

## MODEL APPLICATION

Year	Model	Beginning Frame No.
2012	KLZ1000AC	JKALZCA1□CA000001 JKALZT00AAA000001

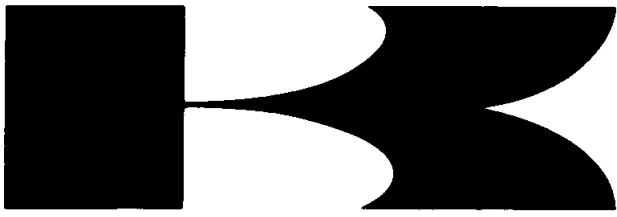
□:This digit in the frame number changes from one machine to another.



KAWASAKI HEAVY INDUSTRIES, LTD.  
Motorcycle & Engine Company

Part No.99924-1449-01

Printed in Japan



# **Kawasaki VERSYS 1000**



## **Motorcycle Service Manual**

# Quick Reference Guide

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## LIST OF ABBREVIATIONS

A	ampere(s)	in.	inch(s)
ABDC	after bottom dead center	km/h	kilometers per hour
ABS	antilock brake system	KTRC	Kawasaki traction control system
AC	alternating current	L	liter(s)
Ah	ampere hour	LCD	liquid crystal display
ATDC	after top dead center	LED	light emitting diode
BBDC	before bottom dead center	lb	pound(s)
BDC	bottom dead center	m	meter(s)
BTDC	before top dead center	min	minute(s)
°C	degree(s) Celsius	mmHg	millimeters of mercury
cmHg	centimeters of mercury	mph	miles per hour
CU	central processing unit	N	newton(s)
cu in	cubic inch(s)	oz	ounce(s)
DC	direct current	Pa	pascal(s)
DFI	digital fuel injection	PS	horsepower
DOHC	double overhead camshaft	psi	pound(s) per square inch
DOT	department of transportation	qt	quart(s)
ECU	electronic control unit	r	revolution
F	farad(s)	rpm	revolution(s) per minute
°F	degree(s) Fahrenheit	s	second(s)
ft	foot, feet	TDC	top dead center
g	gram(s)	TIR	total indicator reading
gal	gallon(s)	V	volt(s)
h	hour(s)	W	watt(s)
HP	horsepower(s)	Ω	ohm(s)
IC	integrated circuit		

## COUNTRY AND AREA CODES

AT	Austria	EUR	Europe
AU	Australia	GB	United Kingdom
BR	Brazil	SEA-B2	Southeast Asia B2
CA	Canada	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 (78.2 Kw 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

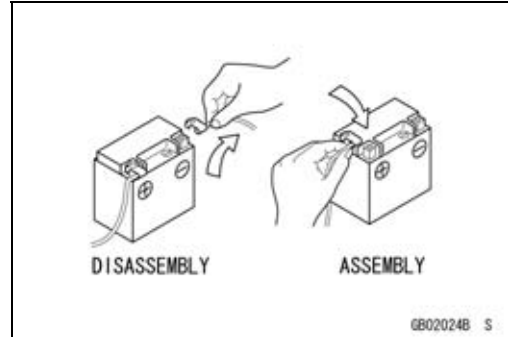
## Before Servicing

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.

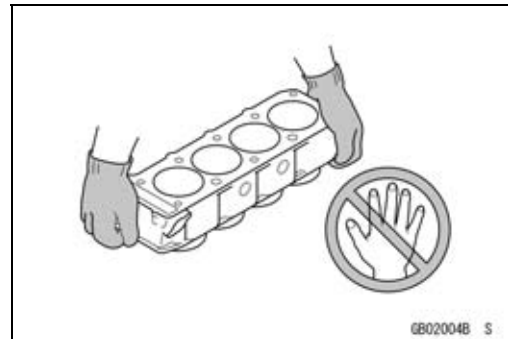
### **Battery Ground**

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.



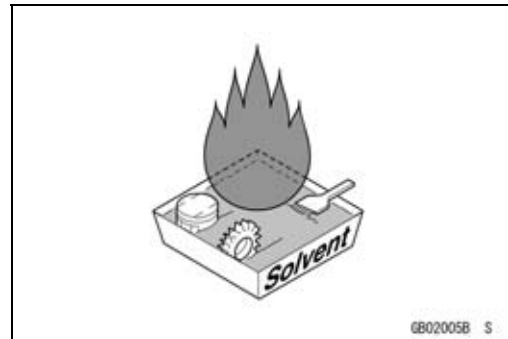
### **Edges of Parts**

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



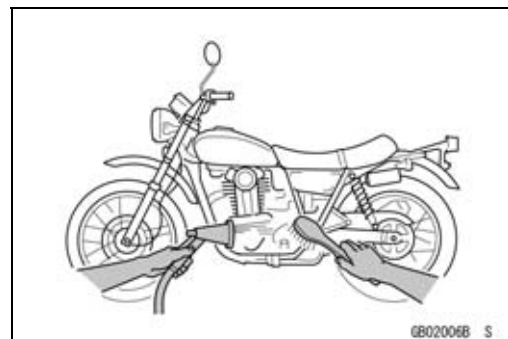
### **Solvent**

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



### **Cleaning Vehicle before Disassembly**

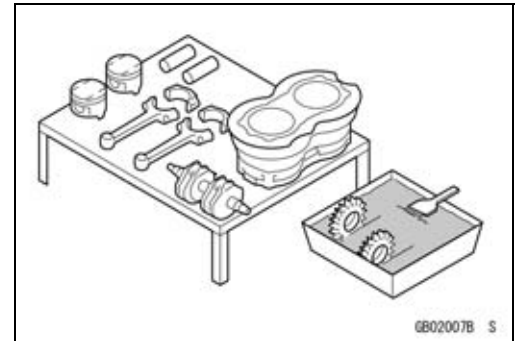
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



**Before Servicing**

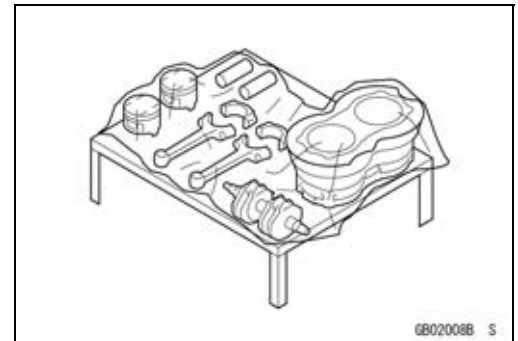
**Arrangement and Cleaning of Removed Parts**

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.



