

## MODEL APPLICATION

Year	Model	Beginning Frame No.
2009	ZX600R9	JKAZX4R1□9A000001 JKAZX600RRA000001
2010	ZX600RA	JKAZX4R1□AA019001 JKAZX600RRA019001
2011	ZX600RB	JKAZX4R1□BA025001 JKAZX600RRA025001
2012	ZX600RC	JKAZX4R1□CA033001 JKAZX600RRA033001

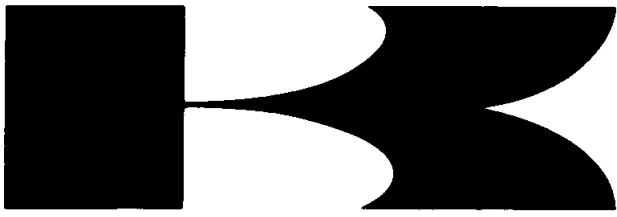
□:This digit in the frame number changes from one machine to another.



KAWASAKI HEAVY INDUSTRIES, LTD.  
Motorcycle & Engine Company

Part No.99924-1417-04

Printed in Japan



**Kawasaki**

**Ninja ZX-6R**



# **Motorcycle Service Manual**

# Quick Reference Guide

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## 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	ID	Indonesia
AU	Australia	MY	Malaysia
BR	Brazil	SEA-B1	Southeast Asia B1 (with Evaporative Emission Control System)
CA	Canada	SEA-B2	Southeast Asia B2
CAL	California	TH	Thailand
CH	Switzerland	US	United States
DE	Germany	WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Full Power)
EUR	Europe	GB WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Left Side Traffic Full Power)
GB	United Kingdom	WVTA (78.2 H)	WVTA Model with Honeycomb Catalytic Converter (Restricted Power)

# 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.

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## How to Use This Manual

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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.

### **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

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# 1-2 GENERAL INFORMATION

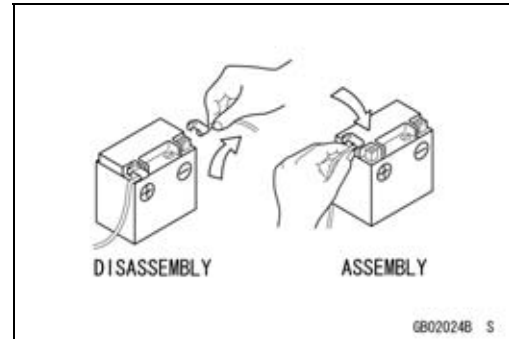
## Before Servicing

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

Especially note the following.

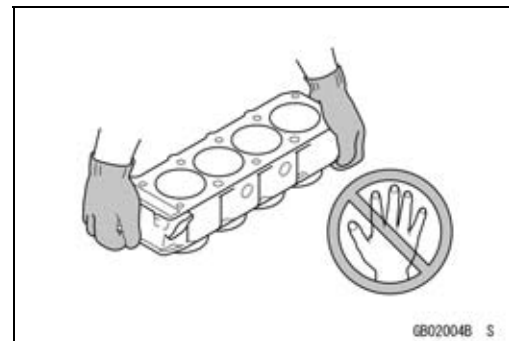
### **Battery Ground**

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



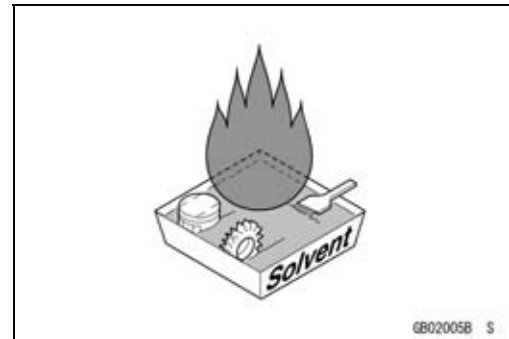
### **Edges of Parts**

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



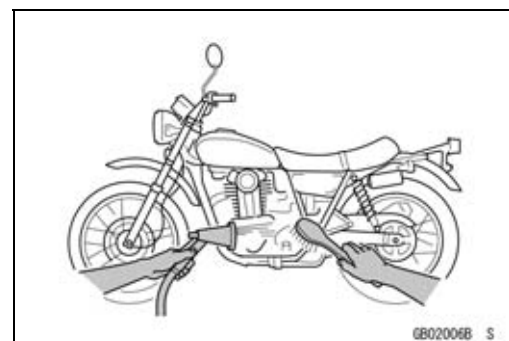
### **Solvent**

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



### **Cleaning Vehicle before Disassembly**

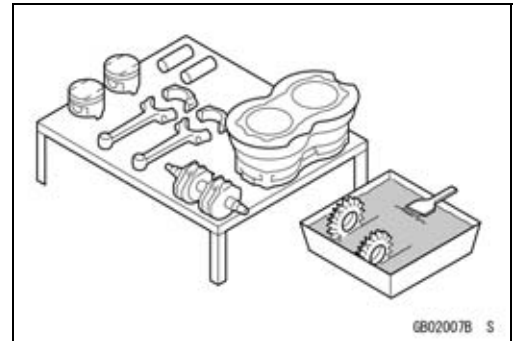
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



## Before Servicing

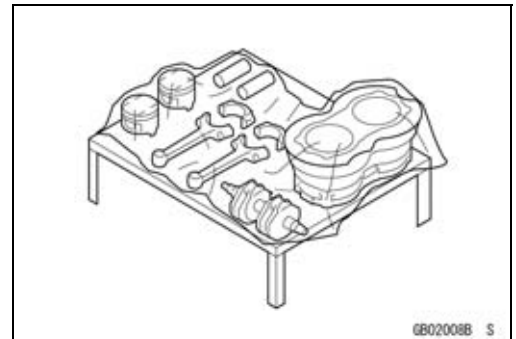
### **Arrangement and Cleaning of Removed Parts**

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



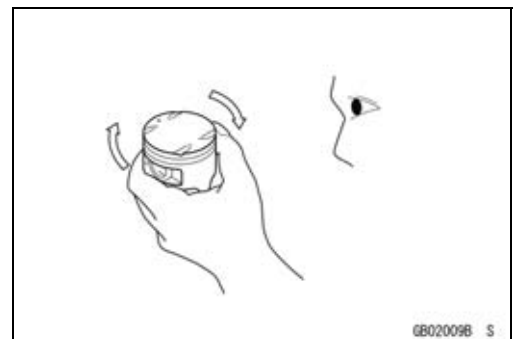
### **Storage of Removed Parts**

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



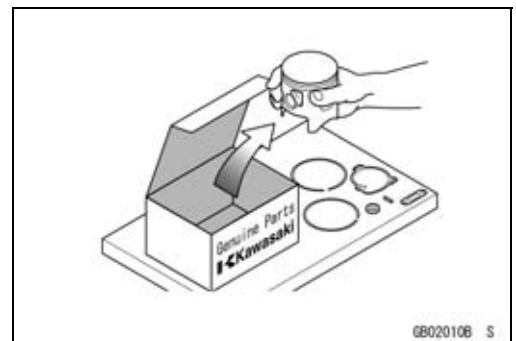
### **Inspection**

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



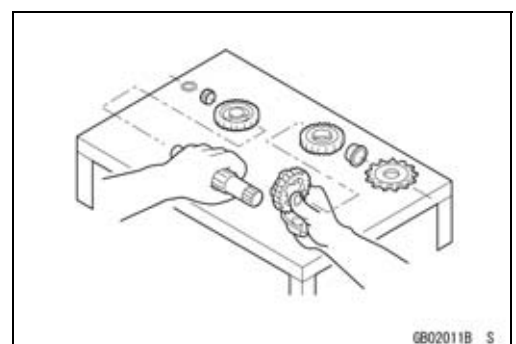
### **Replacement Parts**

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



### **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.



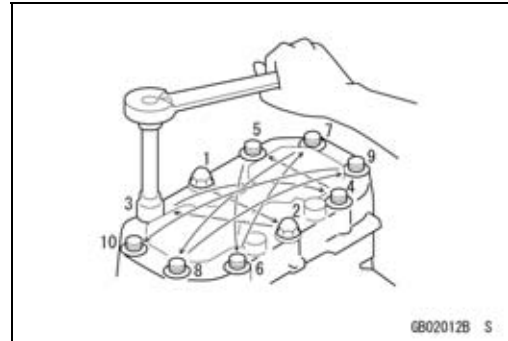


## 1-4 GENERAL INFORMATION

### Before Servicing

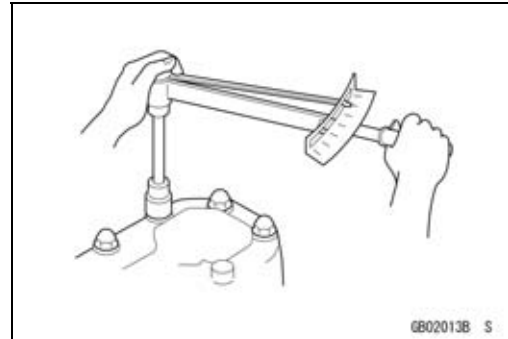
#### **Tightening Sequence**

Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them according to the specified sequence to prevent case warpage or deformation which can lead to malfunction. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter turn and then remove them. If the specified tightening sequence is not indicated, tighten the fasteners alternating diagonally.



