KX250-A7 (Uni-Trak)

Kawasaki Motors Corp., U.S.A.

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Kawasaki

KX250-A7
UNI-TRAK

Motorcycle
Owner's Manual
& Service Manual

Whenever you see the symbols shown below, 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.**

"NOTE" indicates points of particular interest for more efficient and convenient operation.

WARNING

THIS VEHICLE IS A COMPETITION MODEL ONLY AND WAS NOT MANUFACTURED FOR, NOR SHOULD IT BE USED ON, PUBLIC STREETS, ROADS, OR HIGHWAYS. THE USE OF THIS VEHICLE SHOULD BE LIMITED TO PARTICIPATION IN SANCTIONED COMPETITION EVENTS UPON A CLOSED COURSE. THIS VEHICLE SHOULD NOT BE USED FOR GENERAL OFF-ROAD RECREATIONAL RIDING.

DISCLAIMER OF WARRANTY

THIS MOTORCYCLE IS SOLD AS IS, WITH ALL FAULTS, OBVIOUS OR CONCEALED AND THERE ARE NO WARRANTIES EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS.

The purchaser accepts all responsibilities concerning quality, performance, cost of service and/or necessary repairs.

NOTICE

THIS PRODUCT HAS BEEN MANUFACTURED FOR USE IN A REASONABLE AND PRUDENT MANNER BY A QUALIFIED OPERATOR AND AS A VEHICLE ONLY.

WARNING **Brake linings contain asbestos fiber. Inhalation of asbestos may cause serious scarring of the lungs and may promote other internal injury and illness, including cancer. Observe the following precautions when handling brake linings:**

1. **Never blow brake lining dust with compressed air.**
2. **If any components are to be cleaned, wash with detergent, then immediately discard the cleaning solution and wash your hands.**
3. **Do not grind any brake lining material unless a ventilation hood is available and properly used.**

Poor Handling or Stability

Handlebar hard to turn
- Steering stem nut too tight
- Tire pressure too low
- Steering stem lubrication insufficient

Handlebar vibrates or shakes
- Swing arm bent
- Front fork bent
- Frame bent
- Wheel alignment incorrect
- Pivot shaft warped
- Right/left front fork oil level uneven

Shock absorption too stiff
- Front fork oil quantity excessive
- Front fork oil viscosity too high
- Front fork air pressure too high
- Tire air pressure too high

Shock absorption too soft
- Oil quantity insufficient
- Oil viscosity too low
- Front fork air pressure too low
- Fork spring wear
- Suspension oil leak

Brakes Don't Hold
- Brakes maladjusted (cable play excessive)
- Linings or drum worn
- Brakes overheated
- Water in brakes
- Brake cam worn
- Oil in drum

FOREWORD

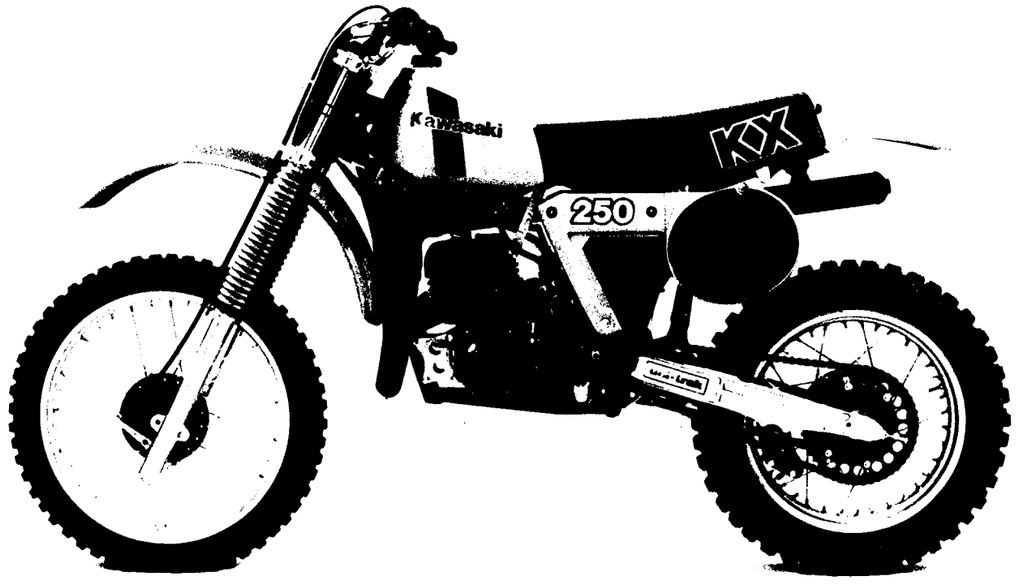
Congratulations on your choice of the new Kawasaki Uni-Trak racing motorcycle. Make sure that you read and understand the contents of this manual before operating or attempting repairs or adjustments.

This manual is a guide for vehicle operation, maintenance, lubrication, and basic assembly and disassembly procedures. Since the models shown in this manual are considered high-performance racing machines, only qualified operators should be permitted to ride them. Similarly, anyone who maintains and services these models must be familiar with sound mechanical practices and have adequate experience with competition motorcycles. For simplicity and brevity, this manual does not contain specialized operations such as crankshaft rebuilding and wheel spoking procedures. Anyone not familiar with these practices should contact a qualified Kawasaki dealer.

READ AND UNDERSTAND THE CONTENTS OF THE "GENERAL INFORMATION" AND "INSPECTION AND ADJUSTMENT" CHAPTERS BEFORE OPERATING THIS VEHICLE.

We wish you luck and success,

Kawasaki Motors Corp., U.S.A.



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TROUBLESHOOTING

Engine Doesn't Start or Starting Difficulty

Engine won't turn over
- Cylinder, piston seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Kick return spring broken
- Kick gear not engaging

Compression low
- Cylinder worn
- Piston ring worn, weak, broken, or sticking
- Piston ring groove and ring clearance excessive
- Cylinder head not sufficiently tightened down
- Cylinder warped
- Cylinder head gasket damaged
- Crankshaft oil seal leak

No spark or spark weak
- Spark plug faulty
- Spark plug cap poorly connected or shorted
- Ignition coil faulty
- Wiring open or shorted
- Magneto faulty (layer short)

No fuel flow
- No gasoline in fuel tank
- Fuel hose clogged
- Fuel valve clogged
- Float valve clogged
- Pilot jet clogged

Flooded
- Fuel level too high
- Float valve worn or stuck open

Poor Running at Low Speed

Spark weak
- Spark plug faulty
- Ignition coil faulty
- Spark plug cap, high tension lead short
- Spark plug gap excessive

Mixture too rich or too lean
- Air screw maladjusted
- Pilot jet or air passage clogged
- Idle mixture screw maladjusted
- Starter plunger stuck open
- Fuel level too high or too low
- Air cleaner clogged
- Intake manifold loose
- Tank cap air vent obstructed

Compression low
- Cylinder worn
- Piston ring worn, weak, broken, or sticking
- Piston ring groove and ring clearance excessive
- Cylinder head not sufficiently tightened down
- Cylinder warped
- Cylinder head gasket damaged
- Crankshaft oil seal leak

Other
- Ignition timing incorrect
- Transmission oil viscosity too high

Poor Running or No Power at High Speed

Mixture too rich or too lean
- Air cleaner clogged
- Intake manifold loose
- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Starter plunger stuck open
- Tank cap air vent obstructed
- Fuel level too high or too low

Compression low
- Cylinder worn
- Piston ring worn, weak, broken, or sticking
- Piston ring groove and ring clearance excessive
- Cylinder head not sufficiently tightened down
- Cylinder warped
- Cylinder head gasket damaged
- Crankshaft oil seal leak

Misfiring
- Spark plug faulty
- Spark plug cap poorly connected or shorted
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Knocking
- Ignition timing advanced
- Fuel poor quality
- Carbon built up in combustion chamber

Other
- Ignition timing incorrect
- Brakes dragging
- Overheating
- Clutch slipping
- Throttle valve does not fully open
- Transmission oil quantity excessive
- Transmission oil viscosity too high

Overheating

- Ignition timing retarded
- Carbon built up in combustion chamber
- Brakes dragging
- Clutch slipping
- Intake manifold loose or damaged
- Main jet clogged
- Fuel level too low

Clutch Not Operating Smoothly

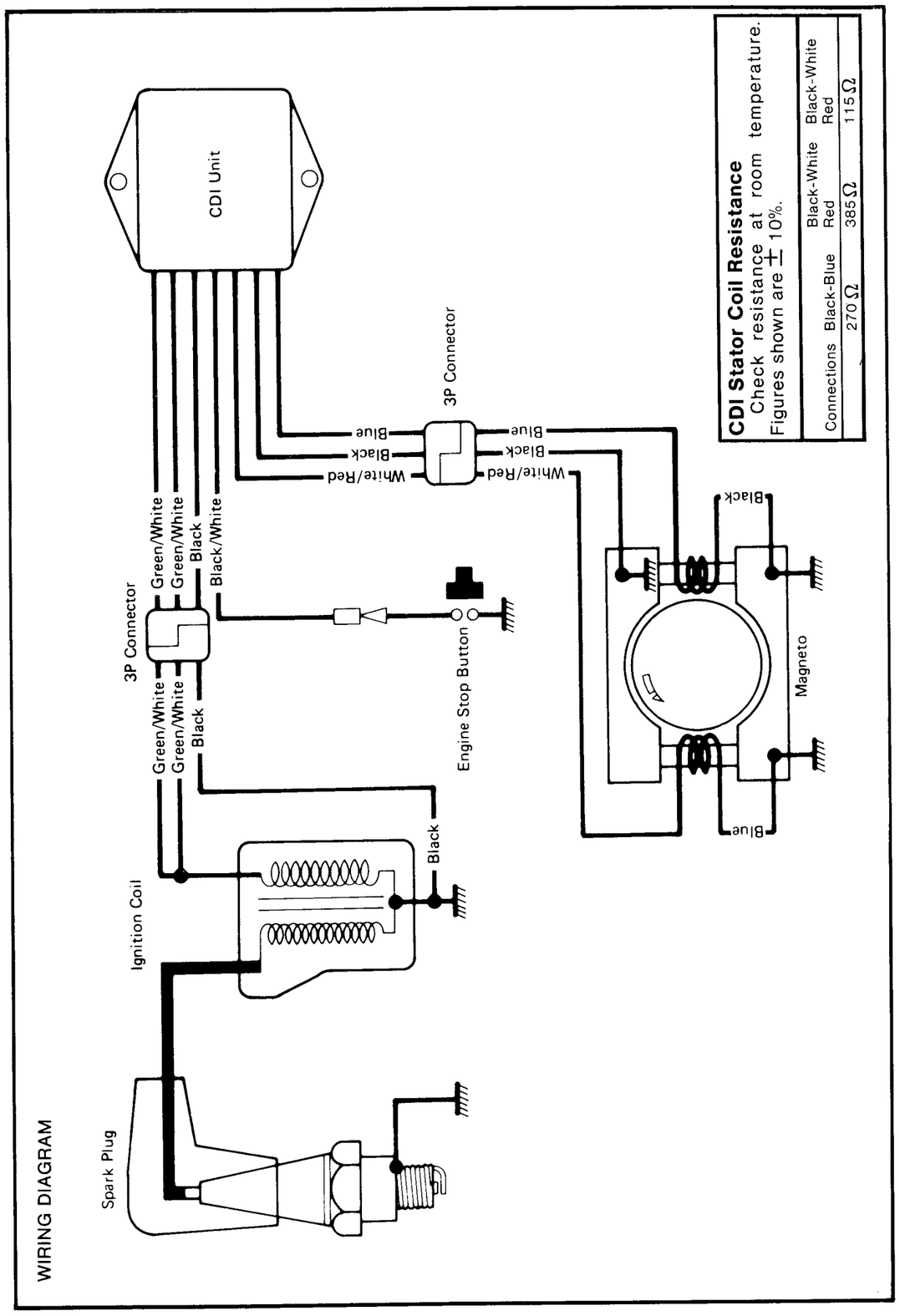
Clutch slipping
- No clutch lever play
- Friction plates worn
- Clutch springs weak
- Clutch inner cable not sliding smoothly

Clutch doesn't disengage properly
- Clutch lever play excessive
- Clutch plates warped or damaged
- Clutch springs not evenly tightened
- Transmission oil deteriorated or of too high a viscosity
- Clutch inner cable not sliding smoothly

Shift Operation Not Smooth

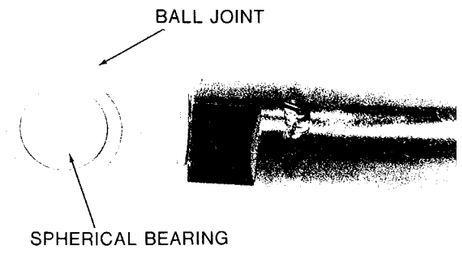
Doesn't go into gear or shift pedal doesn't return
- Clutch not disengaging
- Shift return spring weak or broken
- Shift return spring pin loose
- Shift lever spring broken
- Shift lever broken
- Shift fork bent or seized
- Shift drum damaged

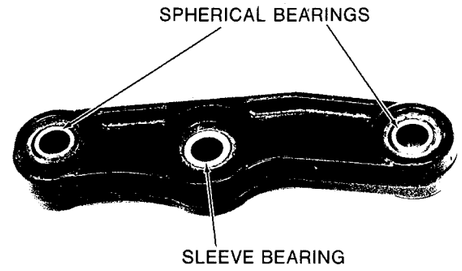
Jumps out of gear
- Shift fork worn
- Drive shaft, output shaft, or gear splines worn
- Gear groove worn
- Shift drum groove worn
- Shift fork guide pin worn



SPECIFICATIONS

Dimensions		
Overall length		2230 mm (87.8 in)
Overall width		840 mm (33.1 in)
Overall height		1200 mm (47.2 in)
Wheelbase		1520 mm (59.8 in)
Ground clearance		355 mm (13.9 in)
Dry weight		98 kg (216 lb)
Fuel tank capacity		9 Liters (2.4 US gal)
Seat height		985 mm (38.8 in)
Engine		
Type		2-stroke, 1-cylinder, reed valve
Bore and stroke		70 x 64.9 mm
Displacement		249 cc
Compression ratio		7.6:1
Induction system		Eyvind Boyesen's valve (Patent Nos. 3904340, 3905341, 4000753)
Port timing:		
Scavenging		63°
Exhaust open/close		94°
Carburetor		Mikuni VM38SS
Lubrication system		Premix 20:1
Starting system		Primary kick
Ignition system		CDI
Ignition timing		17° BTDC (1.79 mm) at 6,000 rpm
Spark plug		NGK B9EV
Compression pressure		12.0 kg/cm^2 (171 psi)
Transmission		
Type		5-speed constant-mesh; return shift
Clutch		Wet, multi-disc
Gear ratio:	1st	2.133 (32/15)
	2nd	1.687 (27/16)
	3rd	1.388 (25/18)
	4th	1.160 (29/25)
	5th	1.000 (24/24)
Primary reduction ratio		2.750 (55/20)
Final reduction ratio		3.428 (48/14)
Overall drive ratio		9.428 (top gear)
Transmission oil		10W30, 10W40 0.9 Liters (1.0 US qt)
Drive chain		No. 520, 114 links
Frame		
Type		Tubular, single down tube
Steering angle		45° to either side
Castor		62°
Trail		120 mm
Tire size		F: 3.00-21 R: 5.10-18
Tire pressure		Front and Rear 1.05 kg/cm^2 (15 psi)
Suspension		F: Telescopic fork R: Uni-Trak swingarm
Front suspension stroke		300 mm
Rear wheel travel		300 mm
Front fork oil		Approx. 418 cc 10W20
Front fork oil height		180 mm (spring removed, fork collapsed)
Front fork air pressure		0.3 kg/cm^2 (4 psi)
Brakes		
Inside diameter		F: 140 x 28 mm R: 150 x 28 mm
Spoke size		P8





- If the spherical bearing in the ball-joint is worn beyond the limit replace the ball-joint.

NOTE: The ball-joint should be installed so that the center of the spherical bearing and the edge of the Uni-Trak link or torque link is 27 mm, and that the mounting holes are parallel.

- If any spherical bearing in the Uni-Trak arm is worn out, replace it using a press and a suitable driver.

WARNING **Installation of new spherical bearing(s) in the Uni-Trak arm may cause initial stiffness in the rear suspension. Test ride the motorcycle slowly and prudently until the suspension responds normally.**

Sleeve Bearing

Pull out the sleeve bearing, and measure the outside diameter of the sleeve bearing and the inside diameter of the Uni-Trak arm. The difference of two readings is the clearance of two parts. If it exceeds 0.7 mm (0.028 in), replace the sleeve bearing.

Spherical Bearing, Sleeve Bearing

Service Limit
0.7 mm (0.0276 in)

ELECTRICAL

CDI Unit Inspection

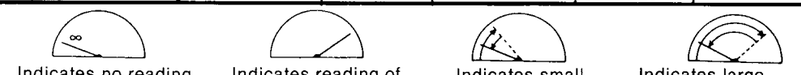
If a Kawasaki electrotester is not available, the unit can be tested with a multimeter (small radio repair type). Set the meter to the highest resistance range available (megohms), and connect the meter leads as shown in the table. If the readings correspond to the table, the CDI unit is good. "Zero" the meter before using it.

CAUTION **Use only a small portable type of multimeter for this test. If a megger or a meter with a large-capacity battery is used, the CDI unit may be damaged.**

CDI Unit Test Using a Multimeter

* Before checking connections indicated with an asterisk, short the green/white and black/white leads together to discharge any residual voltage in the capacitor, and short the black and black/white leads together too.

TESTER NEGATIVE (−) LEAD CONNECTION \ TESTER POSITIVE (+) LEAD CONNECTION	Black/White Eng. Stop	Black Ground	White/Red Exciter	Blue Signal	Green/White Ign. Coil
Black/White Eng. Stop		*	Approx 2M	*	*
Black Ground			Approx 2M		*
White/Red Excitor		*		*	
Blue Signal	∞	∞	∞		∞
Green/White Ign. Coil	*	*	*	*	



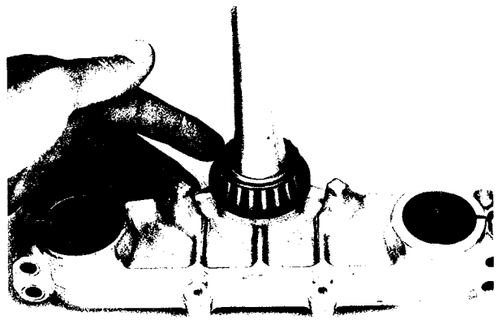
STEERING STEM BEARINGS

The bearing race surfaces may become dented, from overtightening or from a heavy shock to the steering stem. Damaged bearing races will cause the handlebar to jerk or catch when turned.

Bearing Lubrication

Whenever the steering stem is disassembled or after every fifth race, the steering stem bearings should be relubricated.

Wipe all the old grease off the races and rollers. If necessary, wash them in a high flash-point solvent. Replace the bearing parts if they show wear or damage. Apply grease liberally to the upper and lower races, and pack the cone bearings with grease. Turn the bearing around by hand a few time to make sure the grease is distributed uniformly inside the bearing.



Grease Seal Deterioration, Damage

Inspect the grease seal for any signs of deterioration or damage, and replace if necessary.

Replace the grease seal with a new one whenever it has been removed. The grease seal comes off whenever the lower bearing inner race is removed.

UNI-TRAK

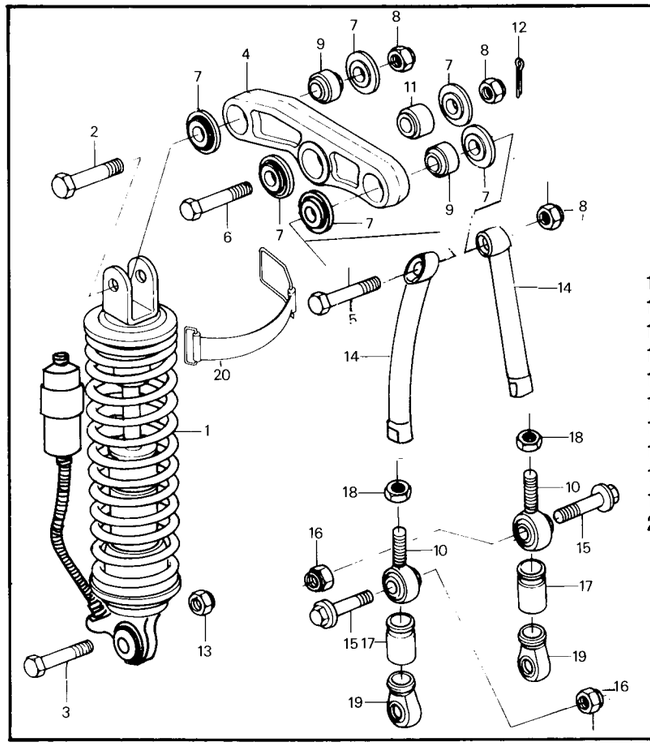
The Uni-Trak spring specifications, including preload setting, are shown in Chapter 2.

Check the Uni-Trak component parts for wear periodically, or whenever excessive play is suspected.

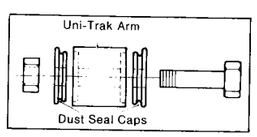
- Put a sturdy support under the engine so that the rear wheel is raised off the ground.
- Push and pull on the swing arm, and up and down, to check for wear externally.
- A small amount of play on the swing arm is normal and no corrective action is needed. However, if excessive play is felt, remove the Uni-Trak parts from the frame and check each for wear.

Spherical Bearings

- Move the spherical bearings in the Uni-Trak arm and ball-joint to feel for wear. The wear must be under 0.7 mm (0.028 in).