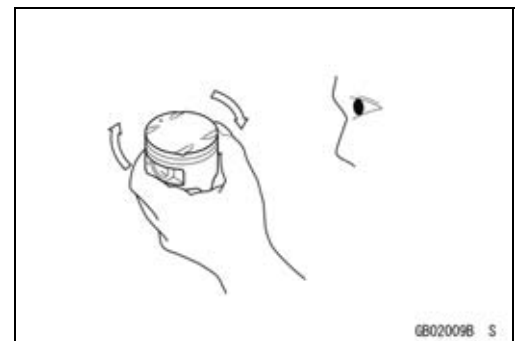
**Storage of Removed Parts**

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.



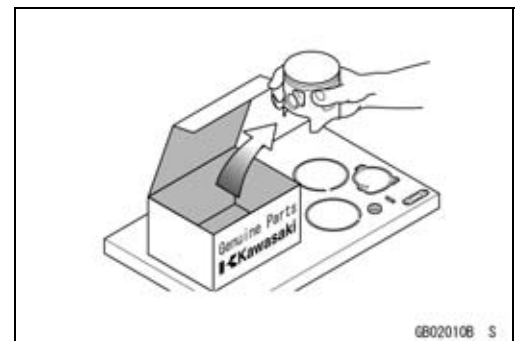
**Inspection**

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.



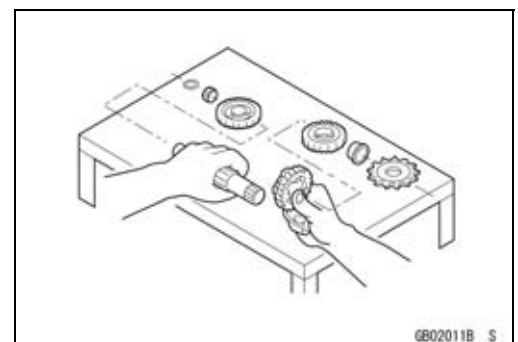
**Replacement Parts**

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.



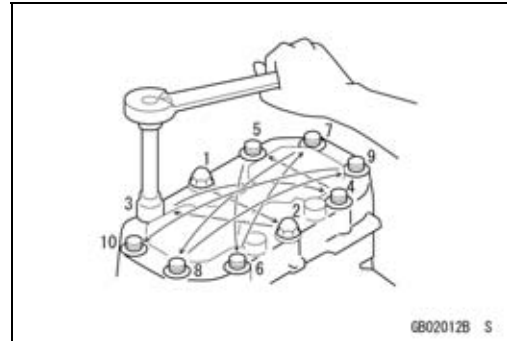


## 1-4 GENERAL INFORMATION

### Before Servicing

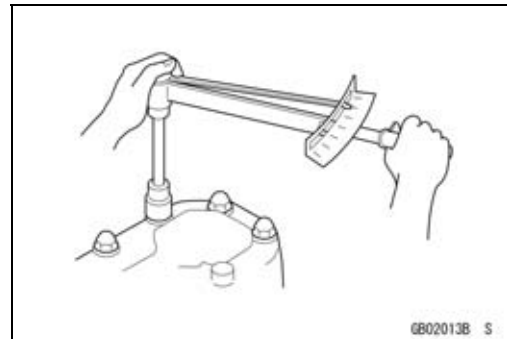
#### **Tightening Sequence**

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.



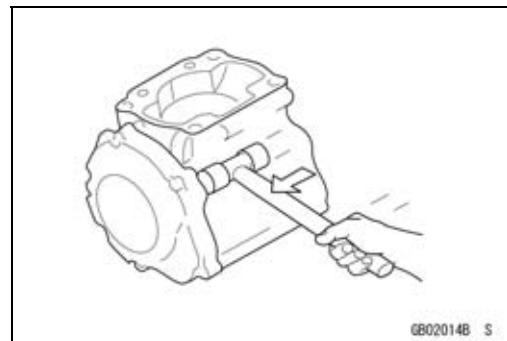
#### **Tightening Torque**

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.



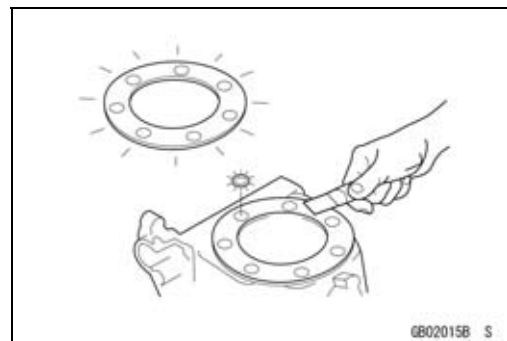
#### **Force**

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**

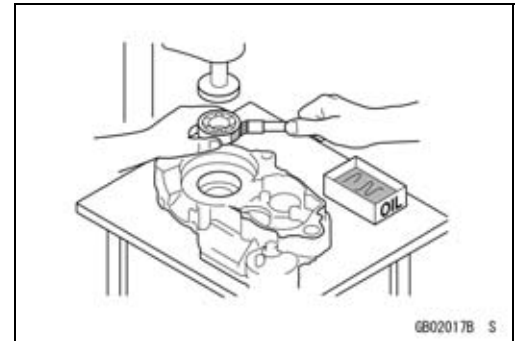
For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



**Before Servicing**

**Press**

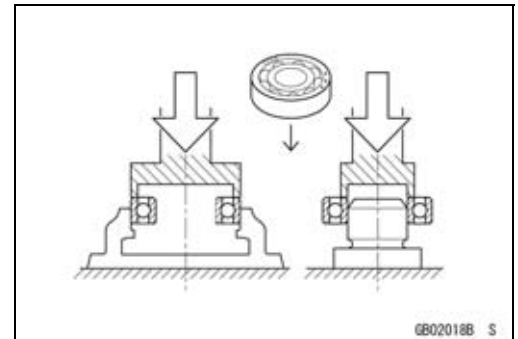
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