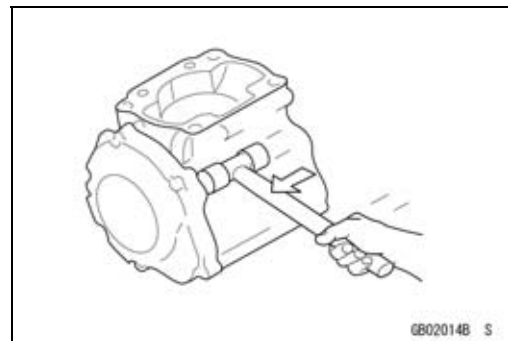
#### **Tightening Torque**

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



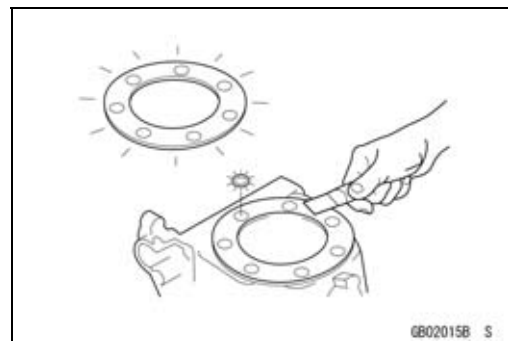
#### **Force**

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



#### **Gasket, O-ring**

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



#### **Liquid Gasket, Non-permanent Locking Agent**

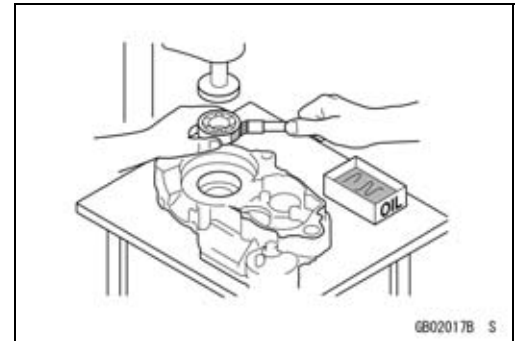
For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



**Before Servicing**

**Press**

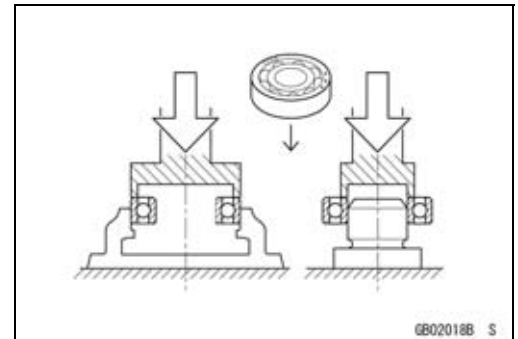
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



**Ball Bearing and Needle Bearing**

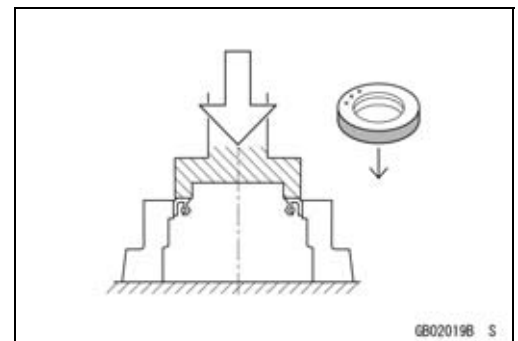
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

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

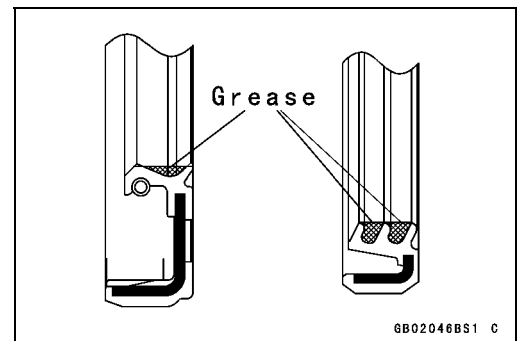


**Oil Seal, Grease Seal**

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

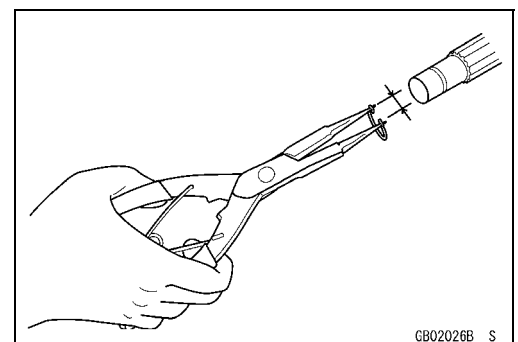


Apply specified grease to the lip of seal before installing the seal.



**Circlips, Cotter Pins**

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

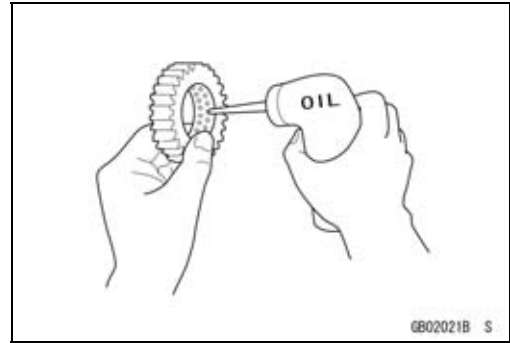


# 1-6 GENERAL INFORMATION

## Before Servicing

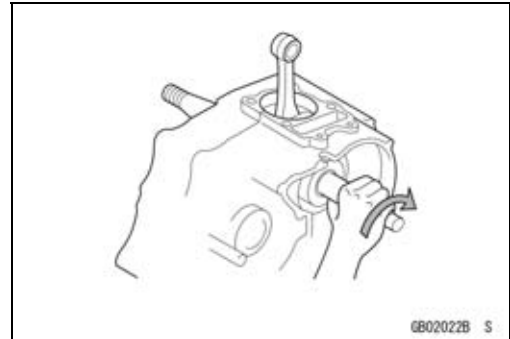
### **Lubrication**

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



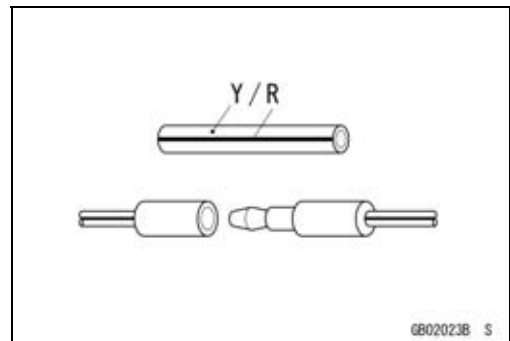
### **Direction of Engine Rotation**

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



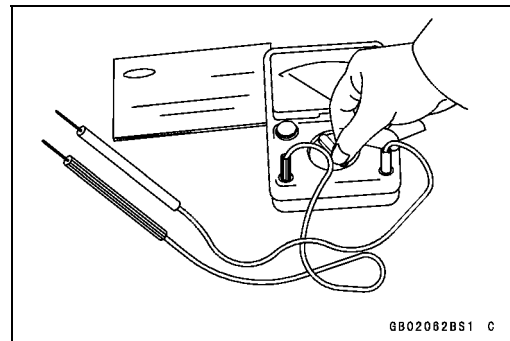
### **Electrical Wires**

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



### **Instrument**

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



Model Identification

ZX600R9 (US and CA Models) Left Side View



ZX600R9 (US and CA Models) Right Side View



# 1-8 GENERAL INFORMATION

## Model Identification

ZX600R9 (EUR Models) Left Side View



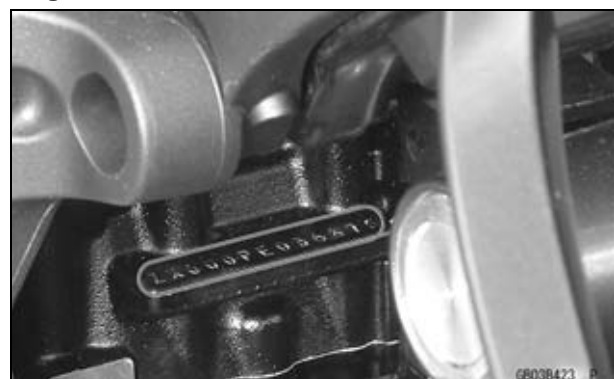
ZX600R9 (EUR Models) Right Side View



Frame Number



Engine Number



**General Specifications**

Items	ZX600R9 ~ RC
<b>Dimensions</b> Overall Length Overall Width Overall Height Wheelbase Road Clearance Seat Height Curb Mass: Front Rear Fuel Tank Capacity	2 090 mm (82.3 in.) 710 mm (28.0 in.) 1 115 mm (43.9 in.) 1 400 mm (55.1 in.) 120 mm (4.72 in.) 815 mm (32.1 in.) 191 kg (421 lb) 97 kg (214 lb) 94 kg (207 lb) 17 L (4.5 US gal)
<b>Performance</b> Minimum Turning Radius	3.4 m (11.2 ft)
<b>Engine</b> Type Cooling System Bore and Stroke Displacement Compression Ratio Maximum Horsepower  Maximum Torque  Carburetion System Starting System Ignition System Timing Advance Ignition Timing  Spark Plug Cylinder Numbering Method Firing Order Valve Timing: Inlet: Open Close Duration Exhaust: Open Close Duration	4-stroke, DOHC, 4-cylinder Liquid-cooled 67.0 × 42.5 mm (2.64 × 1.67 in.) 599 cm <sup>3</sup> (36.6 cu in.) 13.3:1 94.1 kW (128 PS) @14 000 r/min (rpm), (WVTA (78.2 H)) 78.2 kW (106 PS) @14 000 r/min (rpm), (SEA-B1/B2), (TH) 87.5 kW (119 PS) @12 500 r/min (rpm), (CA), (CAL), (US) – – – 66.7 N·m (6.8 kgf·m, 49.2 ft·lb) @11 800 r/min (rpm), (WVTA (78.2 H)) 60 N·m (6.1 kgf·m, 44.3 ft·lb) @11 000 r/min (rpm), (CA), (CAL), (US) – – – FI (Fuel Injection), KEIHIN TTK38 × 4 Electric starter Battery and coil (transistorized) Electronically advanced (IC igniter in ECU) From 12.5° BTDC @1 300 r/min (rpm) to 36.4° BTDC @4 800 r/min (rpm) NGK CR9E Left to right, 1-2-3-4 1-2-4-3  41° (BTDC) 67° (ABDC) 288°  58° (BBDC) 20° (ATDC) 258°

# 1-10 GENERAL INFORMATION

## General Specifications

Items	ZX600R9 ~ RC
Lubrication System Engine Oil: Type Viscosity Capacity	Forced lubrication (wet sump with oil cooler)  API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2 SAE 10W-40 3.6 L (3.8 US qt)
<b>Drive Train</b> Primary Reduction System: Type Reduction Ratio Clutch Type Transmission: Type Gear Ratios: 1st 2nd 3rd 4th 5th 6th Final Drive System: Type Reduction Ratio Overall Drive Ratio	Gear 1.900 (76/40) Wet multi disc  6-speed, constant mesh, return shift  2.714 (38/14) 2.200 (33/15) 1.850 (37/20) 1.600 (32/20) 1.421 (27/19) 1.300 (26/20)  Chain drive 2.688 (43/16) 6.638 @Top gear
<b>Frame</b> Type Caster (Rake Angle) Trail Front Tire: Type Size Rim Size Rear Tire: Type Size Rim Size Front Suspension: Type Wheel Travel Rear Suspension: Type Wheel Travel Brake Type: Front Rear	Tubular, diamond 24° 103 mm (4.06 in.)  Tubeless 120/70 ZR17 M/C (58 W) J17M/C x MT3.50  Tubeless 180/55 ZR17 M/C (73 W) J17M/C x MT5.50  Telescopic fork (upside-down) 120 mm (4.72 in.)  Swingarm (uni-trak) 134 mm (5.28 in.)  Dual discs Single disc

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**General Specifications**


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Items	ZX600R9 ~ RC
<b>Electrical Equipment</b>	
Battery	12 V 8 Ah
Headlight:	
Type	Semi-sealed beam
Bulb:	
High	12 V 55 W + 65 W (quartz-halogen)
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.



