

MODEL APPLICATION

Year	Model	Beginning Frame No.
2008	ZX1000E8F	JKAZXCE1□8A000001 or JKAZXT00EEA000001 or ZXT00E-000001
2009	ZX1000E9F	JKAZXCE1□9A02002 or JKAZXT00EEA021002 or ZXT00E-021001

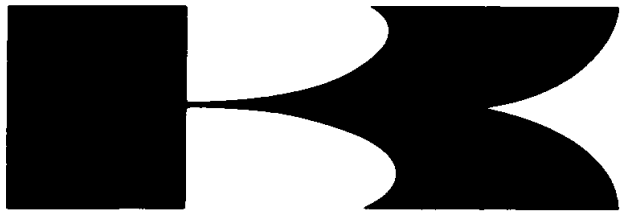
□: This digit in the frame number changes from one machine to another.



KAWASAKI HEAVY INDUSTRIES, LTD.
Consumer Products & Machinery Company

Part No.99924-1388-02

Printed in Japan



Kawasaki Ninja ZX-10R



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	GB	United Kingdom
AU	Australia	MY	Malaysia
BR	Brazil	SEA	Southeast Asia
CA	Canada	TH	Thailand
CAL	California	US	United States
CH	Switzerland	WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Full Power)
DE	Germany	GB WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Left Side Traffic Full Power)
EUR	Europe	WVTA (78.2 H)	WVTA Model with Honeycomb Catalytic Converter (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.

How to Use This Manual

In this manual, the product is divided into its major systems and these systems make up the manual's chapters. The Quick Reference

Guide shows you all of the product's system and assists in locating their chapters. Each chapter in turn has its own comprehensive Table of Contents.

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

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

WARNING

This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

This manual contains four more symbols (in addition to WARNING and CAUTION) 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

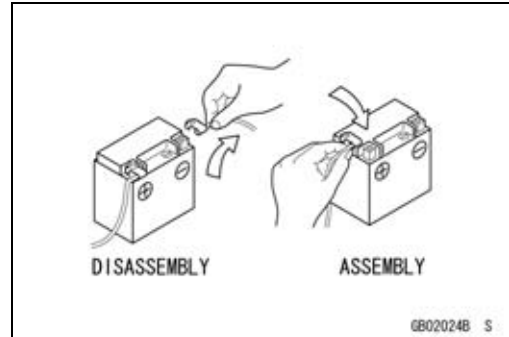
Before Servicing

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.

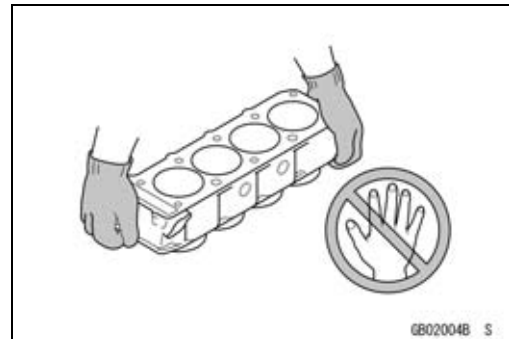
Battery Ground

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.



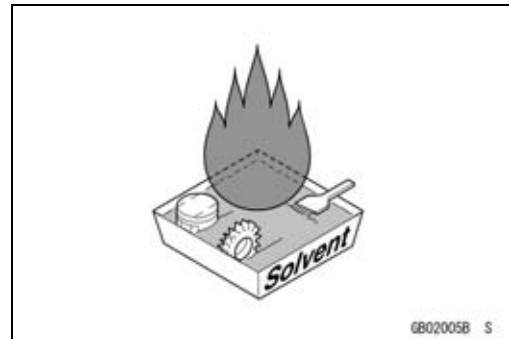
Edges of Parts

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



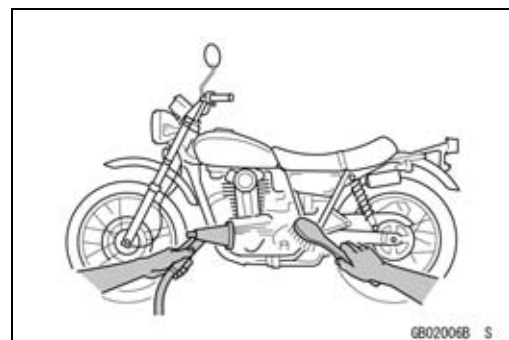
Solvent

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

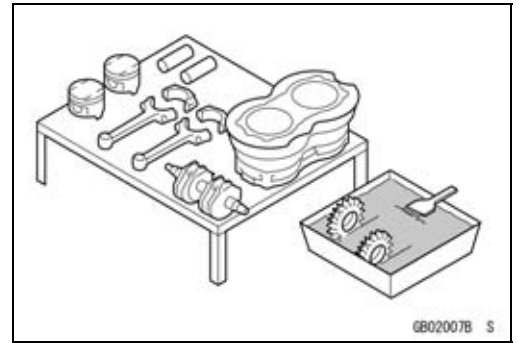
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



