MODEL APPLICATION

Year	Model	Beginning Frame No.
2011	ZX1000JBF	JKAZXCJ1□BA000001 or JKAZXT00JJA000001 or ZXT00J-000001 or 96PZXDJ1□BFS000001
2011	ZX1000KBF	JKAZXCK1□BA000001 or JKAZXT00JKA000001 or 96PZXDK1□BFS000001

□:This digit in the frame number changes from one machine to another.

Kawasaki
KAWASAKI HEAVY INDUSTRIES, LTD.
Motorcycle & Engine Company

Part No.99924-1443-01

Printed in Japan

Kawasaki

Ninja ZX-10R
Ninja ZX-10R ABS

Motorcycle Service Manual

Quick Reference Guide

LIST OF ABBREVIATIONS

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

COUNTRY AND AREA CODES

AT	Austria	GB	United Kingdom
AU	Australia	PH	Philippines
BR	Brazil	SEA	Southeast Asia
CA	Canada	US	United States
CAL	California	WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Full Power)
CH	Switzerland	GB WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Left Side Traffic Full Power)
DE	Germany	WVTA (78.2 H)	WVTA Model with Honeycomb Catalytic Converter (Restricted Power)
EUR	Europe		

Foreword

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

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

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

To get the longest life out of your vehicle.

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

How to Use This Manual

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

For example, if you want ignition coil information, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Ignition Coil section.

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

⚠ 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.

⚠ CAUTION

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

NOTICE

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

This manual contains four more symbols which will help you distinguish different types of information.

NOTE

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

● Indicates a procedural step or work to be done.

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

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

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

General Information

Table of Contents

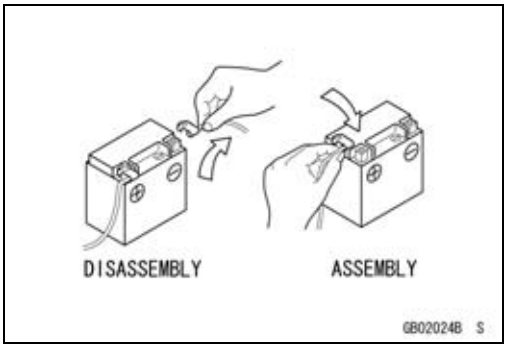
Before Servicing

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.

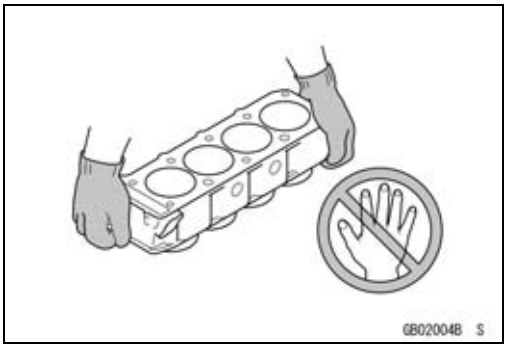
Battery Ground

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.



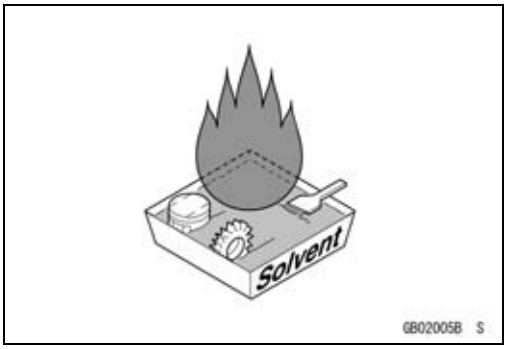
Edges of Parts

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



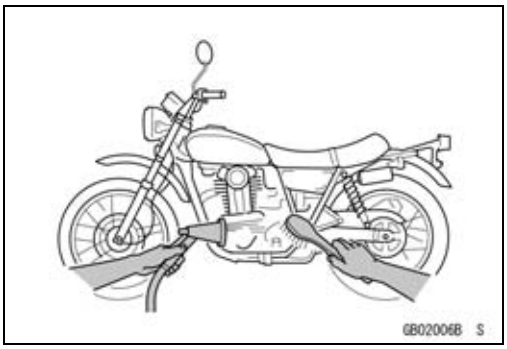
Solvent

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

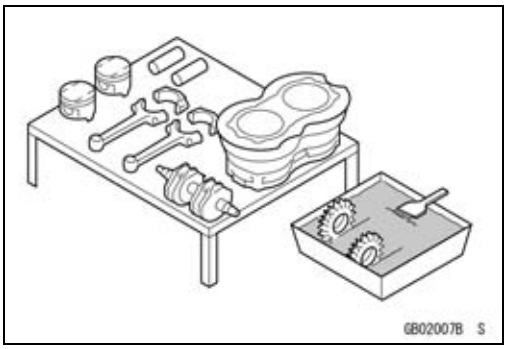
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



Before Servicing

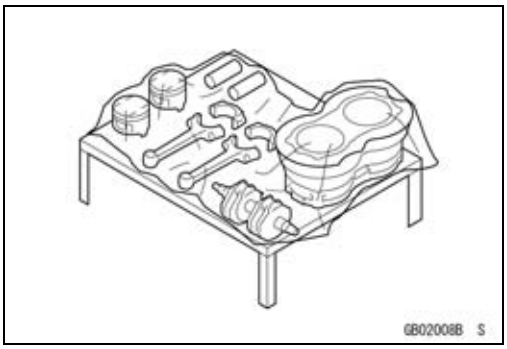
Arrangement and Cleaning of Removed Parts

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.



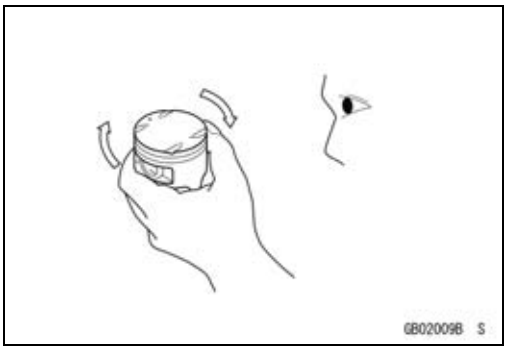
Storage of Removed Parts

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.



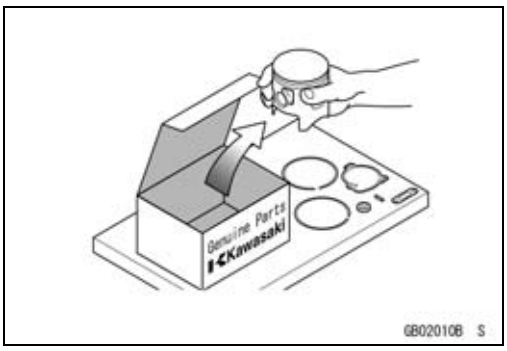
Inspection

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.



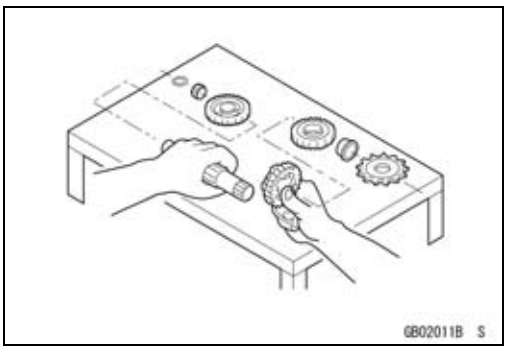
Replacement Parts

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

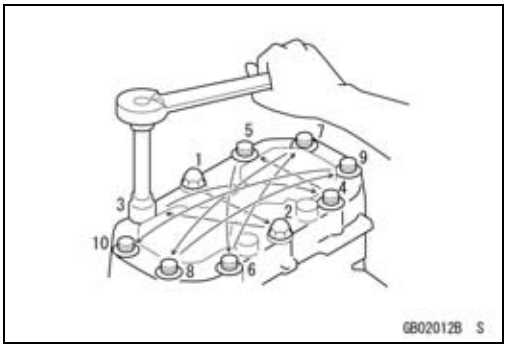
In most cases assembly order is the reverse of disassembly, however, if assembly order is provided in this Service Manual, follow the procedures given.



Before Servicing

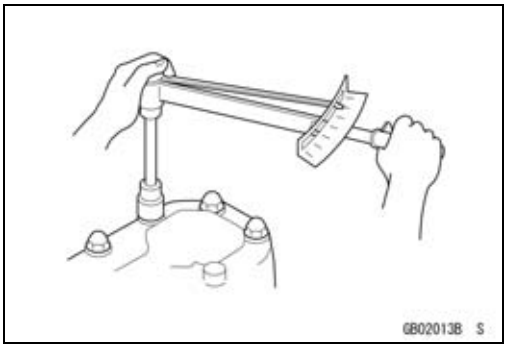
Tightening Sequence

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.



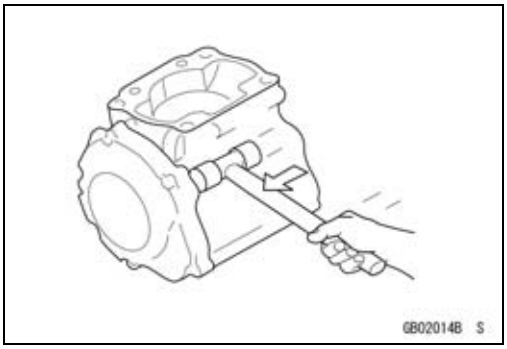
Tightening Torque

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.



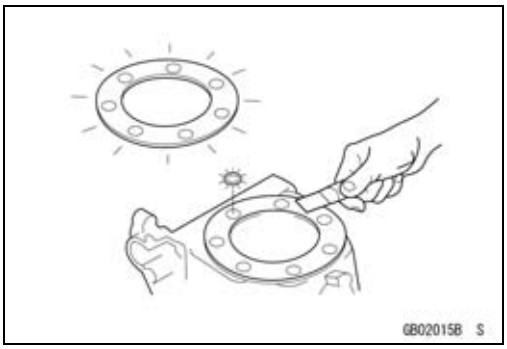
Force

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.



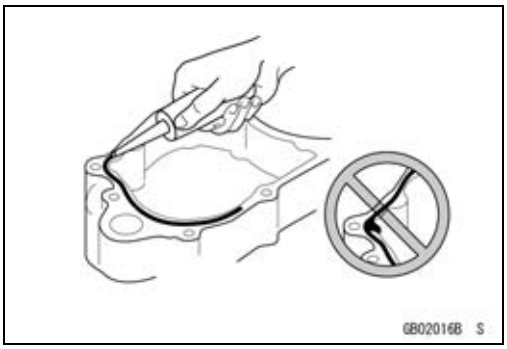
Gasket, O-ring

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

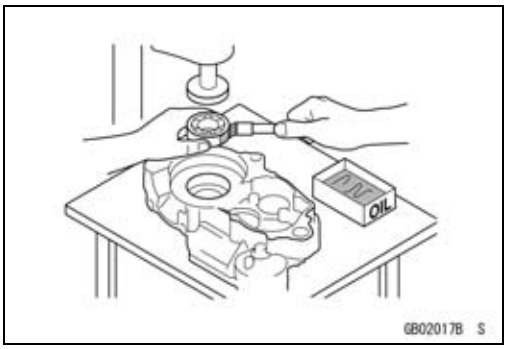
For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



Before Servicing

Press

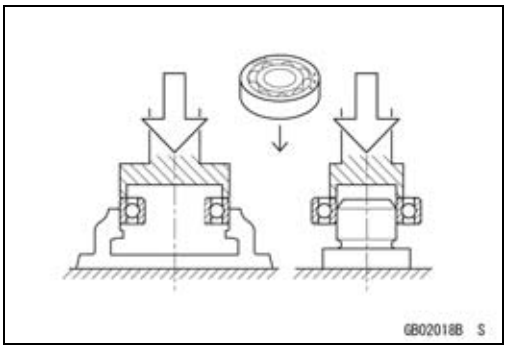
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



Ball Bearing and Needle Bearing

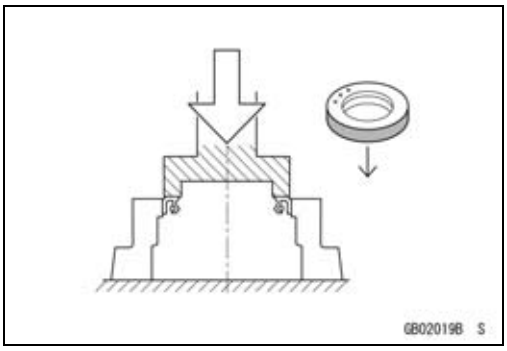
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

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

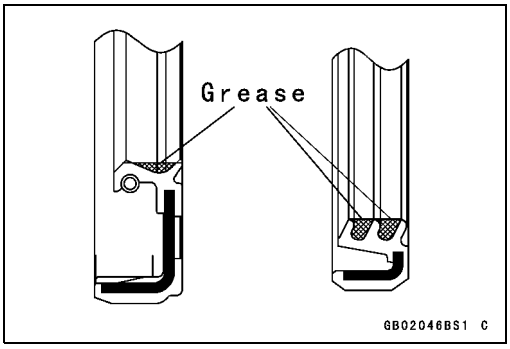


Oil Seal, Grease Seal

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.

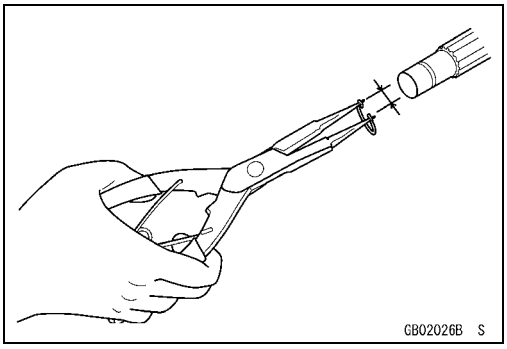


Apply specified grease to the lip of seal before installing the seal.



