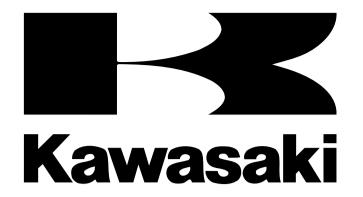
MODEL APPLICATION

Year	Model	Beginning Frame No.
2003	KAF950-B1	JK1AFDB1□3B500001
2004	KAF950-B2	JK1AF950BBB600101 or JK1AFDB1□4B501501

 $\hfill\Box$:This digit in the frame number changes from one machine to another.





MULE 3010 DIESEL



Utility Vehicle Service Manual

Quick Reference Guide

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LIST OF ABBREVIATIONS

Α	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) 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)		

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.

How to Use This Manual

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 General Information chapter. The chart gives a time schedule for required maintenance operations.

If you want engine oil information, for example, go to the Periodic Maintenance Chart first. The chart tells you how frequently to change the oil. Next, use the Quick Reference Guide to locate the Engine Lubrication System chapter. Then, use the Table of Contents on the first page of the chapter to find the Engine Oil section.

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

A 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.
- O 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.

1

General Information

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1-2 GENERAL INFORMATION

Before Servicing

Before starting to perform an inspection service or carry out a disassembly and reassembly operation on a motorcycle, read the precautions given below. To facilitate actual operations, notes, illustrations, photographs, cautions, and detailed descriptions have been included in each chapter wherever necessary. This section explains the items that require particular attention during the removal and reinstallation or disassembly and reassembly of general parts.

Especially note the following:

(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.

(10)Liquid Gasket, Locking Agent

Before Servicing

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

——————————————————————————————————————

(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:

[&]quot;Standards" show dimensions or performances which brand-new parts or systems have.

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

Model Identification

KAF950-B1 Left Side View:



KAF950-B1 Right Side View:



1-6 GENERAL INFORMATION

General Specifications

Items		KAF950-B1 ∼ B2
Dimensions:		
Overall length		2 861 mm (112.64 in.)
Overall width		1 440 mm (56.69 in.)
Overall height		1 930 mm (75.98 in.)
Wheelbase		1 870 mm (73.62 in.)
Tread:	Front	1 160 mm (45.67 in.)
	Rear	1 180 mm (46.46 in.)
Ground clearanc	e	175 mm (6.89 in.)
Seat height		875 mm (34.45 in.)
Dry weight		681 kg (1 502 lb)
Curb weight:	Front	312 kg (688 lb)
	Rear	400 kg (882 lb)
Fuel tank capacit	ty	20 L (5.3 US gal)
Cargo bed (L × V		1 175 × 1 310 × 288 mm (46.26 × 51.57 × 11.34 in.)
Performance:	,	,
Minimum turning	radius	3.4 m (11.16 ft)
Engine:		
Туре		4-stroke, OHV, Diesel, 3 cylinder
Cooling system		Liquid-cooled
Bore and stroke		72 × 78 mm (2.83 × 3.07 in.)
Displacement		953 mL (58.15 cu in.)
Compression ratio		24.8
Injection pump		Denso VE type
Starting system		Electric starter
Cylinder numberi	ing method	Right to left, 1-2-3
Firing order		Right to left, 1-2-3
Valve timing:		
Inlet:	Open	10° BTDC
	Close	45° ABDC
	Duration	235°
Exhaust:	Open	45° BBDC
	Close	10° ATDC
	Duration	235°
Lubrication syste	m	Forced lubrication (wet sump)
Engine oil:	Grade	API CF or CF4
	Viscosity	SAE10W-40
	Capacity	3.3 L (3.5 US qt)
Drive Train:		
Primary reduction	n system:	
Туре		Belt drive torque converter
Reduction ratio)	3.5 ~ 0.98 (KAF950–B1), 3.7 ~ 0.98 (KAF950–B2)

General Specifications

Items		KAF950-B1 ~ B2
Transmission gear ratio	D:	
Forward:	High	1.821 (51/28)
	Low	3.750 (51/28 × 25/20 × 28/17)
Reverse:	Low	4.220 (41/20 × 25/20 × 28/17)
Final drive system:		
Type		Gear (4WD/2WD)
Reduction	ratio	5.4 (81/15) (KAF950–B1),
		5.429 (76/14) (KAF950–B2)
Overall drive ratio:		,
Forward:	High	9.639 (KAF950-B1), 9.690 (KAF950-B2)
	Low	19.845 (KAF950-B1), 19.950 (KAF950-B2)
Reverse:	Low	22.335 (KAF950-B1), 22.454 (KAF950-B2)
Front final gear case oil:	Type	API GL-5 or GL-6 Hypoid gear oil for LSD
		SAE90, or SAE140
	Capacity	0.4 L (0.4 US qt)
Transmission oil:	Type	API GL-5 Hypoid gear oil, SAE90 (above 5°C, 41°F) or
		SAE80 (below 5°C, 41°F)
	Capacity	2.5 L (2.6 US qt)
Frame:		
Type		Steel tube, Ladder
Caster (rake angle)		7.5°
Camber		0.8°
Trail		35 mm (1.38 in.)
Tire:		,
Front and I	Rear	23 x 11.00-10, Tubeless
Steering type		Rack and pinion
Suspension:		·
Front:	Type	MacPherson strut
	Wheel travel	100 mm (3.94 in.)
Rear:	Type	De Dion axle
	Wheel travel	70 mm (2.76 in.)
Brake Type:		
Front and I	Rear	Drum (Hydraulic)
Parking brake type		Drum (Mechanical internal expansion)
Electrical Equipment:		
Battery		12 V 52 Ah
Headlight:	Туре	Semi-sealed beam
	Bulb	12 V 30W × 2
Tail/brake light		12 V 5/21 W
Alternator:	Туре	Three - phase AC
	Rated output	12V, 40 A
Load Capacity:		
Maximum vehicle load		
(including occupants	and cargo)	740 kg (1 631 lb)
Maximum cargo bed lo	ad	499 kg (1 100 lb)

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

1-8 GENERAL INFORMATION

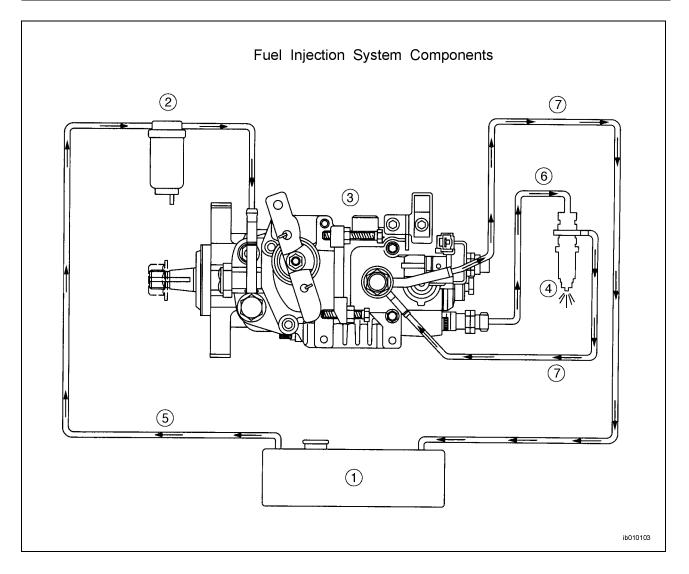
Technical Information - Fuel Injection System Components

The fuel system consists of a gear driven injection pump with fuel delivery and return lines and an injection nozzle for each cylinder. Diesel fuel is drawn from the fuel tank through the fuel filter by the feed pump which is incorporated in the injection pump and delivers fuel to the injection nozzles at a constant volume regardless of pump RPM. The feed pump also circulates fuel through the pump for lubrication purposes.

A single pump plunger meters and distributes fuel in the correct firing order through an injection nozzle in each combustion chamber. Excess fuel from the injection nozzles and pump is returned to the fuel tank by way of the overflow screw and return line. This system of fuel circulation lubricates and cools the injection pump and also warms the fuel in the fuel tank to help prevent fuel waxing in cold weather.

CAUTION

Always use clean fresh diesel fuel with a minimum of 40 cetane (ASTM D975). DO NOT use kerosene. The injection pump requires diesel fuel for lubrication. Damage to the injection pump and/or engine may result if kerosene is used.



- 1. Fuel Tank
- 2. Fuel Filter
- 3. Injection Pump
- 4. Injection Nozzles

- 5. Fuel Line
- 6. Fuel Delivery Line
- 7. Fuel Return Line

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol		Power
mega	M	×	1 000 000
kilo	k	×	1 000
centi	С	×	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/cm²
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cmHg
kgf/cm²	×	98.07	=	kPa
kgf/cm ²	×	14.22	=	psi
cm Hg	×	1.333	=	kPa
	kPa kPa kgf/cm² kgf/cm²	kPa × kpa × kgf/cm² × kgf/cm² ×	kPa × 0.1450 kPa × 0.7501 kgf/cm² × 98.07 kgf/cm² × 14.22	kPa × 0.1450 = kPa × 0.7501 = kgf/cm^2 × 98.07 = kgf/cm^2 × 14.22 =

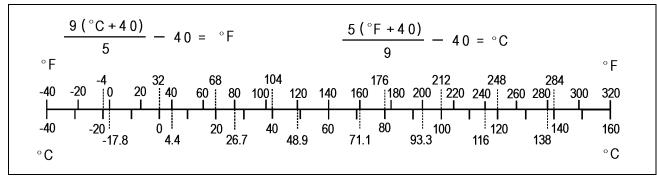
Units of Speed:

km/h × 0.6214 =	mph
-----------------	-----

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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Chango	2 27		

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.

