

### MODEL APPLICATION

Year	Model	Beginning Frame No.
2003	KLF250-A1	JKALFMA1□3B500001,or JKALF250AAB600001
2004	KLF250-A2	JKALFMA1□4B523201,or JKALF250AAB601301
2005	KLF250-A3	JKALFMA1□5B534201,or JKALF250AAB602001

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



KAWASAKI HEAVY INDUSTRIES, LTD.  
Consumer Products & Machinery Company

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**KLF 250**  
**BAYOU 250**  
**Workhorse 250**



# **All Terrain Vehicle Service Manual**

# Quick Reference Guide

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## LIST OF ABBREVIATIONS

A	ampere(s)	lb	pounds(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) Celcius	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)		

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

# 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 Vehicle parts. Special tools, gauges, and testers that are necessary when servicing Kawasaki vehicles 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 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

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### Before Servicing

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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:**

(1) Dirt

Before removal and disassembly, clean the motorcycle. Any dirt entering the engine will shorten the life of the motorcycle. For the same reason, before installing a new part, clean off any dust or metal filings.

(2) Battery Ground

Disconnect the ground (-) wire from the battery before performing any disassembly operations on the motorcycle. This prevents the engine from accidentally turning over while work is being carried out, sparks from being generated while disconnecting the wires from electrical parts, as well as damage to the electrical parts themselves. For reinstallation, first connect the positive wire to the positive (+) terminal of the battery

(3) Installation, Assembly

Generally, installation or assembly is the reverse of removal or disassembly. However, if installation or assembly sequence is given in this Service Manual, follow it. Note parts locations and cable, wire, and hose routing during removal or disassembly so they can be installed or assembled in the same way. It is preferable to mark and record the locations and routing whenever possible.

(4) Tightening Sequence

When installing bolts, nuts, or screws for which a tightening sequence is given in this Service Manual, make sure to follow the sequence. When installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit, thus ensuring that the part has been installed in its proper location. Then, tighten them to the specified torque in the tightening sequence and method indicated. If tightening sequence instructions are not given, tighten them evenly in a cross pattern. Conversely, to remove a part, first loosen all the bolts, nuts, or screws that are retaining the part a 1/4-turn before removing them.

(5) Torque

When torque values are given in this Service Manual, use them. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.

(6) Force

Common sense should dictate how much force is necessary in assembly and disassembly. If a part seems especially difficult to remove or install, stop and examine what may be causing the problem. Whenever tapping is necessary, tap lightly using a wooden or plastic-faced mallet. Use an impact driver for screws (particularly for the removing screws held by non-permanent locking agent) in order to avoid damaging the screw heads.

(7) Edges

Watch for sharp edges, as they could cause injury through careless handling, especially during major engine disassembly and assembly. Use a clean piece of thick cloth when lifting the engine or turning it over.

(8) High-Flash Point Solvent

A high-flash point solvent is recommended to reduce fire danger. A commercial solvent commonly available in North America is standard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.

(9) Gasket, O-ring

Replace a gasket or an O-ring with a new part when disassembling. Remove any foreign matter from the mating surface of the gasket or O-ring to ensure a perfectly smooth surface to prevent oil or compression leaks.

### Before Servicing

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(10) Liquid Gasket, Locking Agent

Clean and prepare surfaces where liquid gasket or non-permanent locking agent will be used. Apply them sparingly. Excessive amount may block engine oil passages and cause serious damage.

(11) Press

When using a press or driver to install a part such as a wheel bearing, apply a small amount of oil to the area where the two parts come in contact to ensure a smooth fit.

(12) Ball Bearing and Needle Bearing

Do not remove a ball bearing or a needle bearing unless it is absolutely necessary. Replace any ball or needle bearings that were removed with new ones. Install bearings with the manufacturer and size marks facing out, applying pressure evenly with a suitable driver. Apply force only to the end of the race that contacts the press fit portion, and press it evenly over the base component.

(13) Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals. Oil or grease seals should be pressed into place using a suitable driver, applying a force uniformly to the end of seal until the face of the seal is even with the end of the hole, unless instructed otherwise. When pressing in an oil or grease seal which has manufacturer's marks, press it in with the marks facing out.

(14) Circlip, Retaining Ring, and Cotter Pin

When installing circlips and retaining rings, take care to compress or expand them only enough to install them and no more. Install the circlip with its chamfered side facing load side as well.

Replace any circlips, retaining rings, and cotter pins that were removed with new ones, as removal weakens and deforms them. If old ones are reused, they could become detached while the motorcycle is driven, leading to a major problem.

(15) Lubrication

Engine wear is generally at its maximum while the engine is warming up and before all the sliding surfaces have an adequate lubricative film. During assembly, make sure to apply oil to any sliding surface or bearing that has been cleaned. Old grease or dirty oil could have lost its lubricative quality and may contain foreign particles that act as abrasives; therefore, make sure to wipe it off and apply fresh grease or oil. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended.

(16) Direction of Engine Rotation

To rotate the crankshaft manually, make sure to do so in the direction of positive rotation. Positive rotation is counterclockwise as viewed from the left side of the engine. To carry out proper adjustment, it is furthermore necessary to rotate the engine in the direction of positive rotation as well.

(17) Replacement Parts

When there is a replacement instruction, replace these parts with new ones every time they are removed.

Replacement parts will be damaged or lose their original function once they are removed. Therefore, always replace these parts with new ones every time they are removed. Although the previously mentioned gasket, O-ring, ball bearing, needle bearing, grease seal, oil seal, circlip, and cotter pin have not been so designated in their respective text, they are replacement parts.

(18) Electrical Wires

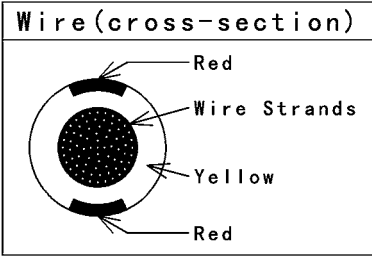
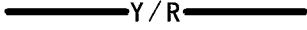
All the electrical wires are either one-color or two-color. A two-color wire is identified first by the primary color and then the stripe color. For example, a yellow wire with thin red stripes is referred to as a "yellow/red" wire; it would be a "red/yellow" wire if the colors were reversed. Unless instructed otherwise, electrical wires must be connected to wires of the same color.



# 1-4 GENERAL INFORMATION

## Before Servicing

### Two-Color Electrical Wire

Wire (cross-section)	Color Indicated on the Wire	Color Indicated on the Wiring Diagram
	Yellow/Red	

6B020601W1 C

#### (19) Inspection

When parts have been disassembled, visually inspect these parts for the following conditions or other damage. If there is any doubt as to the condition of them, replace them with new ones.

Abrasion	Crack	Hardening	Warp
Bent	Dent	Scratch	Wear
Color change	Deterioration	Seizure	

#### (20) Specifications

Specification terms are defined as follows:

"Standards" show dimensions or performances which brand-new parts or systems have.

"Service Limits" indicate the usable limits. If the measurement shows excessive wear or deteriorated performance, replace the damaged parts.

Model Identification

KLF250-A1 Left Side View



HE03B006 5

KLF250-A1 Right Side View



HE03B007 5

# 1-6 GENERAL INFORMATION

## General Specifications

Item	KLF250-A1 ~ A3	
<b>Dimensions</b>		
Overall Length	1 780 mm (70.08 in.)	
Overall Width	1 120 mm (44.09 in.), (US) (CA) 1 020 mm (40.16 in.)	
Overall Height	1 040 mm (40.94 in.)	
Wheelbase	1 115 mm (43.90 in.)	
Ground Clearance	155 mm (6.10 in.)	
Seat Height	730 mm (28.74 in.)	
Dry Mass	185 kg (408 lb), (US) 183 kg (404 lb), (CA) 183.5 kg (405 lb)	
Curb Mass:	Front	89 kg (196 lb), (US) (CA) 88.5 (195 lb)
	Rear	106 kg (234 lb), (US) 104.5 kg (230 lb), (CA) 105 kg (232 lb)
Fuel Tank Capacity	10 L (2.6 US gal)	
<b>Performance</b>		
Minimum Turning Radius	2.7 m (8.86 ft)	
<b>Engine</b>		
Type	4-stroke, SOHC, 1-cylinder	
Cooling System	Air-cooled	
Bore and Stroke	69.0 × 61.0 mm (2.72 × 2.40 in.)	
Displacement	228 mL (13.9 cu in.)	
Compression Ratio	8.9	
Maximum Horsepower	12.5 kW (17 PS) @7 000 r/min (rpm), (US) –	
Maximum Torque	17.9 N·m (1.83 kgf·m, 13.24 ft·lb) @5 500 r/min (rpm)	
Carburetion System	Carburetor, MIKUNI VM24SS	
Starting System	Electric starter & Recoil starter	
Ignition System	CDI	
Timing Advance	Electronically advanced	
Ignition Timing	From 10° BTDC @1 800 r/min (rpm) to 35° BTDC @4 600 r/min (rpm)	
Spark Plug	NGK DR8ES	
Valve Timing:		
Inlet:	Open	35° BTDC
	Close	57° ABDC
	Duration	272°
Exhaust:	Open	54° BBDC
	Close	26° ATDC
	Duration	260°
Lubrication System	Forced lubrication (wet sump)	
Engine Oil:	Type	API SF or SG API SH or SJ with JASO MA
	Viscosity	SAE 10W-40
	Capacity	2.0 L (2.11 US qt)

**General Specifications**

Item	KLF250-A1 ~ A3
<b>Drive Train</b>	
Primary Reduction System:	
Type	Gear
Reduction Ratio	3.450 (69/20)
Clutch Type	Wet multi disc and centrifugal
Transmission:	
Type	5-speed plus reverse, constant mesh, return shift
Gear Ratio:	2.923 (38/13)
1st	1.684 (32/19)
2nd	1.173 (27/23)
3rd	0.923 (24/26)
4th	0.785 (22/28)
5th	3.115 (27/13 × 33/22)
Reverse	
Final Drive System:	
Type	Shaft
Reduction Ratio	4.680 (18/15 × 39/10)
Overall Drive Ratio (@Top Gear)	12.686
Final Gear Case Oil:	
Type	Hypoid gear oil
Capacity	SAE90 (above 5°C, 41°F) or SAE80 (below 5°C, 41°F)
Capacity	0.2 L (0.21 US qt)
<b>Frame</b>	
Type	Double tubular
Caster (Rake Angle)	4.0°
Camber	3.0°
King Pin Angle	10°
Trail	17 mm (0.67 in.)
Tread:	
Front	764 mm (30.08 in.)
Rear	776 mm (30.55 in.)
Front Tire:	
Type	Tubeless
Size	AT21 × 8 - 9
Rear Tire:	
Type	Tubeless
Size	AT22 × 10 - 10
Suspension:	
Front:	
Type	Independent swing axle
Wheel Travel	115 mm (4.53 in.)
Rear:	
Type	Torque tube-link
Wheel Travel	125 mm (4.92 in.)

## 1-8 GENERAL INFORMATION

### General Specifications

Item	KLF250-A1 ~ A3
Brake type:	
Front	Drum (Mechanical)
Rear	Drum (Mechanical)
<b>Electrical Equipment</b>	
Battery	12 V 14 Ah, (US) 12 V 11 Ah
Headlight:	
Type	Semi-sealed beam
Bulb	12 V 25/25 W × 2
Tail/brake light	12 V 8/27 W × 2
Alternator:	
Type	Three - phase AC
Rated Output	13 A, 14 V @8 000 r/min (rpm)

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

(CA): Canada Model

(US): U.S.A. Model

**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	=	kg/cm <sup>2</sup>
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cmHg
kg/cm <sup>2</sup>	×	98.07	=	kPa
kg/cm <sup>2</sup>	×	14.22	=	psi
cm Hg	×	1.333	=	kPa

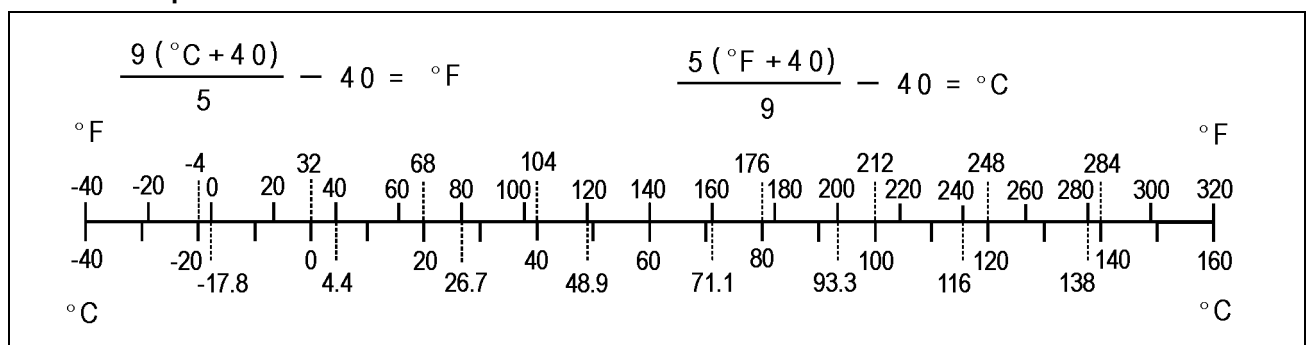
**Units of Speed:**

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

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## 2-2 PERIODIC MAINTENANCE

### Periodic Maintenance Chart

The scheduled maintenance must be done in accordance with this chart to keep the vehicle in good running condition. **The initial maintenance is vitally important and must not be neglected.**

OPERATION	FREQUENCY	First Service	Regular Service			
		After 10 hrs. or 100 km (60 mi) of use	Every 10 days or 200 km (120 mi) of use	Every 30 days or 600 km (360 mi) of use	Every 90 days or 1 700 km (1 100 mi) of use	Every year of use
<b>ENGINE</b>						
Air cleaner - service*	•	•				
Throttle lever play - inspect	•	•				
Valve clearance - inspect	•			•		
Fuel system cleanliness - inspect*	•			•		
Engine oil - change*	•			•		
Oil filter - replace*	•			•		
Clutch adjustment*	•	•				
Spark plug - clean and gap	•			•		
Spark arrester - clean						•
Fuel hoses and connections - inspect				•		
Fuel hose - replace		4 years				
<b>CHASSIS</b>						
Joint boots - inspect*	•	•				
Rear brake pedal and lever adjustment - inspect*	•	•				
Cables adjustment*	•	•				
Bolts and nuts - tighten	•	•				
Brake wear - inspect*	•	•				
Brake light switch - inspect*	•		•			
Battery - inspect	•		•			
Steering - inspect	•			•		
Tire wear - inspect*			•			
Final gear case oil - change	•					•
General lubrication*			•			

\*: Service more frequently when operated in mud, dust, or other harsh riding conditions.

•: Clean, adjust, lubricate, torque, or replace parts as necessary.



**Torque and Locking Agent**

The following tables list the tightening torque for the major fasteners, and the parts 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.

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

S: Tighten the fasteners following the specified sequence.

St: Stake the fasteners to prevent loosening.

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 Sytem</b>				
Carburetor Holder Bolts	11	1.1	95 in·lb	L
Throttle Lever Bolt	5.9	0.6	52 in·lb	
<b>Engine Top End</b>				
Cylinder Head Bolts (M10), first torque	13	1.3	113 in·lb	L(1), MO, S
Cylinder Head Bolts (M10), final torque	34	3.5	25	S
Cylinder Head Bolts (M6), first torque	5.9	0.6	52 in·lb	MO, S
Cylinder Head Bolts (M6), final torque	9.8	1.0	87 in·lb	S
Valve Adjusting Cap Bolts	8.8	0.9	78 in·lb	
Retaining Bolt	4.4	0.45	39 in·lb	
Compression Releasing Lever Bolt	8.8	0.9	78 in·lb	
Camshaft Sprocket Bolt	34	3.5	25	MO
Rear Camshaft Chain Guide Bolt	9.8	1.0	87 in·lb	
Camshaft Chain Tensioner Mounting Bolts	8.8	0.9	78 in·lb	
Valve Adjusting Screw Locknuts	12	1.2	104 in·lb	
Rocker Shaft Retainer Screws	4.4	0.45	39 in·lb	
Camshaft Chain Guard Screws	4.4	0.45	39 in·lb	
<b>Engine Right Side</b>				
Right Engine Cover Bolts	8.8	0.9	78 in·lb	

## 2-4 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Clutch Spring Bolts	12	1.2	104 in·lb	
Primary Clutch Hub Nut	127	13	94	MO
Secondary Clutch Hub Nut	78	8.0	58	MO
Balancer Drive Gear Nut	83	8.5	61	MO
Balancer Gear Nut	118	12	87	MO
Clutch Adjusting Screw Locknut	11	1.1	95 in·lb	
<b>Recoil Starter</b>				
Recoil Starter Mounting Bolts	8.8	0.9	78 in·lb	
Recoil Starter Flange Nut	12	1.2	104 in·lb	
<b>Engine Lubrication System</b>				
Oil Pipe Banjo Bolts	15	1.5	11	
Oil Pump Screws	4.4	0.45	39 in·lb	
Engine Drain Plug	29	3.0	22	
Oil Filter Cover Bolts	8.8	0.9	78 in·lb	
Relief Valve	15	1.5	11	L
<b>Engine Removal/Installation</b>				
Engine Bracket Bolts and Nuts	26	2.7	20	
Engine Mounting Nuts (M10)	39	4.0	29	
Engine Mounting Nut (M8)	29	3.0	22	
<b>Crankshaft/Transmission</b>				
Engine Drain Plug	29	3.0	22	
Crankcase Bolts	8.8	0.9	78 in·lb	
Clutch Release Cam Pin	25	2.5	18	L
Return Spring Pin	25	2.5	18	L
Output Shaft Bearing Position Plate Screws	8.8	0.9	78 in·lb	L
Relief Valve	15	1.5	11	L
Bearing Stopper Screws	9.8	1.0	87 in·lb	
Positioning Lever Bolt	8.8	0.9	78 in·lb	
Neutral and Reverse Switch Screws	–	–	–	L
Shift Drum Pin Plate Bolt	12	1.2	104 in·lb	
<b>Wheels/Tires</b>				
Wheel Nuts	34	3.5	25	S
Rear Axle Nut	147	15	108	
<b>Final Drive</b>				
Output Bevel Gear Case Bolts (M8)	25	2.5	18	L (1)
Output Bevel Gear Case Bolts (M6)	8.8	0.9	78 in·lb	
Oil Seal Housing Nuts	25	2.5	18	
Drive Gear Nut	118	12	87	MO
Cam Damper Mounting Nut	78	8.0	58	MO
Driven Gear Shaft Nut	147	15	108	L
Bearing Retainer	108	11	80	L
Pinion Gear Nut	69	7.0	51	St
Propeller Shaft Housing Nuts	25	2.5	18	

## PERIODIC MAINTENANCE 2-5

### Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Final Gear Case Drain Bolt	20	2.0	14	L
Speedometer Plug	20	2.0	14	
Final Gear Case Filler Cap	15	1.5	11	
Ring Gear Cover Bolts	25	2.5	18	
Axle Shaft Pipe Bolts	20	2.0	14	
Oil Level Inspection Bolt	7.8	0.8	69 in·lb	
<b>Brakes</b>				
Front Axle Nut	34	3.5	25	L
Rear Axle Nut	147	15	108	
Front Brake Panel Bolts	25	2.5	18	
Rear Brake Panel Bolts	29	3.0	22	
Rear Brake Drum Drain Bolts	29	3.0	22	
<b>Suspension</b>				
Front Suspension Arm Pivot Bolts	88	9.0	65	
Rear Suspension Arm Pivot Bolts and Nuts	34	3.5	25	
Shock Absorber Mounting Bolts and Nuts	34	3.5	25	
Steering Knuckle Pivot Nuts	39	4.0	29	
<b>Steering</b>				
Steering Stem Clamp Allen Bolts	26	2.7	20	S
Stem Bottom End Nut	29	3.0	22	
Tie-rod End Nuts	41	4.2	30	
Tie-rod Adjusting Sleeve Locknuts	26	2.7	20	
Steering Knuckle Arm Pivot Nuts	39	4.0	29	
Handlebar Holder Bolts	20	2.0	14	
<b>Frame</b>				
Rear Carrier Bolts	20	2.0	14	
<b>Electrical System</b>				
Alternator Cover Bolts	8.8	0.9	78 in·lb	L
Spark Plug	14	1.4	10	
Starter Motor Clutch Bolts	34	3.5	25	
Ignition Switch Nut	2.9	0.3	26 in·lb	
Alternator Rotor Bolt	59	6.0	43	
Starter Motor Mounting Bolts	8.8	0.9	78 in·lb	
Starter Motor Terminal Nut	4.9	0.5	43 in·lb	
Starter Motor Terminal Locknut	6.9	0.7	61 in·lb	
Starter Motor Bolts	3.4	0.3	30 in·lb	

## 2-6 PERIODIC MAINTENANCE

### Specifications

Item	Standard	Service Limit
<b>Fuel System</b>		
Throttle Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	---
Idle Speed	1 300 ~ 1 400 r/min (rpm)	---
Air Cleaner Element Oil	High-quality foam air filter oil	---
<b>Engine Top End</b>		
Valve Clearance:		
Exhaust	0.18 ~ 0.23 mm (0.0071 ~ 0.0091 in.)	---
Inlet	0.15 ~ 0.20 mm (0.0059 ~ 0.0079 in.)	---
<b>Engine Lubrication System</b>		
Engine Oil:		
Type	API SF or SG API SH or SJ with JASO MA	---
Viscosity	SAE10W40	---
Capacity	2.0 L (2.11 US qt) (When filter is not removed)	---
	2.1 L (2.22 US qt) (When filter is removed)	---
	2.75 L (2.91 US qt) (When engine is completely dry)	---
<b>Wheels/Tires</b>		
Tire Tread Depth:		
Front	---	4 mm (0.16 in.)
Rear	---	4 mm (0.16 in.)
Standard Tire:		
Front	AT 21 X 8-9 Dunlop, KT856, Tubeless	---
Rear	AT 22 x 10-10 Dunlop, KT857, Tubeless	---
<b>Final Drive</b>		
Final Gear Case:		
Gear Case Oil:		
Type	API GL-5 Hypoid gear oil	---
Viscosity	SAE90 (above 5°C, 41°F) SAE80 (below 5°C, 41°F)	---
Capacity	0.2 L (0.21 US qt)	---
<b>Brakes</b>		
Front Brake Lever Free Play	1 ~ 2 mm (0.04 ~ 0.08 in.)	---
Rear (Parking) Brake Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	---
Brake Pedal Free Play	25 ~ 35 mm (1.0 ~ 1.4 in.)	---
Cam Lever angle	80 ~ 90°	---
<b>Electrical System</b>		
Spark Plug Gap	0.6 ~ 0.7 mm (0.024 ~ 0.028 in.)	---
Rear Brake Light Switch Timing	On after 10 mm (0.4 in.) of pedal travel	---

**Periodic Maintenance Procedures**

**Fuel System**

*Throttle Lever Free Play Inspection*

- Check that the throttle lever moves smoothly from full open to close, and the throttle closes quickly and completely in all steering positions by the return spring.
- ★ If the throttle lever does not return properly, check the throttle cable routing, lever free play, and cable damage. Then lubricate the throttle cable.
- Run the engine at the idle speed, and turn the handlebar all the way to the right and left to ensure that the idle speed does not change.
- ★ If the idle speed increases, check the throttle lever free play and the cable routing.
- Stop the engine and check the throttle lever free play [A].
- ★ If the free play is not within the specified range, adjust the cable.

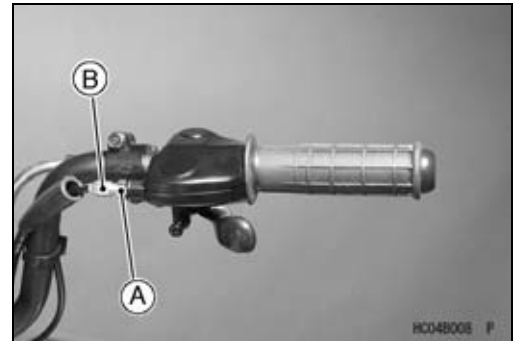


**Throttle Lever Free Play**

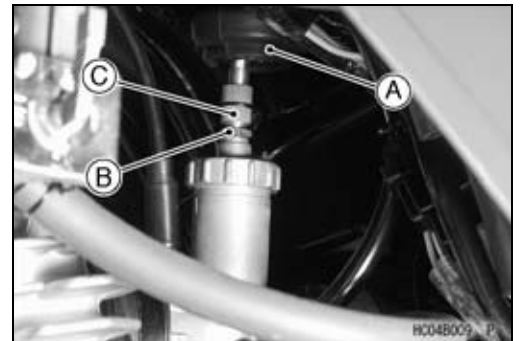
**Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)**

*Throttle Lever Free Play Adjustment*

- Slide the rubber cover off the adjuster at the throttle case.
- Loosen the locknut [A] and turn the throttle cable upper adjuster [B] until the cable has proper amount of play.
- Tighten the locknut and reinstall the rubber cover.



- ★ If the free play cannot be adjusted by using the upper cable adjuster, pull up the rubber cover [A] at the carburetor.
- ★ Loosen the locknut [B] and turn the throttle cable lower adjuster [C] to obtain the specified free play.
- ★ Tighten the locknut and reinstall the rubber cover.



## 2-8 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

---

#### *Fuel System Cleanliness Inspection*

##### **WARNING**

**Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.**

- Turn the fuel tap to the OFF position.
- Run the lower end of the carburetor drain hose to a suitable container.
- Turn out the carburetor drain plug a few turns and drain the fuel system.
- Check to see if water or dirt comes out.
- Tighten the drain plug.
- ★ If any water or dirt appears during the above inspection, clean the fuel system (carburetor, tank, fuel hose).

#### *Air Cleaner Element Cleaning and Inspection*

##### **NOTE**

- *In dusty areas, the element should be cleaned more frequently than the recommended interval.*
- *After riding through rain or muddy terrains, the element should be cleaned immediately.*
- *Since repeated cleaning opens the pores of the element, replace it with a new one in accordance with the Periodic Maintenance Chart.*
- *Also, if there is a break in the element material or any other damage to the element, replace the element with a new one.*

##### **WARNING**

**Clean the element in a well-ventilated area, and take care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Because of the danger of highly flammable liquids, do not use gasoline or a low-flash point solvent to clean the foam element.**

- Remove the air cleaner element (see Air Cleaner Element Removal).
- Clean the element in a bath of high-flash point solvent using a soft bristle brush.

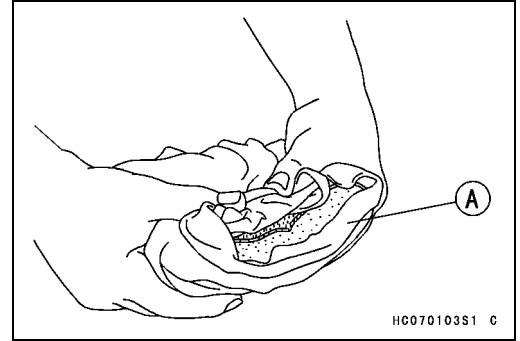
**Periodic Maintenance Procedures**

- Squeeze it dry in a clean towel [A]. Do not wring the element or blow it dry; the element can be damaged.
- Inspect the element for damage.
- ★ If it is torn, punctured, or hardened, replace it.

**NOTE**

○ Replace the element after cleaning it five times or if it is damaged.

- After cleaning, saturate the element with a high-quality foam-air-filter oil, squeeze out the excess oil, then wrap it in a clean rag and squeeze it as dry as possible. Be careful not to tear the element.



*Air Cleaner Draining*

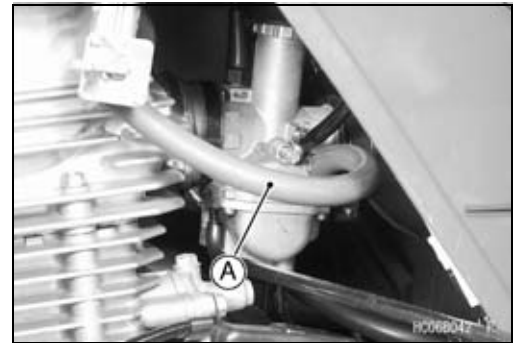
Two drain tubes [A] are connected to the bottom of the air cleaner housing to drain water or oil accumulated in the housing.

- Squeeze open the two drain tubes to expel dust and/or water accumulated inside.



*Fuel Hose and Connection Check*

- Turn the fuel tap to the OFF position.
- Check the fuel hose [A].
- ★ If the fuel hose is frayed, cranked, or bulged, replace the fuel hose.
- Check that the hose is securely connected and clamps are tightened.
- ★ If the fuel hose has been sharply bent or kinked, replace the fuel hose.
- ★ If the clamps are loosened or damaged, replace the clamps.
- When installing the fuel hose, avoid sharp bending, kinking, flattening or twisting, and route the fuel hose with a minimum of bending so that the fuel flow will not be obstructed.



*Fuel Hose Replacement*

**WARNING**

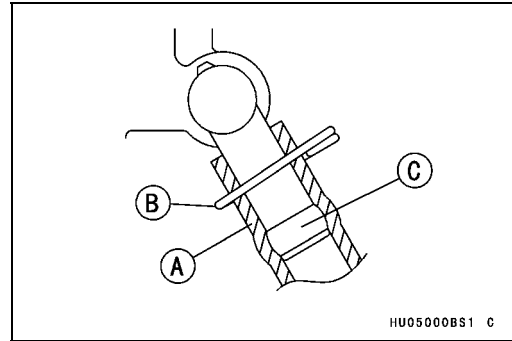
**Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.**

- Turn the fuel tap to the OFF position.
- Remove:
  - Clamps
  - Fuel Hose

## 2-10 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

- Fit the fuel hose [A] onto the pipe fully and install the clamps [B] beyond the raised rib [C].



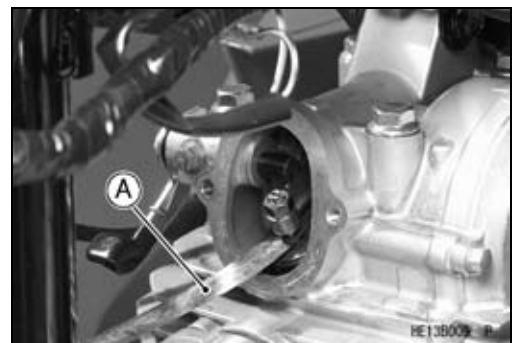
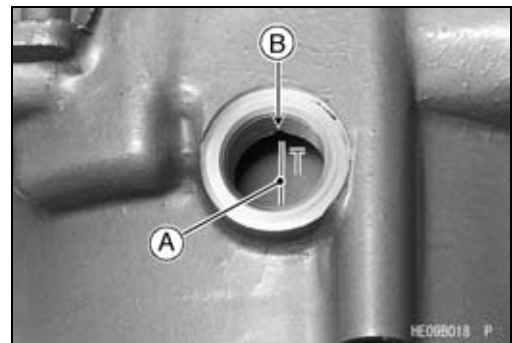
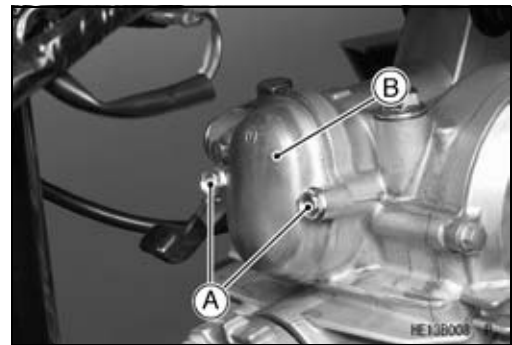
### Engine Top End

#### Valve Clearance Inspection

##### NOTE

○ Check the valve clearance only when the engine is cold (at room temperature).

- Remove:
  - Front Fender (see Frame chapter)
  - Bolts [A] and Valve Adjusting Caps [B]
- Remove:
  - Recoil Starter (see Recoil Starter chapter)
  - Timing Inspection Plug
- Turn the crankshaft counterclockwise with a wrench on the alternator rotor bolt until the "T" mark [A] on the alternator rotor aligns with the slot [B], as shown.
- Measure the clearance of each valve between the end of the valve stem and the adjusting screw on the rocker arm with a thickness gauge [A].
- ★ If the valve clearance is not correct, adjust it.



##### Valve Clearance (when cold)

Exhaust: 0.18 ~ 0.23 mm (0.0071 ~ 0.0091 in.)

Inlet: 0.15 ~ 0.20 mm (0.0059 ~ 0.0079 in.)

#### Spark Arrester Cleaning

##### WARNING

To avoid burns, wear gloves while cleaning the spark arrester. Since the engine must be run during this procedure, the muffler will become hot.



## Periodic Maintenance Procedures

- Remove the drain plug [A] on the muffler.
- In an open area away from combustible materials, start the engine with the transmission in neutral.
- Raise and lower engine speed while tapping on the muffler with a rubber mallet until carbon particles are purged from the muffler.

### WARNING

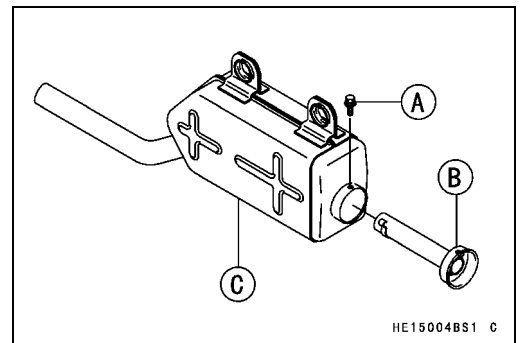
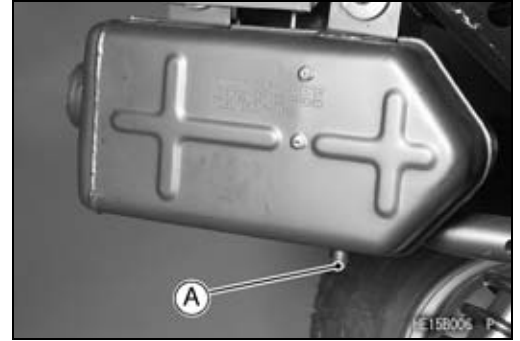
**Do not run the engine in a closed area. Exhaust gases contain carbon monoxide; a colorless, odorless, poisonous gas. Breathing exhaust gas leads to carbon monoxide poisoning, asphyxiation, and death.**

- Stop the engine.
- Remove:
  - Bolt [A]
  - Spark Arrester [B]
  - Muffler [C]
- Scrape carbon deposits off the spark arrester and slide it back into the muffler.

### WARNING

**Never run the engine with the spark arrester removed near combustible materials. Hot carbon particles may start a fire.**

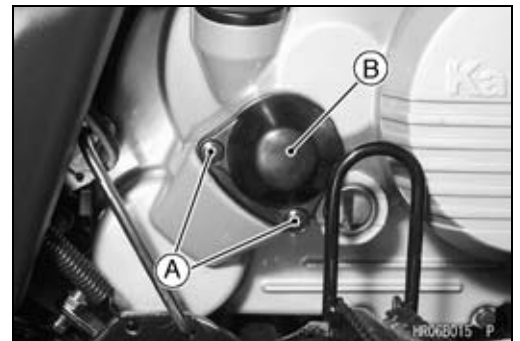
- Install the drain plug.



## Clutches

### Clutch Adjustment

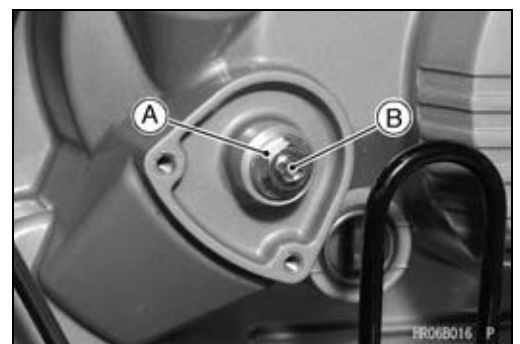
- Remove:
  - Screws [A]
  - Adjusting Screw Cover [B]



- Loosen the locknut [A].
- Turn the adjusting screw [B] clockwise until it becomes hard to turn.
- Turn the adjusting screw counterclockwise until it becomes hard to turn.
- Tighten the locknut without changing the adjusting screw position.

**Torque - Clutch Adjustment Locknut: 11 N·m (1.1 kgf·m, 95 in·lb)**

- Install the adjusting screw cover.



## 2-12 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

#### Engine Lubrication System

##### Engine Oil Change

- Support the vehicle so that it is level side to side and front to back after warming up the engine.
- Remove the engine drain plug [A] to drain the oil.
- The oil in the filter can be drained by removing the filter (see Oil Filter Change).
- ★ Replace the drain plug gasket with a new one if it is damaged.
- Tighten:
  - Torque - Engine Drain Plug : 29 N·m (3.0 kgf·m, 22 ft·lb)
- Pour in the specified type and amount of oil.

##### Engine Oil

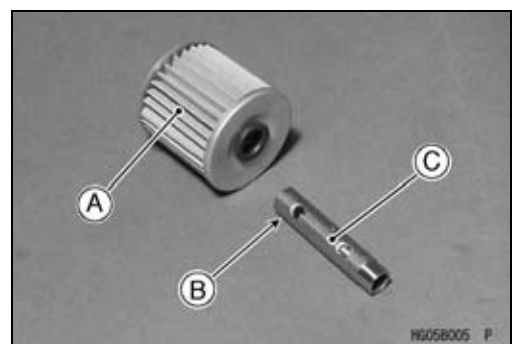
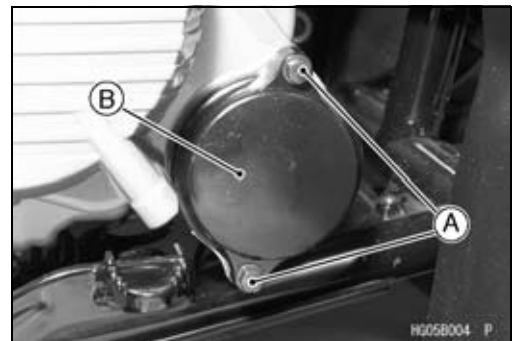
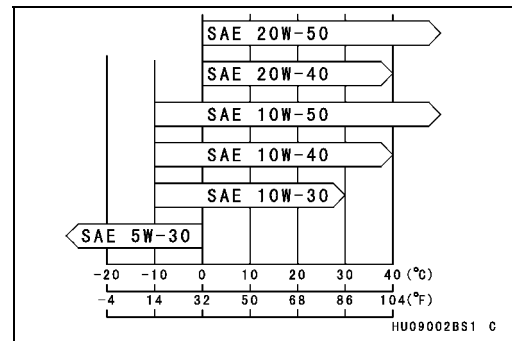
- Type:           API SF or SG  
                    API SH or SJ with JASO MA
- Viscosity:       SAE 10W-40
- Amount:         2.0 L (2.11 US qt)  
                    (When filter is not removed)  
                    2.1 L (2.22 US qt)  
                    (When filter is removed)  
                    2.75 L (2.91 US qt)  
                    (When engine is completely dry)

#### NOTE

- Depending on the atmospheric temperature of your riding area, the engine oil viscosity should be changed according to the chart.

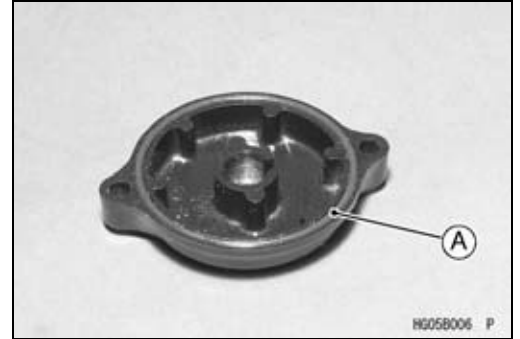
##### Oil Filter Change

- Drain the engine oil.
- Remove:
  - Oil Filter Cover Bolts [A]
  - Oil Filter Cover [B]
- Replace the filter [A] with a new one.
- When installing the oil filter, be careful of the following.
- The large end of mounting pin [B] goes in first.



**Periodic Maintenance Procedures**

- Apply grease to the O-ring [A] in the cover.
- Tighten:
  - Torque - Oil Filter Cover Bolts: 8.8 N·m (0.9 kgf·m, 78 in·lb)**
- Pour in the specified type and amount of oil.



**Wheels/Tires**

*Tire Inspection*

- Examine the tire for damage and wear.
- ★ If the tire is cut or cracked, replace it.
- Lumps or high spots on the tread or sidewalls indicate internal damage requiring tire replacement.
- Remove any foreign objects from the tread. After removal, check for leaks with a soap and water solution.
- Measure the tread depth at the center of the tread with a depth gauge. Since the tire may wear unevenly, take measurements at several places.
- ★ If any measurements are less than the service limit, replace the tire.

**Tire Tread Depth**

**Service Limit:**

- Front:                4 mm (0.16 in.)**
- Rear:                 4 mm (0.16 in.)**

**Standard Tire**

- Front:    AT 21 x 8 - 9 DUNLOP KT856 Tubeless**
- Rear:     AT 22 x 10 - 10 DUNLOP KT857 Tubeless**

## 2-14 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

#### Final Drive

##### Final Gear Case Oil Change

- Warm up the oil by running the vehicle so that the oil will pick up any sediment and drain easily. Then stop the vehicle.
- Park the vehicle so that it is level, both side-to-side and front-to-rear.
- Place an oil pan beneath the final gear case and remove the drain plug [A].

#### CAUTION

**When draining or filling the final gear case, be careful that no oil gets on the tire or rim because oil will deteriorate the tire. Clean off any oil that inadvertently gets on them with a high-flash point solvent.**

- After the oil has completely drained out, install the drain plug with a new aluminum gasket.  
**Torque - Final Gear Case Drain Plug : 20 N·m (2.0 kgf·m, 14 ft·lb)**
- Unscrew the oil level inspection bolt.
- Pour the oil into the case until the oil comes out of the bolt hole.

##### Final Gear Case Oil

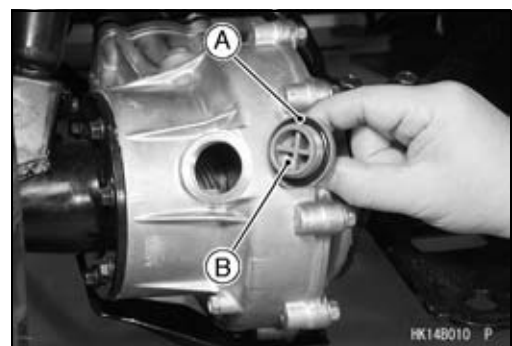
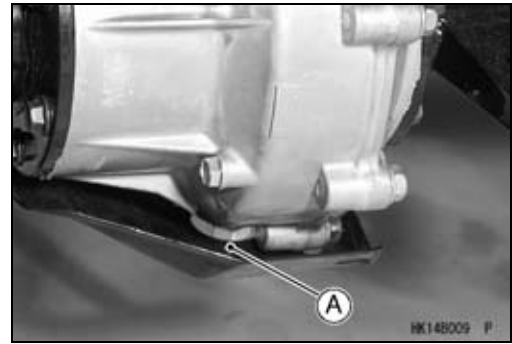
Type:	API "GL-5" Hypoid gear oil
Viscosity:	SAE90 (above 5°, 41°F) SAE80 (below 5°, 41°F)
Capacity	0.2 L (0.21 US qt)

#### NOTE

○ "GL-5" indicates a quality and additive rating. "GL-6" rated hypoid gear oils can also be used.

- Be sure the O-ring [A] is in place and tighten the filler cap [B].

**Torque - Final Gear Case Filler Cap : 15 N·m (1.5 kgf·m, 11 ft·lb)**



##### Propeller Shaft Joint Boot Inspection

- Visually inspect the rear propeller shaft joint boot [A] in accordance with the Periodic Maintenance Chart or if the shaft is noisy during operation.
- ★ If the joint boot is torn, worn, or deteriorated, replace the joint boot and check the propeller shaft (see Propeller Shaft Inspection in Final Drive chapter).

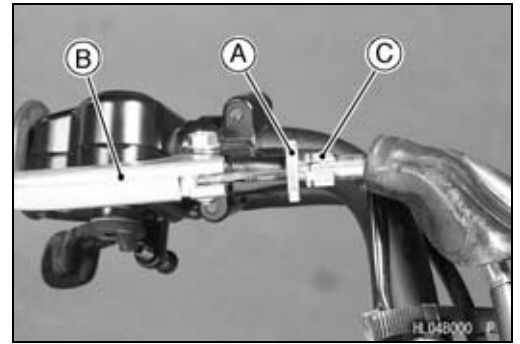


**Periodic Maintenance Procedures**

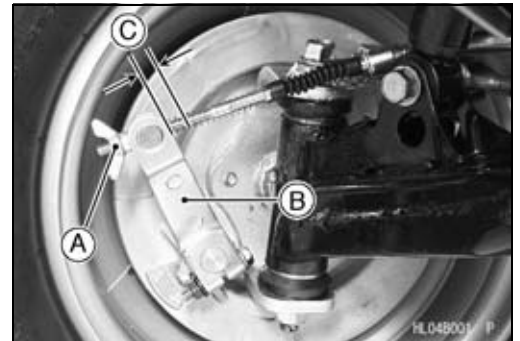
**Brakes**

*Front Brake Adjustment*

- Loosen the locknut [A] at the brake lever [B] and turn in the adjuster [C] as far as it will go to make the brake lever loose.



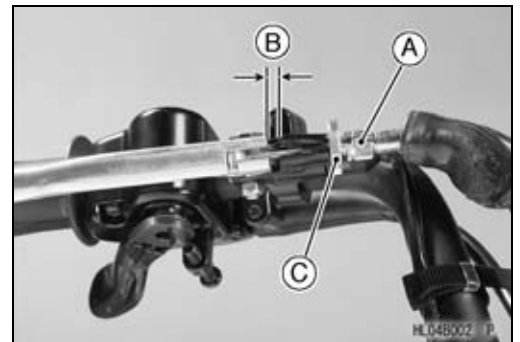
- Turn each adjuster [A] at both lower ends of the cable so that each brake cam lever [B] will have 2 ~ 3 mm (0.08 ~ 0.12 in.) [C] of free play.



- Turn the adjuster [A] at the brake lever until the brake lever has the specified amount of free play [B].

**Front Brake Lever Free Play**

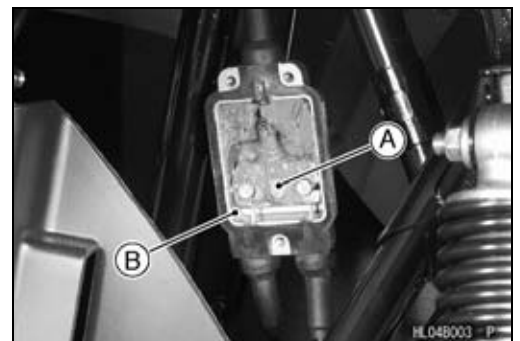
**Standard:** 1 ~ 2 mm (0.04 ~ 0.08 in.)



- Tighten the locknut [C].

**NOTE**

- Once the adjustment has been made following the above procedures, ordinarily adjust the free play by using the adjusters at both lower ends of the cable.
- Make sure that the equalizer [A] is lifted parallel to the bottom of the case [B] when brake lever is pulled in to prevent the brakes from pulling to either side.





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