brake Pads (see Rear Brake Pad Removal in the Brakes chapter)

Rear Caliper Assembly Bolts

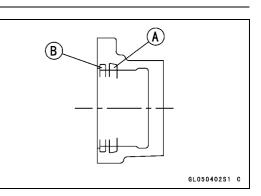
O-ring

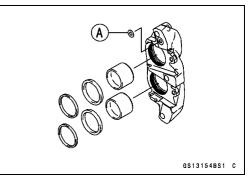
- Remove the left side piston as follows.
- Removal of the left side piston is the same as for the front caliper.

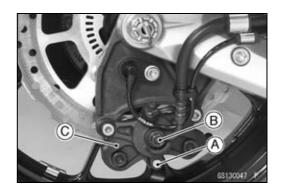
Left Side Caliper [A] Rubber Gasket [B] Wooden Board [C] Bolt [D] and Nut Apply compressed air [E]

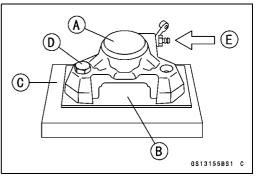
A WARNING

The piston in the brake caliper can crush hands and fingers. Never place your hand or fingers in front of the piston.





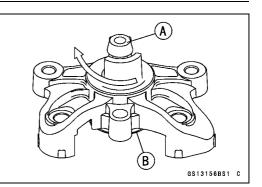




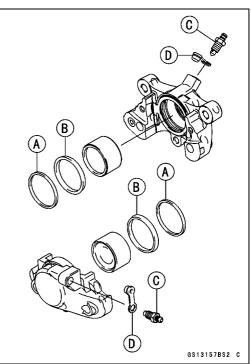
2-62 PERIODIC MAINTENANCE

Maintenance Procedure

- Remove the right side piston as follows.
- Using the rear caliper assembly bolt [A], remove the piston [B] as shown in the figure.



- Remove the dust seals [A] and fluid seals [B].
- Remove the bleed valves [C] and rubber caps [D].



NOTE

- Olf compressed air is not available, do as follows with the brake hose connected to the caliper.
- OPrepare a container for brake fluid, and perform the work above it.
- ORemove the pads and pad spring (see Rear Brake Pad Removal in the Brakes chapter).
- *OPump the brake pedal to remove the caliper piston.*

Rear Caliper Assembly

• Clean the caliper parts except for the pads.

NOTICE

For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

• Install the bleed valves and rubber caps.

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

PERIODIC MAINTENANCE 2-63

Maintenance Procedure

- Apply brake fluid to the cylinder bores.
- Replace the fluid seals [A] with new ones.

OApply silicone grease to the fluid seals, and install them into each cylinder by hand.

• Replace the dust seals [B] with new ones.

OApply brake fluid to the dust seals, and install them into each cylinder by hand.

- Replace the O-ring [A].
- Apply brake fluid to the outside of the pistons, and push them into each cylinder by hand.
- Be sure to install the O-ring.
- Apply a non-permanent locking agent to the threads of the rear caliper assembly bolts, and tighten them.

Torque - Rear Caliper Assembly Bolts: 37 N·m (3.8 kgf·m, 27 ft·lb)

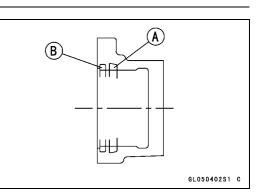
- Install the pads (see Rear Brake Pad Installation in the Brakes chapter).
- Wipe up any spilled brake fluid on the caliper with wet cloth.

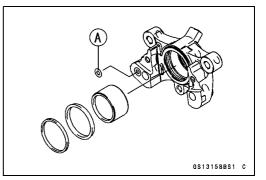
Clutch Hose Replacement

NOTICE

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

• When removing the clutch hose, take care not to spill the clutch fluid on the painted or plastic parts.



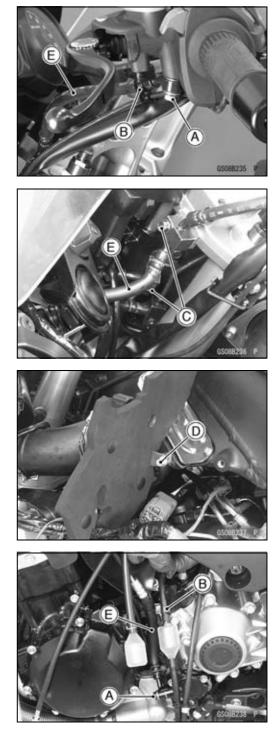


2-64 PERIODIC MAINTENANCE

Maintenance Procedure

• Remove:

Left Subframe (see Left Subframe Removal in the Frame chapter) Banjo Bolts [A] with Washers Clamp [B] Fitting Bolt [C] Bolt [D] Clutch Hose [E]



- Immediately wash away any clutch fluid that spills.
- There are washers on each side of the clutch hose fittings. Replace them with new ones when installing.
- Tighten:

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

- When installing the hoses, avoid sharp bending, kinking, flatting or twisting, and route the hoses according to Cable, Wire, and Hose Routing section in Appendix chapter.
- Fill the clutch line after installing the clutch hose (see Clutch Fluid Change).

Rubber Parts of Clutch Master Cylinder/Slave Cylinder Replacement

Clutch Master Cylinder Cup and Dust Seal Replacement

- Remove the clutch master cylinder (see Clutch Master Cylinder Removal in the Clutch chapter).
- Remove:

Clutch Reservoir Cap Screws [A] Cap [B] Diaphragm Plate [C] Diaphragm [D] Float [E] Clutch Reservoir Screw [F] Clutch Reservoir Bolt [G]

- Pull out the fluid reservoir [H] and O-rings [I].
- Unscrew the locknut [J] and pivot bolt [K], and remove the clutch lever.
- Remove the circlip [L].

Special Tool - Inside Circlip Pliers: 57001-143

- Pull out the piston assy [M].
- Replace:
 - Diaphragm O-rings Circlip Piston Assy
- Before assembly, clean all parts including the master cylinder with clutch fluid or alcohol.

NOTICE

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.
- Apply a non-permanent locking agent to the clutch reservoir screw and bolt.
- Tighten:

Torque - Clutch Reservoir Bolt: 7.9 N⋅m (0.81 kgf⋅m, 70 in⋅lb)

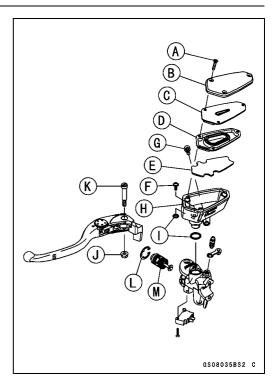
Clutch Reservoir Screw: 1.3 N·m (0.13 kgf·m, 11.5 in·lb)

- Apply silicone grease to the clutch lever pivot bolt.
- Tighten:

Torque - Clutch Lever Pivot Bolt: 1.0 N·m (0.10 kgf·m, 8.9 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 Removal in the Clutch chapter).



2-66 PERIODIC MAINTENANCE

Maintenance Procedure

Clutch Slave Cylinder Piston Seal Replacement

• Remove:

Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)

- Loosen the banjo bolt [A] at the clutch pipe lower end, 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].

NOTICE

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

NOTE

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

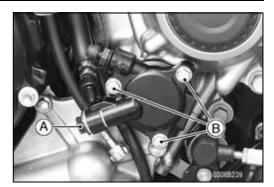
• Remove the spring and piston seal.

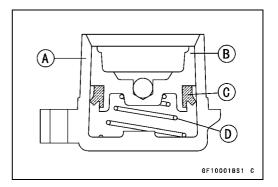
NOTICE

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

- Before assembly, apply a rubber grease to the outside of the piston and the piston seal.
- Install the piston seal as shown in the figure.

Cylinder [A] Piston [B] Piston Seal [C] Spring [D]





Clutch Fluid Change

- Level the clutch fluid reservoir and remove the reservoir cap.
- Remove the left lower fairing (see Lower Fairing Removal in the Frame chapter)
- 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.
- 1. Open [B] the bleed valve, using a wrench.
- 2. Pump the clutch lever and hold [C] it.
- 3. Close [D] the bleed valve.
- 4. Release [E] the clutch lever.
- ORepeat this operation until fresh fluid comes out from the plastic hose or the color of the fluid changes.
- OCheck the fluid level in the reservoir often, replenishing it as necessary.

NOTE

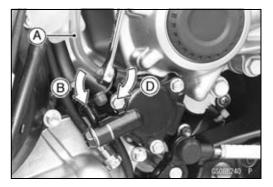
Olf the fluid in the reservoir runs completely out any time during fluid changing, the bleeding operation must be done over again from the beginning since air will have entered the line.

🛦 WARNING

Mixing brands and types of hydraulic fluid lowers the fluid's boiling point, cause rubber part to deteriorate and can reduce the hydraulic clutch system's effectiveness and cause an accident resulting in injury or death. Do not mix two brands of brake fluid. Change the fluid in the hydraulic clutch system completely if the fluid must be refilled but the type and brand of the hydraulic fluid that is already in the reservoir are unidentified.

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

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





2-68 PERIODIC MAINTENANCE

Maintenance Procedure

Spark Plug Replacement

• Remove:

Stick Coils (see Stick Coil Removal in the Electrical System chapter)

• Remove the spark plug using the 16 mm (0.63 in.) plug wrench [A].

Owner's Tool - Spark Plug Wrench: 92110-1132

• Replace the spark plug with a new one.

Standard Spark Plug Type: NGK CR9EIA-9

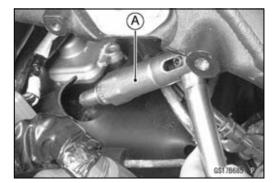
- Insert new spark plug in the plug hole, and finger-tighten it first.
- Using the plug wrench [A] vertically, tighten the plug.

NOTICE

The insulator of the spark plug may break if when the wrench is inclined during tightening.

Torque - Spark Plugs: 13 N·m (1.3 kgf·m, 115 in·lb)

- Install the stick coils securely.
- OBe sure the stick coils are installed by pulling up [A] it lightly.







Final Gear Case Oil Change

- Warm up the oil by running the motorcycle so that the oil will pick up any sediment and drain easily. Stop the motorcycle and turn the key knob to OFF.
- Place an oil pan beneath the final gear case, and remove the filler plug [A] and drain bolt [B].

Special Tool - Driver-Filler Cap: 57001-1454

WARNING

Oil on tires can cause loss of traction and an accident resulting in serious injury or death. When draining or filling the final gear case, do not spill oil the tire or rim. Clean any oil that may spill with a high-flash point solvent.

• After the oil has completely drained out, install the drain bolt with a new gasket.

Torque - Final Gear Case Oil Drain Bolt: 8.8 N·m (0.90 kgf·m, 78 in·lb)

• Fill the final gear case with the specified oil and quantity. ODo not rotate the rear wheel during the oil filling.

OThe oil level [A] should come to the top of the filler opening.

Final Gear Case Oil:

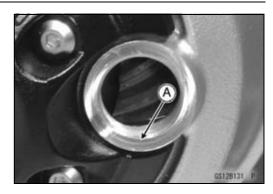
Amount:about 160 mL (5.41 US oz)Grade:API GL-5 hypoid gear oilViscosity:When above 5°C (41°F) SAE 90When below 5°C (41°F) SAE 80

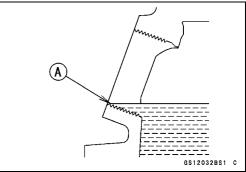
NOTE

OThe term "GL-5" indicates a quality and additive rating. A "GL-6" rated hypoid gear oil can also be used.

- Be sure the O-ring is in place, and install the filler plug.
- Tighten:

Torque - Filler Plug: 2.0 N·m (0.20 kgf·m, 18 in·lb)





3

Fuel System (DFI)

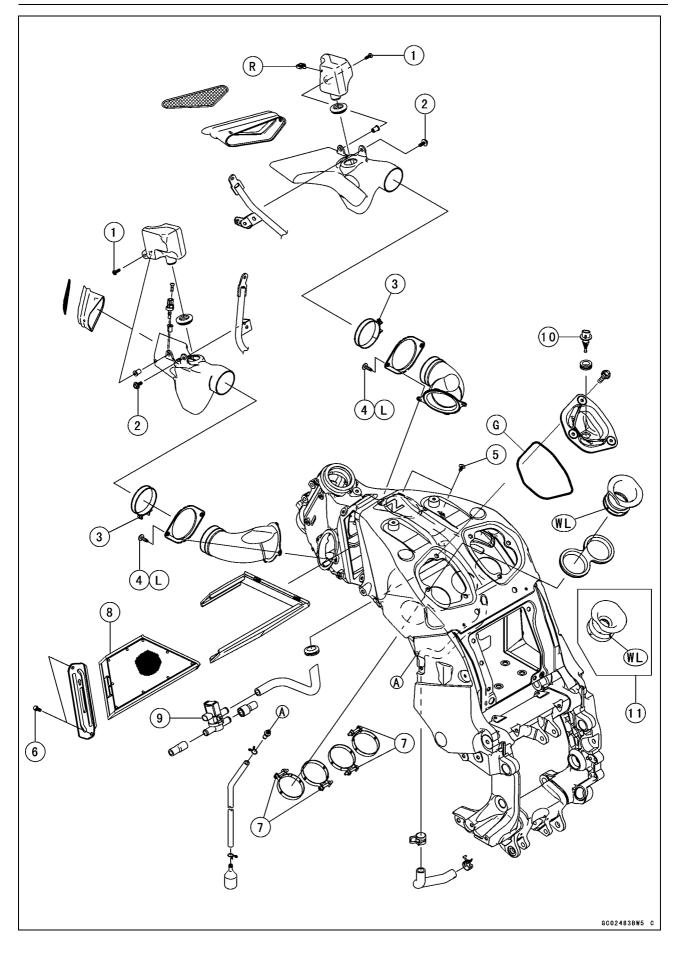
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3-2 FUEL SYSTEM (DFI)

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N∙m	kgf∙m	ft∙lb	Remarks
1	Resonator Mounting Bolts	3.9	0.40	35 in·lb	
2	Front Air Inlet Duct Mounting Bolts	3.9	0.40	35 in·lb	
3	Air Inlet Duct Clamp Bolts	2.9	0.30	26 in·lb	
4	Rear Air Inlet Duct Mounting Bolts	9.8	1.0	87 in·lb	L
5	Air Cleaner Element Holder Screws	6.9	0.70	61 in·lb	
6	Air Cleaner Element Cover Bolts	9.8	1.0	87 in·lb	
7	Duct Clamp Bolts	2.0	0.20	18 in·lb	

8. Air Cleaner Element

9. Air Switching Valve

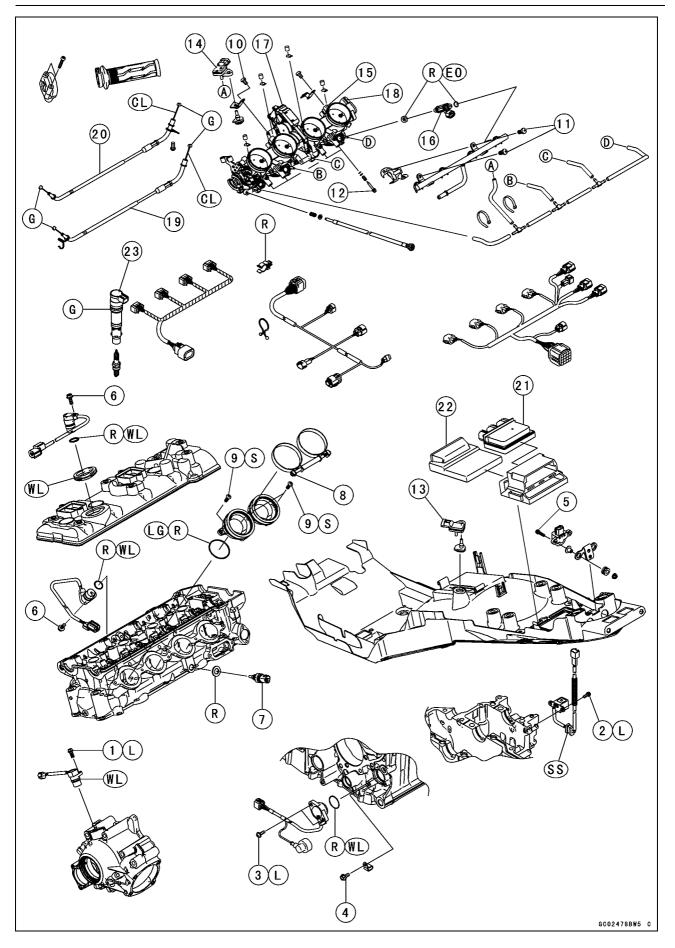
10. Air Inlet Temperature Sensor 11. WVTA (78.2 H) Model

G: Apply grease.

L: Apply a non-permanent locking agent. WL: Apply a soap and water solution or rubber lubricant.

3-4 FUEL SYSTEM (DFI)

Exploded View



Exploded View

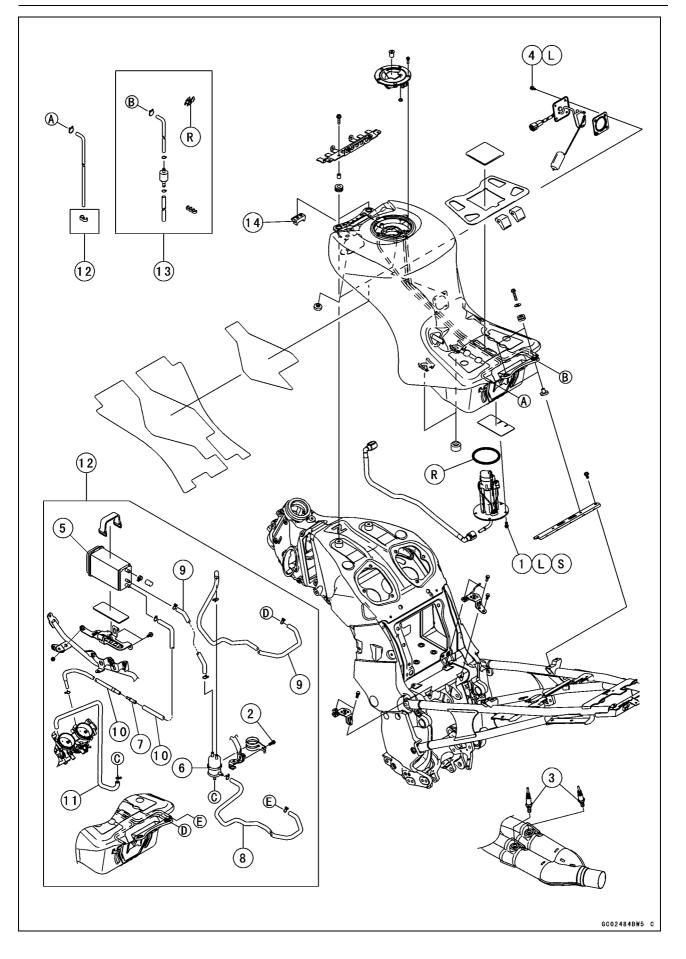
Na	Fastener	Torque			Demode
No.		N∙m	kgf∙m	ft·lb	Remarks
1	Speed Sensor Bolt	9.8	1.0	87 in·lb	L
2	Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	L
3	Gear Position Switch Screws	2.9	0.30	26 in·lb	L
4	Gear Position Switch Lead Clamp Bolt	9.8	1.0	87 in·lb	
5	Vehicle-down Sensor Bolts	5.9	0.60	52 in·lb	
6	Camshaft Position Sensor Bolts	9.8	1.0	87 in·lb	
7	Water Temperature Sensor	30	3.1	22	
8	Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
9	Throttle Body Assy Holder Bolts	9.8	1.0	87 in·lb	S
10	Inlet Air Pressure Sensor Bracket Screws	3.5	0.36	31 in·lb	
11	Delivery Pipe Mounting Screws	5.0	0.51	44 in·lb	
12	Bypass Screws	0.2	0.02	1.8 in·lb	

13. Atmospheric Pressure Sensor

- 14. Inlet Air Pressure Sensor
- 15. Main Throttle Sensor
- 16. Fuel Injectors
- 17. Subthrottle Valve Actuator
- 18. Subthrottle Sensor
- 19. Throttle Cable (Accelerator)
- 20. Throttle Cable (Decelerator)
- 21. Relay Box
- 22. ECU
- 23. Stick Coils
- CL: Apply cable lubricant.
- EO: Apply engine oil.
- G: Apply grease.
- L: Apply a non-permanent locking agent.
- LG: Apply liquid gasket.
- R: Replacement Parts
- S: Follow the specified tightening sequence.
- SS: Apply silicone sealant.
- WL: Apply soap and water solution or rubber lubricant.

3-6 FUEL SYSTEM (DFI)

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
NO.	Fasteller	N∙m	kgf∙m	ft·lb	Rellidiks
1	Fuel Pump Bolts	9.8	1.0	87 in·lb	L, S
2	Separator Bracket Bolt	9.8	1.0	87 in·lb	
3	Oxygen Sensors (Equipped Models)	25	2.5	18	
4	Fuel Level Sensor Bolts	6.9	0.70	61 in·lb	L

5. Canister

6. Separator

7. Fitting

8. Red Hose

9. Blue Hose

10. Green Hose

11. White Hose

12. CAL and SEA Models

13. Other than CAL and SEA Models

14. K-ACT ABS Equipped Models

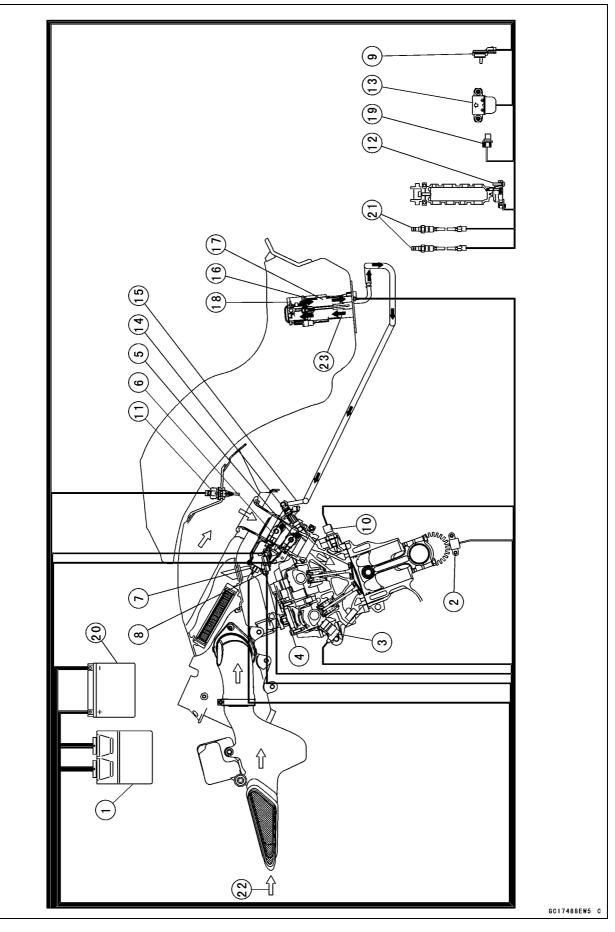
L: Apply a non-permanent locking agent.

R: Replacement Parts

S: Follow the specified tightening sequence.

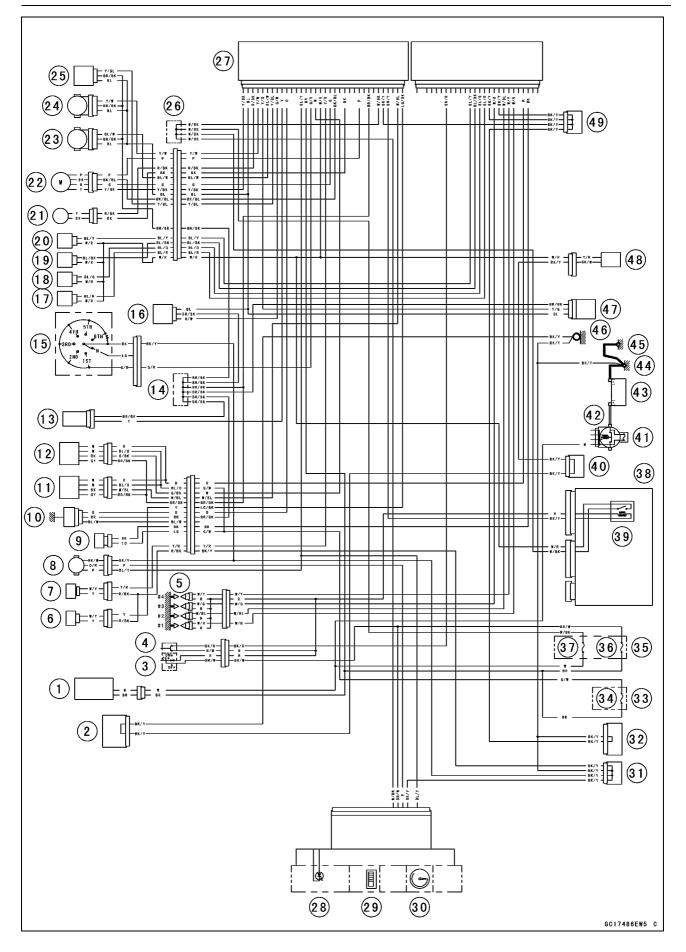
3-8 FUEL SYSTEM (DFI)

DFI System



- 1. ECU
- 2. Crankshaft Sensor
- 3. Exhaust Camshaft Position Sensor
- 4. Inlet Camshaft Position Sensor
- 5. Main Throttle Sensor
- 6. Subthrottle Sensor
- 7. Subthrottle Valve Actuator
- 8. Inlet Air Pressure Sensor
- 9. Atmospheric Pressure Sensor
- 10. Water Temperature Sensor
- 11. Inlet Air Temperature Sensor
- 12. Gear Position Switch
- 13. Vehicle-down Sensor
- 14. Fuel Injectors
- 15. Delivery Pipe
- 16. Pressure Regulator
- 17. Fuel Pump
- 18. Fuel Filter
- 19. Speed Sensor
- 20. Battery 12 V 14 Ah
- 21. Oxygen Sensors (Equipped Models)
- 22. Air Flow
- 23. Fuel Flow

3-10 FUEL SYSTEM (DFI)



DFI System

Part Name

- 1. Steering Lock Unit
- 2. Joint Connector 1
- 3. Engine Stop Switch
- 4. Starter Button
- 5. Stick Coil #1, #2, #3, #4
- 6. Inlet Camshaft Position Sensor
- 7. Exhaust Camshaft Position Sensor
- 8. Speed Sensor
- 9. Oil Control Solenoid Valve
- 10. Water Temperature Sensor
- 11. Oxygen Sensor #1 (Equipped Models)
- 12. Oxygen Sensor #2 (Equipped Models)
- 13. Inlet Air Temperature Sensor
- 14. Water-proof Joint 2
- 15. Gear Position Switch
- 16. Atmospheric Pressure Sensor
- 17. Fuel Injector #1
- 18. Fuel Injector #2
- 19. Fuel Injector #3
- 20. Fuel Injector #4
- 21. Crankshaft Sensor
- 22. Subthrottle Valve Actuator
- 23. Subthrottle Sensor
- 24. Main Throttle Sensor
- 25. Inlet Air Pressure Sensor
- 26. Water-proof Joint 1
- 27. ECU
- 28. Warning Indicator Light (LED)
- 29. Water Temperature Gauge
- 30. Speedometer
- 31. Joint Connector 8
- 32. Joint Connector 9
- 33. Fuse Box 3
- 34. Oil Control Solenoid Valve Fuse 15 A
- 35. Fuse Box 2
- 36. Ignition Fuse 15 A (ZG1400C Model), 10 A (ZG1400D Model)
- 37. ECU Fuse 15 A
- 38. Relay Box
- 39. Fuel Pump Relay
- 40. Joint Connector 2
- 41. Main Fuse 30 A
- 42. Starter Relay
- 43. Battery 12 V 14 Ah
- 44. Frame Ground
- 45. Engine Ground
- 46. Frame Ground
- 47. Vehicle-down Sensor
- 48. Fuel Pump
- 49. Joint Connector 3

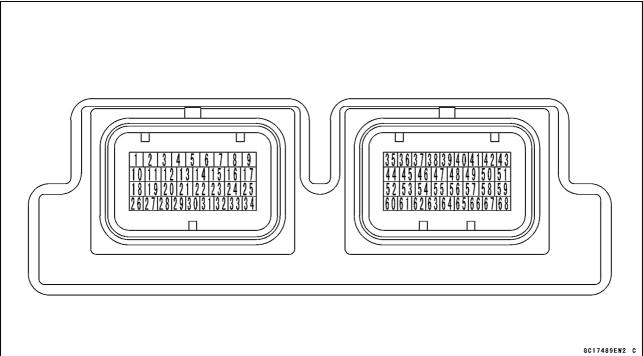
OColor Codes:

- BK: Black BL: Blue BR: Brown CH: Chocolate
- DG: Dark Green G: Green GY: Gray LB: Light Blue
- LG: Light Green O: Orange P: Pink PU: Purple
- R: Red V: Violet W: White Y: Yellow

3-12 FUEL SYSTEM (DFI)

DFI System

Terminal Numbers of ECU Connectors



Terminal Names

- 1. Stick Coil #3: W/G
- 2. Stick Coil #4: W/Y
- 3. Fuel Injector #3: BL/BK
- 4. Electric Windshield Relay (Up): BR/W
- 5. Electric Windshield Relay (Down): BK/O
- 6. Air Switching Valve: R/BL
- 7. Oil Control Solenoid Valve: BK
- 8. Unused
- 9. Unused
- 10. Fuel Injector #1: BL/R
- 11. Unused
- 12. Unused
- 13. Unused
- 14. Unused
- 15. Unused
- 16. Unused
- 17. Unused
- 18. Fuel Injector #2: BL/G
- 19. Electric Windshield Switch (Up): O/G
- 20. Electric Windshield Switch (Down): R/BL
- 21. Engine Ground: BK/Y
- 22. Engine Ground: BK/Y
- 23. Ground (K-ACT ABS Equipped Models): BK/BL
- 24. Ground: BK/G
- 25. Sidestand Switch: G/BK
- 26. Stick Coil #1: W/R
- 27. Stick Coil #2: W/BL
- 28. Fuel Injector #4: BL/Y
- 29. Oxygen Sensor Heater #1 and #2 (Equipped Models): R
- 30. Storage Case Solenoid: G/Y
- 31. Grip Warmer Relay: GY
- 32. Unused
- 33. Starter Lockout Switch: R/G
- 34. Starter Button: BK/R

- 35. Power Supply to ECU (from Steering Lock Unit): BR
- 36. Unused
- 37. Oxygen Sensor #1 (Equipped Models): W/BL
- 38. Inlet Air Pressure Sensor: Y/BL
- 39. Inlet Air Temperature Sensor: Y
- 40. Power Supply to Sensors: BL
- 41. External Communication Line (*KDS): BL/O
- 42. Subthrottle Valve Actuator: G
- 43. Subthrottle Valve Actuator: Y/BK
- 44. Power Supply to ECU (from Battery): W/BK
- 45. Battery Monitor Voltage Line: W/R
- 46. Oxygen Sensor #2 (Equipped Models): W
- 47. Atmospheric Pressure Sensor: G/W
- 48. Water Temperature Sensor: O
- 49. Gear Position Switch: G/R
- 50. Subthrottle Valve Actuator: BK/BL
- 51. Subthrottle Valve Actuator: P
- 52. Ground for Control System: BK/Y
- 53. Fuel Pump Relay: BR/Y
- 54. Main Throttle Sensor: Y/W
- 55. Rear Wheel Rotation Sensor Signal (K-ACT ABS Equipped Models): LG/R
- 56. Crankshaft Sensor (+): R/BK
- 57. Exhaust Camshaft Position Sensor: Y/R
- 58. Front Wheel Rotation Sensor Signal (K-ACT ABS Equipped Models): R/W
- 59. CAN Communication Line (Low): LB
- 60. Ground for Sensors: BR/BK
- 61. Unused
- 62. Radiator Fan Relay: P/BL
- 63. Subthrottle Sensor: BL/W
- 64. Vehicle-down Sensor: Y/G
- 65. Inlet Camshaft Position Sensor: LG/BK
- 66. Crankshaft Sensor (+): BK
- 67. Speed Sensor: BL/Y
- 68. CAN Communication Line (High): GY/BL
 - *: KDS (Kawasaki Diagnostic System)

3-14 FUEL SYSTEM (DFI)

DFI Parts Location

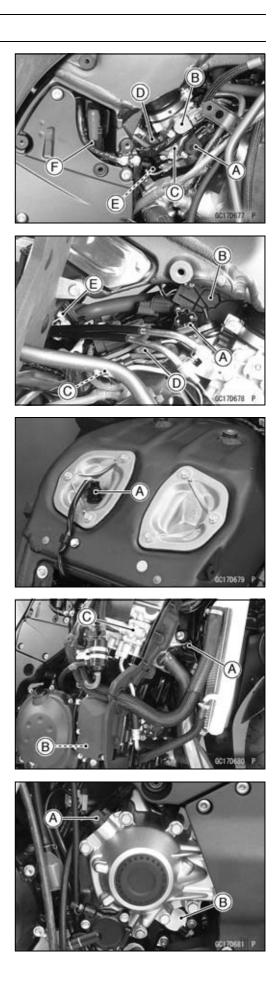
Main Throttle Sensor [A] Subthrottle Sensor [B] Throttle Body Assy [C] Fuel Injectors #1, #2, #3, #4 [D] Water Temperature Sensor [E] Battery 12 V 14 Ah [F]

Inlet Air Pressure Sensor [A] Subthrottle Valve Actuator [B] Stick Coils #1, #2, #3, #4 [C] Inlet Camshaft Position Sensor [D] Air Switching Valve [E]

Inlet Air Temperature Sensor [A]

Exhaust Camshaft Position Sensor [A] Crankshaft Sensor [B] Oil Control Solenoid Valve [C]

Speed Sensor [A] Gear Position Switch [B]



FUEL SYSTEM (DFI) 3-15

DFI Parts Location

Key Knob [A] Steering Lock Unit [B] Warning Indicator Light (LED) [C]

KIPASS ECU [A] Atmospheric Pressure Sensor [B]

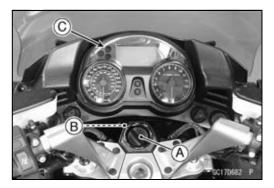
Fuse Box 3 (KIPASS Signal Relay Fuse 10 A, KIPASS ECU Fuse 10A, *Oil Control Solenoid Valve Fuse 15 A) [C]

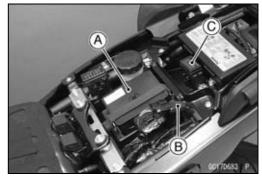
*: For the models equipped with oxygen sensor, this fuse is also used as a oxygen sensor heater fuse.

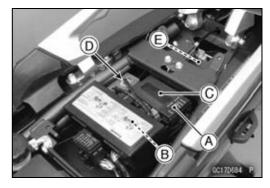
Fuse Box 2 (Ignition Fuse 15 A ZG1400C Model, 10 A ZG1400D Model, ECU Fuse 15A) [A] ECU [B] Relay Box [C] (Fuel Pump Relay, Radiator Fan Relay) Kawasaki Diagnostic System Connector [D] Vehicle-down Sensor [E]

Fuel Pump [A]

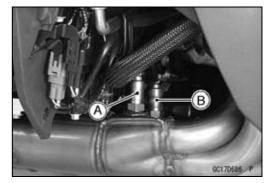
Oxygen Sensor #1 [A] (Equipped Models) Oxygen Sensor #2 [B] (Equipped Models)











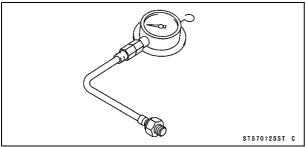
3-16 FUEL SYSTEM (DFI)

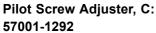
Specifications

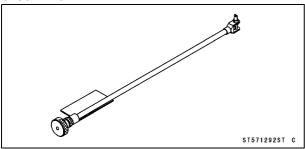
Item	Standard
Digital Fuel Injection System	
Idle Speed	1 100 ±50 r/min (rpm)
Throttle Body Assy:	
Throttle Valve	Dual throttle valve
Bore	ϕ 40 mm (1.57 in.)
Throttle Body Vacuum	34.7 ±1.33 kPa (260 ±10 mmHg)
Bypass Screws (Turn Out)	
ECU:	
Make	MITSUBISHI ELECTRIC
Туре	Digital memory type, with built in IC igniter, sealed with resin
Fuel Pressure (High Pressure Line)	294 kPa (3.0 kgf/cm², 43 psi) with engine idling
Fuel Pump:	
Туре	Wesco pump
Discharge	67 mL (2.3 US oz.) or more for 3 seconds
Fuel Injectors:	
Туре	INP-287
Nozzle Type	Fine atomizing type with 12 holes
Resistance	About 11.7 ~ 12.3 Ω at 20°C (68°F)
CAN Communication Line:	
Resistance	123 ~ 125 Ω at ECU Connector
	114 ~ 126 Ω at KIPASS ECU Connector
Throttle Grip and Cables	
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)
Air Cleaner	
Element	Viscous paper element

Special Tools and Sealant

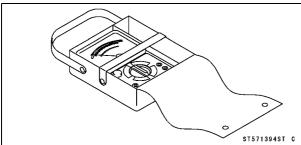
Oil Pressure Gauge, 5 kgf/cm²: 57001-125



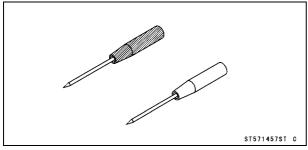




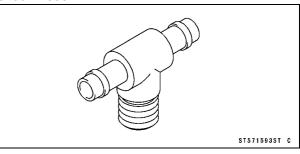
Hand Tester: 57001-1394



Needle Adapter Set: 57001-1457

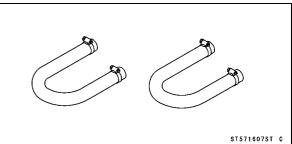


Fuel Pressure Gauge Adapter: 57001-1593

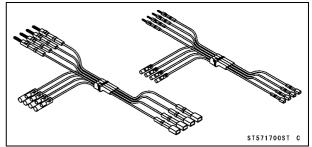


Fuel Hose:

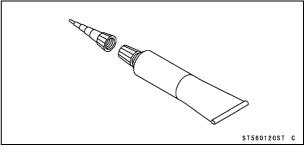
57001-1607



Measuring Adapter: 57001-1700



Liquid Gasket, TB1211: 56019-120



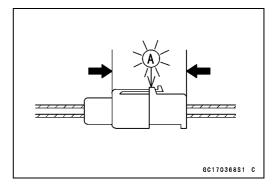
3-18 FUEL SYSTEM (DFI)

DFI Servicing Precautions

DFI Servicing Precautions

There are a number of important precautions that should be followed servicing the DFI system.

- OThis DFI system is designed to be used with a 12 V sealed battery as its power source. Do not use any other battery except for a 12 V sealed battery as a power source.
- ODo not reverse the battery cable connections. This will damage the ECU.
- OTo prevent damage to the DFI parts, do not disconnect the battery cables or any other electrical connections when the ignition switch is on or while the engine is running.
- Take care not to short the leads that are directly connected to the battery positive (+) terminal to the chassis ground.
- OWhen charging, remove the battery from the motorcycle. This is to prevent ECU damage by excessive voltage.
- OWhenever the DFI electrical connections are to be disconnected, first turn off the ignition switch, and disconnect the battery (–) terminal. Do not pull the lead, only the connector. Conversely, make sure that all the DFI electrical connections are firmly reconnected before starting the engine.
- OConnect these connectors until they click [A].

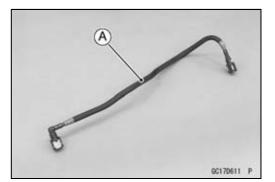


- ODo not push and turn the key knob to ON while any of the DFI electrical connectors are disconnected. The ECU memorizes service codes.
- ODo not spray water on the electrical parts, DFI parts, connectors, leads and wiring.
- Olf a transceiver is installed on the motorcycle, make sure that the operation of the DFI system is not influenced by electric wave radiated from the antenna. Check operation of the system with the engine at idle. Locate the antenna as far as possible away from the ECU.
- OWhen any fuel hose is disconnected, do not turn on the ignition switch. Otherwise, the fuel pump will operate and fuel will spout from the fuel hose.
- ODo not operate the fuel pump if the pump is completely dry. This is to prevent pump seizure.
- OBefore removing the fuel system parts, blow the outer surfaces of these parts clean with compressed air.
- OWhen any fuel hose is disconnected, fuel may spout out by residual pressure in the fuel line. Cover the hose joint with a piece of clean cloth to prevent fuel spillage.
- OWhen installing the fuel hoses, avoid sharp bending, kinking, flattening or twisting, and route the fuel hoses with a minimum of bending so that the fuel flow will not be obstructed.
- ORun the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- OTo prevent corrosion and deposits in the fuel system, do not add to fuel any fuel antifreeze chemicals.

DFI Servicing Precautions

- Olf the motorcycle is not properly handled, the high pressure inside the fuel line can cause fuel to leak or the hose to burst. Check the fuel hose [A] (see Fuel Hose Inspection (fuel leak, damage, installation condition in the Periodic Maintenance chapter).
- ★Replace the fuel hose if any fraying, cracks or bulges are noticed.
- ○To maintain the correct fuel/air mixture (F/A), there must be no inlet air leaks in the DFI system. Be sure to install the oil filler cap [A] after filling the engine oil.

Torque - Oil Filler Cap: Hand-tighten





OConnect the KDS (Kawasaki Diagnostic System) connector cover to the original position when the cover is disconnected.

KDS Connector Color (Main Harness Side): White K-ACT ABS Kawasaki Diagnostic System Connector Color (Main Harness Side): Black (Equipped Models)

NOTE

OConnect the KDS connector cover to the white connector surely because one of the covers has a lead.

NOTICE

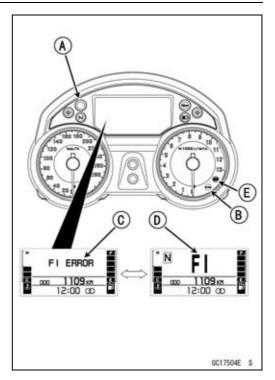
When the KDS connector cover with a lead is connected to the K-ACT ABS Kawasaki Diagnostic System connector by mistake, the fuse of the K-ACT ABS blows and its function will not work.

3-20 FUEL SYSTEM (DFI)

Troubleshooting the DFI System

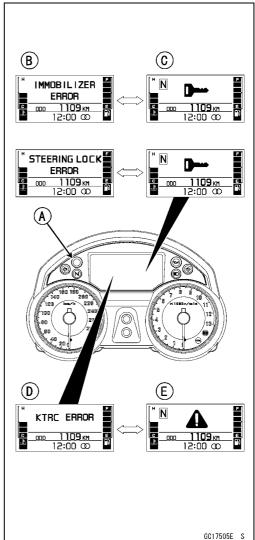
Outline

When a problem occurs with DFI system, the warning indicator (LED) [A] goes on and FI warning message [B] and FI warning symbol [C] are displayed alternately on the LCD (Liquid Crystal Display) to alert the rider.



This model equipped with KIPASS system, the warning indicator light [A] goes on and KIPASS warning message [B] and KIPASS warning symbol [C] are alternately displayed on the LCD, when a problem occurs in the system.

For models equipped with KTRC system (K-ACT ABS Equipped Models), the warning indicator light (LED) goes on and KTRC warning message [D] and warning symbol [E] are alternately displayed on the LCD, when a problem occurs in the system.



Troubleshooting the DFI System

With the engine stopped and turned in the self-diagnosis mode, the service code (error code) [A] is displayed on the LCD by the number of two digits (see Self-diagnosis Procedures in the Self-Diagnosis System chapter).

If the problem is with the following parts, the ECU can not recognize these problem. Therefore, the warning indicator light (LED) does not go on, and warning message, warning symbol and service code are not displayed.

LCD for Meter Unit

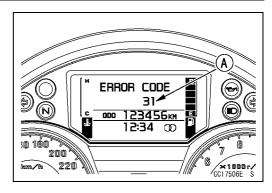
- Fuel Pump
- **Fuel Injectors**

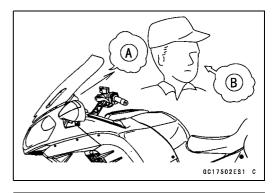
Stick Coil Secondary Wiring and Ground Wiring ECU Power Source Wiring and Ground Wiring

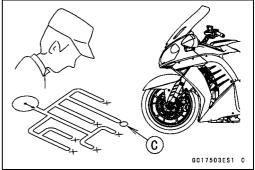
When the service code [A] is displayed, for first ask the rider about the conditions [B] of trouble, and then start to determine the cause [C] of problem.

As a pre-diagnosis inspection, check the ECU for ground and power supply, the fuel line for no fuel leaks, and for correct pressure. The pre-diagnosis items are not indicated by the warning indicator light (LED), warning message and warning symbol.

Don't rely solely on the DFI self-diagnosis function, use common sense.







Even when the DFI system is operating normally, the warning indicator light (LED) goes on and warning message and warning symbol may be displayed under strong electrical interference. Additional measures are not required. Turn the key knob to OFF to stop the indicator light, message and symbol.

If the warning indicator light (LED) of the motorcycle brought in for repair still goes on, check the service code.

When the repair has been done, the warning indicator light (LED) goes off and warning message and warning symbol are not displayed on the LCD. But the service codes stored in memory of the ECU are not erased to preserve the problem history. The problem history can be referred using the KDS (Kawasaki Diagnostic System) when solving unstable problems.

3-22 FUEL SYSTEM (DFI)

Troubleshooting the DFI System

When the motorcycle is down, the vehicle-down sensor operates and the ECU shuts off the fuel pump relay, fuel injectors and ignition system. The key knob is left ON. If the starter button is pushed, the electric starter turns but the engine does not start. When the starter button is pushed, the warning indicator light (LED) blinks, but the service code is not displayed. To start the engine again, raise the motorcycle, turn the key knob to OFF, and then push and turn the key knob to ON.

Much of the DFI system troubleshooting work consists of confirming continuity of the wiring. The DFI parts are assembled and adjusted with precision, and it is impossible to disassemble or repair them.

- When checking the DFI parts, use a digital meter which can be read two decimal place voltage or resistance.
- OThe DFI part connectors [A] have seals [B], including the ECU. When measuring the input or output voltage with the connector joined, use the needle adapter set [C]. Insert the needle adapter inside the seal until the needle adapter reaches the terminal.

Special Tool - Needle Adapter Set: 57001-1457

NOTICE

Insert the needle adapter straight along the terminal in the connector to prevent short-circuit between terminals.

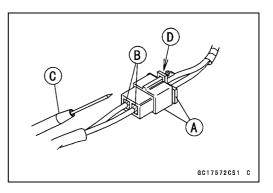
- Make sure that measuring points are correct in the connector, noting the position of the lock [D] and the lead color before measurement. Do not reverse connections of a digital meter.
- Be careful not to short-circuit the leads of the DFI or electrical system parts by contact between adapters.
- Push and turn the key knob to ON and measure the voltage with the connector joined.

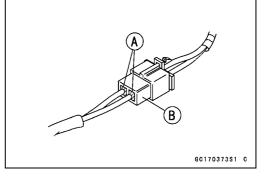
NOTICE

Incorrect, reverse connection or short circuit by needle adapters could damage the DFI or electrical system parts.

OAfter measurement, remove the needle adapters and apply liquid gasket to the seals [A] of the connector [B] for waterproofing.

Sealant - Liquid Gasket, TB1211: 56019-120





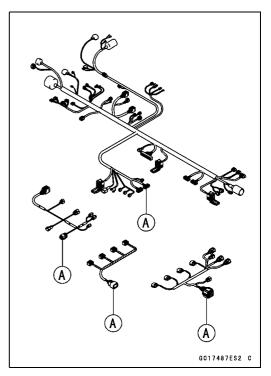
Troubleshooting the DFI System

- Always check battery condition before replacing the DFI parts. A fully charged battery is a must for conducting accurate tests of the DFI system.
- Trouble may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the problem. If the problem was caused by some other item or items, they too must be repaired or replaced, or the new replacement part will soon fail again.
- Measure coil winding resistance when the DFI part is cold (at room temperature).
- Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, short, etc. Deteriorated leads and bad connections can cause reappearance of problems and unstable operation of the DFI system.
- \star If any wiring is deteriorated, replace the 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. Connect the connectors securely.
- Check the wiring for continuity.
- OUse the wiring diagram to find the ends of the lead which is suspected of being a problem.
- OConnect the hand tester between the ends of the leads.

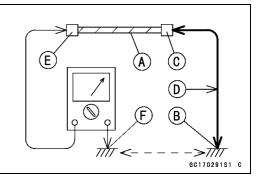
Special Tool - Hand Tester: 57001-1394

 \bigcirc Set the tester to the × 1 Ω range, and read the tester.

★ If the tester does not read 0 Ω , the lead is defective. Replace the lead or the main harness or the subharness.



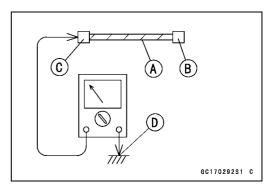
Olf both ends of a harness [A] are far apart, ground [B] the one end [C], using a jumper lead [D] and check the continuity between the end [E] and the ground [F]. This enables to check a long harness for continuity. If the harness is open, repair or replace the harness.



3-24 FUEL SYSTEM (DFI)

Troubleshooting the DFI System

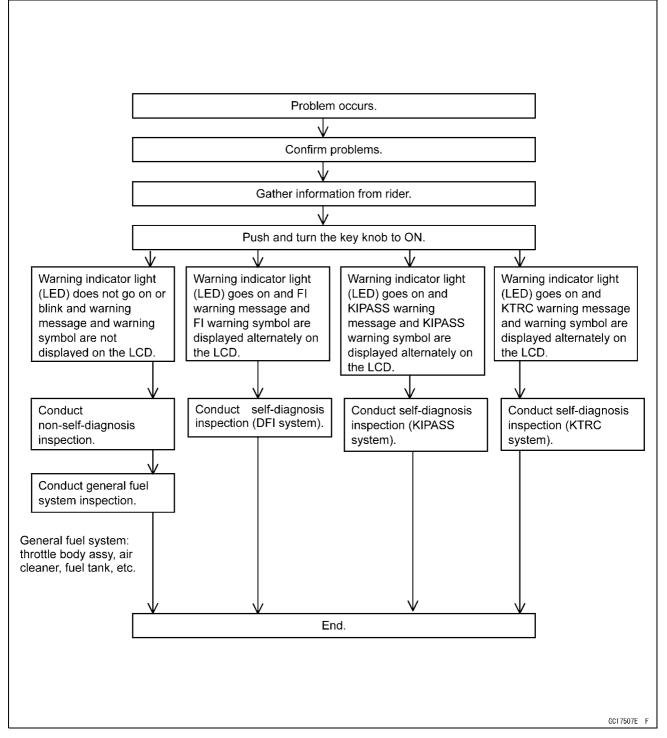
OWhen checking a harness [A] for short circuit, open one end [B] and check the continuity between the other end [C] and ground [D]. If there is continuity, the harness has a short circuit to ground, and it must be repaired or replaced.



- Narrow down suspicious locations by repeating the continuity tests from the ECU connectors.
- ★ If no abnormality is found in the wiring or connectors, the DFI parts are the next likely suspects. Check the part, starting with input and output voltages. However, there is no way to check the ECU itself.
- ★ If an abnormality is found, replace the affected DFI part.
- ★If no abnormality is found in the wiring, connectors, and DFI parts, replace the ECU.

Troubleshooting the DFI System

DFI Diagnosis Flow Chart



Inquiries to Rider

OEach rider reacts to problems in different ways, so it is important to confirm what kind of symptoms the rider has encountered.

OTry to find out exactly what problem occurred under exactly what conditions by asking the rider; knowing this information may help you reproduce the problem.

OThe diagnosis sheet will help prevent you from overlooking any areas, and will help you decide if it is a DFI system problem, or a general engine problem.

3-26 FUEL SYSTEM (DFI)

Troubleshooting the DFI System

Sample Dia	gnosis S	Sheet		
Rider name:				
Model: Engine No.: Frame No.:		Frame No.:		
Date problem	occurred	:		Mileage:
		Environment when prob	lem oco	curred.
Weather	□ fine, □	l cloudy, □ rain, □ snow, □ alw	/ays, □	other:
Temperature	□ hot, □	warm, \Box cold, \Box very cold, \Box	always,	□ other:
Problem frequency	🗆 chroni	c, □ often, □ once		
Road	□ street,	\Box highway, \Box mountain road (🗆 uphill	, \Box downhill), \Box bumpy, \Box pebble
Altitude	🗆 norma	l, 🗆 high (about 1000 m or mo	re)	
		lotorcycle conditions when	probler	n occurred.
Warning Goes on about 3 seconds after from key knob ON, and FI warn indicator light FI warning symbol are displayed alternately on the LCD (DFI s			. . .	
(LED)	□ Goes on about 3 seconds after from key knob ON, and KTRC warning message and warning symbol are displayed alternately on the LCD (KTRC system problem).			
	Goes on about 3 seconds after from key knob ON, and KIPASS warning message and KIPASS warning symbol are displayed alternately on the LCD (KIPASS system problem).			
	□ Does not go on about 3 seconds after key knob ON.			
Starting	□ starter motor not rotating.			
difficulty	□ starter motor rotating but engine doesn't turn over.			
	□ starter motor and engine don't turn over.			
	\Box no fuel flow (\Box no fuel in tank, \Box no fuel pump sound).			
	□ no spark.			
	□ other:			
Engine stalls	□ right after starting.			
	□ when opening throttle grip.			
	□ when	closing throttle grip.		
		moving off.		
	□ when :	stopping the motorcycle.		
	□ when	cruising.		
	\Box other:			

Troubleshooting the DFI System

\Box very low idle speed, \Box very high idle speed, \Box rough idle speed.
□ battery voltage is low (charge the battery).
□ spark plug loose (tighten it).
□ spark plug dirty, broken, or gap maladjusted (remedy it).
□ backfiring.
□ afterfiring.
□ hesitation when acceleration.
engine oil viscosity too high.
□ brake dragging.
□ engine overheating.
□ clutch slipping.
other:
□ spark plug loose (tighten it).
□ spark plug dirty, broken, or gap maladjusted (remedy it).
□ spark plug incorrect (replace it).
\Box knocking (fuel poor quality or incorrect, \rightarrow use high-octane gasoline).
□ brake dragging.
□ clutch slipping.
□ engine overheating.
□ engine oil level too high.
□ engine oil viscosity too high.
other:

3-28 FUEL SYSTEM (DFI)

DFI System 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 in DFI system.

• The ECU may be involved in the DFI electrical and ignition system troubles. If these parts and circuits are checked out good, be sure to check the ECU for ground and power supply. If the ground and power supply are checked good, replace the ECU.

Engine Won't Turn Over

Symptoms or possible Causes	Actions (chapter)
Gear position, starter lockout or sidestand switch trouble	Inspect each switch (see chapter 16).
KIPASS system trouble	Inspect (see chapter 17).
Vehicle-down sensor operated	Turn ignition switch OFF (see chapter 17).
Vehicle-down sensor trouble	Inspect (see chapter 17).
Crankshaft sensor trouble	Inspect (see chapter 16).
Stick coil shorted or not in good contact	Inspect or Reinstall (see chapter 16).
Stick coil trouble	Inspect (see chapter 16).
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 2).
Spark plug incorrect	Replace it with the correct plug (see chapter 2).
ECU ground and power supply trouble	Inspect (see chapter 3).
ECU trouble	Inspect (see chapter 3).
No or little fuel in tank	Supply fuel (see Owner's Manual).
Fuel injector trouble	Inspect and replace (see chapter 3).
Fuel pump not operating	Inspect (see chapter 3).
Fuel pump relay trouble	Inspect and replace (see chapter 3).
Fuel filter or pump screen clogged	Inspect and replace fuel pump (see chapter 3).
Fuel pressure regulator trouble	Inspect fuel pressure and replace fuel pump (see chapter 3).
Fuel line clogged	Inspect and repair (see chapter 3).

Poor Running at Low Speed

Symptoms or Possible Causes	Actions (chapter)	
Spark weak:		
Stick coil shorted or not in good contact	Inspect or reinstall (see chapter 16).	
Stick coil trouble	Inspect (see chapter 16).	
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 2).	
Spark plug incorrect	Replace it with the correct plug (see chapter 2).	
ECU trouble	Inspect (see chapter 3).	
Fuel/air mixture incorrect:		
Little fuel in tank	Supply fuel (see Owner's Manual).	
Air cleaner clogged, poorly sealed, or missing	Replace element or inspect sealing (see chapter 2).	
Air duct loose	Reinstall (see chapter 3).	
Throttle body assy holder loose	Reinstall (see chapter 3).	
Throttle body assy dust seal damage	Replace (see chapter 3).	
Fuel injector O-ring damage	Replace (see chapter 3).	

DFI System Troubleshooting Guide

Symptoms or Possible Causes	Actions (chapter)
Fuel filter or pump screen clogged	Inspect and replace fuel pump (see chapter 3).
Fuel pressure regulator trouble	Inspect fuel pressure and replace fuel pump (see chapter 3).
Fuel line clogged	Inspect and repair (see chapter 3).
Inlet air pressure sensor trouble	Inspect (see chapter 17).
Atmospheric pressure sensor trouble	Inspect (see chapter 17).
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).
Main throttle sensor trouble	Inspect (see chapter 17).
Subthrottle sensor trouble	Inspect (see chapter 17).
Subthrottle valve actuator trouble	Inspect (see chapter 17).
Unstable (rough) idling:	
Fuel pressure too low or too high	Inspect (see chapter 3).
Fuel injector trouble	Inspect (see chapter 3).
Main throttle sensor trouble	Inspect (see chapter 17).
Subthrottle sensor trouble	Inspect (see chapter 17).
Subthrottle valve actuator trouble	Inspect (see chapter 17).
Engine vacuum not synchronizing	Inspect and adjust (see chapter 2).
Inlet air pressure sensor trouble	Inspect (see chapter 17).
Atmospheric pressure sensor trouble	Inspect (see chapter 17).
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).
Engine stalls easily:	
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 2).
Stick coil trouble	Inspect (see chapter 16).
Exhaust Camshaft position sensor trouble	Inspect (see chapter 16).
Main throttle sensor trouble	Inspect (see chapter 17).
Subthrottle sensor trouble	Inspect (see chapter 17).
Subthrottle valve actuator trouble	Inspect (see chapter 17).
Inlet air pressure sensor trouble	Inspect (see chapter 17).
Atmospheric pressure sensor trouble	Inspect (see chapter 17).
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).
Fuel pump trouble	Inspect (see chapter 3).
Fuel injector trouble	Inspect (see chapter 3).
Fuel pressure too low or too high	Inspect (see chapter 3).
Fuel pressure regulator trouble	Inspect fuel pressure and replace fuel pump (see chapter 3).
Fuel line clogged	Inspect and repair (see chapter 3).
Poor acceleration:	
Fuel pressure too low	Inspect (see chapter 3).
Water or foreign matter in fuel	Change fuel. Inspect and clean fuel system (see chapter 3).
Fuel filter or pump screen clogged	Inspect and replace fuel pump (see chapter 3).
Fuel pump trouble	Inspect (see chapter 3).

DFI System Troubleshooting Guide

Symptoms or Possible Causes	Actions (chapter)
Fuel injector trouble	Inspect (see chapter 3).
Main throttle sensor trouble	Inspect (see chapter 17).
Subthrottle sensor trouble	Inspect (see chapter 17).
Subthrottle valve actuator trouble	Inspect (see chapter 17).
Inlet air pressure sensor trouble	Inspect (see chapter 17).
Atmospheric pressure sensor trouble	Inspect (see chapter 17).
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 2).
Stick coil trouble	Inspect (see chapter 16).
Stumble:	
Fuel pressure too low	Inspect (see chapter 3).
Fuel injector trouble	Inspect (see chapter 3).
Main throttle sensor trouble	Inspect (see chapter 17).
Subthrottle sensor trouble	Inspect (see chapter 17).
Subthrottle valve actuator trouble	Inspect (see chapter 17).
Inlet air pressure sensor trouble	Inspect (see chapter 17).
Atmospheric pressure sensor trouble	Inspect (see chapter 17).
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).
Surge:	
Unstable fuel pressure	Fuel pressure regulator trouble (Inspect and replace fuel pump) or kinked fuel line (Inspect and replace fuel pump) (see chapter 3).
Fuel injector trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 17).
Backfiring when deceleration:	
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 2).
Fuel pressure too low	Inspect (see chapter 3).
Fuel pump trouble	Inspect (see chapter 3).
Main throttle sensor trouble	Inspect (see chapter 17).
Subthrottle sensor trouble	Inspect (see chapter 17).
Subthrottle valve actuator trouble	Inspect (see chapter 17).
Inlet air pressure sensor trouble	Inspect (see chapter 17).
Atmospheric pressure sensor trouble	Inspect (see chapter 17).
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).
Air switching valve trouble	Inspect and replace (see chapter 16).
Air suction valve trouble	Inspect and replace (see chapter 5).
After fire:	
Spark plug burned or gap maladjusted	Replace (see chapter 2).
Fuel injector trouble	Inspect (see chapter 3).
Inlet air pressure sensor trouble	Inspect (see chapter 17).
Atmospheric pressure sensor trouble	Inspect (see chapter 17).
· · ·	

DFI System Troubleshooting Guide

Symptoms or Possible Causes	Actions (chapter)
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).
Other:	
Intermittent any DFI fault and its recovery	Check that DFI connectors are clean and tight, and examine leads for signs of burning or fraying (see chapter 3).

Poor Running or No Power at High Speed:

Stick coil shorted or not in good contact Inspect or Reinstall (see chapter 16). Stick coil trouble Inspect (see chapter 16). Spark plug dirty, broken or gap maladjusted Inspect and replace (see chapter 2). Spark plug incorrect Replace it with the correct plug (see chapter 2). ECU trouble Inspect (see chapter 3). Fuel/air mixture incorrect: Replace element or inspect sealing (see chapter 2). Air cleaner clogged, poorly sealed, or missing Replace element or inspect sealing (see chapter 2). Air duct loose Reinstall (see chapter 3). Throttle body assy dust seal damage Replace (see chapter 3). Water or foreign matter in fuel Change fuel. Inspect and clean fuel system (see chapter 3). Fuel injector O-ring damage Replace (see chapter 3). Fuel ingect or O-ring damage Replace (see chapter 3). Fuel ingect or O-ring damage Replace (see chapter 3). Fuel pump operates intermittently and often DFI Fuel pump bearings may wear. Replace the fuel pump (see chapter 3). Fuel pump trouble Inspect (see chapter 17).	Symptoms or Possible Causes	Actions (chapter)
Stick coil trouble Inspect (see chapter 16). Spark plug dirty, broken or gap maladjusted Inspect and replace (see chapter 2). Spark plug incorrect Replace it with the correct plug (see chapter 2). ECU trouble Inspect (see chapter 3). Fuel/air mixture incorrect: Replace element or inspect sealing (see chapter 2). Air cleaner clogged, poorly sealed, or missing Replace element or inspect sealing (see chapter 2). Air duct loose Reinstall (see chapter 3). Throttle body assy holder loose Reinstall (see chapter 3). Throttle body assy dust seal damage Replace (see chapter 3). Water or foreign matter in fuel Change fuel. Inspect and clean fuel system (see chapter 3). Fuel injector O-ring damage Replace (see chapter 3). Fuel ing clogged Inspect and repair (see chapter 3). Fuel pump operates intermittently and often DFI fuel pump bearings may wear. Replace the fuel pump trouble Inspect (see chapter 3). Fuel pump trouble Inspect (see chapter 17). Inspect (see chapter 17). Cracked or obstructed inlet air pressure sensor vacuum hose Inspect (see chapter 17). Atmospheric pressure sensor trouble Inspect (see chapter 17). Mater temperature sensor trouble Inspect (see chapter 17).	Firing incorrect:	
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ECU trouble Inspect (see chapter 3). Fuel/air mixture incorrect: Air cleaner clogged, poorly sealed, or missing Air cleaner clogged, poorly sealed, or missing Replace element or inspect sealing (see chapter 2). Air duct loose Reinstall (see chapter 3). Throttle body assy holder loose Reinstall (see chapter 3). Throttle body assy dust seal damage Replace (see chapter 3). Water or foreign matter in fuel Change fuel. Inspect and clean fuel system (see chapter 3). Fuel injector O-ring damage Replace (see chapter 3). Fuel injector clogged Inspect and repair (see chapter 3). Fuel pump operates intermittently and often DFI Fuel pump bearings may wear. Replace the fuel pump (see chapter 3). Fuel pump trouble Inspect (see chapter 3). Intel air pressure sensor trouble Inspect (see chapter 3). Intel air pressure sensor trouble Inspect (see chapter 17). Cracked or obstructed inlet air pressure sensor Inspect (see chapter 17). Matre temperature sensor trouble Inspect (see chapter 17). Intel air temperature sensor trouble Inspect (see chapter 17). Matre temperature sensor trouble Inspect (see chapter 17). Matre temperature sensor trouble Inspect (see chapter 17).	Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 2).
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vacuum hoseInspect (see chapter 17).Atmospheric pressure sensor troubleInspect (see chapter 17).Water temperature sensor troubleInspect (see chapter 17).Inlet air temperature sensor troubleInspect (see chapter 17).Main throttle sensor troubleInspect (see chapter 17).Subthrottle sensor troubleInspect (see chapter 17).Subthrottle valve actuator troubleInspect (see chapter 17).Knocking:Fuel poor quality or incorrectFuel poor quality or incorrectFuel change (Use the gasoline recommended in the Owner's Manual).Spark plug incorrectReplace it with the correct plug (see chapter 2).Stick coil troubleInspect (see chapter 16).ECU troubleInspect (see chapter 3).	Inlet air pressure sensor trouble	Inspect (see chapter 17).
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Inlet air temperature sensor troubleInspect (see chapter 17).Main throttle sensor troubleInspect (see chapter 17).Subthrottle sensor troubleInspect (see chapter 17).Subthrottle valve actuator troubleInspect (see chapter 17).Knocking:Fuel poor quality or incorrectFuel poor quality or incorrectFuel change (Use the gasoline recommended in the Owner's Manual).Spark plug incorrectReplace it with the correct plug (see chapter 2).Stick coil troubleInspect (see chapter 16).ECU troubleInspect (see chapter 3).	Atmospheric pressure sensor trouble	Inspect (see chapter 17).
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Subthrottle sensor trouble Inspect (see chapter 17). Subthrottle valve actuator trouble Inspect (see chapter 17). Knocking: Fuel poor quality or incorrect Fuel poor quality or incorrect Fuel change (Use the gasoline recommended in the Owner's Manual). Spark plug incorrect Replace it with the correct plug (see chapter 2). Stick coil trouble Inspect (see chapter 16). ECU trouble Inspect (see chapter 3).	Inlet air temperature sensor trouble	Inspect (see chapter 17).
Subthrottle valve actuator trouble Inspect (see chapter 17). Knocking: Fuel poor quality or incorrect Fuel poor quality or incorrect Fuel change (Use the gasoline recommended in the Owner's Manual). Spark plug incorrect Replace it with the correct plug (see chapter 2). Stick coil trouble Inspect (see chapter 16). ECU trouble Inspect (see chapter 3).	Main throttle sensor trouble	Inspect (see chapter 17).
Knocking:Fuel poor quality or incorrectFuel change (Use the gasoline recommended in the Owner's Manual).Spark plug incorrectReplace it with the correct plug (see chapter 2).Stick coil troubleInspect (see chapter 16).ECU troubleInspect (see chapter 3).	Subthrottle sensor trouble	Inspect (see chapter 17).
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Stick coil trouble Inspect (see chapter 16). ECU trouble Inspect (see chapter 3).	Fuel poor quality or incorrect	
ECU trouble Inspect (see chapter 3).	Spark plug incorrect	Replace it with the correct plug (see chapter 2).
	Stick coil trouble	Inspect (see chapter 16).
Engine vacuum not synchronizing Inspect and adjust (see chapter 2).	ECU trouble	Inspect (see chapter 3).
	Engine vacuum not synchronizing	Inspect and adjust (see chapter 2).

3-32 FUEL SYSTEM (DFI)

DFI System Troubleshooting Guide

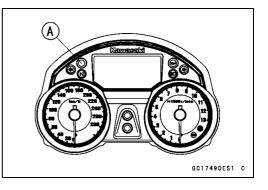
Symptoms or Possible Causes	Actions (chapter)
Inlet air pressure sensor trouble	Inspect (see chapter 17).
Atmospheric pressure sensor trouble	Inspect (see chapter 17).
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).
Miscellaneous:	
Subthrottle sensor trouble	Inspect (see chapter 17).
Subthrottle valve actuator trouble	Inspect (see chapter 17).
Speed sensor trouble	Inspect (see chapter 17).
Throttle valves will not fully open	Inspect throttle cables and lever linkage (see chapter 3).
Engine overheating - Water temperature sensor, crankshaft sensor or speed sensor trouble	(see Overheating of Troubleshooting Guide in chapter 17)
Air switching valve trouble	Inspect and replace (see chapter 16).
Air suction valve trouble	Inspect and replace (see chapter 5).
Exhaust Smokes Excessively:	
(Black smokes)	
Air cleaner element clogged	Replace element (see chapter 2).
Fuel pressure too high	Inspect (see chapter 3).
Fuel injector trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).
(Brown smoke)	
Air duct loose	Reinstall (see chapter 3).
Fuel pressure too low	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 17).
Inlet air temperature sensor trouble	Inspect (see chapter 17).

Warning Indicator Light (LED)

Light (LED) Inspection

OIn this model, the warning indicator light (LED) goes on or blinks by the data sent from the ECU or KIPASS ECU.

Refer to the Meter Unit Operation Inspection in the Electrical System chapter.



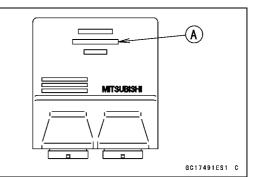
ECU

ECU Identification

OMost countries have their own regulations, so each ECU has different characteristic. So, do not confuse ECU with each other and use only the ECU for your model. Otherwise, the motorcycle cannot clear the regulation.

ECU Identification

Part Number [A]	Specification
21175-0257	US (ZG1400CAF/DAF)
	CA (ZG1400CAF/DAF)
	AU (ZG1400CAF/DAF)
21175-0258	CAL (ZG1400CAF/DAF)
21175-0259	WVTA (FULL H) (ZG1400CAF/DAF)
	GB WVTA (FULL H) (ZG1400CAF/DAF)
21175-0260	WVTA (78.2 H) (ZG1400CAF/DAF)
21175-0261	MY (ZG1400CAF/DAF)
21175-0265	SEA (ZG1400CAF/DAF)
21175-0368	US (ZG1400CBF)
	CA (ZG1400CBF)
	AU (ZG1400CBF)
21175-0369	CAL (ZG1400CBF)
21175-0370	WVTA (FULL H) (ZG1400CBF)
	GB WVTA (FULL H) (ZG1400CBF)
21175-0371	WVTA (78.2 H) (ZG1400CBF)
21175-0387	MY (ZG1400CBF)
21175-0372	SEA (ZG1400CBF)



ECU Removal

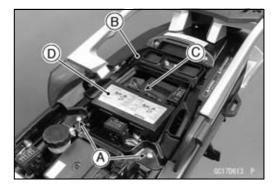
NOTICE

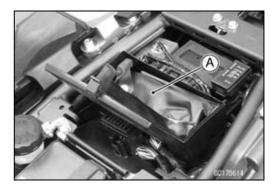
Never drop the ECU, especially on a hard surface. Such a shock to the ECU can damage it.

• Remove:

Seat (see Seat Removal in the Frame chapter) Bolts [A]

- Seat Under Plate [B]
- Pull the hook [C] to lift up the lid [D] of the tool kit case.
- Remove the tool kit [A].





FUEL SYSTEM (DFI) 3-35

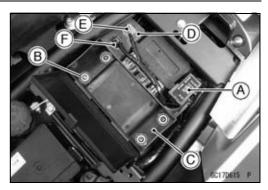
ECU

- Remove: Fuse Box 2 [A]
 - Bolts [B] Tool Kit Case [C]
- Pull out the following connectors from the connector holder [D].
 Kawasaki Diagnostic System Connector [E]
 - K-ACT ABS Kawasaki Self-diagnosis System Connector [F] (Equipped Models)
- Remove the connector holder.
- For EUR models (except the WVTA (FULL H)), using a small chisel or other suitable tool, cut off the screws [A] and remove the plates [B].

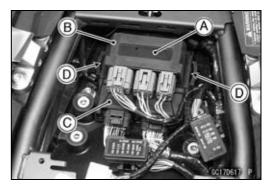
- Pull out the relay box [A] from the rubber protector [B]. ODo not disconnect the relay box connectors.
- Lift up the ECU [C] with rubber protector to clear the projections [D].
- Remove: ECU Connectors [A] ECU [B] (with Rubber Protector [C])

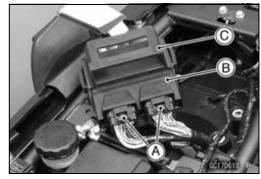
ECU Installation

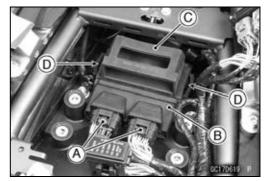
- Install:
 - ECU Connectors [A]
 - ECU [B] (in Rubber Protector [C])
- Insert the slits of the rubber protector to the projections [D] of the rear fender.











3-36 FUEL SYSTEM (DFI)

ECU

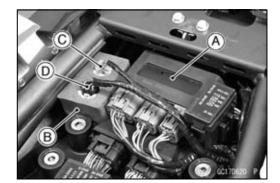
Install: Relay Box [A] Connector Holder [B]

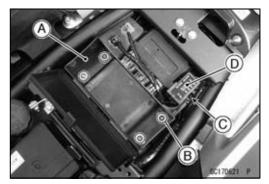
- Put the following connectors on the connector holder. Kawasaki Diagnostic System Connector [C]
 K-ACT ABS Kawasaki Self-diagnosis System Connector
 [D] (Equipped Models)
- Install the tool kit case [A] and tighten the bolts [B].
- Insert the stopper [C] of the fuse box 2 [D] into the groove of the tool case.

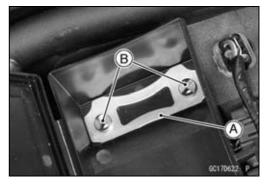
• For EUR models (except the WVTA (FULL H)), install the plates [A] and tighten new screws [B] of the tool kit case use Kawasaki genuine screws of witch treads are coated with non-permanent locking agent.

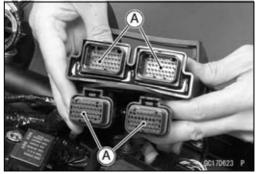
ECU Power Supply Inspection

- Remove the tool kit case (see ECU Removal).
- Visually inspect the ECU connectors.
- ★ If the connector is clogged with mud or dust, blow it off with compressed air.
- Remove the ECU (see ECU Removal).
- Visually inspect the terminals [A] of the ECU connectors.
- ★ If the terminals of the main harness connectors are damaged, replace the main harness.
- ★ If the terminals of the ECU connectors are damaged, replace the ECU.









ECU

- Turn the key knob to OFF.Disconnect the ECU connectors [A].
- Set the hand tester [B] to the \times 1 Ω range and check the following wiring for continuity.

Special Tool - Hand Tester: 57001-1394

ECU Grounding Inspection

Connections:

(I) BK/Y leads (ECU terminal 21, 22 or 52) ← Frame Ground terminal Frame Ground

terminal

(II) Engine Ground

Criteria:

Both: 0 Ω

- ★ If no continuity, check the connectors, the engine ground lead, or main harness, and repair or replace them if necessary.
- ★If the wiring is good, check the power source voltage of the ECU.

NOTE

OBe sure the battery is fully charged.

- Connect the ECU connectors.
- Connect a digital meter [A] to the connector [B] with the needle adapter set.

Special Tool - Needle Adapter Set: 57001-1457

ECU Power Supply Inspection

Connections:

- (I) Digital Meter (+) \rightarrow Terminal 35 (BR) Digital Meter (–) \rightarrow Frame Ground terminal
- (II) Digital Meter (+) \rightarrow Terminal 44 (W/BK)

Digital Meter (–) ightarrow Frame Ground terminal

Key Knob OFF:

Terminal 35 (BR): 0 V

Terminal 44 (W/BK): Battery Voltage

Key Knob ON:

Both: Battery Voltage

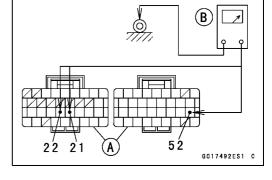
★ If the reading is out of the specification, check the following.

Main Fuse 30 A (see Fuse Inspection in the Electrical System chapter)

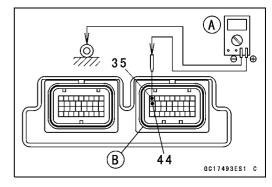
ECU Fuse 15 A (see Fuse Inspection Electrical System chapter)

Power Source Wiring (see wiring diagram in this section)

★ If the fuse and wiring are good, replace the ECU (see ECU Removal/Installation).

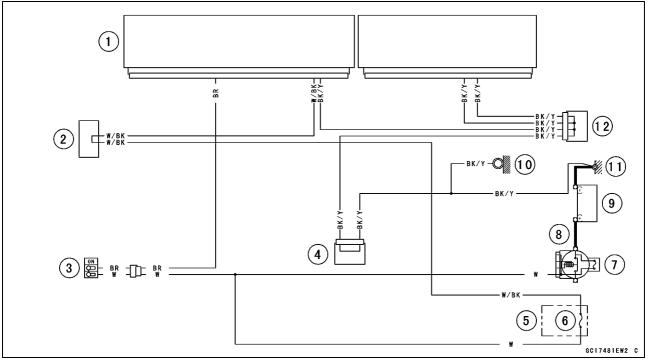


FUEL SYSTEM (DFI) 3-37



ECU

ECU Power Source Circuit



- 1. ECU
- 2. Water-proof Joint 1
- 3. Steering Lock Unit
- 4. Joint Connector 9
- 5. Fuse Box 2
- 6. ECU Fuse 15 A
- 7. Main Fuse 30 A
- 8. Starter Relay
- 9. Battery 12 V 14 Ah
- 10. Frame Ground
- 11. Frame Ground
- 12. Joint Connector 3

CAN Communication Line

CAN Communication Line Resistance Inspection

OIn this model, resistors for CAN communication line are built in the ECU [A], KIPASS ECU [B] and meter unit.

- Refer to the Meter Unit Inspection in the Electrical System chapter for the resistor in the meter unit.
- Turn the key knob to OFF.
- Remove:
 - ECU (see ECU Removal)

KIPASS ECU (see KIPASS ECU Replacement in the Electrical System chapter)



• Measure the resistance of the CAN communication line resistor.

CAN Communication Line Resistance (at ECU Connector)

Connections: Terminal 59 ${\leftarrow}{\rightarrow}$ Terminal 68 Standard: 123 ~ 125 Ω

- Connect a digital meter [A] to the KIPASS ECU connector [B].
- Measure the resistance of the CAN communication line.

CAN Communication Line Resistance (at KIPASS ECU Connector)

Connections: Terminal 12 $\leftarrow \rightarrow$ Terminal 29 Standard: 114 ~ 126 Ω

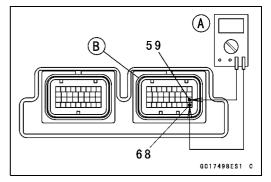
- ★ If the reading is out of the range, replace the ECU and/or KIPASS ECU.
- ★ If the reading is within the range, resistor of the ECU and/or KIPASS ECU for CAN communication line is normal. Check the wiring for continuity of the CAN communication line, using the wiring diagram in this section.

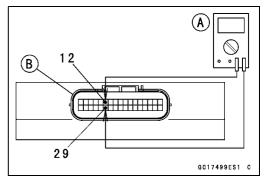
Special Tool - Hand Tester: 57001-1394

 \star If the wiring is open, repair or replace the main harness.





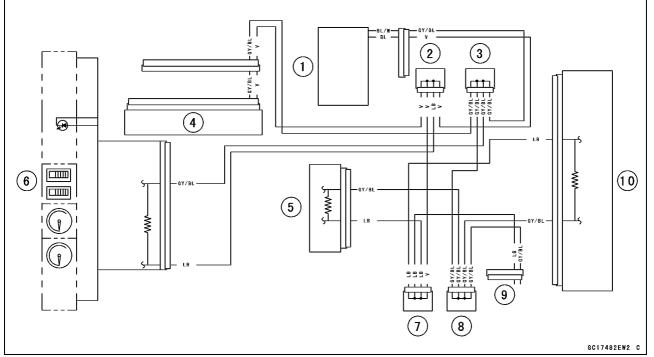




3-40 FUEL SYSTEM (DFI)

CAN Communication Line

CAN Communication Line Circuit



- 1. Steering Lock Unit
- 2. Joint Connector 4
- 3. Joint Connector 5
- 4. K-ACT ABS Hydraulic Unit (Equipped Models)
- 5. KIPASS ECU
- 6. Meter Unit
- 7. Joint Connector 6
- 8. Joint Connector 7
- 9. Kawasaki Diagnostic System Connector
- 10. ECU

DFI Power Source

ECU Fuse Removal

Refer to the Fuse Box Fuse Removal in the Electrical System chapter.

ECU Fuse Installation

- ★ If a fuse fails during operation, inspect the DFI system to determine the cause, and then replace it with a new fuse of proper amperage.
- Refer to the Fuse Installation in the Electrical System chapter.

ECU Fuse Inspection

• Refer to the Fuse Inspection in the Electrical System chapter.

ECU Main Relay Removal/Installation

OThe ECU main relay function is included in the ECU [A] and can not be removed.



ECU Main Relay Inspection

OThe ECU main relay function is included in the ECU [A] and can not be inspected.



Fuel Pressure Inspection

NOTE

OBe sure the battery is fully charged.

• Remove:

Fuel Tank (see Fuel Tank Removal) Fuel Hose (see Fuel Hose Replacement in the Periodic Maintenance chapter)

OBe sure to place a piece of cloth around the delivery pipe of the throttle body assy.

A WARNING

Fuel is flammable and explosive under certain conditions and can cause severe burns. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately. When the fuel hose is disconnected, fuel spills out from the hose and the pipe because of residual pressure. Cover the hose connection with a piece of clean cloth to prevent fuel spillage.

- Install the fuel pressure gauge adapter [A] and fuel hoses (Special Tool: 57001-1607) [B] between the fuel outlet pipe and delivery pipe.
- Secure the fuel hoses with the clamps.
- OWhen tightening the clamp screw [C] of the throttle body assy side, use the pilot screw adjuster [D].

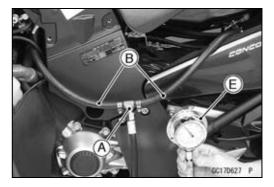
Special Tool - Pilot Screw Adjuster, C: 57001-1292

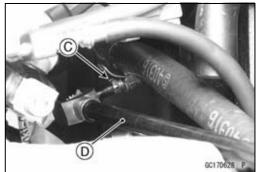
• Connect the pressure gauge [E] to the fuel pressure gauge adapter.

Special Tools - Oil Pressure Gauge, 5 kgf/cm²: 57001-125 Fuel Pressure Gauge Adapter: 57001-1593 Fuel Hose: 57001-1607

🛦 WARNING

Fuel is extremely flammable and can be explosive under certain conditions resulting in serious injury or death. Do not try to start the engine with the fuel hoses disconnected.





• Connect:

Fuel Pump Lead Connector [A] Fuel Level Sensor Lead Connector [B]

- Turn the engine stop switch to run position.
- Push and turn the key knob to ON.

OThe fuel pump should operate for 3 seconds, and then should stop.

NOTE

OAfter turning on the engine stop switch and key knob, inspect the fuel leakage from the connected portion of the special tools.

NOTICE

Do not drive the fuel pump 3 seconds or more without the fuel in the fuel tank. If the fuel pump is driven without the fuel, it may be damaged.

- Start the engine, and let it idle.
- Measure the fuel pressure with the engine idling.

Fuel Pressure (with Engine Idling) Standard: 294 kPa (3.0 kgf/cm², 43 psi)

NOTE

OThe gauge needle will fluctuate. Read the pressure at the average of the maximum and minimum indications.

- Turn the key knob to OFF.
- ★ If the fuel pressure is much higher than specified, replace the fuel pump because the fuel pressure regulator in the fuel pump have been clogged or stuck.
- \star If the fuel pressure is much lower than specified, check the following.

Fuel Line Leakage (see Fuel Injector Fuel Line Inspection)

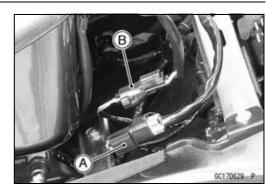
Amount of Fuel Flow (see Fuel Flow Rate Inspection)

- After above checks, measure the fuel pressure again.
- Remove the fuel pressure gauge, hoses and adapter.
- Install:

Fuel Hose (see Fuel Hose Replacement in the Periodic Maintenance chapter)

Fuel Tank (see Fuel Tank Installation)

• Start the engine and check for fuel leakage.



Fuel Flow Rate Inspection

WARNING

Gasoline is extremely flammable and can be explosive under certain conditions, creating the potential for serious burns. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light. Do not smoke. Turn the key knob OFF. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately.

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Wait until the engine cools down.
- Prepare a fuel hose (Special Tool: 57001-1607) and a measuring cylinder.

Special Tool - Fuel Hose: 57001-1607

- Remove the fuel tank bolts (see Fuel Tank Removal).
- Open the fuel tank cap [A] to lower the pressure in the tank.
- Remove the fuel hose from the fuel pump (see Fuel Tank Removal).
- OBe sure to place a piece of cloth around the fuel outlet pipe of the fuel pump.

A WARNING

Fuel is flammable and explosive under certain conditions and can cause severe burns. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately. When the fuel hose is disconnected, fuel spills out from the hose and the pipe because of residual pressure. Cover the hose connection with a piece of clean cloth to prevent fuel spillage.

- Connect the prepared fuel hose [A] to the fuel outlet pipe.
- Secure the fuel hose with a clamp.
- Insert the fuel hose into the measuring cylinder [B].

A WARNING

Wipe off spilled out fuel immediately. Be sure to hold the measuring cylinder vertical.

- Close the fuel tank cap.
- Turn the engine stop switch to run position.
- Push and turn the key knob to ON.
- OThe fuel pump should operate for 3 seconds, and then should stop.





NOTICE

Do not drive the fuel pump 3 seconds or more without the fuel in the fuel tank. If the fuel pump is driven without the fuel, it may be damaged.

• Measure the discharge for 3 seconds. ORepeat this operation several times.

Amount of Fuel Flow Standard: 67 mL (2.3 US oz.) or more for 3 seconds

- Turn the key knob to OFF.
- ★ If the fuel flow is much less than the specified, replace the fuel pump (see Fuel Pump Removal/Installation).
- Install the fuel tank (see Fuel Tank Installation).
- Start the engine and check for fuel leakage.

Fuel Pump

Fuel Pump Removal

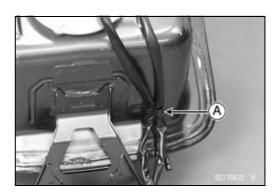
A WARNING

Gasoline is extremely flammable and can be explosive under certain conditions, creating the potential for serious burns. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light. Do not smoke. Turn the key knob OFF. Disconnect the battery (–) terminal. To avoid fuel spills, draw it from the tank when the engine is cold. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately.

NOTICE

Never drop the fuel pump, especially on a hard surface. Such a shock to the pump can damage it.

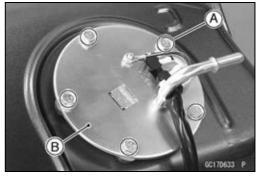
- Draw the fuel out from the fuel tank with a commercially available electric pump.
- Remove the fuel tank (see Fuel Tank Removal).
- OBe careful of fuel spillage from the fuel tank since fuel still remains in the fuel tank and fuel pump. Plug the fuel pipe of the fuel tank.
- Turn the fuel tank upside down.
- Open the clamp [A].



• Unscrew the fuel pump bolts [A], and take out the fuel pump [B].

NOTICE

Do not pull the leads of the fuel pump and fuel reserve switch. If they are pulled, the lead terminals may be damaged.



Fuel Pump

• Discard the fuel pump gasket [A].

Fuel Pump Installation

- Remove dirt or dust from the fuel pump [A] by lightly applying compressed air.
- Replace the fuel pump gasket with a new one.
- Check that the fuel pump terminals [A], fuel reserve switch terminal [B] and band [C] are in place.
 - Front [D] Right [E]
- Apply a non-permanent locking agent to the threads of the fuel pump bolts.
- Tighten the fuel pump bolts to a snug fit, following the tightening sequence as shown in the figure.
- Following the tightening sequence, tighten the fuel pump bolts to the specified torque.

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

• Tighten the pump bolts again to check the tightness in the order shown.

Fuel Pump Operation Inspection

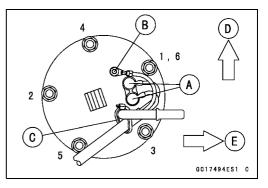
NOTE

OBe sure the battery is fully charged.

- Turn the engine stop switch to run position.
- Push and turn the key knob to ON and make sure that the fuel pump operates (make light sounds) for 3 seconds, and then stops.
- Turn the key knob to OFF.
- ★ If the pump does not operate as described above, check the operating voltage (see Fuel Pump Operating Voltage Inspection).







3-48 FUEL SYSTEM (DFI)

Fuel Pump

Fuel Pump Operating Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the seat (see Seat Removal in the Frame chapter).
- Pull up the fuel pump lead connector [A].
- Disconnect the fuel pump lead connector and connect the measuring adapter [A] between these connectors as shown in the figure.

Main Harness [B]

Fuel Pump [C]

Special Tool - Measuring Adapter: 57001-1700

• Connect a digital meter [D] to the measuring adapter leads.

Fuel Pump Operating Voltage Connections to Adapter:

Digital Meter (+) \rightarrow R (pump Y/R) lead Digital Meter (–) \rightarrow BK (pump BK/W) lead

- Measure the operating voltage with engine stopped and with the connector joined.
- Turn the engine stop switch to run position.
- Push and turn the key knob to ON.

Operating Voltage Standard: Battery Voltage for 3 seconds, and then 0 V

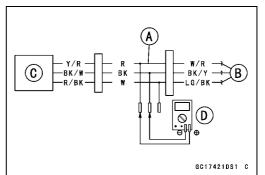
- Turn the key knob to OFF.
- ★ If the reading stays on battery voltage and never shows 0 V, check the fuel pump relay (see Relay Circuit Inspection in the Electrical System chapter).
- ★ If the fuel pump relay is normal, check the ECU for its ground and power supply (see ECU Power Supply Inspection).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).
- ★ If there is still no battery voltage, check the fuel pump relay (see Relay Circuit Inspection in the Electrical System chapter).
- ★ If the fuel pump relay is normal, check the wiring for continuity (see wiring diagram in this section).

Special Tool - Hand Tester: 57001-1394

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).
- ★ If the reading is in specification, but the pump does not operate, replace the fuel pump (see Fuel Pump Removal/Installation).







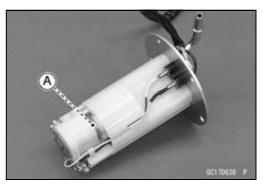
Fuel Pump

Pressure Regulator Removal

OThe pressure regulator [A] is built into the fuel pump and can not be removed.

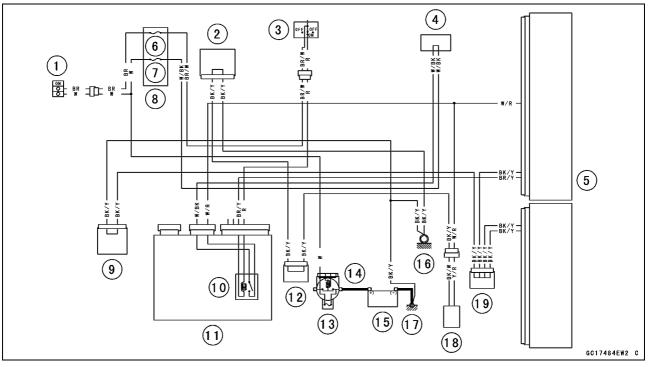


- OThe fuel filter [A] is built into the pump and can not be cleaned or checked.
- ★ If the fuel filter is suspected of clogging or being damaged, replace it with the fuel pump as a set.





Fuel Pump Circuit



- 1. Steering Lock Unit
- 2. Joint Connector 1
- 3. Engine Stop Switch
- 4. Water-proof Joint 1
- 5. ECU
- 6. Ignition Fuse 15 A (ZG1400C Model), 10 A (ZG1400D Model)
- 7. ECU Fuse 15 A
- 8. Fuse Box 2
- 9. Joint Connector 9

- 10. Fuel Pump Relay
- 11. Relay Box
- 12. Joint Connector 2
- 13. Main Fuse 30 A
- 14. Starter Relay
- 15. Battery 12 V 14 Ah
- 16. Frame Ground
- 17. Frame Ground
- 18. Fuel Pump
- 19. Joint Connector 3

Fuel Injectors

Fuel Injector Removal/Installation

• Refer to the Throttle Body Assy Disassembly/Assembly.

Fuel Injector Audible Inspection

NOTE

OBe sure the battery is fully charged.

- Remove the left and right rear middle fairings (see Rear Middle Fairing Removal in the Frame chapter).
- Start the engine, and let it idle.
- Apply the tip of a screwdriver [A] to the fuel injector [B]. Put the grip end onto your ear, and listen whether the fuel injector is clicking or not.

OA sound scope can also be used.

- OThe click interval becomes shorter as the engine speed rises.
- Do the same for the other fuel injectors.
- ★ If all the fuel injectors click at a regular intervals, the fuel injectors are normal.
- Turn the key knob to OFF.
- ★If any fuel injector does not click, check the fuel injector resistance (see Fuel Injector Resistance Inspection).

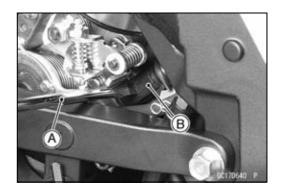
Fuel Injector Resistance Inspection

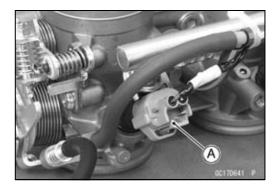
- Remove the throttle body assy (see Throttle Body Assy Removal).
- Disconnect the fuel injector connector [A].
- Connect a digital meter to the terminals in each fuel injector [A].
- Measure the fuel injector resistance.

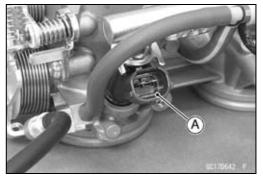
Fuel Injector Resistance

Standard: About 11.7 ~ 12.3 Ω at 20°C (68°F)

- ★ If the reading is out of the standard, replace the primary fuel injector.
- ★ If the reading within the standard, check the power source voltage (see Fuel Injector Power Source Voltage Inspection).







Fuel Injectors

Fuel Injector Power Source Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the throttle body assy (see Throttle Body Assy Removal).
- Connect the throttle body subharness connector [A] temporarily.
- Disconnect the injector connector and connect the measuring adapter [A] between these connectors as shown in the figure.

Harness [B]

Fuel Injector #1 [C]

Special Tool - Measuring Adapter: 57001-1700

• Connect a digital meter [D] to the measuring adapter lead.

Fuel Injector Power Source Voltage Connections to Adapter:

For Fuel Injector #1, #2, #3, #4

Digital Meter (+) \rightarrow R (injector W/R) lead

Digital Meter (–) \rightarrow Frame Ground terminal

- Measure the power source voltage with the engine stopped.
- Turn the engine stop switch to run position.
- Push and turn the key knob to ON.

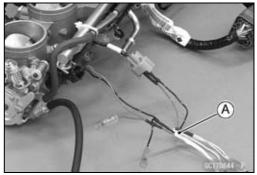
Power Source Voltage Standard: Battery Voltage for 3 seconds, and then 0 V

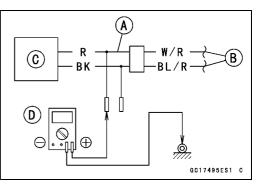
- Turn the key knob to OFF.
- ★ If the reading stays on battery voltage and never shows 0 V, check the fuel pump relay (see Relay Circuit Inspection in the Electrical System chapter).
- ★ If the fuel pump relay is normal, check the ECU for its ground and power supply (see ECU Power Supply Inspection).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).
- ★ If there is still no battery voltage, check the fuel pump relay (see Relay Circuit Inspection in the Electrical System chapter).
- ★ If the fuel pump relay is normal, check the power source wiring (see wiring diagram in this section).

Special Tool - Hand Tester: 57001-1394

- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).
- ★ If the reading is in specification, check the output voltage (see Fuel Injector Output Voltage Inspection).







3-52 FUEL SYSTEM (DFI)

Fuel Injectors

Fuel Injector Output Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the ECU (see ECU Removal).
- ODo not disconnect the ECU connector.
- Connect a digital meter [A] to the connector [B] with the needle adapter set.

Special Tool - Needle Adapter Set: 57001-1457

Fuel Injector Output Voltage

Connections to ECU Connector:

For Fuel Injector #1

Digital Meter (+) \rightarrow BL/R lead (ECU terminal 10)

Digital Meter (–) \rightarrow Frame Ground terminal

For Fuel Injector #2

Digital Meter (+) \rightarrow BL/G lead (ECU terminal 18)

Digital Meter (–) \rightarrow Frame Ground terminal

For Fuel Injector #3

Digital Meter (+) \rightarrow BL/BK lead (ECU terminal 3)

Digital Meter (–) \rightarrow Frame Ground terminal

For Fuel Injector #4

Digital Meter (+) \rightarrow BL/Y lead (ECU terminal 28)

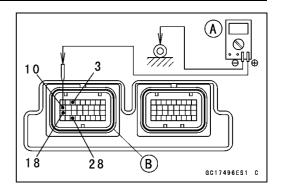
Digital Meter (–) \rightarrow Frame Ground terminal

- Measure the output voltage with the engine stopped and with the connector joined.
- Turn the engine stop switch to run position.
- Push and turn the key knob to ON.

Output Voltage

Standard: Battery Voltage for 3 seconds, and then 0 V

- Turn the key knob to OFF.
- ★ If the reading is in specification, check the ECU for its ground and power supply (see ECU Power Supply Inspection).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).



Fuel Injectors

★ If the reading is out of the specification, remove the ECU and check the wiring for continuity between harness connector.

Special Tool - Hand Tester: 57001-1394

ODisconnect the ECU and injector connector.

Wiring Continuity Inspection ECU Connector [A] ←→ Fuel Injector Connector [B] For Fuel Injector #1 [C]

BL/R lead (ECU terminal 10) [D]

For Fuel Injector #2

BL/G lead (ECU terminal 18)

For Fuel Injector #3

BL/BK lead (ECU terminal 3)

For Fuel Injector #4

BL/Y lead (ECU terminal 28)

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).

Fuel Injector Fuel Line Inspection

- Remove the throttle body assy (see Throttle Body Assy Removal).
- Check the fuel injector fuel line for leakage as follows.
- OConnect a commercially available vacuum/pressure pump [A] to the nipple of the delivery pipe [B] with the fuel hose [C] (both ends connected with the clamps [D]) as shown.

OApply soap and water solution to the areas [E] as shown. OWatching the pressure gauge, squeeze the pump lever

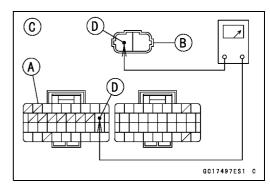
[F], and build up the pressure until the pressure reaches the maximum pressure.

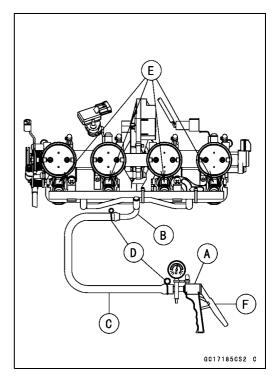
Fuel Injector Fuel Line Maximum Pressure Standard: 300 kPa (3.06 kgf/cm², 43 psi)

NOTICE

During pressure testing, do not exceed the maximum pressure for which the system is designed.

- Watch the gauge for at least 6 seconds.
- \star If the pressure holds steady, the fuel line is good.
- ★ If the pressure drops at once, or if bubbles are found in the area, the line is leaking. Replace the delivery pipe, injectors and related parts.
- ORepeat the leak test, and check the fuel line for no leakage.
- Install the throttle body assy (see Throttle Body Assy Installation).
- Start the engine and check for fuel leakage.

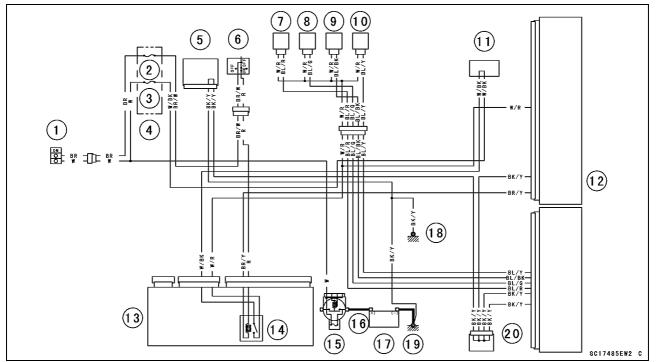




3-54 FUEL SYSTEM (DFI)

Fuel Injectors

Fuel Injector Circuit



- 1. Steering Lock Unit
- 2. Ignition Fuse 15 A (ZG1400C Model), 10 A (ZG1400D Model)
- 3. ECU Fuse 15 A
- 4. Fuse Box 2
- 5. Joint Connector 9
- 6. Engine Stop Switch
- 7. Fuel Injector #1
- 8. Fuel Injector #2
- 9. Fuel Injector #3
- 10. Fuel Injector #4
- 11. Water-proof Joint 1
- 12. ECU
- 13. Relay Box
- 14. Fuel Pump Relay
- 15. Main Fuse 30 A
- 16. Starter Relay
- 17. Battery 12 V 14 Ah
- 18. Frame Ground
- 19. Frame Ground
- 20. Joint Connector 3

Throttle Grip and Cables

Free Play Inspection

• Refer to the Throttle Control System Inspection in the Periodic Maintenance chapter.

Free Play Adjustment

• Refer to the Throttle Control System Inspection in the Periodic Maintenance chapter.

Cable Installation

- Install the throttle cables in accordance with the Cable, Wire, and Hose Routing section in the Appendix chapter.
- Install the lower ends of the throttle cables in the throttle pulley on the throttle assy after installing the upper ends of the throttle cables in the grip.
- After installation, adjust each cable properly (see Throttle Control System Inspection in the Periodic Maintenance chapter).

A WARNING

Operation with incorrectly routed or improperly adjusted cables could result in an unsafe riding condition. Be sure the cables are routed correctly and properly adjusted.

Cable Lubrication

• Refer to the Chassis Parts Lubrication Perform in the Periodic Maintenance chapter.

3-56 FUEL SYSTEM (DFI)

Throttle Body Assy

Idle Speed Inspection/Adjustment

• Refer to the Idle Speed Inspection/Adjustment in the Periodic Maintenance chapter.

Synchronization Inspection/Adjustment

• Refer to the Engine Vacuum Synchronization Inspection in the Periodic Maintenance chapter.

Throttle Body Assy Removal

Gasoline is extremely flammable and can be explosive under certain conditions, creating the potential for serious burns. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light. Do not smoke. Turn the key knob OFF. Disconnect the battery (–) terminal. To avoid fuel spills, draw it from the tank when the engine is cold. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately.

NOTICE

Never drop the throttle body assy, especially on a hard surface. Such a shock to the body assy can damage it.

• Remove:

Fuel Tank (see Fuel Tank Removal) Left and Right Subframe (Left/Right Subframe Removal in the Frame chapter) Left Lower Fairing (see Lower Fairing Removal in the

Frame chapter)

• For CAL and SEA models, pull off the vacuum hoses [A].



FUEL SYSTEM (DFI) 3-57

Throttle Body Assy

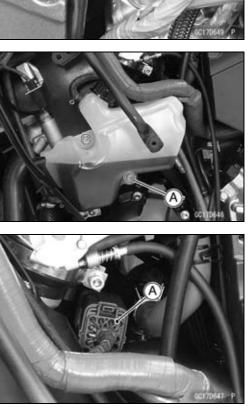
• Disconnect the crankshaft sensor lead connector [A].

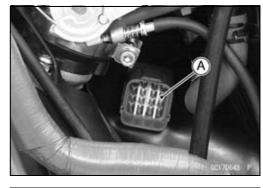
• Remove the coolant reserve tank bolts [A].

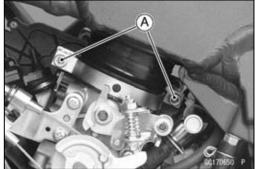
• Disconnect the throttle body subharness connector [A].

• Remove the connector [A] from the connector bracket. OInsert the thin blade screw driver into the connector stopper portion from the right side of the motorcycle.

• Loosen the duct clamp bolts [A] on both sides.







3-58 FUEL SYSTEM (DFI)

Throttle Body Assy

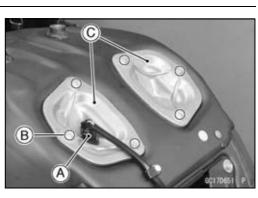
 Remove: Inlet Air Temperature Sensor [A] Bolts [B] Left and Right Air Cleaner Caps [C]
 ODo not disconnect the inlet air temperature sensor connector.

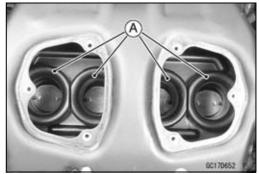
• Pull out the ducts [A] upward.

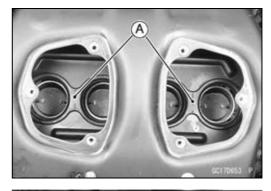
ORemove the grommets [A] as necessary.

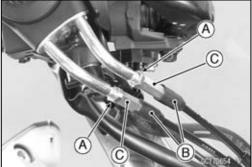
- Loosen the locknuts [A].
- Slide the dust covers [B] and turn the throttle cable adjusters [C] to make a throttle cable slack.

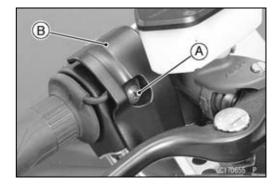
• Remove: Screw [A] Throttle Case Cover [B]











FUEL SYSTEM (DFI) 3-59

Throttle Body Assy

 Remove: Screws [A] Upper Throttle Case [B]

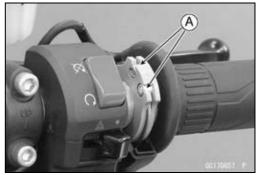
• Remove the throttle cable upper ends [A] from the throttle grip.

• Remove: Clamp [A] Throttle Cable Lower Ends [B]

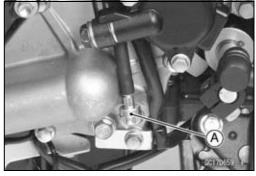
• Free the idle adjusting screw [A].

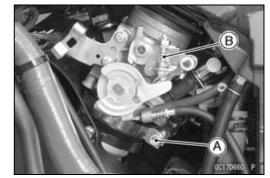
- Loosen the throttle body assy holder clamp bolts [A] on both sides.
- Pull out the throttle body assy [B] from the holder.
- Disconnect the fuel hose joint from the delivery pipe of the throttle body assy (see Fuel Hose Replacement in the Periodic Maintenance chapter).











3-60 FUEL SYSTEM (DFI)

Throttle Body Assy

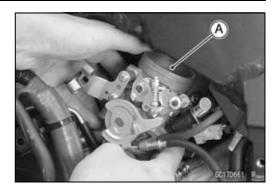
- Remove the throttle body assy [A] to the left side of the motorcycle.
- After removing the throttle body assy, stuff pieces of lint -free, clean cloths into the throttle body assy holders.

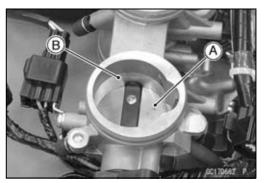
NOTICE

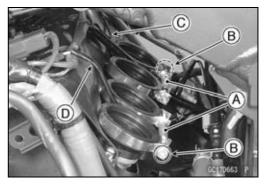
If dirt gets into the engine, excessive engine wear and possible engine damage will occur.

Throttle Body Assy Installation

- Before installing the throttle body assy, check the main throttle valves [A] and throttle bores [B] for carbon deposits.
- ★ If any carbon accumulates, wipe off the carbon around the throttle bores and throttle valves, using a cotton pad penetrated with a high-flash point solvent.
- Install the holder clamp bolts [A] in the direction as shown. Bolt Heads [B]
- Run the engine subharness [C] between the #3 and #4 throttle body assy holder.
- Run the inlet camshaft position sensor lead [D] between the #1 and #2 throttle body assy holder.
- Connect the fuel hose joint to the delivery pipe of the throttle body assy (see Fuel Hose Replacement in the Periodic Maintenance chapter).
- Tighten:
 - Torque Throttle Body Assy Holder Clamp Bolts: 2.0 N·m (0.20 kgf·m, 18 in·lb)







Throttle Body Assy

★ If the grommet [A] was removed, install it.

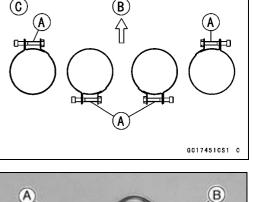
- OInstall the grommet from the inside of the frame.
- Insert the duct [B] to the grommet.
- OApply a soap and water solution or rubber lubricant to the oblique portion [C] on the duct for easy installation.
- Fit the projections [D] of the duct into the holes [E] of the clamp.

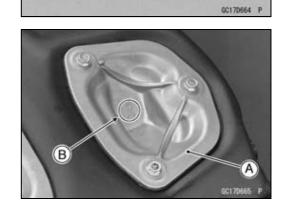
- Install the duct clamp bolts [A] in the direction as shown. Front [B]
 - Upside View [C]
- Tighten:

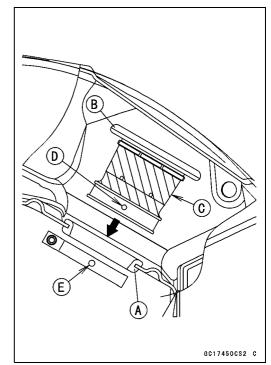
Torque - Duct Clamp Bolts: 2.0 N·m (0.20 kgf·m, 18 in·lb)

- \bigcirc B Ϋ́Α. Î
- Apply grease to the dust seal [A] on the air cleaner cap [B].

- Install the air cleaner caps.
- OThe right air cleaner cap [A] has a "R" mark [B].







3-62 FUEL SYSTEM (DFI)

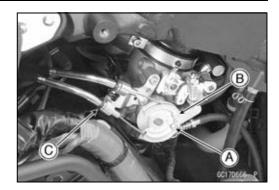
Throttle Body Assy

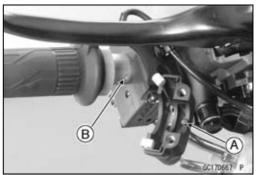
- Apply a thin coat of grease to the throttle cable lower ends.
- Fit the accelerator cable end [A] and the decelerator cable end [B] into the throttle pulley.
- OThe accelerator cable has a clamp [C].
- Install the clamp securely.
- Fit the projection [A] of the throttle case into the hole [B] of the handlebar.
- Apply a thin coat of grease to the throttle cable upper ends.
- Install the upper ends of the throttle cables in the grip.
- Turn the throttle grip and make sure that the throttle pulley moves smoothly and return by spring force.
- Apply a non-permanent locking agent to the threads of the coolant reserve tank bolts and tighten them.

Torque - Coolant Reserve Tank Bolts: 3.9 N·m (0.40 kgf·m, 35 in·lb)

- Run the leads and hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Adjust:

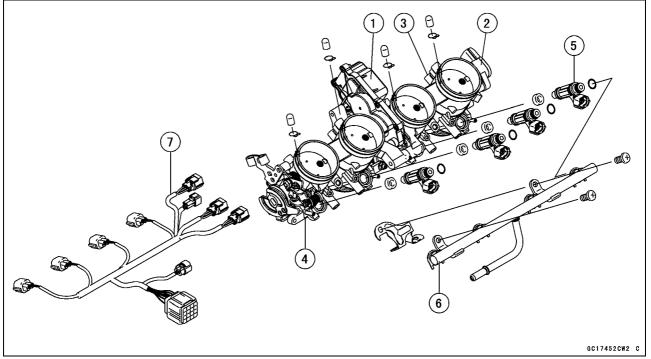
Throttle Grip Free Play (see Throttle Control System Inspection in the Periodic Maintenance chapter) Idle Speed (see Idle Speed Adjustment in the Periodic Maintenance chapter)





Throttle Body Assy

Throttle Body Assy Disassembly



- 1. Subthrottle Valve Actuator
- 2. Subthrottle Sensor
- 3. Main Throttle Sensor
- 4. Throttle Body Assy
- 5. Fuel Injectors
- 6. Delivery Pipe
- 7. Throttle Body Subharness

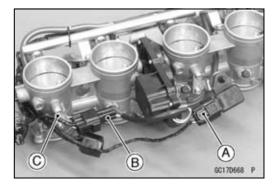
NOTICE

Do not remove, disassemble or adjust the main throttle sensor, subthrottle sensor, subthrottle valve actuator, throttle link mechanism and throttle body assy, because they are adjust or set surely at the manufacturer. Adjustment of these parts could result in poor performance, requiring replacement of the throttle body assy.

• Disconnect:

Inlet Air Pressure Sensor Connector [A] Subthrottle Valve Actuator Lead Connector [B]

• Remove the subthrottle valve actuator lead connector from the bracket [C].



3-64 FUEL SYSTEM (DFI)

Throttle Body Assy

 Disconnect: Main Throttle Sensor Connector [A] Subthrottle Sensor Connector [B]

• Disconnect the fuel injector connectors [A].

• Separate the hoses [A] from the throttle body fittings and inlet air pressure sensor [B].

• Remove the screws [A] to pull out the fuel injectors from the throttle body assy together with the delivery pipe [B].

NOTE

ODo not damage the insertion portions of the injectors when they are pulled out from the throttle body.

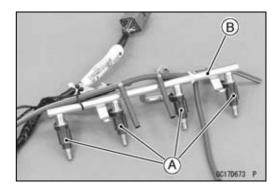
• Pull out the fuel injectors [A] from the delivery pipe [B].

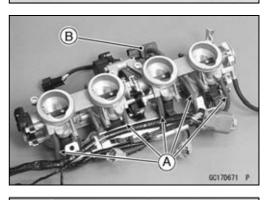
NOTE

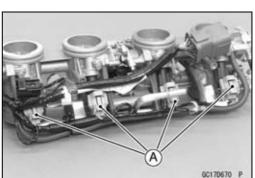
ODo not damage the insertion portions of the injectors when they are pulled out from the delivery pipe.

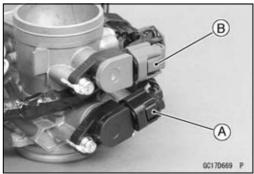
NOTICE

Never drop the fuel injector, especially on a hard surface. Such a shock to the injector can damage it.







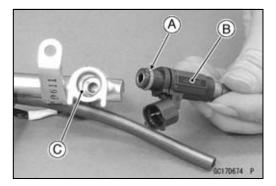


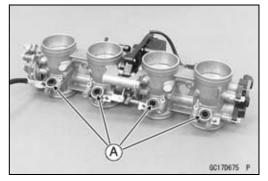
Throttle Body Assy

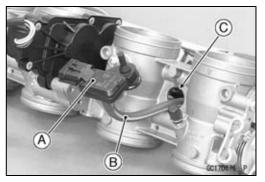
Throttle Body Assy Assembly

- Before assembling, blow away dirt or dust from the throttle body and delivery pipe by applying compressed air.
- Replace the O-rings [A] of each fuel injector [B] with new ones.
- Apply engine oil to the new O-rings, insert them to the delivery pipe [C] and confirm whether the injectors turn smoothly or not.
- Replace the dust seals [A] with new ones.
- Apply engine oil to the new dust seals.
- Install the fuel injectors along with the delivery pipe to the throttle body.
- Tighten:

- Install the each hoses to the throttle fittings and inlet air pressure sensor [A].
- ORun the hose [B] to the hole [C] of the throttle body.
- Install the throttle body assy (see Throttle Body Assy Installation).







Torque - Delivery Pipe Mounting Screws: 5.0 N·m (0.51 kgf·m, 44 in·lb)

3-66 FUEL SYSTEM (DFI)

Air Cleaner

• Remove:

ing.

Screws [A]

Air Cleaner Element Removal/Installation

 Refer to the Air Cleaner Element Replacement in the Periodic Maintenance chapter.

Air Cleaner Element Inspection

- Remove the air cleaner element (see Air Cleaner Element Replacement in the Periodic Maintenance chapter).
- Visually check the element [A] for tears or breaks.

Air Cleaner Element Holder Removal

moval in the Frame chapter)

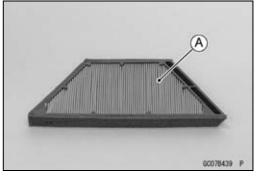
ment in the Periodic Maintenance chapter)

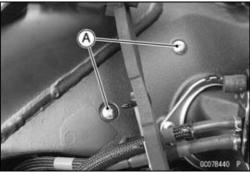
★If the element has any tears or breaks, replace the element.

Air Cleaner Element (see Air Cleaner Element Replace-

Right Rear Middle Fairing (see Rear Middle Fairing Re-

• Pull out the air cleaner element holder [A] from the hous-

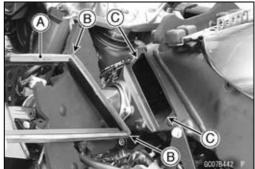






Air Cleaner Element Holder Installation

- Install the air cleaner element holder [A] so that the holder ends [B] insert along the rib [C] in the housing.
- Tighten:
- Torque Air Cleaner Element Holder Screws: 6.9 N·m (0.70 kgf·m, 61 in·lb)
- Install the removed parts (see appropriate chapter).



Air Cleaner

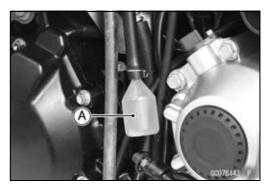
Air Cleaner Oil Draining

A drain hose is connected to the bottom of the air cleaner part to drain water or oil accumulated in the cleaner part.

- Remove the left lower fairing (see Lower Fairing Removal in the Frame chapter).
- Visually check the catch tank [A] of the drain hose, if the water or oil accumulates in the tank.
- ★If any water or oil accumulates in the tank, remove the tank and drain it.

A WARNING

Oil on tires will make them slippery and can cause an accident and injury. Be sure to reinstall the catch tank after draining.



3-68 FUEL SYSTEM (DFI)

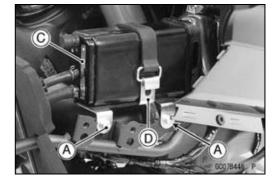
Air Line

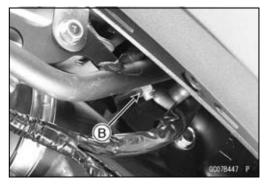
Rear Air Inlet Duct Removal Left Rear Air Inlet Duct

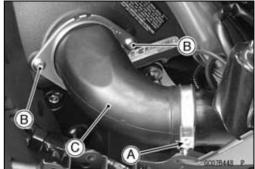
- Remove the font middle fairing (see Front Middle Fairing Removal in the Frame chapter).
- Loosen the clamp bolt [A].
- Remove the mounting bolts [A] and pull off the rear air inlet duct [B] backward.











- Loosen the clamp bolt [A].
- Remove the mounting bolts [B] and pull off the rear air inlet duct [C] backward.

- **Right Rear Air Inlet Duct**
- Remove the font middle fairing (see Front Middle Fairing Removal in the Frame chapter).
- For CAL and SEA models, remove the following parts. Bolts [A] Nut [B]

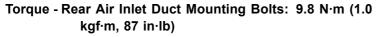
Canister [C] (with Bracket [D])

Air Line

Rear Air Inlet Duct Installation

• Fit the projections [A] of the holder [B] into the slots [C] of rear air inlet duct [D].

- Insert the rear air inlet duct [A] until the duct end [B] align the line [C] of the front air inlet duct [D].
- Apply a non-permanent locking agent to the threads of the rear air inlet duct mounting and tighten them.



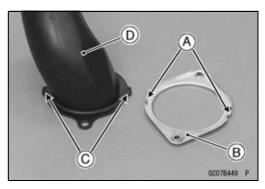
- Install the air inlet duct clamp bolts in the direction as shown.
 - Bolt Heads [A] Upper Side [B] Left Clamp [C] Right Clamp [D] About 30° [E] Rear View [F]
- Tighten:

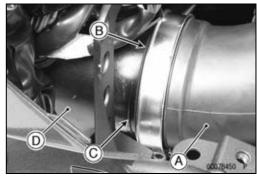
Torque - Air Inlet Duct Clamp Bolts: 2.9 N·m (0.30 kgf·m, 26 in·lb)

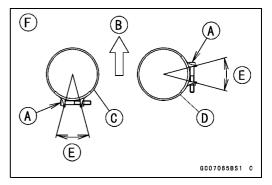
Front Air Inlet Duct Removal

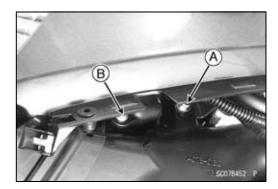
• Remove:

Rear Air Inlet Duct (see Rear Air Inlet Duct Removal) Front Air Inlet Duct Mounting Bolt [A] Resonator Mounting Bolt [B]









3-70 FUEL SYSTEM (DFI)

Air Line

• Pull off the resonator [A] from the front air inlet duct [B].

• For the right resonator [A], free the headlight aiming cable [B] from the clamp [C] of the resonator.

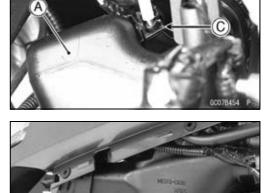
• Separate the rubber seal [A] and front air inlet duct [B] and pull off the front air inlet duct backward.

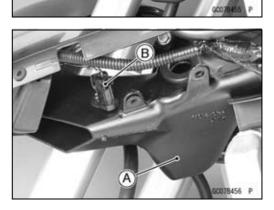
- For the left front air inlet duct [A], disconnect the outside temperature sensor connector [B].
- Remove the rubber seal.

Front Air Inlet Duct Installation

NOTE

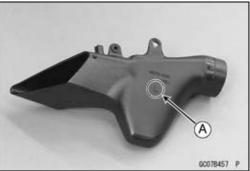
○The left front air inlet duct has a "L" mark [A] and the right front air inlet duct has a "R" mark.

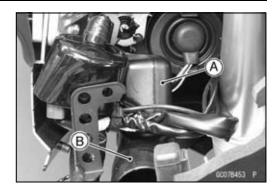




A

B

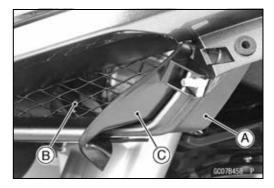


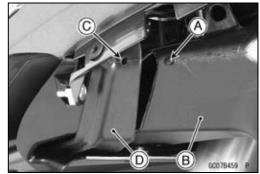


Air Line

• Install the rubber seal [A] together with the screen [B] on the inlet air duct fairing [C].

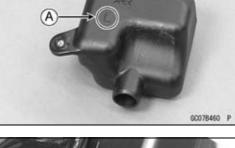
- For the left front air inlet duct, connect the outside temperature sensor connector.
- Fit the projection [A] of the front air inlet duct [B] into the hole [C] of the rubber seal [D].

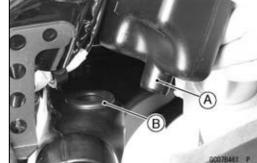




NOTE

○The left resonator has a "L" mark [A] and the right resonator has a "R" mark.





• Install the resonator as follows.

OInsert the fitting [A] of the resonator into the grommet [B] on the front air inlet duct.

OFor the right resonator, hook the headlight aiming cable on the clamp of the resonator.

OTighten:

- Torque Resonator Mounting Bolts: 3.9 N·m (0.40 kgf·m, 35 in·lb)
- Tighten:

Torque - Front Air Inlet Duct Mounting Bolts: 3.9 N·m (0.40 kgf·m, 35 in·lb)

• Install the rear air inlet duct (see Rear Air Inlet Duct Installation).

Fuel Tank

Fuel Tank Removal

A WARNING

Gasoline is extremely flammable and can be explosive under certain conditions, creating the potential for serious burns. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light. Do not smoke. Turn the key knob OFF. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately.

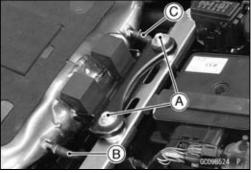
- Turn the key knob to OFF.
- Remove the left and right middle fairings (see Rear Middle Fairing Removal in the Frame chapter).
- Wait until the engine cools down.
- Disconnect the battery (–) terminal (see Battery Removal in the Electrical System chapter).
- Remove the fuel tank bolts [A].

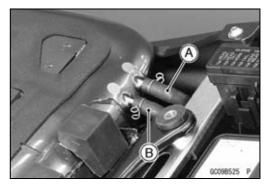
• Remove: Fuel Tank Bolts [A]

Drain Hose [B] Breather Hose [C]

• For CAL and SEA models, remove the following hoses. Fuel Return Hose [A] (right side, red) Fuel Tank Breather Hose [B] (left side, blue)







Fuel Tank

 Disconnect: Fuel Pump Lead Connector [A] Fuel Level Sensor Lead Connector [B]

• Open the fuel tank cap [A] to lower the pressure in the tank.

ODuring tank removal, keep the tank cap open to release pressure in the tank. This makes fuel spillage less.

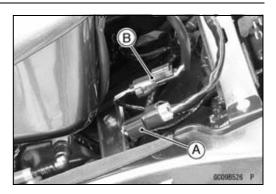
- Draw the fuel out from the fuel tank with a commercially available pump [A].
- OUse a soft plastic hose [B] as a pump inlet hose in order to insert the hose smoothly.
- OPut the hose through the fill opening [C] into the tank and draw the fuel out.

Front [D]

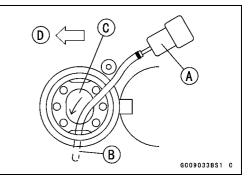
🛦 WARNING

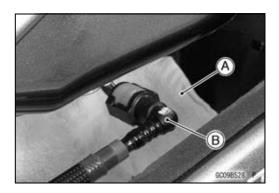
Spilled fuel is flammable and can be explosive under certain conditions. The fuel can not be removed completely from the fuel tank. Be careful for remained fuel spillage.

• Be sure to place a piece of cloth [A] around the fuel hose joint [B].









3-74 FUEL SYSTEM (DFI)

Fuel Tank

• Push the joint lock claws [A].

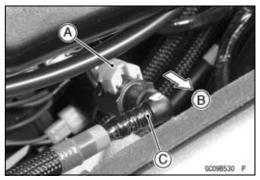


- Pull the joint lock [A] as shown.
- Pull [B] the fuel hose joint [C] out of the fuel outlet pipe.

A WARNING

Fuel is flammable and explosive under certain conditions and can cause severe burns. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately. When the fuel hose is disconnected, fuel spills out from the hose and the pipe because of residual pressure. Cover the hose connection with a piece of clean cloth to prevent fuel spillage.

- Close the fuel tank cap.
- Remove the fuel tank, and place a it on a flat surface.
- ODo not apply the load to the fuel outlet pipe of the fuel pump.



Fuel Tank

• For CAL and SEA and models, note the following.

NOTICE

For the California and Southeast Asia models, 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.

OBe sure to plug the evaporative fuel return hose to prevent fuel spilling before fuel tank removal.

A WARNING

Spilled fuel is flammable and can be explosive under certain conditions. For California and Southeast Asia models, be careful not to spill fuel through the return hose.

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

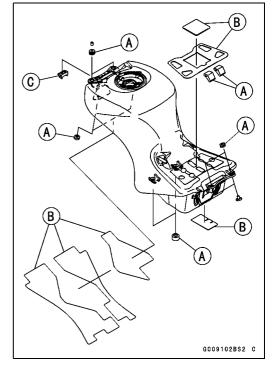
OBe careful of fuel spillage from the fuel tank since fuel still remains in the fuel tank and fuel pump.

A WARNING

Gasoline is extremely flammable and can be explosive under certain conditions, creating the potential for serious burns. Store the fuel tank in an area which is well-ventilated and free from any source of flame or sparks. Do not smoke in this area. Place the fuel tank on a flat surface and plug the fuel pipes to prevent fuel leakage.

Fuel Tank Installation

- Note the above WARNING (see Fuel Tank Removal).
- Route the hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Check that the dampers [A] and pad [B] are in place on the fuel tank as well.
- OFor models equipped with the K-ACT ABS, there is a damper [C].
- \star If the dampers are damaged or deteriorated, replace them.



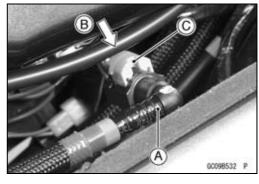
3-76 FUEL SYSTEM (DFI)

Fuel Tank

- For CAL and SEA models, note the following.
- ○To prevent the gasoline from flowing into or out of the canister, hold the separator perpendicular to the ground.
- OConnect the hoses according to the diagram of the system (see Cable, Wire, and Hose Routing section in the Appendix chapter). Make sure they do not get pinched or kinked.
- ORun hoses with a minimum of bending so that the air or vapor will not be obstructed.
- Pull the joint lock [A] as shown.



- Insert the fuel hose joint [A] straight onto the fuel outlet pipe until the hose joint clicks.
- Push [B] the joint lock [C] until the hose joint clicks.



• Push and pull [A] the hose joint [B] back and forth more than two times and make sure it is locked and does not come off.

A WARNING

Leaking fuel can cause a fire or explosion resulting in serious burns. Make sure the hose joint is installed correctly on the delivery pipe by sliding the joint.

- \star If it comes off, reinstall the hose joint.
- Connect the fuel pump, fuel level sensor lead connectors and the battery (–) terminal (see Battery Installation in the Electrical System chapter).



Fuel Tank

• For models equipped with the K-ACT ABS, fit the groove of the damper [A] on the brake pipes [B].

• For models equipped with the K-ACT ABS, fit the grooves of the pad [A] on the brake pipes [B].

Fuel Tank and Cap Inspection

- Visually inspect the gasket [A] on the tank cap for any damage.
- \star Replace the gasket if it is damaged.
- Check to see if the water drain pipe [B] and fuel breather pipe [C] (CAL and SEA models) in the tank are not clogged. Check the tank cap breather also.
- ★ If they are clogged, remove the tank and drain it, and then blow the breather free with compressed air.

NOTICE

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

Fuel Tank Cleaning

WARNING

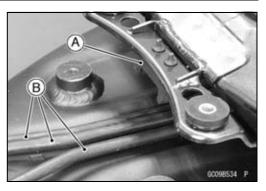
Gasoline and low-flash point solvents can be flammable and/or explosive and cause severe burns. Clean the tank in a well-ventilated area, and take care that there are no sparks or flame anywhere near the working area. Do not use gasoline or low-flash point solvents to clean the tank.

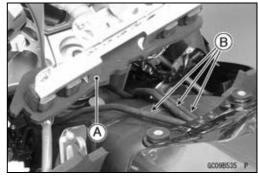
Remove:

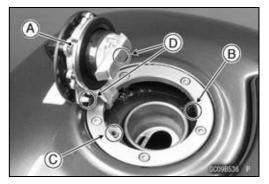
Fuel Tank (see Fuel Tank Removal) Fuel Pump (see Fuel Pump Removal)

- Pour some high-flash point solvent into the fuel tank and shake the tank to remove dirt and fuel deposits.
- Draw the solvent out of the fuel tank.
- Dry the tank with compressed air.
- Install:

Fuel Pump (see Fuel Pump Installation) Fuel Tank (see Fuel Tank Installation)







3-78 FUEL SYSTEM (DFI)

Evaporative Emission Control System (CAL and SEA Models)

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

Parts Removal/Installation

A WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the key knob 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.

NOTICE

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

- To prevent the gasoline from flowing into or out of the canister, hold the separator perpendicular to the ground.
- Connect the hoses according to the diagram of the system. Make sure they do not get pinched or kinked.

Hose Inspection

• Refer to the Evaporative Emission Control System Inspection (CAL and SEA Models) in the Periodic Maintenance chapter.

Separator Inspection

• Refer to the Evaporative Emission Control System Inspection (CAL and SEA Models) in the Periodic Maintenance chapter.

FUEL SYSTEM (DFI) 3-79

Evaporative Emission Control System (CAL and SEA Models)

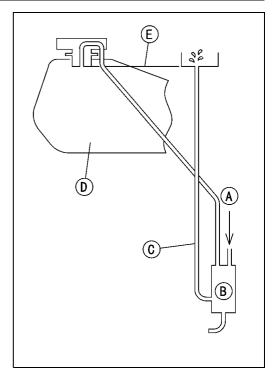
Separator Operation Test

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

- Connect the hoses to the separator, and install the separator on the motorcycle.
- Disconnect the breather hose from the separator, and inject about 20 mL (0.68 US oz.) of gasoline [A] into the separator [B] through the hose fitting.
- Disconnect the fuel return hose [C] from the fuel tank [D].
- Run the open end of the return hose into the container and hold it 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.

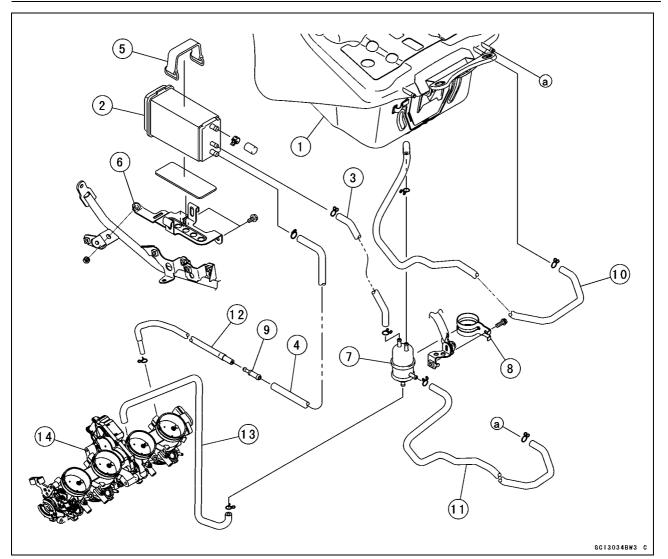
Canister Inspection

• Refer to the Evaporative Emission Control System Inspection (CAL and SEA Models) in the Periodic Maintenance chapter.



3-80 FUEL SYSTEM (DFI)

Evaporative Emission Control System (CAL and SEA Models)



- 1. Fuel Tank
- 2. Canister
- 3. Blue Hose (Breather)
- 4. Green Hose (Purge)
- 5. Band (for Canister)
- 6. Bracket (for Canister)
- 7. Separator
- 8. Bracket (for Separator)
- 9. Fitting
- 10. Blue Hose (Breather)
- 11. Red Hose (Return)
- 12. Green Hose (Purge)
- 13. White Hose (Vacuum)
- 14. Throttle Body Assy

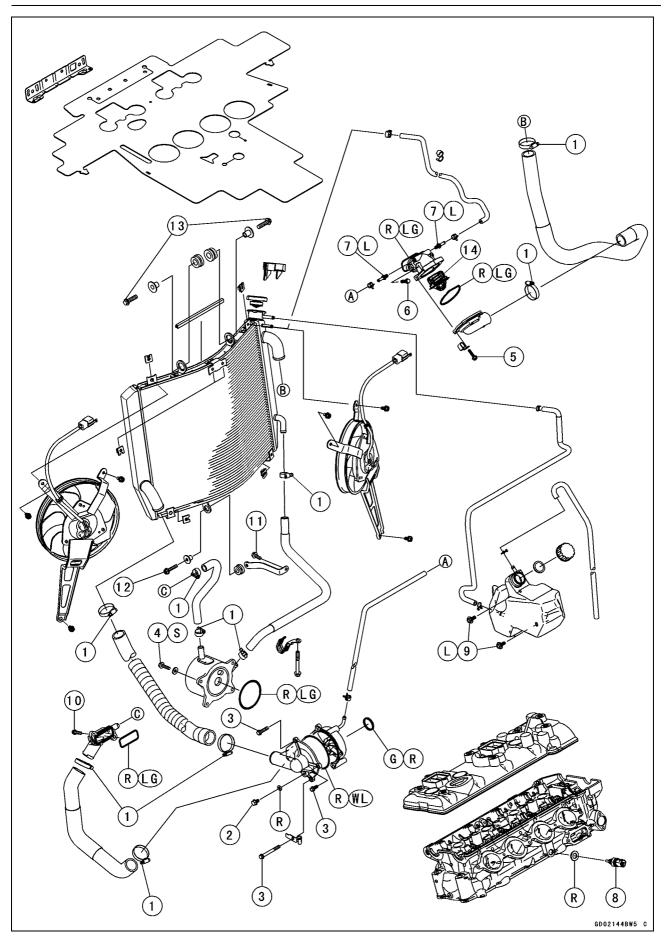
Cooling System

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4-2 COOLING SYSTEM

Exploded View



Exploded View

No	Fastener	Torque			Deveetie
No.		N∙m	kgf∙m	ft·lb	Remarks
1	Water Hose Clamp Screws	3.0	0.31	27 in·lb	
2	Coolant Drain Plug	12	1.2	106 in·lb	
3	Water Pump Cover Bolts	9.8	1.0	87 in·lb	
4	Oil Cooler Mounting Bolts	12	1.2	106 in·lb	S
5	Thermostat Housing Cover Bolts	5.9	0.60	52 in·lb	
6	Thermostat Housing Mounting Bolts	9.8	1.0	87 in·lb	
7	Coolant Fitting Bolt	8.8	0.90	78 in·lb	L
8	Water Temperature Sensor	30	3.1	22	
9	Coolant Reserve Tank Bolts	3.9	0.40	35 in·lb	L
10	Cylinder Fitting Bolts	9.8	1.0	87 in·lb	
11	Radiator Stay Bolt	9.8	1.0	87 in·lb	
12	Radiator Lower Bolt	9.8	1.0	87 in·lb	
13	Radiator Upper Bolts	25	2.5	18	

14. Thermostat

G: Apply grease.

L: Apply a non-permanent locking agent. LG: Apply liquid gasket.

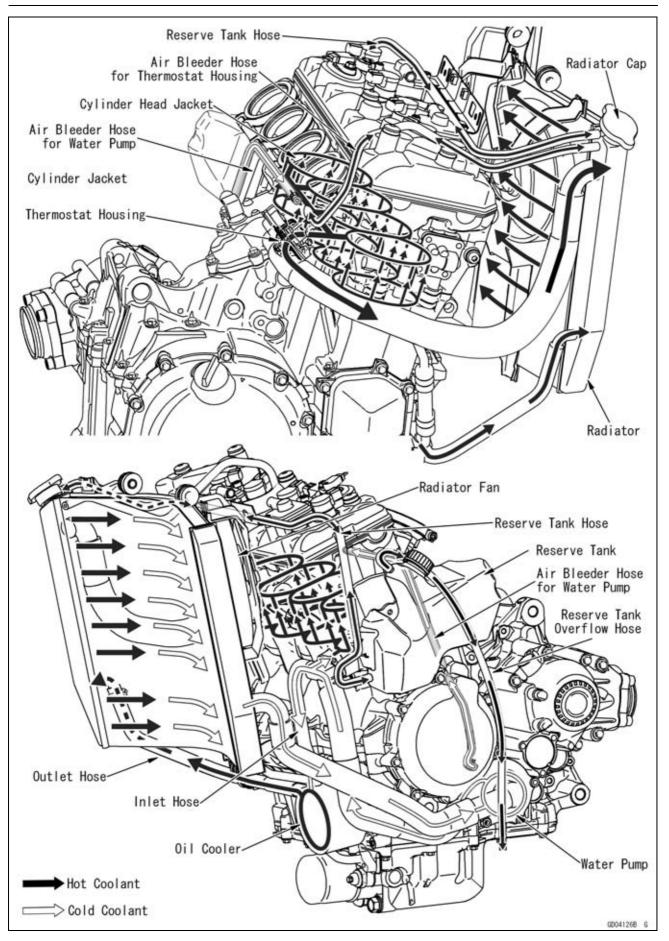
R: Replacement Parts

S: Follow the specified tightening sequence.

WL: Apply soap and water solution or rubber lubricant.

4-4 COOLING SYSTEM

Coolant Flow Chart



Coolant Flow Chart

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

The thermostat is a wax pellet type which opens or closes with coolant temperature changes. The thermostat continuously changes its valve opening to keep the coolant temperature at the proper level. When coolant temperature is less than 55°C (131°F), the thermostat closes so that the coolant flow is restricted through the air bleeder hole, causing the engine to warm up more quickly. When coolant temperature is more than 58 ~ 62°C (136 ~ 144°F), the thermostat opens and the coolant flows.