FREQUENCY	Whichever	First	-				
	comes	Ser- vice		Regular Service			
	first	After	Every	Every	Every	Every	
	\rightarrow	50 h, or	100 h, or	250 h, or	500 h, or	800 h, or	See
	↓	1000 km	2000 km	5000 km	10000 km	16000 km	Page
OPERATION	Every	of use	of use	of use	of use	of use	
ENGINE							
Converter drive belt - inspect*				•			2–24
Converter drive belt deflection - inspect* (KAF950–B2)				•			2–24
Converter drive belt deflection - adjust* (KAF950–B2)				•			2–25
Converter driven pulley shoe -inspect*					•		2–26
Converter air cleaner element -clean*		•		•			2–27
Valve clearance - inspect					•		2–22
Engine oil - change*	1 year	•	•				2–27
Oil filter - replace*		•		•			2–27
Throttle pedal play - inspect		•			•		2–13
Idle speed - adjust		•		•			2–13
Fuel hose - replace	4 years						2–14
Fuel filter element - replace*						•	2–15
Fuel filter water - drain*			•				2–16
Fuel hoses and connections -inspect*		•		•			2–14
Spark arrester - clean				•			2–23
Radiators - clean*		•		•			2–16
Radiator hoses and connections -inspect*	1 year	•			•		2–17
Coolant - change	2 years						2–17
Cooling fan belt - inspect			•				2–20

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

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

Periodic Maintenance Chart

	I						
FREQUENCY	Whichever	First		Regular	Service		
	comes	Service		<u> </u>	T		
	first	After	Every	Every	Every	Every	
	\rightarrow	50 h, or	100 h, or	250 h, or	500 h, or	800 h, or	See
	\	1000 km	2000 km	5000 km	10000 km	16000 km	Page
OPERATION	Every	of use	of use	of use	of use	of use	
CHASSIS							
Steering - inspect		•		•			2–41
Steering joint dust boots - inspect		•		•			2–41
Brake pedal play - inspect*		•		•			2–33
Parking brake lever - inspect		•		•			2–39
Brake hose and pipe - inspect		•		•			2–34
Brake fluid level - inspect		•		•			2–31
Brake wear - inspect*				•			2–36
Tire wear - inspect*		•		•			2–30
Battery - inspect				•			2–41
Brake light switch - inspect		•		•			2–43
Seat belt - inspect				•			2–46
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Bolts, nuts, and fasteners tightness - inspect		•		•			2–45
Wheel nuts tightness - inspect		•		•			2–29
Front final gear case oil and transmission oil - change*	1 year	•			•		2–29 2–30
Brake fluid - change	2 years						2–32
Brake master cylinder cup and dust seal - replace	2 years						2–33
Brake wheel cylinder assembly -replace	2 years						2–37
Brake hose - replace	4 years						2–34

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

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

2-4 PERIODIC MAINTENANCE

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.

- L: Apply a non-permanent locking agent to the threads.
- MO: Apply molybdenum disulfide oil (the weight ratio of the mixture between engine oil and disulfide grease is 10 : 1).
 - O: Apply an oil to the threads, seated surface, or washer.
 - S: Tighten the fasteners following the specified sequence.
- SS: Apply a silicone sealant to the threads.
- LG: Apply liquid gasket (Three Bond: 1207F).

Factoria		Damadra		
Fastener	N⋅m	kgf⋅m	ft⋅lb	Remarks
Fuel System:				
Fuel injection nozzles	59	6.0	43	
Linkage pipe nuts	27	2.8	20	
Idle adjusting screw locknut	5.6	0.57	50 in·lb	
Maximum speed set screw locknut	6.9	0.70	61 in·lb	
Fuel injection pipe mounting nuts	25	2.5	18	
Fuel injection pipe clamp bolts	7.4	0.75	65 in·lb	
Distributor head bolt	17	1.7	12	
Fuel injection pump mounting nuts	20	2.0	14	
Fuel injection pump bracket bolts	20	2.0	14	
Fuel filter mounting bolts	20	2.0	14	
Air vent plug	4.9	0.50	43 in·lb	
Cooling System:				
Water pump mounting bolts and nuts	20	2.0	14	
Coolant inlet bolts	7.8	0.80	69 in·lb	
Fan mounting bolts	8.8	0.90	78 in·lb	
Thermostat housing cap bolts	7.8	0.80	69 in·lb	
Radiator fan switch	25	2.5	18	
Radiator mounting bolts	8.8	0.90	78 in·lb	
Radiator screen bolts	8.8	0.90	78 in·lb	
Coolant reservoir tank bolts	4.5	0.45	40 in·lb	
Coolant drain plug	25	2.5	18	L
Coolant temperature warning light switch	27	2.8	20	L
Thermostat housing cap plug	_	_	_	L
Engine Top End:				
Cylinder head bolts	34	3.5	25	O, S
Cylinder head cover nuts	5.4	0.55	48 in·lb	
Rocker arm components mounting nuts	20	2.0	14	
Valve adjusting screw locknuts	11	1.1	95 in·lb	
Intake manifold mounting bolts and nuts	7.8	0.80	69 in·lb	
Exhaust manifold mounting nuts	20	2.0	14	

Fastener	N⋅m	Torque kgf·m	ft·lb	Remarks
Muffler mounting bolts	_	_	_	L
Water pump mounting studs	_	_	_	L
Converter System:				
Drive pulley bolt	93	9.5	69	
Driven pulley bolt	93	9.5	69	L
Converter outer cover bolts	4.4	0.45	39 in·lb	
Converter case bolts (L=55 mm) and Nut	27	2.8	20	L
Converter case bolts (L=28 mm)	20	2.0	14	L
Drive pulley cover bolts	13	1.3	110 in·lb	
Drive pulley Long Nose cover Mounting bolts	8.8	0.9	78 in·lb	
Driven pulley coupling bolts	13	1.3	110 in·lb	
Weight holder bolts	13	1.3	110 in·lb	
Ramp Weight Nuts	6.9	0.7	61 in·lb	
Roller holder bolts	13	1.3	110 in·lb	
Spider	275	28	203	
Inner cover bolts	4.4	0.45	39 in·lb	
Wear Shoe Mounting Screws	1.1	0.11	10 in·lb	L
Ramp weight collar bolts	7.8	0.80	69 in·lb	L
Engine Lubrication System:				
Engine oil drain plugs	34	3.5	25	
Oil strainer mounting bolts and nuts	7.8	0.80	69 in·lb	
Oil pan bolts and nuts	7.8	0.80	69 in·lb	
Oil pressure relief valve bolt	39	4.0	29	
Oil pressure switch	14	1.4	10	SS
Oil filter stud bolt	44	4.5	33	
Oil pump gear bolt	20	2.0	14	
Oil nozzle	9.8 ~ 18	1.0 ~ 1.8	7.2 ~ 13	
Engine Removal/Installation:				
Stay rod rear bolt	88	9.0	65	
Engine bracket bolts	_	_	_	L
Engine mounting bolts	44	4.5	33	
Crankshaft/Crankcase:				
Camshaft retainer bolts	7.8	0.80	69 in·lb	
Timing gear case bolts	7.8	0.80	69 in·lb	
Idle gear bolts	25	2.6	19	
Fuel injection pump gear nut	64	6.5	47	
Camshaft gear bolt	43	4.4	32	
Oil pump gear bolt	20	2.0	14	
Oil nozzle	9.8 ~ 18	1.0 ~ 1.8	7.2 ~ 13	
Timing gear case cover bolts and nuts	7.8	0.80	69 in·lb	
Crankshaft pulley bolt	98	10	72	0

2-6 PERIODIC MAINTENANCE

Fastener	N⋅m	Torque kgf·m	ft·lb	Remarks
Connecting rod cap nuts	36	3.7	27	
Crankshaft main bearing cap bolts	59	6.0	43	
Oil seal retainer bolts	5.4	0.55	48 in·lb	
End plate bolt	39	4.0	29	
Flywheel mounting bolts	44	4.5	33	LG
Flywheel coupling bolts	37	3.8	27	L
Crankcase plug	25	2.5	18	L
End plate seal cover bolts	_	_	_	LG
End plate seal cover studs	_	_	_	LG
Transmission:				
Transmission oil drain plug	15	1.5	11	
Transmission case mounting bolts	44	4.5	33	
Transmission case bolts	8.8	0.90	78 in·lb	
Shift arm positioning bolt	37	3.8	27	
Hi/Low gear case bolts	20	2.0	14	
Shift shaft stop bolt	7.8	0.80	69 in·lb	
Differential gear housing bolts (KAF950–B1)	29	3.0	22	L
Differential gear housing bolts (KAF950–B2)	57	5.8	42	L
Bearing holder	120	12	87	
Neutral switch	15	1.5	11	
Wheels/Tires:				
Tie-rod end locknuts	49	5.0	36	
Wheel nuts	140	14	100	
Final Drive:				
Oil filler cap	29	3.0	22	
Oil drain plug	20	2.0	14	
Gear case bracket bolts	44	4.5	33	
Gear case mounting nuts	44	4.5	33	
Ring gear cover bolts (10 mm)	47	4.8	35	
Ring gear cover bolts (8 mm)	25	2.5	18	
Pinion gear bearing housing nuts	25	2.5	18	
Differential case torx bolts	32	3.3	24	L
Ring gear bolts	49	5.0	36	
Pinion gear slotted nut	120	12	87	MO
Bevel gear case bolts	22	2.2	16	
Driven gear shaft nut	110	11	80	L
Bearing holder	120	12	87	L
Housing locknut	120	12	87	L
Bevel gear case holder nuts	25	2.5	18	
Drive gear nut	120	12	87	MO
Drive shaft cap bolts	8.8	0.90	78 in·lb	

