Kawasaki

MULE 1000



PREVIEW - YOUFIXTHIS.COM

Utility Vehicle Service Manual

Download full manual at youfixthis.com

Quick Reference Guide

General Information	1
Fuel System	2
Cooling System	3
Engine Top End	4
Belt Drive Torque Converter	5
Engine Lubrication System	6
Engine Removal/Installation	7
Engine Bottom End/Crankshaft	8
Transmission/Final Drive	9
Wheels/Tires	10
Brakes	11
Suspension	12
Steering	13
Frame	14
Electrical System	15
Appendix	16

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

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

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Periodic Maintenance Chart

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

FREQUENCY / OPERATION	Whichever comes first ➡ / Every ⬇	First Service	Regular Service	
		After 1 000 km of use	Every 5 000 km of use	Every 10 000 km of use
CHASSIS				
Steering--check		●	●	
Steering and drive shaft ball joint dust boots--check		●	●	
Brake pedal play--check*		●	●	
Parking brake lever--check		●	●	
Brake hose and pipe--check		●	●	
Brake fluid level--check		●	●	
Brake wear--check*			●	
Tire wear--check*		●	●	
Battery--check			●	
Brake light switch--check		●	●	
Seat belt--check			●	
General lubrication--perform*			●	
Bolts, nuts, and fasteners tightness--check		●	●	
Brake fluid--change	2 years			
Brake master cylinder cup and dust seal--replace	2 years			
Brake wheel cylinder assembly--replace	2 years			
Brake hose--replace	4 years			
ENGINE				
Converter belt--check*			●	
Converter driven pulley shoe--check*				●
Spark plug--clean and gap			●	
Air cleaner elements--clean*		●	●	
Valve clearance--check		●		●
Engine oil--change*	1 year	●		●
Oil filter--replace*		●		●
Engine vacuum synchronization--check		●	●	
Throttle pedal play--check		●		●
Idle speed--adjust		●	●	
Fuel system cleanliness--check*				●
Radiator hose, connections--check	1 year	●		●
Spark arrester--clean			●	
Coolant--change	2 years			
Fuel hose--replace	4 years			

● = Clean, adjust, lubricate, torque, or replace parts as necessary.
* = Service more frequently when operated in mud, dust, or other harsh riding conditions.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Torque and Locking Agent