When the coolant temperature goes up beyond 95°C (203°F), the radiator fan relay 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 coolant temperature is below 90°C (194°F), the fan relay 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 $93 \sim 123$ kPa ($0.95 \sim 1.25$ kgf/cm², $13 \sim 18$ psi), the pressure valve opens and releases the pressure to the reserve tank. As soon as pressure escapes, the valve closes, and keeps the pressure at $93 \sim 123$ kPa ($0.95 \sim 1.25$ kgf/cm², $13 \sim 18$ psi). When the engine cools down, another small valve (vacuum valve) in the cap opens. As the coolant cools, the coolant contracts to form a vacuum in the system. The vacuum valve opens and allows the coolant from the reserve tank to enter the radiator.

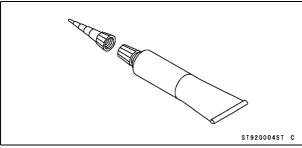
4-6 COOLING SYSTEM

Specifications

ltem	Standard		
Coolant Provided when Shipping			
Type (Recommended)	Permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)		
Color	Green		
Mixed Ratio	Soft water 50%, coolant 50%		
Freezing Point	–35°C (–31°F)		
Total Amount	3.4 L (3.6 US qt)		
	(Reserve tank full level, including radiator and engine)		
Radiator Cap			
Relief Pressure	93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 13 ~ 18 psi)		
Thermostat			
Valve Opening Temperature	58 ~ 62°C (136 ~ 144°F)		
Valve Full Opening Lift 8 mm (0.31 in.) or more at 75°C (167°F)			

Sealant

Liquid Gasket, TB1211F: 92104-0004



Coolant

Coolant Deterioration Inspection

• Remove:

Left Rear Middle Fairing (see Rear Middle Fairing Removal in the Frame chapter)

- Visually inspect the coolant in the reserve tank [A].
- ★ 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

• Refer to the Coolant Level Inspection in the Periodic Maintenance chapter.

Coolant Draining

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

Coolant Filling

 Refer to the Coolant Change in the Periodic Maintenance chapter.

Pressure Testing

Remove:

Right Front Middle Fairing (see Right Front Middle Fairing Removal in the Frame chapter) Radiator Cap Cover [A] Radiator Cap [B]

- ORemove the radiator cap 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.
- Install the cooling system pressure tester [A] on the filler neck.

NOTE

OWet the cap sealing surfaces with water or coolant to prevent pressure leaks.

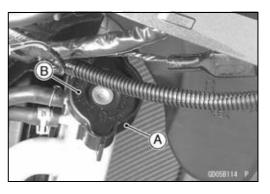
• Build up pressure in the system carefully until the pressure reaches 123 kPa (1.25 kgf/cm², 18 psi).

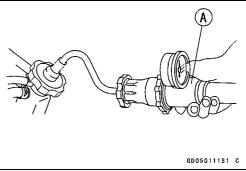
NOTICE

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

- Watch the gauge for at least 6 seconds.
- \star If the pressure holds steady, the system is all right.
- ★ If the pressure drops and no external source is found, check for internal leaks. Droplets in the engine oil indicate internal leakage. Check the cylinder head gasket and the water pump.
- Remove the pressure tester, replenish the coolant, and install the radiator cap.







Coolant

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 considerable reduce the efficiency of the cooling system.

- Drain the cooling system (see Coolant Change in the Periodic Maintenance chapter).
- Fill the cooling system with fresh water mixed with a flushing compound.

NOTICE

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 Change in the Periodic Maintenance chapter).

Coolant Reserve Tank Removal

Remove:

Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)

Left Rear Middle Fairing (see Rear Middle Fairing Removal in the Frame chapter)

Coolant Reserve Tank Bolts [A]

- Remove the cap [B] and poor the coolant into a container.
- Remove:

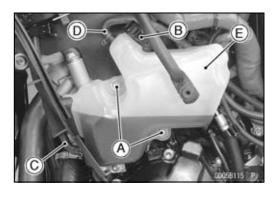
Reserve Tank Hose [C] Reserve Tank Overflow Hose [D] Coolant Reserve Tank [E]

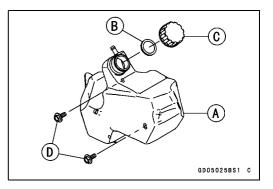
Coolant Reserve Tank Installation

- Install the following to the coolant reserve tank [A]. Gasket [B]
 - Cap [C]
- Apply a non-permanent locking agent to the threads of the reserve tank bolts [D] and tighten them.

Torque - Coolant Reserve Tank Bolts: 3.9 N·m (0.40 kgf·m, 35 in·lb)

- Run the hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Fill the coolant reserve tank with coolant (see Coolant Change in the Periodic Maintenance chapter).
- Install the removed parts (see appropriate chapters).





4-10 COOLING SYSTEM

Water Pump

Water Pump Removal

 Remove: Coolant (Drain, see Coolant Change in the Periodic Maintenance chapter) Engine Oil (Drain, see Engine Oil Change in the Periodic Maintenance chapter) Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)

• Remove:

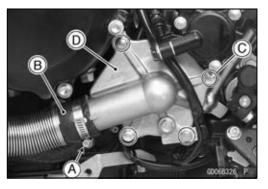
Clamp Screw [A] (Loosen) Water Hose [B] Water Pump Cover Bolts [C] Water Pump Cover [D]

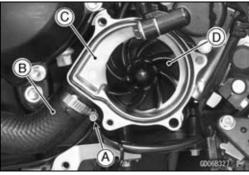
• Remove: Clamp Screw [A] (Loosen) Water Hose [B]

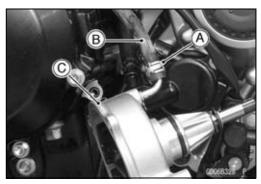
- Pull out the water pump body [C] with impeller [D].
- Slide the clamp [A] and remove the air bleeder hose [B] from the water pump body.
- Remove the water pump body [C] with impeller.



- Replace the O-ring [A] with a new one.
- Apply soap and water solution to the new O-ring.
- OApply soap and water solution to the inside of the water hoses before installation.
- Install the air bleeder hose [B] and clamp [C] to the water pump body as shown in the figure.









COOLING SYSTEM 4-11

Water Pump

• Turn the water pump shaft so that the slot [A] in its shaft fits onto the projection [B] of the oil pump drive gear shaft.

- Install the water hose [A] and hose clamp [B] as shown in the figure.
 - White Mark [C]
- Tighten:
 - Torque Water Hose Clamp Screw: 3.0 N·m (0.31 kgf·m, 27 in·lb)
- Replace the O-ring [D] with a new one.
- Apply grease to the new O-ring.
- Install the water pump cover [A] and clamp [B].
- Tighten:

Torque - Water Pump Cover Bolts [C]: 9.8 N·m (1.0 kgf·m, 87 in·lb)

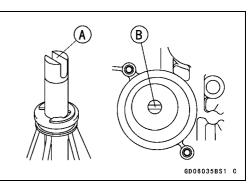
- Align the projection [D] of the water pump cover and the white mark [E] of the water hose [F].
- Install the water hose clamp [G] as shown in the figure.
- Tighten:
 - Torque Water Hose Clamp Screw: 3.0 N·m (0.31 kgf·m, 27 in·lb)
- Install the remove parts (see appropriate chapters).

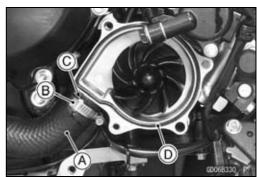
Water Pump Inspection

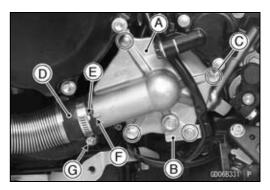
- Check the drainage outlet passage at the bottom of the water pump body for coolant leaks.
- ★ If the mechanical seal is damaged, the coolant leaks through the seal and drains through the passage. Replace the mechanical seal unit.

Water Pump Impeller Inspection

- Remove:
 - Water Pump Cover (see Water Pump Removal)
- Visually inspect the water pump impeller [A].
- ★ If the surface is corroded or if the blades are damaged, replace the water pump assy.









4-12 COOLING SYSTEM

Radiator

Radiator and Radiator Fan Removal

• Remove:

Lower Fairing (see Lower Fairing Removal in the Frame chapter)

Front Middle Fairing (see Front Middle Fairing Removal in the Frame chapter)

Coolant (Drain, see Coolant Change in the Periodic Maintenance chapter)

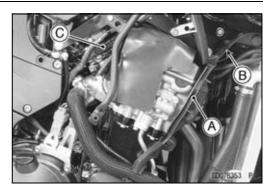
- Remove the right inner rubber cover [A] from the radiator cover [B].
- Remove the right side radiator fan lead connector [C].
- Remove:

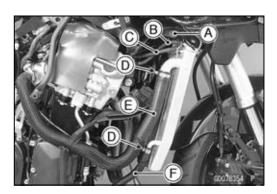
Damper [A] Reserve Tank Hose [B] Air Bleeder Hose [C] Clamp Screws [D] (Loosen) Water Hose [E] Oil Cooler Outlet Hose [F]

• Remove the radiator upper bolt [A].

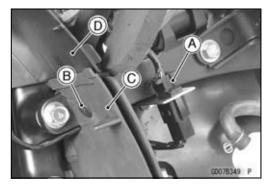
- Remove:
 - Left Side Radiator Fan Lead Connector [A] Quick Rivet [B]
- OPush the central pin of the quick rivet.
- Remove the left inner rubber cover [C] from the radiator cover [D].
- Remove:

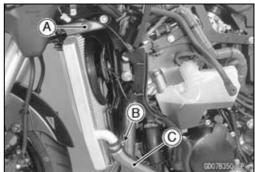
Damper [A] Clamp Screw [B] (Loosen) Water Hose [C]









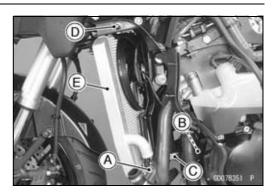


COOLING SYSTEM 4-13

Radiator

• Remove:

Radiator Lower Bolt [A] Radiator Stay Bolt [B] Radiator Stay [C] Radiator Upper Bolt [D] Radiator [E]

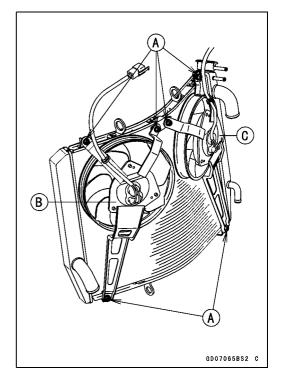


NOTICE

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

• Remove:

Radiator Fan Mounting Bolts [A] Left Side Radiator Fan [B] Right Side Radiator Fan [C]



4-14 COOLING SYSTEM

Radiator

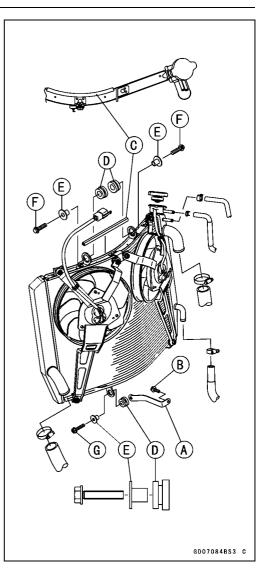
Radiator and Radiator Fan Installation

• Install the radiator stay [A] and tighten it.

Torque - Radiator Stay Bolt [B]: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Run the radiator fan motor lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Be sure that the trim seals [C] are in position on the radiator as shown in the figure.
- Install the rubber dampers [D] and collars [E] as shown in the figure.
- Tighten:
 - Torque Radiator Upper Bolts [F]: 25 N·m (2.5 kgf·m, 18 ft·lb)

Radiator Lower Bolt [G]: 9.8 N·m (1.0 kgf·m, 87 in·lb)



OApply soap and water solution to the inside of the water hoses before installation.

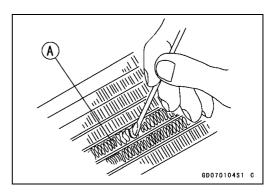
- Install the each hose and clamps (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Tighten:

Torque - Water Hose Clamp Screws: 3.0 N·m (0.31 kgf·m, 27 in·lb)

• Install the removed parts (see appropriate chapters).

Radiator Inspection

- Remove the radiator (see Radiator and Radiator Fan Removal).
- Check the radiator core.
- \bigstar 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.



Radiator

NOTICE

When cleaning the radiator with steam cleaner, be careful of the following to prevent radiator damage: Keep the steam gun [A] away more than 0.5 m (1.6 ft) [B] from the radiator core.

Hold the steam gun perpendicular [C] (not oblique [D]) to the core surface.

Run the steam gun, following the core fin direction.

Radiator Cap Inspection

• Remove:

Right Front Middle Fairing (see Front Middle Fairing Removal in the Frame chapter)

Radiator Cap (see Pressure Testing)

- Check the condition of the bottom [A] and top [B] valve seals and valve spring [C].
- ★ If any one of them shows visible damage, replace the cap with a new one.
- Install the cap [A] on a cooling system pressure tester [B].

NOTE

OWet 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 hand must remain within the same range at least 6 seconds.

Radiator Cap Relief Pressure Standard: 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 13 ~ 18 psi)

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

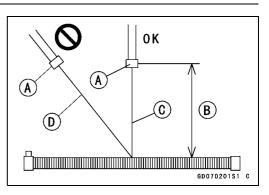
Radiator Filler Neck Inspection

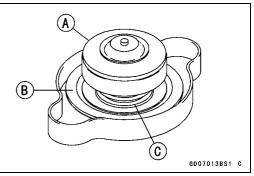
• Remove:

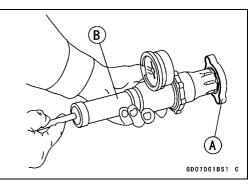
Right Front Middle Fairing (see Front Middle Fairing Removal in the Frame chapter)

Radiator Cap (see Pressure Testing)

- 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.









4-16 COOLING SYSTEM

Thermostat

Thermostat Removal

• Remove:

Coolant (Drain, see Coolant Change in the Periodic Maintenance chapter)

Right Rear Middle Fairing (see Rear Middle Fairing Removal in the Frame chapter)

Battery Compartment Cover (see Battery Removal in the Electrical System chapter)

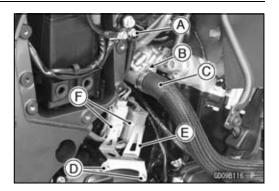
Ground Bolt [A] Clamp Screw [B] (Loosen)

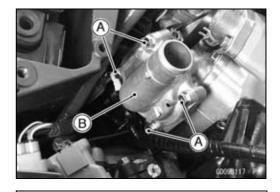
Water Hose [C]

- Clutch Cover Bolts [D] (K-ACT ABS Equipped Models) • Remove the bracket [E] from the connectors [F]
- (K-ACT ABS equipped models (Frame No, ~JK-BZGT40CCA002249)).

• Remove:

Thermostat Housing Cover Bolts [A] Thermostat Housing Cover [B] Thermostat





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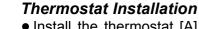
(A)

O)

O

(B)

GD09007BS1 C



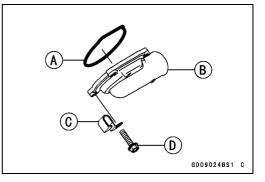
• Install the thermostat [A] in the housing so that the air bleeder hole [B] is on top.

- Replace the O-ring [A] with a new one.
- Apply liquid gasket to the new O-ring.

Sealant - Liquid Gasket, TB1211F: 92104-0004

- Install a new O-ring into the thermostat housing cover [B].
- Install the clamp [C] as shown in the figure.
- Tighten:

Torque - Thermostat Housing Cover Bolts [D]: 5.9 N·m (0.60 kgf·m, 52 in·lb)



COOLING SYSTEM 4-17

Thermostat

OApply soap and water solution to the inside of the water hoses before installation.

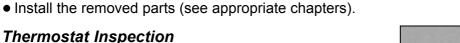
- Align the projection [A] of the thermostat housing cover and the red mark [B] of the water hose [C].
- Install the water hose clamp [D] as shown in the figure.Tighten:

Torque - Water Hose Clamp Screw: 3.0 N·m (0.31 kgf·m, 27 in·lb)

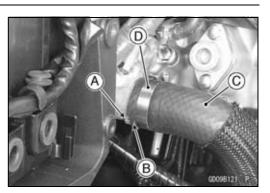
- For K-ACT ABS equipped models (Frame No, ~JK-BZGT40CCA002249); note the following.
- Install the bracket [A] to the connectors [B].
- Install the bracket as shown in the figure.
- Tighten:

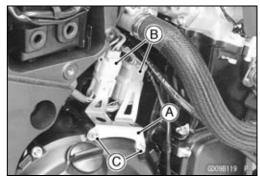
Torque - Clutch Cover Bolts [C]: 9.8 N·m (1.0 kgf·m, 87 in·lb)

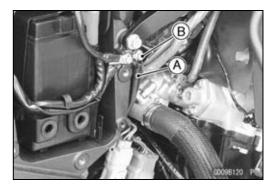
• Install the cable [A] and tighten the ground bolt [B].

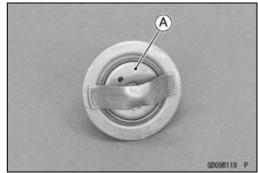


- Remove the thermostat (see Thermostat Removal).
- Inspect the thermostat valve [A] at room temperature.
- \star If the valve is open, replace the thermostat with a new one.







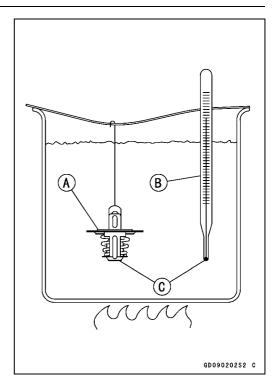


4-18 COOLING SYSTEM

Thermostat

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

Thermostat Valve Opening Temperature 58 ~ 62°C (136 ~ 144°F)



Hoses and Pipes

Hose Installation

- Install the hoses and pipes, being careful to follow bending direction. Avoid sharp bending, kinking, flattening or twisting.
- Run the hoses (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- 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.

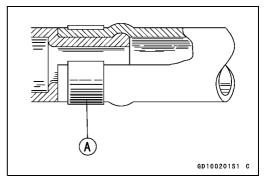
OThe clamp screws should be positioned correctly to prevent the clamps from contacting the other parts.

OTighten:

Torque - Water Hose Clamp Screws: 3.0 N·m (0.31 kgf·m, 27 in·lb)

Hose Inspection

• Refer to the Radiator (Water) Hose Inspection in the Periodic Maintenance chapter.



4-20 COOLING SYSTEM

Water Temperature Sensor

Water Temperature Sensor Removal/Installation

• Refer to the Water Temperature Sensor Removal/Installation in the Fuel System (DFI) chapter.

Water Temperature Sensor Inspection

• Refer to the Water Temperature Sensor Inspection in the Electrical System chapter.

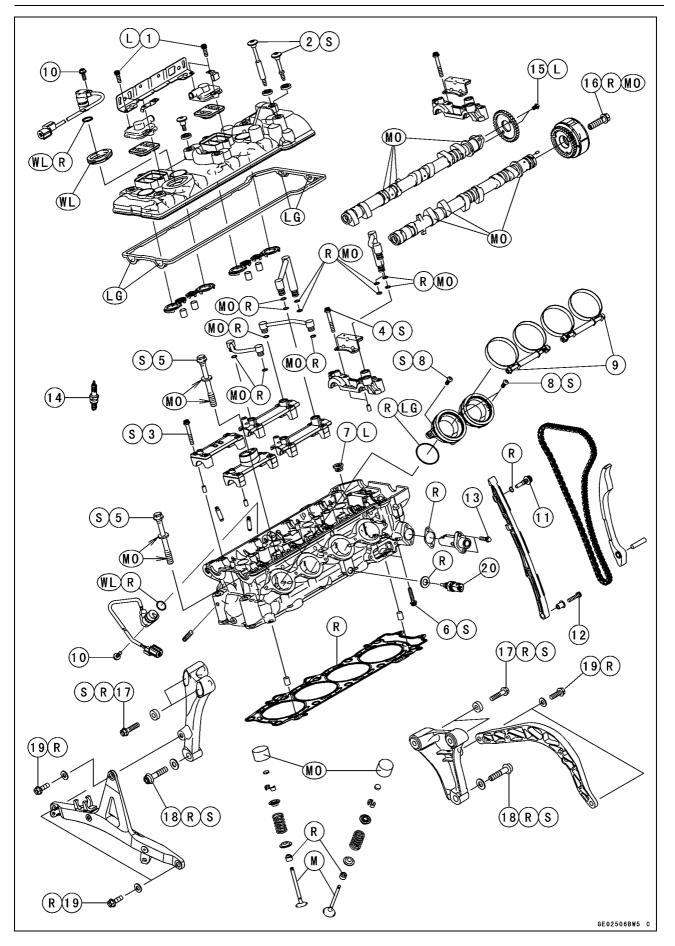
Engine Top End

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5-2 ENGINE TOP END

Exploded View



Exploded View

N -	F = 4 = = = =	Torque			Barrada
No.	Fastener	N∙m	kgf∙m	ft·lb	Remarks
1	Air Suction Valve Cover Bolts	9.8	1.0	87 in·lb	L
2	Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	S
3	Camshaft Cap Bolts	12	1.2	106 in·lb	S
4	Camshaft Chain Guide Bolts	12	1.2	106 in·lb	S
5	Cylinder Head Bolts (M11, First)	39	4.0	29	MO, S
Э	Cylinder Head Bolts (M11, Final)	64	6.5	47	MO, S
6	Cylinder Head Bolts (M6)	12	1.2	106 in·lb	S
7	Water Passage Plugs	20	2.0	15	L
8	Throttle Body Assy Holder Bolts	9.8	1.0	87 in·lb	S
9	Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
10	Camshaft Position Sensor Bolts	9.8	1.0	87 in·lb	
11	Front Camshaft Chain Guide Bolt (Upper)	25	2.5	18	
12	Front Camshaft Chain Guide Bolt (Lower)	12	1.2	106 in·lb	
13	Camshaft Chain Tensioner Mounting Bolts	9.8	1.0	87 in·lb	
14	Spark Plugs	13	1.3	115 in·lb	
15	Cam Sprocket Mounting Bolts	15	1.5	11	L
16	Variable Valve Actuator Mounting Bolt	59	6.0	44	MO, R
17	Engine Bracket Bolts (M8)	25	2.5	18	R, S
18	Front Engine Mounting Bolts (M10)	59	6.0	44	R, S
19	Subframe Bolts	23	2.3	17	R
20	Water Temperature Sensor	30	3.1	22	

G: Apply grease.

L: Apply a non-permanent locking agent.

LG: Apply liquid gasket.

M: Apply molybdenum disulfide grease.

MO: Apply molybdenum disulfide oil.

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

R: Replacement Parts

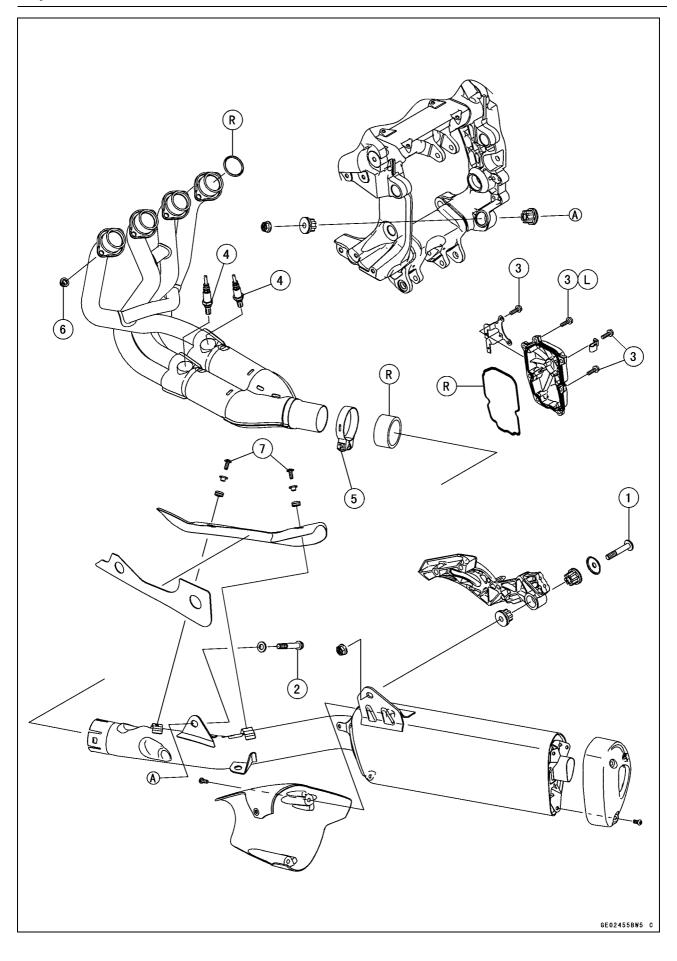
S: Follow the specified tightening sequence.

SS: Apply silicone sealant.

WL: Apply soap and water solution or rubber lubricant.

5-4 ENGINE TOP END

Exploded View



Exploded View

No.	Fastener	Torque			Demerika
NO.	Fasteller	N∙m	kgf∙m	ft·lb	Remarks
1	Muffler Body Mounting Bolt (L = 58 mm)	34	3.5	25	
2	Muffler Body Mounting Bolt (L = 60 mm)	34	3.5	25	
3	Crankshaft Sensor Cover Bolts	9.8	1.0	87 in·lb	L (1)
4	Oxygen Sensor (Equipped Models)	25	2.5	18	
5	Muffler Body Clamp Bolt	17	1.7	13	
6	Exhaust Pipe Manifold Holder Nuts	17	1.7	13	
7	Exhaust Pipe Cover Bolts	9.8	1.0	87 in·lb	

L: Apply a non-permanent locking agent. R: Replacement Parts

5-6 ENGINE TOP END

Exhaust System

MANIFOLD	MUFFLER BODY	SPECIFICATION	MODEL
Honeycomb Type Catalyst with	Non-Catalyst		704400045 005
Oxygen sensor P/No. 39178-0139 Mark: KHI M 128	P/No. 18091-0616 Mark: KHI K 605 EPA Noise Emission Control Information	WVTA (FULL H) GB WVTA (FULL H) WVTA (78.2 H) SEA	ZG1400CAF ~ CBF ZG1400CAF ~ CBF ZG1400CAF ~ CBF ZG1400CAF ~ CBF
Honeycomb Type Catalyst without Oxygen sensor	Non-Catalyst	CAL CAL	ZG1400CAFL ~ CBFL ZG1400DAFL
P/No. 39178-0140 Mark: KHI M 129	Mark: KHI K 605 EPA Noise Emission Control Information	US US CA CA AU	ZG1400CAF ~ CBF ZG1400DAF ZG1400CAF ~ CBF ZG1400DAF ZG1400CAF ~ CBF
Honeycomb Type Catalyst without	Non-Catalyst	70	201400CAF ~ CBF
Oxygen sensor P/No. 39178-0141 Mark: KHI M 130	P/No. 18091-0616 Mark: KHI K 605 EPA Noise Emission Control Information	MY	ZG1400CAF ~ CBF
			GE24564B F

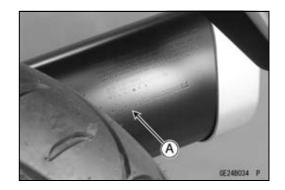
FUL L: Full Power H: Honeycomb Type Catalyst 78.2: Hosepower 78.2 kW (106.3 ps)

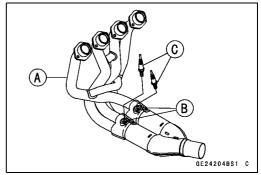
Manifold Mark Position [A]



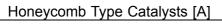
Exhaust System

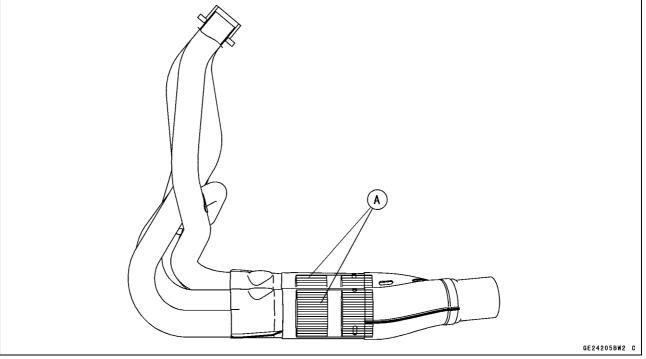
Muffler Body Mark Position [A]





Manifold [A] with Holes [B] for Oxygen Sensors [C]





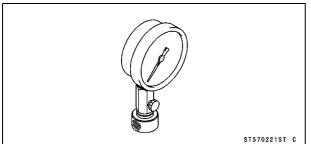
5-8 ENGINE TOP END

Specifications

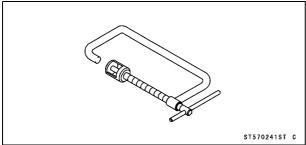
Item	Standard	Service Limit
Camshafts		
Cam Height:		
Exhaust	33.642 ~ 33.756 mm (1.3245 ~ 1.3290 in.)	33.54 mm (1.320 in.)
Inlet	34.243 ~ 34.357 mm (1.3481 ~ 1.3526 in.)	34.14 mm (1.344 in.)
Camshaft Journal, Camshaft Cap Clearance	0.038 ~ 0.081 mm (0.0015 ~ 0.0032 in.)	0.17 mm (0.0067 in.)
Camshaft Journal Diameter	23.940 ~ 23.962 mm (0.9425 ~ 0.9434 in.)	23.91 mm (0.9413 in.)
Camshaft Bearing Inside Diameter	24.000 ~ 24.021 mm (0.9449 ~ 0.9457 in.)	24.08 mm (0.9480 in.)
Camshaft Runout	TIR 0.02 mm (0.0008 in.) or less	TIR 0.1 mm (0.004 in.)
Cylinder Head		
Cylinder Compression	(Usable Range) 912 ~ 1 402 kPa (9.3 ~ 14.3 kgf/cm², 132 ~ 203 psi) @300 r/min (rpm)	
Cylinder Head Warp		0.05 mm (0.002 in.)
Valves		
Valve Clearance:		
Exhaust	0.19 ~ 0.24 mm (0.0075 ~ 0.0094 in.)	
Inlet	0.12 ~ 0.17 mm (0.0047 ~ 0.0067 in.)	
Valve Head Thickness:		
Exhaust	0.80 mm (0.031 in.)	0.7 mm (0.03 in.)
Inlet	0.50 mm (0.020 in.)	0.3 mm (0.01 in.)
Valve Stem Bend	TIR 0.01 mm (0.0004 in.) or less	TIR 0.05 mm (0.002 in.)
Valve Stem Diameter:		
Exhaust	4.955 ~ 4.970 mm (0.1951 ~ 0.1957 in.)	4.94 mm (0.194 in.)
Inlet	4.975 ~ 4.990 mm (0.1959 ~ 0.1965 in.)	4.96 mm (0.195 in.)
Valve Guide Inside Diameter:		
Exhaust	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in.)	5.08 mm (0.200 in.)
Inlet	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in.)	5.08 mm (0.200 in.)
Valve/valve Guide Clearance (Wobble Method):		
Exhaust	0.10 ~ 0.18 mm (0.0039 ~ 0.0071 in.)	0.40 mm (0.016 in.)
Inlet	0.03 ~ 0.12 mm (0.0012 ~ 0.0047 in.)	0.34 mm (0.013 in.)
Valve Seat Cutting Angle	45°, 32°, 60°	
Valve Seating Surface:		
Width:		
Exhaust	0.8 ~ 1.2 mm (0.03 ~ 0.05 in.)	
Inlet	0.5 ~ 1.0 mm (0.02 ~ 0.04 in.)	
Outside Diameter:		
Exhaust	27.6 ~ 27.8 mm (1.087 ~ 1.094 in.)	
Inlet	32.6 ~ 32.8 mm (1.283 ~ 1.291 in.)	
Valve Spring Free Length:		
Exhaust	38.72 mm (1.524 in.)	37.1 mm (1.461 in.)
Inlet	38.72 mm (1.524 in.)	37.1 mm (1.461 in.)

Special Tools and Sealant

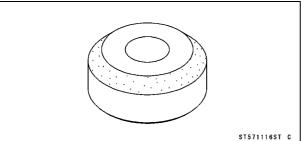
Compression Gauge, 20 kgf/cm²: 57001-221



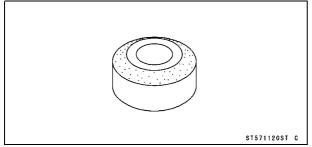
Valve Spring Compressor Assembly: 57001-241



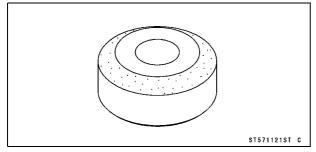




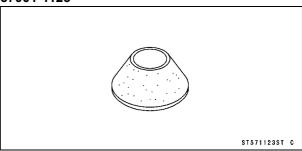
Valve Seat Cutter, 32° - ϕ 30: 57001-1120



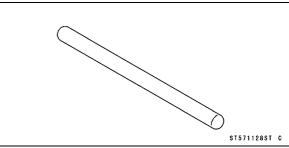
Valve Seat Cutter, 32° - ϕ 35: 57001-1121



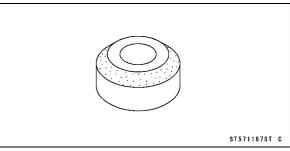
Valve Seat Cutter, 60° - ϕ 30: 57001-1123



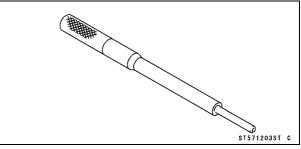
Valve Seat Cutter Holder Bar: 57001-1128



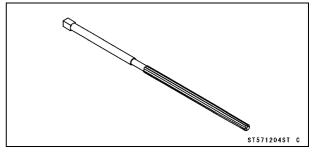
Valve Seat Cutter, 45° - ϕ 30: 57001-1187



Valve Guide Arbor, ϕ 5: 57001-1203



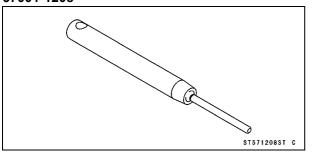
Valve Guide Reamer, ϕ 5: 57001-1204



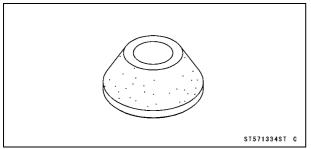
5-10 ENGINE TOP END

Special Tools and Sealant

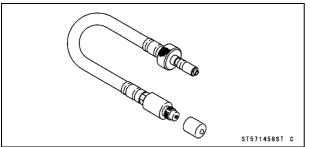
Valve Seat Cutter Holder, ϕ 5: 57001-1208



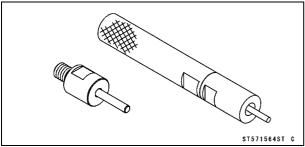
Valve Seat Cutter, 60° - ϕ 33: 57001-1334



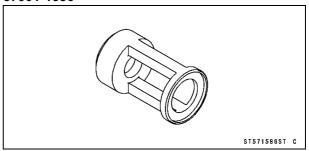
Compression Gauge Adapter, M10 × 1.0: 57001-1458



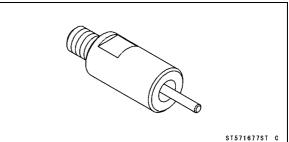
Valve Guide Driver: 57001-1564



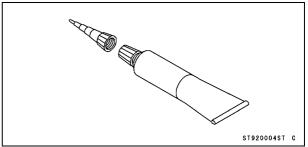
Valve Spring Compressor Adapter, ϕ 24: 57001-1586



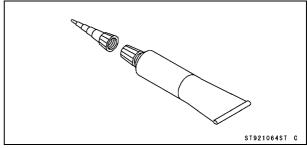
Valve Guide Driver Attachment, E: 57001-1677



Liquid Gasket, TB1211F: 92104-0004



Liquid Gasket, TB1216B: 92104-1064



Clean Air System

Air Suction Valve Removal

• Remove:

Front Middle Fairings (see Front Middle Fairing Removal in the Frame chapter)

Fairing Stays (see Left/Right Fairing Stay Removal in the Frame chapter)

Subframes (see Left/Right Subframe Removal in the Frame chapter)

- Remove the air switching valve with the hoses (see Air Switching Valve Removal).
- Disconnect the connector [A] (Left Side only).
- Remove:
 - Air Suction Valve Cover Bolts [A] Air Suction Valve Cover [B]

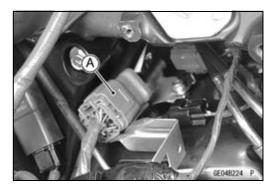
• Remove: Air Suction Valve [A]

Air Suction Valve Installation

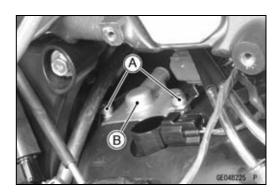
- Install the air suction valves [A] so that opening [B] of the reed faces the rear and downward.
- Apply a non-permanent locking agent to the threads of the air suction valve cover bolts [C].
- Tighten:

Clamp [D] (for inlet camshaft position sensor lead) Plate [E] (for sub harness connector of stick coils) Air Suction Valve Covers [F] Heat Insulation plate Bracket [G]

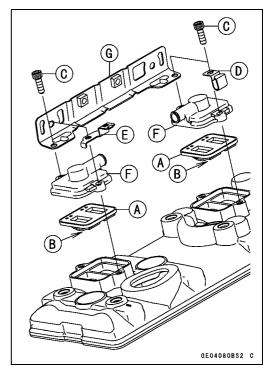
Torque - Air Suction Valve Cover Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)



ENGINE TOP END 5-11







5-12 ENGINE TOP END

Clean Air System

Air Suction Valve Inspection

- Remove the air suction valve (see Air Suction Valve Removal).
- 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 sings 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.

NOTICE

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

Air Switching Valve Removal

• Remove:

Front Middle Fairings (see Front Middle Fairing Removal in the Frame chapter)

Right Subframe (see Right Subframe Removal in the Frame chapter)

- Pull out the hoses [A]
- Remove: Connector [A] Air Switching Valve [B]

NOTICE

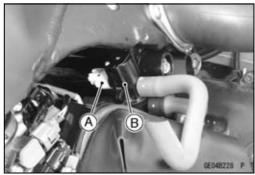
Never drop the switch especially on a hard surface. Such a shock to the switch can damage it.

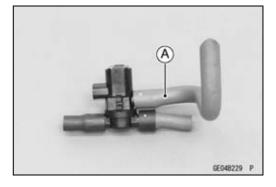
Air Switching Valve Installation

- Install the air switching valve so that the air duct [A] faces right side.
- Route the hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

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Air Switching Valve Operation Test

• Refer to the Air Switching Valve Operation Test in the Electrical System chapter.

Clean Air System

Air Switching Valve Unit Test

• Refer to the Air Switching Valve Unit Test in the Electrical System chapter.

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, air switching valve and air suction valve covers.
- ★If they are not, correct them. Replace them if they are damaged.

Cylinder Head Cover

Cylinder Head Cover Removal

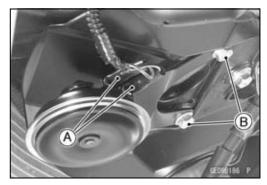
• Remove:

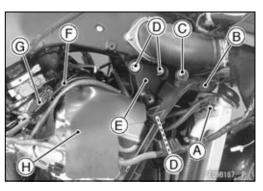
Front Middle Fairings (see Front Middle Fairing Removal in the Frame chapter) Air Suction Valve (see Air Suction Valve Removal) Stick Coils (see Stick Coil Removal in the Electrical System chapter) Inlet Camshaft Position Sensor (see Camshaft Position Sensor Removal in the Electrical System chapter) Horn Connectors [A] Horn Mounting Bolts [B]

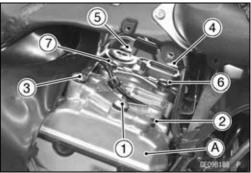
• Remove:

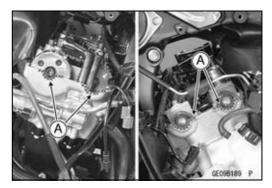
Coolant Hose [A] Plugs [B] (Both Sides) Radiator Bolts [C] (Both Sides) Bolts [D] Right Engine Bracket [E] Exshaust Camshaft Position Sensor Connector [F] Radiator Fan Connector [G]

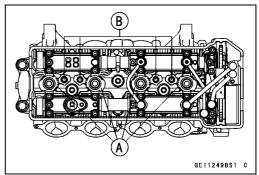
- Turn up the heat insulation rubber plate [H].
- Remove the cylinder head cover bolts, following specified unscrewing sequence [1 ~ 7].
- Remove the cylinder head cover [A] to the right side of the engine.











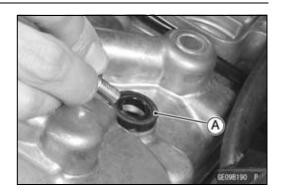
Cylinder Head Cover Installation

- Replace the head cover gasket with a new one.
- Apply liquid gasket [A] to the cylinder head as shown. Sealant - Liquid Gasket, TB1216B: 92104-1064

 Install: Dowel Pins [B] Plug Hole Gaskets [A]

Cylinder Head Cover

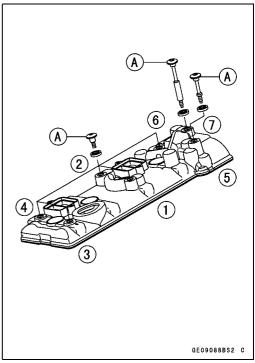
• Install the washers with the metal side face [A] upward.



• Tighten the cover bolt [A], following the specified tightening sequence [1 ~ 7].

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

• Install the removed parts (see appropriate chapters).



5-16 ENGINE TOP END

Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

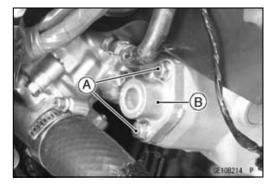
Camshaft Chain Tensioner Installation

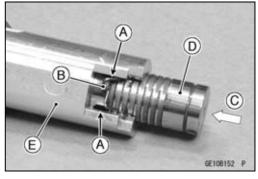
NOTICE

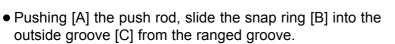
Do not turn over the crankshaft while the tensioner is removed. This could upset the camshaft chain timing, and damage the valves.

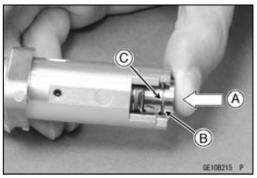
- Remove the right rear middle fairing (see Rear Middle Fairing Removal in the Frame chapter).
- Remove the mounting bolts [A] and take off the camshaft chain tensioner [B].

• Pinching [A] the stopper [B], release it and push [C] the push rod [D] into the interior of the tensioner body [E].









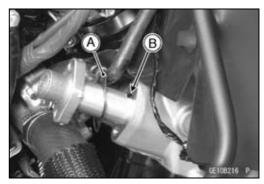
- Replace the gasket [A] with new one.
- Install the tensioner body so that the stopper [B] faces upward.
- Tighten:

Torque - Camshaft Chain Tensioner Mounting Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

• Turn the crankshaft 2 turns clockwise to allow the tensioner to expand and recheck the camshaft chain timing.

NOTE

○You hear of the sound from which the push rod moves out.



Camshaft, Camshaft Chain

Camshaft Removal

• Remove:

Cylinder Head Cover (see Cylinder Head Cover Removal)

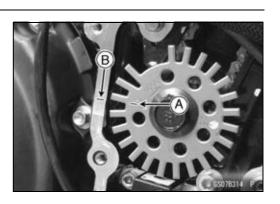
Timing Rotor Cover (see Timing Rotor Removal in the Electrical System chapter)

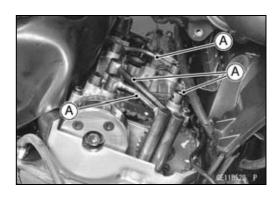
 Align the #1, 4 T mark [A] on the timing rotor with the mating surface [B] of the crankcase halves to position the crankshaft to the #1, 4 piston TDC. TDC mark [A] for #1, 4 Pistons

Timing Mark (crankcase halves mating surface) [B]

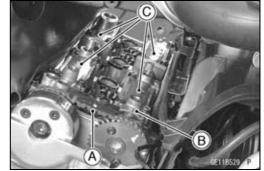
• Remove:

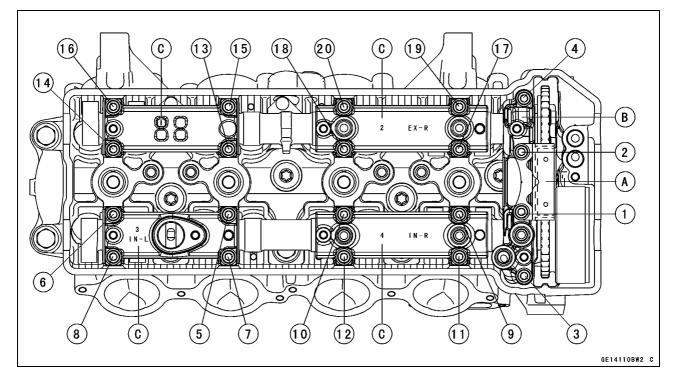
Camshaft Chain Tensioner (see Camshaft Chain Tensioner Removal) Oil Pipes [A]





• First remove the chain guide [A], next remove the camshaft cap [B], the remove all camshaft caps [C] OFirst unscrew the cap bolts [1 ~ 4], then unscrew all camshaft cap bolts [5 ~ 20] following the specified unscrewing sequence.

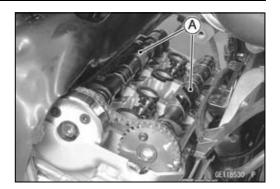




5-18 ENGINE TOP END

Camshaft, Camshaft Chain

- Remove the camshafts [A].
- Stuff a clean cloth into the chain tunnel to keep any parts from dropping into the crankcase.



- Remove the variable valve actuator and cam sprocket mounting bolts [A].
- Remove the variable valve actuator and cam sprocket.

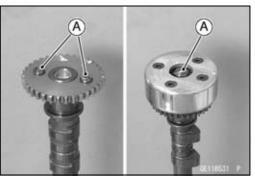
NOTICE

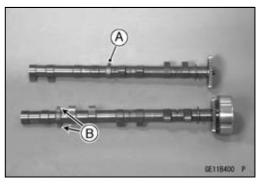
The crankshaft may be turned while the camshafts are removed. Always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower (crankshaft) sprocket. A kinked chain could damage both the chain and the sprocket.

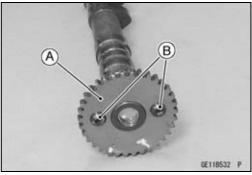
Camshaft Installation

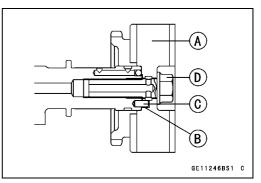
NOTE

- OThe exhaust camshaft has the projection [A] for camshaft position sensor.
- The inlet camshaft has two projections [B] for camshaft position sensor.
- Install the exhaust cam sprocket [A] so that the flat surface faces outside.
- Apply a non-permanent locking agent to the threads of the cam sprocket mounting bolts.
- Tighten:
 - Torque Cam Sprocket Mounting Bolts [B]: 15 N·m (1.5 kgf·m, 11 ft·lb)
- Install the variable valve actuator [A].
- OPut the follow [B] of the actuator on the pin [C] of the camshaft.
- Replace the actuator mounting bolt [D] with a new one.
- Apply molybdenum disulfide oil to seating surface.
- Tighten:
 - Torque Variable Valve Actuator Mounting Bolt: 59 N·m (6.0 kgf·m, 44 ft·lb)







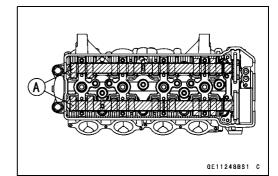


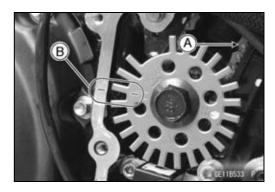
Camshaft, Camshaft Chain

• Be sure to install the dowel pins [A].

• Apply [A] molybdenum disulfide oil to the cam surfaces and all journal portions as shown.

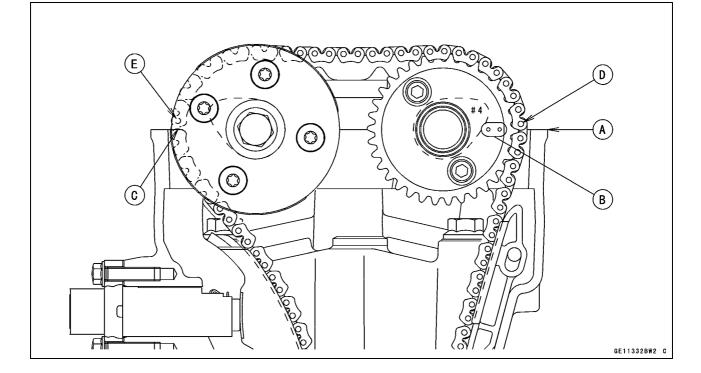
- Position the crankshaft at #1, 4 piston TDC.
- Pull the tension side (exhaust side) [A] of the chain taut to install the chain.
- Engage the camshaft chain with the camshaft sprockets so that the timing marks on the sprockets are positioned as shown.
- OThe timing marks of #1, 4T must be aligned with the lower surface of crankcase of rear side [B].





OThe timing marks must be aligned with the cylinder head upper surface [A].

EX mark [B] IN mark [C] No.1 Pin [D] No.30 Pin [E]

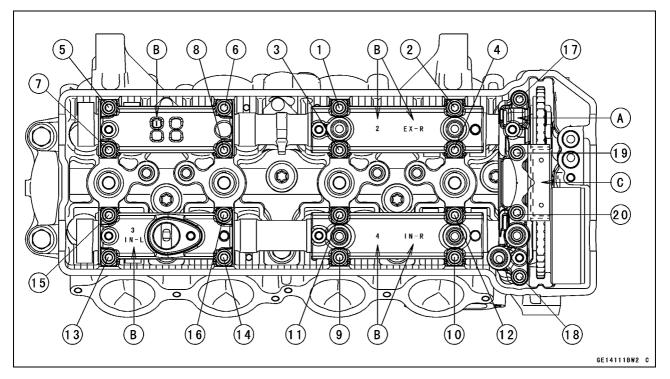


5-20 ENGINE TOP END

Camshaft, Camshaft Chain

- First install the camshaft cap [A] temporary to fix the position of the camshaft.
- Next install the camshaft caps, following the identification No. and/or Name [B] and chain guide [C].
- OInstall the camshaft chain tensioner temporary (see Camshaft Chain Tensioner Installation).
- OTemporary tighten the camshaft cap bolts following the specified tightening sequence to seat the camshaft in place. Then tighten all bolts following the specified tightening sequence.

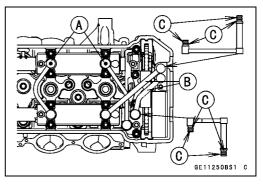
Torque - Camshaft Cap Bolts (1 ~ 20): 12 N·m (1.2 kgf·m, 106 in·lb)



• Install the oil pipes [A] as shown.

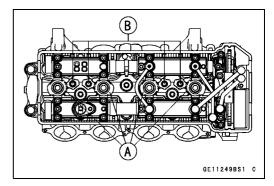
OApply molybdenum disulfide oil solution to the new O-rings.

• Install the two O-rings [C] to the oil pipes [B].



Camshaft, Camshaft Chain

- Be sure to install the following parts. Plug Hole Gaskets [A] Dowel Pins [B]
- Install the cylinder head cover (see Cylinder Head Cover Installation).



Camshaft, Camshaft Cap Wear Inspection

- Remove:
 - Camshaft Chain Guide

Camshaft Cap (see Camshaft Removal)

- 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 (press gauge) [A].
- Tighten:

Torque - Camshaft Cap Bolts: 12 N⋅m (1.2 kgf⋅m, 106 in⋅lb) Camshaft Chain Guide Bolts: 12 N⋅m (1.2 kgf⋅m, 106 in⋅lb) (see Camshaft Installation)

NOTE

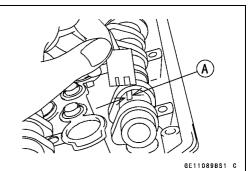
ODo not turn the camshaft when the plastigage is between the journal and camshaft cap.

Camshaft Journal, Camshaft Cap Clearance Standard: 0.038 ~ 0.081 mm (0.0015 ~ 0.0032 in.) Service Limit: 0.17 mm (0.0067 in.)

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

Camshaft Journal Diameter Standard: 23.940 ~ 23.962 mm (0.9425 ~ 0.9434 in.) Service Limit: 23.91 mm (0.9413 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.



5-22 ENGINE TOP END

Camshaft, Camshaft Chain

Camshaft Runout Inspection

- Remove the camshaft (see Camshaft Removal).
- Set the camshaft in a camshaft alignment jig or on V blocks.
- Measure runout with a dial gauge at the specified place as shown.
- \star If the runout exceeds the service limit, replace the shaft.

Camshaft Runout

Standard: TIR 0.02 mm (0.0008 in.) or less Service Limit: TIR 0.1 mm (0.004 in.)

Cam Wear Inspection

- Remove the camshaft (see Camshaft Removal).
- Measure the height [A] of each cam with a micrometer.
- ★ If the cams are worn down past the service limit, replace the camshaft.

Cam Height

Standard:

Exhaust	33.642 ~ 33.756 mm (1.3245 ~ 1.3290 in.)
Inlet	34.243 ~ 34. 357 mm (1.3481 ~ 1.3526 in.)

Service Limit:

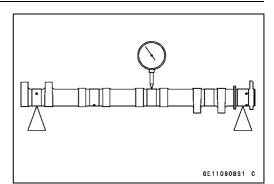
Exhaust	33.54 mm (1.320 in.)
Inlet	34.14 mm (1.344 in.)

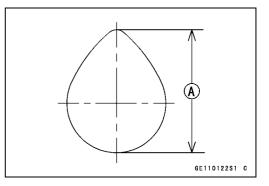
Camshaft Chain Removal

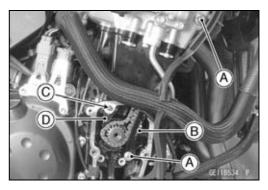
• Remove:

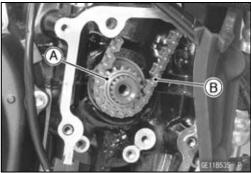
Camshafts (see Camshaft Removal) Timing Rotor (see Timing Rotor Removal in the Electrical System chapter) Front Camshaft Chain Guide Bolts [A] Front Camshaft Chain Guide [B] Dowel Pin [C] Rear Camshaft Chain Guide [D]

- Remove the crankshaft sprocket [A] with the camshaft chain [B].
- Pull out the camshaft chain from downward.









Camshaft, Camshaft Chain

Camshaft Chain Installation

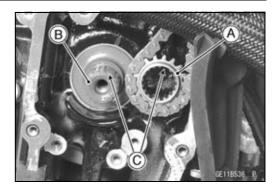
- Install the camshaft chain from head side.
- Install the crankshaft sprocket [A] on the crankshaft [B] with their teeth [C] aligned.
- Install:

Camshaft Chain Guides (see Cylinder Head Installation) Timing Rotor (see Timing Rotor Installation in the Electrical System chapter)

Torque - Front Camshaft Chain Guide Bolt (Upper): 25 N·m (2.5 kgf·m, 18 ft·lb) Front Camshaft Chain Guide Bolt (Lower): 12 N·m

(1.2 kgf·m, 106 in·lb)

• Install the removed parts (see appropriate chapters).



Cylinder Head

Cylinder Compression Measurement

NOTE

○Use the battery which is fully charged.

- Warm up the engine thoroughly.
- Stop the engine.
- Remove:

Stick Coils (see Stick Coil Removal in the Electrical System chapter)

Spark Plugs (see Spark Plug Replacement in the Periodic Maintenance chapter)

Owner's Tool - Spark Plug Wrench: 92110-1132

- Attach the compression gauge [A] and adapter [B] firmly into the spark plug hole.
- OUsing 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: 57001-1458

Cylinder Compression

Usable Range: 912 ~ 1 402 kPa (9.3 ~ 14.3 kgf/cm², 132 ~ 203 psi) @300 r/min (rpm)

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

Torque - Spark Plugs: 13 N·m (1.3 kgf·m, 115 in·lb)



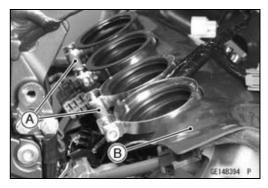
The following table should be consulted if the obtainable compression reading is not within the usable range.

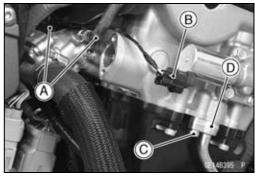
Problem	Diagnosis	Remedy (Action)
Cylinder compression is higher than usable range	Carbon accumulation on piston and in combustion chamber possibly due to damaged valve stem oil seal and/or damaged piston oil rings (This may be indicated by white exhaust smoke).	Remove the carbon deposits and replace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

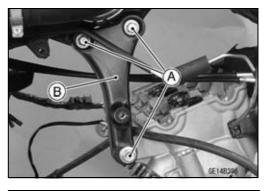
Cylinder Head

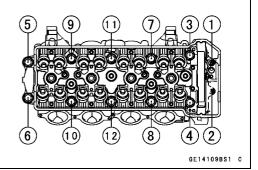
Cylinder Head Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
 - Throttle Body Assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter) Exhaust Pipe (see Exhaust Pipe Removal) Camshafts (see Camshaft Removal)
- Remove:
 - Throttle Body Holder Clamps [A] Heat Inshelation Rubber Plate [B] (turn up)









• Remove:

Air Bleed Hoses [A] (upper side) Oil Control Valve Solenoid Connector [B]

- Remove the bolt [C], and pull out the oil hose fitting [D].
- Remove: Bolts [A] Left Engine Bracket [B]

- Loosen the M6 and M11 cylinder head bolts as shown sequence [1 ~ 12] in the figure, and remove them.
- Take off the cylinder head.

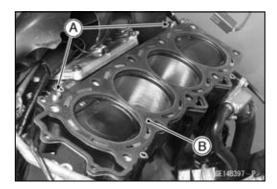
5-26 ENGINE TOP END

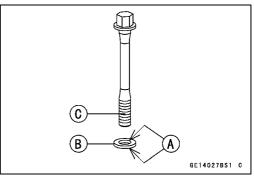
Cylinder Head

Cylinder Head Installation

NOTE

- OThe camshaft cap is machined with the cylinder head, so if a new cylinder head is installed, use the cap that is supplied with the new head.
- Install the dowel pins [A] and new cylinder head gasket [B].
- Replace the cylinder head bolt washers [B] with new ones.
- Apply molybdenum disulfide oil solution to both sides [A] of the cylinder head bolt washers and the thread of head bolts [C].





- Tighten the M11 cylinder head bolts following the tighten-First: 39 N·m (4.0 kgf·m, 29 ft·lb) 0 0 0 Final: 64 N·m (6.5 kgf·m, 47 ft·lb)
- Tighten the M6 cylinder head bolts [11 ~ 12].

Torque - Cylinder Head Bolts (M11):

ing sequence $[1 \sim 10]$.

- Torque Cylinder Head Bolts (M6): 12 N·m (1.2 kgf·m, 106 in·lb)
- Install:

Dowel Pin [A] Rear Camshaft Chain Guide [B] Front Camshaft Chain Guide [C] O-ring [D] Collar [E]

• Tighten:

Torque - Front Camshaft Chain Guide Bolt (Upper) [F]: 25 N·m (2.5 kgf·m, 18 ft·lb) Front Camshaft Chain Guide Bolt (Lower) [G]: 12 N·m (1.2 kgf·m, 106 in·lb)

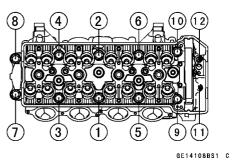
• Replace the following bolts with new bolts pre-coated with locking agent and torque them. **Engine Bracket Bolts**

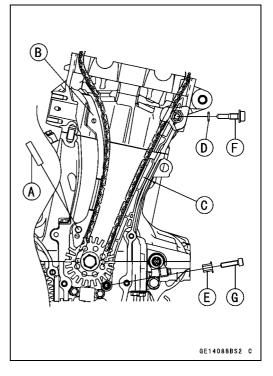
Front Engine Mounting Bolts Subframe Bolts

Torque - Engine Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb) Front Engine Mounting Bolts: 59 N·m (6.0 kgf·m, 44 ft·lb)

Subframe Bolts: 23 N·m (2.3 kgf·m, 17 ft·lb)

• Install the removed parts (see appropriate chapters).





Cylinder Head

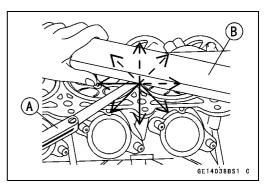
Cylinder Head Warp Inspection

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

Cylinder Head Warp Standard: – – –

Service Limit: 0.05 mm (0.002 in.)

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



5-28 ENGINE TOP END

Valves

Valve Clearance Inspection

• Refer to the Valve Clearance Inspection in the Periodic Maintenance chapter (see Valve Clearance Inspection the Periodic Maintenance chapter).

Valve Removal

- Remove the cylinder head (see Cylinder Head Removal).
- Remove the valve lifter and shim.
- OMark and record the valve lifter and shim locations so they can be installed in their original positions.
- Using the valve spring compressor assembly, remove the valve.

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

Valve Spring Compressor Adapter, ϕ 24: 57001-1586 [B]

Valve Installation

- Replace the oil seal with a new one.
- Apply a thin coat of molybdenum disulfide grease to the valve stem before valve installation.
- Install the springs so that the closed coil end faces downwards.
 - Valve Stem [A] Oil Seal [B] Spring Seat [C] Closed Coil End [D] Valve Spring [E] Retainer [F] Split Keepers [G]

Valve Guide Removal

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

NOTICE

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

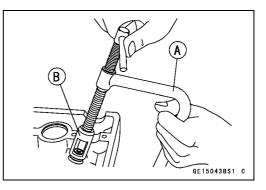
Special Tool - Valve Guide Arbor, ϕ 5: 57001-1203

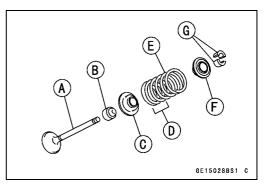
Valve Guide Installation

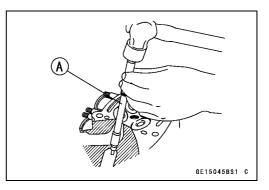
- Apply oil to the valve guide outer surface before installation.
- Heat the area around the valve guide hole to about 120 ~ 150°C (248 ~ 302°F).

NOTICE

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







Valves

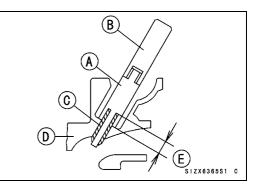
- Assembly the valve guide driver parts (Holder and attachment E).
- Insert the rod of the driver into the valve guide bore and hammer the end of the driver until it bottoms.
 Valve Guide Driver Attachment E [A]

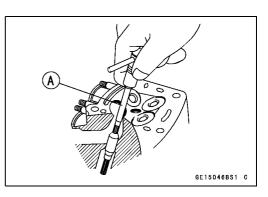
Valve Guide Driver (Holder) [B] Valve Guide [C] Cylinder Head [D] Valve Guide Installed Height: 13 mm (0.51 in.) [E]

Special Tools - Valve Guide Driver: 57001-1564 Valve Guide Driver Attachment, E: 57001 -1677

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

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





Valve-to-Guide Clearance Measurement (Wobble Method)

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

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

NOTE

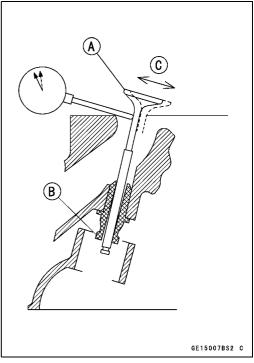
OThe reading is not actual valve/valve guide clearance because the measuring point is above the guide.

Valve/Valve Guide Clearance (Wobble Method) Standard:

Exhaust	0.10 ~ 0.18 mm (0.0039 ~ 0.0071 in.)
Inlet	0.03 ~ 0.12 mm (0.0012 ~ 0.0047 in.)

Service Limit:

Exhaust	0.40 mm (0.016 in.)
Inlet	0.34 mm (0.013 in.)



5-30 ENGINE TOP END

Valves

Valve Seat Inspection

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

Valve Seating Surface Outside Diameter Standard:

Exhaust27.6 ~ 27.8 mm (1.087 ~ 1.094 in.)Inlet32.6 ~ 32.8 mm (1.283 ~ 1.291 in.)

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

Good [F]

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

Valve Seating Surface Width

Standard:

Exhaust 0.8 ~ 1.2 mm (0.03 ~ 0.05 in.) Inlet 0.5 ~ 1.0 mm (0.02 ~ 0.04 in.)

Valve Seat Repair

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

Special Tools - Valve Seat Cutter Holder, ϕ 5: 57001-1208 [B] Valve Seat Cutter Holder Bar: 57001-1128

For Exhaust Valve Seat

[C]

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

Valve Seat Cutter, 32° - ϕ 30: 57001-1120

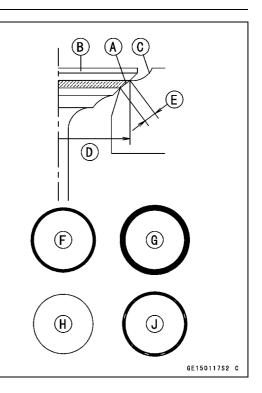
Valve Seat Cutter, 60° - ϕ 30: 57001-1123

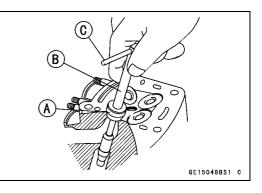
For Inlet Valve Seat

Valve Seat Cutter, 45° - ϕ 35: 57001-1116 Valve Seat Cutter, 32° - ϕ 35: 57001-1121 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.

NOTE

ODo 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

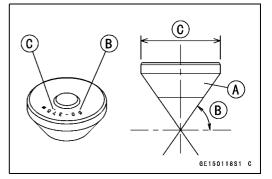
OPrior to grinding, apply engine oil to the cutter and during the operation, wash off any ground particles sticking to the cutter with washing oil.

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

Marks Stamped on the Cutter

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

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



Operating Procedures

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

NOTICE

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.

5-32 ENGINE TOP END

Valves

- Measure the outside diameter of the seating surface with a vernier caliper.
- ★ If the outside diameter of the seating surface is too small, repeat the 45° grind until the diameter is within the specified range.

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

- 60° [F]
- Measure the outside diameter of the seating surface with a vernier caliper.

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

Original Seating Surface [B]

NOTE

Remove all pittings of flaws from 45° ground surface.
 After grinding with 45° cutter, apply thin coat of machinist's dye to seating surface. This makes seating surface distinct and 32° and 60° grinding operation easier.
 When the value quide is replaced be sure to grind with

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

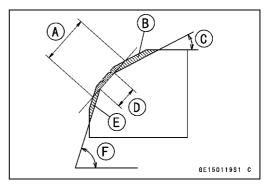
- ★If the outside diameter [A] of the seating surface is too large, make the 32° grind described below.
- ★ If the outside diameter of the seating surface is within the specified range, measure the seat width as described below.
- Grind the seat at a 32° angle [B] until the seat O.D. is within the specified range.
- $\odot \text{To}$ make the 32° grind, fit a 32° cutter into the holder, and slide it into the valve guide.
- OTurn the holder one turn at a time while pressing down very lightly. Check the seat after each turn.

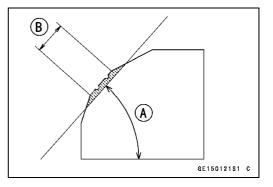
NOTICE

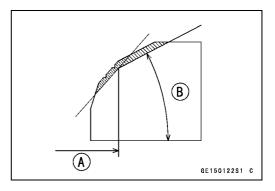
The 32° cutter removes material very quickly. Check the seat outside diameter frequently to prevent overgrinding.

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

- To measure the seat width, use a vernier caliper to measure the width of the 45° angle portion of the seat at several places around the seat.
- ★ If the seat width is too narrow, repeat the 45° grind until the seat is slightly too wide, and then return to the seat O.D. measurement step above.







Valves

- ★ If the seat width is too wide, make the 60° [A] grind described below.
- ★ If the seat width is within the specified range, lap the valve to the seat as described below.
- Grind the seat at a 60° angle until the seat width is within the specified range.
- ○To make the 60° grind, fit 60° cutter into the holder, and slide it into the valve guide.
- OTurn the holder, while pressing down lightly.
- OAfter making the 60° grind, return to the seat width measurement step above.

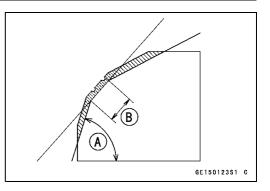
Correct Width [B]

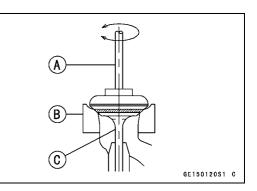
- Lap the valve to the valve seat, once the seat width and O.D. are within the ranges specified above.
- OPut a little coarse grinding compound on the face of the valve in a number of places around the valve head.
- OSpin the valve against the seat until the grinding compound produces a smooth, matched surface on both the seat and the valve.

ORepeat the process with a fine grinding compound.

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

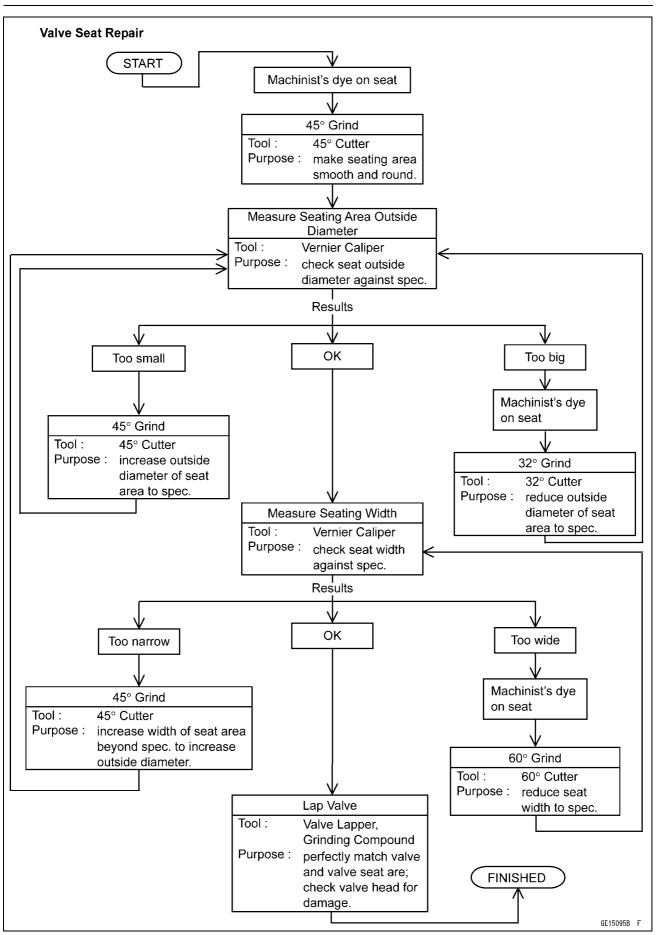
- The seating area should be marked about in the middle of the valve face.
- ★ If the seat area is not in the right place on the valve, check to be sure the valve is the correct part. If it is, it may have been refaced too much; replace it.
- Be sure to remove all grinding compound before assembly.
-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





5-34 ENGINE TOP END

Valves

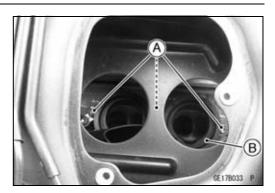


Throttle Body Assy Holder

Throttle Body Assy Holder Removal

• Remove:

Throttle Body Assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter) Throttle Body Assy Holder Bolts [A] Throttle Body Assy Holders [B]

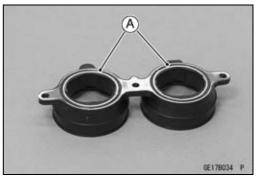


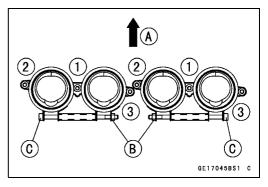
Throttle Body Assy Holder Installation

- Replace the O-rings [A] with new ones.
- Apply liquid gasket to the O-rings, and install them. Sealant - Liquid Gasket, TB1211F: 92104-0004
- Tighten the throttle body assy holder bolts following the tightening sequence [1 ~ 3].
 [A] Upward

Torque - Throttle Body Assy Holder Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install the clamps [B] as shown.
 - Torque Throttle Body Assy Holder Clamp Bolts [C]: 2.0 N·m (0.20 kgf·m, 18 in·lb)





5-36 ENGINE TOP END

Muffler

WARNING

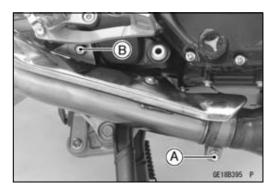
The muffler can become extremely hot during normal operation and cause severe burns. Do not remove the muffler while it is hot.

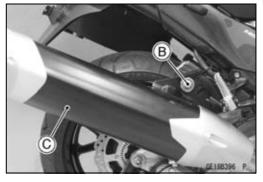
Muffler Body Removal

• Remove:

Right Saddlebag (see Saddlebag Removal in the Frame chapter) Muffler Clamp Bolts [A]

- Muffler Mounting Bolts [B] and Nuts
- Pull the muffler body [C] backward.





Muffler Body Installation

- Replace the muffler gasket [A] with new one.
- OInstall the gaskets until it is bottomed [B].

OInstall the gasket so that their chamfer side [C] faces the front.

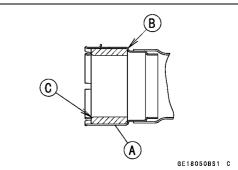
• Tighten:

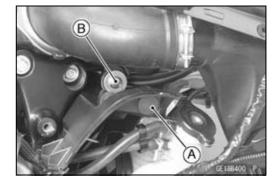
Torque - Muffler Body Mounting Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)

Exhaust Pipe Removal

 Remove: Front Middle Fairings (see Front Middle Fairing Removal in the Frame chapter) Muffler Body (see Muffler Body Removal) Plugs [A] (Both Sides)

Radiator Bolts (Upper) [B] (Both Sides)





Muffler

• Remove:

Horn Connectors [A] Horn Mounting Bolts [B]

- Remove: Radiator Bolts (Lower) [A] Radiator Stay Bolt [B] Radiator Stay [C]
- Move the radiator downward. OSupport the radiator with a suitable stand.
- For the oxygen sensor equipped models as follows.
- ODisconnect the sensor connectors [A], and open the clamp [B].

ORemove the sensors [C].

• Remove:

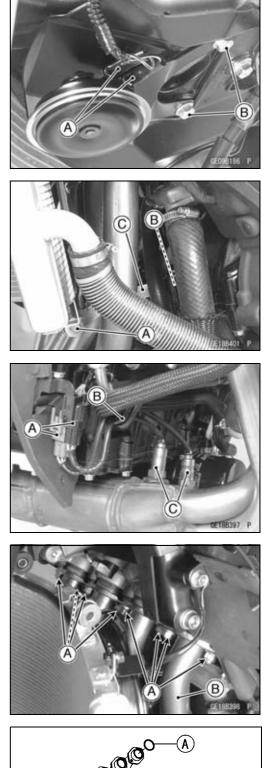
Exhaust Pipe Manifold Holder Nuts [A] Exhaust Pipe Manifold [B]

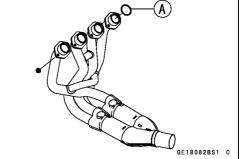
Exhaust Pipe Installation

- Replace the exhaust pipe gaskets [A] and muffler gasket with new ones and install them.
- OInstall the muffler gasket until it is bottomed so that the chamfer side faces front (see Muffler Body Removal/In-stallation).
- Tighten the exhaust pipe manifold holder nuts first, next the muffler clamp bolt.

Torque - Exhaust Pipe Manifold Holder Nuts: 17 N·m (1.7 kgf·m, 13 in·lb)

Muffler Body Clamp Bolt: 17 N·m (1.7 kgf·m, 13 in·lb)



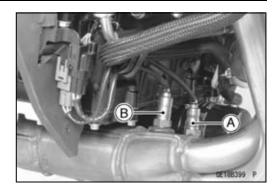


5-38 ENGINE TOP END

Muffler

- For the oxygen sensor equipped models, the sequence of installation is as follows.
 Oxygen Sensor #1 Connector Color (Gray) [A]
 Oxygen Sensor #2 Connector Color (Black) [B]
- Install the radiator.
- Tighten:
 - Torque Radiator Bolts (Upper): 25 N⋅m (2.5 kgf⋅m, 18 ft⋅lb) Radiator Bolts (Lower): 9.8 N⋅m (1.0 kgf⋅m, 87 in⋅lb)

Radiator Stay Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)



6

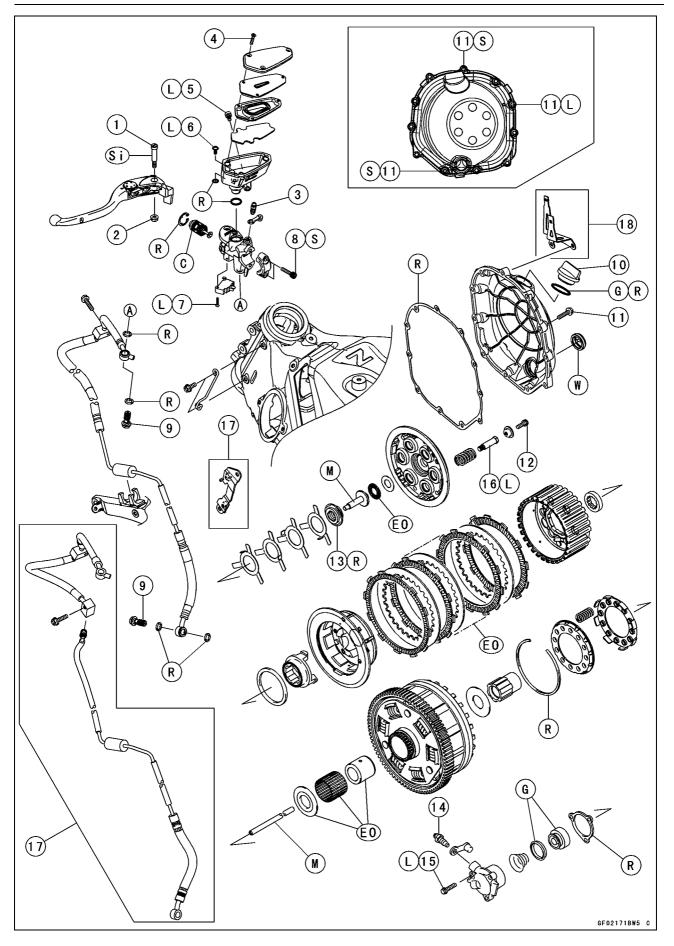
Clutch

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6-2 CLUTCH

Exploded View



Exploded View

No.	Fastener	Torque			Domorko
NO.		N∙m	kgf∙m	ft·lb	Remarks
1	Clutch Lever Pivot Bolt	1.0	0.10	8.9 in·lb	
2	Clutch Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
3	Clutch Master Cylinder Bleed Valve	7.8	0.80	69 in·lb	
4	Clutch Reservoir Cap Screws	1.5	0.15	13 in·lb	
5	Clutch Reservoir Bolt	7.9	0.81	70 in·lb	L
6	Clutch Reservoir Screw	1.3	0.13	11.5 in·lb	L
7	Starter Lockout Switch Screw	0.7	0.07	6.2 in·lb	L
8	Clutch Master Cylinder Clamp Bolts	10.3	1.1	91 in·lb	S
9	Clutch Hose Banjo Bolts	25	2.5	18	
10	Oil Filler Plug	_	_	-	Hand-tighten
11	Clutch Cover Bolts	9.8	1.0	87 in·lb	L (1), S
12	Clutch Spring Bolts	11	1.1	97 in·lb	
13	Clutch Hub Nut	135	14	100	R
14	Clutch Slave Cylinder Bleed Valve	7.8	0.80	69 in·lb	
15	Clutch Slave Cylinder Bolts	9.8	1.0	87 in·lb	L
16	Sub Clutch Hub Bolts	25	2.5	18	L

17. K-ACT ABS Equipped Models

18. K-ACT ABS Equipped Models (Frame No, ~ JKBZGT40CCA002249)

C: Apply clutch fluid.

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.

W: Apply water.

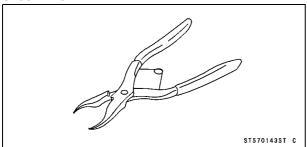
6-4 CLUTCH

Specifications

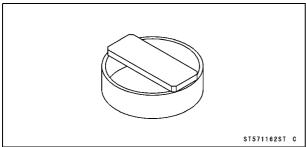
Item	Standard	Service Limit
Clutch Fluid		
Grade	DOT4	
Clutch Lever		
Clutch Lever Position	5-way adjustable (to suit rider)	
Clutch Lever Free Play	Non-adjustable	
Clutch		
Spring Plate Free Play	(Usable Range)	
	0.05 ~ 0.70 mm (0.002 ~ 0.028 in.)	
Clutch Plate Assembly Length	(Reference)	
	54.2 mm (2.13 in.)	
Friction Plate Thickness:		
13088-0031	2.92 ~ 3.08 mm (0.115 ~ 0.121 in.)	2.7 mm (0.11 in.)
13088-0033, 13088-0037	3.72 ~ 3.88 mm (0.146 ~ 0.153 in.)	3.5 mm (0.14 in.)
Friction and Steel Plate Warp	0.15 mm (0.0059 in.) or less	0.3 mm (0.012 in.)
Clutch Spring Free Length	32.11 mm (1.264 in.)	31.0 mm (1.22 in.)

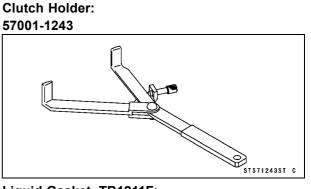
Special Tools and Sealant

Inside Circlip Pliers: 57001-143

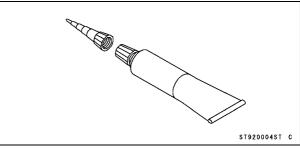


Clutch Spring Compressor: 57001-1162





Liquid Gasket, TB1211F: 92104-0004



6-6 CLUTCH

Clutch Master Cylinder

Clutch Lever Adjustment

The adjuster has 5 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.
- OThe distance from the grip to the lever is minimum at number 5 and maximum at number 1.

Clutch Master Cylinder Removal

- Disconnect the starter lockout switch connector [A].
- Drain the clutch fluid from the reservoir (see Clutch Fluid Change in the Periodic Maintenance chapter).
- Remove the banjo bolt [B] to disconnect the clutch hose from the master cylinder.
- Unscrew the clamp bolts [C], and take off the master cylinder as an assembly with the clutch reservoir, clutch lever and starter lockout switch installed.

NOTICE

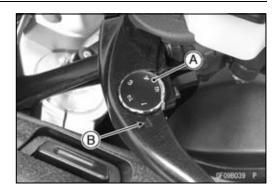
Clutch fluid quickly ruins painted surface; any spilled fluid should be completely washed away immediately.

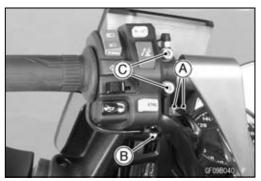
Clutch Master Cylinder Installation

 Install the master cylinder clamp so that the triangular mark [A] faces upward.

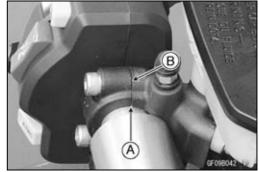
- Align the punch mark [A] on the handlebar with the mating surface [B] of the master cylinder clamp.
- Tighten the upper clamp bolt first, and then the lower clamp bolt.

Torque - Clutch Master Cylinder Clamp Bolts: 10.3 N·m (1.1 kgf·m, 91 in·lb)









Clutch Master Cylinder

- Connect the starter lockout switch connectors [A].
- Replace the washers that are on each side of the clutch hose fitting with new ones.
- Tighten:
 - 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

• Refer to the Rubber Parts of Clutch Master Cylinder/Slave Cylinder Replacement in the Periodic Maintenance chapter.

Clutch Master Cylinder Assembly

• Refer to the Rubber Parts of Clutch Master Cylinder/Slave Cylinder Replacement in the Periodic Maintenance chapter.

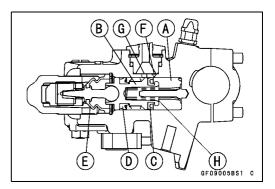
Clutch Master Cylinder Inspection

• Disassemble the clutch master cylinder (see Rubber Parts of Clutch Master Cylinder/Slave Cylinder Replacement in the Periodic Maintenance chapter).

Special Tool - Inside Circlip Pliers: 57001-143

- 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.
- \star If it is damaged, replace the piston assembly.
- Check that the relief [F] and supply [G] 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 [H] for any damage.
- ★ If the spring is damaged, replace it.





6-8 CLUTCH

Clutch Slave Cylinder

Clutch Slave Cylinder Removal

• Remove:

Left Lower Fairing (see Lower Fairing Removal in the Frame chapter) Banjo Bolt [A] Clutch Slave Cylinder Bolts [B] Slave Cylinder [C]

NOTICE

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.

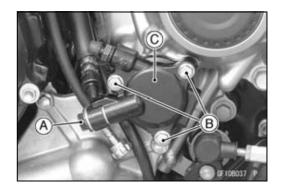
NOTICE

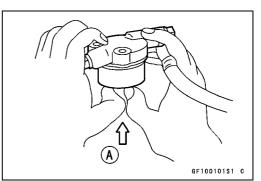
If the clutch slave cylinder is removed and left alone, the piston will be pushed out by spring force and the clutch fluid will drain out.

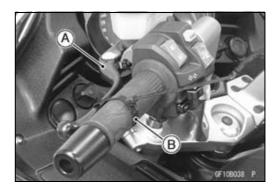
- ORemove the clutch slave cylinder from the engine with the pipe installed. Push [A] the piston into the cylinder as far as it will go.
- OApply the clutch lever [A] slowly and hold it with a band [B].

NOTE

OHolding 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 slave cylinder bolts [A].
- Finger tighten all the clutch slave cylinder bolts.
- Remove the band from the clutch lever and release the clutch lever.
- Tighten:

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

- Replace the washer on each side of the clutch hose fitting with new one.
- Tighten:

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

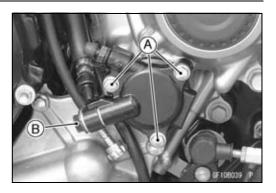
- Check the fluid level in the master cylinder reservoir, and bleed the air in the clutch line.
- Check the clutch operation.
- Install the removed parts (see appropriate chapters).

Clutch Slave Cylinder Disassembly

• Refer to the Rubber Parts of Clutch Master Cylinder/Slave Cylinder Replacement in the Periodic Maintenance chapter.

Clutch Slave Cylinder Assembly

• Refer to the Rubber Parts of Clutch Master Cylinder/Slave Cylinder Replacement in the Periodic Maintenance chapter.



Clutch Fluid

Clutch Fluid Level Inspection

 Refer to the Clutch Fluid Level Inspection in the Periodic Maintenance chapter.

Clutch Fluid Change

 Refer to the Clutch Fluid Change in the Periodic Maintenance chapter.

Bleeding the Clutch Line

AWARNING

Air in the clutch lines diminish clutch performance and can cause an accident resulting in injury or death. If the clutch lever has a soft or "spongy" feeling mushy when it is applied, there might be air in the clutch lines or the clutch may be defective. Do not operate the vehicle and service the clutch system immediately.

NOTICE

Clutch fluid quickly ruins painted or plastic surfaces; any spilled fluid should be completely wiped up immediately with wet cloth.

• Remove:

Screws [A] Clutch Reservoir Cap [B] Diaphragm Plate Diaphragm

• Fill the reservoir with fresh clutch fluid to the upper level line in the reservoir.

NOTE

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

- 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.
- Remove the rubber cap [A] from the bleed valve on the master cylinder.
- Attach a clear plastic hose [B] to the bleed valve, and run the other end of the hose into a container.





Clutch Fluid

• Bleed the clutch line and the master cylinder.

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

- 1. Pump the clutch lever until it becomes hard, and apply the clutch lever and hold it [A].
- 2. Quickly open and close [B] the bleed valve while holding the clutch lever applied.
- 3. Release the clutch lever [C].

NOTE

- ○The fluid level must be checked often during the bleeding operation and replenished with fresh clutch 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.
- Remove the clear plastic hose.
- Tighten the bleed valve, and install the rubber cap.

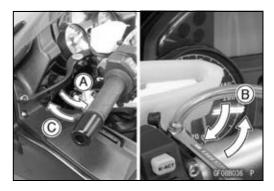
Torque - Clutch Master Cylinder Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)

- Remove the left lower fairing (see Lower Fairing Removal in the Frame chapter).
- Remove the rubber cap from the bleed valve.
- 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.
- ORepeat this operation until no more air can be seen coming out into the plastic hose.
- 1. Pump the clutch lever until it becomes hard, and apply the clutch lever and hold it [B].
- 2. Quickly open and close [C] the bleed valve while holding the clutch lever applied.
- 3. Release the clutch lever [D].

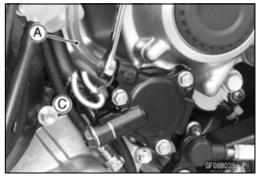
NOTE

OCheck the fluid level in the reservoir often, replenishing it as necessary.

Olf 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.







Clutch Fluid

WARNING

Mixing brands and types of hydraulic fluid lowers the fluid's boiling point, cause rubber part to deteriorate and can reduce the hydraulic clutch system's effectiveness and cause an accident resulting in injury or death. Do not mix two brands of brake fluid. Change the fluid in the hydraulic clutch system completely if the fluid must be refilled but the type and brand of the hydraulic fluid that is already in the reservoir are unidentified.

- Remove the clear plastic hose.
- Tighten the bleed valve, and install the rubber cap.

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

• Install:

Left Lower Fairing (see Lower Fairing Installation in the Frame chapter) Diaphragm Diaphragm Plate Clutch Reservoir Cap

Tighten:

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

Clutch Hose Removal/Installation

• Refer to the Clutch Hose Replacement in the Periodic Maintenance chapter.

Clutch Hose Inspection

• Refer to the Clutch Hose Damage and Installation Condition Inspection in the Periodic Maintenance chapter.

Clutch Cover

Clutch Cover Removal

• Remove:

Engine Oil (Drain, see Engine Oil Change in the Periodic Maintenance chapter) Right Lower Fairing (see Lower Fairing Removal in the Frame chapter) Clutch Cover Bolts [A] Clutch Cover [B]

Clutch Cover Installation

• Apply liquid gasket to the area [A] where the mating surface of the crankcase touches the clutch cover gasket.

Sealant - Liquid Gasket, TB1211F: 92104-0004

- Replace the clutch cover gasket with a new one.
- Install:
 - Clutch Cover [A]

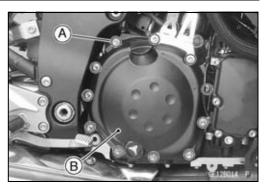
Bracket [B] (K-ACT ABS Equipped Models (Frame No, ~ JKBZGT40CCA002249))

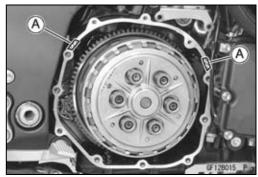
- Tighten the clutch cover bolts.
- OApply a non-permanent locking agent to only one clutch cover bolt [C] as shown in the figure (circle mark [D] portion bolt).
- OTighten the triangular mark [E] portion bolts first, and then other bolts.

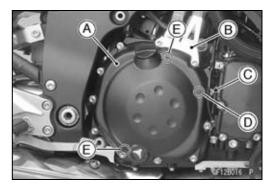
Torque - Clutch Cover Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

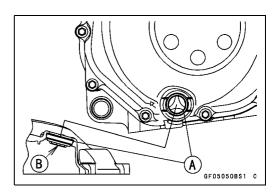
• If the oil gauge [A] is removed, press the gauge so that its projection [B] faces the inside, using lubricant.

 $\bigcirc \mbox{Apply}$ a water to the outer circumference of the gauge.









6-14 CLUTCH

Clutch

Clutch Removal

• Remove:

Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)

Clutch Cover (see Clutch Cover Removal)

Clutch Spring Bolts [A] with Spring Holder

Clutch Springs

Clutch Spring Plate [B] (with Thrust Bearing, Pusher [C] and Washer)

• Remove:

Friction Plates and Steel Plates

• Hold the sub clutch hub [A] steady with the clutch holder [B], and remove the nut [C].

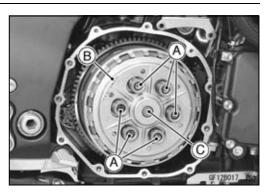
Special Tool - Clutch Holder: 57001-1243

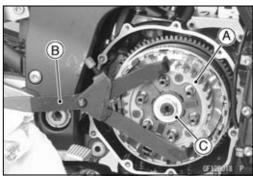
• Remove:

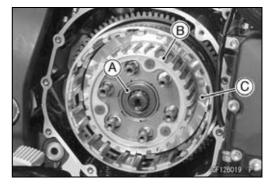
Torque Limiter Springs Toothed Washer [A] Sub Clutch Hub [B] Clutch Hub [C]

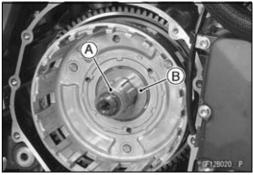
 Remove: Clutch Shaft [A] Spacer [B]

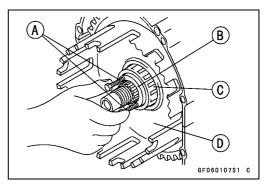
- Using the two 4 mm (0.16 in.) bolts [A], pull out the sleeve [B], needle bearing [C] and clutch housing [D].
- Remove the thrust washer.











Clutch Installation

• When replacing any one of the following parts, check the spring plate free play (see Spring Plate Free Play Measurement).

Spring Plate [A] Friction Plates [B] Steel Plates [C]

• Install the thrust washer [A] by facing its chamfered side [B] towards the crankcase.

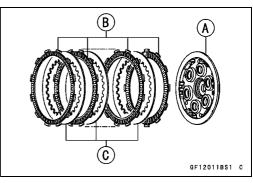
• Engage the clutch housing gear [A] and oil pump drive gear [B] with the crankshaft primary gear and oil pump gear [C].

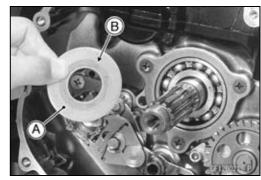
Install:

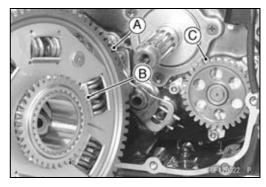
Needle Bearing [A] Sleeve [B]

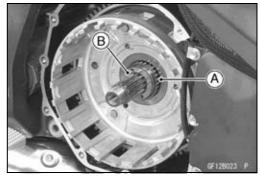
OApply engine oil to the needle bearing and the sleeve before installation.

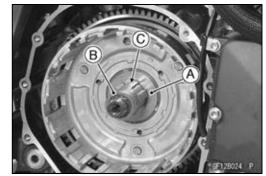
• Install the spacer [A] and clutch shaft [B]. OInstall the clutch shaft so that the tooth side [C] faces in.











6-16 CLUTCH

Clutch

★ If the sub clutch hub bolts were removed, install them as follows.

OApply a non-permanent locking agent to the threads of the sub clutch hub bolts, and tighten them.

Torque - Sub Clutch Hub Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Install the clutch hub [A] on the drive shaft.
- Align the damper cams [B] of the sub clutch hub [C] to the cam followers [D] of the clutch hub.
- Install the toothed washer [A].
- Install the four torque limiter springs [B] as shown in the figure.

Tangs [C]

 $\bigcirc \mbox{Do}$ not over lap the tang of the springs.

- Replace the clutch hub nut [A] with a new one.
- Hold the sub clutch hub [B] steady with the clutch holder [C], and tighten the clutch hub nut.

Special Tool - Clutch Holder: 57001-1243

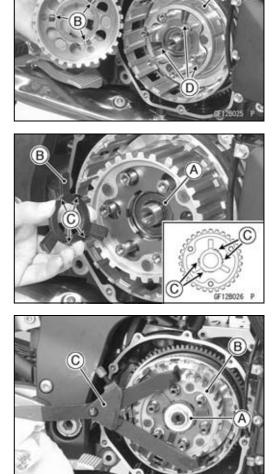
Torque - Clutch Hub Nut: 135 N·m (14 kgf·m, 100 ft·lb)

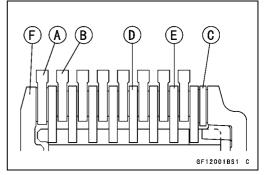
• Install the friction plates and steel plates as shown in the figure.

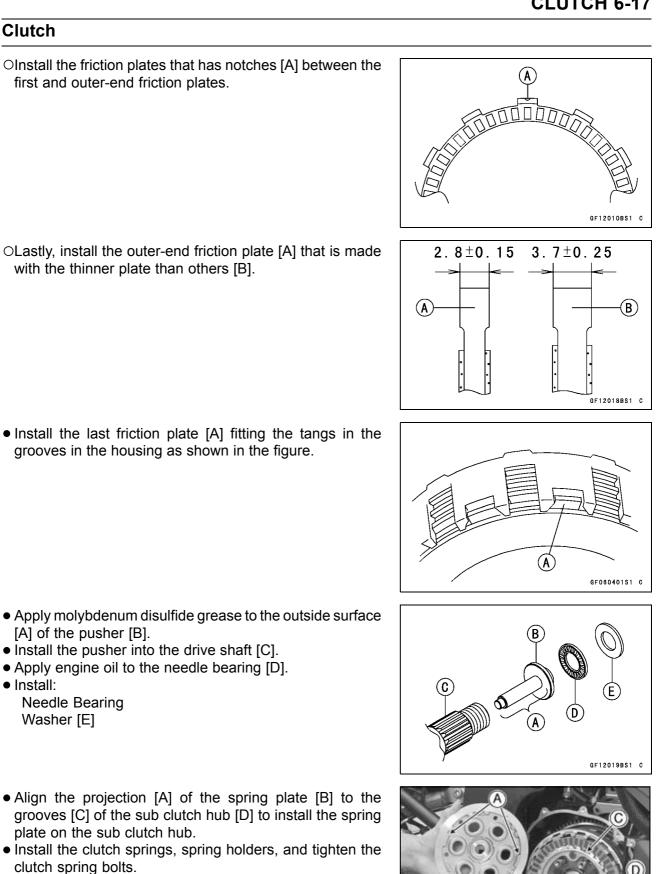
First Friction Plate [A] Friction Plates [B] Outer-End Friction Plate [C] Adjusting Steel Plate [D] Steel Plats [E] Clutch Hub [F]

NOTICE

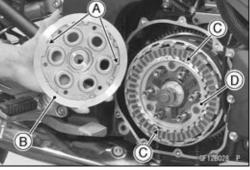
If new dry friction plates and steel plates are installed, apply engine oil to the surfaces of each plate to avoid clutch plate seizure.







- Torque Clutch Spring Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)
- Install the clutch cover (see Clutch Cover Installation).



6-18 CLUTCH

Clutch

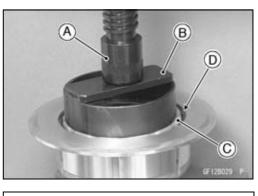
Clutch Hub Disassembly

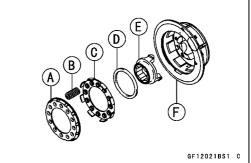
- Remove the clutch hub (see Clutch Removal).
- Using a press [A], and the clutch spring compressor [B], push the damper spring holder [C] to remove the retaining ring [D].

Special Tool - Clutch Spring Compressor: 57001-1162

• Remove:

Spring Holder [A] Damper Spring [B] Spring Holder [C] Spacer [D] Damper Cam [E] Clutch Hub [F]





Clutch Hub Assembly

- Replace the retaining ring with a new one.
- Installation is the reverse of removal.

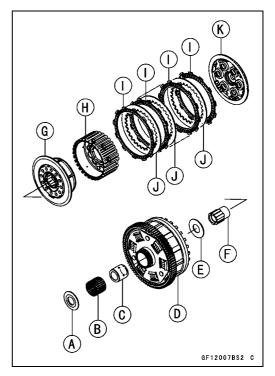
Special Tool - Clutch Spring Compressor: 57001-1162

Spring Plate Free Play Measurement

Insufficient clutch free play will cause the engine braking effect to be more sudden, resulting in rear wheel hop. On the other hand, if the free play is excessive, the clutch lever may feel "spongy" or pulsate when pulled.

• Hold an extra drive shaft in a vise and install the following clutch parts on the shaft (see Clutch Installation).

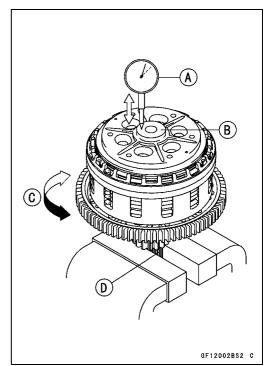
Thrust Washer [A] Needle Bearing [B] Sleeve [C] Clutch Housing [D] Spacer [E] Clutch Shaft [F] Clutch Hub Assembly [G] Sub Clutch Hub [H] Friction Plates [I] Steel Plates [J] Spring Plate [K]



- Engage the clutch hub with the sub clutch hub.
- To measure the free play, set a dial gauge [A] against the raised center [B] of the clutch spring plate.
- Move the clutch housing gear back and forth [C]. The difference between the highest and lowest gauge readings is the amount of free play.
 Drive Shaft [D]
- Measure the spring plate free play.

Spring Plate Free Play Usable Range: 0.05 ~ 0.70 mm (0.002 ~ 0.028 in.)

- ★ If the free play is not within the usable range, change all of the friction plate and measure the free play again.
- ★ If the free play is not within the usable range, adjust the free play (see Spring Plate Free Play Adjustment).



Spring Plate Free Play Adjustment

NOTE

OThe free play adjustment is performed by replacing the steel plate(s).

• Measure the clutch spring plate free play (see Clutch Spring Plate Free Play Measurement), and then replace the steel plate(s) which brings the free play within the usable range.

Spring Plate Free Play Usable Range: 0.05 ~ 0.70 mm (0.002 ~ 0.028 in.)

OReplace the following steel plate(s).

Thickness	Part Number		
2.3 mm (0.090 in.)	13089-0019		
2.6 mm (0.102 in.) (STD)	13089-0018		
2.9 mm (0.114 in.)	13089-0020		

NOTE

ODo not use the steel plate of 2.3 mm (0.091 in.) and 2.9 mm (0.114 in.) thickness at the same time.

Clutch Plate Assembly Length (Reference Information) Inspection

- Inspect the friction plate thickness (see Clutch Plate, Wear, Damage Inspection).
- Assemble:

Clutch Hub [A] Friction Plates [B] Steel Plates [C] Sub Clutch Hub [D] Spring Plate [E] Clutch Springs [F] Clutch Spring Holder [G] Clutch Spring Bolts [H] Clutch Hub Bolts [I]

Torque - Clutch Spring Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)

• Measure the clutch plate assembly length [J].

Clutch Plate Assembly Length (Reference) Standard: 54.2 mm (2.13 in.)

NOTE

OThe length of the clutch plate assembly changes by the steel plate thickness.

Clutch Plate, Wear, Damage Inspection

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

Friction Plate Thickness (13088-0031) Standard: 2.92 ~ 3.08 mm (0.115 ~ 0.121 in.) Service Limit: 2.7 mm (0.11 in.)

 Friction Plate Thickness (13088-0033, 13088-0037)

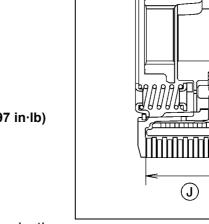
 Standard:
 3.72 ~ 3.88 mm (0.146 ~ 0.153 in.)

 Service Limit:
 3.5 mm (0.14 in.)

Clutch Plate Warp Inspection

- Place each friction plate or steel plate on a surface plate and measure the gap between the surface plate [A] and each friction plate or steel plate [B] with a thickness gauge [C]. The gap is the amount of friction or steel plate warp.
- ★ If any plate is warped over the service limit, replace it with a new one.

Friction and Steel Plate Warp
Standard:0.15 mm (0.0059 in.) or less
Service Limit:0.3 mm (0.012 in.)



(A)

 (\mathbf{D})

(B)

(C)

E)

F

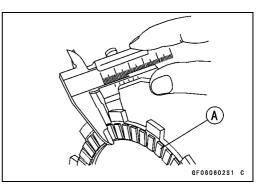
(G)

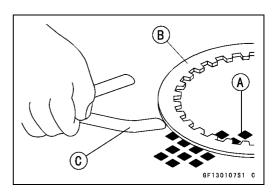
(H)

(I)

GF12008BS2 C

AHAR





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: 32.11 mm (1.264 in.) Service Limit: 31.0 mm (1.22 in.)

Clutch Housing Finger Inspection

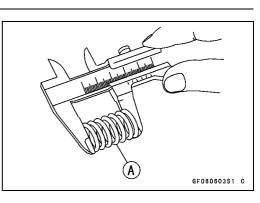
Clutch Housing Spline Inspection

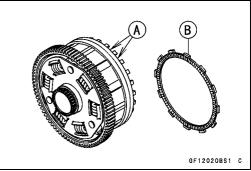
wear against the sub clutch hub splines [B].

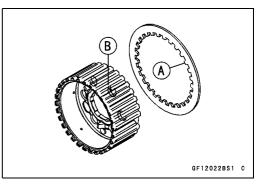
- Visually inspect the clutch housing fingers [A] where the friction plate tangs [B] hit them.
- ★ If they are badly worn or if there are groove cuts where the tangs hit, replace the housing. Also, replace the friction plates if their tangs are damaged.

• Visually inspect where the teeth [A] on the steel plates

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

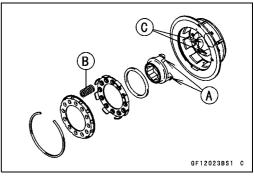






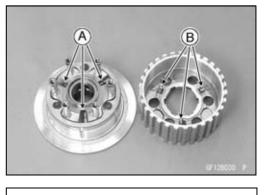
damaged.

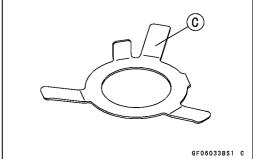
- Cam Damper Inspection
 Disassemble the clutch hub (see Clutch Hub Disassembly).
- Visually inspect the damper cams [A], damper springs [B], and cam follower [C].
- \star Replace any part that appears damaged.



Damper Cam Inspection

- Remove the clutch (see Clutch Removal).
- Visually inspect the damper cam [A], cam follower [B], and the torque limiter spring [C].
- Replace the part if it appears damaged.





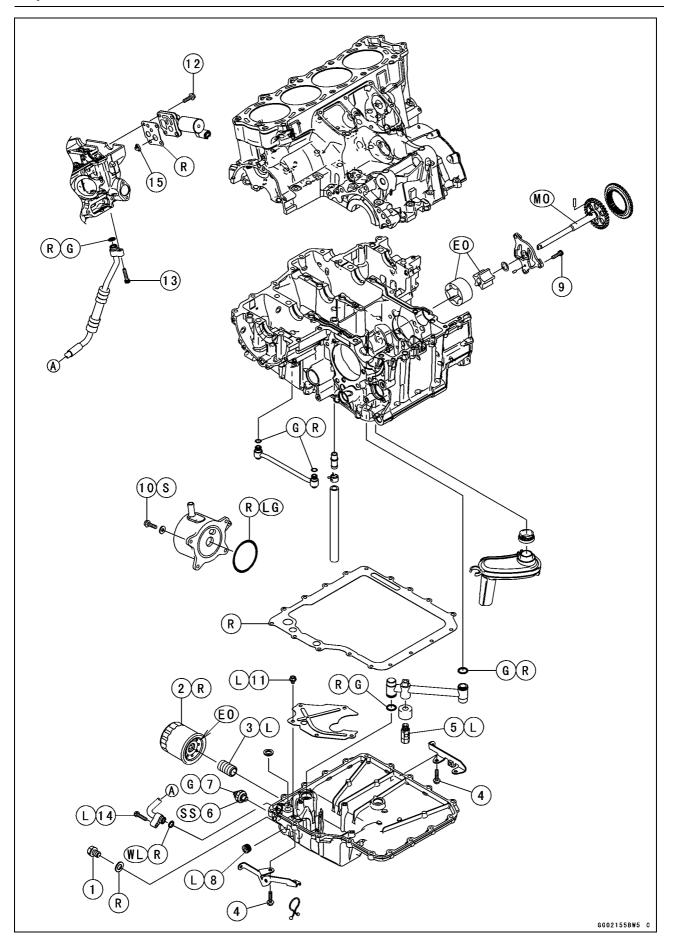
Engine Lubrication System

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7-2 ENGINE LUBRICATION SYSTEM

Exploded View



Exploded View

No.	Fastener	Torque			Demerika
		N∙m	kgf∙m	ft·lb	Remarks
1	Engine Oil Drain Bolt	30	3.1	22	
2	Oil Filter	17	1.7	13	EO, R
3	Holder Mounting Bolt	35	3.6	26	L
4	Oil Pan Bolts	9.8	1.0	87 in·lb	
5	Oil Pressure Relief Valve	15	1.5	11	L
6	Oil Pressure Switch	15	1.5	11	SS
7	Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	G
8	Oil Passage Plug	20	2.0	15	L
9	Oil Pump Cover Bolts	9.8	1.0	87 in·lb	
10	Oil Cooler Mounting Bolts	12	1.2	106 in·lb	S
11	Oil Pan Plate Bolts	9.8	1.0	87 in·lb	L
12	Oil Control Solenoid Valve Bolts	9.8	1.0	87 in·lb	
13	Oil Pipe Bolt (Upper)	9.8	1.0	87 in·lb	
14	Oil Pipe Bolt (Lower)	9.8	1.0	87 in·lb	L

15. Oil Screen

EO: Apply engine oil.

G: Apply grease.

L: Apply a non-permanent locking agent.

LG: Apply liquid gasket.

MO: Apply molybdenum disulfide oil solution.

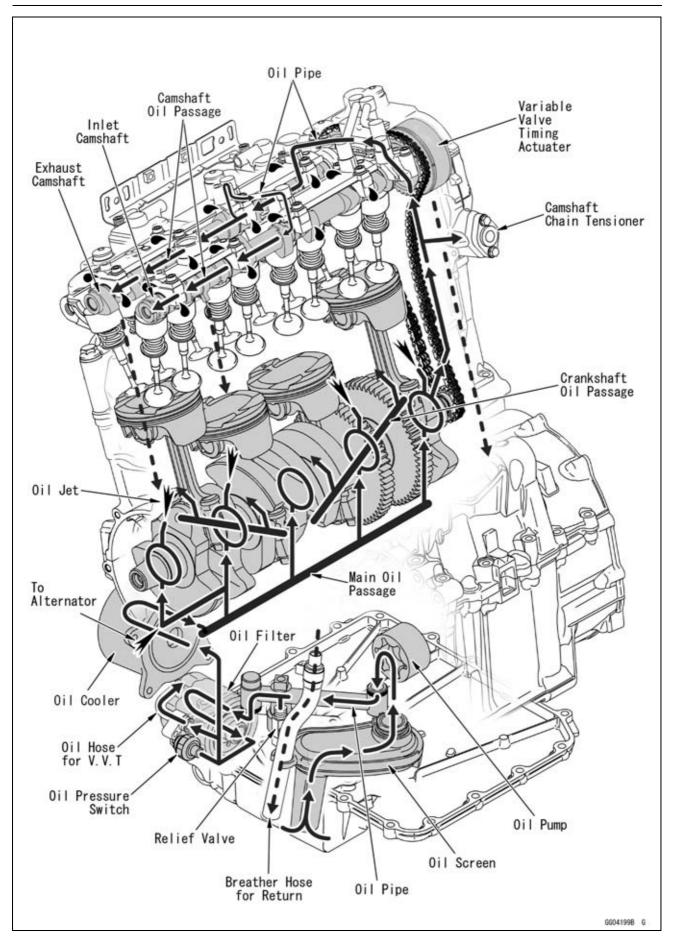
(mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10:1)

R: Replacement Parts

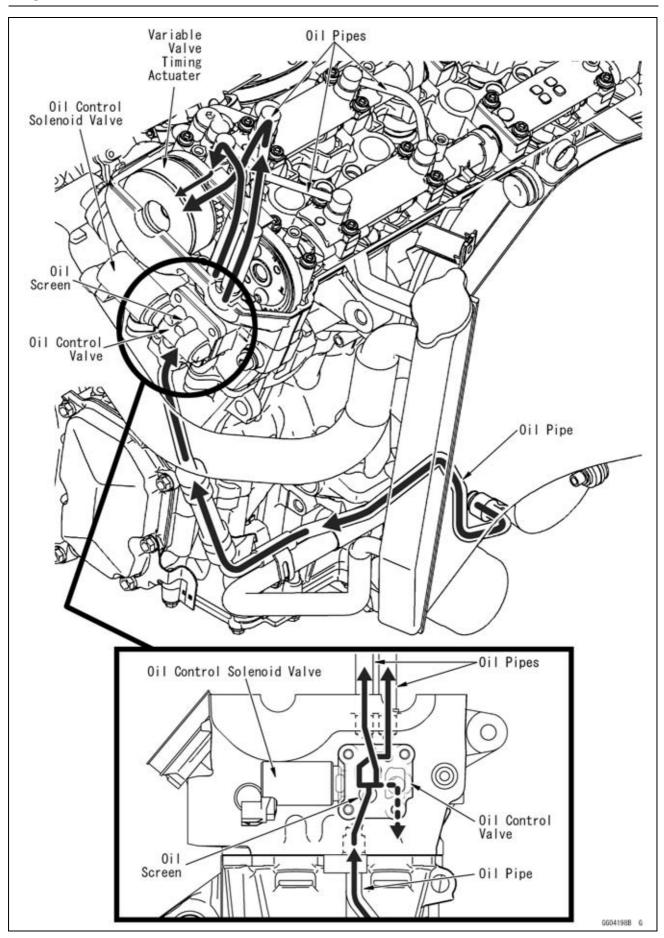
SS: Apply silicone sealant.

7-4 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart

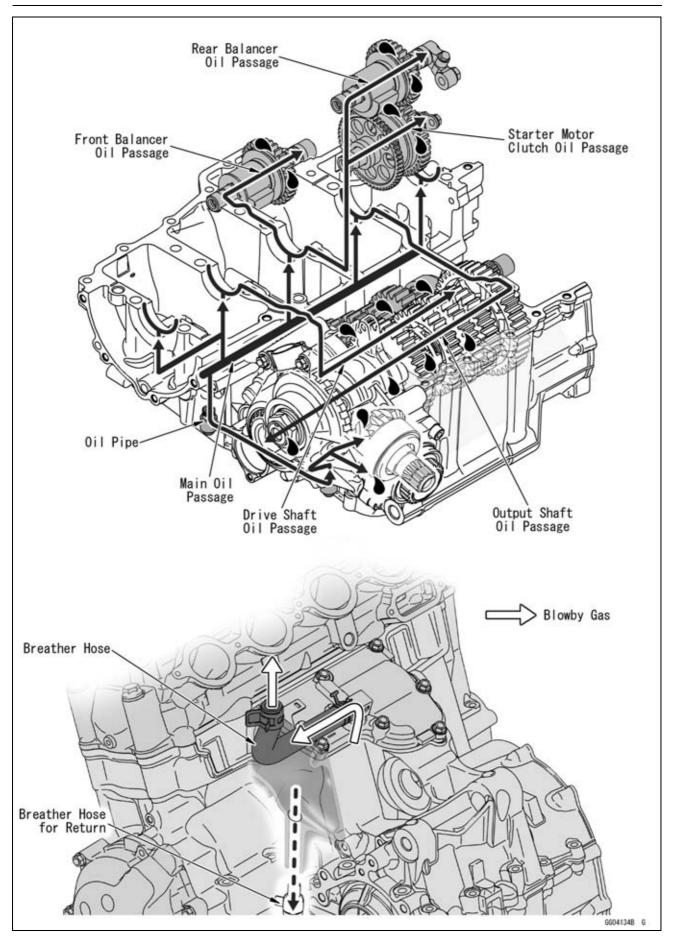


Engine Oil Flow Chart



7-6 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart



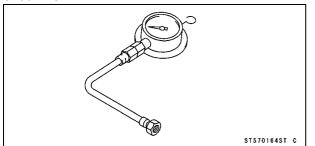
Specifications

Item	Standard		
Engine Oil			
Туре	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2		
Viscosity	SAE 10W-40		
Capacity	4.0 L (4.2 US qt) (when filter is not removed)		
	4.4 L (4.7 US qt) (when filter is removed)		
	4.7 L (5.0 US qt) (when engine is completely dry)		
Level	Between upper and lower level lines (Wait 2 ~ 3 minutes after idling or running)		
Oil Pressure Measurem	nent		
Oil Pressure	245 ~ 343 kPa (2.5 ~ 3.5 kgf/cm², 36 ~ 50 psi) at 4 000 r/min (rpm), Oil Temperature 90°C (194°F)		

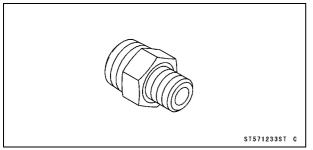
7-8 ENGINE LUBRICATION SYSTEM

Special Tools and Sealant

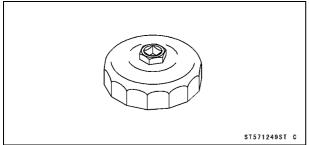
Oil Pressure Gauge, 10 kgf/cm²: 57001-164



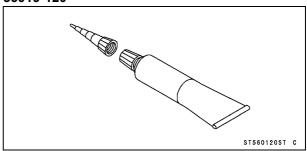
Oil Pressure Gauge Adapter, PT3/8: 57001-1233



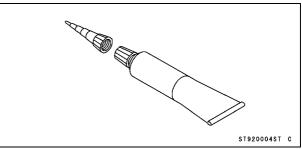
Oil Filter Wrench: 57001-1249



Liquid Gasket, TB1211: 56019-120



Liquid Gasket, TB1211F: 92104-0004



Engine Oil and Oil Filter

🛦 WARNING

Vehicle operation with insufficient, deteriorated, or contaminated engine oil will cause accelerated wear and may result in engine seizure, accident, and injury. Check the oil level before each use and change the oil and filter according to the periodic maintenance chart.

Oil Level Inspection

• Check that the engine oil level is between the upper [A] and lower [B] levels in the gauge.

NOTE

- OSituate the motorcycle so that it is perpendicular to the ground.
- Olf 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.

NOTICE

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

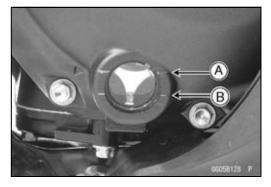
○If the engine oil type and make are unknown, use any brand of the specified oil to top off the level in preference to running the engine with the oil level low. Then at your earliest convenience, change the oil completely.

Engine Oil Change

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

Oil Filter Replacement

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



7-10 ENGINE LUBRICATION SYSTEM

Oil Pan

Oil Pan Removal

Remove:

Engine Oil (Drain, see Engine Oil Change in the Periodic Maintenance chapter)

Muffler Bodies (see Muffler Body Removal/Installation in the Engine Top End chapter)

Exhaust Pipe (see Exhaust Pipe Removal in the Engine Top End chapter)

Oil Pressure Switch Terminal [A] (Disconnect)

Oil Filter [B] (see Oil Filter Replacement in the Periodic Maintenance chapter)

- Remove the oil pipe bolt [C], and pull out the pipe fitting [D].
- Remove:

Oil Pan Bolts [A] with Brackets [B] Oil Pan [C] Gasket

• Remove:

Oil Pan Plate Bolts [A] Oil Pan Plate [B]

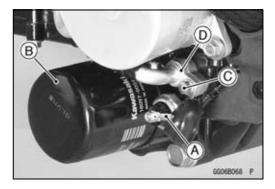
• Remove:

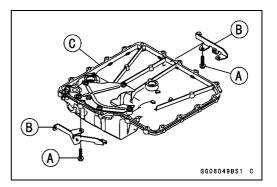
- Oil Screen [A]
- Oil Pipes [B]

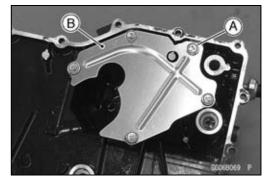
Oil Pressure Relief Valve [C] (see Oil Pressure Relief Valve Removal)

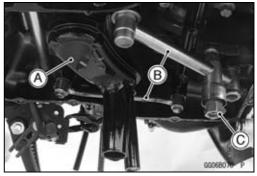
NOTICE

Do not remove the relief valve with the oil pipe installed on the lower crankcase half. The oil pipe will be damaged.









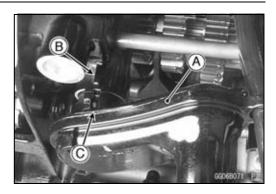
Oil Pan

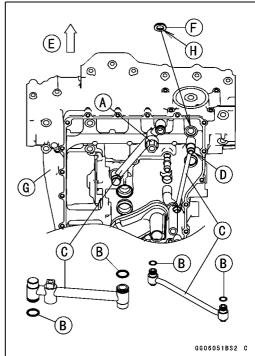
Oil Pan Installation

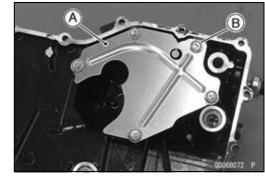
- Clean the oil screen [A].
- Install the oil screen so that the crankcase rib [B] fits the notch [C] of the oil screen.

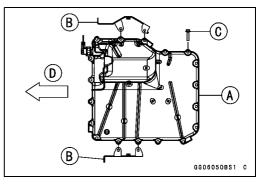
- Install the oil pressure relief valve [A] (see Oil Pressure Relief Valve Installation).
- Replace the O-rings with new ones.
- Apply grease to the oil pipe O-rings [B] and install the oil pipes [C].
- OInstall the oil pipe so that the white paint side [D] faces front [E].
- Put new O-ring [F] on the lower crankcase [G] as shown in the figure.

OFit on the O-ring so that the flat surfaces [H] side in.









- Install the oil pan plate [A].
- Apply a non-permanent locking agent to the threads of the oil pan plate bolts [B], and tighten them.

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

- Replace the oil pan gasket with a new one.
- Install:
 - Gasket Oil Pan [A] Brackets [B]
 - Diackets [D
- Tighten:
 - Torque Oil Pan Bolts [C]: 9.8 N·m (1.0 kgf·m, 87 in·lb) Front [D]
- Install the removed parts (see appropriate chapters).

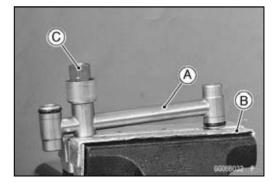
7-12 ENGINE LUBRICATION SYSTEM

Oil Pressure Relief Valve

Oil Pressure Relief Valve Removal

• Remove:

- Oil Pan (see Oil Pan Removal)
- Oil Pipe (see Oil Pan Removal)
- Hold the pipe [A] in a vise [B].
- Remove the oil pressure relief valve [C].



Oil Pressure Relief Valve Installation

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

NOTICE

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

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

• Install the removed parts (see appropriate chapters).

Oil Pressure Relief Valve Inspection

- Remove the oil pressure relief valve (see Oil Pressure Relief Valve Removal).
- 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

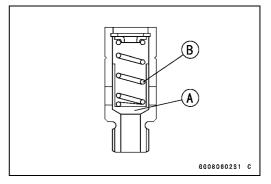
OInspect the valve in its assembled state. Disassembly and assembly may change the valve performance.

★ 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.

A WARNING

Gasoline and low-flash point solvents can be flammable and/or explosive and cause severe burns. Clean the oil pressure relief valve in a well-ventilated area, and take care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Do not use gasoline or a low-flash point solvent to clean the oil pressure relief valve.

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



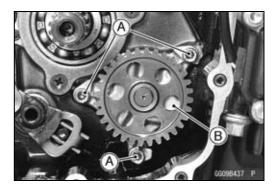
Oil Pump

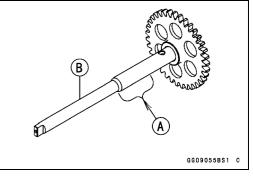
Oil Pump Removal

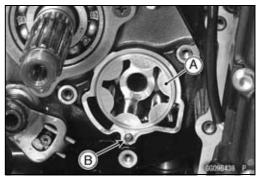
• Remove:

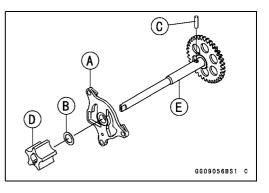
Engine Oil (Drain, see Engine Oil Change in the Periodic Maintenance chapter) Clutch (see Clutch Removal in the Clutch chapter)

- Remove the oil pump cover bolts [A].
- Remove the oil pump cover [B] with oil pump drive gear shaft.
- Remove the outer rotor and inner rotor.









Oil Pump Installation

• Apply molybdenum disulfide oil solution to the journal portions [A] on the oil pump drive gear shaft [B].

• Insert the outer rotor [A] and the dowel pin [B] into the crankcase.

• Insert the pump cover [A], washer [B], pin [C] and inner rotor [D] to the oil pump drive gear shaft [E].

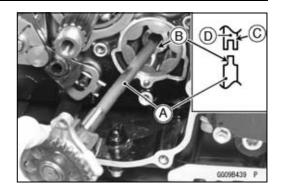
7-14 ENGINE LUBRICATION SYSTEM

Oil Pump

- Install the oil pump drive gear shaft with inner rotor.
- OTurn the oil pump drive gear shaft [A] so that the projection [B] in its shaft fits onto the slot [C] of the water pump shaft [D].
- •Fit the hole of the oil pump cover onto the pin on the lower crankcase half.
- Tighten:

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

• Install the removed parts (see appropriate chapters).



ENGINE LUBRICATION SYSTEM 7-15

Oil Cooler

Oil Cooler Removal

• Remove:

Coolant (Drain, see Coolant Change in the Periodic Maintenance chapter)

Engine Oil (Drain, see Engine Oil Change in the Periodic Maintenance chapter)

Exhaust Pipe (see Exhaust Pipe Removal in the Engine Top End chapter)

- Oil Pipe Bolt [A]
- Pull out the pipe fitting [B].
- Loosen the clamp screws [C].
- Remove the water hoses [D] from the oil cooler [E].
- Unscrew the oil cooler mounting bolts [F], and remove the oil cooler.

Oil Cooler Installation

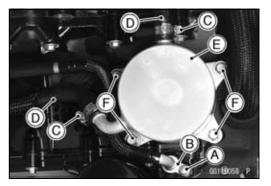
- Replace the O-ring [A] with a new one.
- Apply liquid gasket to new O-ring before installation.
 Sealant Liquid Gasket, TB1211F: 92104-0004
- Install the oil cooler, and tighten the bolts following the specified tightening sequence [1 ~ 4].

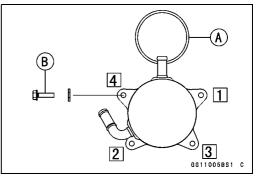
Torque - Oil Cooler Mounting Bolts [B]: 12 N·m (1.2 kgf·m, 106 in·lb)

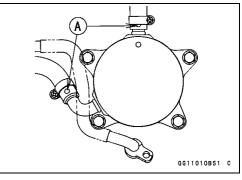
- Install the water hoses as shown in the figure.
 - White Mark [A]
- Tighten:

Torque - Water Hose Clamp Screws: 3.0 N·m (0.31 kgf·m, 27 in·lb)

- Replace the oil pipe O-ring with a new one.
- Apply grease to the oil pipe O-ring.
- Install the oil pipe [A].
- Apply a non-permanent locking agent to the threads of the oil pipe bolt [B], and tighten it.
 - Torque Oil Pipe Bolt (Lower) : 9.8 N·m (1.0 kgf·m, 87 in·lb)
- Install the removed parts (see appropriate chapters).









7-16 ENGINE LUBRICATION SYSTEM

Oil Pressure Measurement

Oil Pressure Measurement

- Remove the left lower fairing (see Lower Fairing Removal in the Frame chapter).
- Remove the oil passage plug, and attach the adapter [A] and gauge [B] to the plug hole.

Special Tools - Oil Pressure Gauge, 10 kgf/cm²: 57001-164 Oil Pressure Gauge Adapter, PT3/8: 57001 -1233

- 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, relief valve, and/or crankshaft bearing insert wear immediately.
- ★ If the reading is much higher than the standard, check the oil passages for clogging.

Oil Pressure Standard:

lanuaru

245 ~ 343 kPa (2.5 ~ 3.5 kgf/cm², 36 ~ 50 psi) at 4 000 r/min (rpm), oil temperature 90°C (194°F)

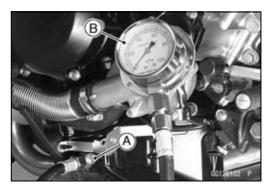
- Stop the engine.
- Remove the oil pressure gauge and adapter.

A WARNING

Hot oil can cause severe burns. Beware of hot engine oil that will drain through the oil passage when the gauge adapter is removed.

• Apply a non-permanent locking agent to the threads of the oil passage plug, and tighten it.

Torque - Oil Passage Plug: 20 N·m (2.0 kgf·m, 15 ft·lb)



Oil Pressure Switch

Oil Pressure Switch Removal

• Remove:

Engine Oil (Drain, see Engine Oil Change in the Periodic Maintenance chapter)

Left Lower Fairing (see Lower Fairing Removal in the Frame chapter) Rubber Boot [A]

- Loosen the oil pressure switch terminal bolt [B], and disconnect the switch lead [C].
- Remove the oil pressure switch [D].

Oil Pressure Switch Installation

• Apply liquid gasket to the threads of the oil pressure switch and tighten it.

Sealant - Liquid Gasket, TB1211: 56019-120

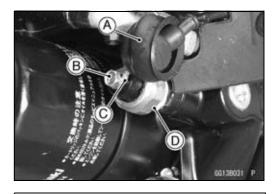
Torque - Oil Pressure Switch: 15 N·m (1.5 kgf·m, 11 ft·lb)

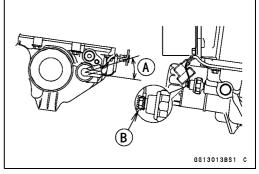
- Install the switch lead direction [A] as shown in the figure.
- Apply grease [B] to the terminal.
- Tighten the terminal bolt.

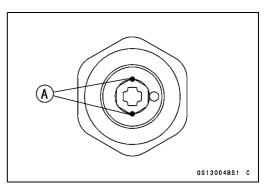
Torque - Oil Pressure Switch Terminal Bolt: 1.5 N·m (0.15 kgf·m, 13 in·lb)

NOTE

OApply a small amount grease to the terminal so that grease should not close two breather holes [A] for switch diaphragm.







7-18 ENGINE LUBRICATION SYSTEM

VVT (Variable Valve Timing)

Oil Pipe Removal

 Remove: Engine Oil (Drain, see Engine Oil Change in the Periodic Maintenance chapter) Oil Cooler (see Oil Cooler Removal) Right Inner Rubber Cover (see Right Inner Rubber Cover Removal)

- Open the clamp [A].
- Remove the oil pipe bolt [B], and pull out the pipe fitting [C].
- Remove the oil pipe [D].

Oil Pipe Installation

- Replace the oil pipe O-ring with a new one.
- Apply grease to the oil pipe O-ring.
- Run the oil pipe [A] correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Tighten:

Torque - Oil Pipe Bolt (Upper) [B]: 9.8 N·m (1.0 kgf·m, 87 in·lb)

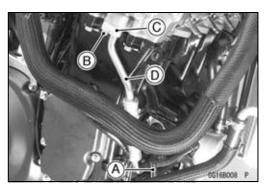
• Install the removed parts (see appropriate chapters).

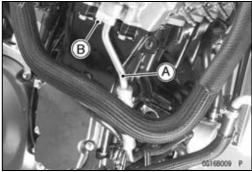
Oil Control Solenoid Valve Removal

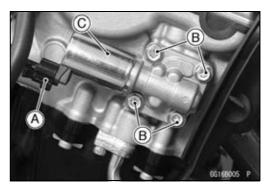
• Remove:

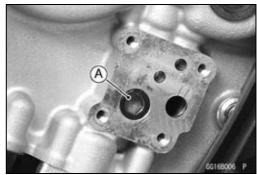
Right Rear Middle Fairing (see Rear Middle Fairing Removal in the Frame chapter)

- Disconnect the connector [A].
- Unscrew the bolts [B].
- Remove the oil control solenoid valve [C] and gasket.
- Remove the oil screen [A].







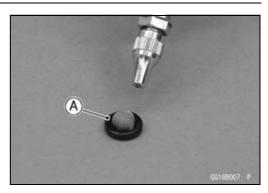


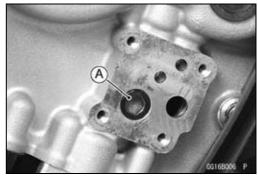
ENGINE LUBRICATION SYSTEM 7-19

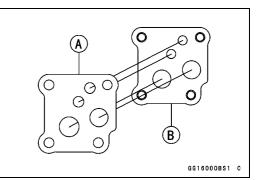
VVT (Variable Valve Timing)

Oil Control Solenoid Valve Installation

- Clean the oil screen [A] with compressed air.
- Check the oil screen carefully for any damage: holes, broken wires, and abnormal wear.
- \star If the oil screen is damaged, replace it.
- Install the oil screen [A].







- Replace the gasket with a new one.
- Install the gasket [A] as shown in the figure. Cylinder Head Mating Surface [B]
- Install the oil control solenoid valve.
- Tighten:
 - Torque Oil Control Solenoid Valve Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Variable Valve Timing Actuator Removal/Installation

• Refer to the Camshaft Removal and Camshaft Installation in the Engine Top End chapter.

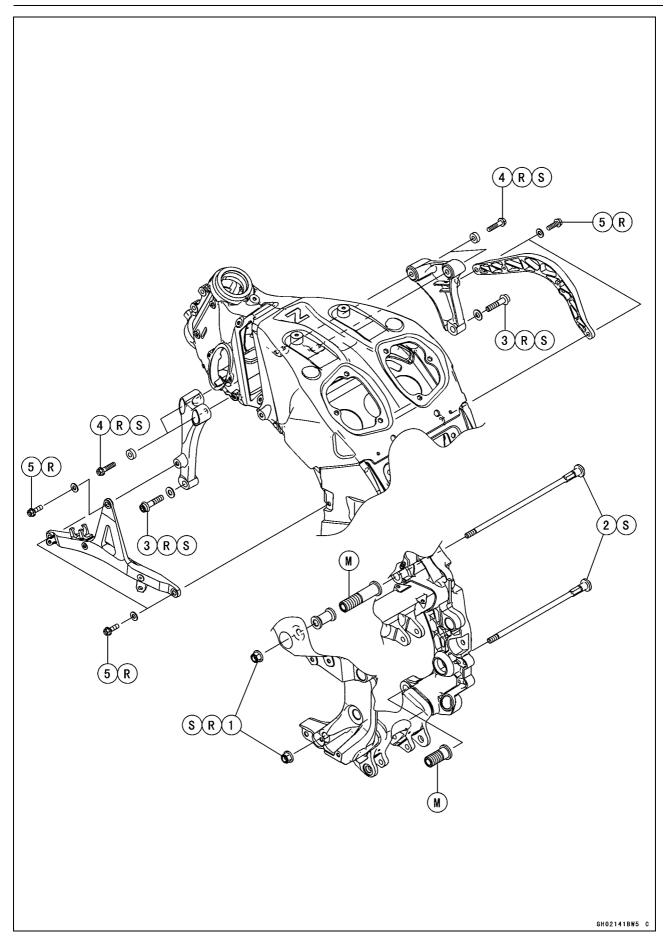
Engine Removal/Installation

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Engine Installation	8-7

8-2 ENGINE REMOVAL/INSTALLATION

Exploded View



ENGINE REMOVAL/INSTALLATION 8-3

Exploded View

No.	Fastener	Torque			Domorko
		N∙m	kgf∙m	ft·lb	Remarks
1	Engine Mounting Nuts (M12)	59	6.0	44	R, S
2	Engine Mounting Bolts	15	1.5	11	S
3	Front Engine Mounting Bolts (M10)	59	6.0	44	R, S
4	Engine Bracket Bolts (M8)	25	2.5	18	R, S
5	Subframe Bolts	23	2.3	17	R

M: Apply molybdenum disulfide grease.

R: Replacement Parts

S: Follow the specified tightening sequence.

8-4 ENGINE REMOVAL/INSTALLATION

Engine Removal/Installation

Engine Removal

- Use the center stand to support the motorcycle upright.
- Squeeze the brake lever slowly and hold it with a band [A].

A WARNING

Motorcycle may fall over unexpectedly resulting in an accident or injury. Be sure to hold the front brake when removing the engine.

NOTICE

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

• Drain:

Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)

Coolant (see Coolant Change in the Periodic Maintenance chapter)

• Remove:

Middle Fairings (see Front/Rear Middle Fairing Removal in the Frame chapter)

Lower Fairings (see Lower Fairing Removal in the Frame chapter)

Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)

Clutch Slave Cylinder (see Clutch Slave Cylinder Removal in the Clutch chapter)

Right Inner Cover (see Inner Cover Removal in the Frame cahpter)

Radiator (see Radiator and Radiator Fan Removal in the Cooling System chapter)

Muffler Body (see Muffler Body Removal in the Engine Top End chapter)

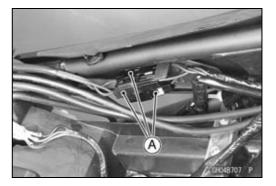
Exhaust Pipe (see Exhaust Pipe Removal in the Engine Top End chapter)

Propeller Shaft (see Propeller Shaft Removal in the Final Drive chapter)

Battery (see Battery Removal in the Electrical System chapter)

• Disconnect the alternator lead connectors [A] (see Alternator Cover Removal in the Electrical System chapter).





ENGINE REMOVAL/INSTALLATION 8-5

Engine Removal/Installation

Remove:

Pad [A]

Right Fairing Stay [B] (see Right Fairing Stay Removal in the Frame chapter) Right Subframe [C] (see Right Subframe Removal in the Frame chapter) Ground Terminal [D]

• Loosen the clamp bolts [A] and pull the ducts [B] upward (see Throttle Body Assy Removal in the Fuel System (DFI) chapter).

• Remove:

Air Switching Valve [A] (see Air Switching Valve Removal in the Engine Top End chapter)

Remove:

Coolant Reserve Tank [A] (see Coolant Change in the Periodic Maintenance chapter)

Left Fairing Stay [B] (see Left Fairing Stay Removal in the Frame chapter)

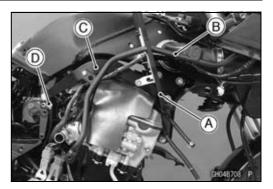
Left Subframe [C] (see Left Subframe Removal in the Frame chapter)

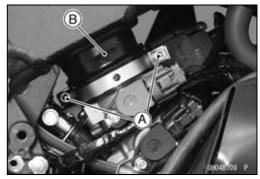
Left Inner Rubber Cover [D] (see Left Inner Rubber Cover Removal in the Frame chapter)

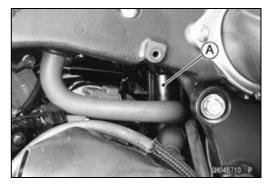
Connectors [E] of Subharness for Sensor and Stick Coils (disconnect)

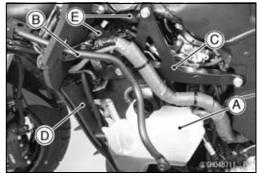
• Disconnect:

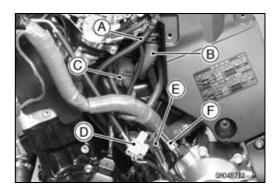
Drain Hose [A] Breather Hose [B] Throttle Body Subharness Connector [C] Gear Position Switch Lead Connector [D] Speed Sensor Lead Connector [E] Sidestand Switch Lead Connector [F]









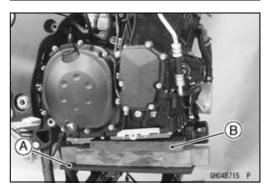


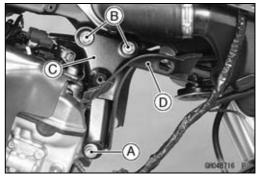
8-6 ENGINE REMOVAL/INSTALLATION

Engine Removal/Installation

• Remove: Clamp [A] Throttle Cable Lower Ends [B]

• Loosen the clamp bolts [C] and pull the ducts [D] upward.

• Support the engine with a suitable stand [A]. OPut a plank [B] onto the suitable stand for engine balance. 



Remove:

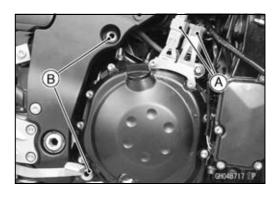
Front Engine Mounting Bolts (M10) [A] (both sides) Engine Bracket Bolts (M8) [B] (both sides) Engine Bracket [C] (both sides) Heat Insulation Cover [D]

• Remove: Engine Mounting Nuts

NOTE

OHold the mounting bolts at the right side of the frame when loosening the engine mounting nuts at the left side of the frame.