_ ,				
Fastener	N·m	Torque kgf·m	ft⋅lb	Remarks
Brakes:				
Bleed valves	5.9	0.60	52 in·lb	
Push rod locknut	18	1.8	13	cylinder
Brake hose banjo bolts	25	2.5	18	
Brake pipe nipples	18	1.8	13	
Piston stop bolt	8.8	0.90	78 in·lb	cylinder
Master cylinder reservoir cap	3.4	0.35	30 in·lb	
Reservoir clamp bolt	5.9	0.60	52 in·lb	
Front axle nut	200	20	140	
Rear axle nut	300	31	220	
Wheel cylinder mounting bolts	11	1.1	95 in·lb	front
Wheel cylinder mounting nuts	7.8	0.80	69 in·lb	rear
Brake panel mounting bolts	44	4.5	33	L
Suspension:				
Strut mounting nuts	44	4.5	33	
Strut clamp nut	98	10	72	
Rear shock absorber mounting nuts	59	6.0	43	
Strut locknut	49	5.0	36	
Front suspension arm pivot bolts	98	10	72	
Front suspension arm joint nut	78	8.0	58	
Damper bracket mounting nuts	44	4.5	33	
Leaf spring mounting nuts (front)	98	10	72	
Leaf spring mounting nuts (rear)	59	6.0	43	
Steering:				
Steering wheel mounting nut	52	5.3	38	
Intermediate shaft clamp bolts	20	2.0	14	
Steering gear assembly bracket bolts	52	5.3	38	L
Tie-rod end nuts	34	3.5	25	
Rack guide spring cap locknut	39	4.0	29	
Tie-rod end locknuts	49	5.0	36	
Strut clamp nut	98	10	72	
Frame:				
Battery holder mounting nut	17	1.7	12	
Stay rod rear bolt	88	9.0	65	
Seat belt mounting bolts	34	3.5	25	
Front bar mounting bolts (lower)	98	10	72	
Front bar mounting bolts (upper)	44	4.5	33	
Rear bar mounting bolts and nuts (lower)	44	4.5	33	
Rear end sub-frame mounting nuts	44	4.5	33	
Latch Handle	4.4	0.45	39	

2-8 PERIODIC MAINTENANCE

Fastener	Torque			Bomorko
Fasterier	N·m	kgf·m	ft·lb	Remarks
Electrical System:				
Alternator adjusting bracket bolts	20	2.0	14	
Alternator mounting bolt	39	4.0	29	
Alternator pulley locknut	11	1.1	95 in·lb	
Starter motor mounting bolts	39	4.0	29	
Starter motor end cover screws	1.5	0.15	13 in·lb	
Starter motor through bolts	9.3	0.95	82 in·lb	
Glow plugs	17	1.7	12	
Connecting plate nuts	1.2	0.12	10 in·lb	
Oil pressure switch	14	1.4	10	SS
Neutral switch	15	1.5	11	
Radiator fan switches	25	2.5	18	
Coolant temperature warning light switch	27	2.8	20	L

Torque and Locking Agent

The table below, relating tightening torque to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. All of the values are for use with dry solvent-cleaned threads.

Basic Torque for General Fasteners of Engine Parts

Threads dia.	Mark of	Torque		
(mm)	bolt head	N·m	kgf∙m	ft·lb
6	4T	3.9 ~ 4.9	0.40 ~ 0.50	35 ~ 43 in·lb
6	7T	7.8 ~ 9.8	0.80 ~ 1.0	69 ~ 87 in·lb
6	9T	12 ~ 15	1.2 ~ 1.5	104 ~ 130 in·lb
8	4T	10 ~ 14	1.0 ~ 1.4	87 ~ 120 in·lb
8	7T	18 ~ 22	1.8 ~ 2.2	13 ~ 16
10	4T	20 ~ 24	2.0 ~ 2.4	14 ~ 17
10	7 T	39 ~ 44	4.0 ~ 4.5	29 ~ 33

Basic Torque for General Fasteners of Frame Parts

Threads dia.	Torque		
(mm)	N·m	kgf⋅m	ft·lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in·lb
6	5.8 ~ 7.9	0.60 ~ 0.80	52 ~ 69 in·lb
8	14 ~ 19	1.4 ~ 1.9	10 ~ 14
10	26 ~ 34	2.6 ~ 3.5	19 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45

2-10 PERIODIC MAINTENANCE

Specifications

Item	Standard	Service Limit
Fuel System:		
Throttle pedal free play	5 ~ 10 mm (0.2 ~ 0.39 in.)	
Idle speed	850 ~ 950 r/min (rpm)	
Cooling System:		
Coolant:		
Туре	Permanent type of antifreeze	
	(Soft water and ethylene glycol plus	
	corrosion and rust inhibitor chemicals	
	for aluminum engine and radiators)	
Color	Green	
Mixed ratio	Soft water 50 % × coolant 50 %	
Freezing point	-35°C (-31°F)	
Total amount	4.6 L (4.9 US qt)	
Fan belt deflection	9.5 ~ 11.5 mm/10 kgf (22lb)	
Engine Top End:		
Valve clearance (when cold)	0.2 mm (0.0079 in.)	
Converter System:		
Belt width	31.5 mm (1.24 in.) (KAF950–B1),	30.0 mm (1.18 in.)
	34.1 mm (1.34 in.) (KAF950–B2),	32.6 mm (1.28 in.)
Belt deflection	28 ~ 36 mm (1.10 ~ 1.42 in.) (KAF950–B2)	
Wear shoe width		11 mm (0.43 in.)
		(KAF950-B1)
		16.4 mm (0.65 in.)
		(KAF950-B2)
Engine Lubrication System:		,
Engine oil:		
Grade	API CF or CF-4 class	
Viscosity	SAE10W-40	
Capacity	3 L (3.2 US qt) (when filter is not removed)	
, ,	3.3 L (3.5 US qt) (when filter is removed)	
Oil level	Between F and L marks on dipstick	
Transmission:	·	
Transmission Oil:		
Туре	API "GL-5" Hypoid gear oil	
Viscosity	SAE90: above 5°C (41°F) or	
	SAE80: below 5°C (41°F)	
Capacity	2.5 L (2.6 US qt)	
Oil level	Between upper and lower level lines	
Wheels/Tires		
Tire tread depth	13.2 mm (0.520 in.)	3 mm (0.12 in.)
·	, ,	,

Specifications

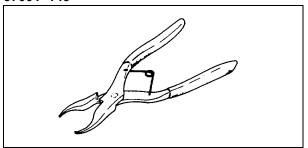
Item	Standard	Service Limit
Final Drive:		
Front final gear case oil:		
Туре	API "GL-5 or GL-6" hypoid gear oil for LSD	
	(Limited Slip Differential gears)	
Viscosity	SAE90 or SAE140	
Capacity	0.4 L (0.4 US qt)	
Oil level	Filler opening level	
Brakes:		
Brake fluid:		
Туре	DOT3	
Fluid level	Between upper and lower level lines	
Brake pedal play	2 ~ 10 mm (0.08 ~ 0.39 in.)	
Brake drum inside diameter	180.000 ~ 180.160 mm	180.75 mm
	(7.0866 ~ 7.0929 in.)	(7.116 in.)
Brake shoe lining thickness	4.5 mm (0.18 in.)	1.0 mm (0.04 in.)
Parking brake lever travel	8 ~ 12 notches (clicks)	
	at 200 N (20 kgf, 44 lb)	
Steering:		
Steering wheel free play	0 ~ 20 mm (0 ~ 0.79 in.)	
Electrical System:		
Battery:		
Capacity	12 V 52 Ah	
Voltage	12.6 V or more	
Electrolyte level	Between upper and lower level (see text)	
Specific gravity	1.265 @ 20° (68°F)	
Switches:		
Brake light switch timing	ON after 10 mm (0.39 in.) of pedal travel	

2-12 PERIODIC MAINTENANCE

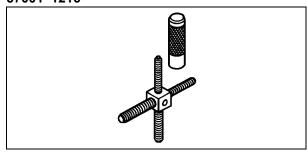
Special Tools

Inside Circlip Pliers:

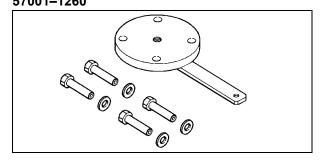
57001-143



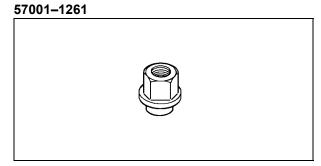
Rotor Puller, M16/M18/M20/M22 x 1.5 : 57001–1216



Brake Drum Remover: 57001–1260

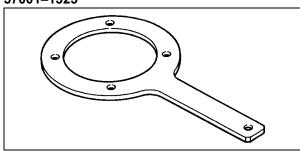


Brake Drum Pusher:



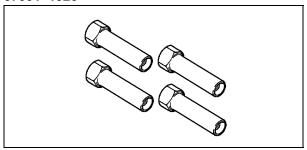
Brake Drum Holder:

57001-1325



Brake Drum Remover Nuts:

57001-1326



Periodic Maintenance Procedures

Fuel System

Throttle Pedal Free Play Inspection

- Check that the throttle pedal moves smoothly from full open to close.
- ★If the throttle pedal does not return properly, lubricate the throttle cable and link (see Fuel System chapter).
- Check the throttle pedal free play [A].