# 1-12 GENERAL INFORMATION

## 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

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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

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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/cm <sup>2</sup>
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cmHg

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kgf/cm <sup>2</sup>	×	98.07	=	kPa
kgf/cm <sup>2</sup>	×	14.22	=	psi
cmHg	×	1.333	=	kPa

### Units of Speed:

km/h	×	0.6214	=	mph
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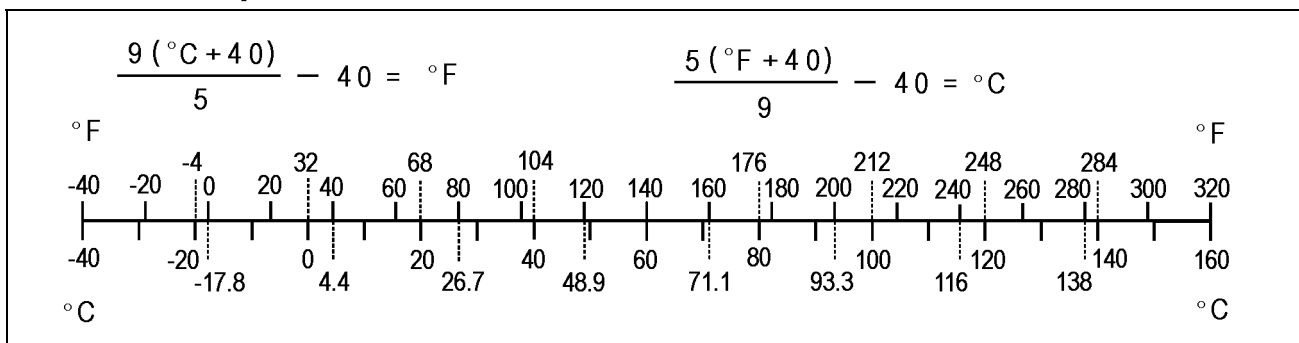
### Units of Power:

kW	×	1.360	=	PS
kW	×	1.341	=	HP

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PS	×	0.7355	=	kW
PS	×	0.9863	=	HP

### Units of Temperature:



# Periodic Maintenance

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## 2-2 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**

ITEM	FREQUENCY	* ODOMETER READING							See Page
	Whichever comes first ↓ Every	1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)	36 (22.5)	
<b>Fuel System</b>									
Throttle control system (play, smooth return, no drag) - inspect	year	●		●		●		●	2-16
Engine vacuum synchronization - inspect				●		●		●	2-16
Idle speed - inspect		●		●		●		●	2-20
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, SEA-B1 and TH Models)		●	●	●	●	●	●	●	2-21
<b>Cooling System</b>									
Coolant level - inspect		●		●		●		●	2-22
Coolant leak (water hose and pipe) - inspect	year	●		●		●		●	2-23
Water hose damage - inspect	year	●		●		●		●	2-23
Water hose installation condition - inspect	year	●		●		●		●	2-23
<b>Engine Top End</b>									
Valve clearance - inspect	CA, CAL and US Models					●			2-23
	Other than CA, CAL and US Models	Every 42 000 km (26 250 mile)							
Air suction system damage - inspect				●		●		●	2-27
<b>Clutch</b>									
Clutch operation (play, disengagement, engagement) - inspect		●		●		●		●	2-28
<b>Wheels and Tires</b>									
Tire air pressure - inspect	year			●		●		●	2-29
Wheel/tire damage - inspect				●		●		●	2-29
Tire tread wear, abnormal wear - inspect				●		●		●	2-30

## 2-4 PERIODIC MAINTENANCE

### Periodic Maintenance Chart

ITEM	FREQUENCY	* ODOMETER READING × 1 000 km (× 1 000 mile)							See Page
		Whichever comes first ↓	1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)	
Wheel bearing damage - inspect	year			●		●		●	2-30
<b>Final Drive</b>									
Drive chain lubrication condition - inspect #		Every 600 km (400 mile)							2-31
Drive chain slack - inspect #		Every 1 000 km (600 mile)							2-32
Drive chain wear - inspect #				●		●		●	2-33
Chain guide wear - inspect				●		●		●	2-34
<b>Brakes</b>									
Brake fluid leak (brake hose and pipe) - inspect	year	●	●	●	●	●	●	●	2-34
Brake hose and pipe damage - inspect	year	●	●	●	●	●	●	●	2-35
Brake hose installation condition - inspect	year	●	●	●	●	●	●	●	2-35
Brake fluid level - inspect	6 months	●	●	●	●	●	●	●	2-35
Brake pad wear - inspect #			●	●	●	●	●	●	2-36
Brake operation (effectiveness, play, no drag) - inspect	year	●	●	●	●	●	●	●	2-36
Brake light switch operation - inspect		●	●	●	●	●	●	●	2-36
<b>Suspension</b>									
Front forks/rear shock absorber operation (damping and smooth stroke) - inspect				●		●		●	2-37
Front forks/rear shock absorber oil leak - inspect	year			●		●		●	2-38
Rocker arm operation - inspect				●		●		●	2-38
Tie-rods operation - inspect				●		●		●	2-38
<b>Steering</b>									
Steering play - inspect	year	●		●		●		●	2-39
Steering stem bearings - lubricate	2 years					●			2-40
Steering damper oil leak - inspect			●	●	●	●	●	●	2-41
<b>Electrical System</b>									
Lights and switches operation - inspect	year			●		●		●	2-42
Headlight aiming - inspect	year			●		●		●	2-44
Sidestand switch operation - inspect	year			●		●		●	2-45

**Periodic Maintenance Chart**

ITEM	FREQUENCY	* ODOMETER READING × 1 000 km (× 1 000 mile)							See Page	
		Whichever comes first ↓ Every	1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)		36 (22.5)
Engine stop switch operation - inspect	year			●			●		●	2-46
<b>Others</b>										
Chassis parts - lubricate	year			●			●		●	2-47
Bolts and nuts tightness - inspect		●		●			●		●	2-48

#: 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**

ITEM	FREQUENCY	* ODOMETER READING × 1 000 km (× 1 000 mile)					See Page
		Whichever comes first ↓ Every	1 (0.6)	12 (7.5)	24 (15)	36 (22.5)	
Air cleaner element # - replace		Every 18 000 km (12 000 mile)					2-49
Fuel hose - replace	5 years						2-49
Coolant - change	3 years				●		2-52
Radiator hose and O-ring - replace	3 years				●		2-55
Engine oil # - change	year	●	●	●	●	●	2-56
Oil filter - replace	year	●	●	●	●	●	2-57
Brake hose - replace	4 years					●	2-58
Brake fluid - change	2 years			●		●	2-58
Rubber parts of master cylinder and caliper - replace	4 years					●	2-60, 2-61
Spark plug - replace			●	●	●	●	2-64

#: 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	
<b>Fuel System (DFI)</b>				
Air Cleaner Housing Assembly Screws	1.2	0.12	11 in·lb	
Air Cleaner Housing Clamp Bolts	2.0	0.20	18 in·lb	
Air Cleaner Housing Mounting Bolt	6.9	0.70	61 in·lb	
Air Inlet Duct Mounting Bolts	9.8	1.0	87 in·lb	L
Canister Bracket Screws	1.2	0.12	11 in·lb	
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	
Delivery Pipe Assy Mounting Screws (Nozzle Assy)	3.43	0.35	30 in·lb	
Delivery Pipe Assy Mounting Screws (Throttle Body Assy)	3.43	0.35	30 in·lb	
Exhaust Butterfly Valve Actuator Mounting Screws	4.3	0.44	38 in·lb	
Exhaust Butterfly Valve Actuator Pulley Bolt	4.9	0.50	43 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
Inlet Air Temperature Sensor Screw	0.80	0.081	7.1 in·lb	
Nozzle Assy Mounting Screws	1.2	0.12	11 in·lb	S
Oxygen Sensor (Equipped Models)	25	2.5	18	
Separator Bracket Mounting Bolt	6.9	0.70	61 in·lb	
Speed Sensor Bolt	6.9	0.70	61 in·lb	L
Throttle Body Assy Holder Bolts	12	1.2	106 in·lb	L
Throttle Body Assy Holder Clamp Bolts	2.9	0.30	26 in·lb	
Throttle Cable Holder Plate Bolt	3.9	0.40	35 in·lb	L
Water Temperature Sensor	30	3.0	22	
<b>Cooling System</b>				
Coolant By-pass Fitting Bolt	8.8	0.90	78 in·lb	L
Coolant Drain Bolt (Cylinder)	9.8	1.0	87 in·lb	
Coolant Drain Bolt (Water Pump)	8.8	0.90	78 in·lb	
Coolant Reserve Tank Mounting Bolts	6.9	0.70	61 in·lb	
Heat Insulation Plate Bolt	3.9	0.40	35 in·lb	L
Impeller Bolt	9.8	1.0	87 in·lb	
Oil Cooler Mounting Bolts	20	2.0	15	

