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**Kawasaki**

**VULCAN 1600 CLASSIC**  
**VN1600 CLASSIC**



# Motorcycle Service Manual

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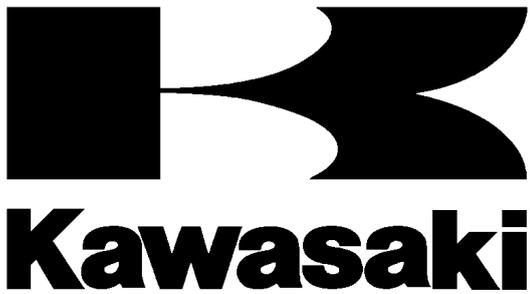
# Quick Reference Guide

<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>

This quick reference guide will assist you in locating a desired topic or procedure.

- Bend the pages back to match the black tab of the desired chapter number with the black tab on the edge at each table of contents page.
- Refer to the sectional table of contents for the exact pages to locate the specific topic required.





# VULCAN 1600 CLASSIC VN1600 CLASSIC

## Motorcycle Service Manual

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No liability can be accepted for any inaccuracies or omissions in this publication, although every possible care has been taken to make it as complete and accurate as possible.

The right is reserved to make changes at any time without prior notice and without incurring an obligation to make such changes to products manufactured previously. See your Motorcycle dealer for the latest information on product improvements incorporated after this publication.

All information contained in this publication is based on the latest product information available at the time of publication. Illustrations and photographs in this publication are intended for reference use only and may not depict actual model component parts.

## 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	r/min, 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) (mass)	W	watt(s)
h	hour(s)	Ω	ohm(s)
kg	(mass)		
kgf	(force)		
L	liter(s)		

**Read OWNER'S MANUAL before operating.**

## EMISSION CONTROL INFORMATION

To protect the environment in which we all live, Kawasaki has incorporated crankcase emission (1) and exhaust emission (2) control systems in compliance with applicable regulations of the United States Environmental Protection Agency and California Air Resources Board. Additionally, Kawasaki has incorporated an evaporative emission control system (3) in compliance with applicable regulations of the California Air Resources Board on vehicles sold in California only.

### 1. Crankcase Emission Control System

This system eliminates the release of crankcase vapors into the atmosphere. Instead, the vapors are routed through an oil separator to the inlet side of the engine. While the engine is operating, the vapors are drawn into combustion chamber, where they are burned along with the fuel and air supplied by the fuel injection system.

### 2. Exhaust Emission Control System

This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this motorcycle. The fuel, ignition, and exhaust systems of this motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.

The exhaust system of this model motorcycle manufactured primarily for sale in California includes a catalytic converter system.

### 3. Evaporative Emission Control System

Vapors caused by fuel evaporation in the fuel system are not vented into the atmosphere. Instead, fuel vapors are routed into the running engine to be burned, or stored in a canister when the engine is stopped. Liquid fuel is caught by a vapor separator and returned to the fuel tank.

The Clean Air Act, which is the Federal law covering motor vehicle pollution, contains what is commonly referred to as the Act's "tampering provisions."

"Sec. 203(a) The following acts and the causing thereof are prohibited...

(3)(A) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchaser, or for any manufacturer or dealer knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser.

(3)(B) for any person engaged in the business of repairing, servicing, selling, leasing, or trading motor vehicles or motor vehicle engines, or who operates a fleet of motor vehicles knowingly to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title following its sale and delivery to the ultimate purchaser..."

### NOTE

○The phrase "remove or render inoperative any device or element of design" has been generally interpreted as follows:

1. Tampering does not include the temporary removal or rendering inoperative of devices or elements of design in order to perform maintenance.
2. Tampering could include:
  - a. Maladjustment of vehicle components such that the emission standards are exceeded.
  - b. Use of replacement parts or accessories which adversely affect the performance or durability of the motorcycle.
  - c. Addition of components or accessories that result in the vehicle exceeding the standards.
  - d. Permanently removing, disconnecting, or rendering inoperative any component or element of design of the emission control systems.

**WE RECOMMEND THAT ALL DEALERS OBSERVE THESE PROVISIONS OF FEDERAL LAW, THE VIOLATION OF WHICH IS PUNISHABLE BY CIVIL PENALTIES NOT EXCEEDING \$10,000 PER VIOLATION.**

## **TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED**

Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:

- Replacement of the original exhaust system or muffler with a component not in compliance with Federal regulations.
- Removal of the muffler(s) or any internal portion of the muffler(s).
- Removal of the air box or air box cover.
- Modifications to the muffler(s) or air inlet system by cutting, drilling, or other means if such modifications result in increased noise levels.

# 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 Special Tool Catalog or 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 preparing this manual, we divided the product into its major systems. These systems became the manual's chapters. All information for a particular system from adjustment through disassembly and inspection is located in a single chapter.

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.

The Periodic Maintenance Chart is located in the Periodic Maintenance chapter. The chart gives a time schedule for required maintenance operations.