- Remove the K-ACT ABS lead connectors [A] (equipped models) and disconnect them.
- Using a hexagon wrench, turn the engine mounting bolts [B] clockwise to make the gap between the adjusting collar and frame.



Engine Removal/Installation

- Remove the starter motor cable terminal nut [A].
- Using the stand, move the engine a little to the front and left.
- Disconnect the fuel hose from the delivery pipe (see Fuel Hose Replacement in the Periodic Maintenance chapter).
- Using the stand, take out the engine.

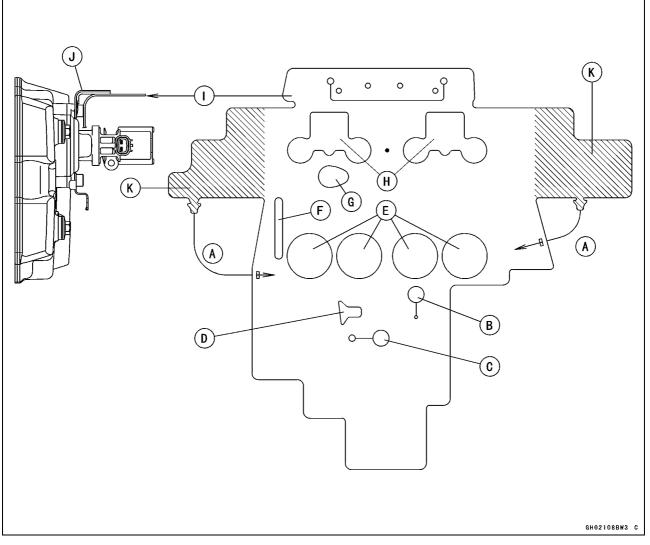


Engine Installation

- Support the engine with a suitable stand.
- OPut a plank onto the suitable stand for engine balance.
- Install the heat insulation cover.

8-8 ENGINE REMOVAL/INSTALLATION

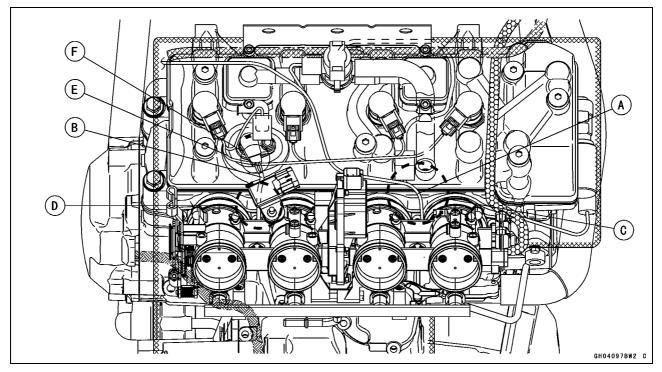
Engine Removal/Installation



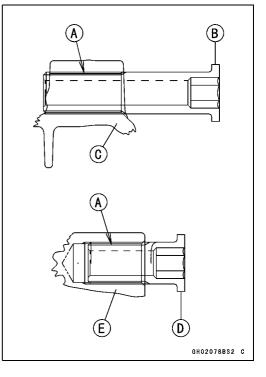
- A: After installation, set the projection in the hole.
- B: To Water Temperature Sensor
- C: To Breather Hose
- D: To Throttle Body Subharness Bracket
- E: To Throttle Body Holder
- F: To Throttle Pulley
- G: To Inlet Cam Position Sensor
- H: To Air Suction Valve and Stick Coils
- I: Only put the heat insulation rubber plate on the cylinder head cover.
- J: Bracket on Air Suction Valve Cover
- K: Cover on both side of cylinder head.

Engine Removal/Installation

- Before installing the engine. Confirm the routing of the water temperature sensor lead [A] and inlet camshaft position sensor lead [B].
- ORun [C] the water temperature sensor lead of the subharness between the #3 and #4 throttle body holders and connect the water temperature sensor body.
- ORun [D] the inlet camshaft position sensor lead between the #1 and #2 throttle body holders.
- ORun the stick coil lead [E] under the inlet camshaft position sensor lead [F].



- Install the engine mounting bolts and nuts, following the specified installing sequence.
- OApply molybdenum disulfide grease [A] to the thread of adjusting collars.
- OFirst, tighten the adjusting collars fully by hand.
 - Upper Adjusting Collar [B]
 - Upper Crankcase [C]
 - Lower Adjusting Collar [D]
 - Lower Crankcase [E]

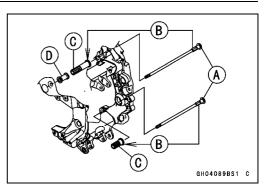


8-10 ENGINE REMOVAL/INSTALLATION

Engine Removal/Installation

OSecondly, insert the engine mounting bolts [A] until they fit [B] in the adjusting collars [C].

 $\bigcirc\ensuremath{\mathsf{Be}}$ sure that the collar [D] is in position.



NOTE

OReplace the following bolts with new bolts pre-coated with locking agent.

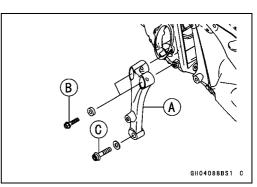
Engine Bracket Bolts (M8) (P/No. 92153-1770) Front Engine Mounting Bolts (M10) (P/No. 92153-1769) Subframe Bolts (P/No. 92153-1768)

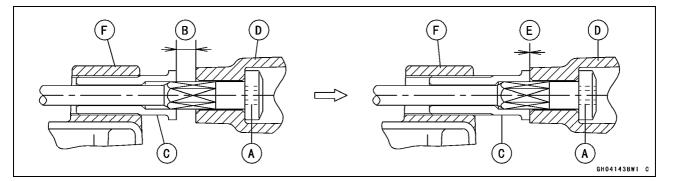
- OThirdly, install the left engine bracket [A] and temporally tighten the left engine bracket bolts [B] and the left front engine mounting bolt [C].
- OFourthly, turn the engine mounting bolts [A] counterclockwise with specified torque until the clearance [B] between the adjusting collars [C] and frame [D] comes to zero mm [E].

Crankcase [F]

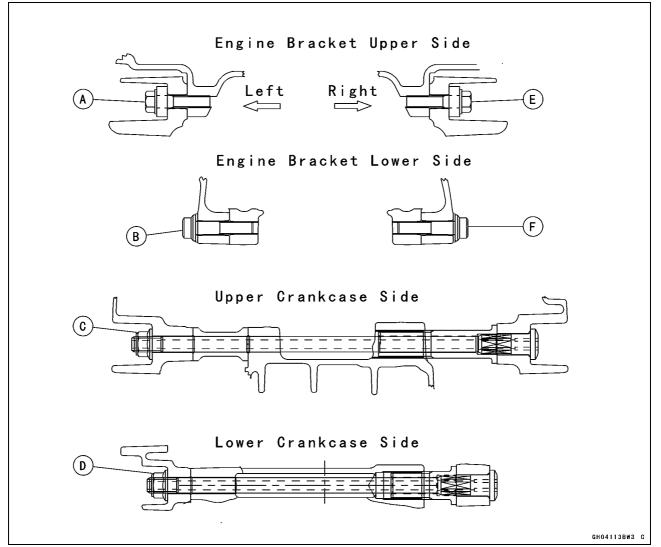
OAt this time, prevent the weight load from hanging to the engine mounting bolts by supporting the engine with the stand.

Torque - Engine Mounting Bolts: 15 N·m (1.5 kgf·m, 11 ft·lb) ODo not exceed the specified torque of the engine mounting bolts .





Engine Removal/Installation



OFifthly, tighten the left engine bracket bolts [A] and left front engine mounting bolt [B].

OReplace the engine mounting nuts [C] [D] with new ones.OSixthly, tighten the upper engine mounting nut and then the lower engine mounting nut.

NOTE

OHold the mounting bolts at the right side of the frame when tightening the engine mounting nuts at the left side of the frame.

OSeventhly, install the right engine bracket and tighten the right engine bracket bolts [E] and the right front engine mounting bolt [F].

OTighten:

Torque - Engine Mounting Nut (M12): 59 N·m (6.0 kgf·m, 44 ft·lb)

Engine Bracket Bolts (M8): 25 N·m (2.5 kgf·m, 18 ft·lb)

Front Engine Mounting Bolts (M10): 59 N·m (6.0 kgf·m, 44 ft·lb)

8-12 ENGINE REMOVAL/INSTALLATION

Engine Removal/Installation

- Run the leads, cable and hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).
- Adjust:

Throttle Cables (see Throttle Control System Inspection in the Periodic Maintenance chapter)

- Fill the engine with engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Fill the engine with coolant and bleed the air from the cooling system (see Coolant Change in the Periodic Maintenance chapter).

Crankshaft/Transmission

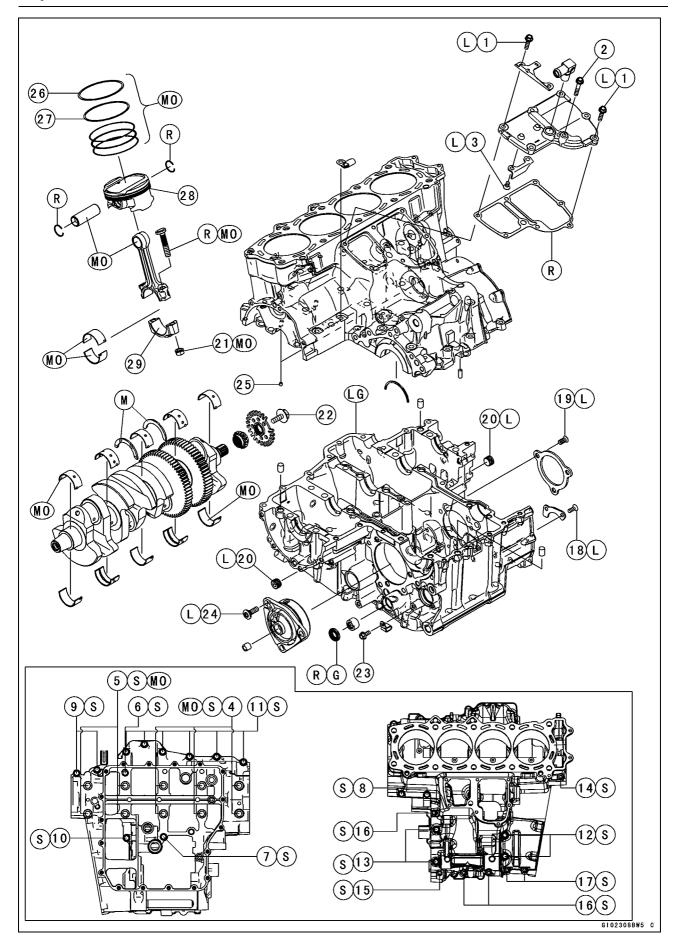
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9-2 CRANKSHAFT/TRANSMISSION

Exploded View



Exploded View

	- .		_ .		
No.	Fastener	N∙m	kgf∙m	ft·lb	Remarks
1	Breather Cover Bolts (L = 25 mm)	9.8	1.0	87 in·lb	L
2	Breather Cover Bolt (L = 35 mm)	9.8	1.0	87 in·lb	
3	Breather Plate Screws	9.8	1.0	87 in·lb	L
4	Crankcase Bolts (M10, L = 90 mm)	47	4.8	35	MO, S
5	Crankcase Bolts (M10, L = 120 mm)	47	4.8	35	MO, S
6	Crankcase Bolt (M7, L = 110 mm)	20	2.0	15	S
7	Crankcase Bolt (M7, L = 85 mm)	20	2.0	15	S
8	Crankcase Bolts (M7, L = 65 mm)	20	2.0	15	S
9	Crankcase Bolts (M7, L = 60 mm)	20	2.0	15	S
10	Crankcase Bolt (M7, L = 50 mm)	20	2.0	15	S
11	Crankcase Bolts (M7, L = 45 mm)	20	2.0	15	S
12	Crankcase Bolts (M8, L = 80 mm)	27	2.8	20	S
13	Crankcase Bolts (M8, L = 70 mm)	27	2.8	20	S
14	Crankcase Bolt (M6, L = 65 mm)	12	1.2	106 in·lb	S
15	Crankcase Bolt (M6, L = 50 mm)	12	1.2	106 in·lb	S
16	Crankcase Bolts (M6, L = 40 mm)	12	1.2	106 in·lb	S
17	Crankcase Bolts (M6, L = 25 mm)	12	1.2	106 in·lb	S
18	Shift Drum Bearing Holder Screws	4.9	0.50	43 in·lb	L
19	Bearing Position Plate Screws	4.9	0.50	43 in·lb	L
20	Oil Passage Plugs	20	2.0	15	L
21	Connecting Rod Big End Nuts	see the text	\leftarrow	\leftarrow	MO
22	Timing Rotor Bolt	39	4.0	29	
23	Gear Position Switch Lead Clamp Bolt	9.8	1.0	87 in·lb	
24	Drive Shaft Cover Bolts	25	2.5	18	L
25	Piston Oil Jets	2.9	0.30	26 in·lb	

26. "R" marked side faces up.

27. "RN" marked side faces up.

28. "IN" mark faces to inlet side (rearward).

29. Do not apply any grease or oil.

G: Apply grease.

L: Apply a non-permanent locking agent.

LG: Apply liquid gasket.

M: Apply molybdenum disulfide grease.

MO: Apply molybdenum disulfide oil.

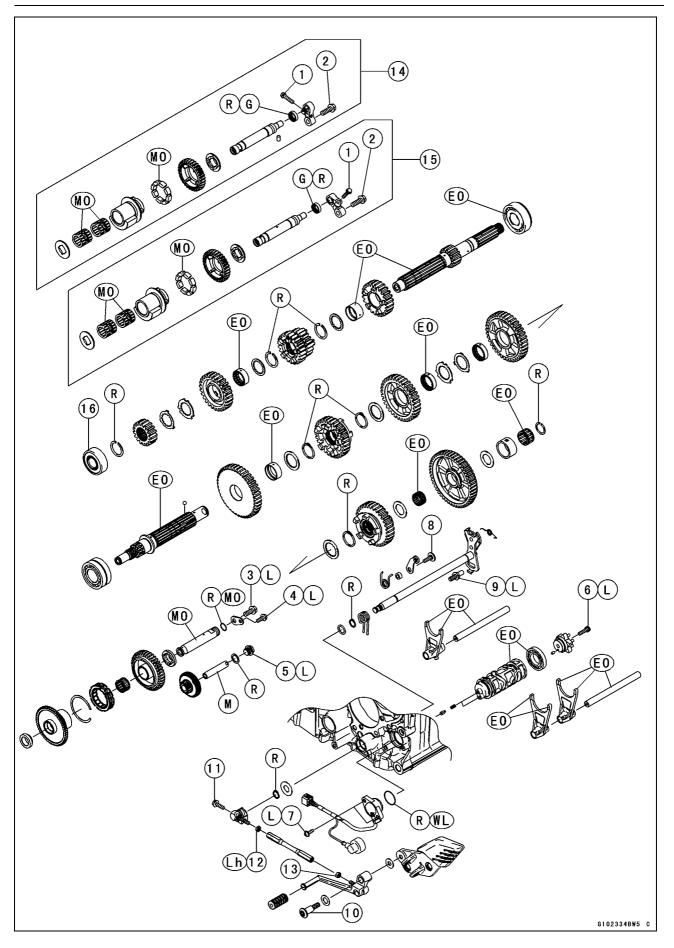
(mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10 : 1)

R: Replacement Parts

S: Follow the specified tightening sequence.

9-4 CRANKSHAFT/TRANSMISSION

Exploded View



Exploded View

Na	Fastanan	Torque			Demode
No.	Fastener	N∙m	kgf∙m	ft·lb	Remarks
1	Balancer Shaft Clamp Bolts	9.8	1.0	87 in·lb	
2	Balancer Shaft Clamp Lever Bolts	25	2.5	18	
3	Starter Clutch Shaft Bolt	9.8	1.0	87 in·lb	L
4	Starter Clutch Shaft Plate Bolt	9.8	1.0	87 in·lb	L
5	Torque Limiter Bolt	25	2.5	18	L
6	Shift Drum Cam Holder Bolt	12	1.2	106 in·lb	L
7	Gear Position Switch Screws	2.9	0.30	26 in·lb	L
8	Gear Positioning Lever Bolt	12	1.2	106 in·lb	
9	Shift Shaft Return Spring Pin	29	3.0	21	L
10	Shift Pedal Mounting Bolt	25	2.5	18	
11	Shift Lever Bolt	6.9	0.70	61 in·lb	
12	Tie-rod Locknut (Front)	6.9	0.70	61 in·lb	Lh
13	Tie-rod Locknut (Rear)	6.9	0.70	61 in·lb	

14. Front Balancer

15. Rear Balancer

16. Install the bearing into the drive shaft cover so that the shield side faces in.

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.

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

R: Replacement Parts

WL: Apply soap and water solution or rubber lubricant.

9-6 CRANKSHAFT/TRANSMISSION

Specifications

Item	Standard	Service Limit
Crankcase, Crankshaft, Connecting		
Rods		
Connecting Rod Bend		TIR 0.2/100 mm (0.008/3.94 in.)
Connecting Rod Twist		TIR 0.2/100 mm (0.008/3.94 in.)
Connecting Rod Big End Side Clearance	0.10 ~ 0.38 mm (0.0039 ~ 0.0150 in.)	0.58 mm (0.023 in.)
Connecting Rod Big End Bearing Insert/crankpin Clearance	0.048 ~ 0.086 mm (0.0019 ~ 0.0034 in.)	0.12 mm (0.0047 in.)
Crankpin Diameter:	37.984 ~ 38.000 mm	37.97 mm
	(1.4954 ~ 1.4961 in.)	(1.4949 in.)
Marking None	37.984 ~ 37.992 mm (1.4954 ~ 1.4957 in.)	
0	37.993 ~ 38.000 mm (1.4958 ~ 1.4961 in.)	
Connecting Rod Big End Inside Diameter:	41.000 ~ 41.016 mm (1.6142 ~ 1.6148 in.)	
Marking None	41.000 ~ 41.008 mm (1.6142 ~ 1.6145 in.)	
0	41.009 ~ 41.016 mm (1.6145 ~ 1.6148 in.)	
Connecting Rod Big End Bearing Insert Thickness:		
Brown	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.)	
Connecting Rod Bolt Stretch:	(Usable Range)	
New Connecting Rod	0.25 ~ 0.34 mm (0.0098 ~ 0.0134 in.)	
Used Connecting Rod	0.25 ~ 0.34 mm (0.0098 ~ 0.0134 in.)	
Crankshaft Side Clearance	0.05 ~ 0.25 mm (0.0020 ~ 0.0098 in.)	0.45 mm (0.018 in.)
Crankshaft Runout	TIR 0.03 mm (0.0012 in.) or less	TIR 0.08 mm (0.0031 in.)
Crankshaft Main Bearing Insert/journal Clearance	0.031 ~ 0.063 mm (0.0012 ~ 0.0025 in.)	0.09 mm (0.0035 in.)
Crankshaft Main Journal Diameter:	37.984 ~ 38.000 mm (1.4954 ~ 1.4961 in.)	37.96 mm (1.494 in.)
Marking None	37.984 ~ 37.992 mm (1.4954 ~ 1.4957 in.)	
1	37.993 ~ 38.000 mm (1.4958 ~ 1.4961 in.)	
Crankcase Main Bearing Inside Diameter:	41.000 ~ 41.016 mm (1.6142 ~ 1.6148 in.)	

CRANKSHAFT/TRANSMISSION 9-7

Specifications

Item	Standard	Service Limit
Marking O	41.000 ~ 41.008 mm	
	(1.6142 ~ 1.6145 in.)	
None	41.009 ~ 41.016 mm (1.6145 ~ 1.6148 in.)	
Crankshaft Main Bearing Insert Thickness:		
Brown	1.490 ~ 1.494 mm (0.0587 ~ 0.0588 in.)	
Black	1.494 ~ 1.498 mm (0.0588 ~ 0.0590 in.)	
Blue	1.498 ~ 1.502 mm (0.0590 ~ 0.0591 in.)	
Pistons		
Cylinder (Upper Crankcase) Inside Diameter	83.994 ~ 84.006 mm (3.3068 ~ 3.3073 in.)	84.10 mm (3.311 in.)
Piston Diameter	83.969 ~ 83.984 mm (3.3059 ~ 3.3065 in.)	83.82 mm (3.300 in.)
Piston/Cylinder Clearance	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in.)	
Piston Ring/Groove Clearance:		
Тор	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.)	0.17 mm (0.0067 in.)
Second	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)	0.16 mm (0.0063 in.)
Piston Ring Groove Width:		
Тор	0.92 ~ 0.94 mm (0.036 ~ 0.037 in.)	1.02 mm (0.040 in.)
Second	1.01 ~ 1.03 mm (0.040 ~ 0.041 in.)	1.11 mm (0.044 in.)
Piston Ring Thickness:		
Тор	0.87 ~ 0.89 mm (0.0343 ~ 0.0350 in.)	0.80 mm (0.031 in.)
Second	0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)	0.90 mm (0.035 in.)
Piston Ring End Gap:		
Тор	0.20 ~ 0.30 mm (0.0079 ~ 0.0118 in.)	0.6 mm (0.024 in.)
Second	0.40 ~ 0.55 mm (0.0157 ~ 0.0217 in.)	0.8 mm (0.031 in.)
Transmission		
Shift Fork Ear Thickness	5.74 ~ 6.00 mm (0.2260 ~ 0.2362 in.)	5.6 mm (0.220 in.)
Gear Groove Width	6.05 ~ 6.15 mm (0.238 ~ 0.242 in.)	6.3 mm (0.25 in.)
Shift Fork Guide Pin Diameter	6.9 ~ 7.0 mm (0.272 ~ 0.276 in.)	6.8 mm (0.268 in.)
Shift Drum Groove Width	7.05 ~ 7.20 mm (0.278 ~ 0.283 in.)	7.3 mm (0.287 in.)

9-8 CRANKSHAFT/TRANSMISSION

Specifications

Connecting Rod Big End Bearing Insert Selection

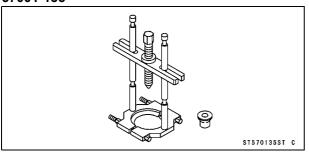
Con-rod Big End Bore	Crankpin Diameter	Bearing Insert	
Diameter Marking	Marking	Size Color	Part Number
None	0	Brown	92139-0131
None	None	Diach	92139-0130
0	0	Black	92139-0130
0	None	Blue	92139-0129

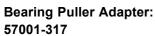
Crankshaft Main Bearing Insert Selection

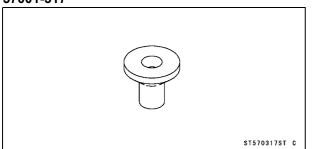
Crankcase Main	Crankshaft Main	Bearing Insert					
Bearing Inside Diameter Marking	Journal Diameter Marking	Size Color	Part Number	Journal Nos.			
0	4	Brown	92139-0134	1, 3, 5			
0	I	Brown	92139-0137	2, 4			
None	1	Dlook	92139-0133	1, 3, 5			
0	None	Black	92139-0136	2, 4			
Nono	Nono	Dhuo	92139-0132	1, 3, 5			
None	None	Blue	92139-0135	2, 4			

Special Tools and Sealant

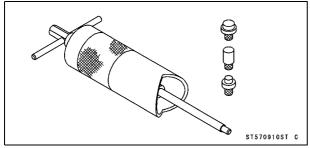
Bearing Puller: 57001-135



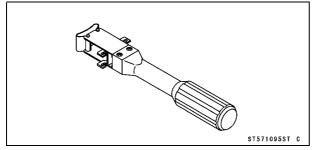




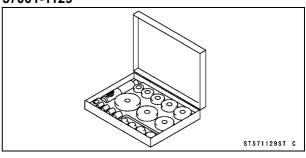
Piston Pin Puller Assembly: 57001-910



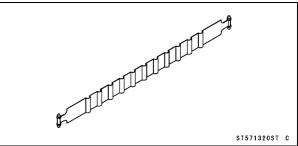
Piston Ring Compressor Grip: 57001-1095



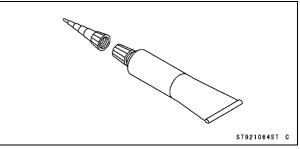
Bearing Driver Set: 57001-1129



Piston Ring Compressor Belt, ϕ 80 ~ ϕ 91: 57001-1320



Liquid Gasket, TB1216B: 92104-1064



9-10 CRANKSHAFT/TRANSMISSION

Crankcase Splitting

Crankcase Splitting

- Remove the engine (see Engine Removal/Installation in the Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove:

Clutch (see Clutch Removal in the Clutch chapter) Starter Clutch (see Starter Clutch Removal) Oil Pump (see Oil Pump Removal in the Engine Lubrication System chapter)

Alternator Rotor (see Alternator Rotor Removal in the Electrical System chapter)

Cylinder Head (see Cylinder Head Removal in the Engine Top End chapter)

Oil Cooler (see Oil Cooler Removal in the Engine Lubrication System chapter)

Oil Pan (see Oil Pan Removal in the Engine Lubrication System chapter)

External Shift Mechanism (see External Shift Mechanism Removal)

• Remove the upper crankcase bolts.

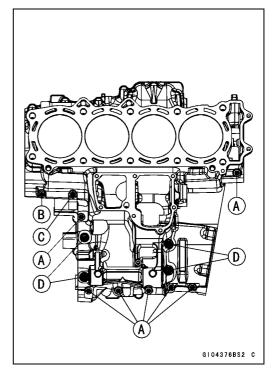
OFirst loosen the M6 bolts.

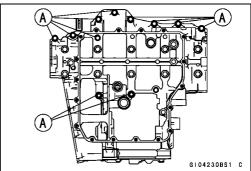
M6 Bolts [A]

M7 Bolt [B]

M7 Bolt with Clamp [C]

M8 Bolts with Washers [D]





• Remove the lower crankcase bolts. OFirst loosen the M7 bolts [A].

Crankcase Splitting

 \bigcirc Next, loosen the M10 Bolts [1 ~10] (sequence numbers).

- Tap lightly around the crankcase mating surface with a plastic mallet, and split the crankcase. Take care not to damage the crankcase.
- ★If the crankshaft is to be removed, remove the pistons (see Piston Removal).
- Remove the following parts from the crankcase.
 Front Balancer (see Front Brancer Removal)
 Transmission Shafts (see Transmission Shaft Removal)

Crankcase Assembly

NOTICE

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

- With a high-flash point solvent, clean off the mating surfaces of the crankcase halves and wipe dry.
- Using compressed air, blow out the oil passages in the crankcase halves.
- Install the new drive shaft bearing [A] so that its stepped side [B] faces as shown.

Special Tool - Bearing Driver Set: 57001-1129

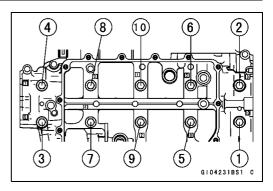
• Install the bearing plate [A].

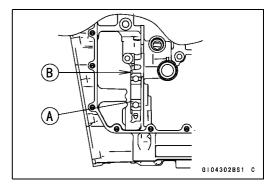
OInstall the plate so that the stepped hole side [B] faces outside.

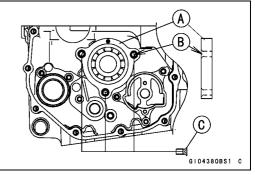
• Apply a non-permanent locking agent to the bearing position plate screws [C] and tighten them.

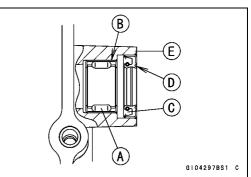
Torque - Bearing Position Plate Screws: 4.9 N·m (0.50 kgf·m, 43 in·lb)

- Install the new needle bearing [A] for the shift shaft so that its marked side [B] faces as shown, using a press.
- Install the new oil seal [C] so that its surface [D] is flush with the surface of the crankcase [E].









9-12 CRANKSHAFT/TRANSMISSION

Crankcase Splitting

• Install the piston oil jets [A] from the upper crankcase lower side.

Torque - Piston Oil Jets: 2.9 N·m (0.30 kgf·m, 26 in·lb)

• Install:

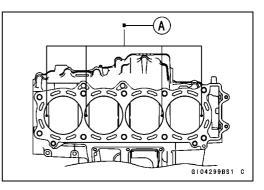
Pistons (see Piston Installation)

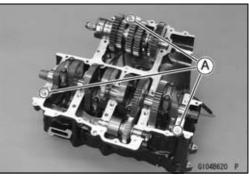
Connecting Rods (see Connecting Rod Installation) Crankshaft (see Crankshaft Installation) Shift Drum and Shift Fork (see Shift Drum and Fork

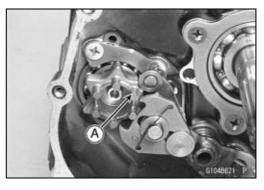
Shift Drum and Shift Fork (see Shift Drum and Fork Installation)

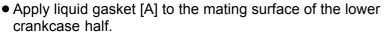
Transmission Shaft (see Transmission Shaft Installation) Front Balancer (see Front Blancer Installation) Dowel Pins [A]

- Before fitting the lower case on the upper case, check the following.
- OCheck to see that the shift drum and transmission gears are in the neutral position [A].









Sealant - Liquid Gasket, TB1216B: 92104-1064

NOTE

OAster tightening the crankcase bolts, wipe up the liquid gasket seeping out the output shaft bearing hole [B].

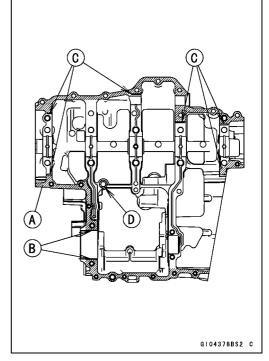
OMake the application finish within 20 minutes when the liquid gasket to the mating surface of the lower crankcase half is applied.

NOTICE

Do not apply liquid gasket to the grooves [C] inside from the crankshaft main bearing inserts, and balancer bearing.

NOTICE

Do not plug the inside of breather hole [D] with liquid gasket.



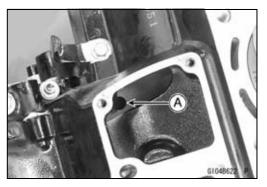
Crankcase Splitting

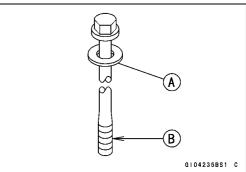
- Fit the lower crankcase half to the upper crankcase half.
- Be sure that the breather hole [A] on the upper crankcase is not plugged with liquid gasket.

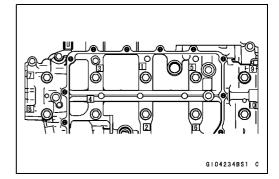
- The M10 bolts have washers, replace them with new ones.
- Apply molybdenum disulfide oil solution to the seating surfaces [A] of the washers and the threads [B] of the M10 bolts.
- Tighten the lower crankcase bolts using the following steps.

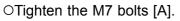
 \bigcirc Following the sequence numbers on the lower crankcase half, tighten the M10 bolts [1 ~ 10] with washers.

Torque - Crankcase Bolts (M10): 47 N·m (4.8 kgf·m, 35 ft·lb)

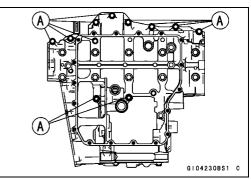








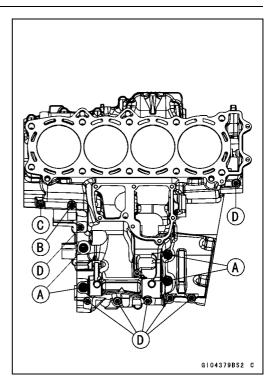
Torque - Crankcase Bolts (M7): 20 N·m (2.0 kgf·m, 15 ft·lb)



9-14 CRANKSHAFT/TRANSMISSION

Crankcase Splitting

- Tighten the upper crankcase bolts in the order listed.
- OThe M8 bolts have washers, replace them with new ones.
- OTighten:
 - M8 Bolts with Washers [A] M7 Bolt with the clamp [B] M7 Bolt [C] M6 Bolts [D]
 - Torque Crankcase Bolts (M8): 27 N·m (2.8 kgf·m, 20 ft·lb) Crankcase Bolts (M7): 20 N·m (2.0 kgf·m, 15 ft·lb) Crankcase Bolts (M6): 12 N·m (1.2 kgf·m, 106 in·lb)



• After tightening all crankcase bolts, check the following items.

OCrankshaft and transmission shafts turn freely.

OWhile spinning the output shaft, gears shift smoothly from the 1st to neutral, and neutral to 1st.

Crankshaft and Connecting Rods

Crankshaft Removal

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

Crankshaft Installation

NOTICE

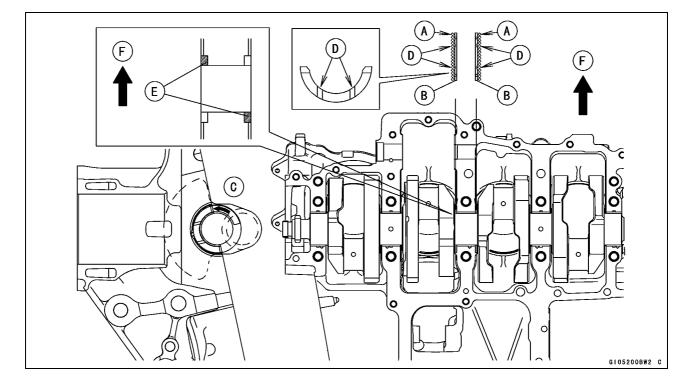
If the crankshaft, bearing inserts, or crankcase halves are replaced with new ones, select the bearing inserts and check clearance with a plastigage (press gauge) before assembling engine to be sure the correct bearing inserts are installed.

NOTE

- ○When replacing the crankcase halves, install the thrust washers (*t* = 2.5 mm, 0.0984 in.) on the upper crankcase half.
- Apply molybdenum disulfide oil solution to the crankshaft main bearing inserts.
- Follow the next procedure to insert the thrust washers on the upper crankcase half, after installing connecting rod on the crankshaft (see Connecting Rod Installation).
- Apply molybdenum disulfide grease to the outside surfaces [A] of both thrust washers [B].
- Slide [C] one thrust washer into the upper crankcase half.
- Move the crankshaft to the left or right and then slide the other washer into the upper crankcase half.

NOTE

 Slide the thrust washers so that the oil grooves [D] face outward. Make sure that the blue-painted edges [E] are positioned as shown in figure.
 Front [F]



9-16 CRANKSHAFT/TRANSMISSION

Crankshaft and Connecting Rods

Connecting Rod Removal

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

NOTE

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

• Remove the piston (see Piston Removal).

NOTICE

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

Connecting Rod Installation

NOTICE

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

Big End Cap [A] Connecting Rod [B] Weight Mark, Alphabet [C] Diameter Mark [D]: ""〇" or no mark

NOTICE

If the connecting rods, big end 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 oil to the inner surface of the upper and lower bearing inserts [A].
- Apply molybdenum disulfide oil to the threads [B] and seating surface [C] of the connecting rod nuts.
- 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.

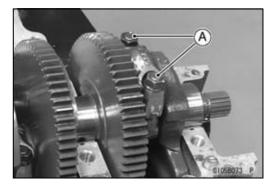
NOTICE

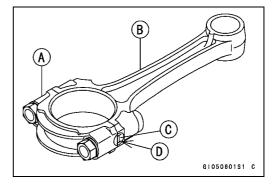
Wrong application of oil and grease could cause bearing damage.

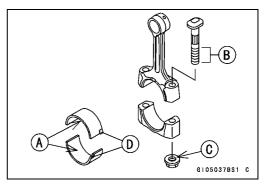
OWhen installing the inserts [A], be careful not to damage the insert surface with the edge of the connecting rod [B] or the cap [C]. One way to install inserts is as follows.

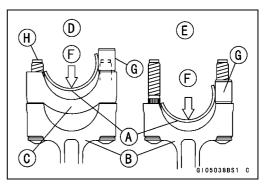
Installation [D] to Cap Installation [E] to Connecting Rod Push [F] Spare Dowel Pin [G] Connecting Rod Bolts [H]

- Remove debris and clean the surface of inserts.
- Install the cap on the connecting rod, aligning the weight and diameter marks.









Crankshaft and Connecting Rods

- Install the crankshaft (see Crankshaft Installation).
- Install each connecting rod on its original crankpin.
- OThe connecting rod big end is bolted using the "plastic region fastening method".
- OThis method precisely achieves the needed clamping force without exceeding it unnecessarily, allowing the use of thinner, lighter bolts further decreasing connecting rod weight.
- OThere 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.

NOTICE

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.

NOTICE

Be careful not to overtighten the nuts. The bolts must be positioned on the seating surface correctly to prevent the bolt heads from hitting the crankcase.

(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.

A WARNING

Gasoline and low-flash point solvents can be flammable and/or explosive and cause severe burns. Clean the bolts, nuts, and connecting rods in a well-ventilated area, and take care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Do not use gasoline or a low-flash point solvent to clean them.

NOTICE

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

9-18 CRANKSHAFT/TRANSMISSION

Crankshaft and Connecting Rods

- 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 to measure the length of new connecting rod bolts and record the values to find the bolt stretch.

Connecting Rod [A]

Dent here with a punch [B].

Nuts [C]

Fit micrometer pins into dents [D].

• Apply a small amount of molybdenum disulfide oil to the following.

Threads of Nuts and Bolts

Seating Surfaces of Nuts and Connecting rods

- Tighten the big end nuts until the bolt elongation reaches the length specified in the table.
- Check the length 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.

Bolt Length after	Bolt Length before	_	Bolt Stretch
tightening	. tightening	-	Buil Stretch

Connect- ing 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	0.25 ~ 0.34 mm (0.0098 ~ 0.0134	
	New	New	in.)	
Used	Replace the bolts with new ones.	Replace the nuts with new ones.	0.25 ~ 0.34 mm (0.0098 ~ 0.0134 in.)	

(2) Rotation Angle Method

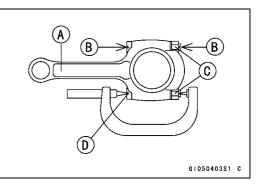
- ★ If you don't have a point micrometer, you may tighten the nuts using the "Rotation Angle Method".
- Be sure to clean the bolts, nuts and connecting rods thoroughly with a high-flash point solvent, because the new connecting rods, bolts and nuts are treated with an anti -rust solution.

Gasoline and low-flash point solvents can be flammable and/or explosive and cause severe burns. Clean the bolts, nuts, and connecting rods in a well-ventilated area, and take care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Do not use gasoline or a low-flash point solvent to clean them.

NOTICE

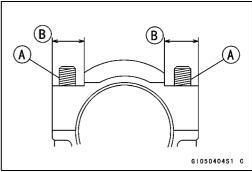
Immediately dry the bolts and nuts with compressed air after cleaning.

Clean and dry the bolts and nuts completely.



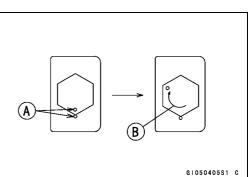
Crankshaft and Connecting Rods

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



- First, tighten the nuts to the specified torque. See the table below.
- Next, tighten the nuts 120° ± 5°.
- OMark [A] the connecting rod big end caps and nuts so that nuts can be turned 120° [B] properly.

Connecting Rod Assy	Bolt	Nut	Torque + Angle N·m (kgf·m, ft·lb)
New	Use the bolts attached to new con-rod.	Attached to new con-rod	21.6 (2.2, 16) + 120°
	New	New	21.6 (2.2, 16) + 120°
Used	Replace the bolts with new ones	Replace the nuts with new ones	21.6 (2.2, 16) + 120°



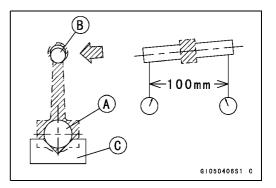
Crankshaft/Connecting Rod Cleaning

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

Connecting Rod Bend Inspection

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

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



9-20 CRANKSHAFT/TRANSMISSION

Crankshaft and Connecting Rods

Connecting Rod Twist Inspection

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

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

Connecting Rod Big End Side Clearance Inspection

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

Connecting Rod Big End Side Clearance Standard: 0.10 ~ 0.38 mm (0.0039 ~ 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 clearance again. If clearance is too large after connecting rod replacement, the crankshaft also must be replaced.

Connecting Rod Big End Bearing Insert/Crankpin Wear Inspection

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

NOTE

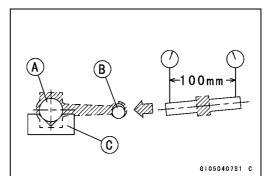
ODo not move the connecting rod and crankshaft during clearance measurement.

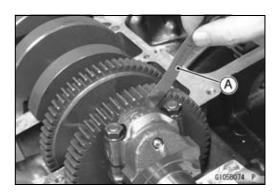
NOTICE

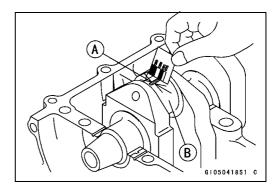
After measurement, replace the connecting rod bolts.

Connecting Rod Big End Bearing Insert/Crankpin Clearance Standard: 0.048 ~ 0.086 mm (0.0019 ~ 0.0034 in.)

Service Limit: 0.12 mm (0.0047 in.)







Crankshaft and Connecting Rods

- ★ If the clearance is within the standard, no bearing replacement is required.
- ★ If the clearance is between 0.087 mm (0.0034 in.) and the service limit (0.12 mm, 0.0047 in.), replace the bearing inserts [A] with inserts painted blue [B]. Check insert/crankpin clearance with the plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.
- ★ If the clearance exceeds the service limit, measure the diameter of the crankpins.

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

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

Crankpin Diameter Marks

```
None 37.984 ~ 37.992 mm (1.4954 ~ 1.4957 in.)
```

```
O 37.993 ~ 38.000 mm (1.4958 ~ 1.4961 in.)
```

- \bigtriangleup : Crankpin Diameter Marks, " \bigcirc " or no mark.
- Measure the connecting rod big end inside diameter, and mark each connecting rod big end in accordance with the inside diameter.
- Tighten the connecting rod big end nuts to the specified torque (see Connecting Rod Installation).

NOTE

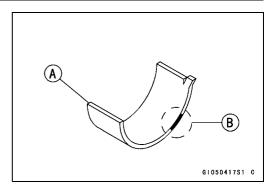
OThe mark already on the big end should almost coincide with the measurement.

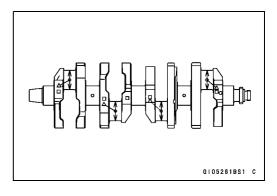
Connecting Rod Big End Inside Diameter Marks

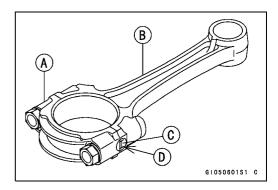
```
None 41.000 ~ 41.008 mm (1.6142 ~ 1.6145 in.)
```

O 41.009 ~ 41.016 mm (1.6145 ~ 1.6148 in.)

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







9-22 CRANKSHAFT/TRANSMISSION

Crankshaft and Connecting Rods

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

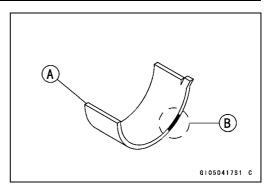
Con-rod Big End Inside	Crankpin Diameter	Bearing Insert	
Diameter Marking	Marking	Size Color	Part Number
None	0	Brown	92139-0131
None	None	Diack	02120 0120
0	0	Black	92139-0130
0	None	Blue	92139-0129

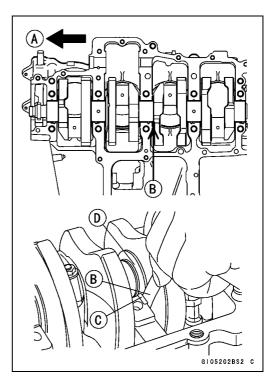
• Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.

Crankshaft Side Clearance Inspection

- Move [A] the crankshaft to the side of the alternator.
- Insert a thickness gauge [B] between the thrust washer [C] and the crank web [D] of the No. 3 main journal to determine clearance.
 - Crankshaft Side Clearance Standard: 0.05 ~ 0.25 mm (0.0020 ~ 0.0098 in.) Service Limit: 0.45 mm (0.018 in.)
- ★ If the clearance exceeds the service limit, replace the thrust washers as a set.

Thrust Washer P/No.	Thickness	Edge Colar
92200-0331	2.45 ~ 2.50 mm (0.0965 ~ 0.0984 in.)	Blue

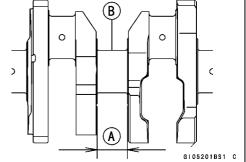




Measure the crankshaft #3 main journal width [A].
 If the measurement exceeds the standard, replace the crankshaft [B].

Crankshaft #3 Main Journal Width

Standard: 27.45 ~ 27.50 mm (1.0807 ~ 1.0827 in.)



Crankshaft and Connecting Rods

Crankshaft Runout Inspection

- Measure the crankshaft runout.
- ★ If the measurement exceeds the service limit, replace the crankshaft.
 - Crankshaft Runout Standard: TIR 0.03 mm (0.0012 in.) or less Service Limit: TIR 0.08 mm (0.0031 in.)

Crankshaft Main Bearing Insert/Journal Wear Inspection

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

NOTE

- ○Tighten the crankcase bolts to the specified torque (see Crankcase Assembly).
- ODo not turn the crankshaft during clearance measurement.

```
Crankshaft Main Bearing Insert/Journal Clearance
Standard: 0.031 ~ 0.063 mm (0.0012 ~ 0.0025 in.)
Service Limit: 0.09 mm (0.0035 in.)
```

- ★ If the clearance is within the standard, no bearing replacement is required.
- ★ If the clearance is between 0.064 mm (0.0025 in.) and the service limit (0.09 mm, 0.0035 in.), replace the bearing inserts [A] with inserts painted blue [B]. Check 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:
 37.984 ~ 38.000 mm (1.4954 ~ 1.4961 in.)

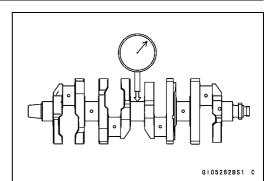
 Service Limit:
 37.96 mm (1.494 in.)

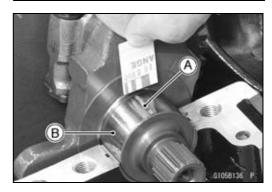
- ★ If any journal has worn past the service limit, replace the crankshaft with a new one.
- ★ If the measured journal diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

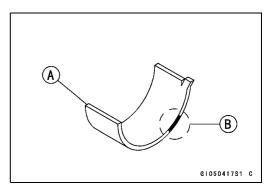
Crankshaft Main Journal Diameter Marks

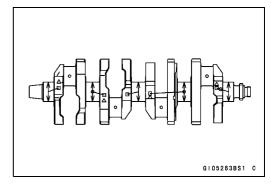
- None 37.984 ~ 37.992 mm (1.4954 ~ 1.4957 in.)
 - 1 37.993 ~ 38.000 mm (1.4958 ~ 1.4961 in.)

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









OJournal clearance less than 0.025 mm (0.00098 in.) can not be measured by plastigage, however, using genuine parts maintains the minimum standard clearance.

9-24 CRANKSHAFT/TRANSMISSION

Crankshaft and Connecting Rods

• Measure the main bearing inside diameter, and mark the upper crankcase half in accordance with the inside diameter.

Crankcase Main Bearing Inside Diameter Marks: " \bigcirc " mark or no mark.

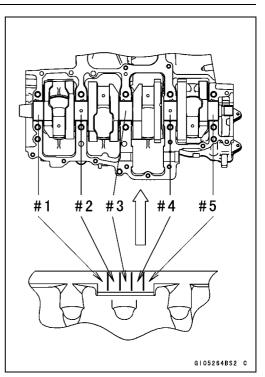
• Tighten the crankcase bolts to the specified torque (see Crankcase Assembly).

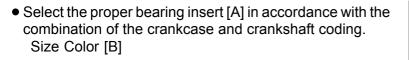
NOTE

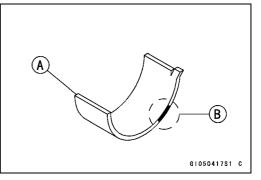
OThe mark already on the upper crankcase half should almost coincide with the measurement.

Crankcase Main Bearing Inside Diameter Marks

0	41.000 ~ 41.008 mm (1.6142 ~ 1.6145 in.)
None	41.009 ~ 41.016 mm (1.6145 ~ 1.6148 in.)







Crankcase Main Bearing Crankshaft Main Jour		Bearing Insert		
Inside Diameter Marking	Diameter Marking	Size Color	Part Number	Journal Nos.
0	1	Brown	92139-0134	1, 3, 5
			92139-0137	2, 4
None	1	Diask	92139-0133	1, 3, 5
0	None	Black	92139-0136	2, 4
None	None	Blue	92139-0132	1, 3, 5
			92139-0135	2, 4

• Install the new inserts in the crankcase halves and check insert/journal clearance with the plastigage.

CRANKSHAFT/TRANSMISSION 9-25

Pistons

Piston Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the connecting rod nuts [A].
- Remove the connecting rod big end caps.

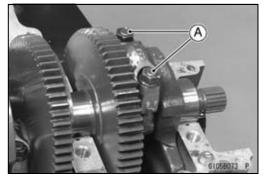
- Remove the crankshaft.
- Remove the piston [A] with connecting rod to the cylinder head side.

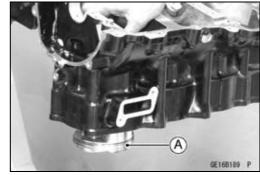
• Remove the piston pin snap ring [A].

Remove the piston pins.

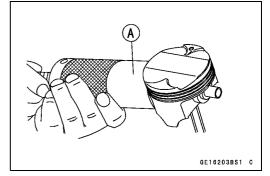
Special Tool - Piston Pin Puller Assembly [A]: 57001-910

• Remove the pistons.

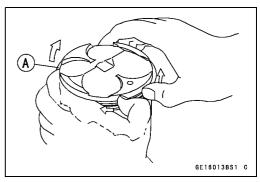








- Carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring [A] to remove it.
- Remove the 3-piece oil ring with your thumbs in the same manner.



9-26 CRANKSHAFT/TRANSMISSION

Pistons

Piston Installation

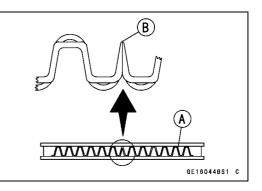
- Apply molybdenum disulfide oil solution to the oil ring expander, and install the oil ring expander [A] in the bottom piston ring groove so the ends [B] butt together.
- Apply molybdenum disulfide oil solution to the oil ring steel rails, and install the oil ring steel rails, one above the expander and one below it.
- OSpread the rail with your thumbs, but only enough to fit the rail over the piston.

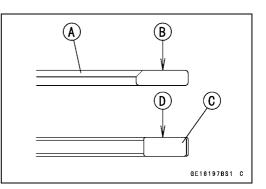
ORelease the rail into the bottom piston ring groove.

NOTE

OThe oil ring rails have no "top" or "bottom".

- Do not mix up the top and second ring.
- Install the top ring [A] so that the "R" mark [B] faces up.
- Install the second ring [C] so that the "RN" mark [D] faces up.
- OApply molybdenum disulfide oil solution to the piston rings.





NOTE

Olf a new piston is used, use new piston ring.

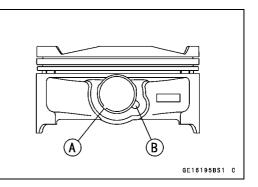
- Fit a new piston pin snap ring into the side of the piston so that the ring opening [A] does not coincide with the slit [B] of the piston pin hole.
- OApply molybdenum disulfide oil solution to the piston pins and piston journals.
- OWhen installing the piston pin snap ring, compress it only enough to install it and no more.

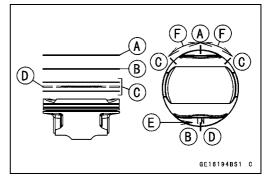
NOTICE

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

• 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° of angle from the opening of the top ring.

Top Ring [A] Second Ring [B] Oil Ring Steel Rails [C] Oil Ring Expander [D] IN Mark [E] 30 ~ 40° [F]





Pistons

- Install the piston with its marking IN [A] facing inlet side.
- Using the piston ring compressor assy [B] to install the piston from the cylinder head side.

Special Tools - Piston Ring Compressor Grip: 57001-1095 Piston Ring Compressor Belt, ϕ 80 ~ ϕ 91: 57001-1320

- Install the crankshaft (see Crankshaft Installation).
- Install the connecting rod to the crankshaft (see Connecting Rod Installation).

Cylinder Wear (Upper Crankcase) Inspection

- Since there is a difference in cylinder wear (upper crankcase) 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 crankcase.

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

Cylinder Inside Diameter

 Standard:
 83.994 ~ 84.006 mm (3.3068 ~ 3.3073 in.)

 Service Limit:
 84.10 mm (3.311 in.)

Piston Wear Inspection

• Measure the outside diameter [A] of each piston 13 mm (0.39 in.) [B] up from the bottom of the piston at a right angle to the direction of the piston pin.

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

Piston Diameter

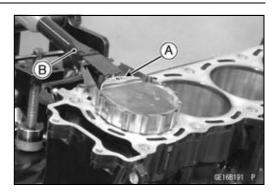
Standard:	83.969 ~ 83.984 mm (3.3059 ~ 3.3065 in.)
Service Limit:	83.82 mm (3.300 in.)

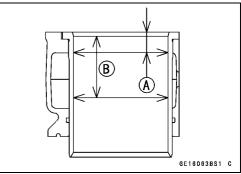
Piston Ring, Piston Ring Groove Wear Inspection

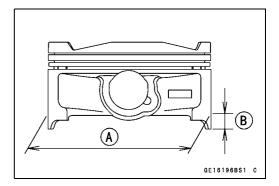
- Check for uneven groove wear by inspecting the ring seating.
- ★ The rings should fit perfectly parallel to groove surfaces. If not, replace the piston and all the piston rings.
- With the piston rings in their grooves, make several measurements with a thickness gauge [A] to determine piston ring/groove clearance.

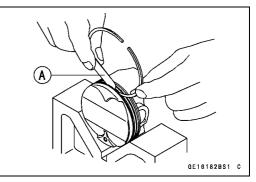
Piston Ring/Groove Clearance Standard:

Тор	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.)
Second	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)
Service Limit:	
Тор	0.17 mm (0.0067 in.)
Second	0.16 mm (0.0063 in.)









9-28 CRANKSHAFT/TRANSMISSION

Pistons

Piston Ring Groove Width Inspection

• Measure the piston ring groove width.

OUse a vernier caliper at several points around the piston.

Piston Ring Groove Standard:	Width
Top [A]	0.92 ~ 0.94 mm (0.036 ~ 0.037 in.)
Second [B]	1.01 ~ 1.03 mm (0.040 ~ 0.041 in.)
Service Limit:	
Top [A]	1.02 mm (0.040 in.)
Second [B]	1.11 mm (0.044 in.)

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

Piston Ring Thickness Inspection

• Measure the piston ring thickness.

OUse the micrometer to measure at several points around the ring.

Piston Ring Thickness

Standard:

Top [A]	0.87 ~ 0.89 mm (0.0343 ~ 0.0350 in.)
Second [B]	0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)
Service Limit:	
Top [A]	0.80 mm (0.031 in.)
Second [B]	0.90 mm (0.035 in.)

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

NOTE

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

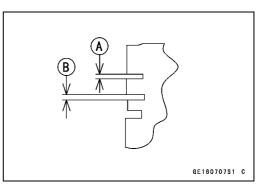
Piston Ring End Gap Inspection

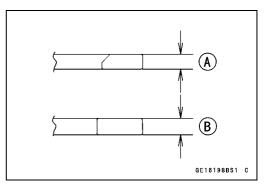
- Place the piston ring [A] inside the cylinder (upper crankcase), using the piston to locate the ring squarely in place. Set it close to the bottom of the cylinder, where cylinder wear is low.
- Measure the gap [B] between the ends of the ring with a thickness gauge.

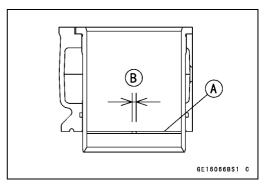
Piston Ring End Gap Standard:

otanuaru.	
Тор	0.20 ~ 0.30 mm (0.0079 ~ 0.0118 in.)
Second	0.40 ~ 0.55 mm (0.0157 ~ 0.0217 in.)
Service Limit:	
Тор	0.6 mm (0.024 in.)
Second	0.8 mm (0.031 in.)

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







CRANKSHAFT/TRANSMISSION 9-29

Balancer

Front Balancer Removal

• Remove:

Engine (see Engine Removal in the Engine Removal/Installation chapter)

• Unscrew:

Balancer Shaft Clamp Bolt [A]

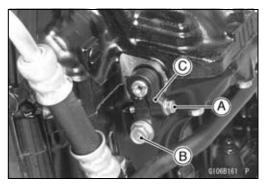
- Remove: Balancer Shaft Clamp Lever Bolt [B] Balancer Shaft Clamp Lever [C]
- Split the crankcase (see Crankcase Splitting).
- Remove the front balancer [A] from the lower crankcase half [B].

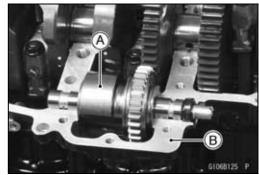
• Check that the rubber dampers [A] are in place as shown.

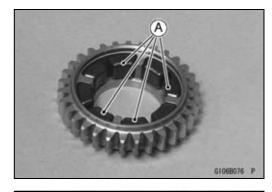


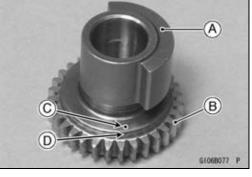
Front Balancer Installation

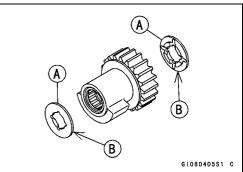
- Apply molybdenum disulfide oil solution to the damper contact portions of the balancer weight.
- Install the balancer weight [A] into the gear [B].
- OAlign the mark [C] of the balancer weight to the groove [D] of the gear.
- Apply molybdenum disulfide oil solution to the needle bearings. Insert the needle bearings.
- Fit the copper washers [A] on both ends of the weight and gear assembly. The projected sides [B] face inward.







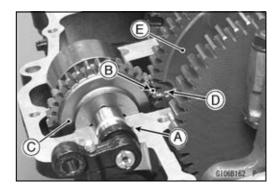




9-30 CRANKSHAFT/TRANSMISSION

Balancer

- Insert the pin [A] as shown.
- Set the front balancer on the upper crankcase half.
- OAlign the punch mark [B] on the balancer gear [C] with the mark [D] (crankshaft at 2, 3 position TDC) on the balancer drive gear [E] of crankshaft.

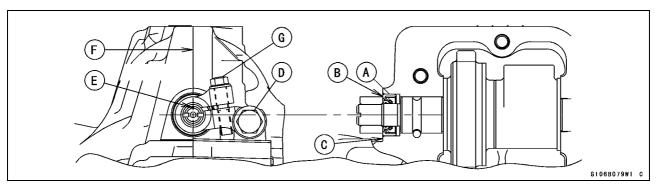


- Assemble the crankcase (see Crankcase Assembly).
- Install the new oil seal [A] so that its surface [B] is flush with the surface of the crankcase [C].
- Fill the oil seal lips with grease.
- Tighten:

Torque - Balancer Shaft Clamp Lever Bolt [D]: 25 N·m (2.5 kgf·m, 18 ft·lb)

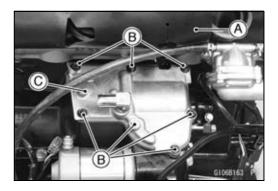
- Turn the balancer shaft so that its mark [E] is aligned with the crankcase mating line [F].
- Tighten:

Torque - Balancer Shaft Clamp Bolt [G]: 9.8 N·m (1.0 kgf·m, 87 in·lb)



Rear Balancer Removal

- Remove the engine (see Engine Removal in the Engine Removal/Installation chapter).
- Turn up the heat insulation rubber plate [A].
- Remove:
 - Breather Cover Bolts [B] Breather Cover [C]



Balancer

• Unscrew the balancer shaft clamp lever bolt [A].

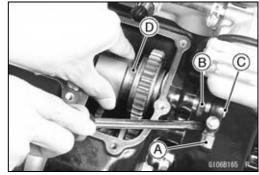
- Pry off the clamp lever [A] until the oil seal [B] removed.
- Pull the balancer shaft [C] out of the crankcase. The balancer weight and gear assembly [D] come off with needle bearings and copper washers.

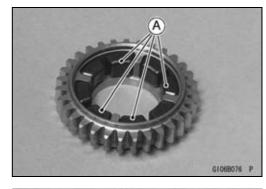
Rear Balancer Installation

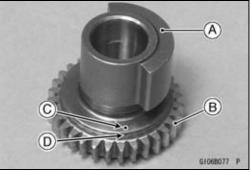
• Check that the rubber dampers [A] are in place as shown.

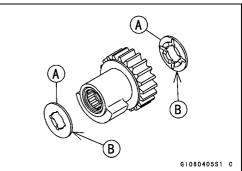
- Apply molybdenum disulfide oil solution to the damper contact portions of the balancer weight.
- Install the balancer weight [A] into the gear [B].
- OAlign the mark [C] of the balancer weight to the groove [D] of the gear.
- Apply molybdenum disulfide oil solution to the needle bearings. Insert the needle bearings.
- Fit the copper washers [A] on both ends of the weight and gear assembly. The projected sides [B] face inward.







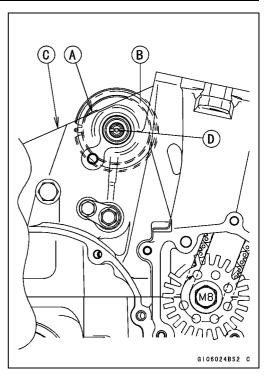




9-32 CRANKSHAFT/TRANSMISSION

Balancer

- Position the crankshaft at # 2, 3 position TDC or at # 1, 4 position TDC.
- Aligin the mark [A] on the balancer gear [B] with the mating surface [C] of the upper crankcase half.
- Install the balancer shaft [D] and then align the balancer gear with the starter motor clutch gear.



- Install the new oil seal [A] so that its surface [B] is flush with the surface of crankcase [C].
- OFill the oil seal lips with grease.

• Tighten:

Torque - Balancer Shaft Clamp Lever Bolt [D]: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Turn the balancer shaft so that its mark [E] is in position as shown.
- Tighten:

Torque - Balancer Shaft Clamp Bolt [F]: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Balancer Adjustment

• Remove:

Right Rear Middle Fairing (see Middle Fairing Removal in the Frame chapter)

NOTE

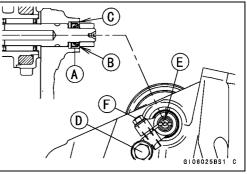
OFirst, adjust the front balancer [A], next the rear balancer [B].

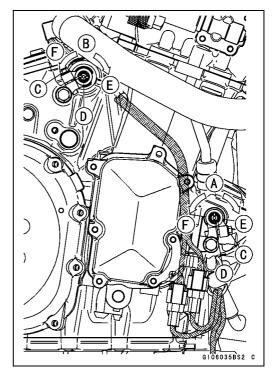
- Start the engine and warm it up thoroughly.
- Adjust the balancer gear backlash with the engine idling. The amount of backlash can be changed by turning the balancer shaft which has eccentric journals.

OStart the engine and let it idle.

- OLoosen the clamp bolt [C] and turn the balancer shaft [D] clockwise [E] until the balancer gear makes a whining sound.
- OTurn the shaft counter-clockwise [F] until the balancer gear whining sound disappears and tighten the clamp bolt.

Torque - Balancer Shaft Clamp Bolt: 9.8 N·m (1.0 kgf·m, 98 in·lb)

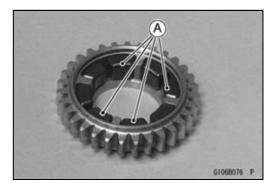




Balancer

Balancer Damper Inspection

- Remove the balancer and disassemble the weight and gear assembly.
- Visually inspect the rubber dampers [A].
- ★ If they appear damaged or deteriorated, replace them.



9-34 CRANKSHAFT/TRANSMISSION

Starter Clutch and Torque Limiter

Starter Clutch Removal

• Remove:

Engine (see Engine Removal in the Engine Removal/Installation chapter)

Starter Motor (see Starter Motor Removal in the Electrical System chapter)

Rear Balancer (see Rear Balancer Removal)

- Unscrew the starter clutch shaft plate bolt [A].
- Pull the starter clutch shaft plate bolt [A] with the shaft plate [B] and starter clutch shaft holding the starter clutch [C].

★ If the shaft bolt [A] removed, hold the shaft to tighten it.
Apply a non-permanent locking agent to the threads of

Torque - Starter Clutch Shaft Bolt [H]: 9.8 N·m (1.0 kgf·m,

• Apply molybdenum disulfide grease [B] to the starter

• Remove the starter clutch.

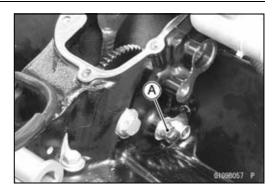
Starter Clutch Installation

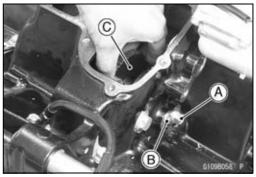
87 in·lb)

• Replace the O-ring [A] with a new one.

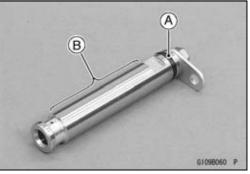
the shaft bolt.

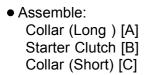
clutch shaft.

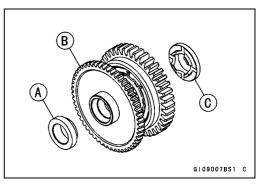












Starter Clutch and Torque Limiter

- Align the starter clutch gear with the torque limiter gear.
- Insert the starter clutch shaft.
- Apply a non-permanent locking agent to the threads of the starter clutch shaft plate bolt, and tighten it.

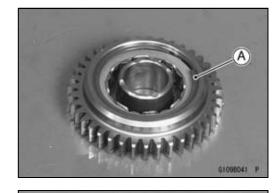
Torque - Starter Clutch Shaft Plate Bolt : 9.8 N·m (1.0 kgf·m, 87 in·lb)

Starter Clutch Disassembly

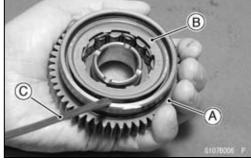
- Remove the starter clutch.
- Pull the driven gear out off from the drive gear.
- Remove:

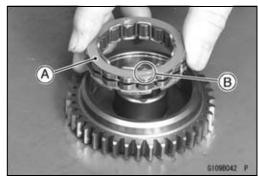
[C].

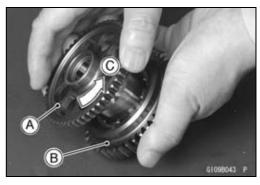
Circlip [A]



• Holding the drive gear [A] with a hand, take off the one -way clutch [B] from the gear by using the screw driver







- Starter Clutch Assembly
- Be sure to install the one-way clutch [A] so that its arrow [B] faces the side of the circlip.

• Turn in the driven gear [A] to the drive gear [B]. Counterclockwise [C]

9-36 CRANKSHAFT/TRANSMISSION

Starter Clutch and Torque Limiter

Starter Clutch Inspection

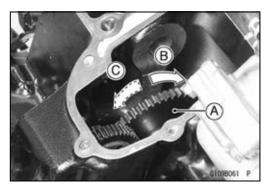
- Remove the rear balancer (see Rear Balancer Removal).
 Turn the starter idle gear [A] by hand. The starter idle gear should turn forward [B] freely, but should not turn backward [C].
- ★ If the clutch does not operate as it should or if it makes noise, disassemble the starter clutch, examine each part visually, and replace any worn or damaged parts.

Torque Limiter Removal

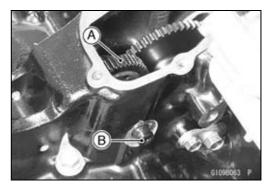
Remove:

Rear Balancer (see Rear Balancer Removal) Starter Motor (see Starter Motor Removal in the Electrical chapter).

- Remove the torque limiter bolt [A] with washer.
- Holding the torque limiter [A], remove the torque limiter shaft [B] and the torque limiter.







Torque Limiter Installation

- Replace the washer with a new one.
- Apply molybdenum disulfide grease to the torque limiter shaft and tooths.
- Apply a non-permanent locking agent to the threads of the torque limiter bolt.
- Tighten:

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

CRANKSHAFT/TRANSMISSION 9-37

External Shift Mechanism

Shift Pedal Removal

• Remove: Shift Lever Bolt [A] Shift Lever [B]

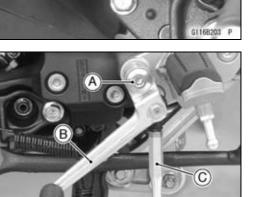
 Remove: Shift Pedal Mounting Bolt [A] Shift Pedal [B] with Tie-rod [C]

- Shift Pedal Installation
- Tighten:

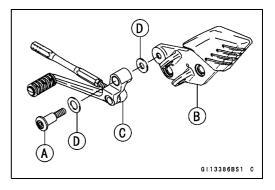
Torque - Shift Pedal Mounting Bolt [A]: 25 N·m (2.5 kgf·m, 18 ft·lb)

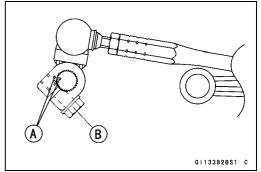
Footpeg Bracket [B] Shift Pedal [C] Washers [D]

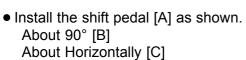
- Install the shift lever so that align the punch marks [A].
- Tighten the shift lever bolt [B] securely.



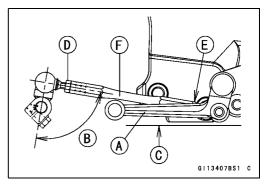
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○To adjust the pedal position, loosen the front locknut [D] (left-hand threads) and rear locknut [E] and then turn the tie-rod [F].



9-38 CRANKSHAFT/TRANSMISSION

External Shift Mechanism

External Shift Mechanism Removal

 Remove: Bolt [A] Shift Lever [B] Snap Ring [C] Washer [D] Clutch (see Clutch Removal in the Clutch chapter)

• Remove the shift shaft assembly [A].

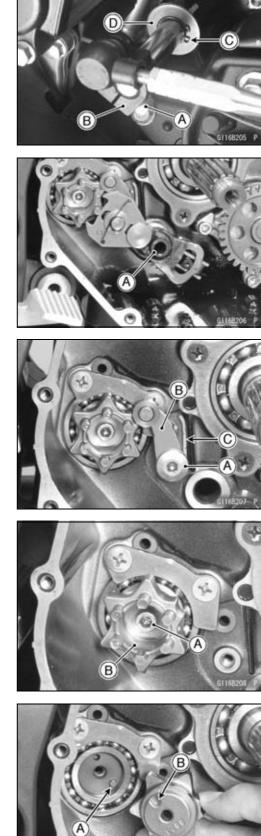
- Remove:
 - Gear Positioning Lever Bolt [A] Gear Positioning Lever [B] Collar and Spring [C]

• Remove: Shift Drum Cam Bolt [A] Shift Drum Cam [B]

External Shift Mechanism Installation

- Be sure to install the dowel pin [A].
- OAlign the dowel pin with the groove [B] of the shift drum cam.
- Apply a non-permanent locking agent to the threads of the shift drum cam holder bolt, and tighten it.

Torque - Shift Drum Cam Holder Bolt: 12 N·m (1.2 kgf·m, 106 in·lb)



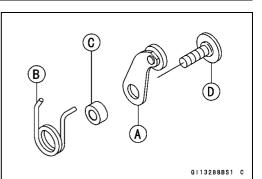
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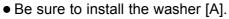
CRANKSHAFT/TRANSMISSION 9-39

External Shift Mechanism

- Install the gear positioning lever [A] as shown.
 - Spring [B] Collar [C]
- Bolt [D]
- Tighten:

Torque - Gear Positioning Lever Bolt: 12 N·m (1.2 kgf·m, 106 in·lb)

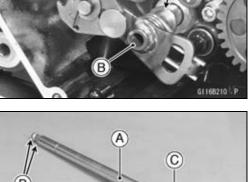


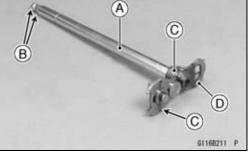


- Insert the shift shaft [B].
- Install: Washer New Snap Ring Shift Lever

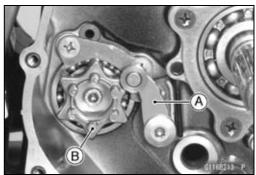
External Shift Mechanism Inspection

- Examine the shift shaft [A] for any damage.
- \star If the shaft is bent, straighten or replace it.
- ★ If the serration [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.
- Check the return spring pin [A] is not loose.
- ★ If it is loose, unscrew it, apply a non-permanent locking agent to the threads of the return spring pin, and tighten it.
 - Torque Shift Shaft Return Spring Pin: 29 N·m (3.0 kgf·m, 21 ft·lb)
- Check the gear positioning lever [A] and its spring for breaks or distortion.
- \bigstar If the lever or spring are damaged in any way, replace them.
- Visually inspect the shift drum cam [B].
- ★ If they are badly worn or if they show any damage, replace it.









9-40 CRANKSHAFT/TRANSMISSION

External Shift Mechanism

Transmission Shaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the output shaft [A].

- Remove the shift forks (see Shift Drum and Fork Removal).
- Remove the cover bolts [A] and cover [B].
- Pull out the drive shaft.

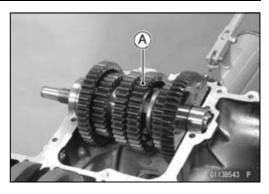


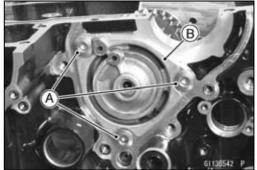
- Check to see that the set pin [A] and set ring [B] are in place.
- Install the output shaft into the upper crankcase half.
- Apply engine oil to the bearing.
- OThe bearing set pin and ring must match properly with the hole or groove in the bearing outer races. When they are properly matched, there is no clearance between the crankcase and the bearing outer races.
- Install the drive shaft into the lower crankcase half.
- Install the cover.
- Apply a non-permanent locking agent to the drive shaft cover bolts and tighten them.
 - Torque Drive Shaft Cover Bolts [A]: 25 N·m (2.5 kgf·m, 18 ft·lb)
- ★ If the cover disassembled, install the bearing and bushing as shown.
- Press in the bushing [A] into cover [C] so that the surface of the bushing is flush with the bottom surface [B] of the cover.
- Press in the bearing [D] until they are bottomed.

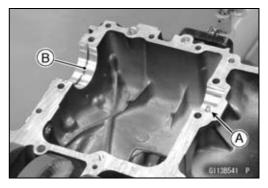
NOTE

OInstall the bearing so that sealed [E] side faces in.

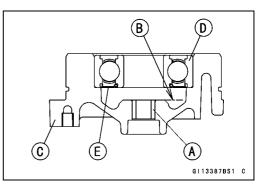
• Assemble the crankcase.











External Shift Mechanism

Transmission Shaft Disassembly

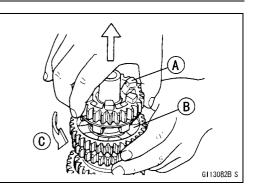
- Remove the transmission shafts (see Transmission Shaft Removal).
- Remove the circlips, disassemble the transmission shafts.
- The 5th gear [A] on the output shaft has three steel balls assembled into it for the positive neutral finder mechanism. Remove the 5th gear.
- OSet the output shaft in a vertical position holding the 3rd gear [B].

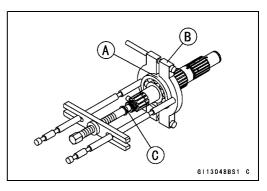
OSpin the 5th gear quickly [C] and pull it off upward.

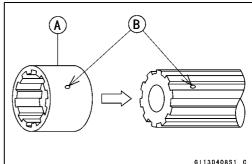
• Remove the ball bearing [A] from output shaft.

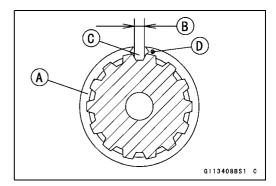
Special Tools - Bearing Puller [B]: 57001-135 Bearing Puller Adapter [C]: 57001-317

• Discard the bearing.









- Transmission Shaft Assembly
- Apply molybdenum disulfide oil to the sliding surfaces of the shafts.
- Install the gear bushings [A] on the shaft with their holes [B] aligned.
- Replace any circlips removed with new ones.
- Install the circlips [A] so that the opening [B] of it is aligned with spline grooves [C].
- Install the circlips so that the mark [D] on them faces to each gear side.
- For assemble the drive shaft.

OBe sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.

- OInstall the 3rd/4th gear onto the drive shaft with their oil holes aligned.
- OInstall the 6th gear bushing onto the drive shaft with their oil holes aligned.
- For assemble the output shaft.
- OBe sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.
- OInstall the 5th and 6th gears onto the output shaft with their oil holes aligned.
- OInstall the 3rd/4th gear bushings onto the output shaft with their oil holes aligned.

9-42 CRANKSHAFT/TRANSMISSION

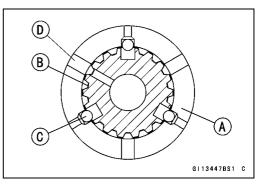
External Shift Mechanism

 Fit the steel balls into the 5th gear holes in the output shaft, aligning oil hole [D].
 5th Gear [A]
 Output Shaft [B]
 Steel Balls [C]

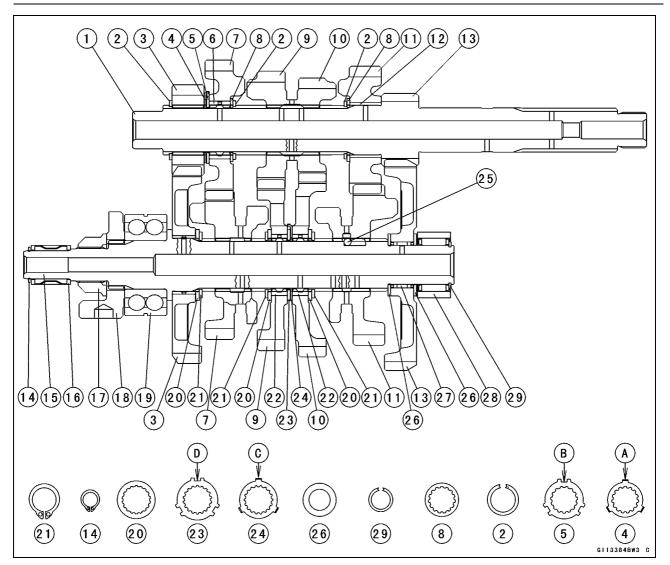
NOTICE

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

- OAfter assembling the 5th gear with steel balls in place on the output shaft, check the ball-locking effect that the 5th gear doesn't 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.



External Shift Mechanism



- 1. Drive Shaft
- 2. Circlip, 33 mm (1.30 in.)
- 3. 2nd Gear
- 4. Toothed Washer, 37 mm (1.46 in.)
- 5. Toothed Washer, 40.5 mm (1.59 in.)
- 6. Bushing
- 7. 6th (Top) Gear
- 8. Toothed Washer, 35.5 mm (1.40 in.)
- 9.4th Gear
- 10. 3rd Gear
- 11. 5th Gear
- 12. Bushing
- 13. 1st Gear
- 14. Circlip, ϕ 19.7 mm (0.776 in.)

- 15. Output Shaft
- 16. Needle Bearing
- 17. Dumper Cam Nut
- 18. Dumper Cam
- 19. Ball Bearing
- 20. Toothed Washer, ϕ 40 mm (1.18 in.)
- 21. Circlip, ϕ 32.2 mm (1.27 in.)
- 22. Bushing
- 23. Toothed Washer, ϕ 43 mm (1.69 in.)
- 24. Toothed Washer, 39.7 mm (1.56 in.)
- 25. Steel Ball
- 26. Thrust Washer, ϕ 35 mm (1.38 in.)
- 27. Needle Bearing
- 28. Needle Bearing
- 29. Circlip, *\phi*25.5 mm (1.00 in.)

OWhen the tongues [C] of the toothed washer [24] shall be assembled, they shall be installed into the notches [D] of the toothed washer [23].

OWhen the tongues [A] of the toothed washer [4] shall be assembled, they shall be installed into the notches [B] of the toothed washer [5].

9-44 CRANKSHAFT/TRANSMISSION

External Shift Mechanism

Shift Drum and Fork Removal

• Remove:

Lower Crankcase Half (see Crankcase Splitting) External Shift Mechanism (see External Shift Mechanism Removal) Screws [A]

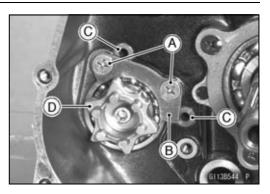
- Shift Drum Bearing Holder [B]
- Pull out the shift rods [C], and take off the shift forks.
- Pull out the shift drum [D].

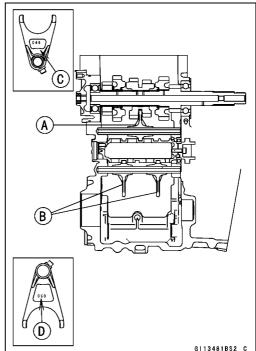
Shift Drum and Fork Installation

- Apply engine oil to the shift drum, forks and rods.
- Install the shift fork noting the groove position.
- •Position the one with shortest ears [A] on the drive shaft and place the pin in the center groove in the shift drum.
- OThe two forks [B] on the output shaft are identical.

NOTE

• The forks have marks (046 [C], 050 [D]), and position them so that so that their marks face the engine left side.



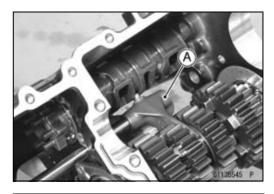


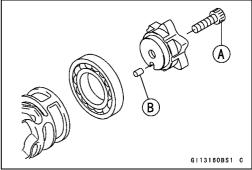
- Install the fork [A] of the drive shaft from the engine under side as shown.
- Apply a non-permanent locking agent to the threads of the shift drum bearing holder screws and tighten them.
 - Torque Shift Drum Bearing Holder Screws: 4.9 N·m (0.50 kgf·m, 43 in·lb)

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 holder bolt. Shift Drum Cam Holder Bolt [A]

Dowel Pin [B]





External Shift Mechanism

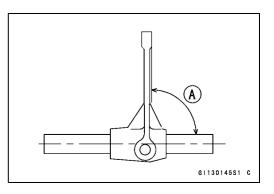
Shift Drum Assembly

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

Torque - Shift Drum Cam Holder Bolt: 12 N·m (1.2 kgf·m, 106 in·lb)

Shift Fork Bending Inspection

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



Shift Fork/Gear Groove Wear Inspection

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

Shift Fork Ear Thickness

 Standard:
 5.74 ~ 6.00 mm (0.2260 ~ 0.2362 in.)

 Service Limit:
 5.6 mm (0.220 in.)

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

Gear Groove Width Standard: 6.05 ~ 6.15 mm (0.238 ~ 0.242 in.) Service Limit: 6.3 mm (0.25 in.)

Shift Fork Guide Pin/Drum Groove Wear Inspection

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

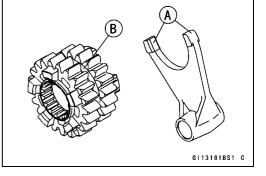
Shift Fork Guide Pin DiameterStandard:6.9 ~ 7.0 mm (0.272 ~ 0.276 in.)Service Limit:6.8 mm (0.268 in.)

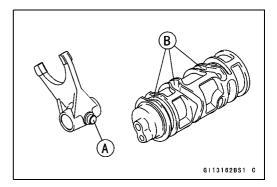
★ If any shift drum groove is worn over the service limit, the drum must be replaced.

Shift Drum Groove Width

 Standard:
 7.05 ~ 7.20 mm (0.278 ~ 0.283 in.)

 Service Limit:
 7.3 mm (0.287 in.)



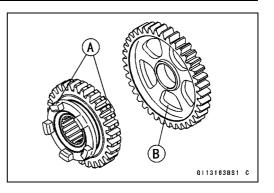


9-46 CRANKSHAFT/TRANSMISSION

External Shift Mechanism

Gear Dog and Gear Dog Hole Damage Inspection

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



Wheels/Tires

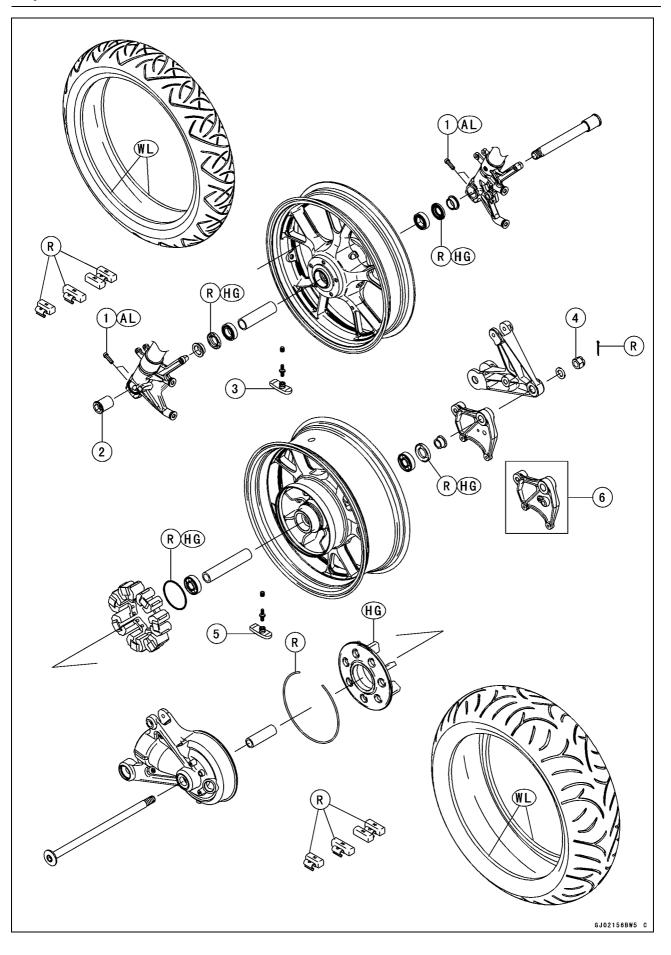
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10

10-2 WHEELS/TIRES

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N∙m	kgf∙m	ft·lb	Remarks
1	Front Axle Clamp Bolts	20	2.0	15	AL
2	Front Axle Nut	127	13	94	
3	Front Tire Pressure Measurement Sensor	4.5	0.46	40 in·lb	
4	Rear Axle Nut	127	13	94	
5	Rear Tire Pressure Measurement Sensor	4.5	0.46	40 in·lb	

6. Caliper Bracket (K-ACT ABS Equipped Models)

AL: Tighten the two clamp bolts alternately two time to ensure even tightening torque.

HG: Apply high-temperature grease.

R: Replacement Parts

WL: Apply soap and water solution or rubber lubricant.

10-4 WHEELS/TIRES

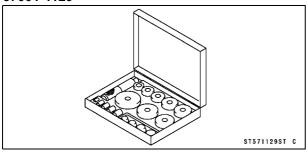
Specifications

Item	Standard	Service Limit
Wheels (Rims)		
Rim Runout:		
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 0.03 mm (0.0012 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 (1.06 oz.)	
Rim Size:		
Front	17 × 3.50	
Rear	17 × 6.00	
Tires		
Air Pressure (when Cold):		
Front	Up to 228 kg (503 lb) load:	
	290 kPa (2.90 kgf/cm², 42 psi)	
Rear	Up to 228 kg (503 lb) load:	
	290 kPa (2.90 kgf/cm², 42 psi)	
Tread Depth:		
Front	4.8 mm (0.19 in.)	1 mm (0.04 in.) (AT, CH, DE) 1.6 mm (0.06 in
Rear	6.2 mm (0.24 in.)	Up to 130 km/h (80 mph): 2 mm (0.08 in.) Over 130 km/h (80 mph): 3 mm (0.12 in.)
Standard Tires:	Make, Type	Size
Front	BRIDGESTONE, BATTLAX BT021F U BATTLAX BT021F M	120/70 ZR17 M/C (58 W)
Rear	BRIDGESTONE, BATTLAX BT021R U	190/50 ZR17 M/C (73 W)

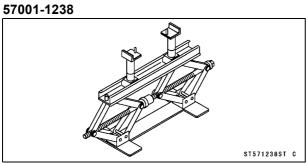
Some replacement tires may adversely affect handling and cause an accident resulting in serious injury or death. To ensure proper handling and stability, use only the recommended standard tires for replacement, inflated to the standard pressure.

Special Tools

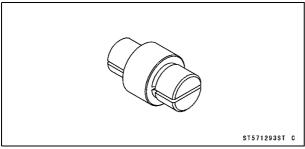
Bearing Driver Set: 57001-1129



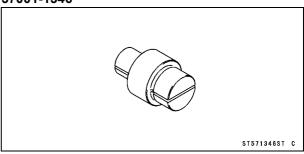
Jack:



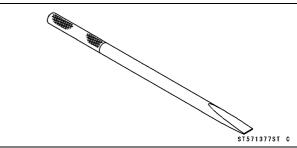
Bearing Remover Head, ϕ 20 × ϕ 22: 57001-1293



Bearing Remover Head, ϕ 25 × ϕ 28: 57001-1346



Bearing Remover Shaft, ϕ 13: 57001-1377



10-6 WHEELS/TIRES

Wheels (Rims)

Front Wheel Removal

- Remove the front fender (see Front Fender Removal in the Frame chapter).
- OFor the K-ACT ABS equipped Models, remove the bolts [A] and front wheel rotation sensor [B].
- Remove:

Front Caliper Mounting Bolts [C] (Lift and Right Sides) Front Calipers [D] (Lift and Right Sides)

• Loosen:

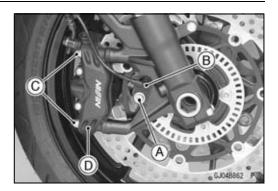
Front Axle Clamp Bolts (Right) [A] Front Axle [B]

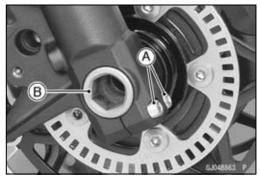
- Use the center stand to support the motorcycle upright.
- Raise the front wheel off the ground with the jack [A].
 Special Tool Jack: 57001-1238
- Remove: Front Axle Front Wheel

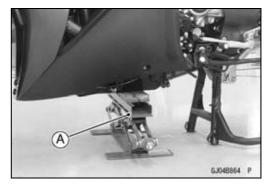
NOTICE

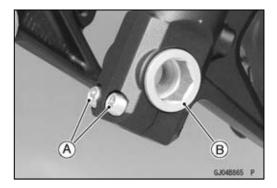
Do not lay the wheel down on one of the discs. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

• Loosen the front axle clamp bolts (Lift) [A], and remove the axle nut [B].









Wheels (Rims)

Front Wheel Installation

NOTE

• The direction of the wheel rotation [A] is shown by an arrow [B] on the wheel spoke.

- Check the wheel rotation mark and install the front wheel.
- Apply high-temperature grease to the grease seal lips.
- Fit the collars [A] on the both sides of the hub.
- OThe collars are identical.
- Insert the front axle from the right side.
- Tighten the front axle nut [B]. Front Axle Clamp Bolts (Right) [C] Front Axle Clamp Bolts (Left) [D] Viewed from Rear [E]

Torque - Front Axle Nut: 127 N·m (13 kgf·m, 94 ft·lb)

• Before tightening the front axle clamp bolts (right), pump the front fork up and down [A] 4 or 5 times to all on the right front fork leg to seat on the front axle.

NOTE

OPut a block [B] in front of the front wheel to stop moving.

• Tighten the front axle clamp bolts (right) first. Next, tighten the front axle clamp bolts (left).

Torque - Front Axle Clamp Bolts: 20 N·m (2.0 kgf·m, 15 ft·lb)

NOTE

○Tighten the two clamp bolts alternately two times to ensure even tightening torque.

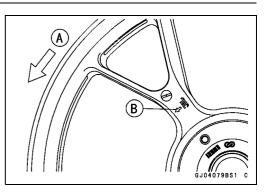
Install:

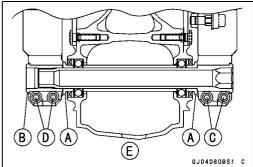
Front Calipers (see Front Caliper Installation in the Brakes chapter)

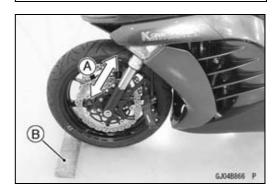
- For the K-ACT ABS equipped Models, install the front wheel rotation sensor (see Front Wheel Rotation Sensor Installation in the Brakes chapter).
- Check the front brake effectiveness (see Brake Operation Inspection in the Periodic Maintenance chapter).

A WARNING

After servicing, it takes several applications of the brake lever before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the motorcycle until a firm brake lever is obtained by pumping the lever until the pads are against the disc.







10-8 WHEELS/TIRES

Wheels (Rims)

Rear Wheel Removal

- Use the center stand to support the motorcycle upright.
- Squeeze the brake lever slowly and hold it with a band [A].

A WARNING

Motorcycle may fall over unexpectedly resulting in an accident or injury. Be sure to hold the front brake when removing the rear wheel.

NOTICE

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

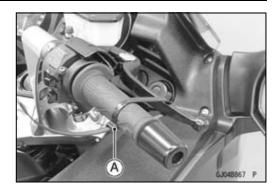
• Remove:

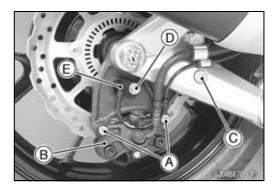
Rear Caliper Mounting Bolts [A] Rear Caliper [B] Caliper Bracket Bolt [C]

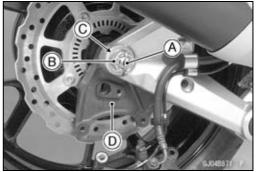
- For the K-ACT ABS equipped Models, remove the bolt [D] and rear wheel rotation sensor [E].
- Remove: Cotter Pin [A] Rear Axle Nut [B] Washer [C] Caliper Bracket [D]
- Pull out the rear axle [A], and slide the rear wheel [B] toward the right [C] to disengage it from the final gear case.
- Remove the rear wheel rearward.

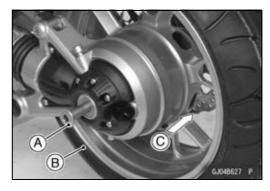
NOTICE

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.







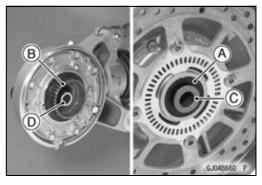


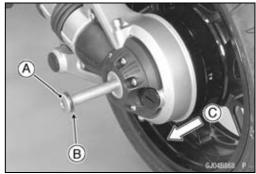
Wheels (Rims)

Rear Wheel Installation

- Apply high-temperature grease: Grease Seal Lips [A]
- Apply molybdenum disulfide grease: Ring Gear Hub Splines [B]
- Fit the collars on the both sides of the hub. Right Side Collar [C] Left Side Collar [D]
- Hold up the rear wheel, and insert the rear axle [A] together with the washer [B] from the left side.
- Slide [C] the rear wheel to the left side.
- OEngage the ring gear hub splines with the wheel coupling hub splines.
- Pull the rear axle little and install the caliper bracket [A].
- Install the caliper bracket bolt temporarily.
- Tighten:

Torque - Rear Axle Nut: 127 N·m (13 kgf·m, 94 ft·lb) Caliper Bracket Bolt: 64 N·m (6.5 kgf·m, 47 ft·lb)







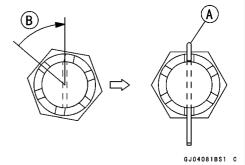
• Insert a new cotter pin [A].

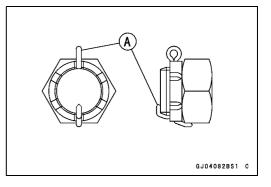
NOTE

- OWhen inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle, tighten the nut clockwise [B] up to next alignment.
- Olt should be within 30°.
- OLoosen once and tighten again when the slot goes past the nearest hole.
- Bend the cotter pin [A] over the nut.

WARNING

A loose axle nut can lead to an accident resulting in serious injury or death. Tighten the axle nut to the proper torque and install a new cotter pin.





10-10 WHEELS/TIRES

Wheels (Rims)

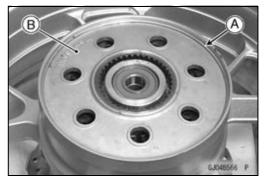
- Install the rear caliper (see Rear Caliper Installation in the Brakes chapter).
- For the K-ACT ABS equipped Models, install the rear wheel rotation sensor (see Rear Wheel Rotation Sensor Installation in the Brakes chapter).
- Check the rear brake effectiveness (see Brake Operation Inspection in the Periodic Maintenance chapter).

WARNING

After servicing, it takes several applications of the brake pedal before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the motorcycle until a firm brake pedal is obtained by pumping the pedal until the pads are against the disc.

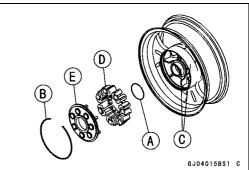
Wheel Coupling Removal

- Remove the rear wheel (see Rear Wheel Removal).
- Remove the coupling retaining ring [A].
- Remove the wheel coupling [B] with a bearing puller if necessary.



Wheel Coupling Installation

- Replace the O-ring [A] and the retaining ring [B].
- Grease the following:
- O-ring Bosses [C] of Rear Drum Hub • Install:
 - Rubber Damper [D] Coupling [E] Retaining Ring



WHEELS/TIRES 10-11

Wheels (Rims)

Wheel Inspection

• Raise the front/rear wheel off the ground.

Special Tools - Jack: 57001-1238

- Spin the wheel lightly, and check for roughness or binding.
- ★ If roughness or binding is found, replace the hub bearings (see Hub Bearing Removal/Installation).
- Inspect the wheel for small cracks, dents, bending, or warp.
- \star If there is any damage to the wheel, replace the wheel.
- Remove the wheel, and support it with the tire by the axle.
- Measure the rim runout, axial [A] and radial [B], with a dial gauge.
- ★ If rim runout exceeds the service limit, check the hub bearings (see Hub Bearing Inspection).
- ★ 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.)

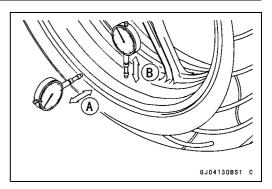
🛦 WARNING

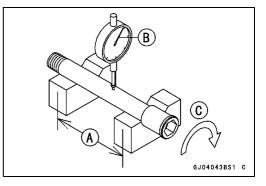
Damaged wheel parts may fail and cause an accident resulting in serious injury or death. Never attempt to repair a damaged wheel part. If the wheel part is damaged, it must be replaced with a new one.

Axle Inspection

- Remove the front and rear axles (see Front/Rear Wheel Removal).
- Visually inspect the front and rear axle for damages.
- \star 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.
- \star If axle runout exceeds the service limit, replace the axle.

Axle Runout/100 mm (3.94 in.) Standard: TIR 0.03 mm (0.0012 in.) or less Service Limit: TIR 0.2 mm (0.01 in.)





10-12 WHEELS/TIRES

Wheels (Rims)

Coupling Damper Inspection

- Remove the rear wheel coupling, and inspect the rubber dampers [A].
- Replace the damper if it appears damaged or deteriorated.

Balance Inspection

- Remove the front and rear wheels (see Front/Rear Wheel Removal).
- 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.
- ORepeat 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 (see Balance Adjustment).

Balance Adjustment

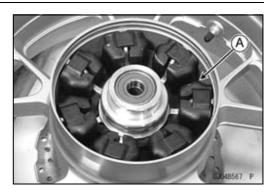
- If the wheel always stops in one position, provisionally attach a balance weight [A] on the rim at the marking using adhesive tape.
- Rotate the wheel 1/4 turn [B], and see whether or not the wheel stops in this position. If it does, the correct balance weight is being used.
- ★ If the wheel rotates 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.

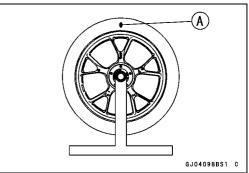
Balance Weight Removal

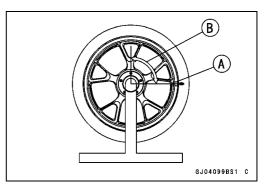
- Insert a regular tip screwdrivers [A] [B] between the rib [C] and weight [D] as shown.
- Pry the balance weight with two screwdrivers and remove the balance weight.
- Discard the used balance weight.

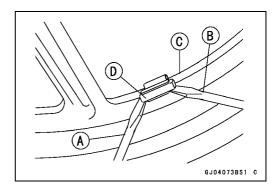
NOTICE

Do not tap the screwdrivers. The rim could be damaged.









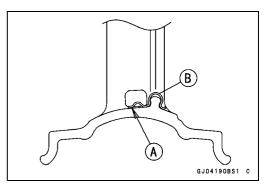
Wheels (Rims)

Balance Weight Installation

- Check if the weight portion has any play on the blade [A] and clip [B].
- ★ If it does, discard it.

A WARNING

Unbalanced wheels can create an unsafe riding condition. If the balance weight has any play on the rib of the rim, the blade and/or clip have been stretched. Replace the loose balance weight. Do not reuse used balance weight.



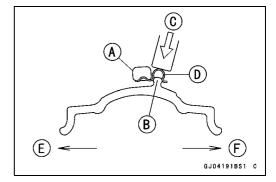
Balance Weight

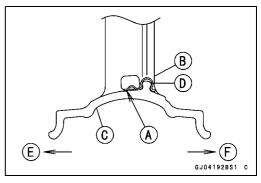
Part Number	Weight
41075-0007	10 g (0.35 oz.)
41075-0008	20 g (0.71 oz.)
41075-0017	30 g (1.06 oz.)

NOTE

- OBalance weights are available from Kawasaki dealers in 10, 20, and 30 grams (0.35 oz., 0.71 oz., and 1.06 oz.) sizes. An imbalance of less than 10 grams (0.35 oz.) will not usually affect running stability.
- ODo not use four or more balance weight (Front: more than 70 gram, 2.5 oz. Rear more than 90 gram, 3.2 oz.). If the wheel requires an excess balance weight, disassemble the wheel to find the cause.
- Slip the balance weight [A] on to the rib [B], by pushing or lightly hammering [C] the clip [D].
- OInstall the balance weight at the left side of the motorcycle. Left Side [E]

Right Side [F]





 Check that the blade [A] and clip [B] are fully seated on the rim [C] and that the clip is hooked over the rib [D]. Left Side [E] Right Side [F]

10-14 WHEELS/TIRES

Tires

Air Pressure Inspection/Adjustment

• Refer to the Air Pressure Inspection in the Periodic Maintenance chapter.

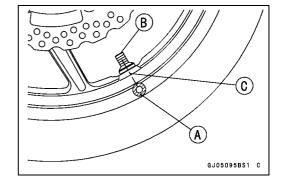
Tire Inspection

 Refer to the Wheel/Tire Damage Inspection in the Periodic Maintenance chapter.

Tire Removal

- Remove: Wheel (see Front/Rear Wheel Removal) Valve Core (Let out the air)
- To maintain wheel balance, mark the valve stem position on the tire with chalk so that the tire can be reinstalled in the same position.

Chalk Mark or Yellow Mark [A] Air Valve [B] Align [C]



• 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.

NOTICE

Never lubricate with engine oil or petroleum distillates because they will deteriorate the tire.

NOTE

• The tires cannot be removed with hand tools because they fit the rims too tightly.

• Remove the tire from the rim using a suitable commercially available tire changer. Note the following.

OLightly break the air valve portion [A] of the bead.

NOTICE

Do not deep break the air valve portion of the bead to prevent damage to the tire pressure measurement sensor.

OStep on the side of the tire opposite the air valve, and start plying the tire off the rim near the air valve [A] with tire lever.

NOTICE

Be careful not to scratch the tire pressure measurement sensor.

Any scratch may damage sensor.

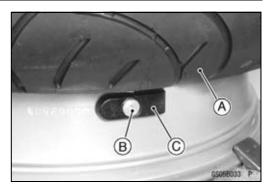




Tires

OPull the opposite bead of the tire [A] upward.

- OUnscrew the bolt [B] and remove the tire pressure measurement sensor [C], spring and air valve.
- OStep on the side of the tire opposite the air valve, and start plying the tire off the rim near the air valve with tire iron.

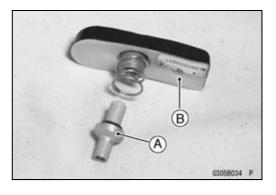


Tire Installation

🛦 WARNING

Some replacement tires may adversely affect handling and cause an accident resulting in serious injury or death. To ensure proper handling and stability, use only the recommended standard tires for replacement, inflated to the standard pressure.

- 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.
- Visually inspect the air valve [A] and sensor [B] for cuts, cracks, and wear.
- \star If they are damaged, replace them with new ones.



10-16 WHEELS/TIRES

Tires

NOTE

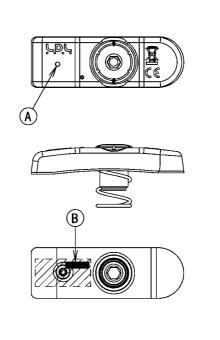
OReplace the tire pressure measurement sensor with the correct part according to the table below.

Tire Pressure Measurement Sensor Identication

Part Number	Hertz	Hertz Specification	
21176-0124	434 MHz	EUR, AU, SEA	Blue
21176-0127	315 MHz	MY	Red
21176-0125	315 MHz	US, CA, CAL	Green

NOTE

 To replace an tire pressure measurement sensor, KDS3 must be used to register the new sensor ID [B].



GJ05100BS2 C

- Lubricate the valve seal with a soap and water solution or rubber lubricant.
- Install the air valve [A] and sensor [B].
- OInstall the sensor position parallel to the rim line in either direction.

Torque - Tire Pressure Measurement sensor: 4.5 N·m (0.46 kgf·m, 40 in·lb)

NOTE

 Internal tire sealants or repair products can cause damage to the tire pressure sensor(s) and should not be used.

Replacement Procedure

- Record new sensor authentication number indicated on the replacement sensor.
- Use KDS3 to manually register the sensor authentication number in the KIPASS ECU.

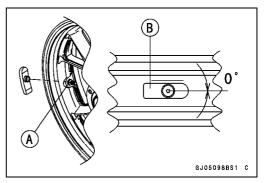
NOTE

• The sensor becomes activated upon completion of registration of the sensor authentication number.

Install the sensor.

NOTICE

If you install a sensor without registering its authentication number, The sensor will not activate and will not transmit tire pressure date.



Tires

- Check the tire rotation mark on the front and rear tires and install them on the rim accordingly.
 - Tire Rotation Mark [A] Rotating Direction [B]

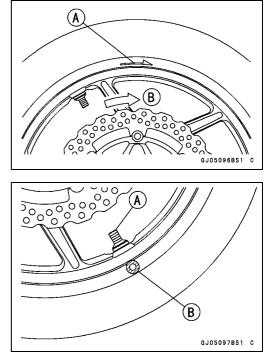
• Position the tire on the rim so that the valve [A] aligns with the tire balance mark [B] (the chalk mark made during removal, or the yellow paint mark on a new tire).

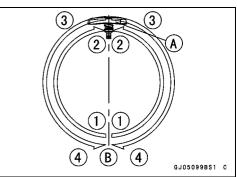
- Install the tire bead over the rim flange using a suitable commercially available tire changer.
- OInstall the beads of the tire onto the rim followings the steps shown.
 - Tire pressure measurement sensor [A]
 - Opposite side of rim (180° from sensor) [B]
 - Push on the first bead following direction shown in steps 1 and 2
 - Push on the second bead following direction shown in steps 3 \sim 4

NOTE

- OWhen pushing on the bead to the rim must be rotated by no more than 180° at a time in order to protect the sensor from damage.
- 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.

Overinflating a tire can cause it to explode, causing serious injury or death. 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).





10-18 WHEELS/TIRES

Tires

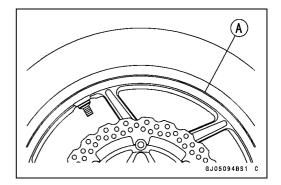
- Check to see that the rim lines [A] on both sides of the tire sidewalls are parallel with the rim flanges.
- ★ If the rim flanges and tire sidewall rim lines are not parallel, remove the valve core.
- Lubricate the rim flanges and tire beads.
- Install the valve core and inflate the tire again.
- After the tire beads seat in the rim flanges, check for air leakage.

OInflate the tire slightly above standard inflation.

- OUse a soap and water solution or submerge the tire, and check for bubbles that would indicate leakage.
- Adjust the air pressure to the specified pressure (see Air Pressure Inspection in the Periodic Maintenance chapter).
- Install the air valve cap.
- Adjust the wheel balance (see Balance Adjustment).

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 Bearing

Hub Bearing Removal

- Remove the wheel (see Front/Rear Wheel Removal), and take out the following. Collars
 - Coupling (Out of rear hub) Grease Seals
- Use the bearing remover to remove the hub bearing [A].

NOTICE

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 Head, ϕ 25 × ϕ 28 [B]: 57001-1346

Bearing Remover Head, ϕ 20 × ϕ 22: 57001 -1293

Bearing Remover Shaft, ϕ 13 [C]: 57001 -1377

Hub Bearing Installation

- Before installing the hub bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.
- Replace the bearings with new ones.
- Install the bearings by using the bearing driver set which does not contact the bearing inner race.
- Press in each right the bearing [A] until they are bottomed.
 Special Tool Bearing Driver Set [B]: 57001-1129
- Replace the grease seals with new ones.
- Press in the grease seals [A] so that the seal surface is flush [B] with the end of the hole.

OApply high-temperature grease to the grease seal lips.

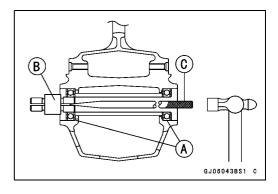
Special Tool - Bearing Driver Set [C]: 57001-1129

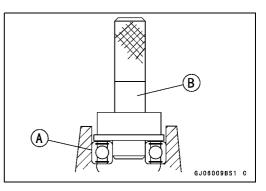
Hub Bearing Inspection

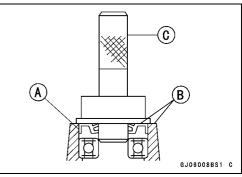
Since the hub bearings are made to extremely close tolerances, the clearance can not normally be measured.

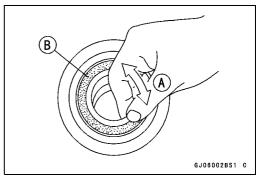
NOTE

- ODo 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.
- \star If the seal is torn or is leaking, replace the bearing.









10-20 WHEELS/TIRES

Hub Bearing

Hub Bearing Lubrication

NOTE

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

Final Drive

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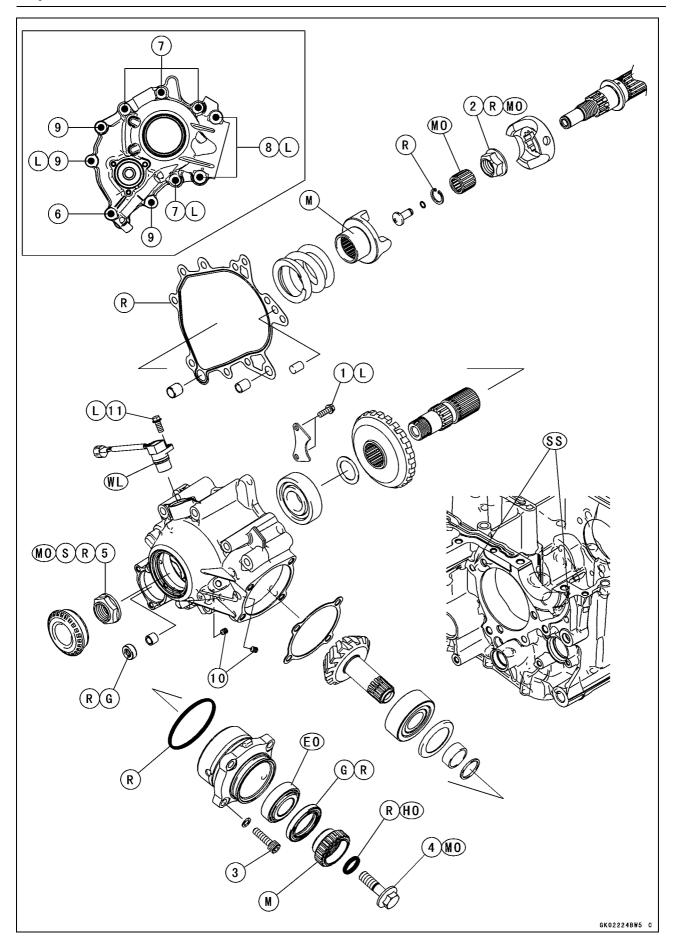
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11

11-2 FINAL DRIVE

Exploded View



Exploded View

Front Gear Case

No.	Fastener	Torque			Remarks
NO.		N∙m	kgf∙m	ft·lb	Remarks
1	Bearing Retainer Bolts	8.8	0.90	78 in·lb	L
2	Damper Cam Nut	210	21.4	155	MO, R
3	Driven Gear Assy Mounting Bolts	25	2.5	18	
4	Driven Gear Bolt	130	13.3	95.9	MO
5	Drive Gear Nut	380	38.7	280	MO, R, S
6	Front Gear Case Bolt (L = 50 mm)	20	2.0	15	
7	Front Gear Case Bolts (L = 95 mm)	29	3.0	21	L (1)
8	Front Gear Case Bolts (L = 92 mm)	29	3.0	21	L
9	Front Gear Case Bolts (L = 35 mm)	20	2.0	15	L (1)
10	Oil Nozzles	2.9	0.30	26 in·lb	
11	Speed Sensor Bolt	9.8	1.0	87 in·lb	L

EO: Apply engine oil.

G: Apply grease.

HO: Apply hypoid gear oil.

L: Apply a non-permanent locking agent.

M: Apply molybdenum disulfide grease.

MO: Apply molybdenum disulfide oil solution.

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

R: Replacement Parts

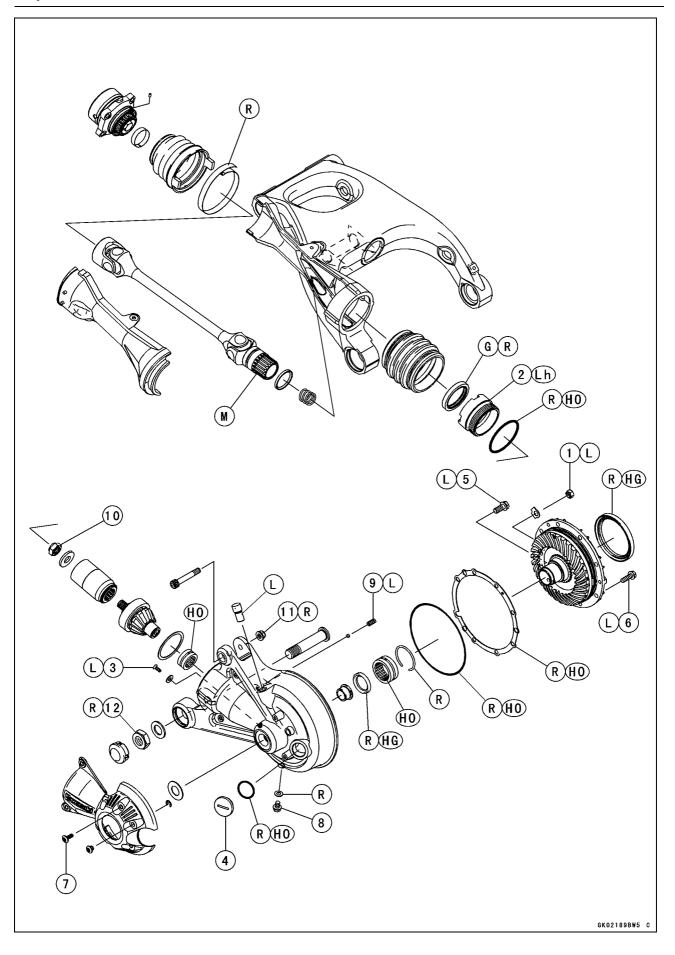
S: Follow the specified tightening sequence.

SS: Apply silicone sealant.

WL: Apply soap and water solution or rubber lubricant.

11-4 FINAL DRIVE

Exploded View



Exploded View

Final Gear Case

No.	Fastener	Torque			Domoriko
NO.		N∙m	kgf∙m	ft·lb	Remarks
1	Adjuster Locknut	40	4.1	30	L
2	Bearing Retainer	540	55.1	398	Lh
3	Bearing Retainer Screw	7.0	0.71	62 in·lb	L
4	Filler Plug	2.0	0.20	18 in·lb	
5	Final Gear Case Cover Bolts (M10)	34	3.5	25	L
6	Final Gear Case Cover Bolts (M8)	24	2.4	18	L
7	Final Gear Case Outer Cover Bolts	9.8	1.0	87 in·lb	
8	Final Gear Case Oil Drain Bolt	8.8	0.90	78 in·lb	
9	Lock Pin	16	1.6	12	L
10	Pinion Gear Assembly Nut	130	13.3	95.9	
11	Torque Rod Nut	59	6.0	44	R
12	Final Gear Case Locknut	98	10	72	R

G: Apply grease.

HG: Apply high-temperature grease.

HO: Apply hypoid gear oil.L: Apply a non-permanent locking agent.

Lh: Left-hand threads

M: Apply molybdenum disulfide grease.

R: Replacement Parts

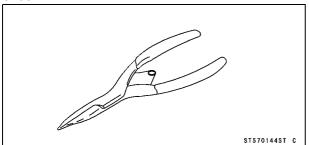
11-6 FINAL DRIVE

Specifications

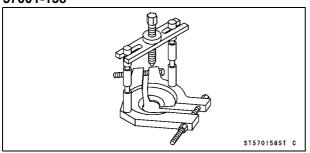
Item	Standard
Final Gear Case Oil	
Grade	API GL-5 hypoid gear oil
Viscosity	When above 5°C (41°F) SAE90
	When below 5°C (41°F) SAE80
Oil level	Filler opening top
Amount	about 160 mL (5.41 US oz.)
Final Bevel Gear Backlash	0.10 ~ 0.20 mm (0.0039 ~ 0.0079 in.) (at ring gear hub splines)
Preload for Front Bevel Gear Bearing	
Using Torque Wrench	0.49 ~ 0.88 N·m (0.05 ~ 0.09 kgf·m, 4.34 ~ 7.79 in·lb)
Using Spring Scale	2.45 ~ 4.40 N (0.25 ~ 0.45 kgf, 0.55 ~ 0.99 lb)
Front Bevel Gear Backlash	0.10 ~ 0.20 mm (0.0039 ~ 0.0079 in.) (at drive gear tooths)

Special Tools

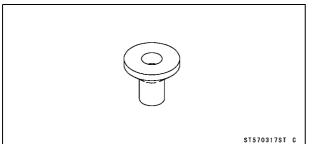
Outside Circlip Pliers: 57001-144



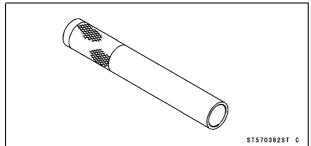
Bearing Puller: 57001-158



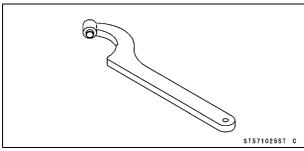
Bearing Puller Adapter: 57001-317



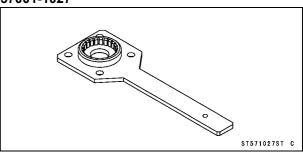
Bearing Driver, ϕ 32: 57001-382



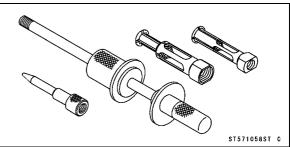
Damper Cam Holder: 57001-1025



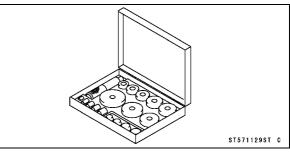
Driven Gear Holder, m2: 57001-1027



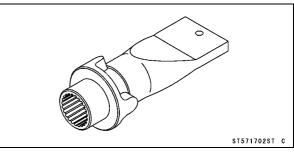
Oil Seal & Bearing Remover: 57001-1058



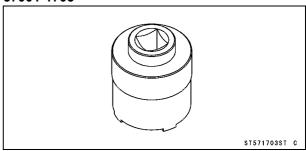
Bearing Driver Set: 57001-1129



Drive Shaft Holder, m1.25: 57001-1702



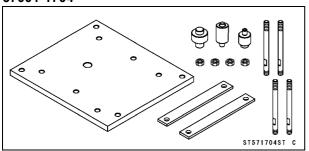
Retainer Wrench: 57001-1703



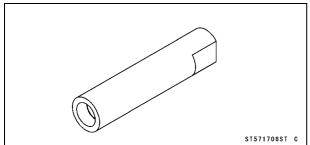
11-8 FINAL DRIVE

Special Tools

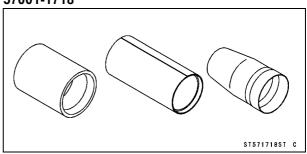
Base Set: 57001-1704



Bevel Gear Holder: 57001-1706



O-ring Installer: 57001-1718



Final Gear Case and Oil

Oil Level Inspection

• Refer to the Final Gear Case Oil Level Inspection in the Periodic Maintenance chapter.

Oil Change

• Refer to the Final Gear Case Oil Change in the Periodic Maintenance chapter.

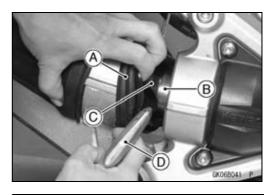
Final Gear Case Removal

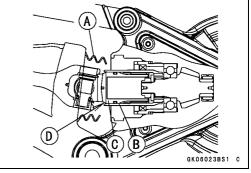
- ★ If the final gear case is to be disassembled, drain the final gear case oil.
- Remove:

Rear wheel (see Rear wheel Removal in the Wheels/Tires chapter)

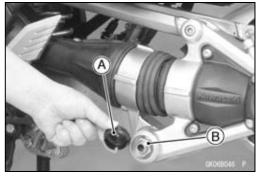
Rubber Boot (rear end) [A]

• Blow away dirt or dust between the joint [B] and yoke [C] by applying compressed air [D].









 Remove: Torque Rod Nut [A]

 Remove: Cap [A] Final Gear Case Locknut [B]

11-10 FINAL DRIVE

Final Gear Case and Oil

- Remove the torque rod bolt (upper side).
- Remove the final gear case [A] by taking off the final gear case bolt [B] (lower side).



NOTE

○If the final gear case is full of oil, place the case so that the breather [A] is on top, and joint portion [B] of the case is upward [C] for prevent the oil leak.

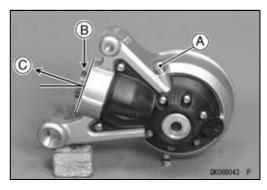
Final Gear Case Installation

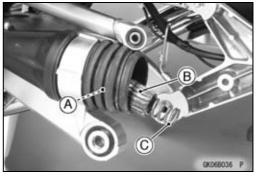
- Apply molybdenum disulfide grease to the rareflon ring [A] and propeller shaft splines portion [B].
- Install the spring [C] in the joint.
- Fit the lower joint portion [A] of the final gear case onto the swingarm.
- Insert the bolt [B].
- Fit the pinion gear joint splines onto the propeller shaft splines while turning the ring gear hub [C].
- OAlign the shaft end [D] parallel the center line [E] of the swingarm.
- Install the torque rod.
- Replace the final gear case locknut and torque rod nut with new ones.
- Tighten:

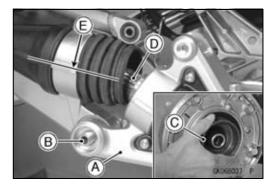
Torque - Final Gear Case Locknut: 98 N·m (10 kgf·m, 72 ft·lb)

Torque Rod Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)

★ If the final gear case oil was drained, fill the case with oil (see Final Gear Case Oil Change in the Periodic Maintenance chapter).







Final Gear Case and Oil

Final Gear Case Disassembly

- Drain the oil (see Final Gear Case Oil Change in the Periodic Maintenance chapter).
- Remove the final gear case (see Final Gear Case Removal).
- Using the hub assembly [A], remove the pinion gear assembly nut [B].

OInsert the wooden bar [C] between the spokes.

NOTICE

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 dose not touch the ground.

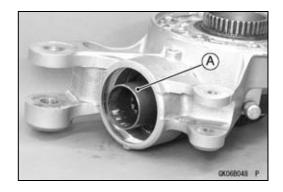
• Remove:

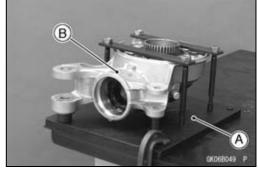
Sliding Joint [A] and Washer

• Using the base set [A] hold the final gear case [B]. Special Tool - Base Set: 57001-1704

• Loosen the lock pin [A].









11-12 FINAL DRIVE

Final Gear Case and Oil

• Using retainer wrench [A] remove the bearing retainer. OThe bearing retainer is left-hand threads.

Special Tool - Retainer Wrench: 57001-1703

• Remove:

Pinion Gear Assembly and Shim(s) Lock Pin and Plug

 Remove: Final Gear Case Cover Bolts [A]

• Use three tapped holes [A] to lift the ring gear assembly from the gear case. The shim(s) comes off with the assembly.

NOTE

ODo not disassemble the ring gear assembly (ring gear, ring gear hub, and final gear case cover), but the oil seal can be removed.

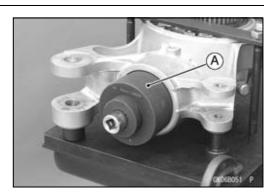
To remove the ring gear oil seal [A], heat the ring gear assembly in an oil bath to 120 ~ 150°C (248 ~ 302°F), then pry out the oil seal with an awl or other tool. Be careful not to scratch the sealing surface on the ring gear hub.



• Remove the snap ring [A] and pull out the needle bearing

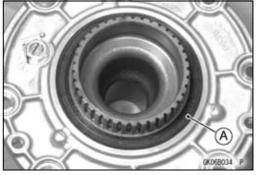
warp the case.

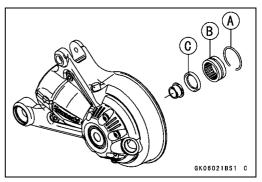
[B].
 ★ If the small ring gear oil seal [C] is damaged, remove it using the oil seal and bearing remover.







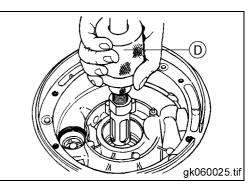


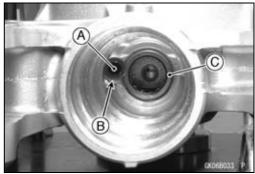


Final Gear Case and Oil

ORemove the small ring gear oil seal if damaged. Special Tool - Oil Seal & Bearing Remover [D]: 57001-1058

- Unscrew the bearing retainer screw [A] and washer [B].
- Pull out the needle bearing [C].
 Special Tool Oil Seal & Bearing Remover: 57001-1058

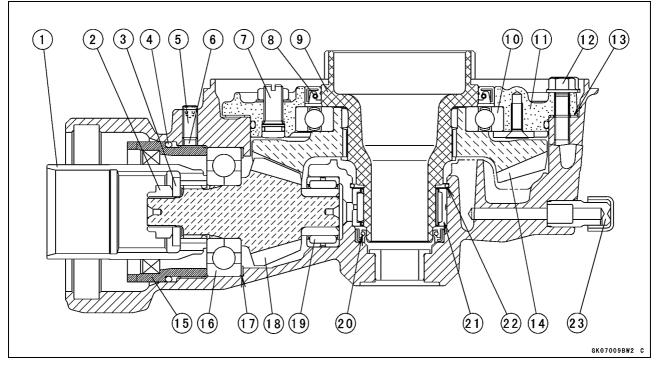




11-14 FINAL DRIVE

Final Gear Case and Oil

Final Gear Case



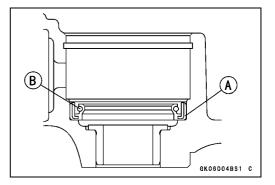
- 1. Sliding Joint
- 2. Pinion Gear Assembly Nut
- 3. Washer
- 4. O-ring
- 5. Lock Pin
- 6. Plug
- 7. Adjuster
- 8. Ring Gear Oil Seal
- 9. Ring Gear Hub
- 10. Ball Bearing
- 11. Final Gear Case Cover
- 12. Cover Mounting Bolts

Final Gear Case Assembly

- OThe ring gear and pinion gear are lapped as a set in the factory to get the best tooth contact. They must be installed as a pair, and never replace one without the other.
- Press the small ring gear oil seal [A] until it bottoms out with its spring [B] facing inward.
- Apply a thin coat of high temperature grease to the oil seal lip.

Special Tool - Bearing Driver Set: 57001-1129

- 13. Ring Gear Shim(s)
- 14. Ring Gear
- 15. Bearing Retainer
- 16. Ball Bearing
- 17. Pinion Gear Shim(s)
- 18. Pinion Gear
- 19. Roller Bearing
- 20. Small Ring Gear Oil Seal
- 21. Needle Bearing
- 22. Snap Ring
- 23. Breather Fitting



Final Gear Case and Oil

- Replace the needle bearings [A] with new ones.
- Apply a hypoid gear oil to the roller parts of the needle bearings.

NOTE

○Install the bearing so that the marked side faces out. ○Press in the bearings until they are bottomed.

Special Tool - Bearing Driver Set: 57001-1129

- Install a new snap ring [B] secure.
- Apply a non-permanent locking agent to the threads of the bearing retainer screw [C].
- Install the washer [D] and the bearing retainer screw.
- Tighten:

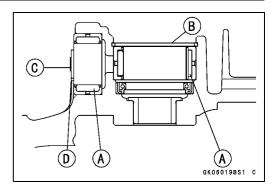
Torque - Bearing Retainer Screw: 7.0 N⋅m (0.71 kgf⋅m, 62 in⋅lb)

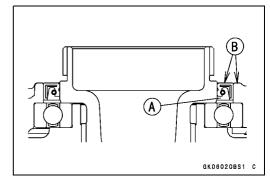
- Apply a thin coat of high temperature grease to the oil seal lip of the ring gear oil seal.
- Install the ring gear oil seal with its spring [A] facing inward using a suitable driver until the face of the seal is even [B] with the end of the hole.
- Bend the lock washer [A] straight.
- Remove the locknut [B] and loosen adjuster [C].

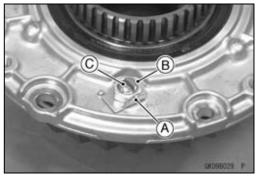
- Turn the adjuster [A] clockwise until it becomes hard to turn, and then back it out 1/4 ~ 1/2 turn.
- Apply a non-permanent locking agent to the threads of the adjuster locknut [B].
- Tighten:

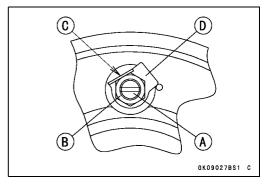
Torque - Adjuster Locknut: 40 N·m (4.1 kgf·m, 30 ft·lb)

• Bend [C] the lock washer [D].





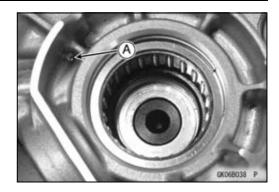


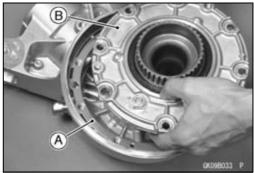


11-16 FINAL DRIVE

Final Gear Case and Oil

• Blow the breather hole [A] in the final gear case clean with compressed air.





- Install the shim(s) [A] and ring gear assembly [B].
- OReinstall the original ring gear shim(s) to keep the gear backlash and the tooth contact unchanged.
- OWhen final gear case parts are replaced, the final bevel gear must be adjusted (see Final Gear Backlash and Tooth Contact Adjustment).
- Apply a non-permanent locking agent to the threads of the final gear case cover bolts.
- Tighten:

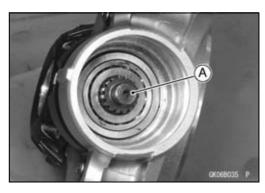
Torque - Final Gear Case Cover Bolts: M10: 34 N·m (3.5 kgf·m, 25 ft·lb) M8: 24 N·m (2.4 kgf·m, 18 ft·lb)

- Insert the shim(s) and pinion gear assembly [A].
- OReinstall the pinion gear assembly shim(s) to keep the gear backlash and the tooth contact unchanged.
- Tighten the bearing retainer.
- OThe bearing retainer is left-hand threads.

Special Tools - Retainer Wrench: 57001-1703 Base Set: 57001-1704

Torque - Bearing Retainer: 540 N·m (55.1 kgf·m, 398 ft·lb)

- Apply a non-permanent locking agent to the threads of the lock pin.
- Install the plug [A] and lock pin [B].
 Torque Lock Pin: 16 N·m (1.6 kgf·m, 12 ft·lb)





Final Gear Case and Oil

- Install the sliding joint [A] and washer.
- Using the hub assembly [B], tighten the pinion gear assembly nut.

OInsert the wooden bar [C] between the sporks.

Torque - Pinion Gear Assembly Nut: 130 N·m (13.3 kgf·m, 95.9 ft·lb)

• Install the final gear case (see Final Gear Case Installation).

Sliding Joint Inspection

- Remove:
 - Final Gear Case (see Final Gear Case Removal)
- Visually inspect the internal splines [A] of the propeller shaft sliding joint [B].
- ★ If they are badly worn or chipped, replace the joint with a new one.

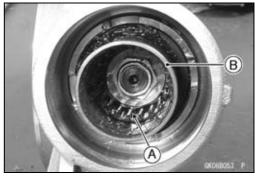
Bevel Gear Inspection

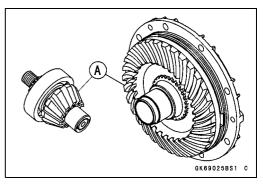
- Visually check the bevel gears [A] for scoring, chipping, or other damage.
- ★Replace the bevel gears as a set if either gear is damaged.

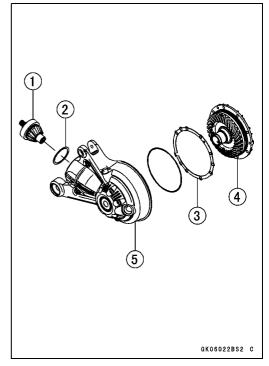
Final Bevel Gear Adjustment

- OThe **backlash** and **tooth contact pattern** of the bevel gears must be correct to prevent the gears from making noise and being damaged.
- After replacing any of the backlash-related parts, be sure to check and adjust the backlash and tooth contact of the bevel gears. First, adjust backlash, and then tooth contact by replacing shims.
 - 1. Pinion Gear Assembly
 - 2. Pinion Gear Shim(s)
 - 3. Ring Gear Shim(s)
 - 4. Ring Gear Assembly
 - 5. Final Gear Case
- OThe amount of backlash is influenced by the ring gear position more than by the pinion gear position.
- OTooth contact locations is influenced by pinion gear position more than by ring gear position.









11-18 FINAL DRIVE

Final Gear Case and Oil

Ring Gear Shims for Backlash Adjustment

Pinion Gear Shims for Tooth Contact Adjustment

Thickness (mm)	Parts Number	Thickness (mm)	Parts Number
0.15 (0.0059 in.)	92180-0263	0.10 (0.0039 in.)	92025-1733
0.5 (0.020 in.)	92180-0264	0.15 (0.0059 in.)	92025-1734
0.6 (0.024 in.)	92180-0265	0.5 (0.020 in.)	92025-1735
0.7 (0.028 in.)	92180-0266	0.6 (0.024 in.)	92025-1736
0.8 (0.031 in.)	92180-0267	0.7 (0.028 in.)	92025-1737
0.9 (0.035 in.)	92180-0268	0.8 (0.031 in.)	92025-1738
1.0 (0.039 in.)	92180-0269	0.9 (0.035 in.)	92025-1739
1.2 (0.047 in.)	92180-0270	1.0 (0.039 in.)	92025-1740
		1.2 (0.047 in.)	92025-1741

Backlash Adjustment

 Clean any dirt and oil off the bevel gear teeth with a high -flash point solvent.

NOTICE

Do not install the O-ring or oil seals during adjustment.

Install the ring gear assembly with the primary shim (1.0 mm, 0.04 in. thickness), and tighten the cover bolts to the specified torque.

Torque - Final Gear Case Cover Bolts: M10: 34 N·m (3.5 kgf·m, 25 ft·lb) M8: 24 N·m (2.4 kgf·m, 18 ft·lb)

- Install the pinion gear assembly with the primary shim (1.0 mm, 0.04 in. thickness).
- Hold the final gear case with the base set and tighten the bearing retainer to the specified torque.
- OThe bearing retainer is left-hand threads.

Special Tools - Base Set: 57001-1704 Retainer Wrench: 57001-1703

Torque - Bearing Retainer: 540 N·m (55.1 kgf·m, 398 ft·lb)

• Hold the pinion gear assembly with the bevel gear holder.

Special Tool - Bevel Gear Holder: 57001-1706

OCheck the backlash during tightening of the cover bolts, and stop tightening them immediately if the backlash disappears. Then, change the ring gear shim to a thicker one.

Final Gear Case and Oil

- Mount a dial gage [A] on the base so that the tip of the gage is against the splines of the ring gear hub.
- To measure the backlash, turn the ring gear hub [B] back and forth [C]. The difference between the highest and the lowest gage reading is the amount of backlash.

OMeasure backlash at three locations equally spaced on the splines.

Final Bevel Gear Backlash:

$0.10 \sim 0.20 \mbox{ mm}$ (0.0039 ~ 0.0079 in.) (at ring gear hub splines)

- ★ If the backlash is out of the limit, replace the ring gear shims. To increase backlash, increase the thickness of the shim(s). To decrease backlash, decrease the thickness of the shim(s).
- Change the thickness a little at a time.
- Recheck the backlash, and readjust as necessary.

NOTE

Olt is OK to pack two shims. Do not pack three or more shims.

Tooth Contact Adjustment

- Clean any dirt and oil off the bevel gear teeth with a high -flash point solvent.
- Apply checking compound to 4 or 5 teeth of the pinion gear.

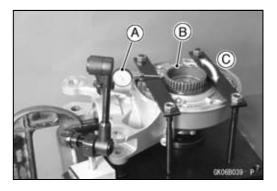
Concave Side Tooth [A] Convex Side Tooth [B]

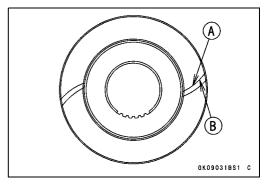
NOTE

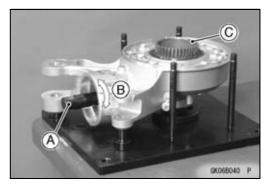
- OApply checking compound to the teeth in a thin, even coat with a fairly stiff paint brush. If painted too thickly, the exact tooth pattern may not appear.
- The checking compound must be smooth and firm, with the consistency of tooth paste.
- OSpecial compounds are available at automotive supply stores for the purpose of checking differential gear tooth patterns and contact.
- Install the pinion gear assembly to the final gear case.
- Tighten:
- OThe bearing retainer is left-hand threads.

Torque - Bearing Retainer: 540 N·m (55.1 kgf·m, 398 ft·lb)

- Install the bevel gear holder [A] to the pinion gear.
 Special Tool Bevel Gear Holder: 57001-1706
- Turn the bevel gear holder for one revolution [B] back and forth, while creating a drag on the ring gear hub [C].







11-20 FINAL DRIVE

Final Gear Case and Oil

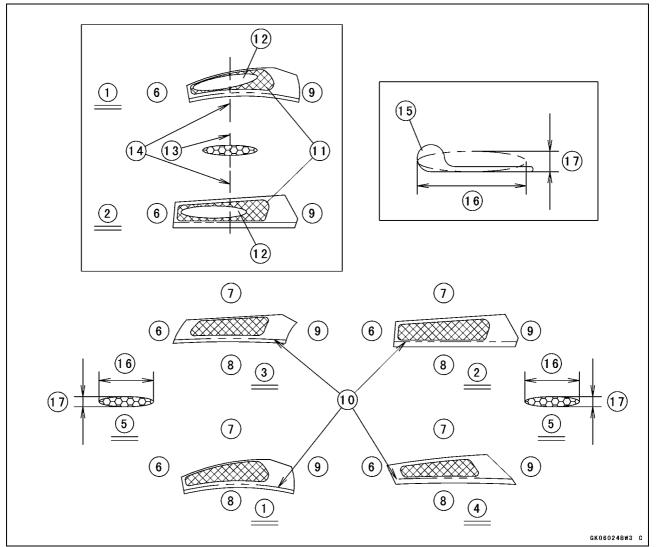
- Remove the ring gear assembly and pinion gear assembly to check the convex side pattern and concave side pattern of the bevel gear teeth. Good contact is achieved when the center line of the tooth contact pattern is visible in the inside of the lines shown in the figure below.
- ★ If the tooth contact pattern is incorrect, replace the pinion gear shim(s). Then erase the tooth contact patterns, and check them again. Also check the backlash every time the shim(s) are replaced. Repeat the shim change procedure as necessary.