**PERIODIC MAINTENANCE 2-7**

**Torque and Locking Agent**

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Radiator Bracket Mounting Bolt	9.8	1.0	87 in-lb	
Radiator Lower Bolt	6.9	0.70	61 in-lb	
Radiator Upper Bolts	9.8	1.0	87 in-lb	
Thermostat Housing Cover Bolts	5.9	0.60	52 in-lb	
Water Hose Clamp Screws	3.0	0.30	27 in-lb	
Water Hose Fitting Bolts	9.8	1.0	87 in-lb	
Water Pump Cover Bolts	12	1.2	106 in-lb	L
Water Temperature Sensor	30	3.0	22	
<b>Engine Top End</b>				
Air Suction Valve Cover Bolts	9.8	1.0	87 in-lb	L
Breather Hose Fitting	15	1.5	11	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	11	1.1	97 in-lb	
Camshaft Sprocket Bolts	15	1.5	11	L
Coolant Drain Bolt (Cylinder)	9.8	1.0	87 in-lb	
Cylinder Head Bolts (M9)	39	4.0	29	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
Exhaust Butterfly Valve Cable Adjuster Locknuts	6.9	0.70	61 in-lb	
Exhaust Butterfly Valve Cable Locknuts	7.0	0.71	62 in-lb	
Exhaust Pipe Clamp Bolt	17	1.7	13	
Exhaust Pipe Guard Bolts	6.9	0.70	61 in-lb	
Exhaust Pipe Holder Nuts	17	1.7	13	
Front Camshaft Chain Guide Bolt (Lower)	12	1.2	106 in-lb	
Front Camshaft Chain Guide Bolt (Upper)	25	2.5	18	
Muffler Body Clamp Bolt	17	1.7	13	
Muffler Body Cover Bolts	7.0	0.71	62 in-lb	
Muffler Body Mounting Bolt	25	2.5	18	
Muffler Body Rear Cover Bolts	7.0	0.71	62 in-lb	
Premuffler Chamber Bracket Bolt	35	3.6	26	
Premuffler Chamber Guard Bolts	6.9	0.70	61 in-lb	
Premuffler Chamber Mounting Bolt	35	3.6	26	
Spark Plugs	13	1.3	115 in-lb	
Starter Clutch Bolt Cap	–	–	–	Hand-tighten
Throttle Body Assy Holder Bolts	12	1.2	106 in-lb	L
Throttle Body Assy Holder Clamp Bolts	2.9	0.30	26 in-lb	
Timing Inspection Cap	–	–	–	Hand-tighten
Upper Camshaft Chain Guide Bolts	12	1.2	106 in-lb	S
Water Passage Plugs	19.6	2.0	14	L
<b>Clutch</b>				
Clutch Cover Bolts (M6, L = 40 mm)	9.8	1.0	87 in-lb	
Clutch Cover Bolts (M6, L = 25 mm)	9.8	1.0	87 in-lb	



## 2-8 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Clutch Cover Plate Bolts	9.8	1.0	87 in-lb	L
Clutch Hub Nut	135	13.8	99.6	R
Clutch Lever Clamp Bolts	7.8	0.80	69 in-lb	S
Clutch Spring Bolts	8.8	0.90	78 in-lb	
Oil Filler Plug	–	–	–	Hand-tighten
Sub Clutch Hub Bolts	25	2.5	18	L
<b>Engine Lubrication System</b>				
Air Bleed Bolt	9.8	1.0	87 in-lb	
Engine Oil Drain Bolt	29	3.0	21	
Impeller Bolt	9.8	1.0	87 in-lb	
Oil Cooler Mounting Bolts	20	2.0	15	
Oil Cooler/Oil Filter Case Mounting Bolts	20	2.0	15	L
Oil Filter	17	1.7	13	G, R
Oil Filter Guard Bolts	4.0	0.41	35 in-lb	L
Oil Filter Holder Bolt	25	2.5	18	L
Oil Jet Nozzles	2.9	0.30	26 in-lb	
Oil Pan Bolts	9.8	1.0	87 in-lb	S
Oil Passage Plug	17	1.7	13	
Oil Passage Plugs (Taper)	20	2.0	15	L
Oil Pressure Relief Valve	15	1.5	11	L
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in-lb	G
Oil Pump Drive Gear Bolt	9.8	1.0	87 in-lb	L
Water Pump Cover Bolts	12	1.2	106 in-lb	L
<b>Engine Removal/Installation</b>				
Adjusting Collar Locknuts	49	5.0	36	S
Adjusting Collars	9.8	1.0	87 in-lb	S
Left Front Engine Mounting Bolt	44	4.5	32	S
Lower Engine Mounting Nut	44	4.5	32	R, S
Middle Engine Mounting Nut	44	4.5	32	R, S
Right Front Engine Mounting Bolt	44	4.5	32	S
<b>Crankshaft/Transmission</b>				
Bearing Holder Screws	4.9	0.50	43 in-lb	L
Breather Hose Fitting	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
Crankcase Bolt (M8, L = 90 mm)	27	2.8	20	S
Crankcase Bolts (M8, L = 95 mm)	31	3.2	23	MO, S
Crankcase Bolts (M8, L = 75 mm)	27	2.8	20	S
Crankcase Bolts (M6, L = 65 mm)	12	1.2	106 in-lb	S
Crankcase Bolts (M6, L = 50 mm)	12	1.2	106 in-lb	
Gear Position Switch Screws	2.9	0.30	26 in-lb	L

**Torque and Locking Agent**

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Gear Positioning Lever Bolt	12	1.2	106 in·lb	
Idle Gear Cover Bolts	9.8	1.0	87 in·lb	
Oil Jet Nozzles	2.9	0.30	26 in·lb	
Oil Passage Nozzle	4.9	0.50	43 in·lb	
Oil Passage Plug	17	1.7	13	
Oil Passage Plugs (Taper)	20	2.0	15	L
Race Holder Screws	4.9	0.50	43 in·lb	L
Shift Drum Cam Holder Bolt	12	1.2	106 in·lb	L
Shift Lever Bolt	6.9	0.70	61 in·lb	
Shift Pedal Mounting Bolt	25	2.5	18	L
Shift Shaft Return Spring Pin	28	2.9	21	L
Starter Clutch Bolt	49	5.0	36	
Starter Clutch Cover Bolt (L = 40 mm)	9.8	1.0	87 in·lb	
Starter Clutch Cover Bolt (L = 20 mm)	9.8	1.0	87 in·lb	
Starter Clutch Cover Bolts (L = 30 mm)	9.8	1.0	87 in·lb	
Tie-Rod Locknut (Front)	6.9	0.70	61 in·lb	Lh
Tie-Rod Locknut (Rear)	6.9	0.70	61 in·lb	
Transmission Case Bolt (M6)	9.8	1.0	87 in·lb	
Transmission Case Bolts (M8)	20	2.0	15	
<b>Wheels/Tires</b>				
Front Axle Clamp Bolts	20	2.0	15	AL
Front Axle Nut	127	13.0	93.7	
Rear Axle Nut	127	13.0	93.7	
<b>Final Drive</b>				
Chain Guide Bolts	9.8	1.0	87 in·lb	L
Engine Sprocket Cover Bolts	9.8	1.0	87 in·lb	
Engine Sprocket Cover Plate Mounting Bolts	9.8	1.0	87 in·lb	L
Engine Sprocket Nut	125	13.0	92.2	MO
Rear Axle Nut	127	13.0	93.7	
Rear Sprocket Nuts	59	6.0	44	R
Speed Sensor Bolt	6.9	0.70	61 in·lb	L
<b>Brakes</b>				
Bleed Valves	7.8	0.80	69 in·lb	
Brake Hose Banjo Bolts	25	2.5	18	
Brake Lever Pivot Bolt	1.0	0.10	8.9 in·lb	Si
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Brake Pedal Mounting Bolt	34	3.5	25	L
Front Brake Disc Mounting Bolts	27	2.8	20	L
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Front Brake Pad Pins	17	1.7	13	
Front Brake Reservoir Cap Stopper Screw	1.2	0.12	11 in·lb	
Front Caliper Assembly Bolts	27	2.8	20	L
Front Caliper Mounting Bolts	34	3.5	25	

## 2-10 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Front Master Cylinder Bleed Valve	5.4	0.55	48 in-lb	
Front Master Cylinder Clamp Bolts	11	1.1	97 in-lb	S
Rear Brake Disc Mounting Bolts	27	2.8	20	L
Rear Caliper Mounting Bolts	25	2.5	18	
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Rear Master Cylinder Push Rod Locknut	17	1.7	13	
<b>Suspension</b>				
Front Axle Clamp Bolts	20	2.0	15	AL
Front Fork Top Plugs	35	3.6	26	
Lower Front Fork Clamp Bolts	23	2.3	17	AL
Lower Rear Shock Absorber Nut	34	3.5	25	R
Piston Rod Guide Case	90	9.2	66	
Rear Shock Absorber Bracket Nut	59	6.0	44	
Swingarm Pivot Adjusting Collar Locknut	98	10.0	72.3	
Swingarm Pivot Shaft	20	2.0	15	
Swingarm Pivot Shaft Nut	108	11.0	79.7	
Tie-Rod Nuts	59	6.0	44	R
Uni-Trak Rocker Arm Bolt	34	3.5	25	
Upper Front Fork Clamp Bolts	20	2.0	15	
Upper Rear Shock Absorber Nut	34	3.5	25	R
<b>Steering</b>				
Handlebar Clamp Bolts	25	2.5	18	
Handlebar Positioning Bolts	9.8	1.0	87 in-lb	L
Left Switch Housing Screws	3.5	0.36	31 in-lb	
Lower Front Fork Clamp Bolts	23	2.3	17	AL
Right Switch Housing Screws	3.5	0.36	31 in-lb	
Steering Damper Mounting Bolts	11	1.1	97 in-lb	L
Steering Stem Head Nut	78	8.0	58	
Steering Stem Nut	20	2.0	15	
Throttle Case Screws	3.5	0.36	31 in-lb	
Upper Front Fork Clamp Bolts	20	2.0	15	
<b>Frame</b>				
Front Fender Mounting Bolts	3.9	0.40	35 in-lb	
Front Footpeg Bracket Bolts	25	2.5	18	
Rear Footpeg Bracket Bolts	25	2.5	18	
Rear Frame Bolts (M10)	44	4.5	32	L
Rear Frame Bolts (M8)	25	2.5	18	L
Sidestand Bolt	44	4.5	32	G
Sidestand Bracket Bolts	49	5.0	36	L
Sidestand Switch Bolt	8.8	0.90	78 in-lb	L
Sidestand Nut	29	3.0	21	R
Windshield Mounting Bolts	0.42	0.043	3.7 in-lb	