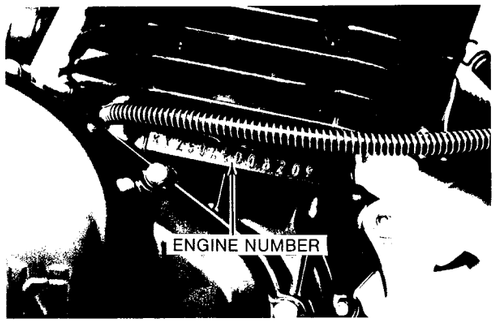
1 SHOCK ABSORBER, rear
2 BOLT, shock absorber fitting
3 BOLT, shock absorber fitting
4 ARM, suspension
5 BOLT, hex head, 14 x 54 mm
6 BOLT, hex head, 14 x 59 mm
7 CAP, Uni-Trak arm (dust cap)
8 NUT
9 JOINT, ball
10 JOINT, ball
11 BUSHING
12 COTTER PIN, 2.5 x 25 mm
13 NUT, lock, 12 mm
14 LINK, Uni-Trak
15 BOLT, hex head
16 NUT, lock, 12 mm
17 BOOT, ball joint upper
18 NUT, 12 mm
19 BOOT, ball joint lower
20 BAND



GENERAL INFORMATION

SERIAL NUMBER LOCATIONS

The frame and engine serial numbers are the only means of distinguishing your particular machine from others of the same model type. These serial numbers may be needed by your dealer when ordering parts. In the event of theft, the investigating authorities may require both numbers as well as the model type and any peculiar features of your machine that can help them identify it. You may wish to add secret identifying marks of your own in some inconspicuous locations.



OWNER'S TOOLS

Air pressure gauge
Tool bag
Spoke wrench
Spark plug wrench

FUEL (PREMIX) RATIO 20:1

The fuel is a mixture of premium gasoline and special oil for 2-stroke racing engines.

CAUTION This model is tuned for a 20:1 gasoline/oil mixture ratio. Carburetor rejetting may be necessary if other mixture ratios are used. Kawasaki factory testing has shown that peak horsepower can be maintained for longer periods by using a 20:1 ratio. Using another ratio may create carburetion problems, premature wear of engine components, and excessive loss of peak horsepower from overheating.

Gasoline	Premium Research Octane Rating 95 or higher
Recommended Oil	Kawasaki 2-Cycle Racing Oil

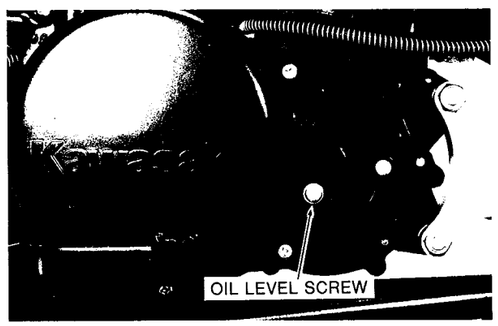
- Thoroughly mix the gasoline and oil.
- If Kawasaki 2-stroke oil is not available, use a high quality 2-stroke racing oil.
- Do not mix a vegetable oil (such as castor bean oil) with a mineral oil.

TRANSMISSION OIL

For the transmission and clutch to function properly, maintain the transmission oil at the proper level, and change the oil periodically. Motorcycle operation with insufficient, deteriorated, or contaminated transmission oil will cause accelerated wear and may result in transmission seizure. Do not add special "additives" since these may cause the clutch to slip.

Oil Level Check

Remove filler cap and level screw. Hold the motorcycle level and add oil until it flows from the hole.



Oil Change

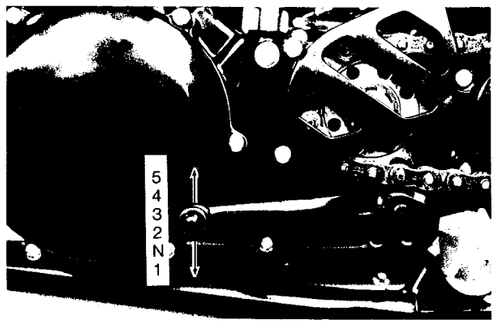
0.9 liter (1.0 US qt)

The transmission oil should be changed after break-in and according to the Periodic Maintenance Chart (page 11).

- Warm up the engine thoroughly so that the oil will pick up any sediment and drain easily.
- Stop the engine, remove the oil filler cap and place an oil pan beneath the engine. Remove the drain plug and position the vehicle so that it is perpendicular to the ground to allow all the oil to drain out.
- Install the drain plug with its gasket and tighten it to 1.3 kg-m (9.5 ft-lbs) of torque.
- Pour in 0.9 liter (1.0 US qt) of fresh transmission oil.
- Kick the kick pedal 3 or 4 times and check the oil level.
- Install the oil filler cap with its O-ring.

TRANSMISSION

The transmission is a 5-speed, return-shift type. Neutral is located between 1st and 2nd gears; 1st gear is reached by shifting down from neutral, and 2nd through 5th gears are reached by shifting up from neutral. The shift pattern is shown on the engine sprocket cover.

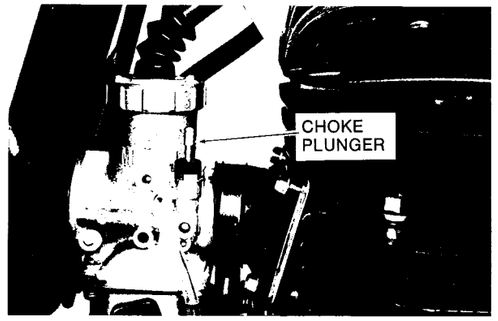


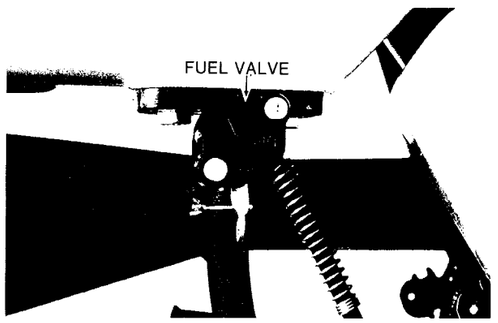
KICKSTARTER

The engine can be started, even if the transmission is in gear, by pulling in the clutch lever and kicking the engine over.

STARTING THE ENGINE

- Turn the fuel valve ON.
- If the engine is cold, pull up the choke plunger. Leave the throttle closed.
- Kick the engine over.
- Even after the engine starts, keep the choke plunger up. When the engine is warm enough to respond normally, push down the plunger. Do not leave the choke plunger up longer than necessary or the spark plug may foul.





NOTES: When the engine is already warm or on hot days, open the throttle part way instead of using the choke plunger.

- If the engine is flooded, kick with the throttle fully open until the engine starts.
- If the clutch lever is pulled, the motorcycle can be started while in any gear.

STOPPING THE ENGINE

- Shift the transmission into neutral.
- After racing the engine slightly, close the throttle completely or push the engine stop button to stop the engine.

FRONT FORK

WARNING **When disassembling, checking the oil level, and changing the oil of the front fork, first release the air from the fork. Failure to first release the air may cause injury.**

Since the springs become shorter as they weaken, check their free length to determine their condition. Replace any spring which is shorter than its service limit. If the length of a replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the suspension balanced.

Front Fork Spring Free Length

Standard	Service Limit
641.5 mm (24.0 in)	610 mm (25.3 in)

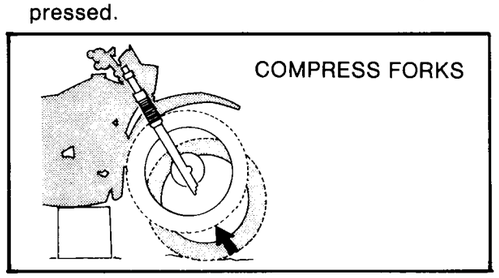
Fork Spring Rate

0.323 kg/m (18 lb/in) each spring

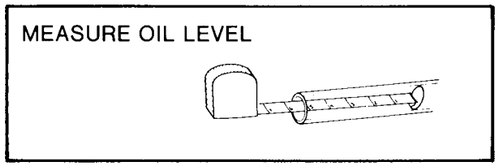
Fork Oil Level

To check the fork oil level:

- Place a jack or stand under the engine so that the front wheel is raised off the ground.
- Remove the caps from the top of the fork tubes, and pull out the spring seats and springs.
- Pull up the forks until they are fully compressed.



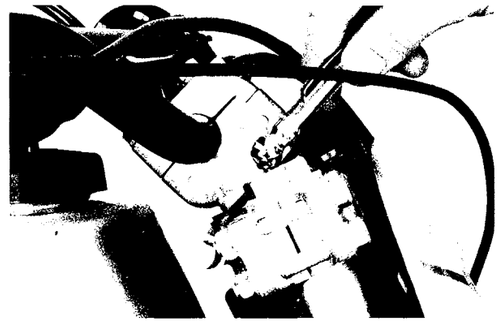
- With the forks fully compressed, insert a tape measure or rod into the tube, and measure the distance from the top of the tube to the oil. Measure both tubes.



Front Fork Oil Level

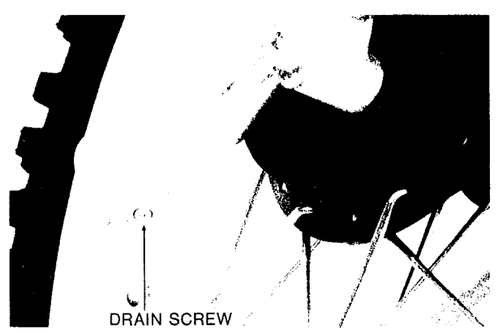
Type	Amount per side	Oil level from top of inner tube
SAE 15 W or 10W20	418 cc	180 mm

- If the oil is below the correct level, add oil.
- Put in springs, fit the spring seats and caps, and then tighten the caps to 2.3 kg-m (16.5 ft-lbs) of torque.
- Pressurize the fork to the desired shock absorption level (approximately 4 psi).



Oil Change

To drain out the old oil, first release the air, and then remove the drain screw from the lower end of the outer tube on each side. With the front wheel on the ground, push down on the handlebar a few times to pump out the oil. Place a jack or stand under the engine so that the front wheel is raised off the ground. Install the drain screws, remove the fork cap from each side, and pour in the specified type and amount of oil. Then install the caps and tighten them securely.



grease seals are nearly always damaged during removal, replace all oil seals or grease seals which have been removed.

Lubricating the Wheel Bearings

If the same bearing is to be used again, wash it with a high flash-point solvent, dry it, and pack it with good quality bearing grease. Turn the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing, and wipe the old grease out of the hub before bearing installation. Clean and grease the wheel bearings periodically.

DRIVE CHAIN

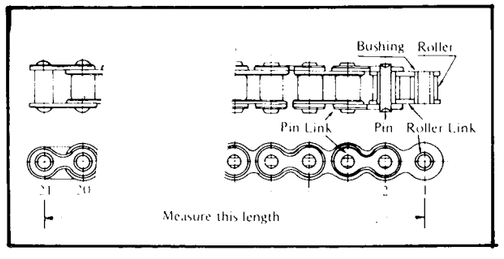
Drive Chain Wear

When the chain has worn so much that it is more than 2% longer than when new, it is no longer safe for use and should be replaced. Whenever the chain is replaced, inspect both the engine and rear sprockets, and replace them if necessary. Worn-out sprockets will cause a new chain to wear quickly.

Since it is impractical to measure the entire length of the chain, determine the degree of wear by measuring a 20-link length of the chain. Stretch the chain taut. Measure the length of 20 links on a straight part of the chain from the center of the 1st pin to the center of the 21st pin. If the length is greater than the service limit, the chain should be replaced.

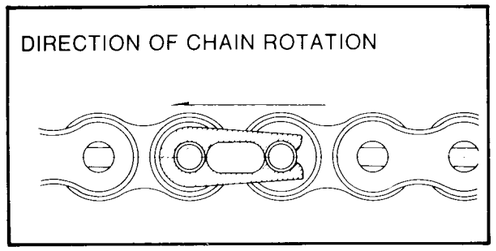
Drive Chain Length

	Standard	Service Limit
20-link length	317.5 mm (12.5 in)	323 mm (12.7 in)



NOTES: The drive system was designed for use with the Tsubaki No. 520 chain. For maximum wear resistance and safety, use the same type of chain for replacement.

To minimize any chance of the master link coming apart, the master link must be installed with the closed end of the "U" pointed in the direction of chain rotation.



Chain Guide

Inspect the chain guide and rollers. Replace each component when worn beyond service limits.

	Standard	Service Limit
Roller diameter	44 mm (1.7 in)	39 mm (1.5 in)
Guide (bolt center to top)	17.5 mm (0.7 in)	12.5 mm (0.5 in)

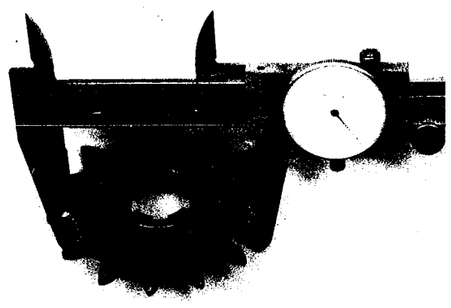
Replace the rear chain guide when it shows more than 5 mm of wear.

SPROCKETS

Sprocket Wear

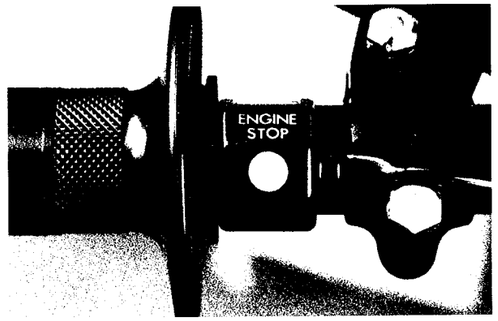
Visually inspect the sprocket teeth. If they are worn, replace the sprocket.

Measure the diameter of the sprocket at the base of the teeth. If the sprocket is worn down to less than the service limit, replace it.



Sprocket Diameter

	Standard	Service Limit
Engine sprocket, 14T	61.18 mm (2.41 in)	60.6 mm (2.38 in)
Driven sprocket, 48T	232.56 mm (9.16 in)	232.0 mm (9.13 in)



- Turn the fuel valve OFF.

BREAK-IN

To obtain the proper operating clearances in the engine and transmission, a brief break-in procedure must be carried out. For the first hour of operation, run the engine at low and moderate rpm.

- Start the engine, and let it run at idle until the engine is thoroughly warmed up. Rev the engine slightly, but never open to full throttle.
- Next, move off and run at half throttle.
- Occasionally stop and make a general inspection. Check bolt and nut tightness. In particular, check chain slack and spoke tightness after 10, 30, and 60 minutes' riding. Adjust if necessary.
- After the break-in procedure has been properly carried out, the motorcycle is ready for regular operation. However, since recklessly high rpm will lead to engine trouble, take care to use the necessary skill and technique in operating the motorcycle.

NOTE: After break-in, install a new spark plug, and change the transmission oil. The front forks and the Uni-Trak shock absorber also require a break-in period. We suggest that you ride for approximately 3 hours before tuning the suspension.

STORAGE

When the motorcycle is to be stored for any length of time, it should be prepared for storage as follows:

- Clean the entire vehicle thoroughly.
- Empty the gasoline from the fuel tank, and empty the carburetor fuel chamber. (If left in for a long time, the gasoline will sour.)
- Remove the spark plug and put several drops of SAE 30 oil into the cylinder. Kick the engine over slowly a few times to coat the cylinder wall with oil, and install the plug. Spray oil into the exhaust pipe.
- Lubricate the drive chain and all the cables.
- Spray oil on all unpainted metal surfaces to prevent rusting. Avoid getting oil on rubber parts or in the brakes.
- Set the motorcycle on a box or stand so that both wheels are raised off the ground. (If this cannot be done, put boards under the front and rear wheels to keep dampness away from the tire rubber.)
- Tie a plastic bag over the exhaust pipe to prevent moisture from entering.
- Put a cover over the motorcycle to keep dust and dirt from collecting on it.

To put the motorcycle back into use after storage:

- Make sure the spark plug is tight.
- Fill the fuel tank.
- Run the engine for about five minutes to warm the oil, and drain the transmission oil.
- Put in fresh transmission oil.
- Check all the points listed under the Inspection and Adjustment Section.
- Lubricate the points listed in the General Lubrication Section.

CLEANING

Preparation for Washing

Before washing, precautions must be taken to keep water off the following parts:

Rear opening of the muffler..... Cover with a plastic bag secured with rubber bands.

Clutch and brake levers, hand grips, engine stop button . Cover with plastic bags.

Air cleaner intake.... Close up the opening with tape, or stuff in rags.

Where to Be Careful

Avoid spraying water with any great force near the following places:

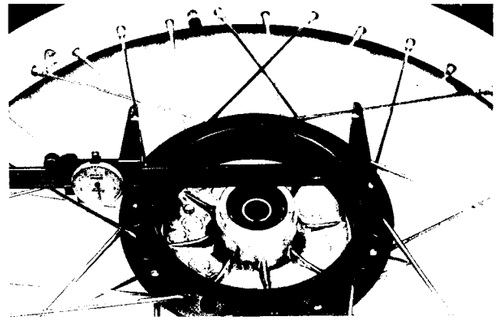
Front and rear hubs..... If water gets inside the hubs, the brakes will not function until they dry out.

Under the fuel tank .. If water gets into the ignition coil or into the spark plug cap, the spark will jump through the water and be grounded out. When this happens, the motorcycle will not start and the affected parts must be wiped dry.

After Washing

- Remove the plastic bags, and clean the air cleaner intake.
- Lubricate the points listed in the General Lubrication Section.
- Start the engine and run it for 5 minutes.
- Test the brakes before motorcycle operation.

uneven drum wear will decrease braking effectiveness, take measurements at a minimum of two places. If any diameter measurement exceeds the service limit, the hub must be replaced.



Brake Drum Diameter

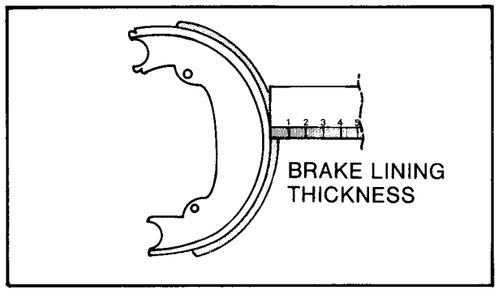
	Standard	Service Limit
Front	140 mm (5.512 in)	140.75 mm (5.541 in)
Rear	150 mm (5.906 in)	150.75 mm (5.935 in)

Braking Shoe Lining Wear

WARNING **Brake linings contain asbestos fiber. Inhalation of asbestos may cause serious scarring of the lungs and may promote other internal injury and illness, including cancer. Observe the following precautions when handling brake linings:**

1. **Never blow brake lining dust with compressed air.**
2. **If any components are to be cleaned, wash with detergent, then immediately discard the cleaning solution and wash your hands.**
3. **Do not grind any brake lining material unless a ventilation hood is available and properly used.**

Check the thickness of the brake linings, and replace both shoes as a set if the thickness at any point is less than the service limit. If the thickness of the brake linings is sufficient, check the linings for uneven wear, and file or sand down any high spots. With a wire brush, remove any foreign particles imbedded in the lining surface. Wash off any oil or grease with a high flash-point solvent. In case the linings are damaged or the surface cannot be restored by sanding and cleaning, the shoes must be replaced.

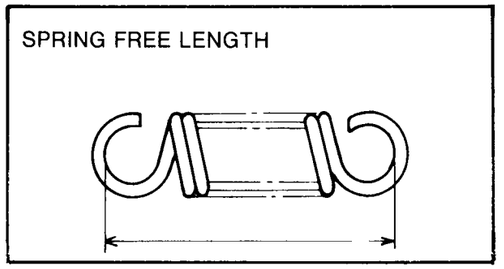


Brake Lining Thickness

	Standard	Service Limit
Front	4 mm (0.16 in)	2 mm (0.08 in)
Rear	5 mm (0.20 in)	2.5 mm (0.10 in)

Brake Shoe Spring Tension

If the brake springs become stretched, they will not pull the shoes back away from the drum after the brake lever or pedal is released, causing the shoes to drag on the drum. Remove the springs, and check their free length with vernier calipers. If either is stretched beyond the service limit, replace both springs.



Brake Shoe Spring Free Length

Standard	Service Limit
47.5 – 48.5 mm (1.87 – 1.91 in)	50.0 mm (1.97 in)

GREASE SEALS, OIL SEALS AND BEARINGS

Ball Bearing Wear, Damage

Since the ball bearings are made to extremely close tolerances, the clearance cannot normally be measured. Therefore, the condition of the bearings must be judged by feel. Wash each bearing with a high flash-point solvent, dry it (do not spin it while it is dry), and oil it. Spin it by hand to check its condition. If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced. Before reinstalling the bearing, replace its oil seal with a new one.

Needle Bearing Wear, Damage

The rollers in the needle bearings wear so little that the wear is difficult to measure. Instead, inspect the bearings for abrasions, color change, or other damage. If there is any doubt as to the condition of a bearing, replace it.

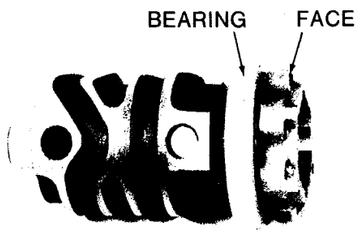
Grease, Oil Seal Damage

Inspect the oil seals or grease seals, and replace any with the lips misshapen, discolored (indicating the rubber has deteriorated), hardened, or otherwise damaged. Since oil seals or

drives it may also be damaged. At the same time that a gear is repaired or replaced, the driving gear should also be inspected and repaired or replaced if necessary.

Shift Drum Bearing

Inspect the shift drum bearing and drum face. If the bearing is damaged, or the drum face shows wear or damage, the shift drum assembly should be replaced.



WHEELS

Rim Runout

Set a dial gauge to the side of the rim, and rotate the wheel to measure axial runout. The difference between the highest and lowest dial readings is the amount of runout.

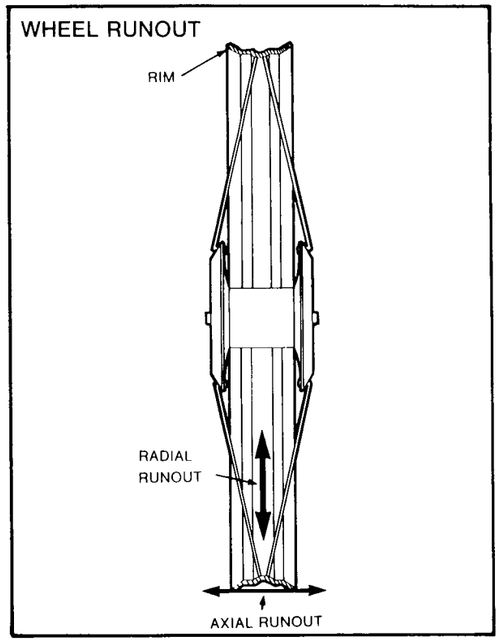
Set the dial gauge to the inner circumference of the rim and rotate the wheel to measure radial runout. The difference between the highest and lowest dial readings is the amount of runout.

A certain amount of rim warp (runout) can be corrected by recentering the rim, that is, loosening some spokes and tightening others to change the position of different parts of the rim. If the rim is badly bent, however, it should be replaced.

NOTE: The location of the weld of the rim may show excessive runout. Disregard this when measuring runout.

Rim Runout

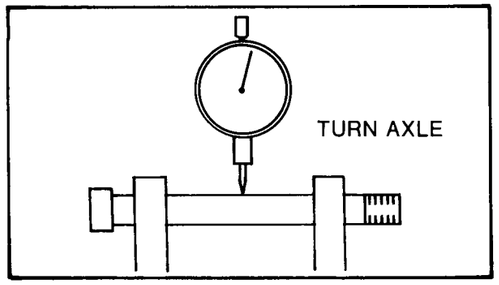
	Standard	Service Limit
Axial	under 0.5 mm (under 0.019 in)	3.0 mm (0.12 in)
Radial	under 0.8 mm (under 0.031 in)	2.0 mm (0.08 in)



Axle Bend

A bent axle causes vibration, poor handling, and instability.

To measure axle runout, remove the axle, place it in V blocks that are 100 mm (4 in) apart, and set a dial gauge to the axle at a point halfway between the blocks. Turn the axle to measure the runout. The amount of runout is the amount of dial variation.



If runout exceeds the service limit, straighten the axle or replace it. If the axle cannot be straightened to within tolerance, or if runout exceeds 0.7 mm (0.0028 in), replace the axle.

Axle Runout/100 mm (4 in)

	Standard	Service Limit
Front and Rear Axle	under 0.1 mm (under 0.004 in)	0.2 mm (0.008 in)

BRAKES

Brake Drum Wear

Measure the inside diameter of the brake drum with calipers to determine wear. Since

INSPECTION AND ADJUSTMENT

PRE-EVENT CHECKS

WARNING **Be sure to perform all Pre-Event and After-Event Checks to prevent equipment damage and/or injury. Refer to the Periodic Maintenance Chart for additional adjustments and checks to be performed before each race (moto).**

Engine	
Transmission oil	Transmission oil level correct
Spark plug	Tighten to correct torque
Cylinder, cylinder head	Tighten to correct torque
Clutch	Clutch functioning properly
Carburetor	Adjusted properly, hose fittings tight
Air cleaner	Clean, properly installed
Ignition timing	Ignition timing correct
Muffler	Muffler not damaged
Engine sprocket	Not worn or damaged
Frame	
Tires	Check for wear, cracks, and other damage. Check pressure.
Spokes	Tighten any loose spokes
Drive chain	Check overall condition and adjustment, oil as necessary
Chain guides	In satisfactory condition
Brakes; Front and rear	Function properly, brake lever and pedal have correct play or travel
Throttle	Functions properly, returns smoothly
Steering	Action is smooth but not loose from lock to lock. No binding of control cables
Front forks	Function properly, no oil leakage; air pressure equalized and correct
Uni-Trak	Functions properly, no oil leakage, no looseness of bearings. Check the shock absorber for damage and the hose for cuts, cracks and deterioration.
Nuts, bolts, fasteners	Tighten any loose bolts and nuts. Make sure all cotter pins are in place and in good condition. See Nut and Bolt Tightening on following page.
Fuel tank	Mounted securely
Rear sprocket	Not worn or damaged
Engine stop	Functions

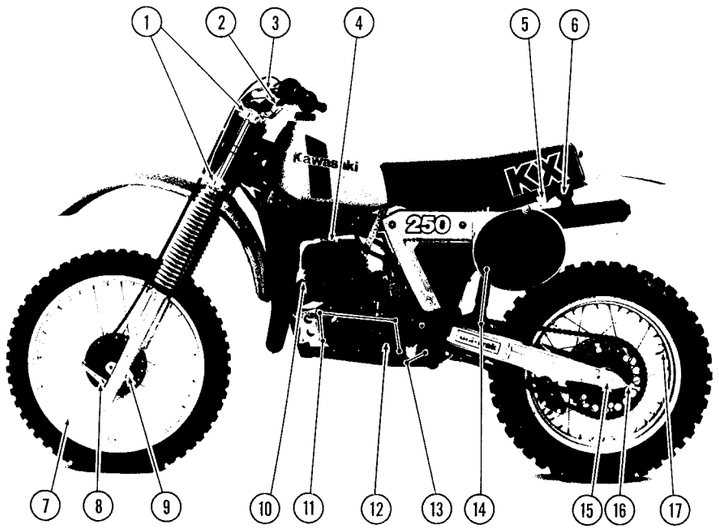
AFTER-EVENT CHECKS

After riding, first clean, and then inspect the entire motorcycle, with special care to parts such as the air cleaner, carburetor, brakes, etc.

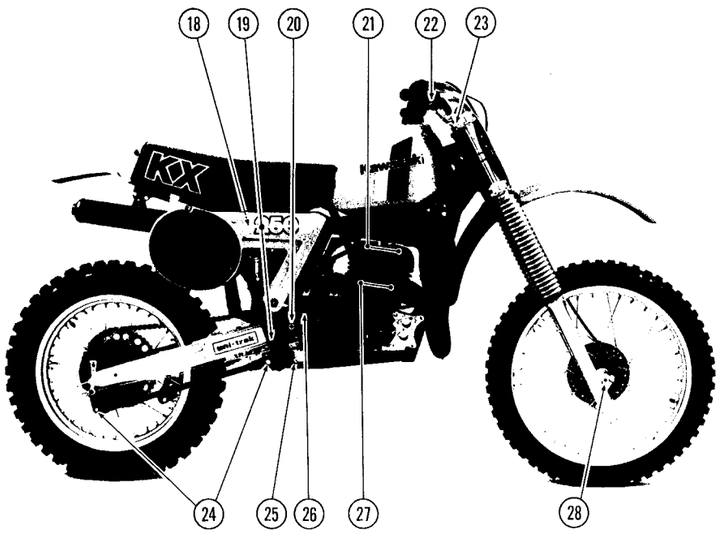
Carry out general lubrication and make adjustments as necessary.

NUT AND BOLT TIGHTENING

Use this page as a guide when checking the tightness of nuts, bolts and fasteners before each event. Also, make sure all cotter pins are in place and in good condition. See Pre-event Checks on preceding page.

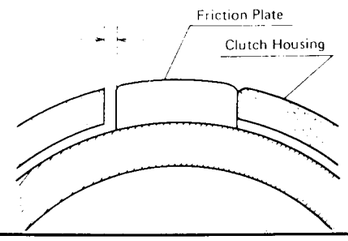


1. Front Fork Clamp Bolts
2. Handlebar Mounting Bolts
3. Clutch Lever Mounting Bolt
4. Spark Plug
5. Seat Mounting Bolt
6. Silencer Mounting Bolt
7. Spokes
8. Brake Cam Lever Bolt
9. Brake Panel Stop Bolt
10. Muffler Mounting Springs
11. Engine Mounting Bolts and Nuts
12. Shift Pedal Bolt
13. Footpeg Mounting Bolt
14. Uni-Trak Link Bolts
15. Rear Axle Nut
16. Chain Adjuster Locknut
17. Bead Protector Nut



18. Uni-Trak Center Bolt
19. Rear Shock Absorber Bolts
20. Pivot Shaft Nut
21. Cylinder Head Nuts
22. Brake Lever Mounting Bolt
23. Steering Stem Head Bolt
24. Torque Link Bolts
25. Rear Brake Pedal Bolt
26. Kickstarter Pedal Bolt
27. Cylinder Base Nuts
28. Axle

FRICTION PLATE/CLUTCH HOUSING CLEARANCE

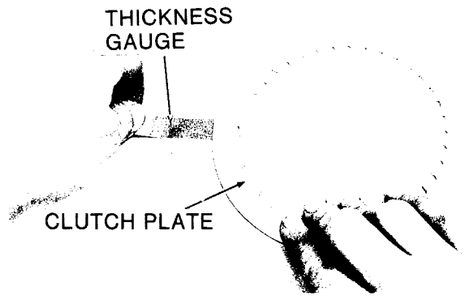


Friction Plate/Clutch Housing Clearance

Standard	Service Limit
0.1 - 0.3 mm (0.004 - 0.012 in)	0.6 mm (0.023 in)

Clutch Plate Warp

Place each friction plate and each steel plate on a surface plate, and measure the gap between each clutch plate and the surface plate. This gap is the amount of clutch plate warp. Replace any plates warped beyond the service limit.



Clutch Plate Warp

	Standard	Service Limit
Friction Plate	under 0.15 mm (under 0.006 in)	0.30 mm (0.012 in)
Steel Plate	under 0.2 mm (under 0.008 in)	0.35 mm (0.014 in)

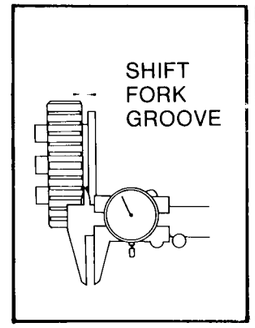
TRANSMISSION

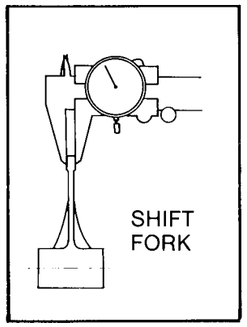
Shift Fork Bending

Visually inspect the shift forks, and replace any fork that is bent. A bent fork could cause difficulty in shifting or allow the transmission to jump out of gear when under power.

Shift Fork, Gear Groove Wear

Measure the thickness of the fingers of each shift fork, and measure the width of the gear shift fork groove. If the thickness of a shift fork finger is under the service limit, the shift fork must be replaced If a gear shift fork groove is worn over the service limit, the gear must be replaced.





Shift Fork Thickness

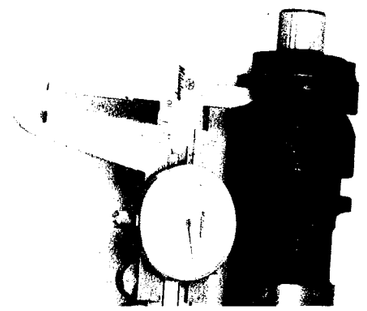
Standard	Service Limit
4.4 - 4.5 mm (0.174 - 0.177 in)	4.2 mm (0.166 in)

Gear Shift Fork Groove Width

Standard	Service Limit
4.55 - 4.65 mm (0.179 - 0.183 in)	4.75 mm (0.187 in)

Shift Fork Guide Pin/Shift Drum Groove Wear

Measure the diameter of each shift fork guide pin, and measure the width of each shift drum groove. Replace any shift fork on which the guide pin has worn past the service limit. If a shift drum groove is worn past the service limit, replace the shift drum.



Shift Fork Guide Pin Diameter

Standard	Service Limit
5.9 – 6.0 mm (0.233 – 0.236 in)	5.85 mm (0.231 in)

Shift Drum Groove Width

Standard	Service Limit
6.05 – 6.20 mm (0.238 – 0.244 in)	6.25 mm (0.246 in)

Transmission Gear Damage

Inspect the teeth on the transmission gears. Any light damage can be corrected with an oilstone, but the gear must be replaced if the teeth are badly damaged. Damaged teeth on a gear indicate that the teeth on the gear that

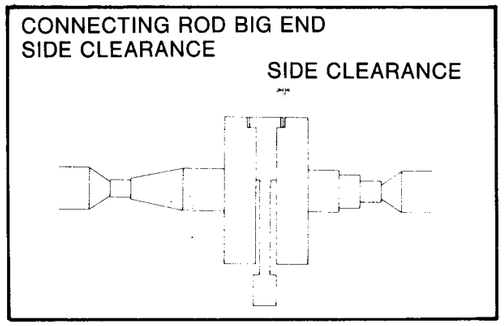
Connecting Rod Big End Radial Clearance

Standard	Service Limit
0.037 - 0.049 mm (0.0015 - 0.0019 in)	0.10 mm (0.004 in.)

Connecting Rod Big End Side Clearance

Measure the side clearance of the connecting rod with a thickness gauge. If the clearance exceeds the service limit, replace the crankshaft assembly.

CONNECTING ROD BIG END SIDE CLEARANCE



Connecting Rod Big End Side Clearance

Standard	Service Limit
0.45 - 0.50 mm (0.018 - 0.020 in)	0.70 mm (0.027 in)

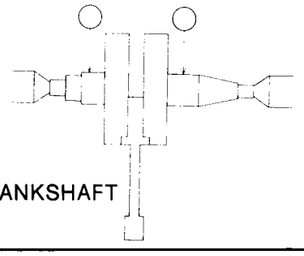
Crankshaft Runout

Set the crankshaft in a flywheel alignment jig, and place a dial gauge on each side of the crankshaft where the crankshaft ball bearings fit. Turn the crankshaft slowly. The maximum difference in gauge readings is the crankshaft runout. If the runout exceeds the service limit, replace the crankshaft assembly.

Crankshaft Runout

Standard	Service Limit
under 0.03 mm (under 0.0011 in)	0.10 mm (0.004 in)

CRANKSHAFT RUNOUT



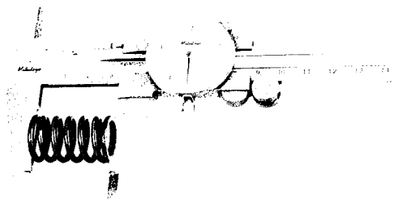
CLUTCH

Clutch Spring Tension

Measure the free length of the clutch springs with vernier calipers. If any spring is shorter than the service limit, replace all the springs as a set to ensure even pressure on the clutch plates.

Clutch Spring Free Length

Standard	Service Limit
33.3 mm (1.31 in)	30.0 mm (1.18 in)

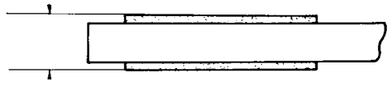


SPRING FREE LENGTH

Friction Plate Wear Damage

Visually inspect the friction plates to see if they show any signs of heat seizure or have become rough or unevenly worn. Measure the thickness of the plates with vernier calipers. If any plates show signs of damage or if they have worn past the service limit, replace them with new ones.

FRICTION PLATE MEASUREMENT



Friction Plate Thickness

Standard	Service Limit
2.92 - 3.08 mm (0.115 - 0.121 in)	2.8 mm (0.111 in)

Friction Plate/Clutch Housing Clearance

Measure the clearance between the tangs on the friction plates and the fingers of the clutch housing. If this clearance is excessive, the clutch will be noisy. If the clearance exceeds the service limit, replace the friction plates.

PERIODIC MAINTENANCE CHART

OPERATION \ FREQUENCY	Each Race Moto	Every 2 Races	Every 3 Races	Every 5 Races	See Page
ENGINE					
Clutch - adjust	●				12
Engine sprocket - check				●	50
Throttle cable - adjust	●				12
Transmission oil - change			●		6
Reed valve - inspect				●	45
Piston - inspect, clean, check †			●		44
Piston ring - replace			●		44
Cylinder - inspect			●		43
Piston-to-cylinder clearance - inspect			●		44
Carburetor - inspect, clean, adjust		●			42
Main bearings - check †				●	33
Big end bearing - check †				●	45
Small end bearing - check †			●		45
Spark plug - clean, gap †	●				13
Check engine compression	●				43
Air cleaner - clean, inspect	●				14
Air cleaner - replace	Every five cleanings				14
CHASSIS					
Brake adjustment - check †	●				16
Brake wear - clean, grease pivots		●			49,24
Rear sprocket - check †				●	50
Spoke tightness, rim runout - check †	●				48
Drive chain - adjust	●				15
Drive chain - replace				●	50
Front fork - inspect, clean, pressurize	●				20
Front fork oil - change				●	51
Fuel system - clean	●				42
General lubrication	●				23
Wheel bearing - grease				●	50
Brake camshaft - grease				●	24
Steering bearings - grease				●	52
Uni-Trak link, bearing wear - check †		●			52
Uni-Trak arm, bearing wear - check †		●			52
Uni-Trak bearings - grease		●			52
Frame, swingarm - inspect for damage	●				9

† Replace, add or adjust if necessary.

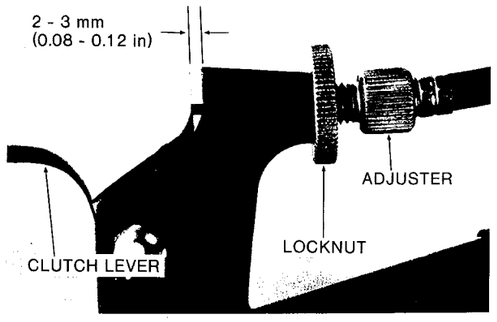
CLUTCH

Clutch Lever

Proper clutch lever play between the clutch lever and the clutch lever holder is 2 - 3 mm (0.08 - 0.12 in). The play increases with cable stretch and decreases with friction plate wear, necessitating adjustment.

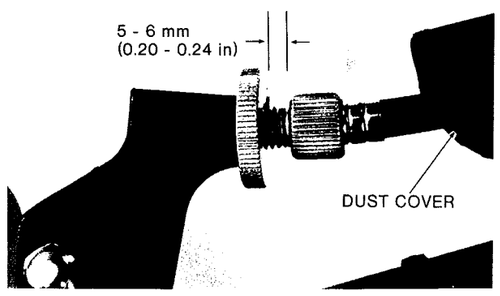
When there is too much lever play, first try adjusting the cable at the clutch lever.

- Slide the clutch lever dust cover out of place.
- Loosen the knurled locknut, turn the adjuster to obtain the proper amount of lever play, and tighten the locknut.
- Slide back the clutch lever dust cover.

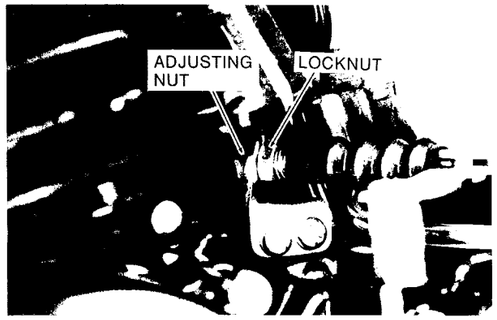


If the adjuster at the clutch lever has reached its limit, adjust the cable with the adjuster on the engine.

- Loosen the knurled locknut at the clutch lever just enough so that the adjuster will turn freely, and then turn the adjuster so that there is 5 - 6 mm (0.20 - 0.24 in) gap between the adjuster and locknut.



- Slide the dust cover up out of its position at the bottom of the clutch cable.
- Loosen the locknut at the bottom of the clutch cable, take up all the cable play with the adjusting nut at the bottom of the cable, and then tighten the locknut.
- Slide the dust cover back into place.

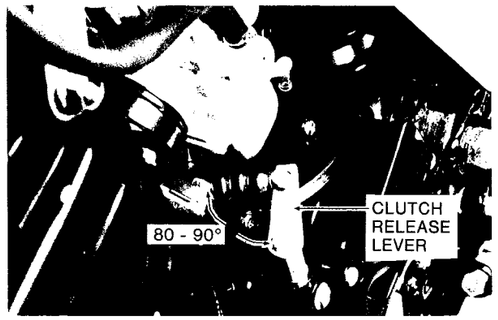


- Turn the adjuster at the clutch lever so that the clutch lever will have 2 - 3 mm (0.08 - 0.12 in) of play, and tighten the locknut.
- Slide back the clutch lever dust cover.

Clutch Release Lever

The clutch release lever may need adjustment if the clutch slips, the action of the lever feels heavy, or you have difficulty obtaining the correct lever free play with the cable adjusters.

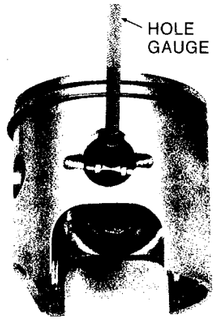
- Loosen the locknut and turn the adjusting nut at the lower end of the cable to give plenty of play.
- Push the clutch release lever until you feel resistance.
- The release lever to clutch cable angle should be 80-90°.



- If it is not, remove the RH engine cover. Loosen the locknut in the center of the clutch and turn the adjusting screw until the correct angle is obtained. Clean the adjusting screw and locknut threads, apply a non-permanent locking agent and tighten the locknut.
- Install the RH engine cover and adjust clutch lever free play at the lower end of the cable.

THROTTLE CABLE

- Check that the throttle grip has 2 - 3 mm (0.08 - 0.12 in) of play and turns smoothly. If the play is incorrect, loosen the locknut, turn the adjuster to obtain the correct amount of play, and tighten the locknut.



Piston Pin, Piston Pin Hole, Small End Diameter

	Standard	Service Limit
Piston Pin	17.995—18.000 mm (0.7085—0.7086 in)	17.96 mm (0.707 in)
Piston Pin Hole	18.000—18.006 mm (0.7087—0.7089 in)	18.07 mm (0.711 in)
Small End I.D.	22.003—22.012 mm (0.8663—0.8666 in)	22.05 mm (0.868 in)

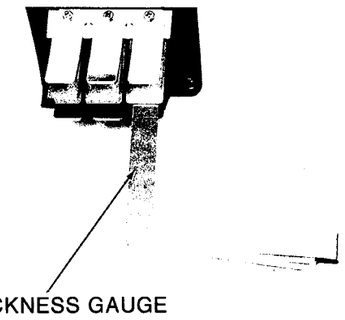
NOTE: When a new piston or pin is used, check that piston-to-pin clearance is under 0.011 mm (0.00043 in).

Needle Bearing

The connecting rod small end needle bearing must be replaced every 5 races or if it has cracked.

REED VALVE

When the clearance between the reed valve and valve holder is over 0.5 mm (0.02 in), or if the reed valve is cracked, warped, or damaged, replace the reed valve assembly with a new one.



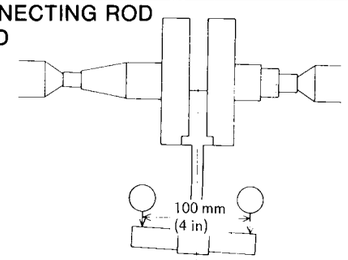
CRANKSHAFT

Connecting Rod Bending, Twisting

Set the crankshaft in a flywheel alignment jig or on V blocks on a surface plate. Select an arbor of the same diameter as the piston pin and of optional length, and insert it through the small end of the connecting rod.

Using a height gauge or dial gauge, measure the difference in the height of the rod above the surface plate over a 100 mm (4 in) length to determine the amount the connecting rod is bent.

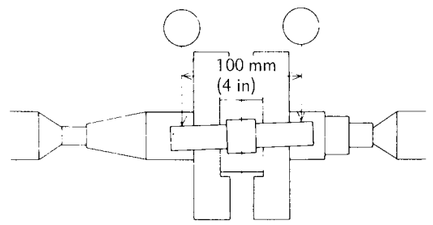
CONNECTING ROD BEND



Using the arrangement shown in the illustration below, measure the amount that the arbor varies from being parallel with the crankshaft over a 100 mm (4 in) length of the arbor to determine the amount the connecting rod is twisted.

If either of these measurements exceeds the service limit, the crankshaft assembly must be replaced.

CONNECTING ROD TWIST



Connecting Rod Bend/Twist

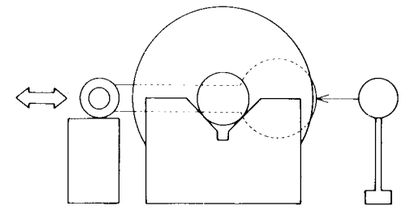
Standard	Service Limit
under 0.05 mm/100 mm (under 0.002 in/4 in)	0.20 mm/100 mm (0.007 in/4 in)

Connecting Rod Big End Radial Clearance

Set the crankshaft in a flywheel alignment jig. Placing a dial gauge against the connecting rod big end, push the connecting rod first towards the gauge and then in the opposite direction. The difference between the high and low reading is the radial clearance.

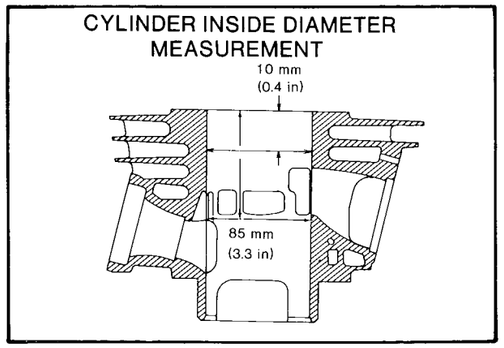
If the radial clearance exceeds the service limit, replace the crankshaft assembly.

CONNECTING ROD BIG END RADIAL CLEARANCE



ween the two measurements, the cylinder must be replaced with a new one.

NOTE: The electrofusion cylinder cannot be bored or honed. If altering the cylinder ports, take care that the cylinder wall does not get scratched or otherwise damaged.



Cylinder Inside Diameter

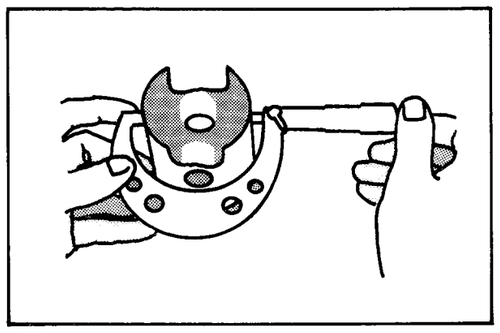
Standard	Service Limit
70.015-70.030mm (2.7565-2.7571 in)	70.1mm (1.760 in)

Piston Wear

Measure the outside diameter of the piston 13 mm up from the bottom of the piston at a right angle to the direction of the piston pin using a micrometer. If the measurement is under the service limit, replace the piston.

Piston Diameter

Standard	Service Limit
69.961-69.976mm (2.7544-2.7550 in.)	69.81mm (2.748 in)



Piston/Cylinder Clearance

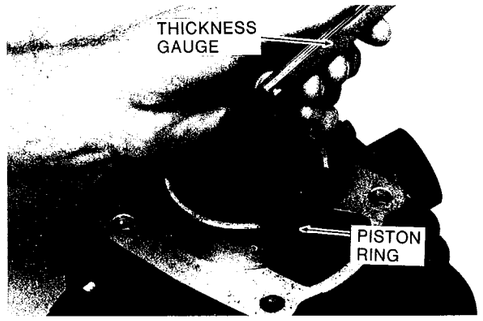
In order to maintain proper piston/cylinder clearance, the piston /cylinder clearance should be measured whenever a new piston or cylinder is installed. The most accurate way to find the clearance is to make separate piston and cylinder measurements and then compute the difference between the two values. Measure the piston diameter as just described, and subtract this piston diameter value from the smallest value of the previously measured front-to-back cylinder diameters. The difference is the piston clearance.

Piston/Cylinder Clearance

Standard
0.049-0.059mm (0.0020-0.0023 in)

Piston Ring End Gap

Place the piston ring being checked inside the cylinder close to the bottom where the wear is low. Measure the gap between the ends of the ring with a thickness gauge. If the gap is wider than the service limit, the ring is worn out and must be replaced.



Piston Ring End Gap

Ring Type	Standard	Service Limit
Top: Keystone, L-shaped	0.2 - 0.4 mm (0.008 - 0.016 in)	0.7 mm (0.03 in)
Second: Keystone	0.2 - 0.4 mm (0.008 - 0.016 in)	0.7 mm (0.03 in)

Piston Ring, Piston Ring Groove Wear

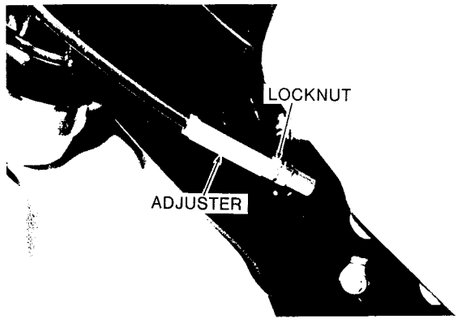
Visually inspect the piston rings and the piston ring grooves. If the rings are worn unevenly or damaged, they must be replaced. If the piston ring grooves are worn unevenly or damaged, the piston must be replaced and fitted with new rings.

When new rings are being fitted into a used piston, check for uneven groove wear by inspecting the ring seating. The rings should fit perfectly parallel to the groove surface. If not, the piston must be replaced.

Piston, Piston Pin, Connecting Rod Small End Wear

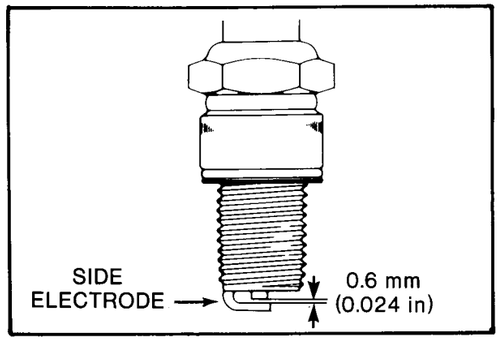
Measure the diameter of the piston pin with a micrometer. If the piston pin diameter is less than the service limit at any point, replace the piston pin.

Using a cylinder gauge, measure the diameter of both piston pin holes in the piston and the inside diameter of the connecting rod small end. If either piston pin hole diameter exceeds the service limit, replace the piston. If the connecting rod small end diameter exceeds the service limit, replace the crankshaft assembly.



SPARK PLUG

The standard spark plug is an NGK B9EV. It should have a 0.6 mm (0.024 in) gap, and be tightened to 2.8 kg-m (20 ft-lbs) of torque.



The spark plug should be taken out to check its gap and ceramic before and after each event. If the plug is oily or has carbon built up on it, clean it using a high flash-point solvent and a wire brush or other suitable tool. Measure the gap with a wire-type thickness gauge. Adjust the gap by bending the side electrode. If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug.

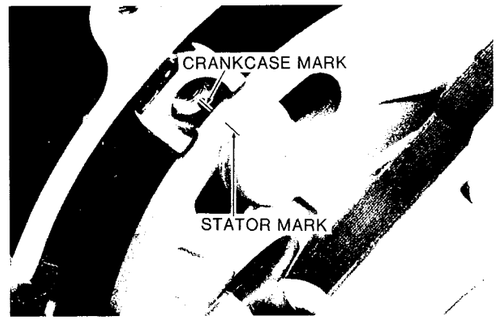
To find out whether the right temperature plug is being used, pull it out and examine the ceramic insulator around the center electrode. If the ceramic is light brown, the spark plug is correctly matched to engine temperature. If the ceramic is burned white, the plug should be replaced with the next colder type. If the ceramic is black, the plug should be replaced with the next hotter type. If you cannot reach the correct spark plug color by going one heat range hotter or colder from the standard plug, make a crankcase pressure check and/or change carburetor jetting.

IGNITION TIMING

Incorrect ignition timing can cause poor performance, knocking, overheating, and serious engine damage. This motorcycle has a CDI (Capacitor Discharge Ignition). It is rarely necessary to re-adjust the ignition timing, unless the magneto stator plate is incorrectly installed during engine assembly. However, if there is any doubt as to correct timing, inspect and adjust as follows:

Inspection (static)

- Remove the LH engine cover. Check to see whether or not the stator plate mark is aligned with the crankcase mark.



- If the marks are not aligned, loosen the stator plate screws, and turn the plate so that the marks are aligned. Tighten the screws securely.
- Install the cover and gasket.

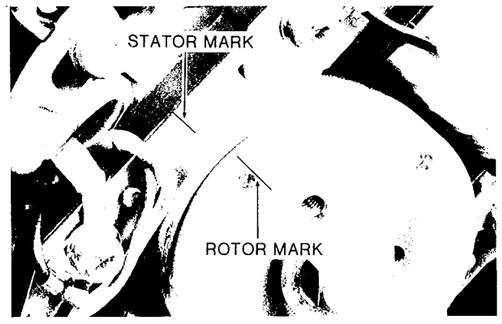
Inspection (dynamic):

To check to see whether or not the ignition timing is correctly set, a strobe light may be used.

- Remove the LH engine cover.
- Connect a strobe light in the manner prescribed by the manufacturer in order to check the ignition timing under operating conditions.

WARNING **Make sure that no tools, clothes, or leads ever touch the spinning rotor. Touching the rotor of a running engine could cause an injury.**

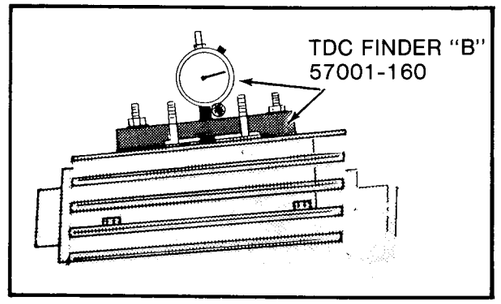
- Start the engine, run the engine at 6,000 rpm, and direct the light at the timing marks on the rotor and stator. The marks should align at 6,000 rpm, which is the approximate point of maximum advance.



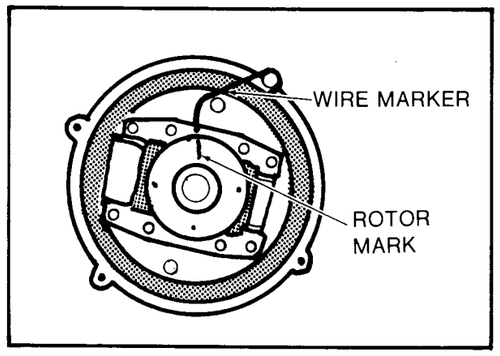
- If they do not, stop the engine and proceed to the following section, "Verification of Timing Marks."

Verification of Timing Marks

- Remove the LH engine cover, exhaust pipe and cylinder head. Install the special tool, TDC finder "B", on the cylinder as shown. Turn the rotor and set the piston at top dead center (TDC).



- Set the dial gauge to zero.
- Turn the rotor clockwise until the gauge reads about 4.0 mm, and then counterclockwise until the gauge reaches 1.79 mm BTDC.
- Install a stiff wire pointer from the crankcase to indicate this timing position.



- Reassemble the engine, but leave the LH engine cover off.
- Attach the timing light, start the engine, and check the firing point at 6,000 rpm.

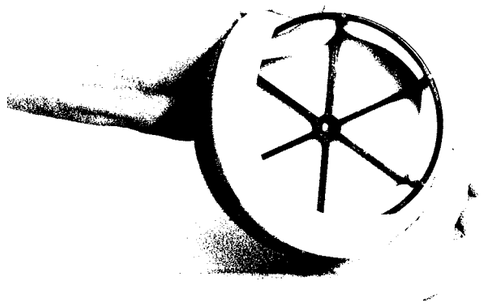
WARNING **Avoid touching the spinning rotor. This could cause injury.**

- Observe the firing position. If necessary, loosen the stator plate and move it until the rotor mark (shown by the timing light) is aligned with the wire marker, which indicates correct piston position.
- Tighten the stator screws and recheck the firing point. If it is correct, remove the wire pointer and reassemble the engine.

AIR CLEANER

A clogged air cleaner restricts the engine's air intake, increasing fuel consumption, reducing engine power, and causing spark plug fouling.

- Inspect the element before and after each ride.
- Remove the left side cover and filter element. Cover the air cleaner inlet to prevent dirt from entering the carburetor.
- Separate the air filter from the frame.



- Clean the filter foam element in solvent, then wash it in soapy water and dry thoroughly.

WARNING **•Because of the danger of highly flammable liquids, do not use gasoline or low flash-point solvent to clean the element.**
•A break in the element material or damage to the air cleaner tube will allow dirt and dust to pass through into the carburetor and eventually damage the engine. Dirt in the carburetor may also cause the throttle to stick open presenting a hazard to the rider. If any part of the element is damaged, the element must be replaced.

- After cleaning the air cleaner element, saturate the element with SAE 30 oil, then squeeze out the excess. Wrap the filter in a clean rag and squeeze it as dry as possible. Be careful not to tear the element.
- When installing the filter element, coat the lip with a thin layer of grease. This helps assure a complete seal against the air cleaner element base. When installing the filter, rotate it slightly it is seated on the base.

STEERING

For safety, the steering should always be kept adjusted so that the handlebar will turn freely but not have excessive play.

- To check the steering adjustment, first place a stand or block under the engine so that the front wheel is raised off the ground. Push the handlebar lightly to either side; if it continues moving under its own momentum, the steering is not too tight. Squat in front of the motorcycle, grasp the lower ends of the front fork at the axle, and push and pull the bottom end of the front fork back and forth; if play is felt, the steering is too loose.

- Rainy weather also may influence the air/fuel mixture. As the moisture content of the air rises, the air density decreases, which may result in too rich a air/fuel mixture.

Selecting the Correct Main Jet

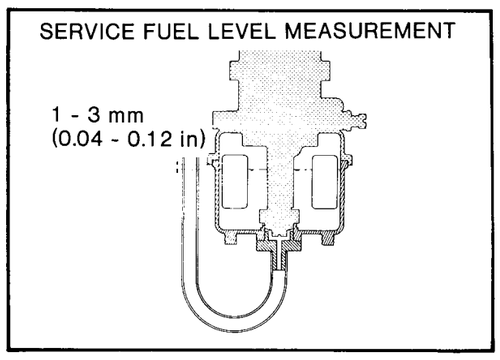
Choose a main jet that fulfills the following conditions:

- Highest rpm.
- Smooth transition when accelerating from low rpm.
- Spark plug burning properly.
- Engine lugs without knocking (detonating).

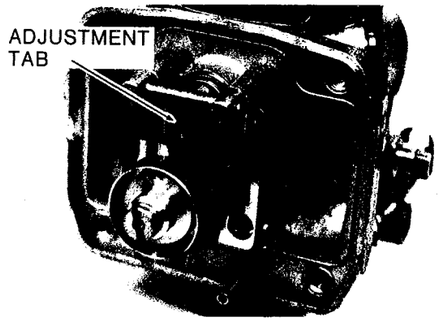
Service Fuel Level/Measurement and Adjustment.

- Close the fuel valve, and remove the carburetor. The fuel hose and carburetor cable do not have to be removed to inspect the fuel level.
- Remove the drain plug from the bottom of the fuel chamber, and screw a fuel level gauge (special tool)into the plug hole.
- Open the fuel valve so that fuel will flow into the carburetor.
- Line up the uppermost part of the ruled portion of the gauge hose with the bottom edge of the carburetor. The proper fuel level is 1 - 3 mm (0.04 - 0.02 in) from the top of the ruled portion.

NOTE: Measure the fuel level, keeping the carburetor perpendicular to the ground.



- If the fuel level is incorrect, open the float chamber, bend the tab on the float arm a slight amount and then recheck the level. Readjust it if necessary.



DECARBONIZATION

The exhaust system, piston head, exhaust port, cylinder head, and muffler can fill up with carbon and other exhaust by-products over an extended period of operation, resulting in a drop in performance.

- Remove the muffler, and scrape off the carbon.
- Remove the cylinder head, scrape out any carbon, and clean the head with a high flash-point solvent.
- Remove cylinder, carefully scrape the carbon out of the exhaust port.
- Remove the piston, scrape off the carbon, and then lightly polish the piston with fine emery cloth.
- Clean carbon and dirt out of the piston ring grooves using a suitable tool.

CAUTION **Carbon particles can be very abrasive to piston rings. Don't allow such particles to fall onto the cylinder walls.**

CYLINDER AND PISTON

Compression Measurement

A compression test is very useful as an aid in determining the condition of the engine. Low compression may be due to cylinder wear; worn piston ring grooves; worn, broken, or sticking piston rings; cylinder head leaks; or damage to the engine such as piston seizure. Too high a compression may be due to carbon build-up on the piston head and cylinder head.

Before measuring compression, check that the cylinder head nuts and cylinder base nuts are properly tightened, and then thoroughly warm up the engine so that engine oil between the piston and cylinder wall will help seal compression as it does during normal running. While the engine is running, check that there is no gas leakage from around the spark plug or the cylinder head gasket.

Stop the engine, remove the spark plug, and install the compression gauge hose securely into the spark plug hole so that there will be no leakage. With the throttle fully open so that air can flow freely to the engine, turn the engine over sharply with the kickstarter pedal several times until the compression gauge stops rising.

The compression is the highest reading obtainable.

Standard Compression Pressure

12.0 kg/cm^2 (171 psi)

Cylinder Wear

Since there is a difference in cylinder wear in different directions, take a side-to-side and a front-to-back measurement using an inside micrometer or a cylinder gauge. If any measurement exceeds the service limit, or if there is a difference of more than 0.05 mm (0.002 in) bet-

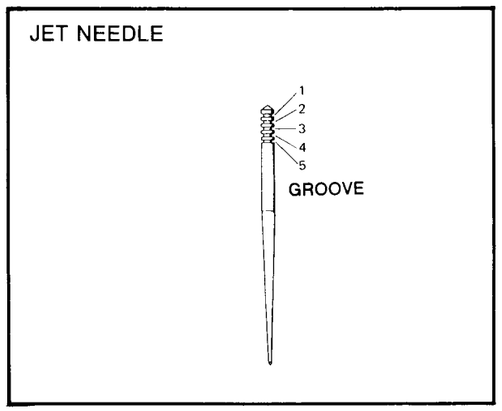
CARBURETOR

Since the carburetor regulates and mixes the fuel and air going to the engine, there are two general types of carburetor trouble: too rich a mixture (too much fuel), and too lean a mixture (too little fuel). Such trouble can be caused by dirt, wear, incorrect adjustment, or improper fuel level in the float chamber. A dirty or damaged air cleaner can also alter the air-to-fuel ratio.

Mixture Trouble Symptoms

Mixture too rich	Mixture too lean
Engine is sluggish	Engine overheats
Smoky exhaust	Spark plug burned white
Runs worse when warm	Running is unstable
Spark plug fouled black	No power

NOTE: The last number of the jet needle number is not stamped on the needle, but is the number of the standard groove in which the clip is set. The groove numbers are counted from the top of the needle, 1 being the topmost groove, and 5 being the lowest groove.

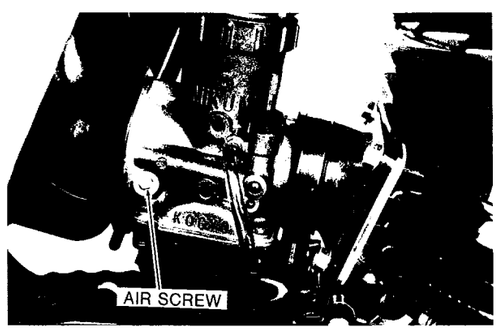


0 - 1/8 Throttle

The fuel is metered by the pilot jet in this throttle range, which provides the rich mixture necessary at low rpm. As the air screw is turned in, the mixture becomes richer.