NOTE

- ○If the backlash is out of the standard range after changing the pinion gear shim(s), replace the ring gear shim(s) to correct the backlash before checking the tooth contact pattern.
- Olt is OK to pack two shims. Do not pack three or more shims.
- After checking the tooth contact pattern, check the pinion gear turns freely.

Final Gear Case and Oil

Correct Tooth Contact Pattern: No adjustment is required.



- 1. Concave Side of Pinion Gear
- 2. Convex Side of Ring Gear
- 3. Convex Side of Pinion Gear
- 4. Concave Side of Ring Gear
- 5. Limit of Good Contact Pattern
- 6. Inside
- 7. Top
- 8. Bottom
- 9. Outside
- 10. Top of Engagement Tooth

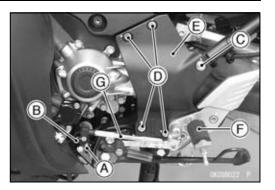
- 11. Area of Good Contact Pattern
- 12. Aiming Position of Tooth Contact
- 13. Center Line of Tooth Contact Pattern
- 14. The center line of tooth contact pattern must come to inside of the line shown in the figure.
- 15. The extreme pattern like figure is improper.
- 16. 16 mm (0.63 in.)
- 17.3 mm (0.12 in.)

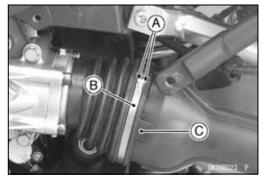
11-22 FINAL DRIVE

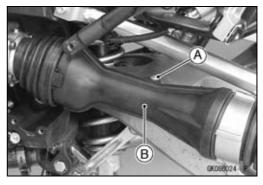
Propeller Shaft

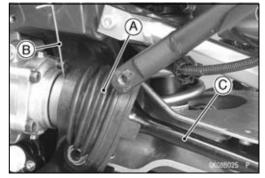
Propeller Shaft Removal

- Remove: Final Gear Case (see Final Gear Case Removal) Shift Lever Bolt [A] Shift Lever [B] Rear Frame Bolt [C] and Washer Frame Side Bracket Bolts [D]
- Remove the frame side bracket [E] with the footpeg [F] and tie-rod [G].
- Open the clamp portion [A] and remove the band [B].
- Pull out the rear side of the rubber boot [C] from the swingarm.









- Remove:
 - Bolt [A]
- Pull out the swingarm cover [B] from the swingarm.

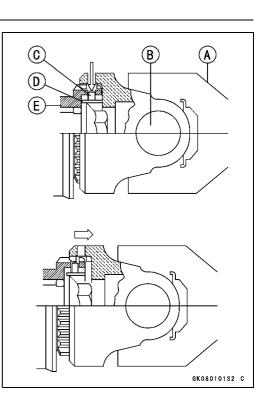
- Pull out the front side of the rubber boot [A].
- Remove the propeller shaft from the front driven gear joint using the thin pushing tool [B].
- OTurn the propeller shaft so that the lockpin access hole in the propeller shaft [C] comes outside.

Propeller Shaft

 $\bigcirc\ensuremath{\mathsf{Move}}$ back the propeller shaft and slip the propeller shaft

off the driven gear joint while pushing on the lockpin. Propeller Shaft [A] Universal Joint [B]

Lockpin [C] Leaf Spring [D] Driven Gear Joint [E]



Propeller Shaft Installation

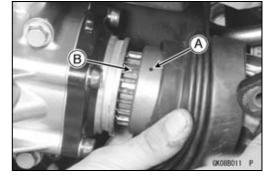
- Replace the O-ring on the rear end of the propeller shaft (see Propeller Shaft O-ring Replacement).
- Apply molybdenum disulfide grease to the driven gear joint and the rear end of the propeller shaft.
- Fit the hole [A] of the propeller shaft on the pin [B] of the driven gear joint.
- After connecting the propeller shaft to the driven gear joint, pull the propeller shaft rearward to check that the shaft is secured in place by the lockpin.
- Install the rubber boot [A] so that the mark [B] of the rubber boot align with the mark [C] of the housing.
- Install:

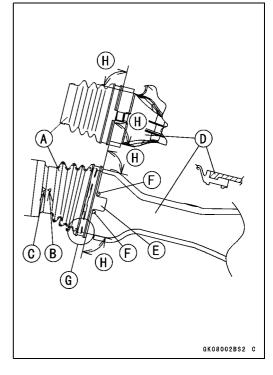
Swingarm Cover [D]

OFit the tab [E] of the rubber boot between the projections [F] on the swingarm cover.

- OThe rubber boot must not hang over the projections.
- OThe rubber boot must not install deeply on the swingarm and swingarm cover [G].
- ODo not install the rubber boot aslant.

90° [H]





11-24 FINAL DRIVE

Propeller Shaft

- Install the band [A] on the rubber boot [B].
- Hook the lower end [C] to the stopper [D] and push in the upper end [E] in the clamp portion [F].

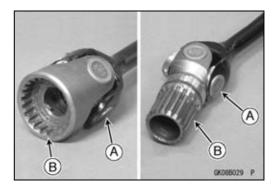
• Pinch the clamp portion [A] of the band [B].

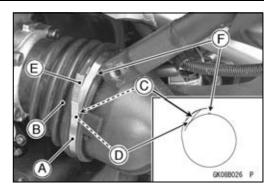
- Apply a non-permanent locking agent to the rear frame bolt [A].
- Install: Frame Side Bracket Assembly [B] Rear Frame Bolt and Washer
 - Frame Side Bracket Bolts [C]
- Tighten:
 - Torque Rear Frame Bolt: 44 N⋅m (4.5 kgf⋅m, 32 ft⋅lb) Frame Side Bracket Bolts: 25 N⋅m (2.5 kgf⋅m, 18 ft⋅lb)
- Install:

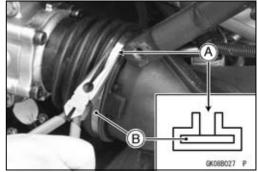
Shift Lever Bolt [D] (see Shift Pedal Installation in the Crankshaft/Transmission chapter)

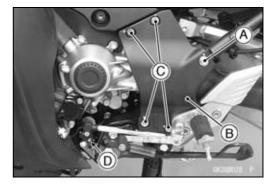
Propeller Shaft Inspection

- Check that the universal joints [A] works smoothly without rattling or sticking.
- ★ If it does not work smoothly, the needle bearings of the universal joint are damaged. Replace the propeller shaft assy with a new one.
- Visually inspect the bending of the shaft and the wear of the splines [B] at the ends of the shaft.
- ★ If it is bent at all, replace the propeller shaft assy. Do not attempt to straighten a bent shaft.





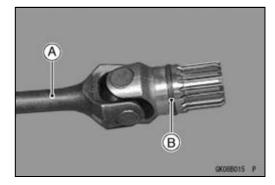


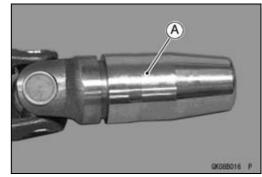


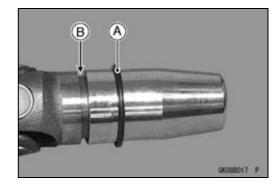
Propeller Shaft

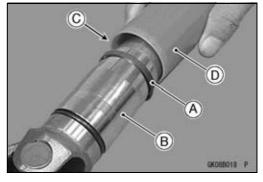
Propeller Shaft O-ring Replacement

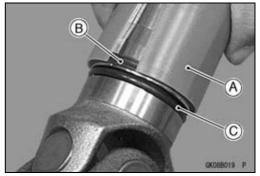
- Remove:
 - Propeller Shaft [A] (see Propeller Shaft Removal) Rareflon Ring with O-ring [B]
- Replace the rareflon ring and O-ring with new ones.











Insert the sliding jig [A] onto the spline.
 Special Tool - O-ring Installer: 57001-1718

• Slide the O-ring [A] onto the groove [B].

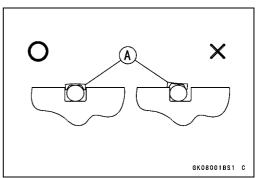
- Set the rareflon ring [A] on the sliding jig [B].
- Place the rareflon ring on the recessed portion [C] of the pusher [D].

- Slide the pusher [A] until the rareflon ring [B] over the O-ring [C].
- Remove the pusher and sliding jig.

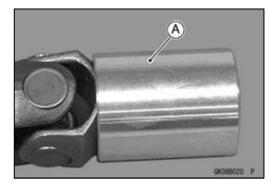
11-26 FINAL DRIVE

Propeller Shaft

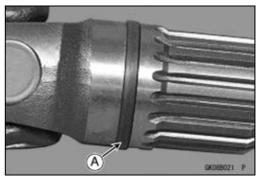
• Fix the rareflon ring [A] on the O-ring uniformly so that it is correctly located in the groove.



- Apply hypoid gear oil to the tapered portion of the correcting jig.
- Insert the correcting jig [A] until it is bottomed then hold it in place for at least 10 seconds.
- Remove the correcting jig.



- Inspect the rareflon ring [A] for frayed, cracks or cuts.
- \bigstar If it is damaged, replace it with a new one.



Front Bevel Gears

Front Gear Case Removal

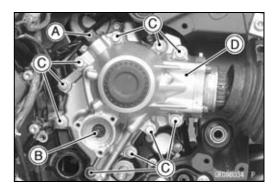
- Drain: Coolant (see Coolant Change in the Periodic Maintenance chapter) Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)
- Remove:

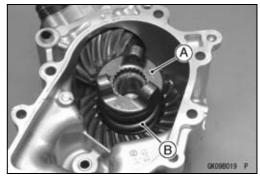
Propeller Shaft (see Propeller Shaft Removal) Water Pump (see Water Pump Removal in the Cooling System chapter) Clutch Slave Cylinder (see Clutch Slave Cylinder Removal in the Clutch chapter) Shift Lever (see Shift Pedal Removal in the Crankshaft/Transmission chapter)

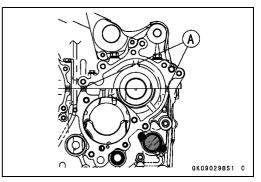
• Remove:

Speed Sensor [A] (see Speed Sensor Removal in the Electrical System chapter) Push Rod [B] Front Gear Case Bolts [C] and Washers Front Gear Case [D]

OThe cam follower [A] and the damper spring [B] come off with the gear case.







Front Gear Case Installation

• Apply silicone sealant to the mating surfaces [A].

11-28 FINAL DRIVE

Front Bevel Gears

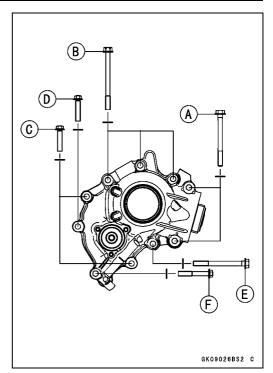
- Tighten the front gear case bolts to the specified torque. Bolts M8 × 92 [A] Bolts M8 × 95 [B] [E]
 - Bolts M8 × 35 [C] [D]
 - Bolt M8 × 50 [F]

OApply a non-permanent locking agent to the threads of the bolts [A] [D] [E].

Torque - Front Gear Case Bolts:

Bolts [A] [B] [E]: 29 N·m (3.0 kgf·m, 21 ft·lb) Bolts [C] [D] [F] : 20 N·m (2.0 kgf·m, 15 ft·lb)

• Install the removed parts (see appropriate chapter).



Front Gear Case Disassembly

• Remove:

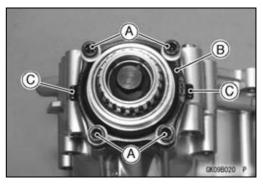
Front Gear Case (see Front Gear Case Removal) Cam Follower (see Front Gear Case Removal) Damper Spring (see Front Gear Case Removal)

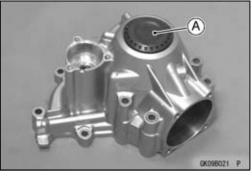
• Remove the driven gear assy mounting bolts [A] and pry the assy [B] off the case.

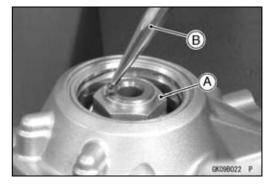
ORaise the driven gear, using the following pry points [C].

• Remove the drive gear assy as follows. OPry off the gear case cap [A] with a tool.

OPry open the drive gear nut [A] with a small chisel or punch [B].







Front Bevel Gears

OUnscrew the drive gear nut [A] while holding the drive gear

```
shaft with the drive gear holder [B].
```

```
Front Gear Case [C]
```

```
Vise [D]
```

Special Tool - Drive Gear Holder, m1.25: 57001-1702

- Pull off the drive gear shaft [A], the drive gear [B], and shim(s) [C].
- Remove the bearing holder [D] from the gear case.
- Remove the drive gear shaft ball bearing [E] using the bearing driver set.

Special Tool - Bearing Driver Set: 57001-1129

Front Gear Case Assembly

OThe drive and driven gear are lapped as a set in the factory to get the best tooth contact. They must be replaced as a set.

• Press the drive gear [B] slowly with the driver [A] onto the shaft [C].

Special Tool - Bearing Driver: 57001-382

- Apply a non-parmanent locking agent to the threads of the bearing retainer bolts.
- Tighten:

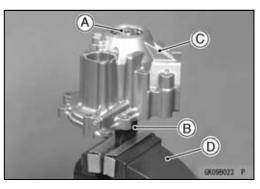
Torque - Bearing Retainer Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)

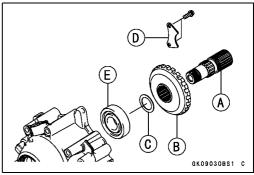
- Be sure to check and adjust the bearing preload, the bevel gear backlash, and tooth contact, when any of the back-lash-related parts are replaced (see Front Bevel Gear Adjustment).
- After completing all adjustment, reassemble the front gear case.

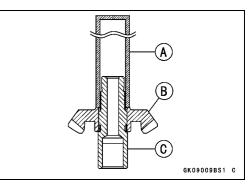
OReplace the drive gear nut with a new one.

- OApply molybdenum disulfide oil to the threads and seating surface of the drive gear nut, and tighten it to the specified torque to settle the bearings in place.
- OLoosen the nut completely and retighten it to the specified torque.

Torque - Drive Gear Nut: 380 N·m (38.7 kgf·m, 280 ft·lb)







11-30 FINAL DRIVE

Front Bevel Gears

OStake [A] the nut [B] to secure it in place.

NOTICE

When staking the nut, be careful not to apply shock to the shaft and its bearing. Such a shock could damage the shaft and/or bearing.

• Install the shim [A].

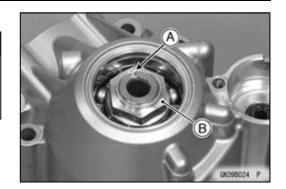
Driven Gear Disassembly

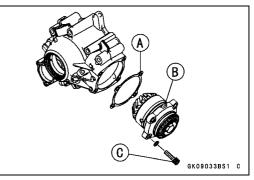
• Remove: Pin [A]

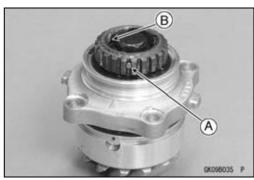
Leaf Spring [B]

- Install the driven gear assy prying the pry points [B] up and down side.
- Tighten the driven gear assy mounting bolts [C] to the specified torque.

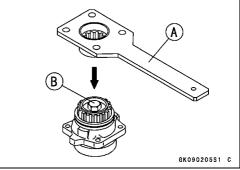
Torque - Driven Gear Assy Mounting Bolts: 25 N⋅m (2.5 kgf⋅m, 18 ft⋅lb)



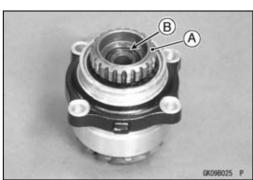




• Holding the driven gear joint with the driven gear holder [A] in a vise, unscrew the driven gear bolt [B]. Special Tool - Driven Gear Holder: 57001-1027



- Remove the driven gear joint [A] with the O-ring [B].
- Remove the driven gear from the bearing housing.
- Remove the oil seal from the housing with a hook, and pull the tapered roller bearing out of the housing.



Front Bevel Gears

• Remove the tapered roller bearing [A] which is pressed onto the driven gear shaft with the bearing puller and adapter.

Special Tools - Bearing Puller: 57001-158 [B] Adapter: 57001-317 [C]

Driven Gear Assembly

- Replace the driven gear bolt with a new one.
- OThe drive and driven gears are lapped as a set at the factory to get the best tooth contact. They must be replaced as a set.
- Be sure to check and adjust the bearing preload, the bevel gear backlash, and tooth contact (see Front Bevel Gear Adjustment).
- Drive the tapered roller bearing inner race [B] onto the driven gear shaft [C] using the bearing driver [A].

Special Tool - Bearing Driver: 57001-382

- After completing the bearing preload adjustment, reassemble the driven gear assy.
- OUsing the bearing driver set, press the oil seal in until the face of the seal is level with the end of the bearing housing hole.

Special Tool - Bearing Driver Set: 57001-1129

OApply molybdenum disulfide oil to the seating surface of the driven gear bolt.

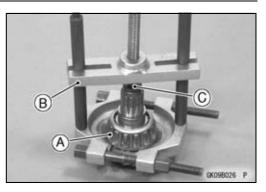
OTighten the driven gear bolt to the specified torque.

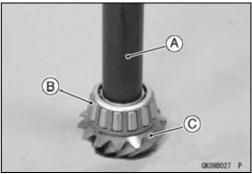
Torque - Driven Gear Bolt: 130 N·m (13.3 kgf·m, 95.9 ft·lb) OStake [A] the driven gear bolt to prevent it from loosening.

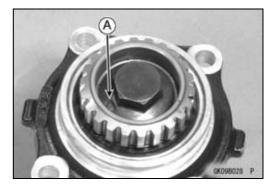
NOTICE

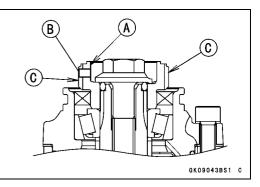
When staking the bolt, be careful not to apply shock to the driven gear and their bearings. Such a shock could damage the driven gear and/or bearings.

- Install: Leaf Spring [A]
 - Pin [B]
- Apply molybdenum disulfide grease to the spline [C] of the coupling.









11-32 FINAL DRIVE

Front Bevel Gears

Damper Cam Removal

• Remove:

Front Gear Case (see Front Gear Case Removal) Nozzle [A] Circlip [B]

Special Tool - Outside Circlip Pliers: 57001-144

- Remove: Needle Bearing [C]
- Unscrew the damper cam nut [A] using a damper cam holder [B] and deep socket wrench.

Special Tool - Damper Cam Holder: 57001-1025

Damper Cam Installation

- Replace the damper cam nut with a new one.
- Fit the damper cam holder [A] onto the damper cam [B].
- Apply molybdenum disulfide oil to the threads and the seating surface of the damper cam nut [C].
- Tighten the damper cam nut to the specified torque.

Torque - Damper Cam Nut: 210 N·m (21.4 kgf·m, 155 ft·lb)

Special Tool - Damper Cam Holder: 57001-1025

 Install: Needle Bearing [A] New Circlip [B]

Special Tool - Outside Circlip Pliers: 57001-144

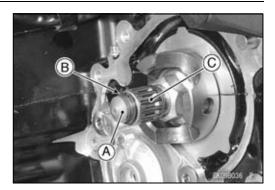
• Replace the O-ring [C] with a new one and install the nozzle [D].

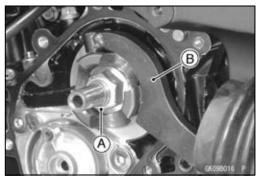
Front Bevel Gear Adjustment

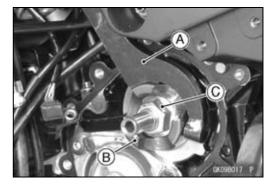
In order to prevent one gear from moving away from the other gear under load, the tapered roller bearings must be properly **preloaded**. Also the **backlash** (the distance one gear will move back and forth without moving the other gear) and **tooth contact pattern** of the bevel gears must be correct to prevent the gears from making noise and being damaged.

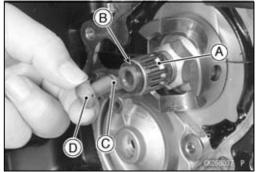
Above three adjustments are of critical importance and must be carried out in the correct sequence and method.

OPreload adjustment is necessary whenever the driven gear bolt [2] loosened, even if the purpose is not to replace the parts.

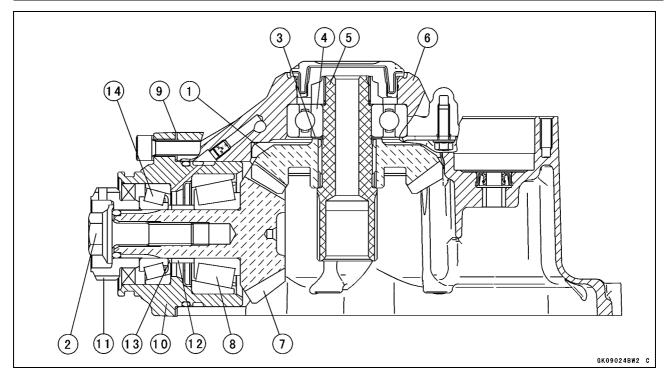








Front Bevel Gears



Backlash-related Parts

- 1. Drive Gear
- 2. Driven Gear Bolt
- 3. Drive Gear Shim(s)
- 4. Ball Bearing
- 5. Drive Gear Shaft
- 6. Front Gear Case

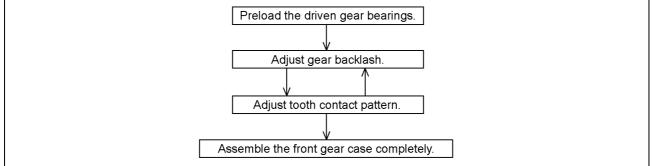
Preload-related Parts

- 7. Driven Gear
- 8. Tapered Roller Bearing
- 9. Driven Gear Shim(s)
- 10. Driven Gear Bearing

Housing

- 11. Driven Gear Joint
- 12. Collar
- (Preload Adjustment) 13. Spacer
- (Preload Adjustment)
- 14. Tapered Roller Bearing

Front Bevel Gear Adjustment



OWhen any of the backlash-related parts are replaced, or the driven gear bolt is loosened; even if the purpose is not to replace the parts, be sure to check and adjust the bearing preload, the bevel gear backlash, and tooth contact by replacing shims.

Front Bevel Gears

Preload Adjustment

• Install the driven gear assy, and tighten the driven gear bolt to the specified torque.

Torque - Driven Gear Bolt: 130 N·m (13.3 kgf·m, 95.9 ft·lb)

ODo not install the oil seal, and O-ring, and do not stake the bolt until the correct bearing preload is obtained.

NOTICE

To start with, choose a shim or collar so that the bearings are just SNUG with NO play and also with NO preload.

Any overpreload on the bearings could damage the bearings.

- Apply a little engine oil to the bearings, and turn the gear shaft more than 5 turns to allow the bearings to seat.
- Measure the bearing preload. Bearing preload is defined as a force or torque which is needed to start the gear shaft turning.

Preload for Driven Gear Bearing

Using Torque Wrench:

0.49 ~ 0.88 N·m (0.05 ~ 0.09 kgf·m, 4.34 ~ 7.79 in·lb)

Using Spring Scale:

2.45 ~ 4.40 N (0.25 ~ 0.45 kgf, 0.55 ~ 0.99 lb)

NOTE

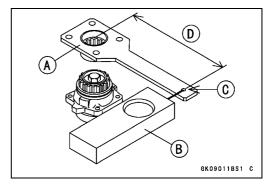
○Preload can be measured either with a spring scale or a beam-type torque wrench. When measured with a spring scale, the preload is designated by force (N, kgf, Ib), and when measured with a torque wrench, it is designated by torque (N·m, kgf·m, in·lb).

Preload Measurement with Spring Scale

- Hold the bearing housing in a vise so that the gear shaft axis is vertical.
- Hook [C] the spring scale [B] on the driven gear holder [A] at a point 200 mm (7.9 in.) [D] apart from the center of the gear shaft.
- Apply force to the handle horizontally and at a right angle to it.

Special Tool - Driven Gear Holder: 57001-1027

- ★ If the preload is out of specified range, replace the bearing collar and/or spacer. To increase preload, decrease the stack length of the collar and spacer. To decrease preload, increase the stack length of the collar and spacer.
- \star Change the stack length a little at a time.
- Recheck the bearing preload, and readjust if necessary.



Front Bevel Gears

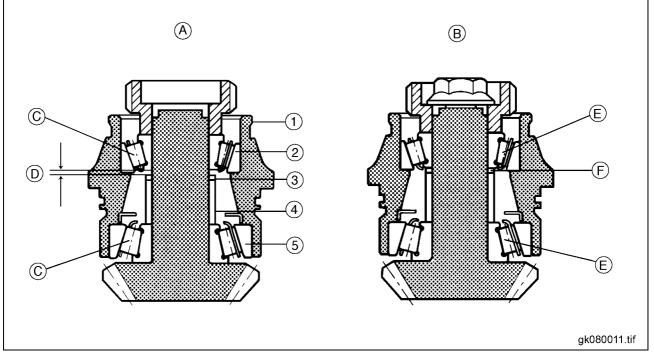
Collars	for	Preload	Adjustment
U Unitar U		1101044	/

	•
Length (mm)	Part Number
10.4 (0.409 in.)	92027-1403
10.5 (0.413 in.)	92027-1404
10.6 (0.417 in.)	92027-1405
10.7 (0.421 in.)	92027-1406
10.8 (0.425 in.)	92027-1407
10.9 (0.429 in.)	92027-1408
11.0 (0.433 in.)	92027-1409
11.1 (0.437 in.)	92027-1410
11.2 (0.441 in.)	92152-0480
11.3 (0.445 in.)	92152-0481
11.4 (0.449 in.)	92152-0482
11.5 (0.453 in.)	92152-0483
11.6 (0.457 in.)	92152-0484
11.7 (0.461 in.)	92152-0485

Spacers for Preload Adjustment

	•
Thickness (mm)	Part Number
1.70 (0.0669 in.)	92025-1072
1.72 (0.0677 in.)	92025-1073
1.74 (0.0685 in.)	92025-1074
1.76 (0.0693 in.)	92025-1075
1.78 (0.0701 in.)	92025-1076
1.80 (0.0709 in.)	92025-1077

Bearing Preloading Mechanism



- 1. Bearing Housing
- 2. Tapered Roller Bearing Before Tightening [A] After Tightening [B]
- 3. Spacer
- 4. Collar Under No Preload [C] Initial Clearance [D]
- 5. Tapered Roller Bearing

Under Preload [E] No Clearance [F]

11-36 FINAL DRIVE

Front Bevel Gears

Backlash Adjustment

- Clean any dirt and oil off bevel gear teeth with a high-flash point solvent.
- Install the drive gear with the primary shim (1.0 mm, 0.04 in., thickness), and tighten the nut to the specified torque.

Torque - Drive Gear Nut: 380 N·m (38.7 kgf·m, 280 ft·lb)

NOTE

ODo not stake the head of the nut until both backlash and tooth contact adjustments are finished.

• Install the driven gear assy in the front gear case with the primary shim (1.0 mm, 0.04 in., thickness), and tighten the mounting bolts to the specified torque.

Torque - Driven Gear Assy Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- OCheck backlash during tightening of the mounting bolts, and stop tightening them immediately if the backlash disappears. Then, change the shim to a thicker one.
- Install a holder [A] with 6 mm bolts and nuts on the front gear case to mount a dial gage.
- Set up a dial gage against a drive gear tooth to check gear backlash. The gage stem must be in line with the direction of tooth travel.
- To measure the backlash, move the drive gear back and forth [C] while holding [B] the driven gear steady with a tool. The difference between the highest and lowest gage readings is the amount of backlash.
- ★ If the backlash is not within the limit, replace the gear shim(s) at the drive and/or driven gear. To increase backlash, increase the thickness of the shim(s). To decrease backlash, decrease the thickness of the shim(s).

 \star Change the thickness a little at a time.

Recheck the backlash, and readjust as necessary.

NOTE

Olt is OK to pack two shims. Do not pack three or more shims.

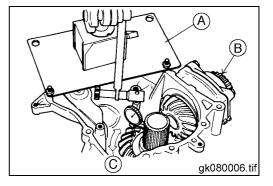
Front Bevel Gear Backlash (at drive gear tooth) 0.10 ~ 0.20 mm (0.0039 ~ 0.0079 in.)

Shims for Drive Gear

Thickness (mm)	Parts Number
0.15 (0.0059 in.)	92025-1688
0.5 (0.020 in.)	92025-1689
0.6 (0.024 in.)	92025-1690
0.7 (0.028 in.)	92025-1691
0.8 (0.031 in.)	92025-1692
0.9 (0.035 in.)	92025-1693
1.0 (0.039 in.)	92025-1694
1.1 (0.043 in.)	92025-1695
1.2 (0.047 in.)	92025-1696

Shims for Driven Gear

Shims for Driven Gear			
Parts Number			
92180-0227			
92180-0228			
92180-0229			
92180-0230			
92180-0231			
92180-0232			
92180-0233			
92180-0234			
92180-0235			



Front Bevel Gears

Tooth Contact Adjustment

- Clean any dirt and oil off the bevel gear teeth with a high -flash point solvent.
- Apply checking compound to 4 or 5 teeth on the driven gear.

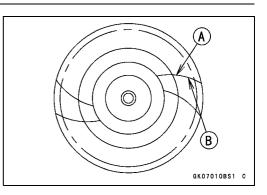
Convex Side Tooth [A] Concave Side Tooth [B]

NOTE

- ○Apply checking compound to the teeth in a thin, even coat with a fairly stiff paint brush. If painted too thickly, the exact tooth pattern may not appear.
- The checking compound must be smooth and firm, with the consistency of tooth paste.
- OSpecial compounds are available from automotive supply stores for the purpose of checking differential gear tooth patterns and contact. Use this for checking the bevel gears.
- Turn the driven gear for 3 or 4 revolutions back and forth, while creating a drag on the drive gear.
- Check the convex side pattern and concave side pattern of the bevel gear teeth. Good contact is achieved when the center line of the tooth contact pattern is visible in the inside of the lines shown in the figure below.
- ★ If the tooth contact pattern is incorrect, replace the shim(s) at the driven gear and shim(s) at the driven gear. Then erase the tooth contact patterns, and check them again. Also check the backlash every time the shims are replaced. Repeat the shim change procedure as necessary.

NOTE

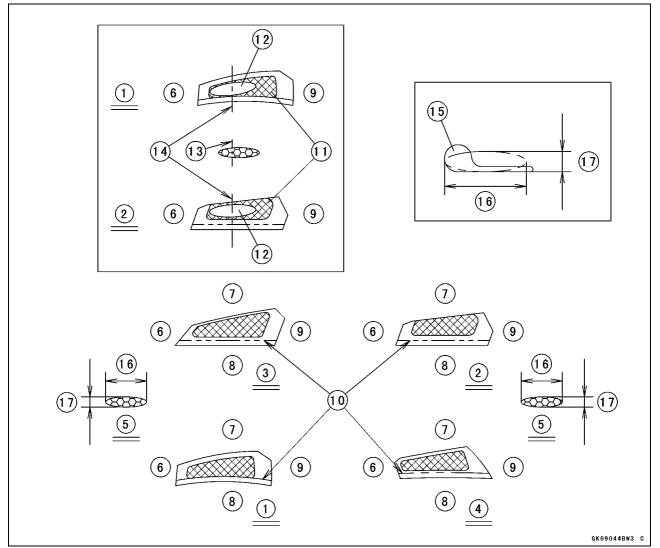
- Olf the backlash goes out of standard range after changing shims, correct the backlash before checking the tooth contact pattern.
- Olt is OK to pack two shims. Do not pack three or more shims.
- After checking the tooth contact pattern, check the pinion gear turns freely.



11-38 FINAL DRIVE

Front Bevel Gears

Correct Tooth Contact Pattern: No adjustment is required



- 1. Concave Side of Pinion Gear
- 2. Convex Side of Ring Gear
- 3. Convex Side of Pinion Gear
- 4. Concave Side of Ring Gear
- 5. Limit of Good Contact Pattern
- 6. Inside
- 7. Top
- 8. Bottom
- 9. Outside
- 10. Top of Engagement Tooth

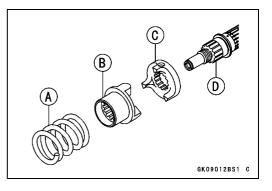
Bevel Gear Inspection

- Visually check the bevel gears for scoring, chipping, or other damage.
- ★Replace the bevel gears as a set if either gear is damaged.

- 11. Area of Good Contact Pattern
- 12. Aiming Position of Tooth Contact
- 13. Center Line of Tooth Contact Pattern
- 14. The center line of tooth contact pattern must come to inside of the line shown in the figure.
- 15. The extreme pattern like figure is improper.
- 16. 16 mm (0.63 in.)
- 17.3 mm (0.12 in.)

Front Bevel Gears

- Cam Damper Inspection
 Visually inspect the spring [A], cam follower [B], damper cam [C], and output shaft [D].
- ★Replace the damaged parts.



11-40 FINAL DRIVE

Bearing and Oil Seal

Ball or Needle Bearing Replacement

 Using the bearing driver set or the oil seal & bearing remover, remove the bearings.

Special Tools - Oil Seal & Bearing Remover: 57001-1058 Bearing Driver Set: 57001-1129

NOTE

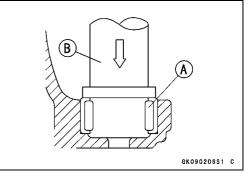
○In the absence of the above mentioned tools, satisfactory results may be obtained by heating the case to approximately 93°C (200°F) max., and tapping the bearing in or out.

NOTICE

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

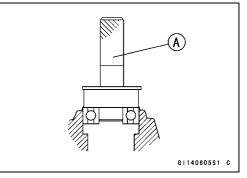
 Install a new needle bearing [A] with the marked side facing out until it bottoms out, using the bearing driver set [B]. This prevents bearing damage.

Special Tool - Bearing Driver Set: 57001-1129



• Using a press and the bearing driver set [A], install a new ball bearing until it stops at the bottom of the case.

Special Tool - Bearing Driver Set: 57001-1129

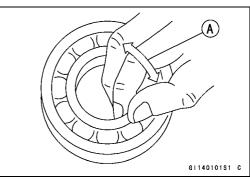


Ball Bearing Wear Inspection

NOTICE

Do not remove the bearings for inspection. Removal may damage them.

- Check the ball bearings.
- OSince 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.
- OSpin [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.



Bearing and Oil Seal

Tapered Roller Bearing Inspection

NOTICE

Do not remove the tapered roller bearing for inspection. Removal may damage them.

- Visually inspect the bearing in the front for abrasion, color change, or other damage.
- ★If there is any doubt as to the condition of the bearing, replace it.

Needle Bearing Inspection

NOTICE

Do not remove the needle bearing in the final gear case for inspection. Removal may damage them.

- Check the needle bearings in the damper cam and final gear cases.
- OThe rollers in the 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.

Brakes

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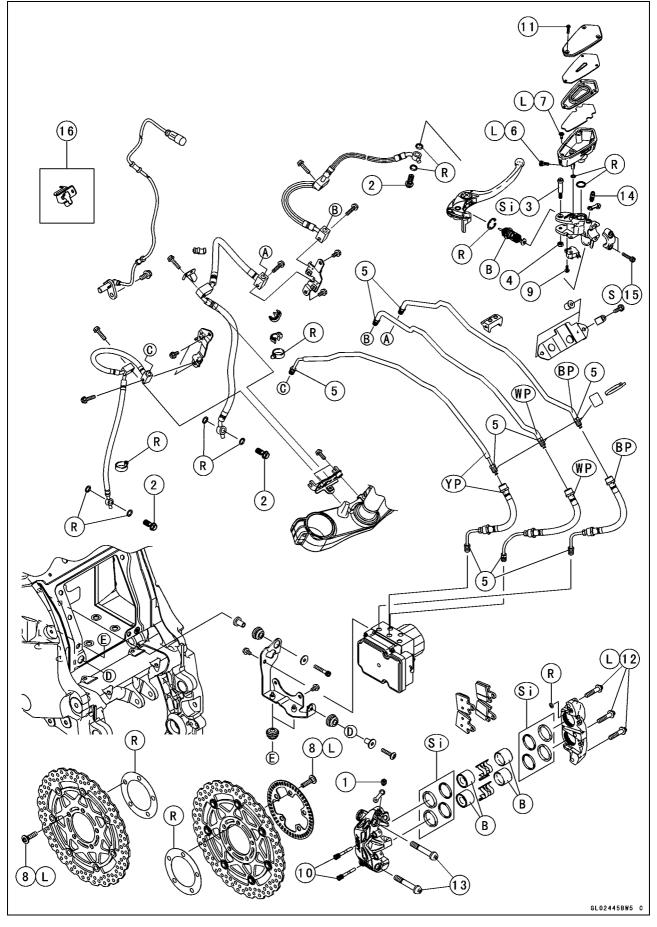
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12

12-2 BRAKES

Exploded View

ZG1400C Model



Exploded View

		Torque			_
No.	Fastener	N∙m	kgf∙m	ft·lb	Remarks
1	Bleed Valves	7.8	0.80	69 in·lb	
2	Brake Hose Banjo Bolts	25	2.5	18	
3	Brake Lever Pivot Bolt	1.0	0.10	8.9 in·lb	Si
4	Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
5	Brake Pipe Joint Nuts	18	1.8	13	
6	Brake Reservoir Bolt	7.8	0.80	69 in·lb	L
7	Brake Reservoir Screw	1.3	0.13	12 in·lb	L
8	Front Brake Disc Mounting Bolts	27	2.8	20	L
9	Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
10	Front Brake Pad Pins	17.2	1.8	13	
11	Front Brake Reservoir Cap Screws	1.5	0.15	13 in·lb	
12	Front Caliper Assembly Bolts	27	2.8	20	L
13	Front Caliper Mounting Bolts	34	3.5	25	
14	Front Master Cylinder Bleed Valve	7.8	0.80	69 in·lb	
15	Front Master Cylinder Clamp Bolts	11	1.1	97 in·lb	S

16. Bracket (AU, CA and US Models)

BP: Blue Paint Mark

WP: White Paint Mark

YP: Yellow Paint Mark

B: Apply brake fluid.

L: Apply a non-permanent locking agent.

R: Replacement Parts

S: Follow the specified tightening sequence.

Si: Apply silicone grease (ex. PBC grease).

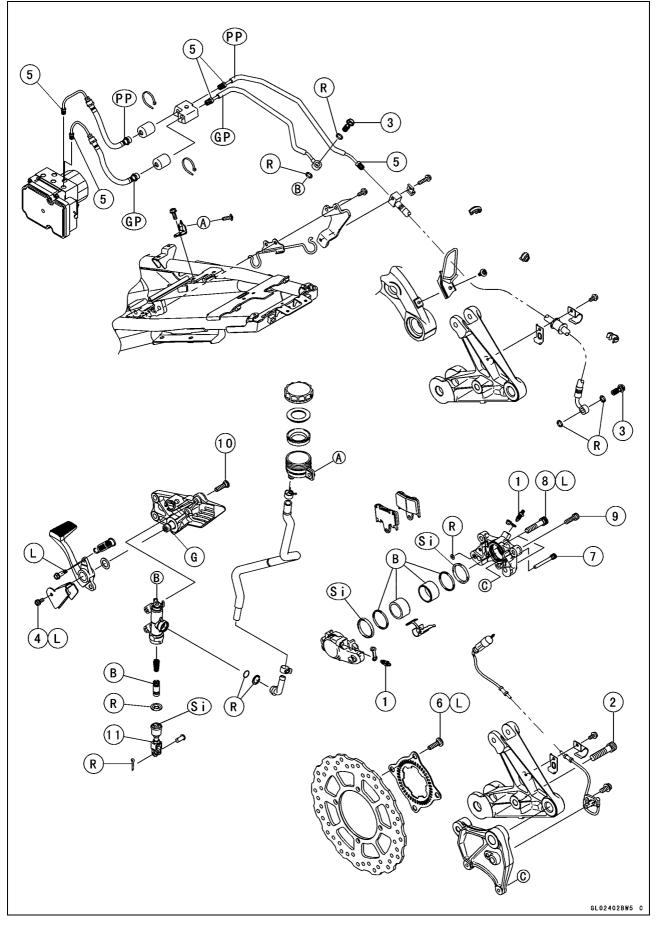
NOTE

OWhen disassembling the brake hose and pipe, disassemble them by the unit as shown in the exploded view.

12-4 BRAKES

Exploded View

ZG1400C Model



Exploded View

No.	Fastener	Torque			Demerika
NO.	Fastener	N∙m	kgf∙m	ft·lb	Remarks
1	Bleed Valves	7.8	0.80	69 in·lb	
2	Caliper Bracket Bolt	64	6.5	47	
3	Brake Hose Banjo Bolts	25	2.5	18	
4	Brake Pedal Bolt	8.8	0.90	78 in·lb	L
5	Brake Pipe Joint Nuts	18	1.8	13	
6	Rear Brake Disc Mounting Bolts	27	2.8	20	L
7	Rear Brake Pad Pin	17.2	1.8	13	
8	Rear Caliper Assembly Bolts	37	3.8	27	L
9	Rear Caliper Mounting Bolts	25	2.5	18	
10	Rear Master Cylinder Mounting Bolts	25	2.5	18	
11	Rear Master Cylinder Push Rod Locknut	17.2	1.8	13	

GP: Green Paint Mark

PP: Purple Paint Mark

B: Apply brake fluid.

G: Apply grease.

L: Apply a non-permanent locking agent.

R: Replacement Parts

Si: Apply silicone grease (ex. PBC grease).

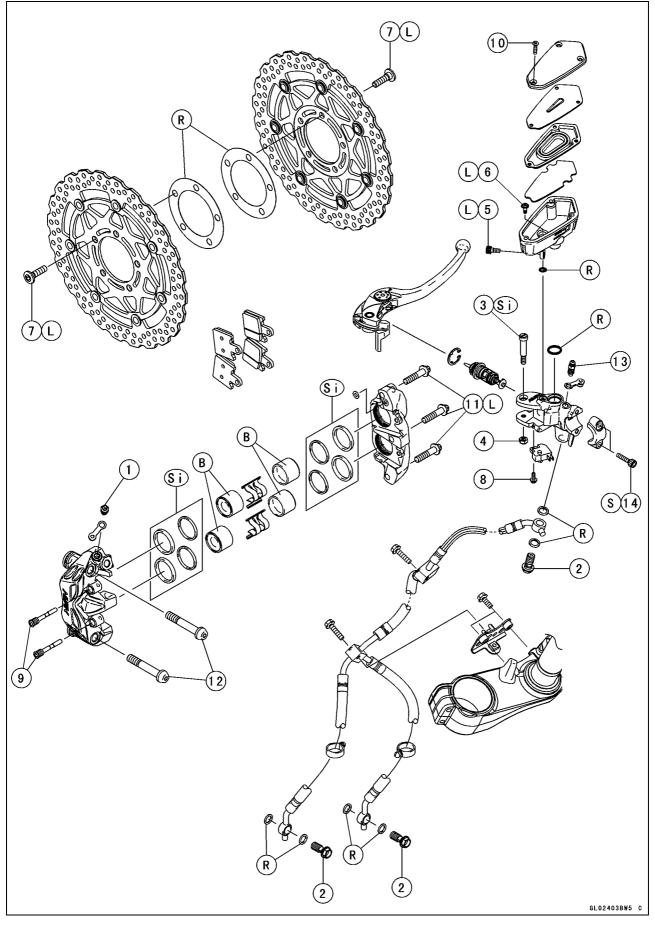
NOTE

OWhen disassembling the brake hose and pipe, disassemble them by the unit as shown in the exploded view.

12-6 BRAKES

Exploded View

ZG1400D Model



Exploded View

Na	Fastanan		Torque		
No.	Fastener	N∙m	kgf∙m	ft·lb	Remarks
1	Bleed Valves	7.8	0.80	69 in·lb	
2	Brake Hose Banjo Bolts	25	2.5	18	
3	Brake Lever Pivot Bolt	1.0	0.10	8.9 in·lb	Si
4	Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
5	Brake Reservoir Bolt	7.8	0.80	69 in·lb	L
6	Brake Reservoir Screw	1.3	0.13	12 in·lb	L
7	Front Brake Disc Mounting Bolts	27	2.8	20	L
8	Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
9	Front Brake Pad Pins	17.2	1.8	13	
10	Front Brake Reservoir Cap Screws	1.5	0.15	13 in·lb	
11	Front Caliper Assembly Bolts	27	2.8	20	L
12	Front Caliper Mounting Bolts	34	3.5	25	
13	Front Master Cylinder Bleed Valve	7.8	0.80	69 in·lb	
14	Front Master Cylinder Clamp Bolts	11	1.1	97 in·lb	S

B: Apply brake fluid.

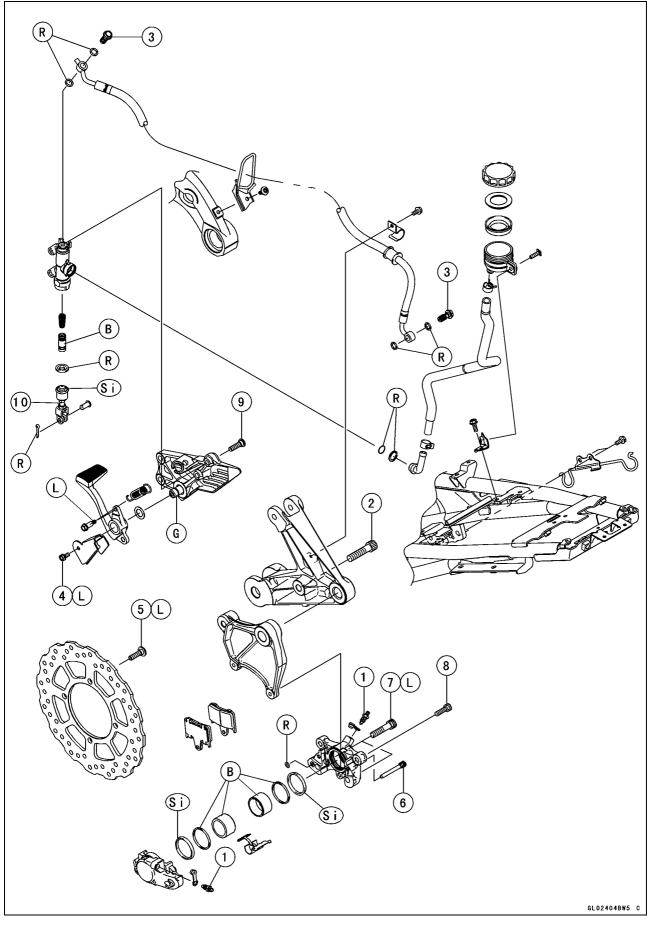
L: Apply a non-permanent locking agent. R: Replacement Parts

S: Follow the specified tightening sequence. Si: Apply silicone grease (ex. PBC grease).

12-8 BRAKES

Exploded View

ZG1400D Model



Exploded View

No	Fastanar	Torque			Domoriko
No.	Fastener	N∙m	kgf∙m	ft·lb	- Remarks
1	Bleed Valves	7.8	0.80	69 in·lb	
2	Caliper Bracket Bolt	64	6.5	47	
3	Brake Hose Banjo Bolts	25	2.5	18	
4	Brake Pedal Bolt	8.8	0.90	78 in·lb	L
5	Rear Brake Disc Mounting Bolts	27	2.8	20	L
6	Rear Brake Pad Pin	17.2	1.8	13	
7	Rear Caliper Assembly Bolts	37	3.8	27	L
8	Rear Caliper Mounting Bolts	25	2.5	18	
9	Rear Master Cylinder Mounting Bolts	25	2.5	18	
10	Rear Master Cylinder Push Rod Locknut	17.2	1.8	13	

B: Apply brake fluid.

G: Apply grease. L: Apply a non-permanent locking agent.

R: Replacement Parts

Si: Apply silicone grease (ex. PBC grease).

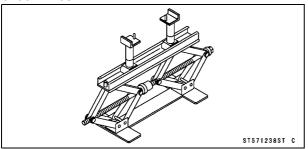
12-10 BRAKES

Specifications

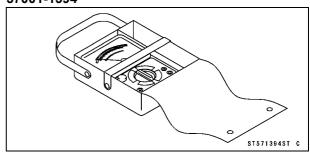
ltem	Standard	Service Limit
Brake Lever, Brake Pedal		
Brake Lever Position	6-way adjustable (to suit rider)	
Brake Lever Free Play	Non-adjustable	
Pedal Free Play	Non-adjustable	
Pedal Position	About 35 mm (1.4 in.) below footpeg top	
Brake Pads		
Lining Thickness:		
Front	4.0 mm (0.16 in.)	1 mm (0.04 in.)
Rear	5.0 mm (0.20 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	5.3 ~ 5.7 mm (0.21 ~ 0.22 in.)	5.0 mm (0.20 in.)
Runout	TIR 0.15 mm (0.006 in.) or less	TIR 0.3 mm (0.01 in.)
Brake Fluid		
Grade	DOT4	
K-ACT ABS (Equipped Models)		
Wheel Rotation Air Gap:		
Front	1.0 mm (0.039 in.)	
Rear	1.0 mm (0.039 in.)	

Special Tools

Jack: 57001-1238



Hand Tester: 57001-1394



12-12 BRAKES

Brake Lever, Brake Pedal

Brake Lever Position Adjustment

The brake lever adjuster has 6 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.
 OThe distance from the grip to the lever is minimum at num-
- ber 6 and maximum at number 1.

Brake Pedal Position Inspection

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

Pedal Position Standard: About 35 mm (1.4 in.) [C] below top of footpeg

★ If it is incorrect, adjust the brake pedal position.

Brake Pedal Position Adjustment

NOTE

OUsually it is not necessary to adjust the pedal position, but always adjust it when push rod locknut has been loosened

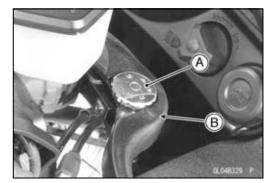
• Remove:

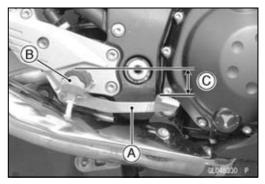
Rear Master Cylinder Mounting Bolts [A] Right Footpeg Bracket Bolts [B]

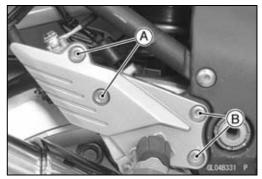
• Remove:

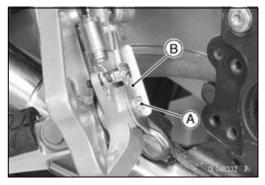
Brake Pedal Bolt [A] Guard [B]

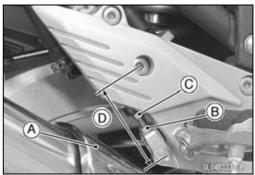
- Install the brake pedal assembly temporarily.
- Remove:
 - Exhaust Pipe Cover [A] (see Exhaust Pipe Cover Removal in the Engine Top chapter)
- Loosen the locknut [B] and turn the push rod with the hex head [C] to achieve the correct pedal position.
- ★ If the length [D] shown is 80 ±1 mm (3.1 ±0.04 in.), the pedal position will be within the standard range.
 Tighten:
 - Torque Rear Master Cylinder Push Rod Locknut: 17.2 N·m (1.8 kgf·m, 13 ft·lb)











Brake Lever, Brake Pedal

- Check the brake light switch operation (see Brake Light Switch Operation Inspection in the Periodic Maintenance chapter).
- Remove the brake pedal assembly, and install the removed parts.

OApply a non-permanent locking agent to the threads of the brake pedal bolt.

OTighten:

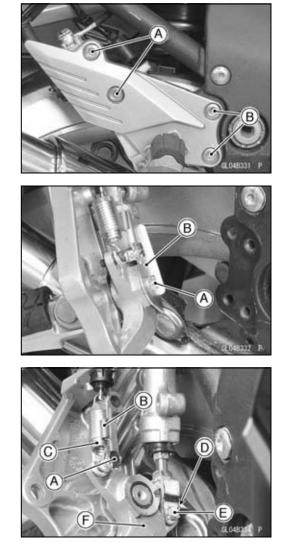
Torque - Brake Pedal Bolt: 8.8 N·m (0.90 kgf·m, 78 in·lb) Exhaust Pipe Cover Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Brake Pedal Removal

 Remove: Rear Master Cylinder Mounting Bolts [A] Right Footpeg Bracket Bolts [B]

• Remove: Brake Pedal Bolt [A] Guard [B]

 Remove: Hook Bolt [A] Rear Brake Light Switch Spring [B] Return Spring [C] Cotter Pin [D] Joint Pin [E] Brake Pedal [F]

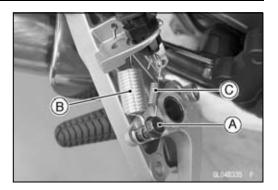


12-14 BRAKES

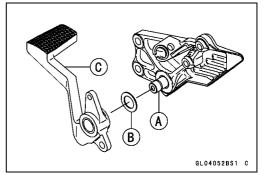
Brake Lever, Brake Pedal

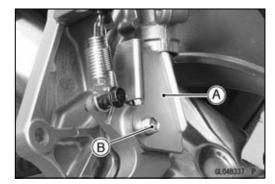
Brake Pedal Installation

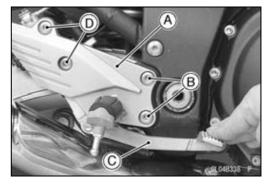
- Apply a non-permanent locking agent to the hook bolt [A] and tighten it.
- Hook the lower ends of the return spring [B] and rear brake light switch spring [C] as shown in the figure.



- Apply grease to the pivot shaft [A].
- Install: Washer [B] Brake Pedal [C]







- Replace the cotter pin with a new one.
- Insert the cotter pin [A] and bend the pin ends [B].

- Install:
 - Guard [A]
- Apply a non-permanent locking agent to the threads of the brake pedal bolt [B].
- Tighten:

Torque - Brake Pedal Bolt: 8.8 N·m (0.90 kgf·m, 78 in·lb)

- Install the right footpeg bracket [A].
 - Torque Front Footpeg Bracket Bolts [B]: 25 N·m (2.5 kgf·m, 18 ft·lb)
- ODepress the brake pedal [C] and then align the bolts holes of the master cylinder.

Torque - Rear Master Cylinder Mounting Bolts [D]: 25 N·m (2.5 kgf·m, 18 ft·lb)

• Check the brake pedal position (see Brake Pedal Position Inspection).

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.

NOTICE

Do not loosen the caliper assembly bolts. 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 hoses [D] from the caliper (see Brake Hose Removal/Installation).

NOTICE

Immediately wash away any brake fluid that spills.

NOTE

Olf the caliper is to be disassembled after removal and if compressed air is not available, disassemble the caliper before the brake hose is removed (see Front Caliper Disassembly).

Rear Caliper Removal

- For ABS equipped models, remove the bolts [A] and wheel rotation sensor [B].
- Loosen the banjo bolt [C] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [D], and detach the caliper [E] from the disc.

NOTICE

Do not loosen the caliper assembly bolts. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper assembly bolts will cause brake fluid leakage.

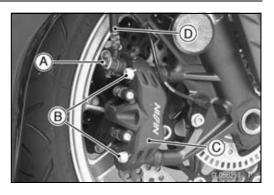
• Unscrew the banjo bolt and remove the brake hose [F] from the caliper (see Brake Hose Removal/Installation).

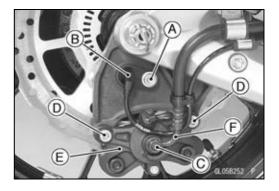
NOTICE

Immediately wash away any brake fluid that spills.

NOTE

○If the caliper is to be disassembled after removal and if compressed air is not available, disassemble the caliper before the brake hose is removed (see Rear Caliper Disassembly).





Caliper Installation

- Install the caliper and brake hose lower end.
- Replace the washers on each side of hose fitting with new ones.
- Tighten:

Torque - Caliper Mounting Bolts

Front: 34 N·m (3.5 kgf·m, 25 ft·lb) Rear: 25 N·m (2.5 kgf·m, 18 ft·lb) Brake Hose Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Check the fluid level in the brake reservoirs.
- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

WARNING

After servicing, it takes several applications of the brake lever or pedal before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the motorcycle until a firm brake lever or pedal is obtained by pumping the lever or pedal until the pads are against the disc.

Front Caliper Disassembly

• Refer to the Caliper Rubber Parts Replacement in the Periodic Maintenance chapter.

Front Caliper Assembly

• Refer to the Caliper Rubber Parts Replacement in the Periodic Maintenance chapter.

Rear Caliper Disassembly

• Refer to the Caliper Rubber Parts Replacement in the Periodic Maintenance chapter.

Rear Caliper Assembly

 Refer to the Caliper Rubber Parts Replacement in the Periodic Maintenance chapter.

Caliper Fluid Seal Damage Inspection

The fluid seal (piston seal) [A] is placed around the piston to maintain clearance between the pad and the disc. If the seal is in a poor condition, it could lead the pad to wear excessively or the brake to drag, which may cause the temperature of the discs or the brake fluid to increase.

- Replace the fluid seal if it exhibits any of the conditions listed below.
- OBrake fluid leakage around the pad.
- OBrakes overheat.

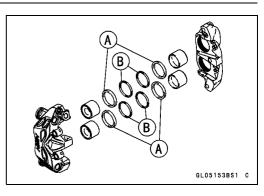
OConsiderable difference in inner and outer pad wear. OSeal and piston are stuck together.

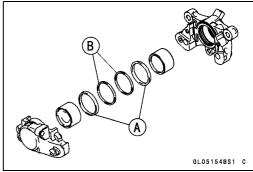
★ If the fluid seal is replaced, replace the dust seal [B] as well. Also, replace all seals every other time the pads are changed.

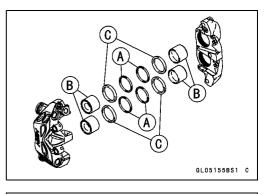
Caliper Dust Seal Damage Inspection

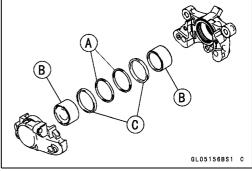
- Check that the dust seals [A] are not cracked, worn, swollen, or otherwise damaged.
- ★ If they show any damage, replace the dust seals with new ones.

Pistons [B] Fluid Seals [C]



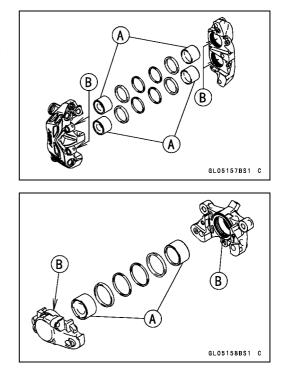






Caliper Piston and Cylinder Damage Inspection

Visually inspect the pistons [A] and cylinder surfaces [B].
 Replace the caliper if the cylinder and piston are badly scores or rusty.



Brake Pads

Front Brake Pad Removal

• Unscrew the pad pins [A].

 Remove: Pad Pins [A] Pad Springs [B] Brake Pads [C]

Front Brake Pad Installation

- Push the caliper pistons in by hand as far as they will go.
- Install the outside pad [A] and insert the pad pin [B] as shown in the figure.
- Insert the inside pad [C].

• Set:

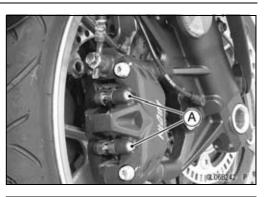
Inside Pad [A] Pad Spring [B]

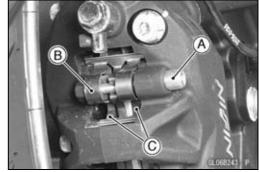
OPushing the pin holder [C] to hole of the pad and insert the pad pin.

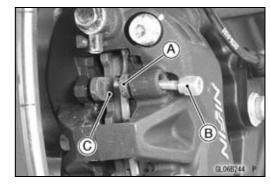
Torque - Front Brake Pad Pins: 17.2 N·m (1.8 kgf·m, 13 ft·lb)

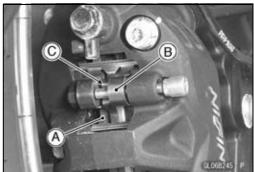
A WARNING

After servicing, it takes several applications of the brake lever before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the motorcycle until a firm brake lever is obtained by pumping the lever until the pads are against the disc.









Brake Pads

Rear Brake Pad Removal

 Remove: Pad Pin [A] Pad Spring [B] Brake Pads [C]

Rear Brake Pad Installation

- Push the caliper pistons in by hand as far as they will go.
- Install the outside pad [A] and insert the pad pin [B] as shown in the figure.
- Set:

Inside Pad [C] Pad Spring [D]

- Pushing the pin holder [A] to hole of the pad and insert the pad pin [B].
- Tighten the pad pin.

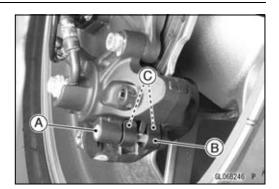
Torque - Rear Brake Pad Pin: 17.2 N·m (1.8 kgf·m, 13 ft·lb)

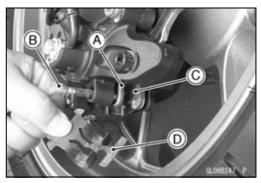
WARNING

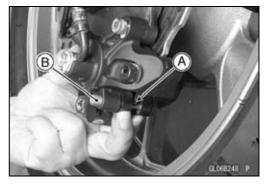
After servicing, it takes several applications of the brake pedal before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the motorcycle until a firm brake pedal is obtained by pumping the pedal until the pads are against the disc.

Brake Pad Wear Inspection

• Refer to the Brake Pad Wear Inspection in the Periodic Maintenance chapter.







Master Cylinder

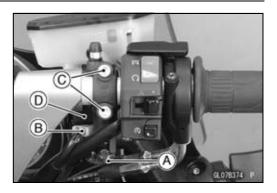
Front Master Cylinder Removal

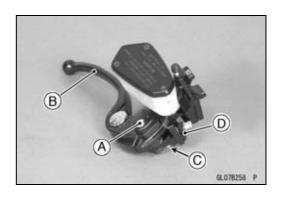
- Remove the banjo bolt [A] to disconnect the brake hose from the master cylinder (see Brake Hose Removal/In-stallation).
- Disconnect the front brake light switch connectors [B].
- Unscrew the clamp bolts [C], and take off the master cylinder [D] as an assembly with the reservoir, brake lever, and brake switch installed.

NOTICE

Immediately wash away any brake fluid that spills.

 Remove: Brake Lever Pivot Bolt [A] and Nut Brake Lever [B] Screw [C] Front Brake Light Switch [D]





Front Master Cylinder Installation

- Install:
 - Brake Lever
- Apply silicone grease to the brake lever pivot bolt.
- Pushing the side of the brake light switch [A] and tighten the front brake light switch screw.
 - Torque Brake Lever Pivot Bolt: 1.0 N·m (0.10 kgf·m, 8.9 in·lb)
 - Brake Lever Pivot Bolt Locknut: 5.9 N·m (0.60 kgf·m, 52 in·lb)

```
Front Brake Light Switch Screw: 1.2 N·m (0.12 kgf·m, 11 in·lb)
```

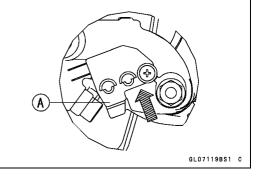
- Set the front master cylinder to match its mating surface [A] to the punch mark [B] of the handlebar.
- The master cylinder clamp must be installed with the arrow mark [C] upward.
- Tighten the upper clamp bolt first, and then the lower clamp bolt.

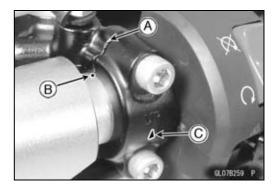
Torque - Front Master Cylinder Clamp Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)

- 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 Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.





12-22 BRAKES

Master Cylinder

Rear Master Cylinder Removal

- Unscrew the brake hose banjo bolt [A] to disconnect the brake hose [B] from the rear master cylinder.
- Remove: Rear Master Cylinder Mounting Bolts [C] Right Footpeg Bracket Bolts [D] Right Footpeg Bracket [E]
- Remove: Brake Pedal Bolt [A] Guard [B]

• Remove: Cotter Pin [A] Joint Pin [B]

- Slide out the clamp [A].
- Pull off the reservoir hose lower end [B], and drain the brake fluid into a container.

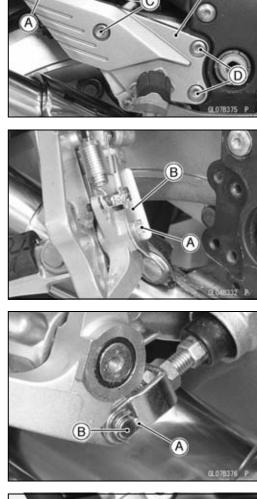
Rear Master Cylinder Installation

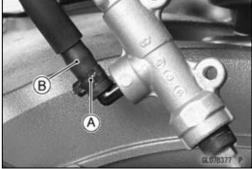
- Replace the cotter pin with a new one.
- Install the removed parts (see Brake Pedal Installation).
- Replace the washers that are on each side of hose fitting with new ones.
- Tighten:

Torque - 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 Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.





Master Cylinder

Front Master Cylinder Disassembly

• Refer to the Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter.

Rear Master Cylinder Disassembly

• Refer to the Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter.

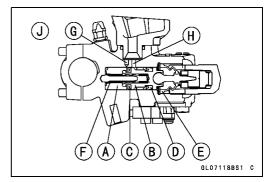
Master Cylinder Assembly

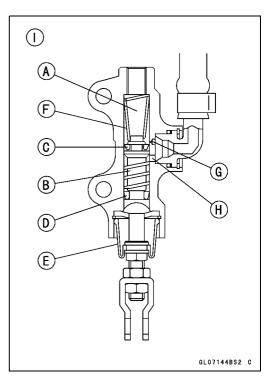
• Refer to the Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter.

Master Cylinder Inspection (Visual Inspection)

- Remove the master cylinders (see Front/Rear Master Cylinder Removal).
- Disassemble the front and rear master cylinders (see Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter).
- 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 cup [C] and secondary cup [D].
- ★ If a cup is worn, damaged softened (rotted), or swollen, the piston assembly should be replaced to renew the cups.
- ★ If fluid leakage is noted at the brake lever, the piston assembly should be replaced to renew the cups. Front Master Cylinder [J]
- Check the dust covers [E] for damage.
- \star If they are damaged, replace them.
- Check the piston return spring [F] for any damage.
- \star If the springs are damaged, replace them.
- Check that relief port [G] and supply port [H] are not plugged.
- ★ If the relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.

Rear Master Cylinder [I]





12-24 BRAKES

Brake Disc

Brake Disc Removal

- Remove the wheels (see Front/Rear Wheel Removal in the Wheels/Tires chapter).
- Unscrew the mounting bolts, and take off the disc.

ORemove the sensor rotor (K-ACT ABS equipped models).

Brake Disc Installation

- Install the brake disc on the wheel so that the marked side [A] faces out.
- OInstall the sensor rotor on the brake disc so that the marked side [B] faces out (K-ACT ABS equipped models).
- Apply a non-permanent locking agent to the threads of the rear brake disc mounting bolts [C].
- 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. Measuring Area [B]

Brake Discs Thickness

Standard:

Front	4.8 ~ 5.2 mm (0.19 ~ 0.20 in.)
Rear	5.3 ~ 5.7 mm (0.21 ~ 0.22 in.)
Service Limit:	
Front	4.5 mm (0.18 in.)
Rear	5.0 mm (0.20 in.)

Brake Disc Warp Inspection

• Raise the front/rear wheel off the ground.

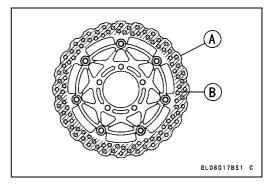
Special Tools - Jack: 57001-1238

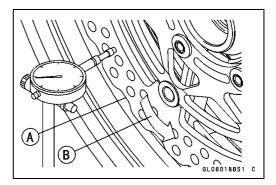
- OFor front disc inspection, turn the handlebar fully to one side.
- Set up a dial gauge against the disc [A] as shown and measure disc runout, while turning [B] the wheel by hand.

 \star If runout exceeds the service limit, replace the disc.

Disc Runout	
Standard:	TIR 0.15 mm (0.006 in.) or less
Service Limit:	TIR 0.3 mm (0.01 in.)







Brake Fluid

Brake Fluid Level Inspection

• Refer to the Brake Fluid Level Inspection in the Periodic Maintenance chapter.

Brake Fluid Change

• Refer to the Brake Fluid Change in the Periodic Maintenance chapter.

Brake Line Bleeding

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.

A WARNING

Air in the brake lines diminish braking performance and can cause an accident resulting in injury or death. If the brake lever or pedal has a soft or "spongy" feeling mushy when it is applied, there might be air in the brake lines or the brake may be defective. Do not operate the vehicle and service the brake system immediately.

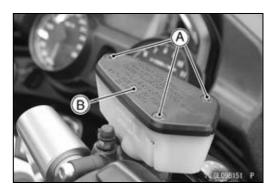
NOTE

 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:

Screws [A] Front Brake Reservoir Cap [B] Diaphragm Plate Diaphragm

- Fill the reservoir with fresh brake fluid to the upper level line in the reservoir.
- Slowly pump the brake lever several times until no air bubbles can be seen rising up through the fluid from the holes [A] at the bottom of the reservoir.
- OBleed the air completely from the master cylinder by this operation.





12-26 BRAKES

Brake Fluid

- Remove the rubber cap from the bleed valve [A] on the front master cylinder.
- Attach a clear plastic hose [B] to the bleed valve, and run the other end of the hose into a container.

• Bleed the brake line and the master cylinder.

ORepeat 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].

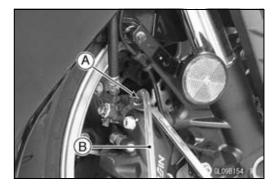
NOTE

○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.

- Remove the clear plastic hose.
- Tighten the bleed valve, and install the rubber cap.
 - Torque Front Master Cylinder Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)
- 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.







Brake Fluid

• Bleed the brake line and the caliper.

ORepeat 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.
- OFront Brake: First bleeding the right caliper then repeat the above steps for the left caliper.
- Remove the clear plastic hose.
- Tighten the bleed valve, and install the rubber cap.

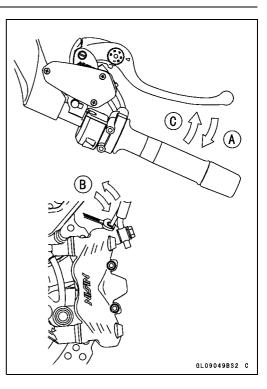
Torque - Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)

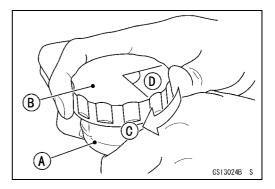
Install:

Diaphragm Diaphragm Plate Front Brake Reservoir Cap Screws

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

- Follow the procedure below to install the rear brake fluid reservoir cap correctly.
- OFirst, tighten the brake fluid reservoir cap [B] clockwise [C] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body, then tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir body [A].
- Check the fluid level (see Brake Fluid Level Inspection in the Periodic Maintenance chapter).
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.





Brake Fluid

WARNING

When working with the disc brake, observe the precautions listed below.

- 1. Never reuse old brake fluid.
- 2. Do not use fluid from a container that has been left unsealed or that has been open for a long time.
- 3. Do not mix two types and brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.
- 4. Don't leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid.
- 5. Don't change the fluid in the rain or when a strong wind is blowing.
- 6. Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning of the 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.
- If any of the brake line fittings or the bleed valve is opened at any time, the AIR MUST BE BLED FROM THE BRAKE LINE.

Brake Hose

Brake Hose and Pipe Removal/Installation

• Refer to the Brake Hose and Pipe Replacement in the Periodic Maintenance chapter.

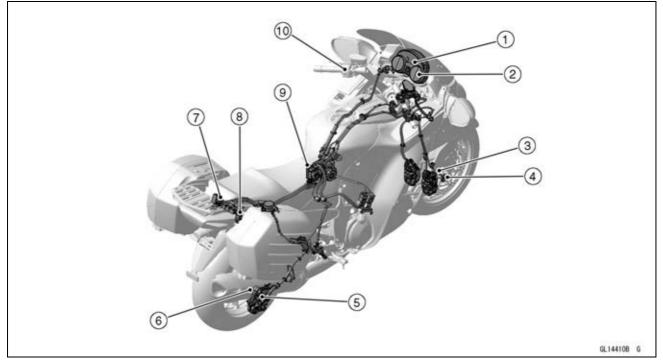
Brake Hose and Pipe Inspection

• Refer to the Brake Hose and Pipe Damage and Installation Condition Inspection in the Periodic Maintenance chapter.

12-30 BRAKES

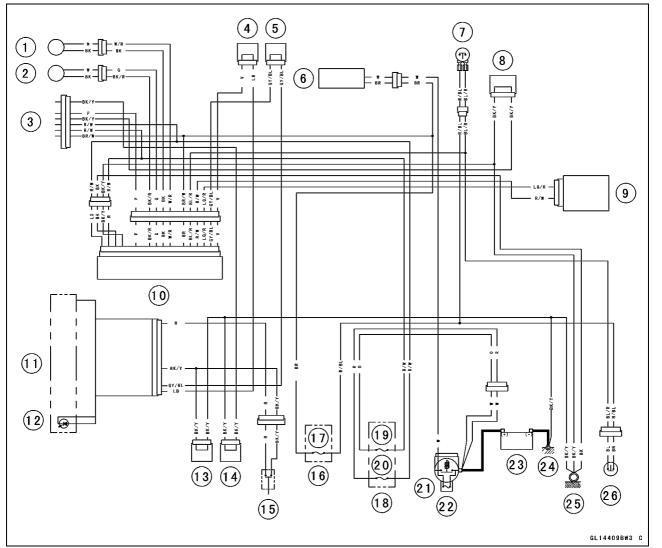
K-ACT ABS (Equipped Models)

Parts Location



- 1. K-ACT ABS Mode Indication
- 2. K-ACT ABS Indicator Light (LED)
- 3. Front Wheel Rotation Sensor Rotor
- 4. Front Wheel Rotation Sensor
- 5. Rear Wheel Rotation Sensor
- 6. Rear Wheel Rotation Sensor Rotor
- 7. K-ACT ABS Fuse Box
- 8. K-ACT ABS Kawasaki Diagnostic System Connector
- 9. K-ACT ABS Hydraulic Unit
- 10. K-ACT ABS Button

K-ACT ABS System Circuit



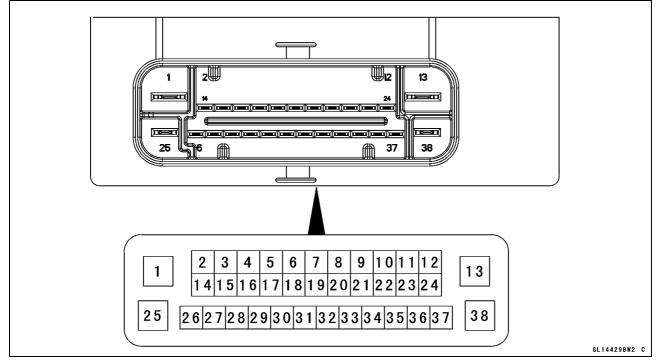
- 1. Rear Wheel Rotation Sensor
- 2. Front Wheel Rotation Sensor
- 3. K-ACT ABS Kawasaki Self-Diagnosis System Connector
- 4. Joint Connector 4
- 5. Joint Connector 5
- 6. Steering Lock Unit
- 7. Front Brake Light Switch
- 8. Joint Connector 11
- 9. ECU
- 10. K-ACT ABS Hydraulic Unit
- 11. Meter Unit
- 12. K-ACT ABS Indicator Light (LED)
- 13. Joint Connector 8

- 14. Joint Connector 9
- 15. K-ACT ABS Button
- 16. Fuse Box 1
- 17. Taillight Fuse 10 A
- 18. Fuse Box 2
- 19. K-ACT ABS Motor Relay Fuse 30 A
- 20. K-ACT ABS Solenoid Valve Relay Fuse 20 A
- 21. Starter Relay
- 22. Main Fuse 30 A
- 23. Battery 12 V 14 Ah
- 24. Frame Ground
- 25. Frame Ground
- 26. Rear Brake Light Switch

12-32 BRAKES

K-ACT ABS (Equipped Models)

Terminal Names



- 1. Power Supply to K-ACT ABS Motor Relay:
- R 2. Unused
- 3. Unused
- 4. Unused
- 5. Unused
- 6. Unused
- 7. Unused
- 8. Unused
- 9. Unused
- 10. Unused
- 11. Unused
- 12. Unused
- 13. Ground to Motor: BK
- 14. CAN Communication Line (Low): V
- 15. Unused
- 16. Unused
- 17. Unused
- 18. Rear Wheel Rotation Sensor Signal: BK
- 19. Power Supply to Front Wheel Rotation Sensor: G
- 20. Unused

- 21. Unused
- 22. Unused
- 23. Unused
- 24. Unused
- 25. Power Supply to K-ACT ABS Solenoid Valve Relay: LG
- 26. CAN Communication Line (High): GY/BL
- 27. Unused
- 28. Power Supply: BR
- 29. Unused
- 30. Front and Rear Brake Light Switch: BL/R
- 31. Power Supply to Rear Wheel Rotation Sensor: W/R
- 32. Front Wheel Rotation Sensor Signal: BK/R
- 33. Unused
- 34. Unused
- 35. Rear Wheel Rotation Sensor Output: LG/R
- 36. K-ACT ABS Kawasaki Diagnostic System Terminal: P
- 37. Front Wheel Rotation Sensor Output: R/W
- 38. Ground to ECU: BK/Y

K-ACT ABS Servicing Precautions

There are a number of important precautions that should be followed servicing the K-ACT ABS.

- OK-ACT ABS does not function if the battery is discharged. When driving with an insufficiently charged battery, K-ACT ABS may not function. Keep the battery in good condition.
- ○This K-ACT ABS is designed to be used with a 12 V sealed battery as its power source. Do not use any other battery except for a 12 V sealed battery as a power source.
- ODo not reverse the battery cable connections. This will damage the K-ACT ABS hydraulic unit.
- ○To prevent damage to the K-ACT ABS parts, do not disconnect the battery cables or any other electrical connections when the ignition switch is ON or while the engine is running.
- Take care not to short the leads that are directly connected to the battery positive (+) terminal to the chassis ground.
- ODo not turn the ignition switch ON while any of the K-ACT ABS electrical connectors are disconnected. The K-ACT ABS hydraulic unit memorizes service codes.
- ODo not spray water on the electrical parts, K-ACT ABS parts, connectors, leads and wiring.
- Olf a transceiver is installed on the motorcycle, make sure that the operation of the K-ACT ABS is not influenced by electric wave radiated from the antenna. Locate the antenna as far as possible away from the K-ACT ABS hydraulic unit.
- OWhenever the K-ACT ABS electrical connections are to be disconnected, first turn off the ignition switch.
- OThe K-ACT ABS 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.
- OThe K-ACT ABS parts cannot be disassembled. Even if a fault is found, do not try to disassemble and repair the K-ACT ABS parts, replace it.
- OThe K-ACT ABS has many brake lines, pipes, and leads. And the K-ACT ABS cannot detect problems with the conventional braking system (brake disc wear, unevenly worn brake pad, and other mechanical faults). To prevent trouble, check the brake lines and pipes for correct routing and connection, the wiring for correct routing, and the brakes for proper braking power. Be sure to check for fluid leakage, and bleed the brake line thoroughly.

12-34 BRAKES

K-ACT ABS (Equipped Models)

OConnect the K-ACT ABS Kawasaki Diagnostic System connector cover to the original position when the cover is disconnected.

K-ACT ABS Kawasaki Diagnostic System Connector Color (Main Harness Side): Black

KDS Connector Color (Main Harness Side): White

NOTICE

When the KDS connector cover with a lead is connected to the K-ACT ABS Kawasaki Diagnostic System connector by mistake, the fuse of the K-ACT ABS blows and its function will not work.

A WARNING

Air in the brake lines diminish braking performance and can cause an accident resulting in injury or death. If any of the brake line fittings, including the K-ACT ABS hydraulic unit joint nuts, or the bleed valve is opened at any time, the air must be bled completely from the brake line. If the brake lever has a soft or "spongy" feeling mushy when it is applied, there might be air in the brake lines or the brake may be defective. Do not operate the vehicle and service the brake system immediately.

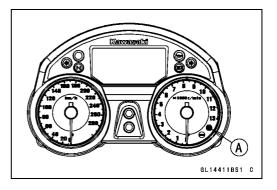
NOTICE

Do not ride the motorcycle with air in the brake line, or the K-ACT ABS could malfunction.

OThe K-ACT ABS indicator light (LED) [A] may light if the tire pressure is incorrect, a non-recommended tire is installed, or the wheel is deformed. If the indicator light lights, remedy the problem and clear the service code.

WARNING

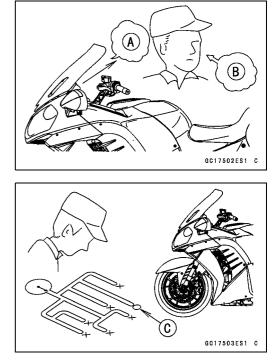
Use of non-recommended tires may cause malfunctioning of K-ACT ABS and can lead to extended braking distance. The rider could have an accident as a result. Always use recommended standard tires for this motorcycle.



- OThe K-ACT ABS indicator light (LED) may come on if the engine is run with the motorcycle on its stand and the transmission in gear. If the indicator light comes on, just turn the steering lock unit to OFF, then clear service code "B 42" which indicates a "Faulty front wheel rotation sensor".
- OWhen the K-ACT ABS operates, the K-ACT ABS makes noise and the rider feels the reaction force on the brake lever and brake pedal. This is a normal condition. It informs the rider that the K-ACT ABS is operating normally.
- Oservice codes detected once by the K-ACT ABS hydraulic unit will be memorized in the K-ACT ABS hydraulic unit. Therefore, after maintenance work is finished, be sure to erase the service codes. Do not erase the service codes during troubleshooting. Wait until all the checks and repair work are finished to prevent duplication of previous service codes and unnecessary maintenance work.
- OBefore delivering the motorcycle to the customer, be sure to erase any service codes which might be stored in the K-ACT ABS hydraulic unit. A fully charged battery is a must for conducting reliable self-diagnosis. Test run the motorcycle at a speed of more than 20 km/h (12 mph) to see that the K-ACT ABS indicator light (LED) does not come on. Finally, test run the motorcycle at a speed of more than 30 km/h (20 mph) and brake suddenly to see that the motorcycle stops without loss of steering control and the K-ACT ABS operates normally (The reaction force generated is felt in the brake lever and pedal.). This completes the final inspection.

K-ACT ABS Troubleshooting Outline

When an abnormality in the system occurs, the K-ACT ABS indicator light (LED) lights up and the warning message and warning symbol are displayed alternately on the LCD (Liquid Crystal Display) to alert the rider. In addition, the nature of the fault is stored in the memory of the K-ACT ABS hydraulic unit and when in the self-diagnosis mode, the service code [A] is displayed on the LCD by the "B" and the number of two digits. The service codes stored in memory are not erased until the mode has been changed to the fault erase mode after the fault has been corrected. Therefore, after correcting the problem, always erase the service codes and then run the self-diagnosis program to confirm normal signal output. When, due to a malfunction, the K-ACT ABS indicator light (LED) remains lit, get a thorough understanding of the background before starting the repair work. Ask the rider about the conditions [B] under which the problem occurred and try to determine the cause [C]. Do not rely solely on the K-ACT ABS self-diagnosis function, use common sense; check the brakes for proper braking power, and brake fluid level, search for leaks, etc.



12-36 BRAKES

K-ACT ABS (Equipped Models)

Even when the K-ACT ABS is operating normally, the K-ACT ABS indicator light (LED) may light up under the conditions listed below. Turn the ignition switch OFF to stop the indicator light. If the motorcycle runs without erasing the service code, the light may light up again.

OAfter continuous riding on a rough road.

- OWhen the engine is started with the stand raised and the transmission engaged, and the rear wheel turns.
- OWhen accelerating so abruptly that the front wheel leaves the ground.
- OWhen the K-ACT ABS has been subjected to strong electrical interference.
- OWhen tire pressure is abnormal. Adjust tire pressure.
- OWhen a tire different in size from the standard size is being used. Replace with standard size.
- OWhen the wheel is deformed. Replace the wheel.

Much of the K-ACT ABS troubleshooting work consists of confirming continuity of the wiring. The K-ACT ABS parts are assembled and adjusted by the manufacturer, so there is no need to disassemble or repair them. Replace the K -ACT ABS hydraulic unit.

The basic troubleshooting procedures are listed below.

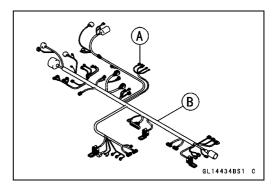
- Carry out pre-diagnosis inspections as a preliminary inspection.
- Determine the fault using the self-diagnosis function.
- Check wiring and connections from the K-ACT ABS hydraulic unit connector to the suspected faulty K-ACT ABS part, using the hand tester.

Special Tool - Hand Tester: 57001-1394

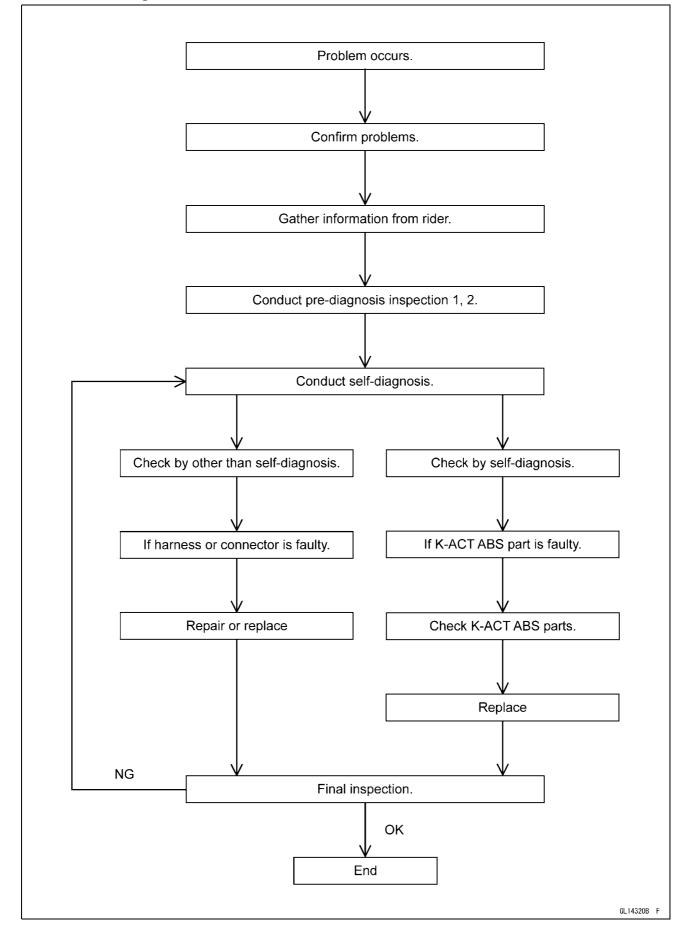
- Visually inspect the wiring for signs of burning or fraying.
- \star If any wiring is poor, replace the damaged wiring.
- Pull each connector [A] apart and inspect it for corrosion, dirt and damage.
- ★ If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.
- Check the wiring for continuity.
- OUse the wiring diagram to find the ends of the lead which is suspected of being a problem.
- OConnect the hand tester between the ends of the leads.

Special Tool - Hand Tester: 57001-1394

- OSet the tester to the × 1 Ω range, and read the tester.
- ★ If the tester does not read 0 Ω , the lead is defective. Replace the main harness [B] if necessary.
- Narrow down suspicious parts and close in on the faulty K-ACT ABS part by repeating the continuity tests.
- ★ If no abnormality is found in the wiring or connectors, the K-ACT ABS parts are the next likely suspects. Check each part one by one.
- ★If an abnormality is found, replace the affected K-ACT ABS part.



K-ACT ABS Diagnosis Flow Chart



12-38 BRAKES

K-ACT ABS (Equipped Models)

Inquiries to Rider

OEach rider reacts to problems in different ways, so it is important to confirm what kind of condition the rider is dissatisfied with.

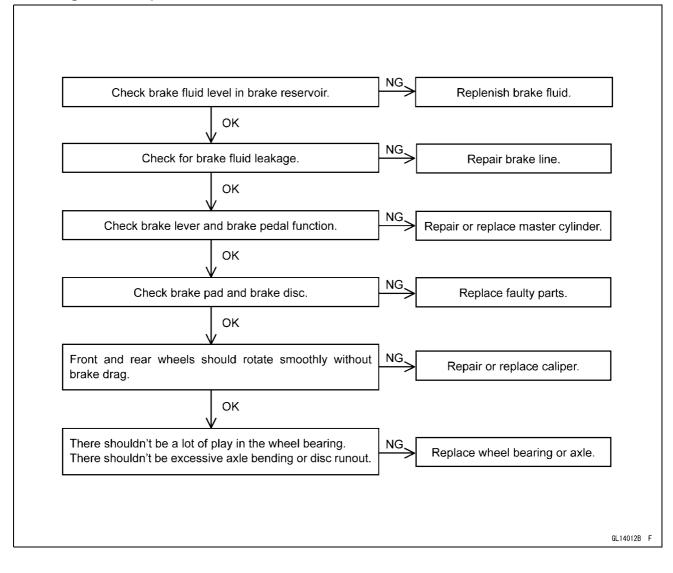
OTry to find out exactly what problem occurs under exactly what conditions by asking the rider; knowing this information may help you reproduce the problem in the shop.

OThe diagnosis sheet will help prevent you from overlooking any keys, so always use it.

Sample Diagnosis Sheet

Rider name:			Registration No. (license plate No.):					
Year of initial registration:			Model:					
Engine No.:			Frame No.:					
Date problem occurred:			Frequency:					
Weather:				Mileage:				
Phenome-	□ Brake lever vibration or noise	□ Indicator light blinks	□ Braking distance too long	□ Abnor- mal brake lever move- ment	□ K-ACT ABS not working	□ K-ACT ABS works but indicator light lights up	□ K-ACT ABS op- erating too fre- quently	
non	Pedal vibration or noise	□ Indicator light remains lit up		□ Abnor- mal pedal move- ment				
Engine conditions at problem		□ At start-up		□ After starting		□ At 5 000 r/min (rpm) or more		
Road conditions		□ Slippery road (□ snow, □ gravel, □ other) □ Rough surface □ Other						
Driving conditions		High-speed cornering						
		□ Driving 10 km/h (6 mph) or above □ Driving below 10 km/h (6 mph)						
		□ When stopping □ When turning						
Brake application								
		Abrupt						
Other conditions		□ Large brake lever stroke						
		Large pedal stroke						

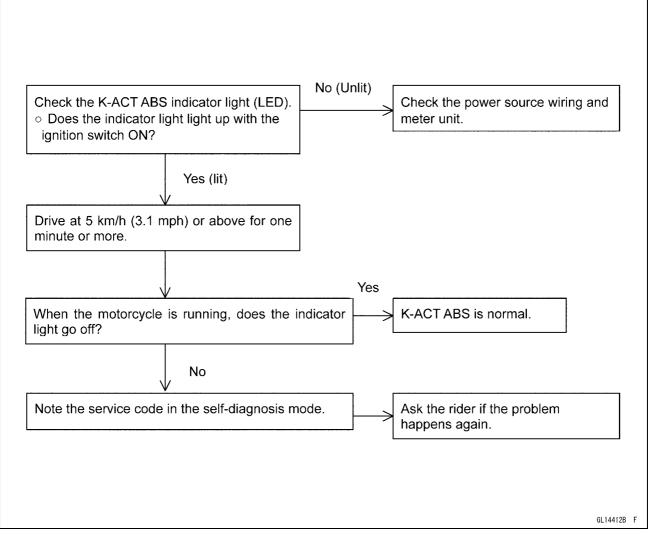
Pre-Diagnosis Inspection 1



12-40 BRAKES

K-ACT ABS (Equipped Models)

Pre-Diagnosis Inspection 2

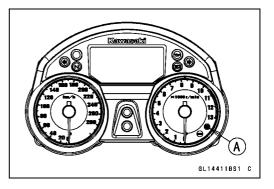


Self-diagnosis Outline

Refer to the Self-Diagnosis System chapter for the self-diagnosis or service code.

K-ACT ABS Indicator Light (LED) Inspection

- OIn this model, the K-ACT ABS indicator light (LED) [A] goes on or blinks by the data sent from the K-ACT ABS hydraulic unit.
- Refer to the Meter Operation Inspection in the Electrical System chapter.



K-ACT ABS Hydraulic Unit Removal

NOTICE

The K-ACT ABS hydraulic unit [A] has been adjusted and set with precision at the factory. Therefore, it should be handled carefully, never struck sharply with a hammer, or allowed to fall on a hard surface.

Be careful not to get water or mud on the K-ACT ABS hydraulic unit.

• Drain the brake fluid from the front and rear brake lines.

ODrain the brake fluid through the bleed valve by pumping the brake lever and pedal.

• Remove:

Battery (see Battery Removal in the Electrical System chapter)

Starter Relay (see Starter Relay Removal in the Electrical System chapter)

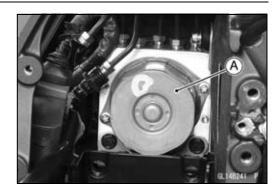
Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)

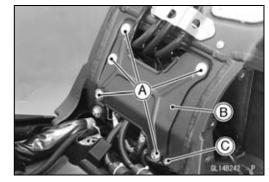
Bolts [A] Battery Back Cover [B] Bolt [C]

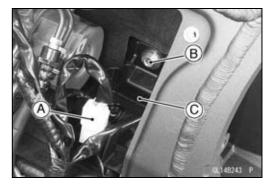
• Remove:

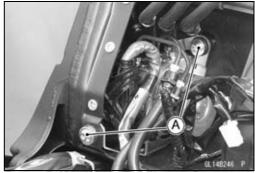
Connector [A] Bolt [B] Bracket [C]

 Remove: Bolts [A]





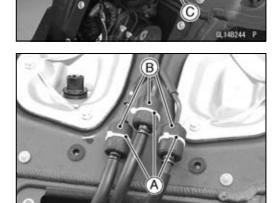




12-42 BRAKES

K-ACT ABS (Equipped Models)

- Remove: Bolts [A] Bracket [B] Damper [C]
- Cut the bands [D] and remove the grommets [E].
- Remove: Connector [A] Bolts [B] Bracket [C]



• Cut the bands [A] and remove the grommets [B].

• Clean the K-ACT ABS hydraulic unit.

NOTICE

Clean all fittings on the K-ACT ABS hydraulic unit and the rear master cylinder because dirt around the banjo bolts could contaminate the brake fluid in the line during removal/installation. Spread out a shop towel around the K-ACT ABS hy-

draulic unit before removing the brake line so that brake fluid does not leak on the parts.

NOTE

ORemove the brake hoses and pipes according to each assembly of the exploded view.

• Push the stopper [A] and pull the lever [B] until it is stopped.

• Disconnect the K-ACT ABS hydraulic unit lead connector [A].

• Loosen the brake pipe joint nuts [A] and remove the brake hoses [B].

NOTE

ODo not loosen the brake pipe joint nuts [C].

• Tape the brake line opening to prevent brake fluid leakage or contamination by foreign matter.

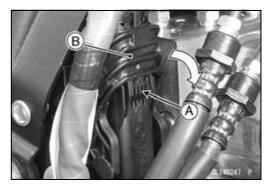
NOTICE

Brake fluid quickly ruins painted plastic surfaces; any spilled fluid should be completely washed away immediately.

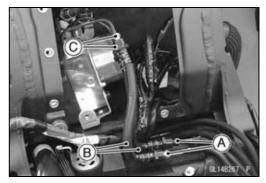
• Loosen the brake pipe joint nuts [A] and remove the brake hoses [B].

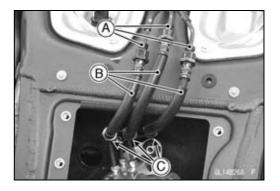
NOTE

○Do not loosen the brake pipe joint nuts [C].





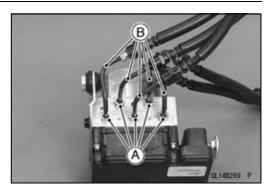




12-44 BRAKES

K-ACT ABS (Equipped Models)

 Loosen the brake pipe joint nuts [A] and remove the brake pipes [B].



 Remove: Bolts [A] Bracket [B]

NOTICE

The K-ACT ABS hydraulic unit has been adjusted and set with precision at the factory. Do not try to disassemble and repair the K-ACT ABS hydraulic unit.

K-ACT ABS Hydraulic Unit Installation

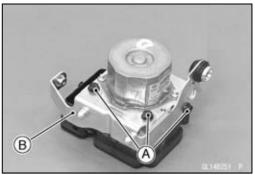
- Install the bracket to the K-ACT ABS hydraulic unit.
- Before installing the brake pipe, check to see that there is no damage on the threads of the brake pipe joint nut.
- ★ If there is any damage, replace the damaged parts with new ones.
- When installing the hoses and pipes, avoid sharp bending, kinking, flatting or twisting, and route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- Install:
 - Brake Hoses and Brake Pipe Joint Nuts

NOTICE

Brake fluid quickly ruins painted plastic surfaces; any spilled fluid should be completely washed away immediately.

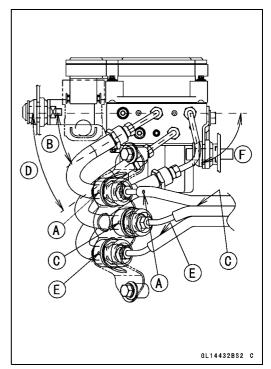
NOTE

- OTighten the brake hose joint pipe nuts at both ends of the brake pipe temporarily and then tighten them to the specified torque.
- Tighten the brake pipe joint nuts with the flare nut wrench.



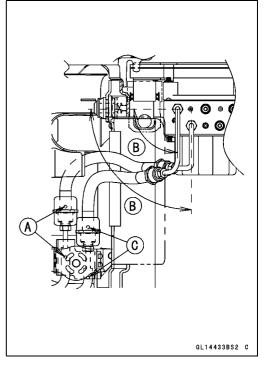
- Install the brake pipe assemblies correctly as shown in
 - the figure.
 - [A] Yellow Marks
 - [B] 31°
 - [C] White Marks
 - [D] 35°
 - [E] Blue Marks
 - [F] 77°
- Tighten:

Torque - Brake Pipe Joint Nuts: 18 N·m (1.8 kgf·m, 13 ft·lb)

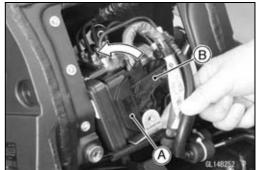


- Install the brake pipe assemblies correctly as shown in the figure.
 - [A] Green Marks
 - [B] 90°
 - [C] Purple Marks
- Tighten:

Torque - Brake Pipe Joint Nuts: 18 N·m (1.8 kgf·m, 13 ft·lb)



• Connect the lead connector [A] and push the lever [B] until it is locked.



12-46 BRAKES

K-ACT ABS (Equipped Models)

• Insert the projections [A] into the grommets [B].

Install:

Bolt [A], L = 30 mm (1.2 in.) (Taper Head) Bolt [B], L = 35 mm (1.4 in.)

- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.
- Install the removed parts (see appropriate chapters).

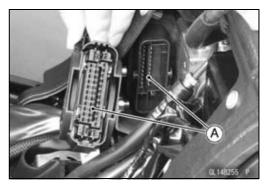
K-ACT ABS Hydraulic Unit Inspection

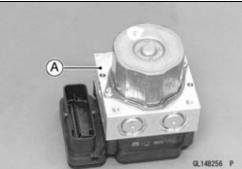
- Visually inspect the connector terminals [A].
- ★Replace the K-ACT ABS hydraulic unit or main harness if either of the terminals are cracked, bent, or otherwise damaged.
- ★ If the K-ACT ABS hydraulic unit connector is clogged with mud or dust, blow it off with compressed air.
- Remove the K-ACT ABS hydraulic unit [A] (see K-ACT ABS Hydraulic Unit Removal).
- Visually inspect the K-ACT ABS hydraulic unit.
- ★ Replace the K-ACT ABS hydraulic unit if any of them are cracked, or otherwise damaged.

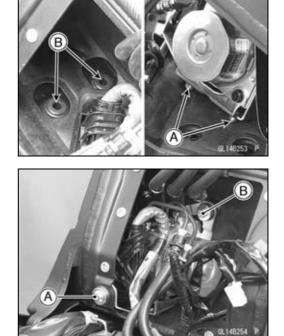
Front Wheel Rotation Sensor Removal

NOTICE

The wheel rotation sensor should be handled carefully, never struck sharply with a hammer, or allowed to fall on a hard surface since the wheel rotation sensor is precision made. Be careful not to get water or mud on the wheel rotation sensor. Do not try to disassemble or repair the wheel rotation sensor.

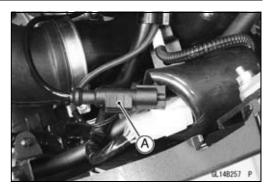






• Remove:

- Right Inner Cover (see Inner Cover Removal in the Frame chapter)
- Disconnect the connector [A] and free the lead from the clamp.
- Remove: Clamps [A] Bolt [B] Front Wheel Rotation Sensor [C]





Front Wheel Rotation Sensor Installation

• Installation is the reverse of removal.

ORun the lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

Rear Wheel Rotation Sensor Removal

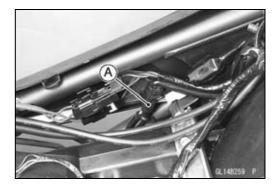
NOTICE

The wheel rotation sensor should be handled carefully, never struck sharply with a hammer, or allowed to fall on a hard surface since the wheel rotation sensor is precision made. Be careful not to get water or mud on the wheel rotation sensor. Do not try to disassemble or repair the wheel rotation sensor.

• Remove:

Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)

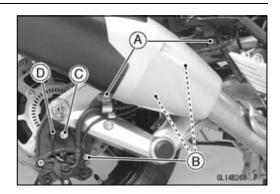
- Connector [A] (Disconnect)
- Remove the connector from the bracket.



12-48 BRAKES

K-ACT ABS (Equipped Models)

 Remove: Bracket Bolts [A] Clamps [B] Bolt [C] Rear Wheel Rotation Sensor [D]



Rear Wheel Rotation Sensor Installation

- Installation is the reverse of removal.
- ORun the lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

Wheel Rotation Sensor Inspection

• Remove the front wheel rotation sensor [A] from the sensor bracket.



- Remove the rear wheel rotation sensor [A] from the caliper bracket.
- Visually inspect the wheel rotation sensors.
- ★ Replace the wheel rotation sensor if it is cracked, bent, or otherwise damaged.



Wheel Rotation Sensor Air Gap Inspection

- Raise the front/rear wheel off the ground (see Front/Rear Wheel Removal in the Wheels/Tires chapter).
- Measure the air gap between the sensor and sensor rotor at several points by turning the wheel slowly.

Thickness Gauge [A]

Air Gap

Standard:

- Front 1.0 mm (0.039 in.)
- Rear 1.0 mm (0.039 in.)

NOTE

○ The sensor air gap cannot be adjusted.

★ If the air gap is not within the specification, inspect the hub bearing (see Hub Bearing Inspection in the Wheels/Tires chapter), sensor installation condition and sensor (see Wheel Rotation Sensor Inspection).

Wheel Rotation Sensor Rotor Removal

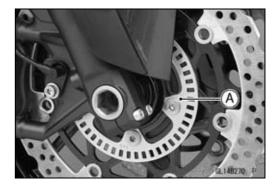
• Refer to the Brake Disc Removal for the wheel rotation sensor removal.

Wheel Rotation Sensor Rotor Installation

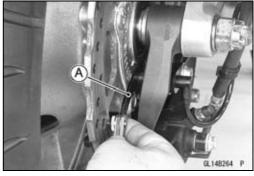
• Refer to the Brake Disc Installation for the wheel rotation sensor rotor installation.

Wheel Rotation Sensor Rotor Inspection

• Turn the wheels, and visually inspect the wheel rotation sensor rotor [A].



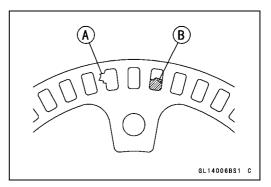


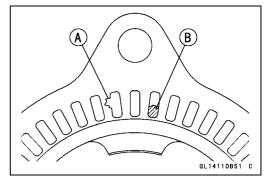


12-50 BRAKES

K-ACT ABS (Equipped Models)

- ★ If the rotor is deformed or damaged (chipped teeth [A]), replace the sensor rotor with a new one.
- ★ If there is iron or other magnetic deposits [B], remove the deposits.





K-ACT ABS Solenoid Valve Relay Fuse (20 A) Removal

• Refer to the Fuse Box Fuse Removal in the Electrical System chapter.

K-ACT ABS Motor Relay Fuse (30 A) Removal

• Refer to the Fuse Box Fuse Removal in the Electrical System chapter.

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 (see Fuse Installation in the Electrical System chapter).

Fuse Inspection

- Remove the fuses (see K-ACT ABS Solenoid Valve Relay Fuse (20 A)/K-ACT ABS Motor Relay Fuse (30 A) Removal).
- Refer to the Fuse Inspection in the Electrical System chapter.

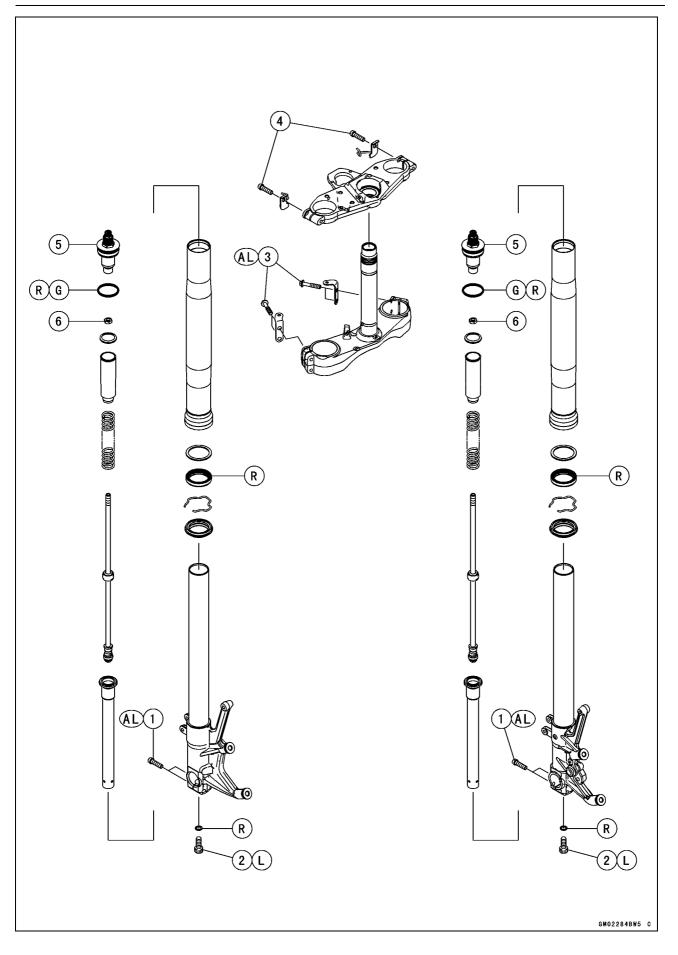
Suspension

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13-2 SUSPENSION

Exploded View



Exploded View

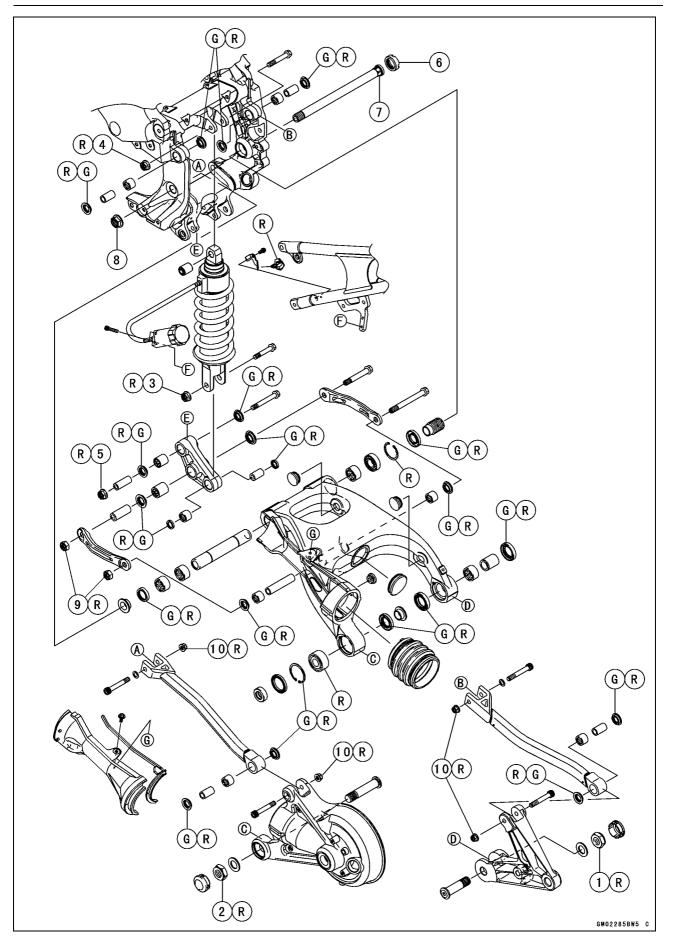
No.	Factorer		Torque		
	Fastener	N∙m	kgf∙m	ft·lb	- Remarks
1	Front Axle Clamp Bolts	20	2.0	15	AL
2	Front Fork Bottom Allen Bolts	23	2.3	17	L
3	Front Fork Clamp Bolts (Lower)	30	3.1	22	AL
4	Front Fork Clamp Bolts (Upper)	20	2.0	15	
5	Front Fork Top Plugs	23	2.3	17	
6	Piston Rod Nuts	15	1.5	11	

AL: Tighten the two clamp bolts alternately two time to ensure even tightening torque. G: Apply grease.

L: Apply a non-permanent locking agent. R: Replacement Parts

13-4 SUSPENSION

Exploded View



Exploded View

No.	Fastener	Torque			Domorika
	Fastellel	N∙m	kgf∙m	ft·lb	Remarks
1	Axle Bracket Locknut	98	10	72	R
2	Final Gear Case Locknut	98	10	72	R
3	Rear Shock Absorber Nut (Lower)	34	3.5	25	R
4	Rear Shock Absorber Nut (Upper)	34	3.5	25	R
5	Rocker Arm Nut	34	3.5	25	R
6	Swingarm Pivot Collar Locknut	98	10	72	
7	Swingarm Pivot Shaft	20	2.0	15	
8	Swingarm Pivot Shaft Nut	108	11	80	
9	Tie-Rod Nuts	59	6.0	44	R
10	Torque Rod Nuts	59	6.0	44	R

G: Apply grease. R: Replacement Parts

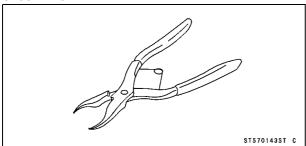
13-6 SUSPENSION

Specifications

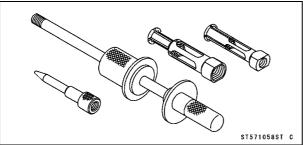
No. 20 Annual Annual						
Item	Standard					
Front Fork (Per One Unit)						
Fork Inner Tube Diameter	φ43 mm (1.7 in.)					
Air Pressure	Atmospheric pressure (non-adjustable)					
Rebound Damper Setting	5th click from the 1st click of the fully clockwise position (Usable range: $0 \leftarrow \rightarrow 11$ clicks)					
Fork Spring Preload Setting	Adjuster protrusion is 14 mm (0.55 in.) (Usable range: 4 ~ 19 mm) (0.16 ~ 0.75 in.)					
Fork Oil:						
Туре	KHL15-10 (KAYABA 01) or equivalent					
Amount	Approx. 470 mL (15.9 US oz.) (when changing oil)					
	551 ±4 mL (18.6 ±0.14 US oz.) (after disassembly and completely dry)					
Fork Oil Level	93 \pm 2 mm (3.7 \pm 0.08 in.) (fully compressed, without fork spring, below from inner tube top)					
Fork Spring Free Length	244 mm (9.61 in.) (Service Limit: 239 mm (9.41 in.))					
Rear Shock Absorber						
Rebound Damper Set	1 1/4 turns out from the fully clockwise position (Usable range: $0 \leftrightarrow 22/4$ turns out)					
Spring Preload Setting	13th click from the 1st click of the fully counterclockwise position (Usable range: $1st \leftarrow \rightarrow 24th click$)					
Gas Pressure	1 270 kPa (13.0 kgf/cm², 184 psi, non-adjustable)					

Special Tools

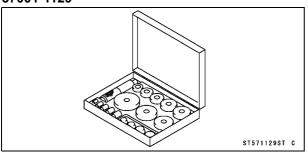
Inside Circlip Pliers: 57001-143



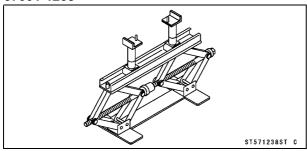




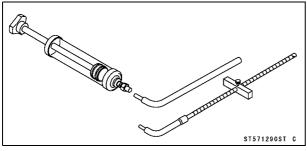
Bearing Driver Set: 57001-1129



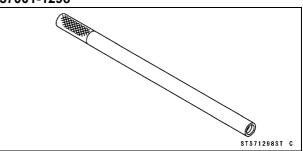
Jack: 57001-1238



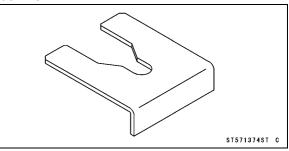
Fork Oil Level Gauge: 57001-1290



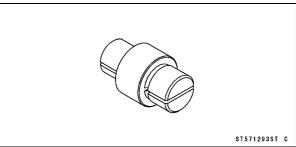
Fork Piston Rod Puller, M10 × 1.0: 57001-1298



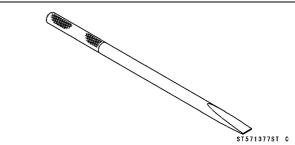
Fork Spring Stopper: 57001-1374

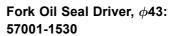


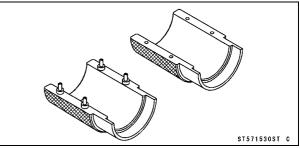
Bearing Remover Head, ϕ 20 × ϕ 22: 57001-1293



Bearing Remover Shaft, ϕ 13: 57001-1377

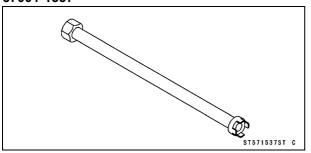




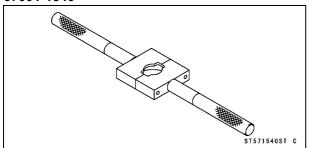


Special Tools

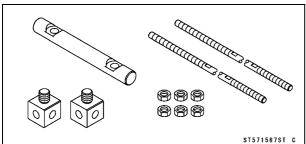
Fork Cylinder Holder, Hex 24: 57001-1537



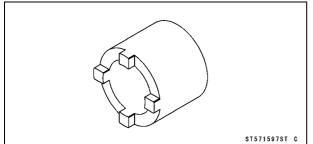
Fork Spring Compressor: 57001-1540



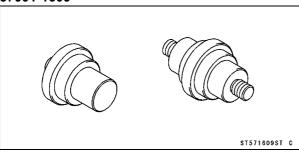
Fork Spring Compressor: 57001-1587



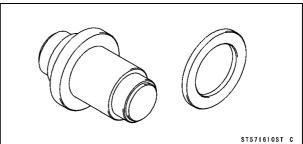
Swingarm Pivot Nut Wrench: 57001-1597



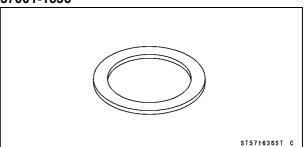
Needle Bearing Driver, ϕ 17/ ϕ 18: 57001-1609



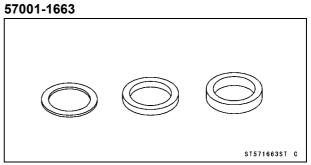
Needle Bearing Driver, ϕ 28: 57001-1610



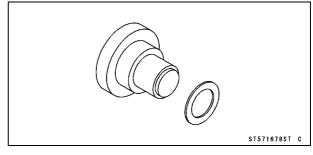
Spacer, *φ*18: 57001-1636



Spacer ϕ 28:



Needle Bearing Driver, ϕ 20 & Spacer, ϕ 28: 57001-1678



Front Fork

Rebound Damping Force Adjustment

- To adjust the rebound damping force, turn the rebound damping adjuster [A] until you feel a click.
- OThe standard adjuster setting is the **5th click** from the 1st click of the fully clockwise position.

🛦 WARNING

If both adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result. Be sure the adjusters are set equally.

OThe 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
11	Weak	Soft	Light	Good	Low
1	1	1	↑	↑	↑
\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow
0	Strong	Hard	Heavy	Bad	High

Spring Preload Adjustment

• Turn the spring preload adjuster [A] to change spring preload setting.

• The standard adjuster setting is the 14 mm (0.55 in.) [B] from top as shown in the figure.

Adjuster Protrusion (from top)

Standard: 14 mm (0.55 in.)

Usable Range: 4 ~ 19 mm (0.16 ~ 0.75 in.)

A WARNING

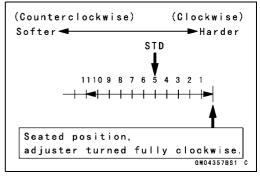
If both adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result. Be sure the adjusters are set equally.

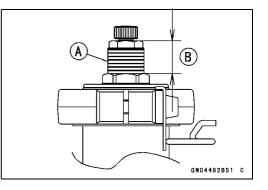
OThe spring preload can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

Spring Action

Adjuster Position	Damping Force	Setting	Load	Road	Speed
19 mm	Weak	Soft	Light	Good	Low
1	1	1	↑	↑	↑
\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow
4 mm	Strong	Hard	Heavy	Bad	High







13-10 SUSPENSION

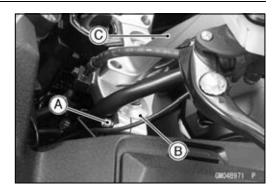
Front Fork

Front Fork Removal (Each Fork Leg)

- Remove the front wheel (see Front Wheel Removal in the Wheels/Tires chapter).
- ★Loosen the upper fork clamp bolt [A] and fork top plug [B] beforehand if the fork leg is to be disassembled.
- ORemove the handlebar holder [C] with handlebar assy (see Handlebar Holder Removal in the steering chapter).

NOTE

- OLoosen the top plug after loosening the upper fork clamp bolt.
- Loosen the upper front fork clamp bolt [A].





- Remove the upper inner fairing (see Upper Inner Fairing Removal in the Frame chapter).
 Loosen the lower fork clamp bolts [A].
- 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 outer tube is flush with the upper surface [B] of the stem head bracket.
- Tighten:
 - Torque Front Fork Clamp Bolts (Lower): 30 N⋅m (3.1 kgf⋅m, 22 ft⋅lb)

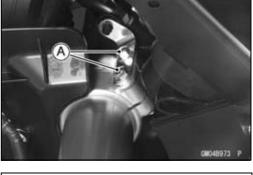
Front Fork Top Plug: 23 N·m (2.3 kgf·m, 17 ft·lb)

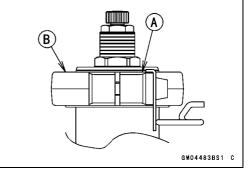
• Tighten:

Torque - Front Fork Clamp Bolt (Upper): 20 N·m (2.0 kgf·m, 15 ft·lb)

NOTE

- Tighten the lower clamp bolts alternately two times to ensure even tightening torque.
- Tighten the top plug before tightening the upper fork clamp bolt.
- Install the removed parts (see appropriate chapters).
- Adjust the spring preload and the damping force.





Front Fork

[B].

Front Fork Oil Change

- Remove the front fork (see Front Fork Removal (Each Fork Leg)).
- Hold the inner tube lower end in a vise.
- Unscrew the top plug [A] out of the outer tube.



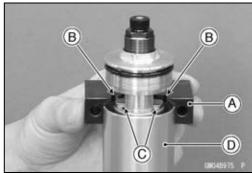
• Install the clamps [A] as shown in the figure.

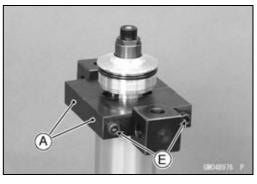
NOTE

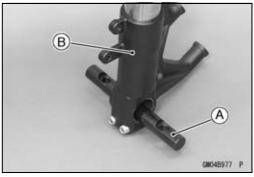
Set the clamps so that the cutouts [B] do not touch the stoppers [C] of the top plug, pull up the outer tube [D] to hold it by the clamps, and then tighten the two bolts [E]. The outer tube is used as a guide.

Special Tools - Fork Spring Compressor (Clamp): 57001 -1540

Fork Spring Compressor: 57001-1587









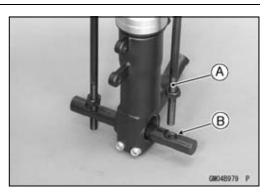
• Insert the compression shaft [A] and install the nut [B]. OSet the other side compression shaft same process.

• Insert the holder bar [A] into the axle hole of the front fork

13-12 SUSPENSION

Front Fork

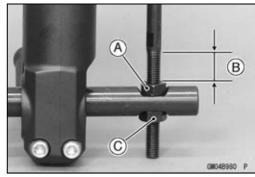
• Insert the lower end of the compression shaft [A] into the hole [B] of the holder bar.

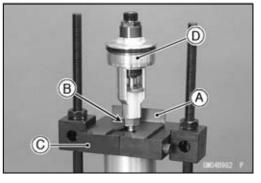


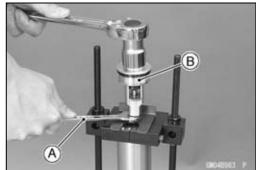
• Screw the adjust nut [A] onto the compression shaft as shown in the figure.

• Screw in one side nut [A] come out the piston rod nut [B]. OHold up the top plug [C] while screwing in the nut.

- 20 mm (0.79 in.) [B]
- Screw the locknut [C].







 Insert the fork spring stopper [A] between the piston rod nut [B] and the clamp [C] while holding up the top plug [D].

Special Tool - Fork Spring Stopper: 57001-1374

• Holding the piston rod nut with a wrench [A], remove the top plug [B] from the piston rod.

Front Fork

• Remove the rebound damping adjuster rod [A] from the piston rod.

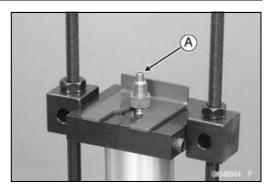
• Remove: Washer [A] Collar [B]

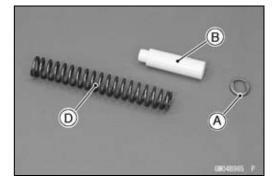
Fork Spring [D]

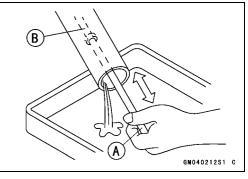
• Drain the fork oil into a suitable container.

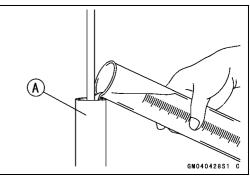
OUsing the fork piston rod puller [A], pump the piston rod [B] up and down at least ten times to expel the oil from the fork.

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









- Hold the fork tube upright, press the outer tube [A] and the piston rod all the way down.
- Pour in the type and amount of fork oil specified.

Fork Oil

Recommended Oil:

KHL15-10 (KAYABA 01) or equivalent

Amount (Per Side):

When changing oil:

Approx. 470 mL (15.9 US oz.)

After disassembly and completely dry:

551 ±4 mL (18.6 ±0.14 US oz.)

13-14 SUSPENSION

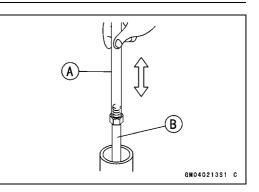
Front Fork

 \star If necessary, measure the oil level as follows.

OHold the inner tube vertically in a vise.

OUsing the fork piston rod puller [A], move the piston rod [B] 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



ORemove the fork piston rod puller.

OWait until the oil level settles.

OWith 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 outer tube to the oil.

Oil Level (fully compressed, without spring) Standard: 93 ±2 mm (3.7 ±0.08 in.)

NOTE

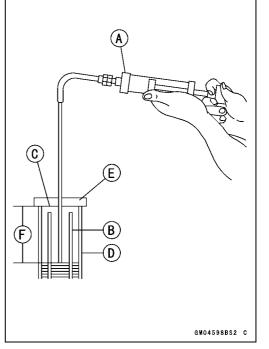
OFork oil level may also be measured using the fork oil level gauge.

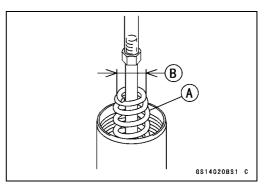
Special Tool - Fork Oil Level Gauge [A]: 57001-1290

- OWith the fork fully compressed and without fork spring, insert the gauge tube into the inner tube [B] and position the stopper across the top end [C] of the outer tube [D].
- OSet the gauge stopper [E] so that its lower side shows the oil level distance specified [F].
- OPull 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.
- Screw the fork piston rod puller onto the end of the piston rod.

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

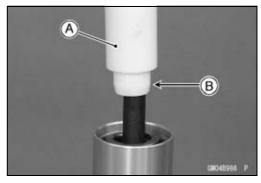
- Pull the puller up above the outer tube top.
- Install the fork spring [A] with the smaller end facing [B] upward.

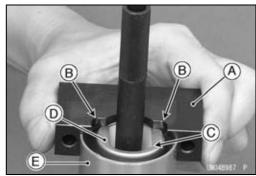


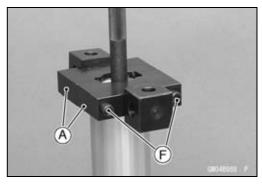


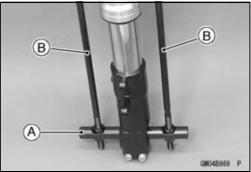
Front Fork

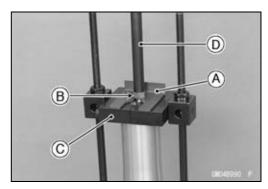
- Install the collar [A] so that the cut side [B] faces downward.
- Install the washer on the collar.











• Install the clamps [A] as shown in the figure.

Special Tools - Fork Spring Compressor (Clamp): 57001 -1540

Fork Spring Compressor: 57001-1587

NOTE

Set the clamps so that the cutouts [B] do not fit the hole
 [C] of the washer [D], pull up the outer tube [E] to hold
 it by the clamps, and then tighten the two bolts [F]. The
 outer tube is used as a guide.

- Set the holder bar [A] and compression shafts [B].
- Screw in the fork compressor nut come out the piston rod nut.
- OHold up the fork piston rod puller while screwing in the nut.
- Insert the fork spring stopper [A] between the piston rod nut [B] and the clamp [C] while holding up the fork piston rod puller [D].

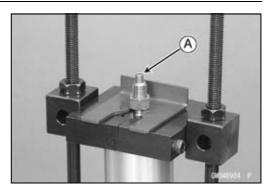
Special Tool - Fork Spring Stopper: 57001-1374

• Remove the fork piston rod puller.

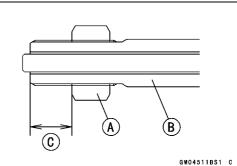
13-16 SUSPENSION

Front Fork

• Install the rebound damping adjuster rod [A].



 Screw the piston rod nut [A] onto the piston rod [B] as shown in the figure.
 12 mm (0.47 in.) or more [C]



 \bigcirc

GM04599BS1 C

• Check the distance between the bottom end [A] of the top plug and rebound damping adjuster [B] with a pair of vernier caliper.

13 mm (0.51 in.) [C]



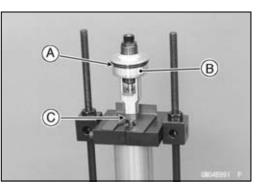
- Check the O-ring [A] on the top plug [B] and replace it with a new one if damaged.
- OApply grease to the new O-ring.
- Screw in the top plug stopped onto the piston rod.
- Holding the top plug with a wrench, tighten the piston rod nut [C] against the top plug.

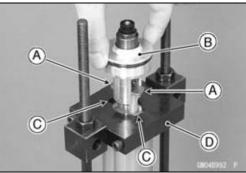
Torque - Piston Rod Nuts: 15 N·m (1.5 kgf·m, 11 ft·lb)

- Remove the fork spring stopper.
- Align the stoppers [A] of the top plug [B] with the grooves [C] of the clamp [D], and loosen the fork spring compressor nut.
- Remove the clamp and fork spring compressor.
- Raise the outer tube and screw the top plug into it.
- Install the front fork (see Front Fork Installation).

NOTE

OAfter installing the front fork, adjust the spring preload and damping force correctly.





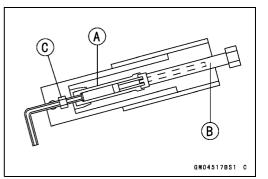
Front Fork

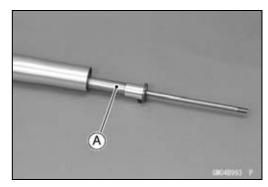
Front Fork Disassembly

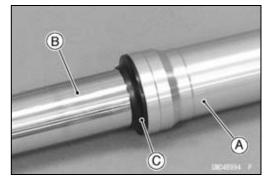
- Remove the front fork (see Front Fork Removal).
- Drain the fork oil (see Front Fork Oil Change).
- Hold the axle portion of the front fork in a vise.
- Stop the cylinder [A] from turning by using the fork cylinder holder [B].

Special Tool - Fork Cylinder Holder, Hex 24: 57001-1537

- Unscrew the Allen bolt [C], then take the bolt and gasket out of the bottom of the inner tube.
- Take the cylinder unit [A] out of the inner tube. ODo not disassemble the cylinder unit.







Separate the outer tube [A] from the inner tube [B].
Pull out the dust seal [C] from the outer tube.

 Remove the following parts from the outer tube. Retaining Ring [A] Oil Seal [B] Washer [C]

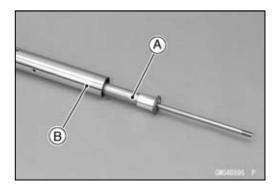
Front Fork Assembly

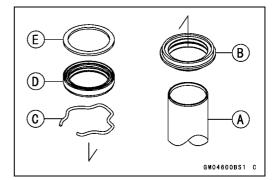
 Replace the following parts with new ones. Dust Seal Oil Seal Retaining Ring Bottom Allen Bolt Gasket

13-18 SUSPENSION

Front Fork

- Insert the cylinder unit [A] into the inner tube [B].
- Stop the cylinder from turning by using the fork cylinder holder.
 - Special Tool Fork Cylinder Holder, Hex 24: 57001-1537
- Apply a non-permanent locking agent to the thread of the Allen bolt, and tighten it.
 - Torque Front Fork Bottom Allen Bolt: 23 N·m (2.3 kgf·m, 17 ft·lb)
- Install the following parts into the inner tube [A]. Dust Seal [B] Retaining Ring [C] Oil Seal [D] Washer [E]

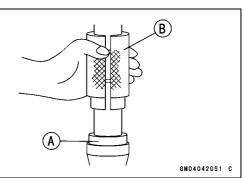




- Insert the inner tube to the outer tube.
- After installing the washer, install the oil seal [A] by using the fork oil seal driver [B].

Special Tool - Fork Oil Seal Driver, ϕ 43: 57001-1530

- Install the retaining ring and dust seal.
- Pour in the specified type of oil (see Front Fork Oil Change).

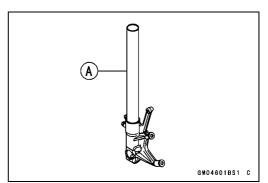


Inner Tube Inspection

- Visually inspect the inner tube [A], 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.

NOTICE

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



Front Fork

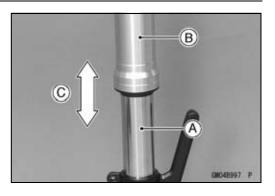
- Temporarily assemble the inner tube [A] and outer tube [B], and pump [C] them back and forth manually to check for smooth operation.
- ★ If you feel binding or catching, the inner and outer tubes must be replaced.

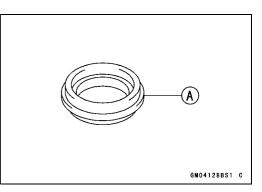
A WARNING

A straightened inner or outer fork tube may fall in use, possibly causing an accident resulting in serious injury or death. 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 seals [A] for any signs of deterioration or damage.
- \star Replace it if necessary.

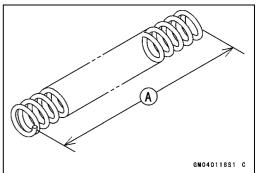




Spring Tension

- Since a spring becomes shorter as it weakens, check its free length [A] to determine its condition.
- ★ If the spring of either fork leg is shorter than the service limit, it must be replaced. If the length of a replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the fork legs balanced for motorcycle stability.

Spring Free Length Standard: 244 mm (9.61 in.) Service Limit: 239 mm (9.41 in.)



13-20 SUSPENSION

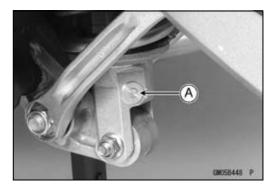
Rear Shock Absorber

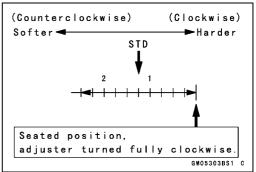
Rebound Damping Force Adjustment

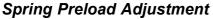
- To adjust the rebound damping force, turn the lower damping adjuster [A] to the desired position, until you feel a click.
- OThe standard adjuster setting is the **1 1/4 turns out** from the fully clockwise position.

Rebound Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
2 2/4 Turns Out	Weak	Soft	Light	Good	Low
↑	1	↑	↑	↑	Ť
\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow
0	Strong	Hard	Heavy	Bad	High







- To adjust the spring preload, turn in the adjuster [A] until you fee a click to the desired position.
- OThe standard adjuster setting is the **13th click** from the 1st click of the fully counterclockwise position.
- \star If the spring action feels too soft or too stiff, adjust it.

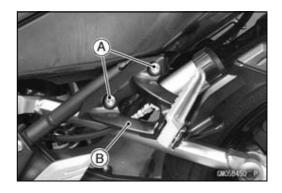
Spring Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
1st	Weak	Soft	Light	Good	Low
1	1	1	1	1	↑
\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow
24th	Strong	Hard	Heavy	Bad	High

Rear Shock Absorber Removal

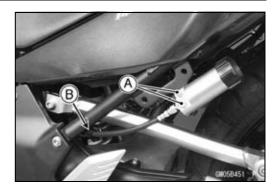
- Use the center stand to support the motorcycle upright.
- Remove:
 - Bolts [A] Rear Footpeg Bracket [B] with Rear Footpeg

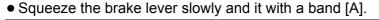




Rear Shock Absorber

- Remove the bolts [A].
- Clear the hose form the clamp [B].



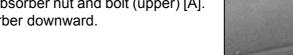


AWARNING

Motorcycle may fall over unexpectedly resulting in an accident or injury. Be sure to hold the front brake when removing the engine.

- Remove:
 - Upper Tie-Rod Nut and Bolt [A] Rear Shock Absorber Nut and Bolt (Lower) [B]

- Remove the rear shock absorber nut and bolt (upper) [A].
- Remove the shock absorber downward.

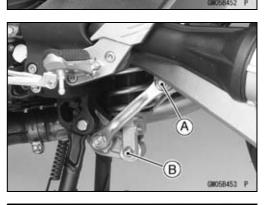


Rear Shock Absorber Installation

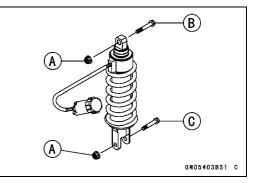
- Replace the rear shock absorber nuts [A] and tie-rod nuts with new ones.
- Tighten:
 - Torque Rear Shock Absorber Nuts: 34 N·m (3.5 kgf·m, 25 ft·lb)

Tie-Rod Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)

- L = 62 mm (2.4 in.) [B]
- L = 55 mm (2.2 in.) [C]







13-22 SUSPENSION

Rear Shock Absorber

Rear Shock Absorber Inspection

- Remove the rear shock absorber (see Rear Shock Absorber Removal).
- Visually inspect the following items. Smooth Stroke Oil Leakage
 - Crack or Dent
- ★ If there is any damage to the rear shock absorber, replace it.
- Visually inspect the rubber bushing [A].
- \bigstar If it show any signs of damage, replace it.

Rear Shock Absorber Scrapping

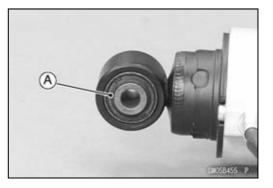
🛦 WARNING

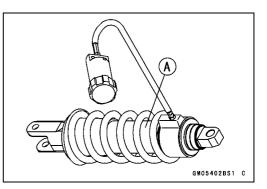
Pressurized nitrogen may explode when heated. The rear shock contains nitrogen gas. To avoid an explosion, do not incinerate the shock body without first releasing the nitrogen and removing the shraeder valve.

- Remove the rear shock absorber (see Rear Shock Absorber Removal).
- Drill the cylinder [A] of the shock absorber using about 2 mm (0.08 in.) drillbit.

A WARNING

Pressurized gas can cause injury. Do not point the drill toward your face or body.





SUSPENSION 13-23

Swingarm

Swingarm Removal

- Use the center stand to support the motorcycle uptight.
- Remove:

Rear Wheel (see Rear Wheel Removal in the Wheels/Tires chapter)

Propeller Shaft (see Propeller Shaft Removal in the Final Drive chapter)

Muffler Body (see Muffler Body Removal in the Engine Tope End chapter)

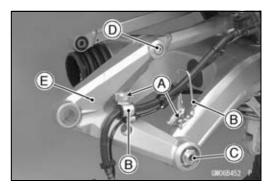
Bolts [A]

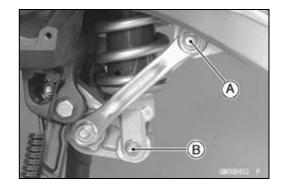
- Clamps [B] Axle Bracket Locknut [C] and Bolt
- Torque Rod Nut and Bolt [D]
- Axle Bracket [E]
- Remove:

Upper Tie-Rod Nut and Bolt [A] Lower Rear Shock Absorber Nut and Bolt [B]

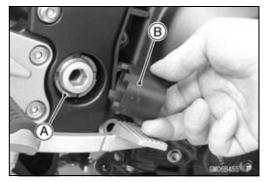
• Remove the swingarm pivot shaft locknut [A].

 Unscrew the swingarm pivot collar locknut [A] using the nut wrench [B].
 Special Tool - Swingarm Pivot Nut Wrench: 57001-1597









13-24 SUSPENSION

Swingarm

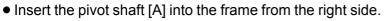
- Unscrew the swingarm pivot shaft [A] few times.
- OTurn out the swingarm pivot adjusting collar.
- Pull out the pivot shaft to right side of the motorcycle and remove the swingarm.

Swingarm Installation

- Apply plenty of grease to the lip of the oil seals [A].
- Install the collar to the left side of the swingarm.

 Place the adjusting collar [A] the frame [B] as shown in the figure.
 Comm (0.42 in) [C]

6 mm (0.43 in.) [C]



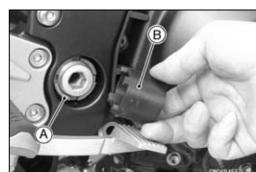
• Tighten the pivot shaft so that the clearance between the adjusting collar [B] and the ball bearing [C] come to 0 mm (0 in.).

Torque - Swingarm Pivot Adjusting Collar: 20 N·m (2.0 kgf·m, 15 ft·lb)

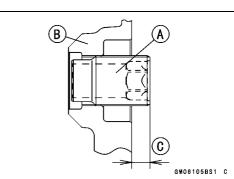
 Tighten the adjusting collar locknut [A] with the swingarm pivot nut wrench [B].