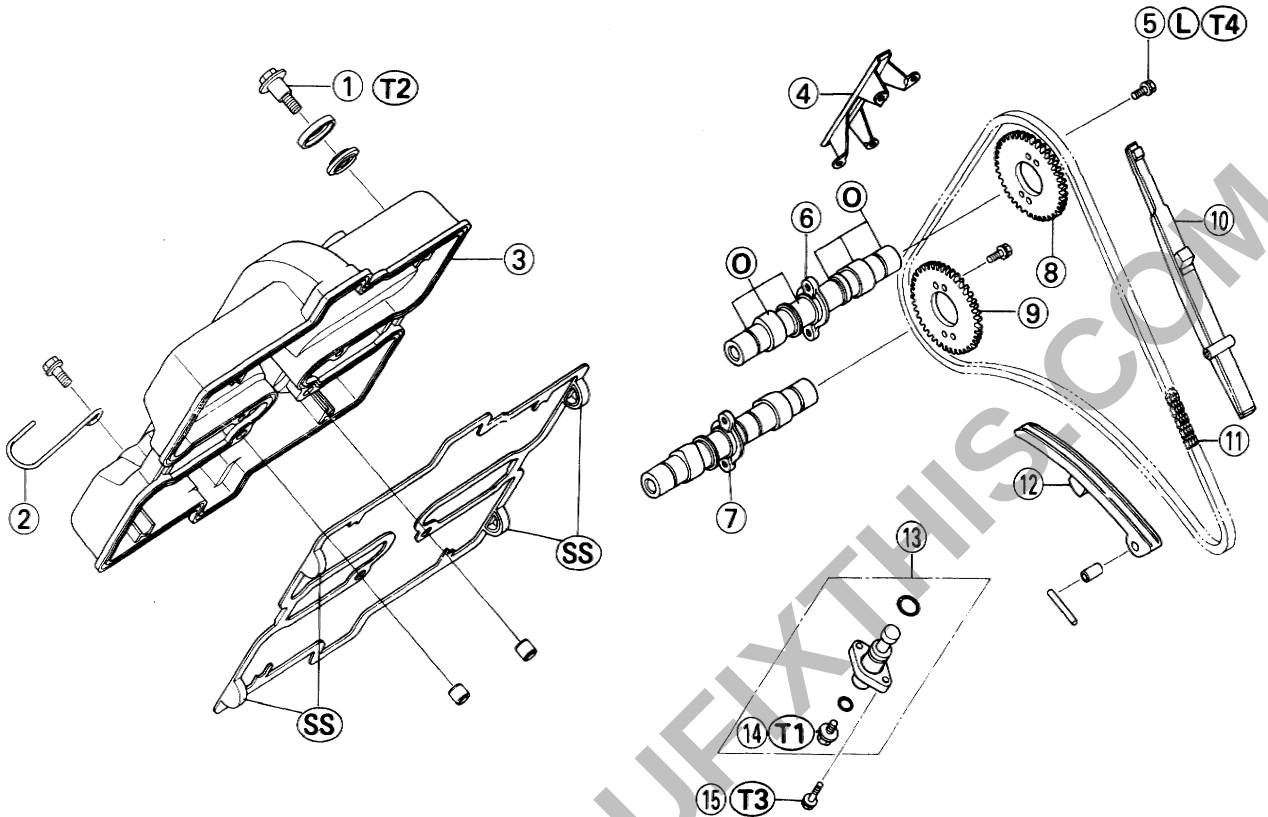
The following tables list the tightening torque for the major fasteners, and the parts requiring use of a non-permanent locking agent or liquid gasket.
Letters used in the "Remarks" column mean:
L : Apply a non-permanent locking agent to the threads.
M : Apply a molybdenum disulfide lubricant (grease or oil) to the threads and seated surface, or washer.
O : Apply engine oil.
S : Tighten the fasteners following the specified sequence.
SS: Apply silicone sealant to the threads.