**Ball Bearing and Needle Bearing**

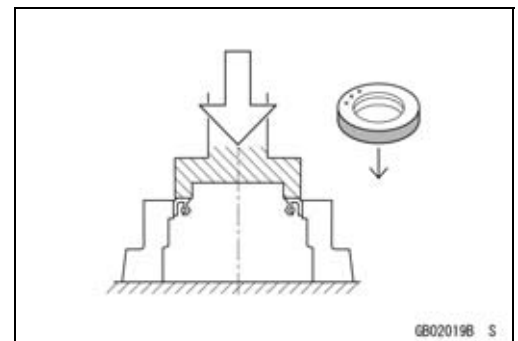
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

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

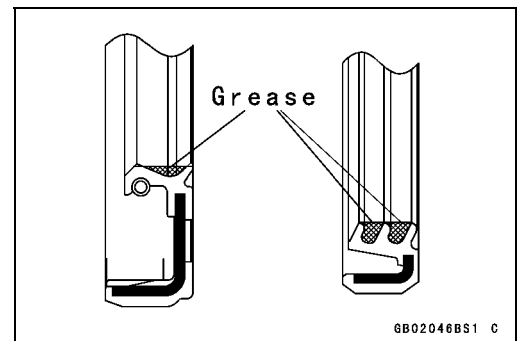


**Oil Seal, Grease Seal**

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.

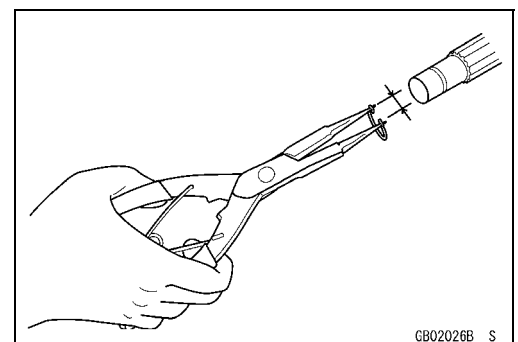


Apply specified grease to the lip of seal before installing the seal.



**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.

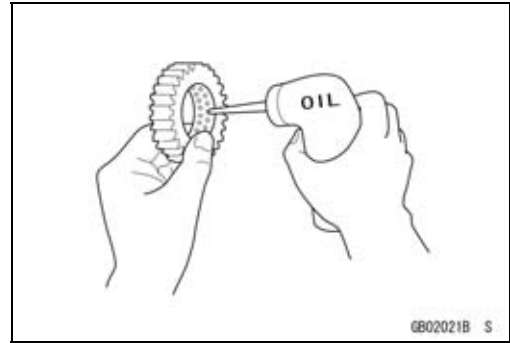


# 1-6 GENERAL INFORMATION

## Before Servicing

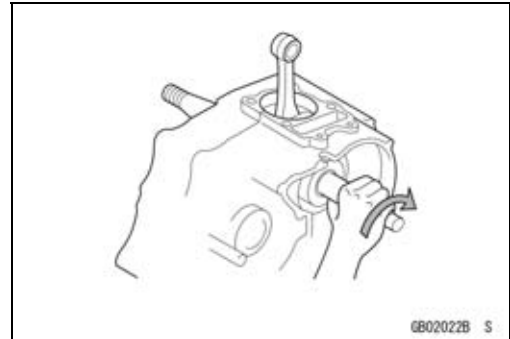
### **Lubrication**

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.



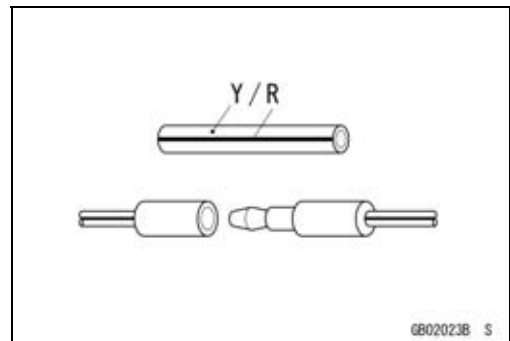
### **Direction of Engine Rotation**

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).