Before Servicing

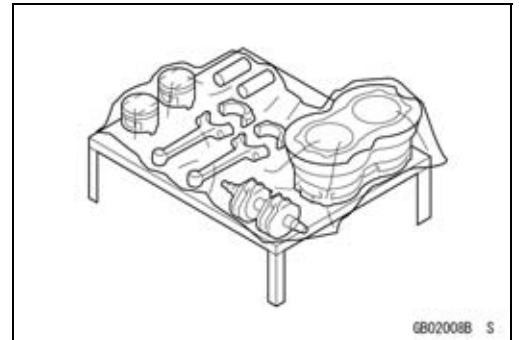
Arrangement and Cleaning of Removed Parts

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.



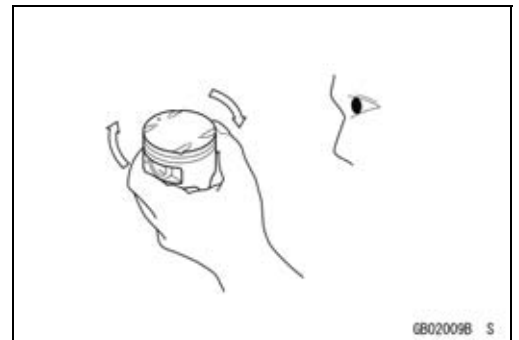
Storage of Removed Parts

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.



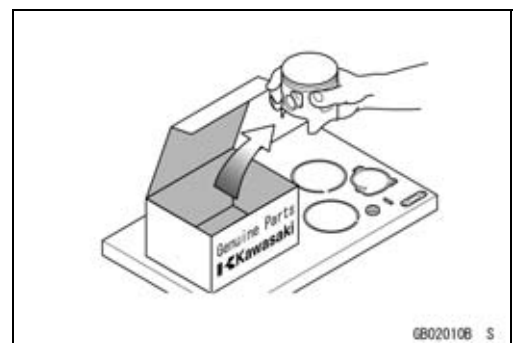
Inspection

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.



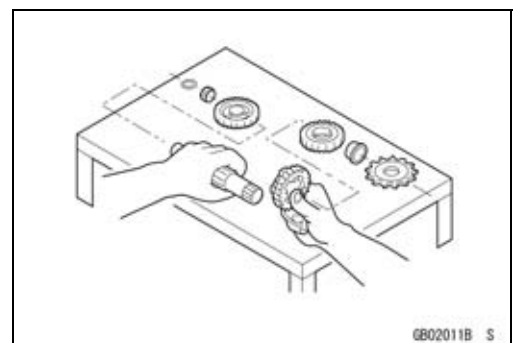
Replacement Parts

Replacement parts must be KAWASAKI genuine or recommended by KAWASAKI. Gaskets, O-rings, oil seals, grease seals, circlips or cotter pins 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.

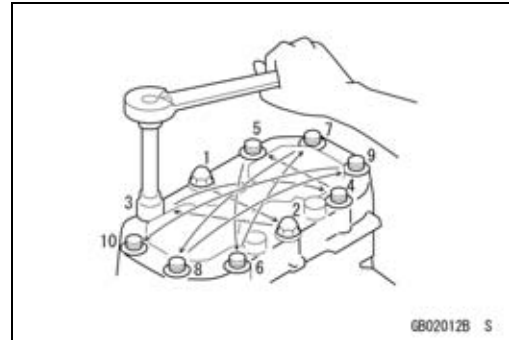


1-4 GENERAL INFORMATION

Before Servicing

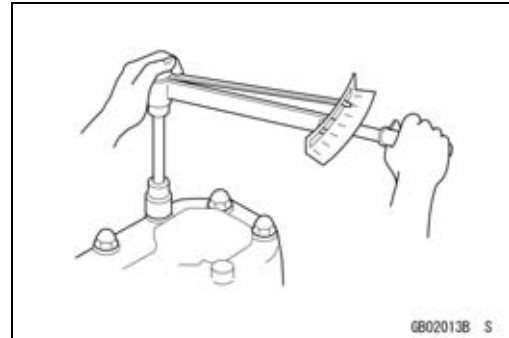
Tightening Sequence

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.