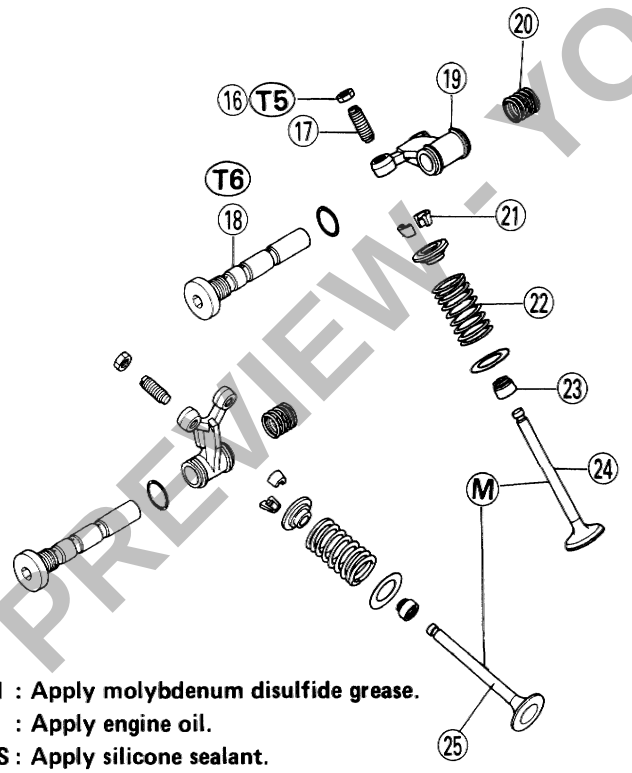
Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Cooling System:				
Radiator fan switch	25	2.5	18.0	
Coolant temperature switch	7.8	0.80	69 in-lb	SS
Water pump cover bolts	9.8	1.0	87 in-lb	
Water pump drain plug	7.8	0.80	69 in-lb	
Engine Top End:				
Cylinder head cover bolts	9.8	1.0	87 in-lb	
Camshaft sprocket bolts	15	1.5	11.0	L
Camshaft cap bolts	12	1.2	104 in-lb	
Valve adjusting screw locknuts	25	2.5	18.0	
Rocker Shafts	39	4.0	29	
Camshaft chain tensioner bolts	12	1.2	104 in-lb	
Chain tensioner cap bolt	4.9	0.50	43 in-lb	
Cylinder head bolts: 10 mm dia.	39	4.0	29	S
6 mm dia.	9.8	1.0	87 in-lb	
Belt Drive Torque Converter:				
Drive pulley cover bolts	13	1.3	113 in-lb	
Drive pulley bolts	93	9.5	69	
Ramp weight shaft stop bolts	13	1.3	113 in-lb	
Ramp weight roller shaft stop bolts	13	1.3	113 in-lb	
Drive pulley fan bolts	9.8	1.0	87 in-lb	
Driven pulley bolt	93	9.5	69	L
Driven pulley coupling bolts	13	1.3	113 in-lb	
Engine Lubrication System:				
Engine oil drain plug	29	3.0	22	
Oil filter mounting bolt	25	2.5	18.0	L
Oil filter	18	1.8	13.0	O
Oil pressure switch	15	1.5	11.0	SS
Oil pressure switch adapter	20	2.0	14.5	
Oil pressure relief valve	15	1.5	11.0	L
Oil pump cover bolts	9.8	1.0	87 in-lb	L
Oil passage plug	9.8	1.0	87 in-lb	

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Exploded View





M : Apply molybdenum disulfide grease.
O : Apply engine oil.
SS : Apply silicone sealant.

T1 : 4.9 N-m (0.50 kg-m, 43 in-lb)
T2 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T3 : 12 N-m (1.2 kg-m, 104 in-lb)
T4 : 15 N-m (1.5 kg-m, 11.0 ft-lb)
T5 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T6 : 39 N-m (4.0 kg-m, 29 ft-lb)

1. Cylinder Head Bolt
2. Shift Cable Guide
3. Cylinder Head Cover
4. Top Chain Guide
5. Camshaft Sprocket Bolts
6. Inlet Camshaft
7. Exhaust Camshaft
8. Camshaft Sprocket (Inlet)
9. Camshaft Sprocket (Exhaust)
10. Rear Chain Guide
11. Camshaft Chain
12. Front Chain Guide
13. Camshaft Chain Tensioner
14. Cap Bolt
15. Tensioner Bolts
16. Valve Adjusting Screw Locknut
17. Adjusting Screw
18. Rocker Shaft
19. Rocker Arm
20. Retainer Spring
21. Split Keeper
22. Valve Spring
23. Oil Seal
24. Inlet Valve
25. Exhaust Valve