If you want spark plug information, for example, go to the Periodic Maintenance Chart first. The chart tells you how frequently to clean and gap the plug. Next, use the Quick Reference Guide to locate the Periodic Maintenance chapter. Then, use the Table of Contents on the first page of the chapter to find the Spark Plug 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.....	1-9
Unit Conversion Table .....	1-11

# 1-2 GENERAL INFORMATION

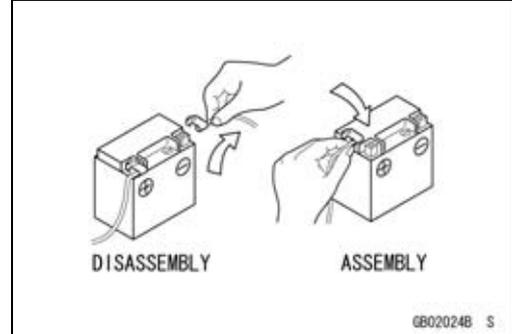
## Before Servicing

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:

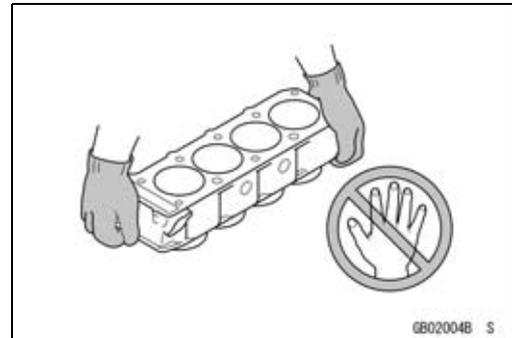
### *Battery Ground*

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



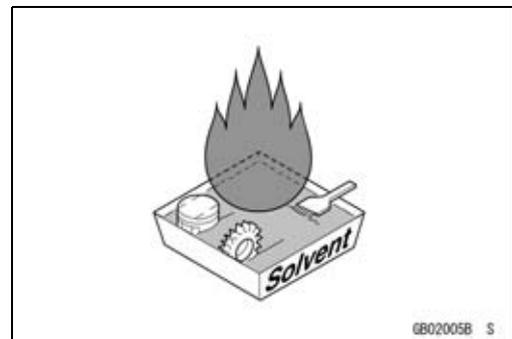
### *Edges of Parts*

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



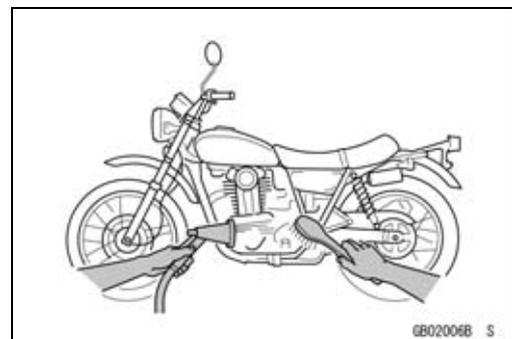
### *Solvent*

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



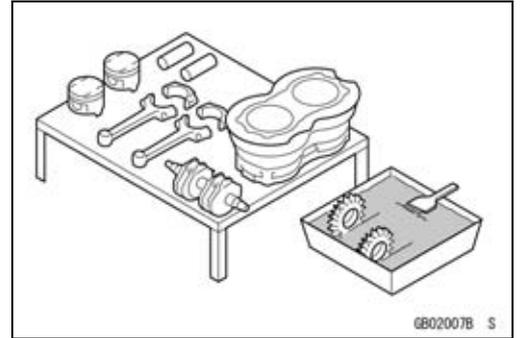
### *Cleaning vehicle before disassembly*

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.

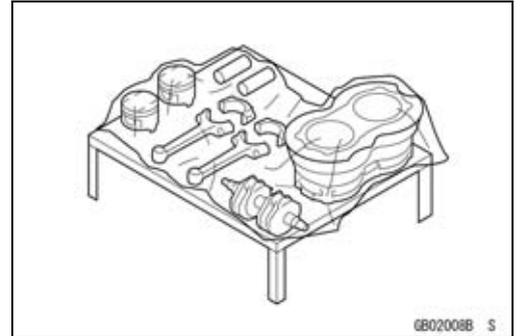


**Before Servicing***Arrangement and Cleaning of Removed Parts*

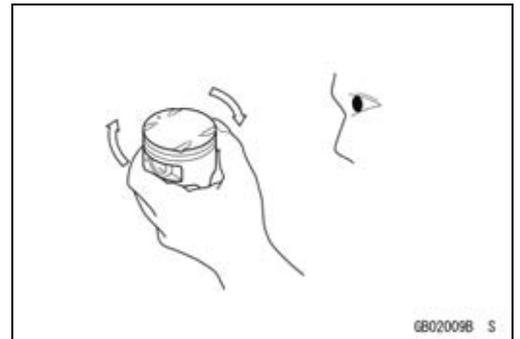
Disassembled parts are easy to confuse. Arrange the parts according to the order the parts were disassembled and clean the parts in order prior to assembly.

*Storage of Removed Parts*

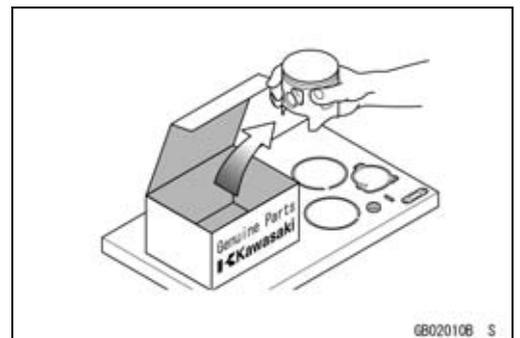
After all the parts including subassembly parts have been cleaned, store the parts in a clean area. Put a clean cloth or plastic sheet over the parts to protect from any foreign materials that may collect before re-assembly.