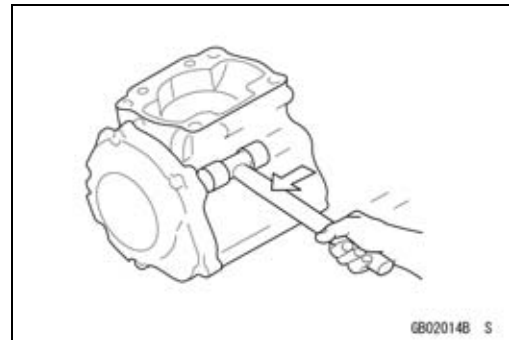
Tightening Torque

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.



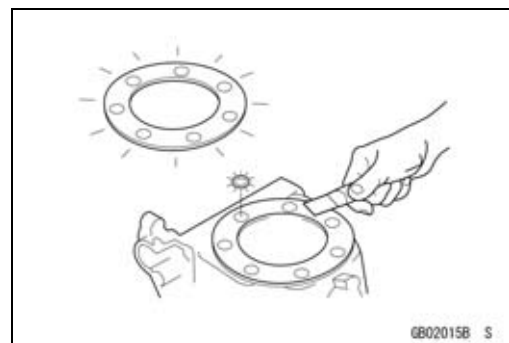
Force

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

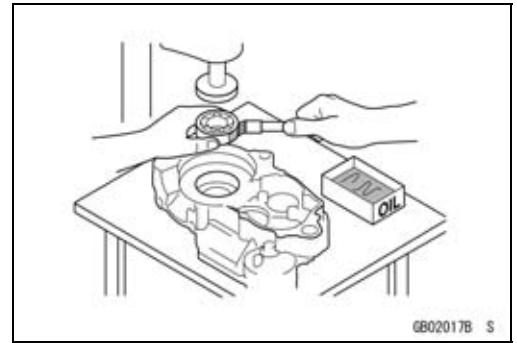
For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



Before Servicing

Press

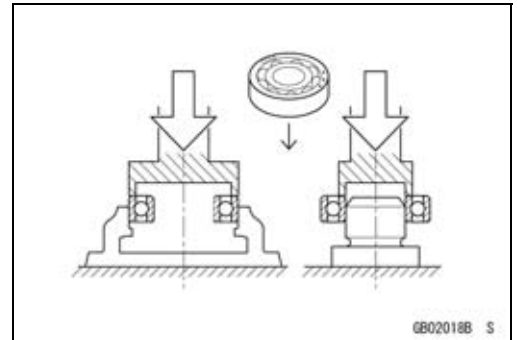
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



Ball Bearing and Needle Bearing

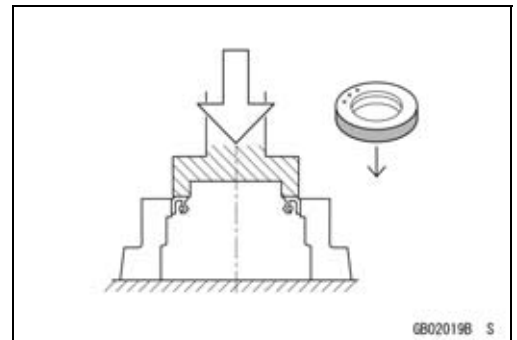
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

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

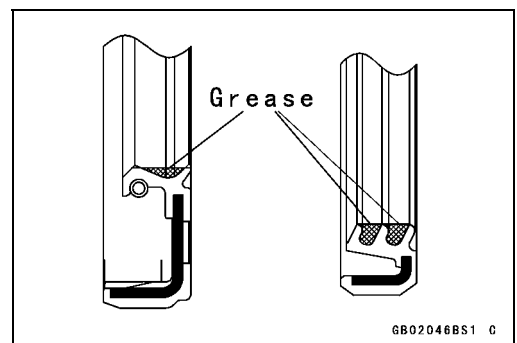


Oil Seal, Grease Seal

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.

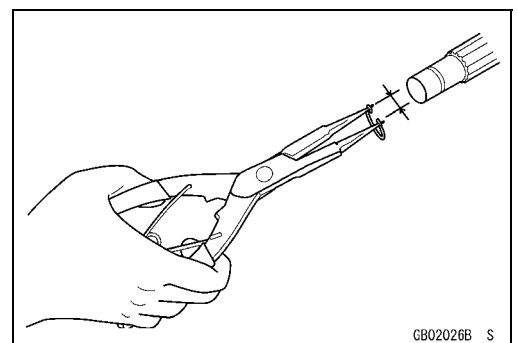


Apply specified grease to the lip of seal before installing the seal.



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.