Throttle Pedal Free Play

Standard: $5 \sim 10 \text{ mm } (0.2 \sim 0.4 \text{ in.})$

- ★If the free play is incorrect, adjust the throttle cable.
- Tilt up the cargo bed.
- Loosen the adjuster mounting nuts [A] at the engine end of the cable.
- Slide the adjuster [B] until the proper amount of throttle pedal free play is obtained.
- Tighten the mounting nuts securely.
- Start the engine.
- With the transmission in neutral, operate the throttle pedal a few times to make sure that the idle speed does not change.
- ★If the idle speed does change, the throttle cable may be improperly adjusted, incorrectly routed, or it may be damaged.
- Correct any of these conditions before operation.

▲ WARNING

Operation with improperly adjusted, incorrectly routed, or a damaged cable could result in an unsafe operating condition.

NOTE

O If the throttle pedal free play cannot be adjusted by using the adjuster at the engine end of the cable, use the cable adjuster [A] at the throttle pedal. Do not forget to securely tighten the adjuster mounting nuts [B].

Idle Speed Inspection

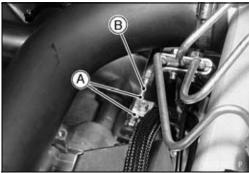
- Start the engine and warm it up thoroughly.
- Tilt up the cargo bed.
- Check the idle speed with a suitable tachometer [A].
 Tachometer Adapter [B]

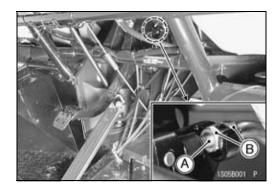
Idle Speed

Standard: 850 ~ 950 r/min (rpm)

★If the idle speed is out of the specified range, adjust it.







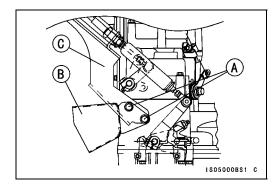


2-14 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

• Remove:

Injection Pump Cover Bolts [A]
Injection Pump Cover [B] (only)
O Retighten the bolts with bracket [C].



- Start the engine and warm it up thoroughly.
- Loosen the locknut [A].
- Turn the idle adjusting screw [B] at the injection pump until the idle speed is correct.
- Tighten:

Torque - Idle Adjusting Screw Locknut: 5.6 N·m (0.57 kgf·m, 50 in·lb)

 Open and close the throttle a few times to make sure that the idle speed is within the specified range. Readjust if necessary.

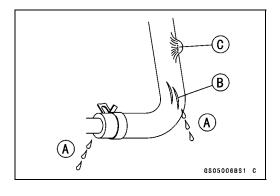


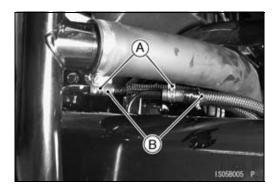
- Lift up the cargo bed and seat.
- Check the fuel hoses and fittings for deterioration, cracks and signs of leakage.
- ★Replace the fuel hose if any fraying, leak [A], cracks [B] or bulges [C] are noticed.
- Check that the hoses are securely connected and clamps are installed correctly.
- When installing, route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- When installing the fuel hoses, avoid sharp bending, kinking, flattening or twisting, and route the fuel hoses with a minimum of bending so that the fuel flow will not be obstructed.
- ★Replace the hose if it has been sharply bent or kinked.

Fuel Hoses Replacement

- Tilt up the cargo bed and seat.
- Slide out the plate clamps [A].
- Remove the hoses [B] (see Exploded View in Fuel System chapter).
- When installing, route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- When installing the fuel hoses, avoid sharp bending, kinking, flattening or twisting, and route the fuel hoses with a minimum of bending so that the fuel flow will not be obstructed.

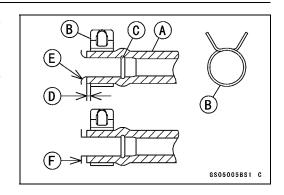






Periodic Maintenance Procedures

- Fit the fuel hose [A] onto the fitting fully and install the plate clamp [B] beyond the raised rib [C].
 - $1 \sim 2 \text{ mm} (0.0039 \sim 0.0078 \text{ in.}) [D]$
- O The hose end must reach the filler [E] or be as near as possible to the step [F].

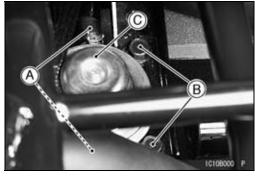


• Bleed the air from the fuel filter (see Next Section).

Fuel Filter Element Replacement

- Tilt up the seat.
- Remove:

Fuel Hoses [A]
Fuel Filter Mounting Bolts [B]
Fuel Filter [C]



• Remove:

Drain Cap [A]

O-ring [B]

Filter Cartridge [C]

- OUse a suitable filter wrench.
- Install a new filter cartridge by hand until the gasket contacts the housing. Then tighten it 1/3 turn more.
- Install:

Drain Cap

New O-ring

Fuel Filter

Fuel Hoses

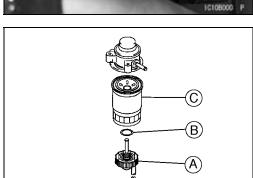
• Tighten:

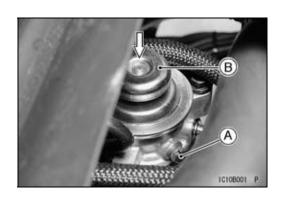
Torque - Fuel Filter Mounting Bolts: 20 N·m (2.0 kgf·m, 14 ft·lb)

- Bleed the air from the fuel filter.
- O Loosen the air vent plug [A].
- O Pump the priming button [B] until the fuel comes out of the air vent.
- O Tighten the air vent plug securely.

Torque - Air Vent Plug: 4.9 N·m (0.50 kgf·m, 43 in·lb)

- OWipe off any spilled fuel.
- Start the engine, and check for fuel leakage.



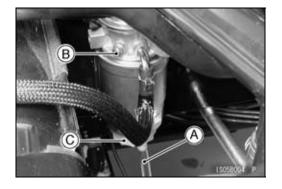


2-16 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Fuel Filter Water Draining

- Tilt up the seat.
- Place a suitable container under the filter drain hose [A].
- Loosen:
 - Air Vent Plug [B]
- Loosen the drain cap [C] approximately 1 turn, and drain water from the filter until only fuel flows from the filter.
- Tighten the drain cap securely.
- Bleed the air from the fuel filter (see Fuel Filter Element Replacement).
- OWipe off any spilled fuel.
- Start the engine, and check for fuel leakage.



Cooling System

Radiator Cleaning

CAUTION

Clean the radiator screens and the radiators in accordance with the Periodic Maintenance Chart. In dusty areas, they should be cleaned more frequently than the recommended interval. After riding through muddy terrain, the radiator screens and the radiators should be cleaned immediately.



• Remove:

Front Cover (for Front Radiator)

Rear Radiator (see Cooling System chapter.)

Radiator Screen Mounting Screws [A]

Radiator Screen [B]

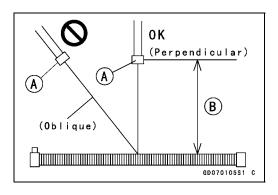
 Clean the radiator screen in a bath of tap water, and then dry it with compressed air or by shaking it.

CAUTION

When cleaning the radiator with a steam cleaner, be careful of the following to prevent radiator damage. Keep the steam gun [A] away more than 0.5 m [B] from the radiator core.

Hold the steam gun perpendicular to the core surface.

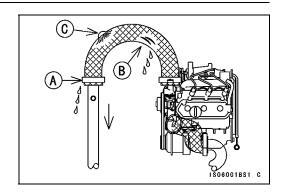
Run the steam gun following the core fin direction.



Periodic Maintenance Procedures

Radiator Hose and Connection Inspection

- OThe high pressure inside the radiator hose can cause coolant to leak [A] or the hose to burst if the line is not properly maintained. Visually inspect the hoses for signs of deterioration. Squeeze the hoses. A hose should not be hard and brittle, nor should it be soft or swollen.
- ★Replace the hose if any fraying, cracks [B] or bulges [C] are noticed.
- Check that the hoses are securely connected and clamps are tightened correctly.