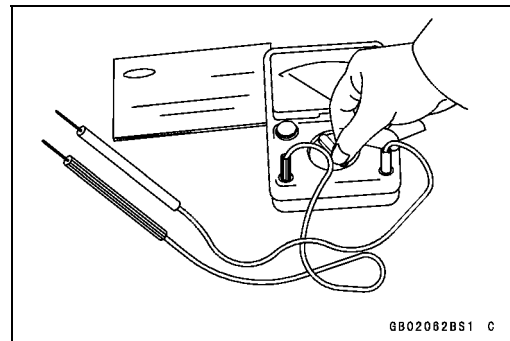
### **Electrical Wires**

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

KLZ1000AC (Europe) Left Side View



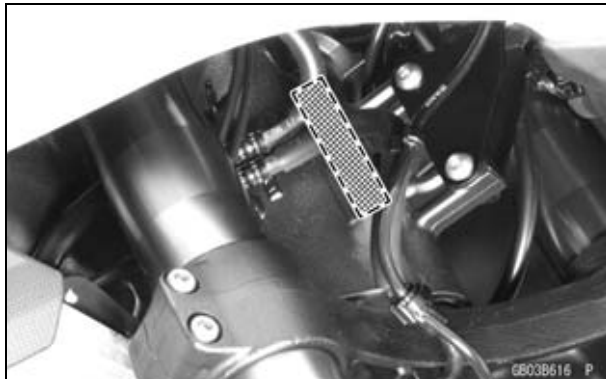
6B03B622 P

KLZ1000AC (Europe) Right Side View



6B03B623 P

Frame Number



6B03B616 P

Engine Number



6B03B617 P

# 1-8 GENERAL INFORMATION

## General Specifications

Items	KLZ1000AC
<b>Dimensions</b> Overall Length Overall Width Overall Height/High Position Wheelbase Road Clearance Seat Height Curb Mass: Front Rear Fuel Tank Capacity	2 235 mm (87.99 in.) 900 mm (35.4 in.) 1 405 mm (55.31 in.)/1 430 mm (56.3 in.) 1 520 mm (59.84 in.) 155 mm (6.10 in.) 845 mm (33.3 in.) 239 kg (527 lb) 117 kg (258 lb) 122 kg (269 lb) 21.0 L (5.55 US gal.)
<b>Performance</b> Minimum Turning Radius	3.0 m (9.8 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: Intake: Open Close Duration Exhaust: Open Close Duration Lubrication System	4-stroke, DOHC, 4-cylinder Liquid-cooled 77.0 × 56.0 mm (3.03 × 2.20 in.) 1 043 cm <sup>3</sup> (63.64 cu in.) 10.3 : 1 86.8 kW (118 PS) @9 000 r/min (rpm) (WVTA (78.2 H)) 78.2 kW (106 PS) @9 000 r/min (rpm) (CA) – – –  102 N·m (10.4 kgf·m, 75 ft·lb) @7 700 r/min (rpm) (WVTA (78.2 H)) 96 N·m (9.8 kgf·m, 71 ft·lb) @6 800 r/min (rpm) (CA) – – –  FI (Fuel Injection) KEIHIN TTK38 × 4 Electric starter Battery and coil (transistorized) Electronically advanced (digital igniter) From 10° BTDC @1 100 r/min (rpm) to 40.2° BTDC @5 200 r/min (rpm)  NGK CR9EIA-9 Left to right, 1-2-3-4 1-2-4-3  24° BTDC 44° ABDC 248°  45° BBDC 19° ATDC 244° Forced lubrication (wet sump)

**General Specifications**

Items	KLZ1000AC
Engine Oil: Type Viscosity Capacity	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2 SAE 10W-40 4.0 L (4.2 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 1.627 (83/51) Wet multi disc 6-speed, constant mesh, return shift 2.692 (35/13) 1.950 (39/20) 1.529 (26/17) 1.304 (30/23) 1.136 (25/22) 0.958 (23/24) Chain drive 2.867 (43/15) 4.471 @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 27° 107 mm (4.21 in.) Tubeless 120/70 ZR17 M/C (58W) J17M/C × MT3.50 Tubeless 180/55 ZR17 M/C (73W) J17M/C × MT5.50 Telescopic fork (upside-down) 150 mm (5.91 in.) Swingarm 150 mm (5.91 in.) Dual discs Single disc

## 1-10 GENERAL INFORMATION

### General Specifications

Items	KLZ1000AC
<b>Electrical Equipment</b>	
Battery	12 V 8 Ah
Headlight:	
Type	Semi-sealed beam
High Beam	12 V 55 W
Low Beam	12 V 55 W
Tail/Brake Light	LED
Alternator:	
Type	Three-phase AC

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

**Unit Conversion Table**

**Prefixes for Units:**

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

**Units of Mass:**

kg	×	2.205	=	lb
g	×	0.03527	=	oz

**Units of Volume:**

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

**Units of Force:**

N	×	0.1020	=	kg
N	×	0.2248	=	lb

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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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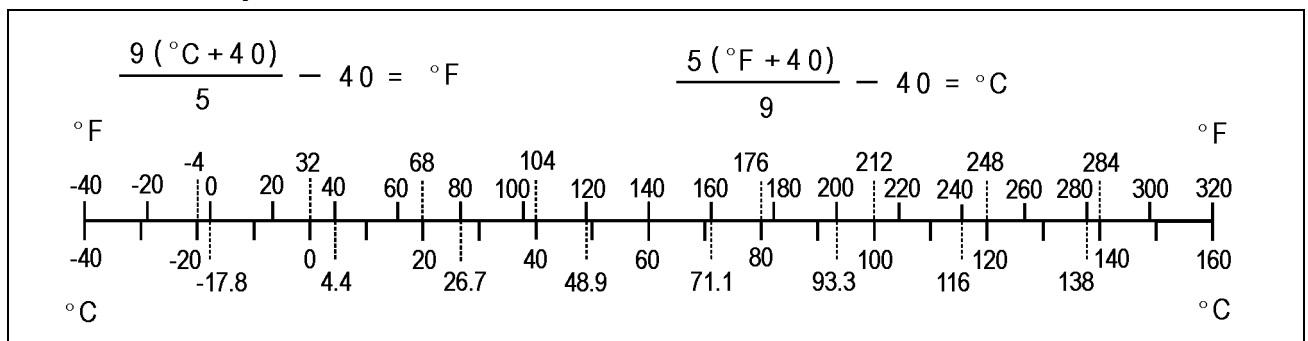
**Units of Power:**

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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Oil Filter Replacement .....	2-55
Brake Hose Replacement.....	2-56
Brake Fluid Change .....	2-58
Master Cylinder Rubber Parts Replacement .....	2-59
Caliper Rubber Parts Replacement .....	2-60
Spark Plug Replacement .....	2-63

**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 × 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)	36 (22.5)	
<b>Fuel System</b>									
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	•		•		•		•	2-19
Fuel hose and pipe damage - inspect	year	•		•		•		•	2-19
Fuel hose and pipe installation condition - inspect	year	•		•		•		•	2-19
<b>Cooling System</b>									
Coolant level - inspect		•		•		•		•	2-20
Coolant leak (water hose and pipe) - inspect	year	•		•		•		•	2-21
Water hose damage - inspect	year	•		•		•		•	2-21
Water hose installation condition - inspect	year	•		•		•		•	2-21
<b>Engine Top End</b>									
Valve clearance - inspect	CA Model					•			2-21
	Other than CA Models	Every 42 000 km (26 250 mile)							2-21
Air suction system damage - inspect				•		•		•	2-26
<b>Clutch</b>									
Clutch operation (play, disengagement, engagement) - inspect		•		•		•		•	2-27
<b>Wheels and Tires</b>									
Tire air pressure - inspect	year			•		•		•	2-28
Wheel/tire damage - inspect				•		•		•	2-28
Tire tread wear, abnormal wear - inspect				•		•		•	2-28
Wheel bearing damage - inspect	year			•		•		•	2-29
<b>Final Drive</b>									
Drive chain lubrication condition - inspect #	Every 600 km (400 mile)								2-30
Drive chain slack - inspect #	Every 1 000 km (600 mile)								2-30