Special Tool - Swingarm Pivot Nut Wrench: 57001-1597

Torque - Swingarm Pivot Adjusting Collar Locknut: 98 N·m (10.0 kgf·m, 72 ft·lb)

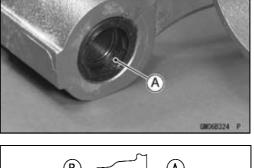


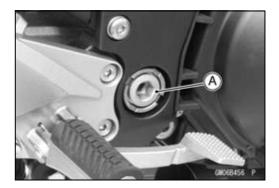
(C



(B

GM06149BS1 C





Swingarm

• Tighten the pivot shaft nut [A].

Torque - Swingarm Pivot Shaft Nut: 108 N·m (11.0 kgf·m, 80 ft·lb)

- Install the axle bracket.
- Replace the axle bracket locknut and torque rod nut with new ones.
- Tighten:

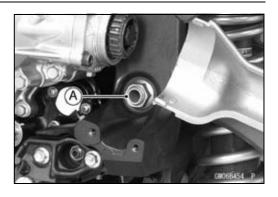
Torque - Axle Bracket Locknut: 98 N·m (10 kgf·m, 72 ft·lb) Torque Rod Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)

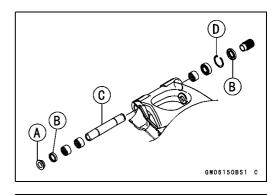
• Install the removed parts (see appropriate chapters).

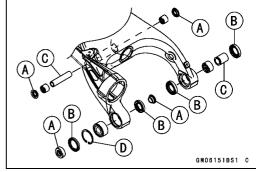
Swingarm Bearing Removal

 Remove: Swingarm (see Swingarm Removal) Collar [A] Grease Seals [B] Sleeve [C] Circlip [D] (Right Side)

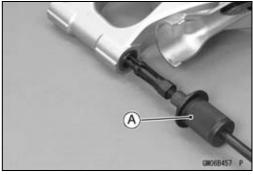
Special Tool - Inside Circlip Pliers: 57001-143







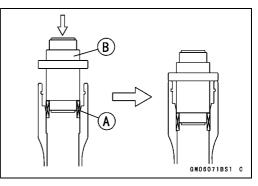
Remove the ball bearing and needle bearings.
 Special Tool - Oil Seal & Bearing Remover [A]: 57001-1058



Swingarm Bearing Installation

- Replace the ball and needle bearings [A] with new ones.
- Install the ball and needle bearings so that the manufacturer's marks face out.

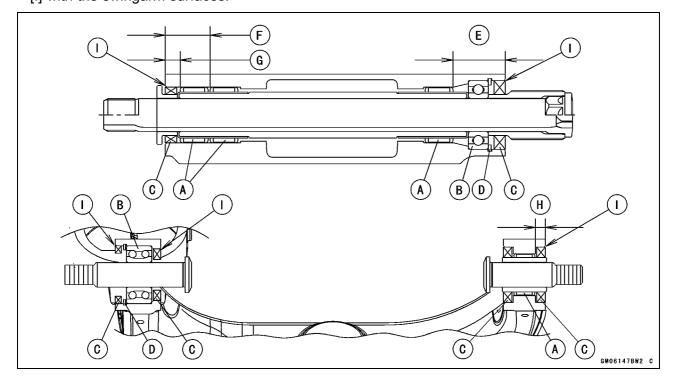
Special Tools - Bearing Driver Set: 57001-1129 Needle Bearing Driver, ϕ 28 [B]: 57001-1610 Spacer ϕ 28: 57001-1663



13-26 SUSPENSION

Swingarm

- Install the needle bearings [A], ball bearing [B], circlip [D] and oil seals [C] position as shown in the figure.
- OPress in the ball bearing until it is bottomed.
 - 31.6 ~ 32.4 mm (1.24 ~ 1.28 in.) [E]
 - 27.1 \sim 27.9 mm (1.07 \sim 1.10 in.) [F]
 - $8.8 \sim 9.6 \text{ mm} (0.35 \sim 0.38 \text{ in.}) \text{ [G]}$
 - 8.1 ~ 8.9 mm (0.32 ~ 0.35 in.) [H]
- Press in the grease seals so that the seal surface is flush [I] with the swingarm surfaces.

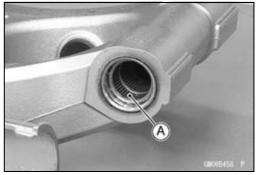


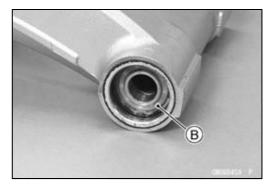
Swingarm Bearing, Sleeve Inspection

NOTICE

Do not remove the bearings for inspection. Removal may damage them.

- Inspect the needle bearings [A] and ball bearing [B] installed in the swingarm.
- OThe rollers and ball in a bearing normally wear very little, and wear is difficult to measure. Instead of measuring, visually inspect the bearing for abrasion, discoloration, or other damage.
- ★ If the needle bearing and sleeve show any sings of abnormal wear, discoloration, or damage, replace them as a set.





Swingarm

- Turn the bearing [A] in the swingarm back and forth [B] while checking for play, roughness, or binding.
- ★If bearing play, roughness, or binding is found, replace the bearing.
- Examine the bearing seal [C] for tears or leakage.
- \star If the seal is torn or is leaking, replace the bearing.

Torque Rod Removal

- Use the center stand to support the motorcycle upright.
- Support the final gear case [A] with the jack [B]. Special Tool - Jack: 57001-1238

• Remove:

Left Frame Bracket [A] (see Propeller Shaft Removal in the Final Drive chapter) Front Torque Rod Bolt [B], Nut and Washer Rear Torque Rod Bolt [C] and Nut Left Torque Rod [D]

Remove:

Muffler (see Muffler Removal in the Engine Top End chapter)

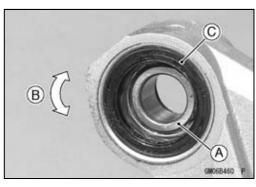
Front Torque Rod Bolt [A], Nut and Washer Rear Torque Rod Bolt [B] and Nut Right Torque Rod [C]

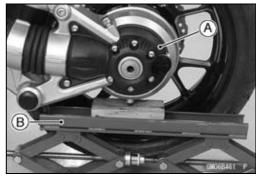
Torque Rod Installation

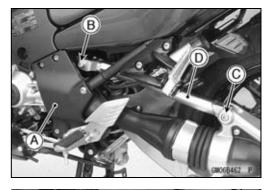
- Apply grease to the lip of the grease seals.
- Replace the torque rod nuts [A] with new ones.
- Tighten:

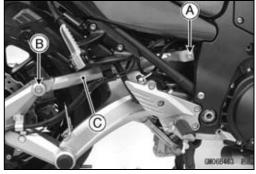
Torque - Torque Rod Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb) Washer [B]

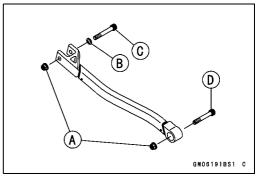
- L = 67 mm (2.6 in.) [C]L = 63 mm (2.5 in.) [D]











13-28 SUSPENSION

Swingarm

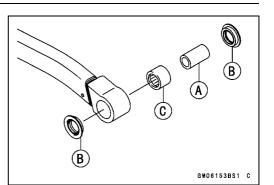
Torque Rod Bearing Removal

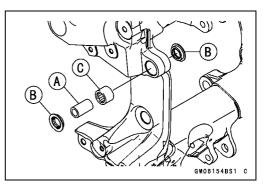
 Remove: Torque Rod Sleeve [A] Grease Seals [B] Needle Bearing [C]
 OHold the torque rod and remove the needle bearing.

Special Tool - Oil Seal & Bearing Remover: 57001-1058

- Remove:
 - Sleeve [A]
 - Grease Seals [B]
 - Needle Bearing [C]

Special Tool - Oil Seal & Bearing Remover: 57001-1058







• Replace the needle bearing and grease seal with new ones.

NOTE

OInstall the Needle bearing of the torque rod so that the manufacture's marks side faces IN.

• Install the needle bearing [A] position as shown in the figure.

5.1 ~ 5.9 mm (0.20 ~ 0.23 in.) [B] Grease Seal [C] Sleeve [D] Inside [E]

OApply grease to the lip of the grease seal.

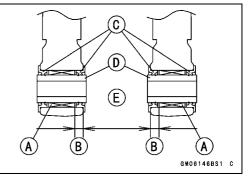
NOTE

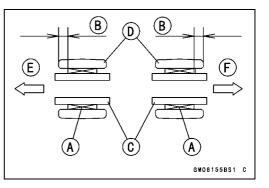
OInstall the Needle bearing of the frame so that the manufacture's marks side faces OUT.

• Install the needle bearing [A] position as shown in the figure.

5.1 ~ 5.9 mm (0.20 ~ 0.23 in.) [B] Sleeve [C] Frame [D] Left Side [E] Right Side [F]

OApply grease to the lip of the grease seal.





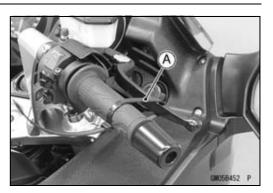
Tie-Rod, Rocker Arm

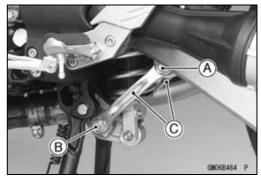
Tie-Rod Removal

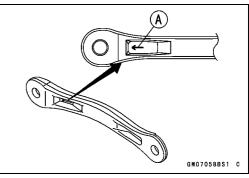
- Use the center stand to support the motorcycle upright.
- Squeeze the brake lever slowly and hold it with a band [A].

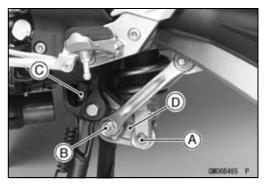
• Remove:

Upper Tie-Rod Nut and Bolt [A] Lower Tie-Rod Nut and Bolt [B] Tie-Rods [C]









Tie-Rod Installation

- Apply grease to the inside of the grease seals.
- Install each tie-rod so that the arrow faces [A] forward.
- Replace the tie-rod nuts with new ones.
- Tighten:

Torque - Tie-Rod Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)

Rocker Arm Removal

- Use the center stand to support the motorcycle upright.
- Squeeze the brake lever slowly and hold it with a band.
 Remove:
 - Muffler Body (see Muffler Body Removal in the Engine Top End chapter)
- Remove:

Lower Rear Shock Absorber Nut and Bolt [A] Lower Tie-Rod Nut and Bolt [B] Rocker Arm Nut and Bolt [C] Rocker Arm [D]

Rocker Arm Installation

- Apply grease to the inside of the grease seals.
- Replace:

Rocker Arm Nut Tie-Rod Nut

Rear Shock Absorber Nut (Lower)

• Tighten:

Torque - Rocker Arm Nut: 34 N·m (3.5 kgf·m, 25 ft·lb) Tie-Rod Nut: 59 N·m (6.0 kgf·m, 44 ft·lb) Rear Shock Absorber Nut (Lower): 34 N·m (3.5 kgf·m, 25 ft·lb)

Tie-Rod, Rocker Arm

Tie-Rod and Rocker Arm Bearing Removal

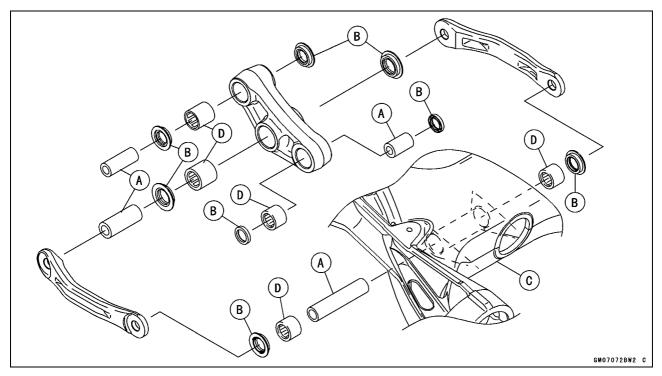
• Remove:

Tie-Rods (see Tie-Rod Removal) Rocker Arm (see Rocker Arm Removal) Sleeves [A] Grease Seals [B] Swingarm [C] (see Swingarm Removal)

• Remove the needle bearings [D], using the bearing remover head and bearing remover shaft.

Special Tools - Bearing Remover Head, ϕ 20 × ϕ 22: 57001 -1293

Bearing Remover Shaft, ϕ 13: 57001-1377



Tie-Rod and Rocker Arm Bearing Installation

- Replace the needle bearing and grease seals with new ones.
- Apply plenty of grease to the lips of the grease seals.
- Install the needle bearings and grease seals position as shown in the figure.

Tie-Rod, Rocker Arm

OScrew the needle bearing driver [A] into the driver holder [B].

Olnsert the needle bearing driver into the needle bearing [C] and press the needle bearing into the housing until the driver contacts the end surface of the housing. Bearing Pressing Depth: 5.5 mm (0.22 in.) [D]

5.0 mm (0.20 in.) [E]

NOTE

 \bigcirc For a bearing of inner diameter ϕ 18, select the pressing side of the needle bearing driver according to its pressing depth.

 Special Tools - Bearing Driver Set: 57001-1129

 Needle Bearing Driver, ϕ 17/ ϕ 18: 57001

 -1609

 Spacer, ϕ 18 [F]: 57001-1636

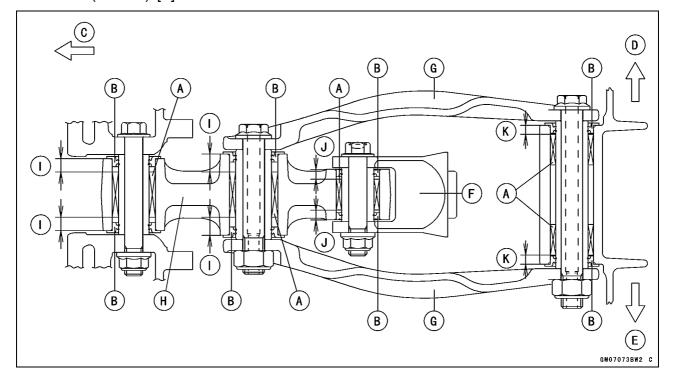
 Needle Bearing Driver, ϕ 20 & Spacer, ϕ 28:

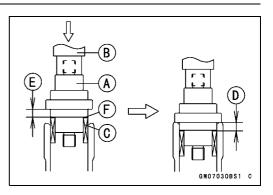
 57001-1678

NOTE

OInstall the needle bearings so that the marked side faces in.

Needle Bearing [A] Oil Seals [B] Front [C] Right Side [D] Left Side [E] Rear Shock Absorber [F] Tie-Rods [G] Rocker Arm [H] 7.5 mm (0.30 in.) [I] 5.5 mm (0.22 in.) [J] 5.0 mm (0.20 in.) [K]





13-32 SUSPENSION

Tie-Rod, Rocker Arm

Rocker Arm/Tie-Rod Bearing, Sleeve Inspection

NOTICE

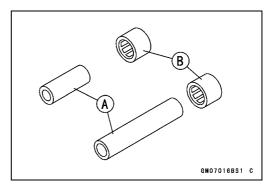
Do not remove the bearings for inspection. Removal may damage them.

- Visually inspect the locker arm, or tie-rod sleeves [A] and needle bearings [B].
- The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.
- ★ If there is any doubt as to the condition of any of the needle bearings or sleeve, replace the sleeve and needle bearings as a set.

Rocker Arm/Tie-Rod Bearing Lubrication

NOTE

OSince the bearings are packed with grease, lubrication is not required.



Steering

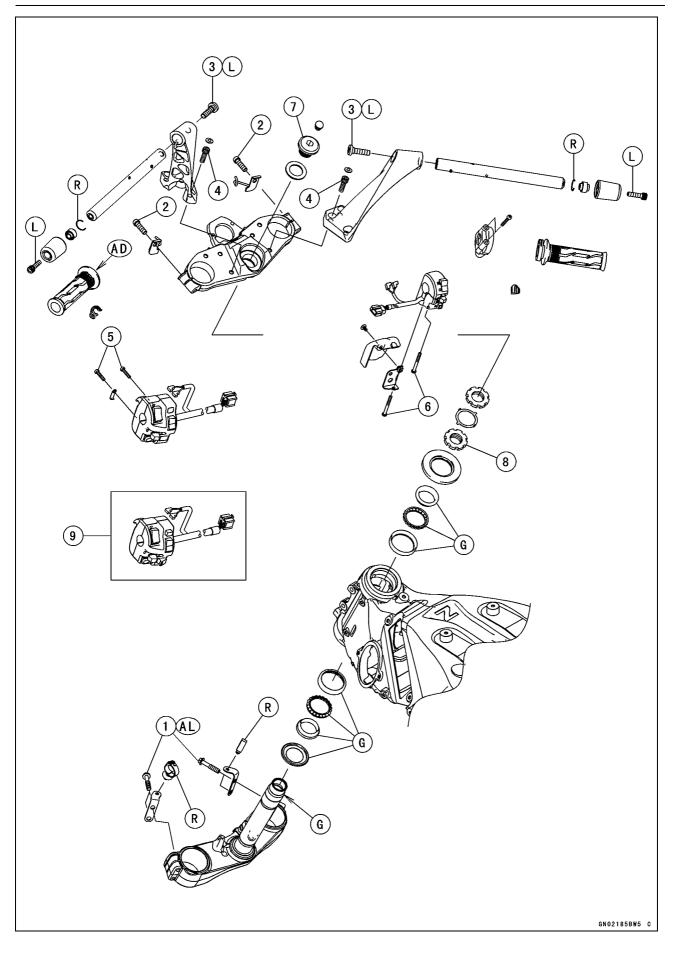
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14

14-2 STEERING

Exploded View



Exploded View

No.	Fastener		Bomorko		
	Fasteller	N∙m	kgf∙m	ft·lb	Remarks
1	Front Fork Clamp Bolts (Lower)	30	3.1	22	AL
2	Front Fork Clamp Bolts (Upper)	20	2.0	15	
3	Handlebar Bolts	34	3.5	25	L
4	Handlebar Holder Bolts	25	2.5	18	
5	Left Handlebar Switch Housing Screws	3.5	0.36	31 in·lb	
6	Right Handlebar Switch Housing Screws	3.5	0.36	31 in·lb	
7	Steering Stem Head Bolt	108	11	80	
8	Steering Stem Nut	25	2.5	18	

9. K-ACT ABS Equipped Models

AD: Apply adhesive.

AL: Tighten the two clamp bolts alternately two time to ensure even tightening.

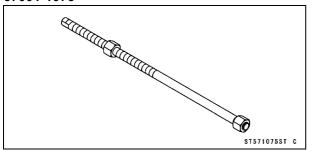
G: Apply grease.

L: Apply a non-permanent locking agent.

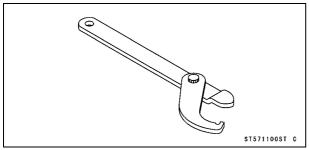
R: Replacement Parts

Special Tools and Sealant

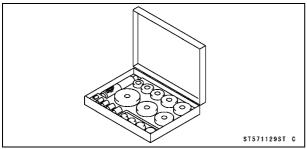
Head Pipe Outer Race Press Shaft: 57001-1075



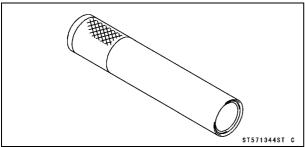
Steering Stem Nut Wrench: 57001-1100



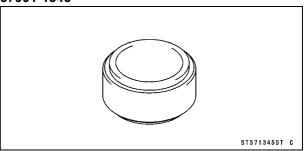
Bearing Driver Set: 57001-1129



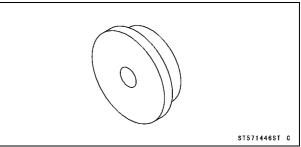
Steering Stem Bearing Driver, ϕ 42.5: 57001-1344



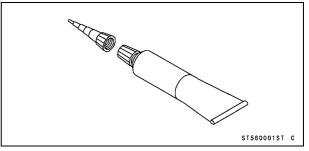
Steering Stem Bearing Driver Adapter, ϕ 41.5: 57001-1345



Head Pipe Outer Race Driver, ϕ 55: 57001-1446



Adhesive, TB1530C: 56042-0001



Steering

Steering Inspection

• Refer to the Steering Play Inspection in the Periodic Maintenance chapter (see Steering Play Inspection in the Periodic Maintenance chapter).

Steering Adjustment

• Refer to the Steering Play Adjustment in the Periodic Maintenance chapter (see Steering Play Adjustment in the Periodic Maintenance chapter).

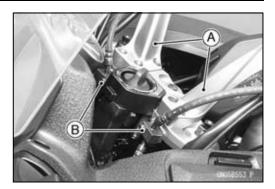
14-6 STEERING

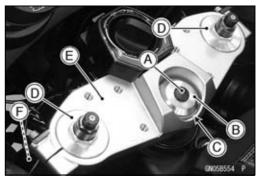
Steering Stem

Stem, Stem Bearing Removal

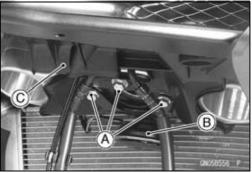
• Remove:

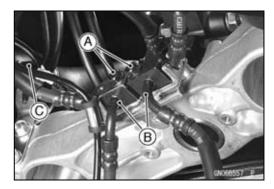
Handlebars Holders [A] with Handlebar Assemblys (see Handlebar Holder Removal) Fitting Bolts [B]











• Remove: Cap [A]

Steering Stem Head Bolt [B] and Washer [C]

Front Forks [D] (see Front Fork Removal in the Suspension chapter)

Steering Stem Head [E]

- Open the clamp [F] of steering lock unit leads on the stem base.
- Open the clamp [A].
- Disconnect the steering lock unit lead connectors [B].

• Remove:

Upper Inner Fairing (see Upper Inner Fairing Removal in the Frame chapter) Bolts [A] Horn Bracket with Horn [B] Steering Stem Cover [C]

• Remove: Bolts [A] Front Brake Fittings [B]

• Open the clamp [C].

Steering Stem

- Bend the claws [A] of lock washer straighten.
- Remove the steering stem locknut [B].

Special Tool - Steering Stem Nut Wrench: 57001-1100

- Remove the lock washer.
- Pushing up the stem base, and remove the steering stem nut [A] with stem cap [B].

Special Tool - Steering Stem Nut Wrench : 57001-1100 • Remove:

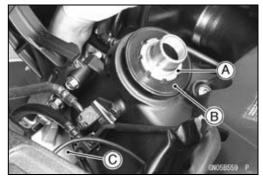
- Steering Stem [C] Upper Ball Bearing Inner Race and Ball Bearing
- To remove the bearing outer races [A] pressed into the head pipe [B], insert a bar [C] into the recesses [D] of head pipe, and applying it to both recess alternately hammer it to drive the race out.

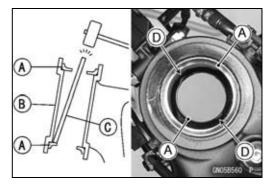
NOTE

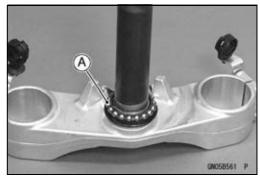
- Olf either steering stem bearing is damaged, it is recommended that both the upper and lower bearings (including outer races) should be replaced with new ones.
- Remove the bearing [A] from the steering stem.

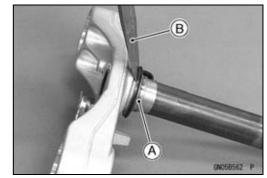
• Remove the lower ball bearing inner race (with its oil seal) [A] which is pressed onto the steering stem with a suitable commercially available chisel [B].











14-8 STEERING

Steering Stem

Stem, Stem Bearing Installation

- Replace the bearing outer races with new ones.
- Drive them into the head pipe at the same time.

Special Tools - Head Pipe Outer Race Press Shaft [A]: 57001-1075 Bearing Driver Set: 57001-1129 Head Pipe Outer Race Driver, ϕ 55 [B]: 57001 -1446

- Apply grease to the outer races.
- Replace the bearing inner races and oil seal with new ones.
- Apply grease to the oil seal.
- Install the oil seal [A] on the steering stem, and drive the lower ball bearing inner race [B] applied the grease onto the stem.

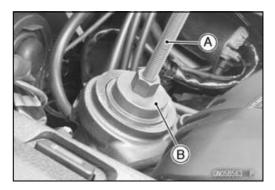
Special Tools - Steering Stem Bearing Driver, ϕ 42.5 [C]: 57001-1344

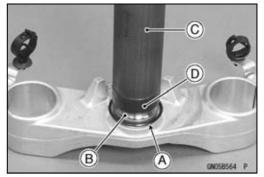
Steering Stem Bearing Driver Adapter, ϕ 41.5 [D]: 57001-1345

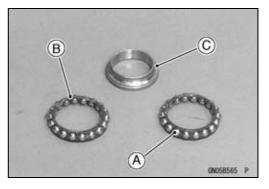
• Apply grease to the lower bearing [A], and install it onto the steering stem.

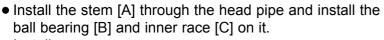
OThe upper and lower bearings are identical.

Apply grease to the upper bearing [B] and inner race [C].



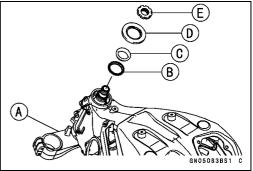






• Install:

Stem Cap [D] Steering Stem Nut [E]



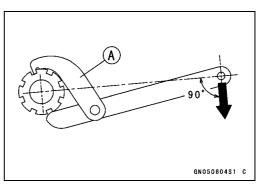
- Settle the inner races in place as follows.
- Apply grease to the thread of the steering stem nut and stem lock nut.

OTighten the steering stem nut with 55 N·m (5.6 kgf·m, 41 ft·lb) of torque first, and loosen it a fraction of a turn until it turns lightly. Afterward tighten it again with specified torque using a stem nut wrench [A] in the direction shown.

OCheck that there is no play and the steering stem turns smoothly without rattles. If not, the steering stem bearings may be damaged.

Special Tool - Steering Stem Nut Wrench: 57001-1100

Torque - Steering Stem Nut: 25 N·m (2.5 kgf·m, 18 ft·lb)



Steering Stem

- Install the lock washer [A] so that its bent side [B] faces upward, and engage the bent claws with the grooves of the steering stem locknut [C].
- Tighten the stem locknut by hand until the lock washer touches the steering stem nut [D].
- Tighten the stem locknut again until the claws are aligned with the grooves (ranging from 2nd to 4th) of the stem nut, and bend the two claws downward [E].
- Install the steering stem head [F].
- Install the washer [G], and tighten the steering stem head bolt [H] temporarily.
- Install the front forks (see Front Fork Installation in the Suspension chapter).

NOTE

- ○Tighten the upper front fork clamp bolts first, next the steering stem head bolt, last the lower front fork clamp bolts and handlebar clamp bolts.
- Tighten the two lower front fork clamp bolts alternately two times to ensure even tightening torque.
- Torque Front Fork Clamp Bolts (Upper): 20 N·m (2.0 kgf·m, 15 ft·lb)

Steering Stem Head Bolt: 108 N·m (11.0 kgf·m, 80 ft·lb)

Front Fork Clamp Bolts (Lower): 30 N·m (3.1 kgf·m, 22 ft·lb)

🛦 WARNING

If the handlebar does not turn to the steering stop it may cause an accident resulting in injury or death. Be sure the cables, harnesses and hoses are routed properly and do not interfere with handlebar movement (see Cable, Wire, and Hose Routing section in the Appendix chapter).

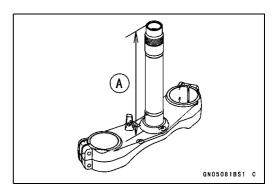
- Install the plug on the steering stem head bolt.
- Install the removed parts (see appropriate chapters).

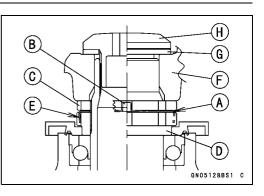
Steering Stem Bearing Lubrication

• Refer to the Steering Stem Bearing Lubrication in the Periodic Maintenance chapter.

Steering Stem Warp Inspection

- Whenever the steering stem is removed, or if the steering can not be adjusted for smooth action, check the steering stem for straightness.
- \star If the steering stem [A] is bent, replace the steering stem.

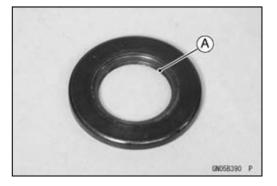




14-10 STEERING

Steering Stem

Stem Cap Deterioration, Damage Inspection ★Replace the stem cap if its oil seal [A] shows damage.



STEERING 14-11

Handlebar

Handlebar Removal

• Remove:

Clutch Master Cylinder [A] (see Clutch Master Cylinder Removal in the Clutch chapter) Left Handlebar Switch Housing [B] Handlebar Weight [C] Left Handlebar Grip (Grip Warmer) [D] Handlebar Bolt [E] Left Handlebar

• Remove:

Front Brake Master Cylinder [A] (see Front Brake Master Cylinder Removal in the Brakes chapter) Cover [B] Right Handlebar Switch Housing [C] Throttle Case [D] Handlebar Weight [E] Throttle Grip (Grip Warmer) [F] Handlebar Bolt [G] Right Handlebar

Handlebar Installation

- Fit the pin [A] of the handlebar to the recess [B] of the handlebar holder.
- Apply a non-permanent locking agent to the threads of the handlebar bolts.
- Tighten:

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

• Install the left and right handlebar switch housings. OFit the projection [A] into a small hole [B] in the handlebar.

Torque - Handlebar Switch Housing Screws: 3.5 N·m (0.36 kgf·m, 31 in·lb)

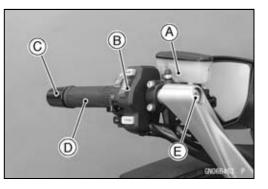
• Apply adhesive [A] to the inside of the left handlebar grip [B].

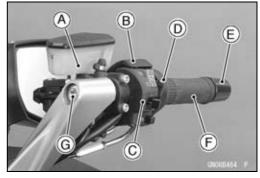
Sealant - Adhesive, TB1530C: 56042-0001

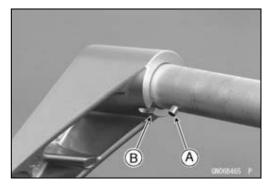
• Insert the left handlebar grip in the handlebar so that the grip fits the handlebar switch housing.

Clamp [C]

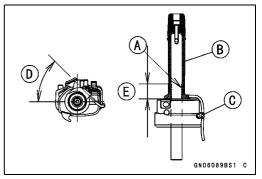
- 45° [D]
- 30 mm (1.2 in) or more [E]











14-12 STEERING

Handlebar

Install:

Throttle Grip

Throttle Case with Throttle Cable

○Fit the projection [A] into a small hole [B] in the handlebar.● Install:

Clutch Master Cylinder (see Clutch Master Cylinder Installation in the Clutch chapter)

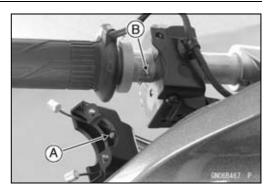
Front Brake Master Cylinder (see Front Brake Master Cylinder Installation in the Brake chapter)

• Apply a non-permanent locking agent to the threads of the handlebar weight bolts, and tighten them.

Handlebar Holder Removal

• Remove:

Left and Right Handlebar (see Handlebar Removal) Caps [A] and Handlebar Holder Bolts Handlebar Holder [B]

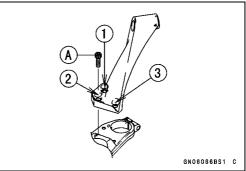




Handlebar Holder Installation

- Install the handlebar holder on the steering stem head.
- Tighten the handlebar holder bolts [A] following the tightening sequence [1-2-3-1].
 - Torque Handlebar Holder Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
- Install:
 - Caps

Left and Right Handlebar (see Handlebar Installation)



Frame

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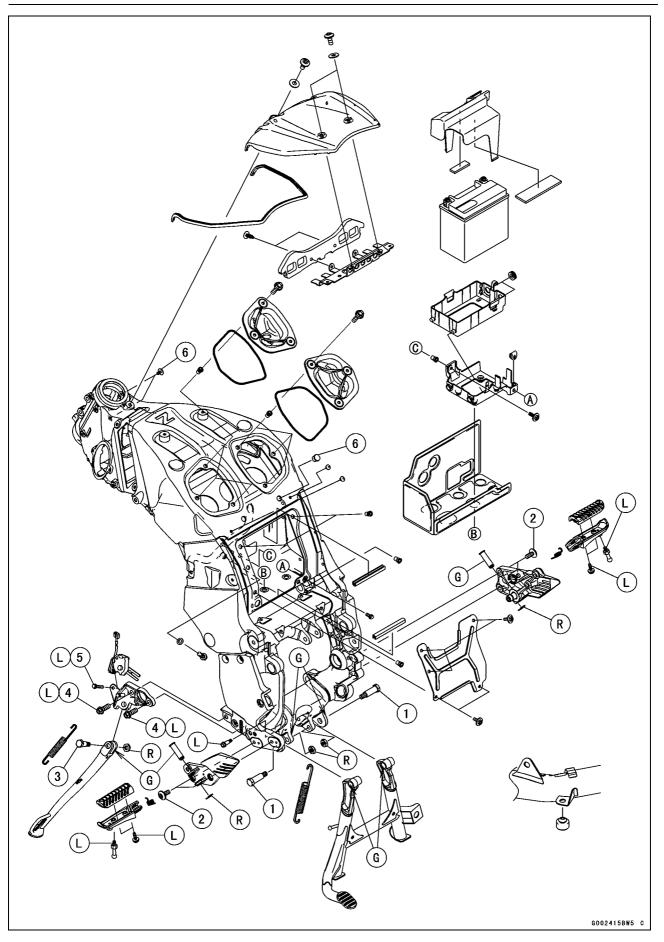
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15-2 FRAME

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
	Fasteller	N∙m	kgf∙m	ft·lb	Rellidiks
1	Center Stand Bolts	44	4.5	32	
2	Front Footpeg Bracket Bolts	25	2.5	18	
3	Sidestand Bolt	44	4.5	32	
4	Sidestand Bracket Bolts	49	5.0	36	L
5	Sidestand Switch Bolt	8.8	0.90	78 in·lb	L

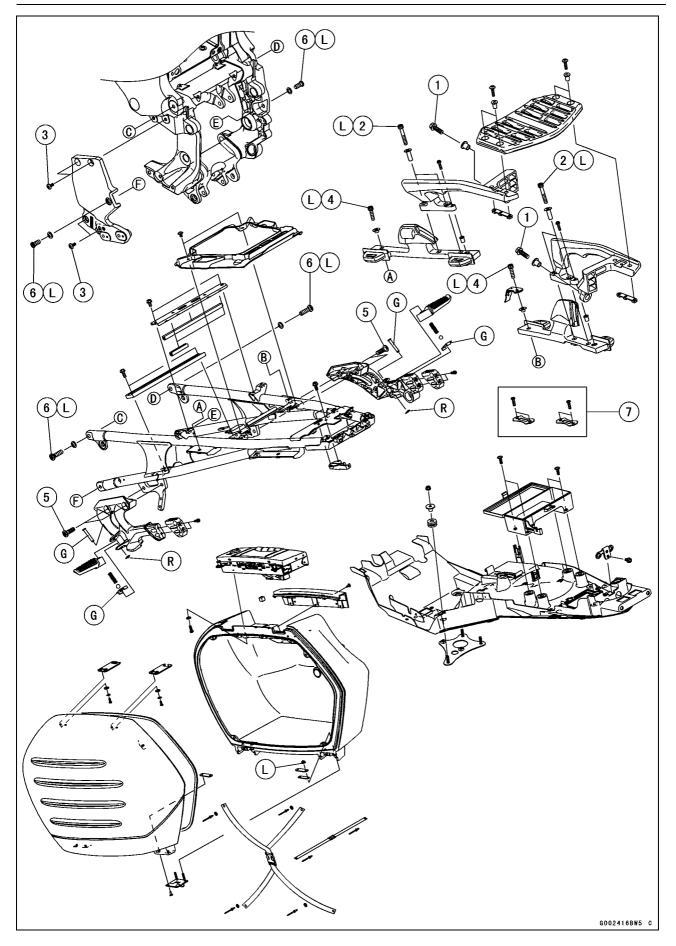
6. Other than K-ACT ABS Equipped Models

G: Apply grease. L: Apply a non-permanent locking agent.

R: Replacement Parts

15-4 FRAME

Exploded View



Exploded View

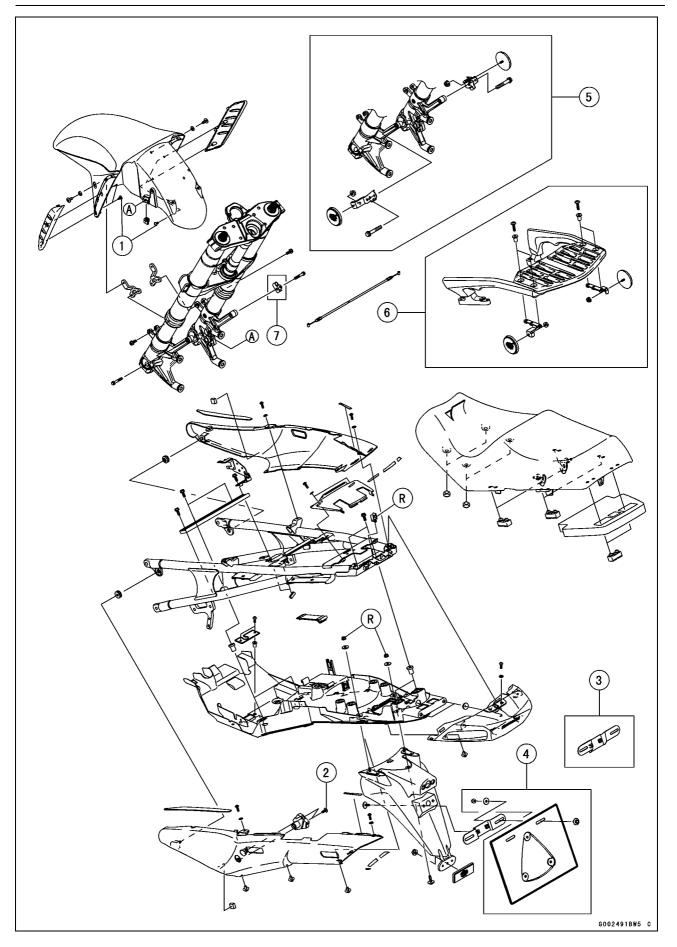
No.	Fastanar	Torque		Remarks	
	Fastener	N∙m	N·m kgf·m ft·l	ft·lb	Remarks
1	Carrier Bracket Bolts (M10)	34	3.5	25	
2	Carrier Bracket Bolts (M8)	25	2.5	18	L
3	Frame Side Bracket Bolts	25	2.5	18	
4	Hook Bracket Bolts	25	2.5	18	L
5	Rear Footpeg Bracket Bolts	34	3.5	25	
6	Rear Frame Bolts	44	4.5	32	L

7. EUR Models except the WVTA (FULL H)

G: Apply grease.L: Apply a non-permanent locking agent.R: Replacement Parts

15-6 FRAME

Exploded View



Exploded View

No.	Fastener	Torque			Bomorko
		N∙m	kgf∙m	ft·lb	Remarks
1	Front Fender Cover Screws	1.2	0.12	11 in·lb	
2	Seat Lock Screws	1.2	0.12	11 in·lb	

3. License Plate Bracket (CA and US Models)

4. AU Model only

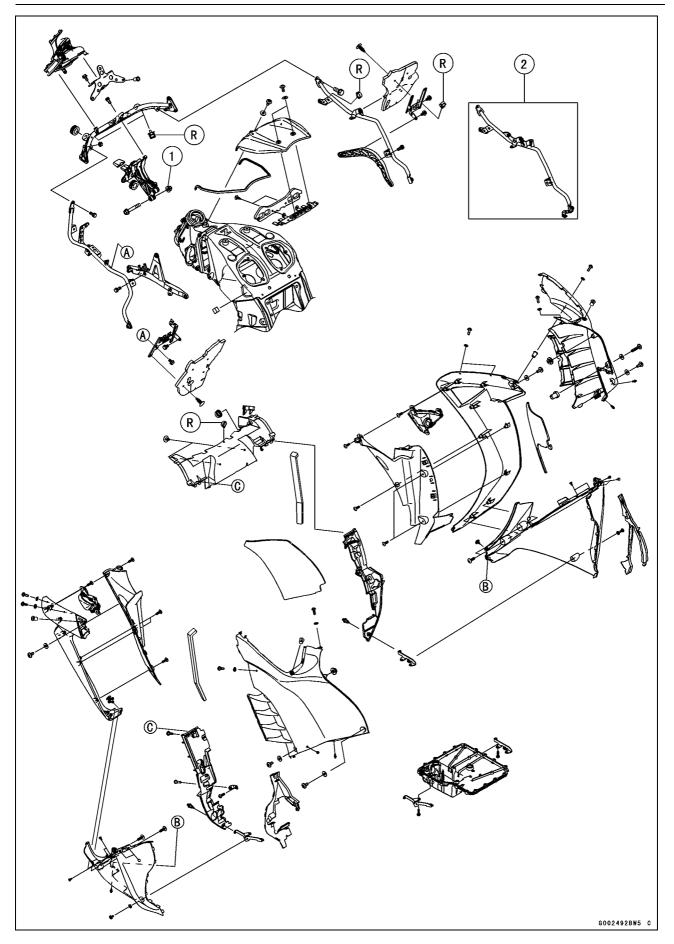
5. Reflectors (AU, CA and US Models)6. Reflectors (CA and US Models)

7. MY and EUR Models

R: Replacement Parts

15-8 FRAME

Exploded View



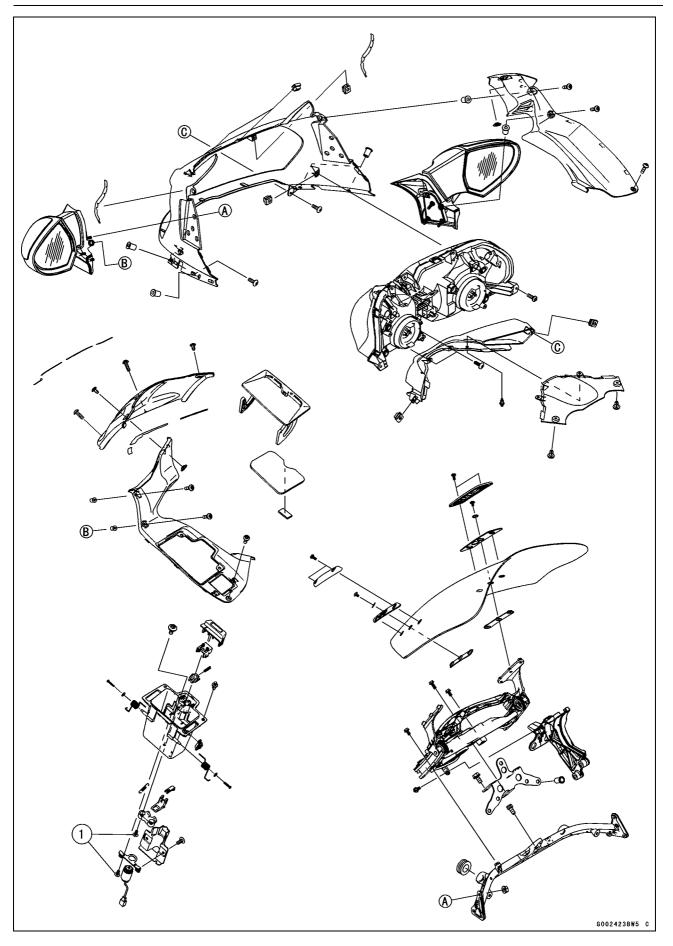
Exploded View

No.	Fastener	Torque			Remarks
		N∙m	kgf∙m	ft·lb	Remarks
1	Upper Fairing Bracket Nuts	25	2.5	18	

2. Canister Bracket (CAL and SEA Models)

15-10 FRAME

Exploded View



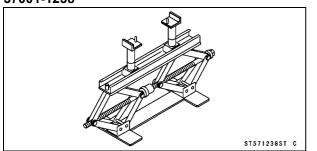
Exploded View

No.	Fastener	Torque			Remarks
		N∙m	kgf∙m	ft·lb	Relliarks
1	Storage Case Screws	0.7	0.07	6.2 in·lb	

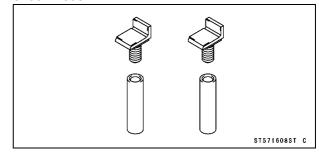
15-12 FRAME

Special Tools

Jack: 57001-1238



Jack Attachment: 57001-1608



Seat

Seat Removal

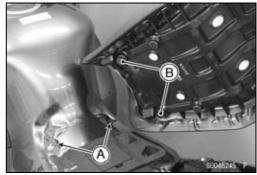
• Insert the key knob [A] into the seat lock and, turning the key counterclockwise, pulling up on the rear of the seat [B], and pulling the seat backward.

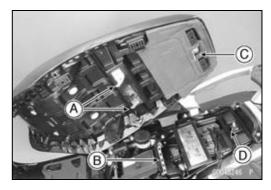
Seat Installation

• Insert the brackets [A] of the fuel tank into the slots [B] of the seat.

- Fit the hooks [A] of the seat under the frame [B], and insert the seat projection [C] into the slot [D] of the frame.
- Push down the rear part of the seat until the lock clicks.
- Push up the front and rear end of the seat to make sure they are securely locked.







15-14 FRAME

Fairings

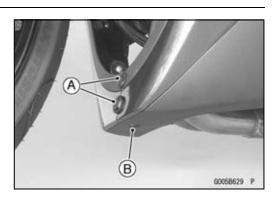
Lower Fairing Removal

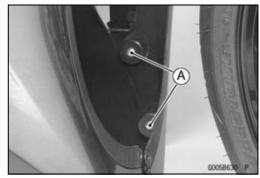
• Remove the quick rivets.

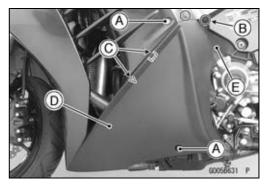
OPull up the core of the quick rivets [A] by the thin blade driver.

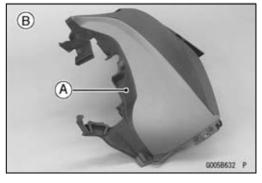
OPush the central pin of the quick rivet [B].

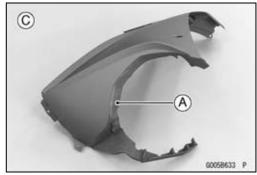
• Remove the screws [A].











- Remove: Bolts with Washers [A] Quick Rivets [B]
- OPush the central pin of the quick rivets.
- Clear the tabs [C] from the slots.
- Remove the lower fairing [D] together with the rubber cover [E].

Lower Fairing Installation

• Be sure to install the rubber cover [A] on the lower fairing. Left Side [B] Right Side [C]

Fairings

- Insert the tabs [A] into the slots [B].
- Set the quick rivets and push the core of them.
- Tighten the screws, bolts with washers.

• For the left lower fairing, insert the idle adjust screw [A] into the hole [B] of the rubber cover.



- Remove the inner cover (see Inner Cover Removal).
- For the right side, remove the bolt [A] and right cover [B].

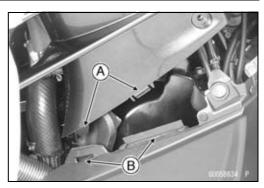
 Remove: Bolts [A] with Washers Quick Rivets [B]

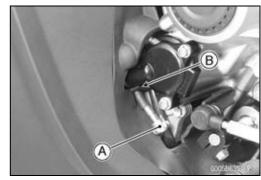
OPush the central pin of the quick rivets.

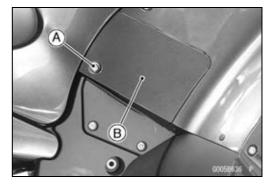
- Detach the projection [C], and clear the tabs [D].
- Remove the rear middle fairing [E].

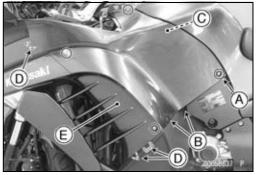
Rear Middle Fairing Installation

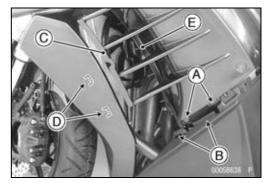
- Insert the tabs [A] of the lower side on the rear middle fairing into the slots [B], and Insert the front part [C] of the rear middle fairing into the hooks [D] on the front middle fairing.
- OBe sure that the inner rubber cover [E] fits the rear middle fairing.







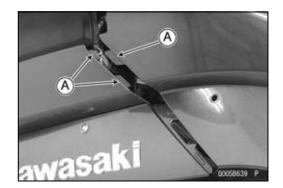


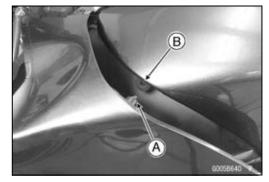


15-16 FRAME

Fairings

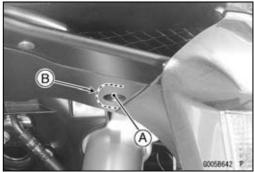
• Insert the tabs [A] into the inside of the fairings.











- Insert the projection [A] into the hole [B] of grommet.
- Set the quick rivets and push the core of them.
- Tighten the bolts with washers.
- Install the removed parts (see the appropriate chapters).

Front Middle Fairing Removal

• Remove:

Rear Middle Fairing (see Rear Middle Fairing Removal) Bolts [A] with Washers

Quick Rivets

OPull up the core of the quick rivets [B] by the thin blade driver.

 $\bigcirc \mathsf{Push}$ the central pin of the quick rivet [C].

• Remove the screws [A].

• Remove the quick rivet [A].

- OPush the central pin of the quick rivet.
- Clear the stopper [B].

Fairings

- Disconnect the front turn signal light lead connector [A].
- Remove the front middle fairing.

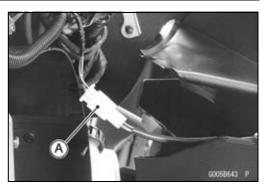
Front Middle Fairing Installation

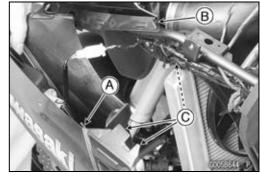
- Connect the turn signal lead connector.
- Fit the hook [A] of the front middle fairing on the rib [B] of the upper fairing.
- Insert the tabs [C] into the inside of the fairing and cover.
- Set the quick rivet and push the core of it.
- Tighten the screws, bolts with washers.
- Install the removed parts (see appropriate chapters).

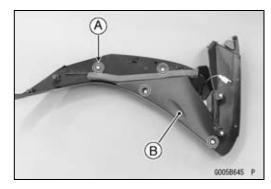
Front Middle Fairing disassembly

• Remove:

Front Middle Fairing (see Front Middle Fairing Removal) Screws [A] Fairing Inner Cover [B]



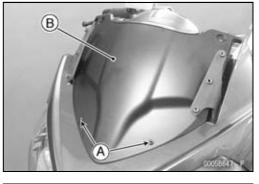


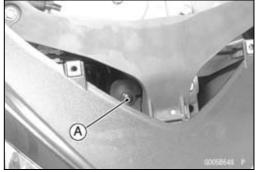




 Remove: Front Middle Fairing (see Front Middle Fairing Removal) Windshield (see Windshield Removal) Upper Inner Fairing (see Upper Inner Fairing) Rear View Mirror (see Rear View Mirror Removal) Bolts [A] Electric Windshield Actuator Cover [B]

• Remove the bolt [A].





15-18 FRAME

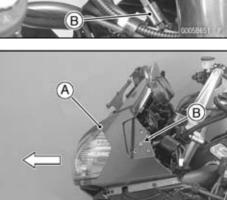
Fairings

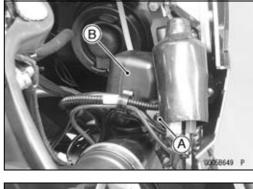
• Remove: Bolts [A] Right Resonator [B]

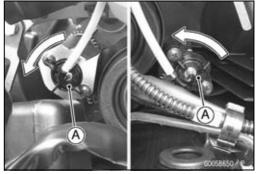
• Turn the fittings [A] of the headlight aiming cable counter-clockwise and remove them.

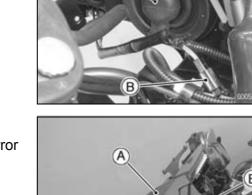
• Disconnect: Headlight Connectors [A] (Both Sides) City Light Lead Connector [B]

- Pull out the upper fairing [A] forward.
- OPull the both side of the fairing to clear the rear view mirror bracket [B].





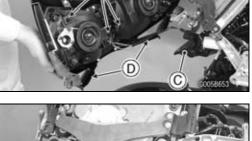


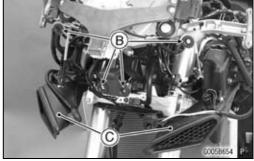


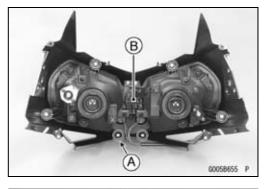
Fairings

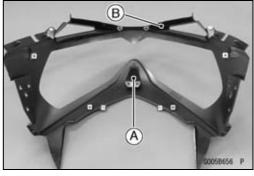
Upper Fairing Installation

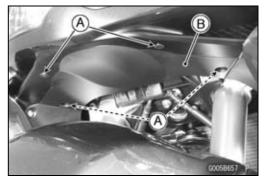
- Insert the projections [A] of the upper fairing in to the holes [B] of the bracket.
- Fit the inlet air duct [C] onto the inlet air duct fairing [D].
- Run the leads and cables correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).











Upper Fairing Disassembly

Remove:

Upper Fairing (see Upper Fairing Removal) Screws [A] Headlight Unit [B]

Upper Fairing Assembly

- Set the fairing damper bracket [A] and the inlet air duct fairing [B].
- Install the head light unit, and tighten the screws.

Upper Inner Fairing Removal

 Remove: Quick Rivets [A] Upper Inner Fairing
 OPush the central pin of the quick rivet.
 OSlide out the upper inner fairing backward.

15-20 FRAME

Fairings

Upper Inner Fairing Installation

- Insert the tabs [A] into the inside of the fairing and inner fairing.
- Set the quick rivets and push the core of them.



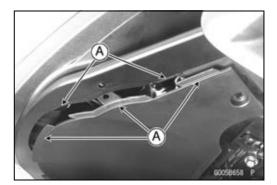
 Remove: Left Front Middle Fairing (see Front Middle Fairing Removal) Bolts [A]

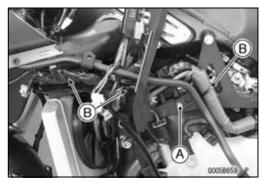
- Open the clamps [B].
- Open the clamp [A].
- Remove: Bolts [B] Left Fairing Stay [C]

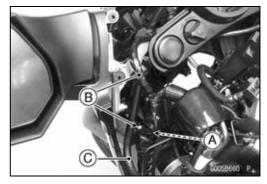
Right Fairing Stay Removal

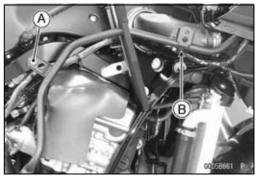
 Remove: Right Front Middle Fairing (see Front Middle Fairing Removal) Bolt [A]

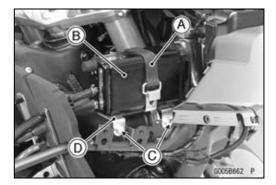
- Open the clamp [B].
- Remove (CAL and SEA Models): Band [A] Canister [B] Bolts [C] Bracket [D]







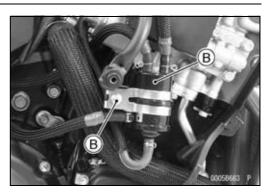




Fairings

 Remove (CAL and SEA Models): Bolt [A] Separater [B]

- Open the clamp [A].
- Remove: Bolts [B] Right Fairing Stay [C]





Fairing Stay Installation

- Installation is the reverse of removal.
- Run the leads and cables correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

Upper Fairing Bracket Removal

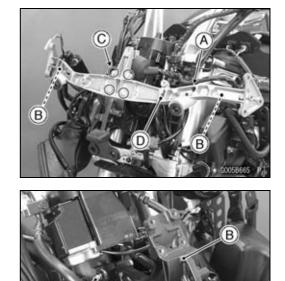
• Remove:

Upper Fairing (see Upper Fairing Removal) Meter Cover (see Meter Cover Removal) Electric Windshield Assembly (see Electric Windshield Assembly Removal in the Electrical System chapter)

- Open the clamp [A].
- Remove:

Fairing Stay Bolts [B] Rear View Mirror Bracket Bolts [C] Rear View Mirror Bracket [D]

 Remove: Upper Fairing Bracket Nuts [A] and Bolts Upper Fairing Bracket [B]



15-22 FRAME

Fairings

Upper Fairing Bracket Installation

- Installation is reverse of removal.
- Tighten:

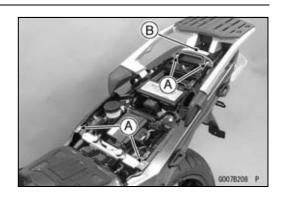
Torque - Upper Fairing Bracket Nuts: 25 N·m (2.5 kgf·m, 18 ft·lb)

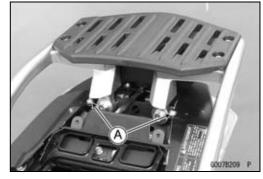
• Run the leads and cables correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

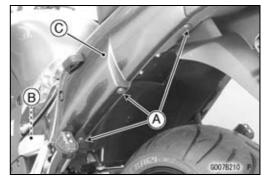
Seat Cover

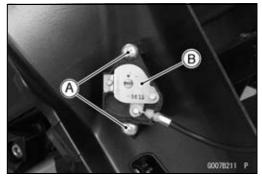
Seat Cover Removal

- Remove: Saddlebag (see Saddlebag Removal) Seat (see Seat Removal) Bolts with Washers [A] Center Seat Cover [B]
- Remove the bolts [A] and washers.









- Remove the quick rivets [A].
- OUnscrew the core of the quick rivets.
- Detach the projection [B], and remove the side seat cover [C].
- For the left side seat cover, remove the screws [A] and seat lock assy with cable [B].

Seat Cover Installation

- For the left side seat cover, install the seat lock assy.
- Tighten:

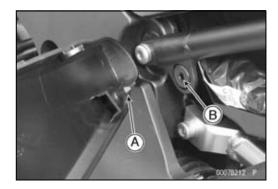
Torque - Seat Lock Screws: 1.2N·m (0.12 kgf·m, 11 in·lb)

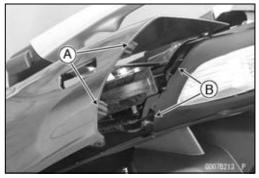
15-24 FRAME

Seat Cover

• Insert the projection [A] to the hole [B].

- Insert the tabs [A] of the seat cover into the slots [B] of the tail light cover.
- Install the removed parts.







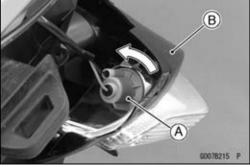
• Remove:

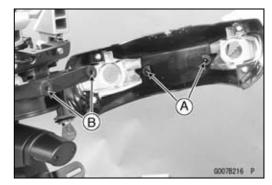
Seat Covers (see Seat Cover Removal) Tail/Brake Light (LED) (see Tail/Brake Light (LED) Removal in the Electrical System chapter) Bolts [A] with Washers Quick Revets [B] OUnscrew the core of the quick rivets.

 $\bigcirc \mathsf{Pull}$ out the tail cover [C] backward.

- Turn the socket [A] counterclockwise (both sides).
- Remove the tail cover [B].







Tail Cover Installation

- Insert the projections [A] of the cover into the hole [B] of the frame.
- Install the removes parts (see appropriate chapters).

Fenders

Front Fender Removal

- Remove: Bolts [A] with Washer (Both Sides) Bolts [B] (Both Sides)
 Brake Hose Clamps [C] (Both Sides)
- Remove the front fender assy [D].
- Remove the screws [A].
- Separate the front fender covers [B] and front fender [C].

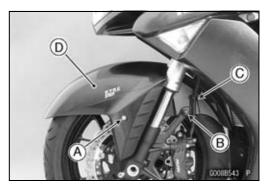
Front Fender Installation

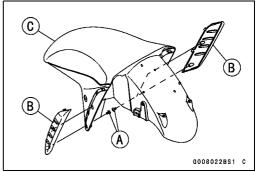
• Install the front fender covers to the front fender.

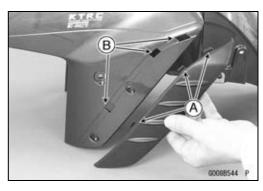
- OInsert the hooks [A] of the front fender cover into the slots [B] of the front fender.
- Install the front fender assy to the front fork, and tighten the bolts.
- Install the brake hose clamps to the front fender holes.

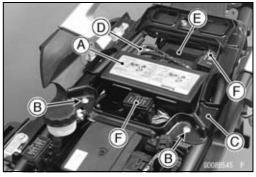
Flap and Rear Fender Removal

Remove: Saddlebag (see Saddlebag Removal) Seat (see Seat Removal) Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter) Tail Cover (see Tail Cover Removal) Tool Kit Case [A] (see ECU Removal in the Fuel System (DFI) chapter) Bolts [B] Cover [C] Kawasaki Self-diagnosis System Connections with Holder [D] ECU and Relay Box [E] (see ECU Removal in the Fuel System (DFI) chapter) Fuse Boxes [F]









15-26 FRAME

Fenders

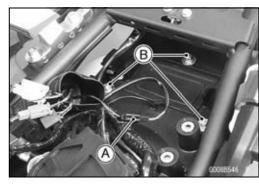
- Disconnect the lisense plate light lead connector [A].
- Remove: Flap Mounting Nuts [B] Flaps

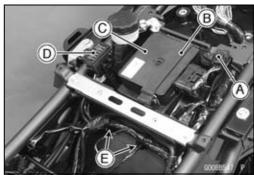
• Remove:

Atmospheric Pressure Sensor [A] (Atmospheric Pressure Sensor Removal in the Fuel System (DFI) chapter) Band [B] KIPASS ECU [C] Fuse Box [D]

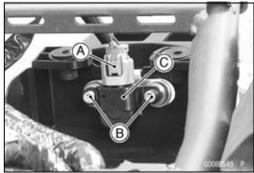
- Open the clamps [E].
- Remove: Bolts [A]

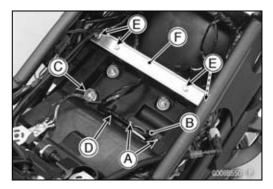
- Disconnect the vehicle-down sensor connector [A].
- Unscrew the bolt [B] and remove the vehicle-down sensor [C].
- Remove:
 - Bolts [A] Lead Cover [B]
 - Regulator/Rectifier Mounting Nuts [C]
- Open the clamp [D].
- ODisconnect the regulator/rectifier connector and remove the regulator/rectifier.
- Remove: Bolts [E] Cross Bar [F]











Fenders

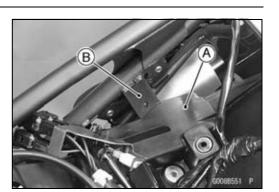
• Pull out the rear fender [A] backward and downward. OCleare the fender from the frame bracket [B].

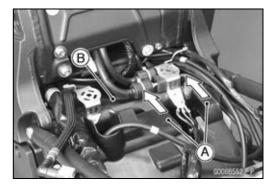
Flap and Rear Fender Installation

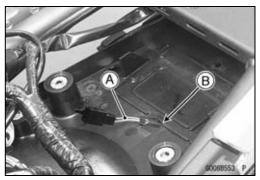
• Put the front portion [A] of the rear fender on the frame [B].

• Before installing the flap, run license plate light lead [A] to the holes [B] of the rear fender and flap.

- Replace the flap mounting nuts and regulator/rectifier mounting nuts with new ones.
- Install the removed parts (see appropriate chapters).
- Run the harness correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).







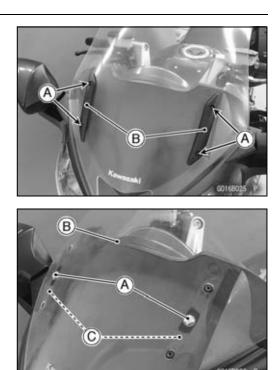
15-28 FRAME

Windshield

Windshield Removal

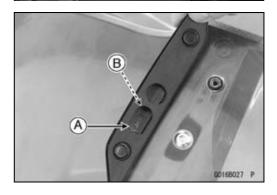
 Remove: Bolts [A] Holder Plates [B] with Rubber Damper

 Remove: Bolts [A] with Washers Windshield [B] Rubber Damper [C]



Windshield Installation

- Installation is the reverse of removal.
- OBe sure that the "FWD" mark [A] of the holder plate and hole of the rubber damper are forward.
- OInstall the holder plate marked "L" mark [B] to the left side, install the holder plate marked "R" mark to the right side.



Frame

Rear Frame Removal

• Remove:

Rear Fender (see Rear Fender Removal) Carrier (see Carrier Removal) Muffler Body Bolt [A] Rear Footpeg Bracket Bolts [B] and Brackets (Both Sides) Rear Frame Bolts [C] Rear Frame [D]

Rear Frame Installation

• Apply a non-permanent locking agent to the thread of the rear frame bolt, and tighten them.

Torque - Rear Frame Bolts: 44 N·m (4.5 kgf·m, 32 ft·lb) Rear Footpeg Bracket Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)

• Install the removed parts (see appropriate chapters).

Left Subframe Removal

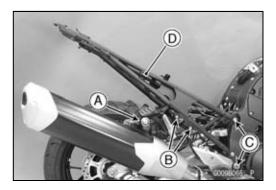
• Remove:

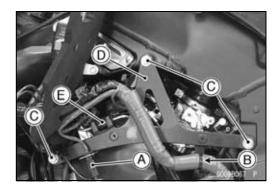
Left Fairing Stay (Left Fairing Stay Removal) Left Inner Rubber Cover (Left Inner Rubber Cover Removal)

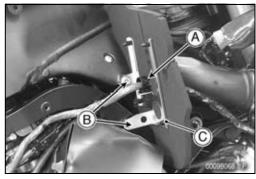
- Disconnect the cooling fan lead connector [A].
- Open the clamp [B].
- Remove the bolts [C].
- Pull out the subframe [D] from the damper [E], using a rubber lubricant.

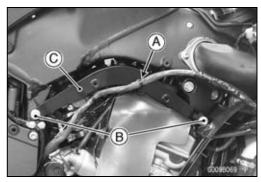
Right Subframe Removal

- Remove the right fairing stay (see Right Fairing Stay Removal).
- Open the clamp [A]
- Remove: Bolts [B] Bracket [C]
- Open the clamp [A].
- Remove: Bolts [B] Right Subframe [C]









15-30 FRAME

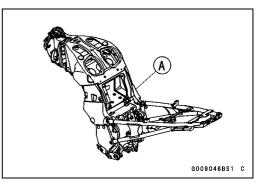
Frame

Frame Inspection

- Visually inspect the frame [A] for cracks, dents, bending, or warp.
- \star If there is any damage to the frame, replace it.

A WARNING

A repaired frame may fail in use, possibly causing an accident resulting in injury or death. If the frame is bent, dented, cracked, or warped, replace it.



Cover

Front Fuel Tank Cover Removal

 Remove: Bolts [A] with Washers Front Fuel Tank Cover



• Be sure that the rubber trim [A] is installed on the front fuel tank cover.

Inner Cover Removal

- Move the windshield to the upper position temporary.
- Remove:

Front Fuel Tank Cover (see Front Fuel Tank Cover Removal)

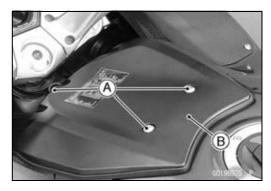
Bolts [A] Bolt [B] (for Left Inner Cover) Quick Rivet [C] Inner cover [D]

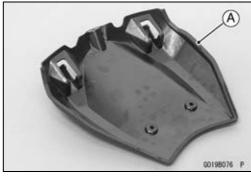
 $\bigcirc \ensuremath{\mathsf{Push}}$ the central pin of the quick rivet.

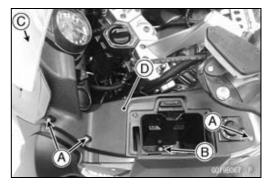
• For the left inner cover, disconnect the storage case solenoid lead connector [A] and grip warmer lead connectors [B].

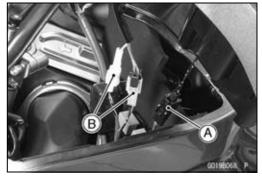
Inner Cover Installation

- Insert the tabs [A] into the inside of the fairing or inner cover.
- Set the quick rivet and push the core of it.
- Tighten the bolts.
- Install the removed part (see appropriate chapter).











15-32 FRAME

Cover

Left Inner Rubber Cover Removal

• Remove:

Left Lower Fairing (see Lower Fairing Removal) Left Rear Middle Fairing (see Rear Middle Fairing Removal)

- Clamp the coolant hose [A] with the suitable clamper [B].
- Remove the coolant reserve tank bolts [C].
- Remove the coolant reserve tank [D] by pulling out the hose with water remains in the reservoir.
- Remove:
 - Quick Rivets [A]
 - Left Inner Rubber Cover [B]
- Push the central pin of the quick rivets.

Left Inner Rubber Cover Installation

- Insert the hooks [A] of the radiator cover into the slots [B] of the rubber cover.
- Set the quick rivets and push the core of them.
- Install the coolant reservoir tank.
- Apply a non-permanent locking agent to the threads of the coolant reserve tank bolts.
- Tighten:

Torque - Coolant Reserve Tank Bolts: 3.9 N·m (0.40 kgf·m, 35 in·lb)

• Install the removed parts (see appropriate chapters).

Right Inner Rubber Cover Removal

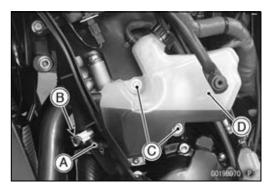
• Remove:

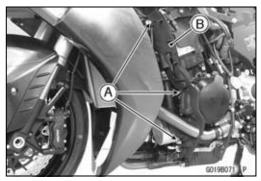
Right Lower Fairing (see Lower Fairing Removal) Right Rear Middle Fairing (see Rear Middle Fairing Removal)

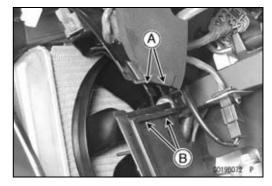
Quick Rivet [A]

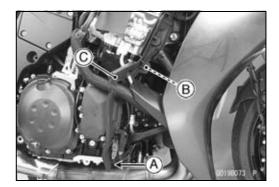
 $\bigcirc \mathsf{Push}$ the central pin of the quick rivet.

• Detach the projection [B], and remove the right inner rubber cover [C].









Cover

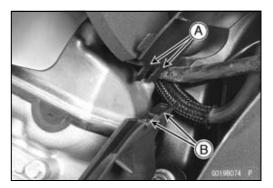
Right Inner Rubber Cover Installation

- Insert the projection of the rubber cover into the hole of the engine.
- Insert the hooks [A] of the radiator cover into the slots [B] of the rubber cover.
- Set the quick rivet and push the core of it.
- Install the removed parts (see appropriate chapters).

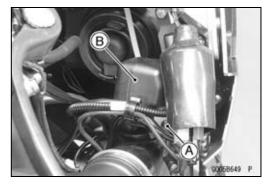
Meter Cover Removal

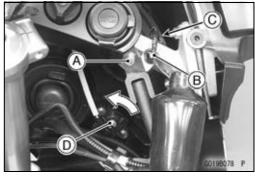
- Remove: Meter Unit (see Meter Unit Removal in the Electrical System chapter) Inner Covers (see Inner Cover Removal) Bolt [A]
- Open the clamp [B].
- Turn the fitting [C] of the headlight aiming cable counterclockwise and remove it.
- Remove: Bolt [A] Right Resonator [B]

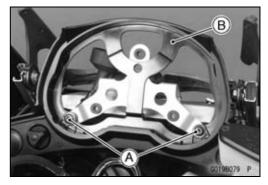
- Remove the bolt [A].
- Open the clamp [B].
- Disconnect the DC12 V accessory socket lead connectors [C].
- Turn the fitting [D] of the headlight aiming cable counterclockwise and remove it.
- Remove: Bolts [A] and Collars Meter Cover [B]







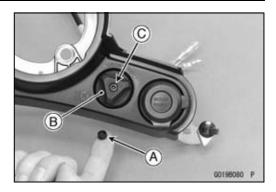


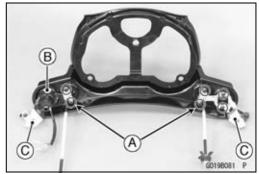


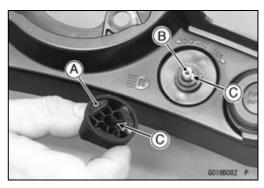
15-34 FRAME

Cover

- Remove the cap [A] of the headlight aiming knob [B] (both sides).
- Detach the knob by removing the bolt [C] (both sides).







 Remove: Screws [A] Ring Nut [B] Brackets [C]

Meter Cover Installation

- Installation is reverse of removal.
- OInsert the knob [A] onto the cable end [B] so that the each flat faces [C] are fit.

Center Stand, Sidestand

Center Stand Removal

• Remove:

Muffler Bodies (see Muffler Body Removal in the Engine Top End chapter)

- Using the jack [A] rais the rear wheel off the ground
 - Special Tools Jack: 57001-1238 Jack Attachment [B]: 57001-1608
- Remove:

Lower Tie-Rod Bolt (see Tie-Rod Removal in the Suspension chapter)

Lower Rear Shock Absorber Bolt (see Rear Shock Absorber Removal in the Suspension chapter)

Bolts [A]

Spring [B]

Center Stand Bolts [C] and Nuts Center Stand [D]

Center Stand Installation

- Apply grease to the sliding area [A] of the center stand [B].
- Tighten the center stand bolts [C] and lock them with the new nuts.

Torque - Center Stand Bolts: 44 N·m (4.5 kgf·m, 32 ft·lb)

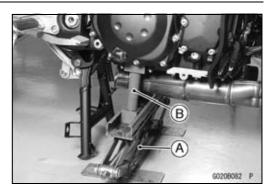
• Hook the spring [D] so that the long end [E] of it faces upward.

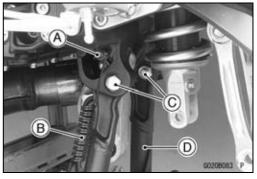
OApply a non-permanent locking agent to the spring bolt [F] and tighten it with spring.

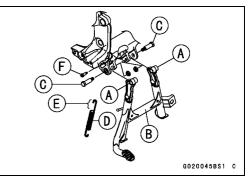
OInstall the spring hook direction as shown in the figure.

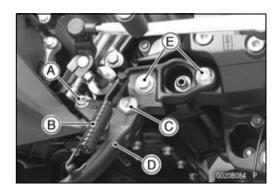
Sidestand Removal

- Use the center stand to support the motorcycle upright.
- Remove: Sidestand Switch Bolt [A] Spring [B] Sidestand Bolt [C] and Nut Sidestand [D] Sidestand Bracket Bolts [E]









15-36 FRAME

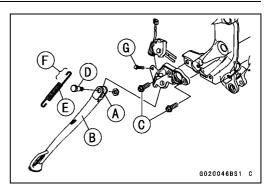
Center Stand, Sidestand

Sidestand Installation

- Apply grease to the sliding area [A] of the sidestand [B].
- Apply a non-permanent locking agent to the bracket bolts [C].
- Tighten the sidestand bolt and lock it with the new nut.
 - Torque Sidestand Bracket Bolts: 49 N·m (5.0 kgf·m, 36 ft·lb)

Sidestand Bolt [D]: 44 N·m (4.5 kgf·m, 32 ft·lb)

- Hook the spring [E] so that the long end [F] of it faces upward.
- OInstall the spring hook direction as shown in the figure.
- Install the sidestand switch.
- OApply a non-permanent locking agent to the switch bolt [G], and tighten it.
 - Torque Sidestand Switch Bolt: 8.8 N·m (0.90 kgf·m, 78 in·lb)



Saddlebag (Accessory)

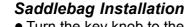
Saddlebag Removal

- Insert the key knob [A] into the lid lock.
- Turn the key knob to the lever side from the lock mark.

- Pull up the handle [A] on the top of the saddlebag [B].
- Remove the saddlebag by pulling it up.







- Turn the key knob to the lever side from the lock mark.
- While aligning the holder [A] on the below of the saddlebag with the projection [B] on the near of the rear footpeg, insert the hooks [C] on the top of the saddlebag into the holders [D] of the rear of the frame.
- Push back the handle to the original position.

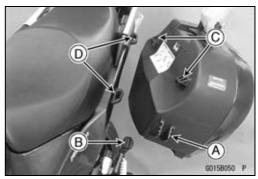
NOTE

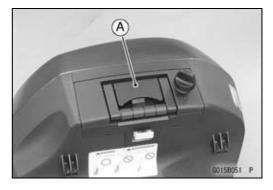
OMark sure that the saddlebag and lid are securely locked by pulling the handle, saddlebag, lid, and lever.

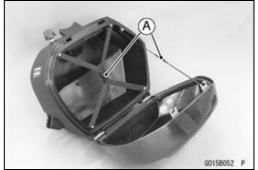
Saddlebag Disassembly

- Remove the saddlebag.
- Turn the key knob to the lever side from the lock mark.
- Pull up the lever [A] on the top of the saddlebag.

• Unlock the hooks [A] of the band.



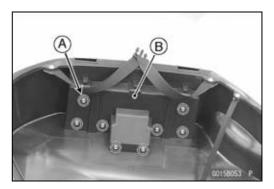




15-38 FRAME

Saddlebag (Accessory)

- Unscrew the screws [A] of the saddlebag lock assy.
- Remove the saddlebag lock assy [B].



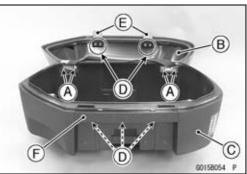
- Unscrew the hinge nuts [A] and separate the lid [B] and case [C].
- Remove:
 - Screws [D] Hooks [E]
 - Lid Cover [F]
- Drill the surface of the rivet using a 1.0 to 1.5 mm drill bit

NOTE

- OStop drilling when the rivet head starts to turn with drill bit.
- Remove the bands.

Saddlebag assembly

- Apply a non-permanent locking agent to the hinge nuts.
- Secure the bands to the case with the rivets using a riveter.

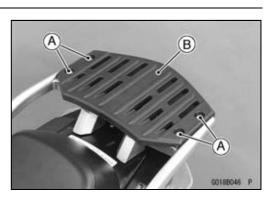


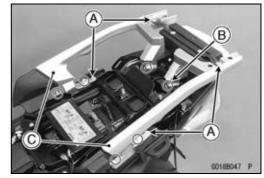
Carrier

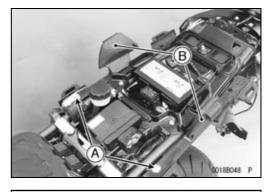
Carrier Removal

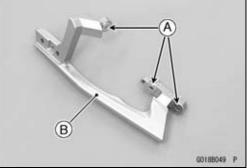
- Remove the saddlebag (see Saddlebag Removal).
- Unscrew the bolts [A] and remove the carrier [B].

- Remove: Seat Cover (seat cover Removal) Bolts [A] Carrier Bracket Bolts [B] Right and Left Carrier Bracket [C]
- Remove: Hook Bracket Bolts [A] Right and Left Hook Brackets [B]









Carrier Installation

OSet the collars [A] before installing the Carrier Bracket [B]. ● Tighten:

Torque - Hook Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb) Carrier Bracket Bolts (M10): 34 N·m (3.5 kgf·m, 25 ft·lb)

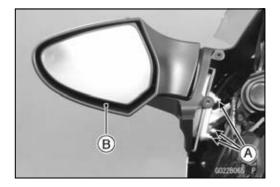
Carrier Bracket Bolts (M8): 25 N·m (2.5 kgf·m, 18 ft·lb)

15-40 FRAME

Rear View Mirror

Rear View Mirror Removal

 Remove: Inner Cover (see Inner Cover Removal) Rear Middle Fairing (see Rear Middle Fairing Removal) Nuts [A] Rear View Mirror [B]



Rear View Mirror Installation

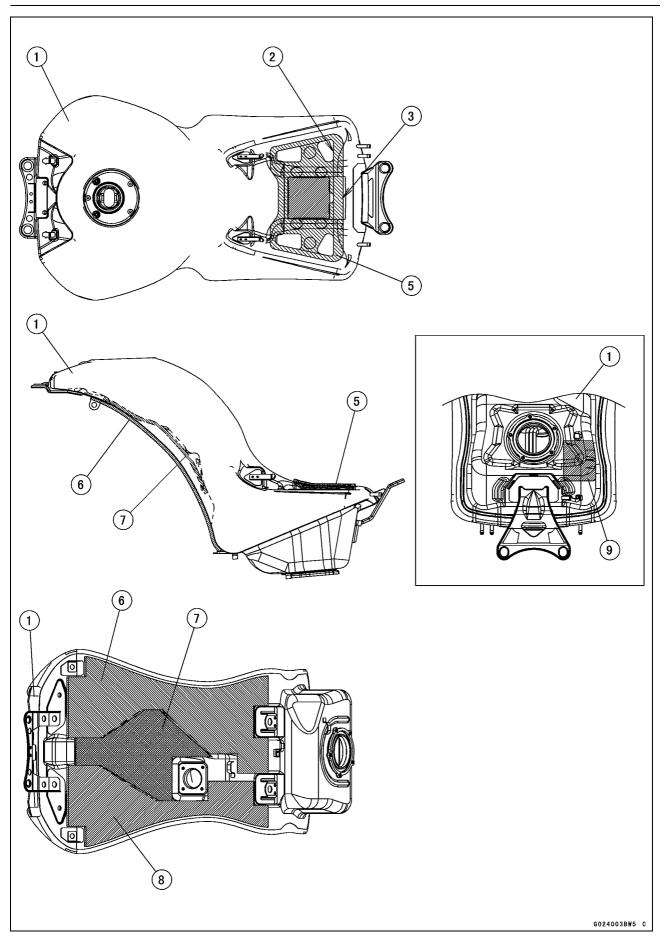
• Installation is the reverse of removal.

Pads

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15-42 FRAME

Pads

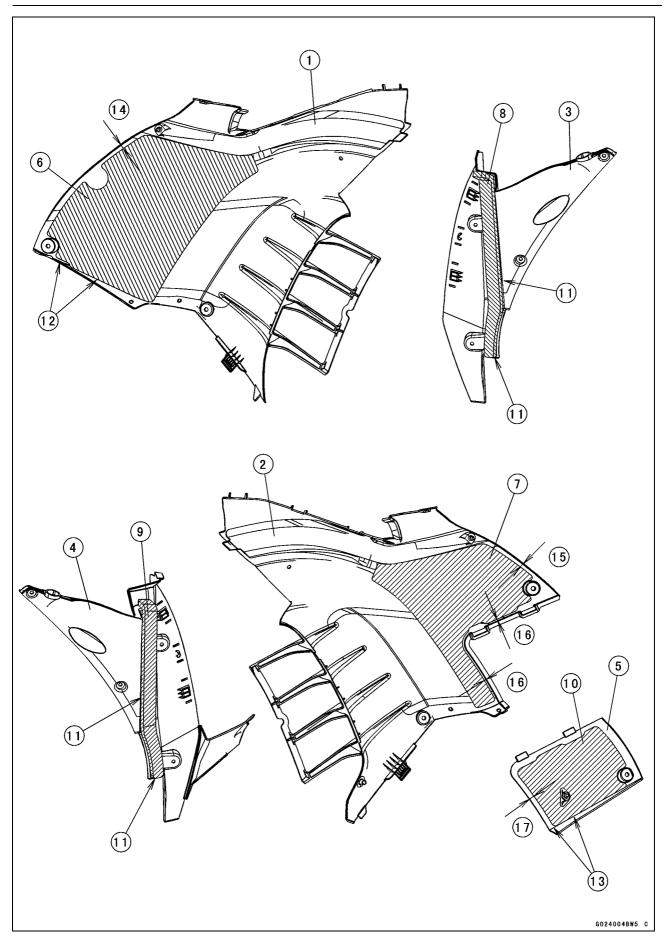


Pads

- 1. Fuel Tank
- 2. Align the pad with plate of the fuel tank.3. Align the pad with weld of the fuel tank.
- 4. Pad
- 5. Pad
- 6. Pad
- 7. Pad
- 8. Pad
- 9. Guard

15-44 FRAME

Pads



Pads

1. Left Rear Middle Fairing

- 2. Right Rear Middle Fairing
- 3. Left Fairing Inner Cover
- 4. Right Fairing Inner Cover
- 5. Right Cover
- 6. Pad
- 7. Pad
- 8. Pad
- 9. Pad
- 10. Pad
- 11. Follow the shape of the inner cover.
- 12. Follow the corner of the middle fairing.
- 13. Follow the corner of the right cover.
- 14. 7 ~ 8 mm (0.28 ~ 0.31 in)
- 15. 6 ~ 7 mm (0.24 ~ 0.28 in)
- 16. 3 ~ 4 mm (0.12 ~ 0.16 in)
- 17.9 ~ 10 mm (0.35 ~ 0.39 in)

Electrical System

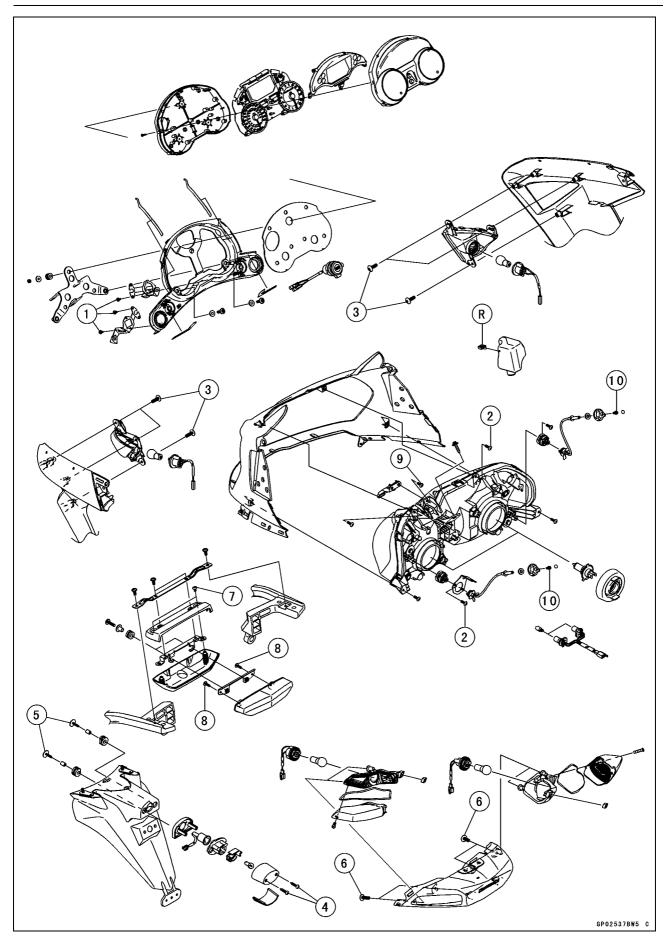
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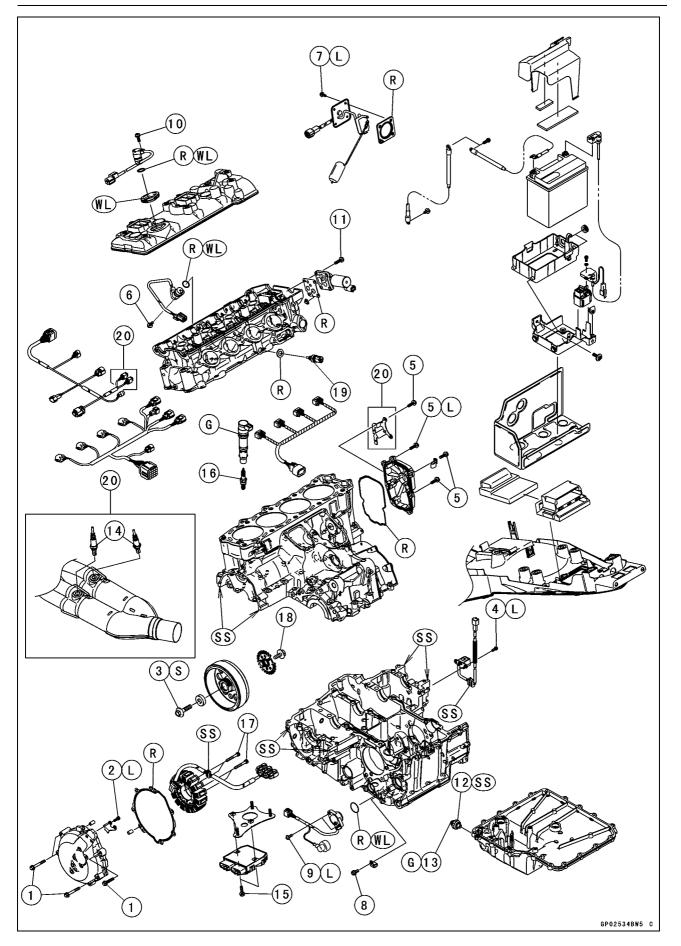
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16-4 ELECTRICAL SYSTEM



No	Eastanar	Torque			Bomarka
No.	Fastener	N∙m	kgf∙m	ft·lb	Remarks
1	Adjuster Knob Bracket Screws	1.2	0.12	11 in·lb	
2	Aiming Bracket Screws	1.2	0.12	11 in·lb	
3	Front Turn Signal Light Mounting Screws	1.2	0.12	11 in·lb	
4	License Plate Light Cover Mounting Screws	0.90	0.09	8 in·lb	
5	License Plate Light Mounting Screws	1.2	0.12	11 in·lb	
6	Rear Turn Signal Light Mounting Screws	1.2	0.12	11 in·lb	
7	Tail Light Cover Bracket Bolts	1.2	0.12	11 in·lb	
8	Tail Light Screws	1.2	0.12	11 in·lb	
9	Upper Fairing Damper Bracket Screws	1.2	0.12	11 in·lb	
10	Headlight Beam Adjuster Bolts	1.5	0.15	13 in·lb	

16-6 ELECTRICAL SYSTEM



Exploded View

No. Footonor					
No.	Fastener	N·m kgf·m		ft·lb	Remarks
1	Alternator Cover Bolts	9.8	1.0	87 in·lb	
2	Alternator Lead Holding Plate Bolts	8.3	0.85	73 in·lb	L
3	Alternator Rotor Bolt	155	15.8	114	S
4	Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	L
5	Crankshaft Sensor Cover Bolts	9.8	1.0	114	L (1)
6	Exhaust Camshaft Position Sensor Bolts	9.8	1.0	87 in·lb	
7	Fuel Level Sensor Bolts	6.9	0.70	61 in·lb	L
8	Gear Position Switch Lead Clamp Bolt	9.8	1.0	87 in·lb	
9	Gear Position Switch Screws	2.9	0.30	26 in·lb	L
10	Inlet Camshaft Position Sensor Bolts	9.8	1.0	87 in·lb	
11	Oil Control Solenoid Valve Bolts	9.8	1.0	87 in·lb	
12	Oil Pressure Switch	15	1.5	11	SS
13	Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	G
14	Oxygen Sensors (Equipped Models)	25	2.5	18	
15	Regulator/Rectifier Bolts	9.8	1.0	87 in·lb	
16	Spark Plugs	13	1.3	115 in·lb	
17	Stator Coil Bolts	12	1.2	106 in·lb	
18	Timing Rotor Bolt	39	4.0	29	
19	Water Temperature Sensor	30	3.1	22	

20. Oxygen Sensors Equipped Models

G: Apply grease.

L: Apply a non-permanent locking agent.

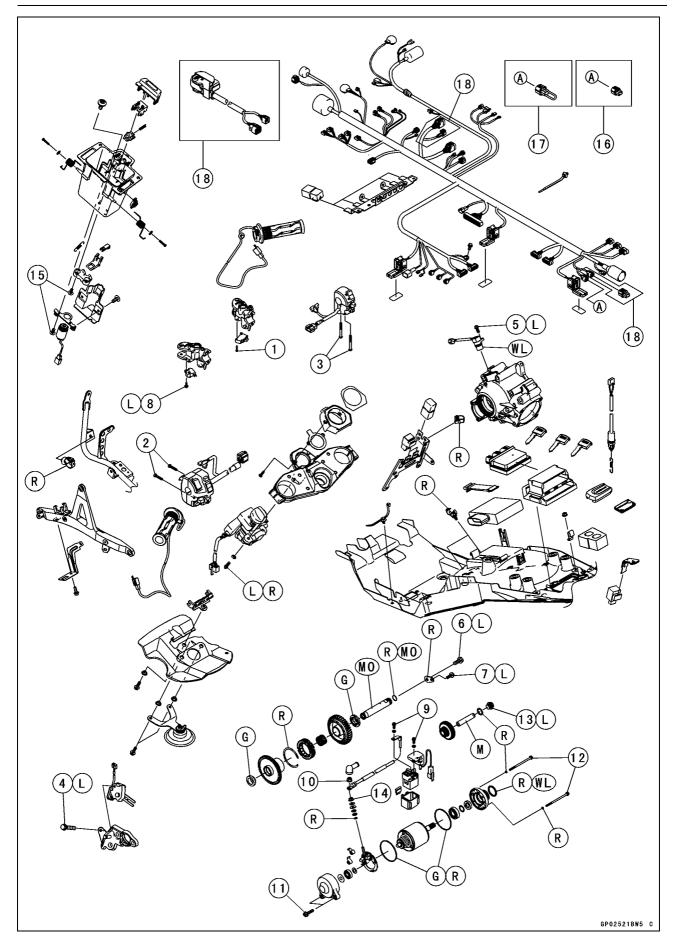
R: Replacement Parts

S: Follow the specified tightening sequence.

SS: Apply silicone sealant.

WL: Apply soap and water solution or rubber lubricant.

16-8 ELECTRICAL SYSTEM



Exploded View

No.	Factorer	Torque			Demerika
NO.	Fastener	N∙m	kgf∙m	ft·lb	Remarks
1	Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
2	Left Switch Housing Screws	3.5	0.36	31 in·lb	
3	Right Switch Housing Screws	3.5	0.36	31 in·lb	
4	Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
5	Speed Sensor Bolt	9.8	1.0	87 in·lb	L
6	Starter Clutch Shaft Bolt	9.8	1.0	87 in·lb	L
7	Starter Clutch Shaft Plate Bolt	9.8	1.0	87 in·lb	L
8	Starter Lockout Switch Screw	0.70	0.07	6.2 in·lb	L
9	Starter Motor Cable Mounting Bolts	3.9	0.40	35 in·lb	
10	Starter Motor Cable Terminal Nut	5.9	0.60	52 in·lb	
11	Starter Motor Mounting Bolts	9.8	1.0	87 in·lb	
12	Starter Motor Through Bolts	3.4	0.35	30 in·lb	
13	Torque Limiter Bolt	25	2.5	18	L
14	Starter Motor Terminal Locknut	6.9	0.70	61 in·lb	
15	Storage Case Screws	0.7	0.07	6.2 in·lb	

16. Other than WVTA, Honeycomb Catalytic Converter (78.2 kW Power Model) and MY Models

17. WVTA, Honeycomb Catalytic Converter (78.2 kW Power Model) and MY Models

- 18. K-ACT ABS Equipped Models
- G: Apply grease.

L: Apply a non-permanent locking agent.

M: Apply molybdenum disulfide grease.

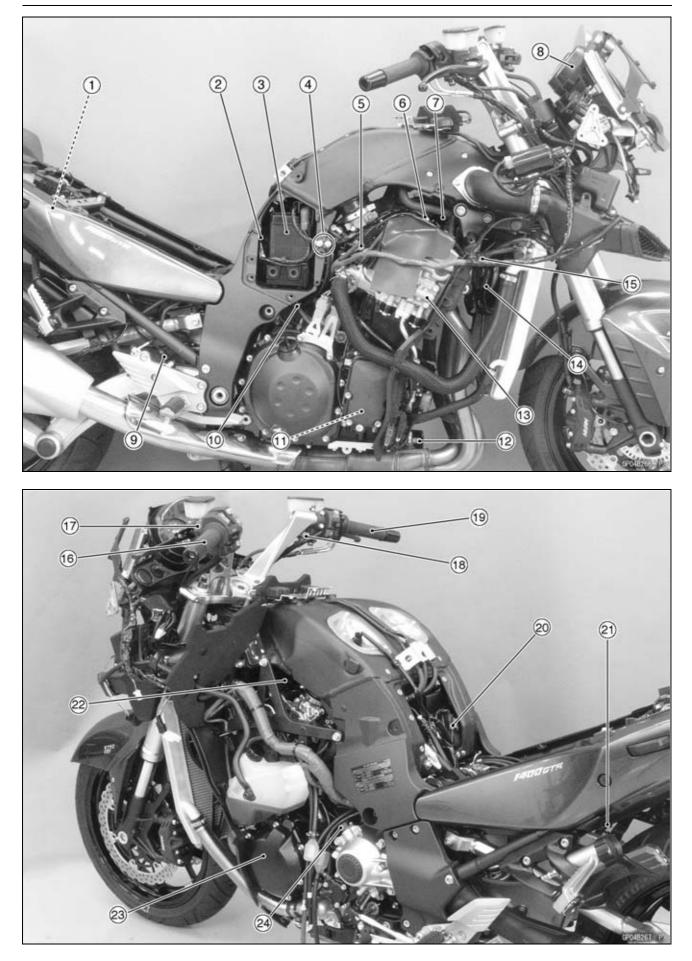
MO: Apply molybdenum disulfide oil solution.

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

R: Replacement Parts

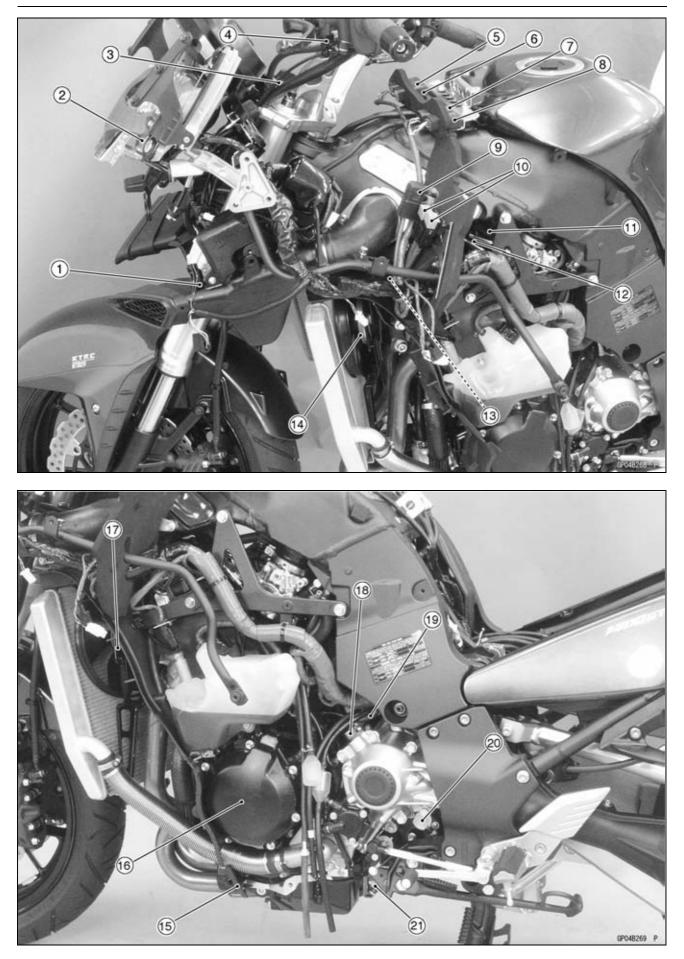
WL: Apply soap and water solution or rubber lubricant.

16-10 ELECTRICAL SYSTEM



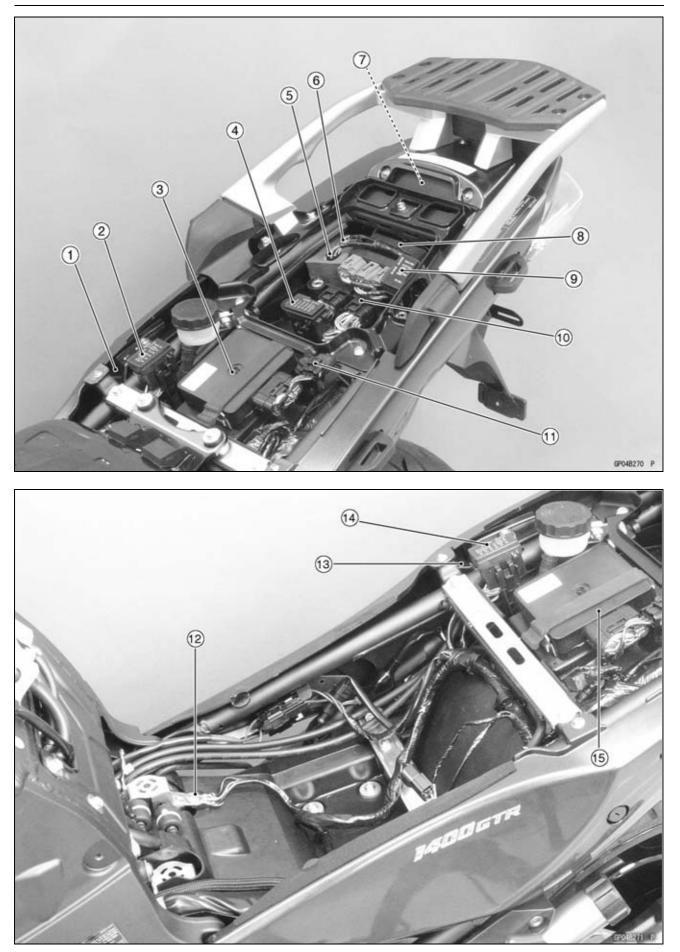
- 1. Turn Signal Relay
- 2. Starter Relay and Main Fuse 30 A
- 3. Battery 12 V 14 Ah
- 4. Frame Ground
- 5. Water Temperature Sensor
- 6. Stick Coils
- 7. Air Switching Valve
- 8. Meter Unit
- 9. Rear Brake Light Switch
- 10. Engine Ground
- 11. Crankshaft Sensor
- 12. Oxygen Sensors (Equipped Models)
- 13. Oil Control Solenoid Valve
- 14. Fan Motor
- 15. KIPASS Signal Diode
- 16. Left Grip Warmer
- 17. Meter Mode Button
- 18. Front Brake Light Switch
- 19. Right Grip Warmer
- 20. Starter Relay and Main Fuse 30 A
- 21. Regulator/Rectifier
- 22. Stick Coils
- 23. Alternator
- 24. Speed Sensor

16-12 ELECTRICAL SYSTEM



- 1. Outside Temperature Sensor
- 2. Electric Windshield Motor
- 3. Steering Lock Unit
- 4. Starter Lockout Switch
- 5. Accessory Relay
- 6. KIPASS Signal Relay
- 7. Headlight Relay (Lo)
- 8. Headlight Relay (Hi)
- 9. Grip Warmer Relay
- 10. Electric Windshield Relays (Up and Down)
- 11. Inlet Camshaft Position Sensor
- 12. Stick Coils
- 13. Exhaust Camshaft Position Sensor
- 14. Fan Motor
- 15. Oil Pressure Switch
- 16. Alternator
- 17. Fan Motor
- 18. Speed Sensor
- 19. Starter Motor
- 20. Gear Position Switch
- 21. Sidestand Switch

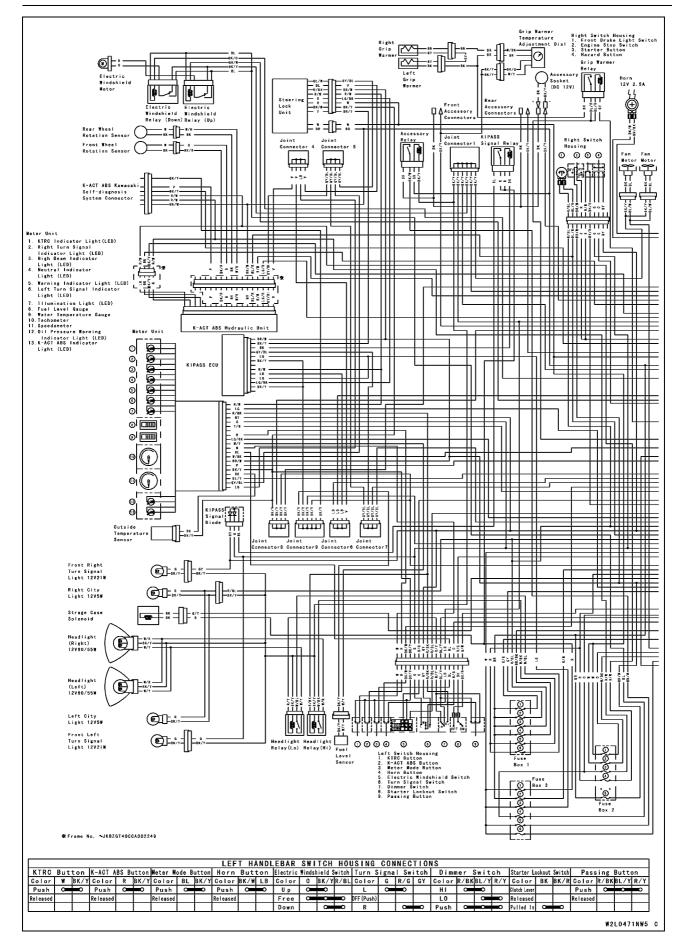
16-14 ELECTRICAL SYSTEM



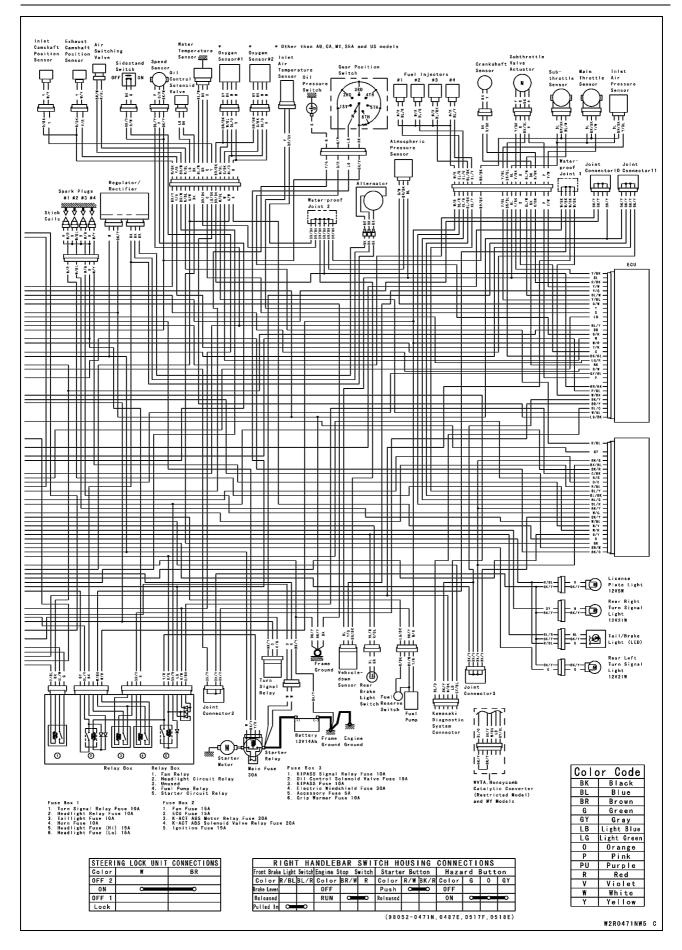
- 1. Turn Signal Relay
- 2. Fuse Box 1
- 3. KIPASS ECU
- 4. Fuse Box 3
- 5. K-ACT ABS Kawasaki Self-Diagnosis System Connector
- 6. Kawasaki Diagnostic System Connector
- 7. Vehicle-down Sensor
- 8. Relay Box
- 9. Fuse Box 2
- 10. ECU
- 11. Atmospheric Pressure Sensor
- 12. Frame Ground
- 13. Turn Signal Relay
- 14. Fuse Box 1
- 15. KIPASS ECU

16-16 ELECTRICAL SYSTEM

Wiring Diagram (K-ACT ABS Equipped Models)

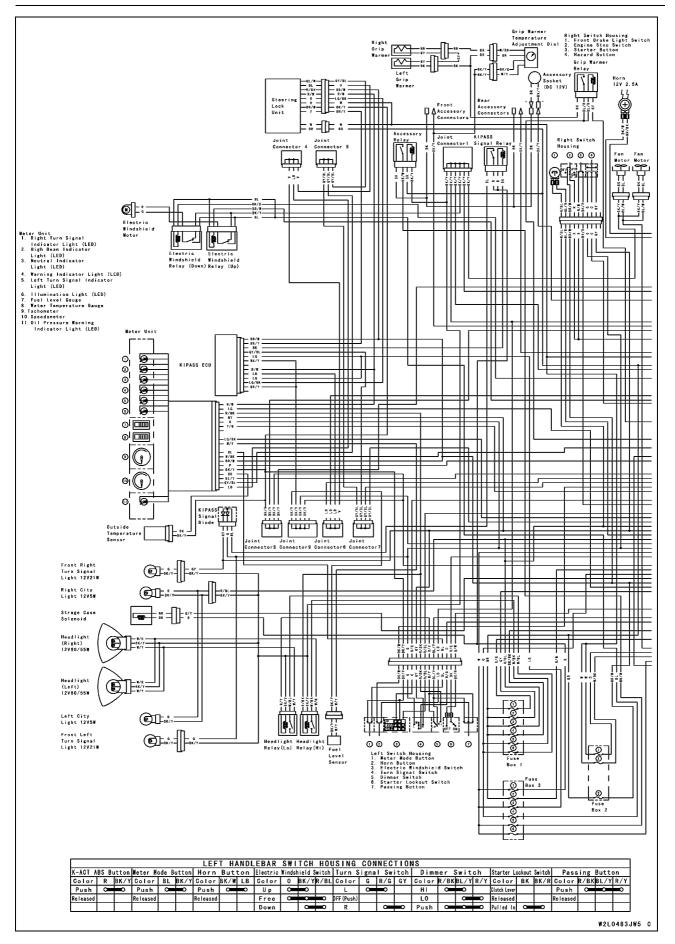


Wiring Diagram (K-ACT ABS Equipped Models)

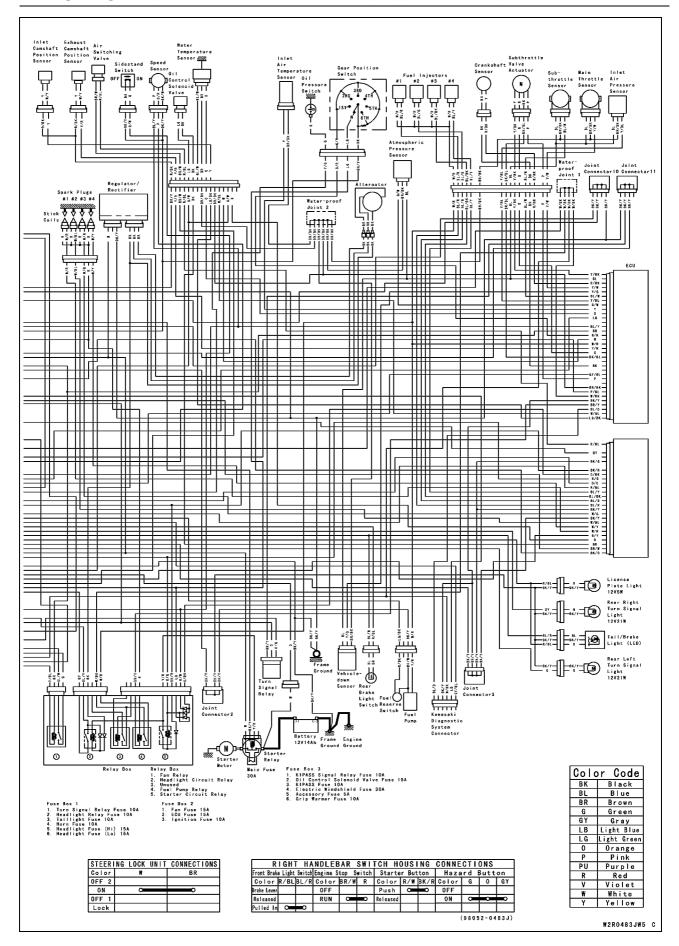


16-18 ELECTRICAL SYSTEM

Wiring Diagram (Other than K-ACT ABS Equipped Models)



Wiring Diagram (Other than K-ACT ABS Equipped Models)



16-20 ELECTRICAL SYSTEM

Specifications

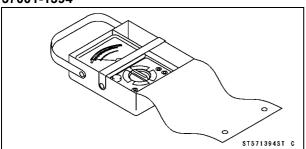
ltem	Standard	Service Limit
Battery		
Туре	Sealed Battery	
Model Name	FTZ14-BS	
Capacity	12 V 14 Ah	
Voltage	12.6 V or more	
Charging System		
Туре	Three-phase AC	
Alternator Output Voltage	56 V or more @4 000 r/min (rpm)	
Stator Coil Resistance	0.05 ~ 0.5 Ω	
Charging Voltage (Regulator/Rectifier Output Voltage)	14.4 ~ 15.0 V	
Ignition System		
Crankshaft Sensor Resistance	376 ~ 564 Ω	
Crankshaft Sensor Peak Voltage	2.4 V or more	
Camshaft Position Sensor Resistance	400 ~ 460 Ω	
Camshaft Position Sensor Peak Voltage	2.8 V or more	
Spark Plug Gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in.)	
Stick Coil:		
Primary Winding Resistance	1.2 ~ 1.6 Ω	
Secondary Winding Resistance	8.5 ~ 11.5 kΩ	
Primary Peak Voltage	72 V or more	
Electric Starter System		
Starter Motor:		
Brush Length	10 mm (0.39 in.)	5 mm (0.20 in.)
Commutator Diameter	28 mm (1.10 in.)	27 mm (1.06 in.)
Air Switching Valve		
Resistance	20 ~ 24 Ω at 20°C (68°F)	
Oil Control Solenoid Valve		
Resistance	6.9 ~ 7.9 Ω at 20°C (68°F)	
Storage Case Solenoid		
Resistance	27.9 ~ 34.9 Ω at 20°C (68°F)	
Grip Warmer		
Resistance:		
Right Grip Warmer	about 1.13 ~ 1.39 Ω	
Left Grip Warmer	about 1.65 ~ 2.01 Ω	
Meter, Gauge, Indicator Unit		
Can Communication Line Resistance (at Meter Unit)	122 ~ 126 Ω	
Speed Sensor Supply Voltage	about 12 V	
Switch and Sensor		
Rear Brake Light Switch Timing	ON after about 10 mm (0.39 in.) of pedal travel	
Engine Oil Pressure Switch Connections	When engine is stopped: ON	
	When engine is running: OFF	
Water Temperature Sensor Resistance	In the text	

Specifications

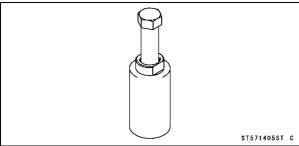
Item	Standard	Service Limit
Fuel Level Sensor Resistance:		
Full Position	9 ~ 11 Ω	
Empty Position	213 ~ 219 Ω	
Gear Position Switch Resistance	in the text	
Outside Temperature Sensor Resistance	5.4 ~ 6.6 kΩ at 0°C (32°F)	
	0.29 ~ 0.39 kΩ at 80°C (176°F)	

Special Tools and Sealants

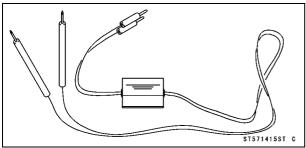
Hand Tester: 57001-1394



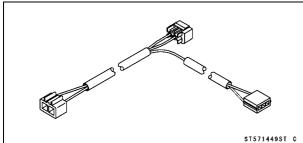
Flywheel Puller Assembly, M38 × 1.5/M35 × 1.5: 57001-1405



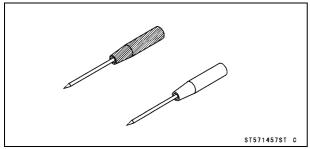
Peak Voltage Adapter: 57001-1415



Lead Wire - Peak Voltage Adapter: 57001-1449

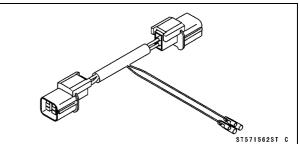


Needle Adapter Set: 57001-1457



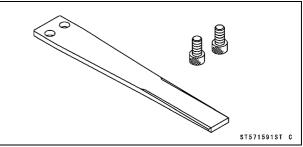
Harness Adapter:

57001-1562

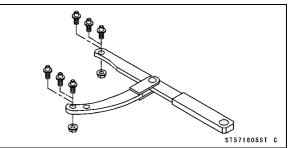


Grip:

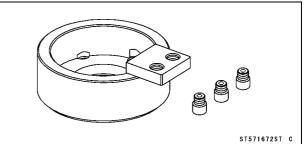




Flywheel & Pulley Holder: 57001-1605

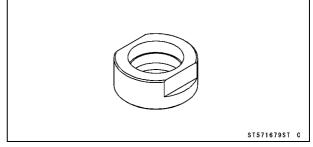


Rotor Holder: 57001-1672



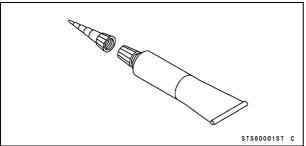


57001-1679

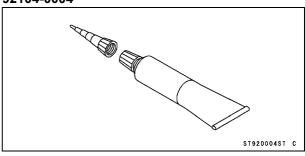


Special Tools and Sealants

Adhesive, TB1530C: 56042-0001



Liquid Gasket, TB1211F: 92104-0004



16-24 ELECTRICAL SYSTEM

Precautions

There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

- ODo not reverse the battery cable connections. This will burn out the diodes on the electrical parts.
- OAlways check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- OThe electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- ○To prevent damage to electrical parts, do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running.
- OBecause 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 wind-ings.
- ○Take care not to short the cables that are directly connected to the battery positive (+) terminal to the chassis ground.
- ○Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was caused by some other item or items, they must be repaired or replaced, or the new replacement will soon fail again.
- OMake sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.
- OMeasure coil and winding resistance when the part is cold (at room temperature).
- OColor 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 Wiring

Wiring Inspection

- Visually inspect the wiring for signs of burning, fraying, etc.
- \star 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.

OUse the wiring diagram to find the ends of the lead which is suspected of being a problem.

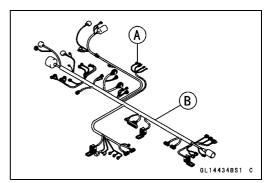
OConnect the hand tester between the ends of the leads.

Special Tool - Hand Tester: 57001-1394

OSet the tester to the × 1 Ω range, and read the tester.

 \star If the tester does not read 0 Ω , the lead is defective. Re-

place the lead or the wiring harness [B] if necessary.



16-26 ELECTRICAL SYSTEM

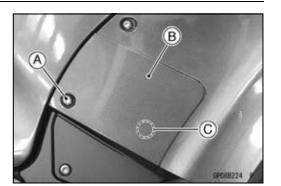
Battery

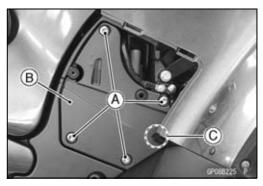
Battery Removal

- Turn the key knob to OFF.
- Remove:
 - Bolt [A]
 - Right Cover [B]

OPull out the projection [C] of the cover from the rubber grommet.

- Remove:
 - Bolts [A]
- Battery Compartment Cover [B]
- OClear the front part [C] of the cover from the rear middle cover.



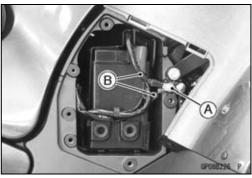


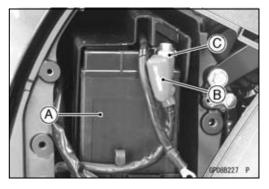


NOTICE

Be sure to disconnect the negative (-) cables first.

- Slightly pull out the battery [A] with battery tray.
- Slide the red cap [B] outward.
- Remove: Positive (+) Cable Terminal [C] Battery with Battery Tray
- Unhook the stoppers [A] and remove the battery cover [B].







Battery

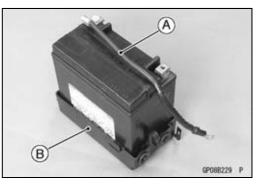
- Disconnect the negative (-) cable [A].
- Remove the battery [B] from the battery tray.

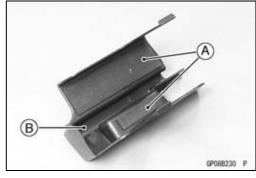


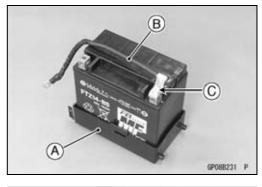
• Check that the dampers [A] are is properly on the battery cover [B].

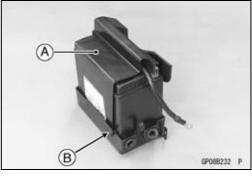
- Place the battery in the battery tray [A] as shown in the figure.
- Connect the negative (-) cable [B] to the battery.
- Put a light coat of grease on the (–) terminal [C] to prevent corrosion.
- Put the battery cover [A] on the battery and fit the stoppers [B] into the tray.

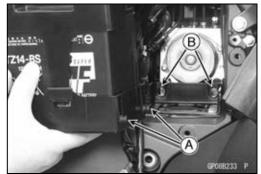
- Insert the battery with the battery tray into the battery compartment.
- Olnsert the projections [A] on the battery tray into the holes [B] of the battery compartment.









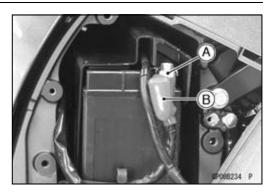


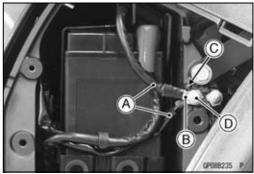
16-28 ELECTRICAL SYSTEM

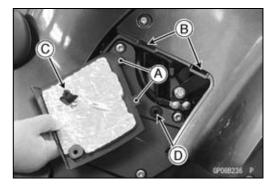
Battery

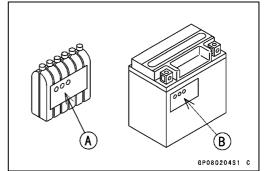
- Connect the positive (+) cable terminal [A] to the battery.
- Put a light coat of grease on the (+) terminal to prevent corrosion.
- Cover the (+) terminal with its red cap [B].

- Install the negative (–) cables [A] to the frame so that the battery cable terminal [B] touches the stopper [C].
- Tighten the frame ground bolt [D].









• Install:

- Battery Compartment Cover Bolts
- **Right Cover**
- OInsert the tabs [A] on the right cover into the slots [B] and then insert the projection [C] into the rubber hole [D].
- Tighten the right cover bolt.

Battery Activation 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 for ZG1400C/D: FTZ14-BS

NOTICE

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.

Battery

NOTICE

Do not remove the aluminum sealing sheet [A] from the filler ports [B] until just prior to use. Be sure to use the dedicated electrolyte container for correct electrolyte volume.

- Place the battery on a level surface.
- Check to see that the sealing sheet has no peeling, tears, or holes in it.
- Remove the sealing sheet.

NOTE

• The battery is vacuum sealed. If the sealing sheet has leaked air into the battery, it may require a longer initial charge.

- Remove the electrolyte container from the vinyl bag.
- Detach the strip of caps [A] from the container and set aside, these will be used later to seal the battery.

NOTE

ODo not pierce or otherwise open the sealed cells [B] of the electrolyte container. Do not attempt to separate individual cells.

• Place the electrolyte container upside down with the six sealed cells into the filler ports of the battery. Hold the container level, push down to break the seals of all six cells. You will see air bubbles rising into each cell as the ports fill.

NOTE

ODo not tilt the electrolyte container.

- Check the electrolyte flow.
- ★ If no air bubbles [A] are coming up from the filler ports, or if the container cells have not emptied completely, tap the container [B] a few times.

NOTE

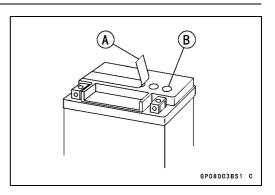
OBe careful not to have the battery fall down.

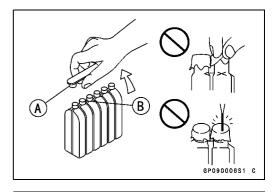
• Keep the container in place. Don't remove the container from the battery, the battery requires all the electrolyte from the container for proper operation.

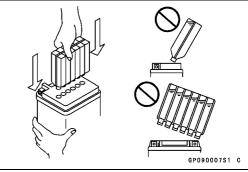


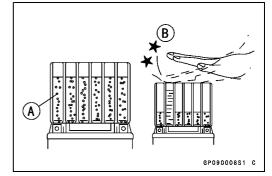
Removal of the container before it is completely empty can shorten the service life of the battery.

- After filling, let the battery sit for 20 ~ 60 minutes with the electrolyte container kept in place, which is required for the electrolyte to fully permeate into the plates.
- Make sure that the container cells have emptied completely, and remove the container from the battery.









16-30 ELECTRICAL SYSTEM

Battery

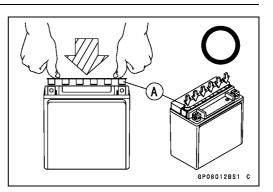
 Place the strip of caps [A] loosely over the filler ports, press down firmly with both hands to seat the strip of caps into the battery (don't pound or hammer). When properly installed, the strip of caps will be level with the top of the battery.

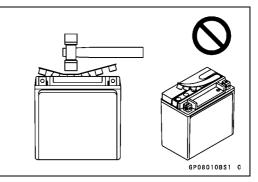
NOTICE

Once the strip of caps is installed onto the battery, never remove the caps, nor add water or electrolyte to the battery.

NOTE

OCharging the battery immediately after filling can shorten service life.





Initial Charge

• Newly activated sealed batteries require an initial charge.

Standard Charge: 1.4 A × 5 ~ 10 hours

★If using a recommended battery charger, follow the charger's instructions for newly activated sealed battery.

Kawasaki-recommended chargers: Battery Mate 150-9 OptiMate PRO 4-S/PRO S/PRO 2 Yuasa MB-2040/2060 Christie C10122S

- ★ If the above chargers are not available, use equivalent one.
- Let battery sit 30 minutes after initial charge, then check voltage using a voltmeter. (Voltage immediately after charging becomes temporarily high. For accurate measuring, let the battery sit for given time.)

NOTE

OCharging rates will vary depending on how long the battery has been stored, temperature, and the type of charger used. If voltage is not at least 12.6 V, repeat charging cycle.

○To ensure maximum battery life and customer satisfaction, it is recommended the battery be load tested at three times its amp-hour rating for 15 seconds. Re-check voltage and if less than 12.6 V repeat the charging cycle and load test. If still below 12.6 V the battery is defective.

Precautions

1) No need of topping-up

No topping-up is necessary in this battery until it ends its life under normal use. Forcibly prying off the seal cap to add water is very dangerous. Never do that.

Battery

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 Refreshing Charge).

When a fast charge is inevitably required, do it following precisely the maximum charge current and time conditions indicated on the battery.

NOTICE

This battery is designed to sustain no unusual deterioration if refresh-charged according to the method specified above. <u>However, the battery's performance may be reduced no-</u><u>ticeably if charged under conditions other than given above. Never remove the seal cap</u><u>during refresh charge.</u>

If by chance an excessive amount of gas is generated due to overcharging, the relief valve releases the gas to keep the battery normal.

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 cable 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).

A DANGER

Batteries produce an explosive gas mixture of hydrogen and oxygen that can cause serious injury and burns if ignited. Keep the battery away from sparks and open flames during charging. 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. 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 and seek medial attention for more severe burns.

Interchange

A sealed battery can fully display its performance only when combined with a proper vehicle electric system. Therefore, replace a sealed battery only on a motorcycle which was originally equipped with a sealed battery.

Be careful, if a sealed battery is installed on a motorcycle which had an ordinary battery as original equipment, the sealed battery's life will be shortened.

Charging Condition Inspection

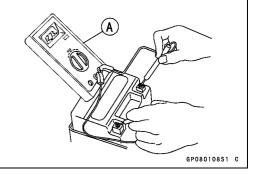
OBattery charging condition can be checked by measuring battery terminal voltage with a digital voltmeter [A].

• Remove:

- Battery (see Battery Removal)
- Measure the battery terminal voltage.

NOTE

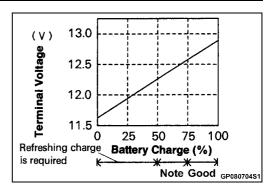
OMeasure with a digital voltmeter which can be read one decimal place voltage.



16-32 ELECTRICAL SYSTEM

Battery

- ★ If the reading is 12.6 V or more, no refresh charge is required, however, if the read is below the specified, refresh charge is required.
 - **Battery Terminal Voltage** Standard: 12.6 V or more



Refreshing Charge

- Remove the battery [A] (see Battery Removal).
- Do refresh charge by following method according to the battery terminal voltage.

A WARNING

This battery is sealed type. Never remove sealing cap [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 following chart) 7 A × 1 h

Quick Charge

NOTICE

If possible, do not quick charge. If quick charge is done unavoidably, do standard charge later on.

Terminal Voltage: less than 11.5 V Charging Method: 1.4 A × 20 h

NOTE

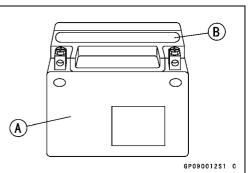
Olncrease the charging voltage to a maximum voltage of 25 V if the battery will not accept current initially. Charge for no more than 5 minutes at the increased voltage then check if the battery is drawing current. If the battery will accept current decrease the voltage and charge by the standard charging method described on the battery case. If the battery will not accept current after 5 minutes, replace the battery.

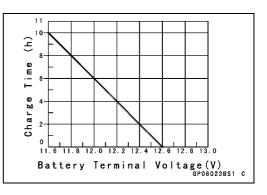
Battery [A] Battery Charger [B] Standard Value [C] Current starts to flow [D]

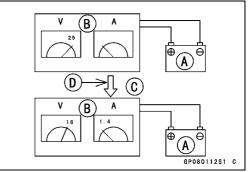
• Determine the battery condition after refresh charge.

ODetermine the condition of the battery left for 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 ~ lower than 12.6 V	Charge insufficient \rightarrow Recharge
lower than 12.0 V	Unserviceable \rightarrow Replace







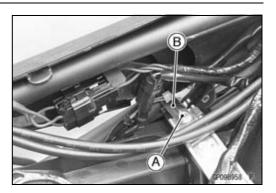
Charging System

Alternator Cover Removal

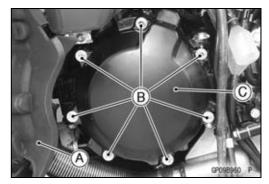
• Remove:

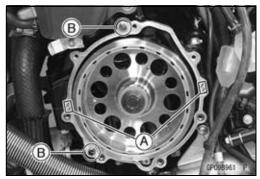
Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter) Bolt [A] Bracket [B]

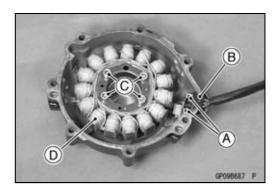
 Disconnect: Alternator Lead Connectors [A]











• Remove:

Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)

- Move the left inner rubber cover [A] forward.
- Remove:
 - Bolts [B]
 - Cover [C]
- Pull out the alternator lead from between the engine and frame.

Alternator Cover Installation

• Apply liquid gasket to the alternator lead grommet and crankcase halves mating surface [A] on the front and rear sides of the cover mount.

Sealant - Liquid Gasket, TB1211F: 92104-0004

- Check that dowel pins [B] are in place on the crankcase.
- Install a new gasket and the alternator cover.
- Tighten:

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

Stator Coil Removal

 Remove: Alternator Cover (see Alternator Cover Removal) Holding Plate Bolts [A] and Plate Alternator Lead Grommet [B] Stator Coil Bolts [C]

• Remove the stator coil [D] from the alternator cover.

16-34 ELECTRICAL SYSTEM

Charging System

Stator Coil Installation

• Tighten the stator coil bolts to the specified torque.

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

• Apply liquid gasket to the circumference of the alternator lead grommet, and fit the grommet into the notch of the cover securely.

Sealant - Liquid Gasket, TB1211F: 92104-0004

• Secure the alternator lead with a holding plate [A], and apply a non-permanent locking agent to the thread of the plate bolts and tighten them.

Torque - Alternator Lead Holding Plate Bolts: 8.3 N·m (0.85 kgf·m, 73 in·lb)

• Install the alternator cover (see Alternator Cover Installation).

Alternator Rotor Removal

- Remove the alternator cover (see Alternator Cover Removal).
- Clean off the oil from the outer circumference of the rotor.
- Hold the alternator rotor steady with the rotor holder [A], and remove the rotor bolt [B] and washer.

Special Tools - Grip [C]: 57001-1591 Rotor Holder: 57001-1672 Stopper [D]: 57001-1679

• Using the flywheel puller [A], remove the alternator rotor from the crankshaft.

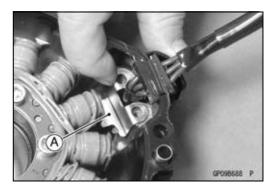
Special Tool - Flywheel Puller, M38 × 1.5: 57001-1405

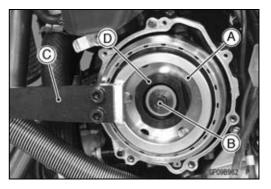
NOTICE

Do not attempt to strike the alternator rotor itself. Striking the rotor can cause the magnets to lose their magnetism.

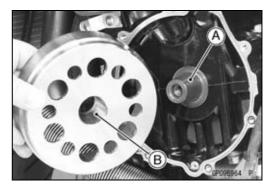
Alternator Rotor Installation

- Using a cleaning fluid, clean off any oil or dirt on the following portions and dry them with a clean cloth. Crankshaft Tapered Portion [A] Alternator Rotor Tapered Portion [B]
- Install the alternator rotor.









Charging System

• Using a cleaning fluid, clean off any oil or dirt on the washer [A] and dry it with a clean cloth.

NOTE

OConfirm the alternator rotor fit or not to the crankshaft before tightening it with specified torque.

- Install the rotor bolt [B] and tighten it with 69 N·m (7.0 kgf·m, 51 ft·lb) of torque.
- Remove the rotor bolt and washer.
- Check the tightening torque with flywheel puller [A].
- ★If the rotor is not pulled out with 20 N·m (2.0 kgf·m, 15 ft·lb) of drawing torque, it is installed correctly.
- ★ If the rotor is pulled out with under 20 N·m (2.0 kgf·m, 15 ft·lb) of drawing torque, clean off any oil dirt or flaw of the crankshaft and rotor tapered portion, and dry them with a clean cloth. Then, confirm that it is not pulled out with above torque.
- Install the rotor bolt and washer.
- Tighten the alternator rotor bolt [A] while holding the alternator rotor steadily with the holder [B].

Special Tools - Grip [C]: 57001-1591 Rotor Holder: 57001-1672 Stopper [D]: 57001-1679

Torque - Alternator Rotor Bolt: 155 N·m (15.8 kgf·m, 114 ft·lb)

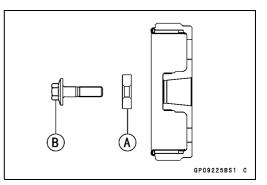
• Install the alternator cover (see Alternator Cover Installation).

Charging Voltage Inspection

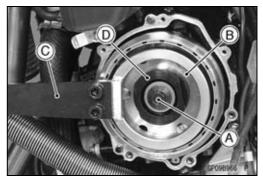
- Check the battery condition (see Charging Condition Inspection).
- Warm up the engine to obtain actual alternator operating conditions.
- Remove the right cover.
- Check that the key knob is turned off, and connect the hand tester [A] to the battery (+) terminal and ground.

Special Tool - Hand Tester: 57001-1394

• Start the engine, and note the voltage readings at various engine speeds with the headlight turned on and then turned off (To turn off the headlight, disconnect the headlight connector on the headlight unit.). The readings should show nearly battery voltage when the engine speed is low, and, as the engine speed rises, the readings should also rise. But they must be kept under the specified voltage.









16-36 ELECTRICAL SYSTEM

Charging System

Charging Voltage

Tester Range	Conne	Reading	
Tester Range	Tester (+) to	Tester (–) to	Reading
25 V DC	Battery (+)	Ground	14.4 ~ 15.0 V

• Turn off the key knob to stop the engine, and disconnect the hand tester.

★ If the charging voltage is kept between the values given in the table, the charging system is considered to be working normally.

- ★ If the charging voltage is much higher than the values specified in the table, the regulator/rectifier is defective or the regulator/rectifier leads are loose or open.
- ★ If the charging voltage does not rise as the engine speed increases, then the regulator/rectifier is defective or the alternator output is insufficient for the loads. Check the alternator and regulator/rectifier to determine which part is defective.

Alternator Inspection

There are three types of alternator failures: short, open (wire burned out), or loss in rotor magnetism. A short or open in one of the coil wires will result in either a low output, or no output at all. A loss in rotor magnetism, which may be caused by dropping or hitting the rotor, by leaving it near an electromagnetic field, or just by aging, will result in low output.

- To check the alternator output voltage, do the following procedures.
- OTurn the key knob to OFF.
- ODisconnect the alternator lead connector [A] from the regulator/rectifier.
- OConnect the hand tester [B] as shown in the table 1.

Special Tool - Hand Tester: 57001-1394

OStart the engine.

ORun it at the rpm given in the table 1.

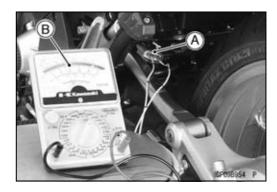
ONote the voltage readings (total 3 measurements).

Table 1 Alternator Output Voltage

Tester	Connections		Reading	
Range	Tester (+) to	Tester (–) to	@4 000 rpm	
250 V AC	One Black Lead	Another Black Lead	56 V or more	

★ If the output voltage shows the value in the table, the alternator operates properly.

★ If the output voltage shows a much higher than the value in the table, the regulator/rectifier is damaged. A much lower reading than that given in the table indicates that the alternator is defective.



Charging System

• Check the stator coil resistance as follows.

OStop the engine.

OConnect the commercially available tester as shown in the table 2.

ONote the readings (total 3 measurement).

Table 2 Stator Coil Resistance	at 20°C (68°F)
--------------------------------	----------------

Tester	Conn	Reading	
Range	Tester (+) to	Tester (-) to	Reading
×1Ω	One Black Lead	Another Black Lead	$0.05\sim 0.5\Omega$

- ★ If there is more resistance than shown in the table, or no tester reading (infinity) for any two leads, the stator has an open lead and must be replaced. Much less than this resistance means the stator is shorted, and must be replaced.
- Using the highest resistance range of the hand tester, measure the resistance between each of the black leads and chassis ground.
- ★Any hand tester reading less than infinity (∞) indicates a short, necessitating stator replacement.
- ★ If the stator coils have normal resistance, but the voltage check showed the alternator to be defective; then the rotor magnets have probably weakened, and the rotor must be replaced.

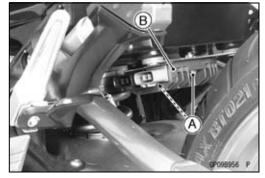
Regulator/Rectifier Inspection

• Remove:

Connectors [A]

 Remove: Regulator/Rectifier Bolts [A] Regulator/Rectifier [B]





16-38 ELECTRICAL SYSTEM

Charging System

• Set the hand tester to the × 1 k Ω range and make the measurements shown in the table.

Special Tool - Hand Tester: 57001-1394

- Connect the hand tester to the regulator rectifier.
- ★If the tester readings are not as specified, replace the regulator/rectifier.

NOTICE

Use only Kawasaki Hand Tester 57001-1394 for this test. A tester other than the Kawasaki Hand Tester may show different readings.

If a megger or a meter with a large capacity battery is used, the regulator/rectifier will be damaged.

Regulator/Rectifier Resistance

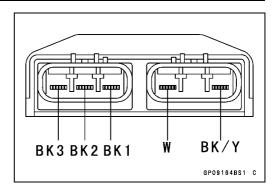
(Unit: kΩ)

		Tester (+) Lead Connection				
	Terminal	W	BK1	BK2	BK3	BK/Y
	W	-	20~300	20~300	20~200	20~750
	BK1	0 ~ 5	-	20~300	20~200	20~750
(–)*	BK2	0 ~ 5	20~300	-	20~200	20~750
()	BK3	0 ~ 5	20~300	20~300	-	20~750
	BK/Y	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20	_

(-)*: Tester (-) Lead Connection

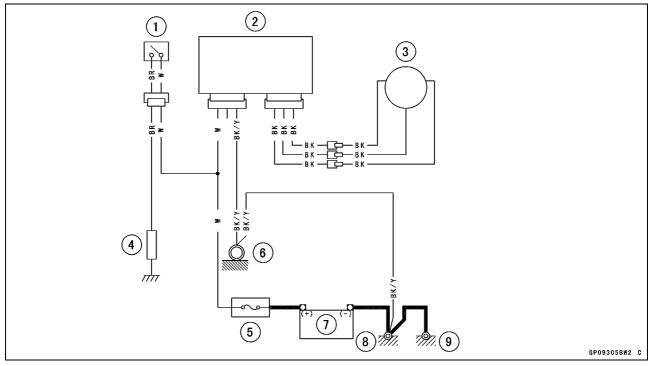
• Install the regulator/rectifier.