Circlips, Cotter Pins

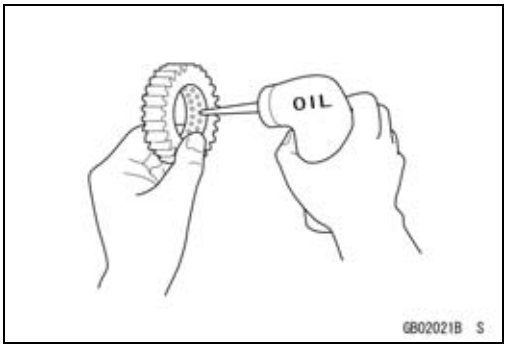
Replace the circlips or cotter pins that were removed with new ones. Take care not to open the clip excessively when installing to prevent deformation.



Before Servicing

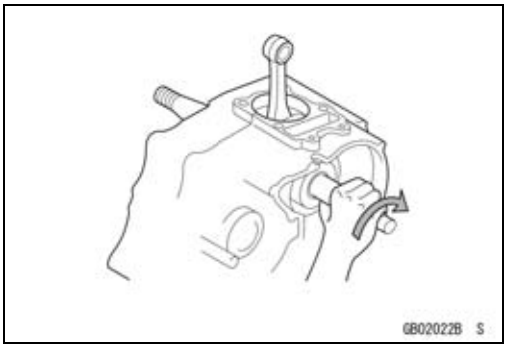
Lubrication

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.



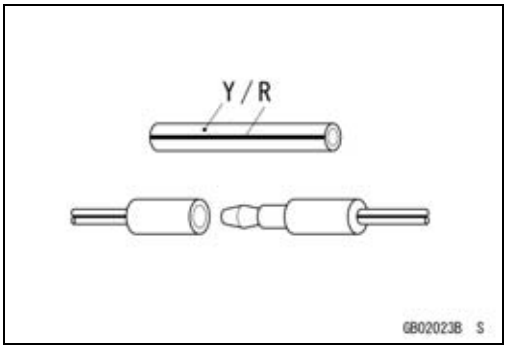
Direction of Engine Rotation

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).



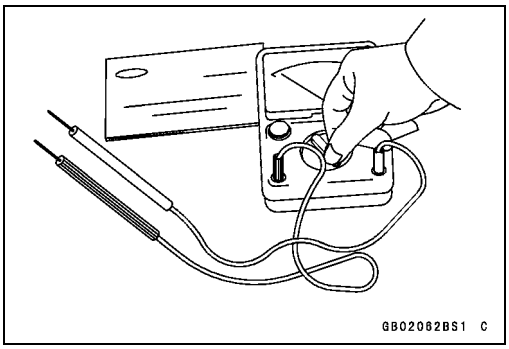
Electrical Leads

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



Instrument

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



Model Identification

ZX1000JBF (US and CA Models) Left Side View

ZX1000JBF (US and CA Models) Right Side View

Model Identification

ZX1000JBF (EUR Models) Left Side View

ZX1000JBF (EUR Models) Right Side View

Model Identification

ZX1000KBF (US and CA Models) Left Side View

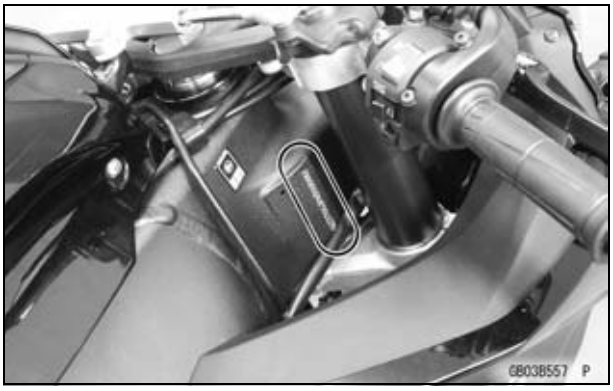
ZX1000KBF (US and CA Models) Right Side View

Model Identification

ZX1000KBF (EUR Models) Left Side View

ZX1000KBF (EUR Models) Right Side View

Frame Number



Engine Number

General Specifications

Items	ZX1000JBF/KBF
Dimensions	
Overall Length	2 075 mm (81.69 in.)
Overall Width	715 mm (28.1 in.)
Overall Height	1 115 mm (43.90 in.)
Wheelbase	1 425 mm (56.10 in.)
Road Clearance	135 mm (5.31 in.)
Seat Height	813 mm (32.0 in.)
Curb Mass:	
(ZX1000J Model)	198 kg (437 lb)
Front	103 kg (227 lb)
Rear	95 kg (209 lb)
(ZX1000K Model)	201 kg (443 lb)
Front	104 kg (229 lb)
Rear	97 kg (214 lb)
Fuel Tank Capacity	17 L (4.5 US gal)
Performance	
Minimum Turning Radius	3.4 m (11.2 ft)
Engine	
Type	4-stroke, DOHC, 4-cylinder
Cooling System	Liquid-cooled
Bore and Stroke	76.0 × 55.0 mm (3.0 × 2.2 in.)
Displacement	998 cm³ (60.9 cu in.)
Compression Ratio	13.0:1
Maximum Horsepower	147.1 kW (200 PS) @13 000 r/min (rpm) (WVTA (78.2 H)) 78.2 kW (106 PS) @12 500 r/min (rpm) (SEA) 110.8 kW (151 PS) @10 000 r/min (rpm) (US, CA, CAL) – – –
Maximum Torque	112 N·m (11.4 kgf·m, 82.6 ft·lb) @11 500 r/min (rpm) (WVTA (78.2 H)) 78 N·m (8.0 kgf·m, 57.5 ft·lb) @5 200 r/min (rpm) (SEA) 105.8 N·m (10.8 kgf·m, 78.0 ft·lb) @10 000 r/min (rpm) (US, CA, CAL) – – –
Fuel System	FI (Fuel Injection), KEIHIN TTK47 × 4
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)
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	36° (BTDC)
Close	80° (ABDC)
Duration	296°

General Specifications

Items	ZX1000JBF/KBF
Exhaust:	
Open	74° (BBDC)
Close	39° (ATDC)
Duration	293°
Lubrication System	Forced lubrication (wet sump with oil cooler)
Engine Oil:	
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2
Viscosity	SAE 10W-40
Capacity	3.7 L (3.9 US qt)
Drive Train	
Primary Reduction System:	
Type	Gear
Reduction Ratio	1.681 (79/47)
Clutch Type	Wet multi disc
Transmission:	
Type	6-speed, constant mesh, return shift
Gear Ratios:	
1st	2.600 (39/15)
2nd	2.053 (39/19)
3rd	1.737 (33/19)
4th	1.571 (33/21)
5th	1.444 (26/18)
6th	1.348 (31/23)
Final Drive System:	
Type	Chain drive
Reduction Ratio	2.294 (39/17)
Overall Drive Ratio	5.197 @Top gear
Frame	
Type	Tubular, diamond
Caster (Rake Angle)	25°
Trail	107 mm (4.21 in.)
Front Tire:	
Type	Tubeless
Size	120/70 ZR17 M/C (58 W)
Rim Size	J17M/C × MT3.50
Rear Tire:	
Type	Tubeless
Size	190/55 ZR17 M/C (75 W)
Rim Size	J17M/C × MT6.00
Front Suspension:	
Type	Telescopic fork (upside-down)
Wheel Travel	120 mm (4.72 in.)

General Specifications

Items	ZX1000JBF/KBF
Rear Suspension:	
Type	Swingarm (horizontal back-link)
Wheel Travel	140 mm (5.51 in.)
Brake Type:	
Front	Dual discs
Rear	Single disc
Electrical Equipment	
Battery:	
(ZX1000J Model)	12 V 6 Ah
(ZX1000K Model)	12 V 8.6 Ah
Headlight:	
Type	Semi-sealed beam
Bulb:	
High	12 V 55 W (quartz-halogen) × 2
Low	12 V 55 W (quartz-halogen)
Tail/Brake Light	LED
Alternator:	
Type	Three-phase AC
Rated Output	30 A/14 V @5 000 r/min (rpm)

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

Technical Information-Sport-Kawasaki TRaction Control System (S-KTRC)

Overview

S-KTRC is a highly sophisticated system based on MotoGP racing technology. Unlike the KTRC system used on the GTR1400 ABS (Concours 14 ABS in N. America), which is designed to offer rider reassurance when traversing slippery surfaces, S-KTRC, is designed to maximize forward motion, allowing riding at the edge of traction.

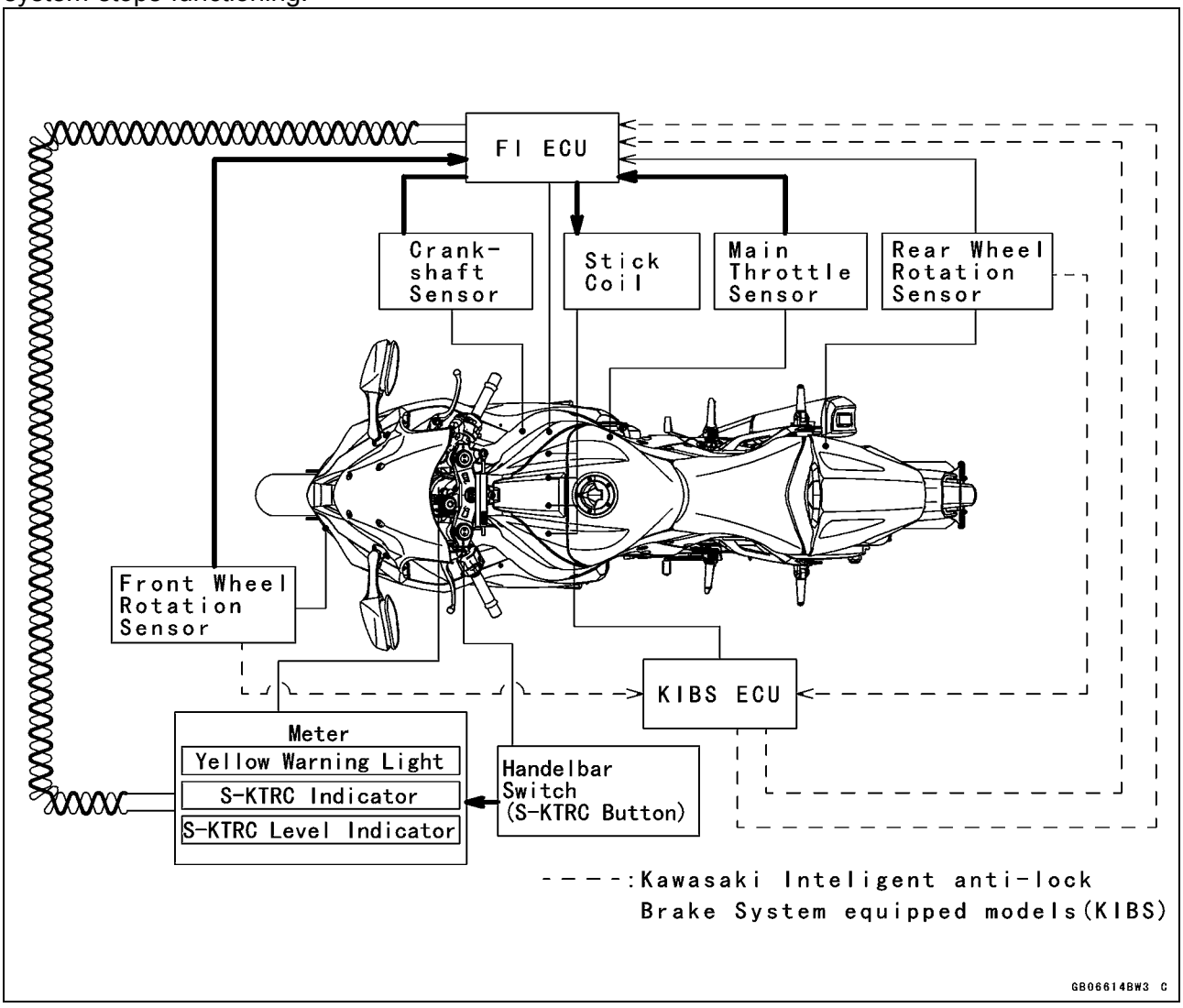
The quickest acceleration requires a certain amount of slip, so in order to optimize traction, S-KTRC actually allows slip. The ideal slip ratio varies according to conditions. The system looks at a number of parameters to get an accurate real-time picture of what is going on: front and rear wheel speed (slippage), engine rpm, throttle position, slippage, acceleration, etc.

Using complex analysis, the system is able to predict when traction conditions are about to become unfavorable. By acting before slippage exceeds the range for optimal traction, drops in power can be minimized resulting in ultra-smooth operation.

There are three available modes that riders can set according to preference (and skill level). Each mode is able to accommodate a range of riding conditions. Of course, engine manageability is such that riders can opt to turn the system OFF without fear of making the bike uncontrollable.

By combining the setting with the power mode, the rider can choose various riding modes to suit the road conditions and riding skill.

The system becomes functional at 5 km/h (3.1 mph) or more. If a failure occurs in the system, the warning indicator light (yellow LED) and mode indicator symbol blink to let the rider know that the system stops functioning.

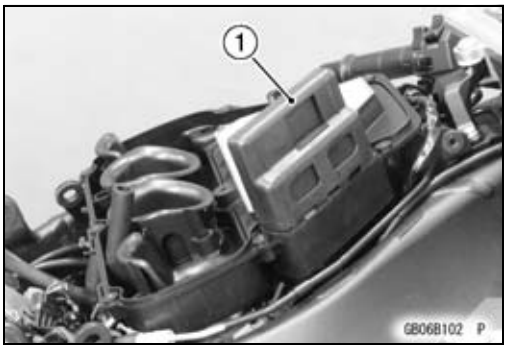


Technical Information-Sport-Kawasaki TRaction Control System (S-KTRC)

System Components

1. FI ECU

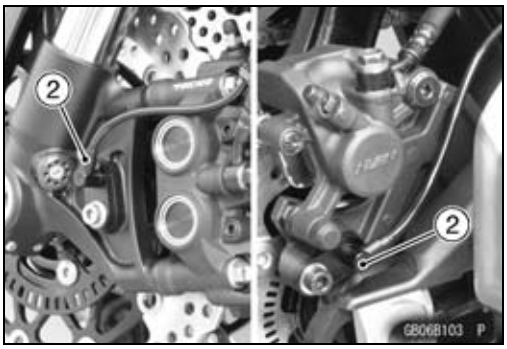
The FI ECU analyzes the motorcycle conditions based on the signals from the front/rear wheel rotation sensors and FI sensors (such as the crankshaft sensor and main throttle sensor), and controls engine power by reducing the number of ignition and retarding the ignition timing. The mode-switching signal is transmitted to the FI ECU by the CAN system via the meter ECU. If a failure occurs in the system, the FI ECU deactivates S-KTRC and displays the warning indication in the meter.