*Inspection*

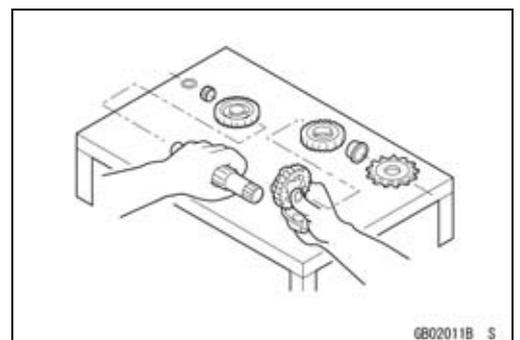
Reuse of worn or damaged parts may lead to serious accident. Visually inspect removed parts for corrosion, discoloration, or other damage. Refer to the appropriate sections of this manual for service limits on individual parts. Replace the parts if any damage has been found or if the part is beyond its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

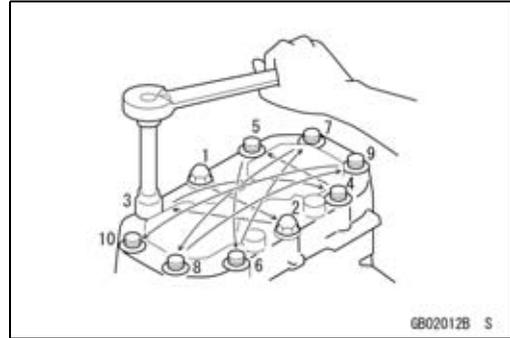


# 1-4 GENERAL INFORMATION

## Before Servicing

### *Tightening Sequence*

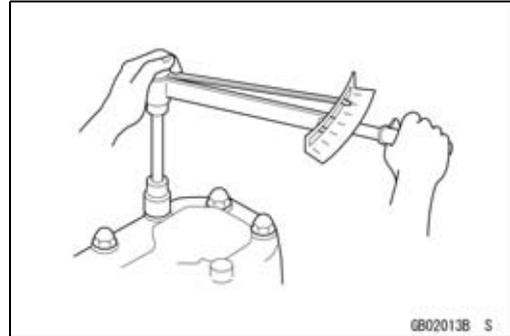
Bolts, nuts, or screws must be tightened according to the specified sequence to prevent case warpage or deformation which can lead to malfunction. If the specified tightening sequence is not indicated, tighten the fasteners alternating diagonally.



### *Tightening Torque*

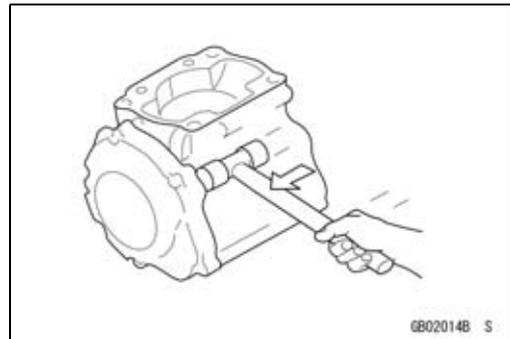
Incorrect torque applied to a bolt, nut, or screw may lead to serious damage. Tighten fasteners to the specified torque using a good quality torque wrench.

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



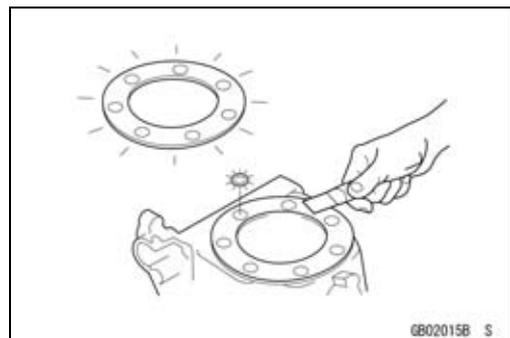
### *Force*

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.



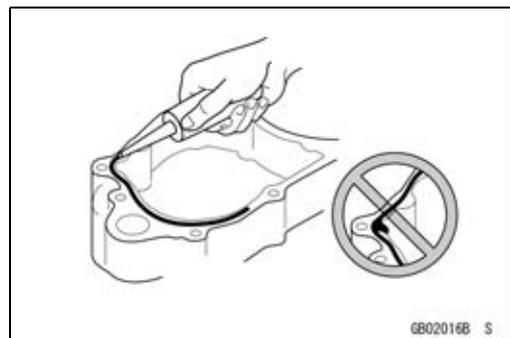
### *Gasket, O-ring*

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, Locking Agent*

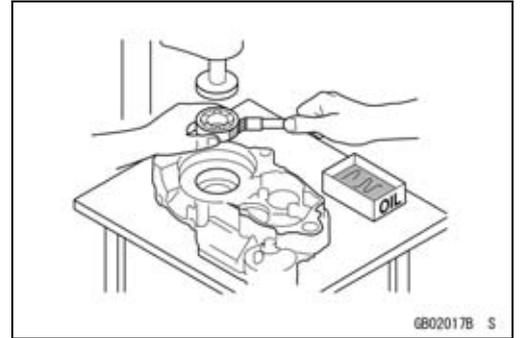
For applications that require Liquid Gasket or a Locking agent, clean the surfaces so that no oil residue remains before applying liquid gasket or locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



**Before Servicing**

*Press*

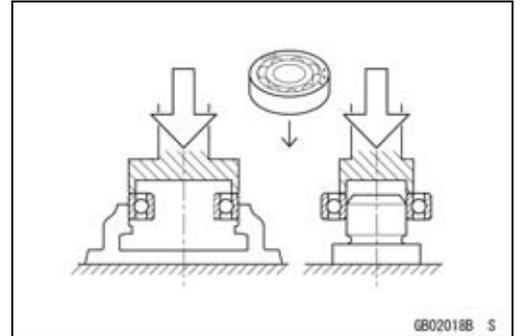
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



*Ball Bearing and Needle Bearing*

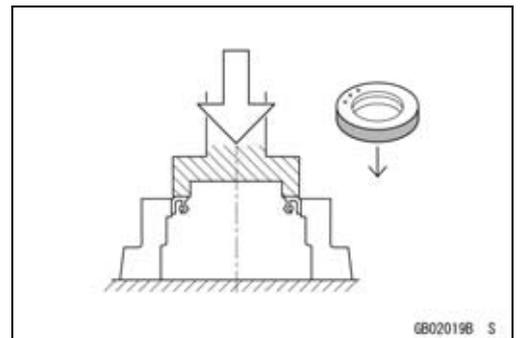
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

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



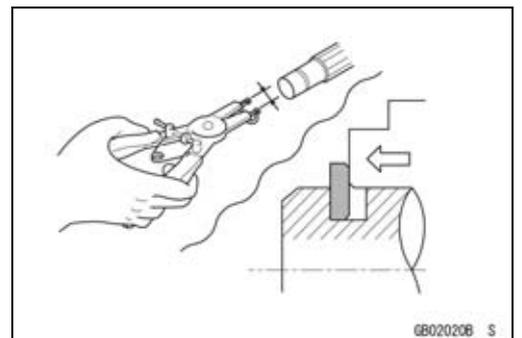
*Oil Seal, Grease Seal*

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.



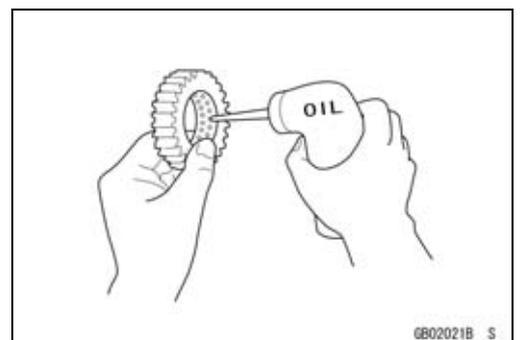
*Circlips, Cotter Pins*

Replace circlips or cotter pins that were removed with new ones. Install the circlip with its sharp edge facing outward and its chamfered side facing inward to prevent the clip from being pushed out of its groove when loaded. Take care not to open the clip excessively when installing to prevent deformation.



*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.

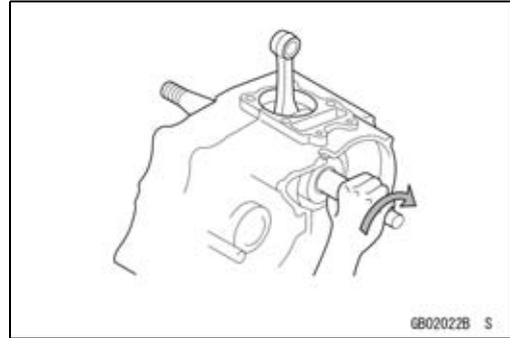


## 1-6 GENERAL INFORMATION

### Before Servicing

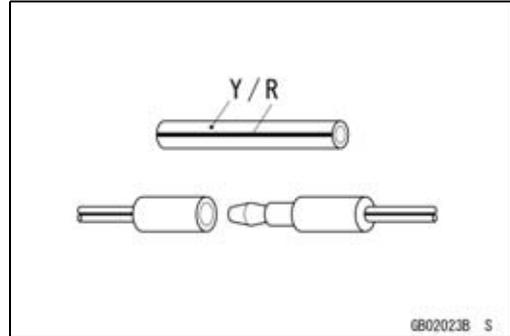
#### *Direction of Engine Rotation*

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.



**Model Identification**

**VN1600-A1 (US, and Canada) Left Side View:**



**VN1600-A1 (US, and Canada) Right Side View:**



## 1-8 GENERAL INFORMATION

### Model Identification

#### VN1600-A1 (Europe) Left Side View:



#### VN1600-A1 (Europe) Right Side View:



**General Specifications**

Items	VN1600-A1 ~
<b>Dimensions:</b>	
Overall length	2 505 mm (98.62 in.)
Overall width	1 040 mm (40.9 in.), (AU) 990 mm (39 in.)
Overall height	1 130 mm (44.5 in.)
Wheelbase	1 680 mm (66.1 in.)
Road clearance	130 mm (5.12 in.)
Seat height	680 mm (26.8 in.)
Dry mass	306 kg (675 lb), (AU) 307 kg (677 lb)
Curb mass:	
Front	156 kg (345 lb)
Rear	181 kg (399 lb), (AU) 182 kg (401 lb)
Fuel tank capacity	20 L (5.3 US gal)
Fuel	Unleaded and high-octane gasoline (see VN1600-A1 ~ Owner's Manual)
<b>Performance:</b>	
Minimum turning radius	3.5 m (11.5 ft)
<b>Engine:</b>	
Type	4-stroke, SOHC, V2-cylinder
Cooling system	Liquid-cooled
Bore and stroke	102 × 95 mm (4.02 × 3.74 in.)
Displacement	1 552 mL (94.70 cu in.)
Compression ratio	9.0 : 1
Maximum horsepower	49 kW (67 PS) @ 4 700 r/min (rpm), (CA) (CAL) (US) –
Maximum torque	127 N·m (12.95 kgf·m, 93.7 ft·lb) @ 2 700 r/min (rpm), (CA) (CAL) (US) –
Carburetion system	DFI (Digital Fuel Injection) System
Starting system	Electric starter
Ignition system	Battery and coil (transistorized)
Timing advance	Electronically advanced (digital)
Ignition timing	From 0° BTDC @ 950 r/min (rpm) ~ 25° BTDC @ 4 500 r/min (rpm)
Spark plugs	NGK DPR6EA-9 or ND X20EPR-U9
Cylinder numbering method	Front to Rear, 1-2
Firing order	1-2
Valve timing:	
Inlet	Open
	Close
	Duration
Exhaust	Open
	Close
	Duration
Lubrication system	Forced lubrication (wet sump)
Engine oil:	Type
	API SE, SF or SG class
	API SH or SJ class with JASO MA
	Viscosity
	SAE10W-40
	Capacity
	3.5 L (3.7US qt, when engine is completely disassembled and dry)

# 1-10 GENERAL INFORMATION

## General Specifications

Items	VN1600-A1 ~
<b>Drive Train:</b>	
Primary reduction system:	
Type	Gear
Reduction ratio	1.517 (85/56)
Clutch type	Wet multi disc
Transmission:	
Type	5-speed, constant mesh, return shift
Gear ratios:	
1st	2.500 (40/16)
2nd	1.590 (35/22)
3rd	1.192 (31/26)
4th	0.965 (28/29)
5th	0.781 (25/32)
Final drive system:	
Type	Shaft
Reduction ratio	2.619 (15/21 × 33/9)
Overall drive ratio	3.105 @ Top gear
Final gear case oil:	
Grade	API Service Classification: GL-5 Hypoid gear oil
Viscosity	SAE90 (above 5°C), SAE80 (below 5°C)
Capacity	200 mL (6.76 US oz)
<b>Frame:</b>	
Type	Tubular, double cradle
Caster (rake angel)	32°
Trail	168 mm (6.61 in.)
Front tire:	
Type	Tubeless
Size	130/90 - 16 M/C 67H
Rear tire:	
Type	Tubeless
Size	170/70B16 M/C 75H
Front suspension:	
Type	Telescopic fork
Wheel travel	150 mm (5.91 in.)
Rear suspension:	
Type	Swingarm
Wheel travel	95 mm (3.74 in.)
Brake Type:	
Front	Dual disc
Rear	Single disc
<b>Electrical Equipment:</b>	
Battery	
Capacity	12 V 18 Ah
Headlight:	
Type	Semi-sealed beam
Bulb	12 V 60/55 W (quartz-halogen)
Tail/brake light	12 V 5/21 W
Alternator:	
Type	Three-phase AC, twin rotor
Rated output	42A × 14 V @ 6 000 r/min (rpm)

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

AU: Australia

CAL: California

CA: Canada

US: United States of America

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

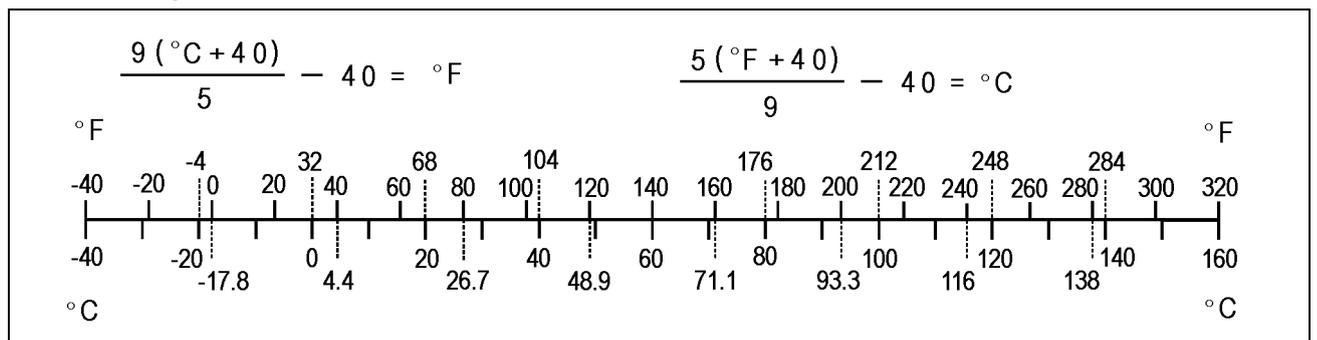
**Units of Speed:**

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	Final Drive.....	2-25
Torque and Locking Agent.....	2-4	Oil Level Inspection.....	2-25
Specifications .....	2-10	Oil Change .....	2-26
Special Tools .....	2-12	Propeller Shaft Joint Lubrication ..	2-26
Periodic Maintenance Procedures.....	2-13	Brakes.....	2-27
Fuel System (DFI).....	2-13	Brake Pad Wear Inspection .....	2-27
Fuel Hose and Connection		Brake Hose and Connection	
Inspection.....	2-13	Inspection.....	2-27
Throttle Control System		Brake Fluid Level Inspection.....	2-27
Inspection.....	2-13	Brake Fluid Change .....	2-28
Idle Speed Inspection .....	2-14	Brake Master Cylinder Cup and	
Air Cleaner Element Cleaning.....	2-15	Dust Seal Replacement .....	2-29
Evaporative Emission Control		Caliper Piston/Dust Seals	
System Inspection (CAL) .....	2-15	Replacement.....	2-29
Cooling System.....	2-16	Front Brake Light Switch	
Radiator Hose and Connection		Inspection.....	2-29
Inspection.....	2-16	Rear Brake Light Switch	
Coolant Change.....	2-17	Check/Adjustment.....	2-30
Engine Top End .....	2-19	Suspension .....	2-30
Air Suction Valve Inspection .....	2-19	Front Fork Oil Leak Inspection.....	2-30
Clutch.....	2-19	Rear Shock Absorber Oil Leak	
Clutch Hose and Connection		Inspection .....	2-31
Inspection.....	2-19	Swingarm Pivot Lubrication .....	2-31
Clutch Fluid Level Inspection .....	2-20	Steering .....	2-31
Clutch Fluid Change .....	2-20	Stem Bearing Lubrication.....	2-31
Clutch Master Cylinder Cup and		Steering Check .....	2-31
Dust Seal Replacement .....	2-21	Steering Adjustment.....	2-32
Clutch Slave Cylinder Piston Seal		Electrical System .....	2-33
Replacement .....	2-22	Spark Plug Cleaning/Inspection...	2-33
Engine Lubrication System.....	2-23	General Lubrication .....	2-33
Engine Oil Change.....	2-23	Lubrication .....	2-33
Oil Filter Replacement .....	2-24	Nut, Bolt, and Fastener Tightness ..	2-34
Wheel/Tires.....	2-24	Tightness Inspection .....	2-34
Tire Inspection .....	2-24		

## 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.**

OPERATION	FREQUENCY	Whichever comes first → ↓	* ODOMETER READING						
			1 000 km (600 mile)	6 000 km (4 000 mile)	12 000 km (7 500 mile)	18 000 km (12 000 mile)	24 000 km (15 000 mile)	30 000 km (20 000 mile)	36 000 km (24 000 mile)
		Every							See Page
Spark plug (e) - clean and gap †			•	•	•	•	•	•	2-35
Air suction valve (e) - inspect †			•	•	•	•	•	•	2-20
Air cleaner element (e) - clean † #				•		•		•	2-16
Throttle control system (e) - inspect †			•	•	•	•	•	•	2-14
Idle speed (e) - inspect †			•		•			•	2-15
Fuel hoses, connections - inspect †			•	•	•	•	•	•	2-14
Engine oil - change #	year		•		•			•	2-24
Oil filter - replace			•		•			•	2-26
Evaporative emission control system (e) (CAL) - inspect †			•	•	•	•	•	•	2-17
Final gear case oil level - inspect †				•		•		•	2-28
Final gear case oil - change			•					•	2-28
Propeller shaft joint - lubricate				•				•	2-29
Brake pad wear - inspect † #			•	•	•	•	•	•	2-29
Brake light switch - inspect †			•	•	•	•	•	•	2-32
Steering - inspect †			•	•	•	•	•	•	2-34
Rear shock absorber oil leak - inspect †				•		•		•	2-33
Front fork oil leak - inspect †				•		•		•	2-33
Tire wear - inspect †			•	•	•	•	•	•	2-27
Swingarm pivot - lubricate				•				•	2-33
General lubrication - perform				•		•		•	2-36
Nut, bolt, and fastener tightness - inspect †			•		•			•	2-37
Brake/clutch hoses, connections - inspect †			•	•	•	•	•	•	2-21, 2-29
Brake/clutch fluid level - inspect †	month		•	•	•	•	•	•	2-21, 2-29
Coolant hoses, connections - inspect †			•						2-18
Brake/clutch fluid - change	2 years					•			2-22, 2-30

## PERIODIC MAINTENANCE 2-3

### Periodic Maintenance Chart

OPERATION	FREQUENCY	Whichever comes first → ↓	* ODOMETER READING							
			1 000 km (600 mile)	6 000 km (4 000 mile)	12 000 km (7 500 mile)	18 000 km (12 000 mile)	24 000 km (15 000 mile)	30 000 km (20 000 mile)	36 000 km (24 000 mile)	
		Every								See Page
Brake/clutch master cylinder cup and dust seal - replace		4 years								2-23, 2-32
Coolant - change		2 years				●				2-28
Caliper piston seal and dust seal - replace		4 years								2-32
Steering stem bearing - lubricate		2 years				●				2-34
Clutch slave cylinder piston seal - replace		4 years								2-24

# : 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.

† : Replace, add, adjust, clean, or torque if necessary.

Throttle control system inspection: Inspection of throttle grip play and throttle bore cleanliness.

(CAL): California

(e): Emission Related Items

## 2-4 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 liquid gasket.

Letters used in the "Remarks" column mean:

- L:** Apply a non-permanent locking agent to the threads.
- G:** Apply grease to the threads.
- MO:** Apply molybdenum disulfide grease oil solution.
- O:** Apply oil to the threads and seating surface.
- S:** Tighten the fasteners following the specified sequence.
- SS:** Apply silicone sealant.
- Si:** Apply silicone grease (ex. PBC grease).
- R:** Replacement parts
- Lh:** Left-hand-threads
- St:** Stake the fasteners to prevent loosening.
- AL:** Tighten the two clamp bolts alternately two times to ensure even tightening torque.

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 dia. (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 ~ 33	165 ~ 240

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
<b>Fuel System:</b>				
Throttle body assy holder bolts	11	1.1	95 in·lb	Right Side
Inlet manifold bolts	12	1.2	104 in·lb	on Cyl. Head
Spark plug lead holder bolts	11	1.1	95 in·lb	Right Side
ISC pipe holder bolts	11	1.1	95 in·lb	
Air cleaner duct holder bolts	9.8	1.0	69 in·lb	Left Side
Right and left air cleaner base bolts	11	1.1	95 in·lb	
Right and left air cleaner base screws	2.2	0.22	19 in·lb	L, Lower Duct
Left air cleaner cover Allen bolt $\phi 8$	16	1.6	12	
Right air cleaner cover Allen bolt $\phi 8$	16	1.6	12	
Right air cleaner Allen bolts	11	1.1	95 in·lb	Throttle Body
Choke cable plate screw	2.9	0.30	26 in·lb	L, Throttle Body
Inlet air temperature sensor nut (DFI)	7.8	0.80	69 in·lb	
Water temperature sensor (DFI)	18	1.8	13	SS
Fuel pump bolts	9.8	1.0	87 in·lb	S, L
<b>Cooling System:</b>				
Radiator hose clamp screws	2.5	0.25	22 in·lb	
Radiator fan switch	18	1.8	13	
Radiator fan bolts	8.3	0.85	74 in·lb	
Water temperature switch	7.8	0.80	69 in·lb	SS
Water pump impeller bolt	8.8	0.90	78 in·lb	Lh
Water pump cover bolts	11	1.1	97 in·lb	
Water pump air bleeder bolt	11	1.1	97 in·lb	
Water pump drain bolt	11	1.1	97 in·lb	
Water pipe bolts	11	1.1	97 in·lb	

**Torque and Locking Agent**

Fastener	Torque			Remarks	
	N·m	kgf·m	ft·lb		
Radiator drain bolt	7.4	0.75	65 in·lb		
Water temperature sensor (DFI)	18	1.8	13	SS	
<b>Engine Top End:</b>					
Spark plugs	18	1.8	13		
Spark plug retainer	12	1.2	104 in·lb		
Air suction valve cover bolts	7.4	0.75	65 in·lb		
Chain tensioner mounting bolts	11	1.1	95 in·lb	S	
Chain tensioner cap	20	2.0	14	S	
Chain tensioner lockbolt	4.9	0.50	43 in·lb	S	
Timing inspection cap	1.5	0.15	13 in·lb		
Rotor bolt cap	1.5	0.15	13 in·lb		
Camshaft sprocket bolts	15	1.5	11	L	
Oil hose flange bolts	9.8	1.0	87 in·lb		
Rocker shafts	25	2.5	18		
Rocker case nuts:				MO, S	
12 mm	78	8.0	58		
8 mm	25	2.5	18	S	
Rocker case bolts	6 mm	8.8	0.90	78 in·lb	S
Cylinder head nuts	25	2.5	18	S	
Cylinder head jacket plugs	20	2.0	14	L	
Rocker case cover bolts	8.8	0.90	78 in·lb	S	
Camshaft chain guide bolts	11	1.1	95 in·lb	L	
Cylinder nuts	25	2.5	18	S	
Inlet manifold bolts	12	1.2	104 in·lb	on Cyl. Head	
Exhaust pipe cover clamp bolts	6.9	0.70	61 in·lb		
Chamber bolts	29	3.0	22	except US, CA	
Muffler stay mounting bolts and nuts, $\phi$ 8	25	2.5	18		
Muffler bracket bolt and nut	29	3.0	22		
<b>Clutch:</b>					
Clutch lever pivot bolt	1.0	0.10	8.7 in·lb	Si	
Clutch lever pivot bolt locknut	5.9	0.60	52 in·lb		
Clutch reservoir cap crews	1.5	0.15	13 in·lb		
Clutch slave cylinder bleed valve	7.8	0.80	69 in·lb		
Clutch slave cylinder bolts	6.9	0.70	61 in·lb	L	
Clutch hose banjo bolts	25	2.5	18		
Clutch master cylinder clamp bolts	11	1.1	95 in·lb	S	
Starter lockout switch screws	1.2	0.12	10 in·lb		
Push rod guide bolts	11	1.1	95 in·lb	L	
Clutch cover bolts	11	1.1	95 in·lb		
Clutch damper cover bolts (outside)	9.8	1.0	87 in·lb	L	
Clutch cover damper plate bolts	9.8	1.0	87 in·lb	EO (tip)	
Clutch cover damper screws	4.9	0.50	43 in·lb	L	
Clutch hub nut	147	15.0	108	MO	

## 2-6 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks	
	N·m	kgf·m	ft·lb		
<b>Engine Lubrication System:</b>					
Oil filler cap	1.5	0.15	13 in·lb		
Oil screen plug	20	2.0	14		
Engine oil drain plug	20	2.0	14		
Oil filter (cartridge type)	18	1.8	13	R, EO	
Oil filter Pipe	25	2.5	18	SS	
Oil pressure relief valve	15	1.5	11	L	
Oil pressure switch terminal screw	1.5	0.15	13 in·lb		
Oil pressure switch	15	1.5	11	SS	
Oil pump mounting bolts	11	1.1	95 in·lb		
Oil hose banjo bolts	9.8	1.0	87 in·lb		
Oil hose flange bolt (outside)	9.8	1.0	87 in·lb		
Oil pipe holder bolts (inside)	11	1.1	95 in·lb	L	
Oil pipe clamp bolts (inside)	11	1.1	95 in·lb	L	
Right & left crankcase oil nozzles	2.9	0.30	26 in·lb	× 3	
Right crankcase oil nozzle	2.9	0.30	26 in·lb	× 1, Lh	
Oil baffle bolt	11	1.1	95 in·lb	L	
<b>Engine Removal/Installation:</b>					
Downtube bolts and nuts	44	4.5	33		
Engine mounting bolts and nuts	44	4.5	33		
Engine mounting bracket bolts	25	2.5	18		
Engine ground terminal bolt	7.8	0.80	69 in·lb		
<b>Crankshaft/Transmission:</b>					
Crankcase bolts:	10 mm	39	4.0	29	S
	8 mm	21	2.1	15	S
	6 mm	11	1.1	95 in·lb	S
Frame ground bracket bolt		1.1	1.1	95 in·lb	Left Crankcase
Crankcase bearing retainer bolts		11	1.1	95 in·lb	L
Camshaft chain guide bolts		11	1.1	95 in·lb	L
Right, left crankcase oil nozzles		2.9	0.30	26 in·lb	× 3
Right crankcase oil nozzles		2.9	0.30	26 in·lb	× 1, Lh
Oil baffle bolt		11	1.1	95 in·lb	L
Connecting rod big end nuts		59	6.0	43	MO
Oil pressure relief valve		15	1.5	11	L
Oil filter Pipe		25	2.5	18	SS
Oil hose banjo bolts		9.8	1.0	87 in·lb	
Primary gear bolt		147	15.0	108	MO
Water pump chain guide spring hook bolt		2.9	0.30	26 in·lb	
Water pump chain guide bolt		8.3	0.85	73 in·lb	
Idle shaft holder bolts		8.3	0.85	73 in·lb	
Oil pressure switch terminal screw		1.5	0.15	13 in·lb	
Oil pressure switch		15	1.5	11	SS
Oil pipe clamp bolts (inside)		11	1.1	95 in·lb	L

## PERIODIC MAINTENANCE 2-7

### Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Left balancer gear bolt	85	8.7	63	MO
Starter clutch bolt	85	8.7	63	MO
Starter clutch coupling bolts	15	1.5	11	L
Gear set lever bolt	11	1.1	95 in·lb	
Shift shaft return spring pin (bolt)	39	4.0	29	L
Shift pedal clamp bolt	25	2.5	18	
Shift pedal clamp bolts (VN1600–A2 ~)	30	3.1	22	
Rear shift lever clamp bolt	12	1.2	104 in·lb	
Shift rod locknuts	11	1.1	95 in·lb	(Rear: Lh)
Shift drum bearing holder bolts	11	1.1	95 in·lb	L
Shift drum cam screw	15	1.5	11	L
Damper cam nut (front gear)	195	20	144	MO (threads)
Push rod guide bolts	9.8	1.0	87 in·lb	L
<b>Wheels/Tires:</b>				
Front axle clamp bolts	20	2.0	14	AL
Front axle	108	11.0	79.6	S
Rear axle nut	108	11.0	79.6	
Tire air valve stem nuts	1.5	0.15	13 in·lb	
Tire air valve caps	0.15	0.015	1.3 in·lb	
Air valve cores	0.3	0.03	2.6 in·lb	
<b>Final Drive:</b>				
Oil pipe banjo bolts (front gear)	12	1.2	104 in·lb	
Oil nozzle (front gear)	2.9	0.30	26 in·lb	
Oil nozzle (front gear)	18	1.8	13	
Neutral switch	15	1.5	11	
Front gear case bolts:	6 mm	12	1.2	104 in·lb
	8 mm	29	3.0	22
Speed sensor bolt	9.8	1.0	87 in·lb	L
Damper cam nut (front gear)	195	20	144	MO (threads)
Drive gear nut (front gear)	265	27	195	MO, St
Driven gear assy mounting bolts	25	2.5	18	
Driven gear bolt (front gear)	137	14	101	MO, St
Bearing retainer bolts (front gear)	8.8	0.9	78 in·lb	L
Final gear case drain plug	8.8	0.9	78 in·lb	
Final gear case mounting nuts	34	3.5	25	
Final gear case studs	–	–	–	L
Final gear case cover bolts:	8 mm	23	2.3	L
	10 mm	34	3.5	L
Pinion gear nut (final gear)	130	13	94	St, MO
Bearing retainer bolt	6.9	0.7	61 in·lb	L
<b>Brakes:</b>				
Caliper bleed valves	7.8	0.8	69 in·lb	
Brake hose banjo bolts	25	2.5	18	

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Brake lever pivot bolt	1.0	0.10	8.7 in·lb	
Brake lever pivot bolt locknut	5.9	0.60	52 in·lb	
Front brake reservoir cap screws	1.5	0.15	13 in·lb	
Front brake light switch screw	1.2	0.12	10 in·lb	
Front master cylinder clamp bolts	8.8	0.9	78 in·lb	G, S
Front caliper mounting bolts	34	3.5	25	
Rear caliper mounting bolts	34	3.5	25	
Rear caliper holder bolt	64	6.5	47	
Brake disc bolts	27	2.8	20	L
Rear master cylinder mounting bolts	25	2.5	18	
Rear master cylinder push rod locknut	18	1.8	13	
Brake pedal clamp bolt	25	2.5	18	
<b>Suspension:</b>				
Upper front fork clamp bolts	20	2.0	14	
Lower front fork clamp bolts	29	3.0	21	AL
Front fork top plugs	22	2.2	16	
Piston rod nuts or joint rod nut	20	2.0	14	
Front fork bottom allen bolt	30	3.1	22	L
Front axle clamp bolts	20	2.0	14	AL
Rear shock absorber nuts	34	3.5	25	
Swingarm pivot shaft	108	11.0	79.6	G
<b>Steering:</b>				
Steering stem head nut	88	9.0	65	
Steering stem nut	5	0.5	43 in·lb	
Handlebar clamp bolts	34	3.5	25	
Handlebar holder nuts	34	3.5	25	
Upper front fork clamp bolts	20	2.0	14	
Lower front fork clamp bolts	29	3.0	21	AL
Turn signal light mounting nuts	5.9	0.6	52 in·lb	
<b>Frame:</b>				
Downtube bolts and nuts	44	4.5	33	
Footboard bracket bolts	34	3.5	25	front
Footpeg bracket bolts	25	2.5	18	rear, L
Sidestand nut	44	4.5	33	
<b>Electrical System:</b>				
Spark plugs	18	1.8	13	
Crankshaft sensor screws	2.9	0.30	26 in·lb	
Stator lead holder screw	9.8	1.0	87 in·lb	L
Inside stator holder bolts	11	1.1	95 in·lb	L
Crankshaft sensor lead holder bolt	2.9	0.30	26 in·lb	L
Alternator outer cover bolts	6.9	0.70	61 in·lb	
Alternator outer cover joint bolts	6.9	0.70	61 in·lb	L
Alternator outer cover damper bolts	6.9	0.70	61 in·lb	L