## 2-4 PERIODIC MAINTENANCE

### 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)	
Drive chain wear - inspect #				•		•		•	2-32
Drive chain guide wear - inspect				•		•		•	2-33
<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 and pipe installation condition - inspect	year	•	•	•	•	•	•	•	2-35
Brake operation (effectiveness, play, no drag) - inspect	year	•	•	•	•	•	•	•	2-35
Brake fluid level - inspect	6 months	•	•	•	•	•	•	•	2-36
Brake pad wear - inspect #			•	•	•	•	•	•	2-37
Brake light switch operation - inspect		•	•	•	•	•	•	•	2-37
<b>Suspension</b>									
Front forks/rear shock absorber operation (damping and smooth stroke) - inspect				•		•		•	2-38
Front forks/rear shock absorber oil leak - inspect	year			•		•		•	2-38, 2-39
Rocker arm operation - inspect				•		•		•	2-39
Tie-rods operation - inspect				•		•		•	2-39
<b>Steering</b>									
Steering play - inspect	year	•		•		•		•	2-39
Steering stem bearings - lubricate	2 years					•			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
Engine stop switch operation - inspect	year			•		•		•	2-46
<b>Others</b>									
Chassis parts - lubricate	year			•		•		•	2-47
Bolts and nuts tightness - inspect		•		•		•		•	2-49

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

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

**Periodic Maintenance Chart**

**Periodic Replacement Parts**

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)	48 (30)	
Air cleaner element # - replace	Every 18 000 km (11 250 mile)						2-50
Fuel hose - replace	5 years						2-50
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	•	•	•	•	•	2-55
Brake hose - replace	4 years					•	2-56
Brake fluid - change	2 years			•		•	2-58
Rubber parts of master cylinder and caliper - replace	4 years					•	2-59, 2-60
Spark plug - replace			•	•	•	•	2-63

#: 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:

AD: Apply adhesive (ThreeBond: TB1344N or equivalent).

AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.

G: Apply grease.

L: Apply a non-permanent locking agent.

MO: Apply molybdenum disulfide oil solution.

(mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10 : 1)

R: Replacement Parts

S: Follow the specified tightening sequence.

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>				
Switch Housing Screws	3.5	0.36	31 in·lb	
Upper Air Cleaner Housing Screws	1.1	0.11	10 in·lb	
Throttle Body Assy Holder Clamp Bolts	2.9	0.30	26 in·lb	
Throttle Body Assy Holder Bolts	12	1.2	106 in·lb	L
Air Cleaner Duct Clamp Bolts	2.0	0.20	18 in·lb	
Delivery Pipe Assy Mounting Screws	3.4	0.35	30 in·lb	
Oxygen Sensor	44	4.5	32	
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	
Intake Air Temperature Sensor Mounting Screw	1.2	0.12	11 in·lb	
Water Temperature Sensor	12	1.2	106 in·lb	
Fuel Pump Bolts	9.8	1.0	87 in·lb	L
<b>Cooling System</b>				
Radiator (Water) Hose Clamp Screws	2.9	0.30	26 in·lb	
Coolant By-pass Fitting Bolt	8.8	0.90	78 in·lb	L
Thermostat Housing Bolts	5.9	0.60	52 in·lb	L
Water Pipe Bolts	12	1.2	106 in·lb	L
Water Pump Impeller Bolt	9.8	1.0	87 in·lb	
Water Pump Cover Bolts	11	1.1	97 in·lb	
Coolant Drain Bolt	11	1.1	97 in·lb	
<b>Engine Top End</b>				
Air Suction Valve Cover Bolts	9.8	1.0	87 in·lb	L
Spark Plugs	13	1.3	115 in·lb	
Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	S
Camshaft Sprocket Bolts	15	1.5	11	L
Upper Camshaft Chain Guide Bolts	12	1.2	106 in·lb	S
Camshaft Cap Bolts	12	1.2	106 in·lb	S
Cylinder Head Bolts (M10) (First)	20	2.0	15	S, MO
Cylinder Head Bolts (M10) (Final)	54	5.5	40	S, MO
Cylinder Head Bolts (M6)	12	1.2	106 in·lb	S

**Torque and Locking Agent**

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Throttle Body Assy Holder Bolts	12	1.2	106 in·lb	L
Plugs	19.6	2.00	14.5	L
Throttle Body Assy Holder Clamp Bolts	2.9	0.30	26 in·lb	
Front Camshaft Chain Guide Bolt (Upper)	25	2.5	18	
Rear Camshaft Chain Guide Bolt	25	2.5	18	
Front Camshaft Chain Guide Bolt (Lower)	12	1.2	106 in·lb	
Coolant By-pass Fitting Bolt	8.8	0.90	78 in·lb	L
Camshaft Chain Tensioner Cap Bolt	20	2.0	15	
Camshaft Chain Tensioner Mounting Bolts	11	1.1	97 in·lb	
Muffler Body Mounting Bolt	34	3.5	25	
Premuffler Chamber Mounting Bolt	34	3.5	25	
Muffler Body Clamp Bolt	21	2.1	15	
Muffler Body End Cover Bolts	9.8	1.0	87 in·lb	
Premuffler Chamber Guard Bolts	9.8	1.0	87 in·lb	S
<b>Clutch</b>				
Clutch Lever Assembly Clamp Bolts	7.8	0.80	69 in·lb	S
Clutch Cover Bolts	9.8	1.0	87 in·lb	
Oil Filler Plug	–	–	–	Hand-tighten
Clutch Spring Bolts	9.0	0.92	80 in·lb	
Clutch Hub Nut	135	13.8	100	R
<b>Engine Lubrication System</b>				
Oil Filler Plug	–	–	–	Hand-tighten
Oil Cooler Bolts	12	1.2	106 in·lb	
Oil Passage Plugs	20	2.0	15	L
Radiator (Water) Hose Clamp Screws	3.0	0.31	27 in·lb	
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	2.0	0.20	18 in·lb	
Oil Pressure Relief Valve	15	1.5	11	L
Oil Filter	17	1.7	13	G, R
Oil Filter Pipe	25	2.5	18	L
Oil Pan Bolts	12	1.2	106 in·lb	S
Engine Oil Drain Bolt	29	3.0	21	
Lower Fairing Bracket Bolts	12	1.2	106 in·lb	
<b>Engine Removal/Installation</b>				
Upper Engine Bracket Bolts (M10)	59	6.0	44	S
Upper Engine Bracket Bolt (M8)	27	2.8	20	S
Lower Engine Bracket Bolts	59	6.0	44	S
Upper Adjusting Collar	9.8	1.0	87 in·lb	S
Upper Engine Mounting Bolt (L = 65)	44	4.5	32	S
Upper Adjusting Collar Locknut	49	5.0	36	S
Upper Engine Mounting Bolt (L = 54)	44	4.5	32	S
Rear Engine Bracket Bolts	59	6.0	44	S
Middle Engine Bracket Bolts	25	2.5	18	L, S