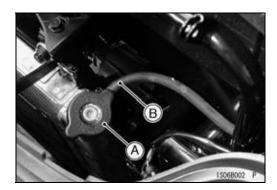
Coolant Change

A WARNING

To avoid burns, do not remove the pressure relief valve cap and radiator caps or try to change the coolant when the engine is still hot. Wait until it cools down. Coolant on tires will make them slippery and can cause an accident and injury. Immediately wash away any coolant that spills on the frame, engine, or wheels.

Since coolant is harmful to the human body, do not use for drinking.

- Tilt up the cargo hood.
- Remove the front radiator valve cap [A] in two steps. First turn the cap counterclockwise to the first stop. Then push and turn it further in the same direction and remove the cap.
- Pull off the reservoir tank hose [B] and pour the coolant into a container.



- Tilt up the seat.
- Turn the rear radiator cap [A] counterclockwise and remove it.



2-18 PERIODIC MAINTENANCE

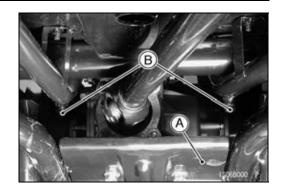
Periodic Maintenance Procedures

• Remove:

Front Final Gear Case Skid Plate [A] (see Final Drive chapter)

Coolant Drain Plugs [B] at Water Pipes

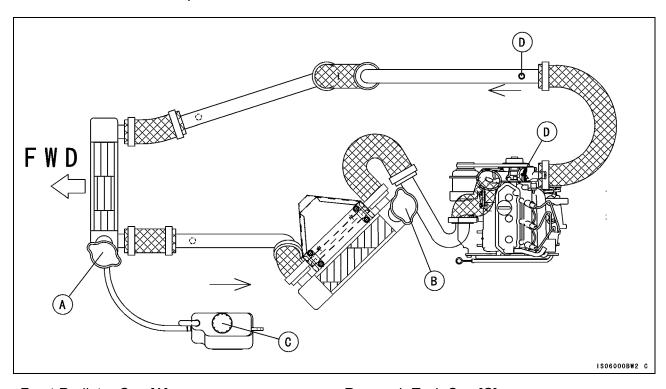
O Place a container under the drain plugs.



- Tighten the drain plugs.
- Install the reservoir tank hose.
- Lift the front wheels 20 ~ 30 cm (7.9 ~ 11.8 in.) from the ground so that the front radiator cap [A] is the highest port of the system.
- Pour the coolant slowly into the front radiator cap fitting.

NOTE

O Pour in the coolant slowly so that the air in the engine and radiators can escape.



Front Radiator Cap [A] Rear Radiator Cap [B] Reservoir Tank Cap [C]
Air Bleeder Bolts [D]

Periodic Maintenance Procedures

CAUTION

Soft or distilled water must be used with antifreeze (see Specifications in this chapter) in the cooling system.

If hard water is used in the system, it causes scale accumulation in the water passages, considerably reducing the efficiency of the cooling system.

Water and Coolant Mixture Ratio (Recommended)

Soft Water: 50 % Coolant: 50 %

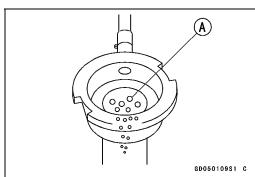
Freezing Point: -35°C (-31°F) Total Amount: 4.6 L (4.9 US qt)

NOTE

- O Choose a suitable mixture ratio by referring to the coolant manufacturer's directions.
- When the coolant begins to flow out the rear radiator cap
 [B] fitting, install the rear radiator cap.
- When the coolant begins to flow out the air bleeder bolt holes, tighten the air bleeder bolts [D].
- Fill the cooling system up to the filler neck [A] in the front radiator cap fitting with coolant.



- Bleed the air from the cooling system as follows.
- O Start the engine and run it until no more air bubbles [A] can be seen in the coolant (less than five minutes).
- O Tap the radiator hoses to force any air bubbles caught inside.
- O Stop the engine and add coolant up to the filler neck.
- Install the front radiator cap.
- Lower the front wheels slowly.



2-20 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

• Fill the reservoir tank up to the F (Full) level line [A] with coolant.

CAUTION

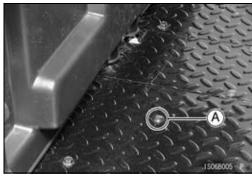
Do not add more coolant above the FULL level line.

• Install the reservoir tank cap.

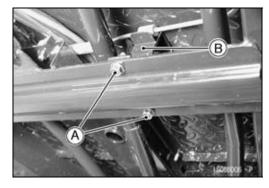


Cooling Fan Belt Inspection

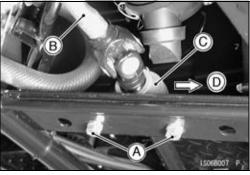
• Remove the bracket mounting screw [A].



 Remove: Bracket Mounting Bolts [A] Bracket [B]



- Remove the propeller shaft bearing housing mounting bolts [A] and nuts [A].
- Remove the propeller shaft [B].
- O Move the propeller shaft bearing housing [C] to the outside [D].



Periodic Maintenance Procedures

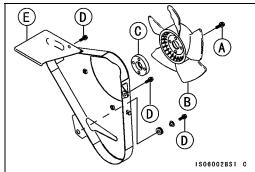
- Tilt up the cargo bed.
- Remove:

Water Pipe Bolts [A]
Fan Cover Bolts (four bolts)
Fan Cover [B]



• Remove:

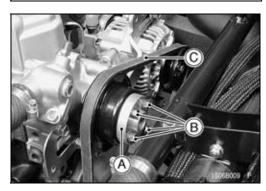
Fan Mounting Bolts [A]
Fan [B]
Spacer [C]
Fan Belt Cover Mounting Bolts [D]
Fan Belt Cover [E]



• Reinstall the spacer [A] and tighten the fan mounting bolts [B].

Torque - Fan Mounting Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)

- Check the cooling fan belt [C] for excessive wear crack or broken.
- ★If necessary, replace the belt with a new one.

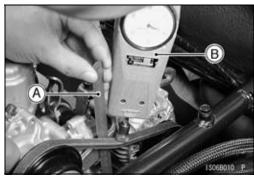


- Check the fan belt deflection.
- O Use a ruler [A], push the belt with 10 kg (22 lb) force. Push Gauge [B]

Fan Belt Deflection

Standard: 9.5 ~ 11.5 mm/10 kgf (22 lb)

★If the deflection is incorrect, adjust it.



2-22 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Loosen the alternator adjusting bracket bolt [A] and alternator mounting bolt [B].

Alternator [C]

- Adjust the fan belt deflection.
- O Use a ruler, push the belt with 10 kg (22 lb) force.
- Tighten the bolts.

Torque - Alternator Adjusting Bracket Bolts: 20 N·m (2.0 kgf·m, 14 ft·lb)

Alternator Mounting Bolt: 39 N·m (4.0 kgf·m, 29 ft·lb)

Install the removed parts.

Engine Top End

Valve Clearance Inspection

NOTE

- O Valve clearance must be checked when the engine is cold (at room temperature).
- Remove:

Fan Belt Cover (see Cooling Fan Belt Inspection in the Periodic Maintenance chapter)

Breather Hose [A]

Cylinder Head Cover Mounting Bolts [B]

Washers [C]

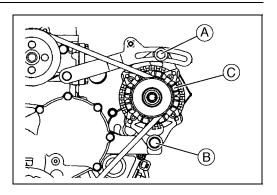
Cylinder Head Cover [D]

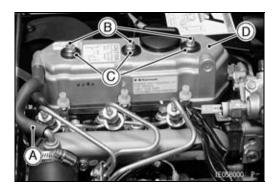
- Turn the crankshaft pulley [A] clockwise so that the timing mark [B] on the pulley aligns with the reference point [C] on the timing gear case cover.
- O Check that the rocker arms at #1 cylinder are free.
- ★If not, turn the pulley one more turn to free the rocker arms.
- Using a thickness gauge [A], measure the valve clearance between the rocker arm [B] and the valve stem cap [C].
- ★If the valve clearance is incorrect, adjust it.

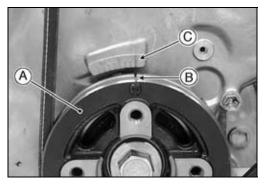
Valve Clearance (when cold)

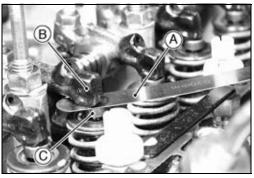
Standard:

0.2 mm (0.0079 in.)