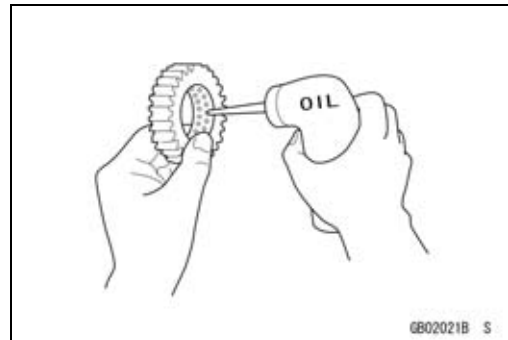


1-6 GENERAL INFORMATION

Before Servicing

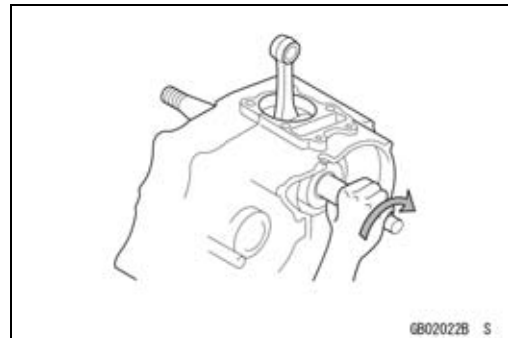
Lubrication

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.



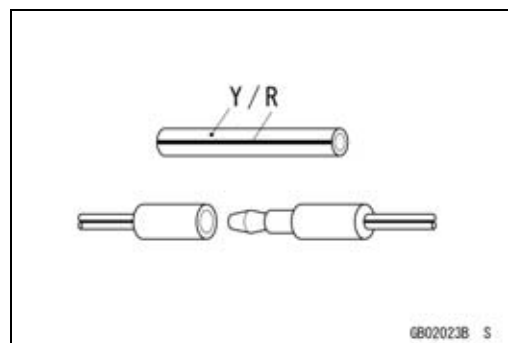
Direction of Engine Rotation

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).



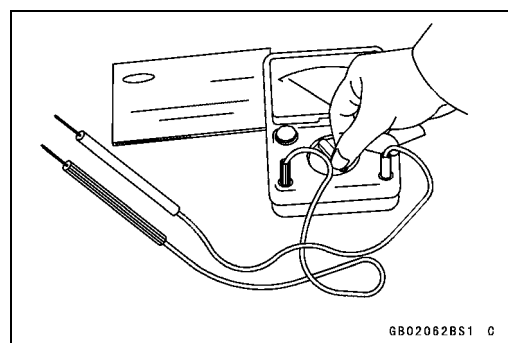
Electrical Wires

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 manufacturer's instructions thoroughly before using the meter. Incorrect values may lead to improper adjustments.



Model Identification

ZX1000E8F (US and CA Models) Left Side View



ZX1000E8F (US and CA Models) Right Side View



General Specifications

Items	ZX1000E8F ~ E9F
Dimensions	
Overall Length	2 110 mm (83.1 in.)
Overall Width	710 mm (28.0 in.)
Overall Height	1 135 mm (44.7 in.)
Wheelbase	1 415 mm (55.7 in.)
Road Clearance	125 mm (4.9 in.)
Seat Height	830 mm (32.7 in.)
Dry Mass	
ZX1000E8F	179 kg (395 lb)
Curb Mass:	
ZX1000E9F	208 kg (459 lb)
Front	106 kg (234 lb)
Rear	102 kg (225 lb)
Fuel Tank Capacity	17 L (4.5 US gal)
Performance	
Minimum Turning Radius	3.4 m (11.2 ft)
Engine	
Type	4-stroke, DOHC, 4-cylinder
Cooling System	Liquid-cooled
Bore and Stroke	76.0 × 55.0 mm (3.0 × 2.2 in.)
Displacement	998 cm ³ (60.9 cu in.)
Compression Ratio	12.9 : 1
Maximum Horsepower	138.3 kW (188.1 PS) @12 500 r/min (rpm), WVTA (78.2 H) 78.2 kW (106 PS) @11 000 r/min (rpm), (MY), (TH) 119.2 kW (162.1 PS) @10 000 r/min (rpm), (SEA) 133 kW (181 PS) @12 500 r/min (rpm), (CA), (CAL), (US) – – –
Maximum Torque	113 N·m (11.5 kgf·m, 83.3 ft·lb) @8 700 r/min (rpm), WVTA (78.2 H) 83 N·m (8.5 kgf·m, 61.2 ft·lb) @5 100 r/min (rpm), (CA), (CAL), (US) – – –
Carburetion System	FI (Fuel injection), KEIHIN TTK43 × 4
Starting System	Electric starter
Ignition System	Battery and coil (transistorized) KIMS (Kawasaki Ignition Management System)
Timing Advance	Electronically advanced (IC igniter in ECU)
Ignition Timing	From 10° BTDC @1 100 r/min (rpm)
Spark Plug	NGK CR9EIA-9
Cylinder Numbering Method	Left to right, 1-2-3-4
Firing Order	1-2-4-3
Valve Timing:	
Inlet:	
Open	35° BTDC
Close	77° ABDC
Duration	292°

1-10 GENERAL INFORMATION

General Specifications

Items	ZX1000E8F ~ E9F
Exhaust: Open Close Duration Lubrication System Engine Oil: Grade Viscosity Capacity	62° BBDC 38° ATDC 280° Forced lubrication (wet sump with oil cooler) API SE, SF or SG API SH, SJ or SL with JASO MA, MA1 or MA2 SAE10W-40 4.0 L (4.2 US qt)
Drive Train 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 1.611 (87/54) Wet multi disc 6-speed, constant mesh, return shift 2.600 (39/15) 2.053 (39/19) 1.737 (33/19) 1.550 (31/20) 1.400 (28/20) 1.304 (30/23) Chain drive 2.412 (41/17) 5.068 @Top gear
Frame Type Caster (Rake Angle) Trail Front Tire: Type Size Rim Size Rear Tire: Type Size Rim Size Front Suspension: Type Wheel Travel	Tubular, diamond 25.5° 110 mm (4.3 in.) Tubeless 120/70 ZR17 M/C (58 W) 17 × 3.50 Tubeless 190/55 ZR17 M/C (75 W) 17 × 6.00 Telescopic fork (upside-down) 120 mm (4.7 in.)

General Specifications

Items	ZX1000E8F ~ E9F
Rear Suspension: Type Wheel Travel Brake Type: Front Rear	Swingarm (uni-trak) 125 mm (4.9 in.) Dual discs Single disc
Electrical Equipment Battery Headlight: Type Bulb: High Low Tail/Brake Light Alternator: Type Rated Output	12 V 10 Ah Semi-sealed beam 12 V 55 W + 65 W (quartz-halogen) 12 V 55 W (quartz-halogen) 12 V 0.5/4.1 W (LED) Three-phase AC 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

Technical Information-KIMS (Kawasaki Ignition Management System)

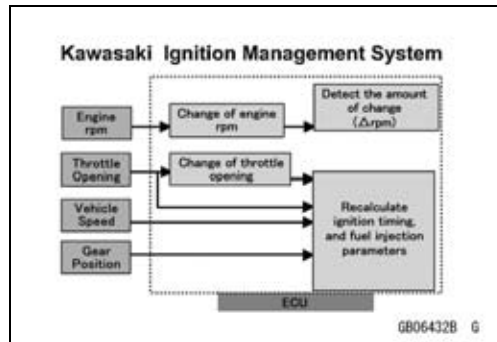
Overview

This motorcycle is equipped with the Kawasaki ignition management system which was developed as a rider aid for track riding using technology borrowed from racing machines. Experienced racers or track riders can deliberately cause wheel spin to occur when exiting mid/high speed corners. However, they rely on precise throttle control to maintain the optimum acceleration level without sacrificing too much wheel spin. KIMS was designed to aid such riding where precise throttle control is required.

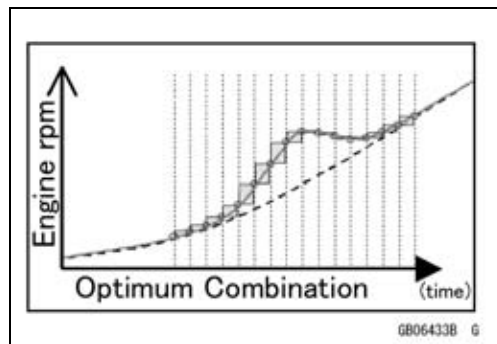
This system has not been developed to eliminate all wheel spin, as there are times when this can be advantageous for experienced riders, and too much control would lead to a very sterile riding experience.

Operation

In addition to normal DFI activity the ECU's complex programme monitors throttle opening, vehicle speed, gear position, and the rate of change of engine speed.

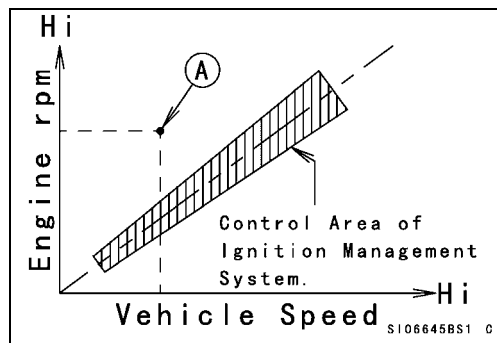


When the ECU detects the rear wheel is slipping by a sudden change in engine speed, the previously mentioned factors are calculated and within certain parameters the ignition timing is retarded to reduce excessive engine speed. The number of degrees that the ECU retards the ignition is determined by continuous sampling, with the aim being to optimize the relationship between throttle opening, engine/vehicle speed and ultimately ensuring the optimum combination of grip/acceleration.



To ensure that this system does not act unnecessarily, the following situations are taken into account.

1. This system does not act at idle speed, small throttle openings, or at full throttle.
2. In cases of snapping open the throttle with the clutch half-engaged (example [A]), the system compares the gear position, engine speed and the vehicle speed to determine whether or not to engage. This system does not act when the clutch is at the partially disengaged or slipping.



3. This system does not act on sudden throttle openings.

Unit Conversion Table

Prefixes for Units:

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

Units of Mass:

kg	×	2.205	=	lb
g	×	0.03527	=	oz

Units of Volume:

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

Units of Force:

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

Units of Length:

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

Units of Torque:

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

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

Units of Pressure:

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

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

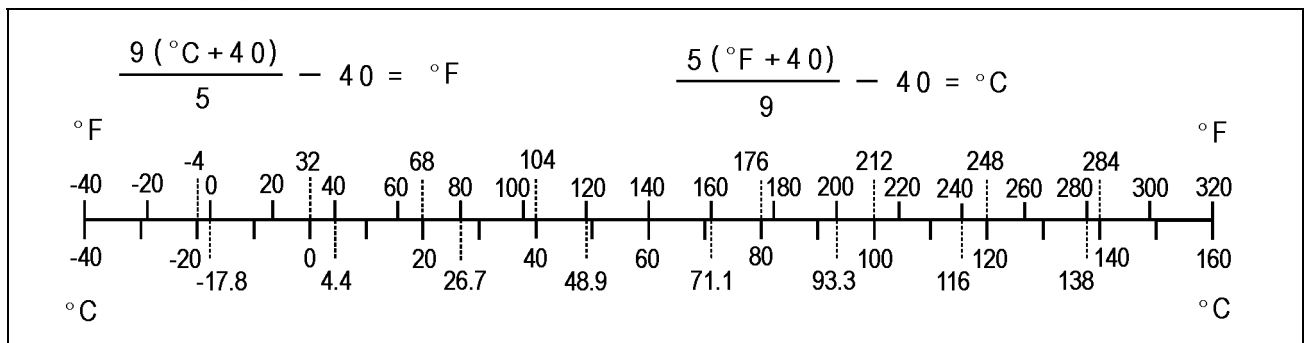
Units of Speed:

km/h	×	0.6214	=	mph
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Units of Power:

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

Units of Temperature:



Periodic Maintenance

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2-2 PERIODIC MAINTENANCE

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Spark Plug Replacement	2-64

2-4 PERIODIC MAINTENANCE

Periodic Maintenance Chart

ITEM	FREQUENCY	Whichever comes first ↓ Every	* ODOMETER READING × 1 000 km (× 1 000 mile)						See Page
			1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	
Brake hose and pipe damage-inspect	year	•	•	•	•	•	•	•	2-35
Brake hose installation condition-inspect	year	•	•	•	•	•	•	•	2-35
Brake operation (effectiveness, play, no drag)-inspect	year	•	•	•	•	•	•	•	2-35
Brake fluid level-inspect	6 months	•	•	•	•	•	•	•	2-35
Brake pad wear-inspect #			•	•	•	•	•	•	2-36
Brake light switch operation-inspect		•	•	•	•	•	•	•	2-36
Suspension									
Front forks/rear shock absorber operation (damping and smooth stroke)-inspect				•		•		•	2-37
Front forks/rear shock absorber oil leak-inspect	year			•		•		•	2-37, 2-38
Rocker arm operation-inspect				•		•		•	2-38
Tie-rods operation-inspect				•		•		•	2-38
Steering									
Steering play-inspect	year	•		•		•		•	2-38
Steering stem bearings-lubricate	2 years					•			2-40
Steering damper oil leak-inspect			•	•	•	•	•	•	2-40
Electrical System									
Lights and switches operation-inspect	year			•		•		•	2-41
Headlight aiming-inspect	year			•		•		•	2-43
Sidestand switch operation-inspect	year			•		•		•	2-44
Engine stop switch operation-inspect	year			•		•		•	2-45
Others									
Chassis parts-lubricate	year			•		•		•	2-45
Bolts and nuts tightness-inspect		•		•		•		•	2-46