Torque - Regulator/Rectifier Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)



Charging System

Charging System Circuit

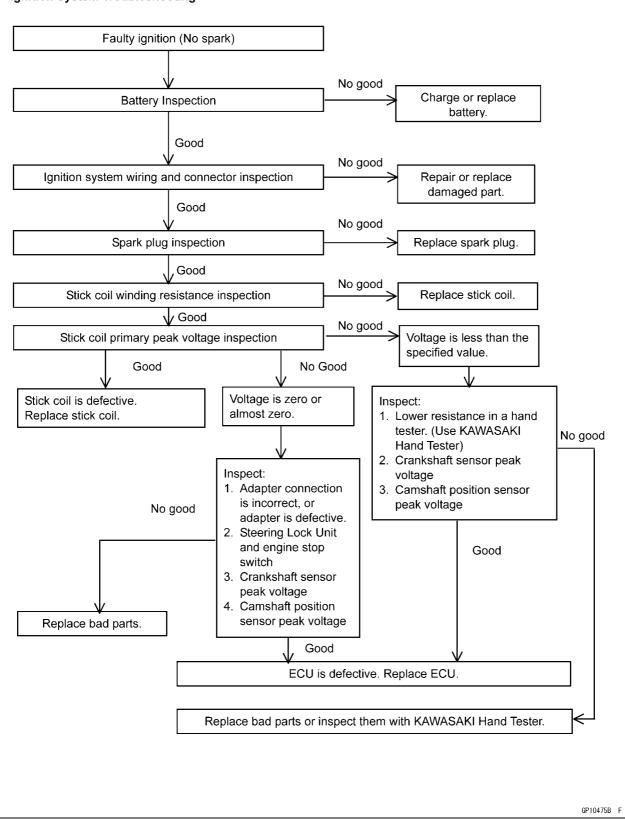


- 1. Steering Lock Unit
- Regulator/Rectifier
 Alternator
- 4. Load
- 5. Main Fuse 30 A
- 6. Frame Ground
- 7. Battery 12 V 14 Ah 8. Frame Ground
- 9. Engine Ground

16-40 ELECTRICAL SYSTEM

Ignition System

Ignition System Troubleshooting



Ignition System

A WARNING

The ignition system produces extremely high voltage. Do not touch the spark plug, ignition coil or ignition coil lead while the engine is running, or you could receive a severe electrical shock.

NOTICE

Do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent ECU damage.

Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the ECU.

Crankshaft Sensor Removal

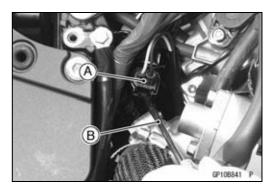
- Remove:
 - Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)

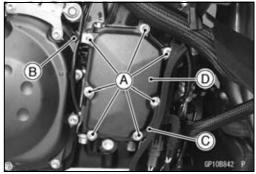
Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)

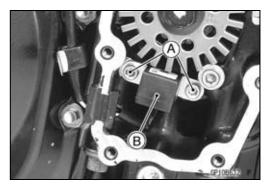
Crankshaft Sensor Lead Connector [A]

OInsert a thin driver [B] on the tab, and disconnect the connector.

- Remove: Crankshaft Sensor Cover Bolts [A] Clamp [B] Bracket [C] Crankshaft Sensor Cover [D]
- Remove: Crankshaft Sensor Bolts [A] Crankshaft Sensor [B]







16-42 ELECTRICAL SYSTEM

Ignition System

Crankshaft Sensor Installation

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

Torque - Crankshaft Sensor Bolts: 5.9 N⋅m (0.60 kgf⋅m, 52 in⋅lb)

- Apply silicone sealant to the circumference of the crankshaft sensor lead grommet [B], and fit the grommet into the notch of the crankcase securely.
- Apply liquid gasket to the mating surface [C] of crankcase halves.

Sealant - Liquid Gasket, TB1211F: 92104-0004

- Replace the O-ring [A] with a new one.
- Install:

Crankshaft Sensor Cover Clamp [B] Bracket [C]

- Apply a non-permanent locking agent to only one crankshaft sensor cover bolt [D] shown in figure.
- Tighten the crankshaft sensor cover bolts.

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

- Run the crankshaft sensor lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).

Crankshaft Sensor Inspection

- Remove the right middle cover (see Middle Fairing Removal in the Frame chapter).
- Disconnect the crankshaft sensor lead connector (see Crankshaft Sensor Removal).
- Set the hand tester [A] to the × 10 Ω range and connect it to the crankshaft sensor lead connector [B].

Special Tool - Hand Tester: 57001-1394

Crankshaft Sensor Resistance: 376 ~ 564 Ω

- ★ If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.
- 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.

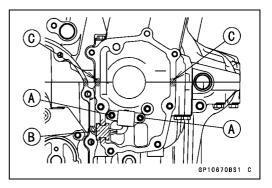
Crankshaft Sensor Peak Voltage Inspection

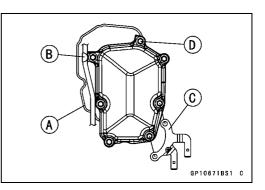
NOTE

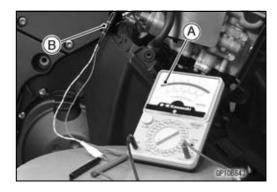
OBe sure the battery is fully charged.

OUsing the peak voltage adapter is a more reliable way to determine the condition of the crankshaft sensor than crankshaft sensor internal resistance measurements.

• Disconnect the crankshaft sensor lead connector (see Crankshaft Sensor Removal).







Ignition System

Set the hand tester [A] to the × 25 V DC range, and connect the peak voltage adapter [B].

Special Tools - Hand Tester: 57001-1394 Peak Voltage Adapter: 57001-1415 Type: KEK-54-9-B

Connections:

Crankshaft Sensor Connector [C]		Adapter		Hand Tester
Black	\leftarrow	Black	\rightarrow	(-)
Yellow	\leftarrow	Red	\rightarrow	(+)

- Turn the key knob and engine stop switch to 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: 2.4 V or more

★ If the tester reading is not specified one, check the crankshaft sensor (see Crankshaft Sensor Inspection).

Timing Rotor Removal

• Remove:

- Crankshaft Sensor (see Crankshaft Sensor Removal)Remove the timing rotor [A].
- OHolding the timing rotor with the flywheel & pulley holder [B] and remove the rotor bolt [C].

OUse the nuts [D] without the flange.

Special Tool - Flywheel & Pulley Holder: 57001-1605

Timing Rotor Installation

- Fit the rotor [A] to the crankshaft.
- Holding the timing rotor with the flywheel & pulley holder and tighten the rotor bolt.

Special Tool - Flywheel & Pulley Holder: 57001-1605

• Tighten:

Torque - Timing Rotor Bolt: 39 N·m (4.0 kgf·m, 29 ft·lb)

• Install the removed parts.

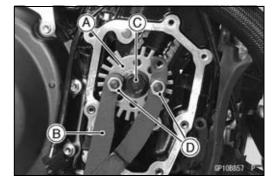
Stick Coil Removal

• Remove:

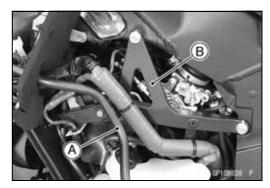
Fairing Stay [A] (both sides) (see Fairing Stay Removal in the Frame chapter)

Subframe [B] (both sides) (see Subframe Removal in the Frame chapter)









16-44 ELECTRICAL SYSTEM

Ignition System

Remove:

Air Suction Valve Cover Bolt [A] Bracket and Stick Coil Lead Connector [B]

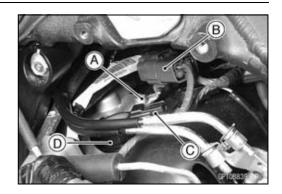
- Disconnect the stick coil connectors [C].
- Pull the stick coils [D] off the spark plugs.

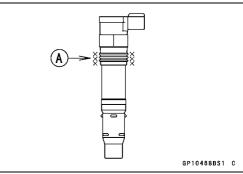
NOTICE

Do not pry the connector part of the coil while removing the coil.

Stick Coil Installation

• Apply grease [A] to the stick coils as shown.





• Insert the stick coils [A] as shown being careful of the coil heads directions.

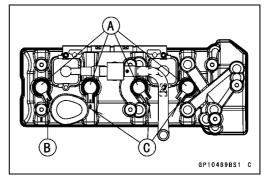
OInstall #1 stick coil [B] as shown in the figure.

OAlign the lines [C] of the cylinder head cover with coil heads of $#2 \sim #4$ coils.

NOTICE

Do not tap the coil head while installing the coil.

OBe sure the stick coils are installed by pulling up [A] it lightly.





- Connect the stick coil connectors.
- Run the hoses and harness correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).

Ignition System

Stick Coil Inspection

• Remove the stick coils (see Stick Coil Removal).

• Measure the primary winding resistance [A] as follows. OConnect the hand tester between the coil terminals.

OSet the tester to the × 1 Ω range, and read the tester.

• Measure the secondary winding resistance [B] as follows. OConnect the tester between the plug terminal and (–) coil terminal.

 \bigcirc Set the tester to the × 1 k Ω range and read the tester.

Stick Coil Winding Resistance			
Primary Windings:	1.2 ~ 1.6 Ω		
Secondary Windings:	8.5 ~ 11.5 kΩ		

 \star If the tester does not read as specified, replace the coil.

Stick Coil Primary Peak Voltage Inspection

NOTE

OBe sure the battery is fully charged.

• Remove the stick coils (see Stick Coil Removal).

ODo not remove the spark plug.

• Measure the primary peak voltage as follows.

OInstall the new spark plug [A] into each stick coil [B], and ground them onto the engine.

OConnect the peak voltage adapter [C] to the hand tester [D] which is set to the × 250 V DC range.

OConnect the adapter to the lead wire-peak voltage adapter [E] which is connected between the stick coil connector and stick coil.

ECU [F]

Battery [G]

Special Tools - Hand Tester: 57001-1394

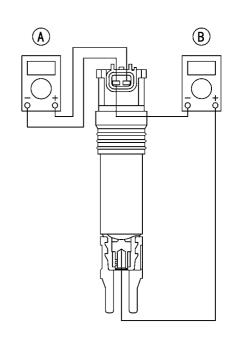
Peak Voltage Adapter: 57001-1415 Type: KEK-54-9-B

Lead Wire-Peak Voltage Adapter: 57001 -1449

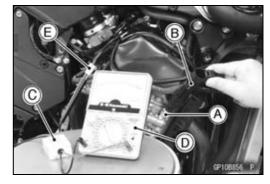
Primary Lead Connection

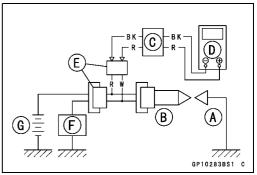
Adapter (R, +) to lead wire-peak voltage adapter (W)

Adapter (BK, –) to lead wire-peak voltage adapter (R)









16-46 ELECTRICAL SYSTEM

Ignition System

A WARNING

To avoid extremely high voltage shocks, do not touch the spark plugs or tester connections.

- Turn the key knob and engine stop switch to 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 stick coil.

Stick Coil Primary Peak Voltage Standard: 72 V or more

- Repeat the test for the other stick coils.
- ★ If the reading is less than the specified value, check the following.

Stick Coils (see Stick Coil Inspection) Crankshaft Sensor (see Crankshaft Sensor Inspection) ECU (see ECU Power Supply Inspection in the Fuel System (DFI) chapter)

Spark Plug Removal

• Refer to the Spark Plug Replacement in the Periodic Maintenance chapter (see Spark Plug Replacement in the Periodic Maintenance chapter).

Spark Plug Installation

• Refer to the Spark Plug Replacement in the Periodic Maintenance chapter (see Spark Plug Replacement in the Periodic Maintenance chapter).

Spark Plug Condition Inspection

- Visually inspect the spark plugs.
- ★ If the spark plug center electrode [A] and/or side electrode [B] are corroded or damaged, or if the insulator [C] is cracked, replace the plug.
- ★ If the spark plug is dirtied or the carbon is accumulated, replace the spark plug.
- Measure the gap [D] with a wire-type thickness gauge.
- \star If the gap is incorrect, replace the spark plug.

Spark Plug Gap: 0.8 ~ 0.9 mm (0.031 ~ 0.035 in.)

• Use the standard spark plug or its equivalent.

Spark Plug: NGK CR9EIA-9

Camshaft Position Sensor Removal

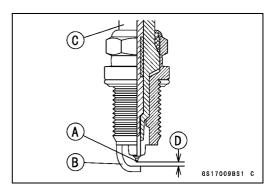
Remove:

Middle Fairings (see Middle Fairing Removal in the Frame chapter)

Lower Fairing (see Lower Fairing Removal in the Frame chapter)

Fairing Stays (see Fairing Stay Removal in the Frame chapter)

Subframes (see Subframe Removal in the Frame chapter)



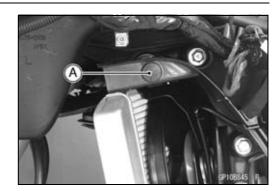
ELECTRICAL SYSTEM 16-47

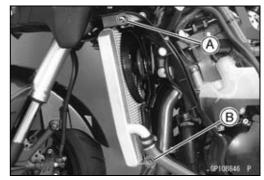
Ignition System

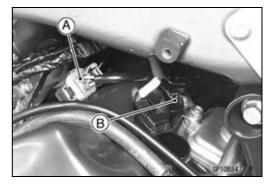
- (Exhaust Side)
- Remove: Grommets [A] (both sides)

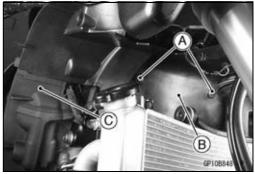
 Remove: Upper Radiator Bolts [A] (both sides) Lower Radiator Bolt [B]

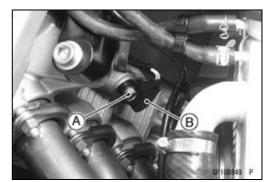
- Disconnect the camshaft position sensor lead connector [A].
- Take out the camshaft position sensor lead from the clamp [B].
- Remove: Quick Rivets [A] Cover [B]
- Remove the rubber cover [C] from the cover.
- Remove: Camshaft Position Sensor Bolt [A] Camshaft Position Sensor [B]











16-48 ELECTRICAL SYSTEM

Ignition System

(Inlet Side)

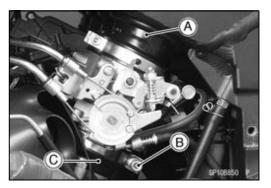
- Remove: Ducts [A] (see Throttle Body Assy Removal in the Fuel
- System (DFI) chapter)
 Loosen the clamp bolts [B] of the throttle body assy and remove the throttle body assy from the throttle body assy holders [C].
- Remove (K-ACT ABS Equipped Models): Bolts [A] Bracket [B] and Connectors [C]

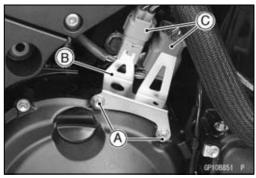
• Disconnect the camshaft position sensor lead connector [A].

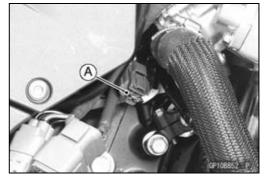
- Bracket and Connector [B]
- Remove: Camshaft Position Sensor Bolt [A]

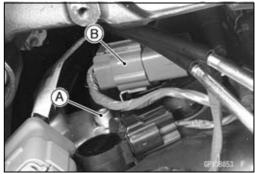
• Remove: Bolt [A]

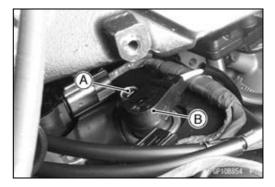
Camshaft Position Sensor [B]











Ignition System

Camshaft Position Sensor Installation

- Replace the O-rings of the camshaft position sensors.
- Apply soap and water solution to the new O-rings.
- Tighten:

Torque - Camshaft Position Sensor Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install the removed parts (see appropriate chapters).
- Run the camshaft position sensor lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

Camshaft Position Sensor Inspection

- Disconnect the camshaft position sensor lead connector (see Camshaft Position Sensor Removal).
- Set the hand tester to the × 10 Ω range and connect it to the terminals.

Special Tool - Hand Tester: 57001-1394

Camshaft Position Sensor Resistance: 400 ~ 460 Ω

- ★ If there is more resistance than the specified value, the sensor coil has an open lead and must be replaced. Much less than this resistance means the sensor coil is shorted, and must be replaced.
- Using the highest resistance range of the tester, measure the resistance between the camshaft position sensor leads and chassis ground.
- ★Any tester reading less than infinity (∞) indicates a short, necessitating replacement of the camshaft position sensor.

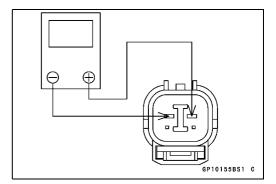
Camshaft Position Sensor Peak Voltage Inspection

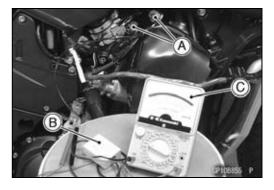
- Disconnect the camshaft position sensor lead connector (see Camshaft Position Sensor Removal).
- Connect the harness adapter [A] between the camshaft position sensor lead connector and harness connector.
- Connect the peak voltage adapter [B] to the hand tester [C] which is set to the × 10 V DC range.
- Connect the adapter to the harness adapter. [D] Camshaft Position Sensor

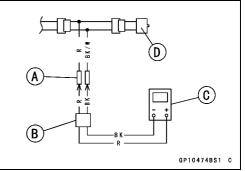
Special Tools - Hand Tester: 57001-1394 Peak Voltage Adapter: 57001-1415 Type: KEK-54-9-B Harness Adapter: 57001-1562

Connections:

Harness Adapter	Peak Voltage Adapter			Hand Tester
Black/White	\leftarrow	Black	\rightarrow	(—)
Red	\leftarrow	Red	\rightarrow	(+)







16-50 ELECTRICAL SYSTEM

Ignition System

- Turn the key knob and engine stop switch to ON.
- Pushing the starter button, run the engine with the transmission gear in neutral to measure the camshaft position sensor peak voltage.
- Repeat the measurement 5 or more times.

Camshaft Position Sensor Peak Voltage Standard: 2.8 V or more

★ If the peak voltage is lower than the standard, inspect the camshaft position sensor.

Interlock Operation Inspection

• Use the center stand to support the motorcycle upright.

1st Check

• Start the engine at the following conditions.

Condition:

Transmission Gear \rightarrow 1st Position Clutch Lever \rightarrow Release Sidestand \rightarrow Down or Up

OTurn the key knob to ON and push the starter button.

- OThen the starter motor should not turn when the starter system circuit is normality.
- ★ If the engine starts, inspect the starter lockout switch, gear position switch, relay box and starter relay.

2nd Check

• Start the engine at the following conditions.

Condition:

Transmission Gear \rightarrow 1st Position Clutch Lever \rightarrow Pulled in

$\textbf{Sidestand} \rightarrow \textbf{Up}$

OTurn the key knob to ON and push the starter button.

- OThen the starter motor should turn when the starter system circuit is normality.
- ★ If the starter motor does not turn, inspect the starter lockout switch, sidestand switch, relay box and starter relay.

3rd Check

- Inspect the engine for its secure stop after the following operations are completed.
- Run the engine at the following conditions.

Condition:

Transmission Gear \rightarrow 1st Position Clutch Lever \rightarrow Release Sidestand \rightarrow Up

- Set the sidestand on the ground, then the engine will stop.
- ★If the engine may be not stopped, inspect the gear position switch, sidestand switch and relay box.
- \star If their parts are normality, replace the ECU.

Ignition System

IC Igniter Inspection

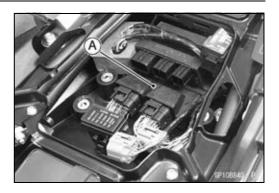
OThe IC igniter is built in the ECU [A].

• Refer to the following items.

Interlock Operation Inspection (see Interlock Operation Inspection)

Ignition System Troubleshooting (see Ignition System Troubleshooting)

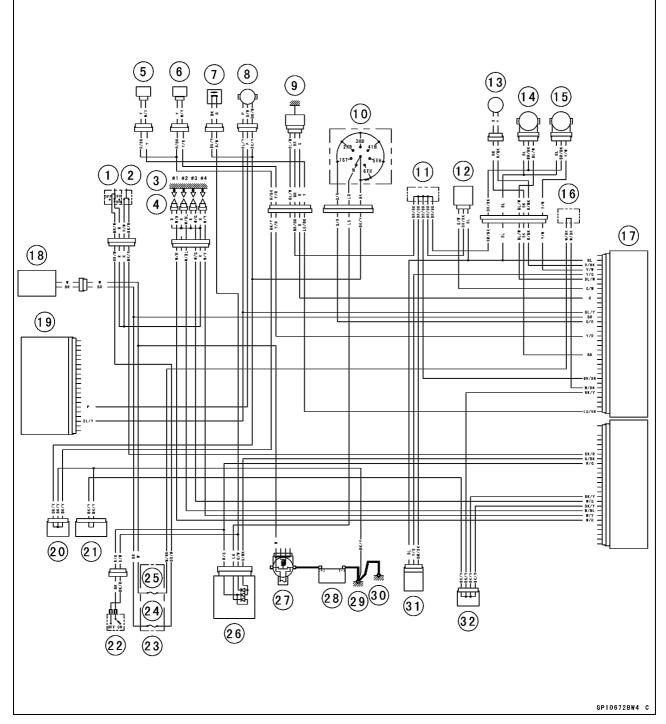
ECU Power Supply Inspection (see ECU Power Supply Inspection in the Fuel System (DFI) chapter)



16-52 ELECTRICAL SYSTEM

Ignition System

Ignition System Circuit



- 1. Engine Stop Switch
- 2. Starter Button
- 3. Spark Plugs
- 4. Stick Coils
- 5. Inlet Camshaft Position Sensor
- 6. Exhaust Camshaft Position Sensor
- 7. Sidestand Switch
- 8. Speed Sensor
- 9. Water Temperature Gauge
- 10. Gear Position Switch
- 11. Water-proof Joint 2

- 12. Atmospheric Pressure Sensor
- 13. Crankshaft Sensor
- 14. Subthrottle Sensor
- 15. Main Throttle Sensor
- 16. Water-proof Joint 1
- 17. ECU
- 18. Steering Lock Unit
- 19. Meter Unit
- 20. Joint Connector 8
- 21. Joint Connector 9
- 22. Starter Lockout Switch
- 23. Fuse Box 2

- 24. Ignition Fuse
 - 15 A (ZG1400C)
 - 10 A (ZG1400D)
- 25. ECU Fuse 15 A
- 26. Relay Box
- 27. Main Fuse 30 A
- 28. Battery 12 V 14 Ah
- 29. Frame Ground
- 30. Engine Ground
- 31. Vehicle-down Sensor
- 32. Joint Connector 3

Electric Starter System

Starter Motor Removal

- Remove: Left Subframe (see Subframe Removal in the Frame chapter) Connector [A]
- Remove: Speed Sensor [A] (see Speed Sensor Removal) Starter Motor Mounting Bolts [B]
- Pull out the starter motor [C].

- Slide off the rubber cap [A].
- Remove:
 - Starter Motor Cable Terminal Nut [B] Starter Motor Cable

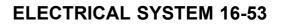
Starter Motor Installation

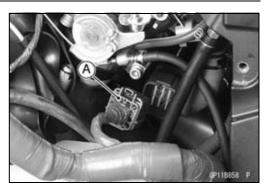
NOTICE

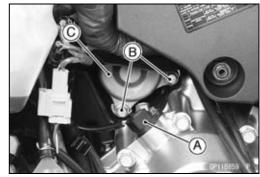
Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.

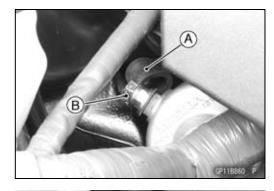
- Clean the starter motor legs [A] and crankcase [B] where the starter motor is ground.
- Replace the O-ring [C] with a new one.
- Apply grease to the new O-ring.
- Tighten:

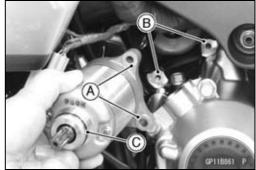
Torque - Starter Motor Mounting Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)











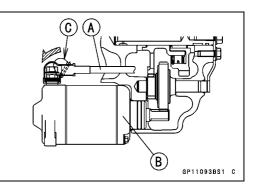
16-54 ELECTRICAL SYSTEM

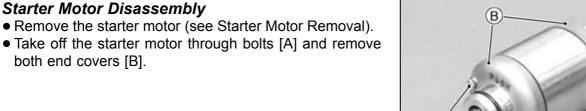
Electric Starter System

Starter Motor Disassembly

both end covers [B].

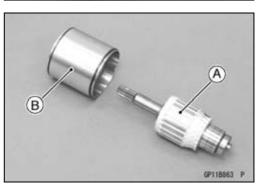
- Install the starter motor cable [A] side by side with starter motor [B].
- Tighten:
 - Torque Starter Motor Cable Terminal Nut: 5.9 N·m (0.60 kgf⋅m, 52 in⋅lb)
- Slide back the rubber cap [C] to the original position.

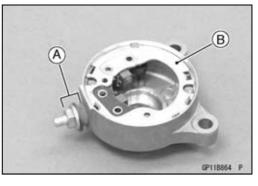


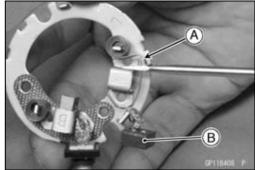




• Pull the armature [A] out of the yoke [B].







Starter Motor Assembly

Brush Plate Assembly [B]

• Remove:

• Pry the spring end [A] and insert the brush [B].

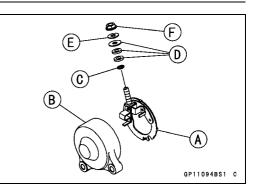
Brush Plate Terminal Nut, Washer and Insulators [A]

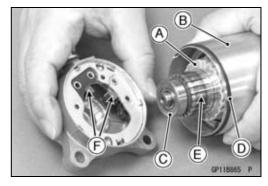
Electric Starter System

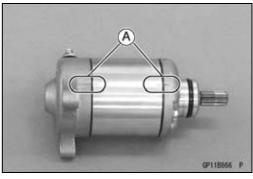
- Install the brush plate assembly [A] into the right-hand end cover [B].
- Replace the O-ring [C] with a new one.
- Install:
 - Insulators [D]
- Washer [E] • Tighten:
- Torque Starter Motor Terminal Locknut [F]: 6.9 N·m (0.70 kgf·m, 61 in·lb)
- Install the armature [A] into the yoke [B].
- Install thrust washer [C].
- Replace the O-rings [D] with new ones.
- Put the commutator [E] among the brushes [F].
- Align the marks [A] to assemble the yoke and the end covers.

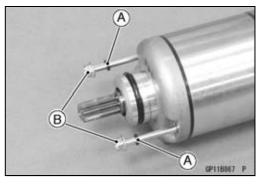
- Replace the O-rings [A] with new ones.
- Tighten:
 - Torque Starter Motor Through Bolts [B]: 3.4 N·m (0.35 kgf·m, 30 in·lb)
- Replace the O-ring [A] with new ones.
- Apply soap and water solution to the new O-ring.

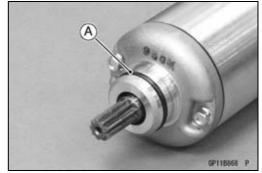












16-56 ELECTRICAL SYSTEM

Electric Starter System

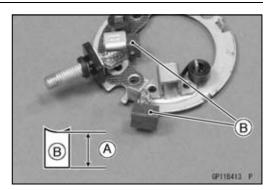
Brush Inspection

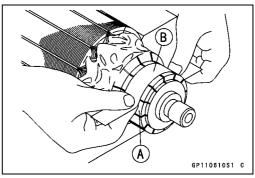
- Measure the length [A] of each brush [B].
- ★ If any is worn down to the service limit, replace the brush holder assembly.

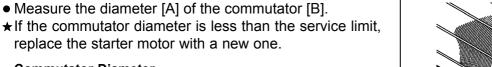
Starter Motor Brush Length Standard: 10 mm (0.39 in.) Service Limit: 5 mm (0.20 in.)

Commutator Cleaning and Inspection

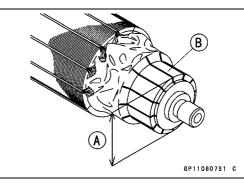
 Smooth the commutator surface [A] if necessary with fine emery cloth (#400 ~ 500) [B], and clean out the grooves.







Commutator Diameter Standard: 28 mm (1.10 in.) Service Limit: 27 mm (1.06 in.)



Armature Inspection

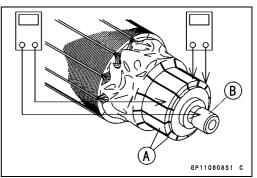
• Using the × 1 Ω hand tester range, measure the resistance between any two commutator segments [A].

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

OEven 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.



Electric Starter System

Brush Lead Inspection

Using the × 1 Ω hand tester range, measure the resistance as shown.
 Terminal Bolt and Positive Brush [A]

Right-hand End Cover and Negative Brush [B]

Special Tool - Hand Tester: 57001-1394

★ If there is not close to zero ohms, the brush lead has an open. Replace the brush holder assembly.

Right-hand End Cover Assembly Inspection

• Using the highest hand tester range, measure the resistance as shown.

Terminal and Right-hand End Cover [A]

Special Tool - Hand Tester: 57001-1394

★ If there is any reading, the right-hand end cover assembly have a short. Replace the right-hand end cover assembly.

Starter Relay Inspection

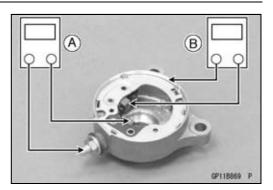
- Remove the battery (see Battery Removal).
- Disconnect the starter motor cable [A] and battery positive (+) cable [B] from the starter relay.
- Disconnect the connector [C].
- Pull out the starter relay from the damper.
- Connect the hand tester [A] and 12 V battery [B] to the starter relay [C] as shown.

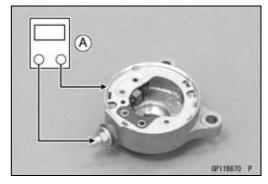
Special Tool - Hand Tester: 57001-1394

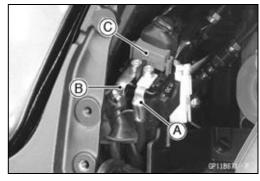
 \star If the relay does not work as specified, replace the relay.

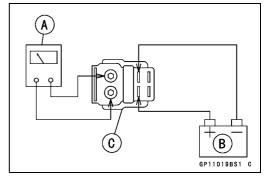
Testing Relay

- Hand Tester Range: \times 1 Ω
- Tighten:
 - Torque Starter Motor Cable Mounting Bolt: 3.9 N·m (0.40 kgf·m, 35 in·lb)





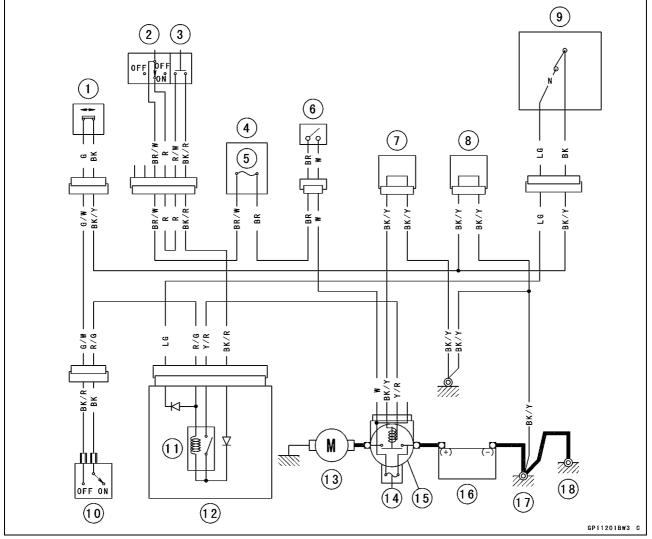




16-58 ELECTRICAL SYSTEM

Electric Starter System

Electric Starter Circuit



- 1. Sidestand Switch
- 2. Engine Stop Switch
- 3. Starter Button
- 4. Fuse Box 2
- 5. Ignition Fuse 15 A (ZG1400C), 10 A (ZG1400D)
- 6. Steering Lock Unit
- 7. Joint Connector 1
- 8. Joint Connector 8
- 9. Gear Position Switch
- 10. Starter Lockout Switch
- 11. Starter Circuit Relay
- 12. Relay Box
- 13. Starter Motor
- 14. Main Fuse 30 A
- 15. Starter Relay
- 16. Battery 12 V 14 Ah
- 17. Frame Ground
- 18. Engine Ground

Lighting System

This motorcycle adopts the daylight system and has a headlight relay in the relay box. The headlight does not go on when the key knob and the engine stop switch are first turned on. The headlight comes on after the starter button is released and stays on until the key knob 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

• Refer to the Headlight Aiming Inspection in the Periodic Maintenance chapter.

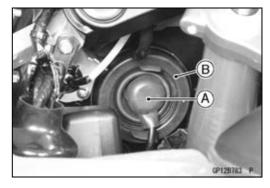
Headlight Beam Vertical Adjustment

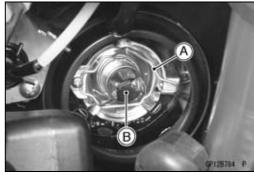
• Refer to the Headlight Aiming Inspection in the Periodic Maintenance chapter.

Headlight Bulb Replacement

• Remove:

Inner Covers (see Inner Cover Removal in the Frame chapter) Headlight Connector [A] Dust Cover [B]





Remove: Hook [A] Headlight Bulb [B]

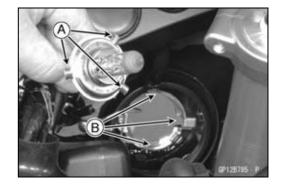
NOTICE

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

OClean off any contamination that inadvertently gets on the bulb with alcohol or soap and water solution.

- Replace the headlight bulb.
- Fit the projections [A] of the bulb in the hollows [B] of the headlight.



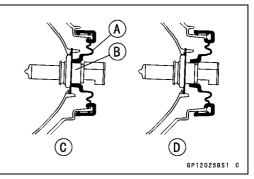
16-60 ELECTRICAL SYSTEM

Lighting System

• Install the hook [A].



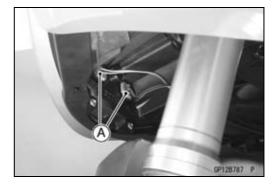
- Fit the dust cover [A] onto the bulb [B] firmly as shown in the figure. Good [C]
 - Bad [D]



- Connect the headlight connector.
- After installation, adjust the headlight aim (see Headlight Aiming Inspection in the Periodic Maintenance chapter).

City Light Bulb Replacement

- Remove the upper inner fairing (see Upper Inner Fairing Removal in the Frame chapter).
- Pull out the sockets [A] together with the bulbs.

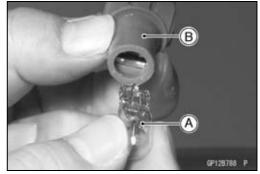


• Pull the bulb [A] out of the socket [B].

NOTICE

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.

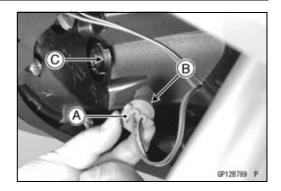
• Replace the bulb with a new one.

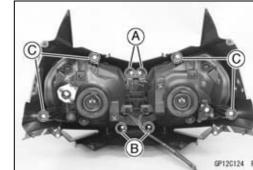


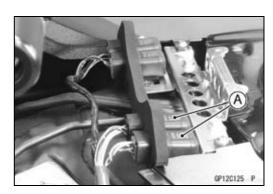
ELECTRICAL SYSTEM 16-61

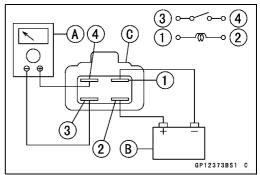
Lighting System

• Insert the socket [A] so that the round side [B] fits the wall [C].









Headlight Removal/Installation

• Remove:

Upper Fairing (see Upper Fairing Removal in the Frame chapter)

Upper Fairing Damper Bracket Screws [A] (Tapping Screws)

Headlight Mounting Screws [B] (Tapping Screws) Headlight Mounting Screws [C]

- Headlights Assy
- Tighten:

Torque - Upper Fairing Damper Bracket Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)

Headlight Relay Inspection

- Remove the left inner cover (see Inner Cover Removal in the Frame chapter).
- Take off the headlight relays [A].
- OThe headlight (Lo) and (Hi) relays are identical.
- Connect the hand tester [A] and 12 V battery [B] to the headlight relay [C] as shown.

Special Tool - Hand Tester: 57001-1394

★ If the relay does not work as specified, replace the headlight relay.

Testing Relay

Hand Tester Range: \times 1 Ω

 $\begin{array}{ll} \mbox{Criteria:} & \mbox{When battery is connected} \to 0 \ \Omega \\ & \mbox{When battery is disconnected} \to \ \infty \ \Omega \end{array}$

16-62 ELECTRICAL SYSTEM

Lighting System

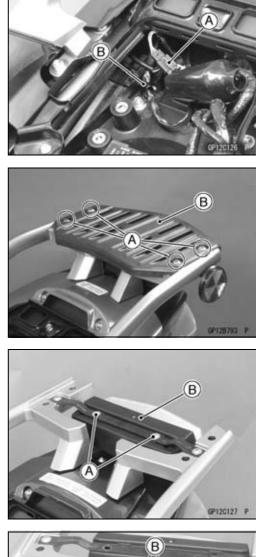
Tail/Brake Light (LED) Removal

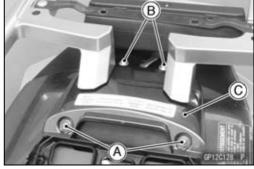
 Remove: Seat (see Seat Removal in the Frame chapter) ECU (see ECU removal in the Fuel System (DFI) chapter Tail/Brake Light Lead Connector [A]

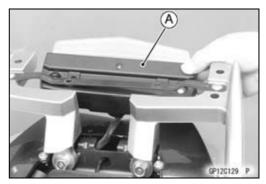
- Open the clamp [B].
- Remove: Bolts [A] Carrier Plate [B]

- Remove:
- Bolts [A]
- Move the tail/brake light assembly [B] to rear.

- Remove:
- Bolts [A] • Loosen the bolts [B].
- Remove: Cover [C]
- Remove the tail/brake light assembly [A].





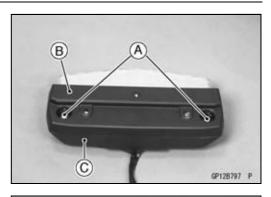


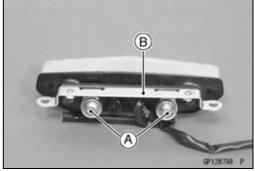
ELECTRICAL SYSTEM 16-63

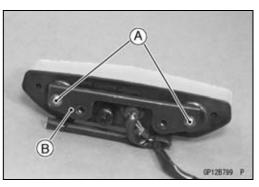
Lighting System

- Remove:
 - Tail Light Cover Bracket Bolts [A] Upper Cover [B] Lower Cover [C]

 Remove: Bolts [A] Bracket [B]







• Remove: Tail Light Screws [A] Tail Light Bracket [B]

Tail/Brake Light (LED) Installation

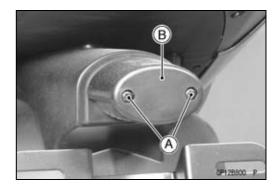
- Installation is basically the reverse of removal.
- Tighten:

Torque - Tail Light Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb) Tail Light Cover Bracket Bolts: 1.2 N·m (0.12 kgf·m, 11 in·lb)

- Run the tail/brake light lead according to the Cable, Wire, and Hose Routing section in the Appendix chapter.
- Install the removed parts (see appropriate chapter).

License Plate Light Bulb Replacement

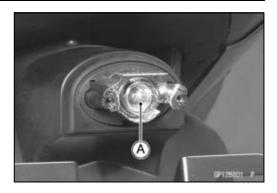
 Remove: Screws [A] License Plate Light Cover [B]



16-64 ELECTRICAL SYSTEM

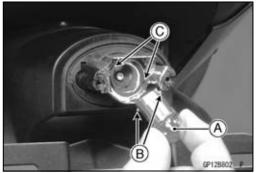
Lighting System

- Push and turn the bulb [A] counterclockwise wise and remove it.
- Replace the bulb with a new one.



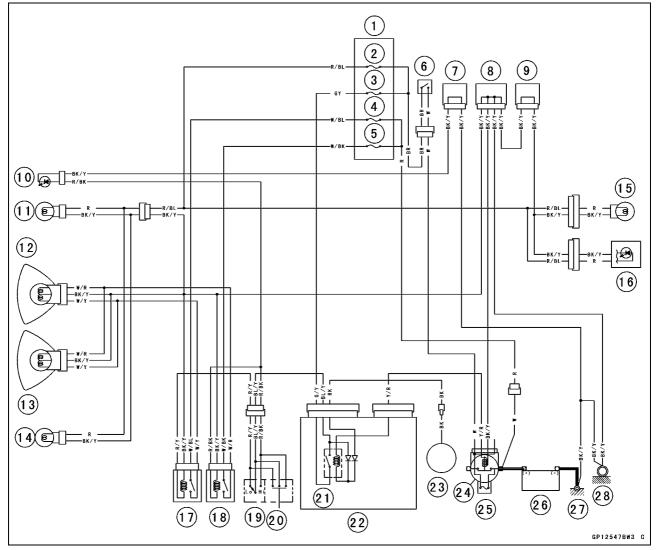
- Insert the new bulb [A] by aligning its upper and lower pins [B] with the upper and lower grooves [C] in the socket, and turn the bulb clockwise.
- OTurn the bulb about 15°.
- Tighten:

Torque - Licence Plate Light Cover Mounting Screws: 0.90 N·m (0.09 kgf·m, 8 in·lb)



Lighting System

Headlight/Tail Light Circuit



- 1. Fuse Box 1
- 2. Taillight Fuse 10 A
- 3. Headlight Relay Fuse 10 A
- 4. Headlight Fuse (Lo) 15 A
- 5. Headlight Fuse (Hi) 15 A
- 6. Steering Lock Unit
- 7. Joint Connector 8
- 8. Joint Connector 1
- 9. Joint Connector 2
- 10. High Beam Indicator Light (LED)
- 11. Right City Light 12 V 5 W
- 12. Headlight (Right) 12 V 60/55 W
- 13. Headlight (Left) 12 V 60/55 W
- 14. Left City Light 12 V 5 W

- 15. License Plate Light 12 V 5 W
- 16. Tail/Brake Light (LED)
- 17. Headlight Relay (Lo)
- 18. Headlight Relay (Hi)
- 19. Dimmer Switch
- 20. Passing Button
- 21. Headlight Circuit Relay
- 22. Relay Box
- 23. Alternator
- 24. Starter Relay
- 25. Main Fuse 30 A
- 26. Battery 12 V 14 Ah
- 27. Frame Ground
- 28. Frame Ground

16-66 ELECTRICAL SYSTEM

Lighting System

Turn Signal Light Bulb Replacement Front Turn Signal Light

• Remove:

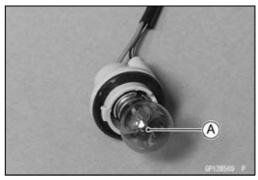
- Front Middle Fairings (see Middle Fairing Removal in the Frame chapter)
- Turn the socket [A] counterclockwise and pull out the socket together with the bulb.
- Push and turn the front turn signal light bulb [A] counterclockwise and remove it.

 Insert the new bulb [A] by aligning its upper and lower pins [B] with the upper and lower grooves [C] in the socket, and

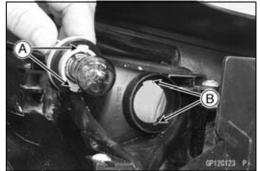
• Replace the bulb with new ones.

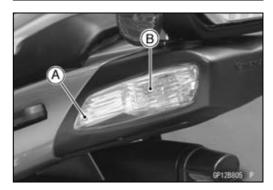
turn the bulb clockwise. OTurn the bulb about 15°.











- Pushing the socket and turn it clockwise.
- OFit the projections [A] of the socket into the grooves [B] of the turn signal light.
- Install the middle fairings (see Middle Fairing Installation in the Frame chapter).

Rear Turn Signal Light

 Remove: Screw [A] Rear Turn Signal Light Lens [B]

Lighting System

• Push and turn the rear turn signal light bulb [A] counterclockwise and remove it.

• Insert the new bulb [A] by aligning its upper and lower pins [B] with the upper and lower grooves [C] in the socket, and turn the bulb clockwise.

OTurn the bulb about 15°.

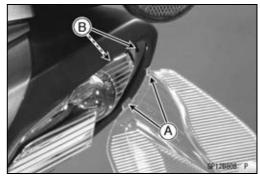
- Fit the projections [A] of the lens into the grooves [B] of the turn signal light.
- Tighten the screw.

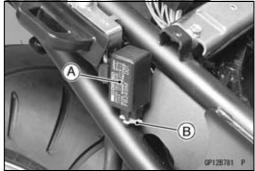
Turn Signal Relay Inspection

- Remove: Right Seat Cover (see Seat Cover Removal in the Frame chapter)
 - Turn Signal Relay [A]
- Disconnect the connector [B].









16-68 ELECTRICAL SYSTEM

Lighting System

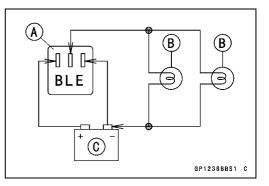
• Connect one 12 V battery and turn signal lights as indicated in the figure, and count how may times the lights flash for one minute.

Turn Signal Relay [A] Turn Signal Lights [B] (12 V 21 W × 2) 12 V Battery [C]

★ If the lights do not flash as specified, replace the turn signal relay.

Testing Turn Signal Relay

Lo		
The Number of Turn Signal Lights	Wattage (W)	Flashing Times (c/m*)
1**	21	140 ~ 250
2	42	75 ~ 95

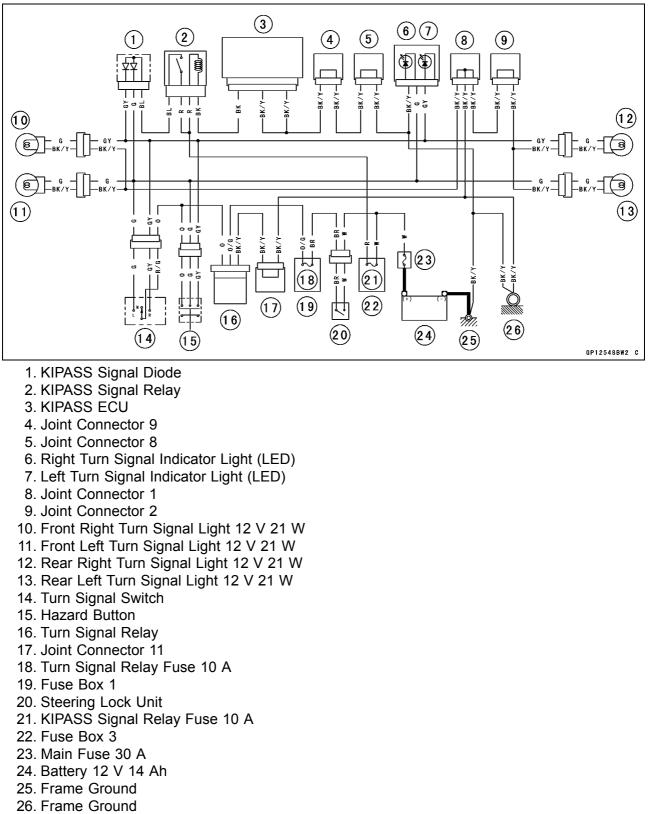


*: Cycle(s) per minute

**: Corrected to "one light burned out".

Lighting System

Turn Signal Light Circuit



16-70 ELECTRICAL SYSTEM

Air Switching Valve

Air Switching Valve Operation Test

• Refer to the Air Suction System Damage Inspection in the Periodic Maintenance chapter.

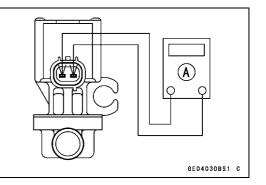
Air Switching Valve Unit Test

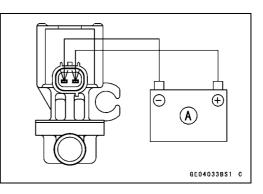
- Remove the air switching valve (see Air Switching Valve Removal in the Engine Top End chapter).
- Set the hand tester [A] to the \times 1 Ω range and connect it to the air switching valve terminals as shown.

Special Tool - Hand Tester: 57001-1394

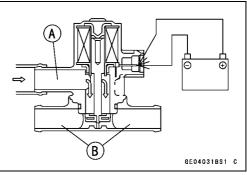
Air Switching Valve Resistance Standard: 20 ~ 24 Ω at 20°C (68°F)

- ★ If the resistance reading is except the specified value, replace it with a new one.
- Connect the 12 V battery [A] to the air switching valve terminals as shown.





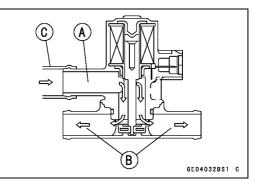
• Blow the air to the inlet air duct [A], and make sure does not flow the blown air from the outlet air ducts [B].



- Disconnect the 12 V battery.
- Blow the air to the inlet air duct [A] again, and make sure flow the blown air from the outlet air ducts [B].
- ★ If the air switching valve dose not operate as described, replace it with a new one.

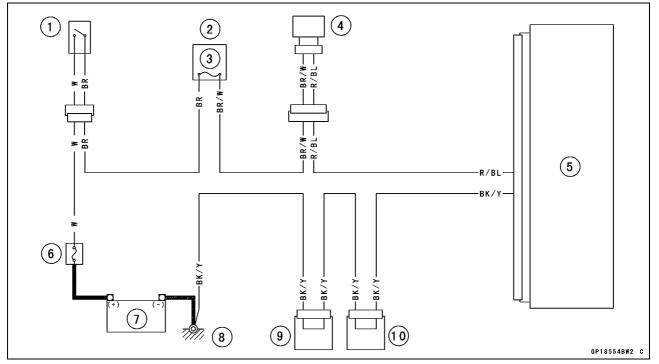
NOTE

○To check air flow through the air switching valve, just blow through the air switching valve hose (inlet side) [C].



Air Switching Valve

Air Switching Valve Circuit



- 1. Steering Lock Unit
- 2. Fuse Box 2
- 3. Ignition Fuse 15 A (ZG1400C), 10 A (ZG1400D)
- 4. Air Switching Valve
- 5. ECU
- 6. Main Fuse 30 A
- 7. Battery 12 V 14 Ah
- 8. Frame Ground
- 9. Joint Connector 9
- 10. Joint Connector 3

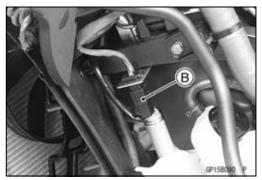
16-72 ELECTRICAL SYSTEM

Radiator Fan System

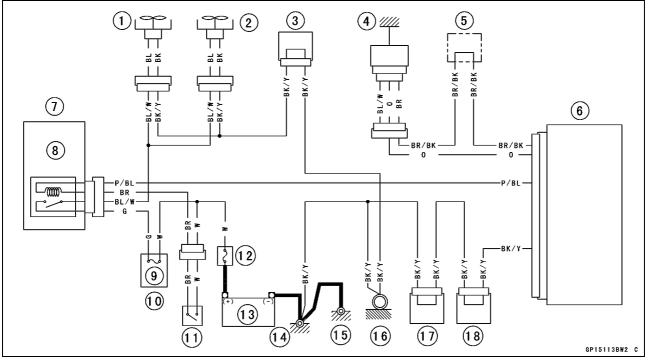
Fan Motor Inspection

- Remove the front middle fairings (see Middle Fairing Removal in the Frame chapter).
- Disconnect the connectors.
 Right Fan Motor Lead Connector [A]
 Left Fan Motor Lead Connector [B]
- Using an auxiliary leads, supply battery power to the fan motor.
- ★If the fan does not rotate, the fan motor is defective and must be replaced.





Radiator Fan Circuit



- 1. Fan Motor
- 2. Fan Motor
- 3. Joint Connector 1
- 4. Water Temperature Sensor
- 5. Water-proof Joint 2
- 6. ECU
- 7. Relay Box
- 8. Fan Relay
- 9. Fan Fuse 15 A

- 10. Fuse Box 2
- 11. Steering Lock Unit
- 12. Main Fuse 30 A
- 13. Battery 12 V 14 Ah
- 14. Frame Ground
- 15. Engine Ground
- 16. Frame Ground
- 17. Joint Connector 9
- 18. Joint Connector 3

Oil Control Solenoid Valve

Oil Control Solenoid Valve Inspection

• Remove:

Right Rear Middle Fairing (see Middle Fairing Removal in the Frame chapter)

• Disconnect the oil control solenoid valve lead connector [A].

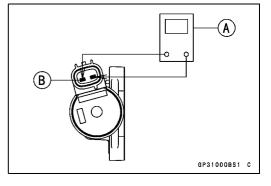


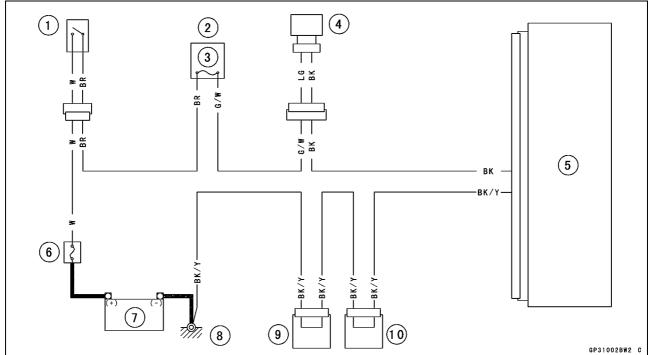
• Set the hand tester [A] to $\times 1 \Omega$ range and connect the tester leads to the terminals in the oil control solenoid valve lead connector [B].

Special Tool - Hand Tester: 57001-1394

- Oil Control Solenoid Valve Resistance
Standard:6.9 ~ 7.9 Ω at 20°C (68°F)
- ★ If the reading is out of the standard, replace the oil control solenoid valve.

Oil Control Solenoid Valve Circuit





- 1. Steering Lock Unit
- 2. Fuse Box 3
- 3. Oil Control Solenoid Valve Fuse 15 A
- 4. Oil Control Solenoid Valve
- 5. ECU
- 6. Main Fuse 30 A
- 7. Battery 12 V 14 Ah
- 8. Frame Ground
- 9. Joint Connector 9
- 10. Joint Connector 3

16-74 ELECTRICAL SYSTEM

Electric Windshield

Electric Windshield Assembly Removal

• Remove:

Upper Fairing (see Upper Fairing Removal in the Frame chapter)

- Position the windshield bracket [A] as shown.
- Remove:

Clamp [B] Bolts [C]

• Disconnect the electric windshield motor lead connector [A].

OPush down the stopper [B] of the connector and pull it.

- Hold the electric windshield assembly and remove the bolt [C].
- Remove:

Electric Windshield Assembly [D]

NOTE

- ODo not remove the bolt or nut in the electric windshield assembly excluding the above-mentioned bolts for removal.
- The electric windshield assembly is elaborately manufactured at the factory.
- Olf they are removed, the performance of electric windshield assembly will not be guaranteed.

Electric Windshield Assembly Installation

• Install:

Bolt [A] L: 18 mm (0.71 in.) Bolts [B] L: 12 mm (0.47 in.) Clamp [C] (Clamp the meter lead.)

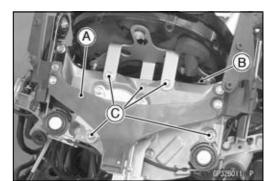
- Install:
 - Bolt [A] L: 12 mm (0.47 in.)

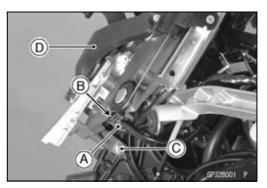
• Connect the electric windshield motor lead connector [B].

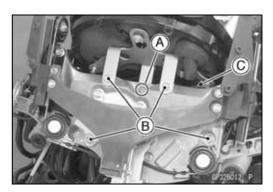
NOTE

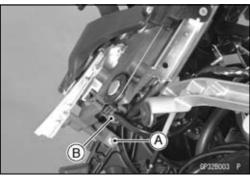
○After connecting the electric windshield motor lead connector, move the windshield with the electric windshield switch and then turn the key knob to OFF.

• Install the removed parts (see appropriate chapter).









Electric Windshield

Electric Windshield Assembly Lubrication

 Remove: Windshield (see Windshield Removal in the Frame chapter) Quick Rivets [A] Screws [B] Electric Windshield Actuator Cover [C]

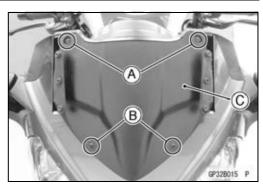
• Apply silicon grease to the right rail [A].

• Apply silicon grease to the left rail [A].

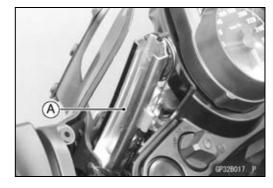
• Apply olefin grease to the center rail [A].

Electric Windshield Relay Inspection

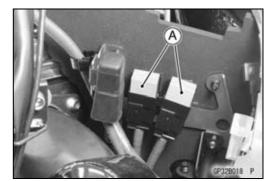
- Remove:
 - Left Inner Cover (see Middle Fairing Removal in the Frame chapter)
 - Electric Windshield Relays [A]
- OThe electric windshield relays (up and down) are identical.











16-76 ELECTRICAL SYSTEM

Electric Windshield

• Connect the hand tester [A] and 12 V battery [B] to the electric windshield relay [C] as shown.

Special Tool - Hand Tester: 57001-1394

 \star If the relay does not work as specified, replace the relay.

Testing Relay

Hand Tester Range: \times 1 Ω

 $\begin{array}{lll} \mbox{Criteria:} & \mbox{When battery is connected} \to 0 \ \Omega \\ & \mbox{When battery is disconnected} \to & \ \Omega \end{array}$

Electric Windshield Inspection

NOTE

OBe sure the battery is fully charged.

• Remove:

Upper Fairing (see Upper Fairing Removal in the Frame chapter)

- Disconnect the electric windshield motor lead connector [A].
- Connect the hand tester [B] (DC 25 V range) to the connector according to the table below.
- Measure the supply voltage to the electric windshield motor.

Tester Connection		Switch Position	Standard Valtaga	
(+)	(—)	Switch Position	Standard Voltage	
Red	Green	Free	0 V	
Red	Green	Up	Battery Voltage	
Green	Red	Free	0 V	
Green	Red	Down	Battery Voltage	

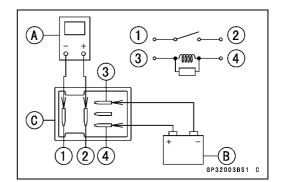
Connection and Measurements

- ★ If the readings are standard, connect the electric windshield motor lead connector and push the electric windshield switch.
- ★ If the wind shield does not move, replace the electric windshield assembly.
- ★ If any reading is out of the standard, check the following parts.

Electric Windshield Fuse 30 A (see Fuse Inspection) Electric Windshield Switch (see Switch Inspection) Electric Windshield Relays (see Electric Windshield Relay Inspection)

Wiring (see Wiring Inspection)

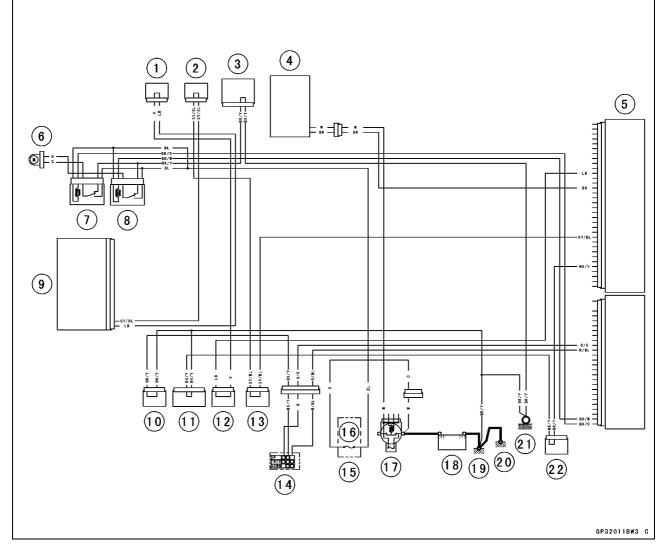
★ If the above parts are good, replace the ECU (see ECU Removal in the Self-Diagnosis System chapter).





Electric Windshield

Electric Windshield Circuit



- 1. Joint Connector 4
- 2. Joint Connector 5
- 3. Joint Connector 1
- 4. Steering Lock Unit
- 5. ECU
- 6. Electric Windshield Motor
- 7. Electric Windshield Relay (Down)
- 8. Electric Windshield Relay (Up)
- 9. Meter Unit
- 10. Joint Connector 8
- 11. Joint Connector 9

- 12. Joint Connector 6
- 13. Joint Connector 7
- 14. Electric Windshield Switch
- 15. Fuse Box 3
- 16. Electric Windshield Fuse 30 A
- 17. Main Fuse 30 A
- 18. Battery 12 V 14 Ah
- 19. Frame Ground
- 20. Engine Ground
- 21. Frame Ground
- 22. Joint Connector 3

16-78 ELECTRICAL SYSTEM

Storage Case Solenoid

Storage Case Solenoid Removal

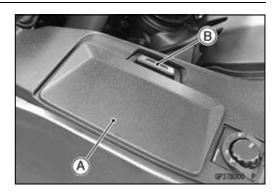
- Turn the key knob to ON.
- Open the lid [A] by pushing the button [B].

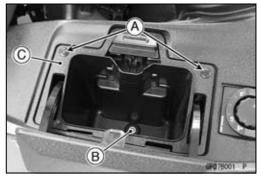
- Remove: Quick Rivets [A]
 - Bolt [B]

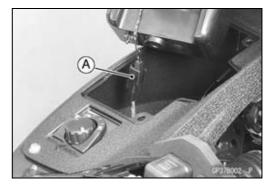
 Remove: Screws [A] Cover [B]

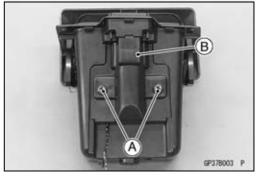
- Take out the storage case [C] from the left inner cover
- Disconnect the storage case solenoid lead connector [A].

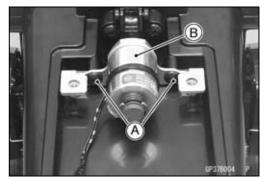
• Remove: Storage Case Screws [A] Storage Case Solenoid [B]









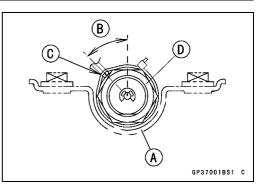


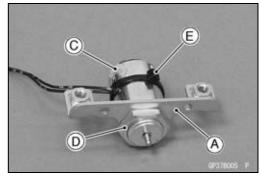
Storage Case Solenoid

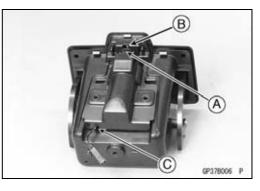
Storage Case Solenoid Installtion

- When installing the bracket [A], install it so that its position is 45 degrees [B] to base [C] of the leads as shown in the figure.
- Tighten the nut [D] securely.

OThe band stopper [E] must not come in contact with the storage case and cover.









- Install:
 - Storage Case Solenoid
- Tighten:

Torque - Storage Case Screws: 0.7 N·m (0.07 kgf·m, 6.2 in·lb)

- Insert the projection [A] of the cover into the slit [B].
- Run the leads into the recess [C].
- Install the removed parts (see appropriate chapters).

Storage Case Solenoid Inspection

Remove:

Storage Case (see Storage Case Solenoid Removal)

• Set the hand tester to ×1 Ω range and connect the tester leads to the terminals in the storage case solenoid lead connector [A].

Special Tool - Hand Tester: 57001-1394

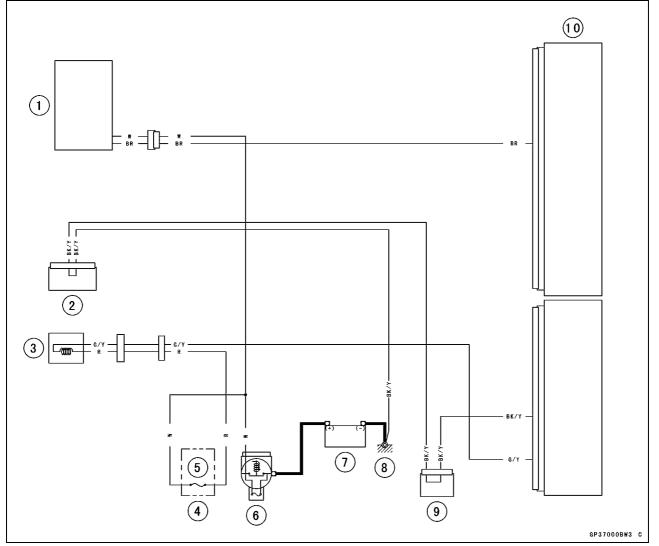
Storage Case Solenoid Resistance Standard: 27.9 ~ 34.1 Ω at 20°C (68°F)

 \bigstar If the reading is out of the standard, replace the storage case solenoid.

16-80 ELECTRICAL SYSTEM

Storage Case Solenoid

Storage Case Solenoid Circuit



- 1. Steering Lock Unit
- 2. Joint Connector 9
- 3. Storage Case Solenoid
- 4. Fuse Box 3
- 5. KIPASS Signal Relay Fuse 10 A
- 6. Main Fuse 30 A
- 7. Battery 12 V 14 Ah
- 8. Frame Ground
- 9. Joint Connector 3
- 10. ECU

Grip Warmer

Grip Warmer Removal (Right Side)

• Remove:

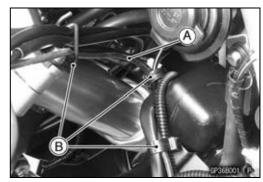
Right Inner Cover (see Inner Cover Removal in the Frame chapter) Right Grip Warmer Lead Connector [A]

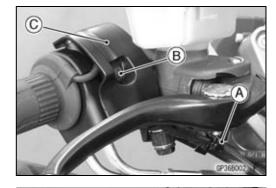
• Remove the grip warmer lead [A] from the clamps [B].

- Remove: Clamp [A] Screw [B] Cover [C]
- Remove: Clamp [A]

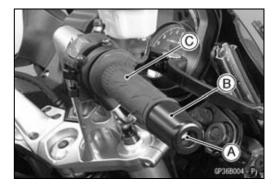
 Remove: Throttle Cable Upper Ends Weight Bolt [A] Weight [B] Right Grip Warmer Assembly [C]











16-82 ELECTRICAL SYSTEM

Grip Warmer

(Left Side)

• Remove:

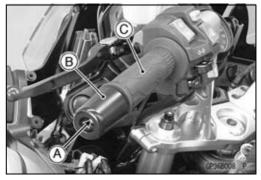
Left Inner Cover (see Inner Cover Removal in the Frame chapter) Left Grip Warmer Lead Connector [A]

• Remove the grip warmer lead [A] from the clamps [B].









 Remove: Clamps [A]

- Remove: Weight Bolt [A] Weight [B] Left Grip Warmer Assembly [C]
- OThe left grip is installed by the adhesive at flange side (Refer to the Left Side section in the Grip Warmer Installation).

Grip Warmer Installation (Right Side)

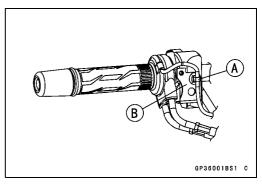
• Install:

Right Grip Warmer Assembly and Throttle Cable Upper Ends Weight

• Apply a non-permanent locking agent to the weight bolt and tighten it.

Grip Warmer

• Insert the clamp [A] in the bracket [B].



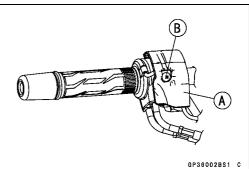
- Install:
 - Cover [A]
 - Screw [B]
- Run the grip warmer lead correctly (see Cable, Wire, and Hose Routing Section in the Appendix chapter).
- Connect the right grip warmer lead connector.
- Install:

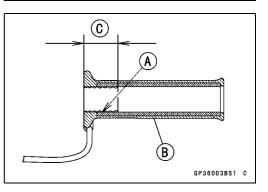
Right Inner Cover (see Inner Cover Installation in the Frame chapter)

(Left Side)

- Apply adhesive [A] to the left grip [B] as shown in the figure.
 - 30 mm (1.2 in.) or more [C]

Sealant - Adhesive, TB1530C: 56042-0001

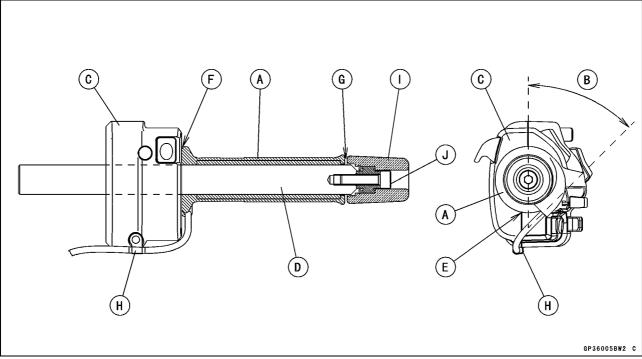




16-84 ELECTRICAL SYSTEM

Grip Warmer

- Install the left grip warmer assembly [A] as shown in the figure.
 45° [B]
 Left Handlebar Switch Housing [C]
 Left Handle Bar [D]
 OAlign the projection of the grip with the mating surface of the left handlebar switch housing [E].
- OTouch the left grip to the left handlebar switch housing [F].
- OWipe off any protruding grease [G].
- Install:
 - Clamp [H]
 - Weight [I]
- Apply a non-permanent locking agent to the weight bolt
 - [J] and tighten it.



- Run the grip warmer lead correctly (see Cable, Wire, and Hose Routing Section in the Appendix chapter).
- Connect the left grip warmer lead connector.
- Install:

Left Inner Cover (see Inner Cover Installation in the Frame chapter)

Grip Warmer Inspection

- Disconnect the grip warmer lead connector [A] (see Grip Warmer Removal).
- Set the hand tester to the × 1 Ω range and connect it to the grip warmer lead connector.

Special Tool - Hand Tester: 57001-1394

Grip Warmer ResistanceRight Grip Warmer:about 1.13 ~ 1.39 Ω

Left Grip Warmer: about 1.65 ~ 2.01 Ω

★ If the tester readings are different much more than the specified, replace the grip warmer assembly.



Grip Warmer

Grip Warmer Temperature Adjustment Dial Removal

• Remove:

Left Inner Cover (see Inner Cover Removal in the Frame chapter)

- Screws [A]
- Bracket [B]

Grip Warmer Temperature Adjustment Dial [C]

Grip Warmer Temperature Adjustment Dial Installation

Installation is basically the reverse of removal.

Grip Warmer Temperature Adjustment Dial Inspection

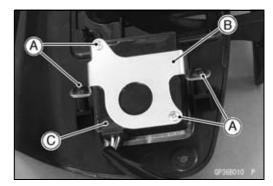
- Remove the left inner cover (see Inner Cover Removal in the Frame chapter) without removing the grip warmer lead connectors.
- Set the hand tester to the DC 25 V range and connect it to the grip warmer temperature adjustment dial lead connectors [A] using the needle adapter set [B] as shown in the figure.

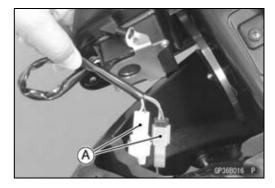
Grip Warmer Temperature Adjustment Dial [C]

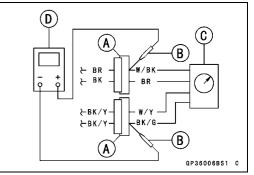
Special Tools - Hand Tester [D]: 57001-1394 Needle Adapter Set: 57001-1457

Connections:

Hand Tester (+) \rightarrow W/BK Lead Hand Tester (–) \rightarrow BK/G Lead







• Turn the key knob to ON and measure the output voltage with the following dial positions.

Output Voltage

Dial Position	Voltage	
OFF	about Battery Voltage	
LO	6 ~ 12 V	
HI	Less than 2 V	

★ If the tester readings are not as specified, check the following items.

Grip Warmers (see Grip Warmer Inspection) Grip Warmer Relay (see Grip Warmer Relay Inspection) Wiring Continuity (see Grip Warmer System Circuit)

★ If above items are good, replace the grip warmer temperature adjustment dial.

16-86 ELECTRICAL SYSTEM

Grip Warmer

Grip Warmer Relay Inspection

• Remove:

Left Inner Cover (see Inner Cover Removal in the Frame chapter)

- Refer to the Headlight Relay Inspection for grip warmer relay inspection.
- OThe grip warmer relay [A] is identical with the headlight relays.

Grip Warmer System Inspection

 Check the following items when the grip warmer doesn't become hot though engine starts. Battery (see Charging Condition Inspection) Grip Warmer Fuse 10 A (see Fuse Inspection)

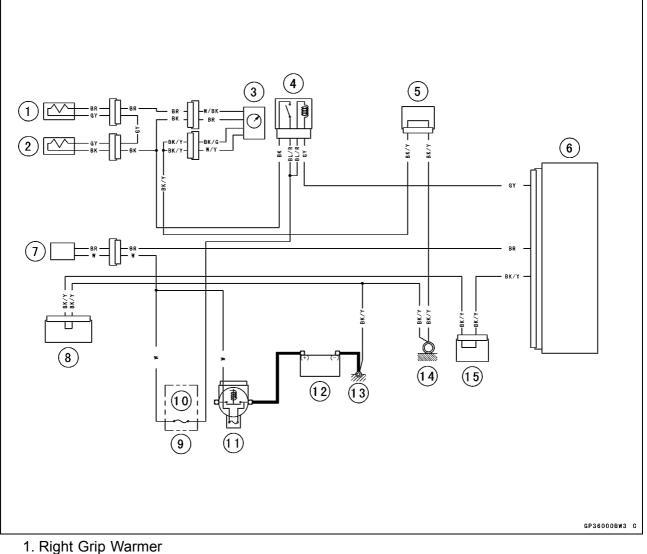
Grip Warmer (see Grip Warmer Inspection) Grip Warmer Temperature Adjustment Dial (see Grip Warmer Temperature Adjustment Dial Inspection) Grip Warmer Relay (see Grip Warmer Relay Inspection) Wiring Continuity (see Grip Warmer System Circuit)

★ If the all parts are good, replace the ECU.



Grip Warmer

Grip Warmer System Circuit



- 2. Left Grip Warmer
- 3. Grip Warmer Temperature Adjustment Dial
- 4. Grip Warmer Relay
- 5. Joint Connector 10
- 6. ECU
- 7. Steering Lock Unit
- 8. Joint Connector 9
- 9. Fuse Box 3
- 10. Grip Warmer Fuse 10 A
- 11. 30 A Main Fuse
- 12. Battery
- 13. Frame Ground
- 14. Frame Ground
- 15. Joint Connector 3

16-88 ELECTRICAL SYSTEM

Meter, Gauge, Indicator Unit

Meter Unit Removal

 Remove: Windshield (see Windshield Removal in the Frame chapter) Quick Rivets [A] Screws [B] Electric Windshield Actuator Cover [C]

• Remove:

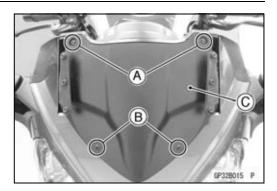
Meter Lead Connector [A] Meter Unit Mounting Nuts [B] and Washers Meter Unit [C] Damper

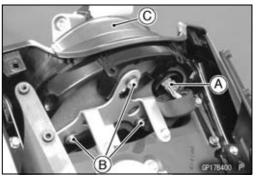
NOTICE

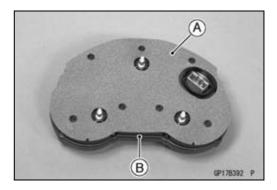
Place the meter unit so that the face is up. If a meter unit is left upside down or sideways for any length of time, it will malfunction.

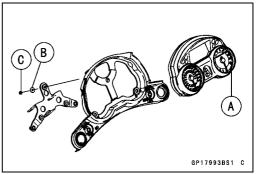
Meter Unit Installation

• Fit the holes of the damper [A] onto the projections of the meter unit [B].









 Install: Meter Unit [A] Washers [B] Nuts [C]

Install:

- Windshield (see Windshield Installation in the Frame chapter)
- Install the removed parts (see appropriate chapter).

Meter Unit Disassembly

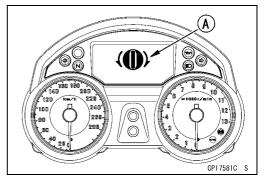
 Remove: Meter Unit (see Meter Unit Removal) Screws [A] Lower Meter Cover [B]

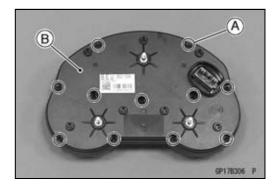
• Separate: Upper Meter Cover [A] Middle Meter Cover [B] Meter Assembly [C]

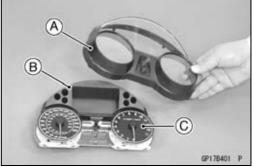
Meter Operation Inspection Check 1-1: Switching Inspection ● Push the key knob [A].

• Check that the key knob symbol [A] appears in the display for five seconds.









16-90 ELECTRICAL SYSTEM

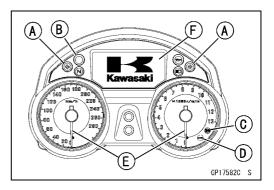
Meter, Gauge, Indicator Unit

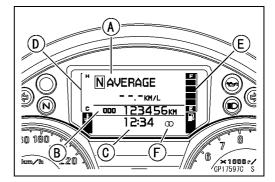
- Turn the key knob to ON while the key knob symbol appears.
- Check the following items.
- OThe turn signal light indicator lights (LED) [A] flash two times.
- OThe warning indicator light (LED) [B] goes on for three seconds.
- OThe K-ACT ABS indicator light (LED) [C] goes on (equipped models).
- OThe KTRC indicator light (LED) [D] flashes (equipped models).
- OThe speedometer and tachometer needles [E] momentarily point their last readings and back to the minimum position.
- OThe K Kawasaki mark [F] appears in the display for three seconds.
- OAfter the K Kawasaki mark appeared, the ordinary indication [A] (Example: N, AVERAGE --.- KM/L), odometer [B] or trip meter, clock [C], water temperature gauge [D], fuel level gauge [E], and K-ACT ABS symbol [F] appear in the display.
- ★ If the meter does not work and the KIPASS is good, replace the meter assembly.
- Refer to the Meter Unit Inspection for other indicator lights (LED) inspection.
- By pushing the upper button [A] each time, check that the display [B] changes as follows.

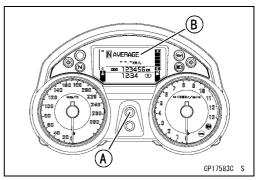
OThis display is ordinary indication.



- By pushing the meter mode button [A] at front side of the left handlebar switch housing each time, check that the display changes as shown in the above figure.
- ★ If the display function does not work, replace the meter assembly.
- ★ If the display function does not work when using the meter mode button, check the following parts. Meter Mode Button (see Switch Inspection)
 - Wiring (see Meter Unit Circuit)









• By pushing the lower button [A] each time, check that the display [B] changes as follows.

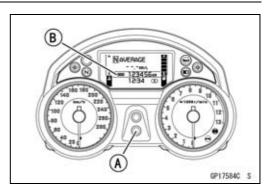
OThis display is ordinary indication, also.

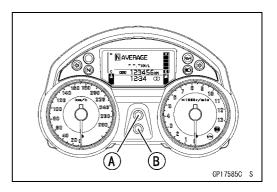


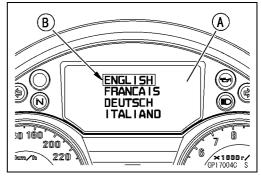
★ If the display function does not work, replace the meter assembly.

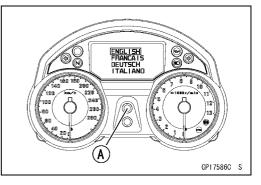
• While the ordinary indication, push the upper button [A] and lower button [B] for more than two seconds.

- Check that the display changes to the language setting mode [A].
- OThis display is system menu indication.
- By pushing the lower button each time, check that the cursor [B] changes on the languages.
- ★ If the display function does not work, replace the meter assembly.
- While the language setting mode, push the upper button [A].









16-92 ELECTRICAL SYSTEM

Meter, Gauge, Indicator Unit

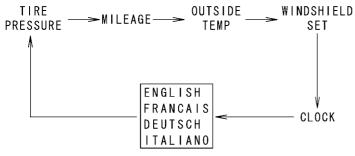
- Check that the display [A] changes to the TIRE PRES-SURE, MILEAGE, OUTSIDE TEMP, WINDSHIELD SET and CLOCK modes.
- OThis display is system menu indication, also.

NOTE

OWhen the battery is installed, the TIRE PRESSURE is not displayed at once.

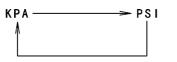
OIf the TIRE PRESSURE is not displayed, wait for about three minutes after the key knob is turned to ON.

• By pushing the upper button each time, check that the display changes as follows.

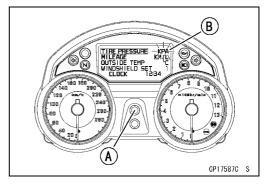




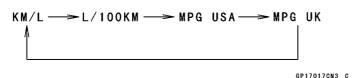
- ★ If the display function does not work, replace the meter assembly.
- When the TIRE PRESSURE is indicated, push the upper button [A] for more than two seconds.
- Check that the unit [B] flashes.
- By pushing the lower button each time, check that the display changes as follows.

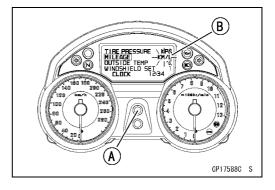


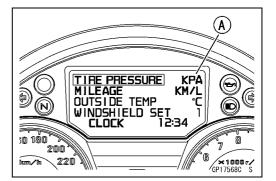
GP17016CN3 C



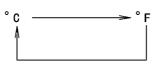
- Check that the unit setting menu is decided by the upper button pushing.
- ★ If the display function does not work, replace the meter assembly.
- Select the MILEAGE indication.
- Push the upper button [A] for more than two seconds.
- Check that the unit [B] flashes.
- By pushing the lower button each time, check that the display changes as follows.

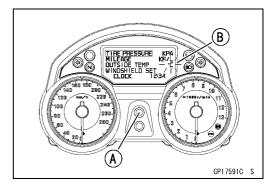






- Check that the unit setting menu is decided by the upper button pushing.
- ★ If the display function does not work, replace the meter assembly.
- Select the OUTSIDE TEMP indication.
- Push the upper button [A] for more than two seconds.
- Check that the unit [B] flashes.
- By pushing the lower button each time, check that the display changes as follows.

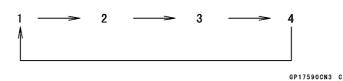


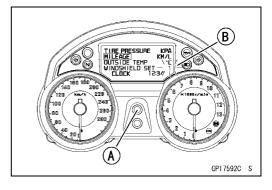


• Check that the unit setting menu is decided by the upper button pushing.

GP17589CN3 C

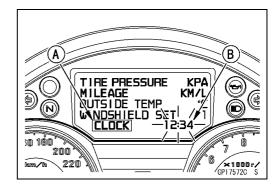
- ★ If the display function does not work, replace the meter assembly.
- Select the WINDSHIELD SET indication.
- Push the upper button [A] for more than two seconds.
- Check that the figure [B] flashes.
- By pushing the lower button each time, check that the display changes as follows.





- Check that the figure setting menu is decided by the upper button pushing.
- \star If the display function does not work, replace the meter assembly.
- Select the CLOCK [A] is indication.
- Push the upper button for more than two seconds.

OThe clock setting menu (hour and minute) [B] should flash.

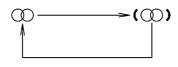


16-94 ELECTRICAL SYSTEM

Meter, Gauge, Indicator Unit

- Push the lower button.
- OThe hour display [A] starts flashing.
- By pushing the upper button each time, check that the hour display changes.

- By pushing the lower button, check that the hour display is decided and minute display [A] starts flashing.
- By pushing the upper button each time, check that the minute display changes.
- By pushing the lower button, check that the hour and minute display [A] starts flashing.
- By pushing the upper button, check that the hour and minute display is decided.
- When both hour and minute display flashing, by pushing the lower button, check that the hour display start flashing. This flashing returns hour setting mode.
- ★ If the display function does not work, replace the meter assembly.
- By pushing the K-ACT button [A] at the left handlebar switch housing for two seconds each time, check that the K-ACT ABS symbol [B] changes as follows.

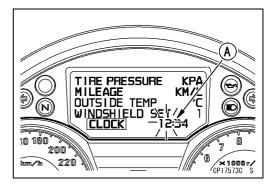


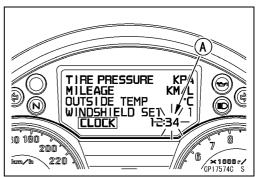
GP17595CN3 C

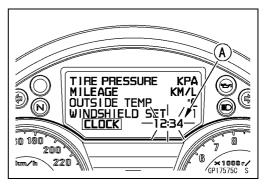
- ★ If the display function does not work, check the following parts.
 - K-ACT Button (see Switch Inspection)

Wiring (see Meter Unit Circuit)

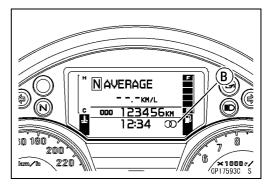
★ If the above parts is good, replace the meter assembly and/or K-ACT ABS hydraulic unit.









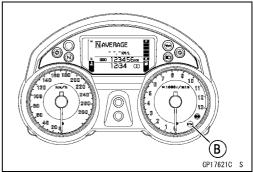


- By pushing the KTRC button [A] at the left handlebar switch housing for two seconds each time, check that the KTRC indicator light (LED) [B] changes to going on or flashing.
- ★If the indicator light (LED) does not work, check the following parts.

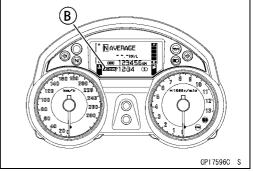
KTRC Button (see Switch Inspection)

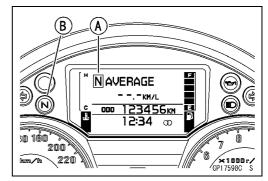
- Wiring (see Meter Unit Circuit)
- ★If the above parts is good, replace the meter assembly and/or ECU.











- By pushing the meter mode button [A] at front side of the left handlebar switch housing for two seconds each time, check that the echo mode symbol [B] changes to appearing or disappearing.
- ★ If the display function does not work, check the following parts.

Meter Mode Button (see Switch Inspection) Wiring (see Meter Unit Circuit)

★If the above parts is good, replace the meter assembly and/or ECU.

Check 1-2: Gear Position Indication Inspection

• Push and turn the key knob to ON.

OThe N mark [A] appears in the display and the neutral indicator light (LED) [B] goes on when the neutral position.

16-96 ELECTRICAL SYSTEM

Meter, Gauge, Indicator Unit

- Set the low gear position, and check that the display changes to 1 mark [A] and the neutral indicator light (LED) goes off.
- Using the center stand, raise the rear wheel off the ground.
- Rotate the rear wheel by hand or start the engine, and change the gear position.
- Check that the display corresponding to each gear position (1, 2, 3, 4, 5 or OD) appears.
- ★ If the display function does not work, check the following parts.

Gear Position Switch (see Gear Position Switch Inspection

Wiring (see Meter Unit Circuit)

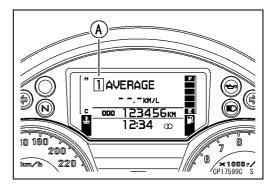
★ If the above parts is good, replace the meter assembly and/or ECU.

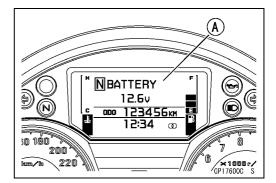
Check 1-3: Battery Voltage Inspection

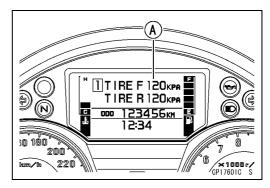
- Select the battery voltage indication [A] in the ordinary indication.
- OThe voltage corresponding to a present battery condition is displayed.
- OThe voltage range is $9.0 \sim 16$ V.
- OThe tolerance is ±0.4V.
- ★ If the display is malfunction, check the wiring (see Meter Unit Circuit).
- \star If the wiring is good, replace the meter assembly.

Check 1-4: Tire Air Pressure Inspection

- Select the tire air pressure indication [A] in the ordinary indication.
- OThe tire air pressure is displayed by riding as approx 20 km/h or more and 1 minute passed.
- OThe display range is 0 ~ 350 KPS (50 PSI).
- ★ If the display is malfunction without the warning message or service code, check the wiring (see Meter Unit Circuit).
- ★ If the wiring is good, replace the meter assembly and/or KIPASS ECU.

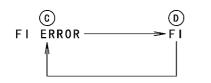


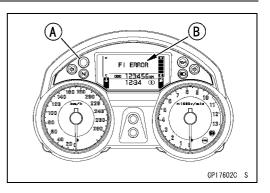




Check 1-5: Warning Message Inspection

- For example, disconnect the atmospheric pressure sensor connector under the seat.
- Push and turn the key knob to ON.
- Check that the warning light (LED) [A] goes on and the display [B] changes as follows.





[C] Warning Message

[D] Symbol

OThe display is the warning message indication.

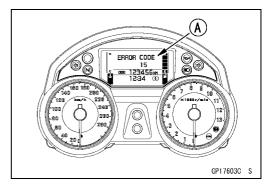
★ If the display function does not work, go to the Check 3-1 and check the following items.

GP17018CN3 C

Wiring (see Wiring Inspection)

CAN Communication Line Resistance (at ECU) (see CAN Communication Line Resistance Inspection in the Fuel System (DFI) chapter)

- ★ If the above items are good, replace the meter assembly and/or ECU.
- Push the upper and lower buttons for more than two seconds, check that the ERROR CODE [A] and numbers appear in the display.
- OThe warning indicator light (LED) goes on.
- Again, push the upper and lower buttons for more than two seconds, check that the display returns the warning message indication.
- OThe warning indicator light (LED) goes on.
- Connect the atmospheric pressure sensor connector and then the warning message and warning light (LED) go off.
- ★ If the display function does not work, replace the meter assembly.



Meter System Inspection

Check 2-1: Speedometer Inspection

- Disconnect the speed sensor lead connector [A] of the main harness side.
- Connect a suitable oscillator [B] to the connector as shown in the figure.
- The speed equivalent to the input frequency is indicated in the oscillator, if the square wave is input into BL/Y lead terminal [C].

BK/Y Lead Terminal [D]

- Push and turn the key knob to ON.
- Indicates approximately 60 mph if the input frequency is approximately 616 Hz.
- Indicates approximately 60 km/h if the input frequency is approximately 385 Hz.
- ★ If the meter function does not work, check the wiring (see Meter Unit Circuit).
- \star If the wiring is good, replace the meter assembly.

NOTE

• The input frequency of the oscillator adds the integrated value of the odometer.

 $\bigcirc \mbox{The integrated value of the odometer cannot be reset.}$

Check 2-2: Odometer Inspection

- Connect the leads in the same circuit as Check 2-1.
- Push and turn the key knob to ON.
- Raise the input frequency of the oscillator to see the result of odometer [A] inspection.
- OExample: Indicates the increase of approximately 1 mile, if the input frequency is approximately 616 Hz for one minute.
- OExample: Indicates the increase of approximately 1 km, if the input frequency is approximately 385 Hz for one minute.
- ★ If the value indicated by the odometer does not increase, check the wiring (see Meter Unit Circuit).
- \star If the wiring is good, replace the meter assembly.

NOTE

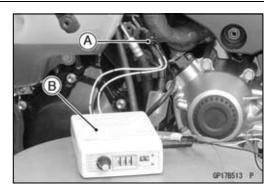
OThe integrated value of the odometer cannot be reset.

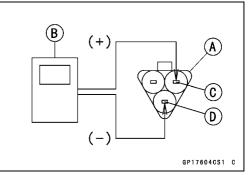
Check 2-3: Trip A/B Meter Inspection

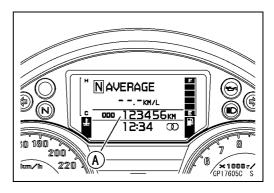
- Connect the leads in the same circuit as Check 2-1.
- Push and turn the key knob to ON.
- Set the TRIP A or B meter mode [A] in the display.
- Raise the input frequency of the oscillator to see the result of this inspection.
- ★ If the value indicated by the trip meter A/B do not increase, replace the meter assembly.
- Push the lower button for more than two seconds and check that each TRIP meter resets to 0.0.
- ★ If the display function does not change, check the wiring (see Meter Unit Circuit).
- \star If the wiring is good, replace the meter assembly.

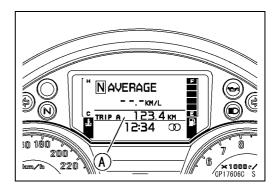
NOTE

OThe integrated value of the odometer cannot be reset.









Check 2-4: Speed Sensor Supply Voltage Inspection

- Disconnect the speed sensor lead connector [A] of the main harness side.
- Set the hand tester [B] to the 25 V range and connect it to the connector as shown in the figure.

Special Tool - Hand Tester: 57001-1394

Connections:

Hand Tester (+) \rightarrow P Lead Terminal [C] Hand Tester (–) \rightarrow BK/Y Lead Terminal [D]

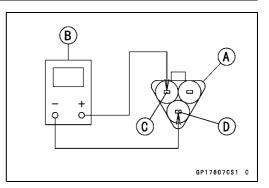
• Push and turn the key knob to ON, and measure the voltage.

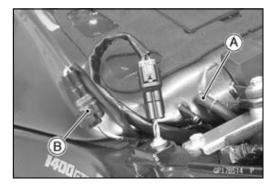
Speed Sensor Supply Voltage Standard: about 12 V

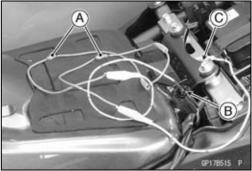
- ★ If the tester reading is not specified, check the wiring (see Meter Unit Circuit).
- \bigstar If the wiring is good, replace the meter assembly.

Check 2-5: Fuel Level Warning Inspection

- Remove: Seat (see Seat Removal in the Frame chapter) Hose [A]
- Take out the fuel pump lead connector [B] and disconnect it.
- Connect the resistor(s) [A] (about 22 Ω) to the LG/BK lead terminal [B] of the main harness side and the ground [C].



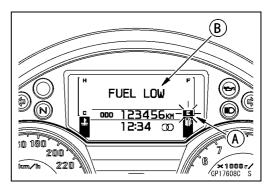


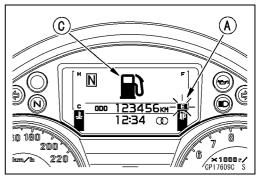


16-100 ELECTRICAL SYSTEM

Meter, Gauge, Indicator Unit

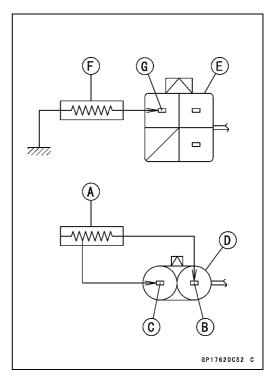
- Push and turn the knob key to ON.
- After about 5 seconds, check that one segment [A] in the fuel gauge starts flashing.
- Check that the FUEL LOW [B] and fuel symbol [C] appear alternately in the display.
- OThis display is the warning message indication.
- ★ If the display function does not change, check the wiring (see Meter Unit Circuit).
- \star If the wiring is good, replace the meter assembly.





Check 2-6: Fuel Level Gauge Inspection

- Connect the leads in the same circuit as Check 2-5, but change the resistor (about 22 Ω) to the (about 1 kΩ).
- Take out the fuel level gauge lead connector and disconnect it.
- Connect the variable rheostat [A] to the W/Y lead terminal [B] and BK/Y lead terminal [C] of the main harness side.
 - [D] Fuel Level Gauge Lead Connector
 - [E] Fuel Pump Lead Connector
 - [F] Resistor (about 1 k Ω)
 - [G] LG/BK Lead Terminal



- Push and turn the key knob to ON.
- Check that the number of segments matches the resistance value of the variable rheostat.
- OThe one segment in the fuel level gauge should appear about every 15 seconds.

Variable Rheostat Resistance	Display Segments [A]	
10 Ω	6	
200 Ω or more	1	

- ★ If the display function does not change, check the wiring (see Meter Unit Circuit).
- \star If the wiring is good, replace the meter assembly.

Check 2-7: Outside Temperature Inspection

- Disconnect the outside temperature sensor lead connector [A] (see Outside Temperature Sensor Removal).
- Connect the variable rheostat [B] to the BK lead [C] and BK/Y lead [D] terminals.

	Resistance (kΩ)			
	9.5660	2.5580	0.6097	
Tomporatura	–13 ±2 (°C)	17 ±2 (°C)	57 ±2 (°C)	
Temperature	9 ±4 (°F)	63 ±4 (°F)	135 ±4 (°F)	

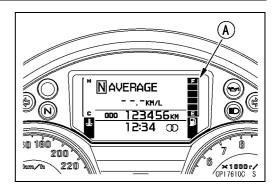
• Push and turn the key knob to ON, and read the temperature in the display.

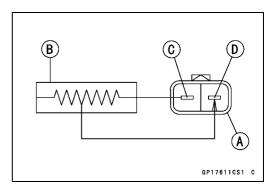
OThe display range is $-20 \sim 60^{\circ}$ C ($-4 \sim 140^{\circ}$ F).

- ★ If the temperature is out of the range, the indication fixes the minimum value or maximum value.
- OWhen the speed is 20 km/h (12 mph) or less and rising the temperature, the indication fixes the value of just before the indication.
- ★ If the display function does not work, check the wiring (see Meter Unit Circuit).
- \star If the wiring is good, replace the meter assembly.

Check 2-8: Other Inspection

- When the water temperature gauge indications is malfunction, even though the warning message does not appear, check the following parts.
 - Water Temperature Sensor (see Water Temperature Sensor Inspection)
 - Wiring (see Meter Unit Circuit)
- ★ If the above parts is good, replace the meter assembly and/or ECU.





16-102 ELECTRICAL SYSTEM

Meter, Gauge, Indicator Unit

- ★ If the three segments of the water temperature gauge [A] is flashed, it is the communication error of the meter and the ECU.
- ★ If the three segments of the fuel level gauge [B] is flashed, it is open or short of the fuel reserve switch.
- When the above both flashings appear, check the following parts.
 - Wiring (see Meter Unit Circuit)

CAN Communication Line Resistance (see Check 1 and CAN Communication Line Resistance Inspection in the Fuel System (DFI) chapter)

Fuel Reserve Switch (for fuel level gauge flashing) (see Fuel Reserve Switch Inspection)

- ★ If the above parts is good, replace the meter assembly and/or ECU.
- OThe following items are displayed while running.

AVERAGE CURRENT RANGE

• When the above item is faulty indication check the following items.

Wiring (see Wiring Inspection)

CAN Communication Line Resistance (see Check 1 and CAN Communication Line Resistance Inspection in the Fuel System (DFI) chapter)

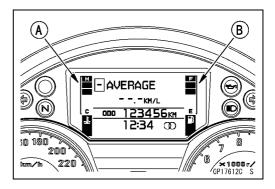
Fuel Injectors (see Fuel Injectors Inspection in the Fuel System (DFI) chapter)

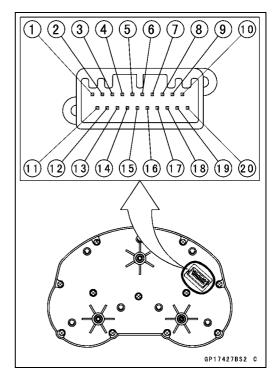
Speed Sensor (see Speed Sensor (Service Code 24) section in the Fuel System (DFI) chapter)

Crankshaft Sensor (see Crankshaft Sensor Inspection) ★ If the above items are good, replace the meter assembly and/or ECU.

Meter Unit Inspection

- Remove the meter unit (see Meter Unit Removal).
 - [1] High Beam Indicator Light (LED) (+)
 - [2] Oil Pressure Warning Indicator Light (LED) (-)
 - [3] Right Turn Signal Indicator Light (LED) (+)
 - [4] Neutral Indicator Light (LED) (-)
 - [5] KIPASS ECU
 - [6] Unused
 - [7] K-ACT ABS Button
 - [8] K-TRC Button
 - [9] Ignition (+)
 - [10] Battery (+)
 - [11] Speed Sensor Supply Voltage (+)
 - [12] Ground (–)
 - [13] Speed Sensor Signal
 - [14] Outside Temperature Sensor
 - [15] Fuel Reserve Switch
 - [16] Fuel Level Sensor
 - [17] CAN Communication Line (High)
 - [18] CAN Communication Line (Low)
 - [19] Left Turn Signal Indicator Light (LED) (+)
 - [20] Meter Mode Button





NOTICE

Do not drop the meter unit. Place the meter unit so that it faces upward. If the meter assembly is left upside down or sideways for a long time or dropped, it will malfunction. Do not short each terminals.

Check 3-1: CAN Communication Line Resistance Inspection

• Set the hand tester [A] to the ×1 Ω range and connect it to the terminal [17] and [18] in the meter unit.

Special Tool - Hand Tester: 57001-1394

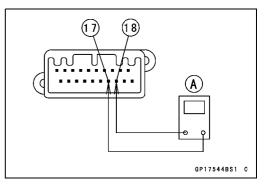
- ★ If the tester reading is not specified, replace the meter assembly.

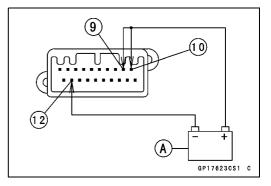
Check 3-2: Meter Unit Power Supply Check

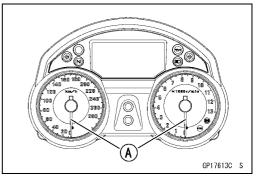
- Using the auxiliary leads, the 12 V battery [A] to the meter unit connector as follows.
- OConnect the battery positive (+) terminal to the terminal [9] [10].
- OConnect the battery negative (–) terminal to the terminal [12].
- Check that the speedometer and tachometer needles [A] momentarily point their last readings and back to the minimum position.
- ★ If the meter unit does not work, replace the meter assembly.

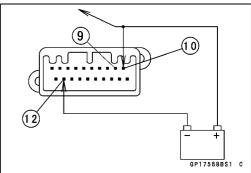
Check 3-3: KIPASS Flashing Mode Inspection

- Connect the leads in the same circuit as Check 3-2.
- Disconnect the terminal [9].









16-104 ELECTRICAL SYSTEM

Meter, Gauge, Indicator Unit

- Check that the warning light (LED) [A] starts flashing (KIPASS Warning Light Flashing Mode).
- Push the upper [B] and lower [C] buttons more than 2 second, within 20 seconds after the terminal [9] disconnected.
- Check that the warning light (LED) goes on one second, and then the light goes off (KIPASS Warning Light No Flashing Mode).

NOTE

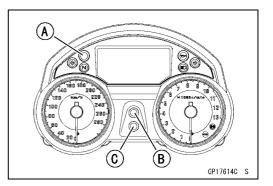
○For this inspection, be sure the battery is 12.4 V or more. KIPASS Warning Light Flashing Mode does not work, when the battery voltage is less than 12±0.4 V.

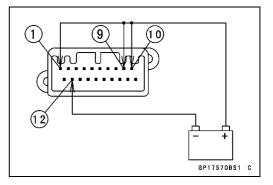
- Again, connect the terminal [9] to the battery (+) terminal.
- And then, disconnect the terminal [9].
- Push the upper and lower buttons more than 2 second, within 20 seconds after the terminal [9] disconnected.
- Check that the warning light (LED) goes on one second, and then the light starts flashing (KIPASS Warning Light Flashing Mode).
- ★ If the meter function does not work, replace the meter assembly.

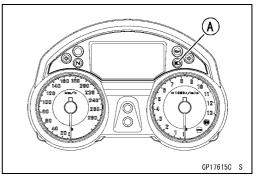
Check 3-4: High Beam Indicator Light (LED) Inspection

- Connect the leads in the same circuit as Check 3-2.
- Connect the terminal [1] to the battery (+) terminal.

- Check that the high beam indicator light (LED) [A] goes on.
- ★ If the indicator light does not go on, replace the meter assembly.







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Meter, Gauge, Indicator Unit

Check 3-5: Right Turn Signal Indicator Light (LED) Inspection

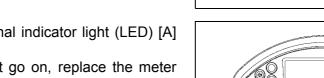
- Connect the leads in the same circuit as Check 3-2.
- Connect the terminal [3] to the battery (+) terminal.

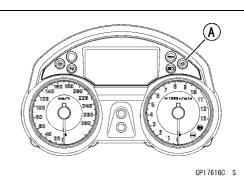
- Check that the right turn signal indicator light (LED) [A] goes on.
- \star If the indicator light does not go on, replace the meter assembly.

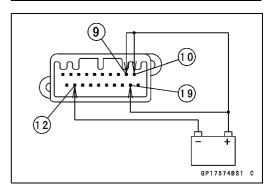
Check 3-6: Left Turn Signal Indicator Light (LED) In-

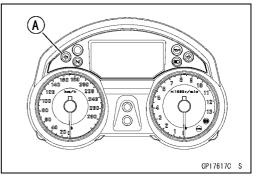
Connect the leads in the same circuit as Check 3-2.
Connect the terminal [19] to the battery (+) terminal.

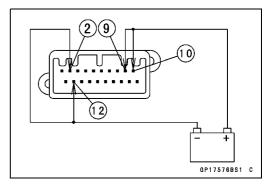
spection











- Check that the left turn signal indicator light (LED) [A] goes on.
- \star If the indicator light does not go on, replace the meter assembly.

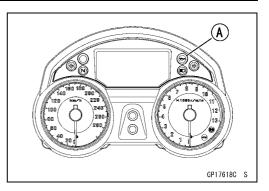
Check 3-7: Oil Pressure Warning Indicator Light (LED) Inspection

- Connect the leads in the same circuit as Check 3-2.
- Connect the terminal [2] to the battery (–) terminal.

16-106 ELECTRICAL SYSTEM

Meter, Gauge, Indicator Unit

- Check that the oil pressure warning indicator light (LED) [A] goes on.
- ★ If the indicator light does not go on, replace the meter assembly.



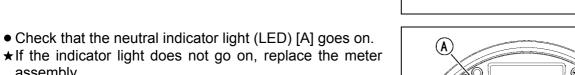
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Check 3-8: Neutral Indicator Light (LED) Inspection

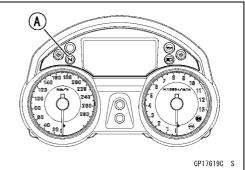
- Connect the leads in the same circuit as Check 3-2.
- Connect the terminal [4] to the battery (–) terminal.

assembly.



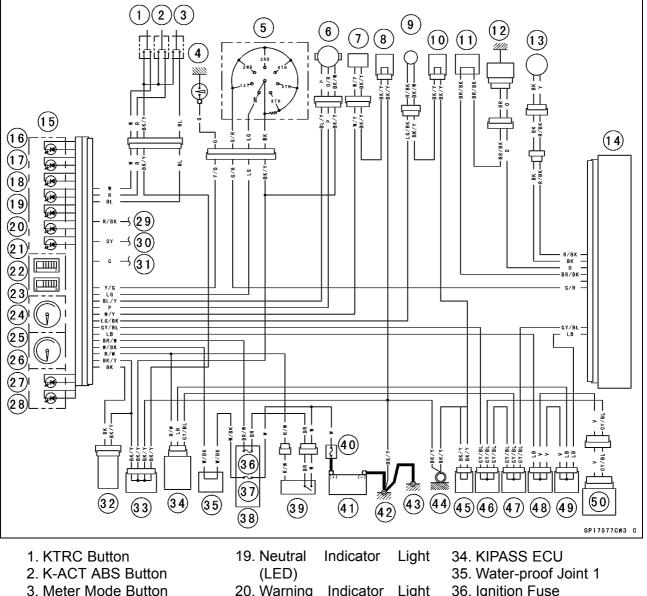
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Meter, Gauge, Indicator Unit

Meter Unit Circuit



- 20. Warning Indicator Light (LED)
- 21. Left Turn Signal Indicator Light (LED)
- 22. Illumination Light (LED)
- 23. Fuel Level Gauge
- 24. Water Temperature Gauge
- 25. Tachometer
- 26. Speedometer
- 27. Oil Pressure Warning Indicator Light (LED)
- 28. K-ACT ABS Indicator Light (LED)
- 29. Dimmer Switch
- 30. Turn Signal Switch (Right)
- 31. Turn Signal Switch (Left)
- 32. Outside Temperature Sensor
- 33. Joint Connector 8

- 36. Ignition Fuse 15 A (ZG1400C) 10 A (ZG1400D)
- 37. ECU Fuse 15 A
- 38. Fuse Box 2
- 39. Steering Lock Unit
- 40. Main Fuse 30 A
- 41. Battery 12 V 14 Ah
- 42. Frame Ground
- 43. Engine Ground
- 44. Frame Ground
- 45. Joint Connector 1
- 46. Joint Connector 5
- 47. Joint Connector 7
- 48. Joint Connector 4
- 49. Joint Connector 6
- 50. K-ACT ABS Hydraulic Unit

18. High Beam Indicator Light (LED)

17. Right Turn Signal Indicator

4. Oil Pressure Switch

5. Gear Position Switch

7. Fuel Level Sensor

8. Joint Connector 9

10. Joint Connector 2

sor

14. ECU

16. KTRC

15. Meter Unit

(LED)

Light (LED)

11. Water-proof Joint 2

13. Crankshaft Sensor

9. Fuel Reserve Switch

12. Water Temperature Sen-

Indicator

Light

6. Speed Sensor

16-108 ELECTRICAL SYSTEM

KIPASS

This motorcycle is equipped with the KIPASS (Kawasaki's Intelligent Proximity Activation Start System) to protect the motorcycle from theft.

A WARNING

KIPASS system may interfere with the operation of certain medical devices such as implanted pacemakers and implanted cardiac defibrillators. The FOB or KIPASS ECU must be kept more than 22 cm (9 in.) from these type of medical devices to avoid interference. Do not carry the FOB in your breast pocket. Operators with medical devices such as pacemakers and implanted cardiac defibrillators should consult with their doctors before use.

FOB Operational Cautions

NOTICE

Do not expose the FOB to excessively high temperature or more humid place. Do not grind the FOB or alter its shape.

Do not put any magnetic materials with the FOB on the same key ring.

Do not put the FOB close to the other electric appliance (TV, Audio system, Personal Computer, etc) or medical appliance.

Do not submerge FOB in water.

Do not disassemble the FOB except of replacing the button battery.

Do not drop the FOB or apply shocks to it.

Do not polish the finish of the FOB by using the gasoline, polishing paint, or etc. If FOB is lost, re-registry at dealer is securely required to prevent the possibility of theft. If FOB and Spare FOB are lost, an authorized Kawasaki dealer will have to replace the ECU, and re-register the new FOB.

Key Registration

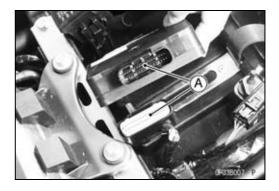
The key can be registered by the KDS 3 version kit. Refer to the instructions in the KDS 3 version kit.

NOTE

- Olf only one key is registered, the registration is not completed.
- Olt is necessary to register two keys or more to complete the key registration.

KIPASS ECU Power Supply Inspection

- Remove the KIPASS ECU (see KIPASS ECU Replacement).
- Visually inspect the terminals [A] of the KIPASS ECU connectors.
- ★ If the connector is clogged with mud or dust, blow it off with compressed air.
- ★ Replace the main harness if the terminals of the main harness connector are cracked, bent, or otherwise damaged.
- ★ Replace the KIPASS ECU if the terminals of the KIPASS ECU connector are cracked, bent, or otherwise damaged.



KIPASS

• With the KIPASS ECU connector [A] connected, check the following ground lead for continuity with the key knob OFF, using the hand tester [B] and needle adapter set.

Special Tools - Needle Adapter Set: 57001-1457 Hand Tester: 57001-1394

ECU Grounding Inspectio	n	
5 (BK/Y) Terminal	\longleftrightarrow	Frame Ground [C]: 0 Ω
22 (BK/Y) Terminal	$\leftarrow \rightarrow$	Frame Ground [C]: 0 Ω

- Engine Ground $\leftarrow \rightarrow$ Frame Ground [C]: 0 Ω
- ★ If no continuity, check the connector, the engine ground lead, or main harness, and repair or replace them if necessary.
- Check the KIPASS ECU power source voltage with the hand tester [A].

OPosition the terminal in accordance with terminal numbers of KIPASS ECU connector [B] in the figure.

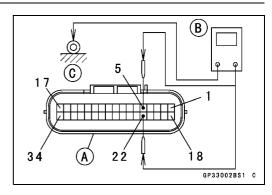
KIPASS ECU Power Source Inspection

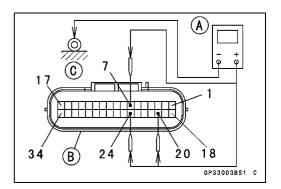
Tester	
Connections:	between 7 (LG) Terminal and Frame Ground [C]
	between 24 (LG) Terminal and Frame Ground [C]
	between 20 (R/W) Terminal and Frame Ground [C] (Supply Voltage to Handle Lock Unit)
Key Knob OFF:	7 (LG) Terminal, Battery Voltage
	24 (LG) Terminal, Battery Voltage
	20 (R/W) Terminal, 0 V
Key Knob ON:	7 (LG) Terminal, Battery Voltage
	24 (LG) Terminal, Battery Voltage
	20 (R/W) Terminal, Battery Voltage
Key Knob from	
ON to OFF:	7 (LG) Terminal, Battery Voltage
	24 (LG) Terminal, Battery Voltage
	20 (R/W) Terminal, Battery Voltage for 5 seconds and then 0 V

★ If the tester does not read as specified, check the following.

Power Source Wiring (see wiring diagram in this section) Main Fuse 30 A (see Fuse Inspection) KIPASS Fuse 10 A (see Fuse Inspection)

★ If the wiring and fuse are good, replace the KIPASS ECU (see KIPASS ECU Replacement).



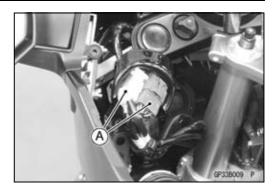


16-110 ELECTRICAL SYSTEM

KIPASS

Steering Lock Unit Replacement

- Remove the left inner cover (see Inner Cover Removal in the Frame chapter).
- Disconnect the lead connectors [A].





Steering Stem Head (see Stem, Stem Bearing Removal in the Steering chapter)

- Using a small chisel or punch, turn out the Torx bolts [A].
- Remove the steering lock unit [B].
- Tighten a new Torx bolt [A] until the bolt head [B] is broken. [C] Broken Head of Other Side
- Run the leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

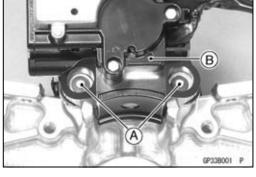
KIPASS ECU Replacement

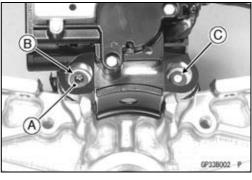
 Remove: Seat (see Seat Removal in the Frame chapter) Rubber Band [A] KIPASS ECU [B]

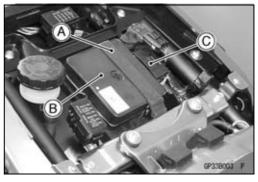
- Connector [C]
- Installation is basically the reverse of removal.

KIPASS Signal Relay Inspection

- Remove:
 - Left Rear Middle Fairing (see Middle Fairing Removal in the Frame chapter)
- Refer to the Headlight Relay Inspection.
- OThe KIPASS Signal Relay [A] is identical with the head-light relays.









KIPASS

KIPASS Signal Diode Inspection

NOTE

OThe KIPASS signal diode [A] is in the main harness.
 OFor the KIPASS signal diode inspection, check the resistance of the diode using the KIPASS signal relay connector and front turn signal light lead connector.

• Remove:

Middle Fairings (see Middle Fairing Removal in the Frame chapter)

KIPASS Signal Relay Connector [A]

• Connect the hand tester [B] to the blue lead terminal [C] of the KIPASS signal relay connector and front turn signal light lead connector as shown.

Front Left Turn Signal Light Lead Connector [D] Green Lead Terminal [E]

Front Right Turn Signal Light Lead Connector [F] Gray Lead Terminal [G]

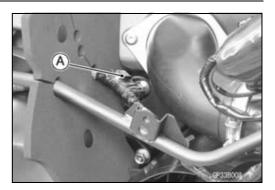
Special Tool - Hand Tester: 57001-1394

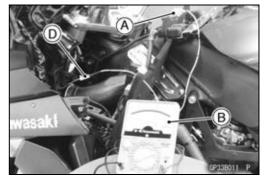
Hand Tester Range: $\times 1 \Omega$

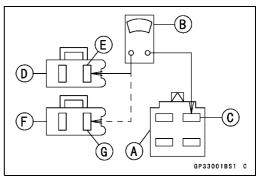
- Check the resistance in both directions of the above terminals.
- OThe resistance should be low in one direction and more than ten times as much in the other direction.
- ★ If any diode shows low or high in both directions, replace the main harness.

NOTE

• The tester reading varies with the tester range, but generally speaking, the lower reading should be from zero to one half the scale.



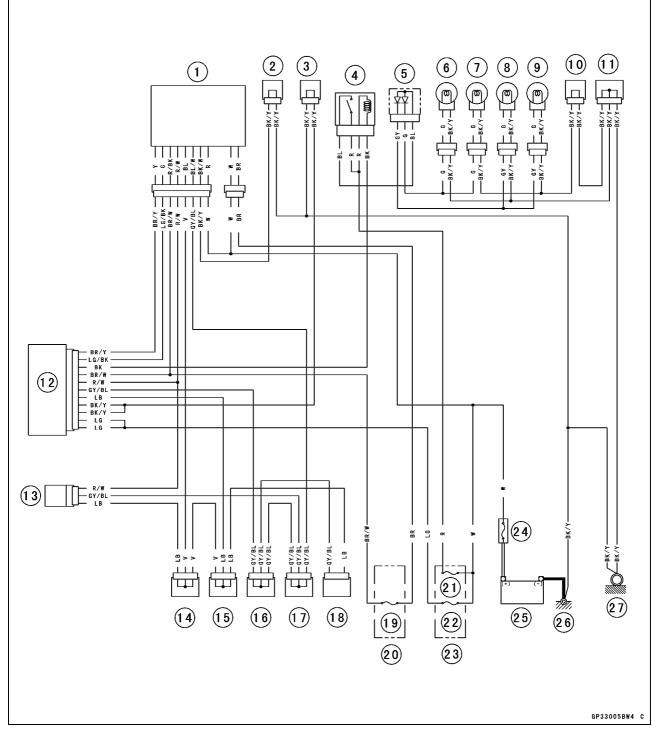




16-112 ELECTRICAL SYSTEM

KIPASS

KIPASS Circuit



- 1. Steering Lock Unit
- 2. Joint Connector 8
- 3. Joint Connector 9
- 4. KIPASS Signal Relay
- 5. KIPASS Signal Diode
- 6. Front Left Turn Signal Light 12 V 21 W
- Rear Left Turn Signal Light 12 V 21 W
- 8. Front Right Turn Signal Light 12 V 21 W
- 9. Rear Right Turn Signal Light 12 V 21 W

- 10. Joint Connector 2
- 11. Joint Connector 1
- 12. KIPASS ECU
- 13. Meter Unit
- 14. Joint Connector 4
- 15. Joint Connector 6
- 16. Joint Connector 7
- 17. Joint Connector 5
- 18. ECU
- 19. Ignition Fuse 15 A (ZG1400C)
 - 10 A (ZG1400D)

- 20. Fuse Box 2
- 21. KIPASS Signal Relay Fuse 10 A
- 22. KIPASS Fuse 10 A
- 23. Fuse Box 3
- 24. Main Fuse 30 A
- 25. Battery 12 V 14 Ah
- 26. Frame Ground
- 27. Frame Ground

Switches and Sensors

Brake Light Timing Inspection

• Refer to the Brake Light Switch Operation Inspection in the Periodic Maintenance chapter.

Brake Light Timing Adjustment

• Refer to the Brake Light Switch Operation Inspection in the Periodic Maintenance chapter.

Switch Inspection

- Using a hand tester, check to see that only the connections shown in the table have continuity (about zero ohms).
- OFor the switch housings and the steering lock unit, 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

Rear Brake Light Swi	itch Con	nections
Color	BR	BL
₩hen brake pedal is pushed down	O	O
₩hen brake pedal is released		

Sidestand Switch Connections

Sidestand Switch	Connect	ions
Color	BK	G
When sidestand is down		
₩hen sidestand is up	0	O

Oil Pressure Switch Connections*

0il Pressure Switch	Connecti	ons *
Color	SW. Terminal	Ground
When engine is stopped	0	———————————————————————————————————————
When engine is running		

*: Engine lubrication system is in good condition.

16-114 ELECTRICAL SYSTEM

Switches and Sensors

Water Temperature Sensor Inspection

- Remove the water temperature sensor (see Removal/Installation in the Water Temperature Sensor (Service Code 14) section in the Self-Diagnosis System chapter).
- Suspend the sensor [A] in a container of coolant so that the threaded portion is submerged.
- Suspend an accurate thermometer [B] with temperature sensing portions [C] located in almost the same depth.

NOTE

OThe sensor and thermometer must not touch the container side or bottom.

- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the sensor.

OThe sensor sends electric signals to the ECU.

- OMeasure the resistance across the terminals and the body (for the gauge) at the temperatures shown in the table.
- ★ If the hand tester does not show the specified values, replace the sensor.

Water Temperature Sensor

Resistance for ECU [D]		
Temperature	Resistance (kΩ) (Terminal [1]-[3])	
20°C (68°F)	2.46 +0.115 -0.143	
80°C (176°F)	0.32 ±0.011	
110°C (230°F)	0.1426 ±0.0041	

Resistance for Auxiliary Function [E] (Reference)		
Temperature	Resistance (Ω) (Terminal [2]-Body)	
50°C (122°F)	210 ±40	
120°C (248°F)	21.2 ±1.5	

OIn this motorcycle, resistance for auxiliary function is not used.

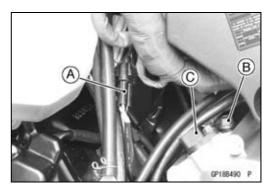
Speed Sensor Removal

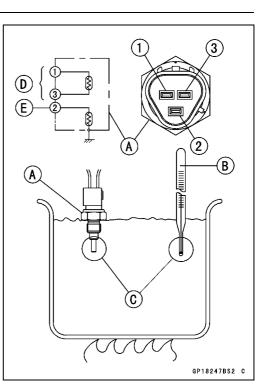
• Remove:

Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)

- Disconnect the speed sensor lead connector [A].
- Remove: Bolt [B]

Speed Sensor [C]





Switches and Sensors

Speed Sensor Installation

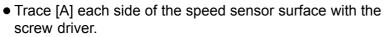
- Apply soap and water solution to the O-ring of the speed sensor.
- Apply a non-permanent locking agent to the threads of the speed sensor bolt.
- Install the speed sensor.

Torque - Speed Sensor Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Speed Sensor Inspection

- Remove the speed sensor (see Speed Sensor Removal).
- Connect the speed sensor lead connector [A] with the battery [B], 10 k Ω resistor [C] and hand tester [D] as shown.
- Set the tester to the DC 25 V range.

Special Tool - Hand Tester: 57001-1394



OThen the tester indicator should flick [B].

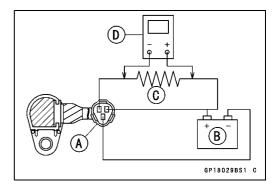
Fuel Level Sensor Inspection

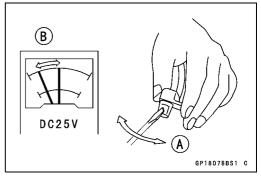
System (DFI) chapter). • Open the clamps [A].

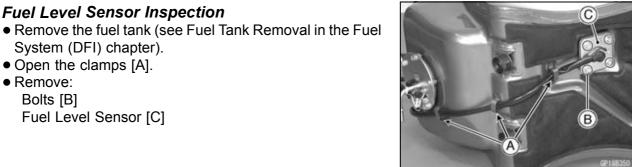
Fuel Level Sensor [C]

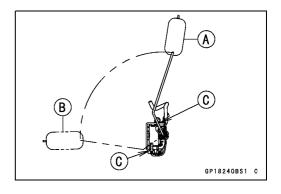
• Remove: Bolts [B]

 \star If the tester indicator does not flick, replace the speed sensor.









- Check that the float moves up and down smoothly without binding. It should go down under its own weight.
- \star If the float does not move smoothly, replace the sensor. Float in Full Position [A] Float in Empty Position [B]
 - Float Arm Stoppers [C]

16-116 ELECTRICAL SYSTEM

Switches and Sensors

• Using the hand tester [A], measure the resistance across the terminals in the fuel level sensor 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.

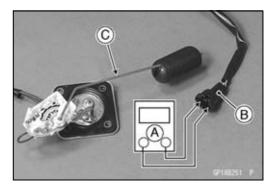
Fuel Level Sensor Resistance Standard: Full position [C]: 9 ~ 11 Ω Empty position: 213 ~ 219 Ω

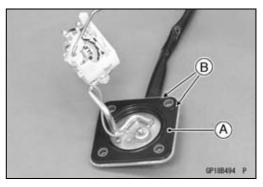
• Install a new gasket [A] on the fuel level sensor as shown in the figure.

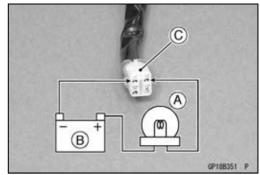
Hollows [B]

• Apply a non-permanent locking agent to the threads of the level sensor bolts and tighten them.

Torque - Fuel Level Sensor Bolts: 6.9 N·m (0.70 kgf·m, 61 in·lb)







Fuel Reserve Switch Inspection

- Fill the fuel tank with fuel.
- Close the fuel tank cap surely.
- Remove the fuel tank (see Fuel Tank Removal in the Fuel System (DFI) chapter).
- Connect the test light [A] (12 V 3.4 W bulb in a socket with leads) and the 12 V battery [B] to the fuel pump connector [C].

Connections

Battery (+) \rightarrow 12 V 3.4 W Bulb (one side) 12 V 3.4 W Bulb (other side) \rightarrow BK/R Lead Terminal Battery (–) \rightarrow BK/W Lead Terminal

Special Tool - Needle Adapter Set: 57001-1457

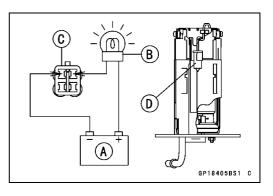
- ★If the test light turn on, the reserve switch is defective. Replace the fuel pump.
- Remove the fuel pump (see Fuel Pump Removal in the Fuel System (DFI) chapter).
- Connect the test light (12 V 3.4 W bulb in a socket with leads) and the 12 V battery to the fuel pump connector as shown.

12 V Battery [A] Test Light [B] Fuel Pump Connector [C] Fuel Reserve Switch [D]

★ If the test light doesn't light, replace the fuel pump.

NOTE

Olt may take a long time to turn on the test light in case that the fuel reserve switch is inspected just after the fuel pump is removed. Leave the fuel reserve switch with leads for inspection connected for few minutes.

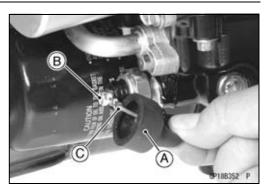


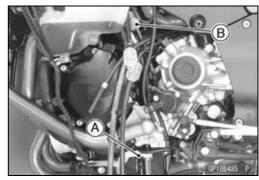
Switches and Sensors

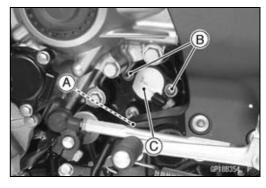
Gear Position Switch Removal

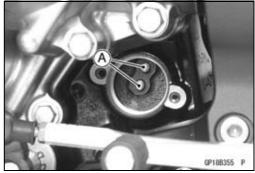
- Remove the lower fairings (see Lower Fairing Removal in the Frame chapter).
- Slide off the rubber boot [A].
- Loosen the oil pressure switch terminal bolt [B], and remove the switch lead [C].
- Open the clamp [A].
- Disconnect the oil pressure switch/gear position switch lead connector [B].

- Open the clamp [A].
- Remove: Screws [B] Gear Position Switch [C]
- Remove the pins [A] and springs from the shift drum.









16-118 ELECTRICAL SYSTEM

Switches and Sensors

Gear Position Switch Installation

- Securely place the springs [A] and pins [B] into the holes of the shift drum [C].
- Apply soap and water solution to the new O-ring [D].
- Install the gear position switch [E] so that the switch sticks to the engine.
- Apply a non-permanent locking agent to the threads of the gear position switch screws [F].
- Tighten:

Torque - Gear Position Switch Screws: 2.9 N·m (0.30 kgf·m, 26 in·lb)

Gear Position Switch Lead Clamp Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)

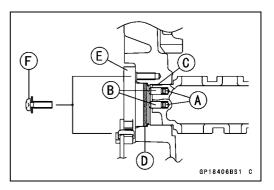
- Run the gear position switch and oil pressure switch lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).

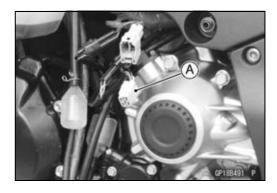
Gear Position Switch Inspection

NOTE

OBe sure the transmission mechanism is good condition.

• Disconnect the connector [A].





- Set the hand tester [A] to the 1 kΩ or × 100 Ω range and connect it to the terminals in the oil pressure switch/gear position switch lead connector [B] and ground.
- OWhen changing the gear position from lower gear to higher gear by the change pedal operated, using the center stand and rotate the rear wheel by hand.

[C] Internal Circuit

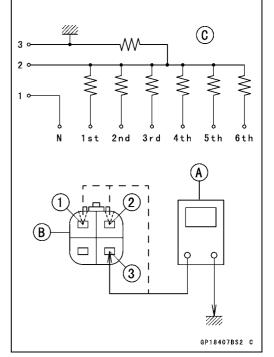
- [1] Light Green Lead
- [2] Green/Red Lead
- [3] Black Lead

Special Tool - Hand Tester: 57001-1394

Gear Position Switch Resistance

			()
	Connections		
Gear Position	[1]-Ground	[2]-Ground	[3]-Ground
Neutral	about 0	8.64 ~ 9.54	about 0
1st	-	2.22 ~ 2.46	about 0
2nd	-	1.42 ~ 1.58	about 0
3rd	_	0.954 ~ 1.055	about 0
4th	-	0.643 ~ 0.711	about 0
5th	_	0.410 ~ 0.453	about 0
OD	_	0.241 ~ 0.266	about 0

★ If the tester reading is not as specified, replace the gear position switch with a new one.



(kΩ)

Switches and Sensors

Outside Temperature Sensor Removal

• Remove:

Front Air Inlet Duct (see Front Air Inlet Duct Removal in the Fuel System (DFI) chapter) Screw [A] Outside Temperature Sensor [B]

Outside Temperature Sensor Installation

- Check that the O-ring [A] is in place on the outside temperature sensor [B].
- Tighten the screw securely.
- Install:

Upper Fairing (see Upper Fairing Installation in the Frame chapter)

Outside Temperature Sensor Inspection

- Remove the outside temperature sensor (see Outside Temperature Sensor Removal).
- Suspend the sensor [A] in a container of machine oil so that the heat-sensitive portion is submerged.
- Suspend a thermometer [B] with the heat-sensitive portion [C] located in almost the same depth with the sensor.

NOTE

OThe sensor and thermometer must not touch the container side or bottom.

- Place the container over a source of heat and gradually raise the temperature of the oil while stirring the oil gently for even temperature.
- Using a digital meter, measure the internal resistance of the sensor across the terminals at the temperatures shown in the following.

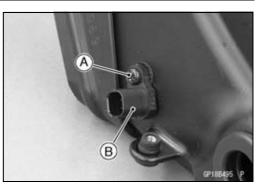
Outside Temperature Sensor Resistance Standard: $5.4 \sim 6.6 \text{ k}\Omega \text{ at } 0^{\circ}\text{C} (32^{\circ}\text{F})$ $0.29 \sim 0.39 \text{ k}\Omega \text{ at } 80^{\circ}\text{C} (176^{\circ}\text{F})$

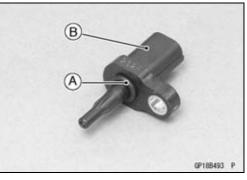
 \star If the reading is out of the standard, replace the sensor.

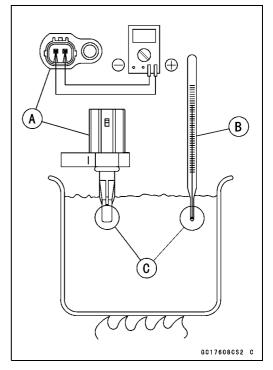
Oxygen Sensor Removal (Equipped Models)

NOTE

• The oxygen sensor itself is the same for #1 [A] and #2 [B], but wiring of the main harness side is different.









16-120 ELECTRICAL SYSTEM

Switches and Sensors

- Remove the right front middle fairing (see Middle Fairing Removal in the Frame chapter).
- Disconnect: Oxygen Sensor #1 Lead Connector [A] Oxygen Sensor #2 Lead Connector [B]
- Remove:

Oxygen Sensor #1 [C] Oxygen Sensor #2 [D]

Oxygen Sensor Installation (Equipped Models)

NOTICE

Never drop the oxygen sensor [A], especially on a hard surface. Such a shock to the unit can damage it. Do not touch the sensing part [B] to prevent oil contact. Oil contamination from hands can reduce sensor performance.

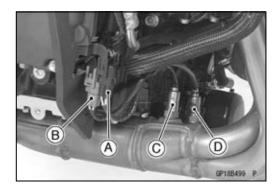
- Tighten:
 - Torque Oxygen Sensors: 25 N·m (2.5 kgf·m, 18 ft·lb)
- Run the oxygen sensor leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

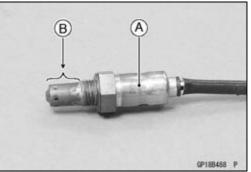
Oxygen Sensor Inspection (Equipped Models)

• Refer to the Oxygen Sensor #1/#2 Inspection in the Fuel System (DFI) chapter (see Oxygen Sensor #1/#2 Inspection in the Fuel System (DFI) chapter).

Oxygen Sensor Heater Inspection (Equipped Models)

• Refer to the Oxygen Sensor Heater Inspection in the Fuel System (DFI) chapter (see Oxygen Sensor Heater Inspection in the Fuel System (DFI) chapter).





Relay Box and Accessory Relay

Relay Box Removal

• Remove:

Seat (see Seat Removal in the Frame chapter) Tool Kit Box (see ECU Removal in the Fuel System (DFI) chapter) Harness [A] Connectors [B] Relay Box [C]

NOTE

○The relay box has relays and diodes. The relays and diodes can not be removed.

Relay Circuit Inspection

- Remove the relay box.
- Check conductivity of the following numbered terminals by connecting the hand tester and one 12 V battery to the relay box as shown (see Relay Box Internal Circuit).
- ★ If the tester does not read as specified, replace the relay box.

	Tester Connection	Tester Reading (Ω)
Headlight Circuit Relay	1-3	ø
	6-7	8
ECU Main Relay**	4-5	Not ∞*
Fuel Pump Relay	7-8	8
	9-10	Not ∞*
Startor Circuit Bolov	11-16	8
Starter Circuit Relay	11-12	8
Fan Relay	17-20	8
	18-19	Not ∞*

Relay Circuit Inspection (with the battery disconnected)

*: The actual reading varies with the hand tester used.

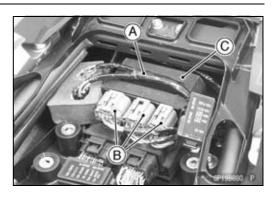
**: In this motorcycle, the ECU main relay is not used.

Relay Circuit Inspection (with the battery connected)

	Battery Connection (+) (–)	Tester Connection	Tester Reading (Ω)
ECU Main	2-11	1-3	0
Relay	4-5	7-6	0
Fuel Pump Relay	9-10	7-8	0
Fan Relay	18-19	17-20	0
	Battery Connection (+) (–)	Tester Connectio DC 25 V Range (+) (–)	lester
Starter Circuit Relay	16-12	11-12	Battery Voltage

(+): Apply positive lead.

(-): Apply negative lead.



16-122 ELECTRICAL SYSTEM

Relay Box and Accessory Relay

Diode Circuit Inspection

- Remove the relay box (see Relay Box Removal).
- Check conductivity of the following pairs of terminals (see Relay Box Internal Circuit).

Diode Circuit Inspection

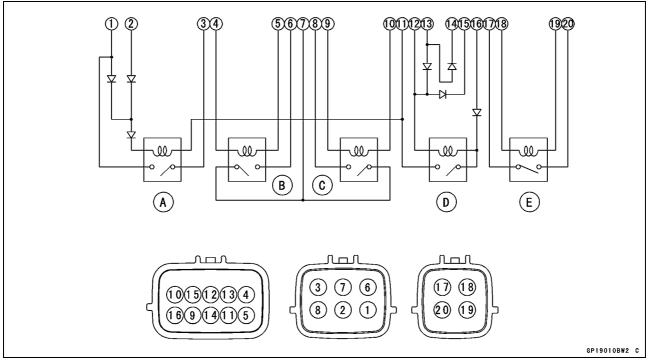
Tester Connection	1-11, 2-11, 12-13, 12-15, 12-16, 13-14, 13-15
	13-15

★ 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 relay box must be replaced.

NOTE

• The actual meter reading varies with the meter or tester used and the individual diodes, but generally speaking, the lower reading should be from zero to one half the scale.

Relay Box Internal Circuit



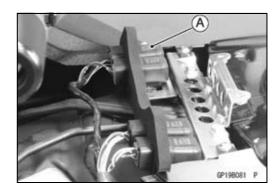
- A. Headlight Circuit Relay
- B. ECU Main Relay (Unused)
- C. Fuel Pump Relay
- D. Starter Circuit Relay
- E. Fan Relay

Accessory Relay Inspection

• Remove:

Front Fuel Tank Cover (see Fuel Tank Removal in the Fuel System (DFI) chapter)

- Refer to the Headlight Relay Inspection.
- OThe accessory relay [A] is identical with the headlight relays.



ELECTRICAL SYSTEM 16-123

Fuse

30 A Main Fuse Removal

• Remove:

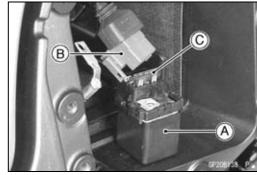
Battery (see Battery Removal) Bolts and Cable Terminals [A]

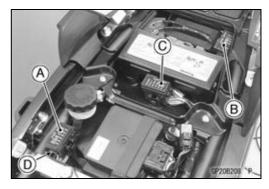
- Take out the starter relay assembly [A].
- Disconnect the 30 A main fuse connector [B].
- Pull out the 30 A main fuse [C] from the starter relay assembly.

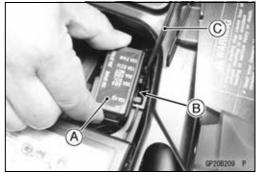
Fuse Box Fuse Removal

- Remove the seat (see Seat Removal in the Frame chapter).
 - Fuse Box 1 [A] Fuse Box 2 [B]
 - Fuse Box 3 [C]
- Unlock each hook [D] to lift up the each lid.
- For the fuse box 2 [A], push the projection [B] with a thin driver [C] to clear the stopper and remove it.









16-124 ELECTRICAL SYSTEM

Fuse

• Pull the fuses [A] straight out of the fuse box with needle nose pliers.



Fuse Installation

- ★ If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of proper amperage.
- Install the fuse box fuses on the original position as specified on the lid.