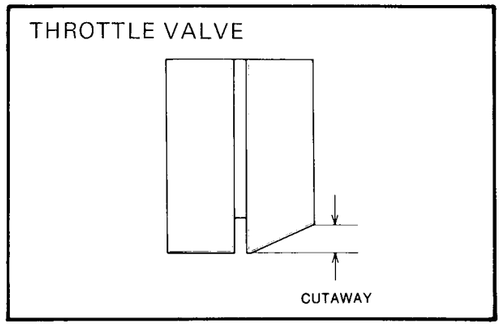
To achieve the standard air screw setting, turn in the air screw lightly until it stops, and then back it out the specified amount.

NOTE: Do not screw in the air screw forcefully; turn it just until it stops.



1/8 - 1/4 Throttle

The greater the amount of throttle valve cutaway, the leaner the mixture in this throttle range.



1/4 - 3/4 Throttle

The bottom part of the jet needle is tapered; as the throttle is opened, the cross sectional area of the jet needle/needle jet clearance becomes greater, increasing the fuel flow.

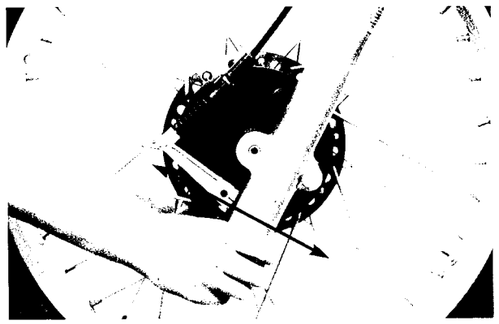
To change the position of the jet needle in the needle jet at a given throttle opening, move the clip, which is in one of 5 grooves at the upper part of the needle, to a higher or lower groove. Moving the clip to a higher groove lowers the needle and makes the fuel/air mixture leaner; conversely, moving the clip to a lower groove raises the needle and makes the mixture richer.

3/4 - Full Throttle

The larger the main jet, the greater the flow of fuel at a given throttle position.

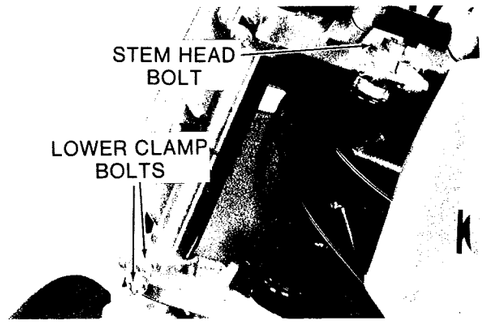
Influence of Atmospheric Pressure and Temperature on Carburetor Settings.

- In high altitude areas, where the air density is low due to the lower atmospheric pressure, less air enters the carburetor, resulting in too rich a mixture for a carburetor that was adjusted properly at low altitude. To obtain the proper carburetor air/fuel mixture, it may be necessary to raise the clip on the jet needle and to change the main jet to one size smaller.
- In particularly cold weather, the increased density of the air may necessitate a lower clip position on the jet needle and a size larger main jet to avoid an overly lean air/fuel mixture.

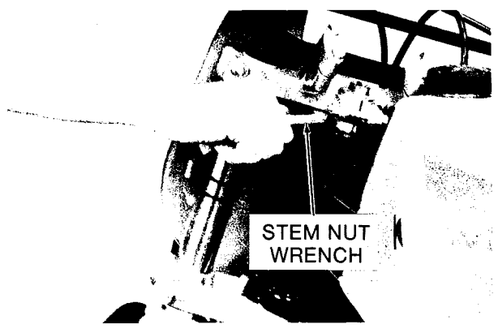


If the steering needs adjusting:

- Place a stand under the frame to raise the front wheel off the ground. Loosen the steering stem head bolt and clamp bolt.



- Loosen the four front fork lower clamp bolts.
- Turn the steering stem locknut with the stem nut wrench (special tool) to obtain the proper adjustment.
- Tighten the steering stem head bolt to 6.0 kg-m (43 ft-lbs) of torque and the stem clamp bolt to 1.6 kg-m (11.5 ft-lbs) of torque.



- Tighten the front fork lower clamp bolts to 1.6 kg-m (11.5 ft-lbs) of torque.
- Check the steering again, and readjust it if necessary.

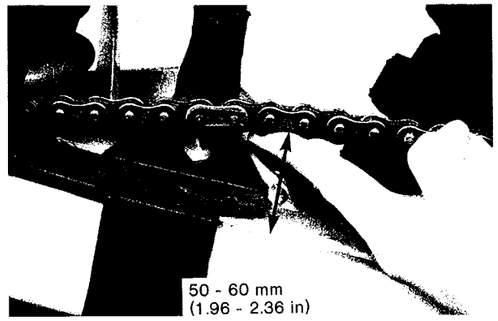
DRIVE CHAIN

The drive chain must be kept properly adjusted for safety and to prevent excessive wear. If the chain becomes badly worn or too far out of adjustment, the chain could jump off the sprockets or break.

WARNING **A chain that breaks or jumps off the sprocket could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control, resulting in injury to the rider.**

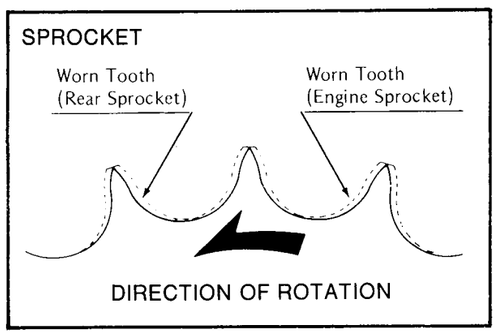
Inspection

With the motorcycle held vertical, push up the drive chain in the middle of the upper run to measure the chain play. The space between the chain and the swing arm at the rear of the rubber protector should be 50 - 60 mm (1.96 - 2.36 in). Rotate the rear wheel to find the place where the chain is tightest (because it wears unevenly).



In addition to checking the slack, rotate the rear wheel to inspect the drive chain and sprockets for damaged rollers, loose pins and links, unevenly or excessively worn teeth, and damaged teeth.

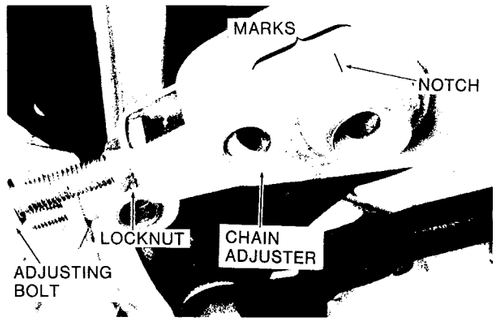
NOTE: Sprocket wear is exaggerated in the illustration. See Maintenance section for wear limits.



If there is any irregularity, replace the drive chain and/or sprockets.

Adjustment

- Loosen both chain adjuster locknuts, while holding the chain adjusting bolt with an open end wrench.



- Loosen the rear axle nut.
- Turn both chain adjusting bolts evenly until the drive chain has the correct amount of slack. To keep the chain and wheel aligned, the left and right chain adjuster notches should be matched to corresponding marks on the swing arm.

NOTE: Wheel alignment can also be checked using the straightedge or string method.

WARNING **Misalignment of the wheel will result in abnormal wear and may result in an unsafe riding condition.**

- Tighten both chain adjuster locknuts.
- Center the brake panel assembly in the brake drum. This is done by lightly tightening the axle, spinning the wheel, and forcefully depressing the brake pedal. The partially tightened axle allows the brake panel assembly to center itself in the brake drum.

NOTE: This procedure can prevent a soft, or "spongy feeling" brake.

- Tighten the axle nut to 9.0 kg-m (65 ft-lbs) of torque.
- Rotate the wheel, measure the chain slack again at the tightest position, and readjust if necessary.

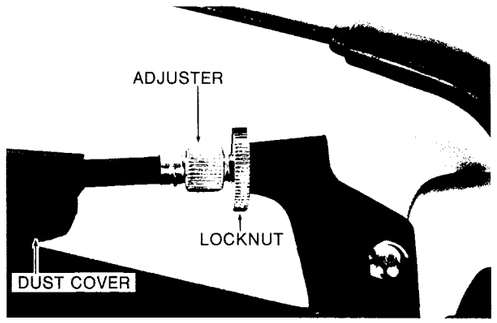
WARNING **If the axle nut is not correctly tightened, an unsafe riding condition may result.**

- Check the rear brake adjustment (page 17).

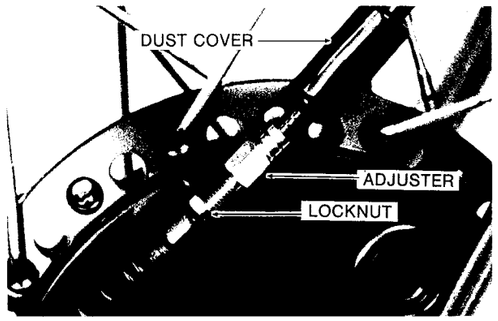
BRAKES

Front Brake Lever

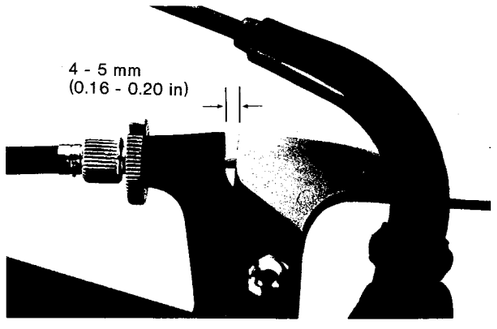
- Slide the front brake lever dust cover off the adjuster.
- Loosen the knurled locknut at the front brake lever, screw in the adjuster, and tighten the locknut.



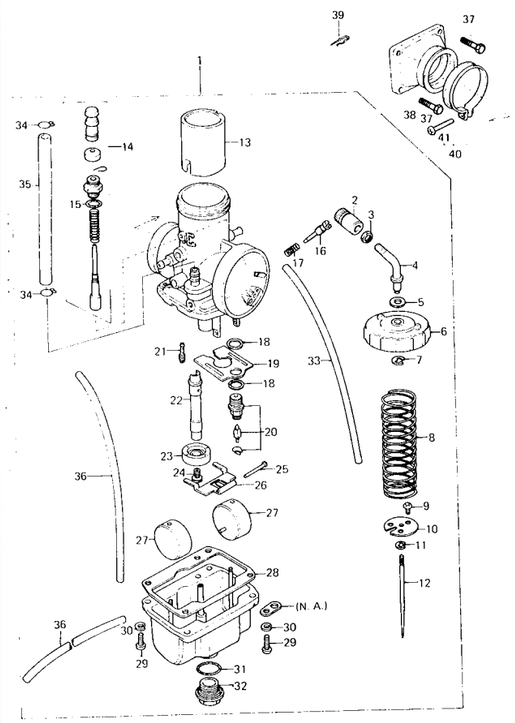
- Slide up the lower dust cover, and loosen the locknut at the lower end of the brake cable.



- Turn the adjuster on the lower end of the front brake cable so that the brake lever has 4 — 5 mm (0.16 - 0.20 in) of play, and tighten the locknut.



MAINTENANCE



1. CARBURETOR ASSY.
2. ADJUSTER, cable
3. NUT, cable adjuster
4. GUIDE, cable
5. GASKET, cable guide
6. TOP, mixing chamber
7. CIRCLIP, cable guide
8. SPRING, throttle valve
9. SCREW, 4 x 5
10. SEAT, throttle valve
11. CIRCLIP, jet needle
12. JET NEEDLE
13. VALVE, throttle
14. PLUNGER ASSY, starter
15. O-RING, plunger
16. SCREW, pilot air
17. SPRING, pilot air screw
18. GASKET, float valve
19. PLATE, float chamber
20. FLOAT VALVE ASSY.
21. PILOT JET
22. NEEDLE JET
23. HOLDER, needle jet
24. MAIN JET
25. PIN, float
26. ARM, float
27. FLOAT
28. GASKET, float chamber
29. SCREW, pan head, 5 x 16 mm
30. WASHER, spring, 5 mm
31. O-RING
32. COVER, main jet
33. HOSE, 3.5 x 6.5 x 290 mm air vent
34. CLAMP
35. HOSE, fuel 6.5 x 11.5 x 225 mm
36. HOSE, overflow 3.5 x 6.5 x 290 mm
37. BOLT, flange, 6 x 20 mm
38. HOLDER, carburetor
39. CIRCLIP, cable adjuster
40. CLAMP, carburetor holder
41. SCREW, pan head, 5 x 35 mm

Carb Specs	
Main Jet	170
Air Jet	2.5
Jet Needle	6F28-4
Cutaway	3.0
Pilot Jet	30
Air Screw (turns out)	1.5
Fuel Level	1 — 3 mm

- Slide the dust seal down to the bearing and screw the cap into the shock body securely. Do not overtighten the cap.
- Charge the reservoir to the recommended pressure with nitrogen gas. Install the spring, spring seat and clip. Adjust spring preload and install the shock absorber.

Nitrogen Gas Pressure	
Recommended	16 kg/cm^2 (228 psi)
Minimum	10 kg/cm^2 (142 psi)
Maximum	20 kg/cm^2 (284 psi)

WARNING **•Pressurize the rear shock absorber reservoir with nitrogen gas only. Do not use air or other gases, since they may cause premature wear, rust, fire hazard or substandard performance.**
•Never exceed the maximum pressure.
•Make sure the hose and other rear shock absorber components are in good condition before pressurizing the reservoir.

- If sufficient adjustment cannot be made with the adjuster, complete the adjustment with the adjuster at the brake lever, and then tighten the locknut.
- Check for brake drag.
- Check braking effectiveness.
- Slide the dust covers back into place.

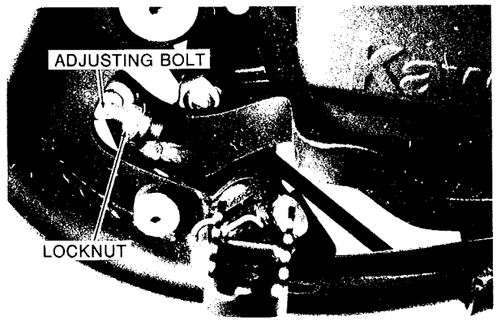
NOTE: For minor corrections, use the adjuster at the front brake lever.

If the brake lever adjustment cannot be made with the adjuster at the brake lever or at the brake panel, move the front brake cam lever to a new position on the brake camshaft.

WARNING **Check brake linings for excessive wear before moving front brake cam lever (page 49).**

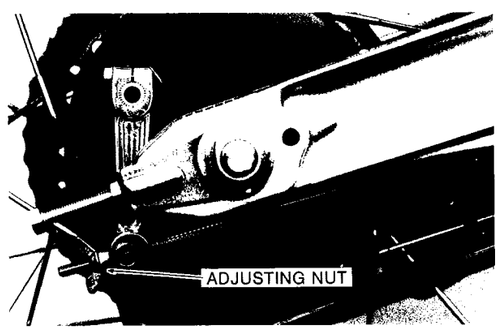
Brake Pedal Position

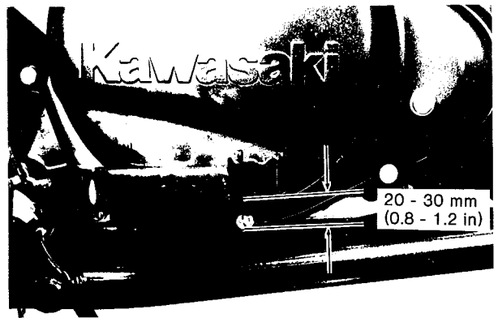
Adjust the rear brake pedal position to suit you. To adjust the pedal position, loosen the locknut, turn the adjusting bolt, and then tighten the locknut. Check brake pedal travel after adjusting pedal position.



Brake Pedal Travel

The brake pedal should have 20 - 30 mm (0.8 - 1.2 in) of travel from the rest position to the fully applied position when the pedal is pushed down lightly by hand. Adjustment is made by turning the adjusting nut at the end of the brake rod.

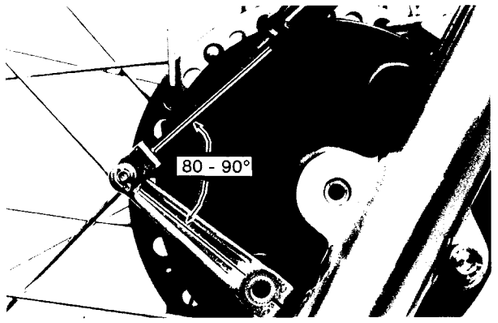


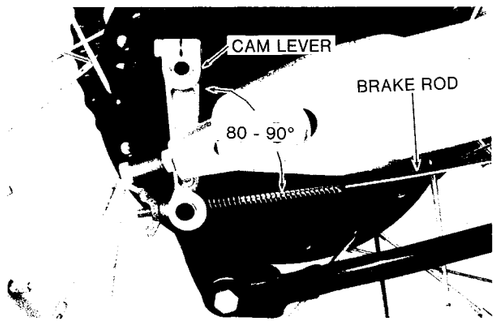


- Check for brake drag.
- Check braking effectiveness.

Cam Lever Angle

- When the brake is fully applied, the brake cam lever should come to an 80 - 90° angle with the brake cable or rod. If it does not, remove the cam lever, and then remount it at a new position on the shaft to obtain the proper angle. Adjust the brakes.



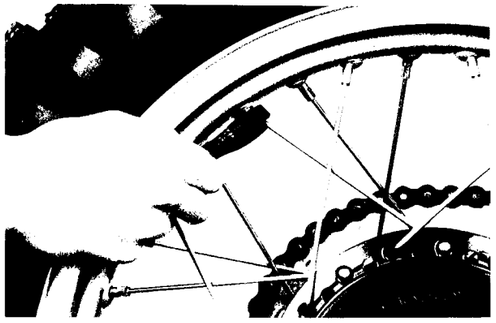


WARNING **Since a cam lever angle greater than 90° reduces braking effectiveness, this adjustment should not be neglected. Whenever the cam lever angle is adjusted, also check for drag and proper pedal operation. In case of doubt as to braking effectiveness, disassemble and inspect all internal brake parts. Worn parts could cause the brake to lock or fail, possibly causing a crash and injury. If the brake linings are worn to the service limit, never adjust the cam lever angle to keep them in service.**

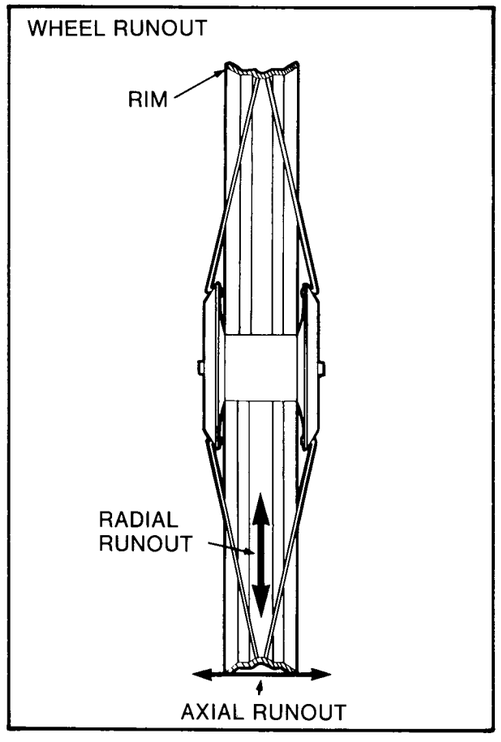
WHEELS

Spokes and Rim

The spokes on both wheels must all be tightened securely and evenly and not allowed to become loose. Unevenly tightened or loose spokes will cause the rim to warp, hasten nipple and overall spoke fatigue, and may result in spoke breakage.



The axial rim runout should be under 3 mm (0.12 in), and the radial rim runout should be under 2 mm (0.08 in).



Tires

Check the tires for wear, cuts or other damage. Check the tire pressures and adjust if necessary.

Tire	F: Bridgestone M27 R: Bridgestone M22
Tire Size	F: 3.00-21 4PR R: 5:10-18 4PR
Tire Pressure	Front and Rear 1.05 kg/cm^2 (15 psi)

Bead Protectors

There is one bead protector (rim lock) on the front wheel and one on the rear. The use of the bead protectors is to prevent the tire and tube from slipping on the rim and damaging the valve stem. Valve stem damage may cause the tube to leak. To keep the tire and tube fixed in their position on the rim, inspect the bead protectors before riding and tighten them if necessary.

UNI-TRAK SUSPENSION

The UNI-TRAK suspension system consists of a single shock absorber with spring, the Uni-Trak arm, and two links. Tuning this suspension is possible by changing the spring preload, substituting an alternate spring, changing nitrogen pressure and adjusting the extension (rebound) damping rate.

Adjusting nitrogen gas pressure and damping rate does not require removal of the Uni-Trak shock absorber.

Removal

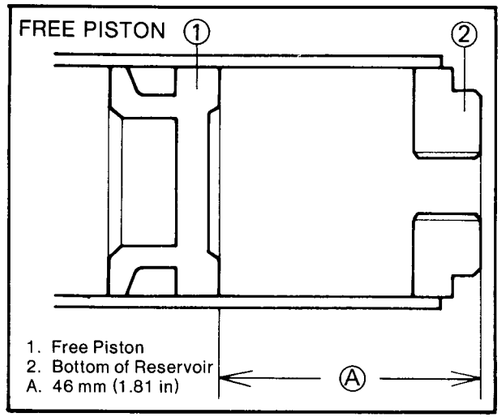
Remove the seat, both side covers, and the air cleaner case.

- Remove the bolt and rubber damper above the Uni-Trak arm.
- Loosen the upper and lower mounting nuts. Do not remove them yet. Place a sturdy block or support under the frame so that the rear wheel is raised off the ground.
- Remove the mounting bolts and nuts, and take the rear shock absorber out to the left.

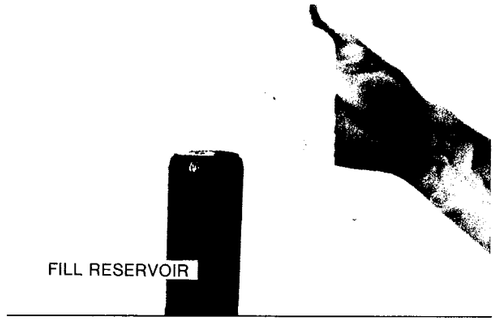
- Inspect the hose O-ring for damage and replace, if necessary.
- Clean the shock body and reservoir in clean solvent and dry them completely.

REAR SHOCK ASSEMBLY

- Set the piston in the reservoir so it is 46 mm (1.81 in) from the bottom. If necessary, remove the valve so you can push the piston from the top of the reservoir.



- Fill the reservoir with the recommended oil. Pour slowly and tap the reservoir to prevent trapping air bubbles inside.

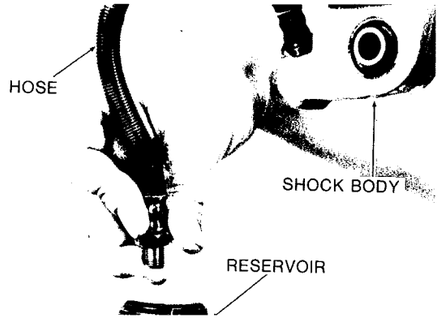


Recommended oil
KYB K-C-2 or equivalent SAE 5W oil

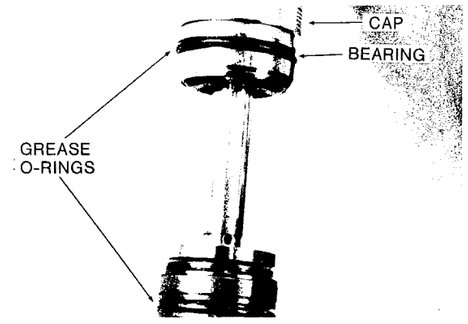
- Fill the shock body to the circlip groove with the recommended oil while holding the hose against the body.

- While holding the shock body above the reservoir lower the hose. When oil comes out, quickly screw the hose into the reservoir. Tighten securely.

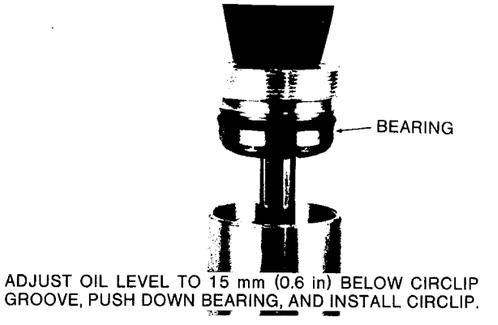
NOTE: This procedure is the only sure way to keep air from being trapped inside with the oil.



- Clamp the shock body into the vise and adjust the oil level to approximately 20 mm (0.8 in) below the circlip groove.
- Lightly grease the O-rings on the shaft assembly, then slide the cap and bearing up against the rubber bumper.



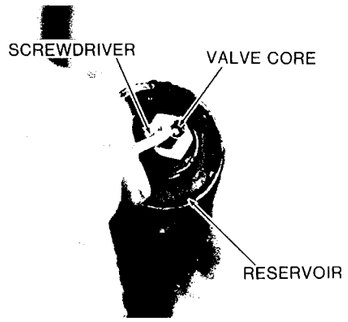
- Slowly push the valve assembly into the shock body with a rocking motion until the piston is at least 20 mm (0.8 in) below the circlip groove.
- Adjust the oil level to approximately 15 mm (0.6 in) below the circlip groove.
- Slowly slide the bearing down until the circlip groove is exposed and install the circlip. Do not move the shaft.



- Hold the reservoir upright and point the valve away from you. Slowly release nitrogen gas pressure by pushing down the valve core with a screwdriver.

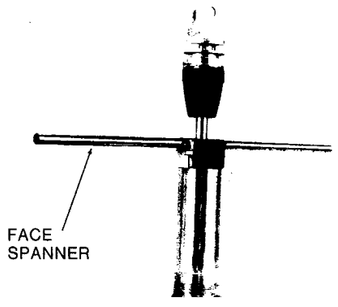
WARNING **●Be sure to point the reservoir valve away from you when releasing nitrogen gas pressure. An oil mist is often released with the nitrogen.**

●Always release nitrogen gas pressure before disassembling the rear shock absorber to prevent explosive separation of parts.

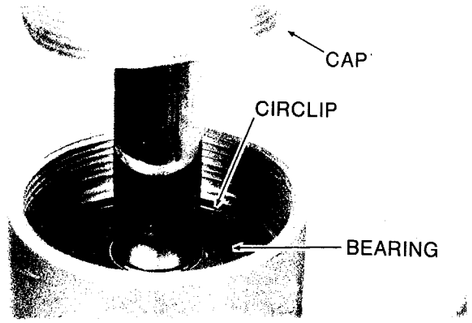


- Remove the shock body cap with the face spanner (special tool).

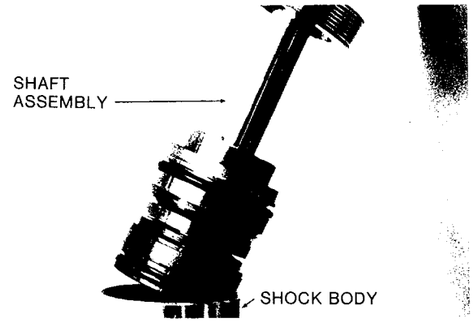
CAUTION **Do not use a hammer and punch or you may damage the cap.**



- Slide the cap up against the rubber bumper, then slide the dust seal up under the cap to hold it up.
- Push the bearing down to expose the circlip and remove the circlip.



- With a rocking motion slowly withdraw the shaft assembly from the shock body.

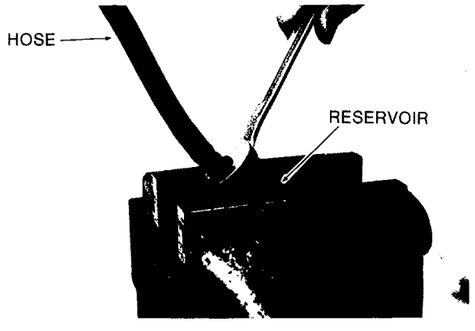


- Clean the shaft assembly in solvent and dry immediately.

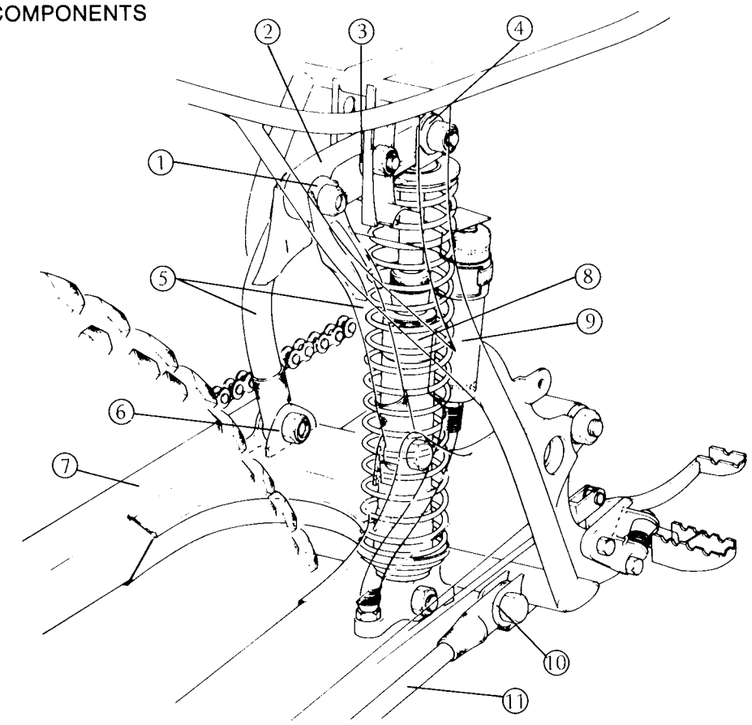
CAUTION **Dry the shaft assembly immediately after washing in solvent to prevent O-ring damage.**

- Pour the oil out of the shock body.
- Remove the rubber reservoir protector and clamp the end of the reservoir in a vise as shown. Remove the hose from the reservoir body and drain the reservoir.

CAUTION **Do not clamp the center of the reservoir. This may deform the reservoir preventing free movement of the floating piston.**



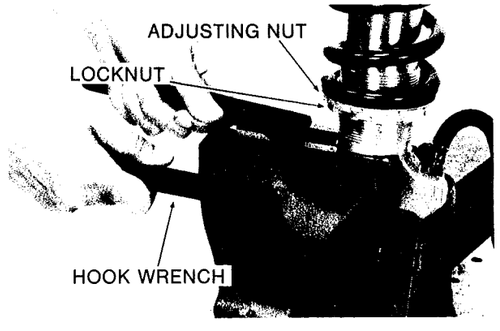
UNI-TRAK COMPONENTS



1. Spherical Bearing
2. Uni-Trak Arm
3. Sleeve Bearing
4. Spherical Bearing
5. Uni-Trak Links
6. Ball Joint
7. Swingarm
8. Rear Shock Absorber
9. Nitrogen Gas Reservoir
10. Ball Joint
11. Torque Link

Spring Preload Adjustment

- Clean the threaded portion on the bottom of the rear shock absorber.
- Hold the bottom of the rear shock absorber with a vise. Be careful not to damage the gas hose.
- Using hook wrenches (special tools), loosen the locknut and turn the adjusting nut as required. Hold the upper mounting bracket so that it does not turn during adjustment. Raising the adjusting nut increases the spring preload.



Uni-Trak Spring

Free length	283 - 293 mm (11.2 - 11.5 in)
Spring rate	K1 = 7 kg/mm (392 lb/in) K2 = 8.5 kg/mm (476 lb/in)

Uni-Trak Spring Preload

To set spring preload, assemble the spring and retainer loosely, with no preload. Measure the spring length in this position. Tighten the adjusting nut to reduce the spring length by the amount shown to set the preload at the standard position.

Set Length	Standard Preload
Free length - 5 mm (2.5 adjuster turns)	35 kg (77 lbs)

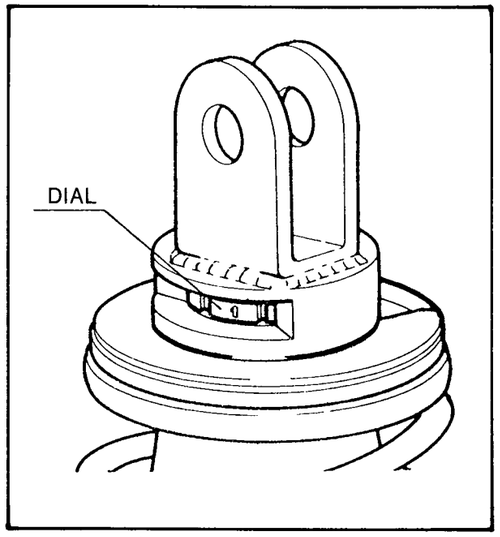
NOTE: Each turn of the adjusting nut changes spring length by 2 mm and preload by 14 kg (31 lbs).

CAUTION **Do not change preload beyond five (5) turns from the standard position.**

Shock Damping Adjustment

The shock rebound damping can be adjusted to 4 settings: I, II, III, or IIII. The damping increases with the number of marks appearing on the adjuster ring.

- Remove the right side cover. Turn the adjuster ring to the desired setting.
- Install the side cover.



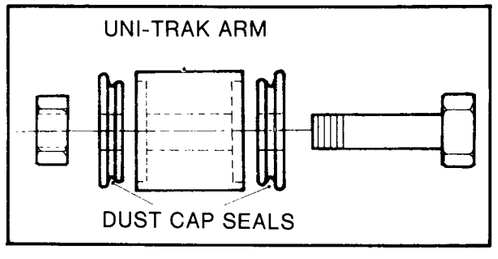
Disposal Procedure (when required)

WARNING Before discarding or disassembling the shock absorber cover the top of the nitrogen gas reservoir with a shop towel and depress the schrader valve core with a screwdriver to release the nitrogen gas. Do not use your finger to depress the core. Point the valve away from you.

Uni-Trak Links

Grease the dust seal caps and fit them on both sides of the spherical bearing, as shown below. Then connect the Uni-Trak links to the arm with the bolt and nut. Tighten the nut to 10 kg-m (72 ft-lbs) of torque.

CAUTION If the dust cap seals are installed backward, the rear suspension will be very stiff and the seals will be destroyed.



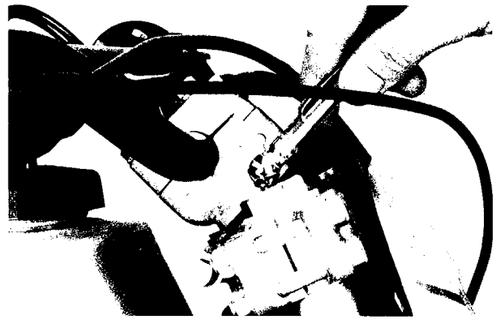
FRONT FORK

The condition of the front fork is very important for steering stability.

Alteration of the stiffness or softness of the shock absorption can be achieved by changing fork air pressure and fork oil quantity.

When altering the shock absorption by changing the fork air pressure, carry out the following steps:

- Use a jack under the engine or other suitable means to lift the front of the motorcycle. Remove all weight from the front wheel. The standard air pressure is 0.3 kg/cm^2 (4 psi).
- Adjust the shock absorption to suit your preference under special conditions. See the Front Fork Tuning Guide on the following page.



CAUTION The maximum air pressure is 2.5 kg/cm^2 (36 psi). Higher pressure will damage the seals.

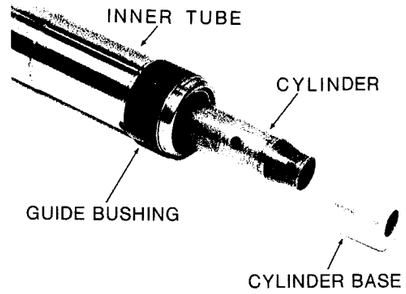
The left and right fork legs must have the same air pressure.
Maximum Variation Between Forks:
0.1 kg/cm^2 (1.4 psi)

WARNING Use only air or nitrogen gas. Using oxygen or other gases may cause damage to the fork components or an explosion and subsequent serious injury.

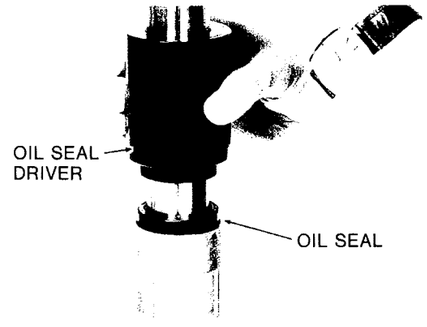
If you want to alter shock absorption by changing fork oil quantity, refer to:

- Front Fork Tuning Guide on following page.
- Front Fork, page 51 in the Maintenance Section.

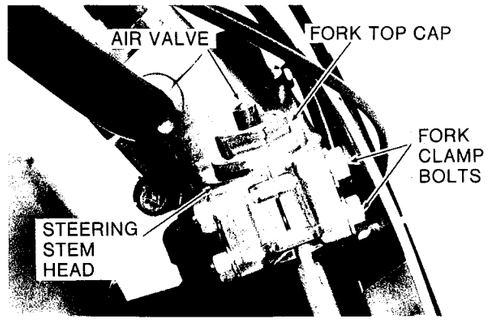
- Apply a non-permanent locking agent to the drain screw and install the screw.
- Insert the cylinder and short spring into the inner tube, and fit cylinder base onto the bottom of the cylinder. Being careful not to damage the guide bush on the lower end of the inner tube, insert the inner tube into the outer tube.



- Apply liquid gasket on both sides of the gasket, apply a non-permanent locking agent to the Allen bolt, and install them with the cylinder holder handle and adapter (special tools). The torque for the bolt is 3.7 kg-m (27 ft-lbs).
- Fit the guide bush and oil seal seat with the oil seal driver (special tool).
- Apply a small amount of fork oil onto the inner tube, and slide the oil seal onto the inner tube. Take care not to damage the oil seal lip.
- Tap the oil seal into the outer tube with the oil seal driver (special tool). Do not strike the oil seal too strongly. The oil seal may be deformed causing oil leakage.



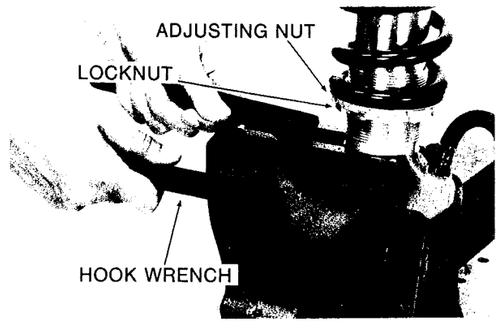
- Fit the dust seal and circlip into place.
- Pour in the recommended oil and adjust the oil level to the specified height with the fork collapsed. See page 51.
- Insert the spring and spring seat, and install the fork top cap.
- Slide on the rubber boot and tighten the clamp screws.
- Install the fork tube into the steering stem so that the bottom of the fork top cap aligns with the upper surface of the steering stem head.



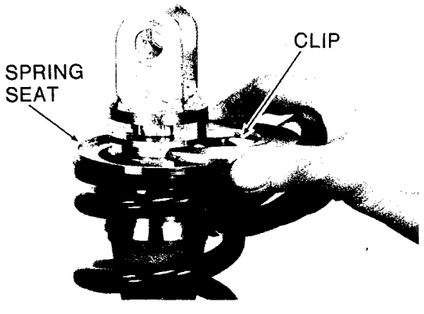
- Tighten the fork clamp bolts to 1.6 kg-m (11.5 ft-lbs) of torque.
- Tighten the top cap to 2.3 kg-m (16.5 ft-lbs) of torque.
- Apply a non-permanent locking agent to the air valve, and tighten the valve to 1.2 kg-m (8.5 ft-lbs) of torque.
- Adjust the air pressure.

REAR SHOCK DISASSEMBLY

- Remove the rear shock absorber from the frame. See page 18.
- Clean the threads at the bottom of the shock absorber and clamp it in a vise. Set the damping adjuster to the lowest setting (I).
- Loosen the locknut and turn the adjusting nut down with the hook wrenches (special tools) until there is no spring preload pressure against the adjusting nut.



- Remove the clip and spring seat at the top of the spring and remove the spring.



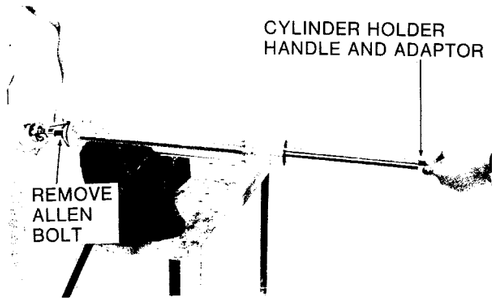
- Tighten the 4 cylinder base nuts to 3.5 kg-m (25 ft-lbs).
- Install the stator assembly so that the index marks are aligned.

- Install the rotor and tighten the bolt to 2.2 kg-m (16.0 ft-lbs).
- Verify the ignition timing according to the procedure in Chapter 2. When complete, install cylinder head and cross-tighten the nuts to 2.2 kg-m (16 ft-lbs).

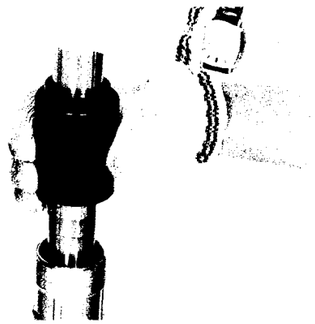
WARNING **When reassembly is complete, check the tightness of all fittings and fasteners before riding the motorcycle. Failure to properly tighten components, including the drive chain, may lead to an accident and injury.**

FRONT FORK DISASSEMBLY

- Before removing the front fork from the frame, release the air and loosen the fork top cap.
- Remove the front wheel. Loosen the front fork clamp bolt and pull out the fork tube.
- Loosen the clamp screws and slide off the rubber boot.
- Remove the top cap and pull out the spring seat and spring.
- Remove the drain screw and pump out the oil into a suitable container.
- Push the inner tube all the way in, and remove the Allen bolt on the bottom of the outer tube using the cylinder holder handle and adapter (special tools).



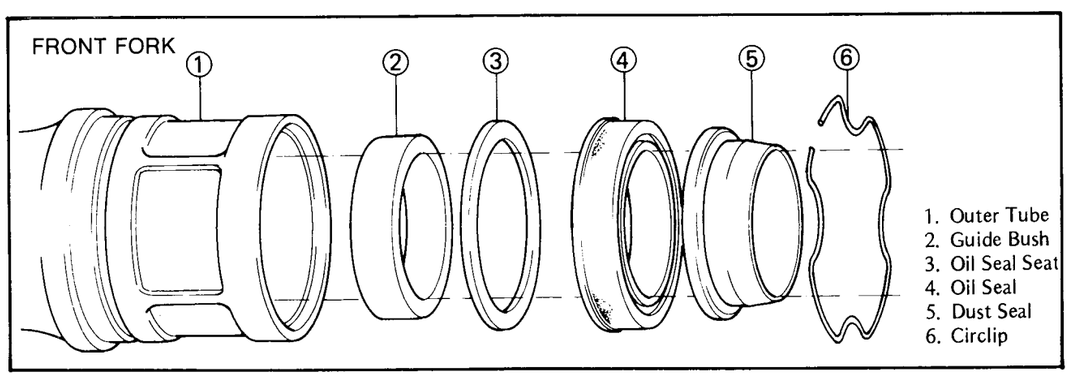
- Remove the damper cylinder and short spring from the inner tube.
- Remove the circlip and dust seal from the outer tube.
- Slide the oil seal driver (special tool) onto the inner tube with the bigger diameter end of the driver first.
- Hold the inner tube vertical over a piece of cardboard or other soft surface and hit the outer tube with the oil seal driver until it falls off the inner tube.



- The oil seal, oil seal seat, and guide bush will come out of the outer tube with the inner tube.
- Remove the damper cylinder base from the outer tube.

FRONT FORK ASSEMBLY

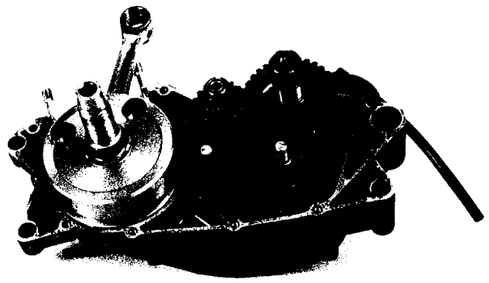
- Inspect the O-ring, oil seal, and guide bushes for damage, and replace them if necessary.



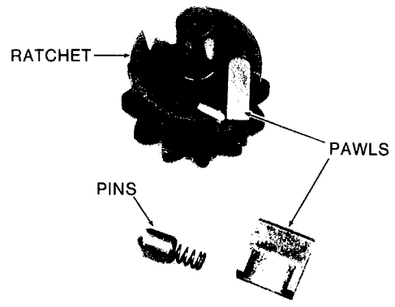
FRONT FORK TUNING GUIDE

CONDITION	RECOMMENDED CHANGE
1. Forks too stiff on small bumps (stutter or ripple bumps).	Start with standard settings. Step 1: Test for bottoming on large jumps and dips. If you are not using full travel, reduce air pressure from 4 psi to 2 psi. Test ride and evaluate. If necessary, reduce air pressure to 1 psi. Test ride. If you are using full travel, go to Step 2 with your satisfactory air pressure. Step 2: Lower oil level from 180 mm to 190 mm and test ride. If the ride is still too firm, try lowering the oil level by another 10 mm to 200 mm.
2. Forks too stiff on large jumps and dips.	Start with standard settings. Step 1: Reduce air pressure from 4 to 2 psi. Test ride and evaluate. Air pressure is correct if the forks use full travel (that is, the forks bottom) occasionally on the most severe jumps. If necessary, reduce air pressure in 1 psi steps and test ride, until the correct condition is reached. Step 2: If the spring is still too stiff, lower the oil level from 180 mm to 190 mm. Test ride and evaluate. If necessary, lower the oil level again by 10 mm. Do not use an oil level lower than 200 mm.
3. Forks mushy on small bumps.	Start with standard settings. Step 1: Test for bottoming on large jumps and dips. If bottoming is not severe, go to Step 2. If bottoming is serious, increase air pressure from 4 to 6 psi. Test ride and evaluate. If necessary, increase again in 1 psi steps until severe bottoming stops. Make sure you are still using full travel on the most severe jumps. If the forks are still mushy on small bumps, go to Step 2. Step 2: Raise the oil level to 170 mm. If necessary, raise the oil level to 160 mm. Adjust air pressure as in Step 1, above.
4. Severe bottoming on large jumps and dips.	Start with standard settings. Step 1: Increase air pressure from 4 to 6 psi, and test. Increase as necessary in 1 psi steps until severe bottoming is reduced. Make sure you are still using full travel occasionally on the most severe jumps. Step 2: Raise the oil level to 170 mm. If necessary, raise the oil level to 160 mm. Adjust air pressure as in Step 1, above.

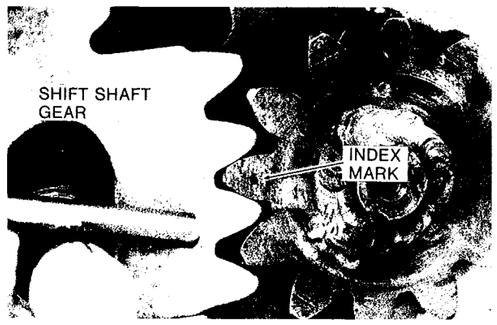
- With the transmission components and crankshaft properly positioned in the right crankcase half, thoroughly clean the case mating surfaces and dry them with a clean towel. Apply liquid gasket to the sealing surface of one case half.



- Fit the case halves together, checking for proper alignment of the shafts. Use a crankcase assembly special tool if it is available. If not, carefully tap the case together using a soft rubber mallet.
- Install the crankcase screws and tighten them securely with an impact driver.
- Check to see that the crankshaft and transmission shafts turn freely. If the crankshaft will not turn, it probably is not centered. Tap the end of the crankshaft with a soft mallet so that the crankshaft will be properly centered. If this does not work, disassemble the crankcase and investigate.
- Stuff a clean rag around the connecting rod to keep debris from entering the crankcase. Note the components and proper assembly of the shift drum ratchet and pawls.



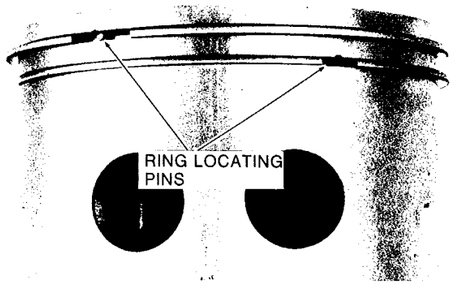
- Install the shift shaft assembly and put the transmission into neutral.
- Install the ratchet assembly so that the tooth with the index mark (punched indentation) meshes with the middle of the shift shaft gear as shown.



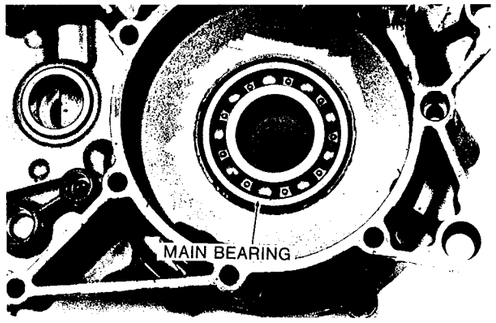
- Install a new O-ring on the transmission output shaft, then install the sleeve and drive sprocket.
- Continue reassembly as reverse of disassembly.
- Install the piston with the arrow toward the front of the engine. Always use new circlips for reassembly.

WARNING **To avoid injury, use eye protection when installing piston circlips.**

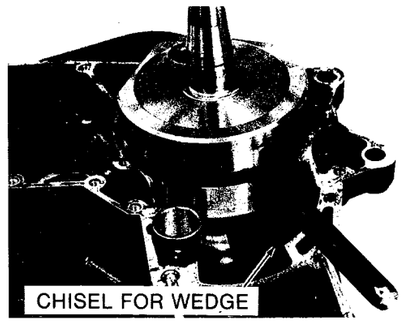
- When installing the cylinder, first position the piston rings so that their openings correspond to the locating pins. Compress the rings while sliding the cylinder onto the piston.



NOTE: Replace any oil seal that has been removed. Press in new seals evenly. Apply a small amount of high-temperature grease to the lips of the seals.



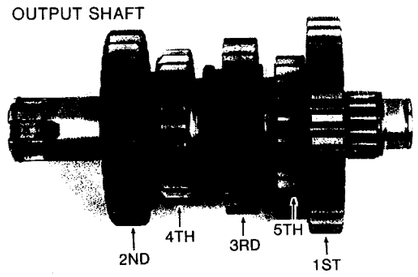
- Insert a chisel or wedge between the crankshaft flywheels opposite the connecting rod big end to protect flywheel alignment. Fit the crankshaft into the right crankcase half using a press.



- Replace the crankcase knock pins (dowels) if they were removed. Mesh the output shaft gears with those on the drive shaft, and simultaneously fit the shift drum, shift forks, and both shaft assemblies into the right crankcase half.

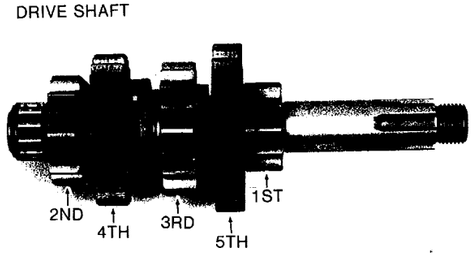
NOTES: The output shaft gears can be recognized by size, the gear with the largest diameter being 1st gear, the smallest one being 5th gear.

- 2nd gear - side with dog recess faces to the right
- 4th gear - fork groove goes to the right side of the gear teeth
- 3rd gear - dog recesses face left
- 5th gear - fork groove goes to the left side of the gear teeth
- 1st gear - shallow recess faces right

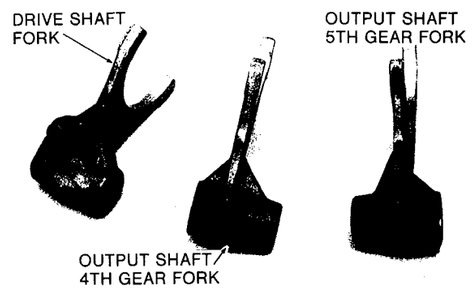


Drive shaft gears are opposite from those of the output shaft, the smallest being for 1st gear and the largest for 5th.

- 1st gear - part of drive shaft
- 5th gear - dog recesses face left
- 3rd gear - fork groove goes to the left side of the gear teeth
- 4th gear - dog recess to the right
- 2nd gear - either side may face in



Identification of the Shift Forks and Shafts



- The shift fork shaft for the forward (drive shaft) fork is 65mm long. The rear shift fork shaft is 90mm long.
- Continue reassembly by reversing the order of disassembly, using the following notes. If necessary, refer to the illustrated parts breakdown drawings for guidance.

GENERAL LUBRICATION

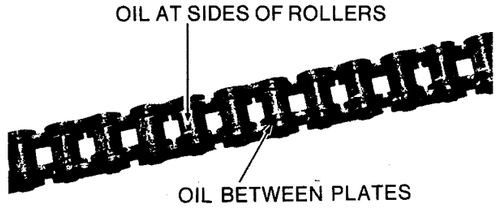
Lubricate exposed parts subject to rust with a rust-preventive spray, such as WD-40 or LPS-1, after each event.

Clean parts before lubricating. Badly rusted nuts, bolts, etc., should be replaced.

LUBRICATION BEFORE AND AFTER EACH EVENT

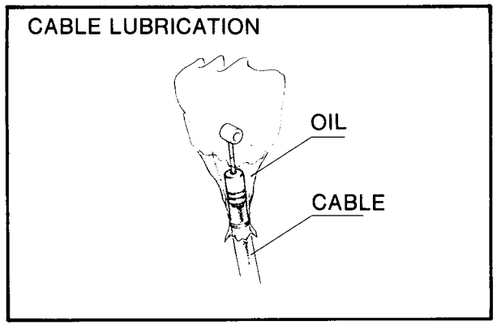
Drive Chain

Lubricate the chain by applying chain lube or SAE 90 gear oil to the sides of the rollers and between the links so that the oil will penetrate to the pins and bushings. Wipe off excess oil. If the chain is dirty, clean the chain using a brush and a high flash-point solvent before chain lubrication.

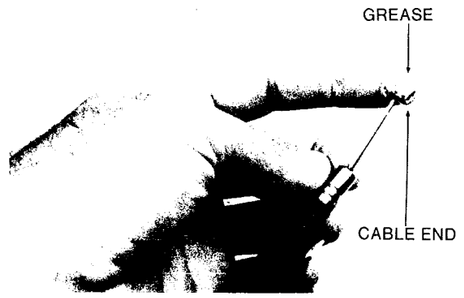


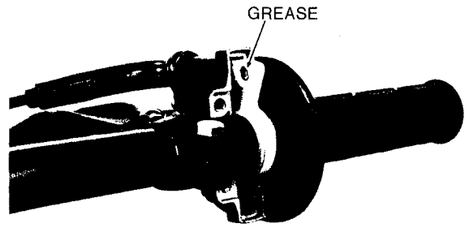
Clutch, Brake, Throttle Cables

Lubricate the clutch cable, throttle cable, and the front brake cable as shown. Attach a plastic bag to the outer cable (Sheath) to allow oil to flow inside.

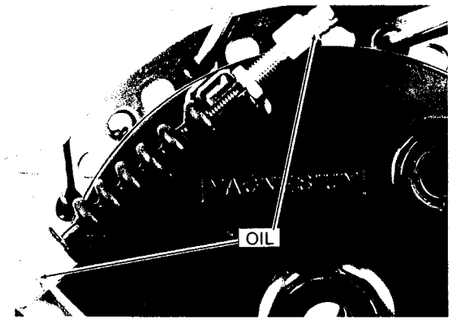


Apply grease to the cable ends before reinstalling them. For cable adjustment refer to pages 12 and 16.

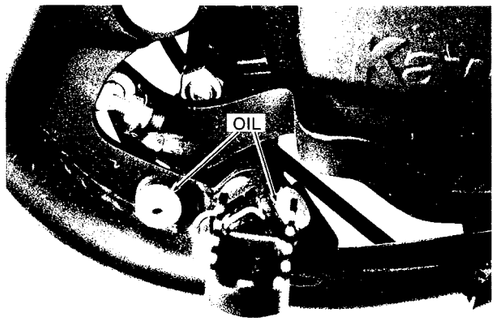




Apply oil to the brake arm ends as shown.



Apply oil to the brake pedal pivot and footpeg hinges.

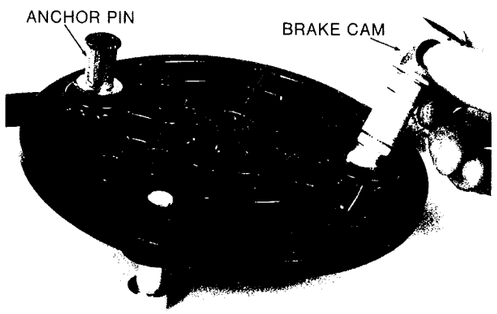


PERIODIC LUBRICATION

In addition to the points above, apply grease to the wheel bearings (page 50) stem bearings (page 52) and the following. See the periodic maintenance chart for intervals.

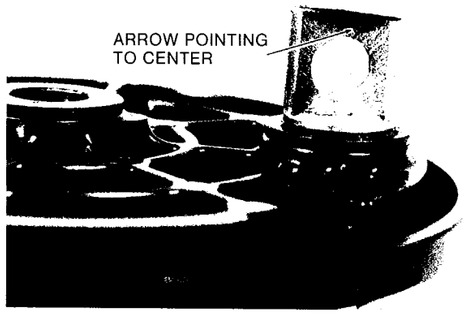
Brake Camshafts

Wipe off the old grease, and re-grease the brake pivot points. Apply grease to the brake shoe anchor pins, spring ends, and cam surface of the camshaft, and fill the camshaft groove with grease.



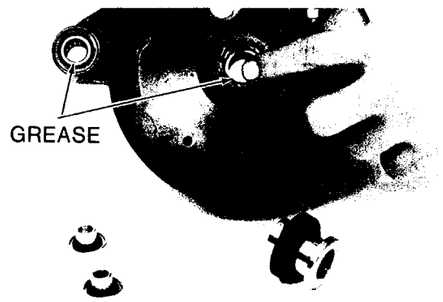
NOTE: Do not get any grease on the brake shoe linings. Wipe off any excess grease so that it will not get on the linings or drum after brake assembly.

CAUTION **The brake camshaft must be installed so that the triangular mark on the cam surface points to the center of the panel.**



Brake Panel

Apply grease to the rear brake panel bearing surfaces as shown.



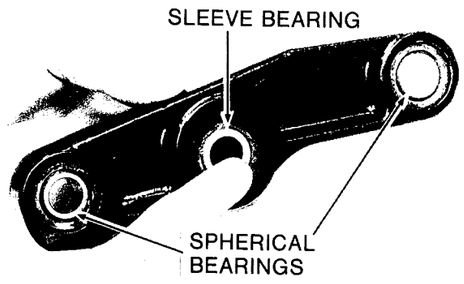
Swingarm

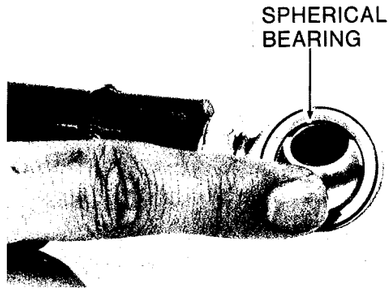
The swingarm rides on dry bushings of Rexnord material. These do not require lubrication.

Do not lubricate these bushings.

Uni-Trak Components

Apply molybdenum disulfide grease (rated quality MIL-G Z1164) to the sleeve bearing and spherical bearings.

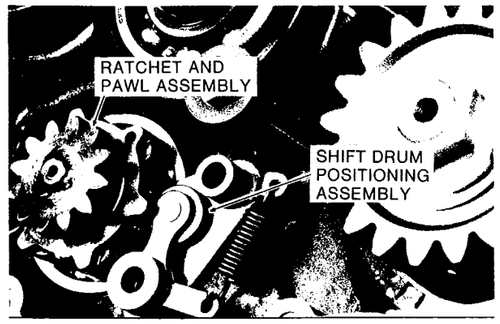


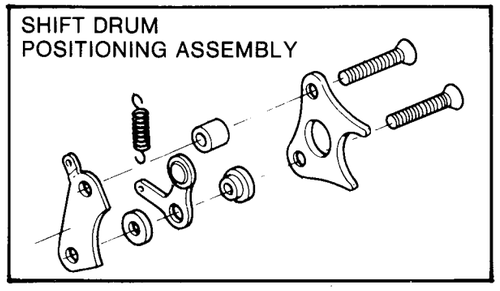


- Remove the shift drum ratchet and pawl assembly.

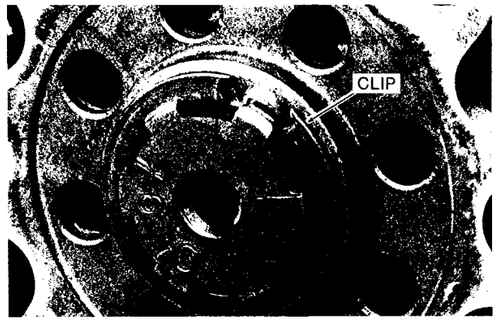
NOTE: The pawls are spring-loaded. Remove them carefully to avoid loss of components.

- Remove the shift drum positioning components (detent assembly).

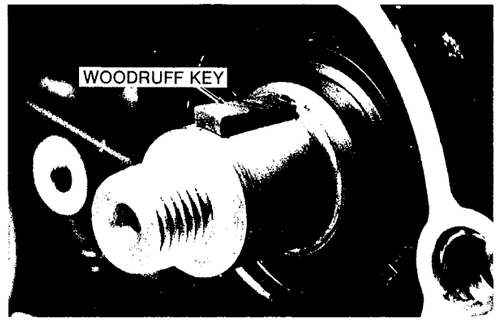




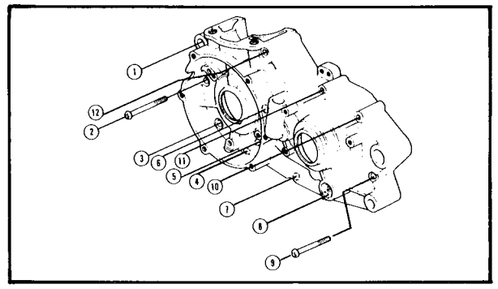
- Remove the clip that holds the engine sprocket.



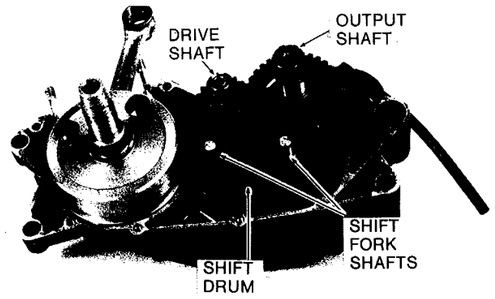
- Remove the primary gear and woodruff key from the end of the crankshaft.



- Remove the screws holding the crankcase halves together.



- When the crankcase screws are removed, install a crankcase separater (special tool) or carefully tap the case halves apart using a soft mallet. Tap evenly to avoid damaging the case halves.
- Remove and examine the internal components.



ENGINE ASSEMBLY

- Before reassembly, thoroughly clean the crankcase and remove any foreign material. Inspect the components according to the specifications in the Maintenance chapter.

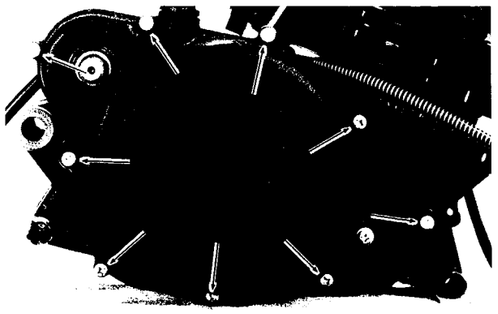
WARNING **Use only a "high flash-point" solvent for cleaning. This is a "safety" solvent (such as Stoddard solvent, a generic name) which is somewhat less flammable than many other cleaning solutions. Never use gasoline for cleaning. Gasoline is highly flammable, poisonous to the skin, and may present an explosion hazard.**

Main Bearing Replacement

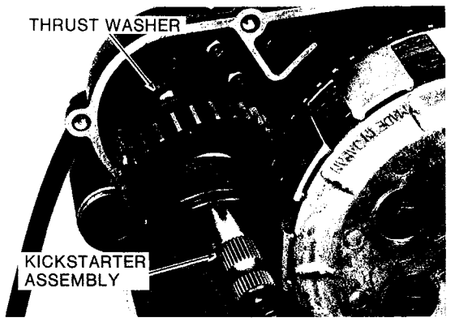
The preferred method of main bearing replacment is as follows:

1. Remove oil seals.
2. Heat the crankcase in an oven to 100°C (212°F).
3. Quickly install the main oil seal and main bearing. If the expansion of the crankcase from the heat is not enough to allow the bearing to seat completely, use a driver that matches the diameter of the bearing outer race.
   Install the shift drum needle bearings in a similar fashion.