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

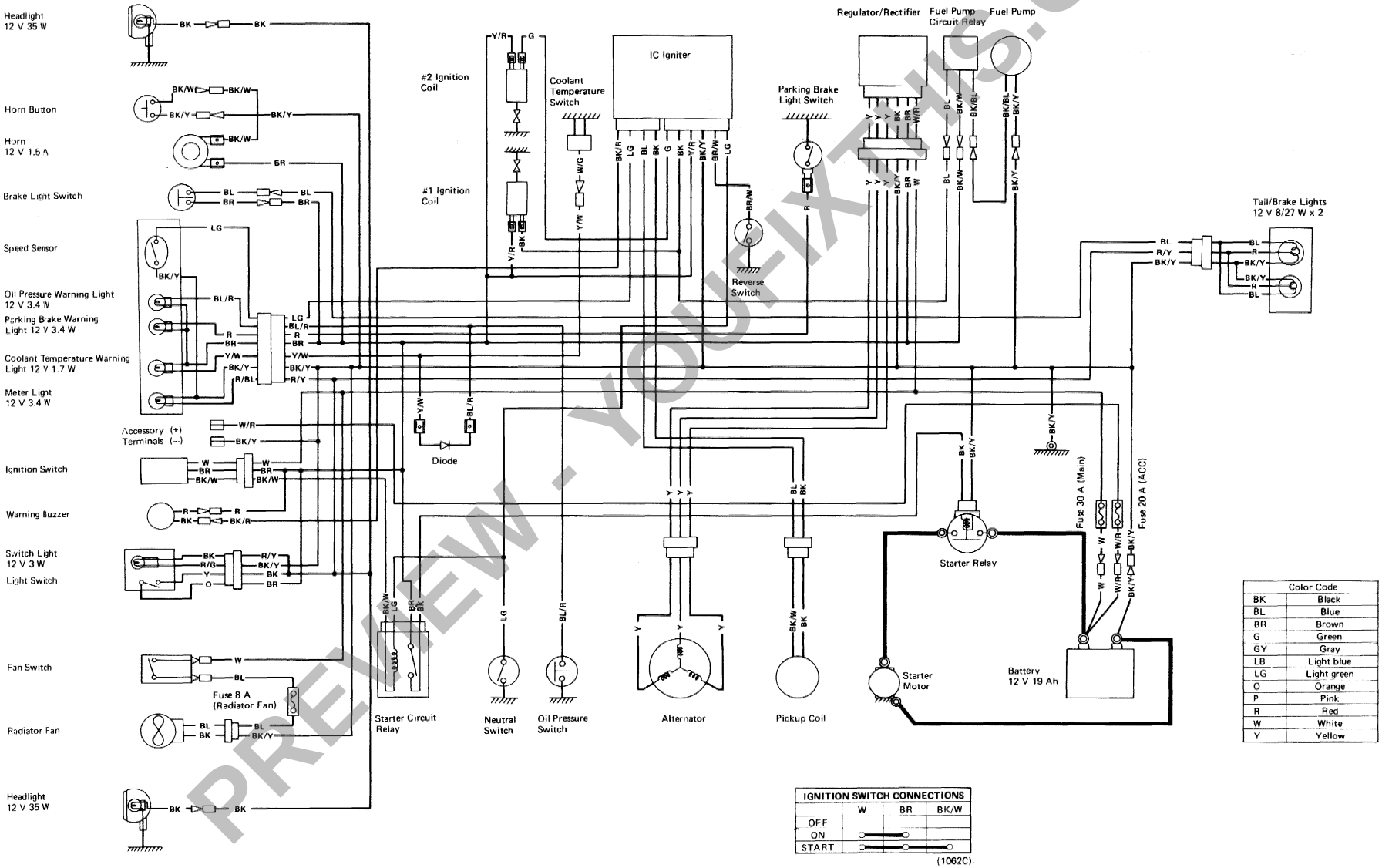
General Specifications

Items			KAF450-B1
Dimensions:			
Overall length			2 760 mm
Overall width			1 315 mm
Overall height			1 830 mm
Wheelbase			1 785 mm
Track:	Front		965 mm
	Rear		1 030 mm
Ground clearance			205 mm
Seat height			790 mm
Dry weight			483 kg
Curb weight:	Front		208 kg
	Rear		292 kg
Fuel tank capacity			17.0 L
Cargo bed (L x W x H)			1 040 x 1 140 x 270 mm
Performance:			
Minimum turning radius			4.1 m (Chassis: 4.4 m): Differential mode 4.5 m (Chassis: 4.8 m): Locked axle mode
Engine:			
Type			4-stroke, DOHC, 2-cylinder
Cooling system			Liquid-cooled
Bore and stroke			72.5 x 55.0 mm
Displacement			454 mL
Compression ratio			9.6
Carburetion system			Carburetors, Keihin CVK30 x 2
Starting system			Electric starter
Ignition system			Battery and coil (Transistorized)
Timing advance			Electronically advanced
Ignition timing			From 10° BTDC @1 000 r/min (rpm) to 30° BTDC @3 500 r/min (rpm)
Spark plug:		US	NGK D6EA or ND X20ES-U
		Other than US	NGK DR6EA or ND X20ESR-U
Cylinder numbering method			Left to right, 1-2
Firing order			2-1
Valve timing:	Inlet	Open	15° BTDC
		Close	35° ABDC
		Duration	230°
	Exhaust	Open	40° BBDC
		Close	10° ATDC
		Duration	230°

