

## MODEL APPLICATION

Year	Model	Beginning Frame No.
2009	EX650C9F	JKAEXEC1□9DA19833 JKAEX650CCDA19835
2009	EX650D9F	JKAEX650CDDA23433

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



KAWASAKI HEAVY INDUSTRIES, LTD.  
Consumer Products & Machinery Company

Part No.99924-1419-01

Printed in Japan



**Ninja 650R**  
**ER-6f**  
**ER-6f ABS**



# **Motorcycle** **Service Manual**

# Quick Reference Guide

<b>General Information</b>	<b>1</b>
<b>Periodic Maintenance</b>	<b>2</b>
<b>Fuel System (DFI)</b>	<b>3</b>
<b>Cooling System</b>	<b>4</b>
<b>Engine Top End</b>	<b>5</b>
<b>Clutch</b>	<b>6</b>
<b>Engine Lubrication System</b>	<b>7</b>
<b>Engine Removal/Installation</b>	<b>8</b>
<b>Crankshaft/Transmission</b>	<b>9</b>
<b>Wheels/Tires</b>	<b>10</b>
<b>Final Drive</b>	<b>11</b>
<b>Brakes</b>	<b>12</b>
<b>Suspension</b>	<b>13</b>
<b>Steering</b>	<b>14</b>
<b>Frame</b>	<b>15</b>
<b>Electrical System</b>	<b>16</b>
<b>Appendix</b>	<b>17</b>

### 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
CA	Canada	SEA	South East Asia
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		

# 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 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

## Table of Contents

Before Servicing .....	1-2
Model Identification.....	1-7
General Specifications.....	1-10
Unit Conversion Table .....	1-13

## 1-2 GENERAL INFORMATION

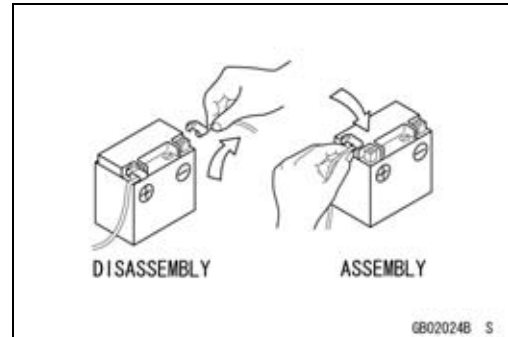
### Before Servicing

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:

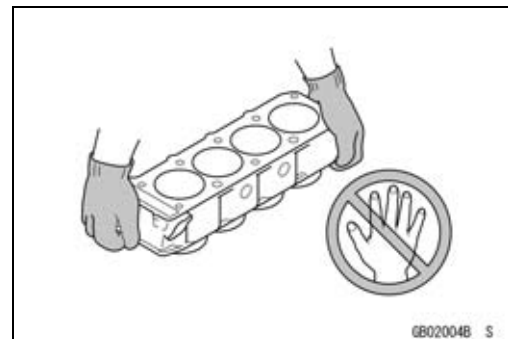
#### **Battery Ground**

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.



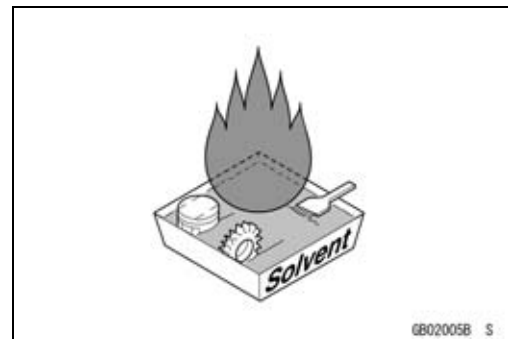
#### **Edges of Parts**

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



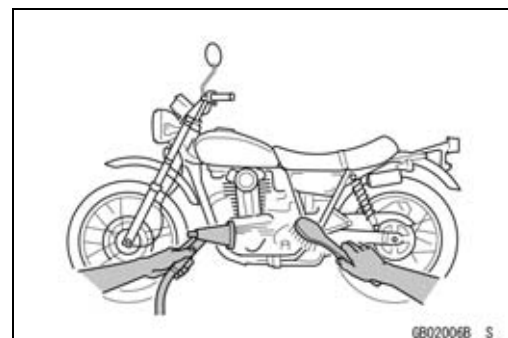
#### **Solvent**

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**

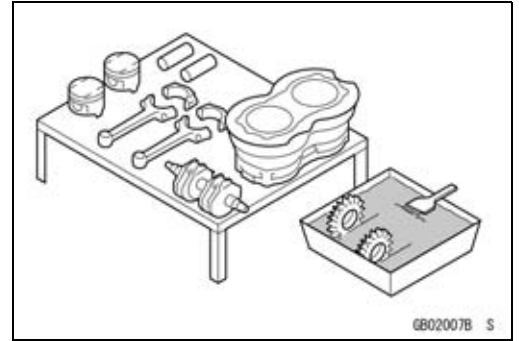
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



## Before Servicing

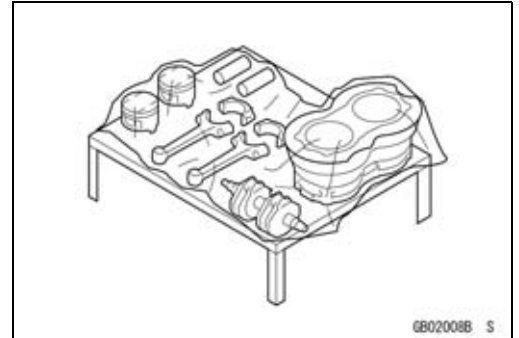
### **Arrangement and Cleaning of Removed Parts**

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.