## 2-8 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Middle Engine Mounting Nut	44	4.5	32	S
Lower Engine Mounting Nut	44	4.5	32	S
Lower Adjusting Collar Locknut	49	5.0	36	S
Lower Adjusting Collar	9.8	1.0	87 in·lb	S
<b>Crankshaft/Transmission</b>				
Balancer Shaft Clamp Bolt	9.8	1.0	87 in·lb	
Balancer Shaft Lever Bolt	25	2.5	18	L
Breather Side Plate Bolt	5.9	0.60	52 in·lb	L
Connecting Rod Big End Nuts	see the text	←	←	MO
Breather Plate Bolts	9.8	1.0	87 in·lb	L
Shift Drum Bearing Holder Bolts	12	1.2	106 in·lb	L
Oil Passage Plugs	20	2.0	15	L
Oil Passage Plug	9.8	1.0	87 in·lb	
Starter Motor Clutch Bolts	12	1.2	106 in·lb	L
Crankcase Bolts (M7)	20	2.0	15	S
Crankcase Bolts (M9)	42	4.3	31	S, MO
Crankcase Bolts (M6)	12	1.2	106 in·lb	S
Crankcase Bolts (M8)	27	2.8	20	S
Gear Positioning Lever Bolt	12	1.2	106 in·lb	
Shift Drum Cam Bolt	12	1.2	106 in·lb	L
Neutral Switch	15	1.5	11	
Shift Shaft Return Spring Pin	39	4.0	29	L
Shift Pedal Mounting Bolt	25	2.5	18	
<b>Wheels/Tires</b>				
Front Axle Clamp Bolt	20	2.0	15	
Front Axle	127	13.0	93.7	
Rear Sprocket Nuts	59	6.0	44	R
Rear Axle Nut	108	11.0	79.7	
<b>Final Drive</b>				
Engine Sprocket Nut	125	12.7	92.2	MO
Drive Chain Guide Bolts	9.8	1.0	87 in·lb	
Rear Sprocket Nuts	59	6.0	44	R
Rear Axle Nut	108	11.0	79.7	
<b>Brakes</b>				
Front Master Cylinder Reservoir Cap Screws	1.5	0.15	13 in·lb	
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	
Front Master Cylinder Clamp Bolts	11	1.1	97 in·lb	S
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Brake Hose Banjo Bolts	25	2.5	18	
Brake Pipe Joint Nuts	18	1.8	13	
ABS Hydraulic Unit Bracket Bolts	8.8	0.90	78 in·lb	L



**Torque and Locking Agent**

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Front Brake Disc Mounting Bolts	27	2.8	20	L
Front Brake Pad Spring Bolts	2.9	0.30	26 in·lb	
Bleed Valve	7.8	0.80	69 in·lb	
Front Caliper Assembly Bolts	22	2.2	16	
Front Brake Pad Pin	15	1.5	11	
Front Caliper Mounting Bolts	25	2.5	18	
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Brake Pedal Bolt	8.8	0.90	78 in·lb	
Rear Master Cylinder Push Rod Locknut	17	1.7	13	
Rear Caliper Pin Bolt	27	2.8	20	Si
Rear Brake Pad Pin Plug	2.5	0.25	22 in·lb	
Rear Brake Pad Pin	17	1.7	13	
Rear Caliper Mounting Bolt	22	2.2	16	
Rear Brake Disc Mounting Bolts	27	2.8	20	L
<b>Suspension</b>				
Upper Front Fork Clamp Bolts	20	2.0	15	
Lower Front Fork Clamp Bolts	20.5	2.09	15.1	AL
Front Fork Top Plugs	22.5	2.29	16.6	
Piston Rod Nuts	15	1.5	11	
Cylinder Units	60	6.1	44	AD
Front Axle Clump Bolt	20	2.0	15	
Rear Shock Absorber Bolt (Upper)	34	3.5	25	
Swingarm Pivot Adjusting Collar Locknut	98	10	72	
Swingarm Pivot Shaft	20	2.0	15	
Swingarm Pivot Shaft Nut	108	11.0	79.7	
Swingarm Pivot Adjusting Collar	20	2.0	15	
Tie-rod Nuts	34	3.5	25	R
Rear Shock Absorber Nut (Lower)	34	3.5	25	R
Rocker Arm Nut	34	3.5	25	R
<b>Steering</b>				
Handlebar Holder Bolts	25	2.5	18	
Switch Housing Screws	3.5	0.36	31 in·lb	
Steering Stem Head Bolt	108	11.0	79.7	
Upper Front Fork Clamp Bolts	20	2.0	15	
Handlebar Holder Mounting Nuts	34	3.5	25	R
Steering Stem Nut	25	2.5	18	
Lower Front Fork Clamp Bolts	20.5	2.09	15.1	AL
<b>Frame</b>				
Front Fender Mounting Bolts	3.9	0.40	35 in·lb	
Rear Frame Bolts	44	4.5	32	
Front Footpeg Bracket Bolts	25	2.5	18	
Sidestand Bracket Bolts	49	5.0	36	L
Sidestand Nut	44	4.5	32	R, S