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Wiring Diagram



IGNITION SWITCH CONNECTIONS			
	W	BR	BK/W
OFF			
ON	○	○	
START	○		○

(1062C)

Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light blue
LG	Light green
O	Orange
P	Pink
R	Red
W	White
Y	Yellow

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Troubleshooting Guide

NOTE

○*This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.*

Engine Doesn't Start, Starting Difficulty:

Starter motor not rotating:
- Neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Relays not contacting or operating
- Wiring open or shorted
- Ignition switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:
- Starter motor clutch trouble

Engine won't turn over:
- Valve seizure
- Rocker arm seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Camshaft seizure
- Balancer seizure

No fuel flow:
- Fuel tank air vent obstructed
- Fuel pump trouble
- Fuel pump relay trouble
- Fuel filter clogged
- Fuel line clogged
- Float valve clogged

Engine flooded:
- Fuel level in carburetor float bowl too high
- Float valve worn or stuck open
- Starting technique faulty
- (When flooded, crank the engine with the throttle fully open to allow more air to reach the engine.)

No spark; spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble
- Ignition switch shorted
- Wiring shorted or open
- Fuse blown

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Poor Running at Low Speed:

Spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Pilot screw maladjusted
- Pilot jet, or air passage clogged
- Air bleed pipe bleed holes clogged
- Pilot passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter plunger stuck open
- Fuel level in carburetor float bowl too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner or silencer duct loose
- Fuel pump trouble

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head warped
- Cylinder head gasket damaged
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Other:
- IC igniter trouble
- Carburetors not synchronizing
- Carburetor vacuum piston doesn't slide smoothly
- Engine oil viscosity too high
- Drive train trouble
- Brake dragging

Poor Running or No Power at High Speed:

Firing incorrect:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

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 your warranty period, especially, 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 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 systems 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 spark plug information, for example, go to the Periodic Maintenance Chart first. The chart tells you how frequently to clean and gap the plug. Next, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Spark Plug section.

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

WARNING

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

CAUTION

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

This manual contains five more symbols (in addition to WARNING and CAUTION) which will help you distinguish different types of information.

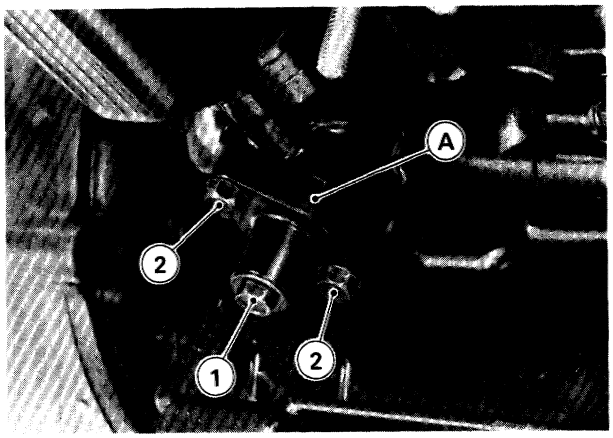
NOTE

○*This note symbol indicates points of particular interest for more efficient and convenient operation.*