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

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

PERIODIC MAINTENANCE 2-5

Periodic Maintenance Chart

Periodic Replacement Parts

ITEM	FREQUENCY	* ODOMETER READING					See Page
		× 1 000 km (× 1 000 mile)					
	Whichever come first ↓ Every	1 (0.6)	12 (7.5)	24 (15)	36 (24)	48 (30)	
Air cleaner element # - replace		Every 18 000 km (12 000 mile)					2-48
Fuel hose - replace	4 years					●	2-48
Coolant - change	3 years				●		2-52
Radiator hose and O-ring - replace	3 years				●		2-54
Engine oil # - change	year	●	●	●	●	●	2-55
Oil filter - replace	year	●	●	●	●	●	2-56
Brake hose and pipe - replace	4 years					●	2-56
Brake fluid - change	2 years			●		●	2-57
Rubber parts of master cylinder and caliper - replace	4 years					●	2-59, 2-60
Spark plug - replace			●	●	●	●	2-64

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

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

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.

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.

SS: Apply silicone sealant.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System (DFI)				
Inlet Air Temperature Sensor Screw	1.2	0.12	11 in·lb	
Air Inlet Duct Mounting Bolts	7.0	0.71	62 in·lb	L
Air Cleaner Housing Bracket Bolt	7.0	0.71	62 in·lb	
Air Cleaner Housing Mounting Bolt (Upper)	7.0	0.71	62 in·lb	
Air Cleaner Housing Mounting Bolts (Lower)	4.2	0.43	37 in·lb	L
Air Cleaner Housing Assembly Screws	1.1	0.11	9.7 in·lb	
Rubber Plate Holder Screws	1.1	0.11	9.7 in·lb	
Delivery Pipe Assy Mounting Screws (Nozzle Assy)	3.4	0.35	30 in·lb	
Nozzle Assy Mounting Bolts	7.0	0.71	62 in·lb	
Delivery Pipe Assy Mounting Screws (Throttle Body Assy)	3.4	0.35	30 in·lb	
Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
Throttle Body Assy Holder Bolts	10	1.0	89 in·lb	S
Vehicle-down Sensor Bolts	6.0	0.61	53 in·lb	
Camshaft Position Sensor Bolt	10	1.0	89 in·lb	
Water Temperature Sensor	25	2.5	18	
Crankshaft Sensor Bolts	6.0	0.61	53 in·lb	L
Fuel Pump Bolts	10	1.0	89 in·lb	L, S
Gear Position Switch Screws	3.0	0.31	27 in·lb	L
Speed Sensor Bolt	10	1.0	89 in·lb	
Inlet Air Pressure Sensor Bracket Screws	3.4	0.35	30 in·lb	
Exhaust Butterfly Valve Actuator Mounting Screws	4.3	0.44	38 in·lb	
Exhaust Butterfly Valve Actuator Pulley Bolt	5.0	0.51	44 in·lb	
Separator Bracket Bolts	7.0	0.71	62 in·lb	
Canister Bracket Bolts	4.3	0.44	38 in·lb	
Cooling System				
Water Hose Clamp Screws	2.0	0.20	18 in·lb	
Coolant Drain Bolt (Cylinder)	10	1.0	89 in·lb	
Water Pump Cover Bolts	10	1.0	89 in·lb	
Water Temperature Sensor	25	2.5	18	
Coolant Reserve Tank Mounting Bolts	7.0	0.71	62 in·lb	

PERIODIC MAINTENANCE 2-7

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Coolant By-pass Fitting Bolt	9.0	0.92	80 in·lb	L
Thermostat Housing Cover Bolts	6.0	0.61	53 in·lb	
Thermostat Housing Mounting Bolts	10	1.0	89 in·lb	
Oil Cooler Mounting Bolts	20	2.0	15	
Water Hose Fitting Bolts	10	1.0	89 in·lb	
Water Passage Plugs	20	2.0	15	L
Radiator Bracket Mounting Bolt	7.0	0.71	62 in·lb	
Radiator Upper Bolt	7.0	0.71	62 in·lb	
Radiator Lower Bolt	7.0	0.71	62 in·lb	
Coolant Drain Bolt (Water Pump)	10	1.0	89 in·lb	
Radiator Overflow Hose Clamp Bolt	10	1.0	89 in·lb	
Engine Top End				
Air Suction Valve Cover Bolts	10	1.0	89 in·lb	L
Cylinder Head Cover Bolts	10	1.0	89 in·lb	
Camshaft Cap Bolts	12	1.2	106 in·lb	S
Upper Camshaft Chain Guide Bolts	12	1.2	106 in·lb	S
Cylinder Head Bolts (M10 New Bolts)	59	6.0	44	MO, S
Cylinder Head Bolts (M10 Used Bolts)	57	5.8	42	MO, S
Cylinder Head Bolts (M6)	12	1.2	106 in·lb	S
Water Passage Plugs	19.6	2.0	14.5	L
Throttle Body Assy Holder Bolts	10	1.0	89 in·lb	S
Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
Camshaft Position Sensor Bolt	10	1.0	89 in·lb	
Front Camshaft Chain Guide Bolt (Upper)	25	2.5	18	
Front Camshaft Chain Guide Bolt (Lower)	12	1.2	106 in·lb	
Camshaft Chain Tensioner Mounting Bolts	10	1.0	89 in·lb	
Camshaft Chain Tensioner Cap Bolt	20	2.0	15	
Spark Plugs	13	1.3	115 in·lb	
Cam Sprocket Mounting Bolts	15	1.5	11	L
Starter Clutch Cover Bolts (M6, L = 30)	10	1.0	89 in·lb	
Starter Clutch Cover Bolts (M6, L = 20)	10	1.0	89 in·lb	
Torque Limiter Cover Bolts	10	1.0	89 in·lb	L (1), S
Coolant Drain Plug (Cylinder)	10	1.0	89 in·lb	
Starter Clutch Bolt Cap	–	–	–	Hand-tighten
Timing Inspection Cap	–	–	–	Hand-tighten
Right Engine Bracket Bolts (Cylinder Head)	9.8	1.0	87 in·lb	L
Exhaust Pipe Holder Nuts	17	1.7	13	
Exhaust Manifold Clamp Bolt	25	2.5	18	
Premuffler Chamber Mounting Bolt	25	2.5	18	
Premuffler Chamber Outer Cover Bolts	7.0	0.71	62 in·lb	
Premuffler Chamber Inner Cover Bolts	7.0	0.71	62 in·lb	
Exhaust Butterfly Valve Cable Clamp Bolt	10	1.0	89 in·lb	
Exhaust Butterfly Valve Pulley Cover Bolts	7.0	0.71	62 in·lb	

2-8 PERIODIC MAINTENANCE

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Muffler Body Clamp Bolt	25	2.5	18	
Muffler Body Mounting Bolt	25	2.5	18	
Muffler Body Front Cover Bolts	7.0	0.71	62 in·lb	
Muffler Body Rear Cover Bolts	7.0	0.71	62 in·lb	
Clutch				
Clutch Lever Clamp Bolts	7.8	0.80	69 in·lb	S
Clutch Cover Bolts (M6, L = 25)	10	1.0	89 in·lb	S
Clutch Cover Bolts (M6, L = 35)	10	1.0	89 in·lb	S
Oil Filler Plug	–	–	–	Hand-tighten
Clutch Spring Bolts	11	1.1	97 in·lb	
Clutch Hub Nut	130	13.3	96	R
Sub Clutch Hub Bolts	25	2.5	18	L
Engine Lubrication System				
Engine Oil Drain Bolt	30	3.1	22	
Oil Filter	17	1.7	13	G, R
Oil Filter Pipe	35	3.6	26	L
Oil Pan Bolts	10	1.0	89 in·lb	
Oil Pressure Relief Valve	15	1.5	11	L
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	–	–	–	Hand-tighten
Oil Pump Gear Bolts	10	1.0	89 in·lb	L
Oil Passage Plugs	20	2.0	15	L
Oil Pump Cover Bolts	10	1.0	89 in·lb	
Oil Cooler/Oil Filter Case Mounting Bolts	20	2.0	15	L
Oil Cooler Mounting Bolts	20	2.0	15	
Engine Removal/Installation				
Adjusting Collar Locknut	49	5.0	36	S
Left Front Engine Mounting Bolt (M10, L = 42)	44	4.5	32	S
Right Front Engine Mounting Bolt (M10, L = 67)	44	4.5	32	S
Middle Engine Mounting Bolt	9.8	1.0	87 in·lb	S
Middle Engine Mounting Nut	44	4.5	32	S
Lower Engine Mounting Bolt	9.8	1.0	87 in·lb	S
Lower Engine Mounting Nut	44	4.5	32	S
Left Engine Bracket Bolts (M10, L = 30)	44	4.5	32	S
Right Engine Bracket Bolts (M10, L = 30)	44	4.5	32	S
Right Engine Bracket Bolt (M10, L = 35)	44	4.5	32	S
Right Engine Bracket Bolts (Cylinder Head)	9.8	1.0	87 in·lb	L
Crankshaft/Transmission				
Breather Plate Bolts	10	1.0	89 in·lb	L
Crankcase Bolts (M9)	39	4.0	29	MO, S
Crankcase Bolts (M8)	27	2.8	20	S
Crankcase Bolts (M7, L = 32)	20	2.0	15	S
Crankcase Bolt (M7, L = 50)	20	2.0	15	S



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