2. Wheel Rotation Sensor

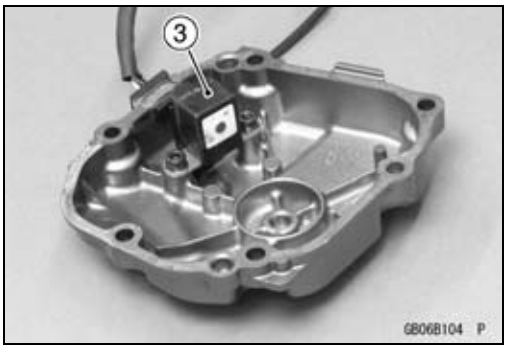
The wheel rotation sensor converts front and rear wheel rotation speed to a pulse signal and transmits it to the FI ECU.

As for the KIBS (Kawasaki Intelligent anti-lock Brake System) equipped model, a pulse signal is transmitted via the KIBS ECU.



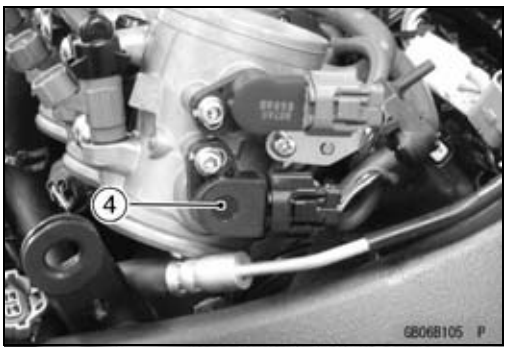
3. Crankshaft Sensor

The crankshaft sensor converts the engine speed to a pulse signal and transmits it to the FI ECU.



4. Main Throttle Sensor

The main throttle sensor converts the throttle position to a voltage signal and transmits it to the FI ECU.



5. S-KTRC Button

The mode-switching signal is transmitted to the meter ECU by depressing the S-KTRC button (0.3 ~ 0.4 sec.).

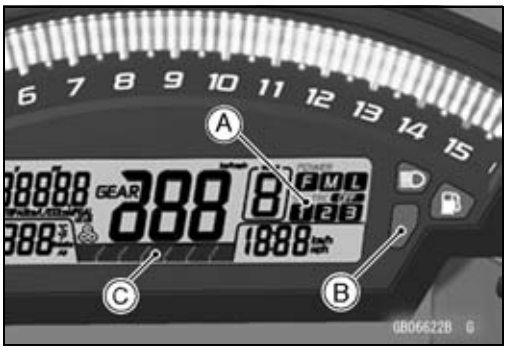
Technical Information-Sport-Kawasaki TRaction Control System (S-KTRC)

6. Multifunction Meter

The multifunction meter receives a mode-switching signal and displays the mode [A], and transmits it to the FI ECU by the CAN system.

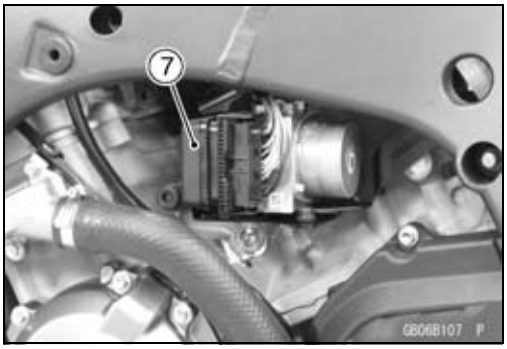
When a failure occurs in the system, the multifunction meter displays the warning indication by blinking the warning indicator light (yellow LED) [B] and mode indicator symbol.

It also displays the S-KTRC operating conditions in the level indicator [C].



7. KIBS ECU

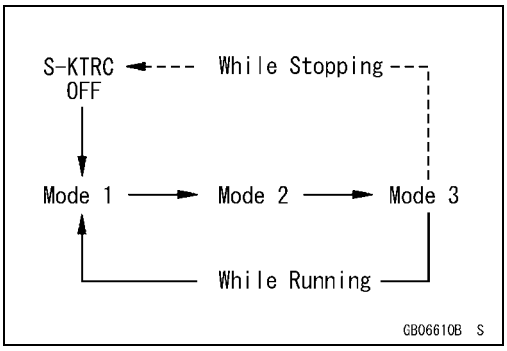
As for the KIBS equipped model, the front and rear wheel sensor signals are transmitted to the FI ECU via the KIBS ECU.



Mode-switching

Depress the S-KTRC button on the left handlebar switch to change the mode. The mode can be changed only when the throttle grip is closed completely.

The S-KTRC OFF can be selected only when the motorcycle is at a stop. Changing to mode 1 from S-KTRC OFF is possible while riding.



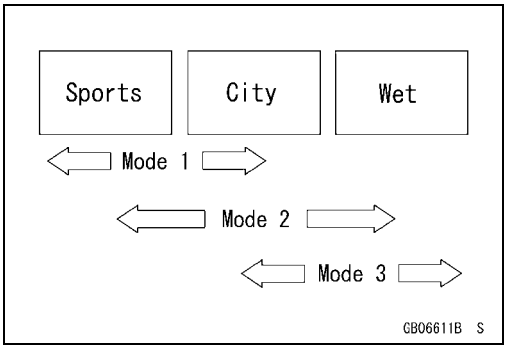
NOTE

- ○*When changing the mode, stop the motorcycle.*
- ○*The mode is retained if the ignition switch is turned to OFF or if the battery is disconnected.*
- ○*When the ignition switch is turned to OFF, and then back to ON while S-KTRC is OFF, the system will automatically be set to mode 1.*
- ○*If the battery is disconnected and then reconnected while S-KTRC is OFF, the S-KTRC is set in mode 1.*

Mode 1: S-KTRC least restrictive among the three modes. This makes lengthy drifts and wheelies possible when exiting tight corners.

Mode 2: There is more S-KTRC interaction compared to mode 1. This makes slight drifts possible when exiting tight corners.

Mode 3: S-KTRC intervenes to prevent the rear wheel from spinning whenever possible.

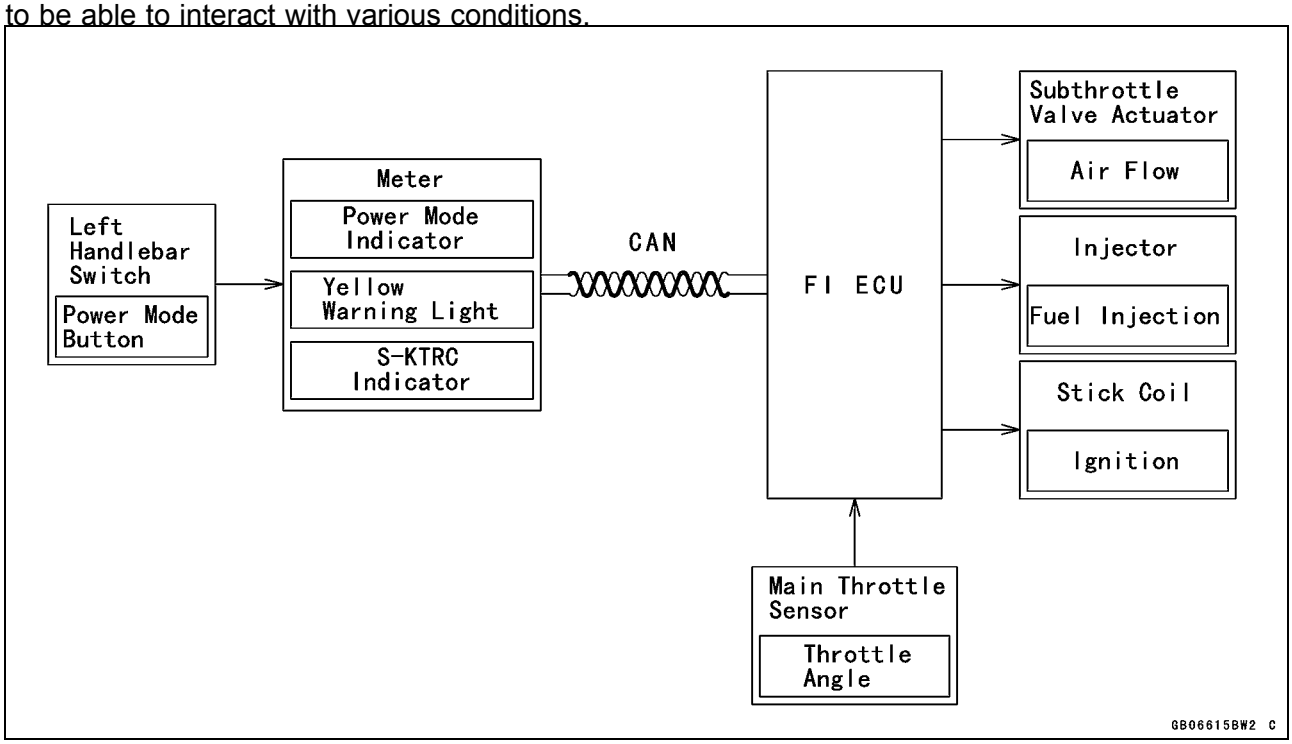


Technical Information-Power Mode

The rider can choose from three engine power modes to suit their preferences and road conditions.

The FI ECU controls the engine power by adjusting fuel injection, air intake, and ignition timing. It enables three-mode selection: Full Power (Mode F), Middle Power (Mode M), and Low Power (Mode L).

In addition, combining each mode with each S-KTRC setting allows the rider to have more choices to be able to interact with various conditions.



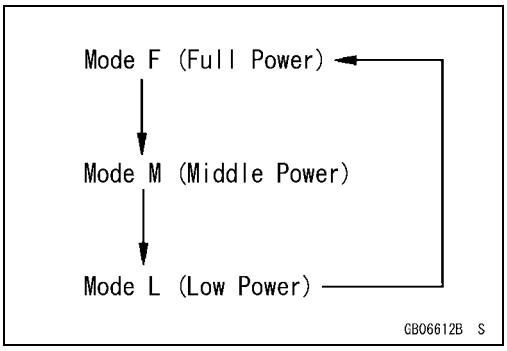
Power Mode Operation

To change the mode, close the throttle grip completely, and depress the power mode button [A] (0.3 ~ 0.4 sec.).

Power Mode Positions

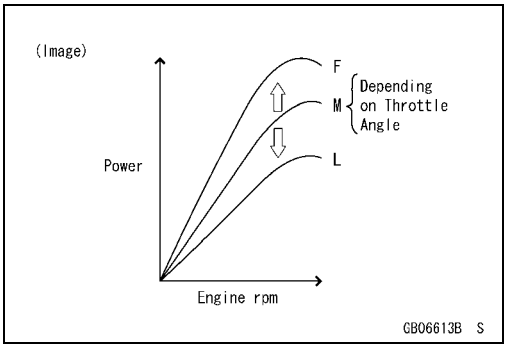
NOTE

○*The power mode setting is maintained when the ignition switch is turned OFF, or when the battery is disconnected.*



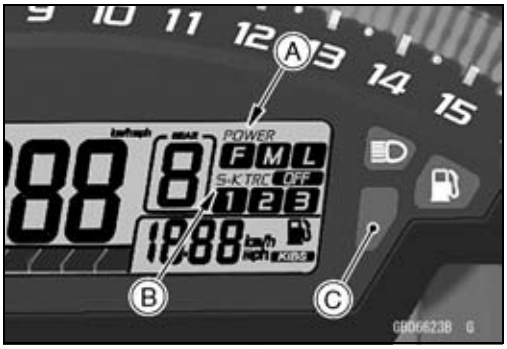
Technical Information-Power Mode

Mode F: The highest engine power output is achieved. The rider can use the full power of the engine.
Mode M: The throttle response is less sharp compared to mode F. Depending on the throttle application, full power can be accessed temporarily.
Mode L: About 60% of the highest engine power output is achieved. The throttle response is mildest among the three modes.



The current mode selection is displayed on the power mode indicator [A] in the multifunction meter.

If a failure occurs with a FI related components such as a subthrottle or main throttle sensor, the warning indicator light (red LED) and FI warning symbol will go ON, and/or the S-KTRC indicator [B] and warning indicator light (yellow LED) [C] blink. The current mode cannot be changed at this time.



Technical Information-Kawasaki Intelligent anti-lock Brake System (KIBS/ZX1000K model only)

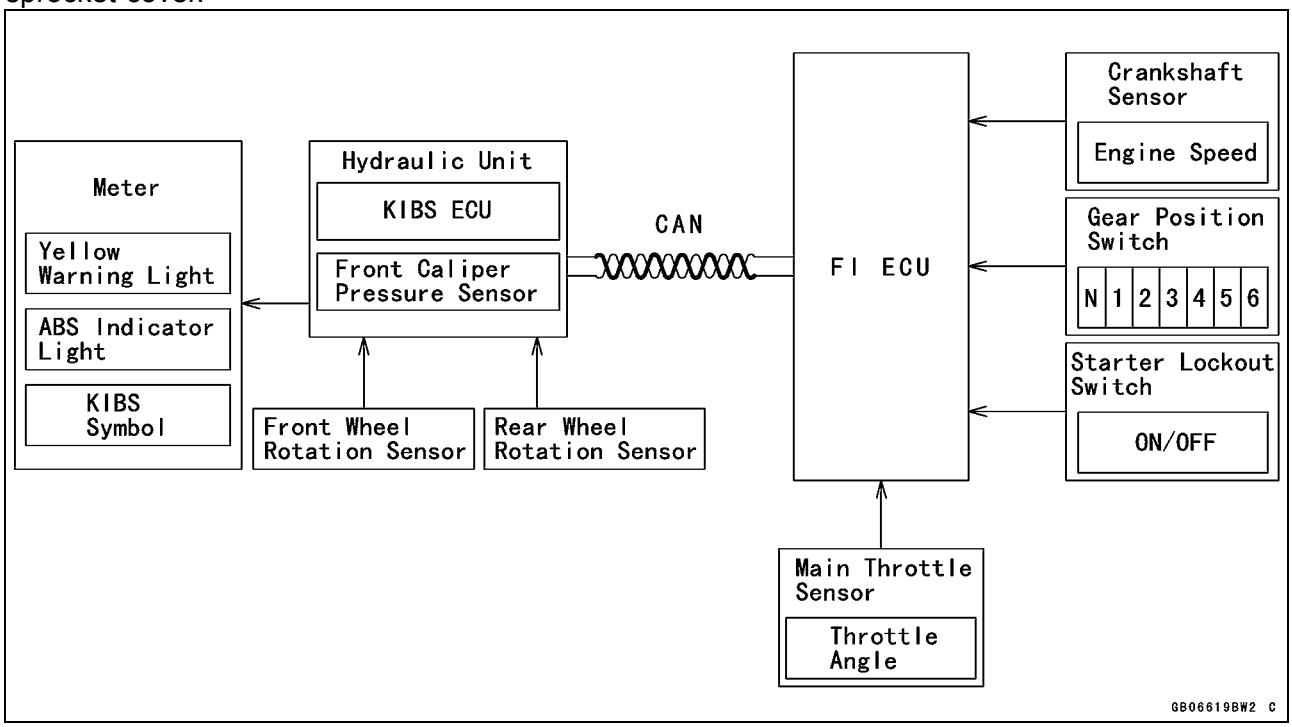
Overview

Kawasaki Intelligent anti-lock Brake System (KIBS) offers enhanced braking stability (ABS performance equivalent to the current model) to supersport models, which pitch more than most motorcycles and also offers high-precision front and rear brake pressure control (high-precision ABS) for sport riding.

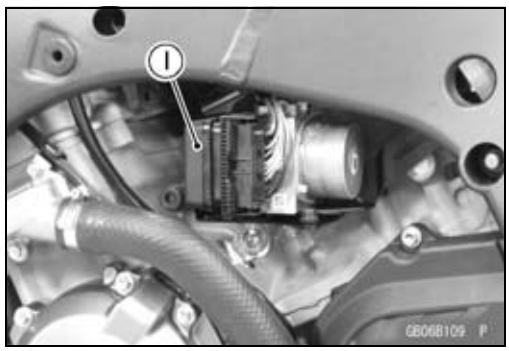
Precise control of the ABS operation decreases kickback to the brake lever and brake pedal during braking compared to the conventional system.

In addition to the front and rear wheel sensors in a conventional ABS, KIBS monitors a number of parameters: front caliper hydraulic pressure and information from the FI ECU (engine speed, throttle position, gear position, and clutch actuation).

KIBS uses an all-new BOSCH hydraulic unit which was designed specifically for motorcycle use. The new design is small and light weight (45% less volume and 800g lighter than current units). The unit is located close to the motorcycle's center of gravity, behind the engine cylinder and above the sprocket cover.



System Components



1. KIBS ECU

With input from the front and rear wheel sensors and front caliper hydraulic pressure, the KIBS ECU analyzes various conditions on the motorcycle, and with additional information from the FI ECU (engine speed, throttle position, gear position, and clutch actuation) precisely controls the brake caliper hydraulic pressure. As a result, brake force is generated to suit conditions. If there is no engine information from the FI ECU, the KIBS is deactivated and the warning is displayed in the meter; however, the conventional ABS function is maintained.

2. Wheel Rotation Sensor

The wheel rotation sensor converts the front and rear wheel rotation speed to a pulse signal and transmits it to the KIBS ECU and FI ECU.

Technical Information-Kawasaki Intelligent anti-lock Brake System (KIBS/ZX1000K model only)

3. KIBS Hydraulic Unit

The KIBS hydraulic unit consists of the hydraulic unit and KIBS ECU and has the front caliper hydraulic pressure sensor built-in.

When receiving a signal from the KIBS ECU, the hydraulic unit increases or decreases the front and rear brake hydraulic pressure.

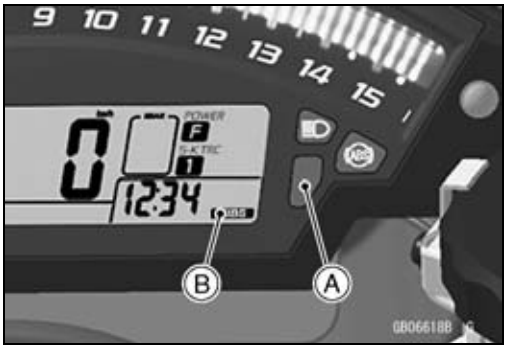
The front caliper hydraulic pressure sensor always monitors the front caliper hydraulic pressure and transmits the hydraulic pressure change to the KIBS ECU.

4. FI ECU

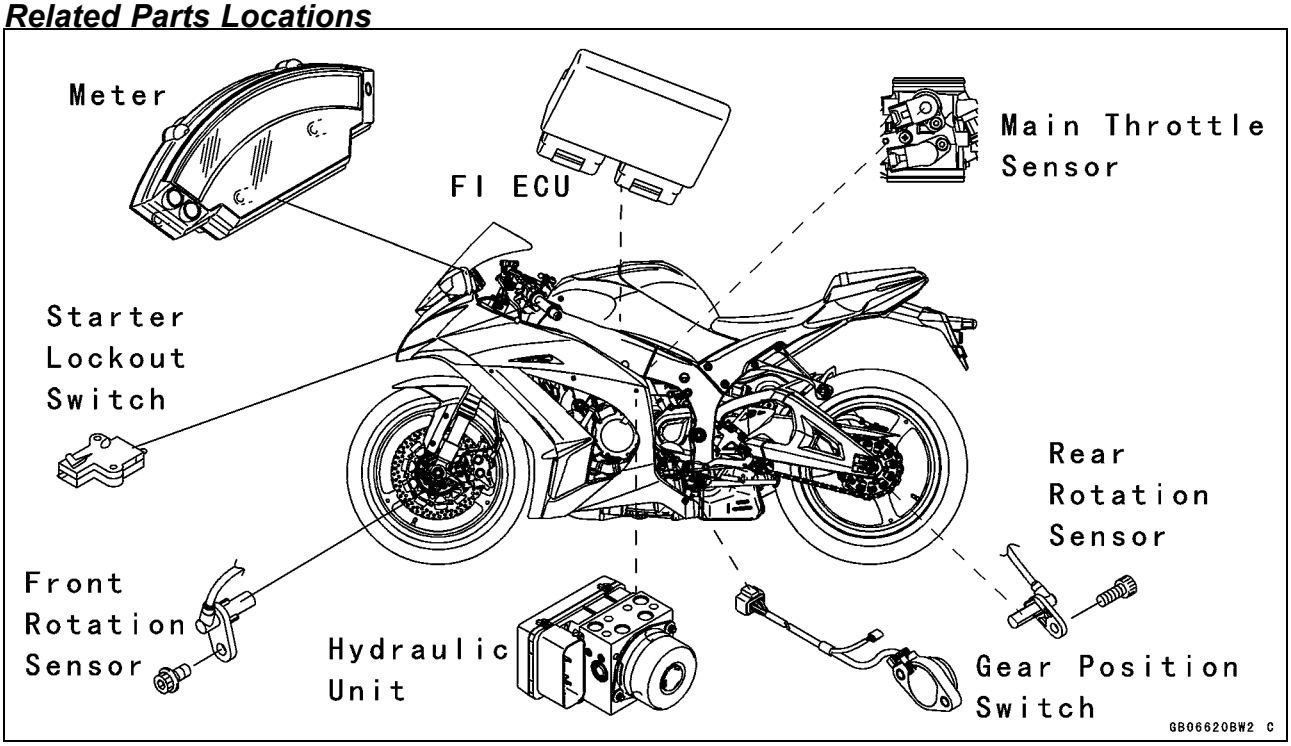
The FI ECU transmits information from the crankshaft sensor (engine speed), the main throttle sensor (throttle position), the gear position switch (gear position), and the starter lockout switch (ON/OFF) to the KIBS ECU by the CAN system.

5. Multifunction Meter

When a failure occurs in the system, the multifunction meter displays the warning indication by turning ON the warning indicator light (yellow LED) [A] and KIBS symbol [B].



Related Parts Locations

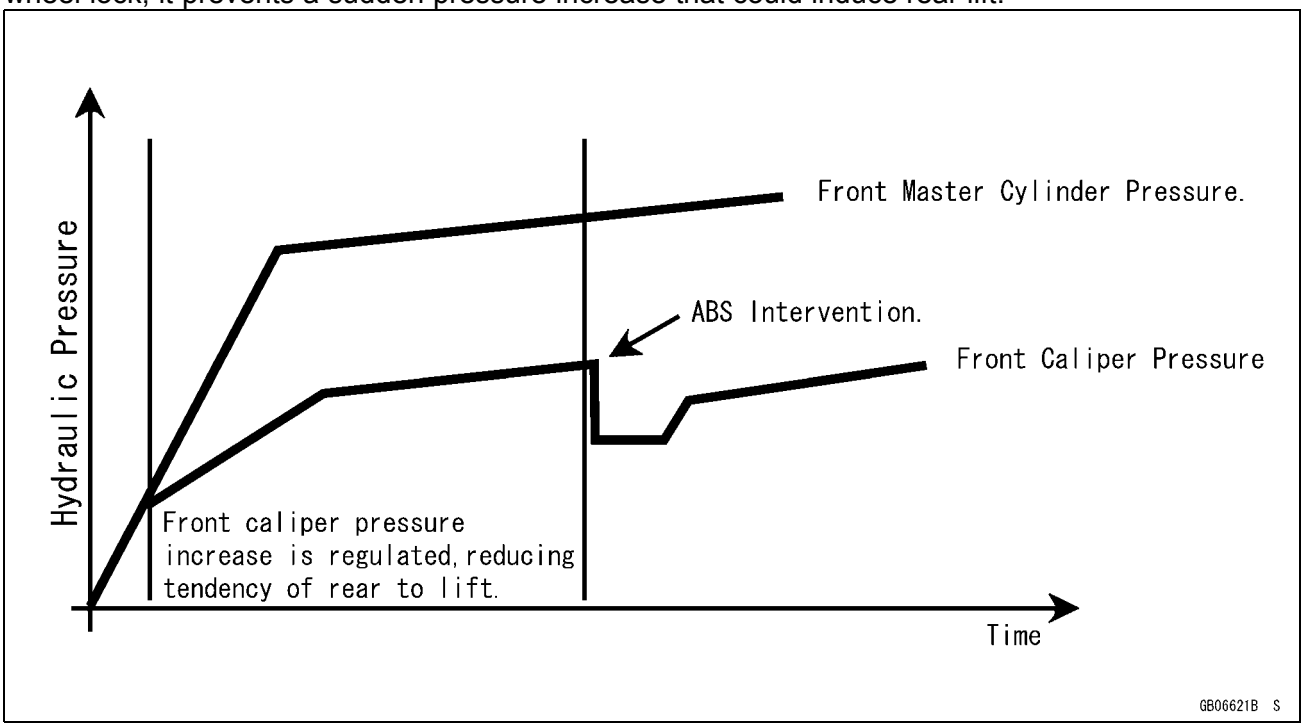


Technical Information-Kawasaki Intelligent anti-lock Brake System (KIBS/ZX1000K model only)

KIBS Control

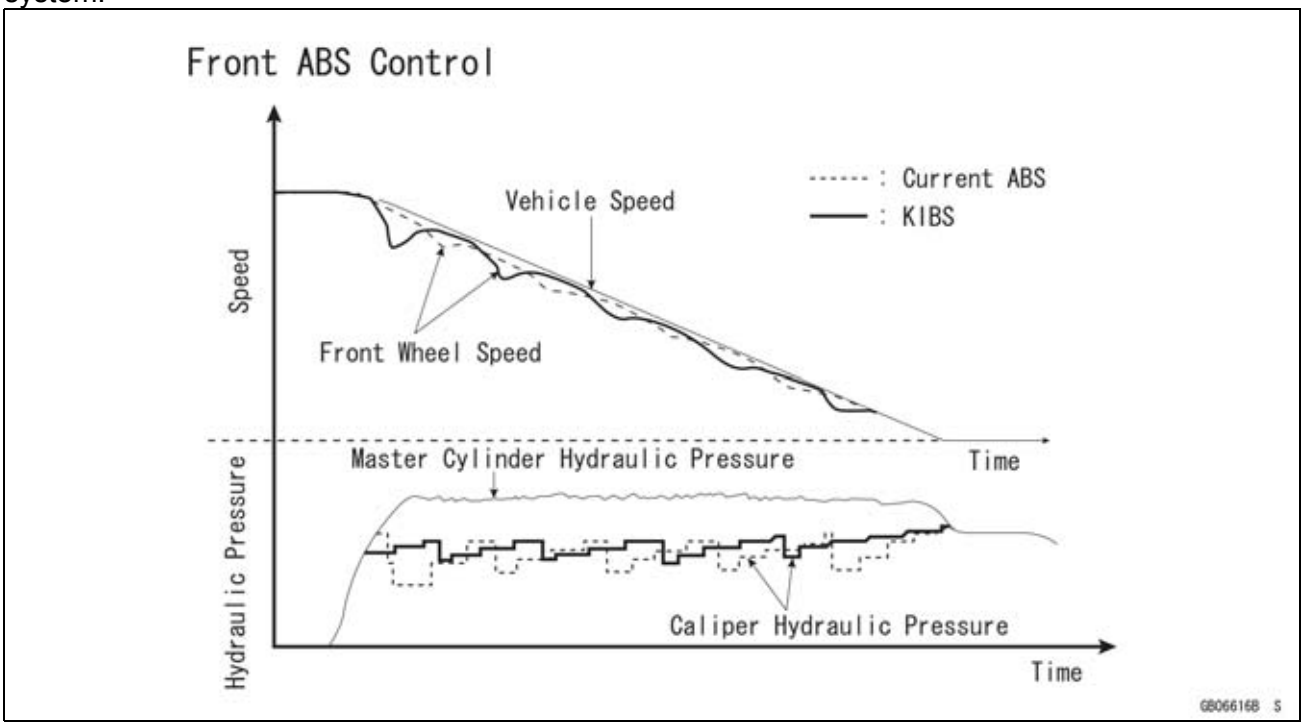
1. ABS performance equivalent to the current model (enhanced braking stability)

By monitoring front caliper hydraulic pressure, KIBS regulates pressure increases reducing the tendency of the rear to lift. Before the ABS system fully reacts, KIBS system prevents the pressure from increasing too quickly thus suppressing rear lift. And after the ABS has decreased pressure to prevent wheel lock, it prevents a sudden pressure increase that could induce rear lift.



2. High-precision ABS to enhance front and rear braking performance

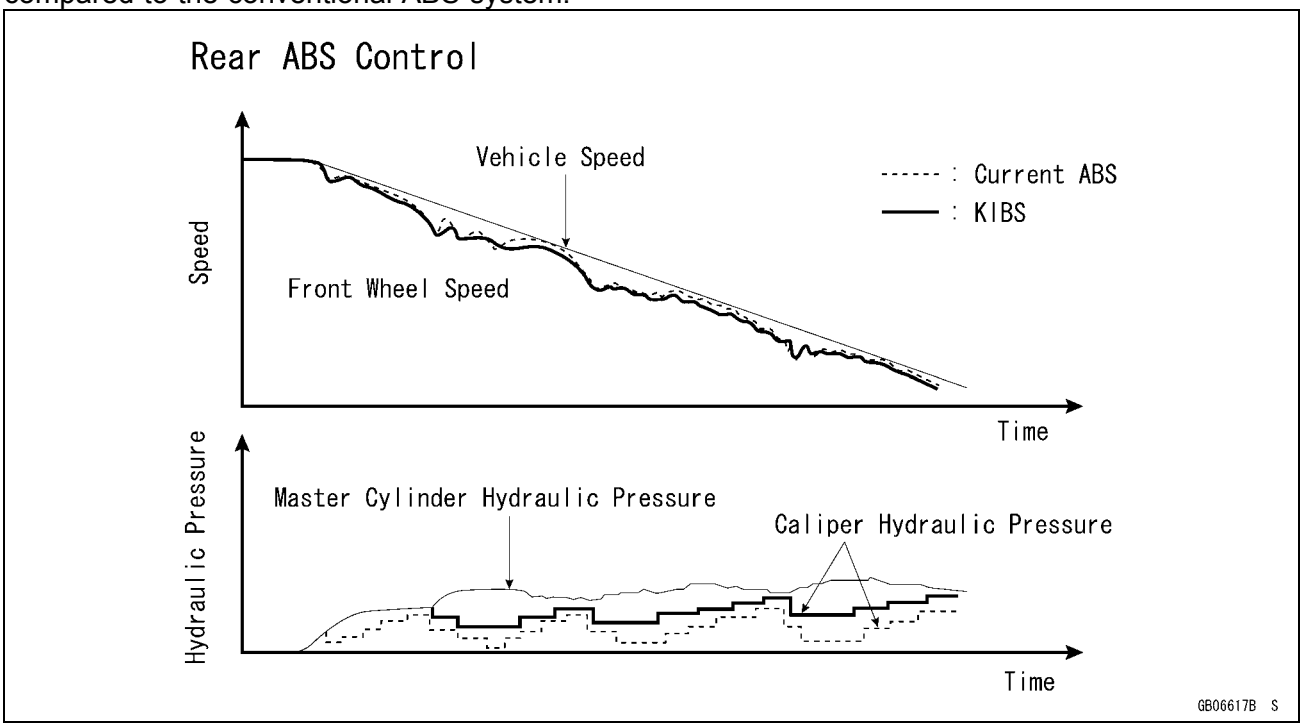
By monitoring front caliper hydraulic pressure, the KIBS system is able to regulate pressure changes precisely, so that slips are minimized resulting in smooth operation compared to the conventional ABS system.



Technical Information-Kawasaki Intelligent anti-lock Brake System (KIBS/ZX1000K model only)

3. Rear brake control enhancement during engine braking

By recognizing rear wheel slip due to engine brake force during aggressive throttle operation, and at high rpm or downshifting, the KIBS system prevents unnecessary ABS intervention to the rear wheel compared to the conventional ABS system.



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

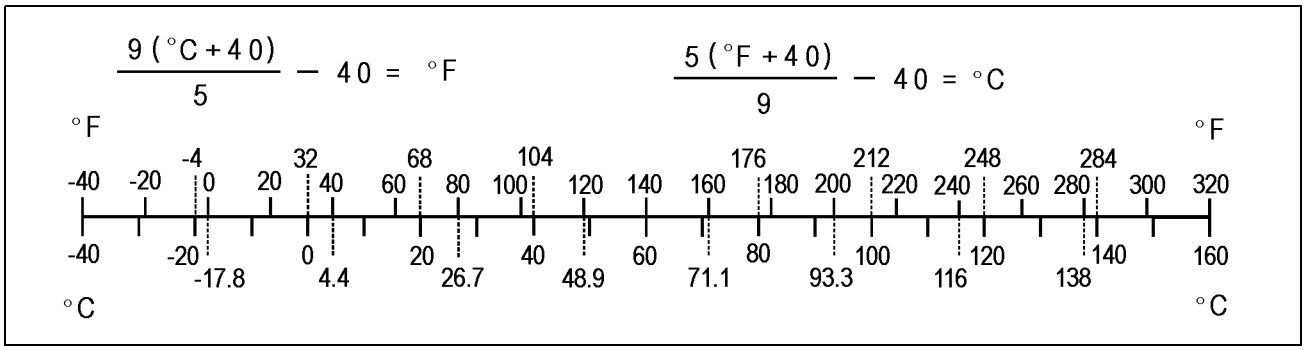
Units of Speed:

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:



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

FREQUENCY / ITEM	Whichever comes first ➡ / Every ⬇	* ODOMETER READING × 1 000 km (× 1 000 mile) 1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)	36 (22.5)	See Page
Fuel System									
Throttle control system (play, smooth return, no drag) - inspect	year	●		●		●		●	2-15
Engine vacuum synchronization - inspect				●		●		●	2-15
Idle speed - inspect		●		●		●		●	2-19
Fuel leak (fuel hose and pipe) - inspect	year	●		●		●		●	2-20
Fuel hose and pipe damage - inspect	year	●		●		●		●	2-20
Fuel hose and pipe installation condition - inspect	year	●		●		●		●	2-20
Evaporative emission control system function - inspect (CAL and SEA Models)		●	●	●	●	●	●	●	2-21
Cooling System									
Coolant level - inspect		●		●		●		●	2-22
Coolant leak (water hose and pipe) - inspect	year	●		●		●		●	2-22
Water hose damage - inspect	year	●		●		●		●	2-22
Water hose installation condition - inspect	year	●		●		●		●	2-22
Engine Top End									
Valve clearance - inspect						●			2-23
Air suction system damage - inspect				●		●		●	2-26
Clutch									
Clutch operation (play, disengagement, engagement) - inspect		●		●		●		●	2-27
Wheels and Tires									
Tire air pressure - inspect	year			●		●		●	2-28
Wheel/tire damage - inspect				●		●		●	2-28
Tire tread wear, abnormal wear - inspect				●		●		●	2-29

Periodic Maintenance Chart

FREQUENCY / ITEM	Whichever comes first ➡ / ⬇ Every	* ODOMETER READING × 1 000 km (× 1 000 mile) 1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)	36 (22.5)	See Page
Wheel bearing damage - inspect	year			●		●		●	2-29
Final Drive									
Drive chain lubrication condition - inspect #	Every 600 km (400 mile)								2-30
Drive chain slack - inspect #	Every 1 000 km (600 mile)								2-31
Drive chain wear - inspect #				●		●		●	2-32
Chain guide wear - inspect				●		●		●	2-33
Brakes									
Brake fluid leak (brake hose and pipe) - inspect	year	●	●	●	●	●	●	●	2-33
Brake hose and pipe damage - inspect	year	●	●	●	●	●	●	●	2-34
Brake hose installation condition - inspect	year	●	●	●	●	●	●	●	2-34
Brake fluid level - inspect	6 months	●	●	●	●	●	●	●	2-34
Brake pad wear - inspect #			●	●	●	●	●	●	2-35
Brake operation (effectiveness, play, no drag) - inspect	year	●	●	●	●	●	●	●	2-35
Brake light switch operation - inspect		●	●	●	●	●	●	●	2-35
Suspension									
Front forks/rear shock absorber operation (damping and smooth stroke) - inspect				●		●		●	2-36
Front forks/rear shock absorber oil leak - inspect	year			●		●		●	2-37
Rocker arms operation - inspect				●		●		●	2-37
Tie-rod operation - inspect				●		●		●	2-37
Steering									
Steering play - inspect	year	●		●		●		●	2-38
Steering stem bearings - lubricate	2 years					●			2-39
Steering damper oil leak - inspect			●	●	●	●	●	●	2-40
Electrical System									
Lights and switches operation - inspect	year			●		●		●	2-41
Headlight aiming - inspect	year			●		●		●	2-43

Periodic Maintenance Chart

FREQUENCY / ITEM	Whichever comes first ➡ / ⬇ Every	* ODOMETER READING × 1 000 km (× 1 000 mile) 1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)	36 (22.5)	See Page
Sidestand switch operation - inspect	year			●		●		●	2-44
Engine stop switch operation - inspect	year			●		●		●	2-45
Others									
Chassis parts - lubricate	year			●		●		●	2-46
Bolts and nuts tightness - inspect		●		●		●		●	2-47

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

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

Periodic Replacement Parts

FREQUENCY / ITEM	Whichever comes first ➡ / ⬇ Every	* ODOMETER READING × 1 000 km (× 1 000 mile) 1 (0.6)	12 (7.5)	24 (15)	36 (22.5)	48 (30)	See Page
Air cleaner element # - replace	Every 18 000 km (12 000 mile)						2-49
Fuel hose - replace	4 years					●	2-49
Coolant - change	3 years				●		2-52
Radiator hose and O-ring - replace	3 years				●		2-54
Engine oil # - change	year	●	●	●	●	●	2-55
Oil filter - replace	year	●	●	●	●	●	2-56
Brake hose - replace	4 years					●	2-57
Brake fluid - change	2 years			●		●	2-60
Rubber parts of master cylinder and caliper - replace	4 years					●	2-61, 2-63
Spark plug - replace			●	●	●	●	2-67

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

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

2-6 PERIODIC MAINTENANCE

Torque and Locking Agent

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

Letters used in the “Remarks” column mean:
AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.
G: Apply grease.
L: Apply a non-permanent locking agent.
Lh: Left-hand Threads
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 (ex. PBC grease).
SS: Apply silicone sealant.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System (DFI)				
Air Cleaner Housing Assembly Screws	1.1	0.11	10 in·lb	
Air Cleaner Housing Clamp Bolts	2.0	0.20	18 in·lb	
Air Cleaner Housing Duct Screws	1.1	0.11	10 in·lb	
Air Intake Duct Assembly Screws	1.5	0.15	13 in·lb	
Air Intake Solenoid Valve Nut	7.0	0.71	62 in·lb	
Intake Air Temperature Sensor Screw	0.8	0.08	7.1 in·lb	
Bracket Screw	3.4	0.35	30 in·lb	
Delivery Pipe Assy Mounting Screws	3.43	0.35	30 in·lb	
Fitting Retainer Screws	2.06	0.21	18 in·lb	
Fitting Screws	3.43	0.35	30 in·lb	
Idle Speed Control Valve Actuator Retainer Screws	2.06	0.21	18 in·lb	
Nozzle Assy Mounting Bolts	4.9	0.50	43 in·lb	S
Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	L
Fuel Pump Bolts	9.8	1.0	87 in·lb	L, S
Gear Position Switch Screws	2.9	0.30	26 in·lb	L
Oxygen Sensor (Equipped Models)	25	2.5	18	
Water Temperature Sensor	12	1.2	106 in·lb	
Exhaust Butterfly Valve Actuator Mounting Screws	1.2	0.12	11 in·lb	
Exhaust Butterfly Valve Actuator Pulley Bolt	4.9	0.50	43 in·lb	
Cooling System				
Water Hose Clamp Screws	3.0	0.31	27 in·lb	
Water Pipe Mounting Bolt	9.8	1.0	87 in·lb	L
Water Pump Cover Bolts	9.8	1.0	87 in·lb	L (2)
Coolant Drain Bolt (Water Pump)	9.8	1.0	87 in·lb	
Impeller Bolt	9.8	1.0	87 in·lb	
Water Temperature Sensor	12	1.2	106 in·lb	
Coolant By-pass Fitting Bolt	8.8	0.90	78 in·lb	L
Thermostat Housing Mounting Bolts	9.8	1.0	87 in·lb	
Thermostat Cap Bolts	5.9	0.60	52 in·lb	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Oil Cooler Mounting Bolts	12	1.2	106 in·lb	L, S
Water Hose Fitting Bolts	9.8	1.0	87 in·lb	
Coolant Drain Bolt (Cylinder)	9.8	1.0	87 in·lb	
Water Passage Plugs	20	2.0	15	L
Engine Top End				
Air Suction Valve Cover Bolts	9.8	1.0	87 in·lb	L
Camshaft Cap Bolts	12	1.2	106 in·lb	S
Camshaft Chain Tensioner Cap Bolt	20	2.0	15	
Camshaft Chain Tensioner Mounting Bolts	9.8	1.0	87 in·lb	
Camshaft Sprocket Bolts	15	1.5	11	L
Coolant Drain Bolt (Cylinder)	9.8	1.0	87 in·lb	
Cylinder Head Bolts (M10)	45	4.6	33	MO, S
Cylinder Head Bolts (M6)	12	1.2	106 in·lb	S
Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	S
Cylinder Head Cover Plug	15	1.5	11	L
Front Camshaft Chain Guide Bolt (Lower)	12	1.2	106 in·lb	
Front Camshaft Chain Guide Bolt (Upper)	25	2.5	18	
Spark Plugs	13	1.3	115 in·lb	
Throttle Body Assy Holder Bolts	9.8	1.0	87 in·lb	S
Upper Camshaft Chain Guide Bolts	12	1.2	106 in·lb	S
Water Passage Plugs	20	2.0	15	L
Muffler Body Mounting Bolt	25	2.5	18	
Premuffler Chamber Mounting Bolt	34	3.5	25	
Clutch				
Clutch Lever Clamp Bolts	7.8	0.80	69 in·lb	S
Clutch Cover Bolts	9.8	1.0	87 in·lb	S
Oil Filler Plug	–	–	–	Hand-tighten
Clutch Cover Plate Bolts	9.8	1.0	87 in·lb	L
Clutch Spring Bolts	11	1.1	97 in·lb	
Sub Clutch Hub Bolts	25	2.5	18	L
Clutch Hub Nut	130	13.3	96	R
Engine Lubrication System				
Oil Cooler Mounting Bolts	12	1.2	106 in·lb	L, S
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	G
Oil Pump Drive Chain Guide Bolt	9.8	1.0	87 in·lb	L
Oil Pump Drive Gear Bolt	9.8	1.0	87 in·lb	L, Lh
Oil Passage Plug (Taper)	20	2.0	15	L
Oil Pipe Holder Bolt	9.8	1.0	87 in·lb	L
Oil Pressure Relief Valve	15	1.5	11	L
Oil Filter	17	1.7	13	G, R
Oil Filter Holder Bolt	35	3.6	26	L
Oil Pan Bolts	9.8	1.0	87 in·lb	S

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Engine Oil Drain Bolt	29	3.0	21	
Engine Removal/Installation				
Adjusting Collar Locknut	49	5.0	36	S
Left Front Engine Mounting Bolt	44	4.5	32	S
Lower Engine Mounting Bolt	9.8	1.0	87 in·lb	S
Lower Engine Mounting Nut	44	4.5	32	R, S
Middle Engine Mounting Bolt	9.8	1.0	87 in·lb	S
Middle Engine Mounting Nut	44	4.5	32	R, S
Right Front Engine Mounting Bolt	44	4.5	32	S
Crankshaft/Transmission				
Balanser Shaft Clamp Bolt	9.8	1.0	87 in·lb	
Balanser Shaft Clamp Lever Bolt	25	2.5	18	L
Bearing Holder Bolts	15	1.5	11	L
Breather Hole Plug	15	1.5	11	L
Breather Plate Bolts	9.8	1.0	87 in·lb	L
Connecting Rod Big End Nuts	see the text			MO, R
Coolant Drain Bolt (Cylinder)	9.8	1.0	87 in·lb	
Crankcase Bolt (M6, L = 60)	12	1.2	106 in·lb	
Crankcase Bolt (M7, L = 45)	20	2.0	15	
Crankcase Bolts (M6, L = 40)	12	1.2	106 in·lb	
Crankcase Bolts (M6, L = 45)	12	1.2	106 in·lb	
Crankcase Bolts (M7, L = 50)	20	2.0	15	
Crankcase Bolts (M8, L = 63)	27	2.8	20	
Crankcase Bolts (M9, L = 100)	45	4.6	33	MO, S
Crankcase Bolts (M9, L = 113)	45	4.6	33	MO, S
Oil Jet Nozzle (M6)	4.9	0.50	43 in·lb	
Oil Jet Nozzle (M8)	8.0	0.82	71 in·lb	
Oil Jet Nozzle (M10)	15	1.5	11	
Oil Jet Nozzles (M5)	2.9	0.30	26 in·lb	
Oil Passage Plugs (Taper)	20	2.0	15	L
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	G
Plate Bolts	4.9	0.50	43 in·lb	L
Torque Limiter Cover Bolts	9.8	1.0	87 in·lb	
Engine Sprocket Nut	145	14.8	107	MO
Gear Position Switch Screws	2.9	0.30	26 in·lb	L
Gear Positioning Lever Bolt	12	1.2	106 in·lb	
Shift Drum Cam Holder Bolt	24	2.4	18	L
Shift Pedal Mounting Bolt	25	2.5	18	L
Shift Ratchet Assembly Holder Bolts	15	1.5	11	L
Shift Shaft Return Spring Pin	29	3.0	21	L
Transmission Case Bearing Holder Bolts (L = 15)	4.9	0.50	43 in·lb	L

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Transmission Case Bearing Holder Bolts (L = 14)	4.9	0.50	43 in·lb	L
Transmission Case Bolts	20	2.0	15	
Torque Limiter Shaft Plug	25	2.5	18	L
Starter Clutch Shaft Holder Bolt	9.8	1.0	87 in·lb	L
Starter Clutch Shaft Bolt	20	2.0	15	L
Wheels/Tires				
Front Axle Clamp Bolts	20	2.0	15	AL
Front Axle Nut	127	13.0	94	
Rear Axle Nut	127	13.0	94	
Final Drive				
Engine Sprocket Cover Bolts	9.8	1.0	87 in·lb	
Engine Sprocket Nut	145	14.8	107	MO
Rear Axle Nut	127	13.0	94	
Rear Sprocket Nuts	59	6.0	44	R
Brakes				
Bleed Valves	7.8	0.80	69 in·lb	
Brake Hose Banjo Bolts	25	2.5	18	
Brake Lever Pivot Bolt	1.2	0.12	11 in·lb	Si
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Brake Disc Mounting Bolts	27	2.8	20	L
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Front Brake Pad Pins	15	1.5	11	
Front Brake Reservoir Cap Stopper Screw	1.2	0.12	11 in·lb	
Front Caliper Assembly Bolts	22	2.2	16	
Front Caliper Mounting Bolts	34	3.5	25	
Front Master Cylinder Bleed Valve	5.4	0.55	48 in·lb	
Front Master Cylinder Clamp Bolts	11	1.1	97 in·lb	S
Brake Pedal Mounting Bolt	8.8	0.90	78 in·lb	L
Rear Brake Pad Pin	17	1.7	13	
Rear Brake Pad Pin Plug	2.5	0.25	22 in·lb	
Rear Caliper Pin Bolt	27	2.8	20	Si
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Rear Master Cylinder Push Rod Locknut	17	1.7	13	
Brake Pipe Joint Nuts	18	1.8	13	
Suspension				
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Front Fork Clamp Bolts (Lower)	23	2.3	17	AL
Front Fork Top Plugs	35	3.6	26	
Piston Rod Guide Case	90	9.2	66	
Front Axle Clamp Bolts	20	2.0	15	AL
Rear Shock Absorber Nut (Lower)	34	3.5	25	R
Rear Shock Absorber Bracket Nut	59	6.0	44	R
Swingarm Pivot Adjusting Collar Locknut	98	10.0	72	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Swingarm Pivot Shaft	20	2.0	15	
Swingarm Pivot Shaft Nut	108	11.0	80	
Tie-Rod Nuts	34	3.5	25	R
Rocker Arm Nut	34	3.5	25	R
Rear Shock Absorber Nut (Upper)	34	3.5	25	R
Steering				
Steering Stem Head Nut	78	8.0	58	
Steering Stem Nut	20	2.0	15	
Left Switch Housing Screws	3.5	0.36	31 in·lb	
Right Switch Housing Screws	3.5	0.36	31 in·lb	
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Handlebar Clamp Bolts	25	2.5	18	
Handlebar Positioning Bolts	9.8	1.0	87 in·lb	L
Throttle Case Screws	3.5	0.36	31 in·lb	
Steering Damper Mounting Bolts	11	1.1	97 in·lb	L
Front Fork Clamp Bolts (Lower)	23	2.3	17	AL
Frame				
Front Fender Mounting Bolts	3.9	0.40	35 in·lb	L
Front Footpeg Bracket Bolts	25	2.5	18	
Rear Footpeg Bracket Bolts	25	2.5	18	
Rear Frame Front Bolts	44	4.5	32	L
Rear Frame Rear Bolts	25	2.5	18	L
Sidestand Bolt	44	4.5	32	S
Sidestand Bracket Bolts	49	5.0	36	L
Sidestand Nut	29	3.0	21	R, S
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
Windshield Mounting Bolts	1.2	0.12	11 in·lb	
Electrical System				
License Plate Light Mounting Screws	1.2	0.12	11 in·lb	
Meter Unit Mounting Screws	1.2	0.12	11 in·lb	
Tail/Brake Light Mounting Screws	1.2	0.12	11 in·lb	
Rear Turn Signal Light Lens Screws	1.0	0.10	8.9 in·lb	
Alternator Cover Bolts	9.8	1.0	87 in·lb	
Alternator Lead Holding Plate Bolt	9.8	1.0	87 in·lb	L
Alternator Rotor Bolt	155	15.8	114	
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	L
Crankshaft Sensor Cover Bolts	9.8	1.0	87 in·lb	
Fuel Pump Bolts	9.8	1.0	87 in·lb	L, S
Gear Position Switch Screws	2.9	0.30	26 in·lb	L
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	G
Oxygen Sensor (Equipped Models)	25	2.5	18	
Spark Plugs	13	1.3	115 in·lb	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Stator Coil Bolts	12	1.2	106 in·lb	L
Timing Rotor Bolt	39	4.0	29	
Water Temperature Sensor	12	1.2	106 in·lb	
Brush Holder Screw	3.8	0.39	34 in·lb	
Engine Ground Terminal Bolt	9.8	1.0	87 in·lb	
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Left Switch Housing Screws	3.5	0.36	31 in·lb	
Right Switch Housing Screws	3.5	0.36	31 in·lb	
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
Starter Motor Cable Terminal Nut	5.9	0.60	52 in·lb	
Starter Motor Mounting Bolts	9.8	1.0	87 in·lb	L
Starter Motor Terminal Locknut	11	1.1	97 in·lb	
Starter Motor Through Bolts	5.0	0.51	44 in·lb	

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

Basic Torque for General Fasteners

Threads Diameter (mm)	Torque		
	N·m	kgf·m	ft·lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in·lb
6	5.9 ~ 7.8	0.60 ~ 0.80	52 ~ 69 in·lb
8	14 ~ 19	1.4 ~ 1.9	10 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17.0 ~ 23.0	125 ~ 165
20	225 ~ 325	23.0 ~ 33.0	165 ~ 240

Specifications

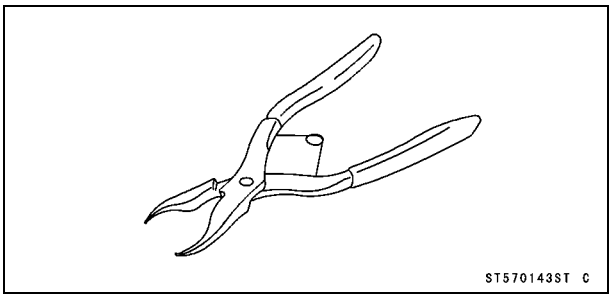
Item	Standard	Service Limit
Fuel System (DFI)		
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	– – –
Idle Speed	1 100 ±50 r/min (rpm)	– – –
Throttle Body Vacuum	30.7 ±1.33 kPa (230 ±10 mmHg) at idle speed	– – –
Main Throttle Sensor Output Voltage	DC 0.64 ~ 0.68 V at idle throttle opening	– – –
Bypass Screws (Turn Out)	0 ~ 2 1/2 (for reference)	– – –
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	2.6 L (2.7 US qt)	– – –
Engine Top End		
Valve Clearance:		
Exhaust	0.17 ~ 0.22 mm (0.0067 ~ 0.0087 in.)	– – –
Intake	0.15 ~ 0.22 mm (0.0059 ~ 0.0087 in.)	– – –
Clutch		
Clutch Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	– – –
Engine Lubrication System		
Engine Oil:		
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2	– – –
Viscosity	SAE 10W-40	– – –
Capacity	2.9 L (3.1 US qt) (when filter is not removed)	– – –
	3.3 L (3.5 US qt) (when filter is removed)	– – –
	3.7 L (3.9 US qt) (when engine is completely dry)	– – –
Level	Between upper and lower level lines (Wait 2 ~ 3 minutes after idling or running)	– – –
Wheels/Tires		
Tread Depth:		
Front	3.6 mm (0.14 in.)	1 mm (0.04 in.) (AT, CH, DE) 1.6 mm (0.06 in.)
Rear	5.3 mm (0.21 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

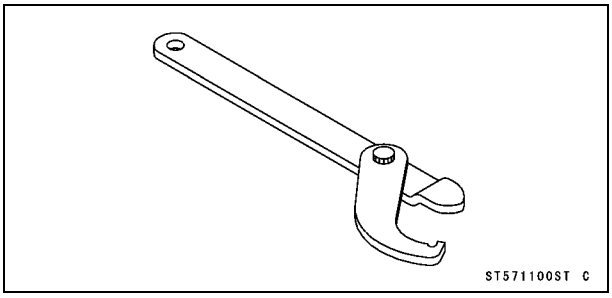
Item	Standard	Service Limit
Air Pressure (when Cold):		
Front	Up to 180 kg (397 lb) load: 250 kPa (2.50 kgf/cm², 36 psi)	– – –
Rear	Up to 180 kg (397 lb) load: 290 kPa (2.90 kgf/cm², 42 psi)	– – –
Final Drive		
Drive Chain Slack	25 ~ 35 mm (1.0 ~ 1.4 in.)	– – –
Drive Chain Wear (20-link Length)	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	323 mm (12.7 in.)
Standard Chain:		
Make	ENUMA	– – –
Type	EK525RMX/3D	– – –
Link	112 links	– – –
Brakes		
Brake Fluid:		
Grade	DOT4	– – –
Brake Pad Lining Thickness:		
Front	4.0 mm (0.16 in.)	1 mm (0.04 in.)
Rear	4.5 mm (0.18 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

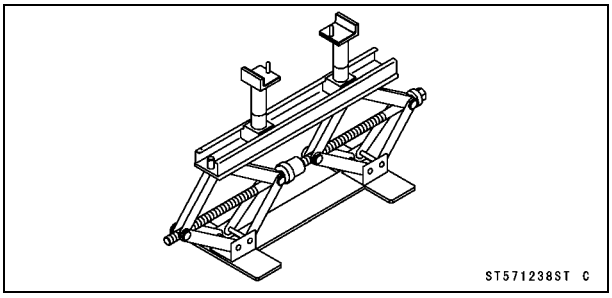
Inside Circlip Pliers:
57001-143



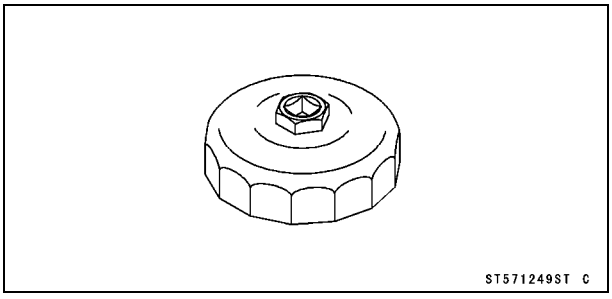
Steering Stem Nut Wrench:
57001-1100



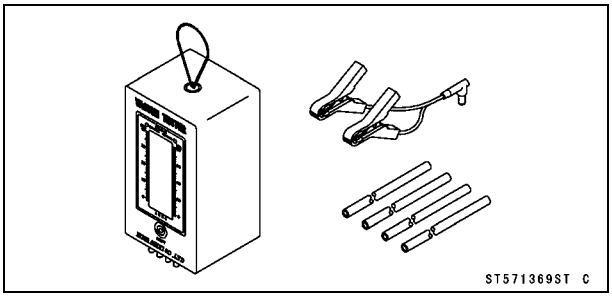
Jack:
57001-1238



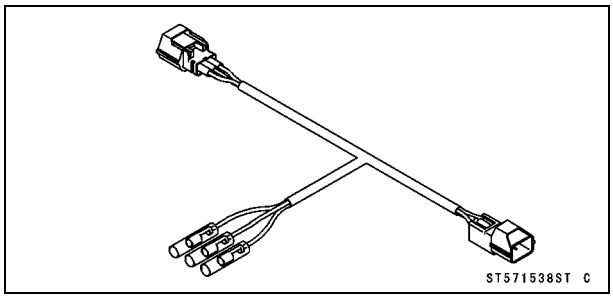
Oil Filter Wrench:
57001-1249



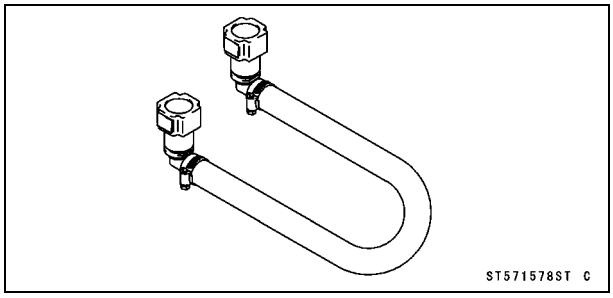
Vacuum Gauge:
57001-1369



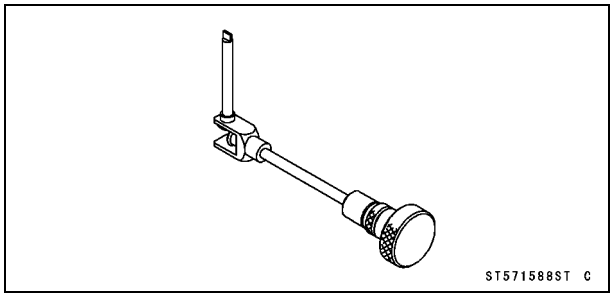
Throttle Sensor Setting Adapter:
57001-1538



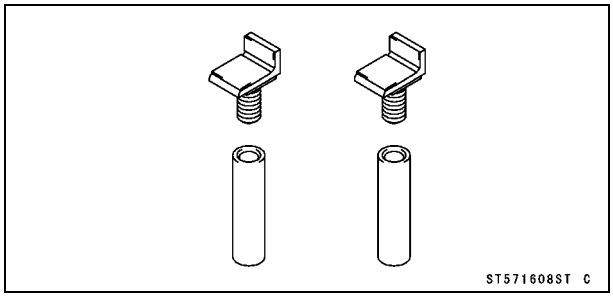
Extension Tube:
57001-1578



Pilot Screw Adjuster, D:
57001-1588



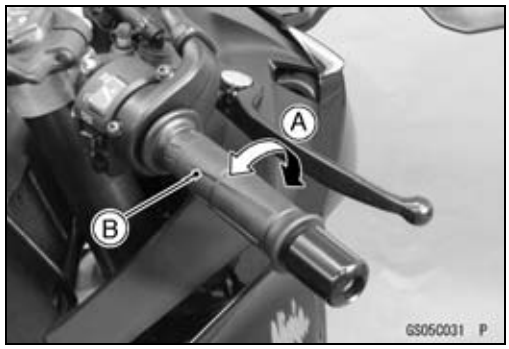
Jack Attachment:
57001-1608



Periodic Maintenance Procedures

Fuel System (DFI)

Throttle Control System Inspection



- Check the throttle grip free play [A].

★If the free play is incorrect, adjust the throttle cables.

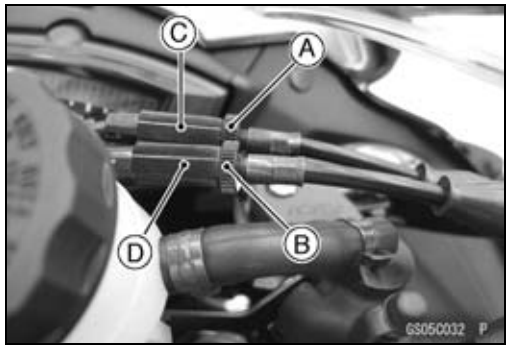
Throttle Grip Free Play
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)

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

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

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

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

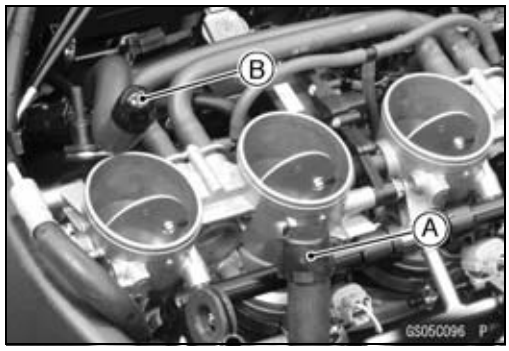


★If necessary, adjust the throttle cable as follows.

- Loosen the locknuts [A] [B].
- Screw both throttle cable adjusters [C] [D] to give the throttle grip plenty of play.
- Turn the decelerator cable adjuster [C] until it has no play when the throttle grip is 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



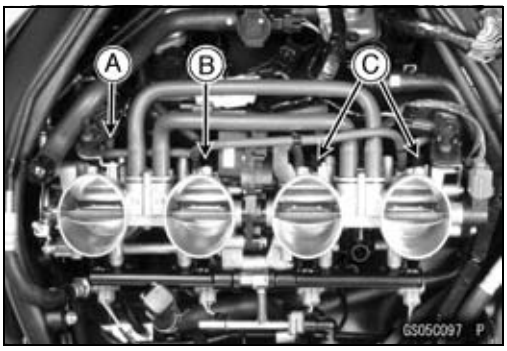
NOTE

○*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:
  Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)
  Air Cleaner Housing (see Air Cleaner Housing Removal in the Fuel System (DFI) chapter)
  Primary Fuel Hose (see Fuel Hose Replacement)
- Plug the breather hose end [A] and the air switching valve hose end [B].

Periodic Maintenance Procedures

- Remove:
  Intake Air Pressure Sensor Hose [A]
  Air Intake Valve Hose [B] (Other than US, CA and CAL Models)
  Rubber Caps [C]
- For CAL and SEA Models, remove the vacuum hoses.



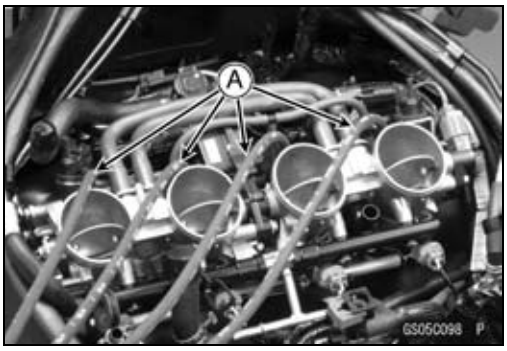
NOTE

○*When the engine is running, the ECU detects the service code 16. But the engine synchronization can be inspected correctly.*

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

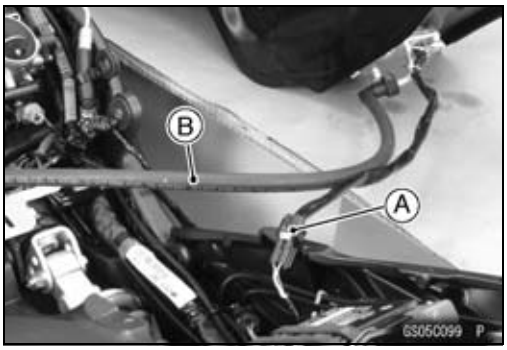
Special Tool - Vacuum Gauge: 57001-1369

- Connect a highly accurate tachometer to one of the stick coil primary leads.



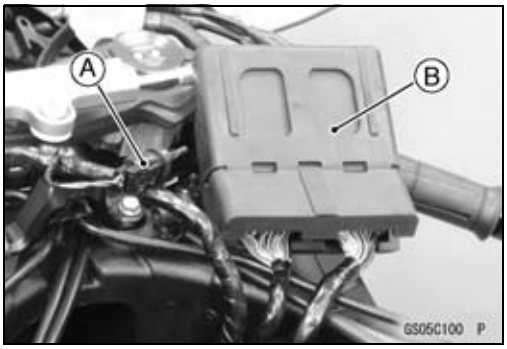
- Connect the following parts temporarily.
  Fuel Pump Lead Connector [A]
  Extension Tube [B]

Special Tool - Extension Tube: 57001-1578



Periodic Maintenance Procedures

● Connect the following parts temporarily.
Intake Air Temperature Sensor [A]
ECU [B]
Secondary Fuel Hose [C] (see Fuel Hose Replacement)



NOTE

○*Be sure to connect the intake air temperature sensor. When the ignition switch is turned ON without the intake air temperature sensor, the ECU detects the service code 13. Then the ECU starts the fail-safe (see Self-diagnosis Outline in the Fuel System (DFI) chapter). In this case, the engine vacuum synchronization can not be inspected correctly.*

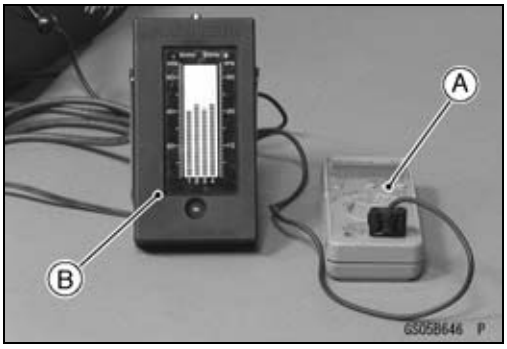
○*Do not connect the secondary fuel injector connectors. The engine vacuum synchronization is inspected with the air cleaner housing removed and the engine started. The secondary fuel injectors are operating with following conditions.*

1. The engine speed is more than 6 000 r/min (rpm).
2. The throttle opening is more than 12°.

⚠ WARNING

Gasoline is extremely flammable and can be explosive under certain conditions, especially when atomized by the fuel injector nozzle. To prevent a fire or explosion, be sure the secondary fuel injector connectors are disconnected before starting the engine so that fuel cannot be sprayed by the injectors.

● 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, inspect the idle speed control valve (see Idle Speed Control Valve Inspection in the Self-Diagnosis System chapter).

NOTICE

Do not measure the idle speed by the meter unit.

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

Throttle Body Vacuum
Standard: 30.7 ±1.33 kPa (230 ±10 mmHg) at idle speed

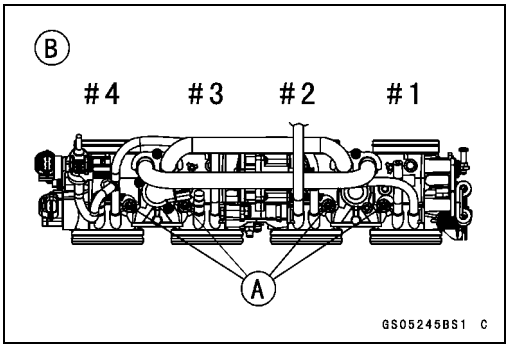
Periodic Maintenance Procedures

★If any vacuum is not within specifications, adjust the bypass screws [A].

View from Front [B]

Special Tool - Pilot Screw Adjuster, D [C]: 57001-1588

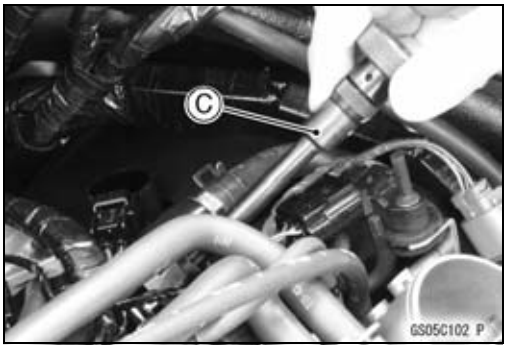
- Adjust the each vacuum (#1 ~ #4) to the standard value.
- Open and close the throttle valves after each measurement, and adjust the idle speed as necessary.



NOTE

○*The engine vacuum synchronization is adjusted with the secondary fuel injector connectors disconnected. Therefore, the secondary fuel injectors do not operate while adjusting the engine vacuum synchronization. If raising the engine speed more than 6 000 r/min (rpm), the engine may not operate smoothly.*

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

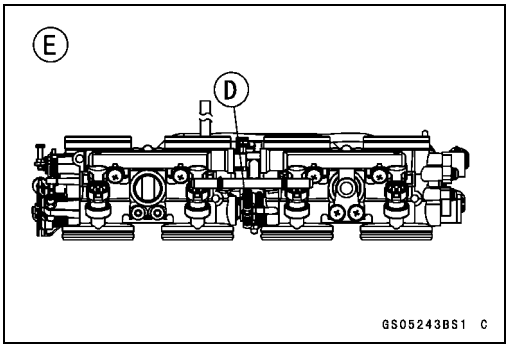


View from Rear [E]

- Check the vacuums as before.

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

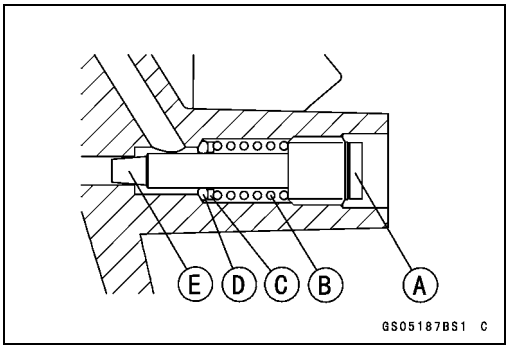
★If any vacuum can not be adjusted within the specification, remove the bypass screws #1 ~ #4 and replace them with new ones.



- Turn in the bypass screw [A] with counting the number of turns until it seals 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 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.

Periodic Maintenance Procedures

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

NOTE

○*A throttle body has different "turns out" of the bypass screw for each individual unit. On setting the bypass screw, use the "turns out" determined during disassembly.*

● Repeat the same procedure for other bypass screws.
● Repeat the synchronization.
★If the vacuums are correct, check the output voltage of the main throttle sensor (see Main Throttle Sensor Output Voltage Inspection in the Self-Diagnosis System chapter).

Special Tool - Throttle Sensor Setting Adapter: 57001 -1538

Main Throttle Sensor Output Voltage
Connections to Adapter:
Degital Meter (+) → R (sensor L) lead
Degital Meter (–) → BK (sensor V/W) lead

Standard: DC 0.64 ~ 0.68 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 Self-Diagnosis System chapter).

● Remove the vacuum gauge hoses and install the intake air pressure sensor hose, rubber caps and air intake valve hose on the original position.
● For CAL and SEA Models, install the vacuum hoses.
○Run the vacuum hose according to Cable, Wire, and Hose Routing section in the Appendix 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, check the idle speed control valve (see Idle Speed Control Valve Inspection in the Self-Diagnosis System chapter).

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

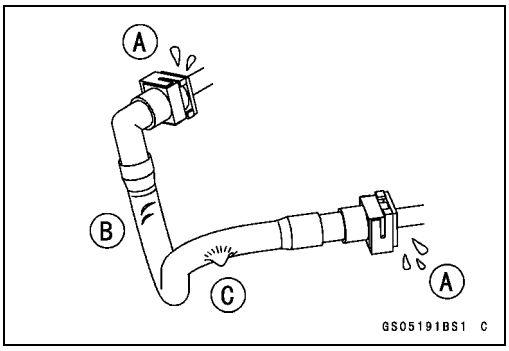
Periodic Maintenance Procedures

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.*

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

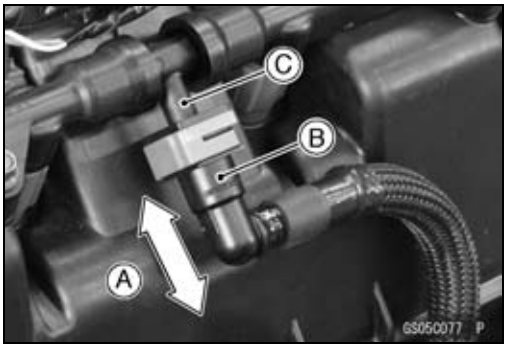


○If the motorcycle is not properly handled, the high pressure inside the fuel line can cause fuel to leak [A] or the hose to burst. Remove the fuel tank (see Fuel Tank Removal in the Fuel System (DFI) chapter) and check the fuel hoses.

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

● Check that the primary fuel hose [A] and secondary fuel hose [B] are routed according to Cable, Wire, and Hose Routing section in the Appendix chapter.

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



● Check that the fuel 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.

○Check the other hose joint in the same way.

NOTICE

When pushing and pulling the fuel hose joint, do not apply strong force to the delivery pipe [C] on the nozzle assy. The pipe made from resin could be damaged.

⚠ 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 hose joint.

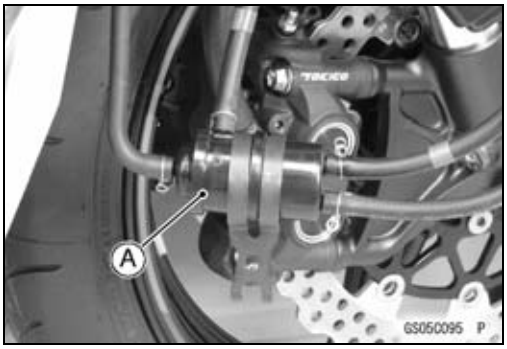
Periodic Maintenance Procedures

Evaporative Emission Control System Inspection (CAL and SEA Models)

● Inspect the canister as follows.
○Remove the upper fairing assembly (see Upper Fairing Assembly Removal in the Frame chapter).
○Remove the canister [A].
○Visually inspect the canister for cracks or other damage.
★If the canister has any cracks or bad damage, replace it with a new one.

NOTE

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

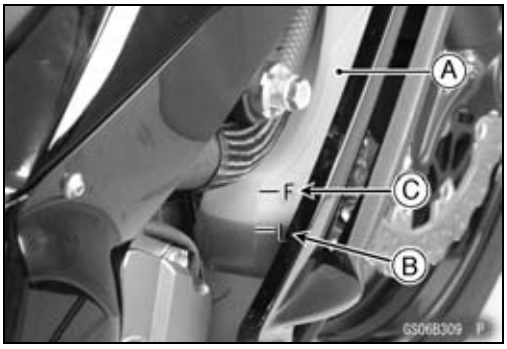


● Inspect the liquid/vapor separator as follows.
○Remove the upper fairing assembly (see Upper Fairing Assembly Removal in the Frame chapter).
○Disconnect the hoses from the separator [A].
○Visually inspect the separator for cracks and other damage.
★If the separator has any cracks or damage, replace it with a new one.
○To prevent the gasoline from flowing into or out of the canister, hold the separator perpendicular to the ground.
● Check the hoses of the evaporative emission control system as follows.
○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 Procedures

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).

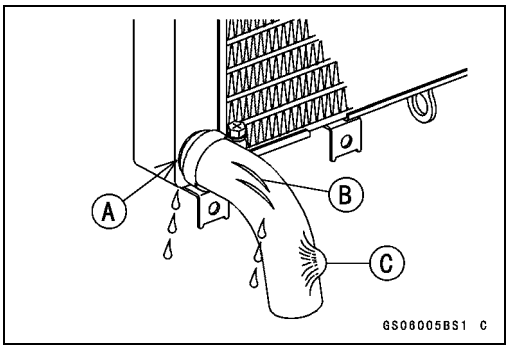
★If the coolant level is lower than the "L" level line [B], remove the upper fairing assembly (see Upper Fairing Assembly Removal in the Frame chapter), and then unscrew the reserve tank cap and add coolant to the "F" level line [C].

"L": Low
"F": Full

NOTICE

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

Radiator Hose and Pipe Inspection (coolant leak, damage, installation condition)



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

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

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

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

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

Periodic Maintenance Procedures

Engine Top End

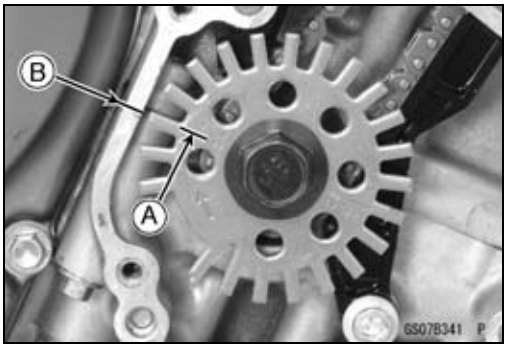
Valve Clearance Inspection

NOTE

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

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

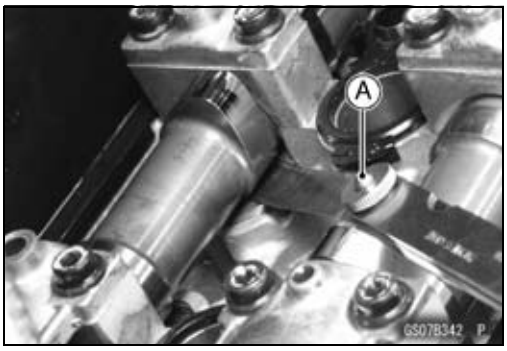
- Turn the crankshaft, align the #1, 4 mark on the timing rotor with the crankcase timing mark.
  TDC Mark [A] for #1, 4 Pistons
  Timing Mark [B] (Crankcase Halves Mating Surface)



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

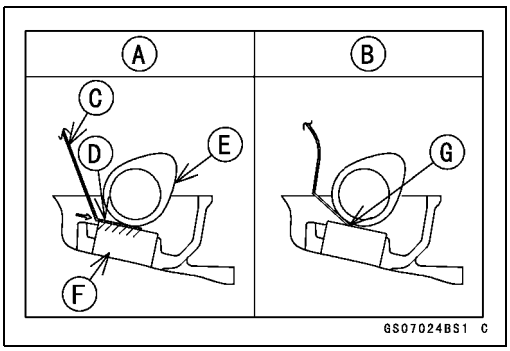
Valve Clearance
Standard:

Exhaust	**0.17 ~ 0.22 mm (0.0067 ~ 0.0087 in.)**
Intake	**0.15 ~ 0.22 mm (0.0059 ~ 0.0087 in.)**



NOTE

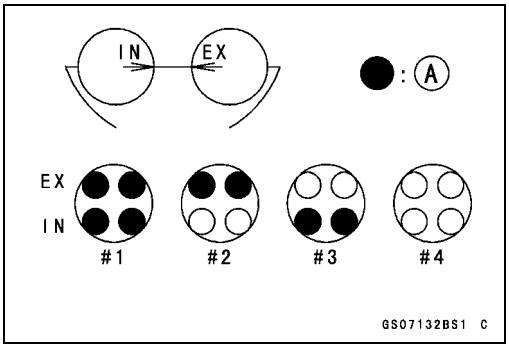
○*Thickness gauge is horizontally inserted on the valve lifter.*



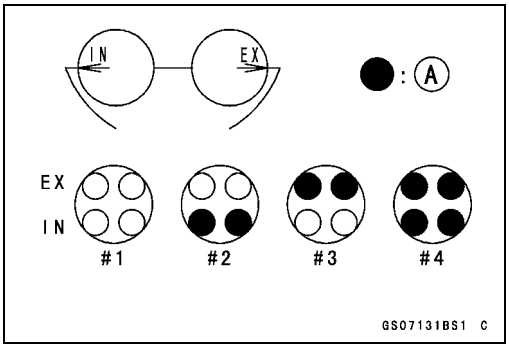
Appropriateness [A]
Inadequacy [B]
Thickness Gauge [C]
Horizontally Inserts [D]
Cam [E]
Valve Lifter [F]
Hits the Valve Lifter Ahead [G]

Periodic Maintenance Procedures

○**When positioning #1 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]



○**When positioning #4 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]



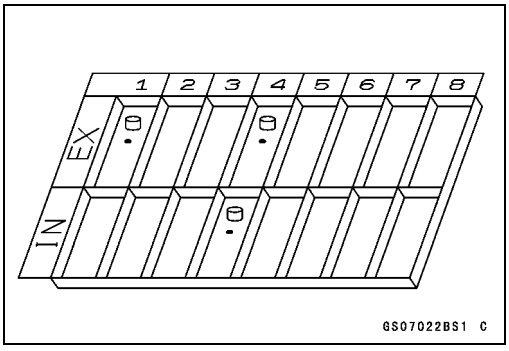
★If the valve clearance is not within the specified range, first record the clearance, and then adjust it.

Valve Clearance Adjustment

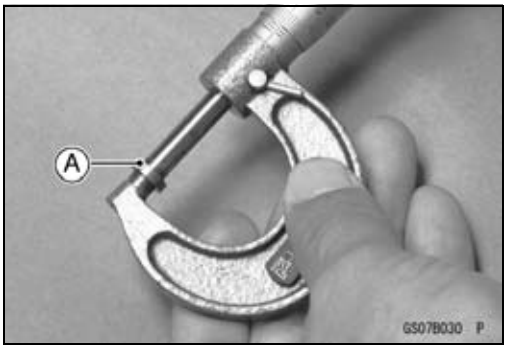
- To change the valve clearance, remove the camshafts (see Camshaft Removal in the Engine Top End chapter) and valve lifters.
- Replace the shim with one of a different thickness.

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 = 0.195 mm (Exhaust), 0.185 mm (Intake))

[d] Replace Shim Thickness

Example (Exhaust):
1.600 + 0.28 – 0.195 = 1.685 mm

○Exchange the shim for the 1.675 size shim.