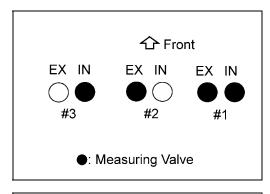


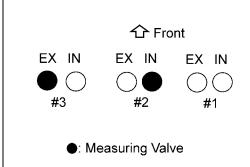


OWhen positioning #1 piston TDC at the compression stroke:

Inlet valve clearance of #1 and #3 cylinders Exhaust valve clearance of #1 and #2 cylinders

O Turn the crankshaft pulley 360° clockwise. Inlet valve clearance of #2 cylinder Exhaust valve clearance of #3 cylinder

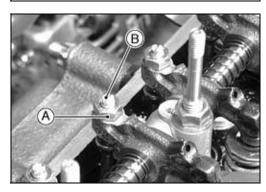




Valve Clearance Adjustment

- Loosen the valve adjusting screw locknut [A].
- Turn the valve adjusting screw [B] until the correct clearance is obtained.
- Holding the adjusting screw, tighten the locknut.

Torque - Valve Adjusting Screw Locknuts: 11 N·m (1.1 kgf·m, 95 in·lb)



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.

- Remove the drain plug [A] from the muffler [B].
- Apply the parking brake.
- In an open area away from combustible materials, start the engine with the gear shift lever in the N (neutral) position.
- Raise and lower engine speed while tapping on the muffler with a rubber mallet until the 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 can lead to carbon monoxide poisoning, asphyxiation, and death.

- Stop the engine.
- Install the drain plug.

Converter System

Drive Belt Inspection

- Remove the driver belt (see Converter System chapter).
- Measure the width [A] of the belt.
- ★If any measurements exceed the service limit, replace the belt.

Belt Width

KAF950-B1 KAF950-B2 Standard: 31.5 mm (1.24 in.) 34.1 mm (1.34 in.) Service Limit: 30.0 mm (1.18 in.) 32.6 mm (1.28 in.)

- Check the belt for wear, cracks, breaks or peeling.
- ★If necessary, replace the belt with a new one.

Belt [A]

Crack [B]

Broken [C]

NOTE

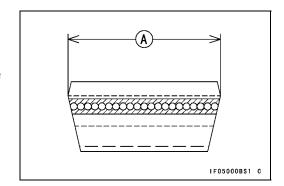
O Whenever the belt is replaced, inspect the drive and the driven pulleys.

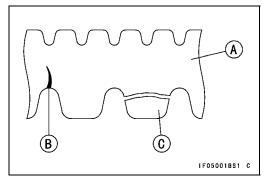
Drive Belt Deflection Inspection (KAF950–B2)

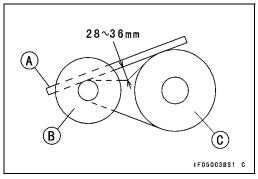
- Remove the torque converter cover (see Converter System chapter).
- Put the transmission in neutral and rotate the driven pulley by hand to make sure the belt is shifted all the way to the top of the driven pulley.
- Measure the belt deflection as shown:
- O Place a straightedge [A] on top of the belt between the drive pulley [B] and the driven pulley [C].
- O Use a ruler to push the belt away from the straightedge. Push hard, but with no more force than 59 N (6 kgf, 13 lb).

Belt Deflection

Standard: 28 ~ 36 mm (1.10 ~ 1.42 in.)







- ★If the belt deflection is not within the specified range, first measure the drive belt width (see Drive Belt Inspection). Adjust the deflection by adding or removing spacers between the driven pulley shaft hub and cam ramp.
- When adjusting the deflection, less is better than more.
 Less deflection will maintain better performance for more time as the belt width decreases by normal wear, which causes the deflection to increase with usage.

Drive Belt Deflection Adjustment (KAF950–B2)

- Disassemble the driven pulley [B] (see Converter System chapter).
- ★If the belt deflection is more than 36 mm (1.42 in.), remove the spacers to decrease it.
- O The rule-of-thumb is: 0.1 mm (0.004 in.) change in spacer thickness equals about 1.2 mm (0.047 in.) change in belt deflection.
- ★If the belt deflection is less than 28 mm (1.10 in.), add the spacers [A] to increase it.
- O The rule-of-thumb is: 0.1 mm (0.004 in.) change in spacer thickness equals about 1.4 mm (0.055 in.) change in belt deflection.

B A IFO7010BS1 C

Spacers

Part No.	Thickness
92026-1625	1.0 mm (0.039 in.)
92026-1626	0.6 mm (0.024 in.)
92026-1627	1.4 mm (0.055 in.)
92026-1628	0.8 mm (0.031 in.)
92026-0036	0.3 mm (0.012 in.)

- Assemble the driven pulley (see Converter System chapter).
- With the transmission in neutral, rotate the driven pulley to allow the belt to return to the top of the sheaves before measuring the belt deflection.
- Measure the belt deflection again and repeat the above procedures until it is within the standard range.
- Using a suitable holder, adapter a non-permanent locking agent to the driven bolt and tighten it.

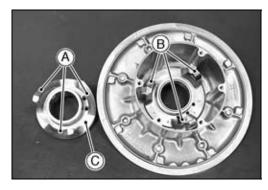
Torque - Driven Pulley Bolt: 93 N·m (9.5 kgf·m, 69 ft·lb)

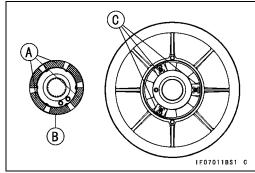
2-26 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Converter Driven Pulley Shoe Inspection

- Remove the driven pulley (see Converter System chapter).
- Disassemble the driven pulley (see Converter System chapter).
- ★If the ramps [A] or the wear shoes [B] are damaged or worn, replace the ramp cap [C] or the shoes.(KAF950–B1)
- ★If the cam [A] of ramp [B] or the wear shoes [C] are damaged or worn, replace the ramp or the wear shoes.(KAF950–B2)

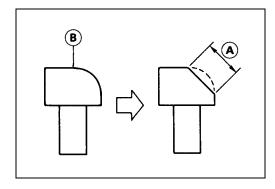




★If the wear shoe contact area width [A] is greater than the service limit, replace the shoe [B].

Wear Shoe Width (KAF950-B1)

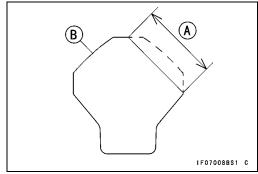
Service Limit: 11 mm (0.43 in.)



★If the wear shoe contact area width [A] is greater than the service limit, replace the shoe [B].

Wear Shoe Width (KAF950-B2)

Service Limit: 16.4 mm (0.65 in.)



Converter Air Cleaner Element Cleaning/Inspection

NOTE

- O In dusty areas, the element should be cleaned more frequently than the recommended interval.
- After riding through rain or on muddy roads, the element should be cleaned immediately.

WARNING

Clean the element in a well-ventilated area, and take ample care that there are no sparks or flame anywhere near the working area.

Because of the danger of highly flammable liquids, do not use gasoline or a low flash-point solvent to clean element.

- Remove the air cleaner element (see Converter System chapter).
- Separate the foam element [A] from the paper element [B].
- Clean the foam element in a bath of a high flash-point solvent, and then dry it with compressed air or by shaking it.
- After cleaning, saturate the foam element with SE class SAE30 oil, squeeze out the excess, then wrap it in a clean rag and squeeze it as dry as possible. Be careful not to tear the foam element.
- Clean the paper element by tapping gently.

CAUTION

Do not use compressed air to clean the paper element.

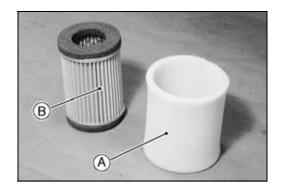
Do not oil the paper element.

Engine Lubrication System

Engine Oil and/or Oil Filter Change

- Warm up the engine so that the oil will pick up any sediment and drain easily.
- Place an oil pan beneath the engine.
- Remove the engine oil drain plug [A], and let the oil drain completely.
- ★If the oil filter is to be changed, replace it with a new one (See Oil Filter Removal/Installation).
- Check the gasket at the drain plug for damage.
- ★Replace the gasket with a new one.
- After the oil has completely drained out, install the drain plug with the gasket.

Torque - Engine Oil Drain Plug: 34 N·m (3.5 kgf·m, 25 ft·lb)





CAUTION

To avoid engine damage, do not fill the engine oil above the full level. If the oil level in the cylinder head cover gets too high because of filling too fast, oil may over flow from the filler opening and/or may flow through the crankcase breather hose into the intake manifold. Oil in the intake manifold may flow into the combustion chambers and cause hydraulic lock, resulting in severe engine damage.

- Remove the oil filler cap, and pull the dipstick out a little (about 5 cm, 2 in.) to allow the air in the crankcase to escape.
- Slowly and evenly fill the engine with a good quality oil as specified in the table.
- Check the oil level.

Engine Oil

Grade: API CF or CF-4 class

Viscosity: SAE10W-40
Capacity: 3 L (3.2 US qt)

(when filter is not removed)

3.3 L

(when filter is removed)

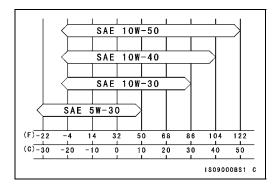
Oil Level: Between F and L marks on dipstick

NOTE

O Although 10W-40 engine oil is the recommended oil for most conditions, the oil viscosity may need to be changed to accommodate atmospheric conditions in your riding area.