PREVIEW - YOUFIXTHIS.COM

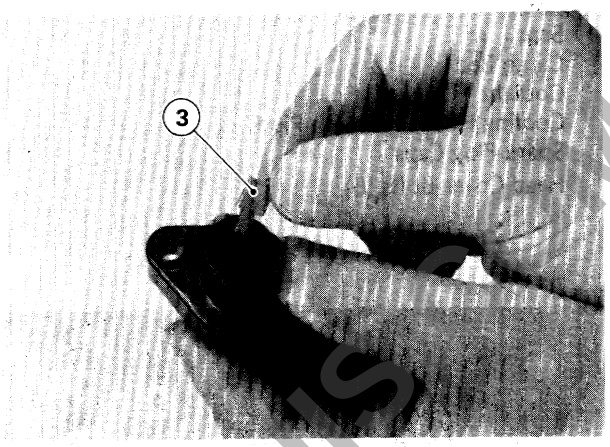
Download full manual at youfixthis.com

●Remove the following
1. Cap Bolt (Loosen)
2. Mounting Bolts



A. Chain Tensioner

3. Attach the rod holder plate.

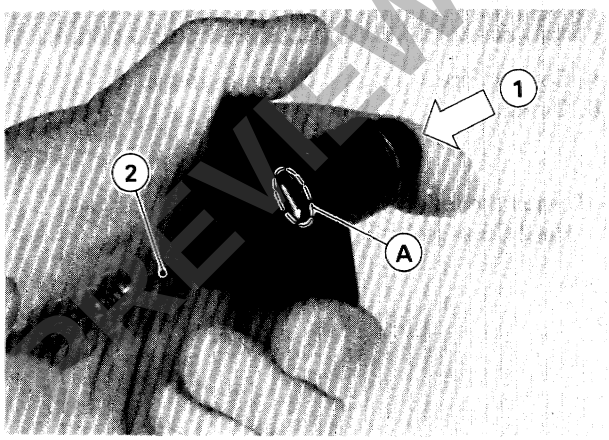


NOTE

○*To make the procedure easy, use a holder plate to keep the rod from pushing out. A replacement chain tensioner (spare parts) has a push rod holder plate.*

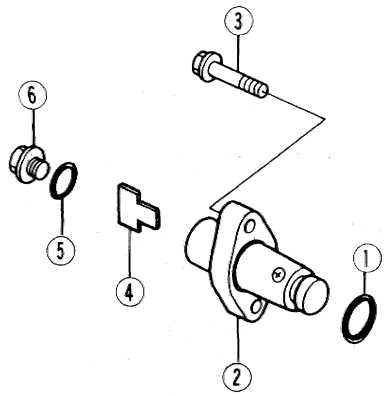
Installation

●Remove the cap bolt and O-ring.
○Perform the following.
1. Compress the push rod.
2. Turn the push rod clockwise until the rod stops.



A. Turn clockwise.

●Install the tensioner body.
1. O-ring
2. Tensioner Body
3. Mounting Bolts
4. Holder Plate (Remove)
5. O-ring
6. Cap Bolt



CAUTION

○**Do not turn the rod counterclockwise at installation. This could detach the rod and the tensioner cannot be reinstalled.**

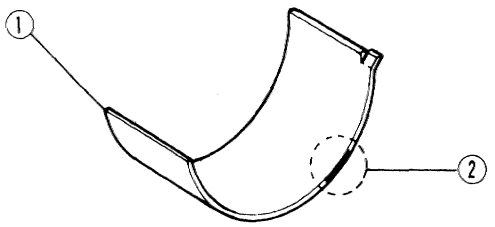
○Torque the following.
Mounting Bolts
Cap Bolt

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Big End Bearing Insert Selection

Con-rod Big End Bore Diameter Marking	Crankpin Diameter Mark	Bearing Insert	
		Size Color	Part Number
○	None	Blue	92028-1348
	○	Black	92028-1349
	None		
None	○	Brown	92028-1350



1. Bearing Insert 2. Size Color Mark

●Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.