## 2-10 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Sidestand Bolt	29	3.0	21	S
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
Carrier Bracket Bolts	34	3.5	25	L
Carrier Mounting Bolts	8.8	0.90	78 in·lb	L
Rear Frame Guard Bolts	8.8	0.90	78 in·lb	
Rear Footpeg Bracket Bolts (Lower)	28	2.9	21	L
Rear Footpeg Bracket Nuts	25	2.5	18	R
<b>Electrical System</b>				
Switch Housing Screws	3.5	0.36	31 in·lb	
Oxygen Sensor	44	4.5	32	
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Licence Plate Light Mounting Screws	0.9	0.09	8 in·lb	
Intake Air Temperature Sensor Mounting Screw	1.2	0.12	11 in·lb	
Spark Plugs	9.8	1.0	87 in·lb	
Crankshaft Sensor Cover Bolts	12	1.2	106 in·lb	
Water Temperature Sensor	12	1.2	106 in·lb	
Timing Rotor Bolt	39	4.0	29	
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	
Starter Motor Cable Terminal Nut	5.9	0.60	52 in·lb	
Starter Motor Terminal Locknut	11	1.1	97 in·lb	
Starter Motor Mounting Bolts	9.8	1.0	87 in·lb	
Alternator Rotor Bolt	155	15.8	114	
Stator Coil Bolts	12	1.2	106 in·lb	L
Starter Motor Through Bolts	5.0	0.51	44 in·lb	
Brush Holder Screw	3.8	0.39	34 in·lb	
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	2.0	0.20	18 in·lb	
Alternator Cover Bolts	12	1.2	106 in·lb	
Alternator Lead Holding Plate Bolt	12	1.2	106 in·lb	L
Engine Ground Cable Terminal Bolt	9.8	1.0	87 in·lb	
Neutral Switch	15	1.5	11	
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L

**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	10.0 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19.0 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17.0 ~ 23.0	125 ~ 165
20	225 ~ 325	23.0 ~ 33.0	165 ~ 240

## 2-12 PERIODIC MAINTENANCE

### Specifications

Item	Standard	Service Limit
<b>Fuel System (DFI)</b>		
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	---
Idle Speed	1 100 ±50 r/min (rpm)	---
Bypass Screws (Turn Out)	2 1/2 (for reference)	---
Throttle Body Vacuum	40.7 ±1.3 kPa (305 ±10 mmHg) at idle speed	---
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	2.6 L (2.7 US qt)	---
<b>Engine Top End</b>		
Valve Clearance:		
Exhaust	0.22 ~ 0.31 mm (0.0087 ~ 0.0122 in.)	---
Intake	0.15 ~ 0.24 mm (0.0059 ~ 0.0094 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	3.2 L (3.4 US qt) (when filter is not removed)	---
	3.8 L (4.0 US qt) (when filter is removed)	---
	4.0 L (4.2 US qt) (when engine is completely dry)	---
<b>Wheels/Tires</b>		
Tread Depth:		
Front	4.4 mm (0.17 in.)	1 mm (0.04 in.), (AT, CH, DE) 1.6 mm (0.06 in.)
Rear	6.6 mm (0.26 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 220 kg (485 lb) load: 250 kPa (2.5 kgf/cm <sup>2</sup> , 36 psi)	---
Rear	Up to 220 kg (485 lb) load: 290 kPa (2.9 kgf/cm <sup>2</sup> , 42 psi)	---
<b>Final Drive</b>		
Drive Chain Slack	25 ~ 35 mm (1.0 ~ 1.4 in.)	---

**Specifications**

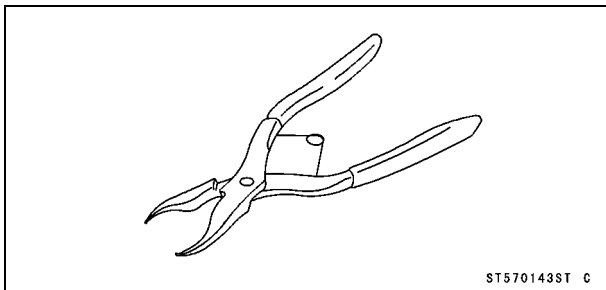
Item	Standard	Service Limit
Drive Chain Wear (20-link Length) Standard Chain: Make Type Link	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)  ENUMA EK525RMX 116 Links	319 mm (12.6 in.)  - - - - - - - - -
<b>Brakes</b> Brake Fluid: Grade Brake Pad Lining Thickness: Front Rear Brake Light Timing: Front Rear	DOT4  4.0 mm (0.16 in.) 5.0 mm (0.20 in.)  Pulled ON ON after about 10 mm (0.39 in.) of pedal travel	- - -  1 mm (0.04 in.) 1 mm (0.04 in.)  - - - - - -
<b>Electrical System</b> Spark Plug: Type	NGK CR9EIA-9	- - -