Oil Filter Removal

- Tilt up the cargo bed.
- Remove the oil filter [A] from under the vehicle.
- O When unscrewing the oil filter, cover the filter bottom with a clean cloth so as not to spill the engine oil out of the filter. Any spilled oil should be wiped up completely.





Oil Filter Installation

- Apply engine oil:
 Oil Filter Gasket
- Install a new filter.
- O Screw the filter in until the gasket touches the engine, then turn it 1 turn.
- Add the engine oil (see Oil Level Inspection).
- Thoroughly warm up the engine, and check for oil leakage and the oil level.
- ★If necessary, add more engine oil.

Transmission

Transmission 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.
- Place an oil pan beneath the transmission case.
- Remove the transmission oil drain plug [A], and let the oil drain completely.
- Check the gasket at the drain plug for damage.
- ★Replace the gasket with a new one if it is damaged.
- After the oil has completely drained out, install the drain plug with the gasket.

Torque - Transmission Oil Drain Plug : 15 N·m (1.5 kgf·m, 11 ft·lb)

- Fill the transmission case with a good quality oil as specified in the table.
- Check the oil level.

Transmission Oil

Type: API "GL-5" Hypoid gear oil Viscosity: SAE90: above 5°C (41°F) or SAE80: below 5°C (41°F)

Capacity: 2.5 L (2.6 US qt)

Oil Level: Between upper and lower level lines

Wheels/Tires

Wheels Nuts Tightness Inspection

- Check the tightness of all the wheel nuts.
- ★If there are loose nut, first loosen by 1/2 turn, then retorque them to the specified torque.

Torque - Wheel Nuts: 140 N·m (14 kgf·m, 100 ft·lb)

O Tighten the wheel nuts $[1] \sim [4]$ in a criss-cross pattern.





2-30 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

- Examine the tire for damage and wear.
- ★If the tire is cut or cracked, replace it.
- OLumps or high spots on the tread or sidewalls indicate internal damage, requiring tire replacement.
- ORemove 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 [A]. Since the tire may wear unevenly, take measurements at several places.
- ★If any of the measurements is less than the service limit, replace the tire.



Standard: 13.2 mm (0.520 in.) **Service Limit** 3 mm (0.12 in.)

Standard Tire

23 × 11.00-10 DUNLOP KT869 Front and rear:

Tubeless



Front 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.
- Remove:

Front Guard (see Frame chapter)

Front Final Gear Case Skid Plate (see Front Final Gear Case Oil Level Inspection in the Final Drive chapter)

• Place an oil pan beneath the front final gear case and remove the drain plug [A].

WARNING

When draining or filling the final gear case, be careful that no oil gets on the tire or rim. 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, and tighten it.

Torque - Oil Drain Plug: 20 N·m (2.0 kgf·m, 14 ft·lb)

• Fill the gear case up to the bottom [B] of filler opening [A] with the oil specified below.

Front Final Gear Case Oil

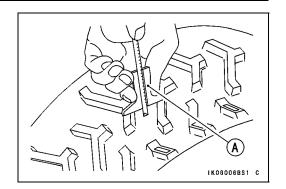
Type: API "GL-5 or GL-6" hypoid gear oil

for LSD (Limited Slip Differential gears)

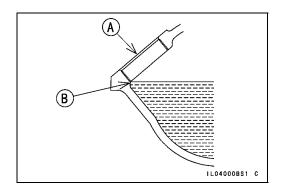
Viscosity: **SAE90, or SAE140** Capacity: 0.4 L (0.4 US at) Filler opening level Oil Level

NOTE

Tire Wear Inspection

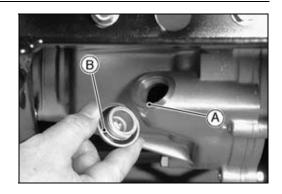






• Be sure the O-ring [B] is in place, and tighten the filler cap. Filler Opening [A]

Torque - Oil Filler Cap: 29 N·m (3.0 kgf·m, 22 ft·lb)



Brakes

Brake Fluid Level Inspection

- With the vehicle on level ground, check that the fluid level in the reservoir is between the upper (MAX) and lower (MIN) level lines.
- O Look the fluid level through the hole [A] in the control
- ★If the fluid level is lower than the lower level line, check for fluid leaks in the brake lines, and fill the reservoir to the upper level line.



Change the fluid in the brake system completely if the fluid level is low but the type and brand of the fluid already in the reservoir are unknown.

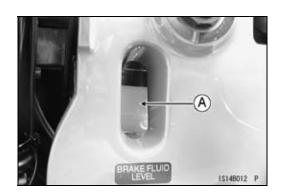
- Tilt up the front cargo hood.
- Remove:

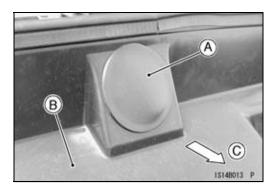
Front [C]

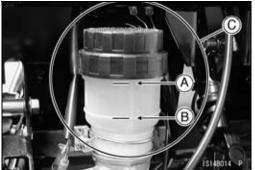
- Rubber Cap [A] Front Cargo Compartment [B]
- Fill the reservoir to the upper level line [A]. Upper Level Line (MAX) Lower Level Line (MIN) [B] Hole [C] of Front Cargo Compartment
- Apply the brake forcefully for a few seconds and check for fluid leakage around the fittings.

▲ WARNING

If the brake pedal has a soft or "spongy feeling" when it is applied, there might be air in the brake lines or the brake may be defective. Since it is dangerous to operate the vehicle under such conditions, have the brake system serviced immediately.







2-32 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Brake Fluid Change

- Tilt up the front cargo hood [A] and remove the front cargo compartment [B] (see Frame chapter).
 Front [C]
- Level the brake fluid reservoir.

NOTE

- O The fluid level must be checked several times during the fluid changing and replenished as necessary. If the fluid in the reservoir runs completely out any time during fluid changing, air bleeding must be done since air will have entered the line.
- Remove the wheel for extra clearance (see Wheels/Tires chapter).
- Remove the reservoir cap.
- Remove the rubber cap from the bleed valve on the wheel cylinder.
- Connect a clear plastic hose [A] to the bleed valve at the wheel cylinder, running the other end of the hose into a container.

Left Front Brake Panel [B] Front [C]



- O Start with the rear left or right wheel and finish with the front left or right wheel.
- Fill the reservoir with new brake fluid.
- Temporarily install the reservoir cap.
- Change the brake fluid as follows:
- 1. Open bleed valve.
- 2. Pump brake pedal and hold it.
- 3. Close bleed valve.
- 4. Release brake pedal.
- Tighten:

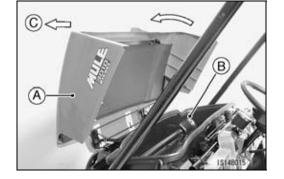
Torque - Bleed Valves: 5.9 N·m (0.6 kgf·m, 52 in·lb)

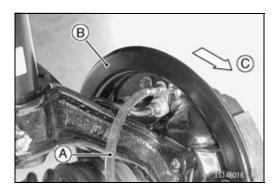
- Repeat the previous step for each wheel.
- When brake fluid changing is finished, add the fluid to the upper level in the reservoir.
- After changing the fluid, check the brake for good braking power, no brake drag, and no fluid leakage.
- ★If necessary, bleed the air from the brake lines (see Brakes chapter).

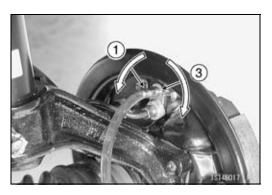
A WARNING

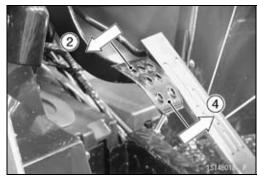
If the brake pedal has a soft or "spongy feeling" when it is applied, there might be air in the brake line or the brake may be defective. Since it is dangerous to operate the vehicle under such conditions, bleed the air from the brake line immediately.

• Install the removed parts.









Torque - Master Cylinder Reservoir Cap: 3.4 N·m (0.35 kgf·m, 30 in·lb)

Brake Pedal Play Inspection

• Check brake pedal free play [A].

Brake Pedal Free Play

Standard: 2 ~ 10 mm (0.08 ~ 0.39 in.)

★If free play is not correct, adjust it.



- Remove the front cargo compartment (see Frame chap-
- Loosen the locknut [A] and turn [B] the push rod to obtain the correct amount of free play.
- Tighten:

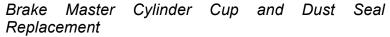
Torque - Push Rod Locknut: 18 N·m (1.8 kgf·m, 13 ft·lb)

• Check the brake for good braking power and no brake drag.



▲ WARNING

Incorrect adjustment with insufficient free play can cause brake heating and drag. Skidding and loss of control may result.



- Remove the master cylinder (see Master Cylinder Removal in the Brakes chapter).
- Remove the piston stop bolt [G].
- Remove the dust seal [A] and then the retainer [B] with the circlip pliers.

Special Tool - Inside Circlip Pliers: 57001-143

O Remove the piston assembly (two pistons) by lightly tap the master cylinder on a wooden block.