ELECTRICAL SYSTEM 16-125

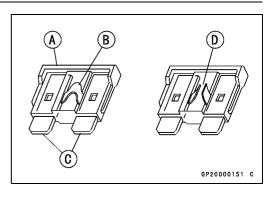
Fuse

Fuse Inspection

- Remove the fuse.
- Inspect the fuse element.

★ If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

Housing [A] Fuse Element [B] Terminals [C] Blown Element [D]



NOTE

Olf the engine is operated under the condition which the battery needs refreshing charge, a main fuse may blow out due to a mass current flows to the battery.

NOTICE

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.

Self-Diagnosis System

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17-4 SELF-DIAGNOSIS SYSTEM

Specifications

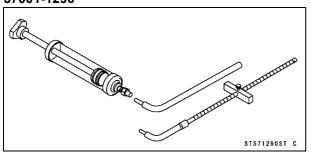
Item	Standard
Digital Fuel Injection System	
Main Throttle Sensor:	
Input Voltage	DC 4.75 ~ 5.25 V
Output Voltage	DC 0.60 ~ 0.62 V at idle throttle opening DC 3.9 ~ 4.1 V at full throttle opening (for reference)
Resistance	4 ~ 6 kΩ
Inlet Air Pressure Sensor/Atmo- spheric Pressure Sensor:	
Input Voltage	DC 4.75 ~ 5.25 V
Output Voltage	DC 3.80 \sim 4.20 V at standard atmospheric pressure (see this text for details)
Inlet Air Temperature Sensor:	
Output Voltage	About DC 2.25 ~ 2.50 V at inlet air temperature 20°C (68°F)
Resistance	2.09 ~ 2.81 kΩ at 20°C (68°F) About 0.322 kΩ at 80°C (176°F) (for reference)
Water Temperature Sensor:	
Output Voltage	About DC 2.80 ~ 2.97 V at 20°C (68°F)
Speed Sensor:	
Input Voltage	About DC 9 ~ 11 V
Output Voltage	About DC 0.05 ~ 0.09 V or DC 4.5 ~ 4.9 at Ignition Switch
	ON and 0 km/h
Vehicle-down sensor:	
Input Voltage	4.75 ~ 5.25 V
Output Voltage	with sensor tilted 60 ~ 70° or more right or left: DC 0.65 ~ 1.35 V
	with sensor arrow mark pointed up: DC 3.55 ~ 4.45 V
Subthrottle Sensor:	
Input Voltage	DC 4.75 \sim 5.25 V
Output Voltage	DC 4.05 ~ 4.25 V at subthrottle valve full close position (for reference)
	DC $0.70 \sim 0.72$ V at subthrottle valve full open position
Resistance	4 ~ 6 kΩ
Subthrottle Valve Actuator:	
Resistance	About 5 ~ 7 Ω
Input Voltage	About DC 8.5 ~ 10.5 V
Oxygen Sensor (Equipped Models):	
Output Voltage (Rich)	DC 0.8 V or more
Output Voltage (Lean)	DC 0.24 V or less
Heater Resistance	6.7 ~ 10.5 Ω at 20°C (68°F)
CAN Communication Line:	
Resistance	123 ~ 125 Ω at ECU Connector
	114 ~ 126 Ω at KIPASS ECU Connector

Specifications

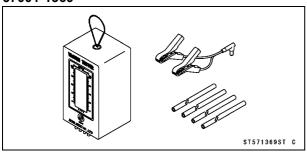
K-ACT ABS System (Equipped Models)	
Wheel Rotation Air Gap:	
Front	1.0 mm (0.039 in.)
Rear	1.0 mm (0.039 in.)
CAN Communication Line Resistance	$30 \sim 70 \ \Omega$
CAN Communication Line/Ground Resistance	5 ~ 30 kΩ

Special Tools

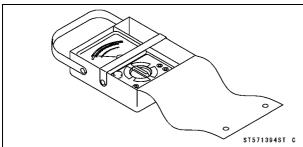
Fork Oil Level Gauge: 57001-1290



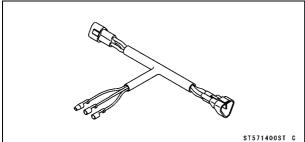
Vacuum Gauge: 57001-1369



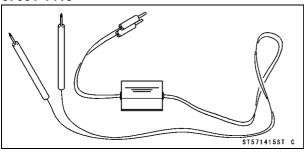
Hand Tester: 57001-1394



Throttle Sensor Setting Adapter #1: 57001-1400

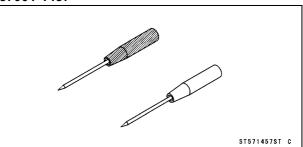


Peak Voltage Adapter: 57001-1415

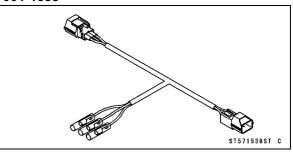


Needle Adapter Set:

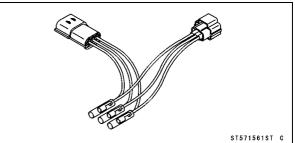
57001-1457



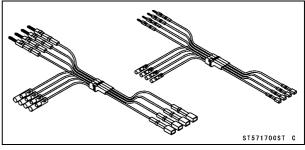
Throttle Sensor Setting Adapter: 57001-1538



Sensor Harness Adapter: 57001-1561



Measuring Adapter: 57001-1700



Self-Diagnosis Outline

The self-diagnosis system is monitoring the following mechanisms.

DFI System and Ignition System

KIPASS

Tire Pressure Measurement Sensor

KTRC System (Equipped Models)

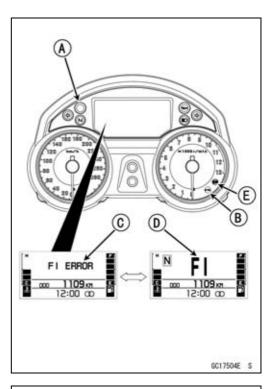
K-ACT ABS (Equipped Models)

The self-diagnosis system has two modes and can be switched to another mode by operating the meter unit.

User Mode

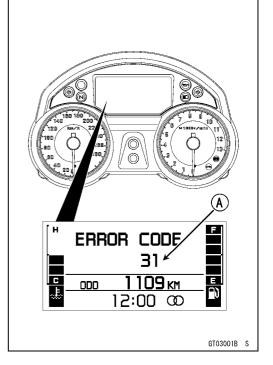
The ECU notifies the rider of troubles in DFI system, ignition system, KIPASS system and KTRC system (K-ACT ABS Equipped Models) by lighting up the warning indicator light (LED) [A] and KTRC indicator light (LED) [B], and displaying the warning message [C] and warning symbol [D] alternately on the LCD (Liquid Crystal Display) when DFI, ignition, KIPASS system and KTRC system parts are faulty, and initiates fail-safe function. In case of serious troubles, ECU stops the injection/ignition/starter motor operation.

For K-ACT ABS system, K-ACT ABS indicator light (LED) [E] goes on.



Dealer Mode

The LCD (Liquid Crystal Display) display the service code(s) [A] to show the problem(s) which the above system has at the moment of diagnosis.

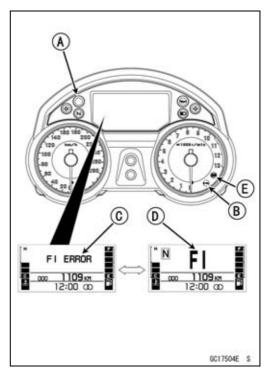


17-8 SELF-DIAGNOSIS SYSTEM

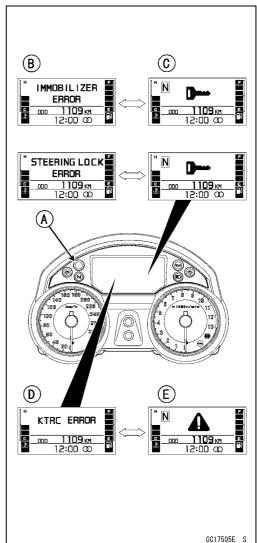
Self-Diagnosis

Self-Diagnosis Procedures

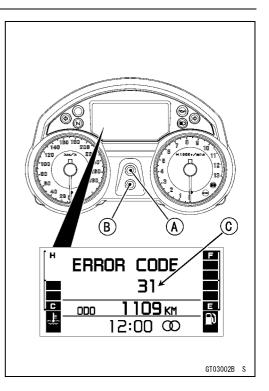
OWhen a problem occurs with DFI system and ignition system, the warning indicator (LED) [A] goes on and FI warning message [B] and FI warning symbol [C] are displayed alternately on the LCD (Liquid Crystal Display) to alert the rider.



- OWhen a problem occurs with KIPASS system, the warning indicator light (LED) [A] goes on and KIPASS warning message [B] and KIPASS warning symbol [C] are alternately displayed on the LCD.
- OFor models equipped with KTRC system (K-ACT ABS Equipped Models), the warning indicator light (LED) goes on and KTRC warning message [D] and warning symbol [E] are alternately displayed on the LCD, when a problem occurs in the system.



- Push the upper button [A] and lower button [B] for more than two seconds.
- The service code [C] is displayed on the LCD by the number of two digits. (The service code of the K-ACT ABS adds "B" at the left side of the code.)
- OWhen pushing and holding the upper button while the warning massage and warning symbol are displayed alternately on the LCD, the display on the LCD is shifted to the previous display with the warning indicator light (LED) goes on.
- OAfter switching to the previous display, the service code can not be displayed even if pushing the upper button and lower button for more than two seconds.

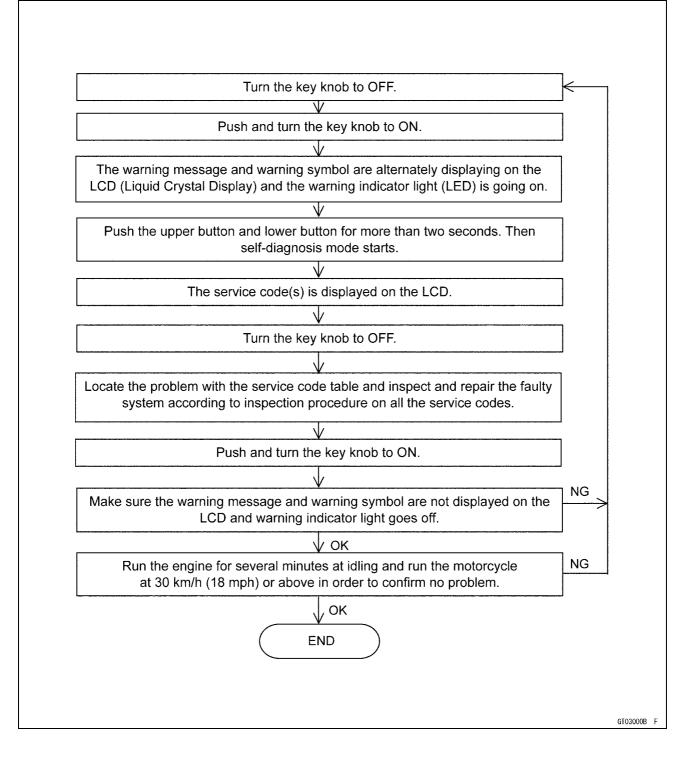


- Any of the following procedures ends self-diagnosis.
- OWhen the service code is displayed on the LCD, push the upper button and lower button for more than two seconds. The display will return to the warning message and the warning symbol.
- OWhen the key knob is turned OFF.

17-10 SELF-DIAGNOSIS SYSTEM

Self-Diagnosis

Self-Diagnosis Flow Chart

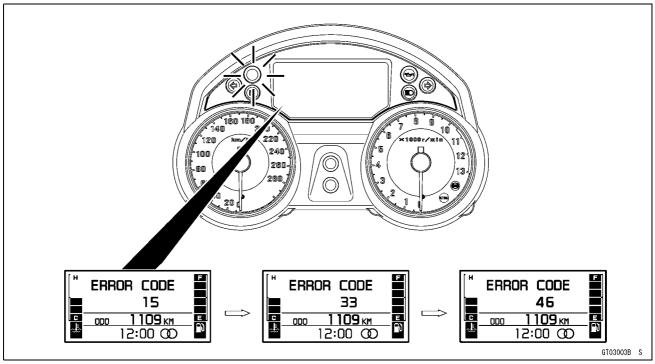


Service Code Reading

OThe service code(s) is displayed on the LCD by the number of two digits. (The service code of the K-ACT ABS adds "B" at the left side of the code.)

- OWhen there are a number of problems, all the service codes can be stored and the display will begin starting from the lowest number service code in the numerical order.
- OThen after completing all codes, the display is repeated until the key knob is turned OFF or upper button and lower button are pushed for more than two seconds.
- OThe order of the system's appearing is the order of DFI System, KTRC System, Tire Pressure Measurement Sensor, KIPASS, and K-ACT ABS.
- OFor example, if three problems occurred in the order of 46, 15, 35, the service codes are displayed (each two seconds) from the lowest number in the order listed as shown below.

 $(15 \rightarrow 33 \rightarrow 46) \rightarrow (15 \rightarrow 33 \rightarrow 46) \rightarrow \rightarrow \cdots \cdots$ (repeated)



OIn the case more than two service codes are available, you may push the upper button to shift into the other code too.

Olf the no problem or when the repair has done, warning indicator light (LED) goes off and warning message, warning symbol and service code are not displayed.

Olf the problem is with the following parts, the ECU can not memorize these problem, the warning indicator light (LED) do not lights up or blinks and warning message and warning symbol are not displayed, and no service codes can be displayed.

Warning Indicator Light (LED)

Meter Panel LCD

Stick Coil Secondary Wiring and Ground Wiring (see Stick Coil Inspection in the Electrical System chapter)

ECU Power Source Wiring and Ground Wiring (see ECU power Supply Inspection)

Service Code Erasing

OWhen repair has been done, warning indicator light (LED) goes off and warning message, warning symbol and service code are not displayed.

★But the service codes stored in memory of the ECU are not erased to preserve the problem history. In this model, the problem history can not be erased. However, the memories of the K-ACT ABS system service codes can be erased using the KDS 3 version kit.

Service Code Table

OThe service codes of the K-ACT ABS system appears to the K-ACT ABS equipped models.

Service Code	System	Problems	
11	FI	Main throttle sensor malfunction, wiring open or short	
12	FI	Inlet air pressure sensor malfunction, wiring open or short	
13	FI	Inlet air temperature sensor malfunction, wiring open or short	
14	FI	Water temperature sensor malfunction, wiring open or short	
15	FI	Atmospheric pressure sensor malfunction, wiring open or short	
21	FI	Crankshaft sensor malfunction, wiring open or short	
23	FI	Exhaust camshaft position sensor malfunction, wiring open or short	
24	FI	Speed sensor malfunction	
25	FI	Gear position switch malfunction, wiring open or short	
26	FI	Inlet camshaft position sensor malfunction, wiring open or short	
27	KTRC	Front and/or rear wheel rotation sensor signal abnormal (sensor or rotor missing, too large clearance, rotor tooth worn or missing, wiring open) (K-ACT ABS Equipped Models)	
31	FI	Vehicle-down sensor malfunction, wiring open or short	
32	FI	Subthrottle sensor malfunction, wiring open or short	
33	FI	Oxygen sensor #1 inactivation, wiring open or short (Equipped Models)	
37	KIPASS	Steering lock unit communication error	
38	KIPASS	ECU communication error	
39	FI	KIPASS ECU communication error	
46	FI	Fuel pump relay malfunction, relay is stuck	
51	FI	Stick coil #1 malfunction, wiring open or short	
52	FI	Stick coil #2 malfunction, wiring open or short	
53	FI	Stick coil #3 malfunction, wiring open or short	
54	FI	Stick coil #4 malfunction, wiring open or short	
56	FI	Radiator fan relay malfunction, wiring open or short	
59	FI	Variable valve timing abnormal	
62	FI	Subthrottle valve actuator malfunction, wiring open or short	
64	FI	Air switching valve malfunction, wiring open or short	
65	FI	Oil control solenoid valve malfunction, wiring open or short	
67	FI	Oxygen sensor heater #1 and/or #2 malfunction, wiring open or short (Equipped Models)	
68	KIPASS	Steering lock unit malfunction, wiring open	
83	FI	Oxygen sensor #2 inactivation, wiring open or short (Equipped Models)	
89	KTRC	KTRC button malfunction, button is stuck or wiring short (K-ACT ABS Equipped Models)	
1A	KTRC	Meter unit and K-ACT ABS hydraulic unit communication error (K-ACT ABS Equipped Models)	

Service Code	System	Problems	
1B	KTRC/K-ACT ABS	K-ACT ABS hydraulic unit communication error (K-ACT ABS Equipped Models)	
2C	KTRC	Ground wiring open (ECU terminal 23) (K-ACT ABS Equipped Mode	
B 13	K-ACT ABS	Rear inlet solenoid valve trouble (open, temperature abnormal)	
B 14	K-ACT ABS	Rear outlet solenoid valve trouble (open, temperature abnormal)	
B 17	K-ACT ABS	Front inlet solenoid valve trouble (open, temperature abnormal)	
B 18	K-ACT ABS	Front outlet solenoid valve trouble (open, temperature abnormal)	
B 19	K-ACT ABS	K-ACT ABS solenoid valve relay trouble (wiring shorted or open, stuck relay (ON or OFF) or dropout)	
B 21	K-ACT ABS	Front combine inlet valve trouble (open, temperature abnormal)	
B 22	K-ACT ABS	Front combine outlet valve trouble (open, temperature abnormal)	
B 25	K-ACT ABS	Front, rear wheel rotation difference abnormal (substandard tire, sensor rotor teeth number wrong)	
B 35	K-ACT ABS	K-ACT ABS motor relay trouble (wiring shorted or open, stuck relay (ON or OFF))	
B 42	K-ACT ABS	Front wheel rotation sensor signal abnormal (sensor or rotor missing, too large clearance, rotor tooth worn or missing)	
B 43	K-ACT ABS	Front wheel rotation sensor wiring (wiring shorted or open, connector bad connection)	
B 44	K-ACT ABS	Rear wheel rotation sensor signal abnormal (sensor or rotor missing, too large clearance, rotor tooth worn or missing)	
B 45	K-ACT ABS	Rear wheel rotation sensor wiring (wiring shorted or open, connector bad connection)	
B 52	K-ACT ABS	Power supply voltage abnormal (under-voltage)	
B 53	K-ACT ABS	Power supply voltage abnormal (over-voltage)	
B 54	K-ACT ABS	K-ACT ABS solenoid valve relay supply voltage (low voltage)	
B 55	K-ACT ABS	ECU trouble (ECU operation abnormal)	
B 57	K-ACT ABS	CAN bus monitor malfunction	
B 58	K-ACT ABS	K-ACT ABS button signal CAN monitor malfunction	
B 59	K-ACT ABS	K-ACT ABS button malfunction, short	
B 71	K-ACT ABS	Rear high pressure switching valve trouble (open, temperature abnormal)	
B 72	K-ACT ABS	Rear switching valve trouble (open, temperature abnormal)	
B 73	K-ACT ABS	Front switching valve trouble (open, temperature abnormal)	
B 74	K-ACT ABS	Front high pressure switching valve trouble (open, temperature abnormal)	
B 81	K-ACT ABS	Input fluid pressure sensor (front brake) trouble (voltage abnormal, wiring shorted or open)	
B 82	K-ACT ABS	Input fluid pressure sensor (front brake) trouble (offset abnormal)	
B 83	K-ACT ABS	Output fluid pressure sensor (front brake) trouble (voltage abnormal, wiring shorted or open)	
B 84	K-ACT ABS	Output fluid pressure sensor (front brake) trouble (offset abnormal)	
B 85	K-ACT ABS	Input fluid pressure sensor (rear brake) trouble (voltage abnormal, wiring shorted or open)	
B 86	K-ACT ABS	Input fluid pressure sensor (rear brake) trouble (offset abnormal)	

17-14 SELF-DIAGNOSIS SYSTEM

Self-Diagnosis

Service Code	System	Problems
B 87	K-ACT ABS	Output fluid pressure sensor (rear brake) trouble (voltage abnormal, wiring shorted or open)
B 88	K-ACT ABS	Output fluid pressure sensor (rear brake) trouble (offset abnormal)
B 89	K-ACT ABS	Fluid pressure sensor supply voltage abnormal
B 91	K-ACT ABS	Front fluid pressure sensor signal abnormal (sensor missing)
B 92	K-ACT ABS	Rear fluid pressure sensor signal abnormal (sensor missing)

Notes:

OThe ECU may be involved in these problems. If all the parts and circuits checked out good, be sure to check the ECU for ground and power supply. If the ground and power supply are checked good, replace the ECU.

OWhen no service code is displayed, the electrical parts of the DFI system has no fault, and the mechanical parts of the DFI system and the engine are suspect.

Backups

OThe ECU takes the following measures to prevent engine damage when the DFI, ignition, KIPASS or immobilizer system parts have troubles.

Service Codes	Parts or Function	Output Signal Usable Range or Criteria	Backups by ECU
11	Main Throttle Sensor	Output Voltage 0.2 ~ 4.8 V	If the main throttle sensor system fails (the output voltage is out of the usable range, wiring short or open), the ECU locks ignition timing into the ignition timing at closed throttle position and sets the DFI in the D-J method (1).
12	Inlet Air Pressure Sensor	Inlet Air Pressure (Absolute) Pv = 0 ~ 950 mmHg	If the inlet air pressure sensor system fails (the signal is out of the usable range, wiring short or open), the ECU sets the DFI in the α -N method (2).
13	Inlet Air Temperature Sensor	Inlet Air Temperature Ta = – 30 ~ + 100°C	If the inlet air temperature sensor system fails (the signal is out of the usable range, wiring short or open), the ECU sets Ta at 30°C.
14	Water Temperature Sensor	Water Temperature Tw = - 30 ~ + 120°C	If the water temperature sensor system fails (the signal is out of the usable range, wiring short or open), the ECU sets Tw at 80°C and the radiator fan operates.
15	Atmospheric Pressure Sensor	Atmospheric Pressure (Absolute) Pa = 0 ~ 950 mmHg	If the atmospheric pressure sensor system fails (the signal is out of the usable range, wiring short or open), the ECU sets Pa at 760 mmHg (the standard atmospheric pressure).
21	Crankshaft Sensor	Crankshaft sensor must send 22 signals to the ECU at the 1 cranking.	If the crankshaft sensor fails, the engine stops by itself.
23	Exhaust Camshaft Position Sensor	Exhaust camshaft position sensor must send 1 signal to the ECU at the 2 crankings.	If the exhaust camshaft position sensor system fails (the signal is missing, wiring short or open), the ECU continues to ignite cylinders in the same sequence following the last good signal. However, it can not be restarted after the engine was stopped once.

Self-Diagnosis

Service Codes	Parts or Function	Output Signal Usable Range or Criteria	Backups by ECU
24	Speed Sensor	Speed sensor must send 22 signals to the ECU at the 1 rotation of the output shaft.	If the speed sensor system fails (no signal, wiring short or open), the speedometer shows 0.
25	Gear Position Switch	Output Voltage 0.2 ~ 4.8 V	If the gear position switch system fails (no signal, wiring short or open), the ECU set the top (6th) gear position.
26	Inlet Camshaft Position Sensor	Inlet camshaft position sensor must send 1 signal to the ECU at the 1 cranking.	If the inlet camshaft position sensor system fails (the signal is missing, wiring short or open), the ECU stops the variable valve timing control, and it sets the ignition timing to the retardation mode.
27	Front and/or Rear Wheel Rotation Sensor Signal (K-ACT ABS Equipped Models)	Front and/or rear wheel rotation sensor must sends 48 signals (front) and 45 signals (rear) to the ECU at the 1 rotation of the wheels.	system fails (the signal is missing, wiring
31	Vehicle -down Sensor	Output Voltage 0.2 ~ 4.8 V	If the vehicle-down sensor system has failures (the output voltage is out of the usable range, wiring short or open), the ECU shuts off the fuel pump relay, the fuel injectors and the ignition system.
32	Subthrottle Sensor	Output Voltage 0.2 ~ 4.8 V	If the subthrottle sensor system fails (the output voltage is out of the usable range, wiring short or open), the ECU drive the subthrottle valve to the full closed position, and it stops the current to the subthrottle valve actuator.
33	Oxygen Sensor #1 (Equipped Models)	The oxygen sensor #1 is active and sensor must send signals (output voltage) continuously to the ECU.	If the oxygen sensor #1 is not activated, the ECU stops the feedback mode of the oxygen sensor #1 and #2.
37	Steering Lock Unit	The steering Lock Unit sends the data to the KIPASS ECU through the CAN communication line.	_
38	ECU	The ECU sends the data to the KIPASS ECU through the CAN communication line.	_
39	KIPASS ECU	The KIPASS ECU sends the data to the meter unit through the CAN communication line.	_
46	Fuel Pump Relay	When the fuel pump relay is ON, battery monitor voltage is 5 V or more.	_

Self-Diagnosis

Service Codes	Parts or Function	Output Signal Usable Range or Criteria	Backups by ECU
51	Stick Coil #1*	The stick coil primary winding must send signals (output voltage) continuously to the ECU.	If the stick coil #1 primary winding has failures (no signal, wiring short or open), the ECU shuts off the injector #1 to stop fuel to the cylinder #1, though the engine keeps running.
52	Stick Coil #2*	The stick coil primary winding must send signals (output voltage) continuously to the ECU.	If the stick coil #2 primary winding has failures (no signal, wiring short or open), the ECU shuts off the injector #2 to stop fuel to the cylinder #2, though the engine keeps running.
53	Stick Coil #3*	The stick coil primary winding must send signals (output voltage) continuously to the ECU.	If the stick coil #3 primary winding has failures (no signal, wiring short or open), the ECU shuts off the injector #3 to stop fuel to the cylinder #3, though the engine keeps running.
54	Stick Coil #4*	The stick coil primary winding must send signals (output voltage) continuously to the ECU.	If the stick coil #4 primary winding has failures (no signal, wiring short or open), the ECU shuts off the injector #4 to stop fuel to the cylinder #4, though the engine keeps running.
56	Radiator Fan Relay	When the radiator fan relay is OFF, the relay is opened.	_
59	Variable Valve Timing	Changes the valve timing by the signal from the inlet camshaft position sensor.	If the variable valve timing is incorrect, the ECU drive the subthrottle valve to the full closed position, and it stops the current to the subthrottle valve actuator.
62	Subthrottle Valve Actuator	The actuator operates open and close of the subthrottle valve by the pulse signal from the ECU.	If the subthrottle valve actuator fails (the signal is out to the usable range, wiring short or open), the ECU stops the current to the actuator.
64	Air Switching Valve	The air switching valve controls the flow of the secondary air by opening and shutting the solenoid valve.	_
65	Oil Control Solenoid Valve	The oil control solenoid valve controls the variable valve timing by opening and shutting the solenoid valve.	If the oil control solenoid valve fails (wiring short or open), the variable valve timing is in the retarded position.
67	Oxygen Sensor Heater #1 and/or #2 (Equipped Models)	The oxygen sensor heater #1 and/or #2 raise temperature of the sensor for its earlier activation.	If the oxygen sensor heater #1 and/or #2 fails (wiring short or open), the ECU stops the current to the heater, and it stops the feedback mode of the oxygen sensor #1 and #2.
68	Steering Lock Unit	-	If the steering lock unit fails (wiring open), the key knob can not be turned to ON.
83	Oxygen Sensor #2 (Equipped Models)	The oxygen sensor #2 is active and sensor must send signals (output voltage) continuously to the ECU.	If the oxygen sensor #2 is not activated, the ECU stops feedback mode of the oxygen sensor #1 and #2.

Self-Diagnosis

Service Codes	Parts or Function	Output Signal Usable Range or Criteria	Backups by ECU
89	KTRC Button (K-ACT ABS Equipped Models)	When the KTRC button is OFF, the button is opened.	If the KTRC button fails (wiring short), the ECU stops the KTRC control.
1A	Meter Unit and K-ACT ABS Hydraulic Unit (K -ACT ABS Equipped Models)	The meter unit and K-ACT ABS hydraulic unit send the data (for KTRC control) to the ECU through the CAN communication line.	If the communication data is not sent, the ECU stops the KTRC control.
1В	K-ACT ABS Hydraulic Unit (K -ACT ABS Equipped Models)	The K-ACT ABS hydraulic unit sends the data (for status of K-ACT ABS hydraulic unit) to the meter unit and ECU through the CAN communication line.	If the communication data is not sent, the ECU stops the KTRC control.
2C	Ground Wiring (ECU Terminal 23) (K-ACT ABS Equipped Models)	The ground wiring (ECU terminal 23) is connected with the ground.	If the ground wiring is opened, the ECU stops the KTRC control.

Note:

- (1): D-J Method: When the engine load is light like at idling or low speed, the ECU determines the injection quantity by calculating from the throttle vacuum (vacuum sensor output voltage) and engine speed (crankshaft sensor output voltage). This method is called D-J method.
- (2): α -N Method: As the engine speed increases, and the engine load turns middle to heavy, the ECU determines the injection quantity by calculating from the throttle opening (throttle sensor output voltage) and the engine speed. This method is called α -N method.

*: This depends on the number of stopped cylinders.

17-18 SELF-DIAGNOSIS SYSTEM

Main Throttle Sensor (Service Code 11)

The main throttle sensor is a rotating variable resistor that change output voltage according to throttle operating. The ECU senses this voltage change and determines fuel injection quantity, and ignition timing according to engine rpm, and throttle opening.

Input Terminal [A]: BL Output Terminal [B]: Y/W Ground Terminal [C]: BR/BK

Main Throttle Sensor Removal/Adjustment

NOTICE

Do not remove or adjust the main throttle sensor [A] since it has been adjusted and set with precision at the factory.

Never drop the throttle body assy, especially on a hard surface. Such a shock to the main throttle sensor can damage it.

Main Throttle Sensor Input Voltage Inspection NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the right subframe (see Right Subframe Removal in the Frame chapter).
- Disconnect the main throttle sensor connector [A].
- Connect the setting adapter [A] between the harness connector and main throttle sensor connector.

Special Tool - Throttle Sensor Setting Adapter: 57001 -1538

• Connect a digital meter to the setting adapter leads.

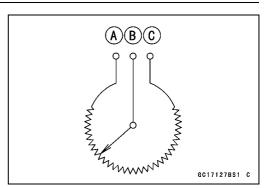
Main Throttle Sensor Input Voltage Connections to Adapter:

> Digital Meter (+) \rightarrow W (sensor BL) lead Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

- Measure the input voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Input Voltage Standard: DC 4.75 ~ 5.25 V

- Turn the key knob to OFF.
- ★ If the reading is within the standard, check the output voltage (see Main Throttle Sensor Output Voltage Inspection).









Main Throttle Sensor (Service Code 11)

★ If the reading is out of the standard, remove the ECU and check the wiring for continuity between harness connectors.

Special Tool - Hand Tester: 57001-1394

ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] ←→ Main Throttle Sensor Connector [B] BL lead (ECU terminal 40) [C] BR/BK lead (ECU terminal 60) [D]

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Main Throttle Sensor Output Voltage Inspection

• Measure the output voltage at the main throttle sensor in the same way as input voltage inspection, note the follow-ing.

ODisconnect the main throttle sensor connector and connect the setting adapter [A] between these connectors.

Special Tool - Throttle Sensor Setting Adapter: 57001 -1538

Main Throttle Sensor Output Voltage Connections to Adapter:

Digital Meter (+) \rightarrow R (sensor Y/W) lead

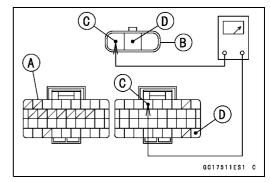
Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

- Start the engine and warm it up thoroughly.
- Check idle speed to ensure the throttle opening is correct.

Idle Speed

Standard: 1 100 ±50 r/min (rpm)

★ If the idle speed is out of the specified range, adjust it (see Idle Speed Inspection in the Periodic Maintenance chapter).





17-20 SELF-DIAGNOSIS SYSTEM

Main Throttle Sensor (Service Code 11)

- Turn the key knob to OFF.
- Measure the output voltage with the engine stopped, and with the connector joined.
- Push and turn the key knob to ON.

Output Voltage

Standard: DC 0.60 ~ 0.62 V at idle throttle opening

DC 3.9 ~ 4.1 V at full throttle opening (for reference)

NOTE

Open the throttle, confirm the output voltage will be raise.

OThe standard voltage refers to the value when the voltage reading at the Input Voltage Inspection shows 5 V exactly.

OWhen the input voltage reading shows other than 5 V, derive a voltage range as follows.
Example:
In the case of a input voltage of 4.75 V.
0.60 × 4.75 ÷ 5.00 = 0.57 V
0.62 × 4.75 ÷ 5.00 = 0.59 V

Thus, the valid range is $0.57 \sim 0.59 V$

- Turn the key knob to OFF.
- ★ If the reading is out of the standard, check the main throttle sensor resistance (see Main Throttle Sensor Resistance Inspection).
- ★ If the reading is within the standard, remove the ECU and check the wiring for continuity between harness connectors.

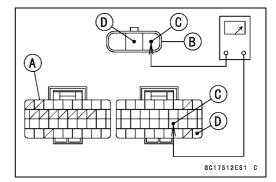
Special Tool - Hand Tester: 57001-1394

ODisconnect the ECU and sensor connectors.

```
Wiring Continuity Inspection
ECU Connector [A] ←→
Main Throttle Sensor Connector [B]
Y/W lead (ECU terminal 54) [C]
```

BR/BK lead (ECU terminal 60) [D]

- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



SELF-DIAGNOSIS SYSTEM 17-21

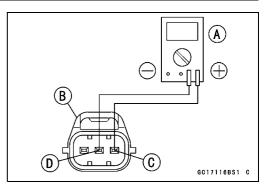
Main Throttle Sensor (Service Code 11)

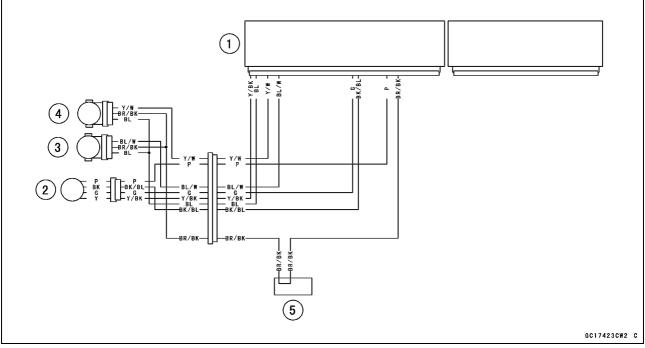
Main Throttle Sensor Resistance Inspection

- Turn the key knob to OFF.
- Disconnect the main throttle sensor connector.
- Connect a digital meter [A] to the main throttle sensor connector [B].
- Measure the main throttle sensor resistance.

- ★ If the reading is out of the standard, replace the throttle body assy.
- ★ If the reading is within the standard, but the problem still exists, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Main Throttle Sensor Circuit





- 1. ECU
- 2. Subthrottle Valve Actuator
- 3. Subthrottle Sensor
- 4. Main Throttle Sensor
- 5. Water-proof Joint 2

Inlet Air Pressure Sensor (Service Code 12)

Inlet Air Pressure Sensor Removal

NOTICE

Never drop the inlet air pressure sensor, especially on a hard surface. Such a shock to the sensor can damage it.

Remove:

Left Subframe (see Left Subframe Removal in the Frame chapter)

Inlet Air Pressure Sensor Connector [A]

• Remove the inlet air pressure sensor [B] from the rubber damper in the bracket [C] and separate the vacuum hose [D].

Inlet Air Pressure Sensor Installation

NOTE

OThe inlet air pressure sensor is the same part as the atmospheric pressure sensor except that the sensor has a vacuum hose and different wiring.

• Installation is the reverse of removal.

Inlet Air Pressure Sensor Input Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the left subframe (see Left Subframe Removal in the Frame chapter).
- Disconnect the inlet air pressure sensor connector and connect the harness adapter [A] between these connectors.

Special Tool - Sensor Harness Adapter: 57001-1561

• Connect a digital meter to the harness adapter leads.

Inlet Air Pressure Sensor Input Voltage Connections to Adapter:

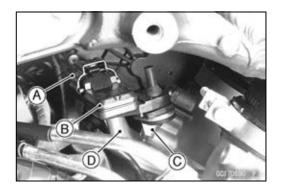
Digital Meter (+) \rightarrow G/W (sensor BL) lead

Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

- Measure the input voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Input Voltage Standard: DC 4.75 ~ 5.25 V

- Turn the key knob to OFF.
- ★ If the reading is within the standard, check the output voltage (see Inlet Air Pressure Sensor Output Voltage Inspection).





Inlet Air Pressure Sensor (Service Code 12)

★ If the reading is out of the standard, remove the ECU and check the wiring for continuity between harness connectors.

Special Tool - Hand Tester: 57001-1394

ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] ←→ Inlet Air Pressure Sensor Connector [B]

BL lead (ECU terminal 40) [C]

BR/BK lead (ECU terminal 60) [D]

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Inlet Air Pressure Sensor Output Voltage Inspection

- Measure the output voltage at the inlet air pressure sensor in the same way as input voltage inspection, note the following.
- ODisconnect the inlet air pressure sensor connector and connect the harness adapter [A] between these connectors.

Special Tool - Sensor Harness Adapter: 57001-1561

Inlet Air Pressure Sensor Output Voltage Connections to Adapter:

Digital Meter (+) \rightarrow G (sensor Y/BL) lead

```
Digital Meter (–) \rightarrow BK (sensor BR/BK) lead
```

- Measure the output voltage with the engine stopped, and with the connector joined.
- Push and turn the key knob to ON.

Output Voltage

Usable Range:

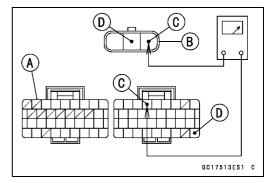
DC 3.80 ~ 4.20 V at standard atmospheric pressure (101.32 kPa, 76 cmHg)

NOTE

 The output voltage changes according to local atmospheric pressure.

• Turn the key knob to OFF.

★ If the reading is out of the usable range, replace the sensor.



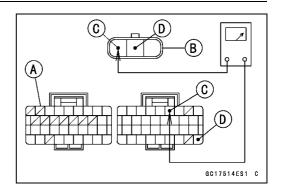


17-24 SELF-DIAGNOSIS SYSTEM

Inlet Air Pressure Sensor (Service Code 12)

- ★ If the reading is within the usable range, remove the ECU and check the wiring for continuity between harness connector.
- Special Tool Hand Tester: 57001-1394
- ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] ←→ Inlet Air Pressure Sensor Connector [B] Y/BL lead (ECU terminal 38) [C] BR/BK lead (ECU terminal 60) [D]



- \star If the wiring is good, check the sensor for various vacuum.
- Remove the inlet air pressure sensor [A] and disconnect the vacuum hose from the sensor.
- Connect an auxiliary hose [B] to the inlet air pressure sensor.
- Temporarily install the inlet air pressure sensor.
- OConnect a digital meter [C], vacuum gauge [D], the fork oil level gauge [E] and the harness adapter to the inlet air pressure sensor.

Special Tools - Fork Oil Level Gauge: 57001-1290 Vacuum Gauge: 57001-1369 Sensor Harness Adapter: 57001-1561

Inlet Air Pressure Sensor Output Voltage Connections to Adapter:

Digital Meter (+) \rightarrow G (sensor Y/BL) lead Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

OPush and turn the key knob to ON.

- OMeasure the inlet air pressure sensor output voltage from various vacuum readings, while pulling the handle of the fork oil level gauge.
- OCheck the inlet air pressure sensor output voltage, using the following formula and chart.

Suppose:

- Pg: Vacuum Pressure (Gauge) of Throttle Body
- PI: Local Atmospheric Pressure (Absolute) measured by a barometer
- Pv: Vacuum Pressure (Absolute) of Throttle Body
- Vv: Sensor Output Voltage (V)

Inlet Air Pressure Sensor (Service Code 12)

then

Pv = PI - Pg

For example, suppose the following data is obtained:

Pg = 8 cmHg (Vacuum Gauge Reading)

PI = 70 cmHg (Barometer Reading)

Vv = 3.2 V (Digital Meter Reading)

then

Pv = 70 - 8 = 62 cmHg (Absolute)

Plot this Pv (62 cmHg) at a point [1] on the chart and draw a vertical line through the point. Then, you can get the usable range [2] of the sensor output voltage.

Usable range = 3.08 ~ 3.48 V

Plot Vv (3.2 V) on the vertical line. \rightarrow Point [3].

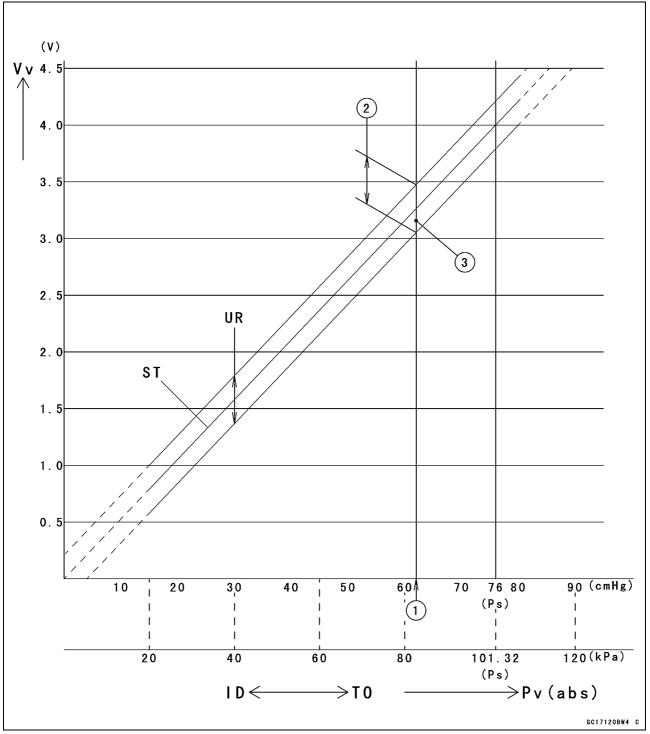
Results: In the chart, Vv is within the usable range and the sensor is normal.

★ If the reading is out of the usable range, replace the sensor.

- ★ If the reading is within the usable range, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

17-26 SELF-DIAGNOSIS SYSTEM

Inlet Air Pressure Sensor (Service Code 12)



ID: Idling

Ps: Standard Atmospheric Pressure (Absolute)

Pv: Throttle Vacuum Pressure (Absolute)

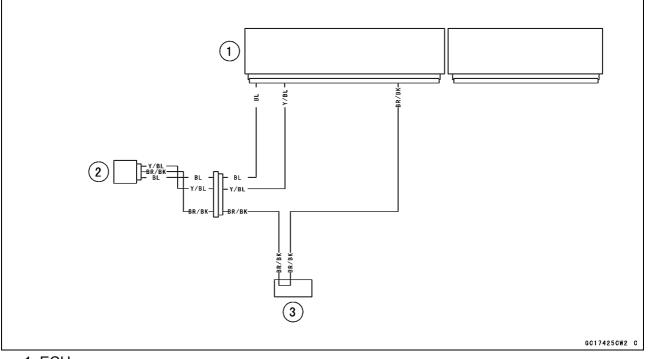
- ST: Standard of Sensor Output Voltage (V)
- TO: Throttle Full Open

UR: Usable Range of Sensor Output Voltage (V)

Vv: Inlet Air Pressure Sensor Output Voltage (V) (Digital Meter Reading)

Inlet Air Pressure Sensor (Service Code 12)

Inlet Air Pressure Sensor Circuit



1. ECU

- 2. Inlet Air Pressure Sensor
- 3. Water-proof Joint 2

Inlet Air Temperature Sensor (Service Code 13)

Inlet Air Temperature Sensor Removal

NOTICE

Never drop the inlet air temperature sensor, especially on a hard surface. Such a shock to the sensor can damage it.

- Remove the fuel tank (see Fuel Tank Removal in the Fuel System (DFI) chapter).
- Disconnect the connector [A] from the inlet air temperature sensor.
- Pull out the inlet air temperature sensor [B].

Inlet Air Temperature Sensor Installation

• Insert the inlet air temperature sensor [A] to the grommet [B].

Inlet Air Temperature Sensor Output Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the fuel tank (see Fuel Tank Removal in the Fuel System (DFI) chapter).

• Disconnect the inlet air temperature sensor connector and connect the measuring adapter [A] between these connectors as shown in the figure. Main Harness [B]

Inlet Air Temperature Sensor [C]

Special Tool - Measuring Adapter: 57001-1700

• Connect a digital meter [D] to the measuring adapter leads.

Inlet Air Temperature Sensor Output Voltage Connections to Adapter:

Digital Meter (+) \rightarrow R (sensor Y) lead

Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

- Measure the output voltage with the engine stopped and the connector joined.
- Push and turn the key knob to ON.

Output Voltage

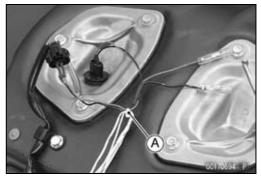
Standard: About DC 2.25 ~ 2.50 V at inlet air temperature 20°C (68°F)

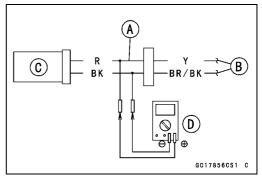
NOTE

OThe output voltage changes according to the inlet air temperature.









Inlet Air Temperature Sensor (Service Code 13)

- Turn the key knob to OFF.
- ★ If the reading is within the standard, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).
- ★ If the reading is out of the standard, remove the ECU and check the wiring for continuity between main harness connectors.

Special Tool - Hand Tester: 57001-1394

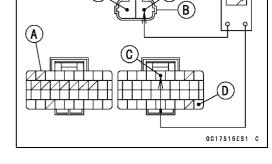
ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] $\leftarrow \rightarrow$

Inlet Air Temperature Sensor Connector [B]

Y lead (ECU terminal 39) [C]

BR/BK lead (ECU terminal 60) [D]



(D

★ If the wiring is good, check the inlet air temperature sensor resistance (see Inlet Air Temperature Sensor Resistance Inspection).

Inlet Air Temperature Sensor Resistance Inspection

- Remove the inlet air temperature sensor (see Inlet Air Temperature Sensor Removal).
- Suspend the sensor [A] in a container of machine oil so that the heat-sensitive portion is submerged.
- Suspend a thermometer [B] with the heat-sensitive portion [C] located in almost the same depth with the sensor.

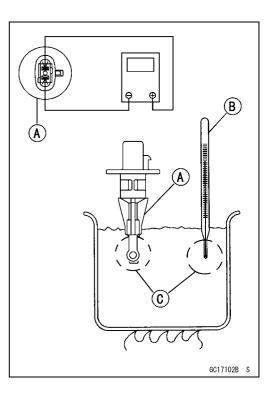
NOTE

OThe sensor and thermometer must not touch the container side or bottom.

- Place the container over a source of heat and gradually raise the temperature of the oil while stirring the oil gently for even temperature.
- Using a digital meter, measure the internal resistance of the sensor across the terminals at the temperatures shown in the following.

Inlet Air Temperature Sensor Resistance Standard: 2.09 ~ 2.81 kΩ at 20°C (68°F) About 0.322 kΩ at 80°C (176°F) (for reference)

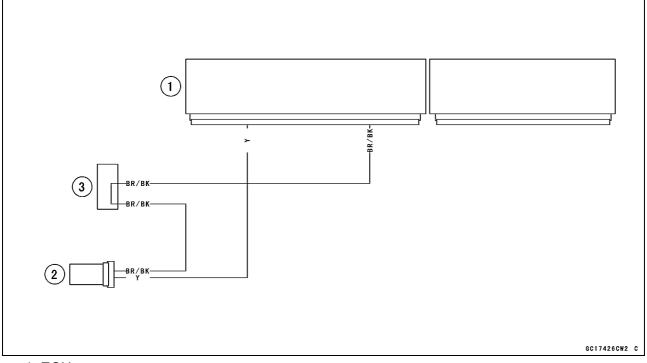
- \star If the reading is out of the standard, replace the sensor.
- ★ If the reading is within the standard, but the problem still exists, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



17-30 SELF-DIAGNOSIS SYSTEM

Inlet Air Temperature Sensor (Service Code 13)

Inlet Air Temperature Sensor Circuit



1. ECU

- 2. Inlet Air Temperature Sensor
- 3. Water-proof Joint 2

Water Temperature Sensor (Service Code 14)

Water Temperature Sensor Removal/Installation

NOTICE

Never drop the water temperature sensor, especially on a hard surface. Such a shock to the sensor can damage it.

- Remove the throttle body assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter).
- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
 - Connector [A]

Water Temperature Sensor [B] with Gasket [C]

- Replace the gasket with a new one.
- Tighten:

Torque - Water Temperature Sensor: 30 N·m (3.1 kgf·m, 22 ft·lb)

• Fill the engine with coolant and bleed the air from the cooling system (see Coolant Change in the Periodic Maintenance chapter).

Water Temperature Sensor Output Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the throttle body assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter).
- Disconnect the water temperature sensor connector and connect the measuring adapter [A] between these connectors as shown in the figure.
 - Harness [B]

Water Temperature Sensor [C]

Special Tool - Measuring Adapter: 57001-1700

• Connect a digital meter [D] to the measuring adapter leads.

Water Temperature Sensor Output Voltage Connections to Adapter:

Digital Meter (+) \rightarrow R (sensor O) lead Digital Meter (–) \rightarrow BK (sensor BR) lead

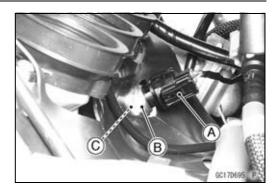
- Measure the output voltage with the engine stopped and the connector joined.
- Push and turn the key knob to ON.

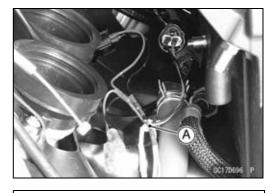
Output Voltage

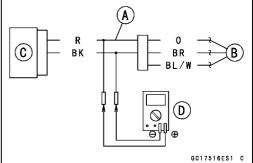
Standard: About DC 2.80 ~ 2.97 V at 20°C (68°F)

NOTE

OThe output voltage changes according to the coolant temperature in the engine.







17-32 SELF-DIAGNOSIS SYSTEM

Water Temperature Sensor (Service Code 14)

- Turn the key knob to OFF.
- ★ If the reading is within the standard, check the ECU for its ground, and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).
- ★ If the reading is out of the standard, remove the ECU and check the wiring for continuity between harness connectors.

Special Tool - Hand Tester: 57001-1394

ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] $\leftarrow \rightarrow$

Water Temperature Sensor Connector [B]

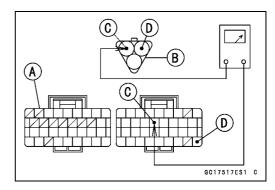
O lead (ECU terminal 48) [C] BR lead [D]

BR/BK lead (ECU terminal 60) [D]

★ If the wiring is good, check the water temperature sensor resistance (see Water Temperature Sensor Resistance Inspection).

Water Temperature Sensor Resistance Inspection

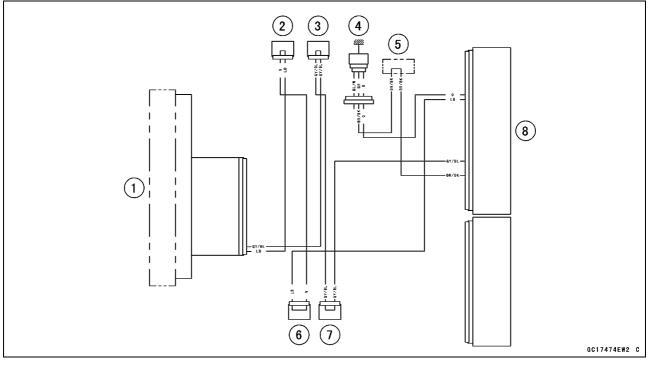
- Refer to the Water Temperature Sensor Inspection in the Electrical System chapter.
- ★ If the reading is within the standard, but the problem still exists, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



SELF-DIAGNOSIS SYSTEM 17-33

Water Temperature Sensor (Service Code 14)

Water Temperature Sensor Circuit



- 1. Meter Unit
- 2. Joint Connector 4
- 3. Joint Connector 5
- 4. Water Temperature Sensor

- 5. Water-proof Joint 2
- 6. Joint Connector 6
- 7. Joint Connector 7
- 8. ECU

17-34 SELF-DIAGNOSIS SYSTEM

Atmospheric Pressure Sensor (Service Code 15)

Atmospheric Pressure Sensor Removal

NOTICE

Never drop the atmospheric pressure sensor, especially on a hard surface. Such a shock to the sensor can damage it.

- Remove the seat (see Seat Removal in the Frame chapter).
- Disconnect the sensor connector [A].
- Remove the atmospheric pressure sensor [B] from the rubber damper [C] in the rear fender.

Atmospheric Pressure Sensor Installation

NOTE

- The atmospheric pressure sensor is the same part as the inlet air pressure sensor except that the inlet air pressure sensor has the vacuum hose and different wiring.
- Installation is the reverse of removal.

Atmospheric Pressure Sensor Input Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the seat (see Seat Removal in the Frame chapter).
- Disconnect the atmospheric pressure sensor connector and connect the harness adapter [A] between these connectors.

Special Tool - Sensor Harness Adapter: 57001-1561

• Connect a digital meter to the harness adapter leads.

Atmospheric Pressure Sensor Input Voltage Connections to Adapter:

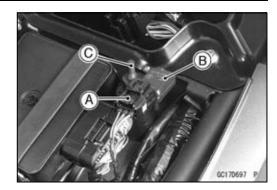
Digital Meter (+) \rightarrow G/W (sensor BL) lead

Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

- Measure the input voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Input Voltage Standard: DC 4.75 ~ 5.25 V

- Turn the key knob to OFF.
- ★ If the reading is within the standard, check the output voltage (Atmospheric Pressure Sensor Output Voltage Inspection).





SELF-DIAGNOSIS SYSTEM 17-35

Atmospheric Pressure Sensor (Service Code 15)

★ If the input voltage is out of the standard, remove the ECU and check the wiring for continuity between main harness connectors.

Special Tool - Hand Tester: 57001-1394

ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] ←→ Atmospheric Pressure Sensor Connector [B] BL lead (ECU terminal 40) [C]

BR/BK lead (ECU terminal 60) [D]

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the
- Fuel System (DFI) chapter). ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Atmospheric Pressure Sensor Output Voltage Inspection

- Measure the output voltage at the atmospheric pressure sensor in the same way as input voltage inspection, note the following.
- ODisconnect the atmospheric pressure sensor connector and connect the harness adapter [A] between these connectors.

Special Tool - Sensor Harness Adapter: 57001-1561

Atmospheric Pressure Sensor Output Voltage Connections to Adapter:

Digital Meter (+) \rightarrow G (sensor G/W) lead

Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

- Measure the output voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Output Voltage

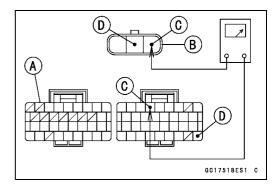
Usable Range: DC 3.80 ~ 4.20 V at the standard atmospheric pressure (101.32 kPa, 76 cmHg abs.)

NOTE

 The output voltage changes according to the local atmospheric pressure.

• Turn the key knob to OFF.

★ If the reading is out of the usable range, replace the sensor.



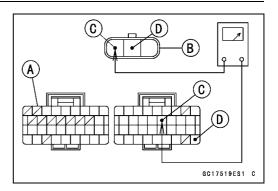


17-36 SELF-DIAGNOSIS SYSTEM

Atmospheric Pressure Sensor (Service Code 15)

- ★ If the reading is within the standard, remove the ECU and check the wiring for continuity between main harness connector.
- Special Tool Hand Tester: 57001-1394
- ODisconnect the ECU and sensor connectors.

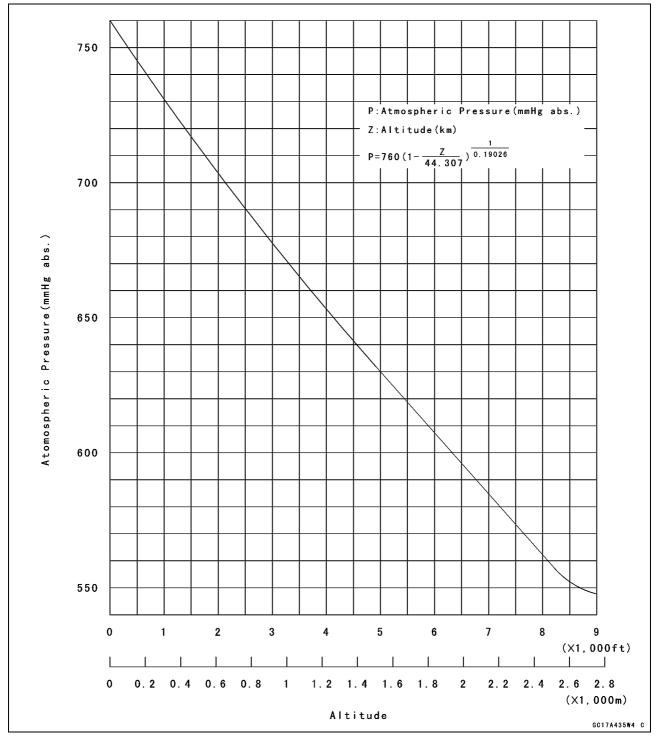
Wiring Continuity Inspection ECU Connector [A] ←→ Atmospheric Pressure Sensor Connector [B] G/W lead (ECU terminal 47) [C] BR/BK lead (ECU terminal 60) [D]



- \star If the wiring is good, check the sensor for various vacuum. ODetermine the local altitude (elevation).
- \star If you know the local altitude, use the chart in this section.
- ★ If you know the local atmospheric pressure using a barometer, substitute the atmospheric pressure for Pv (vacuum pressure) in the inlet air pressure sensor chart (see Inlet Air Pressure Sensor Output Voltage Inspection).
- OGet the usable range of the atmospheric pressure sensor output voltage in the same way as Output Voltage Inspection of the inlet air pressure sensor and check if Va (output voltage) is within the usable range or not.
- ★ If the reading is out of the usable range, replace the sensor.
- ★ If the reading is within the usable range, check the ECU for its ground, and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Atmospheric Pressure Sensor (Service Code 15)

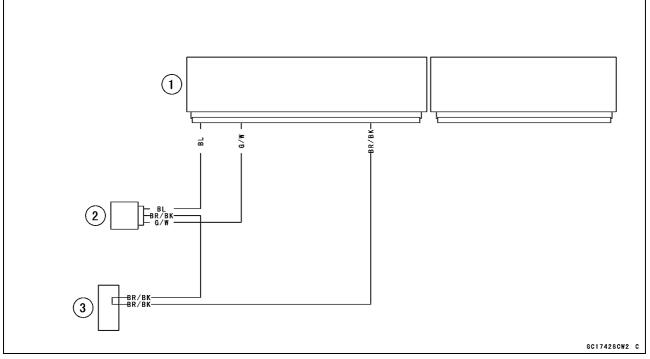
Atmospheric Pressure/Altitude Relationship



17-38 SELF-DIAGNOSIS SYSTEM

Atmospheric Pressure Sensor (Service Code 15)

Atmospheric Pressure Sensor Circuit



1. ECU

- 2. Atmospheric Pressure Sensor
- 3. Water-proof Joint 2

Crankshaft Sensor (Service Code 21)

The crankshaft sensor has no power source, and when the engine stops, the crankshaft sensor generates no signals.

Crankshaft Sensor Removal/Installation

• Refer to the Crankshaft Sensor Removal/Installation in the Electrical System chapter.

Crankshaft Sensor Resistance Inspection

- Refer to the Crankshaft Sensor Inspection in the Electrical System chapter.
- ★ If the reading is within the standard, check the peak voltage (see Crankshaft Sensor Peak Voltage Inspection).

Crankshaft Sensor Peak Voltage Inspection

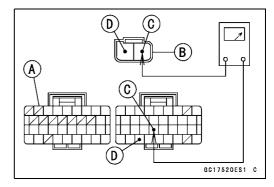
- Refer to the Crankshaft Sensor Peak Voltage Inspection in the Electrical System chapter.
- ★ If the reading is within the standard, remove the ECU and check the wiring for continuity between harness connectors.

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Special Tool - Hand Tester: 57001-1394
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ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] ←→ Crankshaft Sensor Connector [B] R/BK lead (ECU terminal 56) [C] BK lead (ECU terminal 66) [D]

- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



17-40 SELF-DIAGNOSIS SYSTEM

Crankshaft Sensor (Service Code 21)

Crankshaft Sensor Circuit

1. ECU

2. Crankshaft Sensor

Camshaft Position Sensor (Service Code 23, 26)

Exhaust Camshaft Position Sensor: Service Code 23 Inlet Camshaft Position Sensor: Service Code 26

The camshaft position sensor detects the position of the camshaft, and distinguishes the cylinder.

The camshaft position sensor has no power source, and when the engine stops, the camshaft position sensor generates no signals.

Camshaft Position Sensor Removal/Installation

 Refer to the Camshaft Position Sensor Removal/Installation in the Electrical System chapter.

Camshaft Position Sensor Resistance Inspection

- Refer to the Camshaft Position Sensor Inspection in the Electrical System chapter.
- ★ If the reading is within the standard, check the peak voltage (see Camshaft Position Sensor Peak Voltage Inspection).

Camshaft Position Sensor Peak Voltage Inspection

- Refer to the Camshaft Position Sensor Peak Voltage Inspection in the Electrical System chapter.
- ★ If the reading is within the standard, check the wiring for continuity, using the wiring diagram in this section.

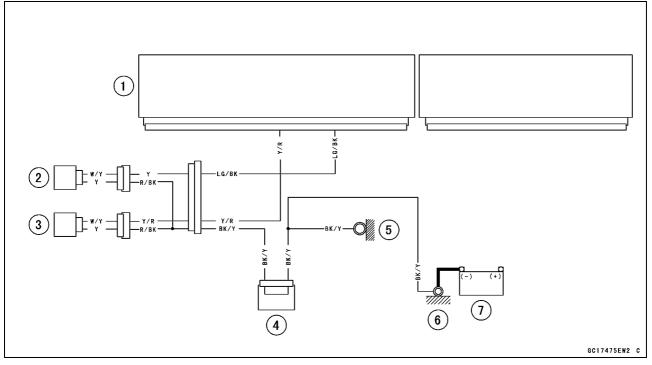
Special Tool - Hand Tester: 57001-1394

- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

17-42 SELF-DIAGNOSIS SYSTEM

Camshaft Position Sensor (Service Code 23, 26)

Camshaft Position Sensor Circuit



- 1. ECU
- 2. Exhaust Camshaft Position Sensor
- 3. Inlet Camshaft Position Sensor
- 4. Joint Connector 8

- 5. Frame Ground
- 6. Frame Ground
- 7. Battery 12 V 14 Ah

Speed Sensor (Service Code 24)

Speed Sensor Removal/Installation

• Refer to the Speed Sensor Removal/Installation in the Electrical System chapter.

Speed Sensor Input Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key nob to OFF.
- Remove the left lower fairing (see Lower Fairing Removal in the Frame chapter).
- Disconnect the speed sensor connector [A].
- Connect the setting adapter [A] between the main harness connector and speed sensor connector.

Special Tool - Throttle Sensor Setting Adapter #1: 57001 -1400

• Connect a digital meter to the setting adapter leads.

Speed Sensor Input Voltage Connections to Adapter:

Digital Meter (+) \rightarrow Y/W (sensor O/R) lead

Digital Meter (–) \rightarrow BK/BL (sensor BK/W) lead

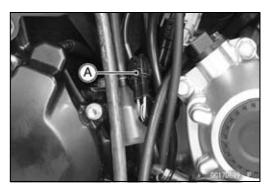
- Measure the input voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Input Voltage Standard: About DC 9 ~ 11 V

- Turn the key knob to OFF.
- ★ If the reading is within the standard, check the output voltage (see Speed Sensor Output Voltage Inspection).
- ★ If the reading is out of the standard, check the wiring for continuity, using the wiring diagram in this section.

Special Tool - Hand Tester: 57001-1394

★ If the wiring is good, check the meter unit for speed sensor supply voltage (see Meter System Inspection in the Electrical System chapter).





17-44 SELF-DIAGNOSIS SYSTEM

Speed Sensor (Service Code 24)

Speed Sensor Output Voltage Inspection

- Using the center stand, raise the rear wheel off the ground.
- Measure the output voltage at the speed sensor in the same way as input voltage inspection, note the following.
- ODisconnect the speed sensor connector and connect the setting adapter [A] between these connectors.

Special Tool - Throttle Sensor Setting Adapter #1: 57001 -1400

Speed Sensor Output Voltage Connections to Adapter: Digital Meter (+) → BL (sensor P) lead Digital Meter (–) → BK/BL (sensor BK/W) lead

- Measure the output voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Output Voltage

Standard: About DC 0.05 ~ 0.09 V or DC 4.5 ~ 4.9 V at ignition switch ON and 0 km/h

NOTE

ORotate the rear wheel by hand, confirm the output voltage will be raise or lower.

- Turn the key knob to OFF.
- \star If the reading is out of the standard, replace the sensor.

★ If the reading is within the standard, check the wiring for continuity, using the wiring diagram in this section.

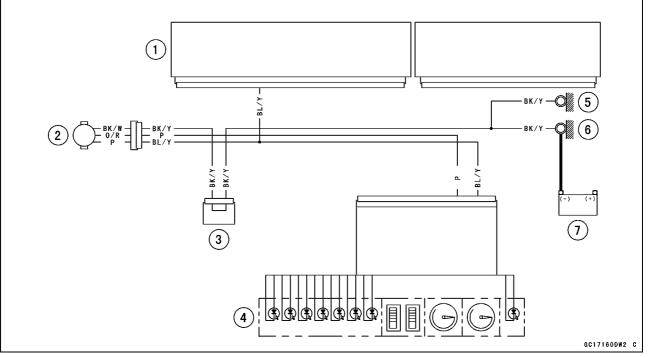
Special Tool - Hand Tester: 57001-1394

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



Speed Sensor (Service Code 24)

Speed Sensor Circuit



- 1. ECU
- 2. Speed Sensor
- 3. Joint Connector 8
- 4. Meter Unit
- 5. Frame Ground
- 6. Frame Ground
- 7. Battery 12 V 14 Ah

17-46 SELF-DIAGNOSIS SYSTEM

Gear Position Switch (Service Code 25)

Gear Position Switch Removal/Installation

• Refer to the Gear Position Switch Removal/Installation in the Electrical System chapter.

Gear Position Switch Resistance Inspection

- Refer to the Gear Position Switch Inspection in the Electrical System chapter.
- ★ If the reading is as the specified, check the output voltage (see Gear Position Switch Output Voltage Inspection).

Gear Position Switch Output Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the left lower fairing (see Lower Fairing Removal in the Frame chapter).
- Disconnect the oil pressure switch/gear position switch lead connector [A].
- Connect the measuring adapter [A] between the main harness connector and oil pressure switch/gear position switch lead connector as shown in the figure. Main Harness [B]

To Gear Position Switch [C] To Oil Pressure Switch [D]

Special Tool - Measuring Adapter: 57001-1700

• Connect a digital meter [E] to the measuring adapter lead.

Gear Position Switch Output Voltage Connections to Adapter:

Digital Meter (+) \rightarrow R (sensor G/R) lead Digital Meter (–) \rightarrow Frame Ground terminal

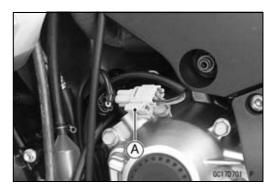
• Measure the switch input voltage with the engine stopped and with the connector joined.

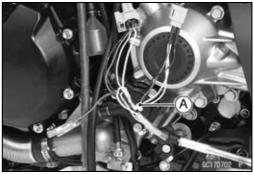
• Push and turn the key knob to ON.

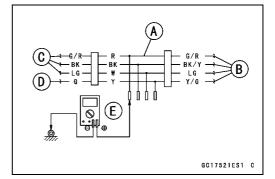
OWhen changing the gear position from lower gear to higher gear, raise the rear wheel off the ground with the center stand and rotate the rear wheel by hand.

Output Voltage at 1 ~ 6 Gear Positions Standard:

1st	About 3.0 V
2nd	About 2.5 V
3rd	About 2.0 V
4th	About 1.5 V
5th	About 1.1 V
6th	About 0.7 V







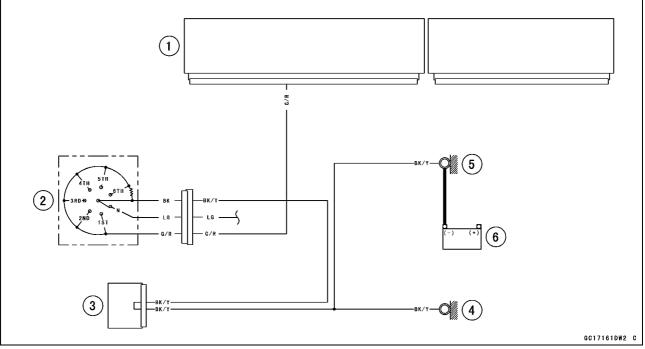
Gear Position Switch (Service Code 25)

- Turn the key knob to OFF.
- ★ If the reading is out of the standard, check the wiring for continuity, using the wiring diagram in this section.

Special Tool - Hand Tester: 57001-1394

- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Gear Position Switch Circuit



1. ECU

- 2. Gear Position Switch
- 3. Joint Connector 8
- 4. Frame Ground
- 5. Frame Ground
- 6. Battery 12 V 14 Ah

17-48 SELF-DIAGNOSIS SYSTEM

Front and/or Rear Wheel Rotation Sensor Signal (Service Code 27, K-ACT ABS Equipped Models)

Front and/or Rear Wheel Rotation Sensor Signal Inspection

OThe front and rear wheel rotation sensors send the signal to the ECU through the K-ACT ABS hydraulic unit OThe ECU uses the wheel rotation sensor signal for KTRC control. OThe service code 27 is detected with the ECU. • When the service code 27 and following service codes (for K-ACT ABS system) are displayed at the same time, inspect the front and/or rear wheel rotation sensor. Service Code B 42 (see Front Wheel Rotation Sensor Signal Abnormal) Service Code B 43 (see Front Wheel Rotation Sensor Wiring Inspection) Service Code B 44 (see Rear Wheel Rotation Sensor Signal Abnormal) Service Code B 45 (see Rear Wheel Rotation Sensor Wiring Inspection)

- When only service code 27 is displayed, do the following inspection procedures.
- Disconnect:

ECU Connectors (see ECU Removal in the Fuel System (DFI) chapter)

K-ACT ABS Hydraulic Unit Connector (see K-ACT ABS Hydraulic Unit Removal in the Brakes chapter)

• Check the wiring for continuity between harness connectors.

Special Tool - Hand Tester: 57001-1394

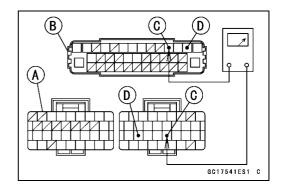
Wiring Continuity Inspection ECU Connector [A] $\leftarrow \rightarrow$

K-ACT ABS Hydraulic Unit Connector [B]

LG/R lead (ECU terminal 55, K-ACT ABS Hydraulic Unit terminal 35) [C]

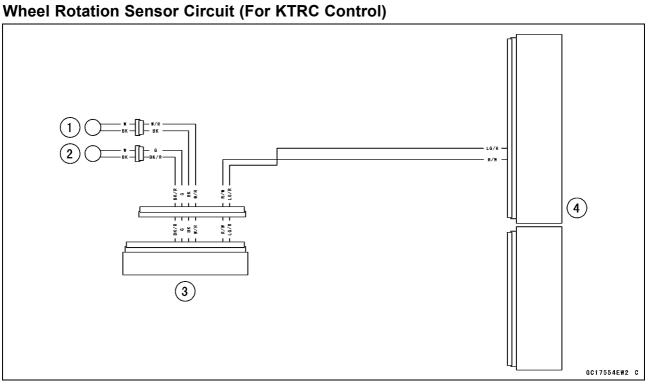
R/W lead (ECU terminal 58, K-ACT ABS Hydraulic Unit terminal 37) [D]

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



SELF-DIAGNOSIS SYSTEM 17-49

Front and/or Rear Wheel Rotation Sensor Signal (Service Code 27, K-ACT ABS Equipped Models)



- 1. Rear Wheel Rotation Sensor
- 2. Front Wheel Rotation Sensor
- 3. K-ACT ABS Hydraulic Unit
- 4. ECU

17-50 SELF-DIAGNOSIS SYSTEM

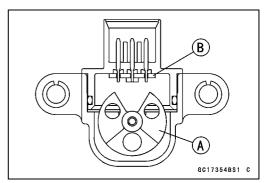
Vehicle-down Sensor (Service Code 31)

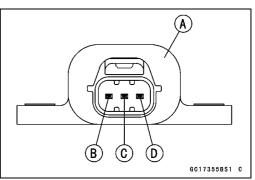
This sensor has a weight [A] with two magnets inside, and sends a signal to the ECU. But when the motorcycle banks $60 \sim 70^{\circ}$ or more to either side (in fact falls down), the weight turns and the signal changes. The ECU senses this change, and stops the fuel pump relay, the fuel injectors and the ignition system.

Hall IC [B]

When the motorcycle is down, the key knob is left ON. If the starter button is pushed, the electric starter turns but the engine does not start. To start the engine again, raise the motorcycle, turn the key knob to OFF, and then push and turn the key knob to ON.

Vehicle-down Sensor [A] Ground Terminal [B]: BR/BK Output Terminal [C]: Y/G Power Source Terminal [D]: BL





Vehicle-down Sensor Removal

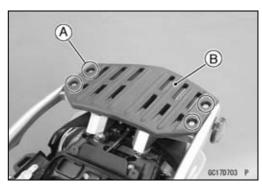
NOTICE

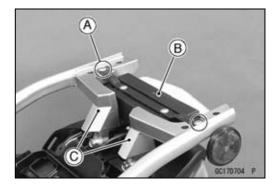
Never drop the vehicle-down sensor, especially on a hard surface. Such a shock to the sensor can damage it.

• Remove:

Left and Right Seat Covers (see Seat Cover Removal in the Frame chapter) Bolts [A] Carrier [B]

- Remove the bolts [A].
- Take the tail/brake light [B] off the grab rails [C].
- Remove the tail cover (see Tail Cover Removal in the Frame chapter).





SELF-DIAGNOSIS SYSTEM 17-51

Vehicle-down Sensor (Service Code 31)

- Free the vehicle-down sensor lead [A] from the clamp [B].
- Remove the bolts [C], and lower the rear fender.
- Disconnect the vehicle-down sensor lead connector [D].

- Remove: Vehicle-down Sens
 - Vehicle-down Sensor Bolts [A] and Nuts [B] Vehicle-down Sensor [C]

Vehicle-down Sensor Installation

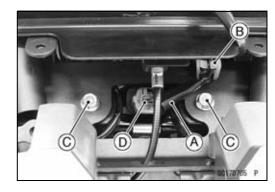
• Be sure to install the rubber dampers [A] and collars [B] on the sensor bracket [C].

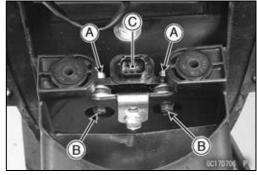
- The UP mark [A] of the sensor should face upward.
- Tighten:

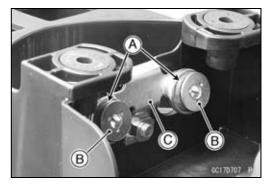
Torque - Vehicle-down Sensor Bolts: 5.9 N·m (0.60 kgf·m, 52 in·lb)

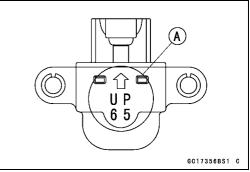
A WARNING

Incorrect installation of the vehicle-down sensor could cause sudden loss of engine power. The rider could lose balance during certain riding situations for an accident resulting in injury or death. Ensure that the vehicle-down sensor is held in place by the sensor bracket.









Vehicle-down Sensor (Service Code 31)

Vehicle-down Sensor Input Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Disconnect the vehicle-down sensor connector and connect the measuring adapter [A] between these connectors as shown in the figure.
 Main Harness [B]
 Vehicle-down Sensor [C]

Special Tool - Measuring Adapter: 57001-1700

• Connect a digital meter [D] to the measuring adapter leads.

Vehicle-down Sensor Input Voltage Connections to Adapter:

> Digital Meter (+) \rightarrow R (sensor BL) lead Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

- Measure the input voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Input Voltage Standard: DC 4.75 ~ 5.25 V

- Turn the key knob to OFF.
- ★ If the reading is within the standard, check the output voltage (see Vehicle-down Sensor Output Voltage Inspection).
- ★ If the reading is out of the standard, remove the ECU and check the wiring for continuity between main harness connectors.

Special Tool - Hand Tester: 57001-1394

ODisconnect the ECU and sensor connectors.

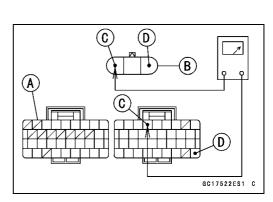
Wiring Continuity Inspection ECU Connector [A] $\leftarrow \rightarrow$

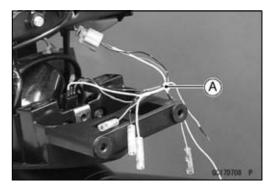
Vehicle-down Sensor Connector [B]

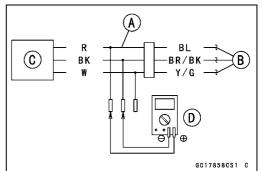
BL lead (ECU terminal 40) [C]

BR/BK lead (ECU terminal 60) [D]

- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).







Vehicle-down Sensor (Service Code 31)

Vehicle-down Sensor Output Voltage Inspection

- Remove the vehicle-down sensor.
- Connect the measuring adapter [A] to the vehicle-down sensor connectors as shown in the figure.

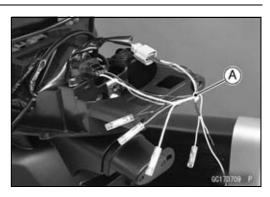
Special Tool - Measuring Adapter: 57001-1700 Main Harness [B] Vehicle-down Sensor [C]

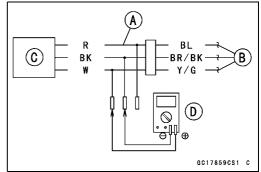
• Connect a digital meter [D] to the measuring adapter leads.

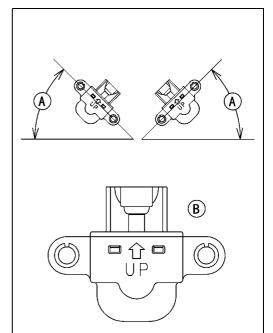
Vehicle-down Sensor Output Voltage Connections to Adapter:

Digital Meter (+) \rightarrow W (sensor Y/G) lead

Digital Meter (–) \rightarrow BK (sensor BR/BK) lead







GC17786CS2 C

- Hold the sensor vertically.
- Measure the output voltage with the engine stopped, and with the connector joined.
- Push and turn the key knob to ON.
- Tilt the sensor 60 ~ 70° or more [A] right or left, then hold the sensor almost vertical with the arrow mark pointed up [B], and measure the output voltage.

Output Voltage

Standard: With sensor tilted 60 ~ 70° or more right or left: DC 0.65 ~ 1.35 V

With sensor arrow mark pointed up: DC 3.55 \sim 4.45 V

NOTE

Olf you need to test again, turn the key knob to OFF, and then ON.

• Turn the key knob to OFF.

 \bigstar If the reading is out of the standard, replace the sensor.

17-54 SELF-DIAGNOSIS SYSTEM

Vehicle-down Sensor (Service Code 31)

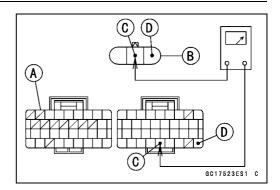
- ★ If the reading is within the standard, remove the ECU and check the wiring for continuity between main harness connectors.
 - Special Tool Hand Tester: 57001-1394
- ODisconnect the ECU and sensor connectors.

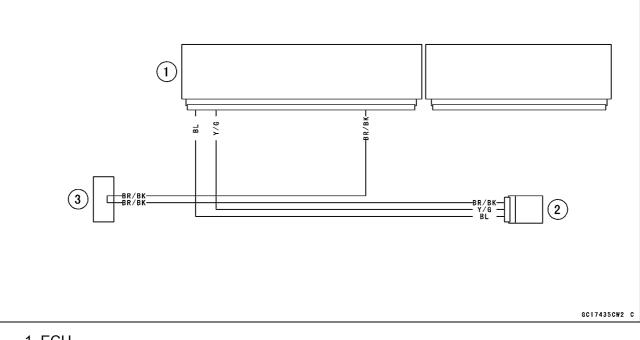
Wiring Continuity Inspection ECU Connector [A] $\leftarrow \rightarrow$

Vehicle-down Sensor Connector [B] Y/G lead (ECU terminal 64) [C] BR/BK lead (ECU terminal 60) [D]

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Vehicle-down Sensor Circuit





1. ECU

2. Vehicle-down Sensor

3. Water-proof Joint 2

Subthrottle Sensor (Service Code 32)

The subthrottle sensor is a rotating variable resistor that change output voltage according to throttle operating. The ECU senses this voltage change and determines fuel injection quantity, and ignition timing according to engine rpm, and throttle opening.

Input Terminal [A]: BL Output Terminal [B]: BL/W Ground Terminal [C]: BR/BK

Subthrottle Sensor Removal/Adjustment

NOTICE

Do not remove or adjust the subthrottle sensor [A] since it has been adjusted and set with precision at the factory.

Never drop the throttle body assy, especially on a hard surface. Such a shock to the subthrottle sensor can damage it.

Subthrottle Sensor Input Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the right subframe (see Right Subframe Removal in the Frame chapter).
- Disconnect the subthrottle sensor connector and connect the harness adapter [A] between these connectors.

Special Tool - Throttle Sensor Setting Adapter: 57001 -1538

• Connect a digital meter to the harness adapter leads.

Subthrottle Sensor Input Voltage Connections to Adapter:

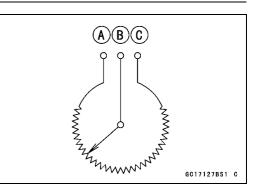
Digital Meter (+) \rightarrow W (sensor BL) lead

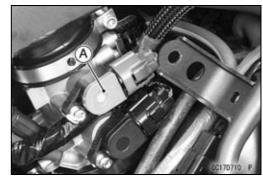
Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

- Measure the input voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Input Voltage Standard: DC 4.75 ~ 5.25 V

- Turn the key knob to OFF.
- ★ If the reading is within the standard, check the output voltage (see Subthrottle Sensor Output Voltage Inspection).







17-56 SELF-DIAGNOSIS SYSTEM

Subthrottle Sensor (Service Code 32)

- ★ If the reading is out of the standard, remove the ECU and check the wiring for continuity between harness connectors.
- Special Tool Hand Tester: 57001-1394
- ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] \longleftrightarrow

Subthrottle Sensor Connector [B]

BL lead (ECU terminal 40) [C]

BR/BK lead (ECU terminal 60) [D]

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Subthrottle Sensor Output Voltage Inspection

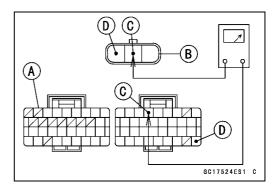
- Measure the output voltage at the subthrottle sensor in the same way as input voltage inspection, note the following.
- ODisconnect the subthrottle sensor connector and connect the setting adapter [A] between these connectors.

Special Tool - Throttle Sensor Setting Adapter: 57001 -1538

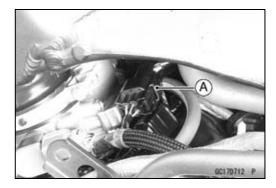
Subthrottle Sensor Output Voltage Connections to Adapter: Digital Meter (+) → R (sensor BL/W) lead

Digital Meter (–) \rightarrow BK (sensor BR/BK) lead

- Disconnect the subthrottle valve actuator connector [A].
- Remove the air cleaner caps (see Throttle Body Assy Removal in the Fuel System (DFI) chapter).







Subthrottle Sensor (Service Code 32)

- Measure the output voltage with the engine stopped with the connector joined.
- Push and turn the key knob to ON.
- Measure the output voltage when the subthrottle valves are fully opened by hand.

Output Voltage

Standard: DC 4.05 ~ 4.25 V at subthrottle valve full close position (for reference)
 DC 0.70 ~ 0.72 V at subthrottle valve full open position

NOTE

- OClose the subthrottle valves, confirm the output voltage will be raise.
- OThe standard voltage refers to the value when the voltage reading at the Input Voltage Inspection shows 5 V exactly.

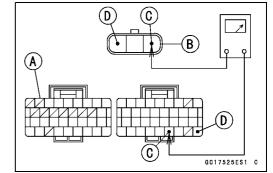
OWhen the input voltage reading shows other than 5 V, derive a voltage range as follows.
Example:
In the case of a input voltage of 4.75 V.
0.70 × 4.75 ÷ 5.00 = 0.66 V

- $0.70 \times 4.75 \div 5.00 = 0.68 V$ $0.72 \times 4.75 \div 5.00 = 0.68 V$
- Thus, the valid range is 0.66 ~ 0.68 V
- ★ If the reading is out of the standard, check the subthrottle sensor resistance (see Subthrottle Sensor Resistance Inspection).
- ★ If the reading is within the standard, remove the ECU and check the wiring for continuity between harness connectors.

Special Tool - Hand Tester: 57001-1394

ODisconnect the ECU and sensor connectors.

- Wiring Continuity Inspection ECU Connector [A] ←→ Subthrottle Sensor Connector [B] BL/W lead (ECU terminal 63) [C] BR/BK lead (ECU terminal 60) [D]
- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



17-58 SELF-DIAGNOSIS SYSTEM

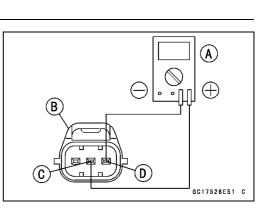
Subthrottle Sensor (Service Code 32)

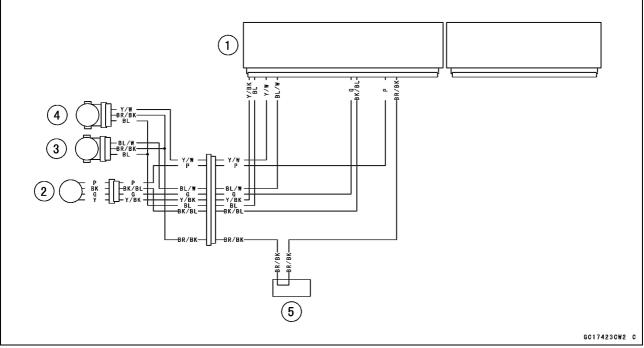
Subthrottle Sensor Resistance Inspection

- Turn the key knob to OFF.
- Disconnect the subthrottle sensor connector.
- Connect a digital meter [A] to the subthrottle sensor connector [B].
- Measure the subthrottle sensor resistance.

- ★ If the reading is out of the standard, replace the throttle body assy.
- ★ If the reading is within the standard, but the problem still exists, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Subthrottle Sensor Circuit





- 1. ECU
- 2. Subthrottle Valve Actuator
- 3. Subthrottle Sensor
- 4. Main Throttle Sensor
- 5. Water-proof Joint 2

Oxygen Sensor #1 - not activated (Service Code 33, Equipped Models)

Oxygen Sensor #1 Removal/Installation

• Refer to the Oxygen Sensor Removal/Installation (Equipped Models) in the Electrical System chapter.

Oxygen Sensor #1 Inspection

- Warm up the engine thoroughly until the radiator fan starts.
- Turn the key knob to OFF.
- Remove:

Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)

Right Subframe (see Right Subframe Removal in the Frame chapter)

Oxygen Sensor #1 Lead Connector (Black) [A]

• Connect the measuring adapter [A] between the harness connector and oxygen sensor #1 lead connector as shown in the figure.

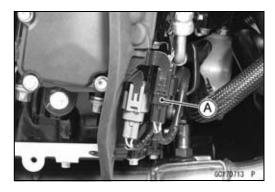
Harness [B] Oxygen Sensor #1 [C]

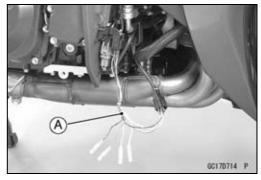
Special Tool - Measuring Adapter: 57001-1700

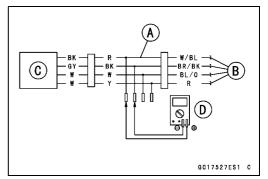
• Connect a digital meter [D] to the measuring adapter leads.

Oxygen Sensor #1 Output Voltage Connections to Adapter:

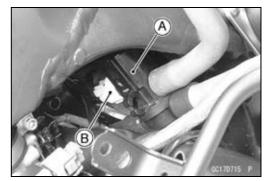
> Digital Meter (+) \rightarrow R (sensor BK) lead Digital Meter (–) \rightarrow BK (sensor GY) lead







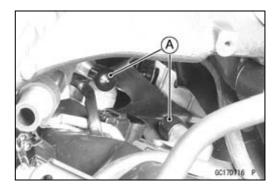
• Remove the air switching valve [A] (see Air Switching Valve Removal in the Engine Top End chapter). ODo not disconnect the air switching valve connector [B].



17-60 SELF-DIAGNOSIS SYSTEM

Oxygen Sensor #1 - not activated (Service Code 33, Equipped Models)

• Install the suitable plugs [A] on the fitting of the air suction valve covers, and shut off the secondary air.



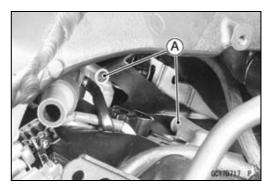
- Start the engine, and let it idle.
- Measure the output voltage with the connector joined.

Output Voltage (with Plugs) Standard: DC 0.8 V or more

- Next, remove the plugs from the fittings [A] with idling.
- Measure the output voltage with the connector joined.

Output Voltage (without Plugs) Standard: DC 0.24 V or less

• Turn the key knob to OFF.



★ If the reading is out of the standard (with plugs: 0.8 V or more, without plugs: 0.24 V or less), remove the ECU and check the wiring for continuity between harness connectors.

Special Tool - Hand Tester: 57001-1394

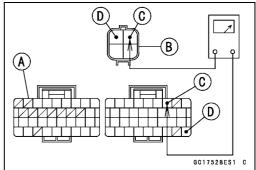
ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] $\leftarrow \rightarrow$ Oxygen Sensor #1 Connector [B]

> W/BL lead (ECU terminal 37) [C] BR/BK lead (ECU terminal 60) [D]

 \star If the wiring is good, replace the sensor.

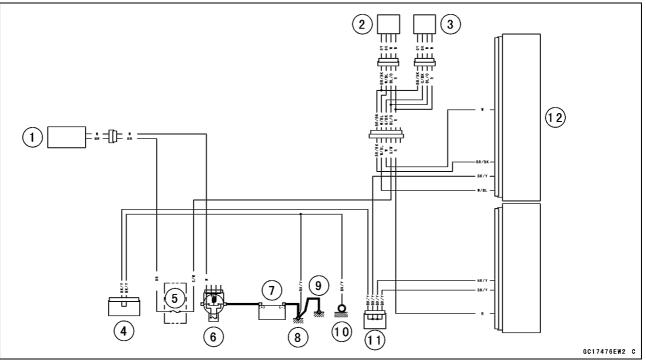
- ★ If the reading is within the standard (with plugs: 0.8 V or more, without plugs: 0.24 V or less), check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



SELF-DIAGNOSIS SYSTEM 17-61

Oxygen Sensor #1 - not activated (Service Code 33, Equipped Models)

Oxygen Sensor Circuit



- 1. Steering Lock Unit
- 2. Oxygen Sensor #1
- 3. Oxygen Sensor #2
- 4. Joint Connector 9
- 5. Oil Control Solenoid Valve Fuse 15 A
- 6. Main Fuse 30 A
- 7. Battery 12 V 14 Ah
- 8. Frame Ground
- 9. Engine Ground
- 10. Frame Ground
- 11. Joint Connector 3
- 12. ECU

Steering Lock Unit and ECU Communication Error (Service Code 37, 38)

Steering Lock Unit and ECU Communication Line Inspection

OWhen the data is not sent from the steering lock unit to the KIPASS ECU, the service code 37 is displayed.

- OWhen the data is not sent from the ECU to the KIPASS ECU, the service code 38 is displayed.
- OThe data is sent through the CAN communication line.
- OThe service code 37, 38 are detected with the KIPASS ECU.

Service Code 37

- Inspect the CAN communication line (see CAN Communication Line Resistance Inspection in the Fuel System (DFI) chapter).
- ★ If the CAN communication line is normal, check the steering lock unit (see Steering Lock Unit Inspection).
- ★ If the steering lock unit is normal, check the KIPASS ECU for its ground and power supply (see KIPASS ECU Power Supply Inspection in the Electrical System chapter).
- ★ If the ground and power supply are good, replace the KIPASS ECU (see KIPASS ECU Replacement in the Electrical System chapter).

Service Code 38

- Inspect the CAN communication line (see CAN Communication Line Resistance Inspection in the Fuel System (DFI) chapter).
- ★ If the CAN communication line is normal, check the ECU (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★If the ECU is normal, check the KIPASS ECU for its ground and power supply (see KIPASS ECU Power Supply Inspection in the Electrical System chapter).
- ★If the ground and power supply are good, replace the KIPASS ECU (see KIPASS ECU Replacement in the Electrical System chapter).

KIPASS ECU Communication Error (Service Code 39)

KIPASS ECU Communication Line Inspection

- OWhen the data is not sent from the KIPASS ECU to the meter unit, the service code 39 is displayed.
- OThe data is sent through the CAN communication line.
- OThe service code 39 is detected with the meter unit.
- Inspect the CAN communication line (see CAN Communication Line Resistance Inspection in the Fuel System (DFI) chapter).
- ★If the CAN communication line is normal, check the KIPASS ECU (see KIPASS ECU Power Supply Inspection in the Electrical System chapter).
- ★If the KIPASS ECU is normal, check the meter unit (see Meter Unit Inspection in the Electrical System chapter).
- ★ If the meter unit is normal, but the problem still exists, replace the meter unit (see Meter Unit Removal/Installation in the Electrical System chapter).

17-64 SELF-DIAGNOSIS SYSTEM

Fuel Pump Relay (Service Code 46)

Fuel Pump Relay Removal/Installation

OThe fuel pump relay is built in the relay box [A].

• Refer to the Relay Box Removal in the Electrical System chapter.



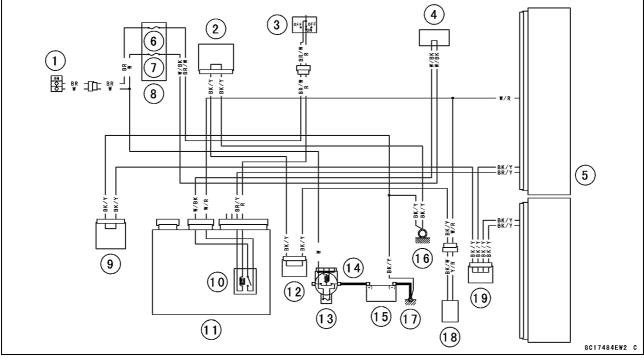
Fuel Pump Relay Inspection

- Refer to the Relay Circuit Inspection in the Electrical System chapter.
- ★ If the fuel pump relay is normal, check the wiring for continuity, using the wiring diagram in this section.

Special Tool - Hand Tester: 57001-1394

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Fuel Pump Relay Circuit



- 1. Steering Lock Unit
- 2. Joint Connector 1
- 3. Engine Stop Switch
- 4. Water-proof Joint 1
- 5. ECU
- 6. Ignition Fuse 10 A
- 7. ECU Fuse 15 A
- 8. Fuse Box 2
- 9. Joint Connector 9
- 10. Fuel Pump Relay

- 11. Relay Box
- 12. Joint Connector 2
- 13. Main Fuse 30 A
- 14. Starter Relay
- 15. Battery 12 V 14 Ah
- 16. Frame Ground
- 17. Frame Ground
- 18. Fuel Pump
- 19. Joint Connector 3

Stick Coils #1, #2, #3, #4: (Service Code 51, 52, 53, 54)

Stick Coil #1: Service Code 51 Stick Coil #2: Service Code 52 Stick Coil #3: Service Code 53 Stick Coil #4: Service Code 54

Stick Coil Removal/Installation

 Refer to the Stick Coil Removal/Installation in the Electrical System chapter.

Stick Coil Primary Winding Resistance Inspection

- Refer to the Stick Coil Inspection in the Electrical System chapter.
- ★ If the reading is within the standard, check the input voltage (see Stick Coil Input Voltage Inspection).

Stick Coil Input Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the ECU (see ECU Removal in the Fuel System (DFI) chapter).

ODo not disconnect the ECU connectors.

• Connect a digital meter [A] to the connector [B] with the needle adapter set.

Special Tool - Needle Adapter Set: 57001-1457

Stick Coil Input Voltage

Connections to ECU Connector:

For Stick Coil #1

Digital Meter (+) \rightarrow W/R lead (terminal 26)

Digital Meter (–) \rightarrow Frame Ground terminal

For Stick Coil #2

Digital Meter (+) \rightarrow W/BL lead (terminal 27)

Digital Meter (–) \rightarrow Frame Ground terminal

For Stick Coil #3

Digital Meter (+) \rightarrow W/G lead (terminal 1)

Digital Meter (–) \rightarrow Frame Ground terminal

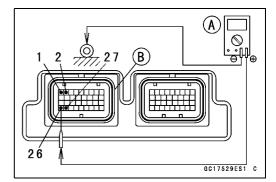
For Stick Coil #4

Digital Meter (+) \rightarrow W/Y lead (terminal 2)

Digital Meter (–) \rightarrow Frame Ground terminal

- Measure the input voltage to each primary winding of the stick coils with the engine stopped, and with the connectors joined.
- Turn the engine stop switch to run position.
- Push and turn the key knob to ON.

Input Voltage Standard: Battery Voltage



17-66 SELF-DIAGNOSIS SYSTEM

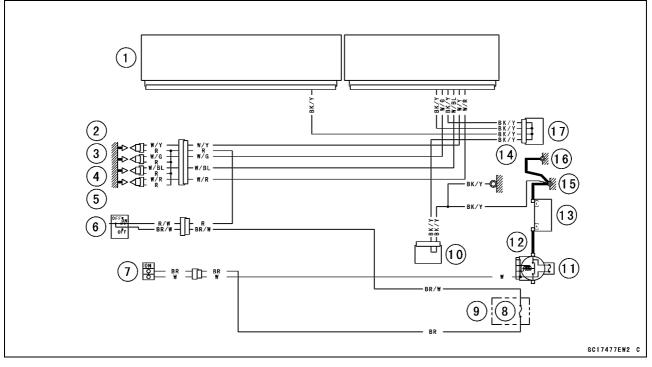
Stick Coils #1, #2, #3, #4: (Service Code 51, 52, 53, 54)

- Turn the key knob to OFF.
- ★ If the input voltage is out of the standard, check the wiring for continuity, using the wiring diagram in this section.

Special Tool - Hand Tester: 57001-1394

- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).
- ★ If the input voltage is within the standard, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Stick Coil Circuit



- 1. ECU
- 2. Stick Coil #4
- 3. Stick Coil #3
- 4. Stick Coil #2
- 5. Stick Coil #1
- 6. Engine Stop Switch
- 7. Steering Lock Unit
- 8. Ignition Fuse 10 A
- 9. Fuse Box 2

- 10. Joint Connector 9
- 11. Main Fuse 30 A
- 12. Starter Relay
- 13. Battery 12 V 14 Ah
- 14. Frame Ground
- 15. Frame Ground
- 16. Engine Ground
- 17. Joint Connector 3

Radiator Fan Relay (Service Code 56)

Radiator Fan Relay Removal/Installation

- OThe radiator fan relay is built in the relay box [A].
- Refer to the Relay Box Removal in the Electrical System chapter.



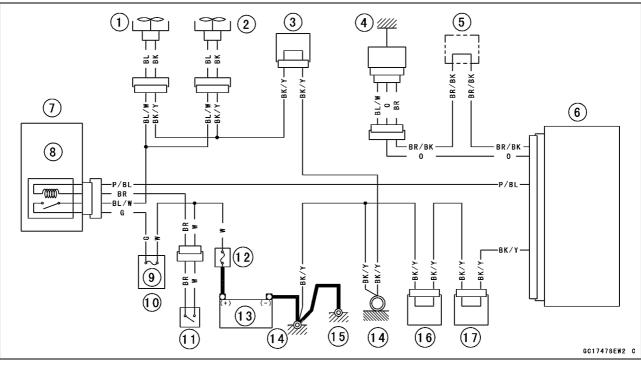
Radiator Fan Relay Inspection

- Refer to the Relay Circuit Inspection in the Electrical System chapter.
- ★If the radiator fan relay is normal, check the wiring for continuity, using the wiring diagram in this section.

Special Tool - Hand Tester: 57001-1394

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Radiator Fan Circuit



- 1. Fan Motor
- 2. Fan Motor
- 3. Joint Connector 1
- 4. Water Temperature Sensor
- 5. Water-proof Joint 2
- 6. ECU
- 7. Relay Box
- 8. Fan Relay

- 9. Fan Fuse 15 A
- 10. Fuse Box 2
- 11. Steering Lock Unit
- 12. Main Fuse 30 A
- 13. Battery 12 V 14 Ah
- 14. Frame Ground
- 15. Engine Ground
- 16. Joint Connector 9
- 17. Joint Connector 3

Variable Valve Timing and Oil Control Solenoid Valve (Service Code 59, 65)

Oil Control Solenoid Valve Removal/Installation

NOTICE

Never drop the oil control solenoid valve, especially on a hard surface. Such a shock to the oil control solenoid valve can damage it.

• Refer to the Oil Control Solenoid Valve Removal/Installation in the Lubrication System chapter.

Oil Control Solenoid Valve Inspection

NOTE

ONormally, when the service code 59 is displayed, service code 65 is generally displayed, too.

OWhen only service code 59 is displayed, use KDS 3 version kit to confirm actuator function/failure.

- Inspect the oil control solenoid valve resistance (see Oil Control Solenoid Valve Inspection in the Electrical System chapter).
- ★If the reading is standard, check the function of the oil control solenoid valve, Using the KDS 3 version kit.

NOTE

ORead the OCV Solenoid Test in the Kawasaki Diagnostic Software Version 3 Instruction Manual.

- ★ If the oil control solenoid valve does not function, check it for any tips interlocked or seizure.
- ★ If the oil control solenoid valve functions, check or replace the variable valve timing actuator when the service code 59 is indicated.

SELF-DIAGNOSIS SYSTEM 17-69

Variable Valve Timing and Oil Control Solenoid Valve (Service Code 59, 65)

★ If the OCV Solenoid Test is normal, check the power source voltage.

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Disconnect the oil control solenoid valve connector and connect the measuring adapter [A] between these connectors as shown in the figure.

Harness [B]

Oil Control Solenoid Valve [C]

Special Tool - Measuring Adapter: 57001-1700

• Connect a digital meter [D] to the measuring adapter lead.

Oil Control Solenoid Valve Power Source Voltage Connections to Adapter:

Digital Meter (+) \rightarrow R (valve LG) lead

Digital Meter (–) \rightarrow Frame Ground terminal

- Measure the power source voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Power Source Voltage Standard: Battery Voltage

- Turn the key knob to OFF.
- ★ If the reading is in specification, but the problem still exists, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).
- ★ If the reading is out of the standard, check the following. Oil Control Solenoid Valve Fuse 15 A (see Fuse Inspection in the Electrical System chapter) Power Source Wiring (see wiring diagram in this section)
- ★ If the fuse and wiring are good, remove the ECU and check the wiring for continuity between harness connectors.

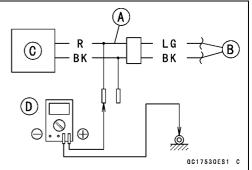
Special Tool - Hand Tester: 57001-1394

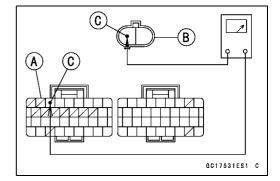
ODisconnect the ECU and valve connectors.

Wiring Continuity Inspection ECU Connector [A] ←→ Oil Control Solenoid Valve Connector [B] BK lead (ECU terminal 7) [C]

- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



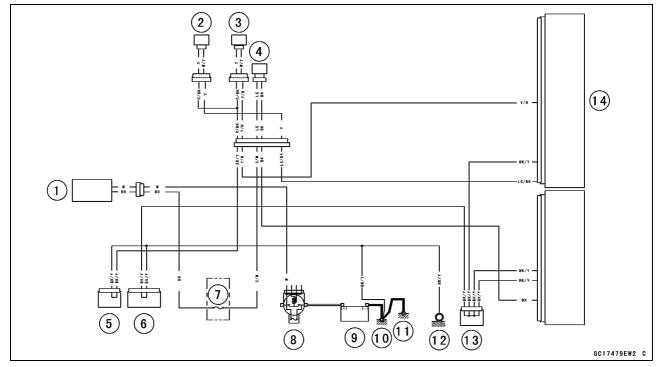




17-70 SELF-DIAGNOSIS SYSTEM

Variable Valve Timing and Oil Control Solenoid Valve (Service Code 59, 65)

Variable Valve Timing System Circuit



- 1. Steering Lock Unit
- 2. Inlet Camshaft Position Sensor
- 3. Exhaust Camshaft Position Sensor
- 4. Oil Control Solenoid Valve
- 5. Joint Connector 8
- 6. Joint Connector 9
- 7. Oil Control Solenoid Valve Fuse 15 A
- 8. Main Fuse 30 A
- 9. Battery 12 V 14 Ah
- 10. Frame Ground
- 11. Engine Ground
- 12. Frame Ground
- 13. Joint Connector 3
- 14. ECU

Subthrottle Valve Actuator (Service Code 62)

Subthrottle Valve Actuator Removal

NOTICE

Do not remove the subthrottle valve actuator [A] since it has been adjusted and set with precision at the factory.

Never drop the throttle body assy, especially on a hard surface. Such a shock to the subthrottle valve actuator can damage it.

Subthrottle Valve Actuator Inspection

NOTE

OBe sure the battery is fully charged.

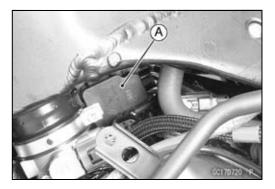
- Remove the air cleaner caps (see Throttle Body Assy Removal in the Fuel System (DFI) chapter).
- Push and turn the key knob to ON.
- Check to see that all the subthrottle valves [A] open and close smoothly.
- Turn the key knob to OFF.
- ★ If the subthrottle valves do not operate, check the subthrottle valve actuator resistance (see Subthrottle Valve Actuator Resistance Inspection).

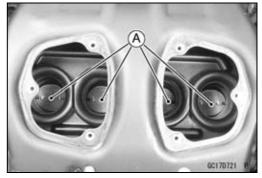
Subthrottle Valve Actuator Resistance Inspection

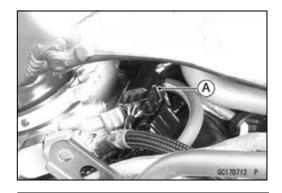
- Turn the key knob to OFF.
- Remove the right subframe (see Right Subframe Removal in the Frame chapter).
- Disconnect the subthrottle valve actuator connector [A].
- Connect a digital meter to the subthrottle valve actuator connector [A].
- Measure the subthrottle valve actuator resistance.

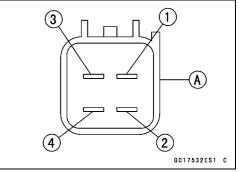
	Actuator Resistance Y lead [1] $\leftarrow \rightarrow$ P lead [2]
	BK lead [3] $\leftarrow \rightarrow$ G lead [4]
Standard:	About 5 ~ 7 Ω

- ★ If the reading is out of the standard, replace the throttle body assy.
- ★ If the reading is within the standard, check the input voltage (see Subthrottle Valve Actuator Input Voltage Inspection).









17-72 SELF-DIAGNOSIS SYSTEM

Subthrottle Valve Actuator (Service Code 62)

Subthrottle Valve Actuator Input Voltage Inspection

NOTE

OBe sure the battery is fully charged

- Turn the key knob to OFF.
- Remove the throttle body assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter).
- Connect the throttle body subharness connector [A] temporarily.
- Disconnect the subthrottle valve actuator connector and connect the measuring adapter [A] between these connectors as shown in the figure.

Harness [B]

To Subthrottle Valve Actuator [C]

Special Tool - Measuring Adapter: 57001-1700

• Connect the peak voltage adapter [D] and a digital meter [E] to the measuring adapter leads.

Special Tool - Peak Voltage Adapter: 57001-1415 Type: KEK-54-9-B

Subthrottle Valve Actuator Input Voltage Connections to Adapter:

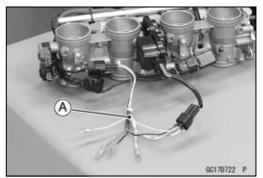
- (I) Digital Meter (+) \rightarrow R (actuator P) lead Digital Meter (-) \rightarrow Frame Ground terminal
- (II) Digital Meter (+) \rightarrow BK (actuator BK) lead Digital Meter (-) \rightarrow Frame Ground terminal
- (III) Digital Meter (+) \rightarrow W (actuator G) lead Digital Meter (–) \rightarrow Frame Ground terminal
- (IV) Digital Meter (+) \rightarrow Y (actuator Y) lead Digital Meter (–) \rightarrow Frame Ground terminal
- Measure the actuator input voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

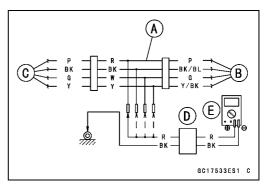
Input Voltage

Standard: About DC 8.5 ~ 10.5 V, and then 0 V

- Turn the key knob to OFF.
- ★ If the reading is in specification, but the actuator does not operate, replace the throttle body assy.







Subthrottle Valve Actuator (Service Code 62)

★ If the reading is out of the specification, remove the ECU and check the wiring for continuity between main harness connector.

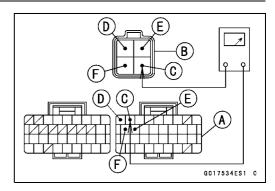
Special Tool - Hand Tester: 57001-1394

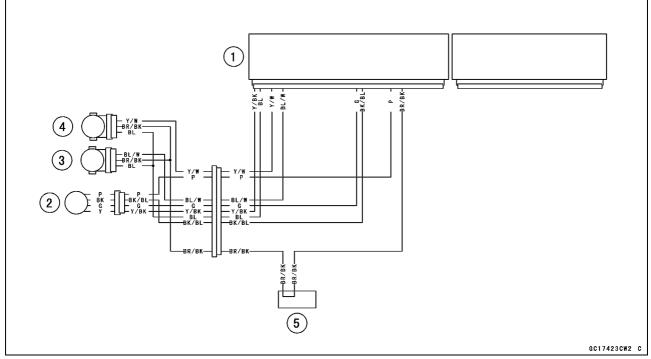
ODisconnect the ECU and actuator connectors.

Wiring Continuity Inspection ECU Connector [A] ←→ Subthrottle Valve Actuator Connector [B] G lead (ECU terminal 42) [C] Y/BK lead (ECU terminal 43) [D] BK/BL lead (ECU terminal 50) [E]

- P lead (ECU terminal 51) [F]
- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Subthrottle Valve Actuator Circuit





- 1. ECU
- 2. Subthrottle Valve Actuator
- 3. Subthrottle Sensor
- 4. Main Throttle Sensor
- 5. Water-proof Joint 2

17-74 SELF-DIAGNOSIS SYSTEM

Air Switching Valve (Service Code 64)

Air Switching Valve Removal/Installation

• Refer to the Air Switching Valve Removal/Installation in the Engine Top End chapter.

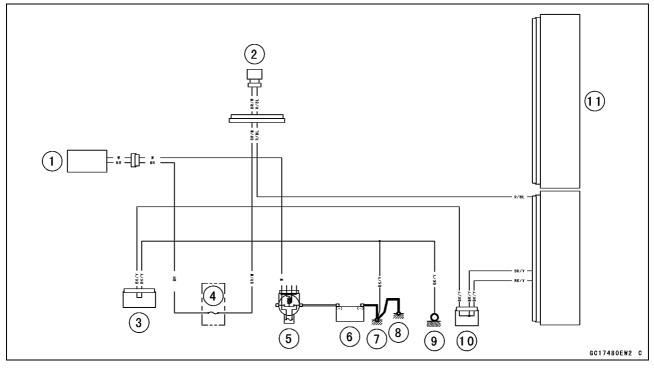
Air Switching Valve Inspection

- Refer to the Air Switching Valve Unit Test in the Electrical System chapter.
- ★ If the air switching valve is normal, check the wiring for continuity, using the wiring diagram in this section.

Special Tool - Hand Tester: 57001-1394

- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Air Switching Valve Circuit



- 1. Steering Lock Nut
- 2. Air Switching Valve
- 3. Joint Connector 9
- 4. Ignition Fuse 15 A (ZG1400C Model), 10 A (ZG1400D Model)
- 5. Main Fuse 30 A

- 6. Battery 12 V 14 Ah
- 7. Frame Ground
- 8. Engine Ground
- 9. Frame Ground
- 10. Joint Connector 3
- 11. ECU

Oxygen Sensor Heater #1 and/or #2 (Service Code 67, Equipped Models)

Oxygen Sensor Heater Removal/Installation

The oxygen sensor heater is built in the oxygen sensor. So, the heater itself can not be removed. Remove the oxygen sensor (see Oxygen Sensor Removal (Equipped Models) in the Electrical System chapter).

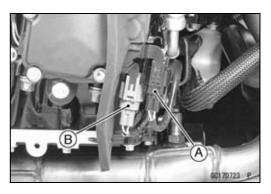
Oxygen Sensor Heater Resistance Inspection

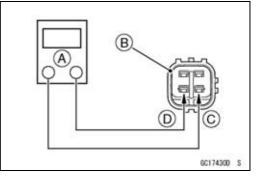
- Turn the key knob to OFF.
- Remove the right lower fairing (see Lower Fairing Removal in the Frame chapter).
- Disconnect: Oxygen Sensor #1 Lead Connector (Black) [A] Oxygen Sensor #2 Lead Connector (Gray) [B]
- Connect a digital meter [A] to the terminals in each oxygen sensor lead connector [B].
- Measure the oxygen sensor heater resistance.

Oxygen Sensor Heater #1 and #2 Resistance Connections: W lead [C] $\leftarrow \rightarrow$ W lead [D] Standard: 6.7 ~ 10.5 Ω at 20° (68°F)

 \bigstar If the reading is out of the standard, replace the sensor.

★ If the reading is within the standard, check the power source voltage (see Oxygen Sensor Heater Power Source Voltage Inspection).





17-76 SELF-DIAGNOSIS SYSTEM

Oxygen Sensor Heater #1 and/or #2 (Service Code 67, Equipped Models)

Oxygen Sensor Heater Power Source Voltage Inspection

NOTE

OBe sure the battery is fully charged.

- Turn the key knob to OFF.
- Remove the right lower fairing (see Lower Fairing Removal in the Frame chapter).
- Disconnect the oxygen sensor #1 and #2 lead connectors and connect the measuring adapter [A] between these connectors as shown in the figure.

Harness [B] Oxygen Sensor #1 [C] Oxygen Sensor #2 [D]

Special Tool - Measuring Adapter: 57001-1700

• Connect a digital meter [E] to the measuring adapter lead.

Oxygen Sensor Heater #1 and #2 Power Source Voltage Connections to Adapter:

Digital Meter (+) \rightarrow R (main harness BL/O) lead

Digital Meter (–) \rightarrow Frame Ground terminal

- Measure the power source voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.

Power Source Voltage Standard: Battery Voltage

- Turn the key knob to OFF.
- ★ If the reading is in specification, but the problem still exists, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

★ If the reading is out of the standard, check the following. Oil Control Solenoid Valve Fuse 15 A (see Fuse Inspection in the Electrical System chapter) Power Source Wiring (see wiring diagram in this section)

★ If the fuse and wiring are good, remove the ECU and check the wiring for continuity between harness connectors.

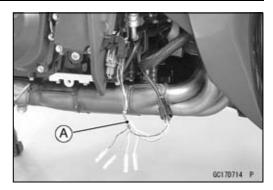
Special Tool - Hand Tester: 57001-1394

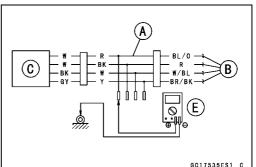
ODisconnect the ECU and sensor connectors.

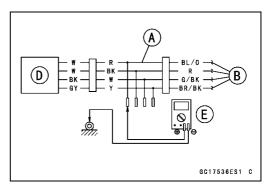
Wiring Continuity Inspection ECU Connector [A] $\leftarrow \rightarrow$

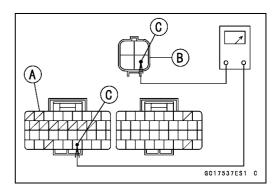
Oxygen Sensor #1 and #2 Connectors [B]

- R lead (ECU terminal 29) [C]
- ★ If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).





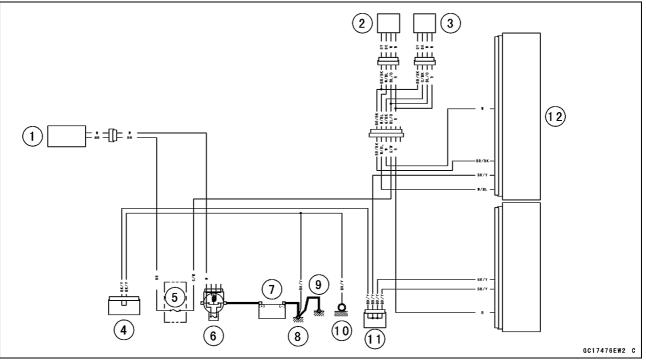




SELF-DIAGNOSIS SYSTEM 17-77

Oxygen Sensor Heater #1 and/or #2 (Service Code 67, Equipped Models)

Oxygen Sensor Circuit



- 1. Steering Lock Unit
- Oxygen Sensor #1
 Oxygen Sensor #2
- 4. Joint Connector 9
- 5. Oil Control Solenoid Valve Fuse 15 A
- 6. Main Fuse 30 A
- 7. Battery 12 V 14 Ah
- 8. Frame Ground
- 9. Engine Ground
- 10. Frame Ground
- 11. Joint Connector 3
- 12. ECU

17-78 SELF-DIAGNOSIS SYSTEM

Steering Lock Unit (Service Code 68)

Steering Lock Unit Removal/Installation

 Refer to the Steering Lock Unit Replacement in the Electrical System chapter.

Steering Lock Unit Inspection

NOTE

OBe sure the battery is fully charged.

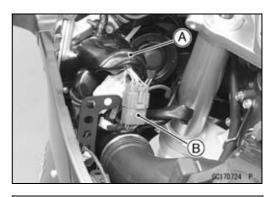
- Turn the key knob to OFF.
- Remove the left inner cover (see Inner Cover Removal in the Frame chapter).
- Slide the dust cover [A] and free the steering lock unit lead connector [B].
- Connect a digital meter [A] to the steering lock unit lead connector [B] with the needle adapter set.

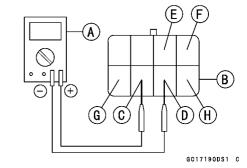
Special Tool - Needle Adapter Set : 57001-1457

Steering Lock Unit Inspection

Connections to Main Harness Side Connector:

- (I) Digital Meter (+) \rightarrow W lead [C] Digital Meter (-) \rightarrow BK/Y lead [D]
- (II) Digital Meter (+) \rightarrow BR/W lead [E]
 - Digital Meter (–) \rightarrow BK/Y lead [D]
- (III) Digital Meter (+) \rightarrow R/W lead [F] Digital Meter (–) \rightarrow BK/Y lead [D]
- (IV) Digital Meter (+) \rightarrow LG/BK lead [G] Digital Meter (-) \rightarrow BK/Y lead [D]
- (V) Digital Meter (+) \rightarrow BR/Y lead [H]
- Digital Meter (–) \rightarrow BK/Y lead [D]
- Measure the steering lock unit voltage with the engine stopped and with the connector joined.
- Push and turn the key knob to ON.
 - Steering Lock Unit Voltage (Key Knob ON) (I), (II), (III): Battery Voltage (IV): DC 4.75 ~ 5.15 V (V): 0 V
- Turn the key knob to OFF.
 - Steering Lock Unit Voltage (Key Knob OFF)
 - (I): Battery Voltage
 - (II): 0 V
 - (III): Battery Voltage for 5 seconds, and then 0 V
 - (IV): DC 4.75 ~ 5.15 V
 - (V): DC 5.75 \sim 6.15 V for 5 seconds, and then DC 4.75 \sim 5.15 V
- ★ If the reading is out of the specification, check the wiring and KIPASS ECU (see KIPASS ECU Power Supply Inspection in the Electrical System chapter).
- ★ If the wiring and KIPASS ECU are good, replace the steering lock unit.





Oxygen Sensor #2 - not activated (Service Code 83, Equipped Models)

Oxygen Sensor #2 Removal/Installation

• Refer to the Oxygen Sensor Removal/Installation (Equipped Models) in the Electrical System chapter.

Oxygen Sensor #2 Inspection

- Warm up the engine thoroughly until the radiator fan starts.
- Turn the key knob to OFF.
- Remove:

Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)

Right Subframe (see Right Subframe Removal in the Frame chapter)

Oxygen Sensor #2 Lead Connector (Gray) [A]

• Connect the measuring adapter [A] between the harness connector and oxygen sensor #2 lead connector as shown in the figure.

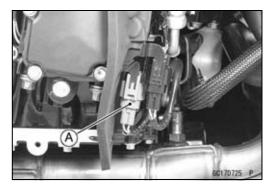
Harness [B] Oxygen Sensor #2 [C]

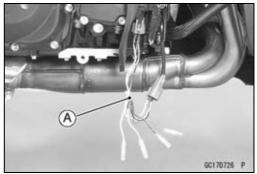
Special Tool - Measuring Adapter: 57001-1700

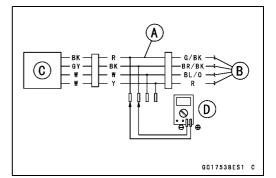
• Connect a digital meter [D] to the measuring adapter leads.

Oxygen Sensor #2 Output Voltage Connections to Adapter:

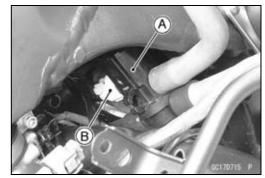
> Digital Meter (+) \rightarrow R (sensor BK) lead Digital Meter (-) \rightarrow BK (sensor GY) lead







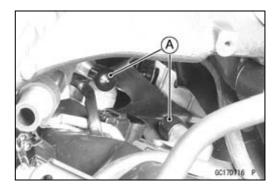
• Remove the air switching valve [A] (see Air Switching Valve Removal in the Engine Top End chapter). ODo not disconnect the air switching valve connector [B].



17-80 SELF-DIAGNOSIS SYSTEM

Oxygen Sensor #2 - not activated (Service Code 83, Equipped Models)

• Install the suitable plugs [A] on the fitting of the air suction valve covers, and shut off the secondary air.



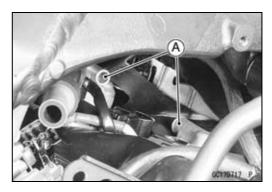
- Start the engine, and let it idle.
- Measure the output voltage with the connector joined.

Output Voltage (with Plugs) Standard: DC 0.8 V or more

- Next, remove the plugs from the fittings [A] with idling.
- Measure the output voltage with the connector joined.

Output Voltage (without Plugs) Standard: DC 0.24 V or less

• Turn the key knob to OFF.



★ If the reading is out of the standard (with plugs: 0.8 V or more, without plugs: 0.24 V or less), remove the ECU and check the wiring for continuity between harness connectors.

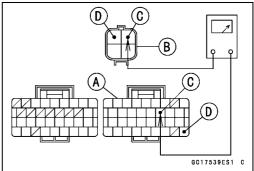
Special Tool - Hand Tester: 57001-1394

ODisconnect the ECU and sensor connectors.

Wiring Continuity Inspection ECU Connector [A] ←→ Oxygen Sensor #2 Connector [B] G/BK lead [C] W lead (ECU terminal 46) [C] BR/BK lead (ECU terminal 60) [D]

 \star If the wiring is good, replace the sensor.

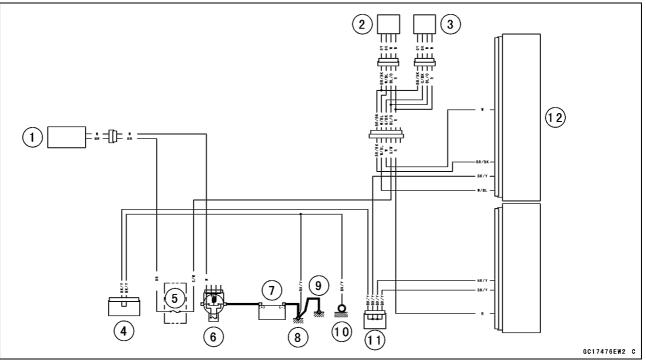
- ★If the reading is within the standard (with plugs: 0.8 V or more, without plugs: 0.24 V or less), check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



SELF-DIAGNOSIS SYSTEM 17-81

Oxygen Sensor #2 - not activated (Service Code 83, Equipped Models)

Oxygen Sensor Circuit



- 1. Steering Lock Unit
- 2. Oxygen Sensor #1
- 3. Oxygen Sensor #2
- 4. Joint Connector 9
- 5. Oil Control Solenoid Valve Fuse 15 A
- 6. Main Fuse 30 A
- 7. Battery 12 V 14 Ah
- 8. Frame Ground
- 9. Engine Ground
- 10. Frame Ground
- 11. Joint Connector 3
- 12. ECU

17-82 SELF-DIAGNOSIS SYSTEM

KTRC Button (Service Code 89, K-ACT ABS Equipped Models)

KTRC Button Inspection

- OWhen the KTRC button was pushed ON for more than 60 seconds, the service code 89 is displayed.
- OIn this case, release the KTRC button and wait for more than 10 seconds. Then, the service code 89 is not displayed (goes off).
- OThe KTRC button sends the signal voltage (0 V (ON) or 5 V (OFF)) to the meter unit, and then meter unit sends the data (status of KTRC button) to the ECU through the CAN communication line.

OThe service code 89 is detected with the ECU.

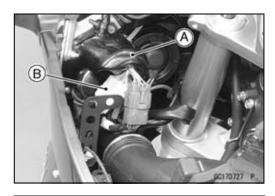
- Refer to the Switch Inspection in the Electrical System chapter.
- ★ If the KTRC button is normal, do the following inspection procedures.
- Remove the left inner cover (see Inner Cover Removal in the Frame chapter).
- Slide the dust cover [A] and free the left switch housing lead connector [B].
- Set the hand tester [A] to the × 1 Ω range and check the following wiring for continuity.

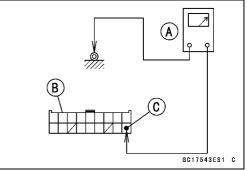
Special Tool - Hand Tester: 57001-1394

Wiring Continuity Inspection Left Switch Housing Lead Connector (Main Harness Side) [B] ←→ Frame Ground terminal

W lead [C]

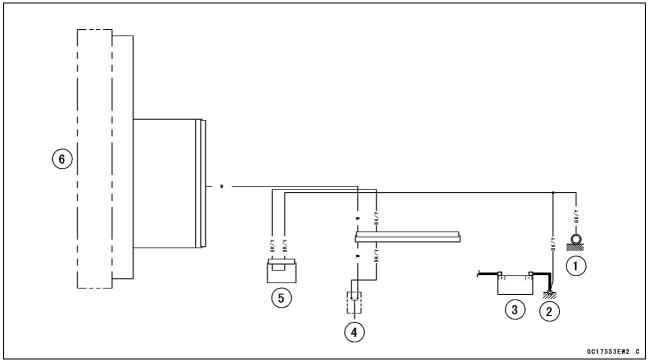
- ★If there is continuity (0 Ω or any reading), wiring is short circuit. Repair or replace the main harness.
- ★ If there is no continuity (infinity (∞) Ω), check the meter unit (see Meter Unit Inspection in the Electrical System chapter).
- ★ If the meter unit is normal, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).





KTRC Button (Service Code 89, K-ACT ABS Equipped Models)

Oxygen Sensor Circuit



- 1. Frame Ground
- 2. Frame Ground
- 3. Battery 12 V 14 Ah
- 4. KTRC Button
- 5. Joint Connector 8
- 6. Meter Unit

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Meter Unit and K-ACT ABS Hydraulic Unit Communication Error (Service Code 1A, K-ACT ABS Equipped Models)

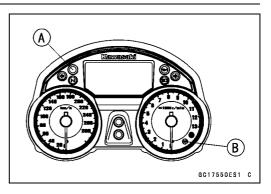
Meter Unit and K-ACT ABS Hydraulic Unit Communication Line Inspection

- OWhen the data (for KTRC control) is not sent from the meter unit and K-ACT ABS hydraulic unit to the ECU, the service code 1A is displayed.
- OThe data is sent through the CAN communication line.
- OThe service code 1A is detected with the ECU.
- OWhen the service code 1A was detected, the warning indicator light (LED) [A] and KTRC indicator light (LED) [B] go on, and KTRC warning message is displayed on the LCD.
- Inspect the CAN communication line (see CAN Communication Line Resistance Inspection in the Fuel System (DFI) chapter).
- ★ If the CAN communication line is normal, check the following parts.

Meter Unit (see Meter Unit Inspection in the Electrical System chapter)

K-ACT ABS Hydraulic Unit (see K-ACT ABS Hydraulic Unit Inspection in the Brakes chapter)

- ★ If the above parts are normal, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



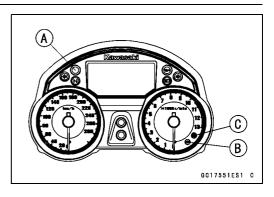
K-ACT ABS Hydraulic Unit Communication Error (Service Code 1B, K-ACT ABS Equipped Models)

K-ACT ABS Hydraulic Unit Communication Line Inspection

OWhen the data (for status of K-ACT ABS hydraulic unit) is not sent from the K-ACT ABS hydraulic unit to the meter unit and ECU, the service code 1B is displayed.

OThe data is sent through the CAN communication line OThe service code 1B is detected with the meter unit.

- OWhen the service code 1B was detected, the warning indicator light (LED) [A], KTRC indicator light (LED) [B] and K-ACT ABS indicator light (LED) [C] go on, and KTRC warning message and K-ACT ABS warning message are alternately displayed on the LCD.
- Inspect the CAN communication line (see CAN Communication Line Resistance Inspection in the Fuel System (DFI) chapter).
- ★ If the CAN communication line is normal, check the K -ACT ABS hydraulic unit (see K-ACT ABS Hydraulic Unit Inspection in the Brakes chapter).
- ★ If the K-ACT ABS hydraulic unit is normal, check the meter unit(see Meter Unit Inspection in the Electrical System chapter).
- ★ If the meter unit is normal, but the problem still exists, replace the meter unit (see Meter Unit Removal/Installation in the Electrical System chapter).



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Ground Wiring (ECU Terminal 23) (Service Code 2C, K-ACT ABS Equipped Models)

Ground Wiring (ECU Terminal 23) Inspection

OWhen the ground wiring (ECU terminal 23) is opened, the service code 2C is displayed.

OThe service code 2C is detected with the ECU.

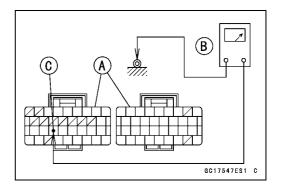
- Disconnect the ECU connectors [A] (see ECU Removal in the Fuel System (DFI) chapter).
- Set the hand tester [B] to the $\times 1 \Omega$ range and check the following wiring for continuity.

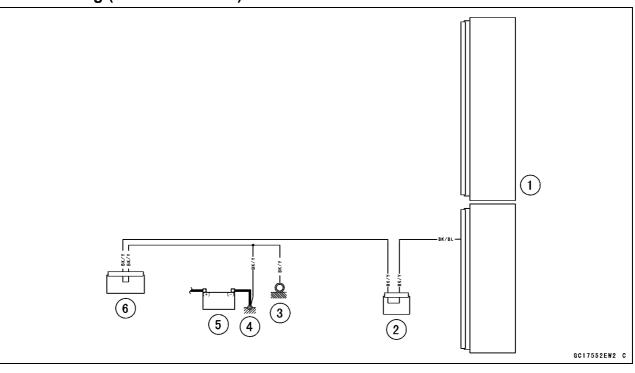
Special Tool - Hand Tester: 57001-1394

Wiring Continuity Inspection ECU Connector ←→ Frame Ground terminal BK/BL lead (ECU terminal 23) [C]

- ★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection in the Fuel System (DFI) chapter).
- ★ If the ground and power supply are good, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Ground Wiring (ECU terminal 23) Circuit





- 1. ECU
- 2. Joint Connector 3
- 3. Frame Ground

- 4. Frame Ground
- 5. Battery 12 V 14 Ah
- 6. Joint Connector 9

K-ACT ABS Service Codes (K-ACT ABS Equipped Models)

Solenoid Valve Inspection (Service Code B 13, B 14, B 17, B 18)

- OThe solenoid valve is built in the K-ACT ABS Hydraulic Unit [A]. Therefore the solenoid valve cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If any of these service codes appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

K-ACT ABS Solenoid Valve Relay Inspection (Service Code B 19)

- OThe K-ACT ABS solenoid valve relay is built in the K -ACT ABS Hydraulic Unit. Therefore the relay cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

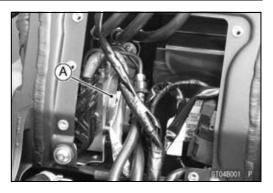
Front Combine Valve Inspection (Service Code B 21, B 22)

- OThe front combine valve is built in the K-ACT ABS Hydraulic Unit. Therefore the front combine valve cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If any of these service codes appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Front, Rear Wheel Rotation Difference Abnormal Inspection (Service Code B 25)

 Check the following and correct the faulty part. Incorrect Tire Pressure Tires not recommended for the motorcycle were installed (incorrect tire size). Deformation of Wheel or Tire Missing Teeth or Clogging with Foreign Matter of Sensor Rotor (see Wheel Rotation Sensor Rotor Inspection in the Brakes chapter)

- \bigstar If the all parts corrected, go to next step.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.



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K-ACT ABS Service Codes (K-ACT ABS Equipped Models)

K-ACT ABS Motor Relay Inspection (Service Code B 35)

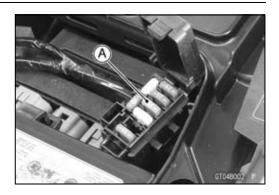
• Check the K-ACT ABS motor relay fuse (30 A) [A] (see Fuse Inspection in the Electrical System chapter)

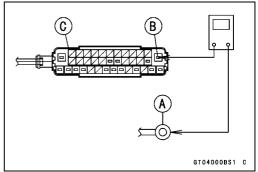
 \star If the fuse is good, check the wiring continuity as follows. ODisconnect:

Battery Positive Cable (see Battery Removal in the Electrical System chapter)

K-ACT ABS Hydraulic Unit Lead Connector (see K-ACT ABS Hydraulic Unit Removal)

- OCheck the wiring continuity between the positive cable terminal [A] of the battery and R lead terminal [B] in the K-ACT ABS Hydraulic Unit Lead Connector [C].
- ★ If the wiring is open, replace or repair the harness (see K-ACT ABS System Circuit).
- ★ If the wiring is good, go to next step.





- OThe K-ACT ABS motor relay is built in the K-ACT ABS Hydraulic Unit. Therefore the relay cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Front Wheel Rotation Sensor Signal Abnormal (Service Code B 42)

Measure the air gap between the front wheel rotation sensor and sensor rotor.

Thickness Gauge [A]

Air Gap

Standard: 1.0 mm (0.039 in.)

- ★ If the measurement is not the standard, check each part for deformation and looseness and correct accordingly.
- \star If the measurement is the standard, go to next step.
- Check that there is iron or other magnetic deposits between the sensor and sensor rotor, and the sensor rotor slots for obstructions.
- Check the installation condition of the sensor for looseness.
- Check the sensor and sensor rotor tip for deformation or damage (e.g., chipped sensor rotor teeth).
- ★ If the sensor and sensor rotor in bad condition, remove the any deposits. Install the proper part or replace faulty part.
- \star If the all items are good, go to next step.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.



K-ACT ABS Service Codes (K-ACT ABS Equipped Models)

Front Wheel Rotation Sensor Wiring Inspection (Service Code B 43)

- Disconnect the front wheel rotation sensor lead connector [A] (see Front Wheel Rotation Sensor Removal in the Brakes chapter).
- Disconnect the K-ACT ABS hydraulic unit lead connector (see K-ACT ABS Hydraulic Unit Removal).
- Check the wiring continuity of the G lead and BK/R lead. Front Wheel Rotation Sensor Lead Connector [A]
 K-ACT ABS Hydraulic Unit Lead Connector [B]
 G Lead Terminals [C]
 BK/R Lead terminals [D]
- ★If the wiring is open, replace or repair the harness (see K-ACT ABS System Circuit).
- \star If the wiring is good, go to next step.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the front wheel rotation sensor (see Front Wheel Rotation Sensor Removal in the Brakes chapter).
- Still, when it is not good, replace the K-ACT ABS hydraulic unit.

Rear Wheel Rotation Sensor Signal Abnormal (Service Code B 44)

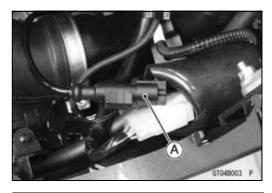
• Measure the air gap between the rear wheel rotation sensor and sensor rotor.

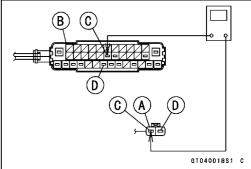
Thickness Gauge [A]

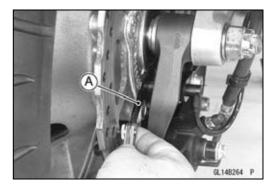
Air Gap

Standard: 1.0 mm (0.039 in.)

- ★ If the measurement is not the standard, check each part for deformation and looseness and correct accordingly.
- \bigstar If the measurement is the standard, go to next step.
- Check that there is iron or other magnetic deposits between the sensor and sensor rotor, and the sensor rotor slots for obstructions.
- Check the installation condition of the sensor for looseness.
- Check the sensor and sensor rotor tip for deformation or damage (e.g., chipped sensor rotor teeth).
- ★ If the sensor and sensor rotor in bad condition, remove the any deposits. Install the proper part or replace faulty part.
- \bigstar If the all items are good, go to next step.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.







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K-ACT ABS Service Codes (K-ACT ABS Equipped Models)

Rear Wheel Rotation Sensor Wiring Inspection (Service Code B 45)

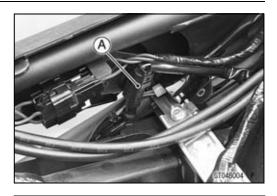
- Disconnect the rear wheel rotation sensor lead connector [A] (see Rear Wheel Rotation Sensor Removal in the Brakes chapter).
- Disconnect the K-ACT ABS hydraulic unit lead connector (see K-ACT ABS Hydraulic Unit Removal in the Brakes chapter).
- Check the wiring continuity of the BK lead and W/R lead. Rear Wheel Rotation Sensor Lead Connector [A]
 K-ACT ABS Hydraulic Unit Lead Connector [B]
 BK Lead Terminals [C]
 W/R Lead terminals [D]
- ★If the wiring is open, replace or repair the harness (see K-ACT ABS System Circuit in the Brakes chapter).
- \star If the wiring is good, go to next step.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the rear wheel rotation sensor (see Rear Wheel Rotation Sensor Removal in the Brakes chapter).
- Still, when it is not good, replace the K-ACT ABS hydraulic unit.

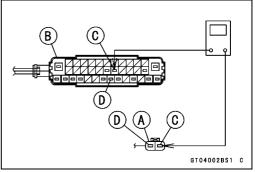
Power Supply Voltage Inspection (Low-Voltage) (Service Code B 52)

- Check the battery condition (see Charging Condition Inspection in the Electrical System chapter).
- ★ If the battery is good condition, perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Power Supply Voltage Inspection (Over-Voltage) (Service Code B 53)

- Check the charging voltage (see Charging Voltage Inspection in the Electrical System chapter).
- ★ If the charging voltage is good, perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.





K-ACT ABS Service Codes (K-ACT ABS Equipped Models)

K-ACT ABS Solenoid Valve Relay Supply Voltage Inspection (Low-Voltage) (Service Code B 54)

- Check the battery condition (see Charging Condition Inspection in the Electrical System chapter).
- ★ If the battery is good condition, perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

ECU Inspection (Service Code B 55)

OThis ECU is built in the K-ACT ABS Hydraulic Unit. Therefore the ECU cannot be checked directly.

- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

CAN Bus OFF Monitor Inspection (Service Code B 57) K-ACT ABS Button Signal CAN Monitor (Service Code B 58)

• Remove:

Seat (see Seat Removal in the Frame chapter) Kawasaki Diagnostic System Connector Cap [A]

 Measure the CAN communication line resistance. Kawasaki Diagnostic System Connector [A] GY/BL Terminal [B] LB Terminal [C]
 Special Tool - Hand Tester: 57001-1394

CAN Communication Line Resistance Standard: $30 \sim 70 \Omega$

 \star If the reading is out of the standard, go to Check 1.

 \star If the reading is the standard, go to Check 2.

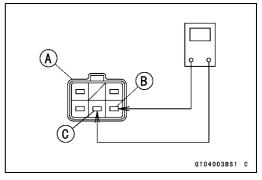
Check 1:

 Check the CAN communication line resistance of following parts.

Meter Unit (see Meter Unit Inspection in the Electrical System chapter)

ECU (see CAN Communication Line Resistance Inspection in the Fuel System (DFI) chapter)

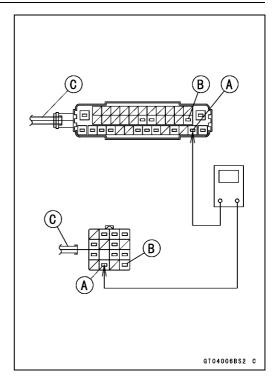




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K-ACT ABS Service Codes (K-ACT ABS Equipped Models)

- ★ If each resistance is good, check the continuity of GY/BL terminals [A] and V terminals [B] in the K-ACT ABS hydraulic unit sub harness [C].
- \star If the sub harness is good, replace the main harness.



Check 2:

• Measure the resistance between the GY/BL [A] or LB [B] terminal and ground [C].

Kawasaki Diagnostic System Connector [D]

Special Tool - Hand Tester: 57001-1394

CAN Communication Line/Ground Resistance Standard: $5 \sim 30 \ k\Omega$

- ★ If the reading is out of the standard, replace or repair the main harness.
- \star If the reading is the standard, go to next step.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

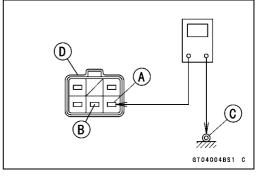
K-ACT ABS Button Short Inspection (Service Code B 59)

• Remove:

Left Inner Cover (see Left Inner Cover Removal in the Frame chapter)

Left Handlebar Switch Housing Lead Connector [A] (disconnect)

- Check the K-ACT ABS button (see Switch Inspection in the Electrical System chapter).
- \star If the button is good, check the wiring as follows.





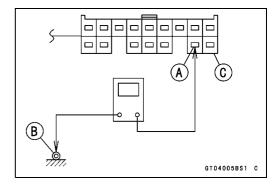
SELF-DIAGNOSIS SYSTEM 17-93

K-ACT ABS Service Codes (K-ACT ABS Equipped Models)

• Check the continuity between the R lead terminal [A] and ground [B].

Left Handlebar Switch Housing Lead Connector [C] of Main Harness

- ★If the R lead and ground is short, replace or repair the harness.
- ★ If the R lead and ground is no continuity, go to next step.



- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

High Pressure Switching/Switching Valve Inspection (Service Code B 71, B 72, B 73, B 74)

- OThe High Pressure Switching Valve and Switching Valve are built in the K-ACT ABS Hydraulic Unit. Therefore they cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Input Fluid Pressure Sensor (Front Brake) Wiring Inspection (Service Code B 81)

- OThe Input Fluid Pressure Sensor is built in the K-ACT ABS Hydraulic Unit. Therefore the sensor cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Input Fluid Pressure Sensor (Front Brake) Offset Abnormal (Service Code B 82)

- OThe Input Fluid Pressure Sensor is built in the K-ACT ABS Hydraulic Unit. Therefore the sensor cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Output Fluid Pressure Sensor (Front Brake) Wiring Inspection (Service Code B 83)

- OThe Output Fluid Pressure Sensor is built in the K-ACT ABS Hydraulic Unit. Therefore the sensor cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

K-ACT ABS Service Codes (K-ACT ABS Equipped Models)

Output Fluid Pressure Sensor (Front Brake) Offset Abnormal (Service Code B 84)

- OThe Output Fluid Pressure Sensor is built in the K-ACT ABS Hydraulic Unit. Therefore the sensor cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Input Fluid Pressure Sensor (Rear Brake) Wiring Inspection (Service Code B 85)

- OThe Input Fluid Pressure Sensor is built in the K-ACT ABS Hydraulic Unit. Therefore the sensor cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Input Fluid Pressure Sensor (Rear Brake) Offset Abnormal (Service Code B 86)

- OThe Input Fluid Pressure Sensor is built in the K-ACT ABS Hydraulic Unit. Therefore the sensor cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Output Fluid Pressure Sensor (Rear Brake) Wiring Inspection (Service Code B 87)

- OThe Output Fluid Pressure Sensor is built in the K-ACT ABS Hydraulic Unit. Therefore the sensor cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Output Fluid Pressure Sensor (Rear Brake) Offset Abnormal (Service Code B 88)

- OThe Output Fluid Pressure Sensor is built in the K-ACT ABS Hydraulic Unit. Therefore the sensor cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

K-ACT ABS Service Codes (K-ACT ABS Equipped Models)

Fluid Pressure Sensor Supply Voltage Inspection (Service Code B 89)

- OThe Fluid Pressure Sensors are built in the K-ACT ABS Hydraulic Unit. Therefore the voltage cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Front Fluid Pressure Sensor Signal Inspection (Service Code B 91)

- OThe Fluid Pressure Sensors are built in the K-ACT ABS Hydraulic Unit. Therefore the signal cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

Rear Fluid Pressure Sensor Signal Inspection (Service Code B 92)

- OThe Fluid Pressure Sensors are built in the K-ACT ABS Hydraulic Unit. Therefore the signal cannot be checked directly.
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider in the Brakes chapter).
- ★ If this service code appears even if all checks are ended, replace the K-ACT ABS hydraulic unit.

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Warning Messages

Warning Message Table

Warning Messay		1		
Message	Symbol	Indicator Lights (LED)	Problems	Action or Remarks
FI ERROR	F١	goes on	FI System Trouble	Indicate the service code (see Service Code Reading). Check the item according to the title of the service code.
IMMOBILIZER ERROR		goes on	Immobilizer System Trouble	Indicate the service code (see Service Code Reading). Check the item according to the title of the service code.
STEERING LOCK ERROR		goes on	Steering Lock Unit Trouble	Indicate the service code (see Service Code Reading). Check the item according to the title of the service code.
KTRC ERROR	▲	goes on	KTRC System Trouble	Indicate the service code (see Service Code Reading). Check the item according to the title of the service code.
K-ACT ABS ERROR		goes on	K-ACT ABS Trouble	Indicate the service code (see Service Code Reading). Check the item according to the title of the service code.
TIRE PRESSURE SENSOR : F LOW BATTERY	$\mathbf{\bigcirc}$	-	The battery voltage of the front tire air pressure sensor is low.	Replace the front tire air pressure sensor (see Tire Removal/Installation in the Wheels/Tires chapter).
TIRE PRESSURE SENSOR : R LOW BATTERY	$\mathbf{\bigcirc}$	-	The battery voltage of the rear tire air pressure sensor is low.	Replace the rear tire air pressure sensor (see Tire Removal/Installation in the Wheels/Tires chapter).
TIRE PRESSURE SENSOR : F ERROR	\bigcirc	goes on	Front Tire Pressure Sensor Trouble	Replace the front tire air pressure sensor (see Tire Removal/Installation in the Wheels/Tires chapter).
TIRE PRESSURE SENSOR : R ERROR	\bigcirc	goes on	Rear Tire Pressure Sensor Trouble	Replace the rear tire air pressure sensor (see Tire Removal/Installation in the Wheels/Tires chapter).
LOW BATTERY	- +	_	Battery voltage is low.	Charge the battery (see Refreshing Charge in the Electrical System chapter).
NO TRANSPONDER		goes on	When the key knob is OFF from ON, the FOB is not near the motorcycle or battery voltage of the transponder is discharged.	If the FOB is lost, the re-registration of the keys are recommended.

SELF-DIAGNOSIS SYSTEM 17-97

Warning Messages

Message	Symbol	Indicator Lights (LED)	Problems	Action or Remarks
NO TRANSPONDER	-	goes on	When the engine is running, the FOB is not near the motorcycle or battery voltage of the transponder is discharged.	If the FOB is lost, the re-registration of the keys are recommended.
STEERING LOCK ID ERROR		blinks	The steering lock unit is not correctly authenticated.	Register the steering lock unit, using the KDS 3 version kit.
ECU ID ERROR		blinks	The ECU is not correctly authenticated.	Register the ECU, using the KDS 3 version kit.
SUBKEY ID ERROR		blinks	The sub-key of the other motorcycle is used or the transponder is not registered.	Check that the serial numbers of the FOB and KIPASS ECU are agreement.
TRANSPONDER REGISTRATION ERROR	-	blinks	The transponder authentication cannot be registered.	Proceed work according to KDS 3 version kit.
STEERING LOCK REGISTRATION ERROR	-	blinks	The steering lock unit authentication number cannot be registered.	Proceed work according to KDS 3 version kit.
ECU REGISTRATION ERROR	-	blinks	The ECU authentication number cannot be registered.	Proceed work according to KDS 3 version kit.
TRANSPONDER REGISTRATION OK-CHANGE	_	_	The FOB registered first is not near the steering lock unit.	Proceed work according to KDS 3 version kit. Place the first registered FOB near the steering lock unit.

• For other messages, refer to Meter Operation Inspection and Meter System Inspection in the Electrical System chapter.

OThe registration can work by using the KDS 3 version kit.

Appendix

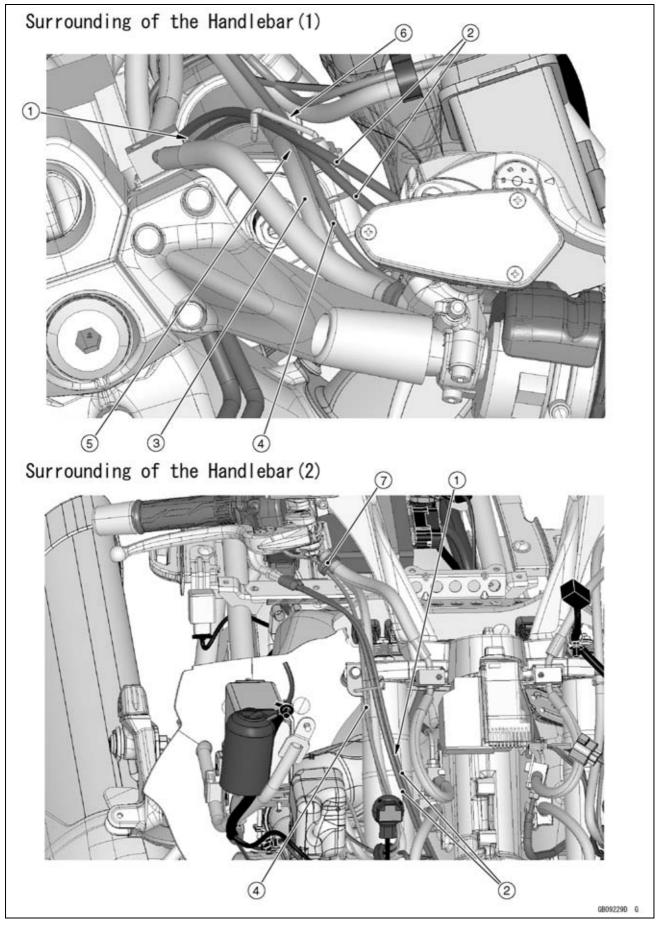
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Cable, Wire, and Hose Routing	18-2
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18-2 APPENDIX

Cable, Wire, and Hose Routing

K-ACT ABS Equipped Models

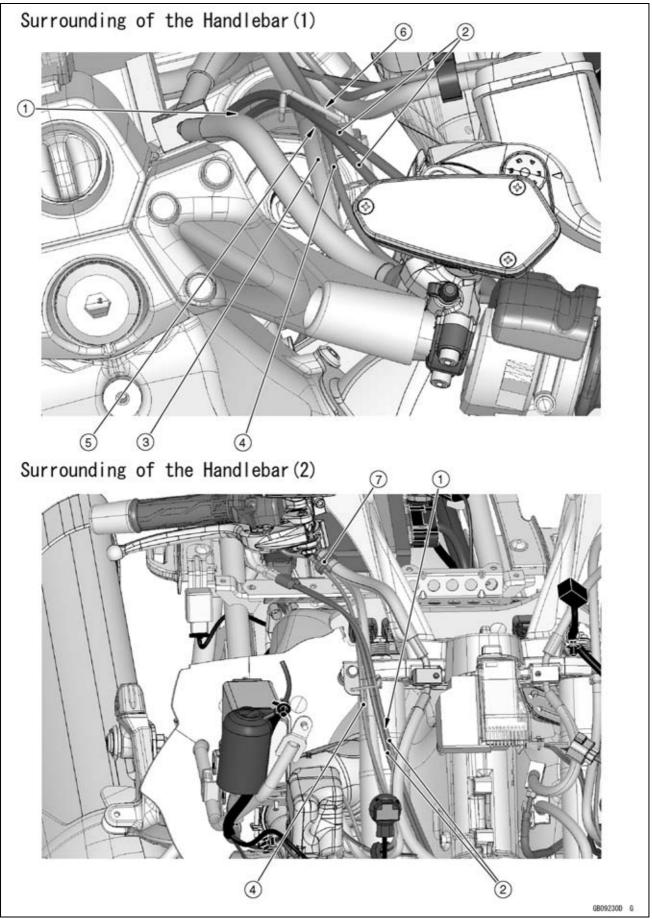


- 1. Run the throttle cables between the front fork and the brake hose.
- 2. Throttle Cables
- 3. Right Switch Housing Lead
- 4. Right Grip Warmer Lead
- 5. Run the throttle cables to the upside of the right switch housing lead.
- 6. Run the throttle cables, right switch housing lead, and right grip warmer lead through the clamp.
- 7. Clamp (Hold the brake hose and right grip warmer lead at the brake hose end as shown in the figure.)

18-4 APPENDIX

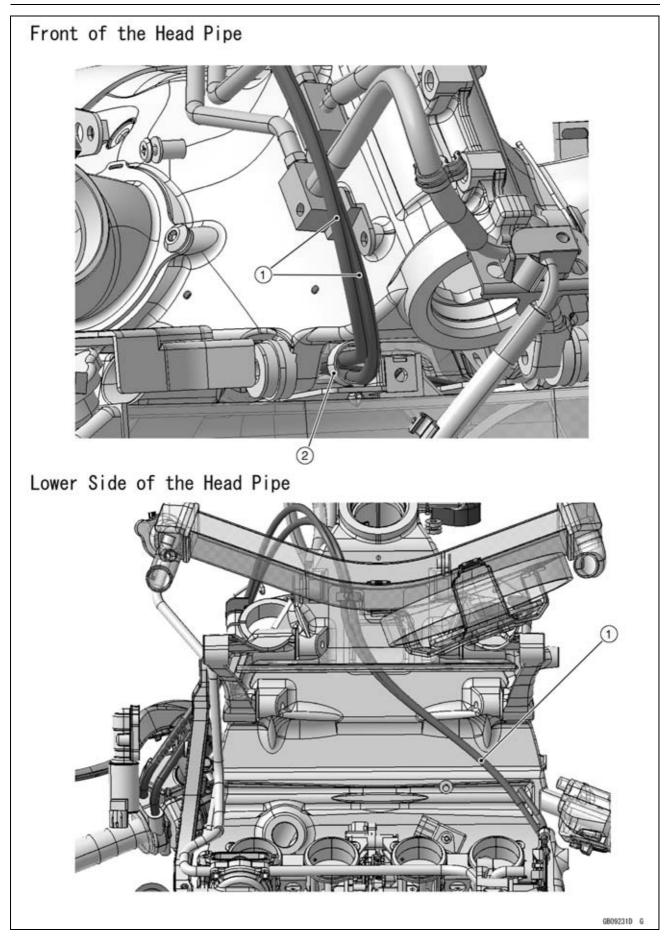
Cable, Wire, and Hose Routing

Non K-ACT ABS Equipped Models



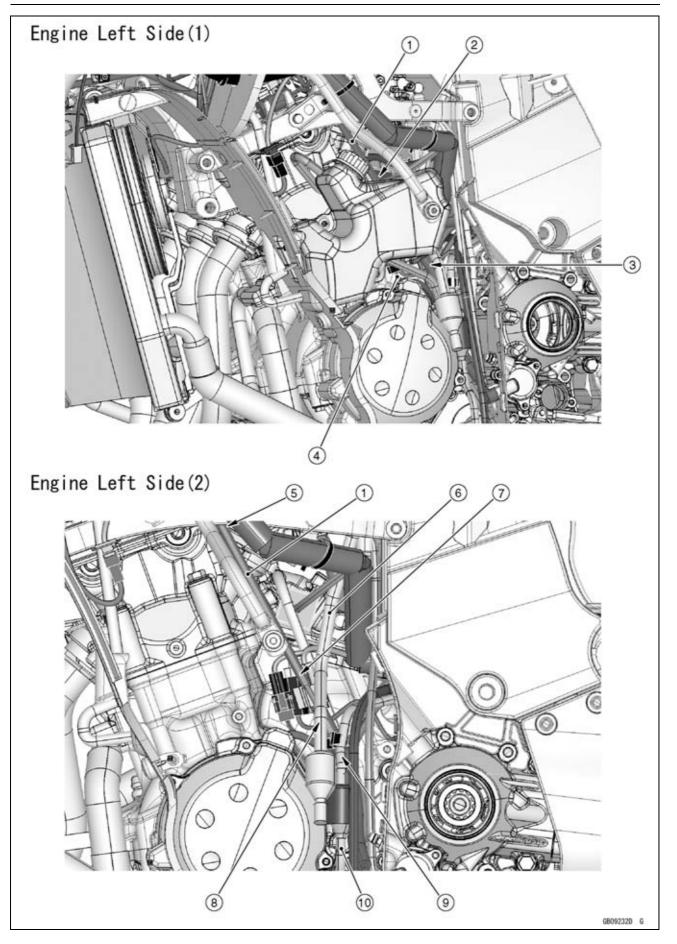
- 1. Run the throttle cables between the front fork and the brake hose.
- 2. Throttle Cables
- 3. Right Switch Housing Lead
- 4. Right Grip Warmer Lead
- 5. Run the throttle cables to the upside of the right switch housing lead.
- 6. Run the throttle cables, right switch housing lead, and right grip warmer lead through the clamp.
- 7. Clamp (Hold the brake hose and right grip warmer lead at the brake hose end as shown in the figure.)

18-6 APPENDIX



- 1. Throttle Cables
- 2. Run the throttle cables through the clamp.

18-8 APPENDIX

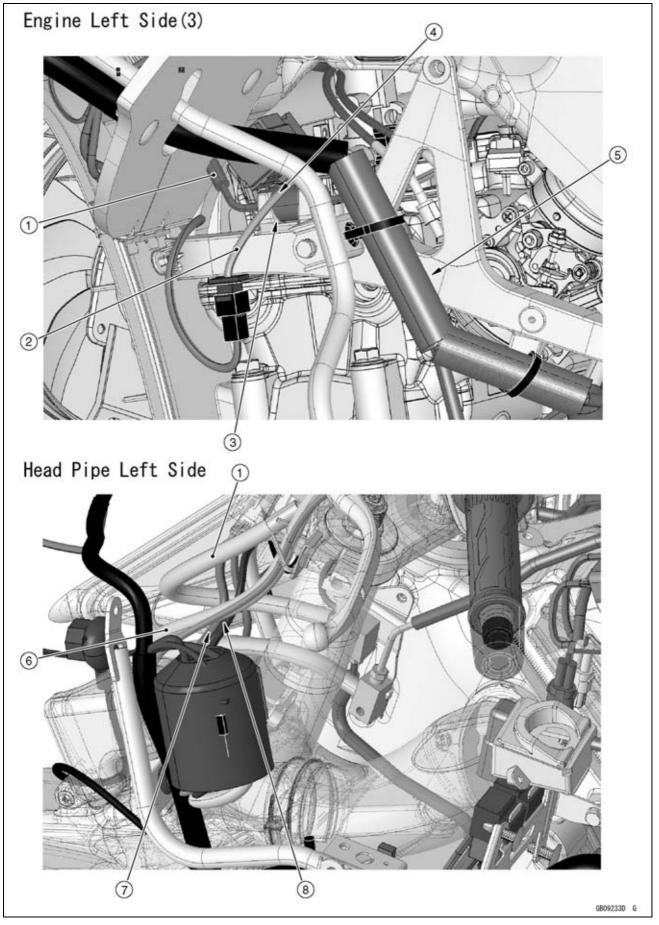


- 1. Clutch Hose
- 2. Run the clutch hose to the inside of the coolant reserve tank.
- 3. Run the clutch hose to the outside of the sidestand switch lead.
- 4. Sidestand Switch Lead
- 5. Run the clutch hose to the inside of the subframe.
- 6. Air Cleaner Drain Hose
- 7. Run the clutch hose to the outside of the connectors.
- 8. Run the clutch hose to the inside of the air cleaner drain hose.
- 9. Run the clutch hose to the inside of the fuel tank breather hose (other than CAL and SEA models).
- 10. Fuel Tank Breather Hose (Other than CAL and SEA Models)

18-10 APPENDIX

Cable, Wire, and Hose Routing

K-ACT ABS Equipped Models

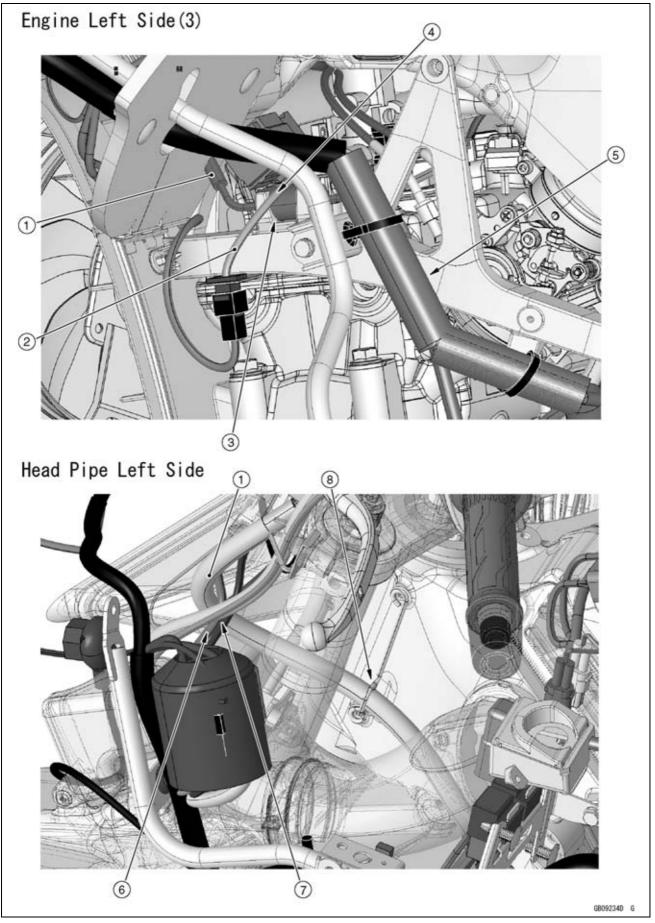


- 1. Clutch Hose
- 2. Left Fan Motor Lead
- 3. Fix the clutch hose to the clamp on the subframe.
- 4. Run the clutch hose to the inside of the left fan motor lead.
- 5. Run the clutch hose to the inside of the subframe.
- 6. Brake Hose
- 7. Run the steering lock unit lead (8-pin) to the inside of the clutch hose and brake hose.
- 8. Run the steering lock unit lead (2-pin) to the inside of the clutch hose and brake hose.

18-12 APPENDIX

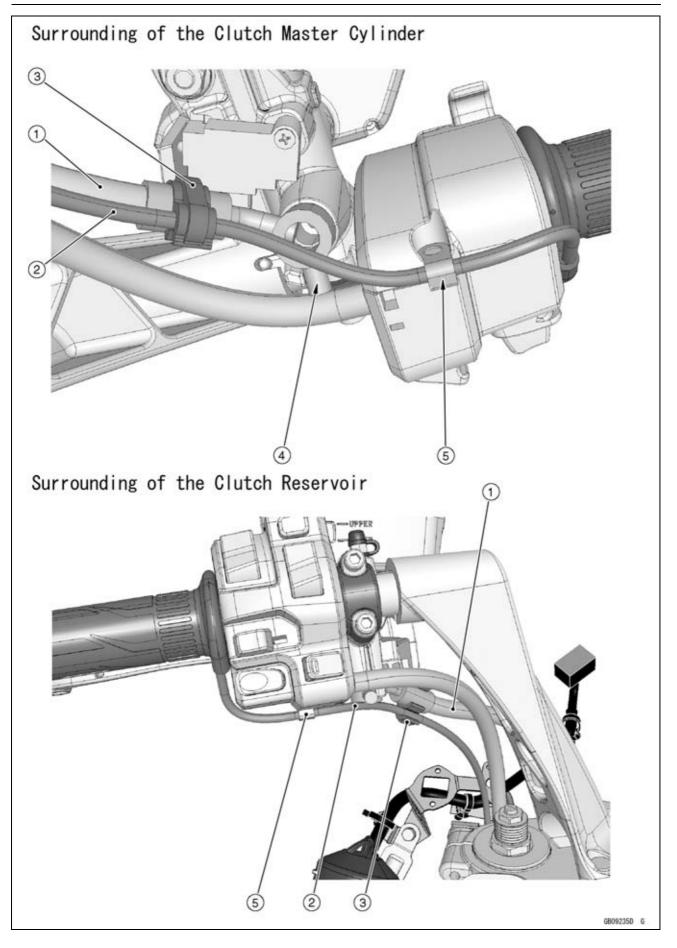
Cable, Wire, and Hose Routing

Non K-ACT ABS Equipped Models



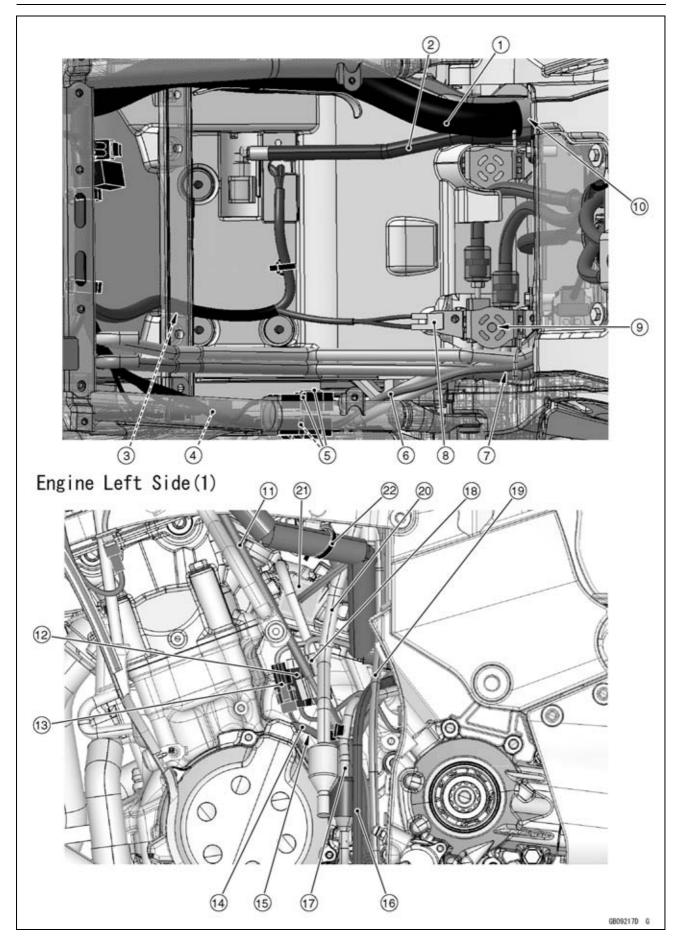
- 1. Clutch Hose
- 2. Left Fan Motor Lead
- 3. Fix the clutch hose to the clamp on the subframe.
- 4. Run the clutch hose to the inside of the left fan motor lead.
- 5. Run the clutch hose to the inside of the subframe.
- 6. Run the steering lock unit lead (8-pin) to the inside of the clutch hose.
- 7. Run the steering lock unit lead (2-pin) to the inside of the clutch hose.
- 8. Run the clutch hose through the clamp.

18-14 APPENDIX



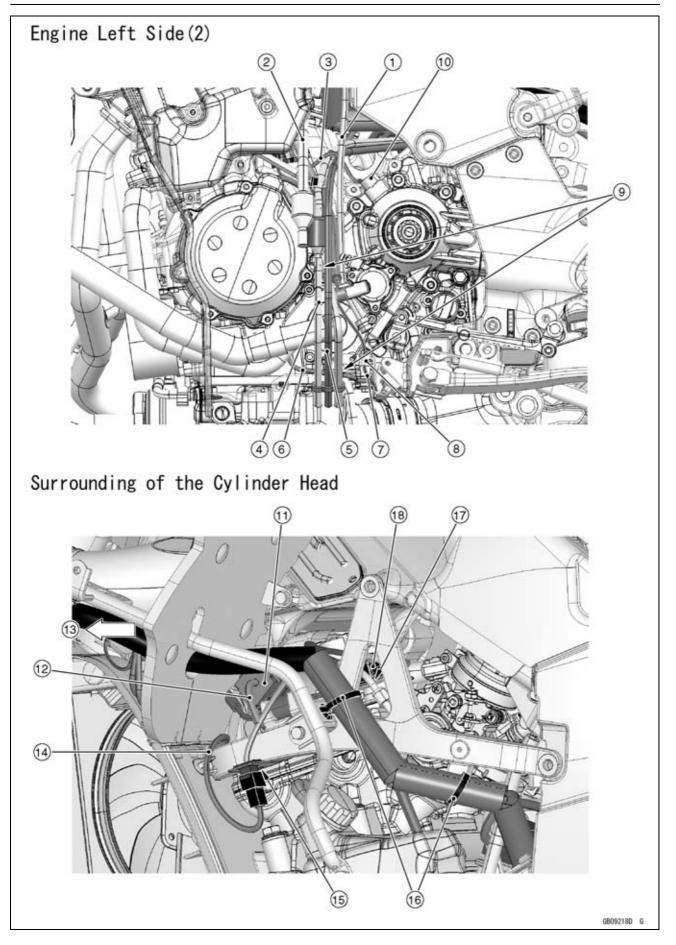
- 1. Clutch Hose
- 2. Left Grip Warmer Lead
- 3. Clamp (Hold the clutch hose and left grip warmer lead at the clutch hose end as shown in the figure.)
- 4. Install the clutch hose so that the projection of the clutch hose joint backward as shown in the figure.
- 5. Hold the left grip warmer lead by bending the clamp at the taped, and tighten the clamp with the left switch housing screw.

18-16 APPENDIX



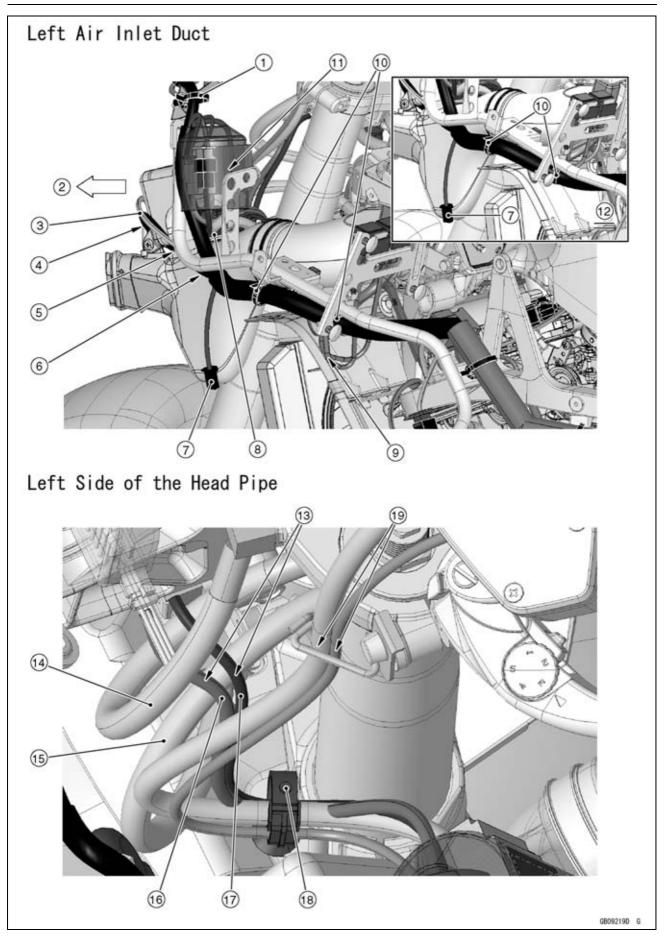
- 1. Main Harness
- 2. Fuel Hose
- 3. Run the regulator/rectifier lead under the cross bracket.
- 4. Alternator Lead
- 5. Alternator Connectors (1-pin × 3)
- 6. Alternator Lead (Alternator Side)
- 7. Put the alternator lead between the frames when the lead remain.
- 8. Frame Ground
- 9. Do not put the hose, lead, and harness on the bracket under the fuel tank.
- 10. Align the center of gray tape on the main harness with the edge of the battery case.
- 11. Clutch Hose
- 12. Speed Sensor Lead Connector
- 13. Sidestand Switch Lead Connector
- 14. Alternator Lead (Run the alternator lead most inside of the leads and hoses.)
- 15. Run the sidestand switch lead and oil pressure switch/gear position switch lead most inside of hoses.
- 16. Fuel Tank Drain Hose
- 17. Fuel Tank Breather Hose (Other than CAL and SEA Models)
- 18. Oil Pressure Switch/Gear Position Switch Lead Connector
- 19. Idle Adjusting Screw Cable
- 20. Air Cleaner Drain Hose
- 21. Engine Subharness Connector (Brown) for the Sensor and Injector (Insert the engine subharness connector (brown) to the bracket.)
- 22. Clamp (Insert the clamp on the main harness to the bracket.)

18-18 APPENDIX



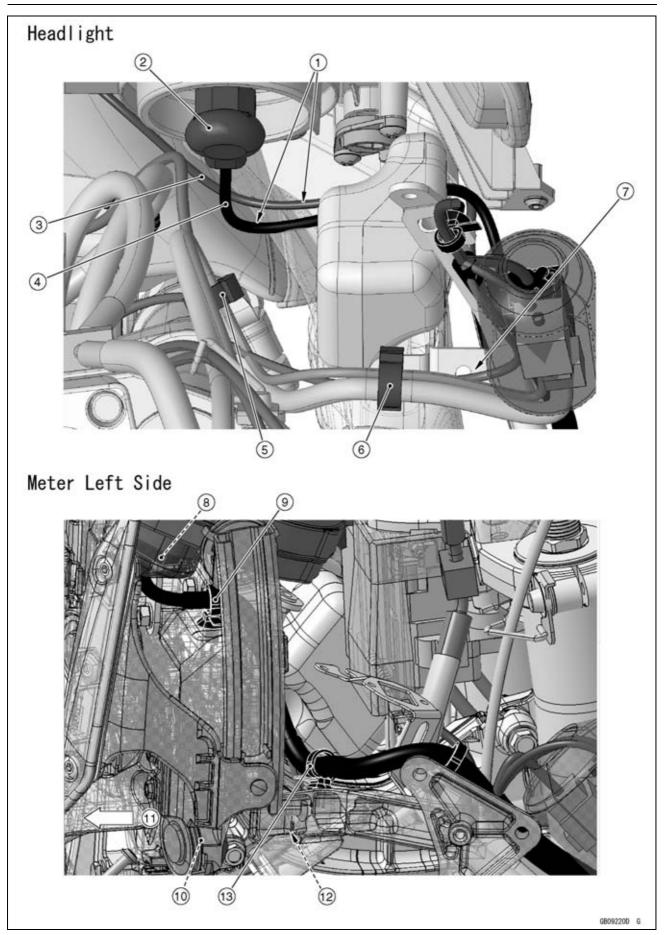
- 1. Idle Adjusting Screw Cable
- 2. Air Cleaner Drain Hose
- 3. Run the speed sensor lead to the outside of the fuel tank drain hose, alternator lead, and fuel tank breather hose (other than CAL and SEA models), and to the inside of the air cleaner drain hose, idle adjusting screw cable, and clutch hose.
- 4. Fuel Tank Breather Hose (Other than CAL and SEA Models)
- 5. Fuel Tank Drain Hose
- 6. Gear Position Switch Lead
- 7. Sidestand Switch Lead
- 8. Clamp
- 9. Run the oil pressure switch/gear position switch lead and sidestand switch lead to the inside of hoses.
- 10. Speed Sensor
- 11. Insert the engine subharness connector (Gray) for the sensor and valve to the bracket (Do not damage the engine subharness lead when installing the pad.).
- 12. Run the engine subharness lead for the sensor and valve to the upside of the clutch hose.
- 13. Front
- 14. Run the left fan motor lead through recess of the inner rubber cover.
- 15. Insert the left fan motor lead connector to the bracket.
- 16. Clamps (Insert the clamp on the main harness to the bracket.)
- 17. Run the stick coil lead under the throttle cables.
- 18. Stick Coil Lead Connector (Install the stick coil lead connector to the bracket.)

18-20 APPENDIX



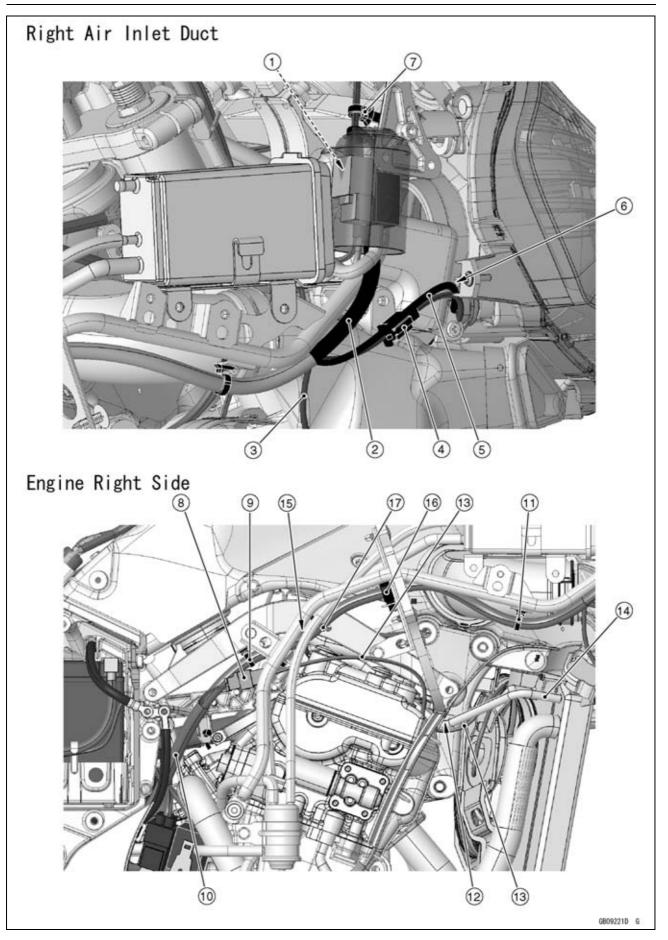
- 1. Insert the clamp on the main harness to the bracket.
- 2. Front
- 3. Ambient Temperature Sensor Lead
- 4. Run the headlight lead between the resonator and headlight.
- 5. Run the headlight lead to the inside of the fairing stay.
- 6. Run the main harness and headlight lead to the inside of the fairing stay.
- 7. Left Turn Signal Light Lead Connector
- 8. Clamp (Run the steering lock unit lead, left switch housing lead, and left grip warmer lead to the inside of the main harness, and through the clamp (Tighten the clamp completely).)
- 9. Run the glove compartment solenoid lead, electric windshield relay leads, and grip warmer controller lead under the main harness.
- 10. Clamps (Insert the clamp on the main harness to the fairing stay.)
- 11. After connecting the connectors for the steering lock unit lead, left switch housing lead, and left grip warmer lead, place the water-proof cover in front of the fairing stay bracket after putting the connectors into the water-proof cover.
- 12. This figure is for after running change of the main harness.
- 13. Run the steering lock unit leads (8-pin and 2-pin) to the inside of the clutch hose, and to the upside of the brake hose, and run them through the clamp 18 from the front side.
- 14. Clutch Hose
- 15. Brake Hose
- 16. Steering Lock Unit Lead (8-pin)
- 17. Steering Lock Unit Lead (2-pin)
- 18. Clamp (Tighten the clamp completely.)
- 19. Run the left switch housing lead and left grip warmer lead into the clamp on the front fork and run them through the clamp 18 from the front side.

18-22 APPENDIX



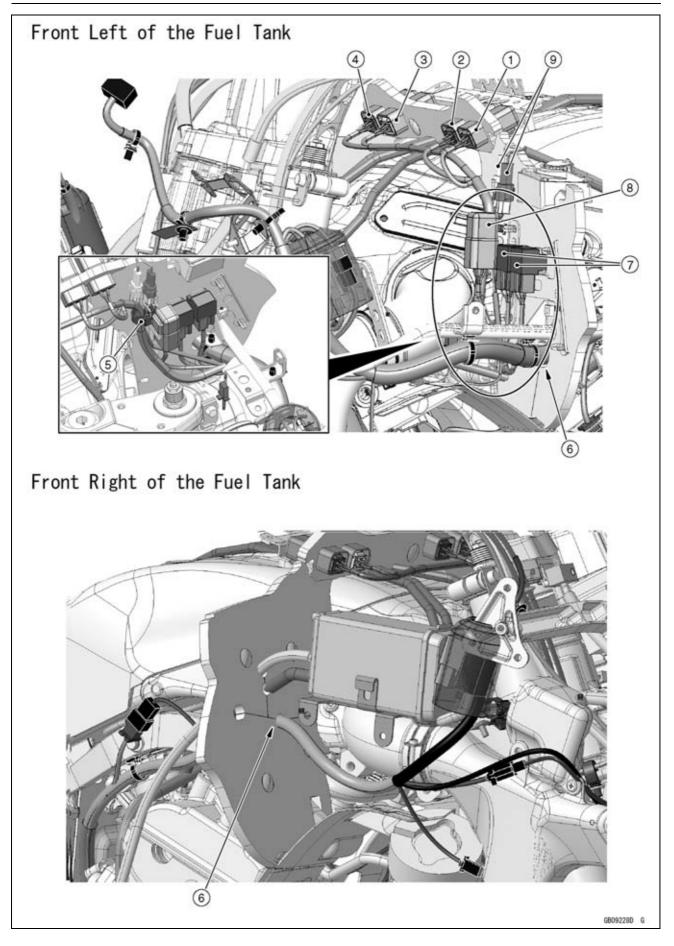
- 1. Run the headlight lead and city light lead between the resonator and the headlight.
- 2. Headlight Lead Connector
- 3. City Light Lead
- 4. Headlight Lead
- 5. Run the front wheel rotation sensor lead (K-ACT ABS equipped models), right switch housing lead, horn lead, and right grip warmer lead through the clamp (Tighten the clamp completely.).
- 6. Run the front wheel rotation sensor lead (K-ACT ABS equipped models), right switch housing lead, horn lead, and right grip warmer lead through the clamp (Tighten the clamp completely.).
- 7. Run the front wheel rotation sensor lead (K-ACT ABS equipped models), right switch housing lead, horn lead, and right grip warmer lead to the inside of the fairing stay.
- 8. Meter Connector
- 9. Insert the clamp on the meter lead to the electric windshield assembly.
- 10. Electric Windshield Motor Lead Connector
- 11. Front
- 12. Run the electric windshield motor lead under the electric windshield assembly.
- 13. Insert the clamp on the meter lead to the electric windshield assembly.

18-24 APPENDIX



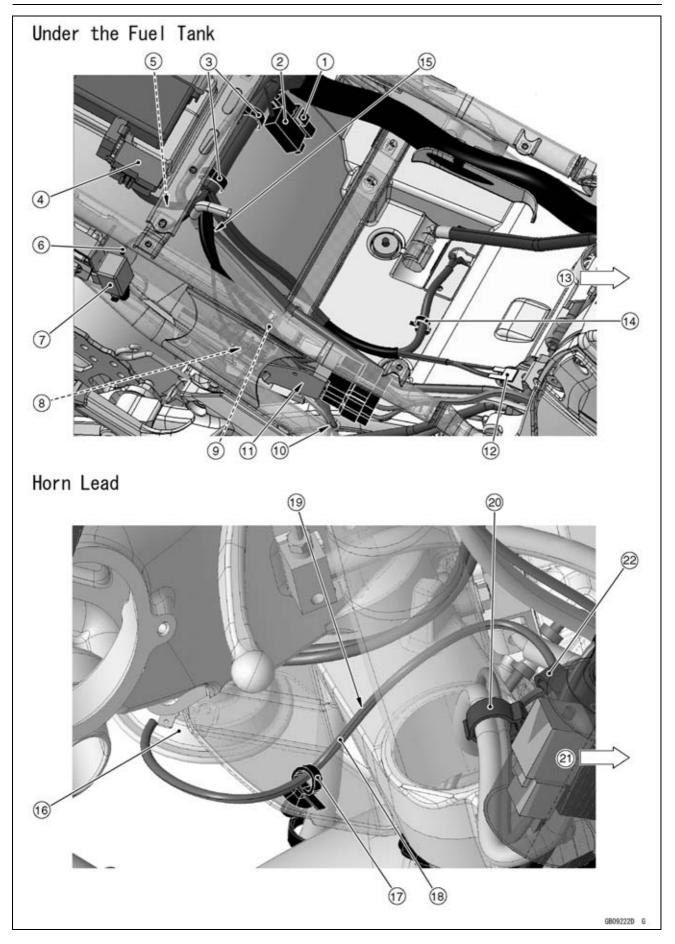
- 1. After connecting the connectors of the front wheel rotation sensor (K-ACT ABS equipped models), right switch housing, and grip warmer, put the connectors into the water-proof cover.
- 2. Run the main harness to the outside of the fairing stay.
- 3. Right Turn Signal Light Lead
- 4. City Light Lead Connector
- 5. Headlight Lead
- 6. Run the headlight lead and city light lead between the resonator and the headlight.
- 7. Insert the clamp on the main harness to the bracket.
- 8. Right Fan Motor Lead Connector
- 9. Insert the clamp on the main harness to the subframe.
- 10. Run the main harness to the inside of the engine ground cable.
- 11. Insert the clamp on the main harness to the fairing stay.
- 12. Run the air bleeder hose for thermostat housing and right fan motor lead through the recess of the inner rubber cover.
- 13. Right Fan Motor Lead
- 14. Air Bleeder Hose for Thermostat Housing
- 15. Run the main harness to the inside of the fairing stay and the evaporative hose (CAL and SEA models).
- 16. Run the main harness through the clamp (Tighten the clamp completely.).
- 17. Insert the clamp on the main harness to the subframe.

18-26 APPENDIX



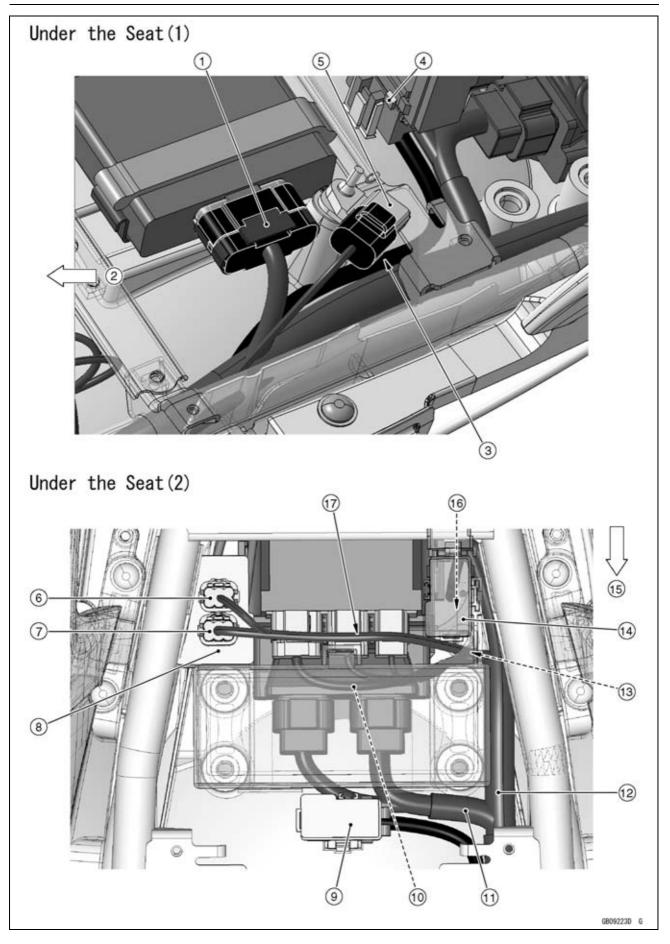
- 1. Headlight Relay (Lo)
- 2. Headlight Relay (Hi)
- 3. KIPASS Signal Relay
- 4. Accessory Relay
- 5. Hold the relay lead and grip warmer controller lead with the clamp (Tighten the clamp completely.).
- 6. Run the main harness through the recess of the pad.
- 7. Electric Windshield Relays (Up and Down)
- 8. Grip Warmer Relay
- 9. Grip Warmer Controller Connectors

18-28 APPENDIX



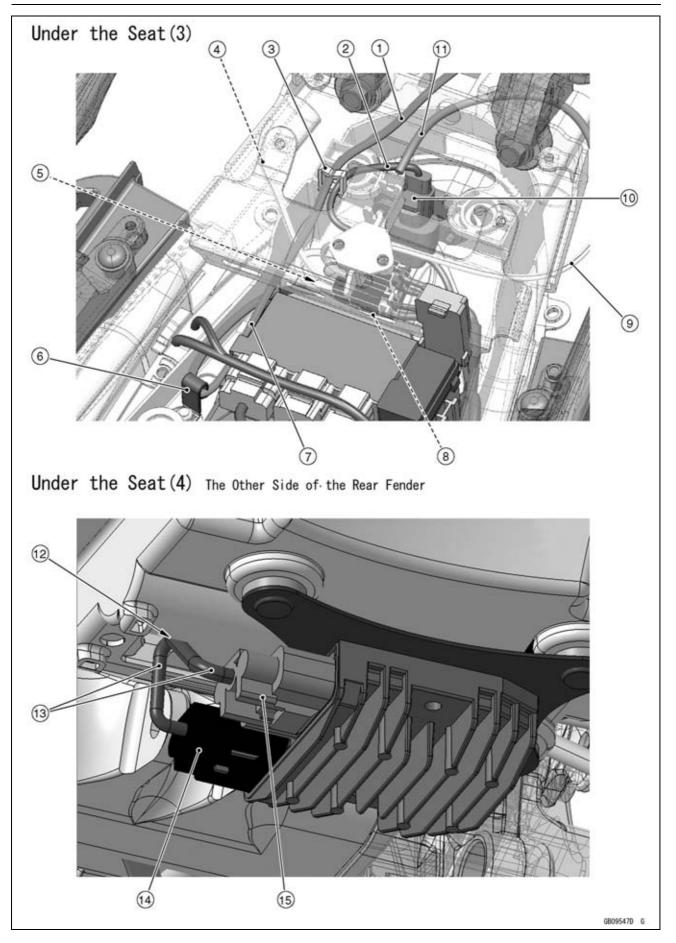
- 1. Fuel Pump Lead Connector
- 2. Fuel Level Sensor Lead Connector
- 3. Clamps
- 4. Fuse Box 1
- 5. Run the fuse box 1 lead under the cross bracket.
- 6. Run the turn signal relay lead between the rear frame.
- 7. Turn Signal Relay
- 8. After fixing the rear brake light switch lead connector to the bracket, cover the connector with the water-proof cover.
- 9. Alternator Lead
- 10. Run the rear wheel rotation sensor lead (K-ACT ABS equipped models) and rear brake light switch lead through the clamp.
- 11. Insert the connectors of the rear wheel rotation sensor (K-ACT ABS equipped models), rear brake light switch, and alternator to the bracket.
- 12. Frame Ground
- 13. Front
- 14. Insert the clamp on the regulator/rectifier lead to the rear fender.
- 15. Run the rear wheel rotation sensor lead (K-ACT ABS equipped models), rear brake light switch lead, and alternator lead to the upside of the hoses.
- 16. Horn
- 17. Insert the clamp on the horn lead to the heat insulation plate.
- 18. Horn Lead
- 19. Run the horn lead to the inside of the front fork.
- 20. Run the right switch housing lead, horn lead, right grip warmer lead, and front wheel rotation sensor lead (K-ACT ABS equipped models) through the clamp (Tighten the clamp completely.).
- 21. Front
- 22. Run the right switch housing lead, horn lead, right grip warmer lead, and front wheel rotation sensor lead (K-ACT ABS equipped models) through the clamp (Tighten the clamp completely.).

18-30 APPENDIX



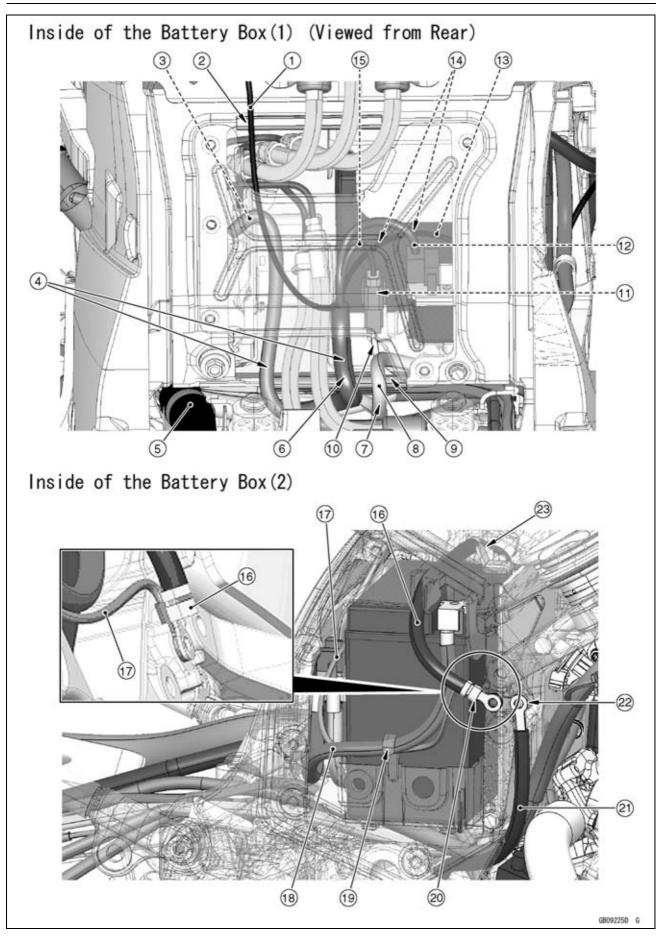
- 1. KIPASS ECU Connector
- 2. Front
- 3. Run the fuse box 3 lead to the outside of the atmospheric pressure sensor.
- 4. Fuse Box 3
- 5. Atmospheric Pressure Sensor
- 6. Kawasaki Diagnostic System Connector
- 7. K-ACT ABS Kawasaki Diagnositc System Connector (K-ACT ABS Equipped Models)
- 8. Pad for Connectors
- 9. Fuse Box 3
- 10. Relay Box Leads
- 11. ECU Lead
- 12. Main Harness
- 13. Run the Kawasaki Diagnositc System lead under the tool case.
- 14. Fuse Box 2
- 15. Front
- 16. License Plate Light Lead (Do not pinch the license plate light lead between the rubber protector of the ECU and rear fender.)
- 17. Kawasaki Diagnositc System Lead (Do not pinch the Kawasaki Diagnostic System lead in the tool case.)

18-32 APPENDIX

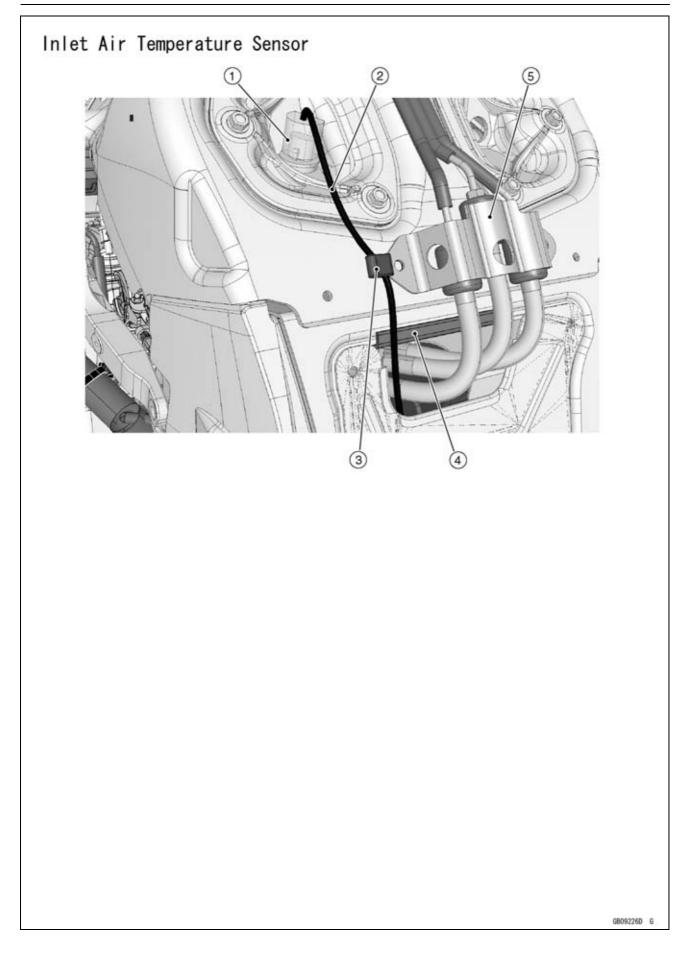


- 1. Tail/Brake Light Lead
- 2. Vehicle-down Sensor Lead
- 3. Run the tail/brake light lead and vehicle-down sensor lead through the clamp.
- 4. Rear Right Turn Signal Light Lead
- 5. After connecting the connectors of the tail/brake light, rear right turn signal light, and license plate light, place the water-proof cover under the seat lock after putting the connectors into the water-proof cover.
- 6. Clamp (Hold the tail/brake light lead.)
- 7. Tail/Brake Light Lead (Do not pinch the tail/brake light lead between the rubber protector of the ECU and rear fender.)
- 8. License Plate Light Lead
- 9. Rear Left Turn Signal Light Lead
- 10. Vehicle-down Sensor Connector
- 11. Seat Lock Cable
- 12. Run the regulator/rectifier leads throught the hole on the rear fender, and run them between the bracket and the rear fender.
- 13. Regulator/Rectifier Leads
- 14. Black Connector
- 15. Gray Connector

18-34 APPENDIX

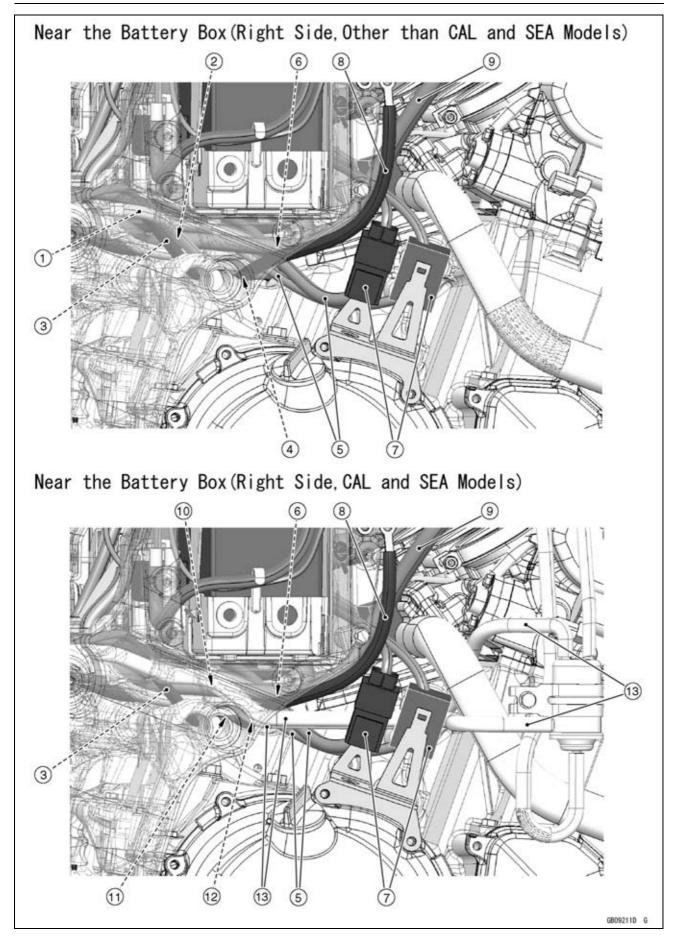


- 1. Inlet Air Temperature Sensor Lead
- 2. Run the inlet air temperature sensor lead through the upper hole of the cover.
- 3. K-ACT ABS Hydraulic Unit Lead* (K-ACT ABS Equipped Models)
- 4. Run the main harness and K-ACT ABS hydraulic unit lead* (K-ACT ABS equipped models) through the lower hole of the cover.
- 5. Run the main harness under the fuel hose.
- 6. Run the main harness to the left side of the starter motor cable, and under the alternator lead.
- 7. Run the starter motor cable under the main harness and alternator lead, and to the upside of the drain hose.
- 8. Starter Motor Cable
- 9. Install the trim seal on the framefrom the right side of the motorcycle.
- 10. Run the battery positive (+) lead to the inside of the starter relay lead.
- 11. Insert the battery positive (+) lead connector to the bracket.
- 12. Stater Relay Lead
- 13. Battery Negative (-) Lead
- 14. Run the battery negative (–) lead to the inside of the starter relay lead and battery positive (+) lead.
- 15. Battery Positive (+) Lead
- 16. Battery Negative (-) Cable
- 17. Battery Negative (-) Lead
- 18. Battery Posotive (+) Cable
- 19. Run the battery positive (+) cable through the hook of the battery case.
- 20. Tighten the bolt together with the battery negative (–) lead and battery negative (–) cable.
- 21. Engine Ground Cable
- 22. Tighten the bolt together with the engine ground cable.
- 23. Connect the battery negative (–) cable as shown in the figure.
- *: ZG1400CAF (Frame No, JKBZGT40CCA002250 ~) and later models do not have the K-ACT ABS hydraulic unit leads and connectors.



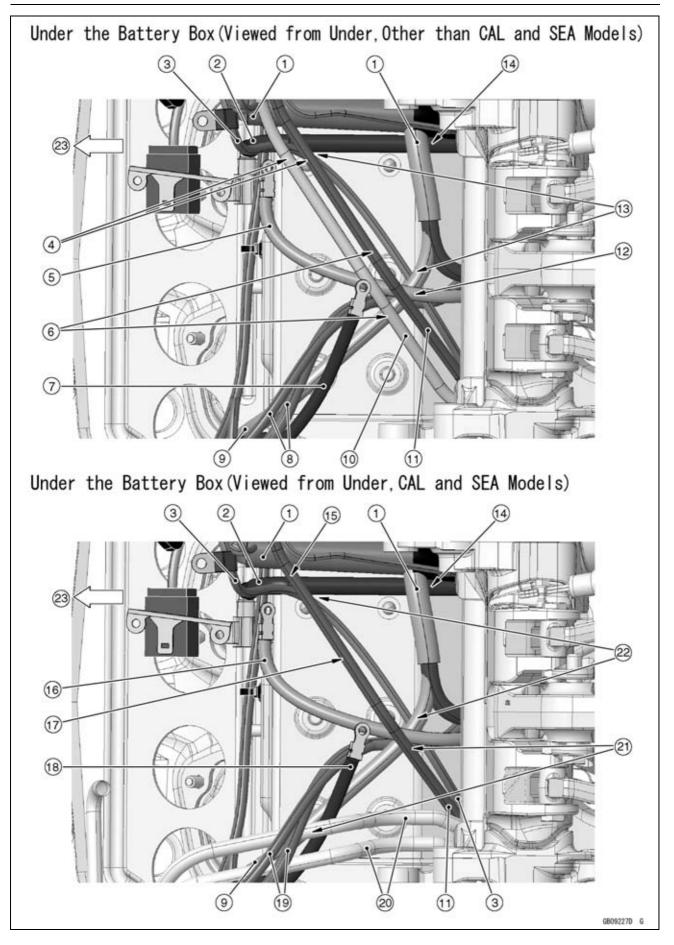
- 1. Inlet Air Temperature Sensor
- 2. Inlet Air Temperature Sensor Lead
- 3. Hold the inlet air temperature sensor lead (For the non K-ACT ABS equipped models, fix the clamp with the nut (92015-1700)).
- 4. Install the trim seal to the frame.
- 5. Bracket (K-ACT ABS Equipped Models)

18-38 APPENDIX



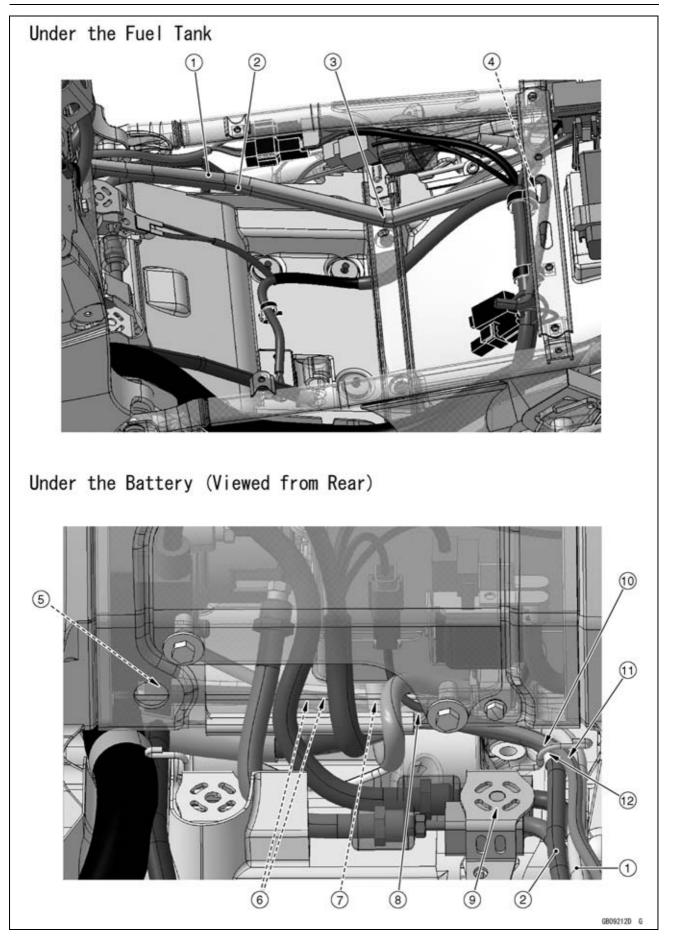
- 1. Fuel Tank Breather Hose
- 2. Run the fuel tank drain hose and breather hose to the upside of the engine mounting bolt.
- 3. Fuel Tank Drain Hose
- 4. Run the fuel tank drain hose and breather hose to the upside of the engine ground cable, and under the main harness.
- 5. K-ACT ABS Hydraulic Unit Leads* (K-ACT ABS Equipped Models)
- 6. Run the engine ground cable to the outside of the main harness and K-ACT ABS hydraulic unit leads* (K-ACT ABS equipped models).
- 7. K-ACT ABS Hydraulic Unit Lead Connectors* (K-ACT ABS Equipped Models)
- 8. Engine Ground Cable
- 9. Main Harness
- 10. Run the evaporative hoses to the upside of the engine mounting bolt.
- 11. Run the fuel tank drain hose to the upside of the engine ground cable.
- 12. Run the evaporative hoses under the engine ground cable, and to the outside of the main harness.
- 13. Evaporative Hoses
 - *: ZG1400CAF (Frame No, JKBZGT40CCA002250 ~) and later models do not have the K-ACT ABS hydraulic unit leads and connectors.

18-40 APPENDIX



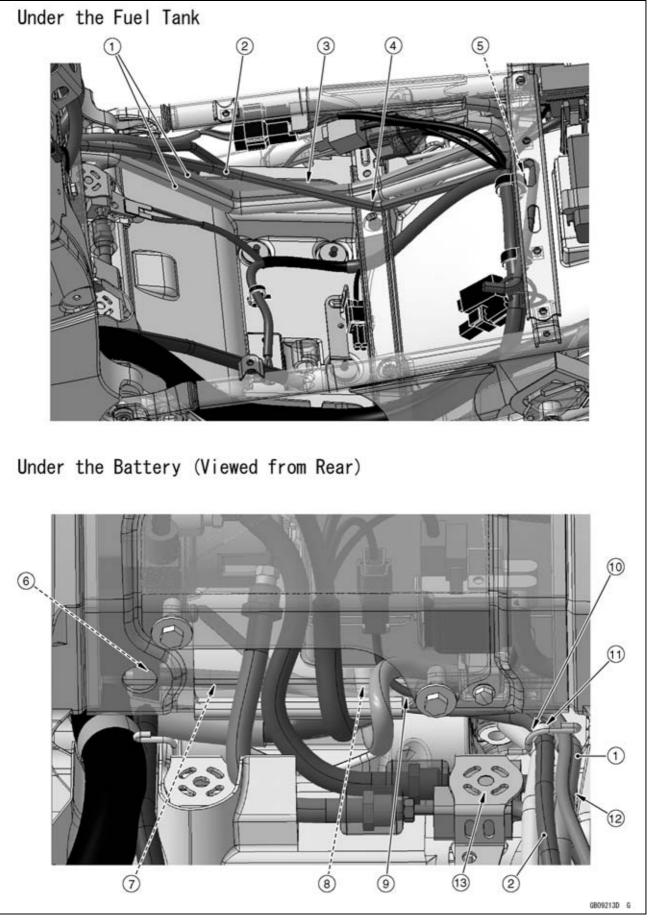
- 1. Main Harness
- 2. Fuel Hose
- 3. Alternator Lead
- 4. Run the fuel tank drain hose and breather hose under the main harness, fuel hose, and alternator lead.
- 5. Run the battery positive (+) cable to the upside of the fuel tank drain hose and breather hose, and under the alternator lead and main harness.
- 6. Run the fuel tank drain hose and breather hose under the main harness and battery positive (+) cable, and to the upside of the engine ground cable.
- 7. Run the engine ground cable under the fuel tank drain hose, breather hose, and main harness.
- 8. Run the K-ACT ABS hydraulic unit leads* under the main harness (K-ACT ABS equipped models).
- 9. Main Harness (Right Side)
- 10. Fuel Tank Breather Hose
- 11. Fuel Tank Drain Hose
- 12. Run the main harness under the K-ACT ABS hydraulic unit leads* (K-ACT ABS equipped models) and alternator lead, and to the upside of the fuel tank drain hose, breather hose, battery positive (+) cable, and engine ground cable.
- Run the alternator lead under the K-ACT ABS hydraulic unit leads* (K-ACT ABS equipped models) and fuel hose, and to the upside of the fuel tank drain hose, breather hose, battery positive (+) cable, and main harness.
- 14. Run the fuel hose to the upside of the main harness.
- 15. Run the fuel tank drain hose under the main harness, fuel hose, and alternator lead.
- 16. Run the battery positive (+) cable to the upside of the fuel tank drain hose, and under the alternator lead and main harness.
- 17. Run the fuel tank drain hose under the battery positive (+) cable and main harness, and to the upside of the engine ground cable.
- 18. Run the engine ground cable under the fuel tank drain hose and main harness, and to the upside of the evaporative hoses.
- 19. Run the K-ACT ABS hydraulic unit leads* under the main harness and evaporative hoses (K -ACT ABS equipped models).
- 20. Run the evaporative hoses under the main harness and engine ground cable, and to the upside of the K-ACT ABS hydraulic unit leads* (K-ACT ABS equipped models).
- 21. Run the main harness under the K-ACT ABS hydraulic unit leads* (K-ACT ABS equipped models) and alternator lead, and to the upside of the evaporative hoses, fuel tank drain hose, battery positive (+) cable, and engine ground cable.
- 22. Run the alternator lead under the K-ACT ABS hydraulic unit leads* (K-ACT ABS equipped models) and fuel hose, and to the upside of the fuel tank drain hose, battery positive (+) cable, and main harness.
- 23. Front
 - *: ZG1400CAF (Frame No, JKBZGT40CCA002250 ~) and later models do not have the K-ACT ABS hydraulic unit leads and connectors.

18-42 APPENDIX



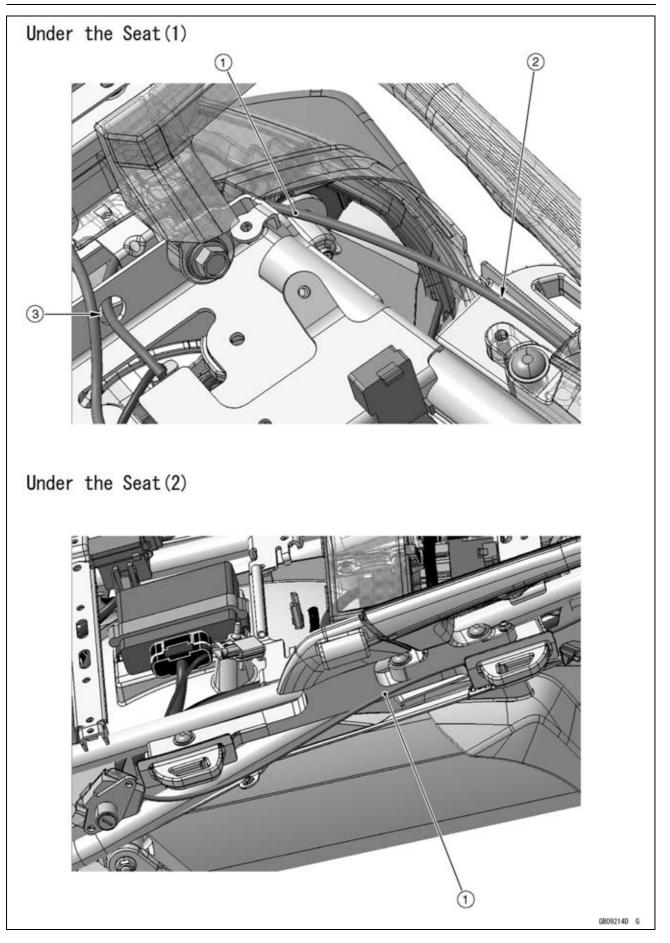
- 1. Fuel Tank Breather Hose (Other than CAL and SEA Models)
- 2. Fuel Tank Drain Hose
- 3. Run the fuel tank breather hose (other than CAL and SEA models) and drain hose to the upside of the cross bracket.
- 4. Run the fuel tank drain hose to the backside of the clamp.
- 5. Run the fuel tank breather hose (other than CAL and SEA models) and drain hose under the fuel hose.
- 6. Run the fuel tank breather hose (other than CAL and SEA models) and drain hose under the battery box.
- 7. Run the fuel tank breather hose (other than CAL and SEA models) and drain hose under the starter motor cable.
- 8. Run the fuel tank breather hose (other than CAL and SEA models) and drain hose under the right side of the main harness.
- 9. Do not put the hose, lead, and harness on the bracket under the fuel tank.
- 10. Run the fuel tank breather hose (other than CAL and SEA models), drain hose, and alternator lead under the clamp.
- 11. Run the alternator lead to the upside of the fuel tank breather hose (other than CAL and SEA models) and drain hose.
- 12. Align the yellow tape on the fuel tank drain hose with the clamp.

CAL and SEA Models



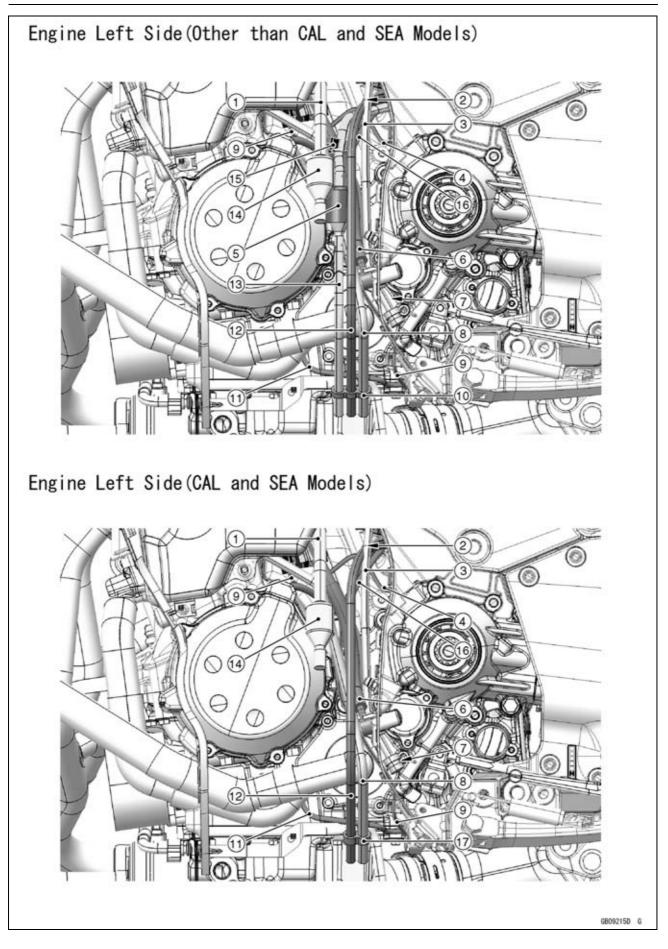
- 1. Evaporative Hoses
- 2. Fuel Tank Drain Hose
- 3. Run the fuel tank drain hose to the upside of the evaporative hoses.
- 4. Run the fuel tank drain hose and evaporative hoses to the upside of the cross bracket.
- 5. Run the fuel tank drain hose to the backside of the clamp.
- 6. Run the fuel tank drain hose under the fuel hose.
- 7. Run the fuel tank drain hose under the battery box.
- 8. Run the fuel tank drain hose under the starter motor cable.
- 9. Run the fuel tank drain hose under the right side of the main harness.
- 10. Run the fuel tank drain hose, evaporative hoses, and alternator lead under the clamp.
- 11. Align the yellow tape on the fuel tank drain hose with the clamp.
- 12. Run the alternator lead to the right side of the fuel tank drain hose, and to the upside of the evaporative hoses.
- 13. Do not put the hose, lead, and harness on the bracket under the fuel tank.

18-46 APPENDIX



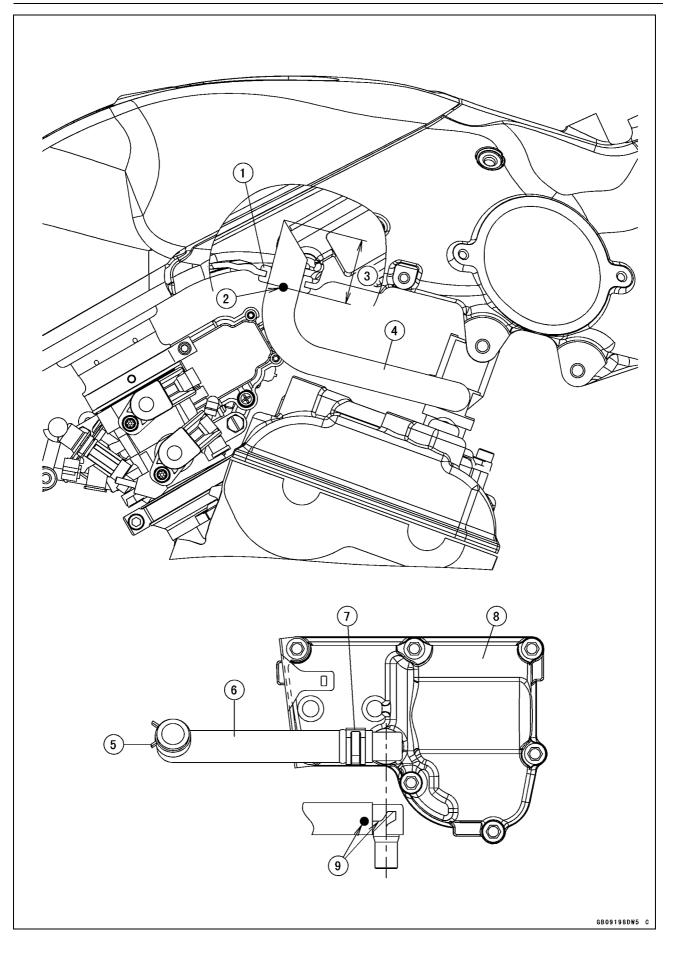
- 1. Seat Lock Cable
- Run the seat lock cable to the upside of the saddlebag holder.
 Run the seat lock cable through the middle hole on the rear frame.

18-48 APPENDIX



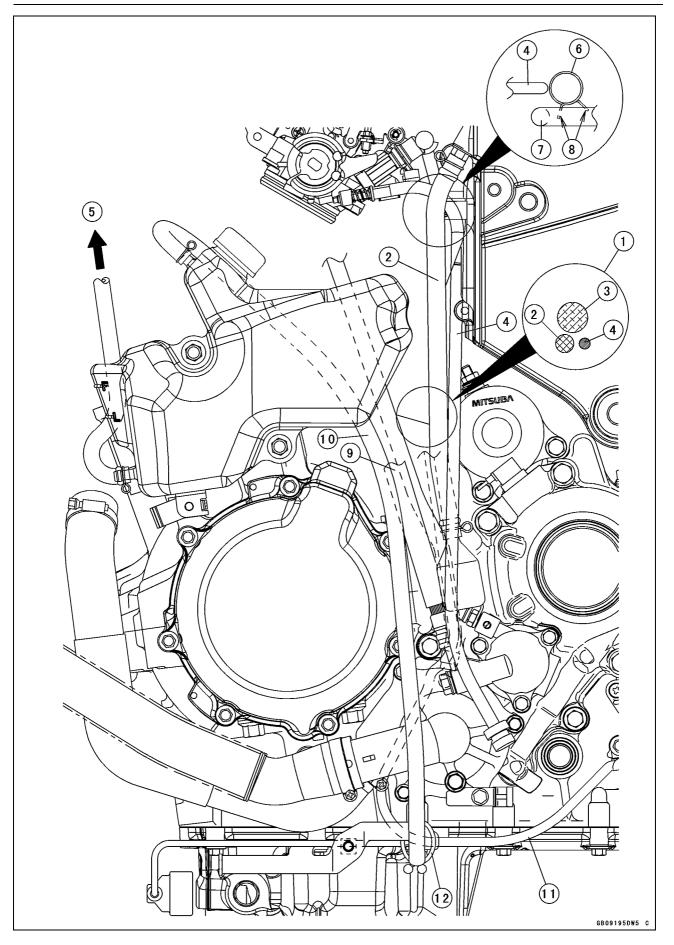
- 1. Air Cleaner Drain Hose
- 2. Run the idle adjusting screw cable to the outside of the main harness.
- 3. Idle Adjusting Screw Cable
- 4. Speed Sensor Lead
- 5. Breather for Fuel Tank Breather Hose
- 6. Clutch Hose
- 7. Run the idle adjusting screw cable through the recess of the rubber cover.
- 8. Reserve Tank Overflow Hose
- 9. Sidestand Switch Lead
- 10. Clamp (Hold the fuel tank breather hose, fuel tank drain hose, and reserve tank overflow hose.)
- 11. Gear Position Switch Lead
- 12. Fuel Tank Drain Hose
- 13. Fuel Tank Breather Hose
- 14. Breather for Air Cleaner Drain Hose
- 15. Clamp (Hold the fuel tank breather hose and the clutch hose.)
- 16. Alternator Lead
- 17. Clamp (Hold the fuel tank drain hose and reserve tank overflow hose.)

18-50 APPENDIX



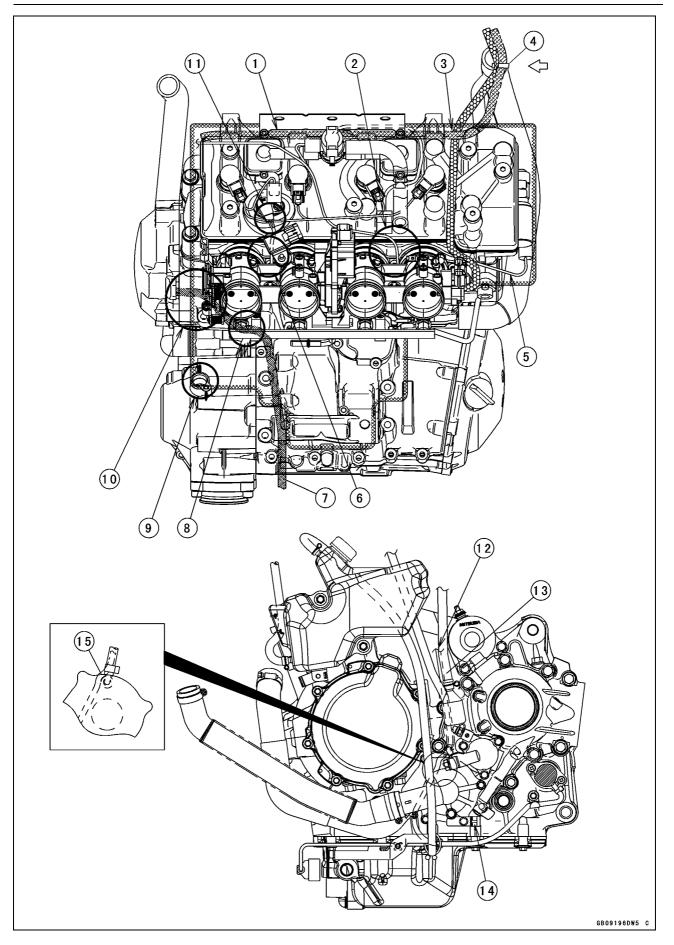
- 1. Grommet
- 2. Insert the air switching valve hose into the air cleaner until white painted mark on it is hidden a half.
- 3. About 41 mm (1.61 in.)
- 4. Air Switching Valve Hose
- 5. Clamp
- 6. Breather Hose
- 7. Clamp
- 8. Breather Cover
- 9. Align the white painted mark with the end of the plate.

18-52 APPENDIX



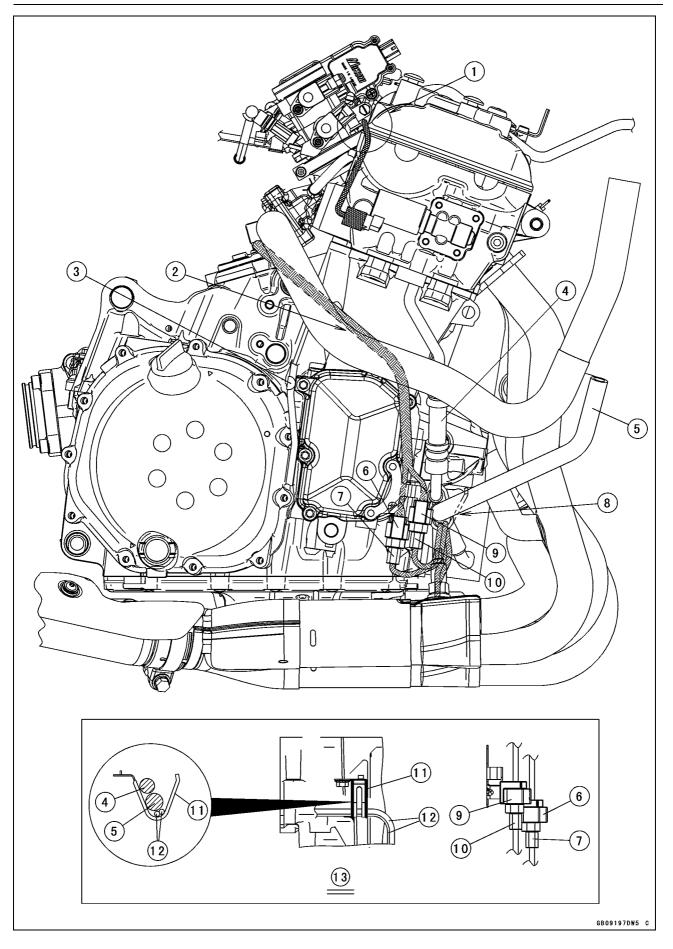
- 1. Run the air cleaner drain hose and idle adjusting screw cable through the outside of the main harness.
- 2. Air Cleaner Drain Hose
- 3. Main Harness
- 4. Idle Adjusting Screw Cable
- 5. To Radiator
- 6. Clamp
- 7. Run the air cleaner drain hose through the front of the clamp.
- 8. Position the clamp so that its pinch heads do not touch the frame and air cleaner drain hose.
- 9. Clutch Hose
- 10. Reserve Tank Overflow Hose
- 11. Gear Position Switch Lead
- 12. Clamp (Hold the oil pressure switch/gear position switch lead together with the bracket.)

18-54 APPENDIX



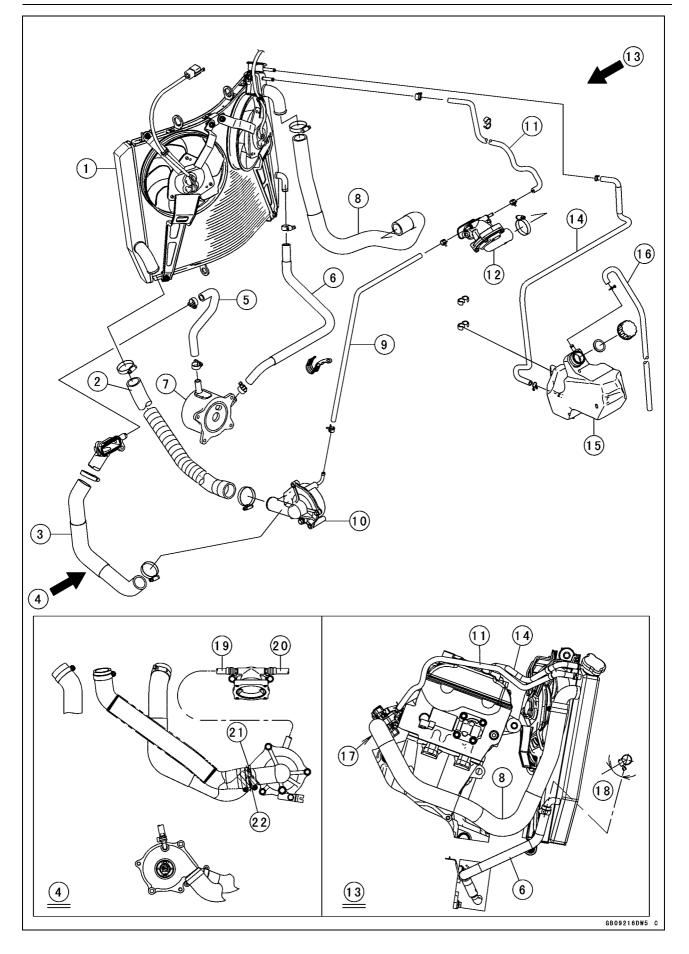
- 1. Run the reserve tank hose between the air suction valve and bracket.
- 2. Run the air switching valve lead which is connected to the water temperature sensor lead between the throttle body #3 and #4.
- 3. Run the reserve tank hose to the upside of the air bleeder hose of the thermostat housing.
- 4. Clamp (Install the clamp from the arrow mark side with the front of the protector of each hose.)
- 5. Oil Control Solenoid Valve Lead
- 6. Run the inlet camshaft position sensor lead between the throttle body #1 and #2.
- 7. Connect the alternator lead to the regulator/rectifier through the subharness.
- 8. Hold the alternator lead with the clamp.
- 9. Connect the speed sensor lead to the main harness.
- 10. Run the alternator lead through the backside of the air bleeder hose come from the water pump.
- 11. Run the stick coil subharness under the inlet camshaft position sensor lead.
- 12. Connect the oil pressure switch/gear position switch lead and sidestand switch lead to the main harness.
- 13. Air Cleaner Drain Hose
- 14. Clamp (Hold the sidestand switch lead.)
- 15. Run the oil pressure switch/gear position switch lead through the front of the air bleeder hose come from the water pump.

18-56 APPENDIX



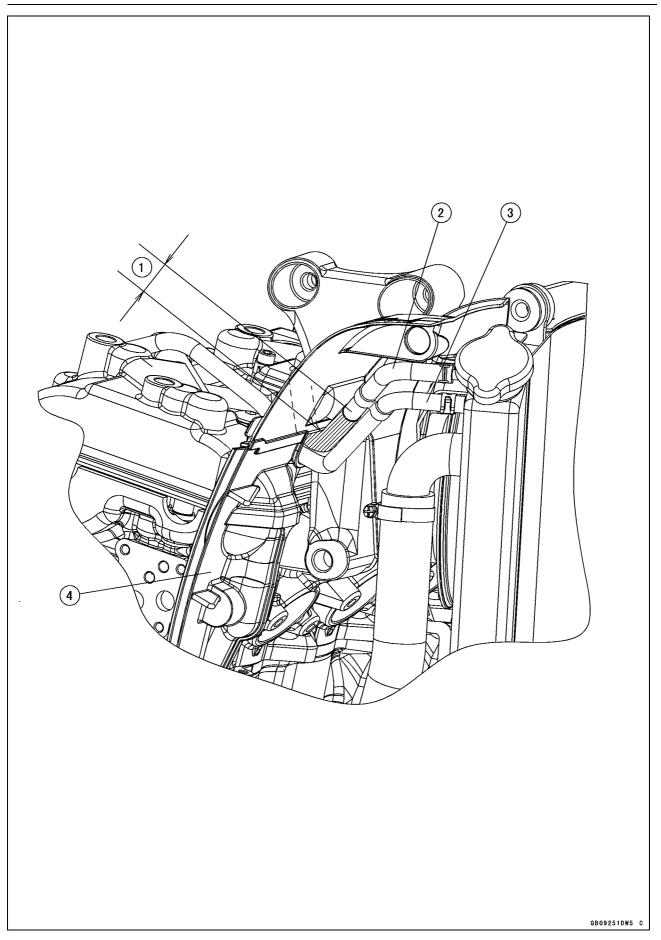
- 1. Run the oil control solenoid valve lead between the cylinder head cover and throttle body assy, and connect it.
- 2. Run the engine subharness as shown in the figure.
- 3. Hold the crankshaft sensor lead with the clamps.
- 4. Oil Hose
- 5. Outlet Hose
- 6. Engine Subharness Connector (Gray) (Equipped Models)
- 7. Oxygen Sensor Connector (Gray) (Equipped Models)
- 8. Run the oxygen sensor leads, and close the clamp.
- 9. Engine Subharness Connector (Black) (Equipped Models)
- 10. Oxygen Sensor Connector (Black) (Equipped Models)
- 11. Clamp
- 12. Oxygen Sensor Leads (Equipped Models)
- 13. Front View

18-58 APPENDIX



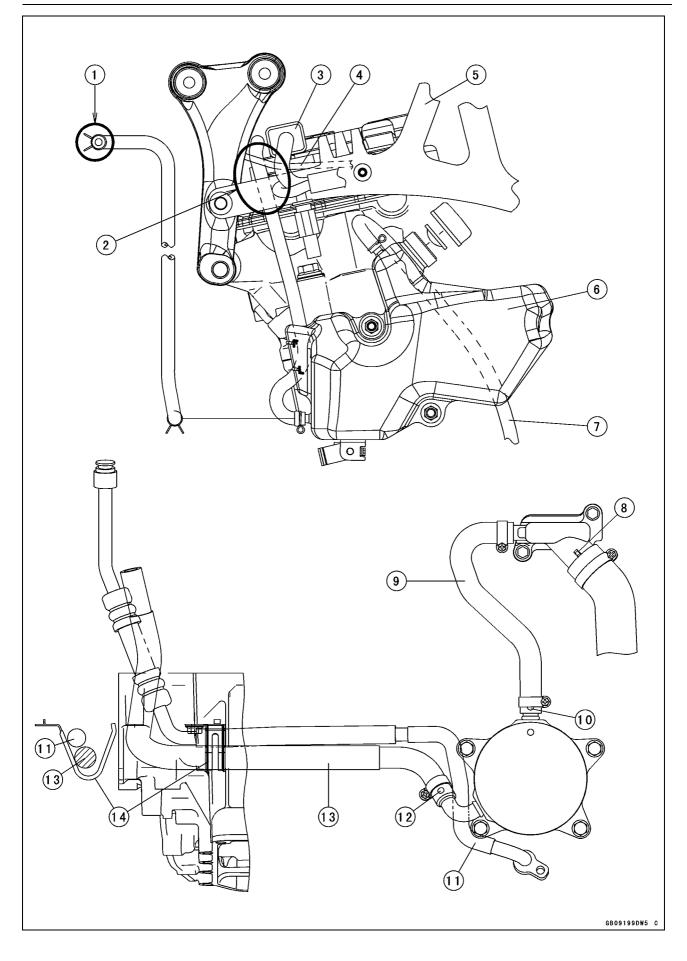
- 1. Radiator
- 2. Water Hose
- 3. Water Hose
- 4. Left Side View
- 5. Inlet Hose
- 6. Outlet Hose
- 7. Oil Cooler
- 8. Water Hose
- 9. Air Bleeder Hose for Water Pump
- 10. Water Pump
- 11. Air Bleeder Hose for Thermostat Housing
- 12. Thermostat Housing
- 13. Right Side View
- 14. Reserve Tank Hose
- 15. Reserve Tank
- 16. Reserve Tank Overflow Hose
- 17. Align the red painted mark on the hose with the mark on the thermostat housing cover.
- 18. About 45°
- 19. Air Bleeder Hose for Water Pump
- 20. Air Bleeder Hose for Thermostat Housing
- 21. Align the white paint mark on the hose with the mark on the water pump.
- 22. Install the hose so that white painted mark on the hose faces the front side.

18-60 APPENDIX



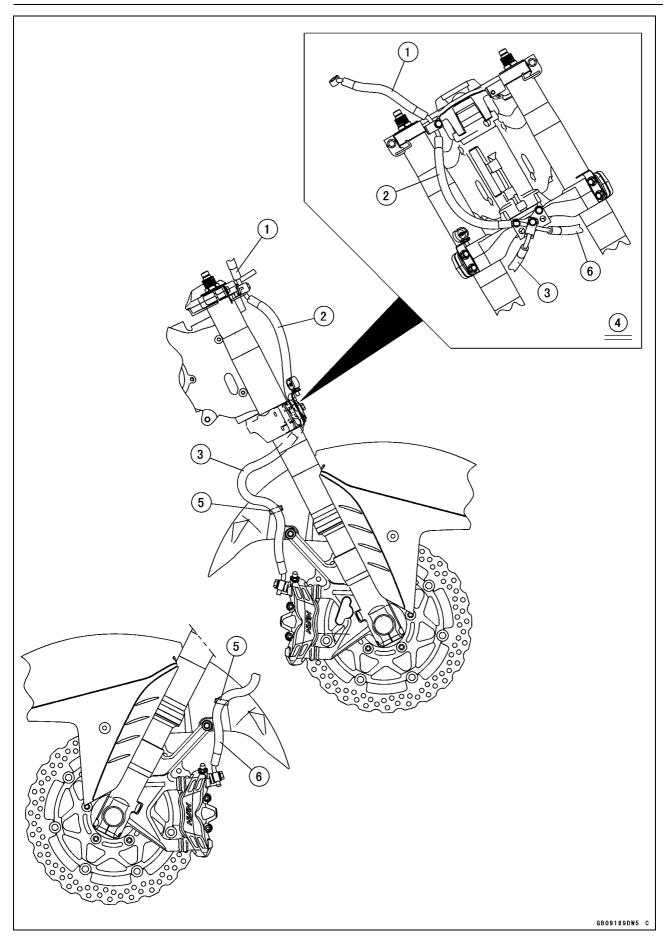
- 1. After setting the overflow hose to the radiator, adjust the position of the hose protector so that the protector end comes $25 \sim 30 \text{ mm} (0.98 \sim 1.18 \text{ in.})$ from the inner rubber cover.
- 2. Reserve Tank Hose
- 3. Air Breeder Hose for Thermostat Housing
- 4. Inner Rubber Cover

18-62 APPENDIX



- 1. Install the clamp so that the knob of the clamp faces right side of the frame as shown in the figure.
- 2. Run the reserve tank hose between the subframe and engine, and inside of the clutch pipe, and front of the engine subharness connector (Gray) for the sensor and valve.
- 3. Engine Subharness Connector (Gray) for the Sensor and Valve
- 4. Clutch Pipe
- 5. Subframe
- 6. Coolant Reserve Tank
- 7. Run the reserve tank overflow hose between the coolant reserve tank and engine.
- 8. Insert the hose until it hit the projection of the cylinder fitting.
- 9. Inlet Hose
- 10. Install the hose so that white painted mark on the hose faces the front side.
- 11. Oil Pipe
- 12. Install the hose so that white painted mark on the hose faces the front side.
- 13. Outlet Hose
- 14. Clamp

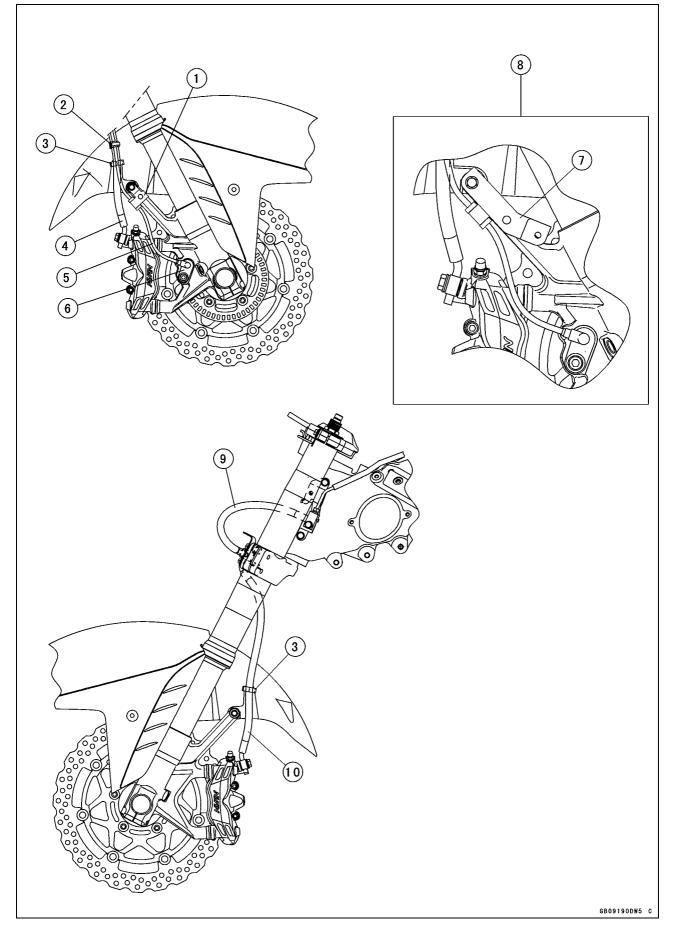
18-64 APPENDIX



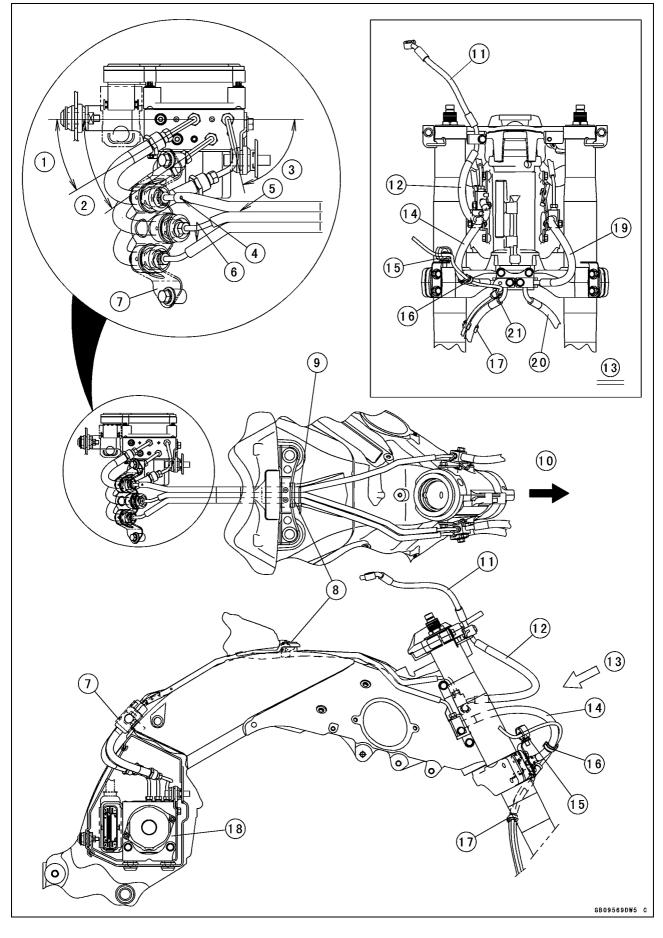
- 1. Brake Hose
- 2. Brake Hose
- 3. Brake Hose
- 4. Front View
- 5. Clamps (Hold the brake hose and insert the clamps into the front fender.)
- 6. Brake Hose

18-66 APPENDIX

Cable, Wire, and Hose Routing

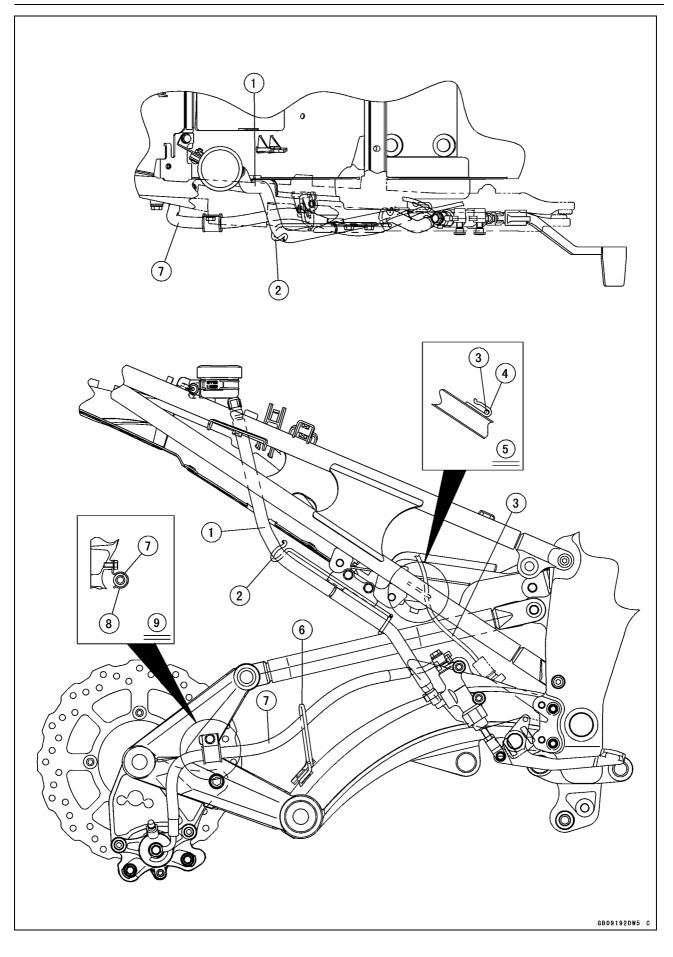


- 1. Clamp (Hold the front wheel rotation sensor lead.)
- 2. Clamp (Hold the brake hose and front wheel rotation sensor lead, and align the clamp with white painted mark of the front wheel rotation sensor lead.)
- 3. Clamps (Hold the brake hose only and insert the clamp into the front fender.)
- 4. Brake Hose
- 5. Front Wheel Rotation Sensor Lead
- 6. Front Wheel Rotation Sensor
- 7. Bracket (Hold the front wheel rotation sensor lead.)
- 8. AU, CA and US Models
- 9. Brake Hose
- 10. Brake Hose



- 1. About 31°
- 2. About 35°
- 3. About 77°
- 4. Brake Pipe (Yellow Painted Mark)
- 5. Brake Pipe (White Painted Mark)
- 6. Brake Pipe (Blue Painted Mark)
- 7. Clamp
- 8. Damper
- 9. Clamp (Frame No, JKBZGNC19AA000522 ~)
- 10. Front
- 11. Brake Hose
- 12. Brake Hose
- 13. Front View
- 14. Brake Hose
- 15. Clamp (Hold the front wheel rotation sensor lead.)
- 16. Clamp (Hold the brake hose and front wheel rotation sensor lead, and align the clamp with white painted mark of the front wheel rotation sensor lead.)
- 17. Clamp (Hold the brake hose and front wheel rotation sensor lead, and align the clamp with white painted mark of the front wheel rotation sensor lead.)
- 18. K-ACT ABS Hydraulic Unit
- 19. Brake Hose
- 20. Brake Hose
- 21. Clamp (Hold the front wheel rotation sensor lead.)

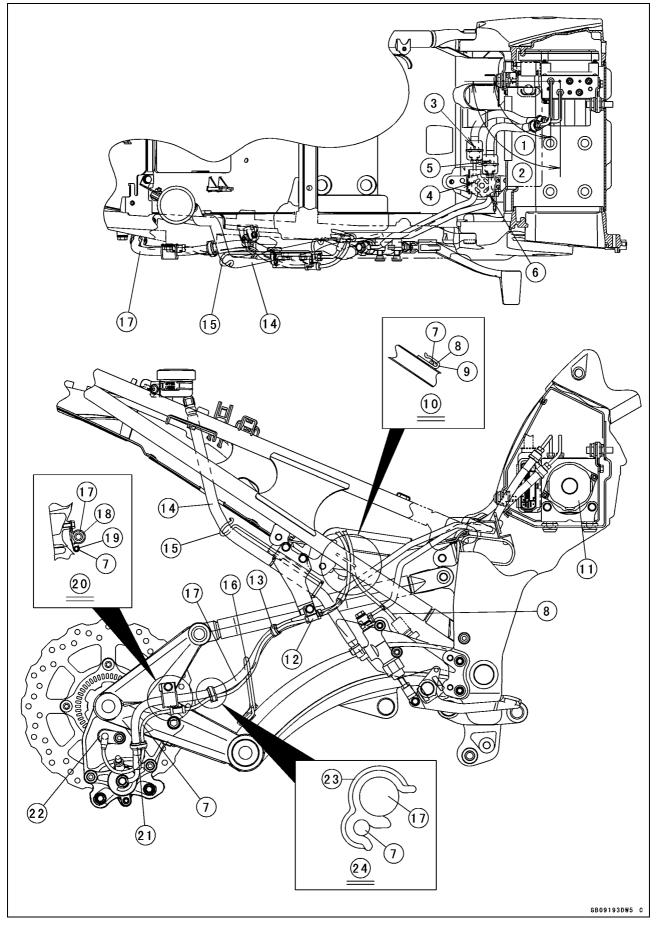
18-70 APPENDIX



- 1. Brake Hose
- 2. Clamp (Hold the brake hose.)
- 3. Rear Brake Light Switch Lead
- 4. Clamp (Hold the rear brake light switch lead.)
- 5. Upper View
- 6. Clamp (Hold the brake hose.)
- 7. Brake Hose
- 8. Clamp (Hold the brake hose.)
- 9. Rear View

18-72 APPENDIX

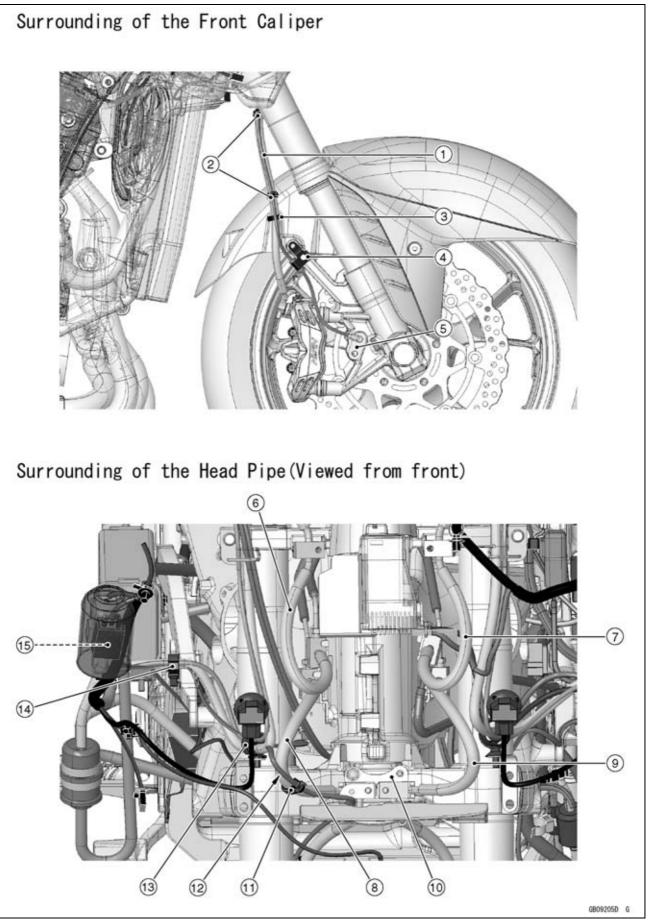
Cable, Wire, and Hose Routing



- 1. About 90°
- 2. About 90°
- 3. Brake Hose (Green Painted Mark)
- 4. Brake Pipe (Green Painted Mark)
- 5. Brake Hose (Purple Painted Mark)
- 6. Brake Pipe (Purple Painted Mark)
- 7. Rear Wheel Rotation Sensor
- 8. Rear Brake Right Switch Lead
- 9. Clamp (Hold the rear wheel rotation sensor lead and rear brake light switch lead.)
- 10. Upper View
- 11. K-ACT ABS Hydraulic Unit
- 12. Clamp (Hold the rear wheel rotation sensor lead.)
- 13. Clamp (Hold the brake hose and rear wheel rotation sensor lead, and align the clamp with white painted mark of the rear wheel rotation sensor lead.)
- 14. Brake Hose
- 15. Clamp (Hold the brake hose.)
- 16. Clamp (Hold the brake hose and rear wheel rotation sensor lead.)
- 17. Brake Hose
- 18. Clamp (Hold the brake hose.)
- 19. Clamp (Hold the rear wheel rotation sensor lead.)
- 20. Rear View
- 21. Clamp (Hold the brake hose and rear wheel rotation sensor lead, and align the clamp with white painted mark of the rear wheel rotation sensor lead.)
- 22. Rear Wheel Rotation Sensor
- 23. Clamp (Hold the brake hose and rear wheel rotation sensor lead, and align the clamp with white painted mark of the rear wheel rotation sensor lead.)
- 24. Front View

18-74 APPENDIX

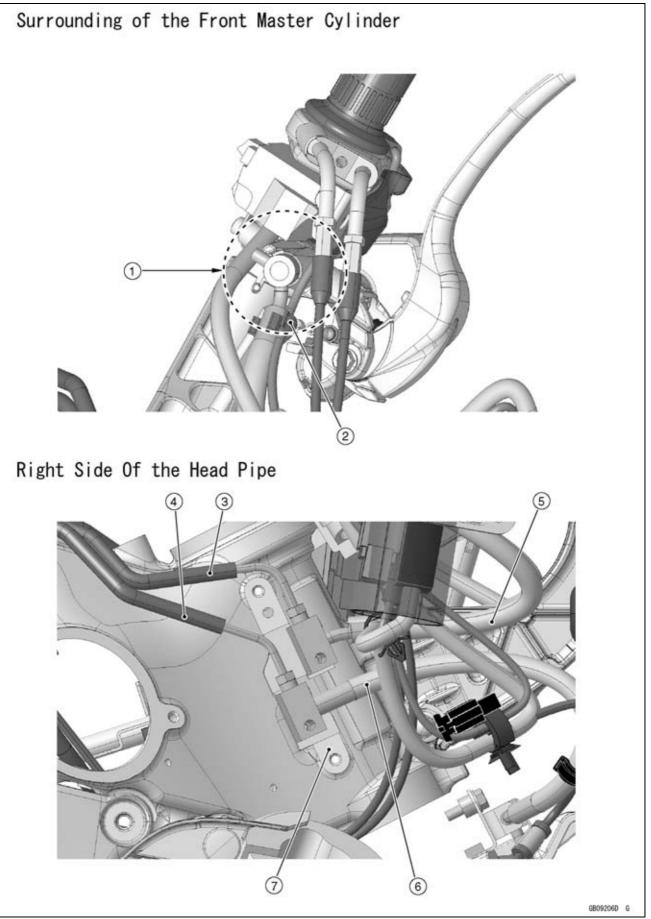
Cable, Wire, and Hose Routing



- 1. Brake Hose
- 2. Clamps (Hold the brake hose and front wheel rotation sensor lead at the position of the white painted mark on the lead.)
- 3. Clamps (Hold the brake hose only and insert the clamp into the front fender (both sides).)
- 4. Clamp (Other than EU and MY models have the bracket (11054-1227).)
- 5. Front Wheel Rotation Sensor
- 6. Brake Hose
- 7. Brake Hose
- 8. Brake Hose
- 9. Brake Hose
- 10. Bracket
- 11. Clamp (Hold the brake hose and front wheel rotation sensor lead at the position of the white painted mark on the lead.)
- 12. Run the front wheel rotation sensor lead to the outside of the brake hose.
- 13. Clamp (Hold the front wheel rotation sensor lead, right grip warmer lead, right switch housing lead, and horn lead, and insert the clamp to the bracket on the steering stem.)
- 14. Clamp (Hold the front wheel rotation sensor lead, right grip warmer lead, right switch housing lead, and horn lead, and insert the clamp to the bracket on the air duct.)
- 15. Join the front wheel rotation sensor lead to the right switch housing lead.

18-76 APPENDIX

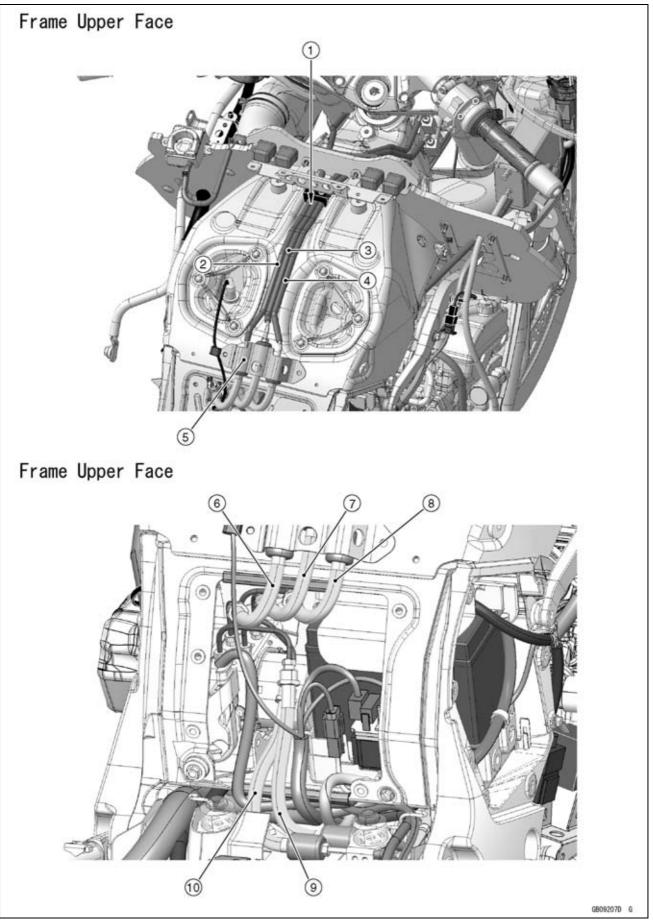
Cable, Wire, and Hose Routing



- 1. Install the brake hose joint as shown in the figure (Face the projection of the brake hose joint backward.).
- 2. Clamp (Hold the brake hose and right grip warmer lead.)
- 3. Brake Pipe
- 4. Brake Pipe
- 5. Brake Hose
- 6. Brake Hose
- 7. Bracket

18-78 APPENDIX

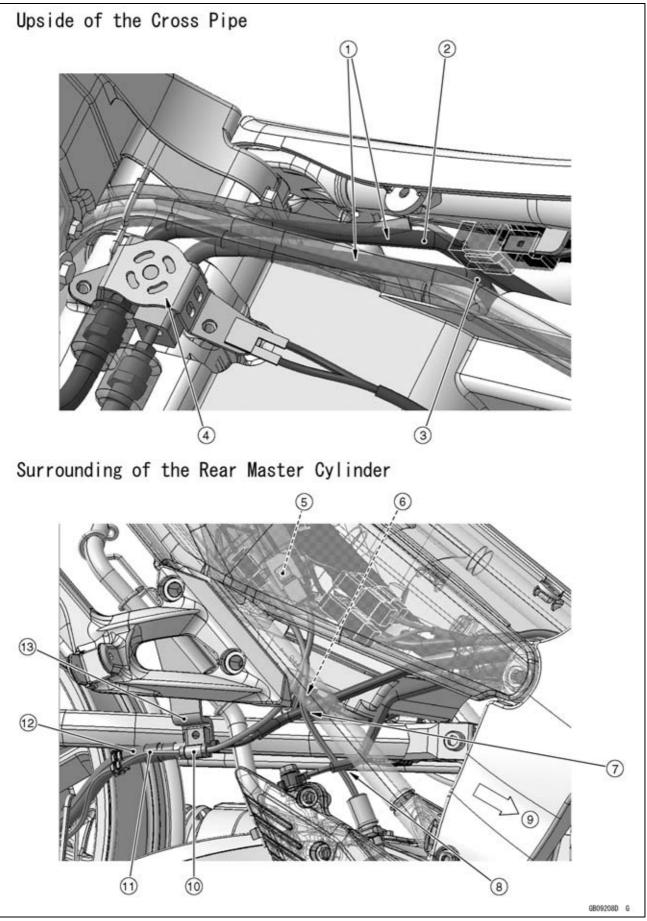
Cable, Wire, and Hose Routing



- 1. Align the brake pipes with the groove of the frame.
- 2. Brake Pipe (Yellow Painted Mark) (K-ACT ABS Hydraulic Unit Side)
- 3. Brake Pipe (White Painted Mark) (K-ACT ABS Hydraulic Unit Side)
- 4. Brake Pipe (Blue Painted Mark) (K-ACT ABS Hydraulic Unit Side)
- 5. Bracket (Push the joint portions of the brake pipes, and clamp them.)
- 6. Brake Hose (Yellow Painted Mark) and Brake Hose Joint Pipe
- 7. Brake Hose (White Painted Mark) and Brake Hose Joint Pipe
- 8. Brake Hose (Blue Painted Mark) and Brake Hose Joint Pipe
- 9. Brake Hose (Purple Painted Mark) and Brake Hose Joint Pipe
- 10. Brake Hose (Green Painted Mark) and Brake Hose Joint Pipe

18-80 APPENDIX

Cable, Wire, and Hose Routing



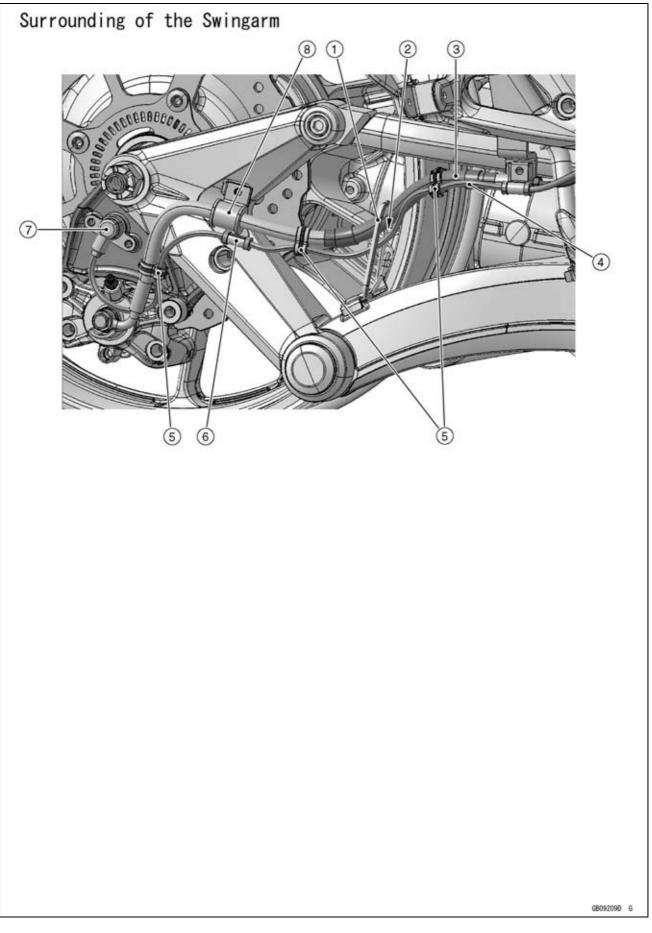
- 1. Run the brake pipes under the hoses and leads.
- 2. Brake Pipe (Purple Painted Mark)
- 3. Brake Pipe (Green Painted Mark)
- 4. Insert the brake pipes to the holes of damper, and fit the projection on the damper into the hole of the bracket.
- 5. Join the rear wheel rotation sensor lead to the main harness.
- 6. Run the leads and brake pipe between the rear frame and torque rod.
- 7. Run the rear brake right switch lead to the outside of the brake pipe.
- 8. Run the rear brake right switch lead to the inside of the brake pipe.

9. Front

- 10. Clamp (Hold the rear wheel rotation sensor lead.)
- 11. Rear Wheel Rotation Sensor Lead
- 12. Brake Hose
- 13. Bracket (Install the bracket to the rear frame.)

18-82 APPENDIX

Cable, Wire, and Hose Routing

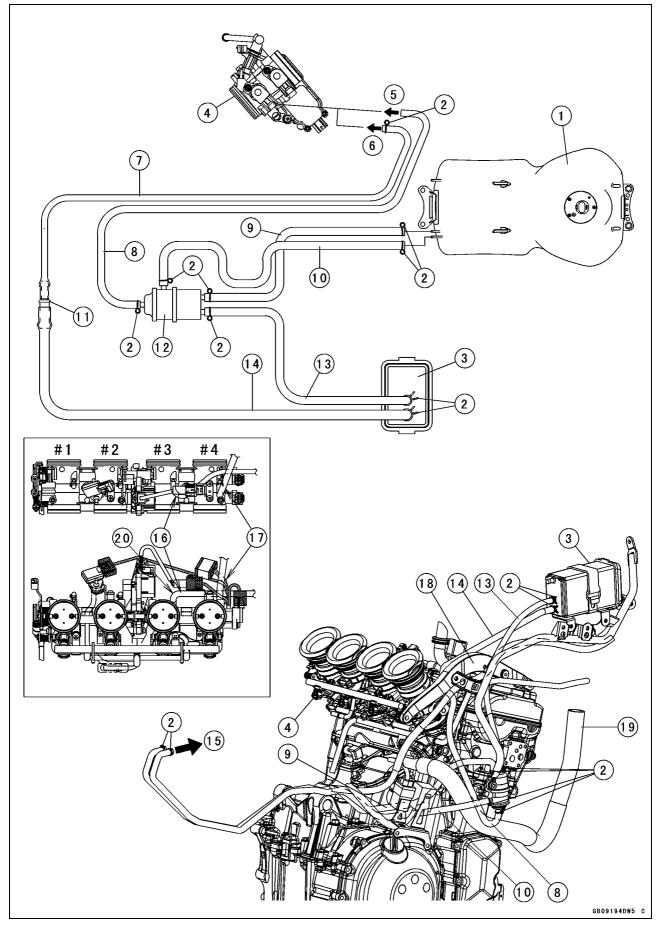


- 1. Clamp
- 2. Run the rear wheel rotation sensor lead through the clamp.
- 3. Brake Hose
- 4. Rear Wheel Rotation Sensor Lead
- 5. Clamps (Hold the brake hose and rear wheel rotation sensor lead, and align the clamp with white painted mark of the rear wheel rotation sensor lead.)
- 6. Clamp (Hold the rear wheel rotation sensor lead.)
- 7. Rear Wheel Rotation Sensor
- 8. Clamp (Hold the brake hose.)

18-84 APPENDIX

Cable, Wire, and Hose Routing

CAL and SEA Models (Frame No, ~ JKBZGT40CCA002249)

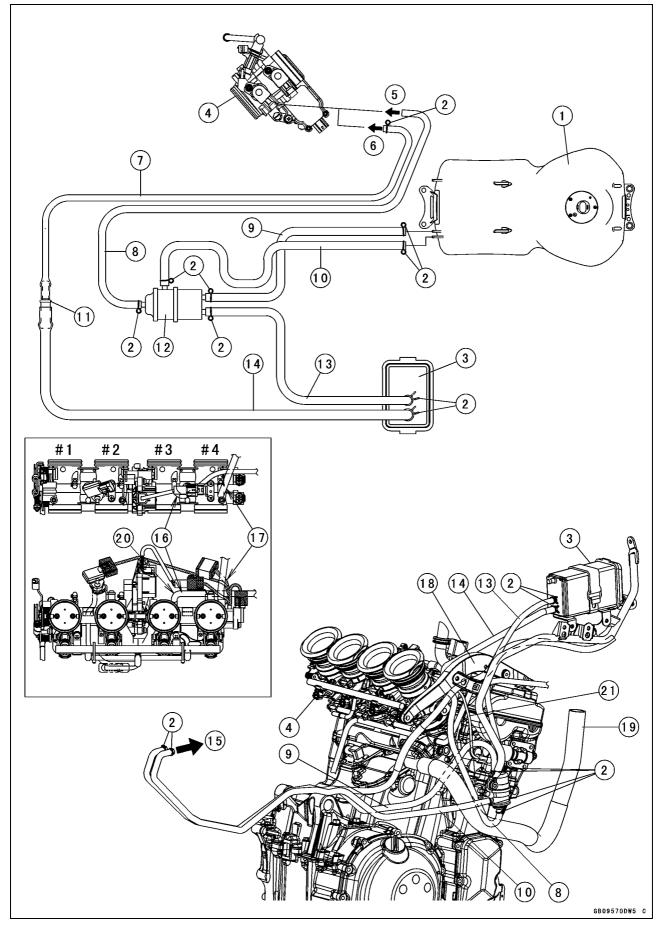


- 1. Fuel Tank
- 2. Clamps
- 3. Canister
- 4. Throttle Body Assy
- 5. To the fitting of the throttle body #3.
- 6. To the fitting of the throttle body #4.
- 7. Hose (Green)
- 8. Hose (White, Align the hose with radiator hose as shown, and run that hose under the main harness and subframe, and then connect the throttle body #3.)
- 9. Hose (Blue)
- 10. Hose (Red)
- 11. Fitting
- 12. Separator
- 13. Hose (Blue) (Run the hose between the subframe and fairing stay.)
- 14. Hose (Green) (Run the hose between the frame and subframe, and connect the canister.)
- 15. To Fuel Tank
- 16. Run the hose (white) under the subthrottle valve actuator lead connector.
- 17. Run the hose (green) over the leads.
- 18. Subframe
- 19. Radiator Hose
- 20. Do not close the hose (white) by pulling the hose when installing.

18-86 APPENDIX

Cable, Wire, and Hose Routing

CAL and SEA Models (Frame No, JKBZGT40CCA002250 ~)



- 1. Fuel Tank
- 2. Clamps
- 3. Canister
- 4. Throttle Body Assy
- 5. To the fitting of the throttle body #3.
- 6. To the fitting of the throttle body #4.
- 7. Hose (Green)
- 8. Hose (White, Align the hose with radiator hose as shown, and run that hose under the main harness and subframe, and then connect the throttle body #3.)
- 9. Hose (Blue)
- 10. Hose (Red)
- 11. Fitting
- 12. Separator
- 13. Hose (Blue) (Run the hose between the subframe and fairing stay.)
- 14. Hose (Green) (Run the hose between the frame and subframe, and connect the canister.)
- 15. To Fuel Tank
- 16. Run the hose (white) under the subthrottle valve actuator lead connector.
- 17. Run the hose (green) over the leads.
- 18. Subframe
- 19. Radiator Hose
- 20. Do not close the hose (white) by pulling the hose when installing.
- 21. Oil Control Solenoid Valve Lead Connector

18-88 APPENDIX

Troubleshooting Guide

NOTE

Refer to the Fuel System chapter for most of DFI trouble shooting guide.
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:

Key knob and engine stop switch not ON Starter lockout switch or gear position switch trouble Starter motor trouble Battery voltage low Starter relay not contacting or operating Starter button not contacting Starter system wiring open or shorted Steering lock unit trouble Engine stop switch trouble Main 30A or ignition fuse blown

Starter motor rotating but engine doesn't turn over:

Vehicle-down sensor (DFI) coming off Starter clutch trouble Starter idle gear trouble

Engine won't turn over:

Valve seizure

Valve seizure Valve lifter seizure Cylinder, piston seizure Crankshaft seizure Connecting rod small end seizure Connecting rod big end seizure Transmission gear or bearing seizure Camshaft seizure Starter idle gear seizure

Balancer bearing seizure

No fuel flow:

No fuel in tank Fuel pump trouble Fuel tank air vent obstructed Fuel filter clogged Fuel line clogged

No spark; spark weak:

Vehicle-down sensor (DFI) coming off Key knob not ON Engine stop switch turned OFF Clutch lever not pulled in or gear not in neutral Battery voltage low Spark plug dirty, broken, or gap maladjusted Spark plug incorrect Stick coil shorted or not in good contact Stick coil trouble

ECU trouble

Camshaft position sensor trouble

- Gear position, starter lockout, or side stand switch trouble
- Crankshaft sensor trouble
- Steering lock unit or engine stop switch shorted

Starter system wiring shorted or open Main 30A or ignition fuse blown

Fuel/air mixture incorrect:

Bypass screw and/or idle adjusting screw maladjusted

Air passage clogged

Air cleaner clogged, poorly sealed, or missing

Leak from oil filler cap, crankcase breather hose or air cleaner drain hose

Compression Low:

Spark plug loose

- Cylinder head not sufficiently tightened down
- 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
- No valve clearance
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Poor Running at Low Speed:

Spark weak:

Battery voltage low Stick coil trouble Stick coil shorted or not in good contact Spark plug dirty, broken, or maladjusted Spark plug incorrect ECU trouble Camshaft position sensor trouble Crankshaft sensor trouble Fuel/air mixture incorrect: Bypass screw maladjusted Air passage clogged Air bleed pipe bleed holes clogged Pilot passage clogged Air cleaner clogged, poorly sealed, or missina Fuel tank air vent obstructed Fuel pump trouble Throttle body assy holder loose Air duct holder loose

Compression low:

Spark plug loose

Troubleshooting Guide

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) Camshaft cam worm Run-on (dieseling): Steering lock unit trouble Engine stop switch trouble Fuel injector trouble Loosen terminal of battery (-) cable or ECU ground lead Carbon accumulating on valve seating surface Engine overheating Other: ECU trouble Throttle body assy not synchronizing Engine oil viscosity too high Drive train trouble Brake dragging Clutch slipping Engine overheating Air suction valve trouble Air switching valve trouble Valve timing abnormal Poor Running or No Power at High Speed:

Firing incorrect: Spark plug dirty, broken, or maladjusted Spark plug incorrect Stick coil shorted or not in good contact trouble
Stick coil trouble
ECU trouble
Fuel/air mixture incorrect: Air cleaner clogged, poorly sealed, or missing Air duct holder loose
Water or foreign matter in fuel Throttle body assy holder loose
Fuel to injector insufficient

Fuel tank air vent obstructed

Fuel line clogged

Fuel pump trouble

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 ECU trouble **Miscellaneous:** Throttle valve won't fully open Brake dragging Clutch slipping Engine overheating Engine oil level too high Engine oil viscosity too high Drive train trouble Camshaft cam worm Air suction valve trouble Air switching valve trouble Catalytic converter melt down due to muffler overheating (KLEEN) Valve timing abnormal

Overheating:

Firing incorrect:

Spark plug dirty, broken, or maladjusted Spark plug incorrect ECU trouble

Muffler overheating:

- For KLEEN, do not run the engine even if with only one cylinder misfiring or poor running (Request the nearest service facility to correct it)
- For 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)

For KLEEN, do not start the engine under misfire due to spark plug fouling or poor connection of the stick coil

For KLEEN, do not coast the motorcycle with the ignition switch off (Turn the ignition switch ON and run the engine) ECU trouble

Fuel/air mixture incorrect:

Throttle body assy holder loose Air duct holder loose

Troubleshooting Guide

Air cleaner poorly sealed, or missing 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 Oil cooler incorrect: Oil cooler clogged Gauge incorrect: 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 relay trouble Fan motor broken Fan blade damaged Water pump not turning Water pump impeller damaged **Over Cooling:** Gauge incorrect: Water temperature gauge broken Water temperature sensor broken Cooling system component incorrect: Thermostat trouble **Clutch Operation Faulty: Clutch slipping:** Friction plate worn or warped Steel plate worn or warped Clutch spring broken or weak Clutch hub or housing unevenly worn Clutch master cylinder trouble Clutch slave 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 hub nut loose Clutch hub spline damaged

Clutch friction plate installed wrong Clutch slave cylinder trouble Clutch fluid deteriorated Clutch fluid leakage Air in clutch fluid line Clutch master cylinder primary or secondary cup damage 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 positioning lever binding Shift return spring weak or broken Shift return spring pin loose Shift mechanism arm spring broken Shift mechanism arm broken Shift pawl broken Jumps out of gear: Shift fork ear worn, bent Gear groove worn Gear dogs and/or dog holes worn Shift drum groove worn Gear positioning lever spring weak or broken Shift fork guide pin worn Drive shaft, output shaft, and/or gear splines worn **Overshifts:** Gear positioning lever spring weak or broken Shift mechanism arm spring broken Abnormal Engine Noise: **Knocking:** ECU trouble Carbon built up in combustion chamber Fuel poor quality or incorrect Spark plug incorrect Overheating Piston slap: Cylinder/piston clearance excessive Cylinder, piston worn Connecting rod bent Piston pin, piston pin hole worn Valve noise: Valve clearance incorrect Valve spring broken or weak Camshaft bearing worn Valve lifter worn Other noise: Connecting rod small end clearance excessive

Troubleshooting Guide

Connecting rod big end clearance excessive Piston ring/groove clearance excessive Piston ring worn, broken, or stuck Piston ring groove worn Piston seizure, damage Cylinder head gasket leaking Exhaust pipe leaking at cylinder head connection Crankshaft runout excessive Engine mount loose Crankshaft bearing worn Primary gear worn or chipped Camshaft chain tensioner trouble Camshaft chain, sprocket, guide worn Air suction valve damaged Air switching valve damaged Alternator rotor loose Catalytic converter melt down due to muffler overheating (KLEEN) Oil control valve damaged Variable valve timing actuator damaged Balancer gear worn or chipped Balancer shaft position maladjusted Balancer bearing worn Balancer rubber damper damaged

Abnormal Drive Train Noise:

Clutch noise:

Clutch damper weak or damaged Clutch housing/friction plate clearance excessive Clutch housing gear worn Wrong installation of outside friction plate Transmission noise: Bearings worn Transmission gear worn or chipped Metal chips jammed in gear teeth Engine oil insufficient Drive line noise: Rear wheel coupling damaged Bevel gear bearing worn Bevel gears worn or chipped Insufficient lubricant Bevel gears misaligned Tetra lever links bearings worn **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 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 filter clogged Engine oil level too low Engine oil viscosity too low Camshaft bearing worn Crankshaft bearing worn Oil pressure switch damaged Wiring faulty Relief valve stuck open O-ring at the oil passage in the crankcase damaged

Exhaust Smokes Excessively:

White smoke: Piston oil ring worn Cylinder worn Valve oil seal damaged Valve guide worn Engine oil level too high Black smoke: Air cleaner clogged Brown smoke: Air duct holder loose 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 Tetra lever link bearing worn Swingarm pivot bearing worn Rim warped, or not balanced Wheel bearing worn Handlebar holder bolt loose Steering stem nut loose Front, rear axle runout excessive Engine mounting bolt loose Handlebar pulls to one side: Frame bent

18-92 APPENDIX

Troubleshooting Guide

Wheel misalignment Tetra lever links bent or twisted Swingarm bent or twisted Swingarm pivot shaft runout excessive Steering maladjusted Front fork bent Right and left front fork oil level uneven Shock absorption unsatisfactory: (Too hard) Front fork oil excessive Front fork oil viscosity too high Rear shock absorber adjustment too hard Tire air pressure too high Front fork bent (Too soft) Tire air pressure too low Front fork oil insufficient and/or leaking Front fork oil viscosity too low Rear shock adjustment too soft Front fork, rear shock absorber spring weak Rear shock absorber oil leaking

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 Master cylinder scratched inside

Battery Trouble:

Battery discharged: Charge insufficient Battery faulty (too low terminal voltage) Battery cable making poor contact Load excessive (e.g., bulb of excessive wattage) Steering lock unit trouble Alternator trouble Wiring faulty Regulator/rectifier trouble Battery overcharged: Alternator trouble

Regulator/rectifier trouble Battery faulty

MODEL APPLICATION

Year	Model	Beginning Frame No.
2010	ZG1400CAF	JKBZGNC1□AA000001 JKBZGT40CCA000001
2010	ZG1400DAF	JKBZGND1□AA000001
2011	ZG1400CBF	JKBZGNC1□AA006001 JKBZGT40CCA006001

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



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Part No.99924-1431-02