Balancer

Removal

●Split the crankcase.

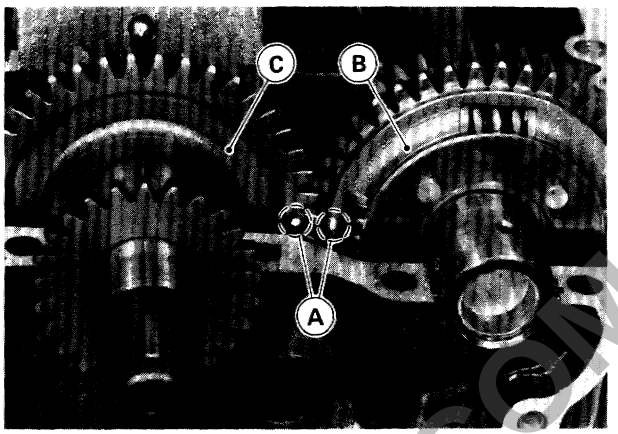
●Pull the balancer shaft with the balancer gear out of the crankcase.

Installation

●Note the following.

○Apply oil to the inside of the balancer shaft bearing insert.

○Align the timing mark on the balancer gear with the timing mark on the balancer drive gear of the crankshaft.



A. Timing Marks C. Balancer Drive Gear
B. Balancer Gear

Balancer Shaft Bearing Insert/Journal Wear

●Measure the bearing insert/journal clearance with a plastigage.

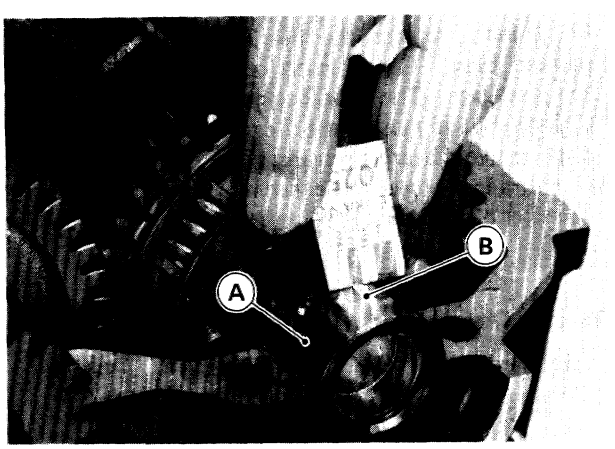
NOTE

○*Do not turn the balancer shaft during clearance measurement.*

○*Torque the following.*

Crankcase Bolts

○Remove the lower crankcase half and measure the plastigage width to determine the bearing insert/journal clearance.