**Torque and Locking Agent**

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
<b>Electrical System</b>				
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	S
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	
Engine Ground Cable Terminal Bolt	9.8	1.0	87 in·lb	
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Front Turn Signal Light Mounting Screw	1.2	0.12	11 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
Left Switch Housing Screws	3.5	0.36	31 in·lb	
License Plate Light Cover Screws	1.0	0.10	8.9 in·lb	
License Plate Light Mounting Nuts	3.5	0.36	31 in·lb	
Meter Unit Mounting Screws	1.2	0.12	11 in·lb	
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	
Rear Turn Signal Light Lens Screws	1.0	0.10	8.9 in·lb	
Regulator/Rectifier Bracket Screws	1.2	0.12	11 in·lb	
Right Switch Housing Screws	3.5	0.36	31 in·lb	
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
Spark Plugs	13	1.3	115 in·lb	
Speed Sensor Bolt	6.9	0.70	61 in·lb	L
Starter Clutch Bolt Cap	–	–	–	Hand-tighten
Starter Clutch Cover Bolt (L = 40 mm)	9.8	1.0	87 in·lb	
Starter Clutch Cover Bolt (L = 20 mm)	9.8	1.0	87 in·lb	
Starter Clutch Cover Bolts (L = 30 mm)	9.8	1.0	87 in·lb	
Starter Motor Cable Terminal Bolt	2.9	0.30	26 in·lb	
Starter Motor Mounting Bolts	9.8	1.0	87 in·lb	
Stator Coil Bolts	12	1.2	106 in·lb	L
Water Temperature Sensor	30	3.0	22	

## 2-12 PERIODIC MAINTENANCE

### Torque and Locking Agent

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

#### 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
<b>Fuel System (DFI)</b>		
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	---
Idle Speed	1 300 ±50 r/min (rpm)	---
Throttle Body Vacuum	30.6 ±1.3 kPa (230 ±10 mmHg) at idle speed	---
Bypass Screws (Turn Out)	0 ~ 2 1/2 (for reference)	---
Air Cleaner Element	Viscous paper element	---
<b>Cooling System</b>		
Coolant:		
Type (Recommended)	Permanent type of antifreeze	---
Color	Green	---
Mixed Ratio	Soft water 50%, coolant 50%	---
Freezing Point	-35°C (-31°F)	---
Total Amount	2.5 L (2.6 US qt)	---
<b>Engine Top End</b>		
Valve Clearance:		
Exhaust	0.24 ~ 0.31 mm (0.0094 ~ 0.0122 in.)	---
Inlet	0.13 ~ 0.19 mm (0.0051 ~ 0.0075 in.)	---
<b>Clutch</b>		
Clutch Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	---
<b>Engine Lubrication System</b>		
Engine Oil:		
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2	---
Viscosity	SAE 10W-40	---
Capacity	2.8 L (3.0 US qt) (when filter is not removed)	---
	3.1 L (3.3 US qt) (when filter is removed)	---
	3.6 L (3.8 US qt) (when engine is completely dry)	---
Level	Between upper and lower level lines (Wait 2 ~ 3 minutes after idling or running)	---
<b>Wheels/Tires</b>		
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.)
Air Pressure (when Cold):		
Front	Up to 180 kg (397 lb) load: 250 kPa (2.5 kgf/cm <sup>2</sup> , 36 psi)	---
Rear	Up to 180 kg (397 lb) load: 290 kPa (2.9 kgf/cm <sup>2</sup> , 42 psi)	---

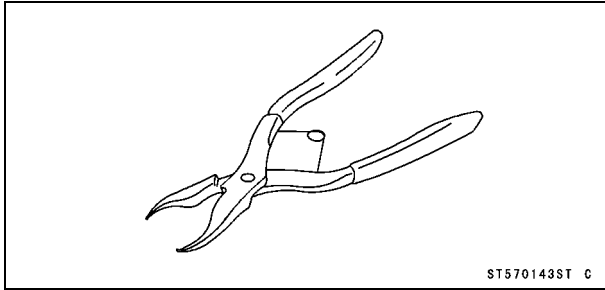
## 2-14 PERIODIC MAINTENANCE

### Specifications

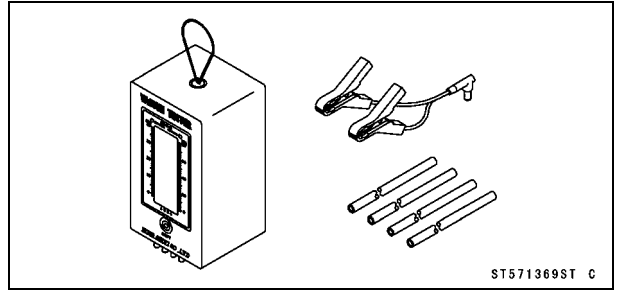
Item	Standard	Service Limit
<b>Final Drive</b>		
Drive Chain Slack	30 ~ 40 mm (1.2 ~ 1.6 in.)	---
Drive Chain Wear (20-link Length)	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	323 mm (12.7 in.)
Standard Chain:		
Make	ENUMA	---
Type	EK 520MVXL2	---
Link	112 links	---
<b>Brakes</b>		
Brake Fluid:		
Grade	DOT4	---
Brake Pad Lining Thickness:		
Front	4.0 mm (0.16 in.)	1 mm (0.04 in.)
Rear	5.0 mm (0.20 in.)	1 mm (0.04 in.)
Brake Light Timing:		
Front	Pulled ON	---
Rear	On after about 10 mm (0.39 in.) of pedal travel	---
<b>Electrical System</b>		
Spark Plug:		
Type	NGK CR9E	---
Gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)	---

**Special Tools**

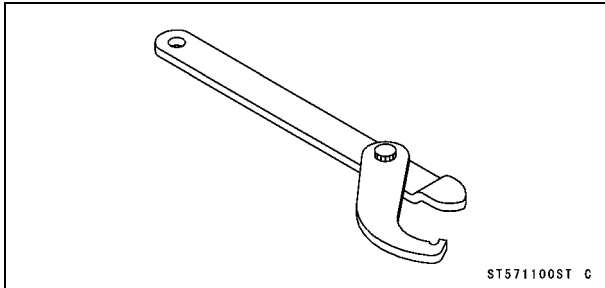
**Inside Circlip Pliers:**  
57001-143



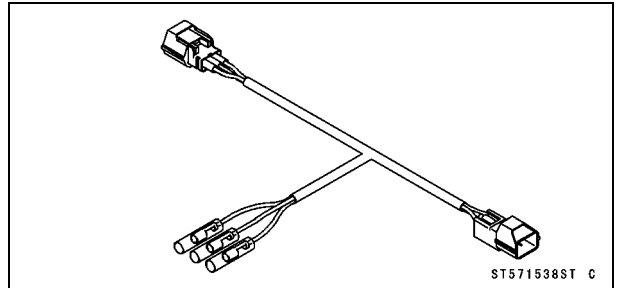
**Vacuum Gauge:**  
57001-1369



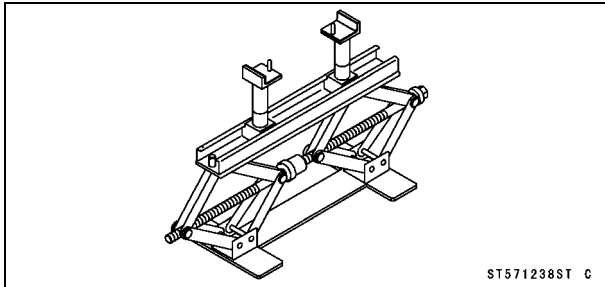
**Steering Stem Nut Wrench:**  
57001-1100



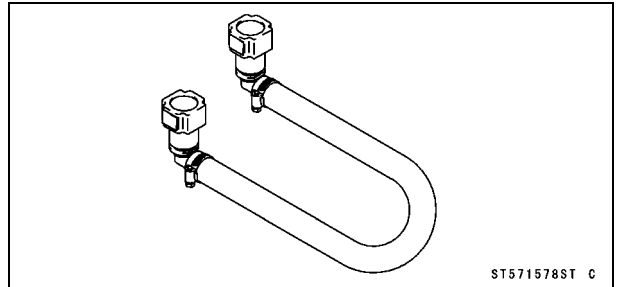
**Throttle Sensor Setting Adapter:**  
57001-1538



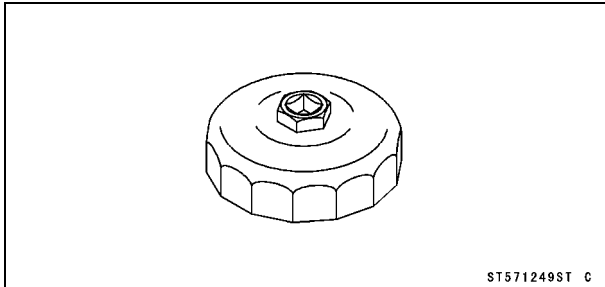
**Jack:**  
57001-1238



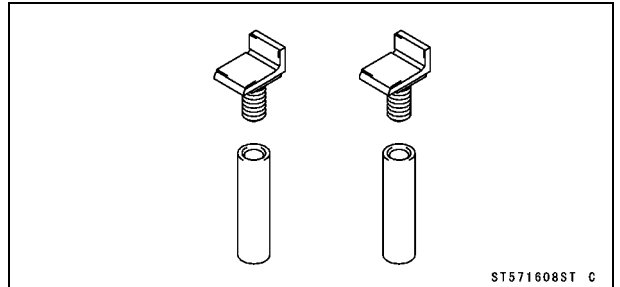
**Extension Tube:**  
57001-1578



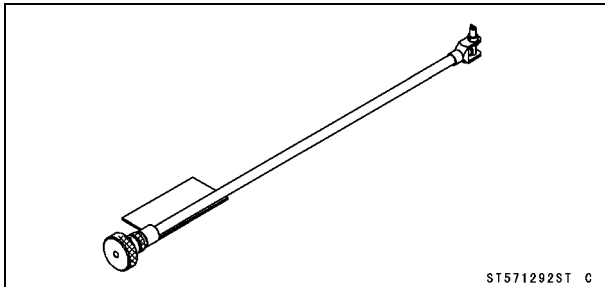
**Oil Filter Wrench:**  
57001-1249



**Jack Attachment:**  
57001-1608



**Pilot Screw Adjuster, C:**  
57001-1292





## 2-16 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

#### Fuel System (DFI)

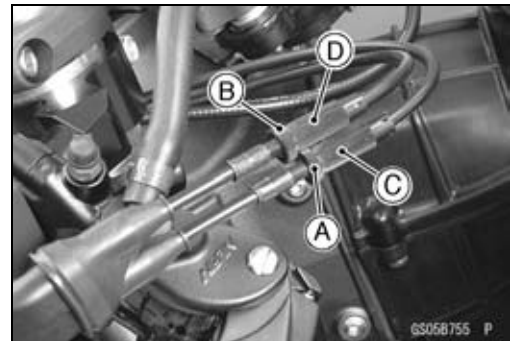
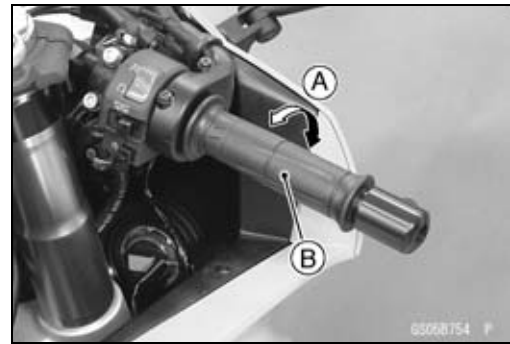
##### **Throttle Control System Inspection**

- 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 2 ~ 3 mm (0.08 ~ 0.12 in.) of throttle grip play is obtained.
- Tighten the locknut [A].
- Turn the accelerator cable adjuster [D] until 2 ~ 3 mm (0.08 ~ 0.12 in.) of throttle grip play is obtained.
- Tighten the locknut [B].
- ★ If the free play can not be adjusted with the adjusters, replace the cable.



##### **Engine Vacuum Synchronization Inspection**

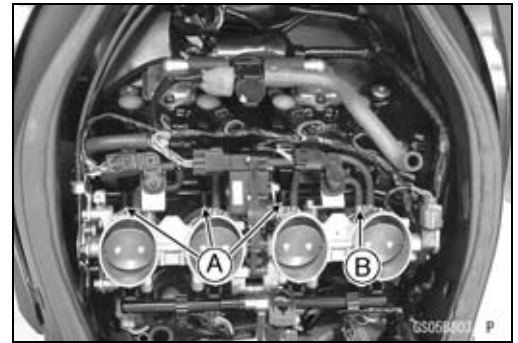
##### **NOTE**

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

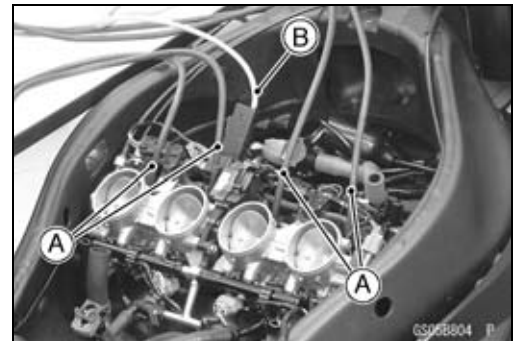
- Situate the motorcycle so that it is vertical.
- Remove:
  - Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)
  - Air Cleaner Housing (see Air Cleaner Housing Removal in the Fuel System (DFI) chapter)
  - Primary Fuel Hose (see Fuel Hose Replacement)

**Periodic Maintenance Procedures**

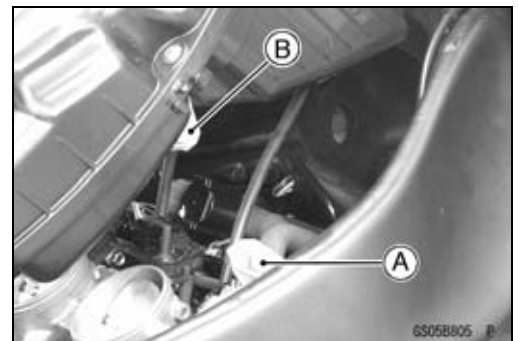
- Pull off the rubber caps [A] and vacuum hose [B] from the fittings of each throttle body.
- For the California, Southeast Asia B1 and Thailand Models, pull off the vacuum hose.



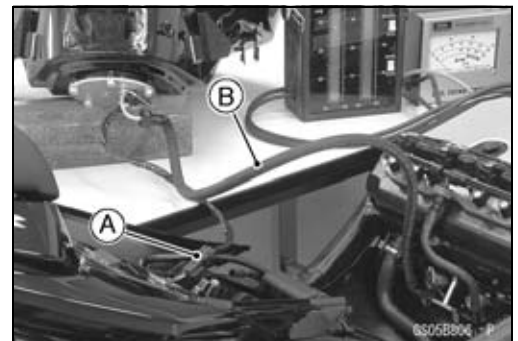
- Connect a vacuum gauge (special tool) and hoses [A] to the fittings on the throttle body.
- **Special Tool - Vacuum Gauge: 57001-1369**
- Connect a highly accurate tachometer lead [B] to one of the stick coil primary lead.



- Plug the air switching valve hose end [A] and air cleaner housing fitting [B].



- Install the air cleaner housing (see Air Cleaner Housing Installation in the Fuel System (DFI) chapter).
- Connect the following parts temporarily.
  - Fuel Pump Lead Connector [A]
  - Extension Tube [B]
- **Special Tool - Extension Tube: 57001-1578**



## 2-18 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

- Start the engine and warm it up thoroughly.
- Check the idle speed, using a highly accurate tachometer [A].

#### Idle Speed

**Standard:** 1 300 ±50 r/min (rpm)

- ★ If the idle speed is out of the specified range, adjust it with the adjusting 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:** 30.6 ±1.3 kPa (230 ±10 mmHg) at idle speed

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

#### Example:

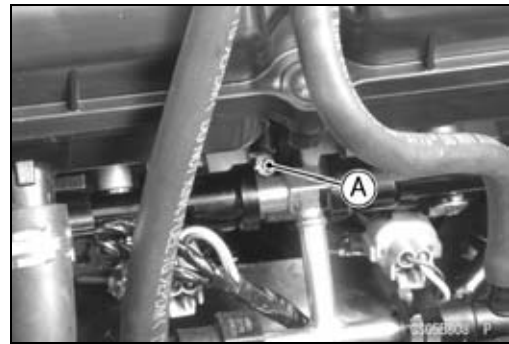
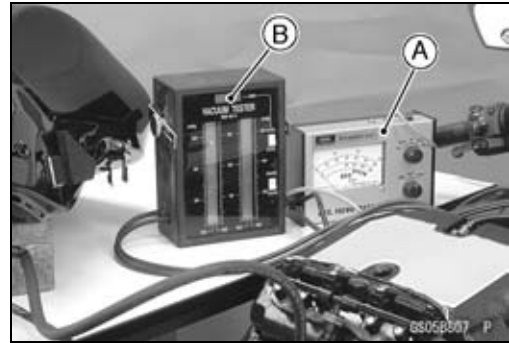
- #1: 165 mmHg
- #2: 190 mmHg
- #3: 170 mmHg
- #4: 200 mmHg

- With the engine at the correct idle speed, equalize the highest vacuum of #3 and #4 (example 200 mmHg) to the highest vacuum of #1 and #2 (example 190 mmHg) by turning the center adjusting screw [A].

#### NOTE

○ After adjustment, the final vacuum measurement between the lowest throttle valves may not be 200 mmHg (in this example). The goal is to have the lower two vacuums between the left (#1 and #2) and right (#3 and #4) banks be the same.

- Open and close the throttle after each measurement and adjust the idle speed as necessary.
- Once the throttle valves have been synchronized, inspect the main throttle sensor output voltage to ensure proper operation (procedure is explained at the end of this section).



**Periodic Maintenance Procedures**

★ If any one vacuum measurement is out of the standard measurement after left and right synchronization, turn in the bypass screws [A] until it seats fully but not tightly.  
Rear View [B]

**Special Tool - Pilot Screw Adjuster, C [C]: 57001-1292**

**NOTICE**

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

- Turn out the bypass screw of the higher vacuum between #1 and #2 to the lower vacuum.
- Turn out the bypass screw of the higher vacuum between #3 and #4 to the lower vacuum.
- Open and close the throttle valves after each measurement and adjust the idle speed as necessary.
- Inspect the vacuums as before.
- ★ If all vacuums are within the specification, finish the engine vacuum synchronization.
- ★ If any vacuum can not be adjusted within the specification, remove the bypass screws #1 ~ #4 and clean them.

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

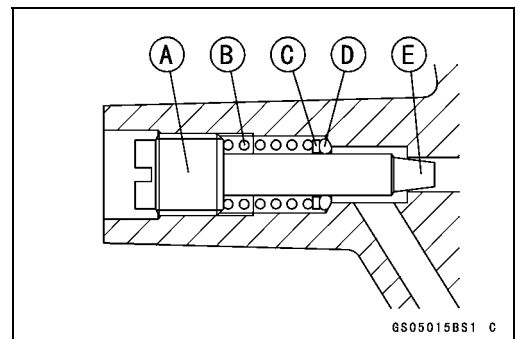
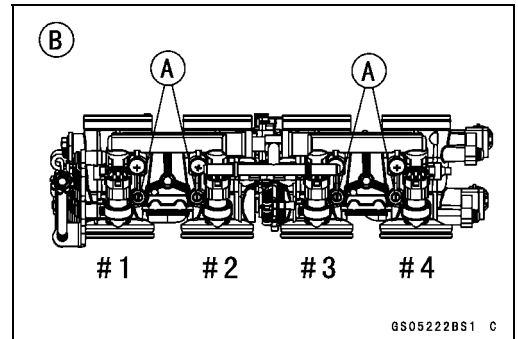
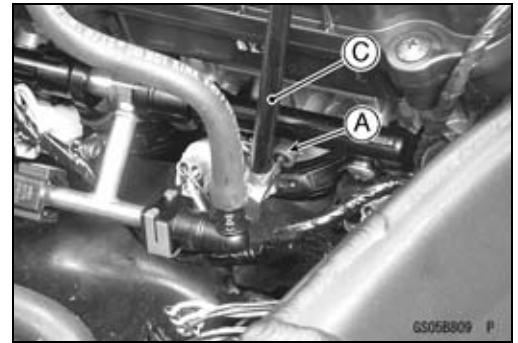
**Connections to Adapter:**

**Digital Meter (+) → R (sensor Y/W) lead**

**Digital Meter (-) → BK (sensor BR/BK) lead**

**Standard: DC 1.02 ~ 1.06 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).



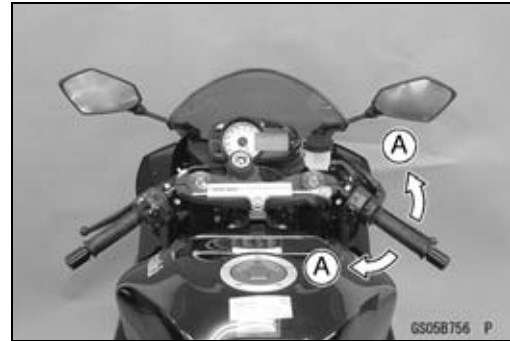
## 2-20 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

- Remove the vacuum gauge hoses and install the rubber caps and vacuum hose on the original position.
- For the California, Southeast Asia B1 and Thailand Models, install the vacuum hose.
- 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.

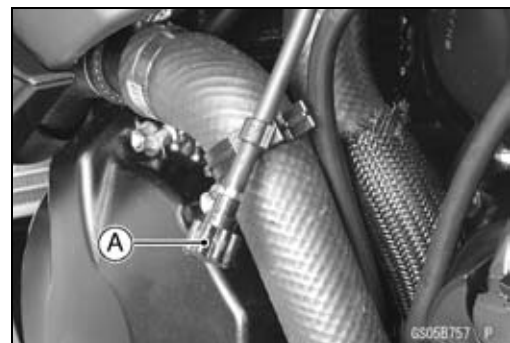
- Check the idle speed.
- ★ If the idle speed is out of specified range, adjust it.

#### **Idle Speed**

Standard: 1 300 ±50 r/min (rpm)

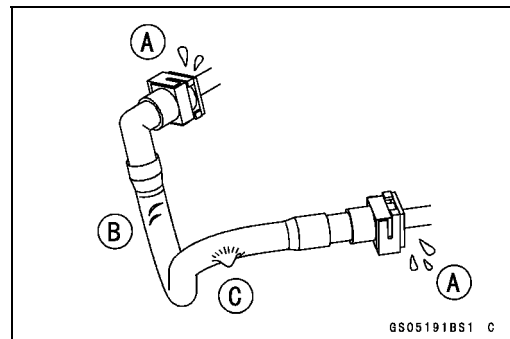
#### **Idle Speed Adjustment**

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



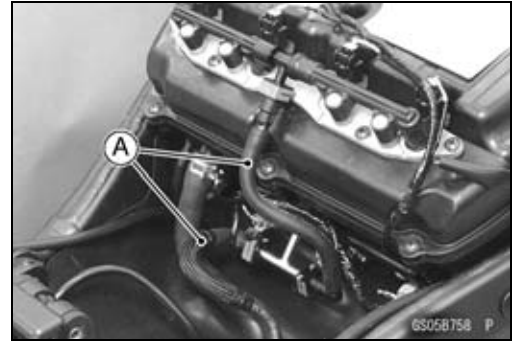
#### **Fuel Hose Inspection (fuel leak, damage, installation condition)**

- 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.

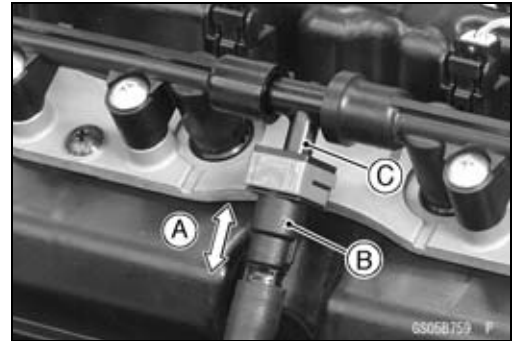


**Periodic Maintenance Procedures**

- Check that the fuel hoses [A] 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.

**Evaporative Emission Control System Inspection (CAL, SEA-B1 and TH Models)**

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



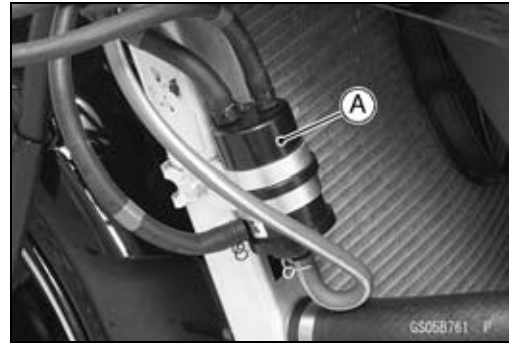
**NOTE**

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

## 2-22 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

- Check 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, and remove the separator [A] from the motorcycle left side.
  - 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.



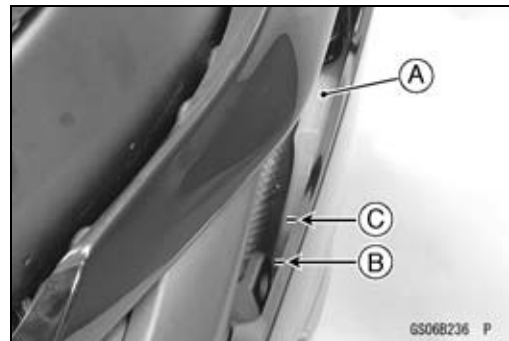
### Cooling System

#### 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

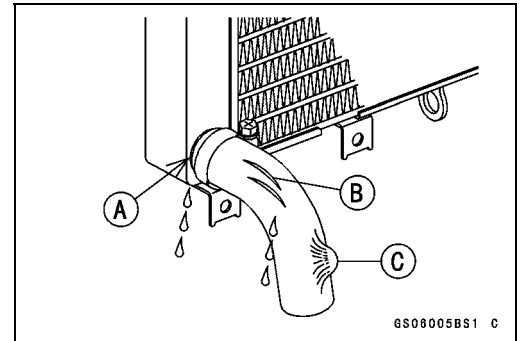
**For refilling, add the specified mixture of coolant and soft water. Adding water alone dilutes the coolant and degrades its anticorrosion properties. The diluted coolant can attack the aluminum engine parts. In an emergency, soft water alone can be added. But the diluted coolant must be returned to 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.**

**Periodic Maintenance Procedures**

**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: 2.0 N·m (0.20 kgf·m, 18 in·lb)**



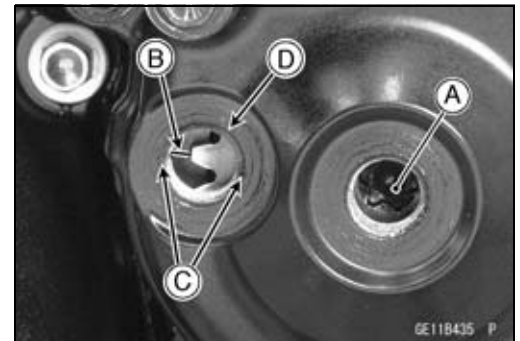
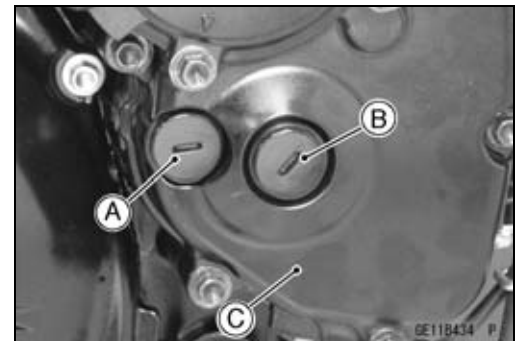
**Engine Top End**

**Valve Clearance Inspection**

**NOTE**

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

- Remove the cylinder head cover (see Cylinder Head Cover Removal in the Engine Top End chapter).
- Remove the timing inspection cap [A] and starter clutch bolt cap [B] on the starter clutch cover [C].
- Using a wrench on the starter clutch bolt [A], turn the crankshaft clockwise until the line [B] (TDC mark for #1,4 pistons) on the starter clutch is aligned with the notches [C] in the edge of the timing inspection hole [D] in the starter clutch cover.



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

**Valve Clearance**

**Standard:**

**Exhaust 0.24 ~ 0.31 mm (0.0094 ~ 0.0122 in.)**

**Inlet 0.13 ~ 0.19 mm (0.0051 ~ 0.0075 in.)**





## 2-24 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

#### NOTE

○ Thickness gauge is horizontally inserted on the valve lifter.

Appropriateness [A]

Inadequacy [B]

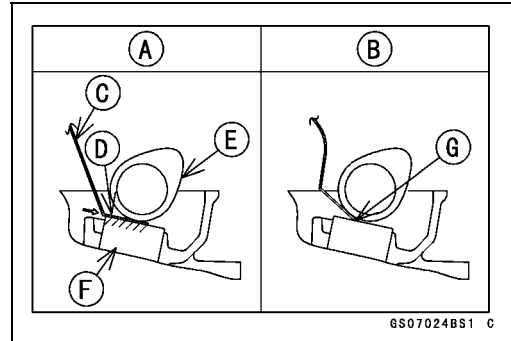
Thickness Gauge [C]

Horizontally Inserts [D]

Cam [E]

Valve Lifter [F]

Hits the Valve Lifter Ahead [G]

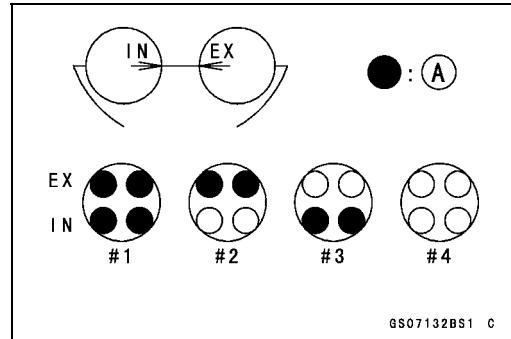


○ When positioning #1 piston TDC at the end of the compression stroke:

Inlet Valve Clearance of #1 and #3 Cylinders

Exhaust Valve Clearance of #1 and #2 Cylinders

Measuring Valve [A]

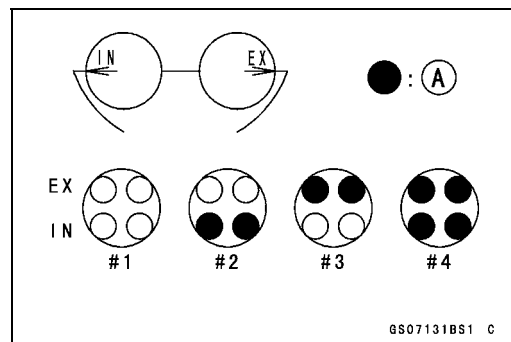


○ When positioning #4 piston TDC at the end of the compression stroke:

Inlet 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.

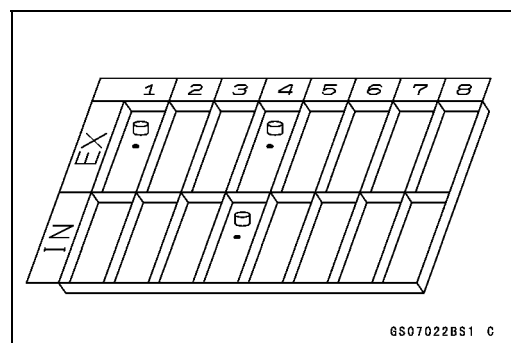
#### Valve Clearance Adjustment

● 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.



---

**Periodic Maintenance Procedures**

---

- 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

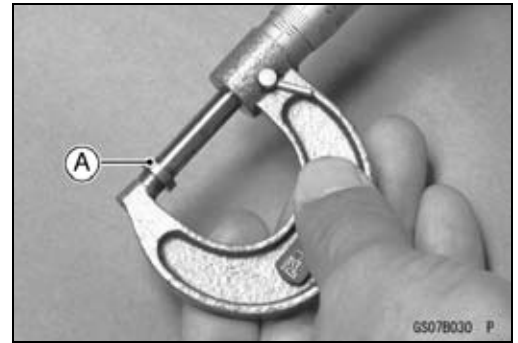
[c] Specified Valve Clearance (Mean Value = 0.275 mm  
(Exhaust), 0.160 mm (Inlet))

[d] Replace Shim Thickness

**Example (Exhaust):**

$$1.600 + 0.33 - 0.275 = 1.655 \text{ mm}$$

- Exchange the shim for the 1.675 size shim.

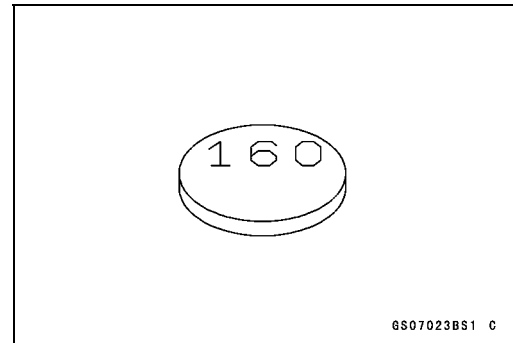


## 2-26 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

#### Adjustment Shims

Thickness	Part Number	Mark
1.300	92180-0108	130
1.325	92180-0109	132
1.350	92180-0110	135
1.375	92180-0111	138
1.400	92180-0112	140
1.425	92180-0113	142
1.450	92180-0114	145
1.475	92180-0115	148
1.500	92180-0116	150
1.525	92180-0117	152
1.550	92180-0118	155
1.575	92180-0119	158
1.600	92180-0120	160
1.625	92180-0121	162
1.650	92180-0122	165
1.675	92180-0123	168
1.700	92180-0124	170
1.725	92180-0125	172
1.750	92180-0126	175
1.775	92180-0127	178
1.800	92180-0128	180
1.825	92180-0129	182
1.850	92180-0130	185
1.875	92180-0131	188
1.900	92180-0132	190
1.925	92180-0133	192
1.950	92180-0134	195
1.975	92180-0135	198
2.000	92180-0136	200
2.025	92180-0137	202
2.050	92180-0138	205
2.075	92180-0139	208
2.100	92180-0140	210
2.125	92180-0141	212
2.150	92180-0142	215
2.175	92180-0143	218
2.200	92180-0144	220
2.225	92180-0145	222
2.250	92180-0146	225
2.275	92180-0147	228
2.300	92180-0148	230



Periodic Maintenance Procedures

**NOTICE**

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

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

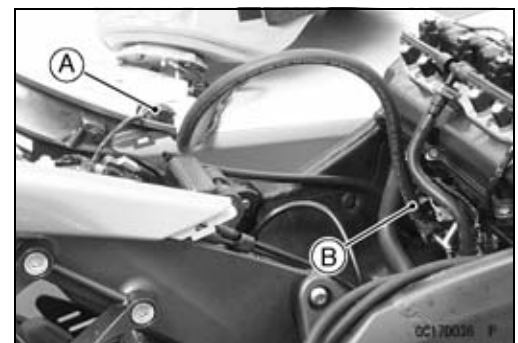
**Air Suction System Damage Inspection**

- Separate the air switching valve hose [A] from the lower air cleaner housing [B] (see Air Cleaner Housing Removal in the Fuel System (DFI) chapter).



- Connect the following parts temporarily.
  - Fuel Pump Lead Connector [A]
  - Extension Tube [B]
  - Air Cleaner Housing (see Air Cleaner Housing Installation in the Fuel System (DFI) chapter)

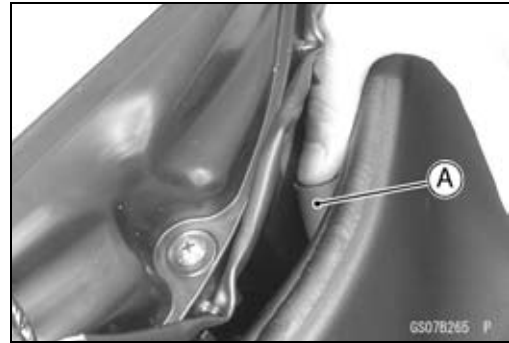
**Special Tool - Extension Tube: 57001-1578**



## 2-28 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

- Start the engine and run it at idle speed.
- Plug the air switching valve hose end [A] 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 Operation Inspection

- Pull the clutch lever just enough to take up the free play [A].
- Measure the gap between the lever and the lever holder.
- ★ If the gap is too wide, the clutch may not release fully. If the gap is too narrow, the clutch may not engage fully. In either case, adjust it.

#### Clutch Lever Free Play

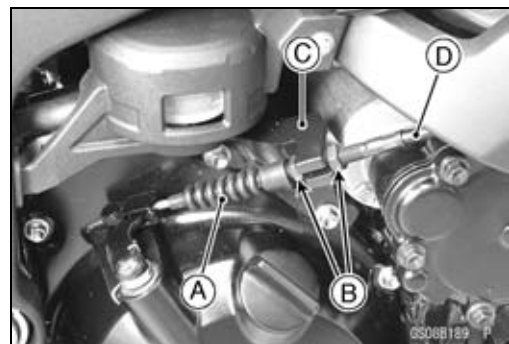
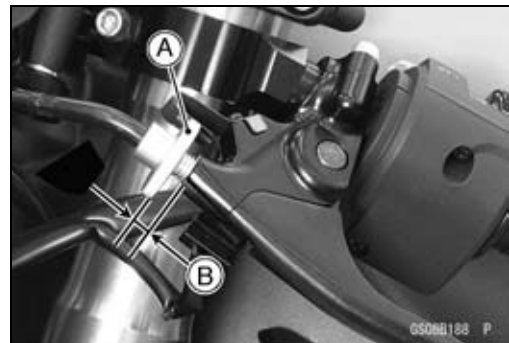
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)



#### **⚠ WARNING**

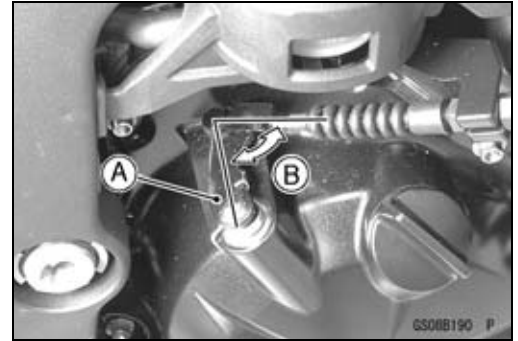
The engine and exhaust system get extremely hot during normal operation and can cause serious burns. Never touch the engine or exhaust pipe during clutch adjustment.

- Turn the adjuster [A] so that 4 ~ 6 mm (0.16 ~ 0.24 in.) [B] of threads is visible.
- Slide the dust cover [A] at the clutch cable lower end out of place.
- Loosen both adjusting nuts [B] at the bracket [C] on the clutch cover as far as they will go.
- Pull the clutch outer cable [D] tight and tighten the adjusting nuts against the bracket.
- Slip the dust cover back onto place.
- Turn the adjuster at the clutch lever until the free play is correct.



## Periodic Maintenance Procedures

- Push the release lever [A] toward the front of the motor-cycle until it becomes hard to turn.
- At this time, the release lever should have the proper angle shown.  
60° [B]
- ★ If the angle is wrong, check the clutch and release parts for wear.



### **⚠ WARNING**

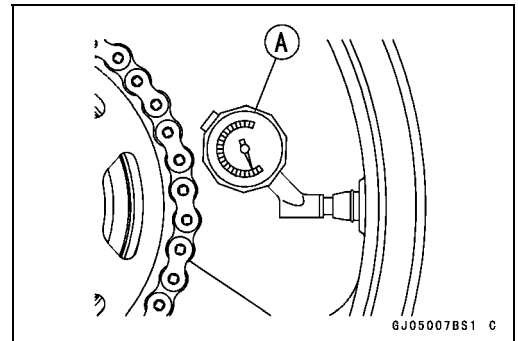
**Too much cable play can prevent clutch disengagement and cause an accident resulting in serious injury or death. When adjusting the clutch or replacing the cable, be sure the upper end of the clutch outer cable is fully seated in its fitting, or it could slip into place later, creating enough cable play to prevent clutch disengagement.**

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

## Wheels/Tires

### ***Air Pressure Inspection***

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

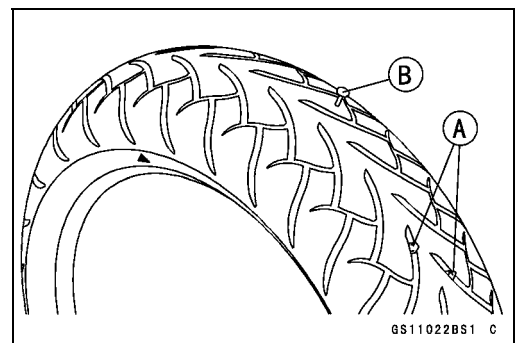


### **Air Pressure (when Cold)**

- Front: Up to 180 kg (397 lb) load:**  
250 kPa (2.5 kgf/cm<sup>2</sup>, 36 psi)
- Rear: Up to 180 kg (397 lb) load:**  
290 kPa (2.9 kgf/cm<sup>2</sup>, 42 psi)

### ***Wheel/Tire Damage Inspection***

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





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