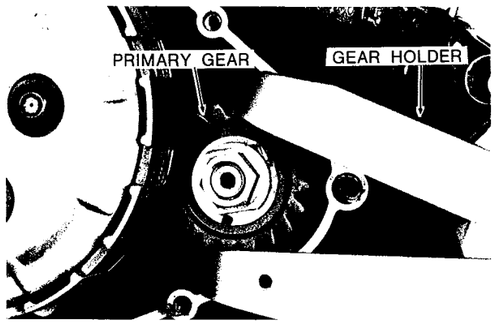
- Remove the woodruff key from the slot in the crankcase.
- It is not necessary to remove the cylinder to gain access to the primary drive. Remove the kickstarter pedal. Remove the screws holding the right engine cover.



- Remove the kickstarter assembly with thrust washer.

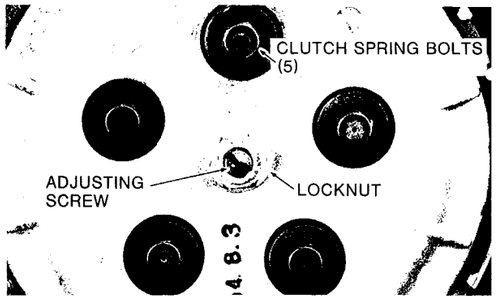


- Use the gear holder (special tool) to hold the primary drive gear. This will allow you to remove the clutch springs and pressure plate. If you need to remove the primary gear, bend down the lock tab and loosen the nut.

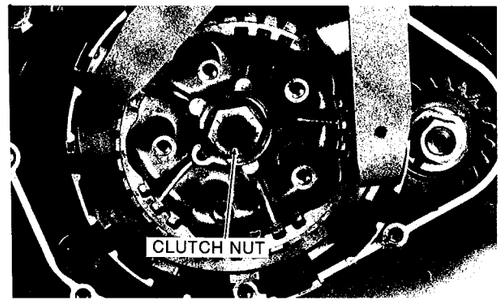


- With the primary driven gear secured, remove the clutch spring bolts, washers, and springs.

NOTE: The screw in the center is for clutch release lever adjustment. Whenever this nut and screw are loosened or removed, clean the threads and apply a non-permanent locking agent.

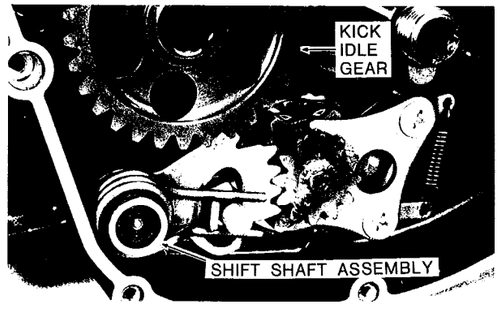


- Remove the clutch pressure plate, friction plates, steel plates, and clutch push rod. Use the gear holder (special tool) to hold the clutch housing and remove the clutch nut.



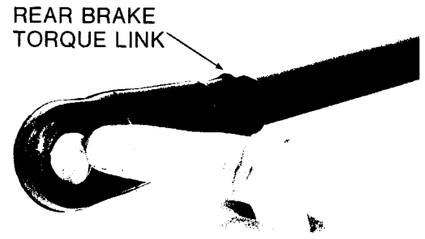
- Remove the clutch housing.
- Remove the thrust washers and sleeve if these components do not come off along with the clutch housing.

- Remove the kick idle gear. There is one thrust washer on each side of the gear.
- Pull the shift shaft assembly straight out to the right side of the crankcase.



Rear Brake Torque Link

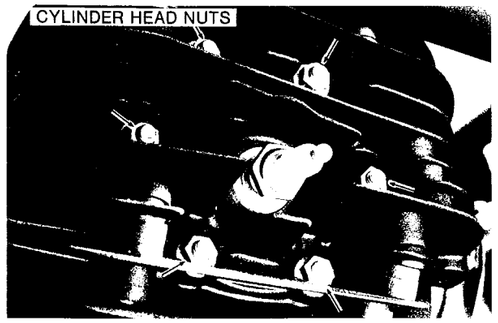
Apply grease to the forward end of the torque link as shown.



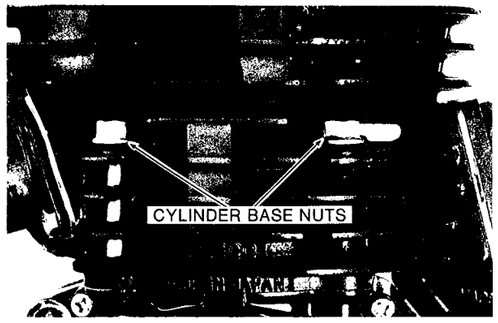
- Remove the brake pedal mounting bolt, and take off the brake pedal.
- Remove the engine mounting bolts, and remove the engine from the left side of the frame.

ENGINE DISASSEMBLY

- Loosen the spark plug.
- Remove the cylinder head nuts.



- Lift off the cylinder head and the gasket.
- Remove the cylinder base nuts.

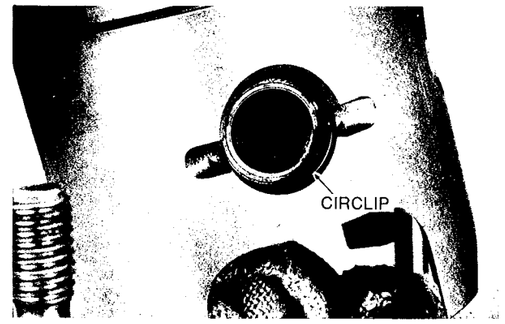


- Lift off the cylinder and cylinder base gasket. If necessary, lightly tap around the cylinder with a mallet, taking care not to damage the cooling fins.

CAUTION **Do not twist the cylinder as you slide if off the piston. Twisting may cause the piston rings to pop into the intake port. This will cause the piston to jam, making removal difficult. If the piston does jam, remove the reed valve and press the piston rings back into position.**

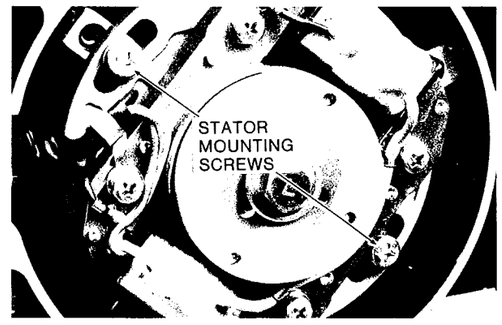
- Remove one of the piston pin circlips with needle nose pliers.

WARNING **To avoid possible eye inuury, wear eye protection whenever removing or replacing circlips.**

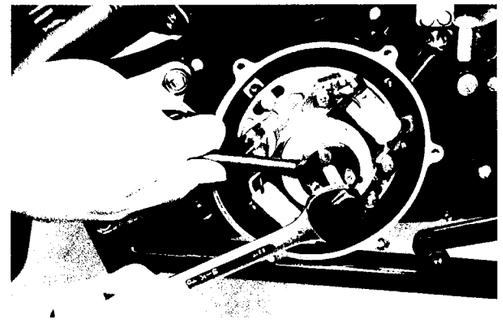


- Remove the small end bearing.

- Remove the LH engine cover screws and cover.
- To avoid damage during complete disassembly, removal of the stator assembly is recommended.



- Remove the magneto rotor using the rotor puller (special tool).



TORQUE VALUES

Torque Table

Tighten all bolts and nuts to the proper torque using an accurate torque wrench. A bolt or nut, if insufficiently tightened, may become damaged or fall out, possibly resulting in damage to the motorcycle and injury to the rider. A bolt or nut which is over-tightened may become damaged, stripped, or break and then fall off.

The following table lists the tightening torque for the major bolts and nuts:

Part Name	Metric (kg-m)	English (ft-lbs)
Brake Pedal Bolt	5.5	39
Clutch Hub Nut	4.5	33
Clutch Spring Bolts (6)	1.0	7.0
Cylinder Base Nuts (4)	3.5	25
Cylinder Head Nuts (6)	2.2	16
Engine Drain Plug	1.3	9.5
Engine Mounting Bolts (4)	4.0	29
Front Axle Nut	8.0	58
Front Fork Air Valve	1.2	8.5
Front Fork Allen Bolt	3.7	27
Front Fork Clamp Bolts (8)	1.6	11.5
Front Fork Top Cap	2.3	16.5
Front Panel Stopper Bolt	3.5	25
Footpeg Mounting Bolts (2)	2.5	18.0
Handlebar Clamp Bolts (4)	1.6	11.5
Magneto Rotor Bolt	2.2	16.0
Pivot Shaft Nut	9.0	65
Primary Gear Nut	4.8	35
Rear Axle Nut	9.0	65
Rear Sprocket Bolts (6)	1.9	13.5
Spark Plug	2.8	20
Spokes	0.3	26 (in-lbs)
Steering Stem Clamp Bolt	1.6	11.5
Steering Stem Head Bolt	6.0	43
Torque Link Lock Nut	4.0	29
Torque Link Mount Nut	1.6	11.5
Uni-Trak Bolts:		
Link bolt, upper	10.0	72
Link bolt, lower	6.0	43
Center bolt	10.0	72

Torque Table for Standard Fasteners

The following table describes tightening torque for standard fasteners of the thread pitch and diameter shown. For special fasteners, see the table above.

COARSE THREADS			
dia (mm)	pitch (mm)	kg-m	ft-lbs
5	0.80	0.35 - 0.50	2.5 - 3.5
6	1.00	0.6 - 0.9	4.5 - 6.5
8	1.25	1.6 - 2.2	11.5 - 16.0
10	1.50	3.1 - 4.2	22 - 30
12	1.75	5.4 - 7.5	39 - 54
14	2.00	8.3 - 11.5	60 - 83
16	2.00	13 - 18	94 - 130
18	2.50	18 - 25	130 - 181
20	2.50	26 - 35	188 - 253

FINE THREADS			
dia (mm)	pitch (mm)	kg-m	ft-lbs
5	0.50	0.35 - 0.50	2.5 - 3.5
6	0.75	0.6 - 0.8	4.5 - 5.5
8	1.00	1.4 - 1.9	10.0 - 13.5
10	1.25	2.6 - 3.5	19.0 - 25
12	1.50	4.5 - 6.2	33 - 45
14	1.50	7.4 - 10.2	54 - 74
16	1.50	11.5 - 16	83 - 116
18	1.50	17 - 23	123 - 166
20	1.50	23 - 33	166 - 239

SPECIAL TOOLS

57001-115	Pliers - Piston Ring
57001-143	Pliers, Circlip, Inside
57001-144	Pliers, Circlip, Outside
57001-151	Adapter, Crankcase 8 mm
57001-153	Puller, Crankcase
57001-156	Adapter, Crankcase 6 mm
57001-157	Adapter, Crankcase 5 mm
57001-183	Handle, Fork Cyl Holder
57001-202	Gauge, Fuel Level
57001-264	Guide, Shift Oil Seal
57001-265	Guide, Kick Oil Seal
57001-1011	Adapter, Fork Cyl. Holder
57001-1087	Compressor Assy, Spring
57001-1093	Puller, Rotor
57001-1100	Wrench, Stem Nut
57001-1101	Wrench, Hook Assy
57001-1104	Driver, Oil Seal
57001-914	Adapter C, Pin Puller
57001-983	Tool - Multimeter
T57001-165	Grabbit Clutch/Sprocket Holder
57001-910	Tool - Piston Pin Puller

ENGINE REMOVAL

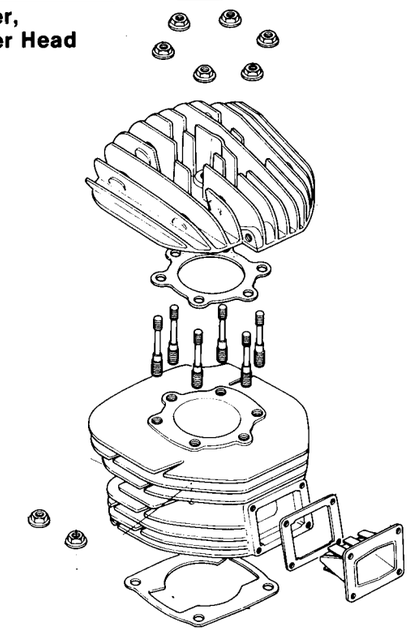
- Drain the transmission oil.
- Remove the seat.
- Close the fuel valve, and pull off the fuel hose. Be careful not to allow gasoline to splash into your eyes during removal.
- Remove the fuel tank.
- Remove the left side cover.
- Remove the silencer mounting bolt, and loosen the clamp screws. Then pull off the silencer from the end of the expansion chamber.
- Remove the springs and expansion chamber mounting bolt at the front of the engine.
- Remove the clutch cable.
- Take off the expansion chamber.
- Remove the gearshift pedal bolt and gearshift pedal.
- Remove the engine sprocket cover screws and take off the cover.
- Remove the master link and the drive chain.
- Disconnect the magneto output lead connectors, and remove the lead from the frame.
- Pull off the spark plug cap.
- Loosen the carburetor mounting clamp screws, and take off the carburetor. Loosen the rear brake adjusting nut, and take the spring off the brake rod.

DISASSEMBLY AND ASSEMBLY

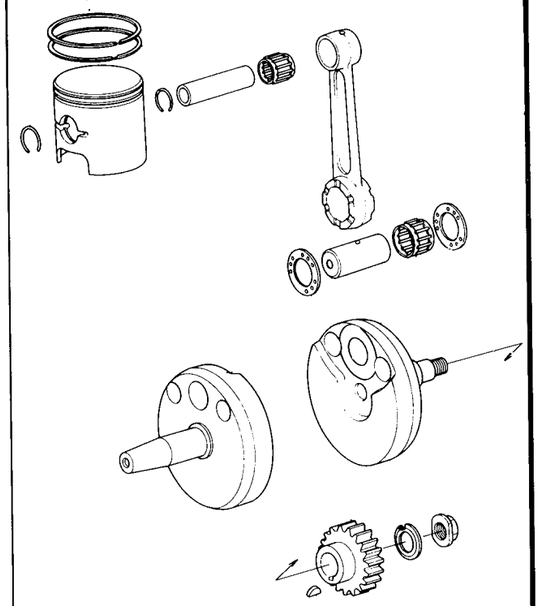
COMPONENT ILLUSTRATIONS

The following illustrations are provided for guidance in disassembly and assembly.

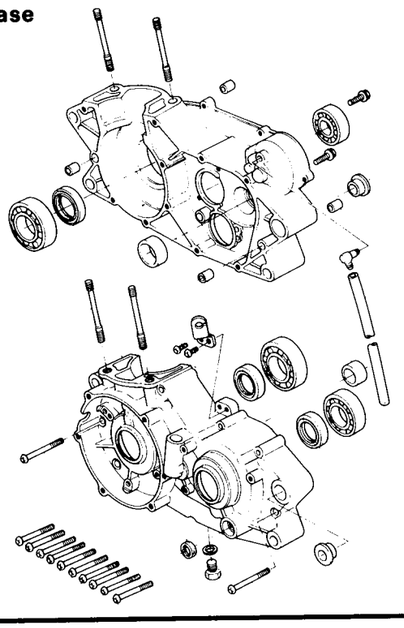
Cylinder, Cylinder Head



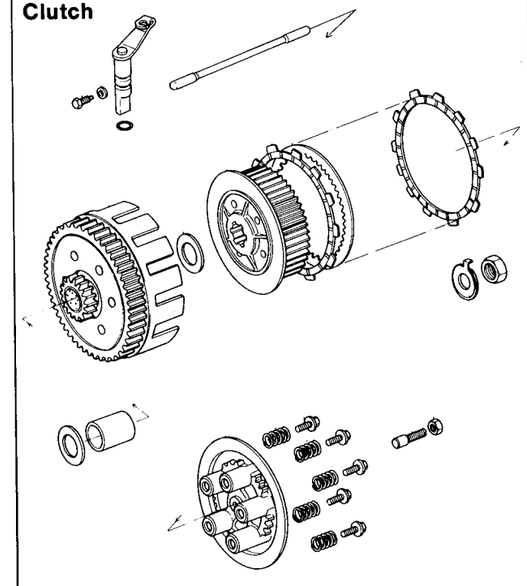
Piston, Crankshaft



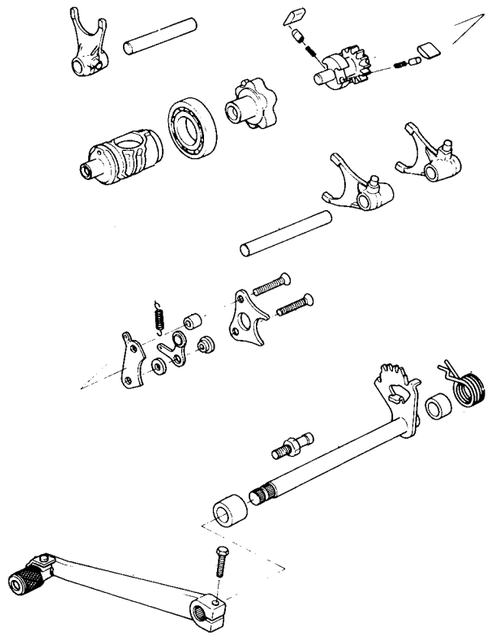
Crankcase



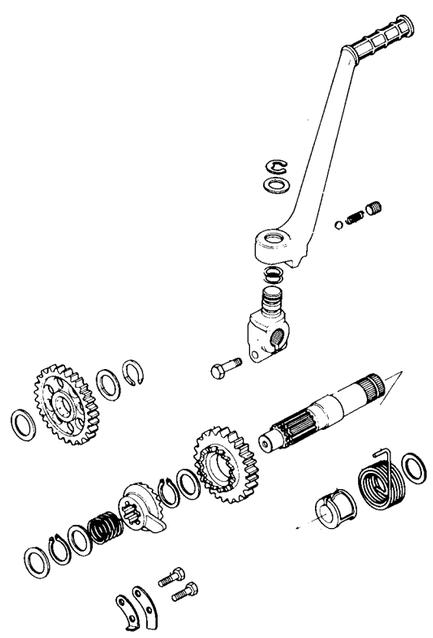
Clutch



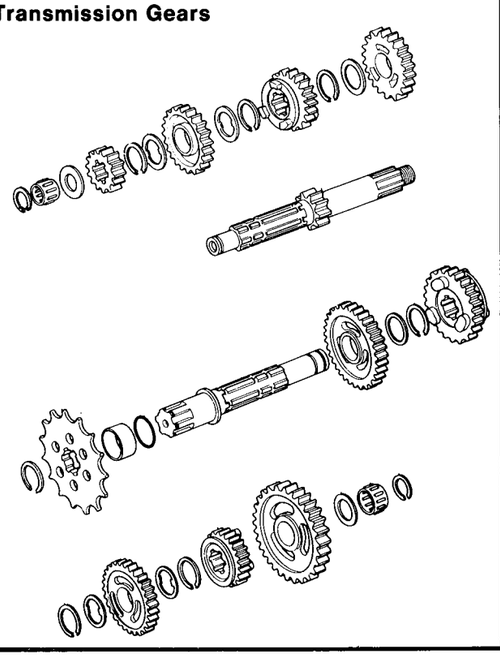
Gear Change Mechanism



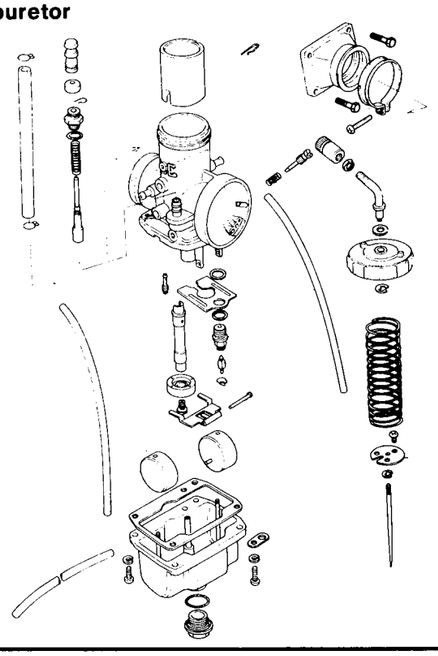
Kickstarter Mechanism



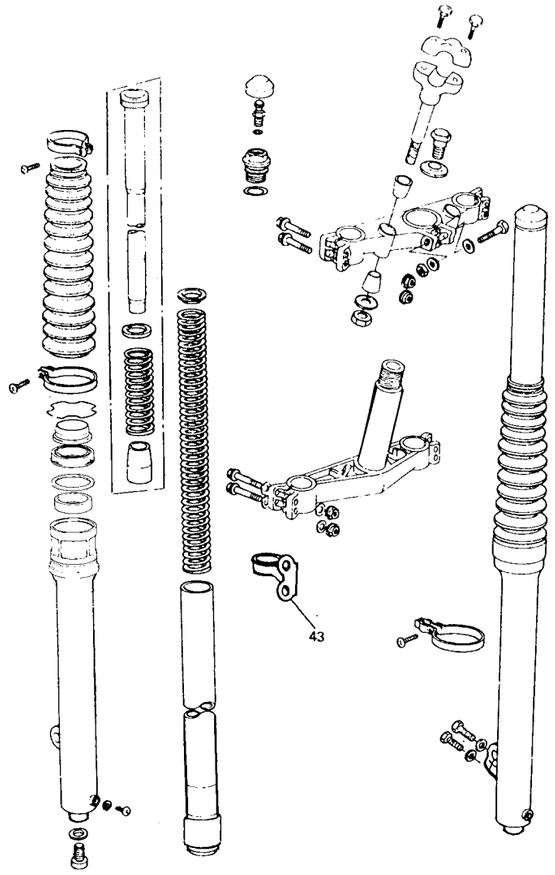
Transmission Gears



Carburetor



Front Fork



Rear Suspension