Pistons [C]

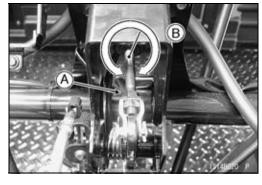
Springs [D]

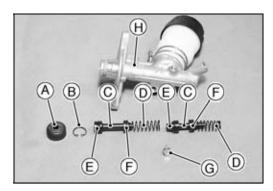
Secondary Cup [E]

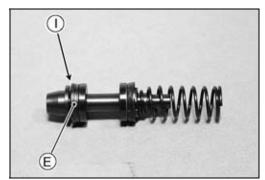
Primary Cup [F]

Master Cylinder [H]

OBe careful of the secondary cup direction [I].







2-34 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

- Assemble the master cylinder:
- O Clean all the parts including the master cylinder with brake fluid or alcohol, and apply brake fluid to the removed parts and the inner wall of the cylinder.

CAUTION

Use only brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, motor oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely, and will eventually deteriorate the rubber used in the brake.

- O Push the piston assembly in all the way with a screwdriver and install the piston stop bolt. Use a new aluminum washer.
- O Tighten:

Torque - Piston Stop Bolt: 8.8 N·m (0.9 kgf·m, 78 in·lb)
Reservoir Clamp Bolt: 5.9 N·m (0.6 kgf·m, 52 in·lb)

Install the master cylinder (see Master Cylinder Installation in the Brakes chapter).

Brake Hose and Pipe Inspection

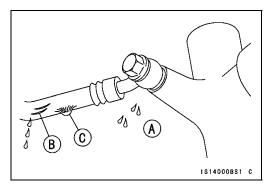
- The high pressure inside the brake line can cause fluid to leak [A] or the hose to burst if the line is not properly maintained. Bend and twist the rubber hose while examining it.
- ★Replace it if any cracks [B] or bulges [C] are noticed.
- The metal pipe will rust if the plating is damaged.
- ★Replace the pipe if it is rusted, cracked (especially check the fittings), or if the plating is badly scratched (see Brake Hose and Pipe Replacement in this section).

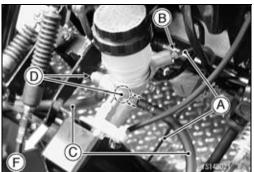
Brake Hose and Pipe Replacement

- To remove the brake pipes [A], unscrew the nipples [B].
- To remove the hoses [C], remove the banjo bolts [D] and/or pull out the retainers [E] (see below).
 Front [F]
- O The front cargo compartment inside is shown.
- Immediately wipe up any brake fluid that spills.

CAUTION

Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely wiped up immediately.





- Use a new copper washer for each side of the hose fittings at the master cylinder.
- Apply brake fluid to the threads of the nipple [B] of the brake pipe [A].
- Tighten:

Torque - Brake Hose Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

Brake Pipe Nipple: 18 N·m (1.8 kgf·m, 13 ft·lb)

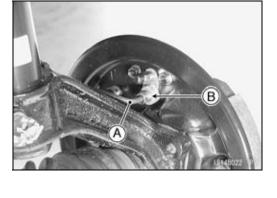
- Check that the brake line has proper fluid pressure and no fluid leakage.
- OThe left front brake drum is shown.
- OThe left front knuckle is shown.

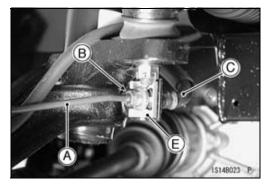
Brake Pipe [A]

Nipple [B]

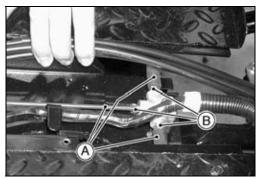
Brake Hose [C]

Retainer [E]





Left View with the center floor panel removed Brake Hose and Pipe [A] Nipple [B]



O The middle-left of the vehicle is shown with the cargo bed tilted up.

Brake Pipe [A]

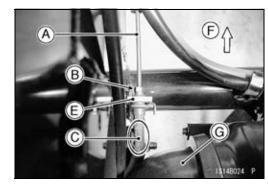
Nipple [B]

Brake Hose [C]

Retainer [E]

Front [F]

Torque Converter Outer Cover [G]

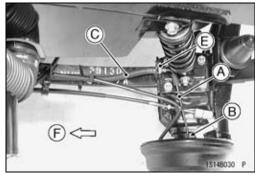


2-36 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

O The rear-left brake line is shown.

Brake Pipe [A] Nipple [B] Brake Hose [C] Retainer [E] Front [F]



Brake Wear Inspection

- Remove the brake drum (see Brake Drum Removal in the Brakes chapter).
- Measure the inside diameter of the drum at several points.
- ★If any measurement is greater than the service limit, replace the drum.
- ★If the drum is worn unevenly or scored, lightly turn the drum on a brake drum lathe or replace it. Do not turn the drum beyond the service limit.

Brake Drum Inside Diameter

Standard: 180.000 ~ 180.160 mm

(7.0866 ~ 7.0929 in.)

Service Limit: 180.75 mm (7.116 in.)

- Remove the brake drum for brake shoe inspection (see Brake Drum Removal in the Brakes chapter).
- Measure the lining thickness at several points.

Brake Shoe Lining thickness

Standard: 4.5 mm (0.18 in.) Service Limit: 1.0 mm (0.04 in.)

- ★If any measurement is less than the service limit, replace both shoes as a set.
- ★If the lining thickness is greater than the service limit, do the following before installing the shoes.
- File or sand down any high spots on the surface on the lining.
- Use a wire brush to remove any foreign particles from the lining.
- Wash off any oil or grease with an oilless solvent.

CAUTION

Do not use a solvent which will leave an oily residue. The shoes will have to be replaced.





Brake Wheel Cylinder Assembly Replacement (Front Brake Panel)

- Remove:
 - Brake Drum (see Brake Drum Removal in the Brakes chapter.)
- OThe left front brake panel is shown.
- Remove the brake shoe springs [A] and brake shoes [B] individually.
- O Push the shoe hold-down springs [C] and twist the pins [D] to remove the shoes.

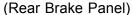
NOTE

- O Wrap the brake shoes with a clean cloth to protect the linings from grease or dirt.
- Remove the brake pipe nipple [A] and plug the nipple. O Immediately wipe up any brake fluid that spills.



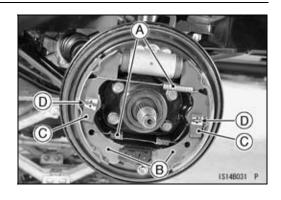
Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely wiped up immediately.

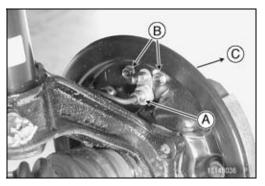
 Unscrew the mounting bolts [B] and take off [C] the front brake wheel cylinder.

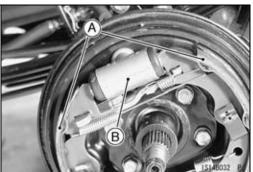


 Remove the brake shoes [A] in the same way as in the front brake panel.

Rear Brake Wheel Cylinder [B]



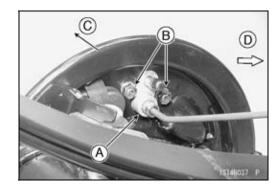




(Rear Brake Panel)

- Remove the brake pipe nipple [A] and plug the nipple.
- Unscrew the mounting nuts [B] and take off [C] the rear brake wheel cylinder.

Front [D]



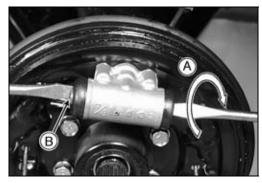
2-38 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

- Replace the rear wheel cylinder with a new one.
- Set the brake shoe clearance adjuster so that the drum can be reinstalled on the panel assembly.

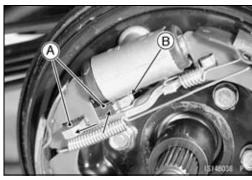
(Front Brake Panel)

O Turn [A] either end of the cylinder fully while holding the other end [B]. Both ends are put into the cylinder.

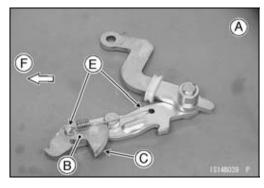


(Rear Brake Panel)

O Push the ratchet [A] forwards and in to reset the shoe clearance adjuster from the protruding position to its original position. The stop [B] sets the position.



Parking Brake Lever Linkage (left) [A] of Rear Brake Ratchet [B]
Protruding Position [C]
Shoe Clearance Adjuster [E]
Front [F]

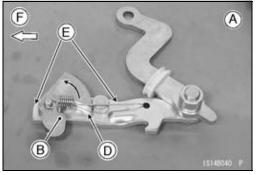


Parking Brake Lever Linkage (left) [A] of Rear Brake Ratchet [B]
Original Position [D]
Shoe Clearance Adjuster [E]
Front [F]

 Apply brake fluid to the threads of the brake pipe nipple and tighten it.

Torque - Brake Pipe Nipple: 18 N·m (1.8 kgf·m, 13 ft·lb)
Wheel Cylinder Mounting Bolts (front): 11 N·m
(1.1 kgf·m, 95 in·lb)
Wheel Cylinder Mounting Nuts (rear): 7.8 N·m (0.8

kgf·m, 69 in·lb)





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