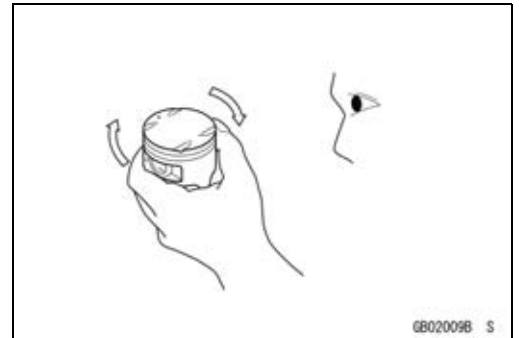
### **Storage of Removed Parts**

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.



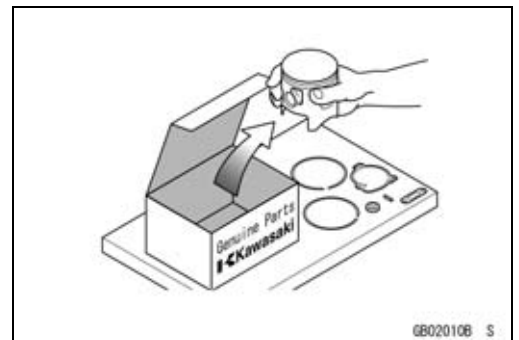
### **Inspection**

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.



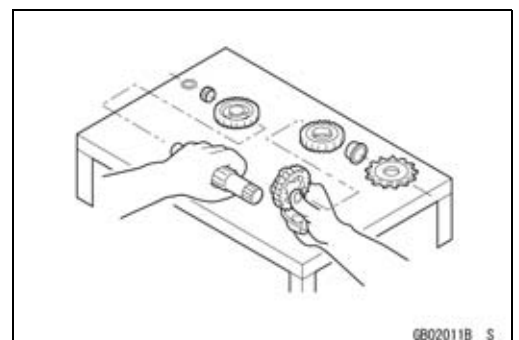
### **Replacement Parts**

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.



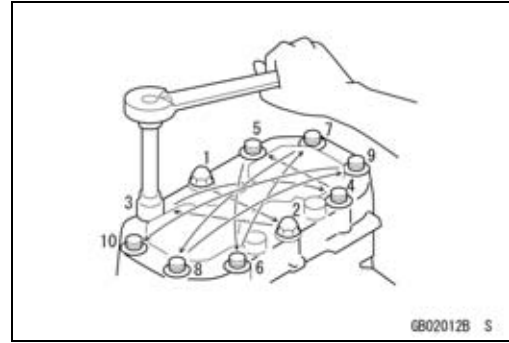


## 1-4 GENERAL INFORMATION

### Before Servicing

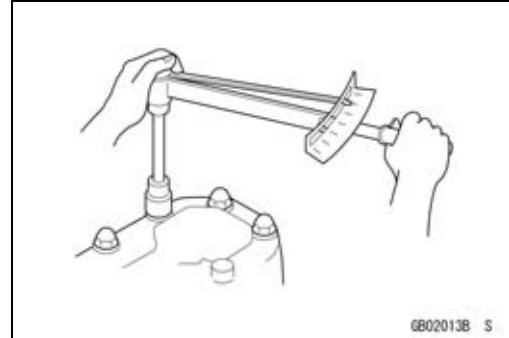
#### **Tightening Sequence**

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.



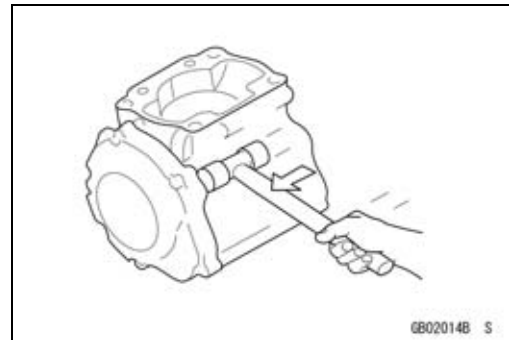
#### **Tightening Torque**

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. Often, the tightening sequence is followed twice-initial tightening and final tightening with torque wrench.



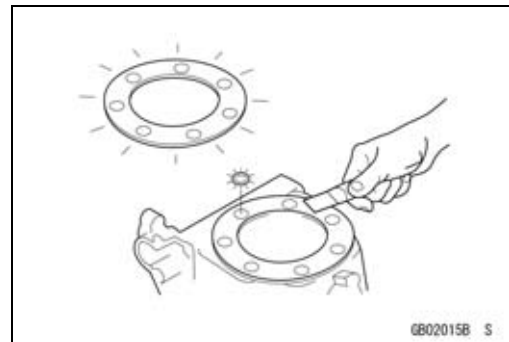
#### **Force**

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.



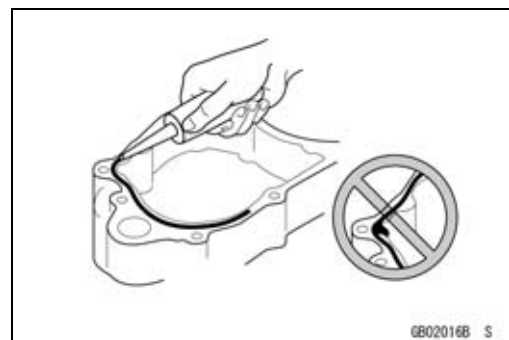
#### **Gasket, O-ring**

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 new gaskets and replace used O-rings when re-assembling.



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

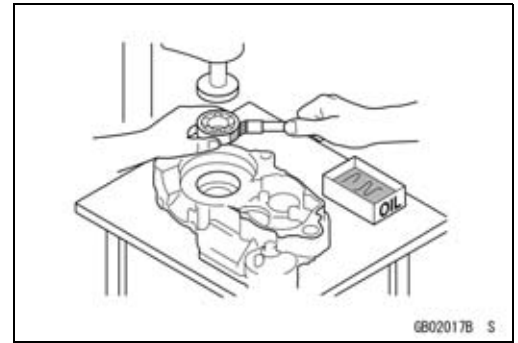
For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



**Before Servicing**

**Press**

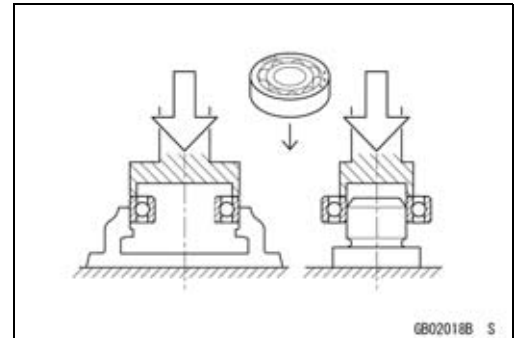
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



**Ball Bearing and Needle Bearing**

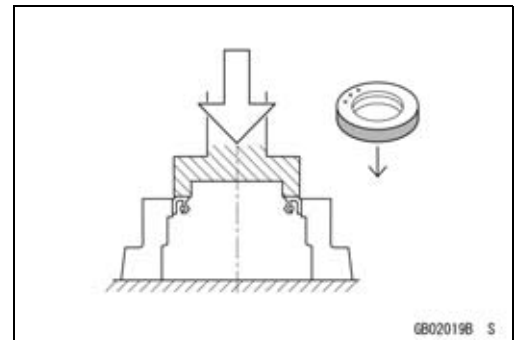
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

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

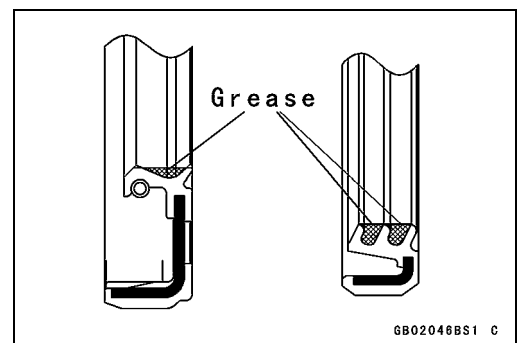


**Oil Seal, Grease Seal**

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.

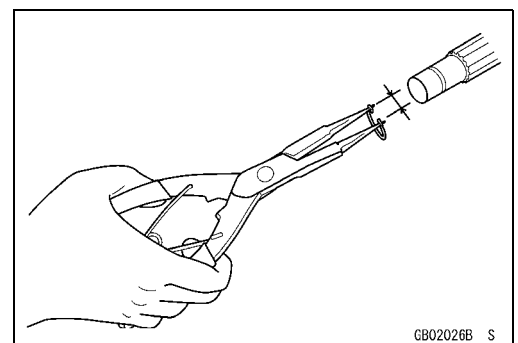


Apply specified grease to the lip of seal before installing the seal.



**Circlips, Cotter Pins**

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

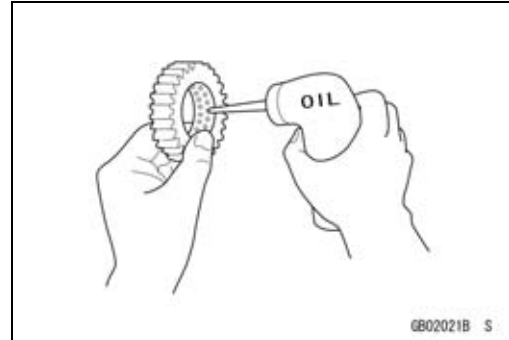


## 1-6 GENERAL INFORMATION

### Before Servicing

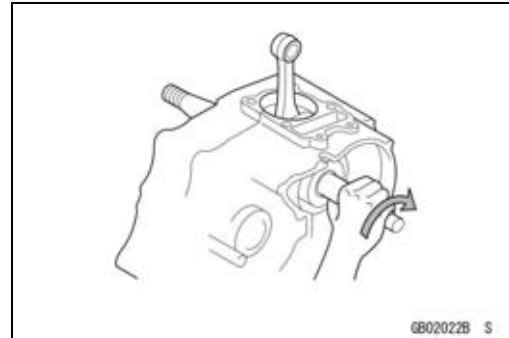
#### **Lubrication**

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.



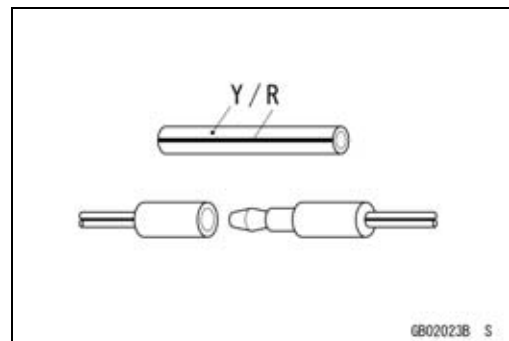
#### **Direction of Engine Rotation**

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).



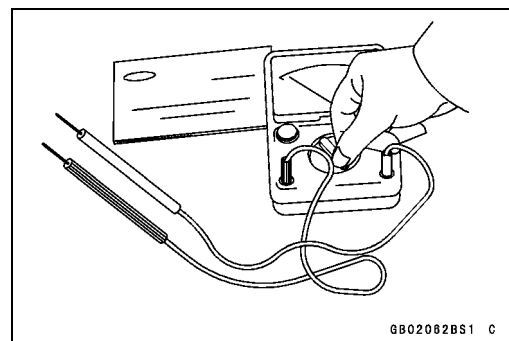
#### **Electrical Leads**

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



#### **Instrument**

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



Model Identification

EX650C9F (EUR Models) Left Side View



6B03B450 P

EX650C9F (EUR Models) Right Side View



6B03B451 P

## 1-8 GENERAL INFORMATION

### Model Identification

EX650C9F (US, CA Models) Left Side View



6803B452 P

EX650C9F (US, CA Models) Right Side View



6803B453 P

Model Identification

EX650D9F Left Side View



EX650D9F Right Side View



Frame Number



Engine Number



# 1-10 GENERAL INFORMATION

## General Specifications

Items	EX650C9F, EX650D9F
<b>Dimensions</b>	
Overall Length	2 100 mm (82.68 in.)
Overall Width	760 mm (29.9 in.)
Overall Height	1 200 mm (47.24 in.)
Wheelbase	1 410 mm (55.51 in.)
Road Clearance	145 mm (5.71 in.)
Seat Height	790 mm (31.1 in.)
Curb Mass:	
EX650C Models:	204 kg (450 lb)
Front	104 kg (229 lb)
Rear	100 kg (221 lb)
EX650D Models:	208 kg (459 lb)
Front	105 kg (232 lb)
Rear	103 kg (227 lb)
Fuel Tank Capacity	15.5 L (4.10 US gal.)
<b>Performance</b>	
Minimum Turning Radius	2.7 m (8.9 ft)
<b>Engine</b>	
Type	4-stroke, DOHC, 2-cylinder
Cooling System	Liquid-cooled
Bore and Stroke	83.0 × 60.0 mm (3.27 × 2.36 in.)
Displacement	649 cm <sup>3</sup> (39.6 cu in.)
Compression Ratio	11.3 : 1
Maximum Horsepower	53 kW (72 PS) @8 500 r/min (rpm)
	(MY) 52 kW (71 PS) @8 000 r/min (rpm)
	(US, CA, CAL) – – –
Maximum Torque	66 N·m (6.7 kgf·m, 49 ft·lb) @7 000 r/min (rpm)
	(US, CA, CAL) – – –
Carburetion System	FI (Fuel Injection), KEIHIN TTK38 × 2
Starting System	Electric starter
Ignition System	Battery and coil (transistorized)
Timing Advance	Electronically advanced (IC igniter in ECU)
Ignition Timing	From 10° BTDC @1 300 r/min (rpm)
	To 34° BTDC @5 000 r/min (rpm)
Spark Plug	NGK CR9EIA-9
Cylinder Numbering Method	Left to right, 1-2
Firing Order	1-2
Valve Timing:	
Inlet:	
Open	31° BTDC
Close	61° ABDC
Duration	272°

**General Specifications**

Items	EX650C9F, EX650D9F
Exhaust: Open Close Duration Lubrication System Engine Oil: Grade  Viscosity Capacity	50° BBDC 30° ATDC 260° Forced lubrication (semi-dry sump)  API SE, SF or SG API SH, SJ, SL or SM with JASO MA, MA1 or MA2  SAE 10W-40 2.4 L (2.5 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 2.095 (88/42) Wet multi disc  6-speed, constant mesh, return shift  2.438 (39/16) 1.714 (36/21) 1.333 (32/24) 1.111 (30/27) 0.966 (28/29) 0.852 (23/27)  Chain drive 3.067 (46/15) 5.473 @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	Tubular, diamond 25° 106 mm (4.17 in.)  Tubeless 120/70 ZR17 M/C (58W) 17 x 3.50  Tubeless 160/60 ZR17 M/C (69W) 17 x 4.50  Telescopic fork 120 mm (4.72 in.)



## 1-12 GENERAL INFORMATION

### General Specifications

Items	EX650C9F, EX650D9F
<b>Rear Suspension:</b> Type Wheel Travel <b>Brake Type:</b> Front Rear	Swingarm 125 mm (4.92 in.)  Dual discs Single disc
<b>Electrical Equipment</b> Battery Headlight: Type Bulb: High Low Tail/Brake Light Alternator: Type Rated Output	12 V 10 Ah  Semi-sealed beam  12 V 55 W + 55 W (quartz-halogen) 12 V 55 W (quartz-halogen) LED  Three-phase AC 24 A/14 V @5 000 r/min (rpm)

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

**Unit Conversion Table**

**Prefixes for Units:**

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

**Units of Mass:**

kg	×	2.205	=	lb
g	×	0.03527	=	oz

**Units of Volume:**

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

**Units of Force:**

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

**Units of Length:**

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

**Units of Torque:**

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

**Units of Pressure:**

kPa	×	0.01020	=	kgf/cm <sup>2</sup>
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cmHg
kgf/cm <sup>2</sup>	×	98.07	=	kPa
kgf/cm <sup>2</sup>	×	14.22	=	psi
cmHg	×	1.333	=	kPa

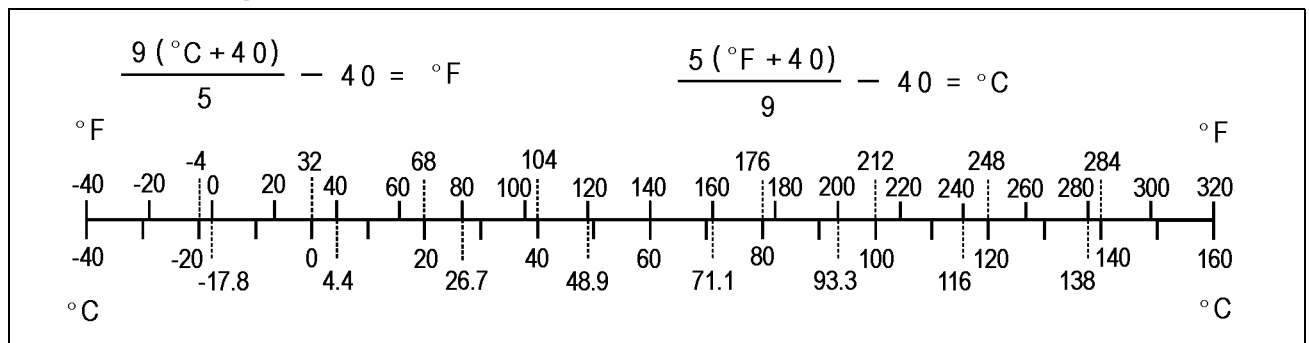
**Units of Speed:**

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

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

**Units of Temperature:**



# Periodic Maintenance

## Table of Contents

Periodic Maintenance Chart .....	2-2	Brake Hose and Pipe Damage and Installation Condition	
Torque and Locking Agent.....	2-5	Inspection.....	2-31
Specifications .....	2-11	Brake Fluid Level Inspection.....	2-32
Special Tools .....	2-13	Brake Pad Wear Inspection .....	2-33
Periodic Maintenance Procedures.....	2-14	Brake Operation Inspection .....	2-33
Fuel System (DFI).....	2-14	Brake Light Switch Operation	
Air Cleaner Element Cleaning.....	2-14	Inspection.....	2-33
Throttle Control System		Suspensions .....	2-34
Inspection.....	2-15	Front Forks/Rear Shock Absorber	
Engine Vacuum Synchronization		Operation Inspection .....	2-34
Inspection.....	2-15	Front Fork Oil Leak Inspection.....	2-34
Idle Speed Inspection .....	2-17	Rear Shock Absorber Oil Leak	
Idle Speed Adjustment.....	2-18	Inspection.....	2-35
Fuel Hose Inspection (fuel leak, damage, installation condition)..	2-18	Steering System .....	2-35
Evaporative Emission Control		Steering Play Inspection .....	2-35
System Inspection (CAL and		Steering Play Adjustment.....	2-35
SEA Models) .....	2-18	Steering Stem Bearing	
Cooling System.....	2-19	Lubrication.....	2-36
Coolant Level Inspection.....	2-19	Electrical System .....	2-37
Water Hose Damage and		Lights and Switches Operation	
Installation Condition		Inspection.....	2-37
Inspection.....	2-20	Headlight Aiming Inspection .....	2-39
Engine Top End .....	2-20	Sidestand Switch Operation	
Valve Clearance Inspection .....	2-20	Inspection.....	2-40
Valve Clearance Adjustment.....	2-21	Engine Stop Switch Operation	
Air Suction System Damage		Inspection.....	2-41
Inspection.....	2-24	Others .....	2-42
Clutch.....	2-24	Chassis Parts Lubrication .....	2-42
Clutch Operation Inspection.....	2-24	Bolts, Nuts and Fasteners	
Wheels/Tires.....	2-25	Tightness Inspection .....	2-43
Air Pressure Inspection.....	2-25	Replacement Parts .....	2-44
Wheel/Tire Damage Inspection....	2-25	Air Cleaner Element	
Tire Tread Wear, Abnormal Wear		Replacement .....	2-44
Inspection.....	2-26	Fuel Hose Replacement .....	2-44
Wheel Bearing Damage		Coolant Change .....	2-45
Inspection.....	2-26	Radiator Hose and O-ring	
Final Drive.....	2-27	Replacement.....	2-47
Drive Chain Lubrication Condition		Engine Oil Change.....	2-47
Inspection.....	2-27	Oil Filter Replacement .....	2-48
Drive Chain Slack Inspection.....	2-28	Brake Hose and Pipe	
Drive Chain Slack Adjustment .....	2-28	Replacement.....	2-49
Wheel Alignment Inspection .....	2-29	Brake Fluid Change .....	2-50
Drive Chain Wear Inspection .....	2-30	Master Cylinder Rubber Parts	
Chain Guide Inspection.....	2-30	Replacement.....	2-51
Brake System .....	2-31	Caliper Rubber Parts	
Brake Fluid Leak (Brake Hose		Replacement.....	2-52
and Pipe) Inspection .....	2-31	Spark Plug Replacement .....	2-55

## 2-2 PERIODIC MAINTENANCE

### 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 → ↓ 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>									
Air cleaner element - clean				●		●		●	2-14
Throttle control system (play, smooth return, no drag) - inspect	year	●		●		●		●	2-15
Engine vacuum synchronization - inspect				●		●		●	2-15
Idle speed - inspect		●		●		●		●	2-17
Fuel leak (fuel hose and pipe) - inspect	year	●		●		●		●	2-18
Fuel hose and pipe damage - inspect	year	●		●		●		●	2-18
Fuel hose and pipe installation condition - inspect	year	●		●		●		●	2-18
Evaporative emission control system function (CAL, SEA Models) - inspection		●	●	●	●	●	●	●	2-18
<b>Cooling System</b>									
Coolant level - inspect		●		●		●		●	2-19
Coolant leak (water hose and pipe) - inspect	year	●		●		●		●	2-20
Water hose damage - inspect	year	●		●		●		●	2-20
Water hose installation condition - inspect	year	●		●		●		●	2-20
<b>Engine Top End</b>									
Valve clearance - inspect	US, CA, CAL Models					●			2-20
	Other than US, CA, CAL Models	Every 42 000 km (26 250 mile)							
Air suction system damage - inspect				●		●		●	2-24
<b>Clutch</b>									
Clutch operation (play, disengagement, engagement) - inspect		●		●		●		●	2-24
<b>Wheels and Tires</b>									
Tire air pressure - inspect	year			●		●		●	2-25
Wheel/tire damage - inspect				●		●		●	2-25
Tire tread wear, abnormal wear - inspect				●		●		●	2-26
Wheel bearing damage - inspect	year			●		●		●	2-26

## PERIODIC MAINTENANCE 2-3

### 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)	
<b>Final Drive</b>									
Drive chain lubrication condition - inspect #		Every 600 km (400 mile)							2-27
Drive chain slack - inspect #		Every 1 000 km (600 mile)							2-28
Drive chain wear - inspect #				●		●		●	2-30
Chain guide wear - inspect				●		●		●	2-30
<b>Brakes</b>									
Brake fluid leak (brake hose and pipe) - inspect	year	●	●	●	●	●	●	●	2-31
Brake hose and pipe damage - inspect	year	●	●	●	●	●	●	●	2-31
Brake hose and pipe installation condition - inspect	year	●	●	●	●	●	●	●	2-31
Brake fluid level - inspect	6 months	●	●	●	●	●	●	●	2-32
Brake pad wear - inspect #			●	●	●	●	●	●	2-33
Brake operation (effectiveness, play, no drag) - inspect	year	●	●	●	●	●	●	●	2-33
Brake light switch operation - inspect		●	●	●	●	●	●	●	2-33
<b>Suspension</b>									
Front forks/rear shock absorber operation (damping and smooth stroke) - inspect				●		●		●	2-34
Front forks/rear shock absorber oil leak - inspect	year			●		●		●	2-34
<b>Steering</b>									
Steering play - inspect	year	●		●		●		●	2-35
Steering stem bearings - lubricate	2 years					●			2-36
<b>Electrical System</b>									
Lights and switches operation - inspect	year			●		●		●	2-37
Headlight aiming - inspect	year			●		●		●	2-39
Sidestand switch operation - inspect	year			●		●		●	2-40
Engine stop switch operation - inspect	year			●		●		●	2-41
<b>Others</b>									
Chassis parts - lubricate	year			●		●		●	2-42
Bolts and nuts tightness - inspect		●		●		●		●	2-43

#: 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.

## 2-4 PERIODIC MAINTENANCE

### Periodic Maintenance Chart

#### Periodic Replacement Parts

ITEM	FREQUENCY ↓ Every	* ODOMETER READING × 1 000 km (× 1 000 mile)					See Page
		1 (0.6)	12 (7.5)	24 (15)	36 (22.5)	48 (30)	
Air cleaner element # - replace	2 years						2-44
Fuel hose - replace	4 years					●	2-44
Coolant - change	3 years				●		2-45
Radiator hose and O-ring - replace	3 years				●		2-47
Engine oil # - change	year	●	●	●	●	●	2-47
Oil filter - replace	year	●	●	●	●	●	2-48
Brake hose and pipe - replace	4 years					●	2-49
Brake fluid - change	2 years			●		●	2-50
Rubber parts of master cylinder and caliper - replace	4 years					●	2-51
Spark plug - replace			●	●	●	●	2-55

#: 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.

**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.

EO: Apply engine oil.

L: Apply a non-permanent locking agent to the threads.

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>				
Crankshaft Sensor Bolts	6.0	0.61	53 in-lb	
Fuel Level Sensor Bolts	6.9	0.70	61 in-lb	L
Fuel Pump Bolts	9.8	1.0	87 in-lb	L, S
Oxygen Sensor (Equipped Models)	44	4.5	32	
Speed Sensor Bolt	7.8	0.80	69 in-lb	L
Speed Sensor Bracket Bolts	9.8	1.0	87 in-lb	
Switch Housing Screws	3.5	0.36	31 in-lb	
Timing Rotor Bolt	40	4.1	30	
Water Temperature Sensor	12	1.2	106 in-lb	
<b>Cooling System</b>				
Baffle Plate Bolts	5.9	0.60	52 in-lb	
Radiator Bolt	15	1.5	11	
Water Hose Clamp Screws	2.0	0.20	18 in-lb	
Thermostat Housing Bolts	9.8	1.0	87 in-lb	
Water Pump Cover Bolts	9.8	1.0	87 in-lb	
Water Pump Drain Bolt	9.8	1.0	87 in-lb	
Water Pump Impeller Bolt	9.8	1.0	87 in-lb	
Water Temperature Sensor	12	1.2	106 in-lb	
<b>Engine Top End</b>				
Air Suction Valve Cover Bolts	9.8	1.0	87 in-lb	
Baffle Plate Bolts	5.9	0.60	52 in-lb	
Camshaft Cap Bolts	12	1.2	106 in-lb	S
Camshaft Chain Tensioner Cap Bolt	20	2.0	15	
Camshaft Chain Tensioner Mounting Bolts	9.8	1.0	87 in-lb	
Camshaft Sprocket Bolts	15	1.5	11	L
Cylinder Head Bolts (M10)	56	5.7	41	MO, S
Cylinder Head Bolts (M6)	12	1.2	106 in-lb	S
Cylinder Head Cover Bolts	9.8	1.0	87 in-lb	
Rear Camshaft Chain Guide Bolts	20	2.0	15	L
Spark Plugs	15	1.5	11	

## 2-6 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Throttle Body Assy Holder Bolts	12	1.2	106 in-lb	
Cylinder Bolt (M8)	27.5	2.8	20	MO, S
Cylinder Nut	49	5.0	36	MO, S
Cylinder Bolts (M6)	12	1.2	106 in-lb	S
Exhaust Pipe Manifold Holder Nuts	17	1.7	13	
Muffler Body Mounting Bolt (Front)	20	2.0	15	
Muffler Body Mounting Bolt (Rear)	20	2.0	15	
<b>Clutch</b>				
Clutch Cable Clamp Bracket Bolt	9.8	1.0	87 in-lb	
Clutch Cable Holder Bolts	9.8	1.0	87 in-lb	L
Clutch Cover Bolts	9.8	1.0	87 in-lb	
Clutch Hub Nut	130	13.3	96	R
Clutch Lever Clamp Bolts	7.8	0.80	69 in-lb	S
Clutch Spring Bolts	9.8	1.0	87 in-lb	
Timing Rotor Bolt Cap	4.9	0.50	43 in-lb	
Oil Filler Plug	–	–	–	Hand-tighten
Oil Pump Chain Guide Bolts	12	1.2	106 in-lb	L (1)
Oil Pump Sprocket Bolt	12	1.2	106 in-lb	L, Lh
Timing Inspection Cap	3.9	0.40	35 in-lb	
<b>Engine Lubrication System</b>				
Engine Oil Drain Plug	30	3.1	22	
Filter Plate Bolts	9.8	1.0	87 in-lb	L
Holder Mounting Bolt	25	2.5	18	L
Lower Fairing Bracket Bolts	12	1.2	106 in-lb	L
Oil Filter	17.5	1.8	13	EO, R
Oil Pan Bolts	12	1.2	106 in-lb	S
Oil Passage Plug	20	2.0	15	L
Oil Passage Plug (M6)	3.9	0.40	35 in-lb	
Oil Pipe Plate Bolt	9.8	1.0	87 in-lb	L
Oil Plate Bolts	9.8	1.0	87 in-lb	L
Oil Pressure Relief Valve	15	1.5	11	L
Oil Pressure Switch	15	1.5	11	SS
Oil Pump Chain Guide Bolts	12	1.2	106 in-lb	L (1)
Oil Pump Cover Bolts	9.8	1.0	87 in-lb	L
Oil Pump Sprocket Bolt	12	1.2	106 in-lb	L, Lh
<b>Engine Removal/Installation</b>				
Engine Bracket Bolts (Left)	25	2.5	18	S
Engine Bracket Bolts (Right)	25	2.5	18	S
Engine Mounting Nut (Lower)	44	4.5	32	S
Engine Mounting Nut (Rear)	44	4.5	32	S
Engine Mounting Bolt (Left)	44	4.5	32	S
Engine Mounting Bolt (Right)	44	4.5	32	S



**PERIODIC MAINTENANCE 2-7**

**Torque and Locking Agent**

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
<b>Crankshaft/Transmission</b>				
Breather Plate Bolts	9.8	1.0	87 in-lb	L
Race Holder Screw	4.9	0.50	43 in-lb	L
Connecting Rod Big End Nuts	see Text	←	←	MO
Crankcase Bolt (M8, L = 110 mm)	27.5	2.8	20	S
Crankcase Bolt (M6, L = 32 mm)	19.6	2.0	14	S
Crankcase Bolts (M6, L = 38 mm)	19.6	2.0	14	S
Crankcase Bolts (M6, L = 45 mm)	19.6	2.0	14	S
Crankcase Bolt (M8, L = 50 mm)	27.5	2.8	20	S
Crankcase Bolts (M8, L = 60 mm)	35	3.6	26	MO, S
Crankcase Bolt (M8, L = 60 mm)	27.5	2.8	20	S
Crankcase Bolts (M8, L = 73 mm)	35	3.6	26	MO, S
Crankcase Bolts (M9, L = 113 mm)	44	4.5	32	MO, S
Crankcase Bolts (M9, L = 83 mm)	44	4.5	32	MO, S
Upper Crankcase Bolt (M8, L = 120 mm)	27.5	2.8	20	S
Upper Crankcase Bolts (M8, L = 110 mm)	27.5	2.8	20	S
Oil Pipe Bolts	9.8	1.0	87 in-lb	L
Oil Plate Bolts	9.8	1.0	87 in-lb	L
Shift Shaft Return Spring Pin	29	3.0	21	L
Timing Rotor Bolt	40	4.1	30	
Drive Shaft Bearing Holder Screw	4.9	0.50	43 in-lb	L
Gear Positioning Lever Bolt	12	1.2	106 in-lb	L
Neutral Switch	15	1.5	11	
Neutral Switch Holder Screw	4.9	0.50	43 in-lb	L
Transmission Case Oil Nozzle	2.9	0.30	26 in-lb	L
Shift Drum Bearing Holder Screws	4.9	0.50	43 in-lb	L
Shift Drum Cam Bolt	12	1.2	106 in-lb	L
Shift Pedal Bolt	12	1.2	106 in-lb	
Shift Rod Plate Bolt	9.8	1.0	87 in-lb	L
Shift Shaft Cover Bolts	9.8	1.0	87 in-lb	L (3)
Shift Shaft Cover Screw	4.9	0.50	43 in-lb	L, S
Transmission Case Bolts	20	2.0	15	
<b>Wheels/Tires</b>				
Front Axle	108	11.0	80	
Front Axle Clamp Bolt	34	3.5	25	
Rear Axle Nut	108	11.0	80	
<b>Final Drive</b>				
Engine Sprocket Nut	125	12.7	92	MO
Rear Axle Nut	108	11.0	80	
Rear Sprocket Nuts	59	6.0	44	
Speed Sensor Bolt	7.8	0.80	69 in-lb	L
Speed Sensor Bracket Bolts	9.8	1.0	87 in-lb	

## 2-8 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
<b>Brakes</b>				
Caliper Bleed Valve	7.8	0.80	69 in-lb	
Brake Hose Banjo Bolts	25	2.5	18	
Brake Lever Pivot Bolt	1.0	0.10	9 in-lb	Si
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in-lb	
Brake Disc Mounting Bolts	27	2.8	20	L
Front Brake Light Switch Screw	1.2	0.12	11 in-lb	
Front Brake Reservoir Cap Screws	1.5	0.15	13 in-lb	
Front Caliper Mounting Bolts	34	3.5	25	
Front Master Cylinder Clamp Bolts	11	1.1	97 in-lb	S
Brake Pedal Bolt	8.8	0.90	78 in-lb	
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	
Brake Pipe Joint Nuts (EX650D Models)	18	1.8	13	
Wheel Rotation Sensor Bolts (EX650D Models)	20	2.0	15	
<b>Suspension</b>				
Front Axle Clamp Bolt	34	3.5	25	
Front Fork Bottom Allen Bolts	30	3.1	22	L
Front Fork Clamp Bolts (Lower)	21	2.1	15	AL
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Front Fork Top Plugs	25	2.5	18	
Rear Shock Absorber Bolts	59	6.0	44	
Swingarm Pivot Shaft Nut	108	11.0	80	
<b>Steering</b>				
Front Fork Clamp Bolts (Lower)	21	2.1	15	AL
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Handlebar Holder Bolts	25	2.5	18	S
Handlebar Holder Mounting Nuts	34	3.5	25	
Switch Housing Screws	3.5	0.36	31 in-lb	
Steering Stem Head Bolt	108	11.0	80	
Steering Stem Nut	20	2.0	15	
<b>Frame</b>				
Footpeg Stay Bolts	25	2.5	18	S
Front Fender Mounting Bolts	8.8	0.90	78 in-lb	
Front Turn Signal Light Mounting Screws	1.2	0.12	11 in-lb	
Grab Rail Mounting Bolts	25	2.5	18	
Lower Fairing Bracket Bolts	12	1.2	106 in-lb	L
Lower Fairing Mounting Bolts	8.8	0.90	78 in-lb	
Seat Lock Mounting Screws	1.2	0.12	11 in-lb	
Sidestand Bolt	44	4.5	32	
Sidestand Switch Bolt	8.8	0.90	78 in-lb	L



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