## 2-14 PERIODIC MAINTENANCE

### Special Tools

**Inside Circlip Pliers:**

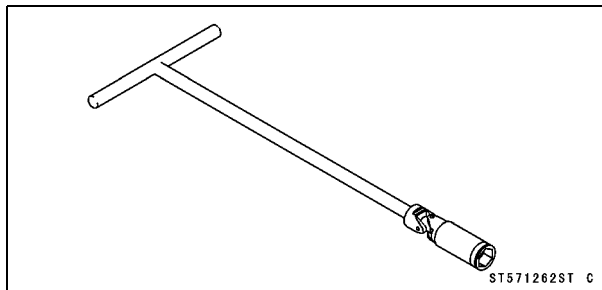
**57001-143**



ST570143ST C

**Spark Plug Wrench, Hex 16:**

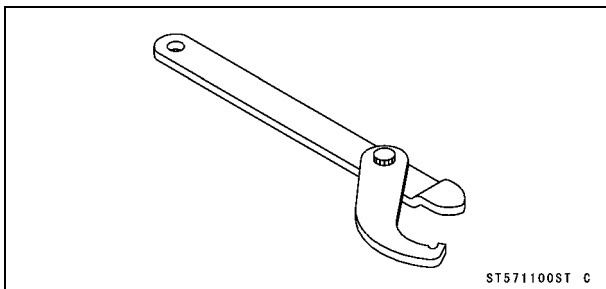
**57001-1262**



ST571262ST C

**Steering Stem Nut Wrench:**

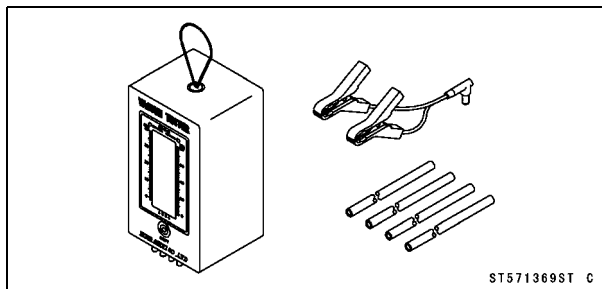
**57001-1100**



ST571100ST C

**Vacuum Gauge:**

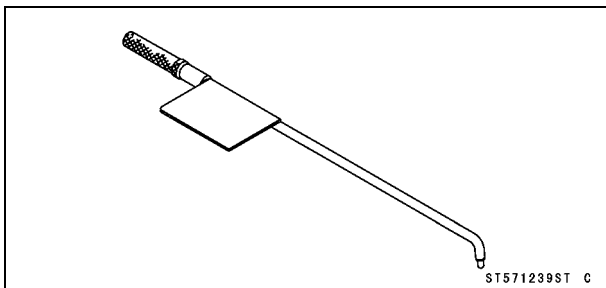
**57001-1369**



ST571369ST C

**Pilot Screw Adjuster, A:**

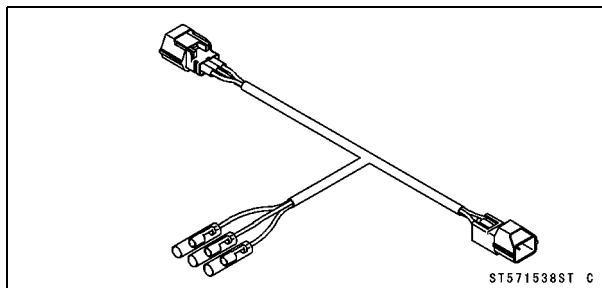
**57001-1239**



ST571239ST C

**Throttle Sensor Setting Adapter:**

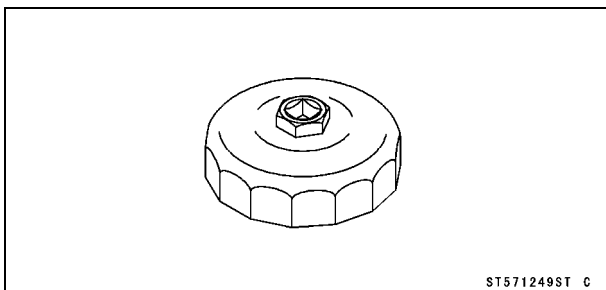
**57001-1538**



ST571538ST C

**Oil Filter Wrench:**

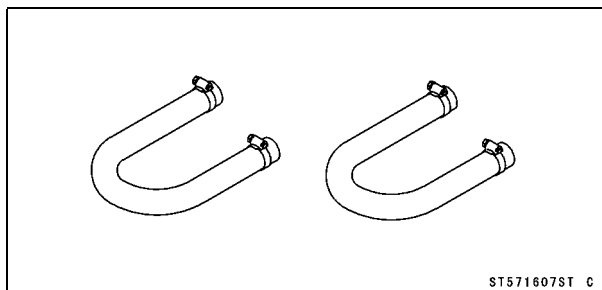
**57001-1249**



ST571249ST C

**Fuel Hose:**

**57001-1607**



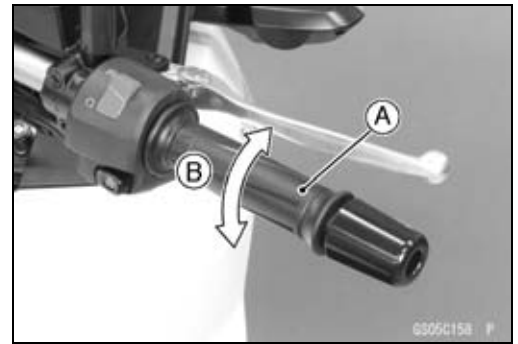
ST571607ST C

Periodic Maintenance Procedures

Fuel System (DFI)

**Throttle Control System Inspection**

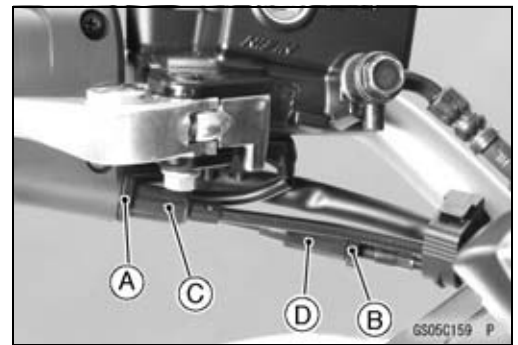
- Check that the throttle grip [A] moves smoothly from full open to close, and the throttle closes quickly and completely by the return spring in all steering positions.
- ★ If the throttle grip does not return properly, check the throttle cable routing, grip free play, and cable damage. Then lubricate the throttle cable.
- Check the throttle grip free play [B].



**Throttle Grip Free Play**

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

- ★ If the free play is incorrect, adjust the throttle cable as follows.
  - Loosen the locknuts [A] [B].
  - Screw both throttle cable adjusters [C] [D] to give the throttle grip plenty of play.
  - Turn the decelerator cable adjuster [C] until 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.

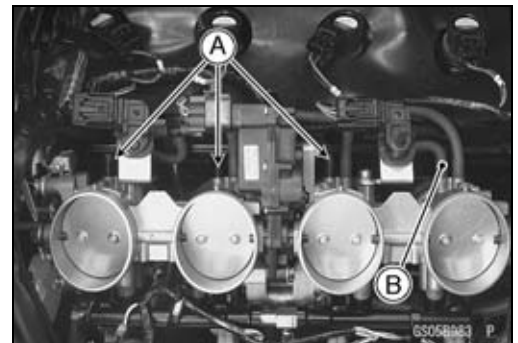


**Engine Vacuum Synchronization Inspection**

**NOTE**

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

- Situate the motorcycle so that it is vertical.
- Remove the air cleaner housing (see Air Cleaner Housing Removal in the Fuel System (DFI) chapter).
- Pull off the rubber caps [A] and vacuum hose [B] from the fittings of each throttle body.
- Plug the vacuum hose end [A].





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