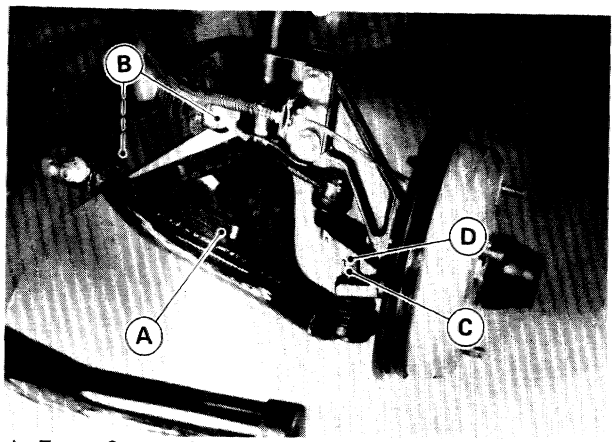
A. Journal B. Plastigage

Balancer Shaft Bearing Insert/Journal Clearance

Standard:	**0.020 – 0.044 mm**
Service Limit:	**0.08 mm**

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



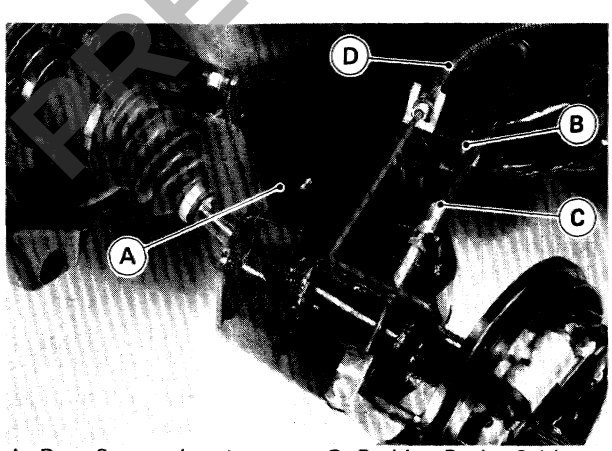
A. Front Suspension Arm
B. Pivot Bolts
C. Joint Nut
D. Cotter Pin

Front Suspension Arm Installation

- Clean the tapered portion of the suspension arm joint and the tapered hole of the steering knuckle, or the tapers will not fit snugly.
- When the suspension arm pivot bolts are tightened, install the arm joint to the steering knuckle to position the arm within its operating range.
- Torque the following.
  Front Suspension Arm Pivot Bolts
  Front Suspension Arm Joint Nut

Rear Suspension Arm Removal

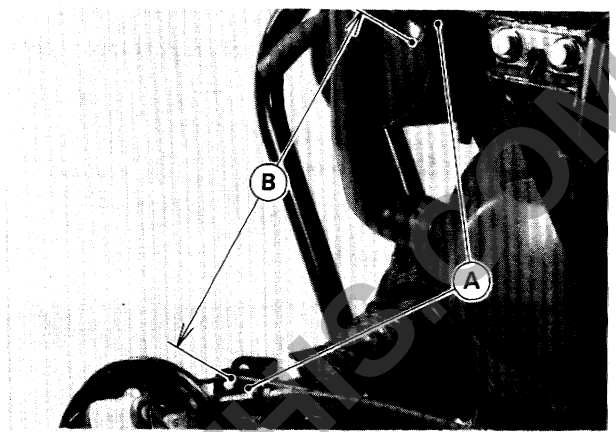
- Remove the following.
  Cargo Bed
  Rear Wheel
  Rear Fender
  Rear Brake Drum
  Rear Brake Panel Assembly
- ○Free the brake hose and the parking brake cable from the suspension arm.
- Hold the suspension arm in its position.
- Remove the following.
  Shock Absorber Mounting Bolts and Nuts
  Rear Shock Absorber
  Suspension Arm Pivot Bolt and Nut
  Rear Suspension Arm



A. Rear Suspension Arm
B. Pivot Bolt
C. Parking Brake Cable
D. Brake Hose

Rear Suspension Arm Installation

- Install the rear suspension arm pivot nut and position the arm within its operating range. Using a rope to keep the inside distance between the bolt holes of the shock absorber mounts between 315 mm and 320 mm.



A. Shock Absorber Mounts
B. 315 – 320 mm

- Torque the following.
  Rear Suspension Arm Pivot Bolt
- ○Apply a molybdenum disulfide grease to the following.
  Pivot Bolt Seating Surface and Threads
  Pivot Nut Threads

Suspension Arm Inspection

- Visually inspect the suspension arm for breaks or distortion.
- ★If the suspension arm is damaged in any way, replace it.
- Remove the parts (wheel, drum, shock absorber, etc.) to allow the suspension arm to swing freely by hand.
- Swing the suspension arm up and down to check for abnormal friction.
- ★If abnormal friction is felt, the rubber bushing may be damaged. Remove the suspension arm to check for rubber bushing damage.
- Check the rubber bushings in the pivots.
- ★Replace any bushings that are worn, cracked, hardened, or otherwise damaged.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 12 of 215 pages

The full manual includes:

- All 215 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Kawasaki MULE 1000, KAF450-B1 Service Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual