ZZR1400 ABS
Ninja ZX-14R ABS

Motorcycle
Service Manual



Kawasaki

Quick Reference Guide

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

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

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Motorcycle Service Manual

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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.

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LIST OF ABBREVIATIONS

A	ampere(s)	in.	inch(es)
ABDC	after bottom dead center	ISC	idle speed control
ABS	antilock brake system	JASO	Japanese Automotive Standards Organization
AC	alternating current	KDS	Kawasaki diagnostic system
Ah	ampere hour	km/h	kilometers per hour
API	American Petroleum Institute	L	liter(s)
ATDC	after top dead center	lb	pound(s)
BBDC	before bottom dead center	LCD	liquid crystal display
BDC	bottom dead center	LED	light emitting diode
BTDC	before top dead center	m	meter(s)
°C	degree(s) celsius	min	minute(s)
cmHg	centimeters of mercury	mmHg	millimeters of mercury
CPU	central processing unit	mph	miles per hour
cu in.	cubic inch(es)	N	newton(s)
DC	direct current	oz	ounce(s)
DFI	digital fuel injection	Pa	pascal(s)
DOHC	double overhead camshaft	PS	horsepower
DOT	Department of Transportation	psi	pound(s) per square inch
ECU	electronic control unit	qt	quart(s)
F	farad(s)	r	revolution
°F	degree(s) fahrenheit	rpm	revolution(s) per minute
FI	fuel injection	s	second(s)
ft	foot, feet	SAE	Society of Automotive Engineers
g	gram(s)	TDC	top dead center
gal	gallon(s)	TIR	total indicator reading
h	hour(s)	V	volt(s)
HP	horsepower(s)	W	watt(s)
IC	integrated circuit	Ω	ohm(s)

COUNTRY AND AREA CODES

AT	Austria	IN	India
AU	Australia	MY	Malaysia
CA	Canada	PH	Philippines
CAL	California	SEA-B1	Southeast Asia B1 (with Evaporative Emission Control System)
CH	Switzerland	SEA-B3	Southeast Asia B3
CN	China	TH	Thailand
DE	Germany	US	United States
EUR	Europe	WVTA (FULL)	WVTA Model (Full Power)
GB	United Kingdom	GB WVTA (FULL)	GB WVTA Model (Full Power)
ID	Indonesia		

EMISSION CONTROL INFORMATION

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

1. Crankcase Emission Control System

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

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

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

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

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

NOTE

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

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

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

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

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

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

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

Foreword

This manual is designed primarily for use by trained mechanics in a properly equipped shop. However, it contains enough detail and basic information to make it useful to the owner who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily. Whenever the owner has insufficient experience or doubts his ability to do the work, all adjustments, maintenance, and repair should be carried out only by qualified mechanics.

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

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

To get the longest life out of your vehicle.

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

How to Use This Manual

In this manual, the product is divided into its major systems and these systems make up the manual's chapters. The Quick Reference Guide shows you all of the product's system and assists in locating their chapters. Each chapter in turn has its own comprehensive Table of Contents.

For example, if you want stick 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 Stick Coil section.

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

⚠ DANGER

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

⚠ WARNING

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

○*NOTE indicates information that may help or guide you in the operation or service of the vehicle.*

- Indicates a procedural step or work to be done.

○Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a NOTE.

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

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

General Information

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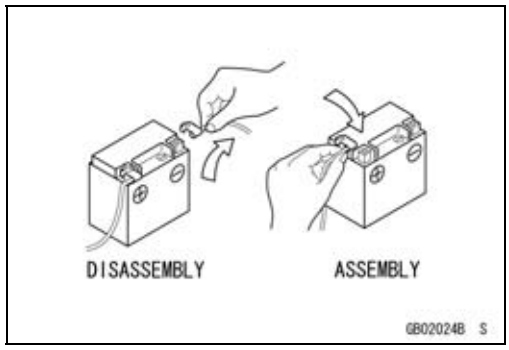
Before Servicing

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.

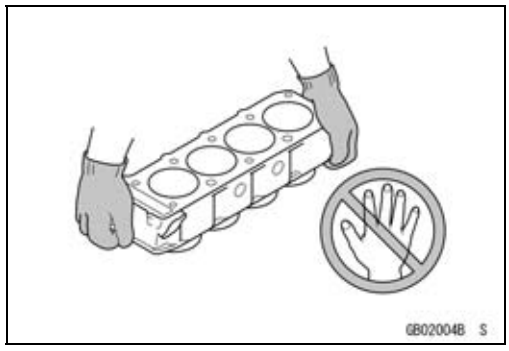
Battery Ground

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.



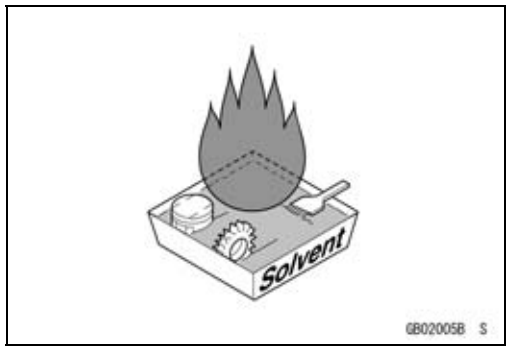
Edges of Parts

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



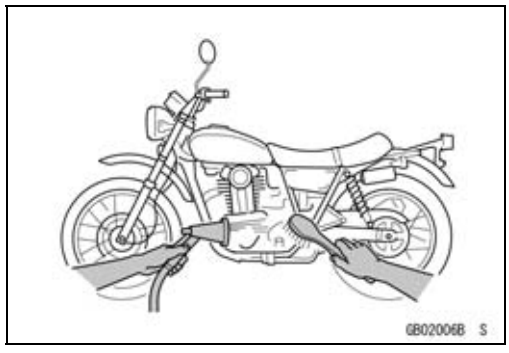
Solvent

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



Cleaning Vehicle before Disassembly

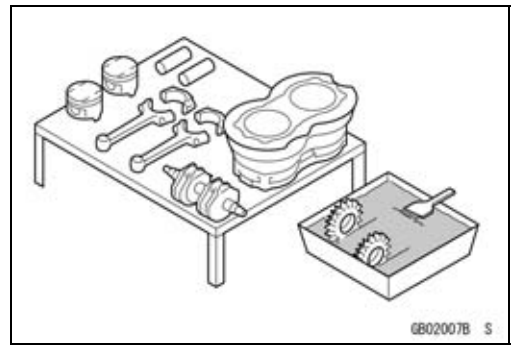
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



Before Servicing

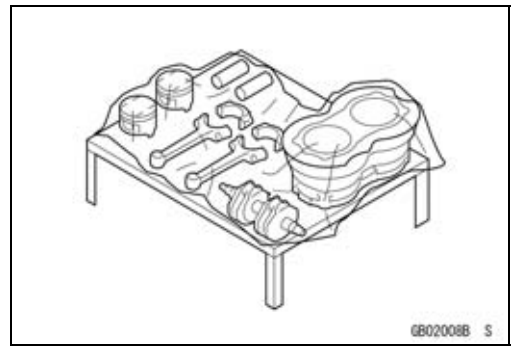
Arrangement and Cleaning of Removed Parts

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.



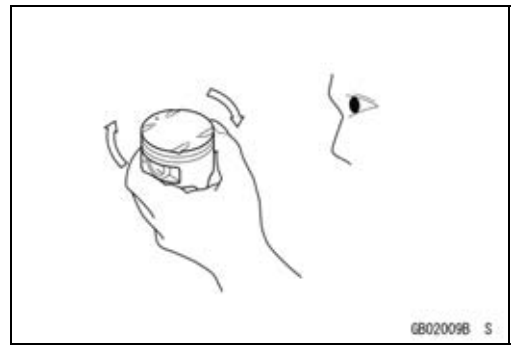
Storage of Removed Parts

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.



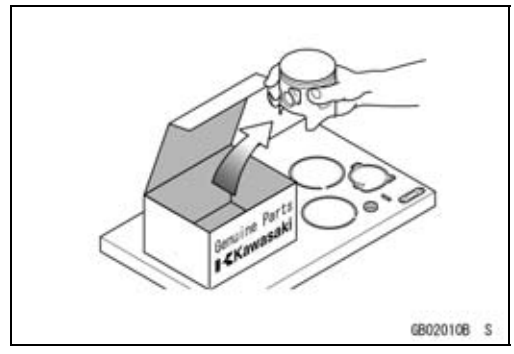
Inspection

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.



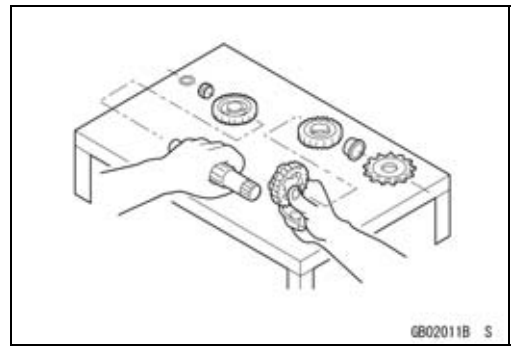
Replacement Parts

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.



Assembly Order

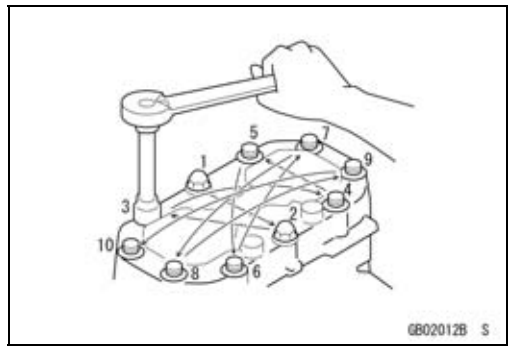
In most cases assembly order is the reverse of disassembly, however, if assembly order is provided in this Service Manual, follow the procedures given.



Before Servicing

Tightening Sequence

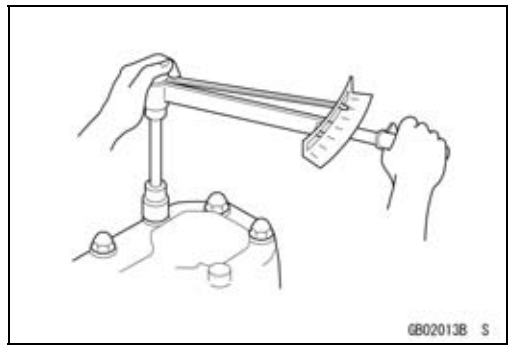
Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them according to the specified sequence to prevent case warpage or deformation which can lead to malfunction. Conversely when loosening the bolts, nuts, or 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

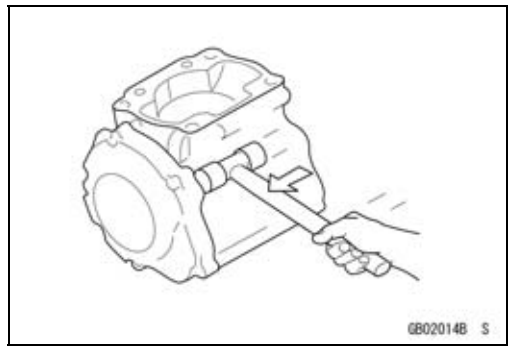
Incorrect torque applied to a bolt, nut, or screw may lead to serious damage. Tighten fasteners to the specified torque using a good quality torque wrench.

All of the tightening torque values are for use with dry, solvent - cleaned threads unless otherwise indicated. If a fastener which should have dry, clean threads gets contaminated with lubricant, etc., applying even the specified torque could damage it.



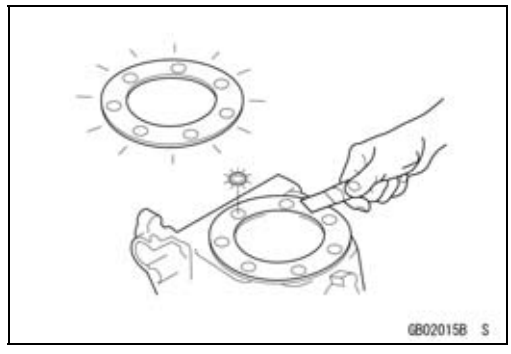
Force

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.



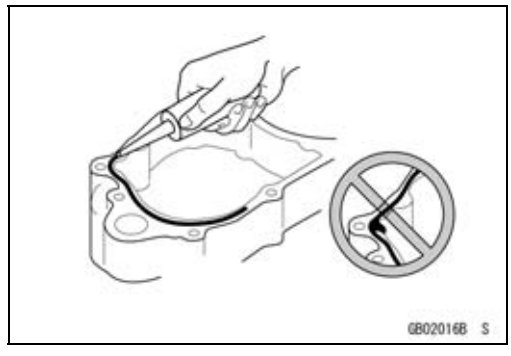
Gasket, O-ring

Hardening, shrinkage, or damage of both gaskets and O-rings after disassembly can reduce sealing performance. Remove 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

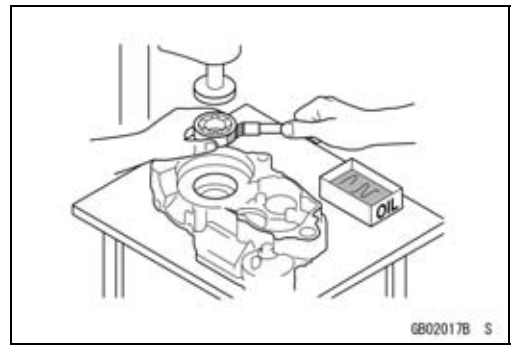
For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



Before Servicing

Press

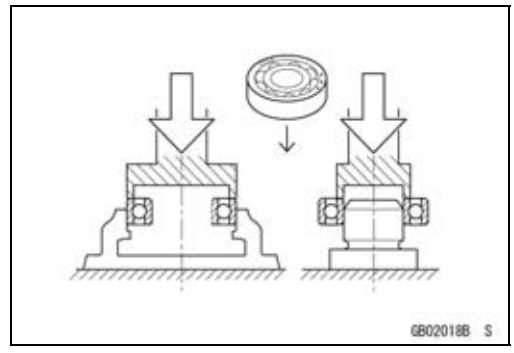
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



Ball Bearing and Needle Bearing

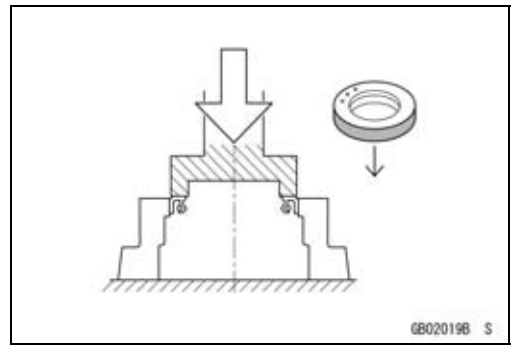
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

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

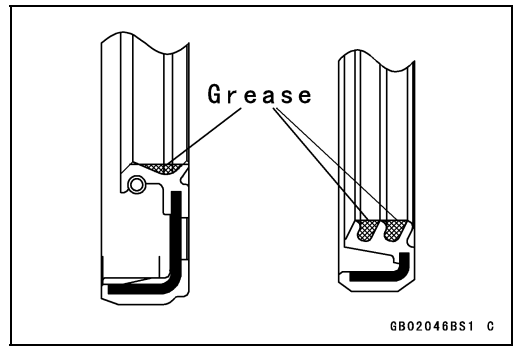


Oil Seal, Grease Seal

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.

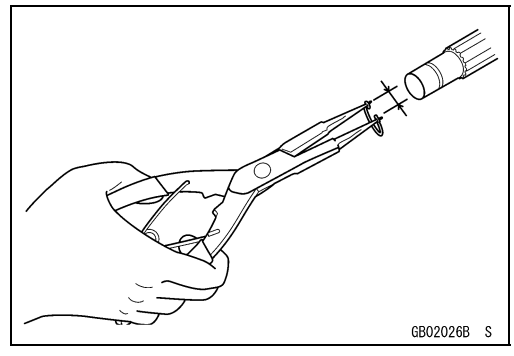


Apply specified grease to the lip of seal before installing the seal.



Circlips, Cotter Pins

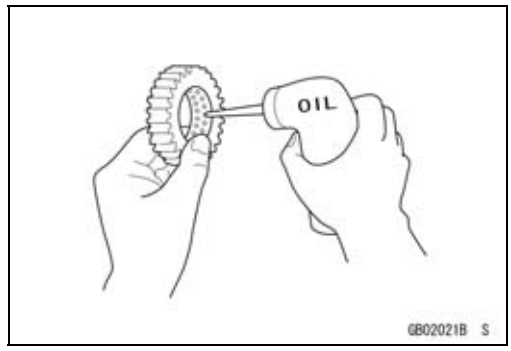
Replace the circlips or cotter pins that were removed with new ones. Take care not to open the clip excessively when installing to prevent deformation.



Before Servicing

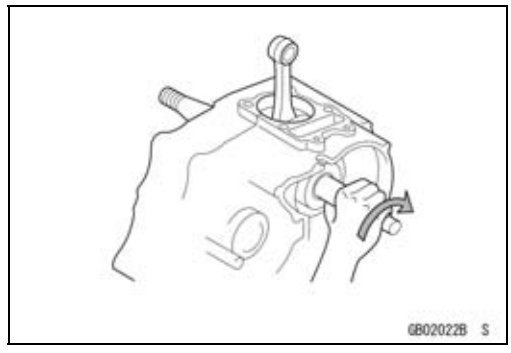
Lubrication

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.



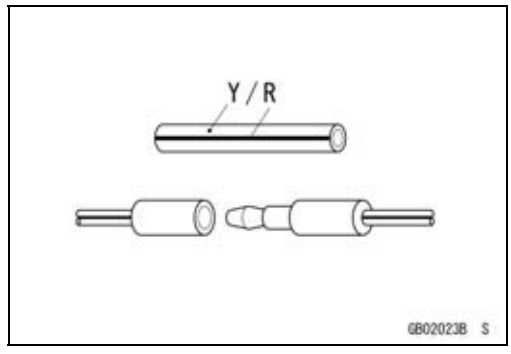
Direction of Engine Rotation

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).



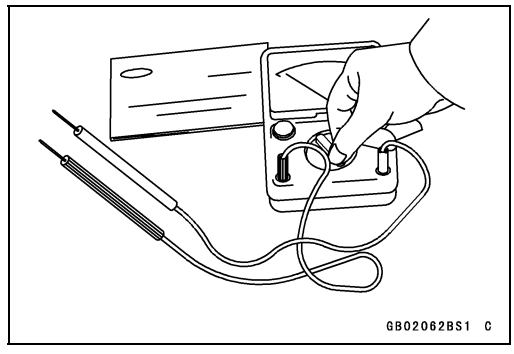
Electrical Wires

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.



Handling Electronic Parts

Severe impacts to electronic parts such as the ECU, sensor, and relay can damage them. If dropped on a hard surface, replace such parts with new ones.

If a high voltage that is created by static electricity is applied to the electric parts, it could cause them to fail. To avoid this, touch a non-painted metal surface to discharge any static electricity that is accumulated on your body before inspecting or replacing electric parts.

Be careful not to touch the electrical terminals of the electronic parts. The static electricity discharged from your body could damage them or deform the electrical terminals.

Model Identification

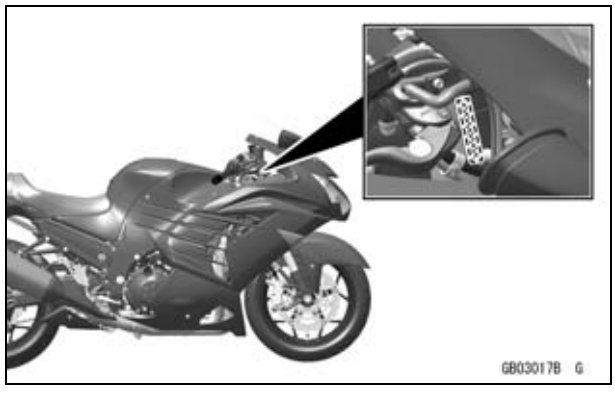
ZX1400HG Left Side View



ZX1400HG Right Side View



Frame Number



Engine Number



Model Identification

ZX1400JG Left Side View



ZX1400JG Right Side View



General Specifications

Items	ZX1400HG ~ HH/JG ~ JH
Dimensions	
Overall Length	2 170 mm (85.43 in.)
Overall Width	770 mm (30.3 in.) (ID, MY, PH, SEA-B1, TH) 780 mm (30.7 in.)
Overall Height	1 170 mm (46.06 in.)
Wheelbase	1 480 mm (58.27 in.)
Road Clearance	125 mm (4.92 in.)
Seat Height	800 mm (31.5 in.)
Curb Mass:	269 kg (593 lb)
Front	135 kg (298 lb)
Rear	134 kg (295 lb)
Fuel Tank Capacity	22 L (5.8 US gal.)
Performance	
Minimum Turning Radius	3.1 m (10.2 ft)
Engine	
Type	4-stroke, DOHC, 4-cylinder
Cooling System	Liquid-cooled
Bore and Stroke	84.0 × 65.0 mm (3.3 × 2.6 in.)
Displacement	1 441 cm³ (87.93 cu in.)
Compression Ratio	12.3:1
Maximum Horsepower	147.2 kW (200 PS) @10 000 r/min (rpm) (AU) 147 kW (200 PS) @10 000 r/min (rpm) (CA, CAL, US) – – –
Maximum Torque	158.2 N·m (16.1 kgf·m, 117 ft·lb) @7 500 r/min (rpm) (AU) 158 N·m (16.1 kgf·m, 117 ft·lb) @7 500 r/min (rpm) (CA, CAL, US) – – –
Fuel System	FI (Fuel Injection), MIKUNI 44EIDW × 4
Fuel Type:	
Minimum Octane Rating:	
Research Octane Number (RON)	95
Antiknock Index (RON + MON)/2	90
Starting System	Electric starter
Ignition System	Battery and coil (transistorized)
Timing Advance	Electronically advanced (IC igniter in ECU)
Ignition Timing	10° BTDC @1 100 r/min (rpm) to 40.1° BTDC @6 000 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:	
Intake:	
Open	34° BTDC
Close	72° ABDC
Duration	286°

General Specifications

Items	ZX1400HG ~ HH/JG ~ JH
Exhaust:	
Open	66° BBDC
Close	36° ATDC
Duration	282°
Lubrication System	Forced lubrication (wet sump)
Engine Oil:	
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2
Viscosity	SAE 10W-40
Capacity	4.6 L (4.9 US qt)
Drive Train	
Primary Reduction System:	
Type	Gear
Reduction Ratio	1.556 (84/54)
Clutch Type	Wet multi disc
Transmission:	
Type	6-speed, constant mesh, return shift
Gear Ratios:	
1st	2.611 (47/18)
2nd	1.947 (37/19)
3rd	1.545 (34/22)
4th	1.333 (32/24)
5th	1.154 (30/26)
6th	1.036 (29/28)
Final Drive System:	
Type	Chain drive
Reduction Ratio	2.471 (42/17)
Overall Drive Ratio	3.980 @Top gear
Frame	
Type	Press backbone
Caster (Rake Angle)	23.0°
Trail	93 mm (3.7 in.)
Front Tire:	
Type	Tubeless
Size	120/70ZR17 M/C (58W)
Rim Size	J17M/C × MT3.50
Rear Tire:	
Type	Tubeless
Size	190/50ZR17 M/C (73W)
Rim Size	J17M/C × MT6.00
Front Suspension:	
Type	Telescopic fork (upside-down)
Wheel Travel	117 mm (4.61 in.)

General Specifications

Items	ZX1400HG ~ HH/JG ~ JH
Rear Suspension:	
Type	Swingarm (uni-trak)
Wheel Travel	124 mm (4.88 in.)
	(Öhlins) 120 mm (4.72 in.)
Brake Type:	
Front	Dual discs
Rear	Single disc
Electrical Equipment	
Battery	12 V 12 Ah (10 HR)
Headlight:	
Type	Semi-sealed beam
High Beam	12 V (65 W + 55 W) × 2
Low Beam	12 V 55 W × 2
Brake/Tail Light	LED
Alternator:	
Type	Three-phase AC
Maximum Output	14.0 V – 35.0 A @5 000 r/min (rpm)

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

Unit Conversion Table

Prefixes for Units:

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

Units of Mass:

kg	×	2.205	=	lb
g	×	0.03527	=	oz

Units of Volume:

L	×	0.2642	=	gal (US)
L	×	0.2200	=	gal (IMP)
L	×	1.057	=	qt (US)
L	×	0.8799	=	qt (IMP)
L	×	2.113	=	pint (US)
L	×	1.816	=	pint (IMP)
mL	×	0.03381	=	oz (US)
mL	×	0.02816	=	oz (IMP)
mL	×	0.06102	=	cu in.

Units of Force:

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

Units of Length:

km	×	0.6214	=	mile
m	×	3.281	=	ft
mm	×	0.03937	=	in.

Units of Torque:

N·m	×	0.1020	=	kgf·m
N·m	×	0.7376	=	ft·lb
N·m	×	8.851	=	in·lb
kgf·m	×	9.807	=	N·m
kgf·m	×	7.233	=	ft·lb
kgf·m	×	86.80	=	in·lb

Units of Pressure:

kPa	×	0.01020	=	kgf/cm²
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cmHg
kgf/cm²	×	98.07	=	kPa
kgf/cm²	×	14.22	=	psi
cmHg	×	1.333	=	kPa

Units of Speed:

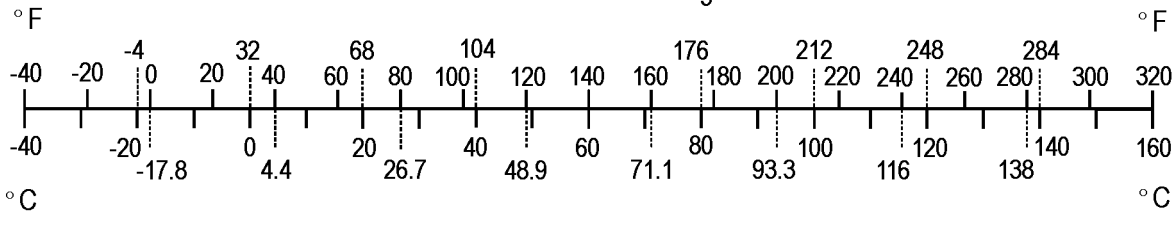
km/h	×	0.6214	=	mph

Units of Power:

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

Units of Temperature:

$$\frac{9(°C+40)}{5} - 40 = °F \qquad \frac{5(°F+40)}{9} - 40 = °C$$



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.**

Periodic Inspection

*A: Service at number of years shown or indicated odometer reading intervals, whichever comes first.
*B: For higher odometer readings, repeat at the frequency interval established here.
*C: Service more frequently when operating in severe conditions: dusty, wet, muddy, high speed, or frequent starting/stopping.
*D: Other than US, CA, AU, ID, PH and SEA-B3 Models
○: Emission Related Item

Q: Inspection
: Change or Replace
: Lubrication

	Items	year (*A)	Odometer Reading (*B) × 1 000 km (× 1 000 mile) 1 (0.6)	6 (3.8)	12 (7.6)	18 (11.4)	24 (15.2)	See Page
Fuel System								
○	Air cleaner element (*C)							2-18
○	Idle speed		Q		Q		Q	2-19
○	Throttle control system (play, smooth return, no drag)	Q:1	Q		Q		Q	2-19
○	Engine vacuum synchronization				Q		Q	2-20
	Fuel system	Q:1	Q		Q		Q	2-23
	Fuel filter							2-23
	Fuel hose	:5						2-26
○	Evaporative emission control system (*D)		Q	Q	Q	Q	Q	2-28
Cooling System								
	Coolant level		Q		Q		Q	2-29
	Cooling system	Q:1	Q		Q		Q	2-29
	Coolant, water hose and O-ring	:3	: every 36 000 km (22 500 mile)					2-29, 2-32
Engine Top End								
○	Valve clearance (US and CA Models)						Q	2-32
	Valve clearance (Other than US and CA Models)		Q: every 42 000 km (26 250 mile)					2-32
○	Air suction system				Q		Q	2-36
Clutch								
	Clutch operation (play, engagement, disengagement)		Q		Q		Q	2-37
	Clutch fluid level	Q:1	Q		Q		Q	2-37
	Clutch fluid, hose and pipe	Q:1	Q		Q		Q	2-36
	Clutch fluid	:2						2-38

2-4 PERIODIC MAINTENANCE

Periodic Maintenance Chart

	Items	year (*A)	Odometer Reading (*B) × 1 000 km (× 1 000 mile)					See Page
			1 (0.6)	6 (3.8)	12 (7.6)	18 (11.4)	24 (15.2)	
	Clutch hose/rubber parts of clutch master cylinder and slave cylinder	:4	: every 48 000 km (30 000 mile)					2-39, 2-40
Engine Lubrication System								
	Engine oil and oil filter (*C)	:1						2-41, 2-42
Wheels and Tires								
	Tire air pressure	:1						2-43
	Wheel and tire	:1						2-43
	Wheel bearing damage	:1						2-44
Final Drive								
	Drive chain lubrication condition (*C)		: every 600 km (400 mile)					2-45
	Drive chain slack (*C)		: every 1 000 km (600 mile)					2-45
	Drive chain wear (*C)							2-47
	Drive chain guide wear							2-48
Brakes								
	Brake system	:1						2-49
	Brake operation (effectiveness, play, no drag)	:1						2-50
	Brake fluid level	:1						2-50
	Brake fluid (front and rear)	:2						2-52
	Brake hose	:4						2-54
	Rubber parts of brake master cylinder and caliper	:4	: every 48 000 km (30 000 mile)					2-56, 2-58
	Brake pad wear (*C)							2-62
	Brake light switch operation							2-63
Suspension								
	Suspension system	:1						2-63
Steering								
	Steering play	:1						2-65
	Steering stem bearing	:2						2-66
Electrical System								
	Electrical system	:1						2-67
○	Spark plug							2-72
Others								
	Chassis parts	:1						2-73
	Condition of bolts, nuts and fasteners							2-74

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. All of the values are for use with dry solvent - cleaned threads unless otherwise indicated.

Letters used in the “Remarks” column mean:
AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.
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
S: Follow the specified tightening sequence.
Si: Apply silicone grease.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System (DFI)				
Front Air Intake Duct Mounting Bolts	8.0	0.82	71 in·lb	
Idle Speed Control Valve Actuator Bracket Bolts	8.0	0.82	71 in·lb	
Idle Speed Control Valve Actuator Mounting Bolts	8.3	0.85	73 in·lb	
Intake Air Temperature Sensor Screw	0.50	0.05	4.4 in·lb	
Air Cleaner Cap Bolts	8.0	0.82	71 in·lb	
Rear Air Intake Duct Mounting Bolts	10	1.0	89 in·lb	L
Air Intake Duct Clamp Bolts	7.0	0.71	62 in·lb	
Air Cleaner Element Cover Bolts	8.0	0.82	71 in·lb	
Duct Clamp Bolts	2.0	0.20	18 in·lb	
Drain Hose Fitting	20	2.0	15	L
Breather Pipe Bolt	8.0	0.82	71 in·lb	L
Throttle Case Cover Screws (ZX1400H Model)	3.5	0.36	31 in·lb	
Throttle Case Cover Screws (ZX1400J Model)	3.0	0.31	27 in·lb	
Delivery Pipe Mounting Screws	5.0	0.51	44 in·lb	
Throttle Cable Holder Screw	4.0	0.41	35 in·lb	
Throttle Body Assy Holder Bolts	10	1.0	89 in·lb	S
Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
Vehicle-down Sensor Bracket Bolt	8.0	0.82	71 in·lb	
Vehicle-down Sensor Mounting Bolts	6.0	0.61	53 in·lb	
Spark Plugs	13	1.3	115 in·lb	
Water Temperature Sensor	12	1.2	106 in·lb	
Gear Position Sensor Bolt	10	1.0	89 in·lb	L
Gear Position Sensor Holder Bolts (L = 20 mm)	5.0	0.51	44 in·lb	L
Crankshaft Sensor Bolts	6.0	0.61	53 in·lb	L
Oxygen Sensor	25	2.5	18	
Fuel Tank Bolts	8.0	0.82	71 in·lb	
Fuel Tank Cap Bolts	4.5	0.46	40 in·lb	
Fuel Level Sensor Bolts	7.0	0.71	62 in·lb	L
Bracket Bolts	8.0	0.82	71 in·lb	
Fuel Pump Assembly Screws	0.98	0.10	8.7 in·lb	R

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel Pump Bolts	10	1.0	89 in·lb	L, S
Canister Bracket Screws	1.2	0.12	11 in·lb	
Hose Bracket Bolt	8.0	0.82	71 in·lb	
Purge Valve Bracket Bolt	8.0	0.82	71 in·lb	
Purge Valve Mounting Nut	8.0	0.82	71 in·lb	
Cooling System				
Radiator Upper Bolts	20	2.0	15	
Water Hose Clamp Screws	3.0	0.31	27 in·lb	
Coolant Fitting Bolts	9.0	0.92	80 in·lb	L
Thermostat Housing Mounting Bolts	10	1.0	89 in·lb	
Radiator Stay Bolt	8.0	0.82	71 in·lb	
Radiator Lower Bolt	8.0	0.82	71 in·lb	
Thermostat Housing Cover Bolts	6.0	0.61	53 in·lb	
Cylinder Fitting Mounting Bolts	10	1.0	89 in·lb	
Oil Cooler Mounting Bolts	12	1.2	106 in·lb	L, S
Water Pump Mounting Bolts	12	1.2	106 in·lb	
Coolant Reserve Tank Cap	–	–	–	Hand-tighten
Water Pump Cover Bolts	12	1.2	106 in·lb	
Coolant Drain Bolt	10	1.0	89 in·lb	
Coolant Reserve Tank Bolts	8.0	0.82	71 in·lb	L
Engine Top End				
Air Suction Valve Cover Bolts	10	1.0	89 in·lb	L
Cylinder Head Cover Bolts	10	1.0	89 in·lb	S
Camshaft Sprocket Mounting Bolts	15	1.5	11	L
Throttle Body Assy Holder Bolts	10	1.0	89 in·lb	S
Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
Camshaft Cap Bolts	12	1.2	106 in·lb	S
Water Passage Plugs	20	2.0	15	L
Front Camshaft Chain Guide Bolt (Upper)	25	2.5	18	
Cylinder Head Bolts (M6)	12	1.2	106 in·lb	S
Cylinder Head Bolts (M11)	see the text	–	–	MO, S
Camshaft Chain Tensioner Mounting Bolts	10	1.0	89 in·lb	
Front Camshaft Chain Guide Bolt (Lower)	12	1.2	106 in·lb	
Engine Bracket Bolts	25	2.5	18	R, S
Front Engine Mounting Bolts	60	6.1	44	R, S
Muffler Cover Bolts	10	1.0	89 in·lb	
Muffler Guard Bolts	8.0	0.82	71 in·lb	
Muffler Body Mounting Bolts	34	3.5	25	
Muffler Body Cover Bolts	8.0	0.82	71 in·lb	L
Exhaust Pipe Manifold Holder Nuts	17	1.7	13	S
Muffler Body Clamp Bolts	17	1.7	13	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Clutch				
Clutch Reservoir Cap Stopper Screw (ZX1400H Model)	2.0	0.20	18 in·lb	
Clutch Reservoir Cap Stopper Screw (ZX1400J Model)	1.2	0.12	11 in·lb	
Clutch Reservoir Bracket Bolt	9.0	0.92	80 in·lb	
Clutch Cover Bolts	10	1.0	89 in·lb	L (1), S
Oil Filler Plug	–	–	–	Hand-tighten
Clutch Hose Banjo Bolts	25	2.5	18	
Clutch Reservoir Bolt	8.0	0.82	71 in·lb	
Clutch Lever Pivot Bolt	1.0	0.10	8.9 in·lb	Si
Clutch Master Cylinder Bleed Valve	8.0	0.82	71 in·lb	
Clutch Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Starter Lockout Switch Screw	0.70	0.07	6.2 in·lb	L
Clutch Master Cylinder Clamp Bolts	10.3	1.05	91 in·lb	S
Clutch Hose Clamp Bolts	8.0	0.82	71 in·lb	
Clutch Spring Bolts	11	1.1	97 in·lb	
Sub Clutch Hub Bolts	25	2.5	18	L
Clutch Hub Nut	135	13.8	100	R
Clutch Slave Cylinder Bleed Valve	8.5	0.87	75 in·lb	
Clutch Slave Cylinder Bolts	8.0	0.82	71 in·lb	L
Engine Lubrication System				
Oil Pipe Mounting Bolts	10	1.0	89 in·lb	L
Oil Pipe Bolts	10	1.0	89 in·lb	L
Oil Passage Plug (R1/4)	15	1.5	11	L
Oil Cooler Mounting Bolts	12	1.2	106 in·lb	L, S
Oil Pump Cover Bolts	10	1.0	89 in·lb	
Oil Pan Plate Bolts	10	1.0	89 in·lb	L
Oil Filter	17	1.7	13	G, R
Oil Filter Holder Mounting Bolt	35	3.6	26	L
Oil Pressure Relief Valve	15	1.5	11	L
Oil Pan Bolts	10	1.0	89 in·lb	
Oil Pressure Switch Terminal Bolt	2.0	0.20	18 in·lb	G
Oil Pressure Switch	15	1.5	11	LG
Engine Oil Drain Bolt	29	3.0	21	
Oil Passage Plug (R3/8)	20	2.0	15	L
Engine Removal/Installation				
Engine Bracket Bolts	25	2.5	18	R, S
Front Engine Mounting Bolts	60	6.1	44	R, S
Adjusting Collars	15	1.5	11	M, S
Engine Mounting Nuts	60	6.1	44	R, S
Crankshaft/Transmission				
Breather Cover Bolts (L = 25 mm)	10	1.0	89 in·lb	L

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Breather Cover Bolt (L = 35 mm)	10	1.0	89 in·lb	
Breather Cover Plate Screws	10	1.0	89 in·lb	L
Connecting Rod Big End Nuts	see the text	←	←	MO, R
Oil Nozzle Pipe Mounting Bolts	25	2.5	18	
Oil Passage Plugs (R3/8)	20	2.0	15	L
Bearing Position Plate Screws	10	1.0	89 in·lb	L
Shift Drum Bearing Holder Screws	10	1.0	89 in·lb	L
Drive Shaft Cover Bolts	25	2.5	18	L
Crankcase Bolts (M7, L = 60 mm)	20	2.0	15	S
Crankcase Bolt (M7, L = 110 mm)	20	2.0	15	S
Crankcase Bolts (M7, L = 45 mm)	20	2.0	15	S
Crankcase Bolts (M10, L = 90 mm)	49	5.0	36	MO, S
Crankcase Bolt (M7, L = 85 mm)	20	2.0	15	S
Crankcase Bolt (M7, L = 50 mm)	20	2.0	15	S
Crankcase Bolts (M10, L = 120 mm)	49	5.0	36	MO, S
Crankcase Bolts (M7, L = 65 mm)	20	2.0	15	S
Crankcase Bolts (M6, L = 40 mm)	12	1.2	106 in·lb	S
Crankcase Bolts (M8, L = 70 mm)	27	2.8	20	S
Crankcase Bolt (M6, L = 50 mm)	12	1.2	106 in·lb	S
Crankcase Bolts (M6, L = 25 mm)	12	1.2	106 in·lb	S
Crankcase Bolts (M8, L = 80 mm)	27	2.8	20	S
Crankcase Bolt (M6, L = 65 mm)	12	1.2	106 in·lb	S
Balancer Shaft Clamp Bolts	10	1.0	89 in·lb	
Balancer Shaft Clamp Lever Bolts	25	2.5	18	
Starter Clutch Shaft Bolt	10	1.0	89 in·lb	L
Starter Clutch Shaft Plate Bolt	10	1.0	89 in·lb	L
Shift Shaft Return Spring Pin	29	3.0	21	L
Torque Limiter Bolt	25	2.5	18	L
Gear Positioning Lever Bolt	12	1.2	106 in·lb	
Shift Drum Cam Holder Bolt	12	1.2	106 in·lb	L
Gear Position Sensor Holder Bolt (L = 14 mm)	6.0	0.61	53 in·lb	L
Shift Pedal Bolt	8.0	0.82	71 in·lb	
Gear Position Sensor Holder Bolts (L = 20 mm)	5.0	0.51	44 in·lb	L
Wheels/Tires				
Front Axle Clamp Bolts	20	2.0	15	AL
Front Axle Nut	130	13.3	95.9	
Rear Axle Nut	130	13.3	95.9	
Final Drive				
Engine Sprocket Cover Bolts	10	1.0	89 in·lb	L (1)
Plate Mounting Bolts	10	1.0	89 in·lb	L
Chain Guide Bolts (M6)	10	1.0	89 in·lb	L
Chain Guide Bolt (M8)	12	1.2	106 in·lb	L

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Chain Guide Bolts	4.0	0.41	35 in·lb	
Chain Cover Screws	8.0	0.82	71 in·lb	
Engine Sprocket Nut	127	13.0	93.7	MO
Rear Sprocket Nuts	70	7.1	52	R, S
Brakes				
Bleed Valves (ZX1400H Model)	8.0	0.82	71 in·lb	
Front Brake Pad Pins (ZX1400H Model)	17.2	1.75	12.7	
Front Wheel Rotation Sensor Bolts	9.8	1.0	87 in·lb	
Brake Hose Joint Bolts	8.0	0.82	71 in·lb	
Front Caliper Mounting Bolts (ZX1400H Model)	35	3.6	26	
Front Caliper Assembly Bolts (ZX1400H Model)	27	2.8	20	L
Front Master Cylinder Bracket Bolt	9.0	0.92	80 in·lb	
Front Brake Reservoir Cap Stopper Screw (ZX1400H Model)	1.2	0.12	11 in·lb	
Front Brake Reservoir Bolt (ZX1400H Model)	4.0	0.41	35 in·lb	
Brake Lever Pivot Bolt (ZX1400H Model)	1.0	0.10	8.9 in·lb	Si
Brake Lever Pivot Bolt Locknut (ZX1400H Model)	5.9	0.60	52 in·lb	
Front Brake Light Switch Screw (ZX1400H Model)	1.2	0.12	11 in·lb	
Front Master Cylinder Clamp Bolts (ZX1400H Model)	11	1.1	97 in·lb	S
Brake Pipe Joint Nuts	18	1.8	13	
Brake Hose Joint Bracket Bolts	8.0	0.82	71 in·lb	
Brake Hose Bracket Bolt	8.0	0.82	71 in·lb	
Brake Hose Banjo Bolts	25	2.5	18	
Front Brake Disc Mounting Bolts	28	2.9	21	L, S
Bleed Valves (Caliper) (ZX1400J Model)	14	1.4	10	
Front Caliper Mounting Bolts (ZX1400J Model)	35	3.6	26	S
Front Brake Reservoir Cap Screws (ZX1400J Model)	0.70	0.07	6.2 in·lb	
Front Brake Reservoir Nut (ZX1400J Model)	8.0	0.82	71 in·lb	
Brake Lever Pivot Bolt Locknut (ZX1400J Model)	6.0	0.61	53 in·lb	R
Bleed Valve (Master Cylinder) (ZX1400J Model)	6.0	0.61	53 in·lb	
Front Master Cylinder Clamp Bolts (ZX1400J Model)	9.0	0.92	80 in·lb	S
Rear Brake Reservoir Bolt	0.50	0.05	4.4 in·lb	
Rear Brake Reservoir Bracket Bolt	8.0	0.82	71 in·lb	
Brake Hose Clamp Bolts	8.0	0.82	71 in·lb	
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Rear Master Cylinder Push Rod Locknut	17.2	1.75	12.7	
Brake Pedal Bolt	9.0	0.92	80 in·lb	
Rear Brake Disc Mounting Bolts	28	2.9	21	L, S
Rear Wheel Rotation Sensor Bolts	9.8	1.0	87 in·lb	
Rear Caliper Mounting Bolts	25	2.5	18	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Bleed Valves (Rear)	8.0	0.82	71 in·lb	
Rear Caliper Assembly Bolts	37	3.8	27	L
Rear Brake Pad Pin	17.2	1.75	12.7	
Suspension				
Front Fork Top Plugs	23	2.3	17	
Piston Rod Nuts	29	3.0	21	
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Front Fork Clamp Bolts (Lower)	30	3.1	22	AL
Front Axle Clamp Bolts	20	2.0	15	AL
Front Fork Bottom Allen Bolts	23	2.3	17	L
Rear Shock Absorber Nuts	35	3.6	26	R
Swingarm Pivot Shaft	20	2.0	15	
Swingarm Pivot Shaft Locknut	100	10.2	73.8	S
Swingarm Pivot Shaft Nut	110	112	81.1	S
Rocker Arm Nut	35	3.6	26	R
Tie-Rod Nuts	60	6.1	44	R
Spring Preload Adjuster Nuts	8.0	0.82	71 in·lb	R
Collar Mounting Bolts	35	3.6	26	
Steering				
Handlebar Bolts	35	3.6	26	L
Handlebar Holder Bolts	25	2.5	18	L, S
Steering Stem Head Nut	78	8.0	58	
Throttle Case Cover Screws (ZX1400H Model)	3.5	0.36	31 in·lb	
Throttle Case Cover Screws (ZX1400J Model)	3.0	0.31	27 in·lb	
Handlebar Weight Bolts	20	2.0	15	L
Right Handlebar Switch Housing Screws	1.2	0.12	11 in·lb	S
Steering Stem Nut	25	2.5	18	
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Left Handlebar Switch Housing Screws	1.2	0.12	11 in·lb	S
Front Fork Clamp Bolts (Lower)	30	3.1	22	AL
Frame				
Upper Fairing Bracket Nuts	25	2.5	18	R
Pad Bracket Bolts (M6)	8.0	0.82	71 in·lb	
Pad Bracket Bolt (M8)	20	2.0	15	
Subframe Bolts	23	2.3	17	R
Subframe Bracket Bolts	8.0	0.82	71 in·lb	
Front Footpeg Bracket Bolts	25	2.5	18	
Bank Sensors	8.0	0.82	71 in·lb	L
Front Footpeg Screws	4.5	0.46	40 in·lb	L
Side Stand Switch Bolt	9.0	0.92	80 in·lb	L
Side Stand Bracket Bolts	50	5.1	37	L
Side Stand Bolt	45	4.6	33	G, S
Side Stand Nut	45	4.6	33	R, S

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Front Footpeg Guard Bolts	8.0	0.82	71 in·lb	
Center Stand Spring Bracket Bolts (Equipped Models)	8.0	0.82	71 in·lb	L
Center Stand Bolts (Equipped Models)	45	4.6	33	L
Cross Bar Bolts	4.0	0.41	35 in·lb	
Fuel Tank Bracket Bolts	8.0	0.82	71 in·lb	
Rear Frame Bolts (L = 40 mm)	45	4.6	33	L
Rear Frame Bolts (L = 30 mm)	45	4.6	33	L
Rear Footpeg Bracket Bolts	25	2.5	18	
Collar Mounting Bolts	35	3.6	26	
Rear Frame Pipe Bolts	45	4.6	33	
Rear Frame Pipe Nuts	45	4.6	33	R
Cover Bolt	8.0	0.82	71 in·lb	
Tool Kit Case Bolts (Other than EUR Model)	4.0	0.41	35 in·lb	
Tool Kit Case Bolts (EUR Model)	4.0	0.41	35 in·lb	L
Helmet Lock Screw (Equipped Models)	8.0	0.82	71 in·lb	L
Bracket Bolts (L = 25 mm)	8.0	0.82	71 in·lb	
Grip Mounting Bolt	35	3.6	26	
Front Fender Mounting Bolts (L = 14 mm)	4.0	0.41	35 in·lb	
Front Fender Cover Screws	1.2	0.12	11 in·lb	
Front Fender Mounting Bolts (L = 35 mm)	8.0	0.82	71 in·lb	
Reflector Nuts	3.0	0.31	27 in·lb	
Center Seat Cover Screws	0.50	0.05	4.4 in·lb	
Side Seat Cover Bolts (L = 12 mm)	4.0	0.41	35 in·lb	
Side Seat Cover Bolts (L = 18 mm)	4.0	0.41	35 in·lb	
Single Seat Cover Screws (Equipped Models)	0.50	0.05	4.4 in·lb	
Tying Hook Bolts (M8) (Equipped Models)	20	2.0	15	
Tying Hook Bracket Bolts (Equipped Models)	8.0	0.82	71 in·lb	S
Seat Lock Screws	8.0	0.82	71 in·lb	
Bracket Bolts (L = 16 mm)	4.0	0.41	35 in·lb	
Rear Fender Mounting Screws	1.2	0.12	11 in·lb	
Seat Lock Bolts	8.0	0.82	71 in·lb	
Rear Fender Mounting Bolts	1.0	0.10	8.9 in·lb	
Flap Mounting Nuts	4.0	0.41	35 in·lb	R
Seat Lock Bracket Screws	1.2	0.12	11 in·lb	
Seat Lock Bracket Bolt	4.0	0.41	35 in·lb	
Seat Lock Cable Cover Bolts	1.0	0.10	8.9 in·lb	
Tying Hook Bolts (M6) (Equipped Models)	8.0	0.82	71 in·lb	
Grab Rail Mounting Bolts (Equipped Models)	25	2.5	18	
License Plate Bracket Bolts	4.0	0.41	35 in·lb	
Windshield Bolts	0.40	0.04	3.5 in·lb	
Inner Cover Bolts (Front and Rear Side)	0.50	0.05	4.4 in·lb	
Inner Cover Bolts (Center Side)	0.50	0.05	4.4 in·lb	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fairing Cover Bolts (M5)	0.50	0.05	4.4 in·lb	
Lower Fairing Screws	1.2	0.12	11 in·lb	
Lower Fairing Bolts	4.0	0.41	35 in·lb	
Middle Fairing Bolts (M5)	0.50	0.05	4.4 in·lb	
Upper Fairing Mounting Bolts	8.0	0.82	71 in·lb	
Inner Cover Bracket Bolts	8.0	0.82	71 in·lb	
Rear View Mirror Nuts	8.0	0.82	71 in·lb	
Inner Fairing Screws	1.2	0.12	11 in·lb	
Middle Fairing Bracket Screws	1.2	0.12	11 in·lb	
Middle Fairing Bracket Bolts	3.0	0.31	27 in·lb	
Middle Fairing Bolts (M6)	4.0	0.41	35 in·lb	
Fairing Cover Bolts (M6)	4.0	0.41	35 in·lb	
Upper Inner Fairing Bolt	0.50	0.05	4.4 in·lb	
Fuel Tank Cover Bolt (L = 23 mm)	8.0	0.82	71 in·lb	
Fuel Tank Cover Bolts (L = 30 mm)	1.0	0.10	8.9 in·lb	
License Plate Bracket Bolts (ID Model only)	8.0	0.82	71 in·lb	
Rear Lower Fairing Bracket Bolts (Equipped Models)	8.0	0.82	71 in·lb	
Rear Lower Fairing Bolts (Equipped Models)	1.0	0.10	8.9 in·lb	
Electrical System				
Meter Unit Mounting Nuts	4.5	0.46	40 in·lb	
Headlight Mounting Screws	1.2	0.12	11 in·lb	
Headlight Bracket Bolts	8.0	0.82	71 in·lb	
Front Turn Signal Light Mounting Screws	1.2	0.12	11 in·lb	
Inner Fairing Screws	1.2	0.12	11 in·lb	
Rear Turn Signal Light Mounting Screws	0.50	0.05	4.4 in·lb	
Tail/Brake Light Mounting Screws	1.2	0.12	11 in·lb	
License Plate Light Mounting Screws	1.2	0.12	11 in·lb	
License Plate Light Cover Mounting Screws	0.90	0.09	8 in·lb	
Battery Compartment Cover Bolt	4.0	0.41	35 in·lb	
Bracket Bolts	8.0	0.82	71 in·lb	
Battery Compartment Bolts	8.0	0.82	71 in·lb	
Starter Motor Through Bolts	3.4	0.35	30 in·lb	
Starter Motor Cable Terminal Nut	6.0	0.61	53 in·lb	
Starter Motor Terminal Locknut	6.9	0.70	61 in·lb	
Starter Motor Mounting Bolts	10	1.0	89 in·lb	
Spark Plugs	13	1.3	115 in·lb	
Regulator/Rectifier Bracket Bolts	8.0	0.82	71 in·lb	
Regulator/Rectifier Bolts	8.0	0.82	71 in·lb	
Water Temperature Sensor	12	1.2	106 in·lb	
Frame Ground Terminal Bolt	7.0	0.71	62 in·lb	
Starter Relay Terminal Bolts	4.5	0.46	40 in·lb	
Engine Ground Terminal Bolt	10	1.0	89 in·lb	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Crankshaft Sensor Bolts	6.0	0.61	53 in·lb	L
Oil Pressure Switch Terminal Bolt	2.0	0.20	18 in·lb	G
Oil Pressure Switch	15	1.5	11	LG
Crankshaft Sensor Cover Bolts	10	1.0	89 in·lb	L (1)
Timing Rotor Bolt	39	4.0	29	
Gear Position Sensor Holder Bolts (L = 20 mm)	5.0	0.51	44 in·lb	L
Gear Position Sensor Bolt	10	1.0	89 in·lb	L
Alternator Cover Bolts	10	1.0	89 in·lb	
Alternator Lead Holding Plate Bolts	8.0	0.82	71 in·lb	L
Alternator Rotor Bolt	155	15.8	114	
Stator Coil Bolts	12	1.2	106 in·lb	
Bracket Bolts	8.0	0.82	71 in·lb	
Outside Temperature Sensor Screw	0.50	0.05	4.4 in·lb	
Steering Stem Cover Bolts	8.0	0.82	71 in·lb	
Left Handlebar Switch Housing Screws	1.2	0.12	11 in·lb	S
Starter Lockout Switch Screw	0.70	0.07	6.2 in·lb	L
Fuel Level Sensor Bolts	7.0	0.71	62 in·lb	L
Frame Ground Bolt	8.0	0.82	71 in·lb	
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Right Handlebar Switch Housing Screws	1.2	0.12	11 in·lb	S
Oxygen Sensor	25	2.5	18	
Side Stand Switch Bolt	9.0	0.92	80 in·lb	L
Immobilizer Amplifier Bracket Bolt (Equipped Models)	8.0	0.82	71 in·lb	
Turn Signal Relay Bracket Bolt	8.0	0.82	71 in·lb	
Fuel Pump Bolts	10	1.0	89 in·lb	L, S

The tables below, relating tightening torque to thread diameter, lists the basic torque for the bolts, nuts and screws. Use these tables for the bolts, nuts and screws which are not specified the tightening torque particularly on the previous pages. All of the values are for use with dry solvent-cleaned threads.

Basic Torque for General Fasteners

For Bolts and Nuts

Threads Diameter (mm)	Torque		
	N·m	kgf·m	ft·lb
5	4.5	0.46	40 in·lb
6	8.0	0.82	71 in·lb
8	20	2.0	15
10	35	3.6	26
12	60	6.1	44

Torque and Locking Agent

For Screws, Plastic Part Tightening Portions and Plastic Washer Tightening Portions

Threads Diameter (mm)	Torque		
	N·m	kgf·m	ft·lb
4	1.2	0.12	11 in·lb
5	3.0	0.31	27 in·lb
6	4.0	0.41	35 in·lb

For Self-Tapping Screws

Threads Diameter (mm)	Torque		
	N·m	kgf·m	ft·lb
All	1.2	0.12	11 in·lb

For Wellnuts

Threads Diameter (mm)	Torque		
	N·m	kgf·m	ft·lb
4	0.2	0.02	1.8 in·lb
5	0.5	0.05	4.4 in·lb
6	1.0	0.10	8.9 in·lb

Specifications

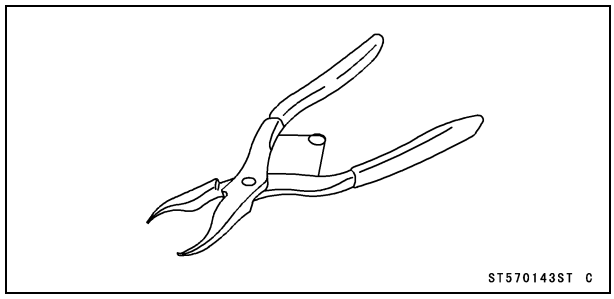
Item	Standard	Service Limit
Fuel System (DFI)		
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	– – –
Idle Speed	1 100 ±50 r/min (rpm)	– – –
Throttle Body Vacuum	36.66 ±1.3 kPa (275.0 ±10 mmHg) at idle speed	– – –
Air Cleaner Element	Viscous paper element	– – –
Cooling System		
Coolant:		
Type (Recommended)	Permanent type of antifreeze	– – –
Color	Green	– – –
Mixed Ratio	Soft water 50%, coolant 50%	– – –
Freezing Point	–35°C (–31°F)	– – –
Total Amount	3.2 L (3.4 US qt)	– – –
Engine Top End		
Valve Clearance:		
Exhaust	0.22 ~ 0.27 mm (0.0087 ~ 0.0106 in.)	– – –
Intake	0.15 ~ 0.20 mm (0.0059 ~ 0.0079 in.)	– – –
Clutch		
Clutch Fluid:		
Grade	DOT4	– – –
Clutch Lever Free Play	Non-adjustable	– – –
Engine Lubrication System		
Engine Oil:		
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2	– – –
Viscosity	SAE 10W-40	– – –
Capacity	3.8 L (4.0 US qt) (when filter is not removed)	– – –
	4.2 L (4.4 US qt) (when filter is removed)	– – –
	4.6 L (4.9 US qt) (when engine is completely dry)	– – –
Level	Between upper and lower level lines (Wait several minutes after idling or running)	– – –
Wheels/Tires		
Tread Depth:		
Front	3.6 mm (0.14 in.)	1 mm (0.04 in.), (AT, CH, DE) 1.6 mm (0.06 in.)
Rear	4.8 mm (0.19 in.)	Up to 130 km/h (80 mph): 2 mm (0.08 in.), Over 130 km/h (80 mph): 3 mm (0.12 in.)

Specifications

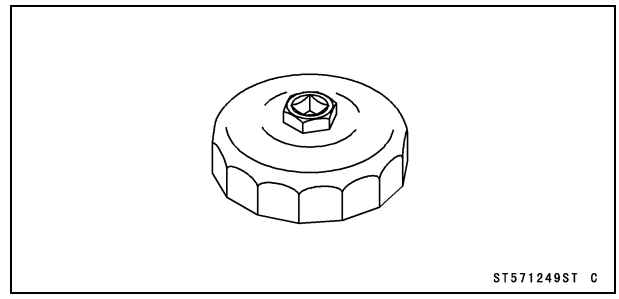
Item	Standard	Service Limit
Air Pressure (when Cold):		
Front	Up to 175 kg (385 lb) load: 290 kPa (2.90 kgf/cm², 42 psi)	– – –
Rear	Up to 175 kg (385 lb) load: 290 kPa (2.90 kgf/cm², 42 psi)	– – –
Final Drive		
Drive Chain Slack	25 ~ 30 mm (1.0 ~ 1.2 in.)	– – –
Drive Chain Wear (20-link Length)	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	319 mm (12.6 in.)
Standard Chain:		
Make	ENUMA	– – –
Type	EK530RMX/3D	– – –
Link	118 links	– – –
Brakes		
Brake Fluid:		
Grade	DOT4	– – –
Brake Pad Lining Thickness:		
Front:		
ZX1400H	4.0 mm (0.16 in.)	1 mm (0.04 in.)
ZX1400J	3.7 mm (0.15 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:		
Type	NGK CR9EIA-9	– – –
Gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in.)	– – –

Special Tools and Sealant

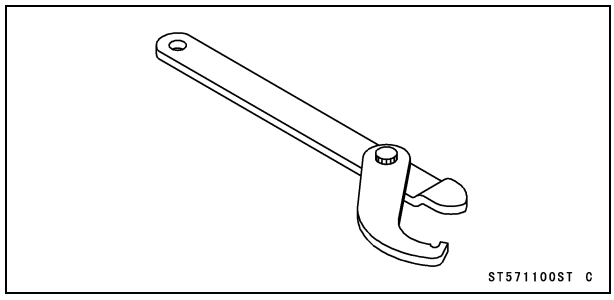
Inside Circlip Pliers:
57001-143



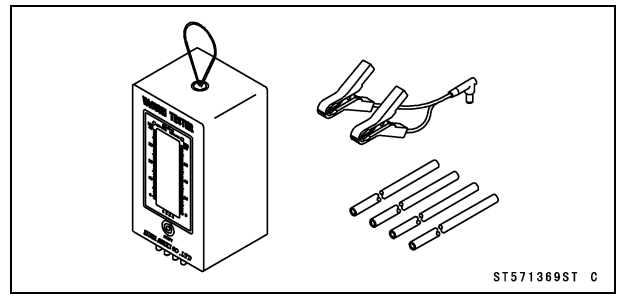
Oil Filter Wrench:
57001-1249



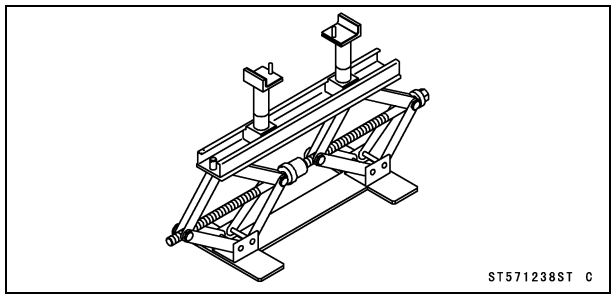
Steering Stem Nut Wrench:
57001-1100



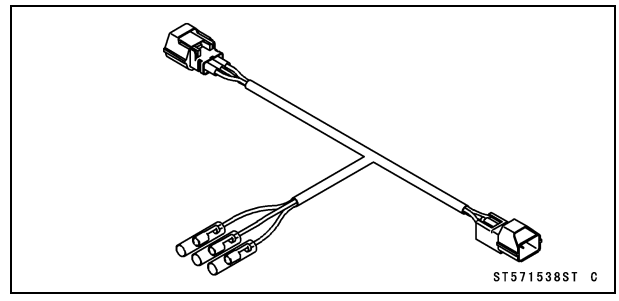
Vacuum Gauge:
57001-1369



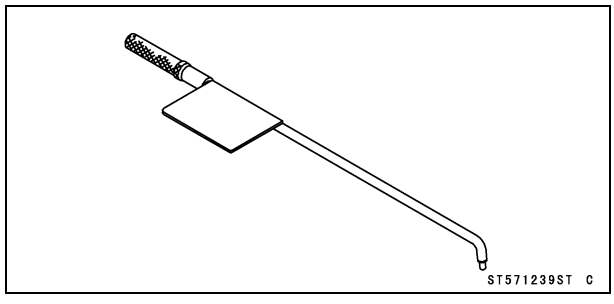
Jack:
57001-1238



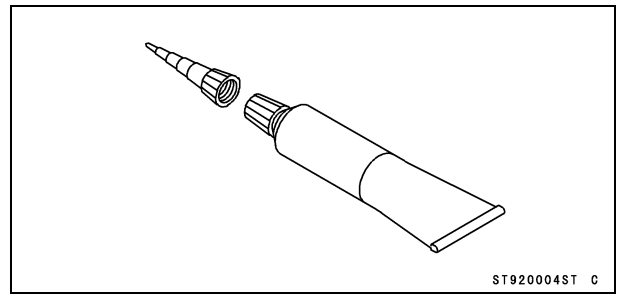
Throttle Sensor Setting Adapter:
57001-1538



Pilot Screw Adjuster, A:
57001-1239



Liquid Gasket, TB1211F:
92104-0004



Periodic Maintenance Procedure

Fuel System (DFI)

Air Cleaner Element Replacement

NOTE

○*In dusty areas, the element should be replaced more frequently than the recommended interval.*

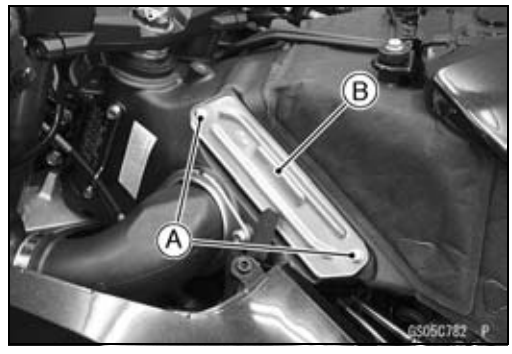
⚠ WARNING

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.

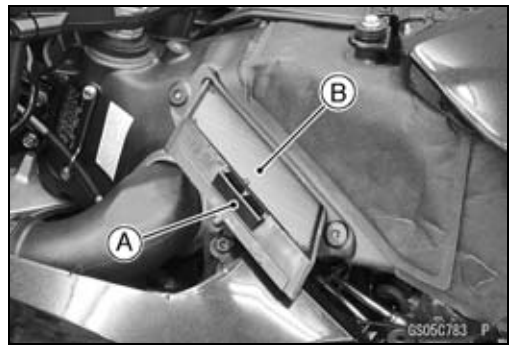
NOTICE

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

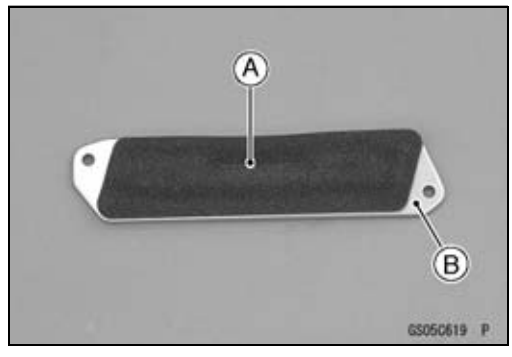
- Remove:
  Fuel Tank Cover (see Fuel Tank Cover Removal in the Frame chapter)
  Air Cleaner Element Cover Bolts [A]
  Air Cleaner Element Cover [B]



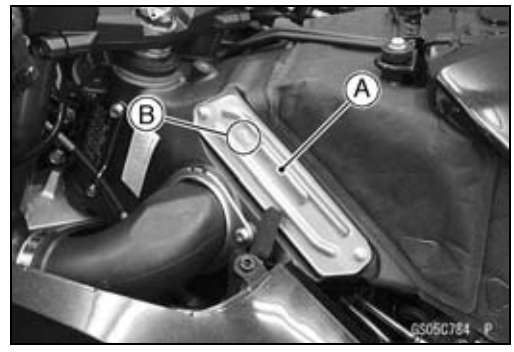
- Pull out the air cleaner element.
- Install a new element [A] so that screen side [B] faces upward.



- Check that the seal [A] is in place on the air cleaner element cover [B].



Periodic Maintenance Procedure



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

Torque - Air Cleaner Element Cover Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Install the fuel tank cover (see Fuel Tank Cover Installation in the Frame chapter).

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 Throttle Control System Inspection and Cable, Wire, and Hose Routing section in the Appendix chapter).

⚠ WARNING

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

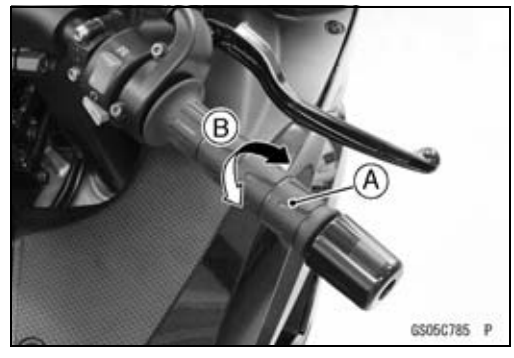
Idle Speed
Standard: 1 100 ±50 r/min (rpm)

Idle Speed Adjustment

NOTE

○*This motorcycle is equipped with the idle speed control valve. The idle speed is adjusted automatically at the specified value (1 100 r/min (rpm)) by the idle speed control valve system. Therefore, it is not necessary to adjust the idle speed normally.*

Throttle Control System Inspection



- Check that the throttle grip [A] 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.

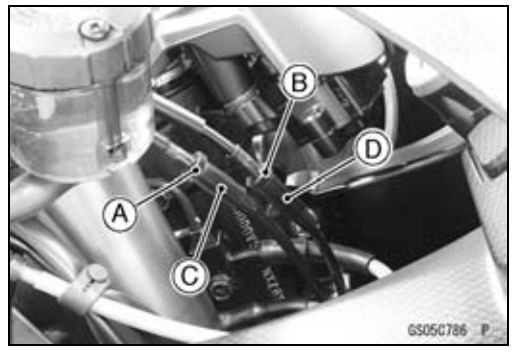
- Check the throttle grip free play [B].

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

Periodic Maintenance Procedure

★If the free play is incorrect, 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 there is no play when the throttle grip play completely closed.
- 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 can not be adjusted with the adjusters, replace the cable.

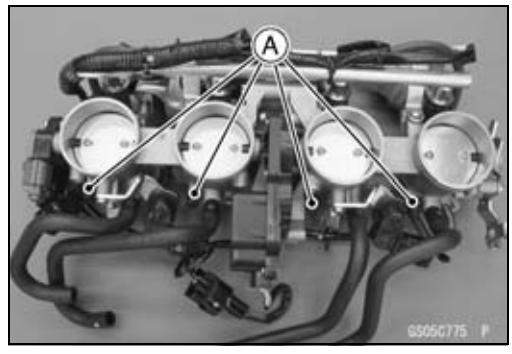


Engine Vacuum Synchronization Inspection

NOTE

○*These procedures are explained on the assumption that the intake and exhaust systems of the engine are in good condition.*

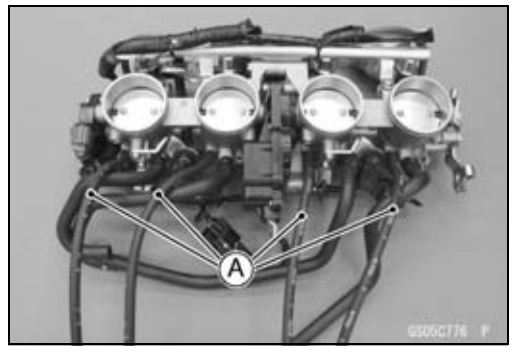
- Situate the motorcycle so that it is vertical.
- Remove:
  Throttle Body Assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter)
  Rubber Caps [A] (for other than US, CA, AU, ID, PH and SEA-B3 models, three rubber caps)



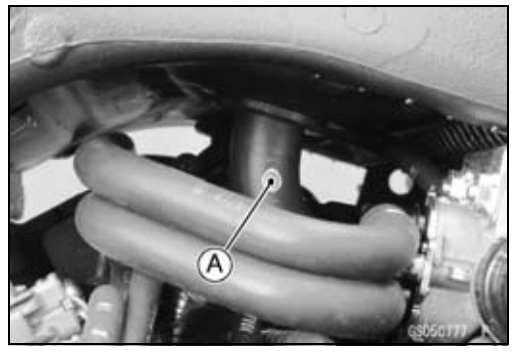
- Connect a vacuum gauge and hoses [A] (Special Tool: 57001-1369) to the fittings on the throttle body assy.

Special Tool - Vacuum Gauge: 57001-1369

- Install the following parts temporarily.
  Throttle Body Assy (see Throttle Body Assy Installation in the Fuel System (DFI) chapter)
  Idle Speed Control Valve Actuator (see Idle Speed Control Valve Actuator Installation in the Fuel System (DFI) chapter)
  Fuel Tank (see Fuel Tank Installation in the Fuel System (DFI) chapter)



- Disconnect the air switching valve hose [A] from the frame.
- Plug the air switching valve hose end and frame hole.

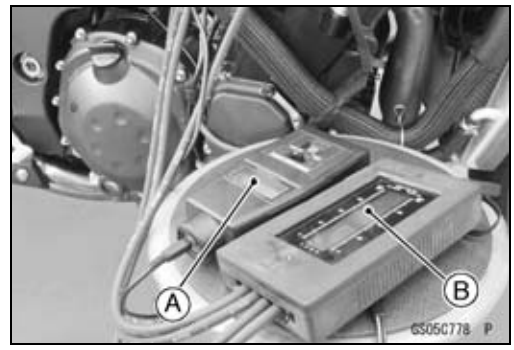


Periodic Maintenance Procedure

- Connect a highly accurate tachometer lead 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].

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

★If the idle speed is out of the specified range, adjust it with the adjust screw (see Idle Speed Adjustment).



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

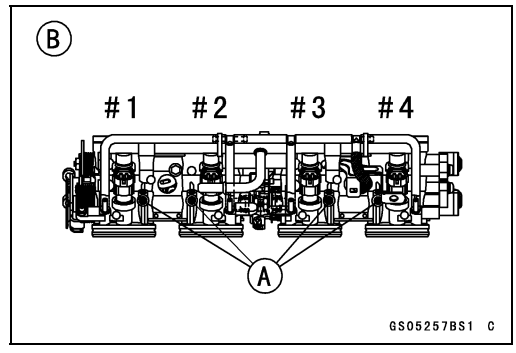
- While idling the engine, inspect the throttle body vacuum, using the vacuum gauge [B].

Throttle Body Vacuum
Standard: 36.66 ±1.3 kPa (275.0 ±10 mmHg) at idle speed

★If any vacuum is not within specifications, adjust the by-pass screws [A].
View from Rear [B]

Special Tool - Pilot Screw Adjuster, A [C]: 57001-1239

- Adjust the each vacuum (#1 ~ #4) to the standard value.
- Open and close the throttle valves after each measurement.



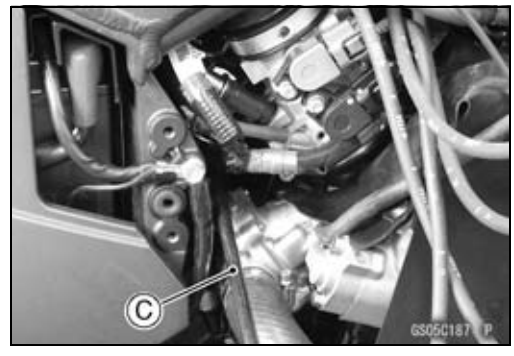
NOTE

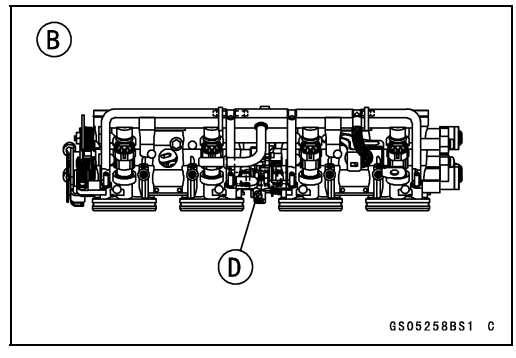
○*Do not turn the center adjusting screw [D].*

- Check the vacuums as before.

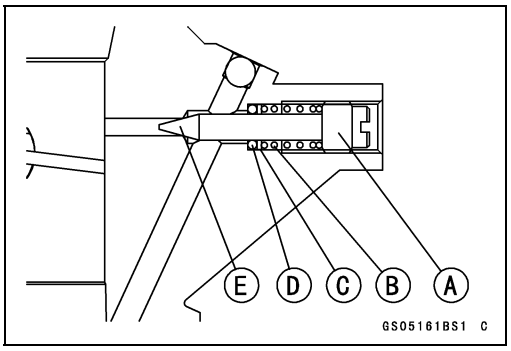
★If all vacuums are within the specification range, finish the engine vacuum synchronization.

★If any vacuum can not be adjusted within the specification, replace the bypass screws #1 ~ #4 with new ones, refer to the following procedure.





Periodic Maintenance Procedure



- Remove the throttle body assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter).
- Turn in the bypass screw [A] with counting the number of turns until it seats fully but not tightly. Record the number of turns.
- Remove:
  Bypass Screw
  Spring [B]
  Washer [C]
  O-ring [D]
- Check the bypass screw hole in the throttle body assy for carbon deposits.

★If any carbons accumulate, wipe the carbons off from the hole, using a cotton pad penetrated with a high flash-point solvent.

- Replace the bypass screw, spring, washer and O-ring as a set.
- Turn in the bypass screw until it seats fully but not tightly.

NOTICE
Do not over-tighten the bypass screw. The tapered portion [E] of the bypass screw could be damaged.

- 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 assy 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 Main Throttle Sensor Output Voltage Inspection in the Fuel System (DFI) chapter).

Special Tool - Throttle Sensor Setting Adapter: 57001 -1538

Main Throttle Sensor Output Voltage
Connections to Adapter:
Meter (+) → R lead (Sensor Y/W)
Meter (–) → BK lead (Sensor G)

Standard: DC 0.63 ~ 0.65 V at idle throttle opening

★If the output voltage is out of the standard, check the input voltage of the main throttle sensor (see Main Throttle Sensor Input Voltage Inspection in the Fuel System (DFI) chapter).

- Remove the vacuum gauge hoses and install the rubber caps on the original position.
- For other than US, CA, AU, ID, PH and SEA-B3 models, install the vacuum hoses.

○Run the vacuum hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.

- Install the remove parts (see appropriate chapters).

Periodic Maintenance Procedure

Fuel System Inspection

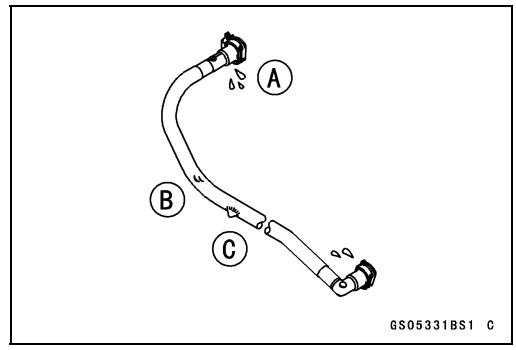
Fuel Hose Inspection (fuel leak, damage, installation condition)

○If 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 the fuel tank (see Fuel Tank Removal in the Fuel System (DFI) chapter).

● Check the fuel hose.

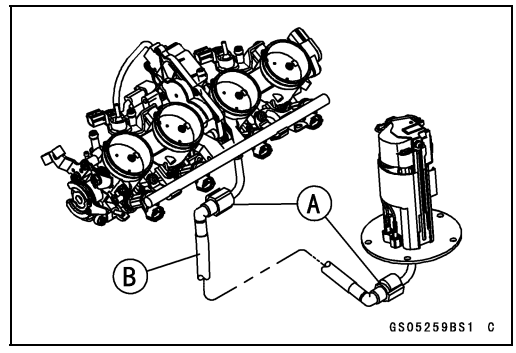
★Replace the fuel hose if any fraying, cracks [B] or bulges [C] are noticed.



● Check that the fuel hose is 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]

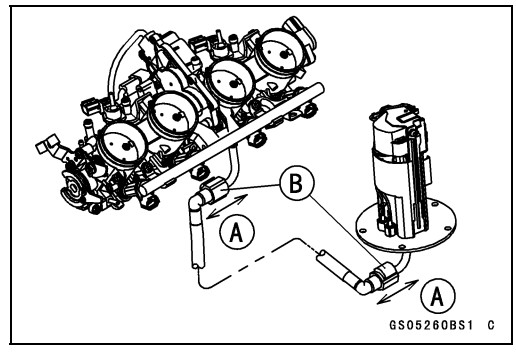


● Check that the hose joints are securely connected.

○Push and pull [A] the fuel hose joint [B] back and forth more than two times, and make sure it is locked.

⚠ 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.



★If it does not locked, reinstall the fuel hose joint.

Fuel Filter Replacement

⚠ WARNING

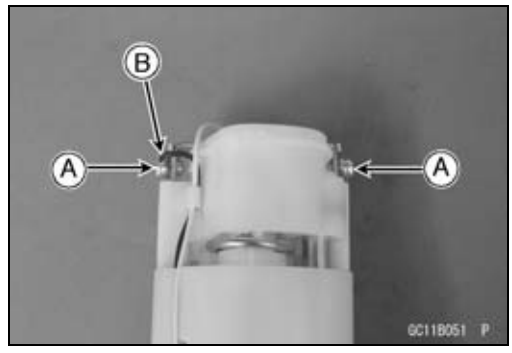
Gasoline is extremely flammable and can be explosive under certain conditions, creating the potential for serious burns. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light. Do not smoke. Turn the ignition switch off. Disconnect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

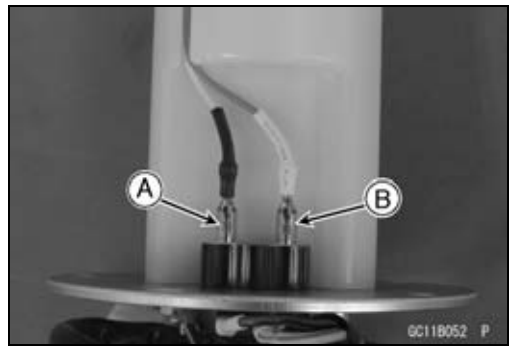
Never drop the fuel pump especially on a hard surface. Such a shock to the pump can damage it.

Periodic Maintenance Procedure

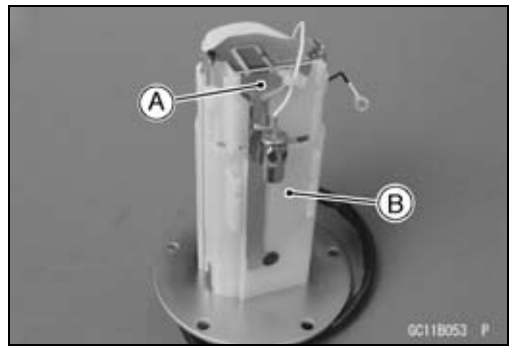
● Remove:
Fuel Pump (see Fuel Pump Removal in the Fuel System (DFI) chapter)
Fuel Pump Assembly Screws [A]
Lead Terminal [B]



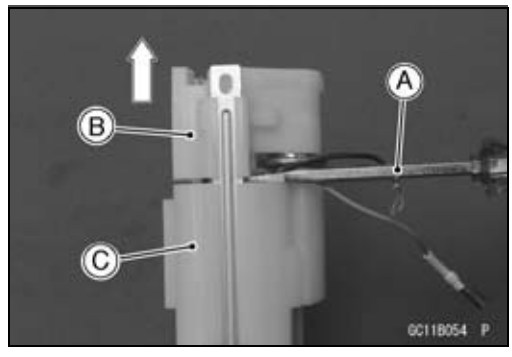
● Disconnect:
Lead Connector (White) [A]
Lead Connector (Light Blue) [B]



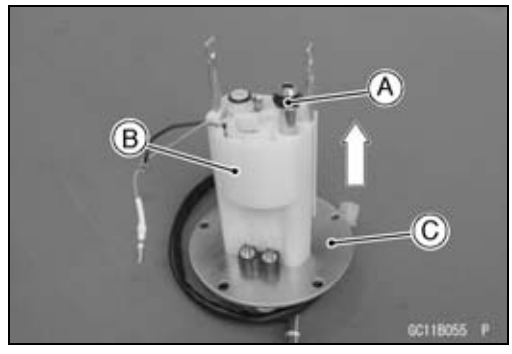
● Remove the thermistor bracket [A] from the fuel pump body [B].



● Using the flat tip screwdriver [A], remove the fuel pump case [B] from the fuel pump body [C].

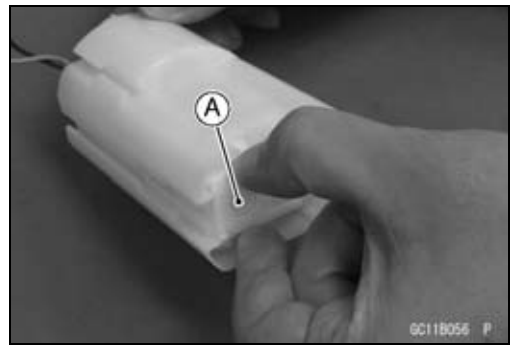


● Remove the O-ring [A].
● Remove the fuel pump body [B] from the installation plate [C].

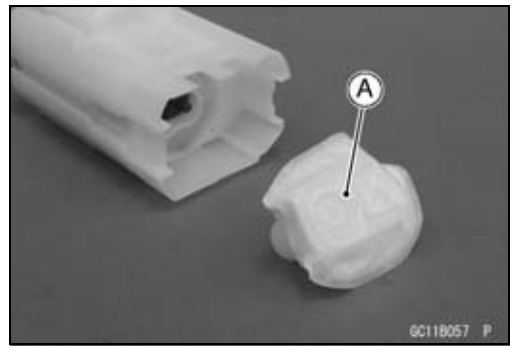


Periodic Maintenance Procedure

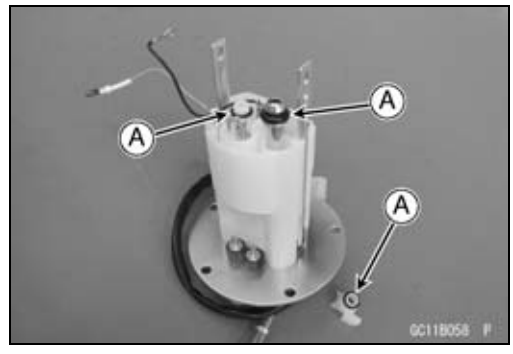
- Remove the fuel filter [A].

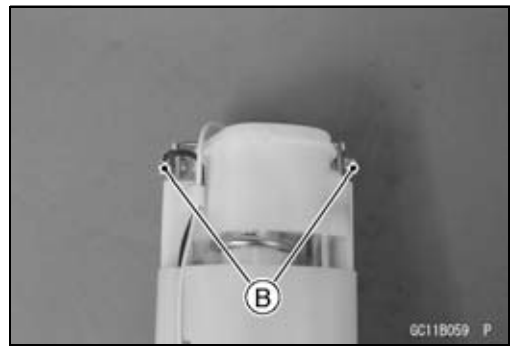


- Replace the fuel filter [A] with a new one, and install it.



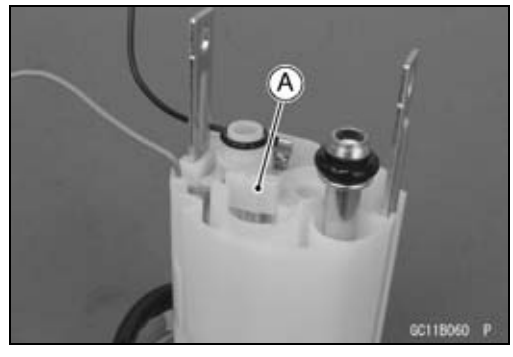
- Replace the following parts with new ones.
  O-rings [A]
  Fuel Pump Assembly Screws [B]





- Install the removed parts in the reverse procedure.
- Install the cap [A] so that the light blue lead terminal is covered as shown.
- Tighten:

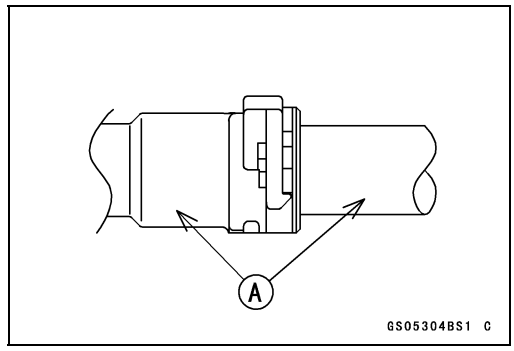
Torque - Fuel Pump Assembly Screws: 0.98 N·m (0.10 kgf·m, 8.7 in·lb)



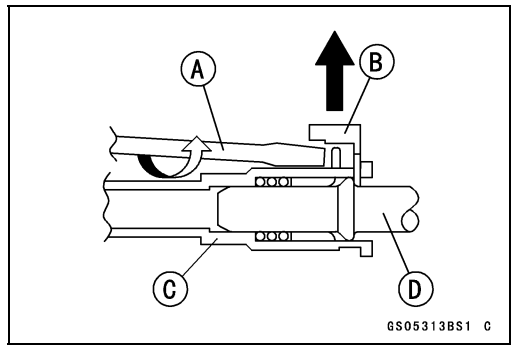
Periodic Maintenance Procedure

Fuel Hose Replacement

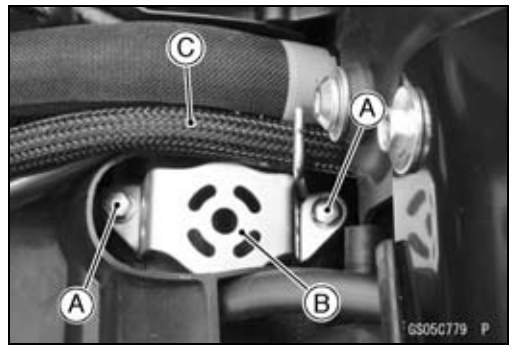
- Remove the fuel tank (see Fuel Tank Removal in the Fuel System (DFI) chapter).
- Be sure to place a piece of cloth around the fuel hose joint.
- Wipe off the dirt of the surface [A] around the connection using a cloth or a soft brush.



- Insert the flat tip screwdriver [A] into slit on the joint lock [B].
- Turn the driver to disconnect the joint lock.
- Pull the fuel hose joint [C] out of the delivery pipe [D].



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

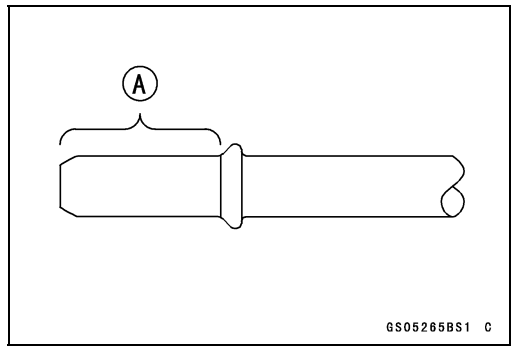


⚠ WARNING

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.

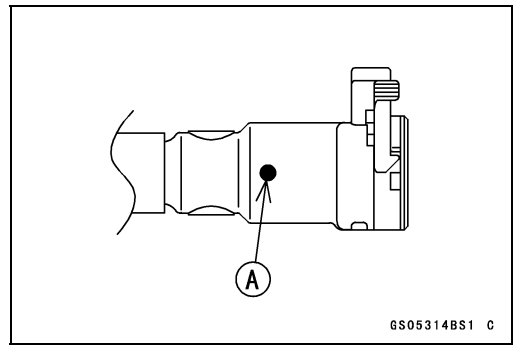
- Clean the delivery pipe.
- Cover the delivery pipe with the vinyl bag to keep it clean.

- Remove the vinyl bag on the pipe.
- Check that there are no flaws, burrs, and adhesion of foreign materials on the delivery pipe [A].

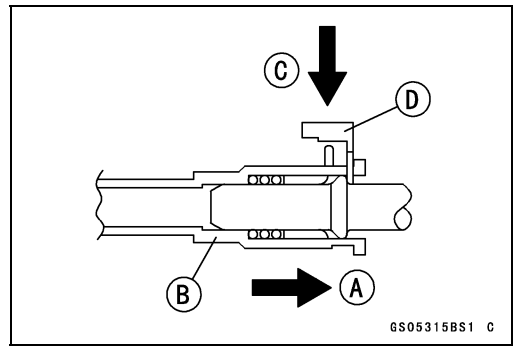


Periodic Maintenance Procedure

- Replace the fuel hose with a new one.
- Install the 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).



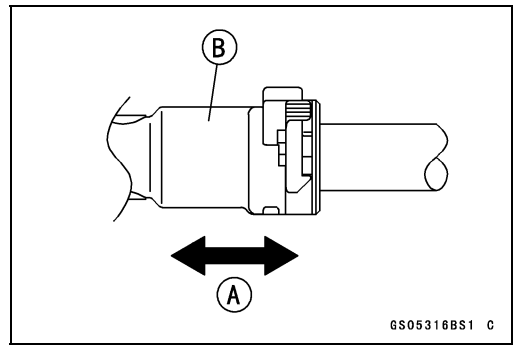
- Insert [A] the fuel hose joint [B] straight onto the delivery pipe until the hose joint clicks.
- Push [C] the joint lock [D].



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



★If it comes off, reinstall the hose joint.

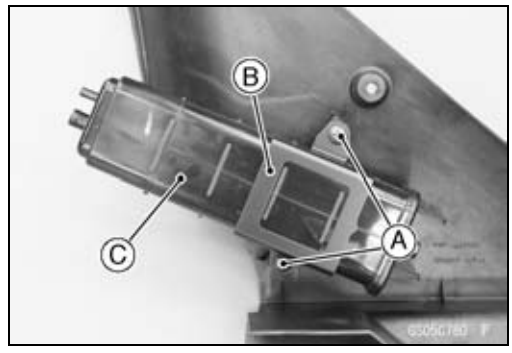
- Install the bracket.
- Tighten:

Torque - Bracket Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Install the removed parts (see appropriate chapters).
- Start the engine and check the fuel hose for leaks.

Periodic Maintenance Procedure

Evaporative Emission Control System Inspection (Other than US, CA, AU, ID, PH and SEA-B3 Models)



- Inspect the canister as follows.
- Remove:
  Right Inner Fairing (see Inner Fairing Removal in the Frame chapter)
  Screws [A]
  Canister Bracket [B]
- Visually inspect the canister [C] 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.*

- Install the canister and canister bracket.
- Tighten:

Torque - Canister Bracket Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)

- Inspect the purge valve (see Purge Valve Operation Inspection in the Fuel System (DFI) chapter).

○Check that the hoses are securely connected and clips are in position.

○Replace any kinked, deteriorated or damaged hoses.

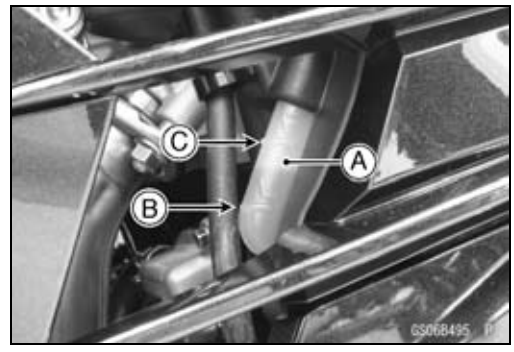
○Run the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.

○When installing the hoses, avoid sharp bending, kinking, flattening or twisting, and run the hoses with a minimum of bending so that the emission flow will not be obstructed.

Periodic Maintenance Procedure

Cooling System

Coolant Level Inspection



NOTE

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

- Check the coolant level in the reserve tank [A] with the motorcycle held perpendicular (Do not use the sidestand).

★If the coolant level is lower than the "L" level line [B], remove the left fairing cover (see Fairing Cover Removal in the Frame chapter) and unscrew the coolant reserve tank cap and add coolant to the "F" level line [C].

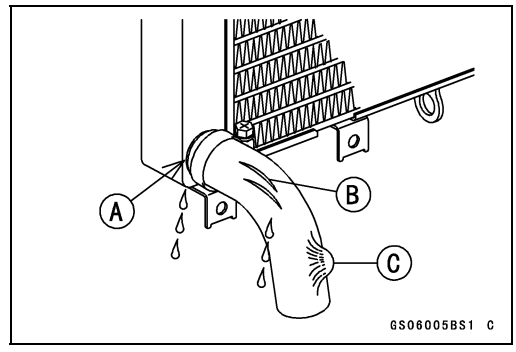
"L": Low
"F": Full

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.

Cooling System Inspection

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



○The high pressure inside the water hose can cause coolant to leak [A] or the hose to burst if the line is not properly maintained.

- Visually inspect the hoses for signs of deterioration. Squeeze the hoses. A hose should not be hard and brittle, nor should it be soft or swollen.

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

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

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

Coolant Change

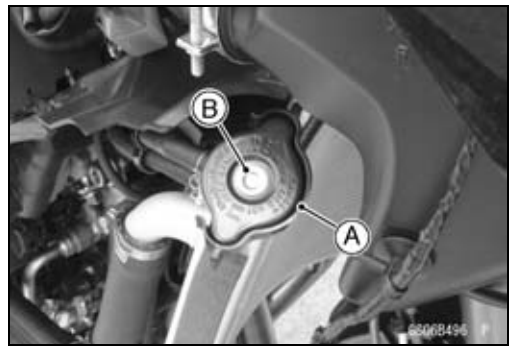
⚠ WARNING

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.

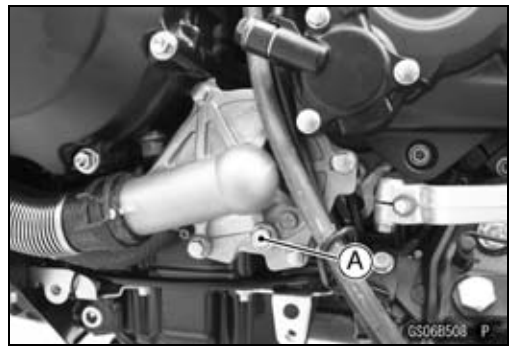
Periodic Maintenance Procedure

● Remove:
Middle Fairings (see Middle Fairing Removal in the Frame chapter)
Radiator Cap Cover [A]
Radiator Cap [B]

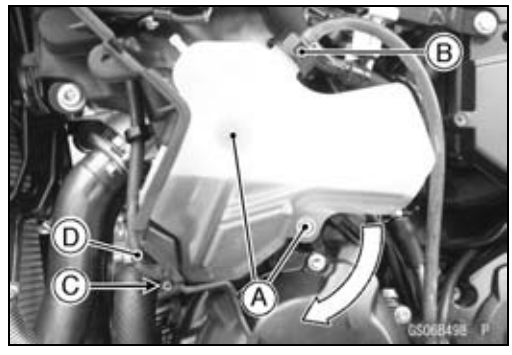
○Remove the radiator cap in two steps. First turn the cap counterclockwise to the first stop. Then push and turn it further in the same direction and remove the cap.



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



● Remove:
Coolant Reserve Tank Bolts [A]
Coolant Reserve Tank Cap [B]
● Turn the coolant reserve tank clockwise.
● Slide the clamp [C] and disconnect the radiator overflow hose [D].
● Pour the coolant into a container.



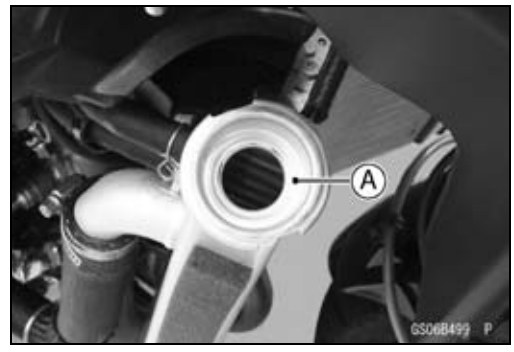
● Install the coolant reserve tank.
● Apply a non-permanent locking agent to the threads of the reserve tank bolts and tighten them.

Torque - Coolant Reserve Tank Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

● Connect the radiator overflow hose.
● Replace the drain bolt gasket with a new one.
● Tighten the drain bolt with the drain bolt gasket.

Torque - Coolant Drain Bolt: 10 N·m (1.0 kgf·m, 89 in·lb)

Periodic Maintenance Procedure



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

NOTE

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

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

NOTICE

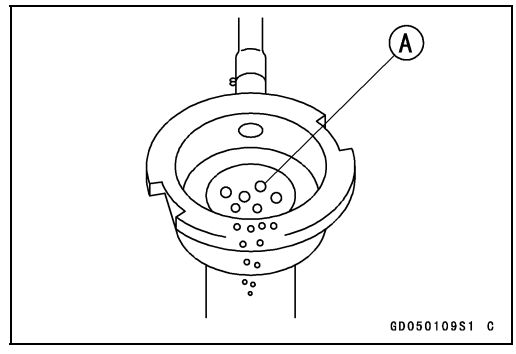
Soft or distilled water must be used with the antifreeze (see below for antifreeze) in the cooling system.
If hard water is used in the system, it causes scales accumulation in the water passages, and considerably reduces the efficiency of the cooling system.

Water and Coolant Mixture Ratio (Recommended)

Soft Water:	**50%**
Coolant:	**50%**
Freezing Point:	**–35°C (–31°F)**
Total Amount:	**3.2 L (3.4 US qt)**

NOTE

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



- Bleed the air from the cooling system as follows.

○Start the engine with the radiator cap removed and run it until no more air bubbles [A] can be seen in the coolant.
○Tap the radiator hoses to force any air bubbles caught inside.
○Stop the engine and add coolant up to the radiator filler neck.

- Install the radiator cap 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.

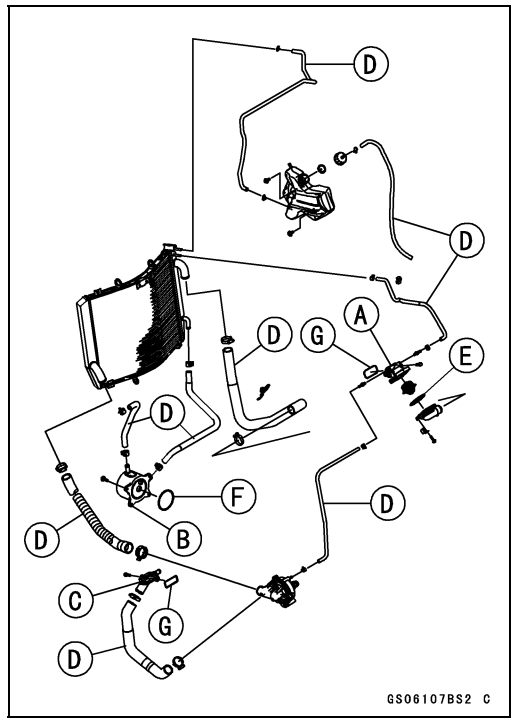
★If the coolant level is lower than the "L" level line, add coolant to the "F" level line (see Coolant Level Inspection).

NOTICE

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

Periodic Maintenance Procedure

Water Hose and O-ring Replacement



- Drain the coolant (see Coolant Change).
- Remove:
  Middle Fairings (see Middle Fairing Removal in the Frame chapter)
  Throttle Body Assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter)
  Thermostat Housing [A]
  Oil Cooler [B] (see Oil Cooler Removal in the Engine Lubrication System chapter)
  Fitting [C]
  Hoses [D]
  O-rings [E] [F] [G]
- Replace the O-rings with new ones.
- Apply grease to the O-rings [E] [F].
- Apply liquid gasket to the O-rings [G].

Sealant - Liquid Gasket, TB1211F: 92104-0004

- Run the new hoses according to 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)

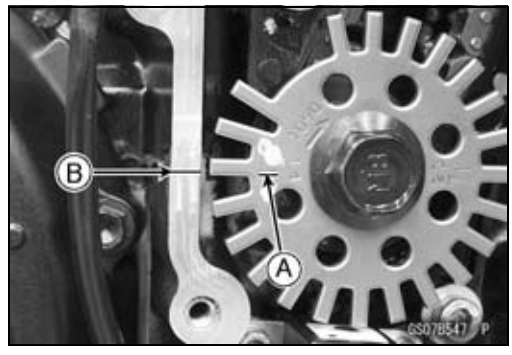
- Install the removed parts (see appropriate chapters).
- Fill the coolant (see Coolant Change).
- Check the cooling system for leaks.

Engine Top End

Valve Clearance Inspection

NOTE

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



- Remove:
  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)

Periodic Maintenance Procedure

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

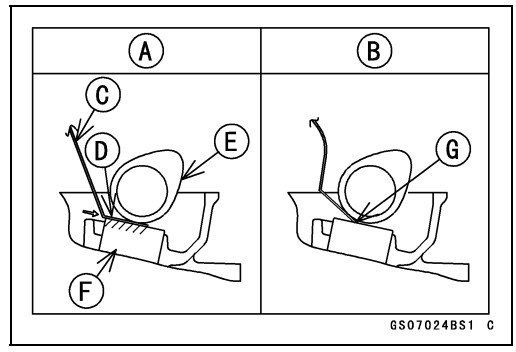


Valve Clearance
Standard:

Exhaust	**0.22 ~ 0.27 mm (0.0087 ~ 0.0106 in.)**
Intake	**0.15 ~ 0.20 mm (0.0059 ~ 0.0079 in.)**

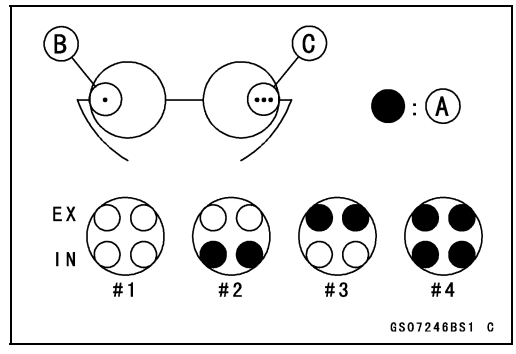
NOTE

○*Thickness gauge is horizontally inserted on the valve lifter.*

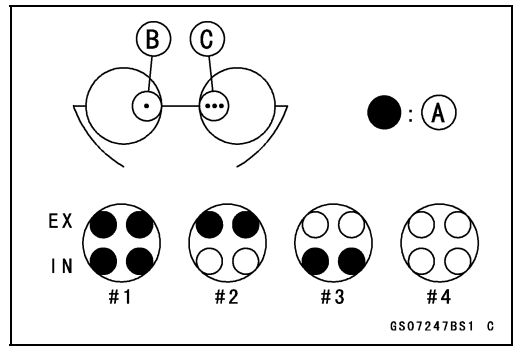


Appropriateness [A]
Inadequacy [B]
Thickness Gauge [C]
Horizontally Inserts [D]
Cam [E]
Valve Lifter [F]
Hits the Valve Lifter Ahead [G]

○**When positioning #1 piston TDC at the end of the compression stroke:**
Intake Valve Clearance of #2 and #4 Cylinders
Exhaust Valve Clearance of #3 and #4 Cylinders
Measuring Valve [A]
Timing Mark (Intake Camshaft) [B]
Punch Marks (Exhaust Camshaft) [C]



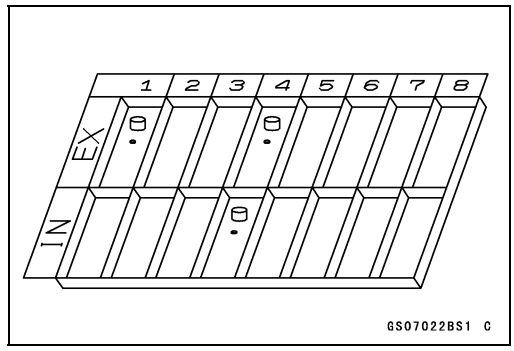
○**When positioning #4 piston TDC at the end of the compression stroke:**
Intake Valve Clearance of #1 and #3 Cylinders
Exhaust Valve Clearance of #1 and #2 Cylinders
Measuring Valve [A]
Timing Mark (Intake Camshaft) [B]
Punch Marks (Exhaust Camshaft) [C]



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

Periodic Maintenance Procedure

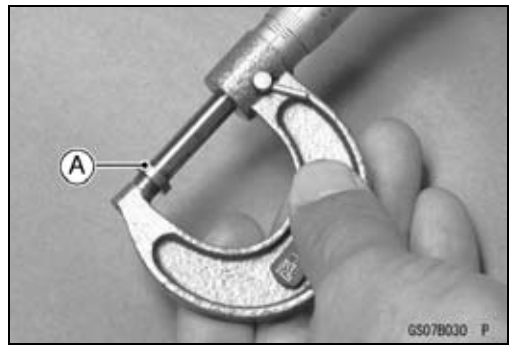
Valve Clearance Adjustment



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

NOTE

○*Mark 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 = 0.245 mm (Exhaust), 0.175 mm (Intake))
  [d] Replace Shim Thickness

Example (Exhaust):
2.100 + 0.33 – 0.245 = 2.185 mm

○Exchange the shim for the 2.200 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.

○If 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

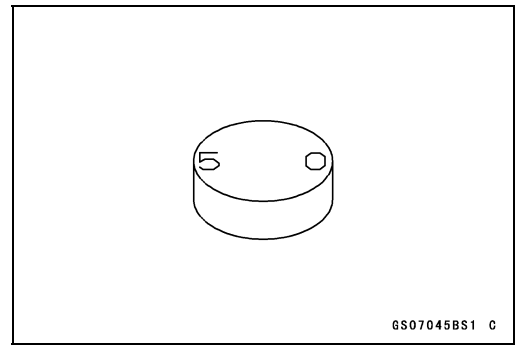
Do not put shim stock under the shim. This may cause the shim to pop out at high rpm, causing extensive engine damage.
Do not grind the shim. This may cause it to fracture, causing extensive engine damage.

- 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).

Periodic Maintenance Procedure

Adjustment Shims

Thickness	Part Number	Mark
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	92180-0215	33
2.350	92025-1877	35
2.375	92180-1058	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
2.775	92180-1196	78
2.800	92025-1886	80
2.825	92180-0216	83
2.850	92025-1887	85
2.875	92180-0217	88
2.900	92025-1888	90
2.925	92180-0218	93
2.950	92025-1889	95
2.975	92180-0219	98
3.000	92025-1890	00



Periodic Maintenance Procedure

Air Suction System Damage Inspection



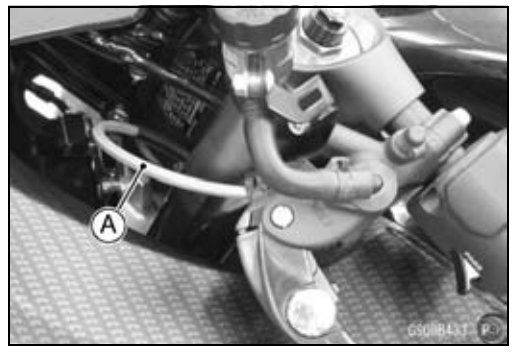
- Remove the left middle fairing (see Middle Fairing Removal in the Frame chapter).
- Disconnect the air switching valve hose out of the frame.
- Start the engine and run it at idle speed.
- Plug [A] the air switching valve hose end with your finger and feel vacuum pulsing in the hose.

★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).

Clutch

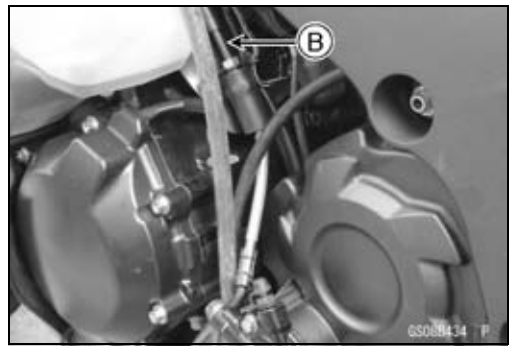
Clutch System Inspection

Clutch Fluid Leak Inspection

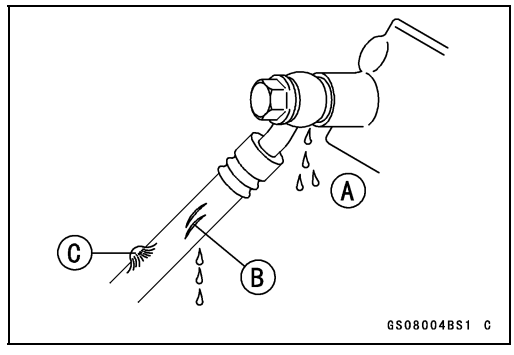


- Apply the clutch lever and inspect the clutch fluid leak from the clutch hose [A], pipe [B] and fittings.

★If the clutch fluid leaked from any position, inspect or replace the problem part.



Clutch Hose Damage and Installation Condition Inspection



- Inspect the clutch hoses and fittings for deterioration, cracks, corrosion and signs of leakage.

○The 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.

Periodic Maintenance Procedure

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.

⚠ WARNING

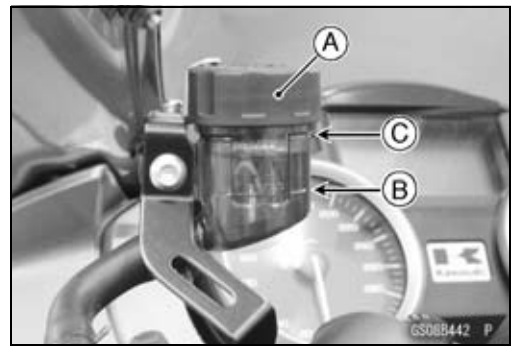
When test riding the vehicle, be aware of surrounding traffic for your safety.

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.

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

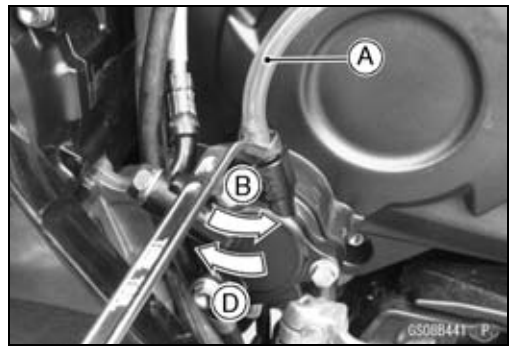


⚠ WARNING

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.

Periodic Maintenance Procedure

Clutch Fluid Change





- Level the clutch fluid reservoir and remove the reservoir cap.

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

- 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.

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

○Check the fluid level in the reservoir often, replenishing it as necessary.

NOTE

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

⚠ WARNING
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 Bleeding the Clutch Line 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: 8.5 N·m (0.87 kgf·m, 75 in·lb)
Clutch Reservoir Cap Stopper Screw (ZX1400H Model): 2.0 N·m (0.20 kgf·m, 18 in·lb)
Clutch Reservoir Cap Stopper Screw (ZX1400J Model): 1.2 N·m (0.12 kgf·m, 11 in·lb)

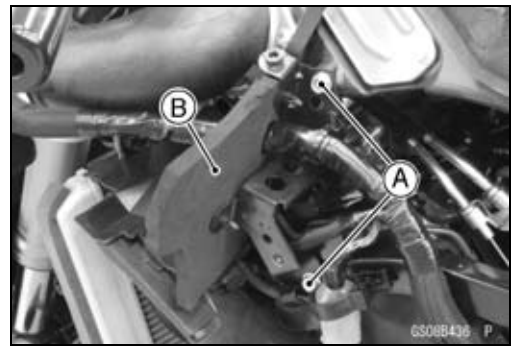
Periodic Maintenance Procedure

Clutch Hose Replacement

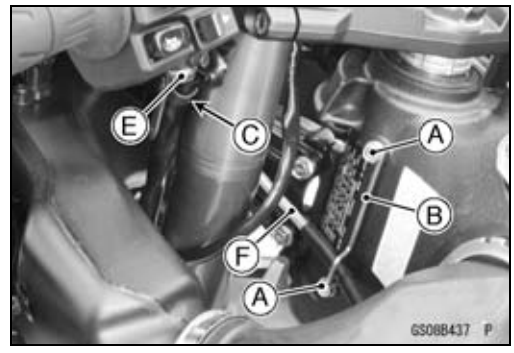
NOTICE
Clutch fluid quickly damages painted surface; any spilled fluid should be completely washed away immediately.

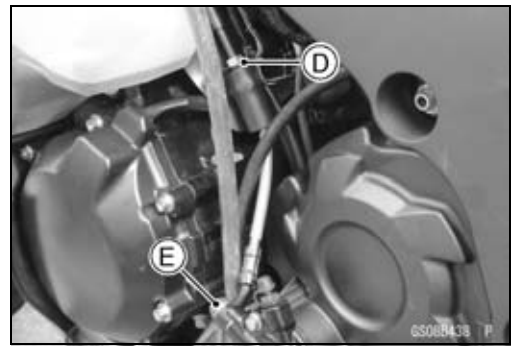
- When removing the clutch hose, take care not to spill the clutch fluid on the painted or plastic parts.

- Remove:
  Left Middle Fairing (see Middle Faring Removal in the Frame chapter)
  Pad Bracket Bolts [A]
- Clear the clutch hose with pad [B].



- Remove:
  Subframe (see Subframe Removal in the Frame chapter)
  Clutch Hose Clamp Bolts [A]
  Clutch Hose Clamp [B]
  Clamp [C]
  Clamp(s) [D]
  Clutch Hose Banjo Bolts [E] with Washers
  Clutch Hose [F]





- Immediately wash away any clutch fluid that spills.
- 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.
- 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)
Clutch Hose Clamp Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Fill the clutch line after installing the clutch hose (see Clutch Fluid Change).

Periodic Maintenance Procedure

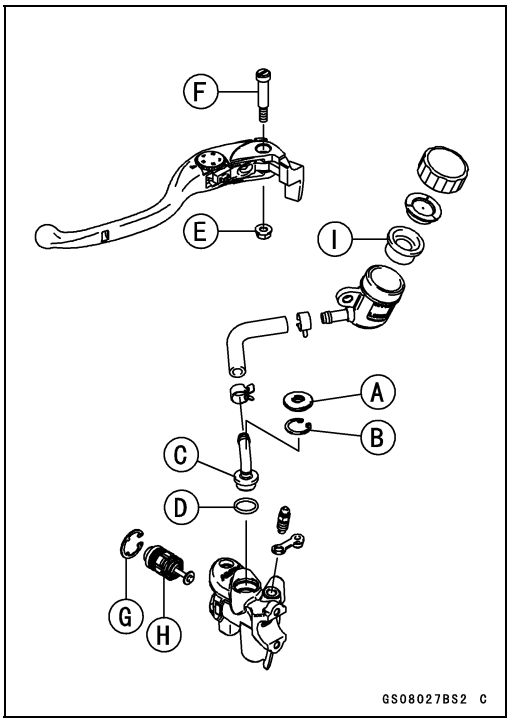
Rubber Parts of Clutch Master Cylinder/Slave Cylinder Replacement

Clutch Master Cylinder Cup and Dust Seal Replacement

- Remove the clutch master cylinder (see Clutch Master Cylinder Removal in the Clutch chapter).
- Remove:
  Seal Cover [A]
  Circlip [B]
  Connector [C]
  O-ring [D]
  Locknut [E]
  Pivot Bolt [F]
  Clutch Lever
  Circlip [G]

Special Tool - Inside Circlip Pliers: 57001-143

- Pull out the piston assy [H].
- Replace:
  Diaphragm [I]
  O-ring
  Circlips
  Piston Assy
  Seal Cover



- 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.

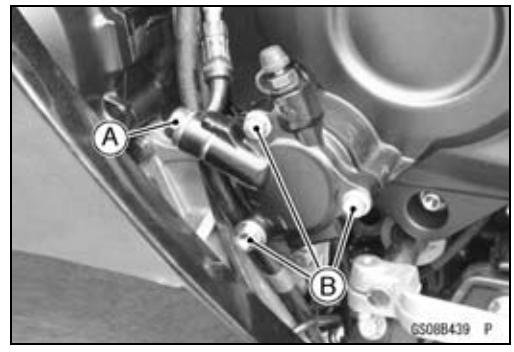
- Apply clutch fluid to the parts removed and to the inner wall of the cylinder.
- Take care not to scratch the piston or the inner wall of the cylinder.
- Apply silicone grease to the clutch lever pivot bolt.
- Tighten:

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 Installation in the Clutch chapter).

Periodic Maintenance Procedure

Clutch Slave Cylinder Piston Seal Replacement



- Free the lower Fairing (see Clutch Slave Cylinder Removal in the Clutch 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.
- Remove the banjo bolt and remove the slave cylinder.

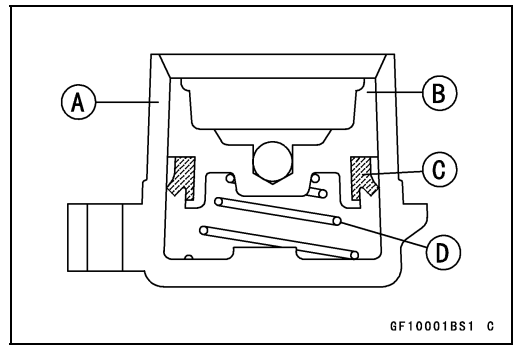
NOTICE
Clutch fluid quickly damages painted surface; any spilled fluid should be completely washed away immediately.

NOTE

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

- Remove the spring and piston seal.

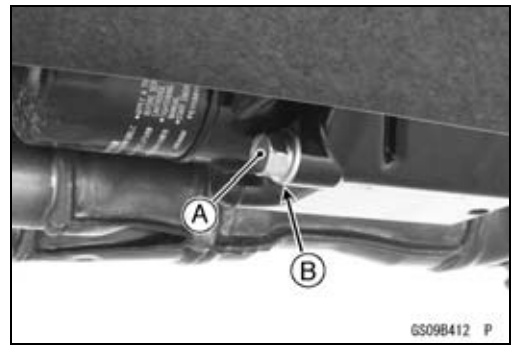
NOTICE
Replace the piston seal with a new one if it was removed from the piston.



- Before assembly, apply a rubber grease to the outside of the piston and the piston seal.
- Install the piston seal as shown.
  Cylinder [A]
  Piston [B]
  Piston Seal [C]
  Spring [D]

Engine Lubrication

Engine Oil Change



- Situate the motorcycle so that it is vertical after warming up the engine.
- Remove the engine oil drain bolt [A] to drain the oil.

○The oil in the oil filter can be drained by removing the filter (see Oil Filter Replacement).

- Replace the drain bolt gasket [B] with a new one.
- Tighten the drain bolt with the drain bolt gasket.

Torque - Engine Oil Drain Bolt: 29 N·m (3.0 kgf·m, 21 ft·lb)

Periodic Maintenance Procedure

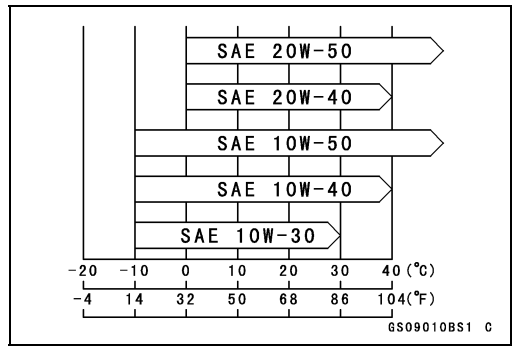
● Remove the oil filler plug [A].



● 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:	**3.8 L (4.0 US qt) (when filter is not removed)**
	4.2 L (4.4 US qt) (when filter is removed)
	4.6 L (4.9 US qt) (when engine is completely dry)



NOTE

○*Do 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.*

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

● Replace the O-ring of the oil filler plug with a new one.
● Install the oil filler plug.

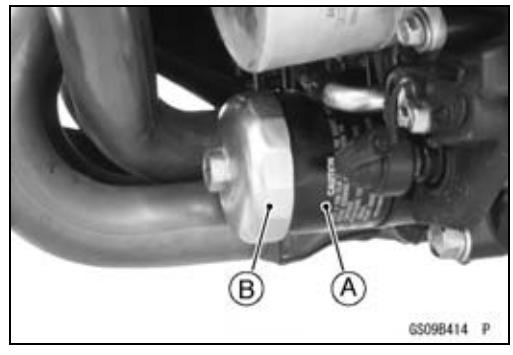
Torque - Oil Filler Plug: Hand-tighten

● 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 left middle fairing (see Middle Fairing Removal in the Frame chapter).
● Remove the oil filter [A] with the oil filter wrench [B].

Special Tool - Oil Filter Wrench: 57001-1249



Periodic Maintenance Procedure

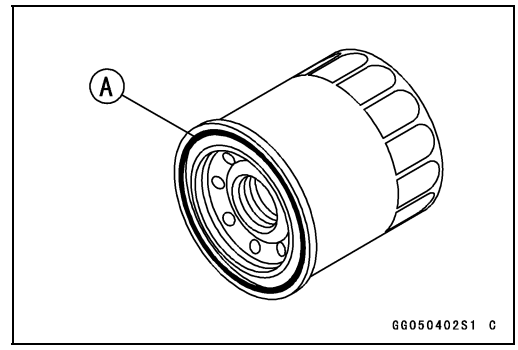
- Replace the filter with a new one.
- Apply grease to the gasket [A] before installation.
- Tighten the filter with the oil filter wrench.

Special Tool - Oil Filter Wrench: 57001-1249

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).

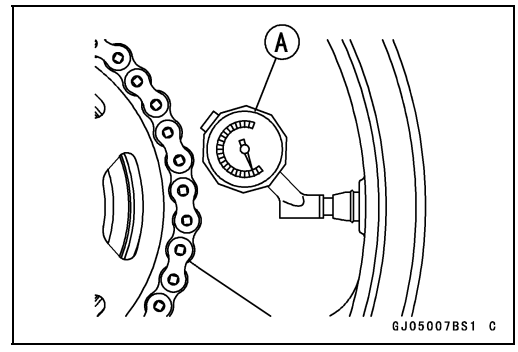
Wheels/Tires

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: 290 kPa (2.90 kgf/cm², 42 psi)
Rear: 290 kPa (2.90 kgf/cm², 42 psi)

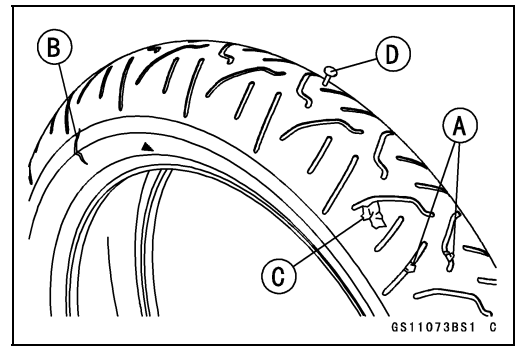


Wheels and Tires

Wheel/Tire Damage Inspection

- Remove any imbedded stones [A] or other foreign particles from tread.
- Visually inspect the tire for cracks [B] and cuts [C] and nail [D], 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.

★If any damage is found, replace the wheel if necessary.

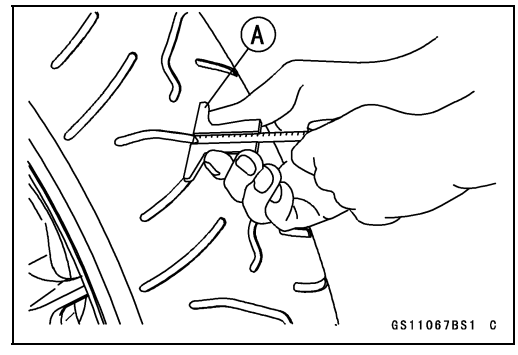


Tire Tread Wear Inspection

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).



Periodic Maintenance Procedure

Tread Depth
Standard:

Front	**3.6 mm (0.14 in.)**
Rear	**4.8 mm (0.19 in.)**

Service Limit:

Front	**1 mm (0.04 in.),**
	(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.

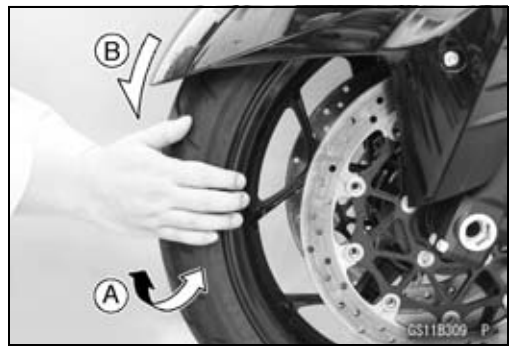
NOTE

○*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).



- Raise the rear wheel off the ground with the stand (see Rear Wheel Removal in the Wheels/Tires chapter).
- Inspect the roughness of the rear wheel bearing by moving [A] the wheel to the left and right.
- Spin [B] 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).



Periodic Maintenance Procedure

Final Drive

Drive Chain Lubrication Condition Inspection

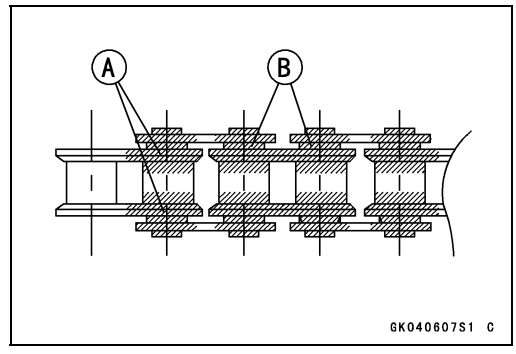
Lubrication is necessary after riding through rain or on wet roads, or any time that the chain appears dry.

Use a lubricant for sealed chains to prevent deterioration of chain seals. If the chain is especially dirty, clean it using a cleaner for sealed chains following the instructions supplied by the chain cleaner manufacturer.

NOTICE

The O-rings between the side plates seal in the lubricant between the pin and the bushing. To avoid damaging the O-rings and resultant loss of lubricant, observe the following rules.
Use only chain cleaner for cleaning of the O-ring of the drive chain. Any other cleaning solution such as gasoline will cause deterioration and swelling of the O-ring. Immediately blow the chain dry with compressed air after cleaning. Complete cleaning and drying the chain within 10 minutes.

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



Drive Chain Slack Inspection

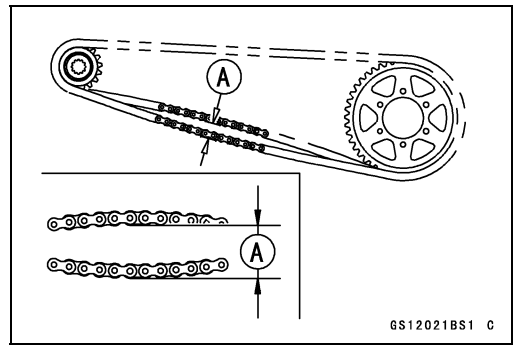
NOTE

- ○*Check the slack with the motorcycle setting on its side stand.*
- ○*Clean the chain if it is dirty, and lubricate it if it appears dry.*

- Check the wheel alignment (see Wheel Alignment Inspection).
- Rotate the rear wheel to find the position where the chain is tightest.
- Measure the vertical movement (chain slack) [A] midway between the sprockets.

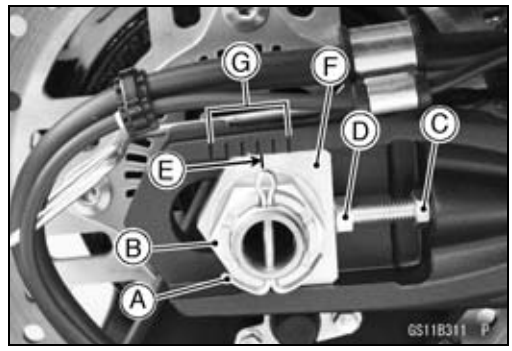
★If the chain slack exceeds the standard, adjust it.

Chain Slack
Standard: 25 ~ 30 mm (1.0 ~ 1.2 in.)



Periodic Maintenance Procedure

Drive Chain Slack Adjustment



- Remove the cotter pin [A], and loosen the rear axle nut [B].
- Loosen the both chain adjuster locknuts [C].

★If the chain is too loose, turn out the left and right chain adjusters [D] evenly.

★If the chain is too tight, turn in the left and right chain adjusters evenly, and kick the wheel forward.

- Turn both chain adjusters evenly until the drive chain has the correct amount of slack. To keep the chain and wheel properly aligned, the notch [E] on the right wheel alignment indicator [F] should align with the same swingarm mark or position [G] that the left indicator notch aligns with.

⚠ WARNING

Misalignment of the wheel will result in abnormal wear and may result in an unsafe riding condition. Be sure the wheel is properly aligned.

- Tighten the both chain adjuster locknuts securely.
- Tighten the rear axle nut.

Torque - Rear Axle Nut: 130 N·m (13.3 kgf·m, 95.9 ft·lb)

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

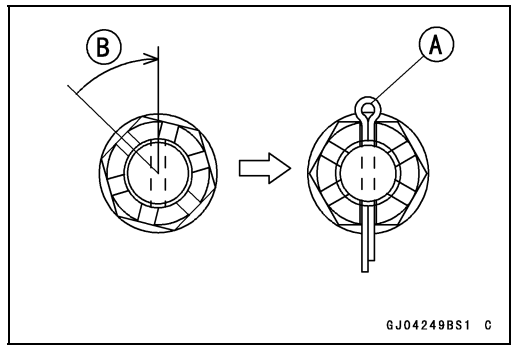
- Insert a new cotter pin [A].

NOTE

○*When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle, tighten the nut clockwise [B] up to next alignment.*

○*It should be within 30 degrees.*

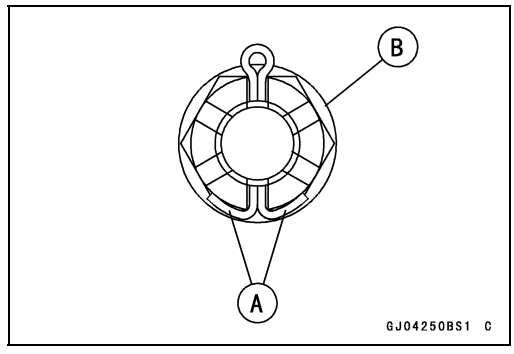
○*Loosen once and tighten again when the slot goes past the nearest hole.*



- Bend the cotter pin [A] over the nut [B].

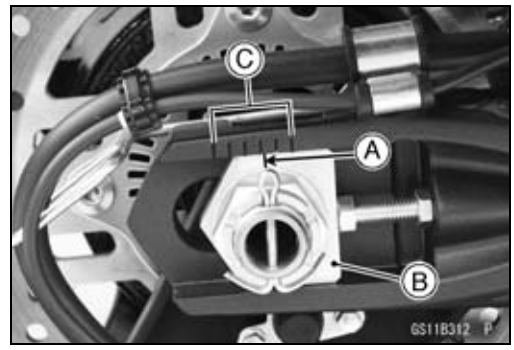
⚠ WARNING

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.



Periodic Maintenance Procedure

Wheel Alignment Inspection



- Check that the notch [A] on the right alignment indicator [B] aligns with the same swingarm mark or position [C] that the left alignment indicator notch aligns with.

★If they do not, adjust the chain slack and align the wheel alignment (see Drive Chain Slack Adjustment).

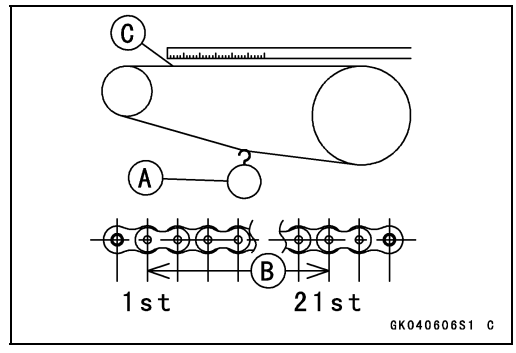
NOTE

○*Wheel alignment can be also checked using the straightedge or string method.*

⚠ WARNING

Misalignment of the wheel will result in abnormal wear and may result in an unsafe riding condition. Be sure the wheel is properly aligned.

Drive Chain Wear Inspection



- Remove the chain cover (see Drive Chain Replacement in the Final Drive chapter).
- Rotate the rear wheel to inspect the drive chain for damaged rollers, and loose pins and links.

★If there is any irregularity, replace the drive chain.

★Lubricate the drive chain if it appears dry.

- Stretch the chain taut by hanging a 10 kg (22 lb) weight [A] on the chain.
- Measure the length of 20 links [B] on the straight part [C] of the chain from the pin center of the 1st pin to the pin center of the 21st pin. Since the chain may wear unevenly, take measurements at several places.

★If any measurements exceed the service limit, replace the chain. Also, replace the front and rear sprockets when the drive chain is replaced.

Drive Chain 20-link Length

Standard: 317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)

Service Limit: 319 mm (12.6 in.)

⚠ WARNING

A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control. Inspect the chain for damage and proper adjustment before each ride. If chain wear exceeds the service limit, replace it with the standard chain.

Standard Chain

Make: ENUMA

Type: EK530RMX/3D

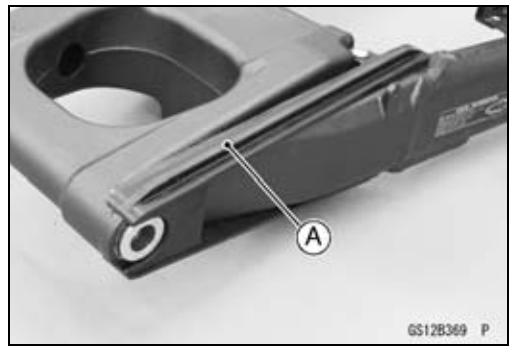
Link: 118 links

Periodic Maintenance Procedure

Chain Guide Wear Inspection

- Remove the swingarm (see Swingarm Removal in the Suspension chapter).
- Visually inspect the chain guide [A].

★Replace the chain guide if it shows any signs of abnormal wear or damage.



Periodic Maintenance Procedure

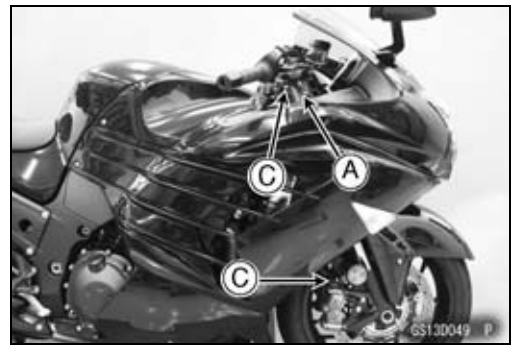
Brakes

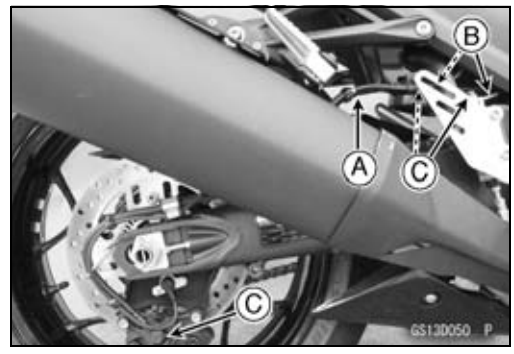
Brake System Inspection

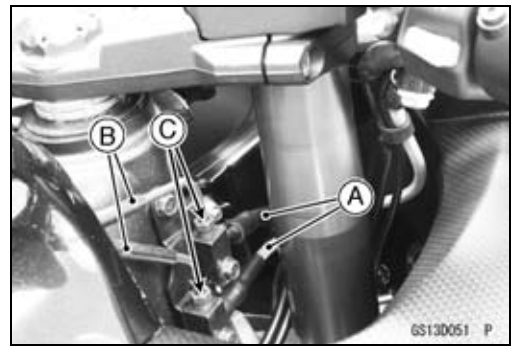
Brake Fluid Leak (Brake Hose and Pipe) Inspection

- Remove:
  Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)
  Battery Back Cover (see ABS Hydraulic Unit Removal in the Brakes chapter)
- Apply the brake lever or pedal and inspect the brake fluid leak from the brake hoses [A], pipes [B] and fittings [C].

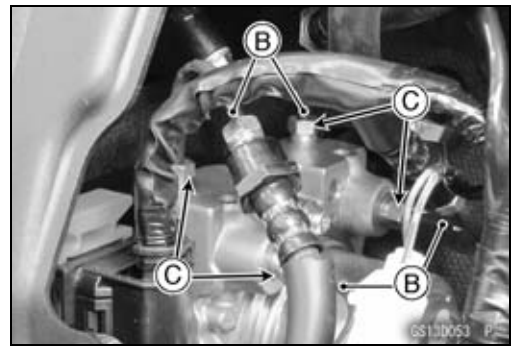
★If the brake fluid leaked from any position, inspect or replace the problem part.





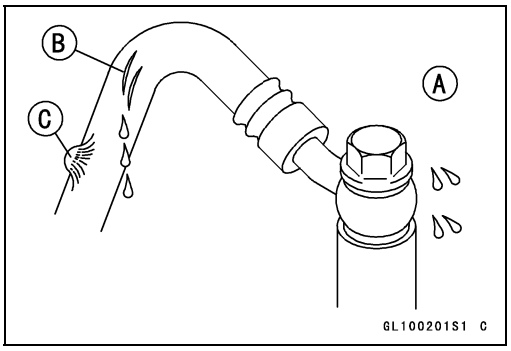






Periodic Maintenance Procedure

Brake Hose and Pipe Damage and Installation Condition Inspection



- 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.

○The high pressure inside the brake line can cause fluid to leak [A] or the hose, pipes to burst if the line is not properly maintained. Bend and twist the rubber hose while examining it.

★Replace the hose and pipe if any crack [B], bulge [C] or leakage is noticed.

★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 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.

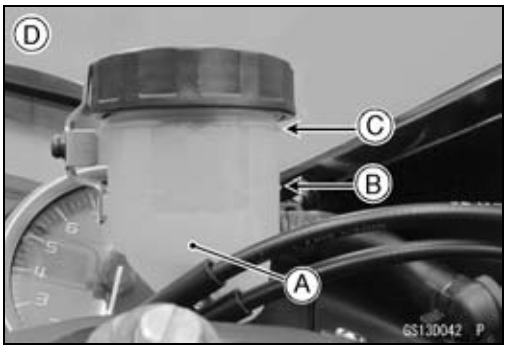
Brake Fluid Level Inspection

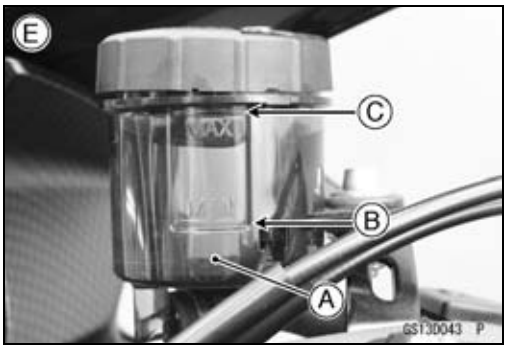
- Check that the brake fluid level in the front brake reservoir [A] is above the lower (ZX1400H model) or MIN (ZX1400J model) level line [B].

NOTE

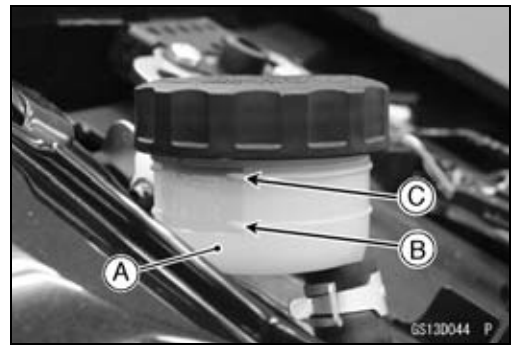
○*Hold the reservoir horizontal by turning the handlebar when checking brake fluid level.*

★If the fluid level is lower than the lower level line, fill the reservoir to the upper (ZX1400H model) or MAX (ZX1400J model) level line [C].
ZX1400H Model [D]
ZX1400J Model [E]





Periodic Maintenance Procedure



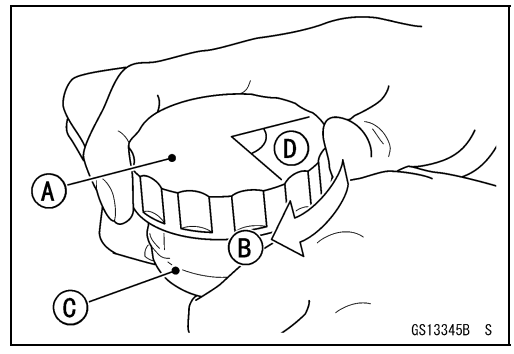
- Remove the seat (see Seat Removal in the Frame chapter).
- Check that the brake fluid level in the rear brake reservoir [A] is above the lower level line [B].

★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 front (ZX1400H Model)/rear brake fluid reservoir cap correctly.

○First, tighten the brake fluid reservoir cap [A] clockwise [B] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body [C], then tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir body.

- Tighten:

Torque - Front Brake Reservoir Cap Stopper Screw (ZX1400H Model): 1.2 N·m (0.12 kgf·m, 11 in·lb)
Front Brake Reservoir Cap Screws (ZX1400J Model): 0.70 N·m (0.07 kgf·m, 6.2 in·lb)

Periodic Maintenance Procedure

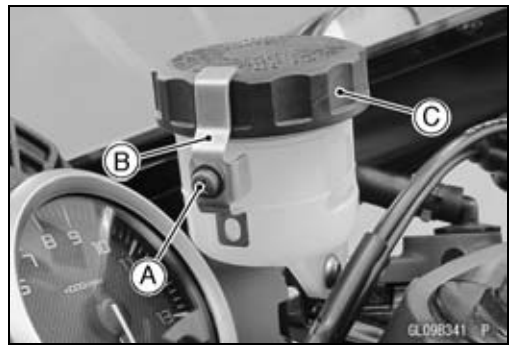
Brake Fluid Change

NOTE

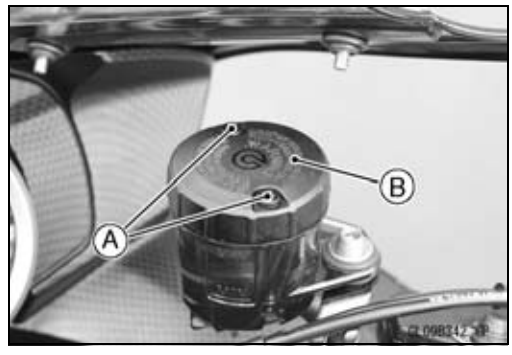
○*The procedure to change the front brake fluid is as follows. Changing the rear brake fluid is the same as for the front brake.*

● Level the brake fluid reservoir.

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

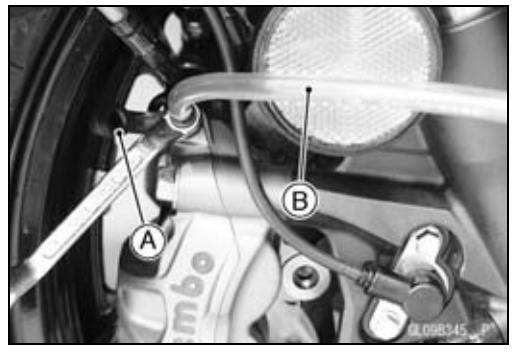


● Remove (ZX1400H Model):
Front Brake Reservoir Cap Stopper Screw [A]
Stopper [B]
Front Brake Reservoir Cap [C]
Diaphragm Plate
Diaphragm

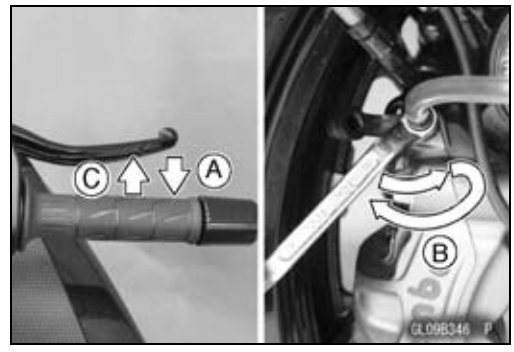


● Remove (ZX1400J Model):
Front Brake Reservoir Cap Screws [A]
Front Brake Reservoir Cap [B]
Diaphragm

● Remove the rubber cap [A] from the bleed valve 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.



Periodic Maintenance Procedure



● Change the brake fluid.
○Repeat this operation until fresh brake fluid comes out from the plastic hose or the color of the fluid changes.
1. 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].

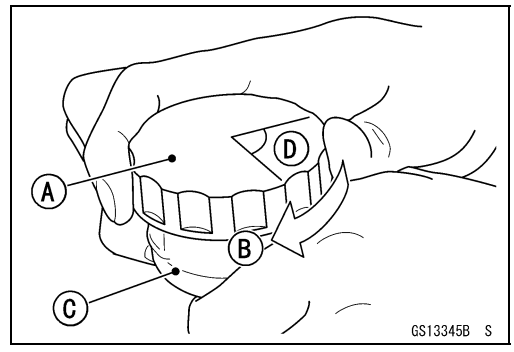
NOTE

○*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.*
○*Front Brake: Repeat the above steps for the other caliper.*

● Remove the clear plastic hose.
● Tighten the bleed valve, and install the rubber cap.

Torque - Bleed Valve (ZX1400H Model and Rear): 8.0 N·m (0.82 kgf·m, 71 in·lb)
Bleed Valve (ZX1400J Model): 14 N·m (1.4 kgf·m, 10 ft·lb)

● Install:
Diaphragm
Diaphragm Plate (ZX1400H Model)
Front Brake Reservoir Cap



● Follow the procedure below to install the front (ZX1400H model)/rear brake fluid reservoir cap correctly.
○First, tighten the reservoir cap [A] clockwise [B] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body [C], then tighten the cap an additional 1/6 turn [D] while holding the reservoir body.

● Install the stopper (ZX1400H model) and screw(s).
● Tighten:

Torque - Front Brake Reservoir Cap Stopper Screw (ZX1400H Model): 1.2 N·m (0.12 kgf·m, 11 in·lb)
Front Brake Reservoir Cap Screws (ZX1400J Model): 0.70 N·m (0.07 kgf·m, 6.2 in·lb)

● After changing the fluid, check the brake for good braking power, no brake drag, and no fluid leakage.
★If necessary, bleed the air from the lines.

Periodic Maintenance Procedure

Brake Hose and Pipe Replacement

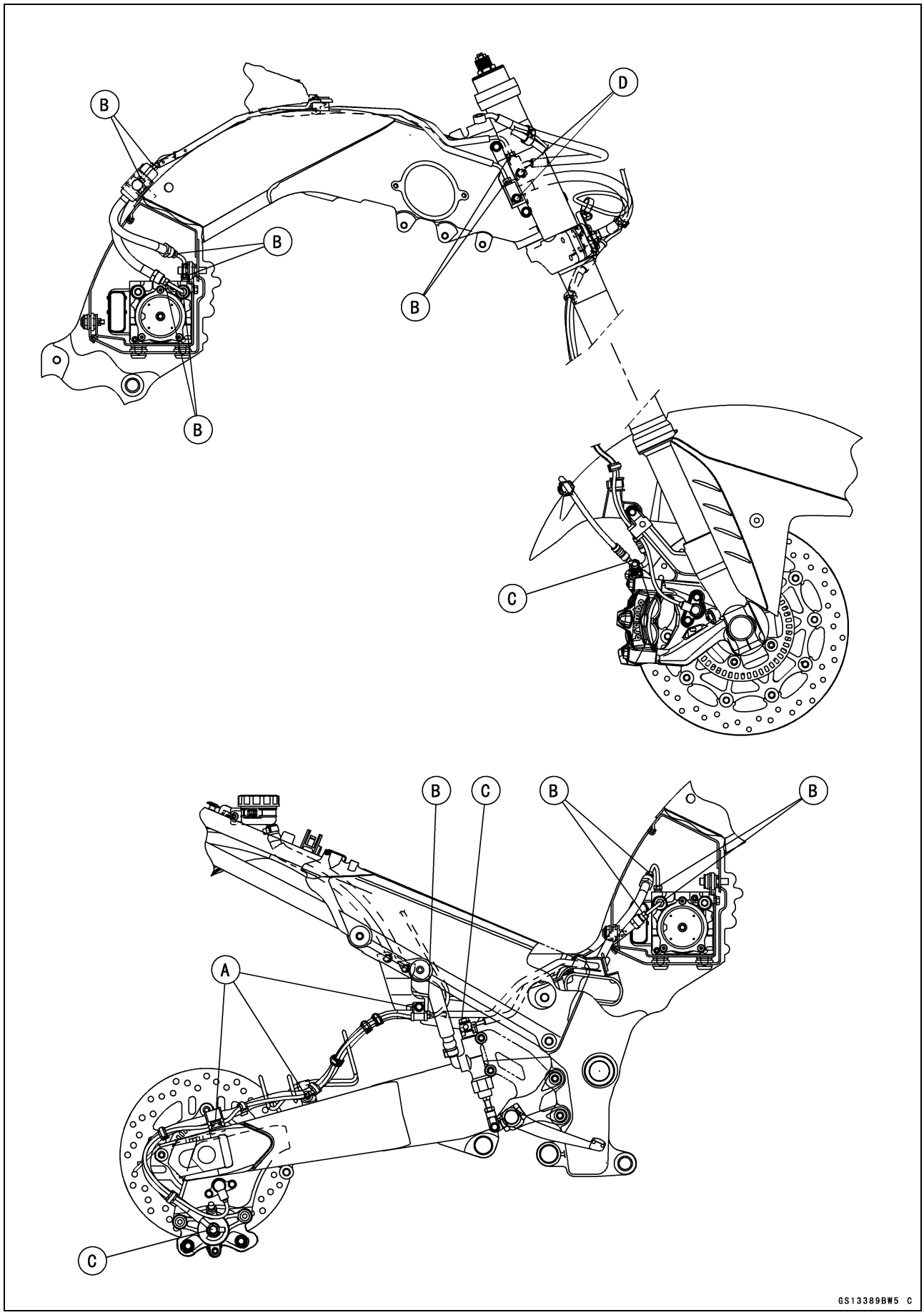
NOTICE
Brake fluid quickly damages painted plastic surfaces; any spilled fluid should be completely washed away immediately.

NOTE

○*When removing the brake pipes and hoses on the hydraulic unit, remove them with the flare nut wrench 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)
Battery Back Cover (see ABS Hydraulic Unit Removal in the Brakes chapter)
Brake Hose Clamp Bolts [A]
Brake Pipe Joint Nuts [B]
Brake Hose Banjo Bolts [C]
Brake Hose Joint Bolts [D]
Clamps
● When removing the brake hose and pipe, take care not to spill the brake fluid on the painted or plastic parts.
● Immediately wash away any brake fluid that spills.

Periodic Maintenance Procedure



Periodic Maintenance Procedure

- There are washers on each side of the brake hose and pipe fitting. Replace them with new ones when installing.
- 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.

NOTE

○*Tighten the brake pipe joint nut at both ends of the brake pipe temporarily and then tighten them to the specified torque.*

- Install the brake pipes and brake hoses to the specified angle (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Tighten the brake pipe joint nuts with the flare nut wrench.
- 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)
Brake Hose Clamp Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)
Brake Hose Joint Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Fill the brake line after installing the brake hose and pipe (see Brake Fluid Change).

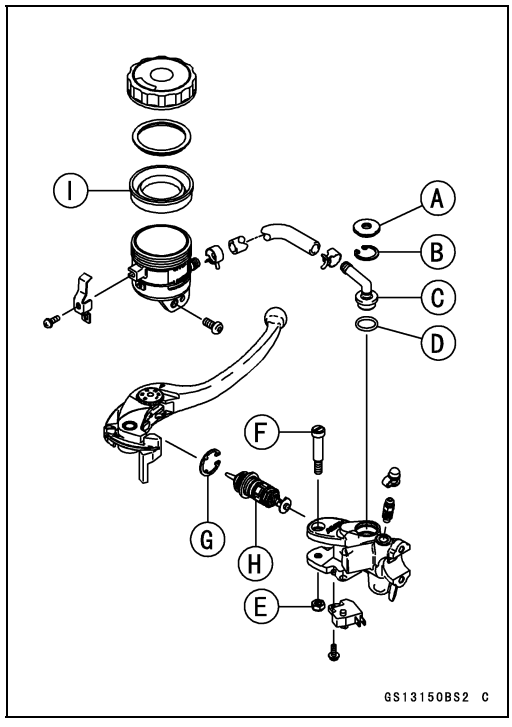
Master Cylinder Rubber Parts Replacement

Front Master Cylinder Disassembly (ZX1400H Model)

- Remove the front master cylinder (see Front Master Cylinder Removal (ZX1400H model) in the Brakes chapter).
- Remove the seal cover [A], circlip [B], connector [C] and O-ring [D].

Special Tool - Inside Circlip Pliers: 57001-143

- Remove the locknut [E] and pivot bolt [F], and remove the brake lever.
- Remove the circlip [G].
- Pull out the piston assy [H].
- Replace:
  Seal Cover [A]
  Circlip [B]
  O-ring [D]
  Circlip [G]
  Piston Assy [H]
  Diaphragm [I]



Front Master Cylinder Disassembly (ZX1400J Model)

- Remove the front master cylinder (see Front Master Cylinder Removal (ZX1400J model) in the Brakes chapter).
- Replace the replacement parts as an assembly of the front master cylinder.

Periodic Maintenance Procedure

Rear Master Cylinder Disassembly

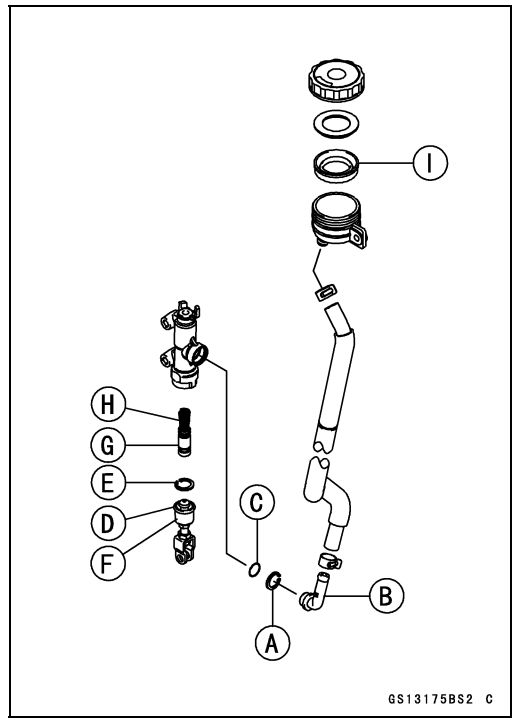
- Remove the rear master cylinder (see Rear Master Cylinder Removal in the Brakes chapter).
- Remove the circlip [A], connector [B] and O-ring [C].

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 (Front of the ZX1400H Model and Rear)

- 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.
- Tighten:

Torque - Rear Brake Reservoir Bolt: 0.50 N·m (0.05 kgf·m, 4.4 in·lb)
Front Brake Reservoir Cap Stopper Screw: 1.2 N·m (0.12 kgf·m, 11 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)

Periodic Maintenance Procedure

Caliper Rubber Parts Replacement

Front Caliper Disassembly (ZX1400H Model)

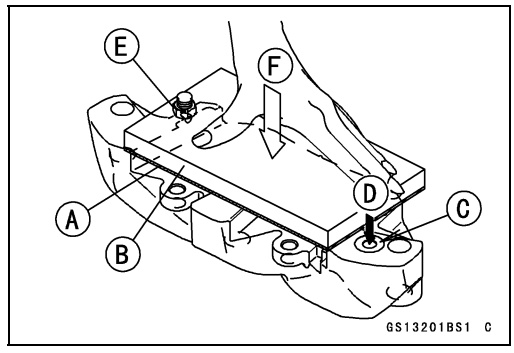
- Remove:
  Brake Pads (see Front Brake Pad Removal (ZX1400H Model) in the brakes chapter)
  Front Caliper (see Front Caliper Removal (ZX1400H Model) in the Brakes chapter)
  Front Caliper Assembly Bolts
  O-ring

- Using compressed air, remove the pistons. One way to remove the pistons is as follows.

○Install a rubber gasket [A] and a wooden board [B] more than 10 mm (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.

○Lightly apply compressed air [D] to the oil passage until the pistons hit the rubber gasket.

○For 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].

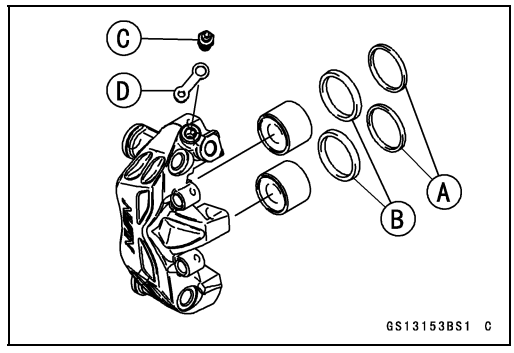


⚠ WARNING

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

○Pull out the pistons by hand.

- Remove the dust seals [A] and fluid seals [B].
- Remove the bleed valve [C] and rubber cap [D].
- Repeat the previous step to remove the pistons from the other side of the caliper body.



Front Caliper Assembly (ZX1400H Model)

- Clean the caliper parts except for the pads.

NOTICE

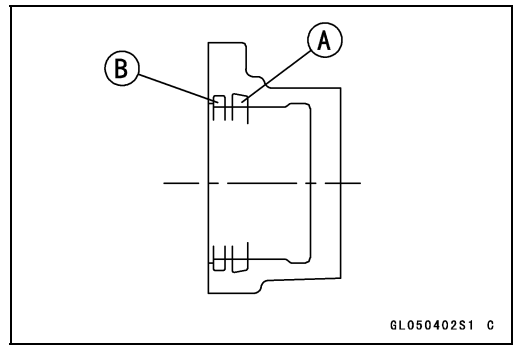
For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

- Install the bleed valve and rubber cap.

Torque - Bleed Valve: 8.0 N·m (0.82 kgf·m, 71 in·lb)

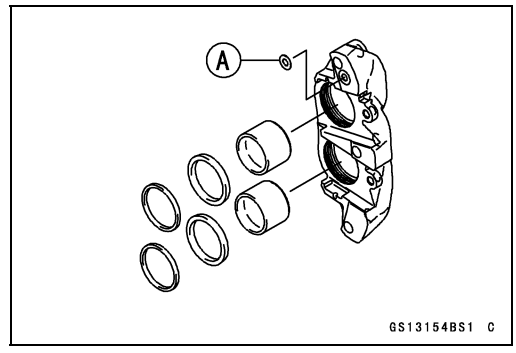
Periodic Maintenance Procedure

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

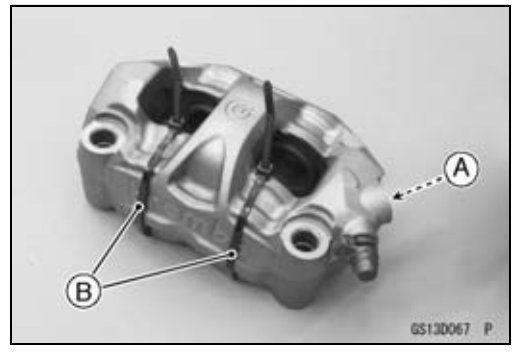


- Install the removed parts (see appropriate chapters).
- Wipe up any spilled brake fluid on the caliper with wet cloth.

Front Caliper Disassembly (ZX1400J Model)

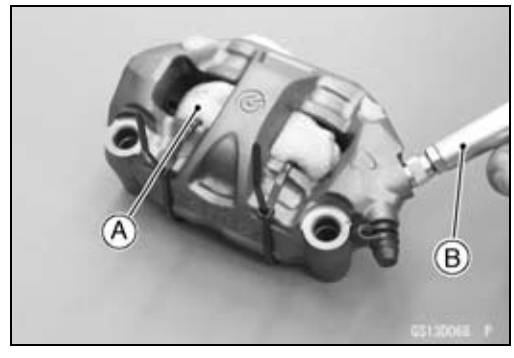
- Remove:
  Front Caliper (see Front Caliper Removal (ZX1400J Model) in the Brakes chapter)
  Brake Pads (see Front Brake Pad Removal (ZX1400J Model) in the Brakes chapter)

- Hold the pistons nearest the oil passage [A] with the bands [B].



- Using compressed air, remove the pistons.

○Cover the caliper opening with a clean heavy cloth [A].
○Lightly apply compressed air [B] to the oil passage.



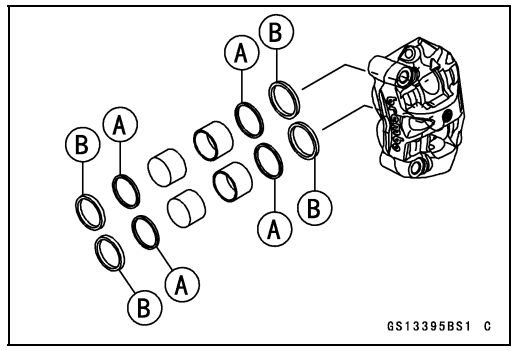
⚠ WARNING

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

○Pull out the pistons by hand.

Periodic Maintenance Procedure

- Remove the dust seals [A] and fluid seals [B].
- Cut the bands.
- Repeat the previous step to remove the pistons from the other side of the caliper body.
- Remove the bleed valve and rubber cap.



Front Caliper Assembly (ZX1400J Model)

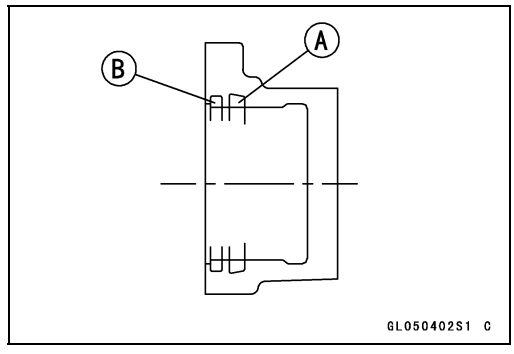
- Clean the caliper parts except for the pads.

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

- Install the bleed valve and rubber cap.

  Torque - Bleed Valves: 14 N·m (1.4 kgf·m, 10 ft·lb)

- Apply brake fluid to the cylinder bores.
- Replace the fluid seals [A] with new ones.
- Apply 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.
- Apply silicone grease to the dust seals, and install them into the cylinders by hand.



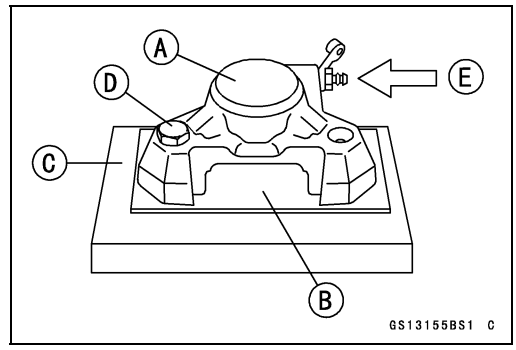
- Apply brake fluid to the outside of the pistons, and push them into each cylinder by hand.
- Install the removed parts (see appropriate chapters).
- Wipe up any spilled brake fluid on the caliper with wet cloth.

Rear Caliper Disassembly

- Remove:
  Brake Pads (see Rear Brake Pad Removal in the Brakes chapter)
  Rear Caliper (see Rear Caliper Removal in the Brakes chapter)
  Rear Caliper Assembly Bolts
  O-ring

Periodic Maintenance Procedure

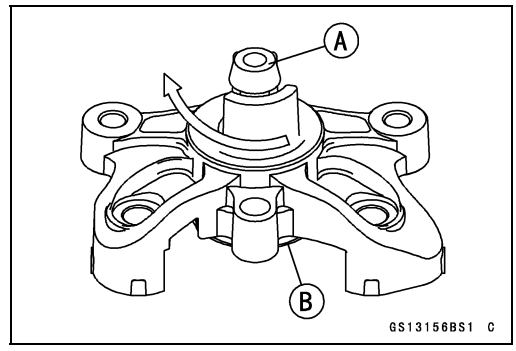
- Remove the left side piston is the same as for the front caliper.
  Left Side Caliper [A]
  Rubber Gasket [B]
  Wooden Board [C]
  Bolt [D] and Nut
  Apply compressed air [E]



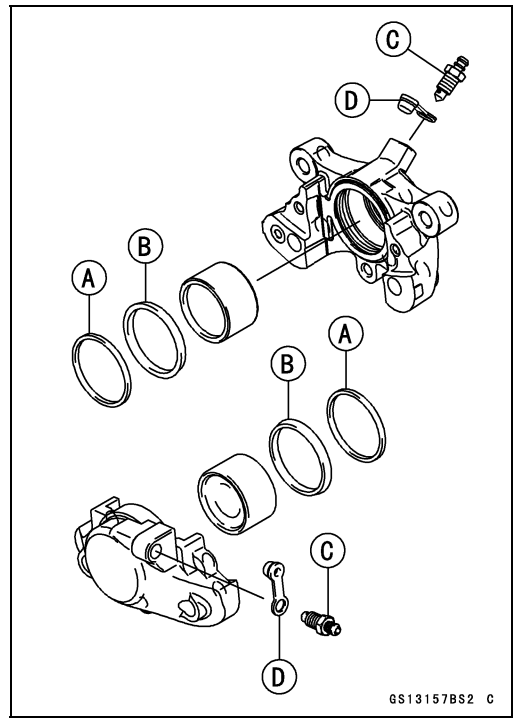
⚠ WARNING

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

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



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



Rear Caliper Assembly

- Clean the caliper parts except for the pads.

NOTICE

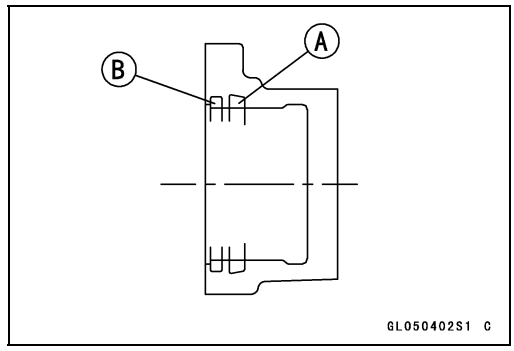
For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

- Install the bleed valves and rubber caps.

Torque - Bleed Valves: 8.0 N·m (0.82 kgf·m, 71 in·lb)

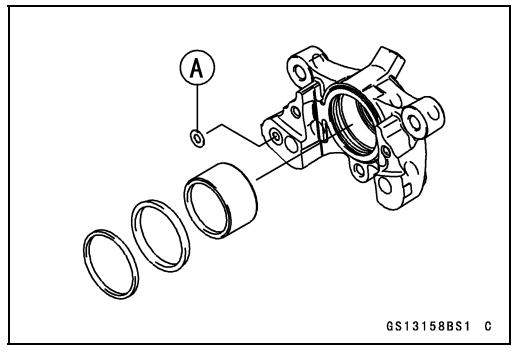
Periodic Maintenance Procedure

- Apply brake fluid to the cylinder bores.
- Replace the fluid seals [A] with new ones.
- Apply silicone grease to the fluid seals, and install them into each cylinder by hand.
- Replace the dust seals [B] with new ones.
- Apply brake fluid to the dust seals, and install them into each cylinder by hand.



- Replace the O-ring [A] with a new one.
- 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)



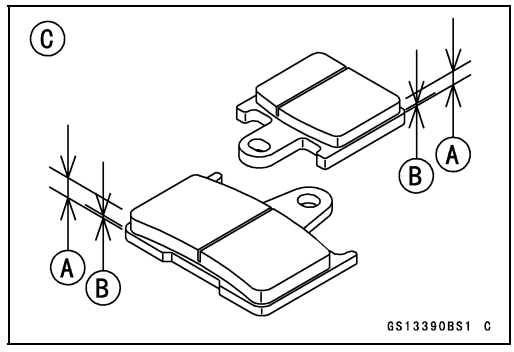
- Install the pads (see Rear Brake Pad Installation in the Brakes chapter).
- Wipe up any spilled brake fluid on the caliper with wet cloth.

Brake Pad Wear Inspection

- Remove the brake pads (see Front/Rear Brake Pad Removal in the Brakes chapter).
- 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.

Front of the ZX1400H Model and Rear [C]
Front of the ZX1400J Model [D]

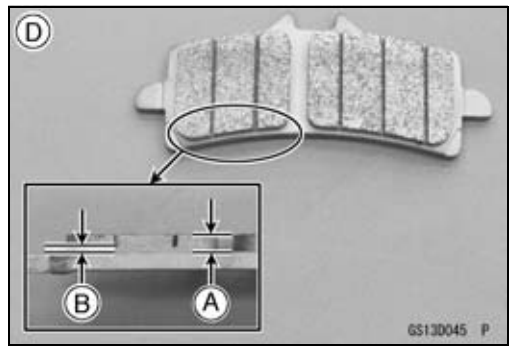


Pad Lining Thickness

Standard:

Front:

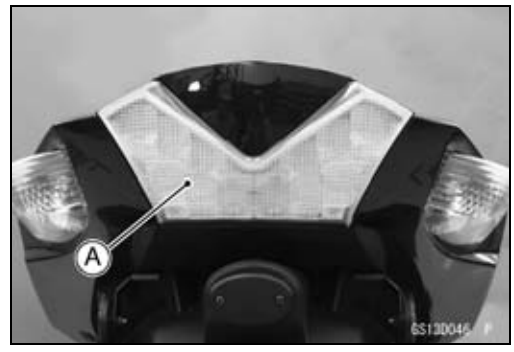
ZX1400H	**4.0 mm (0.16 in.)**
ZX1400J	**3.7 mm (0.15 in.)**
Rear	**5.0 mm (0.20 in.)**
Service Limit:	**1 mm (0.04 in.)**



Periodic Maintenance Procedure

Brake Light Switch Operation Inspection

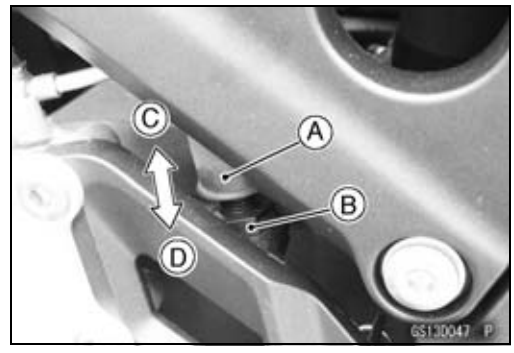
- Turn the ignition switch on.
- The brake light [A] should go on when the brake lever is applied or after the brake pedal is depressed about 10 mm (0.39 in.).



★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 (LED) (see Tail/Brake Light Removal in the Electrical System chapter)
Main Fuse 30 A and Brake Light/Horn 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)
Harness (see Wiring Inspection in the Electrical System chapter)



Suspension

Suspension System Inspection

Front Forks/Rear Shock Absorber Operation Inspection

- Pump the forks down and up [A] 4 or 5 times, and inspect the smooth stroke.

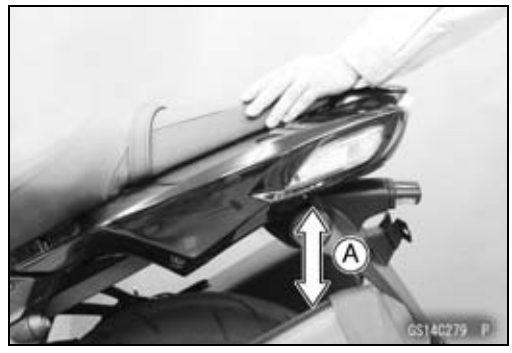
★If the forks do not smoothly or noise is found, inspect the fork oil level or fork clamps (see Front Fork Oil Change in the Suspension chapter).



Periodic Maintenance Procedure

- Pump the seat down and up [A] 4 or 5 times, and inspect the smooth stroke.

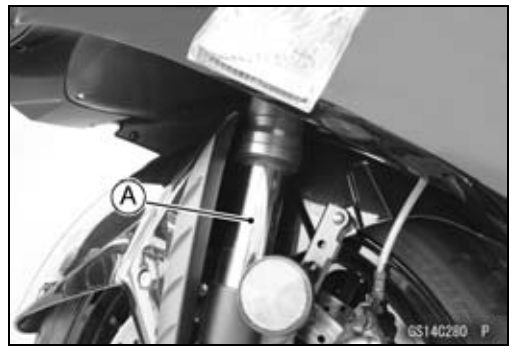
★If the shock absorber does not smoothly stroke or noise is found, inspect the oil leak (see Rear Shock Absorber Oil Leak Inspection).



Front Fork Oil Leak Inspection

- Visually inspect the front forks [A] for oil leakage.

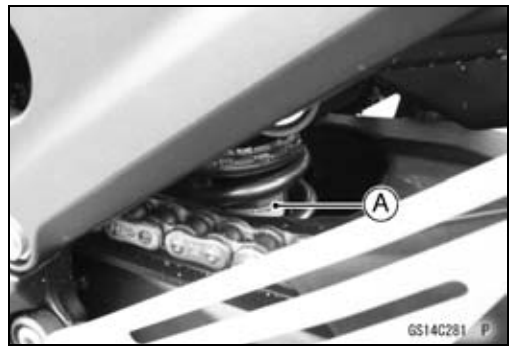
★Replace any defective parts, if necessary.



Rear Shock Absorber Oil Leak Inspection

- Visually inspect the shock absorber [A] for oil leakage.

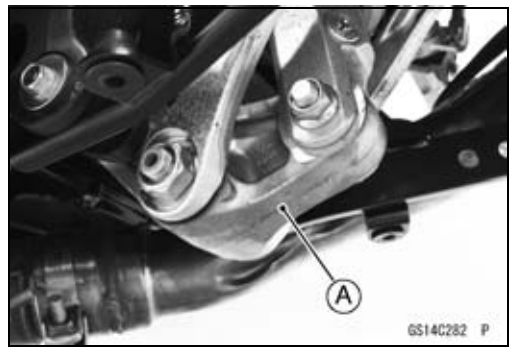
★If the oil leakage is found on it, replace the shock absorber with a new one.



Rocker Arm Operation Inspection

- Remove the rear lower fairing (see Rear Lower Fairing Removal in the Frame chapter) (Equipped Models).
- Pump the seat down and up 4 or 5 times, and inspect the smooth stroke.

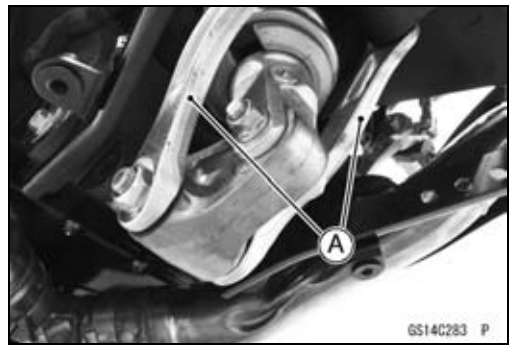
★If the rocker arm [A] does not smoothly stroke or noise is found, inspect the fasteners and bearings (see Rocker Arm/Tie-Rod Bearing, Sleeve Inspection in the Suspension chapter).



Tie-Rod Operation Inspection

- Remove the rear lower fairing (see Rear Lower Fairing Removal in the Frame chapter) (Equipped Models).
- 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).



Periodic Maintenance Procedure

Steering

Steering Play Inspection



- Raise the front wheel off the ground with the jack (see Front Wheel Removal in the Wheels/Tires chapter).
- With the front wheel pointing straight ahead, alternately tap each end of the handlebar. The front wheel should swing fully left and right from the force of gravity until the fork hits the stop.

★If the wheel binds or catches before the stop, the steering is too tight.

- Feel for steering looseness by pushing and pulling the forks.

★If you feel looseness, the steering is too loose.

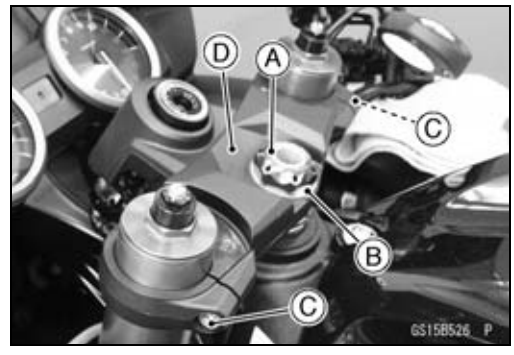
NOTE

○*The cables and wiring will have some effect on the motion of the fork which must be taken into account.*

○*Be sure the leads and cables are properly routed.*

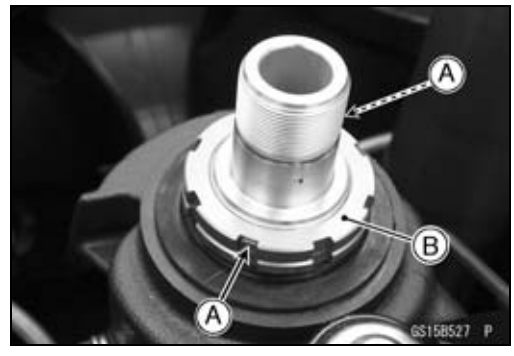
○*The bearings must be in good condition and properly lubricated in order for any test to be valid.*

Steering Play Adjustment



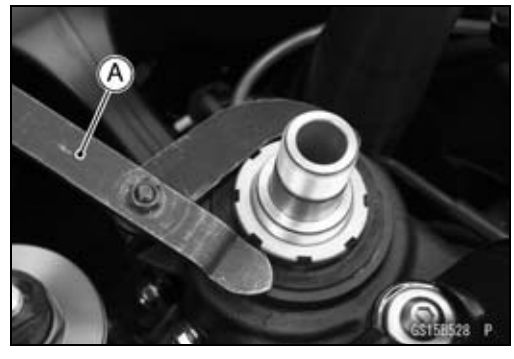
- Remove:

  Handlebars (see Handlebar Removal in the Steering chapter)
  Stem Head Nut [A] and Washer [B]
  Upper Fork Clamp Bolts [C] (Loosen)
  Stem Head [D]



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

Special Tool - Steering Stem Nut Wrench: 57001-1100



- Adjust the steering.

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

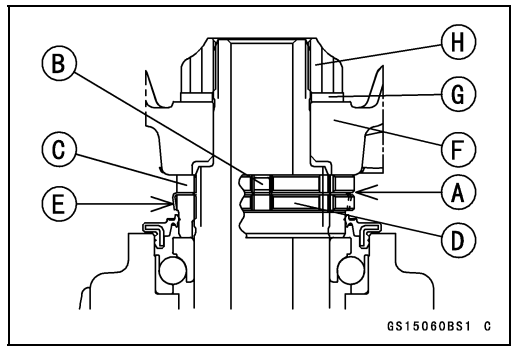
★If the steering is too tight, loosen the stem nut a fraction of a turn.

★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.*

Periodic Maintenance Procedure



- Install the claw 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:

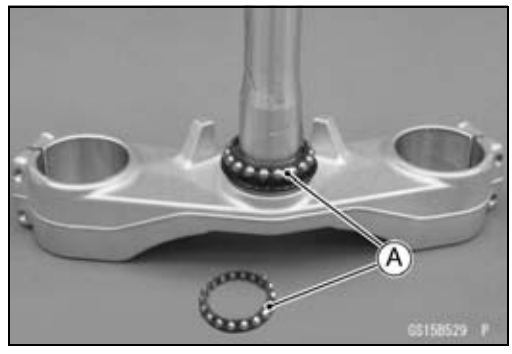
Torque - Steering Stem Head Nut: 78 N·m (8.0 kgf·m, 58 ft·lb)
Front Fork Clamp Bolts (Upper): 20 N·m (2.0 kgf·m, 15 ft·lb)

- 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).

Periodic Maintenance Procedure

Electrical System

Lights and Switches Operation Inspection

First Step

- Set the gear position in the neutral position.
- Turn the ignition switch on.
- The following lights should go on according to below table.

City Lights [A]	goes on
Taillight (LED) [B]	goes on
License Plate Light [C]	goes on
Meter Panel Illumination Light (LED) [D]	goes on
Meter Panel LCD [E]	goes on
Red Warning Indicator /Immobilizer Indicator Light (Equipped Models) (LED) [F]	goes on (for 5 seconds)
Green Neutral Indicator Light (LED) [G]	goes on
Red Oil Pressure Warning Indicator Light (LED) [H]	goes on
Yellow ABS Indicator Light (LED) [I]	goes on

★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, Headlight Relay Fuse 15 A and Brake Light/Horn Fuse 10 A (see Fuse Inspection in the Electrical System chapter)
Ignition Switch (see Switch Inspection in the Electrical System chapter)
Gear Position Sensor (see Gear Position Sensor Inspection in the Electrical System chapter)
Harness (see Wiring Inspection in the Electrical System chapter)

- Turn the ignition switch off.
- The all lights should go off.

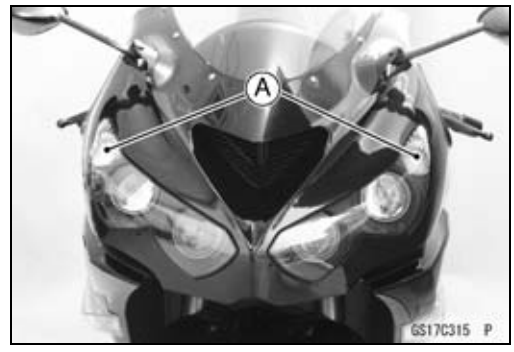
○For models equipped with an immobilizer system, red warning indicator light (LED) will blinks. Refer to the Immobilizer System (Equipped Models) section in the Electrical System chapter.

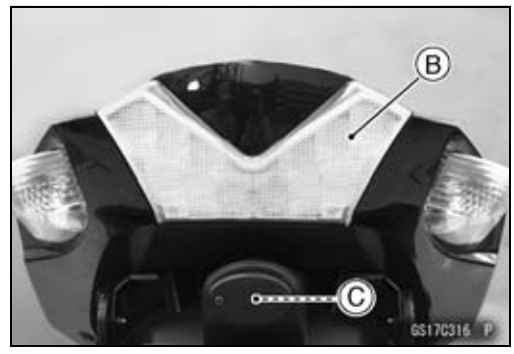
★If the light does not go off, replace the ignition switch.

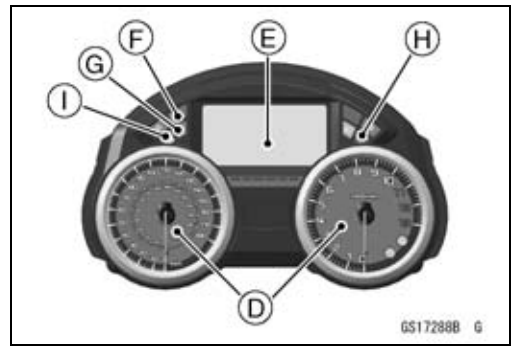
Second Step (Other than US, CA and CAL Models)

- Turn the ignition switch to hazard position.
- The all lights should go off.

★If the light goes on, inspect or replace the following item.
Ignition Switch (see Switch Inspection in the Electrical System chapter)







Periodic Maintenance Procedure

Third Step

- Turn the ignition switch 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 blink.
- The either of green turn signal indicator lights (LED) [C] in the meter unit should blink.

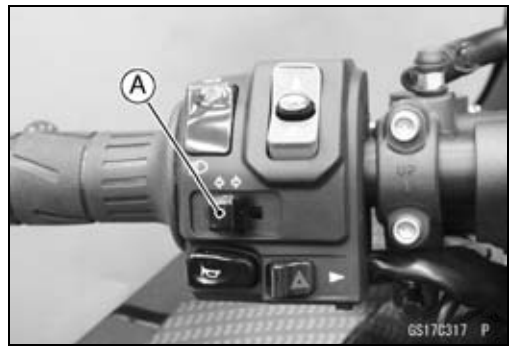
★If the each light does not blink, inspect or replace the following item.

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

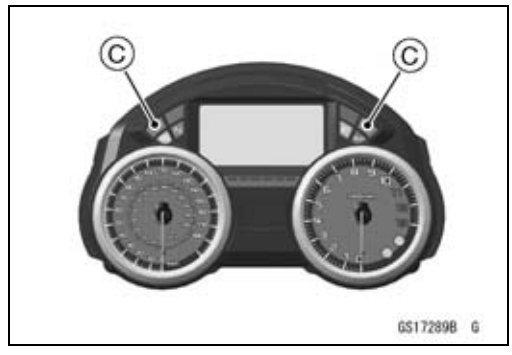
- Push the turn signal switch.
- The turn signal lights and green turn signal indicator light (LED) should go off.

★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)







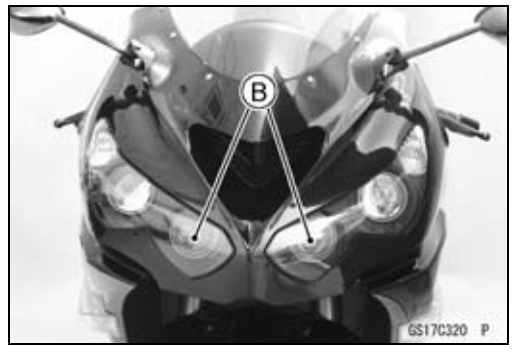
Fourth Step

- 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 Low Beam Bulb (see Headlight Bulb Replacement in the Electrical System chapter)
Headlight Relay Fuse 15 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 (LO) (see Headlight Relay Inspection in the Electrical System chapter)
Harness (see Wiring Inspection in the Electrical System chapter)



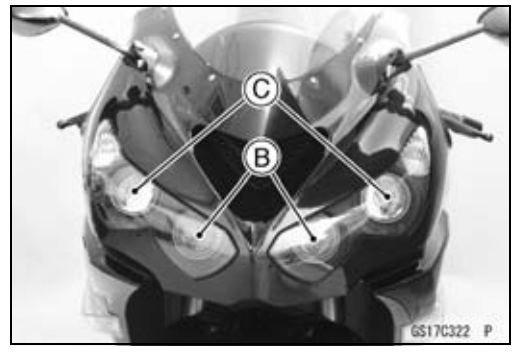


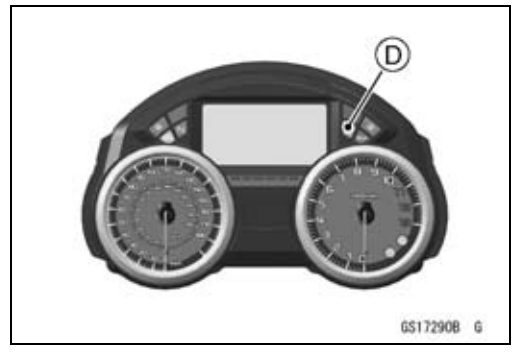
Periodic Maintenance Procedure

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

★If the high beam headlight and/or blue high beam indicator light (LED) does not go on, inspect or replace the following item.
Headlight High Beam Bulb (see Headlight Bulb Replacement in the Electrical System chapter)
Headlight Relay Fuse 15 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 (HI) (see Headlight Relay Inspection in the Electrical System chapter)
Harness (see Wiring Inspection in the Electrical System chapter)



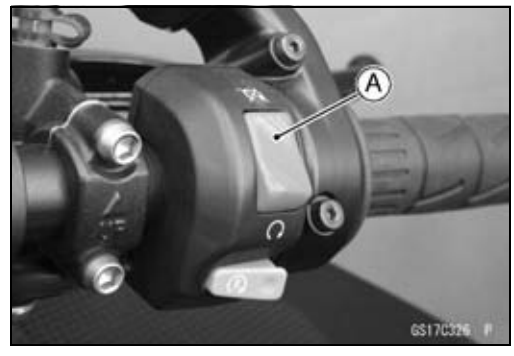




- Turn the engine stop switch [A] to stop position.
- The low beam or high beam headlights should stay going on.

★If the headlights and blue high beam indicator light (LED) go off, inspect or replace the following item.
Headlight Circuit Relay in Relay Box (see Relay Circuit Inspection in the Electrical System chapter)

- Turn the ignition switch off.
- The headlights and blue high beam indicator light (LED) should go off.



Headlight Aiming Inspection

- Inspect the headlight beam for aiming.

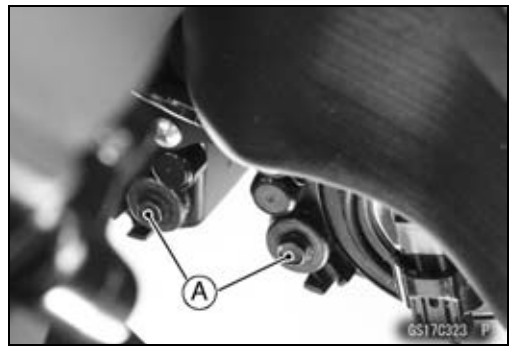
★If the headlight beam points to one side rather than straight ahead, adjust the horizontal beam.

Periodic Maintenance Procedure

Headlight Beam Horizontal Adjustment

- Remove:
  Inner Covers (see Inner Cover Removal in the Frame chapter)
  Upper Inner Fairing (see Upper Inner Fairing Removal in the Frame chapter)
- 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

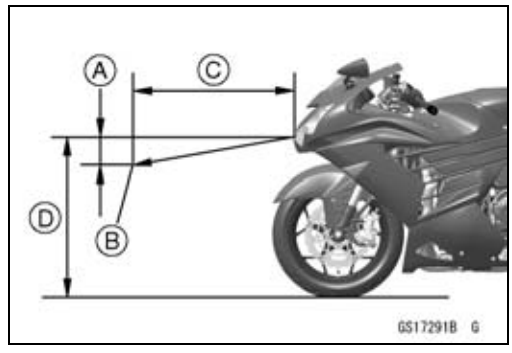
- Remove the inner covers (see Inner Cover Removal in the Frame chapter).
- Turn the vertical adjuster [A] in both headlights in or out to adjust the headlight vertically.



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.*

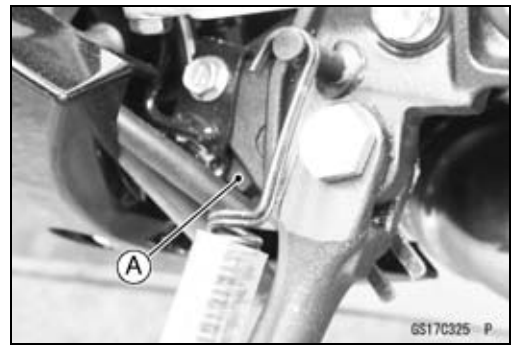
○*For US model, the proper angle is 0.4 degrees below horizontal. This is 50 mm (2.0 in.) drop at 7.6 m (25 ft) measured from the center of the headlight with the motorcycle on its wheels and the rider seated.*



50 mm (2.0 in.) [A]
Center of Brightest Spot [B]
7.6 m (25 ft) [C]
Height of Headlight Center [D]

Periodic Maintenance Procedure

Side Stand Switch Operation Inspection



- Inspect the side stand switch [A] operation accordance to table the below.

Side Stand Switch Operation

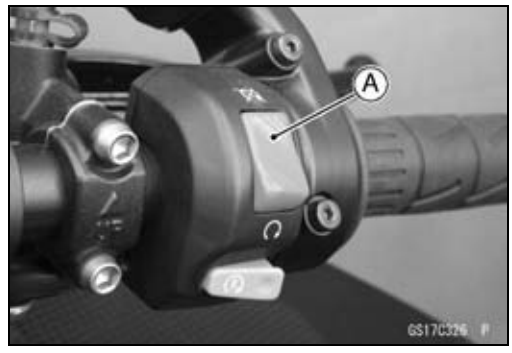
Side Stand	Gear Position	Clutch Lever	Engine Start	Engine Run
Up	Neutral	Released	Starts	Continue running
Up	Neutral	Pulled in	Starts	Continue running
Up	In Gear	Released	Does not start	Continue running
Up	In Gear	Pulled in	Starts	Continue running
Down	Neutral	Released	Starts	Continue running
Down	Neutral	Pulled in	Starts	Continue running
Down	In Gear	Released	Does not start	Stops
Down	In Gear	Pulled in	Does not start	Stops

★If the side stand switch operation does not work, inspect or replace the following item.
Battery (see Charging Condition Inspection in the Electrical System chapter)
Main Fuse 30 A (see Fuse Inspection in the Electrical System chapter)
Ignition Fuse 15 A (see Fuse Inspection in the Electrical System chapter)
Ignition Switch (see Switch Inspection in the Electrical System chapter)
Side Stand 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 Sensor (see Gear Position Sensor 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)

★If the all parts are in good condition, replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).

Periodic Maintenance Procedure

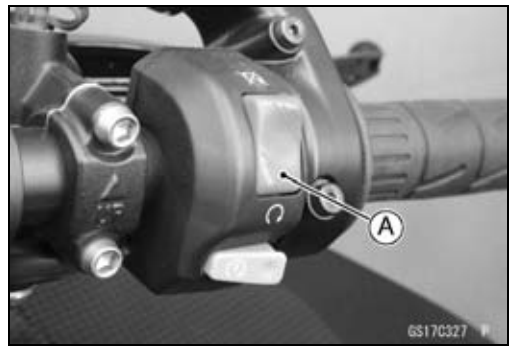
Engine Stop Switch Operation Inspection



First Step

- Turn the ignition switch on.
- Set the gear position in 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)

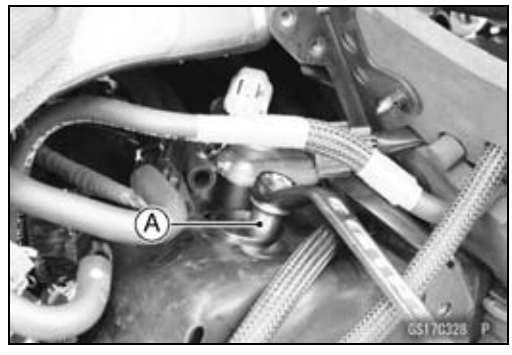


Second Step

- Turn the ignition switch on.
- Set the gear position in the neutral position.
- Turn the engine stop switch to run position [A].
- Push the starter button and start 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)

Spark Plug Replacement



- Remove the 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] vertically.
- Replace the spark plugs with new ones.

Standard Spark Plug
Type: NGK CR9EIA-9

- Insert the spark plug vertically into the spark plug hole with the spark plug installed in the plug wrench, and finger -tighten it first.

NOTICE
If tightening the spark plug with the wrench inclined, the insulator of the spark plug may break.

- Tighten:

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

- Install the stick coils (see Stick Coil Installation in the Electrical System chapter).
- Be sure the stick coils are installed by pulling up it lightly.

Periodic Maintenance Procedure

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

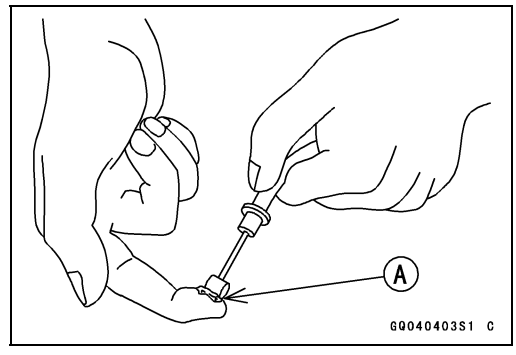
○*Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure water spray, perform the general lubrication.*

Pivots: Lubricate with Grease.

Brake Lever
Brake Pedal
Clutch Lever
Center Stand (Equipped Models)
Rear Brake Joint Pin
Side Stand

Points: Lubricate with Grease.

Throttle Inner Cable Upper and Lower Ends [A]

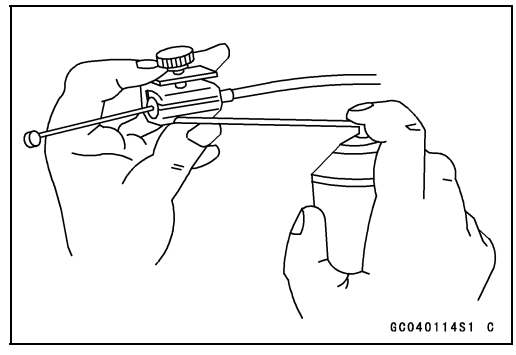


Cables: Lubricate with Rust Inhibitor.

Throttle Cables

- Lubricate the cables by seeping the oil between the cable and housing.

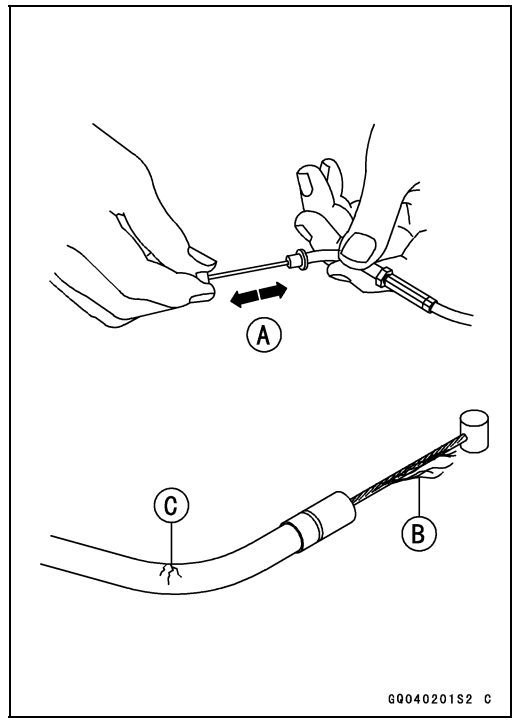
○The cable may be lubricated by using a commercially available pressure cable lubricator with an aerosol cable lubricant.



Periodic 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.

Periodic Maintenance Procedure

Bolt, Nut and Fastener to be checked

Engine:
- Clutch Lever Pivot Bolt Locknut
- Engine Mounting Bolts and Nut
- Exhaust Pipe Manifold Holder Nuts
- Muffler Body Clamp Bolts
- Muffler Body Mounting Bolts

Wheels:
- Front Axle Clamp Bolts
- Front Axle Nut
- Rear Axle Nut
- Rear Axle Nut Cotter Pin

Brakes:
- Brake Lever Pivot Bolt Locknut
- Brake Pedal Bolt
- Caliper Mounting Bolts
- Front Master Cylinder Clamp Bolts
- Rear Master Cylinder Joint Cotter Pin
- Rear Master Cylinder Mounting Bolts

Suspension:
- Front Fork Clamp Bolts
- Rear Shock Absorber Nuts
- Swingarm Pivot Shaft Nut
- Swingarm Pivot Shaft Locknut
- Rocker Arm Nut
- Tie-Rod Nuts

Steering:
- Handlebar Holder Bolts
- Steering Stem Head Nut

Others:
- Center Stand Bolts (Equipped Models)
- Footpeg Bracket Bolts
- Front Fender Mounting Bolts
- Rear Frame Bolts
- Side Stand Bolt

Fuel System (DFI)

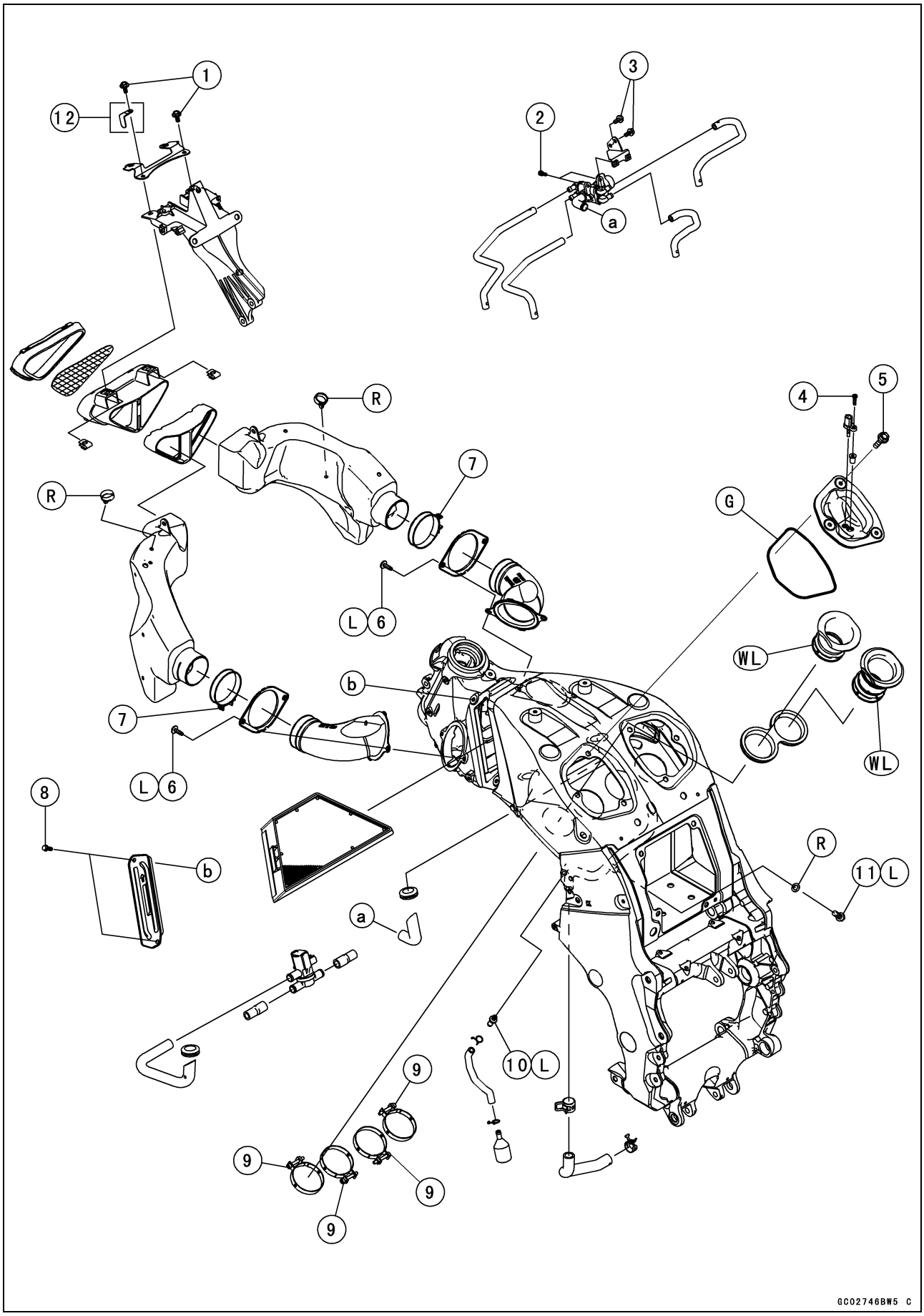
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Exploded View

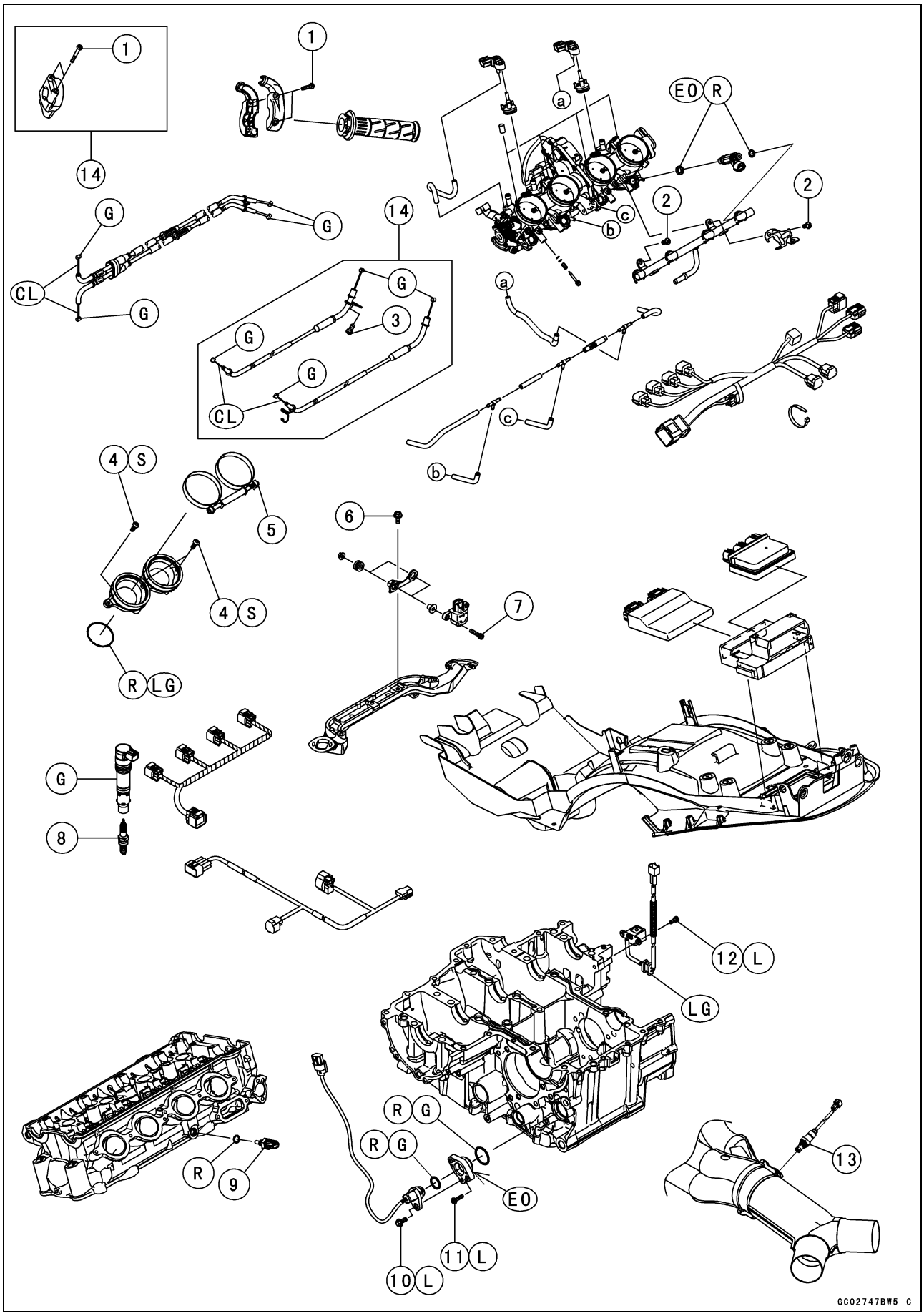


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Air Intake Duct Mounting Bolts	8.0	0.82	71 in·lb	
2	Idle Speed Control Valve Actuator Bracket Bolts	8.0	0.82	71 in·lb	
3	Idle Speed Control Valve Actuator Mounting Bolts	8.3	0.85	73 in·lb	
4	Intake Air Temperature Sensor Screw	0.50	0.05	4.4 in·lb	
5	Air Cleaner Cap Bolts	8.0	0.82	71 in·lb	
6	Rear Air Intake Duct Mounting Bolts	10	1.0	89 in·lb	L
7	Air Intake Duct Clamp Bolts	7.0	0.71	62 in·lb	
8	Air Cleaner Element Cover Bolts	8.0	0.82	71 in·lb	
9	Duct Clamp Bolts	2.0	0.20	18 in·lb	
10	Drain Hose Fitting	20	2.0	15	L
11	Breather Pipe Bolt	8.0	0.82	71 in·lb	L

12. Immobilizer Equipped Models
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts
WL: Apply soap and water solution or rubber lubricant.

Exploded View

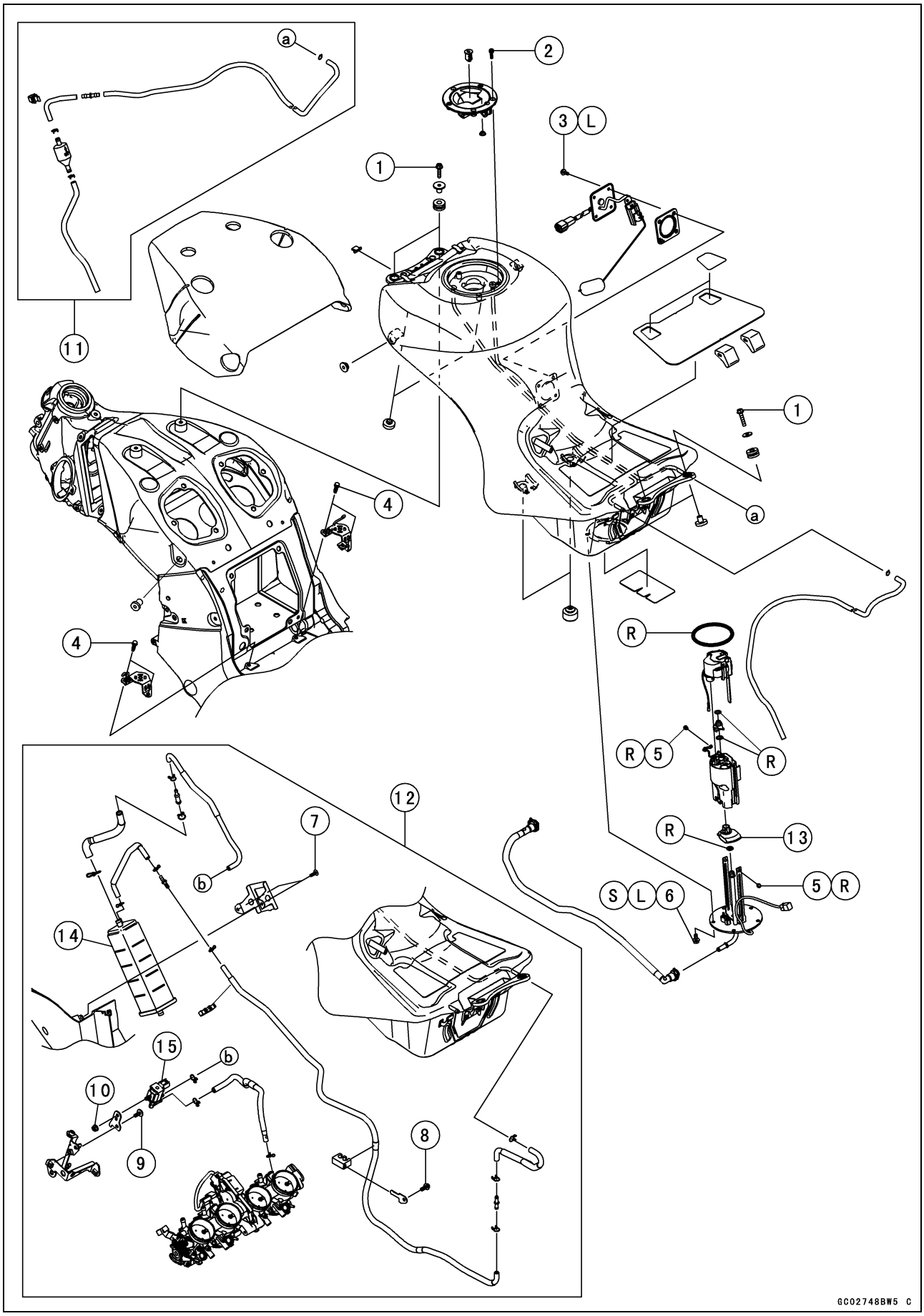


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Throttle Case Cover Screws (ZX1400H Model)	3.5	0.36	31 in·lb	
	Throttle Case Cover Screws (ZX1400J Model)	3.0	0.31	27 in·lb	
2	Delivery Pipe Mounting Screws	5.0	0.51	44 in·lb	
3	Throttle Cable Holder Screw	4.0	0.41	35 in·lb	
4	Throttle Body Assy Holder Bolts	10	1.0	89 in·lb	S
5	Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
6	Vehicle-down Sensor Bracket Bolt	8.0	0.82	71 in·lb	
7	Vehicle-down Sensor Mounting Bolts	6.0	0.61	53 in·lb	
8	Spark Plugs	13	1.3	115 in·lb	
9	Water Temperature Sensor	12	1.2	106 in·lb	
10	Gear Position Sensor Bolt	10	1.0	89 in·lb	L
11	Gear Position Sensor Holder Bolts (L = 20 mm)	5.0	0.51	44 in·lb	L
12	Crankshaft Sensor Bolts	6.0	0.61	53 in·lb	L
13	Oxygen Sensor	25	2.5	18	

14. Other than US, CA, CAL, AU, WVTA (FULL), GB WVTA (FULL), SEA-B3 and CN Models
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.

Exploded View



Exploded View

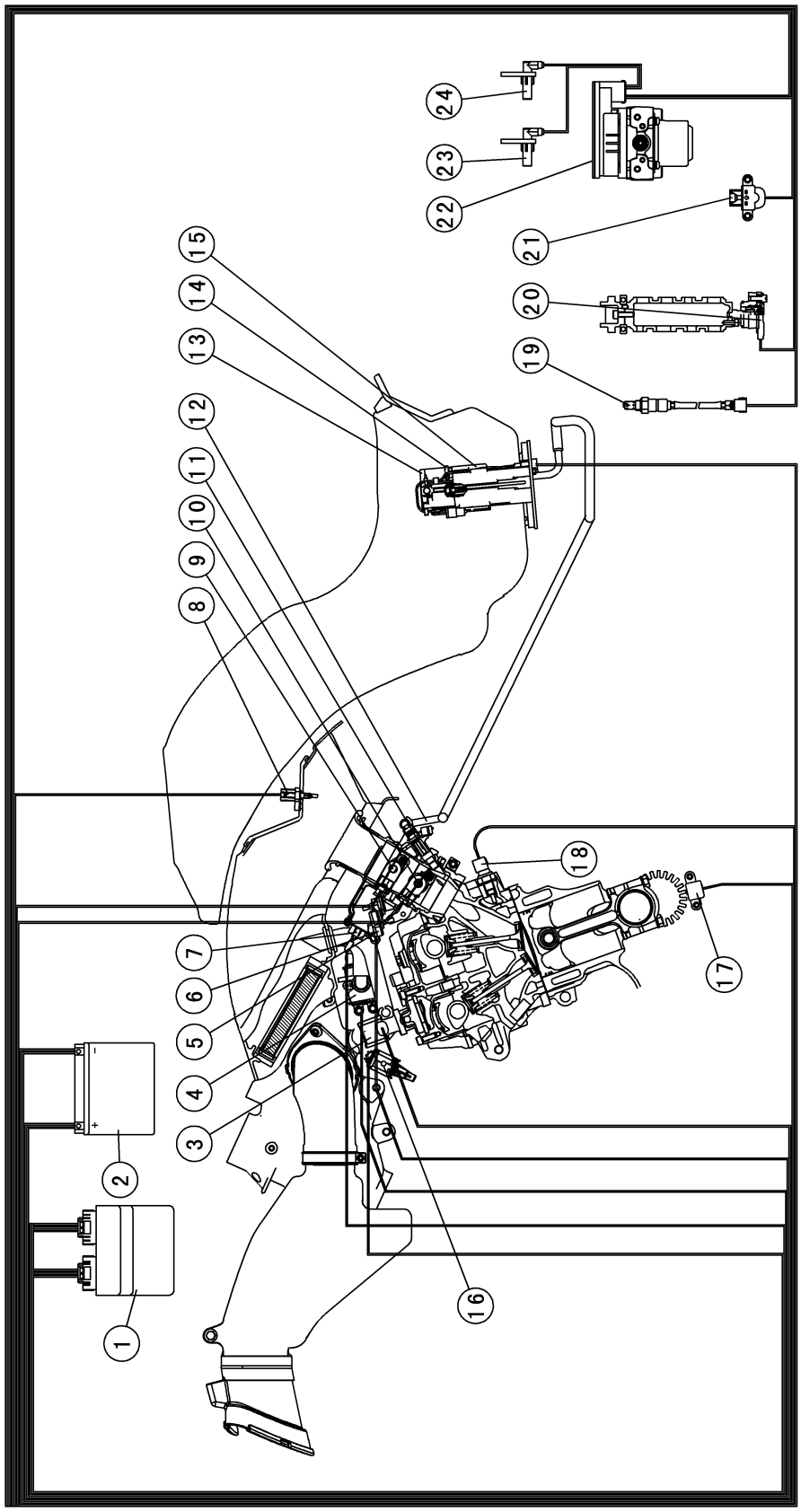
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Fuel Tank Bolts	8.0	0.82	71 in·lb	
2	Fuel Tank Cap Bolts	4.5	0.46	40 in·lb	
3	Fuel Level Sensor Bolts	7.0	0.71	62 in·lb	L
4	Bracket Bolts	8.0	0.82	71 in·lb	
5	Fuel Pump Assembly Screws	0.98	0.10	8.7 in·lb	R
6	Fuel Pump Bolts	10	1.0	89 in·lb	L, S
7	Canister Bracket Screws	1.2	0.12	11 in·lb	
8	Hose Bracket Bolt	8.0	0.82	71 in·lb	
9	Purge Valve Bracket Bolt	8.0	0.82	71 in·lb	
10	Purge Valve Mounting Nut	8.0	0.82	71 in·lb	

11. US, CA, AU, ID, PH and SEA-B3 Models
12. Other than US, CA, AU, ID, PH and SEA-B3 Models
13. Fuel Filter
14. Canister
15. Purge Valve

L: Apply a non-permanent locking agent.
R: Replacement Parts
S: Follow the specified tightening sequence.

DFI System

DFI System



DFI System

1. ECU
2. Battery 12 V 12 Ah
3. Air Switching Valve
4. Idle Speed Control Valve Actuator
5. Intake Air Pressure Sensor #1
6. Intake Air Pressure Sensor #2
7. Subthrottle Valve Actuator
8. Intake Air Temperature Sensor
9. Subthrottle Sensor
10. Main Throttle Sensor
11. Fuel Injectors
12. Delivery Pipe
13. Fuel Filter
14. Pressure Regulator
15. Fuel Pump
16. Purge Valve (Other than US, CA, AU, ID, PH and SEA-B3 Models)
17. Crankshaft Sensor
18. Water Temperature Sensor
19. Oxygen Sensor
20. Gear Position Sensor
21. Vehicle-down Sensor
22. ABS Hydraulic Unit
23. Front Wheel Rotation Sensor
24. Rear Wheel Rotation Sensor

DFI System

DFI Components Naming

The terms used in the European regulation for DFI components are sometimes different from those used by Kawasaki. Use this table to cross reference terms which may appear in a generic scan tool when diagnosing the DFI system.

Sensors described in R44/2014 (Description per ISO 15031-6 in the parentheses)	Kawasaki Name
Barometric pressure sensor (Barometric pressure circuit)	Intake air pressure sensor #2
Crankshaft position sensor (Crankshaft position sensor “A”)	Crankshaft sensor
Engine coolant temperature sensor (Engine coolant temperature sensor 1)	Water (Engine) temperature sensor
Gear shift position sensor (Gear shift position circuit)	Gear position sensor
Intake air temperature sensor (Intake air temperature sensor 1)	Intake air temperature sensor
Manifold absolute pressure sensor (Manifold absolute pressure/barometric pressure circuit)	Intake air pressure sensor #1
O_2 sensor (binary/linear) signals (O_2 sensor)	Oxygen sensor
Throttle position sensor (Throttle/Pedal position sensor/switch “A”)	Main throttle sensor
Throttle position sensor (Throttle/Pedal position sensor/switch “B”)	Subthrottle sensor
Wheel speed sensor (Vehicle speed sensor “A”)	Front wheel rotation sensor
Vehicle speed sensor (Vehicle speed sensor “B”)	Rear wheel rotation sensor

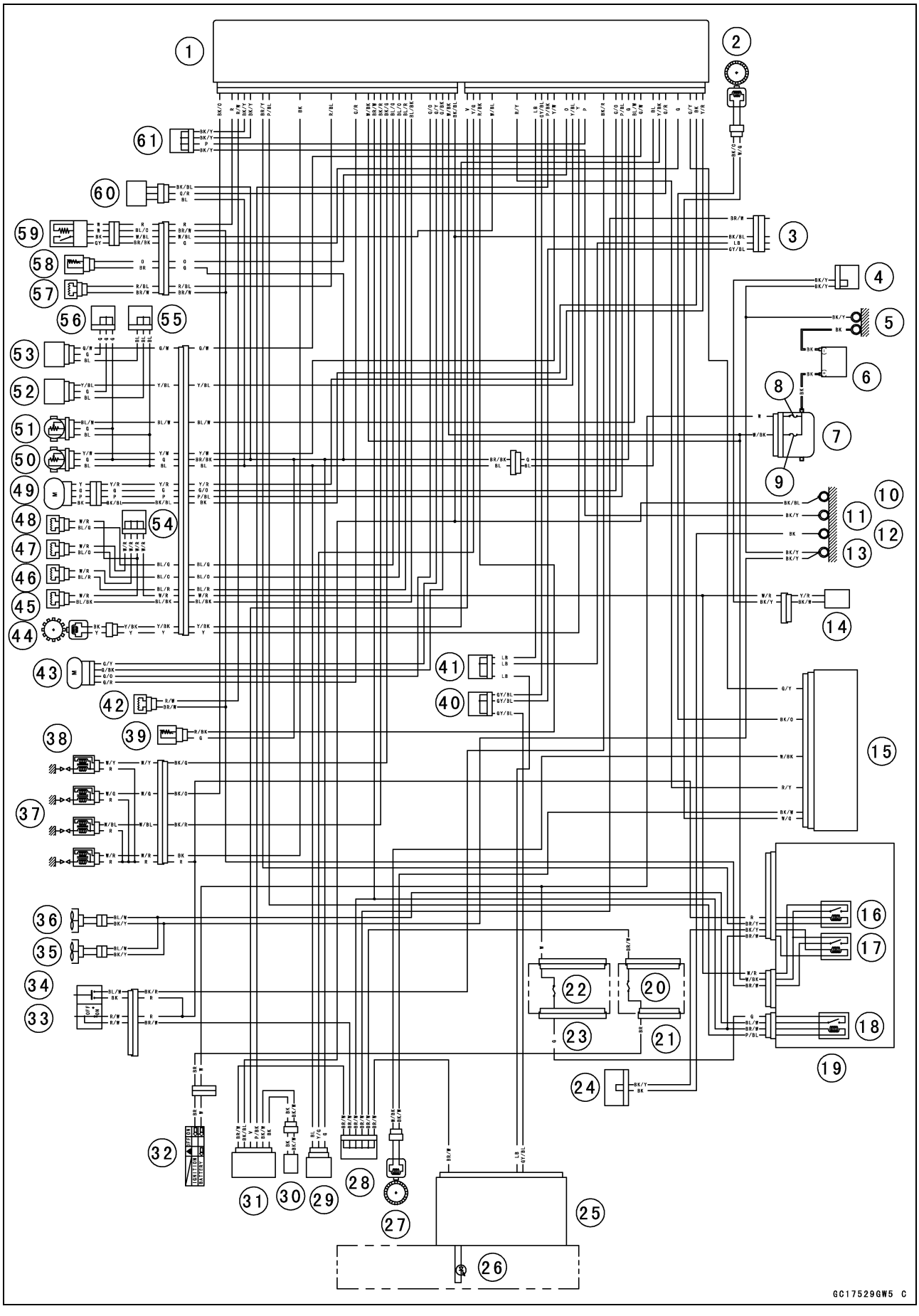
Actuators described in R44/2014 (Description per ISO 15031-6 in the parentheses)	Kawasaki Name
Evaporative emission system purge control valve (Evaporative emission system purge control valve)	Purge valve
Fuel injector (Injector - cylinder 1 ~ 4)	Fuel injector
Idle air control system (Idle air control system)	Idle Speed Control Valve Actuator
Ignition coil primary control circuits (Ignition coil “A ~ D” primary/secondary circuit)	Ignition coil (Stick coil)
O_2 sensor heater (HO_2S heater control circuit)	Oxygen sensor heater
Secondary air injection system (Secondary air injection system)	Air switching valve
Throttle by wire actuator (Throttle actuator control motor circuit)	Subthrottle valve actuator (ETV actuator)

DFI System

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DFI System

DFI System Wiring Diagram



DFI System

Part Names

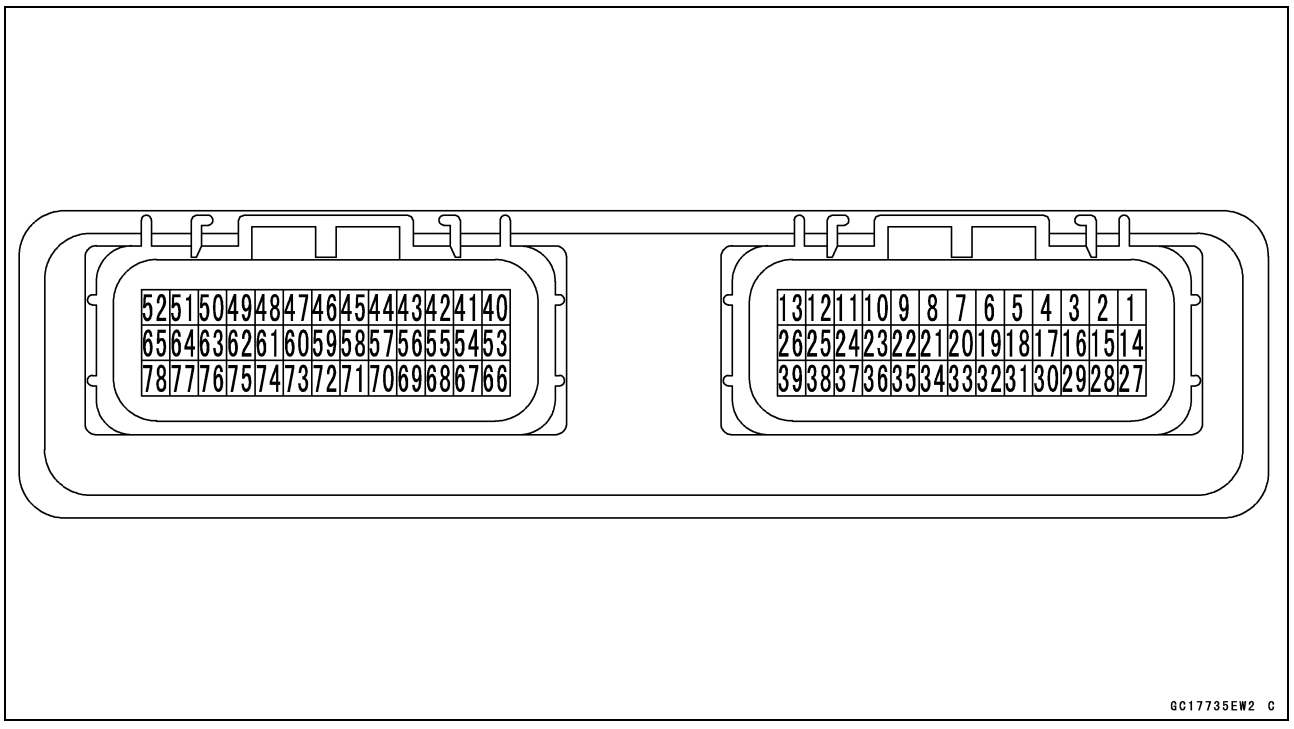
1. ECU
2. Rear Wheel Rotation Sensor
3. Immobilizer (Equipped Models)/Kawasaki Diagnostic System Connector
4. Joint Connector B
5. Frame Ground
6. Battery
7. Starter Relay
8. Main Fuse 30 A
9. ECU Fuse 15 A
10. Frame Ground (3)
11. Frame Ground (2)
12. Frame Ground (1)
13. Frame Ground (4)
14. Fuel Pump
15. ABS Hydraulic Unit
16. Fuel Pump Relay
17. ECU Main Relay
18. Radiator Fan Relay
19. Relay Box
20. Ignition Fuse 15 A
21. Fuse Box (1)
22. Fan Fuse 15 A
23. Fuse Box (2)
24. Joint Connector A
25. Meter Unit
26. Yellow Engine Warning Indicator Light (LED)
27. Front Wheel Rotation Sensor
28. Joint Connector F
29. Vehicle-down Sensor
30. Immobilizer Antenna (Equipped Models)
31. Immobilizer Amplifier (Equipped Models)
32. Ignition Switch
33. Engine Stop Switch
34. Starter Button
35. Fan Motor (2)
36. Fan Motor (1)
37. Spark Plugs
38. Stick Coil #1, #2, #3, #4
39. Intake Air Temperature Sensor
40. Joint Connector C
41. Joint Connector D
42. Purge Valve (Other than US, CA, AU, ID, PH and SEA-B3 Models)
43. Idle Speed Control Valve Actuator
44. Crankshaft Sensor
45. Fuel Injector #1
46. Fuel Injector #2
47. Fuel Injector #3
48. Fuel Injector #4
49. Subthrottle Valve Actuator
50. Main Throttle Sensor
51. Subthrottle Sensor
52. Intake Air Pressure Sensor #1
53. Intake Air Pressure Sensor #2
54. Joint Connector H
55. Joint Connector J
56. Joint Connector I
57. Air Switching Valve
58. Water Temperature Sensor
59. Oxygen Sensor
60. Gear Position Sensor
61. Joint Connector E

○Color Codes:

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

DFI System

Terminal Numbers of ECU Connectors



Terminal Names

1. Subthrottle Valve Actuator: Y/R
2. Subthrottle Valve Actuator: BK
3. Front Wheel Rotation Sensor Signal: G/Y
4. Unused
5. Oxygen Sensor: G
6. Starter Lockout Switch: R/G
7. Gear Position Sensor: G/R
8. Crankshaft Sensor (–): Y/BK
9. Power Supply to Sensors: BL
10. Unused
11. Intake Air Pressure Sensor #2: G/W
12. Subthrottle Sensor: BL/W
13. Ground for Sensors: G
14. Subthrottle Valve Actuator: P/BL
15. Subthrottle Valve Actuator: G/O
16. Unused
17. Starter Button: BK/R
18. Unused
19. Side Stand Switch: G/BK
20. Ground: P
21. Crankshaft Sensor (+): Y
22. Intake Air Pressure Sensor #1: Y/BL
23. Water Temperature Sensor: O
24. Unused
25. Main Throttle Sensor: Y/W
26. Immobilizer Amplifier (Equipped Models): P/BK
27. CAN Communication Line (High): GY/BL
28. CAN Communication Line (Low): LB
29. Unused
30. Unused
31. Rear Wheel Rotation Sensor Signal: R/Y
32. Unused
33. Unused
34. Unused

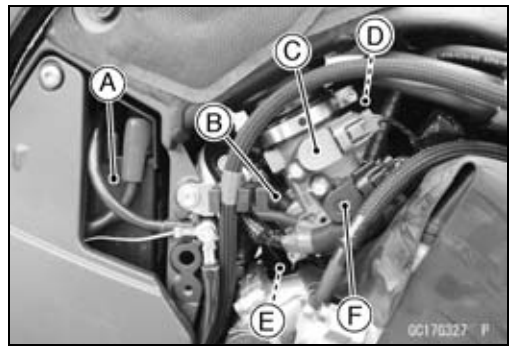
DFI System

35. Oxygen Sensor: W/BL
36. Unused
37. Intake Air Temperature Sensor: R/BK
38. Vehicle-down Sensor: Y/G
39. Immobilizer Amplifier (Equipped Models): V
40. Ground for Control System: BK/BL
41. Power Supply to ECU (from Battery): W/BK
42. Idle Speed Control Valve Actuator: G/BK
43. Idle Speed Control Valve Actuator: G/Y
44. Idle Speed Control Valve Actuator: G/O
45. Unused
46. Unused
47. Fuel Injector #1: BL/BK
48. Fuel Injector #2: BL/R
49. Fuel Injector #3: BL/O
50. Fuel Injector #4: BL/G
51. Stick Coil #4: BK/G
52. Stick Coil #2: BK/R
53. Power Supply to ECU (from Ignition Switch): BR/W
54. Power Supply to ECU (from Battery): W/BK
55. External Communication Line (Immobilizer System (Equipped Models)/*KDS): LG/BK
56. Idle Speed Control Valve Actuator: G/R
57. Green Neutral Indicator Light (LED): LG
58. Unused
59. Unused
60. Air Switching Valve: R/BL
61. Unused
62. Unused
63. Unused
64. Unused
65. Stick Coil #1: BK
66. Unused
67. External Communication Line (Immobilizer System (Equipped Models)/*KDS): LG
68. Unused
69. Battery Monitor Voltage Line: W/R
70. Radiator Fan Relay: P/BL
71. Fuel Pump Relay: BR/Y
72. Unused
73. Engine Ground: BK/Y
74. Engine Ground: BK/Y
75. Purge Valve (Other than US, CA, AU, ID, PH and SEA-B3 Models): R/W
76. Oxygen Sensor Heater: R
77. Unused
78. Stick Coil #3: BK/O

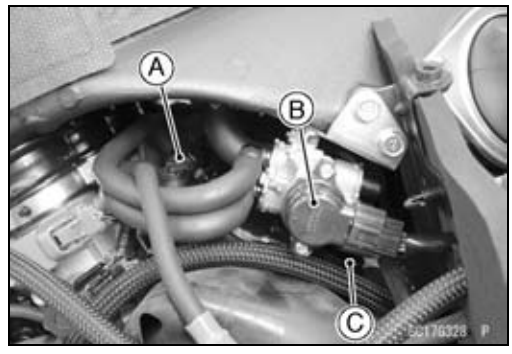
*: KDS (Kawasaki Diagnostic System)

DFI Parts Location

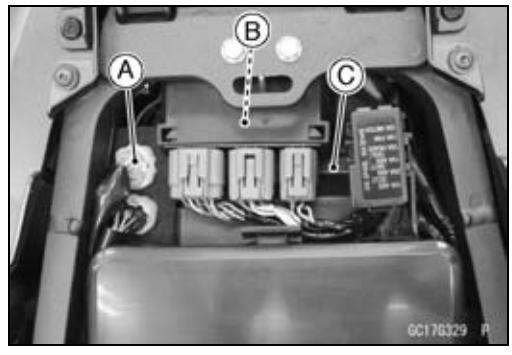
Battery [A]
Fuel Injectors #1, #2, #3, #4 [B]
Subthrottle Sensor [C]
Subthrottle Valve Actuator [D]
Water Temperature Sensor [E]
Main Throttle Sensor [F]



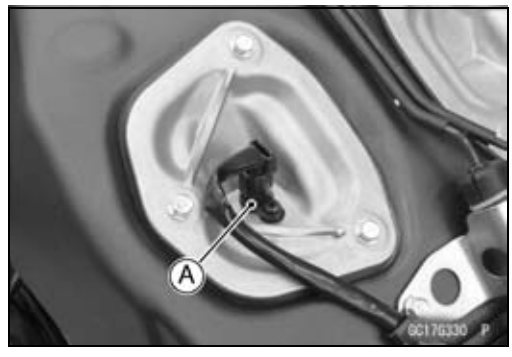
Intake Air Pressure Sensor #1 [A]
Idle Speed Control Valve Actuator [B]
Stick Coils #1, #2, #3, #4 [C]



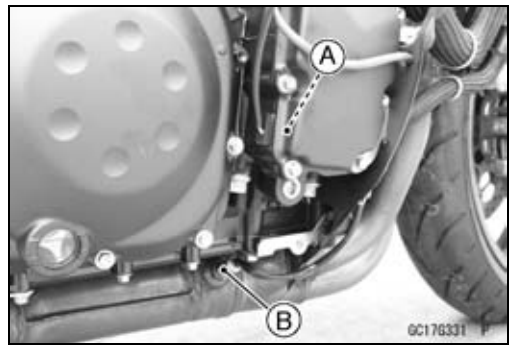
Immobilizer (Equipped Models)/Kawasaki Diagnostic System Connector [A]
Relay Box (Fuel Pump Relay, ECU Main Relay, Radiator Fan Relay) [B]
ECU [C]



Intake Air Temperature Sensor [A]

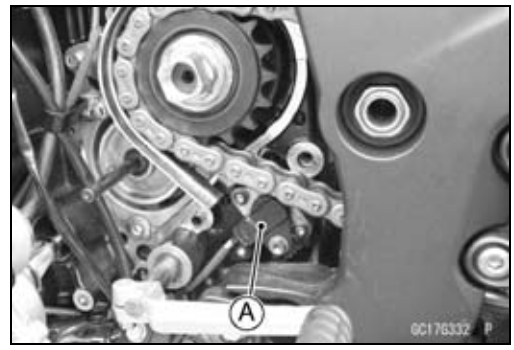


Crankshaft Sensor [A]
Oxygen Sensor [B]

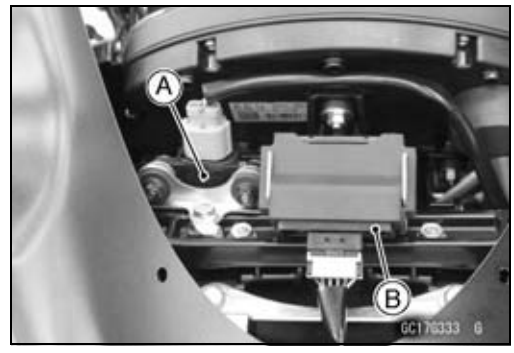


DFI Parts Location

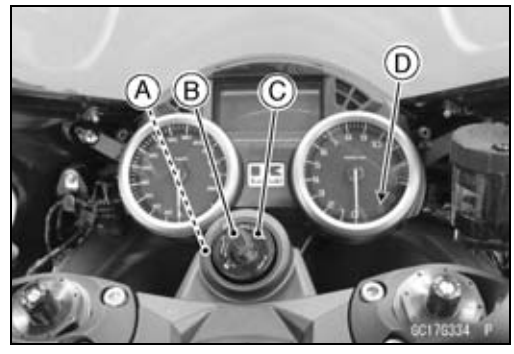
Gear Position Sensor [A]



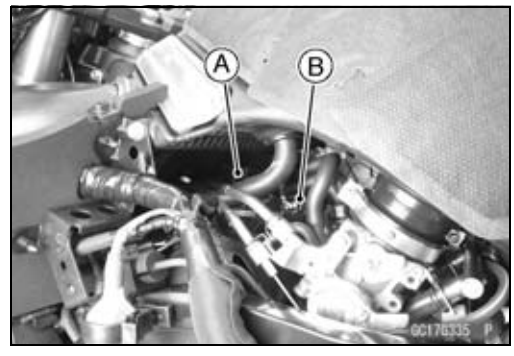
Vehicle-down Sensor [A]
Immobilizer Amplifier [B] (Equipped Models)



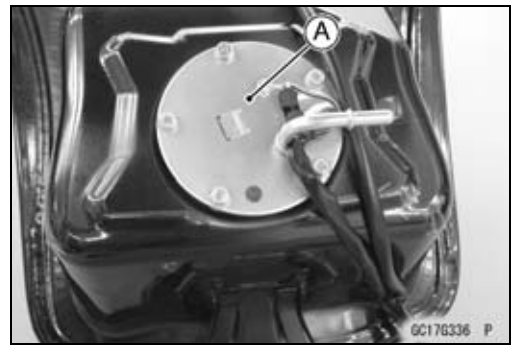
Ignition Switch [A]
Ignition Key (Transponder, Immobilizer System Equipped Models) [B]
Immobilizer Antenna [C] (Equipped Models)
Yellow Engine Warning Indicator Light (LED) [D]



Air Switching Valve [A]
Intake Air Pressure Sensor #2 [B]

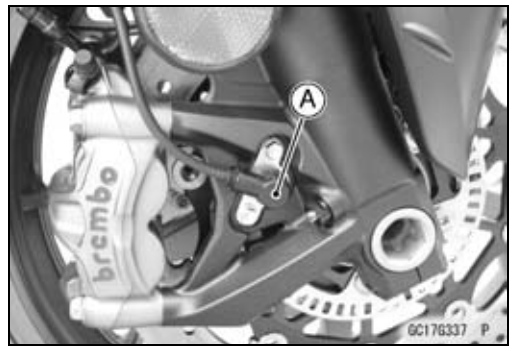


Fuel Pump [A]

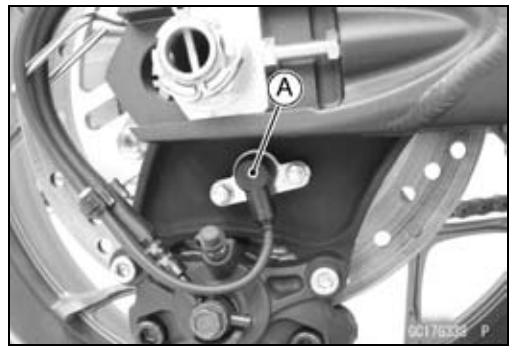


DFI Parts Location

Front Wheel Rotation Sensor [A]



Rear Wheel Rotation Sensor [A]



Purge Valve [A] (Other than US, CA, AU, ID, PH and SEA-B3 Models)



Specifications

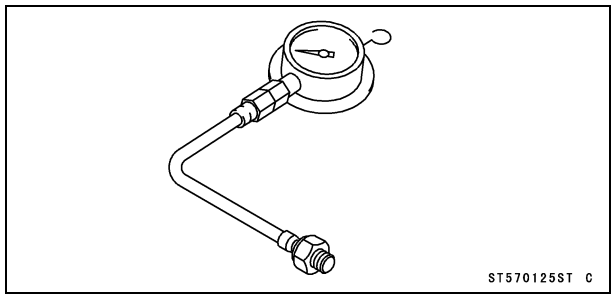
Item	Standard
Digital Fuel Injection System	
Idle Speed	1 100 ±50 r/min (rpm)
Throttle Body Assy:	
Throttle Valve	Dual throttle valve
Bore	ϕ44 mm (1.7 in.)
Throttle Body Vacuum	36.66 ±1.3 kPa (275.0 ±10 mmHg) at idle speed
Bypass Screws (Turn Out)	0 ~ 1 1/4 (for reference)
ECU:	
Make	MITSUBISHI ELECTRIC
Type	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:	
Type	In-tank pump (in fuel pump)
Discharge	67 mL (2.3 US oz.) or more for 3 seconds
Fuel Injectors:	
Type	INP-258
Nozzle Type	Fine atomizing type with 4 holes
Resistance	About 11.7 ~ 12.3 Ω @20°C (68°F)
CAN Communication Line:	
Resistance	122 ~ 126 Ω at ECU connector
Main Throttle Sensor:	
Input Voltage	DC 4.75 ~ 5.25 V
Output Voltage	DC 0.63 ~ 0.65 V at idle throttle opening DC 3.76 ~ 3.96 V at full throttle opening (for reference)
Resistance	4 ~ 6 kΩ
Intake Air Pressure Sensor #1/#2:	
Input Voltage	DC 4.75 ~ 5.25 V
Output Voltage	DC 3.80 ~ 4.20 V at standard atmospheric pressure (see this text for details)
Intake Air Temperature Sensor:	
Output Voltage	About DC 2.25 ~ 2.50 V @20°C (68°F)
Resistance	5.4 ~ 6.6 kΩ @0°C (32°F) 0.29 ~ 0.39 kΩ @80°C (176°F)
Water Temperature Sensor:	
Output Voltage	About DC 2.80 ~ 2.97 V @20°C (68°F)
Gear Position Sensor:	
Input Voltage	DC 4.75 ~ 5.25 V
Output Voltage	In the text
Vehicle-down Sensor:	
Input Voltage	DC 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

Specifications

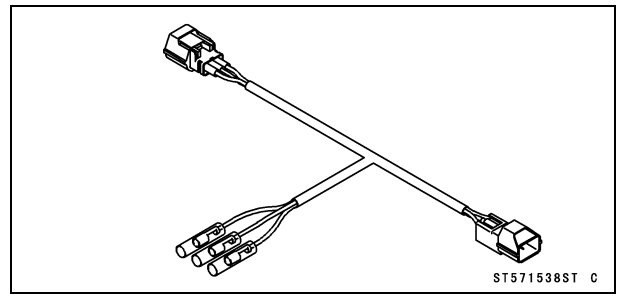
Item	Standard
Subthrottle Sensor:	
Input Voltage	DC 4.75 ~ 5.25 V
Output Voltage	DC 4.14 ~ 4.34 V at subthrottle valve full close position (for reference) DC 0.42 ~ 0.62 V at subthrottle valve full open position
Resistance	4 ~ 6 kΩ
Subthrottle Valve Actuator:	
Resistance	About 6.5 ~ 8.5 Ω
Input Voltage	About DC 9.5 ~ 11.5 V and then 0 V or About DC 9.5 ~ 11.5 V
Oxygen Sensor:	
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 @20°C (68°F)
Immobilizer Antenna (Equipped Models):	
Resistance	About 3.0 ~ 4.6 Ω
Idle Speed Control Valve Actuator:	
Resistance	About 20 Ω
Input Voltage	About DC 11 ~ 13 V and then 0.5 V or About DC 11 ~ 13 V
Purge Valve (Other than US, CA, AU, ID, PH and SEA-B3 Models):	
Resistance	30 ~ 34 Ω @20°C (68°F)
Throttle Grip and Cables	
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)
Air Cleaner	
Air Cleaner Element	Viscous paper element

Special Tools and Sealant

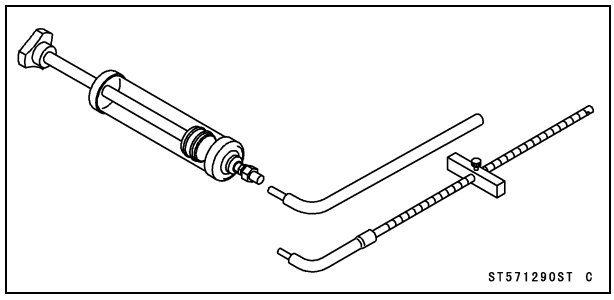
Oil Pressure Gauge, 5 kgf/cm²:
57001-125



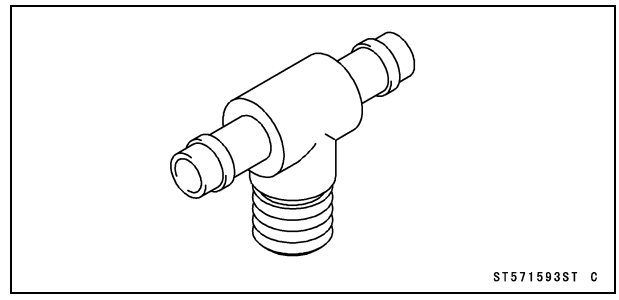
Throttle Sensor Setting Adapter:
57001-1538



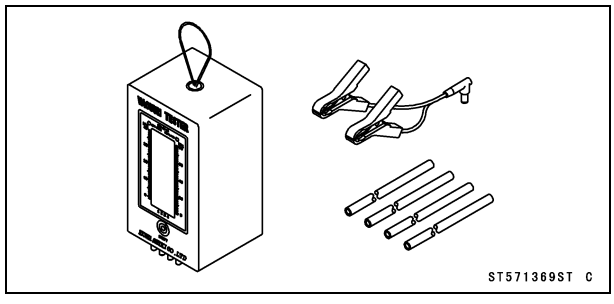
Fork Oil Level Gauge:
57001-1290



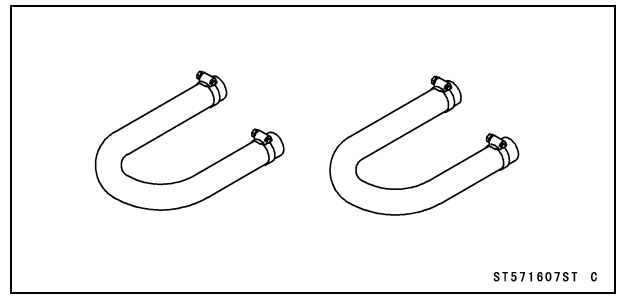
Fuel Pressure Gauge Adapter:
57001-1593



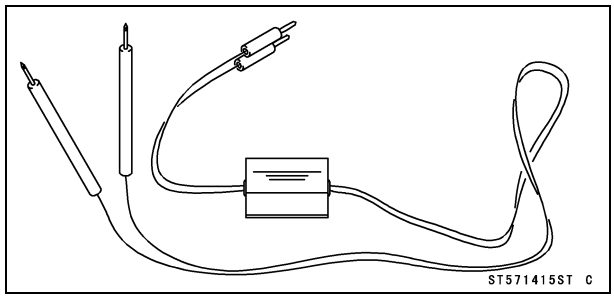
Vacuum Gauge:
57001-1369



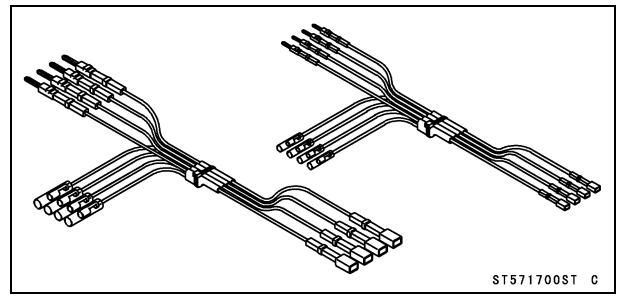
Fuel Hose:
57001-1607



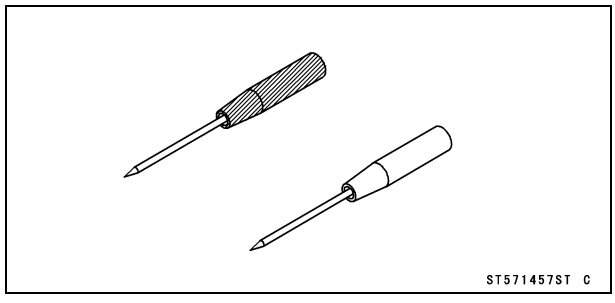
Peak Voltage Adapter:
57001-1415



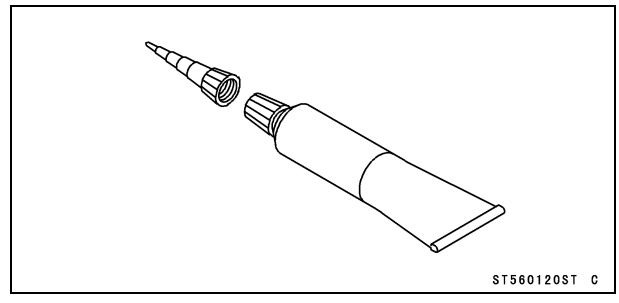
Measuring Adapter:
57001-1700



Needle Adapter Set:
57001-1457



Liquid Gasket, TB1211:
56019-120



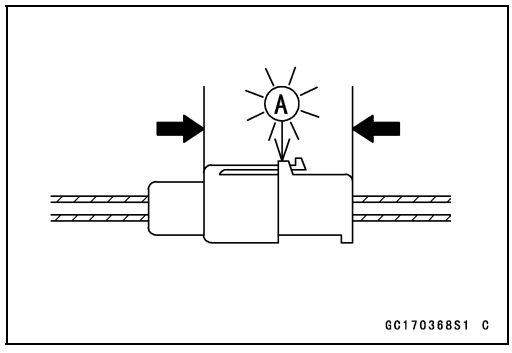
DFI Servicing Precautions

DFI Servicing Precautions

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

- This 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.
- Do not reverse the battery cable connections. This will damage the ECU.
- To 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.
- When charging, remove the battery from the motorcycle. This is to prevent ECU damage by excessive voltage.

- Whenever 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.
- Connect these connectors until they click [A].

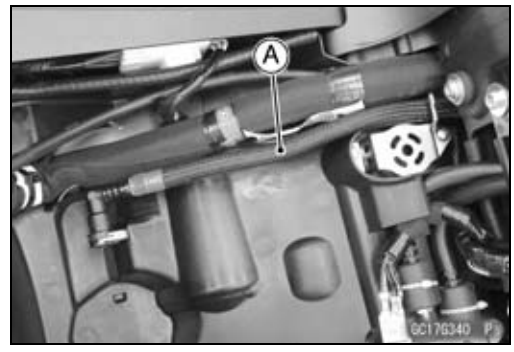


- Do not turn the ignition switch on while any of the DFI electrical connectors are disconnected. The ECU memorizes service codes.
- Do not spray water on the electrical parts, DFI parts, connectors, leads and wiring.
- If a transceiver is installed on the motorcycle, make sure that the operation of 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.
- When 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.
- Do not operate the fuel pump if the pump is completely dry. This is to prevent pump seizure.
- Before removing the fuel system parts, blow the outer surfaces of these parts clean with compressed air.
- When 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.
- When installing the fuel hoses, avoid sharp bending, kinking, flattening or twisting, and run the fuel hoses with a minimum of bending so that the fuel flow will not be obstructed.
- Run the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- To prevent corrosion and deposits in the fuel system, do not add to fuel any fuel antifreeze chemicals.

DFI Servicing Precautions

○If the motorcycle is not properly handled, the high pressure inside the fuel line can cause fuel to leak or the hose to burst. Remove the fuel tank (see Fuel Tank Removal) and check the fuel hose [A].

★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 intake air leaks in the DFI system. Be sure to install the oil filler plug [A] after filling the engine oil.

Torque - Oil Filler Plug: Hand-tighten

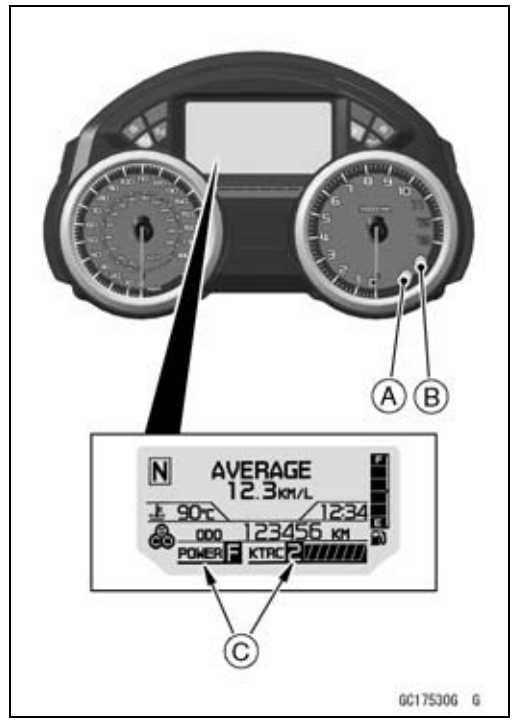


Troubleshooting the DFI System

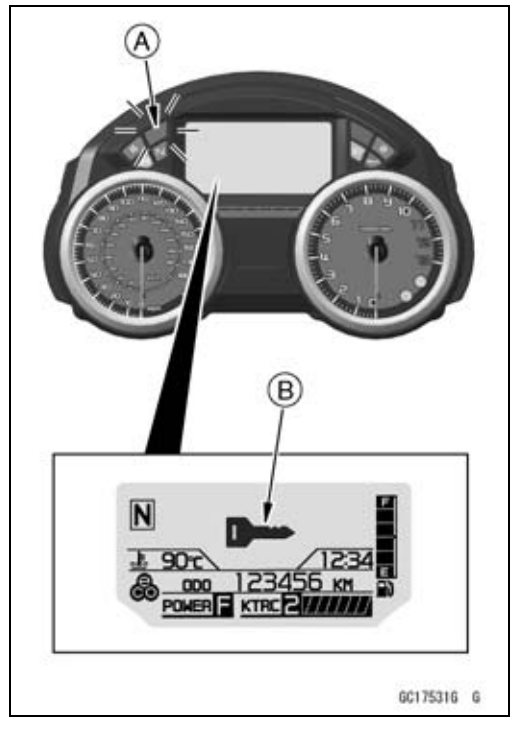
Outline

When a problem occurs with DFI system, the yellow engine warning indicator light (LED) [A] stays on after starting the engine to alert the rider.

○When a problem occurs with KTRC system, the yellow KTRC warning indicator light (LED) [B] goes on, the KTRC and Power mode indicators [C] blinking on the LCD.



For models equipped with an immobilizer system, the red warning indicator light (LED) [A] blinks and immobilizer warning indicator [B] is displayed on the LCD, when a problem occurs in the system.

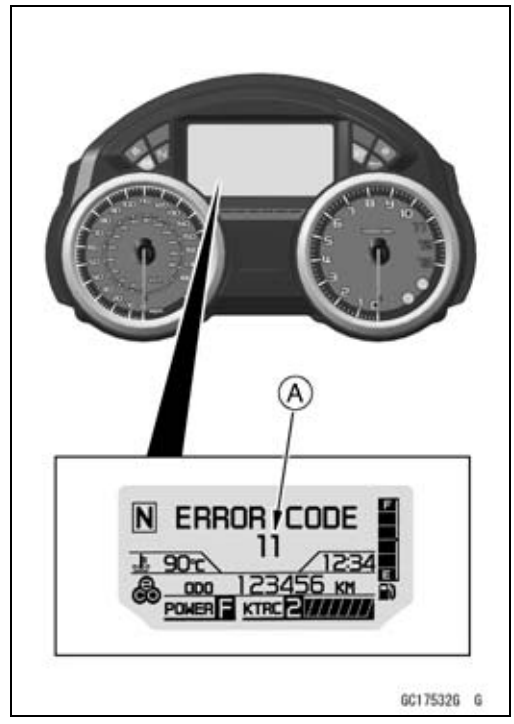


Troubleshooting the DFI System

With the engine stopped and turned in the self-diagnosis mode, the service code [A] is displayed on the LCD by the number of two digits.

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

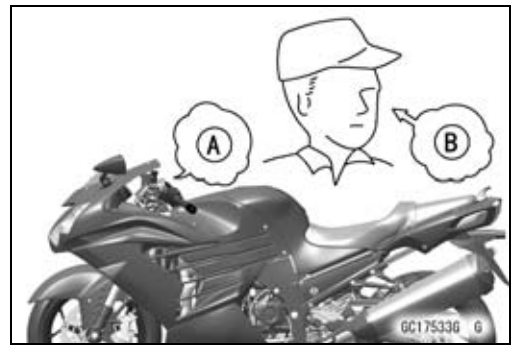
Fuel Pump
ECU Main Relay

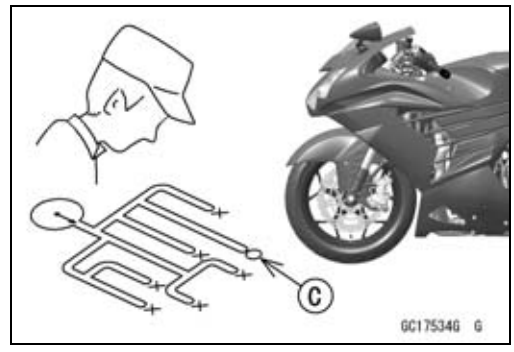


When the service code [A] is displayed, for first ask the rider about the conditions [B] of trouble, and then start to determine the cause [C] of problem.

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 yellow engine warning indicator light (LED).

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





Troubleshooting the DFI System

Even when the DFI system is operating normally, the yellow engine warning indicator light (LED) goes on may be displayed under strong electrical interference. Additional measures are not required. Turn the ignition switch off to stop the indicator light.

If the yellow engine 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 yellow engine warning indicator light (LED) goes off after the service code erasing procedure (see Service Code Erasing) is done.

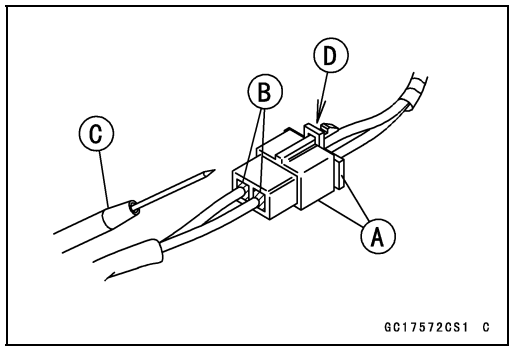
When the motorcycle is down, the vehicle-down sensor operates and the ECU shuts off the fuel pump relay, fuel injectors and ignition system. The ignition switch is left on. If the starter button is pushed, the electric starter turns but the engine does not start. To start the engine again, raise the motorcycle, turn the ignition switch off, and then 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.

○The 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.

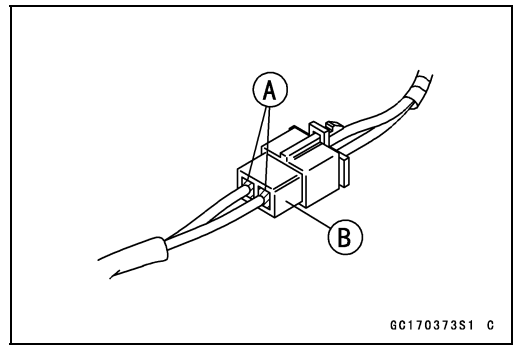
- Make sure that measuring points are correct in the connector, noting the position of the lock [D] and the lead color before measurement. Do not reverse connections of a digital meter.
- Be careful not to short-circuit the leads of the DFI or electrical system parts by contact between adapters.
- Turn the ignition switch 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.

Troubleshooting the DFI System

○After measurement, remove the needle adapters and apply silicone sealant to the seals [A] of the connector [B] for waterproofing.

Sealant - Liquid Gasket, TB1211: 56019-120



- 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 the 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 leads for signs of burning, fraying, short, etc. Deteriorated leads and bad connections can cause reappearance of problems and unstable operation of the DFI system.

★If any wiring is deteriorated, replace the wiring.

- Pull each connector [A] apart and inspect it for corrosion, dirt, and damage.

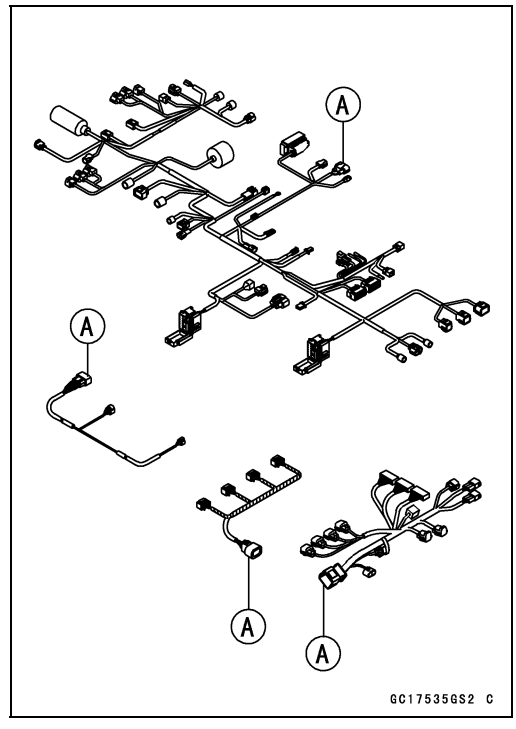
★If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it. Connect the connectors securely.

- Check the wiring for continuity.

○Use the wiring diagram to find the ends of the lead which is suspected of being a problem.

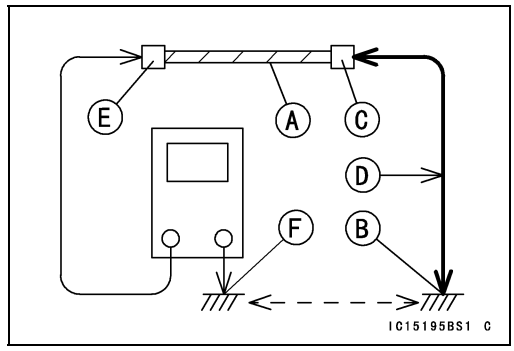
○Connect a tester between the ends of the leads.

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

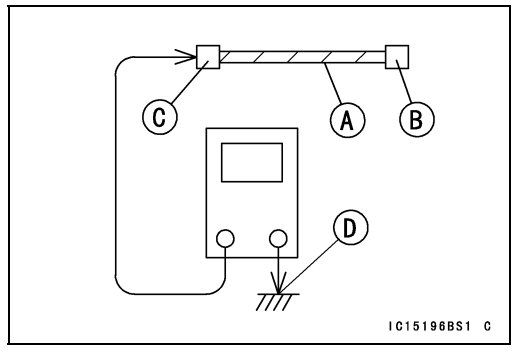


Troubleshooting the DFI System

○If 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.



○When 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.

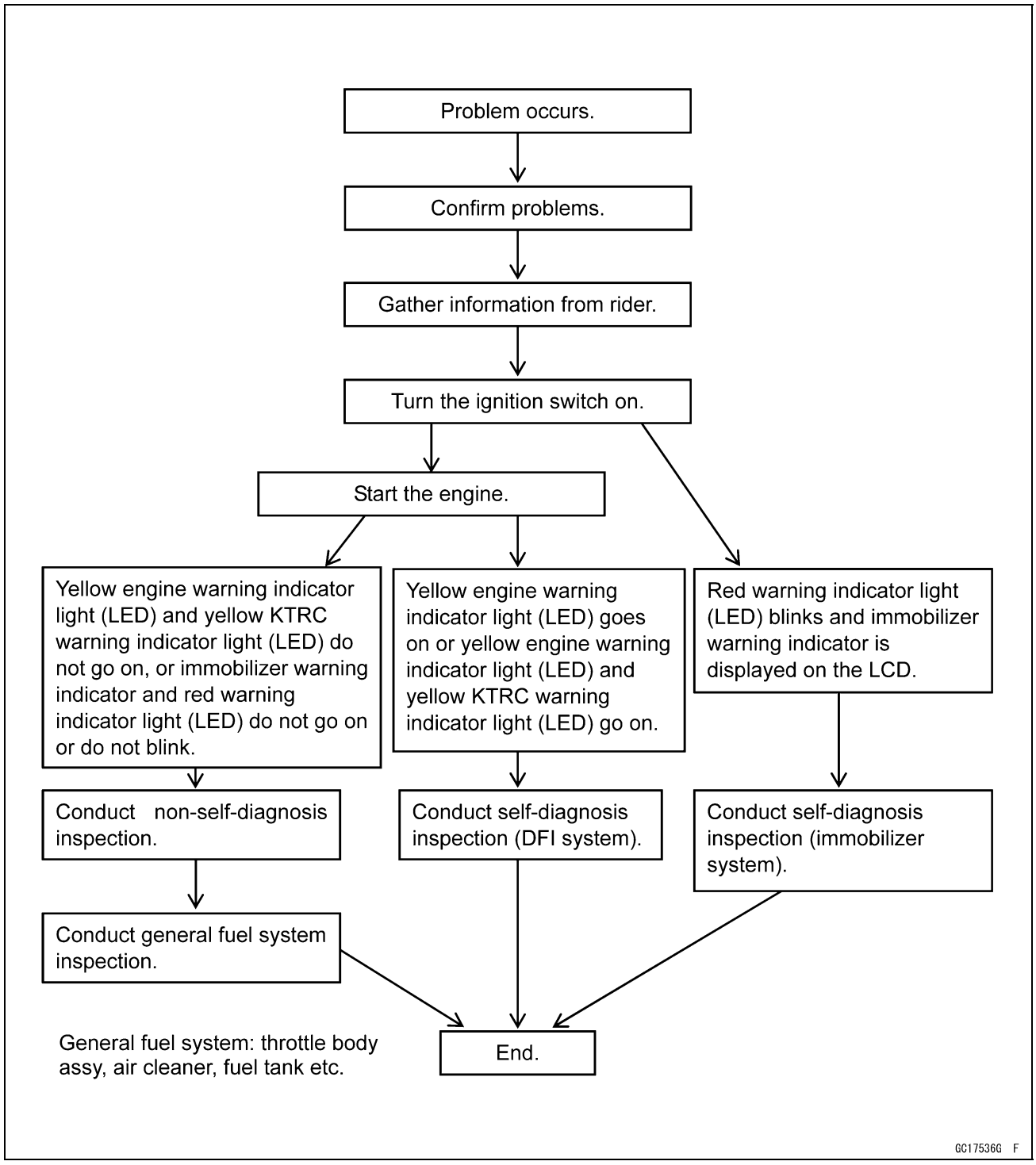
★If no abnormality is found in the wiring or connectors, the DFI parts are the next likely suspects. Check the part, starting with input and output voltages. However, there is no way to check the ECU itself.

★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

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

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

○The following sample 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.

Troubleshooting the DFI System

Sample Diagnosis Sheet

Rider name:	**Registration No. (license plate No.):**	**Year of initial registration:**
Model:	**Engine No.:**	**Frame No.:**
Date problem occurred:		**Mileage:**
Environment when problem occurred.		
Weather	☐ fine, ☐ cloudy, ☐ rain, ☐ snow, ☐ always, ☐ other:	
Temperature	☐ hot, ☐ warm, ☐ cold, ☐ very cold, ☐ always, ☐ other:	
Problem frequency	☐ chronic, ☐ often, ☐once	
Road	☐ street, ☐ highway, ☐ mountain road (☐ uphill, ☐ downhill), ☐ bumpy, ☐ pebble	
Altitude	☐ normal, ☐ high (about 1 000 m or more)	
Motorcycle conditions when problem occurred.		
Yellow engine warning indicator light (LED)	☐ goes on immediately after turning the ignition switch on, and goes off after starting the engine (normal)	
	☐ goes on immediately after turning the ignition switch on, and goes on continuously after starting the engine (DFI problem)	
	☐ does not go on after turning the ignition switch on (indicator light (LED), meter unit fault)	
Red warning indicator light (LED)	☐ Starts blinking about 2 seconds after ignition switch on, and the immobilizer warning indicator is displayed on the LCD (immobilizer system problem).	
	☐ Does not go on about 2 seconds after ignition switch on (ECU or meter unit fault).	
	☐ light up (battery, water temperature, immobilizer or meter unit problem)	
Starting difficulty	☐ starter motor not rotating.	
	☐ starter motor rotating but engine does not turn over.	
	☐ starter motor and engine do not turn over.	
	☐ no fuel flow (☐ no fuel in tank, ☐ no fuel pump sound).	
	☐ no spark.	
	☐ other:	
Engine stalls	☐ right after starting.	
	☐ when opening throttle grip.	
	☐ when closing throttle grip.	
	☐ when moving off.	
	☐ when stopping the motorcycle.	
	☐ when cruising.	
	☐ other:	

Troubleshooting the DFI System

Poor running at low speed	☐ very low idle speed, ☐ very high idle speed, ☐ 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:
Poor running or no power at high speed	☐ spark plug loose (tighten it).
	☐ spark plug dirty, broken, or gap maladjusted (remedy it).
	☐ spark plug incorrect (replace it).
	☐ knocking (fuel poor quality or incorrect, → use high-octane gasoline).
	☐ brake dragging.
	☐ clutch slipping.
	☐ engine overheating.
	☐ engine oil level too high.
	☐ engine oil viscosity too high.
	☐ other:

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 sensor, starter lockout or side stand switch trouble	Inspect each sensor or switch (see chapter 16).
Immobilizer system trouble	Inspect (see chapter 3).
Vehicle-down sensor operated	Turn ignition switch off (see chapter 3).
Vehicle-down sensor trouble	Inspect (see chapter 3).
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 16).
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 16).
Fuel filter clogged	Replace fuel filter (see chapter 2).
Fuel pressure regulator trouble	Inspect fuel pressure and replace fuel pump (see chapter 3).
Fuel line clogged	Inspect and repair (see chapter 3).
Idle speed control valve trouble	Inspect (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 16).
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	Clean 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 clogged	Replace fuel filter (see chapter 2).
Fuel pressure regulator trouble	Inspect fuel pressure and replace fuel pump (see chapter 3).
Fuel line clogged	Inspect and repair (see chapter 3).
Intake air pressure sensor #1 trouble	Inspect (see chapter 3).
Intake air pressure sensor #2 trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
Main throttle sensor trouble	Inspect (see chapter 3).
Subthrottle sensor trouble	Inspect (see chapter 3).
Subthrottle valve actuator trouble	Inspect (see chapter 3).
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 3).
Subthrottle sensor trouble	Inspect (see chapter 3).
Subthrottle valve actuator trouble	Inspect (see chapter 3).
Engine vacuum not synchronizing	Inspect and adjust (see chapter 2).
Intake air pressure sensor #1 trouble	Inspect (see chapter 3).
Intake air pressure sensor #2 trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
Idle speed control valve trouble	Inspect (see chapter 3).
Engine stalls easily:	
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 16).
Stick coil trouble	Inspect (see chapter 16).
Main throttle sensor trouble	Inspect (see chapter 3).
Subthrottle sensor trouble	Inspect (see chapter 3).
Subthrottle valve actuator trouble	Inspect (see chapter 3).
Intake air pressure sensor #1 trouble	Inspect (see chapter 3).
Intake air pressure sensor #2 trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
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).
Idle speed control valve trouble	Inspect (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 clogged	Replace fuel filter (see chapter 2).

DFI System Troubleshooting Guide

Symptoms or Possible Causes	Actions (chapter)
Fuel pump trouble	Inspect (see chapter 3).
Fuel injector trouble	Inspect (see chapter 3).
Main throttle sensor trouble	Inspect (see chapter 3).
Subthrottle sensor trouble	Inspect (see chapter 3).
Subthrottle valve actuator trouble	Inspect (see chapter 3).
Intake air pressure sensor #1 trouble	Inspect (see chapter 3).
Intake air pressure sensor #2 trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 16).
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 3).
Subthrottle sensor trouble	Inspect (see chapter 3).
Subthrottle valve actuator trouble	Inspect (see chapter 3).
Intake air pressure sensor #1 trouble	Inspect (see chapter 3).
Intake air pressure sensor #2 trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
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 3).
Backfiring when deceleration:	
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 16).
Fuel pressure too low	Inspect (see chapter 3).
Fuel pump trouble	Inspect (see chapter 3).
Main throttle sensor trouble	Inspect (see chapter 3).
Subthrottle sensor trouble	Inspect (see chapter 3).
Subthrottle valve actuator trouble	Inspect (see chapter 3).
Intake air pressure sensor #1 trouble	Inspect (see chapter 3).
Intake air pressure sensor #2 trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
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).
Intake air pressure sensor #1 trouble	Inspect (see chapter 3).

DFI System Troubleshooting Guide

Symptoms or Possible Causes	Actions (chapter)
Intake air pressure sensor #2 trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
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

Symptoms or Possible Causes	Actions (chapter)
Firing incorrect:	
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 16).
Spark plug incorrect	Replace it with the correct plug (see chapter 2).
ECU trouble	Inspect (see chapter 3).
Fuel/air mixture incorrect:	
Air cleaner clogged, poorly sealed, or missing	Clean 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 line clogged	Inspect and repair (see chapter 3).
Fuel pump operates intermittently and often DFI fuse blows.	Fuel pump bearings may wear. Replace the fuel pump (see chapter 3).
Fuel pump trouble	Inspect (see chapter 3).
Intake air pressure sensor #1 trouble	Inspect (see chapter 3).
Intake air pressure sensor #2 trouble	Inspect (see chapter 3).
Cracked or obstructed intake air pressure sensor #1 and #2 vacuum hoses	Inspect and repair or replace (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
Main throttle sensor trouble	Inspect (see chapter 3).
Subthrottle sensor trouble	Inspect (see chapter 3).
Subthrottle valve actuator trouble	Inspect (see chapter 3).
Knocking:	
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).
Engine vacuum not synchronizing	Inspect and adjust (see chapter 2).

DFI System Troubleshooting Guide

Symptoms or Possible Causes	Actions (chapter)
Intake air pressure sensor #1 trouble	Inspect (see chapter 3).
Intake air pressure sensor #2 trouble	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
Miscellaneous:	
Subthrottle sensor trouble	Inspect (see chapter 3).
Subthrottle valve actuator trouble	Inspect (see chapter 3).
Throttle valves will not fully open	Inspect throttle cables and lever linkage (see chapter 3).
Engine overheating - Water temperature sensor or crankshaft 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	Clean 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 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).
(Brown smoke)	
Air duct loose	Reinstall (see chapter 3).
Fuel pressure too low	Inspect (see chapter 3).
Water temperature sensor trouble	Inspect (see chapter 3).
Intake air temperature sensor trouble	Inspect (see chapter 3).

Self-Diagnosis

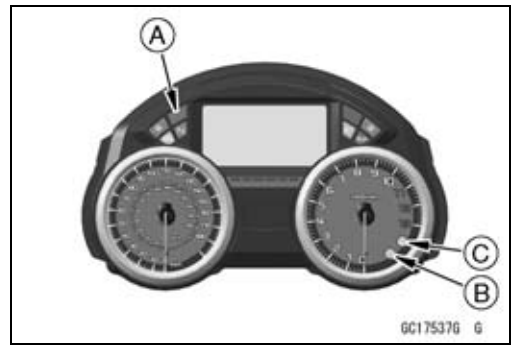
Self-Diagnosis Outline

The self-diagnosis system is monitoring the following mechanisms.

DFI System and Ignition System
KTRC System
Immobilizer System (Equipped Models)

The following warning indicator lights (LED) are used for indicators of below table.

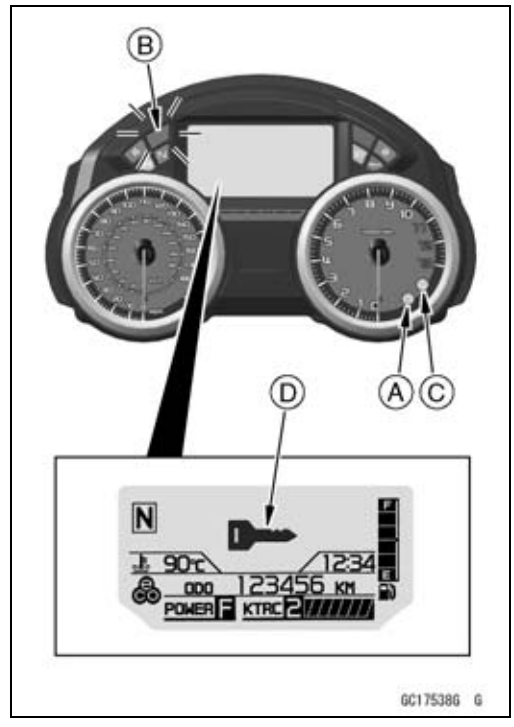
LED Color	Warning Indicators
Red [A]	Battery Water Temperature Immobilizer (Equipped Models)
Yellow [B]	FI (Emission-related Diagnostic)
Yellow [C]	KTRC



The self-diagnosis system has two modes and can be switched to another mode by operating the “SEL” button of the left switch housing.

User Mode

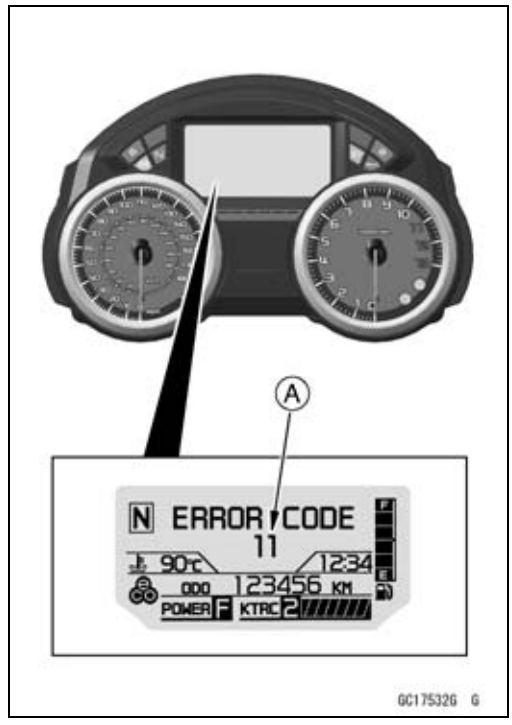
The ECU notifies the rider of troubles in DFI system, ignition system, KTRC system and immobilizer system (equipped models) by lighting or blinking the yellow engine warning indicator light (LED) [A], red warning indicator light (LED) [B], yellow KTRC warning indicator light (LED) [C] and warning indicator [D] when DFI, ignition, KTRC and immobilizer system parts are faulty, and initiates fail-safe function. In case of serious troubles, ECU stops the injection and ignition operations.



Self-Diagnosis

Dealer Mode

The LCD (Liquid Crystal Display) displays the service code(s) [A] to show the problem(s) which the above system has at the moment of diagnosis.



Self-Diagnosis Procedures

NOTE

○*Use a fully charged battery when conducting self-diagnosis. Otherwise, the warning indicator light (LED) and indicator do not light or blink.*

● Turn the ignition switch on and start the engine.

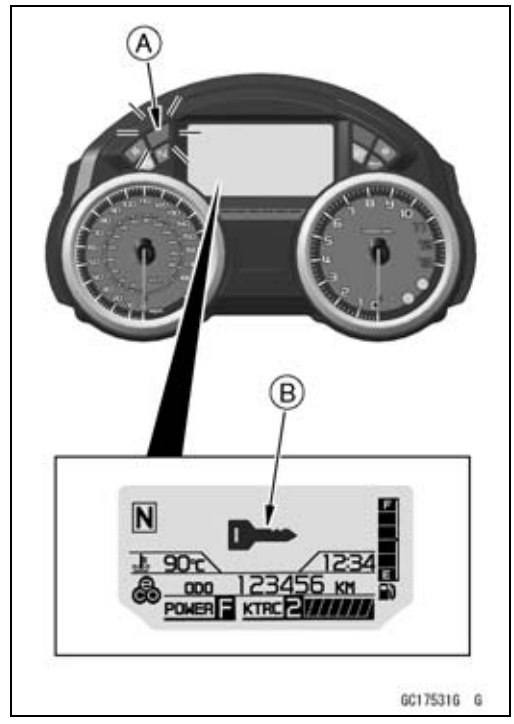
○When a problem occurs with DFI system and ignition system, the yellow engine warning indicator light (LED) [A] stays on after starting the engine to alert the rider.

○When a problem occurs with KTRC system, the yellow KTRC warning indicator light (LED) [B] goes on.

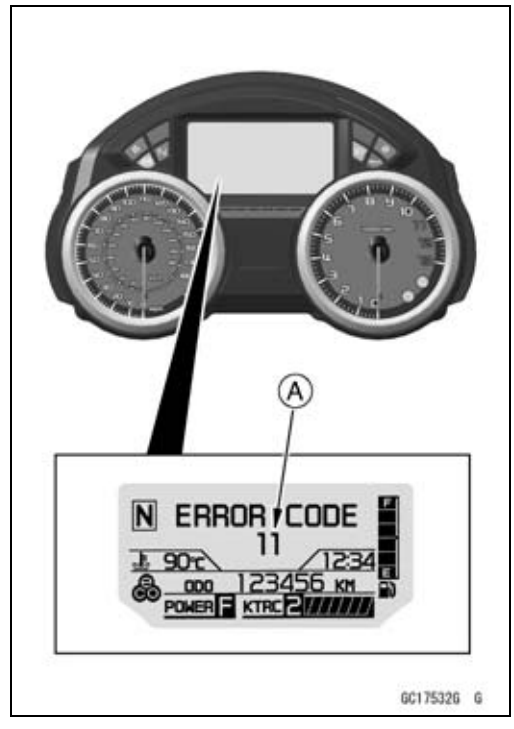


Self-Diagnosis

○When a problem occurs with immobilizer system (equipped models), the red warning indicator light (LED) [A] blinks and immobilizer warning indicator [B] is displayed on the LCD (Liquid Crystal Display).



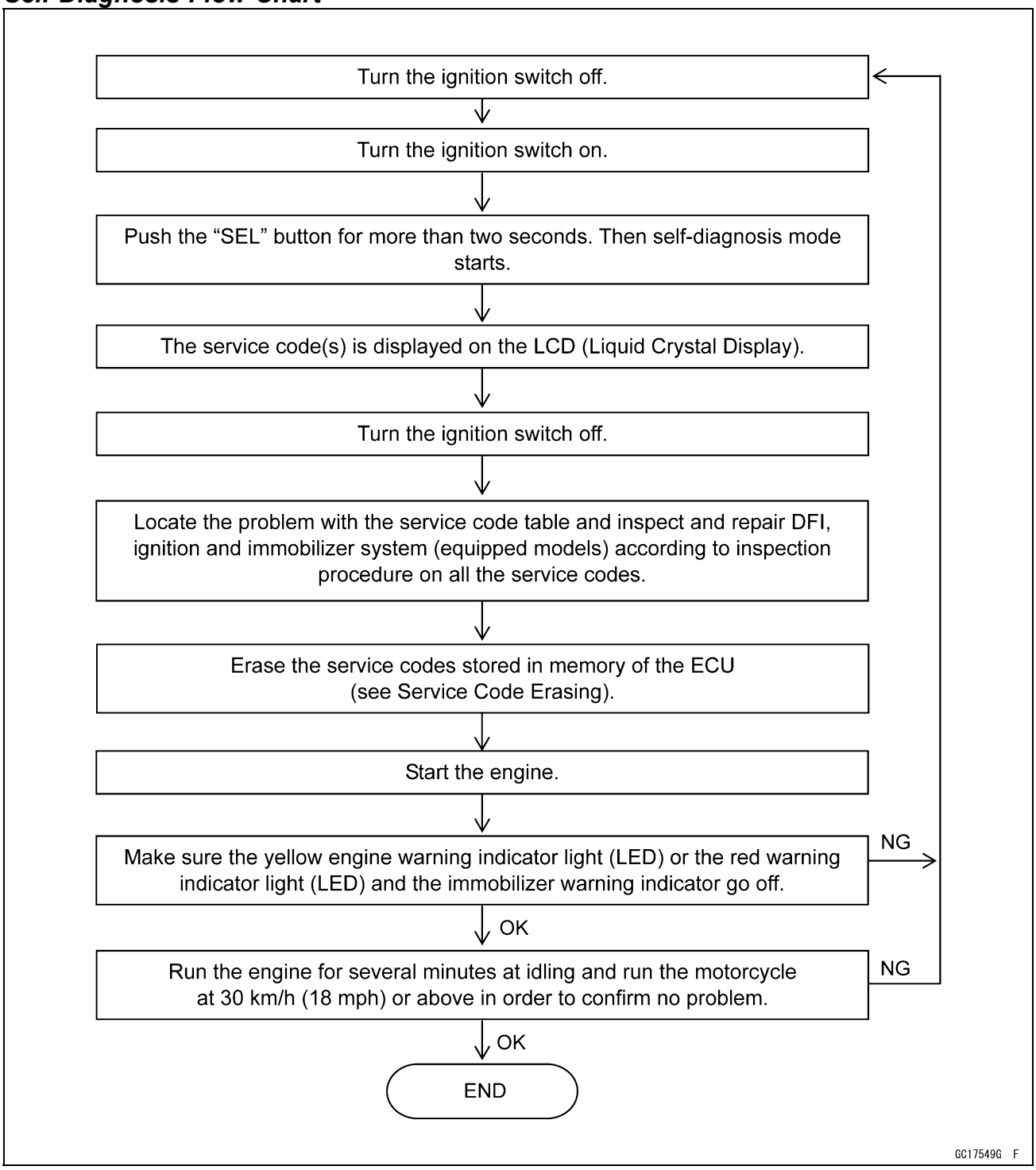
● Push the “SEL” button for more than two seconds.
● The service code [A] is displayed on the LCD by the number of two digits.



● Any of the following procedures ends self-diagnosis.
○When the service code is displayed on the LCD, push the “SEL” button for more than two seconds. The display will return to the previous display.
○When the ignition switch is turned off.

Self-Diagnosis

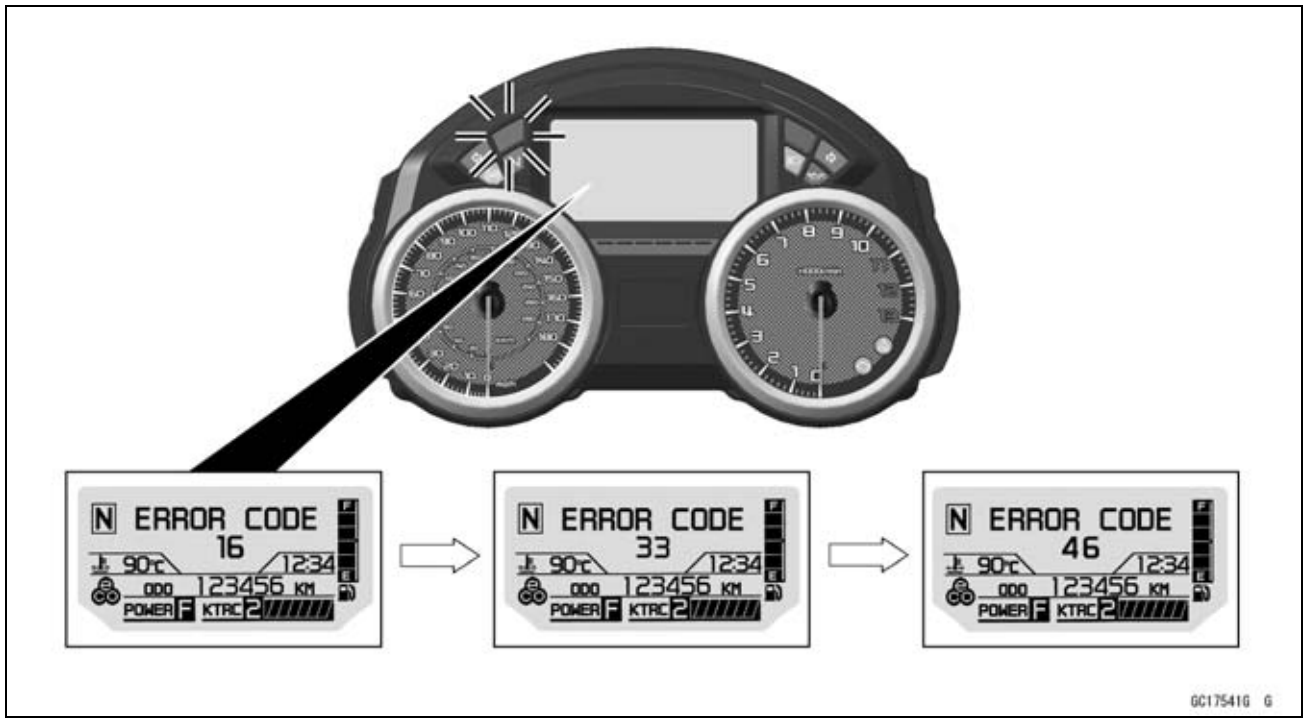
Self-Diagnosis Flow Chart



Self-Diagnosis

Service Code Reading

○The service code(s) is displayed on the LCD by the number of two digits.
○When 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.
○Then after completing all codes, the display is repeated until the ignition switch is turned off or “SEL” button is pushed for more than two seconds.
○The order of the system’s appearing is the order of DFI System, KTRC System and Immobilizer System (equipped models).
○For example, if three problems occurred in the order of 46, 16, 33, the service codes are displayed (each two seconds) from the lowest number in the order listed as shown below.
(16 → 33 → 46) → (16 → 33 → 46) → ··· (repeated)



○In the case more than two service codes are available, you may push the upper button to shift into the other code too.

Self-Diagnosis

Service Code Erasing

● The service codes stored in memory of the ECU can be erased using Kawasaki Diagnostic System (KDS Ver.3).

★If the Kawasaki Diagnostic System (KDS Ver.3) is not available, do the following procedures.

1. Turn on the ignition switch and start the engine.
2. Keep the idling speed more than 30 seconds.
3. Run the vehicle more than 5 minutes at a speed of 40 km/h (25 mph) or more.
   Be sure to keep the engine running during procedures 2 and 3 for more than 10 minutes in total.
4. Turn the ignition switch off.
5. Repeat the above procedures 3 times.
6. Start the engine and check that the yellow engine warning indicator light (LED) goes off.

Service Code Table

○The service codes of the immobilizer system appear to system equipped models.

Service Codes	DTC (Diagnostic Trouble Code)	System	Problems
11	P0120	FI/KTRC	Main throttle sensor malfunction, wiring open or short
	P0123		
12	P0105	FI/KTRC	Intake air pressure sensor #1 malfunction, wiring open or short
	P0107		
13	P0110	FI	Intake air temperature sensor malfunction, wiring open or short
	P0112		
14	P0115	FI	Water temperature sensor malfunction, wiring open or short
	P0117		
16	P2226	FI/KTRC	Intake air pressure sensor #2 malfunction, wiring open or short
	P2227		
	P2228		
21	P0335	FI/KTRC	Crankshaft sensor malfunction, wiring open or short
24	P2158	FI/KTRC	Rear wheel rotation sensor malfunction, wiring open or short
25	P0914	FI/KTRC	Gear position sensor malfunction, wiring open or short
	P0917		
27	P0500	FI/KTRC	Front wheel rotation sensor malfunction, wiring open or short
31	C0064	FI	Vehicle-down sensor malfunction, wiring open or short
32	P0220	FI/KTRC	Subthrottle sensor malfunction, wiring open or short
	P0223		
33	P0130	FI	Oxygen sensor malfunction or inactivate, wiring open or short
	P0131		
35	–	Immobilizer	Immobilizer amplifier malfunction (Equipped Models)
36	–	Immobilizer	Blank key detection (Equipped Models)
39	U0001	FI	ECU communication error
41	P0201	FI/KTRC	Fuel injector #1 malfunction, wiring open or short
42	P0202	FI/KTRC	Fuel injector #2 malfunction, wiring open or short
43	P0203	FI/KTRC	Fuel injector #3 malfunction, wiring open or short
44	P0204	FI/KTRC	Fuel injector #4 malfunction, wiring open or short
46	P0627	FI/KTRC	Fuel pump relay malfunction, relay is stuck
51	P0351	FI/KTRC	Stick coil #1 malfunction, wiring open or short
52	P0352	FI/KTRC	Stick coil #2 malfunction, wiring open or short

Self-Diagnosis

Service Codes	DTC (Diagnostic Trouble Code)	System	Problems
53	P0353	FI/KTRC	Stick coil #3 malfunction, wiring open or short
54	P0354	FI/KTRC	Stick coil #4 malfunction, wiring open or short
56	P0480	FI	Radiator fan relay malfunction, wiring open or short
62	P2100	FI/KTRC	Subthrottle valve actuator malfunction, wiring open or short
64	P0410	FI	Air switching valve malfunction, wiring open or short
67	P0030	FI	Oxygen sensor heater malfunction, wiring open or short
94	P0170	FI	Fuel supply system malfunction
1C	P0511	FI/KTRC	Idle speed control valve actuator malfunction, wiring open or short
	P0518		
	P0519		
3A	P0443	FI	Purge valve malfunction, wiring open or short (Other than US, CA, AU, ID, PH and SEA-B3 Models)

Notes:

○The 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.

○When 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.

○DTC (Diagnostic Trouble Code) is displayed on the Kawasaki Diagnostic System (KDS Ver.3) and the Generic Scan Tool (GST).

Backups

○The ECU takes the following measures to prevent engine damage when the DFI, ignition, KTRC 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 0.63 ~ 3.96 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	Intake Air Pressure Sensor #1	Intake Air Pressure (Absolute) Pv = 150 ~ 800 mmHg	If the intake air pressure sensor #1 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	Intake Air Temperature Sensor	Intake Air Temperature Ta = –30 ~ +120°C	If the intake 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.
16	Intake Air Pressure Sensor #2	Atmospheric Pressure (Absolute) Pa = 150 ~ 800 mmHg	If the intake air pressure sensor #2 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).

Self-Diagnosis

Service Codes	Parts or Function	Output Signal Usable Range or Criteria	Backups by ECU
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.
24	Rear Wheel Rotation Sensor	Rear wheel rotation sensor must send 45 signals to the ECU at the 1 rotation of the wheel.	If the rear wheel rotation sensor system fails (the signal is missing, wiring open), the ECU stops the KTRC.
25	Gear Position Sensor	Output Voltage 0.2 ~ 4.8 V	If the gear position sensor system fails (no signal, wiring short or open), the ECU set the top (6th) gear position.
27	Front Wheel Rotation Sensor	Front wheel rotation sensor must send 48 signals to the ECU at the 1 rotation of the wheel.	If the front wheel rotation sensor system fails (the signal is missing, wiring open), the ECU stops the KTRC.
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 0.42 ~ 4.34 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	The oxygen sensor is active and sensor must send signals (output voltage) continuously to the ECU.	If the oxygen sensor is not activated, the ECU stops the feedback mode of the oxygen sensor.
35	Immobilizer Amplifier (Equipped Models)	–	If the immobilizer system fails (no signal, wiring short or open), the vehicle is no start and run.
36	Ignition Key	The ignition key must use register key.	If the blank key or broken key is used, the vehicle is no start and run.
39	ECU	The ECU sends the data to the meter unit through the CAN communication line.	–
41	Fuel Injector #1*	The injector must send signals continuously to the ECU.	If the injector #1 fails (no signal, wiring short or open), the ECU shuts off the signal to the injector. Fuel is not supplied to the cylinder #1, though the engine keeps running.
42	Fuel Injector #2*	The injector must send signals continuously to the ECU.	If the injector #2 fails (no signal, wiring short or open), the ECU shuts off the signal to the injector. Fuel is not supplied to the cylinder #2, though the engine keeps running.
43	Fuel Injector #3*	The injector must send signals continuously to the ECU.	If the injector #3 fails (no signal, wiring short or open), the ECU shuts off the signal to the injector. Fuel is not supplied to the cylinder #3, though the engine keeps running.

Self-Diagnosis

Service Codes	Parts or Function	Output Signal Usable Range or Criteria	Backups by ECU
44	Fuel Injector #4*	The injector must send signals continuously to the ECU.	If the injector #4 fails (no signal, wiring short or open), the ECU shuts off the signal to the injector. Fuel is not supplied to the cylinder #4, though the engine keeps running.
46	Fuel Pump Relay	When the fuel pump relay is ON, battery monitor voltage is 5 V or more.	–
51	Stick Coil #1*	The ECU sends signals (output voltage) continuously to the stick coil.	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 ECU sends signals (output voltage) continuously to the stick coil.	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 ECU sends signals (output voltage) continuously to the stick coil.	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 ECU sends signals (output voltage) continuously to the stick coil.	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.	–
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.	–
67	Oxygen Sensor Heater	The oxygen sensor heater raises temperature of the sensor for its earlier activation.	If the oxygen sensor heater fails (wiring short or open), the ECU stops the current to the heater, and it stops the feedback mode of the oxygen sensor.
94	Fuel Supply System	Fuel correction value exceeds a threshold.	–
1C	Idle Speed Control Valve Actuator	The actuator operates open and close of the bypass passage by the pulse signal from the ECU.	If the idle speed control valve actuator fails (the signal is out to the usable range, wiring short or open), the ECU stops the current to the actuator.
3A	Purge Valve (Other than US, CA, AU, ID, PH and SEA-B3 Models)	The purge valve controls the flow of the fuel vapor gas air by opening and shutting the solenoid valve.	–

Self-Diagnosis

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.

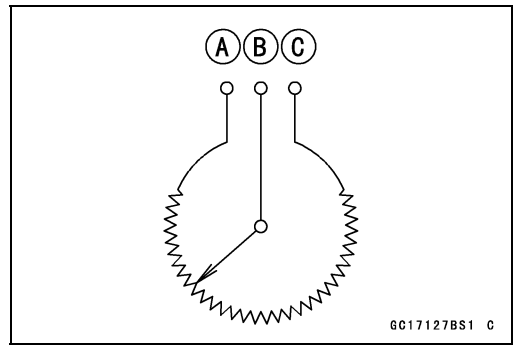
(2): α-N Method: As the engine speed increases, and the engine load turns middle to heavy, the ECU determines the injection quantity by calculating from the throttle opening (throttle sensor output voltage) and the engine speed. This method is called α-N method.

*: This depends on the number of stopped cylinders.

Main Throttle Sensor (Service Code 11) (DTC P0120, P0123)

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.

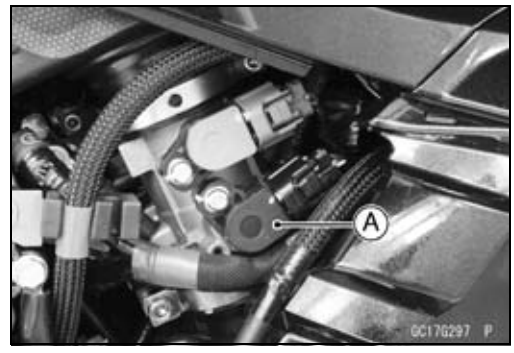
Input Terminal [A]: BL
Output Terminal [B]: Y/W
Ground Terminal [C]: G



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.

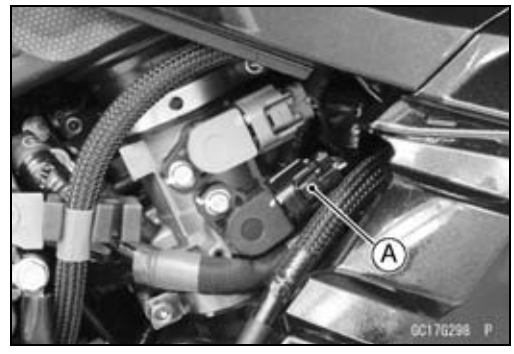


Main Throttle Sensor Input Voltage Inspection

NOTE

○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove the right fairing cover (see Fairing Cover Removal in the Frame chapter).
- Disconnect the main throttle sensor connector [A].



- Connect the throttle sensor 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 (+) → W (sensor BL) lead
Digital Meter (–) → BK (sensor G) lead



- Measure the input voltage with the engine stopped and with the connector joined.
- Turn the ignition switch on.

Input Voltage
Standard: DC 4.75 ~ 5.25 V

- Turn the ignition switch off.

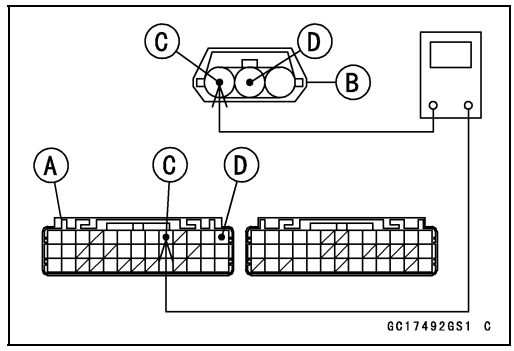
★If the reading is within the standard, check the main throttle sensor resistance (see Main Throttle Sensor Resistance Inspection).

Main Throttle Sensor (Service Code 11) (DTC P0120, P0123)

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

○Disconnect the ECU and sensor connectors.

Wiring Continuity Inspection
ECU Connector [A] ←→
Main Throttle Sensor Connector [B]
BL lead (ECU terminal 9) [C]
G lead (ECU terminal 13) [D]



★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).

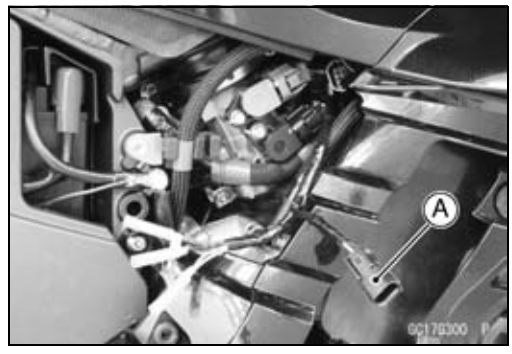
Main Throttle Sensor Resistance Inspection

● Turn the ignition switch off.

● Measure the main throttle sensor resistance in the same way as input voltage inspection, note the following.

○Disconnect the throttle sensor setting adapter [A] from the connector of the main harness side.

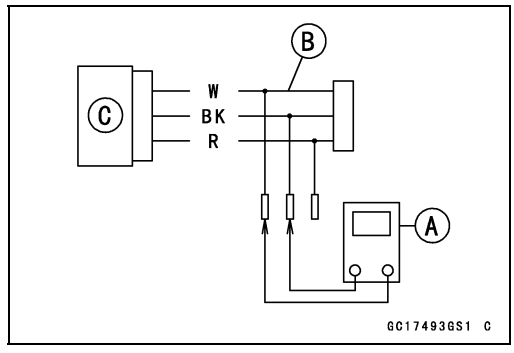
Special Tool - Throttle Sensor Setting Adapter: 57001 -1538



○Connect the setting adapter [B] to the sensor connector only.

○Connect a digital meter [A] to the setting adapter [B].
Main Throttle Sensor [C]

Main Throttle Sensor Resistance
Connections to Adapter:
W (sensor BL) lead ←→ BK (sensor G) lead
Standard: 4 ~ 6 kΩ



★If the reading is out of the standard, replace the throttle body assy.

★If the reading is within the standard, check the output voltage (see Main Throttle Sensor Output Voltage Inspection).

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 following.

○Disconnect 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 (+) → R (sensor Y/W) lead
Digital Meter (–) → BK (sensor G) lead

Main Throttle Sensor (Service Code 11) (DTC P0120, P0123)

- Start the engine and warm it up thoroughly.
- Check idle speed to ensure the throttle opening is correct (see Idle Speed Inspection in the Periodic Maintenance chapter).

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

- Turn the ignition switch off.
- Measure the output voltage with the engine stopped, and with the connector joined.
- Turn the ignition switch on.

Output Voltage
Standard: DC 0.63 ~ 0.65 V at idle throttle opening
DC 3.76 ~ 3.96 V at full throttle opening (for reference)

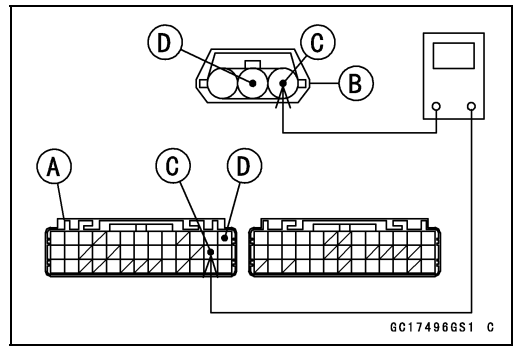
NOTE

○*Open the throttle, confirm the output voltage will be raise.*
○*The standard voltage refers to the value when the voltage reading at the Input Voltage Inspection shows 5 V exactly.*
○*When 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.
0.63 × 4.75 ÷ 5.00 = 0.60 V
0.65 × 4.75 ÷ 5.00 = 0.62 V
Thus, the valid range is 0.60 ~ 0.62 V

- Turn the ignition switch off.

★If the reading is out of the standard, replace the throttle body assy.

★If the reading is within the standard, remove the ECU and check the wiring for continuity between harness connectors.
○Disconnect the ECU and sensor connectors.

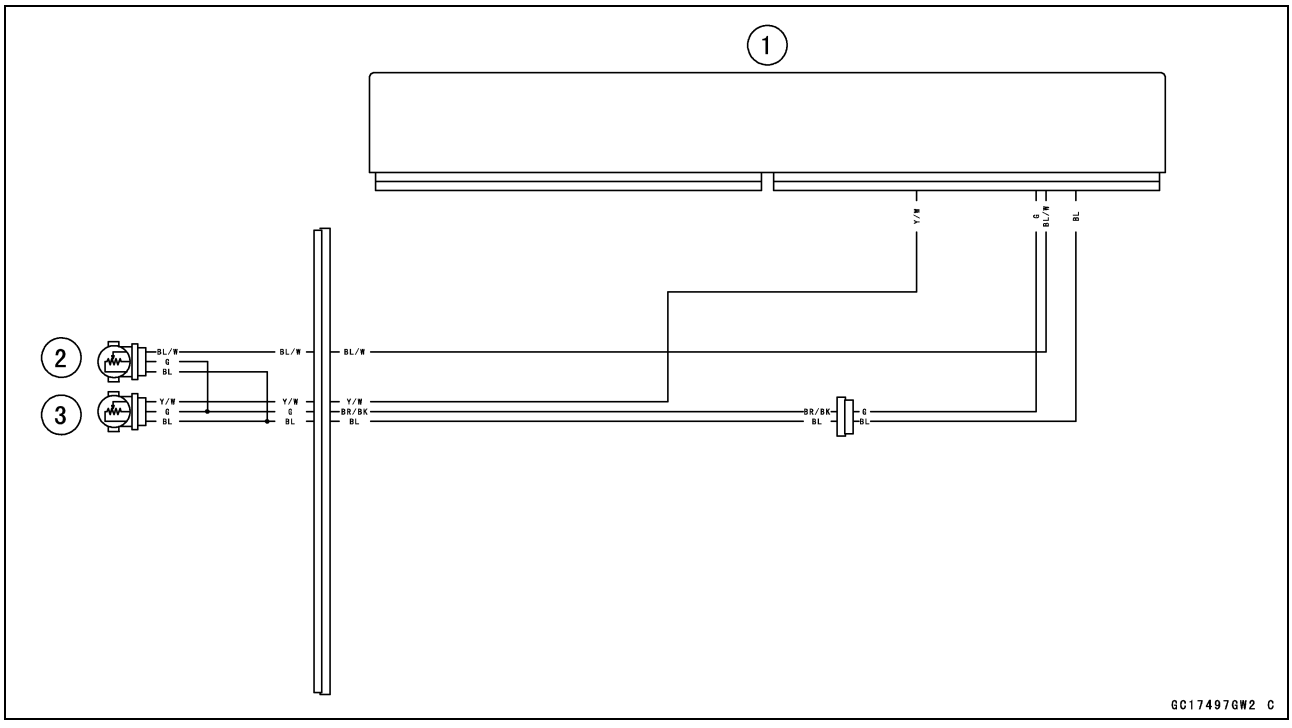


Wiring Continuity Inspection
ECU Connector [A] ←→
Main Throttle Sensor Connector [B]
Y/W lead (ECU terminal 25) [C]
G lead (ECU terminal 13) [D]

★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).

Main Throttle Sensor (Service Code 11) (DTC P0120, P0123)

Main Throttle Sensor Circuit



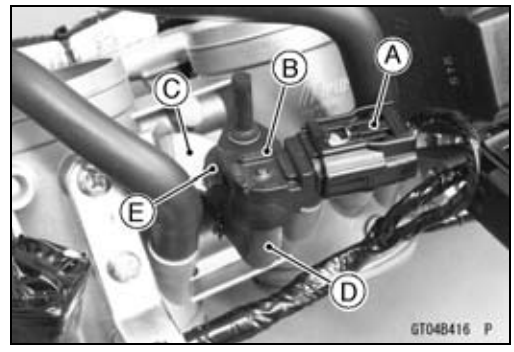
1. ECU
2. Subthrottle Sensor
3. Main Throttle Sensor

Intake Air Pressure Sensor #1 (Service Code 12) (DTC P0105, P0107)

Intake Air Pressure Sensor #1 Removal

NOTICE

Never drop the intake air pressure sensor #1 especially on a hard surface. Such a shock to the sensor can damage it.

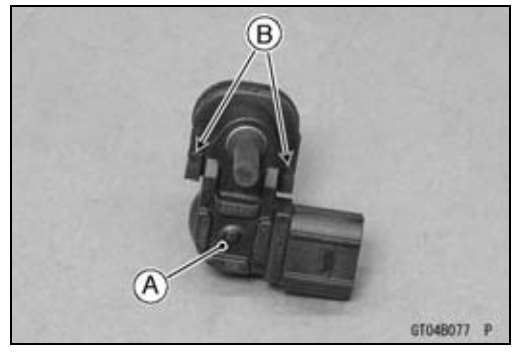


- Remove:
  Throttle Body Assy (see Throttle Body Assy Removal)
- Disconnect the intake air pressure sensor #1 connector [A].
- Remove the intake air pressure sensor #1 [B] from the bracket [C].
- Disconnect the vacuum hose [D] and remove the rubber damper [E] from the intake air pressure sensor #1.

Intake Air Pressure Sensor #1 Installation

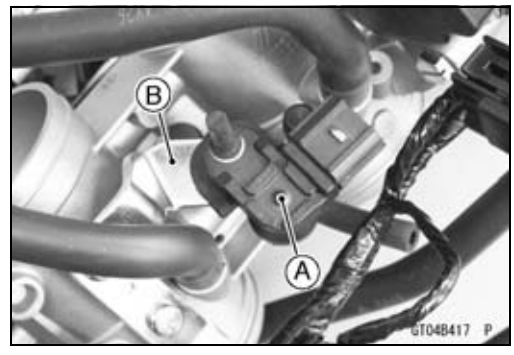
NOTE

○*The intake air pressure sensor #1 is the same part as the intake air pressure sensor #2.*



- Installation is basically the reverse of removal.
- Position the intake air pressure sensor #1 [A] between the projections [B] on the rubber damper.

- Install the intake air pressure sensor #1 [A] on the bracket [B] as shown.



Intake Air Pressure Sensor #1 (Service Code 12) (DTC P0105, P0107)

Intake Air Pressure Sensor #1 Input Voltage Inspection



NOTE

○*Be sure the battery is fully charged.*

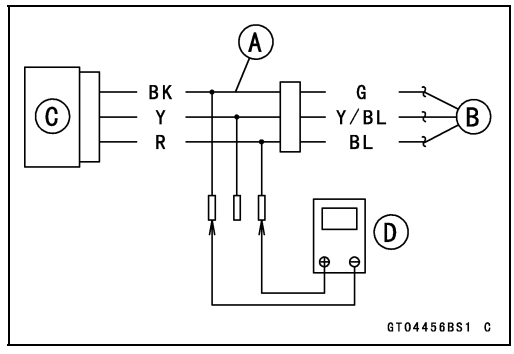
- Turn the ignition switch off.
- Remove the throttle body assy (see Throttle Body Assy Removal).

○Do not disconnect the connectors of the throttle body assy.

- Disconnect the intake air pressure sensor #1 connector and connect the measuring adapter [A] between these connectors.

Main Harness [B]
Intake Air Pressure Sensor #1 [C]

Special Tool - Measuring Adapter: 57001-1700



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

Intake Air Pressure Sensor #1 Input Voltage
Connections to Adapter:

Digital Meter (+) → R (sensor BL) lead

Digital Meter (–) → BK (sensor G) lead

- Measure the input voltage with the engine stopped and with the connector joined.
- Turn the ignition switch on.

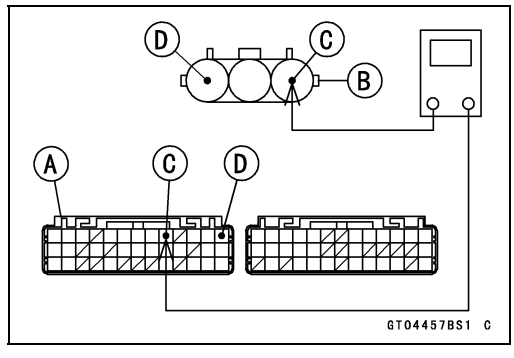
Input Voltage
Standard: DC 4.75 ~ 5.25 V

- Turn the ignition switch off.

★If the reading is within the standard, check the output voltage (see Intake Air Pressure Sensor #1 Output Voltage Inspection).

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

○Disconnect the ECU and sensor connectors.



Wiring Continuity Inspection
ECU Connector [A] ←→
Intake Air Pressure Sensor #1 Connector [B]

BL lead (ECU terminal 9) [C]

G lead (ECU terminal 13) [D]

★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).

Intake Air Pressure Sensor #1 (Service Code 12) (DTC P0105, P0107)

Intake Air Pressure Sensor #1 Output Voltage Inspection

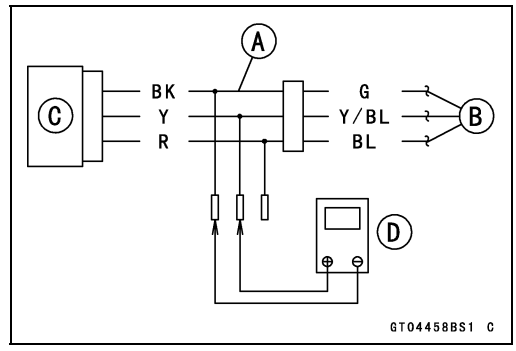


● Measure the output voltage at the intake air pressure sensor #1 in the same way as input voltage inspection, note the following.

○Disconnect the intake air pressure sensor #1 connector and connect the measuring adapter [A] between these connectors.

Main Harness [B]
Intake Air Pressure Sensor #1 [C]
Digital Meter [D]

Special Tool - Measuring Adapter: 57001-1700



Intake Air Pressure Sensor #1 Output Voltage
Connections to Adapter:
Digital Meter (+) → Y (sensor Y/BL) lead
Digital Meter (–) → BK (sensor G) lead

● Measure the output voltage with the engine stopped and with the connector joined.

● Turn the ignition switch on.

Output Voltage
Usable Range: DC 3.80 ~ 4.20 V at standard atmospheric pressure (101.32 kPa, 76 cmHg)

NOTE

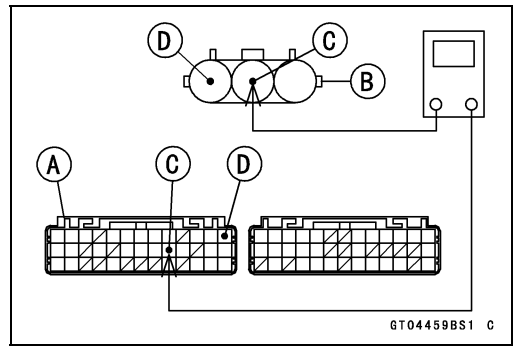
○*The output voltage changes according to the local atmospheric pressure.*

● Turn the ignition switch off.

★If the reading is out of the usable range, replace the sensor.

★If the reading is within the usable range, remove the ECU and check the wiring for continuity between harness connectors.

○Disconnect the ECU and sensor connectors.



Wiring Continuity Inspection
ECU Connector [A] ←→
Intake Air Pressure Sensor #1 Connector [B]
Y/BL lead (ECU terminal 22) [C]
G lead (ECU terminal 13) [D]

Intake Air Pressure Sensor #1 (Service Code 12) (DTC P0105, P0107)

★If the wiring is good, check the sensor for various vacuum.
- Remove the intake air pressure sensor #1 [A] and disconnect the vacuum hose from the sensor.
- Connect an auxiliary hose [B] to the intake air pressure sensor #1.
- Temporarily install the intake air pressure sensor #1.

○Connect a digital meter [C], vacuum gauge [D], the fork oil level gauge [E] and the measuring adapter to the intake air pressure sensor #1.

Special Tools - Fork Oil Level Gauge: 57001-1290
Vacuum Gauge: 57001-1369
Measuring Adapter: 57001-1700

Intake Air Pressure Sensor #1 Output Voltage
Connections to Adapter:
Digital Meter (+) → Y (sensor Y/BL) lead
Digital Meter (–) → BK (sensor G) lead

○Turn the ignition switch on.
○Measure the intake air pressure sensor #1 output voltage from various vacuum readings, while pulling the handle of the fork oil level gauge.
○Check the intake air pressure sensor #1 output voltage, using the following formula and chart.

Suppose:
Pg: Vacuum Pressure (Gauge) of Throttle Body
Pl: Local Atmospheric Pressure (Absolute) measured by a barometer
Pv: Vacuum Pressure (Absolute) of Throttle Body
Vv: Sensor Output Voltage (V)

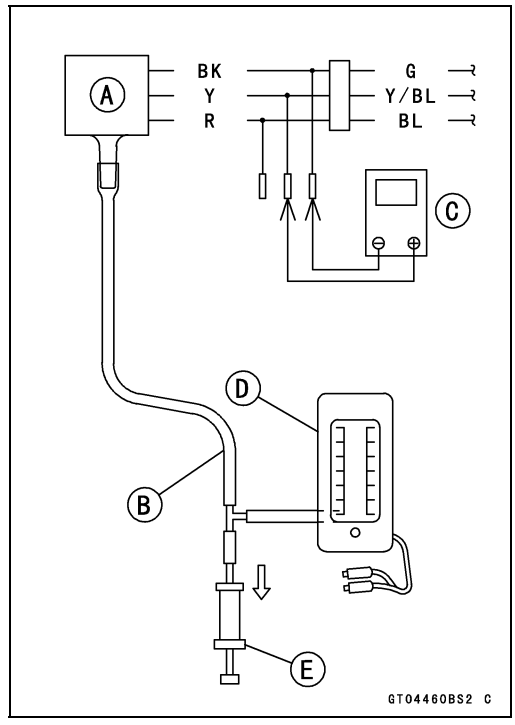
then
Pv = Pl + Pg

For example, suppose the following data is obtained:
Pg = 8 cmHg (Vacuum Gauge Reading)
Pl = 54 cmHg (Barometer Reading)
Vv = 3.2 V (Digital Meter Reading)

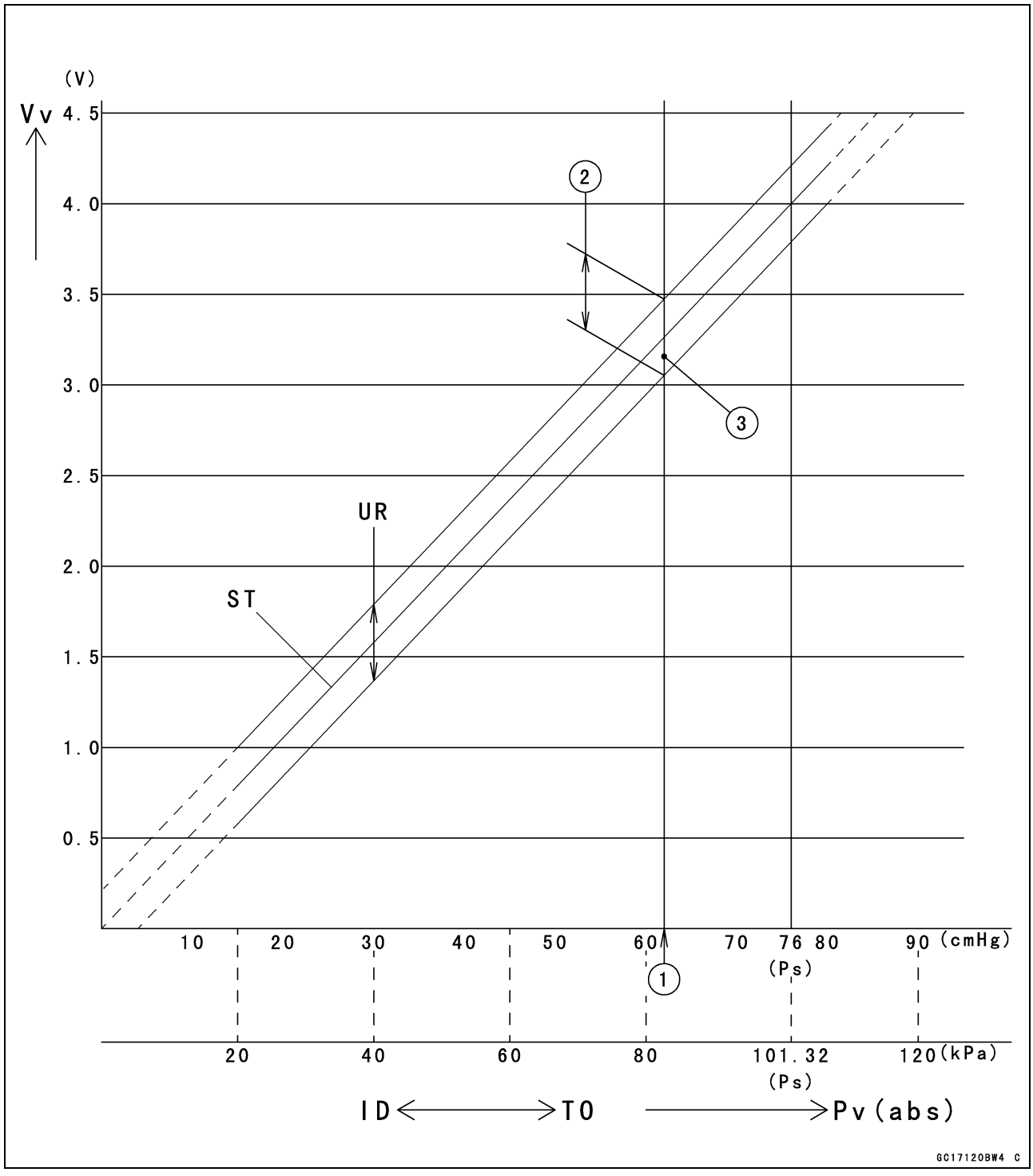
then
Pv = 54 + 8 = 62 cmHg (Absolute)

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. → 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).
★If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).



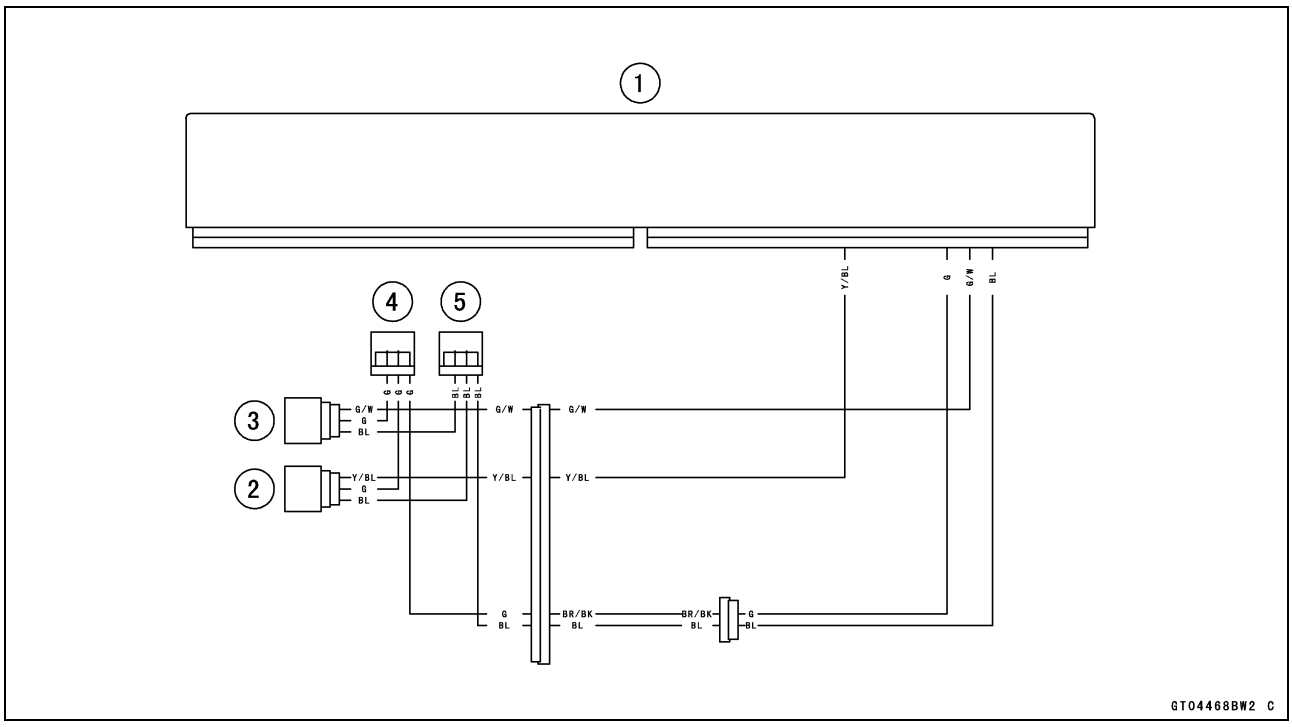
Intake Air Pressure Sensor #1 (Service Code 12) (DTC P0105, P0107)



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: Intake Air Pressure Sensor #1 Output Voltage (V) (Digital Meter Reading)

Intake Air Pressure Sensor #1 (Service Code 12) (DTC P0105, P0107)

Intake Air Pressure Sensor #1 Circuit

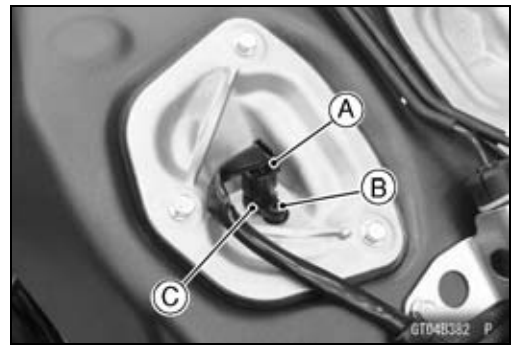


1. ECU
2. Intake Air Pressure Sensor #1
3. Intake Air Pressure Sensor #2
4. Joint Connector I
5. Joint Connector J

Intake Air Temperature Sensor (Service Code 13) (DTC P0110, P0112)

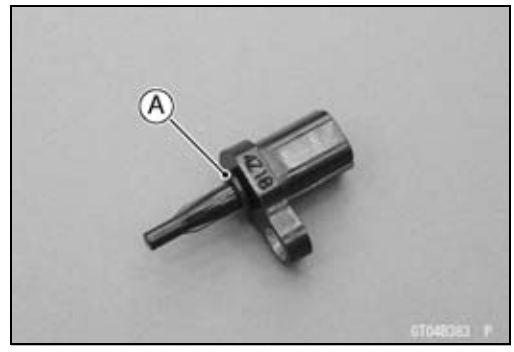
Intake Air Temperature Sensor Removal

NOTICE
Never drop the intake air temperature sensor especially on a hard surface. Such a shock to the sensor can damage it.



- Remove:
  Fuel Tank (see Fuel Tank Removal)
  Heat Insulation Cover (see Throttle Body Assy Removal)
  Intake Air Temperature Sensor Connector [A] (Disconnect)
  Screw [B]
  Intake Air Temperature Sensor [C]

Intake Air Temperature Sensor Installation

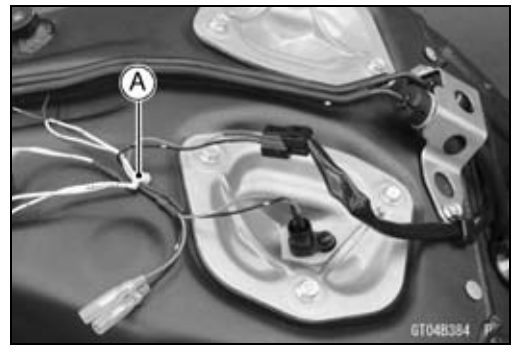


- Be sure to install the O-ring [A].
- Install the intake air temperature sensor.
- Tighten:

Torque - Intake Air Temperature Sensor Screw: 0.50 N·m (0.05 kgf·m, 4.4 in·lb)

- Install the removed parts (see appropriate chapters).

Intake Air Temperature Sensor Output Voltage Inspection

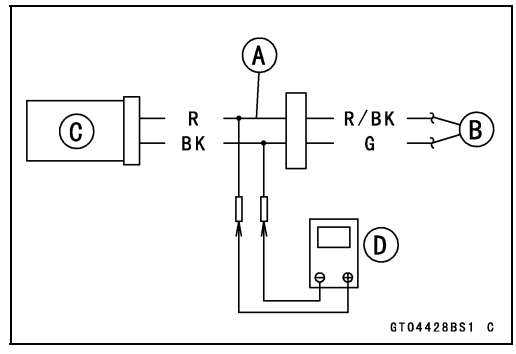


NOTE

○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove:
  Fuel tank (see Fuel Tank Removal)
  Heat Insulation Cover (see Throttle Body Assy Removal)
- Disconnect the intake air temperature sensor connector and connect the measuring adapter [A] between these connectors as shown.
  Main Harness [B]
  Intake Air Temperature Sensor [C]

Special Tool - Measuring Adapter: 57001-1700



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

Intake Air Temperature Sensor Output Voltage
Connections to Adapter:
Digital Meter (+) → R (sensor R/BK) lead
Digital Meter (–) → BK (sensor G) lead

- Measure the output voltage with the engine stopped and the connector joined.
- Turn the ignition switch on.

Output Voltage
Standard: About DC 2.25 ~ 2.50 V @20°C (68°F)

NOTE

○*The output voltage changes according to the intake air temperature.*

Intake Air Temperature Sensor (Service Code 13) (DTC P0110, P0112)

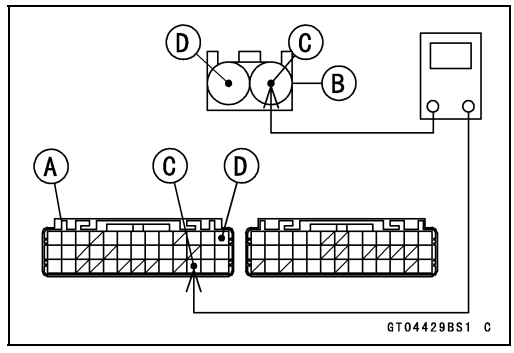
- Turn the ignition switch off.

★If the reading is within the standard, 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 out of the standard, remove the ECU and check the wiring for continuity between main harness connectors.

○Disconnect the ECU and sensor connectors.

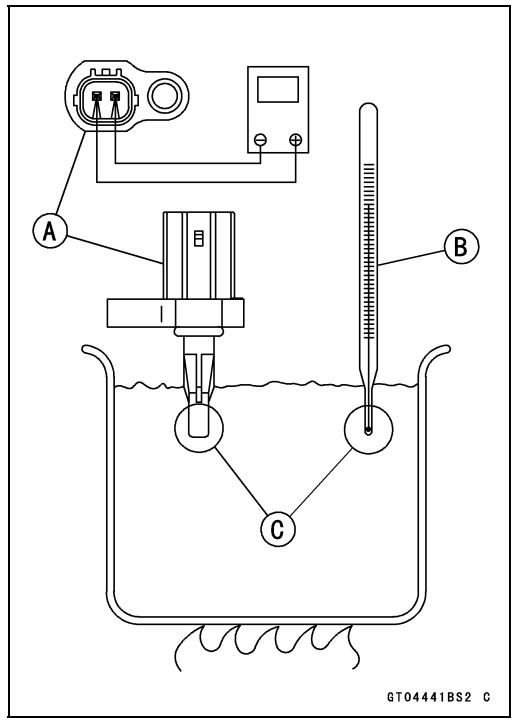


Wiring Continuity Inspection
ECU Connector [A] ←→
Intake Air Temperature Sensor Connector [B]
R/BK lead (ECU terminal 37) [C]
G lead (ECU terminal 13) [D]

★If the wiring is good, check the intake air temperature sensor resistance (see Intake Air Temperature Sensor Resistance Inspection).

Intake Air Temperature Sensor Resistance Inspection

- Remove the intake air temperature sensor (see Intake 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

○*The sensor and thermometer must not touch the container side or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the 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.

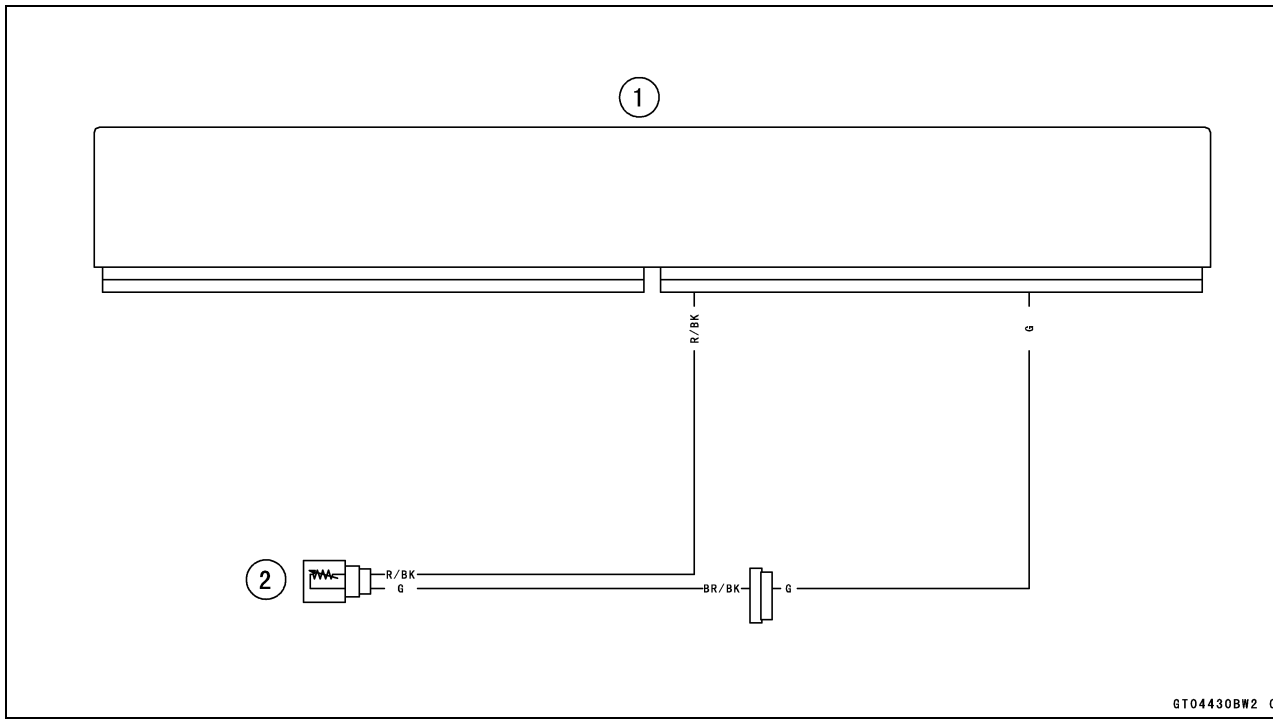
Intake Air Temperature Sensor Resistance
Standard: 5.4 ~ 6.6 kΩ @0°C (32°F)
0.29 ~ 0.39 kΩ @80°C (176°F)

★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).

Intake Air Temperature Sensor (Service Code 13) (DTC P0110, P0112)

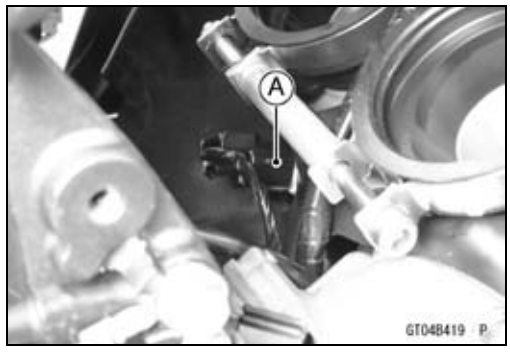
Intake Air Temperature Sensor Circuit



1. ECU
2. Intake Air Temperature Sensor

Water Temperature Sensor (Service Code 14) (DTC P0115, P0117)

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).
- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Water Temperature Sensor Connector [A]
  Water Temperature Sensor with O-ring
- Replace the O-ring with a new one.
- Tighten:

Torque - Water Temperature Sensor: 12 N·m (1.2 kgf·m, 106 in·lb)

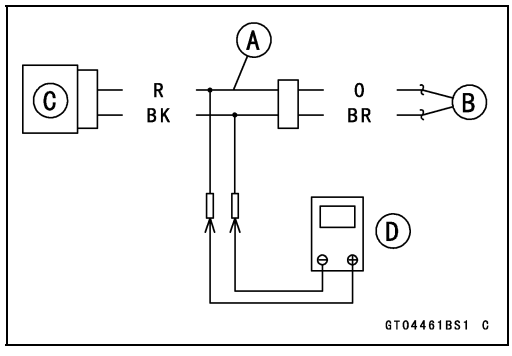
- Fill the engine with coolant and bleed the air from the cooling system (see Coolant Change in the Periodic Maintenance chapter).

Water Temperature Sensor Output Voltage Inspection

NOTE

○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove the throttle body assy (see Throttle Body Assy Removal).

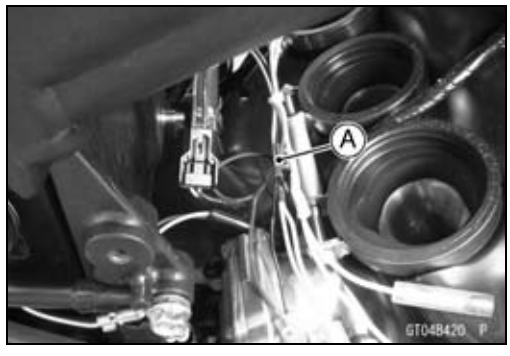


- Disconnect the water temperature sensor connector and connect the measuring adapter [A] between these connectors as shown.
  Harness [B]
  Water Temperature Sensor [C]

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 (+) → R (sensor O) lead
Digital Meter (–) → BK (sensor BR) lead



- Measure the output voltage with the engine stopped and the connector joined.
- Turn the ignition switch on.

Output Voltage
Standard: About DC 2.80 ~ 2.97 V @20°C (68°F)

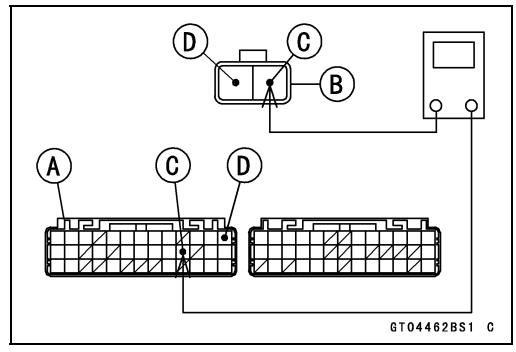
NOTE

○*The output voltage changes according to the coolant temperature in the engine.*

Water Temperature Sensor (Service Code 14) (DTC P0115, P0117)

● Turn the ignition switch off.
★If the reading is within the standard, 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 out of the standard, remove the ECU and check the wiring for continuity between harness connectors.
○Disconnect the ECU and sensor connectors.



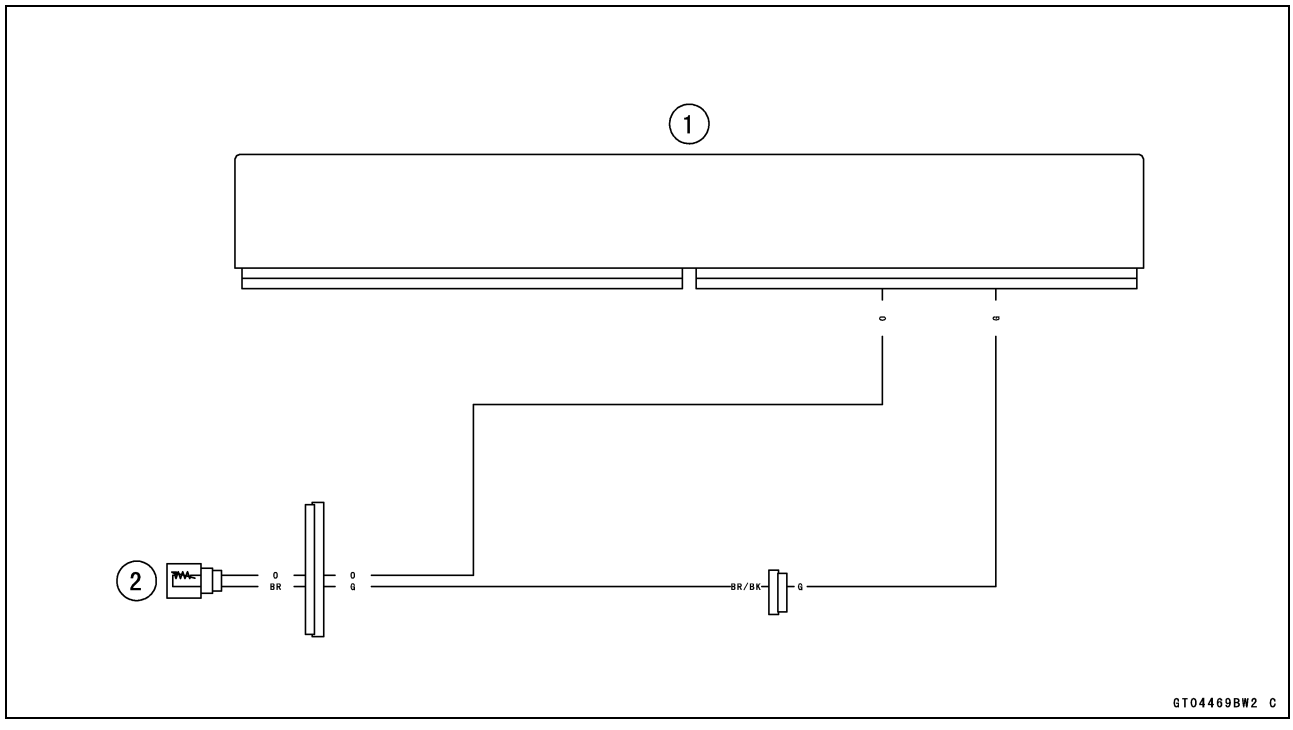
Wiring Continuity Inspection
ECU Connector [A] ←→
Water Temperature Sensor Connector [B]
O lead (ECU terminal 23) [C]
BR lead (ECU terminal 13) [D]

★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).

Water Temperature Sensor Circuit

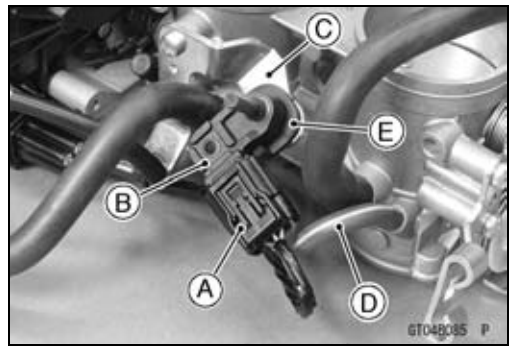


1. ECU
2. Water Temperature Sensor

Intake Air Pressure Sensor #2 (Service Code 16) (DTC P2226, P2227, P2228)

Intake Air Pressure Sensor #2 Removal

NOTICE
Never drop the intake air pressure sensor #2 especially on a hard surface. Such a shock to the sensor can damage it.

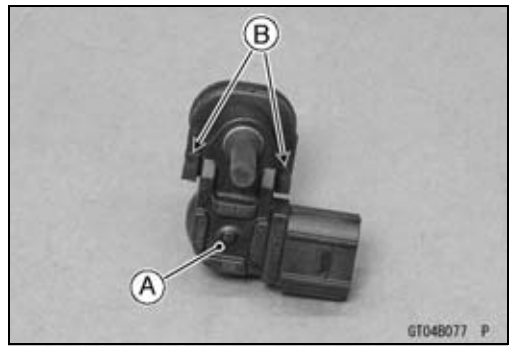


- Remove:
  Throttle Body Assy (see Throttle Body Assy Removal)
- Disconnect the intake air pressure sensor #2 connector [A].
- Remove the intake air pressure sensor #2 [B] from the bracket [C].
- Disconnect the vacuum hose [D] and remove the rubber damper [E] from the intake air pressure sensor #2.

Intake Air Pressure Sensor #2 Installation

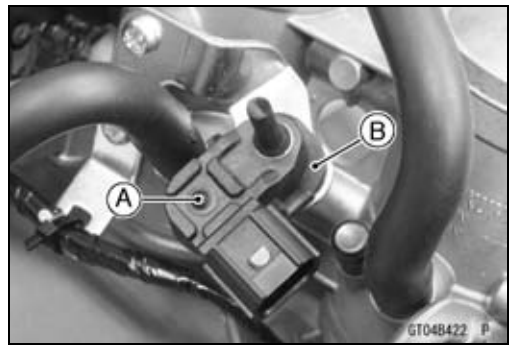
NOTE

○*The intake air pressure sensor #2 is the same part as the intake air pressure sensor #1.*



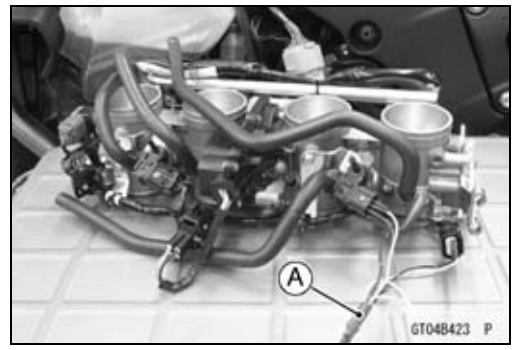
- Installation is basically the reverse of removal.
- Position the intake air pressure sensor #2 [A] between the projections [B] on the rubber damper.

- Install the intake air pressure sensor #2 [A] on the bracket [B] as shown.



Intake Air Pressure Sensor #2 (Service Code 16) (DTC P2226, P2227, P2228)

Intake Air Pressure Sensor #2 Input Voltage Inspection



NOTE

○*Be sure the battery is fully charged.*

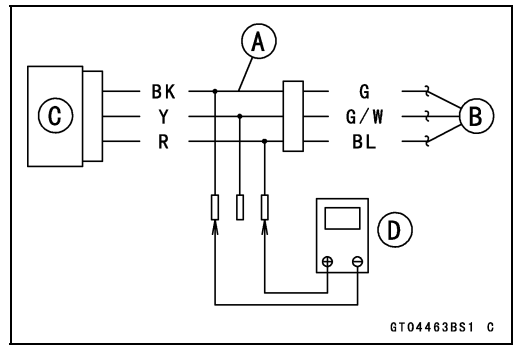
- Turn the ignition switch off.
- Remove the throttle body assy (see Throttle Body Assy Removal).

○Do not disconnect the connectors of the throttle body assy.

- Disconnect the intake air pressure sensor #2 connector and connect the measuring adapter [A] between these connectors.

Main Harness [B]
Intake Air Pressure Sensor #2 [C]

Special Tool - Measuring Adapter: 57001-1700



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

Intake Air Pressure Sensor #2 Input Voltage
Connections to Adapter:
Digital Meter (+) → R (sensor BL) lead
Digital Meter (–) → BK (sensor G) lead

- Measure the input voltage with the engine stopped and with the connector joined.
- Turn the ignition switch on.

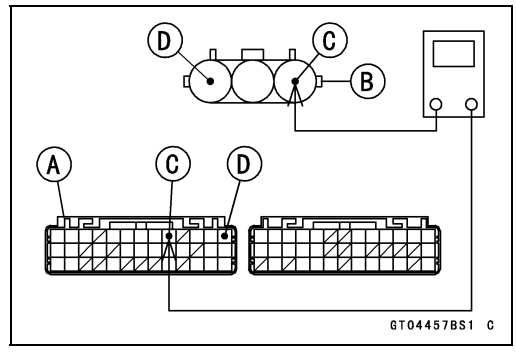
Input Voltage
Standard: DC 4.75 ~ 5.25 V

- Turn the ignition switch off.

★If the reading is within the standard, check the output voltage (see Intake Air Pressure Sensor #2 Output Voltage Inspection).

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

○Disconnect the ECU and sensor connectors.



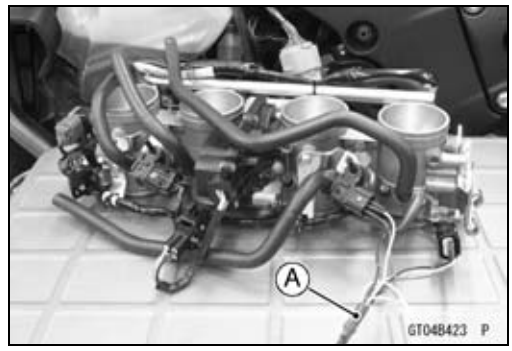
Wiring Continuity Inspection
ECU Connector [A] ←→
Intake Air Pressure Sensor #2 Connector [B]
BL lead (ECU terminal 9) [C]
G lead (ECU terminal 13) [D]

★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).

Intake Air Pressure Sensor #2 (Service Code 16) (DTC P2226, P2227, P2228)

Intake Air Pressure Sensor #2 Output Voltage Inspection

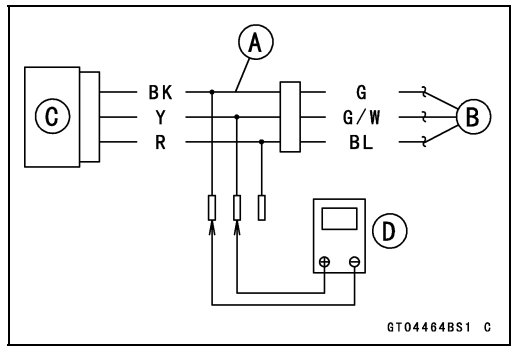


● Measure the output voltage at the intake air pressure sensor #2 in the same way as input voltage inspection, note the following.

○Disconnect the intake air pressure sensor #2 connector and connect the measuring adapter [A] between these connectors.

Main Harness [B]
Intake Air Pressure Sensor #2 [C]
Digital Meter [D]

Special Tool - Measuring Adapter: 57001-1700



Intake Air Pressure Sensor #2 Output Voltage
Connections to Adapter:
Digital Meter (+) → Y (sensor G/W) lead
Digital Meter (–) → BK (sensor G) lead

● Measure the output voltage with the engine stopped and with the connector joined.

● Turn the ignition switch on.

Output Voltage
Usable Range: DC 3.80 ~ 4.20 V at standard atmospheric pressure (101.32 kPa, 76 cmHg absolute)

NOTE

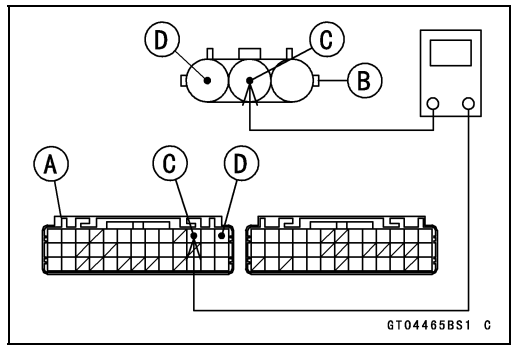
○*The output voltage changes according to the local atmospheric pressure.*

● Turn the ignition switch off.

★If the reading is out of the usable range, replace the sensor.

★If the reading is within the usable range, remove the ECU and check the wiring for continuity between harness connectors.

○Disconnect the ECU and sensor connectors.

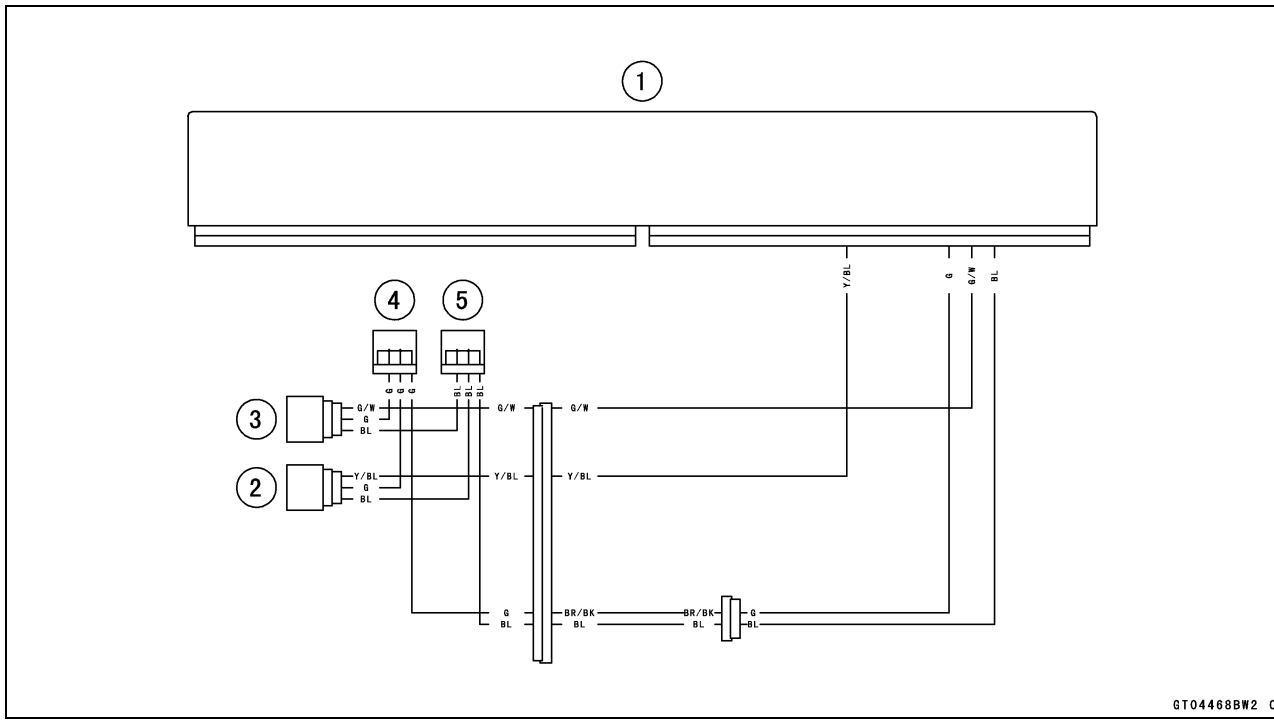


Wiring Continuity Inspection
ECU Connector [A] ←→
Intake Air Pressure Sensor #2 Connector [B]
G/W lead (ECU terminal 11) [C]
G lead (ECU terminal 13) [D]

★If the wiring is good, check the sensor for various vacuum (see Intake Air Pressure Sensor #1 Output Voltage Inspection).

Intake Air Pressure Sensor #2 (Service Code 16) (DTC P2226, P2227, P2228)

Intake Air Pressure Sensor #2 Circuit



1. ECU
2. Intake Air Pressure Sensor #1
3. Intake Air Pressure Sensor #2
4. Joint Connector I
5. Joint Connector J

Crankshaft Sensor (Service Code 21) (DTC P0335)

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.

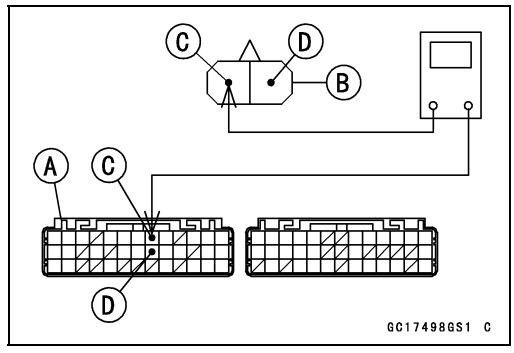
★If the reading is within the standard, remove the ECU and check the wiring for continuity between harness connectors.

○Disconnect the ECU and sensor connectors.

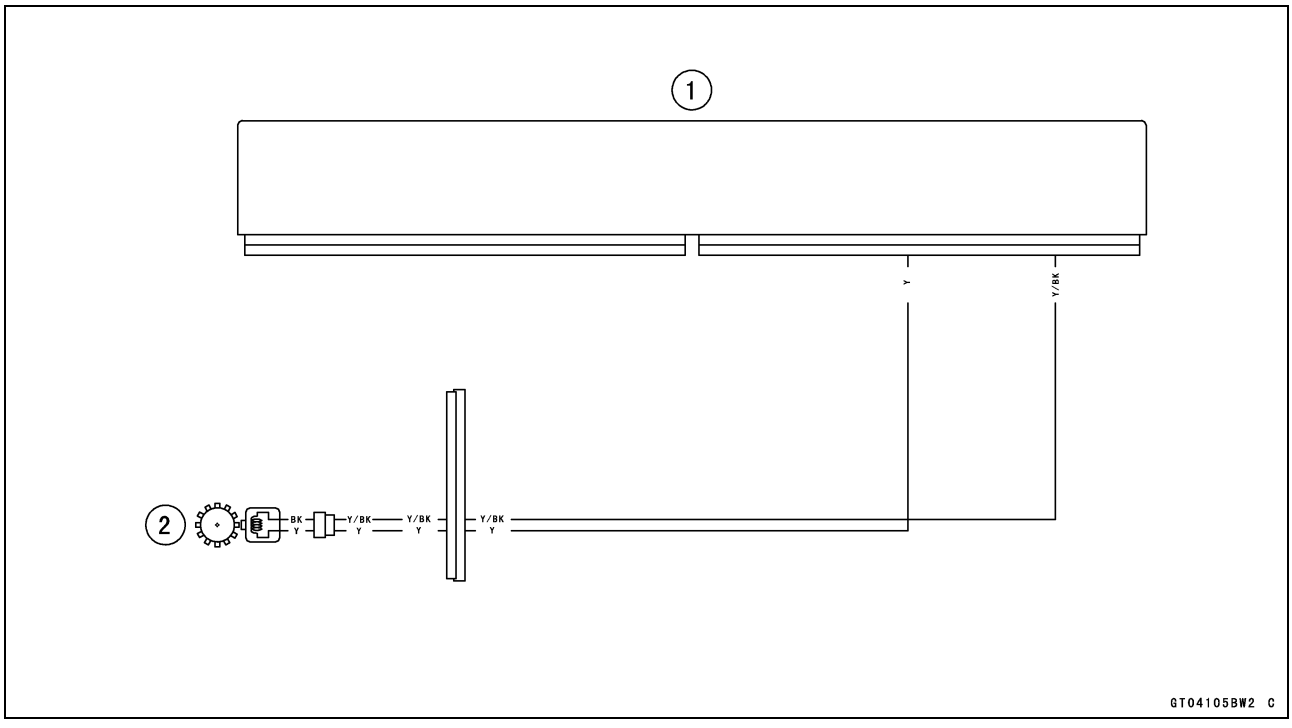
Wiring Continuity Inspection
ECU Connector [A] ←→
Crankshaft Sensor Connector [B]
Y/BK lead (ECU terminal 8) [C]
Y lead (ECU terminal 21) [D]

★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).



Crankshaft Sensor Circuit



1. ECU
2. Crankshaft Sensor

Rear Wheel Rotation Sensor (Service Code 24) (DTC P2158)

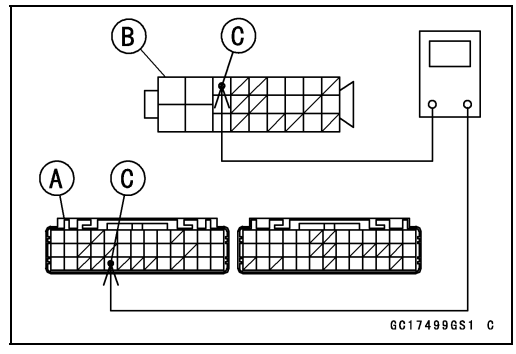
Rear Wheel Rotation Sensor Signal Inspection

○The rear wheel rotation sensor sends the signal to the ECU through the ABS hydraulic unit.
○The ECU uses the rear wheel rotation sensor signal for motorcycle speed and KTRC.
○The service code 24/DTC P2158 is detected with the ECU.
● Inspect the wheel rotation sensor air gap (see Wheel Rotation Sensor Air Gap Inspection in the Brakes chapter).
● Inspect the wheel rotation sensor rotor (see Wheel Rotation Sensor Rotor Inspection in the Brakes chapter).
● When the service code 24/DTC P2158 and following service codes (for ABS) are displayed at the same time, inspect the rear wheel rotation sensor.
Service Code 44 (see Rear Wheel Rotation Sensor Signal Abnormal in the Brakes chapter)
Service Code 45 (see Rear Wheel Rotation Sensor Wiring Inspection in the Brakes chapter)

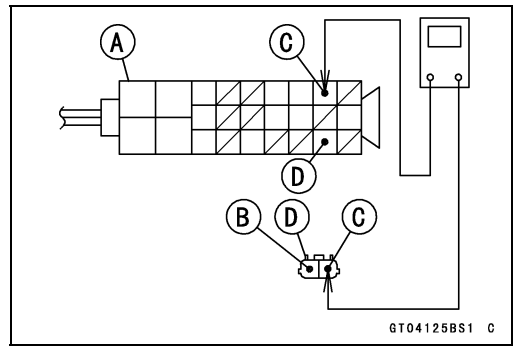
● When only service code 24/DTC P2158 is displayed, do the following inspection procedures.
● Disconnect:
ECU Connectors (see ECU Removal)
Rear Wheel Rotation Sensor Lead Connector (see Rear Wheel Rotation Sensor Removal in the Brakes chapter)

● Check the wiring for continuity between harness connectors.

Wiring Continuity Inspection
ECU Connector [A] ← →
ABS Hydraulic Unit Connector [B]
R/Y lead (ECU terminal 31, ABS Hydraulic Unit terminal 7) [C]



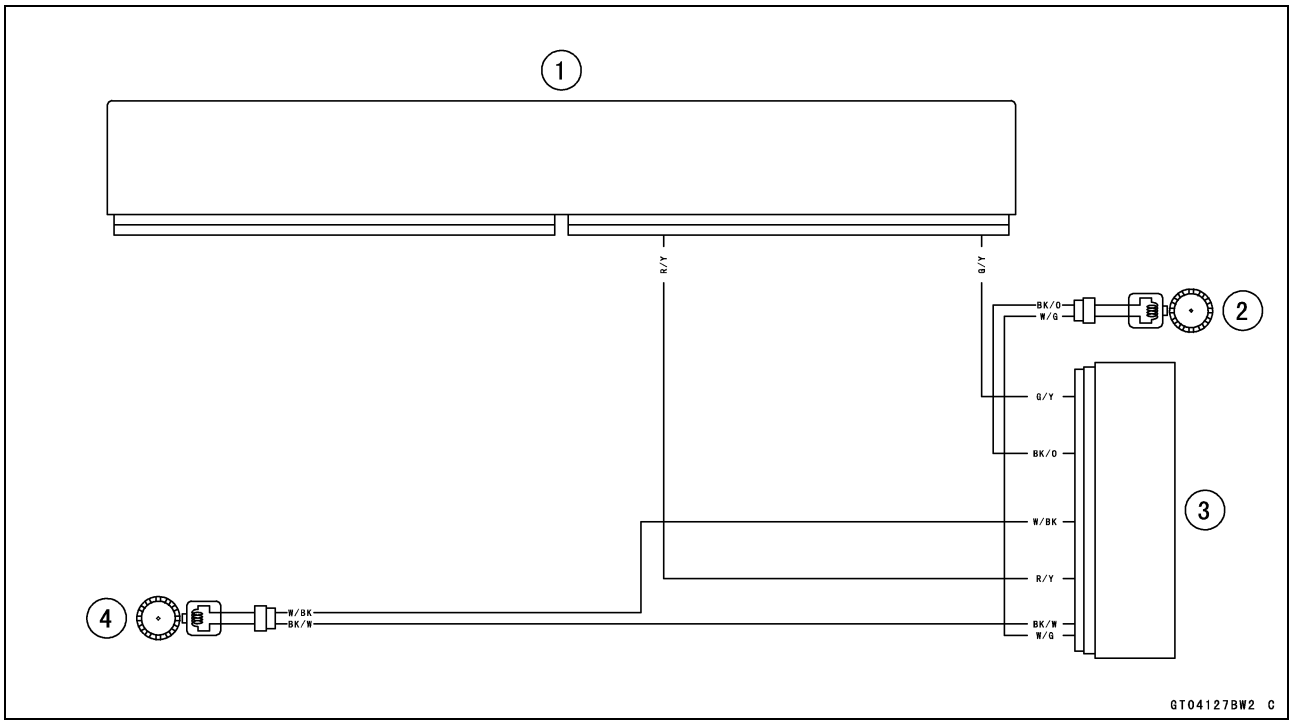
Wiring Continuity Inspection
ABS Hydraulic Unit Connector [A] ← →
Rear Wheel Rotation Sensor Connector [B]
W/G lead (ABS Hydraulic Unit Connector terminal 2) [C]
BK/O lead (ABS Hydraulic Unit Connector terminal 18) [D]



★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).

Rear Wheel Rotation Sensor (Service Code 24) (DTC P2158)

Wheel Rotation Sensor Circuit



1. ECU
2. Rear Wheel Rotation Sensor
3. ABS Hydraulic Unit
4. Front Wheel Rotation Sensor

Gear Position Sensor (Service Code 25) (DTC P0914, P0917)

Gear Position Sensor Removal/Installation

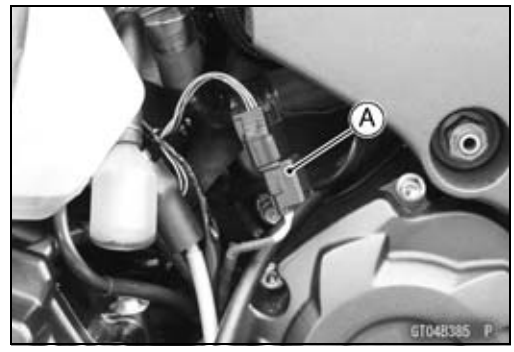
● Refer to the Gear Position Sensor Removal/Installation in the Electrical System chapter.

Gear Position Sensor Input Voltage Inspection

NOTE

○*Be sure the battery is fully charged.*

● Turn the ignition switch off.
● Remove the left middle fairing (see Middle Fairing Removal in the Frame chapter).
● Disconnect the gear position sensor connector [A].



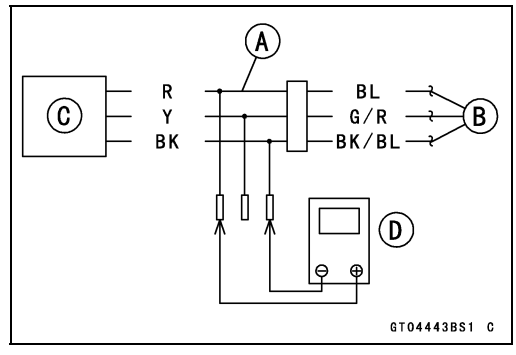
● Connect the measuring adapter [A] between the main harness connector and gear position sensor connector.
Main Harness [B]
Gear Position Sensor [C]

Special Tool - Measuring Adapter: 57001-1700



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

Gear Position Sensor Input Voltage
Connections to Adapter:
Digital Meter (+) → R (sensor BL) lead
Digital Meter (–) → BK (sensor BK/BL) lead



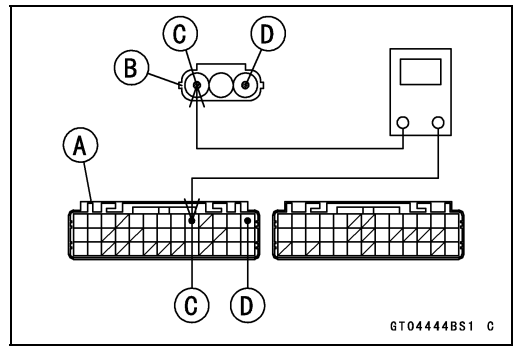
● Measure the input voltage with the engine stopped and with the connector joined.
● Turn the ignition switch on.

Input Voltage
Standard: DC 4.75 ~ 5.25 V

● Turn the ignition switch off.
★If the reading is within the standard, check the output voltage (see Gear Position 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.
○Disconnect the ECU and sensor connectors.

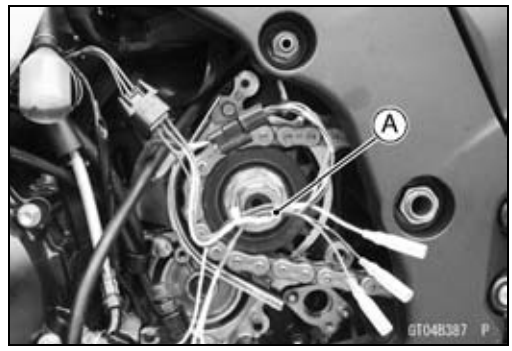
Wiring Continuity Inspection
ECU Connector [A] ← →
Gear Position Sensor Connector [B]
BL lead (ECU terminal 9) [C]
G lead (ECU terminal 13) [D] (sensor BK/BL)



★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 Sensor (Service Code 25) (DTC P0914, P0917)

Gear Position Sensor Output Voltage Inspection

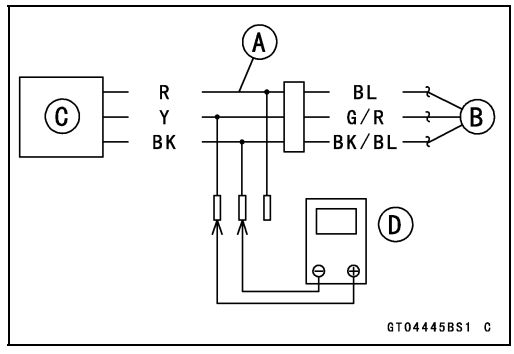


- Remove the gear position sensor (see Gear Position Sensor Removal in the Electrical System chapter).
- Measure the output voltage at the gear position sensor in the same way as input voltage inspection, note the following.

○Connect the measuring adapter [A] between these connectors.
Main Harness [B]
Gear Position Sensor [C]
Digital Meter [D]

Special Tool - Measuring Adapter: 57001-1700

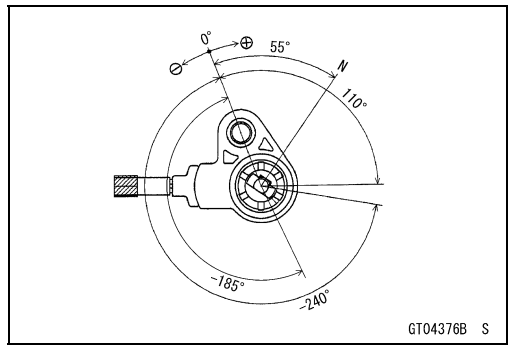
Gear Position Sensor Output Voltage
Connections to Adapter:
Digital Meter (+) → Y (sensor G/R) lead
Digital Meter (–) → BK (sensor BK/BL) lead



- Measure the output voltage with the engine stopped and with the connector joined.
- Turn the ignition switch on.

Output Voltage

Angle	Output Voltage (V)
–240°	0.40 ~ 0.60
–185°	1.03 ~ 1.23
+55°	3.82 ~ 3.92
+110°	4.40 ~ 4.60



NOTE

○*This figure shows 55°.*
○*Rotate the gear position sensor, confirm the output voltage will be raise or lower.*

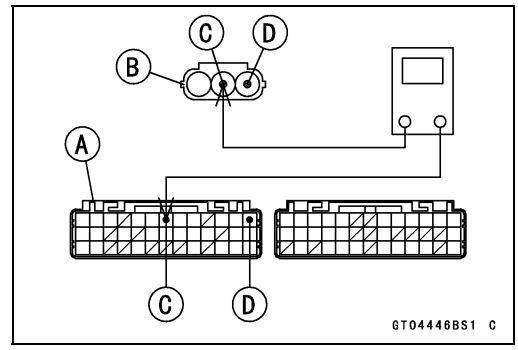
- Turn the ignition switch off.

★If the reading is out of the standard, replace the gear position sensor.

Gear Position Sensor (Service Code 25) (DTC P0914, P0917)

★If the reading is within the standard, remove the ECU and check the wiring for continuity between main harness connectors.

○Disconnect the ECU and sensor connectors.



Wiring Continuity Inspection

ECU Connector [A] ← →

Gear Position Sensor Connector [B]

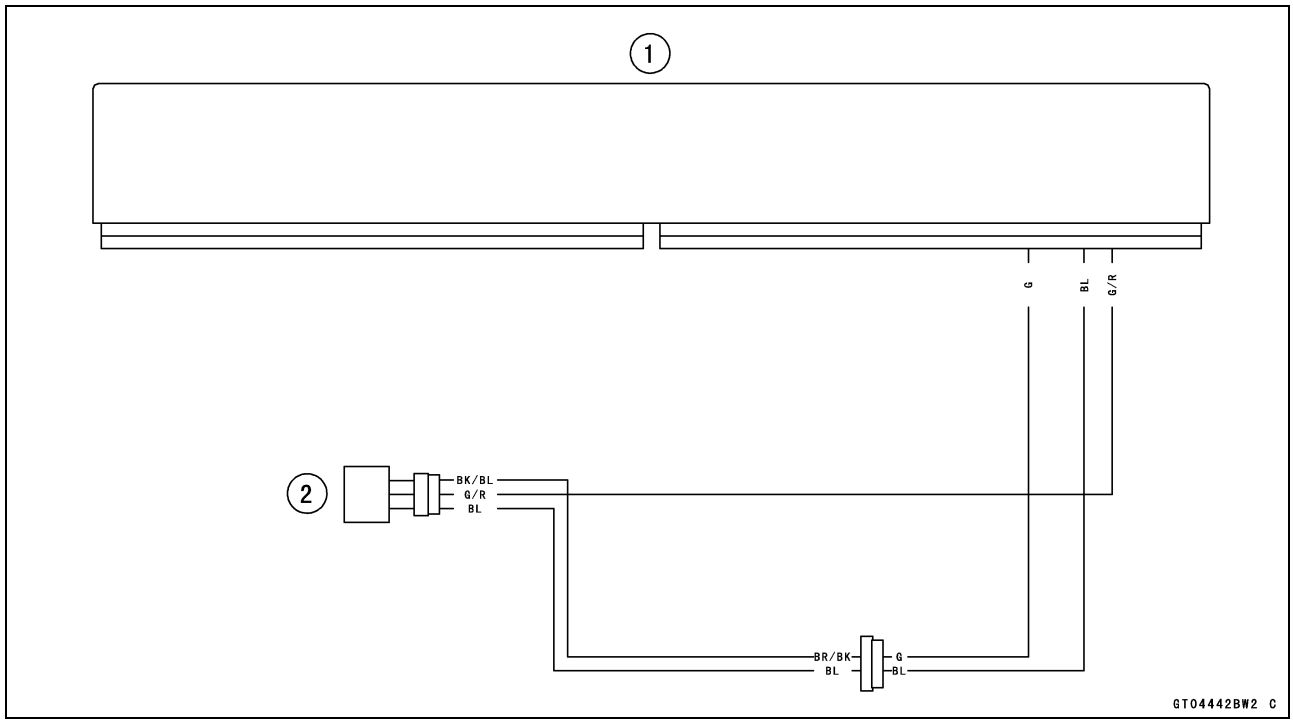
G/R lead (ECU terminal 7) [C]

G lead (ECU terminal 13) [D] (sensor BK/BL)

★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 Sensor Circuit



1. ECU
2. Gear Position Sensor

Front Wheel Rotation Sensor (Service Code 27) (DTC P0500)

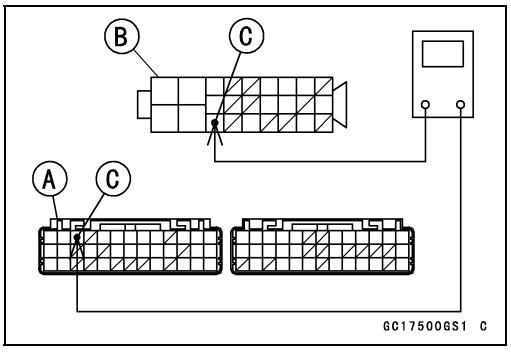
Front Wheel Rotation Sensor Signal Inspection

○The front wheel rotation sensor sends the signal to the ECU through the ABS hydraulic unit.
○The ECU uses the front wheel rotation sensor signal for KTRC.
○The service code 27/DTC P0500 is detected with the ECU.
● Inspect the wheel rotation sensor air gap (see Wheel Rotation Sensor Air Gap Inspection in the Brakes chapter).
● Inspect the wheel rotation sensor rotor (see Wheel Rotation Sensor Rotor Inspection in the Brakes chapter).
● When the service code 27/DTC P0500 and following service codes (for ABS) are displayed at the same time, inspect the front wheel rotation sensor.
Service Code 42 (see Front Wheel Rotation Sensor Signal Abnormal in the Brakes chapter)
Service Code 43 (see Front Wheel Rotation Sensor Wiring Inspection in the Brakes chapter)

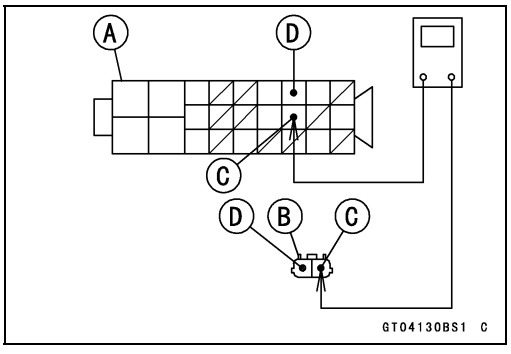
● When only service code 27/DTC P0500 is displayed, do the following inspection procedures.
● Disconnect:
ECU Connectors (see ECU Removal)
Front Wheel Rotation Sensor Lead Connector (see Front Wheel Rotation Sensor Removal in the Brakes chapter)

● Check the wiring for continuity between harness connectors.

Wiring Continuity Inspection
ECU Connector [A] ← →
ABS Hydraulic Unit Connector [B]
G/Y lead (ECU terminal 3, ABS Hydraulic Unit terminal 23) [C]



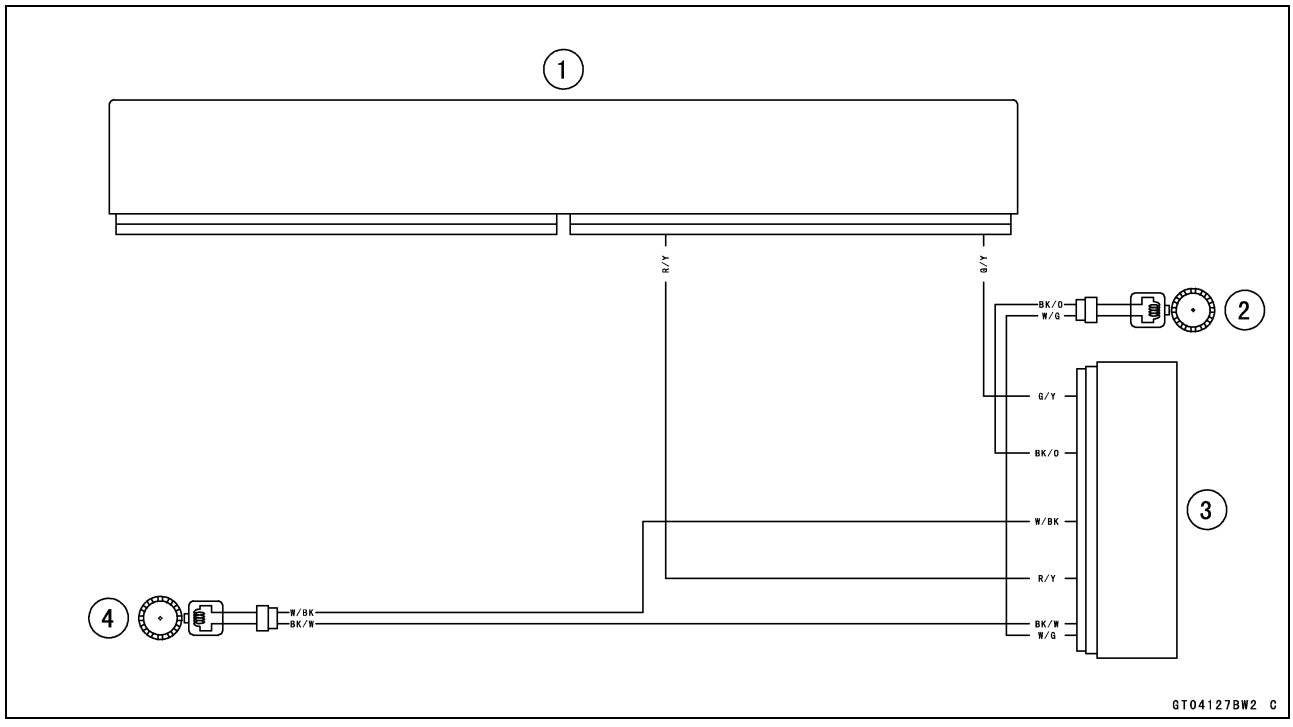
Wiring Continuity Inspection
ABS Hydraulic Unit Connector [A] ← →
Front Wheel Rotation Sensor Connector [B]
W/BK lead (ABS Hydraulic Unit Connector terminal 12) [C]
BK/W lead (ABS Hydraulic Unit Connector terminal 3) [D]



★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).

Front Wheel Rotation Sensor (Service Code 27) (DTC P0500)

Wheel Rotation Sensor Circuit



1. ECU
2. Rear Wheel Rotation Sensor
3. ABS Hydraulic Unit
4. Front Wheel Rotation Sensor

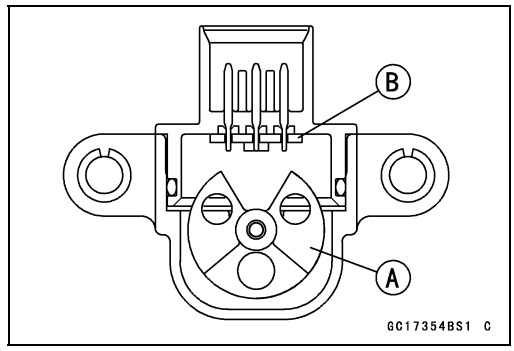
Vehicle-down Sensor (Service Code 31) (DTC C0064)

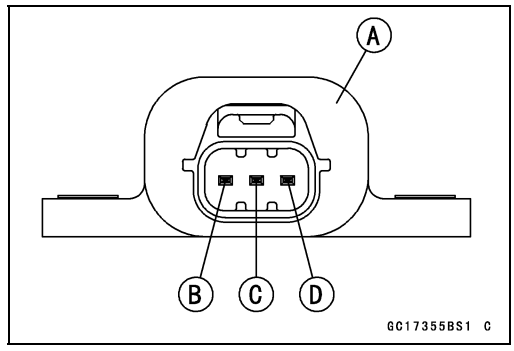
This sensor has a weight [A] with two magnets inside, and sends a signal to the ECU. But when the motorcycle banks 60 ~ 70° or more to either side (in fact falls down), the weight turns and the signal changes. The ECU senses this change, and stops the fuel pump relay, the fuel injectors and the ignition system.

Hall IC [B]

When the motorcycle is down, the ignition switch 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 ignition switch off, and then turn it on.

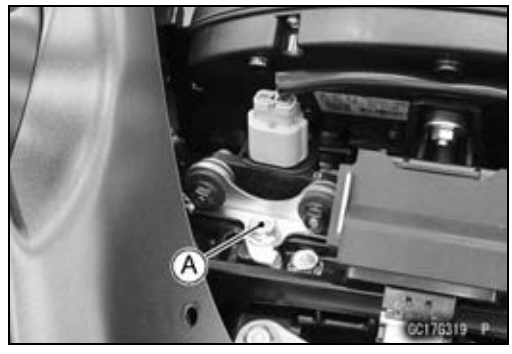
Vehicle-down Sensor [A]
Ground Terminal [B]: G
Output Terminal [C]: Y/G
Power Source Terminal [D]: BL





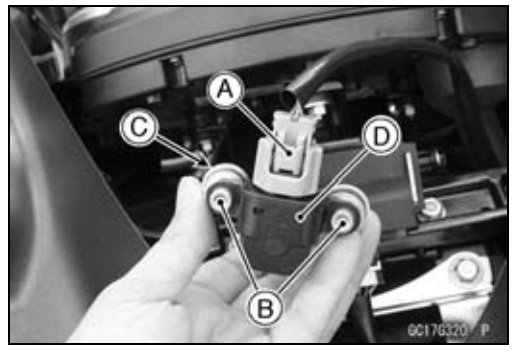
Vehicle-down Sensor Removal

NOTICE
Never drop the vehicle-down sensor especially on a hard surface. Such a shock to the sensor can damage it.



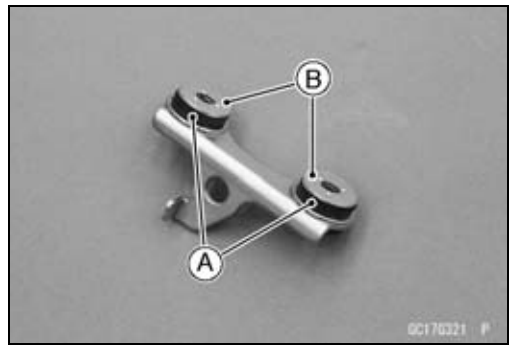
- Remove:
  Meter Cover (see Meter Cover Removal in the Frame chapter)
  Bolt [A]

- Disconnect:
  Vehicle-down Sensor Connector [A]
- Remove:
  Vehicle-down Sensor Mounting Bolts [B] and Nuts
  Bracket [C]
  Vehicle-down Sensor [D]



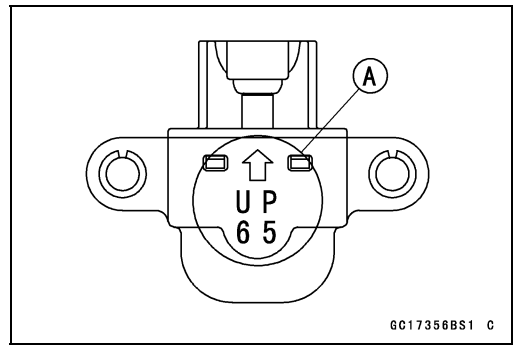
Vehicle-down Sensor Installation

- Be sure to install the rubber dampers [A] and collars [B] on the bracket.



Vehicle-down Sensor (Service Code 31) (DTC C0064)

● The UP mark [A] of the sensor should face upward.



⚠ 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.

● Tighten:

Torque - Vehicle-down Sensor Mounting Bolts: 6.0 N·m (0.61 kgf·m, 53 in·lb)

● Install the removed parts (see appropriate chapters).

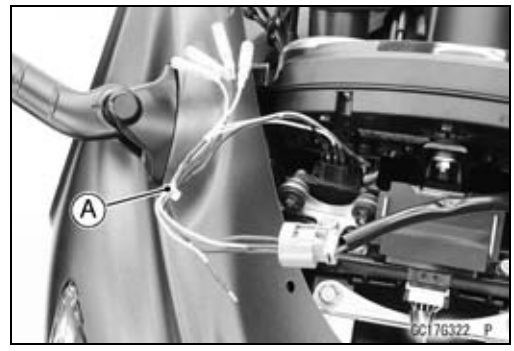
Torque - Vehicle-down Sensor Bracket Bolt: 8.0 N·m (0.82 kgf·m, 71 in·lb)

Vehicle-down Sensor Input Voltage Inspection

NOTE

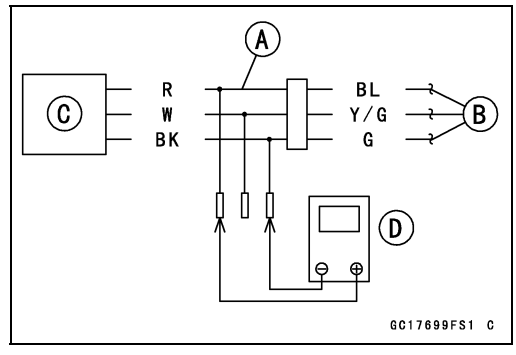
○*Be sure the battery is fully charged.*

● Turn the ignition switch off.
● Remove the meter cover (see Meter Cover Removal in the Frame chapter).
● Disconnect the vehicle-down sensor connector and connect the measuring adapter [A] between these connectors as shown.
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 (+) → R (sensor BL) lead
Digital Meter (–) → BK (sensor G) lead

● Measure the input voltage with the engine stopped and with the connector joined.
● Turn the ignition switch on.

Input Voltage
Standard: DC 4.75 ~ 5.25 V

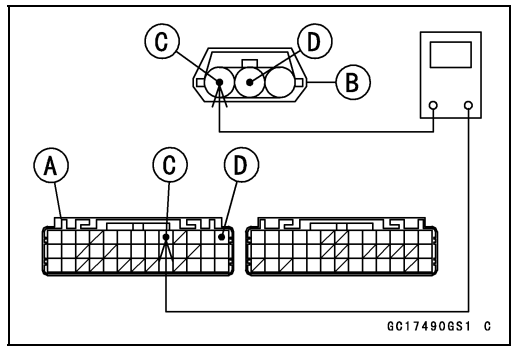
● Turn the ignition switch off.
★If the reading is within the standard, check the output voltage (see Vehicle-down Sensor Output Voltage Inspection).

Vehicle-down Sensor (Service Code 31) (DTC C0064)

★If the reading is out of the standard, remove the ECU and check the wiring for continuity between main harness connectors.

○Disconnect the ECU and sensor connectors.

Wiring Continuity Inspection
ECU Connector [A] ←→
Vehicle-down Sensor Connector [B]
BL lead (ECU terminal 9) [C]
G lead (ECU terminal 13) [D]



★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection).

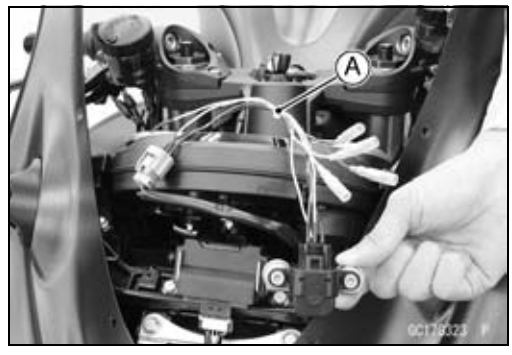
★If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).

Vehicle-down Sensor Output Voltage Inspection

- Remove the vehicle-down sensor (see Vehicle-down Sensor Removal).
- Connect the measuring adapter [A] to the vehicle-down sensor connectors as shown.

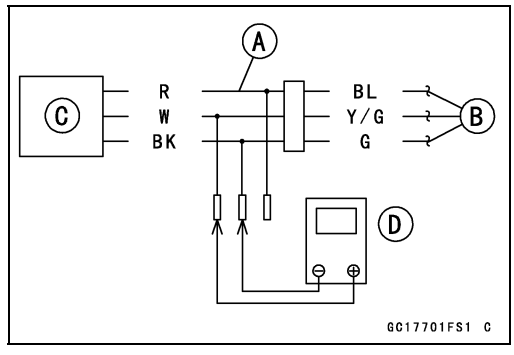
Special Tool - Measuring Adapter: 57001-1700

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 (+) → W (sensor Y/G) lead
Digital Meter (–) → BK (sensor G) lead



Vehicle-down Sensor (Service Code 31) (DTC C0064)

- Hold the sensor vertically.
- Measure the output voltage with the engine stopped, and with the connector joined.
- Turn the ignition switch 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.

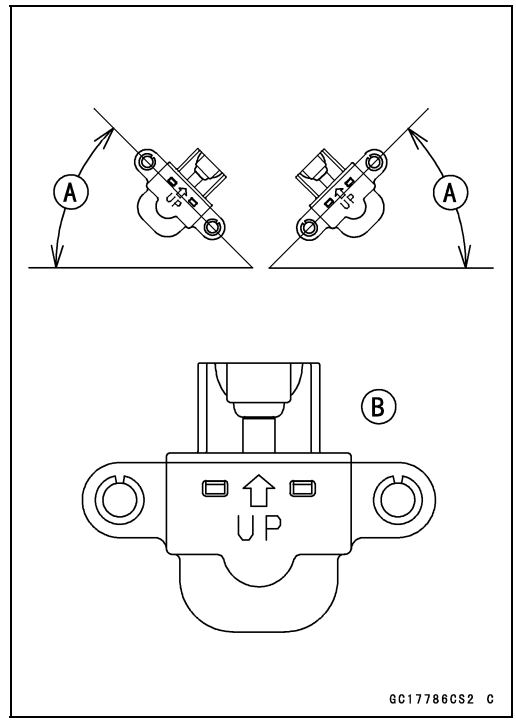
Output Voltage

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 ~ 4.45 V

- Turn the ignition switch off.

★If the reading is out of the standard, replace the sensor.



★If the reading is within the standard, remove the ECU and check the wiring for continuity between main harness connectors.

○Disconnect the ECU and sensor connectors.

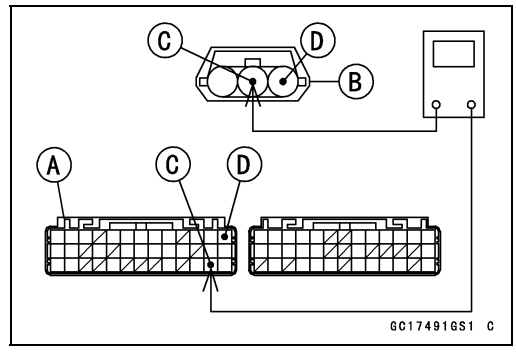
Wiring Continuity Inspection

ECU Connector [A] ←→

Vehicle-down Sensor Connector [B]

Y/G lead (ECU terminal 38) [C]

G lead (ECU terminal 13) [D]

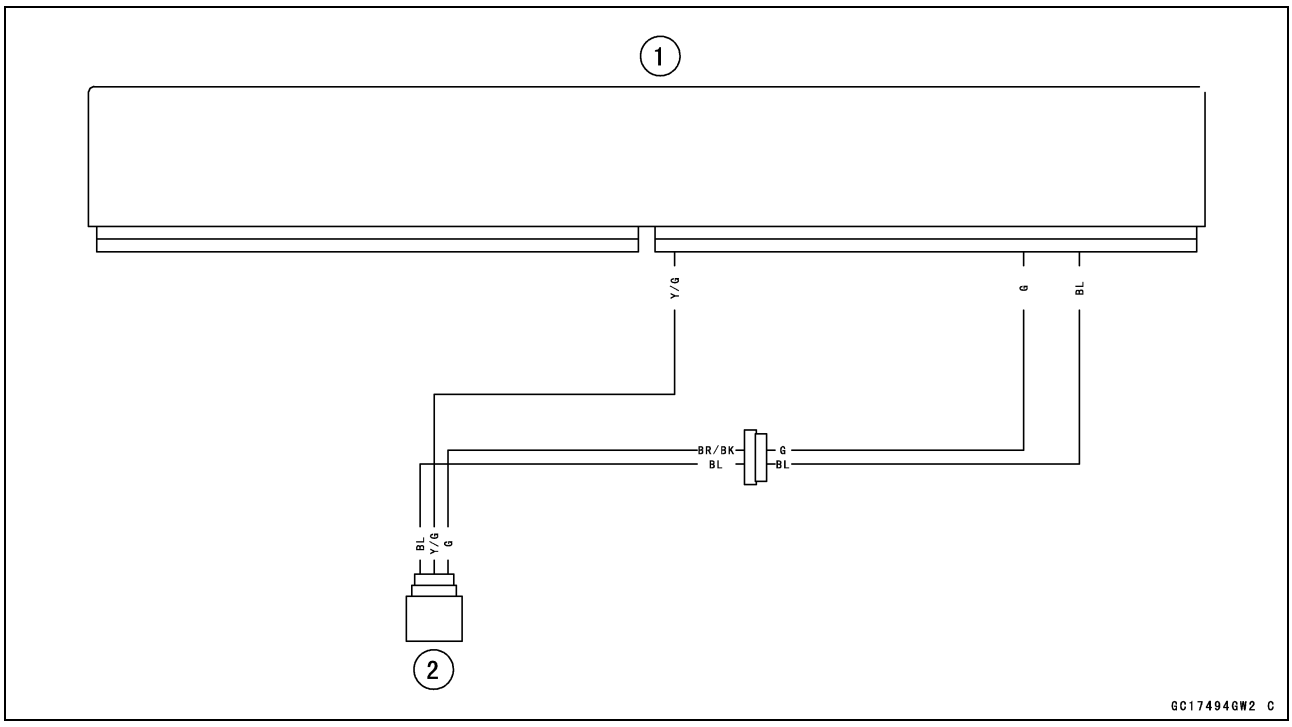


★If the wiring is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection).

★If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).

Vehicle-down Sensor (Service Code 31) (DTC C0064)

Vehicle-down Sensor Circuit

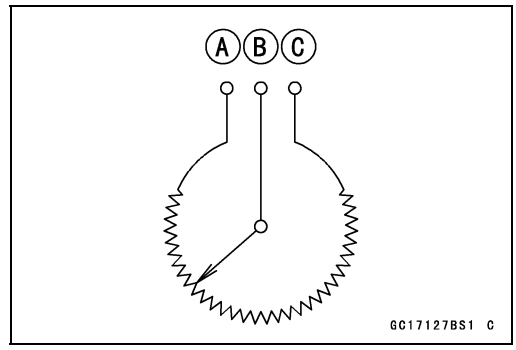


1. ECU
2. Vehicle-down Sensor

Subthrottle Sensor (Service Code 32) (DTC P0220, P0223)

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.

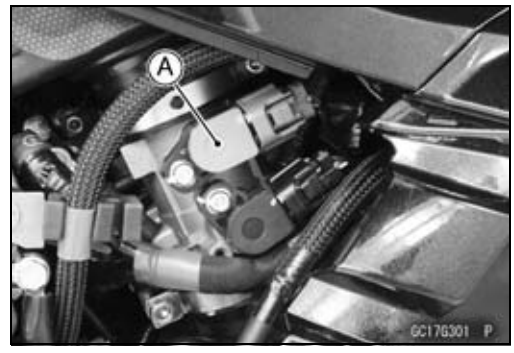
Input Terminal [A]: BL
Output Terminal [B]: BL/W
Ground Terminal [C]: G



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

○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove the right fairing cover (see Fairing Cover Removal in the Frame chapter).
- Disconnect the subthrottle sensor connector and connect the throttle sensor setting 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 (+) → BK (sensor BL) lead
Digital Meter (–) → W (sensor G) lead

- Measure the input voltage with the engine stopped and with the connector joined.
- Turn the ignition switch on.

Input Voltage
Standard: DC 4.75 ~ 5.25 V

- Turn the ignition switch off.

★If the reading is within the standard, check the output voltage (see Subthrottle Sensor Output Voltage Inspection).

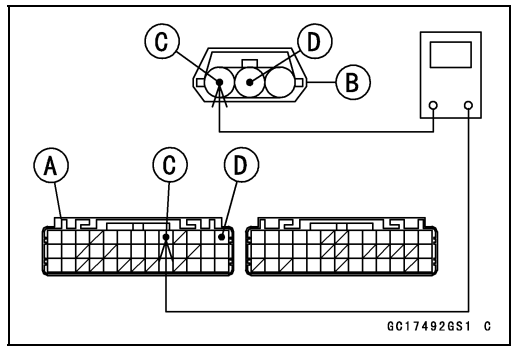


Subthrottle Sensor (Service Code 32) (DTC P0220, P0223)

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

○Disconnect the ECU and sensor connectors.

Wiring Continuity Inspection
ECU Connector [A] ←→
Subthrottle Sensor Connector [B]
BL lead (ECU terminal 9) [C]
G lead (ECU terminal 13) [D]



★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).

Subthrottle Sensor Output Voltage Inspection

● Measure the output voltage at the subthrottle sensor in the same way as input voltage inspection, note the following.

○Remove:
Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
Left Fairing Cover (see Fairing Cover Removal in the Frame chapter)

○Disconnect the subthrottle sensor connector and connect the throttle sensor setting adapter [A] between these connectors.

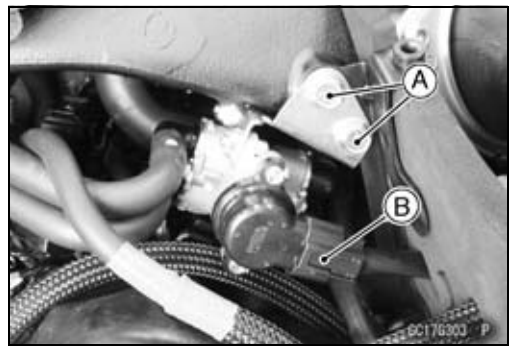
Special Tool - Throttle Sensor Setting Adapter: 57001 -1538

Subthrottle Sensor Output Voltage
Connections to Adapter:
Digital Meter (+) → R (sensor BL/W) lead
Digital Meter (–) → W (sensor G) lead



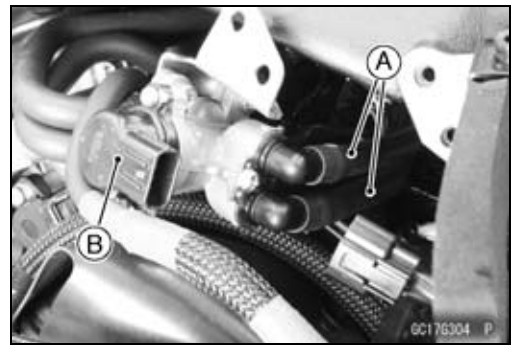
● Remove:
Bolts [A]

● Disconnect:
Idle Speed Control Valve Actuator Connector [B]

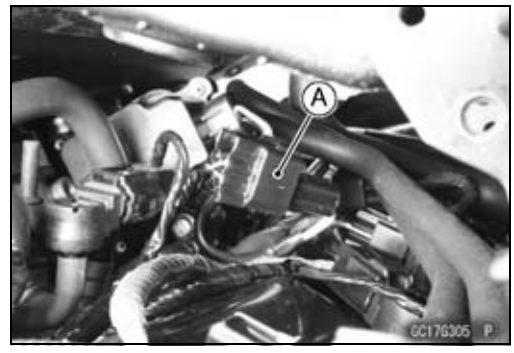


Subthrottle Sensor (Service Code 32) (DTC P0220, P0223)

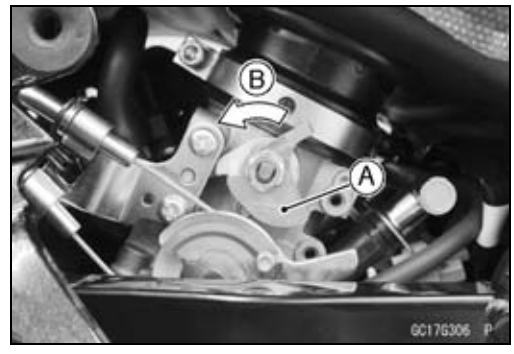
- Disconnect the hoses [A] from the fitting of the idle speed control valve actuator [B].



- Disconnect the subthrottle valve actuator connector [A].



- Measure the output voltage with the engine stopped with the connector joined.
- Turn the ignition switch on.
- Measure the output voltage when the subthrottle valve is completely closed by turning the lever [A] fully counterclockwise [B].



Output Voltage

Standard: DC 4.14 ~ 4.34 V at subthrottle valve full close position (for reference)

DC 0.42 ~ 0.62 V at subthrottle valve full open position

NOTE

○*Open the subthrottle valves, confirm the output voltage will be raise.*

○*The standard voltage refers to the value when the voltage reading at the Input Voltage Inspection shows 5 V exactly.*

○*When 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.
0.42 × 4.75 ÷ 5.00 = 0.40 V
0.62 × 4.75 ÷ 5.00 = 0.59 V
Thus, the valid range is 0.40 ~ 0.59 V

- Turn the ignition switch off.

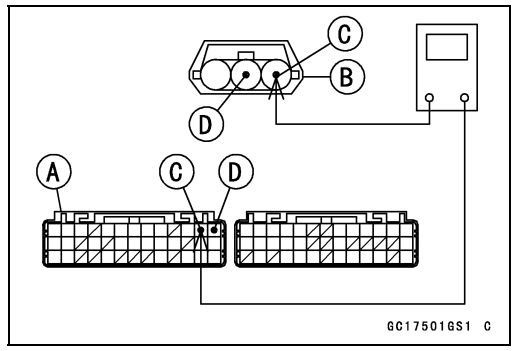
★If the reading is out of the standard, check the subthrottle sensor resistance (see Subthrottle Sensor Resistance Inspection).

Subthrottle Sensor (Service Code 32) (DTC P0220, P0223)

★If the reading is within the standard, remove the ECU and check the wiring for continuity between harness connectors.

○Disconnect the ECU and sensor connectors.

Wiring Continuity Inspection
ECU Connector [A] ←→
Subthrottle Sensor Connector [B]
BL/W lead (ECU terminal 12) [C]
G lead (ECU terminal 13) [D]



★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).

● Install the idle speed control valve actuator (see Idle Speed Control Valve Actuator Installation).

Subthrottle Sensor Resistance Inspection

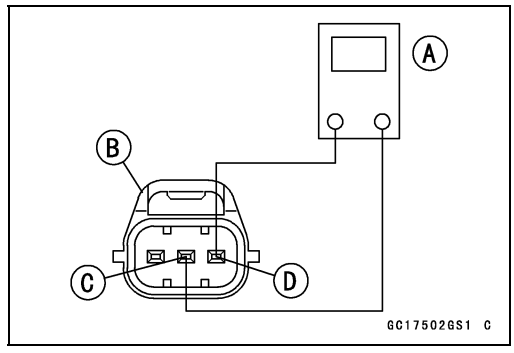
● Turn the ignition switch off.

● Disconnect the subthrottle sensor connector.

● Connect a digital meter [A] to the subthrottle sensor connector [B].

● Measure the subthrottle sensor resistance.

Subthrottle Sensor Resistance
Connections: BL lead [C] ←→ G lead [D]
Standard: 4 ~ 6 kΩ



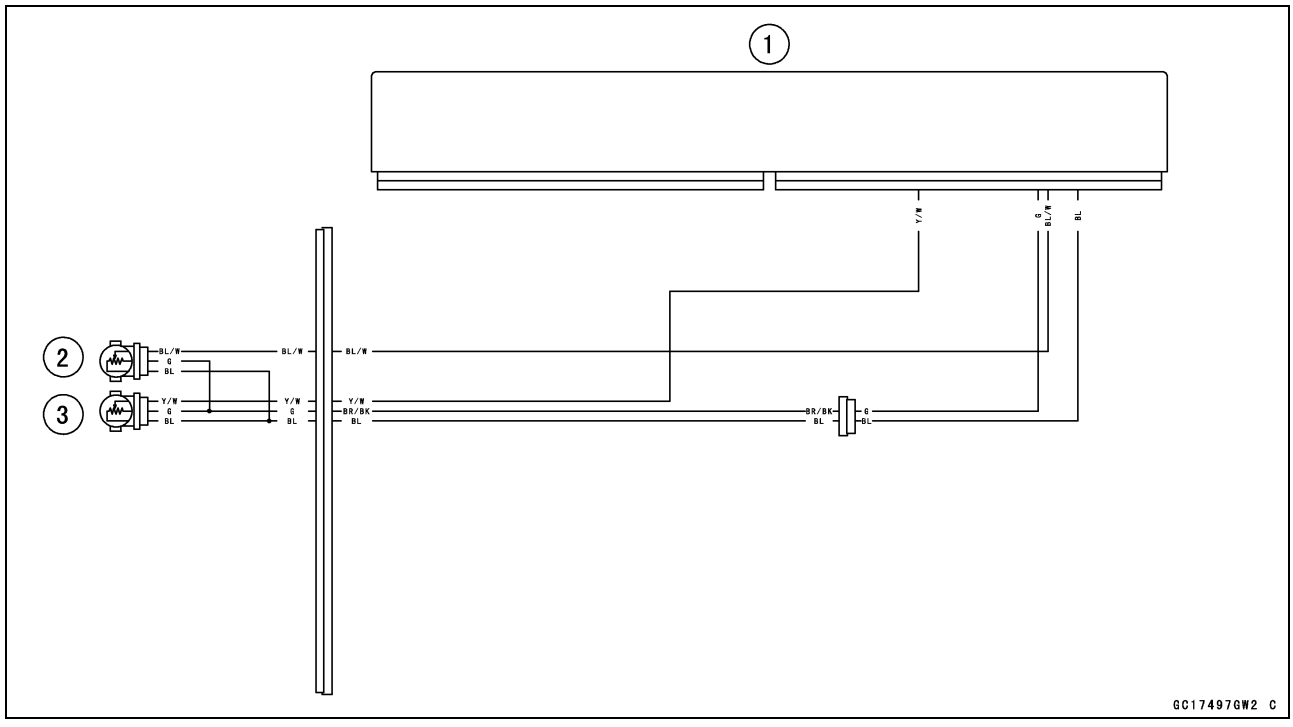
★If the reading is out of the standard, replace the throttle body assy.

★If the reading is within the standard, but the problem still exists, replace the ECU (see ECU Removal/Installation).

● Install the idle speed control valve actuator (see Idle Speed Control Valve Actuator Installation).

Subthrottle Sensor (Service Code 32) (DTC P0220, P0223)

Subthrottle Sensor Circuit



1. ECU
2. Subthrottle Sensor
3. Main Throttle Sensor

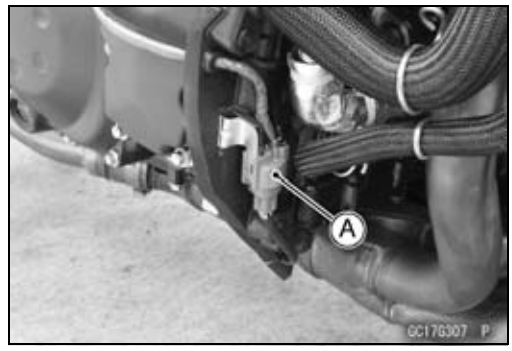
Oxygen Sensor - not activated (Service Code 33) (DTC P0130, P0131)

Oxygen Sensor Removal/Installation

● Refer to the Oxygen Sensor Removal/Installation (Equipped Models) in the Electrical System chapter.

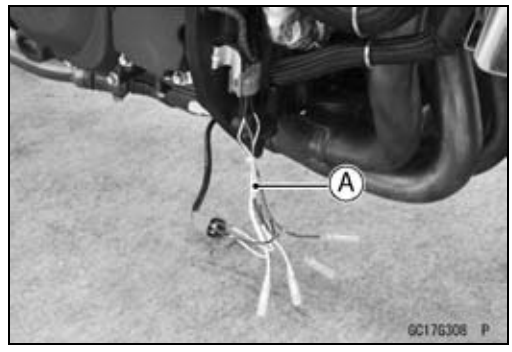
Oxygen Sensor Inspection

● Remove:
Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
Oxygen Sensor Lead Connector [A]



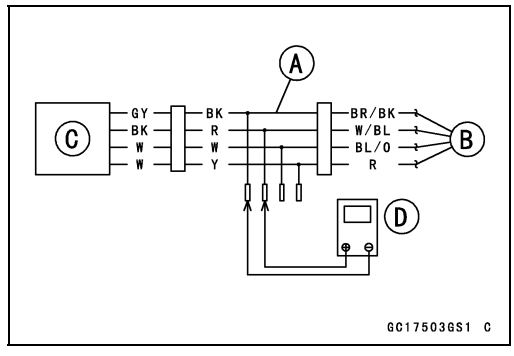
● Connect the measuring adapter [A] between the harness connector and oxygen sensor lead connector as shown.
Main Harness [B]
Oxygen Sensor [C]

Special Tool - Measuring Adapter: 57001-1700

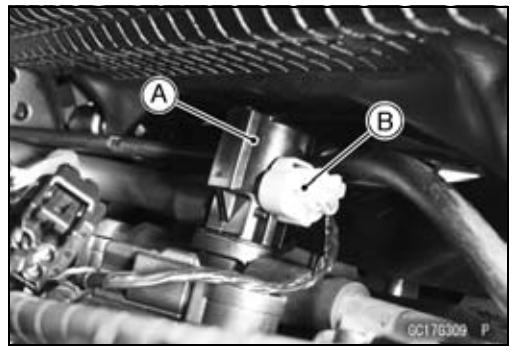


● Connect a digital meter [D] to the measuring adapter leads.

Oxygen Sensor Output Voltage
Connections to Adapter:
Digital Meter (+) → R (sensor BK) lead
Digital Meter (–) → BK (sensor GY) lead

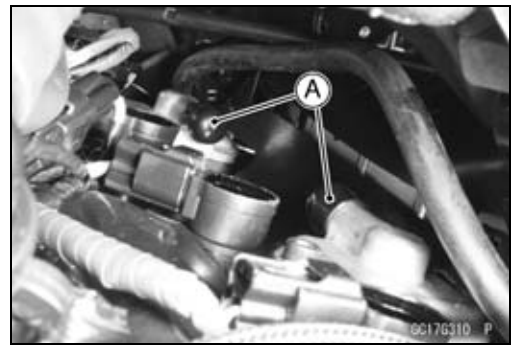


● Remove the air switching valve [A] (see Air Switching Valve Removal in the Engine Top End chapter).
○Do not disconnect the air switching valve connector [B].



Oxygen Sensor - not activated (Service Code 33) (DTC P0130, P0131)

- Install the suitable plugs [A] on the fitting of the air suction valve covers, and shut off the secondary air.
- Install the idle speed control valve actuator temporary (see Idle Speed Control Valve Actuator Installation).



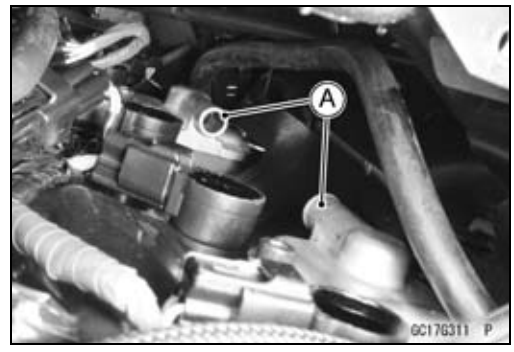
- Warm up the engine thoroughly until the radiator fan starts.
- Measure the output voltage with the connector joined.

Output Voltage (with Plugs, Rich)
Standard: DC 0.8 V or more

- Turn the ignition switch off.
- Remove the plugs from the fittings [A].

⚠ WARNING

The engine gets extremely hot during normal operation and can cause serious burns. Never touch a hot engine.



- Start the engine, and let it idle.
- Measure the output voltage with the connector joined.

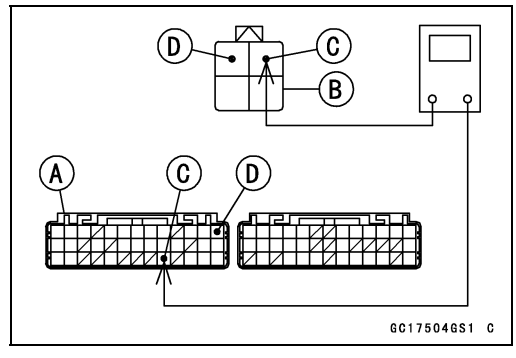
Output Voltage (without Plugs, Lean)
Standard: DC 0.24 V or less

- Turn the ignition switch 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.

○Disconnect the ECU and sensor connectors.

Wiring Continuity Inspection
ECU Connector [A] ←→
Oxygen Sensor Connector [B]
W/BL lead (ECU terminal 35) [C]
BR/BK lead (ECU terminal 13) [D]



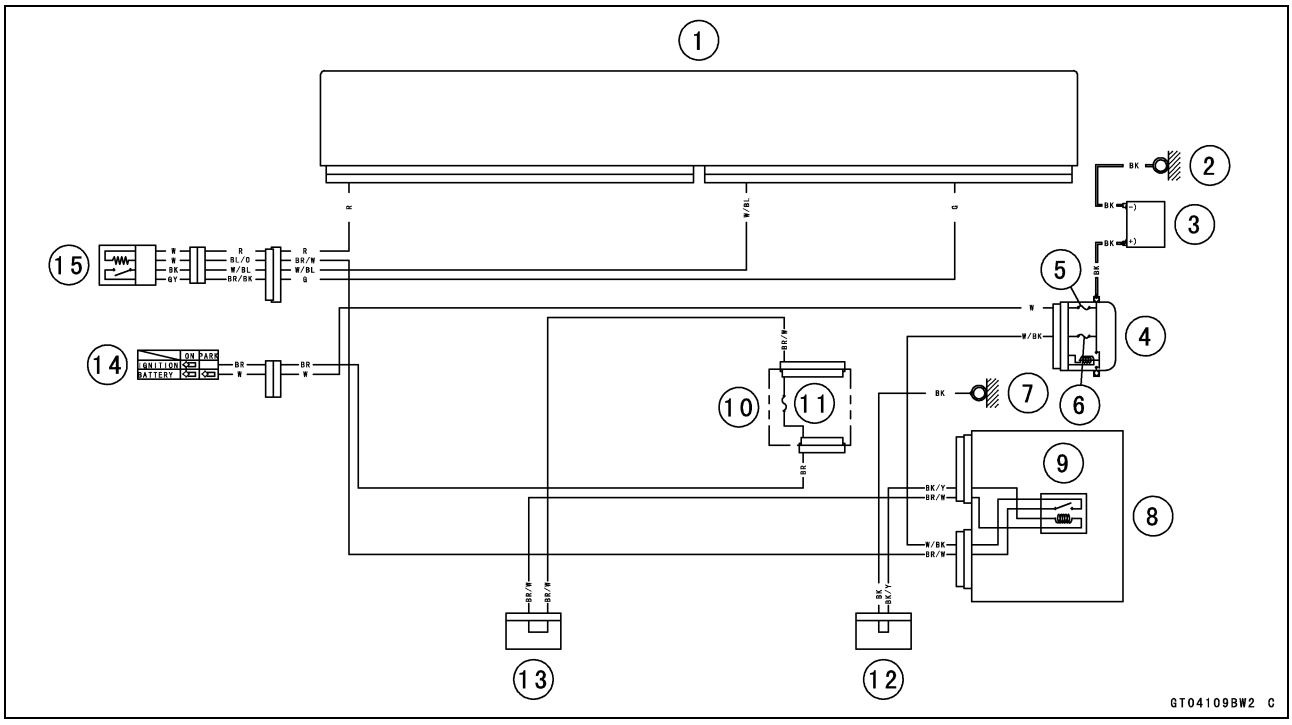
★If the wiring is good, replace the sensor.

★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).

★If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).

Oxygen Sensor - not activated (Service Code 33) (DTC P0130, P0131)

Oxygen Sensor Circuit



1. ECU
2. Frame Ground
3. Battery
4. Starter Relay
5. Main Fuse 30 A
6. ECU Fuse 15 A
7. Frame Ground (1)
8. Relay Box
9. ECU Main Relay
10. Fuse Box (1)
11. Ignition Fuse 15 A
12. Joint Connector A
13. Joint Connector F
14. Ignition Switch
15. Oxygen Sensor

Immobilizer Amplifier (Service Code 35, Equipped Models)

Antenna Resistance Inspection

- Turn the ignition switch off.
- Remove the left middle fairing (see Middle Fairing Removal in the Frame chapter).
- Disconnect the antenna lead connector [A].
- Measure the antenna resistance.



Antenna Resistance
Connections: BK lead ←→ BK/W lead
Standard: About 3.0 ~ 4.6 Ω

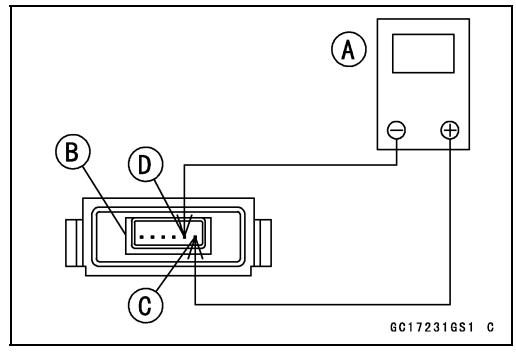
★If the reading is out of the standard, replace the ignition switch (see Immobilizer System Parts Replacement in the Electrical System chapter).
★If the reading is within the standard, check the wiring to the amplifier (see Immobilizer System Circuit).
★If the wiring is good, check the input voltage of the amplifier (see Amplifier Input Voltage Inspection).

Amplifier Input Voltage Inspection

NOTE

○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove the meter cover (see Meter Cover Removal in the Frame chapter).
- Remove the immobilizer amplifier from the bracket.
- Connect a digital meter [A] to the amplifier connector [B] with needle adapter set.



Special Tool - Needle Adapter Set: 57001-1457

Amplifier Input Voltage
Connections to Amplifier Connector:
Digital Meter (+) → BR/W [C] lead
Digital Meter (–) → BK/BL [D] lead

- Measure the input voltage with the engine stopped and with the connector joined.
- Turn the ignition switch on.

Input Voltage
Standard: Battery Voltage

- Turn the ignition switch off.

★If the reading is out of the standard, check the wiring (see Immobilizer System Circuit).
★If the reading is within the standard, check the wiring to ECU (see Immobilizer System Circuit).
★If the wiring is good, replace the amplifier (see Immobilizer System Parts Replacement in the Electrical System chapter).

Blank Key Detection (Service Code 36, Equipped Models)

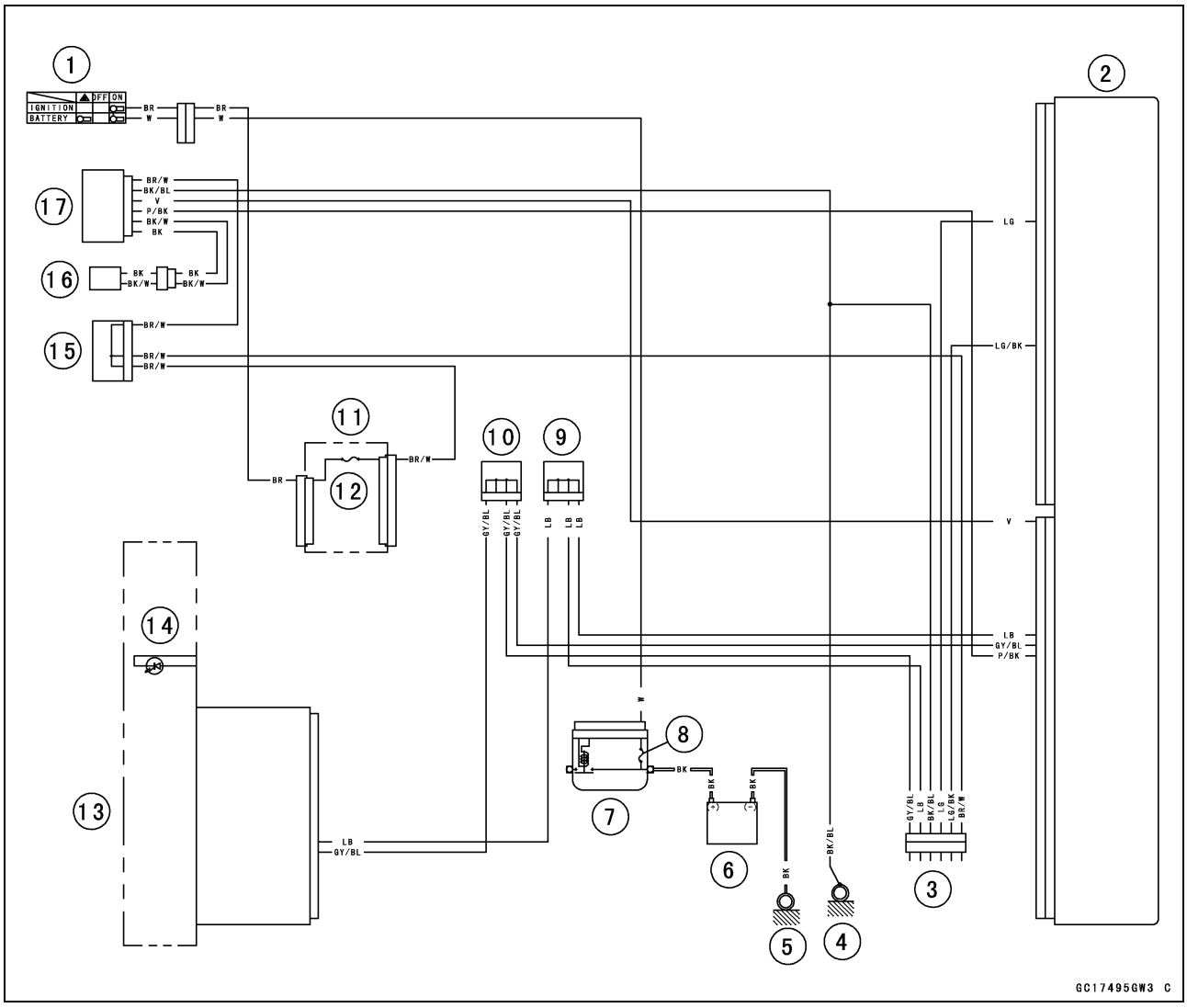
- This code appears in the following conditions.
○The transponder [A] in the ignition key is malfunction.
○When the spare key of unregistration is used.
○When the ignition key is registered in the registered ECU.
- Therefore, the service code 36 will disappear when the above issue is solved.



Ignition Key Inspection

- Register the ignition key correctly (see Key Registration in the Electrical System chapter).
★If the service code 36 appears again, the transponder in the key is malfunction, replace it.

Immobilizer System Circuit



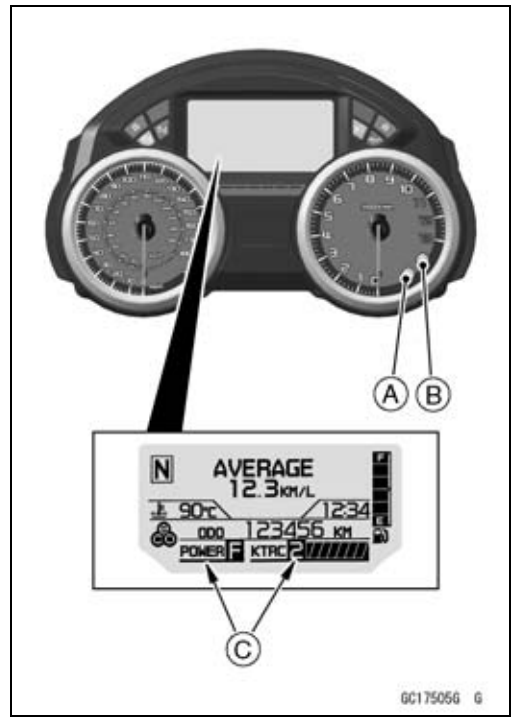
1. Ignition Switch
2. ECU
3. Immobilizer/Kawasaki Diagnostic System Connector
4. Frame Ground 3
5. Frame Ground
6. Battery
7. Starter Relay
8. Main Fuse 30 A
9. Joint Connector D
10. Joint Connector C
11. Fuse Box 1
12. Ignition Fuse 15 A
13. Meter Unit
14. Red Warning Indicator Light (LED)
15. Joint Connector F
16. Immobilizer Antenna
17. Immobilizer Amplifier

ECU Communication Error (Service Code 39) (DTC U0001)

ECU Communication Line Inspection

○When the data is not sent from the ECU to the meter unit for more than about 5 seconds, the service code 39 is displayed.
○The data is sent through the CAN communication line.
○The service code 39 is detected with the meter unit.

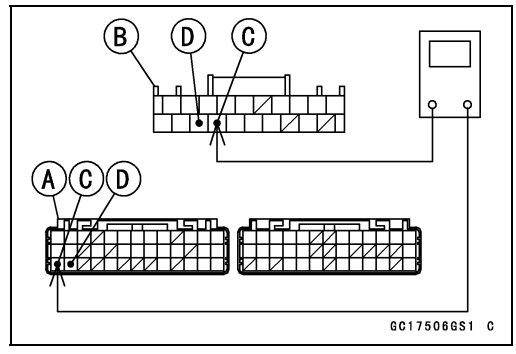
○When the user mode, this communication error goes on the yellow engine warning indicator light (LED) [A] and yellow KTRC warning indicator light (LED) [B], and blinks the following items.
Power Mode and KTRC Indicators [C]



● Inspect the CAN communication line resistance (see CAN Communication Line Resistance Inspection).
★If the CAN communication line resistance is normal, check the wiring according following procedure.

● Remove the ECU and meter unit, check the wiring for continuity between main harness connector.
○Disconnect the ECU and meter unit connectors.

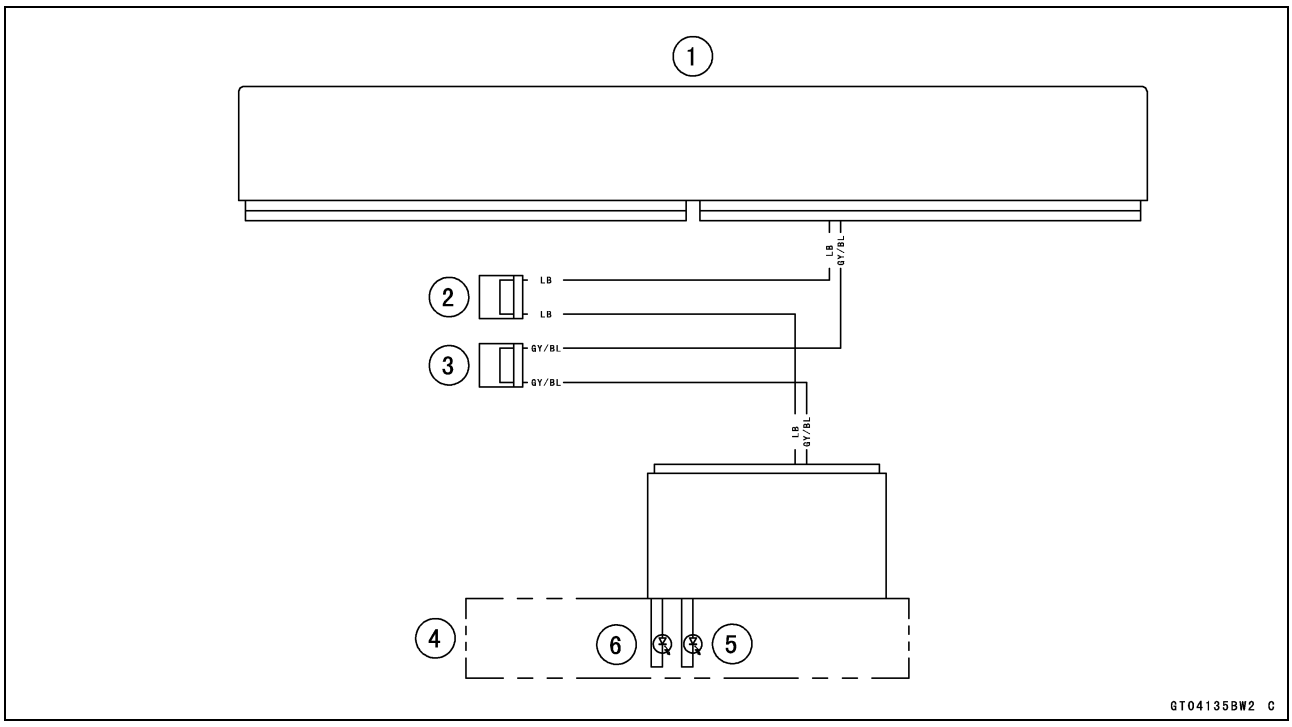
Wiring Continuity Inspection
ECU Connector [A] ←→ Meter Unit Connector [B]
GY/BL lead (ECU terminal 27) [C]
LB lead (ECU terminal 28) [D]



★If the wiring is good, check the meter unit (see Meter Unit Inspection in the Electrical System chapter).
★If the meter unit is normal, replace the ECU (see ECU Removal/Installation).

ECU Communication Error (Service Code 39) (DTC U0001)

ECU Communication Line Circuit



1. ECU
2. Joint Connector D
3. Joint Connector C
4. Meter Unit
5. Yellow Engine Warning Indicator Light (LED)
6. Yellow KTRC Warning Indicator Light (LED)

Fuel Injectors (Service Code 41, 42, 43, 44) (DTC P0201, P0202, P0203, P0204)

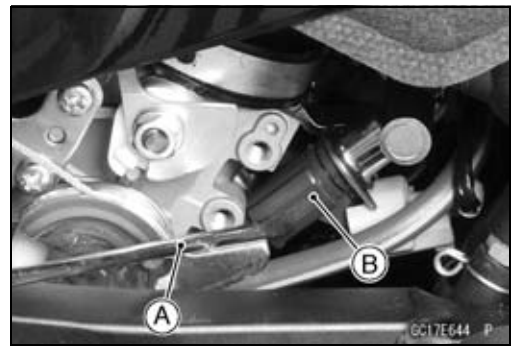
Inspect the eligible fuel injector according to the following service code or DTC.

Service Code 41/DTC P0201 → Fuel Injector #1
Service Code 42/DTC P0202 → Fuel Injector #2
Service Code 43/DTC P0203 → Fuel Injector #3
Service Code 44/DTC P0204 → Fuel Injector #4

Fuel Injector Removal/Installation

● Refer to the Throttle Body Assy Disassembly/Assembly.

Fuel Injector Audible Inspection



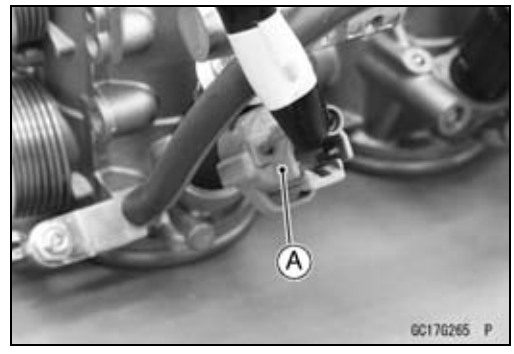
NOTE

○*Be sure the battery is fully charged.*

● Remove the middle fairings (see Middle Fairing Removal in the Frame chapter).
● Start the engine, and let it idle.
● Apply the flat tip screwdriver [A] to the fuel injector [B].
● Put the grip end onto your ear, and listen whether the fuel injector is clicking or not.
○A sound scope can also be used.
○The 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 ignition switch off.
★If any fuel injector does not click, check the fuel injector resistance (see Fuel Injector Resistance Inspection).

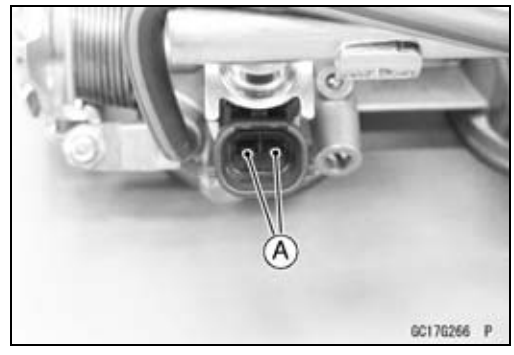
Fuel Injector Resistance Inspection

● Remove the throttle body assy (see Throttle Body Assy Removal).
● Disconnect the fuel injector connector [A].



● Connect a digital meter to the terminals [A] in each fuel injector.
● Measure the fuel injector resistance.

Fuel Injector Resistance
Standard: About 11.7 ~ 12.3 Ω @20°C (68°F)



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

Fuel Injectors (Service Code 41, 42, 43, 44) (DTC P0201, P0202, P0203, P0204)

Fuel Injector Power Source Voltage Inspection

NOTE

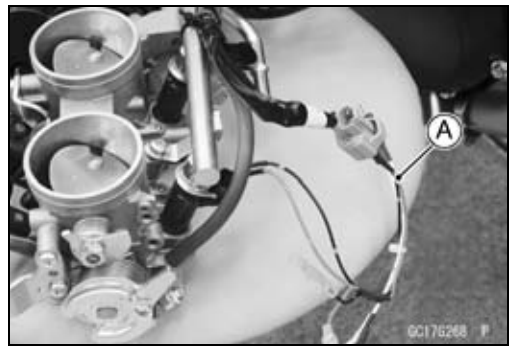
○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove the throttle body assy (see Throttle Body Assy Removal).
- Connect the throttle body subharness connector [A] temporarily.

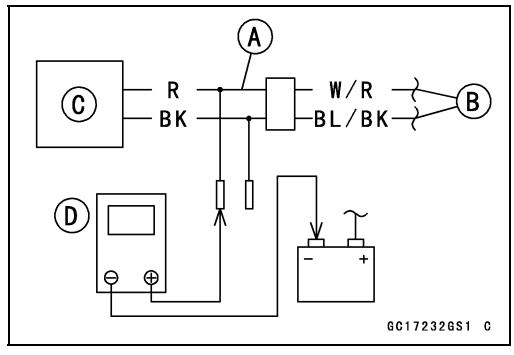


- Disconnect the injector connector and connect the measuring adapter [A] between these connectors as shown.
  Harness [B]
  Fuel Injector #1 [C]

  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 (+) → R (injector W/R) lead
Digital Meter (–) → Frame Ground terminal



- Measure the power source voltage with the engine stopped.
- Turn the engine stop switch to run position.
- Turn the ignition switch on.

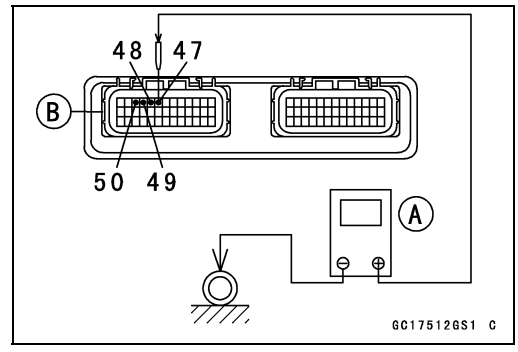
Power Source Voltage
Standard: Battery Voltage for 3 seconds, and then 0 V

- Turn the ignition switch 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).
★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).

Fuel Injectors (Service Code 41, 42, 43, 44) (DTC P0201, P0202, P0203, P0204)

Fuel Injector Output Voltage Inspection



NOTE

○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove the ECU (see ECU Removal).

○Do not disconnect the ECU connector.

- Connect a digital meter [A] to the connector (gray) [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 (+) → BL/BK lead (ECU terminal 47)
Digital Meter (–) → Frame Ground terminal
For Fuel Injector #2
Digital Meter (+) → BL/R lead (ECU terminal 48)
Digital Meter (–) → Frame Ground terminal
For Fuel Injector #3
Digital Meter (+) → BL/O lead (ECU terminal 49)
Digital Meter (–) → Frame Ground terminal
For Fuel Injector #4
Digital Meter (+) → BL/G lead (ECU terminal 50)
Digital Meter (–) → Frame Ground terminal

- Measure the output voltage with the engine stopped and with the connector joined.
- Turn the engine stop switch to run position.
- Turn the ignition switch on.

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

- Turn the ignition switch off.

★If the reading is in specification, check the ECU for its ground and power supply (see ECU Power Supply Inspection).

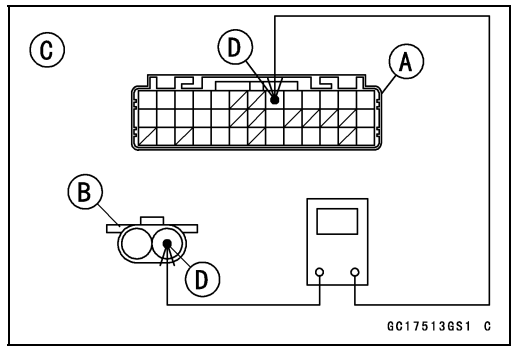
★If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).

Fuel Injectors (Service Code 41, 42, 43, 44) (DTC P0201, P0202, P0203, P0204)

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

○Disconnect the ECU and injector connector.

Wiring Continuity Inspection
ECU Connector (Gray) [A] ←→ Fuel Injector Connector [B]
For Fuel Injector #1 [C]
BL/BK lead (ECU terminal 47) [D]
For Fuel Injector #2
BL/R lead (ECU terminal 48)
For Fuel Injector #3
BL/O lead (ECU terminal 49)
For Fuel Injector #4
BL/G lead (ECU terminal 50)



★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).

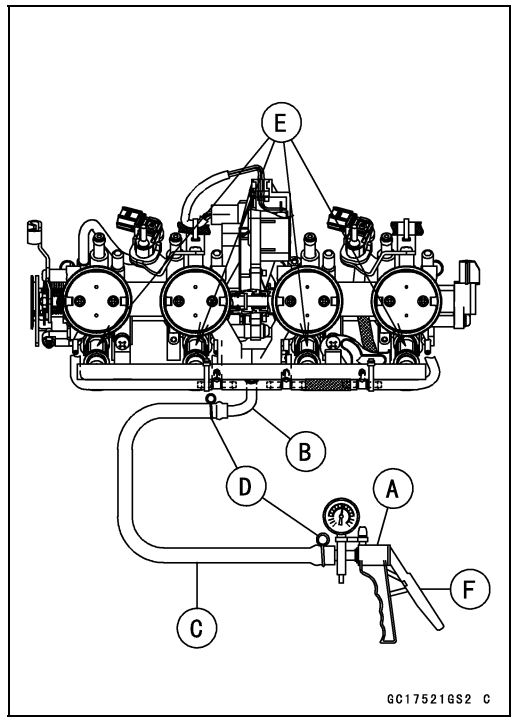
● Check the fuel injector fuel line for leakage as follows.

○Connect 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.

○Apply soap and water solution to the areas [E] as shown.

○Watching 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.

★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.

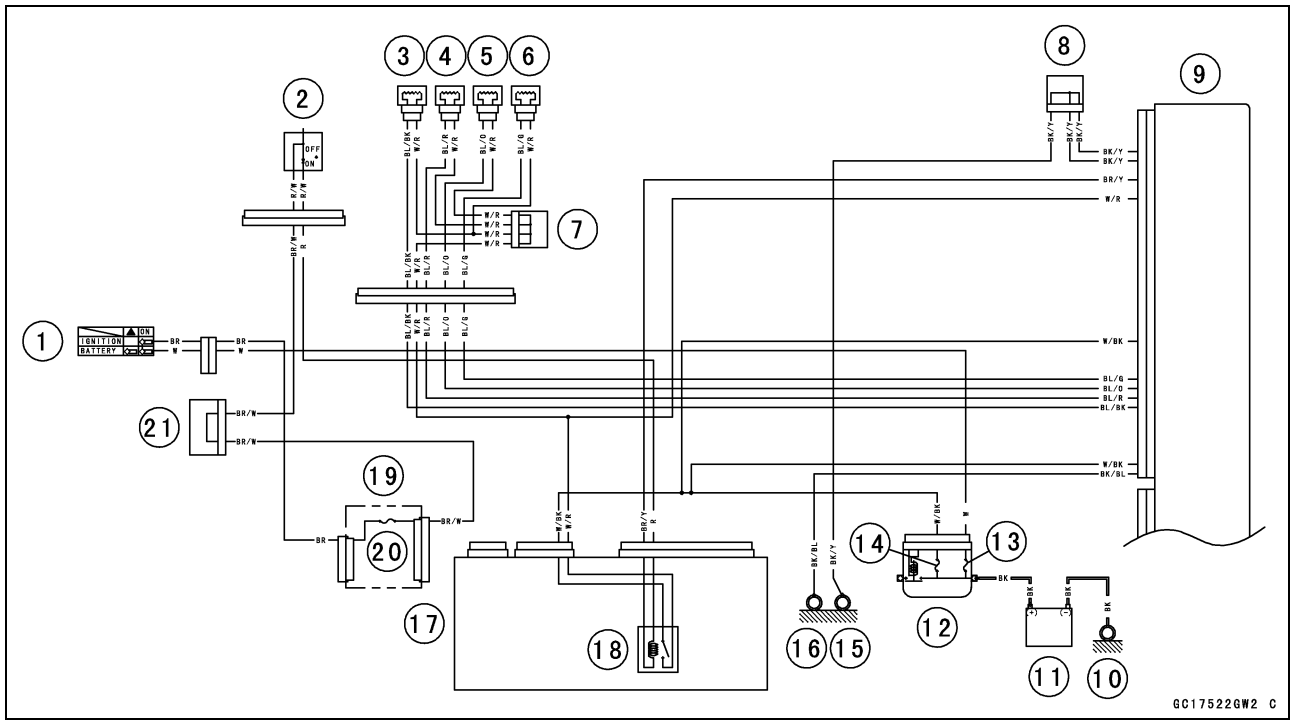
○Repeat the leak test, and check the fuel line for no leakage.

● Install the throttle body assy (see Throttle Body Assy Installation).

● Start the engine and check for fuel leakage.

Fuel Injectors (Service Code 41, 42, 43, 44) (DTC P0201, P0202, P0203, P0204)

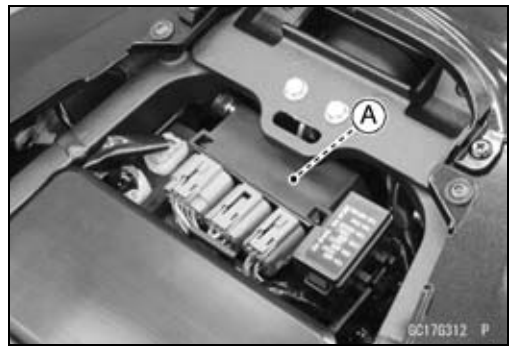
Fuel Injector Circuit



1. Ignition Switch
2. Engine Stop Switch
3. Fuel Injector #1
4. Fuel Injector #2
5. Fuel Injector #3
6. Fuel Injector #4
7. Joint Connector H
8. Joint Connector E
9. ECU
10. Frame Ground
11. Battery
12. Starter Relay
13. Main Fuse 30 A
14. ECU Fuse 15 A
15. Frame Ground (3)
16. Frame Ground (2)
17. Relay Box
18. Fuel Pump Relay
19. Fuse Box (1)
20. Ignition Fuse 15 A
21. Joint Connector F

Fuel Pump Relay (Service Code 46) (DTC P0627)

Fuel Pump Relay Removal/Installation



○The 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

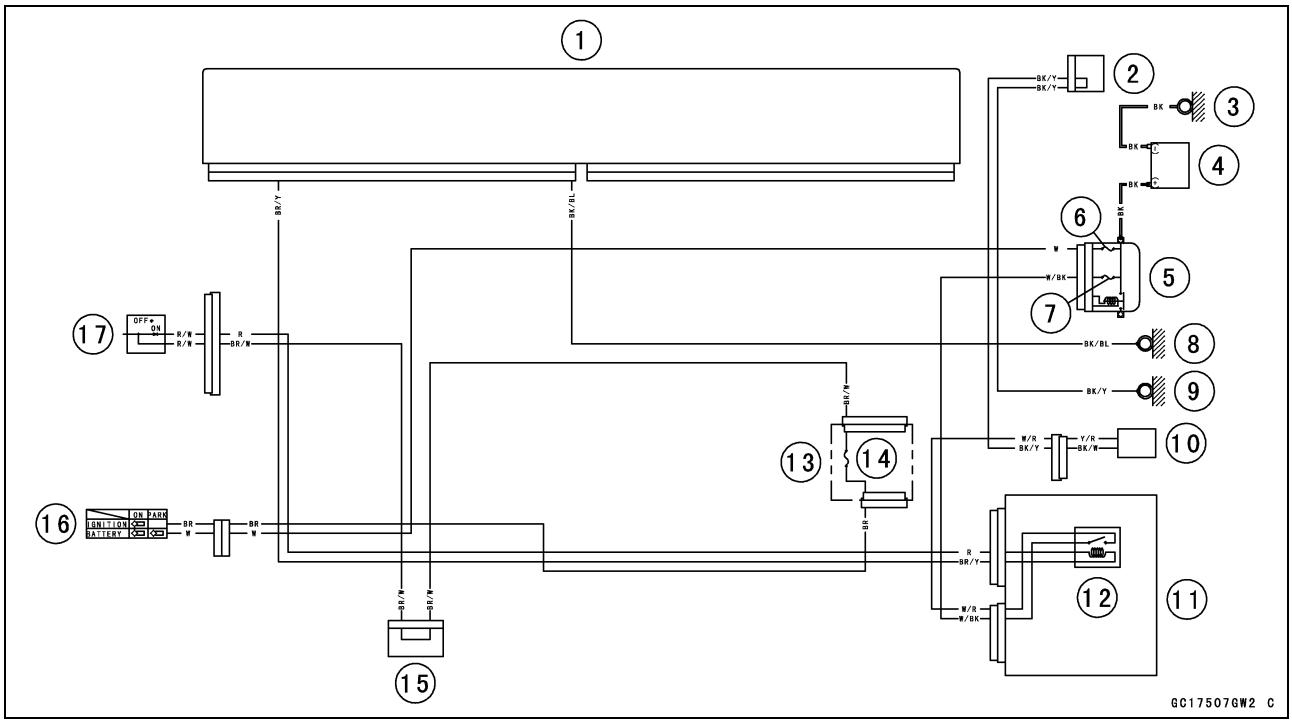
● Refer to the Relay Circuit Inspection in the Electrical System chapter.

★If the fuel pump relay is normal, check the wiring to the fuel pump relay (see Fuel Pump Relay Circuit).

★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 Pump Relay Circuit



1. ECU
2. Joint Connector B
3. Frame Ground
4. Battery
5. Starter Relay
6. Main Fuse 30 A
7. ECU Fuse 15 A
8. Frame Ground (2)
9. Frame Ground (4)
10. Fuel Pump
11. Relay Box
12. Fuel Pump Relay
13. Fuse Box (1)
14. Ignition Fuse 15 A
15. Joint Connector F
16. Ignition Switch
17. Engine Stop Switch

Stick Coils #1, #2, #3, #4 (Service Code 51, 52, 53, 54) (DTC P0351, P0352, P0353, P0354)

Inspect the eligible stick coil according to the following service code or DTC.

Service Code 51/DTC P0351 → Stick Coil #1
Service Code 52/DTC P0352 → Stick Coil #2
Service Code 53/DTC P0353 → Stick Coil #3
Service Code 54/DTC P0354 → Stick Coil #4

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

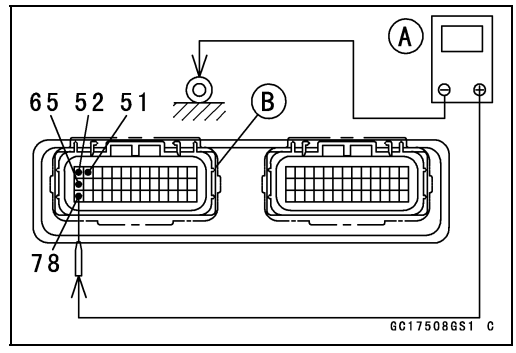
○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove the ECU (see ECU Removal).

○Do 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 (+) → BK lead (terminal 65)
Digital Meter (–) → Frame Ground terminal
For Stick Coil #2
Digital Meter (+) → BK/R lead (terminal 52)
Digital Meter (–) → Frame Ground terminal
For Stick Coil #3
Digital Meter (+) → BK/O lead (terminal 78)
Digital Meter (–) → Frame Ground terminal
For Stick Coil #4
Digital Meter (+) → BK/G lead (terminal 51)
Digital Meter (–) → Frame Ground terminal

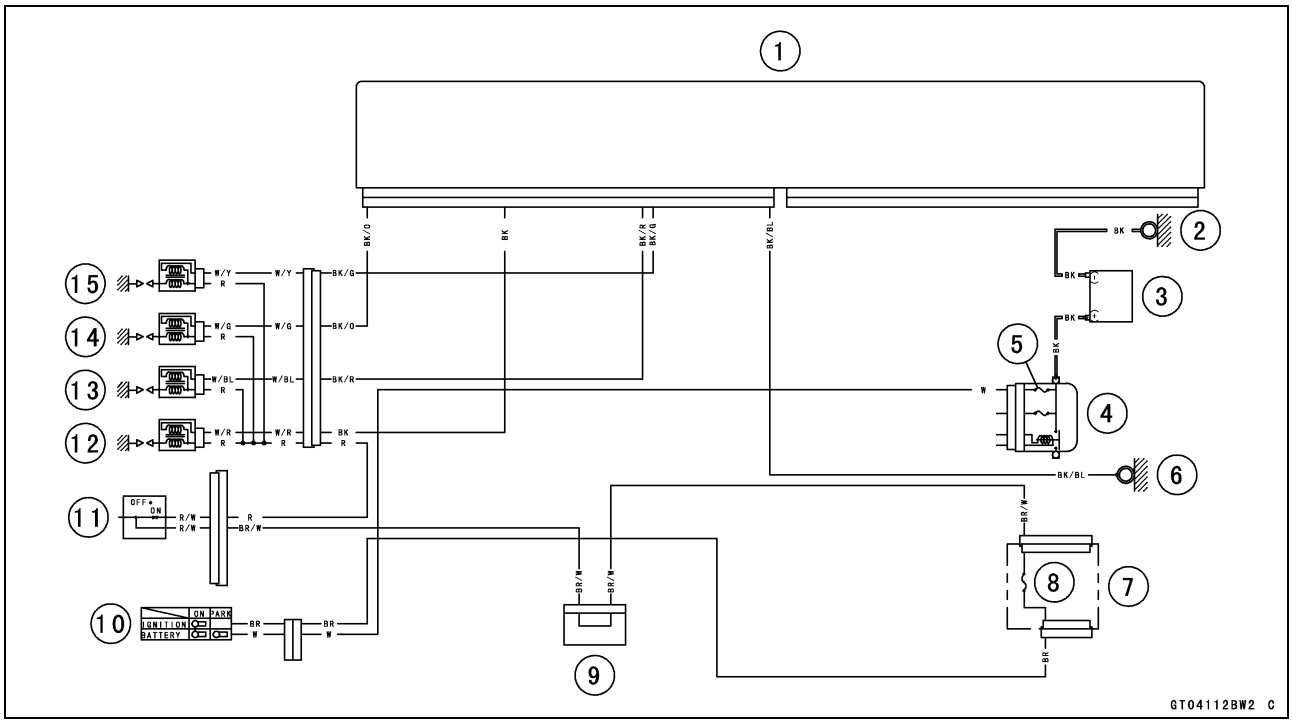
- Measure the input voltage to each primary winding of the stick coils with the engine stopped, and with the connectors joined.
- Turn the engine stop switch to run position.
- Turn the ignition switch on.

Input Voltage
Standard: Battery Voltage

Stick Coils #1, #2, #3, #4 (Service Code 51, 52, 53, 54) (DTC P0351, P0352, P0353, P0354)

● Turn the ignition switch off.
★If the input voltage is out of the standard, check the wiring for continuity (see Stick Coil Circuit).
★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 input voltage is within the standard, 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).

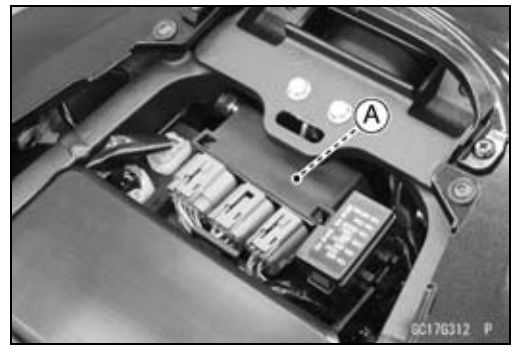
Stick Coil Circuit



1. ECU
2. Frame Ground
3. Battery
4. Starter Relay
5. Main Fuse 30 A
6. Frame Ground (2)
7. Fuse Box (1)
8. Ignition Fuse 15 A
9. Joint Connector F
10. Ignition Switch
11. Engine Stop Switch
12. Stick Coil #1
13. Stick Coil #2
14. Stick Coil #3
15. Stick Coil #4

Radiator Fan Relay (Service Code 56) (DTC P0480)

Radiator Fan Relay Removal/Installation



○The 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.

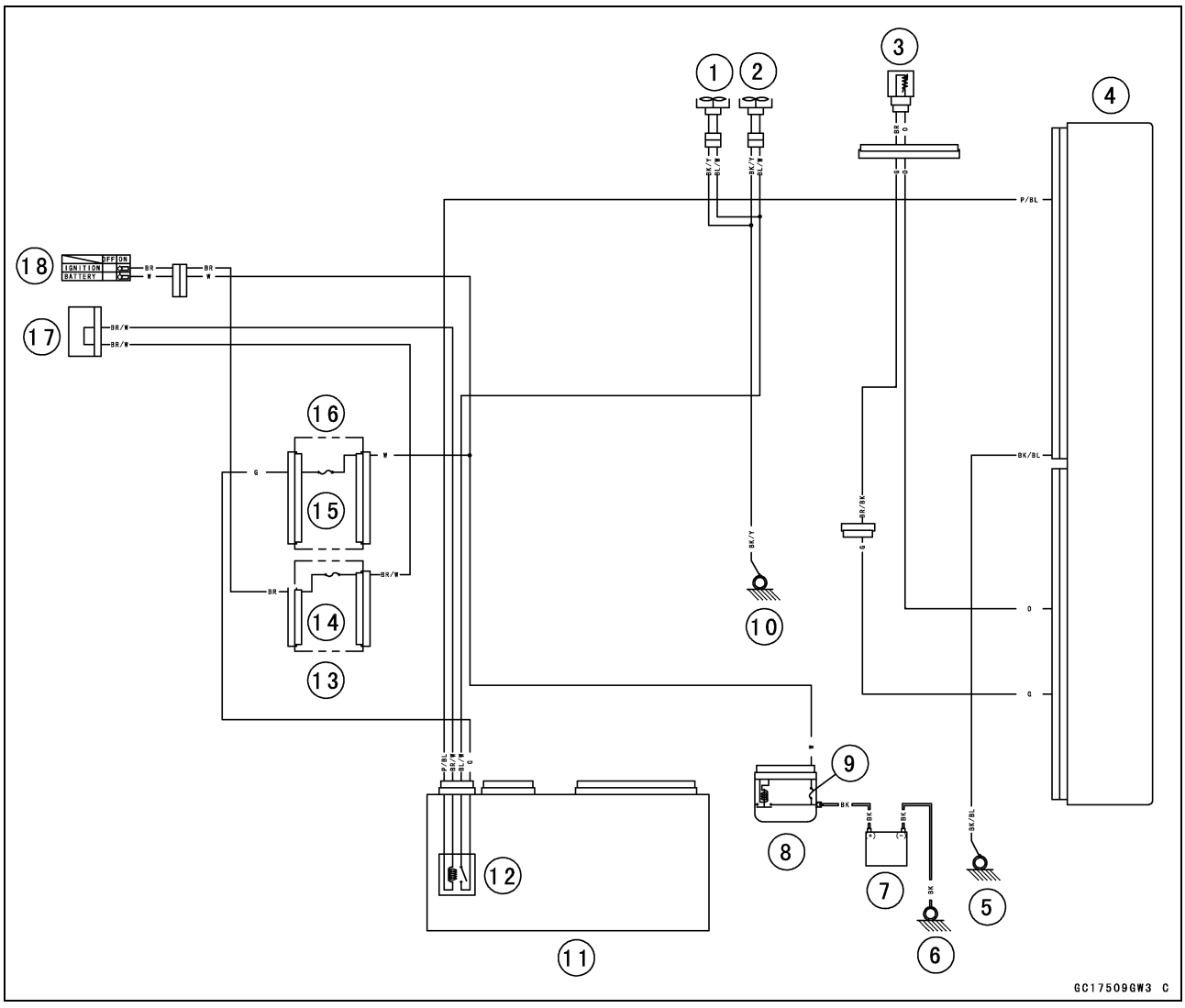
★If the radiator fan relay is normal, check the wiring for continuity, using the wiring diagram in this section.

★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).

Radiator Fan Relay (Service Code 56) (DTC P0480)

Radiator Fan Circuit

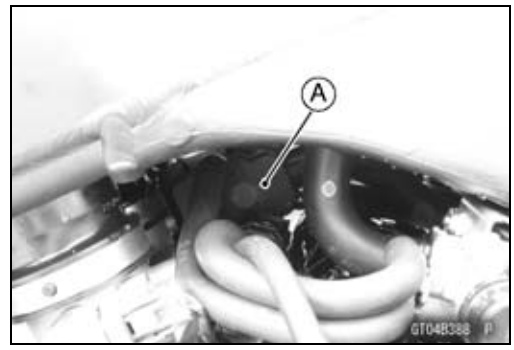


1. Fan Motor (2)
2. Fan Motor (1)
3. Water Temperature Sensor
4. ECU
5. Frame Ground (3)
6. Frame Ground
7. Battery
8. Starter Relay
9. Main Fuse 30 A
10. Frame Ground (4)
11. Relay Box
12. Fan Relay
13. Fuse Box (1)
14. Ignition Fuse 15 A
15. Fan Fuse 15 A
16. Fuse Box (2)
17. Joint Connector F
18. Ignition Switch

Subthrottle Valve Actuator (Service Code 62) (DTC P2100)

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.**



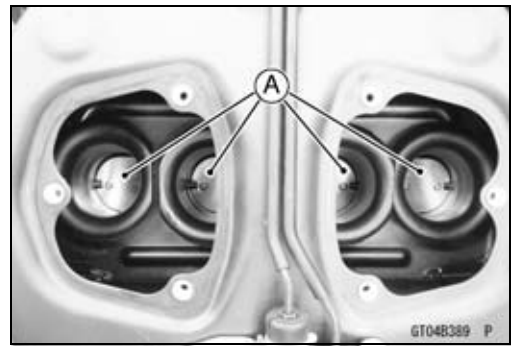
Subthrottle Valve Actuator Inspection

NOTE

○*Be sure the battery is fully charged.*

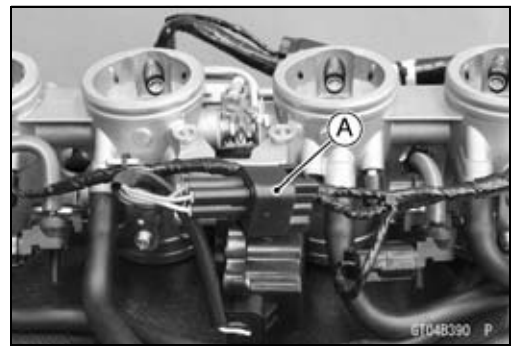
- Remove the air cleaner caps (see Throttle Body Assy Removal).
- Turn the ignition switch on.
- Check to see that all the subthrottle valves [A] open and close smoothly.
- Turn the ignition switch off.

★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 ignition switch off.
- Remove the throttle body assy (see Throttle Body Assy Removal).
- Disconnect the subthrottle valve actuator connector [A].



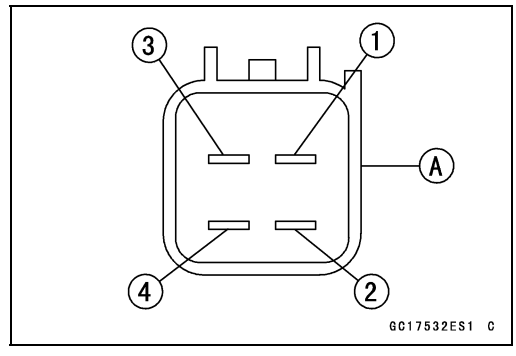
- Connect a digital meter to the subthrottle valve actuator connector [A].
- Measure the subthrottle valve actuator resistance.

Subthrottle Valve Actuator Resistance

Connections: **BK lead [1] ←→ G lead [2]**

Y lead [3] ←→ P lead [4]

Standard: **About 6.5 ~ 8.5 Ω**

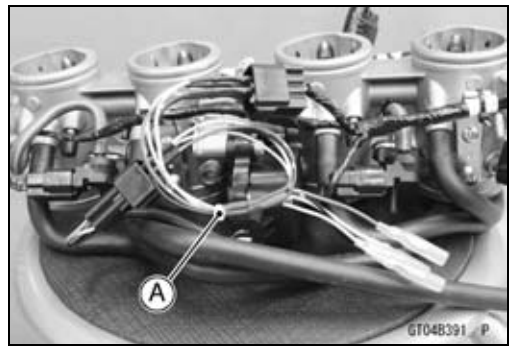


★If the reading is out of the standard, replace the throttle body assy.

★If the reading is within the standard, check the input voltage (see Subthrottle Valve Actuator Input Voltage Inspection).

Subthrottle Valve Actuator (Service Code 62) (DTC P2100)

Subthrottle Valve Actuator Input Voltage Inspection



NOTE

○*Be sure the battery is fully charged.*

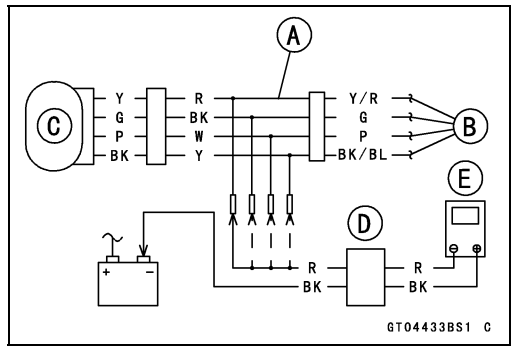
- Turn the ignition switch off.
- Remove the throttle body assy (see Throttle Body Assy Removal).

○Do not disconnect the connectors of the throttle body assy.

- Disconnect the subthrottle valve actuator connector and connect the measuring adapter [A] between these connectors as shown.

  Main Harness [B]
  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 (+) → R (actuator Y) lead
Digital Meter (–) → Frame Ground terminal
(II) Digital Meter (+) → BK (actuator G) lead
Digital Meter (–) → Frame Ground terminal
(III) Digital Meter (+) → W (actuator P) lead
Digital Meter (–) → Frame Ground terminal
(IV) Digital Meter (+) → Y (actuator BK) lead
Digital Meter (–) → Frame Ground terminal

- Measure the actuator input voltage with the engine stopped and with the connector joined.
- Turn the ignition switch on.

Input Voltage
Standard: About DC 9.5 ~ 11.5 V and then 0 V or
About DC 9.5 ~ 11.5 V

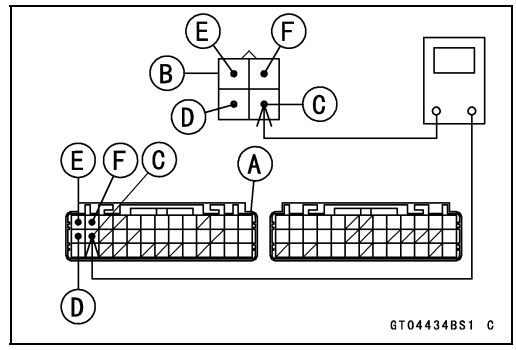
- Turn the ignition switch off.

★If the reading is in specification, but the actuator does not operate, replace the throttle body assy.

Subthrottle Valve Actuator (Service Code 62) (DTC P2100)

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

○Disconnect the ECU and actuator connectors.



Wiring Continuity Inspection

ECU Connector [A] ←→

Subthrottle Valve Actuator Connector [B]

G/O lead (ECU terminal 15) [C] (actuator G)

P/BL lead (ECU terminal 14) [D] (actuator P)

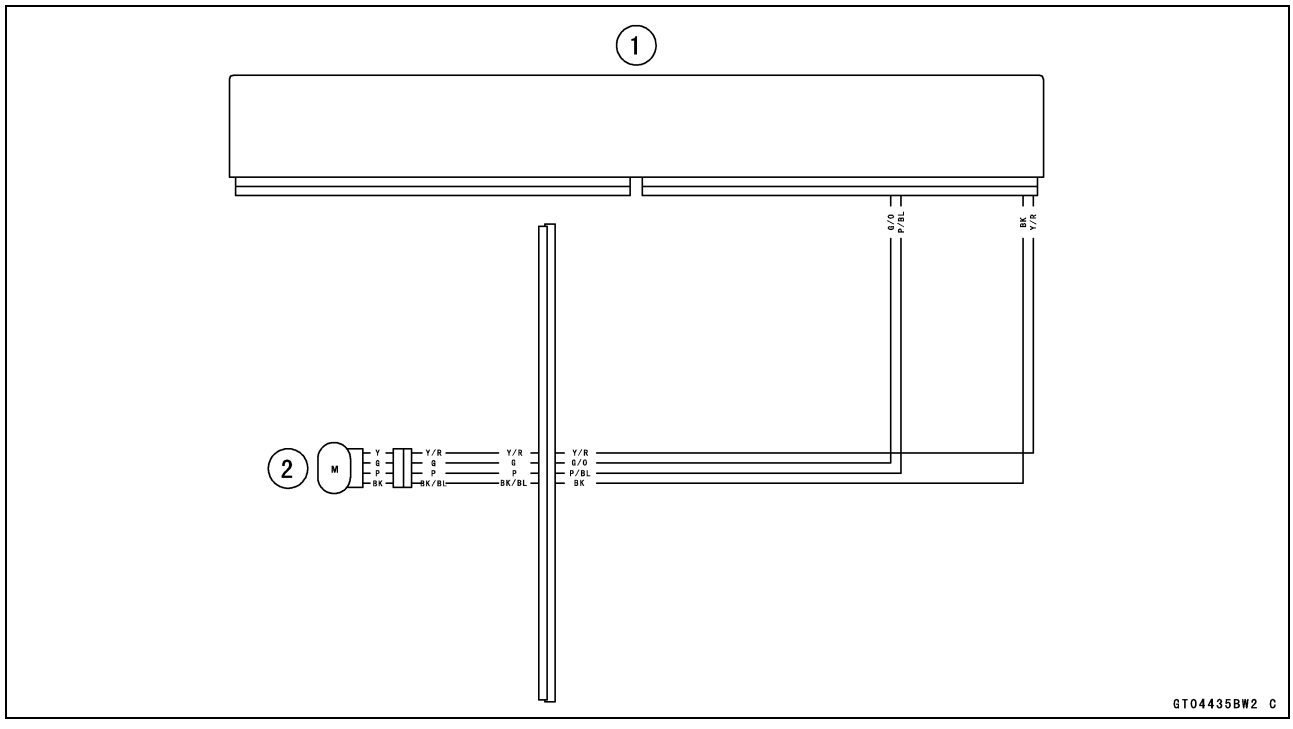
Y/R lead (ECU terminal 1) [E] (actuator Y)

BK lead (ECU terminal 2) [F]

★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).

Subthrottle Valve Actuator Circuit



1. ECU
2. Subthrottle Valve Actuator

Air Switching Valve (Service Code 64) (DTC P0410)

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.

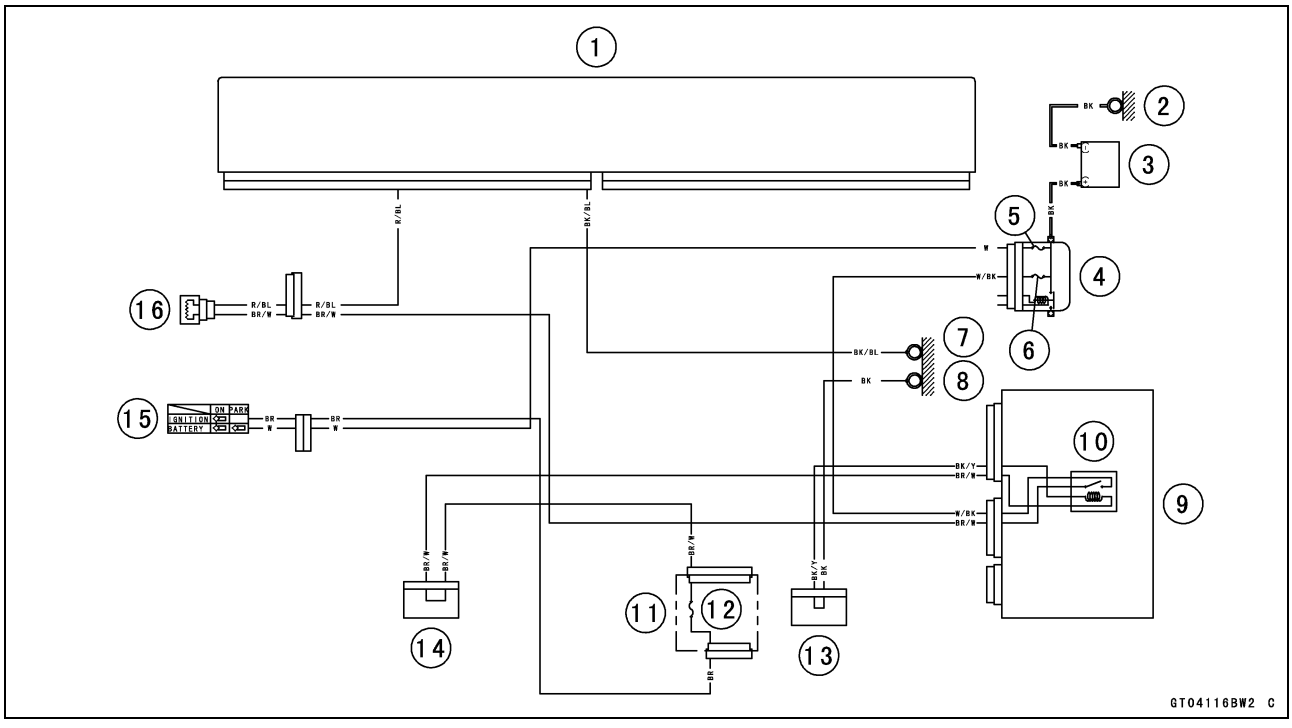
★If the air switching valve [A] is normal, check the wiring for continuity (see Air Switching Valve Circuit).

★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).



Air Switching Valve Circuit



1. ECU
2. Frame Ground
3. Battery
4. Starter Relay
5. Main Fuse 30 A
6. ECU Fuse 15 A
7. Frame Ground (3)
8. Frame Ground (1)
9. Relay Box
10. ECU Main Relay
11. Fuse Box (1)
12. Ignition Fuse 15 A
13. Joint Connector A
14. Joint Connector F
15. Ignition Switch
16. Air Switching Valve

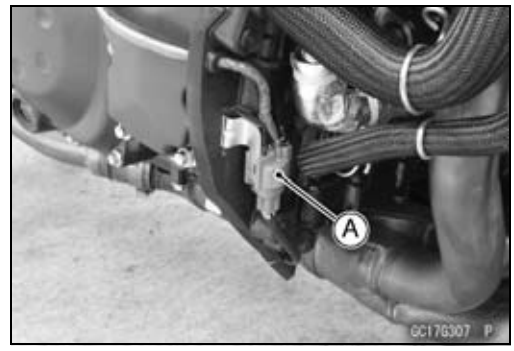
Oxygen Sensor Heater (Service Code 67) (DTC P0030)

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 in the Electrical System chapter).

Oxygen Sensor Heater Resistance Inspection

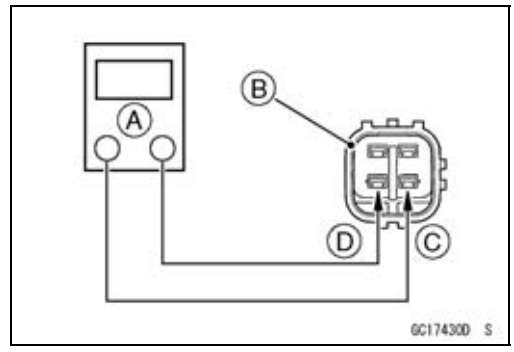
- Turn the ignition switch off.
- Remove the right middle fairing (see Middle Fairing Removal in the Frame chapter).
- Disconnect the oxygen sensor lead connector [A].



- Connect a digital meter [A] to the terminals in the oxygen sensor lead connector [B].
- Measure the oxygen sensor heater resistance.

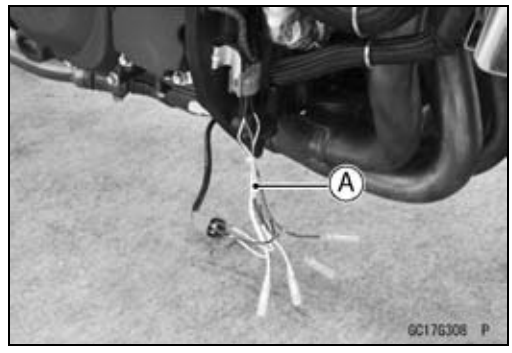
Oxygen Sensor Heater Resistance
Connections: W lead [C] ←→ W lead [D]
Standard: 6.7 ~ 10.5 Ω @20°C (68°F)

★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).



Oxygen Sensor Heater (Service Code 67) (DTC P0030)

Oxygen Sensor Heater Power Source Voltage Inspection



NOTE

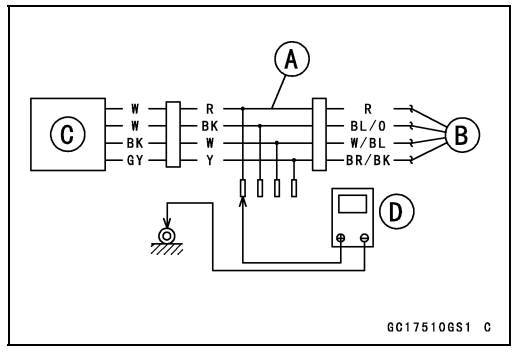
○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove the right middle fairing (see Middle Fairing Removal in the Frame chapter).
- Disconnect the oxygen sensor lead connector and connect the measuring adapter [A] between these connectors as shown.
  Main Harness [B]
  Oxygen Sensor [C]

Special Tool - Measuring Adapter: 57001-1700

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

Oxygen Sensor Heater Power Source Voltage
Connections to Adapter:
Digital Meter (+) → R (main harness R) lead
Digital Meter (–) → Frame Ground terminal



- Measure the power source voltage with the engine stopped and with the connector joined.
- Turn the ignition switch on.

Power Source Voltage
Standard: Battery Voltage

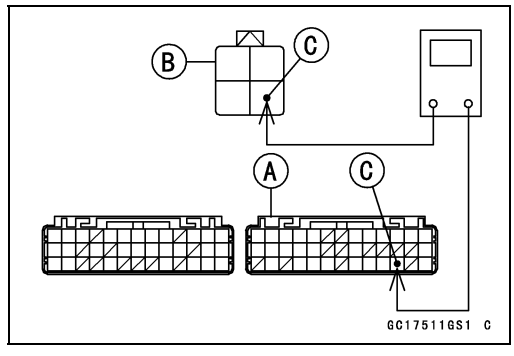
- Turn the ignition switch off.

★If the reading is in specification, but the problem still exists, replace the ECU (see ECU Removal/Installation).

★If the reading is out of the standard, check the following.
ECU Relay Fuse 15 A (see Fuse Inspection in the Electrical System chapter)
Power Source Wiring (see Oxygen Sensor Circuit)

★If the fuse and wiring are good, remove the ECU and check the wiring for continuity between harness connectors.

○Disconnect the ECU and sensor connectors.



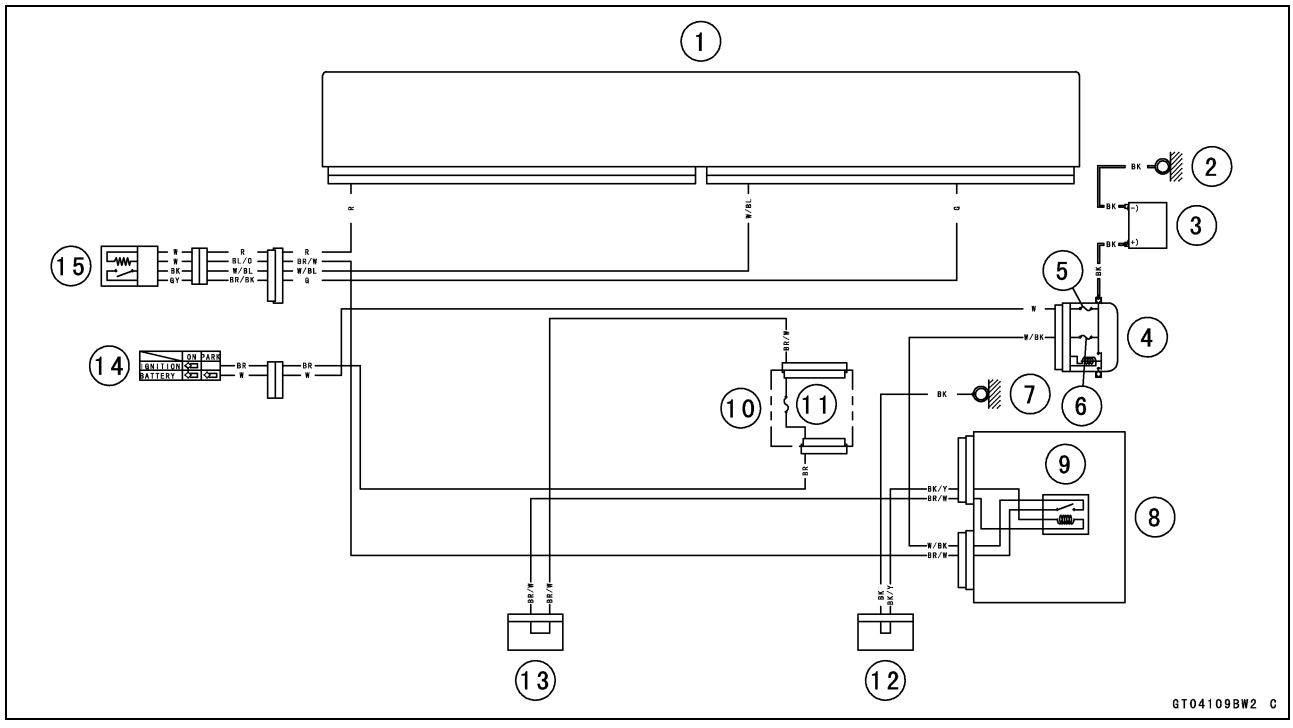
Wiring Continuity Inspection
ECU Connector [A] ←→
Oxygen Sensor Connectors [B]
R lead (ECU terminal 76) [C]

★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).

Oxygen Sensor Heater (Service Code 67) (DTC P0030)

Oxygen Sensor Circuit



1. ECU
2. Frame Ground
3. Battery
4. Starter Relay
5. Main Fuse 30 A
6. ECU Fuse 15 A
7. Frame Ground (1)
8. Relay Box
9. ECU Main Relay
10. Fuse Box (1)
11. Ignition Fuse 15 A
12. Joint Connector A
13. Joint Connector F
14. Ignition Switch
15. Oxygen Sensor

Fuel Supply System (Service Code 94) (DTC P0170)

Fuel Supply System Inspection

NOTE

○*If the motorcycle has any other service code, first inspect the other service code.*

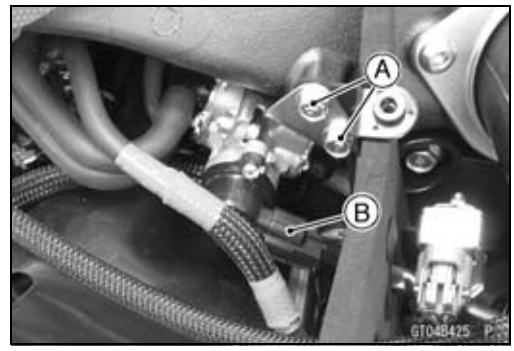
● Inspect the General fuel system (throttle body assy, air cleaner, fuel tank etc.).
★If the General fuel system is good, check the ECU for its ground and power supply (see ECU Power Supply Inspection).
★If the ground and power supply are good, replace the ECU (see ECU Removal/Installation).

Idle Speed Control Valve Actuator (Service Code 1C) (DTC P0511, P0518, P0519)

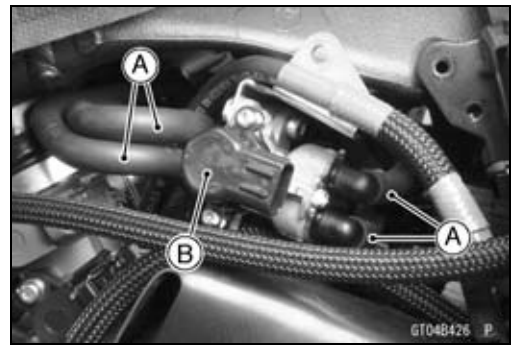
Idle Speed Control Valve Actuator Removal

NOTICE
Never drop the idle speed control valve actuator especially on a hard surface. Such a shock to the actuator can damage it.

- Remove:
  Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
  Idle Speed Control Valve Actuator Bracket Bolts [A]
- Disconnect:
  Idle Speed Control Valve Actuator Connector [B]



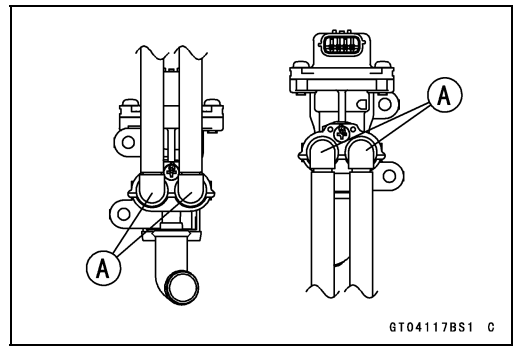
- Disconnect the hoses [A] from the fitting of the idle speed control valve actuator [B].
- Remove:
  Idle Speed Control Valve Actuator Mounting Bolts
  Bracket
  Idle Speed Control Valve Actuator



Idle Speed Control Valve Actuator Installation

- Installation is the reverse of removal.
- Run the hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Be sure that the fittings [A] are in position on the idle speed control valve actuator as shown.
- Tighten:

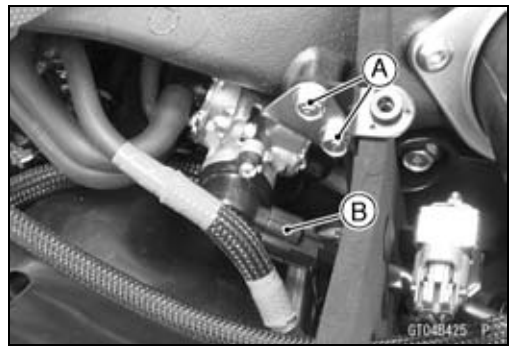
Torque - Idle Speed Control Valve Actuator Mounting Bolts: 8.3 N·m (0.85 kgf·m, 73 in·lb)
Idle Speed Control Valve Actuator Bracket Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)



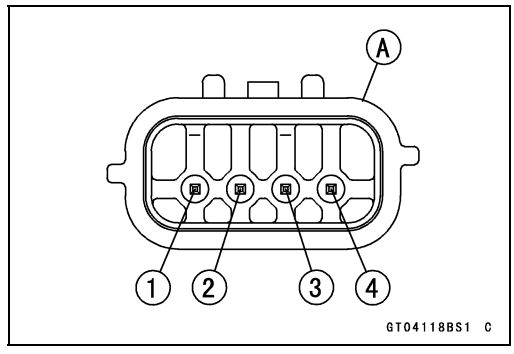
★If the idle speed control valve actuator is replaced, be sure to do the following procedures.
○Turn the ignition switch on.
○Turn the ignition switch off, and wait for 2 or 3 seconds.
○Inspect the idle speed (see Idle Speed Inspection in the Periodic Maintenance chapter).

Idle Speed Control Valve Actuator (Service Code 1C) (DTC P0511, P0518, P0519)

Idle Speed Control Valve Actuator Resistance Inspection



- Turn the ignition switch off.
- Remove:
  Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
  Idle Speed Control Valve Actuator Bolts [A]
- Disconnect the idle speed control valve actuator connector [B].



- Connect a digital meter to the idle speed control valve actuator [A].
- Measure the idle speed control valve actuator resistance.

Idle Speed Control Valve Actuator Resistance

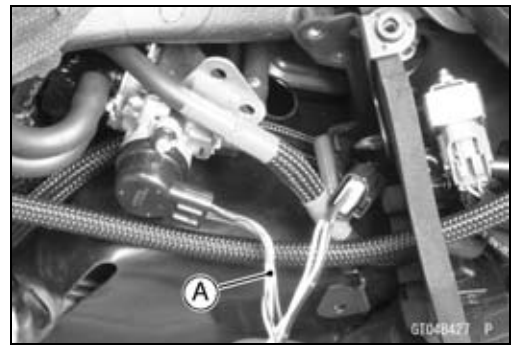
Connections:	**G/Y lead [1] ←→ G/O lead [2]**
	G/BK lead [3] ←→ G/R lead [4]
Standard:	**About 20 Ω**

★If the reading is out of the standard, replace the idle speed control valve actuator.

★If the reading is within the standard, check the input voltage (see Idle Speed Control Valve Actuator Input Voltage Inspection).

Idle Speed Control Valve Actuator (Service Code 1C) (DTC P0511, P0518, P0519)

Idle Speed Control Valve Actuator Input Voltage Inspection

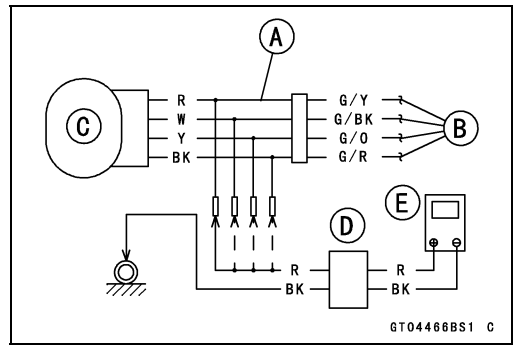


NOTE

○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Disconnect the idle speed control valve actuator connector and connect a suitable measuring leads [A] between these connectors as shown.
  Main Harness [B]
  Idle Speed Control Valve Actuator [C]
- 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



Idle Speed Control Valve Actuator Input Voltage
Connections to Adapter:

(I) Digital Meter (+) → R (actuator G/Y) lead
Digital Meter (–) → Frame Ground terminal
(II) Digital Meter (+) → W (actuator G/BK) lead
Digital Meter (–) → Frame Ground terminal
(III) Digital Meter (+) → Y (actuator G/O) lead
Digital Meter (–) → Frame Ground terminal
(IV) Digital Meter (+) → BK (actuator G/R) lead
Digital Meter (–) → Frame Ground terminal

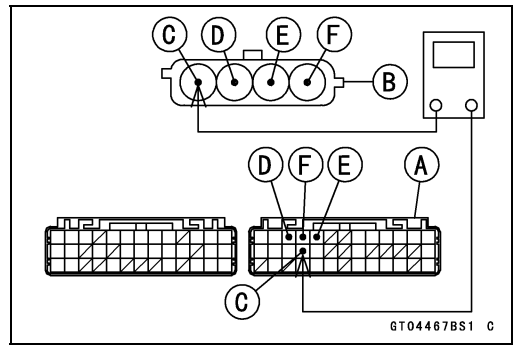
- Measure the actuator input voltage with the engine stopped and with the connector joined.
- Turn the ignition switch on.

Input Voltage
Standard: About DC 11 ~ 13 V and then 0.5 V or About DC 11 ~ 13 V

- Turn the ignition switch off.

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

○Disconnect the ECU and actuator connectors.



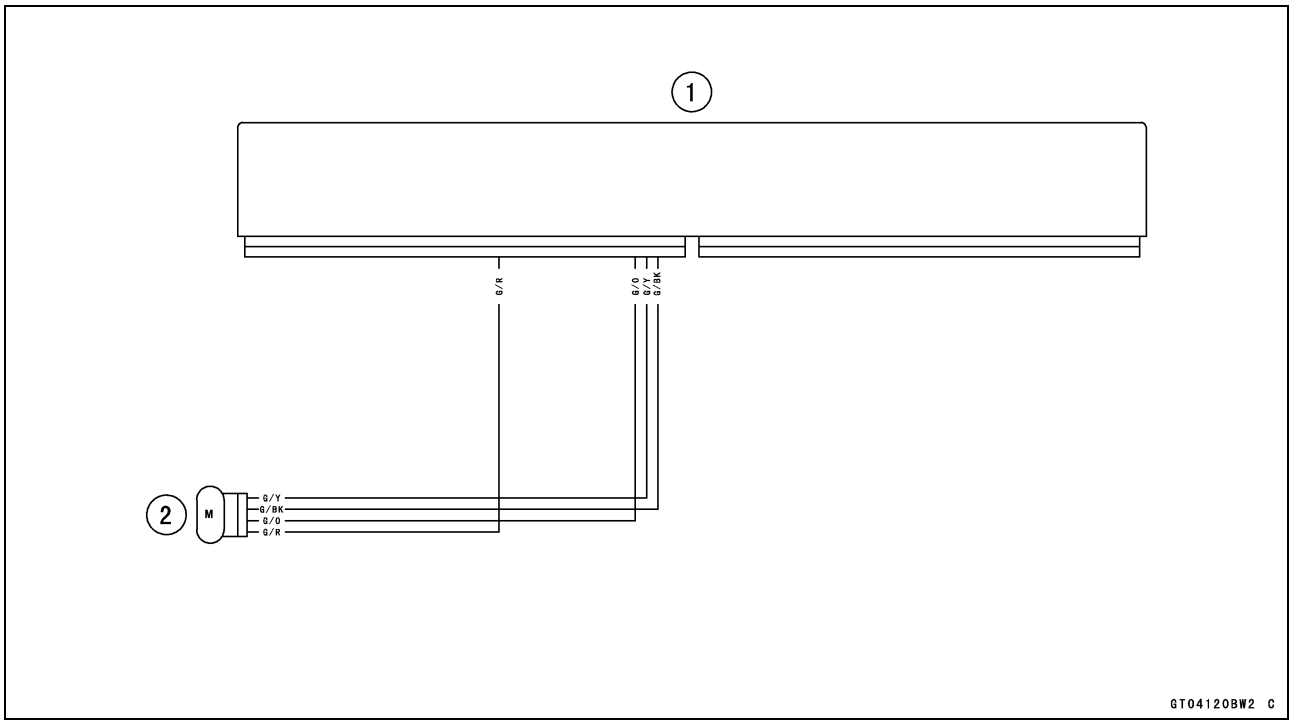
Wiring Continuity Inspection
ECU Connector [A] ←→
Idle Speed Control Valve Actuator Connector [B]
G/R lead (ECU terminal 56) [C]
G/BK lead (ECU terminal 42) [D]
G/O lead (ECU terminal 44) [E]
G/Y lead (ECU terminal 43) [F]

★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).

Idle Speed Control Valve Actuator (Service Code 1C) (DTC P0511, P0518, P0519)

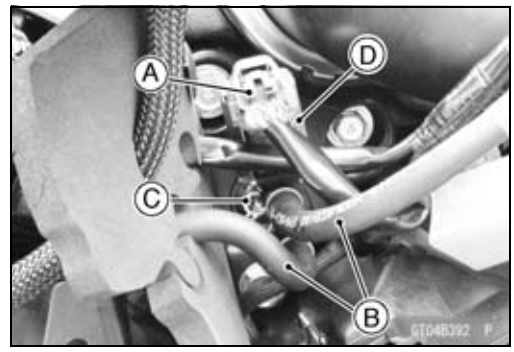
Idle Speed Control Valve Actuator Circuit



1. ECU
2. Idle Speed Control Valve Actuator

Purge Valve (Service Code 3A) (DTC P0443) (Other than US, CA, AU, ID PH and SEA-B3 Models)

Purge Valve Removal/Installation



- Remove:
  Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
- Disconnect:
  Purge Valve Connector [A]
  Hoses [B]
- Remove:
  Bolt [C]
  Purge Valve [D]
- Installation is the reverse of removal.

Torque - Purge Valve Mounting Nut: 8.0 N·m (0.82 kgf·m, 71 in·lb)
Purge Valve Bracket Bolt: 8.0 N·m (0.82 kgf·m, 71 in·lb)

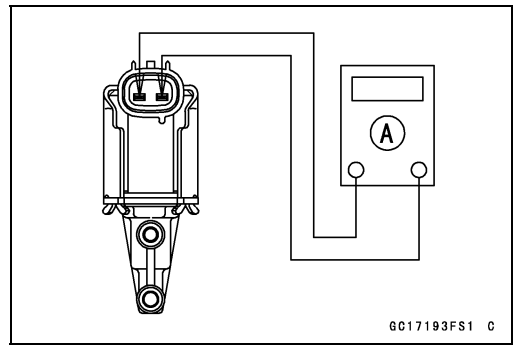
○Run the hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

Purge Valve Inspection

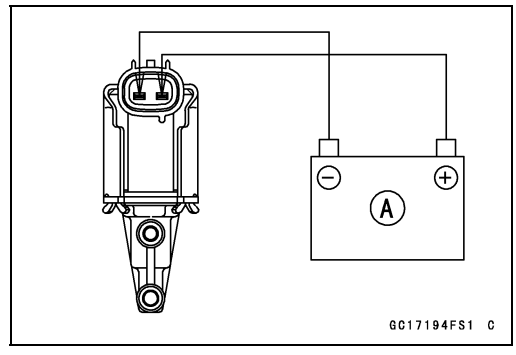
- Remove the purge valve (see Purge Valve Removal/Installation).
- Connect a digital meter [A] to the purge valve terminals as shown.

Purge Valve Resistance
Standard: 30 ~ 34 Ω @20°C (68°F)

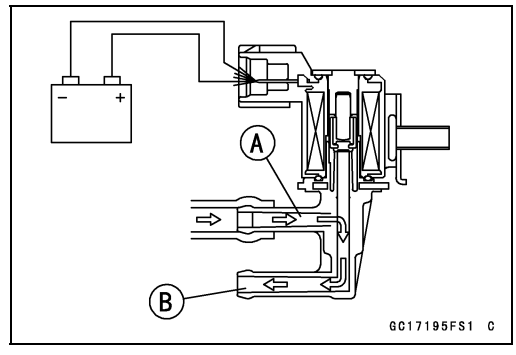
★If the resistance reading is out of the specified value, replace it with a new one.



- Connect the 12 V battery [A] to the purge valve terminals as shown.



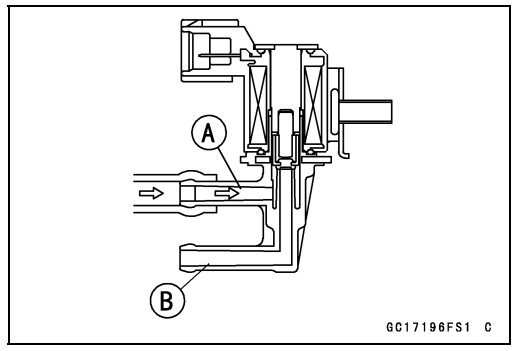
- Blow the air to the intake air duct [A], and make sure that the air flows from the outlet air duct [B].



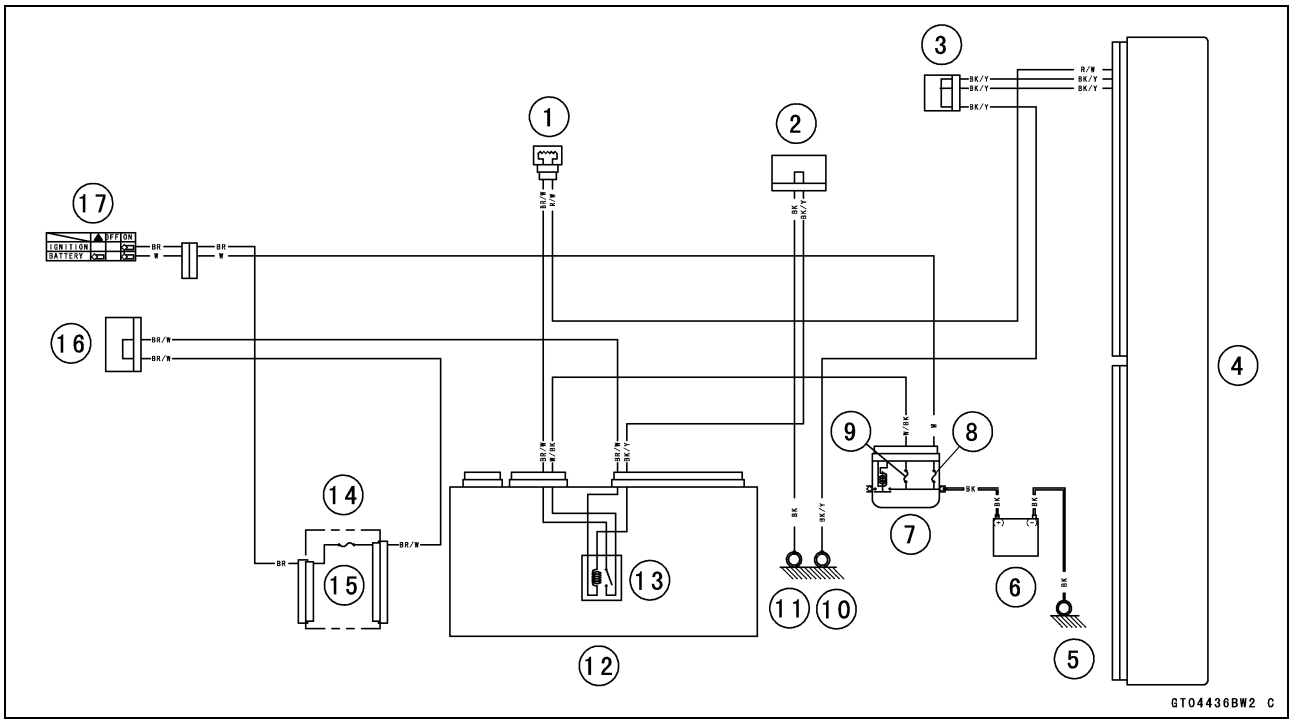
Purge Valve (Service Code 3A) (DTC P0443) (Other than US, CA, AU, ID PH and SEA-B3 Models)

- Disconnect the 12 V battery.
- Blow the air to the intake air duct [A] again, and make sure that the air does not flow from the outlet air duct [B].

★If the purge valve dose not operate as described, replace it with a new one.



Purge Valve Circuit



1. Purge Valve
2. Joint Connector A
3. Joint Connector E
4. ECU
5. Frame Ground
6. Battery
7. Starter Relay
8. Main Fuse 30 A
9. ECU Fuse 15 A
10. Frame Ground (2)
11. Frame Ground (1)
12. Relay Box
13. ECU Main Relay
14. Fuse Box (1)
15. Ignition Fuse 15 A
16. Joint Connector F
17. Ignition Switch

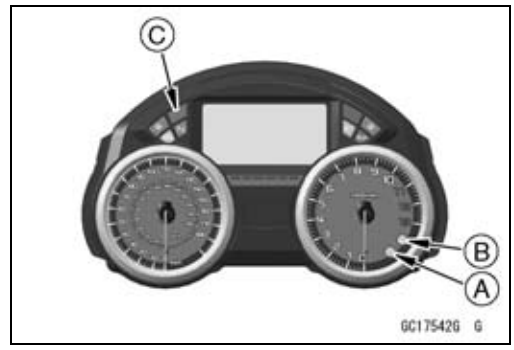
Warning Indicator Light (LED)

Yellow Engine Warning/Yellow KTRC Warning/Red Warning Indicator Light (LED) Inspection

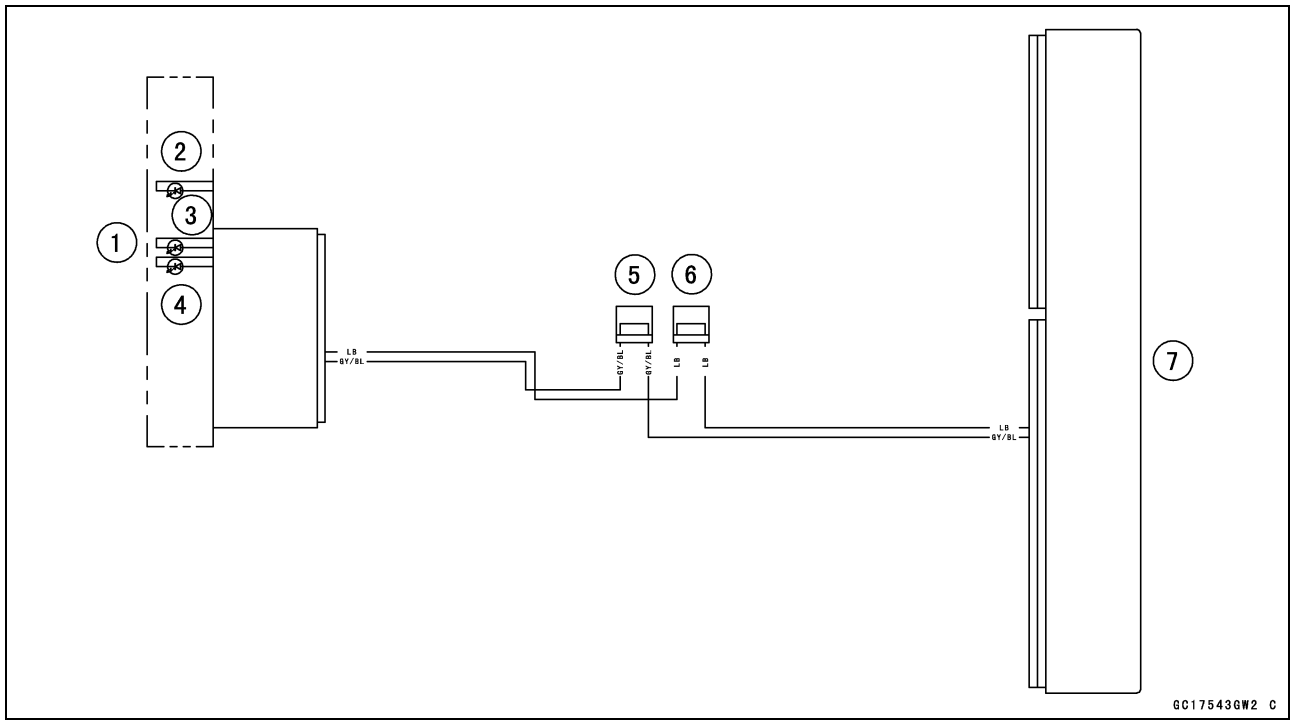
Yellow Engine Warning Indicator Light (LED) [A]
Yellow KTRC Warning Indicator Light (LED) [B]
Red Warning Indicator Light (LED) [C]

○In this model, the above mentioned warning indicator lights (LED) go on or blink by the data sent from the ECU.

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



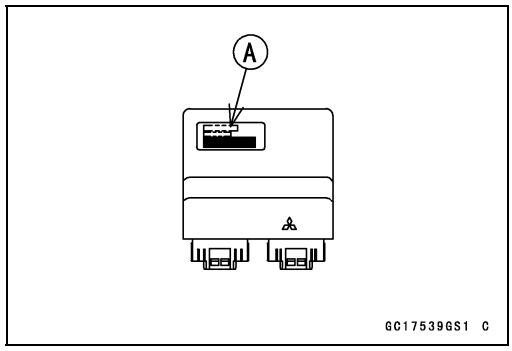
Warning Indicator Light (LED) Circuit



1. Meter Unit
2. Red Warning Indicator Light (LED)
3. Yellow KTRC Warning Indicator Light (LED)
4. Yellow Engine Warning Indicator Light (LED)
5. Joint Connector C
6. Joint Connector D
7. ECU

ECU

ECU Identification



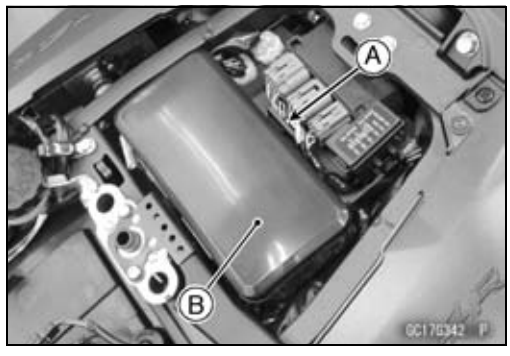
○Most countries have their own regulations, so each ECU has different characteristic. So, do not confuse ECU with each other and use only the ECU for your model. Otherwise, the motorcycle cannot clear the regulation.

ECU Identification

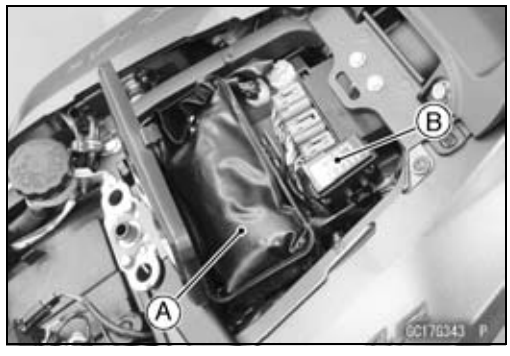
Model	Part Number [A]	Specification
ZX1400H/J	21175-1123	US, without Immobilizer
		CA, without Immobilizer
	21175-1124	CAL, without Immobilizer
	21175-1125	TH, with Immobilizer
		IN, with Immobilizer
		GB WVTA (FULL), with Immobilizer
		WVTA (FULL), with Immobilizer
	21175-1137	AU, with Immobilizer
		ID, with Immobilizer
		PH, with Immobilizer
		SEA-B3, with Immobilizer
	21175-1149	MY, with Immobilizer
	21175-1160	SEA-B1, with Immobilizer
		CN, with Immobilizer

ECU Removal

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



- Remove the seat (see Seat Removal in the Frame chapter).
- Pull the hook [A] to lift up the lid [B] of the tool kit case.

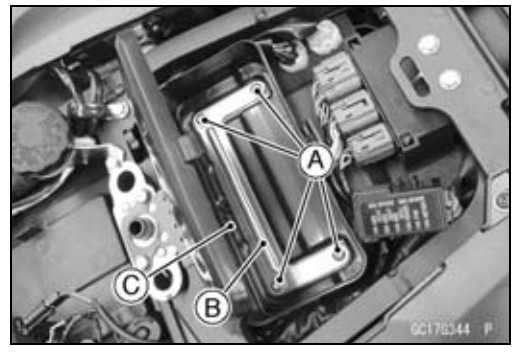


- Remove:
  Tool Kit [A]
  Fuse Box (2) [B]

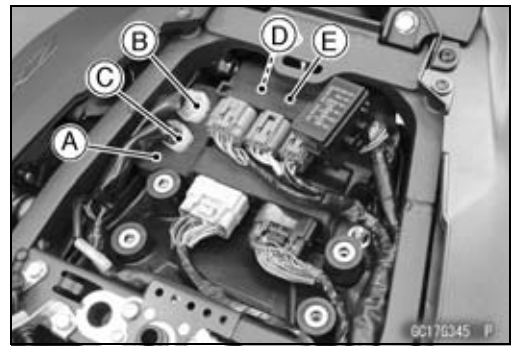
ECU

- Remove:
  Bolts [A]
  Plate [B]
  Tool Kit Case [C]

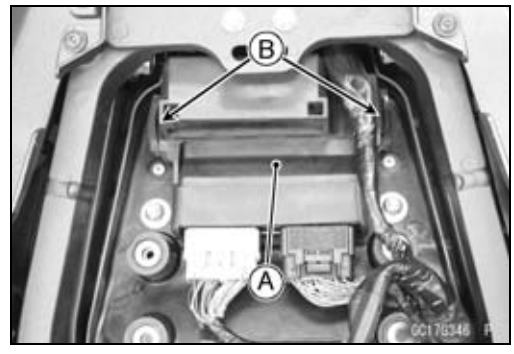
○For WVTA (FULL) and GB WVTA (FULL) models, using a small chisel or other suitable tool, remove the bolts.



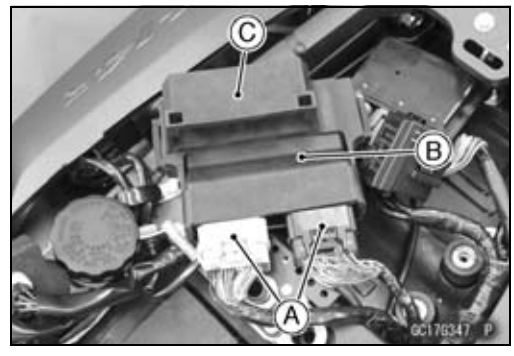
- Pull out the following connectors from the connector holder [A].
  Immobilizer (Equipped Models)/Kawasaki Diagnostic System Connector [B]
  ABS Kawasaki Diagnostic System Connector [C]
- Remove the connector holder.
- Remove the relay box [D] from the rubber protector [E].



- Lift up the ECU [A] with rubber protector to clear the projections [B].

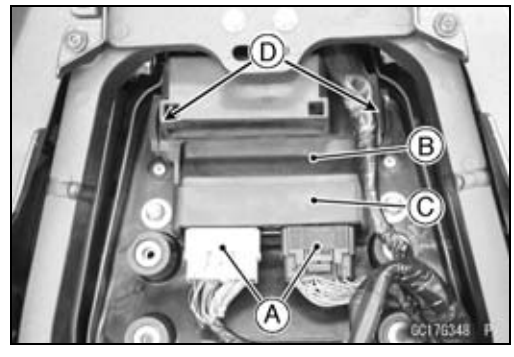


- Disconnect the ECU connectors [A].
- Remove:
  ECU [B] (with Rubber Protector [C])



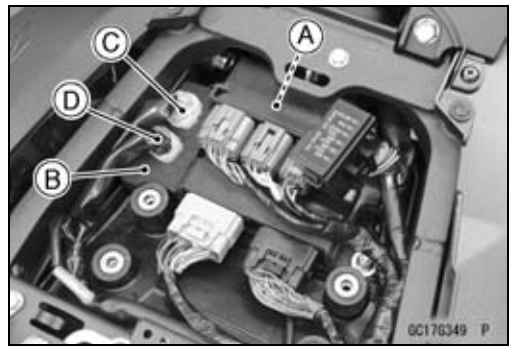
ECU Installation

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



ECU

- Install:
  Relay Box [A]
  Connector Holder [B]
- Put the following connectors on the connector holder.
  Immobilizer (Equipped Models)/Kawasaki Diagnostic System Connector [C]
  ABS Kawasaki Diagnostic System Connector [D]

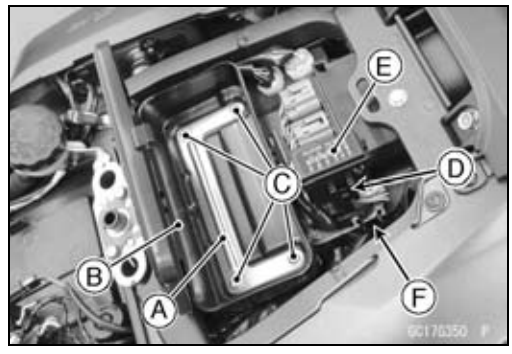


- Install the plate [A] to the tool kit case [B] and tighten the bolts [C].

○For WVTA (FULL) and GB WVTA (FULL) models, replace the bolts with new ones. Using the Kawasaki genuine bolts of which threads are coated with locking agent.

Torque - Tool Kit Case Bolts: 4.0 N·m (0.41 kgf·m, 35 in·lb)

- Insert the stopper [D] of the fuse box (2) [E] into the groove [F] of the tool kit case.



ECU Power Supply Inspection

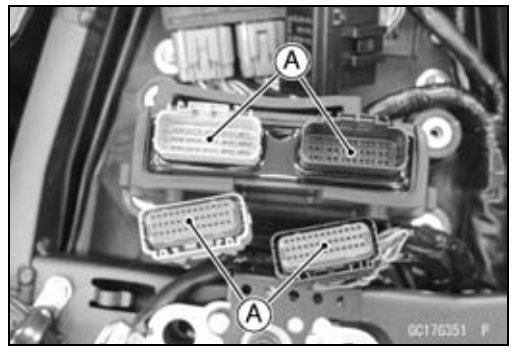
- Remove the tool kit case (see ECU Removal).
- Visually inspect the ECU connectors.

★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 and main harness 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.



- Turn the ignition switch off.
- Disconnect the ECU connectors.
  Gray Connector [A]
- Set a tester [B] and check the following wiring for continuity.

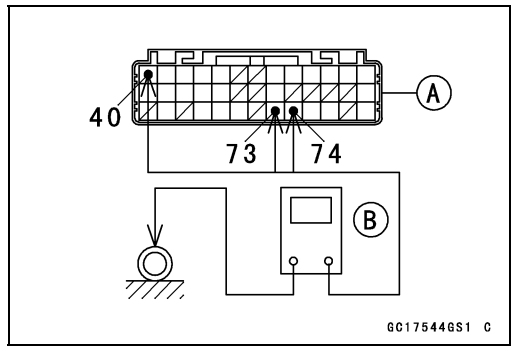
ECU Grounding Inspection
Connections:

(I) BK/Y leads (ECU terminal 73 or 74) ←→ **Frame Ground Terminal**
BK/BL lead (ECU terminal 40)

(II) Engine Ground ←→ **Frame Ground Terminal**

Criteria:

Both: 0 Ω



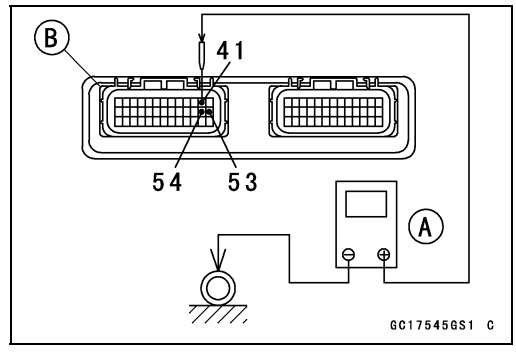
★If no continuity, check the connectors, the engine ground lead, or main harness, and repair or replace them if necessary.

ECU

★If the wiring is good, check the power source voltage of the ECU.

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

Special Tool - Needle Adapter Set: 57001-1457



ECU Power Supply Inspection

Connections:

(I) Digital Meter (+) → Terminal 41 (W/BK)

Digital Meter (–) → Frame Ground Terminal

(II) Digital Meter (+) → Terminal 53 (BR/W)

Digital Meter (–) → Frame Ground Terminal

(III) Digital Meter (+) → Terminal 54 (W/BK)

Digital Meter (–) → Frame Ground Terminal

Ignition Switch off:

Terminal 41 (W/BK): Battery Voltage

Terminal 53 (BR/W): 0 V

Terminal 54 (W/BK): Battery Voltage

Ignition Switch on:

All: 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 in the Electrical System chapter)

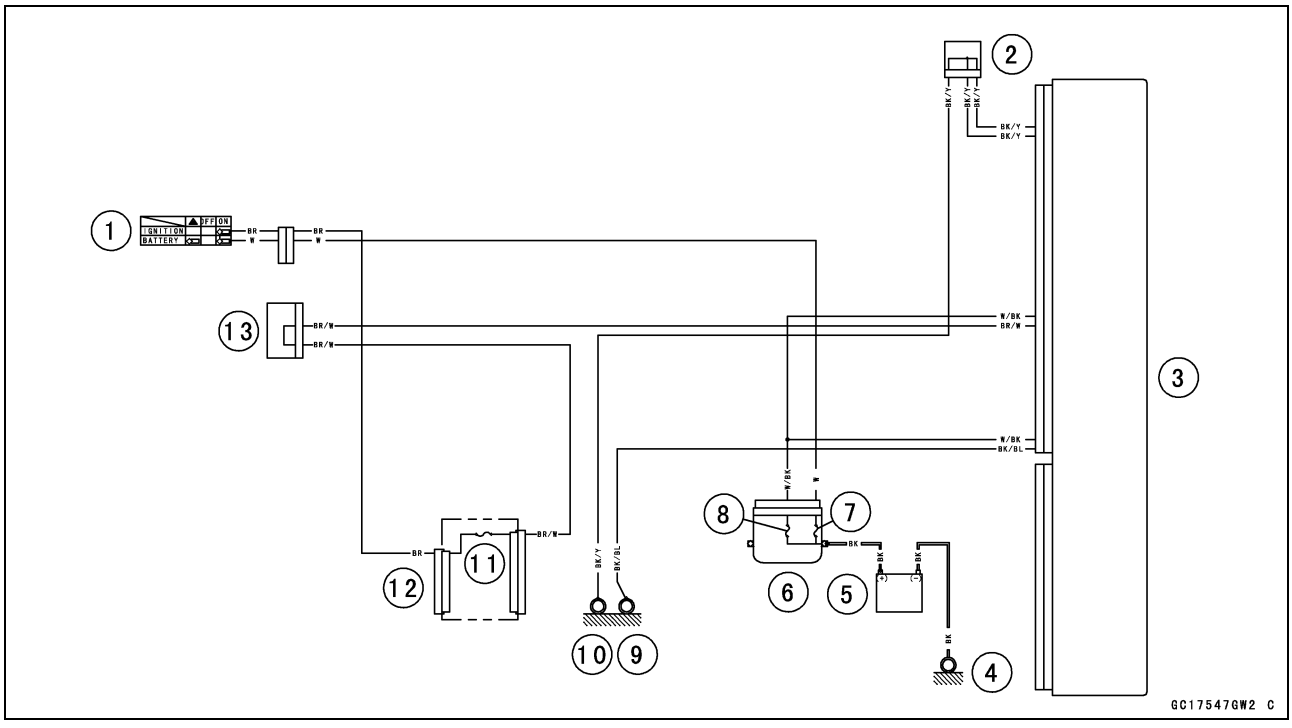
ECU Main Relay (see Relay Circuit Inspection in the Electrical System chapter)

Power Source Wiring (see wiring diagram in this section)

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

ECU

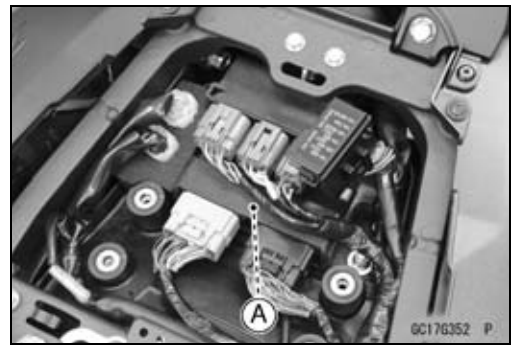
ECU Power Source Circuit



1. Ignition Switch
2. Joint Connector E
3. ECU
4. Frame Ground
5. Battery
6. Starter Relay
7. Main Fuse 30 A
8. ECU Fuse 15 A
9. Frame Ground (3)
10. Frame Ground (2)
11. Ignition Fuse 15 A
12. Fuse Box (1)
13. Joint Connector F

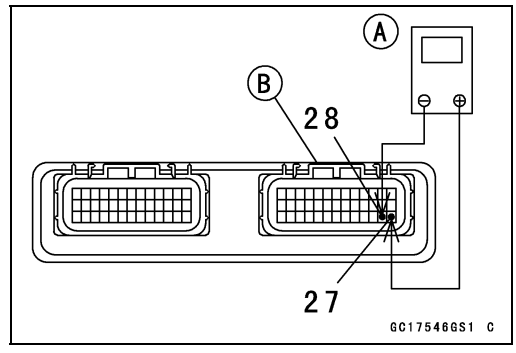
CAN Communication Line

CAN Communication Line Resistance Inspection



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

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



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

CAN Communication Line Resistance (at ECU Connector)

Connections: Terminal 27 ←→ Terminal 28

Standard: 122 ~ 126 Ω

★If the reading is out of the standard, replace the ECU (see ECU Removal/Installation).

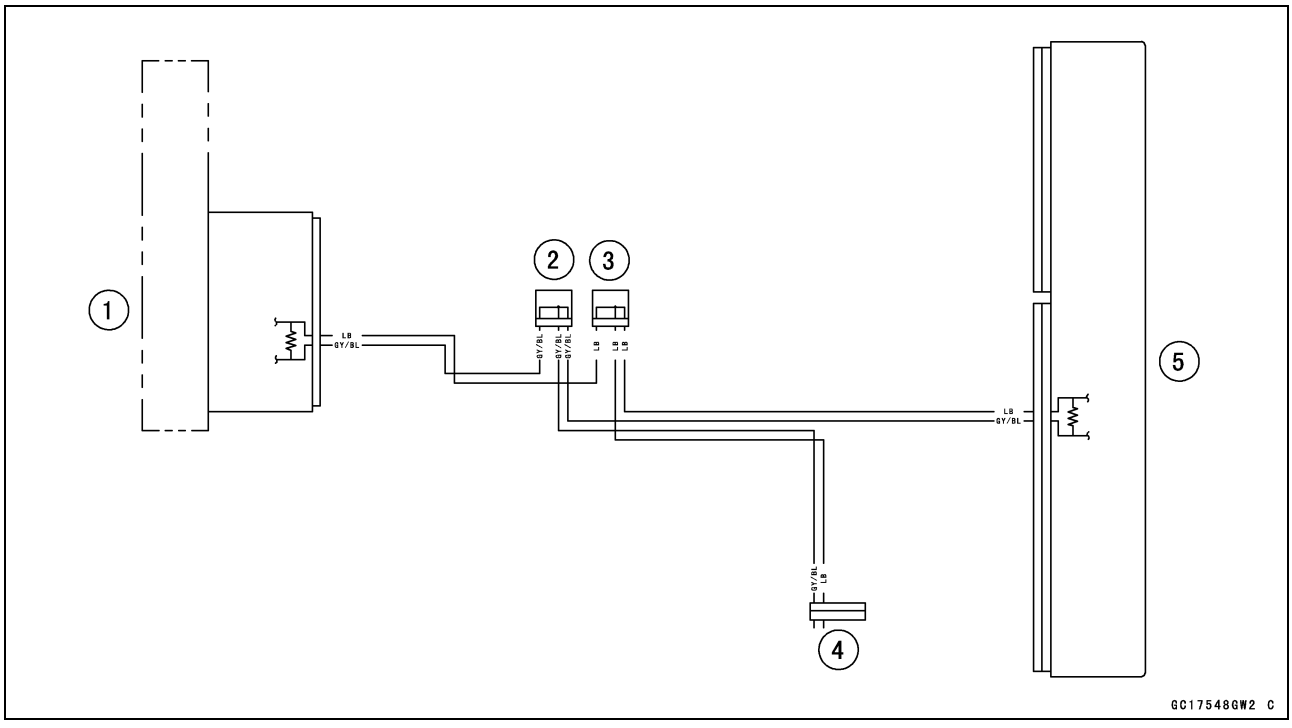
★If the reading is within the standard, resistor of the ECU for CAN communication line is normal.

- Check the wiring for continuity of the CAN communication line (see wiring diagram in this section).

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

CAN Communication Line

CAN Communication Line Circuit



1. Meter Unit
2. Joint Connector C
3. Joint Connector D
4. Immobilizer (Equipped Models)/Kawasaki Diagnostic System Connector
5. ECU

DFI Power Source

ECU Fuse Removal

- Refer to the 30 A Main/15 A ECU 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.

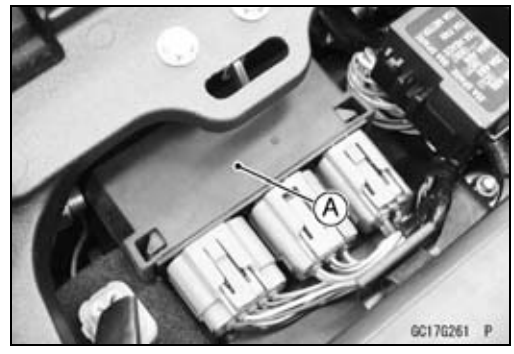
ECU Fuse Inspection

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

ECU Main Relay Removal/Installation

○The ECU main relay is built in the relay box [A].

- Refer to the Relay Box Removal in the Electrical System chapter.



ECU Main Relay Inspection

- Refer to the Relay Circuit Inspection in the Electrical System chapter.

Fuel Line

Fuel Pressure Inspection

NOTE

○*Be sure the battery is fully charged.*

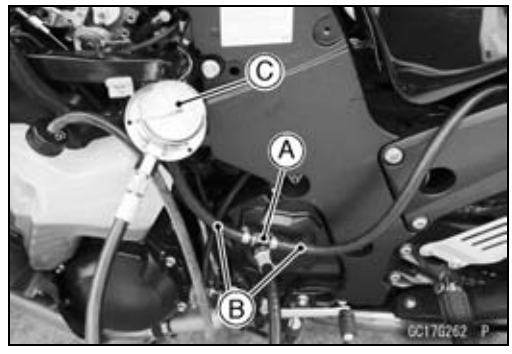
● Remove:
Fuel Tank (see Fuel Tank Removal)
Fuel Hose (see Fuel Hose Replacement in the Periodic Maintenance chapter)

○Be sure to place a piece of cloth around the fuel outlet pipe of the fuel pump and the delivery pipe of the throttle body assy.

⚠ 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.
● Connect the following parts temporary.
Fuel Pump Lead Connector
Fuel Level Sensor Lead Connector
● Connect the pressure gauge [C] 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.

● Turn the engine stop switch to run position.
● Turn the ignition switch on.
○The fuel pump should operate for 3 seconds, and then should stop.

NOTE

○*After turning on the engine stop switch and ignition switch, inspect the fuel leakage from the connected portion of the special tools.*

NOTICE

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

Fuel Line

- 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

○*The gauge needle will fluctuate. Read the pressure at the average of the maximum and minimum indications.*

- Turn the ignition switch 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.

★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 ignition switch off. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately.

NOTE

○*Be sure the battery is fully charged.*

- Turn the ignition switch 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

Fuel Line

- Remove the fuel tank bolts (see Fuel Tank Removal).
- Open the fuel tank cap [A] to lower the pressure in the tank.
- Disconnect the fuel hose from the fuel pump (see Fuel Tank Removal).

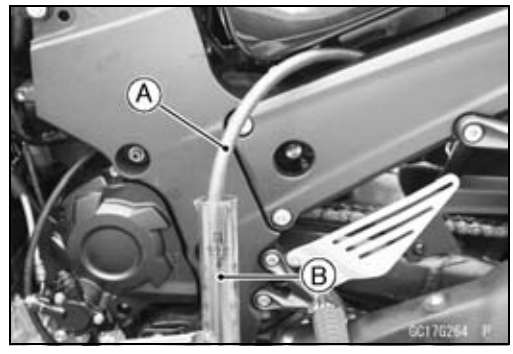
○Be sure to place a piece of cloth around the fuel outlet pipe of the fuel pump.



⚠ 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 of the fuel pump.
- Secure the fuel hose with a clamp.
- Insert the fuel hose into the measuring cylinder [B].



⚠ 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.
- Turn the ignition switch on.

○The 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.

○Repeat this operation several times.

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

- Turn the ignition switch 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

⚠ 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 ignition switch 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.

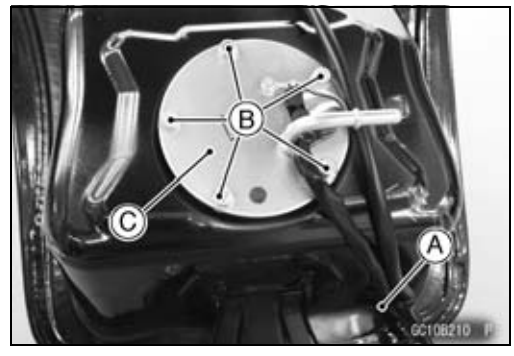
NOTICE

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).

○Be 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.

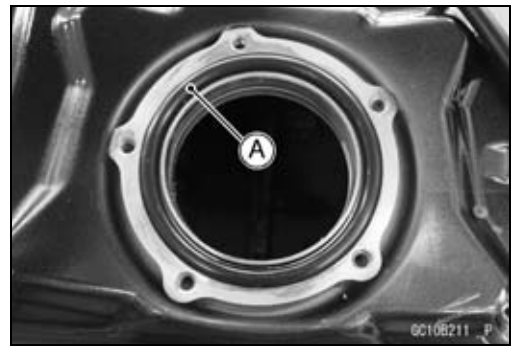
- Turn the fuel tank upside down.
- Open the clamp [A].
- Unscrew the fuel pump bolts [B], and take out the fuel pump [C].



NOTICE

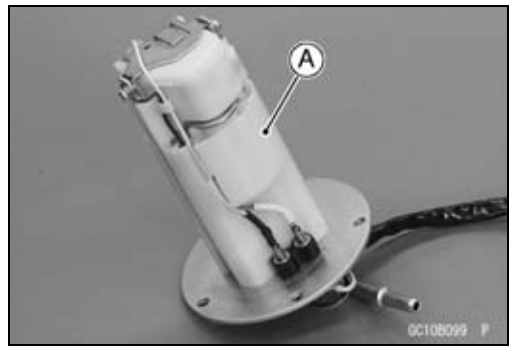
Do not pull the leads of the fuel pump and fuel reserve switch. If they are pulled, the lead terminals may be damaged.

- Discard the fuel pump gasket [A].

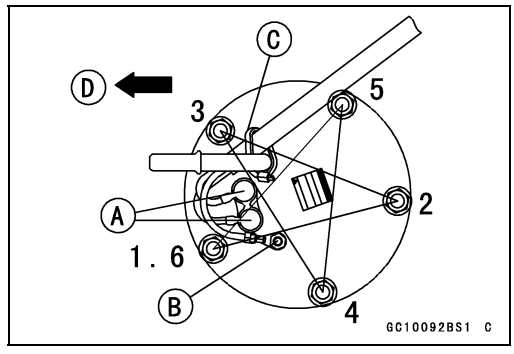


Fuel Pump

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.
  Left [D]
- 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.
- Following the tightening sequence, tighten the fuel pump bolts to the specified torque.

Torque - Fuel Pump Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

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

Fuel Pump Operation Inspection

NOTE

○*Be sure the battery is fully charged.*

- Turn the engine stop switch to run position.
- Turn the ignition switch on and make sure that the fuel pump operates (make light sounds) for 3 seconds, and then stops.
- Turn the ignition switch off.

★If the pump does not operate as described above, inspect the operating voltage (see Fuel Pump Operating Voltage Inspection).

Fuel Pump Operating Voltage Inspection

NOTE

○*Be sure the battery is fully charged.*

- Turn the ignition switch off.
- Remove the seat (see Seat Removal in the Frame chapter).

Fuel Pump

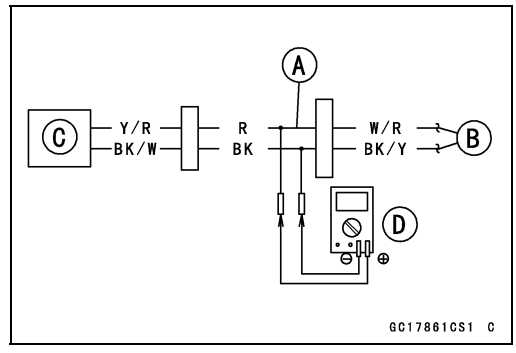
- Disconnect the fuel pump lead connector and connect the measuring adapter [A] between these connectors as shown.
  Main Harness [B]
  Fuel Pump [C]

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 (+) → R (pump Y/R) lead
Digital Meter (–) → 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.
- Turn the ignition switch on.

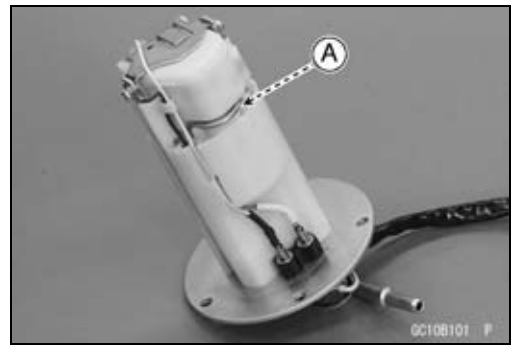
Operating Voltage
Standard: Battery Voltage for 3 seconds, and then 0 V

- Turn the ignition switch 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).
★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).

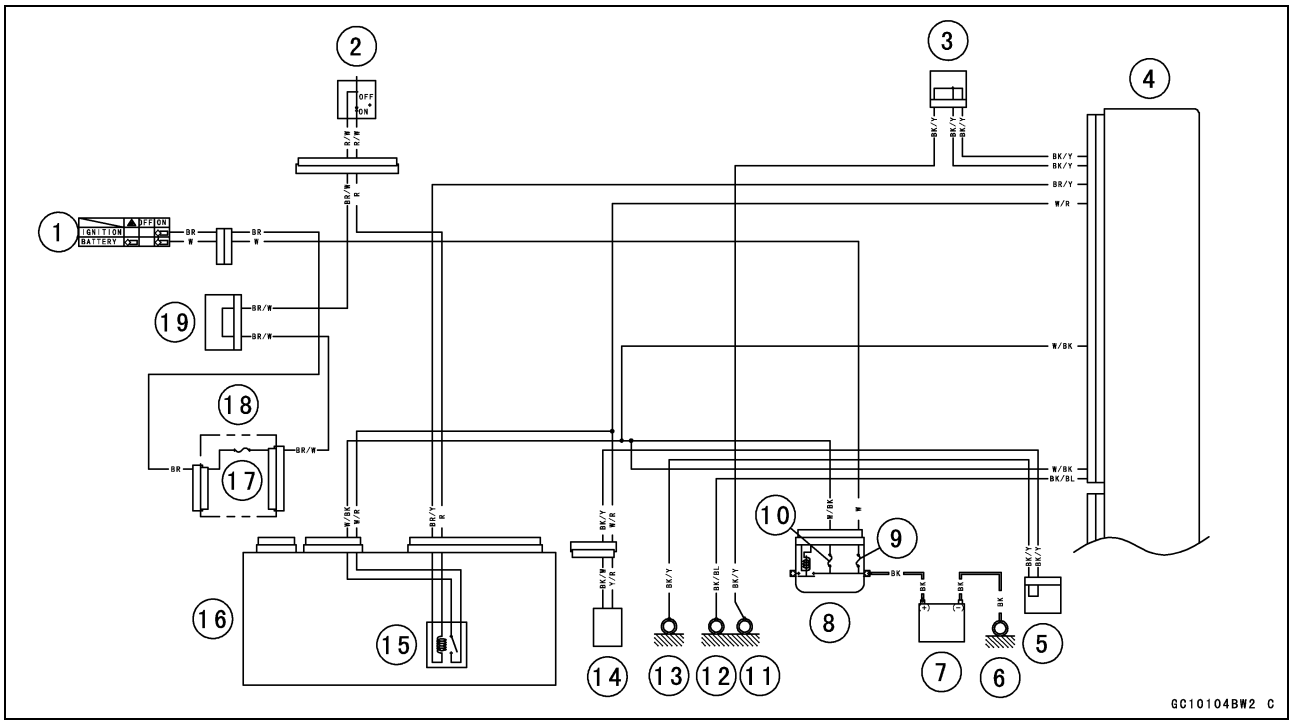
Pressure Regulator Removal

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



Fuel Pump

Fuel Pump Circuit



1. Ignition Switch
2. Engine Stop Switch
3. Joint Connector E
4. ECU
5. Joint Connector B
6. Frame Ground
7. Battery
8. Starter Relay
9. Main Fuse 30 A
10. ECU Fuse 15 A
11. Frame Ground (2)
12. Frame Ground (3)
13. Frame Ground (4)
14. Fuel Pump
15. Fuel Pump Relay
16. Relay Box
17. Ignition Fuse 15 A
18. Fuse Box (1)
19. Joint Connector F

Throttle Grip and Cables

Throttle Grip Free Play Inspection

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

Throttle Grip Free Play Adjustment

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

Throttle 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 body 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).

⚠ 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.

Throttle Cable Lubrication

- Refer to the Chassis Parts Lubrication in the Periodic Maintenance chapter.

Throttle Body Assy

Idle Speed Inspection

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

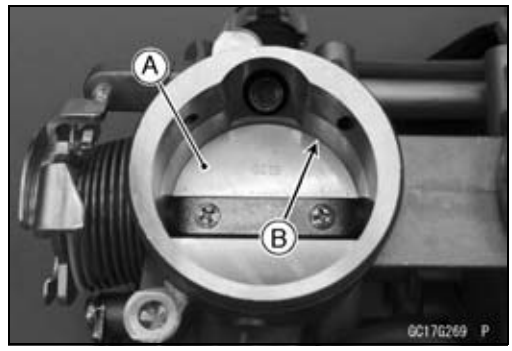
Throttle Bore Cleaning

● Check the throttle bore for cleanliness as follows.

○Remove the throttle body assy (see Throttle Body Assy Removal).

○Check the main throttle valves [A] and throttle bores [B] for carbon deposits by opening the main throttle valves.

★If any carbon accumulates, wipe the carbon off the throttle bores around the throttle bores and the throttle valves, using a cotton pad penetrated with a high flash-point solvent.



Synchronization Inspection/Adjustment

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

Throttle Body Assy Removal

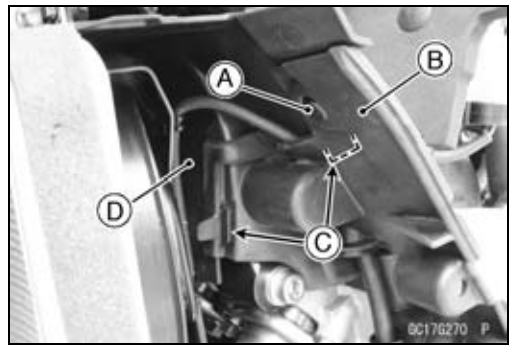
⚠ WARNING

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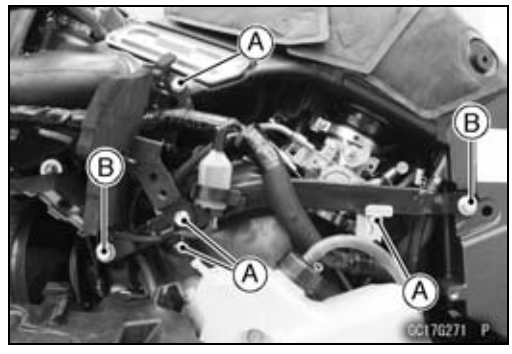
● Remove:
Middle Fairings (see Middle Fairing Removal in the Frame chapter)
Idle Speed Control Valve Actuator (see Idle Speed Control Valve Actuator Removal)
Fuel Tank (see Fuel Tank Removal)
Quick Rivet [A]

○Push the central pin of the quick rivet.

● Clear the left inner rubber cover [B] from the hooks [C] of the radiator cover [D].



● Remove:
Bolts [A]
Subframe Bolts [B] and Washers



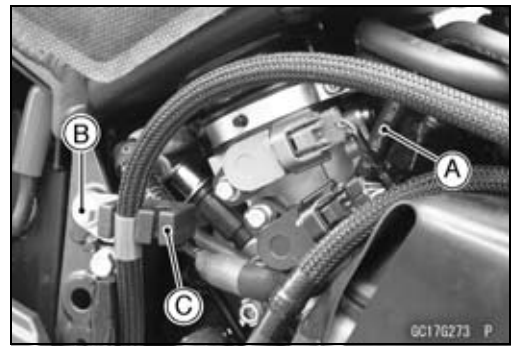
Throttle Body Assy

- Disconnect the throttle body subharness connector [A].
- Disconnect the fuel hose joint from the delivery pipe of the throttle body assy (see Fuel Hose Replacement in the Periodic Maintenance chapter).

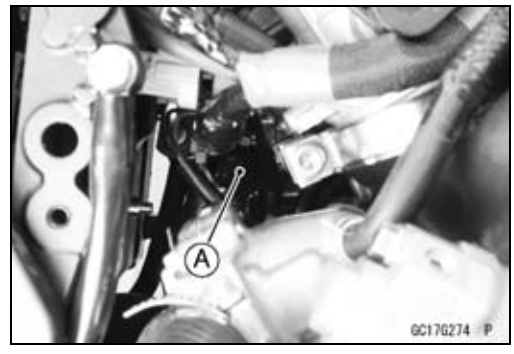


Other than US, CA, AU, ID, PH and SEA-B3 Models

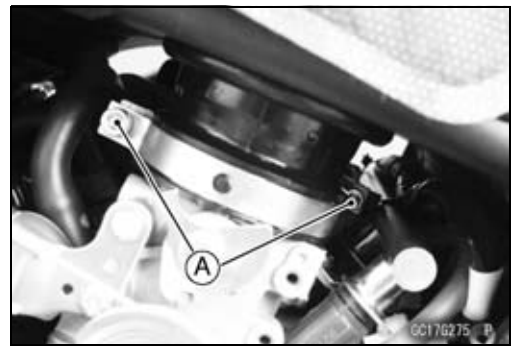
- Disconnect the vacuum hose [A] from the throttle body assy.
- Remove:
  Bolt [B]
  Hose Bracket [C]



- Disconnect the crankshaft sensor lead connector [A].



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

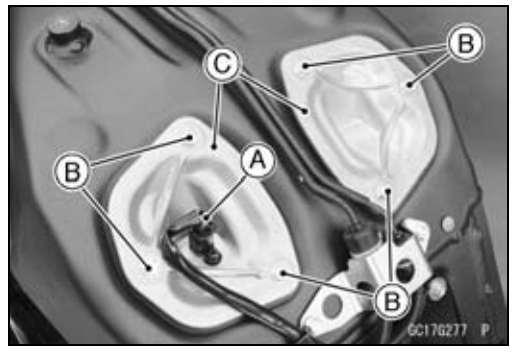


- Remove:
  Heat Insulation Cover [A]

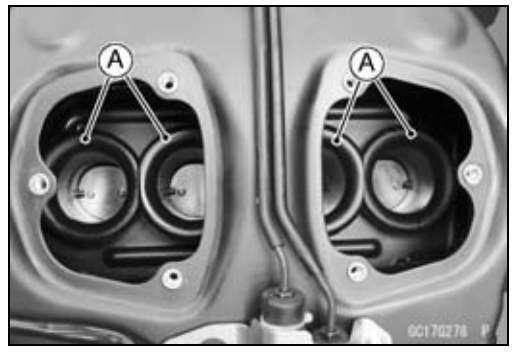


Throttle Body Assy

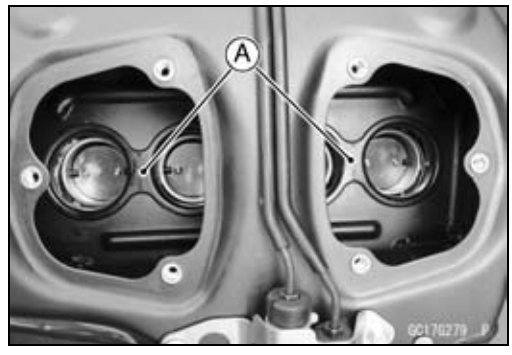
- Disconnect the intake air pressure sensor lead connector [A].
- Remove:
  Air Cleaner Cap Bolts [B]
  Air Cleaner Caps [C]



- Pull out the ducts [A] upward.



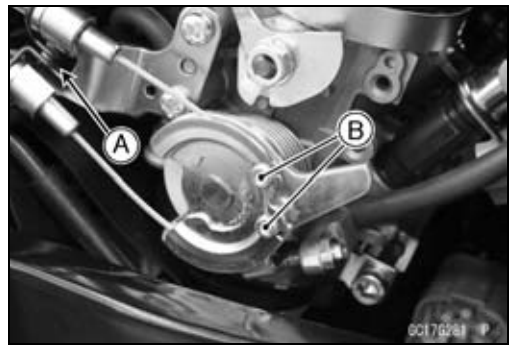
○Remove the grommets [A] as necessary.



- Remove the throttle case [A] to make a throttle cable slack.

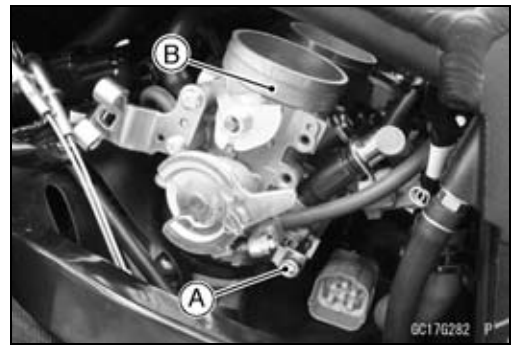


- Remove:
  Clamp [A]
  Throttle Cable Lower Ends [B]



Throttle Body Assy

- Loosen the throttle body assy holder clamp bolt [A] on both sides.
- Pull out the throttle body assy [B] from the holder.



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

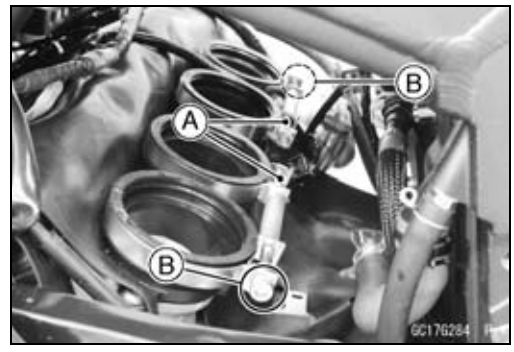


NOTICE
If dirt gets into the engine, excessive engine wear and possible engine damage will occur.

Throttle Body Assy Installation

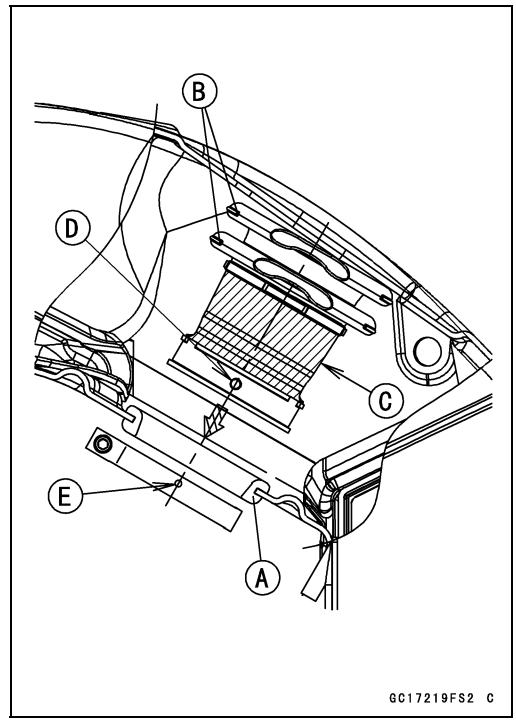
- Install the holder clamp bolts [A] in the direction as shown.
  Bolt Heads [B]
- Connect the fuel hose joint to the delivery pipe of the throttle body assy (see Fuel Hose Replacement in the Periodic Maintenance chapter).
- Tighten:

Torque - Throttle Body Assy Holder Clamp Bolts: 2.0 N·m (0.20 kgf·m, 18 in·lb)



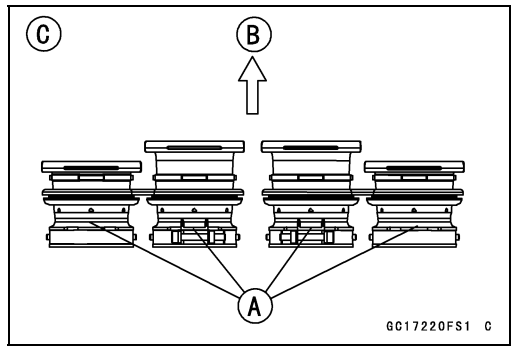
★If the grommet [A] was removed, install it.
○Install the grommet from the inside of the frame.
- Insert the duct [B] to the grommet.

○Apply 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] in the clamp.



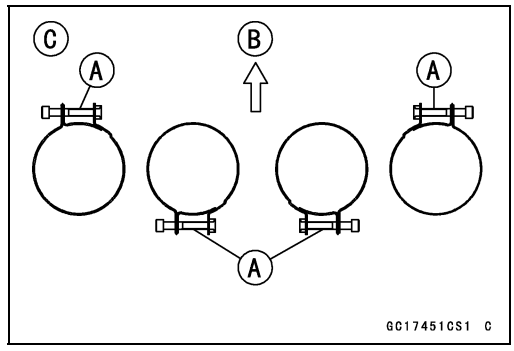
Throttle Body Assy

● Install the ducts [A] to the throttle body assy as shown.
Front [B]
Rear View [C]

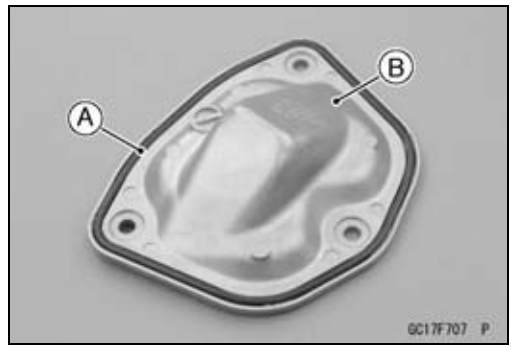


● Install the duct clamp bolts [A] in the direction as shown.
Front [B]
Upside View [C]
● Tighten:

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

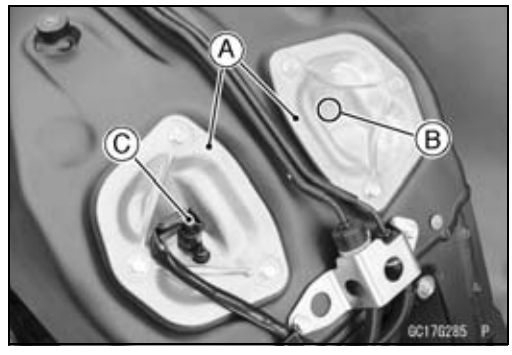


● Apply grease to the dust seal [A] on the air cleaner cap [B].

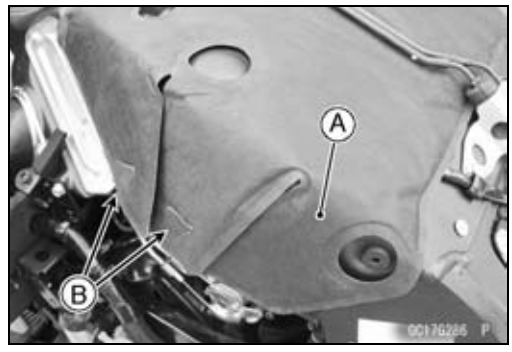


● Install the air cleaner caps [A].
○The right air cleaner cap has a “R” mark [B].
● Connect the intake air temperature sensor lead connector [C].
● Tighten:

Torque - Air Cleaner Cap Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

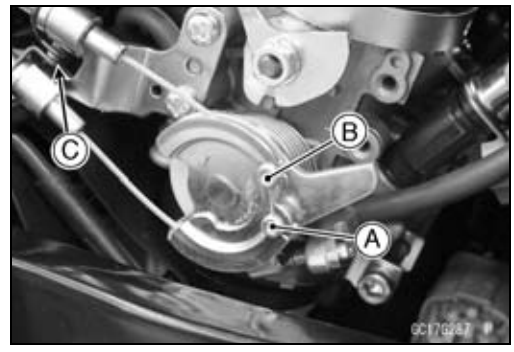


● Install the heat insulation cover [A], and insert the tabs [B] into the slots on both sides.



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.
- Hold the throttle cables with the clamp [C], and hook its clamp to the hole of the throttle body assy.

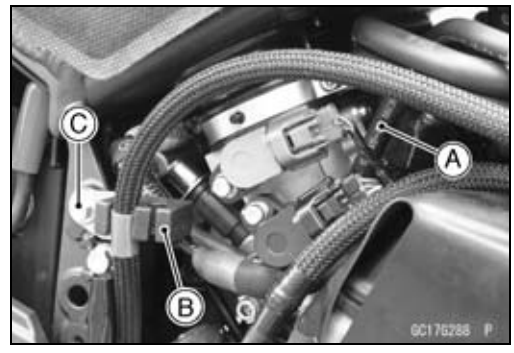


- Install the throttle case (see Handlebar Installation in the Steering chapter).
- Run the leads and hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Adjust:
  Throttle Grip Free Play (see Throttle Control System Inspection in the Periodic Maintenance chapter)
- Install the removed parts (see appropriate chapters).

Other than US, CA, AU, ID, PH and SEA-B3 Models

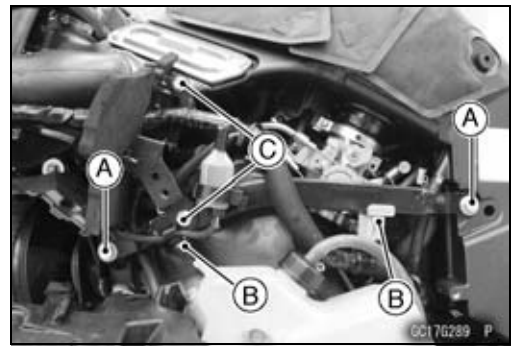
- Connect the vacuum hose [A] to the throttle body assy.
- Install the bracket [B] and tighten the bracket bolt [C].

Torque - Hose Bracket Bolt: 8.0 N·m (0.82 kgf·m, 71 in·lb)



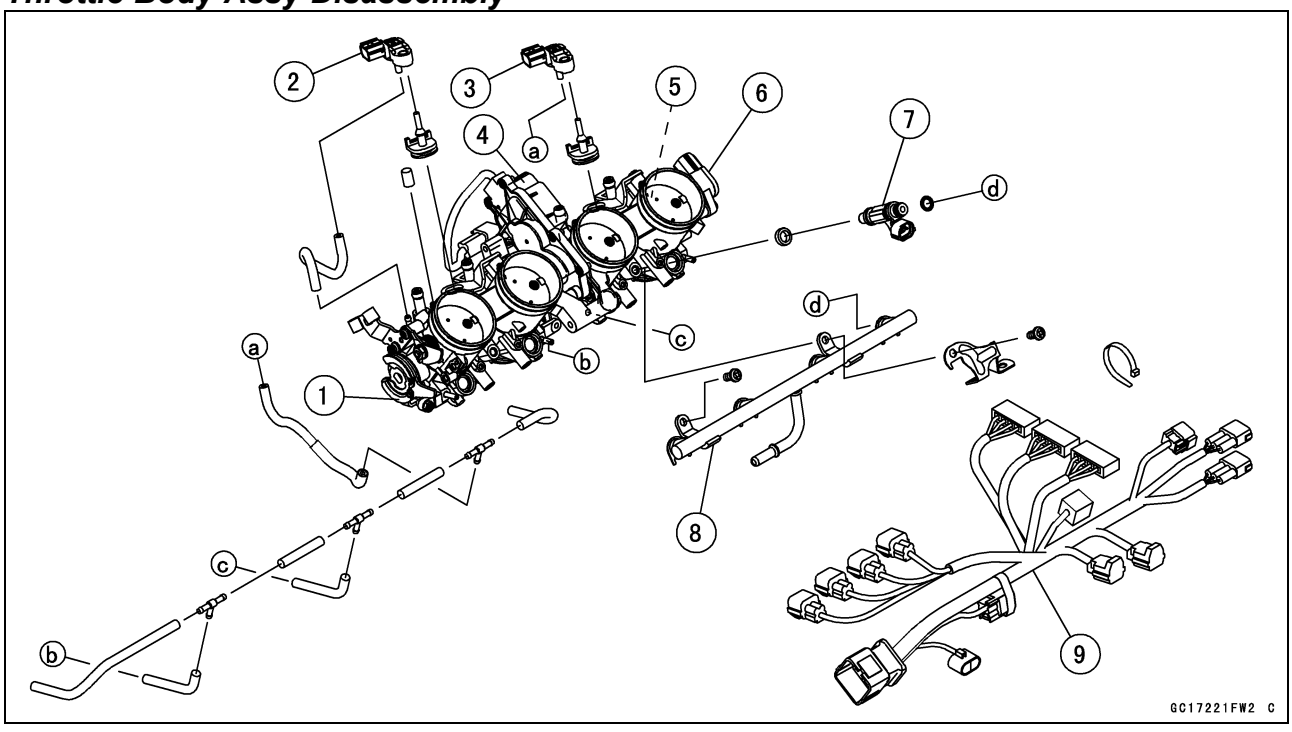
- Tighten:

Torque - Subframe Bolts [A]: 23 N·m (2.3 kgf·m, 17 ft·lb)
Bracket Bolts [B]: 8.0 N·m (0.82 kgf·m, 71 in·lb)
Pad Bracket Bolts (M6) [C]: 8.0 N·m (0.82 kgf·m, 71 in·lb)



Throttle Body Assy

Throttle Body Assy Disassembly



1. Throttle Body Assy
2. Intake Air Pressure Sensor #2
3. Intake Air Pressure Sensor #1
4. Subthrottle Valve Actuator
5. Main Throttle Sensor
6. Subthrottle Sensor
7. Fuel Injectors
8. Delivery Pipe
9. Throttle Body Subharness

NOTICE

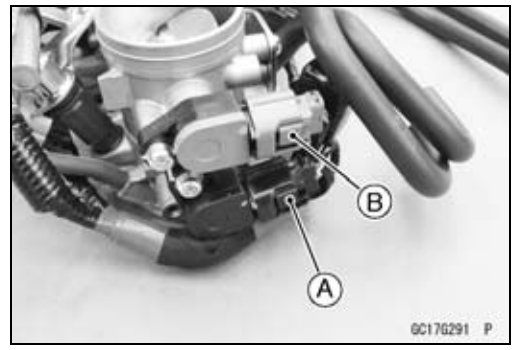
Do not remove, disassemble or adjust the main throttle sensor, subthrottle sensor, subthrottle valve actuator, throttle link mechanism and throttle body assy, because they are adjust or set surely at the manufacturer. Adjustment of these parts could result in poor performance, requiring replacement of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

- Remove the throttle body assy (see Throttle Body Assy Removal).
- Disconnect the fuel injector connectors [A].

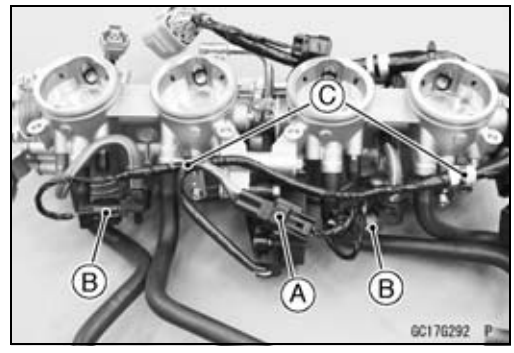


Throttle Body Assy

- Disconnect the main throttle sensor [A] and subthrottle sensor [B] connectors.



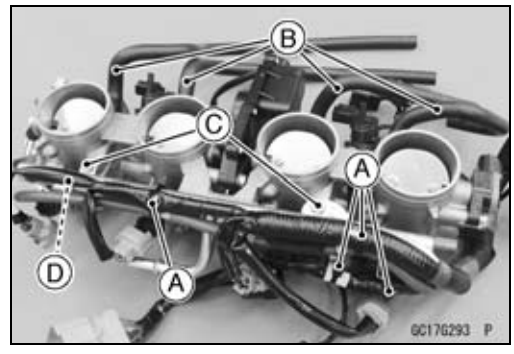
- Disconnect:
  Subthrottle Valve Actuator Lead Connector [A]
  Intake Air Pressure Sensor Connectors [B]
- Cut the clamps [C].



- Cut the clamps [A].
- Separate the hoses [B] from the throttle body fittings and intake air pressure sensors.
- Remove the screws [C] to pull out the fuel injectors from the throttle body assy together with the delivery pipe [D].

NOTE

○*Do not damage the insertion portions of the fuel injectors when they are pulled out from the throttle body.*



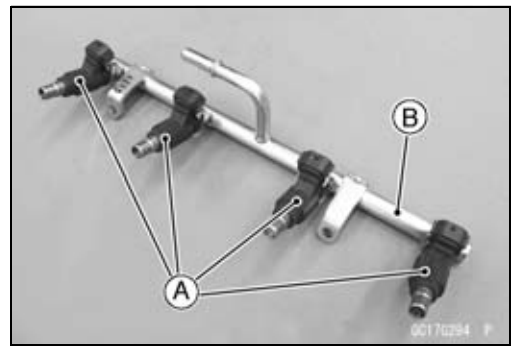
- Pull out the fuel injectors [A] from the delivery pipe [B].

NOTE

○*Do not damage the insertion portions of the fuel injectors when they are pulled out from the delivery pipe.*

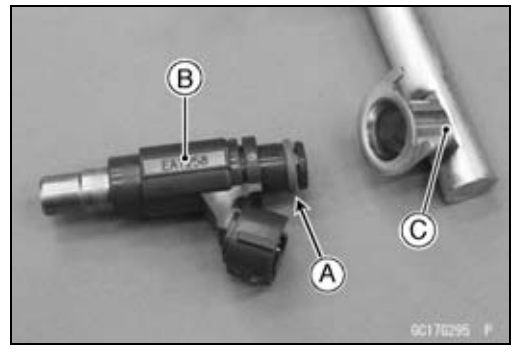
NOTICE

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

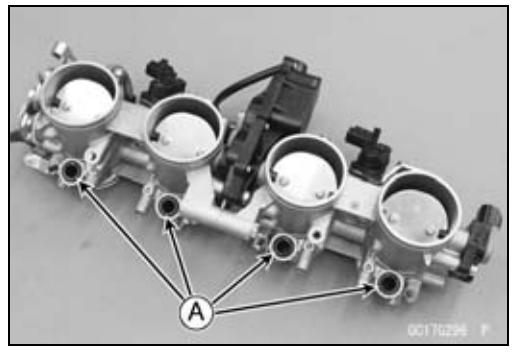


Throttle Body Assy Assembly

- 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 O-rings, insert them to the delivery pipe [C] and confirm whether the fuel injectors turn smoothly or not.



Throttle Body Assy



- Replace the dust seals [A] with new ones.
- Apply engine oil to the dust seals.
- Install the fuel injectors along with the delivery pipe to the throttle body.
- Tighten:

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

- Connect the connectors.
- Insert the each hose to the throttle body fittings and intake air pressure sensors.
- Bind the harness and hoses with clamps.
- Install the throttle body assy (see Throttle Body Assy Installation).

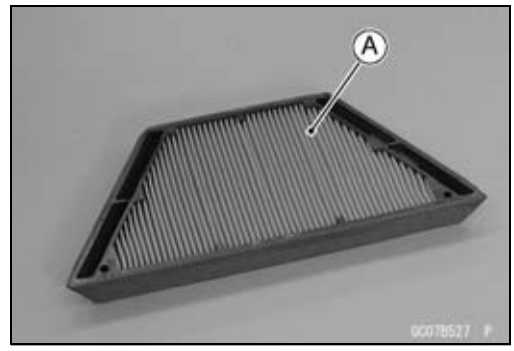
Air Cleaner

Air Cleaner Element Removal/Installation

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

Air Cleaner Element Inspection

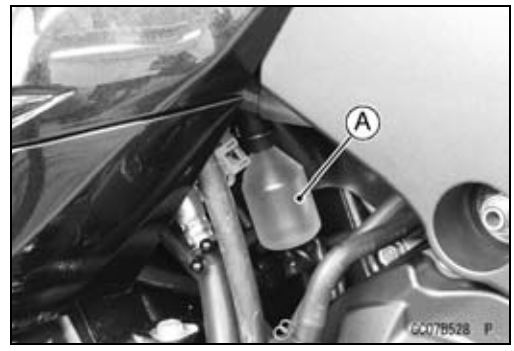
● Remove the air cleaner element (see Air Cleaner Element Replacement in the Periodic Maintenance chapter).
● Visually check the element [A] for tears or breaks.
★If the element has any tears or breaks, replace the element.



Air Cleaner Oil Draining

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

● 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.



⚠ WARNING

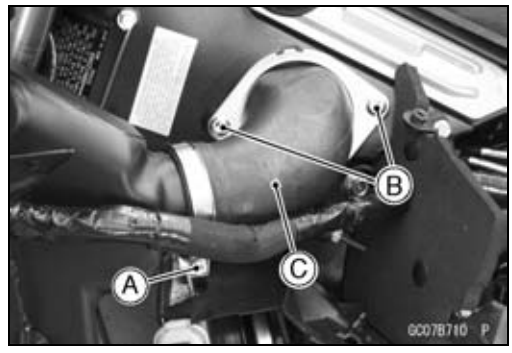
Oil on tires will make them slippery and can cause an accident and injury. Be sure to reinstall the catch tank after draining.

Air Line

Rear Air Intake Duct Removal

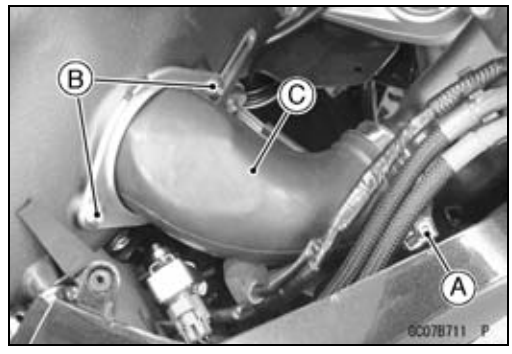
Left Rear Air Intake Duct

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



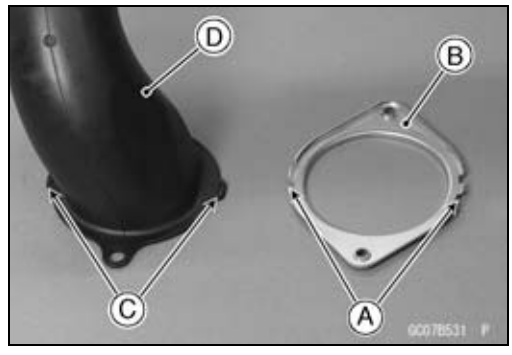
Right Rear Air Intake Duct

- Remove the fuel tank cover (see Fuel Tank Cover Removal in the Frame chapter).
- Loosen the clamp bolt [A].
- Remove the mounting bolts [B] and pull off the right rear air intake duct [C] backward.



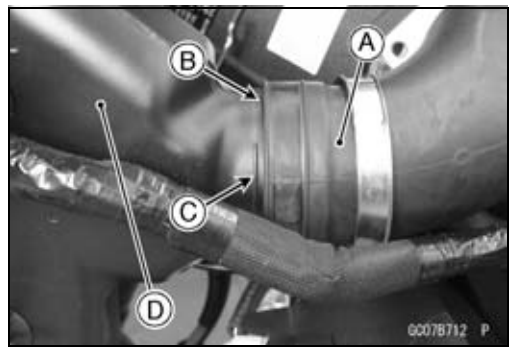
Rear Air Intake Duct Installation

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



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

Torque - Rear Air Intake Duct Mounting Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

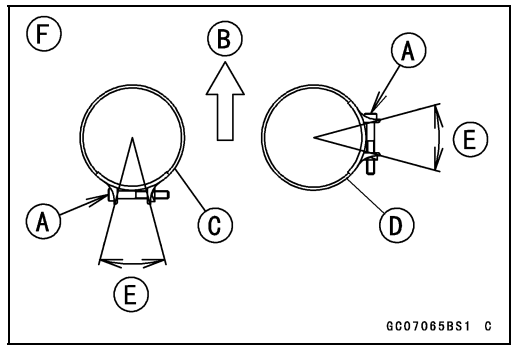


- Install the air intake duct clamp bolts in the direction as shown.

  Bolt Heads [A]
  Upper Side [B]
  Left Clamp [C]
  Right Clamp [D]
  About 30° [E]
  Rear View [F]

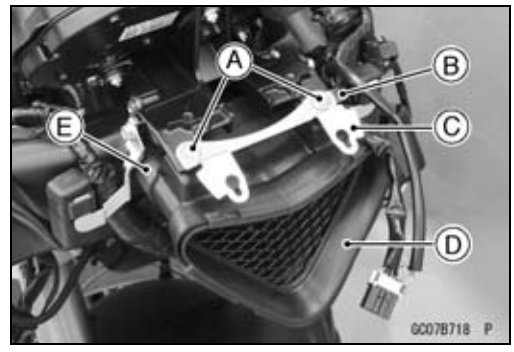
- Tighten:

Torque - Air Intake Duct Clamp Bolts: 7.0 N·m (0.71 kgf·m, 62 in·lb)

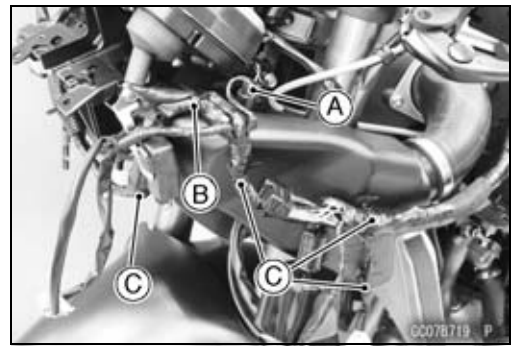


Air Line

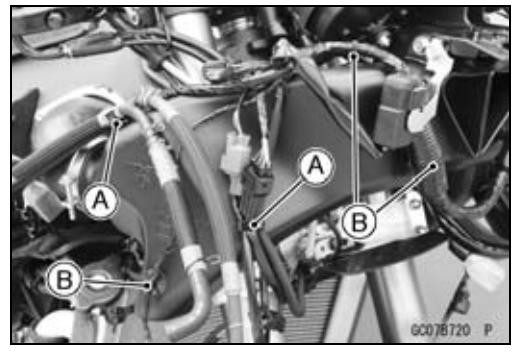
Front and Middle Intake Duct Removal



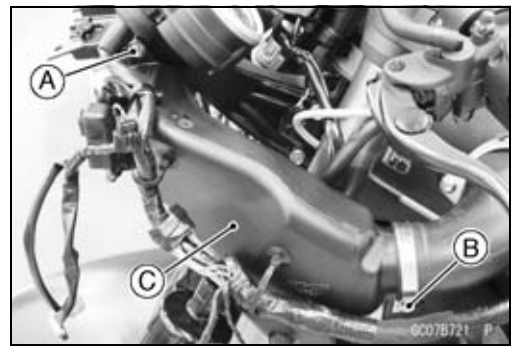
- Remove:
  Upper Fairing (see Upper Fairing Removal in the Frame chapter)
  Front Air Intake Duct Mounting Bolts [A]
  Clamp [B] (Immobilizer Equipped Model)
  Meter Cover Bracket [C]
  Front Air Intake Duct [D] with Rubber Seal [E]



- Remove:
  Outside Temperature Sensor [A] (see Outside Temperature Sensor Removal in the Electrical System chapter)
  Clamp [B]
- Open the bands [C].



- Remove the clamps [A].
- Open the bands [B].

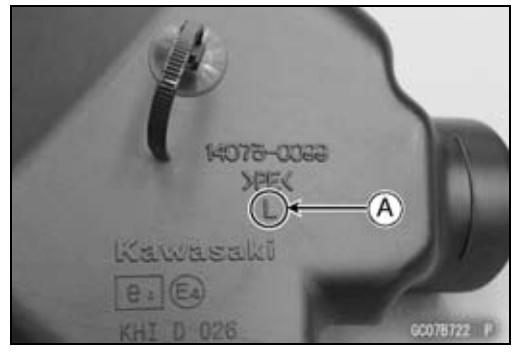


- Remove the middle air duct mounting bolt [A].
- Loosen the clamp bolt [B].
- Remove the middle air intake duct [C] to forward.

Front and Middle Air Intake Duct Installation

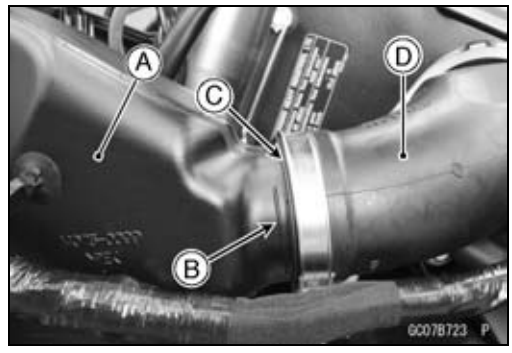
NOTE

○*The left middle air intake duct has a "L" mark [A] and the right middle air intake duct has a "R" mark.*



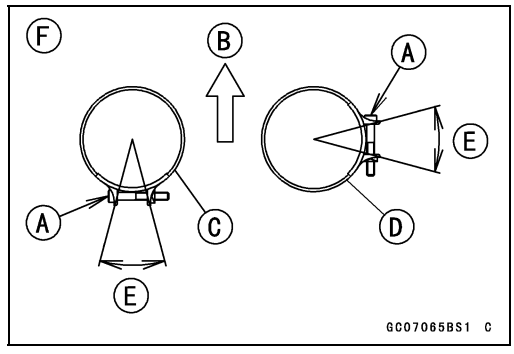
Air Line

- Insert the middle air intake duct [A] into the rear air intake duct until the line [B] align with the duct end [C] of rear air intake duct [D].
- Tighten the middle air intake duct mounting bolts.



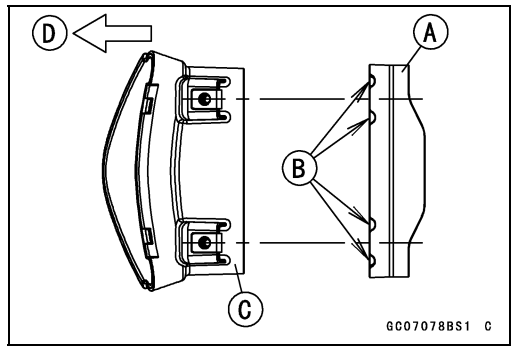
- Install the air intake duct clamp bolts in the direction as shown.
  Bolt Heads [A]
  Upper Side [B]
  Left Clamp [C]
  Right Clamp [D]
  About 30° [E]
  Rear View [F]
- Tighten:

Torque - Air Intake Duct Clamp Bolts: 7.0 N·m (0.71 kgf·m, 62 in·lb)



- When installing the rubber seal [A], note the following.

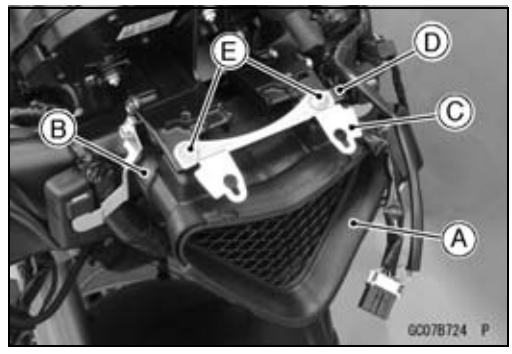
○Install the rubber seal so that the hollow side [B] faces forward.
  Front Air Intake Duct [C]
  Front [D]



- Install the front air intake duct [A] together with the rubber seal [B], meter cover bracket [C] and clamp [D] (immobilizer equipped model).
- Tighten:

Torque - Front Air Intake Duct Mounting Bolts [E]: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Replace the clamps with new ones (see Exploded View in this chapter).
- Run the leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).



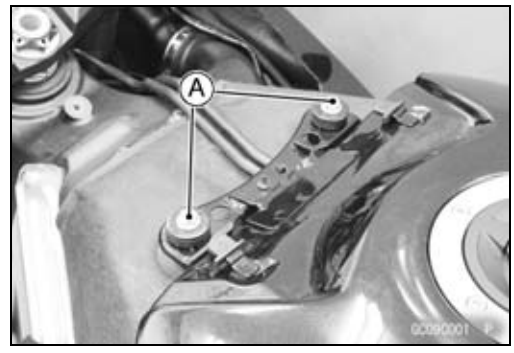
Fuel Tank

Fuel Tank Removal

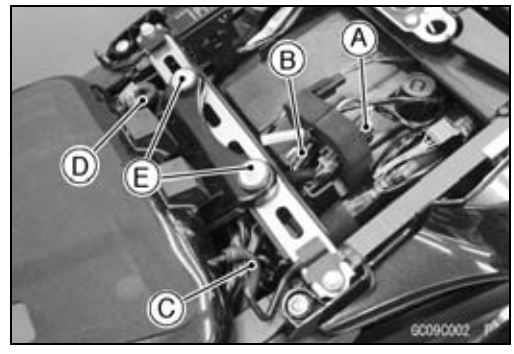
⚠ WARNING

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 ignition switch 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.

- Turn the ignition switch off.
- Wait until the engine cools down.
- Remove the fairing covers (see Fairing Cover Removal in the Frame chapter).
- Disconnect the battery (–) terminal (see Battery Removal in the Electrical System chapter).
- Remove:
  Inner Covers (see Inner Cover Removal in the Frame chapter)
  Fuel Tank Cover (see Fuel Tank Cover Removal in the Frame chapter)
  Seat (see Seat Removal in the Frame chapter)
  Fuel Tank Bolts [A]



- Disconnect:
  Fuel Pump Lead Connector [A]
  Fuel Level Sensor Lead Connector [B]
  Drain Hose [C]
  Breather Hose [D]
- Remove the fuel tank bolts [E] and washers.



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

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



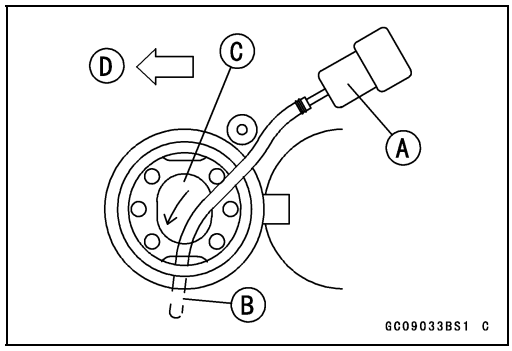
Fuel Tank

- Draw the fuel out from the fuel tank with a commercially available pump [A].

○Use a soft plastic hose [B] as a pump intake hose in order to insert the hose smoothly.

○Put the hose through the fill opening [C] into the tank and draw the fuel out.

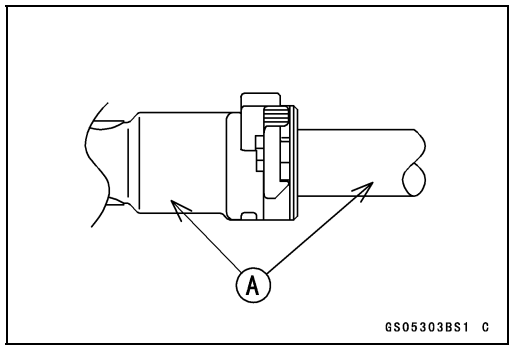
Front [D]



⚠ 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 around the fuel hose joint.
- Wipe off the dirt of the surface [A] around the connection using a cloth or a soft brush.

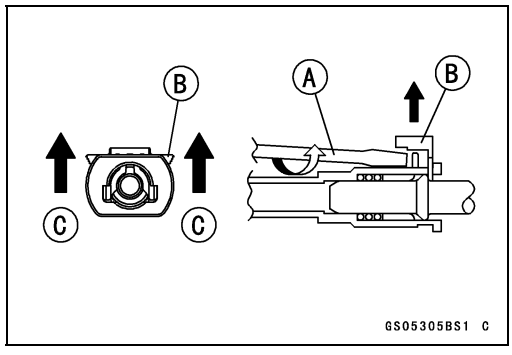


When removing with flat tip screwdriver

- Insert the flat tip screwdriver [A] into slit on the joint lock [B].
- Turn the driver to disconnect the joint lock.

When removing with fingers

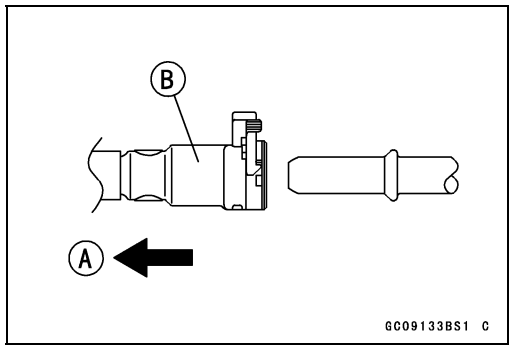
- Open and push up [C] the joint lock with your fingers.



NOTICE

Prying or excessively widening the joint lock ends for fuel hose removal will permanently deform the joint lock, resulting in a loose or incomplete lock that may allow fuel to leak and create the potential for a fire explosion. To prevent fire or explosion from a damaged joint lock, do not pry or excessively widen the joint lock ends when removing the fuel hose. The joint lock has a retaining edge that locks around the housing.

- Pull [A] the fuel hose joint [B] out of the outlet pipe.



⚠ WARNING

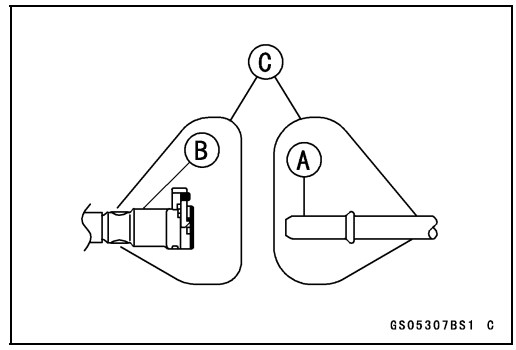
Fuel is flammable and explosive under certain conditions and can cause severe burns. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately. When the fuel hose is disconnected, fuel spills out from the hose and the pipe because of residual pressure. Cover the hose connection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

Fuel Tank

- Close the fuel tank cap.
- Remove the fuel tank, and place it on a flat surface.

○Do not apply the load to the fuel outlet pipe of the fuel pump.

- Clean the pipe [A].
- Cover the pipe and hose joint [B] with the vinyl bags [C] to keep it clean.



- For other than US, CA, AU, ID, PH and SEA-B3 models, note the following.

NOTICE
For other than US, CA, AU, ID, PH and SEA-B3 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.

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

⚠ WARNING
Spilled fuel is flammable and can be explosive under certain conditions. For other than US, CA, AU, ID, PH and SEA-B3 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.

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

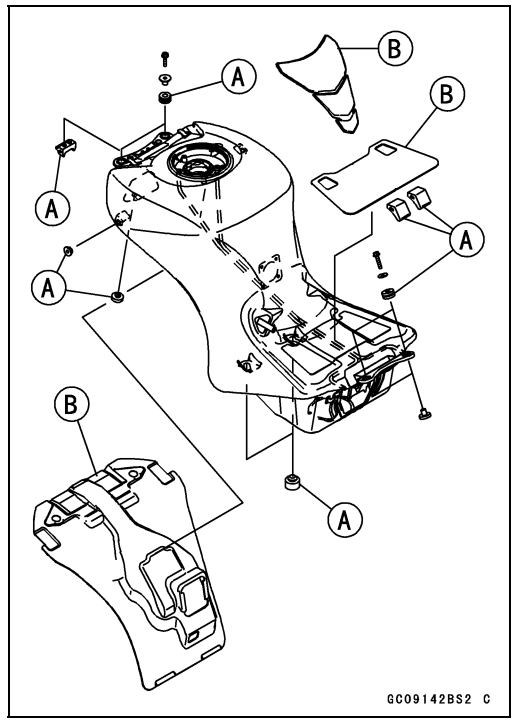
⚠ WARNING
Gasoline is extremely flammable and can be explosive under certain conditions, creating the potential for serious burns. Store the fuel tank in an area which is well ventilated and free from any source of flame or sparks. Do not smoke in this area. Place the fuel tank on a flat surface and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

Fuel Tank

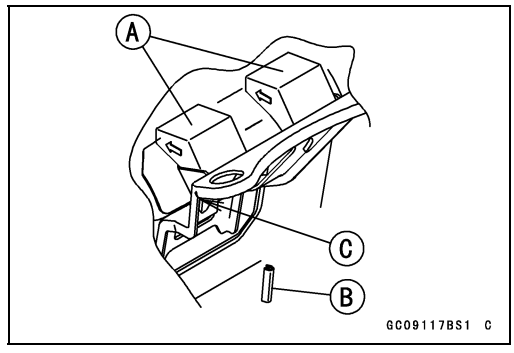
Fuel Tank Installation

- Note the above WARNING (see Fuel Tank Removal).
- Run the hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Check that the dampers [A] and pads [B] are in place on the fuel tank.

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



- When installing the dampers [A] so that the side of it contacts the bracket as shown.
- When installing the trim [B], install it align the corner [C] of the bracket.

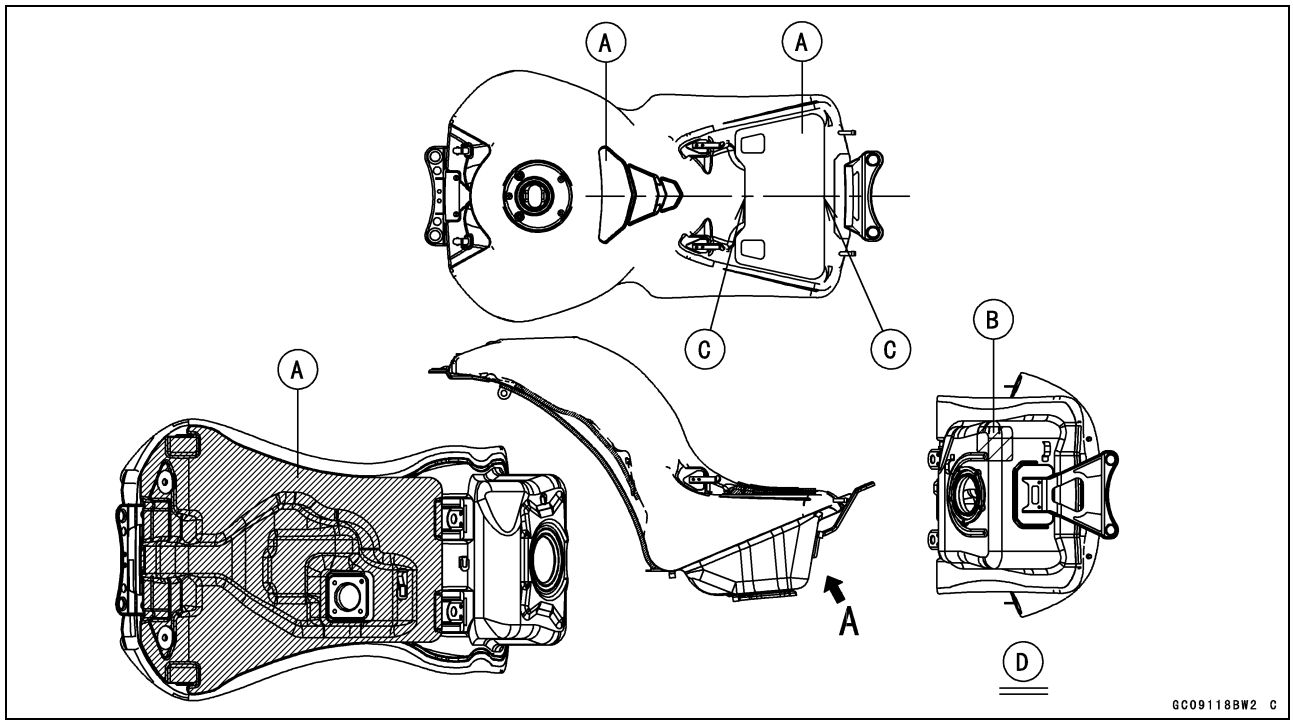


- When installing the pads [A] and guard [B], install them as shown.

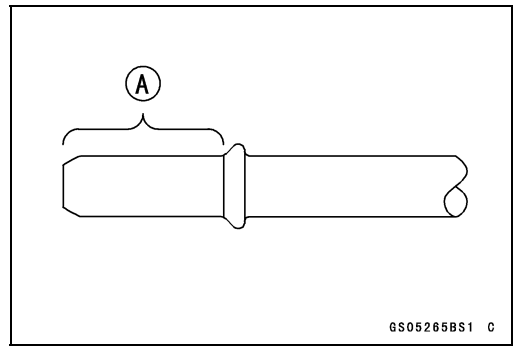
  Align [C] the weld portion of the fuel tank and dents of the pad.

  View A [D]

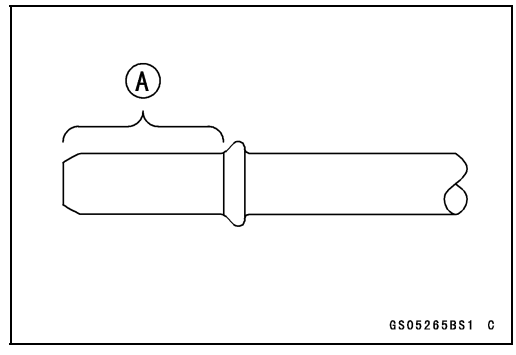
Fuel Tank



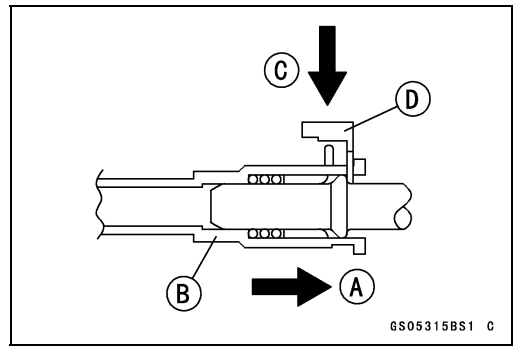
- Remove the vinyl bags on the pipe and hose joint.
- Check that there are no flaws, burrs, and adhesion of foreign materials on fuel outlet pipe [A].
- Check the joint lock for deformation and wear.
- If the joint lock is deformed, replace the fuel hose with a new one.



- Apply engine oil to the fuel outlet pipe [A] lightly.

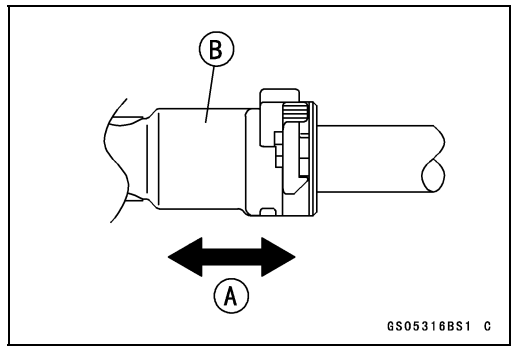


- Insert [A] the fuel hose joint [B] straight onto the fuel outlet pipe until the hose joint clicks.
- Push [C] the joint lock [D] until the hose joint clicks.



Fuel Tank

- 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.

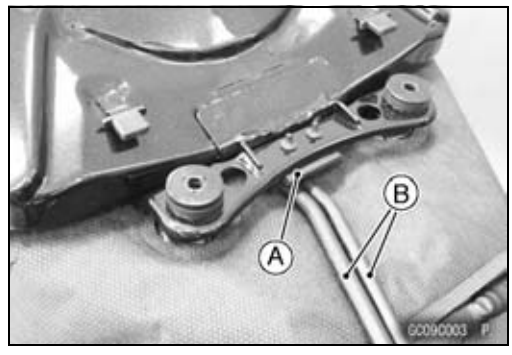


⚠ WARNING

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

★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).



- Fit the grooves of the damper [A] on the brake pipes [B].
- Tighten:

Torque - Fuel Tank Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Install the removed parts (see appropriate chapters).

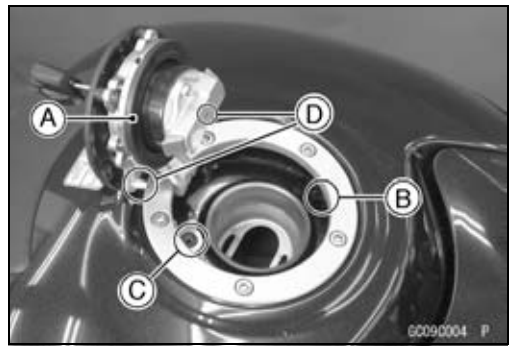
Fuel Tank and Cap Inspection

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

★Replace the gasket if it is damaged.

- Check to see if the water drain pipe [B] and fuel breather pipe [C] 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

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)

Evaporative Emission Control System (Other than US, CA, AU, ID, PH and SEA -B3 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

⚠ WARNING

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

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.

- Connect 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.

Hose Inspection

- Refer to the Evaporative Emission Control System Inspection (Other than US, CA, AU, ID, PH and SEA-B3 Models) in the Periodic Maintenance chapter.

Purge Valve Inspection

- Refer to the Purge Valve Inspection.

Canister Inspection

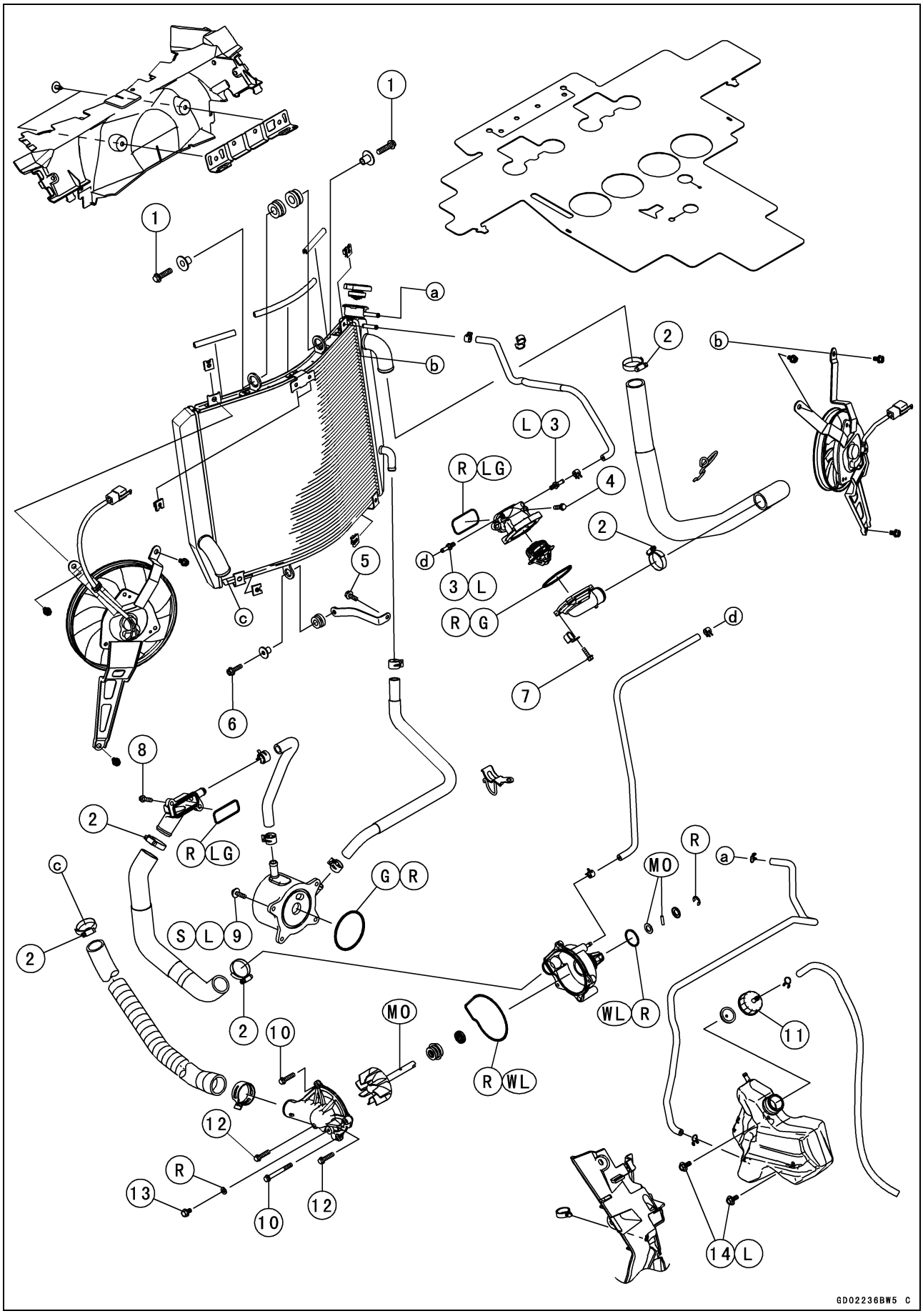
- Refer to the Evaporative Emission Control System Inspection (Other than US, CA, AU, ID, PH and SEA-B3 Models) in the Periodic Maintenance chapter.

Cooling System

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Exploded View

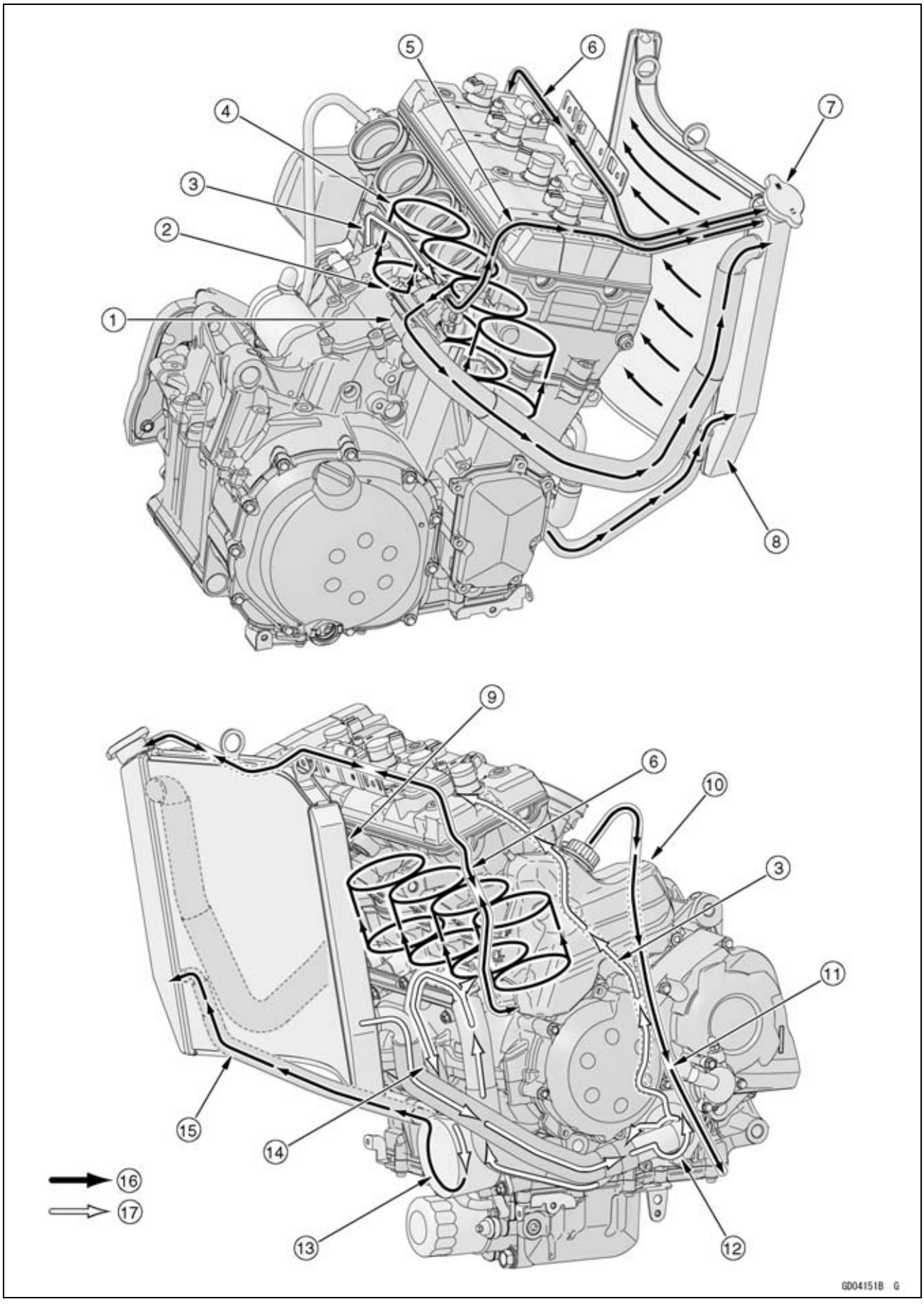


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Radiator Upper Bolts	20	2.0	15	
2	Water Hose Clamp Screws	3.0	0.31	27 in·lb	
3	Coolant Fitting Bolts	9.0	0.92	80 in·lb	L
4	Thermostat Housing Mounting Bolts	10	1.0	89 in·lb	
5	Radiator Stay Bolt	8.0	0.82	71 in·lb	
6	Radiator Lower Bolt	8.0	0.82	71 in·lb	
7	Thermostat Housing Cover Bolts	6.0	0.61	53 in·lb	
8	Cylinder Fitting Mounting Bolts	10	1.0	89 in·lb	
9	Oil Cooler Mounting Bolts	12	1.2	106 in·lb	L, S
10	Water Pump Mounting Bolts	12	1.2	106 in·lb	
11	Coolant Reserve Tank Cap	–	–	–	Hand -tighten
12	Water Pump Cover Bolts	12	1.2	106 in·lb	
13	Coolant Drain Bolt	10	1.0	89 in·lb	
14	Coolant Reserve Tank Bolts	8.0	0.82	71 in·lb	L

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 weight ratio 2:1)
R: Replacement Parts
S: Follow the specified tightening sequence.
WL: Apply soap and water solution or rubber lubricant.

Coolant Flow Chart



Coolant Flow Chart

1. Thermostat Housing
2. Cylinder Jacket
3. Air Bleeder Hose for Water Pump
4. Cylinder Head Jacket
5. Air Bleeder Hose for Thermostat Housing
6. Reserve Tank Hose
7. Radiator Cap
8. Radiator
9. Radiator Fan
10. Reserve Tank
11. Reserve Tank Overflow Hose
12. Water Pump
13. Oil Cooler
14. Intake Hose
15. Outlet Hose
16. Hot Coolant
17. Cold Coolant

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 93.3 ~ 122.7 kPa (0.95 ~ 1.25 kgf/cm², 13.5 ~ 17.8 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 93.3 ~ 122.7 kPa (0.95 ~ 1.25 kgf/cm², 13.5 ~ 17.8 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

Item	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	3.2 L (3.4 US qt) (reserve tank full level, including radiator and engine)
Radiator Cap	
Relief Pressure	93.3 ~ 122.7 kPa (0.95 ~ 1.25 kgf/cm², 13.5 ~ 17.8 psi)
Thermostat	
Valve Opening Temperature	58 ~ 62°C (136 ~ 144°F)
Valve Full Opening Lift	8 mm (0.31 in.) or more @75°C (167°F)

Coolant

Coolant Deterioration Inspection



- Remove the left middle fairing (see 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.

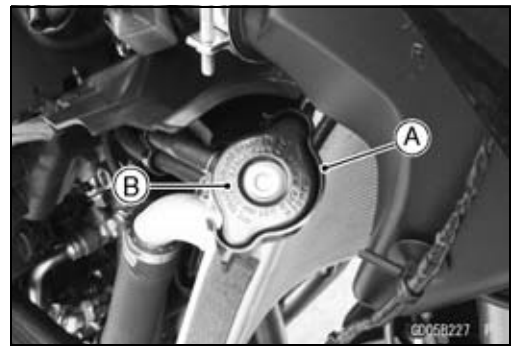
Coolant Draining

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

Coolant Filling

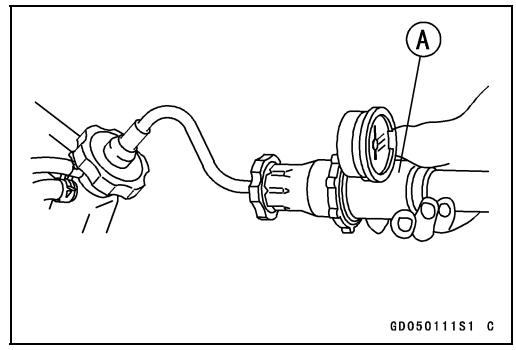
- Refer to the Coolant Change in the Periodic Maintenance chapter.

Pressure Testing



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

○Remove 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

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

- Build up pressure in the system carefully until the pressure reaches 122.7 kPa (1.25 kgf/cm², 17.8 psi).

NOTICE

During pressure testing, do not exceed the pressure for which the system is designed. The maximum pressure is 122.7 kPa (1.25 kgf/cm², 17.8 psi).

- Watch the gauge for at least 6 seconds.

★If the pressure holds steady, the system is all right.

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

- Remove the pressure tester, replenish the coolant, and install the radiator cap and cover.
- Install the right middle fairing (see Middle Fairing Installation in the Frame chapter).

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/Installation

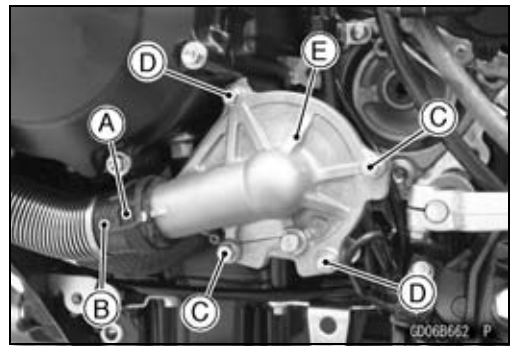
- The coolant reserve tank is removed and installed during coolant change (see Coolant Change in the Periodic Maintenance chapter).

Water Pump

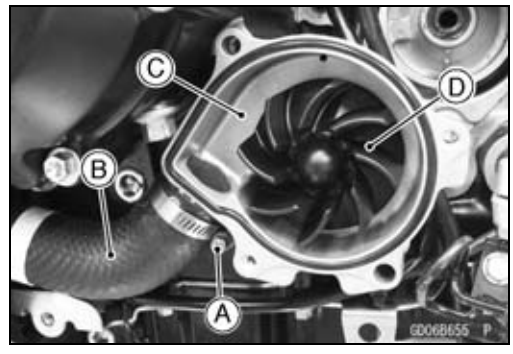
Water Pump Removal

- Drain:
  Coolant (see Coolant Change in the Periodic Maintenance chapter)
  Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)
- Remove:
  Clutch Slave Cylinder (see Clutch Slave Cylinder Removal in the Clutch chapter)
  Engine Sprocket Cover (see Engine Sprocket Removal in the Final Drive chapter)

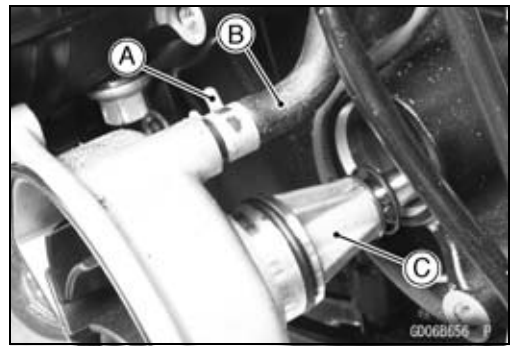
- Slide the clamp [A] and disconnect the water hose [B].
- Remove:
  Water Pump Cover Bolts [C]
  Water Pump Mounting Bolts [D]
  Water Pump Cover [E]



- Loosen the clamp screw [A] and disconnect the water hose [B].
- Remove the water pump body [C] with impeller [D] from the engine.

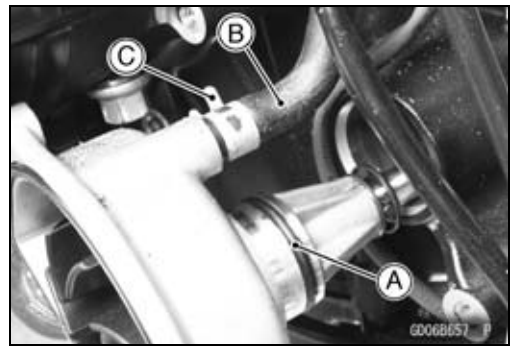


- Slide the clamp [A] and disconnect the air bleeder hose [B] from the water pump body.
- Remove the water pump body [C] with impeller.



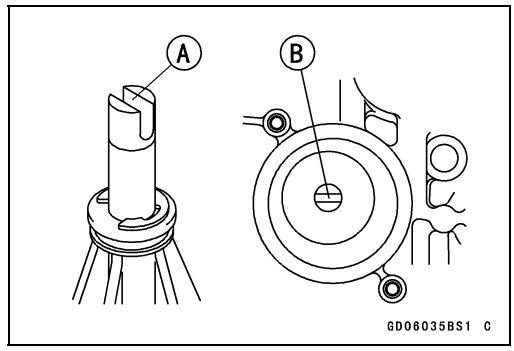
Water Pump Installation

- Replace the O-ring [A] with a new one.
- Apply soap and water solution to the O-ring.
- Install the air bleeder hose [B] and clamp [C] to the water pump body as shown.



Water Pump

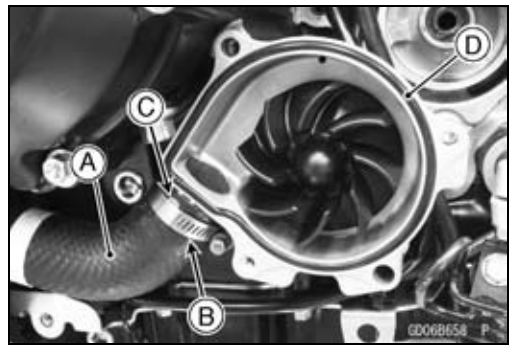
● Turn the water pump shaft so that the slot [A] in its shaft fits onto the projection [B] of the oil pump drive gear shaft.



● Install the water hose [A] and hose clamp [B] as shown. 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 soap and water solution to the O-ring.



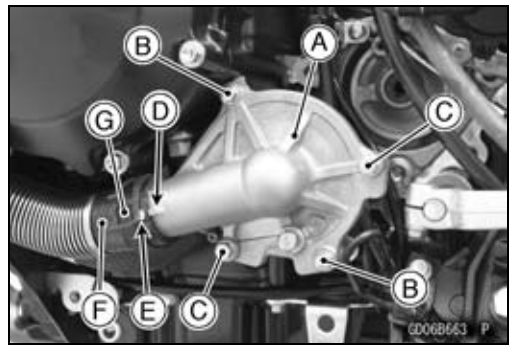
● Install the water pump cover [A].
● Tighten:

Torque - Water Pump Mounting Bolts [B]: 12 N·m (1.2 kgf·m, 106 in·lb)
Water Pump Cover Bolts [C]: 12 N·m (1.2 kgf·m, 106 in·lb)

● Align the projection [D] of the water pump cover with the mark [E] of the water hose [F].
● Install the clamp [G] as shown.
● Tighten:

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

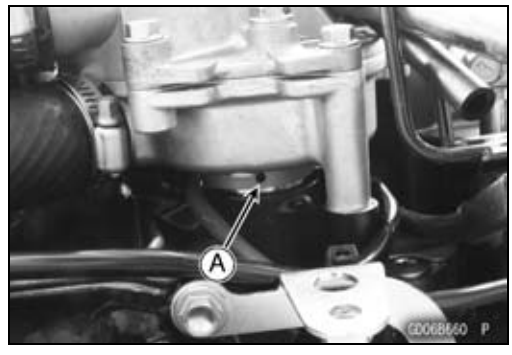
● Install the remove parts (see appropriate chapters).



Water Pump Inspection

● Check the drainage outlet passage [A] at the bottom of the water pump body for coolant leaks.
● If a coolant leak or ooze is found, start the engine and check if the coolant leaks continuously.

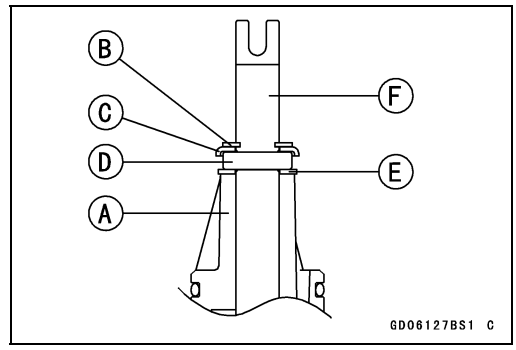
○When coolant does not continuously leak, it is normal.
★If the mechanical seal is damaged, the coolant continuously leaks through the drainage outlet passage. Replace the mechanical seal unit.
★If the oil seal is damaged, engine oil leaks through the drainage outlet passage. Replace the oil seal.



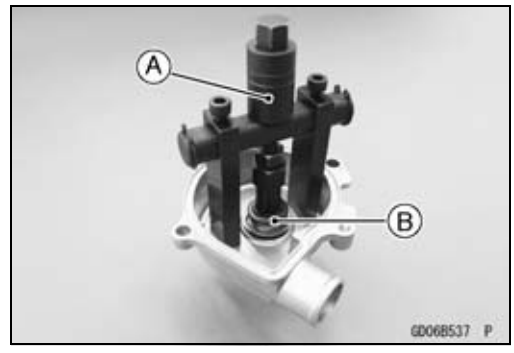
Water Pump

Water Pump Disassembly

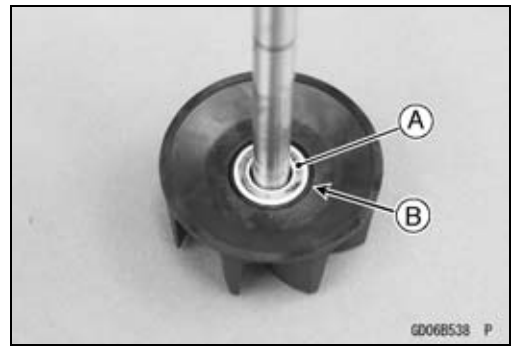
- Remove:
  Water Pump Body [A] (see Water Pump Removal)
  Circlip [B]
  Washer [C]
  Pin [D]
  Washer [E]
  Water Pump Shaft with Impeller [F]



- Using a suitable tool [A], remove the mechanical seal [B] and oil seal from the water pump body.

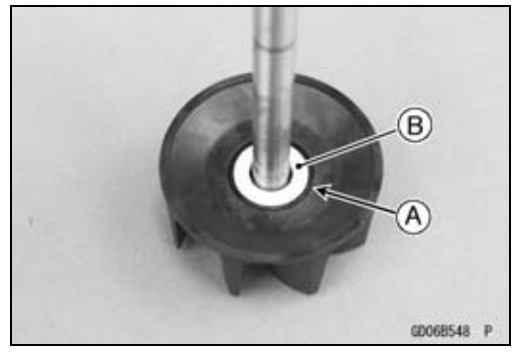


- Remove the sealing seat [A] and rubber seal [B].



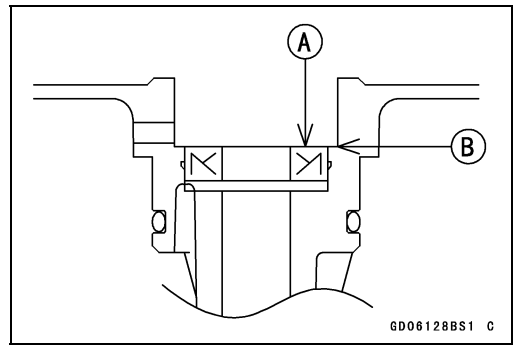
Water Pump Assembly

- Apply water or coolant around the surfaces of the rubber seal [A] and sealing seat [B].
- Install the rubber seal and sealing seat into the impeller by pressing them by hand until the seat stops at the bottom of the hole.



NOTICE
Do not reuse the mechanical seal and oil seal.

- Press the new oil seal into the water pump body with a suitable tool so that the surface [A] of the oil seal is flush with the surface [B] of the water pump body.
- Apply grease to the oil seal lips.

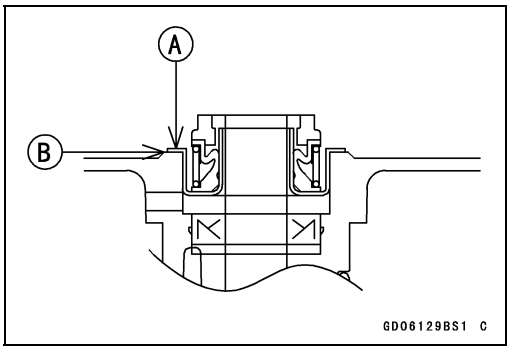


Water Pump

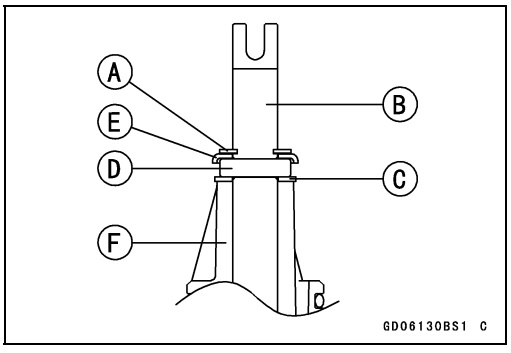
NOTICE

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

- Press the new mechanical seal into the water pump body with the suitable tool until its flange [A] touches the surface [B] of the water pump body.



- Replace the circlip [A] with a new one.
- Apply molybdenum disulfide oil solution to the following parts.
  Water Pump Shaft [B]
  Washer [C]
  Pin [D]
- Install the following parts as shown.
  Water Pump Shaft with Impeller
  Washer
  Pin
  Washer [E]
  Circlip
  Water Pump Body [F] (see Water Pump Installation)



Water Pump Impeller Inspection

- Remove the water pump cover (see Water Pump Removal).
- Visually inspect the water pump impeller [A].

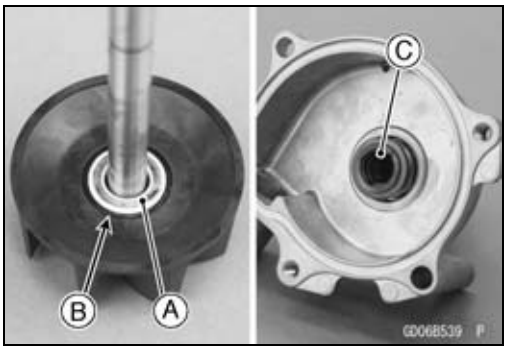
★If the surface is corroded or if the blades are damaged, replace the water pump assy.



Mechanical Seal Inspection

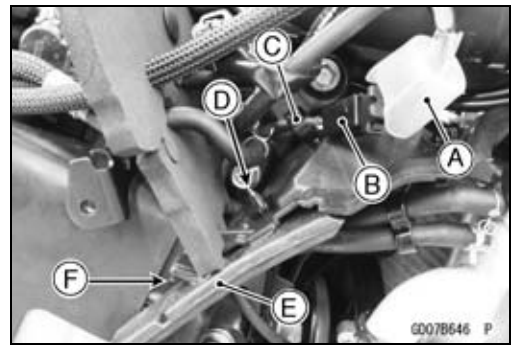
- Remove the water pump shaft with impeller (see Water Pump Disassembly).
- Visually inspect the mechanical seal.

★If any one of the parts is damaged, replace the mechanical seal as a unit.
  Impeller Sealing Seat Surface [A]
  Rubber Seal [B]
  Mechanical Seal [C]

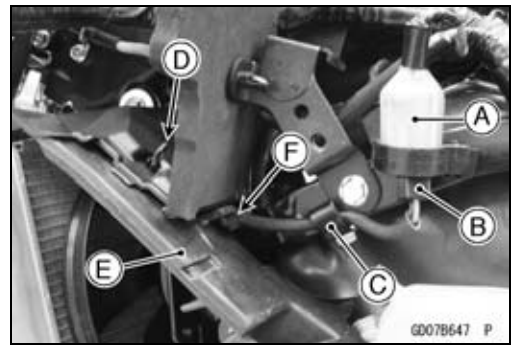


Radiator

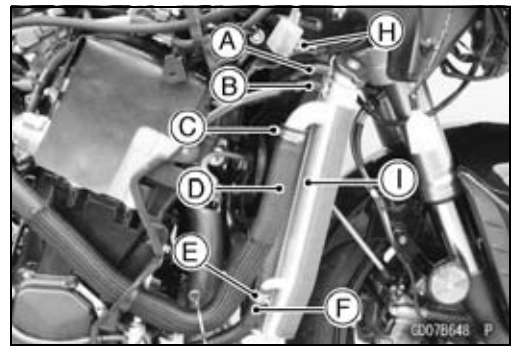
Radiator and Radiator Fan Removal



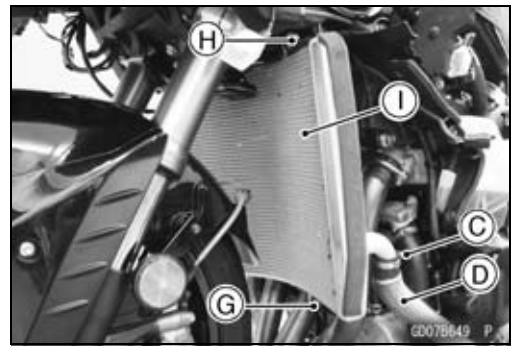
- Remove the middle fairings (see Middle Fairing Removal in the Frame chapter).
- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Slide the dust cover [A] and disconnect the right radiator fan motor lead connector [B].
- Remove:
  Clamp [C]
  Quick Rivet [D]
- Clear the right inner rubber cover [E] from the hook [F] of the radiator cover.
- Free the right radiator fan motor lead.



- Slide the dust cover [A] and disconnect the left radiator fan motor lead connector [B].
- Open the clamp [C].
- Remove the quick rivet [D].
- Clear the left inner rubber cover [E] from the hook [F] of the radiator cover.
- Free the left radiator fan motor lead.



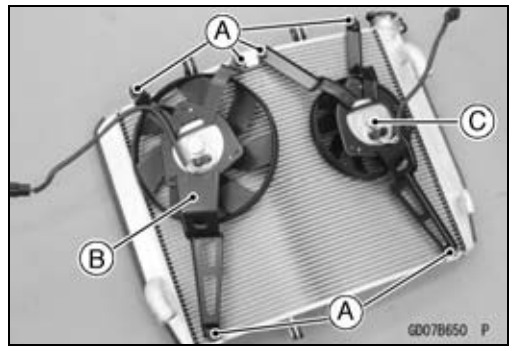
- Slide the clamps and disconnect the reserve tank hose [A] and air bleeder hose [B].
- Loosen the clamp screws [C] and disconnect the water hoses [D].
- Slide the clamp [E] and disconnect the outlet hose [F].
- Remove:
  Lower Radiator Mounting Bolt [G]
  Upper Radiator Mounting Bolts [H]
  Radiator [I]



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

Radiator

- Remove:
  Radiator Fan Mounting Bolts [A]
  Left Side Radiator Fan Assy [B]
  Right Side Radiator Fan Assy [C]



Radiator and Radiator Fan Installation

- Install the radiator and run the radiator fan motor lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Tighten:

Torque - Radiator Upper Bolts: 20 N·m (2.0 kgf·m, 15 ft·lb)
Radiator Lower Bolt: 8.0 N·m (0.82 kgf·m, 71 in·lb)

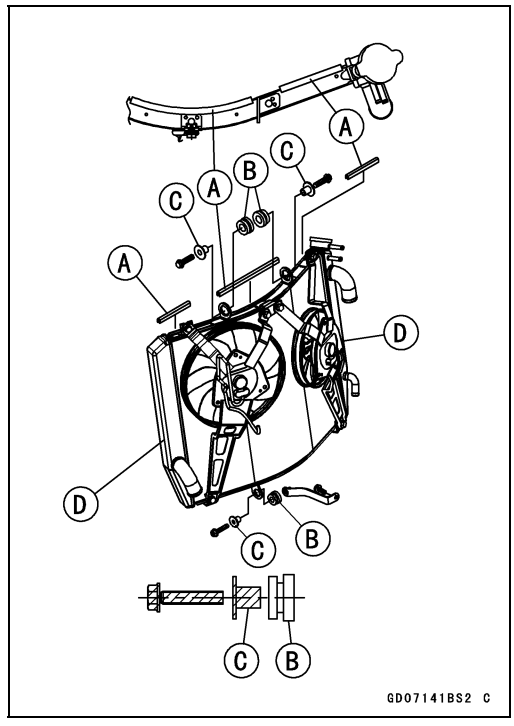
- Be sure that the trim seals [A] are in position on the radiator as shown.
- Install the dampers [B], radiator bracket collars [C] and bolts as shown.
- Apply soap and water solution to the inside of the water hoses before installation.
- Install the each hose and clamp (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Tighten:

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

- Check that the pads [D] are in place on the radiator.

★If the pads are damage or deteriorated, replace them.

- Install the removed parts (see appropriate chapters).



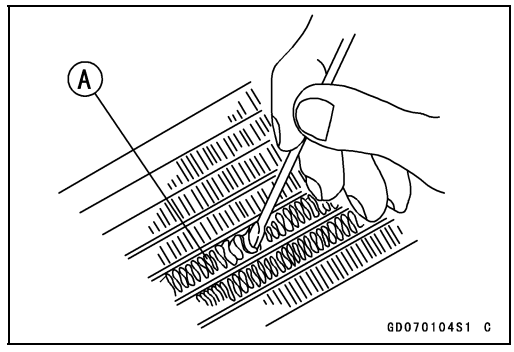
Radiator Inspection

- Remove the radiator (see Radiator and Radiator Fan Removal).
- Check the radiator core.

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

★If the corrugated fins [A] are deformed, carefully straighten them.

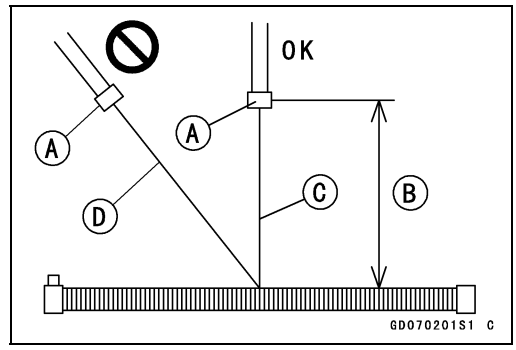
★If the air passages of the radiator core are blocked more than 20% by unremovable obstructions or irreparably deformed fins, replace the radiator with a new one.



Radiator

NOTICE

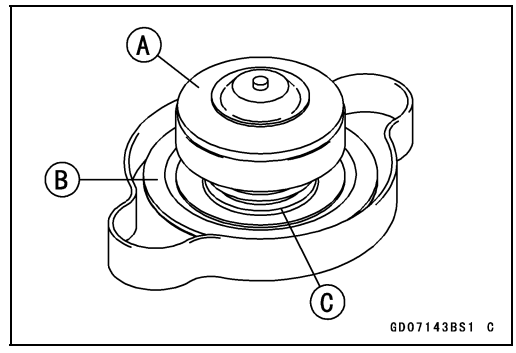
When cleaning the radiator with steam cleaner, be careful of the following to prevent radiator damage:
Keep the steam gun [A] away more than 0.5 m (1.6 ft) [B] from the radiator core.
Hold the steam gun perpendicular [C] (not oblique [D]) to the core surface.
Run the steam gun, following the core fin direction.



Radiator Cap Inspection

- Remove:
  Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
  Radiator Cap Cover
  Radiator Cap
- 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.

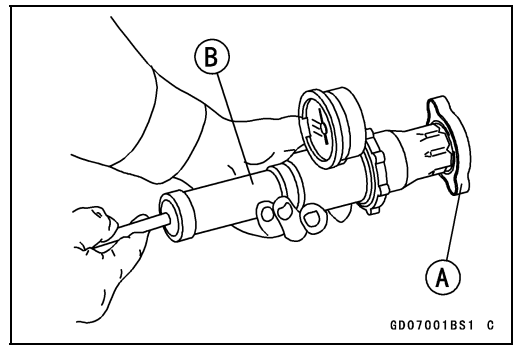


- Install the cap [A] on a cooling system pressure tester [B].

NOTE

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

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



Radiator Cap Relief Pressure
Standard: 93.3 ~ 122.7 kPa (0.95 ~ 1.25 kgf/cm², 13.5 ~ 17.8 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

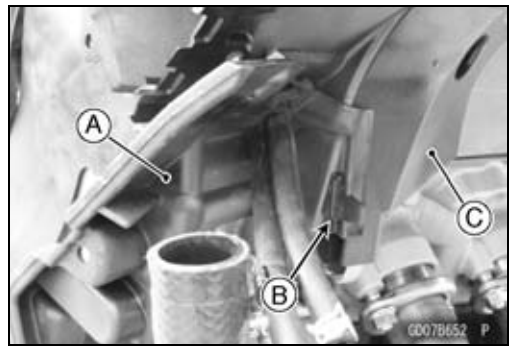
- Remove:
  Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
  Radiator Cap Cover
  Radiator Cap
- Check the radiator filler neck for signs of damage.
- Check the condition of the top and bottom sealing seats [A] in the filler neck. They must be smooth and clean for the radiator cap to function properly.



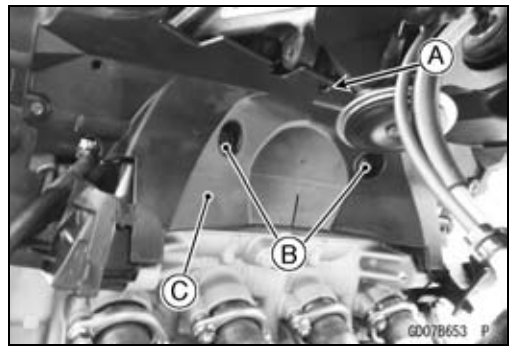
Radiator

Radiator Cover Removal

- Remove:
  Radiator (see Radiator and Radiator Fan Removal)
- Clear the inner rubber cover [A] from the hook [B] of the radiator cover [C] on both sides.



- Remove:
  Clamp [A]
  Quick Rivets [B]
  Radiator Cover [C]

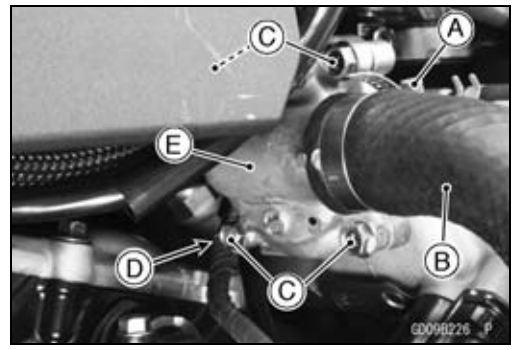


Radiator Cover Installation

- Installation is the reverse of removal.

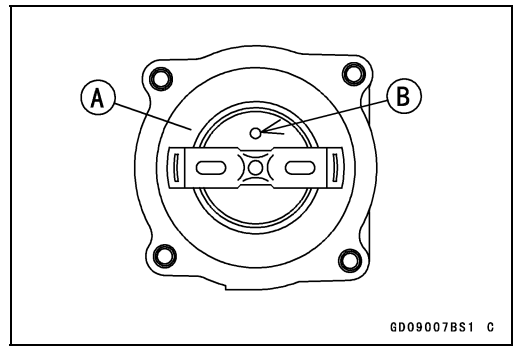
Thermostat

Thermostat Removal

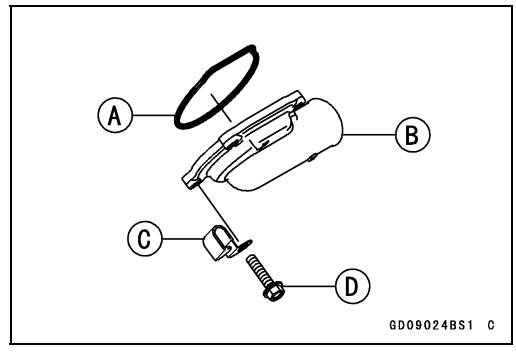


- Remove the middle fairings (see Middle Fairing Removal in the Frame chapter).
- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Loosen the clamp screw [A] and disconnect the water hose [B].
- Remove:
  Thermostat Housing Cover Bolts [C] and Clamp [D]
  Thermostat Housing Cover [E]
  Thermostat

Thermostat Installation



- 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 grease to the new O-ring to prevent it from coming off.
- Install the O-ring into the thermostat housing cover [B].
- Install the clamp [C] as shown.
- Tighten:

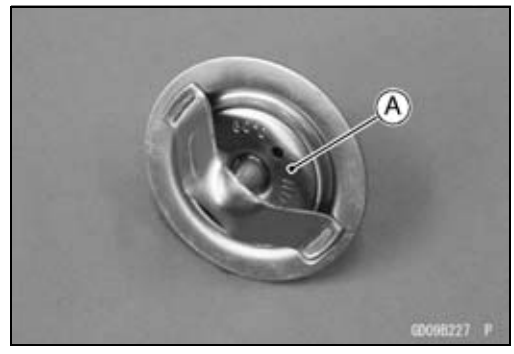
  Torque - Thermostat Housing Cover Bolts [D]: 6.0 N·m (0.61 kgf·m, 53 in·lb)

- Confirm that the thermostat is installed correctly.
- Install the water hose and tighten the clamp screw (see Cable, Wire, and Hose Routing section in the Appendix chapter).

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

- Fill the radiator with coolant (see Coolant Change in the Periodic Maintenance chapter).

Thermostat Inspection



- Remove the thermostat (see Thermostat Removal), and inspect the thermostat valve [A] at room temperature.

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

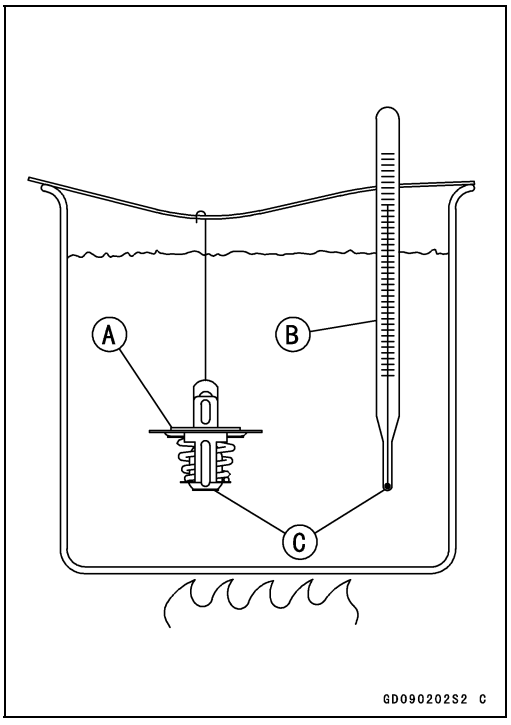
Thermostat

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

○The thermostat must be completely submerged and must not touch the container sides or bottom. Suspend an accurate thermometer [B] in the water so that the heat sensitive portions [C] are located in almost the same depth. 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

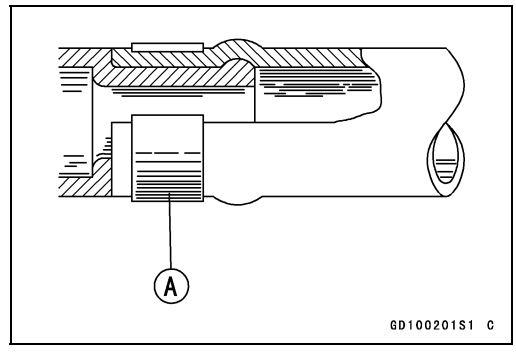
Hose Installation

- 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.

○The clamp screws should be positioned correctly to prevent the clamps from contacting the other parts.

- Tighten:

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



Hose Inspection

- Refer to the Radiator Hose and Pipe Inspection in the Periodic Maintenance chapter.

Water Temperature Sensor

NOTICE
The water temperature sensor should never be allowed to fall on a hard surface. Such a shock to the water temperature sensor can damage it.

Water Temperature Sensor Removal/Installation

- Refer to the Water Temperature Sensor Removal/Installation in the Fuel System (DFI) chapter.

Water Temperature Sensor Inspection

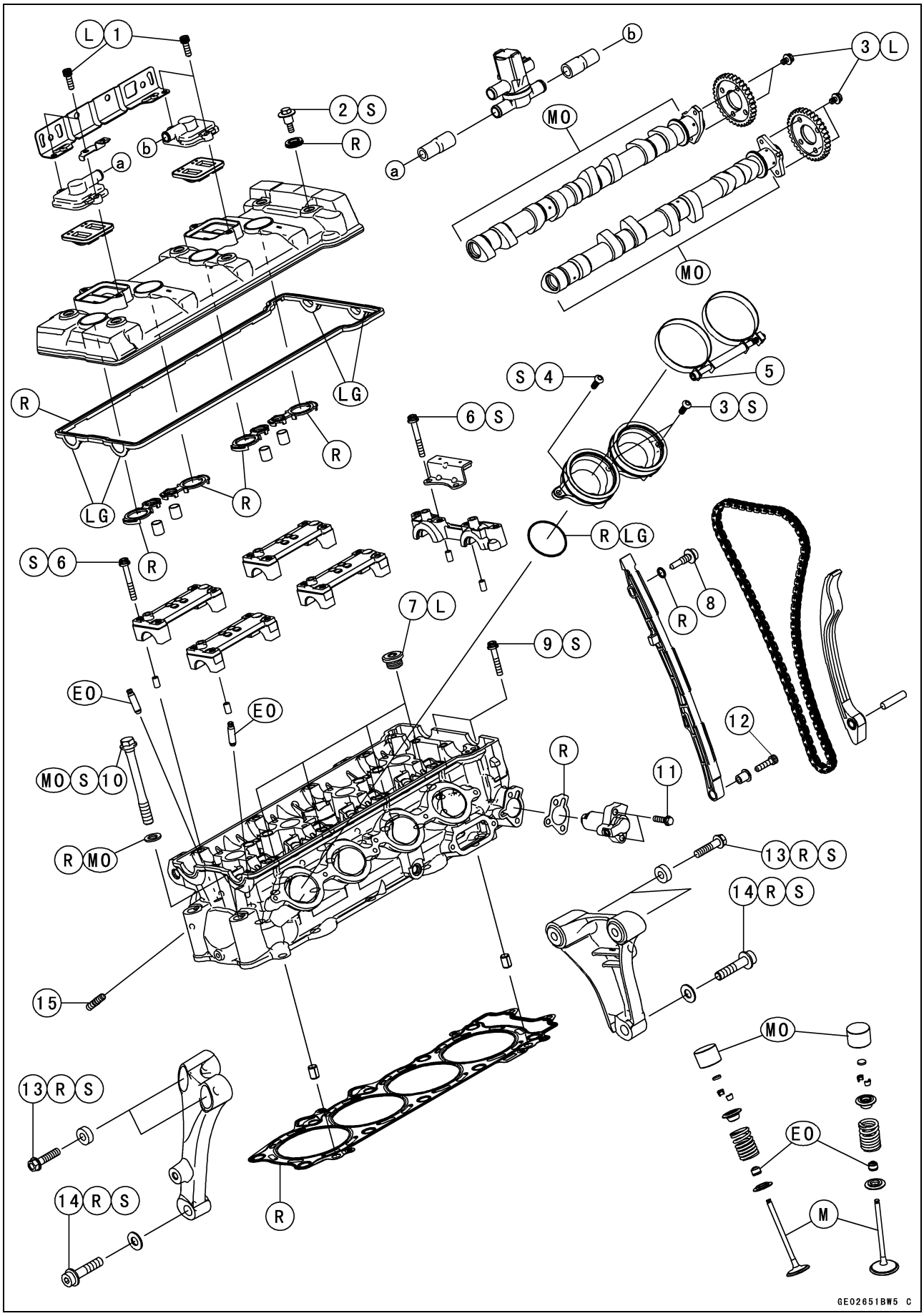
- Refer to the Water Temperature Sensor Inspection in the Electrical System chapter.

Engine Top End

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Exploded View

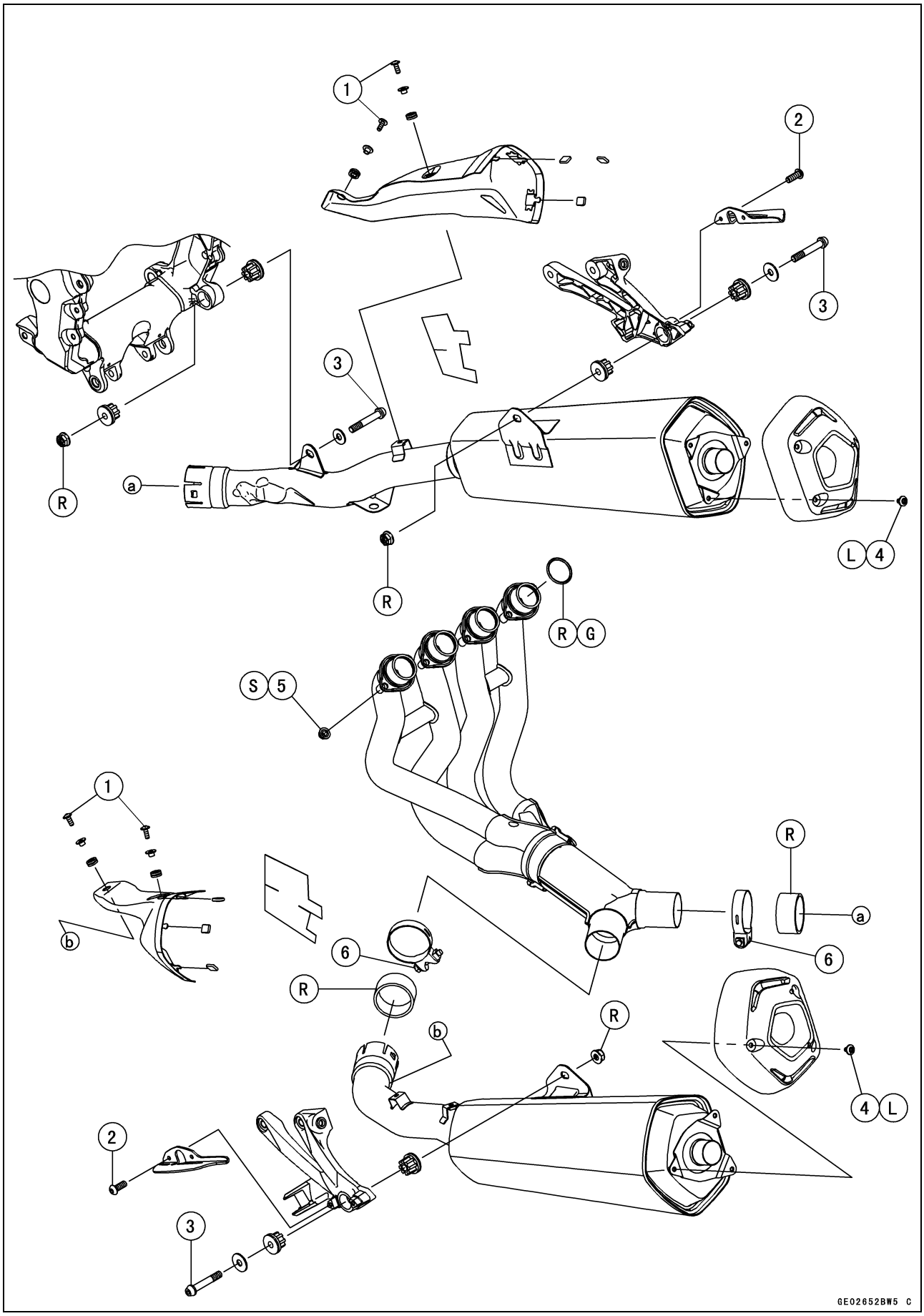


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Air Suction Valve Cover Bolts	10	1.0	89 in·lb	L
2	Cylinder Head Cover Bolts	10	1.0	89 in·lb	S
3	Camshaft Sprocket Mounting Bolts	15	1.5	11	L
4	Throttle Body Assy Holder Bolts	10	1.0	89 in·lb	S
5	Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
6	Camshaft Cap Bolts	12	1.2	106 in·lb	S
7	Water Passage Plugs	20	2.0	15	L
8	Front Camshaft Chain Guide Bolt (Upper)	25	2.5	18	
9	Cylinder Head Bolts (M6)	12	1.2	106 in·lb	S
10	Cylinder Head Bolts (M11)	see the text	–	–	MO, S
11	Camshaft Chain Tensioner Mounting Bolts	10	1.0	89 in·lb	
12	Front Camshaft Chain Guide Bolt (Lower)	12	1.2	106 in·lb	
13	Engine Bracket Bolts	25	2.5	18	R, S
14	Front Engine Mounting Bolts	60	6.1	44	R, S

15. Face the round end outward.
EO: Apply engine oil.
L: Apply a non-permanent locking agent.
LG: Apply liquid gasket.
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil solution.
(mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10:1)
R: Replacement Parts
S: Follow the specified tightening sequence.

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Muffler Cover Bolts	10	1.0	89 in·lb	
2	Muffler Guard Bolts	8.0	0.82	71 in·lb	
3	Muffler Body Mounting Bolts	34	3.5	25	
4	Muffler Body Cover Bolts	8.0	0.82	71 in·lb	L
5	Exhaust Pipe Manifold Holder Nuts	17	1.7	13	S
6	Muffler Body Clamp Bolts	17	1.7	13	

G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts
S: Follow the specified tightening sequence.

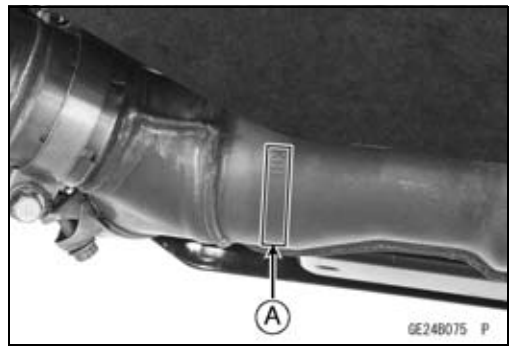
Exhaust System Identification

Exhaust System

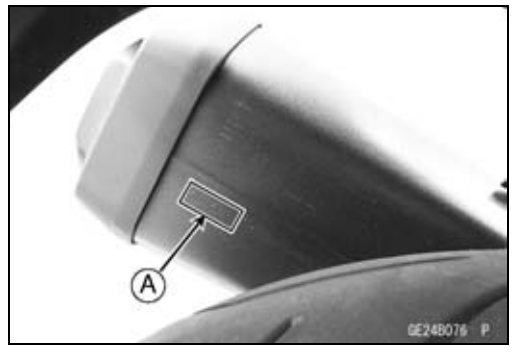
MANIFOLD	MUFFLER BODY	SPECIFICATION	MARKETING CODE
Honeycomb Type Catalyst with Oxygen Sensor P/No. 39178-0249 Mark: KHI M 174	Honeycomb Type Catalyst P/No. 18091-0974 P/No. 18091-0976 Mark: KHI K 619 EPA Noise Emission Control Information	WVTA (FULL) GB WVTA (FULL) AU PH SEA-B1 SEA-B3 ID IN TH MY CN	ZX1400HG ~/JG ~ ZX1400HG ~/JG ~ ZX1400HG ~/JG ~ ZX1400JG ~ ZX1400JG ~ ZX1400HG ~/JG ~ ZX1400HG ~/JG ~ ZX1400JG ~ ZX1400JG ~ ZX1400HG ~/JG ~ ZX1400JG ~
Honeycomb Type Catalyst with Oxygen Sensor P/No. 39178-0260 Mark: KHI M 178	Honeycomb Type Catalyst P/No. 18091-0974 P/No. 18091-0976 Mark: KHI K 619 EPA Noise Emission Control Information	US CAL CA	ZX1400HG ~/JG ~ ZX1400HG ~/JG ~ ZX1400JG ~

GE24535C F

Manifold Mark Position [A]

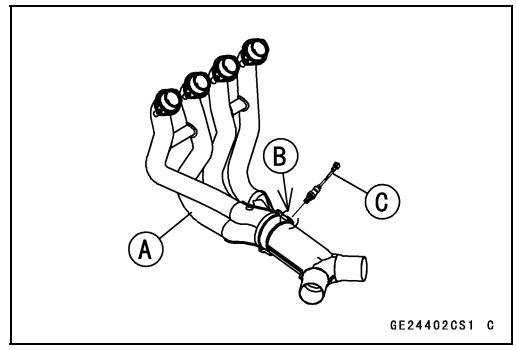


Muffler Body Mark Position [A]

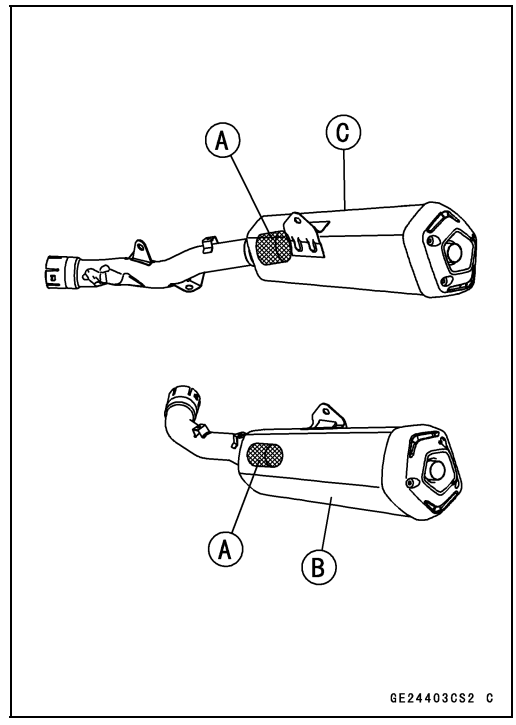


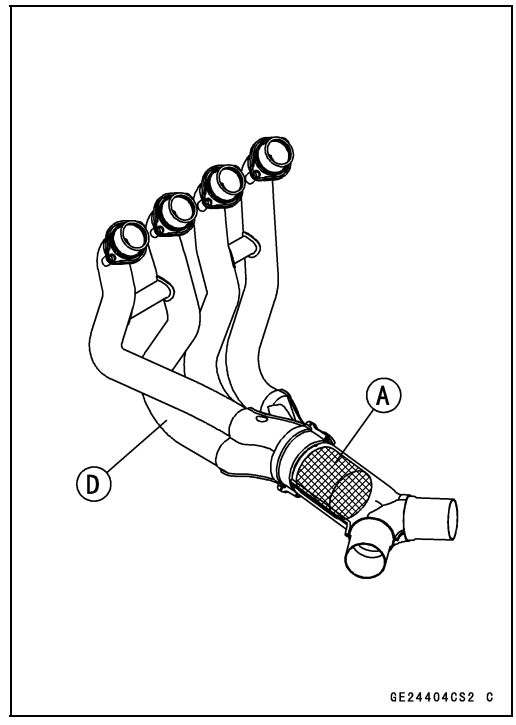
Exhaust System Identification

Manifold [A] with Hole [B] for Oxygen Sensor [C]



Honeycomb Type Catalyst Positions [A]
Left Muffler Body [B]
Right Muffler Body [C]
Manifold [D]



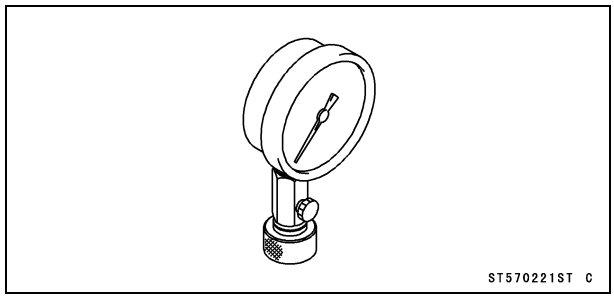


Specifications

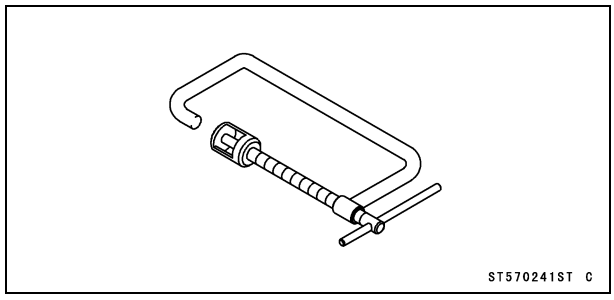
Item	Standard	Service Limit
Camshafts		
Cam Height:		
Exhaust	35.243 ~ 35.357 mm (1.3875 ~ 1.3920 in.)	35.14 mm (1.383 in.)
Intake	35.243 ~ 35.357 mm (1.3875 ~ 1.3920 in.)	35.14 mm (1.383 in.)
Camshaft Journal/Cap Clearance	0.038 ~ 0.081 mm (0.0015 ~ 0.0032 in.)	0.17 mm (0.0067 in.)
Camshaft Journal Diameter	23.940 ~ 23.962 mm (0.94252 ~ 0.94338 in.)	23.91 mm (0.9413 in.)
Camshaft Bearing Inside Diameter	24.000 ~ 24.021 mm (0.94488 ~ 0.94571 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)	
	1 190 ~ 1 798 kPa (12.13 ~ 18.33 kgf/cm², 172.6 ~ 260.7 psi) @300 r/min (rpm)	– – –
Cylinder Head Warp	– – –	0.05 mm (0.002 in.)
Valves		
Valve Clearance:		
Exhaust	0.22 ~ 0.27 mm (0.0087 ~ 0.0106 in.)	– – –
Intake	0.15 ~ 0.20 mm (0.0059 ~ 0.0079 in.)	– – –
Valve Head Thickness:		
Exhaust	0.8 mm (0.031 in.)	0.7 mm (0.028 in.)
Intake	0.7 mm (0.028 in.)	0.4 mm (0.016 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.)
Intake	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.)
Intake	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in.)	5.08 mm (0.200 in.)
Valve/Valve Guide Clearance (Wobble Method):		
Exhaust	0.09 ~ 0.16 mm (0.0035 ~ 0.0063 in.)	0.36 mm (0.014 in.)
Intake	0.03 ~ 0.11 mm (0.0012 ~ 0.0043 in.)	0.30 mm (0.012 in.)
Valve Seat Cutting Angle	32°, 45°, 60°	– – –
Valve Seating Surface:		
Outside Diameter:		
Exhaust	27.6 ~ 27.8 mm (1.087 ~ 1.094 in.)	– – –
Intake	32.6 ~ 32.8 mm (1.283 ~ 1.291 in.)	– – –
Width:		
Exhaust	0.8 ~ 1.2 mm (0.031 ~ 0.047 in.)	– – –
Intake	0.5 ~ 1.0 mm (0.020 ~ 0.039 in.)	– – –
Valve Spring Free Length:		
Exhaust	41.0 mm (1.61 in.)	39.4 mm (1.55 in.)
Intake	42.1 mm (1.66 in.)	40.4 mm (1.59 in.)

Special Tools and Sealants

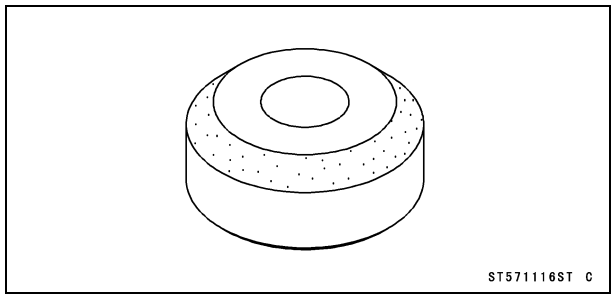
Compression Gauge, 20 kgf/cm²:
57001-221



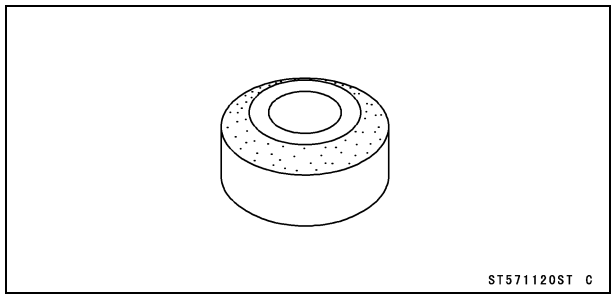
Valve Spring Compressor Assembly:
57001-241



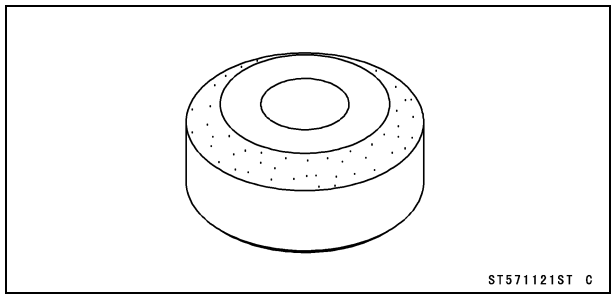
Valve Seat Cutter, 45° - ϕ35:
57001-1116



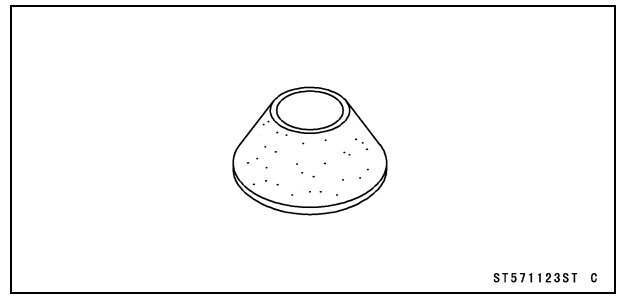
Valve Seat Cutter, 32° - ϕ30:
57001-1120



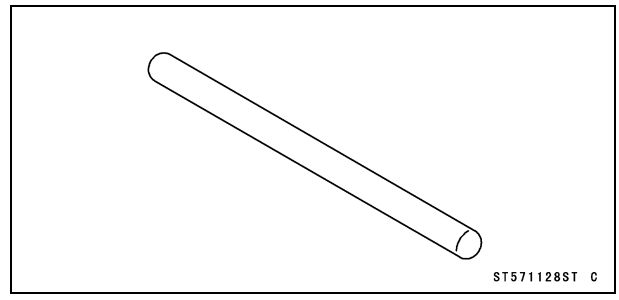
Valve Seat Cutter, 32° - ϕ35:
57001-1121



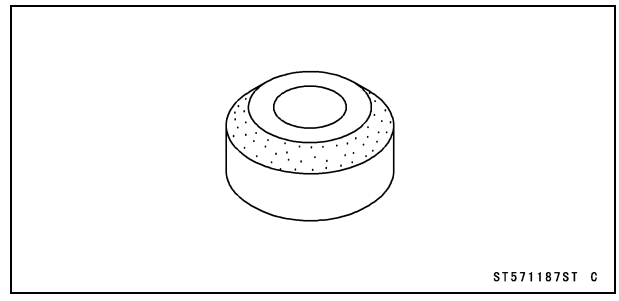
Valve Seat Cutter, 60° - ϕ30:
57001-1123



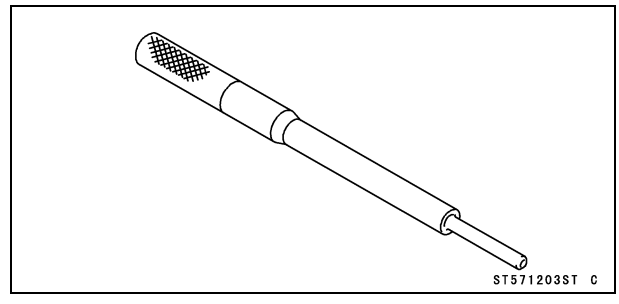
Valve Seat Cutter Holder Bar:
57001-1128



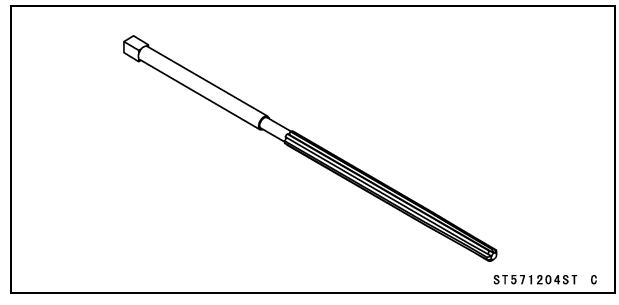
Valve Seat Cutter, 45° - ϕ30:
57001-1187



Valve Guide Arbor, ϕ5:
57001-1203

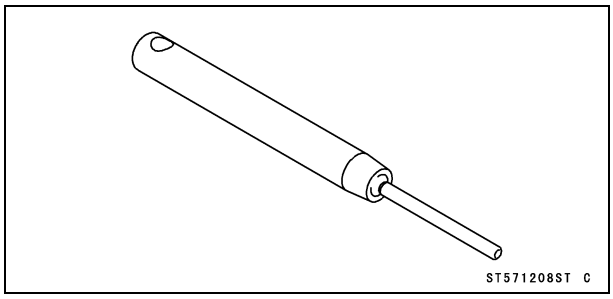


Valve Guide Reamer, ϕ5:
57001-1204

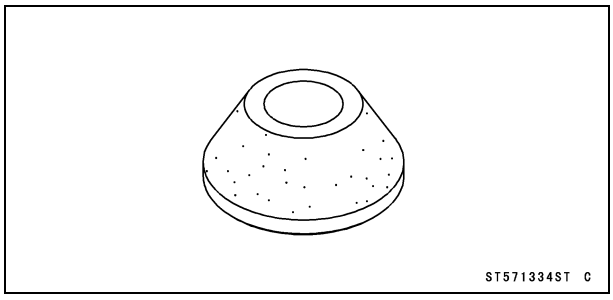


Special Tools and Sealants

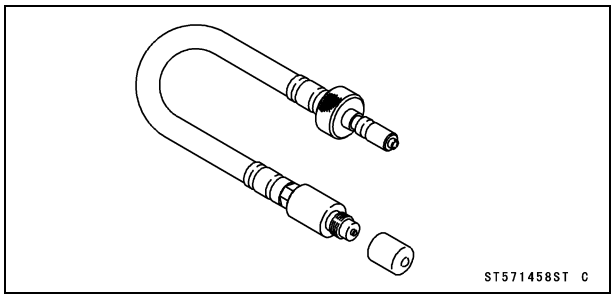
Valve Seat Cutter Holder, ϕ5:
57001-1208



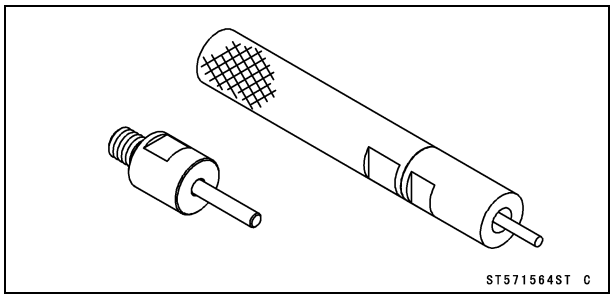
Valve Seat Cutter, 60° - ϕ33:
57001-1334



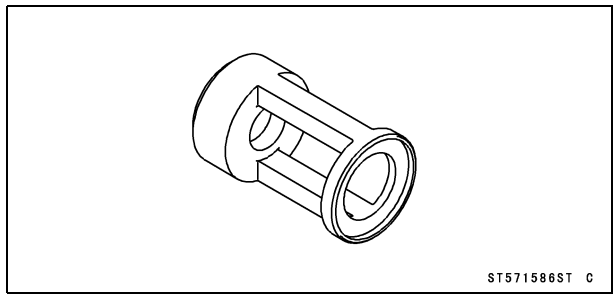
Compression Gauge Adapter, M10 × 1.0:
57001-1458



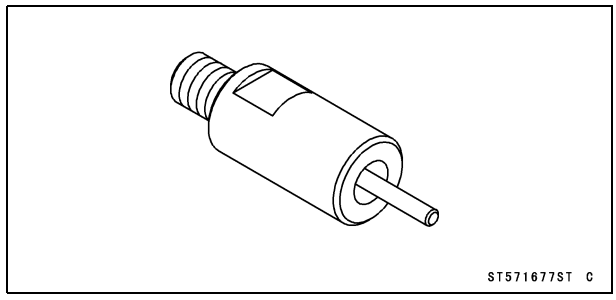
Valve Guide Driver:
57001-1564



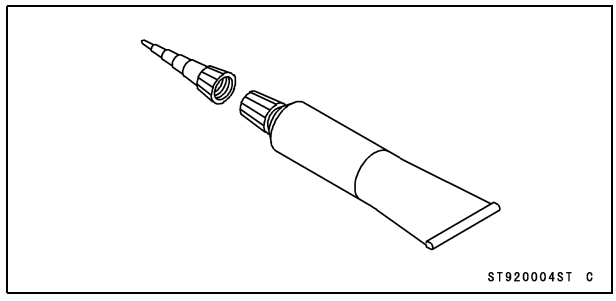
Valve Spring Compressor Adapter, ϕ24:
57001-1586



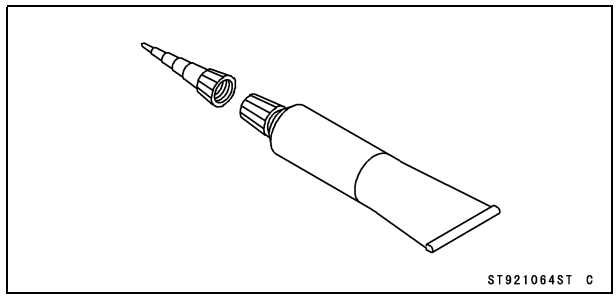
Valve Guide Driver Attachment, E:
57001-1677



Liquid Gasket, TB1211F:
92104-0004



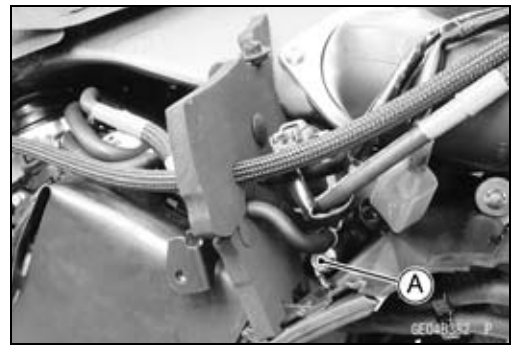
Liquid Gasket, TB1216B:
92104-1064



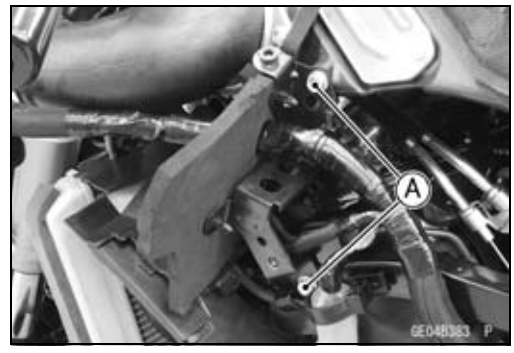
Clean Air System

Air Suction Valve Removal

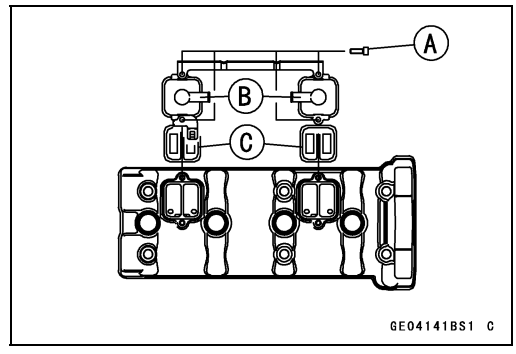
- Remove:
  Middle Fairings (see Middle Fairing Removal in the Frame chapter)
  Air Switching Valve (see Air Switching Valve Removal)
  Pad Bracket Bolt [A]



- Remove:
  Pad Bracket Bolts [A]



- Remove:
  Air Suction Valve Cover Bolts [A]
  Air Suction Valve Covers [B]
  Air Suction Valves [C]

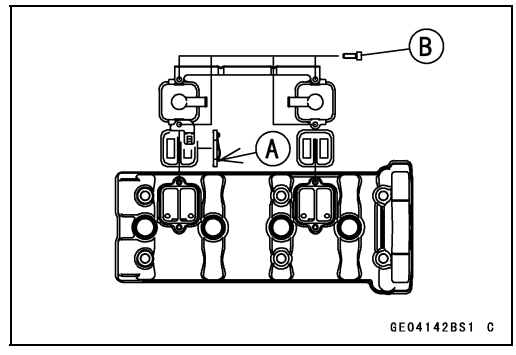


Air Suction Valve Installation

- Install the air suction valve so that opening [A] of the reed faces the rear and downward.
- Apply a non-permanent locking agent to the threads of the air suction valve cover bolts [B], and tighten them.

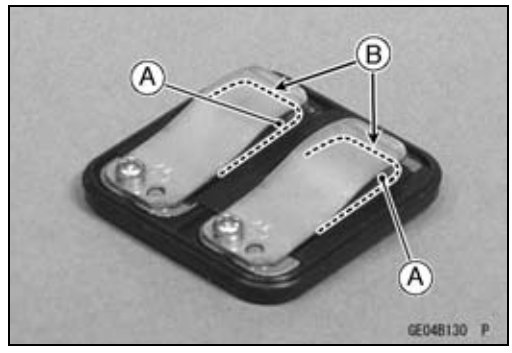
  Torque - Air Suction Valve Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Install the removed parts (see appropriate chapters).



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 reeds, replace the air suction valve as an assembly.

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

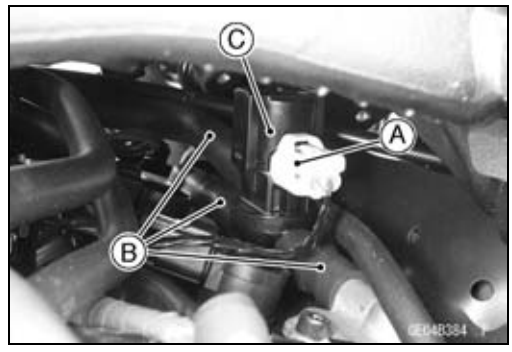
★If there is any doubt as to the condition of the reed contact areas, replace the air suction valve as an assembly.

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

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:
  Middle Fairings (see Middle Fairing Removal in the Frame chapter)
  Idle Speed Control Valve Actuator (see Idle Speed Control Valve Actuator Removal in the Fuel System (DFI) chapter)
- Disconnect the connector [A].
- Disconnect the hoses [B] from the air suction valve covers and frame, and remove the air switching valve [C].

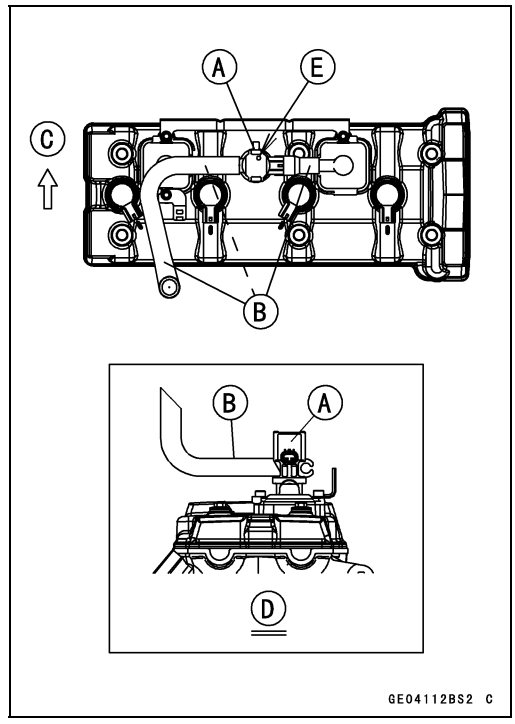
NOTICE

Never drop the air switching valve especially on a hard surface. Such a shock to the air switching valve can damage it.

Clean Air System

Air Switching Valve Installation

- Install the air switching valve [A] with hoses [B] as shown.
  Front [C]
  Right Side View [D]
  White Paint [E]
- Run the hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removes parts (see appropriate chapters).



Air Switching Valve Operation Test

- Refer to the Air Switching Valve Operation Test in the Electrical System chapter.

Air Switching Valve Unit Test

- Refer to the Air Switching Valve Unit Test in the Electrical System chapter.

Clean Air System Hose Inspection

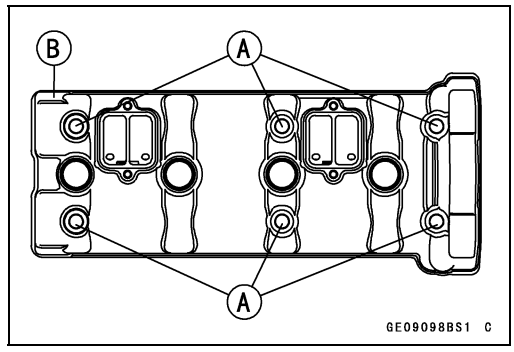
- Be certain that all the hoses are routed without being flattened or kinked, and are connected correctly to the air cleaner housing, air switching valve and air suction valve covers.

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

Cylinder Head Cover

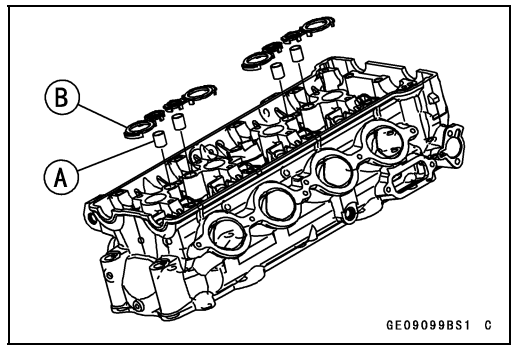
Cylinder Head Cover Removal

- Remove:
  Middle Fairings (see Middle Fairing Removal in the Frame chapter)
  Throttle Body Assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter)
  Air Switching Valve (see Air Switching Valve Removal)
  Radiator Cover (see Radiator Cover Removal in the Cooling System chapter)
  Stick Coils (see Stick Coil Removal in the Electrical System chapter)
  Air Suction Valves (see Air Suction Valve Removal)
- Free the heat insulation rubber plate.
- Remove:
  Cylinder Head Cover Bolts [A] with Rubber Washers
  Cylinder Head Cover [B]



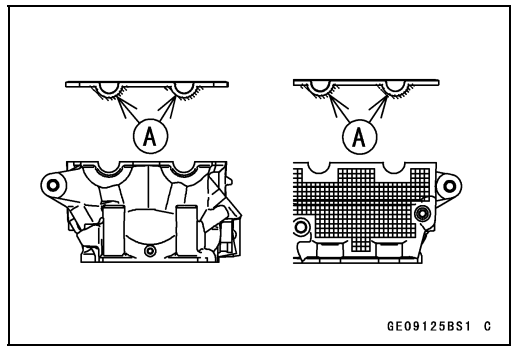
Cylinder Head Cover Installation

- Replace the plug hole gaskets with new ones.
- Install:
  Dowel Pins [A]
  Plug Hole Gaskets [B]



- Replace the cylinder head cover gasket with a new one.
- Using a high flash-point solvent, clean off any oil or dirt that may be on the liquid gasket coating area. Dry them with a clean cloth.
- Apply liquid gasket [A] to the cylinder head cover gasket as shown.

  Sealant - Liquid Gasket, TB1216B: 92104-1064
- Install the cylinder head cover gasket.

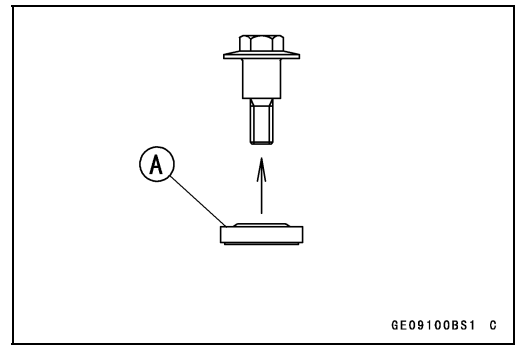


NOTE

○*Make the application finish within 20 minutes when the liquid gasket (TB1216B) to the mating surface of the cylinder head cover is applied.*

Cylinder Head Cover

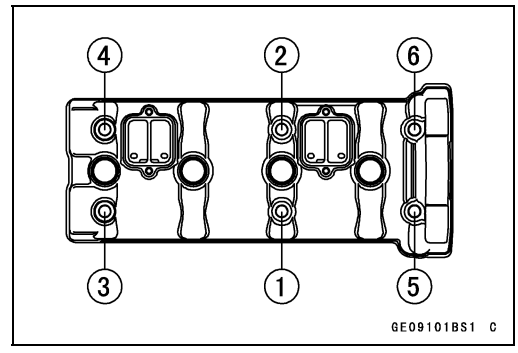
- Install the cylinder head cover.
- Replace the rubber washers [A] with new ones.
- Install the rubber washers with the metal side faces upward.



- Tighten the cover bolts following the specified tightening sequence [1 ~ 6].

  Torque - Cylinder Head Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Install the heat insulation rubber plate and run the leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).

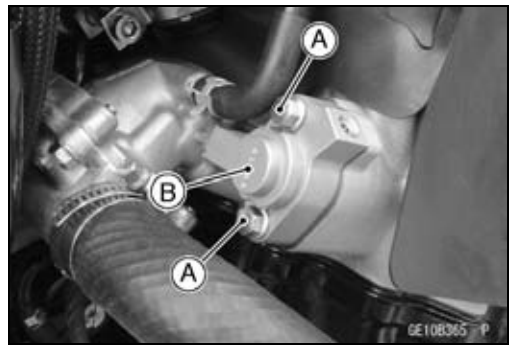


Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

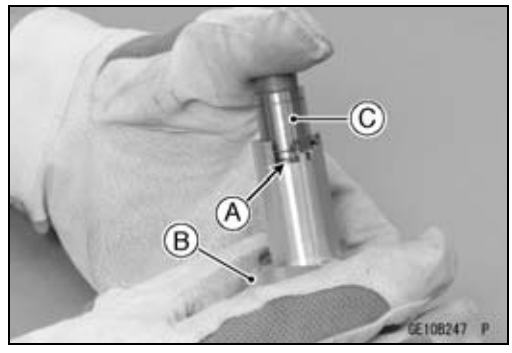
NOTICE
Do not turn over the crankshaft while the tensioner is removed. This could upset the camshaft chain timing, and damage the valves.

- Remove:
  Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
  Camshaft Chain Tensioner Mounting Bolts [A]
  Camshaft Chain Tensioner [B]



Camshaft Chain Tensioner Installation

- Opening the snap ring [A], release it and turn the tensioner body [B] clockwise while holding the push rod [C].

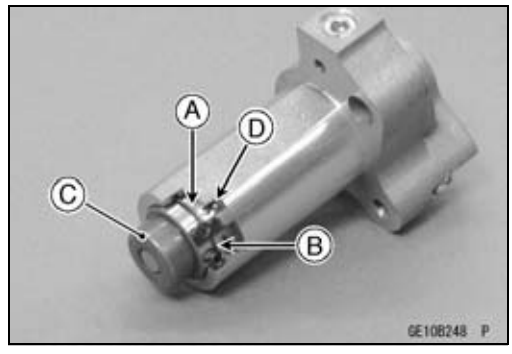


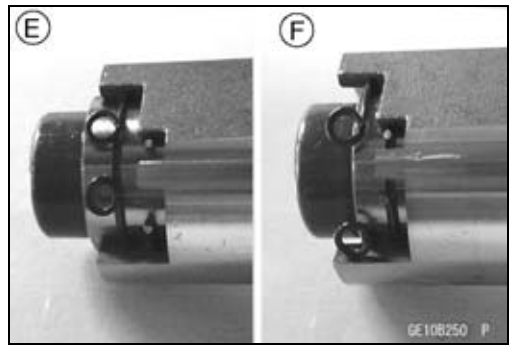
- Turning the tensioner body clockwise, slide the stopper [A] into the groove [B] of the push rod [C].

NOTE

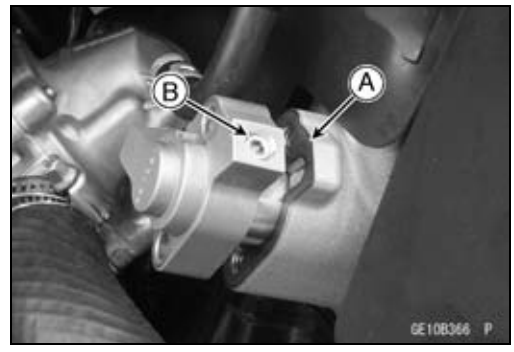
○*Be careful not to fit the snap ring [D] into the groove.*

Good [E]
Bad [F]





Camshaft Chain Tensioner



- Replace the gasket [A] with a new one.
- Install the tensioner body so that the plug [B] faces upward.
- Tighten:

Torque - Camshaft Chain Tensioner Mounting Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Turn the crankshaft 2 turns clockwise to allow the tensioner to expand and recheck the camshaft chain timing.

NOTE

○*You hear the sound from which the push rod moves out.*
○*If you do not hear the sound, reassemble the camshaft chain tensioner.*

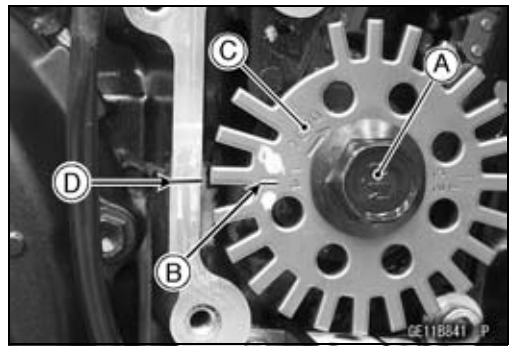
NOTICE
If you start the engine in case that the sound can not be heard, the engine may be damaged.

Camshaft, Camshaft Chain

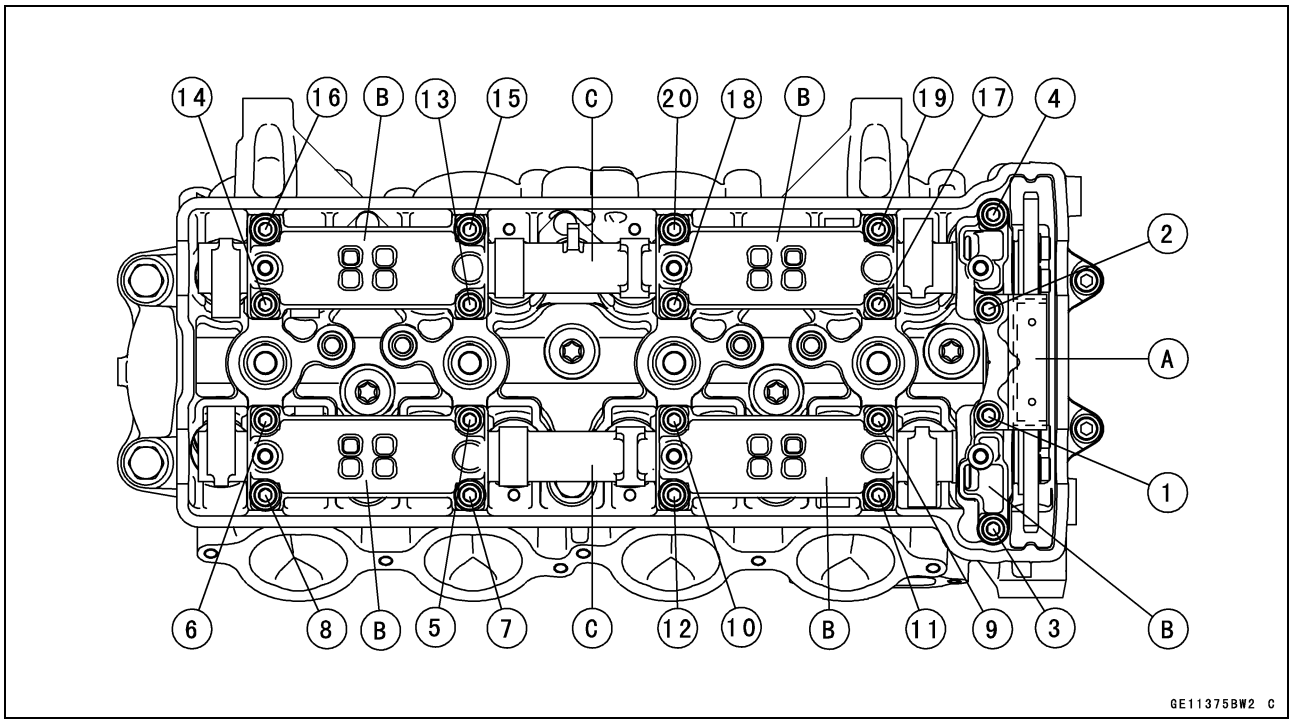
Camshaft Removal

- Remove:
  Cylinder Head Cover (see Cylinder Head Cover Removal)
  Crankshaft Sensor Cover (see Crankshaft Sensor Removal in the Electrical System chapter)

- Using a wrench on the timing rotor bolt [A], turn the crankshaft clockwise until the line [B] (TDC mark for #1,4 pistons) on the timing rotor [C] is aligned with the mating surface [D] of the crankcase.

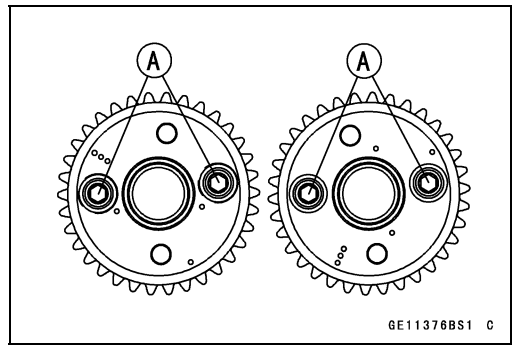


- Remove the camshaft chain tensioner (see Camshaft Chain Tensioner Removal).
- Loosen the camshaft cap bolts gradually and evenly as shown sequence [1 ~ 20], and remove them.
- Remove:
  Upper Camshaft Chain Guide [A]
  Camshaft Caps [B]
  Camshafts [C]
- Stuff a clean cloth into the chain tunnel to keep any parts from dropping into the crankcase.



Camshaft, Camshaft Chain

● Remove:
Camshaft Sprocket Mounting Bolts [A]
Camshaft Sprockets



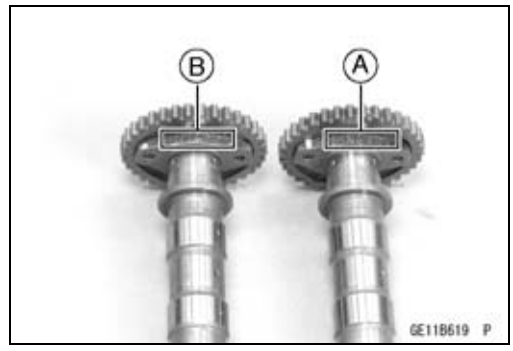
NOTICE

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

○*The exhaust camshaft has a 1093 EX mark [A] and the intake camshaft has a 1093 IN mark [B]. Be careful not to mix up these shafts.*

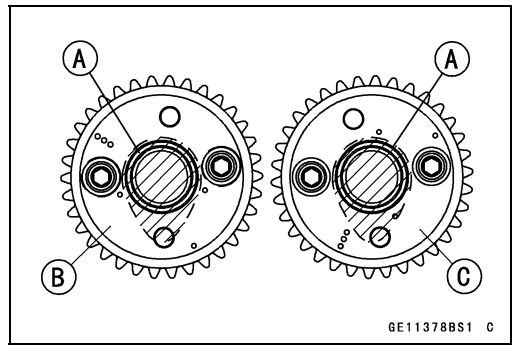


● Install the camshaft sprockets as shown.
#4 Cam Positions [A]
Intake Camshaft Sprocket [B]
Exhaust Camshaft Sprocket [C]

○The intake camshaft sprocket and exhaust camshaft sprocket are identical.

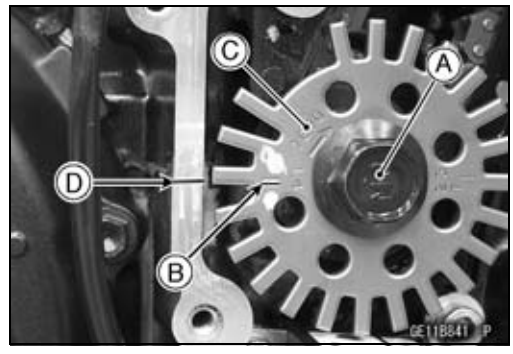
● Apply a non-permanent locking agent to the threads of the camshaft sprocket mounting bolts and tighten them.

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



● Apply molybdenum disulfide oil solution oil to all cam parts, journals and tappets.

● Using a wrench on the timing rotor bolt [A], turn the crankshaft clockwise until the line [B] (TDC mark for #1,4 pistons) on the timing rotor [C] is aligned with the mating surface [D] of the crankcase.



NOTICE

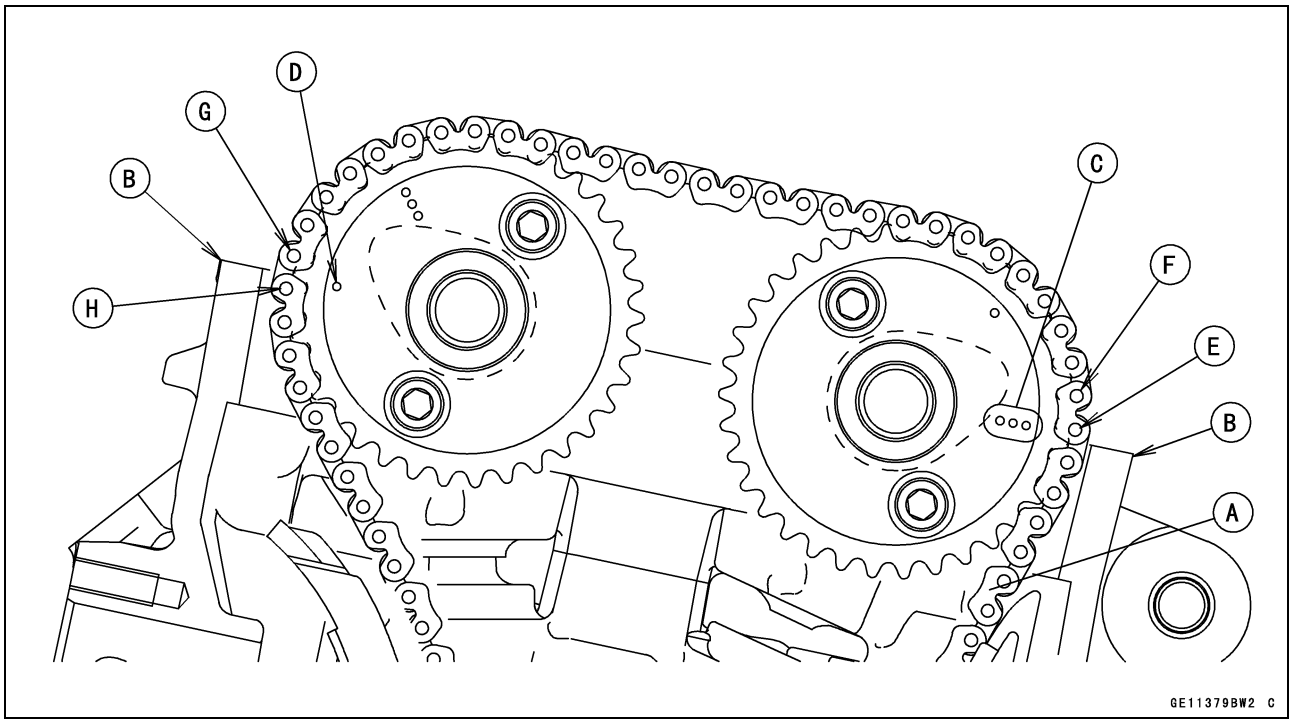
The crankshaft may be turned while the camshafts are removed. Always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower (crankshaft) sprocket. A kinked chain could damage both the chain and the sprocket.

Camshaft, Camshaft Chain

- Pull the tension side (exhaust side) [A] of the chain taut to install the chain.
- Engage the camshaft chain with the sprockets so that timing marks on the sprockets are positioned as shown.

○The timing marks must be aligned with the cylinder head upper surface [B].

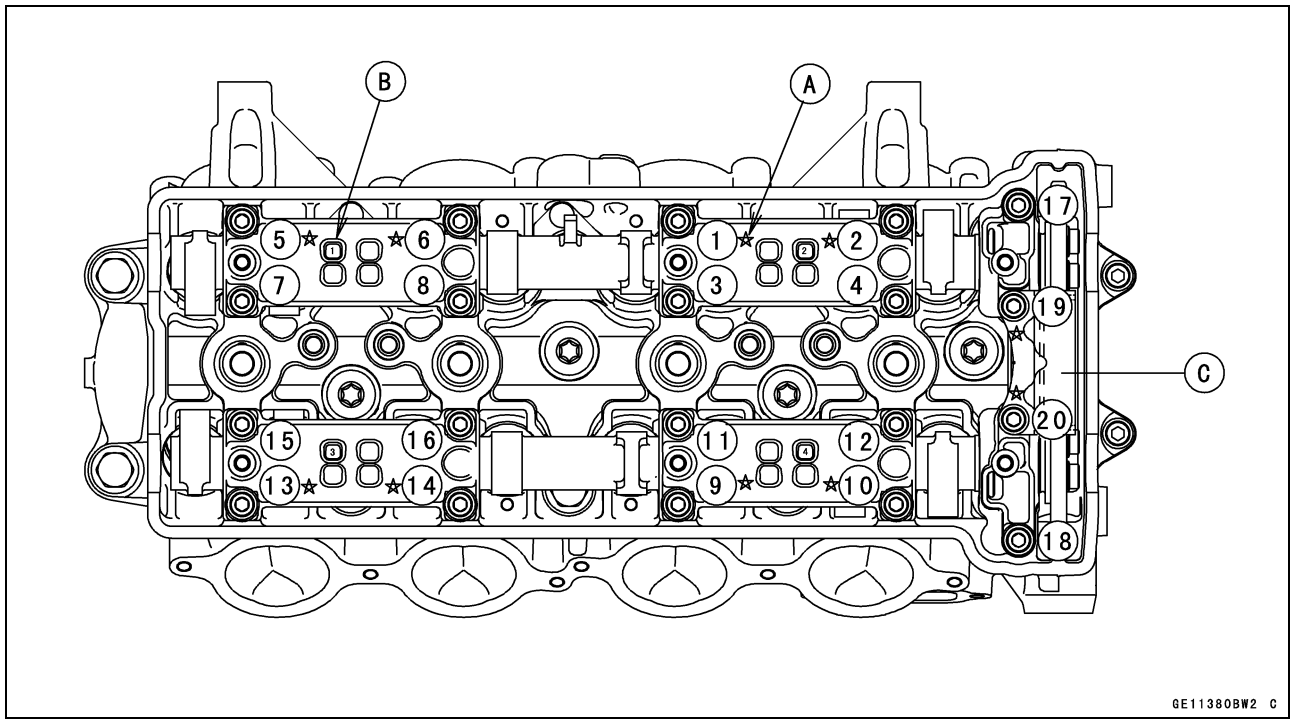
Punch Marks (EX) [C]
Punch Mark (IN) [D]
#1 Pin [E]
#2 Pin [F]
#30 Pin [G]
#31 Pin [H]



Camshaft, Camshaft Chain

- Install the ten dowel pins on the ★ marks [A].
- Install the camshaft caps, following the identification No. [B] and upper camshaft chain guide [C].
- First tighten the all camshaft cap bolts evenly to seat the camshaft in place, then tighten all bolts following the specified tightening sequence [1 ~ 20].

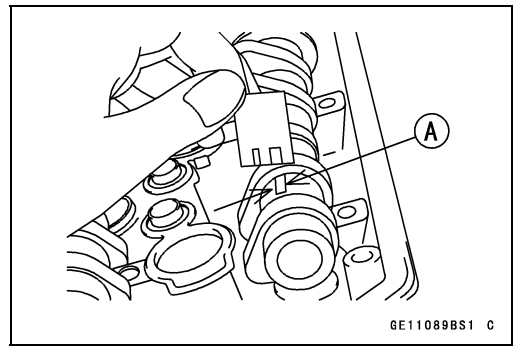
Torque - Camshaft Cap Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)



- Install the camshaft chain tensioner (see Camshaft Chain Tensioner Installation).
- Turn the crankshaft 2 turns clockwise to allow the tensioner to expand and recheck the camshaft chain timing.
- Install the removed parts (see appropriate chapters).

Camshaft, Camshaft Cap Wear Inspection

- Remove:
  Upper Chain Guide (see Camshaft Removal)
  Camshaft Caps (see Camshaft Removal)
- Cut strips of plastigage (press gauge) to journal width. Place a strip on each journal parallel to the camshaft installed in the correct position.
- Tighten the camshaft cap bolts and upper camshaft chain guide bolts to the specified torque (see Camshaft Installation).



NOTE

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

- Remove the camshaft cap again, measure each clearance between the camshaft journal and the camshaft cap using plastigage [A].

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

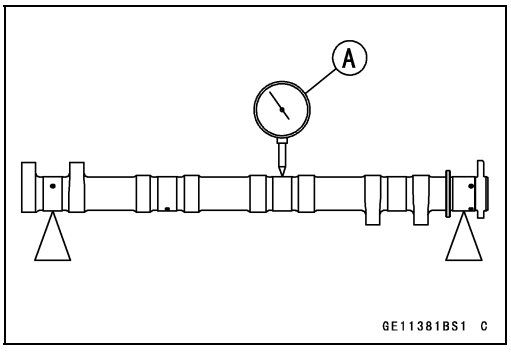
Standard:	**23.940 ~ 23.962 mm (0.94252 ~ 0.94338 in.)**
Service Limit:	**23.91 mm (0.9413 in.)**

★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 service limit, replace the cylinder head unit.

Camshaft Runout Inspection

- Remove the camshafts (see Camshaft Removal).
- Set the camshaft in a camshaft alignment jig or on V blocks.
- Measure the runout with a dial gauge [A] at the specified place as shown.

★If the runout exceeds the service limit, replace the camshaft.



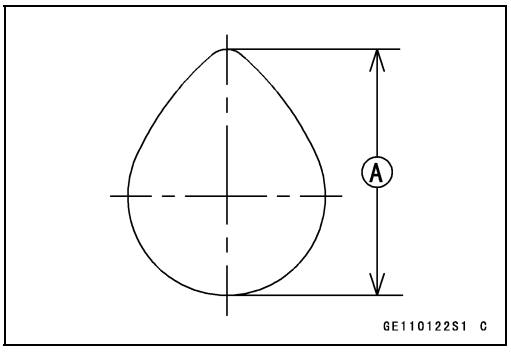
Camshaft Runout

Standard:	**TIR 0.02 mm (0.0008 in.) or less**
Service Limit:	**TIR 0.1 mm (0.004 in.)**

Cam Wear Inspection

- Remove the camshafts (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	**35.243 ~ 35.357 mm (1.3875 ~ 1.3920 in.)**
Intake	**35.243 ~ 35.357 mm (1.3875 ~ 1.3920 in.)**
Service Limit:	
Exhaust	**35.14 mm (1.383 in.)**
Intake	**35.14 mm (1.383 in.)**

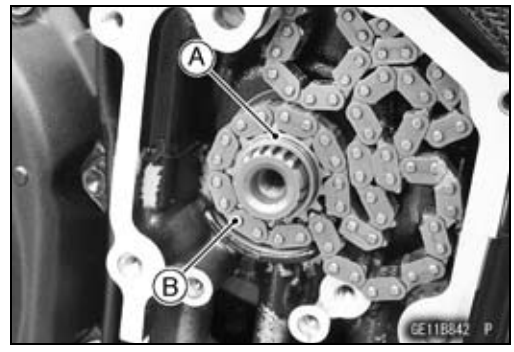
Camshaft Chain Removal

- Remove:

Camshafts (see Camshaft Removal)
Crankshaft Sensor (see Crankshaft Sensor Removal in the Electrical System chapter)
Timing Rotor (see Timing Rotor Removal in the Electrical System chapter)
Front and Rear Camshaft Chain Guides (see Cylinder Head Removal)

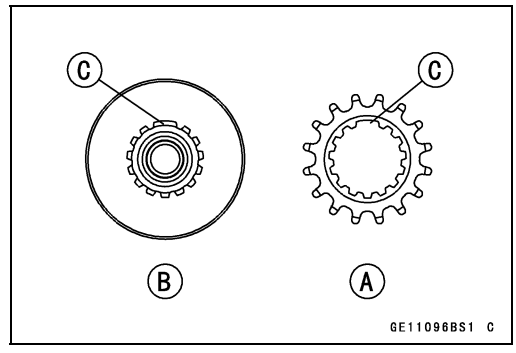
Camshaft, Camshaft Chain

- Remove the crankshaft sprocket [A].
- Pull out the camshaft chain [B] downward.



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 the removed parts (see appropriate chapters).



Cylinder Head

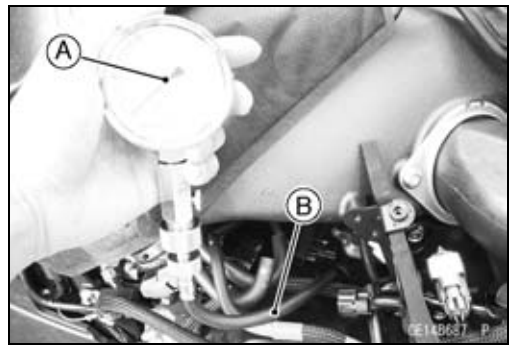
Cylinder Compression Measurement

NOTE

○*Use the battery which is fully charged.*

- Warm up the engine thoroughly.
- Stop the engine.
- Remove:
  Spark Plugs (see Spark Plug Replacement in the Periodic Maintenance chapter)

- Attach the compression gauge [A] and adapter [B] firmly into the spark plug hole.
- Using the starter motor, turn the engine over with the throttle fully open until the compression gauge stops rising; the compression is the highest reading obtainable.



Special Tools - Compression Gauge, 20 kgf/cm²: 57001-221
Compression Gauge Adapter, M10 × 1.0: 57001-1458

Cylinder Compression
Usable Range: 1 190 ~ 1 798 kPa (12.13 ~ 18.33 kgf/cm², 172.6 ~ 260.7 psi) @300 r/min (rpm)

- Repeat the measurement for the other cylinders.
- Install the spark plugs (see Spark Plug Replacement in the Periodic Maintenance chapter).

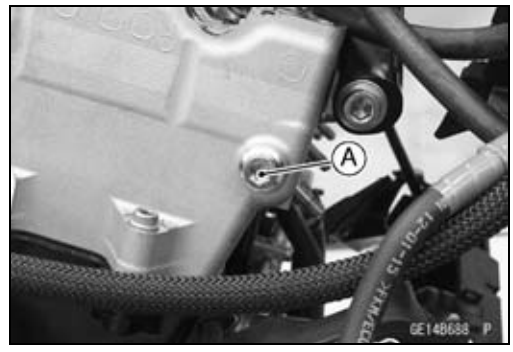
○The following table should be consulted if the obtainable compression reading is not within the usable range.

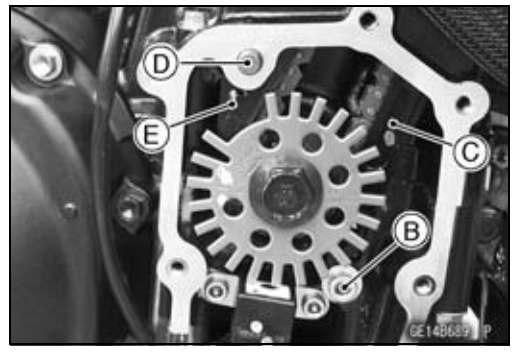
Problem	Diagnosis	Remedy (Action)
Cylinder compression is higher than usable range	Carbon accumulation on piston and in combustion chamber possibly due to damaged valve stem oil seal and/or damaged piston oil rings (This may be indicated by white exhaust smoke).	Remove the carbon deposits and replace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

Cylinder Head

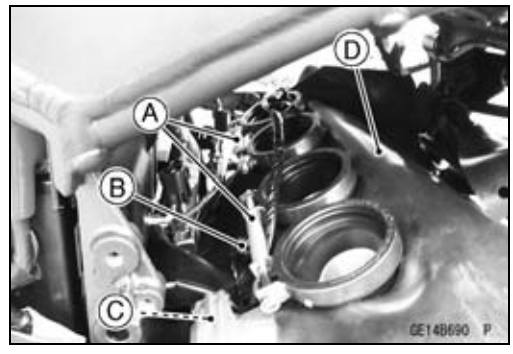
Cylinder Head Removal

● Remove:
Coolant Reserve Tank (see Coolant Reserve Tank Removal in the Cooling System chapter)
Camshafts (see Camshaft Removal)
Exhaust Pipe (see Exhaust Pipe Removal)
Front Camshaft Chain Guide Bolt (Upper) [A]
Front Camshaft Chain Guide Bolt (Lower) [B]
Collar
Front Camshaft Chain Guide [C]
Dowel Pin [D]
Rear Camshaft Chain Guide [E]

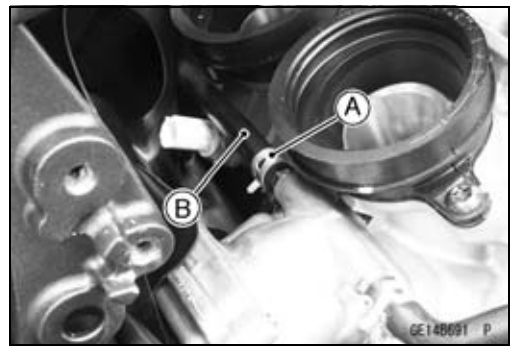




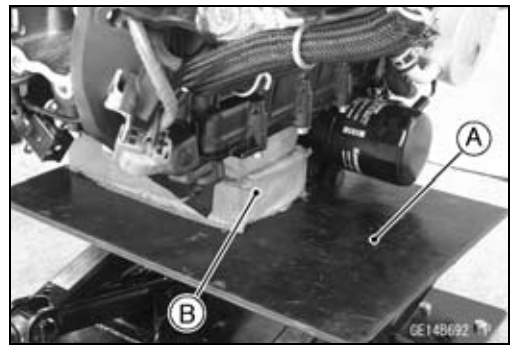
● Remove the throttle body holder clamps [A].
● Disconnect the water temperature sensor connector [B].
● Open the clamp [C].
● Move the hear insulation rubber plate [D] backward.



● Slide the clamp [A] and disconnect the air bleed hose [B].

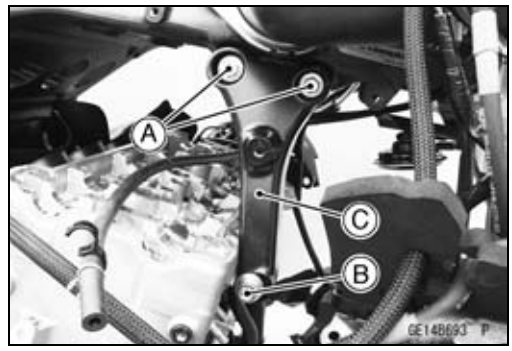


● Support the engine with a suitable stand [A].
○Put a plank [B] onto the suitable stand for engine balance.

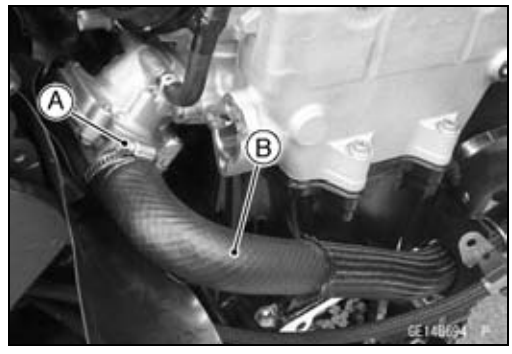


Cylinder Head

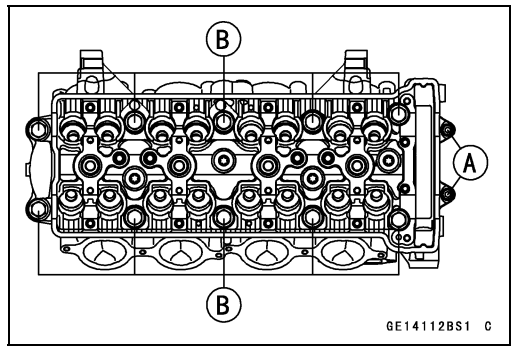
- Remove:
  Engine Bracket Bolts [A] and Washers (Both Sides)
  Front Engine Mounting Bolt [B] and Washer (Both Sides)
  Engine Bracket [C] (Both Sides)



- Loosen the clamp screw [A].
- Disconnect the water hose [B].



- Remove the cylinder head bolts (M6) [A], and then the cylinder head bolts (M11) [B].
- Remove the cylinder head.



Cylinder Head Installation

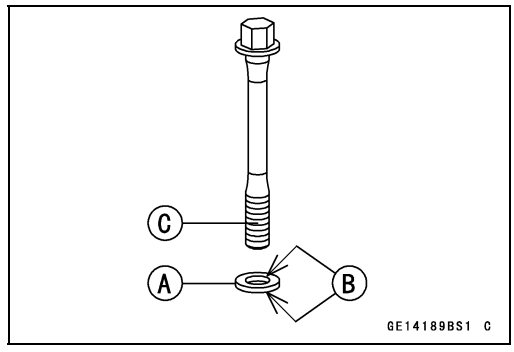
NOTE

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

- Replace the cylinder head gasket with a new one.
- Install the dowel pins [A] and cylinder head gasket [B].



- Replace the cylinder head bolt washers [A] with new ones.
- Apply molybdenum disulfide oil solution to both sides [B] of the cylinder head bolt washers and the thread of head bolts [C].



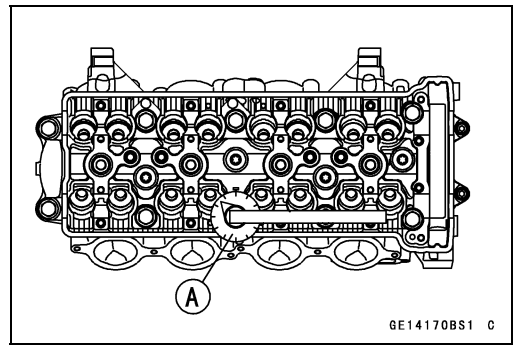
Cylinder Head

- Tighten the M11 cylinder head bolts following the tightening sequence [1 ~ 10].

○First, tighten the bolts specified torque.

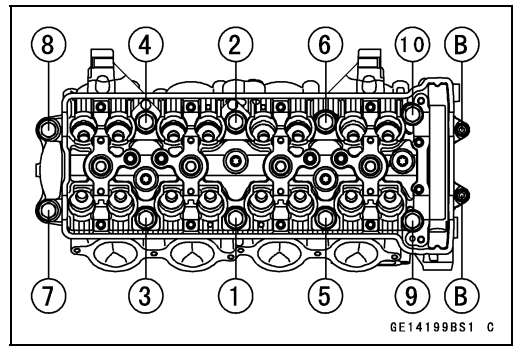
○Next, using a angle torque gauge [A], tighten the bolts specified angle.

Cylinder Head Bolts (M11)	First Torque N·m (kgf·m, ft·lb)	Angle
New	39 (4.0, 20)	100° ±5
Used	39 (4.0, 20)	100° ±5



- Tighten:

Torque - Cylinder Head Bolts (M6) [B]: 12 N·m (1.2 kgf·m, 106 in·lb)



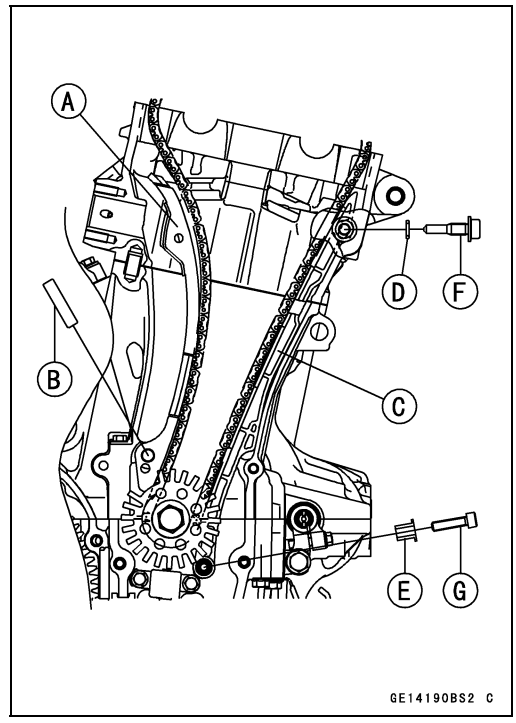
- Install:
  Rear Camshaft Chain Guide [A]
  Dowel Pin [B]
  Front Camshaft Chain Guide [C]
  New O-ring [D]
  Collar [E]
- Tighten:

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

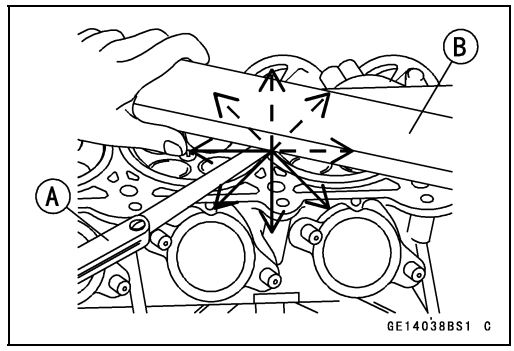
Torque - Engine Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Front Engine Mounting Bolts: 60 N·m (6.1 kgf·m, 44 ft·lb)

- 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).

Valves

Valve Clearance Inspection

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

Valve Clearance Adjustment

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

Valve Removal

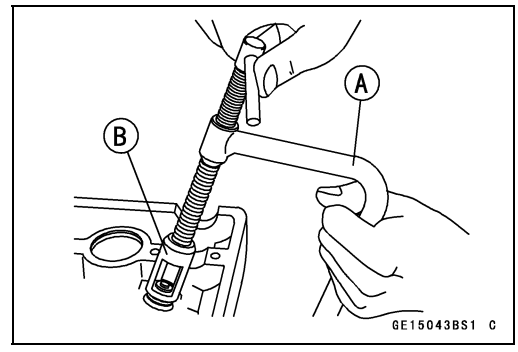
● Remove:
Cylinder Head (see Cylinder Head Removal)
Valve Lifter and Shim

NOTE

○*Mark and record the valve lifter and shim locations so they can be installed in their original positions.*

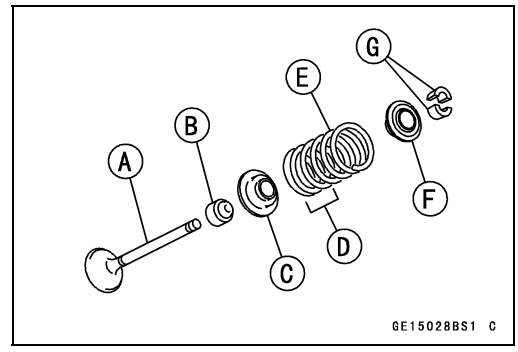
● Using the valve spring compressor assembly, remove the valve.

Special Tools - Valve Spring Compressor Assembly [A]: 57001-241
Valve Spring Compressor Adapter, ϕ24 [B]: 57001-1586



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.
● Apply engine oil to the lips of the seal.
● 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]:
EX-Orange Paint
IN-Pink Paint
Retainer [F]
Split Keepers [G]

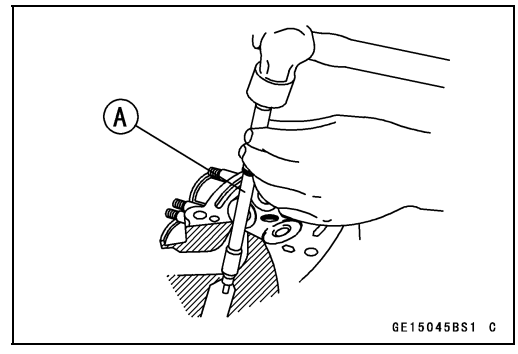


Valve Guide Removal

● 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, ϕ5: 57001-1203



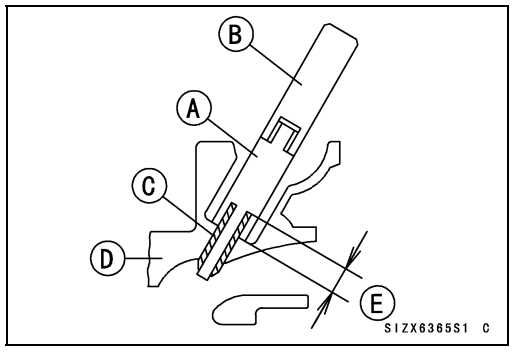
Valves

Valve Guide Installation

- Apply engine oil to the valve guide outer surface before installation.
- Heat the area around the valve guide hole to about 120 ~ 150°C (248 ~ 302°F).

NOTICE
Do not heat the cylinder head with a torch. This Will warp the cylinder head. Soak the cylinder head and heat the oil.

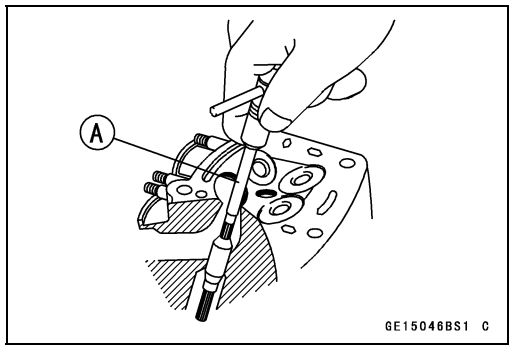
- Assembly the valve guide driver parts (holder and attachment E).
- Insert the rod of the driver into the valve guide bore and hammer the end of the driver until it bottoms.
  Valve Guide Driver Attachment E [A]
  Valve Guide Driver (Holder) [B]
  Valve Guide [C]
  Cylinder Head [D]
  Valve Guide Installed Height = 12.8 ~ 13.0 mm (0.50 ~ 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, ϕ5: 57001-1204

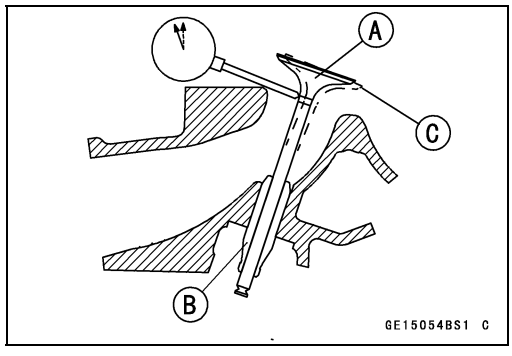


Valve-to-Guide Clearance Measurement (Wobble Method)

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

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

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



Valves

NOTE

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

Valve/Valve Guide Clearance (Wobble Method)

Standard:

Exhaust 0.09 ~ 0.16 mm (0.0035 ~ 0.0063 in.)

Intake 0.03 ~ 0.11 mm (0.0012 ~ 0.0043 in.)

Service Limit:

Exhaust 0.36 mm (0.014 in.)

Intake 0.30 mm (0.012 in.)

Valve Seat Inspection

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

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

★If the outside diameter is too large or too small, repair the seat (see Seat Repair).

Valve Seating Surface Outside Diameter

Standard:

Exhaust 27.6 ~ 27.8 mm (1.087 ~ 1.094 in.)

Intake 32.6 ~ 32.8 mm (1.283 ~ 1.291 in.)

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

Good [F]

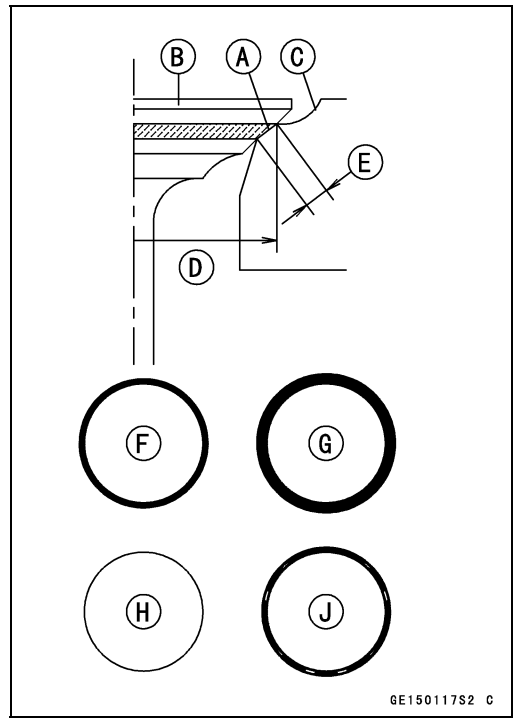
★If the width is too wide [G], too narrow [H] or uneven [J], repair the seat (see Valve Seat Repair).

Valve Seating Surface Width

Standard:

Exhaust 0.8 ~ 1.2 mm (0.031 ~ 0.047 in.)

Intake 0.5 ~ 1.0 mm (0.020 ~ 0.039 in.)



Valve Seat Repair

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

Special Tools - Valve Seat Cutter Holder Bar [B]: 57001-1128

Valve Seat Cutter Holder, ϕ5 [C]: 57001-1208

[For Exhaust Valve Seat]

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

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

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

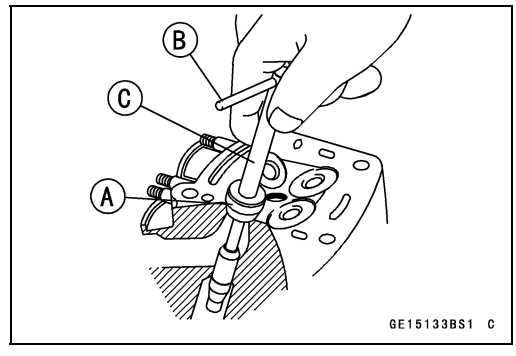
[For Intake Valve Seat]

Valve Seat Cutter, 45° - ϕ35: 57001-1116

Valve Seat Cutter, 32° - ϕ35: 57001-1121

Valve Seat Cutter, 60° - ϕ33: 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.

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

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

NOTE

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

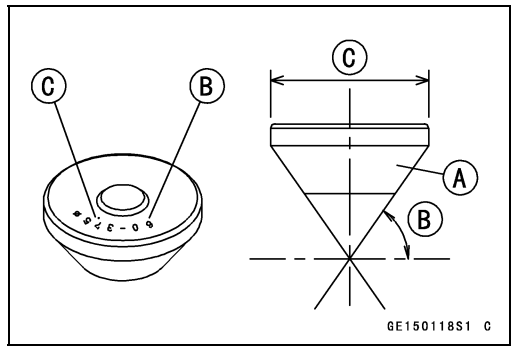
5. After use, wash it with washing oil and apply thin layer of engine oil before storing.

Marks Stamped on the Cutter

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

60° ..... Cutter angle [B]

37.5ϕ ..... 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.

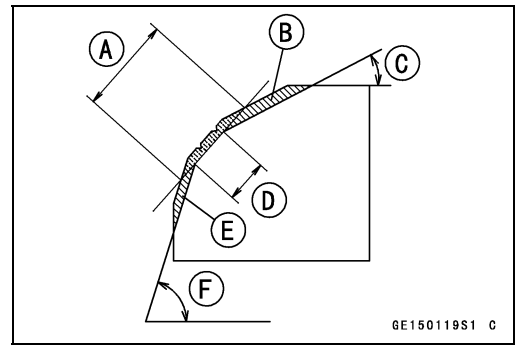
NOTICE
Do not grind the seat too much. Overgrinding will reduce valve clearance by sinking the valve into the head. If the valve sinks too far into the head, it will be impossible to adjust the clearance, and the cylinder head must be replaced.

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° [A] grind until the diameter is within the specified range.

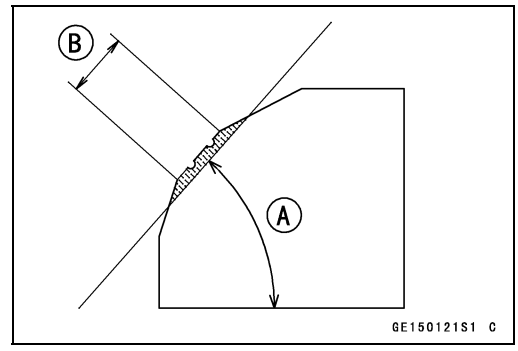
Original Seating Surface [B]

NOTE

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

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

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



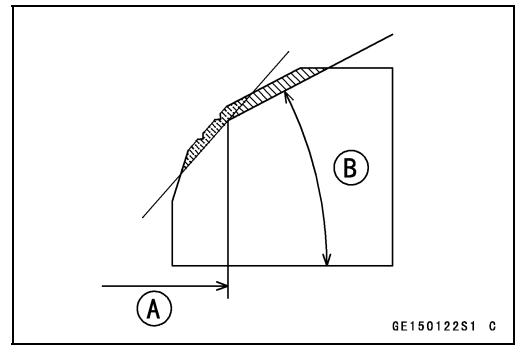
★If the outside diameter [A] of the seating surface is too large, make the 32° [B] grind described below.

★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 until the seat outside diameter is within the specified range.

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

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



NOTICE

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

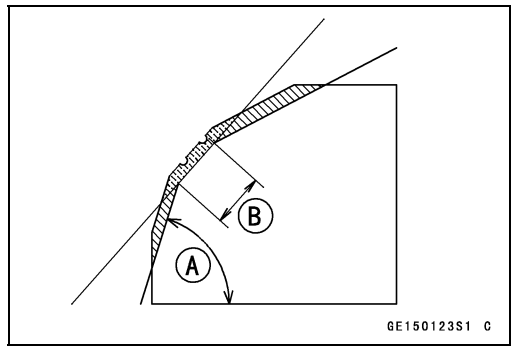
○After making the 32° grind, return to the seat outside diameter measurement step above.

● 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.

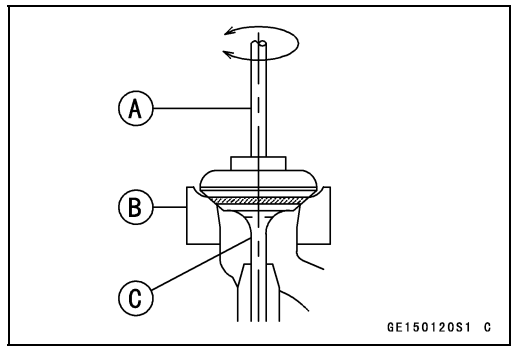
★If the seat width is too narrow, repeat the 45° grind until the seat is slightly too wide, and then return to the seat outside diameter measurement step above.

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.
○Turn the holder, while pressing down lightly.
○After making the 60° grind, return to the seat width measurement step above.
Correct Width [B]

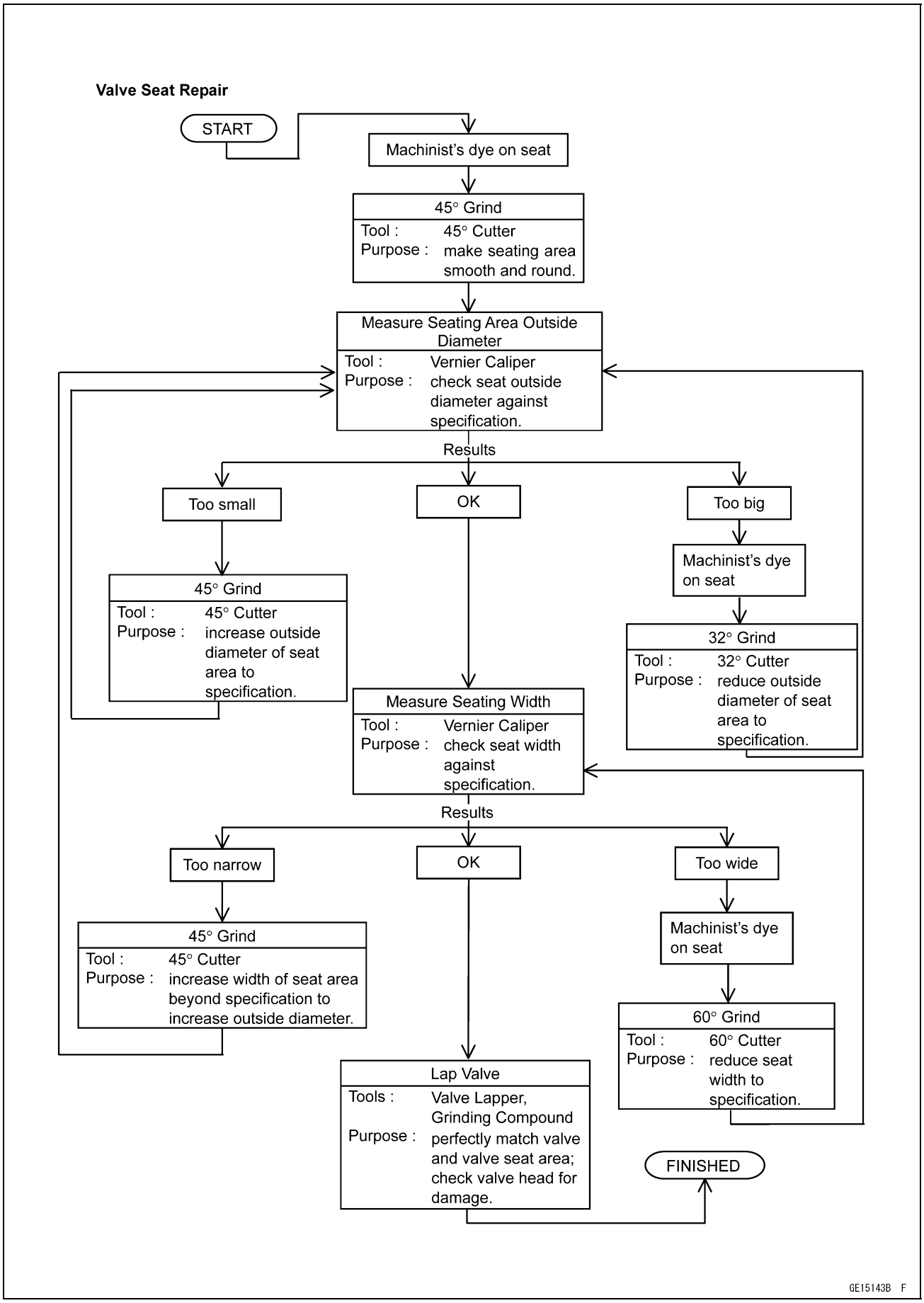


● Lap the valve to the seat, once the seat width and outside diameter are within the ranges specified above.
○Put a little coarse grinding compound on the face of the valve in a number of places around the valve head.
○Spin the valve against the seat until the grinding compound produces a smooth, matched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



● The 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).

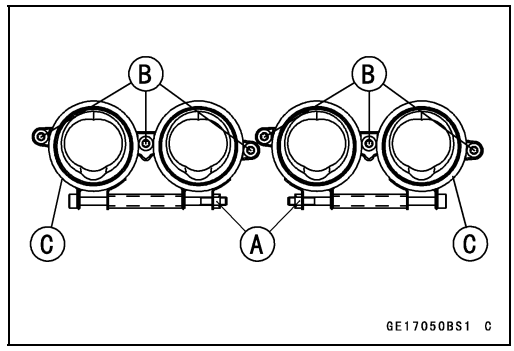
Valves


Valve Seat Repair
START
Machinist's dye on seat
45° Grind
Tool : 45° Cutter
Purpose : make seating area smooth and round.
Measure Seating Area Outside Diameter
Tool : Vernier Caliper
Purpose : check seat outside diameter against specification.
Results
Too small
OK
Too big
45° Grind
Tool : 45° Cutter
Purpose : increase outside diameter of seat area to specification.
Machinist's dye on seat
32° Grind
Tool : 32° Cutter
Purpose : reduce outside diameter of seat area to specification.
Measure Seating Width
Tool : Vernier Caliper
Purpose : check seat width against specification.
Results
Too narrow
OK
Too wide
45° Grind
Tool : 45° Cutter
Purpose : increase width of seat area beyond specification to increase outside diameter.
Machinist's dye on seat
60° Grind
Tool : 60° Cutter
Purpose : reduce seat width to specification.
Lap Valve
Tools : Valve Lapper, Grinding Compound
Purpose : perfectly match valve and valve seat area; check valve head for damage.
FINISHED
GE15143B F

Throttle Body Holder

Throttle Body Assy Holder Removal

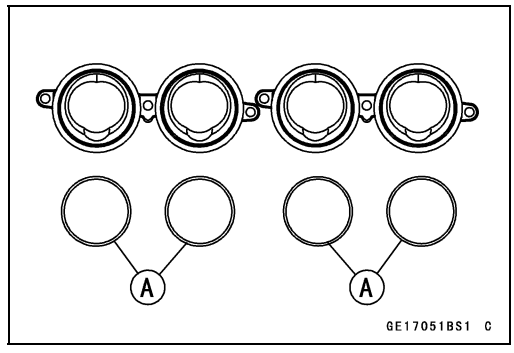
- Remove:
  Throttle Body Assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter)
  Clamp [A]
  Throttle Body Assy Holder Bolts [B]
  Throttle Body Assy Holders [C]



Throttle Body Assy Holder Installation

- Replace the O-rings [A] with new ones.
- Apply liquid gasket to any three positions of the O-rings, and install them.

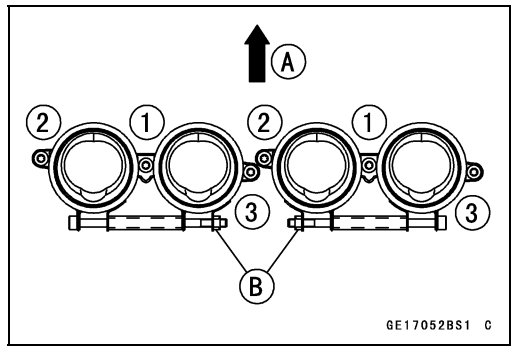
  Sealant - Liquid Gasket, TB1211F: 92104-0004



- Tighten the throttle body assy holder bolts following the tightening sequence [1 ~ 3].
  Upward [A]

  Torque - Throttle Body Assy Holder Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Install the clamps [B] as shown.
- Install:
  Throttle Body Assy (see Throttle Body Assy Installation in the Fuel System (DFI) chapter)



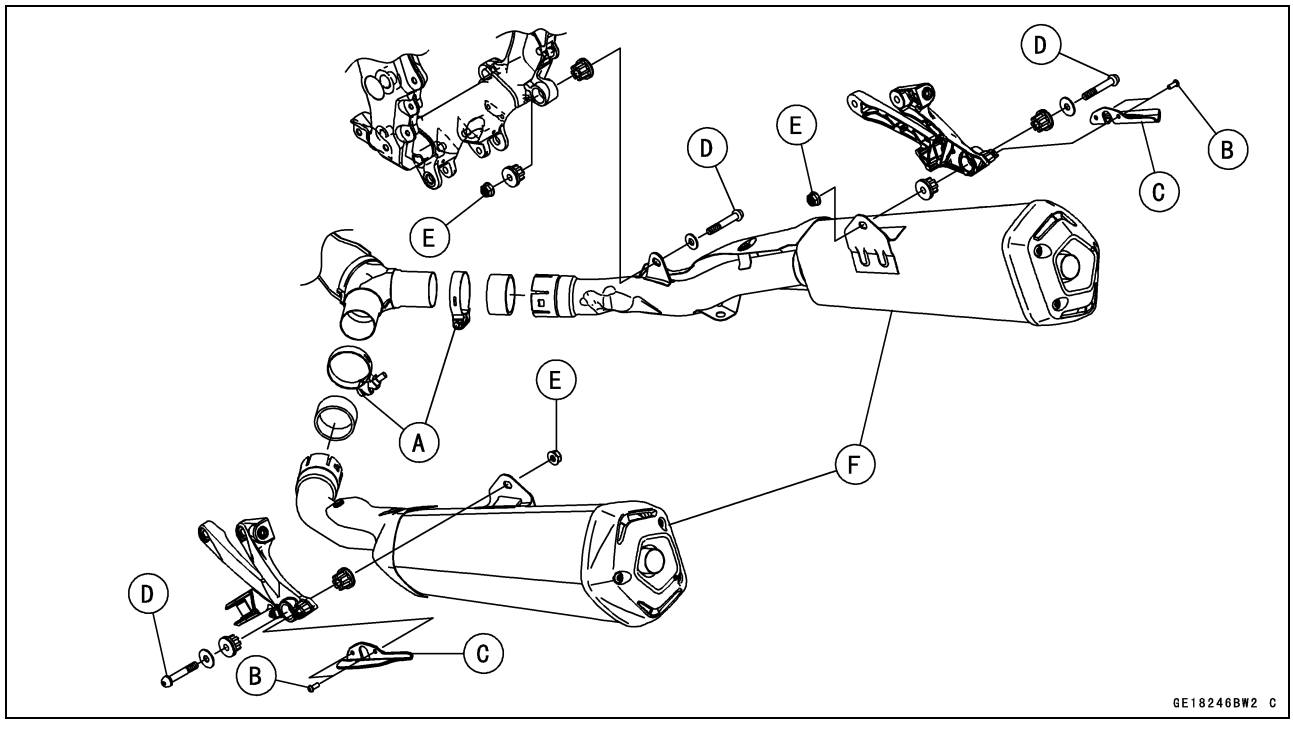
Muffler

⚠ 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:
  Rear Lower Fairing (see Rear Lower Fairing Removal in the Frame chapter) (Equipped Models)
- Loosen the muffler body clamp bolts [A].
- Remove:
  Muffler Guard Bolts [B]
  Muffler Guards [C]
  Muffler Body Mounting Bolts [D] and Nuts [E]
- Pull the muffler bodies [F] backward.

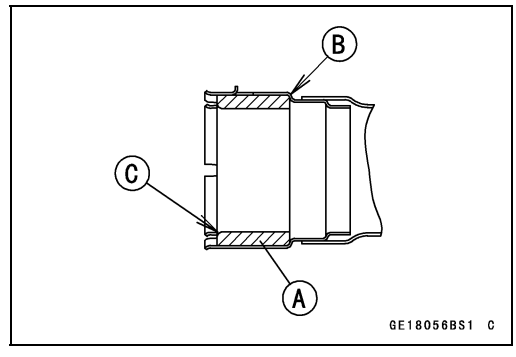


Muffler Body Installation

- Replace the muffler body gaskets [A] with new ones.

○Install the gaskets until they are bottomed [B].

○Install the gaskets so that their chamfer side [C] faces the front.



Muffler

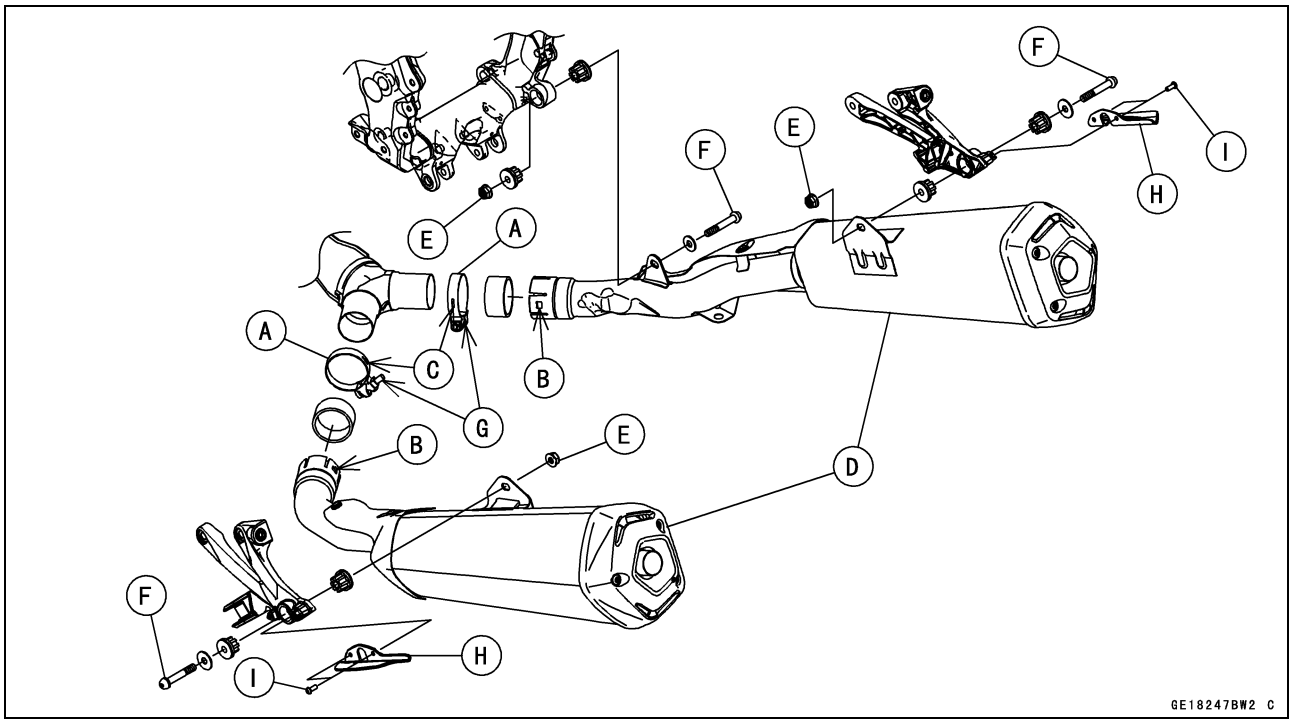
- Install the muffler body clamps [A] as shown.
○Insert the projections [B] into the slots [C].
- Install the muffler bodies [D].
- Replace the nuts [E] with new ones.
- Tighten:

Torque - Muffler Body Mounting Bolts [F]: 34 N·m (3.5 kgf·m, 25 ft·lb)
Muffler Body Clamp Bolts [G]: 17 N·m (1.7 kgf·m, 13 ft·lb)

- Install the muffler guards [H].
- Tighten:

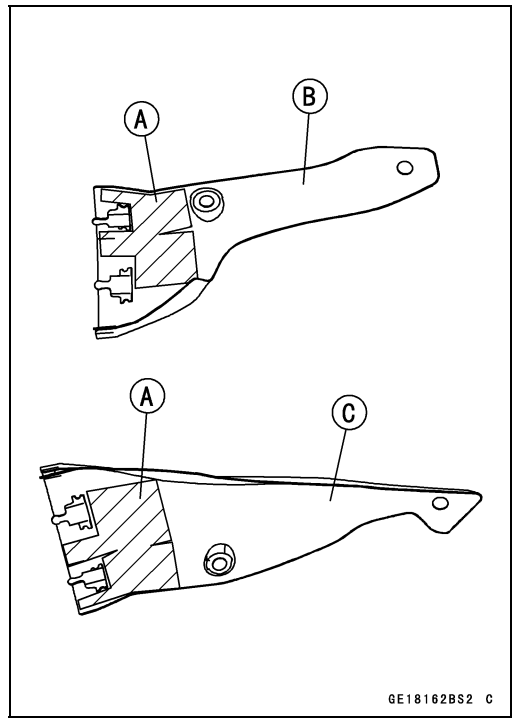
Torque - Muffler Guard Bolts [I]: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Thoroughly warm up the engine, wait until the engine cools down, retighten all the bolts.



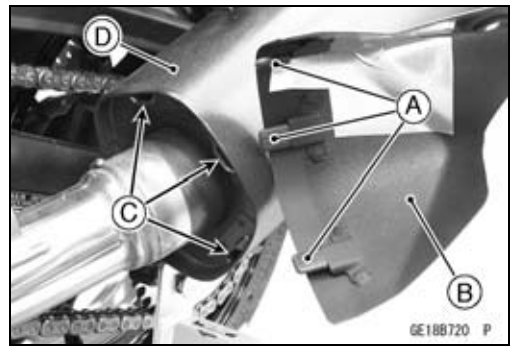
Muffler

● When installing the muffler covers, note the following.
○Be sure that the pads [A] are in place. If the pads are removed, install the pads on the inside of the muffler cover as shown.
Left Muffler Cover [B]
Right Muffler Cover [C]



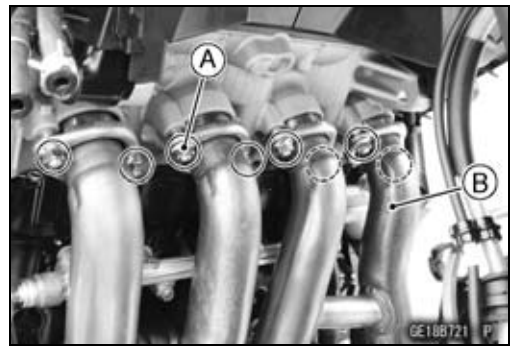
○Fit the dampers [A] of the muffler cover [B] into the slots [C] of the muffler body [D], and tighten the bolts.

Torque - Muffler Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)



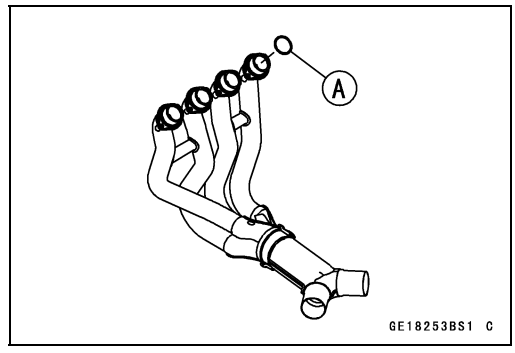
Exhaust Pipe Removal

● Remove:
Oxygen Sensor (see Oxygen Sensor Removal in the Electrical System chapter)
Radiator (see Radiator and Radiator Fan Removal in the Cooling System chapter)
Muffler Bodies (see Muffler Body Removal)
Exhaust Pipe Manifold Holder Nuts [A]
Exhaust Pipe Manifold [B]



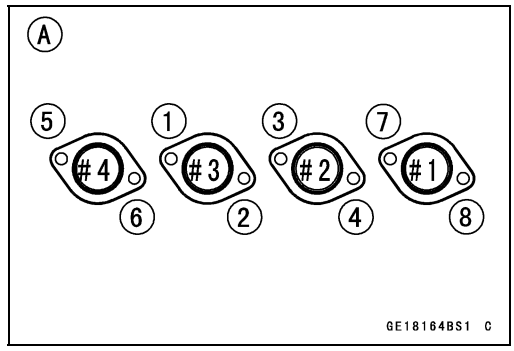
Exhaust Pipe Installation

● Replace the exhaust pipe gaskets [A] with new ones.
● Apply grease to the exhaust pipe gasket and install them.



Muffler

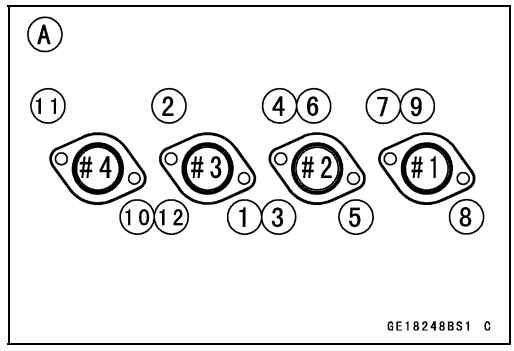
- Temporarily tighten the exhaust pipe manifold holder nuts following the tightening sequence [1 ~ 8].
  View from Front [A]



- Tighten the exhaust pipe manifold holder nuts following the tighten sequence [1 ~ 12].
  View from Front [A]

  Torque - Exhaust Pipe Manifold Holder Nut: 17 N·m (1.7 kgf·m, 13 ft·lb)

- Install the removed parts (see appropriate chapters).

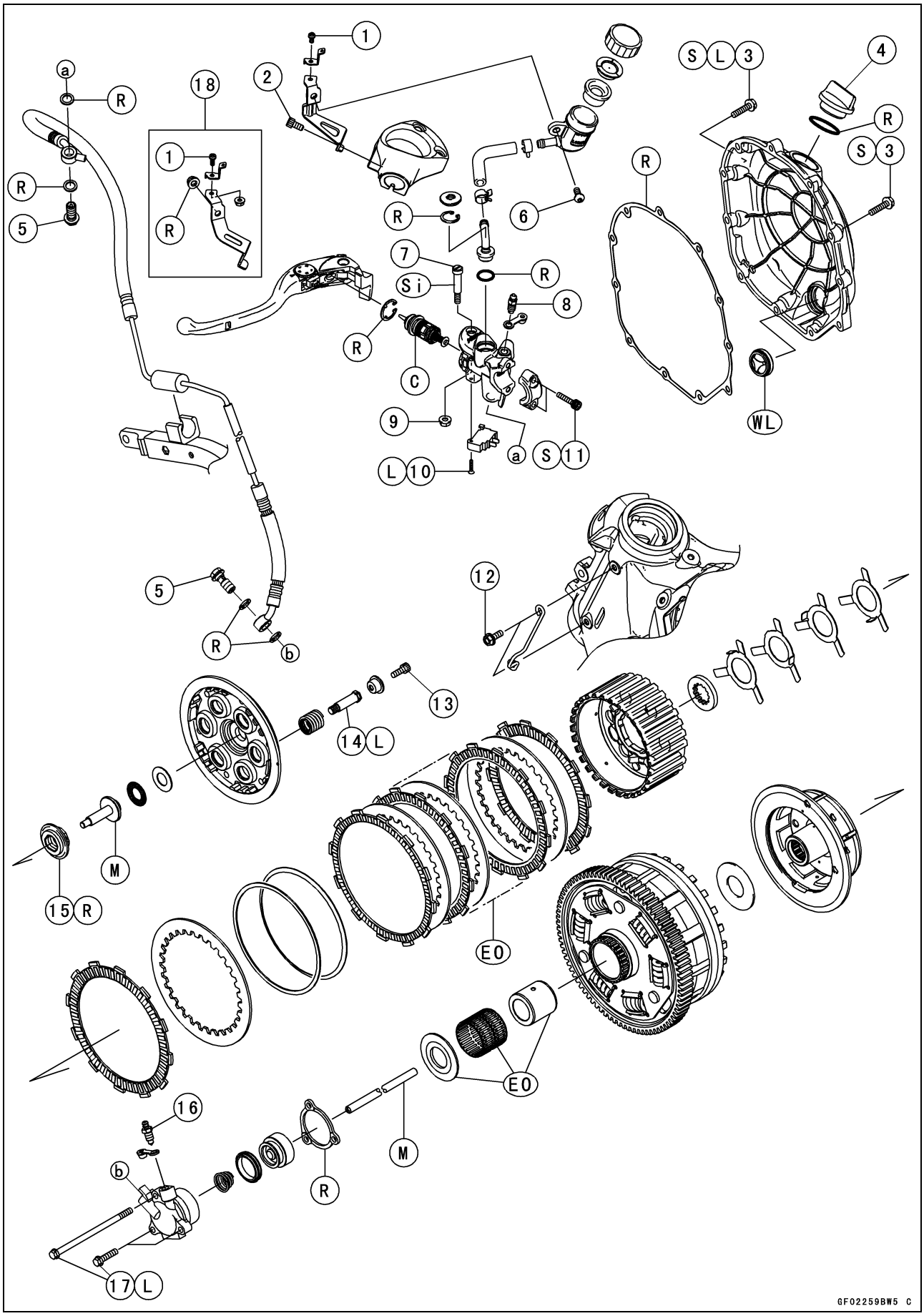


Clutch

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Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Clutch Reservoir Cap Stopper Screw (ZX1400H Model)	2.0	0.20	18 in·lb	
	Clutch Reservoir Cap Stopper Screw (ZX1400J Model)	1.2	0.12	11 in·lb	
2	Clutch Reservoir Bracket Bolt	9.0	0.92	80 in·lb	
3	Clutch Cover Bolts	10	1.0	89 in·lb	L (1), S
4	Oil Filler Plug	–	–	–	Hand-tighten
5	Clutch Hose Banjo Bolts	25	2.5	18	
6	Clutch Reservoir Bolt	8.0	0.82	71 in·lb	
7	Clutch Lever Pivot Bolt	1.0	0.10	8.9 in·lb	Si
8	Clutch Master Cylinder Bleed Valve	8.0	0.82	71 in·lb	
9	Clutch Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
10	Starter Lockout Switch Screw	0.70	0.07	6.2 in·lb	L
11	Clutch Master Cylinder Clamp Bolts	10.3	1.05	91 in·lb	S
12	Clutch Hose Clamp Bolts	8.0	0.82	71 in·lb	
13	Clutch Spring Bolts	11	1.1	97 in·lb	
14	Sub Clutch Hub Bolts	25	2.5	18	L
15	Clutch Hub Nut	135	13.8	100	R
16	Clutch Slave Cylinder Bleed Valve	8.5	0.87	75 in·lb	
17	Clutch Slave Cylinder Bolts	8.0	0.82	71 in·lb	L

18. ZX1400J Model
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.
WL: Apply soap and water solution or rubber lubricant.

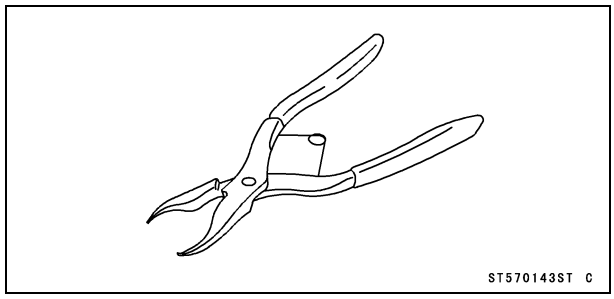
6-4 CLUTCH

Specifications

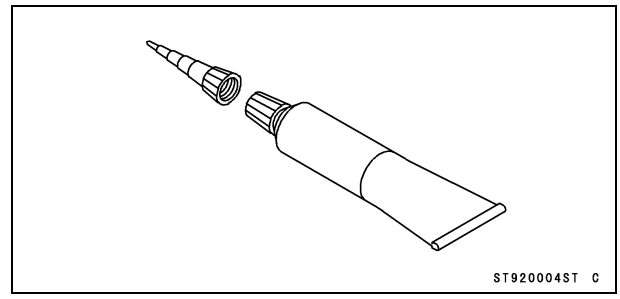
Item	Standard	Service Limit
Clutch Lever		
Clutch Lever Position	5-way adjustable (to suit rider)	– – –
Clutch Lever Free Play	Non-adjustable	– – –
Clutch Fluid		
Grade	DOT4	– – –
Clutch		
Spring Plate Free Play	(Usable Range) 0.05 ~ 0.70 mm (0.002 ~ 0.028 in.)	– – –
Clutch Plate Assembly Length	(Reference) 54.2 mm (2.13 in.)	– – –
Friction Plate Thickness:		
13088-0030, 13088-0031	2.92 ~ 3.08 mm (0.115 ~ 0.121 in.)	2.8 mm (0.11 in.)
13088-0032	3.72 ~ 3.88 mm (0.146 ~ 0.153 in.)	3.6 mm (0.14 in.)
Friction and Steel Plate Warp	0.15 mm (0.0059 in.) or less	0.3 mm (0.01 in.)
Friction Plate Warp (13088-0030 only)	0.2 mm (0.008 in.) or less	0.3 mm (0.01 in.)

Special Tools and Sealant

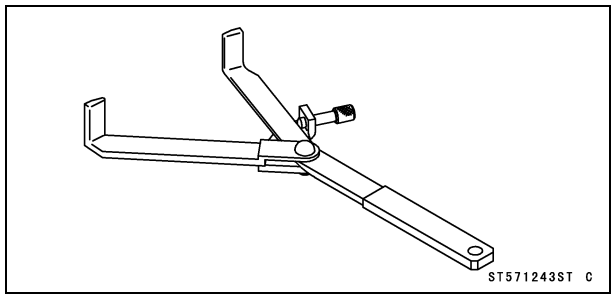
Inside Circlip Pliers:
57001-143



Liquid Gasket, TB1211F:
92104-0004



Clutch Holder:
57001-1243



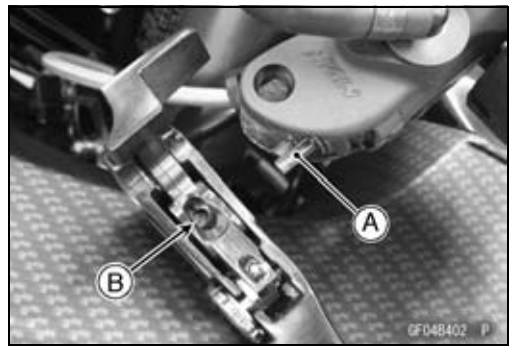
Clutch Lever

Clutch Lever Installation

⚠ WARNING

If the starter lockout switch pin has been damaged the starter lockout system will not work properly. This allows the motorcycle to be started in gear with the clutch lever released (clutch engaged), creating sudden forward movement that can result in an accident or injury. Check that the starter lockout switch operates properly when installing the clutch lever.

- Insert the push rod [A] of the master cylinder to the hole [B] of the clutch lever.

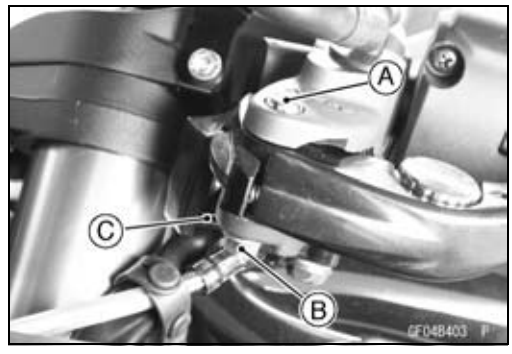


NOTICE

The pin of the starter lockout switch may be damaged in the projection of a clutch lever.

- Apply silicone grease to the sliding surface of the clutch lever pivot bolt [A].
- Tighten the clutch lever pivot bolt and clutch lever pivot bolt locknut [B].

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)



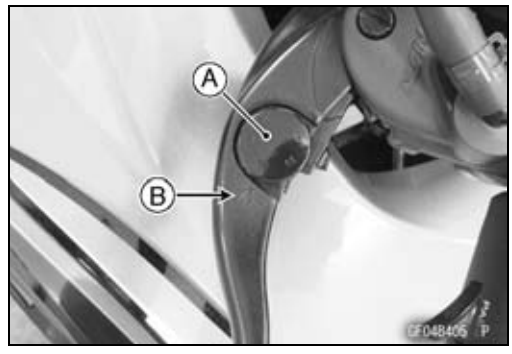
- Check that the pin [C] of the starter lockout switch moves smoothly.

Clutch Lever Position Adjustment

The clutch lever adjuster has 5 positions so that the clutch lever position can be adjusted to suit the operator's hand.

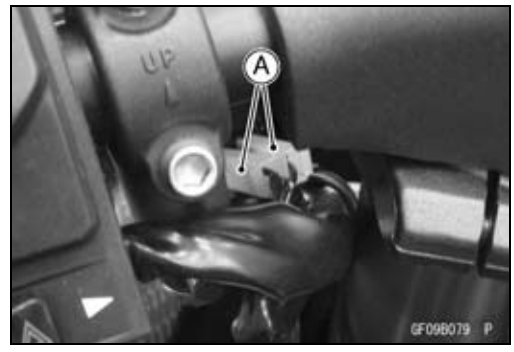
- Push the lever forward and turn the adjuster [A] to align the number with the arrow mark [B] on the lever.

○The distance from the grip to the lever is minimum at number 5 and maximum at number 1.

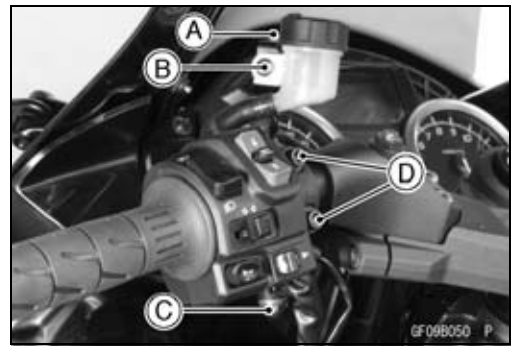


Clutch Master Cylinder

Clutch Master Cylinder Removal



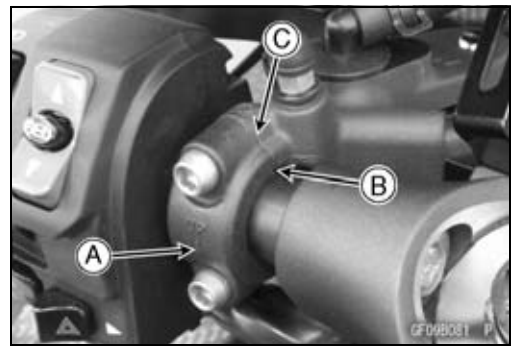
- Disconnect the starter lockout switch connectors [A].
- Drain the clutch fluid from the reservoir (see Clutch Fluid Change in the Periodic Maintenance chapter).



- For ZX1400H model, remove the following parts.
  Clutch Reservoir Cap Stopper Screw [A]
  Clutch Reservoir Cap Stopper
  Clutch Reservoir Bolt [B]
- For ZX1400J model, remove the following parts.
  Clutch Reservoir Cap Stopper Screw and Nut
  Clutch Reservoir Cap Stopper
  Clutch Reservoir Bolt and Nut
- Remove the banjo bolt [C] to disconnect the clutch hose from the master cylinder.
- Remove the clamp bolts [D], and take off the master cylinder as an assembly with the clutch reservoir, clutch lever and starter lockout switch installed.

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

Clutch Master Cylinder Installation



- Install the master cylinder clamp with the arrow mark [A] upward.
- Align the punch mark [B] on the handlebar with the mating surface [C] of the master cylinder clamp.
- Tighten the upper clamp bolt first, and then the lower clamp bolt. There will be a gap at the lower part of the clamp after tightening.

  Torque - Clutch Master Cylinder Clamp Bolts: 10.3 N·m (1.05 kgf·m, 91 in·lb)

- Replace the washers that are on each side of the hose fitting with new ones.
- Tighten:

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

- For ZX1400J model, replace the clutch reservoir nut with a new one.
- Tighten:

  Torque - Clutch Reservoir Bolt: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Connect the starter lockout switch connectors.
- 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

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.

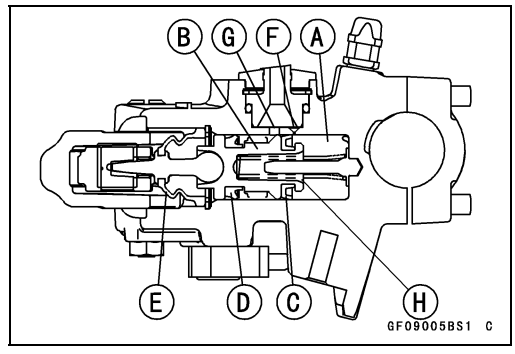
★If it is damaged, replace the piston assembly.

- 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.



Clutch Slave Cylinder

Clutch Slave Cylinder Removal

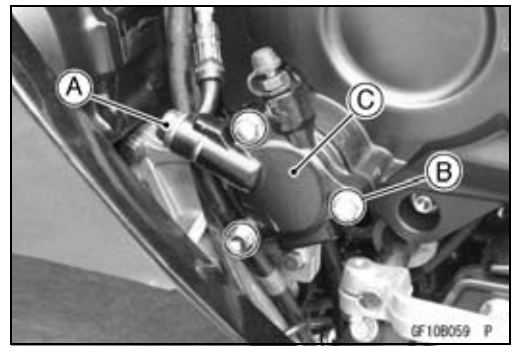
- Remove:
  Quick Rivet [A]
  Bolts [B] and Collars
- Free the lower fairing.



- Remove:
  Banjo Bolt [A]
  Clutch Slave Cylinder Bolts [B]
  Slave Cylinder [C]

NOTICE

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

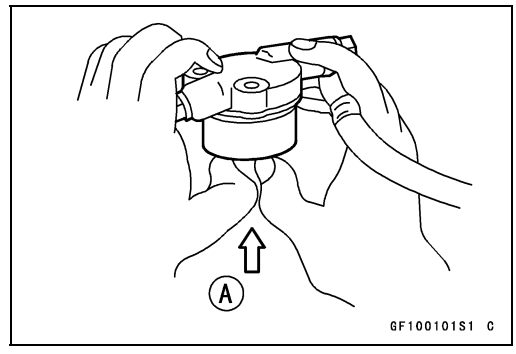


- Perform the following if the clutch slave cylinder is to be removed but not disassembled.

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.

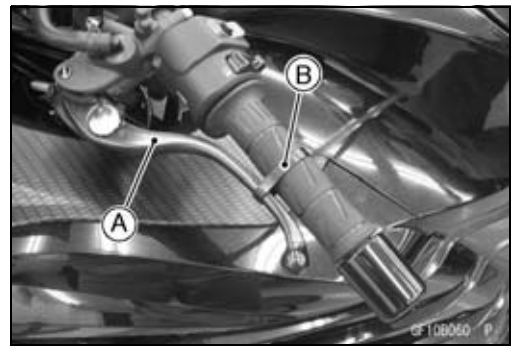
○Remove the clutch slave cylinder from the engine with the pipe installed. Push [A] the piston into the cylinder as far as it will go.



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

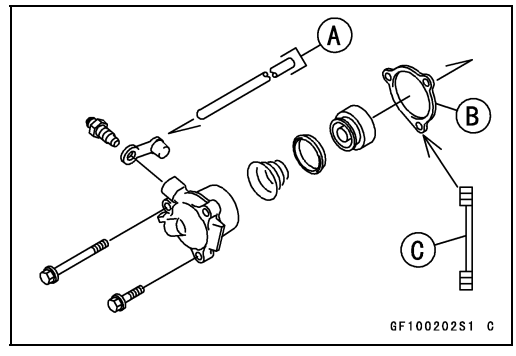
NOTE

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

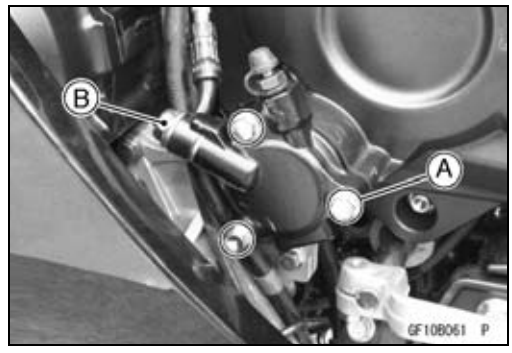


Clutch Slave Cylinder Installation

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



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: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Replace the washers that are on each side of the hose fitting with new ones.
- 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 (see Bleeding 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.

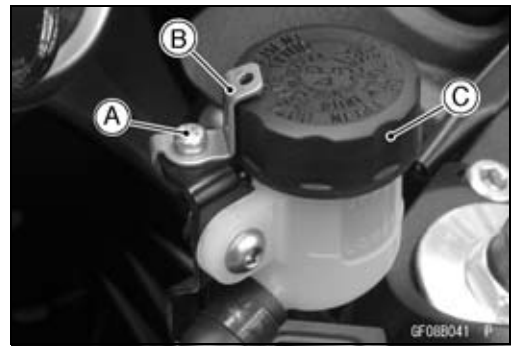
Bleeding the Clutch Line

⚠ WARNING

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 damages painted or plastic surfaces; any spilled fluid should be completely wiped up immediately with wet cloth.



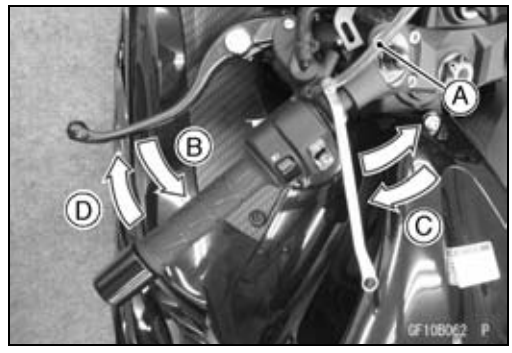
- Remove:
  Clutch Reservoir Cap Stopper Screw [A] (ZX1400H Model)
  Clutch Reservoir Cap Stopper Screw and Nut (ZX1400J Model)
  Clutch Reservoir Cap Stopper [B]
  Clutch Reservoir Cap [C]
  Diaphragm Plate
  Diaphragm
- Fill the reservoir with fresh clutch fluid to the upper level line in the reservoir.

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 hole at the bottom of the reservoir.

Clutch Fluid



- Remove the rubber cap from the bleed valve on the master cylinder.
- Attach a clear plastic hose [A] to the bleed valve, and run the other end of the hose into a container.
- Bleed the clutch line and the master cylinder.

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

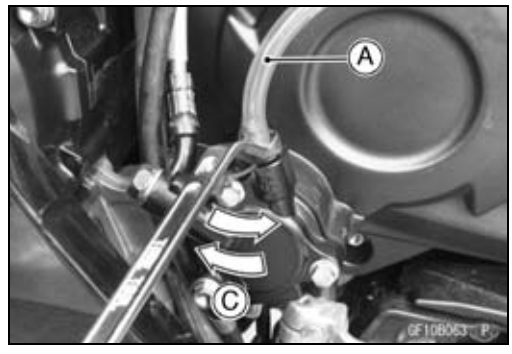
1. Pump the clutch lever until it becomes hard, and apply the clutch lever and hold it [B].
2. Quickly open and close [C] the bleed valve while holding the clutch lever applied.
3. Release the clutch lever [D].

NOTE

○*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.

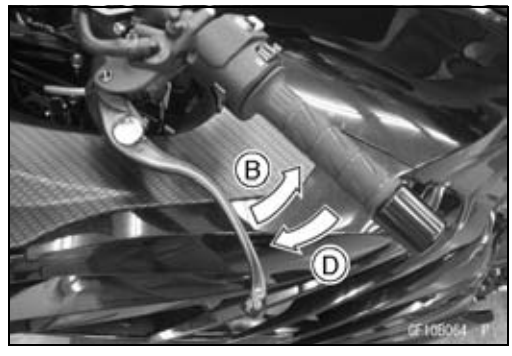
Torque - Clutch Master Cylinder Bleed Valve: 8.0 N·m (0.82 kgf·m, 71 in·lb)



- 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.

○Repeat 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

○*Check the fluid level in the reservoir often, replenishing it 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.*

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.

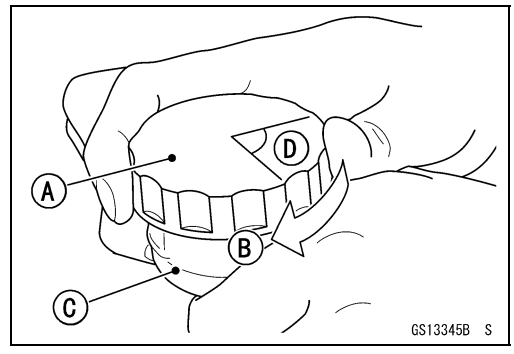
- Remove the clear plastic hose.
- Tighten the bleed valve, and install the rubber cap.

Torque - Clutch Slave Cylinder Bleed Valve: 8.5 N·m (0.87 kgf·m, 75 in·lb)

- Install:
  Diaphragm
  Diaphragm Plate
  Clutch Reservoir Cap

- Follow the procedure below to install the clutch fluid reservoir cap correctly.

○First, tighten the clutch fluid reservoir cap [A] clockwise [B] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body [C], then tighten the cap an additional 1/6 turn [D] while holding the clutch fluid reservoir body.



- Install the stopper and tighten the clutch reservoir cap stopper screw.

Torque - Clutch Reservoir Cap Stopper Screw (ZX1400H Model): 2.0 N·m (0.20 kgf·m, 18 in·lb)
Clutch Reservoir Cap Stopper Screw (ZX1400J Model): 1.2 N·m (0.12 kgf·m, 11 in·lb)

- After bleeding the clutch line, check the clutch for good clutching effectiveness and no fluid leakage.

★If necessary, bleed the air from the line again.

Clutch Hose Removal/Installation

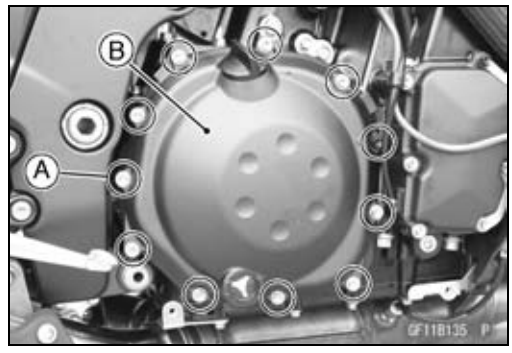
- Refer to the Clutch Hose Replacement in the Periodic Maintenance chapter.

Clutch Hose Inspection

- Refer to the Clutch Hose Damage and Installation Condition Inspection in the Periodic Maintenance chapter.

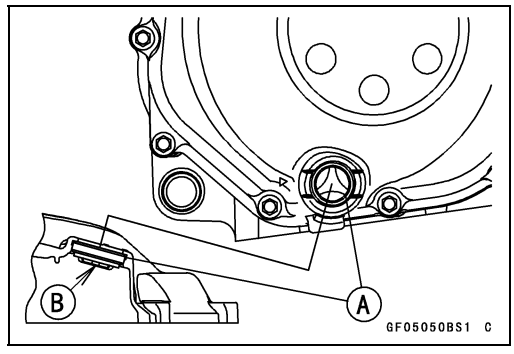
Clutch Cover

Clutch Cover Removal



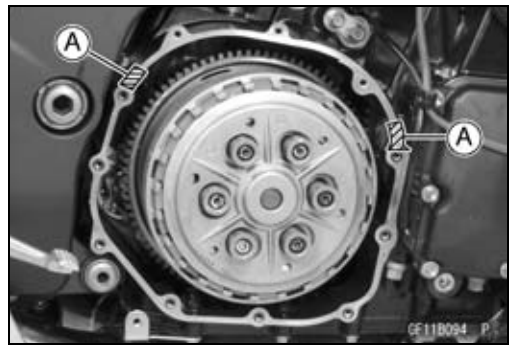
- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove:
  Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
  Clutch Cover Bolts [A]
  Clutch Cover [B]

Clutch Cover Installation



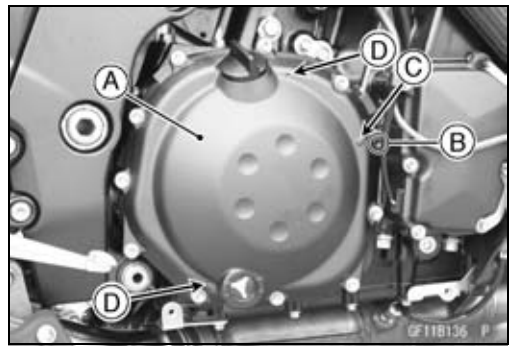
- If the oil level inspection window [A] is removed, press the oil level inspection window so that its projection [B] faces the inside, using lubricant.

○Apply a soap and water solution or rubber lubricant to the outer circumference of the oil level inspection window.



- Using a cleaning fluid, clean off any oil or dirt that may be on the liquid gasket coating area. Dry them with a clean cloth.
- 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 the clutch cover [A].
- Tighten the clutch cover bolts.

○Apply a non-permanent locking agent to only one clutch cover bolt [B] as shown (circle mark [C] portion bolt).

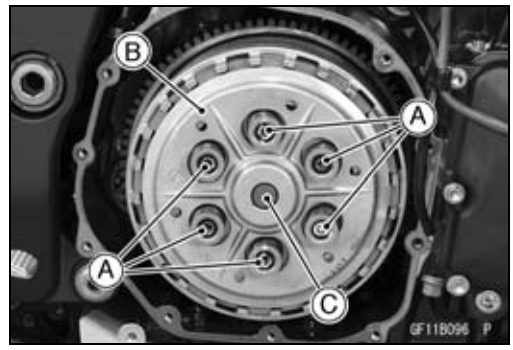
○Tighten the triangular mark [D] portion bolts first, and then other bolts.

Torque - Clutch Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

Clutch

Clutch Removal

- Remove:
  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)

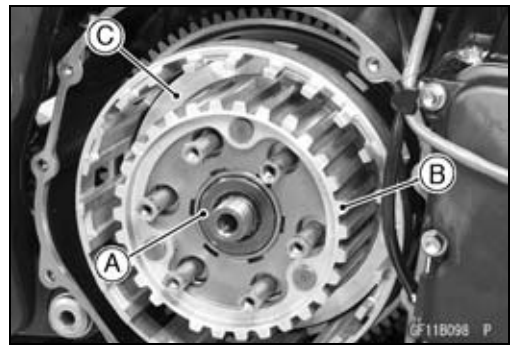


- Remove:
  Friction Plates and Steel Plates
- Hold the sub clutch hub [A] steady with the clutch holder [B], and remove the nut [C].

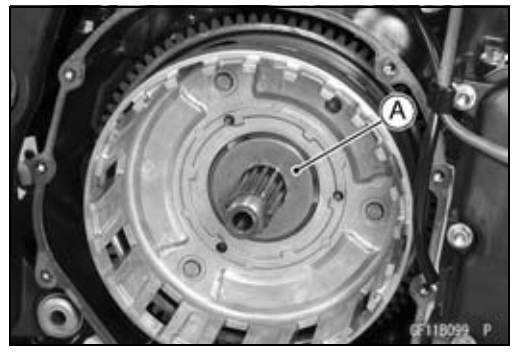
  Special Tool - Clutch Holder: 57001-1243



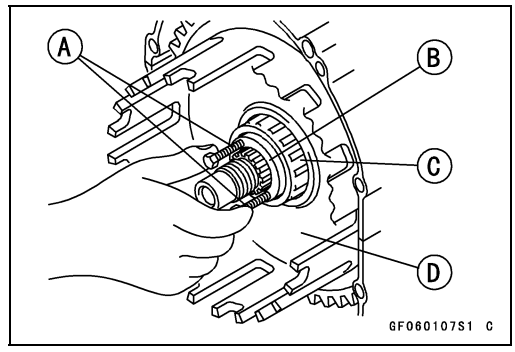
- Remove:
  Torque Limiter Springs
  Toothed Washer [A]
  Sub Clutch Hub [B]
  Clutch Hub [C]



- Remove:
  Spacer [A]



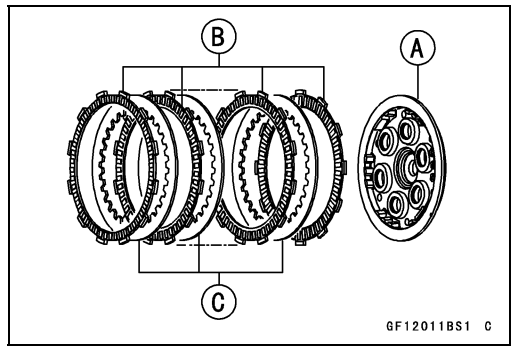
- Using the two 4 mm (0.16 in.) bolts [A], pull out the sleeve [B], needle bearing [C] and clutch housing [D].
- Remove the thrust washer.



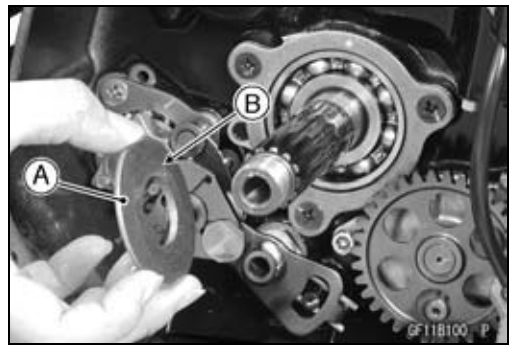
Clutch

Clutch Installation

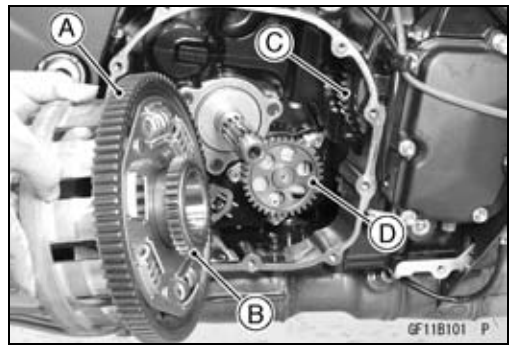
- When replacing any one of the following parts, check the spring plate free play (see Spring Plate Free Play Measurement).
  Spring Plate [A]
  Friction Plates [B]
  Steel Plates [C]



- Install the thrust washer [A] by facing its chamfered side [B] towards the crankcase.

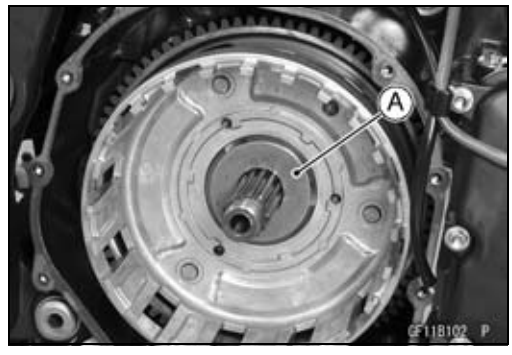


- Engage the clutch housing gear [A] and oil pump drive gear [B] with the crankshaft primary gear [C] and oil pump gear [D].



- Install:
  Needle Bearing
  Sleeve
  Spacer [A]

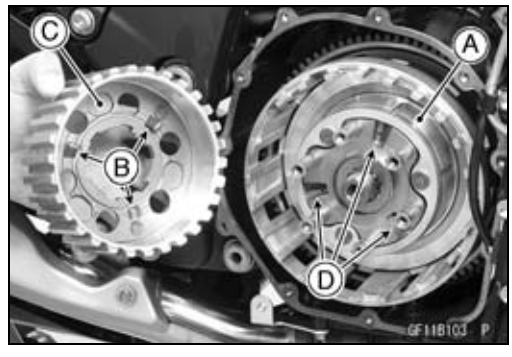
○Apply engine oil to the needle bearing and the sleeve before installation.
○Install the sleeve so that the holes face outward.



★If the sub clutch hub bolts were removed, install them as follows.
○Apply a non-permanent locking agent to the threads of the sub clutch hub bolts, and tighten them.

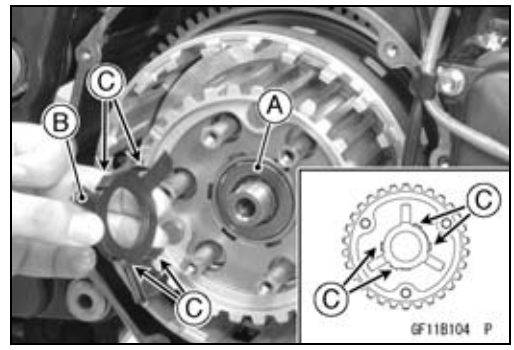
Torque - Sub Clutch Hub Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- 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.



Clutch

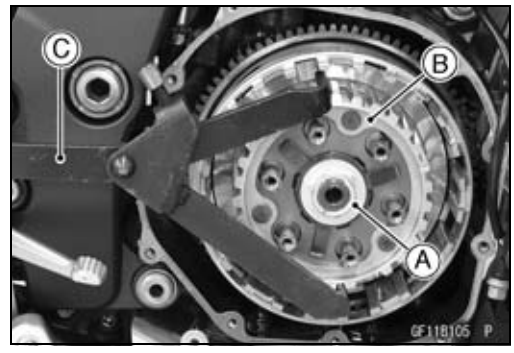
● Install the toothed washer [A].
● Install the four torque limiter springs [B] as shown.
Tangs [C]
○Do not over lap the tang of the springs.



● 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

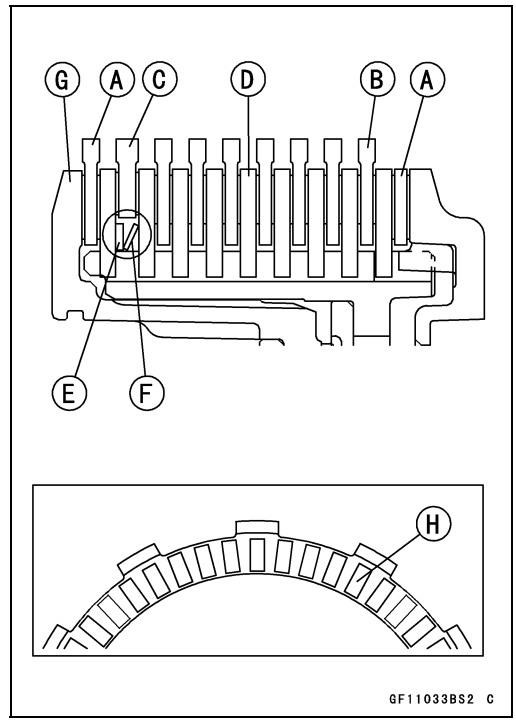
Torque - Clutch Hub Nut: 135 N·m (13.8 kgf·m, 100 ft·lb)



● Install the following as shown.
Friction Plates [A] [B] [C]
Steel Plates [D]
Spring Seat [E]
Spring [F]
Clutch Hub [G]

NOTE

○*The lining blocks [H] of the friction plate [A] are larger than them of the friction plates [B].*
○*Install the spring seat and spring between first steel plate and second steel plate.*
○*The inside diameter of second friction plate [C] is larger than the others because the spring seat and spring are equipped to decrease the judder noise as shown.*



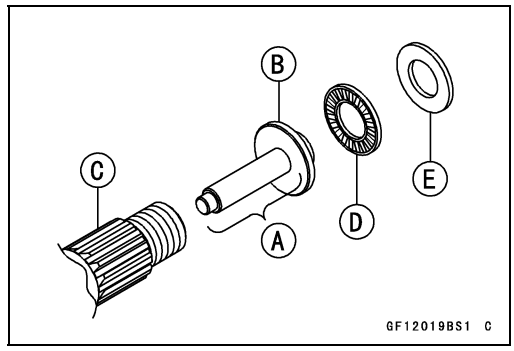
NOTICE
If new dry friction plates and steel plates are installed, apply engine oil to the surfaces of each plate to avoid clutch plate seizure.

● Install the last friction plate [A] fitting the tangs in the grooves in the housing as shown.



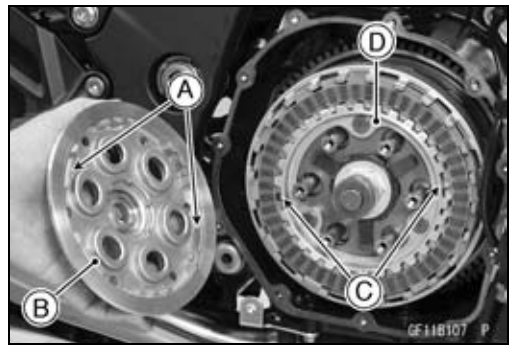
Clutch

- Apply molybdenum disulfide grease to the outside surface [A] of the pusher [B].
- Install the pusher into the drive shaft [C].
- Apply engine oil to the needle bearing [D].
- Install:
  Needle Bearing
  Washer [E]



- Align the wide projections [A] of the spring plate [B] with the wide grooves [C] of the sub clutch hub [D] to install the spring plate on the sub clutch hub.
- Install the clutch springs, spring holders, and tighten the clutch spring bolts.

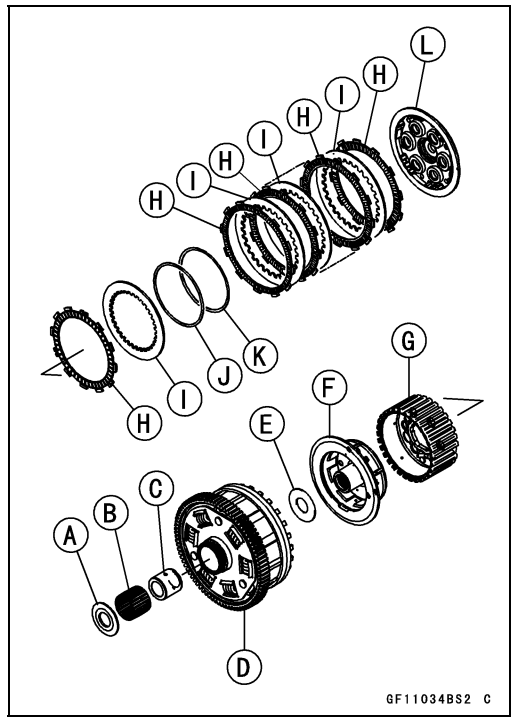
  Torque - Clutch Spring Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)
- Install the clutch cover (see Clutch Cover Installation).



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 Hub [F]
  Sub Clutch Hub [G]
  Friction Plates [H]
  Steel Plates [I]
  Spring Seat [J]
  Spring [K]
  Spring Plate [L]



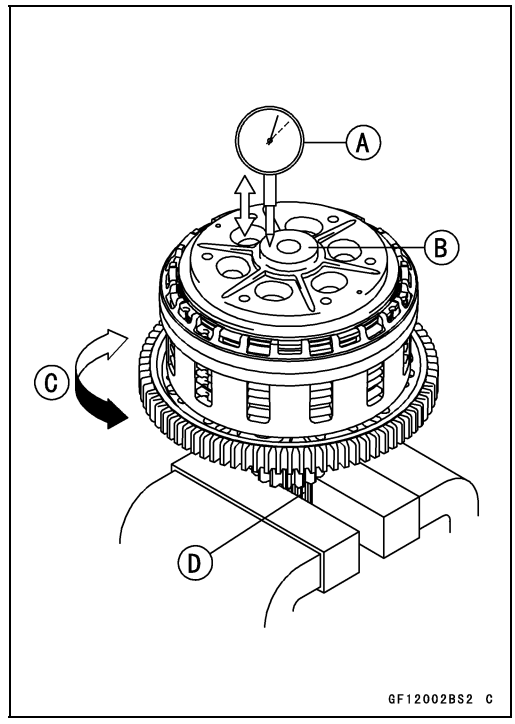
Clutch

- 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

○*The 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.)

○Replace the following steel plate(s).

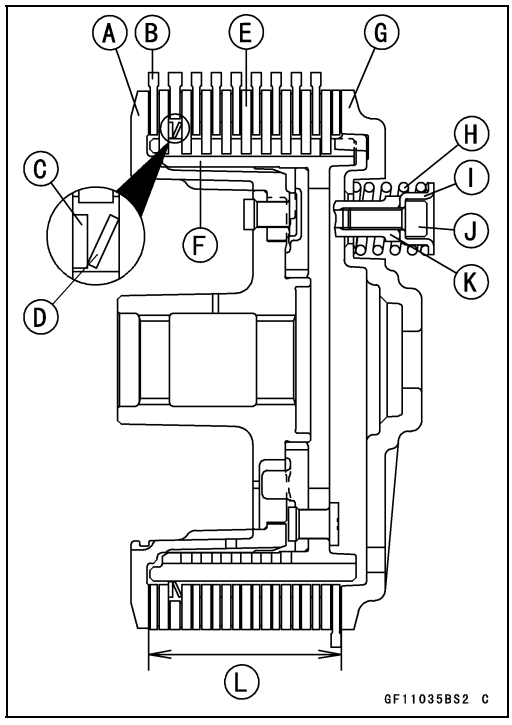
Thickness	Part Number
2.3 mm (0.090 in.)	13089-0019
2.6 mm (0.102 in.) (STD)	13089-0018
2.9 mm (0.114 in.)	13089-0020

NOTE

○*Do 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

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]
  Spring Seat [C]
  Spring [D]
  Steel Plates [E]
  Sub Clutch Hub [F]
  Spring Plate [G]
  Clutch Springs [H]
  Clutch Spring Holder [I]
  Clutch Spring Bolts [J]
  Clutch Hub Bolts [K]

Torque - Clutch Spring Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)

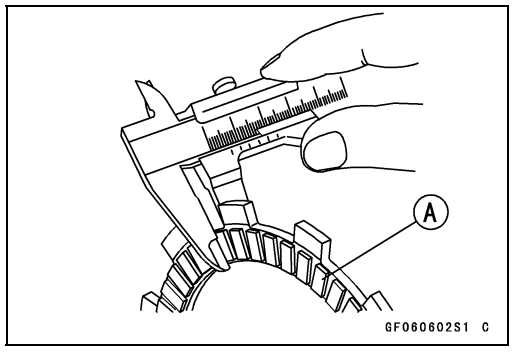
- Measure the clutch plate assembly length [L].

Clutch Plate Assembly Length (Reference)
Standard: 54.2 mm (2.13 in.)

NOTE

○*The length of the clutch plate assembly changes by the steel plate thickness.*

Clutch Plate, Wear, Damage Inspection



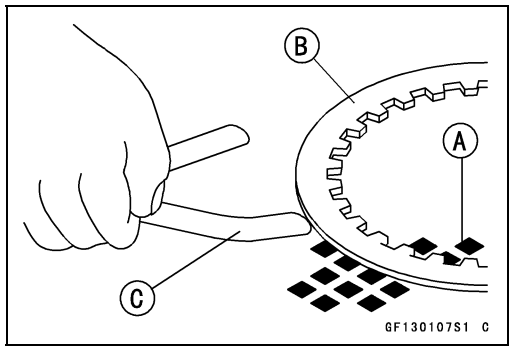
- Visually inspect the friction and steel plates for signs of seizure, overheating (discoloration), or uneven wear.
- Measure the thickness of each friction plate [A] at several points.

★If any plates show signs of damage, or if they have worn past the service limit, replace them with new ones.

Friction Plate Thickness (13088-0030, 13088-0031)
Standard: 2.92 ~ 3.08 mm (0.115 ~ 0.121 in.)
Service Limit: 2.8 mm (0.11 in.)

Friction Plate Thickness (13088-0032)
Standard: 3.72 ~ 3.88 mm (0.146 ~ 0.153 in.)
Service Limit: 3.6 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 (0.01 in.)

Friction Plate Warp (13088-0030 only)
Standard: 0.2 mm (0.008 in.) or less
Service Limit: 0.3 mm (0.01 in.)

Clutch

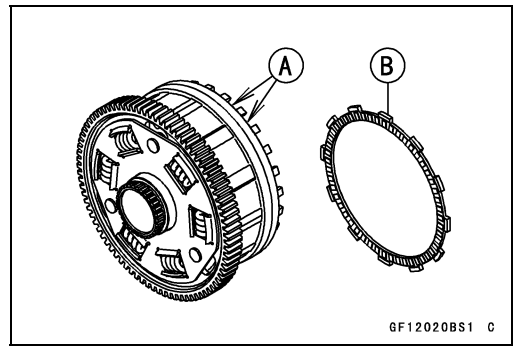
Clutch Spring Inspection

★If all the components are good, but the problem still exists, replace the clutch springs (see Clutch Removal and Clutch Installation).

Clutch Housing Finger Inspection

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

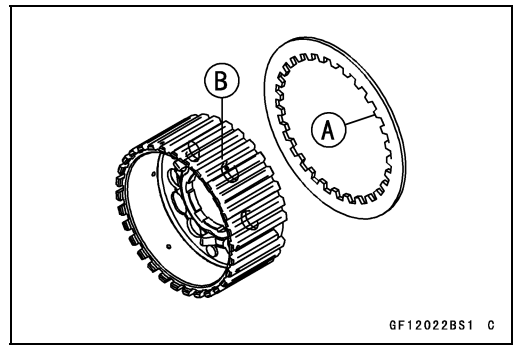
★If they are badly worn or if there are groove cuts where the tangs hit, replace the housing. Also, replace the friction plates if their tangs are damaged.



Clutch Housing Spline Inspection

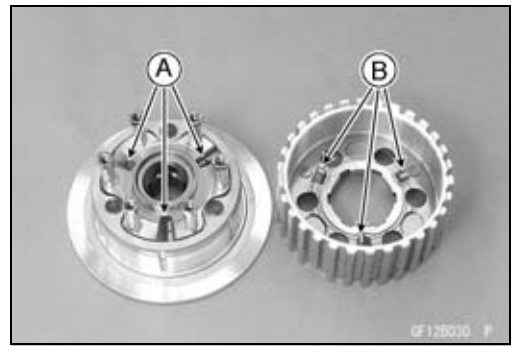
- Visually inspect where the teeth [A] on the steel plates wear against the sub clutch hub splines [B].

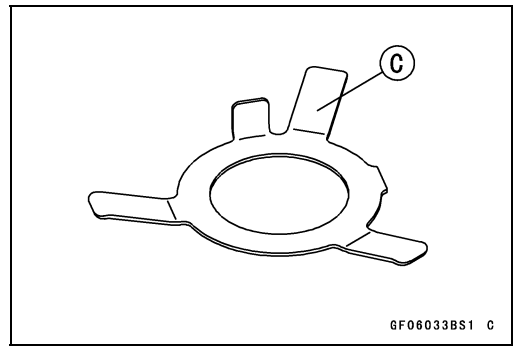
★If there are notches worn into the splines, replace the sub clutch hub. Also, replace the steel plates if their teeth are damaged.



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 is damaged.



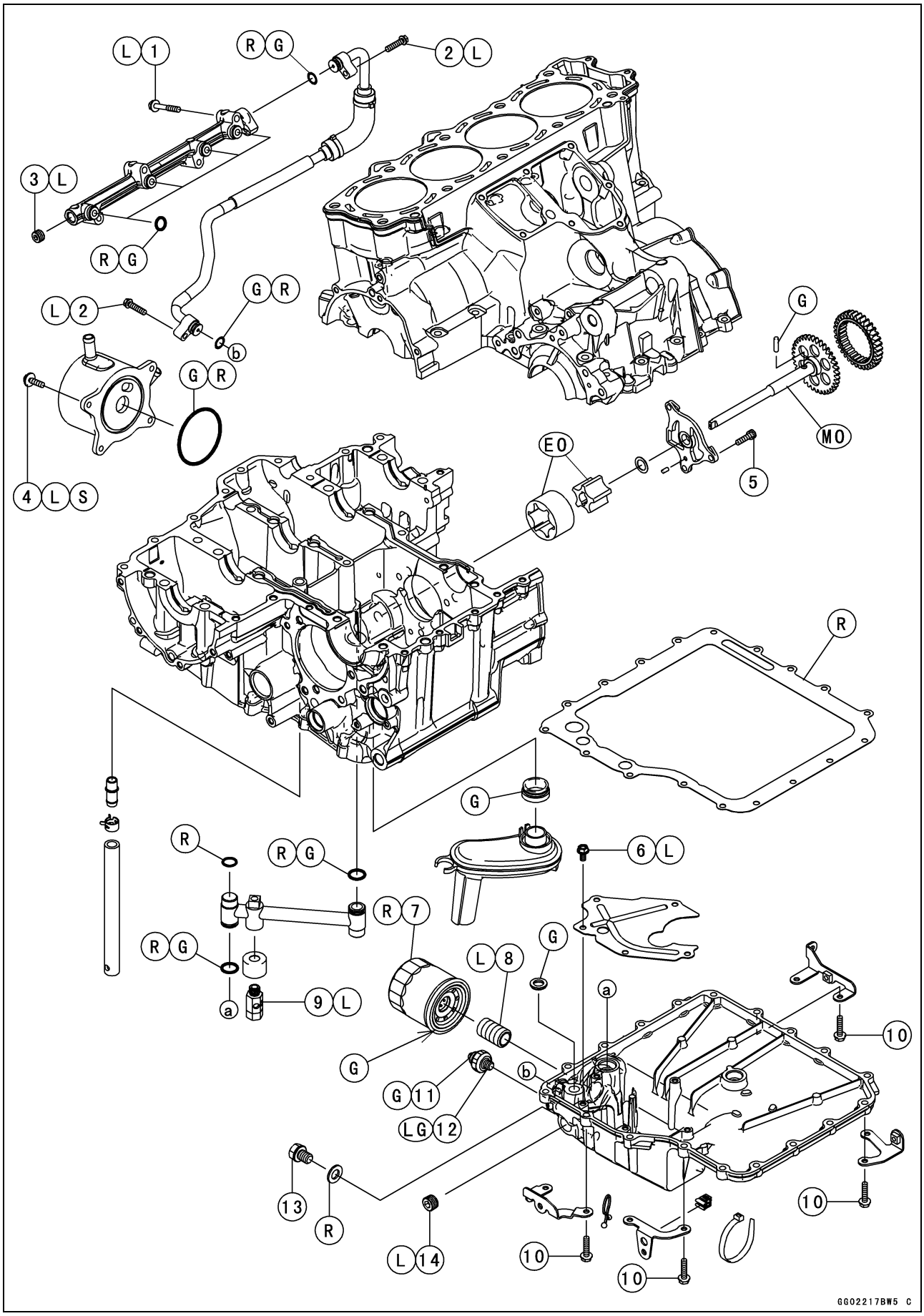


Engine Lubrication System

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Exploded View

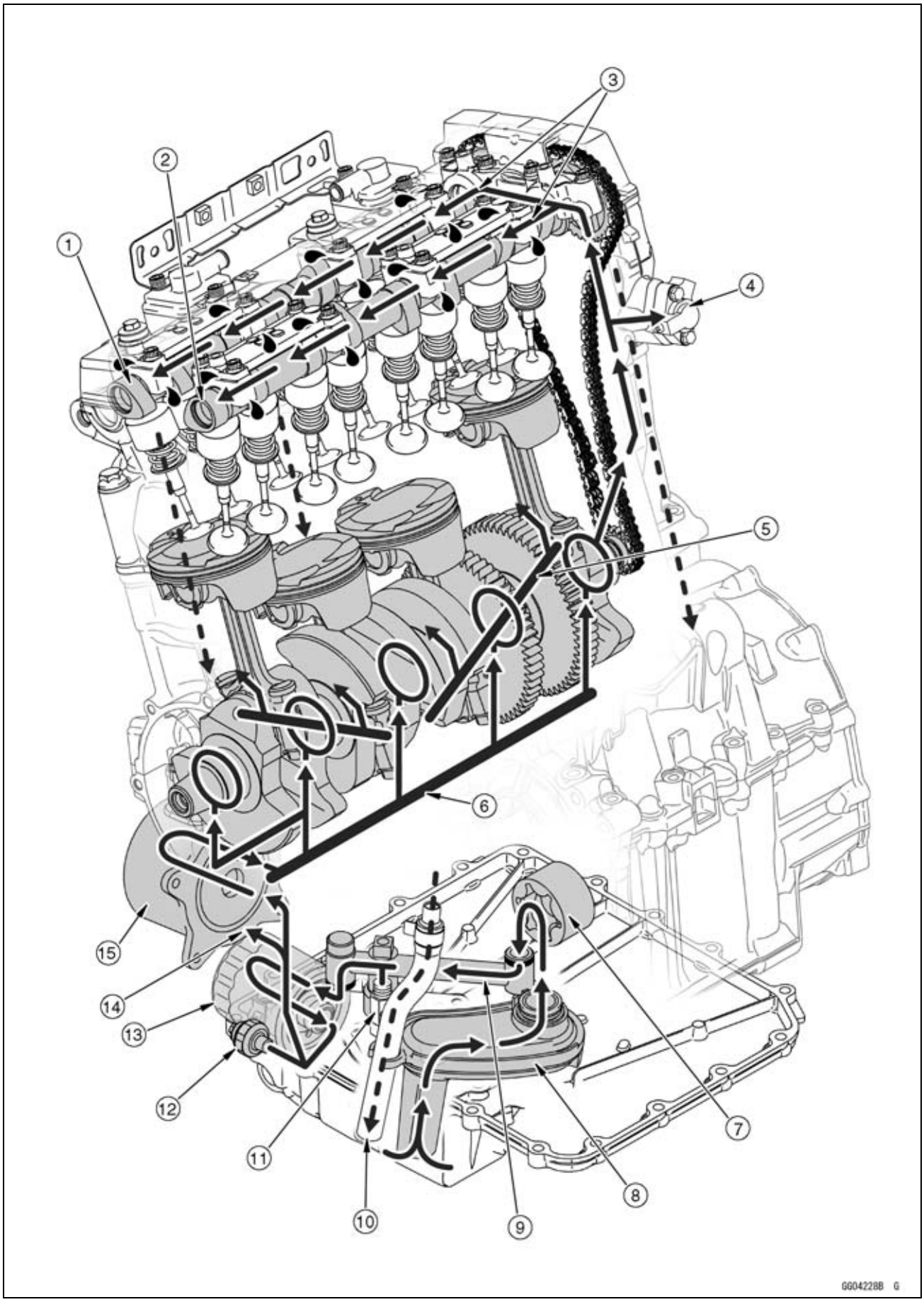


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Oil Pipe Mounting Bolts	10	1.0	89 in·lb	L
2	Oil Pipe Bolts	10	1.0	89 in·lb	L
3	Oil Passage Plug (R1/4)	15	1.5	11	L
4	Oil Cooler Mounting Bolts	12	1.2	106 in·lb	L, S
5	Oil Pump Cover Bolts	10	1.0	89 in·lb	
6	Oil Pan Plate Bolts	10	1.0	89 in·lb	L
7	Oil Filter	17	1.7	13	G, R
8	Oil Filter Holder Mounting Bolt	35	3.6	26	L
9	Oil Pressure Relief Valve	15	1.5	11	L
10	Oil Pan Bolts	10	1.0	89 in·lb	
11	Oil Pressure Switch Terminal Bolt	2.0	0.20	18 in·lb	G
12	Oil Pressure Switch	15	1.5	11	LG
13	Engine Oil Drain Bolt	29	3.0	21	
14	Oil Passage Plug (R3/8)	20	2.0	15	L

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
S: Follow the specified tightening sequence.

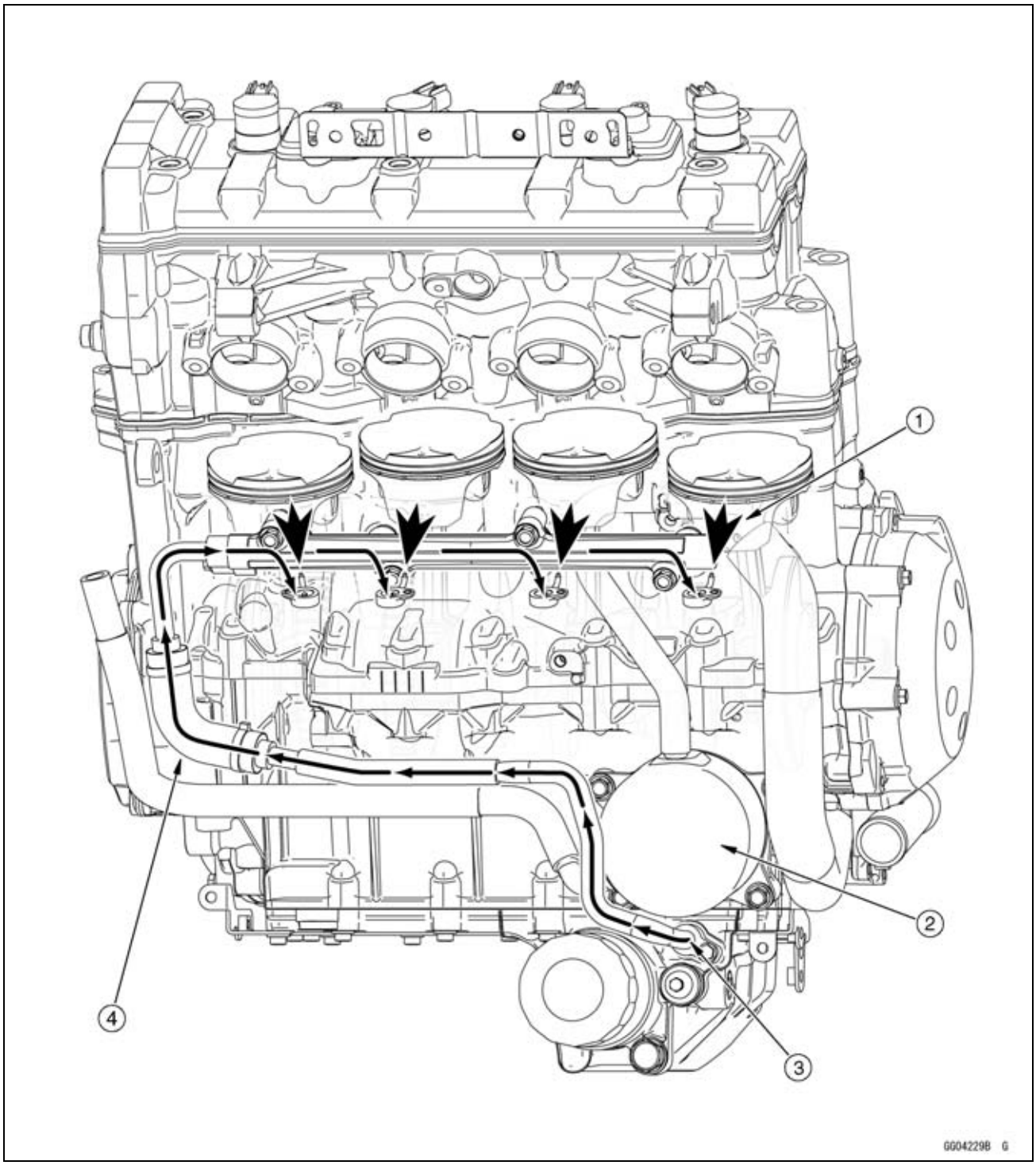
Engine Oil Flow Chart



Engine Oil Flow Chart

1. Exhaust Camshaft
2. Intake Camshaft
3. Camshaft Oil Passages
4. Camshaft Chain Tensioner
5. Crankshaft Oil Passage
6. Main Oil Passage
7. Oil Pump
8. Oil Screen
9. Oil Pipe
10. Breather Hose for Return
11. Relief Valve
12. Oil Pressure Switch
13. Oil Filter
14. to Oil Jets
15. Oil Cooler

Engine Oil Flow Chart

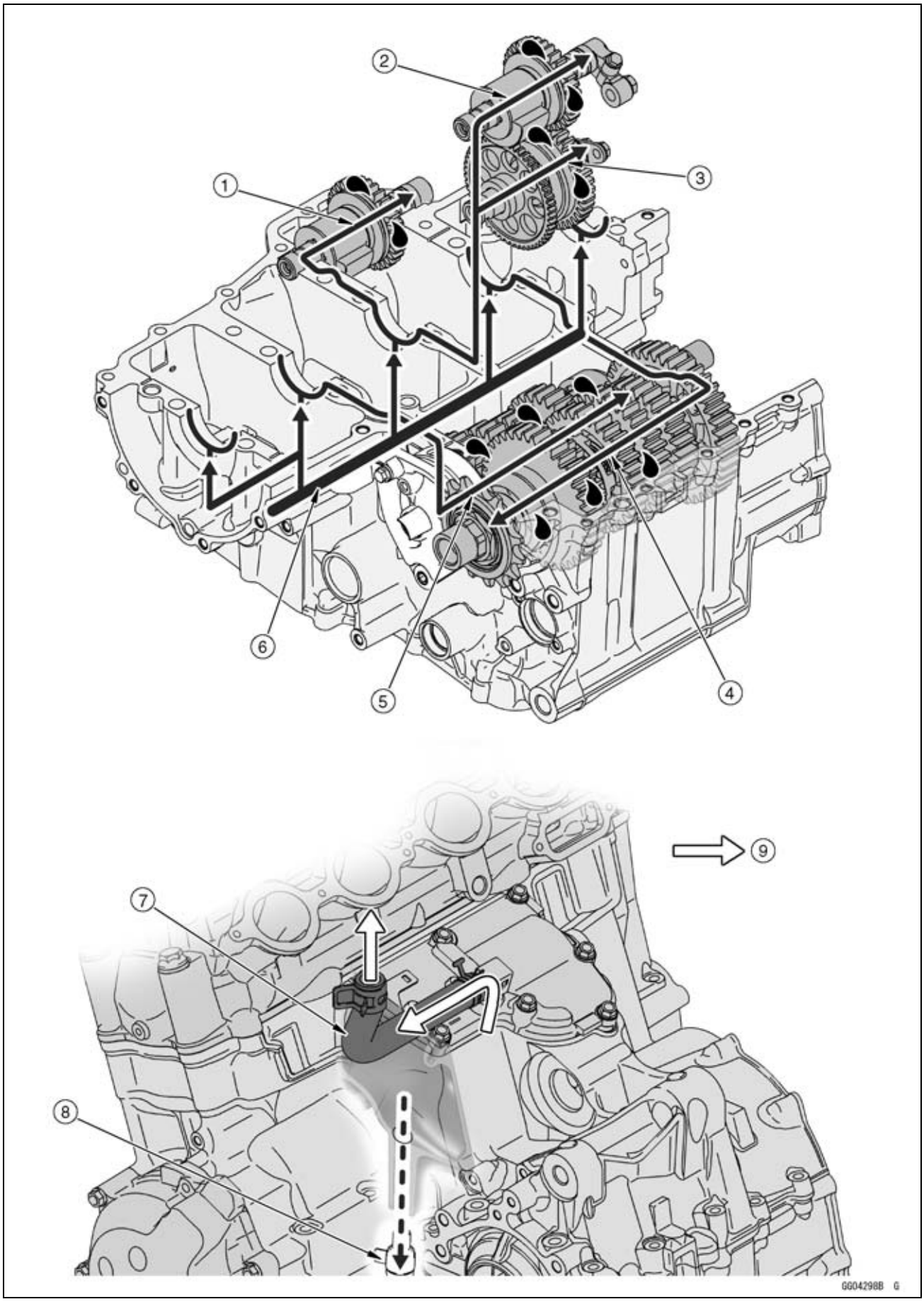


1. Oil Jet
2. Oil Cooler
3. from Oil Filter
4. Oil Pipe

Engine Oil Flow Chart

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Engine Oil Flow Chart



Engine Oil Flow Chart

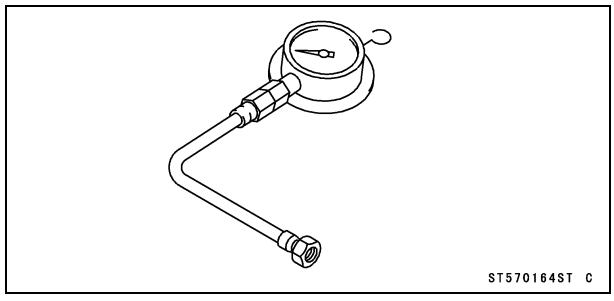
1. Front Balancer Oil Passage
2. Rear Balancer Oil Passage
3. Starter Motor Clutch Oil Passage
4. Output Shaft Oil Passage
5. Drive Shaft Oil Passage
6. Main Oil Passage
7. Breather Hose
8. Breather Hose for Return
9. Blowby Gas

Specifications

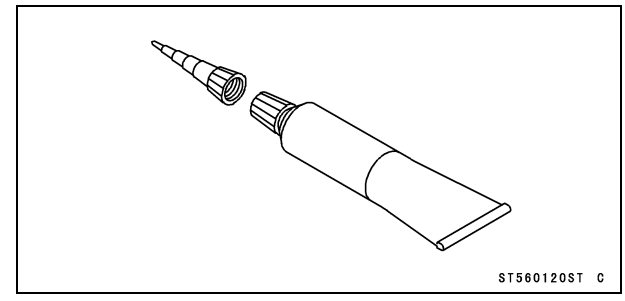
Item	Standard
Engine Oil	
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2
Viscosity	SAE 10W-40
Capacity	3.8 L (4.0 US qt) (when filter is not removed)
	4.2 L (4.4 US qt) (when filter is removed)
	4.6 L (4.9 US qt) (when engine is completely dry)
Level	Between upper and lower level lines (Wait several minutes after idling or running)
Oil Pressure Measurement	
Oil Pressure	245 ~ 343 kPa (2.50 ~ 3.50 kgf/cm², 35.5 ~ 49.7 psi) @4 000 r/min (rpm), Oil Temperature 90°C (194°F)

Special Tools and Sealant

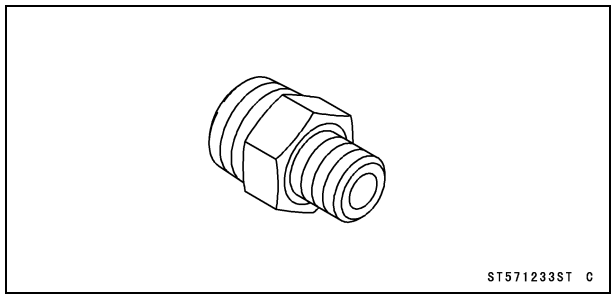
Oil Pressure Gauge, 10 kgf/cm²:
57001-164



Liquid Gasket, TB1211:
56019-120



Oil Pressure Gauge Adapter, PT3/8:
57001-1233



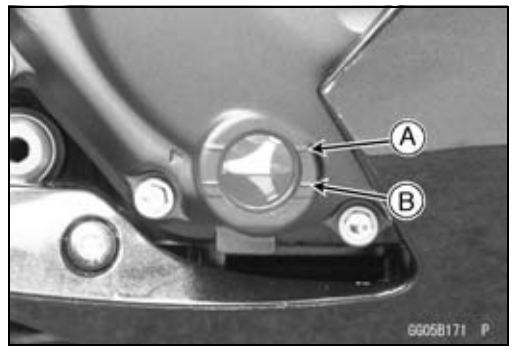
Engine Oil and Oil Filter

⚠ 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 oil level inspection window.



NOTE

○*Situate the motorcycle so that it is perpendicular to the ground.*

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

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

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

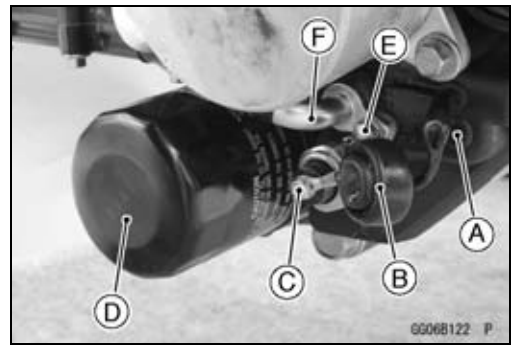
- Refer to the Engine Oil Change in the Periodic Maintenance chapter.

Oil Filter Replacement

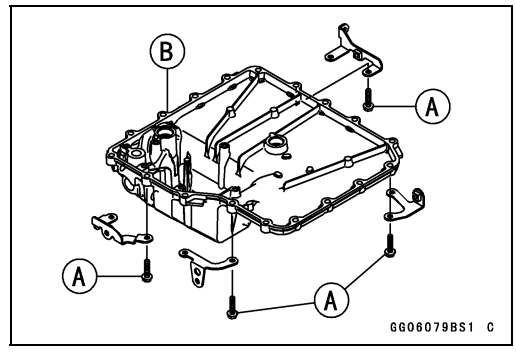
- Refer to the Oil Filter Replacement in the Periodic Maintenance chapter.

Oil Pan

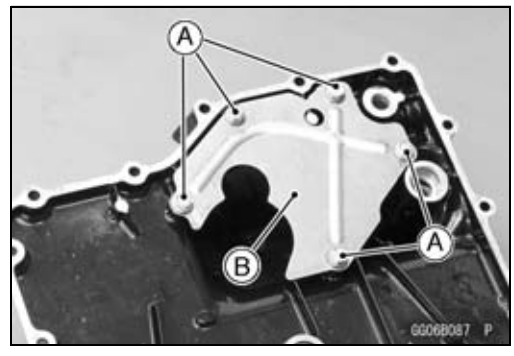
Oil Pan Removal



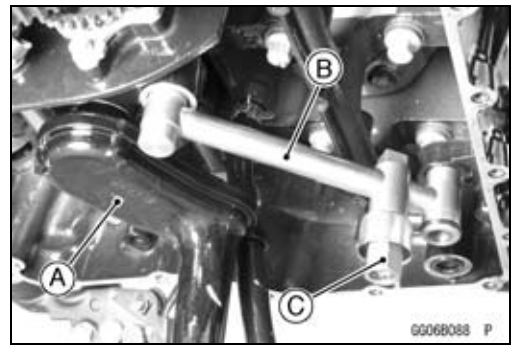
- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove:
  Exhaust Pipe (see Exhaust Pipe Removal in the Engine Top End chapter)
  Quick Rivet [A] (Both Sides)
- Slide the rubber boot [B].
- Loosen the oil pressure switch terminal bolt [C] and disconnect the switch lead.
- Remove the oil filter [D] (see Oil Filter Replacement in the Periodic Maintenance chapter).
- Remove the oil pipe bolt [E], and pull out the pipe fitting [F].



- Remove:
  Oil Pan Bolts [A] with Brackets
  Oil Pan [B]
  Oil Pan Gasket



- Remove:
  Oil Pan Plate Bolts [A]
  Oil Pan Plate [B]



- Remove:
  Oil Screen [A]
  Oil Pipe [B]
- If necessary, remove the oil pressure relief valve [C] (see Oil Pressure Relief Valve Removal).

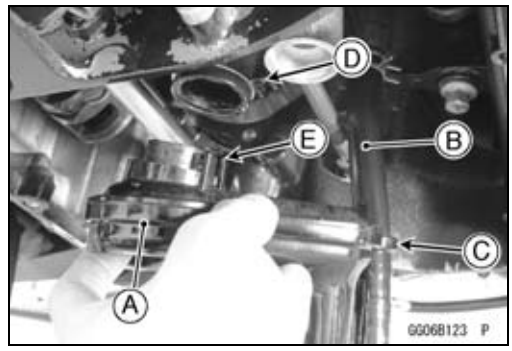
NOTICE
Do not remove the relief valve with the oil pipe installed on the lower crankcase half. The oil pipe will be damaged.

Oil Pan Installation

- Replace the O-rings with new ones.
- Install the breather hose and clamp if removed.
  ○Install the breather hose so that the hole side to the oil pan.
  ○Install the clamp so that the knob faces to the forward.
- Install the oil pressure relief valve (see Oil Pressure Relief Valve Installation).

Oil Pan

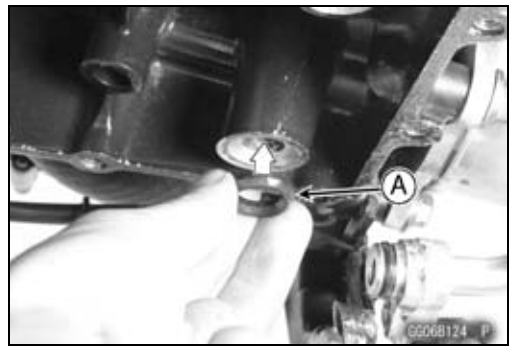
- Clean the oil screen [A].
- Through the breather hose [B] to the clamp [C].
- Install the oil screen so that the crankcase rib [D] fits the notch [E] of the oil screen.



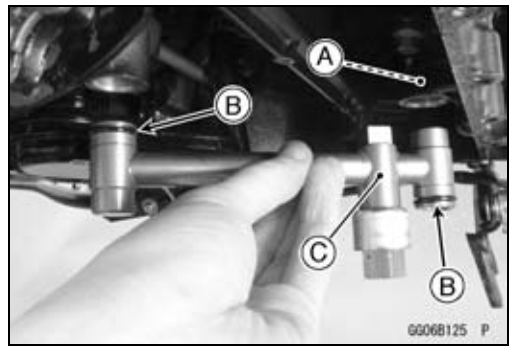
- Put new O-ring on the lower crankcase as shown.

○Apply grease to the O-ring.

○Fit on the O-ring so that the flat surfaces [A] side in.

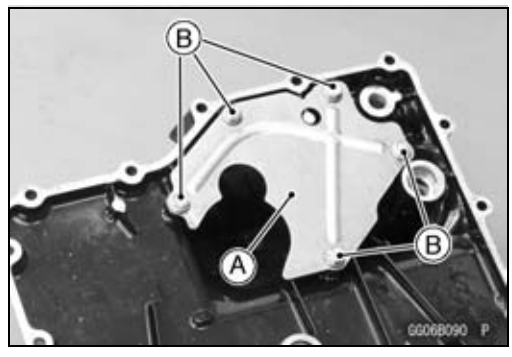


- Install the O-ring [A].
- Apply grease to the oil pipe O-rings [B] and install the oil pipe [C].



- 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.

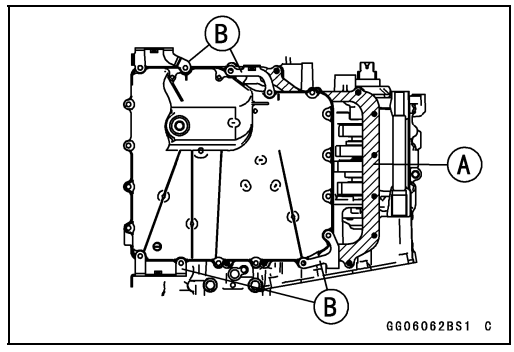
Torque - Oil Pan Plate Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)



- Replace the oil pan gasket [A] with a new one.
- Install the brackets [B] as shown.
- Tighten:

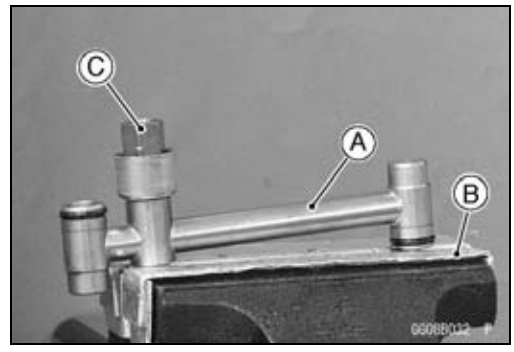
Torque - Oil Pan Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Install the removed parts (see appropriate chapters).



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

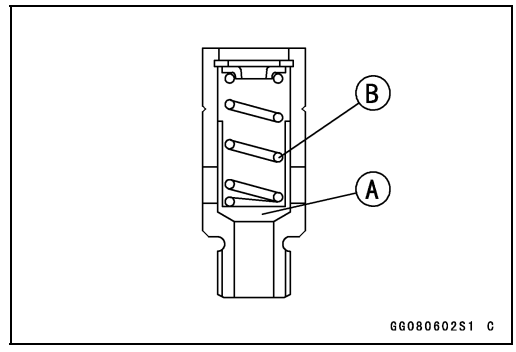
- Apply a non-permanent locking agent to the threads of the oil pressure relief valve, and tighten it.

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



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

NOTE

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

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

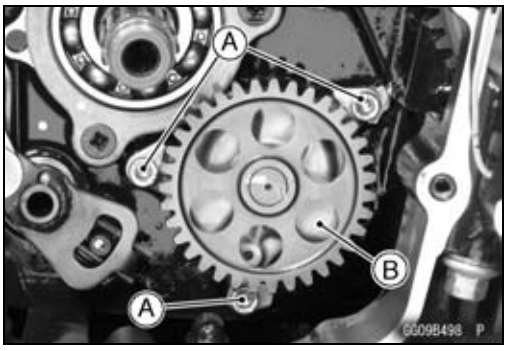
⚠ WARNING
Gasoline and low flash-point solvents can be flammable and/or explosive and cause severe burns. Clean the oil pressure relief valve in a well-ventilated area, and take care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Do not 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

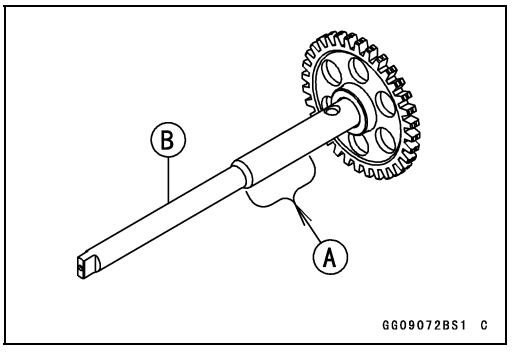
Oil Pump Removal

- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove the 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.

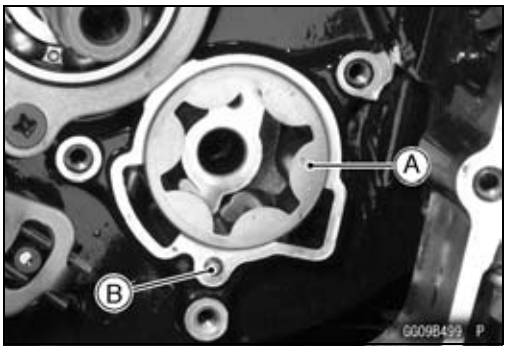


Oil Pump Installation

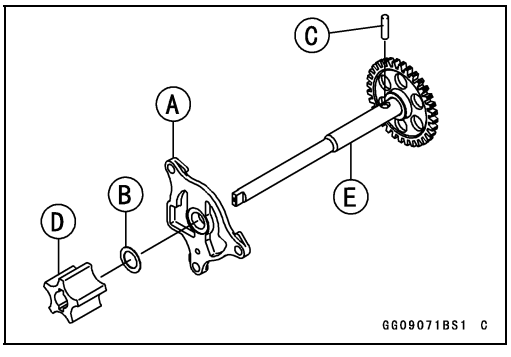
- Apply molybdenum disulfide oil solution to the journal portions [A] on the oil pump drive gear shaft [B].



- Insert the outer rotor [A] and the dowel pin [B] into the lower crankcase half.



- Install the pump cover [A], washer [B], pin [C] and inner rotor [D] to the oil pump drive gear shaft [E].
- Apply grease to the pin to prevent it from falling off.



- Install the oil pump drive gear shaft with inner rotor.

○Turn the oil pump drive gear shaft so that the projection in its shaft fits onto the slot of the water pump shaft.

○Fit the hole of the oil pump cover onto the pin on the lower crankcase half.

- Tighten:

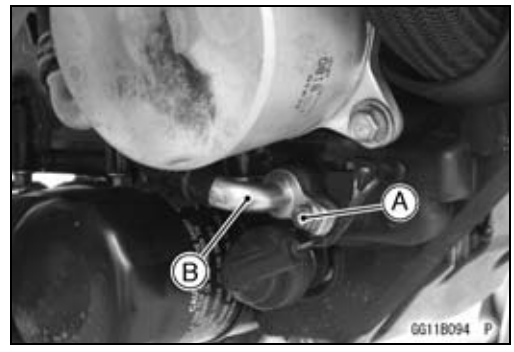
Torque - Oil Pump Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Install the removed parts (see appropriate chapters).

Oil Cooler

Oil Cooler Removal

- Drain:
  Coolant (see Coolant Change in the Periodic Maintenance chapter)
  Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)
- Remove the oil pipe bolt [A].
- Pull out the pipe fitting [B].



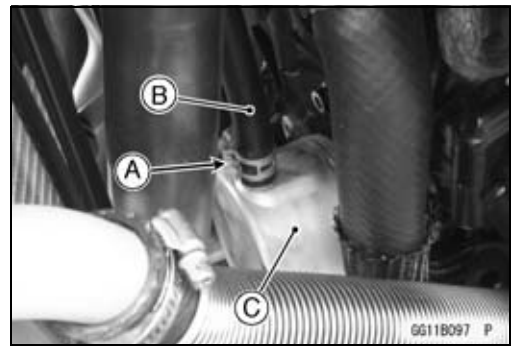
- Free the outlet hose from the clamps [A].
- Slide the clamp [B].
- Disconnect the outlet hose [C].



- Remove the oil cooler mounting bolts [A].



- Slide the clamp [A].
- Disconnect the inlet hose [B].
- Remove the oil cooler [C].

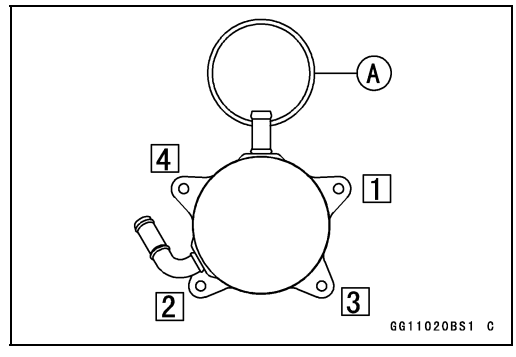


Oil Cooler Installation

- Replace the O-ring [A] with a new one.
- Apply grease to the O-ring.
- Apply a non-permanent locking agent to the threads of the oil cooler mounting bolts.
- Install the oil cooler, and temporarily tighten the bolts following the specified tightening sequence [1 ~ 4].
- Tighten the bolts following the specified tightening sequence [1 ~ 4].

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

- Install the each hose and clamps (see Cable, Wire, and Hose Routing section in the Appendix chapter).



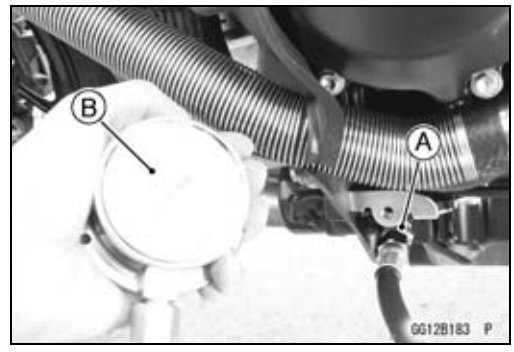
Oil Cooler

- Replace the oil pipe O-ring with a new one.
- Apply grease to the oil pipe O-ring.
- Install the oil pipe.
- Apply a non-permanent locking agent to the threads of the oil pipe bolt, and tighten it.

  Torque - Oil Pipe Bolt: 10 N·m (1.0 kgf·m, 89 in·lb)
- Install the removed parts (see appropriate chapters).

Oil Pressure Measurement

Oil Pressure Measurement



- Remove the left middle fairing (see Middle 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: 245 ~ 343 kPa (2.50 ~ 3.50 kgf/cm², 35.5 ~ 49.7 psi) @4 000 r/min (rpm), oil temperature 90°C (194°F)

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

⚠ WARNING

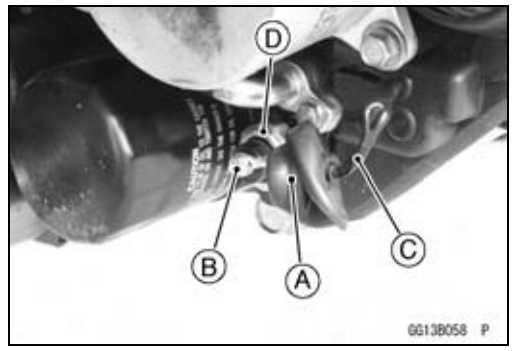
Hot oil can cause severe burns. Beware of hot engine oil that will drain through the oil passage when the gauge adapter is removed.

- Apply a non-permanent locking agent to the threads of the oil passage plug, and tighten it.

Torque - Oil Passage Plug (R3/8): 20 N·m (2.0 kgf·m, 15 ft·lb)

Oil Pressure Switch

Oil Pressure Switch Removal



- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove the left middle fairing (see Middle Fairing Removal in the Frame chapter)
- Slide the 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

- Using a high flash-point solvent, clean off any oil or dirt that may be on the liquid gasket coating area. Dry them with a clean cloth.
- 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)

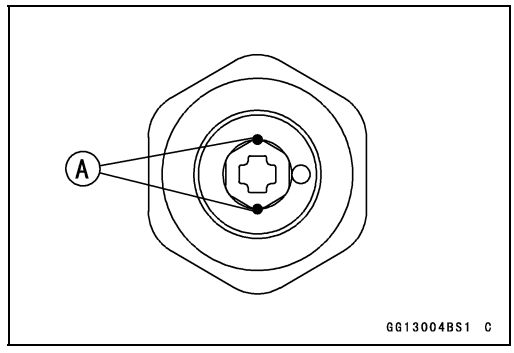
- Install the switch lead (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Tighten:

Torque - Oil Pressure Switch Terminal Bolt: 2.0 N·m (0.20 kgf·m, 18 in·lb)

- Apply grease to the terminal.

NOTE

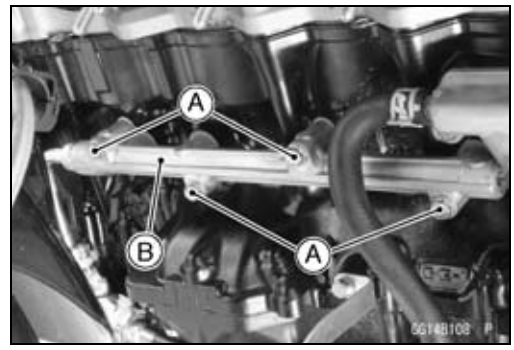
○*Apply a small amount grease to the terminal so that grease should not close two breather holes [A] for switch diaphragm.*



- Install the rubber boot.
- Install the removed parts (see appropriate chapters)

Oil pipe

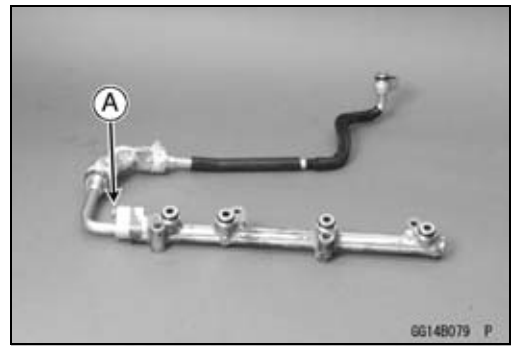
Oil Pipe Removal



- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter)
- Remove:
  Exhaust Pipe (see Exhaust Pipe Removal in the Engine chapter)
  Oil Cooler (see Oil Cooler Removal)
  Oil Pipe Mounting Bolt [A]
  Oil Pipe [B]

- When disassembling the oil pipe, remove the oil pipe bolt [A].

○Hold the oil pipe in a vice.

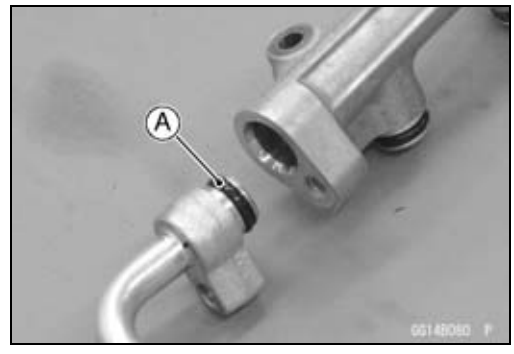


Oil Pipe Installation

- When assembling the oil pipe, replace the O-ring [A] with a new one and apply grease.
- Apply a non-permanent locking agent to the threads of the oil pipe bolt, and tighten it.

○Hold the oil pipe in a vice.

Torque - Oil Pipe Bolt : 10 N·m (1.0 kgf·m, 89 in·lb)



- Replace the oil pipe O-rings with new ones.
- Apply grease to the oil pipe O-rings.
- Run the oil pipe correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Apply a non-permanent locking agent to the threads of the oil pipe mounting bolts, and tighten them.

Torque - Oil Pipe Mounting Bolts : 10 N·m (1.0 kgf·m, 89 in·lb)

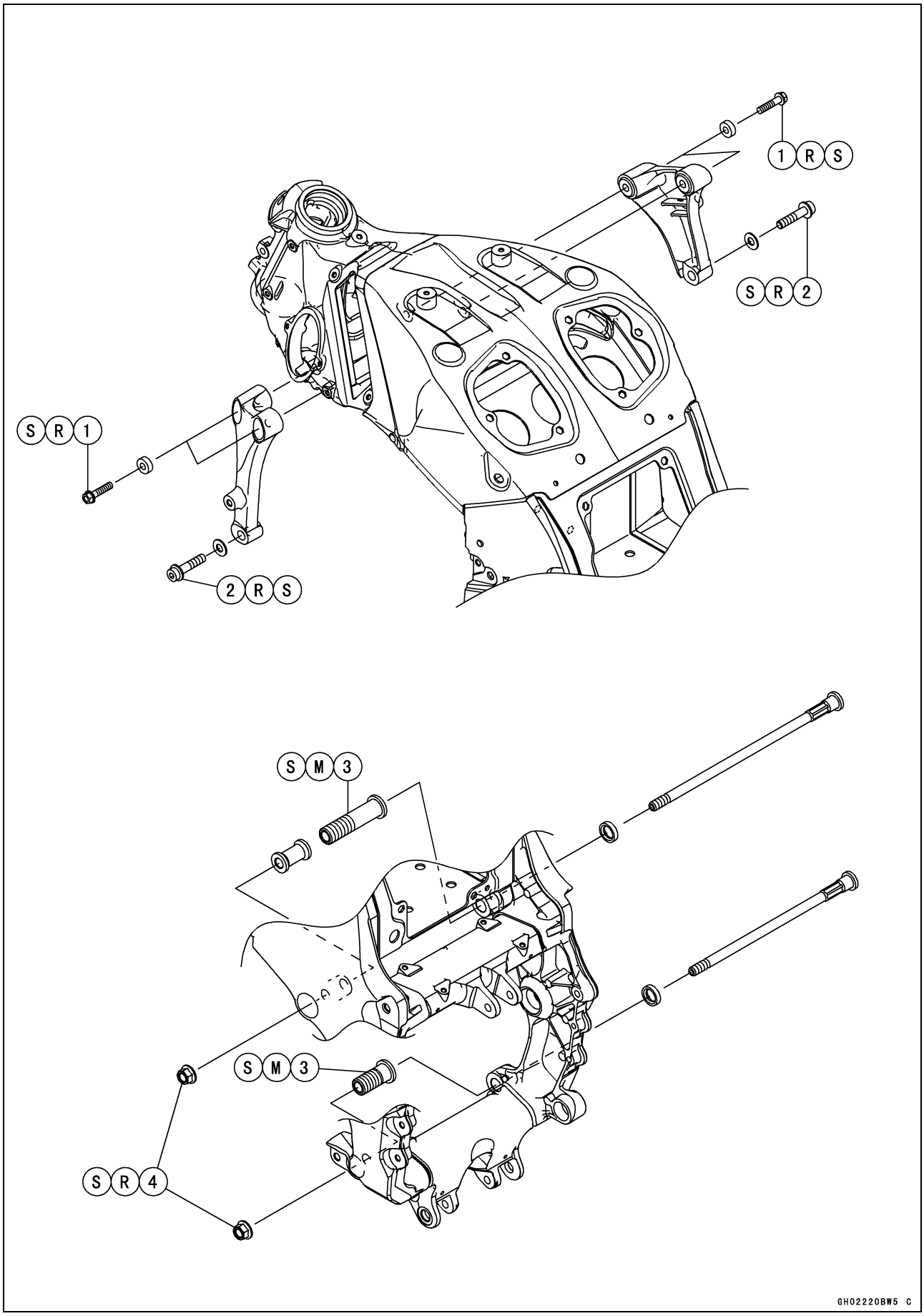
- Install the removed parts (see appropriate chapters).

Engine Removal/Installation

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Exploded View



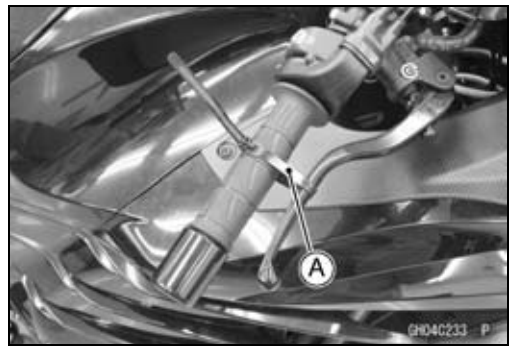
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine Bracket Bolts	25	2.5	18	R, S
2	Front Engine Mounting Bolts	60	6.1	44	R, S
3	Adjusting Collars	15	1.5	11	M, S
4	Engine Mounting Nuts	60	6.1	44	R, S

M: Apply molybdenum disulfide grease.
R: Replacement Parts
S: Follow the specified tightening sequence.

Engine Removal/Installation

Engine Removal



- Support the rear part of the swingarm with a stand.
- Squeeze the brake lever slowly and hold it with a band [A].

⚠ WARNING

Motorcycle may fall over unexpectedly resulting in an accident or injury. Be sure to hold the front brake when removing the engine.

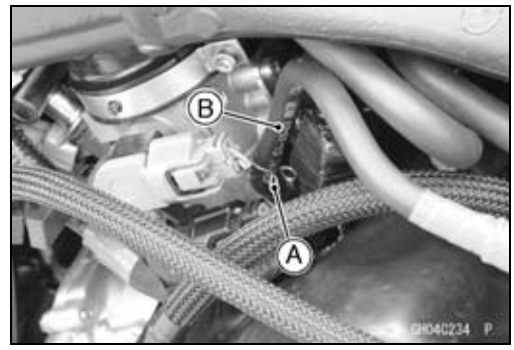
NOTICE

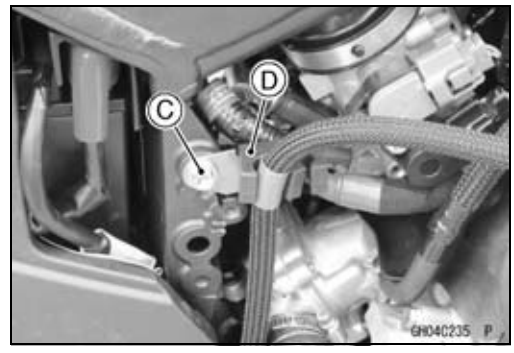
Be sure to hold the front brake when removing the engine, or the motorcycle may fall over. The engine or the motorcycle could be damaged.

- Drain:
  Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)
  Coolant (see Coolant Change in the Periodic Maintenance chapter)
- Remove:
  Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)
  Air Cleaner Caps (see Throttle Body Assy Removal in the Fuel System (DFI) chapter)
  Air Switching Valve (see Air Switching Valve Removal in the Engine Top End chapter)
  Subframe (see Subframe Removal in the Frame chapter)
  Coolant Reserve Tank (see Coolant Change in the Periodic Maintenance chapter)
  Radiator (see Radiator and Radiator Fan Removal in the Cooling System chapter)
  Radiator Cover (see Radiator Cover Removal in the Cooling System chapter)
  Exhaust Pipe (see Exhaust Pipe Removal in the Engine Top End chapter)
  Left Inner Rubber Cover (see Left Inner Rubber Cover Removal in the Frame chapter)
  Shift Pedal (see Shift Pedal Removal in the Crankshaft/Transmission chapter)
  Engine Sprocket (see Engine Sprocket Removal in the Final Drive chapter)

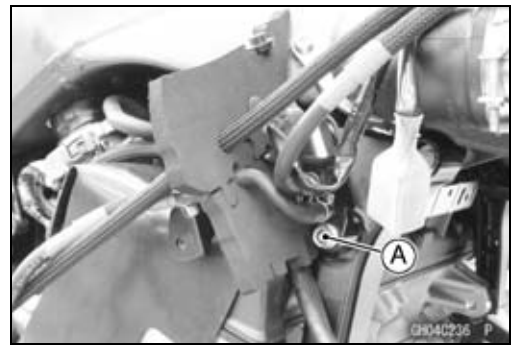
Engine Removal/Installation

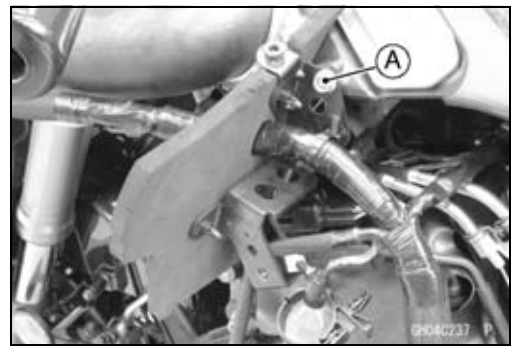
- For evaporative emission control system equipped models, note the following.
- Slide the clamp [A] and disconnect the hose [B].
- Remove:
  Hose Bracket Bolt [C]
  Hose Bracket [D]



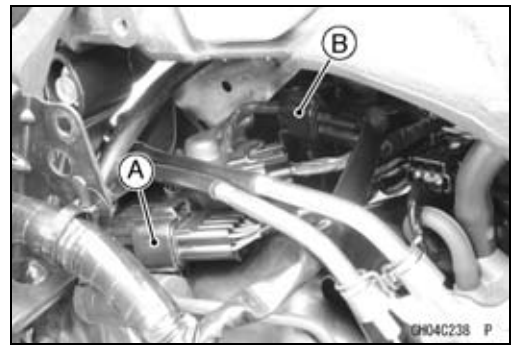


- Remove the pad bracket bolts [A].



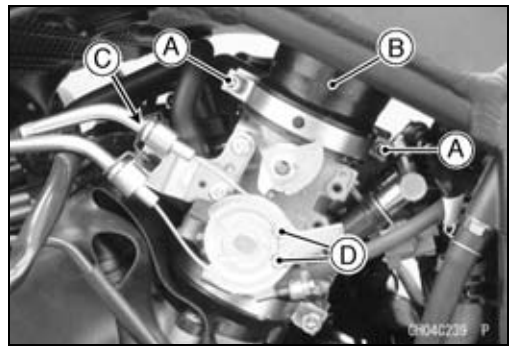


- Disconnect:
  Air Switching Valve Lead Connector [A]
  Stick Coil Subharness Connector [B]

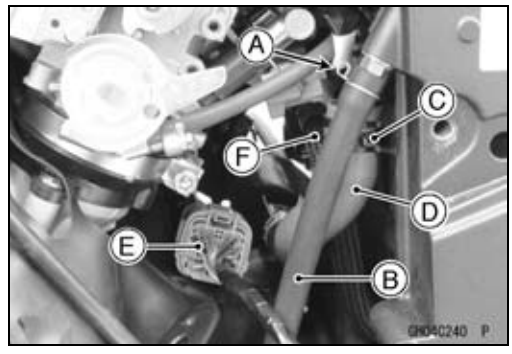


Engine Removal/Installation

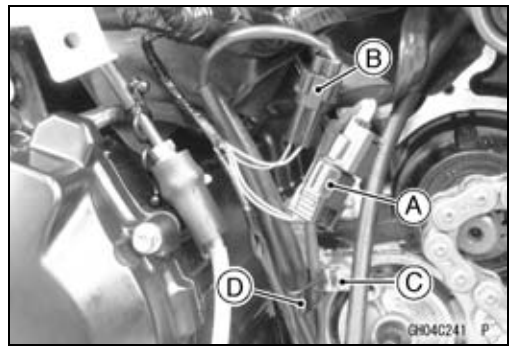
- Loosen the duct clamp bolts [A] on both sides.
- Pull up the ducts [B] upward.
- Remove:
  Clamp [C]
  Throttle Cable Lower Ends [D] (see Throttle Body Assy Removal in the Fuel System (DFI) chapter)



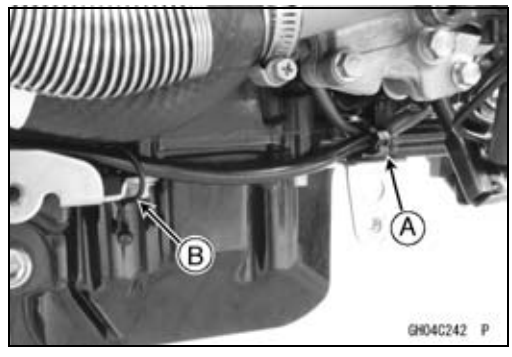
- Slide the clamp [A] and remove the air cleaner drain hose [B].
- Slide the clamp [C] and disconnect the breather hose [D].
- Disconnect:
  Throttle Body Subharness Connector [E]
  Fuel Hose [F] (see Fuel Hose Replacement in the Periodic Maintenance chapter)



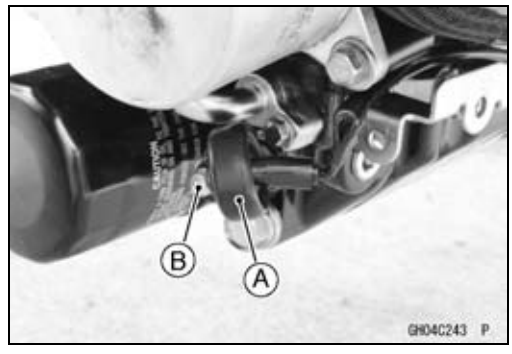
- Disconnect:
  Gear Position Sensor Lead Connector [A]
  Side Stand Switch Lead Connector [B]
- Remove:
  Clamp Bolt [C]
  Clamp [D]



- Open the band [A].
- Remove the clamp [B].

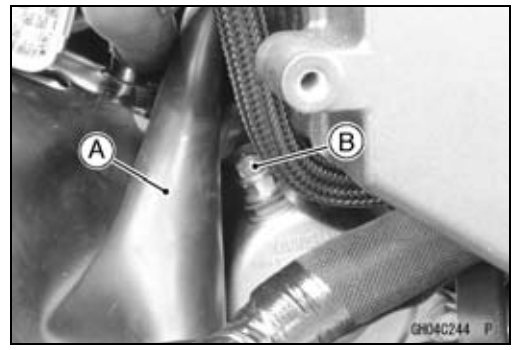


- Slide the rubber boot [A].
- Loosen the oil pressure switch terminal bolt [B] and disconnect the switch lead.

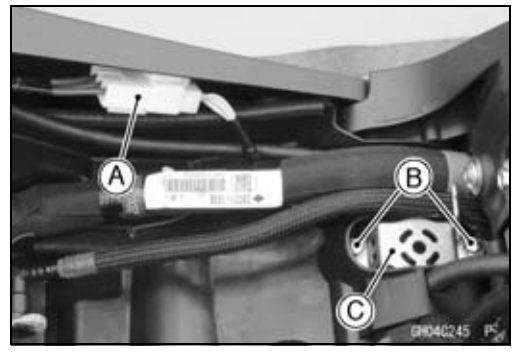


Engine Removal/Installation

- Pull up the heat insulation rubber plate [A].
- Slide the rubber cap.
- Remove the starter motor cable terminal nut [B], and disconnect the starter motor cable.



- Disconnect the alternator lead connector [A].
- Remove the bolts [B] and bracket [C].

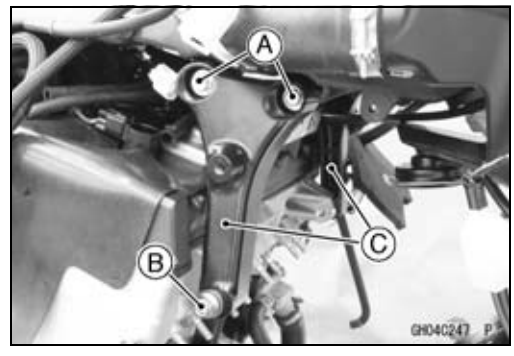


- Support the engine with a suitable stand [A].

○Put a plank [B] onto the suitable stand for engine balance.



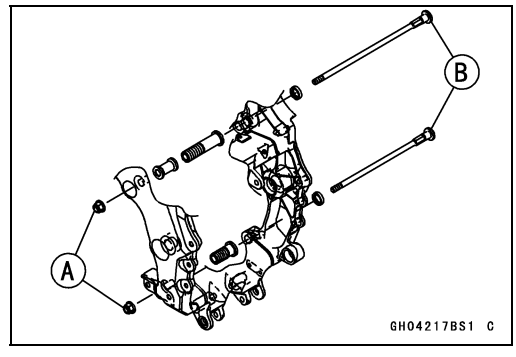
- Remove:
  Engine Bracket Bolts [A] (Both Sides)
  Front Engine Mounting Bolt [B] (Both Sides)
  Engine Brackets [C]



- Remove the engine mounting nuts [A].

NOTE

○*Hold the mounting bolts [B] to prevent it from turning when loosening the upper and lower engine mounting nuts.*



Engine Removal/Installation

- Using a Hexagon wrench, turn the engine mounting bolts [A] clockwise to make the gap between the frame and adjusting collar.
- Remove:
  Engine Mounting Bolts and Collars
  Collar (Upper Side only)



- Remove the drive chain from the output shaft.
- Using the stand, take out the engine.

Engine Installation

- Support the engine with a suitable stand.

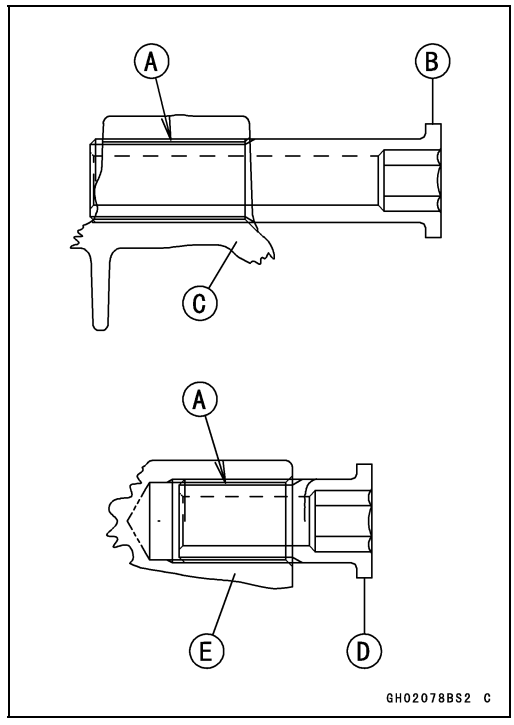
○Put a plank onto the suitable stand for engine balance.

- Install the heat insulation rubber plate and run the leads and hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

- Install the engine mounting bolts and nuts, following the specified installing sequence.

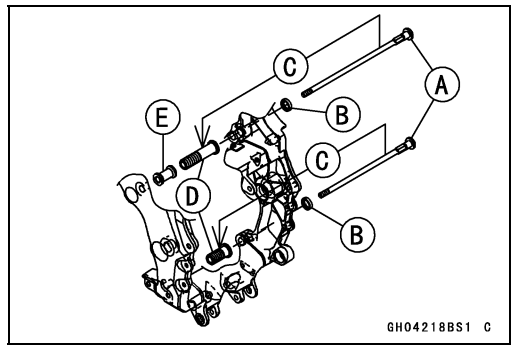
○Apply molybdenum disulfide grease [A] to the threads of the adjusting collars.

○First, tighten the adjusting collars fully by hand.
  Upper Adjusting Collar [B]
  Upper Crankcase [C]
  Lower Adjusting Collar [D]
  Lower Crankcase [E]



○Second, insert the mounting bolts [A] with collars [B] until they fit [C] in the adjusting collars [D].

○Be sure that the collar [E] is in position.



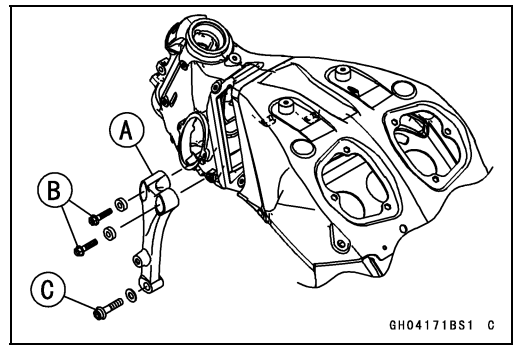
Engine Removal/Installation

NOTE

○*Replace the following bolts with new bolts pre-coated with locking agent.*

Engine Bracket Bolts (P/No. 92154-1863)
Front Engine Mounting Bolts (P/No. 92154-1862)

○Third, install the left engine bracket [A] and temporally tighten the left engine bracket bolts [B] and left front engine mounting bolt [C].

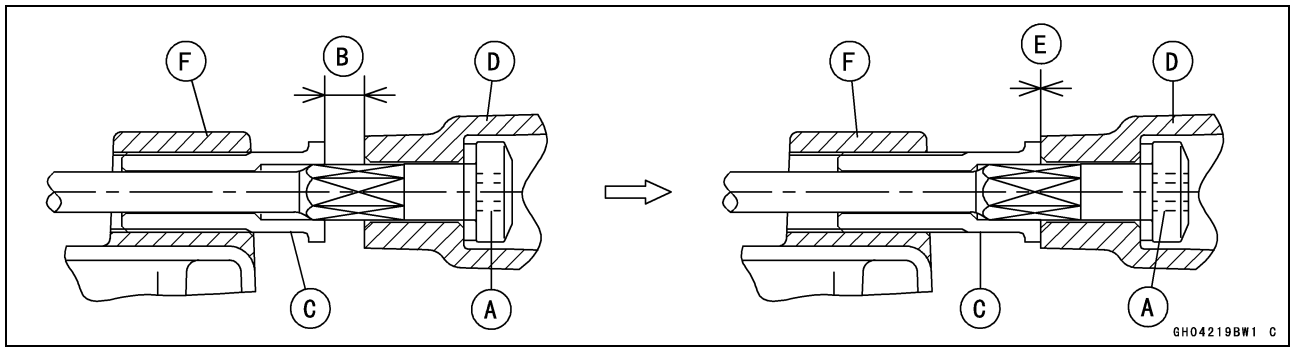


○Fourth, turn the engine mounting bolts [A] counterclockwise with specified torque until the clearance [B] between the adjusting collars [C] and frame [D] comes to 0 mm (0 in.) [E].
Crankcase [F]

○At this time, prevent the weight load from hanging to the engine mounting bolts by supporting the engine with the stand.

Torque - Adjusting Collars: 15 N·m (1.5 kgf·m, 11 ft·lb)

○Do not exceed the specified torque of the adjusting collars.



Engine Removal/Installation

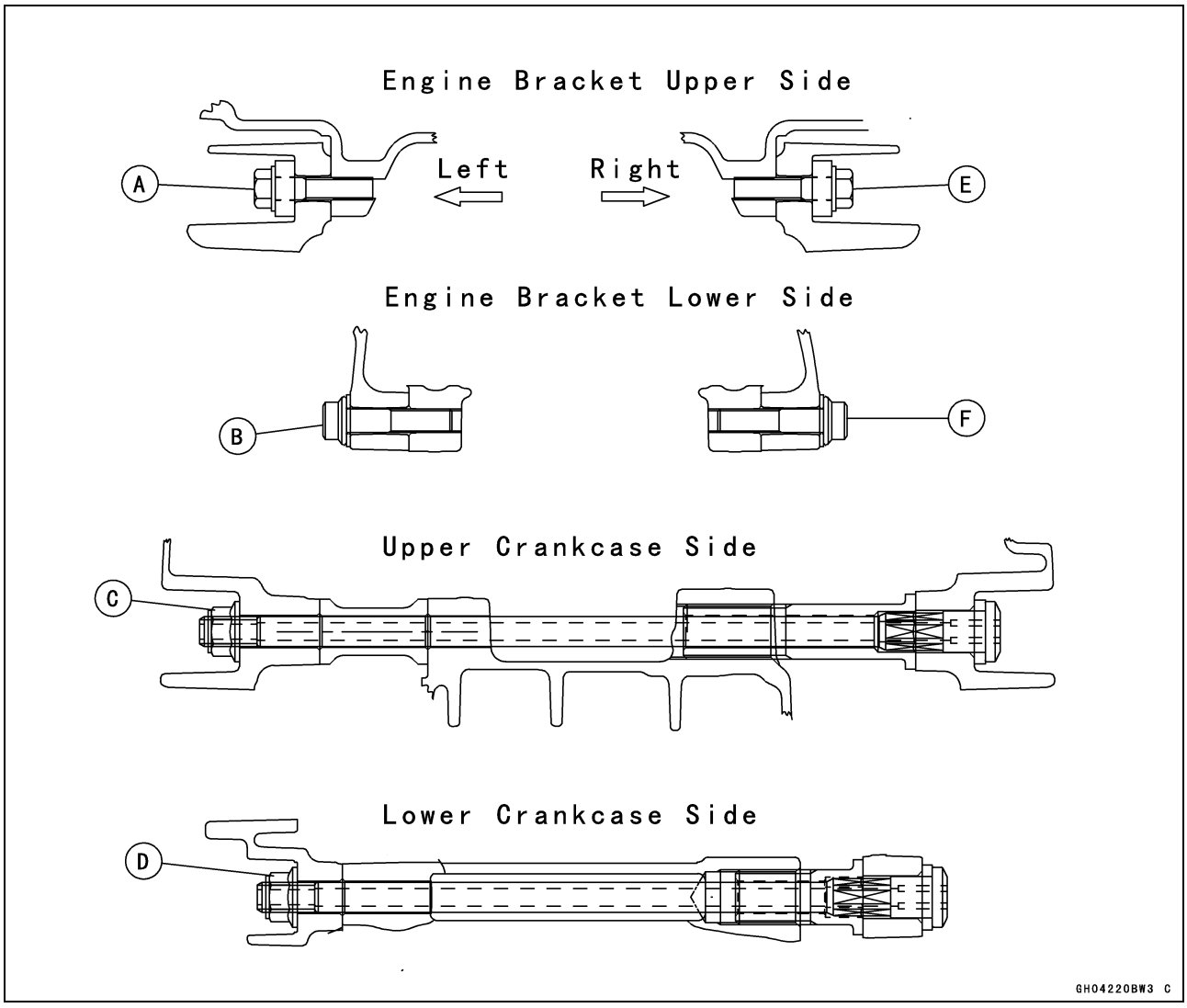
○Fifth, tighten the left engine bracket bolts [A] and left front engine mounting bolt [B].
○Replace the engine mounting nuts [C] [D] with new ones.
○Sixth, tighten the upper engine mounting nut and then the lower engine mounting nut.

NOTE

○*Hold the mounting bolts at the right side of the frame when tightening the engine mounting nuts at the left side of the frame.*

○Seventh, install the right engine bracket and tighten the right engine bracket bolts [E] and the right front engine mounting bolt [F].
○Tighten:

Torque - Engine Mounting Nut: 60 N·m (6.1 kgf·m, 44 ft·lb)
Engine Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Front Engine Mounting Bolts: 60 N·m (6.1 kgf·m, 44 ft·lb)



Engine Removal/Installation

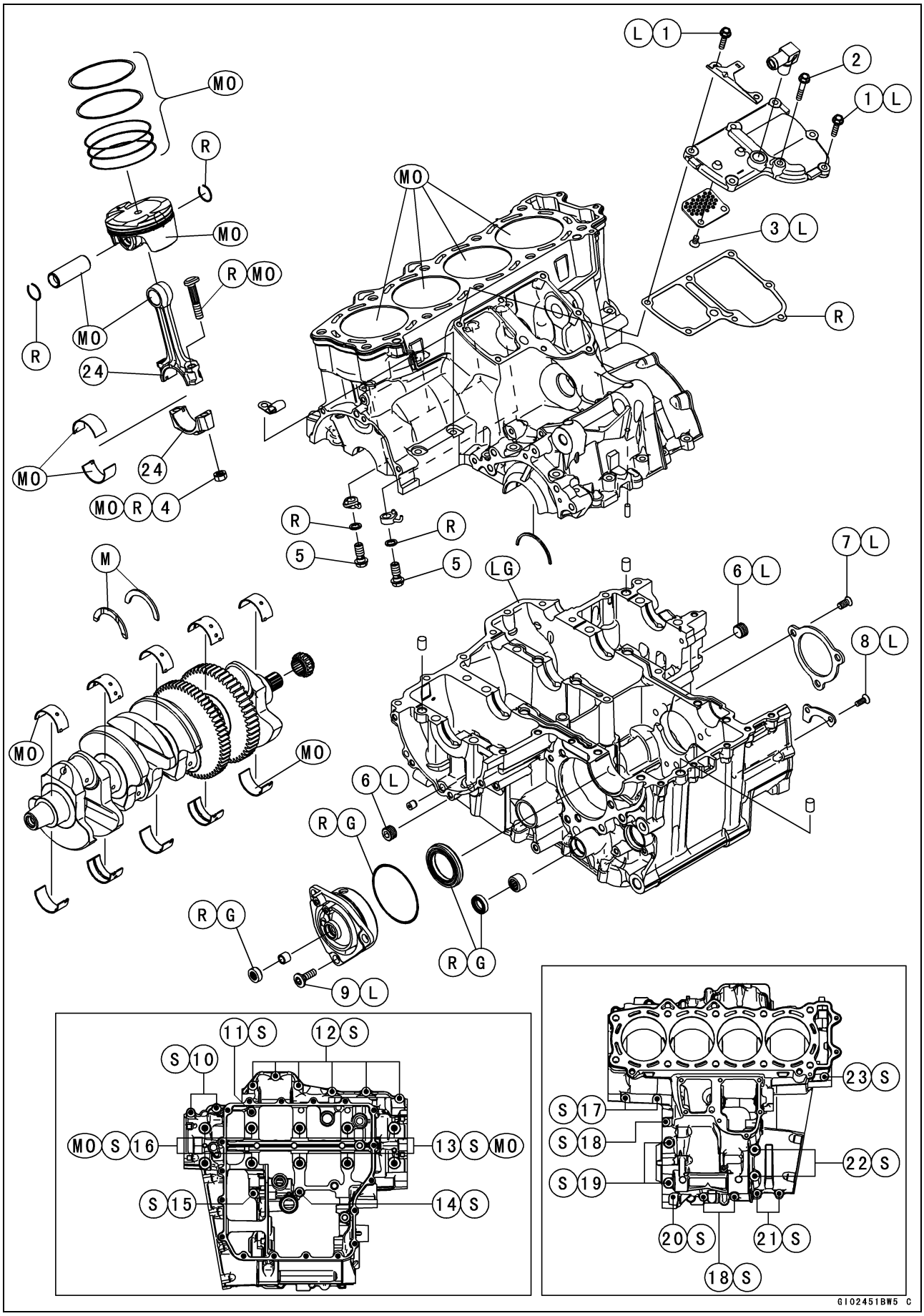
- Run the leads, cables and hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).
- Adjust:
  Throttle Cables (see Throttle Control System Inspection in the Periodic Maintenance chapter)
  Drive Chain (see Drive Chain Slack 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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Exploded View

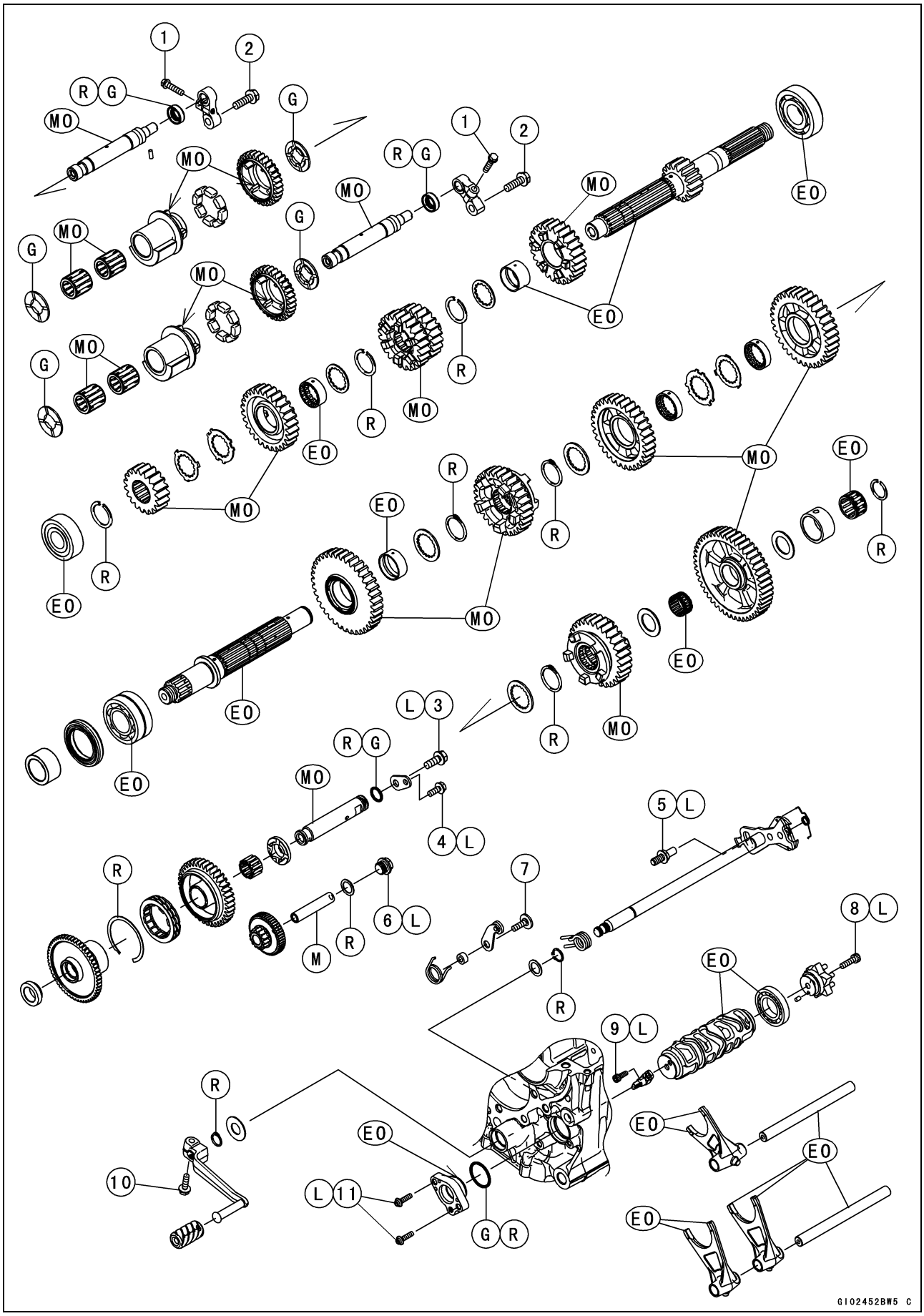


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Breather Cover Bolts (L = 25 mm)	10	1.0	89 in·lb	L
2	Breather Cover Bolt (L = 35 mm)	10	1.0	89 in·lb	
3	Breather Cover Plate Screws	10	1.0	89 in·lb	L
4	Connecting Rod Big End Nuts	see the text	←	←	MO, R
5	Oil Nozzle Pipe Mounting Bolts	25	2.5	18	
6	Oil Passage Plugs (R3/8)	20	2.0	15	L
7	Bearing Position Plate Screws	10	1.0	89 in·lb	L
8	Shift Drum Bearing Holder Screws	10	1.0	89 in·lb	L
9	Drive Shaft Cover Bolts	25	2.5	18	L
10	Crankcase Bolts (M7, L = 60 mm)	20	2.0	15	S
11	Crankcase Bolt (M7, L = 110 mm)	20	2.0	15	S
12	Crankcase Bolts (M7, L = 45 mm)	20	2.0	15	S
13	Crankcase Bolts (M10, L = 90 mm)	49	5.0	36	MO, S
14	Crankcase Bolt (M7, L = 85 mm)	20	2.0	15	S
15	Crankcase Bolt (M7, L = 50 mm)	20	2.0	15	S
16	Crankcase Bolts (M10, L = 120 mm)	49	5.0	36	MO, S
17	Crankcase Bolts (M7, L = 65 mm)	20	2.0	15	S
18	Crankcase Bolts (M6, L = 40 mm)	12	1.2	106 in·lb	S
19	Crankcase Bolts (M8, L = 70 mm)	27	2.8	20	S
20	Crankcase Bolt (M6, L = 50 mm)	12	1.2	106 in·lb	S
21	Crankcase Bolts (M6, L = 25 mm)	12	1.2	106 in·lb	S
22	Crankcase Bolts (M8, L = 80 mm)	27	2.8	20	S
23	Crankcase Bolt (M6, L = 65 mm)	12	1.2	106 in·lb	S

24. 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 solution.
(mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10:1)
R: Replacement Parts
S: Follow the specified tightening sequence.

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Balancer Shaft Clamp Bolts	10	1.0	89 in·lb	
2	Balancer Shaft Clamp Lever Bolts	25	2.5	18	
3	Starter Clutch Shaft Bolt	10	1.0	89 in·lb	L
4	Starter Clutch Shaft Plate Bolt	10	1.0	89 in·lb	L
5	Shift Shaft Return Spring Pin	29	3.0	21	L
6	Torque Limiter Bolt	25	2.5	18	L
7	Gear Positioning Lever Bolt	12	1.2	106 in·lb	
8	Shift Drum Cam Holder Bolt	12	1.2	106 in·lb	L
9	Gear Position Sensor Holder Bolt (L = 14 mm)	6.0	0.61	53 in·lb	L
10	Shift Pedal Bolt	8.0	0.82	71 in·lb	
11	Gear Position Sensor Holder Bolts (L = 20 mm)	5.0	0.51	44 in·lb	L

EO: Apply engine oil.
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 ratio 10:1)
R: Replacement Parts

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		0.13 ~ 0.38 mm (0.0051 ~ 0.0150 in.)	0.6 mm (0.024 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 (1.4954 ~ 1.4961 in.)	37.97 mm (1.495 in.)
Marking	None	37.984 ~ 37.992 mm (1.4954 ~ 1.4957 in.)	– – –
	○	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.)	– – –
	○	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)	
		0.29 ~ 0.39 mm (0.011 ~ 0.015 in.)	– – –
Crankshaft Side Clearance		0.05 ~ 0.25 mm (0.0020 ~ 0.0098 in.)	0.45 mm (0.018 in.)
Crankshaft #3 Main Journal Width		27.45 ~ 27.50 mm (1.081 ~ 1.083 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:		39.984 ~ 40.000 mm (1.5742 ~ 1.5748 in.)	39.96 mm (1.573 in.)
Marking	None	39.984 ~ 39.992 mm (1.5742 ~ 1.5745 in.)	– – –
	1	39.993 ~ 40.000 mm (1.5745 ~ 1.5748 in.)	– – –
Crankcase Main Bearing Inside Diameter:		43.000 ~ 43.016 mm (1.6929 ~ 1.6935 in.)	– – –

Specifications

Item	Standard	Service Limit
Marking ○	43.000 ~ 43.008 mm (1.6929 ~ 1.6932 in.)	– – –
None	43.009 ~ 41.016 mm (1.6933 ~ 1.6935 in.)	– – –
Crankshaft Main Bearing Insert Thickness:		
Brown	1.490 ~ 1.494 mm (0.05866 ~ 0.05882 in.)	– – –
Black	1.494 ~ 1.498 mm (0.05882 ~ 0.05898 in.)	– – –
Blue	1.498 ~ 1.502 mm (0.05898 ~ 0.05913 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	83.959 ~ 83.974 mm (3.3055 ~ 3.3061 in.)	83.81 mm (3.300 in.)
Piston/Cylinder Clearance	0.020 ~ 0.047 mm (0.0008 ~ 0.0019 in.)	– – –
Piston Ring/Groove Clearance:		
Top	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.)	0.17 mm (0.0067 in.)
Second	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)	0.16 mm (0.0063 in.)
Piston Ring Groove Width:		
Top	0.92 ~ 0.94 mm (0.0362 ~ 0.0370 in.)	1.02 mm (0.040 in.)
Second	1.01 ~ 1.03 mm (0.0398 ~ 0.0406 in.)	1.11 mm (0.044 in.)
Piston Ring Thickness:		
Top	0.87 ~ 0.89 mm (0.0343 ~ 0.0350 in.)	0.80 mm (0.032 in.)
Second	0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)	0.90 mm (0.035 in.)
Piston Ring End Gap:		
Top	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.)	0.9 mm (0.035 in.)
Transmission		
Shift Fork Ear Thickness	5.74 ~ 6.00 mm (0.226 ~ 0.236 in.)	5.6 mm (0.22 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 (0.27 in.)
Shift Drum Groove Width	7.05 ~ 7.20 mm (0.278 ~ 0.283 in.)	7.3 mm (0.29 in.)

Specifications

Connecting Rod Big End Bearing Insert Selection

Con-rod Big End Inside Diameter Marking	Crankpin Diameter Marking	Bearing Insert	
		Size Color	Part Number
None	○	Brown	92139-0830
None	None	Black	92139-0829
○	○		
○	None	Blue	92139-0828

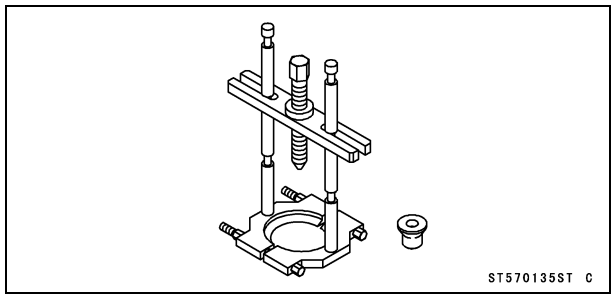
Crankshaft Main Bearing Insert Selection

Crankcase Main Bearing Inside Diameter Marking	Crankshaft Main Journal Diameter Marking	Bearing Insert*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	92139-0740	1, 3, 5
			92139-0743	2, 4
None	1	Black	92139-0739	1, 3, 5
○	None		92139-0742	2, 4
None	None	Blue	92139-0738	1, 3, 5
			92139-0741	2, 4

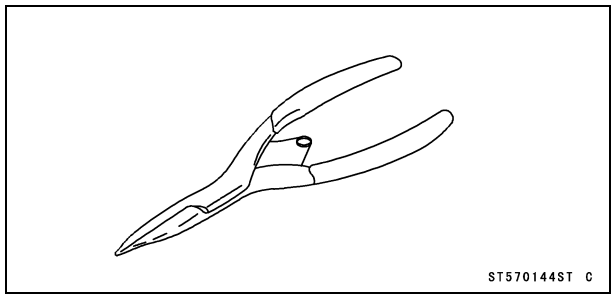
* The bearing inserts for Nos. 2 and 4 journals have an oil groove, respectively.

Special Tools and Sealant

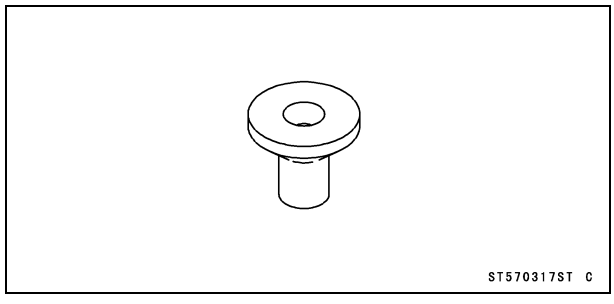
Bearing Puller:
57001-135



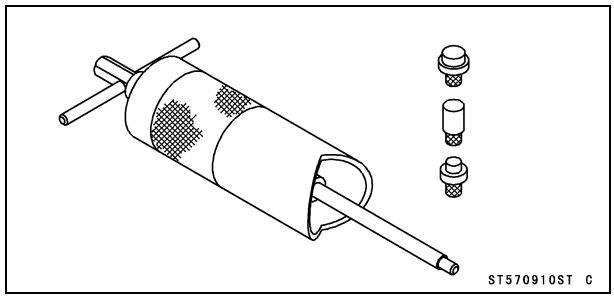
Outside Circlip Pliers:
57001-144



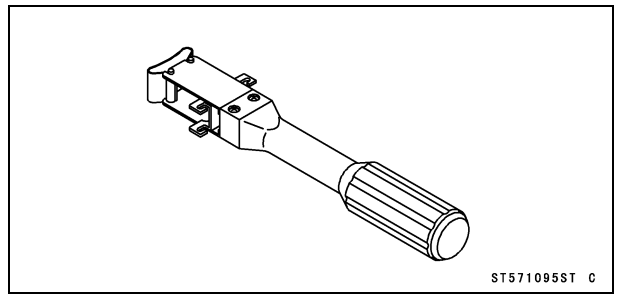
Bearing Puller Adapter:
57001-317



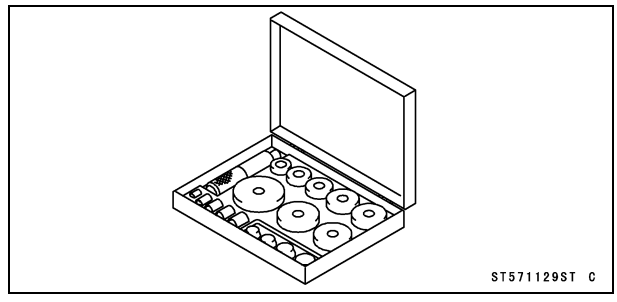
Piston Pin Puller Assembly:
57001-910



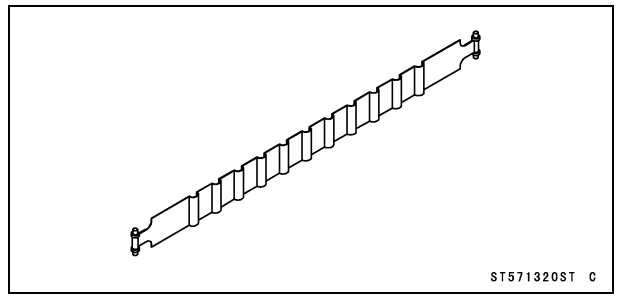
Piston Ring Compressor Grip:
57001-1095



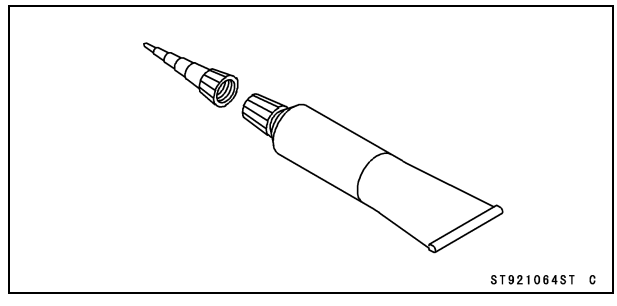
Bearing Driver Set:
57001-1129



Piston Ring Compressor Belt, ϕ80 ~ ϕ91:
57001-1320



Liquid Gasket, TB1216B:
92104-1064



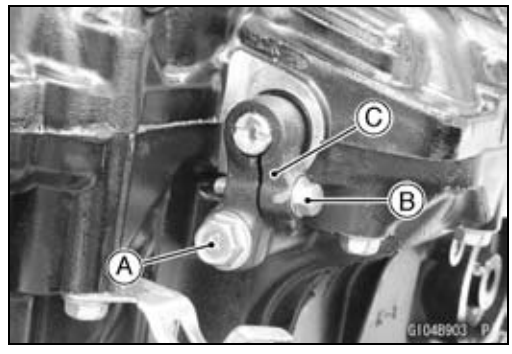
Crankcase Splitting

Crankcase Splitting

- Remove the engine (see Engine Removal in the Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove:

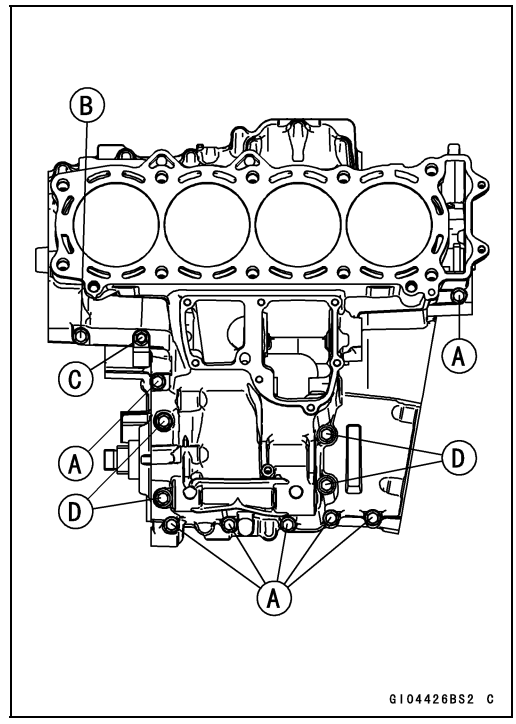
  Cylinder Head (see Cylinder Head Removal in the Engine Top End chapter)
  Clutch (see Clutch Removal in the Clutch chapter)
  Timing Rotor (see Timing Rotor Removal in the Electrical System chapter)
  Starter Motor (see Starter Motor Removal in the Electrical System chapter)
  External Shift Mechanism (see External Shift Mechanism Removal)
  Oil Pump (see Oil Pump Removal in the Engine Lubrication System chapter)
  Alternator Rotor (see Alternator Rotor Removal in the Electrical System chapter)
  Water Pump (see Water Pump Removal in the Cooling System chapter)
  Oil Cooler (see Oil Cooler Removal in the Engine Lubrication System chapter)
  Oil Pipe (see Oil Pipe Removal in the Engine Lubrication System)
  Oil Pan (see Oil Pan Removal in the Engine Lubrication System chapter)

- Remove the front balancer shaft clamp lever bolt [A].
- Loosen the front balancer shaft clamp bolt [B] and remove the front balancer shaft clamp lever [C].

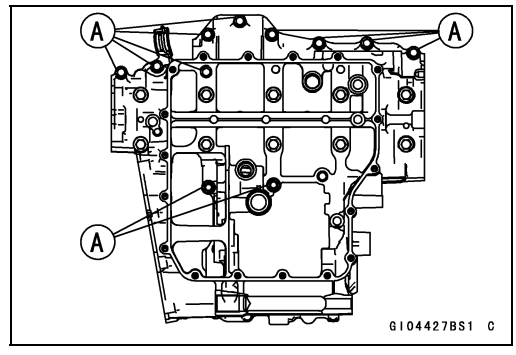


Crankcase Splitting

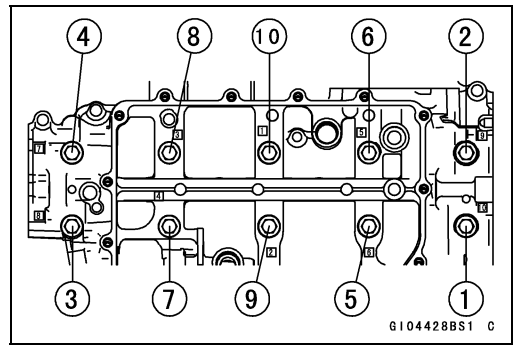
● Remove the upper crankcase bolts.
○First loosen the M6 bolts.
M6 Bolts [A]
M7 Bolt [B]
M7 Bolt with Clamp [C]
M8 Bolts with Washers [D]



● Remove the lower crankcase bolts.
○First loosen the M7 bolts [A].



○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.



Crankcase Splitting

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.

⚠ WARNING
Gasoline and low flash-point solvents can be flammable and/or explosive and cause severe burns. Clean the crankcase 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 crankcase.

- Using compressed air, blow out the oil passages in the crankcase halves.

- Press the new drive shaft bearing [A] so that its stepped side [B] faces as shown.

  Special Tool - Bearing Driver Set: 57001-1129

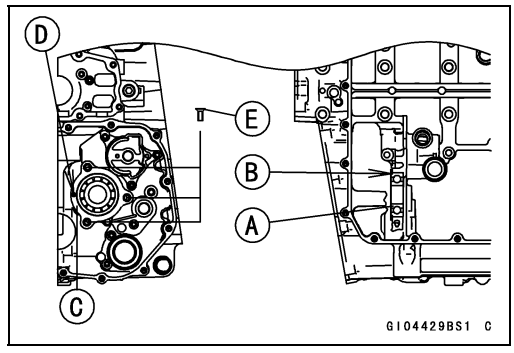
- Install the bearing position plate [C].

○Install the plate so that the stepped hole side faces outside.

Punch Mark [D]

- Apply a non-permanent locking agent to the threads of the bearing position plate screws [E] and tighten them.

  Torque - Bearing Position Plate Screws: 10 N·m (1.0 kgf·m, 89 in·lb)



- Press the new needle bearing [A] for the shift shaft so that its marked side [B] faces as shown.

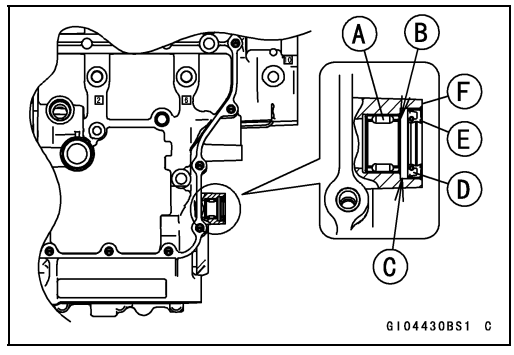
○Press the new needle bearing so that its surface is flush with the end of hole [C].

Special Tool - Bearing Driver Set: 57001-1129

- Press the new oil seal [D] so that the oil seal lip [E] faces to the outside, and the oil seal surface is flush with the surface [F] of the crankcase.

  Special Tool - Bearing Driver Set: 57001-1129

- Apply grease to the oil seal lips.



- When installing the oil passage plugs [A], note the following.

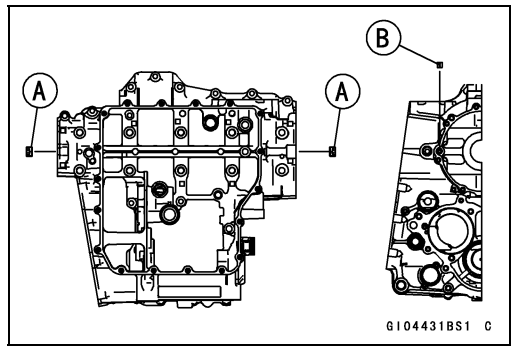
○Apply a non-permanent locking agent to the oil passage plugs.

○Tighten:

Torque - Oil Passage Plugs (R3/8): 20 N·m (2.0 kgf·m, 15 ft·lb)

- When installing the plug [B], note the following.

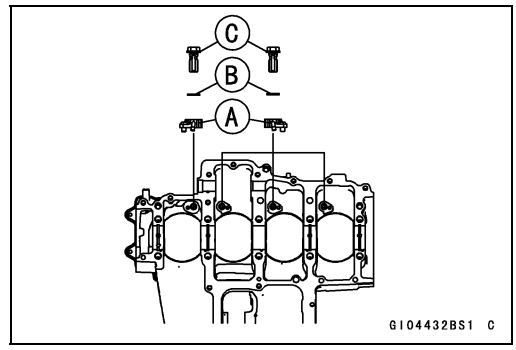
○Press the plug so that the chamfered side faces inside, and the plug surface is flush with the end of the hole.



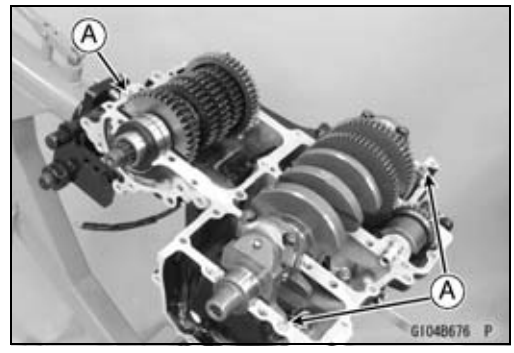
Crankcase Splitting

● When installing the oil nozzle pipes [A], note the following.
○Replace the washers [B] of oil nozzle pipe with new ones.
○Install:
Oil Nozzle Pipe
Washers
○Tighten:

Torque - Oil Nozzle Pipe Mounting Bolts [C]: 25 N·m (2.5 kgf·m, 18 ft·lb)



● Be sure to install the following parts.
Pistons (see Piston Installation)
Crankshaft (see Crankshaft Installation)
Connecting Rod Big End Caps (see Connecting Rod Installation)
Transmission Shaft (see Transmission Shaft Installation)
Shaft Drum and Shift Fork (see Shift Drum and Fork Installation)
Front Balancer (see Front Balancer Installation)
Dowel Pins [A]
● Before fitting the lower case on the upper case, check the following.
○Check to see that the shift drum and transmission gears are in the neutral position.

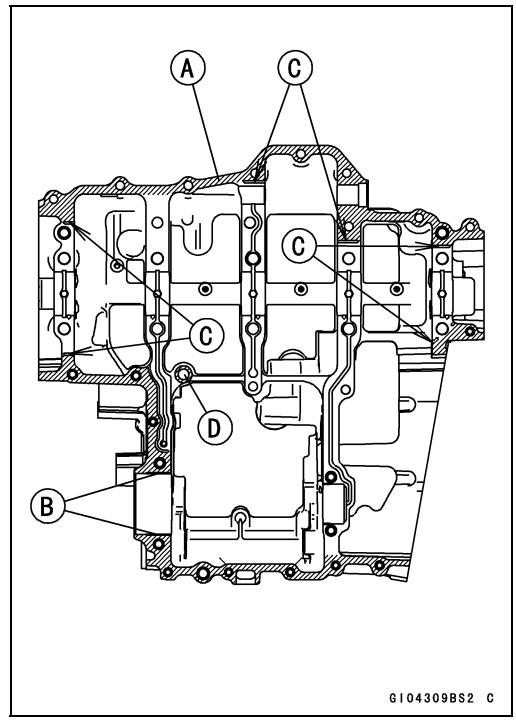


● Using a high flash-point solvent, clean off any oil or dirt that may be on the liquid gasket, coating area. Dry them with a clean cloth.
● Apply liquid gasket [A] to the mating surface of the lower crankcase half as shown.

Sealant - Liquid Gasket, TB1216B: 92104-1064

NOTE

○*Make the application finish within 20 minutes when the liquid gasket to the mating surface of the lower crankcase half is applied.*
○*After tightening the crankcase bolts, wipe up the liquid gasket seeping out the output shaft bearing journal [B].*

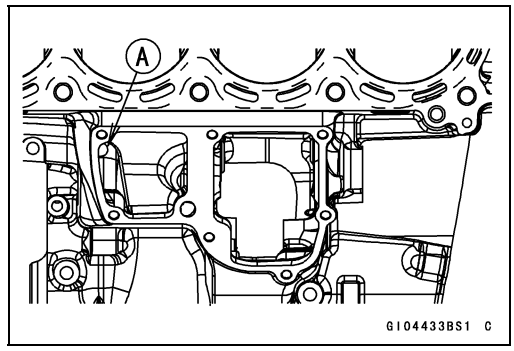


NOTICE

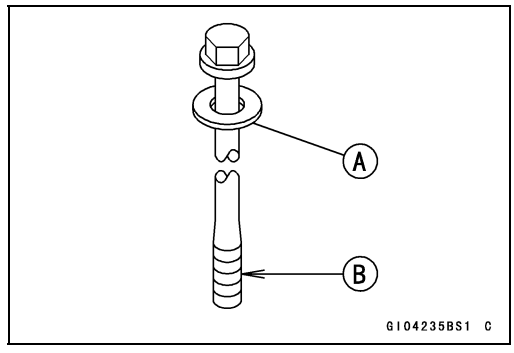
Do not apply liquid gasket inside of the grooves [C] near the crankshaft main bearing inserts, and balancer bearing.
Do not plug the inside of breather hole [D] with liquid gasket.

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.



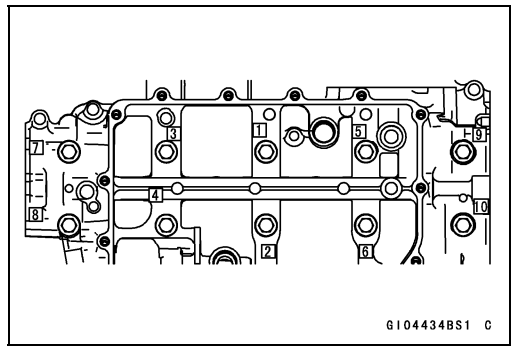
- The M10 bolts have washers, replace them with new ones.
- Apply molybdenum disulfide oil solution to the seating surfaces [A] of the washers and the threads [B] of the M10 bolts.



- Tighten the lower crankcase bolts using the following steps.

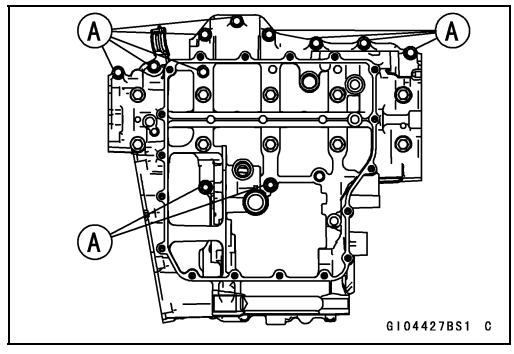
○Following the sequence numbers on the lower crankcase half, tighten the M10 bolts [1 ~ 10] with washers.

Torque - Crankcase Bolts (M10): 49 N·m (5.0 kgf·m, 36 ft·lb)



○Tighten the M7 bolts [A].

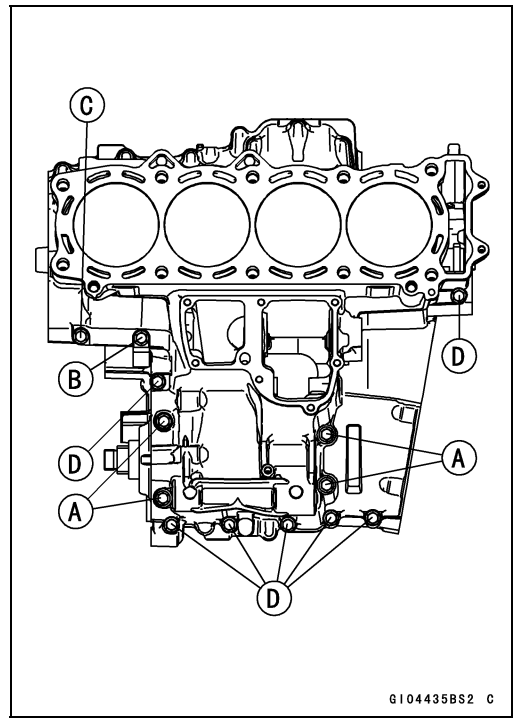
Torque - Crankcase Bolts (M7): 20 N·m (2.0 kgf·m, 15 ft·lb)



Crankcase Splitting

● Tighten the upper crankcase bolts in the order listed.
○The M8 bolts have washers, replace them with new ones.
○Tighten:
M8 Bolts with Washer [A]
M7 Bolt with 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.
○Crankshaft and transmission shafts turn freely.
○While spinning the output shaft, gears shift smoothly from the 1st to neutral, and neutral to 1st.
● Install the removed parts (see appropriate chapters).

Crankshaft and Connecting Rods

Crankshaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove:
  Front Balancer (see Front Balancer Removal)
  Connecting Rod Big End Caps (see Piston Removal)
  Crankshaft

Crankshaft Installation

NOTICE

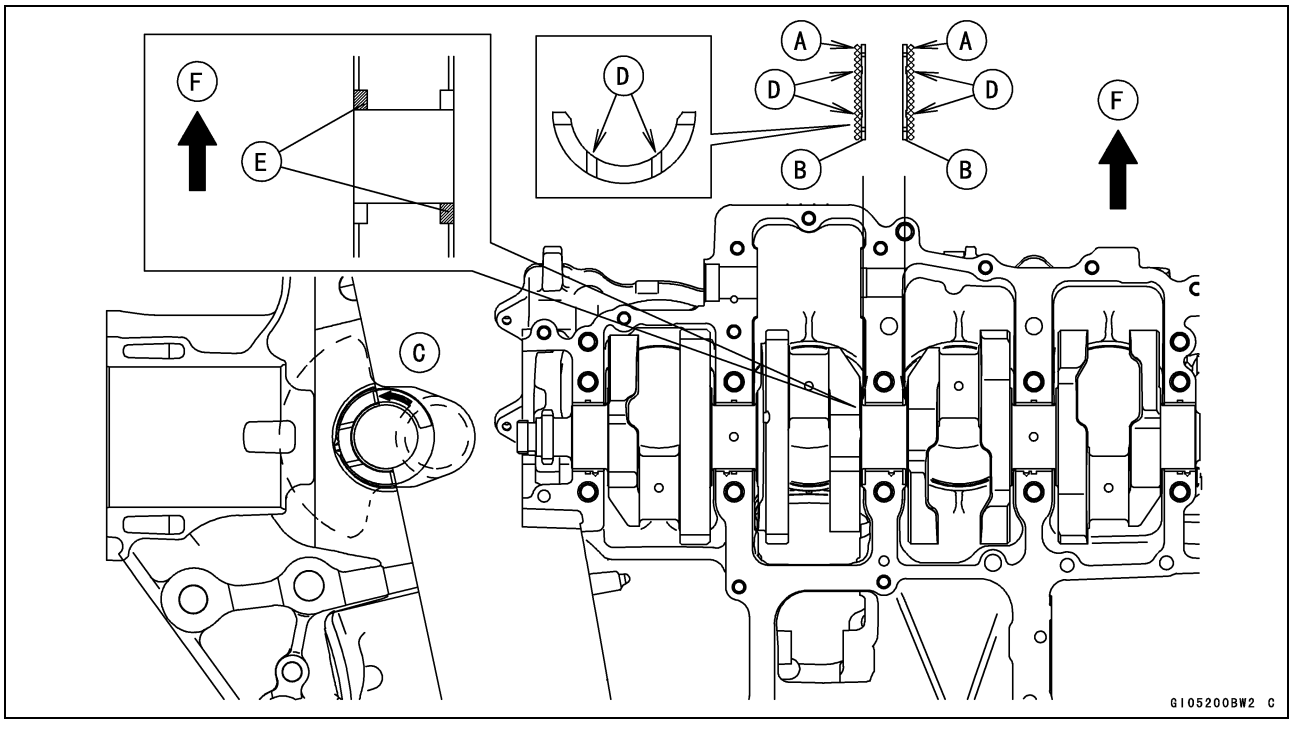
If the crankshaft, bearing inserts, or crankcase halves are replaced with new ones, select the bearing inserts and check clearance with a plastigage (press gauge) before assembling engine to be sure the correct bearing inserts are installed.

- 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

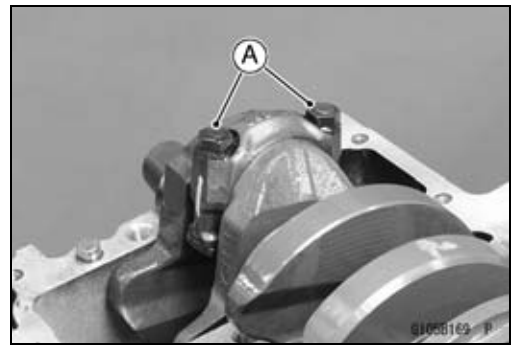
○*Slide the thrust washers so that the oil grooves [D] face outward. Make sure that the red-painted edges [E] are positioned as shown.*

Front [F]



Crankshaft and Connecting Rods

Connecting Rod Removal



- Split the crankcase (see Crankcase Splitting).
- Remove:
  Connecting Rod Nuts [A]

NOTE

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

- Remove the piston (see Piston Removal).

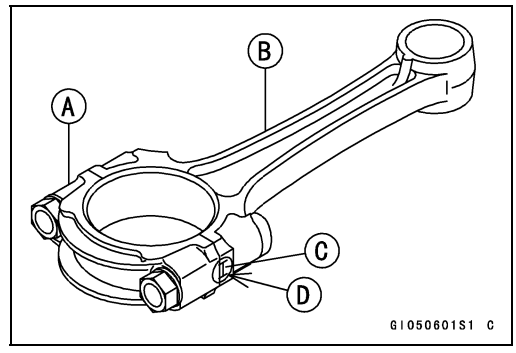
NOTICE

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

Connecting Rod Installation

NOTICE

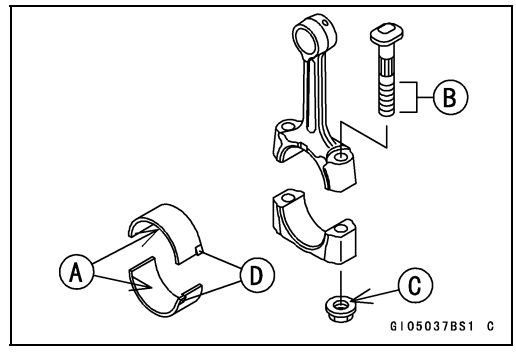
To minimize vibration, the connecting rods should have the same weight mark.



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



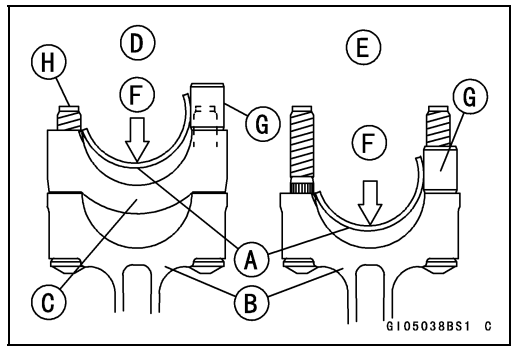
- Apply molybdenum disulfide oil solution to the inner surfaces of the upper and lower bearing inserts [A].
- Apply molybdenum disulfide oil solution to the threads [B] and seating surface [C] of the connecting rod nuts.
- Install the inserts so that their nails [D] are on the same side and fit them into the recess of the connecting rod and cap.

NOTICE

Wrong application of oil and grease could cause bearing damage.

Crankshaft and Connecting Rods

○When installing the inserts [A], be careful not to damage the insert surface with the edge of the connecting rod [B] or the cap [C]. One way to install inserts is as follows.
Installation [D] to Cap
Installation [E] to Connecting Rod
Push [F]
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.

- Install each connecting rod on its original crankpin.

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

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.**

Crankshaft and Connecting Rods

(1) Bolt Length Measurement Method

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

⚠ WARNING

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.

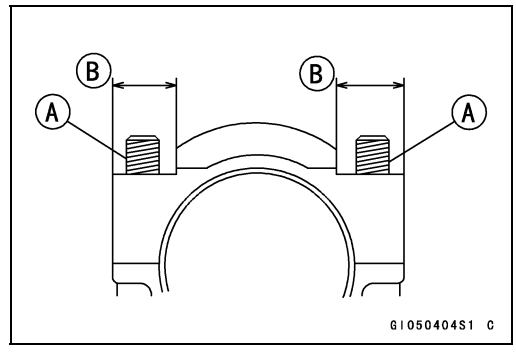
NOTICE

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

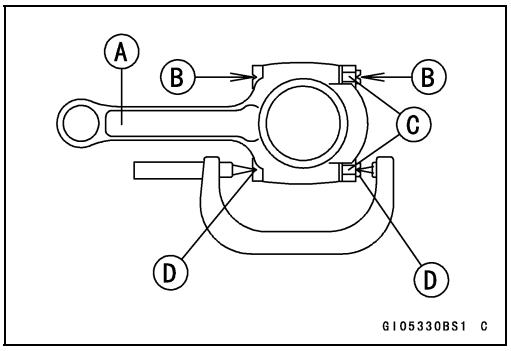
- Install new bolts and nuts in reused connecting rod.

★If the connecting rod assembly was replaced, use the bolts and nuts attached to the new connecting rod assembly.

- Apply a small amount of molybdenum disulfide oil solution to the following portions.
  Threads [A] of Nuts and Bolts
  Seating Surfaces [B] of Nuts and Connecting Rods



Crankshaft and 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].
- Tighten the big end nuts until the bolt elongation reaches the length specified as follows.

Bolt Length after tightening – Bolt Length before tightening = Bolt Stretch

Connecting Rod Assy	Bolt	Nut	Usable Range of Connecting Rod Bolt Stretch
New	Use the bolts attached to new con-rod.	Attached to new con-rod	0.29 ~ 0.39 mm (0.011 ~ 0.015 in.)
	New	New	
Used	Replace the bolts with new ones.	Replace the nuts with new ones.	0.29 ~ 0.39 mm (0.011 ~ 0.015 in.)

- 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.

(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.

⚠ 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

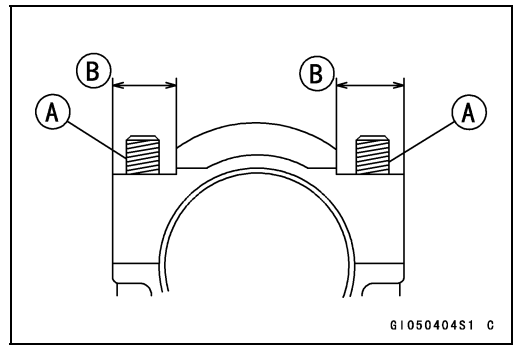
Immediately dry the bolts and nuts with compressed air after cleaning.
Clean and dry the bolts and nuts completely.

Crankshaft and Connecting Rods

- Install new bolts and nuts in reused connecting rod.

★If the connecting rod assembly was replaced, use the bolts and nuts attached to the new connecting rod assembly.

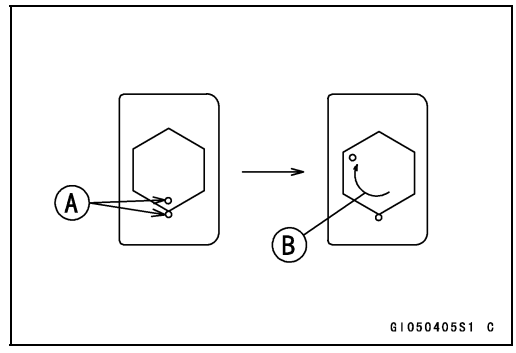
- Apply a small amount of molybdenum disulfide oil solution to the following portions.
  Threads [A] of Nuts and Bolts
  Seating Surfaces [B] of Nuts and Connecting Rods



- First, tighten the nuts to the specified torque. See the table below.
- Next, tighten the nuts **120°**.

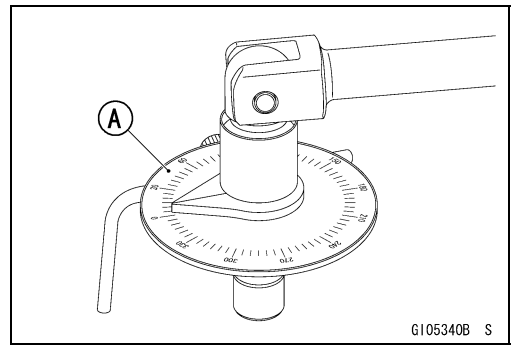
○Mark [A] the connecting rod big end caps and nuts so that nuts can be turned 120° [B] properly.

○The nuts can be tightened by using an angle torque gauge. For details refer to “Cylinder Head Installation” in the Engine Top End chapter.



Connecting Rod Assy	Bolt	Nut	Torque + Angle N·m (kgf·m, ft·lb)
New	Attached to new con-rod	Attached to new con-rod	33.3 (3.4, 25) + 120°
		New	39.2 (4.0, 29) + 120°
Used	Replace the bolts with new ones	Used	39.2 (4.0, 29) + 120°
		New	37.3 (3.8, 28) + 120°

- The nuts can be tightened by using a torque angle gauge [A].

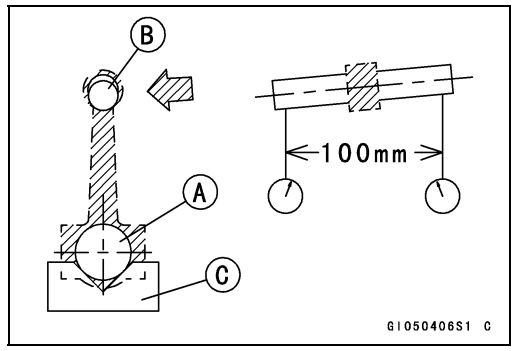


Crankshaft/Connecting Rod Cleaning

- 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.

Crankshaft and Connecting Rods

Connecting Rod Bend Inspection

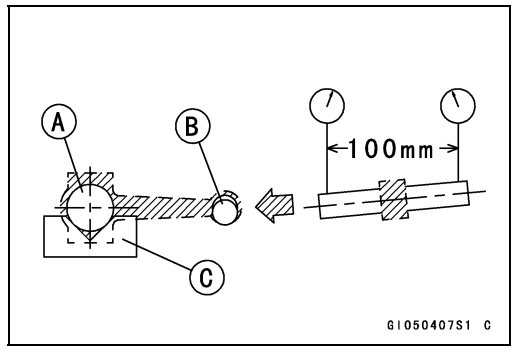


- Remove the connecting rod big end bearing inserts, and reinstall the connecting rod big end cap.
- Select an arbor [A] of the same diameter as the connecting rod big end, and insert the arbor through the connecting rod big end.
- Select an arbor of the same diameter as the piston pin and at least 100 mm (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 the connecting rod bend exceeds the service limit, the connecting rod must be replaced.

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

Connecting Rod Twist Inspection

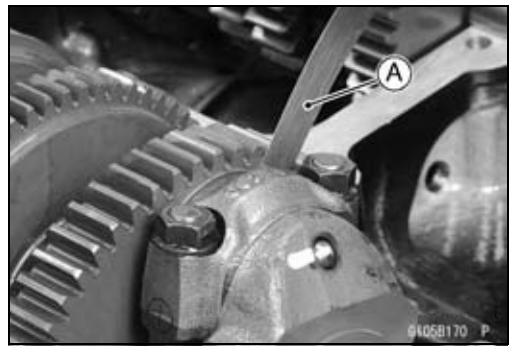


- With the big-end arbor [A] still on V block [C], hold the connecting rod horizontally and measure the amount that the arbor [B] varies from being paralleled with the surface plate over a 100 mm (3.94 in.) length of the arbor to determine the amount of connecting rod twist.

★If the 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.

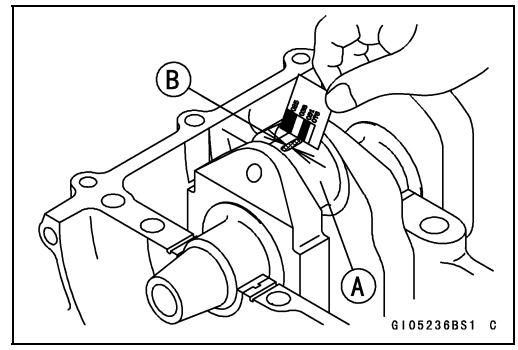
○Insert a thickness gauge [A] between the big end and either crank web to determine clearance.

Connecting Rod Big End Side Clearance
Standard: 0.13 ~ 0.38 mm (0.0051 ~ 0.0150 in.)
Service Limit: 0.6 mm (0.024 in.)

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

Crankshaft and Connecting Rods

Connecting Rod Big End Bearing Insert/Crankpin Wear Inspection



- Remove the connecting rod big end cap (see Connecting Rod Removal).
- Cut strips of plastigage (press gauge) to crankpin width. Place a strip on the crankpin parallel to the crankshaft installed in the correct position.
- Tighten the connecting rod big end nuts to the specified torque (see Connecting Rod Installation).

NOTE

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

- Remove the connecting rod big end again, measure each clearance between the bearing insert and crankpin [A] using plastigage [B].

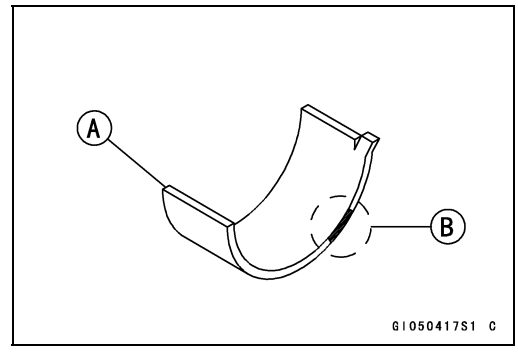
NOTICE

After measurement, replace the connecting rod bolts and nuts.

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.)



★If the clearance is within the standard, no bearing replacement is required.

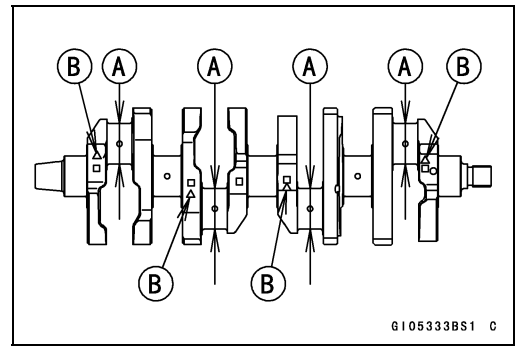
★If the clearance is between 0.087 mm (0.0034 in.) and the service limit (0.12 mm, 0.0047 in.), replace the bearing inserts [A] with inserts painted blue [B]. Check insert/crankpin clearance with the plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum 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 (1.495 in.)



★If any crankpin has worn past the service limit, replace the crankshaft with a new one.

★If the measured crankpin diameters [A] are not less than the service limit, but do not coincide with the original diameter markings [B] on the crankshaft, make new marks on it.

Crankpin Diameter Marks

None 37.984 ~ 37.992 mm (1.4954 ~ 1.4957 in.)

○ 37.993 ~ 38.000 mm (1.4958 ~ 1.4961 in.)

△: Crankpin Diameter Marks, "○" or no mark.

Crankshaft and Connecting Rods

- 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

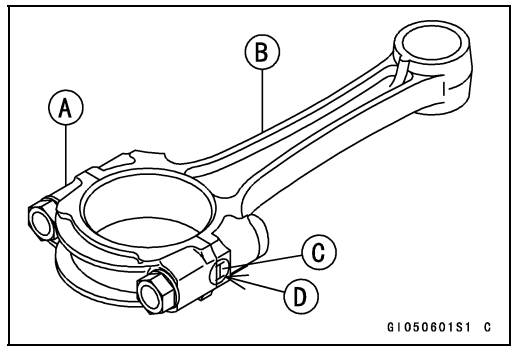
○*The mark already on the big end should almost coincide with the measurement.*

Connecting Rod Big End Inside Diameter Marks

None 41.000 ~ 41.008 mm (1.6142 ~ 1.6145 in.)

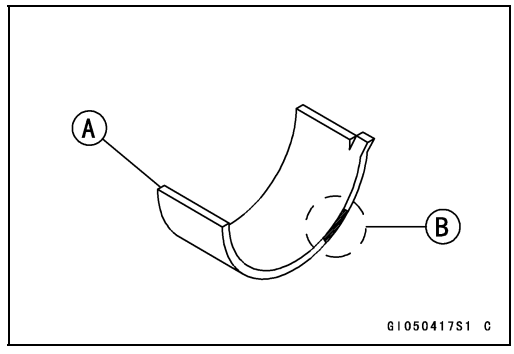
○ 41.009 ~ 41.016 mm (1.6145 ~ 1.6148 in.)

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



- 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 Diameter Marking	Crankpin Diameter Marking	Bearing Insert	
		Size Color	Part Number
None	○	Brown	92139-0830
None	None	Black	92139-0829
○	○		
○	None	Blue	92139-0828



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

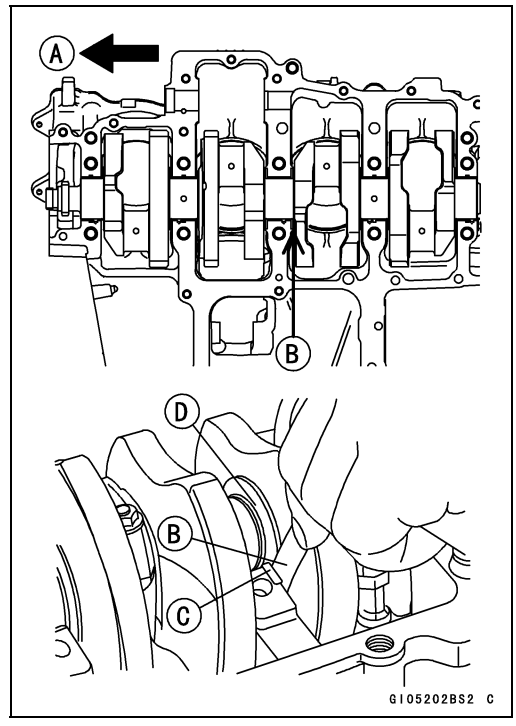
Crankshaft and Connecting Rods

Crankshaft Side Clearance Inspection

- Move [A] the crankshaft to the side of the camshaft chain.
- Insert a thickness gauge [B] between the thrust washer [C] and the crank web [D] at the #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.)

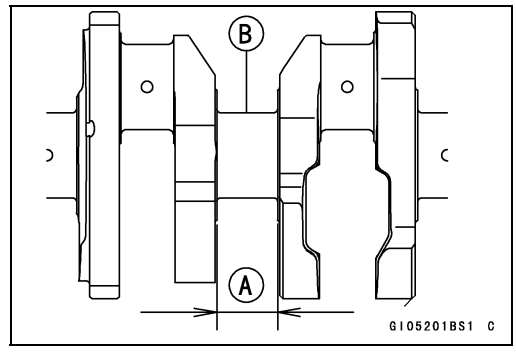
★If the clearance exceeds the service limit, replace the thrust washers as a set.



- 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 (1.081 ~ 1.083 in.)

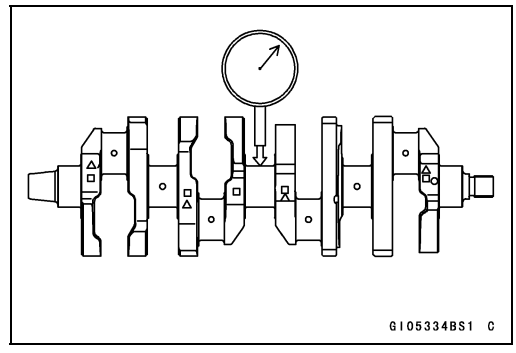


Crankshaft Runout Inspection

- Measure the crankshaft runout.

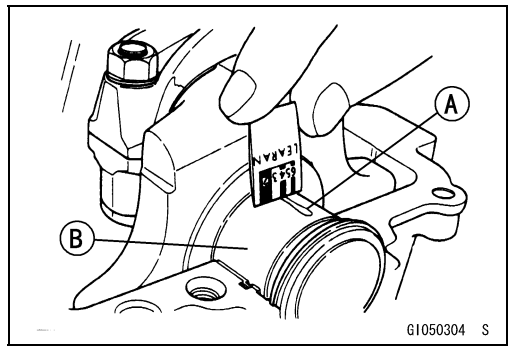
★If the measurement exceeds the service limit, replace the crankshaft.

Crankshaft Runout
Standard: TIR 0.03 mm (0.0012 in.) or less
Service Limit: TIR 0.08 mm (0.0031 in.)



Crankshaft and Connecting Rods

Crankshaft Main Bearing Insert/Journal Wear Inspection



- Split the crankcase (see Crankcase Splitting).
- Cut strips of plastigage (press gauge) to journal width.
- Place a strip on each journal parallel to the crankshaft installed in the correct position.
- Tighten the crankcase bolts to the specified torque (see Crankcase Assembly).

NOTE

○*Do not turn the crankshaft during clearance measurement.*

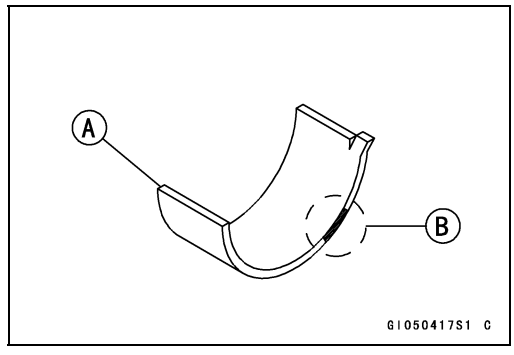
○*Journal clearance less than 0.025 mm (0.00098 in.) can not be measured by plastigage [A], however, using genuine parts maintains the minimum standard clearance.*

- Split the crankcase again, measure each clearance between the bearing insert and journal [B] using plastigage.

Crankshaft Main Bearing Insert/Journal Clearance

Standard: 0.031 ~ 0.063 mm (0.0012 ~ 0.0025 in.)

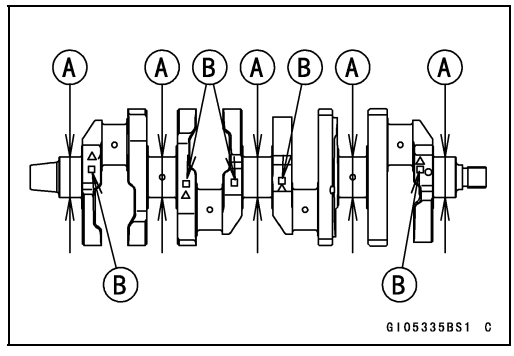
Service Limit: 0.09 mm (0.0035 in.)



★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: 39.984 ~ 40.000 mm (1.5742 ~ 1.5748 in.)

Service Limit: 39.96 mm (1.573 in.)

★If any journal has worn past the service limit, replace the crankshaft with a new one.

★If the measured journal diameters [A] are not less than the service limit, but do not coincide with the original diameter markings [B] on the crankshaft, make new marks on it.

Crankshaft Main Journal Diameter Marks

None 39.984 ~ 39.992 mm (1.5742 ~ 1.5745 in.)

1 39.993 ~ 40.000 mm (1.5745 ~ 1.5748 in.)

□: Crankshaft Main Journal Diameter Marks, “1” or no mark.

Crankshaft and Connecting Rods

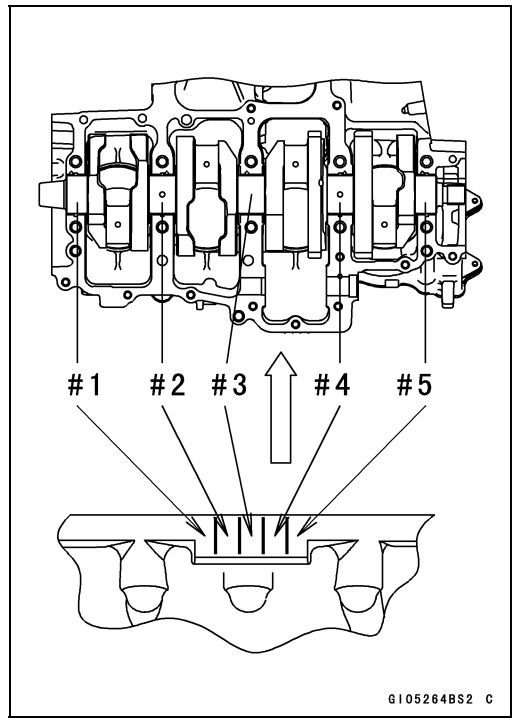
- Measure the main bearing inside diameter, and mark the upper crankcase half in accordance with the inside diameter.
  Crankcase Main Bearing Inside Diameter Marks, "○" or no mark.
- Tighten the crankcase bolts to the specified torque (see Crankcase Assembly).

NOTE

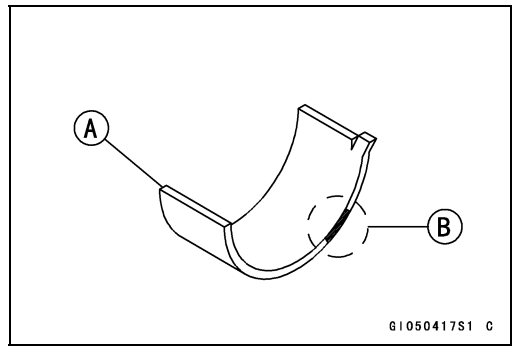
○*The mark already on the upper crankcase half should almost coincide with the measurement.*

Crankcase Main Bearing Inside Diameter Marks

○	**43.000 ~ 43.008 mm (1.6929 ~ 1.6932 in.)**
None	**43.009 ~ 43.016 mm (1.6933 ~ 1.6935 in.)**



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



Crankcase Main Bearing Inside Diameter Marking	Crankshaft Main Journal Diameter Marking	Bearing Insert*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	92139-0740	1, 3, 5
			92139-0743	2, 4
None	1	Black	92139-0739	1, 3, 5
○	None		92139-0742	2, 4
None	None	Blue	92139-0738	1, 3, 5
			92139-0741	2, 4

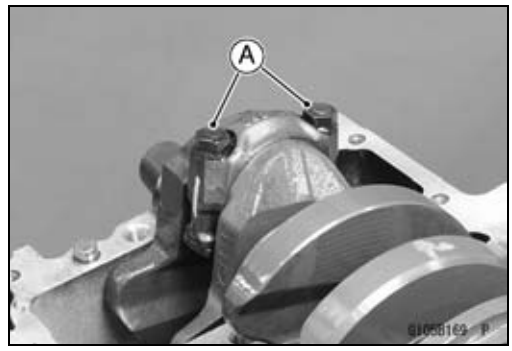
* The bearing inserts for Nos. 2 and 4 journals have an oil groove, respectively.

- Install the new inserts in the crankcase halves and check insert/journal clearance with the plastigage.

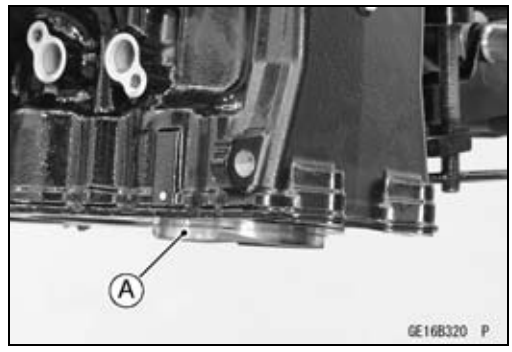
Pistons

Piston Removal

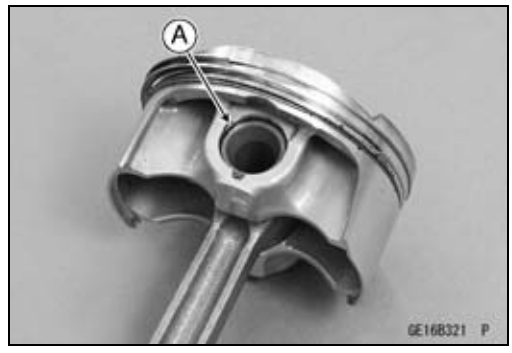
- Split the crankcase (see Crankcase Splitting).
- Remove:
  Connecting Rod Nuts [A]
  Connecting Rod Big End Caps



- Remove the piston [A] with connecting rod to the cylinder head side.



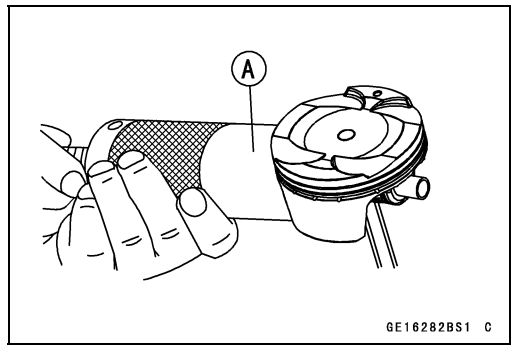
- Remove the piston pin snap ring [A].



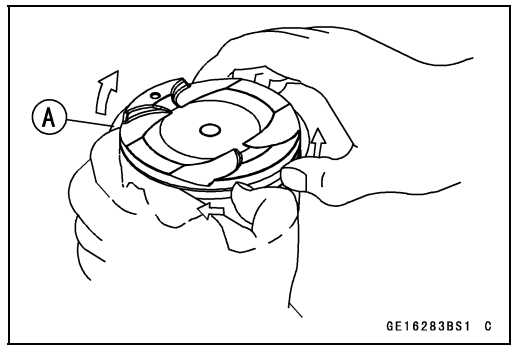
- Using the piston pin puller assembly [A], remove the piston pin.

  Special Tool - Piston Pin Puller Assembly: 57001-910

- Remove the piston from the connecting rod.

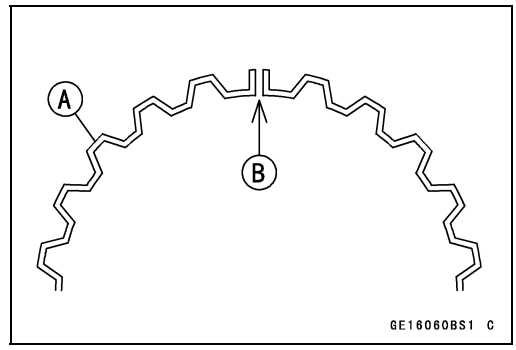


- Carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring [A] to remove it.
- Remove the 3-piece oil ring with your thumbs in the same manner.



Pistons

Piston Installation



NOTE

○*If a new piston is used, use new piston ring.*

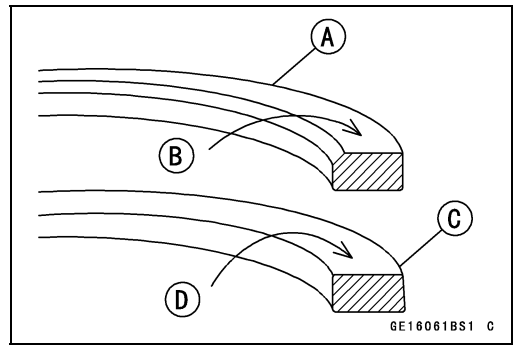
- Apply molybdenum disulfide oil solution to the oil ring expander, and install the oil ring expander [A] in the bottom piston ring groove so the ends [B] not butt together.
- Apply molybdenum disulfide oil solution to the oil ring steel rails, and install the oil ring steel rails, one above the expander and one below it.

○Spread the rail with your thumbs, but only enough to fit the rail over the piston.

○Release the rail into the bottom piston ring groove.

NOTE

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

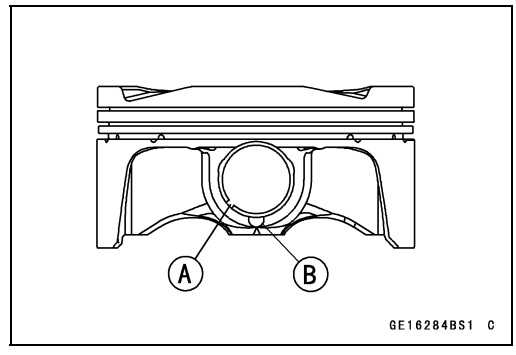


- Apply molybdenum disulfide oil solution to the piston rings.

NOTE

○*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.

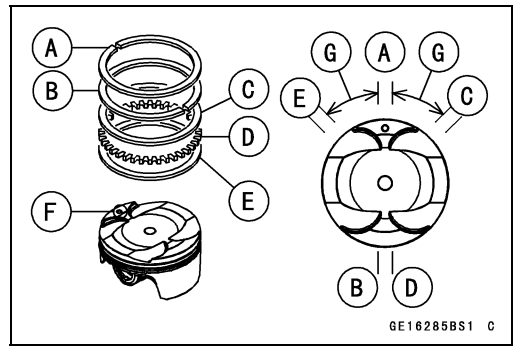


- Apply molybdenum disulfide oil solution to the piston pin and piston journal.
- Fit a new piston pin snap ring into the side of the piston so that the ring opening [A] does not coincide with the slit [B] of the piston pin hole.

○When installing the piston pin snap ring, compress it only enough to install it and no more.

NOTICE

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

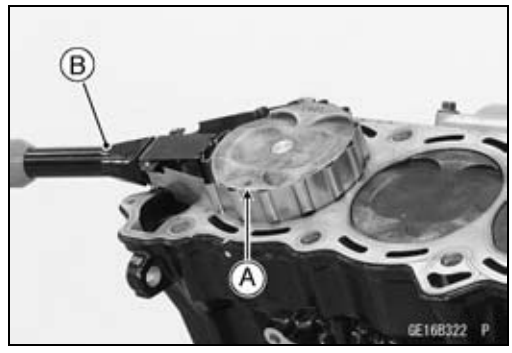


- The piston ring openings must be positioned as shown in the figure. The openings of the oil ring steel rails must be about 30 ~ 40° of angle from the opening of the top ring.
  Top Ring [A]
  Second Ring [B]
  Upper Oil Ring Steel Rail [C]
  Oil Ring Expander [D]
  Lower Oil Ring Steel Rail [E]
  Dent [F]
  30 ~ 40° [G]

Pistons

- Apply molybdenum disulfide oil solution to the cylinder bore and piston skirt.
- Install the piston with its dent mark [A] facing exhaust side.
- Using the piston ring compressor assembly [B] to install the piston from the cylinder head side.

Special Tools - Piston Ring Compressor Grip: 57001-1095
Piston Ring Compressor Belt, ϕ80 ~ ϕ91: 57001-1320

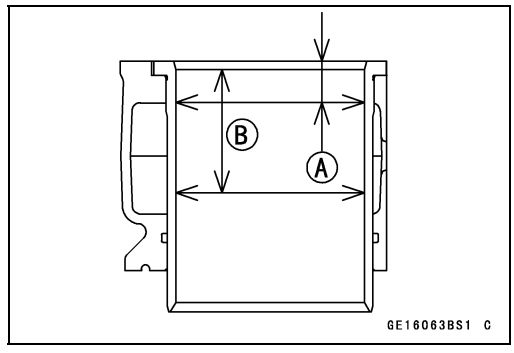


- Install:
  Connecting Rod Big End Caps (see Connecting Rod Installation)

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).

★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]

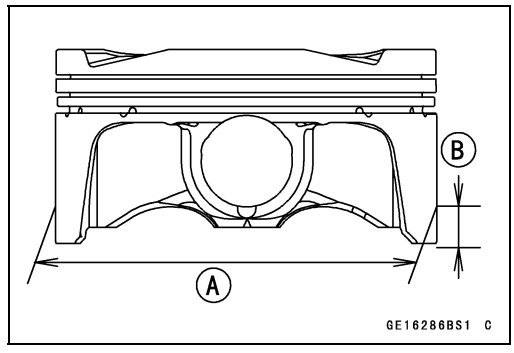


Cylinder (Upper Crankcase) Inside Diameter
Standard: 83.994 ~ 84.006 mm (3.3068 ~ 3.3073 in.)
Service Limit: 84.10 mm (3.311 in.)

Piston Wear Inspection

- Measure the outside diameter [A] of each piston 10 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.



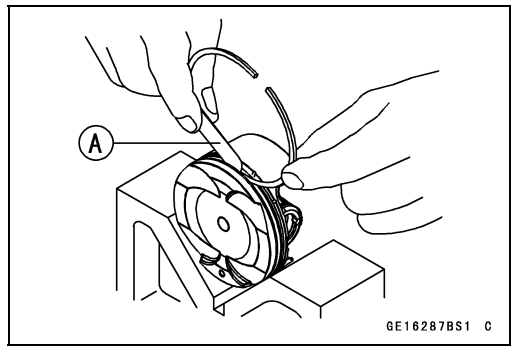
Piston Diameter
Standard: 83.959 ~ 83.974 mm (3.3055 ~ 3.3061 in.)
Service Limit: 83.81 mm (3.300 in.)

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.

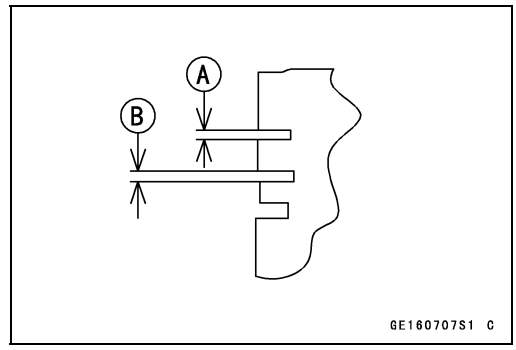
- With the piston rings in their grooves, make several measurements with a thickness gauge [A] to determine piston ring/groove clearance.



Piston Ring/Groove Clearance
Standard:
Top 0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.)
Second 0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)
Service Limit:
Top 0.17 mm (0.0067 in.)
Second 0.16 mm (0.0063 in.)

Pistons

Piston Ring Groove Width Inspection



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

Piston Ring Groove Width
Standard:

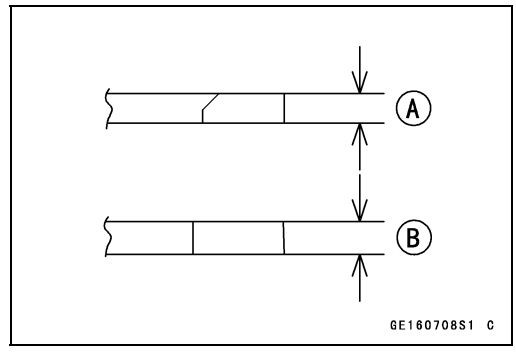
Top [A]	**0.92 ~ 0.94 mm (0.0362 ~ 0.0370 in.)**
Second [B]	**1.01 ~ 1.03 mm (0.0398 ~ 0.0406 in.)**

Service Limit:

Top	**1.02 mm (0.040 in.)**
Second	**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.
○Use 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:

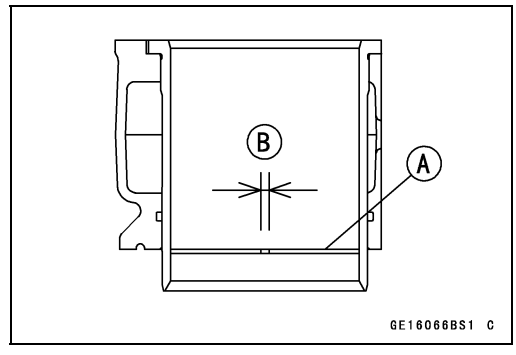
Top	**0.80 mm (0.032 in.)**
Second	**0.90 mm (0.035 in.)**

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

NOTE

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

Piston Ring End Gap Inspection



● Place the piston ring [A] inside the cylinder (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:

Top	**0.20 ~ 0.30 mm (0.0079 ~ 0.0118 in.)**
Second	**0.40 ~ 0.55 mm (0.0157 ~ 0.0217 in.)**

Service Limit:

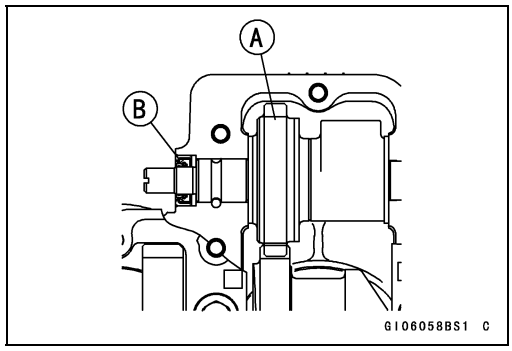
Top	**0.6 mm (0.024 in.)**
Second	**0.9 mm (0.035 in.)**

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

Balancer

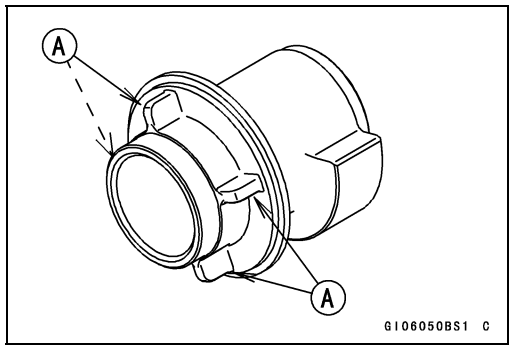
Front Balancer Removal

- Split the crankcase (see Crankcase Splitting).
- Remove:
  Front Balancer [A]
  Balancer Shaft Oil Seal [B]



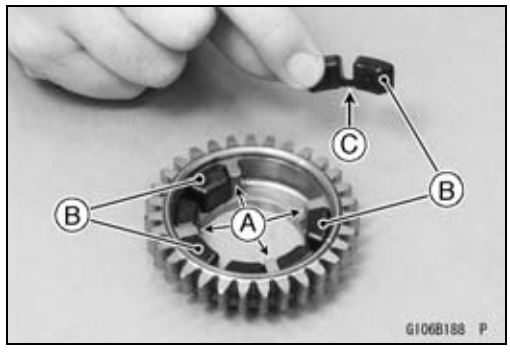
Front Balancer Installation

- Apply molybdenum disulfide oil solution to the ribs [A] of the balancer.



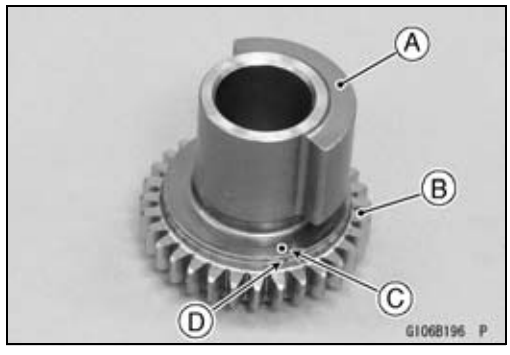
- Apply molybdenum disulfide oil solution to the ribs [A] of the balancer gear.
- Check that the rubber dampers [B] are in place.

○Face the linked portion [C] to the bottom.

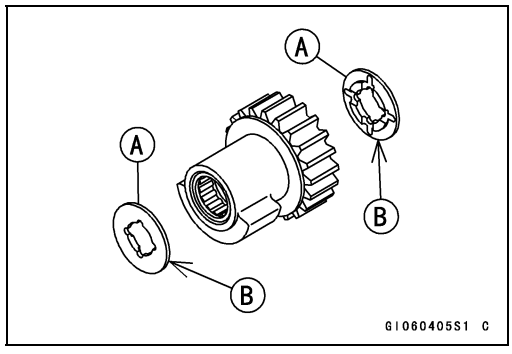


- Install the balancer weight [A] into the gear [B].

○Align the punch mark [C] of the balancer weight to the groove [D] of the gear.



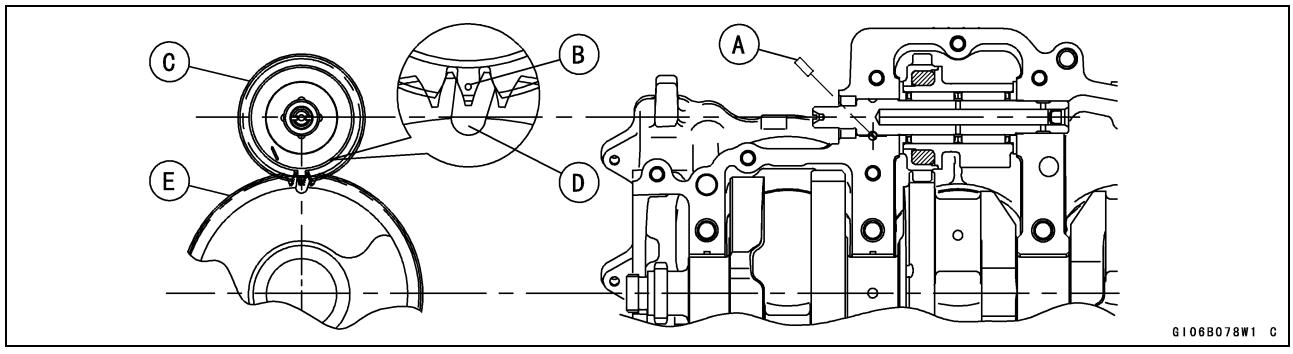
- Apply molybdenum disulfide oil solution to the needle bearings. Insert the needle bearings.
- Apply grease to the washers [A] to prevent them from falling off.
- Fit the washers on both ends of the weight and gear assembly. The projected sides [B] face inward.



Balancer

- Position the crankshaft at #2, 3 position TDC.
- Insert the pin [A] as shown.
- Set the front balancer on the upper crankcase half.

○Align the punch mark [B] on the balancer gear [C] with the mark [D] 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].

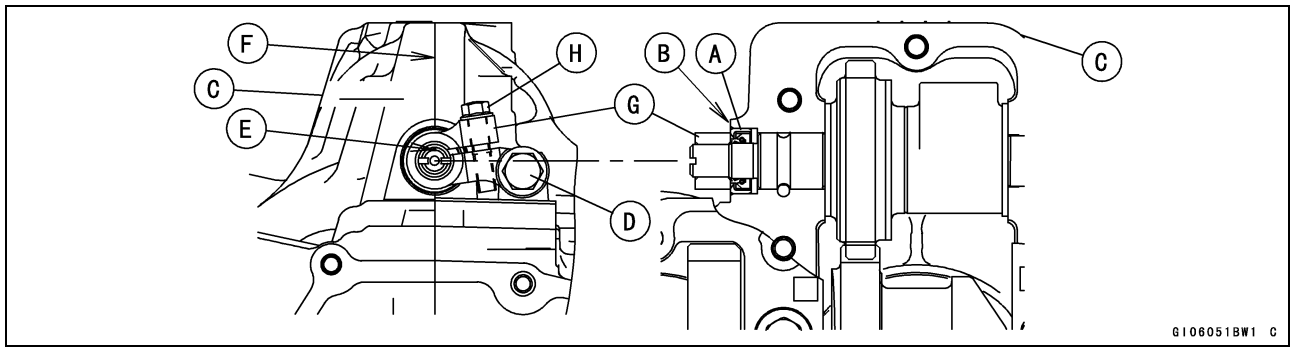
○Fill the oil seal lips with grease.

- Install the balancer shaft clamp lever.
- 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].
- Check that the lever [G] is in contact with the crankcase.
- Tighten:

Torque - Balancer Shaft Clamp Bolt [H]: 10 N·m (1.0 kgf·m, 89 in·lb)



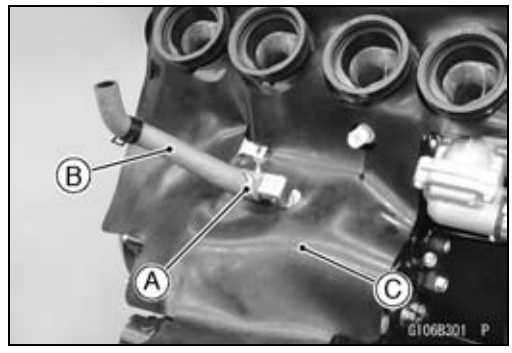
Rear Balancer Removal

- Remove:

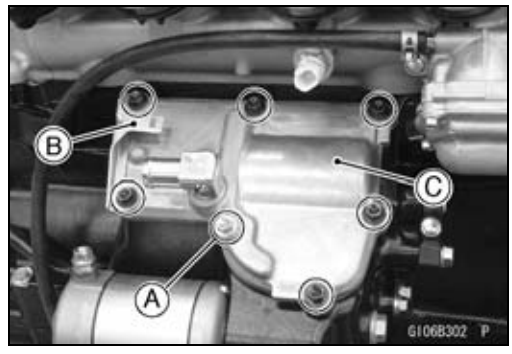
Engine (see Engine Removal in the Engine Removal/Installation chapter)
Throttle Body Assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter)

Balancer

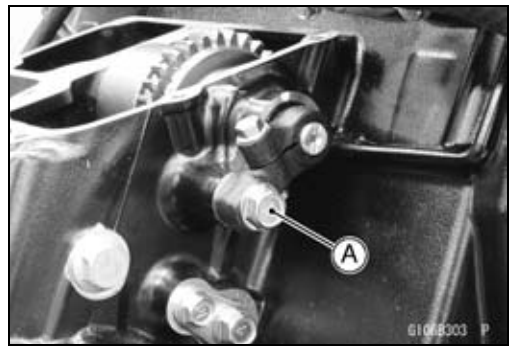
- Slide the clamp [A] and remove the breather hose [B].
- Turn up the heat insulation rubber plate [C].



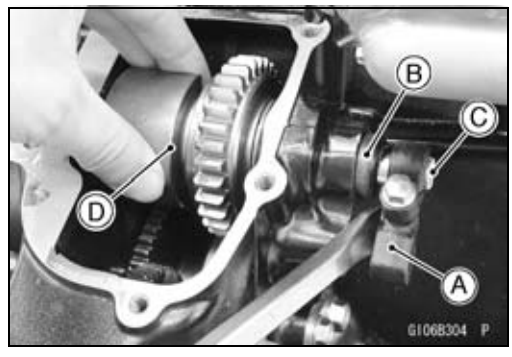
- Remove:
  Breather Cover Bolts [A]
  Bracket [B]
  Breather Cover [C]
  Breather Cover Gasket



- Remove:
  Balancer Shaft Clamp Lever Bolt [A]

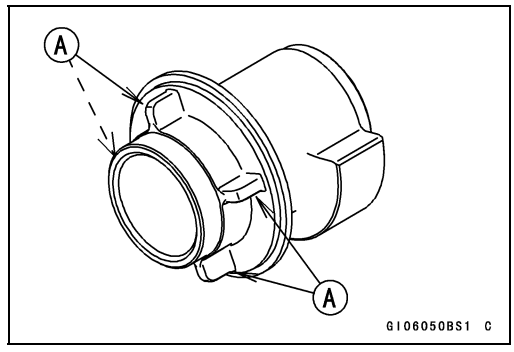


- Pry off the clamp lever [A] until the oil seal [B] removed.
- Pull the balancer shaft [C] out of the crankcase.
- Remove the balancer weight and gear assembly [D] together with needle bearings and washers.



Rear Balancer Installation

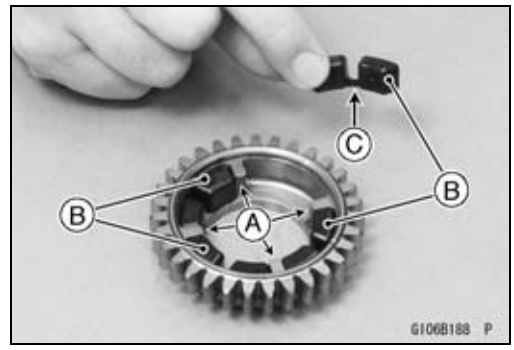
- Apply molybdenum disulfide oil solution to the ribs [A] of the balancer.



Balancer

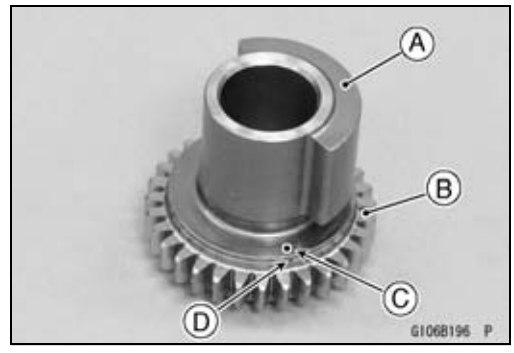
- Apply molybdenum disulfide oil solution to the ribs [A] of the balancer gear.
- Check that the rubber dampers [B] are in place.

○Face the linked portion [C] to the bottom.

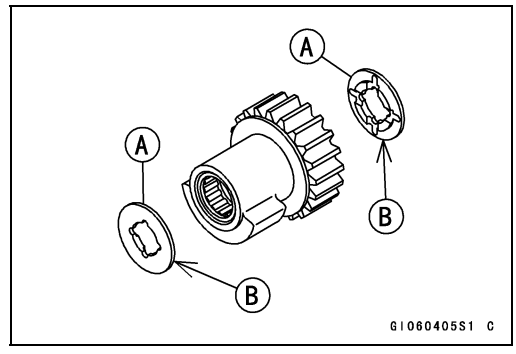


- Install the balancer weight [A] into the gear [B].

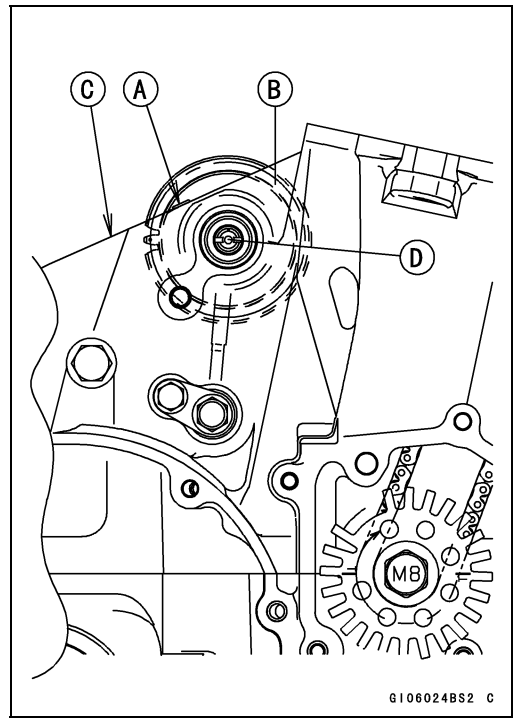
○Align the punch mark [C] of the balancer weight to the groove [D] of the gear.



- Apply molybdenum disulfide oil solution to the needle bearings. Insert the needle bearings.
- Apply grease to the washers [A] to prevent them from falling off.
- Fit the washers on both ends of the weight and gear assembly. The projected sides [B] face inward.



- Position the crankshaft at # 2, 3 position TDC or at # 1, 4 position TDC.
- Align the mark [A] on the balancer gear [B] with the mating surface [C] of the upper crankcase half.
- Apply molybdenum disulfide oil solution to the balancer shaft.
- Install the balancer shaft [D] and then engage the balancer gear and starter motor clutch gear.



Balancer

- Install the new oil seal [A] so that its surface [B] is flush with the surface of crankcase [C].

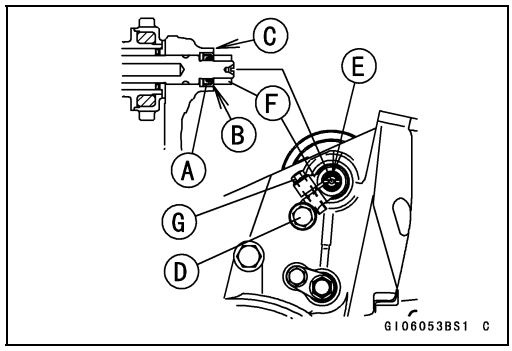
○Fill the oil seal lips with grease.

- Install the balancer shaft clamp lever.
- 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.
- Check that the lever [F] is in contact with the crankcase.
- Tighten:

Torque - Balancer Shaft Clamp Bolt [G]: 10 N·m (1.0 kgf·m, 89 in·lb)



- When installing the breather cover plate [A], note the following.

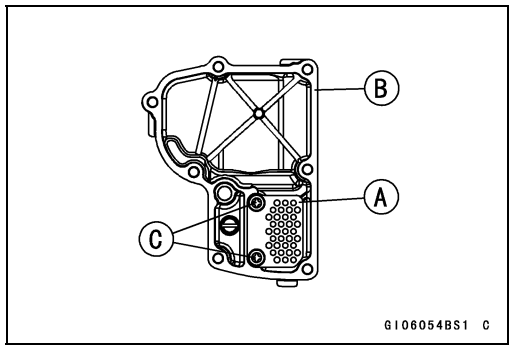
○Install the breather cover plate to the breather cover [B] as shown.

○Apply a non-permanent locking agent to the threads of the breather cover plate screws [C].

○Temporarily tighten the breather cover plate screws.

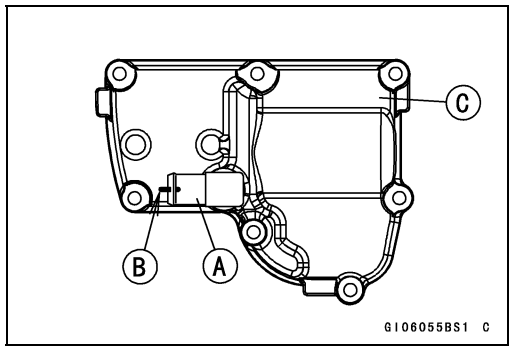
○Tighten:

Torque - Breather Cover Plate Screws: 10 N·m (1.0 kgf·m, 89 in·lb)



- When installing the fitting [A], note the following.

○Press the fitting so that it is aligned with the line [B] of the breather cover [C].



- Replace the breather cover gasket [A] with a new one.
- Apply a non-permanent locking agent to the breather cover bolts [B].
- Install:

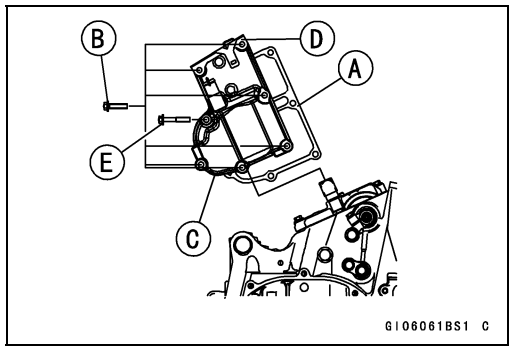
  Breather Cover [C]

  Bracket [D]
- Tighten:

Torque - Breather Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

25 mm (0.98 in.) [B]

35 mm (1.38 in.) [E]



Balancer

Balancer Adjustment

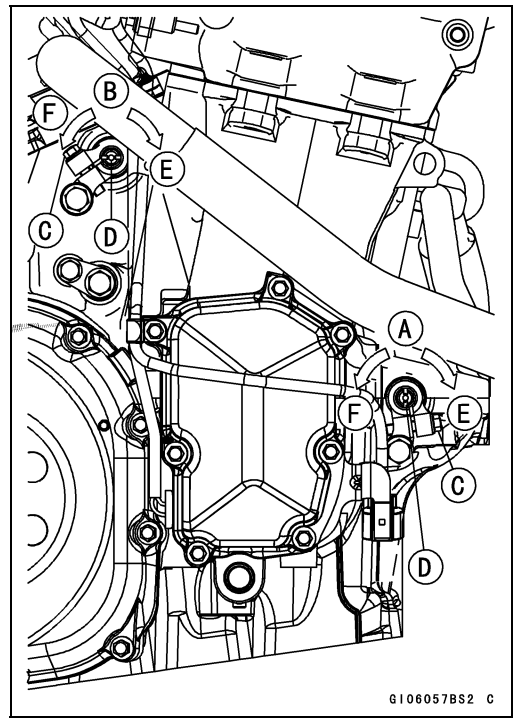
● Remove:
Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)

NOTE

○*First, adjust the front balancer [A], next the rear balancer [B].*

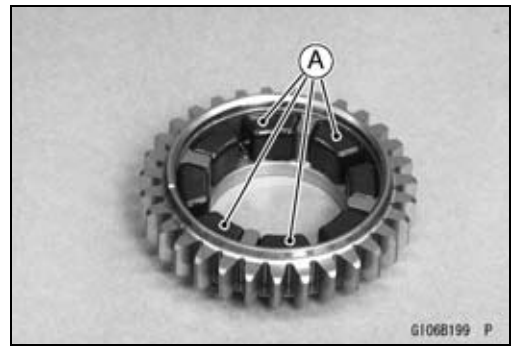
● Start the engine and warm it up thoroughly.
● Adjust the balancer gear backlash with the engine idling. The amount of backlash can be changed by turning the balancer shaft which has eccentric journals.
○Start the engine and let it idle.
○Loosen the clamp bolt [C] and turn the balancer shaft [D] clockwise [E] until the balancer gear makes a whining sound.
○Turn the shaft counterclockwise [F] until the balancer gear whining sound disappears and tighten the clamp bolt.

Torque - Balancer Shaft Clamp Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)



Balancer Damper Inspection

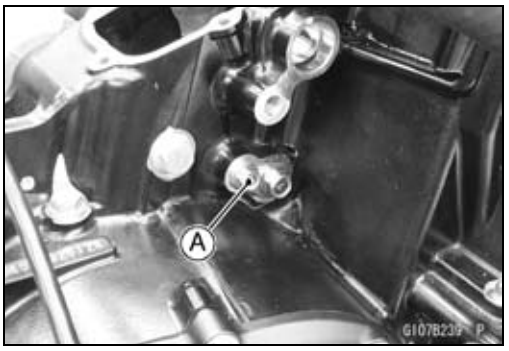
● Remove the balancer and disassemble the weight and gear assembly.
● Visually inspect the rubber dampers [A].
★If they appear damaged or deteriorated, replace them.



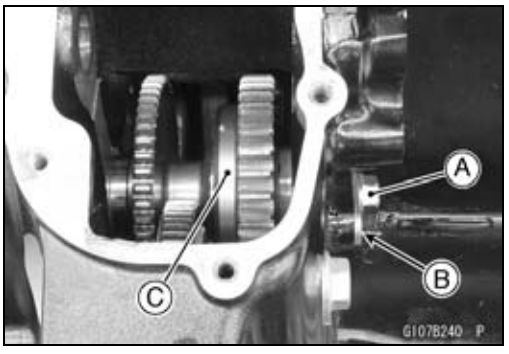
Starter Motor Clutch and Torque Limiter

Starter Motor 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)
  Starter Clutch Shaft Plate Bolt [A]



- Pull the starter clutch shaft bolt [A] with the shaft plate [B] and starter clutch shaft holding the starter clutch [C].
- Remove the starter clutch.

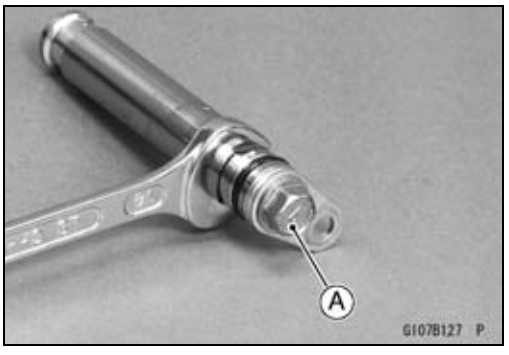


Starter Motor Clutch Installation

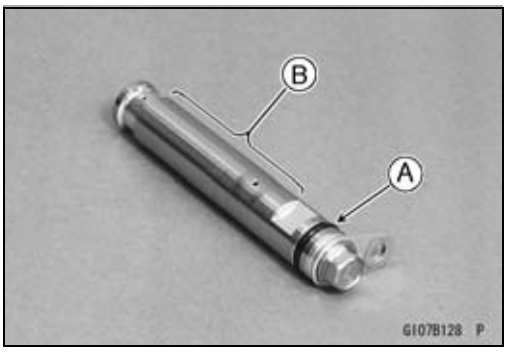
★If the shaft bolt [A] removed, hold the shaft to tighten it.

- Apply a non-permanent locking agent to the threads of the shaft bolt.

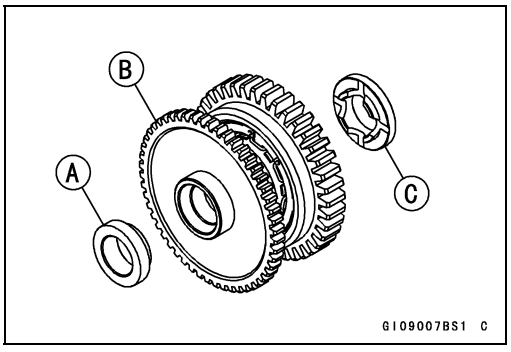
Torque - Starter Clutch Shaft Bolt: 10 N·m (1.0 kgf·m, 89 in·lb)



- Replace the O-ring [A] with a new one.
- Apply grease to the O-ring.
- Apply molybdenum disulfide grease [B] to the starter clutch shaft.



- Assemble:
  Collar (Long) [A]
  Starter Clutch [B]
  Collar (Short) [C]



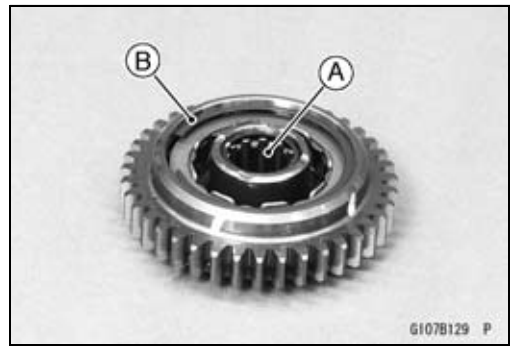
Starter Motor Clutch and Torque Limiter

- Install the starter clutch and starter clutch shaft.
- Apply a non-permanent locking agent to the threads of the starter clutch shaft plate bolt, and tighten it.

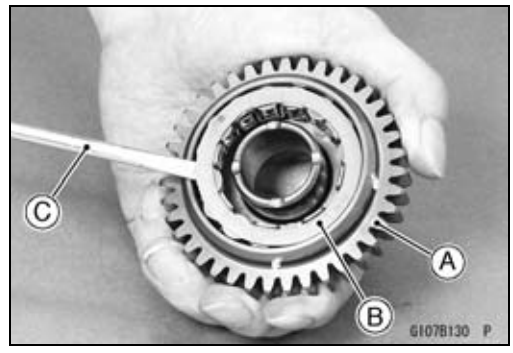
Torque - Starter Clutch Shaft Plate Bolt : 10 N·m (1.0 kgf·m, 89 in·lb)

Starter Motor Clutch Disassembly

- Remove the starter motor clutch (see Starter Motor Clutch Removal).
- Pull the driven gear out off from the drive gear.
- Remove the needle bearing [A] and snap ring [B].

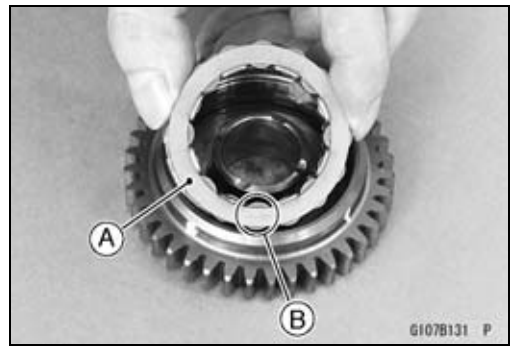


- Holding the drive gear [A] with a hand, remove the one -way clutch [B] from the gear by using the flat tip screw-driver [C].

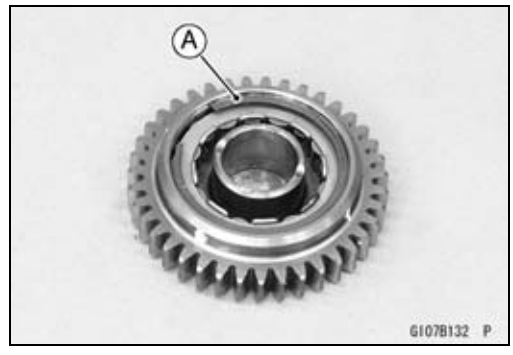


Starter Motor Clutch Assembly

- Be sure to install the one-way clutch [A] so that its arrow [B] faces the side of the snap ring.

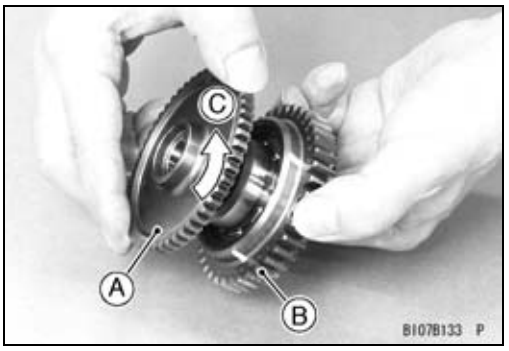


- Install the new snap ring [A] to the one-way clutch.



Starter Motor Clutch and Torque Limiter

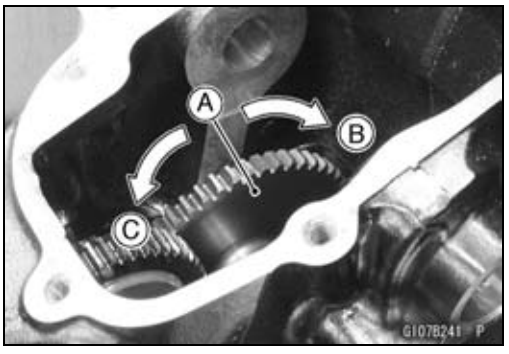
- Turn in the driven gear [A] to the drive gear [B].
  Counterclockwise [C]
- Install the needle bearing.



Starter Clutch Inspection

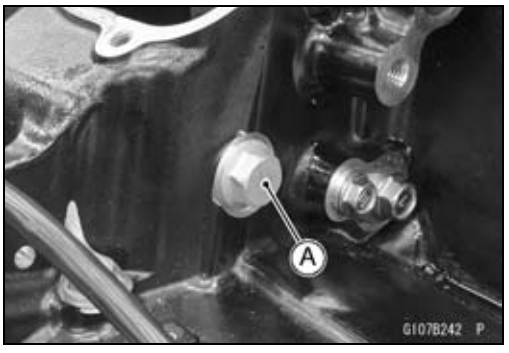
- Remove:
  Starter Motor (see Starter Motor Removal in the Electrical System chapter)
  Rear Balancer (see Rear Balancer Removal)
- Turn the starter idle gear [A] by hand. The starter idle gear should turn forward [B] freely, but should not turn backward [C].

★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.

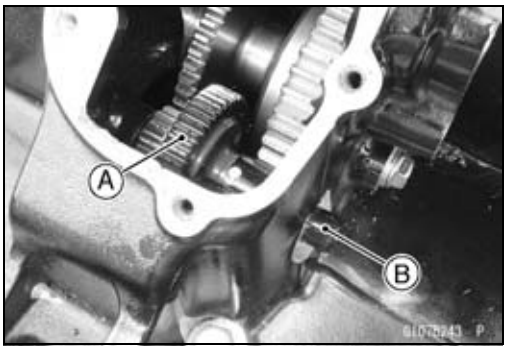


Torque Limiter Removal

- Remove:
  Rear Balancer (see Rear Balancer Removal)
  Starter Motor (see Starter Motor Removal in the Electrical System chapter)
  Torque Limiter Bolt [A]
  Washer



- Holding the torque limiter [A], remove the torque limiter shaft [B] and the torque limiter.



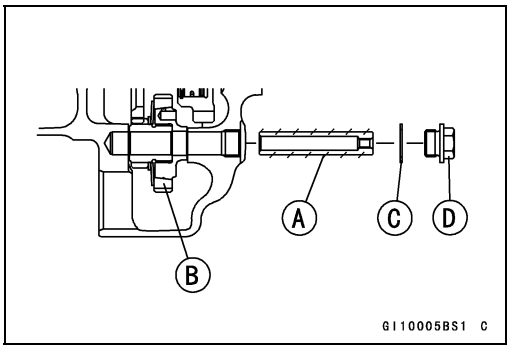
Torque Limiter Installation

- Apply molybdenum disulfide grease to the torque limiter shaft [A].
- Install the torque limiter [B] and shaft.

○Turn the large-hole end of the shaft to inside as shown.

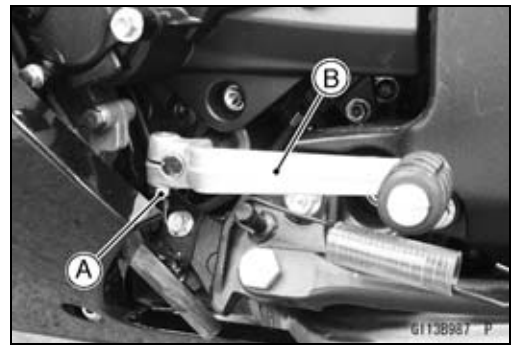
- Replace the washer [C] with a new one.
- Apply a non-permanent locking agent to the threads of the torque limiter bolt [D].
- Tighten:

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



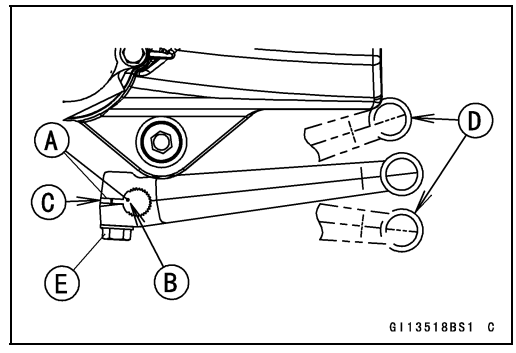
External Shift Mechanism

Shift Pedal Removal



- Remove:
  Shift Pedal Bolt [A]
  Shift Pedal [B]

Shift Pedal Installation



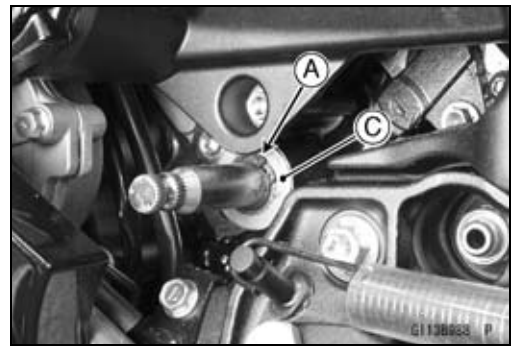
- Align [A] the punch mark [B] on the shift shaft with the upper surface [C] of shift pedal slit.

★If the punch mark is misaligned with the slit, the shift pedal is positioned [D] as shown. In that case, reinstall the shift pedal.

- Tighten:

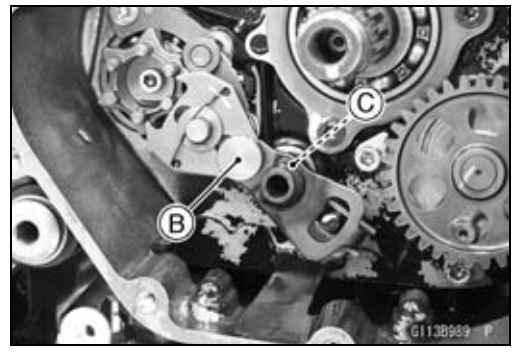
Torque - Shift Pedal Bolt [E]: 8.0 N·m (0.82 kgf·m, 71 in·lb)

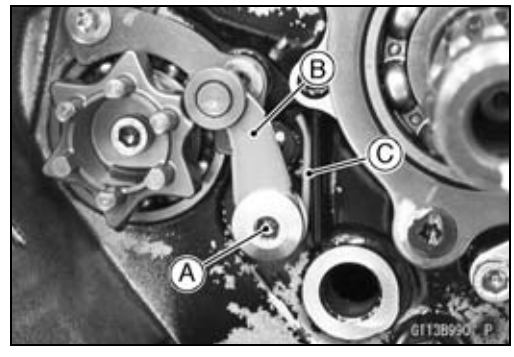
External Shift Mechanism Removal



- Remove:
  Shift Pedal (see Shift Pedal Removal)
  Clutch (see Clutch Removal in the Clutch chapter)
  Snap Ring [A]
  Shift Shaft Assembly [B]
  Washers [C]

Special Tool - Outside Circrip Pliers: 57001-144

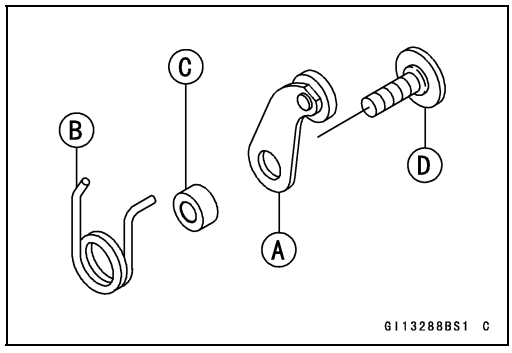




- Remove:
  Gear Positioning Lever Bolt [A]
  Gear Positioning Lever [B]
  Collar and Spring [C]

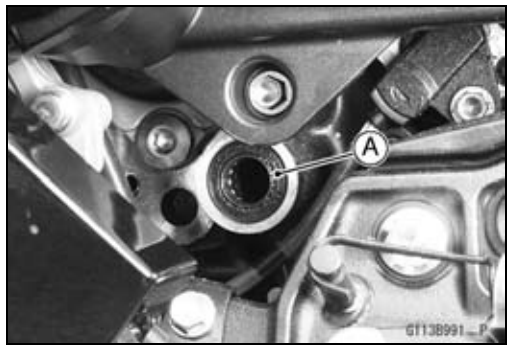
External Shift Mechanism

External Shift Mechanism Installation

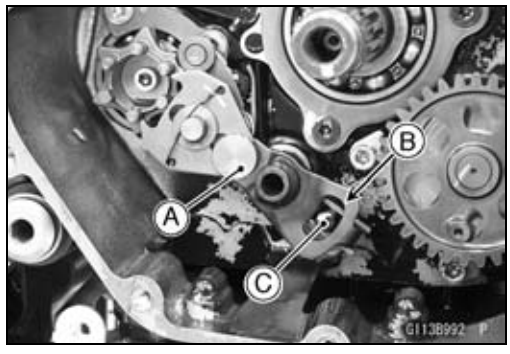


- Install the gear positioning lever [A] as shown.
  Spring [B]
  Collar [C]
- Tighten:

Torque - Gear Positioning Lever Bolt [D]: 12 N·m (1.2 kgf·m, 106 in·lb)

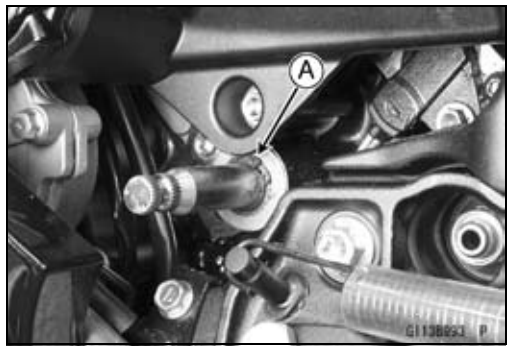


- Replace the oil seal [A] with a new one.
- Apply grease to the lips of the grease seal.



- Install:
  Shift Shaft Assembly [A] and Washers

○Fit the hole [B] and return spring pin [C].



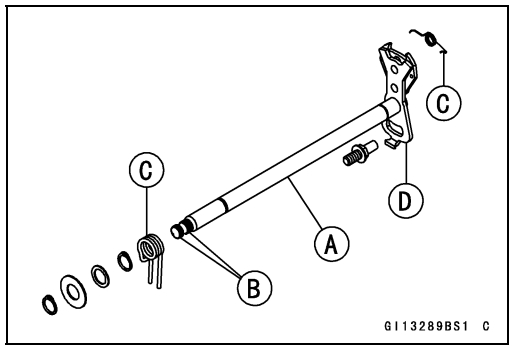
- Replace the snap ring [A] with a new one.
- Install:
  Snap Ring

Special Tool - Outside Circlip Pliers: 57001-144

○Fit the snap ring into the groove of the shift shaft securely.

- Install the removed parts (see appropriate chapters).

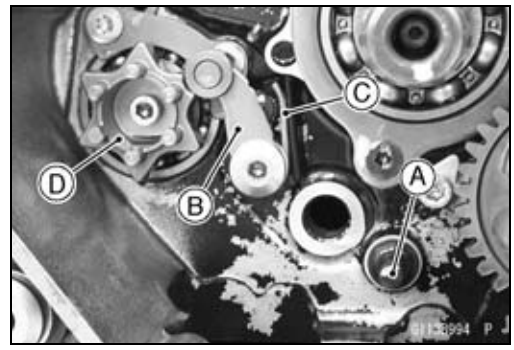
External Shift Mechanism Inspection



- Examine the shift shaft [A] for any damage.

★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 shaft.

External Shift Mechanism



- Check the return spring pin [A] is not loose.

★If it is loose, remove it, apply a non-permanent locking agent to the threads, and tighten it.

Torque - Shift Shaft Return Spring Pin: 29 N·m (3.0 kgf·m, 21 ft·lb)

- Check the gear positioning lever [B] and spring [C] for breaks or distortion.

★If the lever or spring are damaged in any way, replace them.

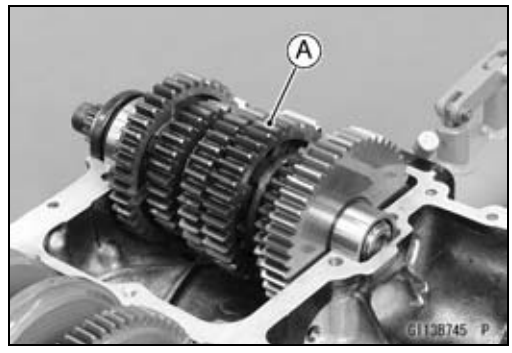
- Visually inspect the shift drum cam [D].

★If they are badly worn or if they show any damage, replace it.

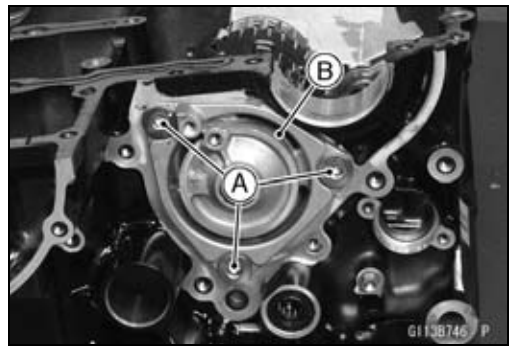
Transmission

Transmission Shaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the output shaft [A].



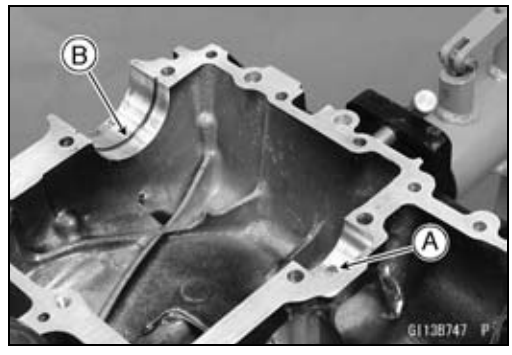
- Remove:
  Shift Forks (see Shift Drum and Fork Removal)
  Drive Shaft Cover Bolts [A]
  Drive Shaft Cover [B]
  Drive Shaft



Transmission Shaft Installation

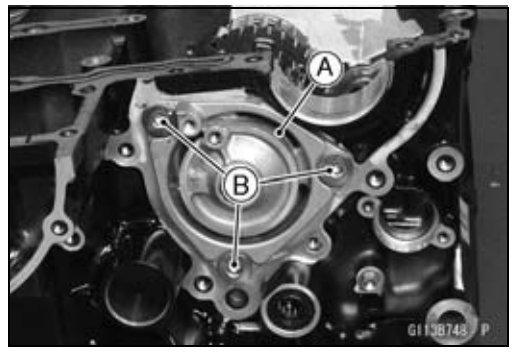
- Check to see that the set pin [A] and set ring [B] are in place.
- Install the output shaft into the upper crankcase half.
- Apply engine oil to the bearing.

○The 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.



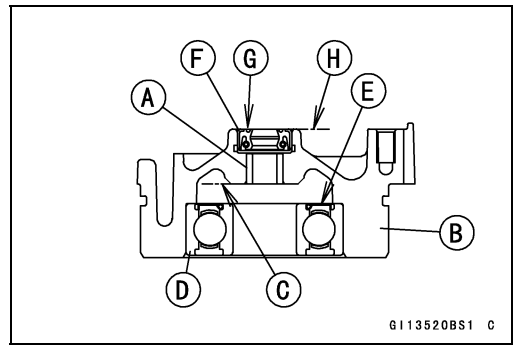
- Install the drive shaft into the lower crankcase half.
- Apply grease to the new O-ring.
- Install the drive shaft cover [A].
- Apply a non-permanent locking agent to the threads of the drive shaft cover bolts [B] and tighten them.

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



Transmission

★If the drive shaft cover disassembled, install the bearing, bushing and oil seal as shown.



- Press the new bushing [A] into the drive shaft cover [B] so that the surface of the bushing is flush with the bottom surface [C] of the drive shaft cover.

  Special Tool - Bearing Driver Set: 57001-1129

- Press the bearing [D] until they are bottomed.

NOTE

○*Install the bearing so that sealed [E] side faces in.*

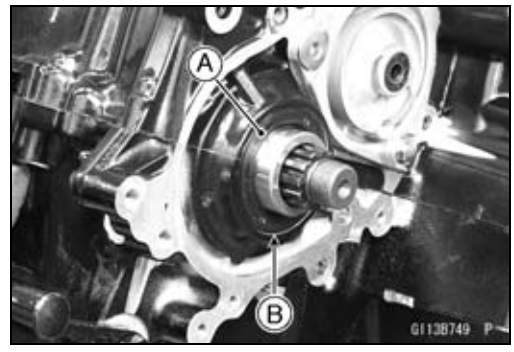
Special Tool - Bearing Driver Set: 57001-1129

- Press the new oil seal [F] so that the oil seal lip [G] faces to the outside, and the oil seal surface is flush with the surface [H] of the drive shaft cover.

  Special Tool - Bearing Driver Set: 57001-1129

- Apply grease to the oil seal lips.

- Assemble the crankcase.
- Apply grease to the oil seal lips.
- Press in the oil seal [A] to the crankcase so that the surface of the oil seal is flush with the surface [B] of the crankcase.

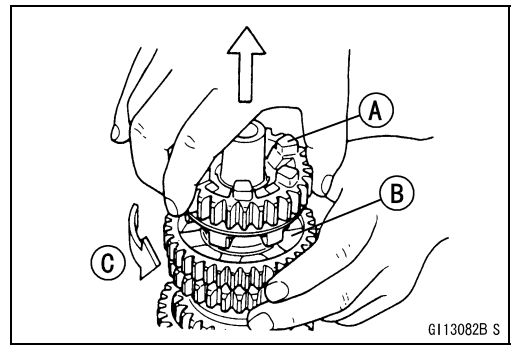


Transmission Shaft Disassembly

- 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.

○Set the output shaft in a vertical position holding the 3rd gear [B].

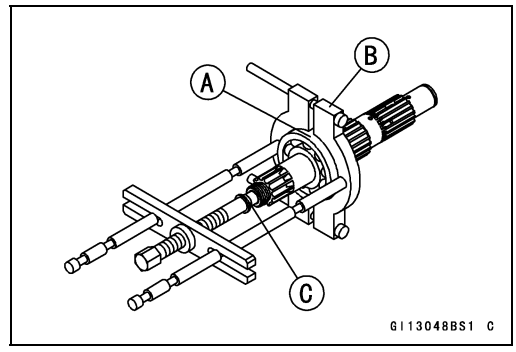
○Spin the 5th gear quickly [C] and pull it off upward.



- Remove the ball bearing [A] from output shaft.

  Special Tools - Bearing Puller [B]: 57001-135
  Bearing Puller Adapter [C]: 57001-317

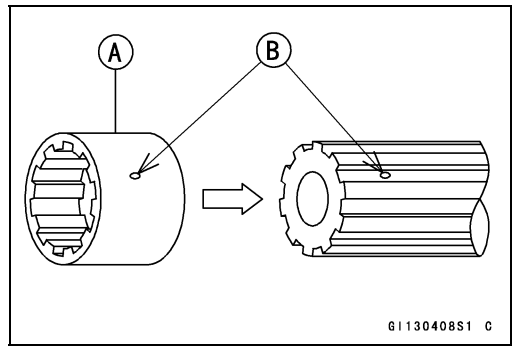
- Discard the bearing.



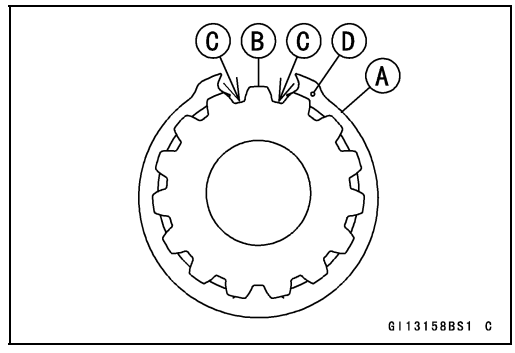
Transmission

Transmission Shaft Assembly

- Apply engine oil to the bushings, ball bearing and shafts.
- Install the gear bushings [A] on the shaft with their holes [B] aligned.

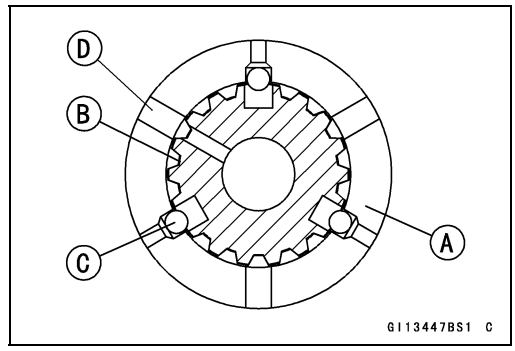


- Replace any circlips removed with new ones.
- Install the circlips [A] so that the opening [B] of it is aligned with spline grooves [C].
- Install the circlips so that the mark [D] on them faces to each gear side.



- The drive shaft gears can be recognized by size: the gear with the smallest diameter is 1st gear, and the largest one is 6th gear. Be sure that all parts are put back in the correct sequence and all snap rings and washers are properly in place.
- Install the 3rd/4th gear onto the drive shaft with their oil holes aligned.
- Install the 5th and 6th gear bushings onto the drive shaft with their oil holes aligned.
- The output shaft gears can be recognized by size: the gear with the largest diameter is 1st gear, and the smallest one is 6th gear. Be sure that all parts are put back in the correct sequence and all snap ring, circlips and washers are properly in place.
- Install the 5th and 6th gears onto the output shaft with their oil holes aligned.
- Install the 2nd and 3rd/4th gear bushings onto the output shaft with their oil holes aligned.

- Fit the steel balls into the 5th gear holes in the output shaft, aligning oil holes as shown in the figure.
  5th Gear [A]
  Output Shaft [B]
  Steel Balls [C]
  Oil Hole [D]



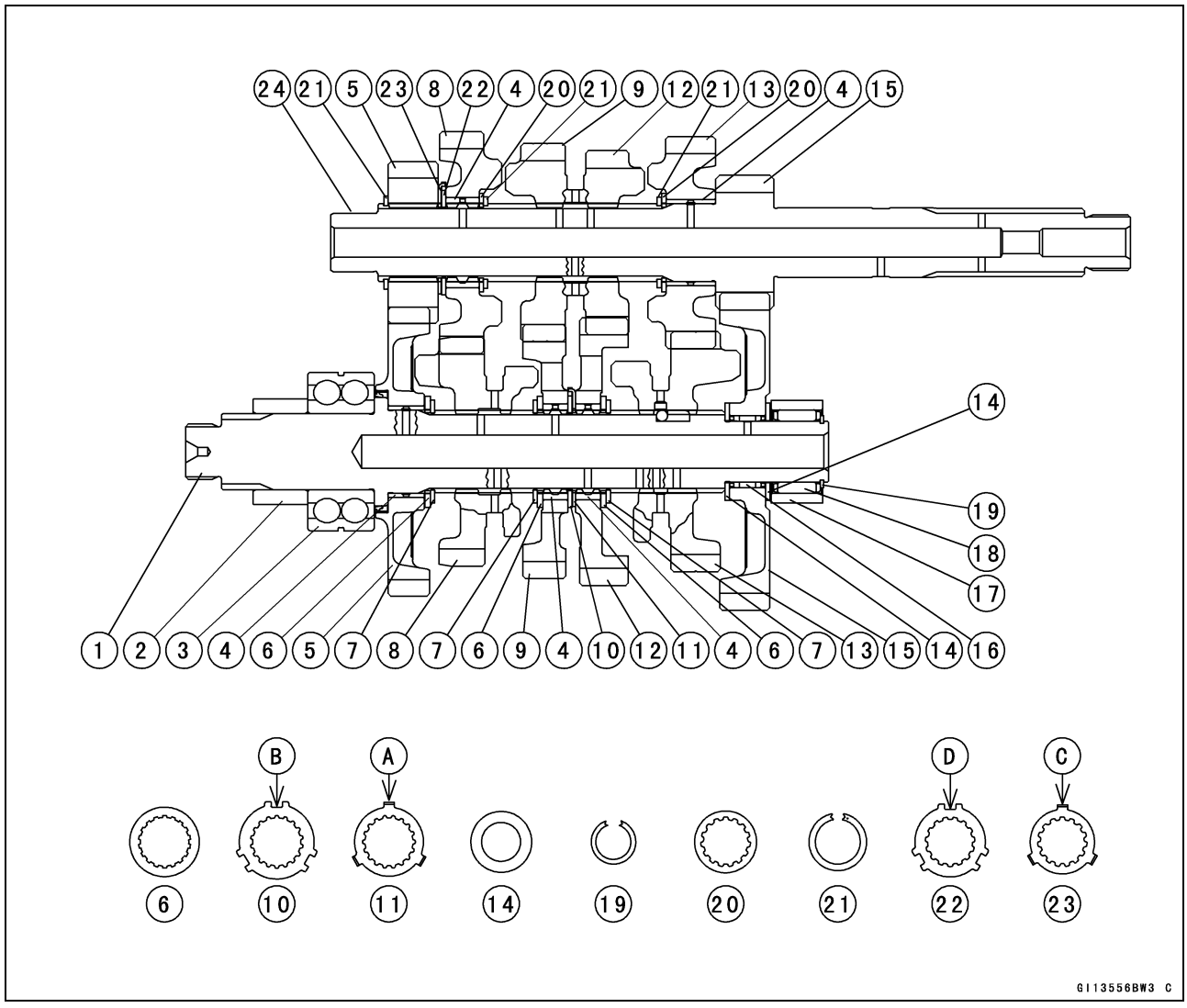
NOTICE

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

○After assembling the 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.

Transmission



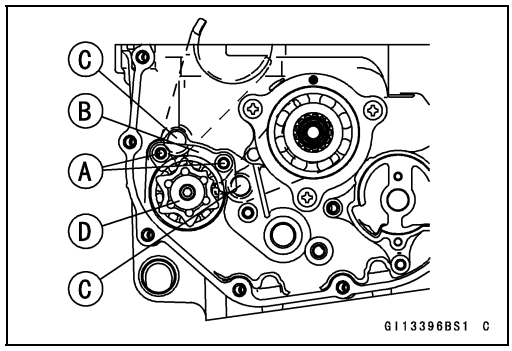
1. Output Shaft
2. Collar
3. Ball Bearing
4. Bushing
5. 2nd Gear
6. Toothed Washer, ϕ40 mm (1.57 in.)
7. Circlip
8. 6th (Top) Gear
9. 4th Gear
10. Toothed Washer, ϕ43 mm (1.69 in.)
11. Toothed Washer, ϕ39.7 mm (1.56 in.)
12. 3rd Gear
13. 5th Gear
14. Thrust Washer, ϕ35 mm (1.38 in.)
15. 1st Gear
16. Needle Bearing
17. Bearing Outer Race
18. Needle Bearing
19. Snap Ring, ϕ25.5 mm (1.00 in.)
20. Toothed Washer, ϕ35.5 mm (1.40 in.)
21. Snap Ring, ϕ33 mm (1.30 in.)
22. Toothed Washer, ϕ40.5 mm (1.59 in.)
23. Toothed Washer, ϕ37 mm (1.46 in.)
24. Drive Shaft

○When the tongues [A] of the toothed washer [11] shall be assembled, they shall be installed into the notches [B] of the toothed washer [10].

○When the tongues [C] of the toothed washer [23] shall be assembled, they shall be installed into the notches [D] of the toothed washer [22].

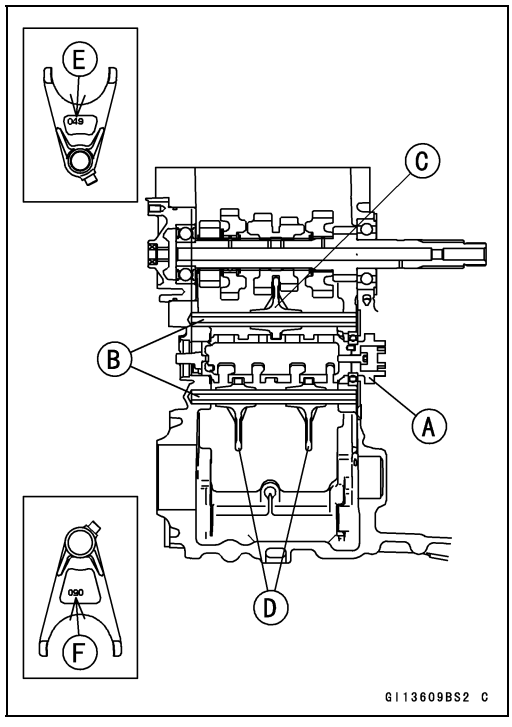
Transmission

Shift Drum and Fork Removal



- Remove:
  Lower Crankcase Half (see Crankcase Splitting)
  Gear Position Sensor (see Gear Position Sensor Removal in the Electrical System chapter)
  Gear Positioning Lever (see External Shift Mechanism Removal)
  Shift Drum Bearing Holder Screws [A]
  Shift Drum Bearing Holder [B]
- Pull out the shift rods [C], and remove the shift forks.
- Pull out the shift drum [D].

Shift Drum and Fork Installation



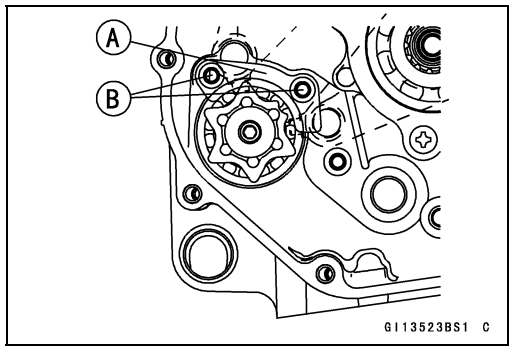
- Apply engine oil to the shift drum, forks and rods.
- Install the shift drum [A].
- Install the shift rods [B] and shift forks as shown.

○Position the one with shortest ears [C] on the drive shaft and place the pin in the center groove in the shift drum.

○The two forks [D] on the output shaft are identical.

NOTE

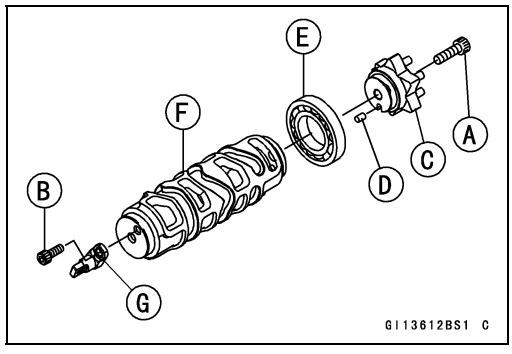
○*The forks have marks (049 [E], 050 [F]), and position them so that their marks face the engine left side.*



- Install the shift drum bearing holder [A] as shown.
- Apply a non-permanent locking agent to the threads of the shift drum bearing holder screws [B].
- Temporarily tighten the shift drum bearing holder screws.
- Tighten:

Torque - Shift Drum Bearing Holder Screws: 10 N·m (1.0 kgf·m, 89 in·lb)

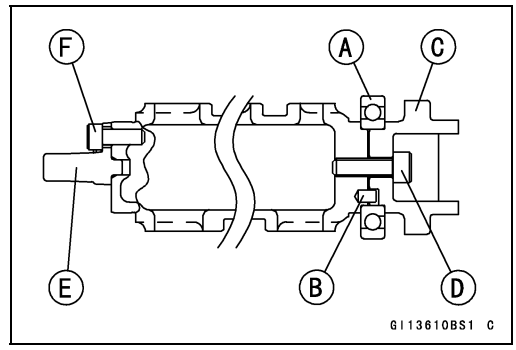
Shift Drum Disassembly



- 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 [A] and gear position sensor holder bolt (L = 14 mm) [B].
  Shift Drum Cam [C]
  Dowel Pin [D]
  Ball Bearing [E]
  Shift Drum [F]
  Gear Position Sensor Holder [G]

Transmission

Shift Drum Assembly



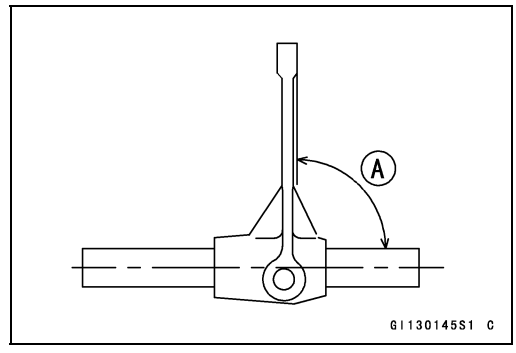
● Install:
Ball Bearing [A]
Dowel Pin [B] and Shift Drum Cam [C]
○Align the pin with the groove in the shift drum cam.
● Apply a non-permanent locking agent to the threads of the shift drum cam holder bolt [D], and tighten it.

Torque - Shift Drum Cam Holder Bolt: 12 N·m (1.2 kgf·m, 106 in·lb)

● Install the gear position sensor holder [E].
● Apply a non-permanent locking agent to the threads of the gear position sensor holder bolt (L = 14 mm) [F], and tighten it.

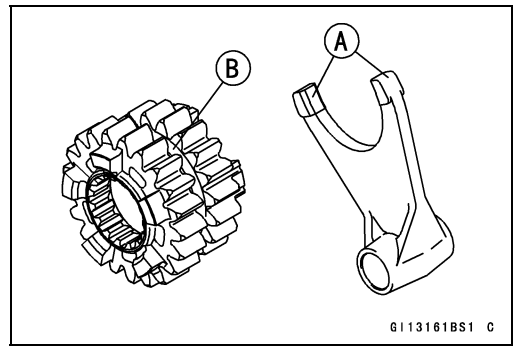
Torque - Gear Position Sensor Holder Bolt (L = 14 mm): 6.0 N·m (0.61 kgf·m, 53 in·lb)

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.

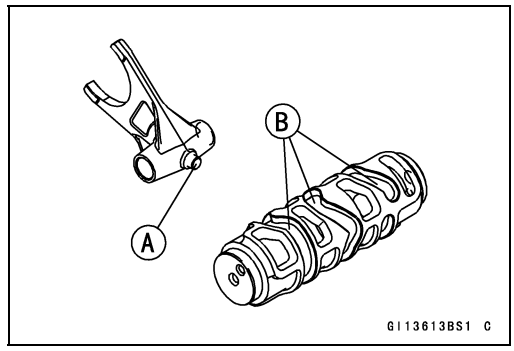
Shift Fork Ear Thickness
Standard: 5.74 ~ 6.00 mm (0.226 ~ 0.236 in.)
Service Limit: 5.6 mm (0.22 in.)

★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.)

Transmission

Shift Fork Guide Pin/Drum Groove Wear Inspection



- Measure the diameter of each shift fork guide pin [A], and measure the width of each shift drum groove [B].

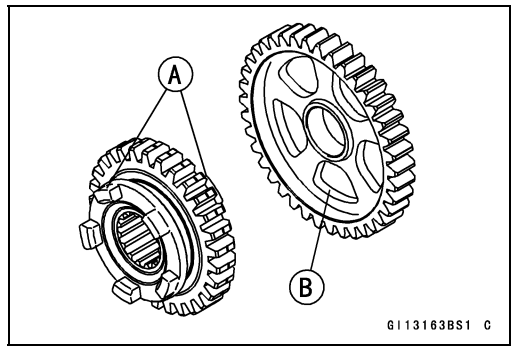
★If the guide pin on any shift fork is less than the service limit, the fork must be replaced.

Shift Fork Guide Pin Diameter
Standard: 6.9 ~ 7.0 mm (0.272 ~ 0.276 in.)
Service Limit: 6.8 mm (0.27 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 (0.29 in.)

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

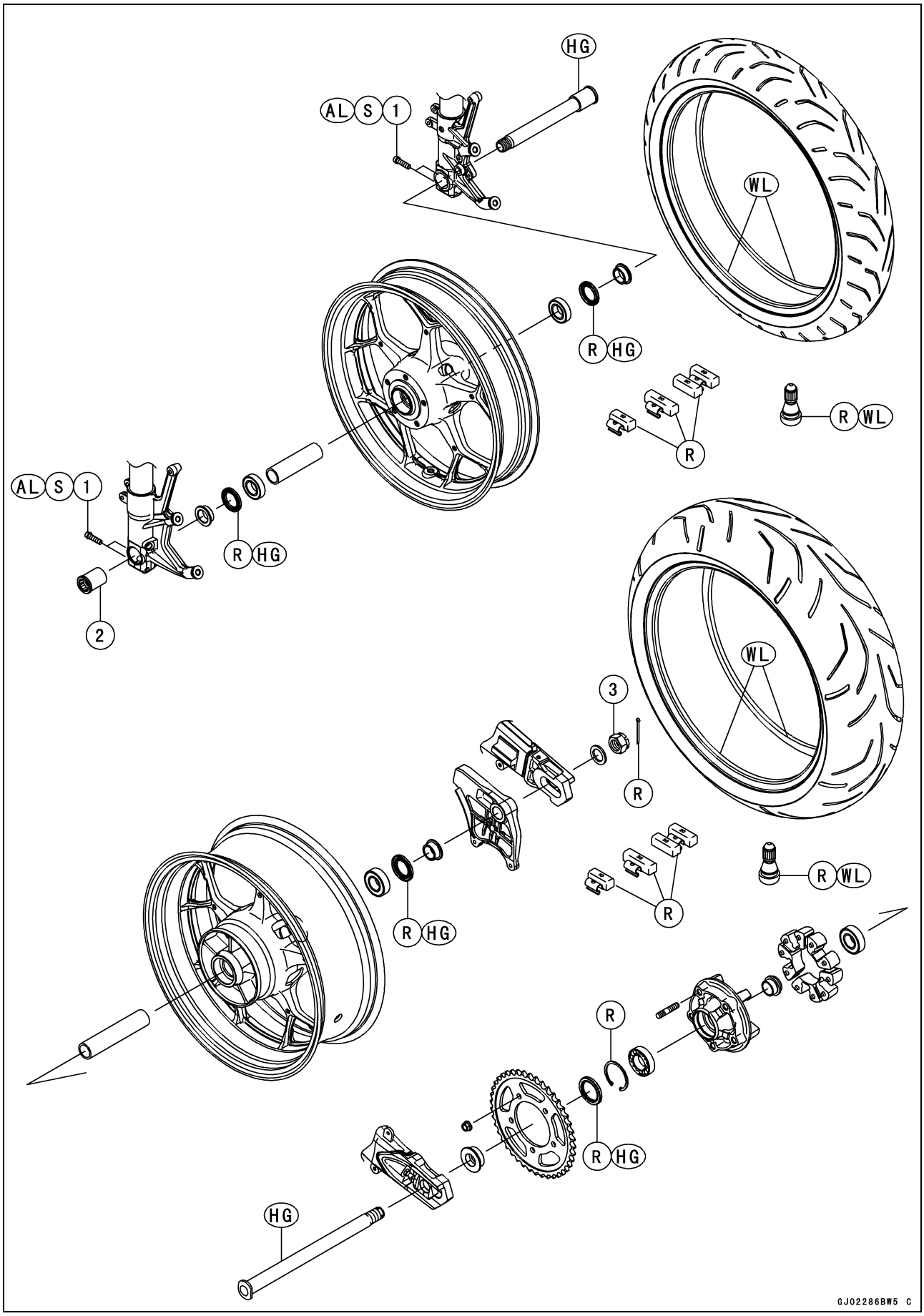
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Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Axle Clamp Bolts	20	2.0	15	AL, S
2	Front Axle Nut	130	13.3	95.9	
3	Rear Axle Nut	130	13.3	95.9	

AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.
HG: Apply high-temperature grease.
R: Replacement Parts
S: Follow the specified tightening sequence.
WL: Apply soap and water solution or rubber lubricant.

Specifications

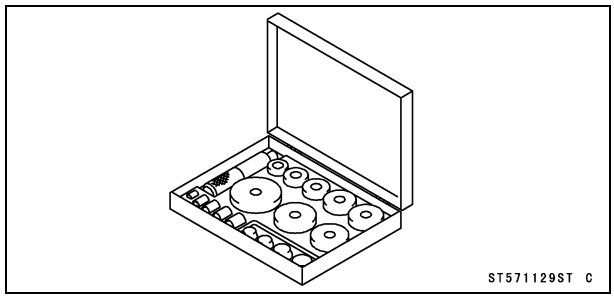
Item	Standard	Service Limit
Wheels (Rims)		
Rim Runout:		
Axial	TIR 0.5 mm (0.02 in.) or less	TIR 1.0 mm (0.04 in.)
Radial	TIR 0.8 mm (0.03 in.) or less	TIR 1.0 mm (0.04 in.)
Axle Runout/100 mm (3.94 in.)	TIR 0.03 mm (0.001 in.) or less	TIR 0.2 mm (0.008 in.)
Wheel Balance	10 g (0.35 oz.) or less	– – –
Balance Weights	10 g (0.35 oz.), 20 g (0.71 oz.), 30 g (1.06 oz.)	– – –
Rim Size:		
Front	J17M/C × MT3.50	– – –
Rear	J17M/C × MT6.00	– – –
Tires		
Air Pressure (when Cold):		
Front	Up to 175 kg (385 lb) load: 290 kPa (2.90 kgf/cm², 42 psi)	– – –
Rear	Up to 175 kg (385 lb) load: 290 kPa (2.90 kgf/cm², 42 psi)	– – –
Tread Depth:		
Front	3.6 mm (0.14 in.)	1 mm (0.04 in.) (AT, CH, DE) 1.6 mm (0.06 in.)
Rear	4.8 mm (0.19 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, HYPERSPORT S20F E	120/70 ZR17 M/C (58W)
Rear	BRIDGESTONE, BATTLAX, HYPERSPORT S20R E	190/50 ZR17 M/C (73W)

⚠ WARNING

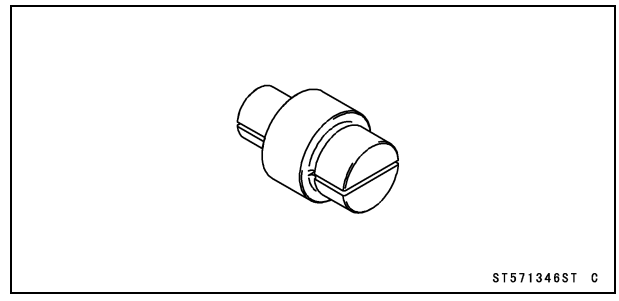
Some replacement tires may adversely affect handling and cause an accident resulting in serious injury or death. To ensure proper handling and stability, use only the recommended standard tires for replacement, inflated to the standard pressure.

Special Tools

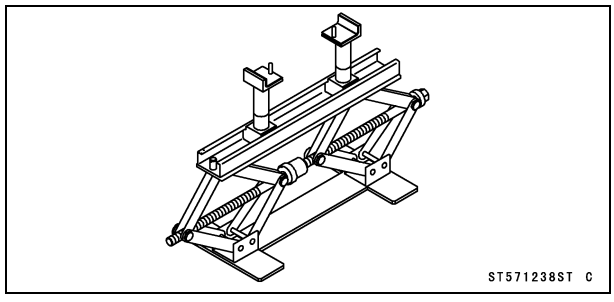
Bearing Driver Set:
57001-1129



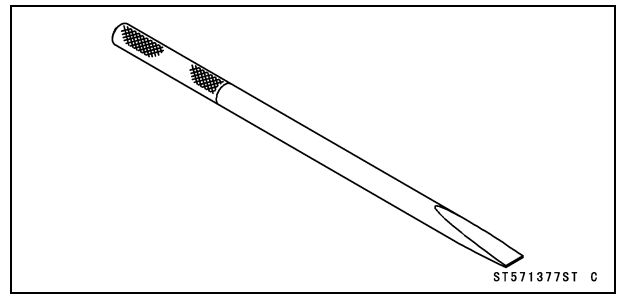
Bearing Remover Head, ϕ25 × ϕ28:
57001-1346



Jack:
57001-1238

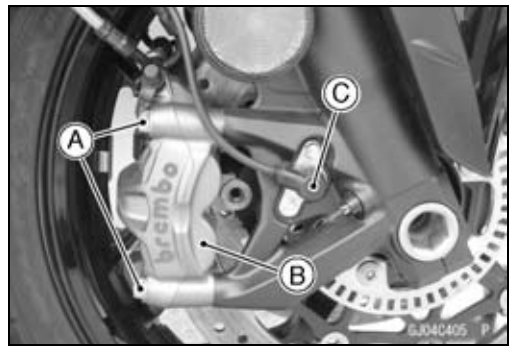


Bearing Remover Shaft, ϕ13:
57001-1377

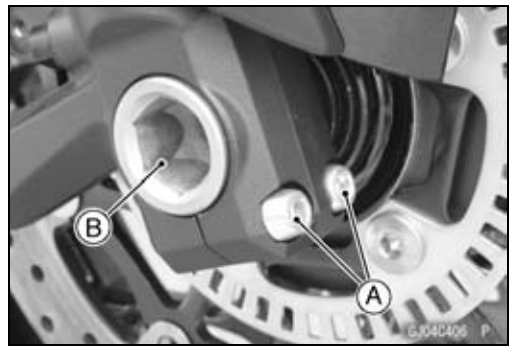


Wheels (Rims)

Front Wheel Removal



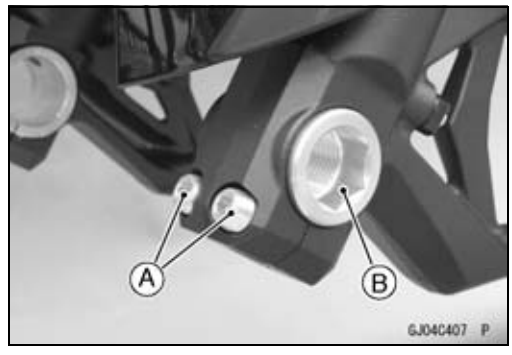
- Remove:
  Front Caliper Mounting Bolts [A] (Both Sides)
  Front Calipers [B] (Both Sides)
- Remove the front wheel rotation sensor [C] from the front fork (see Front Wheel Rotation Sensor Removal in the Brakes chapter).



- Loosen:
  Front Axle Clamp Bolts [A] (Right Side)
  Front Axle [B]
- Raise the front wheel off the ground.

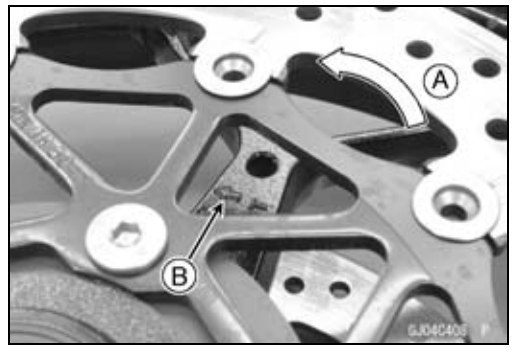
  Special Tool - Jack: 57001-1238
- Pull out the front axle to the right side and drop the front wheel out of the front forks.

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 (left side) [A] and remove the front axle nut [B].

Front Wheel Installation



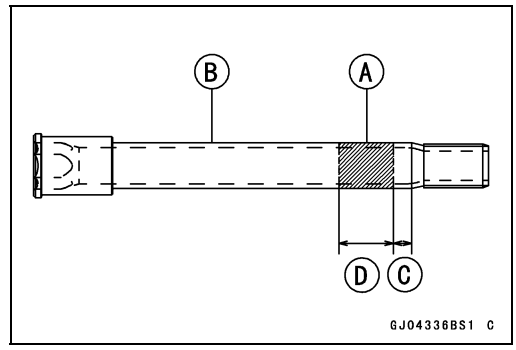
NOTE

○*The direction of the wheel rotation [A] is shown by an arrow [B] on the wheel spoke.*

- Check the wheel rotation mark on the front wheel and install it.

Wheels (Rims)

- Apply a thin coat of grease [A] to the front axle [B] for rust prevention.
  About 10 mm (0.4 in.) [C]
  About 30 mm (1.2 in.) [D]



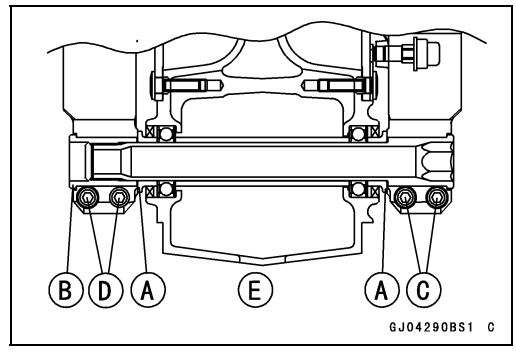
NOTE

○*Do not apply grease to the threads of the axle.*

- Apply high-temperature grease to the grease seal lips.
- Fit the collars [A] on the both sides of the hub.

○The collars are identical.

- Insert the axle from the right side.
- Tighten the axle nut [B].
  Right Axle Clamp Bolts [C]
  Left Axle Clamp Bolts [D]
  Viewed from Rear [E]



Torque - Front Axle Nut: 130 N·m (13.3 kgf·m, 95.9 ft·lb)

- Before tightening the axle clamp bolts on the right front fork leg, pump the front fork up and down 4 or 5 times to all on the right front fork leg to seat on the front axle.

NOTE

○*Put a block in front of the front wheel to stop moving.*

- Tighten the axle clamp bolts on the right fork leg first. Next, tighten the axle clamp bolts on the left fork leg.

NOTE

○*Tighten the two clamp bolts alternately two times to ensure even tightening torque.*

Torque - Front Axle Clamp Bolts: 20 N·m (2.0 kgf·m, 15 ft·lb)

- Install the removed parts (see appropriate chapters).
- Check the front brake effectiveness (see Brake Operation Inspection in the Periodic Maintenance chapter).

⚠ 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.

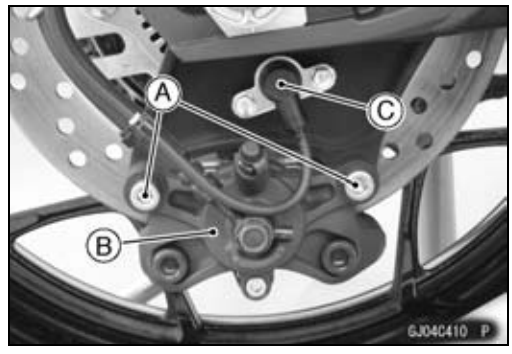
Wheels (Rims)

Rear Wheel Removal

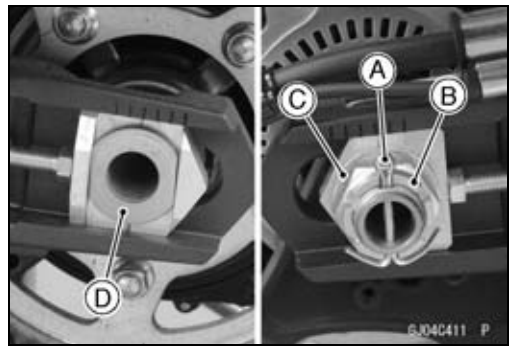
- Raise the rear wheel off the ground with the stand [A].



- Remove:
  Rear Caliper Mounting Bolts [A]
  Rear Caliper [B]
- Remove the rear wheel rotation sensor [C] from the caliper bracket (see Rear Wheel Rotation Sensor Removal in the Brakes chapter).



- Remove:
  Cotter Pin [A]
  Rear Axle Nut [B]
  Washer [C]
  Rear Axle [D] (from Left Side)



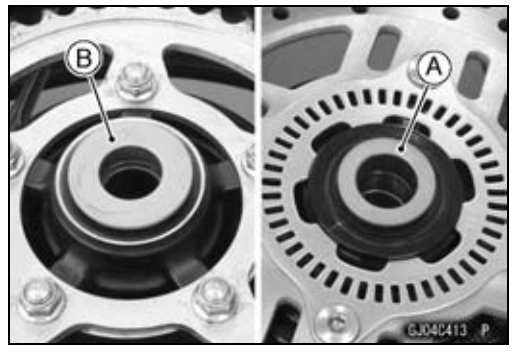
- Remove the drive chain [A] from the rear sprocket toward the left.
- Move the rear wheel back and remove it.



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.

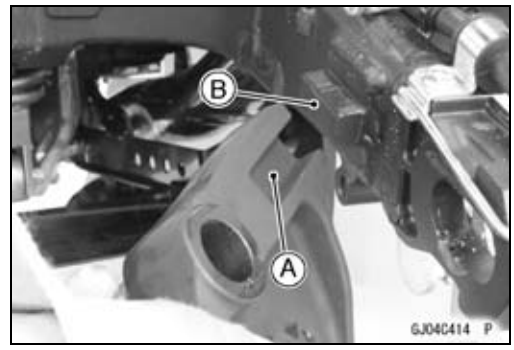
Rear Wheel Installation

- Apply high-temperature grease to the grease seal lips.
- Fit the collars on the both sides of the hub.
  Right Side Collar [A]
  Left Side Collar [B]



Wheels (Rims)

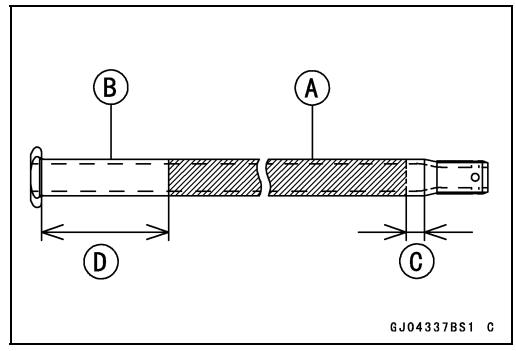
- Install the caliper bracket [A] onto the stopper [B] of the swingarm.
- Engage the drive chain with the rear sprocket.



- Apply a thin coat of grease [A] to the rear axle [B] for rust prevention.
  About 10 mm (0.4 in.) [C]
  About 70 mm (2.8 in.) [D]

NOTE

○*Do not apply grease to the threads of the axle.*



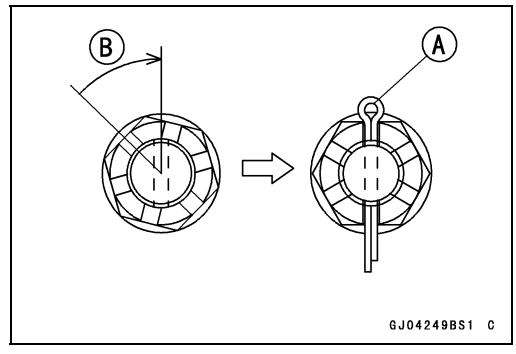
- Insert the axle from the left side of the wheel.
- Adjust the drive chain slack before tightening the axle nut (see Drive Chain Slack Inspection in the Periodic Maintenance chapter).
- Tighten:

Torque - Rear Axle Nut: 130 N·m (13.3 kgf·m, 95.9 ft·lb)

- Insert a new cotter pin [A].

NOTE

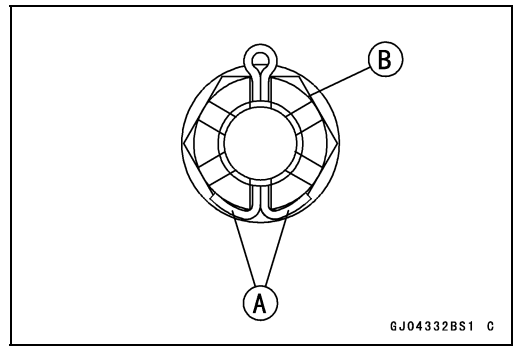
○*When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle, tighten the nut clockwise [B] up to next alignment.*
○*It should be within 30 degrees.*
○*Loosen once and tighten again when the slot goes past the nearest hole.*



- Bend the cotter pin [A] over the nut [B].

⚠ 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.



Wheels (Rims)

- Install the rear caliper (see Caliper Installation in the Brakes chapter).
- 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 Inspection

- Raise the front/rear wheel off the ground.

  Special Tool - Jack: 57001-1238

- Spin the wheel lightly, and check for roughness or binding.

★If roughness or binding is found, replace the hub bearings (see Hub Bearing Removal/Installation).

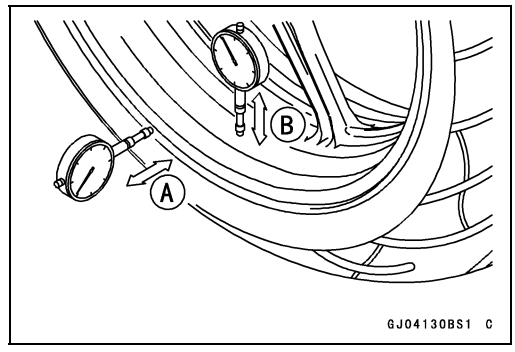
- Inspect the wheel for small cracks, dents, bending, or warp.

★If there is any damage to the wheel, replace the wheel.

- Remove the wheel, and support it 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:

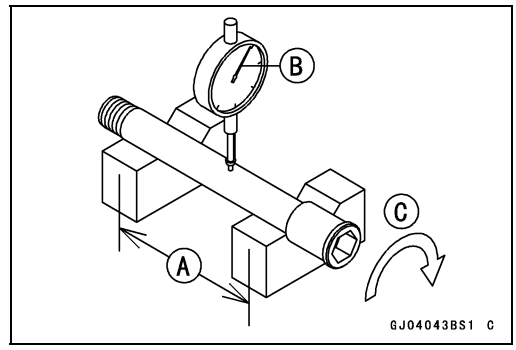
Axial	**TIR 1.0 mm (0.04 in.)**
Radial	**TIR 1.0 mm (0.04 in.)**

⚠ 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.

Wheels (Rims)

Axle Inspection



- Remove the front and rear axles (see Front/Rear Wheel Removal).
- Visually inspect the front and rear axle for damages.

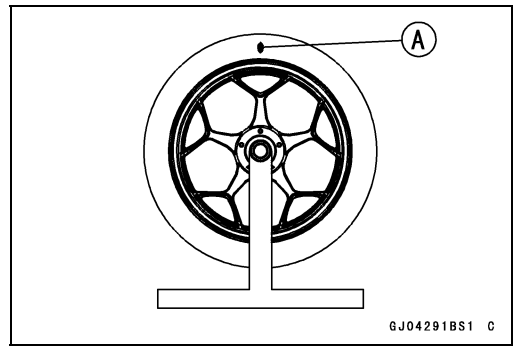
★If the axle is damaged or bent, replace it.

- Place the axle in V blocks that are 100 mm (3.94 in.) [A] apart, and set a dial gauge [B] on the axle at a point halfway between the blocks. Turn [C] the axle to measure the runout. The difference between the highest and lowest dial readings is the amount of runout.

★If axle runout exceeds the service limit, replace the axle.

Axle Runout/100 mm (3.94 in.)
Standard: TIR 0.03 mm (0.001 in.) or less
Service Limit: TIR 0.2 mm (0.008 in.)

Balance Inspection

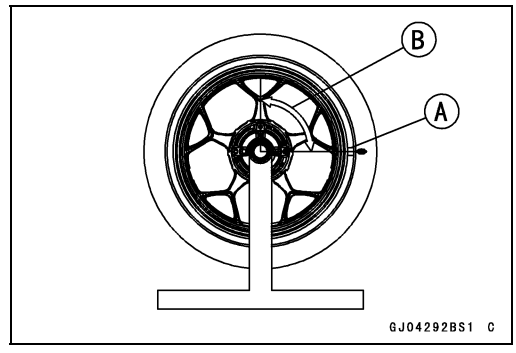


- Remove the front and rear wheels (see Front/Rear Wheel Removal).
- Support the wheel so that it can be spun freely.
- Spin the wheel lightly, and mark [A] the wheel at the top when the wheel stops.

○Repeat this procedure several times. If the wheel stops of its own accord in various positions, it is well balanced.

★If the wheel always stops in one position, adjust the wheel balance (see Balance Adjustment).

Balance Adjustment

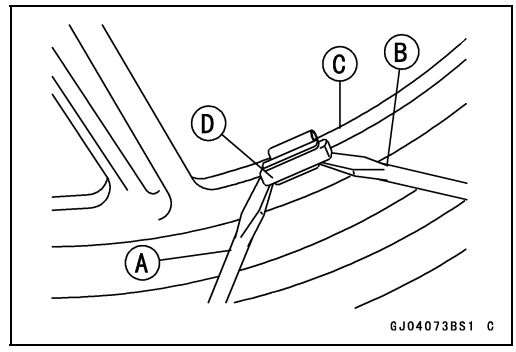


- If the wheel always stops in one position, provisionally attach a balance weight [A] on the rim at the marking using adhesive tape.
- Rotate the wheel 1/4 turn [B], and see whether or not the wheel stops in this position. If it does, the correct balance weight is being used.

★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 flat tip screwdrivers [A] [B] between the rib [C] and weight [D] as shown.
- Pry the balance weight with two flat tip screwdrivers and remove the balance weight.
- Discard the used balance weight.

NOTICE
Do not tap the screwdrivers. The rim could be damaged.

Wheels (Rims)

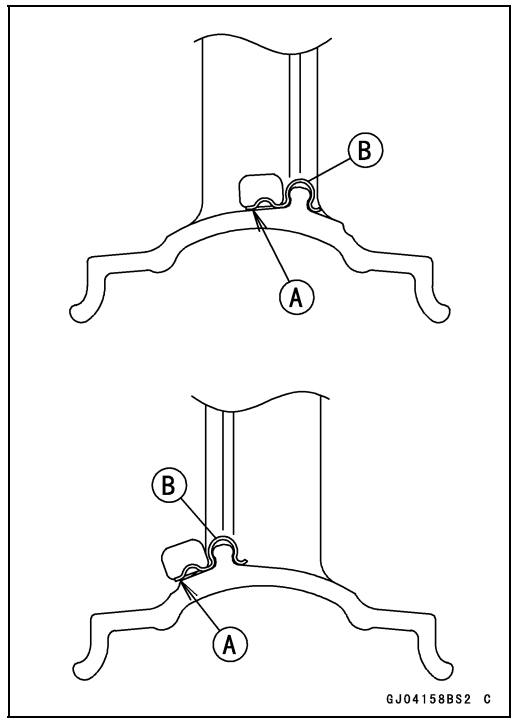
Balance Weight Installation

- Check if the weight portion has any play on the blade [A] and clip [B].

★If it does, discard it.

⚠ 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

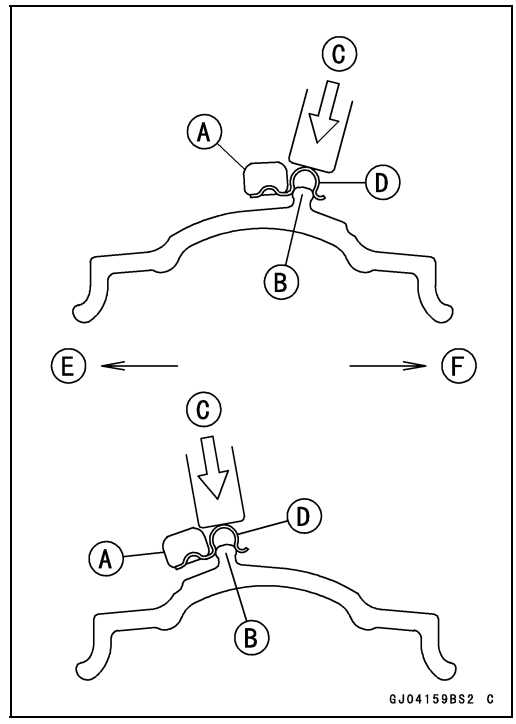
○*Balance weights are available from Kawasaki dealers in 10, 20 and 30 grams (0.35, 0.71 and 1.06 oz.) sizes. An imbalance of less than 10 grams (0.35 oz.) will not usually affect running stability.*

○*Do not use four or more balance weight (more than 90 gram, 3.2 oz.). If the wheel requires an excess balance weight, disassemble the wheel to find the cause.*

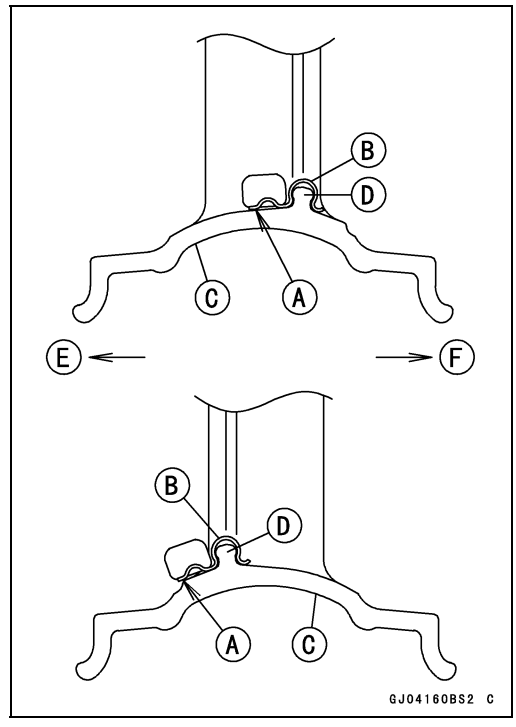
Wheels (Rims)

● Slip the balance weight [A] on the rib [B], by pushing or lightly hammering [C] the clip [D].

○Install 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]



Tires

Air Pressure Inspection/Adjustment

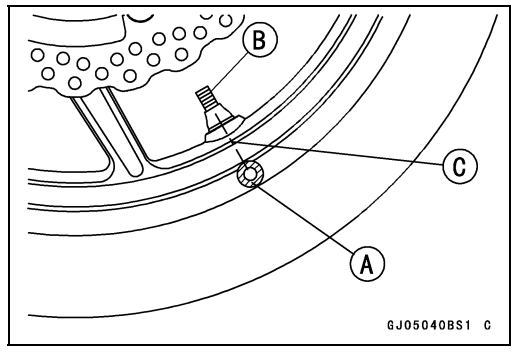
- Refer to the Air Pressure Inspection in the Periodic Maintenance chapter.

Tire Inspection

- Refer to the Wheel/Tire Damage Inspection in the Periodic Maintenance chapter.

Tire Removal

- Remove:
  Wheels (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.

- Remove the tire from the rim using a suitable commercially available tire changer.

NOTE

○*The tires cannot be removed with hand tools because they fit the rims too tightly.*

Tire Installation

⚠ WARNING
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.

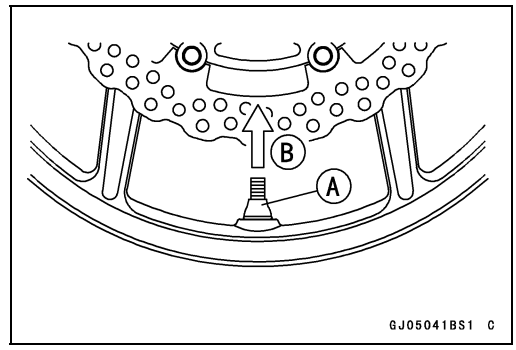
- Inspect the rim and tire, and replace them if necessary.
- Clean the sealing surfaces of the rim and tire, and smooth the sealing surfaces of the rim with a fine emery cloth if necessary.
- Remove the air valve and discard it.

NOTICE
Replace the air valve whenever the tire is replaced. Do not reuse the air valve.

Tires

● Install a new valve in the rim.

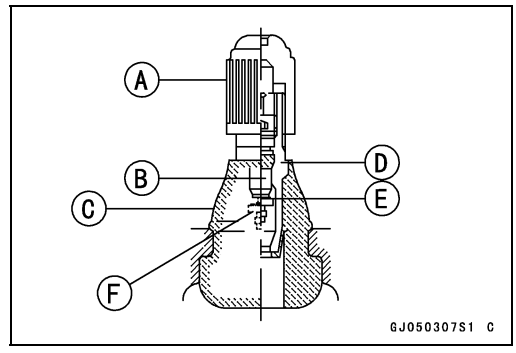
○Remove the valve cap, lubricate the stem seal [A] with a soap and water solution or rubber lubricant, and pull [B] the valve stem through the rim from the inside out until it snaps into place.



NOTICE
Do not use engine oil or petroleum distillates to lubricate the stem because they will deteriorate the rubber.

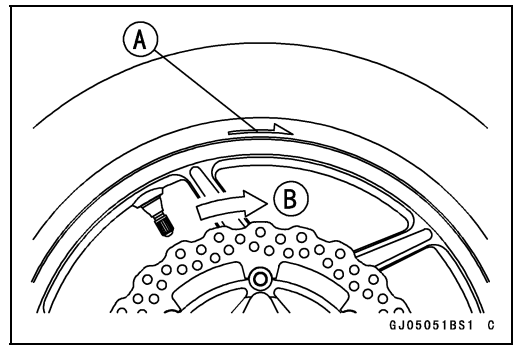
○The air valve is as shown.

Valve Cap [A]
Valve Core [B]
Stem Seal [C]
Valve Stem [D]
Valve Seat [E]
Valve Opened [F]



● Check the tire rotation mark on the front and rear tires and install them on the rim accordingly.

Tire Rotation Mark [A]
Rotating Direction [B]

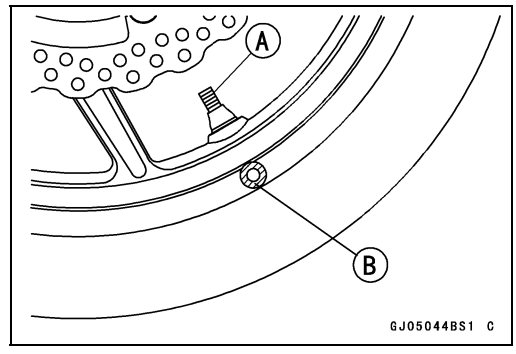


● Position the tire on the rim so that the valve [A] align with the tire balance mark [B] (the chalk mark made during removal, or the yellow paint mark on a new tire).

● Install the tire bead over the rim flange using a suitable commercially available tire changer.

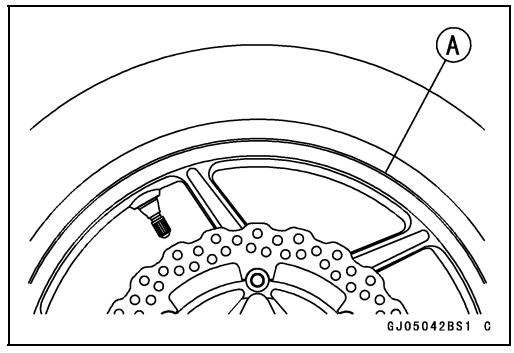
● Lubricate the tire beads and rim flanges with a soap and water solution or rubber lubricant to help seat the tire beads in the sealing surfaces of the rim while inflating the tire.

● Center the rim in the tire beads, and inflate the tire with compressed air until the tire beads seat in the sealing surfaces.



⚠ WARNING
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).

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.

○Inflate the tire slightly above standard inflation.

○Use a soap and water solution or submerge the tire, and check for bubbles that would indicate leakage.

- Adjust the air pressure to the specified pressure (see Air Pressure Inspection in the Periodic Maintenance chapter).
- Install the air valve cap.
- Adjust the wheel balance (see Balance Adjustment).

Tire Repair

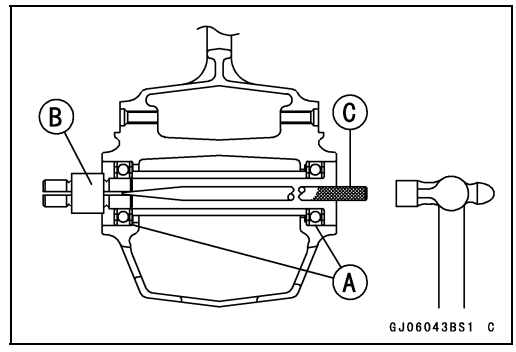
Currently two types of repair for tubeless tires have come into wide use. One type is called a temporary (external) repair which can be carried out without removing the tire from the rim, and the other type is called permanent (internal) repair which requires tire removal. It is generally understood 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 wheels (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 bearings [A].



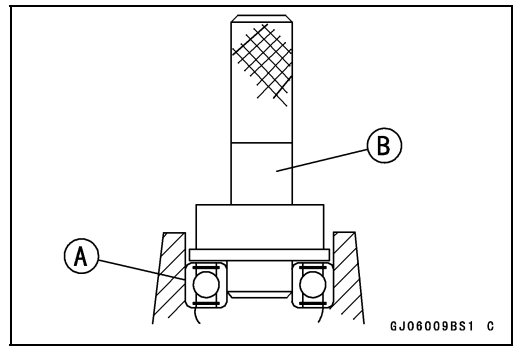
NOTICE
Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

Special Tools - Bearing Remover Head, ϕ25 × ϕ28 [B]: 57001-1346
Bearing Remover Shaft, ϕ13 [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.

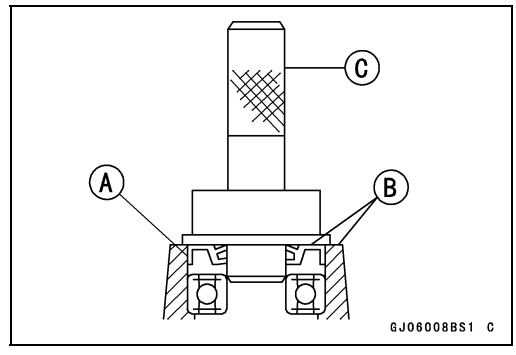
Special Tool - Bearing Driver Set [B]: 57001-1129



- 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.

○Apply 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

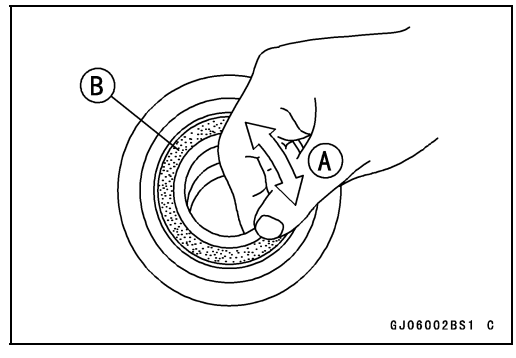
○*Do not remove any bearings for inspection. If any bearings are removed, they will need to be replaced with new ones.*

- Turn each bearing in the hub back and forth [A] while checking for plays, roughness, or binding.

★If bearing play, roughness or binding is found, replace the bearing.

- Examine the bearing seal [B] for tears or leakage.

★If the seal is torn or is leaking, replace the bearing.



Hub Bearing

Hub Bearing Lubrication

NOTE

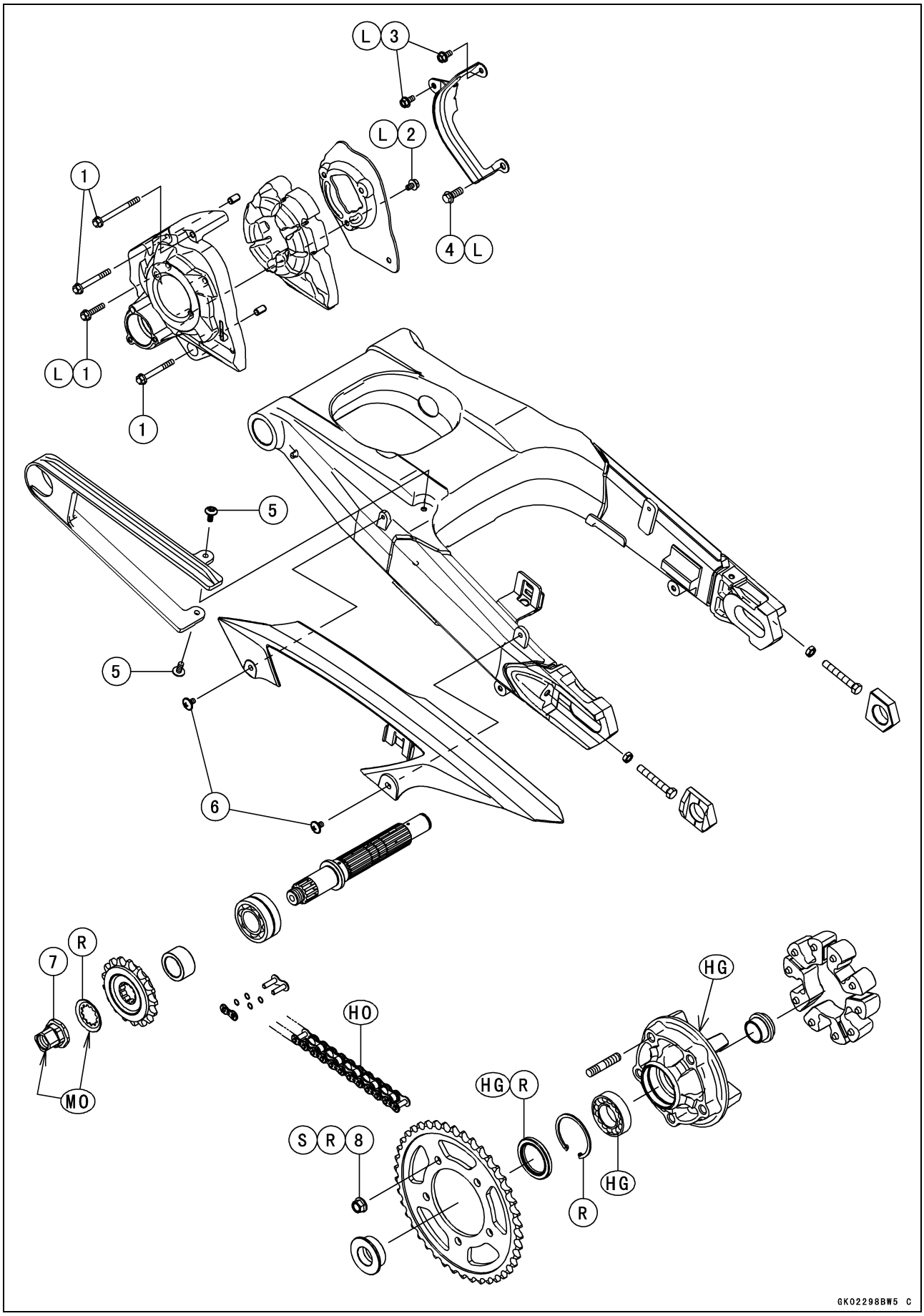
○*Since the hub bearings are packed with grease and sealed, lubrication is not required.*

Final Drive

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Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine Sprocket Cover Bolts	10	1.0	89 in·lb	L (1)
2	Plate Mounting Bolts	10	1.0	89 in·lb	L
3	Chain Guide Bolts (M6)	10	1.0	89 in·lb	L
4	Chain Guide Bolt (M8)	12	1.2	106 in·lb	L
5	Chain Guide Bolts	4.0	0.41	35 in·lb	
6	Chain Cover Screws	8.0	0.82	71 in·lb	
7	Engine Sprocket Nut	127	13.0	93.7	MO
8	Rear Sprocket Nuts	70	7.1	52	R, S

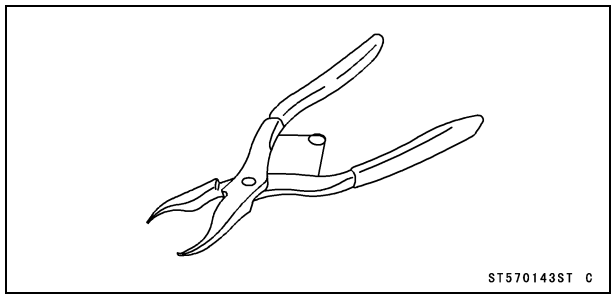
HG: Apply high-temperature grease.
HO: Apply heavy oil.
L: Apply a non-permanent locking agent.
MO: Apply molybdenum disulfide oil solution.
(mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10:1)
R: Replacement Parts
S: Follow the specified tightening sequence.

Specifications

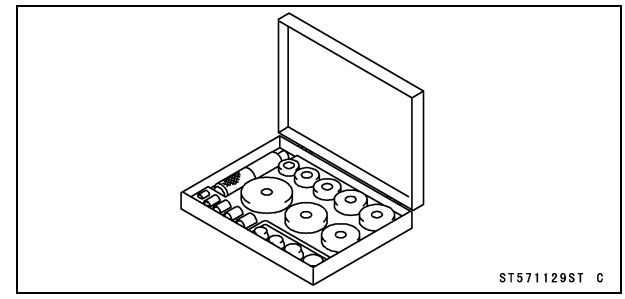
Item	Standard	Service Limit
Drive Chain		
Drive Chain Slack	25 ~ 30 mm (1.0 ~ 1.2 in.)	– – –
Drive Chain Wear (20-link Length)	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	319 mm (12.6 in.)
Standard Chain:		
Make	ENUMA	– – –
Type	EK530RMX/3D	– – –
Link	118 links	– – –
Link Pin Outside Diameter (When drive chain replacing)	5.8 ~ 6.2 mm (0.23 ~ 0.24 in.)	– – –
Link Plates Outside Width (When drive chain replacing)	22.40 ~ 22.55 mm (0.8819 ~ 0.8878 in.)	– – –
Sprockets		
Rear Sprocket Warp	TIR 0.4 mm (0.016 in.) or less	TIR 0.5 mm (0.020 in.)

Special Tools

Inside Circlip Pliers:
57001-143



Bearing Driver Set:
57001-1129



Drive Chain

Drive Chain Slack Inspection

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

Drive Chain Slack Adjustment

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

Wheel Alignment Inspection/Adjustment

- Refer to the Wheel Alignment Inspection in the Periodic Maintenance chapter.

Drive Chain Wear Inspection

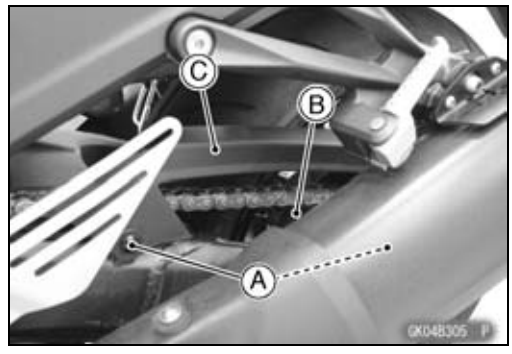
- Refer to the Drive Chain Wear Inspection in the Periodic Maintenance chapter.

Drive Chain Lubrication

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

Drive Chain Removal/Installation

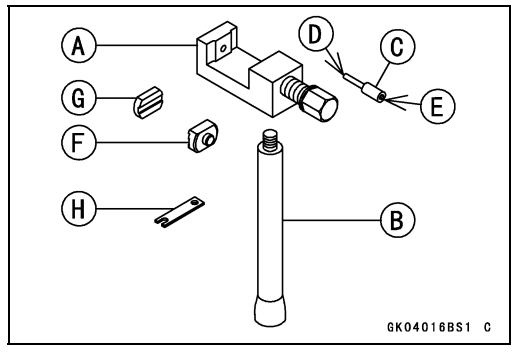
- Remove the screws [A].
- Clear the hook [B], and remove the chain cover [C].



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

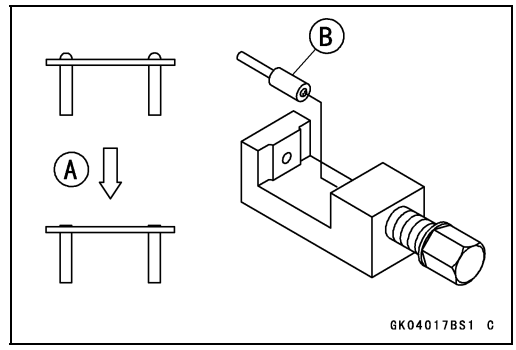
Recommended Tool - Type: EK Joint Tool #50
Brand: ENUMA

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

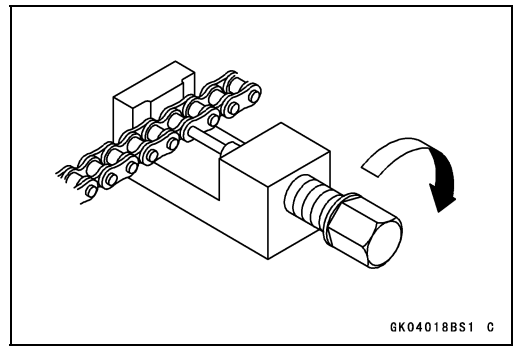


Drive Chain

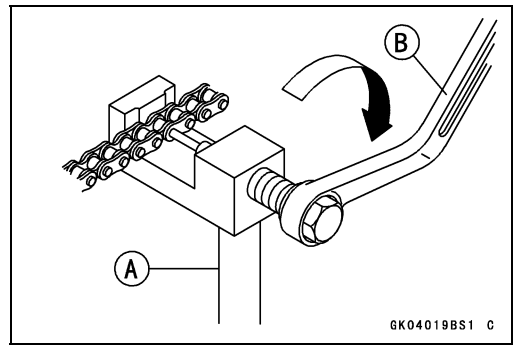
- Grind [A] the pin head to make it flat.
- Set the cutting and riveting pin [B] as shown.



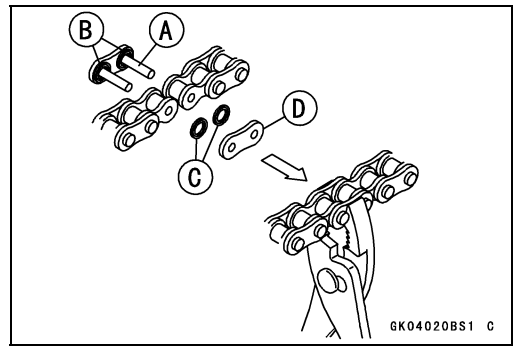
- Screw the pin holder until it touches the link pin.
- Be sure that the cutting pin hits center of the link pin.



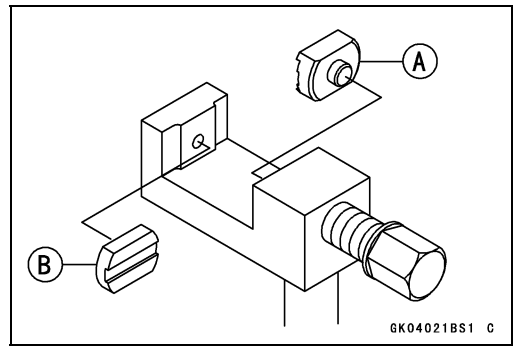
- Screw the handlebar [A] into the body.
- Turn the pin holder with the wrench [B] clockwise to extract the link pin.



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

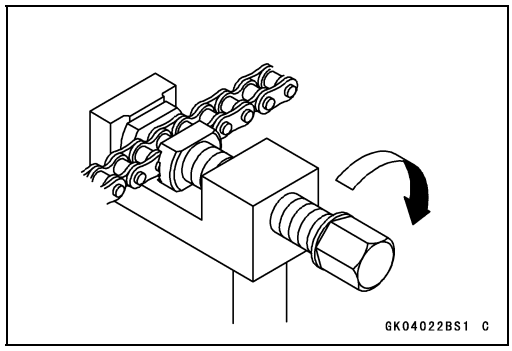


- Set the plate holder (A) [A] and plate holder (B) [B] on the body.

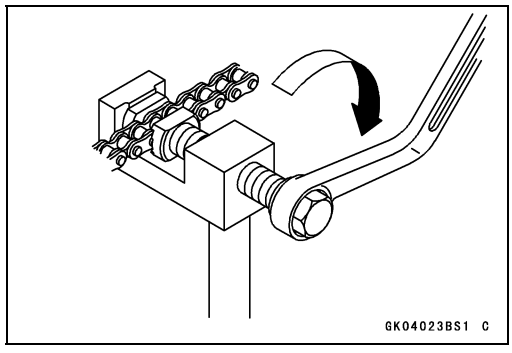


Drive Chain

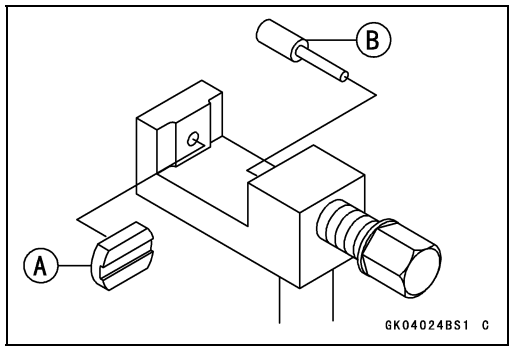
- Fit the plate holder (A) to the link plate.
- Turn the pin holder by hand until the plate holder (B) touches the other link plate.



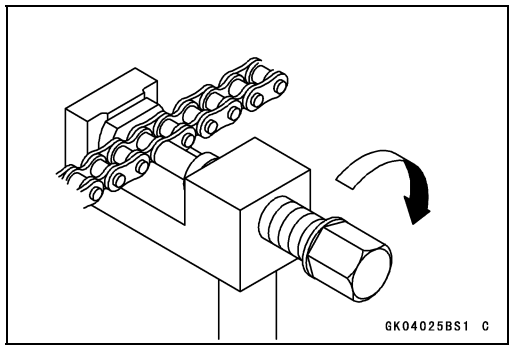
- Turn the pin holder by a wrench clockwise until two pins of link come into groove of the plate holder (A).
- Take off the plate holder.



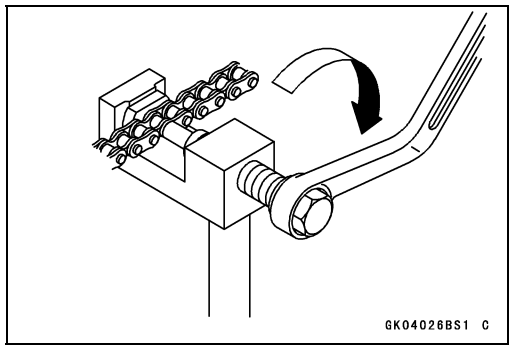
- Set the plate holder (B) [A] and cutting and riveting pin [B] as shown.



- Turn the pin holder until the riveting pin touches the link pin.



- Turn the wrench clockwise until the tip of riveting pin hits of the link pin.
- Rivet it.
- Same work for the other link pin.

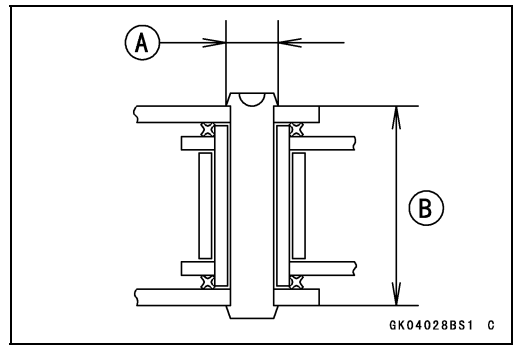


Drive Chain

- After staking, check the staked area of the link pin for cracks.
- Measure the outside diameter [A] of the link pin and link plates width [B].

Link Pin Outside Diameter
Standard: 5.8 ~ 6.2 mm (0.23 ~ 0.24 in.)

Link Plates Outside Width
Standard: 22.40 ~ 22.55 mm (0.8819 ~ 0.8878 in.)



★If the reading exceeds the specified length, cut and rejoin the chain again.

- Check:
  Movement of the Rollers
- Adjust the drive chain slack after installing the chain (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).

- Hung the hook [A], and install the chain cover.
- Tighten:

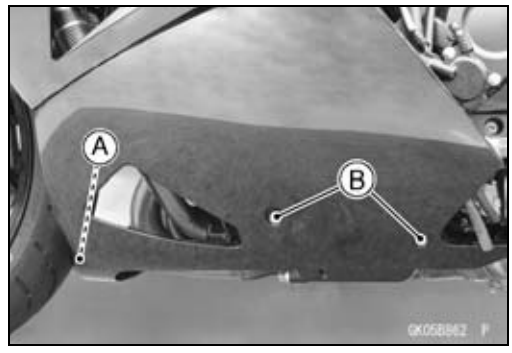
Torque - Chain Cover Screws: 8.0 N·m (0.82 kgf·m, 71 in·lb)



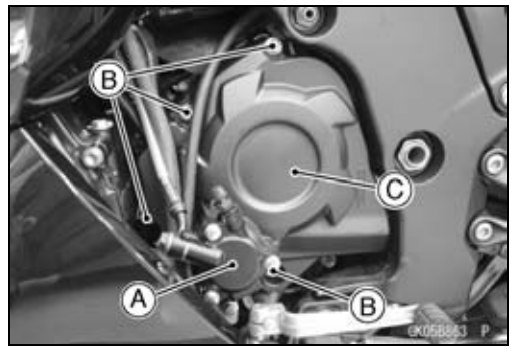
Sprocket, Coupling

Engine Sprocket Removal

- Pull up the core of the quick rivet [A] by the flat tip screwdriver, and remove it.
- Remove the left lower fairing bolts [B] and collars.
- Free the lower fairing.



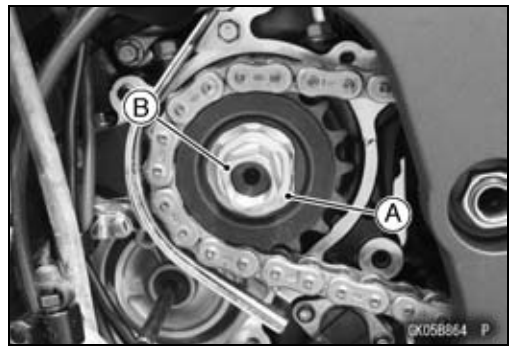
- Remove:
  Clutch Slave Cylinder [A] (see Clutch Slave Cylinder Removal in the Clutch chapter)
  Engine Sprocket Cover Bolts [B]
  Engine Sprocket Cover [C]



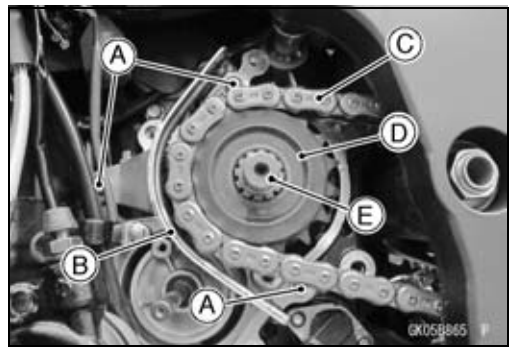
- Flatten out the bended washer [A].
- Remove the engine sprocket nut [B] and washer.

NOTE

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

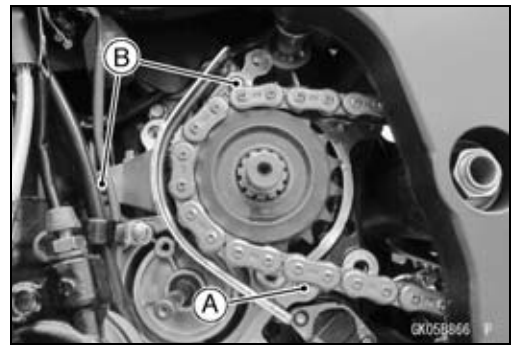


- Remove:
  Chain Guide Bolts [A]
  Chain Guide [B]
- Raise the rear wheel off the ground with the stand.
- Loosen the drive chain (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).
- Remove the drive chain from the rear sprocket toward the right.
- Disengage the drive chain [C] from the engine sprocket [D].
- Pull the engine sprocket off the output shaft [E].



Sprocket, Coupling

Engine Sprocket Installation



- Replace the sprocket washer.
- Install the engine sprocket onto the output shaft.
- Apply a non-permanent locking agent to the threads of the chain guide bolts.
- Install the chain guide, and tighten the bolts.

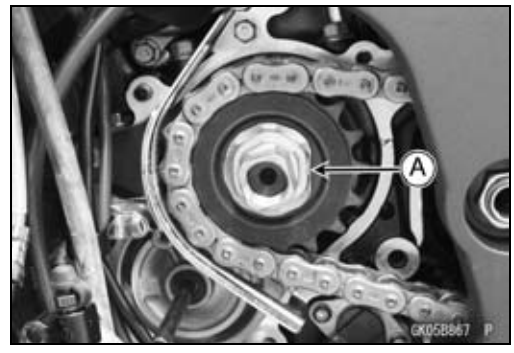
Torque - Chain Guide Bolt (M8) [A]: 12 N·m (1.2 kgf·m, 106 in·lb)
Chain Guide Bolts (M6) [B]: 10 N·m (1.0 kgf·m, 89 in·lb)

- Apply molybdenum disulfide oil solution to the threads and the seating surface of the engine sprocket nut.
- Tighten:

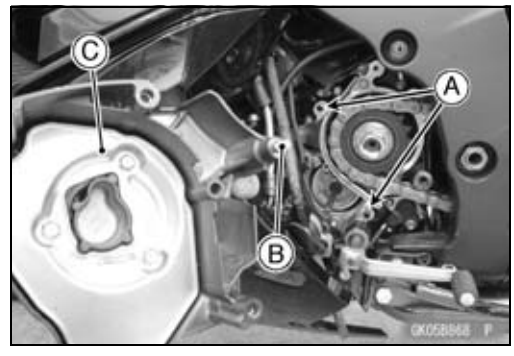
Torque - Engine Sprocket Nut: 127 N·m (13.0 kgf·m, 93.7 ft·lb)

NOTE

○*Tighten the nut while applying the rear brake.*



- After torquing the engine sprocket nut, bend the one side of the washer [A] over the nut.
- Adjust the drive chain slack after installing the engine sprocket (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).



- Install the dowel pins [A].
- Apply a non-permanent locking agent to only one engine sprocket cover bolt [B] as shown.
- Install the engine sprocket cover bolt [B] on the engine sprocket cover [C] first, and then install the engine sprocket cover.
- Install the other engine sprocket cover bolts, and tighten the all bolts.

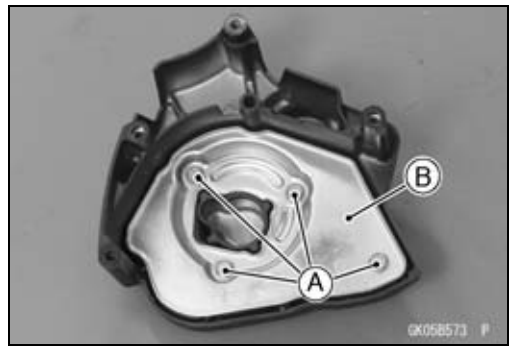
Torque - Engine Sprocket Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Install the quick rivet and collar, and tighten the left lower fairing bolts.

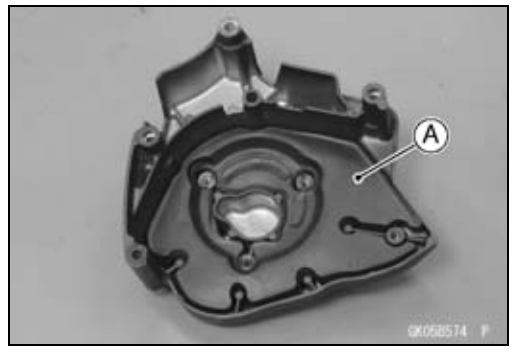
Torque - Left Lower Fairing Bolts: 4.0 N·m (0.41 kgf·m, 35 in·lb)

Sprocket, Coupling

Engine Sprocket Cover Disassembly



- Remove:
  Engine Sprocket Cover (see Engine Sprocket Cover Removal)
  Plate Mounting Bolts [A]
  Plate [B]



- Remove the damper [A].

Engine Sprocket Cover Assembly

- Assembly is reverse of disassembly.
- Apply a non-permanent locking agent to the threads of the plate mounting bolts.

Torque - Plate Mounting Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

Rear Sprocket Removal

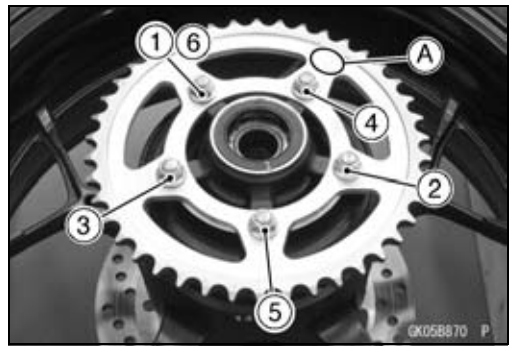
- Remove the rear wheel (see Rear Wheel Removal in the Wheels/Tires chapter).

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.



- Remove:
  Rear Sprocket Nuts [A]
  Rear Sprocket [B]

Rear Sprocket Installation



- Install the sprocket facing the tooth number marking [A] outward.
- Replace the rear sprocket nuts with new ones.
- Tighten the rear sprocket nuts following the specified tightening sequence [1 ~ 6].

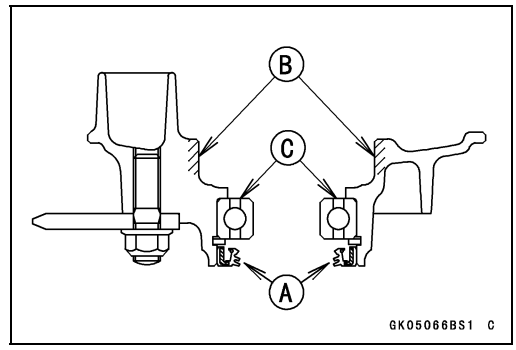
Torque - Rear Sprocket Nuts: 70 N·m (7.1 kgf·m, 52 ft·lb)

- Install the rear wheel (see Rear Wheel Installation in the Wheels/Tires chapter).

Sprocket, Coupling

Coupling Installation

- Apply high-temperature grease to the following.
  Coupling Grease Seal Lips [A]
  Coupling Internal Surface [B]
  Ball Bearing [C]



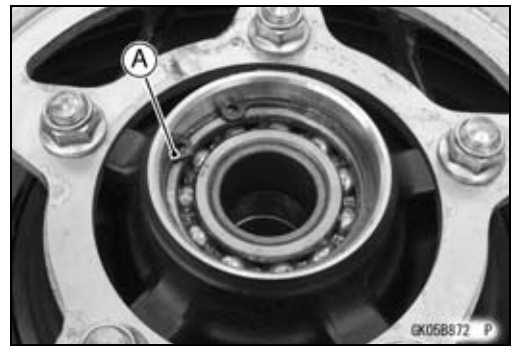
- Install:
  Collar [A]
  Coupling



Coupling Bearing Removal

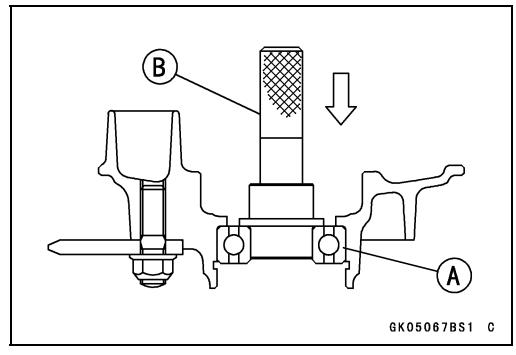
- Remove:
  Coupling
  Grease Seal
  Circlip [A]

  Special Tool - Inside Circlip Pliers: 57001-143



- Remove the bearing [A] by tapping from the wheel side.

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



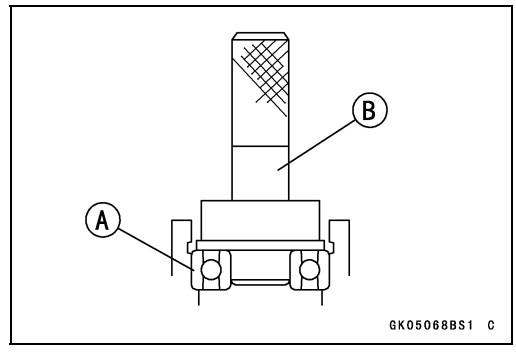
Coupling Bearing Installation

- Replace the bearing with a new one.
- Press in the bearing [A] until it is bottomed.

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

- Pack the bearing with high-temperature grease.
- Replace the circlip with a new one.

  Special Tool - Inside Circlip Pliers: 57001-143



Sprocket, Coupling

- Replace the grease seal with a new one.
- Press in the grease seal so that the seal surface is flush with the end of the hole.

○Apply high-temperature grease to the grease seal lips.

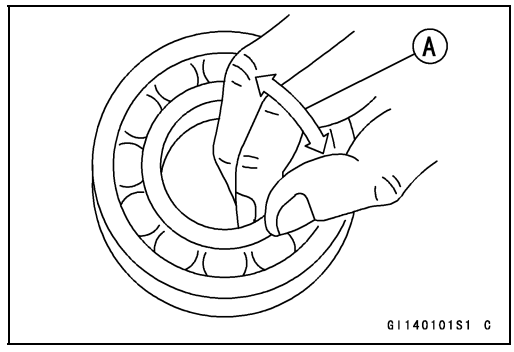
Special Tool - Bearing Driver Set: 57001-1129

Coupling Bearing Inspection

Since the coupling bearing is made to extremely close tolerances, the clearance can not normally be measured.

NOTE

○*It is not necessary to remove the coupling bearing for inspection. If the bearing is removed, it will need to be replaced with a new one.*



- Turn the bearing in the coupling back and forth [A] while checking for plays, roughness or binding.

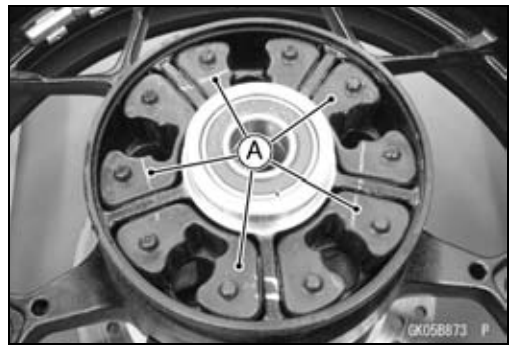
★If the bearing play, roughness or binding is found, replace the bearing.

Coupling Bearing Lubrication

- Pack the bearing with good quality bearing grease. Turn the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing.

Coupling Damper Inspection

- Remove the rear wheel coupling, and inspect the rubber dampers [A].
- Replace the damper if it appears damaged or deteriorated.

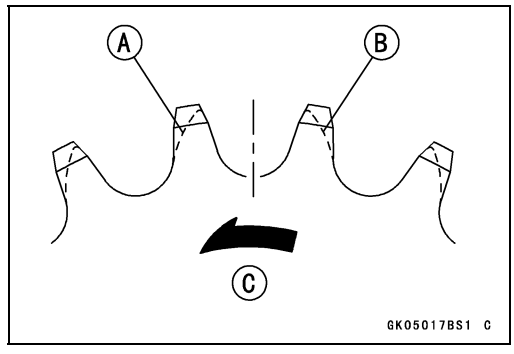


Sprocket Wear Inspection

- Visually inspect the engine and rear sprocket teeth for wear and damage.

★If the teeth are worn as illustrated, replace the sprocket, and inspect the drive chain wear (see Drive Chain Wear Inspection in the Periodic Maintenance chapter).

Worn Tooth (Engine Sprocket) [A]
Worn Tooth (Rear Sprocket) [B]
Direction of Rotation [C]

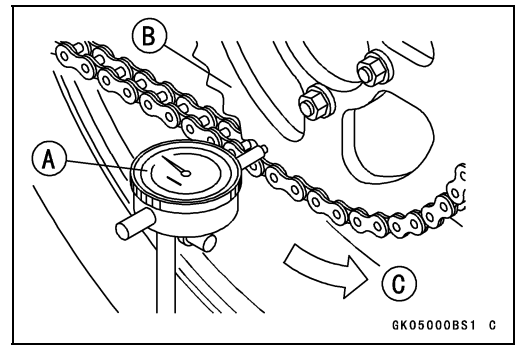


NOTE

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

Sprocket, Coupling

Rear Sprocket Warp Inspection



- Raise the rear wheel off the ground with the stand so that it will turn freely.
- Set a dial gauge [A] against the rear sprocket [B] near the teeth as shown, and rotate [C] the rear wheel to measure the sprocket runout (warp). The difference between the highest and lowest dial gauge readings is the amount of runout (warp).

★If the runout exceeds the service limit, replace the rear sprocket.

Rear Sprocket Warp

Standard:	**TIR 0.4 mm (0.016 in.) or less**
Service Limit:	**TIR 0.5 mm (0.020 in.)**

Brakes

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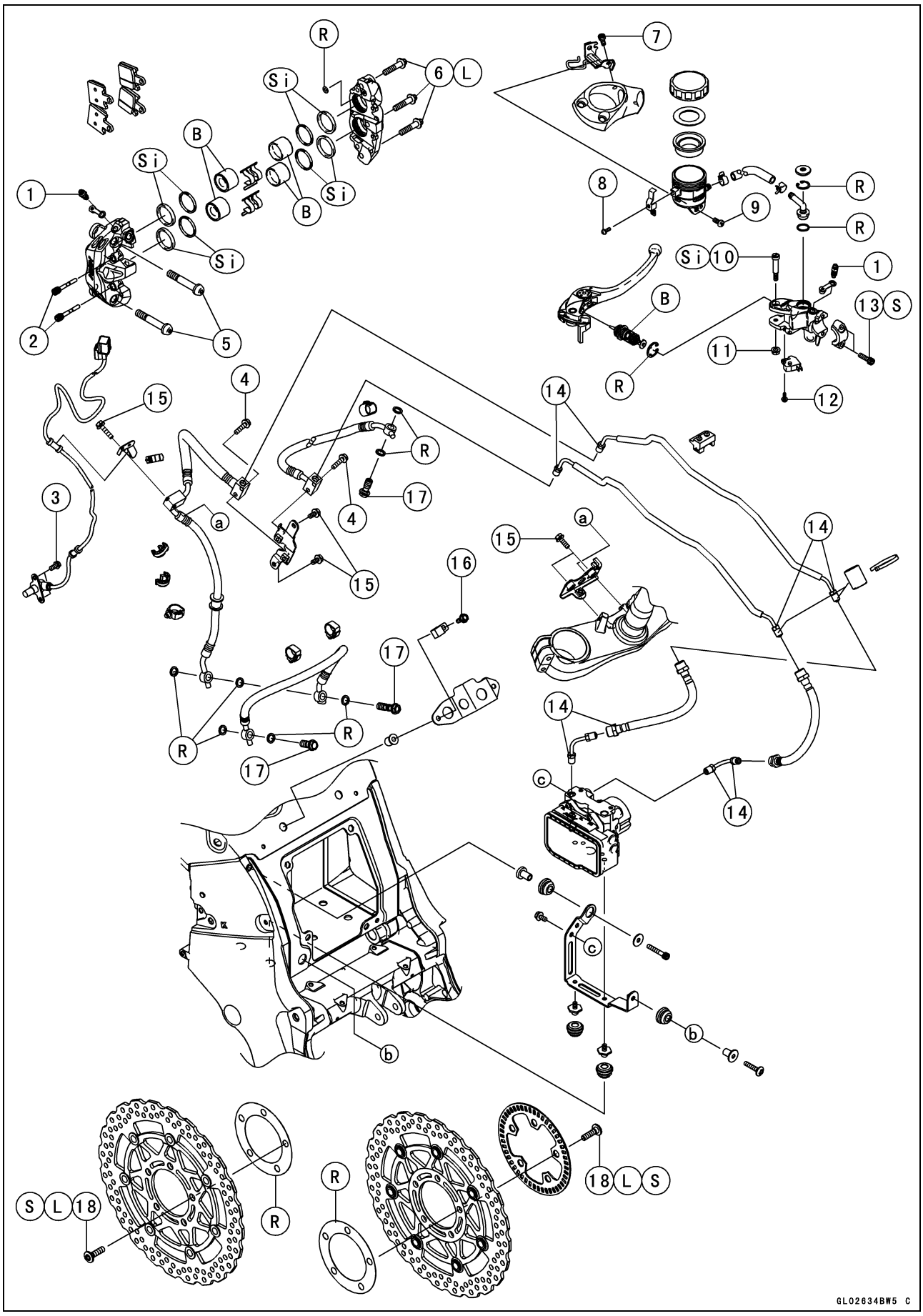
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Exploded View

ZX1400H Model



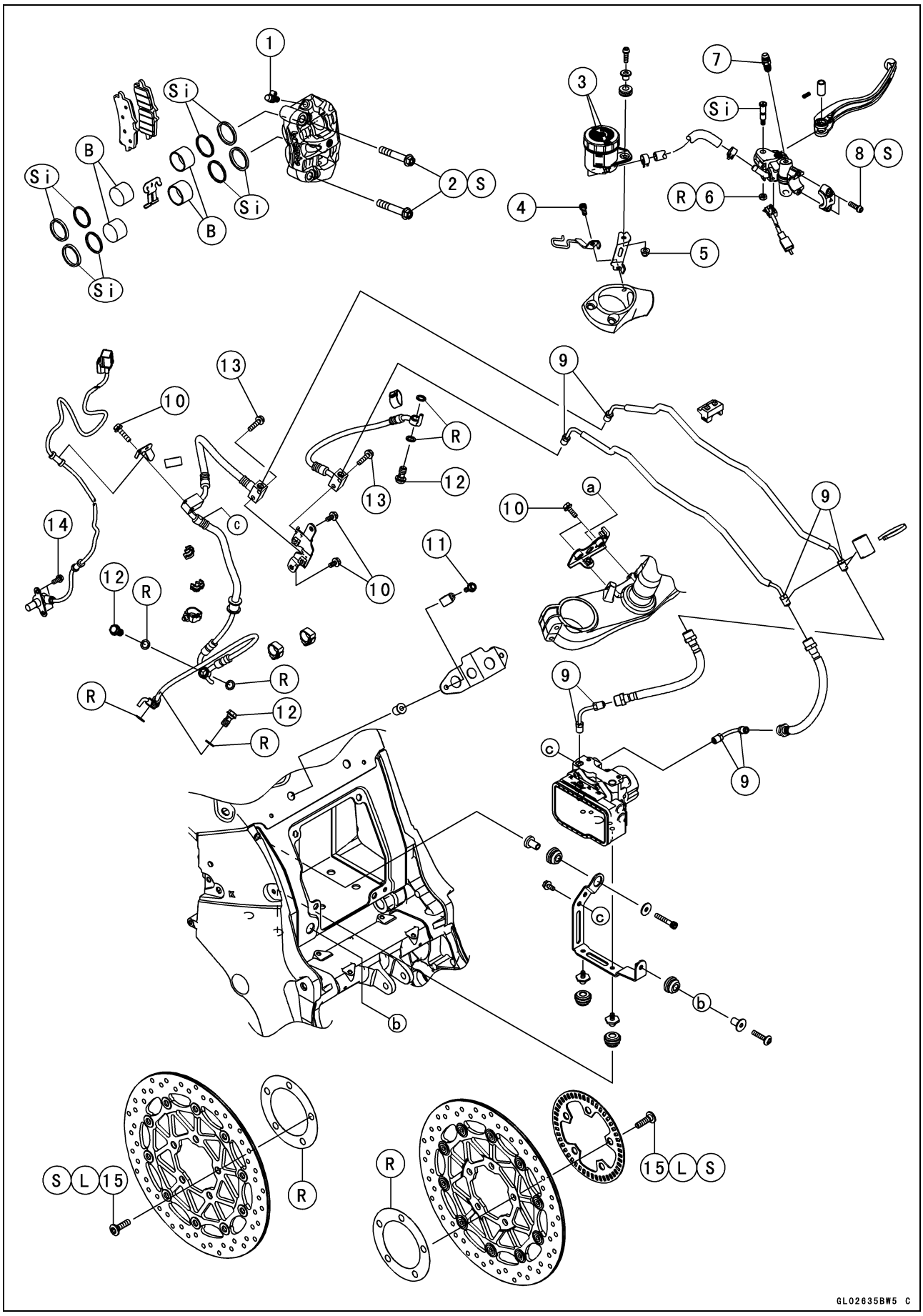
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Bleed Valves	8.0	0.82	71 in·lb	
2	Front Brake Pad Pins	17.2	1.75	12.7	
3	Front Wheel Rotation Sensor Bolts	9.8	1.0	87 in·lb	
4	Brake Hose Joint Bolts	8.0	0.82	71 in·lb	
5	Front Caliper Mounting Bolts	35	3.6	26	
6	Front Caliper Assembly Bolts	27	2.8	20	L
7	Front Master Cylinder Bracket Bolt	9.0	0.92	80 in·lb	
8	Front Brake Reservoir Cap Stopper Screw	1.2	0.12	11 in·lb	
9	Front Brake Reservoir Bolt	4.0	0.41	35 in·lb	
10	Brake Lever Pivot Bolt	1.0	0.10	8.9 in·lb	Si
11	Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
12	Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
13	Front Master Cylinder Clamp Bolts	11	1.1	97 in·lb	S
14	Brake Pipe Joint Nuts	18	1.8	13	
15	Brake Hose Joint Bracket Bolts	8.0	0.82	71 in·lb	
16	Brake Hose Bracket Bolt	8.0	0.82	71 in·lb	
17	Brake Hose Banjo Bolts	25	2.5	18	
18	Front Brake Disc Mounting Bolts	28	2.9	21	L, 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.

Exploded View

ZX1400J Model

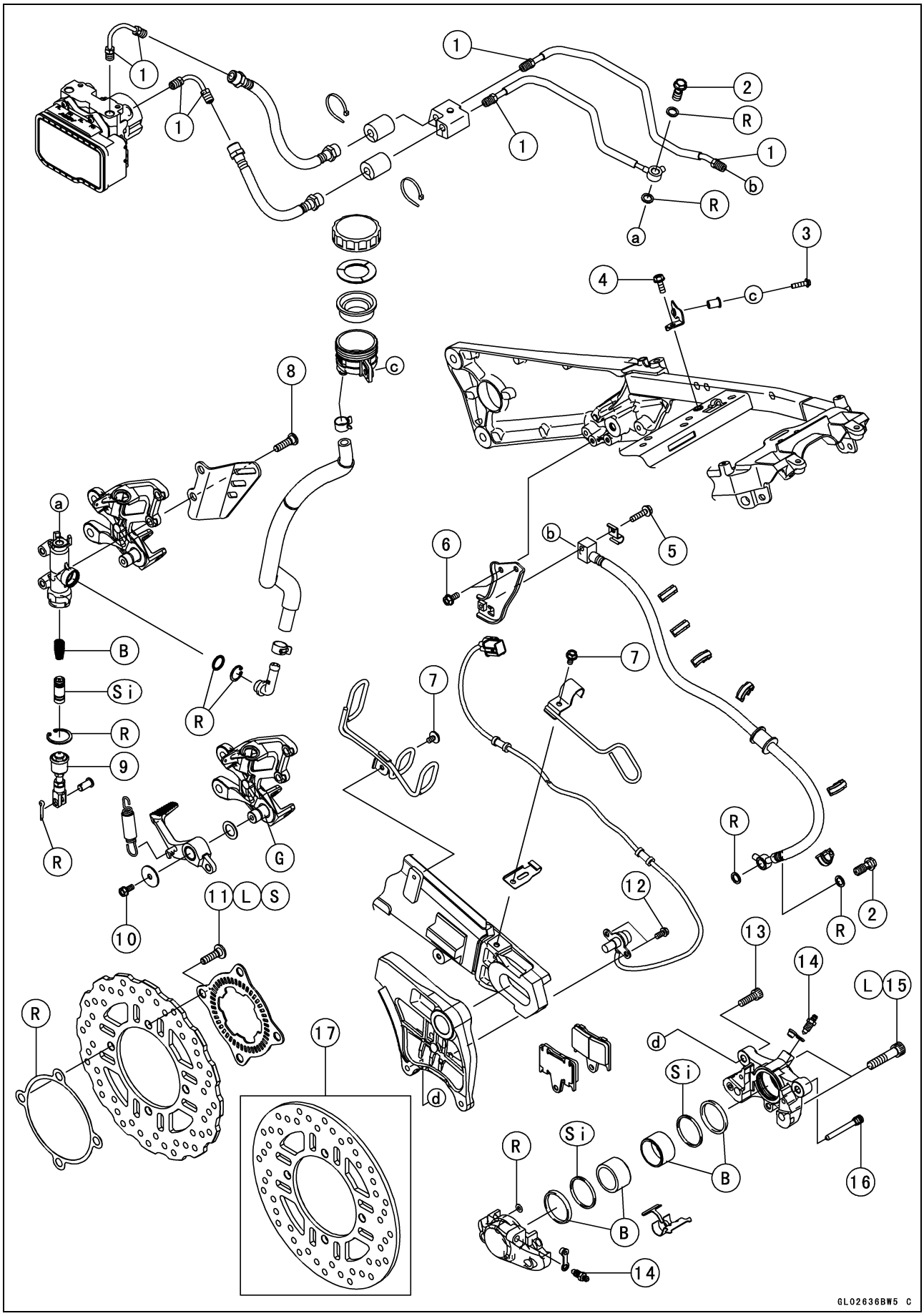


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Bleed Valves (Caliper)	14	1.4	10	
2	Front Caliper Mounting Bolts	35	3.6	26	S
3	Front Brake Reservoir Cap Screws	0.70	0.07	6.2 in·lb	
4	Front Master Cylinder Bracket Bolt	9.0	0.92	80 in·lb	
5	Front Brake Reservoir Nut	8.0	0.82	71 in·lb	
6	Brake Lever Pivot Bolt Locknut	6.0	0.61	53 in·lb	R
7	Bleed Valve (Master Cylinder)	6.0	0.61	53 in·lb	
8	Front Master Cylinder Clamp Bolts	9.0	0.92	80 in·lb	S
9	Brake Pipe Joint Nuts	18	1.8	13	
10	Brake Hose Joint Bracket Bolts	8.0	0.82	71 in·lb	
11	Brake Hose Bracket Bolt	8.0	0.82	71 in·lb	
12	Brake Hose Banjo Bolts	25	2.5	18	
13	Brake Hose Joint Bolts	8.0	0.82	71 in·lb	
14	Front Wheel Rotation Sensor Bolts	9.8	1.0	87 in·lb	
15	Front Brake Disc Mounting Bolts	28	2.9	21	L, 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.

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Brake Pipe Joint Nuts	18	1.8	13	
2	Brake Hose Banjo Bolts	25	2.5	18	
3	Rear Brake Reservoir Bolt	0.50	0.05	4.4 in·lb	
4	Rear Brake Reservoir Bracket Bolt	8.0	0.82	71 in·lb	
5	Brake Hose Joint Bolts	8.0	0.82	71 in·lb	
6	Brake Hose Joint Bracket Bolts	8.0	0.82	71 in·lb	
7	Brake Hose Clamp Bolts	8.0	0.82	71 in·lb	
8	Rear Master Cylinder Mounting Bolts	25	2.5	18	
9	Rear Master Cylinder Push Rod Locknut	17.2	1.75	12.7	
10	Brake Pedal Bolt	9.0	0.92	80 in·lb	
11	Rear Brake Disc Mounting Bolts	28	2.9	21	L, S
12	Rear Wheel Rotation Sensor Bolts	9.8	1.0	87 in·lb	
13	Rear Caliper Mounting Bolts	25	2.5	18	
14	Bleed Valves	8.0	0.82	71 in·lb	
15	Rear Caliper Assembly Bolts	37	3.8	27	L
16	Rear Brake Pad Pin	17.2	1.75	12.7	

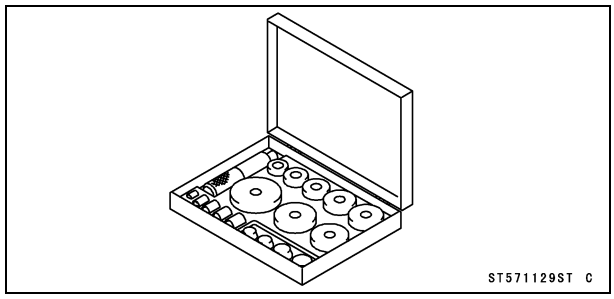
17. ZX1400J Model
B: Apply brake fluid.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts
S: Follow the specified tightening sequence.
Si: Apply silicone grease.

Specifications

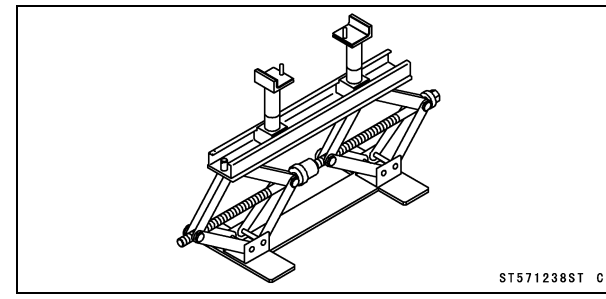
Item	Standard	Service Limit
Brake Lever, Brake Pedal		
Brake Lever Position:		
ZX1400H	6-way adjustable (to suit rider)	– – –
ZX1400J	Adjustable type (to suit rider)	– – –
Brake Lever Free Play	Non-adjustable	– – –
Pedal Position	About 45 mm (1.8 in.) below top of footpeg	– – –
Pedal Free Play	Non-adjustable	– – –
Brake Pads		
Lining Thickness:		
Front:		
ZX1400H	4.0 mm (0.16 in.)	1 mm (0.04 in.)
ZX1400J	3.7 mm (0.15 in.)	1 mm (0.04 in.)
Rear	5.0 mm (0.20 in.)	1 mm (0.04 in.)
Brake Discs		
Thickness:		
Front:		
ZX1400H	4.8 ~ 5.2 mm (0.19 ~ 0.20 in.)	4.5 mm (0.18 in.)
ZX1400J	5.3 ~ 5.7 mm (0.21 ~ 0.22 in.)	5.0 mm (0.20 in.)
Rear	5.8 ~ 6.2 mm (0.23 ~ 0.24 in.)	5.5 mm (0.22 in.)
Runout	TIR 0.15 mm (0.0059 in.) or less	TIR 0.3 mm (0.01 in.)
Brake Fluid		
Grade	DOT4	– – –
ABS		
ABS Hydraulic Unit:		
Make	NISSIN	– – –
Wheel Rotation Sensor Air Gap:		
Front	0.1 ~ 1.5 mm (0.004 ~ 0.060 in.)	– – –
Rear	0.1 ~ 1.5 mm (0.004 ~ 0.060 in.)	– – –

Special Tools

Bearing Driver Set:
57001-1129

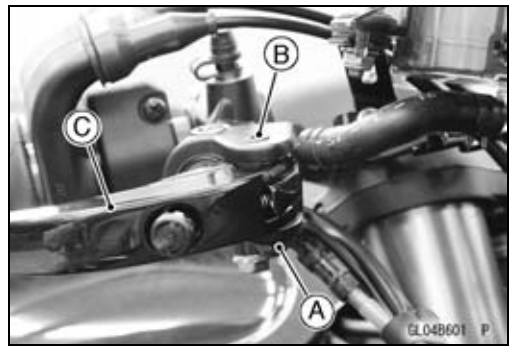


Jack:
57001-1238

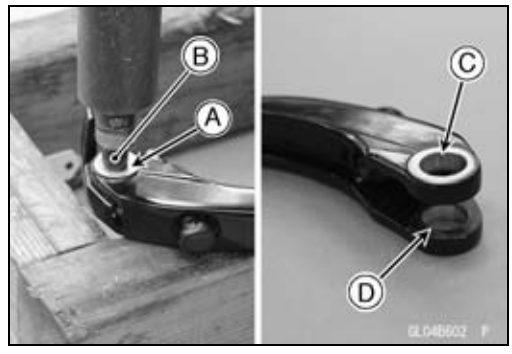


Brake Lever, Brake Pedal

Brake Lever Removal/Installation (ZX1400J Model)

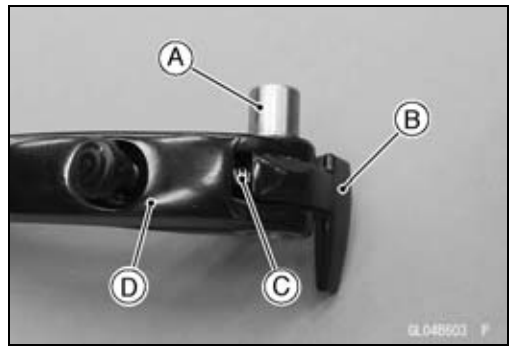


- Remove:
  Brake Lever Pivot Bolt Locknut [A]
  Brake Lever Pivot Bolt [B]
  Brake Lever Assembly [C]



- Press the lever collar [A] with the bearing driver set [B] from the lower side of the lever.
  Crimping Point [C]
  No Crimping [D]

  Special Tool - Bearing Driver Set: 57001-1129



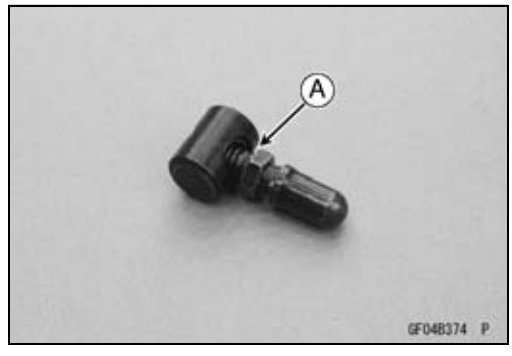
- Remove:
  Lever Collar [A]
  Knocker [B] with Push Rod Assembly
  Lever Spring [C]
  Brake Lever [D]

NOTE

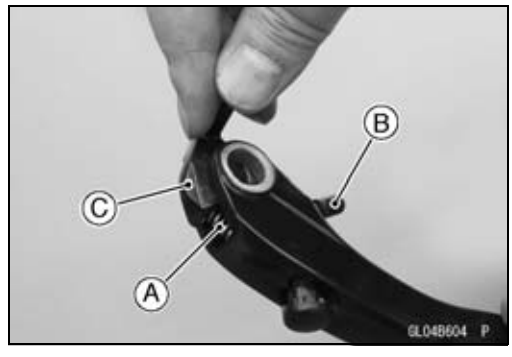
○*Be careful not to pop out the lever spring when removing the lever collar.*

NOTICE

Do not adjust the adjuster [A]. That has a bad affect the brake operation. If turn the adjuster, the brake master cylinder assembly must be replaced.



- Install:
  Lever Spring [A]
  Push Rod Assembly [B]
  Knocker [C]

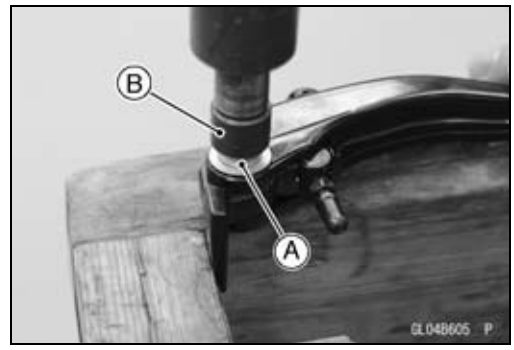


Brake Lever, Brake Pedal

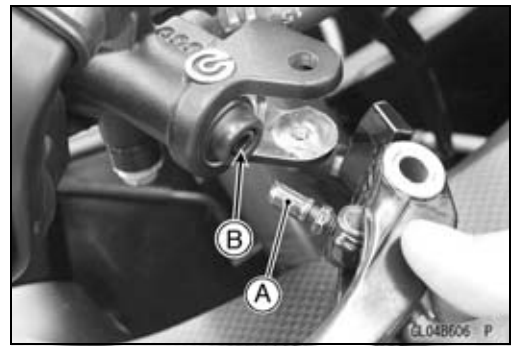
- Press the lever collar [A] with the bearing driver set [B] from the upper side of the lever.

○Install the collar so that the end of the collar is flush with the end of the hole.

Special Tool - Bearing Driver Set: 57001-1129

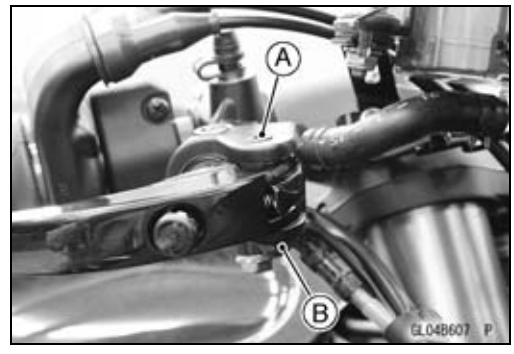


- Insert the push rod [A] of the brake lever to the hole [B] of the master cylinder.
- Check that the push rod is inserted correctly.



- Apply silicone grease to the sliding surface of the brake lever pivot bolt [A].
- Replace the brake lever pivot bolt locknut [B] with a new one.
- Tighten the brake lever pivot bolt and brake lever pivot bolt locknut.

Torque - Brake Lever Pivot Bolt Locknut: 6.0 N·m (0.61 kgf·m, 53 in·lb)

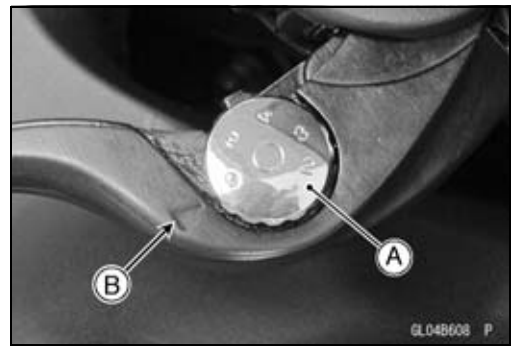


Brake Lever Position Adjustment (ZX1400H Model)

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.

○The distance from the grip to the lever is minimum at number 6 and maximum at number 1.

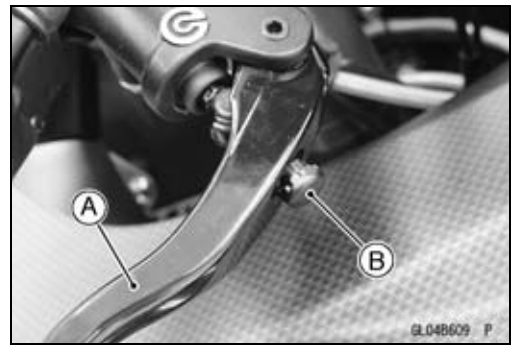


Brake Lever Position Adjustment (ZX1400J Model)

The brake lever position can be adjusted to suit the operator's hand.

- Push the brake lever [A] forward and turn the adjuster [B] and choose a suitable brake lever position.

Adjuster	Turn in ← →	Turn out
Lever Position	Far ← →	Near



Brake Lever, Brake Pedal

Brake Pedal Position Inspection

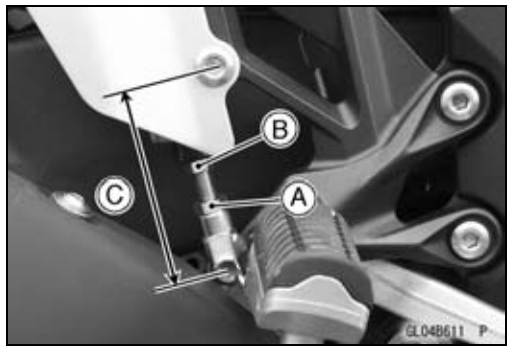


- Check that the brake pedal [A] is in the correct position.
  Footpeg [B]

Pedal Position
Standard: About 45 mm (1.8 in.) [C] below top of footpeg

★If it is incorrect, adjust the brake pedal position.

Brake Pedal Position Adjustment



NOTE

○*Usually it is not necessary to adjust the pedal position, but always adjust it when push rod locknut has been loosened.*

- Loosen the locknut [A] and turn the push rod with the hex head [B] to achieve the correct pedal position.

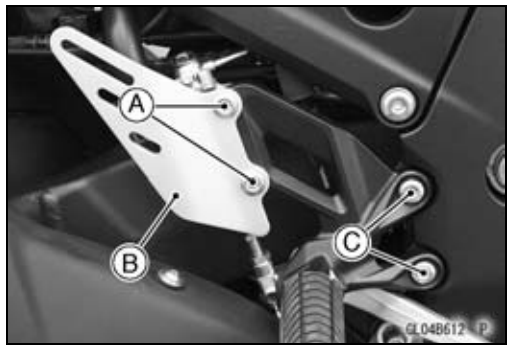
★If the length [C] shown is **80 ±1 mm (3.1 ±0.04 in.)**, the pedal position will be within the standard range.

- Tighten:

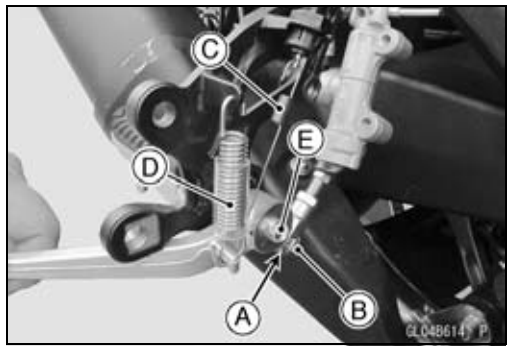
Torque - Rear Master Cylinder Push Rod Locknut: 17.2 N·m (1.75 kgf·m, 12.7 ft·lb)

- Check the brake light switch operation (see Brake Light Switch Operation Inspection in the Periodic Maintenance chapter).

Brake Pedal Removal



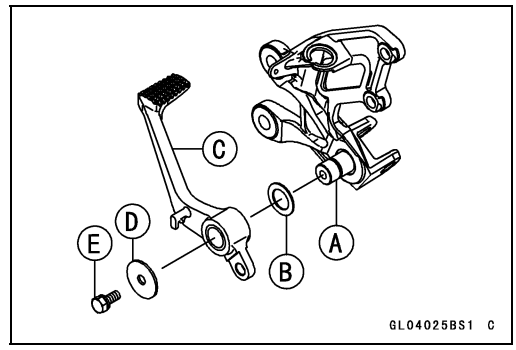
- Remove:
  Rear Master Cylinder Mounting Bolts [A]
  Footpeg Guard [B]
  Right Front Footpeg Bracket Bolts [C]



- Remove:
  Cotter Pin [A]
  Joint Pin [B]
  Rear Brake Light Switch Spring [C]
  Return Spring [D]
- Remove the brake pedal bolt [E] and take out the brake pedal.

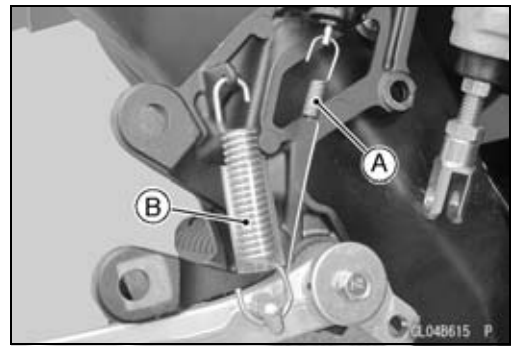
Brake Lever, Brake Pedal

Brake Pedal Installation

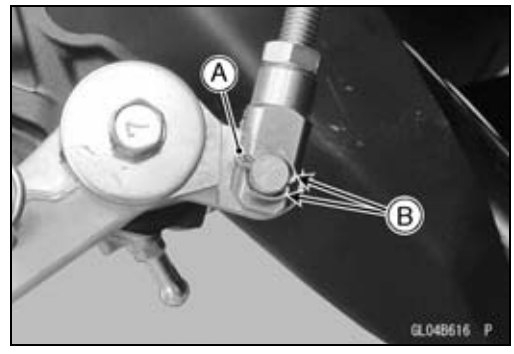


- Apply grease to the pivot shaft [A] and install the washer [B].
- Install:
  Brake Pedal [C]
  Washer [D]
  Brake Pedal Bolt [E]

  Torque - Brake Pedal Bolt: 9.0 N·m (0.92 kgf·m, 80 in·lb)



- Hook the lower end of the rear brake light switch spring [A] on the pedal hook.
- Hook the upper end of the return spring [B] on the pedal hook.



- Replace the cotter pin [A] with a new one.
- Insert the cotter pin and bend the pin ends [B].



- Install the brake light switch and the right front footpeg bracket.

  Torque - Front Footpeg Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Install the footpeg guard and tighten the rear master cylinder mounting bolts.

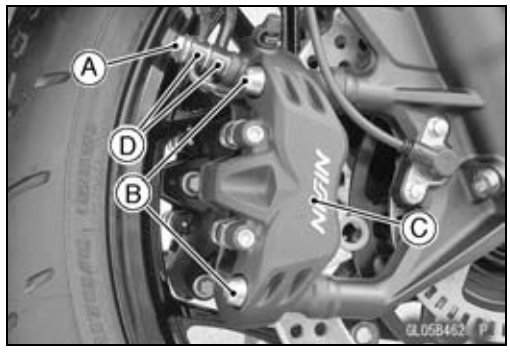
○Depress the brake pedal [A] and then align the bolts holes of the master cylinder [B].

  Torque - Rear Master Cylinder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Check the brake pedal position (see Brake Pedal Position Inspection).

Calipers

Front Caliper Removal (ZX1400H Model)



- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Remove 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.

- Remove the banjo bolt and remove the brake hoses [D] from the caliper (see Brake Hose and Pipe Replacement in the Periodic Maintenance chapter).

NOTICE

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

Front Caliper Installation (ZX1400H Model)

- Replace the washers that are on each side of the hose fitting with new ones.
- Install the front caliper and brake hose lower end.

○Avoid sharp banding, kinking, flatting or twisting.

○Touch the brake hoses to the stopper of the front caliper.

- Tighten:

Torque - Front Caliper Mounting Bolts: 35 N·m (3.6 kgf·m, 26 ft·lb)
Brake Hose Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

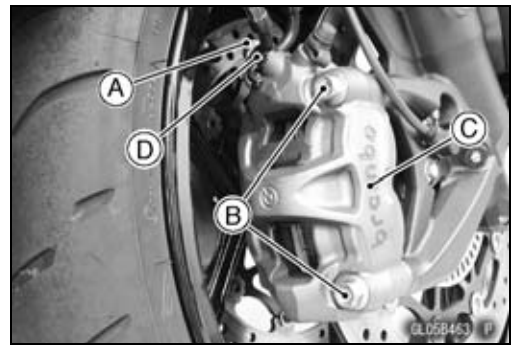
- Check the fluid level in the brake reservoir.
- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠ WARNING

After servicing, it takes several applications of the brake lever 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.

Calipers

Front Caliper Removal (ZX1400J Model)



- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Remove the caliper mounting bolts [B], and detach the caliper [C] from the disc.
- Remove the banjo bolt and remove the brake hose [D] from the caliper (see Brake Hose and Pipe Replacement in the Periodic Maintenance chapter).

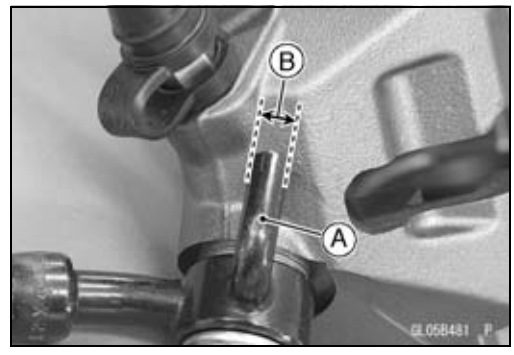
NOTICE

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

Front Caliper Installation (ZX1400J Model)

- Replace the washers that are on each side of the hose fitting with new ones.
- Install the front caliper mounting bolts so that the seating surface of the bolt do not contact the caliper and brake hose lower end.

○Avoid sharp bending, kinking, flatting or twisting.



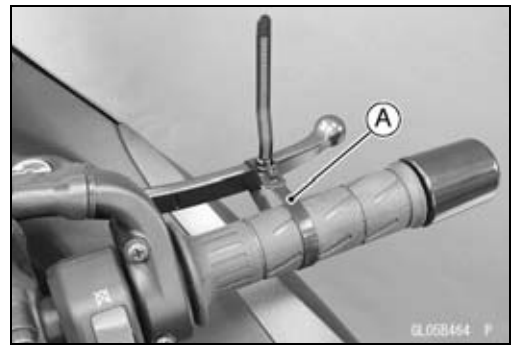
- Position the projection [A] of the left brake hose so that the projection end faces flat part [B] as shown.
- Tighten:

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

- Check the fluid level in the brake fluid reservoir.
- 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 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.

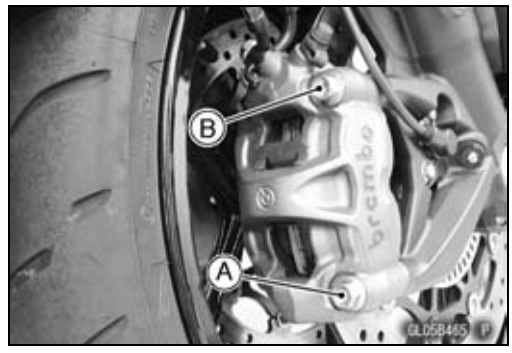


- Squeeze the brake lever slowly and hold it with a band [A].

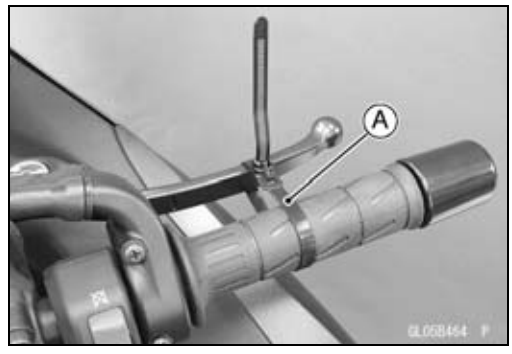
Calipers

- Tighten the front caliper mounting bolt [A] [B] following specified tightening sequence.
  Tightening Sequence:
  [A → B → A]

  Torque - Front Caliper Mounting Bolts: 35 N·m (3.6 kgf·m, 26 ft·lb)

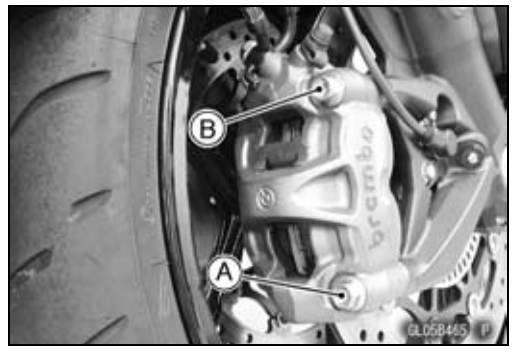


- Remove the band [A] and release the brake lever.



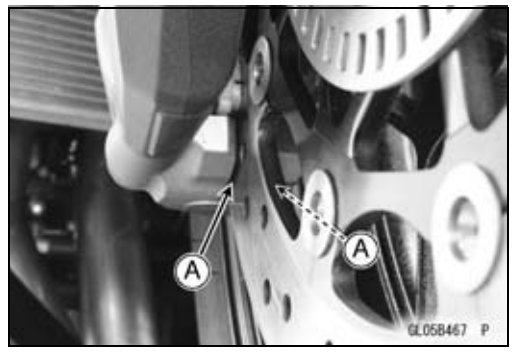
- Retighten the front caliper mounting bolt [A] [B] following specified tightening sequence.
  Tightening Sequence:
  [A → B → A]

  Torque - Front Caliper Mounting Bolts: 35 N·m (3.6 kgf·m, 26 ft·lb)



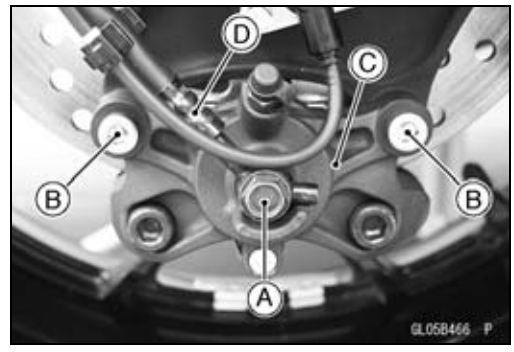
- Check the clearance [A] 0.5 mm (0.020 in.) or more between the caliper and disc at the lower position.

★If there is no clearance, reinstall the caliper.



Calipers

Rear Caliper Removal



- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Remove 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.

- Remove the banjo bolt and remove the brake hose [D] from the caliper (see Brake Hose Removal/Installation).

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

Rear Caliper Installation

- Replace the washers that are on each side of the hose fitting with new ones.
- Install the rear caliper and brake hose lower end.

○Avoid sharp bending, kinking, flatting or twisting.
○Touch the brake hose to the stopper of the rear caliper.

- Tighten:

Torque - Rear Caliper Mounting Bolts: 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 reservoir.
- 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 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.

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.

Calipers

Rear Caliper Assembly

- Refer to the Caliper Rubber Parts Replacement in the Periodic Maintenance chapter.

Caliper Fluid Seal Damage Inspection

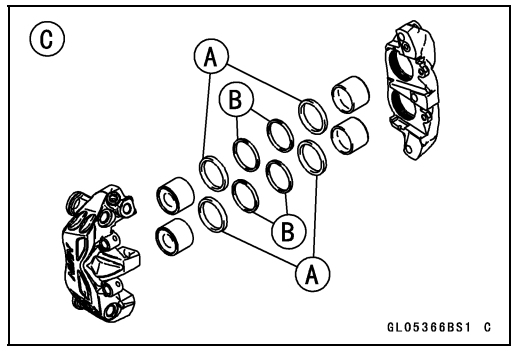
The fluid seal (piston seal) [A] is placed around the piston to maintain clearance between the pad and the disc. If the seal is in a poor condition, it could lead the pad to wear excessively or the brake to drag, which may cause the temperature of the discs or the brake fluid to increase.

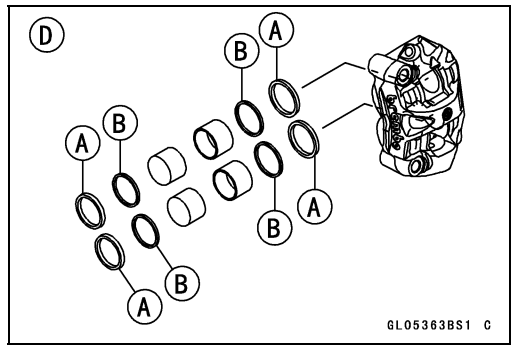
- Replace the fluid seal if it exhibits any of the conditions listed below.

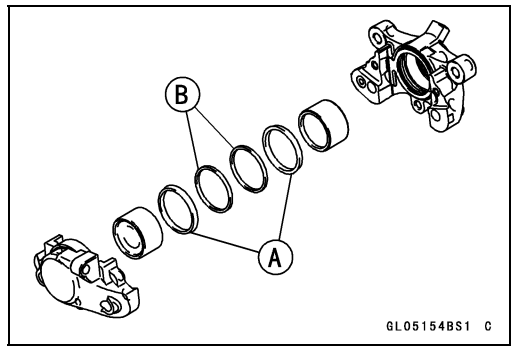
○Brake fluid leakage around the pad.
○Brakes overheat.
○Considerable difference in inner and outer pad wear.
○Seal and piston are stuck together.

★If the fluid seal is replaced, replace the dust seal [B] as well. Also, replace all seals every other time the pads are changed.

ZX1400H Model [C]
ZX1400J Model [D]







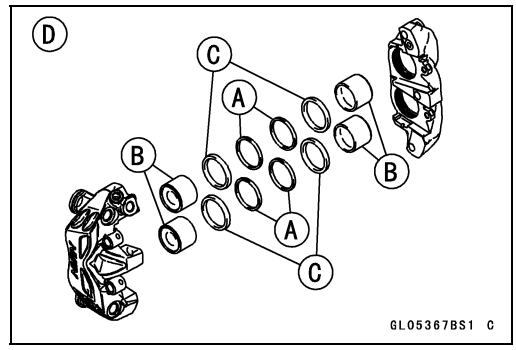
Calipers

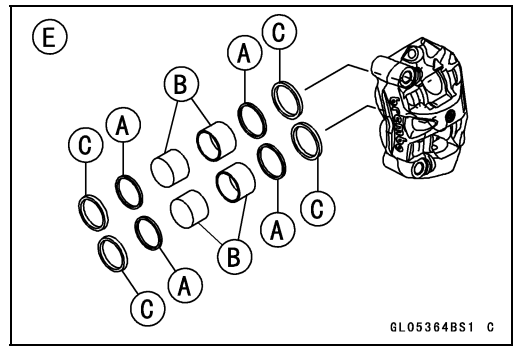
Caliper Dust Seal Damage Inspection

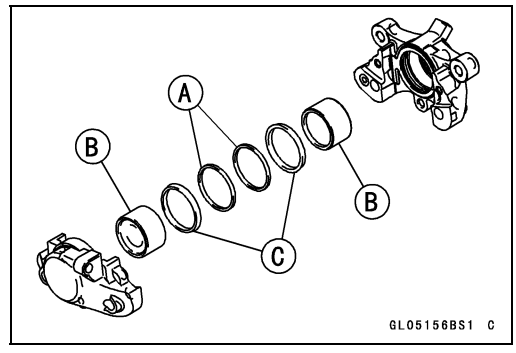
- Check that the dust seals [A] are not cracked, worn, swollen, or otherwise damaged.

★If they show any damage, replace the dust seals with new ones.

Pistons [B]
Fluid Seals [C]
ZX1400H Model [D]
ZX1400J Model [E]







Calipers

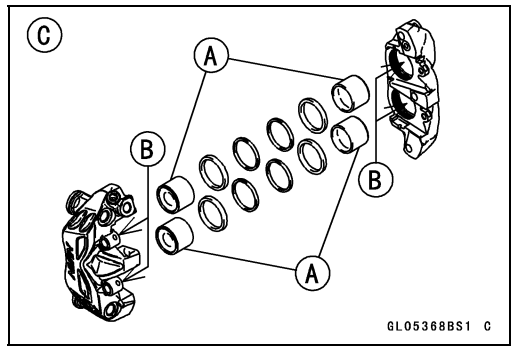
Caliper Piston and Cylinder Damage Inspection

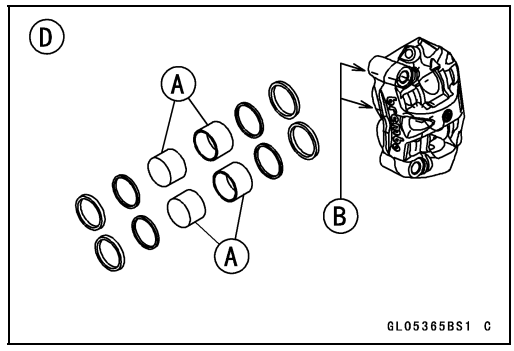
● Visually inspect the pistons [A] and cylinder surfaces [B].

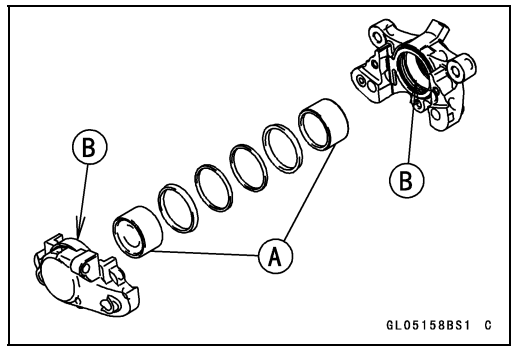
★Replace the caliper if the cylinder and piston are badly scores or rusty.

ZX1400H Model [C]

ZX1400J Model [D]







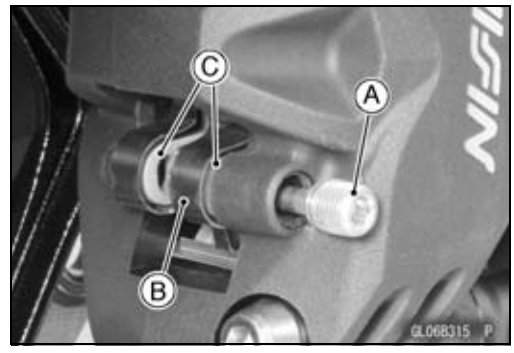
Brake Pads

Front Brake Pad Removal (ZX1400H Model)

● Loosen the pad pins [A].

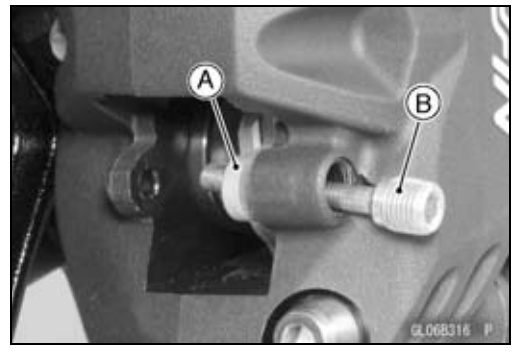


● Remove:
Pad Pins [A]
Pad Springs [B]
Brake Pads [C]



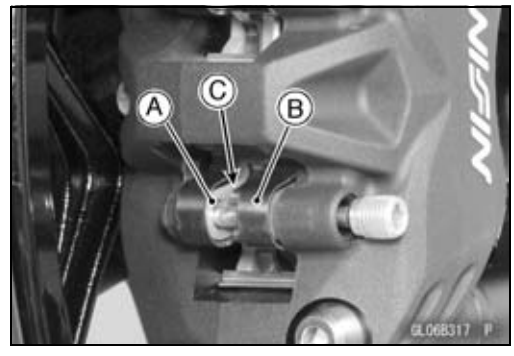
Front Brake Pad Installation (ZX1400H Model)

● 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.



● Set:
Inside Pad [A]
Pad Spring [B]
○Pushing the pin holder [C] to hole of the pad and insert the pad pin.

Torque - Front Brake Pad Pins: 17.2 N·m (1.75 kgf·m, 12.7 ft·lb)



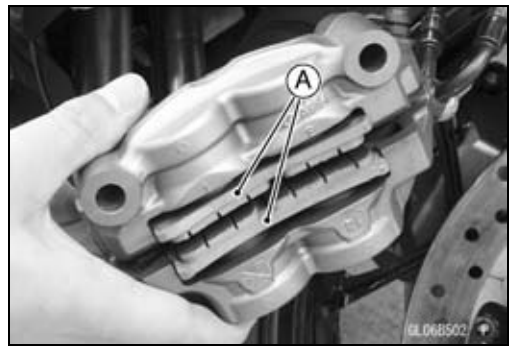
⚠ WARNING

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

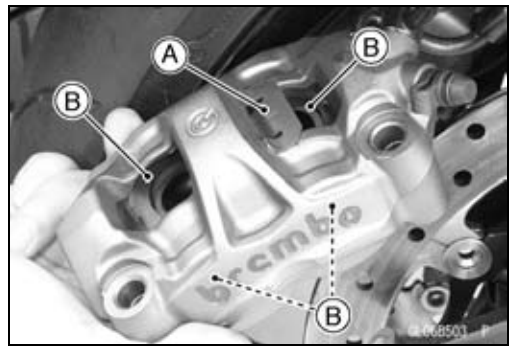
Front Brake Pad Removal (ZX1400J Model)

- Remove the front caliper with the hose installed (see Front Caliper Removal (ZX1400J Model)).
- Remove:
  Brake Pads [A]



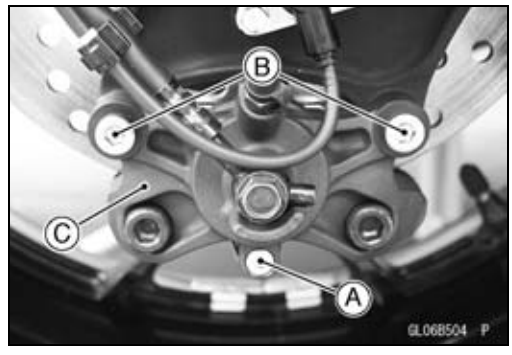
Front Brake Pad Installation (ZX1400J Model)

- Install the pad spring [A] on the caliper as shown.
- Push the caliper pistons [B] in by hand as far as they will go.
- Install the brake pads on the pad spring correctly.
- Install the front caliper (see Front Caliper Installation (ZX1400J Model)).

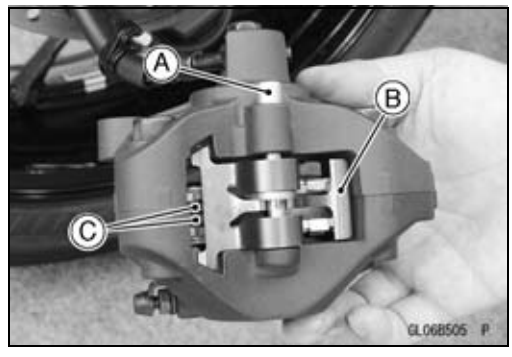


Rear Brake Pad Removal

- Loosen the pad pin [A].
- Remove the caliper mounting bolts [B].
- Remove the caliper [C] with the hose installed.

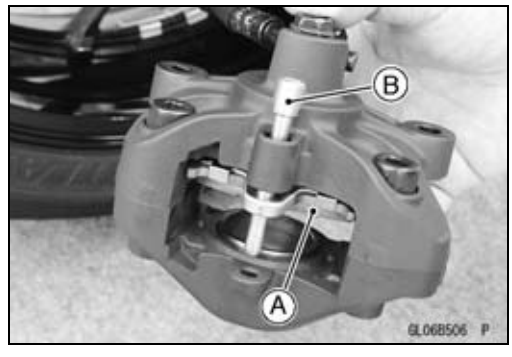


- Remove:
  Pad Pin [A]
  Pad Spring [B]
  Brake Pads [C]



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.



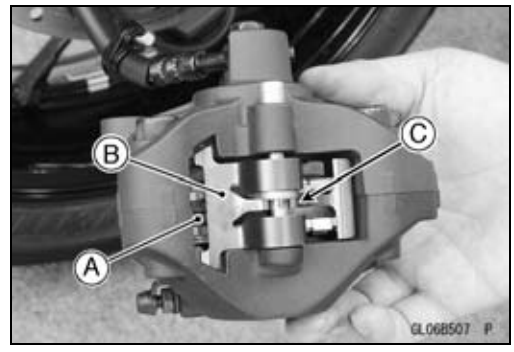
Brake Pads

- Set:
  Inside Pad [A]
  Pad Spring [B]

○Pushing the pin holder [C] to hole of the pad and insert the pad pin.

- Install the rear caliper (see Rear Caliper Installation).
- Tighten the pad pin.

Torque - Rear Brake Pad Pin: 17.2 N·m (1.75 kgf·m, 12.7 ft·lb)



⚠ WARNING

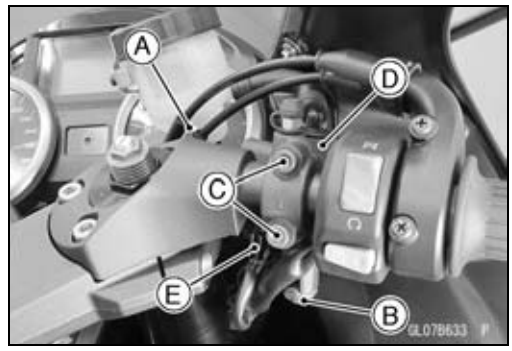
After servicing, it takes several applications of the brake pedal before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the motorcycle until a firm brake pedal is obtained by pumping the pedal 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 (ZX1400H Model)

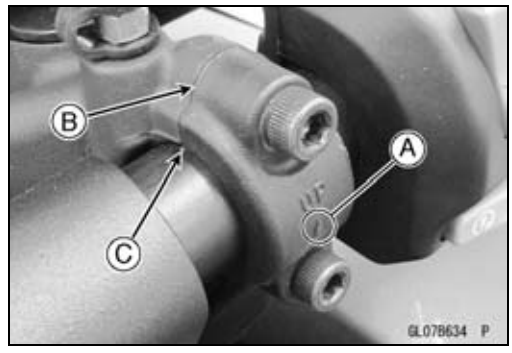


- Remove the reservoir bracket bolt [A].
- Remove the banjo bolt [B] to disconnect the brake hose from the front master cylinder.

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

- Remove the clamp bolts [C], and take off the front master cylinder [D] as an assembly with the reservoir, brake lever, and front brake light switch installed.
- Disconnect the front brake light switch connector [E].

Front Master Cylinder Installation (ZX1400H Model)



- Install the front master cylinder clamp so that the arrow mark [A] faces upward.
- Set the front master cylinder to match its mating surface [B] to the punch mark [C] of the handlebar.
- 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)

- Connect the front brake light switch connector.
- Replace the washers that are on each side of the hose fitting with new ones.
- Install the brake hose.

○Touch the brake hose to the stopper of the front master cylinder.

- Tighten:

Torque - Brake Hose Banjo Bolts: 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.

Front Master Cylinder Removal (ZX1400J Model)

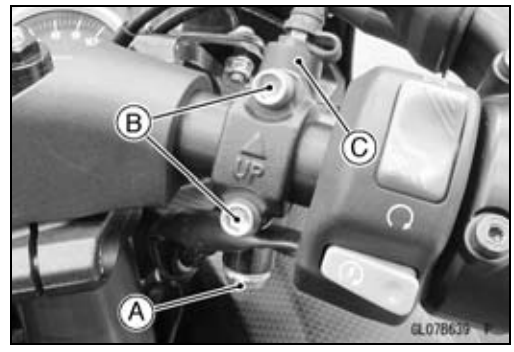


- Remove:

Front Master Cylinder Bracket Bolt [A]

Master Cylinder

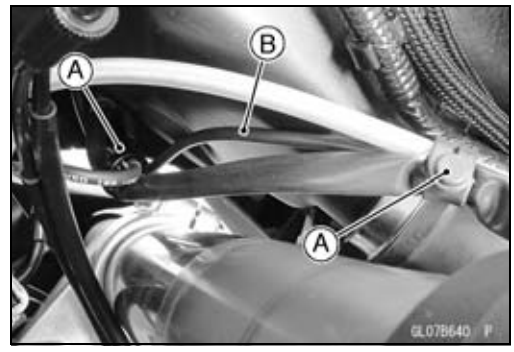
- Remove the banjo bolt [A] to disconnect the brake hose from the front master cylinder.



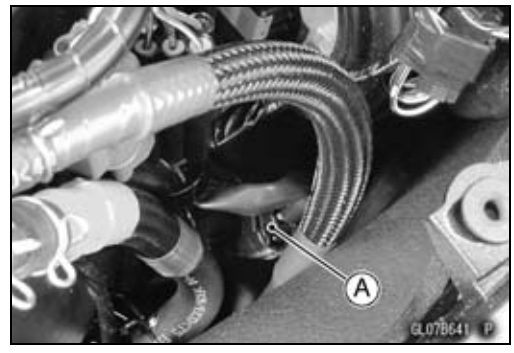
NOTICE
Brake fluid quickly damages painted plastic surfaces; any spilled fluid should be completely washed away immediately.

- Remove the clamp bolts [B], and take off the front master cylinder [C] as an assembly with the reservoir, brake lever, and brake light switch installed.

- Remove the right inner cover (see Inner Cover Removal in the Flame chapter).
- Remove the clamps [A] and clear the front brake light switch lead [B].

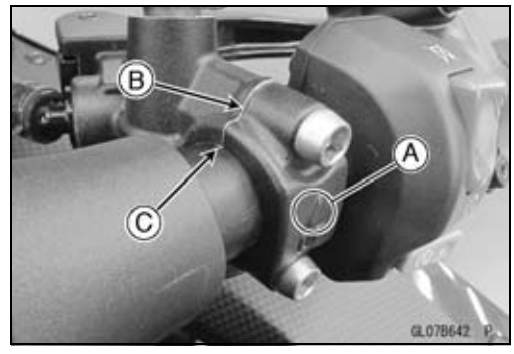


- Disconnect the front brake light switch lead connector [A].



Front Master Cylinder Installation (ZX1400J Model)

- Run the front brake light switch lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Connect the front brake light switch lead connector.
- Install the front master cylinder clamp so that the arrow mark [A] faces upward.
- Set the front master cylinder to match its mating surface [B] to the punch mark [C] of the handlebar.
- Tighten the upper clamp bolt first, and then the lower clamp bolt.



Torque - Front Master Cylinder Clamp Bolts: 9.0 N·m (0.92 kgf·m, 80 in·lb)

- Replace the washers that are on each side of the hose fitting with new ones.
- Install the brake hose.

○Touch the brake hose to the stopper of the front master cylinder.

- Tighten:

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

Master Cylinder

- Tighten:

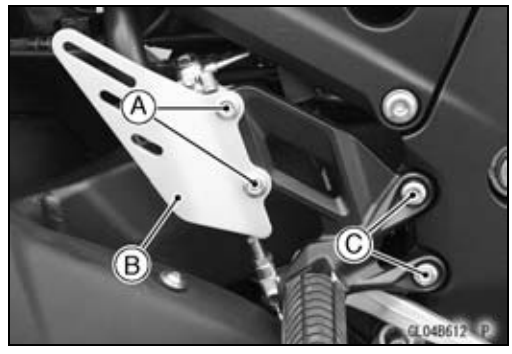
Torque - Front Master Cylinder Bracket Bolt [A]: 9.0 N·m (0.92 kgf·m, 80 in·lb)

- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.
- Install the right inner cover (see Inner Cover Installation in the Frame chapter).

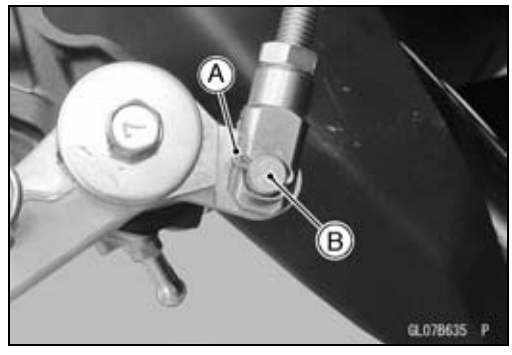


Rear Master Cylinder Removal

- Remove:
  Rear Master Cylinder Mounting Bolts [A]
  Footpeg Guard [B]
  Right Front Footpeg Bracket Bolts [C]



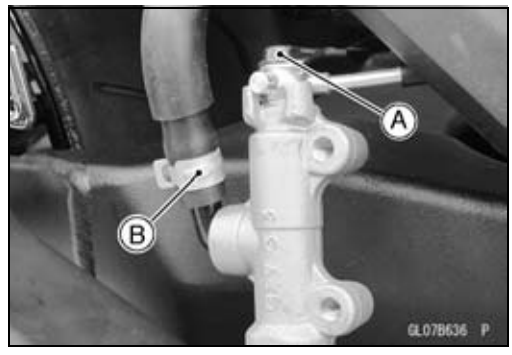
- Remove:
  Cotter Pin [A]
  Joint Pin [B]



- Remove the brake hose banjo bolt [A] and slide out the clamp [B].

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

- Disconnect the reservoir hose lower end, and drain the brake fluid into a container.



Rear Master Cylinder Installation

- Replace the washers that are on each side of the hose fitting with new ones.
- Install the brake hose.

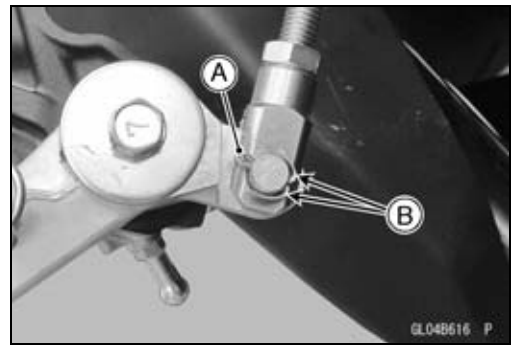
○Touch the brake hose to the stopper of the rear master cylinder.

- Tighten:

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

Master Cylinder

- Replace the cotter pin [A] with a new one.
- Insert the cotter pin and bend the pin ends [B].



- Install the brake light switch and the right front footpeg bracket.

Torque - Front Footpeg Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Install the footpeg guard and tighten the rear master cylinder mounting bolts.

○Depress the brake pedal [A] and then align the bolts holes of the master cylinder [B].

Torque - Rear Master Cylinder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)



- Check the brake pedal position (see Brake Pedal Position Inspection).
- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

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

Master Cylinder Inspection (Visual Inspection)

Other than Front Master Cylinder of the ZX1400J Model

- 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.

- Check the dust covers [E] for damage.

★If they are damaged, replace them.

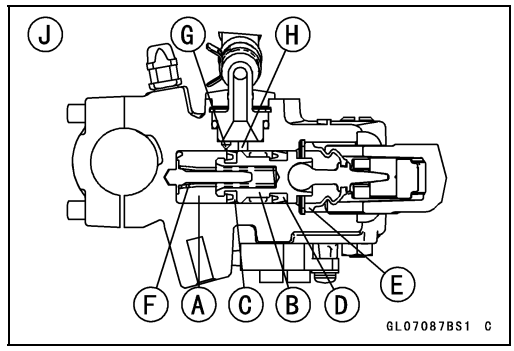
- Check the piston return springs [F] for any damage.

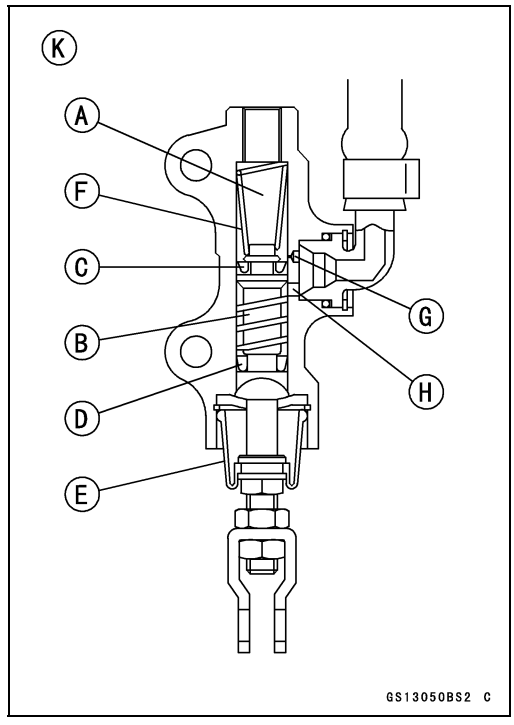
★If the springs are damaged, replace them.

- Check that relief port [G] and supply port [H] are not plugged.

★If the relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.

Front Master Cylinder [J]
Rear Master Cylinder [K]



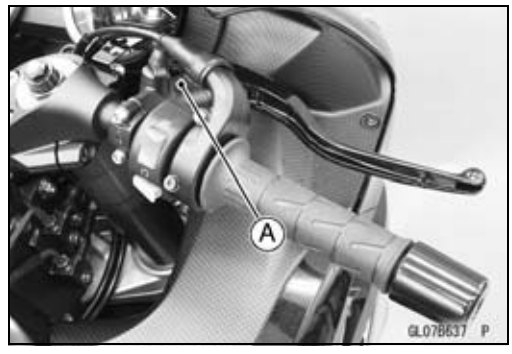


Front Master Cylinder of the ZX1400J Model

- Remove the front master cylinder [A] (see front Master Cylinder Removal (ZX1400J Model)).
- Check the front master cylinder for leakage, and replace the front master cylinder assembly if necessary.
- Check the front master cylinder for damage, deformation or crack and replace the front master cylinder assembly if necessary.

NOTE

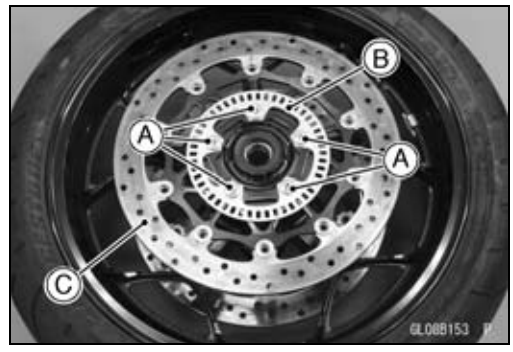
○*Do not try to disassemble the front master cylinder.*



Brake Disc

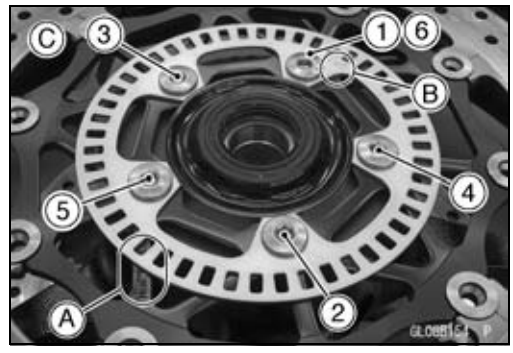
Brake Disc Removal

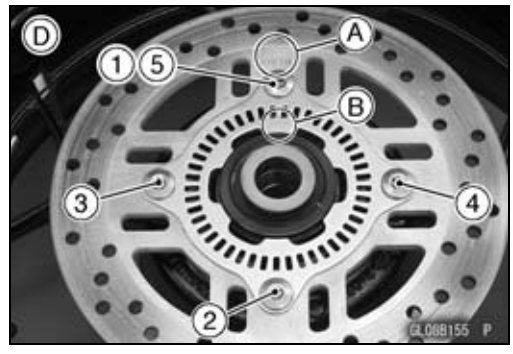
- Remove:
  Wheels (see Front/Rear Wheel Removal in the Wheels/Tires chapter)
  Bolts [A]
  Wheel Rotation Sensor Rotor [B]
  Brake Disc [C]
  Gasket(s)



Brake Disc Installation

- Replace the gasket(s) with new ones.
- Install the brake disc on the wheel so that the marked side [A] faces out.
- Install the wheel rotation sensor rotor on the brake disc so that the marked side [B] faces out.
- Apply a non-permanent locking agent to the threads of the front and rear brake disc mounting bolts.
- Tighten the front brake disc mounting bolts following the specified tightening sequence [1 ~ 6].
- Tighten the rear brake disc mounting bolts following the specified tightening sequence [1 ~ 5].
  Front [C]
  Rear [D]





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]
  ZX1400H Model [C]
  ZX1400J Model [D]

Brake Disc Thickness

Standard:

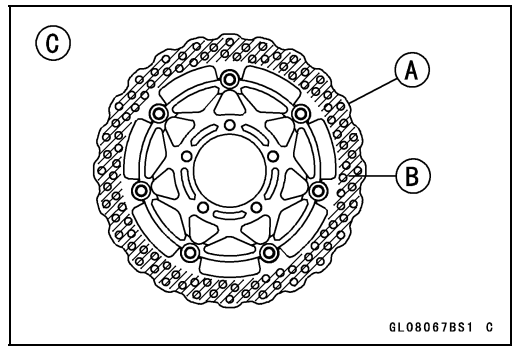
Front:

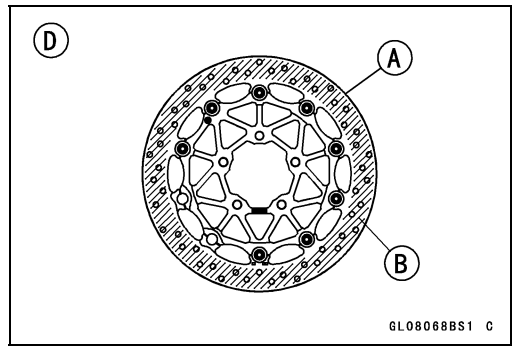
ZX1400H	**4.8 ~ 5.2 mm (0.19 ~ 0.20 in.)**
ZX1400J	**5.3 ~ 5.7 mm (0.21 ~ 0.22 in.)**
Rear	**5.8 ~ 6.2 mm (0.23 ~ 0.24 in.)**

Service Limit:

Front:

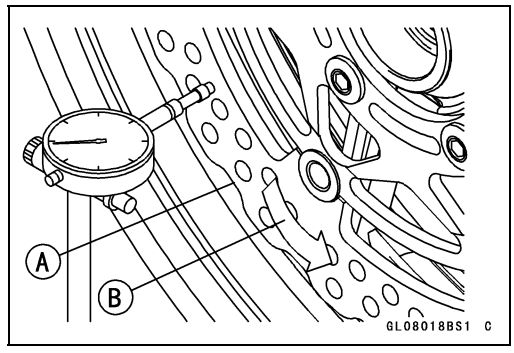
ZX1400H	**4.5 mm (0.18 in.)**
ZX1400J	**5.0 mm (0.20 in.)**
Rear	**5.5 mm (0.22 in.)**





Brake Disc

Brake Disc Warp Inspection



- Raise the front/rear wheel off the ground.

Special Tool - Jack: 57001-1238

○For front disc inspection, turn the handlebar fully to one side.

- Set up a dial gauge against the disc [A] as shown and measure disc runout, while turning [B] the wheel by hand.

★If runout exceeds the service limit, replace the disc.

Disc Runout

Standard:	**TIR 0.15 mm (0.0059 in.) or less**
Service Limit:	**TIR 0.3 mm (0.01 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.

⚠ 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.

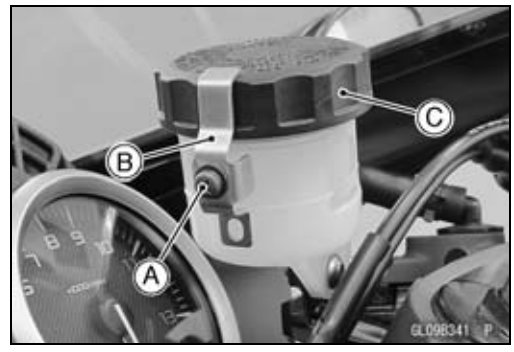
NOTE

○ *The procedure to bleed the front brake line is as follows. Bleeding the rear brake line is the same as for the front brake.*

NOTICE

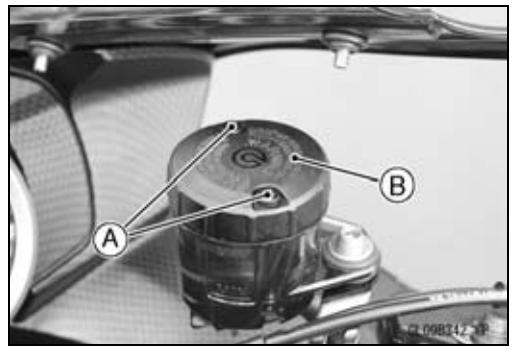
Brake fluid quickly damages painted plastic surfaces; any spilled fluid should be completely washed away immediately.

● Remove (ZX1400H Model):
Front Brake Reservoir Cap Stopper Screw [A]
Stopper [B]
Front Brake Reservoir Cap [C]
Diaphragm Plate
Diaphragm



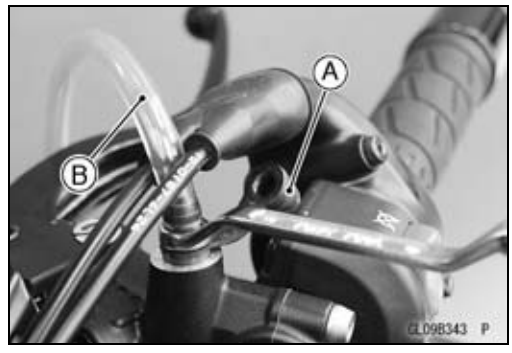
Brake Fluid

- Remove (ZX1400J Model):
  Front Brake Reservoir Cap Screws [A]
  Front Brake Reservoir Cap [B]
  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 hole at the bottom of the reservoir.

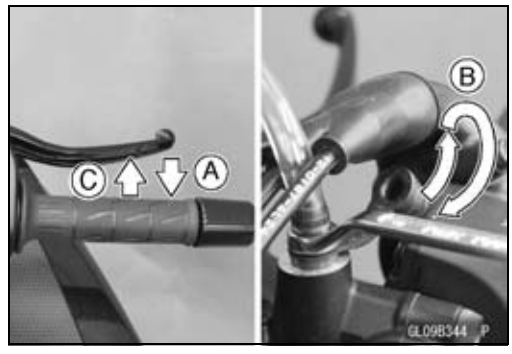
- Remove the rubber cap [A] from the bleed valve on the front master cylinder.
- Attach a clear plastic hose [B] to the bleed valve, and run the other end of the hose into a container.



- Bleed the brake line and the master cylinder.

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

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



NOTE

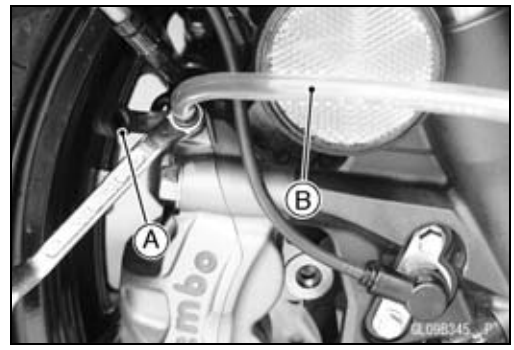
○*The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.*

- Remove the clear plastic hose.
- Tighten the bleed valve, and install the rubber cap.

Torque - Bleed Valve (ZX1400H Model): 8.0 N·m (0.82 kgf·m, 71 in·lb)
Bleed Valve (ZX1400J Model): 6.0 N·m (0.61 kgf·m, 53 in·lb)

Brake Fluid

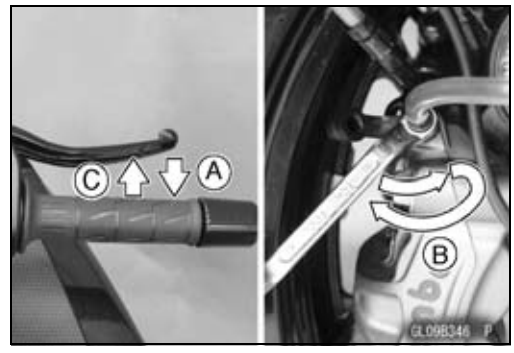
- Remove the rubber cap [A] from the bleed valve on the caliper.
- Attach a clear plastic hose [B] to the bleed valve, and run the other end of the hose into a container.



- Bleed the brake line and the caliper.

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

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



NOTICE

After pumping the brake lever several times, releasing it without opening and closing of the bleed valve may cause brake fluid to be blown back from the master cylinder reservoir. Brake fluid spilt on painted surfaces and plastic parts will quickly damage them. Be sure to open and close the bleed valve.

NOTE

○*The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.*

○*Tap the brake hose lightly from the caliper to the reservoir for more complete bleeding.*

○*Front Brake: 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.

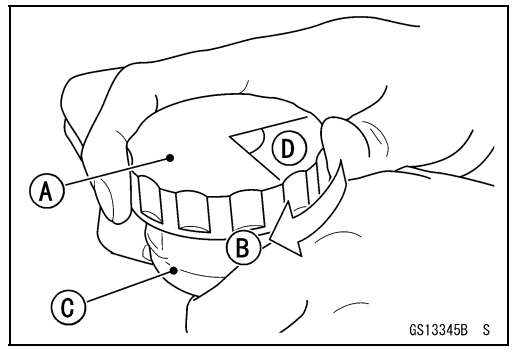
Torque - Bleed Valves (ZX1400H Model and Rear): 8.0 N·m (0.82 kgf·m, 71in·lb)
Bleed Valves (ZX1400J Model): 14 N·m (1.4 kgf·m, 10 ft·lb)

- Install:
  Diaphragm
  Diaphragm Plate (ZX1400H Model)
  Front Brake Reservoir Cap

Brake Fluid

- Follow the procedure below to install the front (ZX1400H Model)/rear brake fluid reservoir cap correctly.

○First, tighten the brake fluid reservoir cap [A] clockwise [B] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body [C], then tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir body.



- Install the stopper (ZX1400H model) and screw(s).
- Tighten:

Torque - Front Brake Reservoir Cap Stopper Screw (ZX1400H Model): 1.2 N·m (0.12 kgf·m, 11 in·lb)
Front Brake Reservoir Cap Screws (ZX1400J Model): 0.70 N·m (0.07 kgf·m, 6.2 in·lb)

- 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.

- **Never reuse old brake fluid.**
- **Do not use fluid from a container that has been left unsealed or that has been open for a long time.**
- **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.**
- **Don't leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid.**
- **Don't change the fluid in the rain or when a strong wind is blowing.**
- **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.**
- **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.**
- **Brake fluid quickly damages 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.

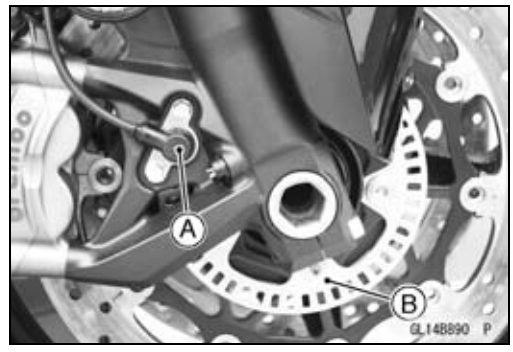
Brake Hose and Pipe Inspection

- Refer to the Brake Hose and Pipe Damage and Installation Condition Inspection in the Periodic Maintenance chapter.

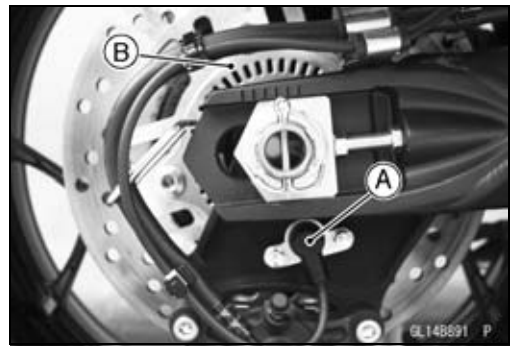
Anti-Lock Brake System

Parts Location

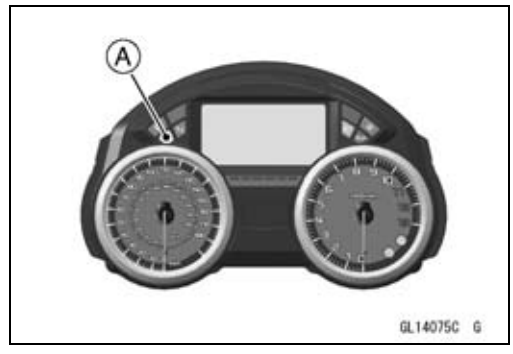
Front Wheel Rotation Sensor [A]
Front Wheel Rotation Sensor Rotor [B]



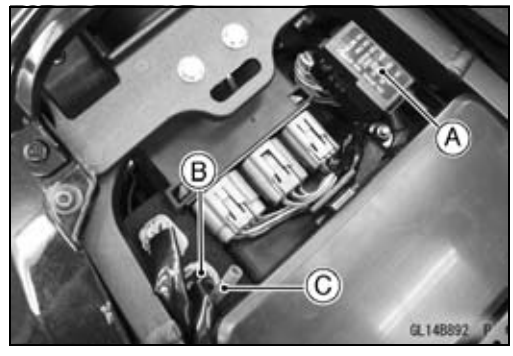
Rear Wheel Rotation Sensor [A]
Rear Wheel Rotation Sensor Rotor [B]



Yellow ABS Indicator Light (LED) [A]

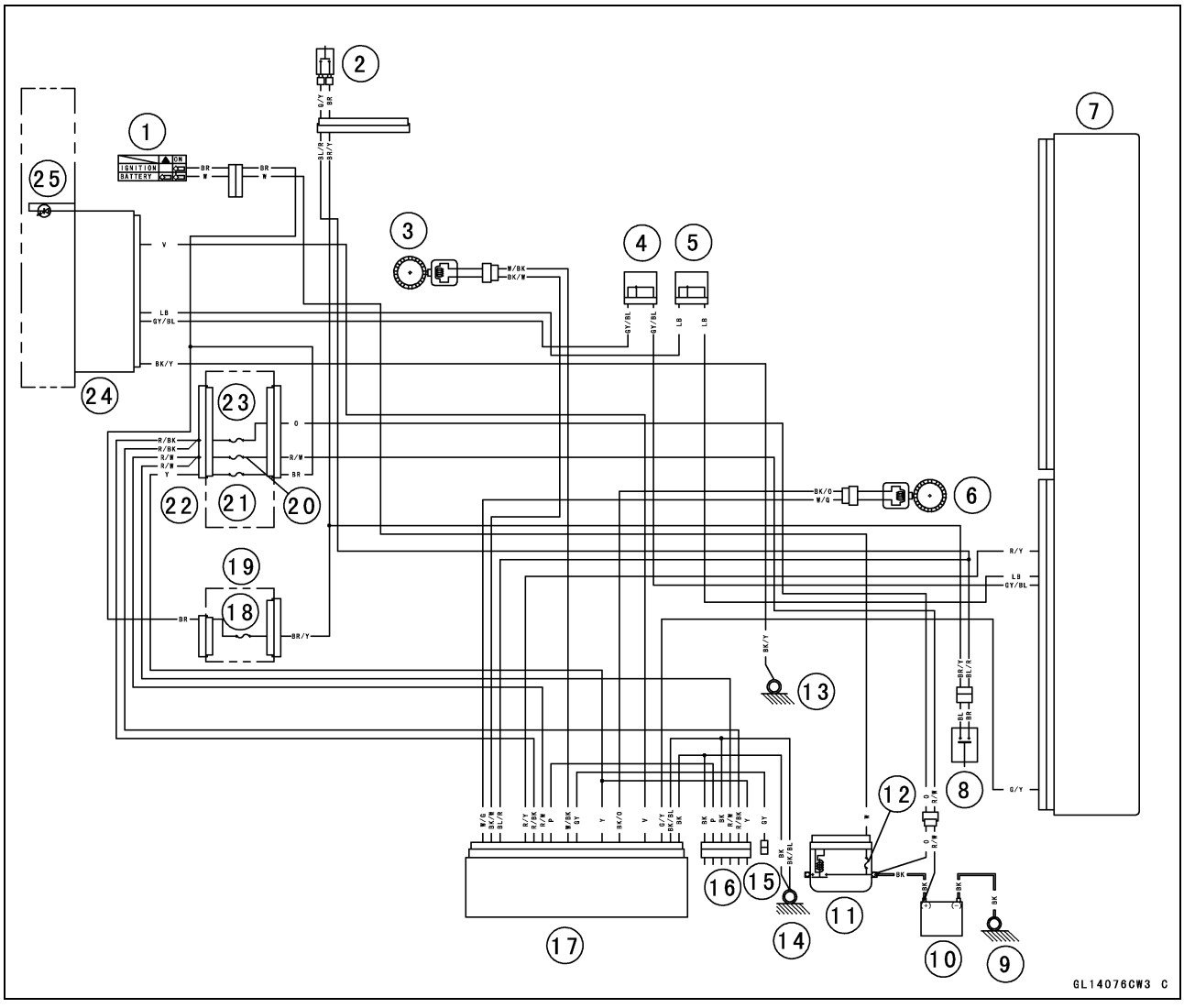


Fuse Box (2) [A]
ABS Kawasaki Diagnostic System Connector [B]
ABS Self-diagnosis Terminal [C]



Anti-Lock Brake System

ABS Wiring Diagram



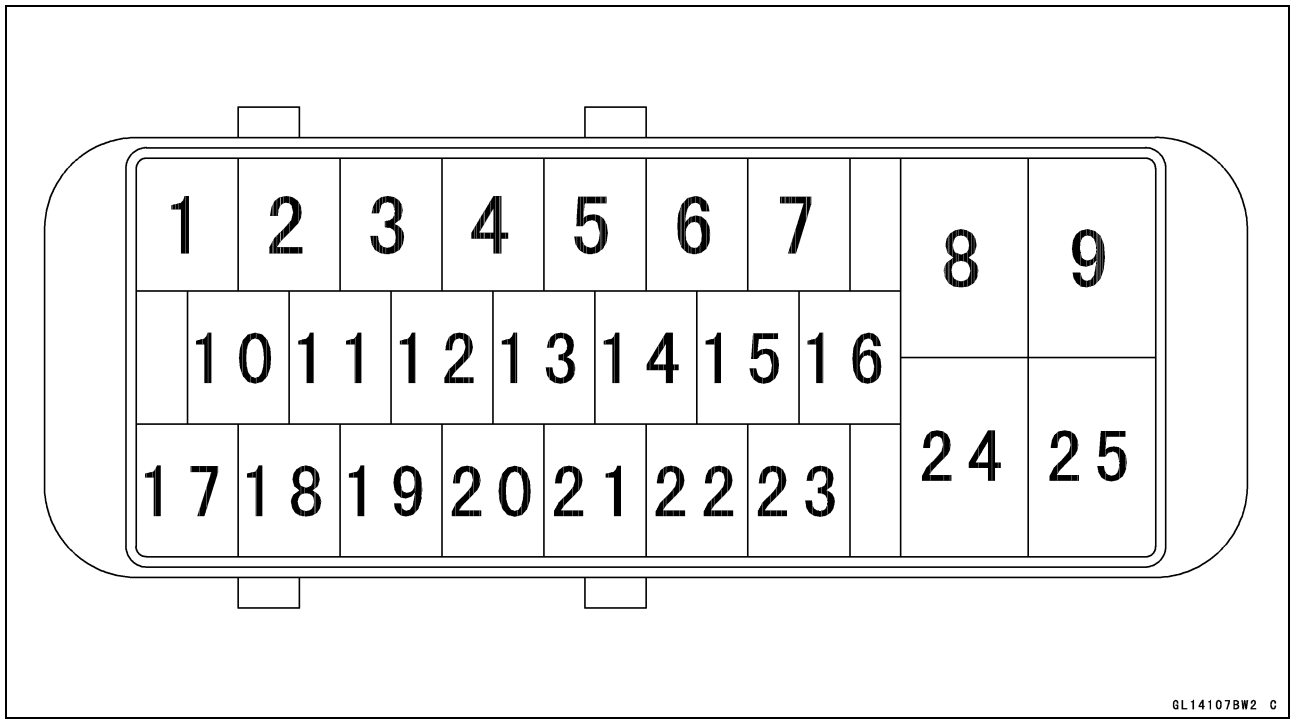
1. Ignition Switch
2. Front Brake Light Switch
3. Front Wheel Rotation Sensor
4. Joint Connector C
5. Joint Connector D
6. Rear Wheel Rotation Sensor
7. ECU
8. Rear Brake Light Switch
9. Frame Ground
10. Battery 12 V 12 Ah
11. Starter Relay
12. Main Fuse 30 A
13. Frame Ground (2)
14. Frame Ground (5)
15. ABS Self-diagnosis Terminal
16. ABS Kawasaki Diagnostic System Connector
17. ABS Hydraulic Unit
18. Brake Light/Horn Fuse 10 A
19. Fuse Box (1)
20. ABS Motor Relay Fuse 20 A
21. ABS ECU Fuse 10 A
22. Fuse Box (2)
23. ABS Solenoid Valve Relay Fuse 15 A
24. Meter Unit
25. Yellow ABS Indicator Light (LED)

○Color Codes:

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

Anti-Lock Brake System

Terminal Names



1. Unused
2. Power Supply to Rear Wheel Rotation Sensor: W/G
3. Front Wheel Rotation Sensor Signal: BK/W
4. Front and Rear Brake Light Switch: BL/R
5. Unused
6. Unused
7. Rear Wheel Rotation Sensor Output: R/Y
8. Power Supply to ABS Solenoid Valve Relay: R/BK
9. Power Supply to ABS Motor Relay: R/W
10. ABS Kawasaki Diagnostic System Connectorl: P
11. Unused
12. Power Supply to Front Wheel Rotation Sensor: W/BK
13. ABS Self-diagnosis Terminal: GY
14. Unused
15. Unused
16. Power Supply: Y
17. Unused
18. Rear Wheel Rotation Sensor Signal: BK/O
19. Unused
20. Unused
21. Yellow ABS Indicator Light: V
22. Unused
23. Front Wheel Rotation Sensor Output: G/Y
24. Ground: BK/BL
25. Ground to Motor: BK

Anti-Lock Brake System

ABS Servicing Precautions

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

- This 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.
- Do not reverse the battery cable connections. This will damage the ABS hydraulic unit.
- To prevent damage to the 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.
- Do not turn the ignition switch on while any of the ABS electrical connectors are disconnected. The ABS hydraulic unit memorizes service codes.
- Do not spray water on the electrical parts, ABS parts, connectors, leads and wiring.
- If a transceiver is installed on the motorcycle, make sure that the operation of the ABS is not influenced by electric wave radiated from the antenna. Locate the antenna as far as possible away from the ABS hydraulic unit.
- Whenever the ABS electrical connections are to be disconnected, first turn off the ignition switch.
- The 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.
- The ABS parts cannot be disassembled. Even if a fault is found, do not try to disassemble and repair the ABS parts, replace it.
- The ABS has many brake lines, pipes, and leads. And the 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.

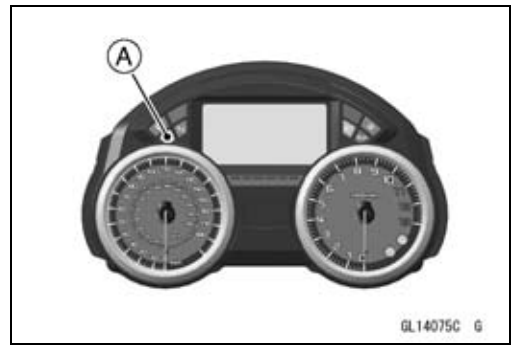
⚠ WARNING

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 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 ABS could malfunction.

Anti-Lock Brake System



○The yellow 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 ABS and can lead to extended braking distance resulting in an accident causing serious injury or death. Always use recommended standard tires for this motorcycle.

○The yellow 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 ignition switch off, then clear service code 42, which indicates a “Faulty front wheel rotation sensor”.

○When the ABS operates, the 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 ABS is operating normally.

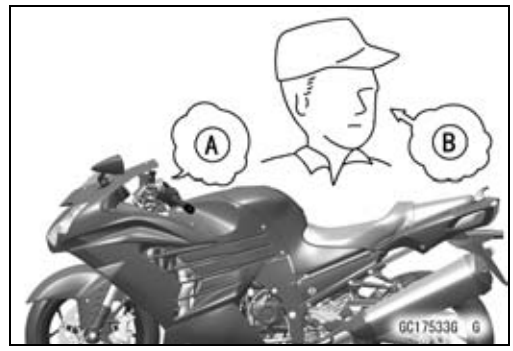
○Service codes detected once by the ABS hydraulic unit will be memorized in the ABS hydraulic unit. Therefore, after maintenance work is finished, be sure to erase the service codes. Do not erase the service codes during troubleshooting. Wait until all the checks and repair work are finished to prevent duplication of previous service codes and unnecessary maintenance work.

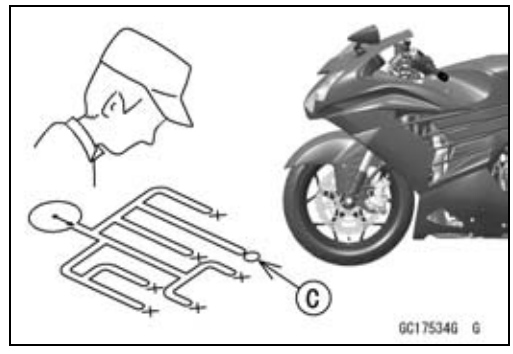
○Before delivering the motorcycle to the customer, be sure to erase any service codes which might be stored in the ABS hydraulic unit. Using the self-diagnosis feature, make sure that the yellow ABS indicator light (LED) lights. A fully charged battery is a must for conducting reliable self-diagnosis. Test run the motorcycle at a speed of more than 20 km/h (12 mph) to see that the yellow 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 ABS operates normally (The reaction force generated is felt in the brake lever and pedal.). This completes the final inspection.

Anti-Lock Brake System

ABS Troubleshooting Outline

When an abnormality in the system occurs, the yellow ABS indicator light (LED) lights up to alert the rider. In addition, the nature of the fault is stored in the memory of the ABS hydraulic unit and when in the self-diagnosis mode, the service code [A] is indicated by the number of times the yellow ABS indicator light (LED) blinks. 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 yellow 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 ABS self-diagnosis function, use common sense; check the brakes for proper braking power, and brake fluid level, search for leaks, etc.





Even when the ABS is operating normally, the yellow 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.

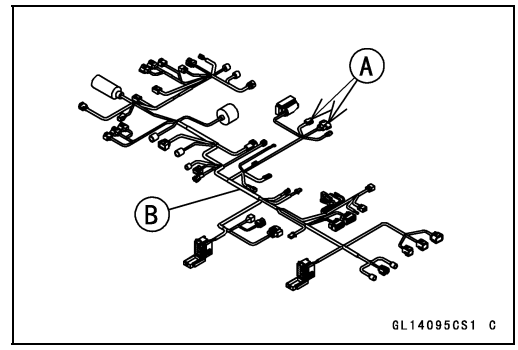
- ○After continuous riding on a rough road.
- ○When the engine is started with the stand raised and the transmission engaged, and the rear wheel turns.
- ○When accelerating so abruptly that the front wheel leaves the ground.
- ○When the ABS has been subjected to strong electrical interference.
- ○When tire pressure is abnormal. Adjust tire pressure.
- ○When a tire different in size from the standard size is being used. Replace with standard size.
- ○When the wheel is deformed. Replace the wheel.

Much of the ABS troubleshooting work consists of confirming continuity of the wiring. The ABS parts are assembled and adjusted by the manufacturer, so there is no need to disassemble or repair them. Replace the 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 ABS hydraulic unit connector to the suspected faulty ABS part, using a digital meter.

Anti-Lock Brake System



- Visually inspect the wiring for signs of burning or fraying.

★If any wiring is poor, replace the damaged wiring.

- Pull each connector [A] apart and inspect it for corrosion, dirt and damage.

★If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.

- Check the wiring for continuity.

○Use the wiring diagram to find the ends of the lead which is suspected of being a problem.

○Connect the digital meter between the ends of the leads.

★If the tester does not read about 0 Ω, the lead is defective. Replace the main harness [B] if necessary.

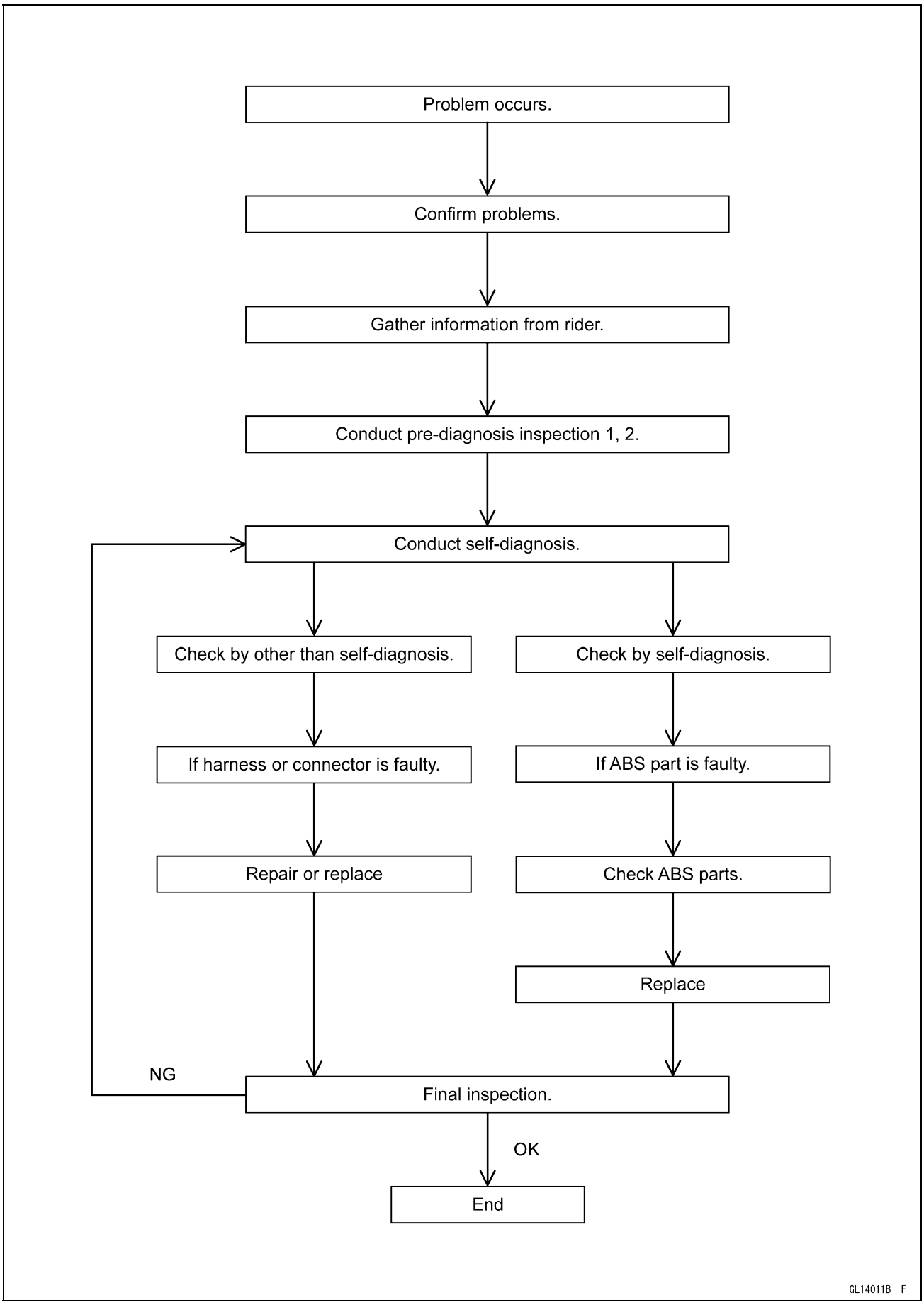
- Narrow down suspicious parts and close in on the faulty ABS part by repeating the continuity tests.

★If no abnormality is found in the wiring or connectors, the ABS parts are the next likely suspects. Check each part one by one.

★If an abnormality is found, replace the affected ABS part.

Anti-Lock Brake System

ABS Diagnosis Flow Chart



Inquiries to Rider

○Each rider reacts to problems in different ways, so it is important to confirm what kind of problem the rider is experiencing.
○Try 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 workshop.
○The diagnosis sheet will help prevent you from overlooking any key information, so always use it.

Sample Diagnosis Sheet 1

Rider Name: ……..…….. Registration No. (license plate No.): ……
Date of registration: …..……. Model: ……
Vin No.: …..……..……..... Odometer reading: …….. km or miles
Engine No.: ..…… Odometer reading when problem first occured: …… km or miles

Question	Description			Answer	Advice to customer
Which statement/s best describes the fault with the ABS system?	*Yellow ABS indicator light (LED) illuminated?*	*Flashing*			A fault has been detected with the ABS system.
		Continuous			
		Not working			
	ABS not working				Further inspection by technician required.
	ABS operates too frequently				Continuous riding on rough or un-even surfaces can cause the ABS to operate more frequently.
	Stopping distance too long				
	Does the wheel lock when you apply the brakes				Further inspection by technician required.
	Brake can't be released				
	Other				
Do the front and rear brake levers feel normal during application?	*Normal*				Further inspection by technician required.
	Abnormal	*Long stroke (lever feels soft and moves back close to the handle bar)*			This indicates a probable fault with the braking system and should be inspected immediately.
		Limited stroke (lever feels hard and has little movement)			
		Pulsing/vibrating			
	Which lever? (front, rear or both)				
When does the fault occur?	*During start up / stationary*	*(Is a centre stand or service stand used)*			If the motorcycle engine is left running whilst on its centre or service stand, mechanical drag can cause the rear wheel to rotate. If the rear wheel rotates the ABS system may detect a fault. Turning off the ignition switch and restarting should reset the yellow ABS indicator light (LED) if no problems are detected. However the service code will be stored in the ABS ECU and should be reset by the dealer.
	Driving below 6 km/h (4mph) (Speeds vary depending on model)				The ABS system is not active at these speeds.
	Driving above 6 km/h (4mph) (Speeds vary depending on model)				This may be normal ABS operation if the road conditions are poor.
	When slowing or stopping (Rate of brake application)	*Gradual braking*	*front only*		
			rear only		
			both brakes		
		During abrupt braking	*front only*		Abrupt braking may cause the ABS to function early as the suspension may not have had enough time to react to the situation.
			rear only		
			both brakes		
		There is no specific pattern			
	Other				

Question	Description		Answer	Advice to customer
How often does the fault occur?	*Every time ignition is switched on*			Further inspection by technician required.
	Every time the brakes are used (Continually)			
	No regularity (Intermittent)			
	Other			
During which riding conditions does the fault occur?	*Highway riding*	*Any comment on riding style maybe applicable.*		Braking and handling characteristics can vary with vehicle speed, therefore ABS operation during braking at highway speed may be more frequent.
	City riding			Accelerating abruptly between traffic signals so that the front wheel leaves the ground can trigger the ABS warning indicator. Normal riding on good condition roads should allow the yellow ABS indicator light (LED) to reset automatically.
	Minor/country roads riding			Continuous riding on rough or uneven surfaces can cause the ABS to operate more frequently.
	Cross country riding			Continuous riding on loose or off road surfaces can trigger the ABS warning indicator. Normal riding on good condition roads should allow the yellow ABS indicator light (LED) to reset automatically.
	Track/closed circuit riding			Excessive use of the ABS system due to continuous fast riding can trigger the ABS warning indicator. Normal riding on good condition roads should allow the yellow ABS indicator light (LED) to reset automatically.
	All			Further inspection by technician required.
In what road conditions does the problem occur?	*Dry*			Further inspection by technician required.
	Wet			In wet conditions it is possible that the ABS is operating normally
	Snow/Ice			In snow/icy conditions it is possible that the ABS is operating normally
	Loose/rough surface (gravel)			On loose/rough surfaces it is possible that the ABS is operating normally
Motorcycle condition	*Has the machine been regularly serviced according to the periodic maintenance schedule?*			If the service history is incomplete it is possible that a fault may become apparent. For example, failure to replace the brake fluid during periodic maintenance can cause the hydraulic unit to become internally damaged.
	Have there been any previous braking problems?			Any previous braking problems may be related to the ABS complaint. It is important that the customer provides as much information as possible so that diagnosis can be made as quickly as possible.
	Have any aftermarket parts been fitted?	*OE Tires and brakes?*		Further inspection by technician required.
	Have the daily safety checks been carried out? (tire pressures / condition etc.)			Worn tires or tires with incorrect pressures can cause an ABS fault. It is important to regularly check both tire condition and pressure.

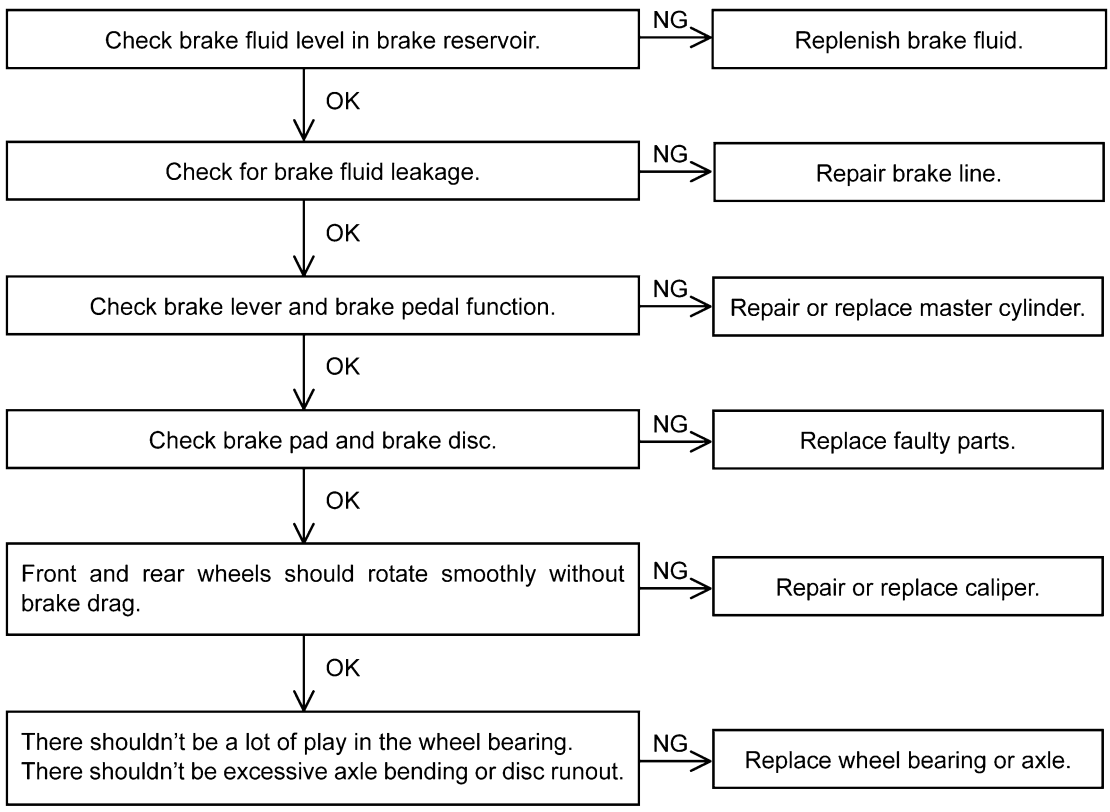
Dealer Findings

Sample Diagnosis Sheet 2

Question/Action	Description		Answer	Advice to technician
Review customer feedback information	*Carefully analyze the information that has been collected from the customer. Use this information to help you perform your initial diagnosis.*			
Check to see if any diagnostic codes are present	*1*			If codes are present refer to service manual.
	2			
	3			
	4			
	5			
Inspect the following	*Battery voltage*			The ABS is designed to be used with a 12 V sealed battery as its power source. Only use the battery specified by the service manual as a power source. If low battery voltage is detected service codes: B52 or B53 will be displayed.
	Tires type/size		Front …… Rear ……	Refer to service manual.
	Tire pressures		Front …… Rear ……	
	Tire condition		Front …… Rear ……	Excessive or abnormal wear can be recognized as an ABS fault.
	Wheel rotation sensor air gap		Front …… Rear ……	Refer to service manual. Also check that the wheel orientation is correct.
	Wheel condition (damaged or deformed)		Front …… Rear ……	Refer to service manual.
	Brake system general condition		Front …… Rear ……	Pad wear/Front and rear operation/Condition of hoses etc.
	Brake disc run-out		Front …… Rear ……	Refer to service manual.
Additional information on the yellow ABS indicator light (LED)	*Continuous*	*Stays on all the time while ignition on*		Check for diagnostic trouble codes.
		Turns off when first moving off but turns on again and stays on		
		Turns on when brake(s) are operated		
		Other:		
	Not working	*Turns off soon after moving off*		Test the operation of the light by turning on the ignition. If the light fails to illuminate ensure that the bike is equipped with ABS before inspecting the meter panel for faults as per the service manual.
		Turns off after riding for a while		
		Other:		
	How many times does it flash per 10 seconds?		5, 15, or 20	By flashing the ABS unit is indicating additional fault codes that may not be listed in the service manual. Please carefully count the number of flashes per 10 seconds before contacting Kawasaki. *(Kawasaki may request a video of the flashing sequence)*
			Other: ……. times	

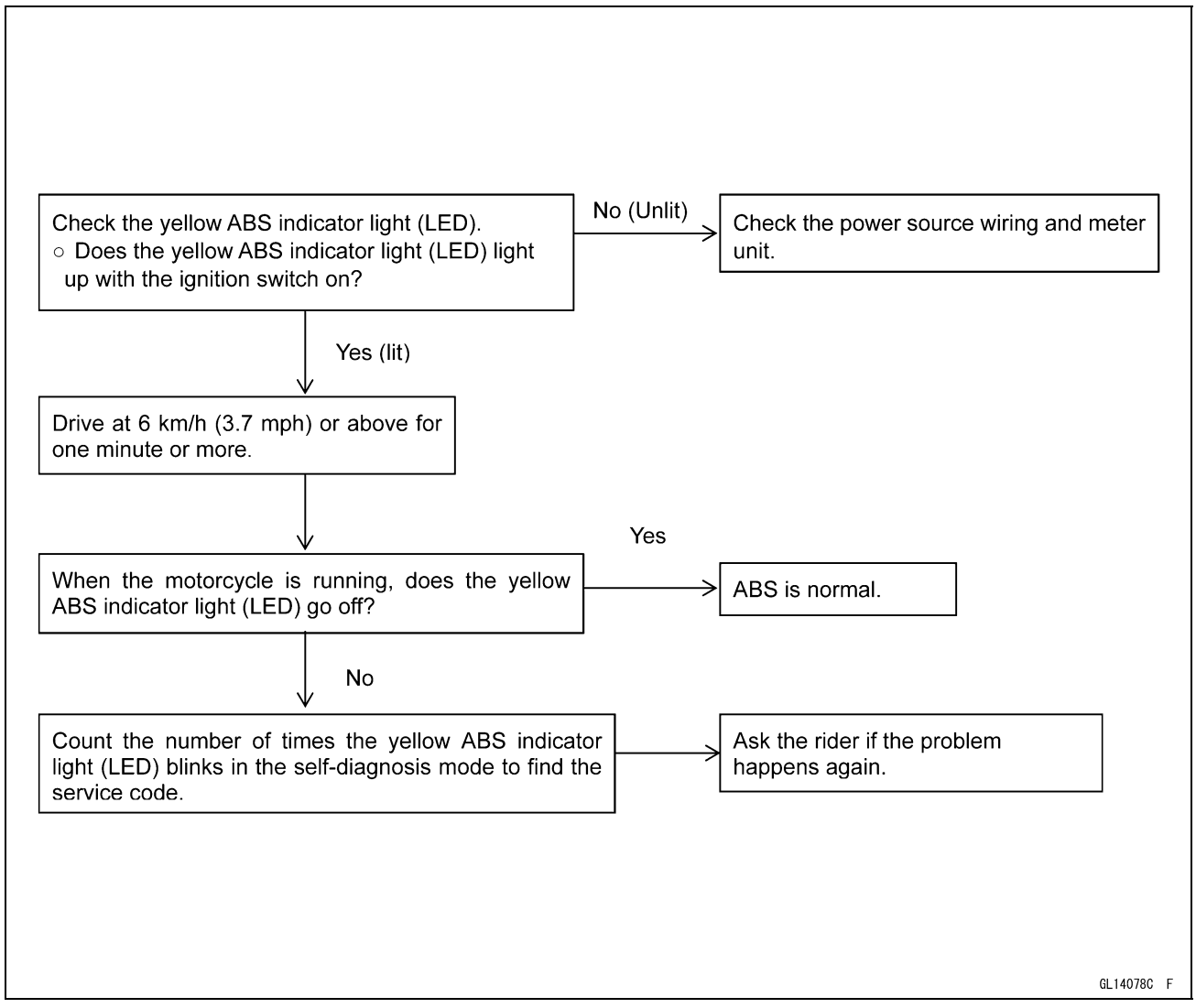
Anti-Lock Brake System

Pre-Diagnosis Inspection 1



Anti-Lock Brake System

Pre-Diagnosis Inspection 2



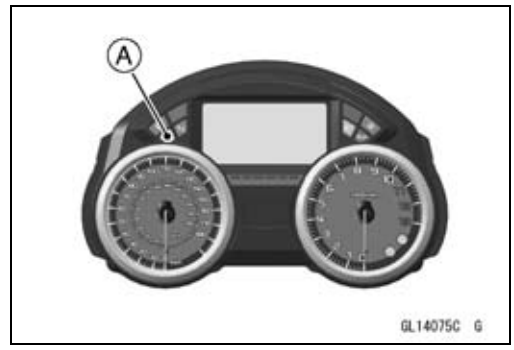
Self-diagnosis Outline

When the indicator light has blinked or come on, the ABS hydraulic unit memorizes and stores the service code for the service person to troubleshoot easily. The service code memory is powered directly by the battery and cannot be canceled by the ignition switch.

The ABS hydraulic unit can memorize up to all service codes. Further service codes are memorized after erasing the preceding all service codes. If there is no fault, the yellow ABS indicator light (LED) lights, indicating that “The ABS is normal”.

Self-diagnosis Procedures

○When a problem occurs with the ABS, the yellow ABS indicator light (LED) [A] lights.

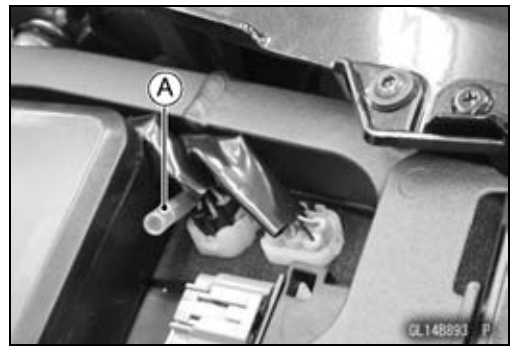


NOTE

- ○*Use a fully charged battery when conducting self-diagnosis. Otherwise, the light blinks very slowly or doesn’t blink.*
- ○*The motorcycle is stopped.*
- ○*Keep the self-diagnosis terminal grounded during self -diagnosis, with an auxiliary lead.*

- Remove the seat (see Seat Removal in the Frame chapter).
- Ground the self-diagnosis terminal [A] (Gray) to the frame ground, using a suitable lead.
- Turn the ignition switch on.

○Count the blinks of the light to read the service code. Keep the auxiliary lead ground until you finish reading the service code.



Service Code Erasing Procedures

- Start the service code erase mode with the following procedure.

○The erase mode starts when the ABS self-diagnosis terminal is disconnected from the frame ground after starting the self-diagnosis mode.

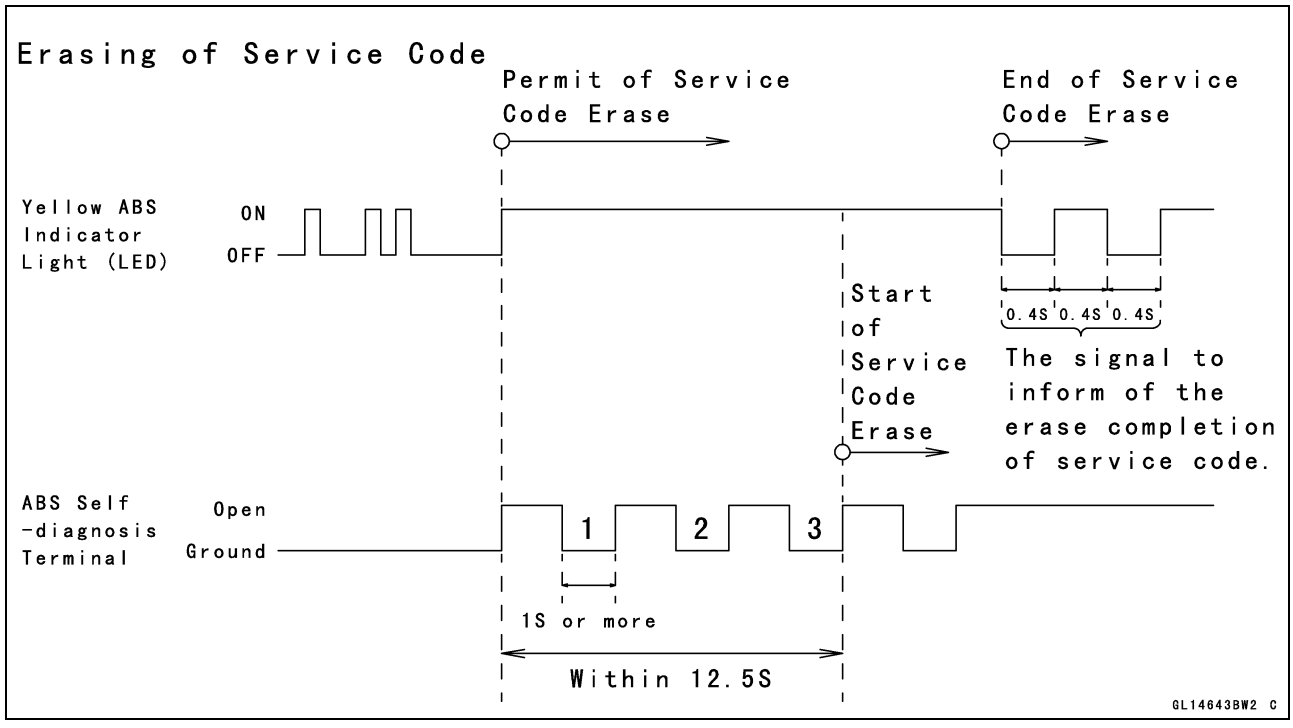
○The service code can be erased by grounding and ungrounding (each time for at least one second) the ABS self-diagnosis terminal three times or more within about 12.5 seconds after starting the erase mode.

○The yellow ABS indicator light (LED) remains lit during the erase mode.

○After erasing, the yellow ABS indicator light (LED) blinks and lights.

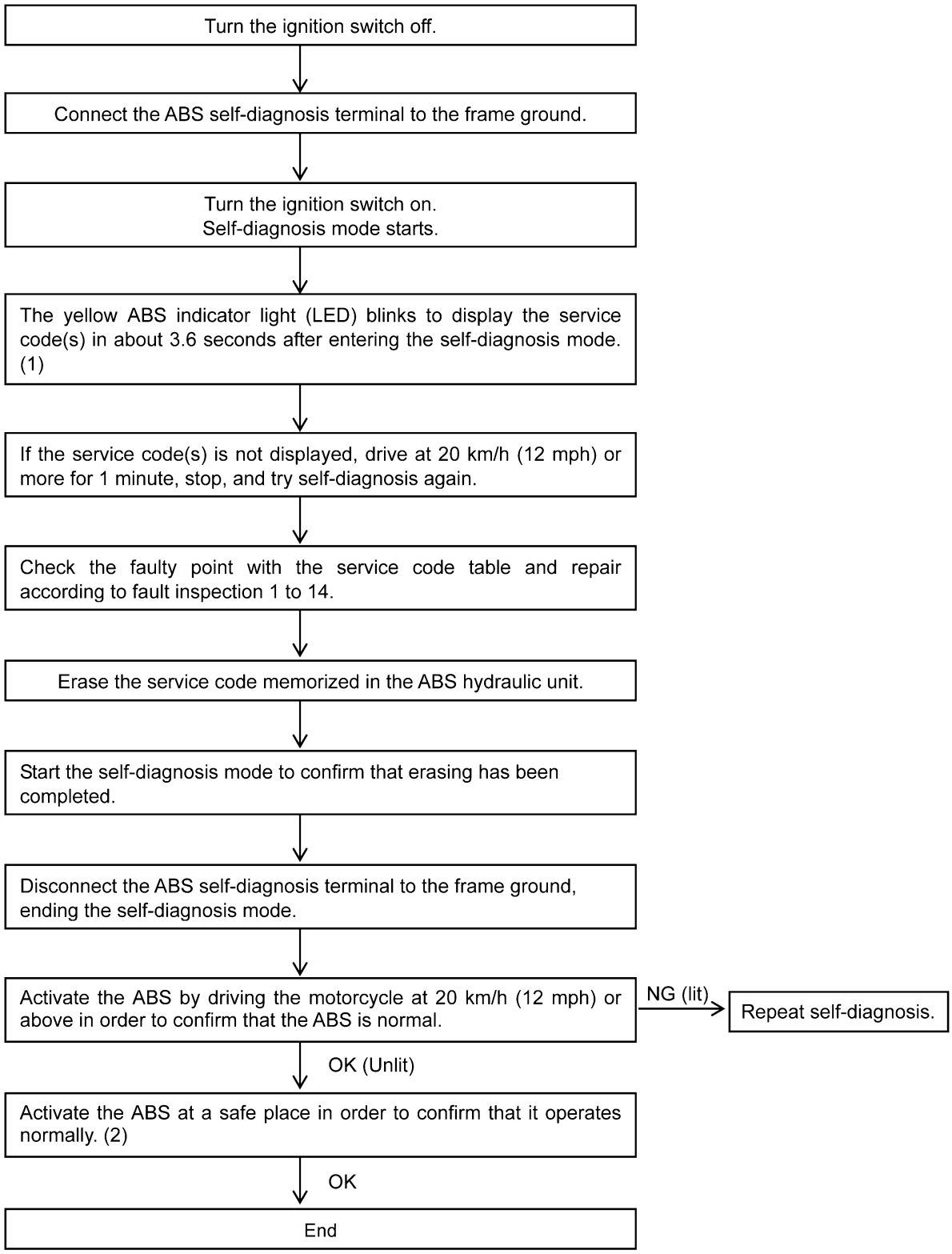
○Once erasing is finished, enter the self-diagnosis mode again to confirm that the service codes have been erased. If the ABS has been reset and all codes have been erased, the yellow ABS indicator light (LED) lights.

Anti-Lock Brake System



Anti-Lock Brake System

Self-diagnosis Flow Chart



(1): The self-diagnosis mode ends following.
When the ignition switch is off.
When the motorcycle is driven while in the self-diagnosis mode.
When the self-diagnosis terminal disconnects.

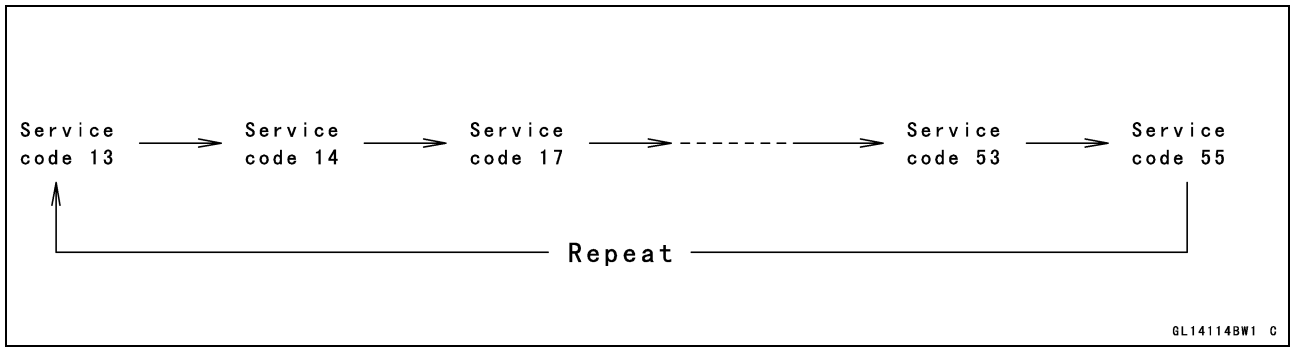
(2): Apply brake suddenly at 30 km/h (19 mph) or more to confirm that the motorcycle stops smoothly and steady with pulsation on the brake lever and pedal.

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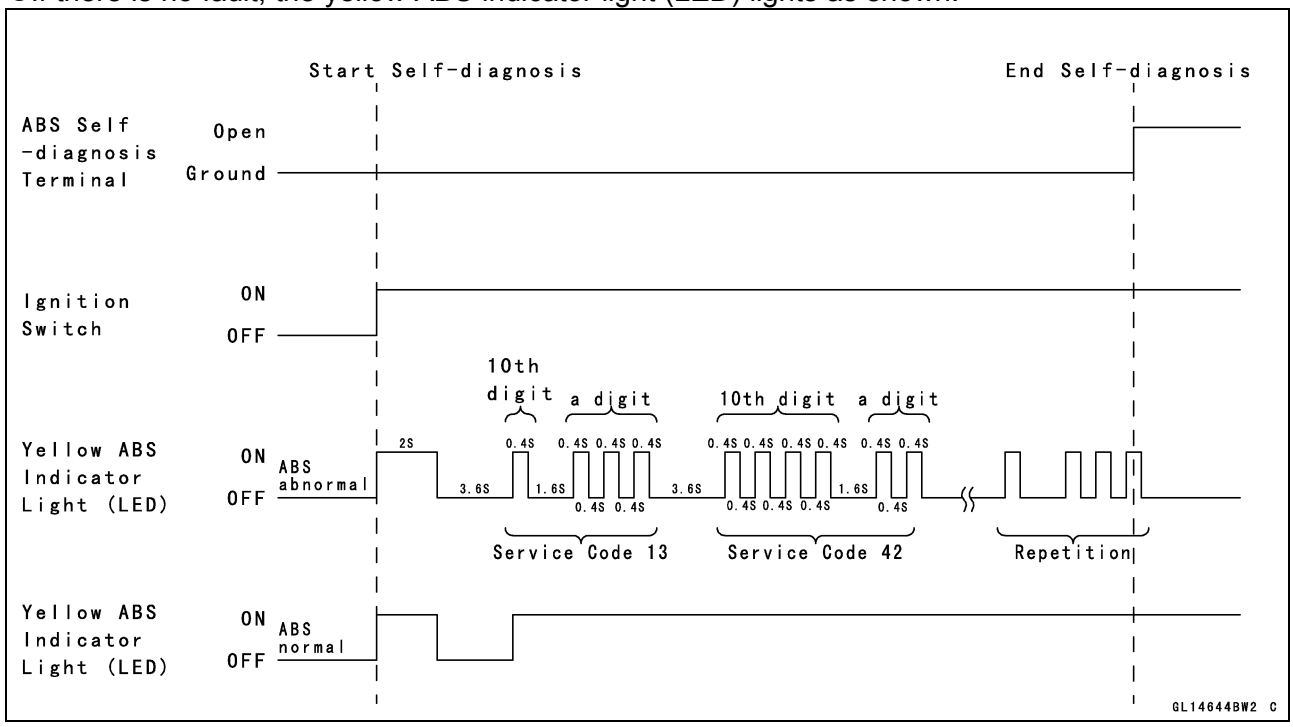
Anti-Lock Brake System

How to Read Service Codes

○Service codes are shown by a series of long and short blinks of the yellow ABS indicator light (LED) as shown below.
○Read 10th digit and unit digit as the yellow ABS indicator light (LED) blinks.
○When there are a number of faults, a maximum of all service codes can be stored and the display will begin starting from the small number code entered.
○For the display pattern, first the smallest number code is shown, next up to all service codes starting with the last one stored, then the display is repeated from the smallest number code once again.



○If there is no fault, the yellow ABS indicator light (LED) lights as shown.

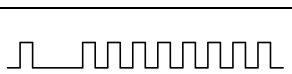
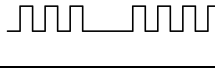
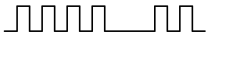
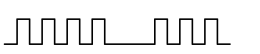
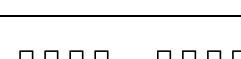


How to Erase Service Codes

○Even if the ignition switch is turned off, the battery or the ABS hydraulic unit are disconnected, all service codes remain in the ABS hydraulic unit.
○Refer to the Service Code Erasing Procedure for the service code erasure.

Anti-Lock Brake System

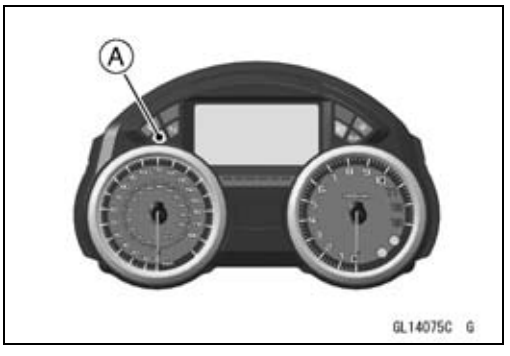
Service Code Table

Service Code	Yellow ABS Indicator Light (LED)	Problems	Light State
13		Rear intake solenoid valve trouble (wiring shorted or open)	ON
14		Rear outlet solenoid valve trouble (wiring shorted or open)	ON
17		Front intake solenoid valve trouble (wiring shorted or open)	ON
18		Front outlet solenoid valve trouble (wiring shorted or open)	ON
19		ABS solenoid valve relay trouble [stuck relay (ON or OFF)]	ON
25		Front, rear wheel rotation difference abnormal (substandard tire)	ON
35		ABS motor relay trouble [stuck relay (ON or OFF)]	ON
42		Front wheel rotation sensor signal abnormal (sensor or rotor missing, too large clearance, rotor tooth worn or missing)	ON
43		Front wheel rotation sensor wiring (wiring shorted or open, connector bad connection)	ON
44		Rear wheel rotation sensor signal abnormal (sensor or rotor missing, too large clearance, rotor tooth worn or missing)	ON
45		Rear wheel rotation sensor wiring (wiring shorted or open, connector bad connection)	ON
52		Power supply voltage abnormal (under-voltage)	ON
53		Power supply voltage abnormal (over-voltage)	ON
55		ECU trouble (ECU operation abnormal)	ON

Yellow ABS Indicator Light (LED) Inspection

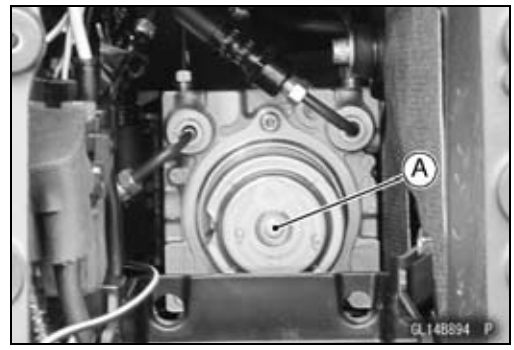
○In this model, the yellow ABS indicator light (LED) [A] goes on or blinks by the control of the ABS hydraulic unit.

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



Anti-Lock Brake System

Solenoid Valve Inspection (Service Code 13, 14, 17, 18)



○The solenoid valve is built in the ABS hydraulic unit [A]. Therefore the solenoid valve cannot be checked directly.
● Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider).
★If any of these service codes appears even if all checks are ended, replace the ABS hydraulic unit.
★If the service code does not appear, the ABS is normal (temporary failure).

ABS Solenoid Valve Relay Inspection (Service Code 19)

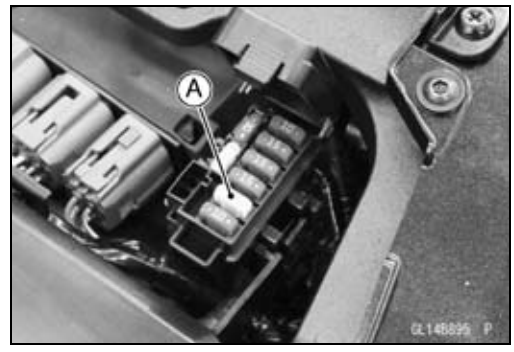
○The ABS solenoid valve relay is built in the ABS hydraulic unit. Therefore the relay cannot be checked directly.
● Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider).
★If this service code appears even if all checks are ended, replace the ABS hydraulic unit.
★If the service code does not appear, the ABS is normal (temporary failure).

Front, Rear Wheel Rotation Difference Abnormal Inspection (Service Code 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)
★If the all parts corrected, go to next step.

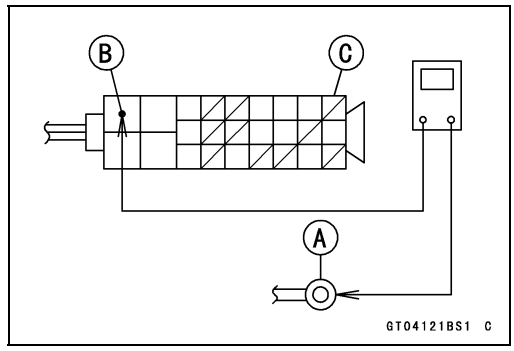
● Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider).
★If this service code appears even if all checks are ended, replace the ABS hydraulic unit.
★If the service code does not appear, the ABS is normal (temporary failure).

ABS Motor Relay Inspection (Service Code 35)



● Check the ABS motor relay fuse 20 A [A] (see Fuse Inspection in the Electrical System chapter).
★If the fuse is good, check the wiring continuity as follows.
○Disconnect:
Battery Positive Cable (see Battery Removal in the Electrical System chapter)
ABS Hydraulic Unit Lead Connector (see ABS Hydraulic Unit Removal)

○Check the wiring continuity between the positive cable terminal [A] of the battery and R/W lead terminal [B] in the ABS hydraulic unit lead connector [C].
★If the wiring is open, replace or repair the harness (see ABS Wiring Diagram).
★If the wiring is good, go to next step.

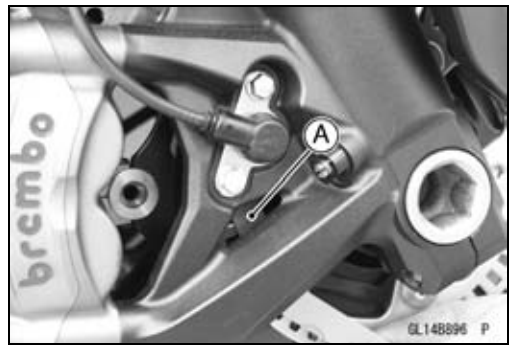


○The ABS motor relay is built in the ABS hydraulic unit. Therefore the relay cannot be checked directly.
● Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider).
★If this service code appears even if all checks are ended, replace the ABS hydraulic unit.
★If the service code does not appear, the ABS is normal (temporary failure).

Front Wheel Rotation Sensor Signal Abnormal (Service Code 42)

● Measure the air gap between the front wheel rotation sensor and sensor rotor.
Thickness Gauge [A]

Air Gap
Standard: 0.1 ~ 1.5 mm (0.004 ~ 0.060 in.)

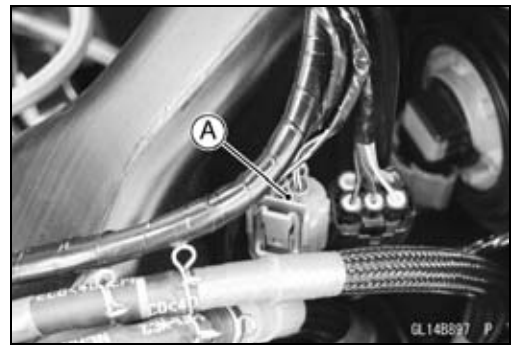


★If the measurement is not the standard, check each part for deformation and looseness and correct accordingly.
★If the measurement is the standard, go to next step.

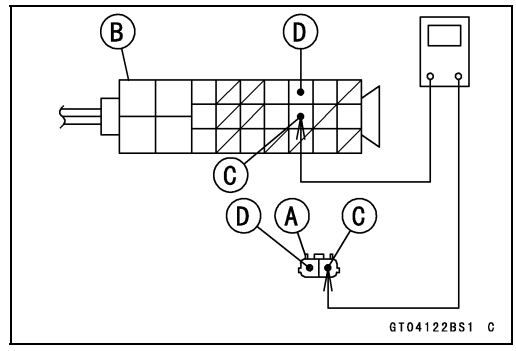
● Check that there is iron or other magnetic deposits between the sensor and sensor rotor, and the sensor rotor slots for obstructions.
● Check the installation condition of the sensor for looseness.
● Check the sensor and sensor rotor tip for deformation or damage (e.g., chipped sensor rotor teeth).
★If the sensor and sensor rotor in bad condition, remove the any deposits. Install the proper part or replace faulty part.
★If the all items are good, go to next step.
● Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider).
★If this service code appears even if all checks are ended, replace the ABS hydraulic unit.
★If the service code does not appear, the ABS is normal (temporary failure).

Anti-Lock Brake System

Front Wheel Rotation Sensor Wiring Inspection (Service Code 43)



- Remove the right inner cover (see Inner Cover Removal in the Frame chapter).
- Disconnect the front wheel rotation sensor lead connector [A].



- Disconnect the ABS hydraulic unit lead connector (see ABS Hydraulic Unit Removal).
- Check the wiring continuity of the W/BK lead and BK/W lead.
  Front Wheel Rotation Sensor Lead Connector [A]
  ABS Hydraulic Unit Lead Connector [B]
  W/BK Lead Terminals [C]
  BK/W Lead terminals [D]

★If the wiring is open, replace or repair the harness (see ABS Wiring Diagram).

★If the wiring is good, go to next step.

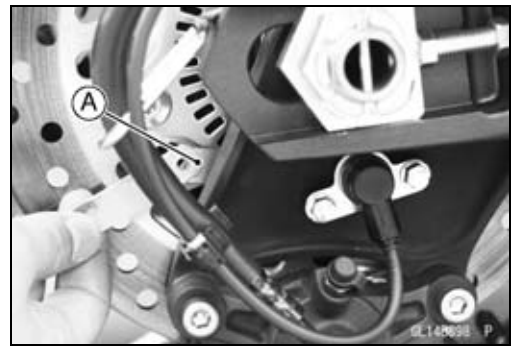
- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider).

★If this service code appears even if all checks are ended, replace the front wheel rotation sensor (see Front Wheel Rotation Sensor Removal).

- Still, when it is not good, replace the ABS hydraulic unit.

★If the service code does not appear, the ABS is normal (temporary failure).

Rear Wheel Rotation Sensor Signal Abnormal (Service Code 44)



- Measure the air gap between the rear wheel rotation sensor and sensor rotor.
  Thickness Gauge [A]

Air Gap
Standard: 0.1 ~ 1.5 mm (0.004 ~ 0.060 in.)

★If the measurement is not the standard, check each part for deformation and looseness and correct accordingly.

★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.

★If the all items are good, go to next step.

- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider).

★If this service code appears even if all checks are ended, replace the ABS hydraulic unit.

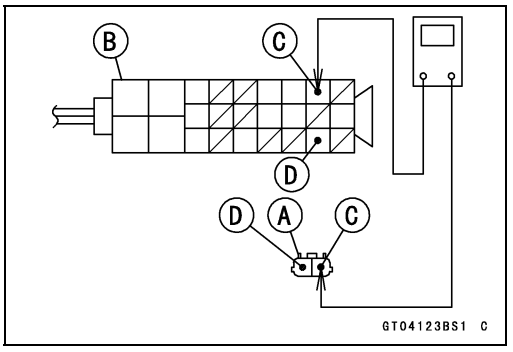
★If the service code does not appear, the ABS is normal (temporary failure).

Rear Wheel Rotation Sensor Wiring Inspection (Service Code 45)

- Remove the fuel tank (see Fuel Tank Removal in the Fuel System (DFI) chapter).
- Disconnect the rear wheel rotation sensor lead connector [A].



- Disconnect the ABS hydraulic unit lead connector (see ABS Hydraulic Unit Removal).
- Check the wiring continuity of the W/G lead and BK/O lead.
  Rear Wheel Rotation Sensor Lead Connector [A]
  ABS Hydraulic Unit Lead Connector [B]
  W/G Lead Terminals [C]
  BK/O Lead terminals [D]



★If the wiring is open, replace or repair the harness (see ABS Wiring Diagram).

★If the wiring is good, go to next step.

- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider).

★If this service code appears even if all checks are ended, replace the rear wheel rotation sensor (see Rear Wheel Rotation Sensor Removal).

- Still, when it is not good, replace the ABS hydraulic unit.

★If the service code does not appear, the ABS is normal (temporary failure).

Power Supply Voltage Inspection (Low-Voltage) (Service Code 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).

★If this service code appears even if all checks are ended, replace the ABS hydraulic unit.

★If the service code does not appear, the ABS is normal (temporary failure).

Anti-Lock Brake System

Power Supply Voltage Inspection (Over-Voltage) (Service Code 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).

★If this service code appears even if all checks are ended, replace the ABS hydraulic unit.

★If the service code does not appear, the ABS is normal (temporary failure).

ECU Inspection (Service Code 55)

○This ECU is built in the ABS hydraulic unit. Therefore the ECU cannot be checked directly.

- Perform the Pre-Diagnosis Inspection 1 and 2 (see Inquiries to Rider).

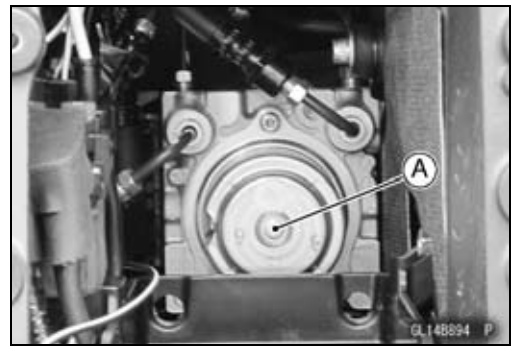
★If this service code appears even if all checks are ended, replace the ABS hydraulic unit.

★If the service code does not appear, the ABS is normal (temporary failure).

ABS Hydraulic Unit Removal

NOTICE

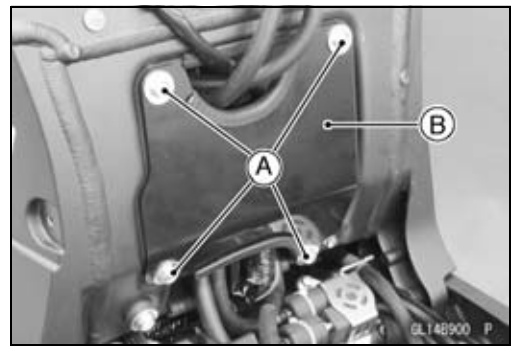
The ABS hydraulic unit [A] has been adjusted and set with precision at the factory. Therefore, it should be handled carefully, never struck sharply with a hammer, or allowed to fall on a hard surface. Be careful not to get water or mud on the ABS hydraulic unit.



- Drain the brake fluid from the front and rear brake lines.

○Drain the brake fluid through the bleed valve by pumping the brake lever and pedal.

- Remove:
  Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)
  Battery (see Battery Removal in the Electrical System chapter)
  Battery Back Cover Bolts [A]
  Battery Back Cover [B]
- Clean the ABS hydraulic unit.

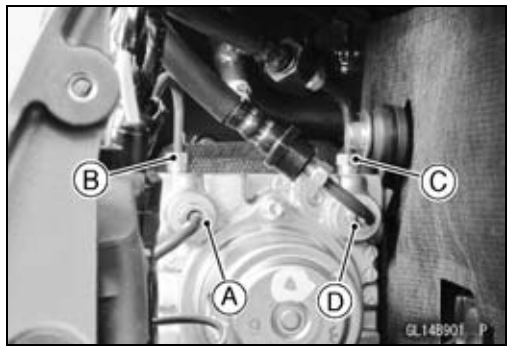


NOTICE

Clean all fittings on the 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 ABS hydraulic unit before removing the brake line so that brake fluid does not leak on the parts.

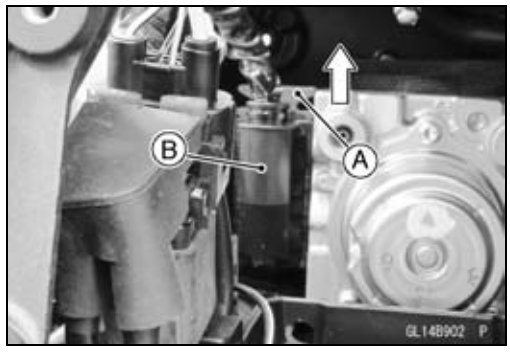
Anti-Lock Brake System

- Remove the brake pipe joint nuts [A] [B] [C] [D] with the flare nut wrench.
- Tape the brake line opening to prevent brake fluid leakage or contamination by foreign matter.

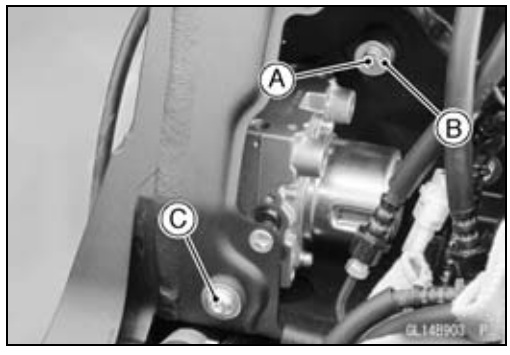


NOTICE
Brake fluid quickly damages painted plastic surfaces; any spilled fluid should be completely washed away immediately.

- Pull the joint lock [A] upward to disconnect the ABS hydraulic unit connector [B].

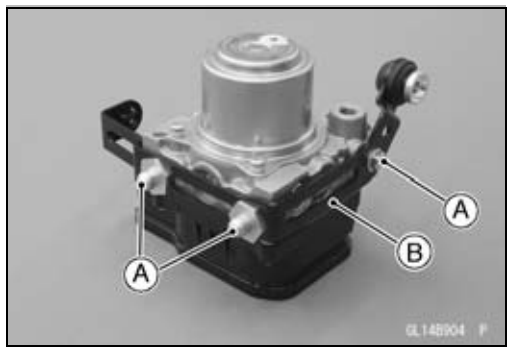


- Remove:
  Upper Bolt [A]
  Washer [B]
  Lower Bolt [C]
- Remove the ABS hydraulic unit with bracket.



- Remove the bolts [A] and bracket [B].

NOTICE
The ABS hydraulic unit has been adjusted and set with precision at the factory. Do not try to disassemble and repair the ABS hydraulic unit.

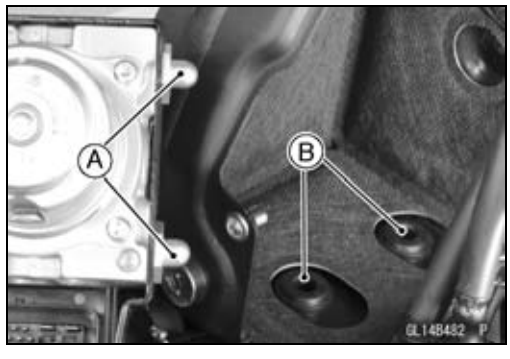


ABS Hydraulic Unit Installation

- Install the ABS hydraulic unit to the bracket.

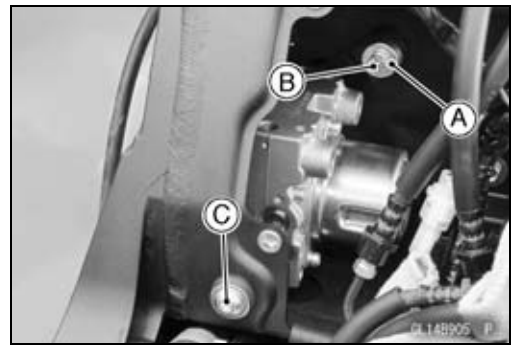
NOTICE
Brake fluid quickly damages painted plastic surfaces; any spilled fluid should be completely washed away immediately.

- Insert the bolts [A] into the grommets [B].

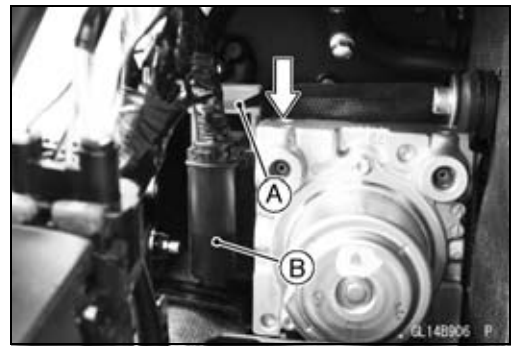


Anti-Lock Brake System

- Install the washer [A], upper bolt [B] and lower bolt [C].



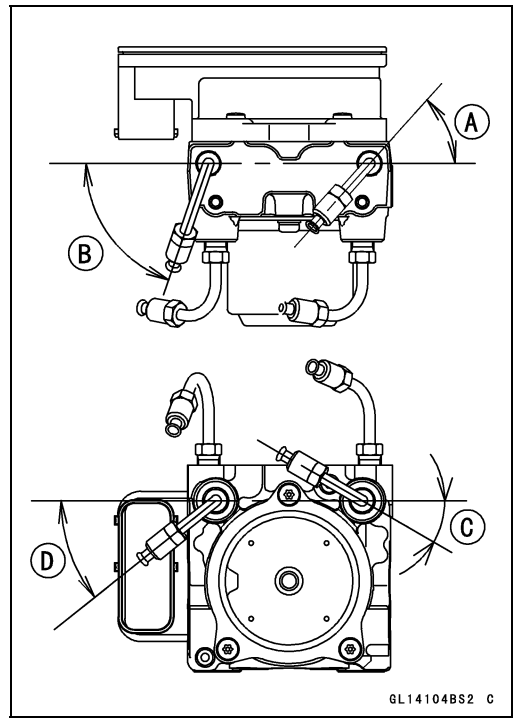
- Push the joint lock [A] downward to connect the ABS hydraulic unit connector [B].



- Install the brake pipes correctly as shown.
  48° [A]
  71° [B]
  30° [C]
  38.5° [D]
- Tighten the joint nuts with the flare nut wrench.

  Torque - Brake Pipe Joint Nuts: 18 N·m (1.8 kgf·m, 13 ft·lb)
- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.
- Install the battery back cover.
- Tighten:

  Torque - Battery Back Cover Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)
- Install the removed parts (see appropriate chapters).



ABS Hydraulic Unit Inspection

- Remove the ABS hydraulic unit (see ABS Hydraulic Unit Removal).
- Visually inspect the ABS hydraulic unit.

★Replace the ABS hydraulic unit if any of them are cracked, or otherwise damaged.

- Visually inspect the connector terminals [A].

★Replace the ABS hydraulic unit or main harness if either of the terminals are cracked, bent, or otherwise damaged.

★If the ABS hydraulic unit connector is clogged with mud or dust, blow it off with compressed air.

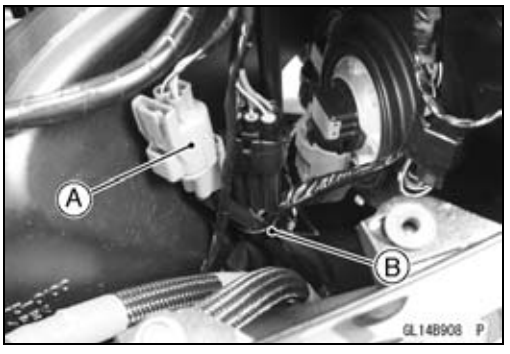


Front Wheel Rotation Sensor Removal

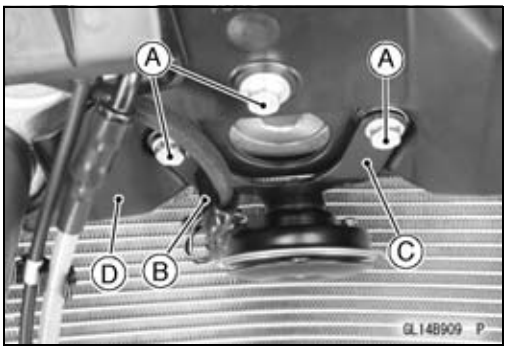
NOTICE

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)
  Upper Inner Fairing (see Upper Inner Fairing Removal in the Frame chapter)
- Disconnect the front wheel rotation sensor lead connector [A] and free the front wheel rotation sensor lead from the clamp [B].



- Remove:
  Steering Stem Cover Bolts [A]
  Clamp [B]
  Horn Bracket [C]
  Steering Stem Cover [D]



- Free the front wheel rotation sensor lead from the clamps [A].



Anti-Lock Brake System

- Free the front wheel rotation sensor lead from the clamps [A].
- Remove:
  Front Wheel Rotation Sensor Bolts [B]
  Front Wheel Rotation Sensor [C]



Front Wheel Rotation Sensor Installation

- Installation is the reverse of removal.
- Run the lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Tighten :

Torque - Front Wheel Rotation Sensor Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)
Steering Stem Cover Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

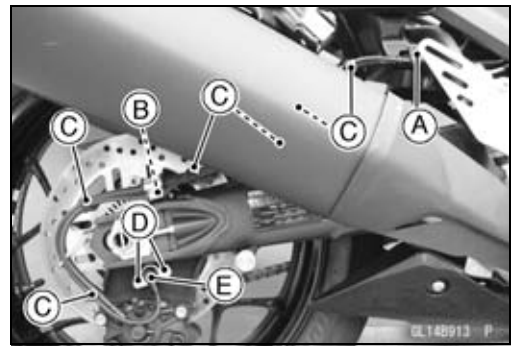
Rear Wheel Rotation Sensor Removal

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).
- Disconnect the rear wheel rotation sensor lead connector [A].
- Remove the rear wheel rotation sensor lead connector from the bracket.



- Remove:
  Brake Hose Joint Bolt [A]
  Brake Hose Clamp Bolt [B]
  Clamps [C]
  Rear Wheel Rotation Sensor Bolts [D]
  Rear Wheel Rotation Sensor [E]



Anti-Lock Brake System

Rear Wheel Rotation Sensor Installation

- Installation is the reverse of removal.
- Run the lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Tighten:

Torque - Brake Hose Joint Bolt: 8.0 N·m (0.82 kgf·m, 71 in·lb)
Brake Hose Clamp Bolt: 8.0 N·m (0.82 kgf·m, 71 in·lb)
Rear Wheel Rotation Sensor Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Wheel Rotation Sensor Inspection

- Remove the front wheel rotation sensor [A] from the front fork.
- Remove the rear wheel rotation sensor [B] 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]

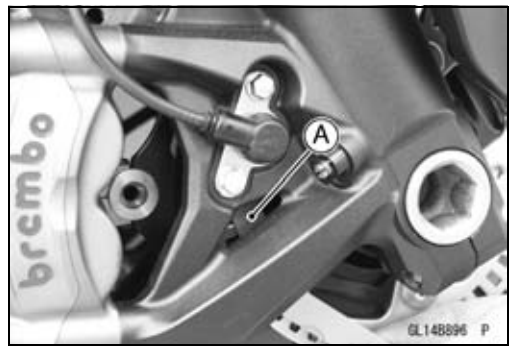
Air Gap
Standard:

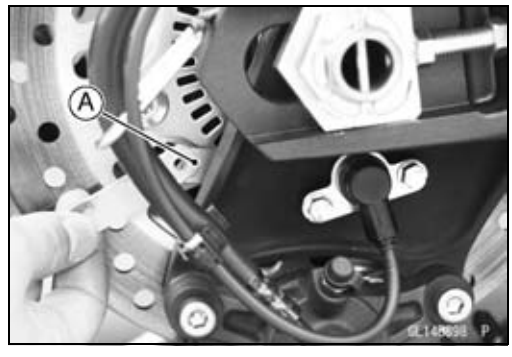
Front	**0.1 ~ 1.5 mm (0.004 ~ 0.060 in.)**
Rear	**0.1 ~ 1.5 mm (0.004 ~ 0.060 in.)**

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).

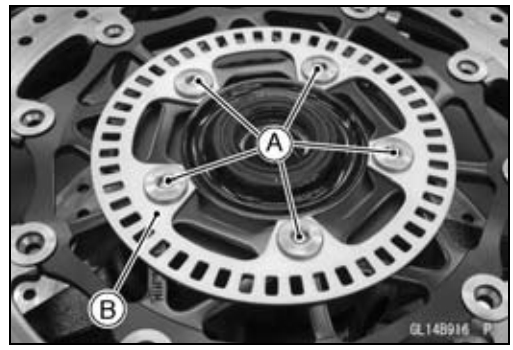


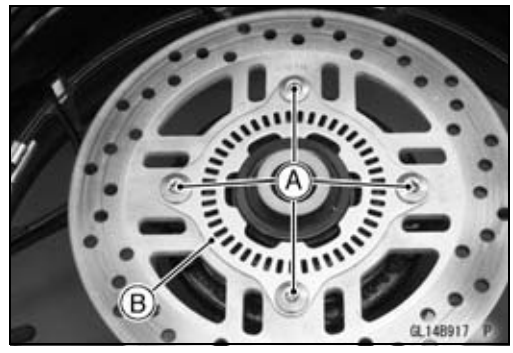


Anti-Lock Brake System

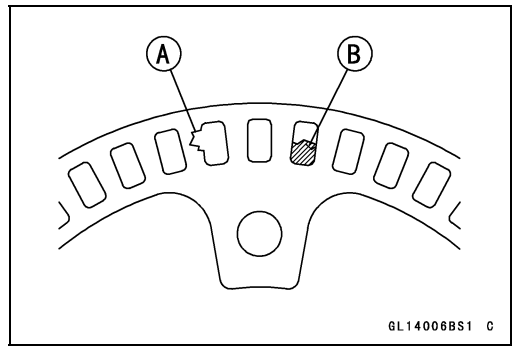
Wheel Rotation Sensor Rotor Inspection

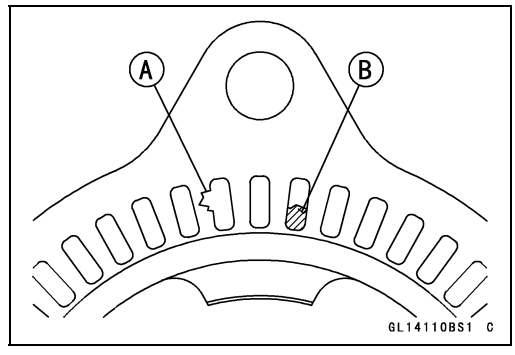
● Remove:
Wheels (see Front/Rear Wheel Removal in the Wheels/Tires chapter)
Brake Disc Mounting Bolts [A]
Sensor Rotor [B]





● Visually inspect the wheel rotation sensor rotor.
★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.





ABS Solenoid Valve Relay Fuse 20 A Removal

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

ABS Motor Relay Fuse 30 A Removal

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

ABS ECU Fuse 10 A Removal

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

Anti-Lock Brake System

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

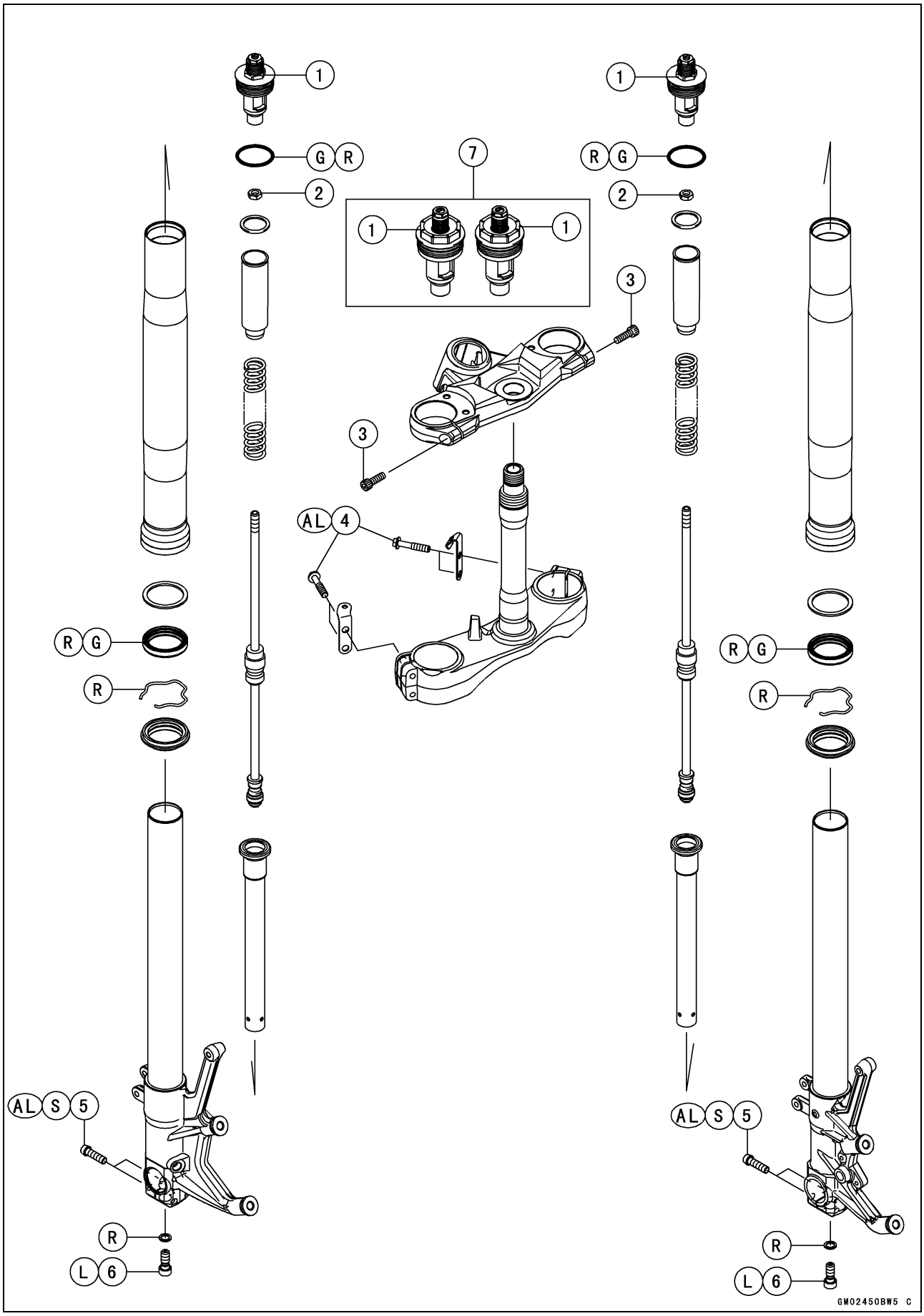
- Remove the fuses (see ABS Solenoid Valve Relay Fuse 20 A/ABS Motor Relay Fuse 30 A/ABS ECU Fuse 10 A Removal).
- Refer to the Fuse Inspection in the Electrical System chapter.

Suspension

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Rocker Arm/Tie-Rod Bearing, Sleeve Inspection 13-49
Rocker Arm/Tie-Rod Bearing Lubrication 13-49

Exploded View

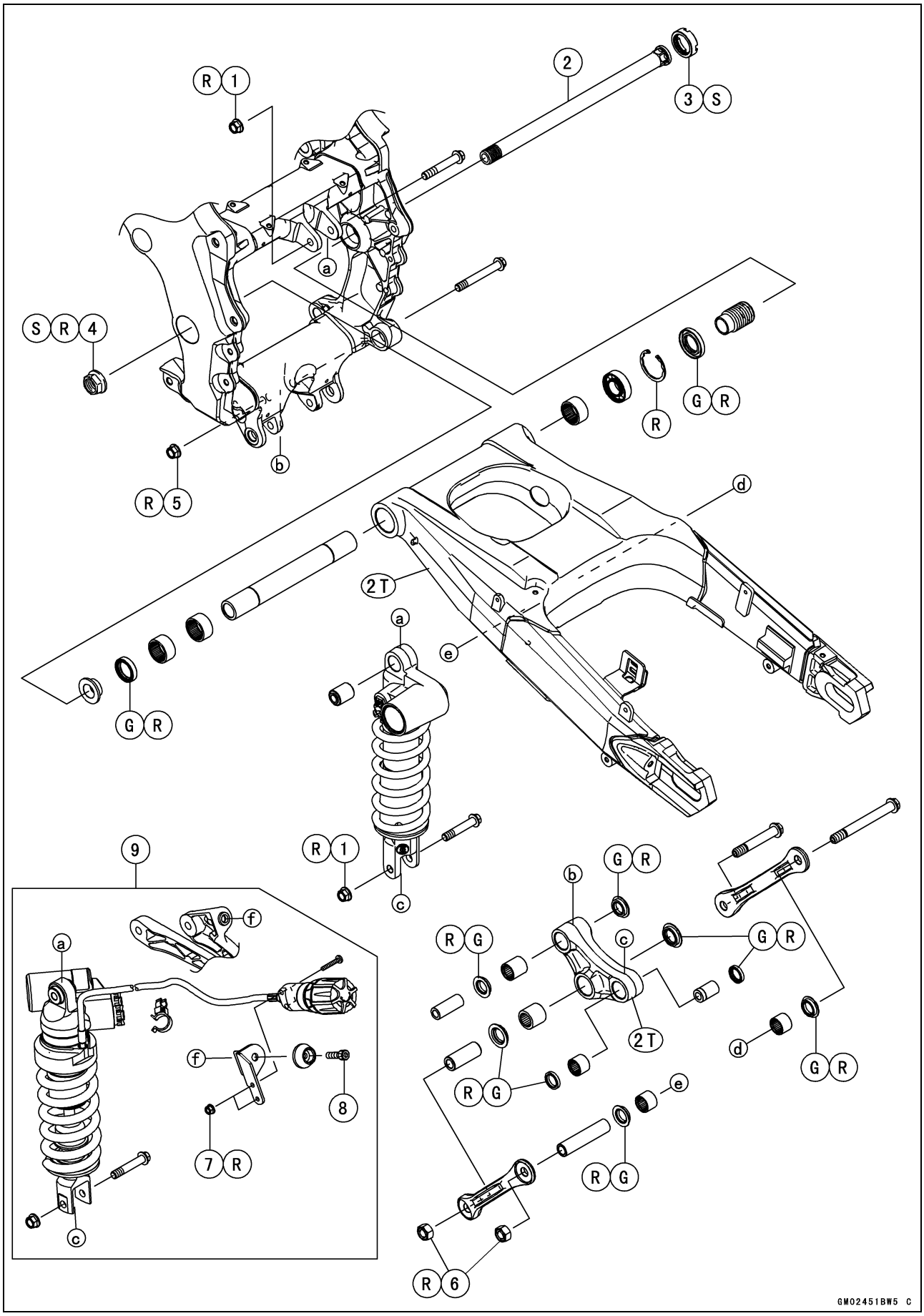


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Fork Top Plugs	23	2.3	17	
2	Piston Rod Nuts	29	3.0	21	
3	Front Fork Clamp Bolts (Upper)	20	2.0	15	
4	Front Fork Clamp Bolts (Lower)	30	3.1	22	AL
5	Front Axle Clamp Bolts	20	2.0	15	AL, S
6	Front Fork Bottom Allen Bolts	23	2.3	17	L

7. Top Plug for Öhlins Model
AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts
S: Follow the specified tightening sequence.

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear Shock Absorber Nuts	35	3.6	26	R
2	Swingarm Pivot Shaft	20	2.0	15	
3	Swingarm Pivot Shaft Locknut	100	10.2	73.8	S
4	Swingarm Pivot Shaft Nut	110	112	81.1	S
5	Rocker Arm Nut	35	3.6	26	R
6	Tie-Rod Nuts	60	6.1	44	R
7	Spring Preload Adjuster Nuts	8.0	0.82	71 in·lb	R
8	Collar Mounting Bolts	35	3.6	26	

9. Make the proper works for each model in reference to the figure.
G: Apply grease.
R: Replacement Parts
S: Follow the specified tightening sequence.
2T: Apply 2-stroke oil.

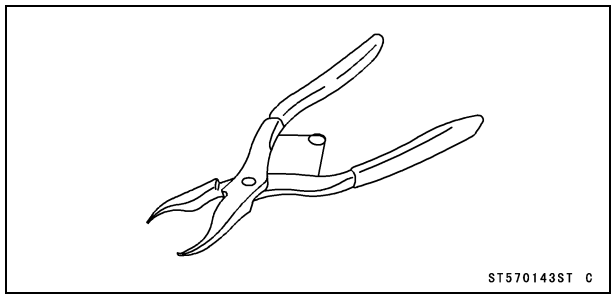
Specifications

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	8 clicks from the fully clockwise position (Usable Range: 0 ←→ 15 clicks)
Compression Damper Setting	10 clicks from the fully clockwise position (Usable Range: 0 ←→ 18 clicks)
Fork Spring Preload Setting	Adjuster protrusion is 14 mm (0.55 in.) (Usable Range: 4 ~ 19 mm (0.16 ~ 0.75 in.))
Suspension Oil	Kawasaki KHL15-10 or equivalent
Amount	Approx. 465 mL (15.7 US oz.) (when changing oil)
	548 ±4 mL (18.5 ±0.14 US oz.) (after disassembly and completely dry)
Suspension Oil Level	94 ±2 mm (3.70 ±0.08 in.) (fully compressed, without fork spring, below from the top of the inner tube)
Fork Spring Free Length	237 mm (9.33 in.) (Service Limit: 232 mm (9.13 in.))
Rear Shock Absorber (Other than Öhlins)	
Rebound Damper Setting	2 turns out from the fully clockwise position (Usable Range: 0 ←→ 2 3/4 turns out)
Compression Damper Setting	2 2/3 turns out from the fully clockwise position (Usable Range: 0 ←→ 6 turns out)
Spring Preload Setting:	
Standard	Spring length: 175.5 mm (6.909 in.)
Usable Range	Spring length: 170.0 ~ 180.5 mm (6.693 ~ 7.106 in.) (stronger to weaker)
Gas Pressure	1 000 kPa (10.20 kgf/cm², 145.0 psi, Non-adjustable)
Rear Shock Absorber (Öhlins)*	
Rebound Damper Setting	14 clicks from the fully clockwise position (Usable Range: 9 ←→ 19 clicks)
Compression Damper Setting	14 clicks from the fully clockwise position (Usable Range: 9 ←→ 19 clicks)
Spring Preload Setting:	0 clicks from the fully counterclockwise position (Usable Range: 0 ←→ 33 clicks)

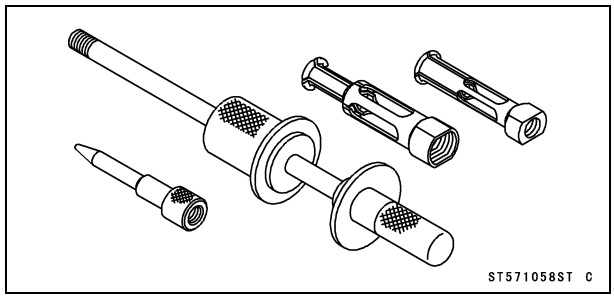
* See the each adjustment in the Rear Shock Absorber (Öhlins) section.

Special Tools

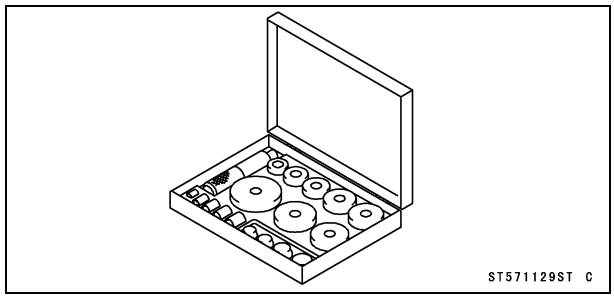
Inside Circlip Pliers:
57001-143



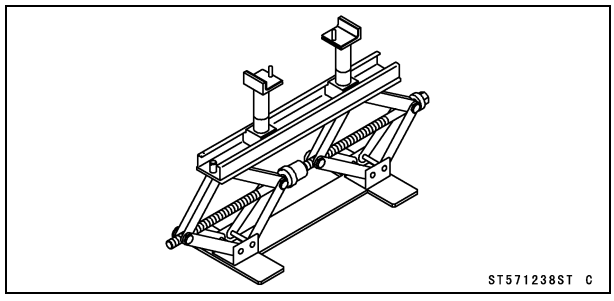
Oil Seal & Bearing Remover:
57001-1058



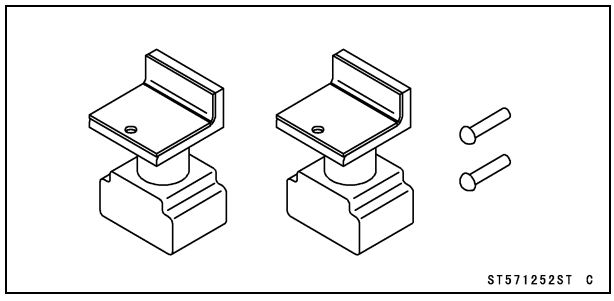
Bearing Driver Set:
57001-1129



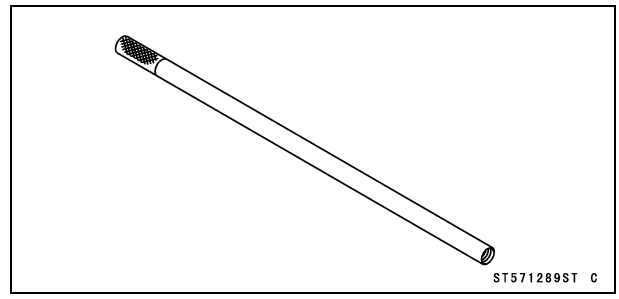
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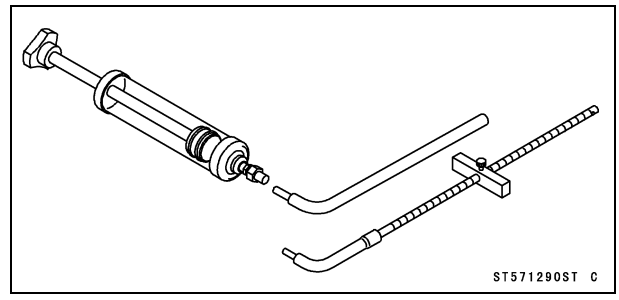
Attachment Jack:
57001-1252



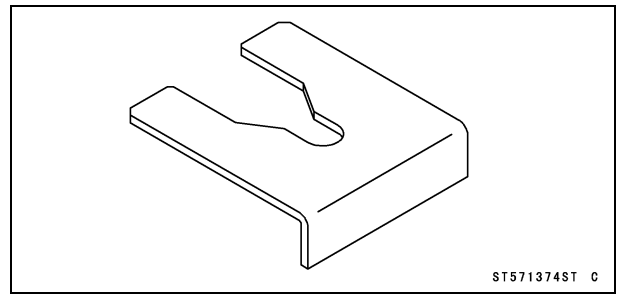
Fork Piston Rod Puller, M12 × 1.25:
57001-1289



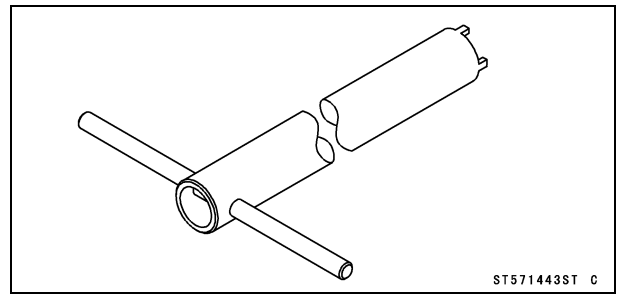
Fork Oil Level Gauge:
57001-1290



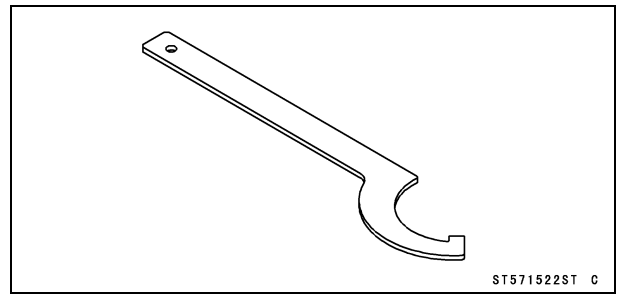
Fork Spring Stopper:
57001-1374



Fork Cylinder Holder:
57001-1443

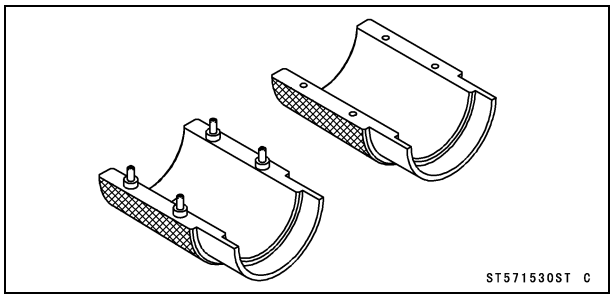


Hook Wrench T=3.2 R37:
57001-1522

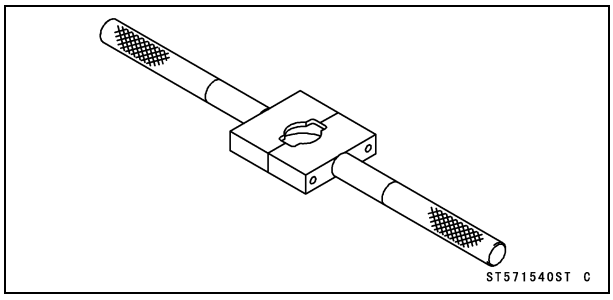


Special Tools

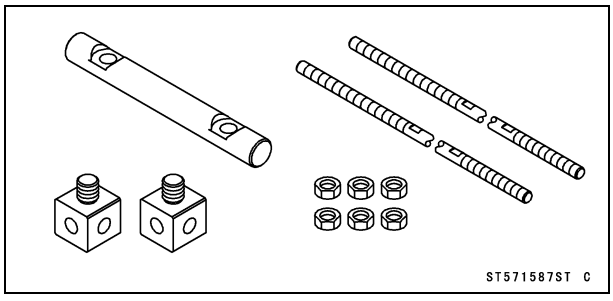
Fork Oil Seal Driver, ϕ43:
57001-1530



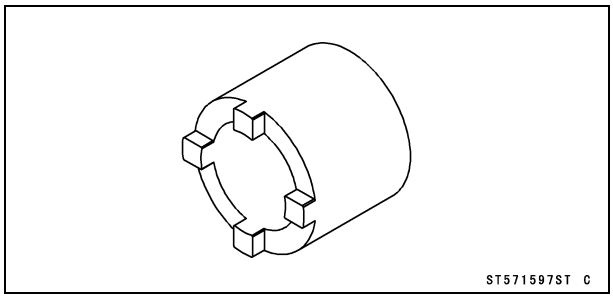
Fork Spring Compressor:
57001-1540



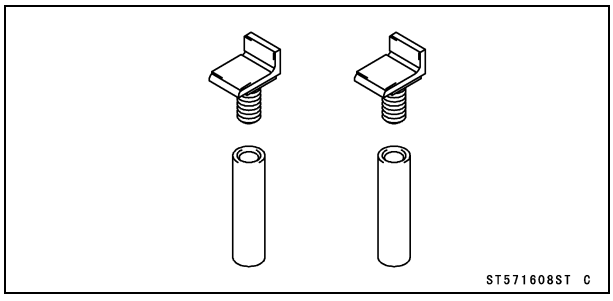
Fork Spring Compressor:
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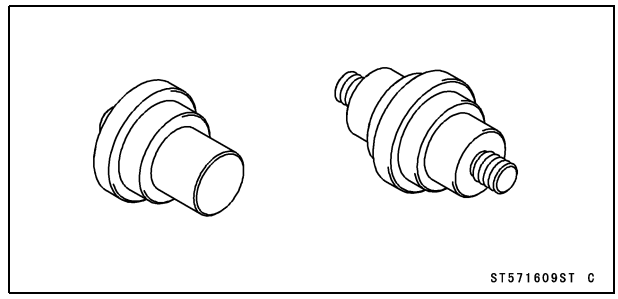
Swingarm Pivot Nut Wrench:
57001-1597



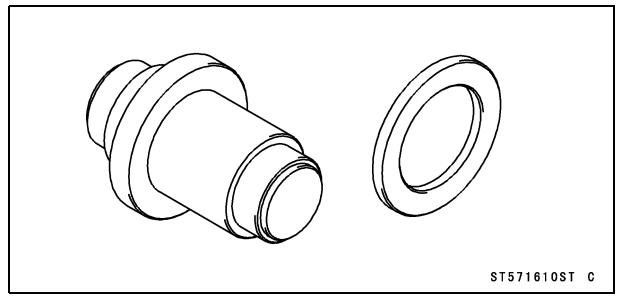
Jack Attachment:
57001-1608



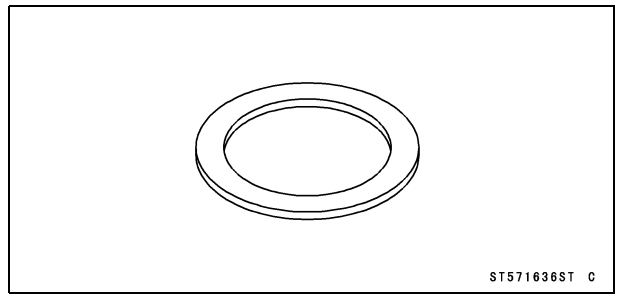
Needle Bearing Driver, ϕ17/ϕ18:
57001-1609



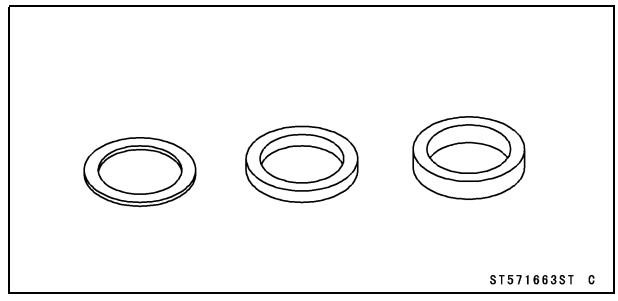
Needle Bearing Driver, ϕ28:
57001-1610



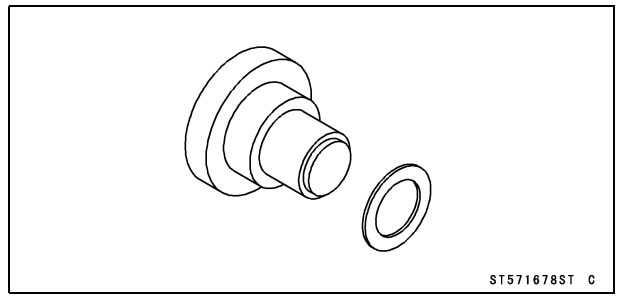
Spacer, ϕ18:
57001-1636



Spacerϕ28:
57001-1663

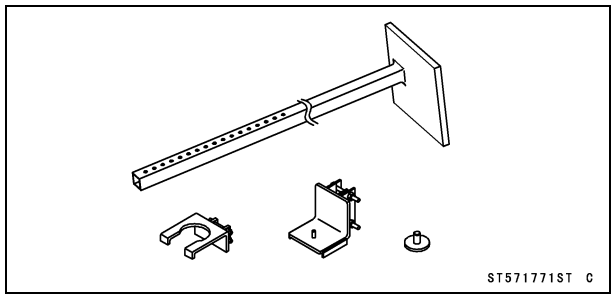


Needle Bearing Driver, ϕ20 & Spacer, ϕ28:
57001-1678

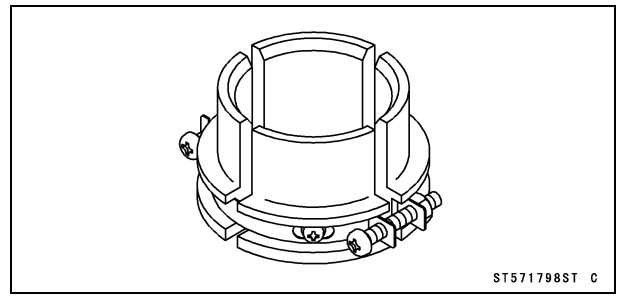


Special Tools

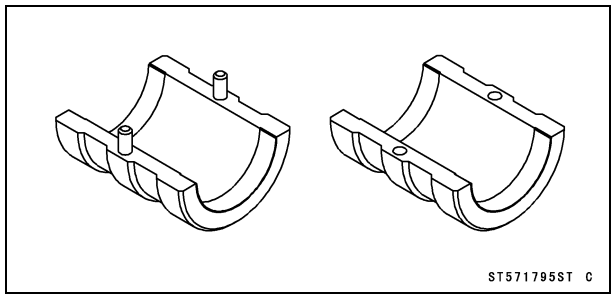
Fork Spring Compressor:
57001-1771



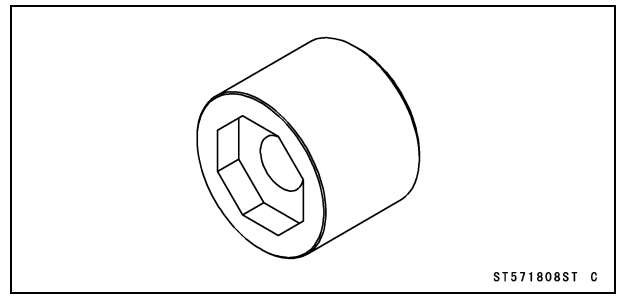
Fork Oil Seal Driver Attachment, ϕ36 ~ ϕ46:
57001-1798



Fork Oil Seal Driver Weight, ϕ26 ~ ϕ46:
57001-1795



Top Plug Wrench:
57001-1808



Front Fork

Rebound Damping Force Adjustment

NOTE

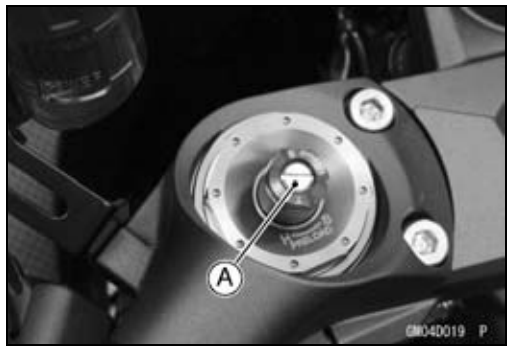
○*Currently two types of the top plug.*
○*Make the proper adjustments for each model in reference to the figure.*



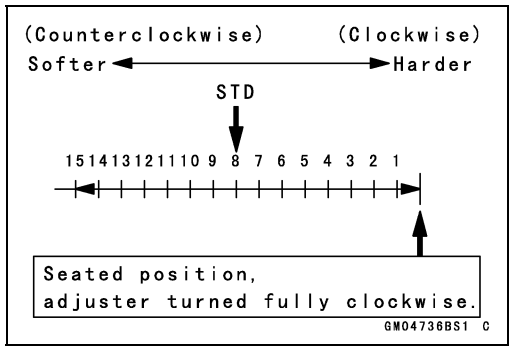
● To adjust the rebound damping force, turn the rebound damping adjuster [A] until you feel a click.
○The standard adjuster setting is the **8th click** from the 1st click of the fully clockwise position.

⚠ 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.



○The damping force can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the damping feels too soft or too stiff, adjust it in accordance with the following table.



Rebound Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
15	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
0	Strong	Hard	Heavy	Bad	High

Compression Damping Force Adjustment



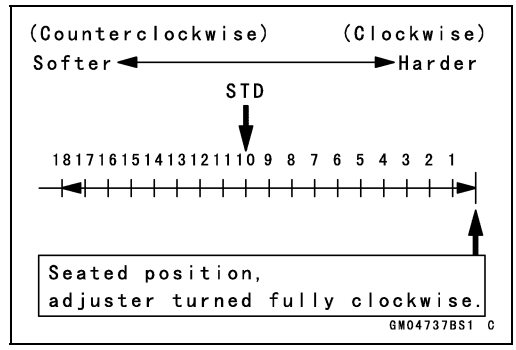
● To adjust the compression damping force, turn the compression damping adjuster [A] until you feel a click.
○The standard adjuster setting is the **10th click** from the 1st click of the fully clockwise position.

⚠ 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.

Front Fork

○The damping force can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the damping feels too soft or too stiff, adjust it in accordance with the following table.



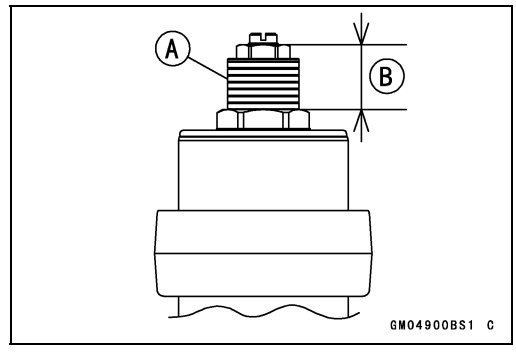
Compression Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
18	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
0	Strong	Hard	Heavy	Bad	High

Spring Preload Adjustment

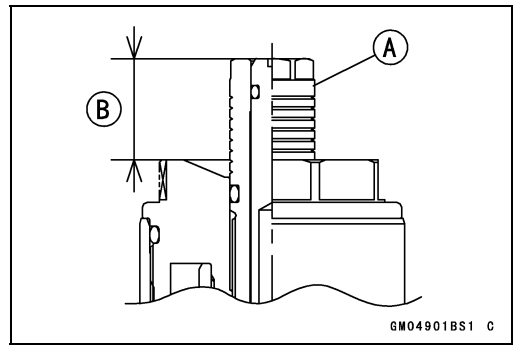
NOTE

○*Currently two types of the top plug.*
○*Make the proper adjustments for each model in reference to the figure.*



● 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.

Adjuster Protrusion (from top)
Standard: 14 mm (0.55 in.)
Usable Range: 4 ~ 19 mm (0.16 ~ 0.75 in.)



⚠ 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.

○The spring preload can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

Spring Preload Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
19 mm (0.75 in.)	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
4 mm (0.16 in.)	Strong	Hard	Heavy	Bad	High

Front Fork

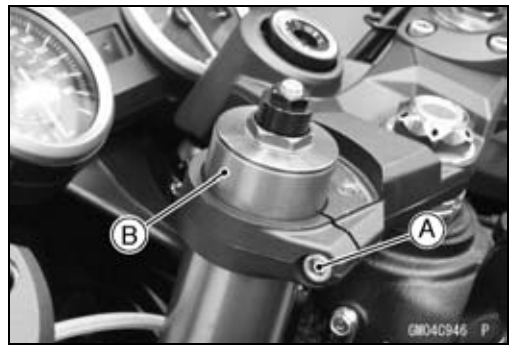
Front Fork Removal (Each Fork Leg)

NOTE

○*Currently two types of the top plug.*
○*Make the proper works for each model in reference to the figure.*

● Remove:
Upper Inner Fairings (see Upper Inner Fairing Removal in the Frame chapter)
Front Wheel (see Front Wheel Removal in the Wheels/Tires chapter)
Front Fender (see Front Fender Removal in the Frame chapter)
Handlebar (see Handlebar Removal in the Steering chapter)

★Loosen the upper front fork clamp bolt [A] and fork top plug [B] beforehand if the fork leg is to be disassembled.



NOTE

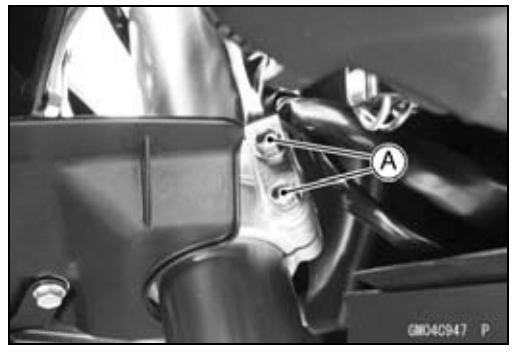
○*Loosen the top plug after loosening the upper front fork clamp bolt.*

● Use the top plug wrench except for the top plug in the upper figure.

Special Tool - Top Plug Wrench [C]: 57001-1808

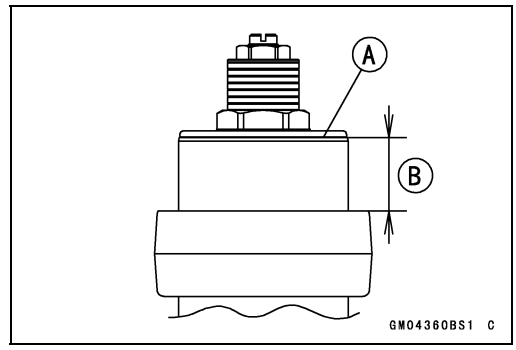


● Loosen the upper front fork clamp bolt and lower front fork clamp bolts [A].
● With a twisting motion, work the fork leg down and out.



Front Fork

Front Fork Installation



NOTE

○*Currently two types of the top plug.*
○*Make the proper works for each model in reference to the figure.*

- Install the fork so that the top end [A] of the outer tube is as shown.
  21.5 mm (0.85 in.) [B]
- Tighten:

Torque - Front Fork Clamp Bolts (Lower): 30 N·m (3.1 kgf·m, 22 ft·lb)
Front Fork Top Plugs: 23 N·m (2.3 kgf·m, 17 ft·lb)
Front Fork Clamp Bolts (Upper): 20 N·m (2.0 kgf·m, 15 ft·lb)

NOTE

○*Tighten the two clamp bolts alternately two times to ensure even tightening torque.*
○*Tighten the top plug before tightening the upper front fork clamp bolt.*

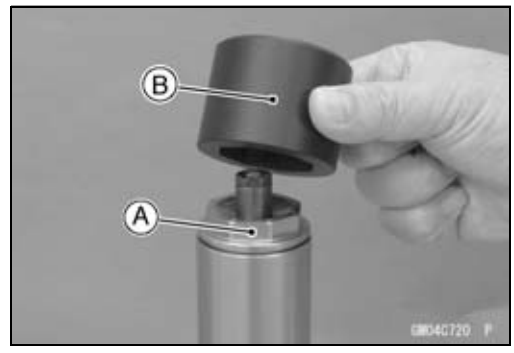
- Use the top plug wrench except for the top plug in the figure.

Special Tool - Top Plug Wrench: 57001-1808

- Install the removed parts (see appropriate chapters).
- Adjust:
  Spring Preload (see Spring Preload Adjustment)
  Rebound Damping Force (see Rebound Damping Force Adjustment)
  Compression Damping Force (see Compression Damping Force Adjustment)

Front Fork Oil Change





NOTE

○*Currently two types of the top plug.*
○*Make the proper works for each model in reference to the figure.*

- Remove the front fork (see Front Fork Removal).
- Hold the inner tube lower end in a vise.
- Unscrew the top plug [A] out of the outer tube.
- Use the top plug wrench except for the top plug in the upper figure.

Special Tool - Top Plug Wrench [B]: 57001-1808

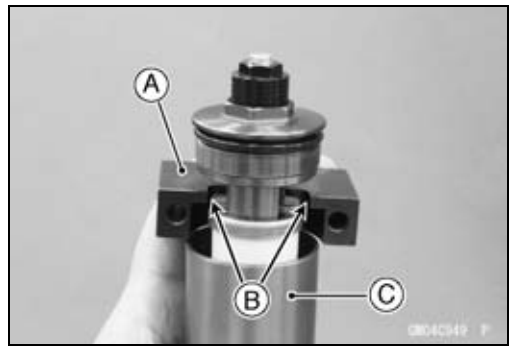
Front Fork

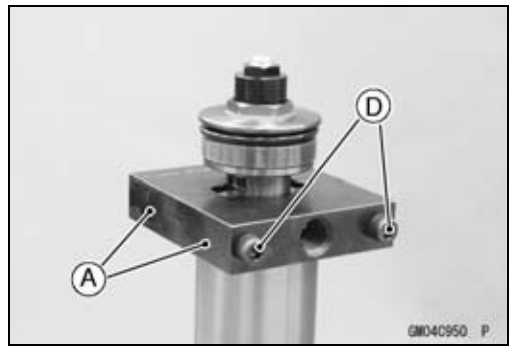
- Install the clamps [A] as shown.

NOTE

○*Set the clamps so that the cutout [B] of the upper side does not touch the tongue shape of stopper, pull up the outer tube [C] to hold it by the clamps, and then tighten the two bolts [D]. The outer tube is used as a guide.*

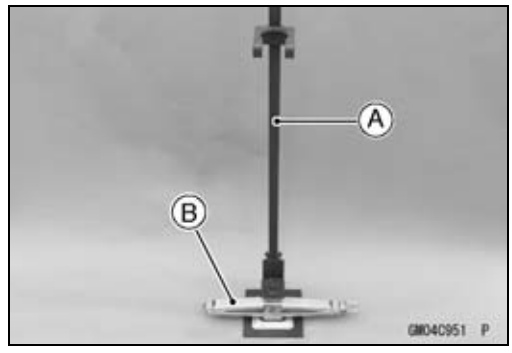
Special Tool - Fork Spring Compressor: 57001-1540



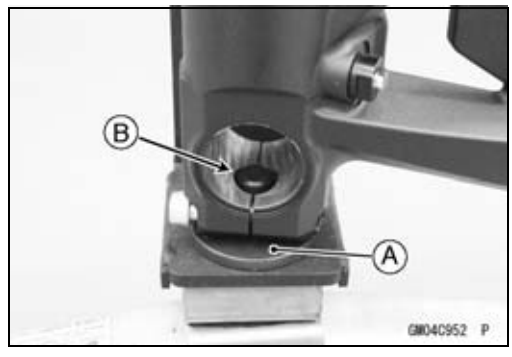


- Set the fork spring compressor [A] and a suitable jack [B] as shown.

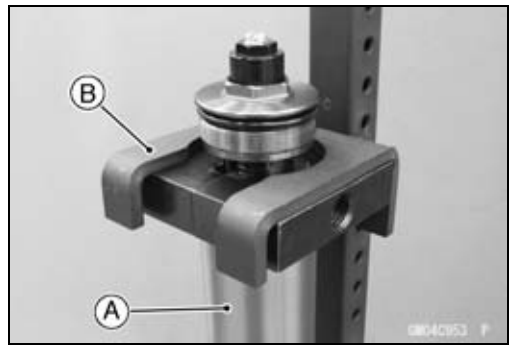
Special Tool - Fork Spring Compressor: 57001-1771



- Insert the projection of the protector [A] into the front fork bottom hole [B].



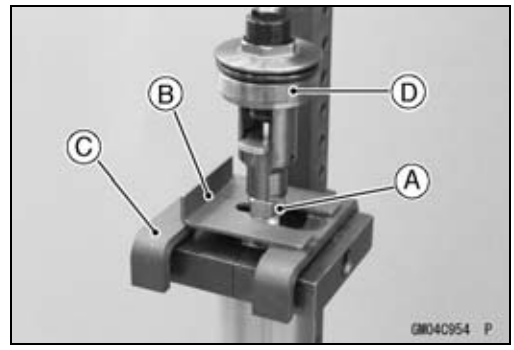
- Set the front fork [A] under the holder [B].
- Lift up the suitable jack, and hold the front fork.



Front Fork

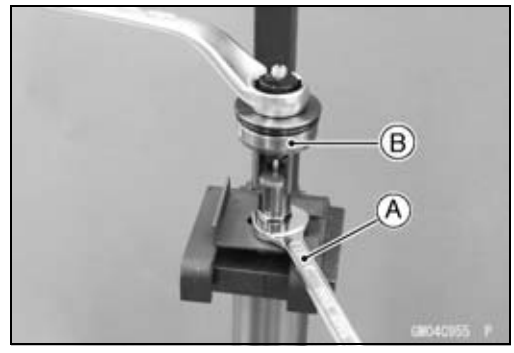
- Lift up the suitable jack until the piston rod nut [A] comes out, while pulling up the top plug.
- Insert the fork spring stopper [B] between the piston rod nut and the holder [C] while holding up the top plug [D].

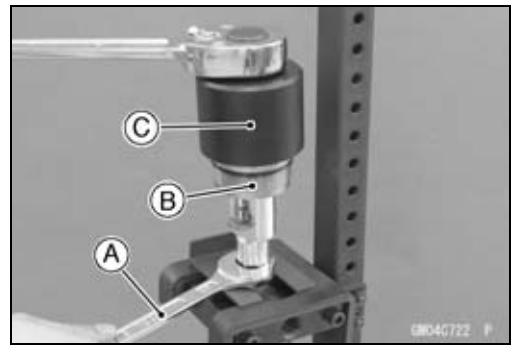
Special Tool - Fork Spring Stopper: 57001-1374



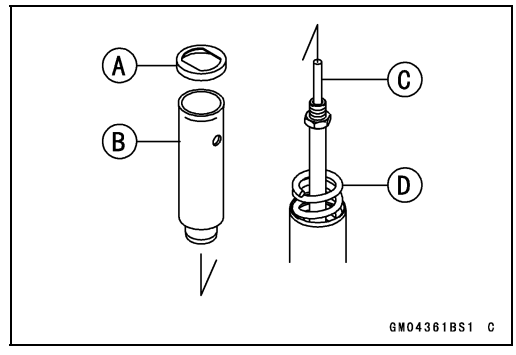
- Holding the piston rod nut with a wrench [A], remove the top plug [B] from the piston rod.
- Use the top plug wrench except for the top plug in the upper figure.

Special Tool - Top Plug Wrench [C]: 57001-1808

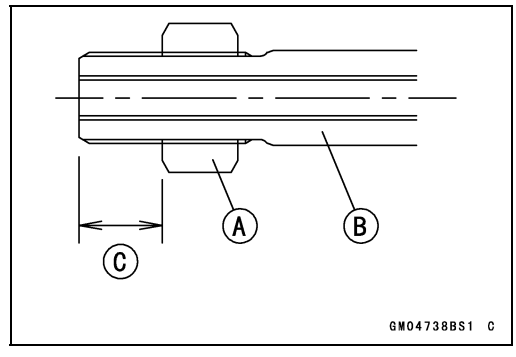




- Remove the front fork from the fork spring compressor.
- Remove:
  Washer [A]
  Collar [B]
  Rebound Damping Adjuster Rod [C]
  Fork Spring [D]



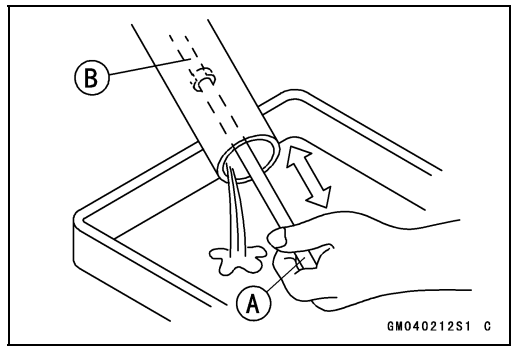
- Screw the rod nut [A] onto the piston rod [B] as shown.
  12 mm (0.47 in.) or more [C]



Front Fork

● Drain the fork oil into a suitable container.
○Using the piston rod puller [A], pump the piston rod [B] up and down at least ten times to expel the oil from the fork.

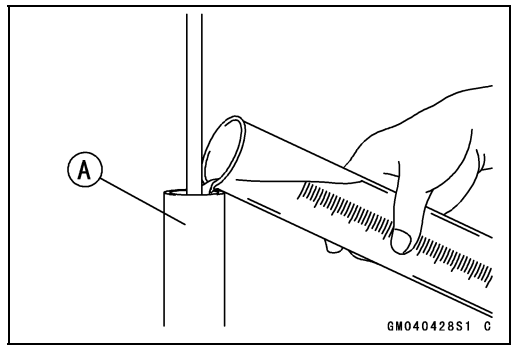
Special Tool - Fork Piston Rod Puller, M12 × 1.25: 57001 -1289



● Hold the fork tube upright, press the inner tube [A] and the piston rod all the way down.
● Pour in the type and amount of fork oil specified.

Suspension Oil - KHL15-10 (1 L): 44091-0004
KHL15-10 (4 L): 44091-0013

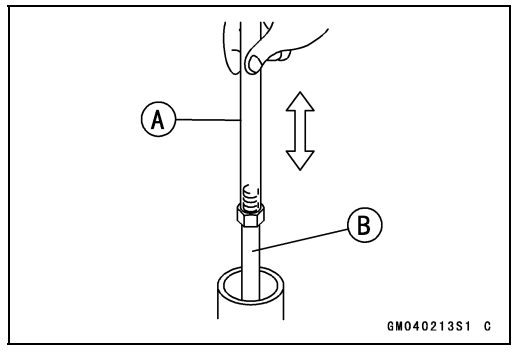
Amount (Per Side):
When changing oil: Approx. 465 mL (15.7 US oz.)
After disassembly and completely dry:
548 ±4 mL (18.5 ±0.14 US oz.)



★If necessary, measure the oil level as follows.
○Hold the inner tube vertically in a vise.
○Using the 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, M12 × 1.25: 57001 -1289

○Remove the piston rod puller.
○Wait until the oil level settles.
○With the fork fully compressed and the piston rod fully pushed in, insert a tape measure or rod into the inner tube, and measure the distance from the top of the inner tube to the oil.



Front Fork

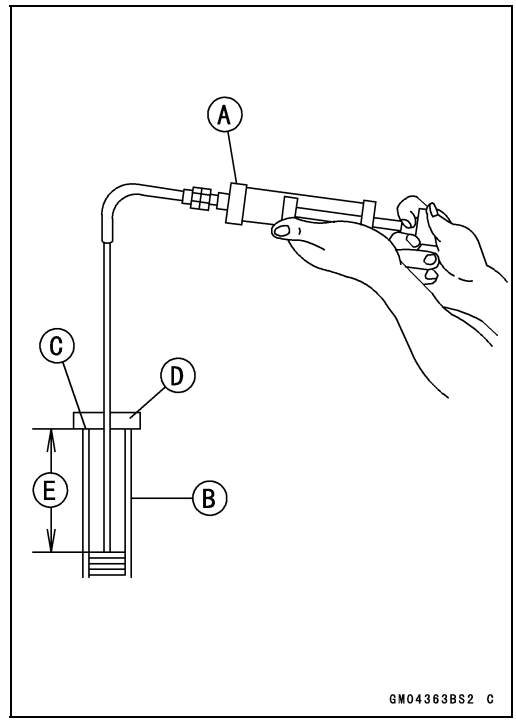
Oil Level (fully compressed, without spring)
Standard: 94 ±2 mm (3.70 ±0.08 in.)
(from the top of the inner tube)

NOTE

○*Fork oil lever may also be measured using the fork oil level gauge.*

Special Tool - Fork Oil Level Gauge [A]: 57001-1290

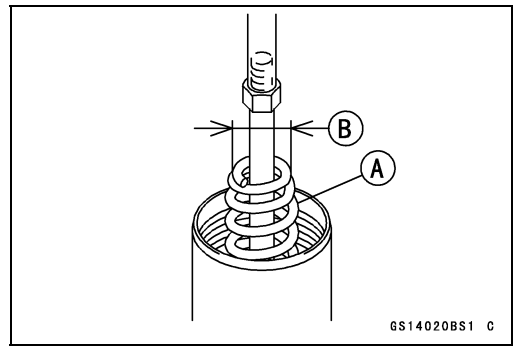
○With the fork fully compressed and without fork spring, insert the gauge tube into the inner tube [B] and position the stopper across the top end [C] of the inner tube.
○Set the gauge stopper [D] so that its lower side shows the oil level distance specified [E].
○Pull the handle slowly to pump out the excess oil until the oil no longer comes out.
★If no oil is pumped out, there is insufficient oil in the inner tube. Pour in enough oil, then pump out the excess oil as shown above.



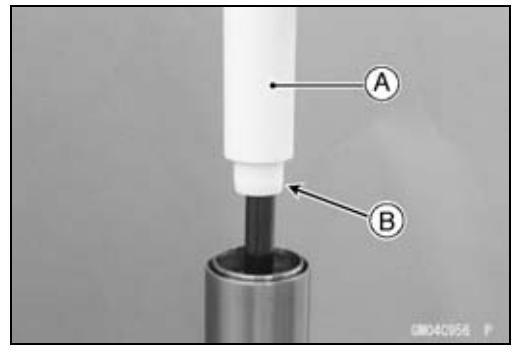
● Screw the fork piston rod puller onto the end of the piston rod.

Special Tool - Fork Piston Rod Puller, M12 × 1.25: 57001 -1289

● Pull the puller up above the outer tube top.
● Install the fork spring [A] with the smaller end [B] facing upward.



● Install the collar [A] so that the cut side [B] faces downward.
● Install the washer on the collar.



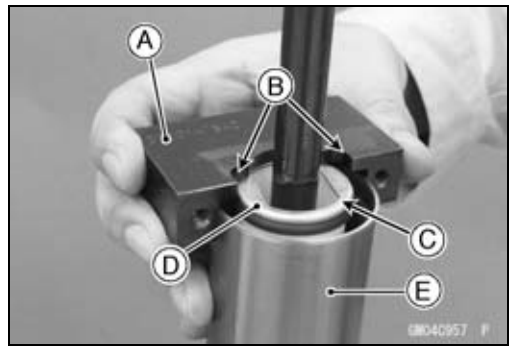
Front Fork

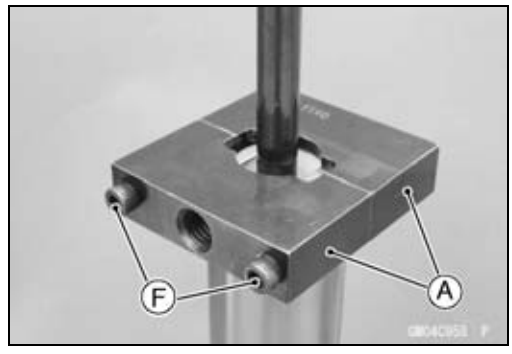
- Install the clamps [A] as shown.

Special Tool - Fork Spring Compressor: 57001-1540

NOTE

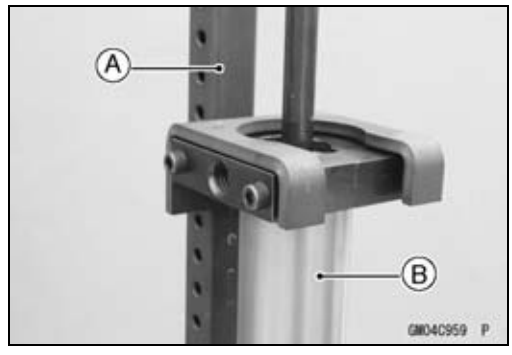
○*Set the clamps so that the cutouts [B] do not fit the hole [C] of the washer [D], pull up the outer tube [E] to hold it by the clamps, and then tighten the two bolts [F]. The outer tube is used as a guide.*





- Set the fork spring compressor [A] and front fork [B], protector, suitable jack.
- Lift up the suitable jack until the piston rod nut comes out.

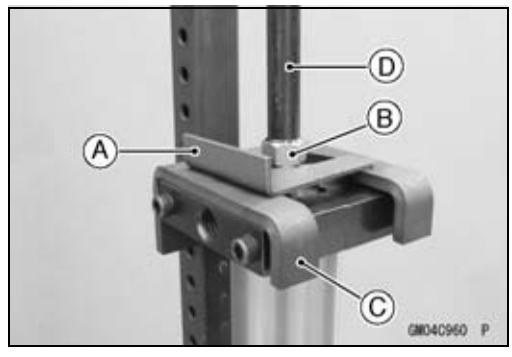
Special Tool - Fork Spring Compressor: 57001-1771



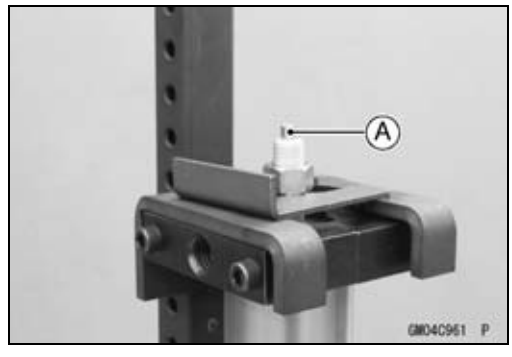
- Hold up the fork piston rod puller.
- Insert the fork spring stopper [A] between the piston rod nut [B] and the holder [C] while holding up the fork piston rod puller [D].

Special Tool - Fork Spring Stopper: 57001-1374

- Remove the fork piston rod puller.

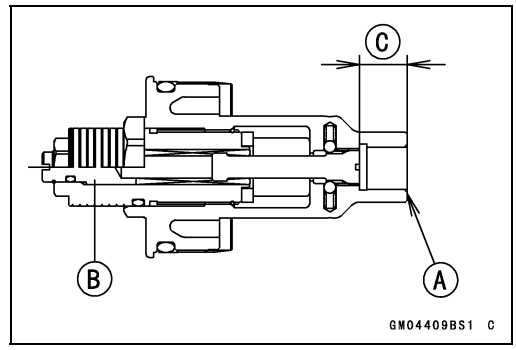


- Install the rebound damping adjuster rod [A].



Front Fork

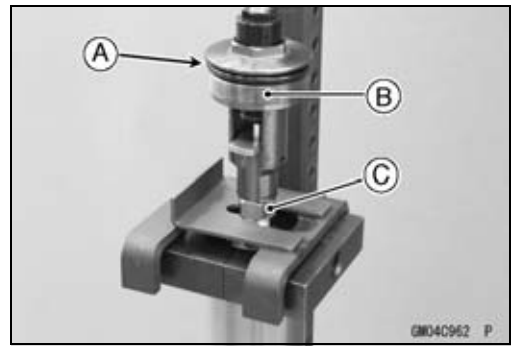
- Check the distance between the bottom end [A] of the top plug and rebound damping adjuster [B] with a pair of vernier caliper.
  13 mm (0.51 in.) [C]



- Replace the O-ring [A] on the top plug [B] with a new one.
- Apply grease to the new O-ring.
- Install the top plug on the piston rod, and screw it.
- Holding the top plug with a wrench, tighten the piston rod nut [C] against the top plug.
- Use the top plug wrench except for the top plug in the figure.

Special Tool - Top Plug Wrench: 57001-1808

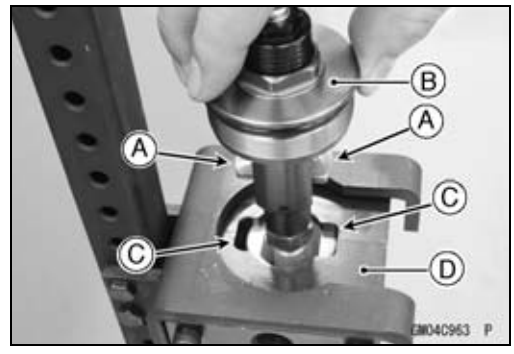
Torque - Piston Rod Nuts: 29 N·m (3.0 kgf·m, 21 ft·lb)



- Remove the fork spring stopper.
- Align the stoppers [A] of the top plug [B] with the grooves [C] of the clamp [D], and down the suitable jack.
- Remove the front fork from the fork spring compressor.
- Raise the outer tube and screw the top plug into it.
- Install the front fork (see Front Fork Installation).

NOTE

○*After installing the front fork, adjust the spring preload and damping force correctly.*



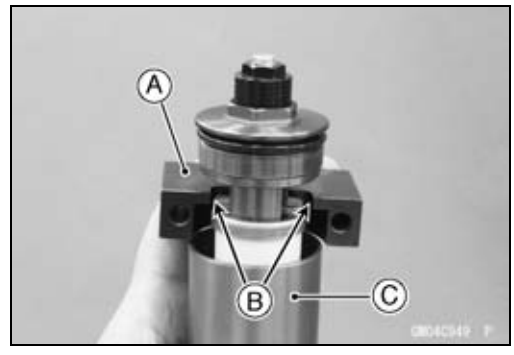
If using the spring compressor (57001-1587).

- Install the clamps [A] as shown.

NOTE

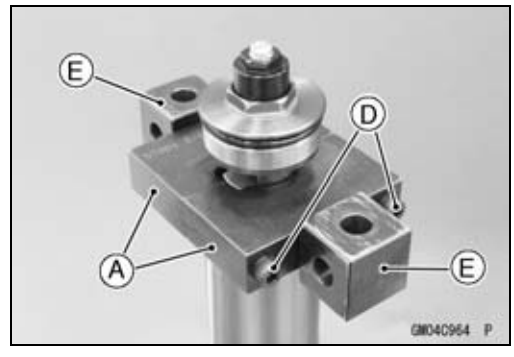
○*Set the clamps so that the cutout [B] of the upper side does not touch the tongue shape of stopper, pull up the outer tube [C] to hold it by the clamps, and then tighten the two bolts [D]. The outer tube is used as a guide.*

Special Tool - Fork Spring Compressor: 57001-1540



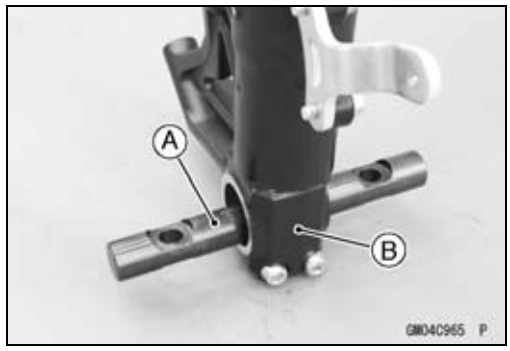
- Install the holders [E] to the clamps as shown.

Special Tool - Fork Spring Compressor: 57001-1587



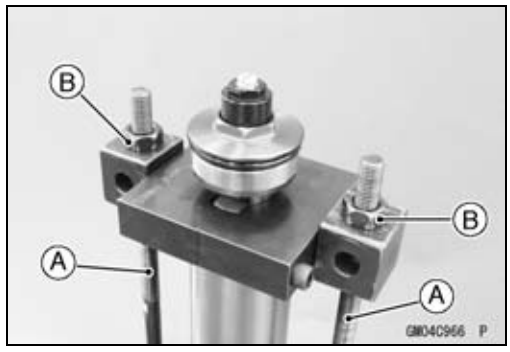
Front Fork

- Insert the holder bar [A] into the axle hole of the front fork [B].

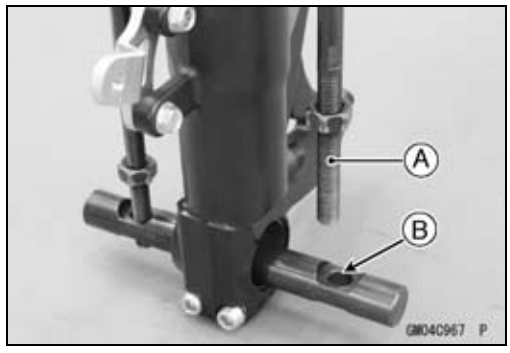


- Insert the compression shafts [A] and install the nuts [B].

○Set the other side compression shaft same process.



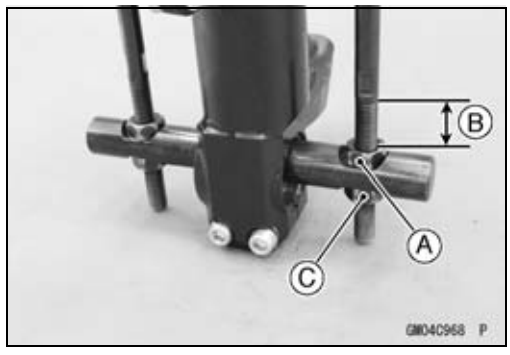
- Insert the lower end of the compression shaft [A] into the hole [B] of the holder bar.



- Screw the adjust nut [A] onto the compression shaft as shown.

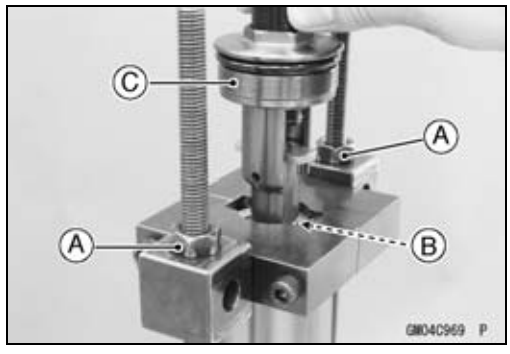
  About 20 mm (0.79 in.) [B]
- Screw the locknut [C].

○Set the other side compression shaft same process.



- Screw in the nuts [A] until the piston rod nut [B] comes out.

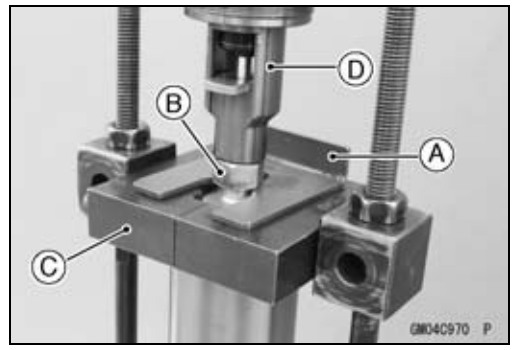
○Hold up the top plug [C] while screwing in the nut.



Front Fork

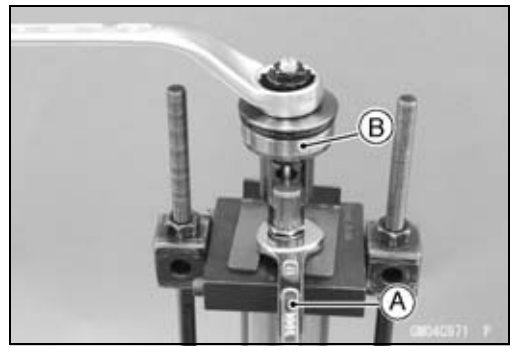
- Insert the fork spring stopper [A] between the piston rod nut [B] and the clamp [C] while holding up the top plug [D].

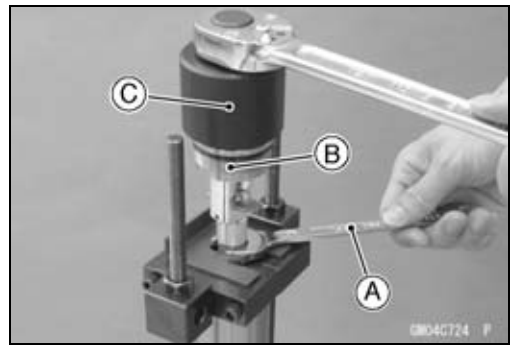
  Special Tool - Fork Spring Stopper: 57001-1374



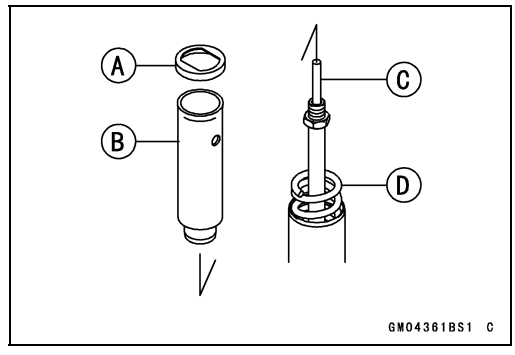
- Holding the piston rod nut with a wrench [A], remove the top plug [B] from the piston rod.
- Use the top plug wrench except for the top plug in the upper figure.

  Special Tool - Top Plug Wrench [C]: 57001-1808

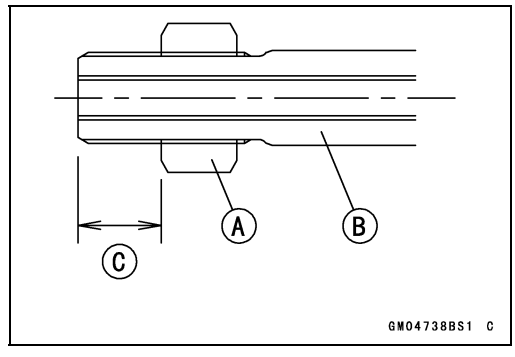




- Remove the fork spring compressor from the front fork.
- Remove:
  Washer [A]
  Collar [B]
  Rebound Damping Adjuster Rod [C]
  Fork Spring [D]



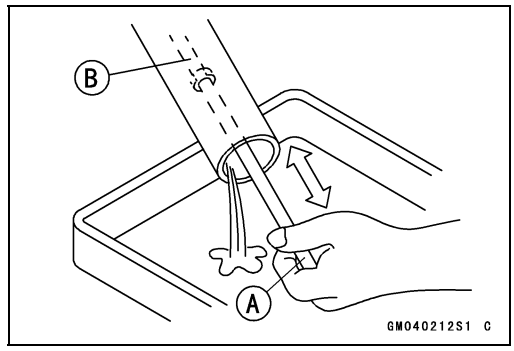
- Screw the rod nut [A] onto the piston rod [B] as shown.
  12 mm (0.47 in.) or more [C]



Front Fork

● Drain the fork oil into a suitable container.
○Using the piston rod puller [A], pump the piston rod [B] up and down at least ten times to expel the oil from the fork.

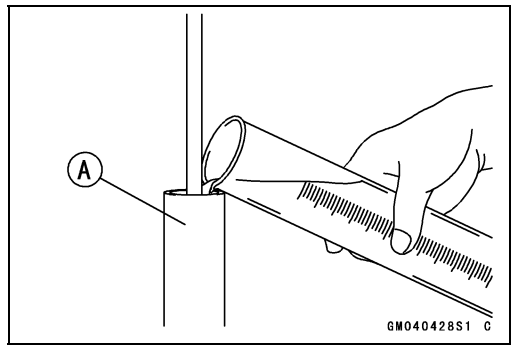
Special Tool - Fork Piston Rod Puller, M12 × 1.25: 57001 -1289



● Hold the fork tube upright, press the inner tube [A] and the piston rod all the way down.
● Pour in the type and amount of fork oil specified.

Suspension Oil - KHL15-10 (1 L): 44091-0004
KHL15-10 (4 L): 44091-0013

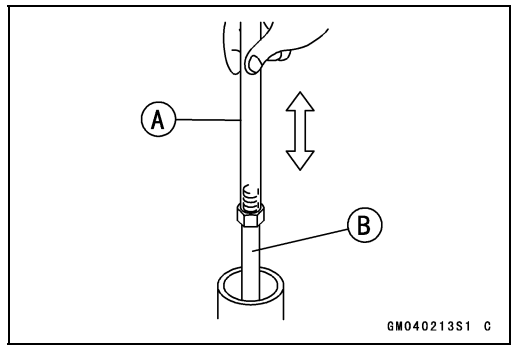
Amount (Per Side):
When changing oil: Approx. 465 mL (15.7 US oz.)
After disassembly and completely dry:
548 ±4 mL (18.5 ±0.14 US oz.)



★If necessary, measure the oil level as follows.
○Hold the inner tube vertically in a vise.
○Using the 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, M12 × 1.25: 57001 -1289

○Remove the piston rod puller.
○Wait until the oil level settles.
○With the fork fully compressed and the piston rod fully pushed in, insert a tape measure or rod into the inner tube, and measure the distance from the top of the inner tube to the oil.



Front Fork

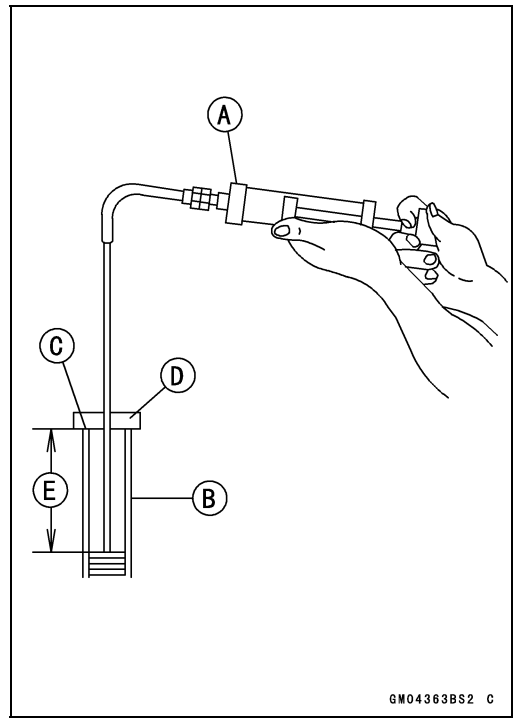
Oil Level (fully compressed, without spring)
Standard: 94 ±2 mm (3.70 ±0.08 in.)
(from the top of the inner tube)

NOTE

○*Fork oil lever may also be measured using the fork oil level gauge.*

Special Tool - Fork Oil Level Gauge [A]: 57001-1290

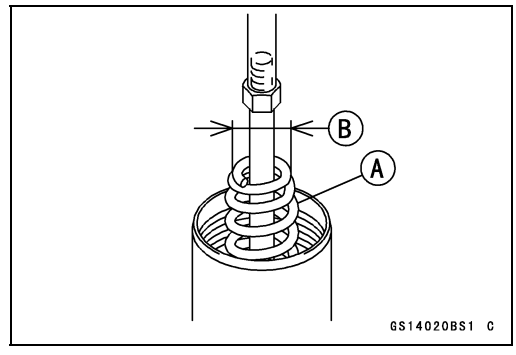
○With the fork fully compressed and without fork spring, insert the gauge tube into the inner tube [B] and position the stopper across the top end [C] of the inner tube.
○Set the gauge stopper [D] so that its lower side shows the oil level distance specified [E].
○Pull the handle slowly to pump out the excess oil until the oil no longer comes out.
★If no oil is pumped out, there is insufficient oil in the inner tube. Pour in enough oil, then pump out the excess oil as shown above.



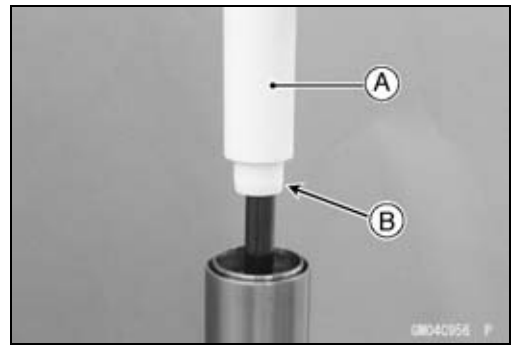
● Screw the fork piston rod puller onto the end of the piston rod.

Special Tool - Fork Piston Rod Puller, M12 × 1.25: 57001 -1289

● Pull the puller up above the outer tube top.
● Install the fork spring [A] with the smaller end [B] facing upward.



● Install the collar [A] so that the cut side [B] faces downward.
● Install the washer on the collar.



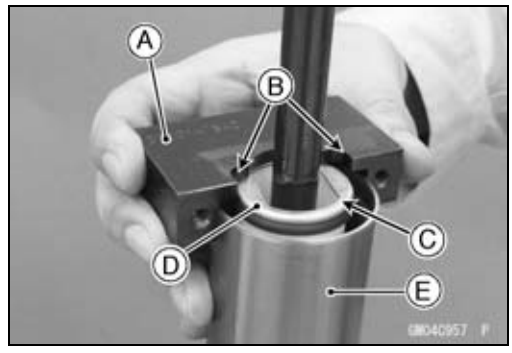
Front Fork

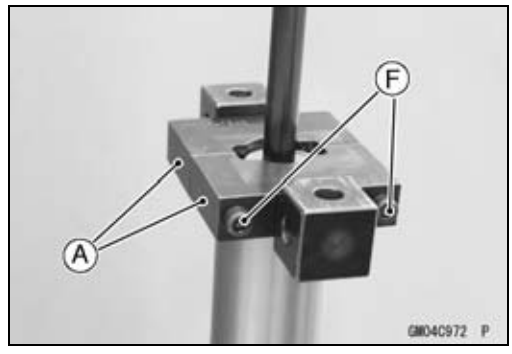
● Install the clamps [A] as shown.

Special Tools - Fork Spring Compressor: 57001-1540
Fork Spring Compressor: 57001-1587

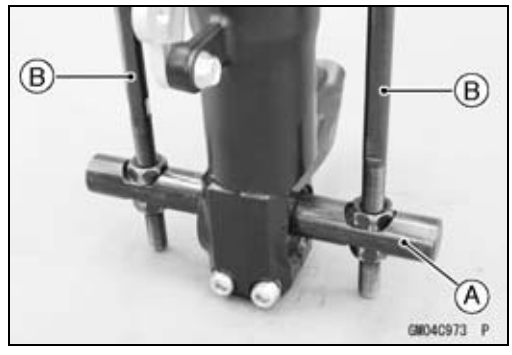
NOTE

○*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.*





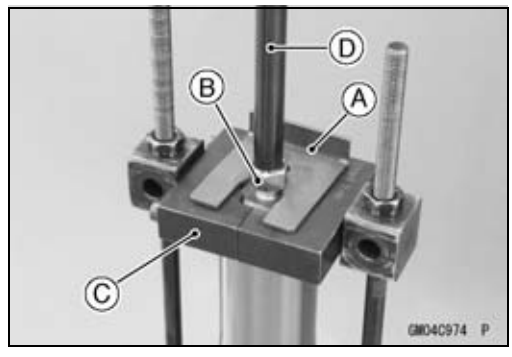
● Set the holder bar [A] and compression shafts [B].
● Screw in the fork compressor nut come out the piston rod nut.
○Hold up the fork piston rod puller while screwing in the nut.



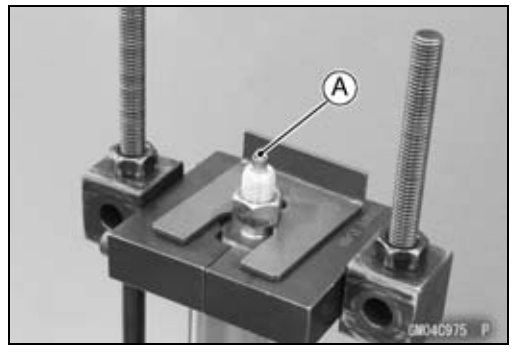
● Insert the fork spring stopper [A] between the piston rod nut [B] and the clamp [C] while holding up the fork piston rod puller [D].

Special Tool - Fork Spring Stopper: 57001-1374

● Remove the fork piston rod puller.

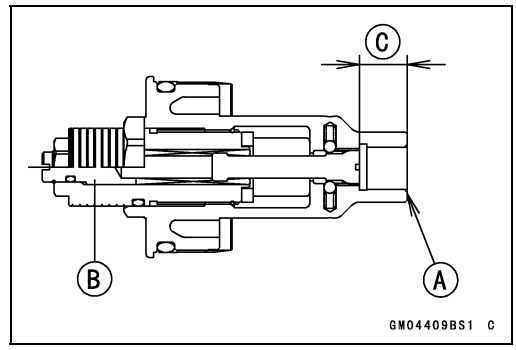


● Install the rebound damping adjuster rod [A].



Front Fork

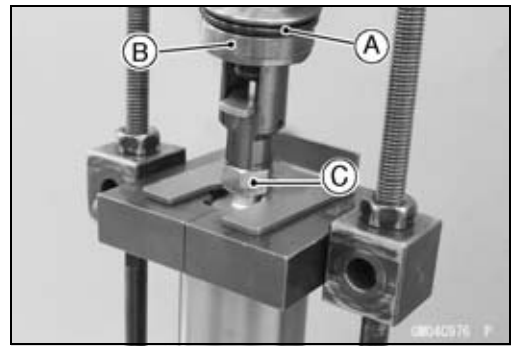
● Check the distance between the bottom end [A] of the top plug and rebound damping adjuster [B] with a pair of vernier caliper.
13 mm (0.51 in.) [C]



● Replace the O-ring [A] on the top plug [B] with a new one.
● Apply grease to the new O-ring.
● Install the top plug on the piston rod, and screw it.
● Holding the top plug with a wrench, tighten the piston rod nut [C] against the top plug.
● Use the top plug wrench except for the top plug in the figure.

Special Tool - Top Plug Wrench: 57001-1808

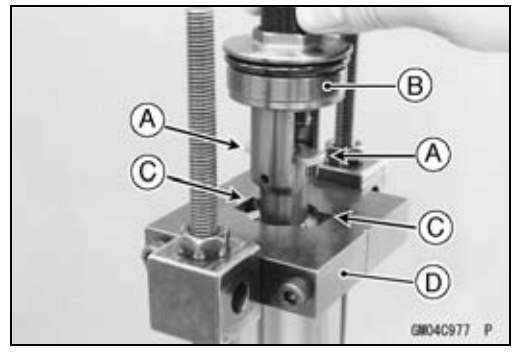
Torque - Piston Rod Nuts: 29 N·m (3.0 kgf·m, 21 ft·lb)



● 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 fork spring compressor and clamps.
● Raise the outer tube and screw the top plug into it.
● Install the front fork (see Front Fork Installation).

NOTE

○*After installing the front fork, adjust the spring preload and damping force correctly.*

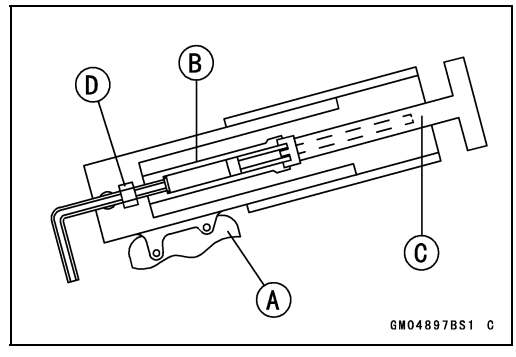


Front Fork Disassembly

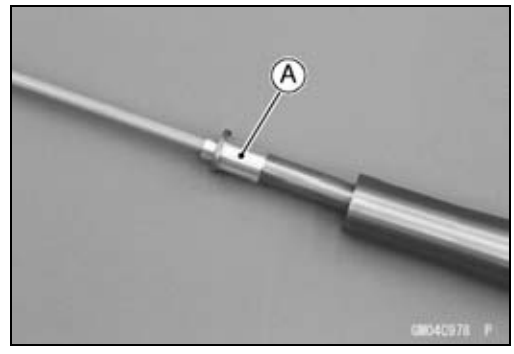
● Remove the front fork (see Front Fork Removal).
● Drain the fork oil (see Front Fork Oil Change).
● Hold the axle portion of the front fork in a vise [A].
● Stop the cylinder [B] from turning by using the fork cylinder holder [C].

Special Tool - Fork Cylinder Holder: 57001-1443

● Unscrew the Allen bolt [D], then take the bolt and gasket out of the bottom of the inner tube.

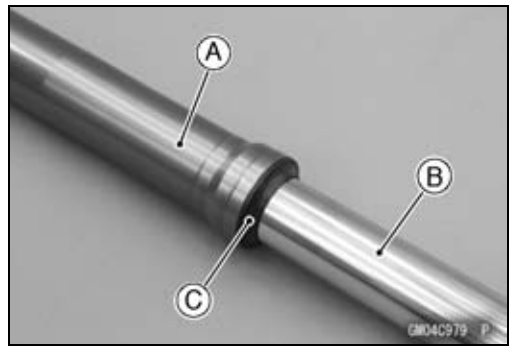


● Remove the cylinder unit [A] from the inner tube.
○Do not disassemble the cylinder unit.

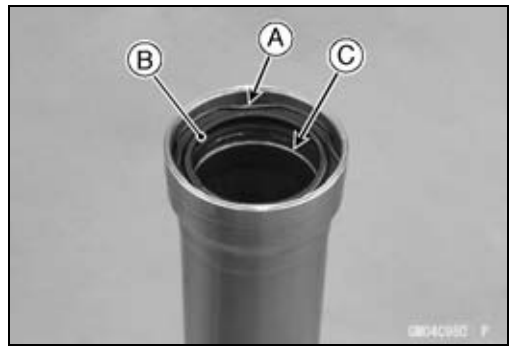


Front Fork

- Separate the outer tube [A] from the inner tube [B].
- Pull out the dust seal [C].



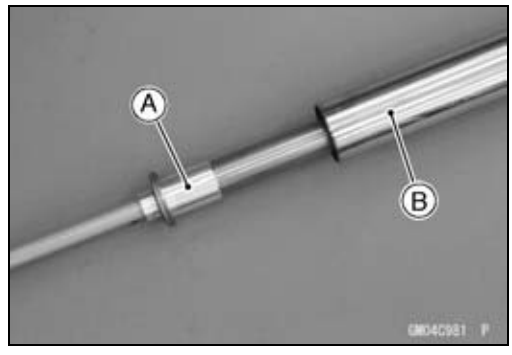
- Remove the retaining ring [A] from the outer tube.
- Remove the oil seal [B] and washer [C].



Front Fork Assembly

- Replace the following parts with new ones.
  Oil Seal
  Bottom Allen Bolt Gasket
  Retaining Ring
- Insert the cylinder unit [A] into the inner tube [B].
- Stop the cylinder from turning by using the fork cylinder holder.

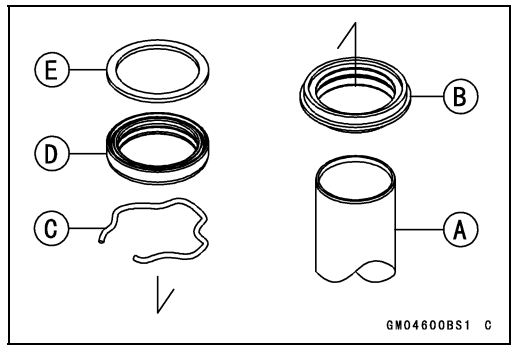
  Special Tool - Fork Cylinder Holder: 57001-1443



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

  Torque - Front Fork Bottom Allen Bolts: 23 N·m (2.3 kgf·m, 17 ft·lb)

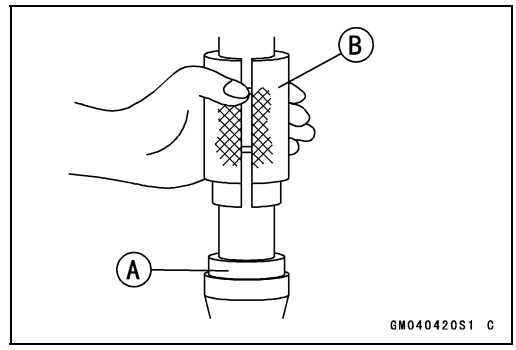
- Apply grease to the oil seal lips.
- Install the following parts onto the inner tube [A] temporarily.
  Dust Seal [B]
  Retaining Ring [C]
  Oil Seal [D]
  Washer [E]



Front Fork

- 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 Tools - Fork Oil Seal Driver, ϕ43: 57001-1530
or Fork Oil Seal Driver Weight, ϕ26 ~ ϕ46: 57001-1795
Fork Oil Seal Driver Attachment, ϕ36 ~ ϕ46: 57001-1798

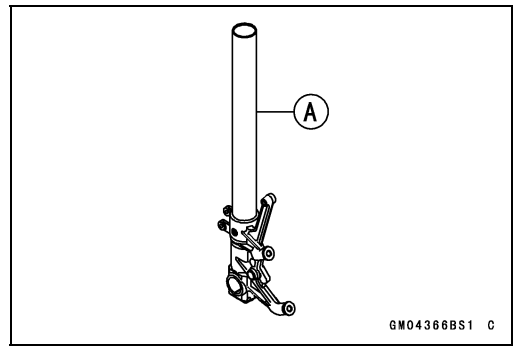


- Install the retaining ring and dust seal into the outer tube.
- Pour in the specified type of oil (see Front Fork Oil Change).

Inner Tube, Outer Tube Inspection

- Visually inspect the inner tube [A].

★If there is any damage, replace the inner tube. Since damage to the inner tube damages the oil seal, replace the oil seal whenever the inner tube is replaced.



NOTICE

If the inner tube is badly bent or creased, replace it. Excessive bending, followed by subsequent straightening, can weaken the inner tube.

- Temporarily assemble the inner and outer tubes, and pump them back and forth manually to check for smooth operation.

★If you feel binding or catching, the inner and outer tubes must be replaced.

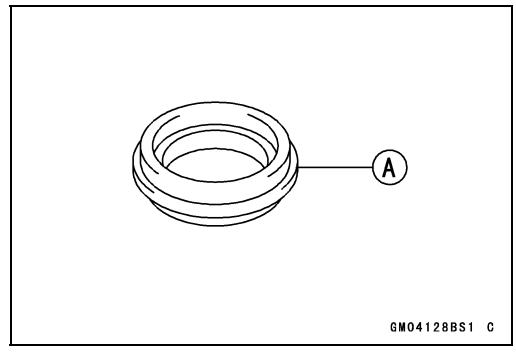
⚠ WARNING

A straightened inner or outer fork tube may fall in use, possibly causing an accident 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 seal [A] for any signs of deterioration or damage.

★Replace it if necessary.

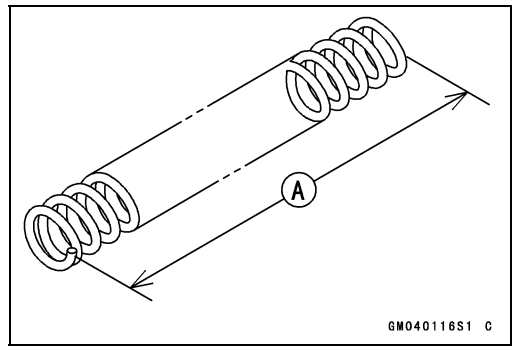


Front Fork

Spring Tension Inspection

- Since a spring becomes shorter as it weakens, check its free length [A] to determine its condition.

★If the spring of either fork leg is shorter than the service limit, it must be replaced. If the length of a replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the fork legs balanced for motorcycle stability.



Spring Free Length

Standard: 237 mm (9.33 in.)

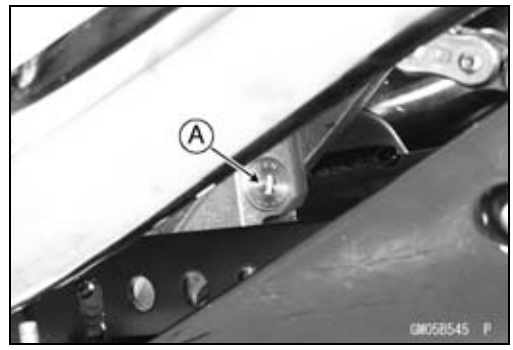
Service Limit: 232 mm (9.13 in.)

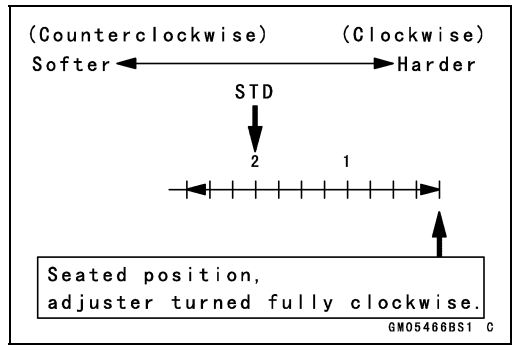
Rear Shock Absorber (Other than Öhlins)

Rebound Damping Force Adjustment

- Remove the rear lower fairing (see Rear Lower Fairing Removal in the Frame chapter) (Equipped Models).
- To adjust the rebound damping force, turn the lower damping adjuster [A].

○The standard adjuster setting is the **2 turns out** from the fully clockwise position.





Rebound Damping Force Adjustment

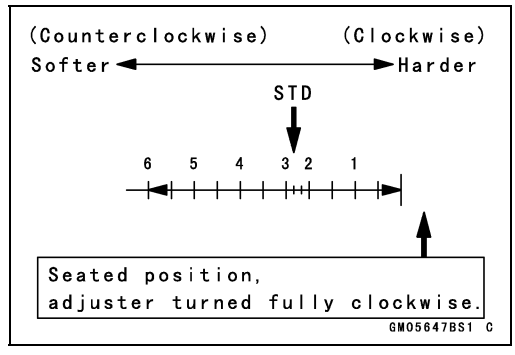
Adjuster Position	Damping Force	Setting	Load	Road	Speed
2 3/4 Turns Out	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
0	Strong	Hard	Heavy	Bad	High

Compression Damping Force Adjustment

- To adjust the compression damping force, turn the upper damping adjuster [A].

○The standard adjuster setting is the **2 2/3 turns out** from the fully clockwise position.





Compression Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
6 Turns Out	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
0	Strong	Hard	Heavy	Bad	High

Spring Preload Adjustment

- Remove the rear shock absorber from the frame (see Rear Shock Absorber Removal).
- Loosen the locknut and turn out the adjusting nut to free the spring.

Special Tool - Hook Wrench T=3.2 R37: 57001-1522

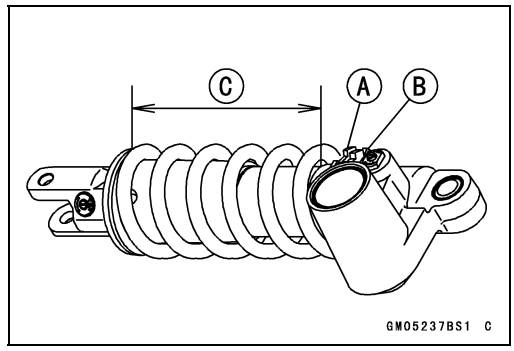
Rear Shock Absorber (Other than Öhlins)

● To adjust the spring preload, turn in the adjusting nut [A] and tighten the locknut [B].
Spring Length [C]

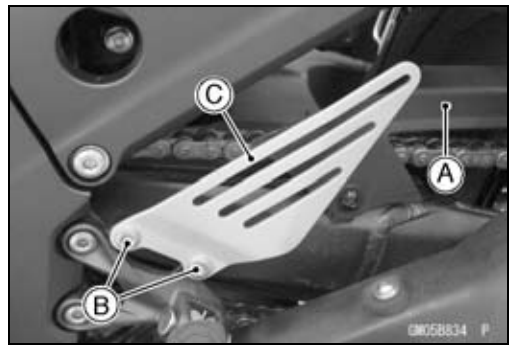
Spring Preload Setting

Standard:	**Spring length 175.5 mm (6.909 in.)**
Usable Range:	**Spring length 170.0 ~ 180.5 mm (6.693 ~ 7.106 in.)**

○The standard adjusting nut setting is 175.5 mm (6.9 in.) spring length.



● Remove the chain cover [A] (see Drive Chain Removal in the Final Drive chapter).
● Remove the bolts [B] and left front footpeg guard [C] for turning the hook wrench easily.

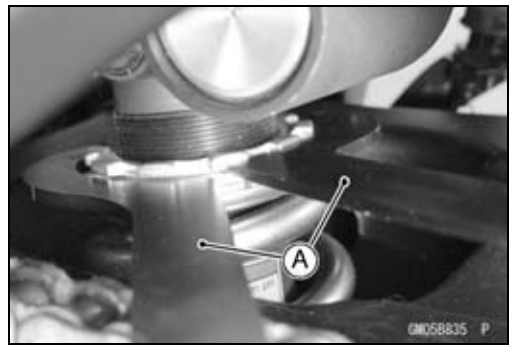


● To adjust the spring preload, turn in the adjusting nut and tighten the locknut by using hook wrenches [A] with the rear shock absorber attached the frame.

Special Tool - Hook Wrench T=3.2 R37: 57001-1522

★If the spring action feels too soft or too stiff, adjust it.
● Install:
Chain Cover (see Drive Chain Installation in the Final Drive chapter)
Left Front Footpeg Guard
● Tighten:

Torque - Left Front Footpeg Guard Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

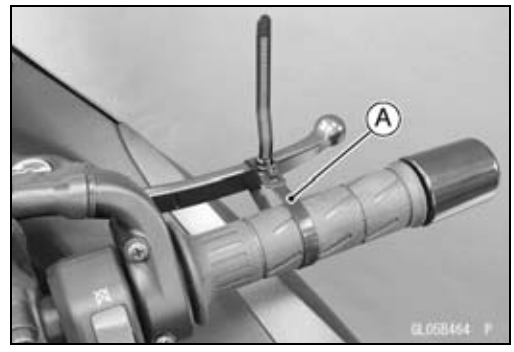


Spring Preload Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
180.5 mm (7.106 in.)	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
170.0 mm (6.693 in.)	Strong	Hard	Heavy	Bad	High

Rear Shock Absorber (Other than Öhlins)

Rear Shock Absorber Removal



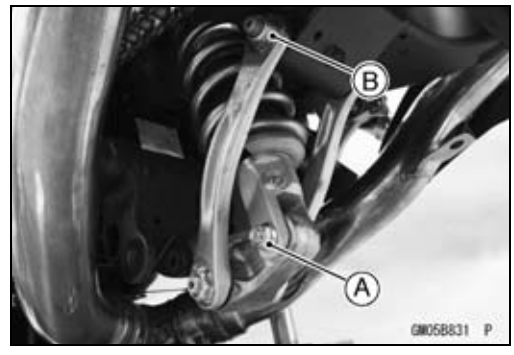
- Squeeze the brake lever slowly and hold it with a band [A].

⚠ WARNING

When raising the rear wheel off the ground with the jack and removing part(s) from the motorcycle, be sure to hold the front brake, or the motorcycle may fall over. It could cause an accident and injury.

- Remove:
  Center Stand (see Center Stand Removal in the Frame chapter) (Equipped Models)
  Rear Lower Fairing Bracket (see Rear Lower Fairing Bracket Removal in the Frame chapter) (Equipped Models)
- Raise the rear wheel off the ground with the jack.

Special Tools - Jack: 57001-1238
Attachment Jack: 57001-1252
Jack Attachment: 57001-1608



- Remove:
  Lower Rear Shock Absorber Nut [A] and Bolt
  Upper Tie-Rod Nut [B] and Bolt



- Remove the upper rear shock absorber nut [A] and bolt.
- Remove the shock absorber downward.

Rear Shock Absorber Installation

- Replace the following nuts with new ones.
  Rear Shock Absorber Nuts
  Tie-Rod Nut (Upper)
- Tighten:

Torque - Rear Shock Absorber Nuts: 35 N·m (3.6 kgf·m, 26 ft·lb)
Tie-Rod Nut (Upper): 60 N·m (6.1 kgf·m, 44 ft·lb)

- Install the removed parts (see appropriate chapters).

Rear Shock Absorber (Other than Öhlins)

Rear Shock Absorber Inspection

- Remove the rear shock absorber (see Rear Shock Absorber Removal).
- Visually inspect the following items.
  Oil Leakage
  Crack or Dent

★If there is any damage to the rear shock absorber, replace it.

- Visually inspect the rubber bushing.

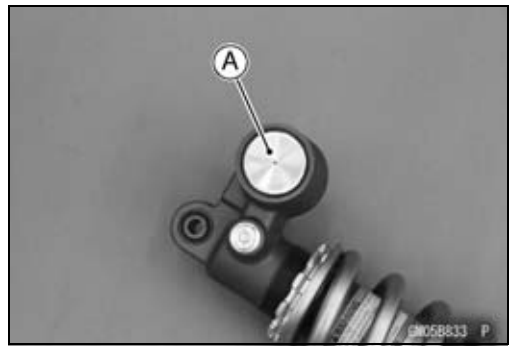
★If it show any signs of damage, replace it.

Rear Shock Absorber Scrapping

⚠ WARNING

Pressurized nitrogen may explode when heated. The shock contains nitrogen gas. To avoid an explosion, do not incinerate the shock body without first releasing the nitrogen.

- Remove the rear shock absorber (see Rear Shock Absorber Removal).
- Drill the hole [A] of the reservoir tank using about 2 mm (0.08 in.) drillbit.



⚠ WARNING

Pressurized gas can cause injury. Do not point the drill toward your face or body.

Rear Shock Absorber (Öhlins)

⚠ WARNING

Adjusting the Öhlins TTX39 shock absorber outside the spring preload and damper adjuster usable range could effect suspension balance and result in an unsafe riding condition. Adjust the spring preload and the damping only within the adjustable usable range. When making spring preload and damping adjustments, change the adjuster only one click at a time and confirm the effect from the adjustment before making additional changes. Go back to the standard setting if necessary.

Rebound Damping Force Adjustment

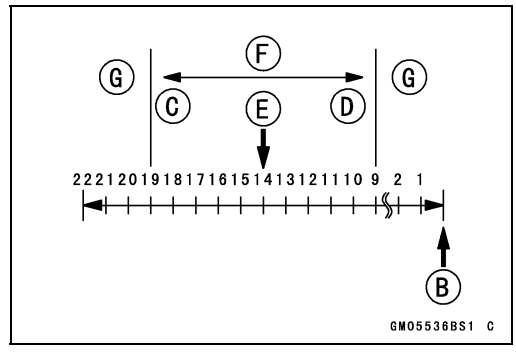
- To adjust the rebound damping force, turn the rebound damping force adjuster [A] to the desired position.

○The standard adjuster setting is the **14 clicks** from the fully clockwise position.



Rebound Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
19 clicks	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
9	Strong	Hard	Heavy	Bad	High



Seated Position (Adjuster Turned Fully Clockwise) [B]
Softer (Counterclockwise) [C]
Harder (Clockwise) [D]
Standard Setting [E]
Usable Range [F]
Unusable Range [G]

Compression Damping Force Adjustment

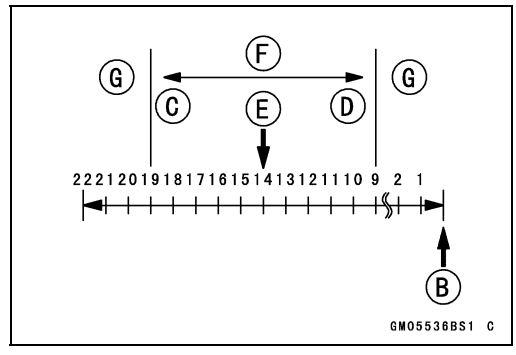
- To adjust the compression damping force, turn the compression damping force adjuster [A] to the desired position.

○The standard adjuster setting is the **14 clicks** from the fully clockwise position.



Compression Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
19 clicks	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
9	Strong	Hard	Heavy	Bad	High



Seated Position (Adjuster Turned Fully Clockwise) [B]
Softer (Counterclockwise) [C]
Harder (Clockwise) [D]
Standard Setting [E]
Usable Range [F]
Unusable Range [G]

Rear Shock Absorber (Öhlins)

Spring Preload Adjustment



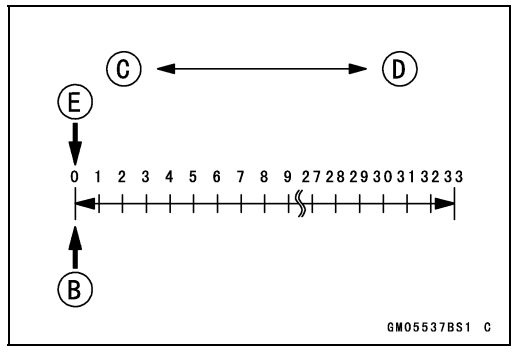
- To adjust the spring preload, turn in the adjuster [A] until you feel a click to the desired position.

○To standard adjuster setting is the **0 clicks** from the fully counterclockwise position.

★If the spring action feels too soft or too stiff, adjust it.

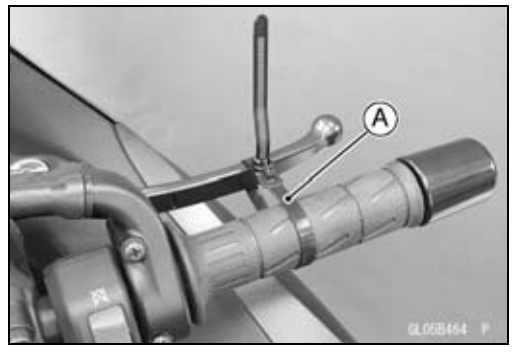
Spring Preload Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
0 clicks	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
33 clicks	Strong	Hard	Heavy	Bad	High



Seated Position (Adjuster Turned Fully Counterclockwise) [B]
Softer (Counterclockwise) [C]
Harder (Clockwise) [D]
Standard Setting [E]

Rear Shock Absorber Removal



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

⚠ WARNING

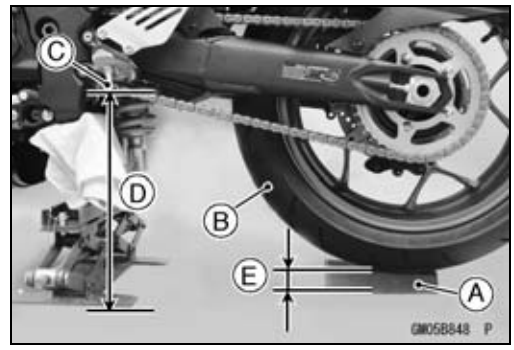
When raising the rear wheel off the ground with the jack and removing part(s) from the motorcycle, be sure to hold the front brake, or the motorcycle may fall over. It could cause an accident and injury.

- Remove:
  Muffler Bodies (see Muffler Body Removal in the Engine Top End chapter)
  Center Stand (see Center Stand Removal in the Frame chapter) (Equipped Models)
  Rear Lower Fairing Bracket (see Rear Lower Fairing Bracket Removal in the Frame chapter) (Equipped Models)
- Raise the rear wheel off the ground with the jack.

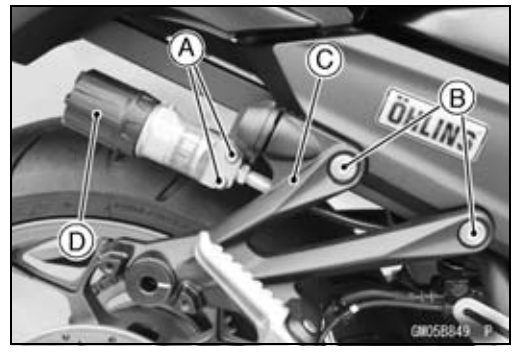
Special Tools - Jack: 57001-1238
Attachment Jack: 57001-1252
Jack Attachment: 57001-1608

Rear Shock Absorber (Öhlins)

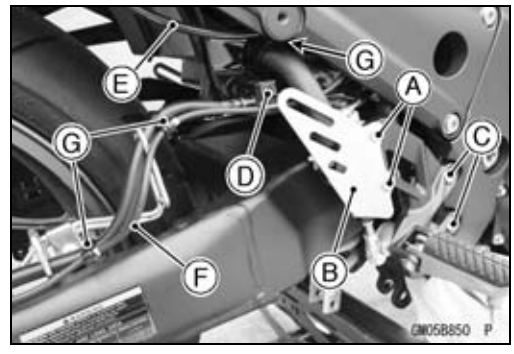
- Remove:
  Rocker Arm (see Rocker Arm Removal)
  Tie-Rod (see Tie-rod Removal)
- Put a suitable block [A] under the rear wheel [B] and adjust the height of the jack as shown.
  Bank Sensor [C]
  323 mm (12.7 in.) [D]
  38 mm (1.5 in.) [E]



- Remove:
  Spring Preload Adjuster Bolts [A] and Nuts
  Right Rear Footpeg Bracket Bolts [B]
  Right Rear Footpeg Bracket [C]
- Cover the adjuster [D] with a clean cloth to protect it.

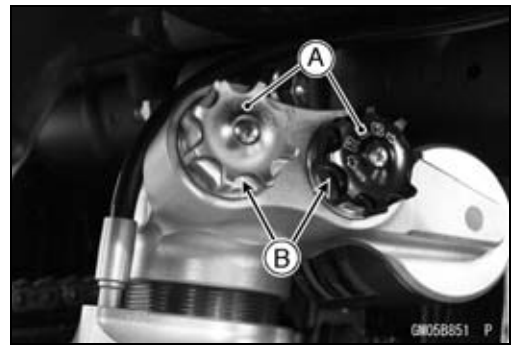


- Remove:
  Rear Master Cylinder Mounting Bolts [A]
  Footpeg Guard [B]
  Right Rear Footpeg Bracket Bolts [C]
- Remove the bolt [D].
- Free the adjuster cable [E] and rear wheel rotation sensor lead [F] from the clamps [G].



NOTE

○*When removing the rear shock absorber, the adjusters [A] may possibly turn. Before removal, be sure to record the position of the mark [B] of the adjuster.*



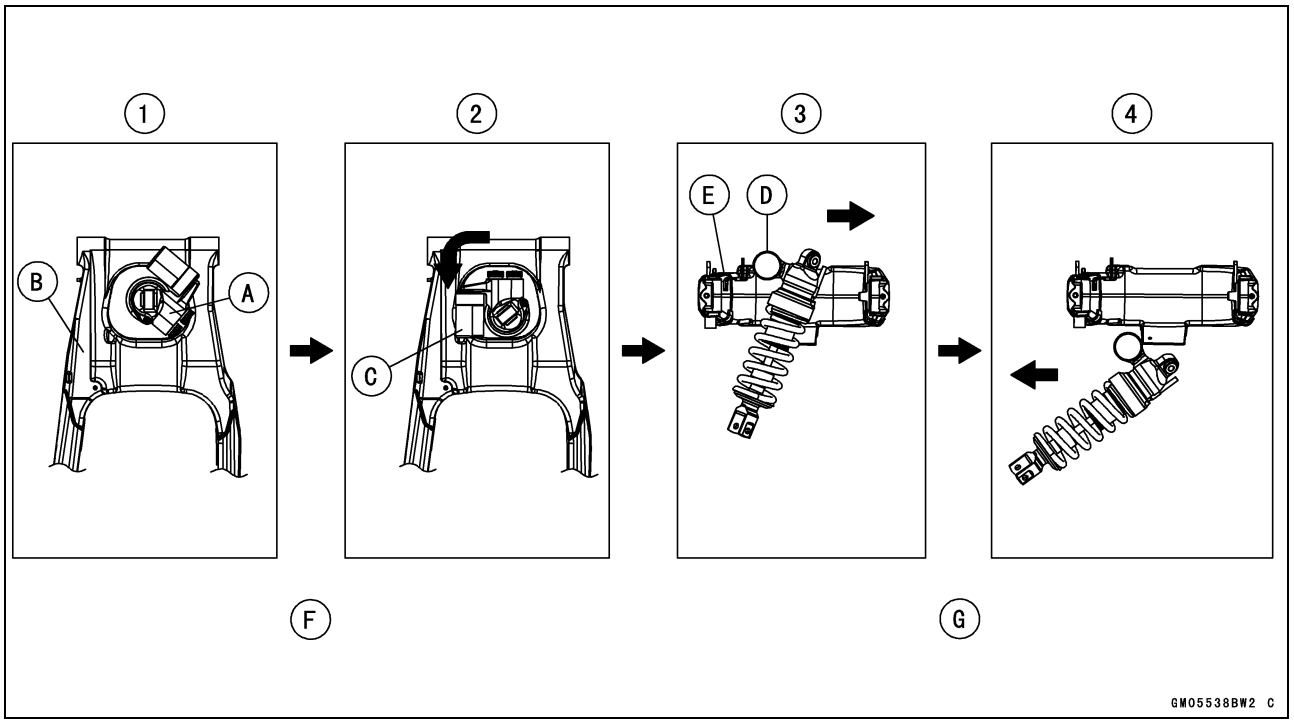
- Remove the upper rear shock absorber nut and bolt [A].



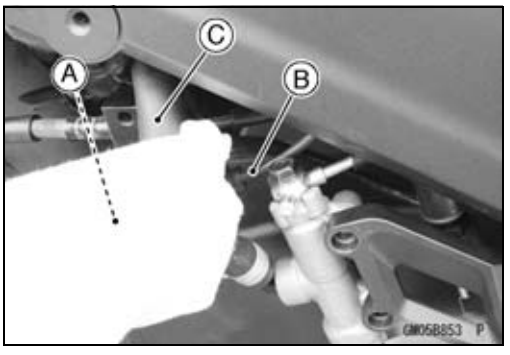
Rear Shock Absorber (Öhlins)

● Remove the rear shock absorber [A], according to the following procedure.

1. Original Position
   Swingarm [B]
2. Turn the rear shock absorber counterclockwise, position the reservoir tank [C] to the left side.
3. Tilt the rear shock absorber right side to clear the reservoir tank [D] from the swingarm [E].
4. Pull out the rear shock absorber to the left side so that the reservoir tank does not touch the swingarm.
   View from Upper [F]
   View from Rear [G]

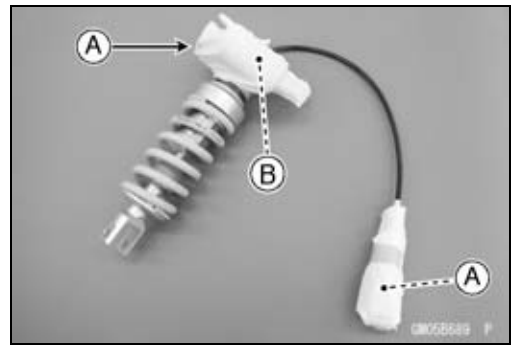


● Through the adjuster [A] covered with the cloth between the rear wheel rotation sensor lead [B] and brake hose [C].

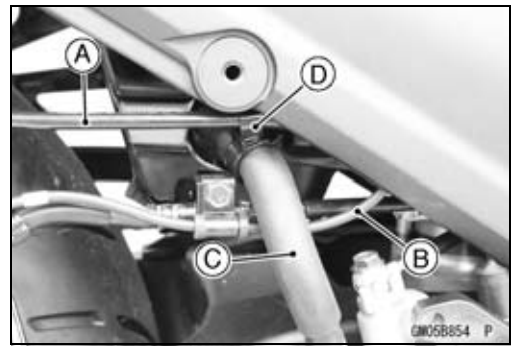


Rear Shock Absorber (Öhlins)

Rear Shock Absorber Installation



- Installation is the reverse of removal.
- Replace the following nuts with new ones.
  Rear Shock Absorber Nuts
  Spring Preload Adjuster Nuts
  Tie-Rod Nuts
  Rocker Arm Nut
- Cover the adjusters [A] and reservoir tank [B] with the clean cloths.



- Through the adjuster cable [A] between the rear wheel rotation sensor lead [B] and brake hose [C].
- Hold the adjuster cable as shown.
  Clamp [D]
- Tighten:

Torque - Rear Shock Absorber Nuts: 35 N·m (3.6 kgf·m, 26 ft·lb)

- Install the right front footpeg bracket, footpeg guard and rear master cylinder (see Bracket Pedal Installation in the Brakes chapter).
- Install the right rear footpeg bracket.
- Tighten:

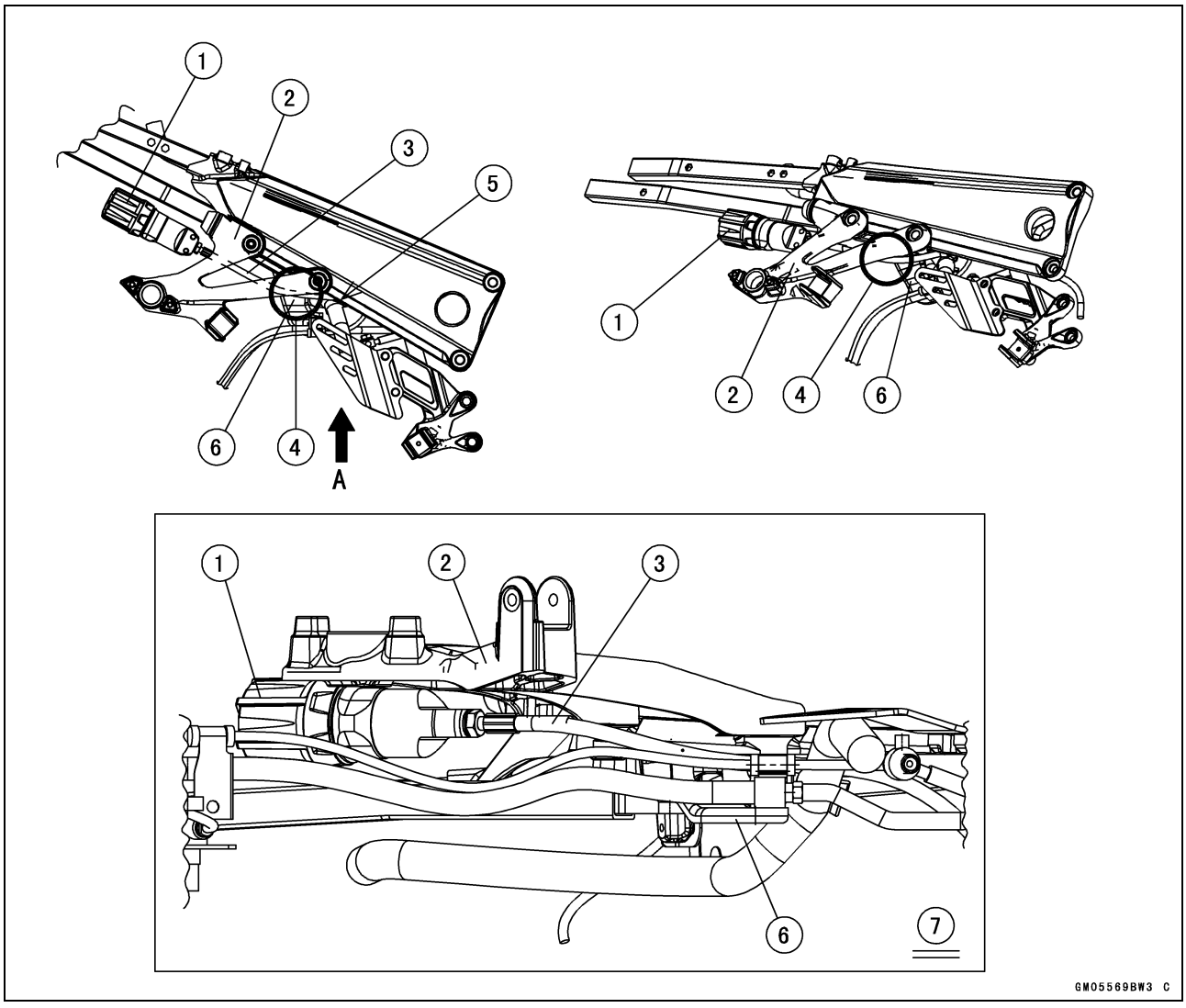
Torque - Rear Footpeg Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Tighten:

Torque - Spring Preload Adjuster Nuts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Install the removed parts (see appropriate chapters).

Rear Shock Absorber (Öhlins)



1. Adjuster
2. Rear Footpeg
3. Adjuster Cable
4. Through the adjuster cable between the rear footpeg and bracket.
5. Clamp (Hold the adjuster cable. When viewed from the right side, clamp look slightly.)
6. Bracket
7. Viewed from A

Rear Shock Absorber Inspection

- Remove the rear shock absorber (see Rear Shock Absorber Removal).
- Visually inspect the following items.
  Oil Leakage
  Crack or Dent

★If there is any damage to the rear shock absorber, replace it.

Rear Shock Absorber (Öhlins)

Rear Shock Absorber Scrapping

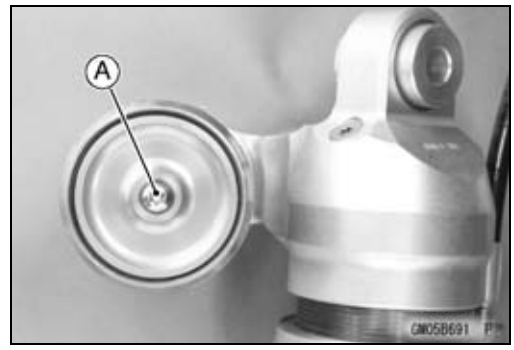
⚠ WARNING

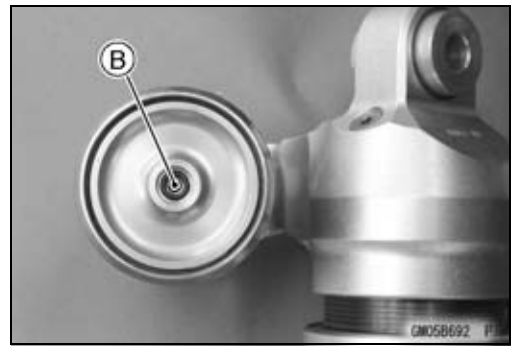
Pressurized nitrogen may explode when heated. The shock contains nitrogen gas. To avoid an explosion, do not incinerate the shock body without first releasing the nitrogen.

- Remove the rear shock absorber (see Rear Shock Absorber Removal).
- Remove the Torx bolt [A].
- Drill the hole [B] of the reservoir tank using about 2 mm (0.08 in.) drillbit.

⚠ WARNING

Pressurized gas can cause injury. Do not point the drill toward your face or body.

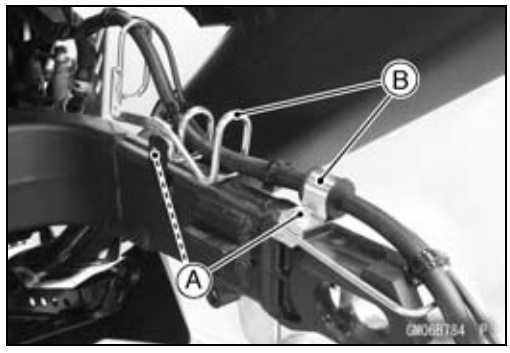




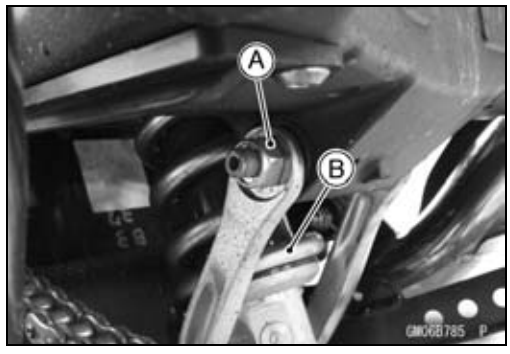
Swingarm

Swingarm Removal

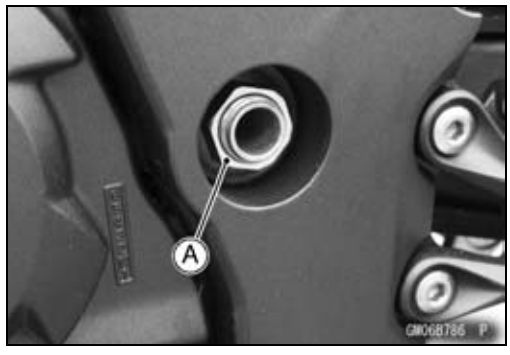
- Remove:
  Chain Cover (see Drive Chain Removal in the Final Drive chapter)
  Rear Wheel (see Rear Wheel Removal in the Wheels/Tires chapter)
  Bolts [A]
  Clamps [B]



- Remove:
  Upper Tie-Rod Nut [A] and Bolt
  Rear Shock Absorber [B] (see Rear Shock Absorber Removal)

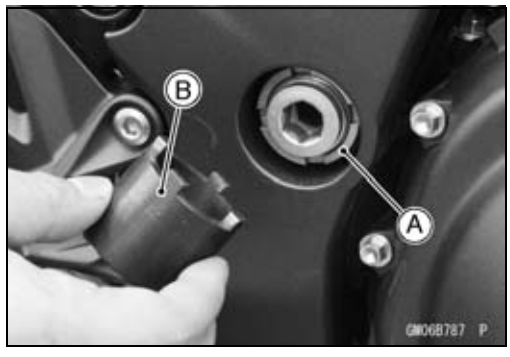


- Remove the swingarm pivot shaft nut [A].

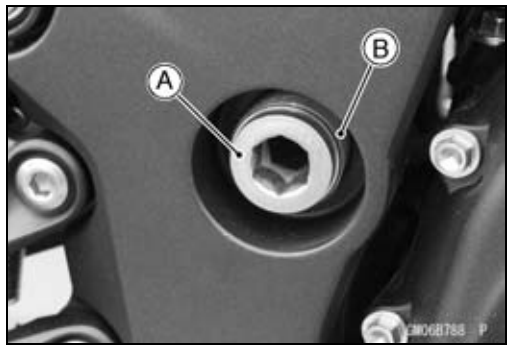


- Remove the swingarm pivot shaft locknut [A], using the swingarm pivot nut wrench [B].

  Special Tool - Swingarm Pivot Nut Wrench: 57001-1597



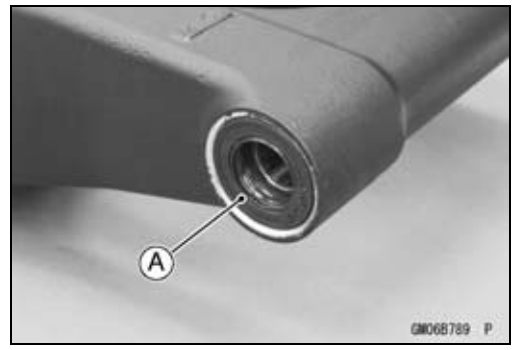
- Turn the swingarm pivot shaft [A] counterclockwise few times.
- ○Turn out the swingarm pivot adjusting collar [B].
- Pull out the pivot shaft to the right side of the motorcycle and remove the swingarm.



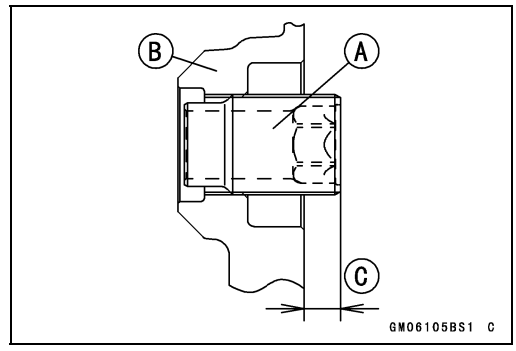
Swingarm

Swingarm Installation

- Apply plenty of grease to the lip of the grease seals [A].
- Install the collar to the left side of the swingarm.



- Place the adjusting collar [A] into the frame [B] as shown.
  11 mm (0.43 in.) [C]

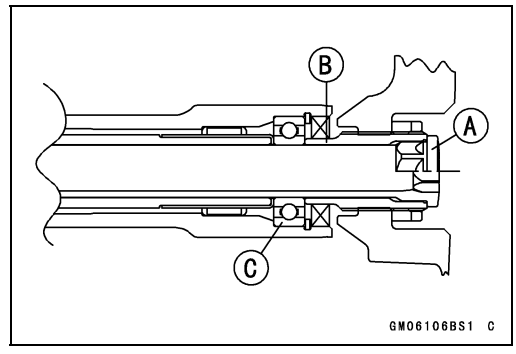


- Install the swingarm and insert the swingarm pivot shaft [A] into the adjusting collar [B] from the right side, and tighten the pivot shaft.

  Torque - Swingarm Pivot Shaft: 20 N·m (2.0 kgf·m, 15 ft·lb)

NOTE

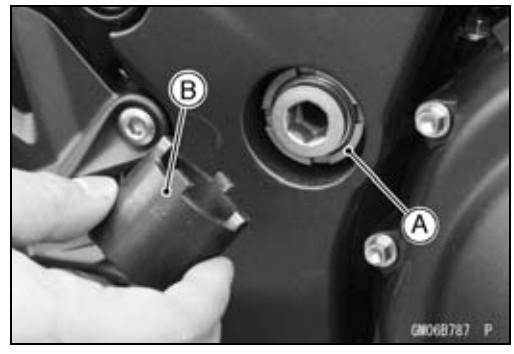
○*Tighten the swingarm pivot shaft until the clearance between the ball bearing [C] and collar comes to 0 mm (0 in.).*



- Tighten the swingarm pivot shaft locknut [A] with the swingarm pivot nut wrench [B].

  Special Tool - Swingarm Pivot Nut Wrench: 57001-1597

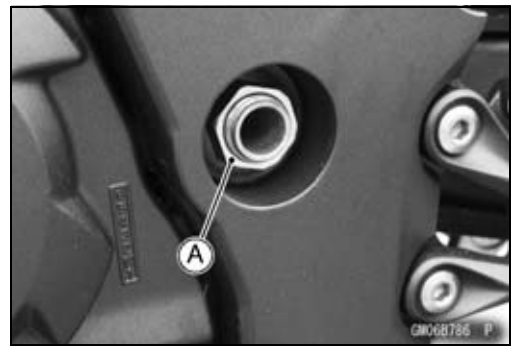
  Torque - Swingarm Pivot Shaft Locknut: 100 N·m (10.2 kgf·m, 73.8 ft·lb)



- Replace the swingarm pivot shaft nut [A] with a new one.
- Tighten the swingarm pivot shaft nut.

  Torque - Swingarm Pivot Shaft Nut: 110 N·m (11.2 kgf·m, 81.1 ft·lb)

- Install the removed parts (see appropriate chapters).

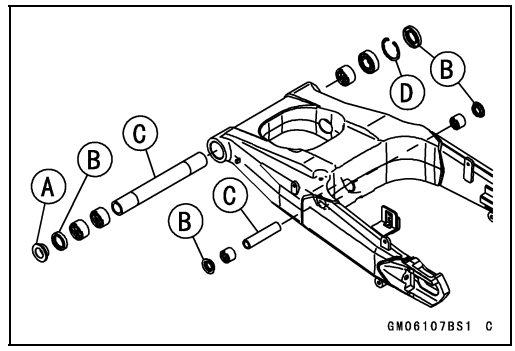


Swingarm

Swingarm Bearing Removal

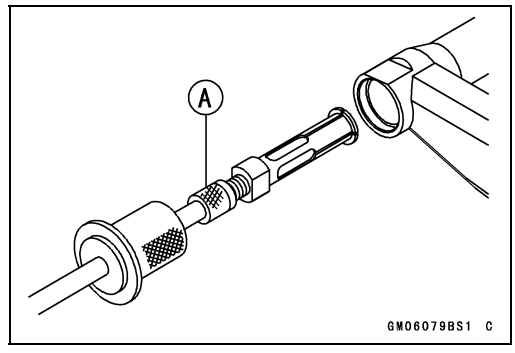
- Remove:
  Swingarm (see Swingarm Removal)
  Collar [A]
  Grease Seals [B]
  Sleeves [C]
  Circlip [D] (Right Side)

Special Tool - Inside Circlip Pliers: 57001-143



- Remove the ball bearing and needle bearings.

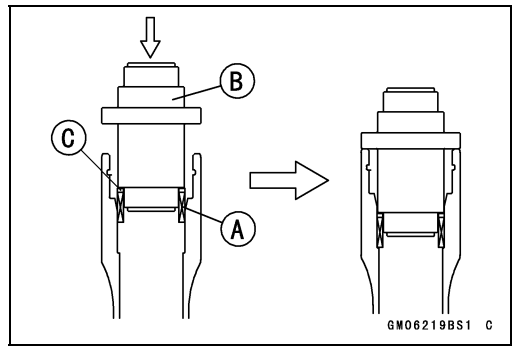
Special Tool - Oil Seal & Bearing Remover [A]: 57001-1058



Swingarm Bearing Installation

- Replace the ball and needle bearings [A] with new ones.
- Apply 2-stroke oil to the inner surface of the swingarm.
- Install the ball and needle bearings so that the manufacturer's marks face out.

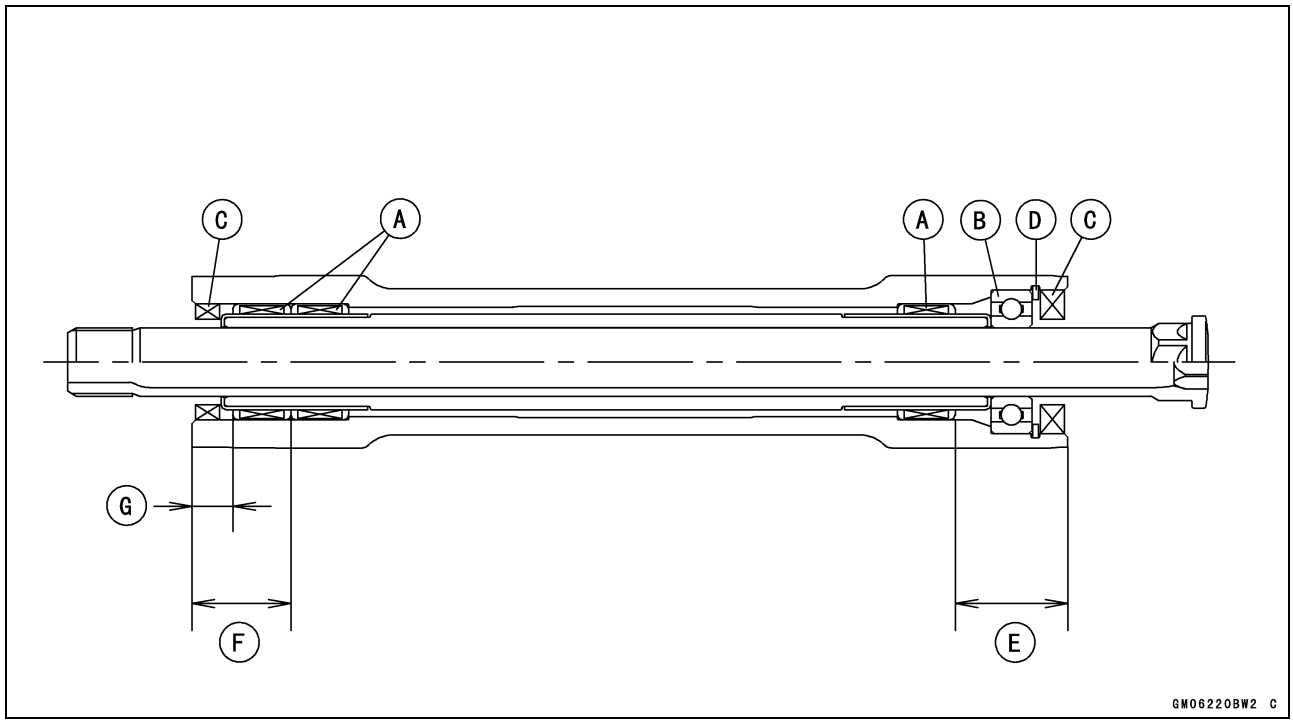
Special Tools - Bearing Driver Set: 57001-1129
Needle Bearing Driver, ϕ28 [B]: 57001-1610
Spacerϕ28 [C]: 57001-1663



Swingarm

- Replace the circlip with a new one.
- Install the needle bearings [A], ball bearing [B] and grease seals [C] position as shown.
  Circlip [D]
  32 mm (1.26 in.) [E]
  27.5 mm (1.08 in.) [F]
  9.5 mm (0.37 in.) [G]

Special Tool - Inside Circlip Pliers: 57001-143



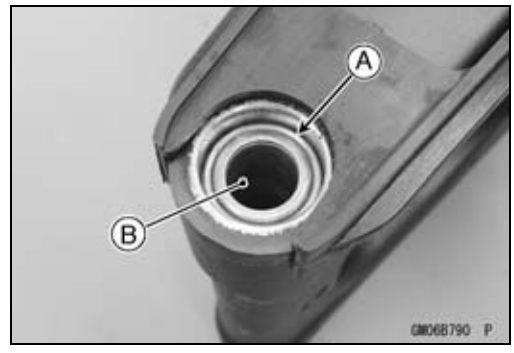
Swingarm Bearing, Sleeve Inspection

NOTICE
Do not remove the bearings for inspection. Removal may damage them.

- Inspect the needle bearings [A] and ball bearing installed in the swingarm.

○The 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 [B] show any sings of abnormal wear, discoloration, or damage, replace them as a set.



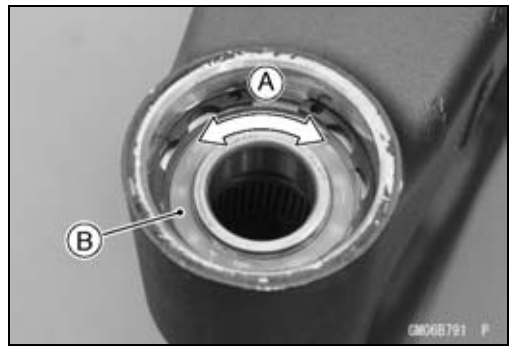
Swingarm

- Turn the bearing in the swingarm back and forth [A] while checking for plays, roughness, or binding.

★If bearing play, roughness, or binding is found, replace the bearing.

- Examine the bearing seal [B] for tears or leakage.

★If the seal is torn or is leaking, replace the bearing.



Swingarm Bearing Lubrication

NOTE

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

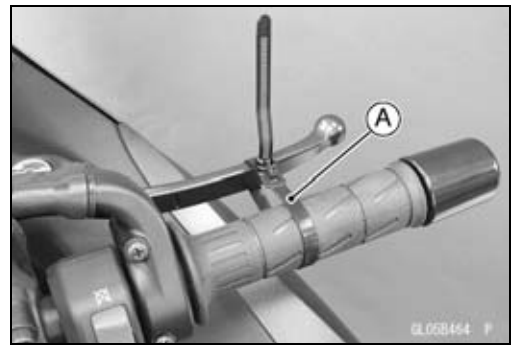
Chain Guide Inspection

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

Tie-Rod, Rocker Arm

Tie-Rod Removal

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



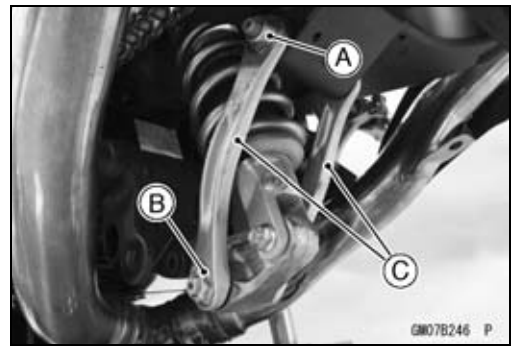
⚠ WARNING

When raising the rear wheel off the ground with the jack and removing part(s) from the motorcycle, be sure to hold the front brake, or the motorcycle may fall over. It could cause an accident and injury.

- Remove:
  Center Stand (see Center Stand Removal in the Frame chapter) (Equipped Models)
  Rear Lower Fairing Bracket (see Rear Lower Fairing Bracket Removal in the Frame chapter) (Equipped Models)
- Raise the rear wheel off the ground with the jack.

Special Tools - Jack: 57001-1238
Attachment Jack: 57001-1252
Jack Attachment: 57001-1608

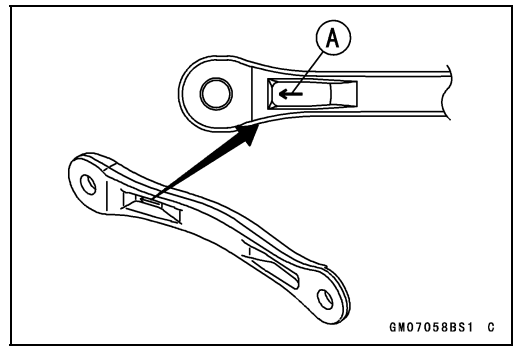
- Remove:
  Upper Tie-Rod Nut [A] and Bolt
  Lower Tie-Rod Nut [B] and Bolt
  Tie-Rods [C]



Tie-Rod Installation

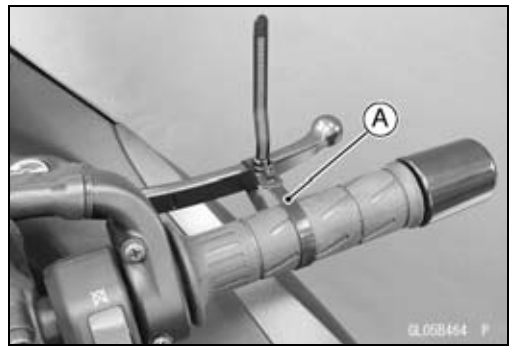
- Apply grease to the inside of the grease seals.
- Install each tie-rod so that the arrow [A] faces forward.
- Replace the tie-rod nuts with new ones.
- Tighten:

Torque - Tie-Rod Nuts: 60 N·m (6.1 kgf·m, 44 ft·lb)



Tie-Rod, Rocker Arm

Rocker Arm Removal



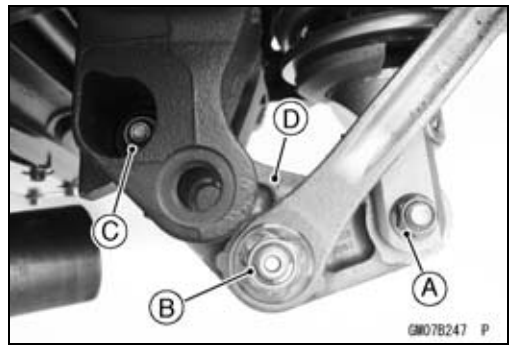
- Squeeze the brake lever slowly and hold it with a band [A].

⚠ WARNING

When raising the rear wheel off the ground with the jack and removing part(s) from the motorcycle, be sure to hold the front brake, or the motorcycle may fall over. It could cause an accident and injury.

- Remove:
  Center Stand (see Center Stand Removal in the Frame chapter) (Equipped Models)
  Rear Lower Fairing Bracket (see Rear Lower Fairing Bracket Removal in the Frame chapter) (Equipped Models)
  Muffler Bodies (see Muffler Body Removal/Installation in the Engine Top End chapter)
- Raise the rear wheel off the ground with the jack.

Special Tools - Jack: 57001-1238
Attachment Jack: 57001-1252
Jack Attachment: 57001-1608



- Remove:
  Lower Rear Shock Absorber Nut [A] and Bolt
  Lower Tie-Rod Nut [B] and Bolt
  Rocker Arm Nut [C] and Bolt
  Rocker Arm [D]

Rocker Arm Installation

- Apply grease to the inside of the grease seals.
- Replace the following nuts with new ones.
  Tie-Rod Nut (Lower)
  Rear Shock Absorber Nut (Lower)
  Rocker Arm Nut
- Tighten:

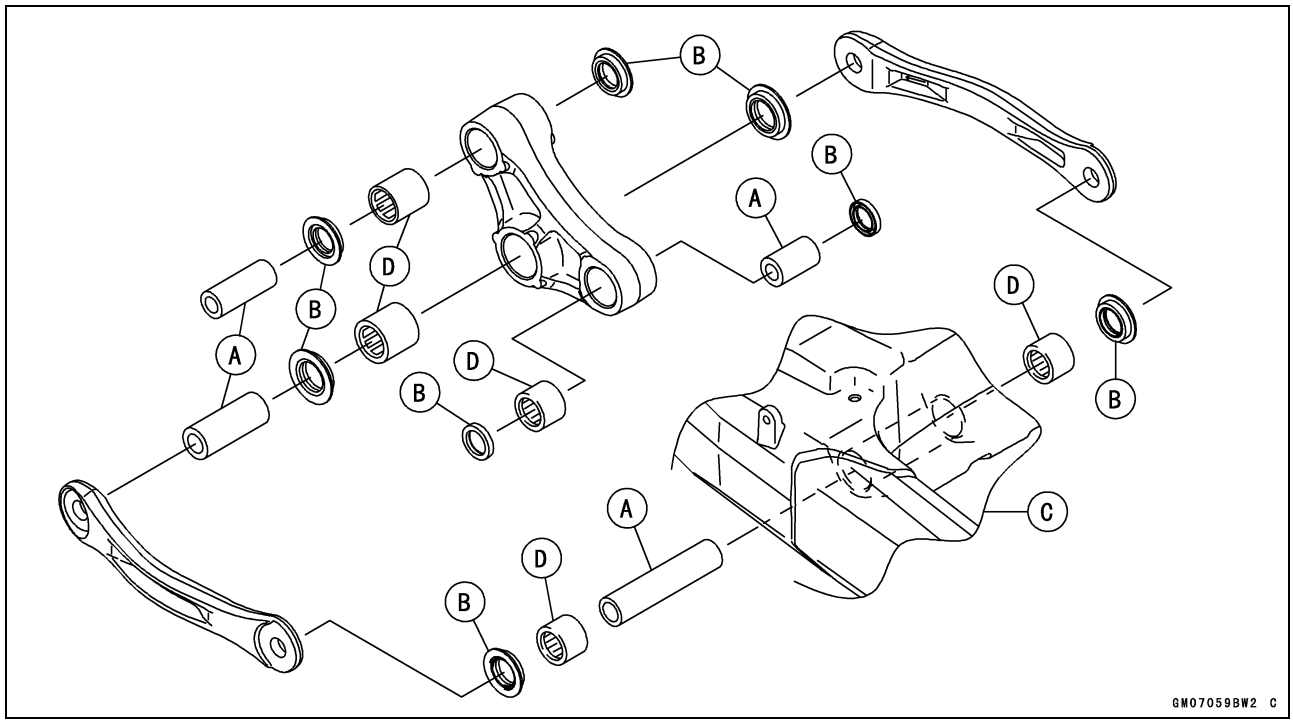
Torque - Rocker Arm Nut: 35 N·m (3.6 kgf·m, 26 ft·lb)
Tie-Rod Nut (Lower): 60 N·m (6.1 kgf·m, 44 ft·lb)
Rear Shock Absorber Nut (Lower): 35 N·m (3.6 kgf·m, 26 ft·lb)

- Install the removed parts (see appropriate chapters).

Tie-Rod, Rocker Arm

Tie-Rod and Rocker Arm Bearing Removal

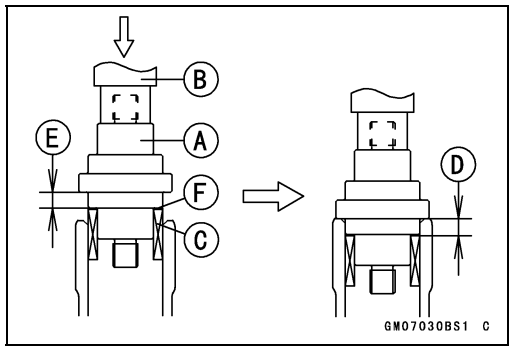
- Remove:
  Tie-Rods (see Tie-Rod Removal)
  Rocker Arm (see Rocker Arm Removal)
  Sleeves [A]
  Grease Seals [B]
  Swingarm [C] (see Swingarm Removal)
- Remove the needle bearings [D], using a suitable bearing driver.



Tie-Rod and Rocker Arm Bearing Installation

- Replace the needle bearings and grease seals with new ones.
- Apply plenty of grease to the lips of the grease seals.
- Apply 2-stroke oil to the inner surface of the rocker arm and swingarm.
- Install the needle bearings and grease seals position as shown.

Tie-Rod, Rocker Arm



○Screw the needle bearing driver [A] into the driver holder [B].
○Insert 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

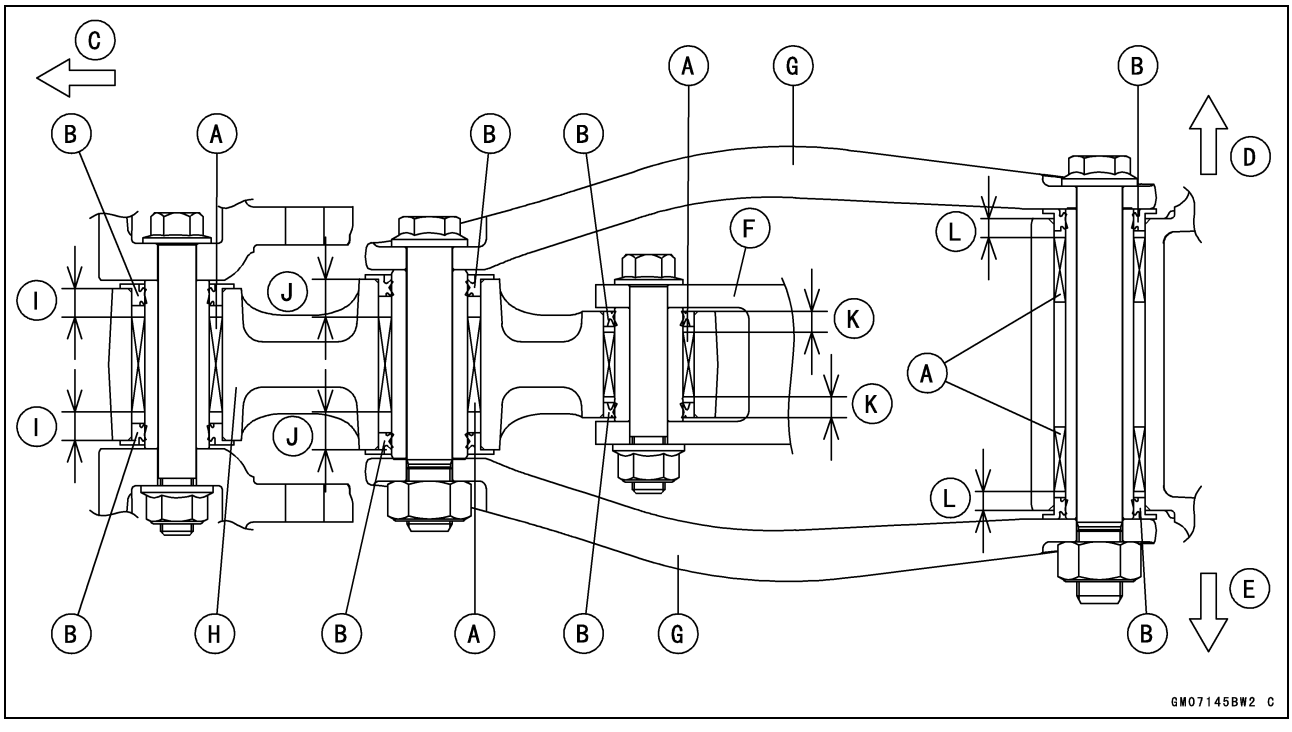
○*For a bearing of inner diameter ϕ18, select the pressing side of the needle bearing driver according to its pressing depth.*

Special Tools - Bearing Driver Set: 57001-1129
Needle Bearing Driver, ϕ17/ϕ18: 57001-1609
Spacer, ϕ18 [F]: 57001-1636
Needle Bearing Driver, ϕ20 & Spacer, ϕ28: 57001-1678

NOTE

○*Install the needle bearings so that the marked side faces out.*

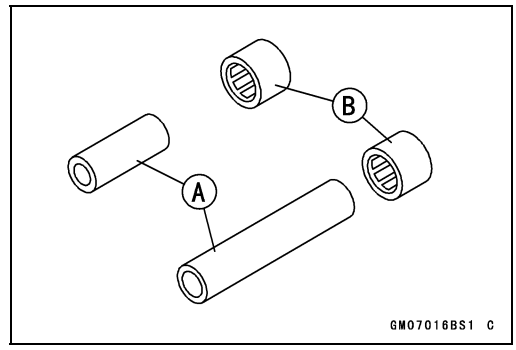
Needle Bearings [A]
Grease Seals [B]
Front [C]
Right Side [D]
Left Side [E]
Rear Shock Absorber [F]
Tie-Rods [G]
Rocker Arm [H]
7.5 mm (0.30 in.) [I]
10 mm (0.39 in.) [J]
5.5 mm (0.22 in.) [K]
5.0 mm (0.20 in.) [L]



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

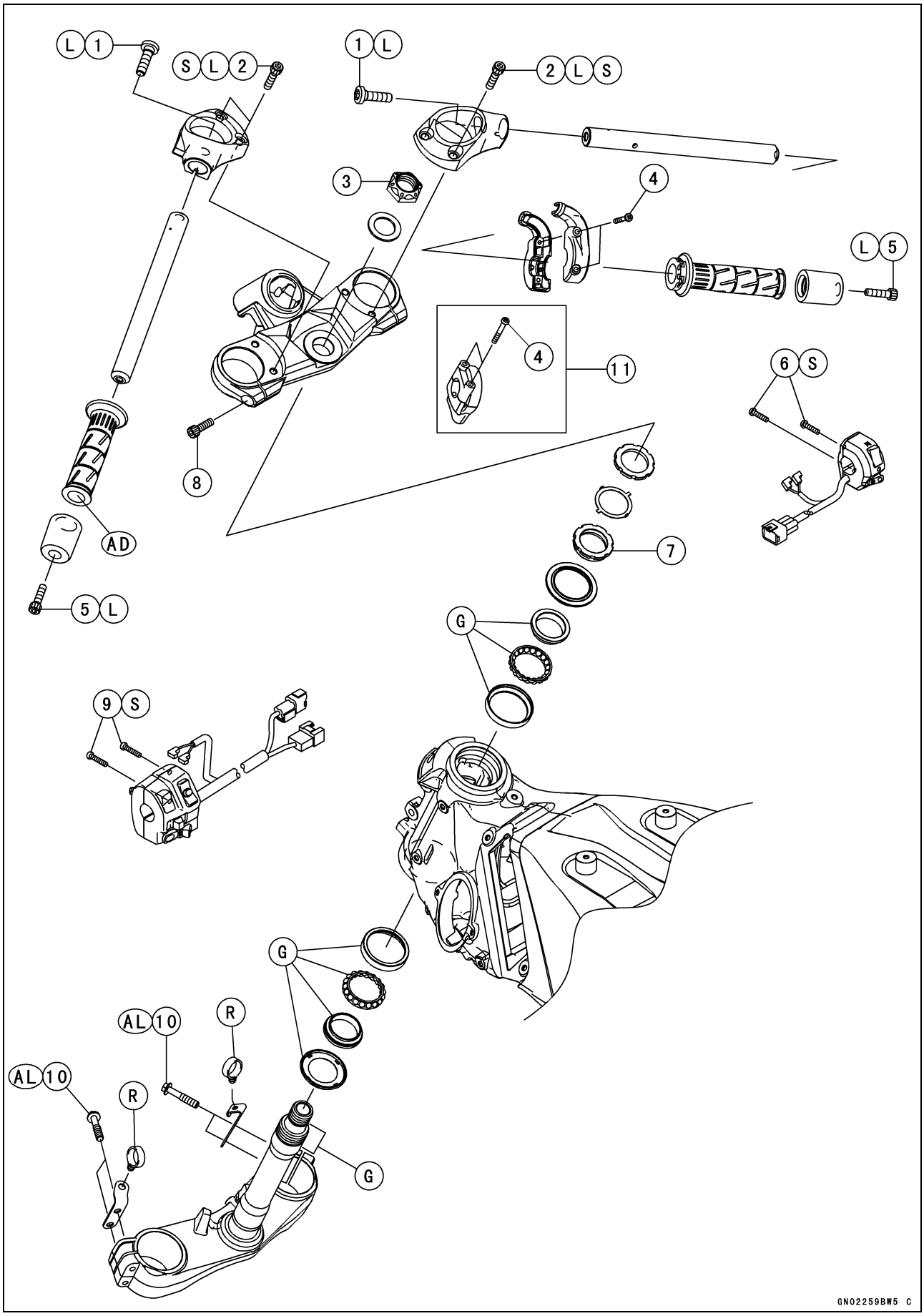
○*Since the bearings are packed with grease, lubrication is not required.*

Steering

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Exploded View



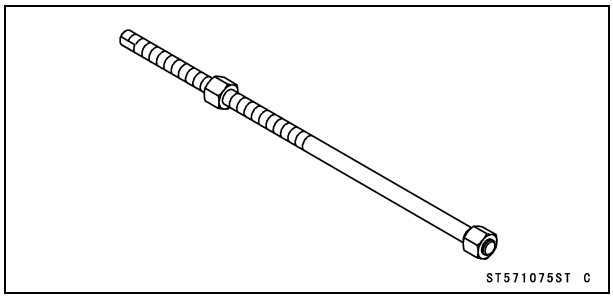
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Handlebar Bolts	35	3.6	26	L
2	Handlebar Holder Bolts	25	2.5	18	L, S
3	Steering Stem Head Nut	78	8.0	58	
4	Throttle Case Cover Screws (ZX1400H Model)	3.5	0.36	31 in·lb	
	Throttle Case Cover Screws (ZX1400J Model)	3.0	0.31	27 in·lb	
5	Handlebar Weight Bolts	20	2.0	15	L
6	Right Handlebar Switch Housing Screws	1.2	0.12	11 in·lb	S
7	Steering Stem Nut	25	2.5	18	
8	Front Fork Clamp Bolts (Upper)	20	2.0	15	
9	Left Handlebar Switch Housing Screws	1.2	0.12	11 in·lb	S
10	Front Fork Clamp Bolts (Lower)	30	3.1	22	AL

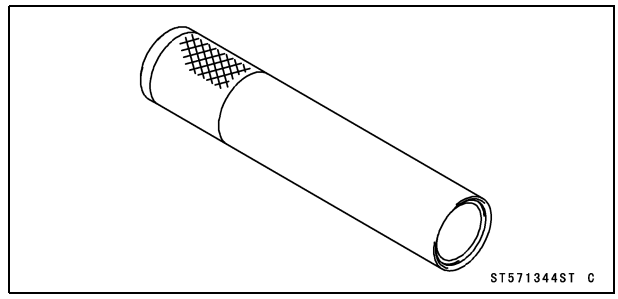
11. Other than US, CA, CAL, AU, WVTA (FULL), GB EVTA (FULL), SEA-B3 and CN Models
AD: Apply adhesive.
AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts
S: Follow the specified tightening sequence.

Special Tools

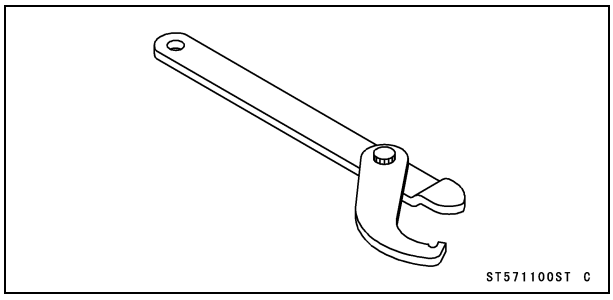
Head Pipe Outer Race Press Shaft:
57001-1075



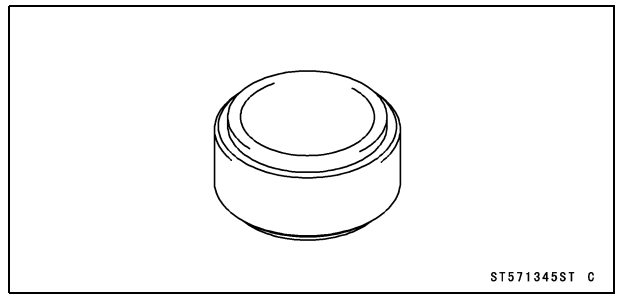
Steering Stem Bearing Driver, ϕ42.5:
57001-1344



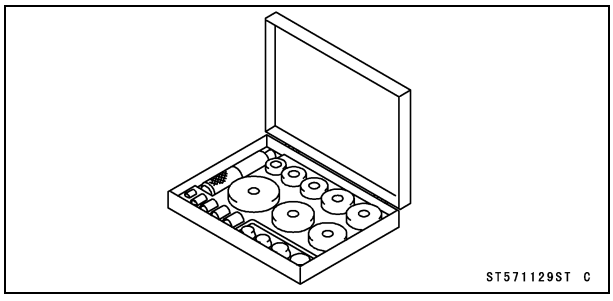
Steering Stem Nut Wrench:
57001-1100



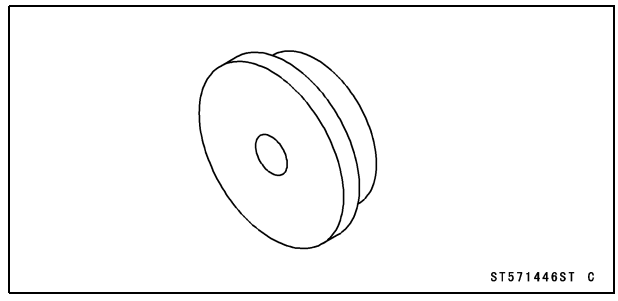
Steering Stem Bearing Driver Adapter, ϕ41.5:
57001-1345



Bearing Driver Set:
57001-1129



Head Pipe Outer Race Driver, ϕ55:
57001-1446



Steering

Steering Inspection

- Refer to the Steering Play Inspection in the Periodic Maintenance chapter.

Steering Adjustment

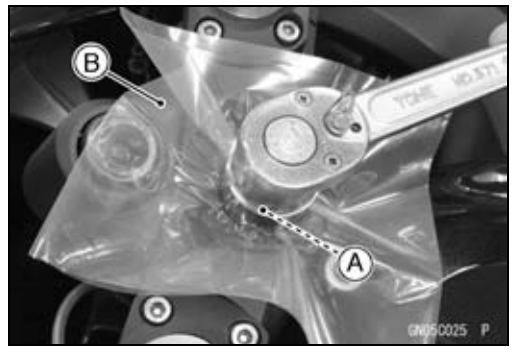
- Refer to the Steering Play Adjustment in the Periodic Maintenance chapter.

Steering Stem

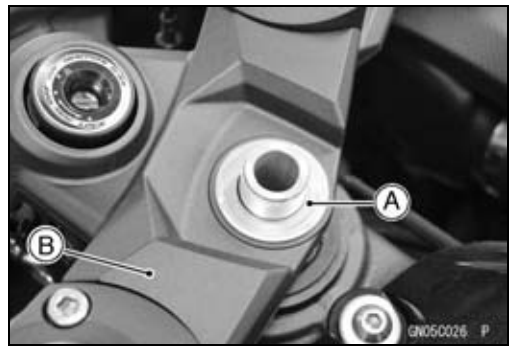
Stem, Stem Bearing Removal

- Remove:
  Front Forks (see Front Fork Removal in the Suspension chapter)
  Steering Stem Head Nut [A]

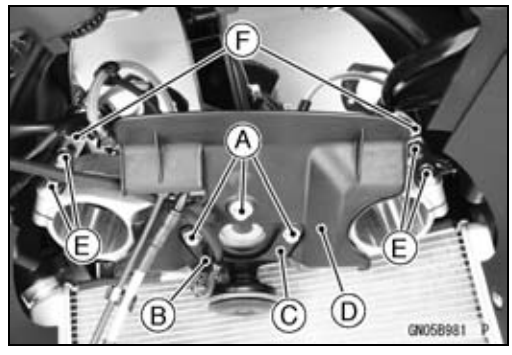
○Place a plastic bag [B] over the steering stem head nut to protect the steering stem head nut.



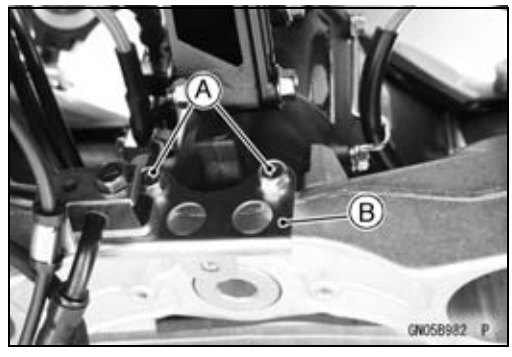
- Remove:
  Washer [A]
  Steering Stem Head [B]



- Remove:
  Steering Stem Cover Bolts [A]
  Clamp [B]
  Horn Bracket [C]
  Steering Stem Cover [D]
  Front Fork Clamp Bolts (Lower) [E]
  Brackets [F]



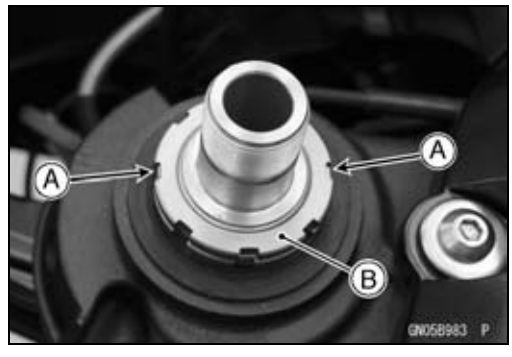
- Remove:
  Brake Hose Bracket Bolts [A]
  Brake Hose Bracket [B]



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

Special Tool - Steering Stem Nut Wrench: 57001-1100

- Remove the claw washer.

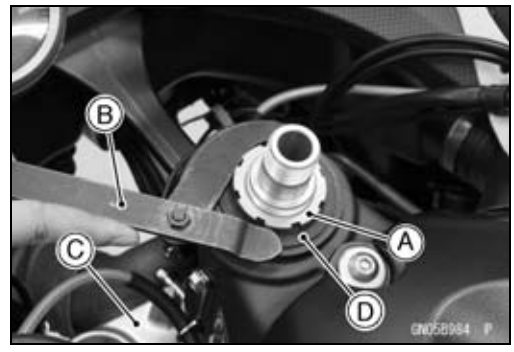


Steering Stem

- Pushing up the stem base, and remove the steering stem nut [A].

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

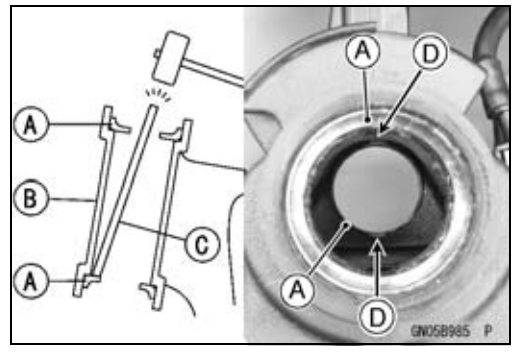
- Remove:
  Steering Stem [C]
  Stem Cap [D]
  Upper Ball Bearing Inner Race and Ball Bearing



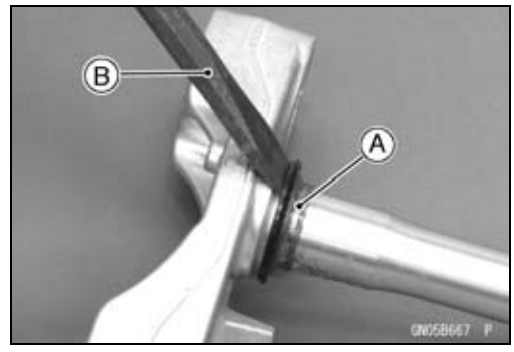
- To remove the ball bearing outer races [A] pressed into the head pipe [B], insert a bar [C] into the head pipe and apply it on the recesses [D] of the collar, then hammer the bar on both recess alternately to drive the races out.

NOTE

○*If either steering stem bearing is damaged, it is recommended that both the upper and lower bearings (including outer races) should be replaced with new ones.*



- Remove the lower ball bearing inner race (with its oil seal) [A] which is pressed onto the steering stem with a suitable commercially available chisel [B].

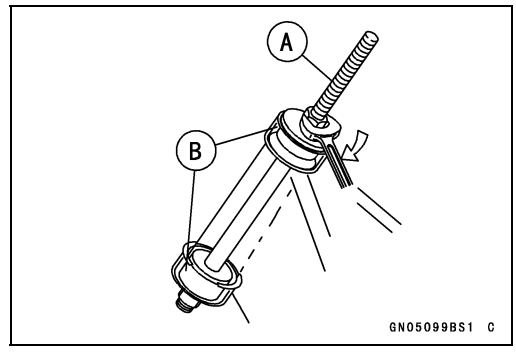


Stem, Stem Bearing Installation

- Replace the bearing outer races with new ones.
- Drive them into the head pipe at the same time.

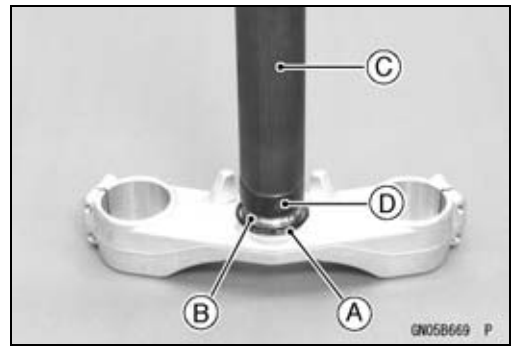
Special Tools - Head Pipe Outer Race Press Shaft [A]: 57001-1075
Head Pipe Outer Race Driver, φ55 [B]: 57001-1446 or Bearing Driver Set: 57001-1129

- Apply grease to the outer races.



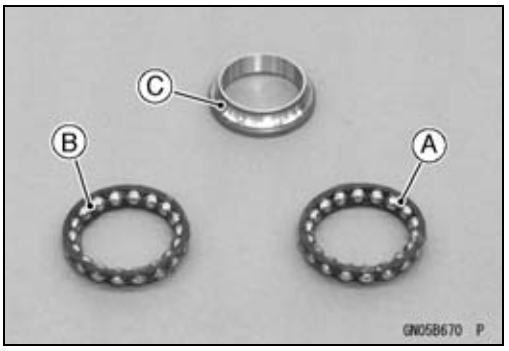
- Replace the bearing inner races and oil seal with new ones.
- Apply grease to the oil seal.
- Install the oil seal [A] on the steering stem, and drive the lower ball bearing inner race [B] applied the grease onto the stem.

Special Tools - Steering Stem Bearing Driver, φ42.5 [C]: 57001-1344
Steering Stem Bearing Driver Adapter, φ41.5 [D]: 57001-1345

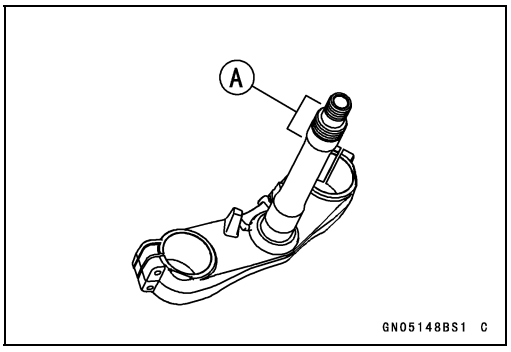


Steering Stem

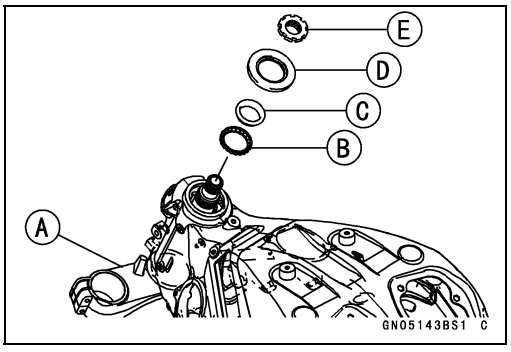
● Apply grease to the lower ball bearing [A], and install it onto the steering stem.
○The lower and upper ball bearings are identical.
● Apply grease to the upper ball bearing [B] and inner race [C].



● Apply grease to the thread and shaft [A] as shown.



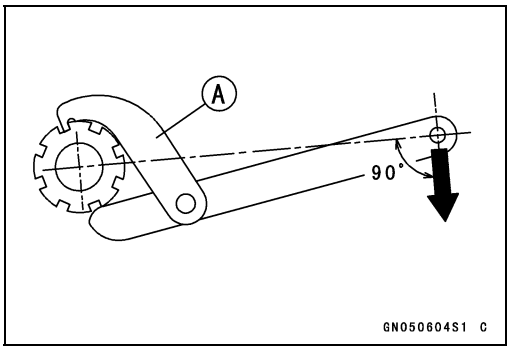
● Install the stem [A] through the head pipe and install the ball bearing [B] and inner race [C] on it.
● Install:
Stem Cap [D]
Steering Stem Nut [E]



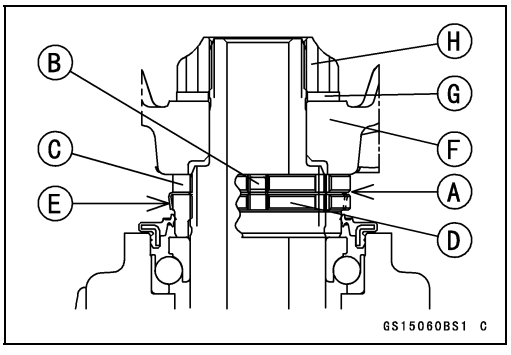
● Settle the bearings in place as follows.
○Tighten the steering stem nut with **65 N·m (6.6 kgf·m, 48 ft·lb)** of torque first, and loosen it a fraction of a turn until it turns lightly. Afterward tighten it again with specified torque using a steering stem nut wrench [A].
○Check that there is no play 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)



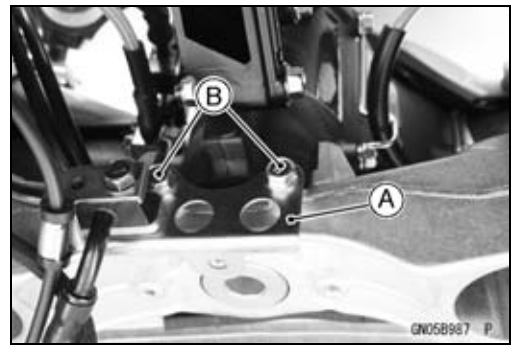
● Install the claw washer [A] so that its bent side [B] faces upward, and engage the bent claws with the grooves of stem locknut [C].
● Hand tighten the stem locknut until it touches the claw washer.
● Tighten the stem locknut clockwise until the claws are aligned with the grooves (ranging from 2nd to 4th) of stem nut [D], and bend the 2 claws downward [E].
● Install the stem head [F].
● Install the washer [G], and temporary tighten the stem head nut [H].
○Place a plastic bag over the steering stem head nut to protect the steering stem head nut.



Steering Stem

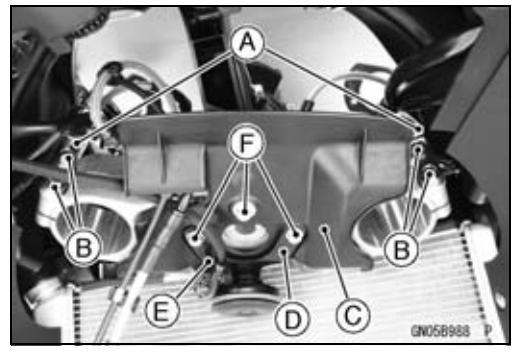
- Install the brake hose bracket [A] and tighten the brake hose bracket bolts [B].

Torque - Brake Hose Bracket Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)



- Install the brackets [A] and temporarily tighten the front fork clamp bolts (lower) [B].
- Install the steering stem cover [C], horn bracket [D] and clamp [E].
- Tighten:

Torque - Steering Stem Cover Bolts [F]: 8.0 N·m (0.82 kgf·m, 71 in·lb)



- Install the front forks (see Front Fork Installation in the Suspension chapter).

NOTE

○Tighten the upper front fork clamp bolts first, next the stem head nut, last the lower front fork clamp bolts.
○Place a plastic bag over the steering stem head nut to protect the steering stem head nut.
○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 Nut: 78 N·m (8.0 kgf·m, 58 ft·lb)
Front Fork Clamp Bolts (Lower): 30 N·m (3.1 kgf·m, 22 ft·lb)

⚠ WARNING

If the handlebars do not turn to the steering stop, they 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 removed parts (see appropriate chapters).
- Adjust the steering (see Steering Play Adjustment in the Periodic Maintenance chapter).

Steering Stem Bearing Lubrication

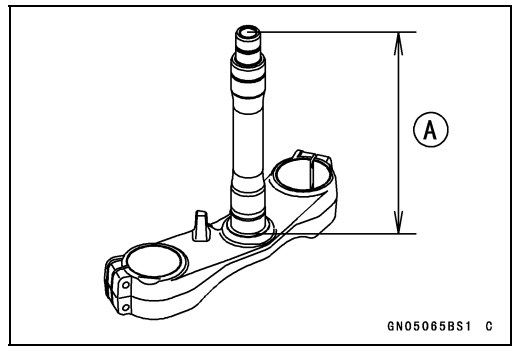
- Refer to the Steering Stem Bearing Lubrication in the Periodic Maintenance chapter.

Steering Stem

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.

★If the steering stem [A] is bent, replace the steering stem.



Stem Cap Deterioration, Damage Inspection

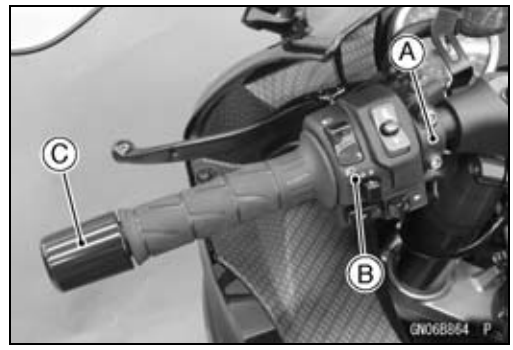
★Replace the stem cap if its oil seal [A] shows damage.



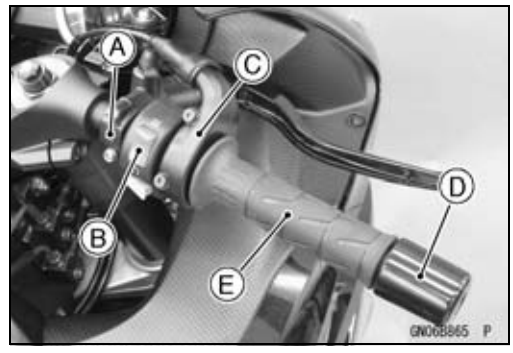
Handlebar

Handlebar Removal

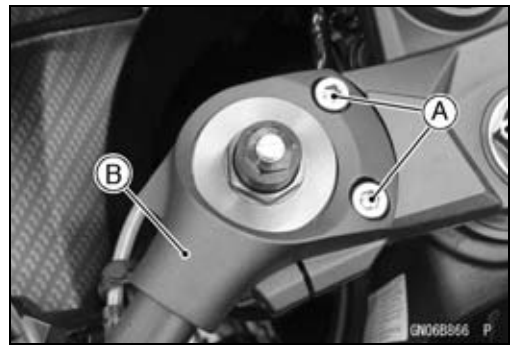
- Remove:
  Clutch Master Cylinder (see Clutch Master Cylinder Removal in the Clutch chapter) [A]
  Left Switch Housing [B]
  Handlebar Weight [C]



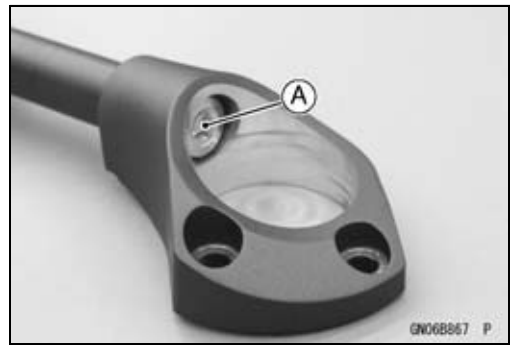
- Remove:
  Front Master Cylinder [A] (see Front Master Cylinder Removal in the Brakes chapter)
  Right Switch Housing [B]
  Throttle Case [C]
  Handlebar Weight [D]
  Throttle Grip [E]



- Remove the handlebar holder bolts [A].
- Remove each handlebar holder [B] with handlebar.



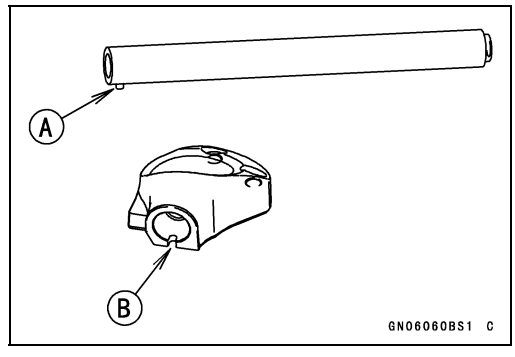
- Hold the handlebar in a vise, and remove the handlebar bolt [A] and handlebar.
- Remove:
  Left Handlebar Grip



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:

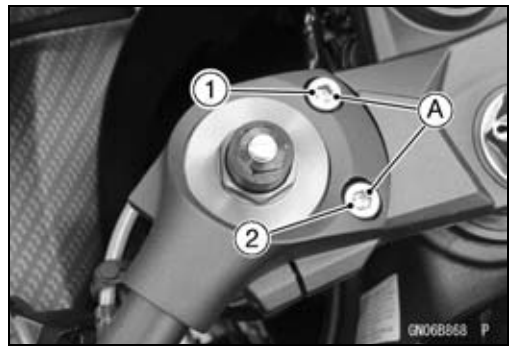
Torque - Handlebar Bolts: 35 N·m (3.6 kgf·m, 26 ft·lb)



Handlebar

- Install the handlebar holder with handlebar on the steering stem head.
- Apply a non-permanent locking agent to the threads of the handlebar holder bolts [A].
- Tighten the handlebar holder bolts following the tightening sequence [1-2-1].

Torque - Handlebar Holder Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)



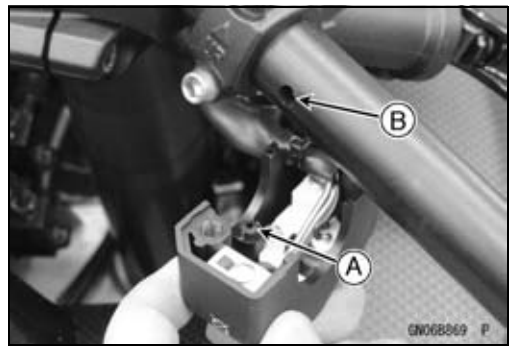
- Install the front master cylinder (see Front Master Cylinder Installation in the Brakes chapter).

- Install the left and right handlebar switch housings.

○Fit the projection [A] into a hole [B] in the handlebar.

○Tighten the upper screw first, and then the lower screw. There will be a gap at the lower part of the left and right handlebar switch housing after tightening.

Torque - Left and Right Handlebar Switch Housing Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)

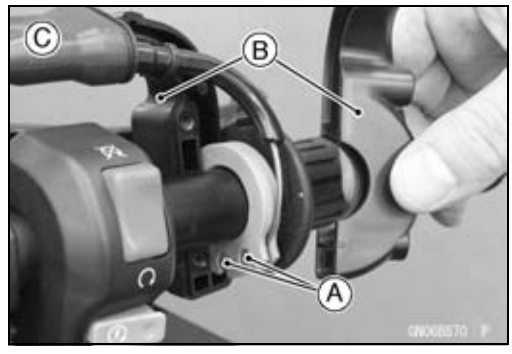


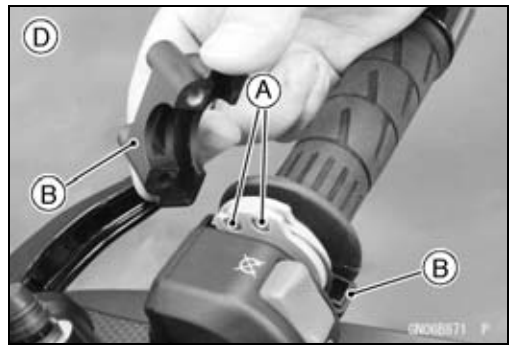
- Install the clutch master cylinder (see Clutch Master Cylinder Installation in the Clutch chapter).

- Install:
  Throttle Grip
  Throttle Cable Tips [A]
  Throttle Cases [B]

○Fit the projection into a hole in the handlebar.
  US, CA, CAL, AU, WVTA (FULL), GB WVTA (FULL), SEA-B3 and CN Models [C]
  Other than US, CA, CAL, AU, WVTA (FULL), GB WVTA (FULL), SEA-B3 and CN Models [D]

Torque - Throttle Case Cover Screws (ZX1400H Model): 3.5 N·m (0.36 kgf·m, 31 in·lb)
Throttle Case Cover Screws (ZX1400J Model): 3.0 N·m (0.31 kgf·m, 27 in·lb)





- Apply adhesive cement to the inside of the left handlebar grip, and install it.
- Install the left/right handlebar weight.
- Apply a non-permanent locking agent to the threads of the handlebar weight bolts.
- Tighten:

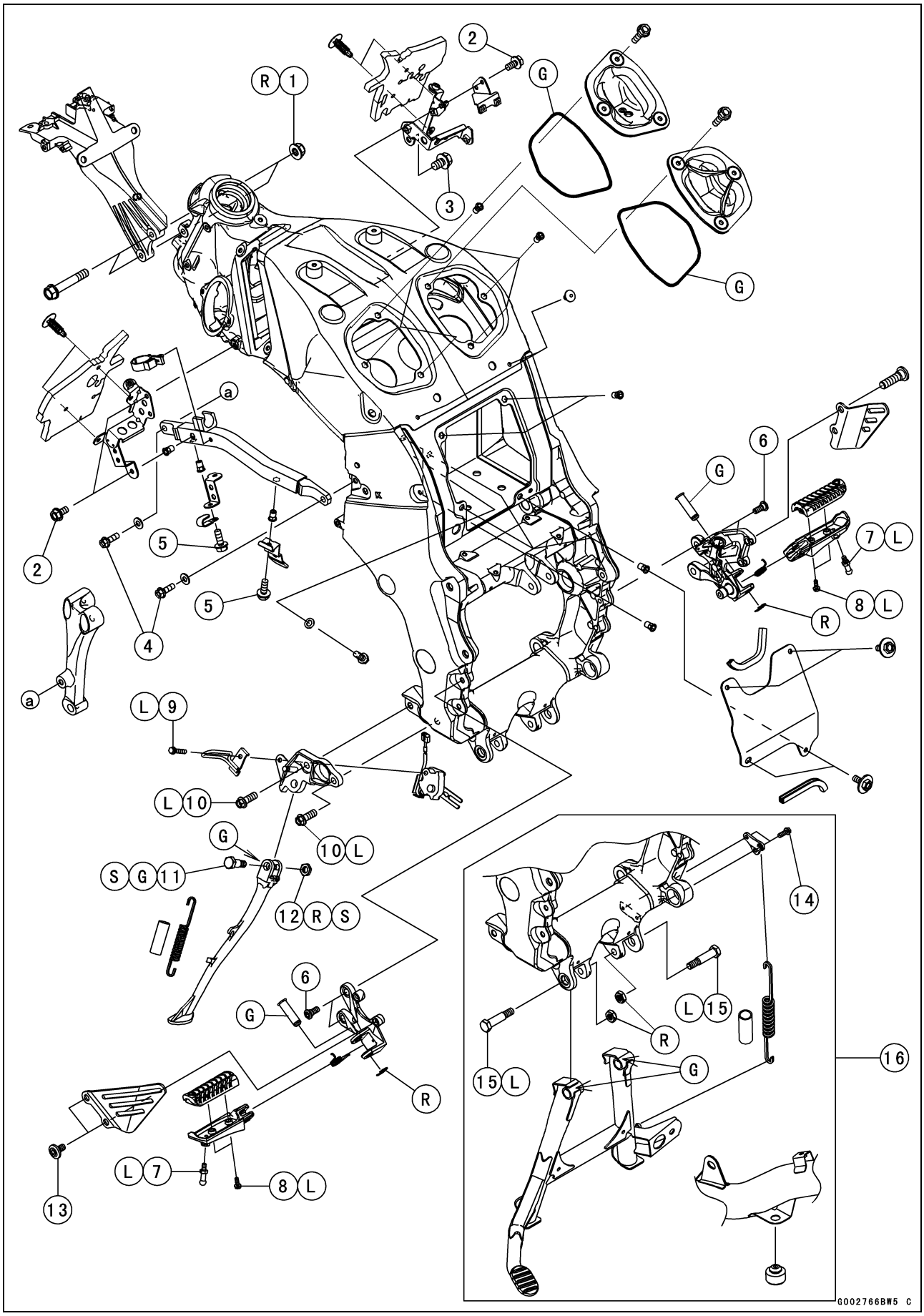
Torque - Handlebar Weight Bolts: 20 N·m (2.0 kgf·m, 15 ft·lb)

Frame

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Exploded View



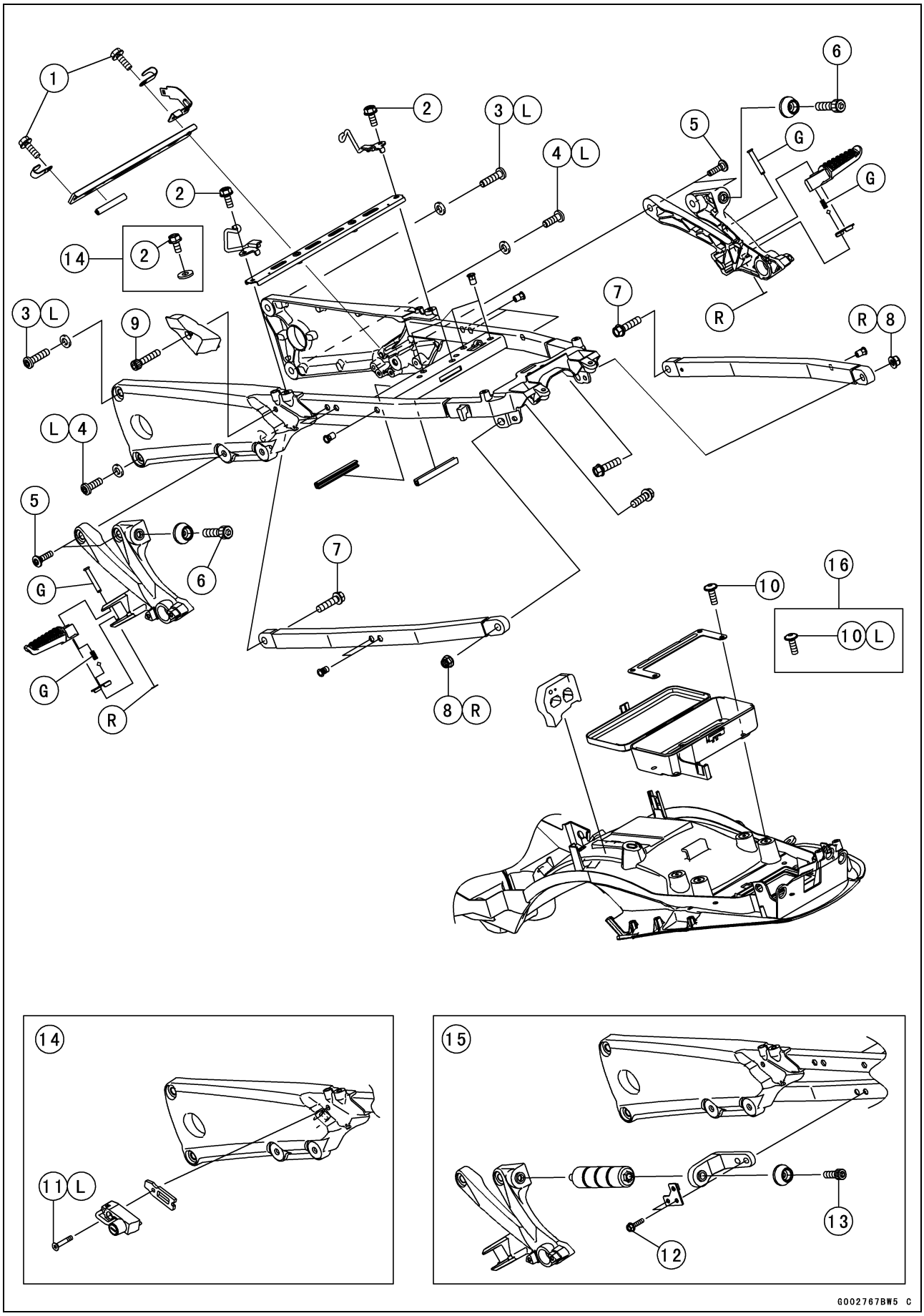
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Upper Fairing Bracket Nuts	25	2.5	18	R
2	Pad Bracket Bolts (M6)	8.0	0.82	71 in·lb	
3	Pad Bracket Bolt (M8)	20	2.0	15	
4	Subframe Bolts	23	2.3	17	R
5	Subframe Bracket Bolts	8.0	0.82	71 in·lb	
6	Front Footpeg Bracket Bolts	25	2.5	18	
7	Bank Sensors	8.0	0.82	71 in·lb	L
8	Front Footpeg Screws	4.5	0.46	40 in·lb	L
9	Side Stand Switch Bolt	9.0	0.92	80 in·lb	L
10	Side Stand Bracket Bolts	50	5.1	37	L
11	Side Stand Bolt	45	4.6	33	G, S
12	Side Stand Nut	45	4.6	33	R, S
13	Front Footpeg Guard Bolts	8.0	0.82	71 in·lb	
14	Center Stand Spring Bracket Bolts (Equipped Models)	8.0	0.82	71 in·lb	L
15	Center Stand Bolts (Equipped Models)	45	4.6	33	L

16. Center Stand (Equipped Models)

G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts
S: Follow the specified tightening sequence.

Exploded View



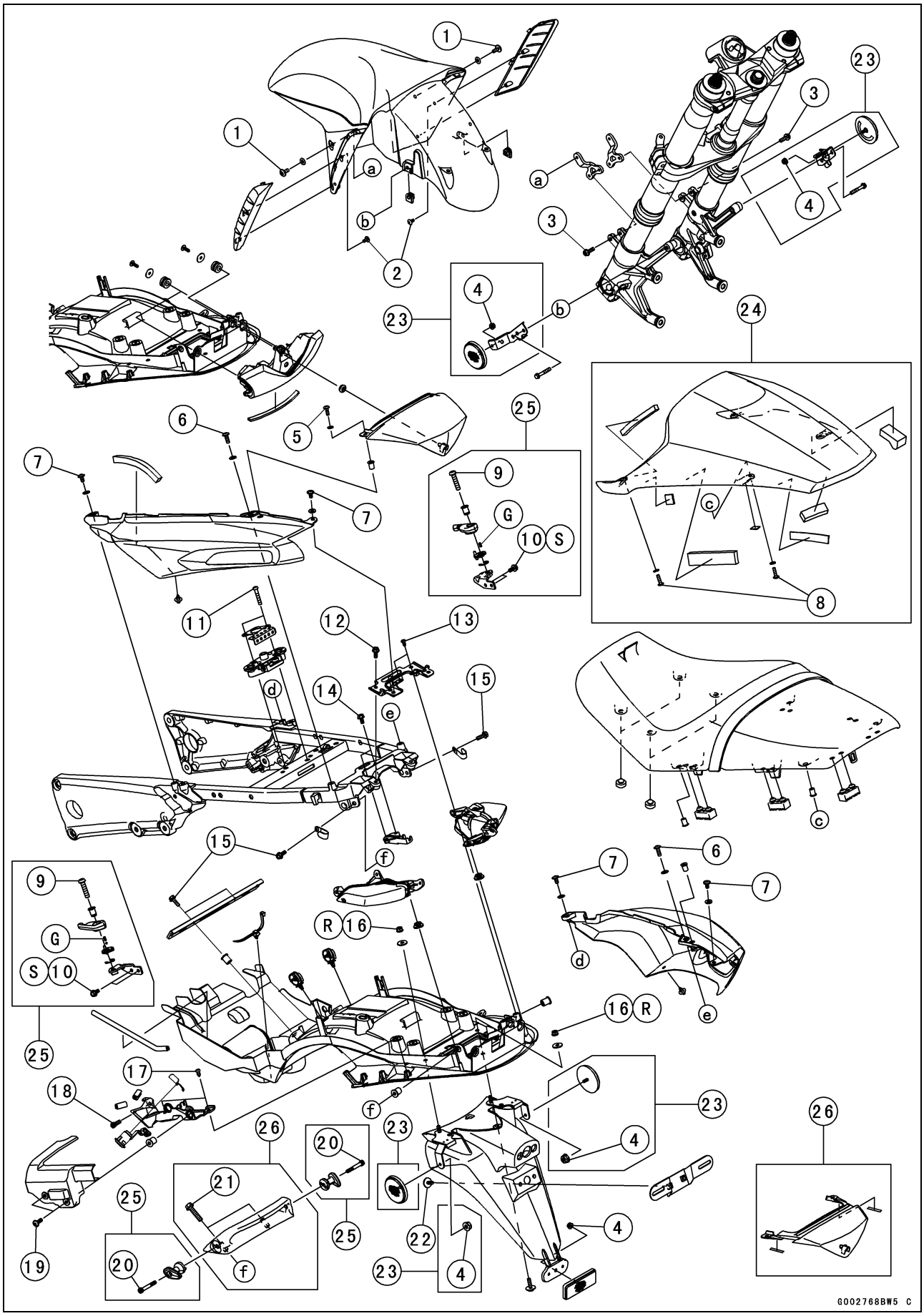
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Cross Bar Bolts	4.0	0.41	35 in·lb	
2	Fuel Tank Bracket Bolts	8.0	0.82	71 in·lb	
3	Rear Frame Bolts (L = 40 mm)	45	4.6	33	L
4	Rear Frame Bolts (L = 30 mm)	45	4.6	33	L
5	Rear Footpeg Bracket Bolts	25	2.5	18	
6	Collar Mounting Bolts	35	3.6	26	
7	Rear Frame Pipe Bolts	45	4.6	33	
8	Rear Frame Pipe Nuts	45	4.6	33	R
9	Cover Bolt	8.0	0.82	71 in·lb	
10	Tool Kit Case Bolts (Other than EUR Model)	4.0	0.41	35 in·lb	
	Tool Kit Case Bolts (EUR Model)	4.0	0.41	35 in·lb	L
11	Helmet Lock Screw (Equipped Models)	8.0	0.82	71 in·lb	L
12	Bracket Bolts (L = 25 mm)	8.0	0.82	71 in·lb	
13	Grip Mounting Bolt	35	3.6	26	

14. SEA-B1 and MY Models
15. Center Stand Equipped Models
16. EUR Model

G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts

Exploded View



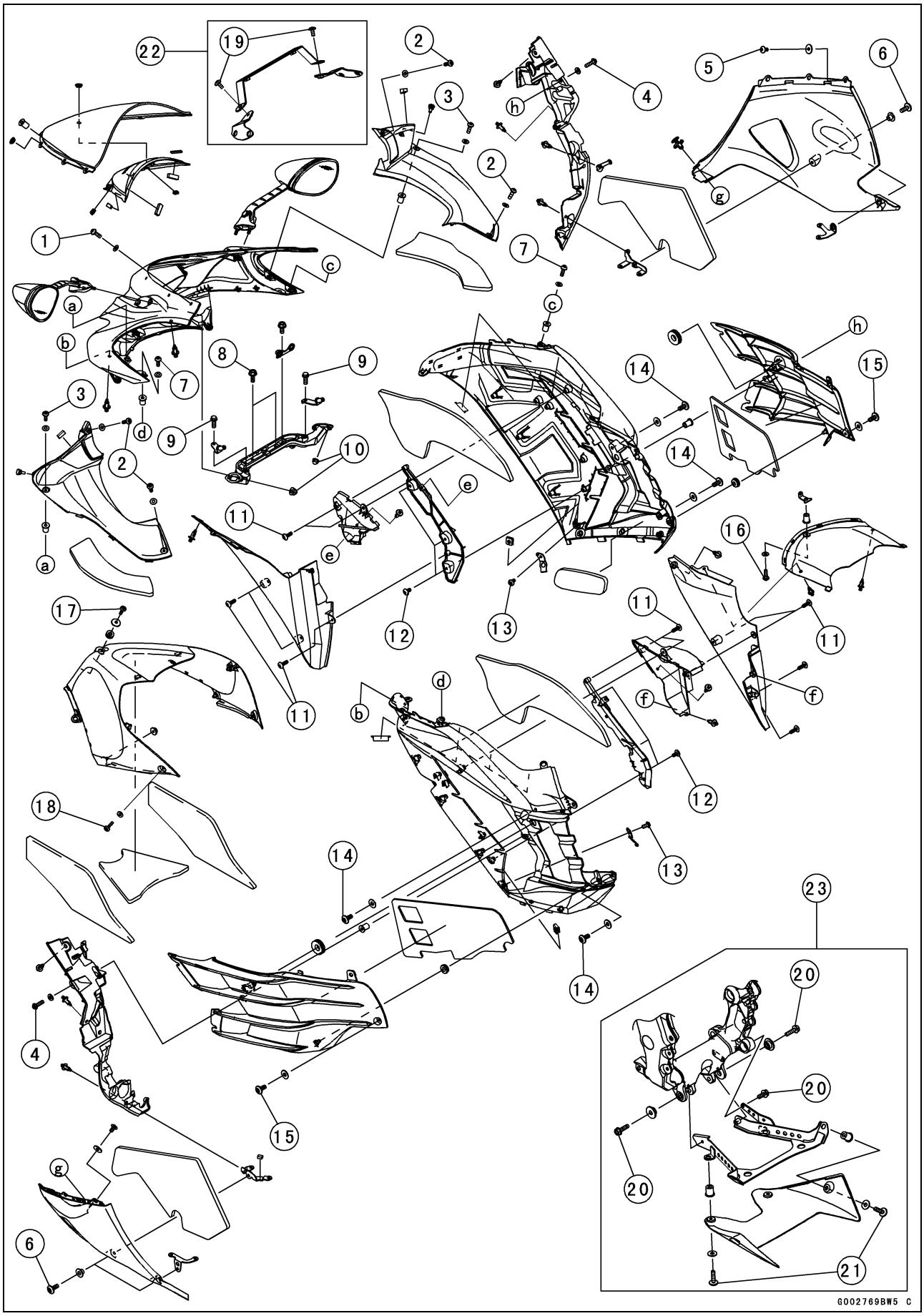
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Fender Mounting Bolts (L = 14 mm)	4.0	0.41	35 in·lb	
2	Front Fender Cover Screws	1.2	0.12	11 in·lb	
3	Front Fender Mounting Bolts (L = 35 mm)	8.0	0.82	71 in·lb	
4	Reflector Nuts	3.0	0.31	27 in·lb	
5	Center Seat Cover Screws	0.50	0.05	4.4 in·lb	
6	Side Seat Cover Bolts (L = 12 mm)	4.0	0.41	35 in·lb	
7	Side Seat Cover Bolts (L = 18 mm)	4.0	0.41	35 in·lb	
8	Single Seat Cover Screws (Equipped Models)	0.50	0.05	4.4 in·lb	
9	Tying Hook Bolts (M8) (Equipped Models)	20	2.0	15	
10	Tying Hook Bracket Bolts (Equipped Models)*	8.0	0.82	71 in·lb	S
11	Seat Lock Screws	8.0	0.82	71 in·lb	
12	Bracket Bolts (L = 16 mm)	4.0	0.41	35 in·lb	
13	Rear Fender Mounting Screws	1.2	0.12	11 in·lb	
14	Seat Lock Bolts	8.0	0.82	71 in·lb	
15	Rear Fender Mounting Bolts	1.0	0.10	8.9 in·lb	
16	Flap Mounting Nuts	4.0	0.41	35 in·lb	R
17	Seat Lock Bracket Screws	1.2	0.12	11 in·lb	
18	Seat Lock Bracket Bolt	4.0	0.41	35 in·lb	
19	Seat Lock Cable Cover Bolts	1.0	0.10	8.9 in·lb	
20	Tying Hook Bolts (M6) (Equipped Models)	8.0	0.82	71 in·lb	
21	Grab Rail Mounting Bolts (Equipped Models)	25	2.5	18	
22	License Plate Bracket Bolts	4.0	0.41	35 in·lb	

23. Reflector (Equipped Models)
24. Single Seat Cover (Equipped Models)
25. Tying Hook (Equipped Models)
26. Grab Rail (Equipped Models)

*: Tighten the tying hook bracket bolts of the front side first.
G: Apply grease.
R: Replacement Parts
S: Follow the specified tightening sequence.

Exploded View



Exploded View

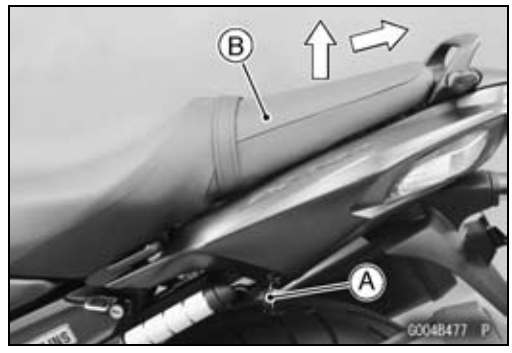
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Windshield Bolts	0.40	0.04	3.5 in·lb	
2	Inner Cover Bolts (Front and Rear Side)	0.50	0.05	4.4 in·lb	
3	Inner Cover Bolts (Center Side)	0.50	0.05	4.4 in·lb	
4	Fairing Cover Bolts (M5)	0.50	0.05	4.4 in·lb	
5	Lower Fairing Screws	1.2	0.12	11 in·lb	
6	Lower Fairing Bolts	4.0	0.41	35 in·lb	
7	Middle Fairing Bolts (M5)	0.50	0.05	4.4 in·lb	
8	Upper Fairing Mounting Bolts	8.0	0.82	71 in·lb	
9	Inner Cover Bracket Bolts	8.0	0.82	71 in·lb	
10	Rear View Mirror Nuts	8.0	0.82	71 in·lb	
11	Inner Fairing Screws	1.2	0.12	11 in·lb	
12	Middle Fairing Bracket Screws	1.2	0.12	11 in·lb	
13	Middle Fairing Bracket Bolts	3.0	0.31	27 in·lb	
14	Middle Fairing Bolts (M6)	4.0	0.41	35 in·lb	
15	Fairing Cover Bolts (M6)	4.0	0.41	35 in·lb	
16	Upper Inner Fairing Bolt	0.50	0.05	4.4 in·lb	
17	Fuel Tank Cover Bolt (L = 23 mm)	8.0	0.82	71 in·lb	
18	Fuel Tank Cover Bolts (L = 30 mm)	1.0	0.10	8.9 in·lb	
19	License Plate Bracket Bolts (ID Model only)	8.0	0.82	71 in·lb	
20	Rear Lower Fairing Bracket Bolts (Equipped Models)	8.0	0.82	71 in·lb	
21	Rear Lower Fairing Bolts (Equipped Models)	1.0	0.10	8.9 in·lb	

22. ID Model
23. Rear Lower Fairing (Equipped Models)

Seat

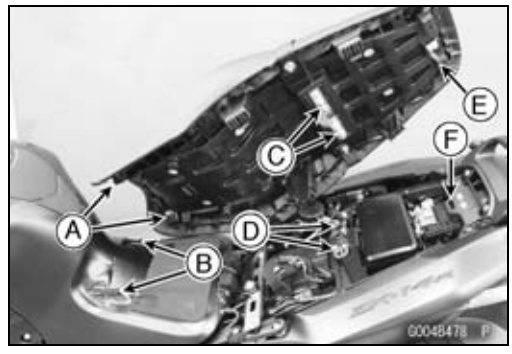
Seat Removal

- Insert the ignition key [A] into the seat lock.
- Turn the key clockwise, and pull up on the rear of seat [B].
- Remove the seat backward.



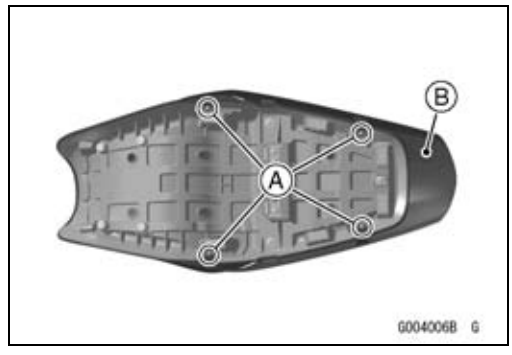
Seat Installation

- Insert the slots [A] of the seat into the brackets [B] of the fuel tank.
- Insert the projections [C] of the seat into the holes [D] of the seat lock, and insert the seat hook [E] into the slot [F] of the frame.
- Push down the rear part of the seat until the lock clicks.
- Pull up the front and rear end of the seat to make sure they are securely locked.

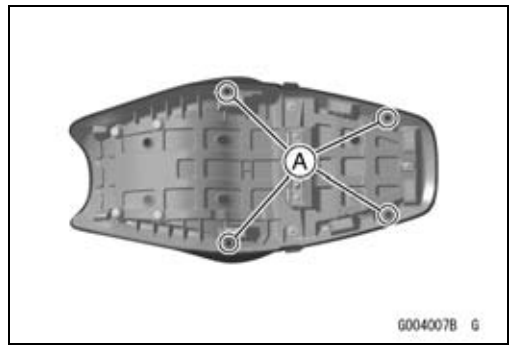


Single Seat Cover Removal (Equipped Models)

- Remove:
  Seat (see Seat Removal)
  Single Seat Cover Screws [A] and Washers
- Remove the single seat cover [B] from the seat.



- Remove:
  Wellnuts [A]



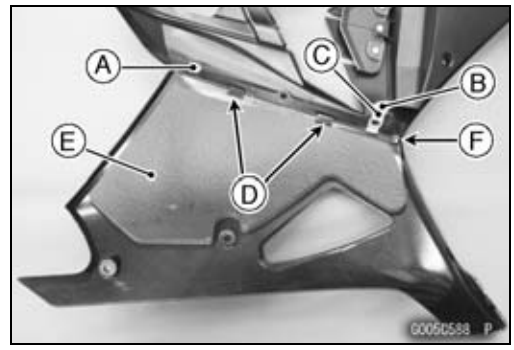
Single Seat Cover Installation (Equipped Models)

- Installation is the reverse of removal.
- Tighten:

Torque - Single Seat Cover Screws: 0.50 N·m (0.05 kgf·m, 4.4 in·lb)

Fairings

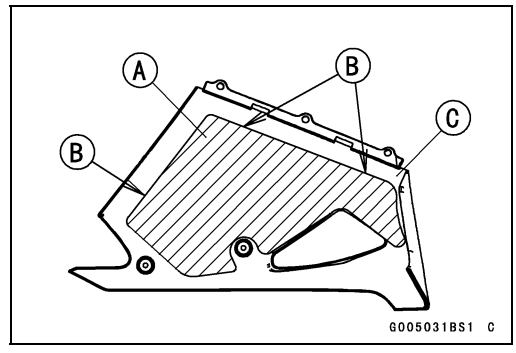
Lower Fairing Removal



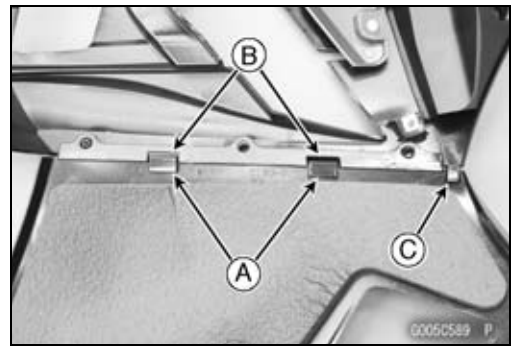
- Remove:
  Middle Fairing (see Middle Fairing Removal)
  Lower Fairing Screw [A] and Washer
  Middle Fairing Bracket Bolt [B] and Bracket [C]
- Clear the hook [D] of the middle fairing from the slots of the lower fairing [E], and remove the lower fairing.

○Be careful not to break the tab [F] of the middle fairing.

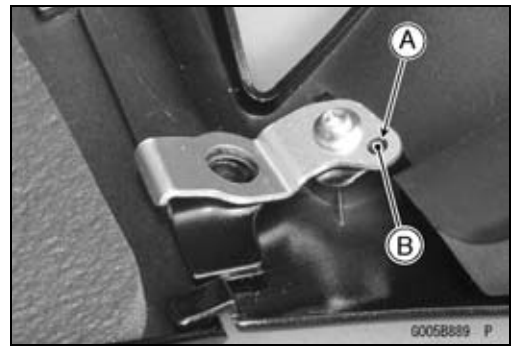
Lower Fairing Installation



- Installation is the reverse of removal.
- When installing the pad [A], align the edge of the pad with the lines [B] of the lower fairing [C].



- Insert the hook [A] of the middle fairing into the slots [B] of the lower fairing.
- Insert the tab [C] of the middle fairing into the inside of the lower fairing.



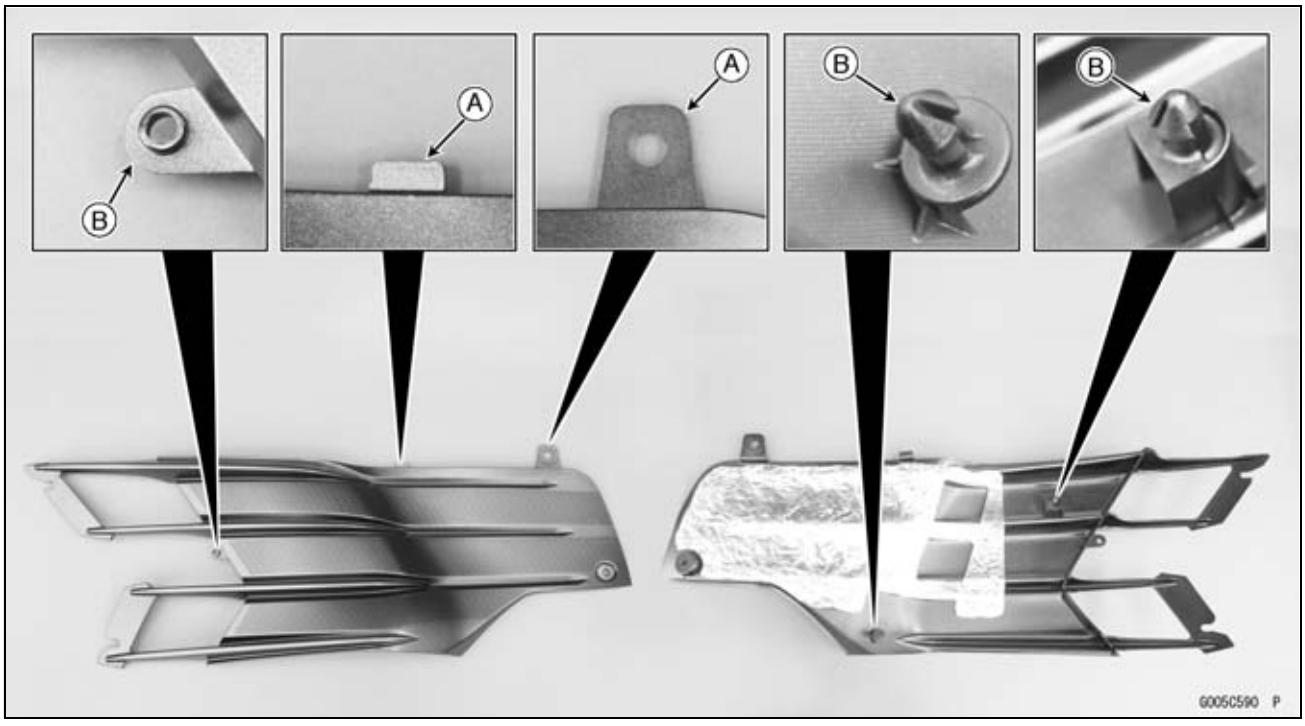
- Fit the hole [A] of the bracket to the projection [B] of the middle fairing.
- Tighten:

Torque - Middle Fairing Bracket Bolt: 3.0 N·m (0.31 kgf·m, 27 in·lb)
Lower Fairing Screw: 1.2 N·m (0.12 kgf·m, 11 in·lb)

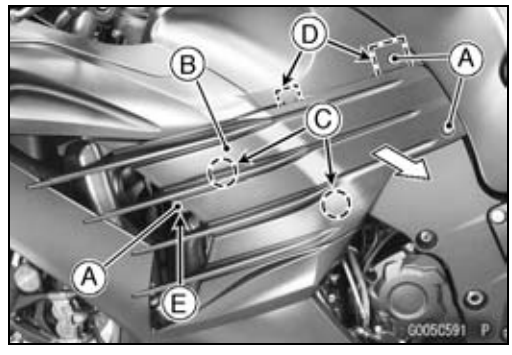
Fairings

Fairing Cover Removal

- Remove:
  Tabs [A]
  Projections [B]



- Remove:
  Bolts [A] and Washers
- Pulling out the fairing cover [B] out slowly to clear the projections [C], and clear the tabs [D] from the fuel tank cover.
- Clear the inner rubber cover [E] from the fairing cover.



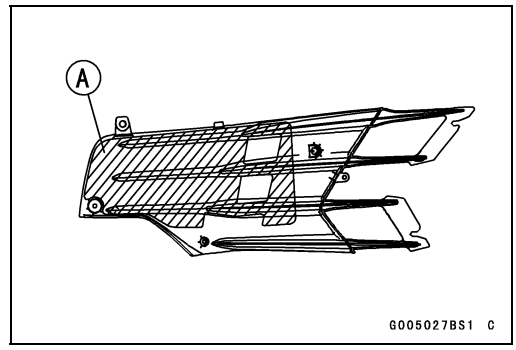
- Remove the fairing cover [A] backward.



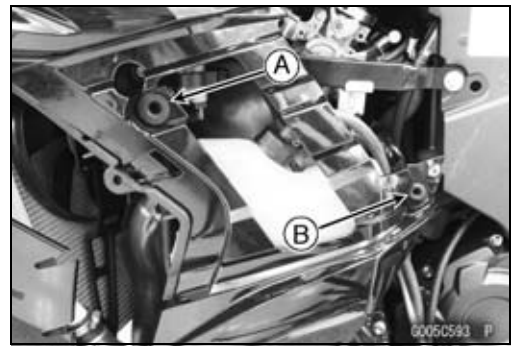
Fairings

Fairing Cover Installation

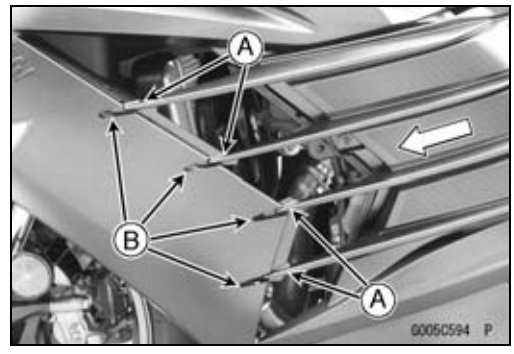
- When installing the pad [A], install it as shown.



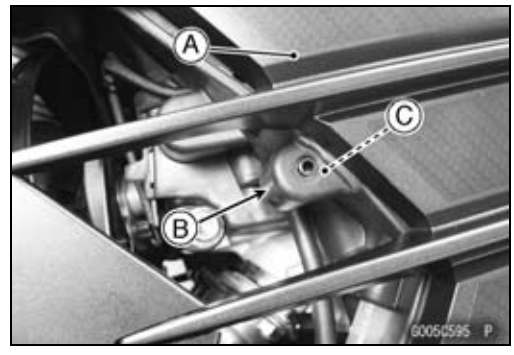
- Check that the grommet [A] and damper [B] are in place on the middle fairing.



- Insert the projections [A] of the fairing cover into the grooves [B] of the middle fairing.

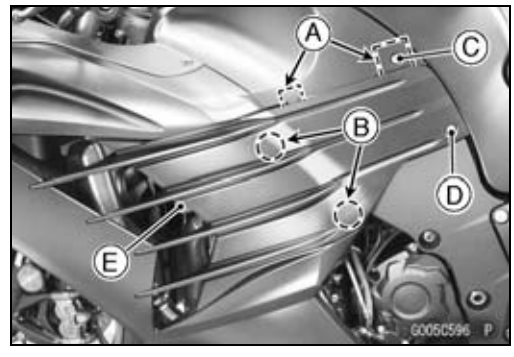


- Insert the fairing cover [A] halfway, and fit the inner rubber cover [B] to the projection [C] of the fairing cover as shown.



- Insert the tabs [A] on the fairing cover under the fuel tank cover first, and then fit the projections [B] to the grommet and damper.
- Tighten the bolts with washers.

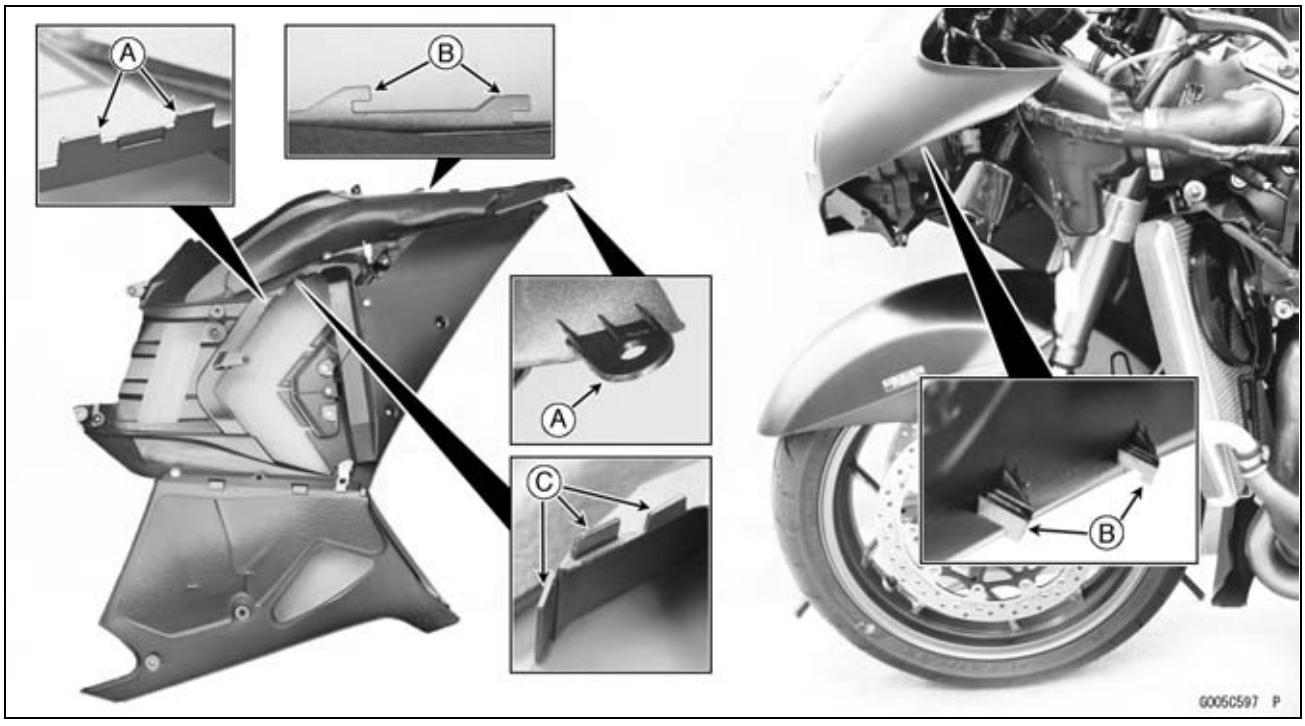
Torque - Fuel Tank Cover Bolt (L = 30 mm) [C]: 1.0 N·m (0.10 kgf·m, 8.9 in·lb)
Fairing Cover Bolt (M6) [D]: 4.0 N·m (0.41 kgf·m, 35 in·lb)
Fairing Cover Bolt (M5) [E]: 0.50 N·m (0.05 kgf·m, 4.4 in·lb)



Fairings

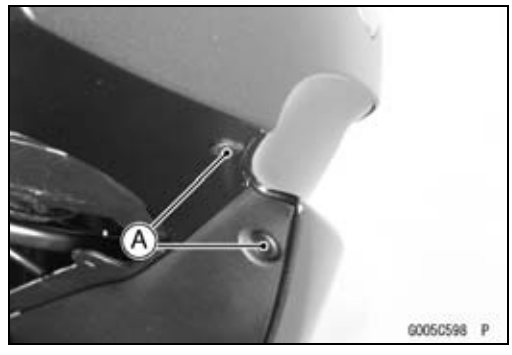
Middle Fairing Removal

Tabs [A]
Hooks [B]
Tabs [C] (Only on Left Middle Fairing)



● Remove:
Fairing Covers (see Fairing Cover Removal)
Inner Covers (see Inner Cover Removal)
Fuel Tank Cover (see Fuel Tank Cover Removal)
Upper Inner Fairing (see Upper Inner Fairing Removal)
Quick Rivets [A]

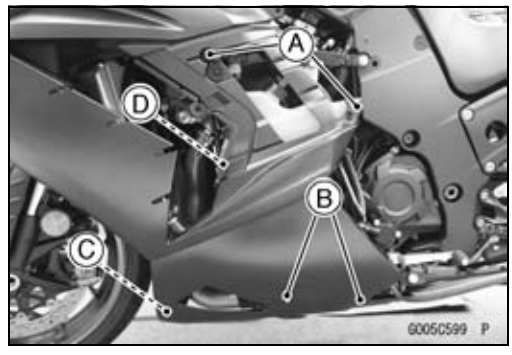
○Push the central pin of the quick rivet.



● Remove:
Middle Fairing Bolts (M6) [A] and Washers
Lower Fairing Bolts [B] and Collars
Quick Rivets

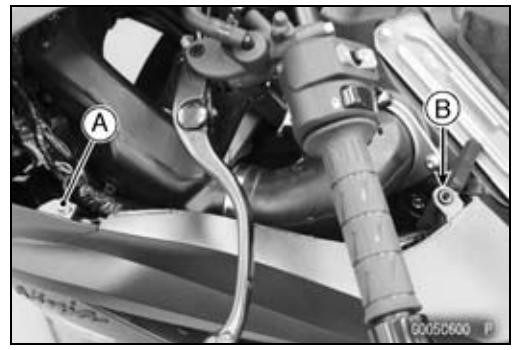
○Pull up the core of the quick rivet [C] by the flat tip screwdriver.

○Push the central pin of the quick rivet [D].



Fairings

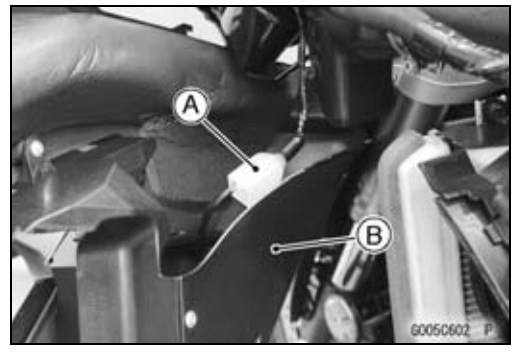
- Remove:
  Middle Fairing Bolt (M5) [A] and Washer
- Clear the hook [B] from the bracket.



- Clear the projection [A] of the middle fairing from the hole [B] of the upper fairing.
- While pulling backward the middle fairing, clear the hooks [C] of the middle fairing.
- Clear the tab [D] of the middle fairing from the upper fairing.
- Clear the inner rubber cover from the middle fairing.



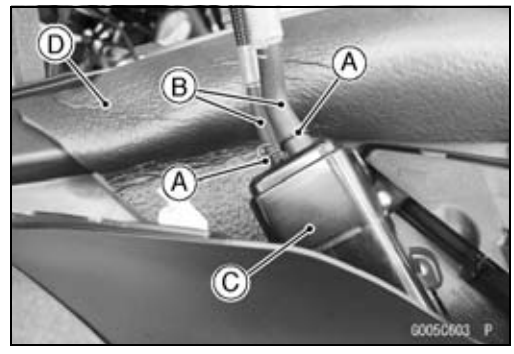
- Disconnect the front turn signal light lead connector [A].
- Remove the middle fairing [B].



- For models equipped with an evaporative emission control system, note the following.

○Slide the clamps [A].

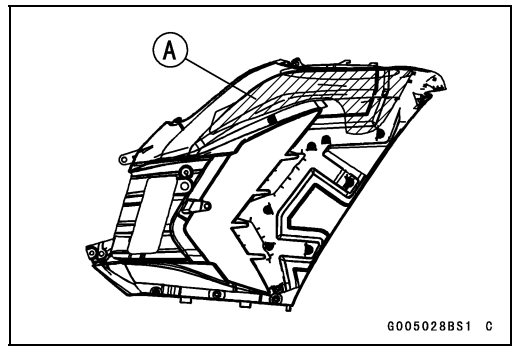
○Disconnect the hoses [B] from the canister [C].
  Right Middle Fairing [D]

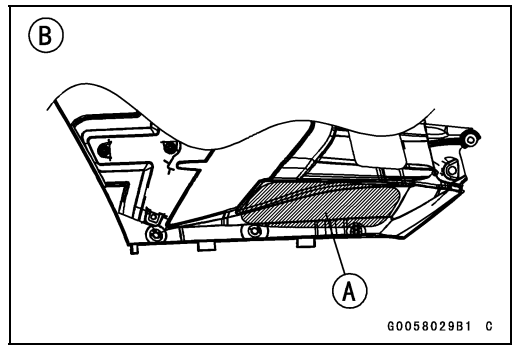


Fairings

Middle Fairing Installation

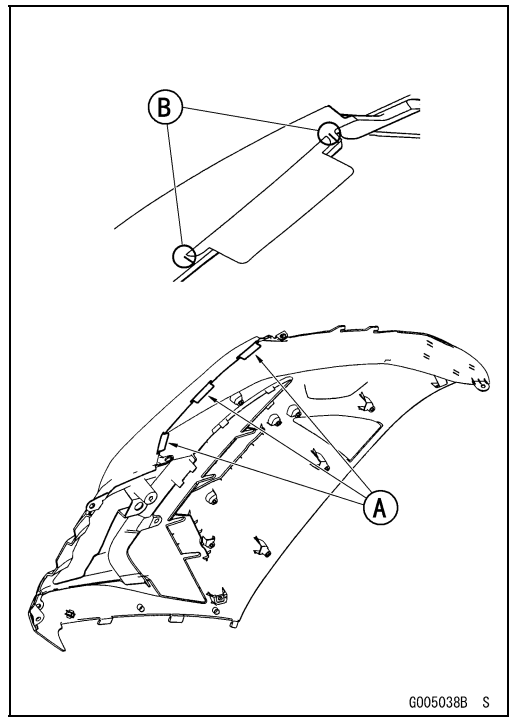
- Installation is the reverse of removal.
- When installing the pad [A], install it along the middle fairing as shown.
  Right Middle Fairing Only [B]





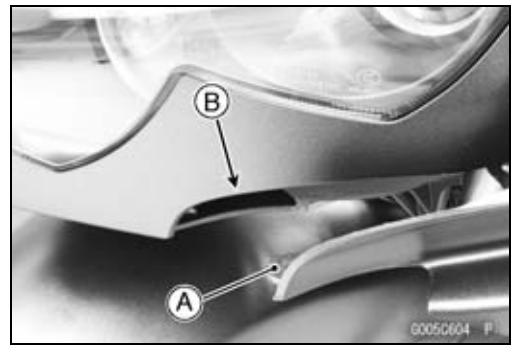
- Stick the tape [A] between the guide lines [B] and bend it.

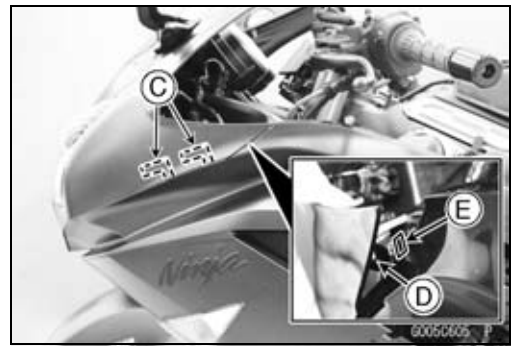
○Do not protrude the tape from the end of the guide line.



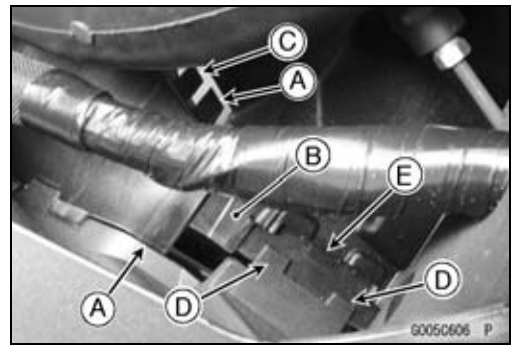
Fairings

- Insert the tab [A] of the middle fairing to the inside of the upper fairing [B] first, and then fit the hooks [C] of the middle fairing on the hooks of the upper fairing.
- Fit the projection [D] of the middle fairing into the hole [E] of the upper fairing.



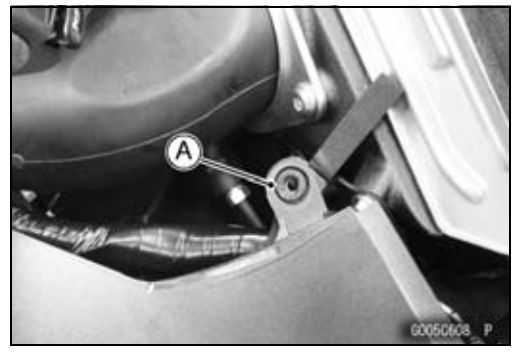


- Insert the tabs [A] of the middle fairing over the radiator cover [B] (only on left middle fairing).
- Insert the tab [C] of the middle fairing under the radiator cover (only on left middle fairing).
- Insert the tabs [D] of the middle fairing under the radiator cover.
- Insert the tab [E] of the radiator cover under the middle fairing.



- Hang the hook [A] of the middle fairing to the bracket.
- Fit the inner rubber cover to the middle fairing.
- Tighten:

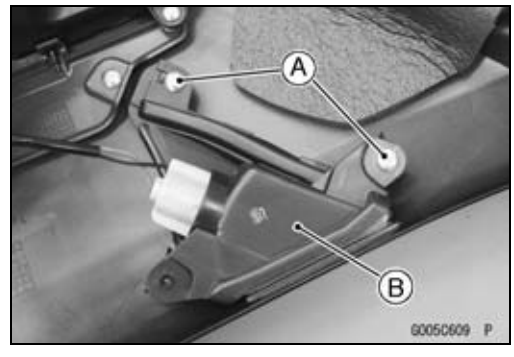
Torque - Middle Fairing Bolt (M5): 0.50 N·m (0.05 kgf·m, 4.4 in·lb)
Middle Fairing Bolts (M6): 4.0 N·m (0.41 kgf·m, 35 in·lb)
Lower Fairing Bolts: 4.0 N·m (0.41 kgf·m, 35 in·lb)



Middle Fairing Disassembly

- Remove:

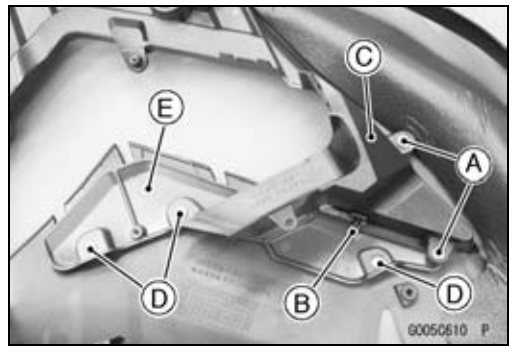
Middle Fairing (see Middle Fairing Removal)
Lower Fairing (see Lower Fairing Removal)
Inner Fairing (see Inner Fairing Removal)
Front Turn Signal Light Mounting Screws [A]
Front Turn Signal Light [B]



Fairings

- Remove:
  Inner Fairing Screws [A]
  Quick Rivet [B]
  Cover [C]
  Inner Fairing Screws [D]
  Bracket [E]

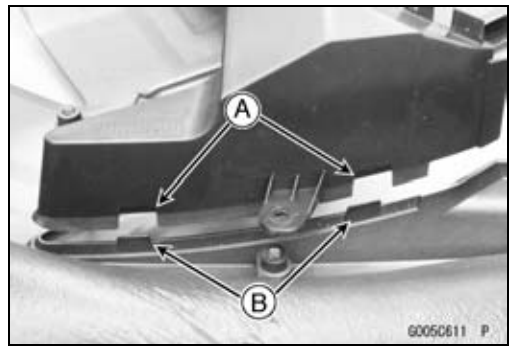
○Push the central pin of the quick rivet.

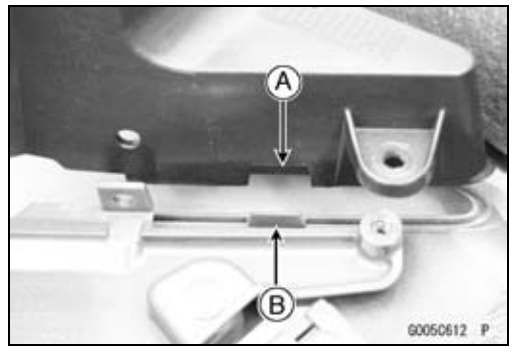


Middle Fairing Assembly

- Installation is the reverse of removal.
- Fit the grooves [A] of the cover to the projections [B] of the middle fairing.
- Tighten:

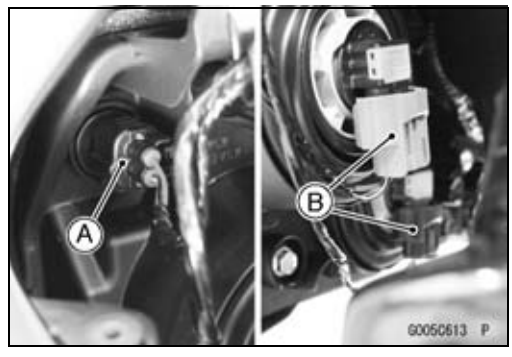
Torque - Inner Fairing Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)
Front Turn Signal Light Mounting Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)



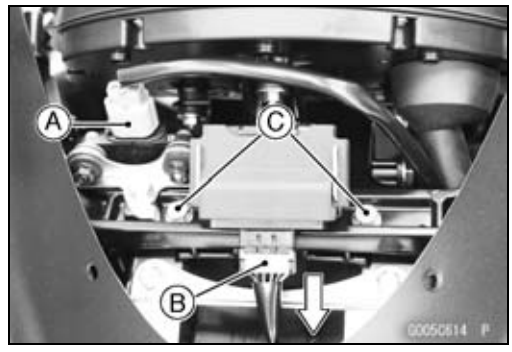


Upper Fairing Removal

- Remove:
  Fairing Covers (see Fairing Cover Removal)
  Inner Covers (see Inner Cover Removal)
  Middle Fairings (see Middle Fairing Removal)
  Windshield (see Windshield Removal)
  Meter Cover (see Meter Cover Removal)
- Disconnect:
  City Light Lead Connector [A] (Both Sides)
  Headlight Lead Connectors [B] (Both Sides)

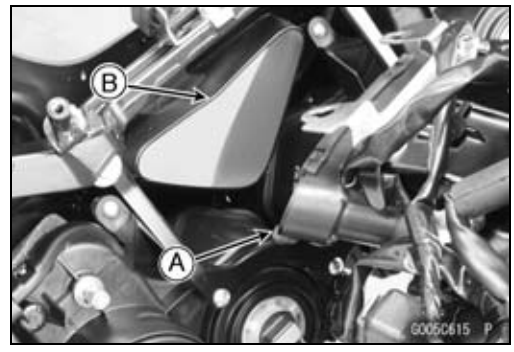


- Disconnect:
  Vehicle-down Sensor Lead Connector [A]
  Immobilizer Amplifier Lead Connector (Equipped Models) [B]
- Remove:
  Upper Fairing Mounting Bolts [C]
- Remove the upper fairing forward.



Fairings

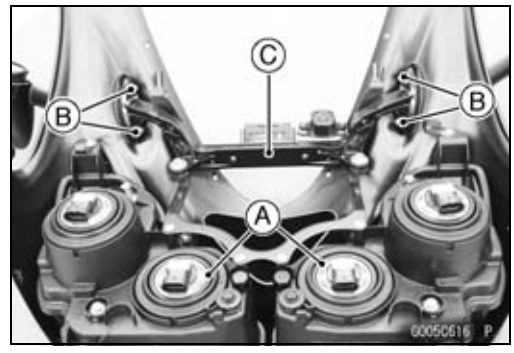
Upper Fairing Installation



- Installation is the reverse of removal.
- Run the hoses, leads and harness correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Fit the front air intake duct [A] to the upper fairing [B].
- Tighten:

Torque - Upper Fairing Mounting Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

Upper Fairing Disassembly



- Remove:

Upper Fairing (see Upper Fairing Removal)
Headlights [A] (see Headlight Removal/Installation in the Electrical System chapter)
Rear View Mirror Nuts [B] and Rear View Mirrors
Bracket [C]

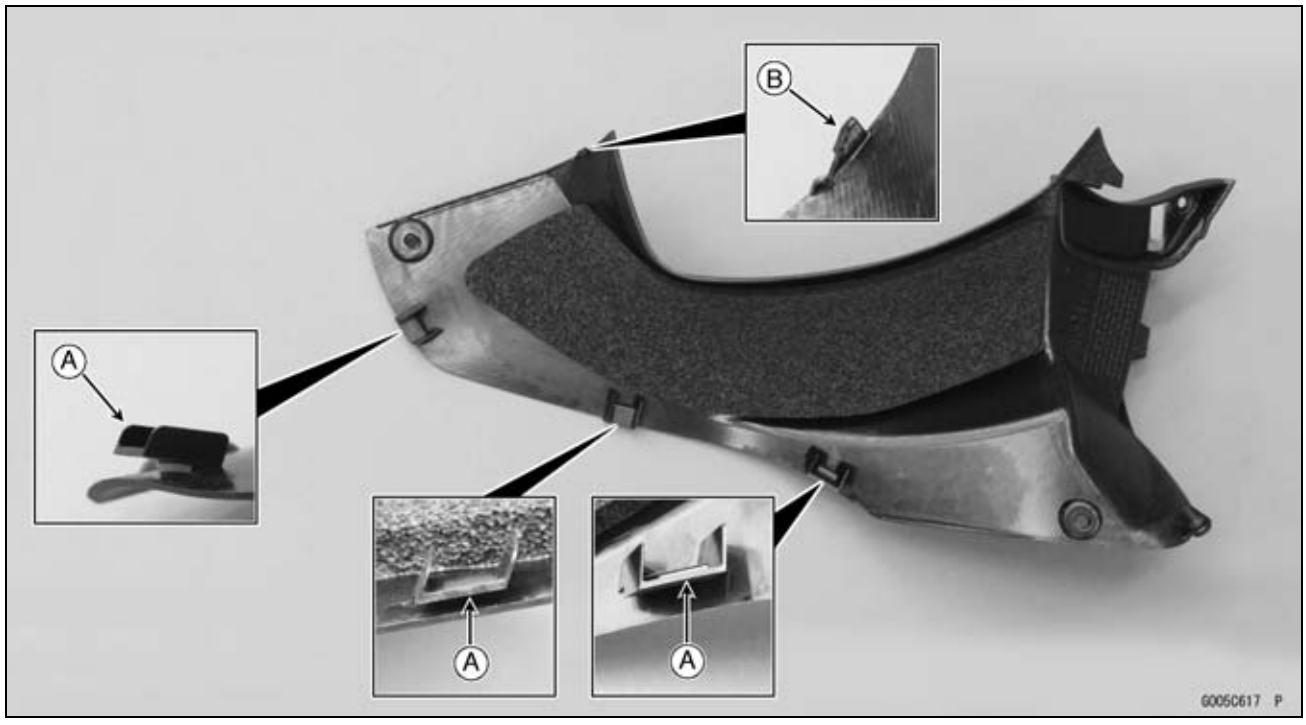
Upper Fairing Assembly

- Installation is the reverse of removal.
- Tighten:

Torque - Rear View Mirror Nuts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

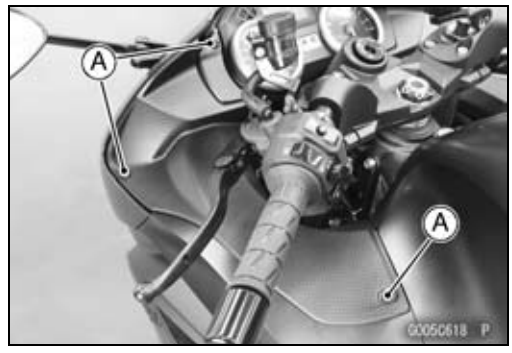
Inner Cover Removal

Hooks [A]
Tab [B]

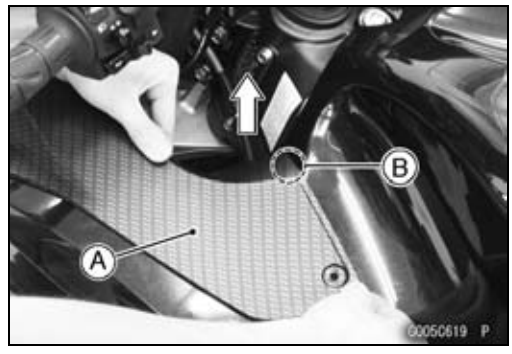


Fairings

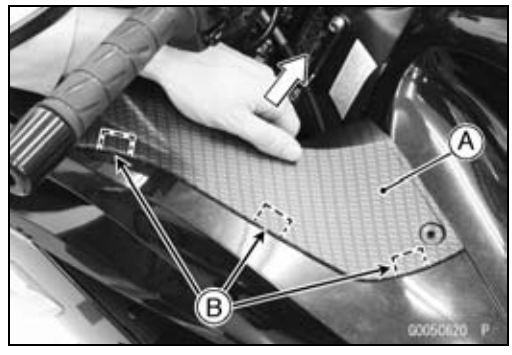
- Remove:
  Inner Cover Bolts [A] and Washers



- Pull up the inner cover [A], clear the tab [B] of the inner cover from the slot of fuel tank cover.

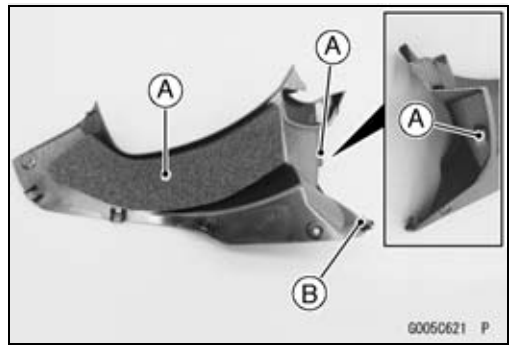


- Pull the inner cover [A] inward to clear the hooks [B] of the inner cover from the middle fairing.



Inner Cover Installation

- Be sure that the pads [A] and damper [B] are in place.

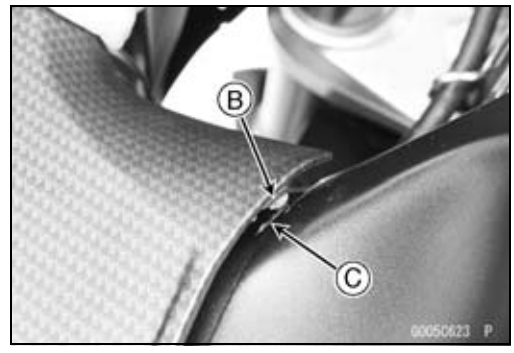


Fairings

- Insert the hooks [A] of the inner cover under the middle fairing first, and then insert the tab [B] into the slot [C] of the fuel tank cover.
- Tighten the bolts with washers.

Torque - Inner Cover Bolts (Front and Rear Side): 0.50 N·m (0.05 kgf·m, 4.4 in·lb)
Inner Cover Bolts (Center Side): 0.50 N·m (0.05 kgf·m, 4.4 in·lb)

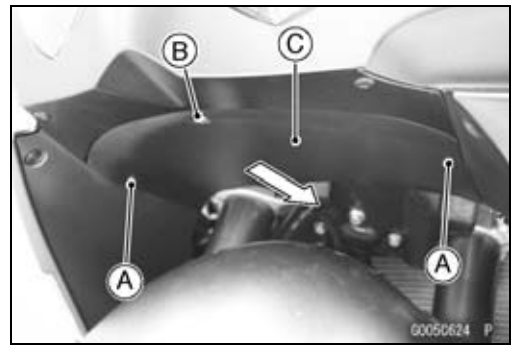




Upper Inner Fairing Removal

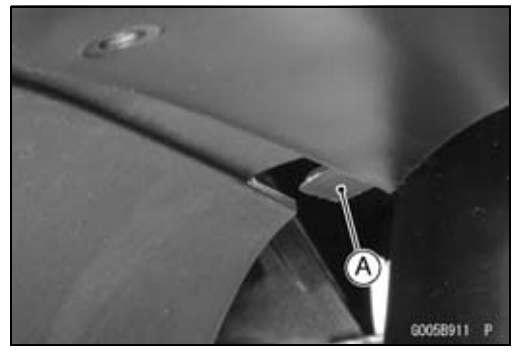
- Remove:
  Quick Rivets [A]
  Upper Inner Fairing Bolt [B] and Washer
  Upper Inner Fairing [C]

○Push the central pin of the quick rivet.
○Slide out the upper inner fairing backward.



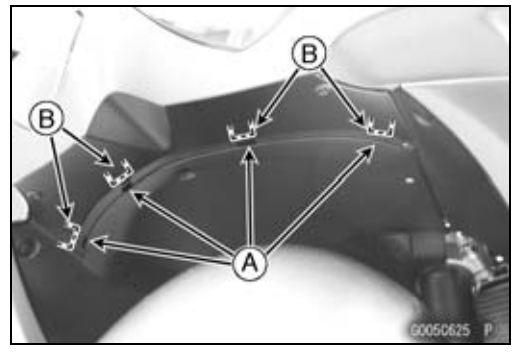
Upper Inner Fairing Installation

- Insert the tab [A] of the upper inner fairing over the upper fairing on both sides.



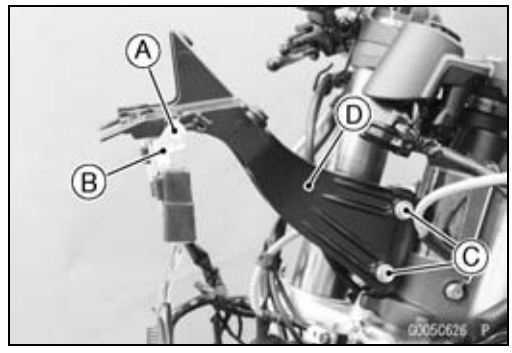
- Insert the slots [A] of the upper inner fairing into the tabs [B] of the upper fairing.
- Set the quick rivets and push the core of them.
- Tighten the bolt with washer.

Torque - Upper Inner Fairing Bolt: 0.50 N·m (0.05 kgf·m, 4.4 in·lb)



Fairings

Upper Fairing Bracket Removal



- Remove:
  Upper Fairing (see Upper Fairing Removal)
  Front and Middle Intake Ducts (see Front and Middle Intake Duct Removal in the Fuel System (DFI) chapter)
  Meter Unit (see Meter Unit Removal in the Electrical System chapter)
  Bolt [A] and Bracket [B] (Both Sides)
  Upper Fairing Bracket Bolts [C] and Nuts
  Upper Fairing Bracket [D]

Upper Fairing Bracket Installation

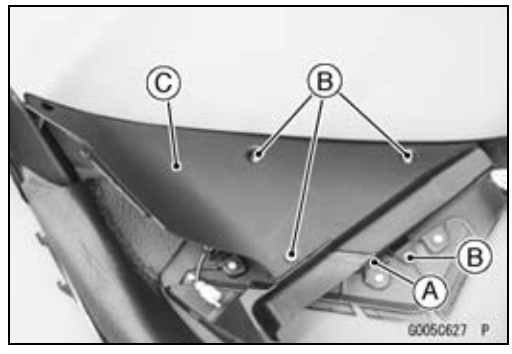
- Installation is the reverse of removal.
- Replace the upper fairing bracket nuts with new ones.
- Tighten:

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).

Inner Fairing Removal

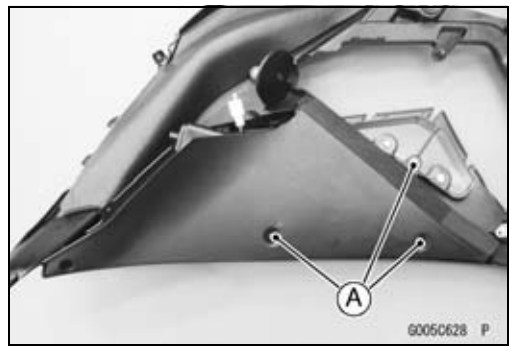
Left Inner Fairing



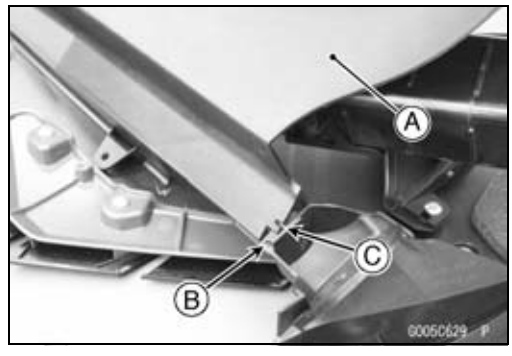
- Remove:
  Left Middle Fairing (see Middle Fairing Removal)
  Quick Rivet [A]
  Inner Fairing Screws [B]
  Left Inner Fairing [C]

○Push the central pin of the quick rivet.

Right Inner Fairing



- Remove:
  Right Middle Fairing (see Middle Fairing Removal)
  Inner Fairing Screws [A]

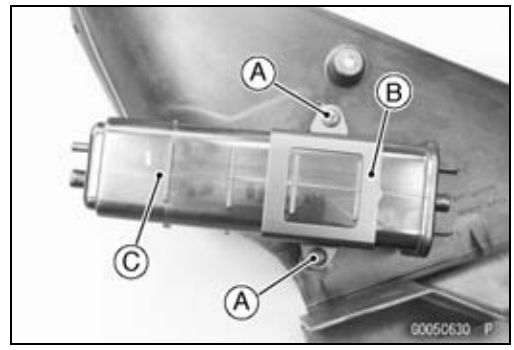


- Pull up the right inner fairing [A] to clear the projection [B] and slit [C].

Fairings

- For models equipped with an evaporative emission control system, note the following.

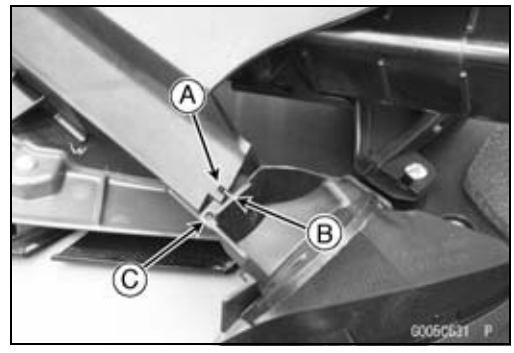
○Remove:
Screws [A]
Bracket [B]
Canister [C]



Inner Fairing Installation

- Installation is the reverse of removal.
- Fit the slit [A] of the right inner fairing to the projection [B] of the cover.
- Fit the projection [C] of the right inner fairing to the hole of the cover.
- Tighten:

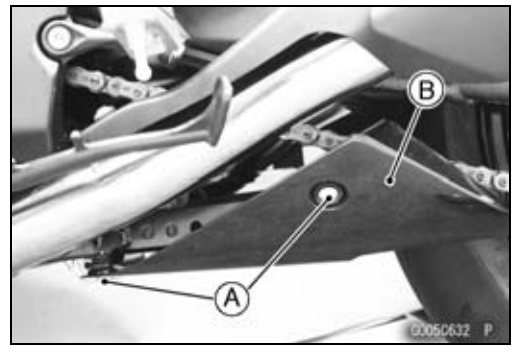
Torque - Inner Fairing Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)



Rear Lower Fairing Removal (Equipped Models)

- Remove:

Rear Lower Fairing Bolts [A] and Washers (Both Sides)
Rear Lower Fairing [B]



Rear Lower Fairing Installation (Equipped Models)

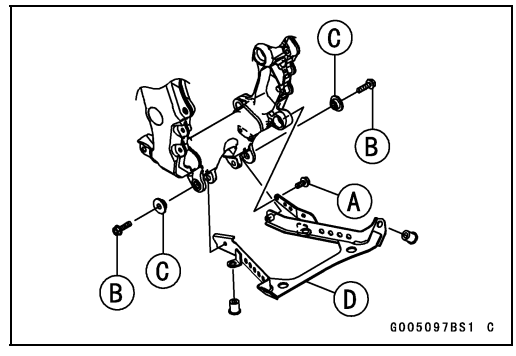
- Installation is the reverse of removal.
- Tighten

Torque - Rear Lower Fairing Bolts: 1.0 N·m (0.10 kgf·m, 8.9 in·lb)

Rear Lower Fairing Bracket Removal (Equipped Models)

- Remove:

Rear Lower Fairing (see Rear Lower Fairing Removal)
Rear Lower Fairing Bracket Bolt (L = 14 mm) [A]
Rear Lower Fairing Bracket Bolts (L = 22 mm) [B]
Collars [C]
Rear Lower Fairing Bracket [D]



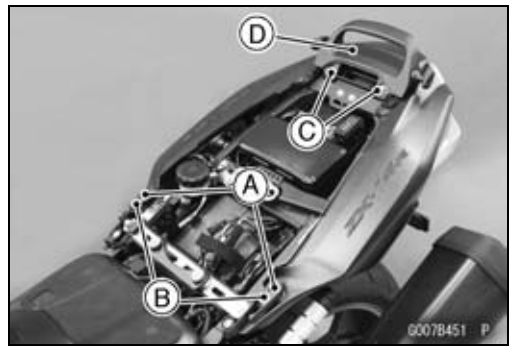
Rear Lower Fairing Bracket Installation (Equipped Models)

- Installation is the reverse of removal.
- Tighten

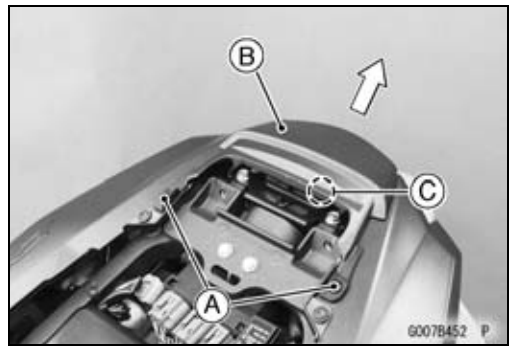
Torque - Rear Lower Fairing Bracket Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

Seat Cover

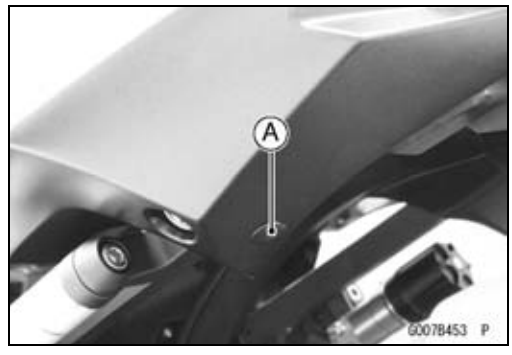
Seat Cover Removal



- Remove:
  Seat (see Seat Removal)
  Tying Hook Bolts (M8) [A] and Tying Hooks [B] (Equipped Models)
  Grab Rail Mounting Bolts [C] and Grab Rail [D] (Equipped Models)

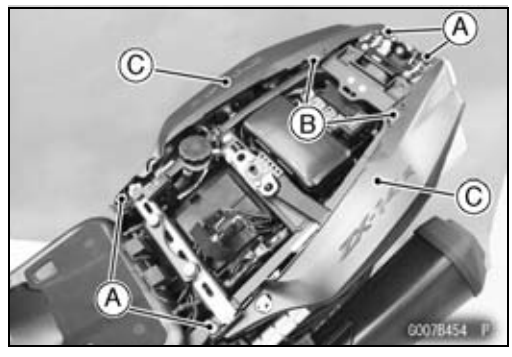


- Remove:
  Center Seat Cover Screws [A] and Washers
- Pull the center seat cover [B] backward to clear the projection [C] of the center seat cover.



- Remove:
  Quick Rivet [A] (Both Sides)

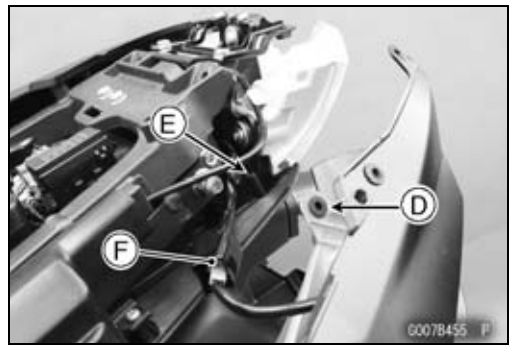
○Push the central pin of the quick rivet.



- Remove:
  Side Seat Cover Bolts (L = 12 mm) [A] and Washers
  Side Seat Cover Bolts (L = 18 mm) [B] and Washers
- Clear the side seat covers [C] from the rear fender.

○Clear the grommet [D] of the side seat cover from the projection [E] of the rear fender.

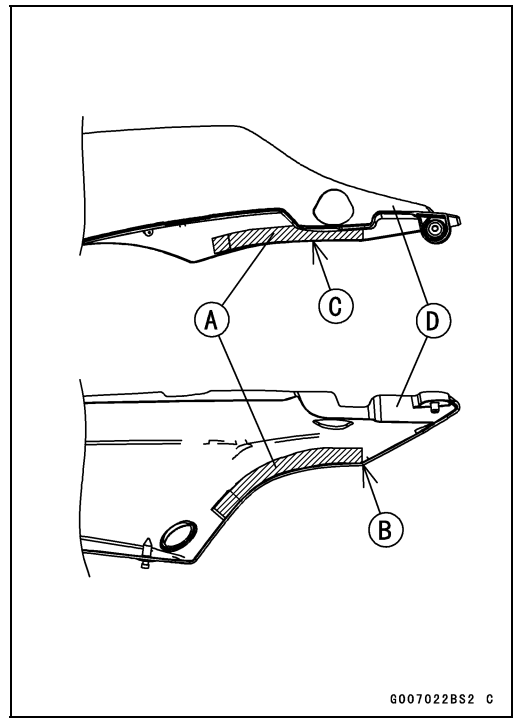
- Disconnect the rear turn signal light lead connector [F] (both sides), and remove each side seat cover.



Seat Cover

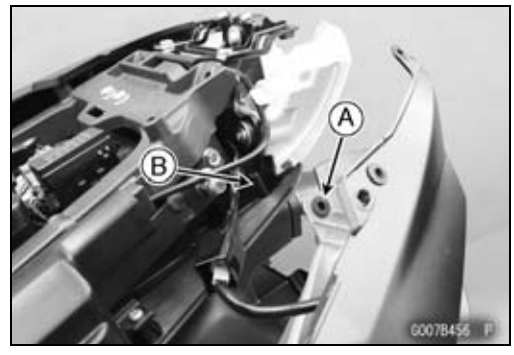
Seat Cover Installation

- When installing the pad [A], align the edge of the pad with the line [B] and edge [C] of the left side seat cover [D].

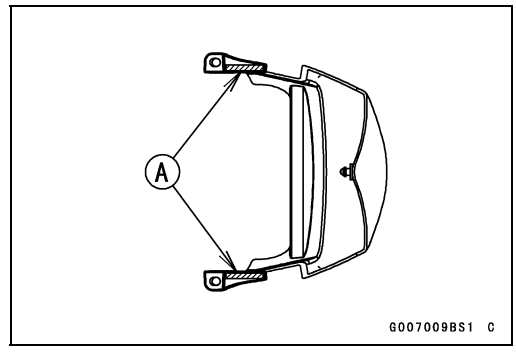


- Connect the rear turn signal light lead connector.
- Insert the grommet [A] to the projection [B].
- Set the quick rivets and push the core of them.
- Tighten the bolts with washers.

Torque - Side Seat Cover Bolts: 4.0 N·m (0.41 kgf·m, 35 in·lb)



- When installing the guards [A], install them as shown (grab rail equipped models).



- Insert the projection [A] into the grommet [B].
- Tighten the screws with washers.

Torque - Center Seat Cover Screws: 0.50 N·m (0.05 kgf·m, 4.4 in·lb)

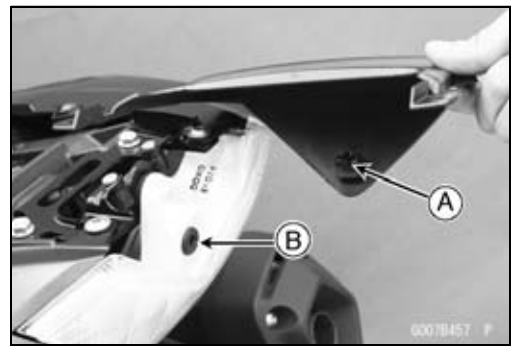
- Install the grab rail (equipped models).
- Tighten:

Torque - Grab Rail Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Install the tying hooks (equipped models).
- Tighten:

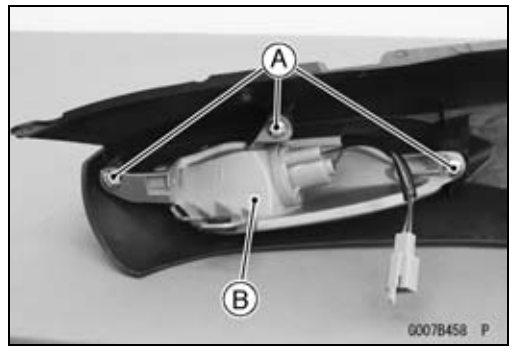
Torque - Tying Hook Bolts (M6): 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Install the seat (see Seat Installation).



Seat Cover

Seat Cover Disassembly



- Remove:
  Seat Cover (see Seat Cover Removal)
  Rear Turn Signal Light Mounting Screws [A]
  Rear Turn Signal Light [B]

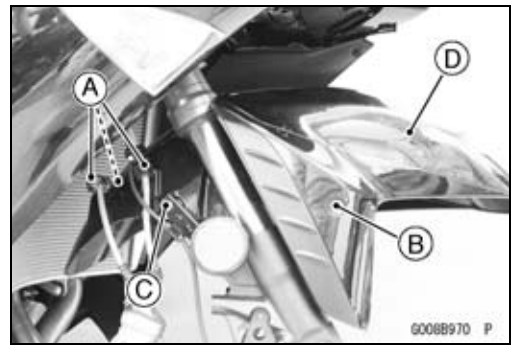
Seat Cover Assembly

- Installation is the reverse of removal.
- Tighten:

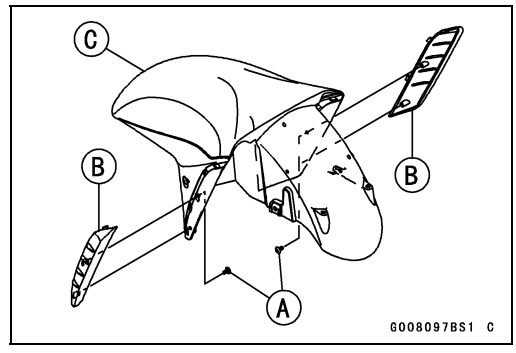
Torque - Rear Turn Signal Light Mounting Bolts: 0.50 N·m (0.05 kgf·m, 4.4 in·lb)

Fenders

Front Fender Removal

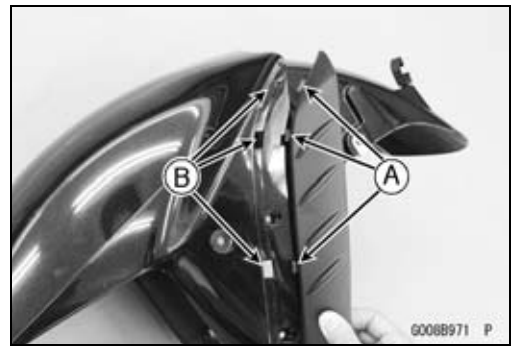


- Remove:
  Front Wheel (see Front Wheel Removal in the Wheels/Tires chapter)
- Open the brake hose clamps [A].
- Remove:
  Front Fender Mounting Bolt (L = 14 mm) [B] with Washer (Both Sides)
  Front Fender Mounting Bolt (L = 35 mm) [C] (Both Sides)
  Front Fender Assy [D]



- Remove the front fender cover screws [A].
- Separate the front fender covers [B] and front fender [C].

Front Fender Installation



- Install the front fender covers to the front fender.

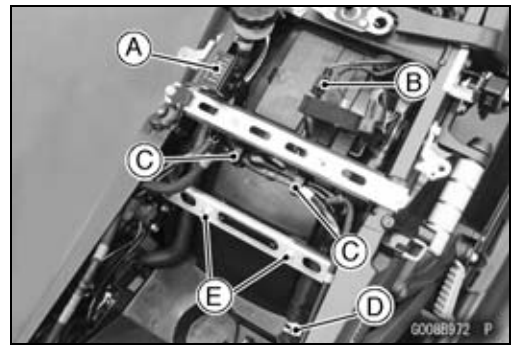
○Insert the hooks [A] of the front fender cover into the slots [B] of the front fender.

- Tighten:

Torque - Front Fender Cover Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)
Front Fender Mounting Bolts (L = 35 mm): 8.0 N·m (0.82 kgf·m, 71 in·lb)
Front Fender Mounting Bolts (L = 14 mm): 4.0 N·m (0.41 kgf·m, 35 in·lb)

- Install the front fender assy to the front fork, and tighten the bolts.
- Run the hoses and leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

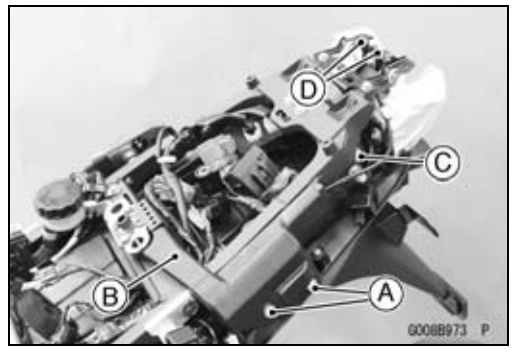
Flap and Rear Fender Removal



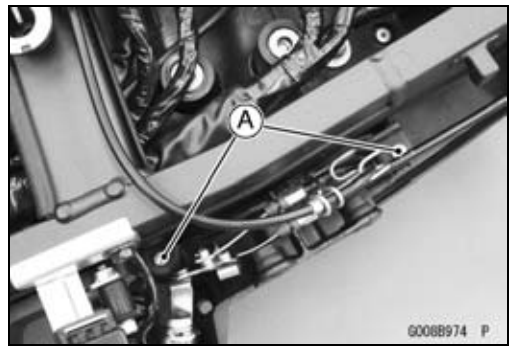
- Remove:
  Seat (see Seat Removal)
  Seat Covers (see Seat Cover Removal)
  Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)
  ECU (see ECU Removal in the Fuel System (DFI) chapter)
  Rear Wheel (see Rear Wheel Removal in the Wheels/Tires chapter)
  Fuse Box [A]
- Disconnect the license plate light lead connector [B].
- Open the clamps [C].
- Cut the band [D].
- Remove:
  Rear Fender Mounting Bolts [E]

Fenders

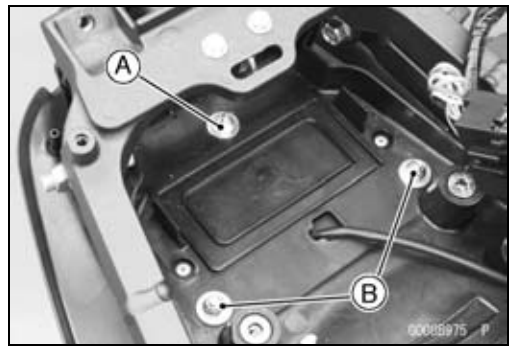
- Remove:
  Seat Lock Cable Cover Bolts [A]
  Seat Lock Cable Cover [B]
  Rear Fender Mounting Bolt [C] (Both Sides)
  Rear Fender Mounting Screws [D]



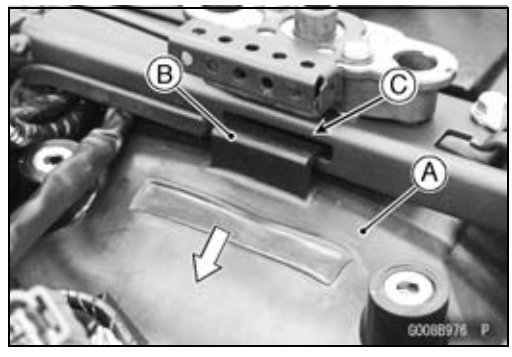
- Remove:
  Seat Lock Bracket Screws [A]



- Remove:
  Tail/Brake Light (LED) (see Tail/Brake Light (LED) Removal in the Electrical System chapter)
  Flap Mounting Nut [A], Bolt and Washer
  Flap Mounting Nuts [B] and Washers
  Flap (with License Plate Light)

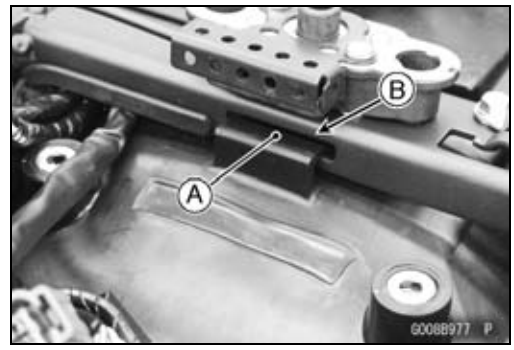


- Pull out the rear fender [A] backward to clear the hook [B] of rear fender from the slot [C] of the rear frame.



Fenders

Flap and Rear Fender Installation



- Installation is the reverse of removal.
- Hang the hook [A] of the rear fender to the slot [B] of the rear frame.
- Tighten:

Torque - Rear Fender Mounting Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)
Rear Fender Mounting Bolts: 1.0 N·m (0.10 kgf·m, 8.9 in·lb)

- Replace the flap mounting nuts with new ones.
- Tighten:

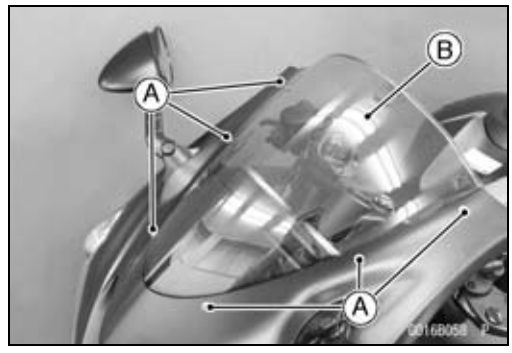
Torque - Flap Mounting Nuts: 4.0 N·m (0.41 kgf·m, 35 in·lb)
Seat Lock Bracket Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)
Seat Cable Cover Bolts: 1.0 N·m (0.10 kgf·m, 8.9 in·lb)

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

Windshield

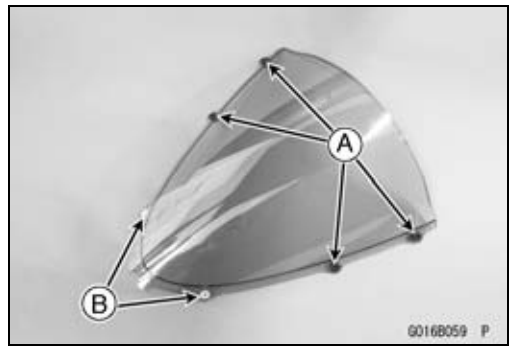
Windshield Removal

- Remove:
  Windshield Bolts [A] and Washers
  Windshield [B]



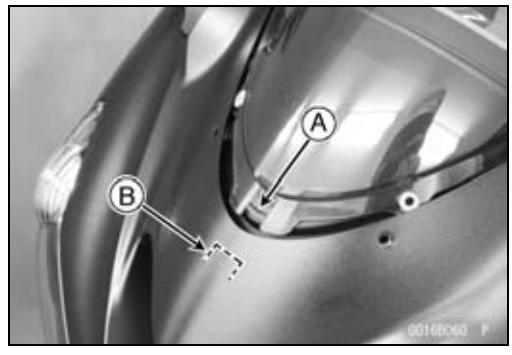
Windshield Installation

- Fit the wellnuts [A] and the collars [B] into the holes in the edge of the windshield from the outside with their flanges out.



- Fit the groove [A] of the windshield to the outside of the projection [B].
- Tighten the bolts with washers.

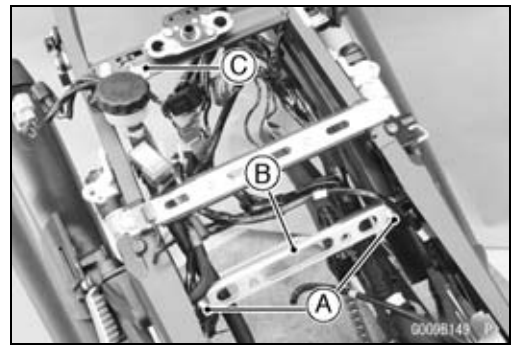
Torque - Windshield Bolts: 0.40 N·m (0.04 kgf·m, 3.5 in·lb)



Frame

Rear Frame Removal

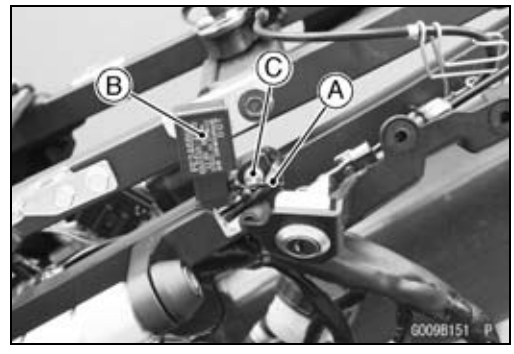
- Remove:
  Rear Fender (see Flap and Rear Fender Removal)
  Regulator/Rectifier (see Regulator/Rectifier Inspection in the Electrical System chapter)
  Cross Bar Bolts [A] and Cross Bar [B]
  Rear Brake Reservoir Bracket Bolt [C]



- Remove:
  Brake Hose Joint Bracket Bolts [A]

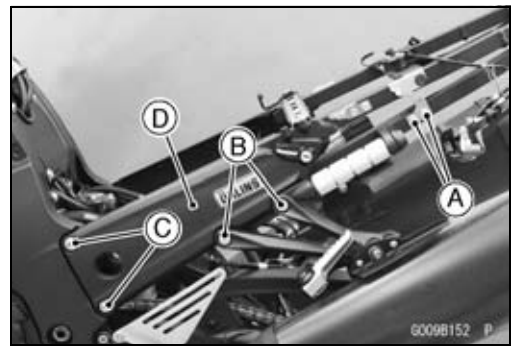


- Open the clamp [A].
- Remove:
  Turn Signal Relay [B]
  Seat Lock Bracket Bolt [C]



- Remove:
  Bracket Bolts (L = 25 mm) [A] (Center Stand Equipped Models)
  Rear Footpeg Bracket Bolts [B] (Both Sides)
  Rear Frame Bolts [C] (Both Sides)
  Rear Frame [D]

○Support the muffler bodies with a suitable stand.



Frame

Rear Frame Installation

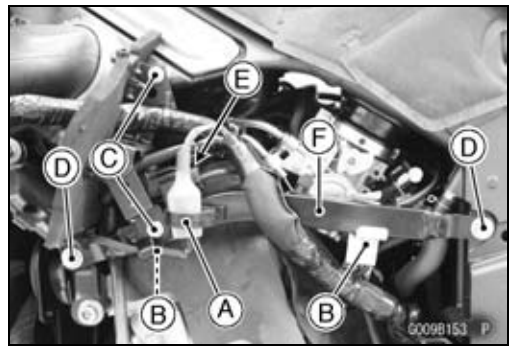
- Installation is the reverse of removal.
- Apply a non-permanent locking agent to the threads of the rear frame bolt, and tighten them.

Torque - Rear Frame Bolts: 45 N·m (4.6 kgf·m, 33 ft·lb)
Rear Footpeg Bracket Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Bracket Bolts (L = 25 mm): 8.0 N·m (0.82 kgf·m, 71 in·lb)
Seat Lock Bracket Bolt: 4.0 N·m (0.41 kgf·m, 35 in·lb)
Brake Hose Joint Bracket Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)
Rear Brake Reservoir Bracket Bolt: 8.0 N·m (0.82 kgf·m, 71 in·lb)
Cross Bar Bolts: 4.0 N·m (0.41 kgf·m, 35 in·lb)

- Run the leads and hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).

Subframe Removal

- Remove:
  Left Middle Faring (see Middle Fairing Removal)
  Left Inner Rubber Cover (see Left Inner Rubber Cover Removal)
- Open the clamp [A].
- Remove:
  Subframe Bracket Bolts [B]
  Pad Bracket Bolts (M6) [C]
  Subframe Bolts [D]
- Free the clutch hose [E] from the subframe [F].
- Remove the subframe.



Subframe Installation

- Installation is the reverse of removal.
- Tighten:

Torque - Subframe Bolts: 23 N·m (2.3 kgf·m, 17 ft·lb)
Pad Bracket Bolts (M6): 8.0 N·m (0.82 kgf·m, 71 in·lb)
Subframe Bracket Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Run the leads and hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).

Frame Inspection

- Visually inspect the frame for cracks, dents, bending, or warp.

★If there is any damage to the frame, replace it.

⚠ WARNING

A repaired frame may fail in use, possibly causing an accident resulting in injury or death. If the frame is bent, dented, cracked, or warped, replace it.

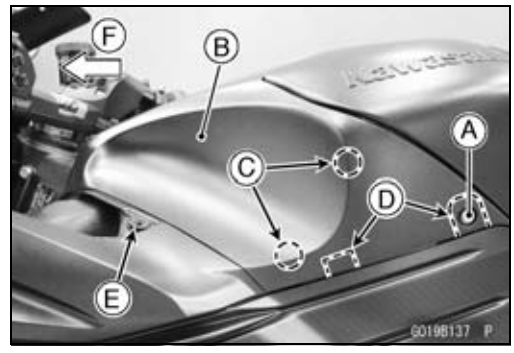
Cover

Fuel Tank Cover Removal

- Remove:
  Inner Covers (see Inner Cover Removal)
  Fuel Tank Cover Bolt (L = 23 mm) [A]

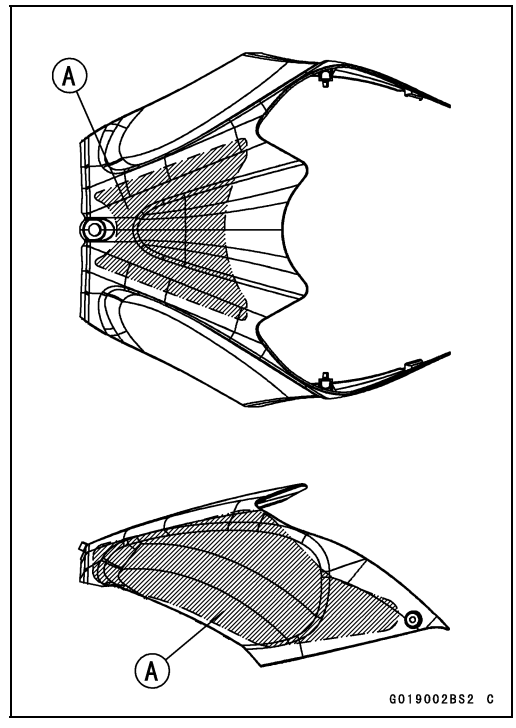


- Remove the fuel tank cover bolt (L = 30 mm) [A] and washer on both sides.
- Spread the fuel tank cover [B] evenly outward to clear the projections [C] on both sides.
- Clear the tab [D] of fairing cover and hook [E] of fuel tank cover on both sides.
- Remove the fuel tank cover to forward [F].

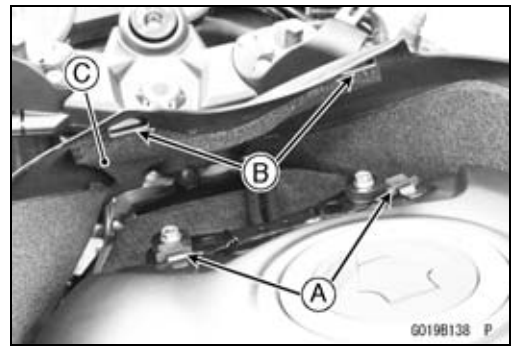


Fuel Tank Cover Installation

- Installation is the reverse of removal.
- When installing the pads [A], install them as shown.



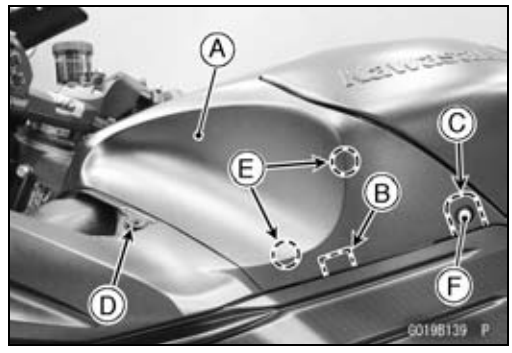
- Be sure that the dampers [A] are in position.
- Fit the dampers of the fuel tank into the slots [B] of the fuel tank cover [C].



Cover

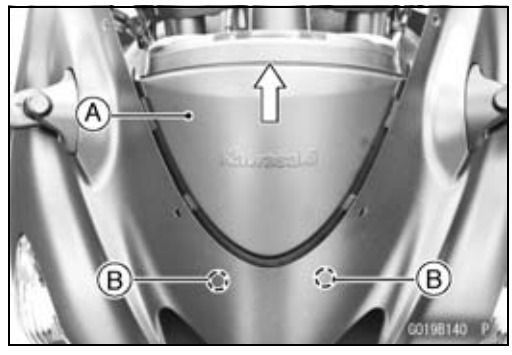
- Insert the slots of the fuel tank cover [A] into the tab [B] of the fairing cover on both sides.
- Insert the tab [C] of fairing cover to the inside of the fuel tank cover on both sides.
- Hang the hook [D] of the fuel tank cover to the bracket on both sides.
- Insert the projections [E] into the grommets on both sides.
- Tighten the bolt [F] with washer on both sides.

Torque - Fuel Tank Cover Bolts (L = 30 mm): 1.0 N·m (0.10 kgf·m, 8.9 in·lb)
Fuel Tank Cover Bolt (L = 23 mm): 8.0 N·m (0.82 kgf·m, 71 in·lb)



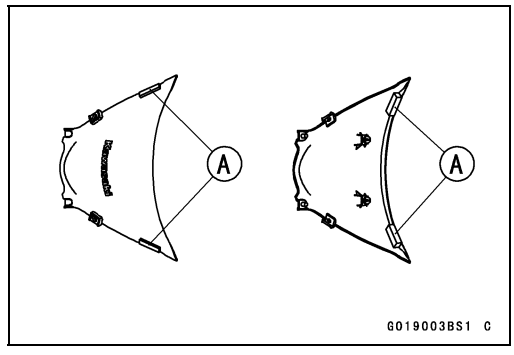
Meter Cover Removal

- Remove:
  Windshield (see Windshield Removal)
- Pull up the meter cover [A] to clear the projections [B] of the meter cover.
- Pull out the meter cover backward.

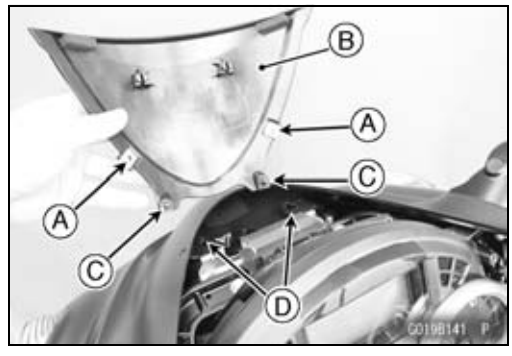


Meter Cover Installation

- Check that the pads [A] are in place on the meter cover.

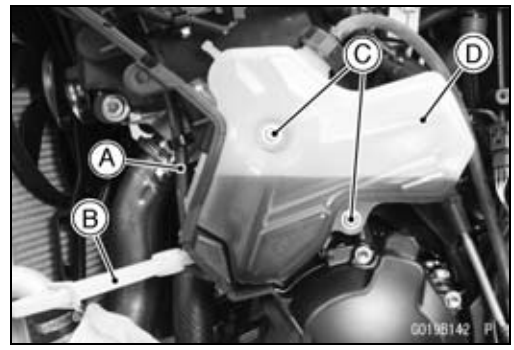


- Check that the clip nuts [A] are in place on the meter cover [B].
- Insert the projections [C] of the meter cover into the holes [D] of bracket.
- Install the windshield (see Windshield Installation).

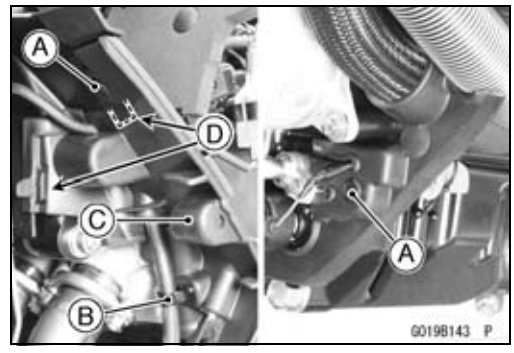


Cover

Left Inner Rubber Cover Removal



- Remove:
  Left Middle Fairing (see Middle Fairing Removal)
- Clamp the coolant hose [A] with a 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 reserve tank.

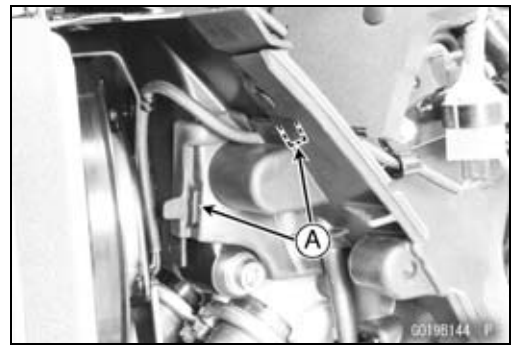


- Remove:
  Quick Rivets [A]
  Clamp [B]

○Push the central pin of the quick rivet.

- Clear the left inner rubber cover [C] from the hooks [D] of the radiator cover.
- Remove the left inner rubber cover.

Left Inner Rubber Cover Installation

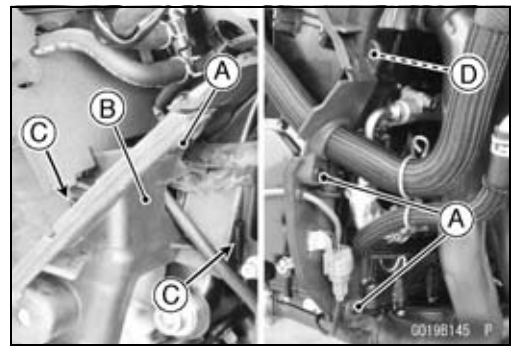


- Run the hose, harness and lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Insert the hooks [A] of the radiator cover into the slots of the left inner rubber cover.
- Set the quick rivets and push the core of them.
- Install the coolant reserve tank.
- Apply a non-permanent locking agent to the threads of the coolant reserve tank bolts, and tighten them.

Torque - Coolant Reserve Tank Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Install the removed parts (see appropriate chapters).

Right Inner Rubber Cover Removal



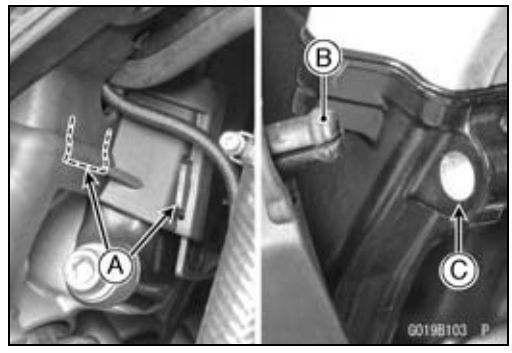
- Remove:
  Right Middle Fairing (see Middle Fairing Removal)
  Quick Rivets [A]

○Push the central pin of the quick rivet.

- Clear the right inner rubber cover [B] from the hooks [C] of the radiator cover.
- Clear the right inner rubber cover from the hole [D] of the engine.
- Remove the right inner rubber cover.

Cover

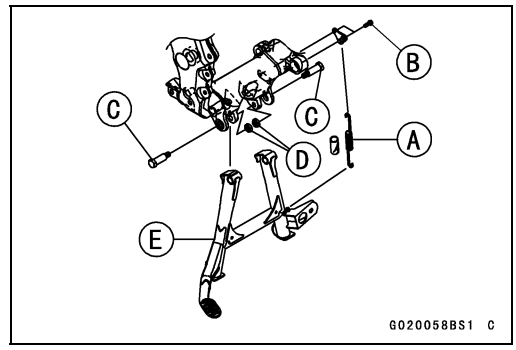
Right Inner Rubber Cover Installation



- Run the hose, harness and lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Insert the hooks [A] of the radiator cover into the slots of the right inner rubber cover.
- Insert the projection [B] of the right inner rubber cover into the hole [C] of the engine.
- Set the quick rivets and push the core of them.
- Install the removed parts (see appropriate chapters).

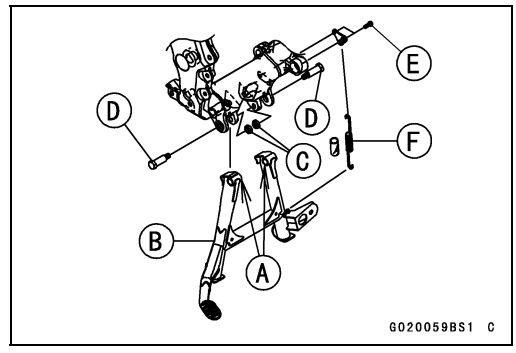
Center Stand, Side Stand

Center Stand Removal (Equipped Models)



- Remove:
  Muffler Bodies (see Muffler Body Removal in the Engine Top End chapter)
  Spring [A]
  Center Stand Spring Bolts [B]
  Center Stand Bolts [C] and Nuts [D]
  Center Stand [E]

Center Stand Installation (Equipped Models)



- Apply grease to the sliding area [A] of the center stand [B].
- Replace the center stand nuts [C] with new ones.
- Install the center stand bolts [D] and nuts, and tighten them.

Torque - Center Stand Bolts: 45 N·m (4.6 kgf·m, 33 ft·lb)

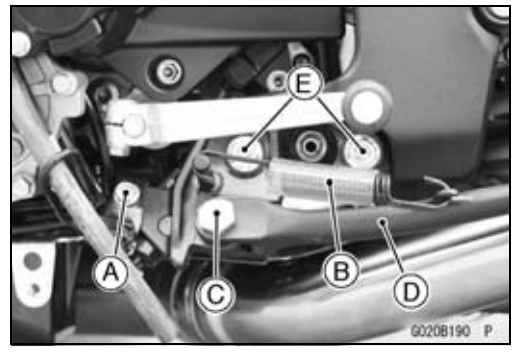
- Tighten:

Torque - Center Stand Spring Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Hook the spring [F] so that the long spring end of it faces upward.

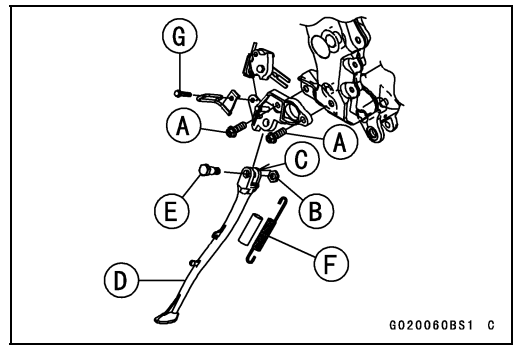
○The spring hook direction is as shown.

Side Stand Removal



- Raise the rear wheel off the ground with the stand.
- Remove:
  Left Middle Fairing (see Middle Fairing Removal)
  Side Stand Switch Bolt [A]
  Spring [B]
  Side Stand Bolt [C] and Nut
  Side Stand [D]
  Side Stand Bracket Bolts [E]
  Side Stand Bracket

Side Stand Installation



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

Torque - Side Stand Bracket Bolts: 50 N·m (5.1 kgf·m, 37 ft·lb)

- Replace the side stand nut [B] with a new one.
- Apply grease to the sliding area [C] of the side stand [D].
- Tighten the side stand bolt [E] first, and then the side stand nut.

Torque - Side Stand Bolt: 45 N·m (4.6 kgf·m, 33 ft·lb)
Side Stand Nut: 45 N·m (4.6 kgf·m, 33 ft·lb)

- Hook the spring [F] so that the long spring end of it faces upward.

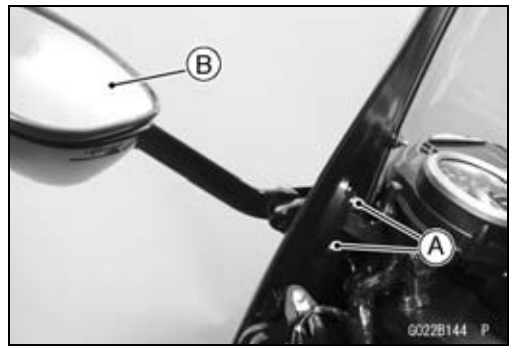
○The spring hook direction is as shown.

- Install the side stand switch.
- Apply a non-permanent locking agent to the threads of the switch bolt [G], and tighten it.

Torque - Side Stand Switch Bolt: 9.0 N·m (0.92 kgf·m, 80 in·lb)

Rear View Mirror

Rear View Mirror Removal



- Remove:
  Inner Cover (see Inner Cover Removal)
  Rear View Mirror Nuts [A]
  Rear View Mirror [B]

Rear View Mirror Installation

- Installation is the reverse of removal.
- Tighten:

Torque - Rear View Mirror Nuts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

Electrical System

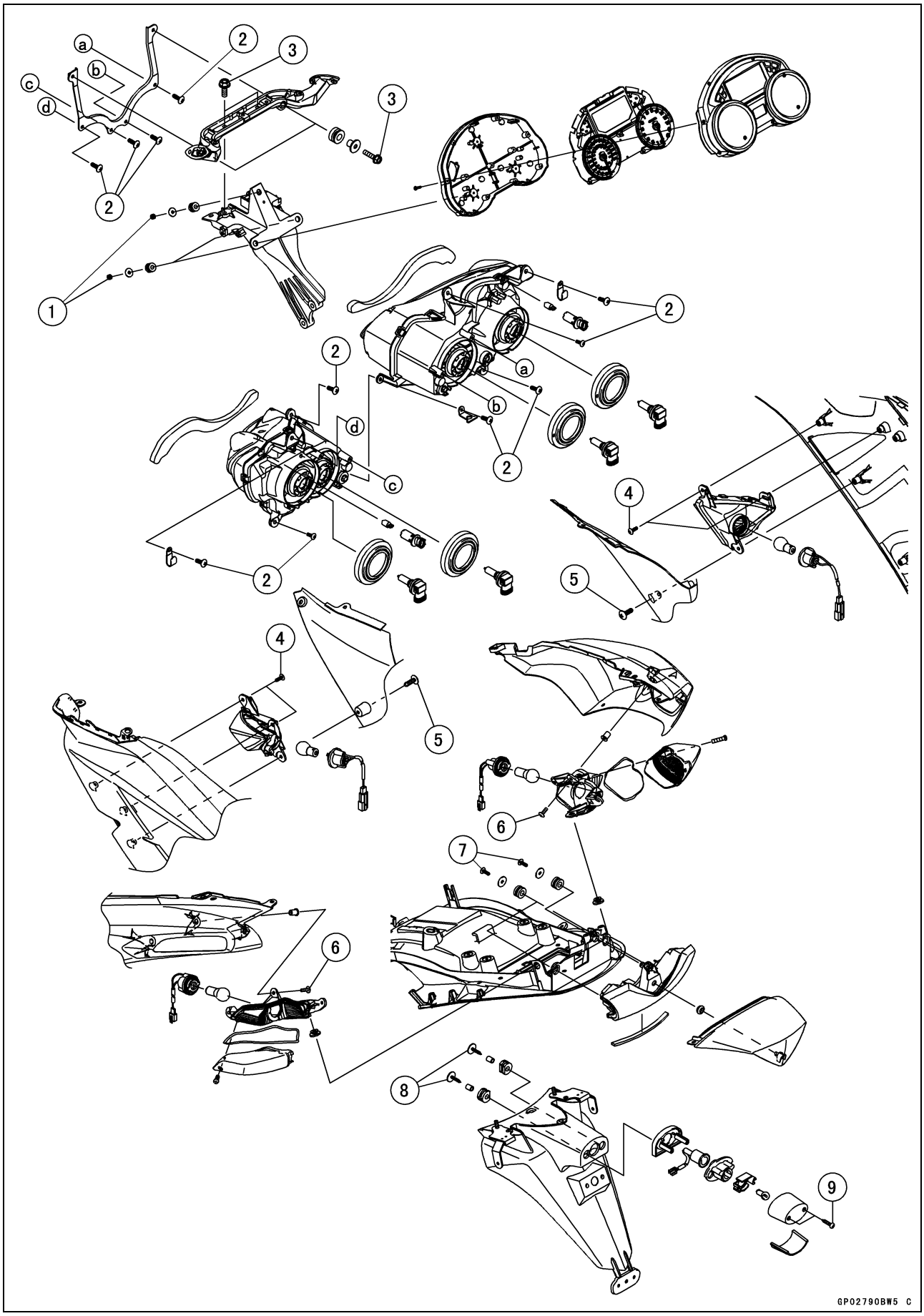
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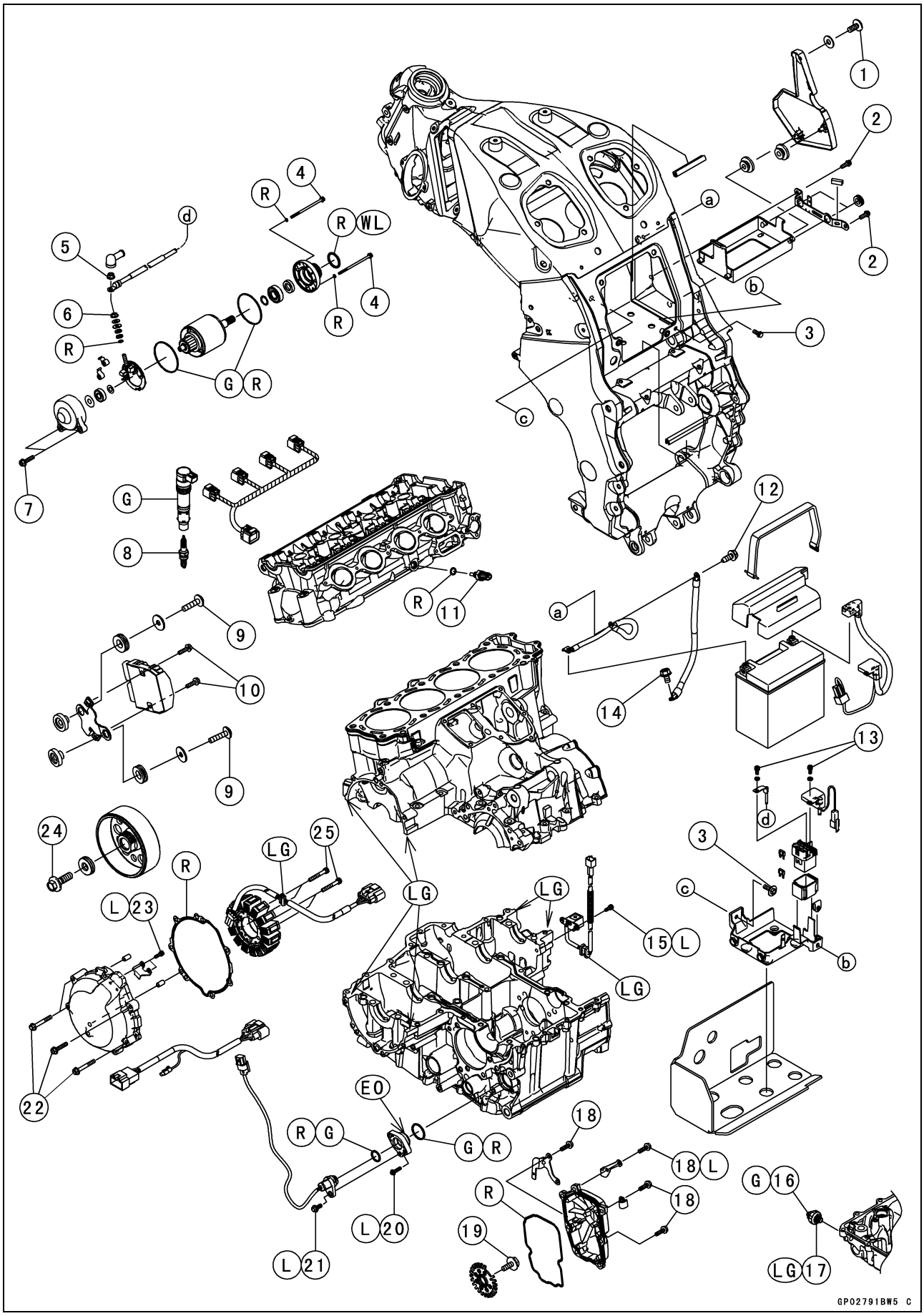
Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Meter Unit Mounting Nuts	4.5	0.46	40 in·lb	
2	Headlight Mounting Screws	1.2	0.12	11 in·lb	
3	Headlight Bracket Bolts	8.0	0.82	71 in·lb	
4	Front Turn Signal Light Mounting Screws	1.2	0.12	11 in·lb	
5	Inner Fairing Screws	1.2	0.12	11 in·lb	
6	Rear Turn Signal Light Mounting Screws	0.50	0.05	4.4 in·lb	
7	Tail/Brake Light Mounting Screws	1.2	0.12	11 in·lb	
8	License Plate Light Mounting Screws	1.2	0.12	11 in·lb	
9	License Plate Light Cover Mounting Screws	0.90	0.09	8 in·lb	

Exploded View

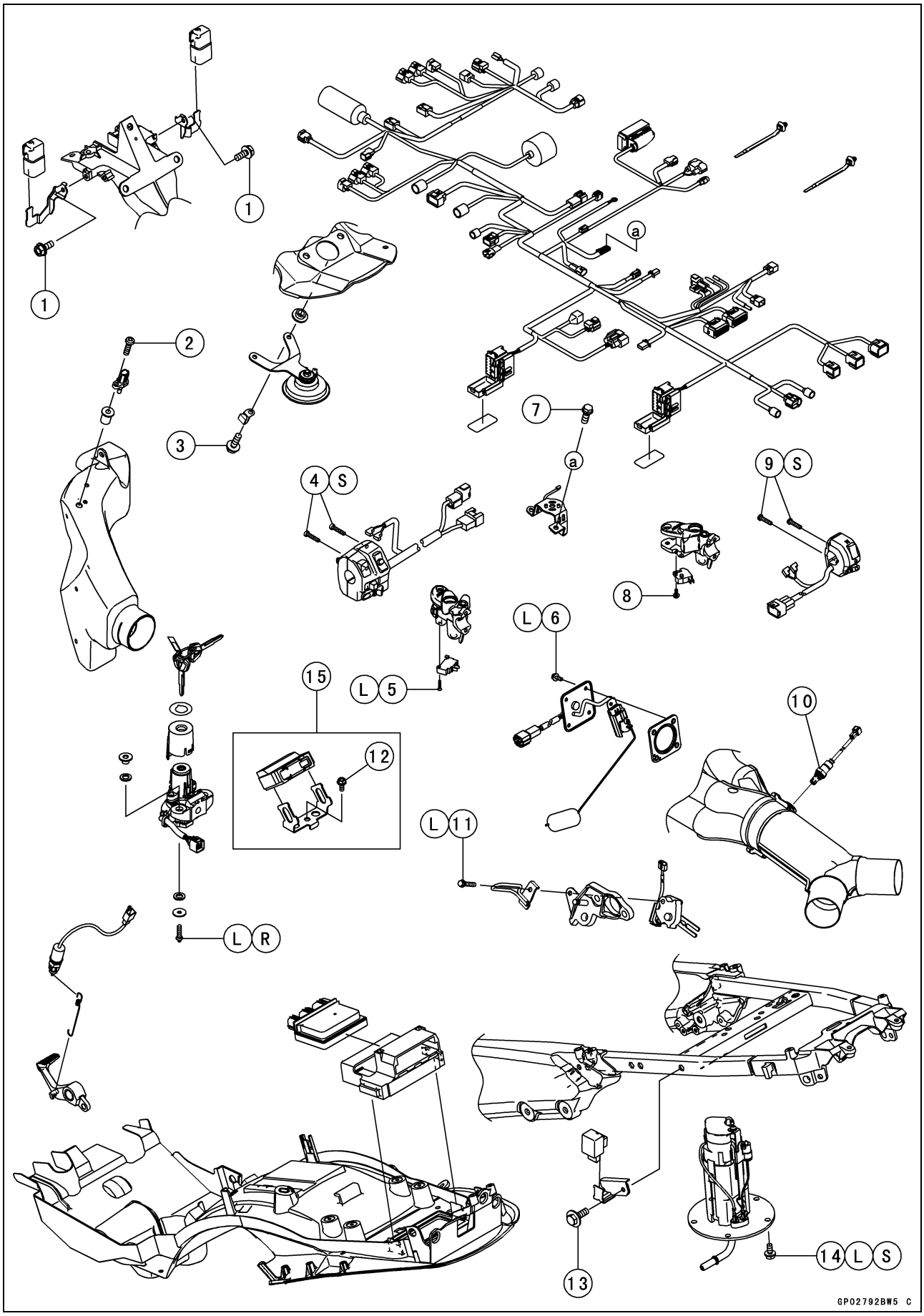


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Battery Compartment Cover Bolt	4.0	0.41	35 in·lb	
2	Bracket Bolts	8.0	0.82	71 in·lb	
3	Battery Compartment Bolts	8.0	0.82	71 in·lb	
4	Starter Motor Through Bolts	3.4	0.35	30 in·lb	
5	Starter Motor Cable Terminal Nut	6.0	0.61	53 in·lb	
6	Starter Motor Terminal Locknut	6.9	0.70	61 in·lb	
7	Starter Motor Mounting Bolts	10	1.0	89 in·lb	
8	Spark Plugs	13	1.3	115 in·lb	
9	Regulator/Rectifier Bracket Bolts	8.0	0.82	71 in·lb	
10	Regulator/Rectifier Bolts	8.0	0.82	71 in·lb	
11	Water Temperature Sensor	12	1.2	106 in·lb	
12	Frame Ground Terminal Bolt	7.0	0.71	62 in·lb	
13	Starter Relay Terminal Bolts	4.5	0.46	40 in·lb	
14	Engine Ground Terminal Bolt	10	1.0	89 in·lb	
15	Crankshaft Sensor Bolts	6.0	0.61	53 in·lb	L
16	Oil Pressure Switch Terminal Bolt	2.0	0.20	18 in·lb	G
17	Oil Pressure Switch	15	1.5	11	LG
18	Crankshaft Sensor Cover Bolts	10	1.0	89 in·lb	L (1)
19	Timing Rotor Bolt	39	4.0	29	
20	Gear Position Sensor Holder Bolts (L = 20 mm)	5.0	0.51	44 in·lb	L
21	Gear Position Sensor Bolt	10	1.0	89 in·lb	L
22	Alternator Cover Bolts	10	1.0	89 in·lb	
23	Alternator Lead Holding Plate Bolts	8.0	0.82	71 in·lb	L
24	Alternator Rotor Bolt	155	15.8	114	
25	Stator Coil Bolts	12	1.2	106 in·lb	

EO: Apply engine oil.
G: Apply grease.
L: Apply a non-permanent locking agent.
LG: Apply liquid gasket.
R: Replacement Parts
WL: Apply soap and water solution or rubber lubricant.

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Bracket Bolts	8.0	0.82	71 in·lb	
2	Outside Temperature Sensor Screw	0.50	0.05	4.4 in·lb	
3	Steering Stem Cover Bolts	8.0	0.82	71 in·lb	
4	Left Handlebar Switch Housing Screws	1.2	0.12	11 in·lb	S
5	Starter Lockout Switch Screw	0.70	0.07	6.2 in·lb	L
6	Fuel Level Sensor Bolts	7.0	0.71	62 in·lb	L
7	Frame Ground Bolt	8.0	0.82	71 in·lb	
8	Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
9	Right Handlebar Switch Housing Screws	1.2	0.12	11 in·lb	S
10	Oxygen Sensor	25	2.5	18	
11	Side Stand Switch Bolt	9.0	0.92	80 in·lb	L
12	Immobilizer Amplifier Bracket Bolt (Equipped Models)	8.0	0.82	71 in·lb	
13	Turn Signal Relay Bracket Bolt	8.0	0.82	71 in·lb	
14	Fuel Pump Bolts	10	1.0	89 in·lb	L, S

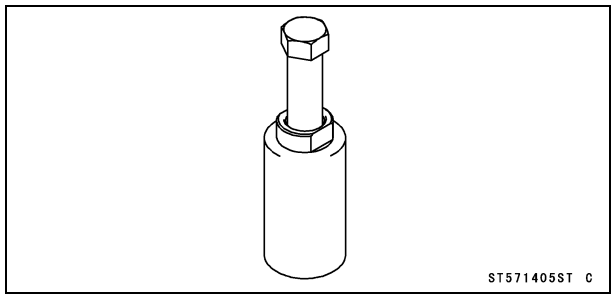
15. Immobilizer Equipped Models
L: Apply a non-permanent locking agent.
R: Replacement Parts
S: Follow the specified tightening sequence.

Specifications

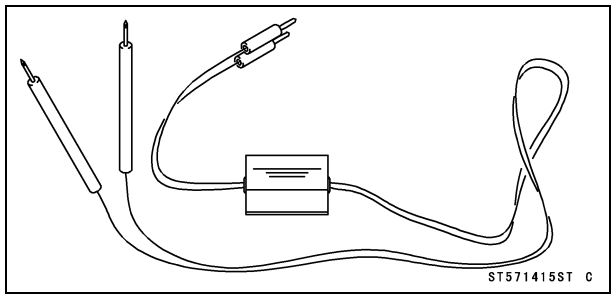
Item	Standard
Battery	
Type	Sealed battery
Model Name	FTX14-BS
Capacity	12 V 12 Ah (10 HR)
Voltage	12.6 V or more
Gross Weight	4.6 kg (10 lb)
Electrolyte Volume	0.69 L (42 cu in.)
Charging System	
Type	Three-phase AC
Alternator Output Voltage	AC 51 V or more @4 000 r/min (rpm)
Stator Coil Resistance	0.05 ~ 0.5 Ω @20°C (68°F)
Charging Voltage (Regulator/Rectifier Output Voltage)	DC 14.5 ~ 14.9 V @25°C (77°F)
Ignition System	
Crankshaft Sensor Resistance	376 ~ 564 Ω @20°C (68°F)
Crankshaft Sensor Peak Voltage	2.4 V or more
Stick Coil:	
Primary Winding Resistance	1.19 ~ 1.61 Ω @20°C (68°F)
Secondary Winding Resistance	8.5 ~ 11.5 kΩ @20°C (68°F)
Primary Peak Voltage	72 V or more
Spark Plug:	
Type	NGK CR9EIA-9
Gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in.)
Electric Starter System	
Starter Motor:	
Brush Length	10 mm (0.39 in.) (Service Limit: 5.0 mm (0.20 in.))
Commutator Diameter	28 mm (1.10 in.) (Service Limit: 27 mm (1.06 in.))
Air Switching Valve	
Resistance	20 ~ 24 Ω @20°C (68°F)
Meter, Gauge, Indicator Unit	
CAN Communication Line Resistance (at Meter Unit)	123 ~ 125 Ω at Meter Unit
Switches and Sensors	
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
Outside Temperature Sensor Resistance	5.4 ~ 6.6 kΩ @0°C (32°F) 0.29 ~ 0.39 kΩ @80°C (176°F)
Fuel Level Sensor Resistance:	
Full Position	9 ~ 11 Ω
Empty Position	213 ~ 219 Ω

Special Tools and Sealant

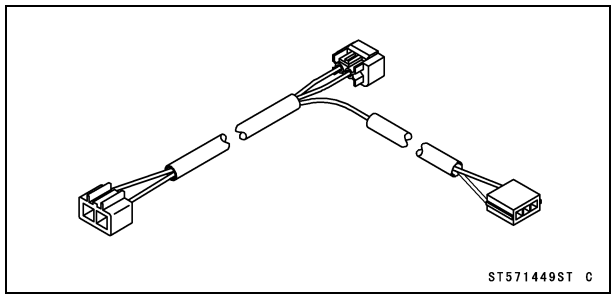
Flywheel Puller Assembly, M38 × 1.5/M35 × 1.5:
57001-1405



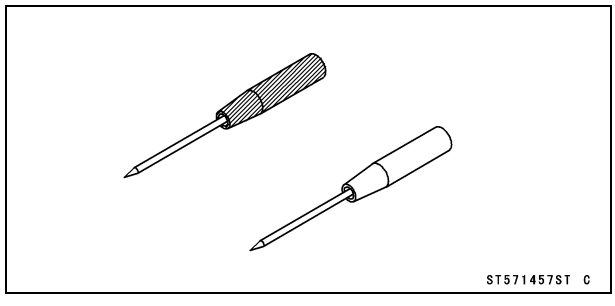
Peak Voltage Adapter:
57001-1415



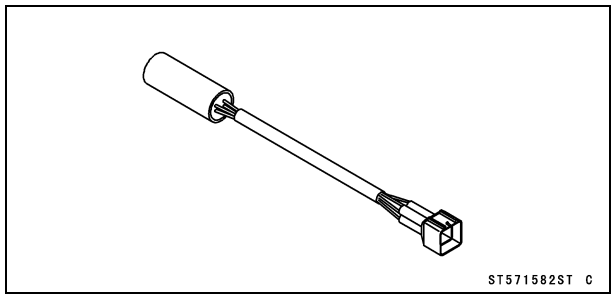
Lead Wire - Peak Voltage Adapter:
57001-1449



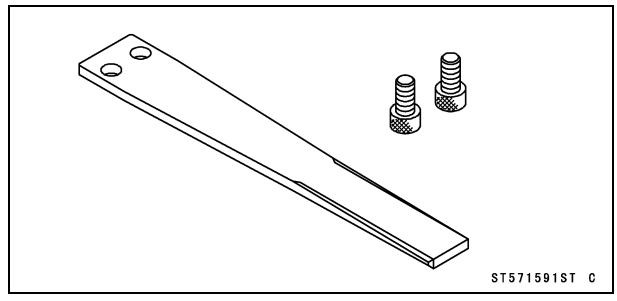
Needle Adapter Set:
57001-1457



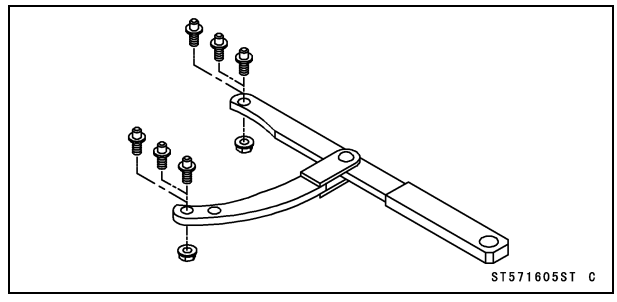
Key Registration Unit:
57001-1582



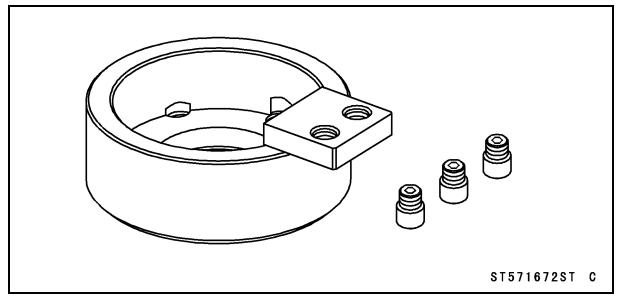
Grip:
57001-1591



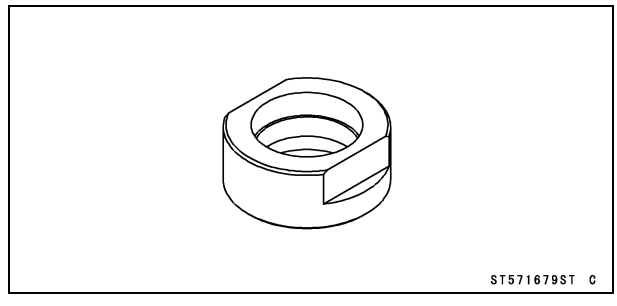
Flywheel & Pulley Holder:
57001-1605



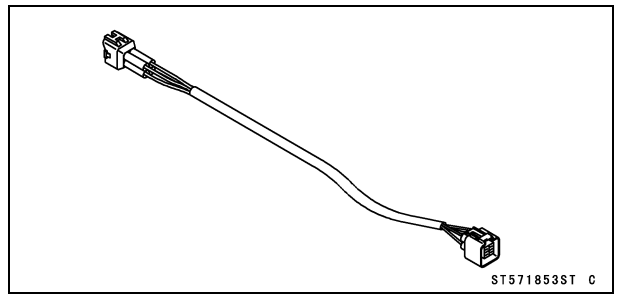
Rotor Holder:
57001-1672



Stopper:
57001-1679

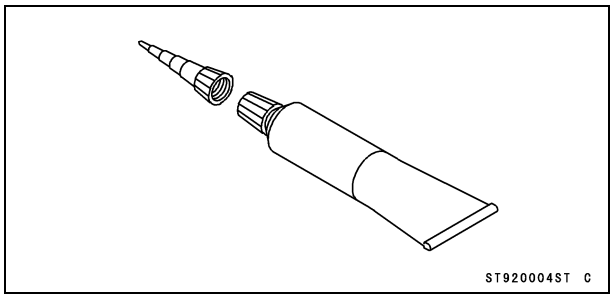


Key Registration Adapter:
57001-1853



Special Tools and Sealant

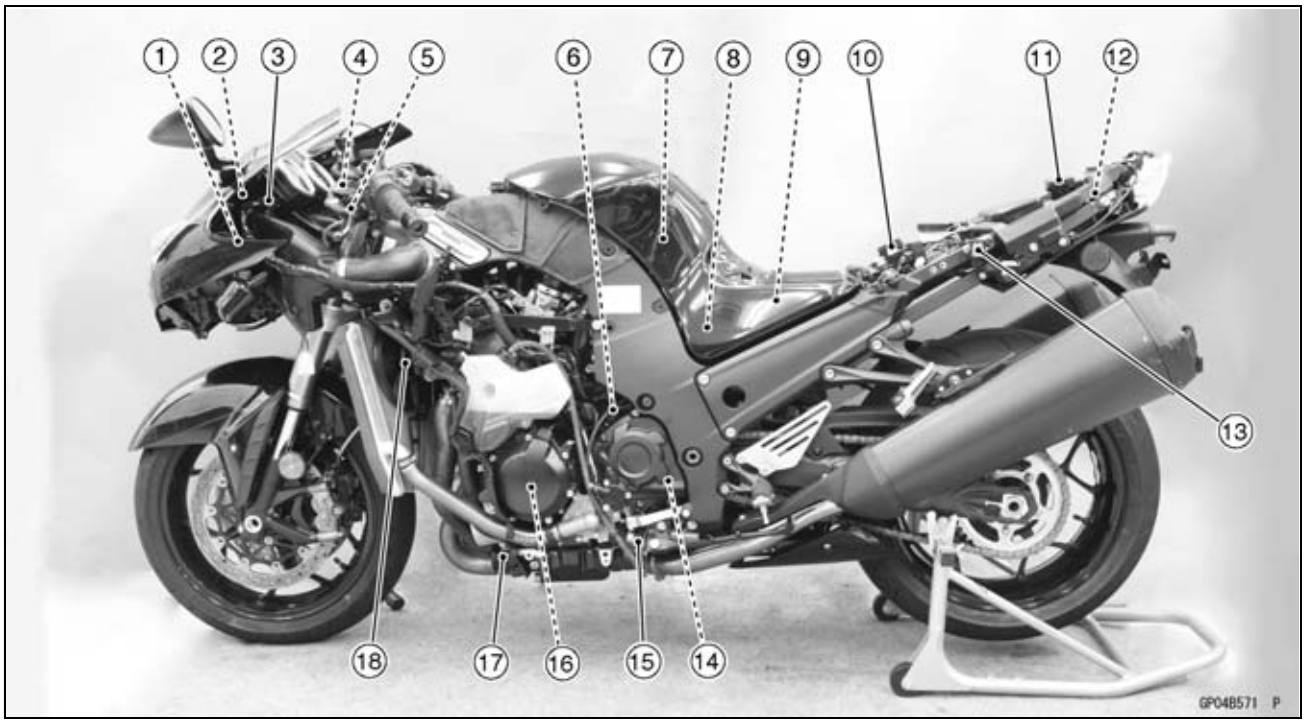
Liquid Gasket, TB1211F:
92104-0004

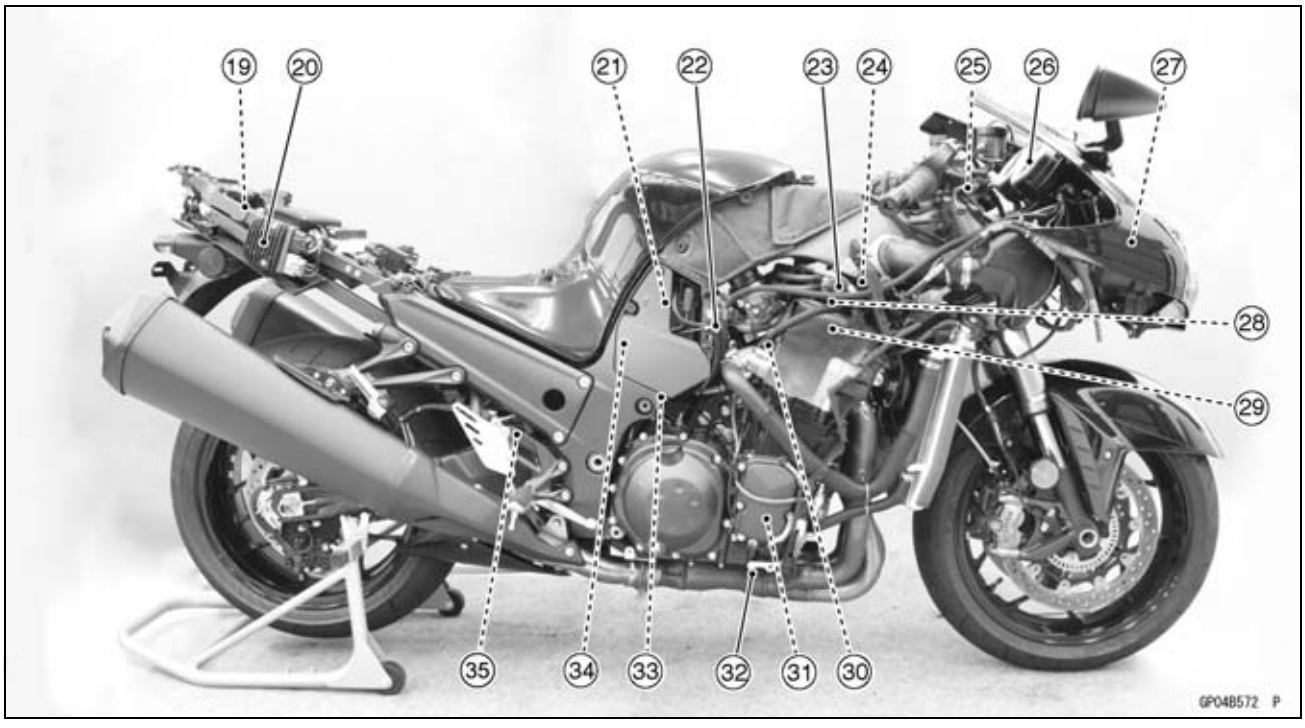


Parts Location

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Parts Location

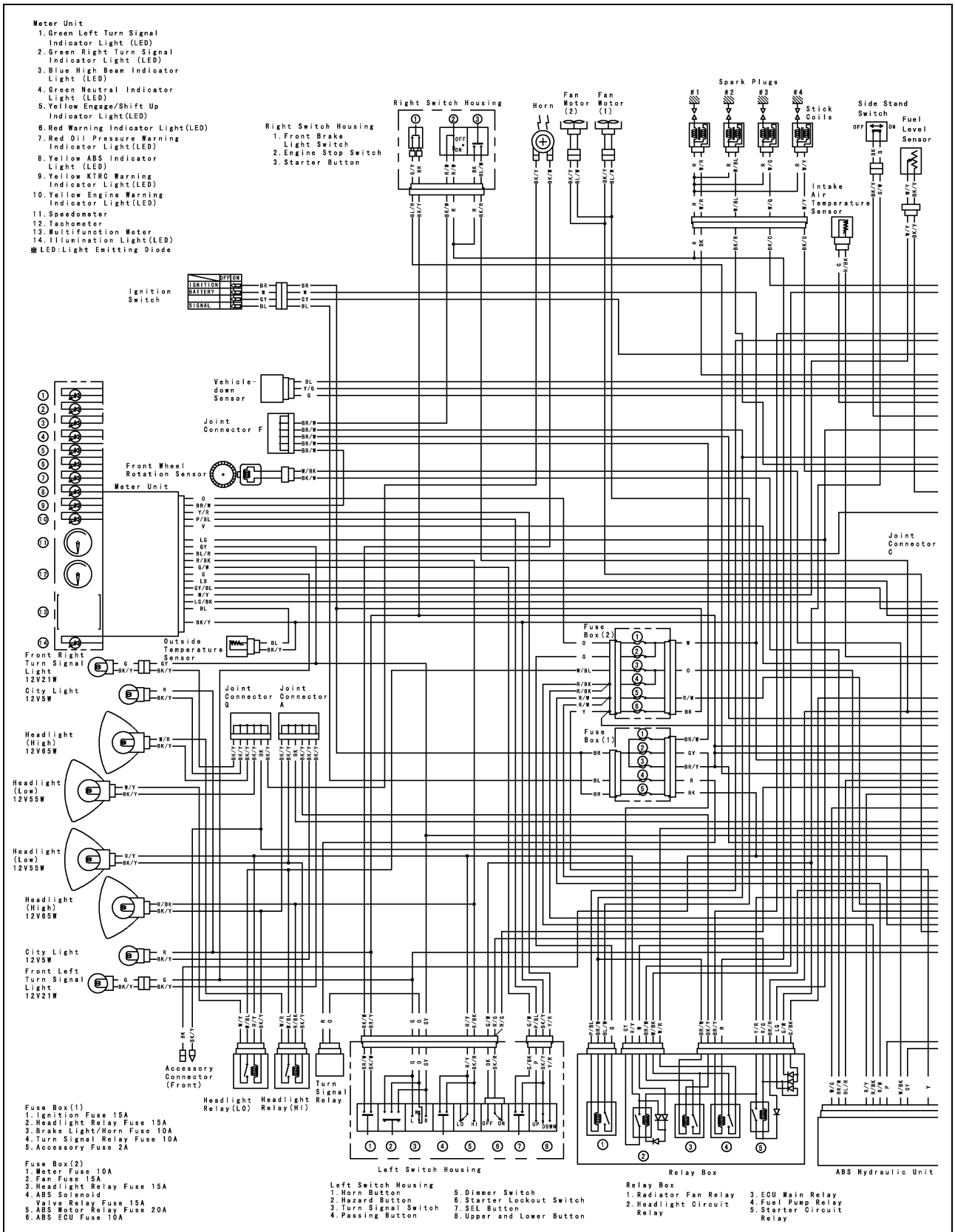




Parts Location

1. Headlight Relay (HI)
2. Immobilizer Amplifier (Immobilizer Equipped Models)
3. Outside Temperature Sensor
4. Ignition Switch
   (Immobilizer Equipped Models: Including Immobilizer Antenna)
5. Starter Lockout Switch
6. Starter Motor
7. Fuel Level Sensor
8. Frame Ground (1)
9. Fuel Reserve Switch
10. Fuse Box (1)
11. Fuse Box (2)
12. ECU
13. Turn Signal Relay
14. Gear Position Sensor
15. Side Stand Switch
16. Alternator
17. Oil Pressure Switch
18. Radiator Fan Motors
19. Relay Box
20. Regulator/Rectifier
21. Battery 12 V 12 Ah
22. Frame Ground (2)
23. Idle Speed Control Valve Actuator
24. Air Switching Valve
25. Front Brake Light Switch
26. Meter Unit
27. Headlight Relay (LO)
28. Stick Coils
29. Spark Plugs
30. Water Temperature Sensor
31. Crankshaft Sensor
32. Oxygen Sensor
33. Engine Ground
34. Starter Relay
35. Rear Brake Light Switch

Wiring Diagram (US, CA and CAL Models)

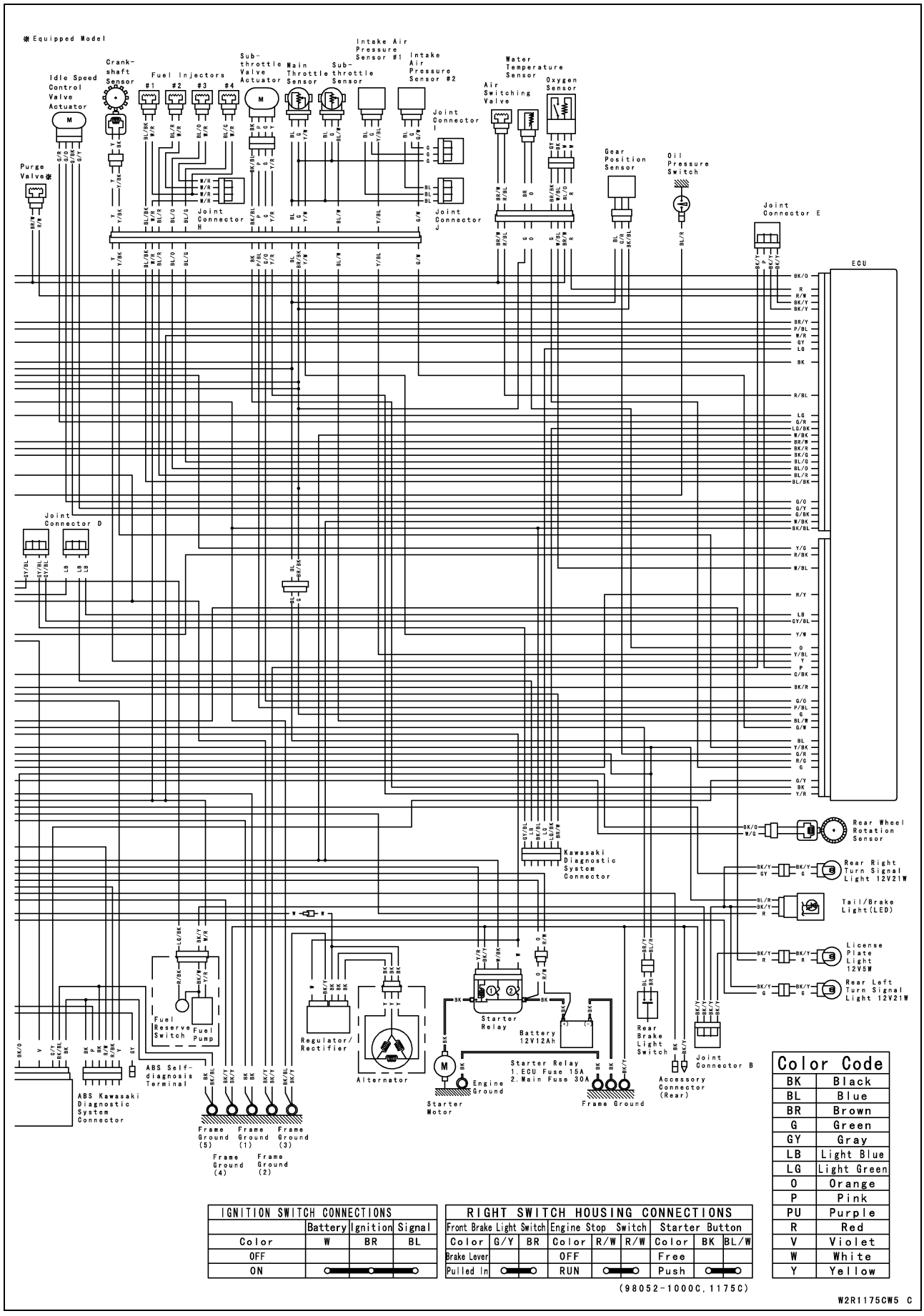


LEFT SWITCH HOUSING CONNECTIONS

Horn Button			Hazard Button				Turn Signal Switch				Passing Button			Dimmer Switch			Starter Lockout Switch			Multifunction Button				
Color	BR/W	BK/W	Color	G	O	GY	Color	G	O	GY	Color	R/Y	BK/R	Color	R/Y	BK/R	Color	BK	BK/R	Color	P	BK/Y	G/BK	Y/R
			OFF				L	●						HI	●		Clutch Lever			Upper	●			
Push	●		ON	●	●	●	OFF(Push)				Push	●					Released			SEL		●		
Released							R		●					LO			Pulled In	●		Lower		●		

W2L1175CW5 C

Wiring Diagram (US, CA and CAL Models)



IGNITION SWITCH CONNECTIONS			
	Battery	Ignition	Signal
Color	W	BR	BL
OFF			
ON			

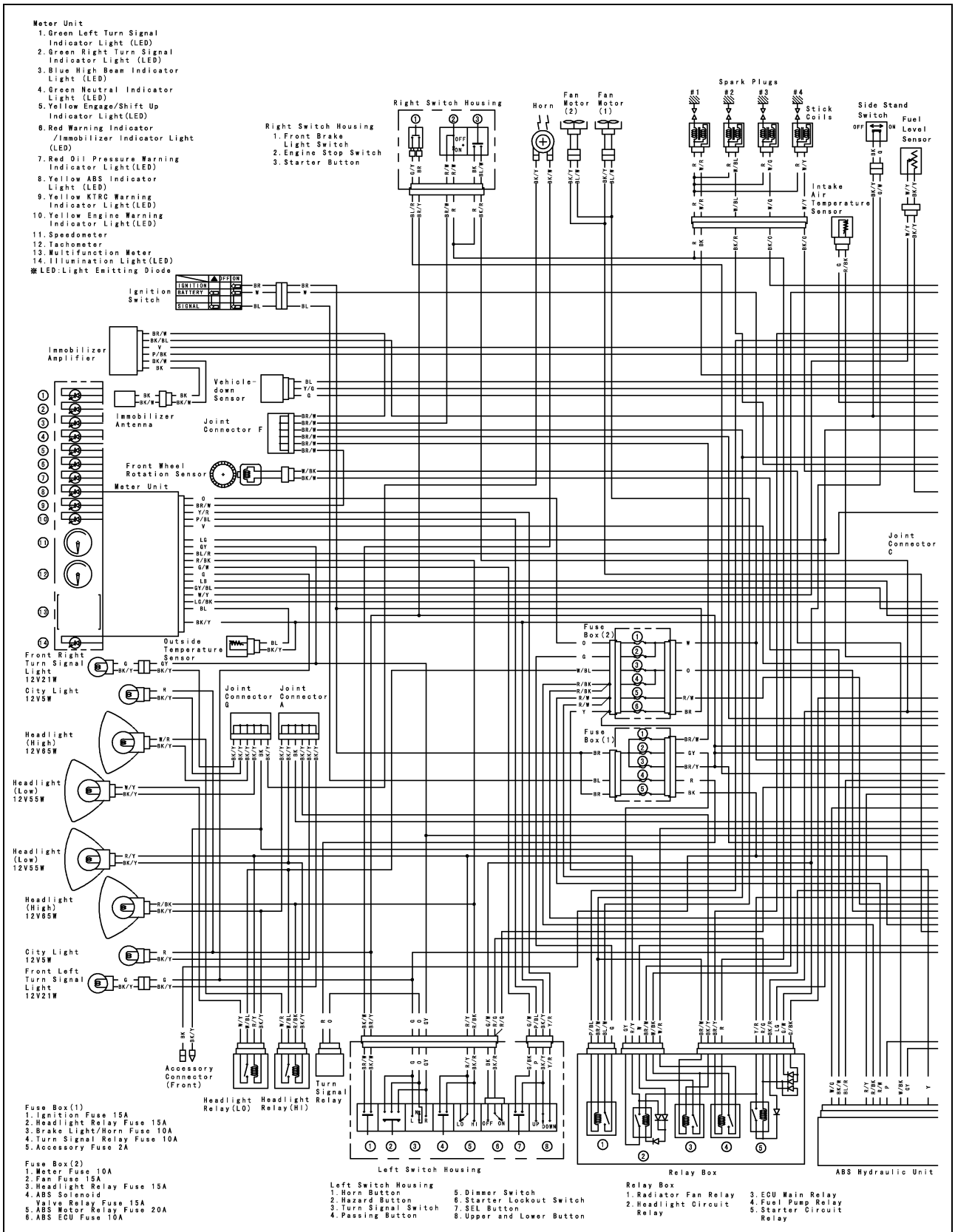
RIGHT SWITCH HOUSING CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	G/Y	BR	Color	R/W	R/W	Color	BK	BL/W
Brake Lever			OFF			Free		
Pulled In	●	●	RUN	●	●	Push	●	●

(98052-1000C, 1175C)

Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
V	Violet
W	White
Y	Yellow

W2R1175CW5 C

Wiring Diagram (Other than US, CA and CAL Models)

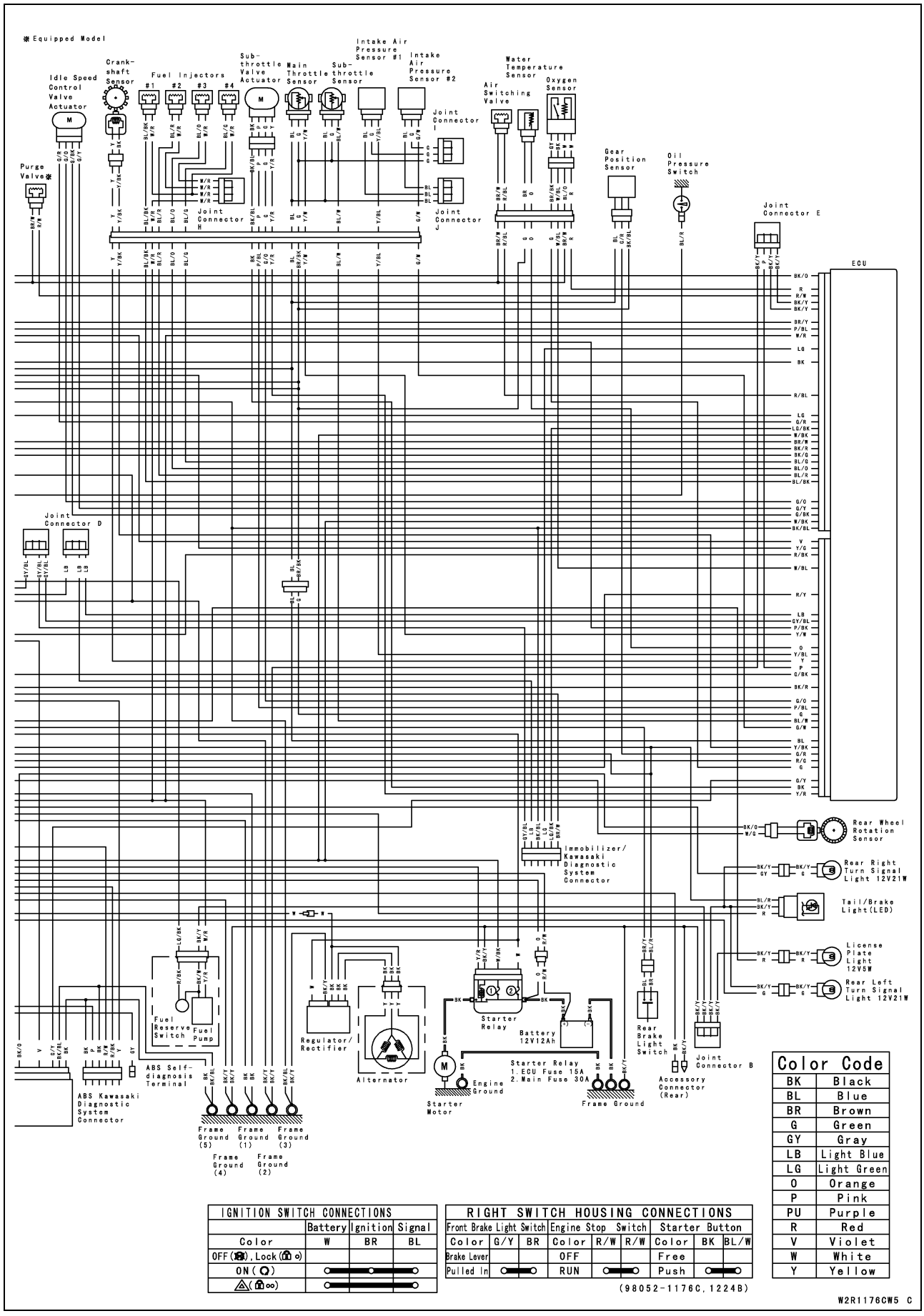


LEFT SWITCH HOUSING CONNECTIONS

Horn Button			Hazard Button				Turn Signal Switch				Passing Button			Dimmer Switch			Starter Lockout Switch			Multifunction Button				
Color	BR/W	BK/W	Color	G	O	GY	Color	G	O	GY	Color	R/Y	BK/R	Color	R/Y	BK/R	Color	BK	BK/R	Color	P	BK/Y	G/BK	Y/R
			OFF				L		●					HI	●		Clutch Lever			Upper	●			
Push	●		ON	●	●	●	OFF(Push)				Push	●					Released			SEL		●		
Released							R		●					LO			Pulled In	●		Lower		●		

W2L1176CW5 C

Wiring Diagram (Other than US, CA and CAL Models)



IGNITION SWITCH CONNECTIONS			
	Battery	Ignition	Signal
Color	W	BR	BL
OFF ( ), Lock ( )			
ON ( )			
( )			

RIGHT SWITCH HOUSING CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	G/Y	BR	Color	R/W	R/W	Color	BK	BL/W
Brake Lever			OFF			Free		
Pulled In			RUN			Push		

Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
V	Violet
W	White
Y	Yellow

(98052-1176C, 1224B)

W2R1176CW5 C

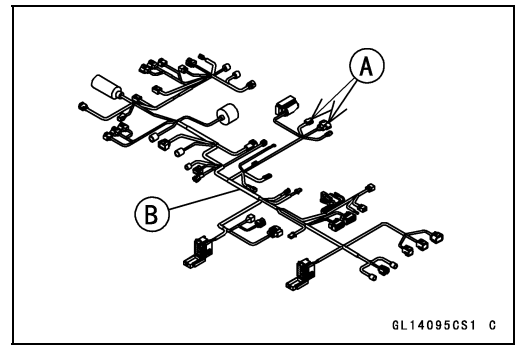
Precautions

There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

- Do not reverse the battery cable connections. This will burn out the diodes on the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- To prevent damage to electrical parts, do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running.
- Because of the large amount of current, never keep the starter button pushed when the starter motor will not turn over, or the current may burn out the starter motor windings.
- 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.
- Make sure all connectors in the circuit are clean and tight, and examine leads for signs of burning, fraying, etc. Poor leads and bad connections will affect electrical system operation.
- Measure coil and winding resistance when the part is cold (at room temperature).

Electrical Wiring

Wiring Inspection



- Visually inspect the wiring for signs of burning, fraying, etc.

★If any wiring is poor, replace the damaged wiring.

- Pull each connector [A] apart and inspect it for corrosion, dirt, and damage.

★If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.

- Check the wiring for continuity.

○Use the wiring diagram to find the ends of the lead which is suspected of being a problem.

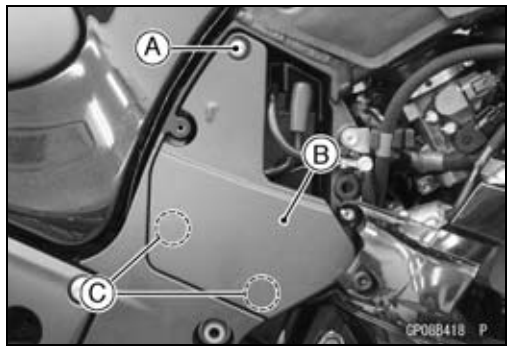
○Connect a digital meter between the ends of the leads.

★If the digital meter does not read about 0 Ω, the lead is defective. Replace the lead or the wiring harness [B] if necessary.

Battery

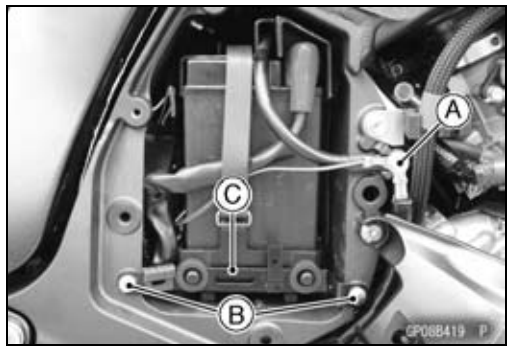
Battery Removal

- Turn the ignition switch off.
- Remove:
  Right Fairing Cover (see Fairing Cover Removal in the Frame chapter)
  Bolt [A] with Washer
- Pull the battery compartment cover [B] outward to clear the projections [C] of the battery compartment cover.

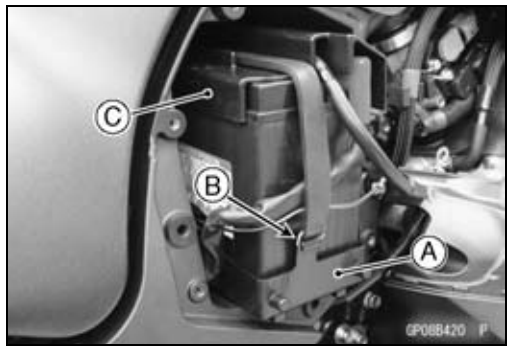


- Remove:
  Frame Ground Terminal Bolt [A], Negative Cables and Lead
  Bracket Bolts [B]
  Bracket [C]

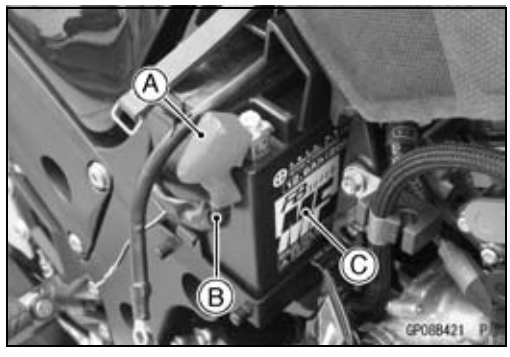
NOTICE
Be sure to disconnect the negative (–) cable first.



- Slightly pull out the battery tray [A].
- Unhook the band [B].
- Slide the battery cover [C].



- Slide the red cap [A] out.
- Disconnect the positive (+) cable [B].
- Remove the battery tray with battery [C].



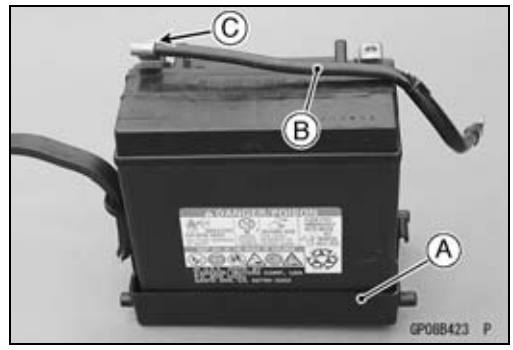
- Disconnect the negative (–) cable [A].
- Remove the battery [B] from the battery tray.



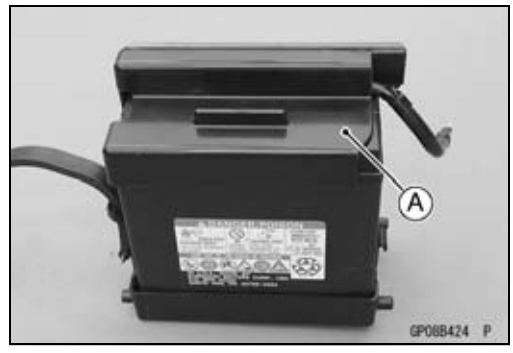
Battery

Battery Installation

- Place the battery in the battery tray [A] as shown.
- Connect the negative (–) cable [B] to the battery.
- Put a light coat of grease on the (–) terminal [C] to prevent corrosion.

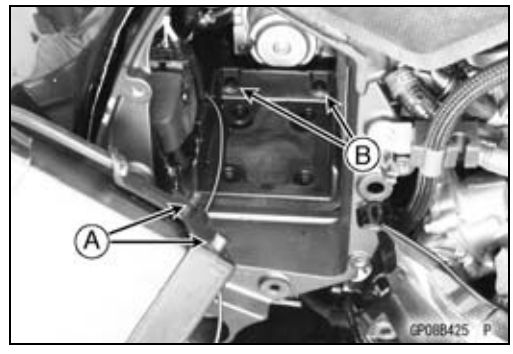


- Put the battery cover [A] on the battery.

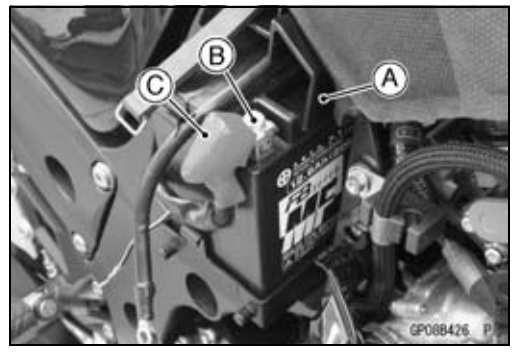


- Insert the battery with the battery tray into the battery compartment.

○Insert the projections [A] on the battery tray into the holes [B] of the battery compartment.

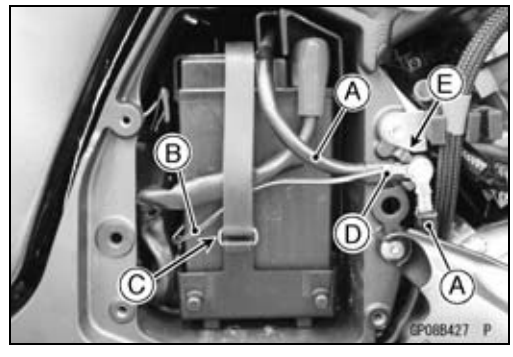


- Slide the battery cover [A].
- Connect the positive (+) cable terminal [B] to the battery.
- Put a light coat of grease on the (+) terminal to prevent corrosion.
- Cover the (+) terminal with its red cap [C].
- Fit the cover on the battery and push in the battery tray.



- Run the cables [A] and lead [B] correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter), and install them.
- Hook the band [C].
- Install the negative (–) cables to the frame so that the battery cable terminal [D] touches the stopper [E].
- Tighten:

Torque - Frame Ground Terminal Bolt: 7.0 N·m (0.71 kgf·m, 62 in·lb)

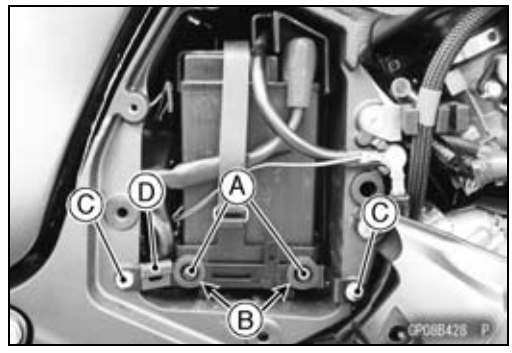


Battery

- Insert the projections [A] of the battery tray into the grommets [B] on the bracket.
- Tighten:

Torque - Bracket Bolts [C]: 8.0 N·m (0.82 kgf·m, 71 in·lb)

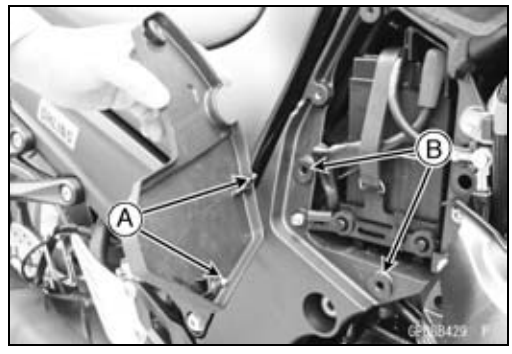
- Check that the trim seal [D] are in place on the bracket.



- Insert the projections [A] of the battery compartment cover into the grommets [B] of the frame and install the washer.
- Tighten:

Torque - Battery Compartment Cover Bolt: 4.0 N·m (0.41 kgf·m, 35 in·lb)

- Install the right fairing cover (see Fairing Cover Installation in the Frame chapter).



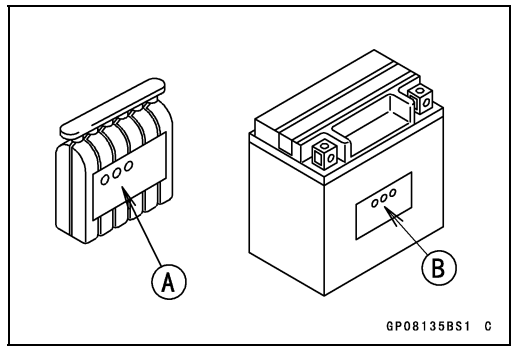
Battery Activation

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

ZX1400H/J: FTX14-BS



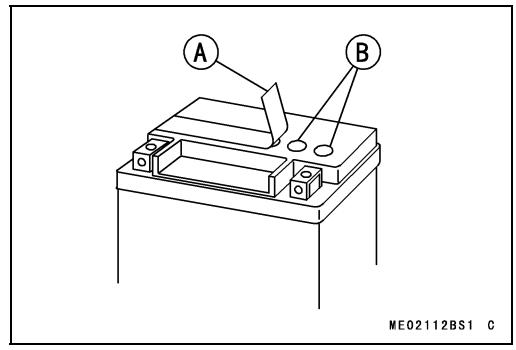
NOTICE

Each battery comes with its own specific electrolyte container; using the wrong container may overfill the battery with incorrect electrolyte, which can shorten battery life and deteriorate battery performance. 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.

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.



⚠ DANGER

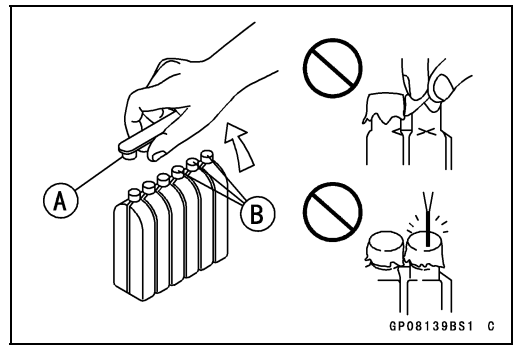
Sulfuric acid in battery electrolyte can cause severe burns. To prevent burns, wear protective clothing and safety glasses when handling electrolyte. If the electrolyte comes in contact with your skin or eyes, wash the area with liberal amounts of water and seek medical attention for more severe burns.

- 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.*

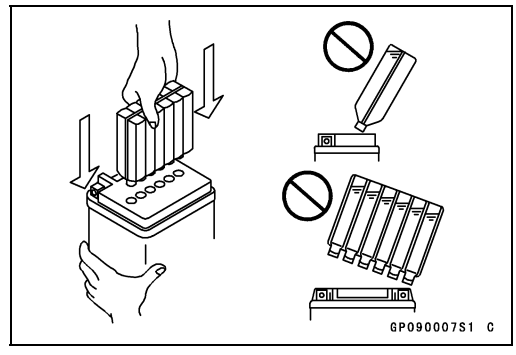
- Remove the electrolyte container from the vinyl bag.
- Detach the strip of caps [A] from the container and set aside, these will be used later to seal the battery.



NOTE

○*Do 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.



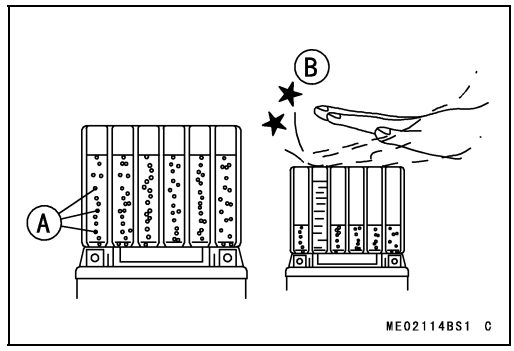
NOTE

○*Do not tilt the electrolyte container.*

Battery

● 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

○*Be 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.

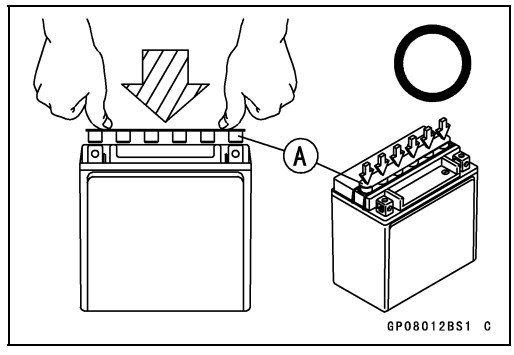
NOTICE

Removal of the container before it is completely empty can shorten the service life of the battery. Do not remove the container until it is completely empty.

● 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.

● 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.

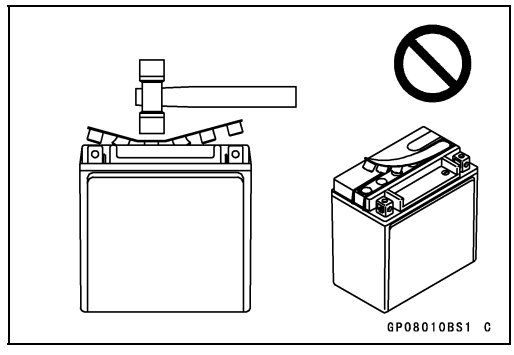


NOTICE

Once the strip of caps is installed onto the battery, never remove the caps, nor add water or electrolyte to the battery.

NOTE

○*Charging the battery immediately after filling can shorten service life.*



Battery

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/PRO2
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

○*Charging 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.

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. However, the battery's performance may be reduced noticeably if charged under conditions other than given above. Never remove the seal cap during refresh charge.
If by chance an excessive amount of gas is generated due to overcharging, the 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).

Battery

⚠ 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 medical attention for more severe burns.

Interchange

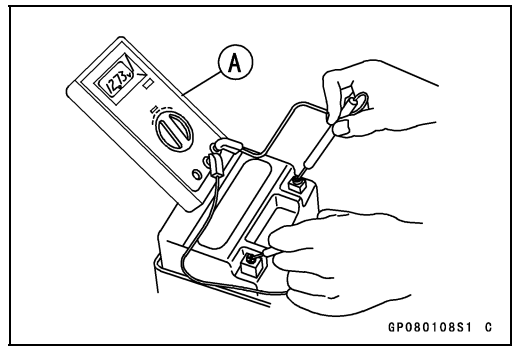
A sealed battery can fully display its performance only when combined with a proper vehicle electric system. Therefore, replace a sealed battery only on a motorcycle which was originally equipped with a sealed battery.

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

○Battery charging condition can be checked by measuring battery terminal voltage with a digital voltmeter [A].

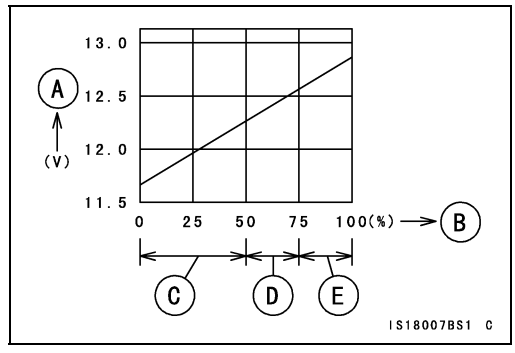
- Remove the battery (see Battery Removal).
- Measure the battery terminal voltage.



NOTE

○*Measure with a digital voltmeter which can be read one decimal place voltage.*

★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

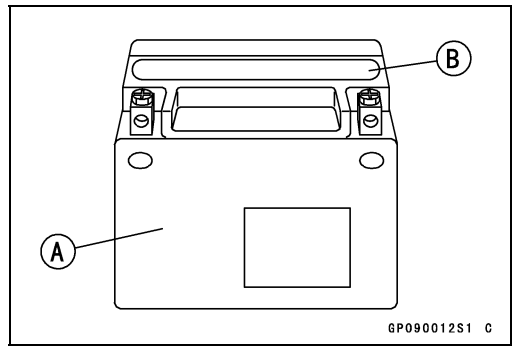
Terminal Voltage (V) [A]
Battery Charge Rate (%) [B]
Refresh charge is required [C]
Note [D]
Good [E]

Refreshing Charge

- Remove the battery [A] (see Battery Removal).
- Do refresh charge by following method according to the battery terminal voltage.

⚠ WARNING

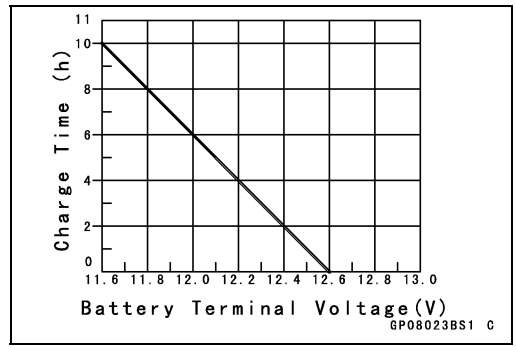
This battery is sealed type. Never remove sealing cap [B] even at charging. Never add water. Charge with current and time as stated below.



Battery

Terminal Voltage: 11.5 ~ less than 12.6 V
Standard Charge 1.4 A × 5 ~ 10 h (see following chart)
Quick Charge 6 A × 1 h

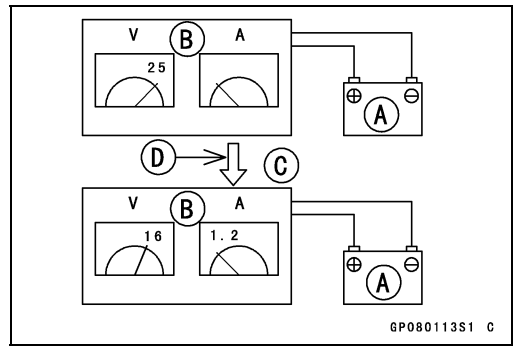
NOTICE
If possible, do not quick charge. If quick charge is done unavoidably, do standard charge later on.



Terminal Voltage: less than 11.5 V
Charging Method: 1.4 A × 20 h

NOTE

○*Increase the charging voltage to a maximum voltage of 25 V if the battery will not accept current initially. Charge for no more than 5 minutes at the increased voltage then check if the battery is drawing current. 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.*



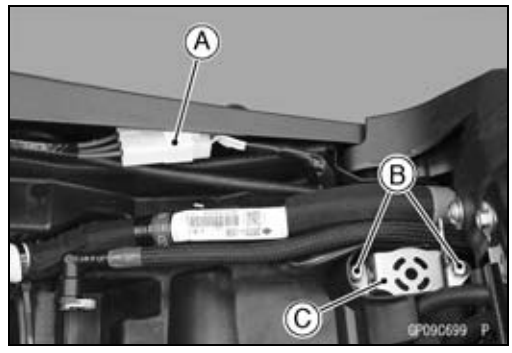
Battery [A]
Battery Charger [B]
Standard Value [C]
Current starts to flow [D]

● Determine the battery condition after refresh charge.
○Determine the condition of the battery left for 30 minutes after completion of the charge by measuring the terminal voltage according to the table below.

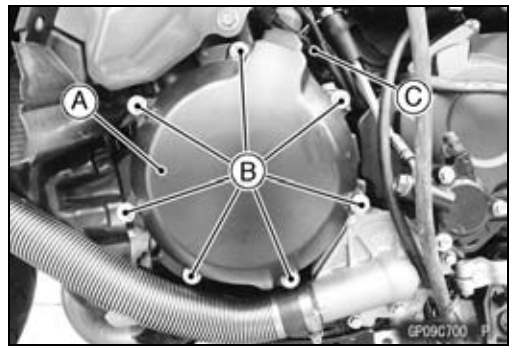
Criteria	Judgement
12.6 V or higher	Good
12.0 ~ lower than 12.6 V	Charge insufficient → Recharge
lower than 12.0 V	Unserviceable → Replace

Charging System

Alternator Cover Removal

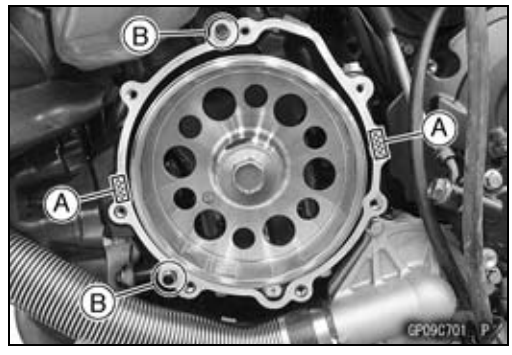


- Remove:
  Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)
  Left Middle Fairing (see Middle Fairing Removal in the Frame chapter)
  Alternator Lead Connector [A]
  Bolts [B] and Bracket [C]



- Place a suitable container under the alternator cover [A].
- Remove:
  Alternator Cover Bolts [B]
  Alternator Cover
  Gasket
- Open the clamp [C], clear the alternator lead.
- Pull the alternator lead out of between the engine and frame.

Alternator Cover Installation



- Using a high flash-point solvent, clean off any oil or dirt that may be on the liquid gasket coating area. Dry them with a clean cloth.
- 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.
- Replace the gasket with a new one.
- Install a new gasket and the alternator cover.
- Tighten:

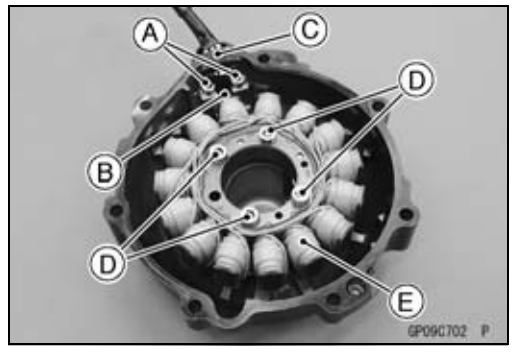
  Torque - Alternator Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Run the alternator lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the bracket.
- Tighten:

  Torque - Bracket Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Install the removed parts (see appropriate chapters).

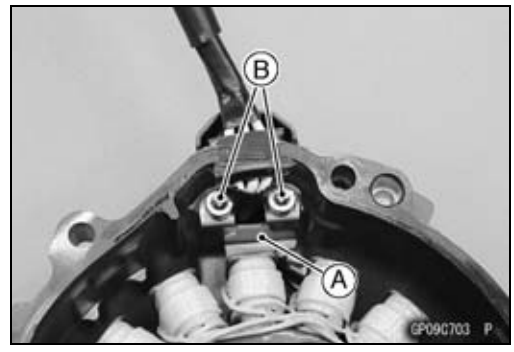
Stator Coil Removal



- Remove:
  Alternator Cover (see Alternator Cover Removal)
  Alternator Lead Holding Plate Bolts [A] and Plate [B]
  Alternator Lead Grommet [C]
  Stator Coil Bolts [D]
- Remove the stator coil [E] from the alternator cover.

Charging System

Stator Coil Installation



- Tighten:

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

- Using a high flash-point solvent, clean off any oil or dirt that may be on the liquid gasket coating area. Dry them with a clean cloth.
- Apply liquid gasket to the circumference of the alternator lead grommet, and fit the grommet into the notch of the cover securely.

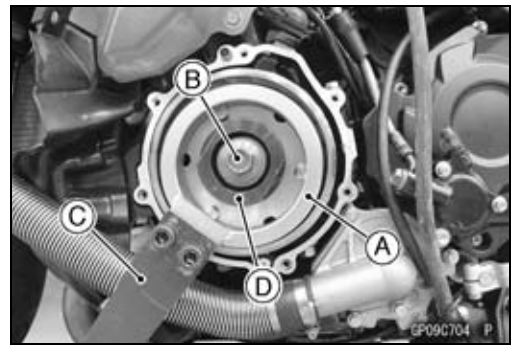
  Sealant - Liquid Gasket, TB1211F: 92104-0004

- Secure the alternator lead with a holding plate [A], and apply a non-permanent locking agent to the threads of the plate bolts [B] and tighten them.

  Torque - Alternator Lead Holding Plate Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

- Install the alternator cover (see Alternator Cover Installation).

Alternator Rotor Removal



- Remove the alternator cover (see Alternator Cover Removal).
- 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

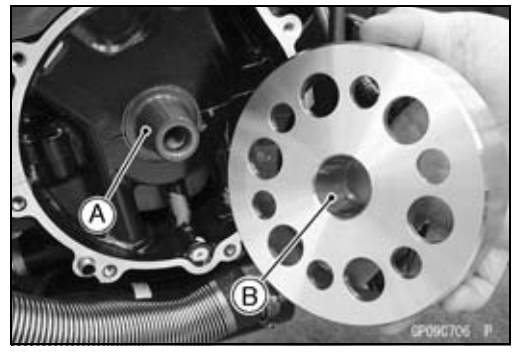


- Using the flywheel puller [A], remove the alternator rotor from the crankshaft.

  Special Tool - Flywheel Puller Assembly, M38 × 1.5/M35 × 1.5: 57001-1405

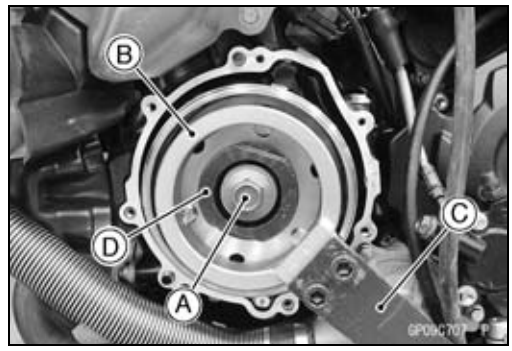
NOTICE
Do not attempt to strike the alternator rotor itself. Striking the rotor can cause the magnets to lose their magnetism.

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.

- Using a cleaning fluid, clean off any oil or dirt on the washer and dry if with a clean cloth.



NOTE

○*Confirm the alternator rotor fit or not to the crankshaft before tightening it with specified torque.*

- Install the washer and rotor bolt.
- Tighten the alternator rotor bolt [A] while holding the alternator rotor steadily with the holder [B] temporary.

Special Tools - Grip [C]: 57001-1591
Rotor Holder: 57001-1672
Stopper [D]: 57001-1679

Torque - Alternator Rotor Bolt: 70 N·m (7.0 kgf·m, 52 ft·lb)

- Remove the rotor bolt and washer.
- Check the tightening torque with flywheel puller [A].

Special Tool - Flywheel Puller Assembly, M38 × 1.5/M35 × 1.5: 57001-1405



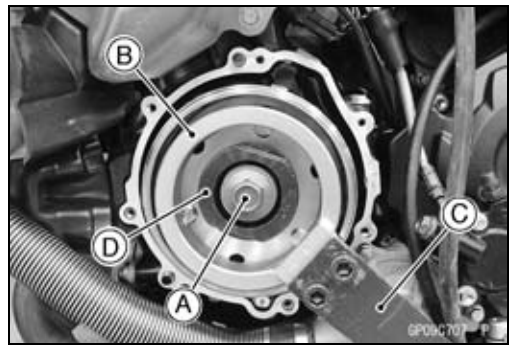
★If the rotor is not pulled out with 20 N·m (2.0 kgf·m, 15 ft·lb) of drawing torque, it is installed correctly.

★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 washer, and dry them with a clean cloth. Then, confirm that it is not pulled out with above torque.

- Install the washer and rotor bolt.
- 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 System

Charging Voltage Inspection



- Check the battery condition (see Charging Condition Inspection).
- Warm up the engine to obtain actual alternator operating conditions.
- Remove the right fairing cover (see Fairing Cover Removal in the Frame chapter).
- Check that the ignition switch is turned off, and connect a tester [A] to the battery (+) terminal and ground.
- Start the engine, and note the voltage readings at various engine speeds (except idling engine speed) 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.

Charging Voltage

Connections		Reading
Tester (+) to	Tester (–) to	
Battery (+)	Ground	DC 14.5 ~ 14.9 V

- Turn off the ignition switch to stop the engine, and disconnect the 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 alternator, by leaving it near an electromagnetic field, or just by aging, will result in low output.

Charging System



● To check the alternator output voltage, do the following procedures.
○Turn the ignition switch off.
○Remove the right seat cover (see Seat Cover Removal in the Frame chapter).
○Disconnect the alternator lead connector [A].
○Connect a tester as shown in the table 1.
○Start the engine.
○Run it at the rpm given in the table 1.
○Note the voltage readings (total 3 measurements).

Table 1 Alternator Output Voltage

Connections		Reading @4 000 r/min (rpm)
Tester (+) to	Tester (–) to	
One Black Lead	Another Black Lead	AC 51 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.

● Check the stator coil resistance as follows.
○Stop the engine.
○Connect the tester as shown in the table 2.
○Note the readings (total 3 measurement).

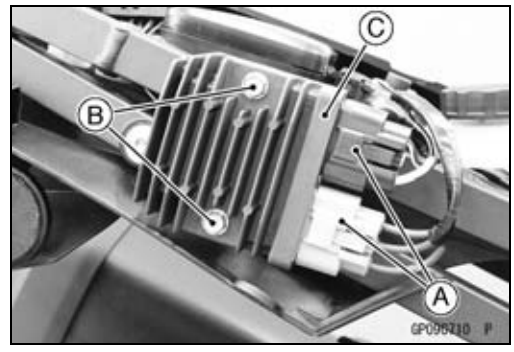
Table 2 Stator Coil Resistance @20°C (68°F)

Connections		Reading
Tester (+) to	Tester (–) to	
One Black Lead	Another Black Lead	0.05 ~ 0.5 Ω

When measuring the resistance, use a tester that can measure the standard value.
★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 tester, measure the resistance between each of the black leads and chassis ground.
★Any tester reading less than infinity (∞) indicates a short, necessitating stator replacement.
★If the stator coil has 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.

Charging System

Regulator/Rectifier Removal



- Remove:
  Right Seat Cover (see Seat Cover Removal in the Frame chapter)
  Connectors [A]
  Regulator/Rectifier Bolts [B]
  Regulator/Rectifier [C]

Regulator/Rectifier Installation

- Installation is the reverse of removal.
- Tighten:

Torque - Regulator/Rectifier Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

Regulator/Rectifier Inspection

- Refer to the Charging System Troubleshooting for the Regulator/Rectifier Inspection.

Charging System Troubleshooting

- Before inspection, remove all accessories that consume electrical power.

NOTE

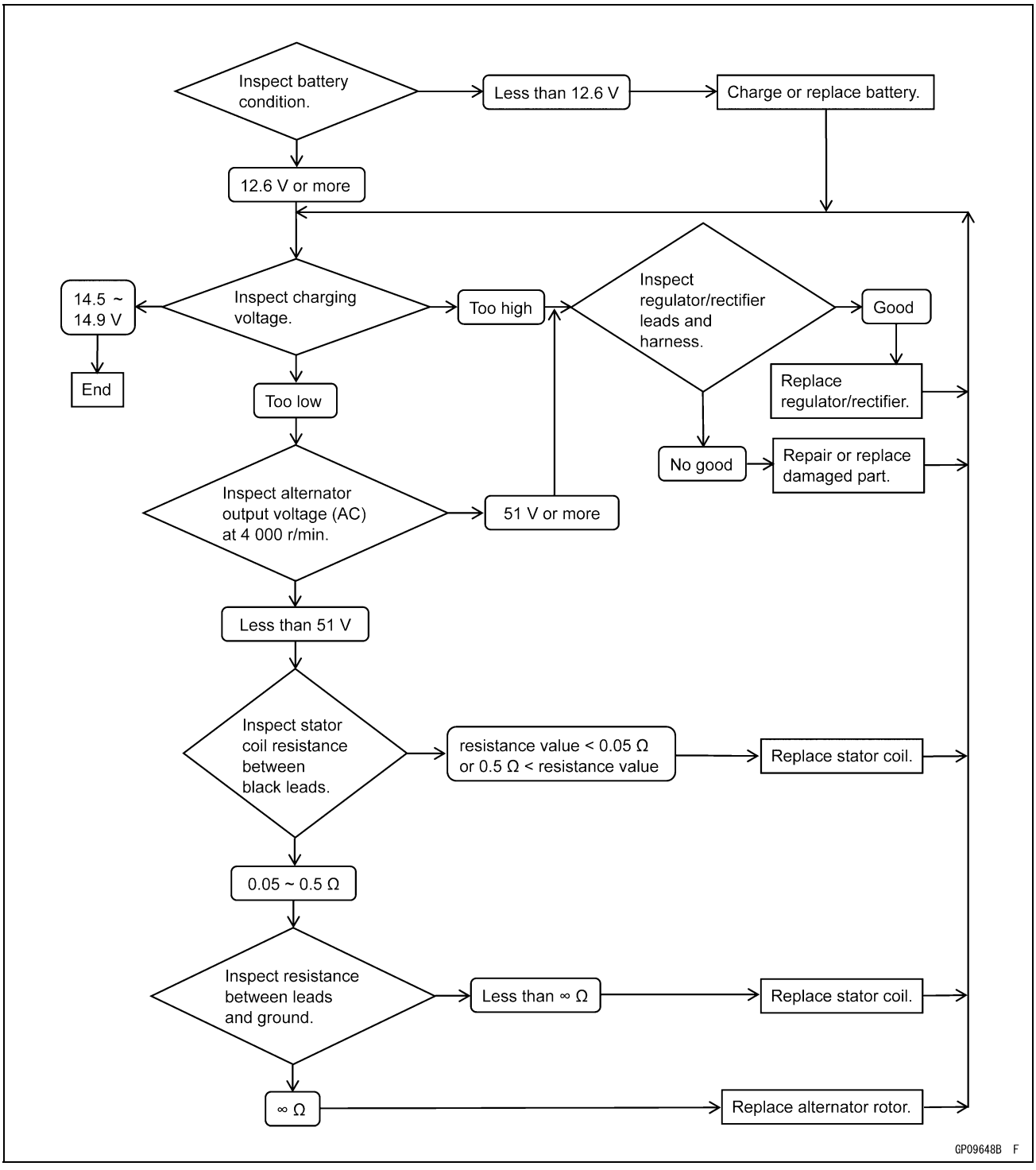
○*Even when the charging system is working properly, the battery may discharge if the motorcycle is equipped with too many accessories.*

- Pay attention to riding conditions and the customer's riding habits which could affect the charging system such as:

Frequent use at low engine speed
Frequent and unnecessary brake pedal dragging
→ Battery Discharged

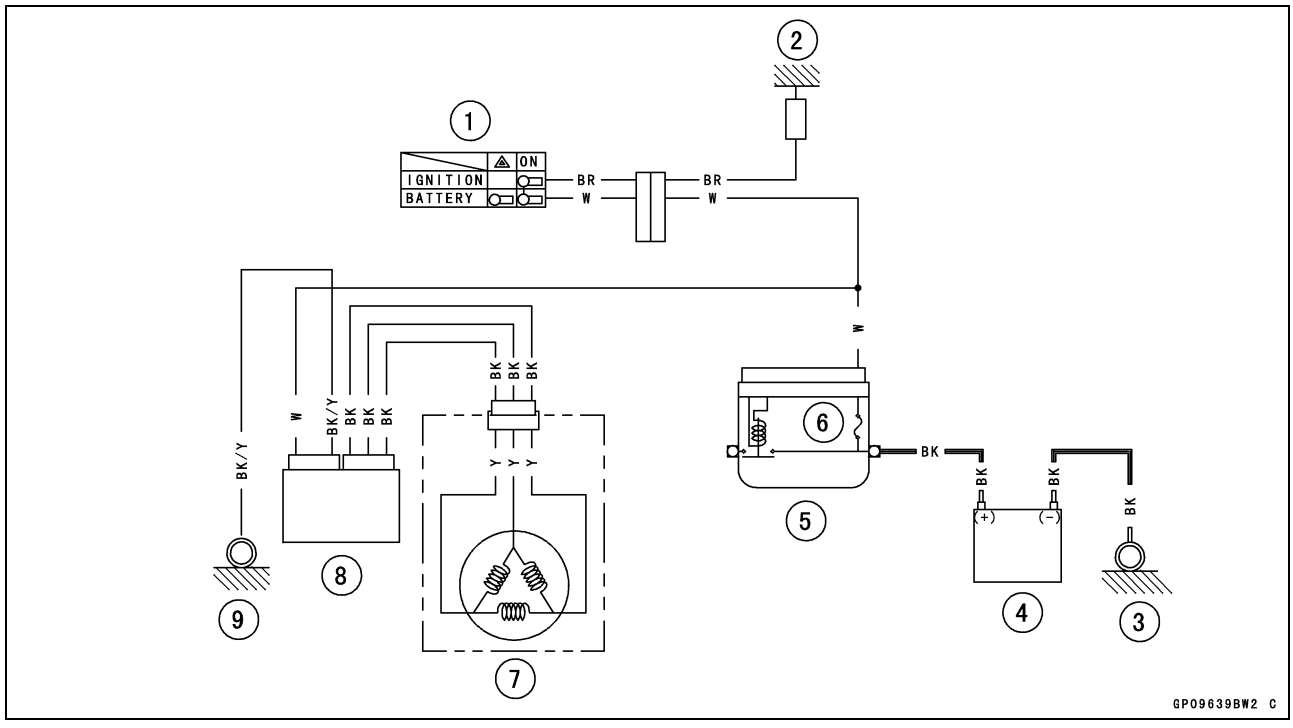
- Recharge the battery if it is discharged.

Charging System



Charging System

Charging System Circuit



1. Ignition Switch
2. Load
3. Frame Ground
4. Battery 12 V 12 Ah
5. Starter Relay
6. Main Fuse 30 A
7. Alternator
8. Regulator/Rectifier
9. Frame Ground (3)

Ignition System

⚠ WARNING

The ignition system produces extremely high voltage. Do not touch the spark plug, stick coil or stick coil lead while the engine is running, or you could receive a severe electrical shock.

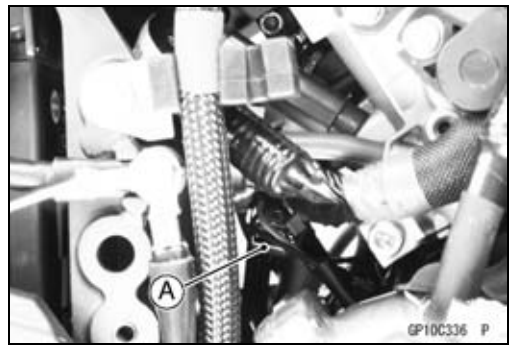
NOTICE

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.

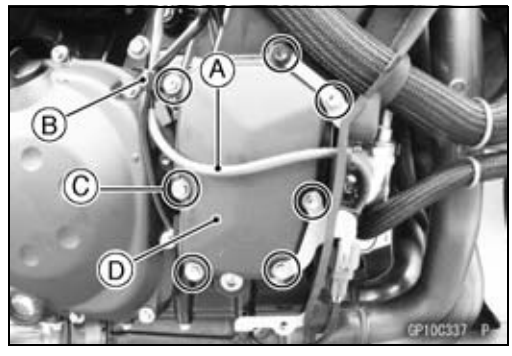
Crankshaft Sensor Removal

NOTICE

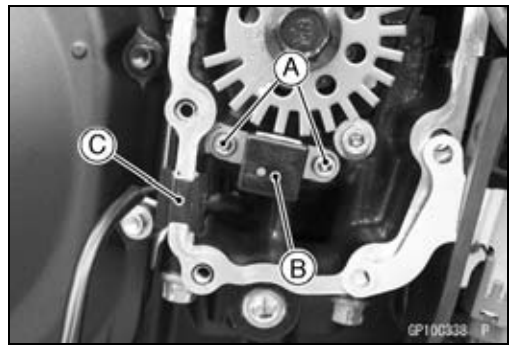
Never drop the sensor especially on a hard surface. Such a shock to the sensor can damage it.



- Remove:
  Right Middle Fairing (see Middle Fairing Removal in the Frame chapter)
  Crankshaft Sensor Lead Connector [A]



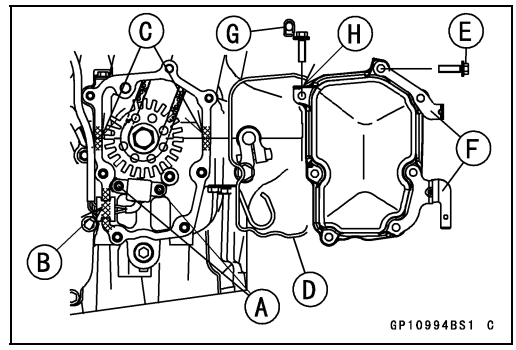
- Free the oxygen sensor lead [A] from the clamp [B].
- Remove:
  Crankshaft Sensor Cover Bolts [C], Clamp and Brackets
  Crankshaft Sensor Cover [D]



- Remove:
  Crankshaft Sensor Bolts [A]
  Crankshaft Sensor [B]
  Grommet [C]

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: 6.0 N·m (0.61 kgf·m, 53 in·lb)

- Using a high flash-point solvent, clean off any oil or dirt that may be on the silicone sealant coating area. Dry them with a clean cloth.
- Apply liquid gasket 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 the crankcase halves.

Sealant - Liquid Gasket, TB1211F: 92104-0004

- Replace the O-ring [D] with a new one.
- Install the crankshaft sensor cover.
- Apply a non-permanent locking agent to only one crankshaft sensor cover bolt [E].
- Install the brackets [F] and clamp [G] as shown.

○Touch the clamp to the stopper [H] of the crankshaft sensor cover.

- Tighten the crankshaft sensor cover bolts.

Torque - Crankshaft Sensor Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Run the crankshaft sensor lead and oxygen 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 fairing cover (see Fairing Cover Removal in the Frame chapter).
- Disconnect the crankshaft sensor lead connector [A] (see Crankshaft Sensor Removal).
- Connect a tester [B] to the crankshaft sensor lead connector.

Crankshaft Sensor Resistance:
376 ~ 564 Ω @20°C (68°F)

★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.

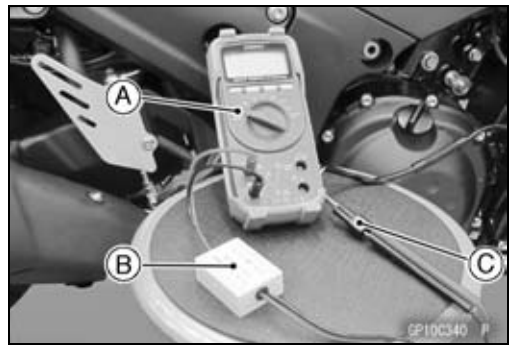
Ignition System

Crankshaft Sensor Peak Voltage Inspection

NOTE

○*Be sure the battery is fully charged.*
○*Using the peak voltage adapter is a more reliable way to determine the condition of the crankshaft sensor than crankshaft sensor internal resistance measurements.*

- Remove the right fairing cover (see Fairing Cover Removal in the Frame chapter).
- Disconnect the crankshaft sensor lead connector (see Crankshaft Sensor Removal).
- Connect a tester [A] to the peak voltage adapter [B].



Special Tool - Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B

Connections:

Crankshaft Sensor Connector [C]		Peak Voltage Adapter		Tester
Yellow	←	Red	→	(+)
Black	←	Black	→	(–)

- Turn the engine stop switch to run position.
- Turn the ignition 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.

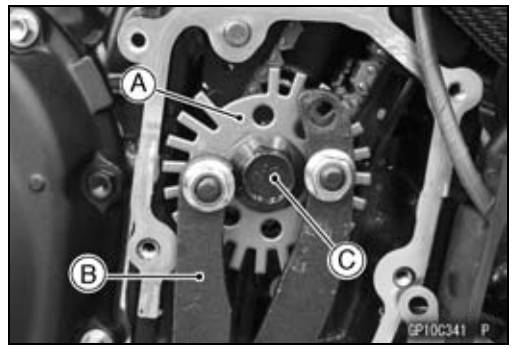
Crankshaft Sensor Peak Voltage
Standard: 2.4 V or more

★If the reading is less than the standard, inspect the crankshaft sensor (see Crankshaft Sensor Inspection).

Timing Rotor Removal

- Remove the crankshaft sensor (see Crankshaft Sensor Removal).
- Remove the timing rotor [A].

○Holding the timing rotor with the flywheel & pulley holder [B] and remove the timing rotor bolt [C].



Special Tool - Flywheel & Pulley Holder: 57001-1605

Timing Rotor Installation

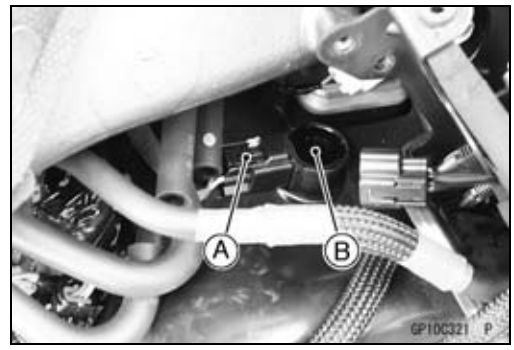
- Fit the rotor to the crankshaft.
- Tighten the rotor bolt.

Torque - Timing Rotor Bolt: 39 N·m (4.0 kgf·m, 29 ft·lb)

- Install the removed parts (see appropriate chapters).

Ignition System

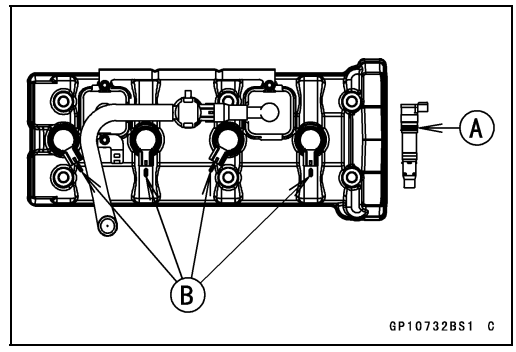
Stick Coil Removal



- Remove:
  Middle Fairings (see Middle Fairing Removal in the Frame chapter)
  Air Switching Valve (see Air Switching Valve Removal in the Engine Top End chapter)
- Disconnect the stick coil connectors [A].
- Pull out the stick coils [B] upward.

NOTICE
Do not pry the connector part of the coil while removing the coil.

Stick Coil Installation

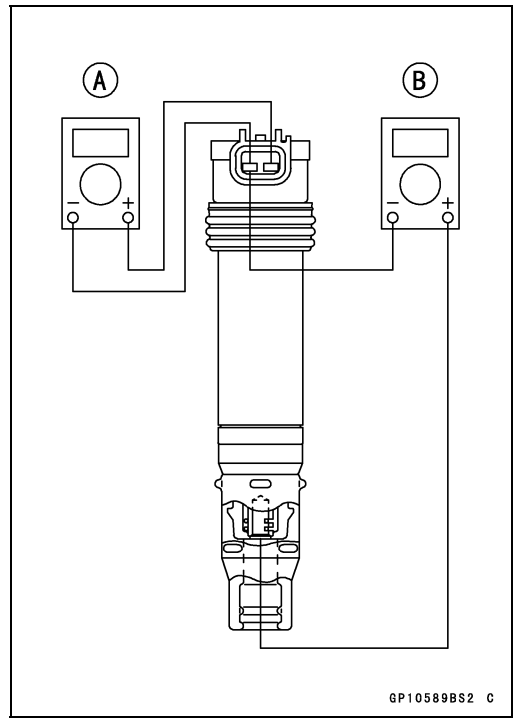


- Apply a thin coat of grease [A] to the stick coils for easy installation.
- Insert the stick coils so that the coil heads align with the lines [B] on the cylinder head cover.

NOTICE
Do not tap the coil head while installing the coil.

- After installation, be sure the stick coils are installed securely by pulling up them lightly.
- Run the leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).

Stick Coil Inspection



- Remove the stick coils (see Stick Coil Removal).
- Measure the primary winding resistance [A] as follows.

○Connect a tester between the coil terminals.

- Measure the secondary winding resistance [B] as follows.

○Connect the tester between the plug terminal and (–) coil terminal.

Stick Coil Winding Resistance

Primary Windings:	**1.19 ~ 1.61 Ω @20°C (68°F)**
Secondary Windings:	**8.5 ~ 11.5 kΩ @20°C (68°F)**

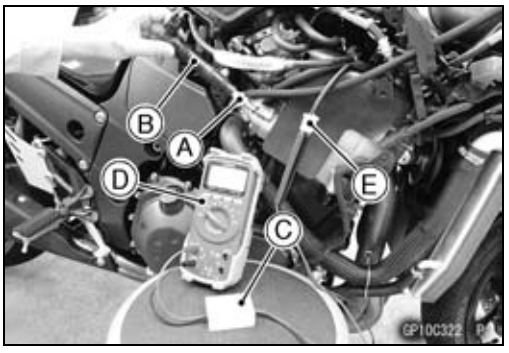
★If the tester does not read as specified, replace the coil.

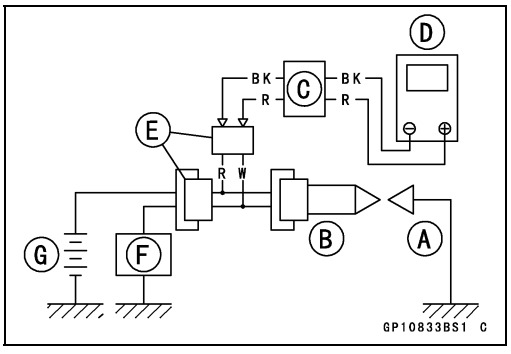
Stick Coil Primary Peak Voltage Inspection

NOTE

○*Be sure the battery is fully charged.*

● Remove the stick coils (see Stick Coil Removal).
○Do not remove the spark plug.
● Measure the primary peak voltage as follows.
○Install the new spark plug [A] into each stick coil [B], and ground them onto the engine.
○Connect the peak voltage adapter [C] to a tester [D].
○Connect 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 - 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)

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the spark plugs or tester connections.

● Turn the engine stop switch to run position.
● Turn the ignition switch on.
● Pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission in neutral to measure the primary peak voltage.
● Repeat the measurements 5 times for one 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

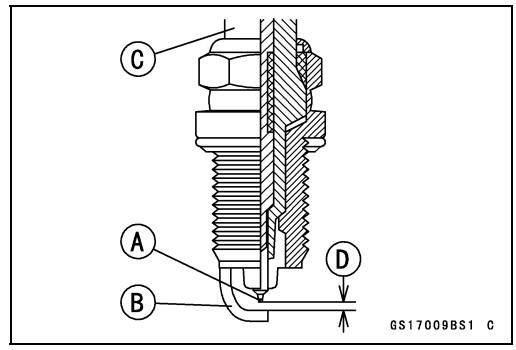
● Refer to the Spark Plug Replacement in the Periodic Maintenance chapter.

Spark Plug Installation

● Refer to the Spark Plug Replacement in the Periodic Maintenance chapter.

Ignition System

Spark Plug Condition Inspection



- Remove the spark plugs (see Spark Plug Replacement in the Periodic Maintenance Chapter).
- 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.

★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

Interlock Operation Inspection

- Raise the rear wheel off the ground with the stand.

1st Check

- Start the engine to the following conditions.

Condition:
Transmission Gear → 1st Position
Clutch Lever → Release
Side Stand → Down or Up

○Turn the ignition switch on and push the starter button.
○Then the starter motor should not turn when the starter system circuit is normality.

★If the engine is start, inspect the starter lockout switch, gear position sensor and relay box.

2nd Check

- Start the engine to the following conditions.

Condition:
Transmission Gear → 1st Position
Clutch Lever → Pulled in
Side Stand → Up

○Turn the ignition switch on and push the starter button.
○Then the starter motor should turn when the starter system circuit is normality.

★If the starter motor is not turn, inspect the starter lockout switch, side stand switch, relay box and starter relay.

Ignition System

3rd Check

- Inspect the engine for its secure stop after the following operations are completed.
- Run the engine to the following conditions.

Condition:

Transmission Gear → 1st Position

Clutch Lever → Release

Side Stand → Up

- Set the side stand on the ground, then the engine will stop.

★If the engine may not be stopped, inspect the gear position sensor, side stand switch and relay box.

★If their parts are normality, replace the ECU.

IC Igniter Inspection

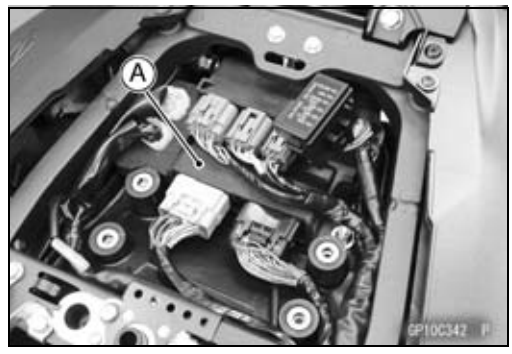
○The IC igniter is built in the ECU [A].

- Refer to the following items.

Interlock Operation Inspection (see Interlock Operation Inspection)

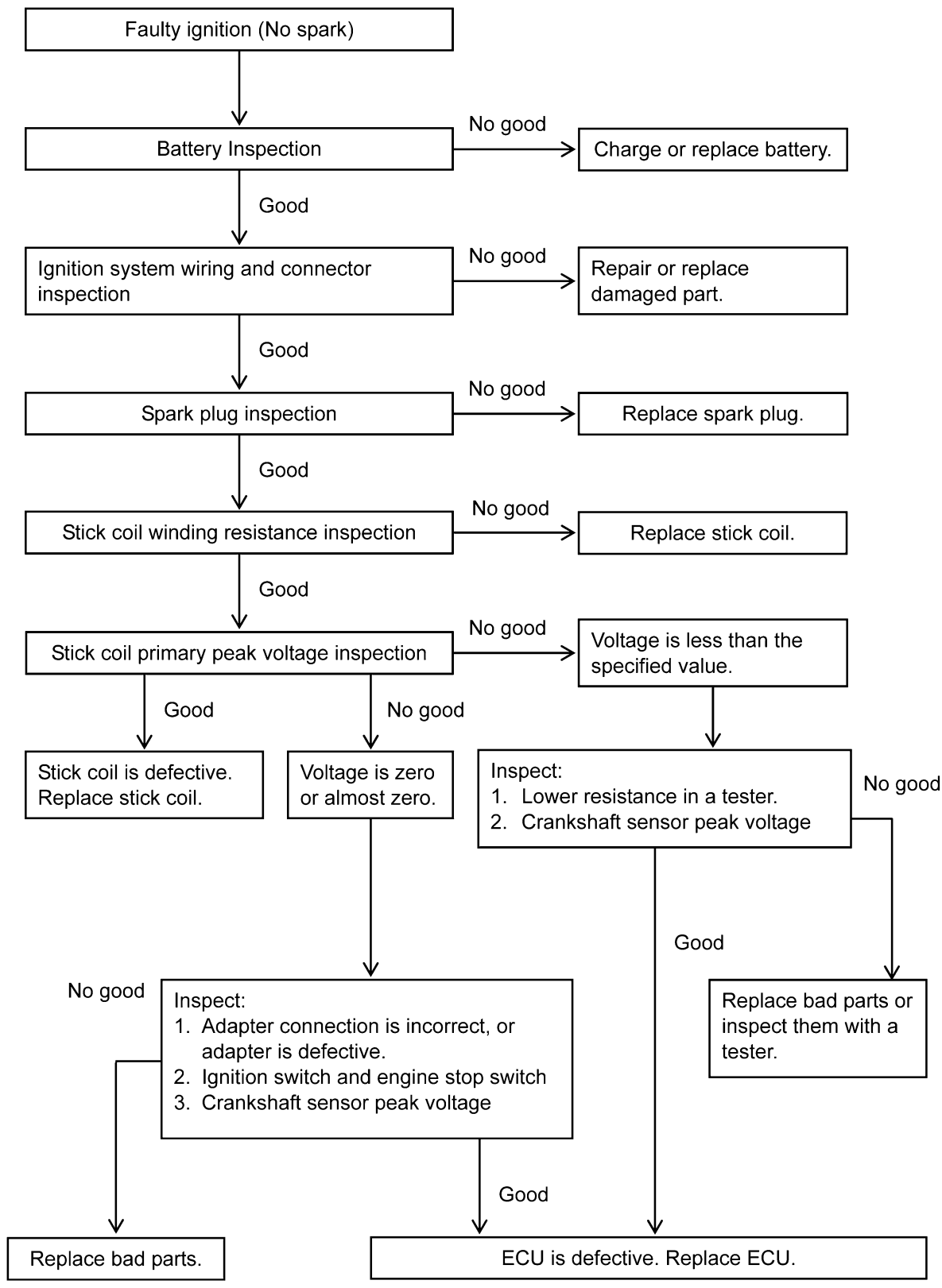
Ignition System Troubleshooting (see Ignition System section)

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



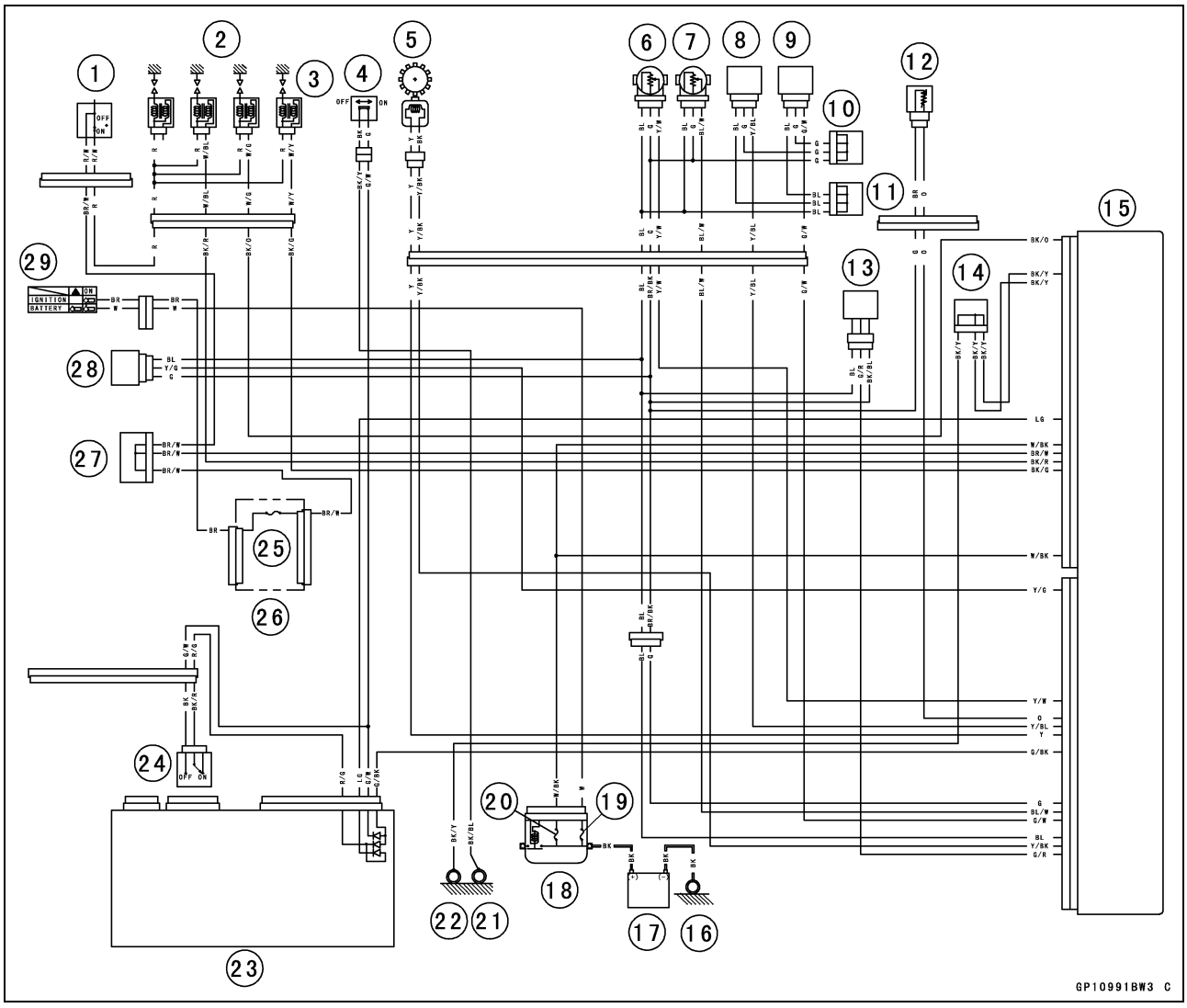
Ignition System

Ignition System Troubleshooting



Ignition System

Ignition System Circuit

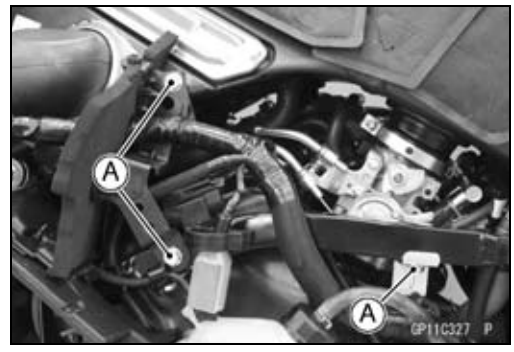


1. Engine Stop Switch
2. Spark Plugs
3. Stick Coils
4. Side Stand Switch
5. Crankshaft Sensor
6. Main Throttle Sensor
7. Subthrottle Sensor
8. Intake Air Pressure Sensor #1
9. Intake Air Pressure Sensor #2
10. Joint Connector I
11. Joint Connector J
12. Water Temperature Sensor
13. Gear Position Sensor
14. Joint Connector E
15. ECU
16. Frame Ground
17. Battery 12 V 12 Ah
18. Starter Relay
19. Main Fuse 30 A
20. ECU Fuse 15 A
21. Frame Ground (3)
22. Frame Ground (2)
23. Relay Box
24. Starter Lockout Switch
25. Ignition Fuse 15 A
26. Fuse Box (1)
27. Joint Connector F
28. Vehicle-down Sensor
29. Ignition Switch

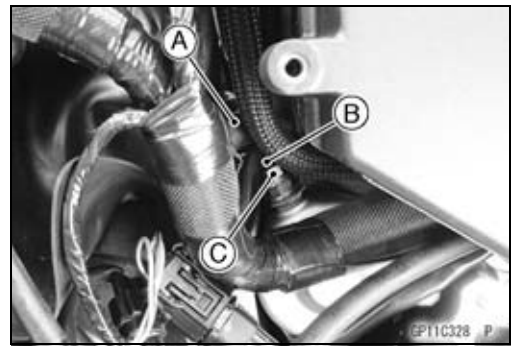
Electric Starter System

Starter Motor Removal

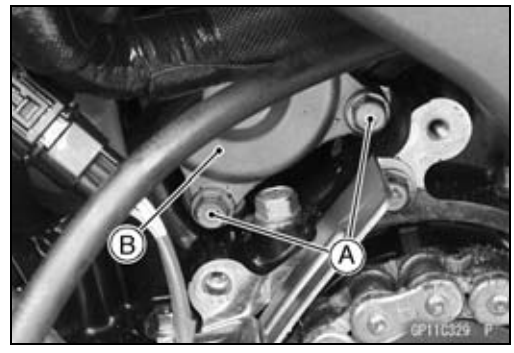
NOTICE
Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.



- Remove:
  Engine Sprocket Cover (see Engine Sprocket Removal in the Final Drive chapter)
  Left Middle Fairing (see Middle Fairing Removal in the Frame chapter)
  Bolts [A]
  Reserve Tank Bolts (see Coolant Change in the Periodic Maintenance chapter)



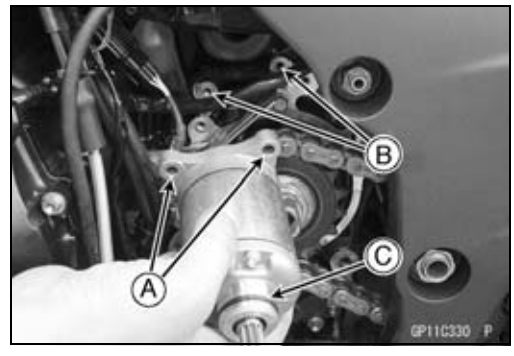
- Pull up the heat insulation rubber plate [A].
- Slide out the rubber cap [B].
- Remove the starter motor cable terminal nut [C].



- Remove the starter motor mounting bolts [A].
- Pull out the starter motor [B] from the left side.

Starter Motor Installation

NOTICE
Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.



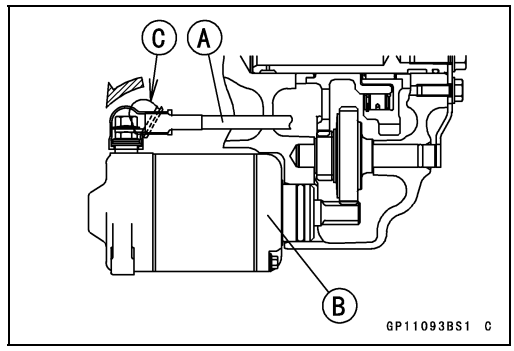
- Clean the starter motor legs [A] and crankcase [B] where the starter motor is grounded.
- Replace the O-ring [C] with a new one.
- Apply soap and water solution to the O-ring.
- Tighten:

Torque - Starter Motor Mounting Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Install the starter motor cable [A] side by side with starter motor [B].
- Tighten:

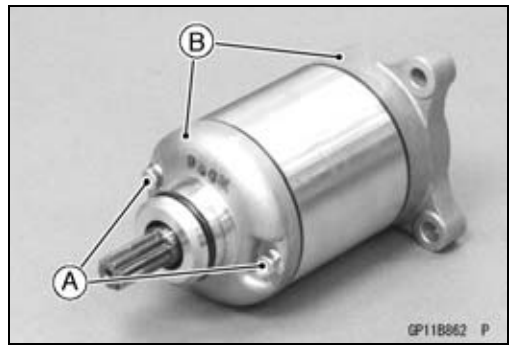
Torque - Starter Motor Cable Terminal Nut: 6.0 N·m (0.61 kgf·m, 53 in·lb)

- Slide back the rubber cap [C] to the original position.
- Install the removed parts (see appropriate chapters).

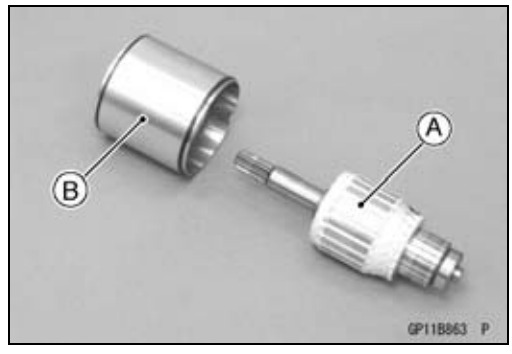


Starter Motor Disassembly

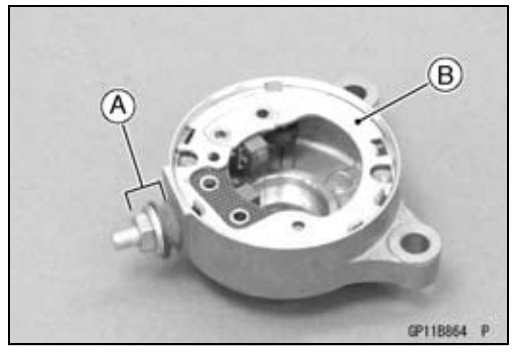
- Remove the starter motor (see Starter Motor Removal).
- Take off the starter motor through bolts [A] and remove the both end covers [B].



- Pull the armature [A] out of the yoke [B].

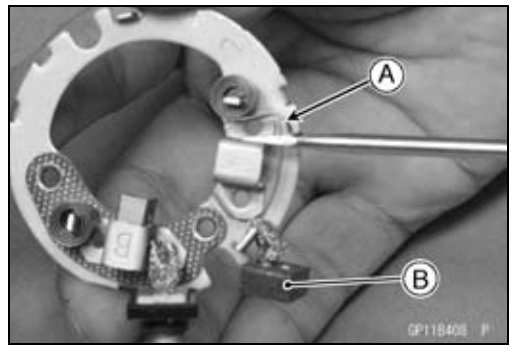


- Remove:
  Starter Motor Terminal Locknut, Washer and Insulators [A]
  Brush Plate Assembly [B]



Starter Motor Assembly

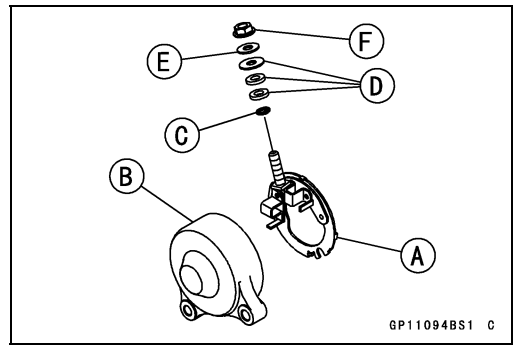
- Pry the spring end [A] and insert the brush [B].



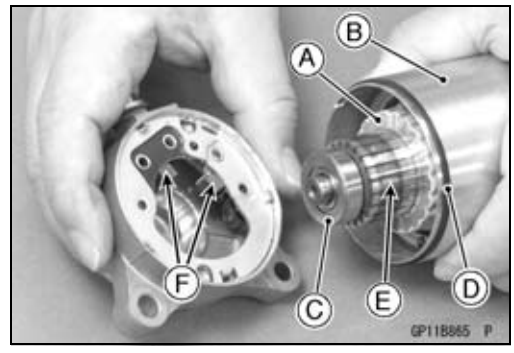
Electric Starter System

- 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:

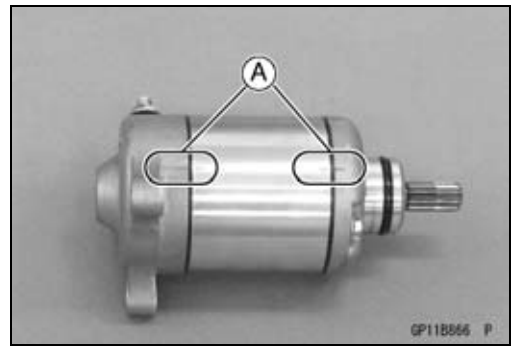
Torque - Starter Motor Terminal Locknut [F]: 6.9 N·m (0.70 kgf·m, 61 in·lb)



- Install the armature [A] into the yoke [B].
- Install the thrust washer [C].
- Replace the O-rings [D] with new ones.
- Put the commutator [E] among the brushes [F].

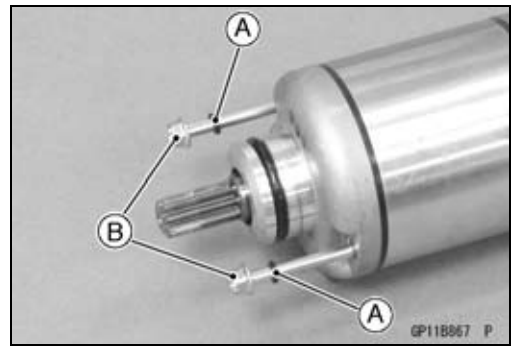


- Align the marks [A] to assemble the yoke and the end covers.

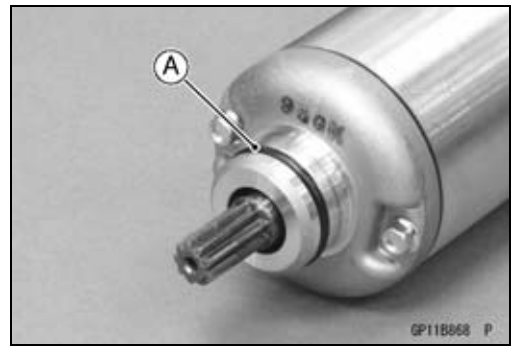


- Replace the O-rings [A] with new ones.
- Tighten:

Torque - Starter Motor Through Bolts [B]: 3.4 N·m (0.35 kgf·m, 30 in·lb)



- Replace the O-ring [A] with a new one.
- Apply soap and water solution to the new O-ring.



Electric Starter System

Brush Inspection

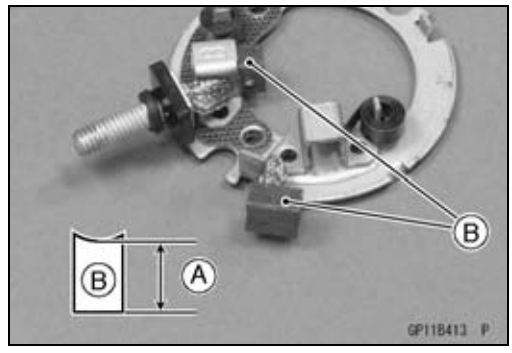
● Measure the length [A] of each brush [B].

★If any is worn down to the service limit, replace the brush holder assembly.

Starter Motor Brush Length

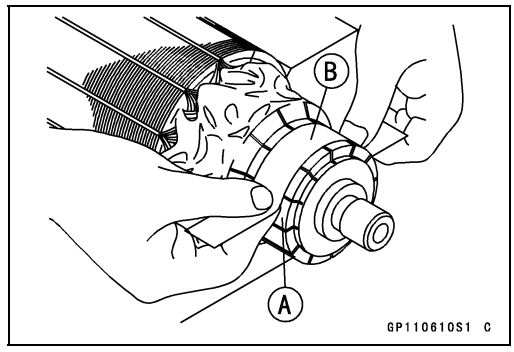
Standard: 10 mm (0.39 in.)

Service Limit: 5.0 mm (0.20 in.)



Commutator Cleaning and Inspection

● Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.



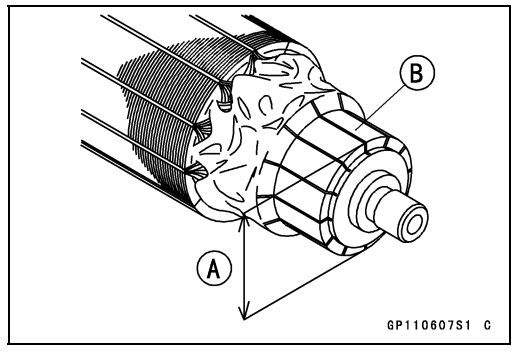
● Measure the diameter [A] of the commutator [B].

★If the commutator diameter is less than the service limit, replace the starter motor with a new one.

Commutator Diameter

Standard: 28 mm (1.10 in.)

Service Limit: 27 mm (1.06 in.)



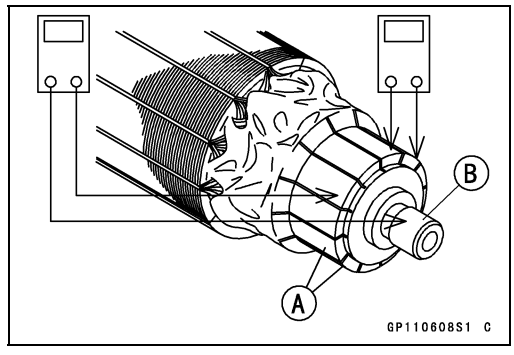
Armature Inspection

● Using a tester, measure the resistance between any two commutator segments [A].

★If there is a high resistance or no reading (∞) between any two segments, a winding is open and the starter motor must be replaced.

● Using the tester, measure the resistance between the segments and the shaft [B].

★If there is any reading at all, the armature has a short and the starter motor must be replaced.

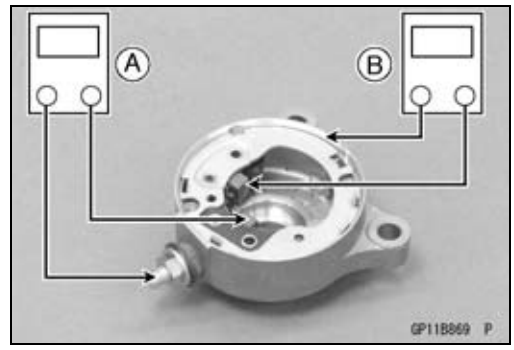


NOTE

○*Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with the 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

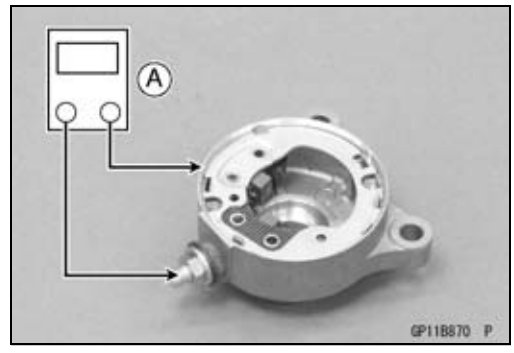
Brush Lead Inspection



- Using a tester, measure the resistance as shown.
  Terminal Bolt and Positive Brush [A]
  Right-hand End Cover and Negative Brush [B]

★If there is not close to zero ohms, the brush lead has an open. Replace the brush holder assembly.

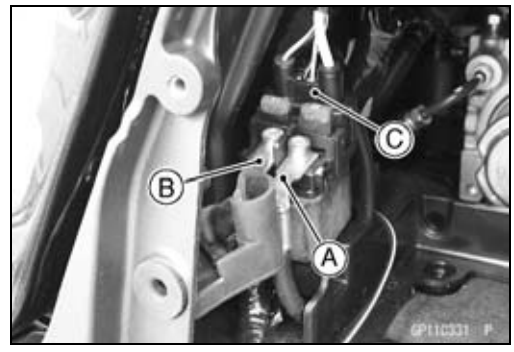
Right-hand End Cover Assembly Inspection



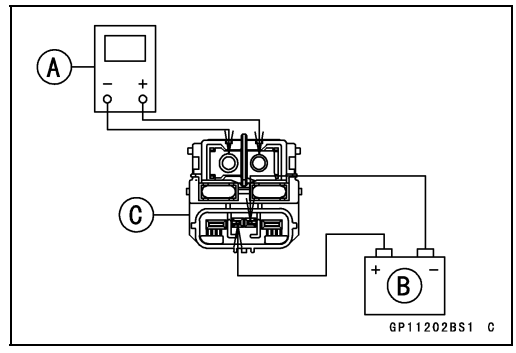
- Using a tester, measure the resistance as shown.
  Terminal and Right-hand End Cover [A]

★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 a tester [A] and 12 V battery [B] to the starter relay [C] as shown.

★If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

Criteria: **When battery is connected → 0 Ω**
When battery is disconnected → ∞ Ω

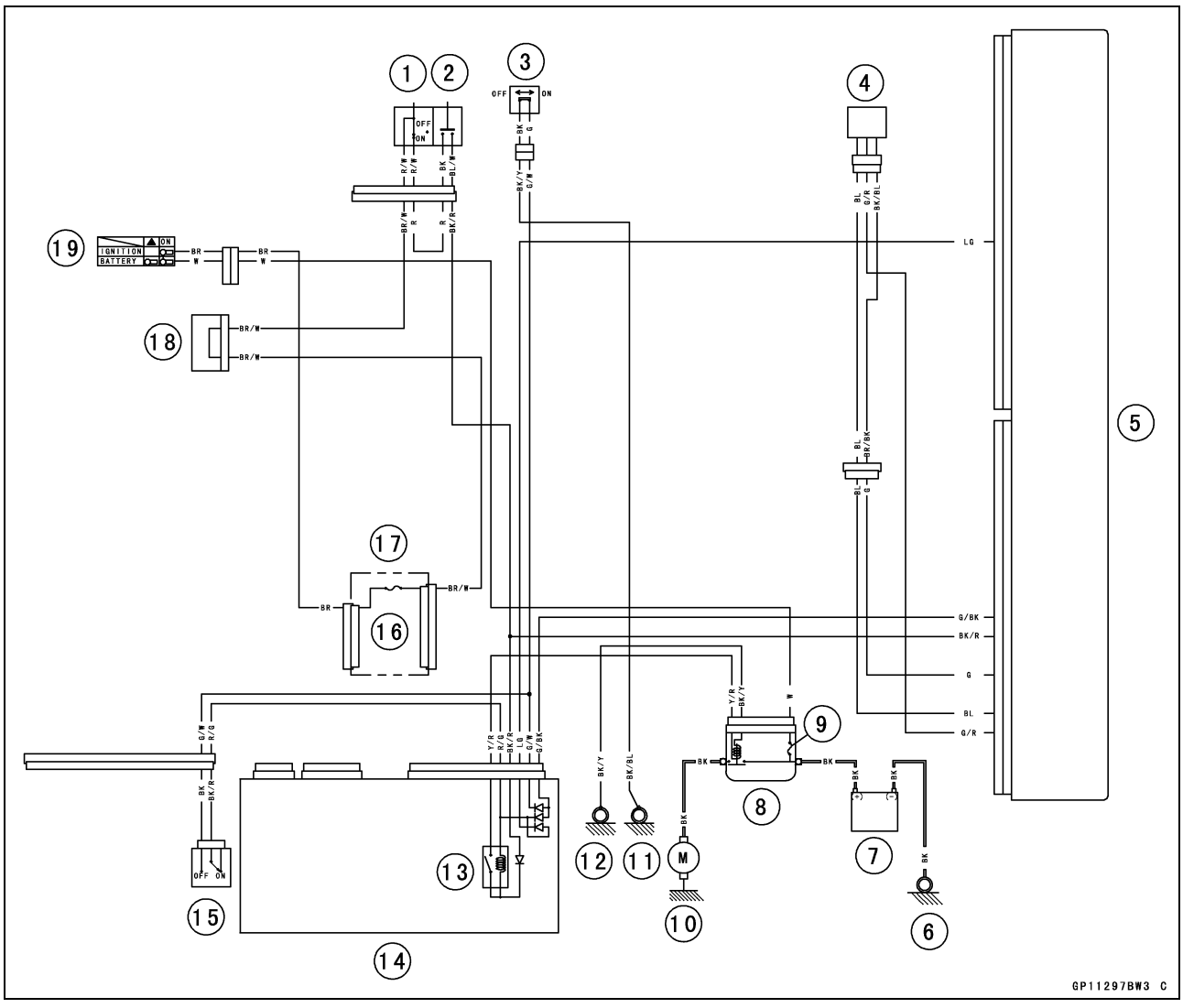
- Tighten:

Torque - Starter Relay Terminal Bolts: 4.5 N·m (0.46 kgf·m, 40 in·lb)

- Install the removed parts (see appropriate chapters).

Electric Starter System

Electric Starter Circuit



1. Engine Stop Switch
2. Starter Button
3. Side Stand Switch
4. Gear Position Sensor
5. ECU
6. Frame Ground
7. Battery 12 V 12 Ah
8. Starter Relay
9. Main Fuse 30 A
10. Starter Motor
11. Frame Ground (3)
12. Frame Ground (4)
13. Starter Circuit Relay
14. Relay Box
15. Starter Lockout Switch
16. Ignition Fuse 15 A
17. Fuse Box (1)
18. Joint Connector F
19. Ignition Switch

Lighting System

This motorcycle adopt the daylight system and have a headlight circuit relay in the relay box. The headlight does not go on when the ignition switch and the engine stop switch are first turned on. The headlight comes on after the starter button is released and stays on until the ignition switch is turned off. The headlight will go out momentarily whenever the starter button is pressed and come back on when the button is released.

Headlight Beam Horizontal Adjustment

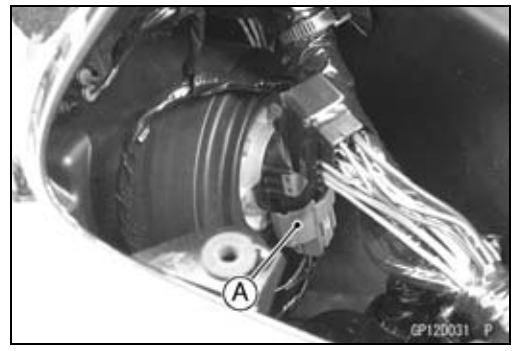
- Refer to the Headlight Aiming Inspection in the Periodic Maintenance chapter.

Headlight Beam Vertical Adjustment

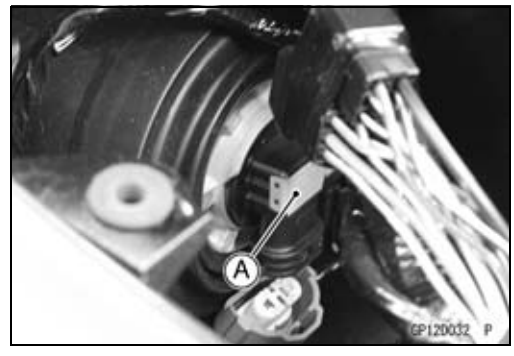
- Refer to the Headlight Aiming Inspection in the Periodic Maintenance chapter.

Headlight Bulb Replacement

- Remove the inner covers (see Inner Cover Removal in the Frame chapter).
- Disconnect the headlight connector [A].



- Turn the headlight bulb [A] counterclockwise and pull out the bulb from the headlight.

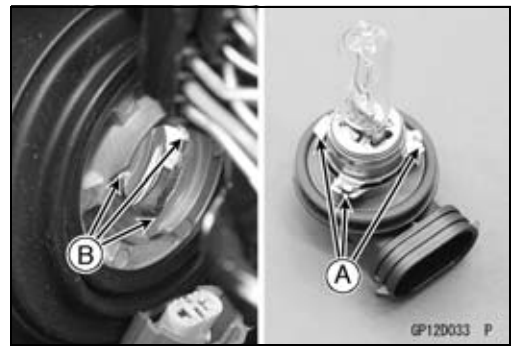


NOTICE
When handling the quartz-halogen bulb, never touch the glass portion with bare hands. Always use a clean cloth. Oil contamination from hands or dirty rags can reduce bulb life or cause the bulb to explode.

NOTE

○*Clean 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.



- Turn the headlight bulb clockwise.
- Connect the headlight connector.
- After installation, adjust the headlight aim (see Headlight Aiming Inspection in the Periodic Maintenance chapter).

○Other Bulbs: Repeat the above steps.

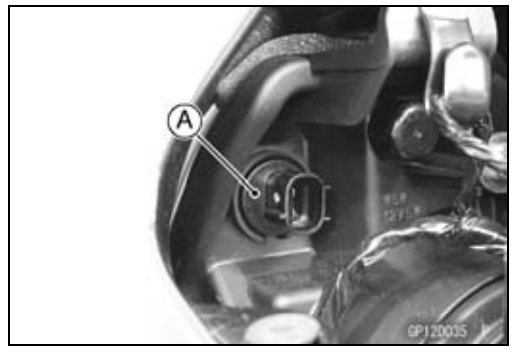
Lighting System

City Light Bulb Replacement

- Remove the inner covers (see Inner Cover Removal in the Frame chapter).
- Disconnect the city light connector [A].

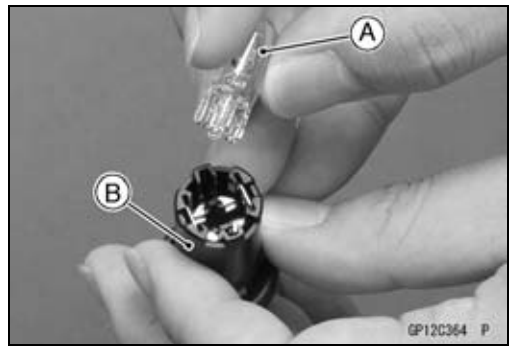


- Turn the city light bulb counterclockwise and pull out the socket [A] together with the bulb.



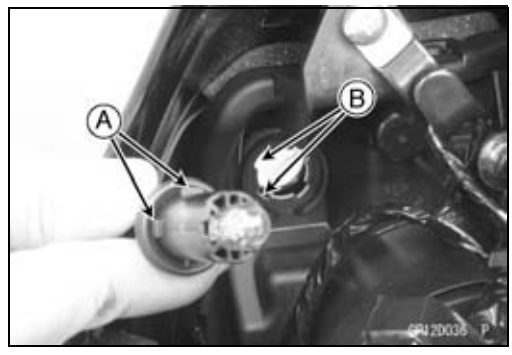
- Pull out the bulb [A] straight from the socket [B].

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.



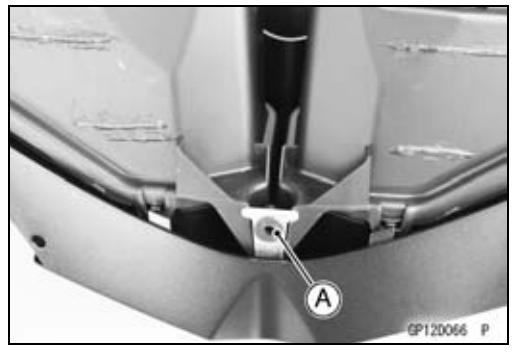
- Replace the bulb with a new one.

- Insert the socket to the headlight.
  - ○Align the projections [A] of the socket and the grooves [B] of the headlight.
- Turn the city light bulb clockwise.
- Connect the city light connector.



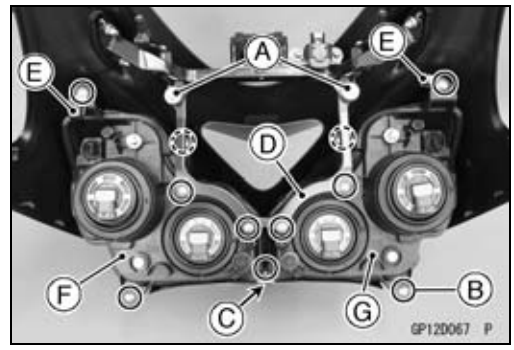
Headlight Removal

- Remove:
  Upper Fairing (see Upper Fairing Removal in the Frame chapter)
  Wellnut [A]



Lighting System

- Remove:
  Headlight Bracket Bolts [A]
  Headlight Mounting Screws [B]
  Bracket [C]
  Headlight Bracket [D]
  Clamps [E]
  Left Headlight [F]
  Right Headlight [G]



Headlight Installation

- Installation is the reverse of removal.
- Install the left headlight first, and then the right headlight.

Torque - Headlight Mounting Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)
Headlight Bracket Bolts: 8.0 N·m (0.82 kgf·m, 71 in·lb)

Headlight Relay Inspection

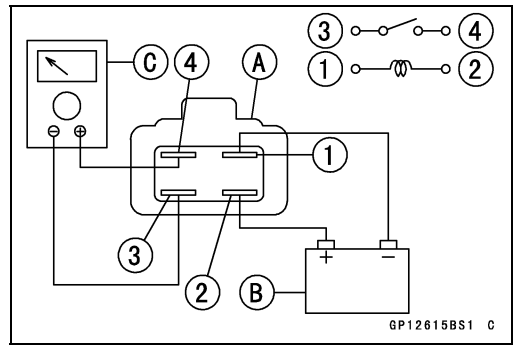
- Remove the inner covers (see Inner Cover Removal in the Frame chapter).
- Take off the headlight relay [A] on both sides.



- Connect a tester and make the measurements shown.
  Headlight Relay [A]
  12 V Battery [B]
  Tester [C]

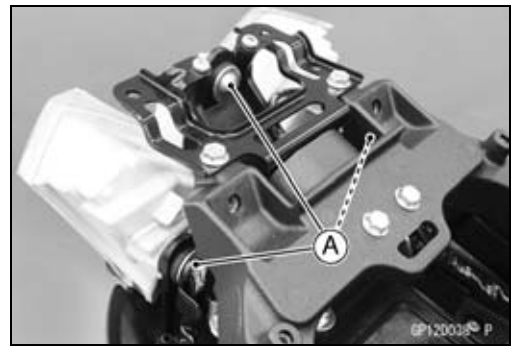
★If the tester readings are not as specified, replace the headlight relay.

Testing Relay
Criteria: When battery is connected → 0 Ω
When battery is disconnected → ∞ Ω

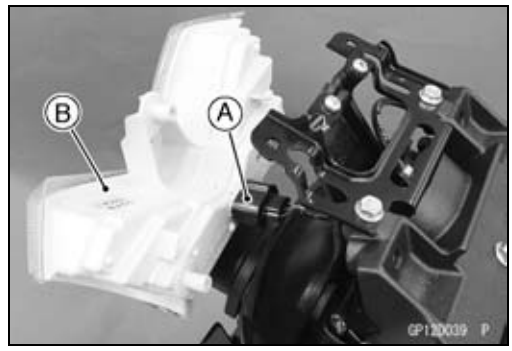


Tail/Brake Light (LED) Removal

- Remove:
  ECU (see ECU Removal in the Fuel System (DFI) chapter)
  Seat Covers (see Seat Cover Removal in the Frame chapter)
  Tail/Brake Light Mounting Screws [A] with Washers



- Disconnect the connector [A].
- Remove the tail/brake light [B].

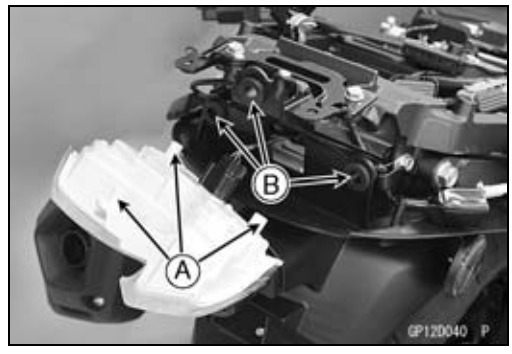


Tail/Brake Light (LED) Installation

- Connect the connector.
- Insert the projections [A] of the tail/brake light into the grommets [B] of the rear fender.
- Tighten:

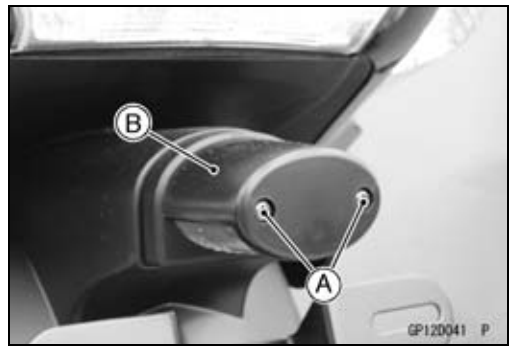
Torque - Tail/Brake Light Mounting Screws: 1.2 N·m (0.12 kgf·m, 11 in·lb)

- Install the removed parts (see appropriate chapters).



License Plate Light Bulb Replacement

- Remove:
  License Plate Light Cover Mounting Screws [A]
  License Plate Light Cover [B]



- Push and turn the bulb [A] counterclockwise and remove it.
- Replace the bulb with a new one.

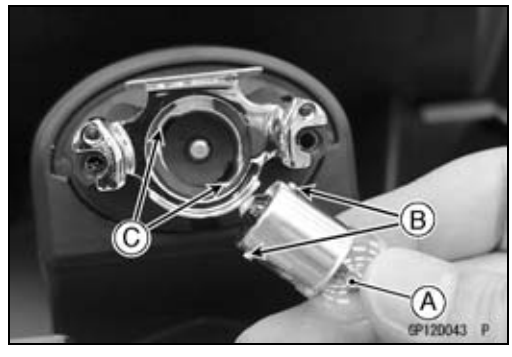


- Insert the new bulb [A] by aligning its upper and lower pins [B] with the upper and lower grooves [C] in the socket, and turn the bulb clockwise.

○Turn the bulb about 15°.

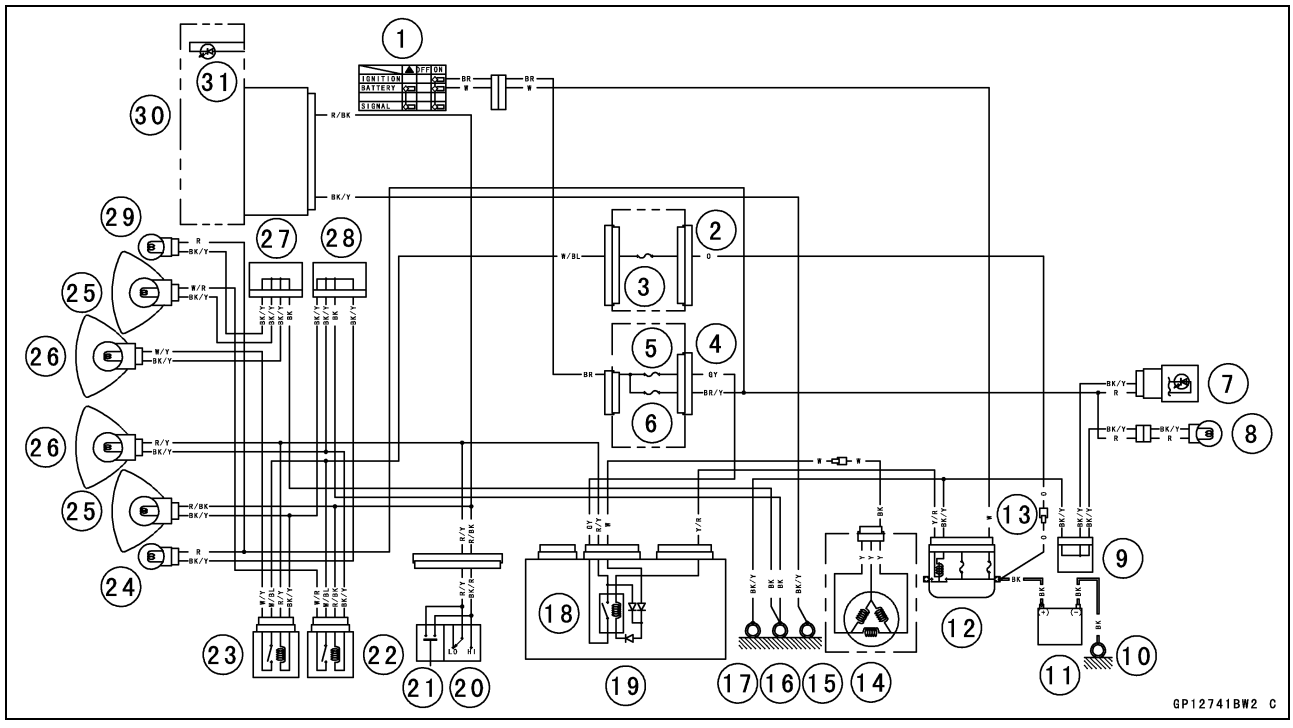
- Tighten:

Torque - License Plate Light Cover Mounting Screws: 0.90 N·m (0.09 kgf·m, 8 in·lb)



Lighting System

Headlight/Tail Light Circuit

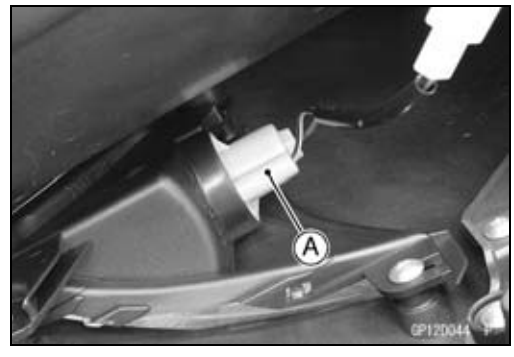


1. Ignition Switch
2. Fuse Box (2)
3. Headlight Relay Fuse 15 A
4. Fuse Box (1)
5. Headlight Relay Fuse 15 A
6. Turn Signal Relay Fuse 10 A
7. Tail/Brake Light (LED)
8. License Plate Light
9. Joint Connector B
10. Frame Ground
11. Battery 12 V 12 Ah
12. Starter Relay
13. Main Fuse 30 A
14. Alternator
15. Frame Ground (2)
16. Frame Ground (1)
17. Frame Ground (4)
18. Headlight Circuit Relay
19. Relay Box
20. Dimmer Switch
21. Passing Button
22. Headlight Relay (HI)
23. Headlight Relay (LO)
24. Left City Light
25. Headlights (High Beam)
26. Headlights (Low Beam)
27. Joint Connector G
28. Joint Connector A
29. Right City Light
30. Meter Unit
31. Blue High Beam Indicator Light (LED)

Turn Signal Light Bulb Replacement

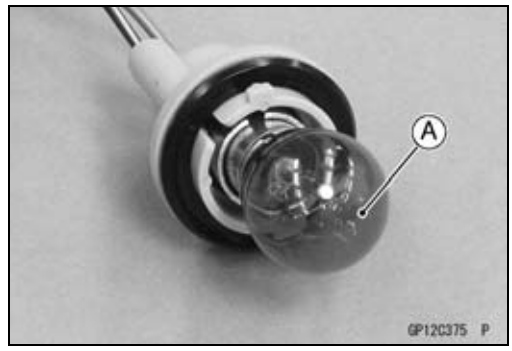
Front Turn Signal Light

- Remove:
  Middle Fairings (see Middle Fairing Removal in the Frame chapter)
- For the right middle fairing (other than US, CA, AU, ID, PH and SEA-B3 model), remove the canister (see Evaporative Emission Control System Inspection (Other than US, CA, AU, ID, PH and SEA-B3 Models) in the Periodic Maintenance chapter).
- Turn the socket [A] counterclockwise and pull out the socket together with the bulb.



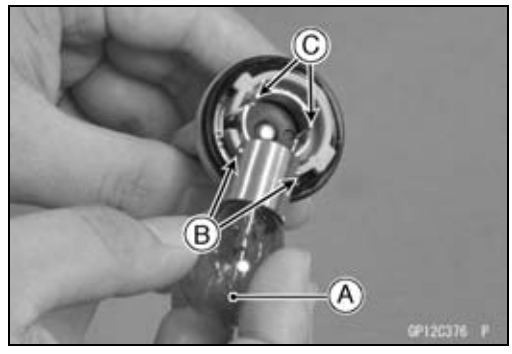
Lighting System

- Push and turn the front turn signal light bulb [A] counterclockwise and remove it.
- Replace the bulb with new ones.



- 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.

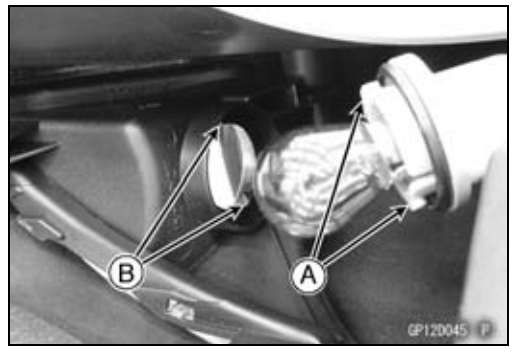
○Turn the bulb about 15°.



- Pushing the socket and turn it clockwise.

○Fit the projections [A] of the socket into the grooves [B] of the turn signal light.

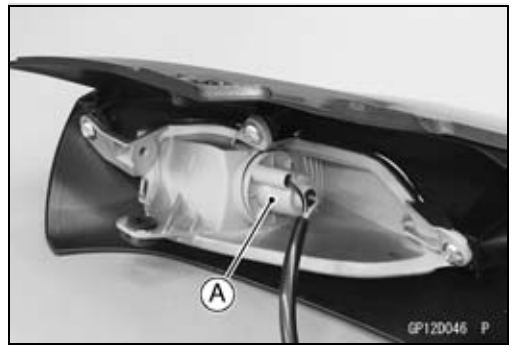
- Install the removed parts (see appropriate chapters).



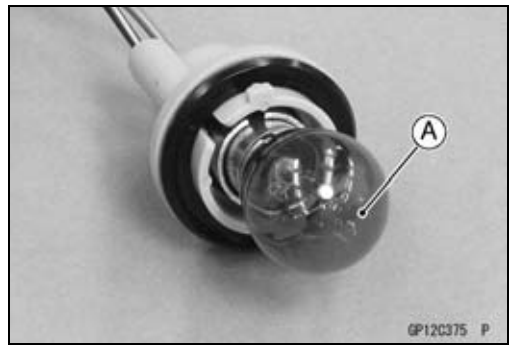
Rear Turn Signal Light

- Remove:
  Seat Covers (see Seat Cover Removal in the Frame chapter)

○Turn the socket [A] counterclockwise and pull out the socket together with the bulb.

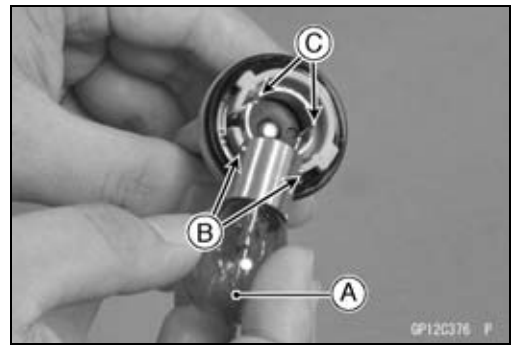


- Push and turn the front turn signal light bulb [A] counterclockwise and remove it.
- Replace the bulb with new ones.

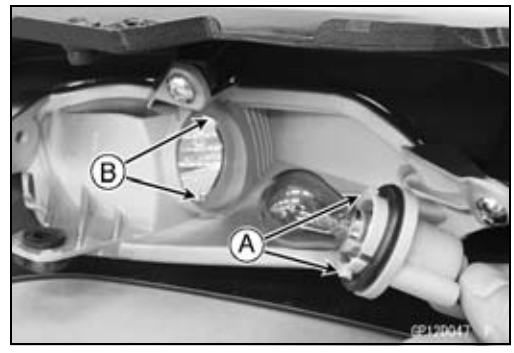


Lighting System

● 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.
○Turn the bulb about 15°.

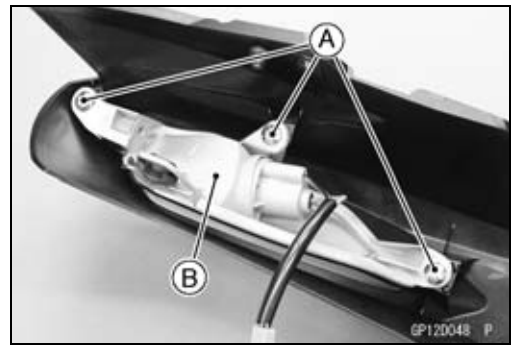


● Pushing the socket and turn it clockwise.
○Fit the projections [A] of the socket into the grooves [B] of the turn signal light.
● Install the removed parts (see appropriate chapters).

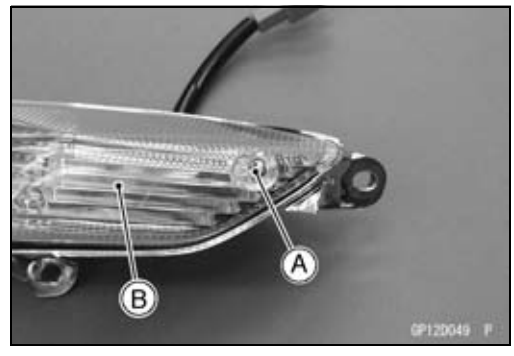


Rear Turn Signal Light Disassembly

● Remove:
Seat Covers (see Seat Cover Removal in the Frame chapter)
Screws [A]
● Pull out the rear turn signal light [B] from the seat cover.

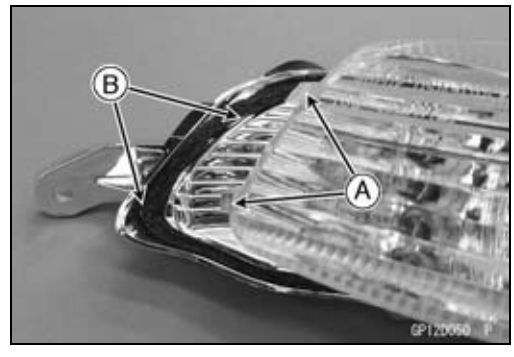


● Remove:
Screw [A]
Rear Turn Signal Light Lens [B]



Rear Turn Signal Light Assembly

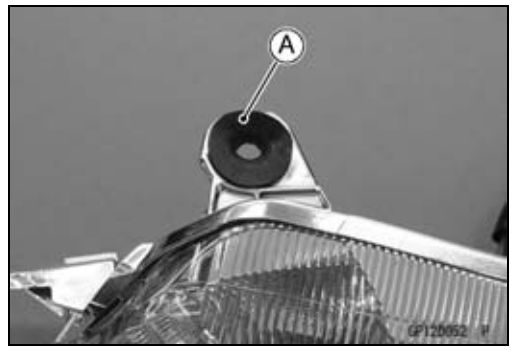
● Fit the projections [A] of the lens into the grooves [B] of the turn signal light.



- Check that the gasket fits into the groove.
- Tighten the screw [A] .

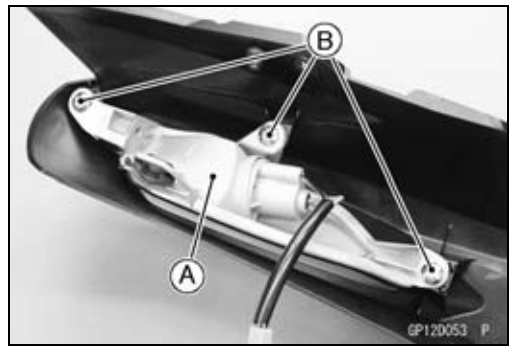


- When installing the grommet [A], face the large diameter side toward rear fender.



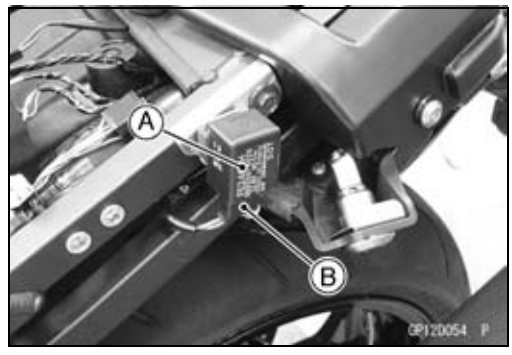
- Install the rear turn signal light [A].
- Tighten:

Torque - Rear Turn Signal Light Mounting Screws [B]: 0.50 N·m (0.05 kgf·m, 4.4 in·lb)



Turn Signal Relay Inspection

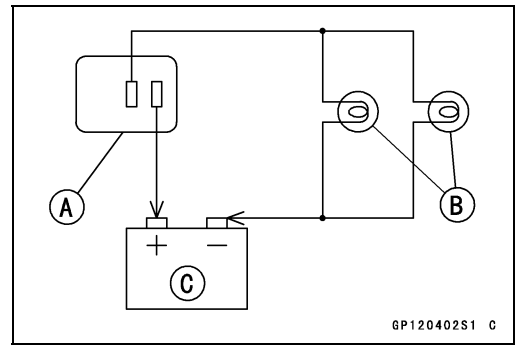
- Remove:
  Left Seat Cover (see Seat Cover Removal in the Frame chapter)
  Turn Signal Relay [A]
- Disconnect the connector [B].



Lighting System

- Connect one 12 V battery and turn signal lights as indicated, and count how may times the lights flash for one minute.
  Turn Signal Relay [A]
  Turn Signal Lights [B]
  12 V Battery [C]

★If the lights do not flash as specified, replace the turn signal relay.



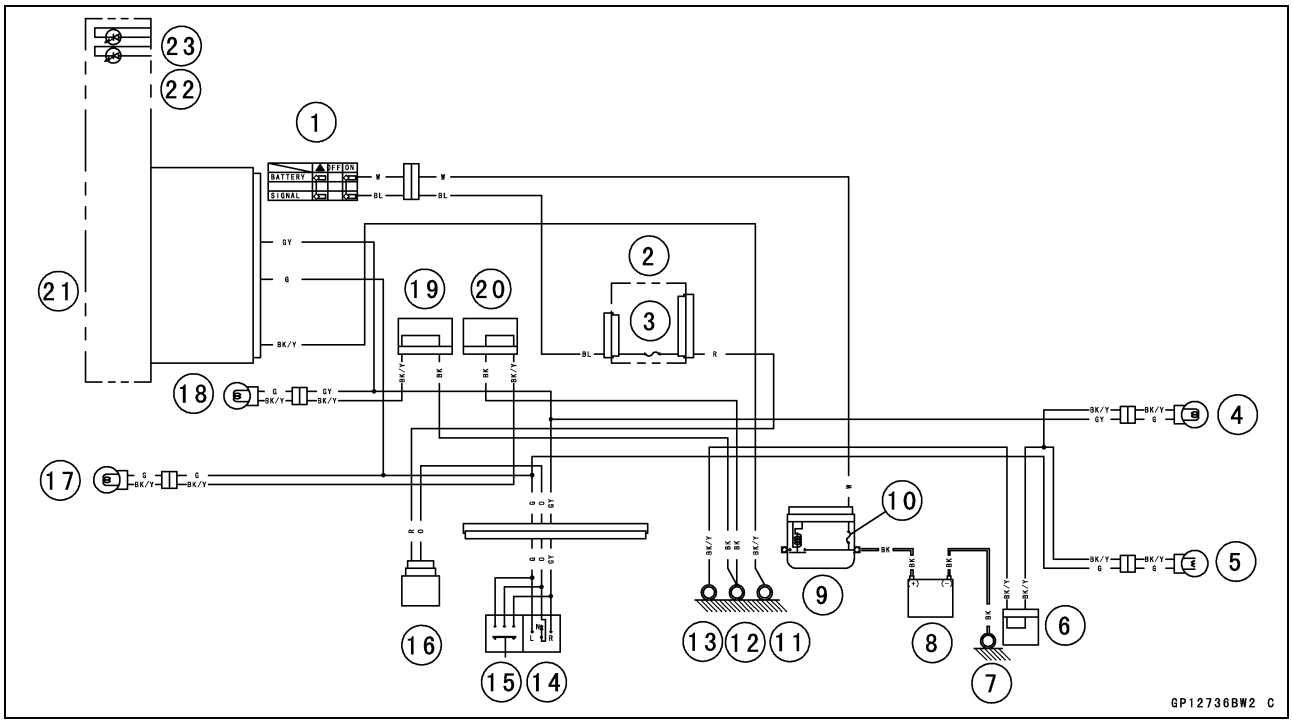
Testing Turn Signal Relay

Load		Flashing Times (c/m*)
The Number of Turn Signal Lights	Wattage (W)	
1**	21 or 23	140 ~ 250
2	42 or 46	75 ~ 95

*: Cycle(s) per minute
**: Corrected to “one light burned out.”

Lighting System

Turn Signal Light Circuit



1. Ignition Switch
2. Fuse Box (1)
3. Turn Signal Relay Fuse 10 A
4. Rear Right Turn Signal Light
5. Rear Left Turn Signal Light
6. Joint Connector B
7. Frame Ground
8. Battery 12 V 12 Ah
9. Starter Relay
10. Main Fuse 30 A
11. Frame Ground (2)
12. Frame Ground (1)
13. Frame Ground (4)
14. Turn Signal Switch
15. Hazard Button
16. Turn Signal Relay
17. Front Left Turn Signal Light
18. Front Right Turn Signal Light
19. Joint Connector G
20. Joint Connector A
21. Meter Unit
22. Green Right Turn Signal Indicator Light (LED)
23. Green Left Turn Signal Indicator Light (LED)

Air Switching Valve

Air Switching Valve Operation Test

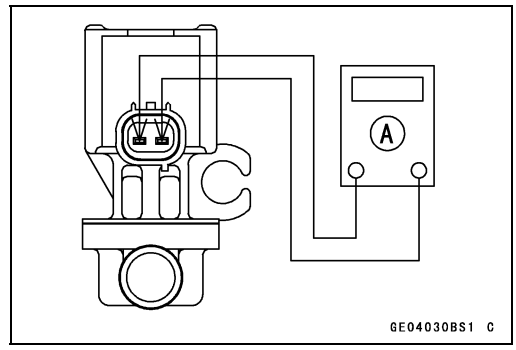
- Refer to the Air Suction System Damage Inspection in the Periodic Maintenance chapter.

Air Switching Valve Unit Test

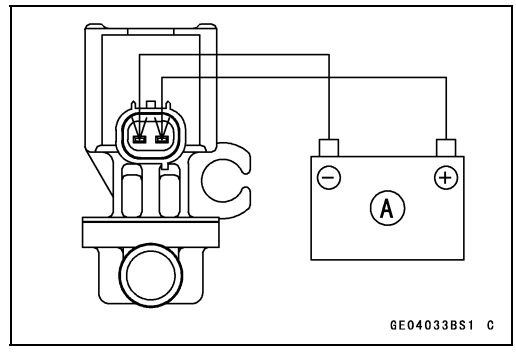
- Remove the air switching valve (see Air Switching Valve Removal in the Engine Top End chapter).
- Connect a digital meter [A] to the air switching valve terminals as shown.

Air Switching Valve Resistance
Standard: 20 ~ 24 Ω @20°C (68°F)

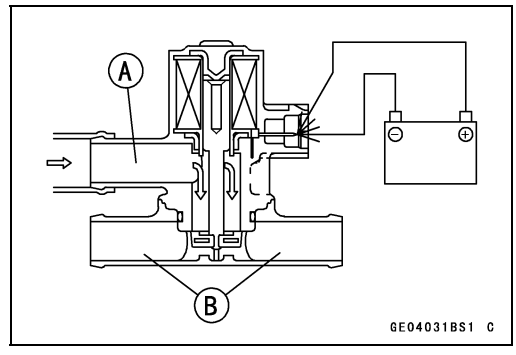
★If the resistance reading is except the specified value, replace it with a new one.



- Connect the 12 V battery [A] to the air switching valve terminals as shown.



- Blow the air to the intake air duct [A], and make sure does not flow the blown air from the outlet air ducts [B].

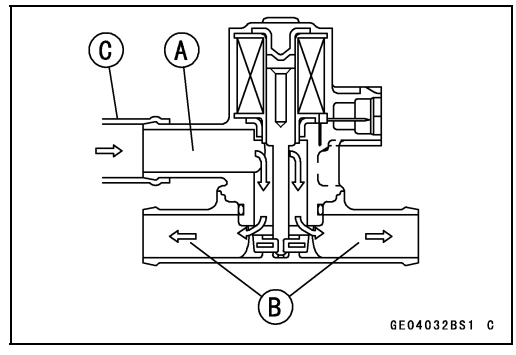


- Disconnect the 12 V battery.
- Blow the air to the intake air duct [A] again, and make sure flow the blown air from the outlet air ducts [B].

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

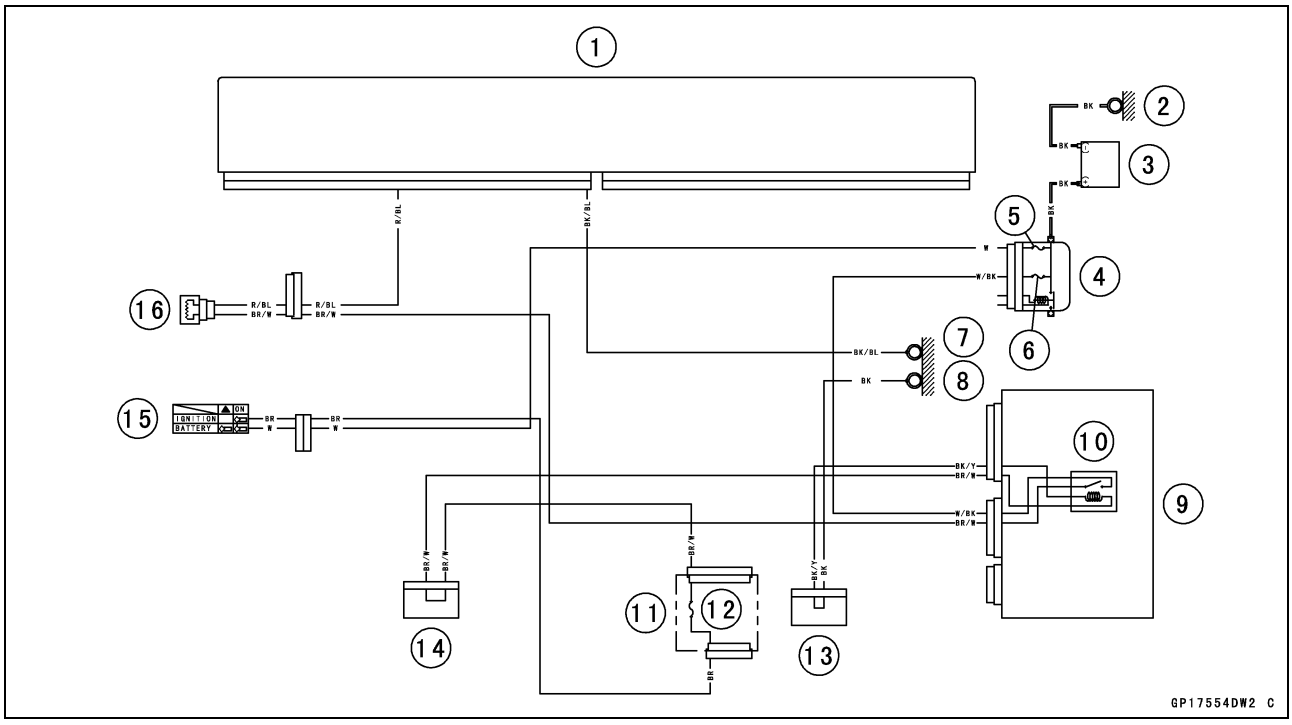
NOTE

○*To check air flow through the air switching valve, just blow through the air switching valve hose (intake side) [C].*



Air Switching Valve

Air Switching Valve Circuit

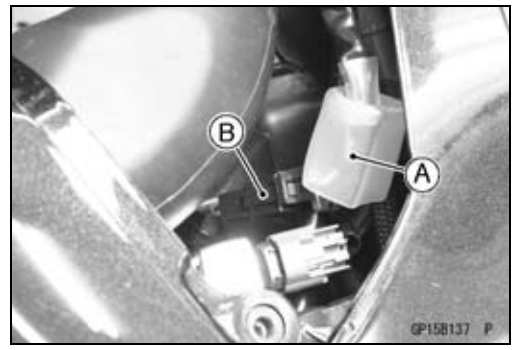


1. ECU
2. Frame Ground
3. Battery 12 V 12 Ah
4. Starter Relay
5. Main Fuse 30 A
6. ECU Fuse 15 A
7. Frame Ground (2)
8. Frame Ground (1)
9. Relay Box
10. ECU Main Relay
11. Fuse Box (1)
12. Ignition Fuse 15 A
13. Joint Connector A
14. Joint Connector F
15. Ignition Switch
16. Air Switching Valve

Radiator Fan System

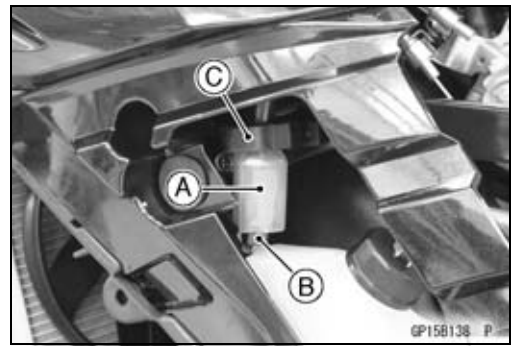
Fan Motor Inspection

- Remove the right inner cover (see Inner Cover Removal in the Frame chapter).
- Slide the rubber boot [A] and disconnect the right radiator fan motor lead connector [B].

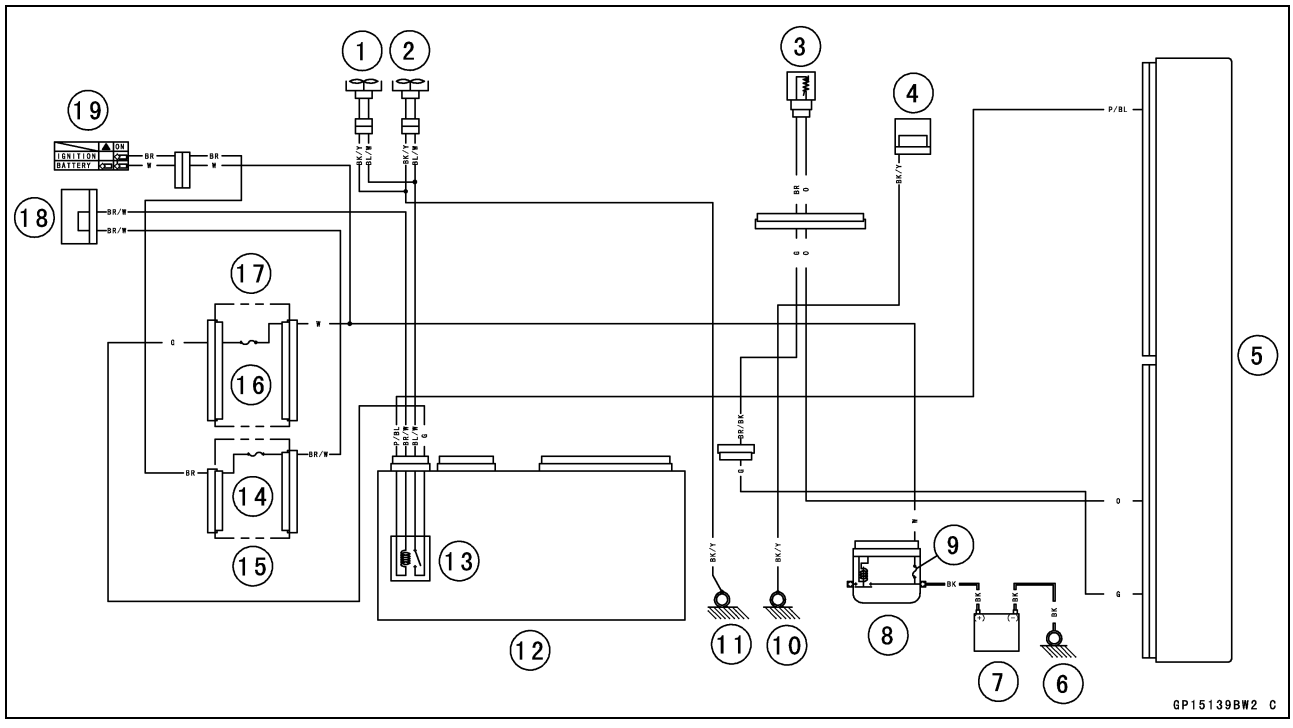


- Remove the left fairing cover (see Fairing Cover Removal in the Frame chapter).
- Slide the rubber boot [A] and disconnect the left radiator fan motor lead connector [B].
- Open the clamp [C] if necessary.
- Using an auxiliary leads, supply battery power to the fan motor.

★If the fan does not rotate, the fan motor is defective and must be replaced.



Radiator Fan Circuit



1. Fan Motor (2)
2. Fan Motor (1)
3. Water Temperature Sensor
4. Joint Connector E
5. ECU
6. Frame Ground
7. Battery 12 V 12 Ah
8. Starter Relay
9. Main Fuse 30 A
10. Frame Ground (2)
11. Frame Ground (4)
12. Relay Box
13. Radiator Fan Relay
14. Ignition Fuse 15 A
15. Fuse Box (1)
16. Fan Fuse 15 A
17. Fuse Box (2)
18. Joint Connector F
19. Ignition Switch

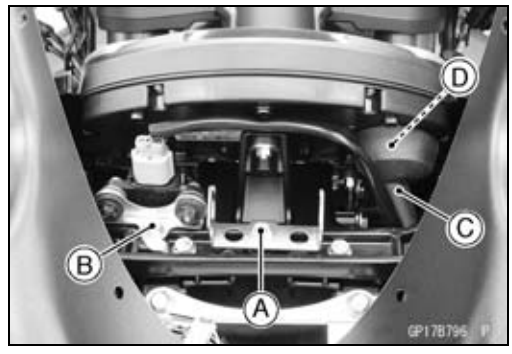
Meter, Gauge, Indicator Unit

Meter Unit Removal

- Remove:
  Inner Covers (see Inner Cover Removal in the Frame chapter)
  Meter Cover (see Meter Cover Removal in the Frame chapter)
  Immobilizer Amplifier [A] (Equipped Models)



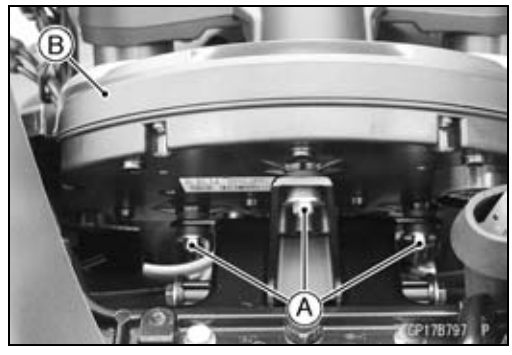
- Remove:
  Immobilizer Amplifier Bracket Bolt [A] and Bracket (Equipped Models)
  Vehicle-down Sensor Bracket Bolt [B] and Bracket
- Slide the dust cover [C] and disconnect the meter lead connector [D].



- Remove:
  Meter Unit Mounting Nuts [A] and Washers
  Meter Unit [B]

NOTICE

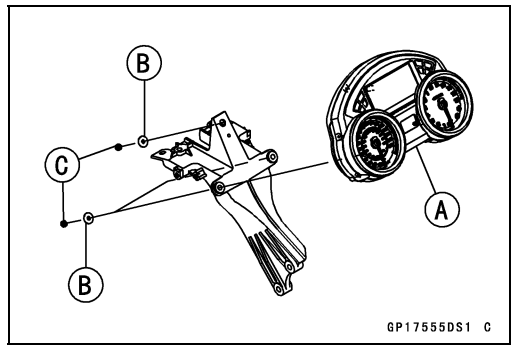
Do not drop the meter unit. Place the meter unit so that it faces upward. If the meter unit is left upside down or sideways for a long time or dropped, it will malfunction.



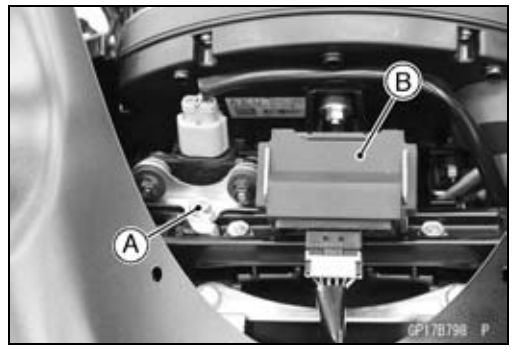
Meter Unit Installation

- Install:
  Meter Unit [A]
  Washers [B] and Meter Unit Mounting Nuts [C]

  Torque - Meter Unit Mounting Nuts: 4.5 N·m (0.46 kgf·m, 40 in·lb)



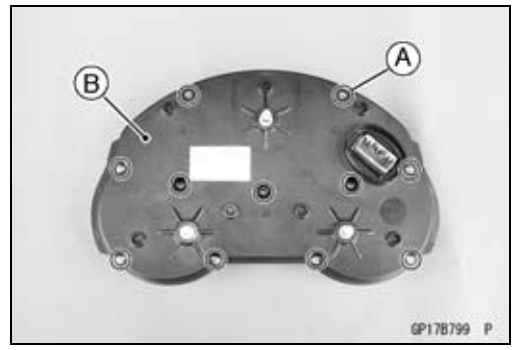
- Connect the meter lead connector.
- Install:
  Vehicle-down Sensor Bracket and Bolt [A]
  Immobilizer Amplifier Bracket and Bolt (Equipped Models)
  Immobilizer Amplifier [B] (Equipped Models)
- Install the removed parts (see appropriate chapters).



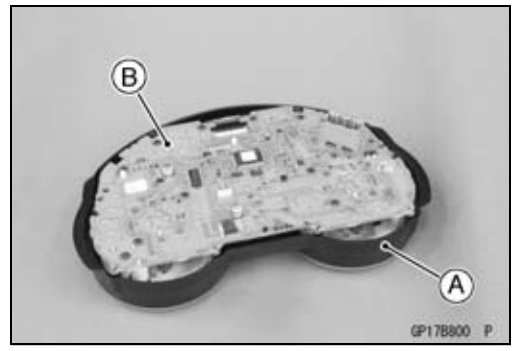
Meter, Gauge, Indicator Unit

Meter Unit Disassembly

● Remove:
Meter Unit (see Meter Unit Removal)
Screws [A]
Lower Meter Cover [B]



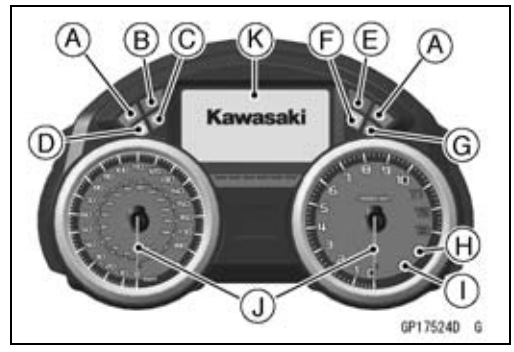
● Separate:
Upper Meter Cover [A]
Meter Assembly [B]



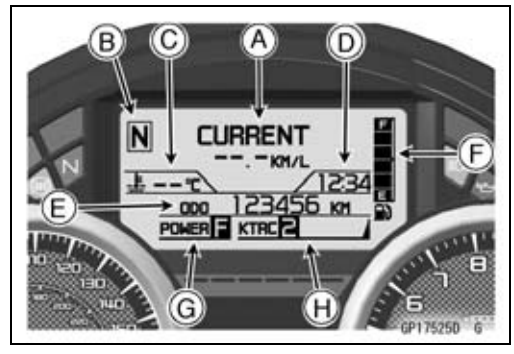
Meter Operation Inspection

Check 1-1: Meter Unit Primary Operation Check

● Turn the ignition switch on.
● Check that the following items.
○The following indicator lights (LED) blink two times.
Green Turn Signal Indicator Lights (LED) [A]
Red Warning Indicator Light (LED) [B]
Green Neutral Indicator Light (LED) [C]
Yellow ABS Indicator Light (LED) [D]
Yellow Engage/Shift Up Indicator Light (LED) [E]
Blue High Beam Indicator Light (LED) [F]
Red Oil Pressure Warning Indicator Light (LED) [G]
○The yellow KTRC warning indicator light (LED) [H] goes on for one second.
○The yellow engine warning indicator light (LED) [I] goes on.
○The speedometer and tachometer needles [J] momentarily point their last readings and back to the minimum position.
○The animation and Kawasaki mark [K] appears in the display for 4.5 seconds.



○After the Kawasaki mark appeared, the ordinary indication [A] (Example: CURRENT --.- KM/L), gear position [B] (Example: N), water temperature [C], clock [D], odometer [E] or trip meter, fuel level gauge [F], power mode indicator [G] (Example: F) and KTRC mode indicator [H] (Example: 2) appear in the display.
★If the meter unit does not work, replace the meter unit.



Meter, Gauge, Indicator Unit

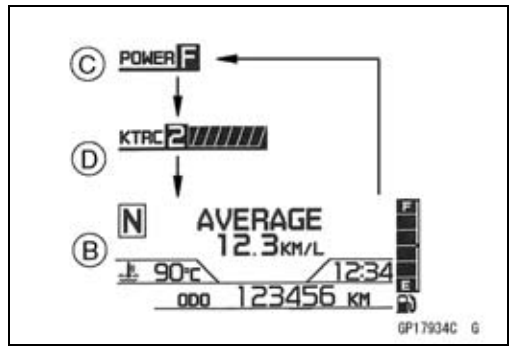
Check 1-2: Left Switch Housing Switching Inspection

- Turn the ignition switch on.
- By pushing the “SEL” button [A] each time, check that the display selects main display [B], power mode [C] and KTRC mode [D].

★If the display does not work, check the following parts.
Left Switch Housing (see Switch Inspection)
Wiring (see Meter Unit Circuit)

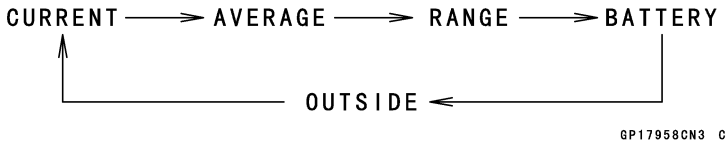
★If the above parts are good, replace the meter unit.





- Select the main display.
- By pushing the upper button [A] each time, check that the display [B] changes as follows.

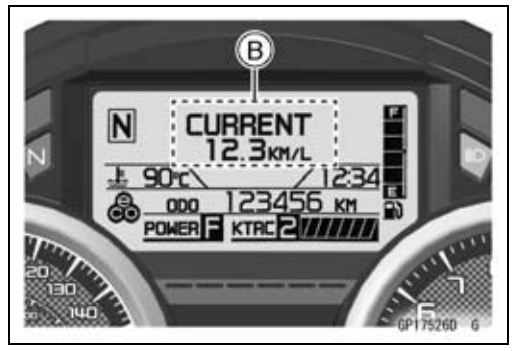
○This display is ordinary indication.





★If the display function does not work, check the following parts.
Left Switch Housing (see Switch Inspection)
Wiring (see Meter Unit Circuit)

★If the above parts are good, replace the meter unit.



Meter, Gauge, Indicator Unit

- Select the main display.
- By pushing the lower button [A] each time, check that the display [B] changes as follows.

○This display is ordinary indication.

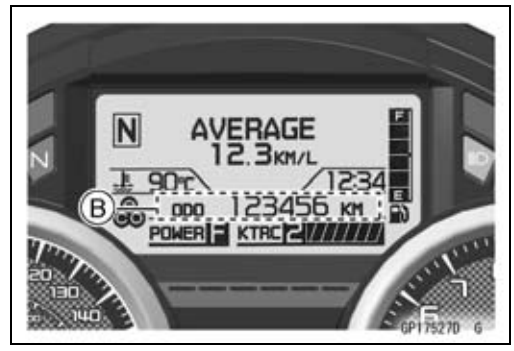


GP17959CN3 C

★If the display function does not work, check the following parts.
Left Switch Housing (see Switch Inspection)
Wiring (see Meter Unit Circuit)

★If the above parts are good, replace the meter unit.

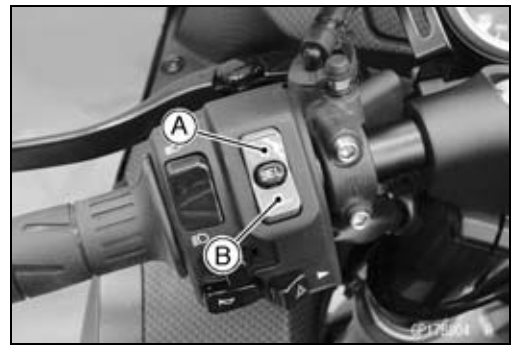


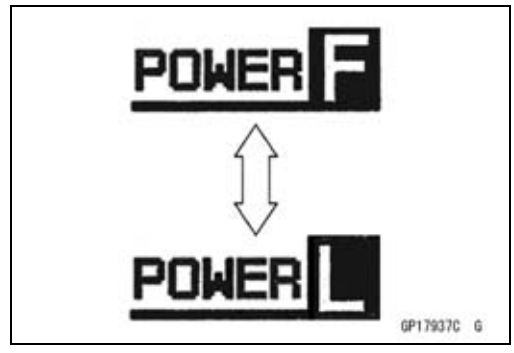


- Select the power mode.
- By pushing the upper button [A] or lower button [B] each time, check that the power mode indicator changes to going on.

★If the display function does not work, check the following parts.
Left Switch Housing (see Switch Inspection)
Wiring (see Meter Unit Circuit)

★If the above parts are good, replace the meter unit.



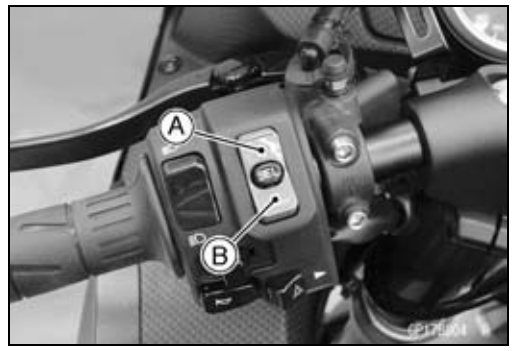


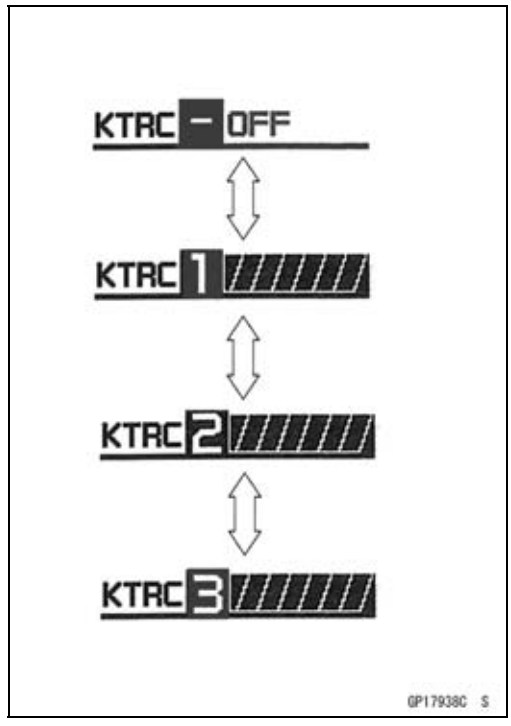
Meter, Gauge, Indicator Unit

- Select the KTRC mode.
- By pushing the upper button [A] or lower button [B] each time, check that the KTRC mode indicator changes to going on.

★If the indicator does not work, check the following parts.
Left Switch Housing (see Switch Inspection)
Wiring (see Meter Unit Circuit)

★If the above parts are good, replace the meter unit.





- Push the “SEL” button [A] for more than two seconds.



- Check that the display changes to the language setting mode [A].

○This display is system menu indication.

- By pushing the upper button or lower button each time, check that the display selects the ENGLISH or FRANCAIS.

★If the display function does not work, check the following parts.
Left Switch Housing (see Switch Inspection)
Wiring (see Meter Unit Circuit)

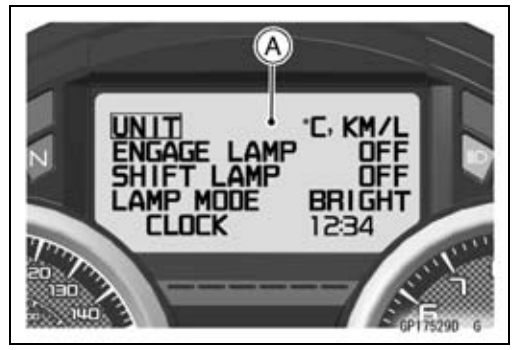
★If the above parts are good, replace the meter unit.

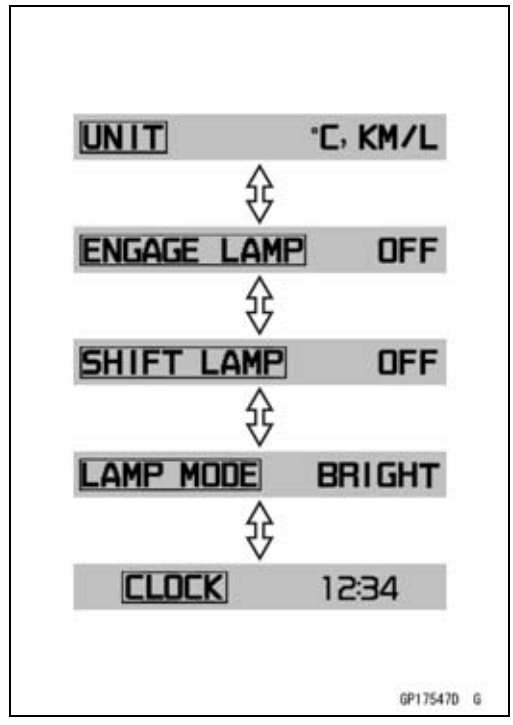


Meter, Gauge, Indicator Unit

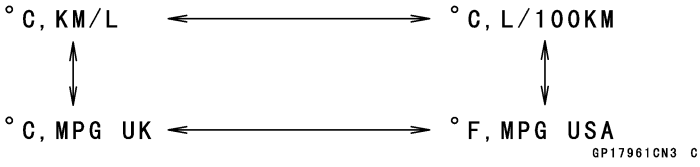
- While the language setting mode, push the “SEL” button.
- Check that the display [A] changes to the UNIT, ENGAGE LAMP, SHIFT LAMP, LAMP MODE and CLOCK modes.
- By pushing the upper button or lower button each time, check that the display selects as shown.

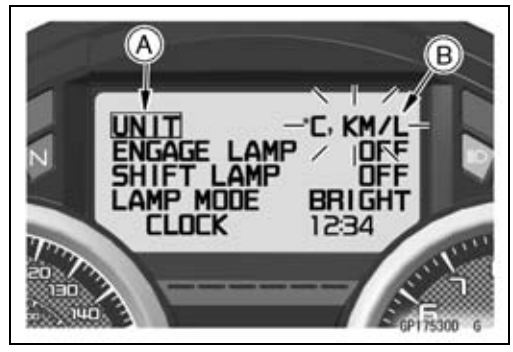
★If the display function does not work, replace the meter unit.





- Select the UNIT [A] indication.
- Push the “SEL” button, check that the unit setting menu [B] blinks.
- By pushing the upper button or lower button each time, check that the display changes as follows.





NOTE

○*Mile/Km display can alternate between English and metric modes (mile and km) in the digital meter. Make sure that km or mile according to local regulations is correctly displayed before riding.*

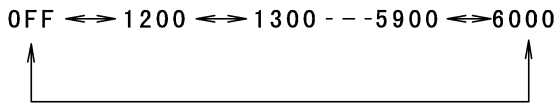
- Check that the unit setting menu is decided by the “SEL” button pushing.

★If the display function does not work, replace the meter unit.

Meter, Gauge, Indicator Unit



- Select the ENGAGE LAMP [A] indication.
- Push the “SEL” button, check that the engine speed setting menu [B] blinks.
- By pushing the upper button or lower button each time, check that the display changes as follows.

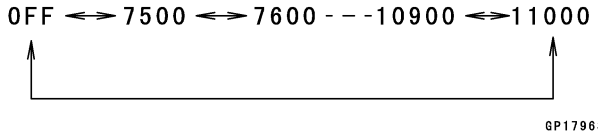


- Check that the engine speed setting menu is decided by the “SEL” button pushing.

★If the display function does not work, replace the meter unit.



- Select the SHIFT LAMP [A] indication.
- Push the “SEL” button, check that the engine speed setting menu [B] blinks.
- By pushing the upper button or lower button each time, check that the display changes as follows.



- Check that the engine speed setting menu is decided by the “SEL” button pushing.

★If the display function does not work, replace the meter unit.



- Select the LAMP MODE [A] indication.
- Push the “SEL” button check that the lighting mode setting menu [B] blinks.
- By pushing the upper button or lower button each time, check that the display changes as follows and the indicator light (LED) goes on or blinks according to message.

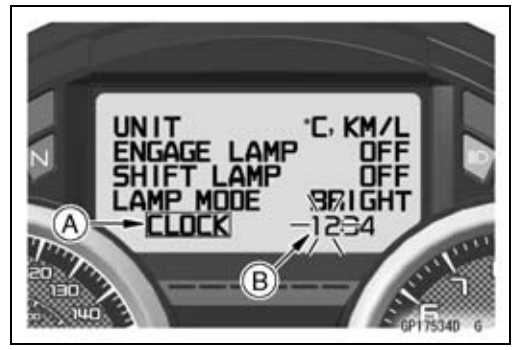


- Check that the lighting mode setting menu is decided by the “SEL” button pushing.

★If the display function does not work, replace the meter unit.

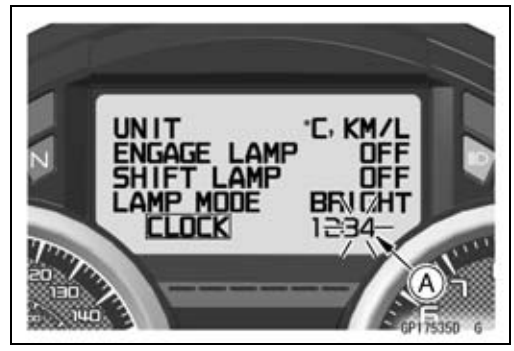
Meter, Gauge, Indicator Unit

- Select the CLOCK [A] indication.
- Push the “SEL” button, check that the clock setting menu (hour) [B] blinks.
- By pushing the upper button or lower button each time, check that the hour display changes.



- By pushing the “SEL” button, check that the hour display decide and minute display [A] starts blinking.
- By pushing the upper button or lower button each time, check that the minute display changes.
- By pushing the “SEL” button, check that the hour and minute display decide.

★If the display function does not work, replace the meter unit.



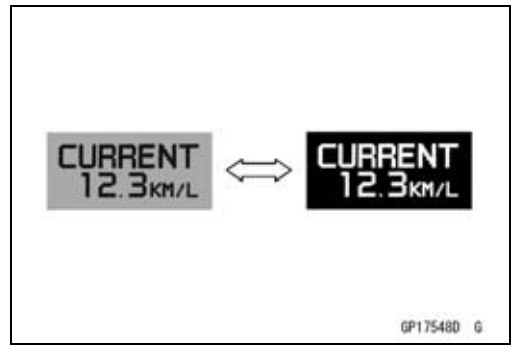
- Select the main display.
- Push the upper button for more than 2 seconds, check that the display color changes as shown.

NOTE

○*The display color can be changed when the CURRENT, RANGE, BATTERY or OUTSIDE displayed.*

★If the display function does not work, check the following parts.
Left Switch Housing (see Switch Inspection)
Wiring (see Meter Unit Circuit)

★If the above parts are good, replace the meter unit.



Meter System Inspection

Check 2-1: Battery Voltage Inspection

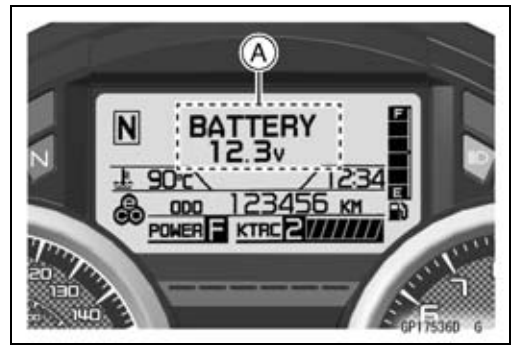
- Turn the ignition switch on.
- Select the battery voltage indication [A] in the ordinary indication.

○The voltage corresponding to a present battery condition is displayed.

○The voltage range is 11 ~ 16 V.

★If the display is malfunction, check the following parts.
Battery (see Charging Condition Inspection)
Wiring (see Meter Unit Circuit)

★If the above parts are good, replace the meter unit.

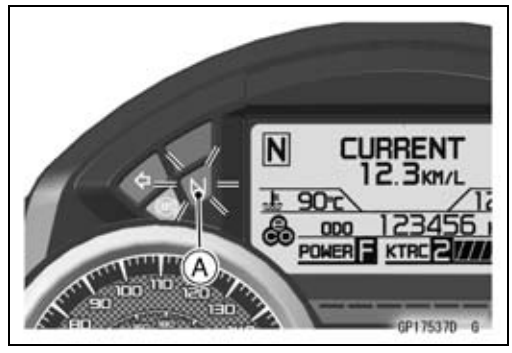


Meter, Gauge, Indicator Unit

Check 2-2: Gear Position Indication Inspection

- Turn the ignition switch on.

○The green neutral indicator light (LED) [A] goes on when the transmission gear is neutral position.



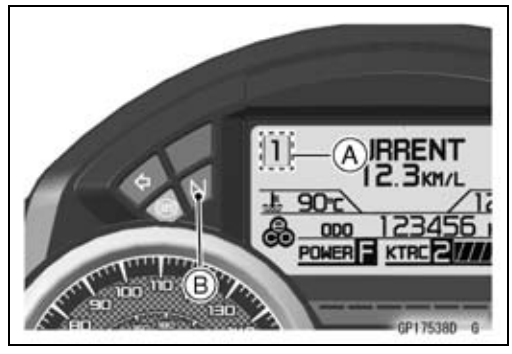
- Set the low gear position, and check that the display changes to 1 mark [A] and the green neutral indicator light (LED) [B] goes off.
- Using the suitable stand, raise the rear wheel off the ground.
- Rotate the rear wheel by hand and change the gear position.
- Check that the display corresponding to each gear position (1, 2, 3, 4, 5 or 6) appears.

★If the display function does not work, check the following parts.

Gear Position Sensor (see Gear Position Sensor Inspection)

Wiring (see Meter Unit Circuit)

★If the above parts are good, replace the meter unit and/or ECU.



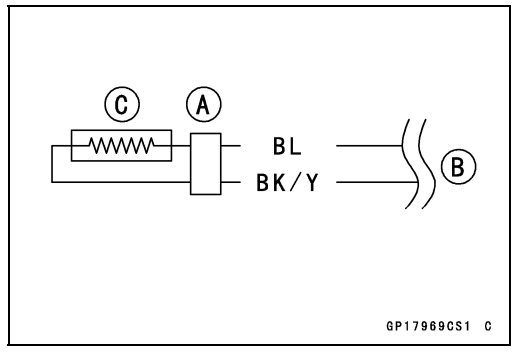
Check 2-3: Outside Temperature Inspection

- Disconnect the outside temperature sensor lead connector [A] (see Outside Temperature Sensor Removal).

Main Harness [B]

- Connect the resistor [C] to the BL lead and BK/Y lead terminals.

	Resistance (kΩ)
	6
Temperature	–3 ±2 (°C)
	32 ±4 (°F)



- Turn the ignition switch on, and read the temperature in the display.

○The display range is –20 ~ 60°C (–4 ~ 140°F).

★If the temperature is out of the range, the indication fixes the minimum value or maximum value.

○When the speed is 20 km/h (12 mph) or less and rising the temperature, the indication fixes the value of just before the indication.

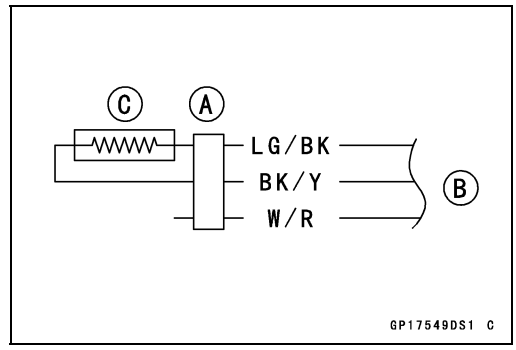
★If the display function does not work, check the wiring (see Meter Unit Circuit).

★If the wiring is good, replace the meter unit.

Meter, Gauge, Indicator Unit

Check 2-4: Fuel Level Warning Inspection

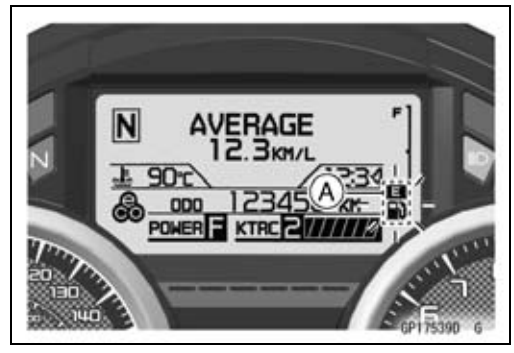
- Disconnect the fuel pump lead connector [A] (see Fuel Tank Removal in the Fuel System (DFI) chapter).
  Main Harness [B]
- Connect the resistor [C] (about 100 Ω) to the fuel pump lead connector terminal as shown.



- Turn the ignition switch on.
- After about 5 seconds, check that the "E" segment and fuel indicator [A] starts blinking.

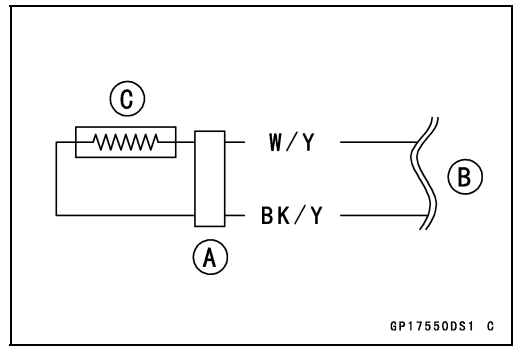
★If the display function does not work, check the wiring (see Meter Unit Circuit).

★If the wiring is good, replace the meter unit.



Check 2-5: Fuel Gauge Inspection

- Disconnect the fuel level sensor lead connector [A] (see Fuel Tank Removal in the Fuel System (DFI) chapter).
  Main Harness [B]
- Connect the variable rheostat [C] to the fuel level sensor lead connector terminal as shown.

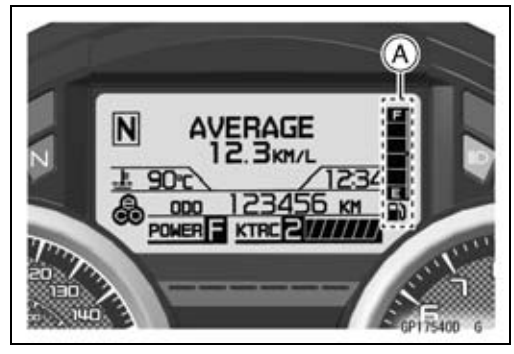


- Turn the ignition switch on.
- After about 5 seconds, check that the number of segments matches the resistance value of the variable rheostat.

Variable Rheostat Resistance (Ω)	Display Segments [A]
10	6
50	5
100	4
140	3
170	2
200	1

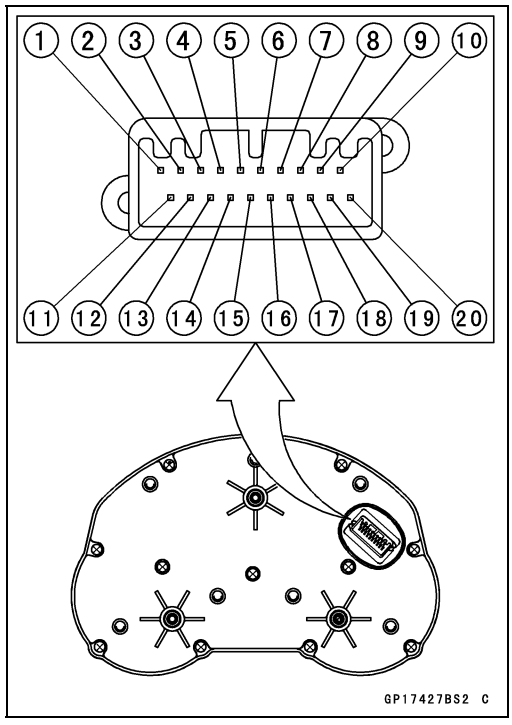
★If the display function does not work, check the wiring (see Meter Unit Circuit).

★If the wiring is good, replace the meter unit.



Meter, Gauge, Indicator Unit

Meter Unit Inspection



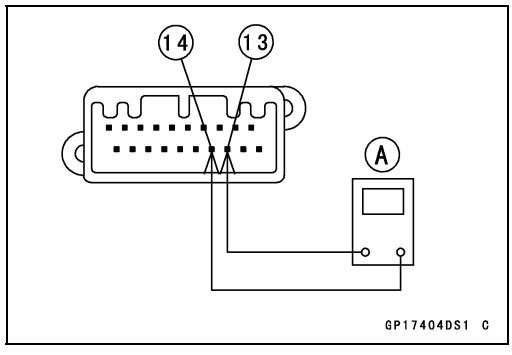
- Remove the meter unit (see Meter Unit Removal).

[1] Blue High Beam Indicator Light (LED) (+)
[2] Red Oil Pressure Warning Indicator Light (LED) (–)
[3] Green Right Turn Signal Indicator Light (LED) (+)
[4] Green Neutral Indicator Light (LED) (–)
[5] Unused
[6] Yellow ABS Indicator Light (LED)
[7] Upper Button
[8] Lower Button
[9] Ignition (+)
[10] Battery (+)
[11] Unused
[12] Ground (–)
[13] Unused
[14] Outside Temperature Sensor
[15] Fuel Reserve Switch
[16] Fuel Level Sensor
[17] CAN Communication Line (High)
[18] CAN Communication Line (Low)
[19] Green Left Turn Signal Indicator Light (LED) (+)
[20] “SEL” 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

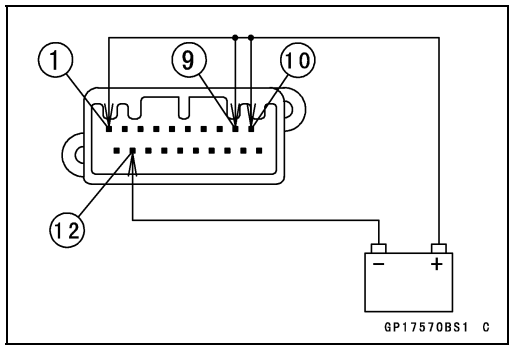


- Connect a digital meter to the terminal [17] and [18] in the meter unit.

CAN Communication Line Resistance (at Meter Unit)
Standard: 123 ~ 125 Ω

★If the digital meter reading is not specified, replace the meter unit.

Check 3-2: Blue High Beam Indicator Light (LED) Inspection



- Using the auxiliary leads, the 12 V battery to the meter unit connector as follows.

○Connect the battery positive (+) terminal to the terminal [9] [10].
○Connect the battery negative (–) terminal to the terminal [12].

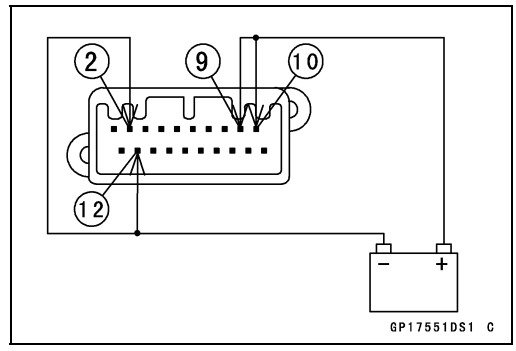
- Connect the terminal [1] to the battery (+) terminal.

Meter, Gauge, Indicator Unit

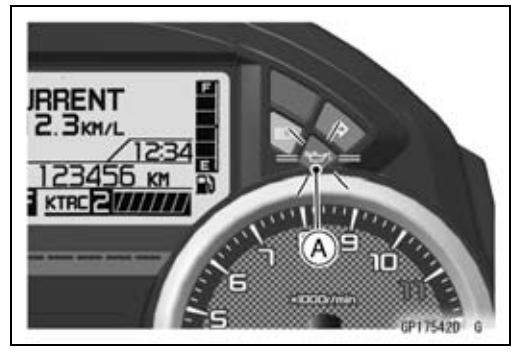
● Check that the blue high beam indicator light (LED) [A] goes on.
★If the indicator light (LED) does not go on, replace the meter unit.



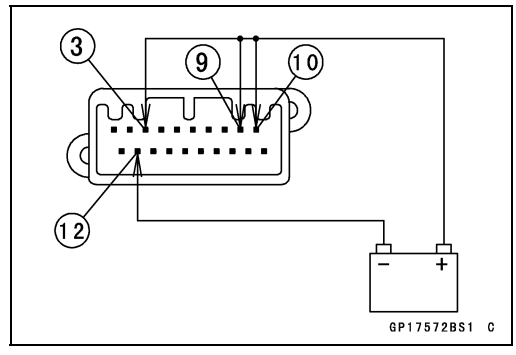
Check 3-3: Red Oil Pressure Warning Indicator Light (LED) Inspection
● Using the auxiliary leads, the 12 V battery to the meter unit connector as follows.
○Connect the battery positive (+) terminal to the terminal [9] [10].
○Connect the battery negative (–) terminal to the terminal [12].
● Connect the terminal [2] to the battery (–) terminal.



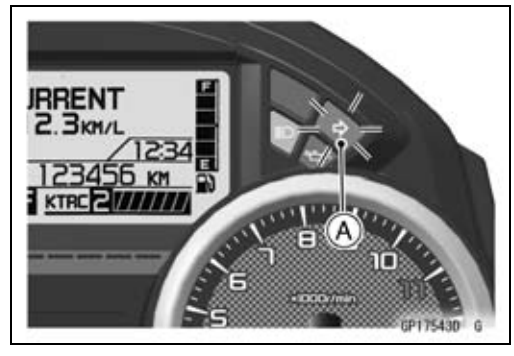
● Check that the red oil pressure warning light (LED) [A] go on.
★If the indicator light (LED) does not go on, replace the meter unit.



Check 3-4: Green Right Turn Signal Indicator Light (LED) Inspection
● Using the auxiliary leads, the 12 V battery to the meter unit connector as follows.
○Connect the battery positive (+) terminal to the terminal [9] [10].
○Connect the battery negative (–) terminal to the terminal [12].
● Connect the terminal [3] to the battery (+) terminal.



● Check that the green right turn signal indicator light (LED) [A] goes on.
★If the indicator light (LED) does not go on, replace the meter unit.



Meter, Gauge, Indicator Unit

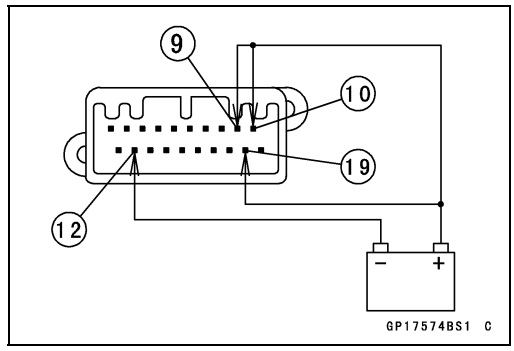
Check 3-5: Green Left Turn Signal Indicator Light (LED) Inspection

- Using the auxiliary leads, the 12 V battery to the meter unit connector as follows.

○Connect the battery positive (+) terminal to the terminal [9] [10].

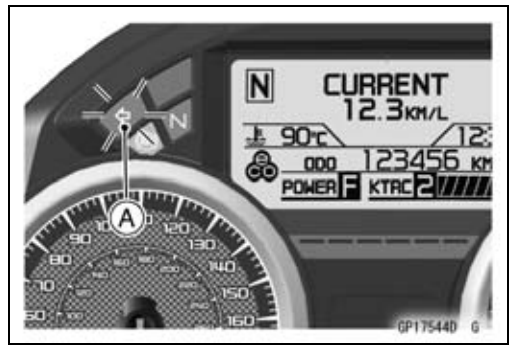
○Connect the battery negative (–) terminal to the terminal [12].

- Connect the terminal [19] to the battery (+) terminal.



- Check that the green left turn signal indicator light (LED) [A] goes on.

★If the indicator light (LED) does not go on, replace the meter unit.



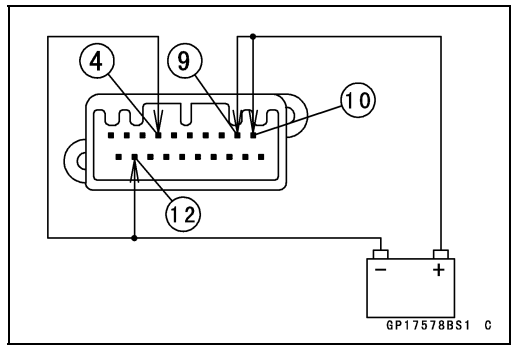
Check 3-6: Green Neutral Indicator Light (LED) Inspection

- Using the auxiliary leads, the 12 V battery to the meter unit connector as follows.

○Connect the battery positive (+) terminal to the terminal [9] [10].

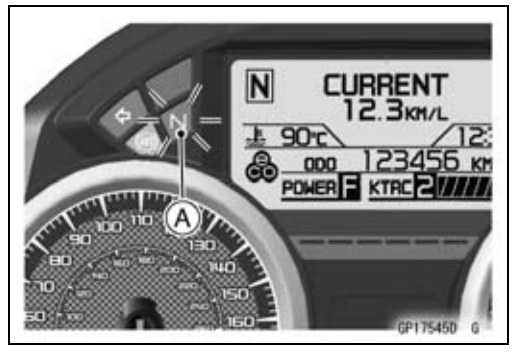
○Connect the battery negative (–) terminal to the terminal [12].

- Connect the terminal [4] to the battery (–) terminal.



- Check that the green neutral indicator light (LED) [A] goes on.

★If the indicator light (LED) does not go on, replace the meter unit.



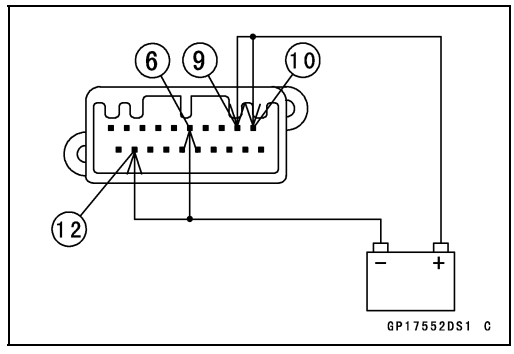
Check 3-7: Yellow ABS Indicator Light (LED) Inspection

- Using the auxiliary leads, the 12 V battery to the meter unit connector as follows.

○Connect the battery positive (+) terminal to the terminal [9] [10].

○Connect the battery negative (–) terminal to the terminal [12].

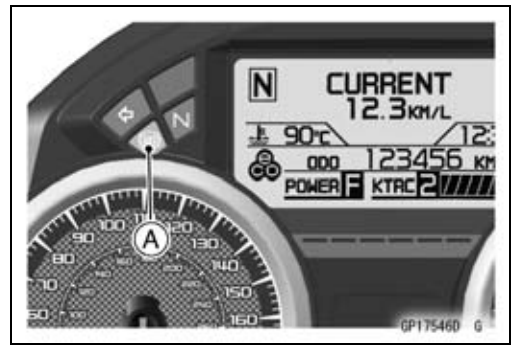
- Connect the terminal [6] to the battery (–) terminal.



Meter, Gauge, Indicator Unit

- Check that the yellow ABS indicator light (LED) [A] goes off.

★If the indicator light (LED) does not go off, replace the meter unit.



Check 3-8: Other Inspection

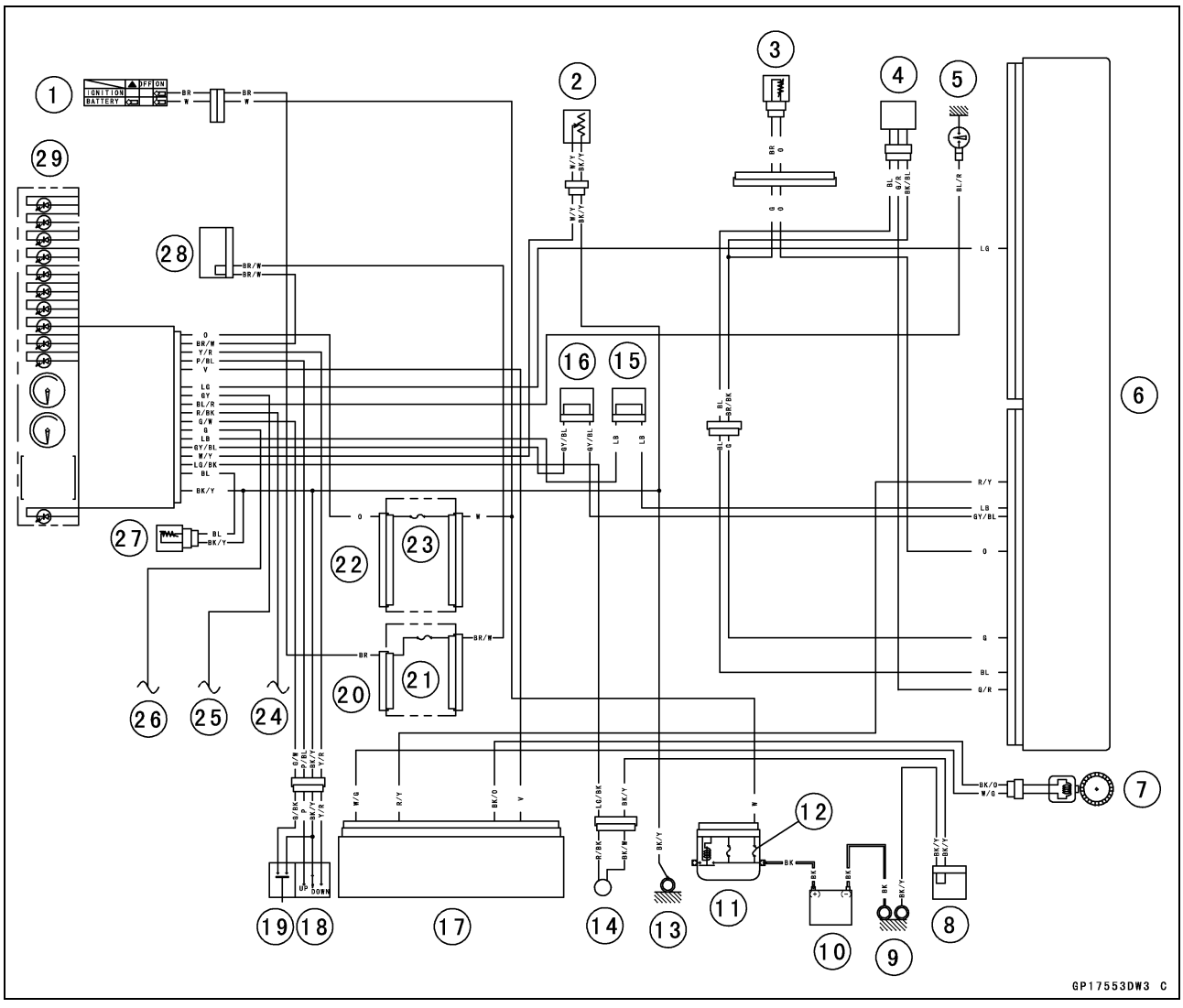
- Other items of the meter unit are related to the CAN communication line.
- When the other items are faulty indication, check the followings.

  Wiring (see Wiring Inspection)
  Fuel Injectors (see Fuel Injectors section in the Fuel System (DFI) chapter)
  Each Sensor or Switch (see Appropriate Chapters)

★If the above items are good, replace the meter unit and/or ECU.

Meter, Gauge, Indicator Unit

Meter Unit Circuit



1. Ignition Switch
2. Fuel Level Sensor
3. Water Temperature Sensor
4. Gear Position Sensor
5. Oil Pressure Switch
6. ECU
7. Rear Wheel Rotation Sensor
8. Joint Connector B
9. Frame Ground
10. Battery 12 V 12 Ah
11. Starter Relay
12. Main Fuse 30 A
13. Frame Ground (2)
14. Fuel Reserve Switch
15. Joint Connector D
16. Joint Connector C
17. ABS Hydraulic Unit
18. Upper and Lower Button
19. SEL Button
20. Fuse Box (1)
21. Ignition Fuse 15 A
22. Fuse Box (2)
23. Meter Fuse 10 A
24. Dimmer Switch (High Beam)
25. Turn Signal Switch (Right)
26. Turn Signal Switch (Left)
27. Outside Temperature Sensor
28. Joint Connector F
29. Meter Unit

Immobilizer System (Equipped Models)

This motorcycle is equipped with an immobilizer system to protect the motorcycle from theft. This system provides a theft proof device by means of matching a code between the inbuilt key transponder and ECU. If the code does not match, ignition system, injectors and subthrottle valve actuator will not operate and the engine will not start.

Abstract

- Do not keep more than one immobilizer key of any system on a key ring. Jamming of the key code signal may occur and the operation of the system may be affected.
- The red immobilizer warning indicator light (LED) will blink for a period of 24 hours once the ignition switch has been switched off and the key removed. This blinking can be set to on or off as desired by holding the upper and lower buttons on the left switch housing down for 2 seconds within 20 seconds of switching the ignition off.
- If all coded keys are lost the ECU and ignition switch will have to be replaced.
- The immobilizer system can not function until the ignition key code is registered in the ECU.
- A total of five keys can be registered in the ECU at any one time.

Operational Cautions

1. Do not put two keys of any immobilizer system on the same key ring.
2. Do not submerge any key in water.
3. Do not expose any key to excessively high temperature.
4. Do not place any key close to magnet.
5. Do not place a heavy item on any key.
6. Do not grind any key or alter its shape.
7. Do not disassemble the plastic part of any key.
8. Do not drop the key and/or apply any shocks to the key.
9. When a ignition key is lost, the user should go to his dealer to invalidate the lost key registration in the ECU.
10. When the all ignition keys are lost, the user should go to his dealer and have a new ECU installed and register the ignition keys.

NOTE

○*No.9 and 10 are strongly recommended to the customer to ensure security of the motorcycle.*

Key Registration

Case 1: When additional spare ignition key is required.

NOTE

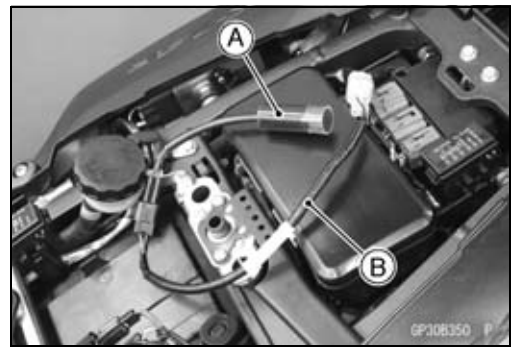
○*Two ignition keys have been already registered in this case.*

- Prepare a new spare ignition key.
- Cut the key in accordance with the shape of the current ignition key.
- Remove the seat (see Seat Removal in the Frame chapter).
- Remove the immobilizer/Kawasaki diagnostic system connector [A] and cap.



- Connect the key registration unit [A] and key registration adapter [B] as shown.

Special Tools - Key Registration Unit: 57001-1582
Key Registration Adapter: 57001-1853

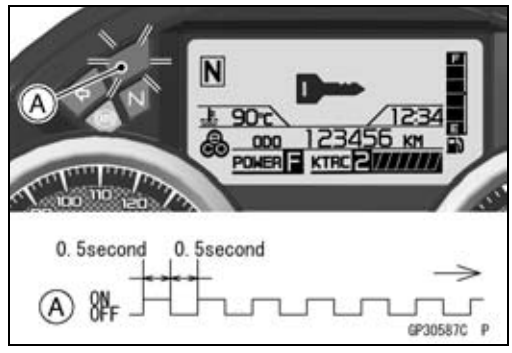


Immobilizer System (Equipped Models)

● Insert one of the registered ignition keys to the ignition switch and turn it to “ON.”

NOTE

○*Keep the other ignition key away from the immobilizer antenna.*



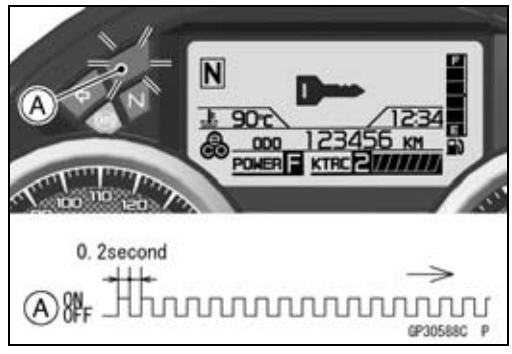
Verified

○The red immobilizer indicator light (LED) [A] blinks to display the registration mode (go to the next step).

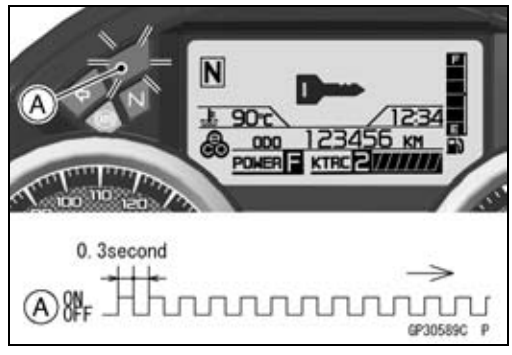
Not Verified

○The red immobilizer indicator light (LED) [A] blinks to display the collation error (refer to the following failure illustrations).

Immobilizer Amplifier Failure

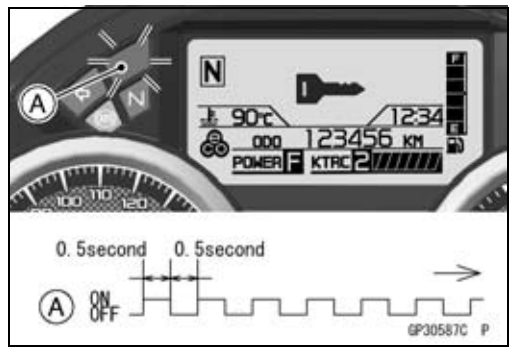


Registered Ignition Key Collation Error



● Turn the registered ignition key to “OFF” and remove the registered ignition key.

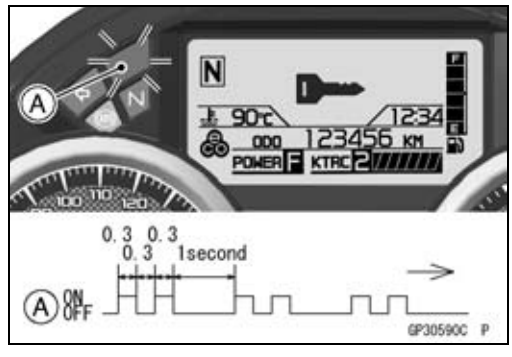
○The red immobilizer indicator light (LED) [A] blinks continuously to display that the ECU is in the registration mode for 15 seconds.



● Insert the other registered ignition key to the ignition switch and turn it to “ON.”

NOTE

○*Keep the other ignition key away from the immobilizer antenna.*



● Confirm that following.

○The red immobilizer indicator light (LED) [A] blinks 2 times and stops for 1 second and then repeats.

○If there is any problem in the registration, the red immobilizer indicator light (LED) blinks to display collation error as mentioned above.

● Turn the registered ignition key to “OFF” and remove the registered ignition key.

Immobilizer System (Equipped Models)

NOTE

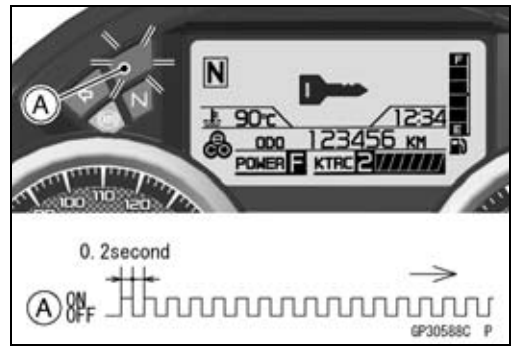
○*Insert next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF" and removed otherwise registration mode will be ended and the red immobilizer indicator light (LED) stops blinking.*

○*To return to the registration mode start the registered ignition key(s) verification procedure. This applies to all ignition key registration.*

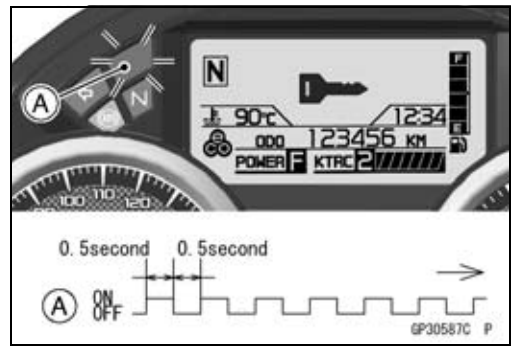
● Insert the new ignition key 1 to the ignition switch and turn it to "ON."

○If there is any problem in the registration, the red immobilizer indicator light (LED) [A] blinks to display the collation error.

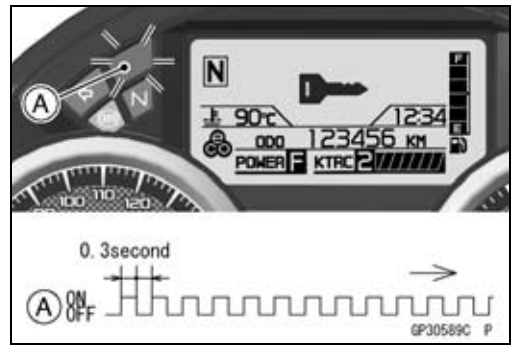
Immobilizer Amplifier Failure



When Registered Ignition Key is Inserted.

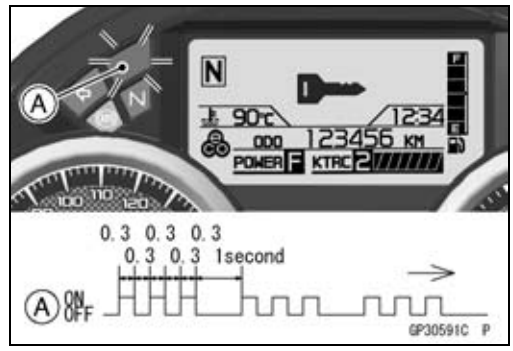


Ignition Key Collation Error



Immobilizer System (Equipped Models)

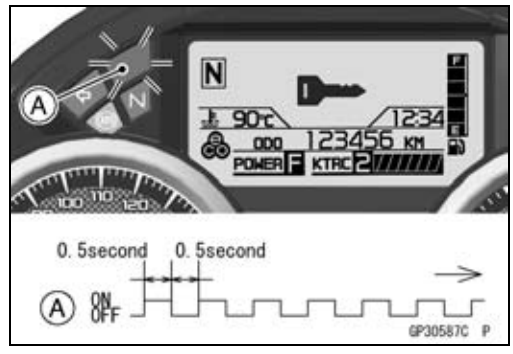
● The ignition key 1 is successfully registered in the ECU.
○The red immobilizer indicator light (LED) [A] blinks 3 times and stops for 1 second and then repeats this cycle.



● Turn the ignition key 1 to “OFF” and remove the ignition key 1.
○The red immobilizer indicator light (LED) [A] blinks to display the registration mode.

NOTE

○*Turn to “OFF” the ignition switch and wait for the period of 15 seconds or more. The registration mode automatically finishes and the red immobilizer indicator light (LED) will switch off.*
○*This procedure registered the registered ignition key and one ignition key.*
○*Continue with the procedure to register the second and later keys before the 15 seconds period has elapsed.*

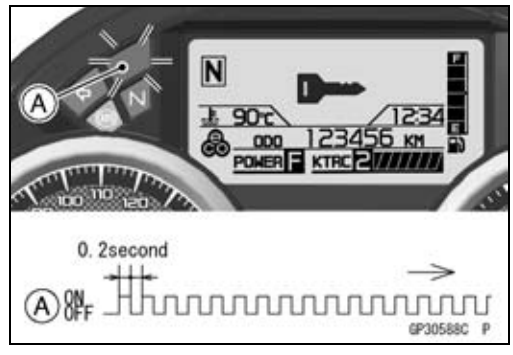


● Insert the new ignition key 2 to the ignition switch and turn it to “ON.”

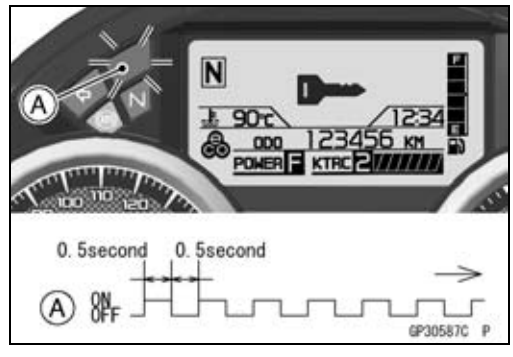
NOTE

○*Keep the other ignition key away from the immobilizer antenna.*

○If there is any problem in the registration, the red immobilizer indicator light (LED) [A] blinks to display the collation error.
Immobilizer Amplifier Failure

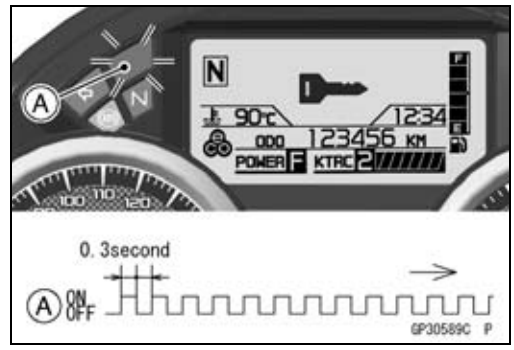


When Registered Ignition Key is Inserted.



Immobilizer System (Equipped Models)

Ignition Key Collation Error

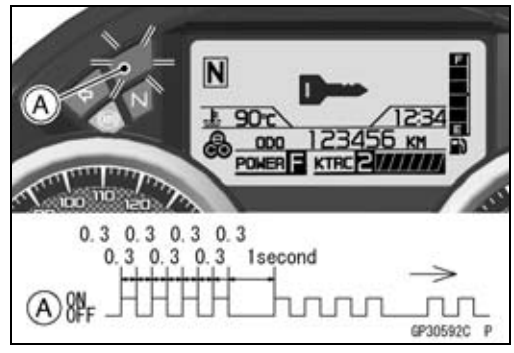


- The ignition key 2 is registered in the ECU.

○The red immobilizer indicator light (LED) [A] blinks 4 times and stops for 1 second and then repeats this cycle.

○This procedure has registered the 2 ignition keys.

- Continue with the procedure to register an additional one ignition key.



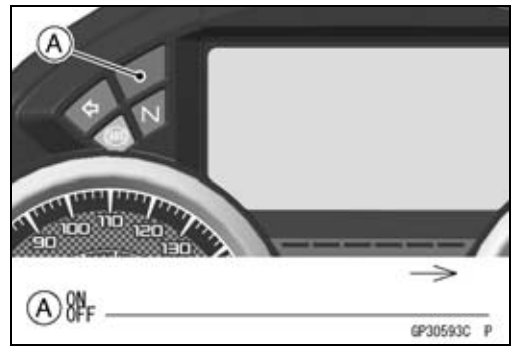
NOTE

○*The ECU can store up the five key codes.*

Red Immobilizer Warning Indicator Light (LED)

	Indicator Blinks	Indicator Stop	Remarks
Ignition Key 3	5 times	1 second	Repeat

- Turn to “OFF” the ignition switch and wait for period of more than 15 seconds.
- The registration mode automatically ends.
- The red immobilizer indicator light (LED) goes off [A].



- Remove the key registration unit, key registration adapter and install the immobilizer/Kawasaki diagnostic system connector cap.

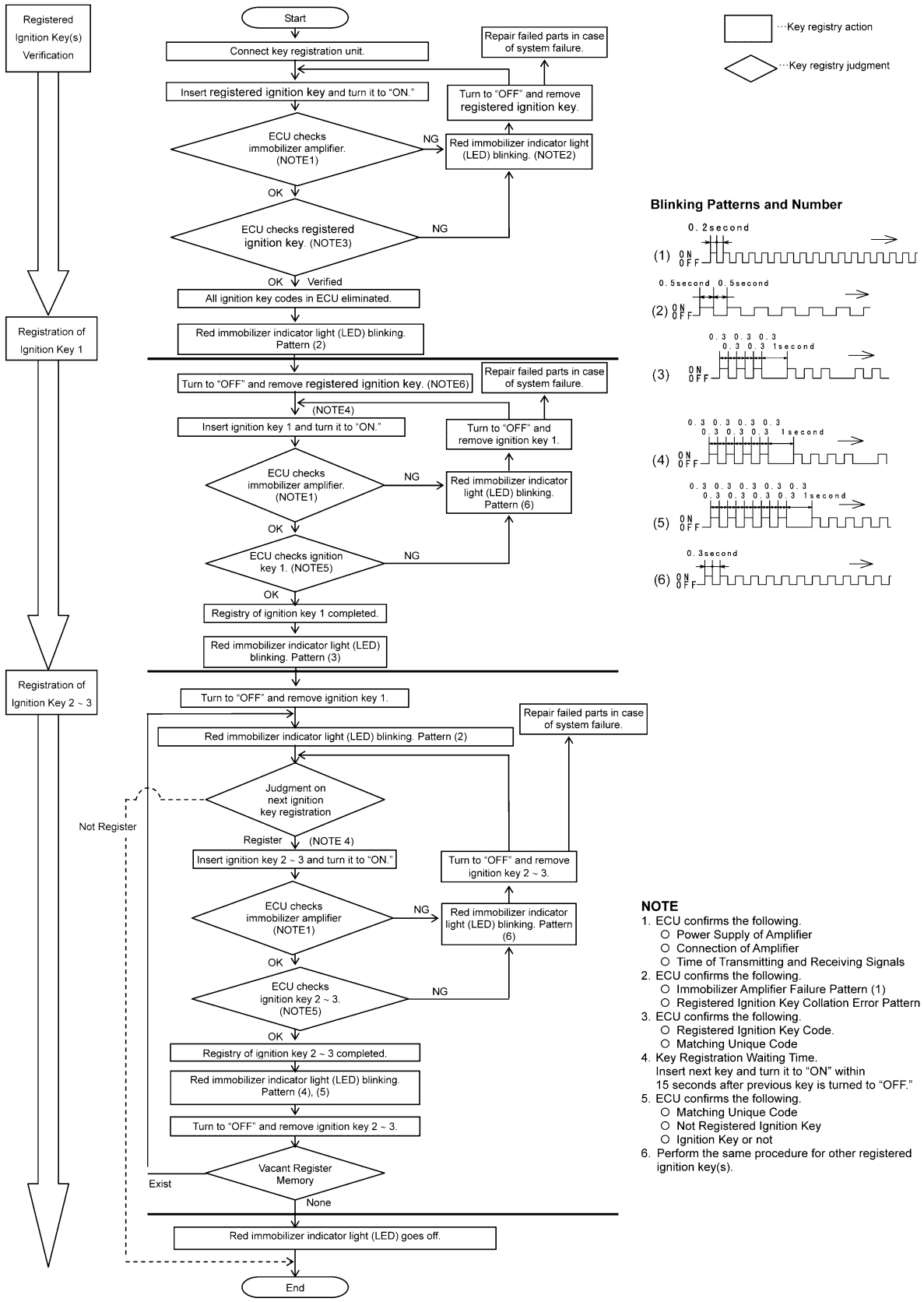
NOTE

○*Turn the ignition switch to “ON” with the registered ignition key.*

○*Check that the engine can be started using all registered ignition keys.*

Immobilizer System (Equipped Models)

Spare Ignition Key Registration Flow Chart (Ignition Key 1: 3rd Key)



NOTE

1. ECU confirms the following.
   - ○ Power Supply of Amplifier
   - ○ Connection of Amplifier
   - ○ Time of Transmitting and Receiving Signals
2. ECU confirms the following.
   - ○ Immobilizer Amplifier Failure Pattern (1)
   - ○ Registered Ignition Key Collation Error Pattern (6)
3. ECU confirms the following.
   - ○ Registered Ignition Key Code.
   - ○ Matching Unique Code
4. Key Registration Waiting Time.
   Insert next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF."
5. ECU confirms the following.
   - ○ Matching Unique Code
   - ○ Not Registered Ignition Key
   - ○ Ignition Key or not
6. Perform the same procedure for other registered ignition key(s).

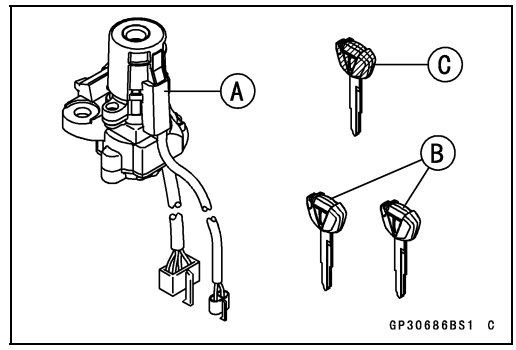
GP30595C F

Immobilizer System (Equipped Models)

Case 2: When the ignition switch is faulty and to be replaced.

- Prepare a new ignition switch [A] and two new ignition keys [B].

○These parts are available as a set. Prepare the current registered ignition key [C].

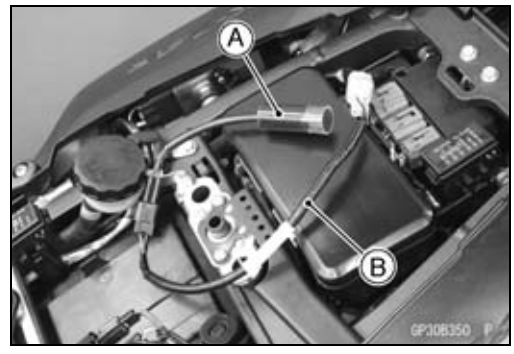


- Remove:
  Ignition Switch (see Immobilizer System Parts Replacement)
  Seat (see Seat Removal in the Frame chapter)
- Remove the immobilizer/Kawasaki diagnostic system connector [A] and cap.



- Connect the key registration unit [A] and key registration adapter [B] as shown.

Special Tools - Key Registration Unit: 57001-1582
Key Registration Adapter: 57001-1853

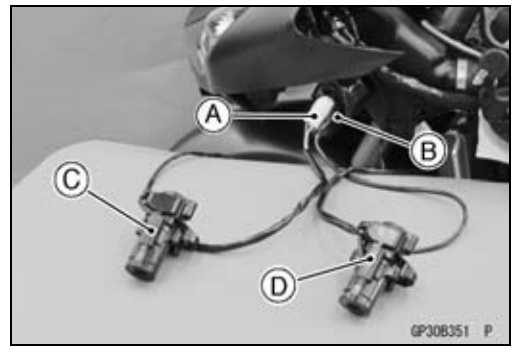


- Connect:
  New Ignition Switch Lead Connector [A]
  Current Immobilizer Antenna Lead Connector [B]

NOTE

○*Keep the ignition switches more than 15 cm (5.9 in.).*

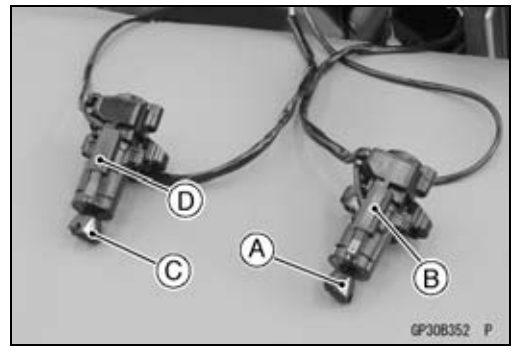
New Ignition Switch [C]
Current Ignition Switch [D]



- Insert the current registered ignition key [A] at the current ignition switch [B].
- Insert the new ignition key 1 [C] to the new ignition switch [D] and turn it to “ON.”

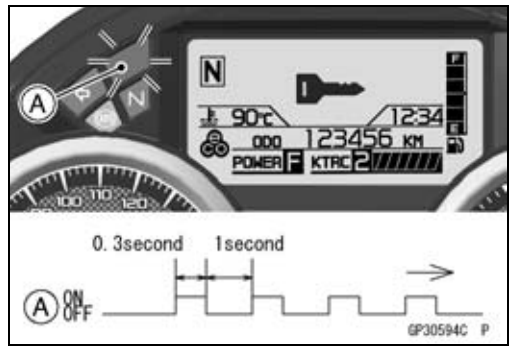
NOTE

○*Keep the other ignition key away from the immobilizer antenna.*



Immobilizer System (Equipped Models)

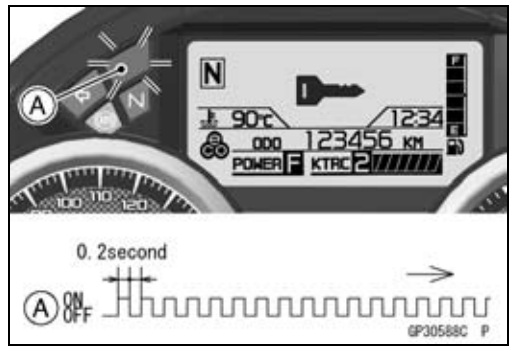
○The red immobilizer indicator light (LED) [A] blinks 1 time and stops for 1 second and repeats this cycle.



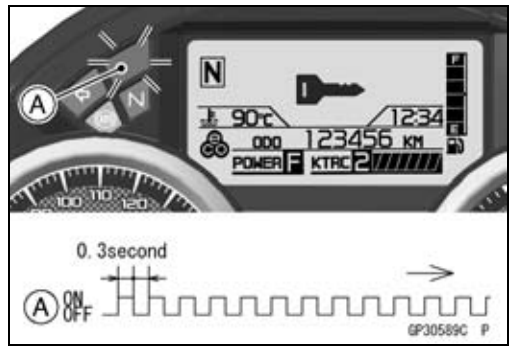
Not Verified

○The red immobilizer indicator light (LED) [A] blinks to display the collation error.

Immobilizer Amplifier Failure



Registered Ignition Key Collation Error



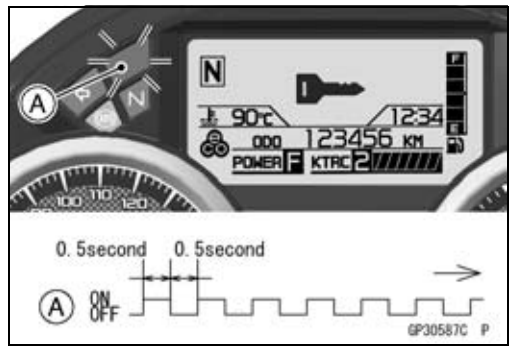
● Turn to “OFF” and remove the new ignition key 1.

NOTE

○*Insert the next key and turn it to “ON” within 15 seconds after previous key is turned to “OFF” and removed otherwise registration mode will be ended and the red immobilizer indicator light (LED) stops blinking.*

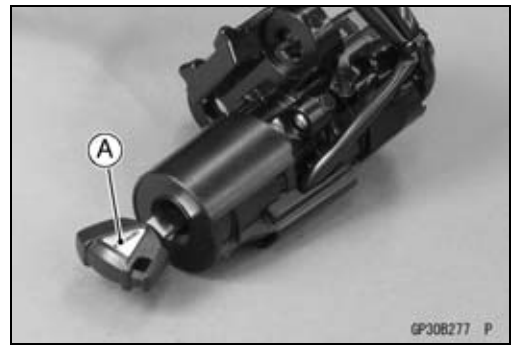
Verified

○The red immobilizer indicator light (LED) [A] blinks to display the ECU is in the registration mode (go to the next step).



Immobilizer System (Equipped Models)

- Disconnect the immobilizer antenna lead connector, then connect the antenna lead connector of the new ignition switch.
- Insert the ignition key 1 [A] again into the new ignition switch and turn it to “ON.”

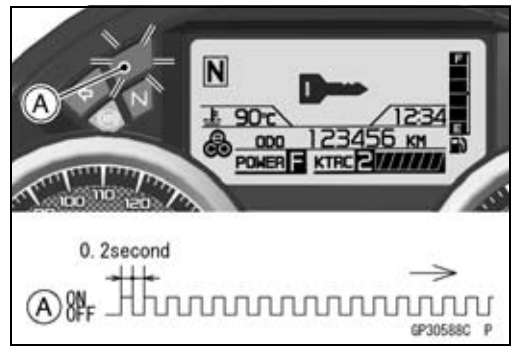


NOTE

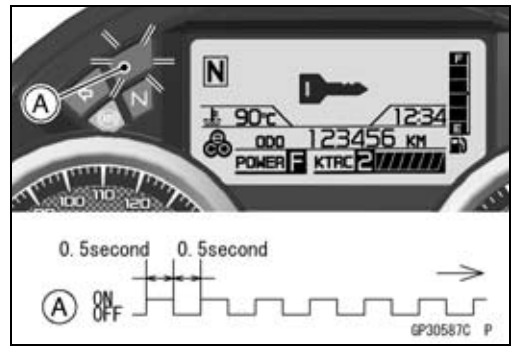
- ○*Insert the next key and turn it to “ON” within 15 seconds after previous key is turned to “OFF” and removed otherwise registration mode will be ended and the red immobilizer indicator light (LED) stops blinking.*
- ○*To return to the registration mode start the registered ignition key verification procedure. This applies to all ignition key registration.*
- ○*Keep other ignition keys away from the ignition switch.*

○If there is any problem in the registration, the red immobilizer indicator light (LED) [A] blinks to display the collation error.

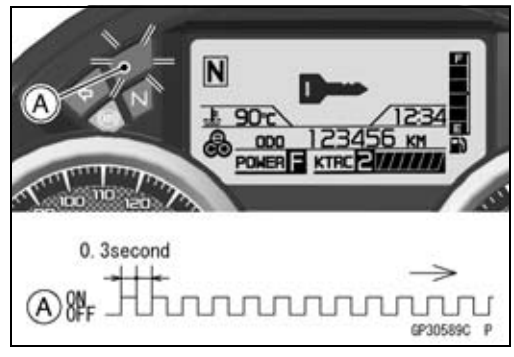
Immobilizer Amplifier Failure



When Registered Ignition Key is Inserted.

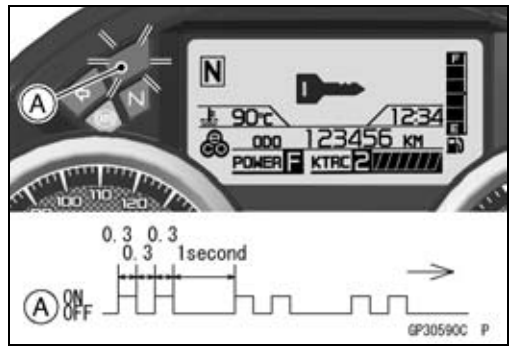


Ignition Key Collation Error

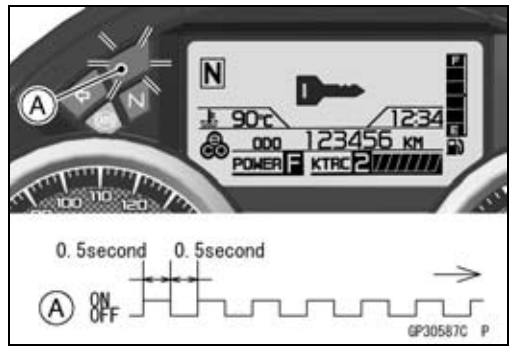


Immobilizer System (Equipped Models)

● The ignition key 1 is successfully registered in the ECU.
○The red immobilizer indicator light (LED) [A] blinks 2 times and stops for 1 second and then repeats this cycle to indicate successful registering of ignition key 1.



● Turn to “OFF” and remove ignition key 1.
○The red immobilizer indicator light (LED) [A] blinks to display the registration mode.



NOTE

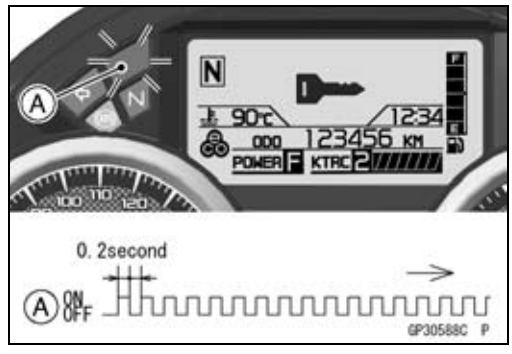
○*Turn to “OFF” the ignition switch and wait for the period more than 15 seconds. The registration mode automatically ends and red immobilizer indicator light (LED) goes off.*
○*This procedure has , registered the registered ignition key and one ignition key.*
○*Continue the procedure to program the second and later keys.*

● Insert the ignition key 2 to the ignition switch and turn it to “ON.”

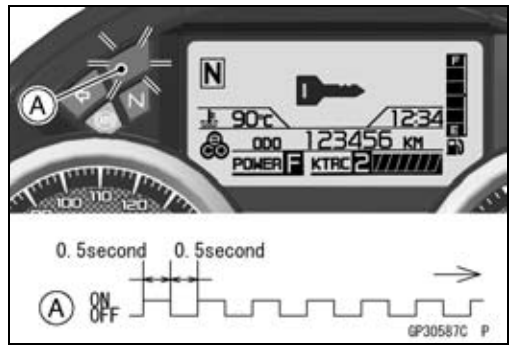
NOTE

○*Keep the other ignition key away from the immobilizer antenna.*

○If there is any problem in the registration, the red immobilizer indicator light (LED) [A] blinks to display the collation error.
Immobilizer Amplifier Failure

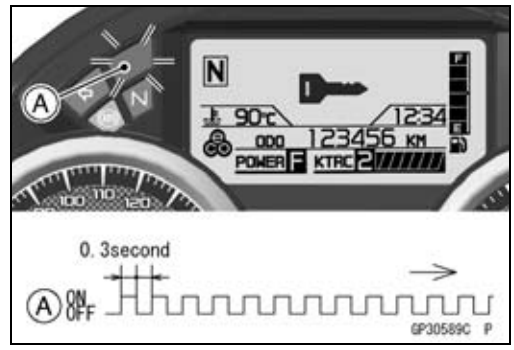


When Registered Ignition Key is Inserted.

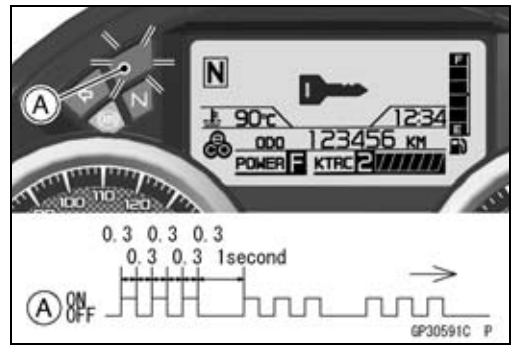


Immobilizer System (Equipped Models)

Ignition Key Collation Error



- The ignition key 2 is successfully registered in the ECU.
- Turn to “OFF” the ignition switch and wait for period more than 15 seconds.
- The registration mode automatically ends.



- The red immobilizer indicator light (LED) goes off [A].



- Remove the key registration unit, key registration adapter and install the immobilizer/Kawasaki diagnostic system connector cap.

NOTE

○*Turn the ignition switch to “ON” with the registered ignition key.*

○*Check that the engine can be started using all registered ignition keys.*

- Install the new ignition switch (see Immobilizer System Parts Replacement).

Case 3: When the ECU is faulty and has to be replaced.

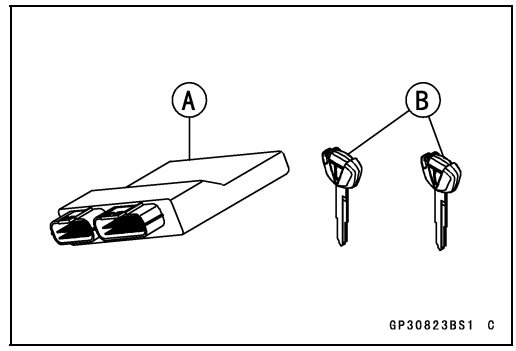
- Prepare a new ECU [A] and current registered ignition key(s) [B].

NOTE

○*The key registration unit is not required.*

○*After replacing the ECU, be sure to register the 2 ignition keys. If the 2 keys are not registered, the engine can not be started.*

- Replace the ECU (see ECU Removal/Installation in the Fuel System (DFI) chapter).



Immobilizer System (Equipped Models)

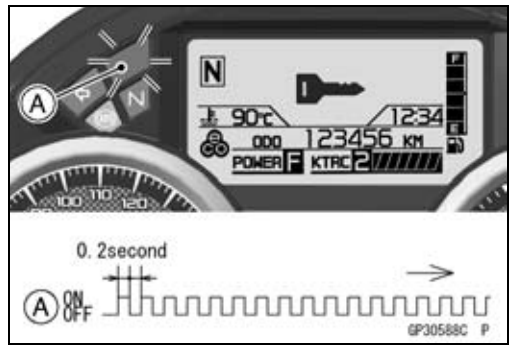
● Insert the current registered ignition key into the ignition switch and turn it to “ON.”

NOTE

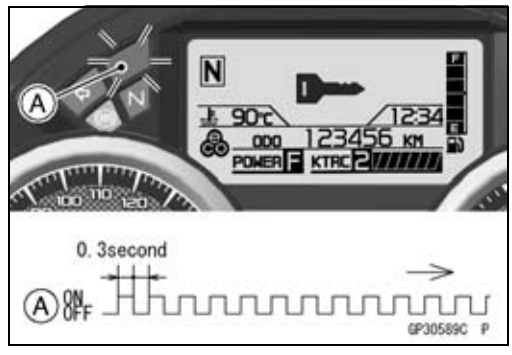
○*Keep the other ignition key away from the immobilizer antenna.*

○If there is any problem in the registration, the red immobilizer indicator light (LED) [A] blinks to display the collation error.

Immobilizer Amplifier Failure

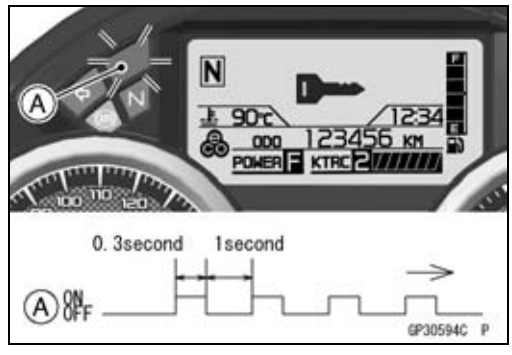


Registered Ignition Key Collation Error



● The registered ignition key is registered in the ECU.

○The red immobilizer warning indicator light (LED) [A] blinks 1 time and stops for 1 second and the repeats this cycle to indicate successful registration of the registered ignition key.



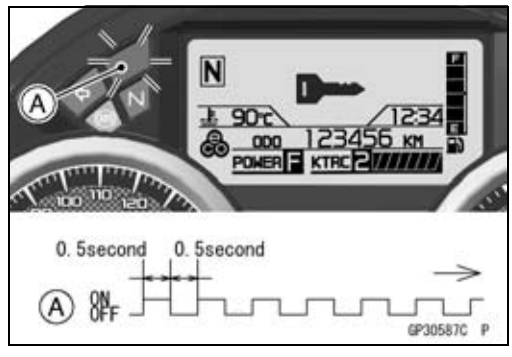
● Turn to “OFF” the registered ignition key and remove it.

○The red immobilizer indicator light (LED) [A] blinks to display the registration mode.

NOTE

○*Insert next key and turn it to “ON” within 15 seconds after previous key is turned to “OFF” and removed otherwise registration mode will be ended and the red immobilizer indicator light (LED) goes off.*

○*To return to the registration mode start the registered ignition key verification procedure. This applies to all ignition key registration.*



● Insert the other remaining registered ignition key to the ignition switch and turn it to “ON.”

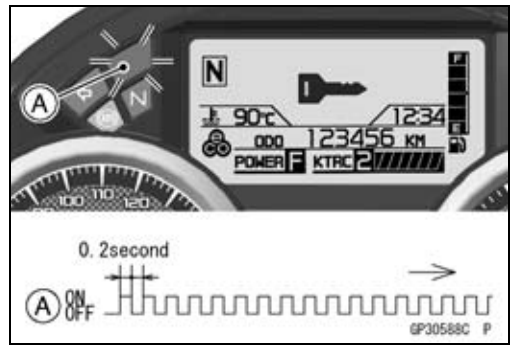
NOTE

○*Keep the other ignition keys away from the immobilizer antenna.*

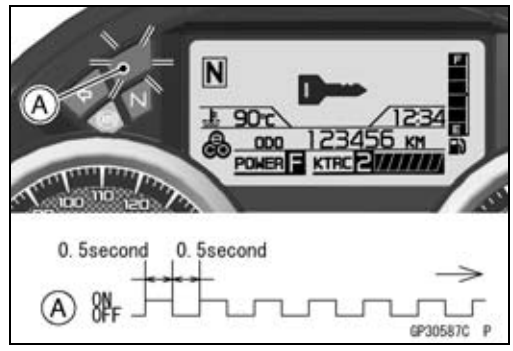
Immobilizer System (Equipped Models)

○If there is any problem in the registration, the red immobilizer indicator light (LED) [A] blinks to display the collation error.

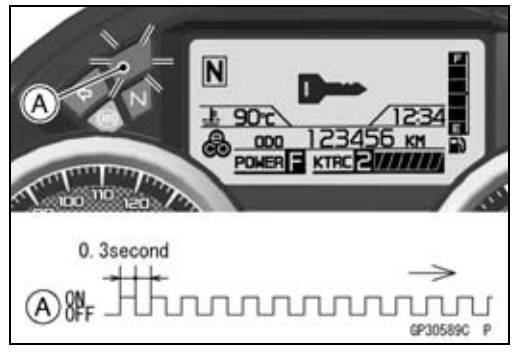
Immobilizer Amplifier Failure



When Registered Ignition Key is Inserted.

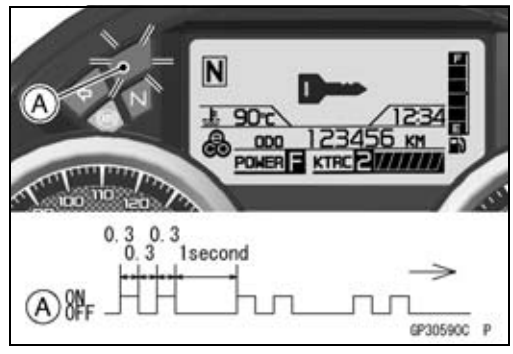


Ignition Key Collation Error



● The other remaining ignition key is registered in the ECU.

○The red immobilizer indicator light (LED) [A] blinks 2 times and stops for 1 second and then repeats this cycle to indicate successful registration of ignition key.



● Turn to “OFF” the ignition switch and wait for period more than 15 seconds.

● The registration mode automatically ends.

Immobilizer System (Equipped Models)

● The red immobilizer indicator light (LED) goes off [A].



NOTE

○*Turn the ignition switch to "ON" with the registered ignition key.*

○*Check that the engine can be started using all registered ignition keys.*

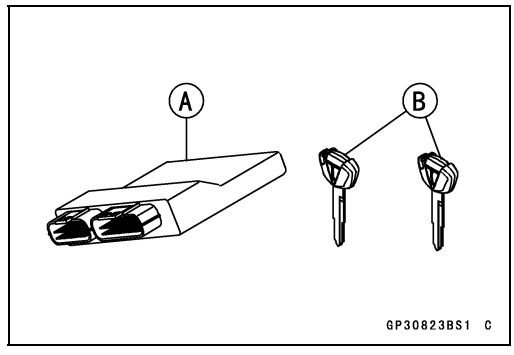
Case 4: When all registered ignition keys are faulty or lost.

The all registered ignition keys replacement is considered very rare case. However if it is required, the following is necessary.

NOTE

○*The ECU must be replaced with a new one because the registered ignition key code that is registered in the current ECU can not be rewritten.*

● Prepare a new ECU [A] and 2 new ignition keys [B].



NOTE

○*The key registration unit is not required.*

○*After replacing the ECU, be sure to register the 2 ignition keys. If the 2 keys are not registered, the engine can not be started.*

● Insert the first ignition key into the ignition switch and turn it to "ON."

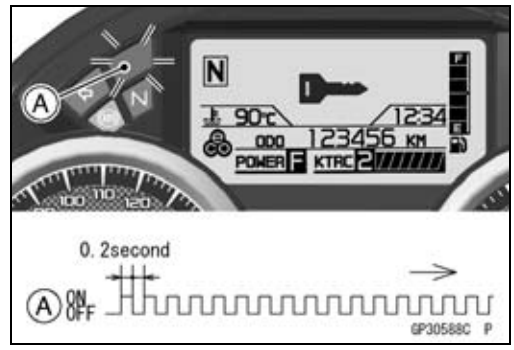
NOTE

○*Keep the other ignition key away from the immobilizer antenna.*

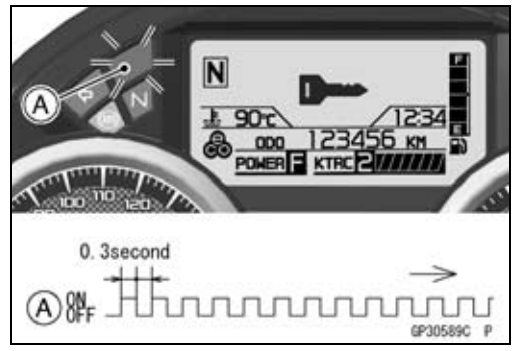
Immobilizer System (Equipped Models)

○If there is any problem in the registration, the red immobilizer indicator light (LED) [A] blinks to display the collation error.

Immobilizer Amplifier Failure

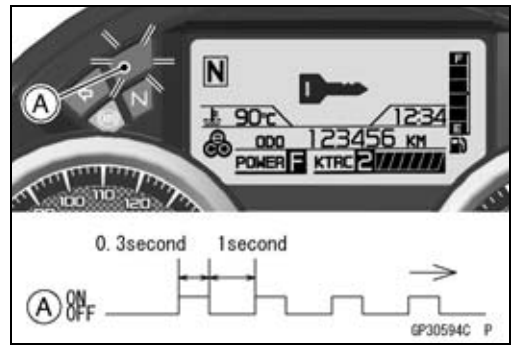


Ignition Key Collation Error



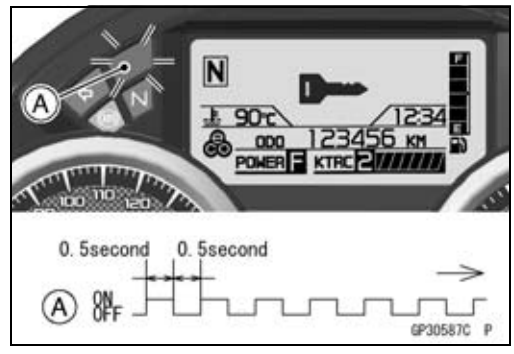
● The first ignition key is registered in the ECU.

○The red immobilizer indicator light (LED) [A] blinks 1 time and stops for 1 second and the repeats this cycle to indicate successful registration of the first ignition key.



● Turn to “OFF” the first ignition key and remove it.

● The red immobilizer indicator light (LED) [A] blinks to display the registration mode.



NOTE

○*Insert next key and turn it to “ON” within 15 seconds after previous key is turned to “OFF” and removed otherwise registration mode will be ended and the red immobilizer indicator light (LED) goes off.*

○*To return to the registration mode start the registered ignition key verification procedure. This applies to all ignition key registration.*

● Insert the second ignition key to the ignition switch and turn it to “ON.”

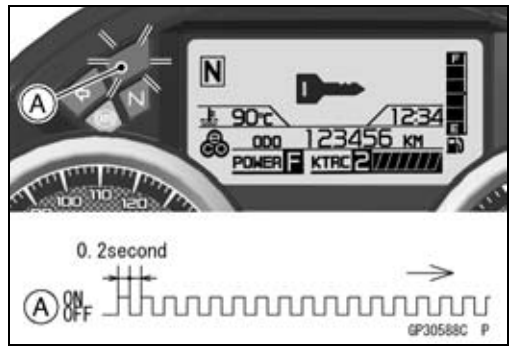
NOTE

○*Keep the other ignition keys away from the immobilizer antenna.*

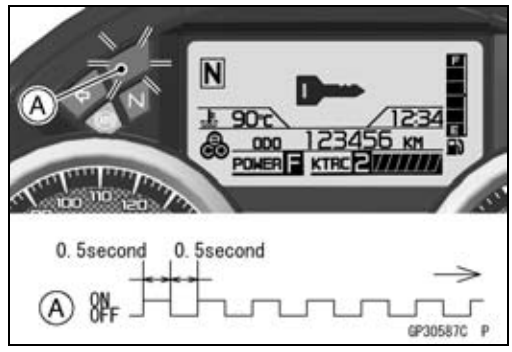
Immobilizer System (Equipped Models)

○If there is any problem in the registration, the red immobilizer indicator light (LED) [A] blinks to display the collation error.

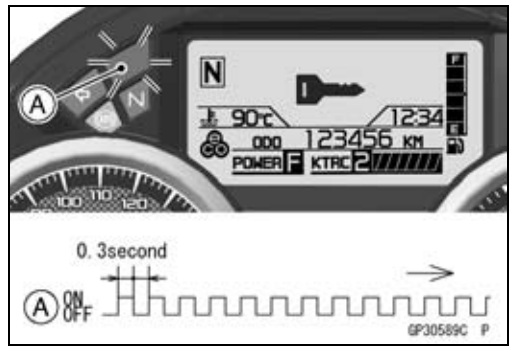
Immobilizer Amplifier Failure



When Registered Ignition Key is Inserted



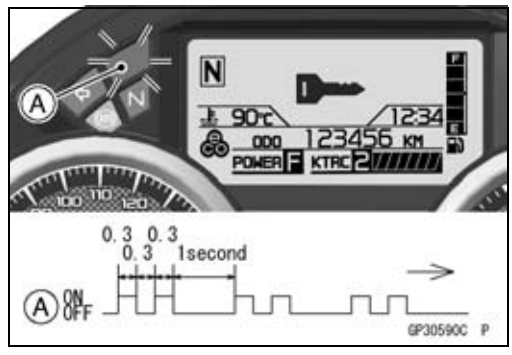
Ignition Key Collation Error



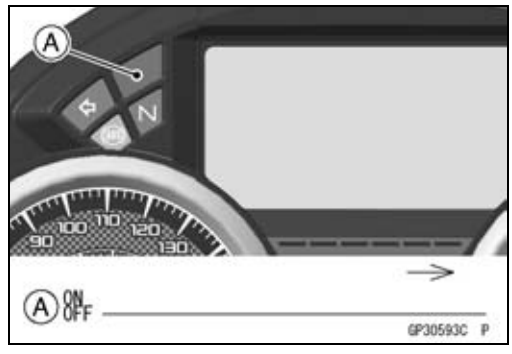
- The second ignition key is registered in the ECU.

○The red immobilizer indicator light (LED) [A] blinks 2 times and stops for 1 second and then repeats this cycle to indicate successful registration of second ignition key.

- Turn to “OFF” the ignition switch and wait for period more than 15 seconds.
- The registration mode automatically ends.



- The red immobilizer indicator light (LED) [A] goes off.



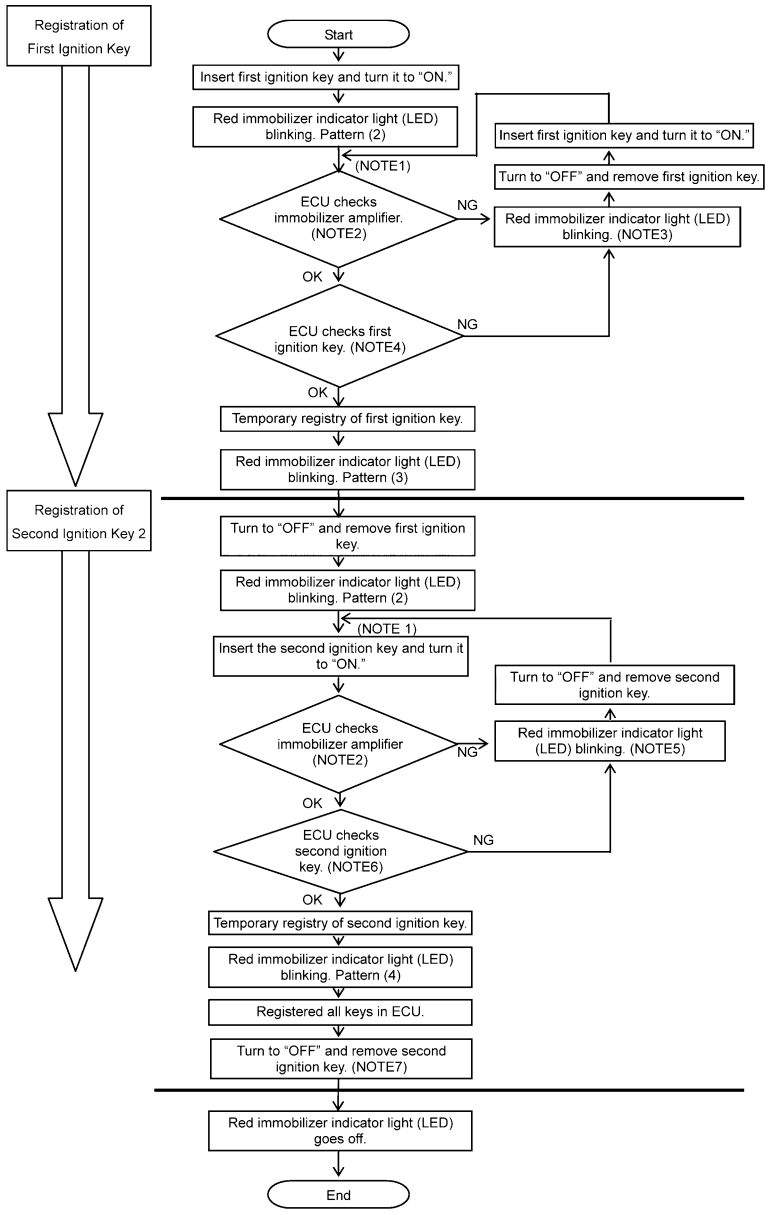
Immobilizer System (Equipped Models)

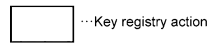
NOTE

- *Turn the ignition switch to “ON” with the registered ignition key.*
- *Check that the engine can be started using all registered ignition keys.*

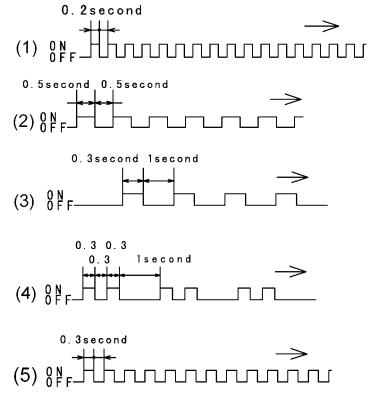
Immobilizer System (Equipped Models)

All Keys Initial Registration Flow Chart





Blinking Patterns and Number



NOTE

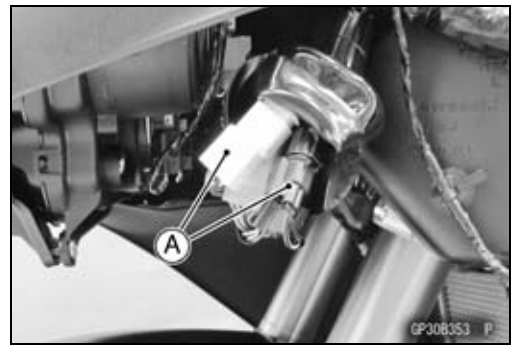
1. Key Substitute Time
   Insert next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF."
2. ECU confirms the following.
   - Power Supply of Amplifier
   - Connection of Amplifier
   - Time of Transmitting and Receiving Messages.
3. ECU confirms the following.
   - Immobilizer Amplifier Failure Pattern (1)
   - Ignition Key Collation Error Pattern (5)
4. ECU confirms the following.
   - Ignition Key or Not
   - Match the Unique Code
5. ECU confirms the following.
   - Immobilizer Amplifier Failure Pattern (1)
   - Second Ignition Key Collation Error Pattern (5)
   - Registered Ignition Key is Inserted Pattern (2)
6. ECU confirms the following.
   - Ignition Key or Not.
   - Match the Unique Code
   - Not Registered Ignition Key
7. When the ECU-registered key is turned to "OFF", ECU keeps the power on for two seconds.
   And then, in two seconds after the key is turned to "OFF", ECU turns the power off.

Immobilizer System (Equipped Models)

Immobilizer System Parts Replacement

Ignition Switch Replacement

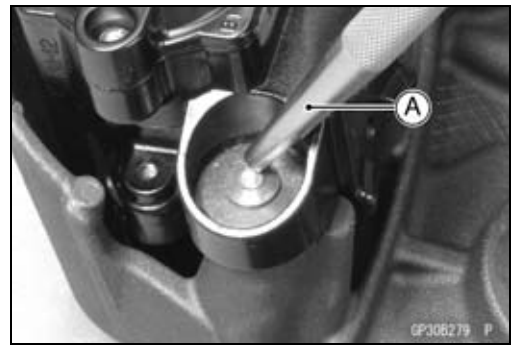
- Remove the left middle fairing (see Middle Fairing Removal in the Frame chapter).
- Disconnect the lead connectors [A].



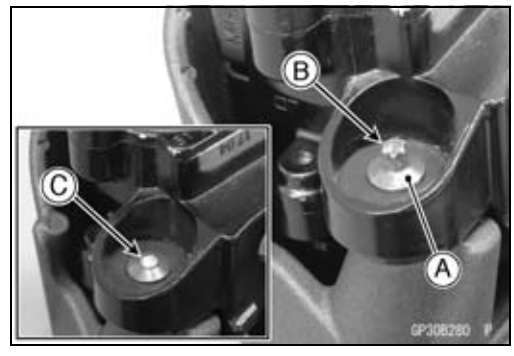
- Remove the clamp [A].



- Remove the steering stem head (see Stem, Stem Bearing Removal in the Steering chapter).
- Using a small chisel or punch [A], turn out the Torx bolts.
- Pull out the ignition switch from the steering stem head.

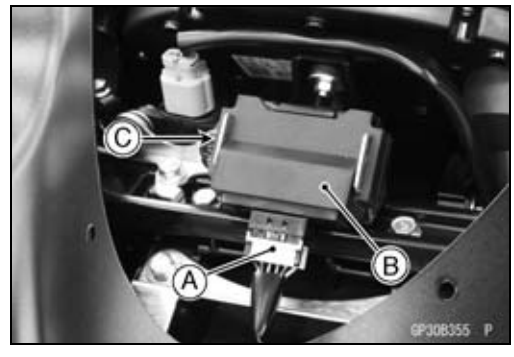


- Register the more than 2 ignition keys (see Key Registration).
- Tighten a new Torx bolts [A] until the bolt head [B] is broken.
  Broken Head of Other Side [C]
- Run the leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).



Immobilizer Amplifier Replacement

- Remove the windshield (see Windshield Removal in the Frame chapter).
- Disconnect the connector [A].
- Remove the amplifier [B] from the bracket [C].



ECU Replacement

- Refer to the ECU Removal/Installation in the Fuel System (DFI) chapter.

Immobilizer System (Equipped Models)

Registered Immobilizer Relational Parts Replacement Chart

		Failed or Lost Part			
		Ignition Keys	Ignition Switch	Amplifier	ECU
*	Ignition Key	●	○		
	Ignition Switch		●		
	Amplifier			●	
	ECU	○			●

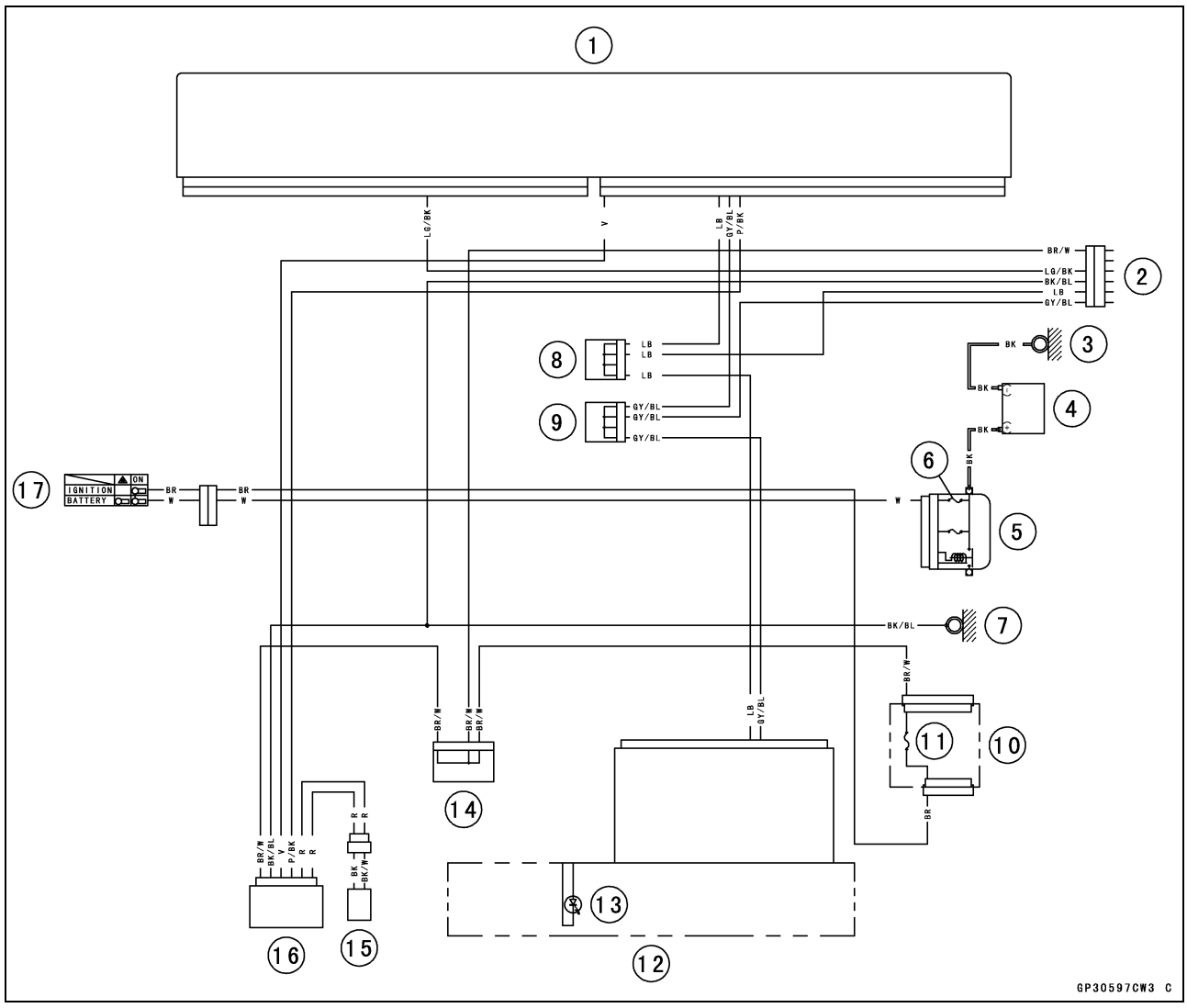
*	Replacement Part
●	Main Replacement Part
○	Additional Replacement Part

Immobilizer System Inspection

- Refer to the Immobilizer Amplifier and Blank Key Detection section in the Fuel System (DFI) chapter.

Immobilizer System (Equipped Models)

Immobilizer System Circuit



1. ECU
2. Immobilizer/Kawasaki Diagnostic System Connector
3. Frame Ground
4. Battery 12 V 12 Ah
5. Starter Relay
6. Main Fuse 30 A
7. Frame Ground (2)
8. Joint Connector D
9. Joint Connector C
10. Fuse Box (1)
11. Ignition Fuse 15 A
12. Meter Unit
13. Red Warning Indicator/Immobilizer Indicator Light (LED)
14. Joint Connector F
15. Immobilizer Antenna
16. Immobilizer Amplifier
17. Ignition Switch

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 digital meter, check to see that only the connections shown in the table have continuity.

○For the switch housings and the ignition switch, refer to the tables in the Wiring Diagram.

★If the switch has an open or short, repair it or replace it with a new one.

Rear Brake Light Switch Connections

Rear Brake Light Switch Connections		
Color	BR	BL
When brake pedal is pushed down	○——○	
When brake pedal is released		

Side Stand Switch Connections

Side Stand Switch Connections		
Color	BK	G
When side stand is down		
When side stand is up	○——○	

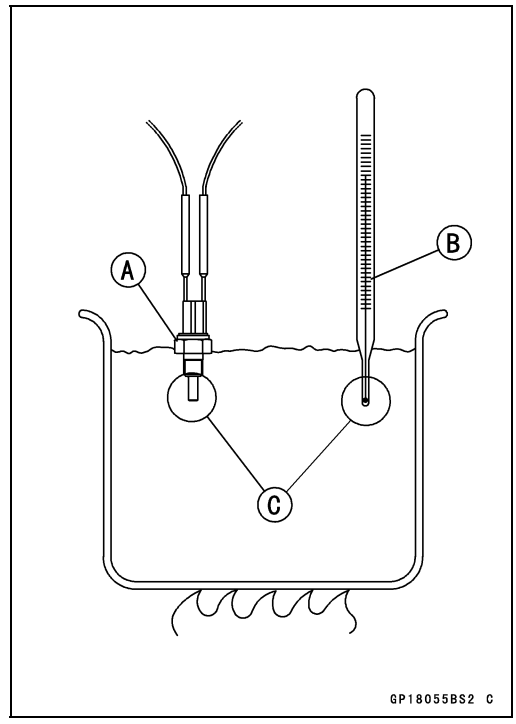
Oil Pressure Switch Connections*

Oil Pressure Switch Connections *		
Color	SW. Terminal	Ground
When engine is stopped	○——○	
When engine is running		

*: Engine lubrication system is in good condition.

Switches and Sensors

Water Temperature Sensor Inspection



- Remove the water temperature sensor (see Water Temperature Sensor Removal/Installation in the Fuel System (DFI) chapter).
- Suspend the sensor [A] in a container of coolant so that the thread portion is submerged.
- Suspend an accurate thermometer [B] with temperature -sensing portion [C] located in almost the same depth.

NOTE

○*The sensor and thermometer must not touch the container side or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using a digital meter, measure the internal resistance of the sensor.

★If the digital meter does not show the specified values, replace the sensor.

Water Temperature Sensor Resistance

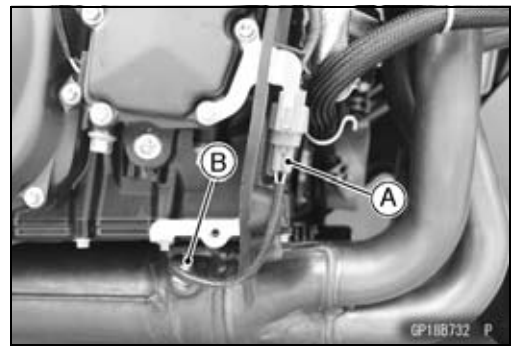
Temperature	Resistance (kΩ)
–20°C (–4°F)	*18.80 ±2.37
0°C (32°F)	*(about 6.544)
40°C (104°F)	1.136 ±0.095
100°C (212°F)	0.1553 ±0.0070

*: Reference Information

Oxygen Sensor Removal

NOTICE
Never drop the oxygen sensor especially on a hard surface. Such a shock to the sensor can damage it.

NOTICE
Do not pull strongly, twist, or bend the oxygen sensor lead. This may cause the wiring open.

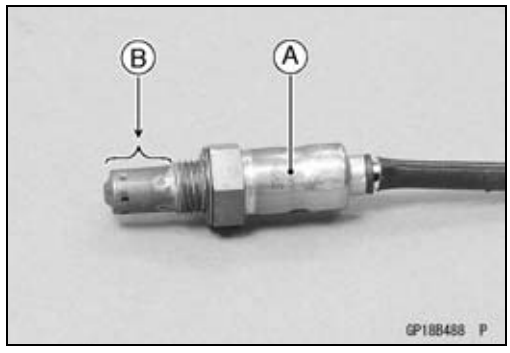


- Remove the right middle fairing (see Middle Fairing Removal in the Frame chapter).
- Disconnect the oxygen sensor lead connector [A] and remove the oxygen sensor [B].

Switches and Sensors

Oxygen Sensor Installation

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 Sensor: 25 N·m (2.5 kgf·m, 18 ft·lb)

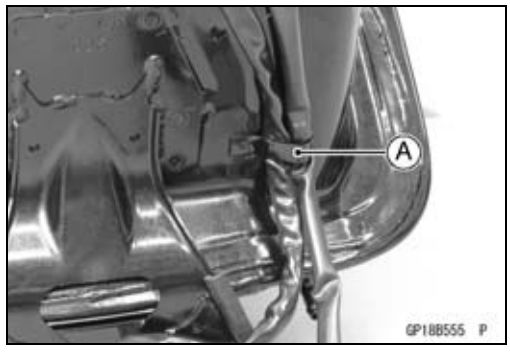
- Run the oxygen sensor lead correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the right middle fairing (see Middle Fairing Installation in the Frame chapter).

Oxygen Sensor Inspection

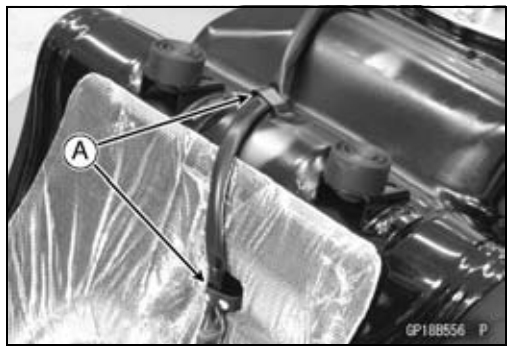
- Refer to the Oxygen Sensor Inspection in the Fuel System (DFI) chapter.

Fuel Level Sensor Inspection

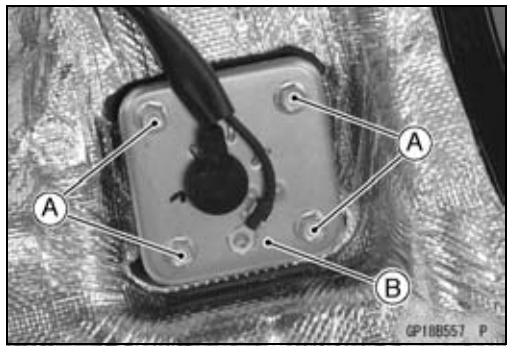
- Remove:
  Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)
- Open the clamp [A].



- Open the clamps [A].



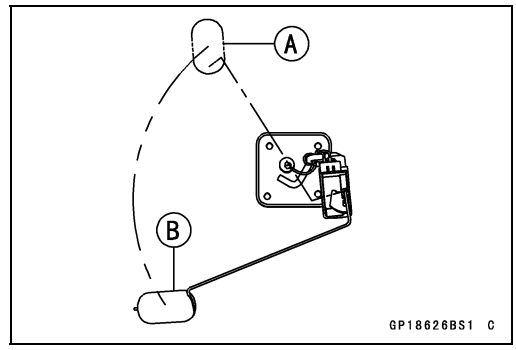
- Remove:
  Bolts [A]
  Fuel Level Sensor [B]



Switches and Sensors

- Check that the float moves up and down smoothly without binding. It should go down under its own weight.

★If the float does not move smoothly, replace the sensor.
Float in Full Position [A]
Float in Empty Position [B]

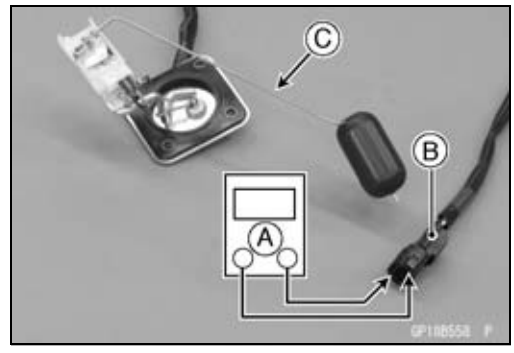


- Using a digital meter [A], measure the resistance across the terminals in the fuel level sensor lead connector [B].

Special Tool - Needle Adapter Set: 57001-1457

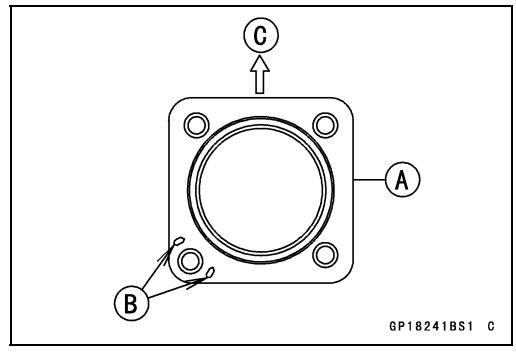
★If the digital meter readings are not as specified, or do not change smoothly according as the float moves up and down, replace the sensor.

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.
Hollows [B]
Front [C]
- Apply a non-permanent locking agent to the threads of the fuel level sensor bolts and tighten them.

Torque - Fuel Level Sensor Bolts: 7.0 N·m (0.71 kgf·m, 62 in·lb)



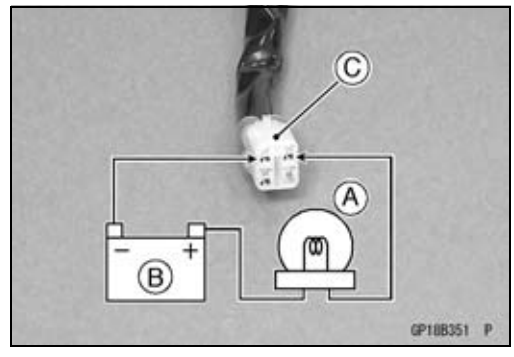
Fuel Reserve Switch Inspection

- 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 lead connector [C].

Connections
Battery (+) → 12 V 3.4 W Bulb (one side)
12 V 3.4 W Bulb (other side) → R/BK Lead Terminal
Battery (–) → BK/W Lead Terminal

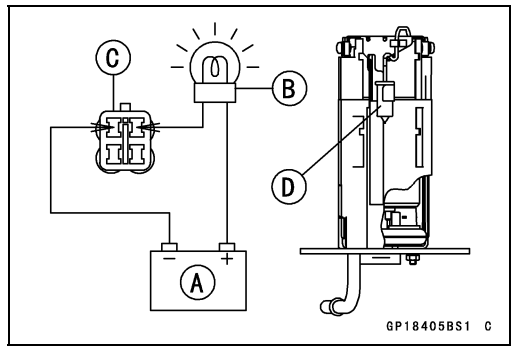
Special Tool - Needle Adapter Set: 57001-1457

★If the test light turn on, the reserve switch is defective. Replace the fuel pump.



Switches and Sensors

- 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 lead connector as shown.
  12 V Battery [A]
  Test Light [B]
  Fuel Pump Lead Connector [C]
  Fuel Reserve Switch [D]



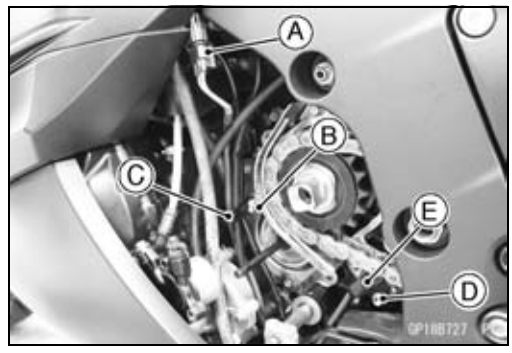
★If the test light doesn't light, replace the fuel pump.

NOTE

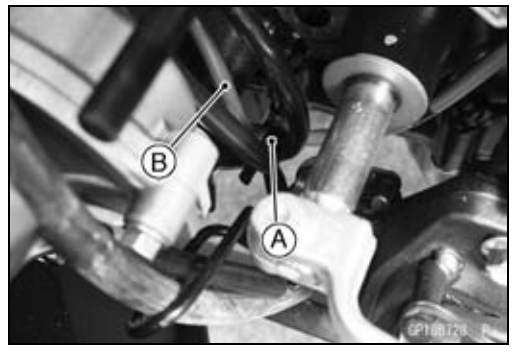
○*It may take a long time to turn on the test light in case that the fuel reserve switch is inspected just after the fuel pump is removed. Leave the fuel reserve switch with leads for inspection connected for few minutes.*

Gear Position Sensor Removal

- Remove the engine sprocket cover (see Engine Sprocket Removal in the Final Drive chapter).
- Disconnect the gear position sensor connector [A].
- Remove:
  Clamp Bolt [B]
  Clamp [C]
  Gear Position Sensor Bolt [D]
  Gear Position Sensor [E]

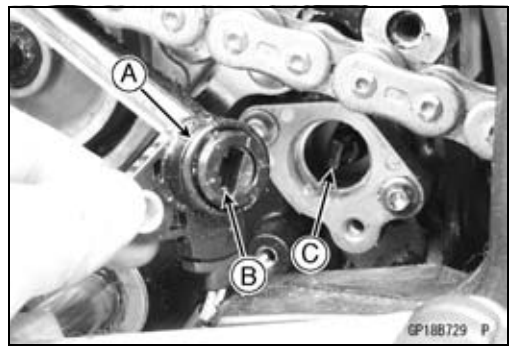


- Open the band [A] to clear the gear position sensor lead [B].



Gear Position Sensor Installation

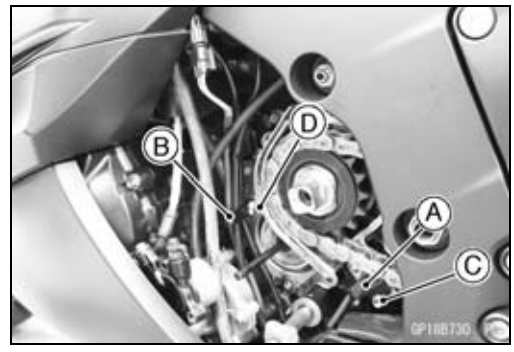
- Replace the O-ring [A] with a new one.
- Apply grease to the O-ring.
- Install the gear position sensor so that the slit [B] fits to the projection [C] of the holder.



Switches and Sensors

- Install:
  Gear Position Sensor [A]
  Clamp [B]
- Apply a non-permanent locking agent to the threads of the gear position sensor bolt [C].
- Tighten:

Torque - Gear Position Sensor Bolt: 10 N·m (1.0 kgf·m, 89 in·lb)
Clamp Bolt [D]: 8.0 N·m (0.82 kgf·m, 71 in·lb)



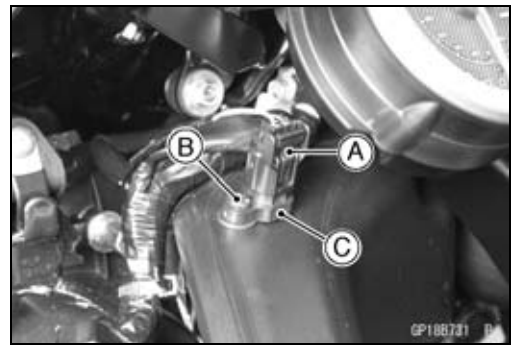
- Run the leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).

Gear Position Sensor Inspection

- Refer to the Gear Position Sensor Output Voltage Inspection in the Fuel System (DFI) chapter.

Outside Temperature Sensor Removal

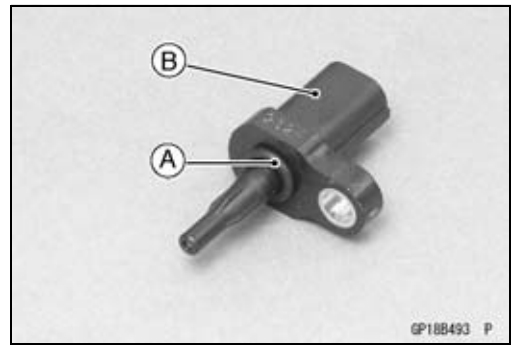
- Remove the left inner cover (see Inner Cover Removal in the Frame chapter).
- Disconnect the outside temperature sensor connector [A].
- Remove:
  Screw [B]
  Outside Temperature Sensor [C]



Outside Temperature Sensor Installation

- Installation is the reverse of removal.
- Check that the O-ring [A] is in place on the outside temperature sensor [B].
- Tighten:

Torque - Outside Temperature Sensor Screw: 0.50 N·m (0.05 kgf·m, 4.4 in·lb)



Switches and Sensors

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.

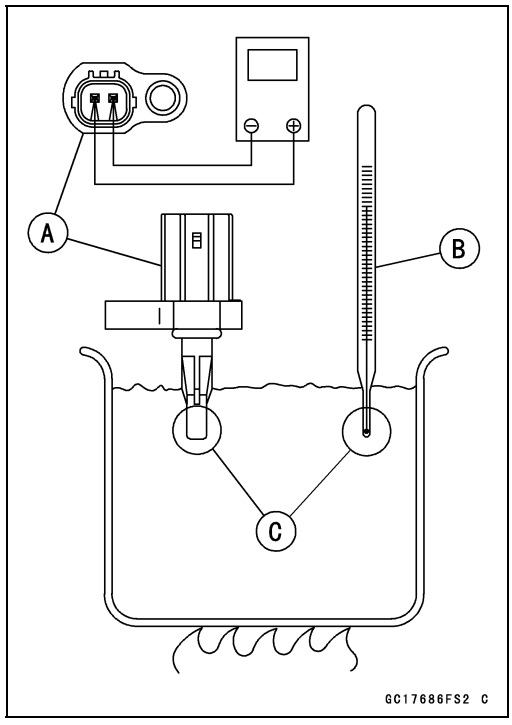
NOTE

○*The sensor and thermometer must not touch the container side or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the 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 ~ 6.6 kΩ @0°C (32°F)
0.29 ~ 0.39 kΩ @80°C (176°F)

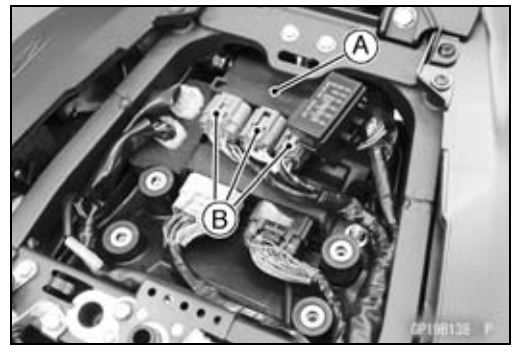
★If the reading is out of the standard, replace the sensor.



Relay Box

Relay Box Removal

NOTICE
Never drop the relay box especially on a hard surface. Such a shock to the relay box can damage it.



- Remove:
  Seat (see Seat Removal in the Frame chapter)
  Tool Kit Case (see ECU Removal in the Fuel System (DFI) chapter)
- Take out the relay box [A] and disconnect the connectors [B].

NOTE

○*The relay box has relays and diodes. The relays and diodes can not be removed.*

Relay Circuit Inspection

- Remove the relay box (see Relay Box Removal).
- Check conductivity of the following numbered terminals by connecting a 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.

Relay Circuit Inspection (with the battery disconnected)

	Tester Connection	Tester Reading (Ω)
Headlight Circuit Relay	1-3	∞
ECU Main Relay	6-7	∞
	4-5	Not ∞*
Fuel Pump Relay	7-8	∞
	9-10	Not ∞*
Starter Circuit Relay	11-16	∞
	11-12	∞
Fan Relay	17-20	∞
	18-19	Not ∞*

*: The actual reading varies with the tester used.

Relay Box

Relay Circuit Inspection (with the battery connected)

	Battery Connection (+) (–)	Tester Connection	Tester Reading (Ω)
Headlight Circuit Relay	2-11	1-3	0
ECU Main Relay	4-5	7-6	0
Fuel Pump Relay	9-10	7-8	0
Fan Relay	18-19	17-20	0

	Battery Connection (+) (–)	Tester Connection (+) (–)	Tester Reading (V)
Starter Circuit Relay	16-12	11-12	Battery Voltage

(+): Apply positive lead.
(–): Apply negative lead.

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

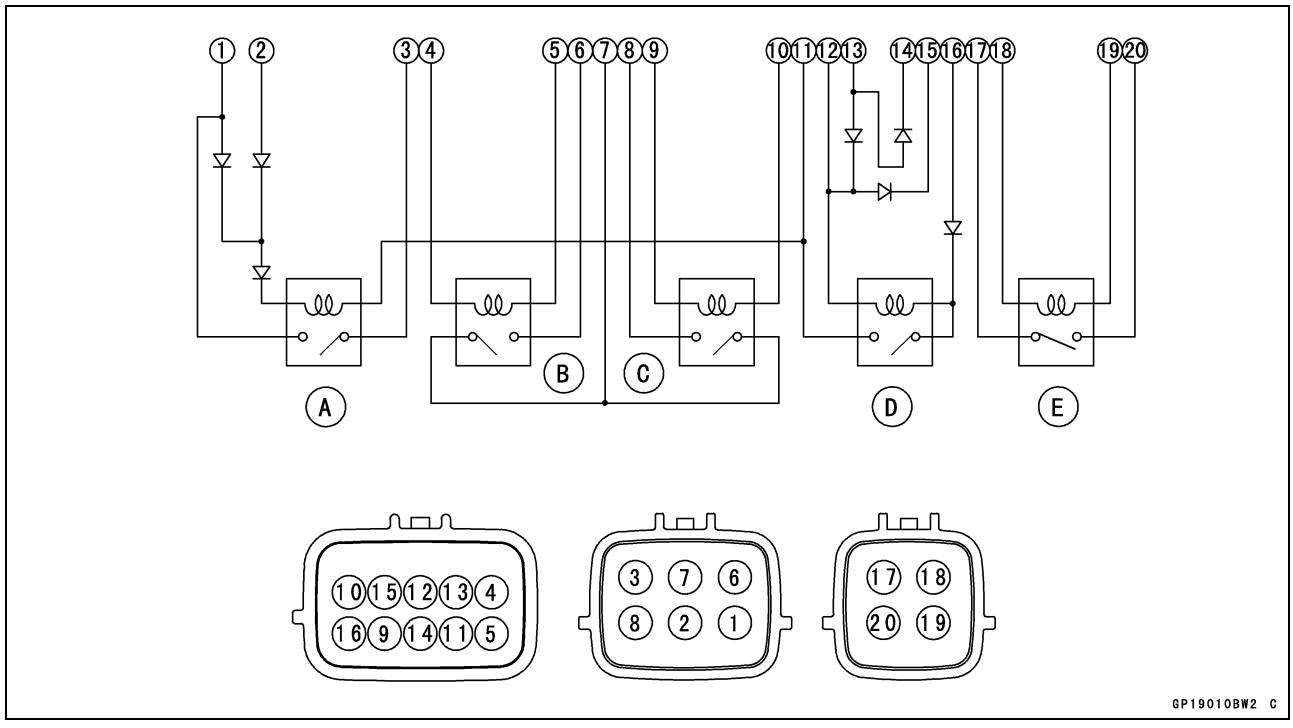
★The resistance should be low in one direction and more than 10 times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the relay box must be replaced.

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

Relay Box Internal Circuit

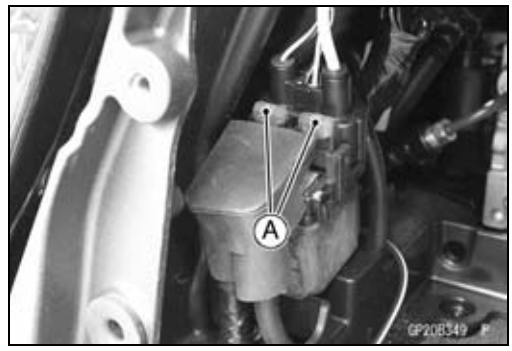


A: Headlight Circuit Relay
B: ECU Main Relay
C: Fuel Pump Relay
D: Starter Circuit Relay
E: Fan Relay

Fuse

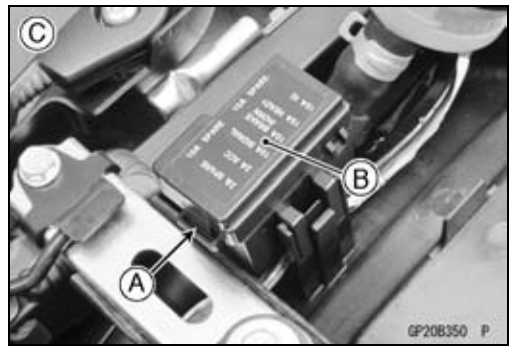
30 A Main/15 A ECU Fuse Removal

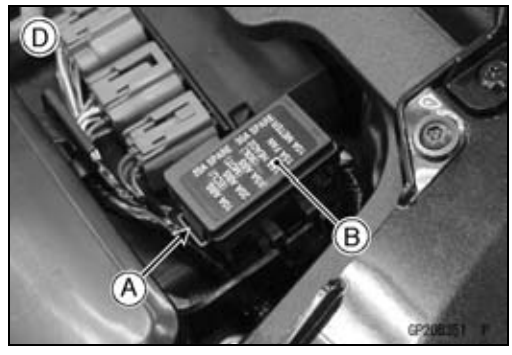
- Remove the battery (see Battery Removal).
- Pull out the fuses [A] from the starter relay with needle nose pliers.



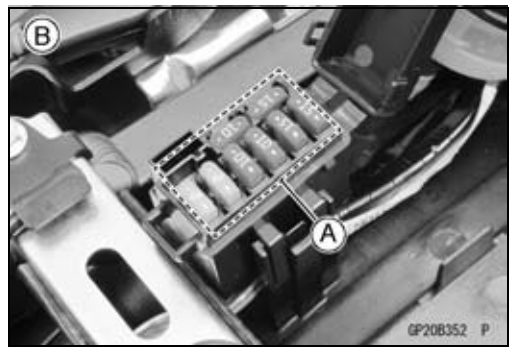
Fuse Box Fuse Removal

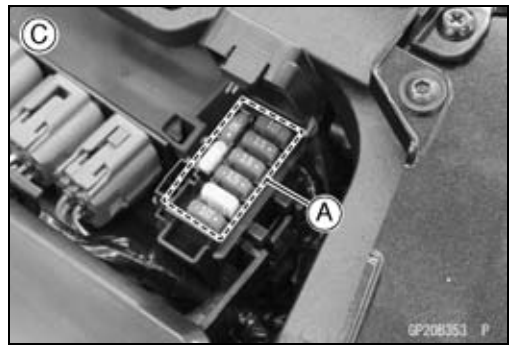
- Remove the seat (see Seat Removal in the Frame chapter).
- Unlock the hook [A] to lift up the lid [B].
  Fuse Box (1) [C]
  Fuse Box (2) [D]





- Pull the fuses [A] straight out of the fuse box with needle nose pliers.
  Fuse Box (1) [B]
  Fuse Box (2) [C]





Fuse

Fuse Installation

★If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of proper amperage.

● Install the fuse box fuses on the original position as specified on the lid.

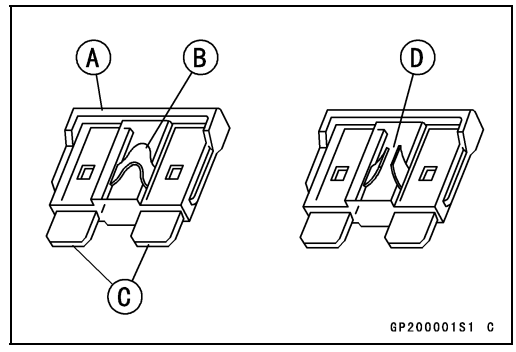
Fuse Inspection

● Remove the fuse (see 30 A Main/Fuse Box/15 A ECU Fuse Removal).

● Inspect the fuse element.

★If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

Housing [A]
Fuse Element [B]
Terminals [C]
Blown Element [D]



NOTE

○*A mass current flows to the battery according to the state of the battery which needs refreshing charge when the engine is turned causing main fuse blown out.*

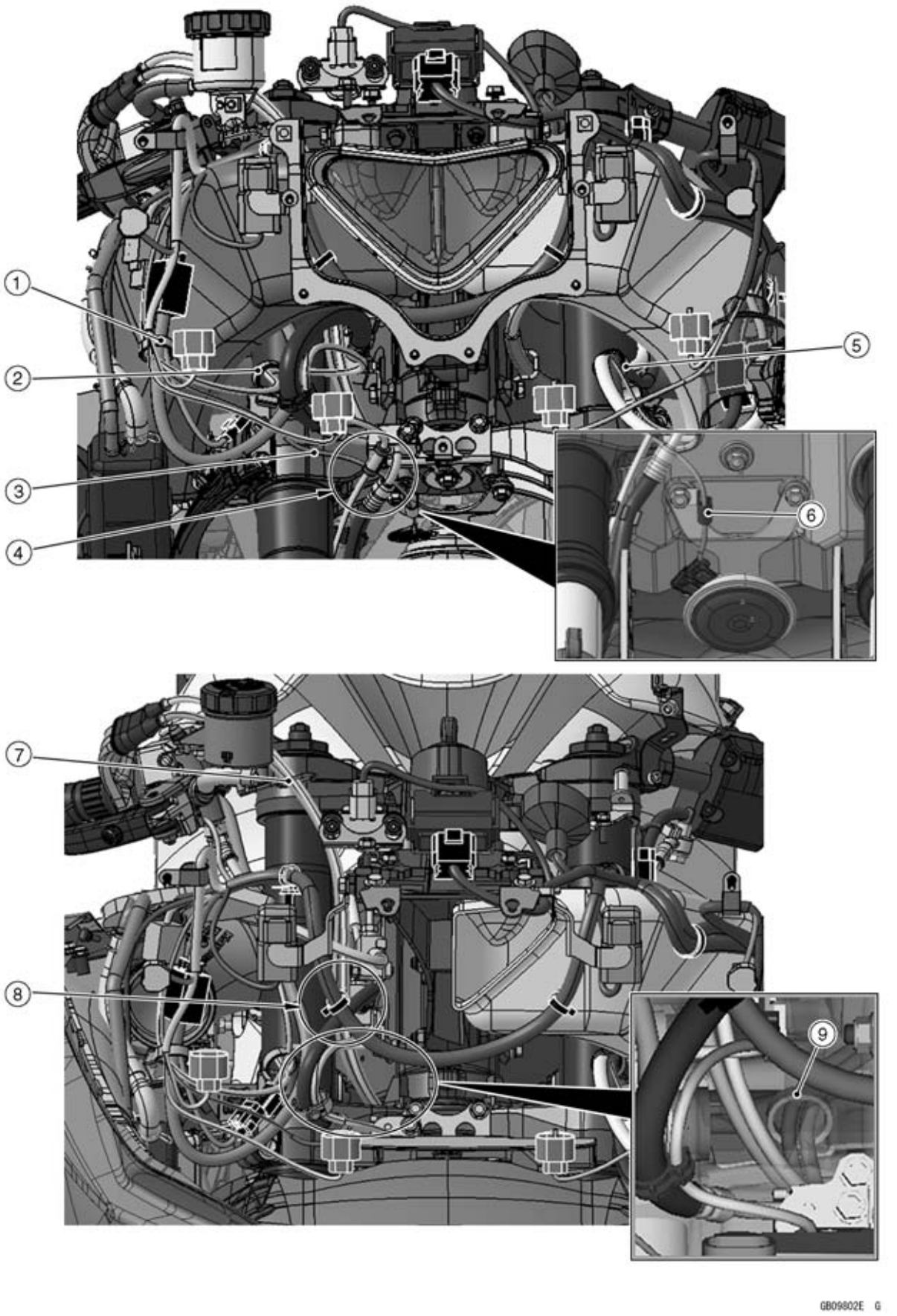
NOTICE
When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

Appendix

Table of Contents

Cable, Wire, and Hose Routing 17-2
Troubleshooting Guide 17-52

Cable, Wire, and Hose Routing

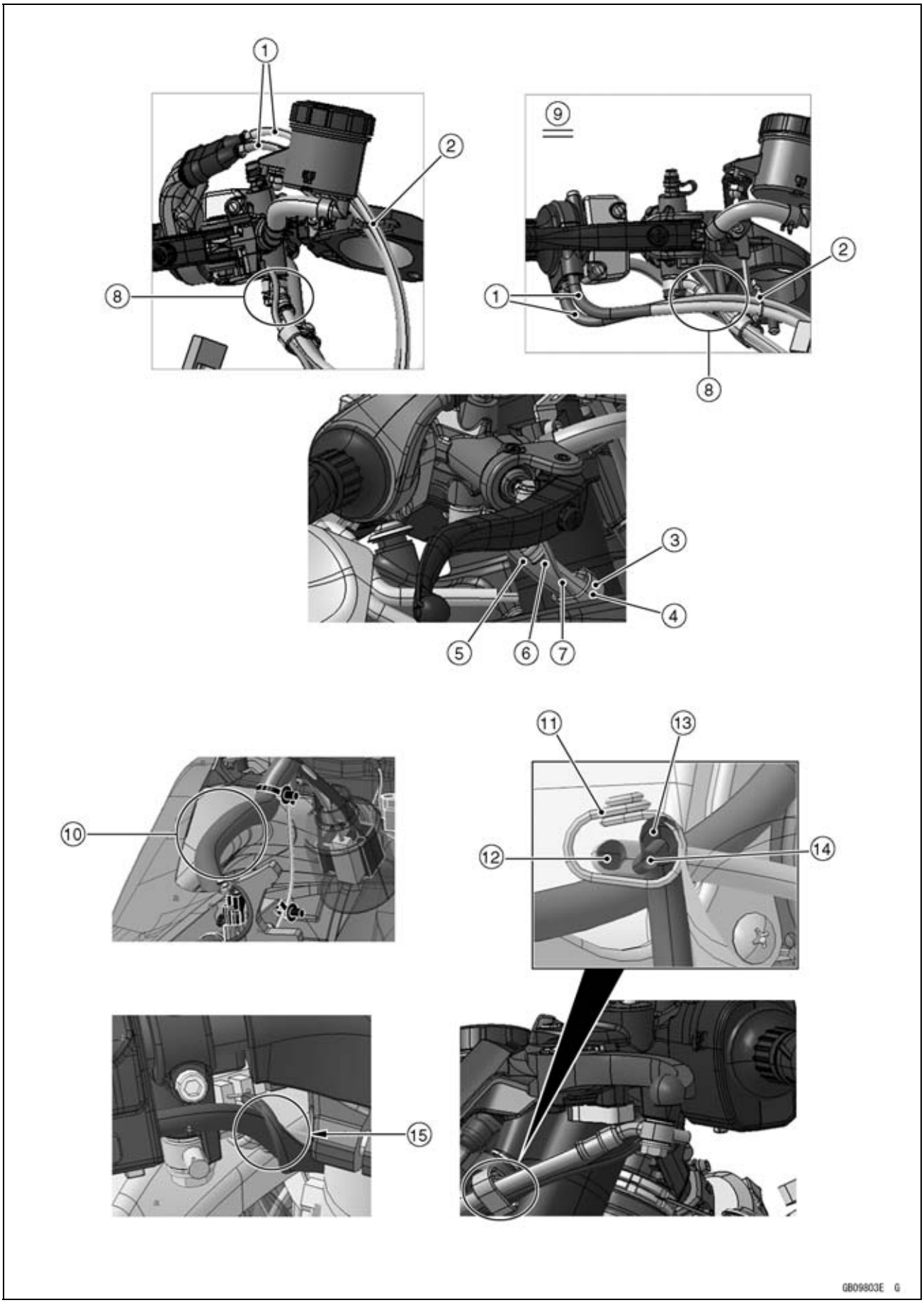


Cable, Wire, and Hose Routing

1. Run the right switch housing lead, horn lead and front wheel rotation sensor lead through the clamp.
2. Do not run the horn lead through the clamp on the steering stem.
3. Horn Lead
4. Run the horn lead between the brake hose and front fork.
5. Run the left switch housing lead, ignition switch lead and *immobilizer lead through the clamp. Pull the leads forward so that they have no slack near the front fork.
6. Install the clamp as shown, and hold the white tape position of the horn lead.
7. Run the throttle cables through the clamp of the front brake reservoir bracket.
8. Run the throttle cables to the inside of the brake hose.
9. Run the throttle cables through the clamp of the radiator cover.

*: Immobilizer Equipped Models

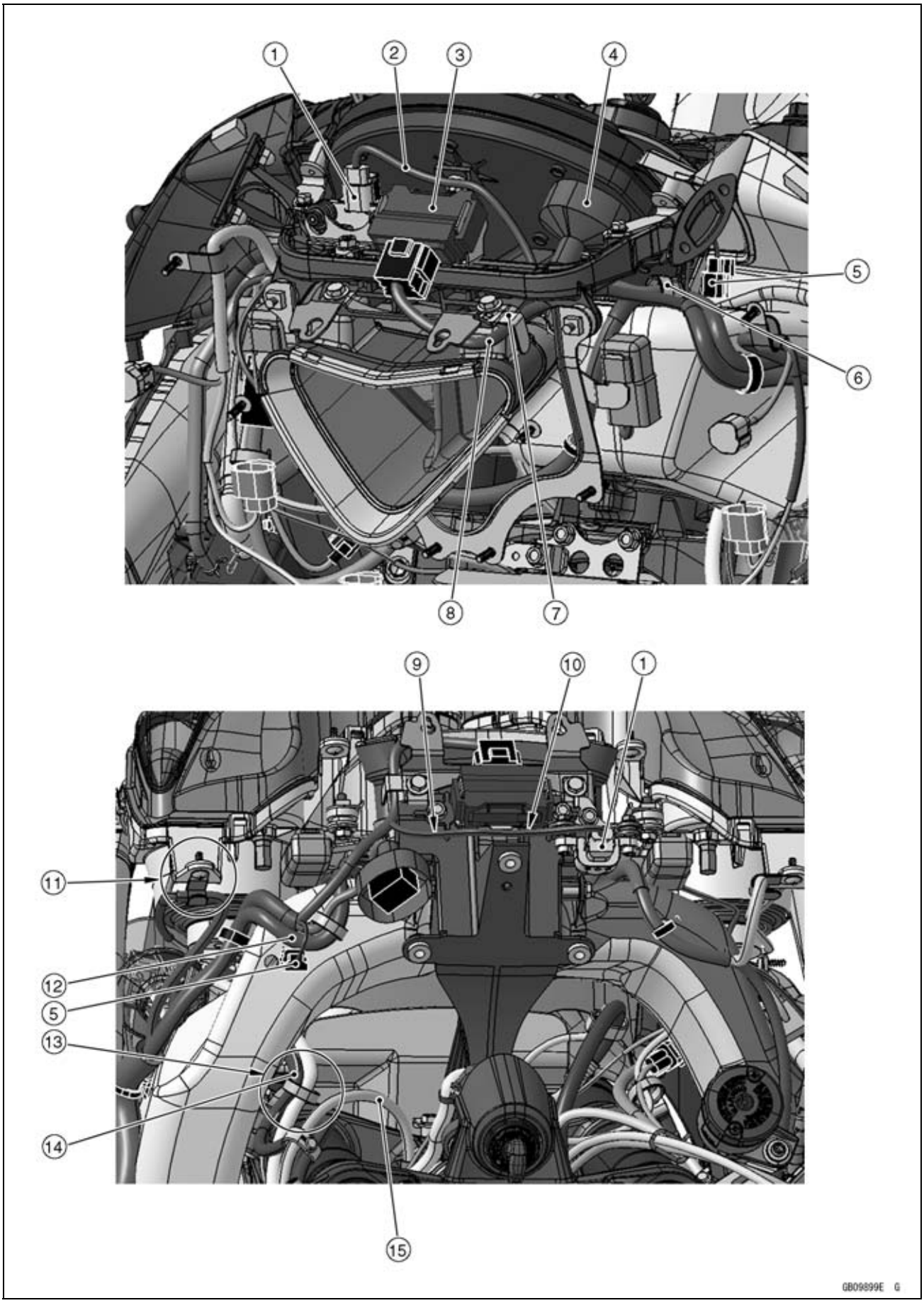
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Throttle Cables
2. Run the throttle cables through the clamp of the front brake reservoir bracket.
3. Clamp (For ZX1400H model, hold the right switch housing lead, front brake light switch lead and brake hose as shown.)
4. Clamp (For ZX1400J model, hold the right switch housing lead, front brake light switch lead and brake hose at the rubber protector of the brake hose as shown.)
5. Right Switch Housing Lead
6. Brake Hose
7. Front Brake Light Switch Lead
8. Make sure that the right switch housing lead and brake light switch lead has no slack, after the clamp.
9. Up Handlebar (ID, SEA-B1, PH, TH and MY models)
10. Run the main harness to the upside of the projection on left middle fairing as shown.
11. Clamp (Hold the left switch housing lead, brake hose and starter lockout switch lead as shown.)
12. Clutch Hose
13. Left Switch Housing Lead
14. Starter Lockout Switch Lead
15. Run the starter lockout switch lead to the upside from inside of the left switch housing lead. Make sure that the left switch housing lead and starter lockout switch lead has no slack, after the clamp.

Cable, Wire, and Hose Routing

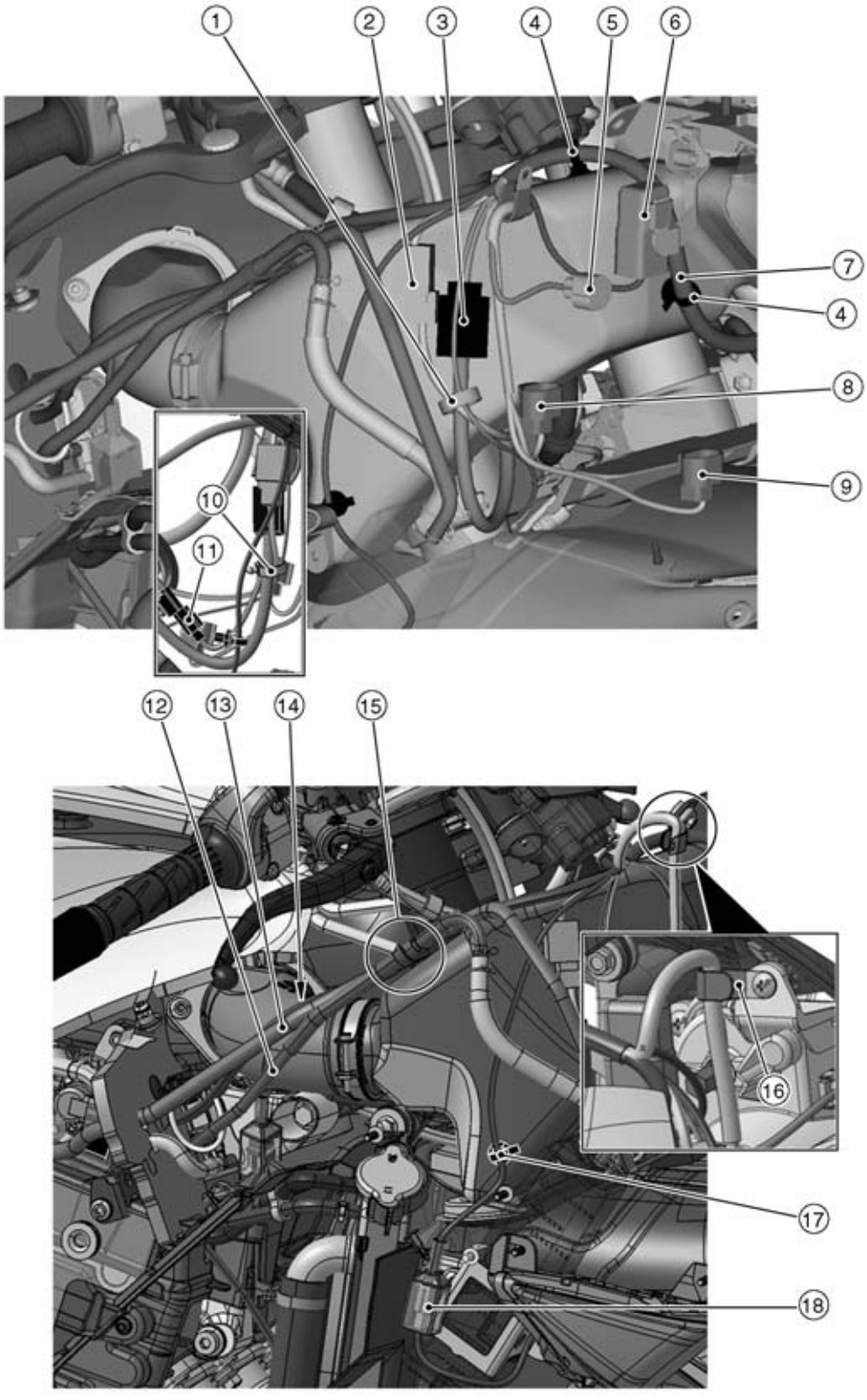


Cable, Wire, and Hose Routing

1. Vehicle-down Sensor
2. *Run the vehicle-down sensor lead between the meter bracket and immobilizer amplifier.
3. *Immobilizer Amplifier
4. Meter Unit Connector
5. Outside Temperature Sensor
6. Clamp (Hold the main harness and meter unit lead.)
7. *Run the immobilizer amplifier lead to the inside of the clamp as shown.
8. *Immobilizer Amplifier Lead
9. Run the vehicle-down sensor lead to the front of the meter unit lead.
10. Run the vehicle-down sensor lead in front of the meter bracket.
11. Clamp (Hook the main harness from the inside to the outside of the motorcycle.)
12. Run the main harness to the front of the outside temperature sensor.
13. Clamp (Hold the left switch housing lead and ignition switch lead.)
14. Run the left switch housing lead through the clamp after routing the outside of the front fork.
15. Run the clutch hose between the front fork and head pipe.

*: Immobilizer Equipped Models

Cable, Wire, and Hose Routing



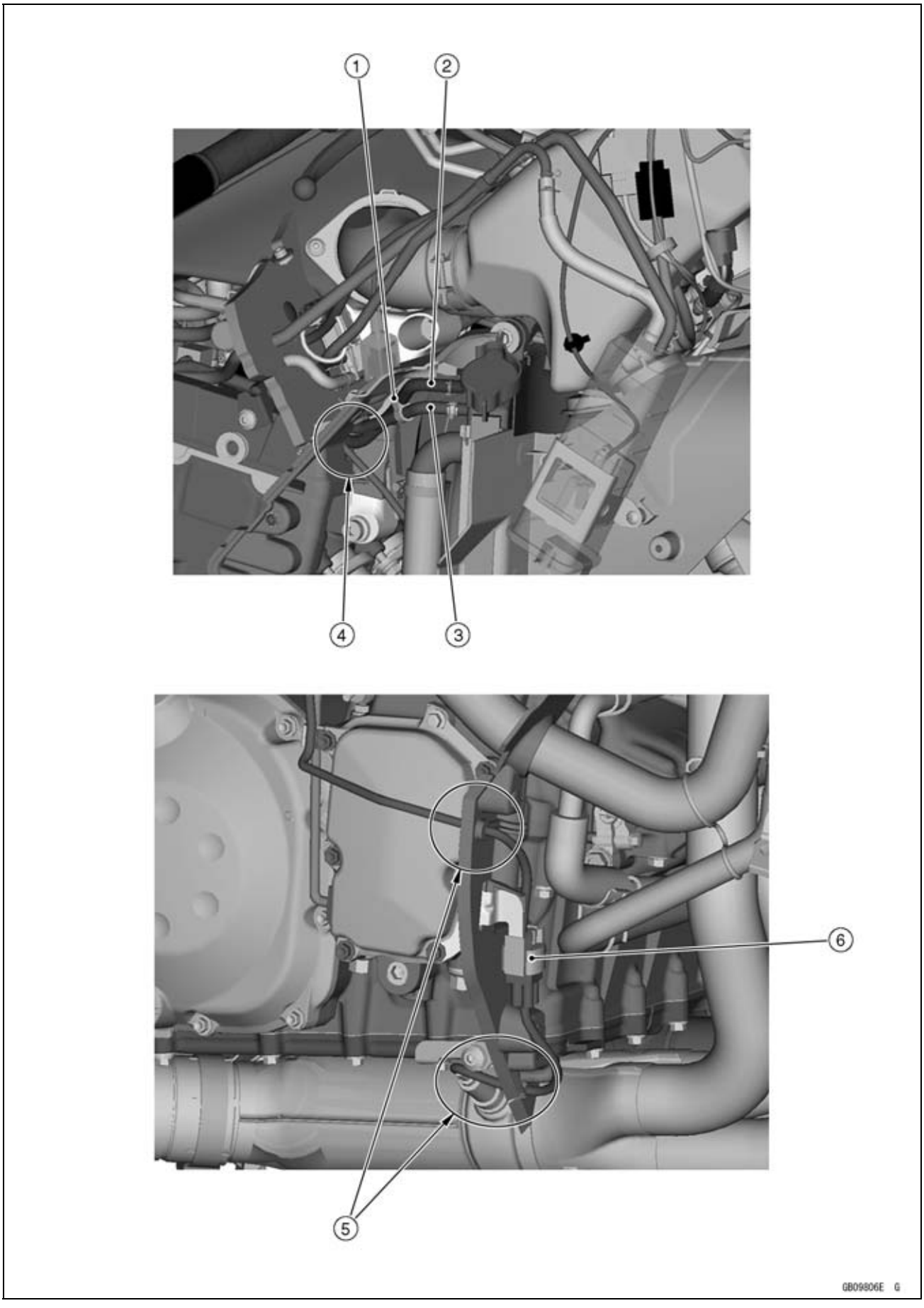
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Cable, Wire, and Hose Routing

1. Clamp (Hold the front wheel rotation sensor lead, right switch housing lead and horn lead.) (ZX1400H)
2. Front Wheel Rotation Sensor Lead Connector
3. Right Switch Housing Lead Connector
4. Clamps (Insert the clamps of the main harness to the middle air intake duct.)
5. City Light Lead Connector
6. Headlight Relay
7. Position the main harness near the middle air intake duct to prevent it contact with the relay bracket.
8. Headlight Lead Connector (High)
9. Headlight Lead Connector (Low)
10. Clamp (Hold the front wheel rotation sensor lead, right switch housing lead, horn lead and brake switch lead.) (ZX1400J)
11. Brake Switch Connector (ZX1400J)
12. *Green Hose
13. *Blue Hose
14. Main Harness (Insert the clamps of the main harness to the middle air intake duct to hold it.)
15. Clamp (Hold the main harness, *green hose and *blue hose, and insert the clamp into the middle air intake duct.)
16. Clamp (Hook the headlight lead as shown.)
17. Clamp (Insert the clamp of the front right turn signal light lead to the middle air intake duct.)
18. Front Right Turn Signal Light Lead Connector

*: Evaporative Emission Control System Equipped Models

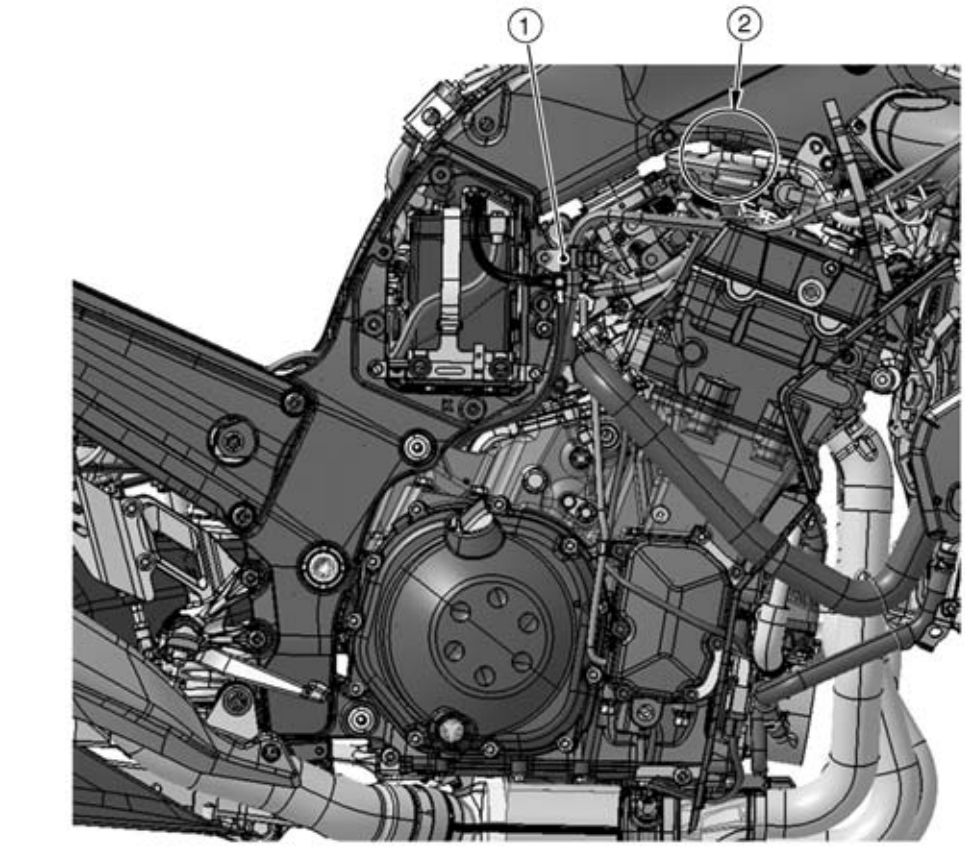
Cable, Wire, and Hose Routing

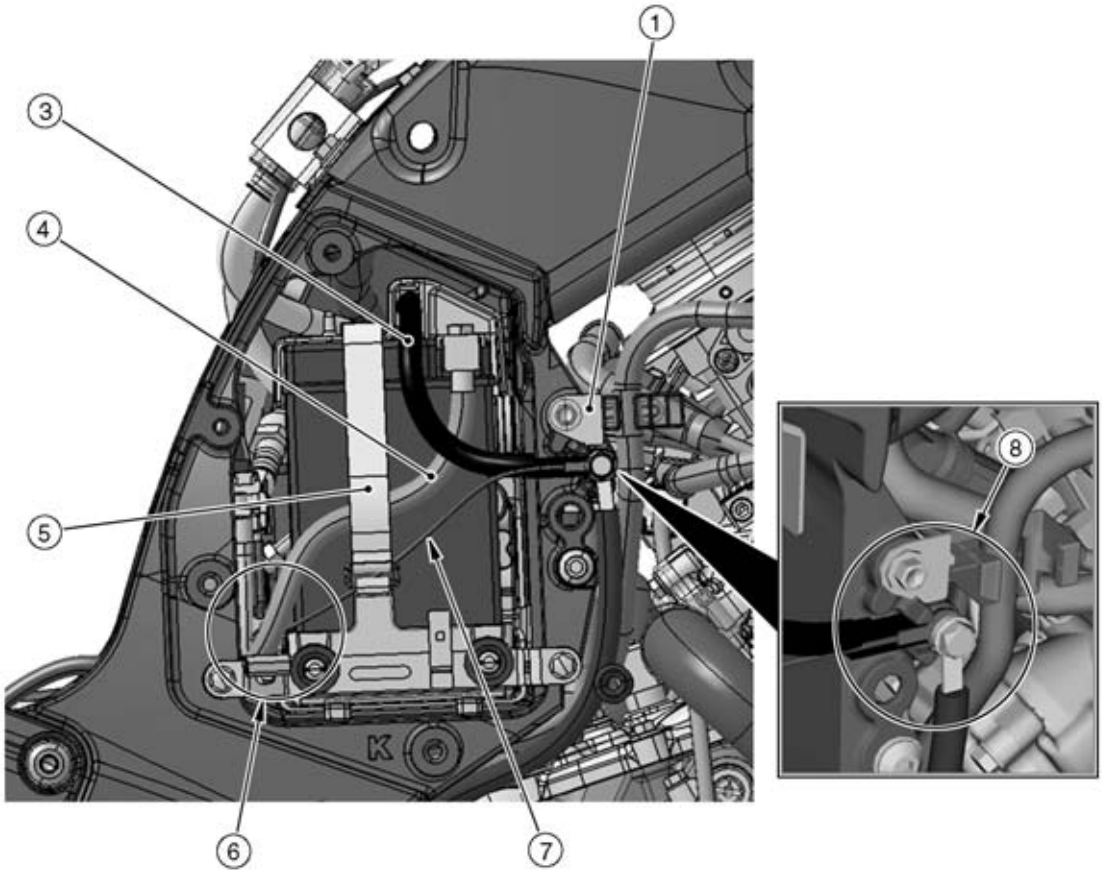


Cable, Wire, and Hose Routing

1. Clamp (Hold the reserve tank hose and air bleeder hose as shown.)
2. Reserve Tank Hose
3. Air Bleeder Hose
4. Run the air bleeder hose, reserve tank hose and right fan motor lead into the hole of the right inner rubber cover from top to bottom. Run the right fan motor lead to the outside of the two hoses.
5. Run the oxygen sensor lead into the holes of the right inner rubber cover.
6. Oxygen Sensor Lead Connector

Cable, Wire, and Hose Routing





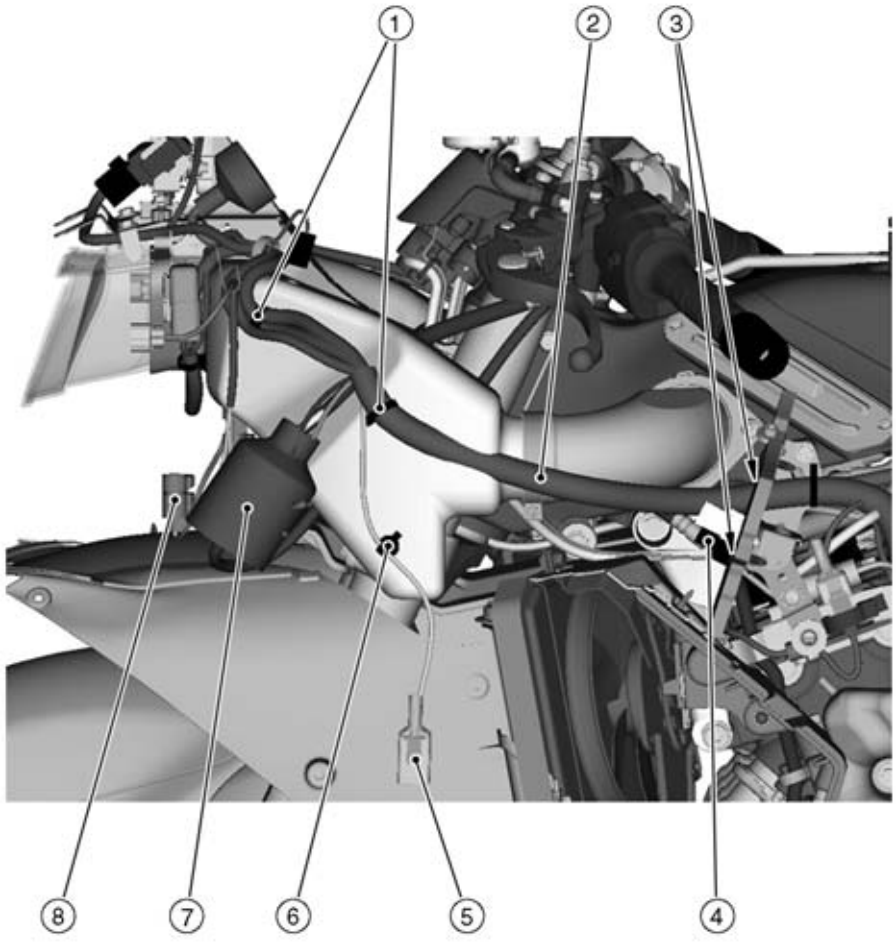
GB09901E G

Cable, Wire, and Hose Routing

1. *Clamp (Hold the blue hose, and align the clamp with the blue tape of the hose.)
2. Insert the idle speed control valve hose into the air cleaner so that its white painted mark is hidden a half.
3. Battery Negative (–) Cable
4. Battery Positive (+) Cable
5. Fix the battery positive (+) cable and battery ground lead with the band.
6. Run the battery ground lead to the inside of the battery positive (+) cable.
7. Battery Ground Lead
8. Tighten the bolt together with the battery ground lead, engine ground cable and battery negative (–) cable from the frame side as shown.

*: Evaporative Emission Control System Equipped Models

Cable, Wire, and Hose Routing

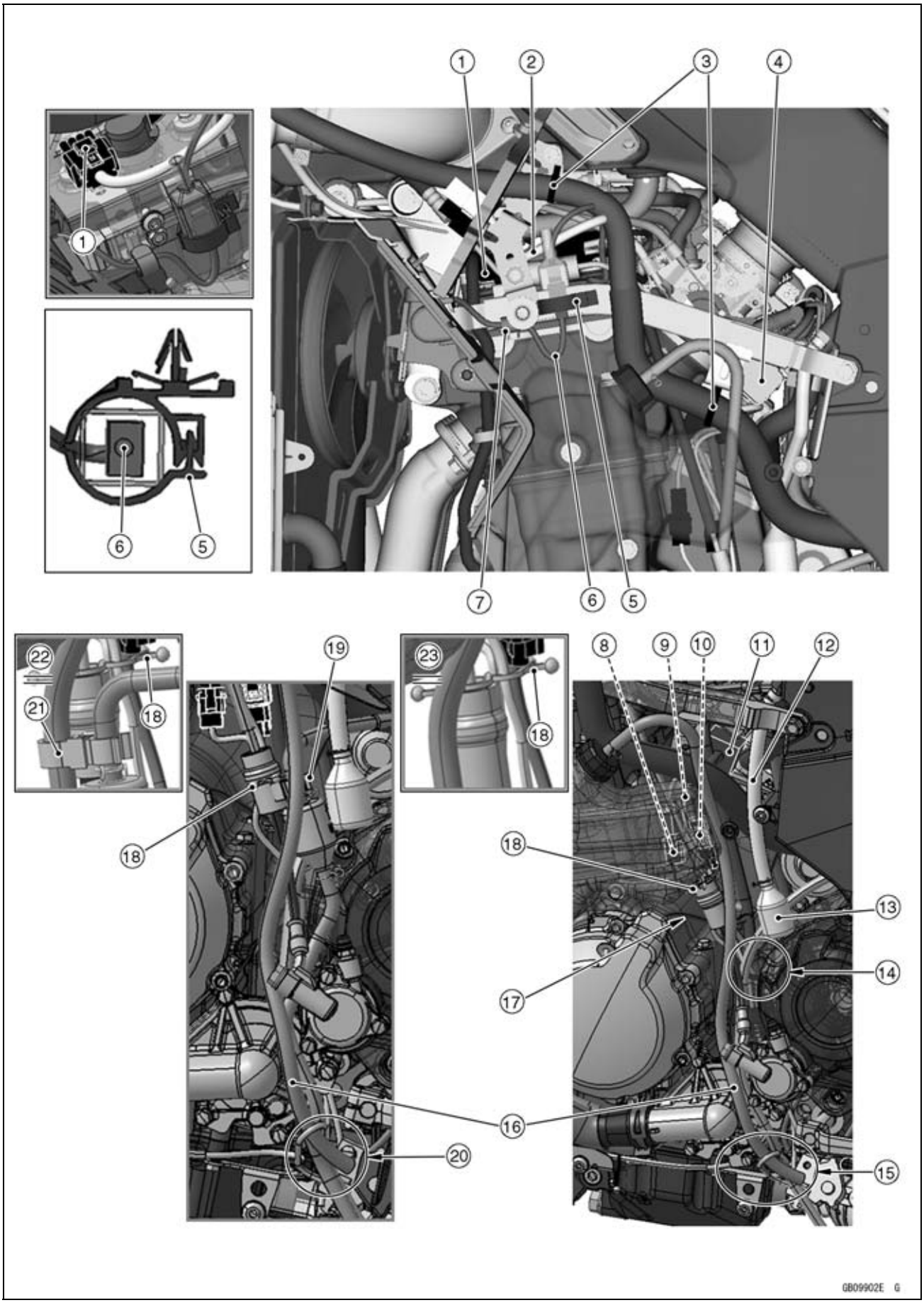


GB09808E G

Cable, Wire, and Hose Routing

1. Clamps (Insert the clamps of the main harness to the middle air intake duct.)
2. Main Harness
3. Run the main harness and clutch hose into the hole of the pad.
4. Clutch Hose
5. Front Left Turn Signal Light Lead Connector
6. Clamp (Hold the front left turn signal light lead, and insert the clamp into the middle air intake duct.)
7. Cover (Cover the ignition switch lead connector and left switch housing lead connector as shown.)
8. Headlight Lead Connector

Cable, Wire, and Hose Routing

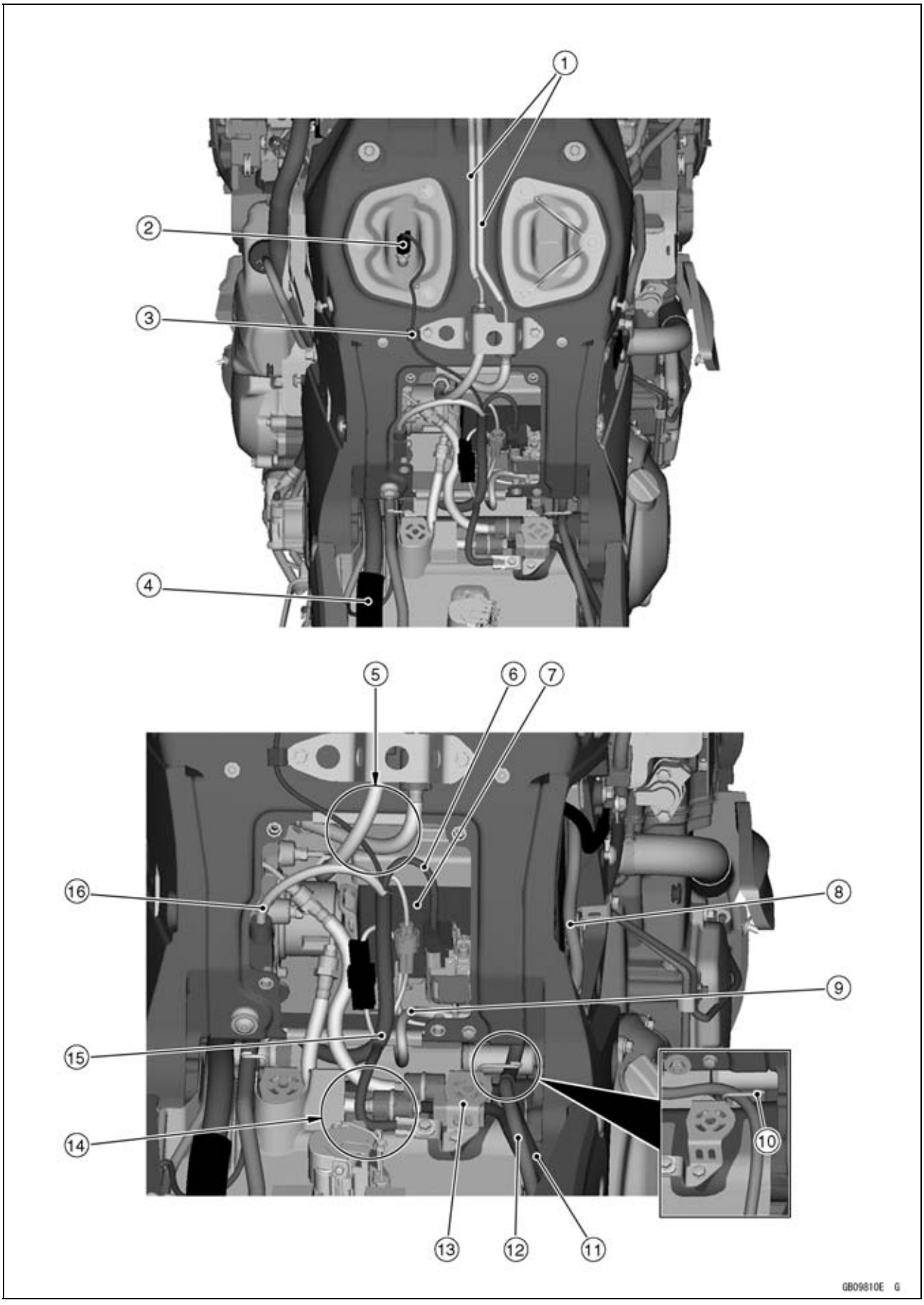


Cable, Wire, and Hose Routing

1. Stick Coil Lead Connector (Hold the main harness to the stick coil lead connector by inserting it to the bracket of the subframe.)
2. Run the main harness to the outside of the throttle cables. Run the main harness to the inside of the bracket.
3. Clamps (Insert the clamps of the main harness to the brackets.)
4. Throttle Body Subharness Connector
5. Clamp (Hold the left fan motor lead connector, and insert the clamp into the subframe with its opening faces to the rear.)
6. Left Fan Motor Lead
7. Clamp (Hold the left fan motor lead.)
8. Side Stand Switch Lead Connector
9. Oil Pressure Switch Lead
10. Gear Position Sensor Lead Connector
11. Main Harness Connector (Insert the connector to the bracket and hold it.)
12. Run the air cleaner drain hose to the outside of the main harness.
13. Air Cleaner Drain Tank (Put the air cleaner drain tank as shown.)
14. Run the side stand switch lead, gear position sensor lead, oil pressure switch lead and water hose through the notch of the engine sprocket cover into the inside of the cover.
15. Run the reserve tank overflow hose and drain hose through the clamp of the side stand.
16. Run the reserve tank overflow hose to the most outside of the frame.
17. Run the alternator lead to the most inside of the leads and hoses.
18. Clamp (Hold the clutch hose, side stand switch lead, gear position sensor lead and oil pressure switch lead.)
    Larger Diameter Side → Side Stand Switch Lead, Gear Position Sensor Lead and Oil Pressure Switch Lead
    Smaller Diameter Side → Clutch Hose
19. *Clamp (Hold the fuel tank breather hose and clutch hose.)
20. *Run the reserve tank overflow hose, drain hose and fuel tank breather hose through the clamp of the side stand.
21. *Clamp (Hold the fuel tank breather hose and reserve tank overflow hose.)
22. Other than ZX1400J evaporative emission control system equipped models.
23. ZX1400J Evaporative emission control system equipped models

*: Other than Evaporative Emission Control System Equipped Models

Cable, Wire, and Hose Routing

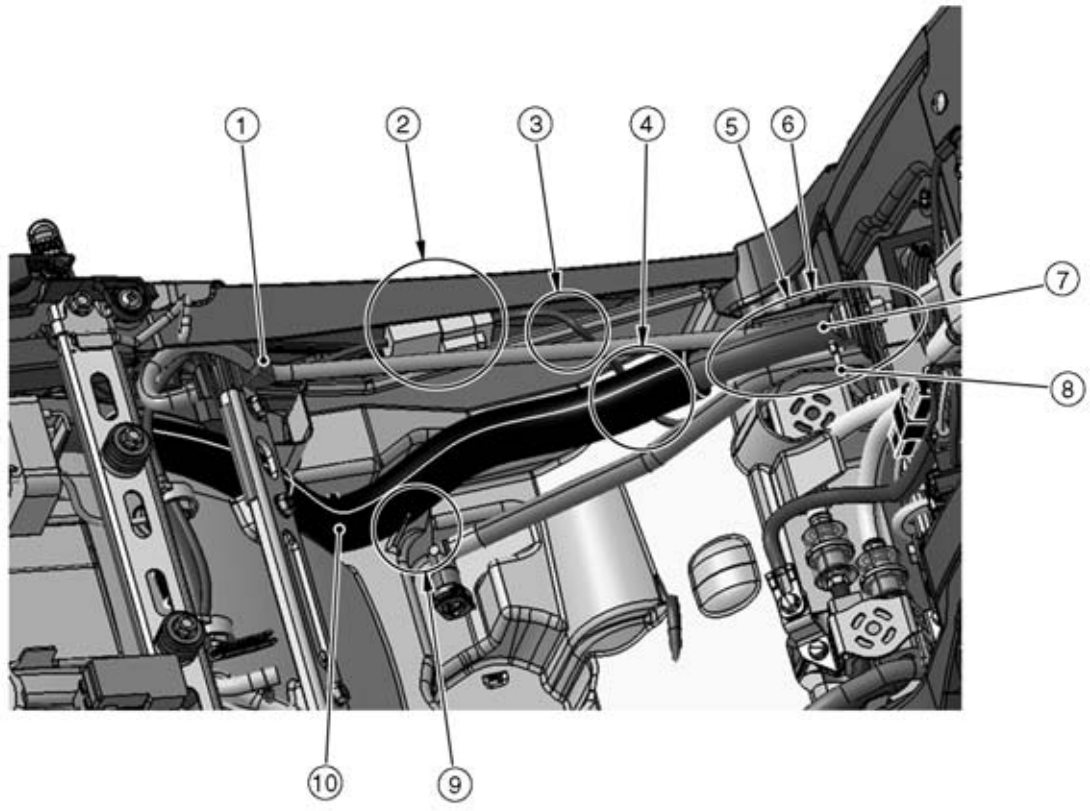


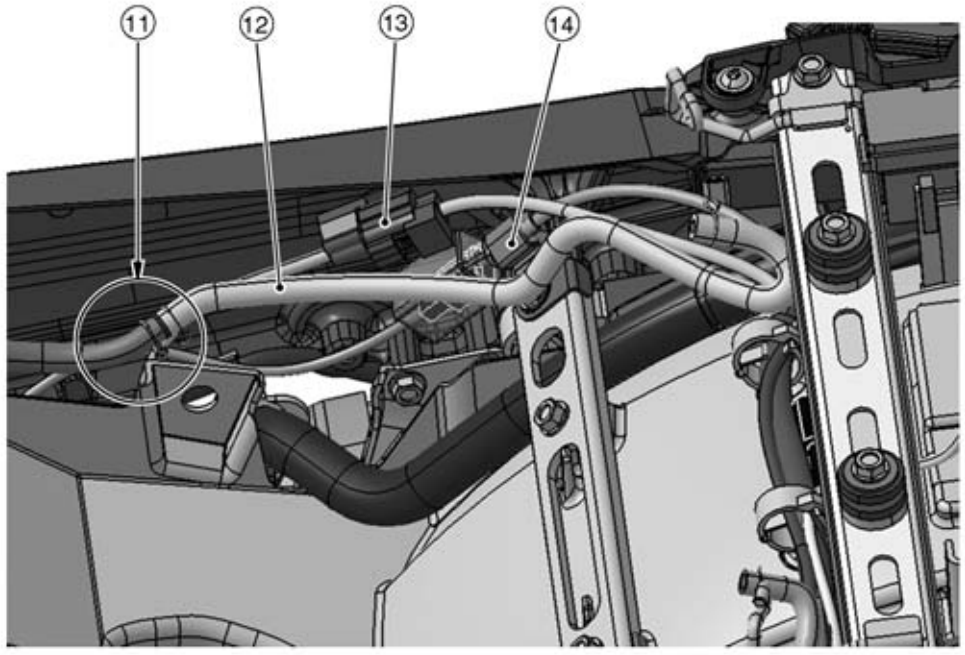
Cable, Wire, and Hose Routing

1. ABS Brake Pipes
2. Intake Air Temperature Sensor
3. Clamp (Hold the white tape position of the intake air temperature sensor lead.)
4. Main Harness
5. Intake Air Temperature Sensor Lead (Run the intake air temperature sensor lead between the ABS brake pipes. Take care not to pinch the intake air temperature sensor lead by the cover.)
6. Starter Relay Lead
7. Run the battery ground lead to the front of the starter relay.
8. Battery Negative (–) Cable
9. Starter Motor Cable
10. Align the tape portion of the hose with bracket.
11. Run the brake pipes under the *Blue hoses.
12. *Blue Hose
13. Align the projection of the damper with hole of the bracket.
14. Run the frame ground lead to the left of the motorcycle as shown. Push down the frame ground lead to prevent it from running over the rear fender. Run the frame ground lead over the ABS brake pipes.
15. Run the leads through the cutout of the cover.
16. ABS Hydraulic Unit Lead

*: Evaporative Emission Control System Equipped Models

Cable, Wire, and Hose Routing





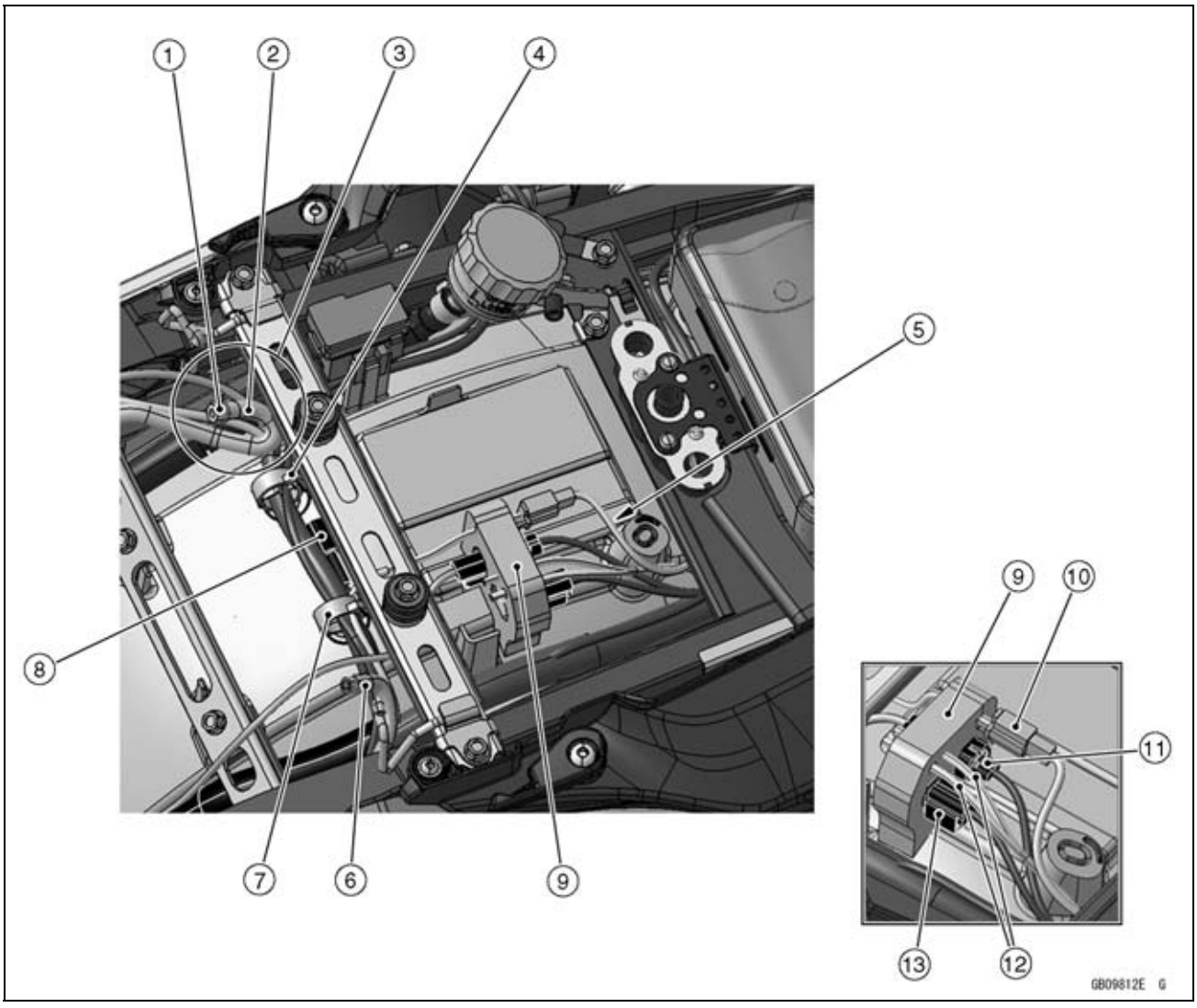
GB09811E G

Cable, Wire, and Hose Routing

1. Clamp (Hold the white tape position of the alternator lead, and yellow tape position of the drain hose.)
2. Alternator Lead Connector (Put into the alternator lead connector between the rear fender and rear frame.)
3. Run the alternator lead to the most outside.
4. Run the alternator lead under the main harness as shown.
5. Run the alternator lead under the fuel hose. Take care not to pinch the alternator lead by the rear fender and main harness.
6. Run the drain hose, main harness and fuel hose from the left side of the motorcycle.
7. Align the white tape portion of the main harness with the end of the battery case to fix main harness position.
8. Align the yellow tape portion of the drain hose with clamp.
9. Run the main harness between the rear fender and rib. Take care not to run the main harness over the rib.
10. Band (Hold the main harness at the white tape position of the main harness, and insert the band to the rear fender.)
11. Run the rear brake light switch lead to the outside of the *blue hose and rear wheel rotation sensor lead.
12. *Run the blue hose under the rear wheel rotation sensor lead connector.
13. Rear Wheel Rotation Sensor Lead Connector (Insert the rear wheel rotation sensor lead connector to the bracket.)
14. Clamp (Hold the rear brake light switch lead as shown.)

*: Evaporative Emission Control System Equipped Models

Cable, Wire, and Hose Routing

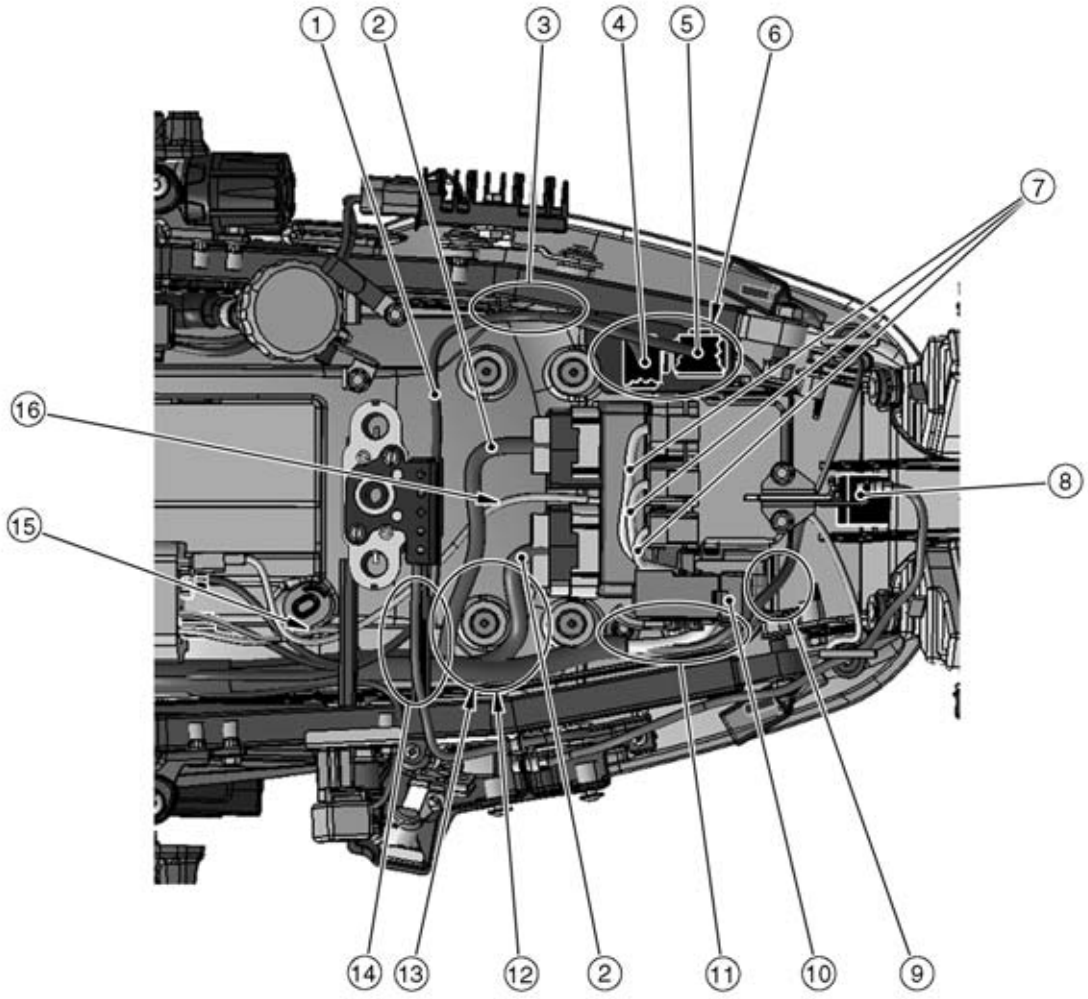


1. *Fuel Tank Breather Hose
2. **Blue Hose
3. *Run the fuel tank breather hose under the rear brake light switch lead and rear wheel rotation sensor lead. **Run the blue hose over the rear brake light switch lead and rear wheel rotation sensor lead.
4. Clamp (Hold the main harness and white tape position of the alternator lead.)
5. Run the license plate light lead of the rear fender to the outside of the projection.
6. Fuel Tank Drain Hose
7. Clamp (Hold the main harness, alternator lead and license plate light lead.)
8. Put the alternator lead connector between the clamps as shown. Make sure that the alternator lead connector is positioned under the leads.
9. Pad
10. License Plate Light Lead Connector
11. Fuel Level Sensor Lead Connector
12. Electric Accessory Leads
13. Fuel Pump Lead Connector

*: Other than Evaporative Emission Control System Equipped Model
**: Evaporative Emission Control System Equipped Model

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Cable, Wire, and Hose Routing

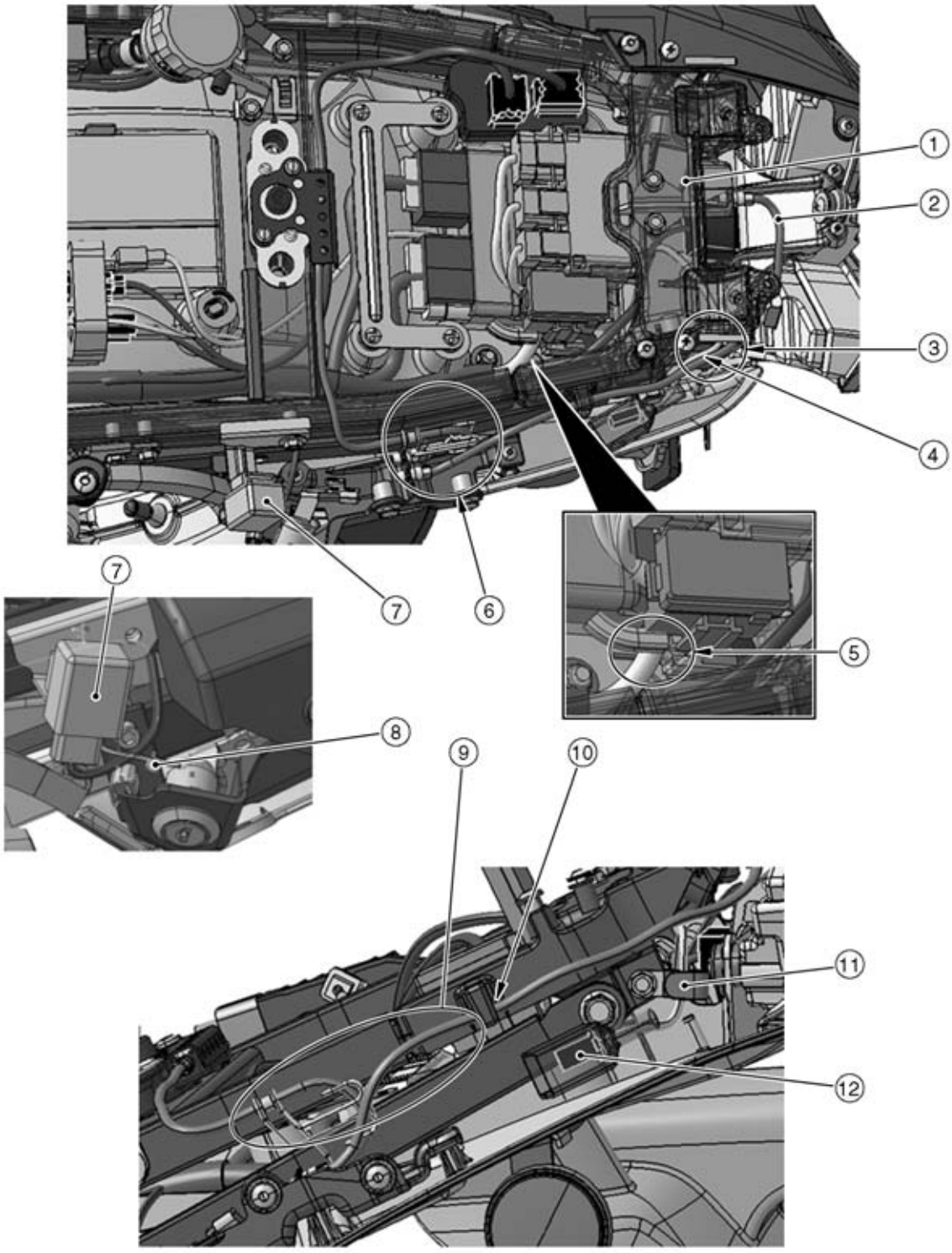


GB09813E G

Cable, Wire, and Hose Routing

1. Run the immobilizer (equipped models)/Kawasaki diagnostic system connector lead and ABS Kawasaki Self-diagnosis system connector lead to the rear of the seat lock and under the tool case. Take care not to run the leads above the seat lock.
2. ECU Leads
3. Run the diagnostic system connector leads between the tool case and frame. Take care not to run the leads above the rear frame.
4. ABS Kawasaki Self-diagnosis System Connector
5. Immobilizer (Equipped Models)/Kawasaki Diagnostic System Connector
6. Fix the immobilizer (equipped models)/Kawasaki diagnostic system connector and ABS Kawasaki Self-diagnosis system connector to the connector holder as shown. Make sure that the connectors are securely installed to the connector holder.
7. Relay Box Leads
8. Tail/Brake Light Lead Connector
9. Run the tail/brake light lead to the upside of the ECU rubber protector. Take care not to pinch the tail/brake light lead by the ECU rubber protector.
10. Fuse Box (2)
11. Put the main harness to the inside of the rear fender rib. Take care not to pinch the main harness by the frame, rear fender and rib.
12. Run the right ECU lead and license plate light lead to the front of the tool box installation position. Run the left ECU lead and to the rear of the tool box installation position.
13. Mount the tool case while holding the ECU leads by fingers to prevent it from being caught between the tool case and mounting surface. After tightening the mounting bolts of the tool case, make sure that the ECU leads are not caught between the tool case and mounting surface.
14. Run the main harness, left ECU lead, right ECU lead and diagnostic system connector leads from the left side of the motorcycle. Make sure that the leads are not compressed by the frame and rear fender.
15. Run the license plate light lead of the rear fender to the outside of the projection.
16. Run the license plate light lead with slack under the right ECU connector as shown. Make sure that the license plate light lead has no slack above the connecting points and rear wheel.

Cable, Wire, and Hose Routing

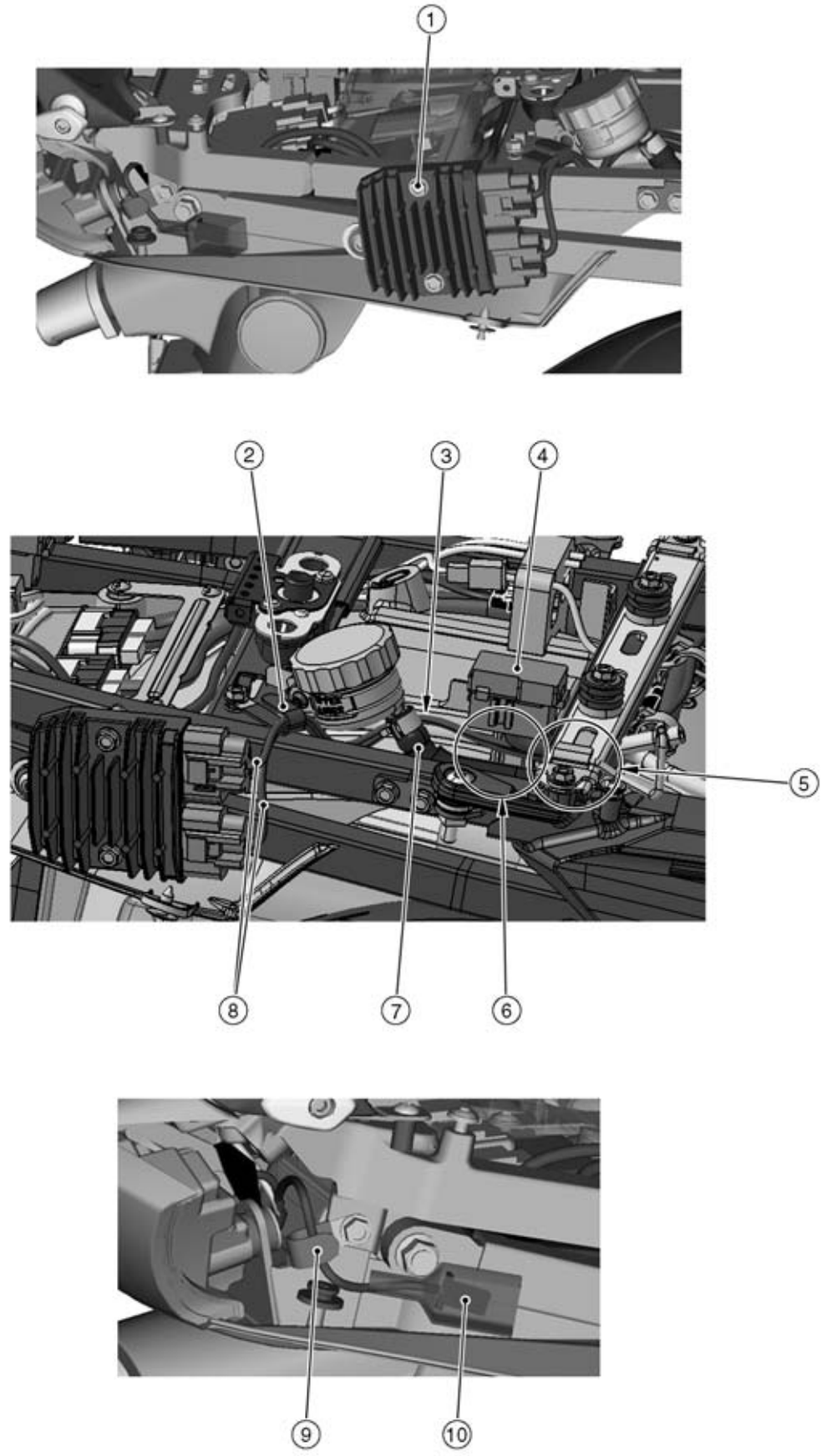


GB09814E G

Cable, Wire, and Hose Routing

1. Rear Right Turn Signal Light Lead
2. Seat Lock Cable
3. Run the seat lock cable to the outside of the rear left turn signal light lead.
4. Rear Left Turn Signal Light Lead
5. Run the relay box leads to the front of the fuse box (2).
6. Fix the seat lock cable run through in front of the tool case with the clamp as shown.
7. Turn Signal Relay
8. Clamp (For MY, PH and SEA-B1 models, hold the turn signal relay lead to the bracket.)
9. Take care not to pinch the seat lock cable by the cover and frame.
10. Insert the seat lock cable in the hook portion of the rear frame and hold it.
11. Clamp (Hold the rear left turn signal light lead as shown.)
12. Put the rear left turn signal light lead connector under the rear frame as shown.

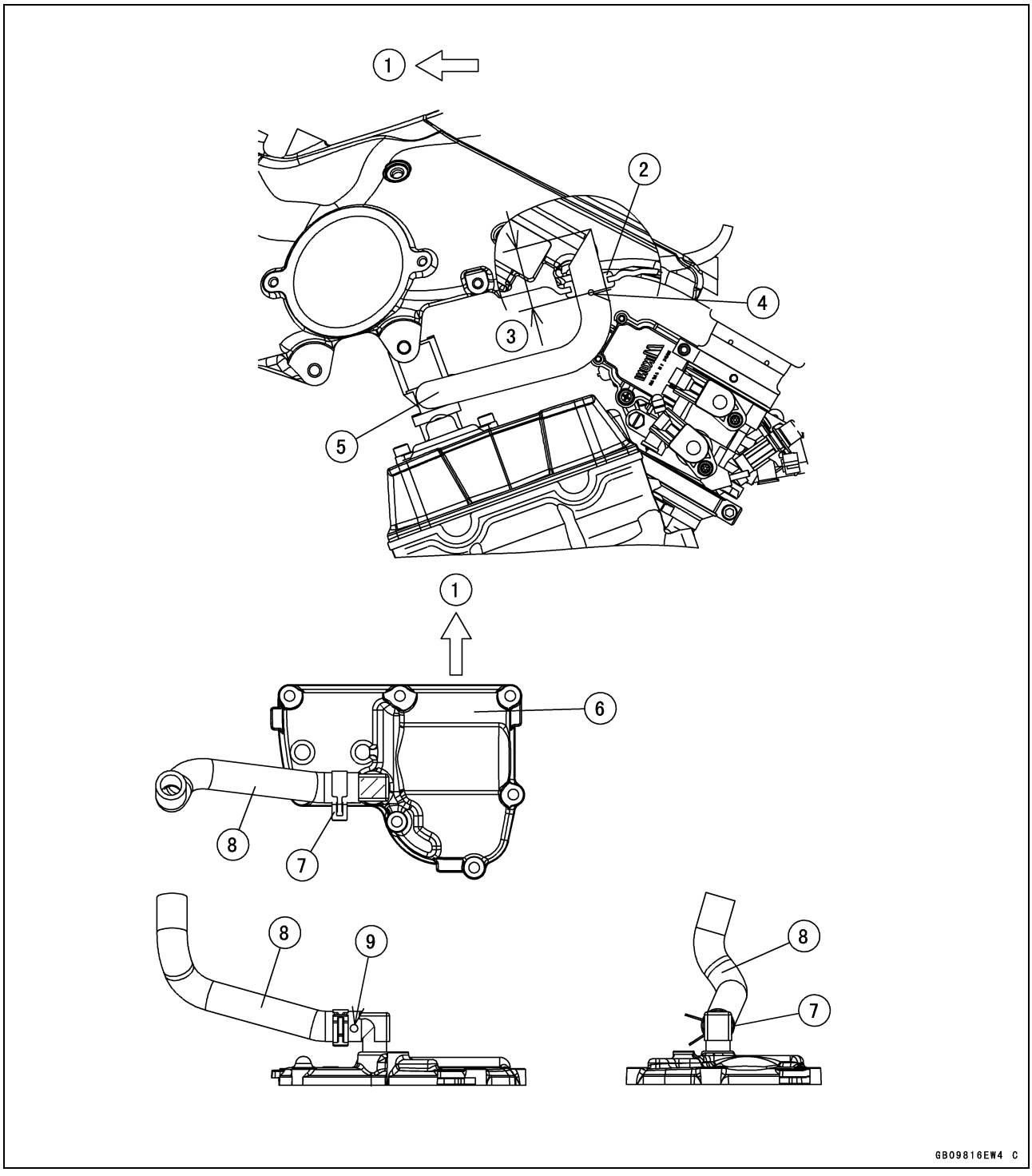
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

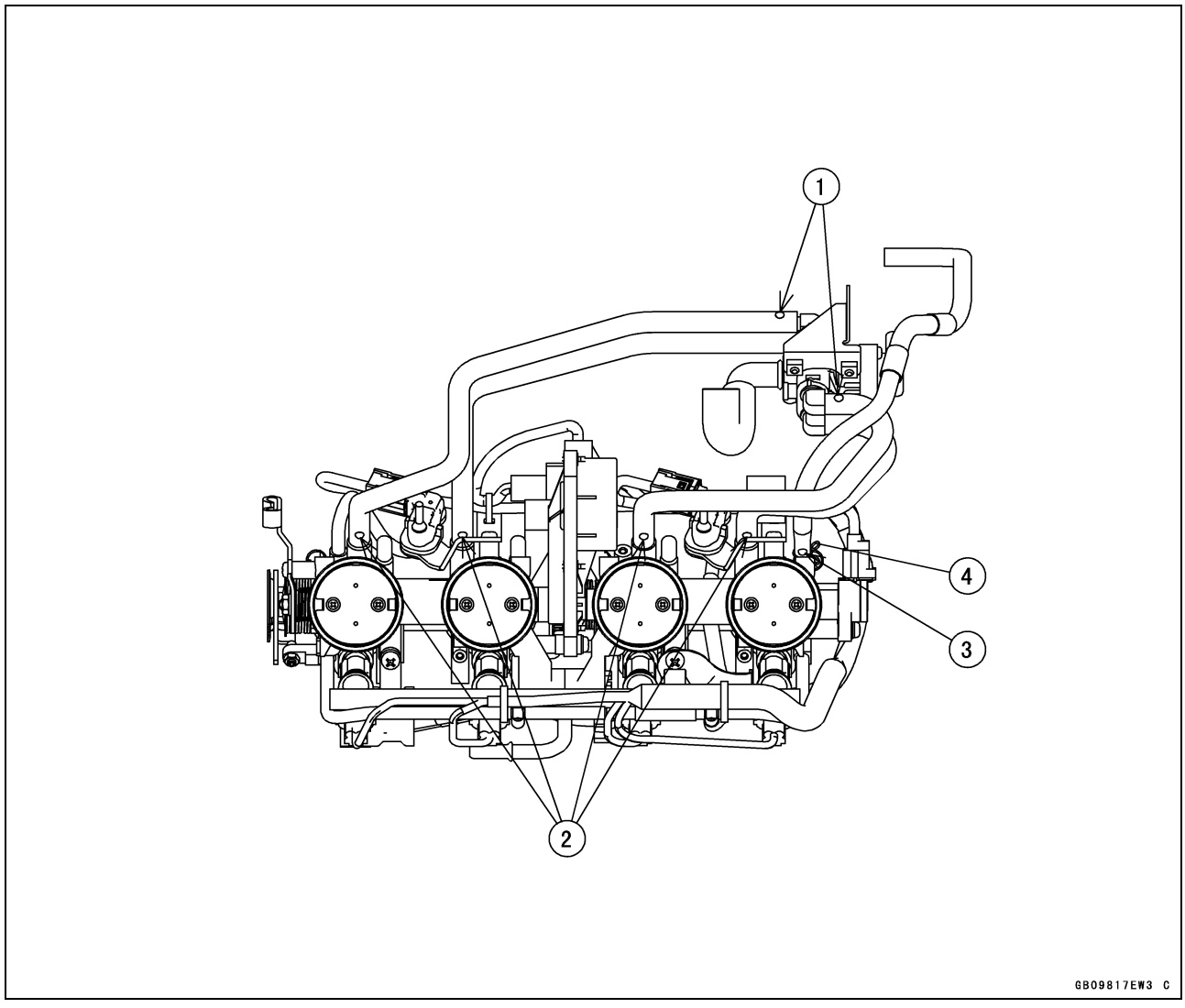
1. Regulator/Rectifier
2. Clamp (Hold the regulator/rectifier leads as shown. Make sure that the regulator/rectifier leads do not interfere with the bolt head.)
3. Run the regulator/rectifier leads to the inside of the rear brake reserve tank.
4. Fuse Box (1)
5. Run the regulator/rectifier leads under the cross bracket.
6. Run the regulator/rectifier leads between the fuse box (1) and rear brake reservoir hose.
7. Rear Brake Reservoir Hose
8. Regulator/Rectifier Leads
9. Clamp (Hold the rear right turn signal light lead as shown.)
10. Put the rear right turn signal light lead connector under the rear frame as shown.

Cable, Wire, and Hose Routing



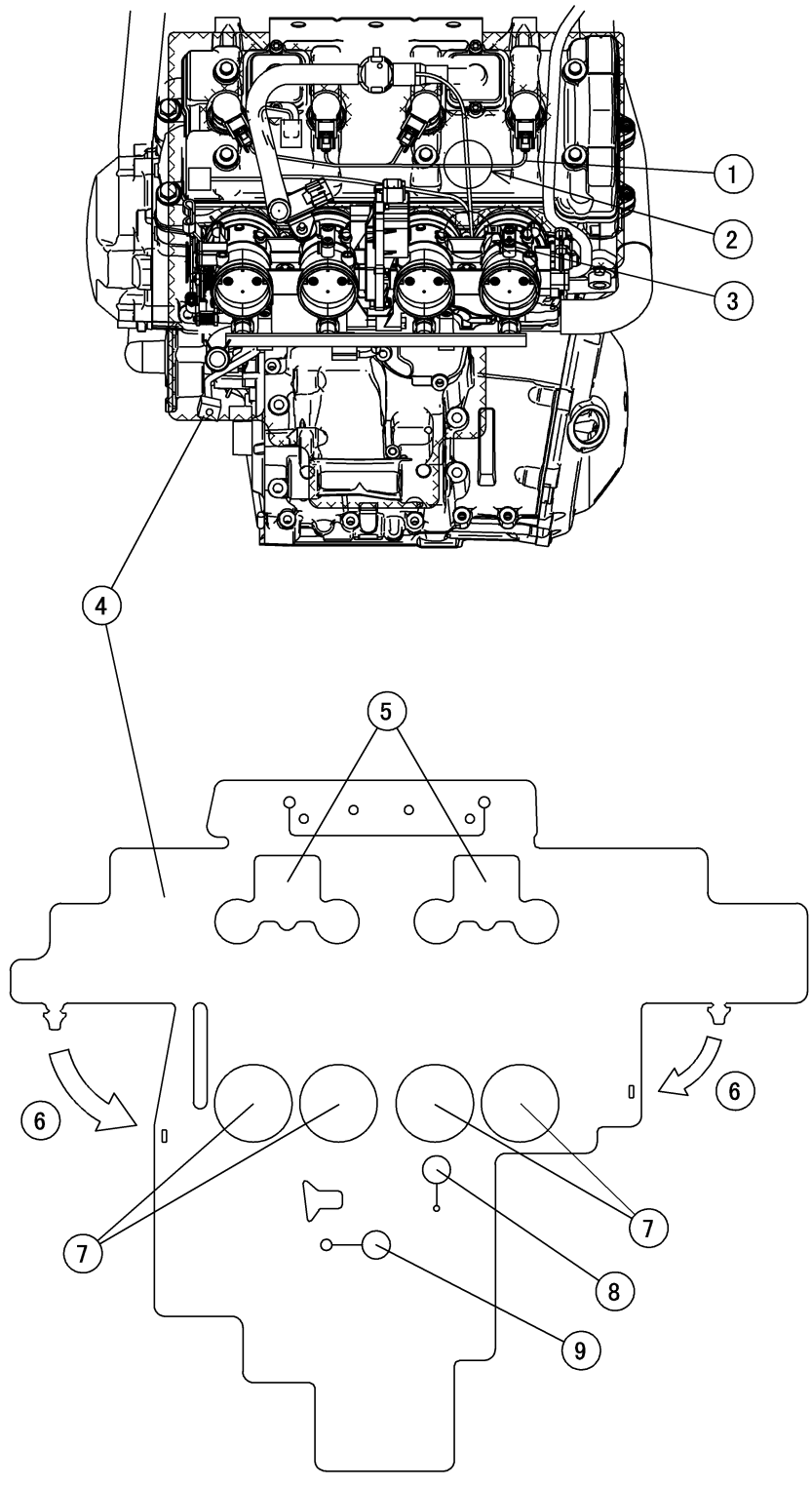
1. Front
2. Grommet
3. About 41 mm (1.61 in.)
4. Insert the air switching valve hose into the frame until while painted mark on it is hidden a half.
5. Air Switching Valve Hose
6. Breather Cover
7. Clamp
8. Breather Hose
9. White Mark

Cable, Wire, and Hose Routing



1. White Marks
2. Yellow Marks
3. Green Mark (Purge Valve Equipped Models)
4. Clamp (Purge Valve Equipped Models)

Cable, Wire, and Hose Routing

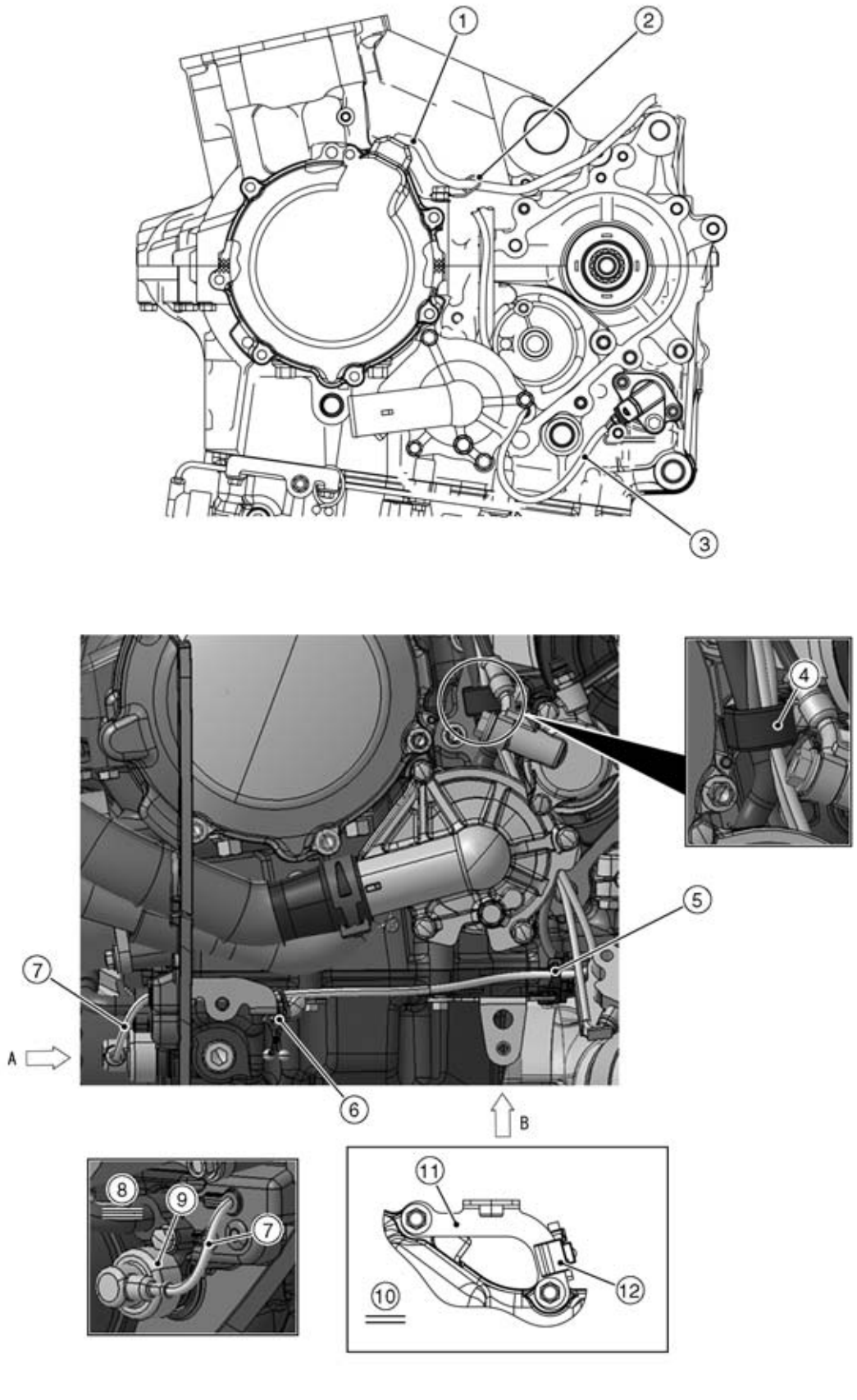


GBO9818EW5 C

Cable, Wire, and Hose Routing

1. Stick Coil Lead
2. Run the air switching valve lead under the stick coil lead.
3. Run the air switching valve lead which is connected to the water temperature sensor lead between the throttle body #3 and #4.
4. Heat Insulation Rubber Plate
5. For Air Suction Valve Cover and Stick Coil
6. Insert the tab into the slot.
7. For Throttle Body Assy Holder
8. For Water Temperature Sensor
9. For Breather Hose

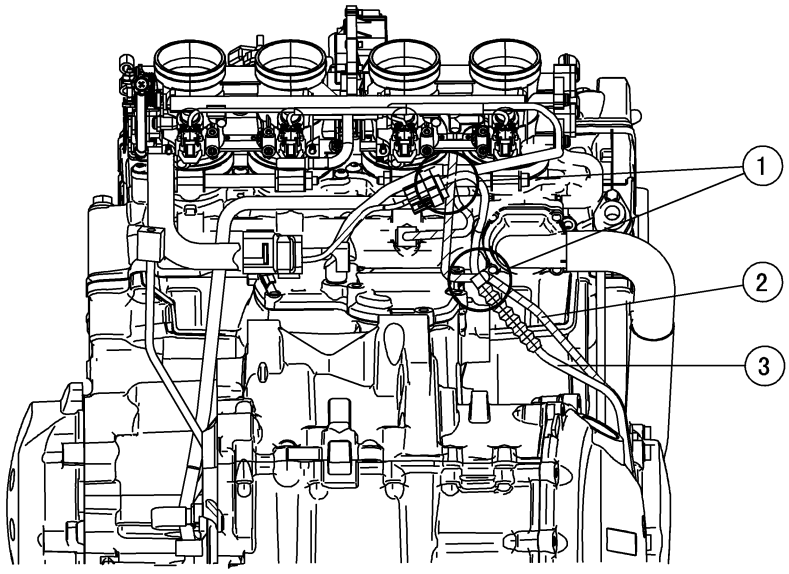
Cable, Wire, and Hose Routing

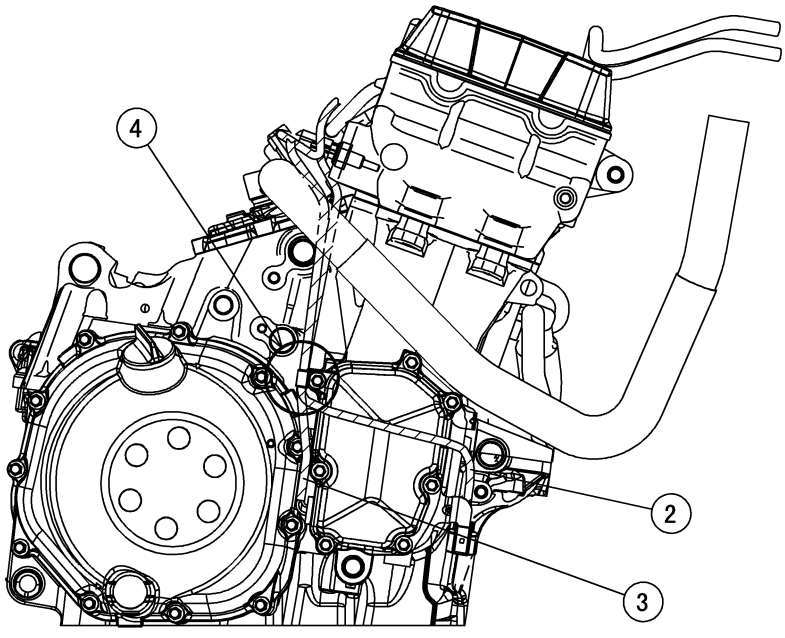


Cable, Wire, and Hose Routing

1. Alternator Lead
2. Clamp (Hold the alternator lead.)
3. Gear Position Sensor Lead
4. Clamp (Hold the gear position sensor lead, oil pressure switch lead, side stand switch lead and air bleed hose.)
5. Band (Hold the gear position sensor lead and oil pressure switch lead as shown.)
6. Clamp (Hold the oil pressure switch lead.)
7. Oil Pressure Switch Lead
8. Viewed from A
9. Rubber Boot (Position the oil pressure switch lead horizontally and cover it with rubber boot in place as shown.)
10. Viewed from B
11. Lower Fairing Bracket
12. Clamp (Install the clamp to the lower fairing bracket so that the band faces upside, and set the position of the clamp as shown.)

Cable, Wire, and Hose Routing



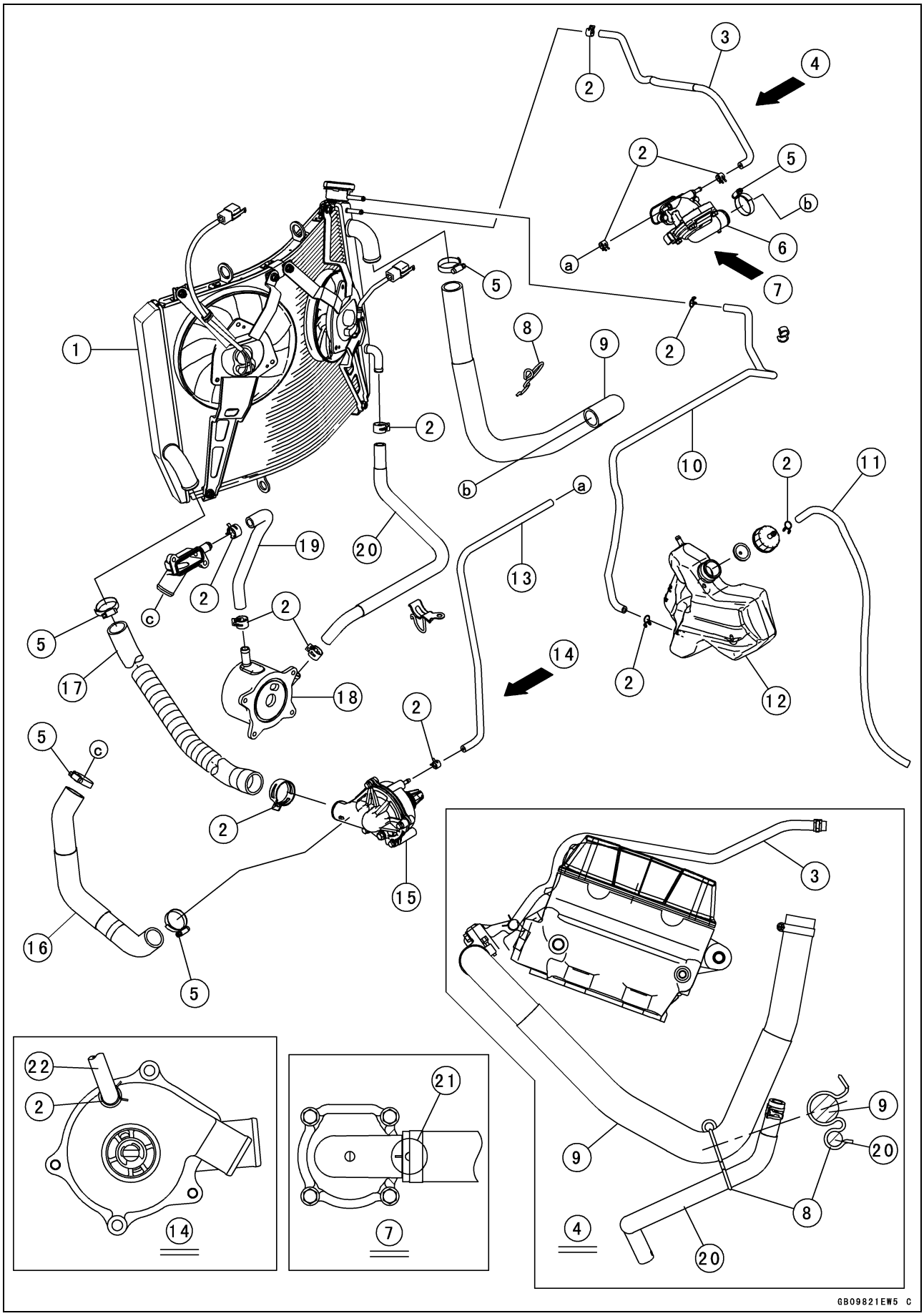


GBO9820EW5 C

Cable, Wire, and Hose Routing

1. Clamps (Hold the crankshaft sensor lead and oxygen sensor lead.)
2. Oxygen Sensor Lead
3. Crankshaft Sensor Lead
4. Clamp (Hold the crankshaft sensor lead and oxygen sensor lead at the black tape position of the oxygen sensor lead.)

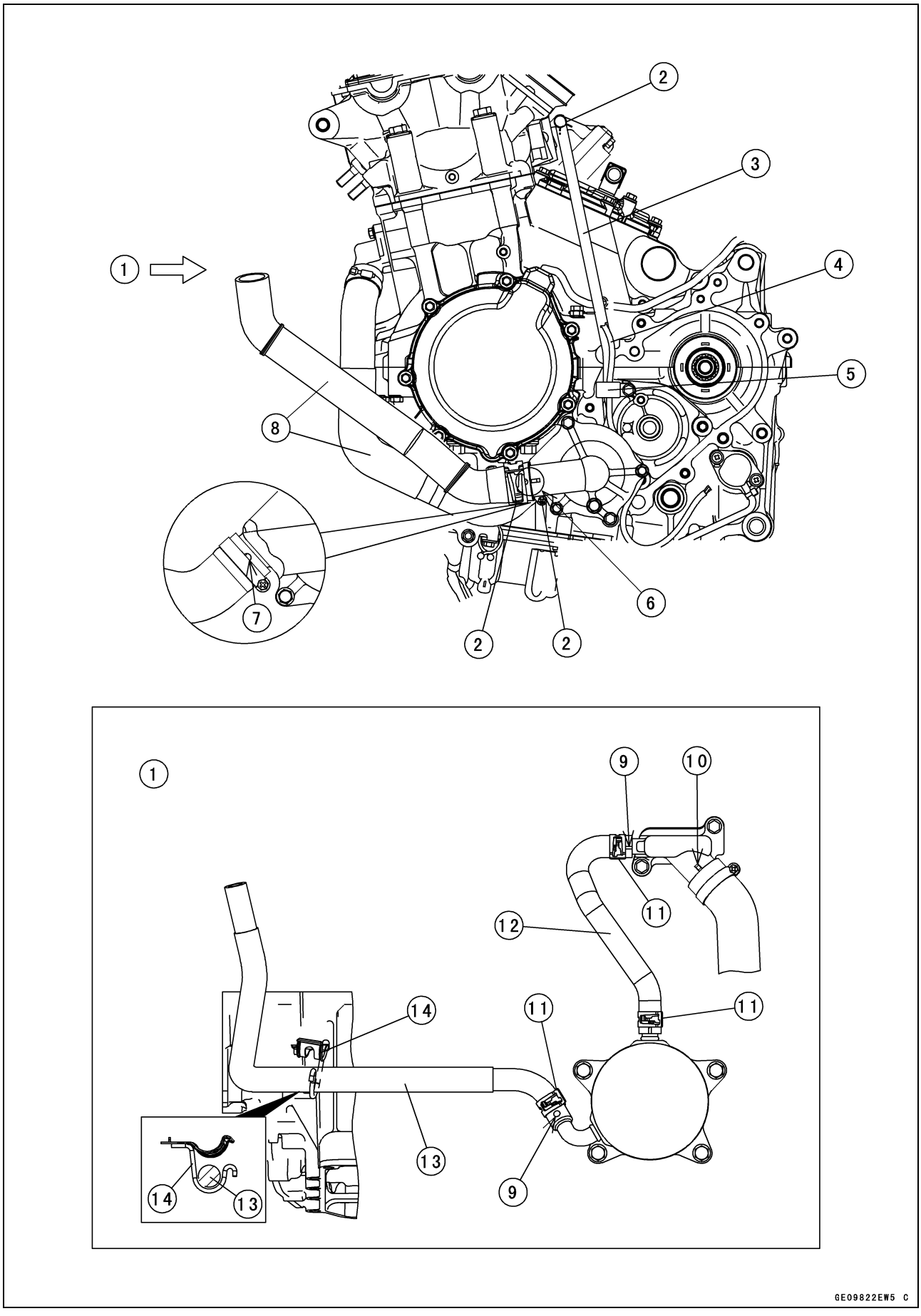
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Radiator
2. Clamps (Face the knob of the clamp as shown.)
3. Air Bleeder Hose for Thermostat Housing
4. Right Side View
5. Clamp Screws (Face the screw head as shown.)
6. Thermostat Housing
7. Rear Side View
8. Clamps
9. Water Hose
10. Reserve Tank Hose
11. Reserve Tank Overflow Hose
12. Reserve Tank
13. Air Bleeder Hose for Water Pump
14. Right Side View
15. Water Pump
16. Water Hose
17. Water Hose
18. Oil Cooler
19. Inlet Hose
20. Outlet Hose
21. Align the white paint mark on the hose with the mark on the thermostat housing cover.
22. Insert the air bleeder hose into the water pump fitting so that it point to the center of the impeller shaft.

Cable, Wire, and Hose Routing

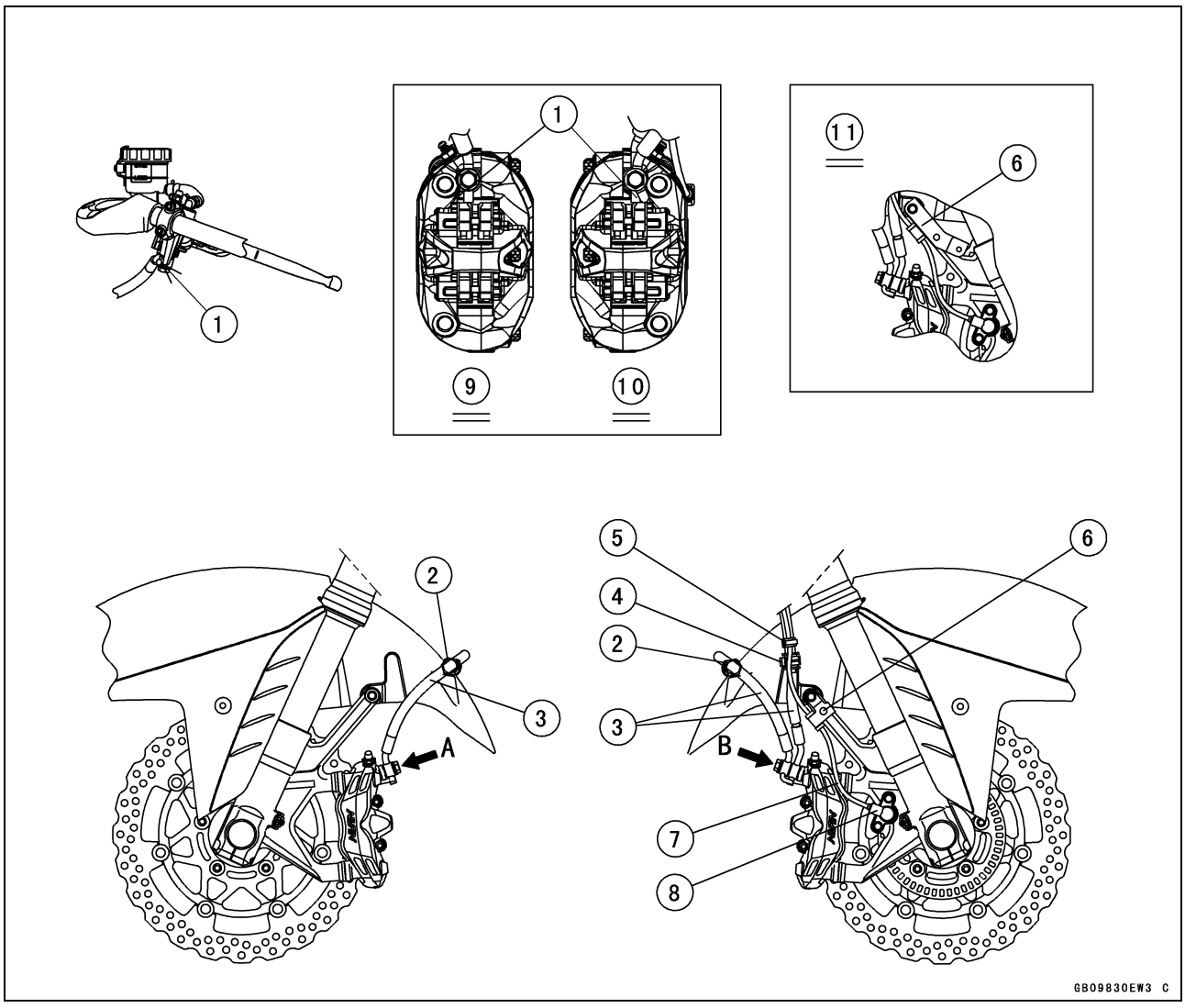


Cable, Wire, and Hose Routing

1. Front Side View
2. Install the clamp as shown.
3. Air Bleeder Hose for Water Pump
4. Gear Position Sensor Lead
5. Clamp (Hold the air bleeder hose and gear position sensor lead.)
6. Align the white paint mark of the water hose with the projection on the water pump cover.
7. Install the water hose so that white paint mark faces left side.
8. Water Hose
9. Install the water hose so that white painted mark on the water hose faces the front side.
10. Insert the water hose until it hit the projection of the cylinder fitting.
11. Clamps (Face the knob of the clamps to the front side.)
12. Inlet Hose
13. Outlet Hose
14. Clamp

Cable, Wire, and Hose Routing

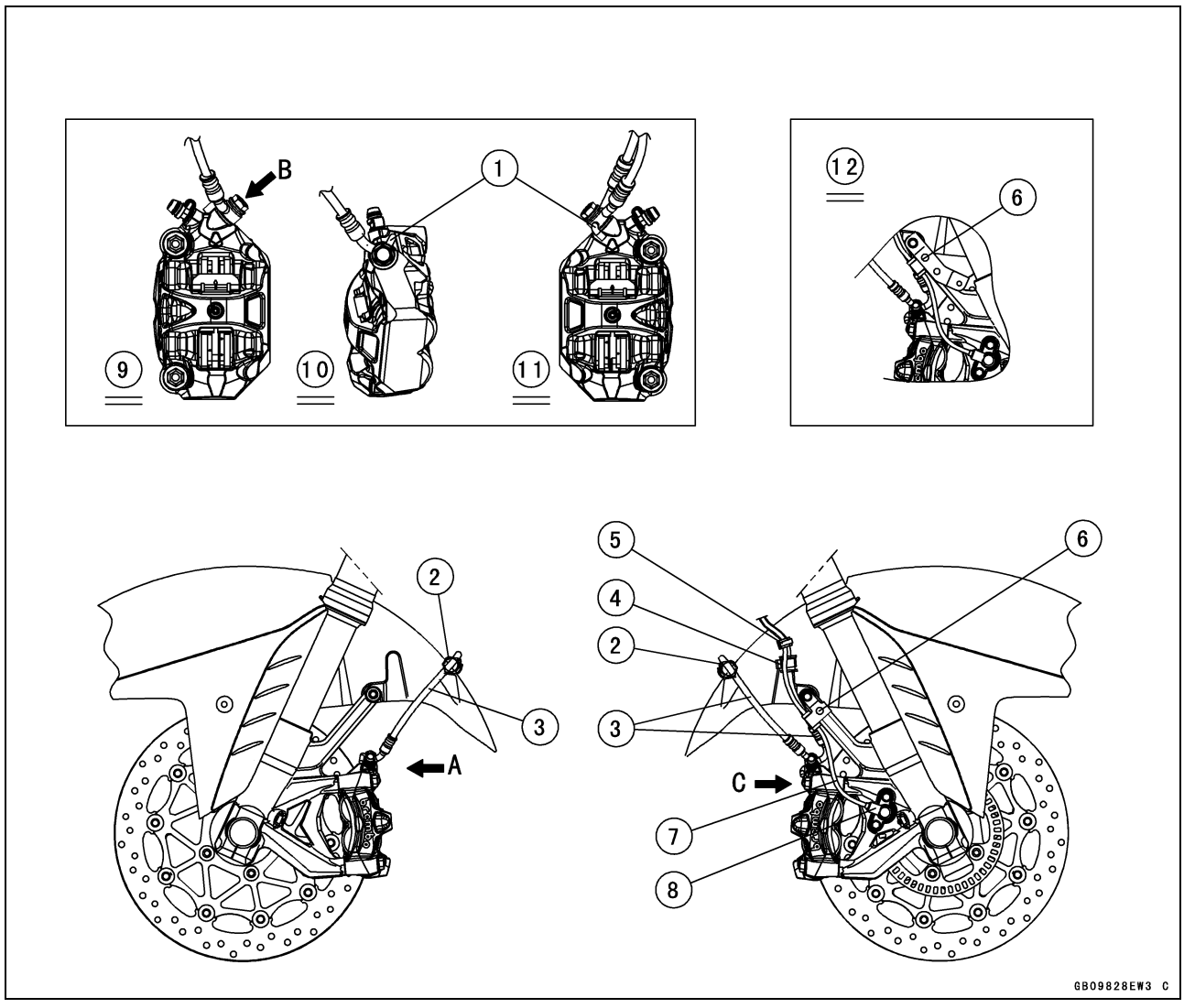
ZX1400H Model



1. Touch the brake hose fitting to the stopper.
2. Clamps (Hold the brake hose, and insert the clamps into the front fender.)
3. Brake Hoses
4. Clamp (Hold the grommet of the brake hose only and insert the clamp into the front fender.)
5. 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.)
6. Bracket (Hold the front wheel rotation sensor lead.)
7. Front Wheel Rotation Sensor Lead
8. Front Wheel Rotation Sensor
9. Viewed from A
10. Viewed from B
11. US and CAL Models

Cable, Wire, and Hose Routing

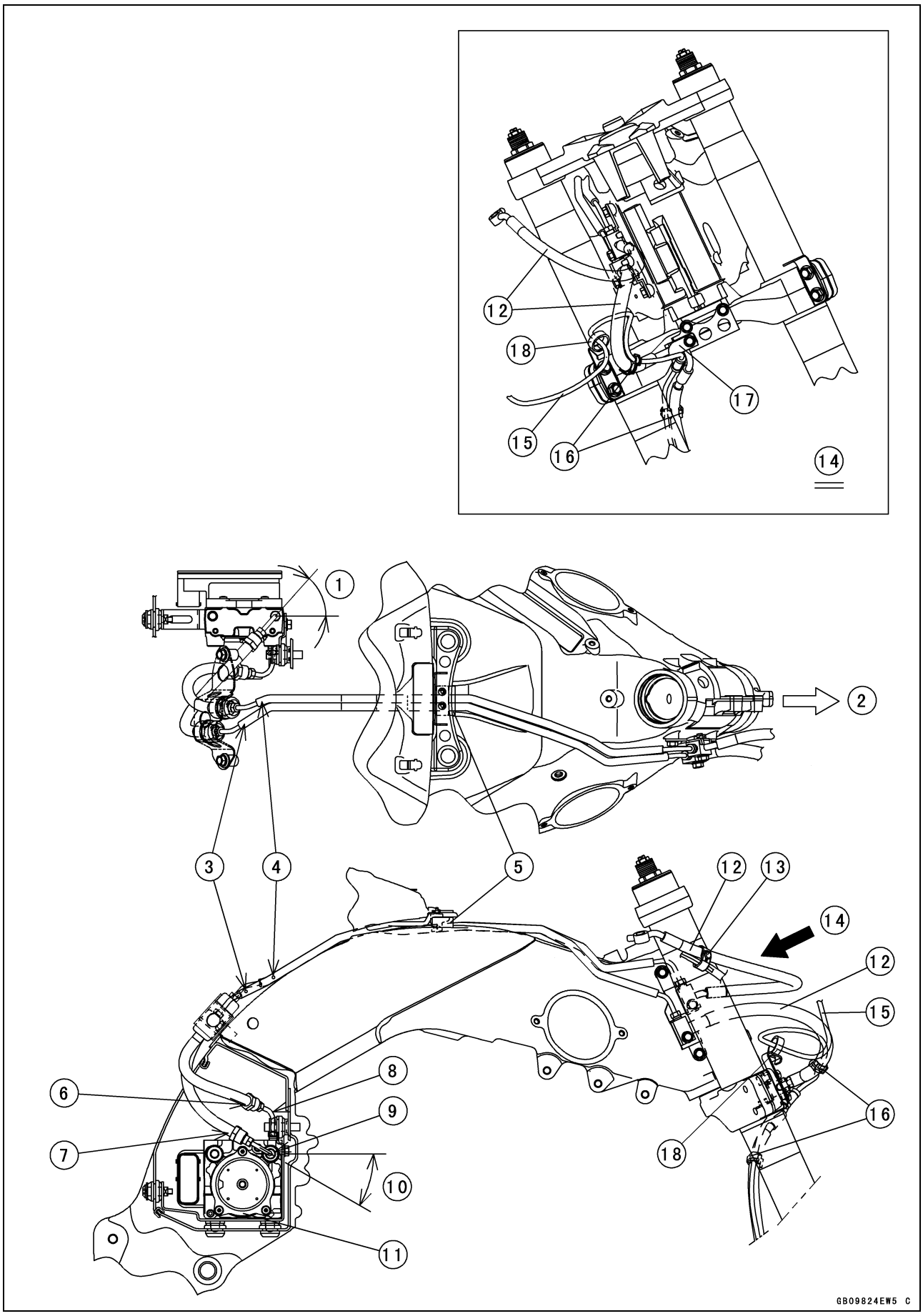
ZX1400J Model



1. Touch the brake hose fitting to the caliper.
2. Clamps (Hold the brake hose, and insert the clamps into the front fender.)
3. Brake Hoses
4. Clamp (Hold the grommet of the brake hose only and insert the clamp into the front fender.)
5. 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.)
6. Clamp (Hold the front wheel rotation sensor lead.)
7. Front Wheel Rotation Sensor Lead
8. Front Wheel Rotation Sensor
9. Viewed from A
10. Viewed from B
11. Viewed from C
12. US, CA, CAL and CN Models

Cable, Wire, and Hose Routing

ZX1400H Model

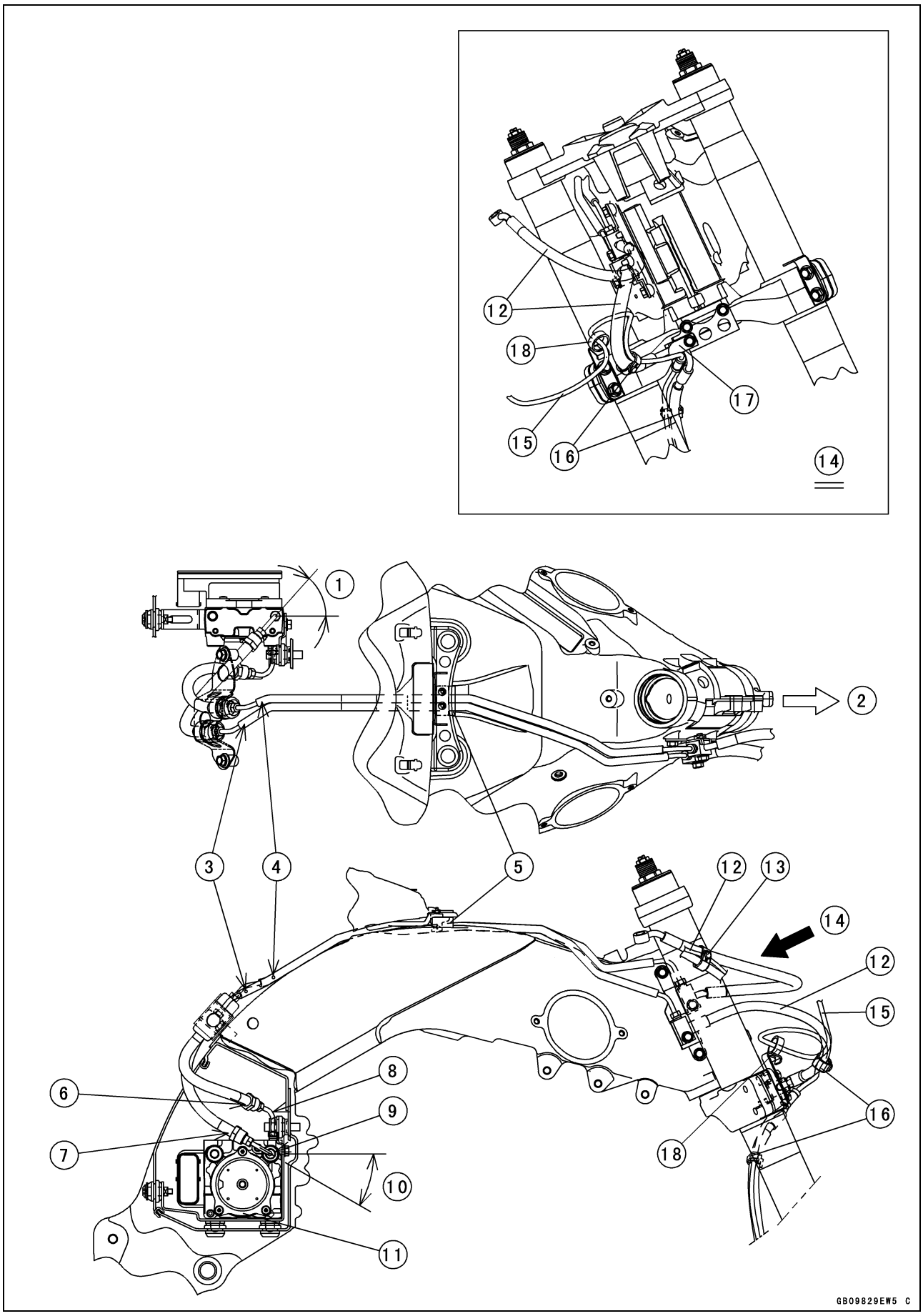


Cable, Wire, and Hose Routing

1. About 48°
2. Front
3. Brake Pipe (Blue Paint Mark)
4. Brake Pipe (White Paint Mark)
5. Damper
6. Brake Hose (Blue Paint Mark)
7. Brake Hose (White Paint Mark)
8. Brake Hose Joint Pipe (Blue Paint Mark)
9. Brake Hose Joint Pipe (White Paint Mark)
10. About 30°
11. ABS Hydraulic Unit
12. Brake Hoses
13. Clamp (Hold the brake hose and right switch housing lead.)
14. Viewed from Front Side
15. Front Wheel Rotation Sensor Lead
16. Clamps (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. Bracket (Hold the front wheel rotation sensor lead.)
18. Clamp (Hold the front wheel rotation sensor lead.)

Cable, Wire, and Hose Routing

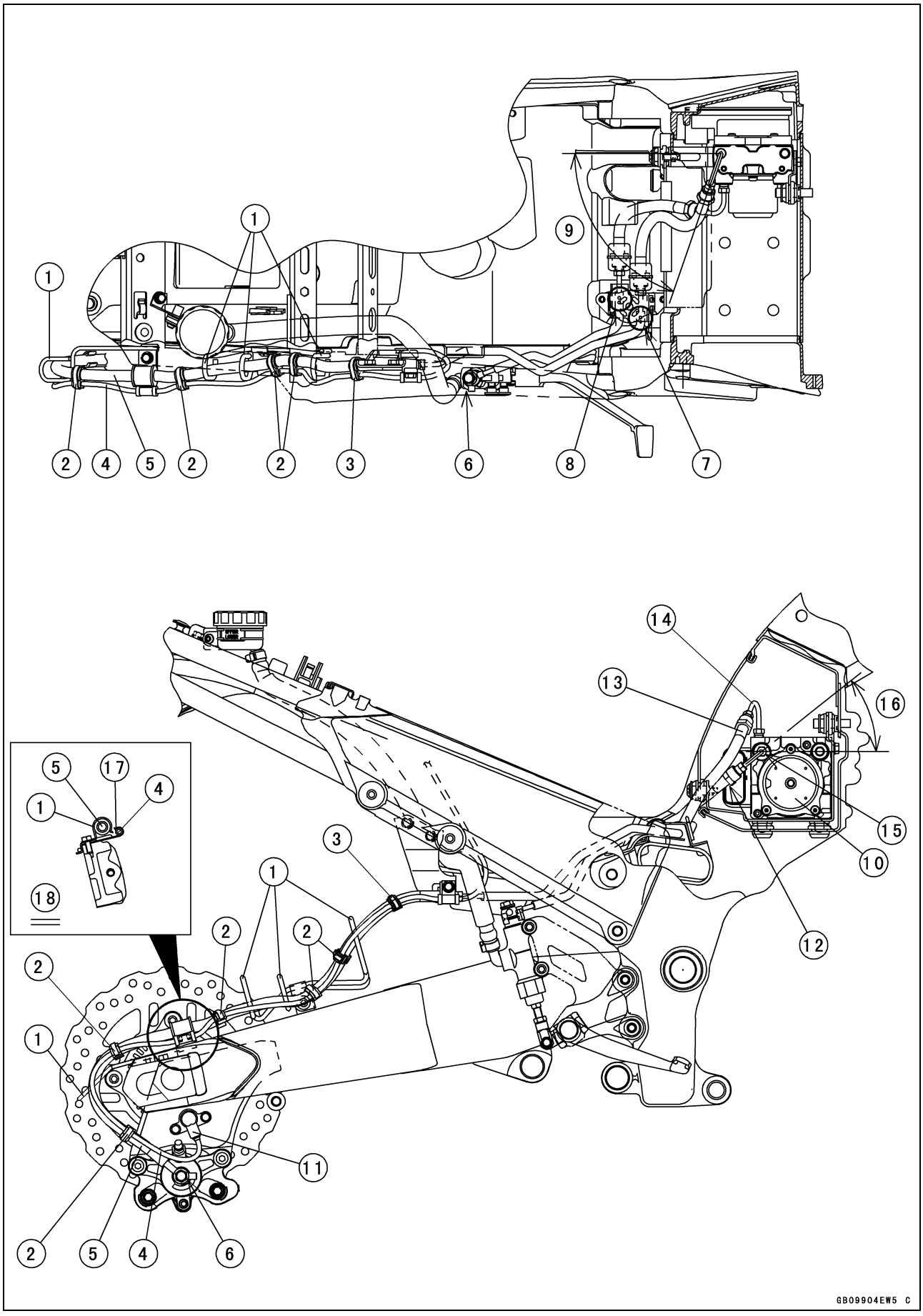
ZX1400J Model



Cable, Wire, and Hose Routing

1. About 48°
2. Front
3. Brake Pipe (Blue Paint Mark)
4. Brake Pipe (White Paint Mark)
5. Damper
6. Brake Hose (Blue Paint Mark)
7. Brake Hose (White Paint Mark)
8. Brake Hose Joint Pipe (Blue Paint Mark)
9. Brake Hose Joint Pipe (White Paint Mark)
10. About 30°
11. ABS Hydraulic Unit
12. Brake Hoses
13. Clamp (Hold the brake hose and right switch housing lead.)
14. Viewed from Front Side
15. Front Wheel Rotation Sensor Lead
16. Clamps (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. Bracket (Hold the front wheel rotation sensor lead.)
18. Clamp (Hold the front wheel rotation sensor lead.)

Cable, Wire, and Hose Routing

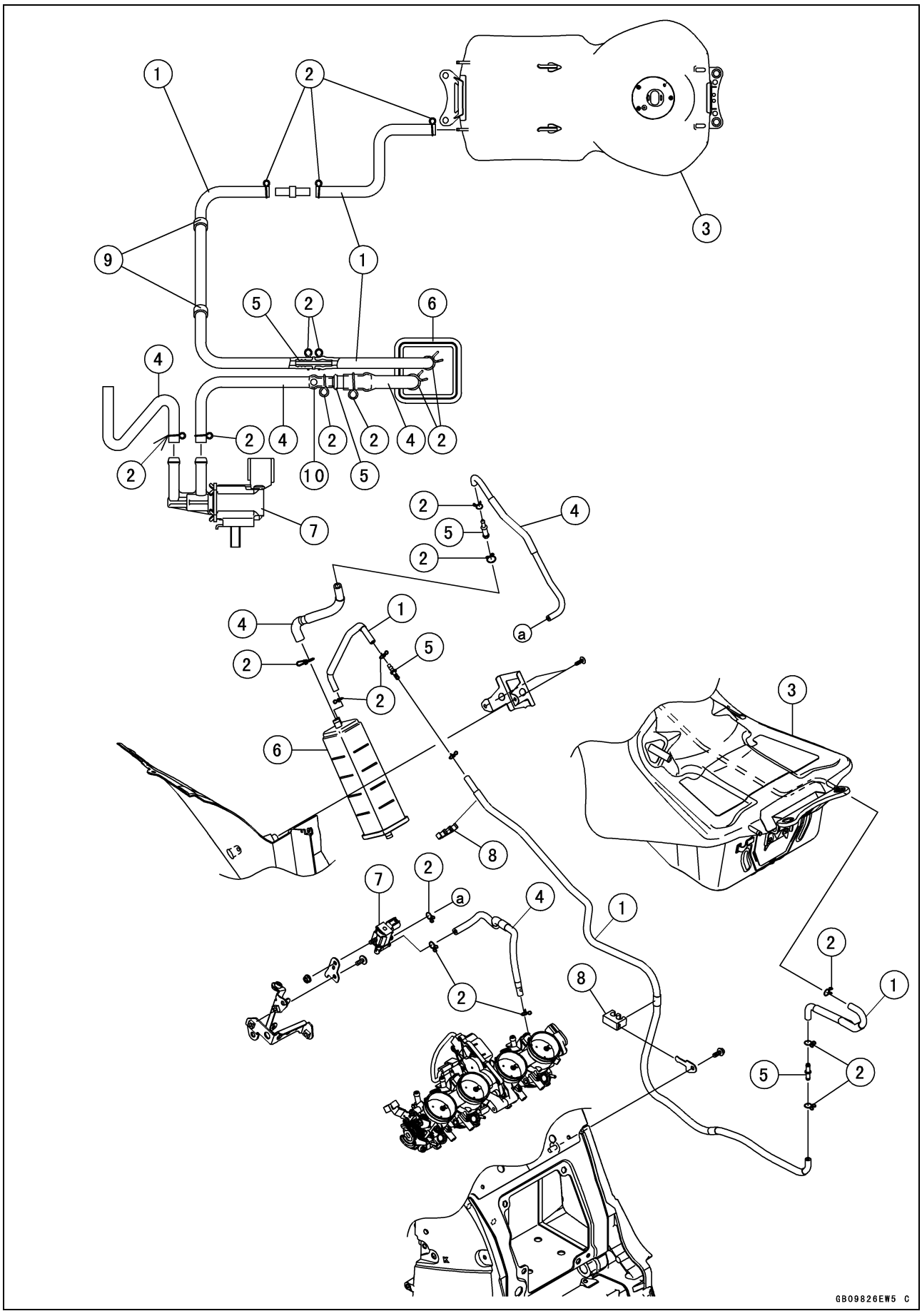


Cable, Wire, and Hose Routing

1. Clamps (Hold the brake hose.)
2. Clamps (Hold the brake hose and rear wheel rotation sensor lead at the white painted marks on the rear wheel rotation sensor lead.)
3. Clamp (Hold the brake hose and rear wheel rotation sensor lead at the blue painted mark on the rear wheel rotation sensor lead.)
4. Rear Wheel Rotation Sensor Lead
5. Brake Hose
6. Touch the brake hose fitting to the stopper.
7. Brake Pipe (Two Blue Paint Marks)
8. Brake Pipe (Two White Paint Marks)
9. About 71°
10. ABS Hydraulic Unit
11. Rear Wheel Rotation Sensor
12. Brake Hose (Two White Paint Marks)
13. Brake Hose (Two Blue Paint Marks)
14. Brake Hose Joint Pipe (Two Blue Paint Marks)
15. Brake Hose Joint Pipe (White Paint Mark)
16. About 38.5°
17. Clamp (Hold the rear wheel rotation sensor lead.)
18. Rear View

Cable, Wire, and Hose Routing

Evaporative Emission Control System Equipped Models



Cable, Wire, and Hose Routing

1. Blue Hose
2. Clamps
3. Fuel Tank
4. Green Hose
5. Fittings
6. Canister
7. Purge Valve
8. Clamps
9. Blue Tapes
10. Install the hose so that the green painted mark faces to the fitting.

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:
- Ignition and engine stop switch not ON
- Starter lockout switch or gear position sensor trouble
- Starter motor trouble
- Battery voltage low
- Starter relay not contacting or operating
- Starter button not contacting
- Starter system wiring shorted or open
- Ignition switch trouble
- Engine stop switch trouble
- Main 30 A or ignition fuse blown

Starter motor rotating but engine doesn't turn over:
- Vehicle-down sensor (DFI) coming off
- Immobilizer system trouble (equipped models)
- Starter clutch trouble
- Starter idle gear trouble

Engine won't turn over:
- 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
- Ignition switch not ON
- Engine stop switch turned OFF
- Clutch lever not pulled in or gear not in neutral
- Battery voltage low
- Immobilizer system trouble (equipped models)
- Spark plug dirty, broken, or gap maladjusted
- Spark plug incorrect
- Stick coil shorted or not in good contact
- Stick coil trouble
- ECU trouble
- Gear position sensor , starter lockout, or side stand switch trouble
- Crankshaft sensor trouble
- Ignition switch or engine stop switch shorted
- Starter system wiring shorted or open
- Main 30 A or ignition fuse blown

Fuel/air mixture incorrect:
- Bypass screw
- 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
- Immobilizer system trouble (equipped models)
- Stick coil trouble
- Stick coil shorted or not in good contact
- Spark plug dirty, broken, or maladjusted
- Spark plug incorrect
- ECU 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 missing
- Fuel tank air vent obstructed
- Fuel pump trouble
- Throttle body assy holder loose

Troubleshooting Guide

Air duct holder loose
Fuel to injector insufficient
Fuel line clogged

Compression low:
Spark plug loose
Cylinder head not sufficiently tightened down
No valve clearance
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/groove clearance excessive
Cylinder head gasket damaged
Cylinder head warped
Valve spring broken or weak
Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)
Camshaft cam worn

Run-on (dieseling):
Ignition switch 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

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 worn
Air suction valve trouble
Air switching valve trouble
Catalytic converter melt down due to muffler overheating (KLEEN)

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

Troubleshooting Guide

Fuel/air mixture incorrect:
Throttle body assy holder loose
Air duct holder loose
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
Water temperature meter incorrect:
Water temperature meter 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:

Water temperature meter incorrect:
Water temperature meter 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
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

Troubleshooting Guide

Other noise:
- Connecting rod small end clearance excessive
- 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 mounting portions 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)
- 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:
- Drive chain adjusted improperly
- Drive chain worn
- Rear and/or engine sprocket worn
- Chain lubrication insufficient
- Rear wheel misaligned

Abnormal Frame Noise:

Front fork noise:
- Oil insufficient or too thin
- Spring weak or broken

Rear shock absorber noise:
- Shock absorber damaged

Disc brake noise:
- Pad installed incorrectly
- Pad surface glazed
- Disc warped
- Caliper trouble

Other noise:
- Bracket, nut, bolt, etc. not properly mounted or tightened

Oil Pressure Warning Indicator 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
- 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 portions loose

Handlebar pulls to one side:
- Frame bent

Wheel misalignment
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 absorber 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)
Ignition switch trouble
Alternator trouble
Wiring faulty
Regulator/rectifier trouble

Battery overcharged:
Alternator trouble
Regulator/rectifier trouble
Battery faulty

Part No.99924-1508-02

MODEL APPLICATION

Year	Model	Beginning Frame No.
2016	ZX1400HG	JKBZXNH1□GA000001 JKBZXT40HHA000001
2016	ZX1400JG	JKBZXNJ1□GA000001 JKBZXT40HJA000001 JKBZXT40JJA000001
2017	ZX1400HH	JKBZXNH1□HA004001 JKBZXT40HHA004001
2017	ZX1400JH	JKBZXNJ1□HA003001 JKBZXT40HJA004001 JKBZXT40JJA003001

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

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